

norelem positions.

norelem assembles.

norelem moves.

norelem measures.

norelem clamps.

norelem trans-ports.

norelem techno shop.

THE **BIG GREEN** BOOK

BOOK 1



YOU WILL FIND ALL ITEMS IN THESE PRODUCT GROUPS IN BOOK 1. THE **BIG GREEN** BOOK.

norelem positions.

Our flexible standard component system.

norelem assembles.

Aluminium profiles, connectors, covers and special elements.

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BOOK 2



Systems and components for power transmission in machine and plant construction.



Devices, fixtures and standard elements for measuring and testing.



Vices and accessories with maximum clamping force for machining workpieces.



Products for material handling and transport: wheels, castors and ball transfer units.



All other accessories: from adhesives to cylinder cleaners.

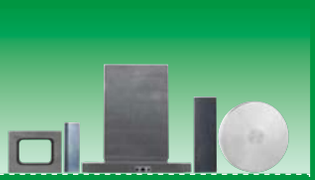
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My customer number

Enter your customer number here.
You receive this with your first order.

norelem positions.







01000

Basic elements
Subplates
Discs
Profiles
Tombstones
Angle Plates

02000

Self-aligning pads
Fixture feet
Clamp rests
Support elements

03000

Spring plungers
Indexing plungers
Stops
Centring and locating components
Ballock pins
T-slot nuts







04000

Stepped clamps
Cam clamps
Swing clamps
Clamping hooks
Clamping cams
Clamping jaws / Edge clamps
Tension nuts and screws

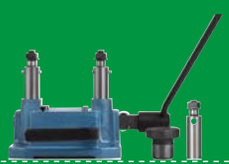
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Toggle clamps
Pneumatic clamps
Accessories of clamps
Latches
Quarter-turn locks

06000

Handles and knobs
Handwheels, crank handles and screw-in handles
Clamping and tension levers
Clamping joints
Pull handles, tubular handles and recessed handles







07000

Connecting elements
Ball-end thrust screws and baseplates
Ring bolts
Thrust screws and pressure pads
Torque bolts and threaded inserts
Hoist rings / swivel bales

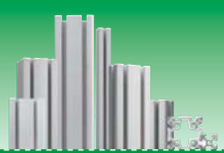
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Drilling jigs
Drill bushes

09000

Magnets

norelem assembles.



10000

Aluminium profiles
Connectors
Covers
Special elements

BOOK 1

YOU WILL FIND THE CONTENTS OF THESE PRODUCT GROUPS IN **BOOK 1**

FIND WHAT YOU NEED FASTER:
OUR PRODUCT GROUPS

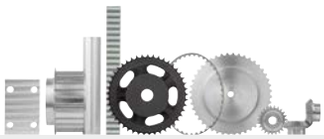
norelem moves.



20000
- Linear modules
- Lifting units
- Rotary modules
- Grip modules
- Inductive proximity switches
- Plug connectors



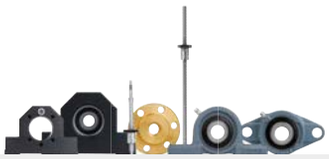
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- Guide rails
- Positioning tables
- Linear guide systems
- Position indicators



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- Toothed belt pulleys
- splined shafts
- Timing belts
- Gears
- Gear racks
- Bevel gears
- Worm screws and worm wheels
- Transmissions



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- Cardan joints
- Quick-fit couplings
- Bearings
- Seals



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- Ball screw linear actuators
- Pillow block bearings



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- Elastomer springs
- Rubber buffers
- Shock absorbers
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- Rod ends
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norelem measures.



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- Universal measuring fixtures



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- Ball transfer units
- Small conveyor belts

norelem techno shop.



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- Protective nets
- Supercraft mallet inserts
- Taper and cylinder cleaners
- Coolant hoses



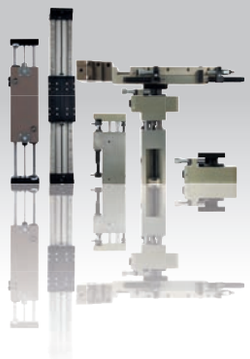
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2 BOOK

norelem moves

Systems and components for machine and plant construction

Linear modules
Lifting units
Rotary modules
Grip modules
Inductive proximity switches
Plug connectors



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Linear modules pneumatic
with two round guides

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Linear modules pneumatic
with three round guides

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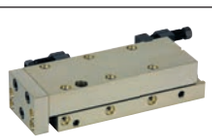
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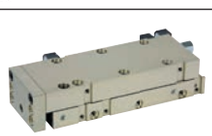
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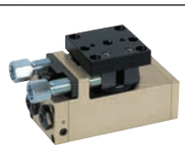
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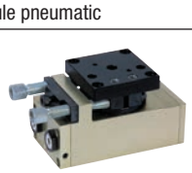
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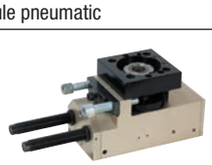
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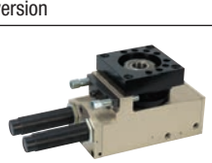
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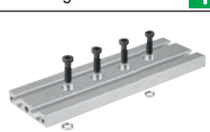
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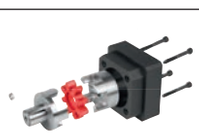
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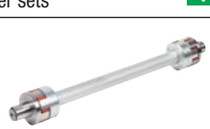
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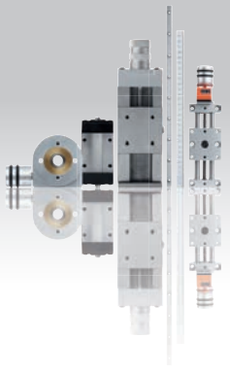
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norelem moves

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Guide rails
Positioning stages
Linear guide systems
Position indicators



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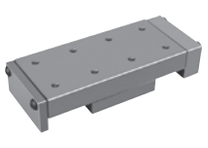
Straps

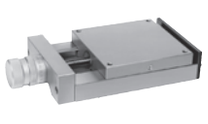
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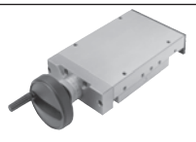
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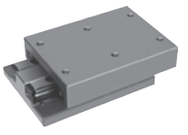
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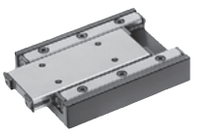
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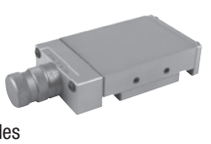
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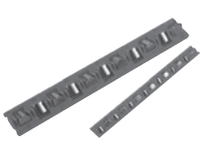
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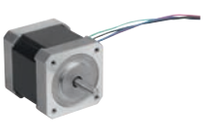
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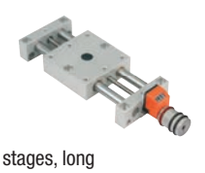
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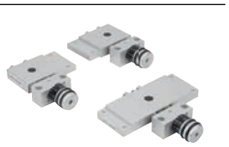
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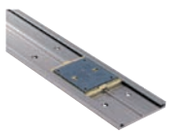
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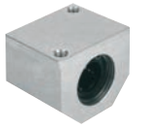
Linear ball bearings
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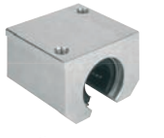
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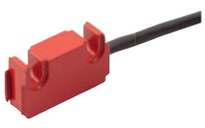
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quasi-absolute, mains-independent,
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Position indicator
quasi-absolute, mains-independent,
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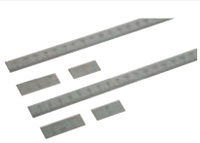
Bullseye level body
plastic

21812
Page 226



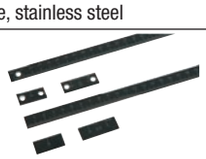
Tubular bubble levels
with frame to screw on

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Linear scales
self-adhesive, stainless steel

21882
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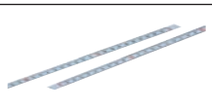
Linear scales
self adhesive or with screw holes,
aluminium

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Linear scales
self-adhesive or with screw holes,
aluminium

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Scale tape, steel
self-adhesive

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Position indicators

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Position indicators

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Position indicators

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Position indicators
freely programmable

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Position indicators
freely programmable

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Reducing bushings

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Intermediate plates

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Mounting brackets

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Adjusting knobs with position
indicator
digital display

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Position indicators for handwheels
analogue-digital display

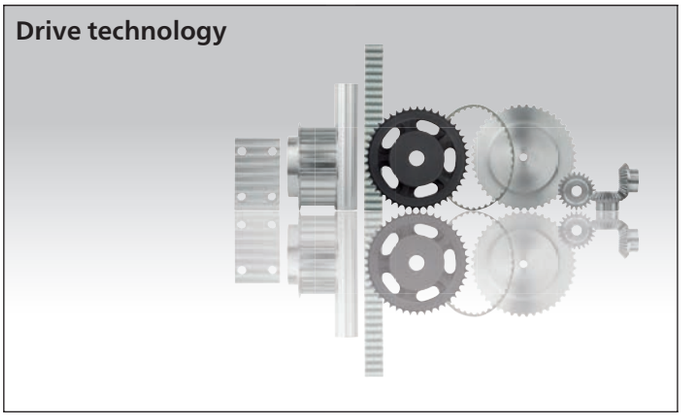
21972
Page 241



Handwheels for position indicators

New/Expanded Items

Drive technology



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Page 248

Toothed belt pulleys
T profile

22003
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Toothed belt pulleys
AT profile

22004
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Toothed pulleys
profile HTD 5M

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Page 255

Toothed pulleys
profile HTD 8M

22005
Page 256

Toothed pulleys
profile HTD 5M, for assembly with
taper clamping bushes

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Toothed pulleys
profile HTD 8M, for assembly with
taper clamping bushes

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Splined shafts
T profile

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Splined shafts
AT profile

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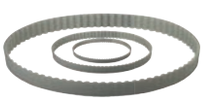
Clamp plates for toothed belts
profile T and AT

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Toothed belts
T profile

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Toothed belts by the meter
T profile

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Toothed belts
AT profile

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Toothed belts by the meter
AT profile

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Toothed belt
profile HTD 5M

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Toothed belt
profile HTD 8M

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Belt tension meter

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Line laser

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Tension pulleys

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Page 280

Roller chains single
DIN ISO 606, curved link plate

22200
Page 280

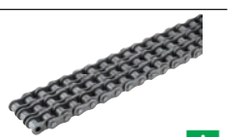
Links
DIN ISO 606

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Roller chains duplex
DIN ISO 606, curved link plate

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Connecting links duplex
DIN ISO 606

22202
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Roller chains triplex
DIN ISO 606, curved link plate

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Connecting links triplex
DIN ISO 606

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Roller chains single
DIN ISO 606, straight link plate

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Links
DIN ISO 606

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Roller chains single stainless steel
DIN ISO 606, curved link plate

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Links stainless steel
DIN ISO 606

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Roller chain duplex, stainless steel
DIN ISO 606, curved link plate

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Connecting links duplex,
stainless steel
DIN ISO 606

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Sprockets single 3/8“ x 7/32“
DIN ISO 606, ready to install

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Sprockets single 1/2“ x 5/16“
DIN ISO 606, ready to install

New/Expanded Items

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Sprockets single 5/8“ x 3/8“
DIN ISO 606, ready to install

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Sprockets single 3/4“ x 7/16“
DIN ISO 606, ready to install

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Sprockets single 1“ x 17.02 mm
DIN ISO 606, ready to install

22252
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Sprockets single 3/8“ x 7/32“
DIN ISO 606

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Sprockets single 1/2“ x 5/16“
DIN ISO 606

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Sprockets single 5/8“ x 3/8“
DIN ISO 606

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Sprockets single 3/4” x 7/16”
DIN ISO 606

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Sprockets single 1“ x 17.02 mm
DIN ISO 606

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Sprockets duplex 8.0 mm x 3.0 mm
DIN ISO 606

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Sprockets duplex 3/8“ x 7/32“
DIN ISO 606

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Sprockets duplex 1/2“ x 5/16“
DIN ISO 606

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Sprockets duplex 5/8“ x 3/8“
DIN ISO 606

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Sprockets duplex 3/4“ x 7/16“
DIN ISO 606

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Sprockets duplex 1“ x 17,02 mm
DIN ISO 606

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Sprockets duplex 1 1/4“ x 3/4“
DIN ISO 606

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Sprockets duplex 1 1/2“ x 1“
DIN ISO 606

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Sprockets triplex 3/8“ x 7/32“
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Sprockets triplex 1/2“ x 5/16“
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Sprockets triplex 5/8“ x 3/8“
DIN ISO 606

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Sprockets triplex 3/4“ x 7/16“
DIN ISO 606

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Sprockets triplex 1“ x 17,02 mm
DIN ISO 606

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Sprockets single 3/8“ x 7/32“
stainless steel
DIN ISO 606

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Sprockets single 1/2“ x 5/16“
stainless steel
DIN ISO 606

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Sprockets single 5/8“ x 3/8“ stainless
steel
DIN ISO 606

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Page 322

Sprockets single 3/4“ x 7/16“
stainless steel
DIN ISO 606

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Sprockets single 1“ x 17.02 mm
stainless steel
DIN ISO 606

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Sprockets single 3/8“ x 7/32“
DIN ISO 606

22264
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Sprockets single 1/2“ x
5/16“
DIN ISO 606

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Sprockets single 5/8“ x 3/8“
DIN ISO 606

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Sprockets single 3/4“ x
7/16“
DIN ISO 606

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Sprockets single 1“ x 17.02
mm
DIN ISO 606

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Sprockets duplex 8.0 mm x 3.0 mm
DIN ISO 606

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Sprockets duplex 3/8“ x 7/32“
DIN ISO 606

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Sprockets duplex 1/2“ x 5/16“
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Sprockets, duplex 5/8“ x 3/8“
DIN ISO 606

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Sprockets duplex 3/4“ x 7/16“
DIN ISO 606

New/Expanded Items

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Page 344

Sprockets duplex 1“ x 17,02 mm
DIN ISO 606

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Sprockets duplex 1 1/4“ x 3/4“
DIN ISO 606

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Sprockets duplex 1 1/2“ x 1“
DIN ISO 606

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Sprockets triplex 3/8“ x 7/32“
DIN ISO 606

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Sprockets triplex 1/2“ x 5/16“
DIN ISO 606

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Sprockets triplex 5/8“ x 3/8“
DIN ISO 606

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Sprockets triplex 3/4“ x 7/16“
DIN ISO 606

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Sprockets triplex 1“ x 17,02 mm
DIN ISO 606

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Idler sprockets with ball bearing

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Page 359

Mounting screws for idler sprockets

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Page 360

Sprocket sets

22281-01
Page 361

Chain tensioner sets

22281-10
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Clamping elements

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Clamping elements stainless steel

22281-16
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Clamping elements with front fastening

22281-20
Page 365

Angle bracket for clamping elements

22400
Page 366

Spur gears in steel, module 1 toothing milled, straight teeth, engagement angle 20°

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Page 368

Spur gears in steel, module 1.5 toothing milled, straight teeth, engagement angle 20°

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Spur gears in steel, module 2 toothing milled, straight teeth, engagement angle 20°

22400
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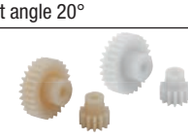
Spur gears in steel, module 2.5 toothing milled, straight teeth, engagement angle 20°

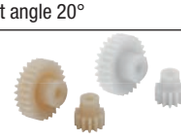
22400
Page 374

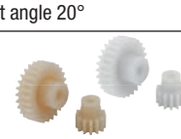
Spur gears in steel, module 3 toothing milled, straight teeth, engagement angle 20°

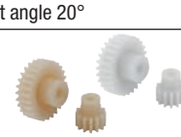
22402
Page 377

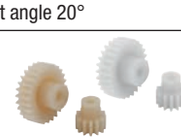
Spur gears, plastic, module 0.5 injection moulded, straight teeth, engagement angle 20°

22402
Page 379

Spur gears, plastic, module 0.7 injection moulded, straight teeth, engagement angle 20°

22402
Page 381

Spur gears, plastic, module 1 injection moulded, straight teeth, engagement angle 20°

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Spur gears, plastic, module 1.25 injection moulded, straight teeth, engagement angle 20°

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Spur gears, plastic, module 1.5 injection moulded, straight teeth, engagement angle 20°

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Spur gears, plastic, module 2 injection moulded, straight teeth, engagement angle 20°

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Spur gears, plastic, module 2.5 injection moulded, straight teeth, engagement angle 20°

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Page 391

Spur gears, plastic, module 3 injection moulded, straight teeth, engagement angle 20°

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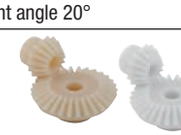
Gear racks, plastic injection moulded, straight teeth, engagement angle 20°

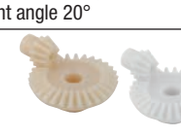
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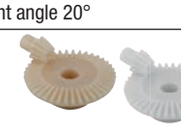
Bevel gears, plastic, ratio 1:1 injection-moulded, straight teeth, engagement angle 20°

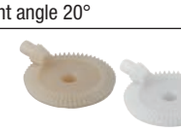
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Bevel gears, plastic, ratio 1:1.5 injection moulded, straight teeth, engagement angle 20°

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Bevel gears, plastic, ratio 1:2 injection moulded, straight teeth, engagement angle 20°

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Bevel gears, plastic, ratio 1:3 injection moulded, straight teeth, engagement angle 20°

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Bevel gears, plastic, ratio 1:4 injection-moulded, straight teeth, engagement angle 20°

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Bevel gears, plastic, ratio 1:5 injection moulded, straight teeth, engagement angle 20°

New/Expanded Items

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Bevel gears, zinc, ratio 1:1
cast, straight teeth, engagement angle 20°

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Page 400



Bevel gear drive with plastic bevel gears

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Page 401



Gear racks in steel
toothing milled, straight teeth, engagement angle 20°

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Page 402



Gear racks in steel
toothing milled, straight teeth, engagement angle 20°

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Bevel gears in steel, ratio 1:1
toothing milled, straight teeth, engagement angle 20°

22430
Page 404



Bevel gears in steel, ratio 1:2
toothing milled, straight teeth, engagement angle 20°

22430
Page 405



Bevel gears in steel, ratio 1:3
toothing milled, straight teeth, engagement angle 20°

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Bevel gears in steel, ratio 1:4
toothing milled, straight teeth, engagement angle 20°

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Page 411



Worm gears, right-hand
centre distance 17 mm

22500
Page 413



Worm gears, right-hand
centre distance 22.62 mm

22500
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Worm gears, right-hand
centre distance 25 mm

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Worm gears, right-hand
centre distance 31 mm

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Worm gears, right-hand
centre distance 33 mm

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Worm gears, right-hand
centre distance 35 mm

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Worm gears, right-hand
centre distance 40 mm

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Worm gears, right-hand
centre distance 50 mm

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Worm gears, right-hand
centre distance 53 mm

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Worm gears, right-hand
centre distance 63 mm

22500
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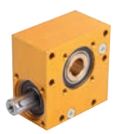
Worm gears, right-hand
centre distance 65 mm

22500
Page 433



Worm gears, right-hand
centre distance 80 mm

22700
Page 435



Worm drives

22710
Page 436



Bevel gears
plastic housing

22712
Page 437



Bevel gears

22714
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Bevel gears

New/Expanded Items

Couplings
Rigid couplings
Keyless locking couplings
Cardan joints
Quick-fit couplings
Bearings
Seals



23000
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Metal bellows couplings
with radial clamping hub

23002
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Metal bellows couplings
clamping with grub screw

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Beam couplings
with radial clamping hub, aluminium

23010
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Beam couplings
with radial clamping hub, stainless steel

23012
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Beam couplings
with removable clamping hub, aluminium

23012
Page 446



Beam couplings
with removable clamping hub, stainless steel

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Elastomer dog couplings
with conical hub and clamping ring
(similar to DIN 69002)

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Elastomer dog couplings
with radial clamping hub

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Elastomer dog couplings
clamping with grub screw

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Oldham-type couplings
with radial clamping hub

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Oldham-type couplings
clamping with grub screw

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Rigid couplings
one-piece

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Rigid couplings
two-piece

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Taper clamping bushes

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Page 460-461



Keyless locking couplings Form A
for thin walled hubs

23350-01
Page 462



Keyless locking couplings Form A
stainless steel

23351
Page 464-465



Keyless locking couplings Form B

23352
Page 466-467



Keyless locking couplings Form C
with axial ring

23354
Page 468-469



Keyless locking couplings Form D
compact design

23354-01
Page 470



Keyless locking couplings, Form D
stainless steel

23356
Page 473



Keyless locking couplings Form E
short version

23358
Page 475



Keyless locking couplings Form F
short version with axial ring

23360
Page 477



Keyless locking couplings Form G
increased tolerance range

23360-01
Page 478



Keyless locking couplings Form G
stainless steel

23362
Page 481



Keyless locking couplings Form H
for high torques

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Page 483



Keyless locking couplings with central nut

23370
Page 484



Shaft-hub clamping sets
stainless steel

23380
Page 487



Shrink discs Form A

23380-01
Page 489



Shrink discs stainless steel Form A

23382
Page 491



Shrink discs Form B

23403
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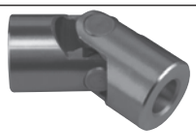
Universal joints single
with plain bearing, DIN 808

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Universal joints double
with plain bearing, DIN 808

New/Expanded Items

23406
Page 497

Universal joints single
with needle bearing, DIN 808

23407
Page 498

Universal joints double
with needle bearing, DIN 808

23409
Page 499

Universal joints single
with plain bearing, robust version
DIN 808

23410
Page 500

Universal joints double
with plain bearing, robust version
DIN 808

23412
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Cardan shafts telescopic

23414
Page 502

Protective rubber sleeves
for universal and cardan joints (single)

23415
Page 502

Protective rubber sleeves
for universal and cardan joints
(double)

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Quick-fit couplings
with radial offset compensation

23452
Page 507

Quick-fit couplings
with radial offset compensation and
mounting flange

23454
Page 508

Quick-fit couplings
with angular and radial offset
compensation

23500
Page 509

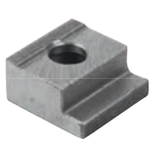
igubal® pillow block bearings

23680
Page 510

Guide bushes
bronze, maintenance-free

23681
Page 511

Guide bushes
DIN 9834 / ISO 9448, bronze,
maintenance-free with collar

23682
Page 512

Retaining clips
DIN 9832

23710
Page 515

Plain bearings
plastic

23715
Page 516

Thrust washers plastic

23730
Page 518

Plain bearings
cylindrical

23731
Page 520

Plain bearings
with collar

23732
Page 521

Thrust washers

23760
Page 522

Plain bearing sintered bronze
cylindrical

23761
Page 524

Plain bearing sintered bronze
with collar

23800
Page 526

Deep groove ball bearing FAG
single row

23800-01
Page 529

Deep groove ball bearings
stainless steel, DIN 626

23800-03
Page 530

Ceramic ball bearings ZrO2

23800-04
Page 531

Ceramic ball bearings Si3N4

23805
Page 532

Angular contact ball bearing FAG
single-row

23815
Page 533

Spherical roller bearing FAG
cylindrical bore

23820
Page 534

Cylinder roller bearing FAG
with cage

23825
Page 535

Tapered roller bearing FAG
single row

23830
Page 536

Axial ball bearing FAG
single direction

23900
Page 537

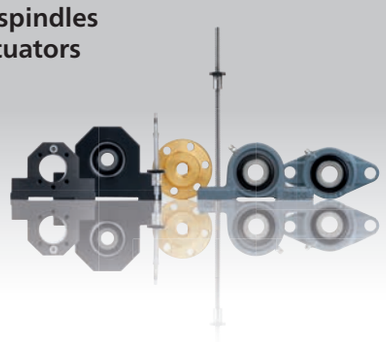
O-rings

23915
Page 545

Rotary shaft lip seals
DIN 3760

New/Expanded Items

Trapezoidal thread spindles
Ball screw linear actuators
Bearings units
Splined shafts



24000
Page 550

Trapezoidal thread spindles
single-start, RH or LH thread

24001
Page 551

Trapezoidal thread spindles
double-start, right-hand thread

24003
Page 553

Trapezoidal thread nuts, round
single-start, RH or LH thread

24004
Page 554

Trapezoidal thread nuts, round
double-start, RH thread

24005
Page 555

Trapezoidal thread flange nuts
single-start, RH or LH thread

24006
Page 556

Trapezoidal thread nuts with flange
double-start, RH thread

24007
Page 557

Trapezoidal thread nuts, hexagon
single-start, RH or LH thread

24010
Page 558

Splined shafts
similar to DIN ISO 14

24011
Page 559

Splined hubs round
similar to DIN ISO 14

24011-01
Page 560

Splined hubs with flange
similar to DIN ISO 14

24055
Page 563

Ball screw linear actuators
rolled, with flange nut DIN 69051
Part 5

24060
Page 564

Ball screw linear actuators
rolled, with screw-in cylinder nut

24070
Page 565

Housings
for flange nuts

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Fixed bearing units

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Floating bearing units

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Fixed bearing units
block version

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Floating bearing units
block version

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Fixed bearing units
flange version

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Floating bearing units
flange version

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Page 574-575

Miniature ball screw linear actuators
ground, with flange nut

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Miniature ball screw linear actuators
ground, with screw-in cylinder nut

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Pillow block bearing pedestal type
UCP

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Pillow block bearing flange type UCF

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Pillow block bearing flange type UCFC
with centring hub

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Pillow block bearing flange type UCFL
2-hole

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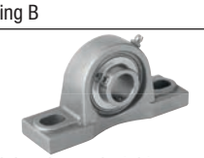
Pillow block bearing pedestal type
BPP

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Insert bearing UC

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Insert bearing B

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Pillow block bearing pedestal type
MUCP
stainless steel

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Pillow block bearing pedestal type

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Pillow block bearing pedestal type

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Pillow block bearing flange type MUCF
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Pillow block bearing flange type

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Pillow block bearing flange type MUCF
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Pillow block bearing flange type
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Insert bearing MUC
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Pillow block bearing pedestal type

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Pillow block bearing flange type

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Pillow block bearing flange type
2-hole

Compression springs
Elastomer springs
Rubber buffers
Shock absorbers
Gas springs



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Compression springs
ISO 10243, light load

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Compression springs
ISO 10243, moderate load

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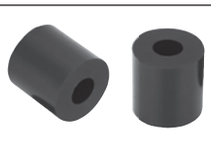
Compression springs
ISO 10243, heavy load

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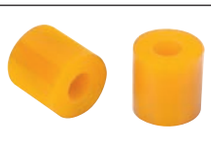
Compression springs
ISO 10243, very heavy load

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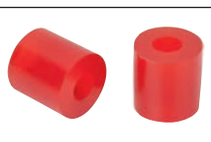
Elastomer buffers
Shore 70A

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Elastomer buffers
Shore 80A

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Elastomer buffers
Shore 90A

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Rubber buffers
steel or stainless steel, type A

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Rubber buffers
type AT tapered

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Rubber buffers
steel or stainless steel, type B

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Rubber buffers
stainless steel, type B

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Rubber buffers
type E

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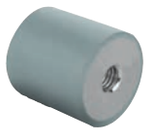
Rubber buffers
stainless steel, type E

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Rubber buffers
steel or stainless steel, type C

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Rubber buffers
stainless steel, type C

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Rubber buffers
type CT tapered

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Rubber buffers
steel or stainless steel, type D

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Rubber buffers
stainless steel, type D

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Rubber buffers
type DS suction foot

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Rubber impact buffers
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Rubber buffers
parabolic

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Rubber buffers
conical

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Rubber buffers
spherical

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Rubber-metal impact buffer rails

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O-shaped mounts

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Profile dampers
axial damping

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Profile damper
axial damping, soft version

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Profile damper
radial damping

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Profile damper
radial damping, hard version

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Gas springs

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Gas springs
stainless steel

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Industrial shock absorbers
adjustable

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Industrial shock absorbers
adjustable, stainless steel

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Mounting flange

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Mounting brackets
stainless steel

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Stop nuts
stainless steel

New/Expanded Items

Clevis joints
Rod ends
Ball joints
Axial joints
Levelling sets
Swivel feet
Levelling feet
Tube-end plugs
Equipment feet
Hinges



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Clevis joints for rod ends

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Clevis joints for rod ends
stainless steel

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Hinge plates

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Rod-end eyes

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Clevis joints with snap-in pin
DIN 71752

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Snap-in pins
for DIN 71752 clevis joints

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Pin with circlip groove
suitable for clevis joints

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Pin with circlip groove
suitable for clevis joints

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Pin with hole for split pin
suitable for clevis joints

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Clevis joints stainless steel
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Clevis joints
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Clevis, steel or stainless steel
with male thread

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Clevis tang, steel

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Rod ends with ball bearing
external thread

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Rod ends with ball bearing
internal thread

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Rod ends with plain bearing
external thread

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Rod ends igubal® with plain bearing
external thread

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Rod ends with plain bearing
internal thread

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Rod ends igubal® with plain bearing
internal thread

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Rod ends with plain bearing
external thread, stainless steel

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Rod ends with plain bearing
internal thread, stainless steel

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Rod ends with plain bearing
external thread, narrow version

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Rod ends with plain bearing
internal thread, narrow version

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Spherical bearings K/E series
DIN ISO 12240-1

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Ball joints
DIN 71802

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Ball seats for ball joints
DIN 71805

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Ball studs DIN 71803
for DIN 71802 angle joints

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Angle brackets

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Side brackets

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Round brackets

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Circlips for ball seats
DIN 71805

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Axial joints
similar to DIN 71802

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Axial joints for tractive forces
adjustable

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Levelling sets
high version

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Levelling sets
with locknut

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Levelling sets
low version

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Levelling sets
low version with locknut

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Levelling sets
spherical washer

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Levelling sets
spherical washer with locknut

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Levelling sets
spherical washer

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Levelling sets
spherical washer with locknut

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Cup elements
type H2

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Machine feet

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Swivel feet plates antistatic

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Swivel feet plates
plastic

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Swivel feet plates
die-cast zinc or stainless steel

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Swivel feet plates extended
die-cast zinc

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Swivel feet plates
stainless steel

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Swivel feet plates
with vibration absorption

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Swivel feet
with vibration absorption

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Machine feet
with vibration absorption

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Swivel feet threaded spindles
steel or stainless steel

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Swivel feet ball joints
with internal thread

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Levelling feet plates
plastic

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Levelling feet plates
plastic, heavy-duty version

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Levelling feet plates
die-cast zinc or stainless steel

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Levelling feet plates extended
die-cast zinc

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Levelling feet threaded spindles
steel or stainless steel

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Levelling feet plates ECO
die-cast zinc, stainless steel or plastic

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Levelling feet ECO threaded spindles
steel or stainless steel

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Ducks feet

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Tube inserts square
with tapped bush

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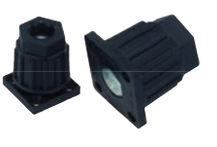
Tube inserts round
with tapped bush

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Levelling feet
for aluminium profiles

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Levelling feet

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Hinges
plastic, lift-off, left

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Hinges
plastic, lift-off, right

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Hinges
plastic

New/Expanded Items

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Hinges
plastic, with locking lever

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Hinges
plastic, with elongated holes

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Hinges
plastic with fastening holes

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Hinges
plastic, lift-off, with guide tabs

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Hinges
plastic, detent

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Hinges
plastic, with adjustable friction

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Hinges
aluminium, with adjustable friction

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Hinges
aluminium, with adjustable friction

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Hinges
aluminium, with detent

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Hinges
aluminium, with detent

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Hinges
die-cast zinc, with elongated holes

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Hinges
die-cast zinc, with locking lever

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Hinges
aluminium, lift-off, left

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Hinges
aluminium, lift-off, right

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Hinges lift-off
stainless steel

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Hinges
aluminium

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Hinges
stainless steel

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Hinges
stainless steel

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Hinges lift-off
stainless steel

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Hinges
stainless steel

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Hinges
stainless steel

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Single leaf hinges
adjustable, stainless steel

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Hinges
stainless steel

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Strap hinges
stainless steel with grease nipple

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Hinges
plate, steel or stainless steel

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Butt hinges
stainless steel

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Hinges steel or stainless steel
internal, opening angle 90°

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Hinges steel or stainless steel
internal, opening angle 125°

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Hinges steel
internal, opening angle 110°

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Hinges
plastic with bushes

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Hinges
plastic with fastening screws

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Hinges
plastic with bushes and fastening screws

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Hinges
weldable

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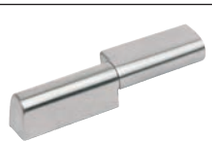
Hinges
weldable, stainless steel

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Hinges
weldable, stainless steel

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In-line hinges stainless steel
lift-off, screw-on

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Hinges
weldable

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Block hinges
with fastening nuts

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Block hinges
with fastening nuts

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Block hinges
with fastening nuts, long version

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Block hinges
with counterbore, long version

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Hinges
steel, maintenance-free

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Spring hinges
steel, stainless steel or aluminium,
50 mm

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Spring hinges
steel or stainless steel, 75 mm

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Spring hinges
steel, stainless steel or aluminium,
120 mm

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Spring hinges
steel or stainless steel, 180 mm

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Spring hinges
steel or stainless steel, 240 mm

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Spring hinges
aluminium profile tension spring
hinges, 0.20 Nm

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Spring hinges
aluminium profile tension spring
hinges, 0.35 Nm

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Spring hinges
aluminium profile tension spring
hinges, 0.7 Nm

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Spring hinges
aluminium profile tension spring
hinges, 1.3 Nm

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Spring hinges
aluminium profile tension spring
hinges, 3.8 Nm

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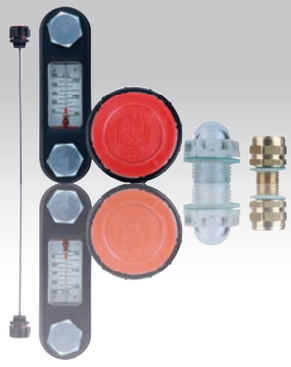
Security hinge switches

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Security hinge switches
long version

New/Expanded Items

Oil level gauges
Caps
Plugs
Vent screws
Dipsticks
Filler necks



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Oil level gauges

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Oil level gauges

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Oil level gauges
with electronic oil level monitoring

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Oil level gauges
with electronic temperature monitoring

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Oil level gauges
with electronic oil level and temperature monitoring

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Oil level gauges
long version

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Oil level gauges
with electronic oil level monitoring, long version

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Oil level gauges
with electronic temperature monitoring, long version

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Oil level gauges
with electronic oil level and temperature monitoring, long version

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Oil level sight glasses

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Oil level sight glasses
press-in

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Oil level sight glasses
domed

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Oil level sight glasses
aluminium

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Oil level sight glasses
aluminium, glass window

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Screw plugs with hexagon socket
DIN 906, tapered thread

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Screw plugs with collar and hexagon socket
DIN 908

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Screw plugs hex head with collar
DIN 910

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Screw plugs

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Screw plugs

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Screw plugs
with hexagon socket

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Press-in plugs

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Screw plugs with magnet

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Screw plugs aluminium with magnet

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Screw plugs
aluminium

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Screw plugs

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Screw plugs
with dipstick

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Plugs fill only
knurled cap

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Caps for filler necks

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Vent screws

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Vent screws
with splash guard

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Vent screws
with check valve

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Vent screws brass

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Vent screws brass
with check valve

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Press-in plugs
with dipstick

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Vent screws
with dipstick

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Vent screws
with check valve and dipstick

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Dipsticks

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Filler necks

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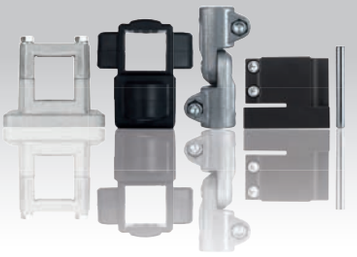
Filler necks

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Filler necks

Tube connectors
Tube clamps
Tube joints
Tubes
Columns



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Tube clamps
cross, plastic

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Tube clamps
cross, aluminium

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Tube clamps
cross, aluminium

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Tube clamps
cross, stainless steel

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Tube clamps
cross, plastic

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Tube clamps
cross, aluminium

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Tube clamps
cross, plastic

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Tube clamps
cross, aluminium

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Tube clamps
T-angle, plastic

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Tube clamps
T-angle, aluminium

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Tube clamps
T-angle, stainless steel

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Tube clamps
T-angle, plastic

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Tube clamps
T-angle, aluminium

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Tube clamps
right-angle, aluminium

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Tube clamps
base, plastic

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Tube clamps
base, aluminium

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Tube clamps
base, stainless steel

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Tube clamps
base, plastic

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Tube clamps
base, aluminium

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Tube clamps
flange, plastic

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Tube clamps
flange, aluminium

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Tube clamps
flange, aluminium

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Tube clamps
flange, stainless steel

New/Expanded Items

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Tube clamps
flange, plastic

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Tube clamps
flange, aluminium

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Tube clamps
straight, plastic

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Tube clamps
swivel half, sunken teeth, plastic

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Tube clamps
swivel half, raised teeth, plastic

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Tube clamps
swivel half, sunken teeth, plastic

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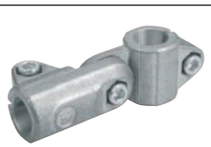
Tube clamps
swivel base, sunken teeth, plastic

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Tube clamps
swivel, plastic

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Tube clamps
swivel, aluminium

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Tube clamps
swivel, plastic

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Tube clamps
swivel, aluminium

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Tube clamps
swivel base, plastic

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Tube clamps
swivel base, aluminium

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Reducer sleeves
square

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Reducer sleeves
round

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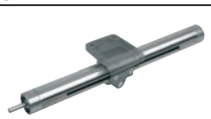
Round and square tubes

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Tube end plugs

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Linear actuators

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Linear actuator connector clamps
cross

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Linear actuator connector clamps
cross

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Linear actuator connector clamps
flange

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Linear actuator connector clamps
base

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Monitor brackets

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Column bases single

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Column bases double

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Column clamps double

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Adjustment units

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Column shaft collars

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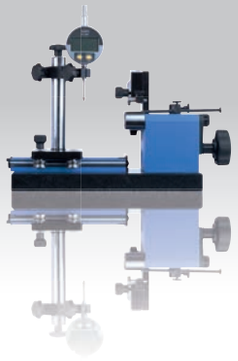
Rods stainless steel

New/Expanded Items

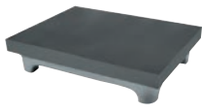
Inspection tables
Gauge stands
Gauge joints



Concentricity gauges
Dial gauges



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Inspection tables

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Inspection blocks
with column

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Support cylinders
for workpieces with collar

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Gauge holders articulated arm
with central hydraulic lock

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Gauge stands magnetic

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Magnetic stands

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Magnetic stands

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Dial gauge arms

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Dial gauge holders

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Dial gauge holders
with fine adjustment

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Joint blocks

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Joint blocks

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Joint blocks

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Clamping joints

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Concentricity gauges
max. Ø 35 mm

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Concentricity gauges
max. Ø 80 mm

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Accessories
for concentricity gauges

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Dial gauges
DIN 878

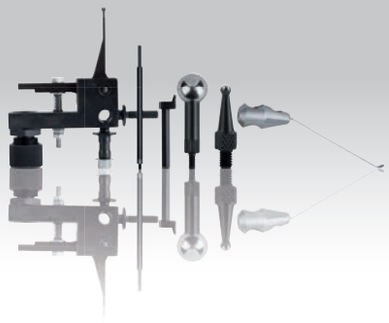
32542
Page 880



Dial gauges digital

New/Expanded Items

Standard inspection and test fixture elements



33000 Page 882

Dial gauge collets for Ø8 shafts

33010 Page 883

Dial gauge holders sliding

33012 Page 883

Dial gauge holders short version with thread

33014 Page 884

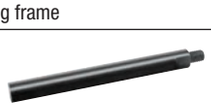
Dial gauge holders long version with thread

33016 Page 884

Dial gauge holders short version with smooth shaft

33018 Page 885

Dial gauge holders for measuring frame

33020 Page 886

Probe with flat face

33022 Page 886

Probe with flat point

33024 Page 887

Probe with reduced flat face

33026 Page 887

Probe with reduced domed point

33028 Page 888

Probe knife point

33029 Page 888

Probe knife point offset

33032 Page 889

Extension for probe inserts

33035 Page 889

Probe knife point offset, for fixed stop

33040 Page 890

Probe inserts with domed point

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Probe inserts with ball point

33044 Page 891

Probe inserts knife point

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Probe inserts with flat face

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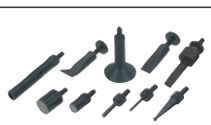
Probe inserts with domed face

33050 Page 892

Probe inserts with enlarged flat face

33052 Page 893

Extensions for probe inserts

33058 Page 893

Probe insert set 11-piece

33058 Page 894

Probe inserts hardened steel thread M2.5

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Probe inserts carbide thread M2.5

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Protection frames for dial gauges

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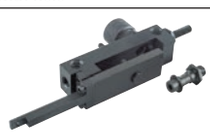
Deflection dial gauge holders 90°

33072 Page 898

Deflection dial gauge holders 90° probe lever with thread

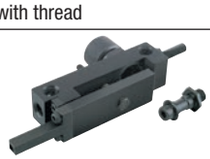
33074 Page 899

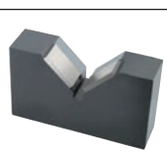
Deflection dial gauge holders 90° probe lever with hole

33076 Page 899

Deflection dial gauge holders 180° probe lever with hole

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Deflection dial gauge holders 90° probe lever with thread

33080 Page 900

Deflection dial gauge holders 180° probe lever with thread

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Prism attachments

New/Expanded Items

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Page 901



Spacers
for prisms attachments

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Page 902



Slotted round nuts

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Page 903



Pivoting columns

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Page 904



Pivoting systems

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Page 905



Measuring fixtures

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Page 907



Measuring arms

33180
Page 908



Spring mounted centre sleeves
with tension lever

33182
Page 909



Centre sleeves
spring mounted with retraction cam

33184
Page 910



Adjustable holder
for fixed centres

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Page 910



Fixed centres

33202
Page 912



Measuring element
for gear wheels

33205
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Ball holders

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Page 915



Precision vice

33226
Page 916



Precision three-jaw chuck
manual operation

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Page 917



Needle support

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Page 918



Clamping component set

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Page 919



Spring fingers

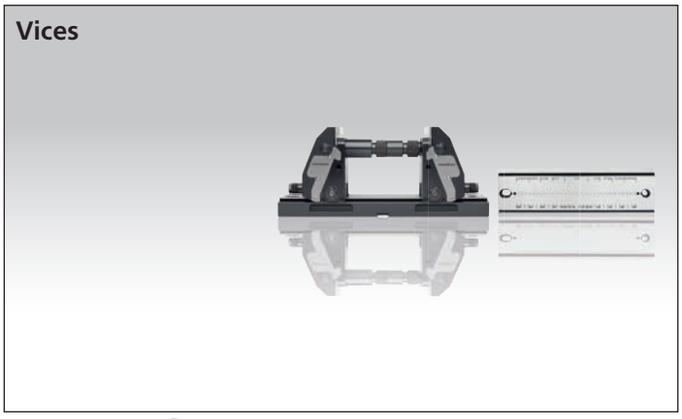
33262
Page 920



Columns
for spring fingers

New/Expanded Items

Vices



41300
Page 926



5-axis clamping system compact jaw plate, smooth

41305
Page 927



Base plates

41315
Page 928



Vice jaws complete

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Page 929



Jaw plates smooth

41320
Page 929



Jaw plates with pins

41320
Page 930



Jaw plates machinable

41325
Page 931



Pendulum jaws

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Page 932



Jaw plates smooth for pendulum jaws

41330
Page 933



Jaw plates with pins for pendulum jaws

41335
Page 934



Centre jaws

41340
Page 935



Jaw plates smooth for centre jaws

41340
Page 935



Jaw plates with pins for centre jaws

41345
Page 936



Seating ledges

41060
Page 936



Jaw pins

41350
Page 937



Cylinder clamping sets

41355
Page 938



Extension shafts

41360
Page 938



Adapter shafts

41365
Page 939



Couplings for cross-clamping

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Page 940



Stop sets

41375
Page 941



Clamping claw sets

New/Expanded Items

Material handling and transport



95010
Page 944



Swivel and fixed castors
standard version

95010
Page 945



Swivel and fixed castors
electrically conductive, standard version

95012
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Swivel and fixed castors
heavy-duty version

95012
Page 947



Swivel and fixed castors
steel plate, electrically conductive, heavy-duty version

95016
Page 948



Swivel and fixed castors
standard version

95016
Page 949



Swivel and fixed castors
steel plate, electrically conductive
standard version

95018
Page 950



Swivel and fixed castors
standard version

95020
Page 951



Swivel and fixed castors
heavy-duty version

95024
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Swivel and fixed castors
standard version

95028
Page 953



Swivel and fixed castors
medium-duty version

95030
Page 954



Swivel and fixed castors
heavy-duty version

95032
Page 955



Swivel and fixed castors
welded steel heavy-duty version

95034
Page 956



Swivel and fixed castors
standard version

95036
Page 957



Swivel and fixed castors
heavy-duty version

95040
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Swivel and fixed castors
heavy-duty version

95045
Page 959



Swivel castors
compact version

95050
Page 960



Wheels
rubber tyres on steel plate rims

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Page 961



Wheels
rubber tyres on die-cast aluminium rims

95056
Page 961



Wheels
polyamide with injection-moulded tread

95057
Page 962



Guide rollers

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Page 963



Wheels
aluminium rims with injection-moulded tread

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Page 963



Rollers heavy-load

95060
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Wheels heavy-load
wheel body welded

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Page 964



Wheels polyamide

95064
Page 965



Wheels polyamide
heavy-duty version

95065
Page 966



Thermoset wheels
heat-resistant

95090
Page 967



Elevating castors with foot
with bolt hole or mounting plate

95092
Page 968



Elevating castors
with integrated machine foot

95150
Page 971



Ball transfer units
with steel housing

95152
Page 972



Ball transfer units
with steel housing and plastic ball

95154
Page 973



Ball transfer units
undersprung

95156
Page 974



Ball transfer units
with solid steel housing

New/Expanded Items

95156-01
Page 974



Ball transfer units heavy duty
stainless steel

95156-02
Page 975



Ball transfer units heavy duty
stainless steel, suitable for
outdoor use

95158
Page 975



Ball transfer units
with fastening holes, without housing

95160
Page 976



Ball transfer units
with spring clips

95164
Page 976



Tolerance rings

95180
Page 977



Ball transfer units mini

95182-01
Page 978



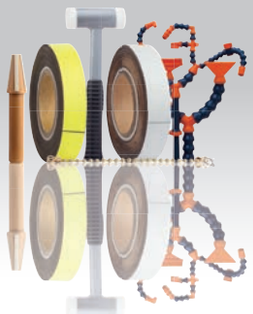
Ball transfer units with stud
stainless steel

95300
Page 979



Small conveyor belts
with internal drive

Coolant hoses
Feeler gauge strips
Magnetic labels and envelopes
Protective nets
Supercraft mallets and inserts
Taper and cylinder cleaners



96200
Page 983



Coolant hose LOC-LINE® Flexi

96202
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Suction hoses LOC-LINE® Flexi 75

96203
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Suction hoses LOC-LINE® Flexi 75
antistatic

96205
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High pressure nozzles LOC-LINE®

96382
Page 989



Feeler gauge strips

96390
Page 990



Ball chains

96450
Page 992



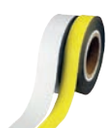
Magnetic labels
on a roll, perforated

96455
Page 992



Magnetic labels

96460
Page 993



Magnetic tape rolls

96465
Page 993



Magnetic C profiles

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Page 994



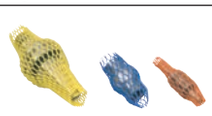
Magnetic envelopes

96471
Page 994



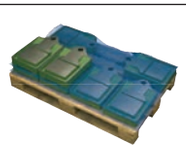
Magnetic envelopes
with strong magnetics

96500
Page 995



Net sleeves

96510
Page 995



Net mats

96520
Page 996



Edge protection profiles
with steel retaining strip

96521
Page 997



Edge protection profiles
with integrated steel wire core

96610
Page 998



Supercraft soft faced hammer
recoilless

96614
Page 998



Hammer inserts
for Supercraft hammers

96630
Page 999



Taper cleaners
for Morse tapers

96632
Page 999



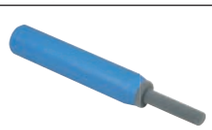
Taper cleaners
for short tapers

96634
Page 1000



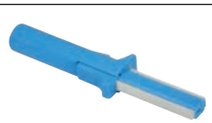
Taper cleaners
for hollow shank tapers

96636
Page 1001



Cylinder cleaners

96638
Page 1001



Cylinder cleaners
two-part

New/Expanded Items

96650
Page 1002



Hook wrench with lug
DIN 1810A enhanced

96651
Page 1003



Face pin spanner
adjustable, cranked

Lubricants
Adhesives
Grease nipples



97900
Page 1006



Klüber "Quietsch-Ex"

97901
Page 1006



Klüber lubricating paste

97903
Page 1007



Klüber copper paste
lead-free

97905
Page 1007



Klüber safety lubricating grease

97907
Page 1008



Klüber molybdenum disulphide
lubricant

97909
Page 1008



Klüber liquid chain grease

97920
Page 1009



Klüber bonded coating
UNIMOLY C 220

97930
Page 1010



Ballistol all-purpose oil
in food industry quality

97940
Page 1012
Page 1013



Grease nipples
conical head DIN 71412

97941
Page 1014



Grease nipple caps
for conical grease nipples

97942
Page 1015



Grease nipples
flush type, DIN 3405

97944
Page 1016



Grease nipples
button head DIN 3404

97990
Page 1017



LOCTITE liquid epoxy metals

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LOCTITE liquid epoxy metals

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LOCTITE threadlocker

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Page 1019



LOCTITE universal adhesive

97990
Page 1020



LOCTITE thread sealant

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LOCTITE flange sealant

97990
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LOCTITE adhesive and sealant

97990
Page 1023



LOCTITE retaining compound

97990
Page 1024



LOCTITE cleaner

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LOCTITE activators

97990
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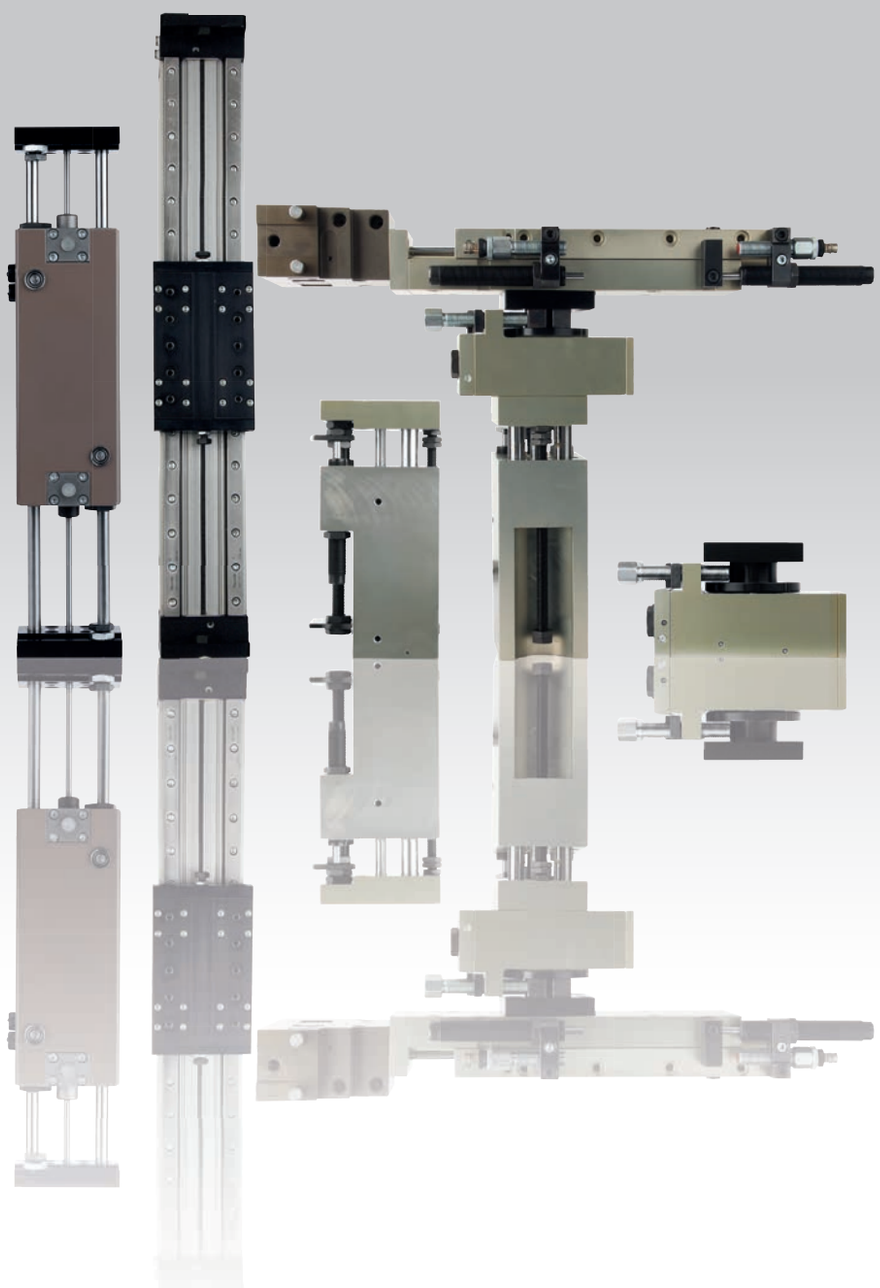


Application equipment

New/Expanded Items

20000

Linear modules
Lifting units
Rotary modules
Grip modules
Inductive proximity switches
Plug connectors



Notes

Technical information for pneumatic linear modules with round guides

Housing:
Hard coated aluminium alloy with high corrosion resistance and surface hardness.

Flange plates:
Aluminium alloy. Weight reduction, no oxidation.

Mounting surfaces:
Three mounting faces with mounting and locating holes on the housing and flange plates for flexible application.

Fastening thread:
All fastening threads in the housing are reinforced with threaded inserts.

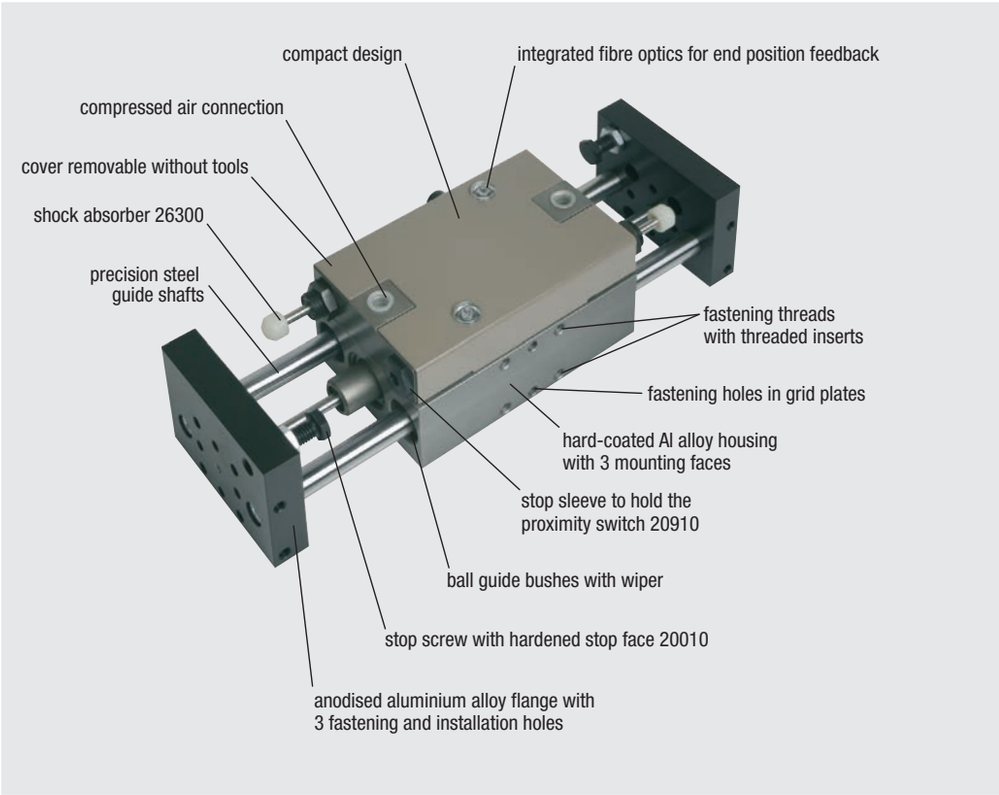
Guidance:
Ball guide bushing and precision steel shafts. Extremely precise and quiet run at high speeds. Low friction values due to rolling friction, low moving force, low wear. No stick-slip phenomena.

Piston bores:
Fine honed piston bores ensure a long lifespan of the piston seals.

Piston seals:
The double grooved rings undertake ancillary sealing and guidance functions and guarantee optimal sealing at full pressure.

Advantages:
– Locating holes for highest fitting accuracy of the modules with each. All modules can be combined without intermediate plates (see combination table.
– Compact design, double action cylinder, integrated shock absorber and proximity switch.
– Assembly and maintenance friendly. Cover removable without tools.
– Any mounting position.
– Integrated fibre optics make the LED indicators easily visible from most perspectives.
– Optionally available with integrated stroke deviation safeguard to secure production.

The drive is a double-acting cylinder integrated in the carriage. Four sizes with two or three guide shafts and travel of 40 to 300 mm are available. The large dimensioned guide shafts with ball-bearing guides allow load bearing capacities up to max. 1080 N and repeat accuracies of ±0.01 mm are realisable.



Combination possibilities without intermediate plate

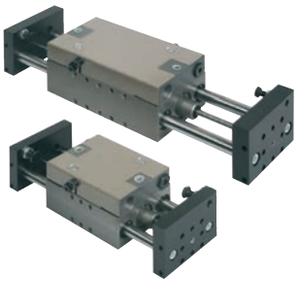
		Horizontal mounting			
		Size 1	Size 2	Size 3	Size 5
Vertical mounting	Size 1	X	X	X	
	Size 2		X	X	X
	Size 3			X	X
	Size 5				X

Unlisted combinations are possible with intermediate plates.

In principle, linear module combinations in all stroke variants and sizes are possible. However, in horizontal applications it is better to use modules of the same size or larger.

Linear modules pneumatic

with two round guides



Material:
Body and flange plate EN AW-5754.
Guide shafts steel

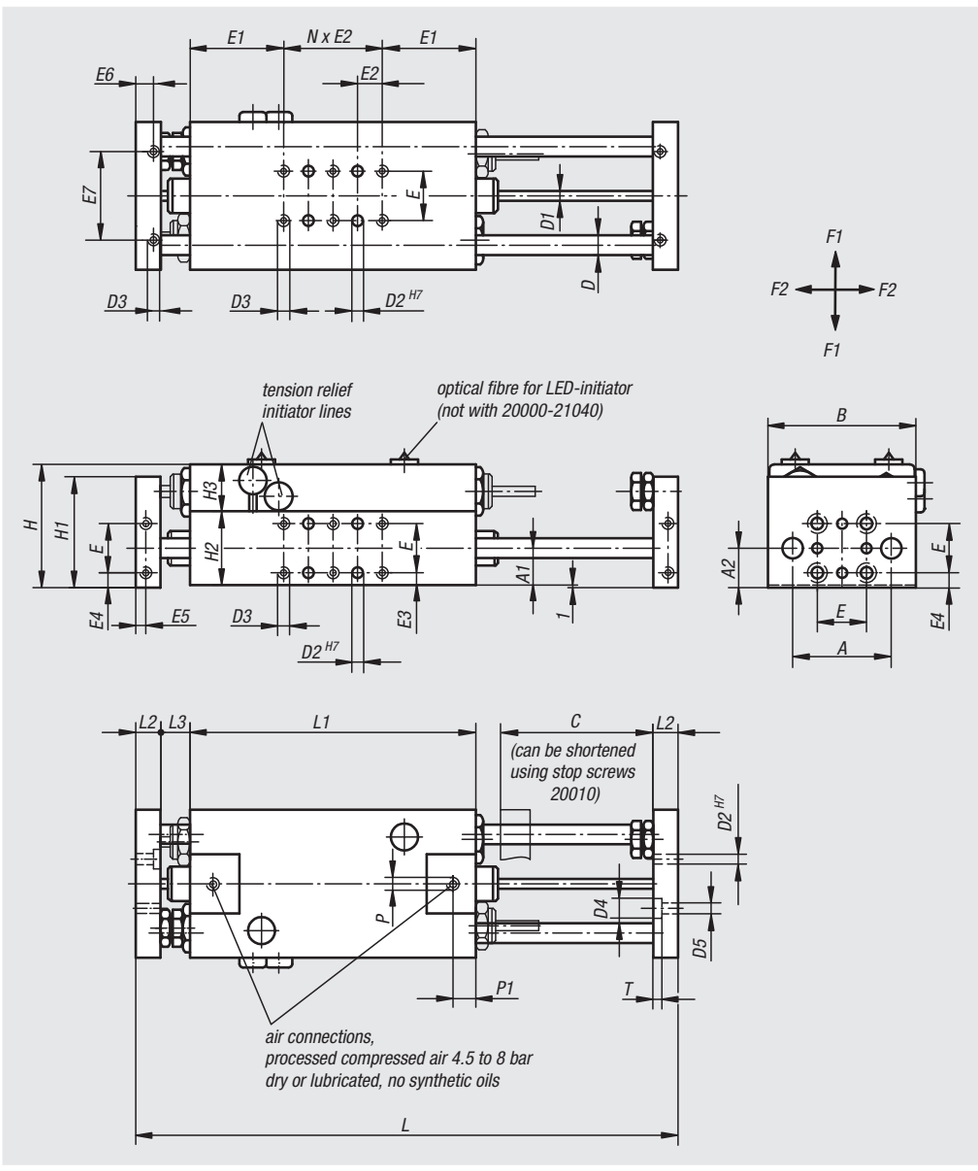
Version:
Body, hard-coated
Flange plates, anodised.
Guide shaft, hardened.

Sample order:
nlm 20000-21040

Note:
Maintenance-free pneumatic linear modules with two precision steel shafts and ball guide bushing with wipers. Double acting cylinder drive. All fastening threads have threaded inserts. The as accessory available shock absorbers and proximity switches can be integrated (no protruding edges). Positive fit construction for hundred per cent reproducibility. Combinations in all sizes and stroke variants are feasible without adapter plates.
Repeat accuracies of ±0.01 mm are possible. Specified loads apply by centred carriages.

Temperature range:
+5 °C up to +80 °C

On request:
Available with locking cartridge as stroke deviation safeguard.



Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20000-21040	1	26300-1415010	20910-010X5000	-
20000-21060	1	26300-1415010	20910-020	20950-030X2000
20000-21080	1	26300-1415010	20910-020	20950-030X2000
20000-21100	1	26300-1415010	20910-020	20950-030X2000
20000-22060	2	26300-1415010	20910-020	20950-030X2000
20000-22090	2	26300-1415010	20910-030	20950-030X2000
20000-22120	2	26300-1415010	20910-030	20950-030X2000
20000-22150	2	26300-1415010	20910-030	20950-030X2000
20000-23080	3	26300-2015016	20910-030	20950-030X2000
20000-23120	3	26300-2015016	20910-030	20950-030X2000
20000-23160	3	26300-2015016	20910-030	20950-030X2000
20000-23200	3	26300-2015016	20910-030	20950-030X2000
20000-25120	5	26300-2515030	20910-030	20950-030X2000
20000-25180	5	26300-2515030	20910-030	20950-030X2000
20000-25240	5	26300-2515030	20910-030	20950-030X2000
20000-25300	5	26300-2515030	20910-030	20950-030X2000

Linear modules pneumatic

with two round guides

Accessories:
See table for shock absorber, proximitiy switch and plug connector.

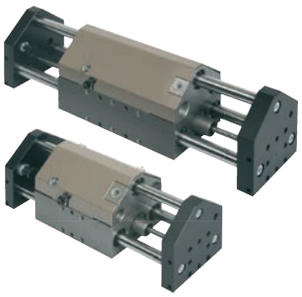


Order No.	Size	A	A1	A2	B	C (travel)	D	D1	D2	D3	D4	D5	E	E1	E2	E3	E4	E5	E6	E7
20000-21040	1	40	15	16	60	40	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-21060	1	40	15	16	60	60	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-21080	1	40	15	16	60	80	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-21100	1	40	15	16	60	100	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-22060	2	55	20	21	82	60	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-22090	2	55	20	21	82	90	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-22120	2	55	20	21	82	120	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-22150	2	55	20	21	82	150	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-23080	3	70	25	26	100	80	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-23120	3	70	25	26	100	120	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-23160	3	70	25	26	100	160	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-23200	3	70	25	26	100	200	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-25120	5	104	38	39	150	120	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-25180	5	104	38	39	150	180	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-25240	5	104	38	39	150	240	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-25300	5	104	38	39	150	300	25	12	10	M10	18	11	60	72	30	8	9	8	17	96

Order No.	Size	H	H1	H2	H3	L	L1	L2	L3	N (number)	P	P1	T	F1 max. kN	F2 max. kN	Piston force at 6 bar (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20000-21040	1	50	45	30	19	180	96	12	10	2	M5	9,3	3	0,14	0,38	100	16	11,3
20000-21060	1	50	45	30	19	220	116	12	10	4	M5	9,3	3	0,09	0,26	100	16	17
20000-21080	1	50	45	30	19	260	136	12	10	6	M5	9,3	3	0,05	0,18	100	16	22,6
20000-21100	1	50	45	30	19	300	156	12	10	8	M5	9,3	3	0,025	0,125	100	16	28,3
20000-22060	2	64	60	40	23	254	120	16	21	2	G1/8	9,9	5,7	0,3	0,61	250	25	56
20000-22090	2	64	60	40	23	314	150	16	21	4	G1/8	9,9	5,7	0,16	0,35	250	25	84
20000-22120	2	64	60	40	23	374	180	16	21	6	G1/8	9,9	5,7	0,08	0,24	250	25	112
20000-22150	2	64	60	40	23	434	210	16	21	8	G1/8	9,9	5,7	0,045	0,16	250	25	140
20000-23080	3	77	70	50	26	300	140	20	20	2	G1/8	9,5	5	0,46	0,84	407	32	118
20000-23120	3	77	70	50	26	380	180	20	20	4	G1/8	9,5	5	0,24	0,52	407	32	178
20000-23160	3	77	70	50	26	460	220	20	20	6	G1/8	9,5	5	0,12	0,32	407	32	236
20000-23200	3	77	70	50	26	540	260	20	20	8	G1/8	9,5	5	0,07	0,2	407	32	295
20000-25120	5	112	100	76	35	420	204	25	23	2	G1/4	14	7	0,75	1,08	660	40	354,6
20000-25180	5	112	100	76	35	540	264	25	23	4	G1/4	14	7	0,42	0,7	660	40	531,8
20000-25240	5	112	100	76	35	660	324	25	23	6	G1/4	14	7	0,25	0,48	660	40	709,1
20000-25300	5	112	100	76	35	780	384	25	23	8	G1/4	14	7	0,16	0,36	660	40	886,4

Linear modules pneumatic

with three round guides



Material:
Body and flange plate EN AW-5754.
Guide shafts steel

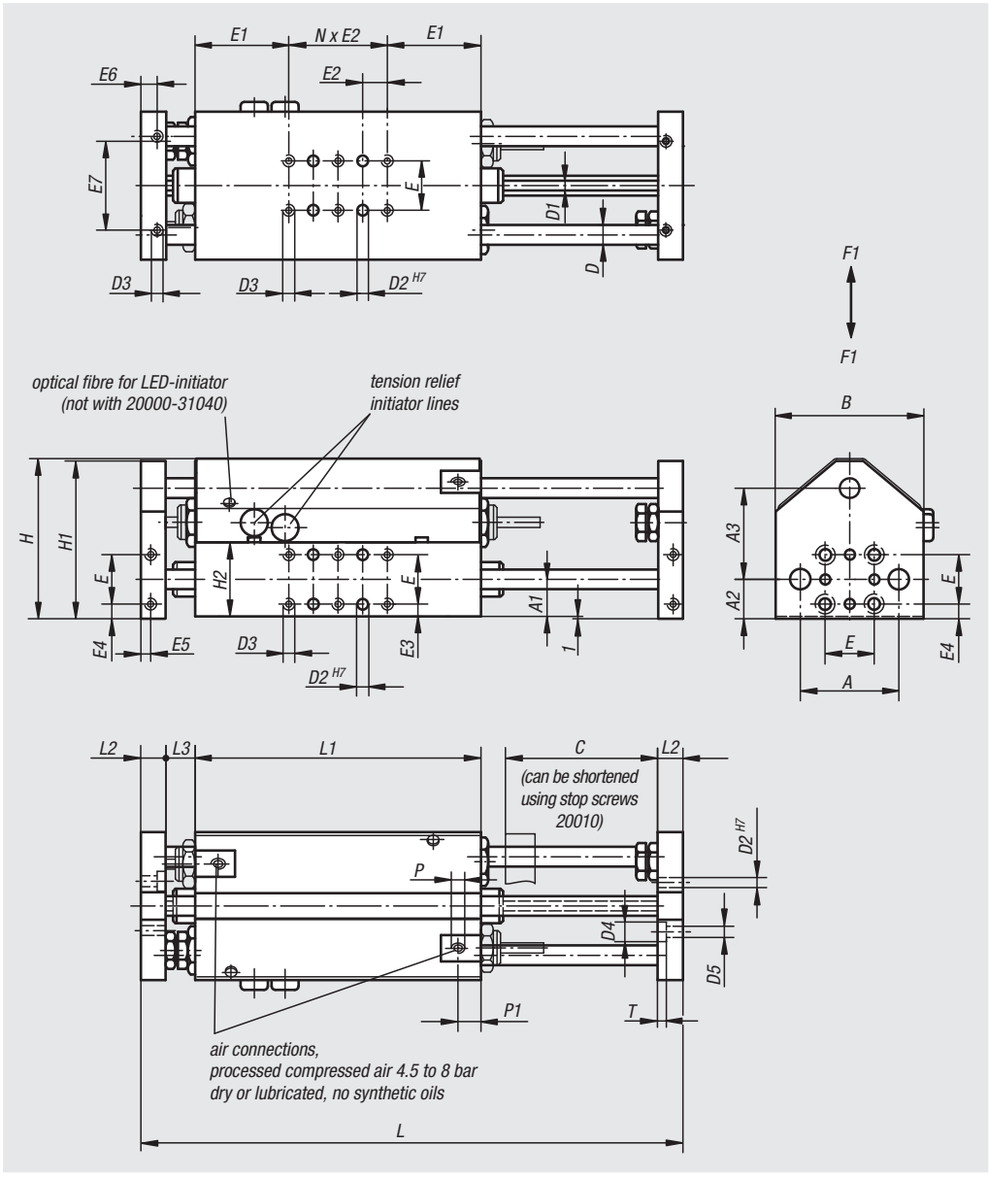
Version:
Body, hard-coated
Flange plates, anodised.
Guide shaft, hardened.

Sample order:
nlm 20000-31040

Note:
Maintenance-free pneumatic linear modules with three precision steel shafts and ball guide bushing with wipers. Double acting cylinder drive. All fastening threads have threaded inserts. The as accessory available shock absorbers and proximity switches can be integrated (no protruding edges). Positive fit construction for hundred per cent reproducibility. Combinations in all sizes and stroke variants are feasible without adapter plates.
Repeat accuracies of ±0.01 mm are possible. Specified loads apply by centred carriages.

Temperature range:
+5 °C up to +80 °C

On request:
Available with locking cartridge as stroke deviation safeguard.



Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20000-31040	1	26300-1415010	20910-010X5000	-
20000-31060	1	26300-1415010	20910-020	20950-030X2000
20000-31080	1	26300-1415010	20910-020	20950-030X2000
20000-31100	1	26300-1415010	20910-020	20950-030X2000
20000-32060	2	26300-1415010	20910-020	20950-030X2000
20000-32090	2	26300-1415010	20910-030	20950-030X2000
20000-32120	2	26300-1415010	20910-030	20950-030X2000
20000-32150	2	26300-1415010	20910-030	20950-030X2000
20000-33100	3	26300-2015016	20910-030	20950-030X2000
20000-33120	3	26300-2015016	20910-030	20950-030X2000
20000-33160	3	26300-2015016	20910-030	20950-030X2000
20000-33200	3	26300-2015016	20910-030	20950-030X2000
20000-35120	5	26300-2515030	20910-030	20950-030X2000
20000-35180	5	26300-2515030	20910-030	20950-030X2000
20000-35240	5	26300-2515030	20910-030	20950-030X2000
20000-35300	5	26300-2515030	20910-030	20950-030X2000

Linear modules pneumatic

with three round guides

Accessories:
See table for shock absorber, proximitiy switch and plug connector.

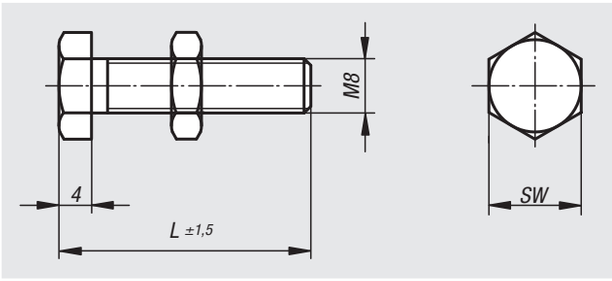


Order No.	Size	A	A1	A2	A3	B	C (travel)	D	D1	D2	D3	D4	D5	E	E1	E2	E3	E4	E5	E6	E7
20000-31040	1	40	15	16	37	60	40	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-31060	1	40	15	16	37	60	60	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-31080	1	40	15	16	37	60	80	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-31100	1	40	15	16	37	60	100	8	4	4	M4	8	4,5	20	38	10	5	6	4	9	36
20000-32060	2	55	20	21	50	82	60	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-32090	2	55	20	21	50	82	90	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-32120	2	55	20	21	50	82	120	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-32150	2	55	20	21	50	82	150	12	6	5	M5	10	5,5	30	45	15	5	6	5	11	50
20000-33100	3	70	25	26	62	100	80	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-33120	3	70	25	26	62	100	120	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-33160	3	70	25	26	62	100	160	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-33200	3	70	25	26	62	100	200	16	8	6	M6	11	6,6	40	50	20	5	6	6	14	70
20000-35120	5	104	38	39	93	150	120	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-35180	5	104	38	39	93	150	180	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-35240	5	104	38	39	93	150	240	25	12	10	M10	18	11	60	72	30	8	9	8	17	96
20000-35300	5	104	38	39	93	150	300	25	12	10	M10	18	11	60	72	30	8	9	8	17	96

Order No.	Size	H	H1	H2	L	L1	L2	L3	N (number)	P	P1	T	F1 max. kN	Piston force at 6 bar (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20000-31040	1	65	64	30	180	96	12	10	2	M5	9,3	3	0,38	100	16	11,3
20000-31060	1	65	64	30	220	116	12	10	4	M5	9,3	3	0,26	100	16	17
20000-31080	1	65	64	30	260	136	12	10	6	M5	9,3	3	0,18	100	16	22,6
20000-31100	1	65	64	30	300	156	12	10	8	M5	9,3	3	0,125	100	16	28,3
20000-32060	2	86	85	40	254	120	16	21	2	G1/8	9,9	5,7	0,61	250	25	56
20000-32090	2	86	85	40	314	150	16	21	4	G1/8	9,9	5,7	0,35	250	25	84
20000-32120	2	86	85	40	374	180	16	21	6	G1/8	9,9	5,7	0,24	250	25	112
20000-32150	2	86	85	40	434	210	16	21	8	G1/8	9,9	5,7	0,16	250	25	140
20000-33100	3	107	106	50	300	140	20	20	2	G1/8	9,5	5	0,84	407	32	118
20000-33120	3	107	106	50	380	180	20	20	4	G1/8	9,5	5	0,52	407	32	178
20000-33160	3	107	106	50	460	220	20	20	6	G1/8	9,5	5	0,32	407	32	236
20000-33200	3	107	106	50	540	260	20	20	8	G1/8	9,5	5	0,2	407	32	295
20000-35120	5	159	158	76	420	204	25	23	2	G1/4	14	7	1,08	660	40	354,6
20000-35180	5	159	158	76	540	264	25	23	4	G1/4	14	7	0,7	660	40	531,8
20000-35240	5	159	158	76	660	324	25	23	6	G1/4	14	7	0,48	660	40	709,1
20000-35300	5	159	158	76	780	384	25	23	8	G1/4	14	7	0,36	660	40	886,4

Stop screws





Material:
Steel
grade 8.8.

Version:
Stop screw black oxidised.
Stop face hardened (52 HRC).
Nut electro zinc-plated.

Sample order:
nlm 20010-08017

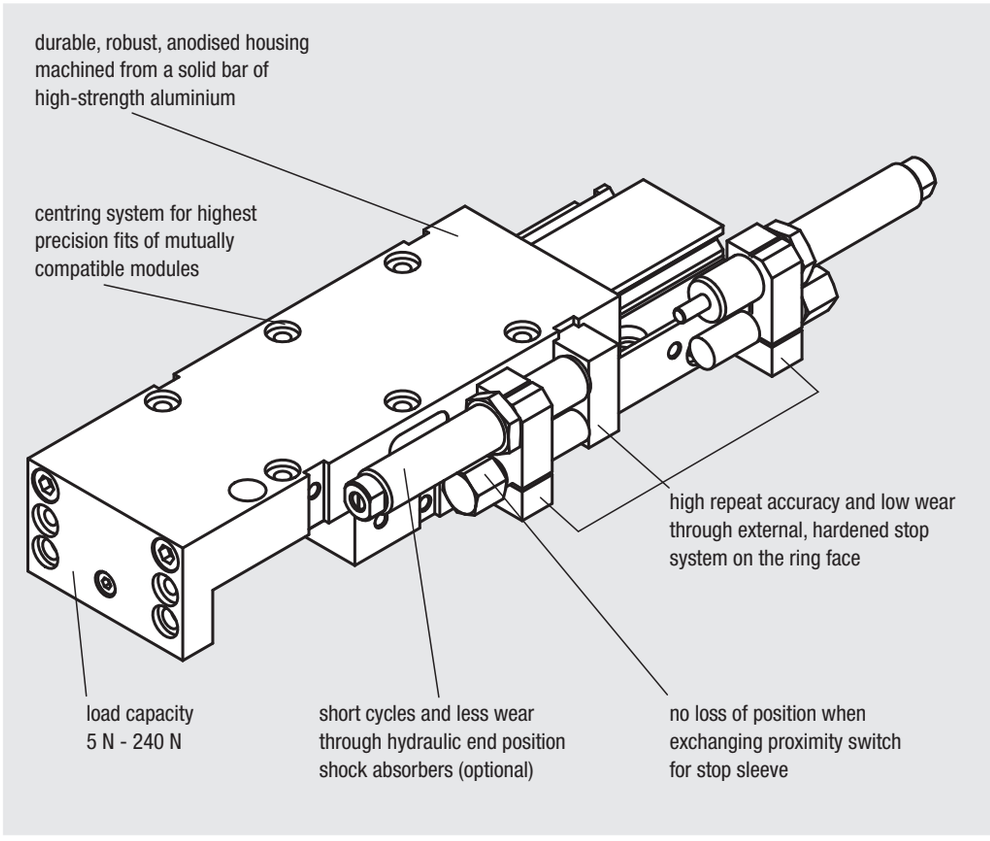
Note:
The screw heads are machined before being hardened giving a defined and permanently consistent stop face.

Order No.	L	SW
20010-08017	17	13
20010-08022	22	13
20010-08027	27	13
20010-08032	32	13
20010-08035	35	13
20010-08045	45	13
20010-08055	55	13
20010-08065	65	13
20010-08073	73	13
20010-08088	88	13

Technical information for pneumatic linear modules with rail guide

The linear modules can be mounted in any position. The standardised fastening holes enable diverse combinations with our other units. The precise centring system enables all modules to be combined with one another quickly and easily. No adapter plate required for same size combinations.

– piston force at 6 bar: 18 N – 76 N.
– cylinder diameter: 8 mm – 16 mm.
– stroke lengths: 20 mm – 200 mm.
– repeat accuracy: ±0.01 mm.
– diverse fastening possibilities.
– recirculating linear ball bearings for heavy loads and positioning accuracy and quiet operation.
– cross roller guide for high torque loads and precision.



Travel times			
norelem	**Stroke lengths (mm)**	**Load (kg)**	**time / cycle**
20032	35 / 65	0,500	0,3 s / 0,45 s
20034	30 / 60 / 90	1,000	0,3 s / 0,4 s / 0,5 s
20036	50 / 100 / 150 / 200	5,000	0,5 s / 0,65 s / 0,8 s / 0,95 s

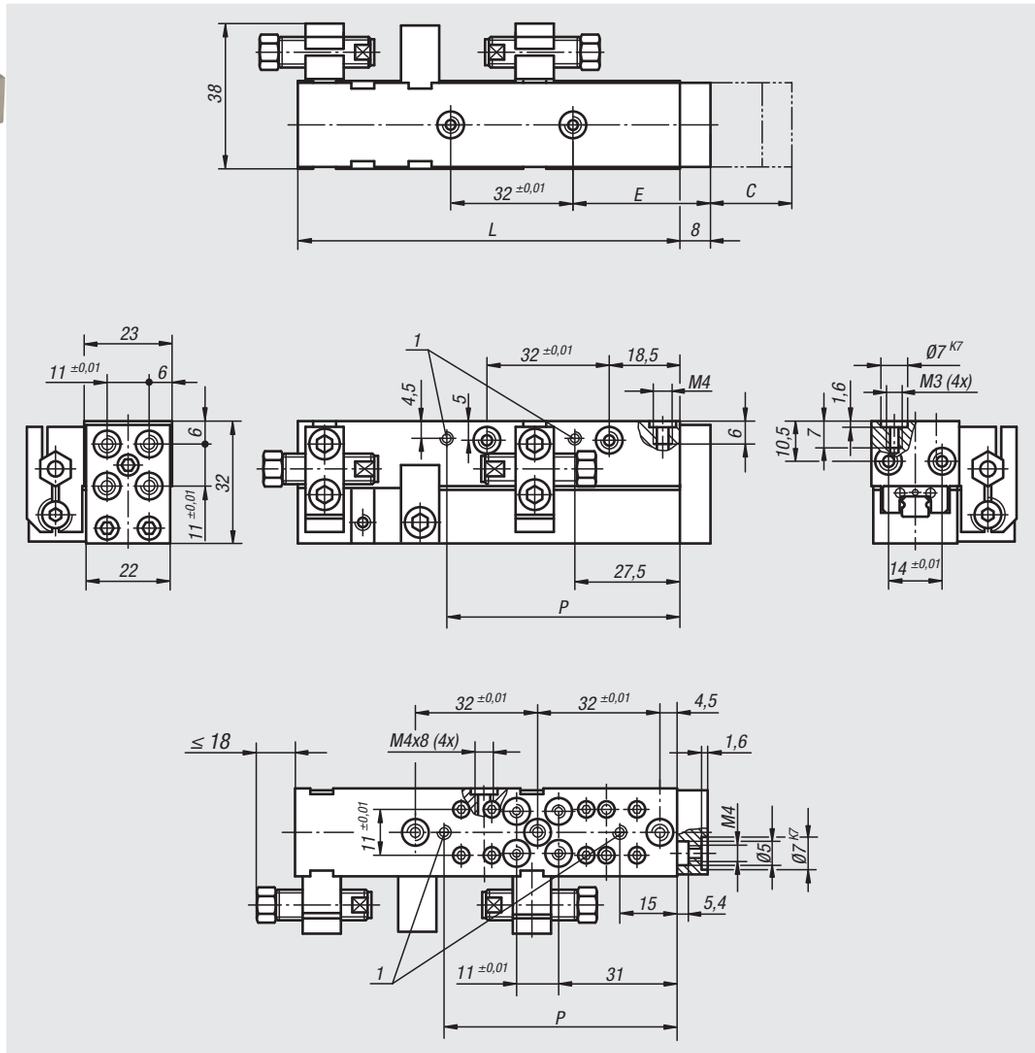
The specified guide values for cycle times were ascertained under operation specific conditions and represent e”ective values.

Selection overview			
Guidance	Recirculating balls	Cross roller	
Design	for narrow spaces	-	-
Stroke lengths (mm)	35 / 65	20 / 30 / 45 / 60 / 75 / 90	30 / 50 / 75 / 100 / 125 / 150 /200
Piston force at 6 bar (N)	18	33	76
Cylinder Ø (mm)	8	12	16
Load bearing max. (N)	12	33	100 - 240
norelem	**20032**	**20034**	**20036**

Linear modules pneumatic

with rail guide





Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20032-4035

Note:
Maintenance-free pneumatic linear modules for small installation spaces with recirculating ball bearing guide and load capacity of max. 12 N.
Control by 4/2 or 5/2 directional valve.
Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled.
Compressed air connection M3.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.
The position of the stop system is variable.

Repeat accuracy ±0.01 mm.

Accessories:
See table for shock absorbers and proximity switches.

Drawing reference:
1) compressed air connections



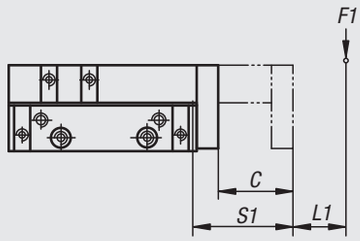
Order No.	Size	C (travel)	E	L	P	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20032-4035	4	35	36	100	61	18	13	8	30,8
20032-4065	4	65	51	130	91	18	13	8	57,2

Order No.	Size	Suitable shock absorber	Suitable proximity switch
20032-4035	4	26300-0810008	20900-020X5000
20032-4065	4	26300-0810008	20900-020X5000

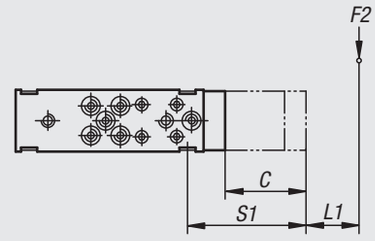
Linear modules pneumatic

with rail guide

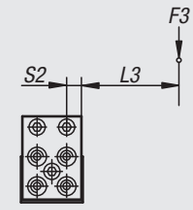
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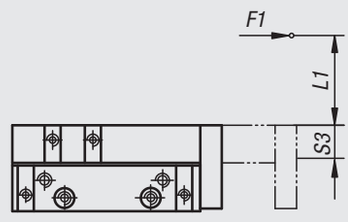
M1 = (S1 + L1) x F1



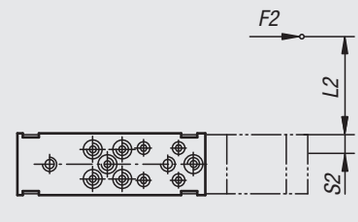
M2 = (S1 + L2) x F2



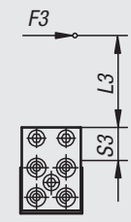
M3 = (S2 + L3) x F3



M1 = (S3 + L1) x F1



M2 = (S2 + L2) x F2



M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculating the lifespan:

$$L = \left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)

$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

L = lifespan (m)
C = dynamic base load (N)
F = dynamic load (N)

Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3	Dynamic load rating N	Static load rating N
20032-4035	4	8	8	4	13 + C (travel)	7,5	10	1200	1960
20032-4065	4	8	8	4	13 + C (travel)	7,5	10	1200	1960

Linear modules pneumatic

with rail guide



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

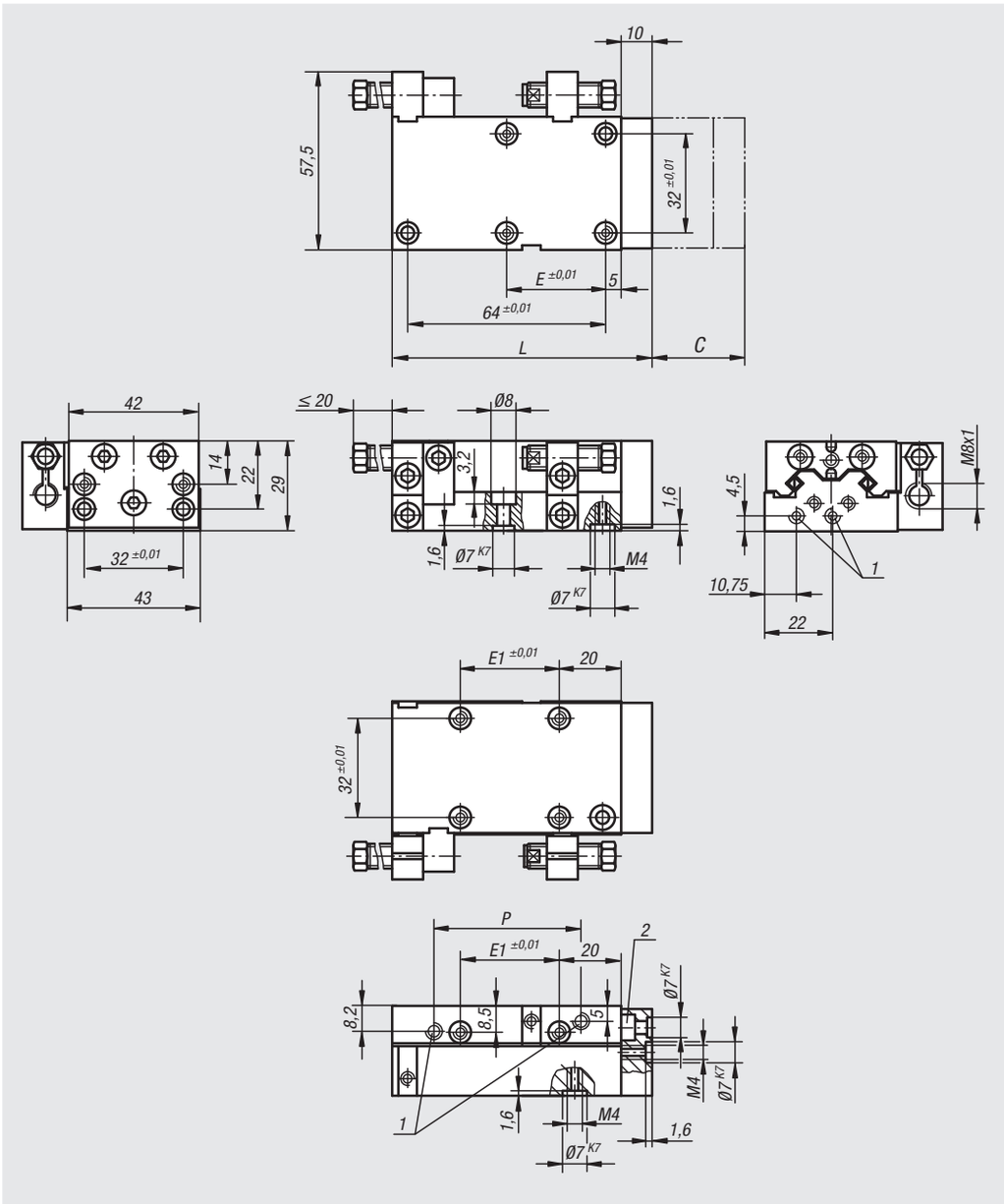
Sample order:
nlm 20034-4020

Note:
Maintenance-free pneumatic linear modules with recirculating ball bearing guide and load capacity of max. 30 N.
Control by 4/2 or 5/2 directional valve.
Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled.
Compressed air connection M5.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.
The position of the stop system is variable.

Repeat accuracy ±0.01 mm.

Accessories:
See table for shock absorbers and proximity switches.

Drawing reference:
1) compressed air connections
2) counterbore for socket head screw ISO 4762-M4



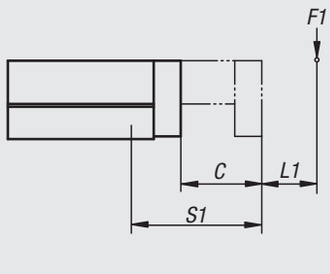
Order No.	Size	C (travel)	E	E1	L	P	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20034-4020	4	20	1 x 32	1 x 32	84	47,5	33	45	12	4
20034-4030	4	30	1 x 32	1 x 32	84	47,5	33	45	12	6
20034-4045	4	45	2 x 32	2 x 32	104	55	33	45	12	10,5
20034-4060	4	60	3 x 32	2 x 32	124	78,5	33	45	12	15
20034-4075	4	75	3 x 32	2 x 32	144	85	33	45	12	21,5
20034-4090	4	90	4 x 32	3 x 32	164	110,5	33	45	12	28

Order No.	Size	Suitable shock absorber	Suitable proximity switch
20034-4020	4	26300-0810008	20900-020X5000
20034-4030	4	26300-0810008	20900-020X5000
20034-4045	4	26300-0810008	20900-020X5000
20034-4060	4	26300-0810008	20900-020X5000
20034-4075	4	26300-0810008	20900-020X5000
20034-4090	4	26300-0810008	20900-020X5000

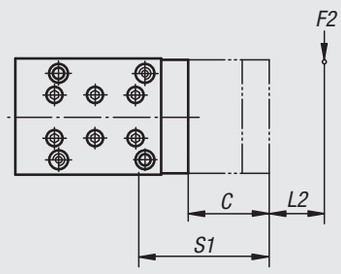
Linear modules pneumatic

with rail guide

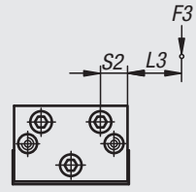
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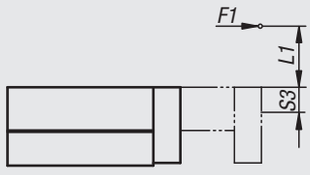
M1 = (S1 + L1) x F1



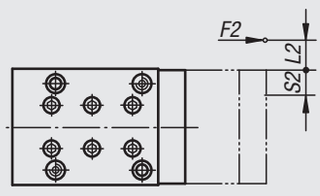
M2 = (S1 + L2) x F2



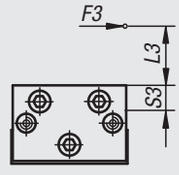
M3 = (S2 + L3) x F3



M1 = (S3 + L1) x F1



M2 = (S2 + L2) x F2



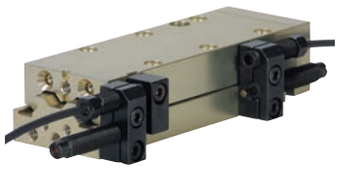
M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculating the lifespan:

$$L = \left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)



Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3
20034-4020	4	12	12	17	29 + C/2 (travel)	9	13
20034-4030	4	12	12	17	29 + C/2 (travel)	9	13
20034-4045	4	15	15	20	36 + C/2 (travel)	9	13
20034-4060	4	18	18	23	44 + C/2 (travel)	9	13
20034-4075	4	21	21	26	51 + C/2 (travel)	9	13
20034-4090	4	25	25	29	59 + C/2 (travel)	9	13

Linear modules pneumatic

with rail guide



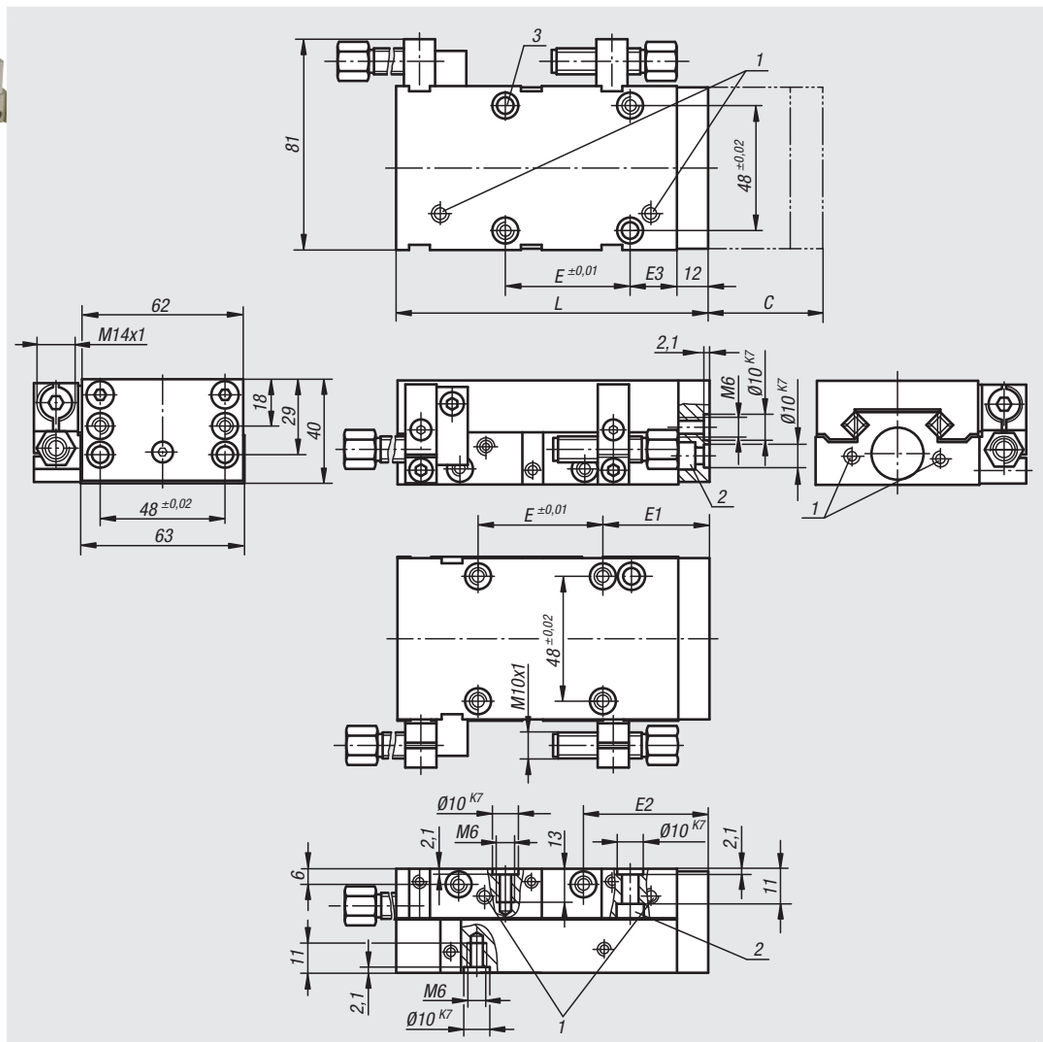
Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20036-6030

Note:
Maintenance-free pneumatic linear modules with recirculating ball bearing guide and load capacity of max. 240 N. Control by 4/2 or 5/2 directional valve. pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.
The position of the stop system is variable.

Repeat accuracy ±0.01 mm.



Order No.	Size	C (travel)	E	E1	E2	E3	L	Load capacity N	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20036-6030	6	30	1 x 48	29	36	18	121	240	76	66	16	11,2
20036-6050	6	50	1 x 48	29	36	18	121	220	76	66	16	18,7
20036-6075	6	75	2 x 48	35	42	21	175	200	76	66	16	28
20036-6100	6	100	2 x 48	35	42	21	175	180	76	66	16	37,4
20036-6125	6	125	3 x 48	17	45	27	231	160	76	66	16	46,8
20036-6150	6	150	3 x 48	17	45	27	231	140	76	66	16	56,1
20036-6175	6	175	4 x 48	26	52	34	288	120	76	66	16	65,5
20036-6200	6	200	4 x 48	26	52	34	288	100	76	66	16	74,8

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20036-6030	6	26310-1410012	20915-020	20950-010X2000
20036-6050	6	26310-1410012	20915-020	20950-010X2000
20036-6075	6	26310-1410012	20915-020	20950-010X2000
20036-6100	6	26310-1410012	20915-020	20950-010X2000
20036-6125	6	26310-1410012	20915-020	20950-010X2000
20036-6150	6	26310-1410012	20915-020	20950-010X2000
20036-6175	6	26310-1410012	20915-020	20950-010X2000
20036-6200	6	26310-1410012	20915-020	20950-010X2000

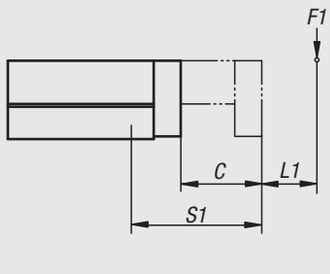
Linear modules pneumatic

with rail guide

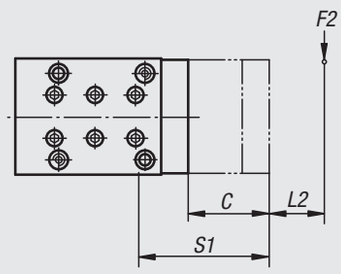
Accessories:
See table for shock absorbers, proximity switches and plug connectors.

Drawing reference:
1) compressed air connections
2) counterbore for socket head screw ISO 4762-M6
3) screw cannot be installed by 30/75/125/175 travel

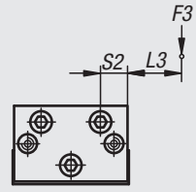
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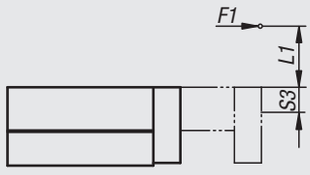
M1 = (S1 + L1) x F1



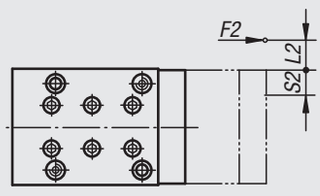
M2 = (S1 + L2) x F2



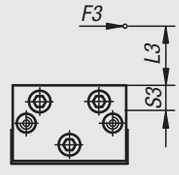
M3 = (S2 + L3) x F3



M1 = (S3 + L1) x F1



M2 = (S2 + L2) x F2



M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculating the lifespan:

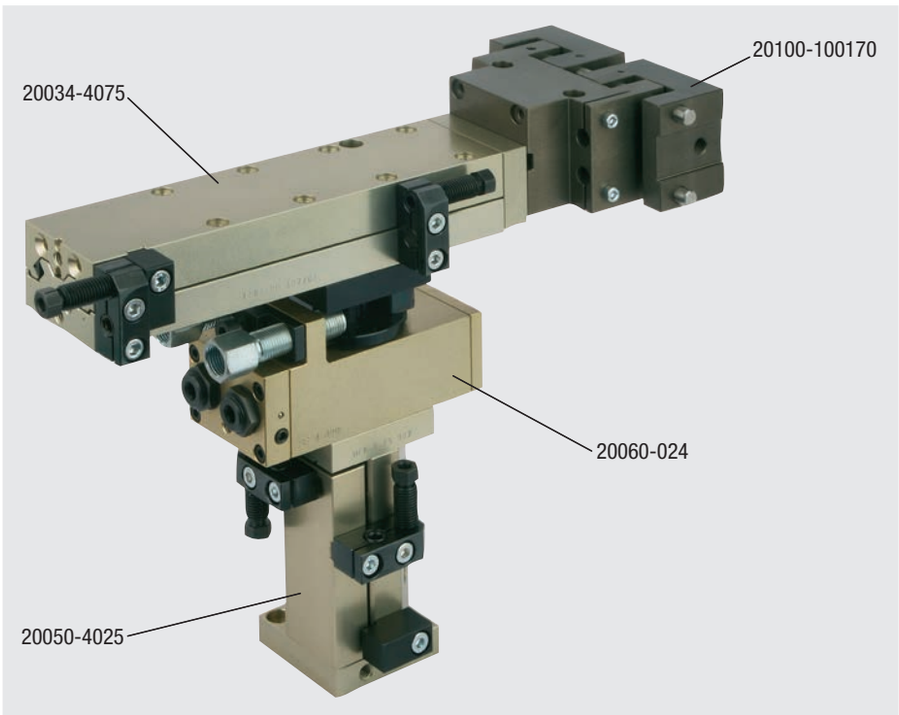
$$L = \left(\frac{M_{zul}}{M_{eff}} \right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)



Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3
20036-6030	6	33,2	33,2	44,6	45 + C/2 (travel)	14	16
20036-6050	6	33,2	33,2	44,6	45 + C/2 (travel)	14	16
20036-6075	6	38,7	38,7	59,5	70 + C/2 (travel)	14	16
20036-6100	6	38,7	38,7	59,5	70 + C/2 (travel)	14	16
20036-6125	6	44,2	44,2	59,5	95 + C/2 (travel)	14	16
20036-6150	6	44,2	44,2	59,5	95 + C/2 (travel)	14	16
20036-6175	6	49,7	49,7	74,4	120 + C/2 (travel)	14	16
20036-6200	6	49,7	49,7	74,4	120 + C/2 (travel)	14	16

Construction of a lift-swivel unit made of four same size modules



Technical information for pneumatic lifting units

Highly robust lifting units for universal application as short stroke modules. The standardised fastening holes enable diverse combinations with our other units. Precise centring system enables all modules to be combined with one another quickly and easily. Same size combinations without adapter plates.

– piston force at 6 bar: 80 N – 360 N.

– cylinder diameter: 16 mm – 32 mm.

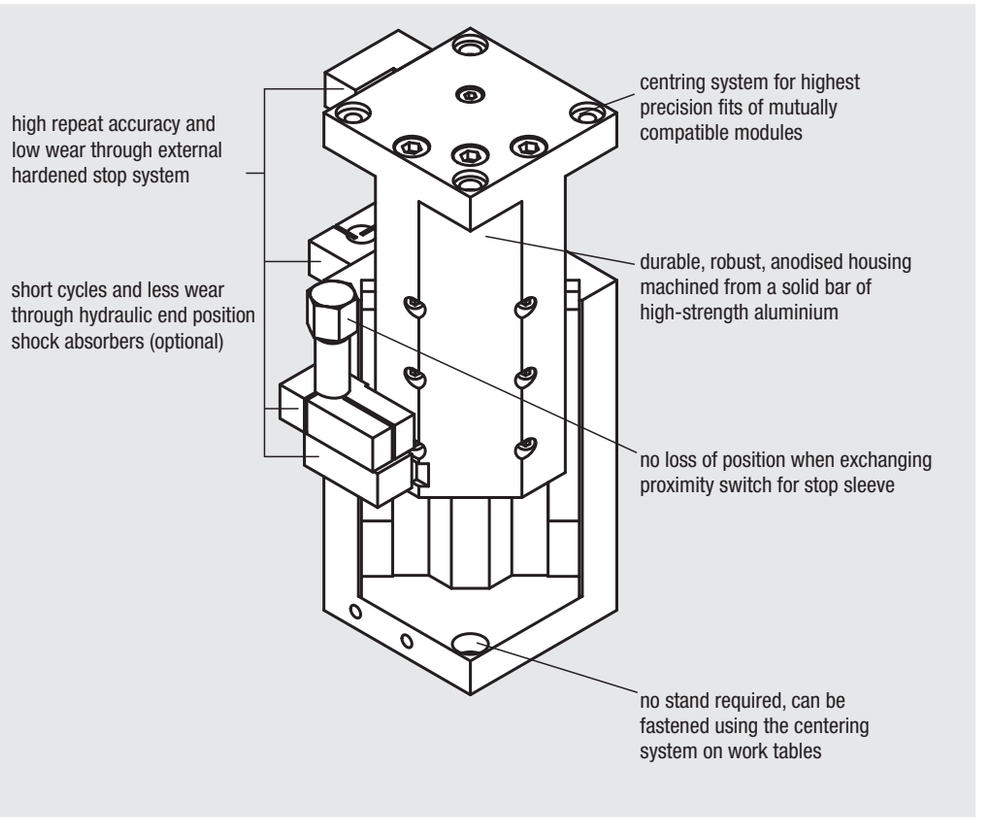
– stroke lengths: 10 mm – 100 mm.

– repeat accuracy: up to ±0.01 mm.

– diverse fastening possibilities.

– double junction rolling guide for high torque loads and precision.

– ball-bearing guide sealed for hard application conditions with high precision.



Travel times				
norelem	**Size**	**Travel lengths (mm)**	**Load (kg)**	**time / cycle (with shock absorbers)**
20050	4	10 / 25	0,200	0,3 s / 0,4 s
20050	6	25 / 50	0,200	0,3 s / 0,4 s
20054	6	50 / 75 / 100	5,000	0,5 s / 0,7 s / 0,8 s
20056	9	50 / 75 / 100	10,000	0,5 s / 0,7 s / 0,9 s

The specified guide values for cycle times were ascertained under operation specific conditions and represent e‹ective values.

Selection overview				
Guidance	Cross roller		Sealed ball guide	
Design	compact	compact	robust	robust
Size	4	6	6	6
Travel lengths (mm)	10 / 25	25 / 50	50 / 75 / 100	50 / 75 / 100
Piston force at 6 bar (N)	80	185	220	360
Cylinder Ø (mm)	16	25	25	32
norelem	**20050**	**20050**	**20054**	**20056**

Lifting units pneumatic

with rail guide



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

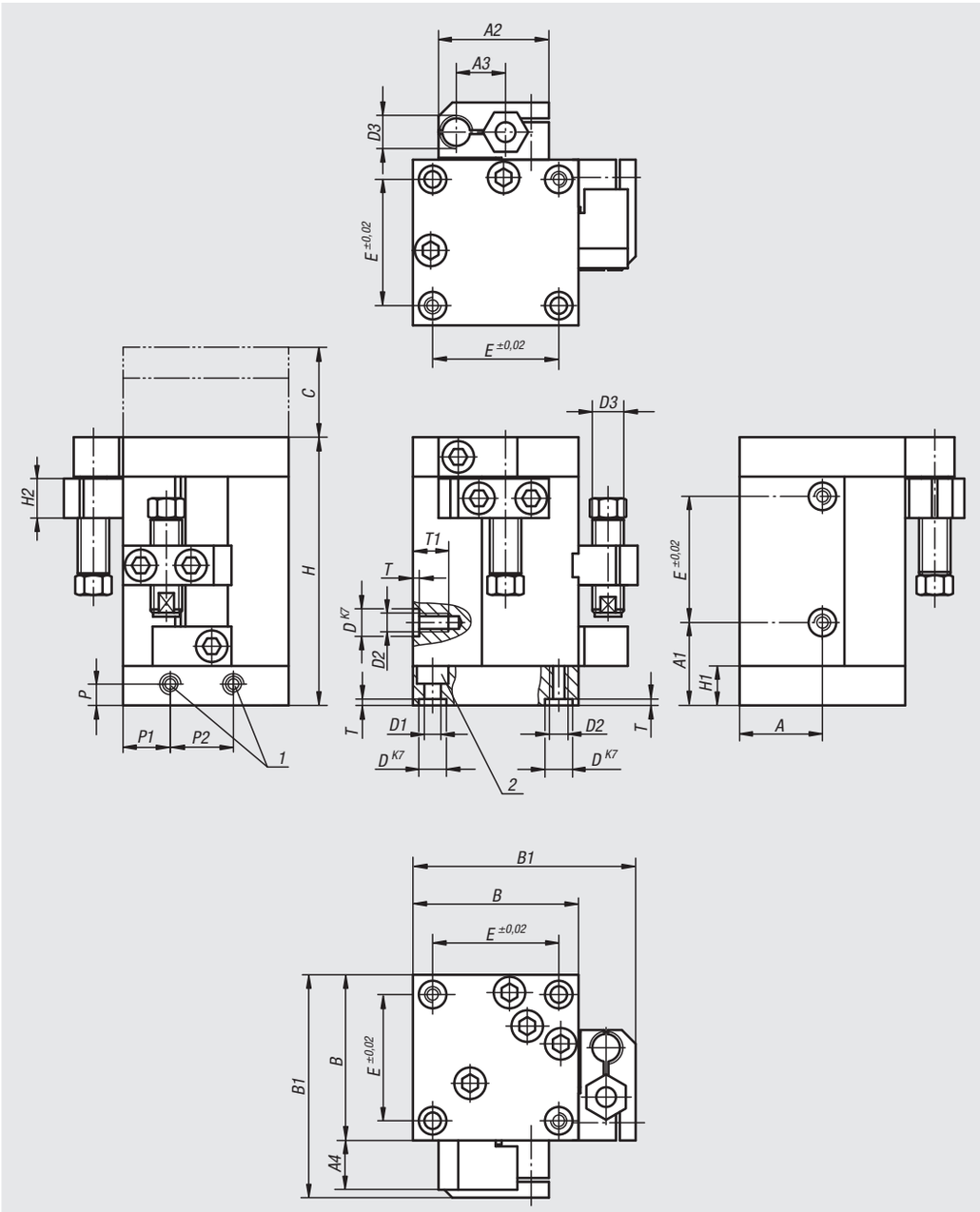
Sample order:
nlm 20050-4010

Note:
Maintenance-free pneumatic lifting units, compact construction with cross roller guides. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

Repeat accuracy ±0.01 mm.

Accessories:
See table for shock absorbers, proximity switches and plug connectors.

Drawing reference:
1) compressed air connections
2) counterbore for socket head screw ISO 4762-M4



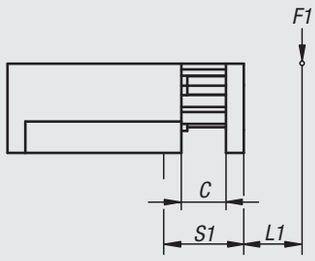
Order No.	Size	C (travel)	A	A1	A2	A3	A4	B	B1	D	D1	D2	D3	E	H	H1	H2	P	P1	P2	T	T1
20050-4010	4	10	21	21	27,5	12	12,5	42	57	7	4,2	M4	M8x1	32	68	10	10	5	12	16	1,6	6
20050-4025	4	25	21	39	27,5	12	12,5	42	57	7	4,2	M4	M8x1	32	86	10	10	5	12	16	1,6	6
20050-6025	6	25	30	38	38	17,5	14	60	78	10	6,4	M6	M14x1	48	104	12	12	6	16	18	2,1	9
20050-6050	6	50	30	63	38	17,5	14	60	78	10	6,4	M6	M14x1	48	129	12	12	6	16	18	2,1	9

Order No.	Size	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20050-4010	4	80	55	16	3,7	26300-0810008	20900-020X5000	-
20050-4025	4	80	55	16	9,3	26300-0810008	20900-020X5000	-
20050-6025	6	185	175	25	23,8	26310-1410012	20915-020	20950-010X2000
20050-6050	6	185	175	25	47,7	26310-1410012	20915-020	20950-010X2000

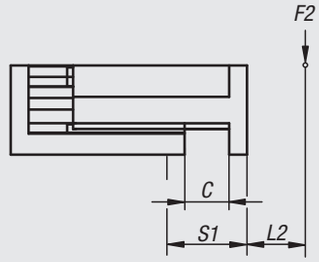
Lifting units pneumatic

with rail guide

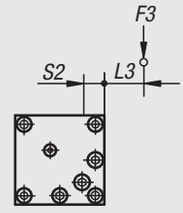
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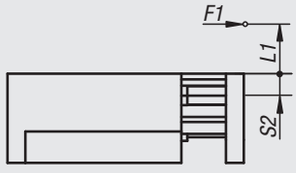
M1 = (S1 + L1) x F1



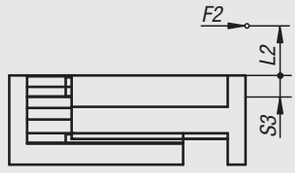
M2 = (S1 + L2) x F2



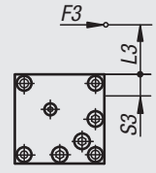
M3 = (S2 + L3) x F3



M1 = (S2 + L1) x F1



M2 = (S3 + L2) x F2



M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculation of lifespan:

$$L = \left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)



Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3	Dynamic load rating N	Static load rating N
20050-4010	4	12,5	12,5	13,5	19 + C/2 (travel)	10	16,5	1435	1435
20050-4025	4	15	15	18	26 + C/2 (travel)	10	16,5	1640	1640
20050-6025	6	33	33	56	33 + C/2 (travel)	11	17	2600	2600
20050-6050	6	33	33	56	45 + C/2 (travel)	11	17	2600	2600

Lifting units pneumatic

with round guides



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

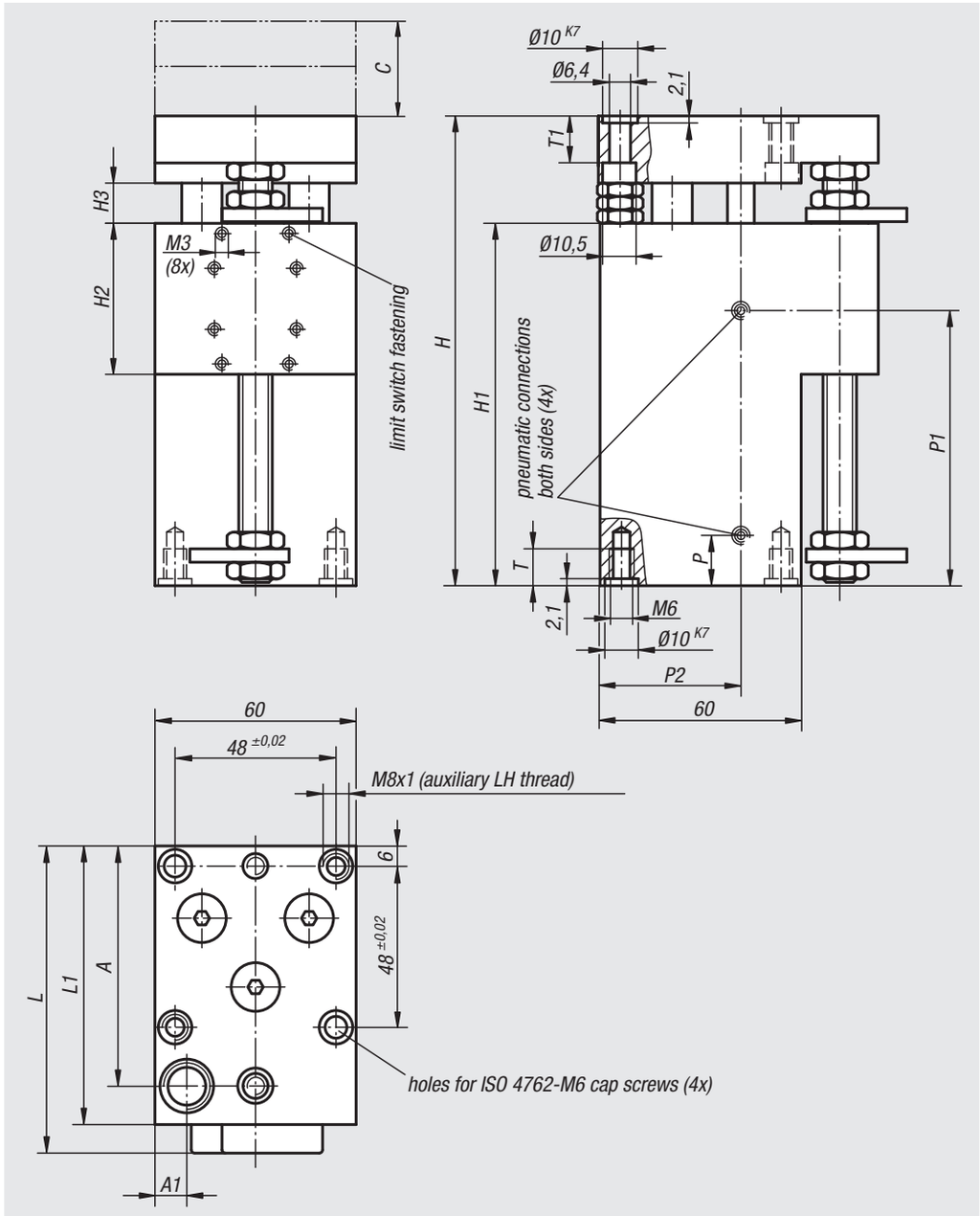
Sample order:
nlm 20054-6050

Note:
Highly robust maintenance-free pneumatic lifting units with sealed ball guide. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5. Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

Repeat accuracy ±0.02 mm.

On request:
Lifting units with shorter strokes available.

Accessories:
See table for shock absorbers, proximity switches and plug connectors.



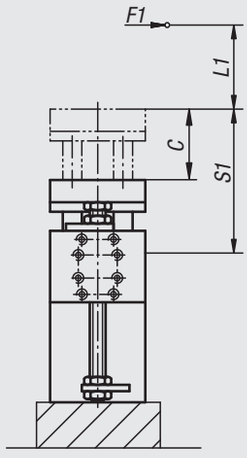
Order No.	Size	C (travel)	A	A1	H	H1	H2	H3	L	L1	P	P1	P2	T	T1
20054-6050	6	50	71,5	10	140	108	45	12	92	83	15	83	41,5	16	13
20054-6075	6	75	71,5	10	165	133	45	12	92	83	15	108	41,5	16	13
20054-6100	6	100	71,5	10	190	158	45	12	92	83	15	133	41,5	16	13

Order No.	Size	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20054-6050	6	220	200	25	33	26310-1410012	20905-010	20950-010X2000
20054-6075	6	220	200	25	50	26310-1410012	20905-010	20950-010X2000
20054-6100	6	220	200	25	66	26310-1410012	20905-010	20950-010X2000

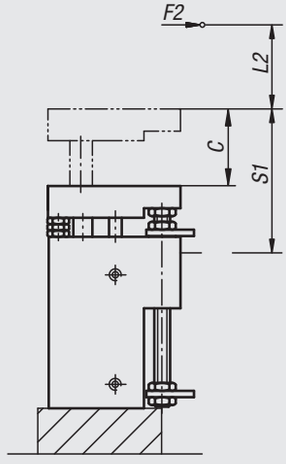
Lifting units pneumatic

with round guides

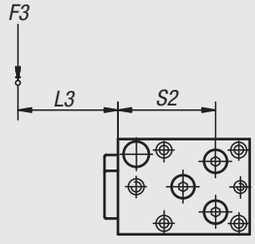
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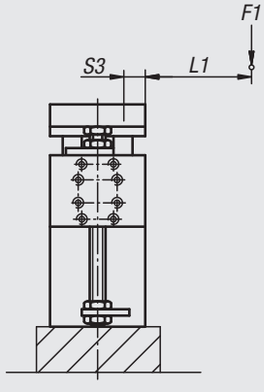
M1 = (S1 + L1) x F1



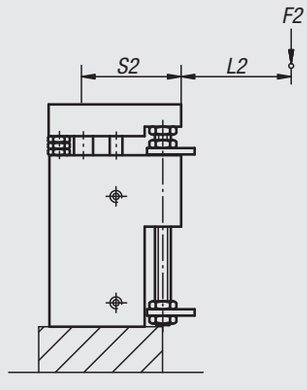
M2 = (S1 + L2) x F2



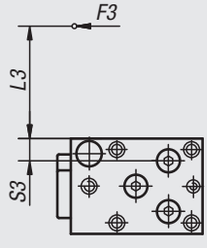
M3 = (S2 + L3) x F3



M1 = (S3 + L1) x F1



M2 = (S2 + L2) x F2



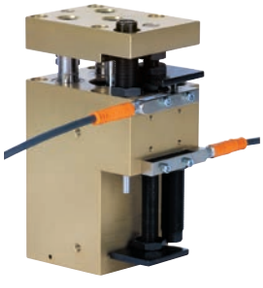
M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculating the lifespan:

$$L = \left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)



Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3
20054-6050	6	28	28	30	46 + C/2 (travel)	61	14
20054-6075	6	28	28	30	46 + C/2 (travel)	61	14
20054-6100	6	28	28	30	46 + C/2 (travel)	61	14

Lifting units pneumatic

with round guides



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

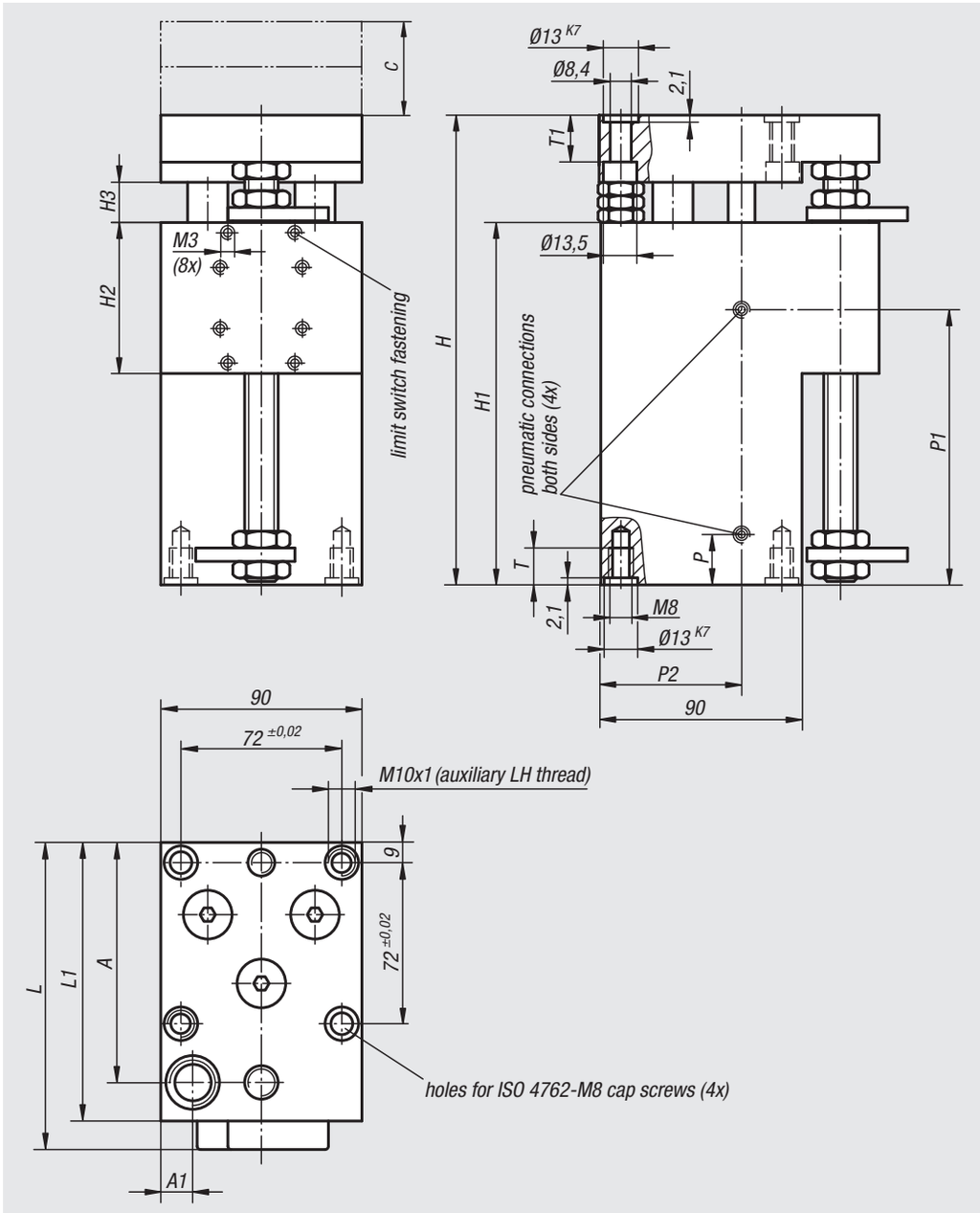
Sample order:
nlm 20056-9050

Note:
Robust maintenance-free pneumatic lifting units with sealed ball guide.
Control by 4/2 or 5/2 directional valve.
Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled.
Compressed air connection R1/8.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

Repeat accuracy ±0.02 mm.

On request:
Lifting units with shorter strokes available.

Accessories:
See table for shock absorber, proximitiy switch and plug connector.



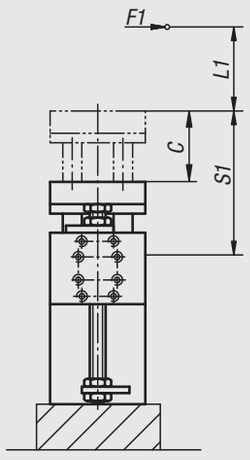
Order No.	Size	C (travel)	A	A1	H	H1	H2	H3	L	L1	P	P1	P2	T	T1
20056-9050	9	50	101,5	24,5	150	108	45	12	121	113	15,5	83	68	16	13
20056-9075	9	75	101,5	24,5	175	133	45	12	121	113	15,5	108	68	16	13
20056-9100	9	100	101,5	24,5	200	158	45	12	121	113	15,5	133	68	16	13

Order No.	Size	Piston force at 6 bar (N)	Retraction force at 6 bars (N)	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20056-9050	9	360	325	32	56	26310-1410012	20905-010	20950-010X2000
20056-9075	9	360	325	32	84	26310-1410012	20905-010	20950-010X2000
20056-9100	9	360	325	32	112	26310-1410012	20905-010	20950-010X2000

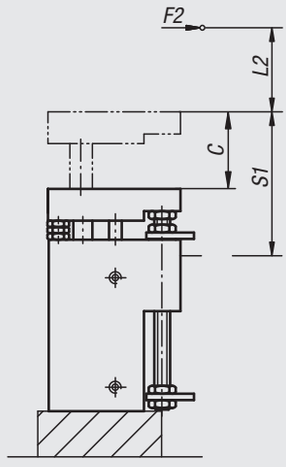
Lifting units pneumatic

with round guides

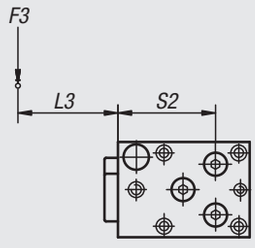
Load data



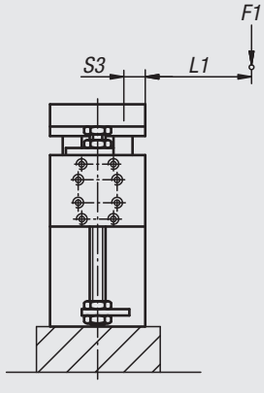
M1 = (S1 + L1) x F1



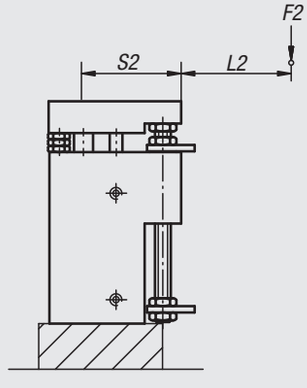
M2 = (S1 + L2) x F2



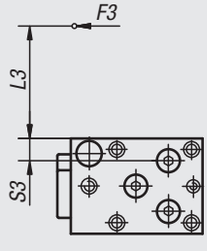
M3 = (S2 + L3) x F3



M1 = (S3 + L1) x F1



M2 = (S2 + L2) x F2



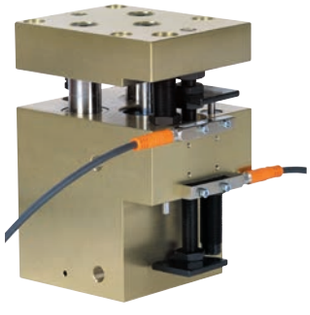
M3 = (S3 + L3) x F3

$$\frac{M1_{eff}}{M1_{zul}} + \frac{M2_{eff}}{M2_{zul}} + \frac{M3_{eff}}{M3_{zul}} \leq 1$$

Calculating the lifespan:

$$L = \left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L = lifespan (m)
M_{zul} = permissible torque (Nm)
M_{eff} = calculated torque (Nm)



Order No.	Size	M1 Nm	M2 Nm	M3 Nm	S1	S2	S3
20056-9050	9	43	43	72	57 + C/2 (travel)	73	20
20056-9075	9	43	43	72	57 + C/2 (travel)	73	20
20056-9100	9	43	43	72	57 + C/2 (travel)	73	20

Technical information for pneumatic rotary modules

Compact, high-performance rotary modules open many fields of application. They are an indispensable component, when combined with linear modules to reach any point in a given space. Rotary modules can be mounted in any position. The extremely compact design of the rotary modules allow for high load bearing capacity in all directions with high rigidity of the entire system. The 0° – 190° rotation angle for all models is infinitely adjustable.

– cylinder diameter: 10 mm – 38 mm.

– axial load: 280 N – 1.800 N.

– radial load: 220 N – 2.400 N.

– repeat accuracy ±0.01°.

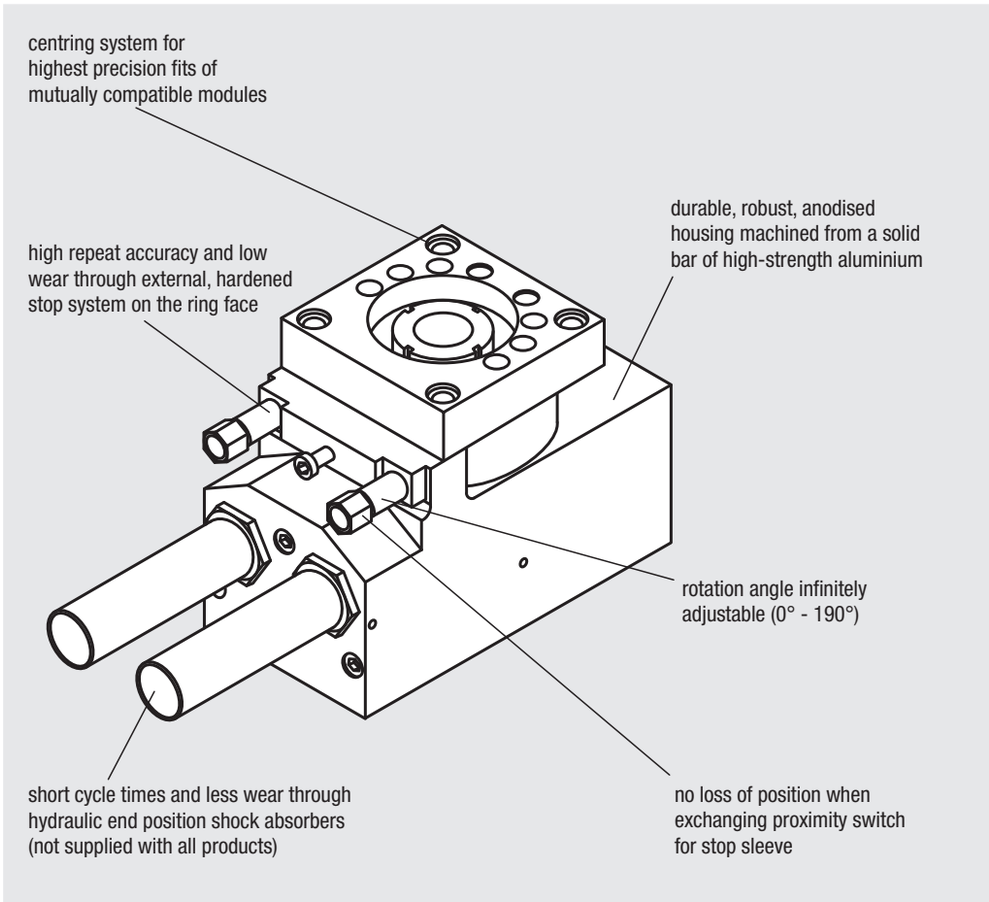
– rotary angle infinitely adjustable.

– play-free end positions through double actuated drive cylinders with protected pinion rack drive.

– many applications covered by coordinated increases in torque per size.

– also available for small installation spaces and as heavy-duty versions.

– drive protected by rotation limiter.



Swivel times		
norelem	**Load (kg)**	**time / cycle**
20060-014	0,250	0,3
20060-024	0,400	0,7 s
20062-016	1,500	0,8 s

The specified guide values for cycle times were ascertained under operation specific conditions and represent effective values.

Selection overview						
Design	for small spaces			heavy-duty		heavy-duty
Driving torque	0,28	0,94	3,5	6,5	12	24
Rotation angle	0°-190°	0°-190°	0°-190°	0°-190°	0°-190°	0°-190°
Axial load (N)	300	280	350	1100	1800	1800
Radial load (N)	220	350	450	1600	2400	2400
norelem	**20060-014**	**20060-024**	**20062-016**	**20062-026**	**20065-019**	**20064-029**

Rotary module pneumatic



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

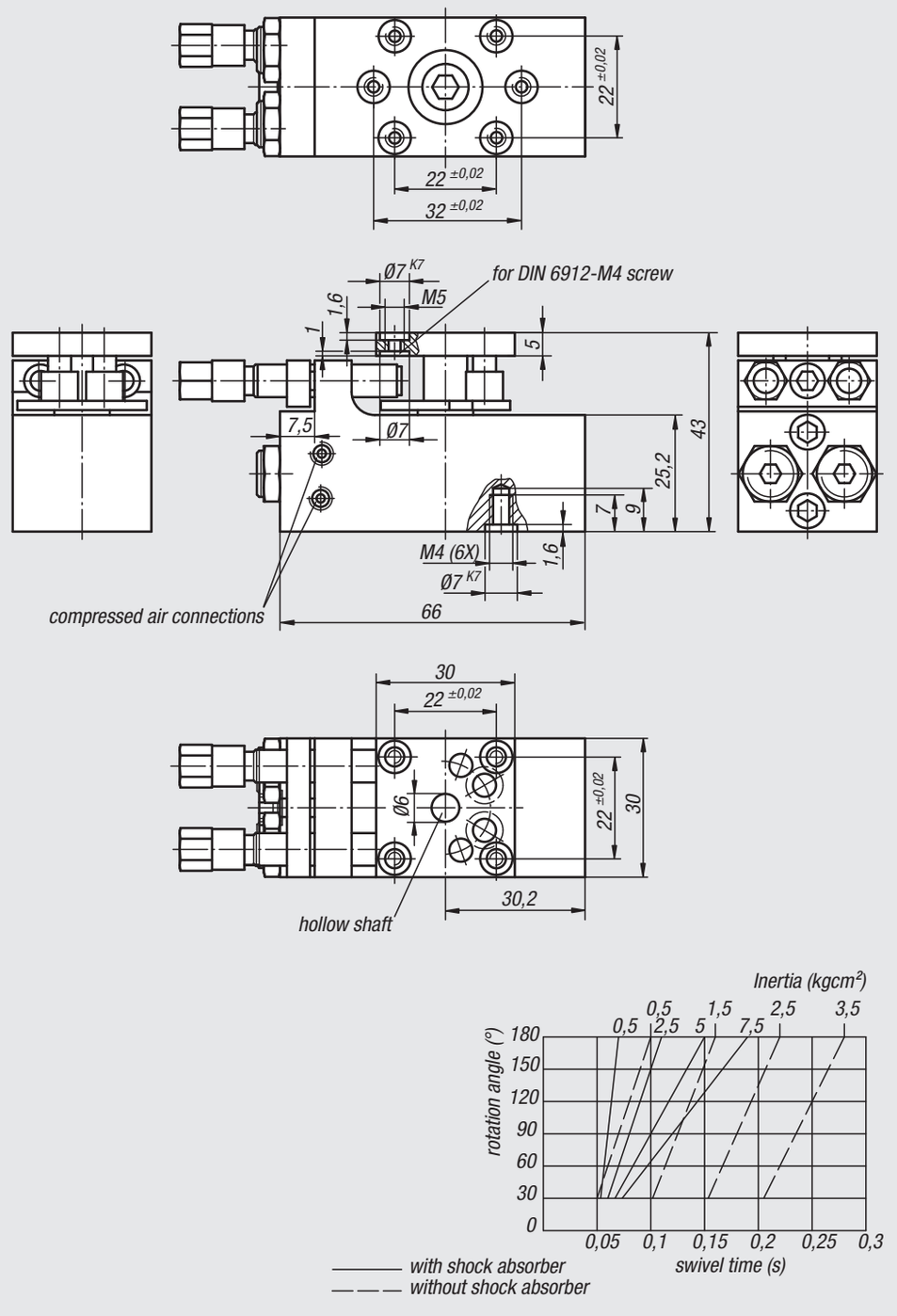
Sample order:
nlm 20060-014

Note:
Maintenance-free pneumatic rotary module for small installation spaces with double actuated drive cylinder. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

The 0° – 190° rotation angle is infinitely adjustable.

Repeat accuracy ±0.01°.

Accessories:
See table for shock absorber, proximitiy switch and plug connector.

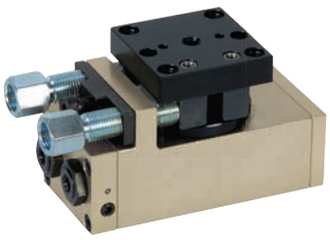




Order No.	Size	Driving torque Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20060-014	4	0,28	0° - 190°	300	220	2 x 10	5

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20060-014	4	26300-1010008	20915-010	20960-010X2000

Rotary module pneumatic



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20060-024

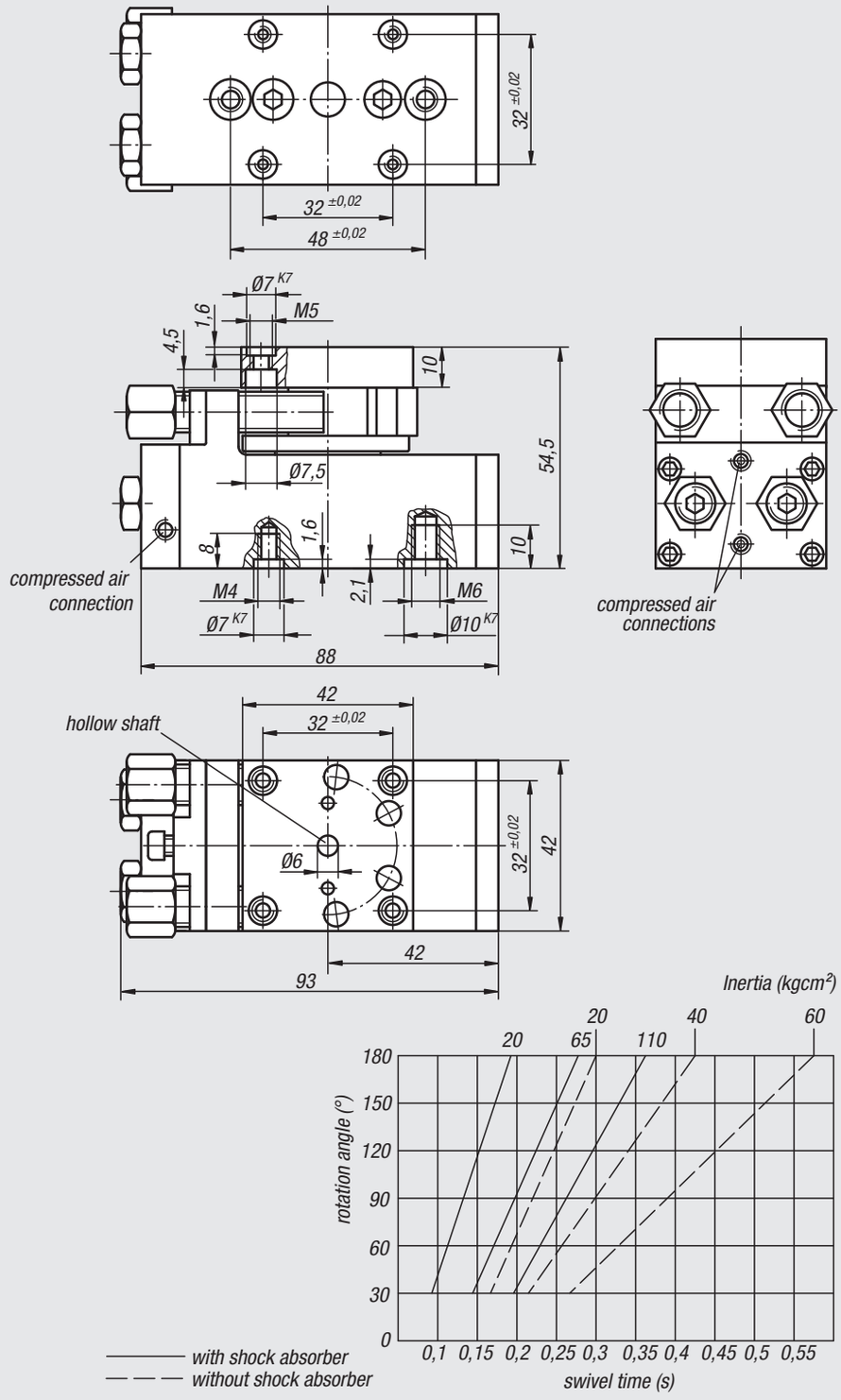
Note:
Maintenance-free pneumatic rotary module with double actuated drive cylinder. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5. Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

The 0° – 190° rotation angle is infinitely adjustable.

Repeat accuracy ±0.01°.

Accessories:
See table for shock absorber, proximitiy switch and plug connector.

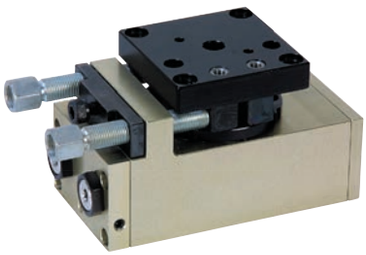




Order No.	Size	Driving torque Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20060-024	4	0,94	0° - 190°	280	350	2 x 14	19

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20060-024	4	26300-1210010	20915-020	20950-010X2000

Rotary module pneumatic



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20062-016

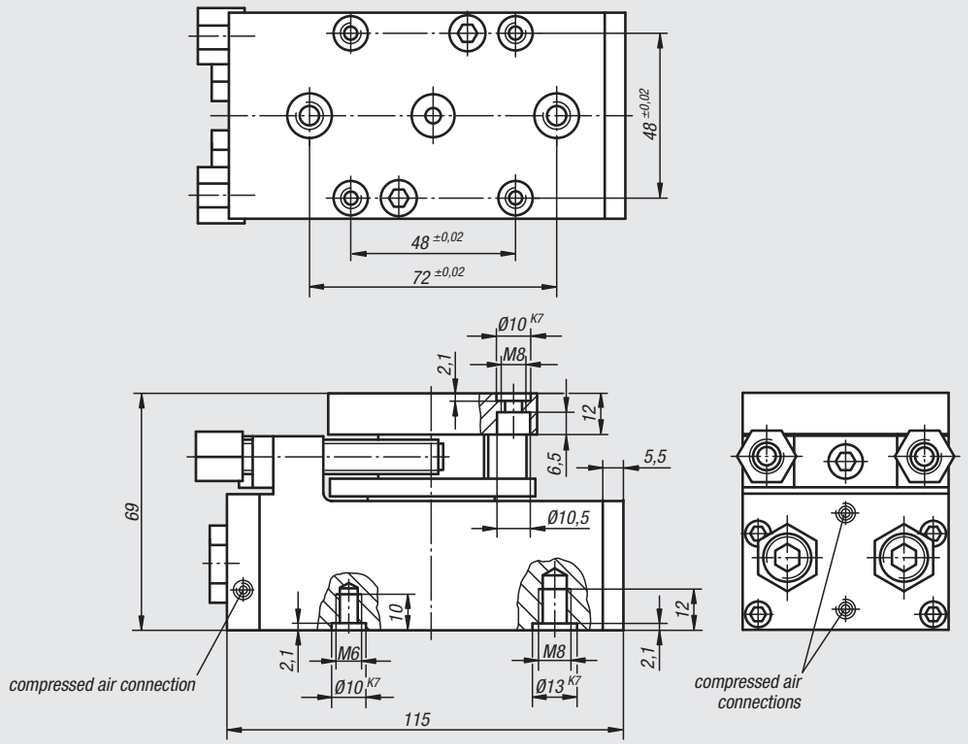
Note:
Maintenance-free pneumatic rotary module with double actuated drive cylinder. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

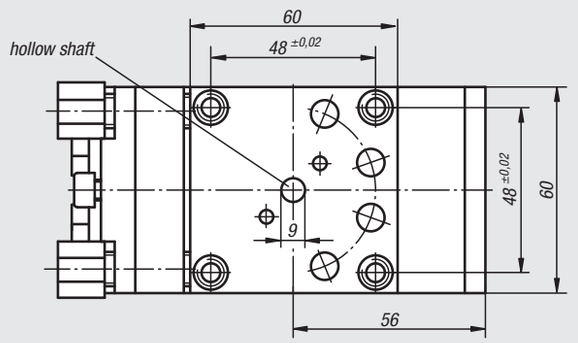
The 0° – 190° rotation angle is infinitely adjustable.

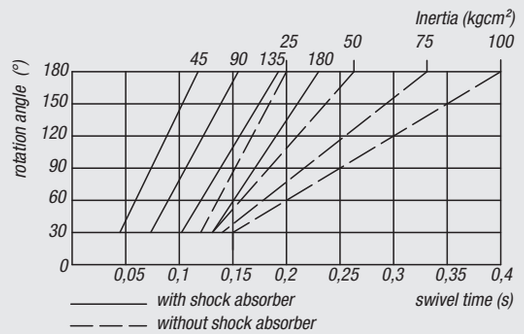
Repeat accuracy ±0.01°.

Accessories:
See table for shock absorber, proximitiy switch and plug connector.







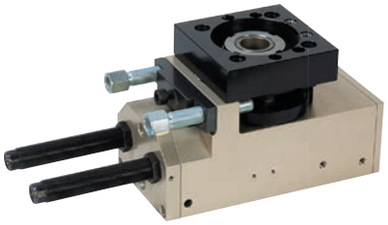


Order No.	Size	Driving torque Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20062-016	6	3,5	0° - 190°	350	450	2 x 22	45

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20062-016	6	26310-1410012	20915-030	20950-010X2000

Rotary module pneumatic

heavy duty version



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20062-026

Note:
Maintenance-free pneumatic rotary module with double actuated drive cylinder, heavy duty version. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection M5. Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

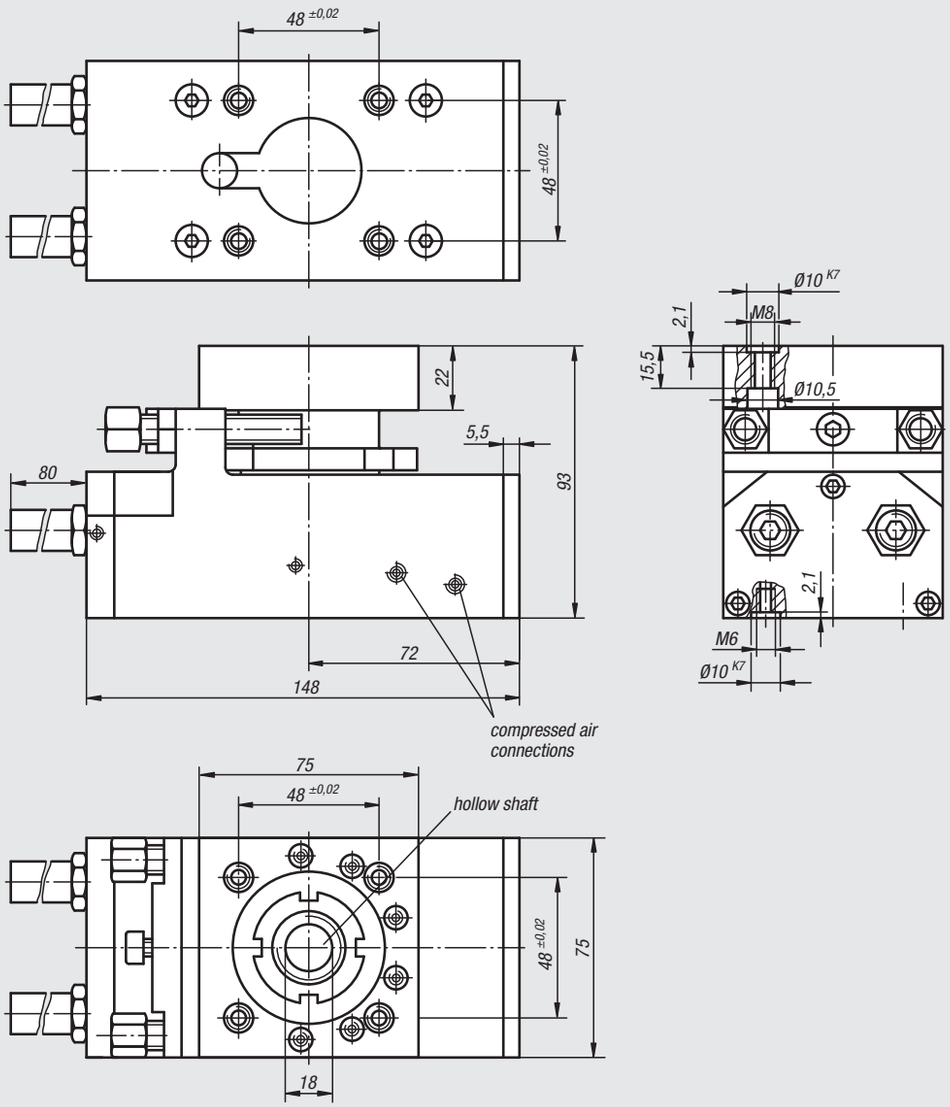
The 0° – 190° rotation angle is infinitely adjustable.

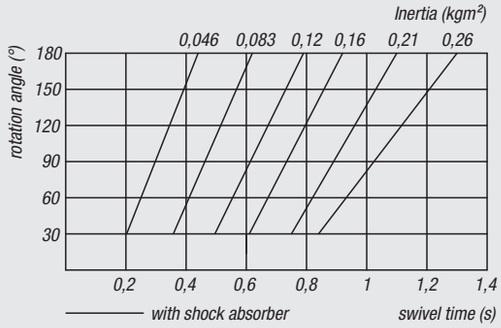
Repeat accuracy ±0.01°.

Shock absorbers are supplied.

Accessories:
See table for proximity switches and plug connectors.







Order No.	Size	Driving torque Nm	tilt moment max. Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20062-026	6	6,5	55	0° - 190°	1100	1600	2 x 25	88

Order No.	Size	Suitable proximity switch	Suitable plug connector
20062-026	6	20915-030	20950-010X2000

Rotary module pneumatic



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20064-019

Note:
Maintenance-free pneumatic rotary module with double actuated drive cylinder. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection R1/8. Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

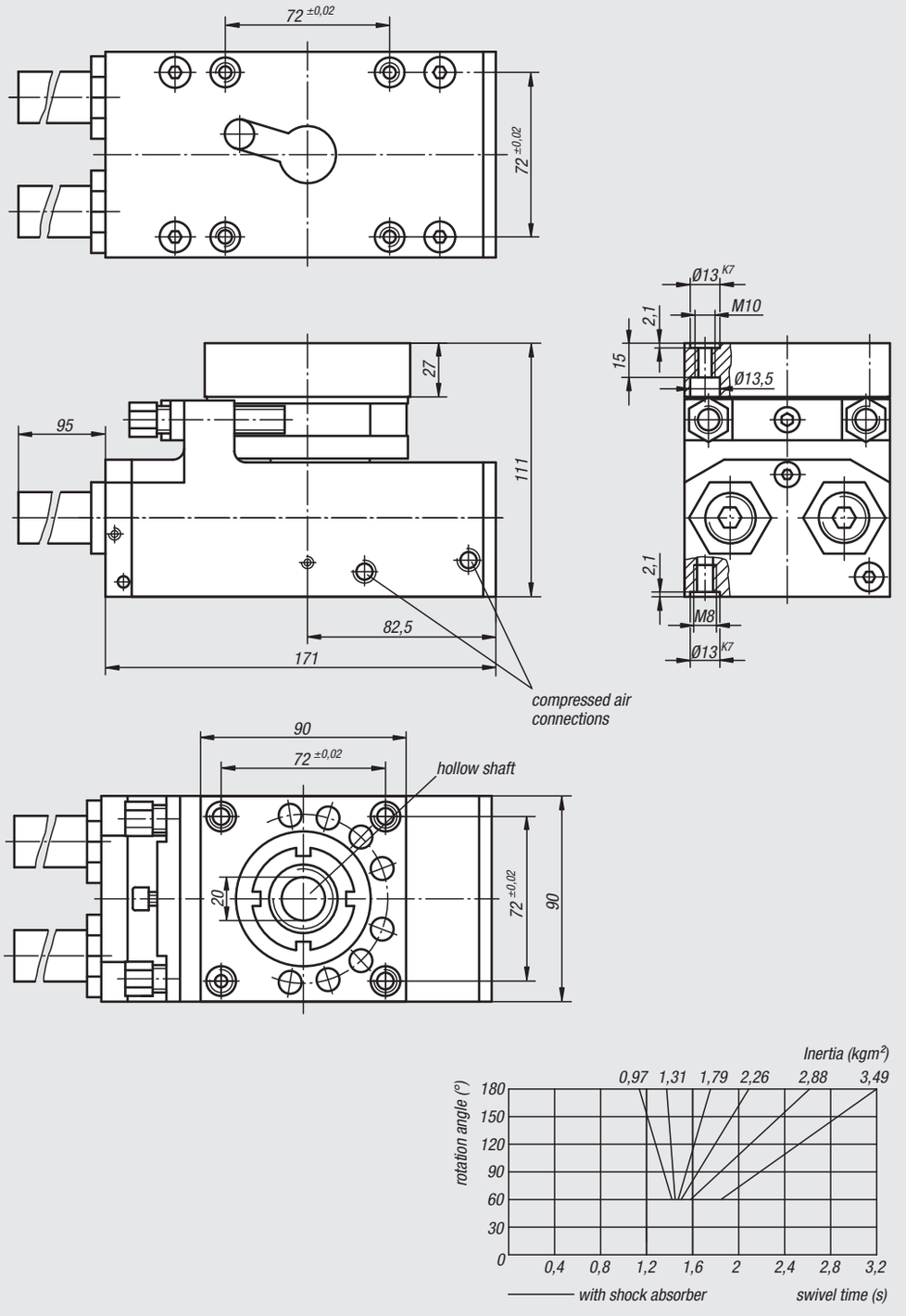
The 0° – 190° rotation angle is infinitely adjustable.

Repeat accuracy ±0.01°.

Shock absorbers are supplied.

Accessories:
See table for proximity switches and plug connectors.



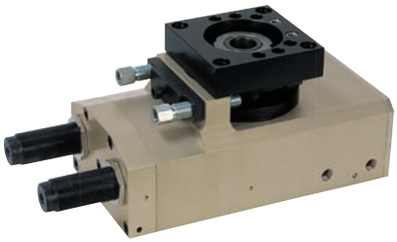


Order No.	Size	Driving torque Nm	tilt moment max. Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20064-019	9	12	110	0° - 190°	1800	2400	2 x 32	161

Order No.	Size	Suitable proximity switch	Suitable plug connector
20064-019	9	20915-030	20950-010X2000

Rotary module pneumatic

heavy duty version



Material:
Housing high-strength aluminium.
Stop system steel.

Version:
Housing anodised.
Stop system hardened and black oxidised.

Sample order:
nlm 20064-029

Note:
Maintenance-free pneumatic rotary module with double actuated drive cylinder, heavy-duty version. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Compressed air connection R1/8.
Modules of the same size can be combined with one another without adapter plates via the precise centring system by means of centring rings 20240.

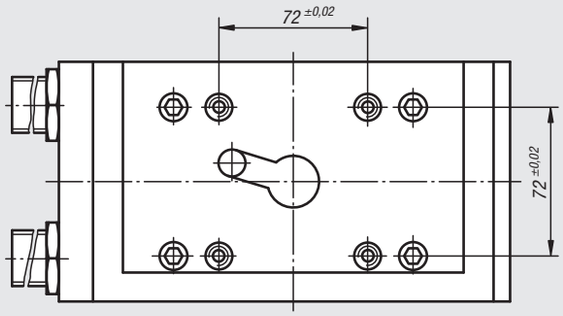
The 0° – 190° rotation angle is infinitely adjustable.

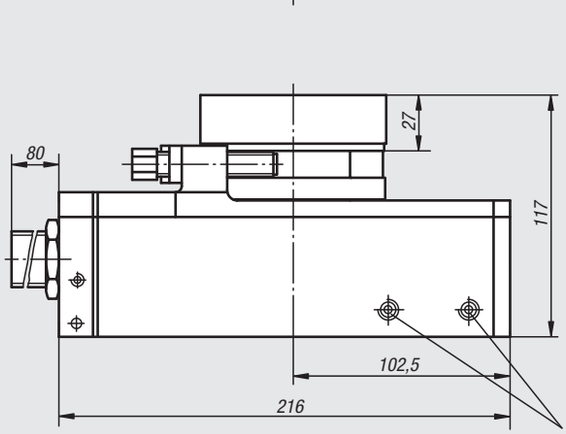
Repeat accuracy ±0.01°.

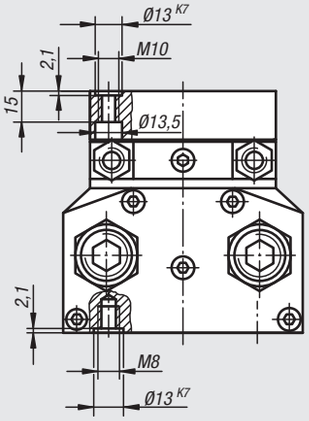
Shock absorbers are supplied.

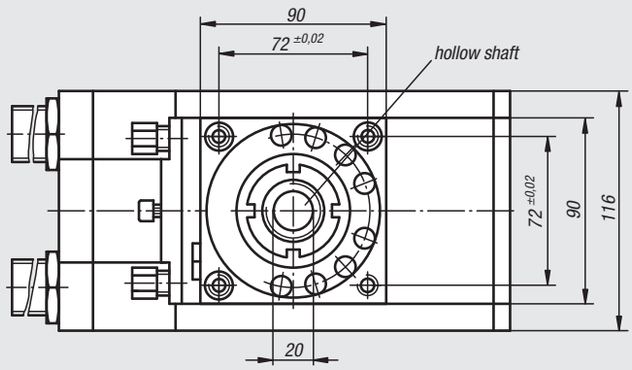
Accessories:
See table for proximity switches and plug connectors.

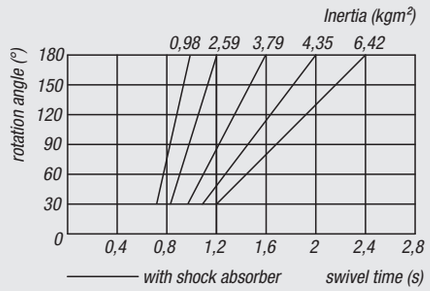












Order No.	Size	Driving torque Nm	tilt moment max. Nm	Rotation angle	Axial load N	Radial load N	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)
20064-029	9	24	110	0° - 190°	1800	2400	2 x 38	303

Order No.	Size	Suitable proximity switch	Suitable plug connector
20064-029	9	20915-030	20950-010X2000

Technical information for grip modules

Grip modules can be mounted in any position. The applications for pneumatic grip modules in assembly and machining are almost limitless.

These components can manage a multitude of functions such as centring, feeding, transposing and loading.

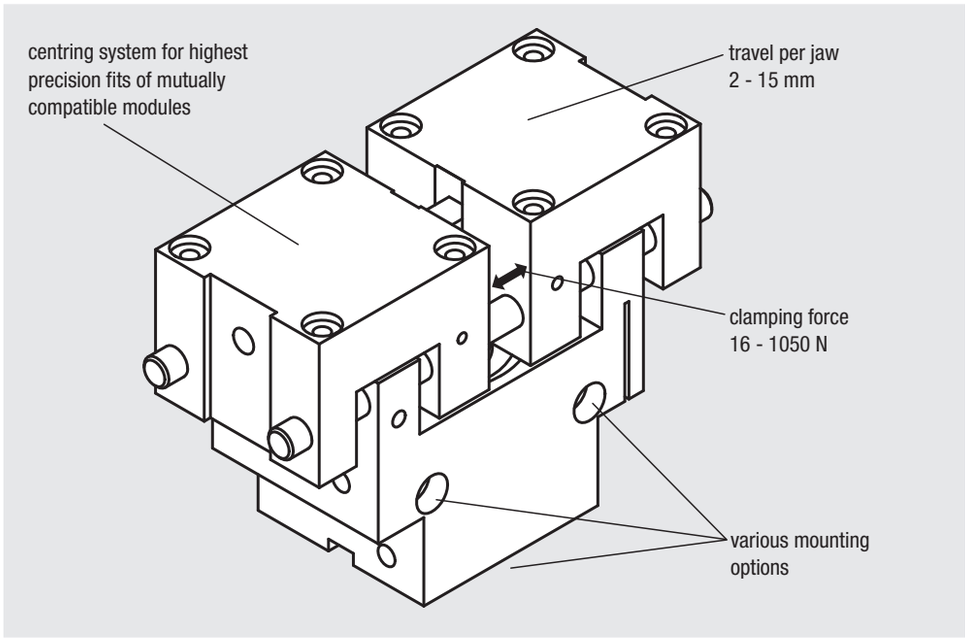
The standardised fastening holes allow diverse combinations with our other units.

– workpiece weight 0.08 kg – 4.74 kg.

– also for particularly robust use.

– grip force feedback - open, closed, part gripped.

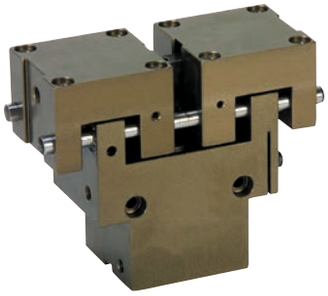
– steel slide – hardened and ground for universal use and long life.



Overview	
Type	Parallel grippers
Guidance	Steel slides
Design	robust
Travel per jaw (mm)	2 - 15
Clamping force at 6 bar (N)	16 - 1050
Workpiece weight (kg)	0,08 - 4,74
Finger length max. (mm)	15 - 140
Operating principle	Link rod kinematics
Application	Universal application in clean and lightly contaminated environments
norelem	**20100**

Grip module

parallel grippers



Material:
Housing high-strength aluminium.
Guide shafts and leverage steel.

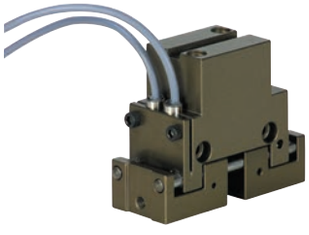
Version:
Housing coated with Hart-Coat®.
Guide shafts hardened and ground.

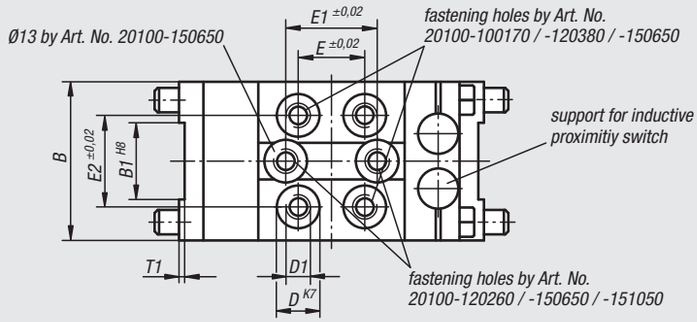
Sample order:
nlm 20100-030025

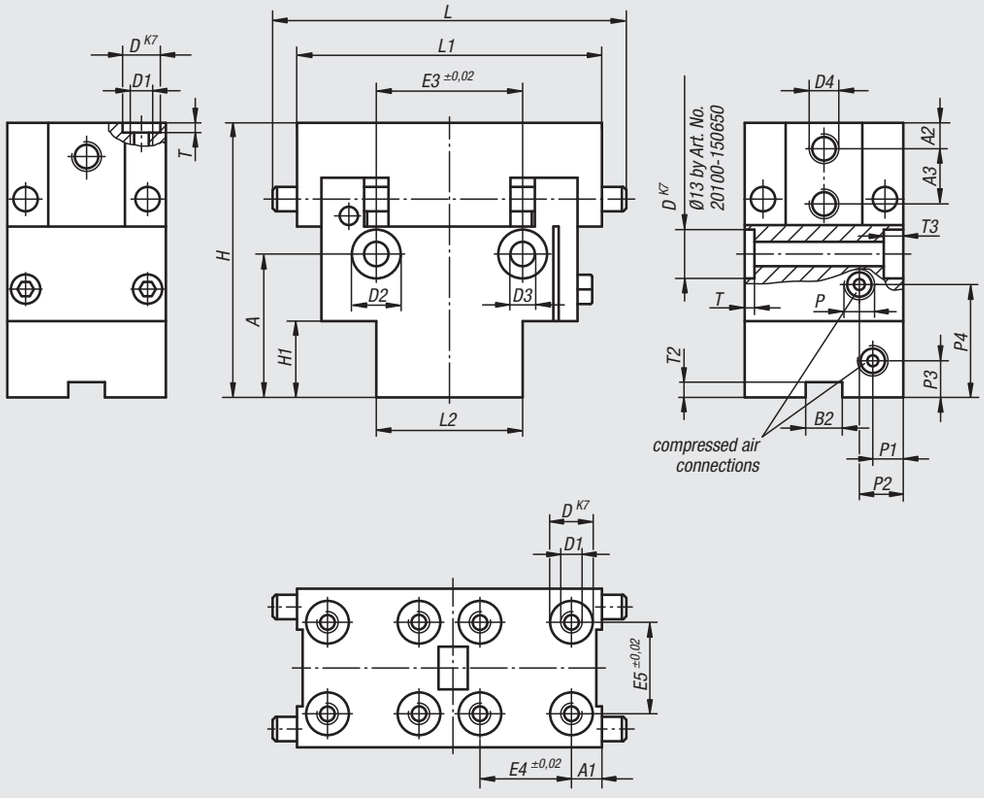
Note:
Maintenance-free pneumatic parallel gripper with leverage kinematics. Control by 4/2 or 5/2 directional valve. Pneumatic drive, 4-8 bar, constant, filtered (10 µm), dried, oiled or unoiled. Grips absolutely centrally. Can grip internally or externally. Proximity switches (accessories) can be integrated for end position feedback.

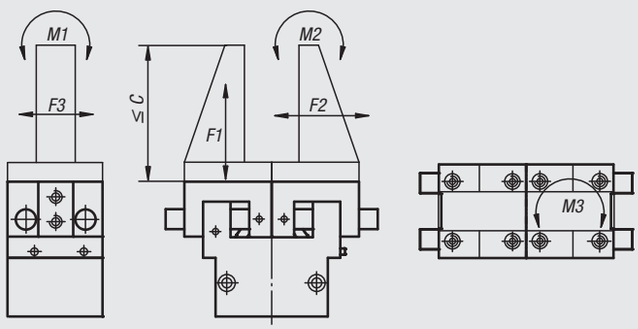
Repeat accuracy ±0.02 mm.

Accessories:
See table for proximity switches and plug connectors.









$$\frac{M1_{e''}}{M1_{zul}} + \frac{M2_{e''}}{M2_{zul}} + \frac{M3_{e''}}{M3_{zul}} \leq 1$$

$$\frac{F1_{e''}}{F1_{zul}} + \frac{F2_{e''}}{F2_{zul}} + \frac{F3_{e''}}{F3_{zul}} \leq 1$$

zul = permissible
e'' = calcula ted

Grip module

parallel grippers

Order No.	A	A1	A2	A3	B	B1	B2	D	D1	D2	D3	D4	E	E1	E2	E3
20100-030025	21,5	5	4,5	-	19	6	-	7	M3	6	3	M3	11	-	11	17,5
20100-040036	24	5	6	-	26	10	6	7	M4	7,5	4,3	M4	15	-	15	24
20100-050085	33,5	5	5	-	28	12	6	7	M4	7,5	4,3	M5	26	-	15	32
20100-100170	22,5	4,5	10	-	40	16	6	7	M4	7,5	4,3	M6	32	-	32	38
20100-120260	20	8	11	-	45	20	-	10	M6	10,5	6,4	M8	48	48	24	48
20100-120380	21	6	9	16	60	25	-	10	M6	10,5	6,4	M8	48	-	48	58
20100-120660	21	6	9	16	60	25	-	10	M6	10,5	6,4	M8	48	-	48	58
20100-150650	27	11	12	20	75	28	-	10	M6	13,5	8,2	M8	48	72	48	72
20100-151050	27	11	12	20	75	28	-	10	M6	13,5	8,2	M8	48	72	48	72

Order No.	E4	E5	H	H1	L	L1	L2	P	P1	P2	P3	P4	T	T1	T2	T3
20100-030025	-	11	40	13	40	34	19	M5	9,5	9,5	4,5	16	1,6	0,5	-	3,5
20100-040036	15	15	45	12,5	60	50	24	M5	4,5	7	6	18,5	1,6	1	2,5	4,2
20100-050085	20	20	56	20	70	60	34	M5	4	7	6,5	28	1,6	1	2,5	4,5
20100-100170	32	32	67	18,5	100	82	42	M5	9	9	6	27	1,6	1,5	2,5	4,5
20100-120260	32	32	81	23,5	120	96	60	R1/8	8	8	8	30,5	2,1	1,5	-	6,5
20100-120380	48	48	87	39	145	120	70	R1/8	15	15	11,5	30	2,1	2	-	6,5
20100-120660	48	48	87	39	145	120	70	R1/8	15	15	11,5	30	2,1	2	-	6,5
20100-150650	48	48	108	47	171	140	90	R1/8	22	22	15	38	2,1	2	-	9
20100-151050	48	48	108	47	171	140	90	R1/8	22	22	15	38	2,1	2	-	9

Order No.	Travel per jaw	Clamping force at 6 bar (N)	Expanding force at 6 bars (N)	Recommended workpiece weight kg	Cylinder-Ø	Air consumption per cycle at 6 bar (ccm)	Suitable proximity switch	Suitable plug connector
20100-030025	3	25	35	0,12	14	0,34	20900-010X2000	-
20100-040036	4	36	46	0,17	16	0,8	20900-030X3000	-
20100-050085	5	85	95	0,4	25	2,5	20900-030X3000	-
20100-100170	10	170	170	0,76	32	8	20900-040	20950-010X2000
20100-120260	12	260	260	1,17	40	15,1	20900-050	20950-010X2000
20100-120380	12	380	380	1,78	50	23,6	20900-040	20950-010X2000
20100-120660	12	660	660	2,96	50	23,6	20900-040	20950-010X2000
20100-150650	15	650	650	3	63	46,8	20900-050	20950-010X2000
20100-151050	15	1050	1050	4,74	63	46,8	20900-050	20950-010X2000

Order No.	M1 Nm	M2 Nm	M3 Nm	F1 N	F2 N	F3 N	C max.	Moment of inertia (10^{-3} kgm^2)
20100-030025	1,6	1,5	1,5	140	84	140	25	0,00632
20100-040036	3,9	3,7	1,3	250	82	71	40	0,0278
20100-050085	6	6	1,6	280	100	72	50	0,0767
20100-100170	12	14	12	540	150	400	65	0,416
20100-120260	27	30	12	1100	640	340	80	0,787
20100-120380	57	67	95	1500	350	2100	110	1,89
20100-120660	57	67	95	1500	350	2100	110	1,89
20100-150650	87	94	201	1900	890	3700	140	5,36
20100-151050	87	94	201	1900	890	3700	140	5,36

Notes

Technical information for pneumatic gantry modules

Note:
Pneumatically activated gantry modules in lengths as requested.

Drive is through a rodless cylinder integrated in the slide.

Three sizes are available with rail guide or round guides and travel up to 5000 mm with a repeat accuracy of ±0.02.

Application:
Gantry modules can be used anywhere loads are to be precisely guided. The profile structure with integrated drive cylinder is particularly well suited to cost-efficient integration in machining and assembly plants. The load bearing profile guarantees extreme rigidity with low module weight. The gantry module does not require a stable base structure, it is stable on its own and so is a load-bearing and space-saving element within a total system.

Features:
These gantry modules are constructed from heavy-duty, stiffened aluminium profiles. The user can choose between rail guide or round guide system. The structural dimensions of both guidance systems are identical. The gantry modules can be mounted in any position.

Advantages:
– low coefficients of friction due to rollers convert piston power almost entirely into motion force.

– low deflection makes high span sizes and long travel possible.

– optimised construction sizes with large piston diameters.

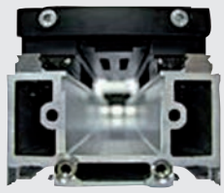
– high run accuracy.

– heavy loads possible due to stiffened self-supporting aluminium profiles.

– integrated shock absorbers and proximity switches can be mounted.

– steel cylinder cover (except for 20200-1065X0500).

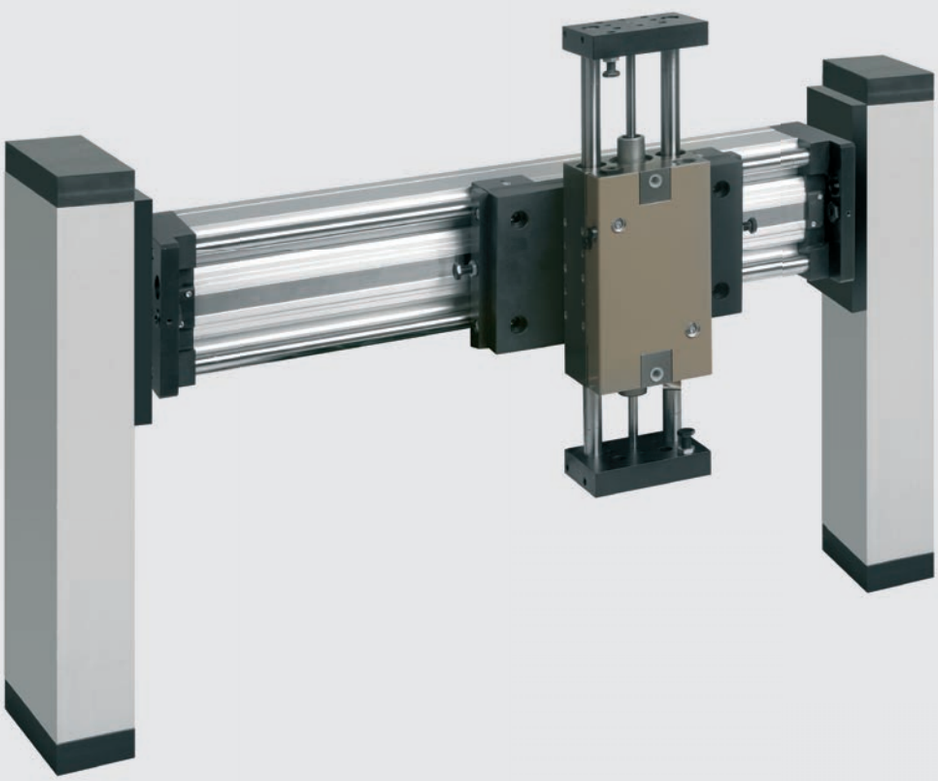
– optional: several intermediate positions possible.



Rail guide



Round guide



Linear gantry module

with rail guides



Material:
Body, carriage and flange plate aluminium alloy.
Guide rails steel

Version:
Body anodised natural colour.
Carriage and flange plate anodised.
Rail guides hardened.

Sample order:
nlm 20200-1065X0500 or to DIN specifications.

Note:
Portal modules with ball rail guides. Pneumatic drive through a rodless cylinder. High load rating due to stiffened self-supporting aluminium profiles. The modules can be mounted in any position. Specified loads apply to dynamic loads.

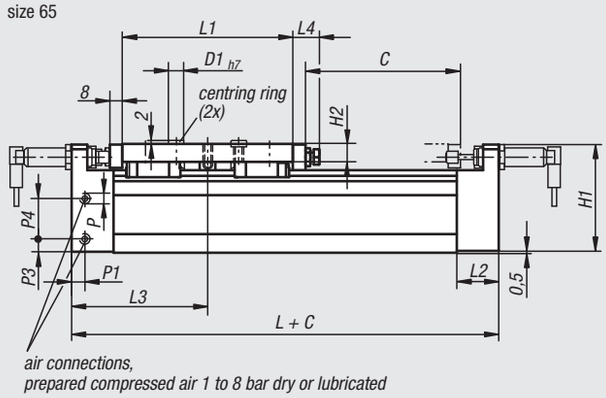
Repeat accuracy ±0.02 mm.

Temperature range:
+5 °C to +70 °C
(+5 °C to +60 °C by size 65)

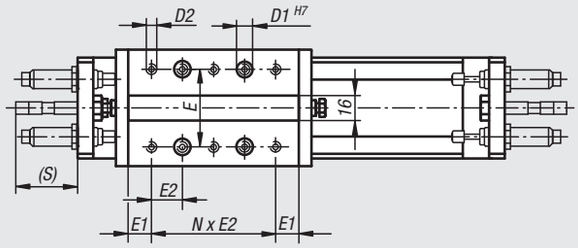
On request:
* Other lengths (travel C max. 5000 mm) and intermediate positions.

Accessories:
See table for shock absorbers, proximity switches and plug connectors.

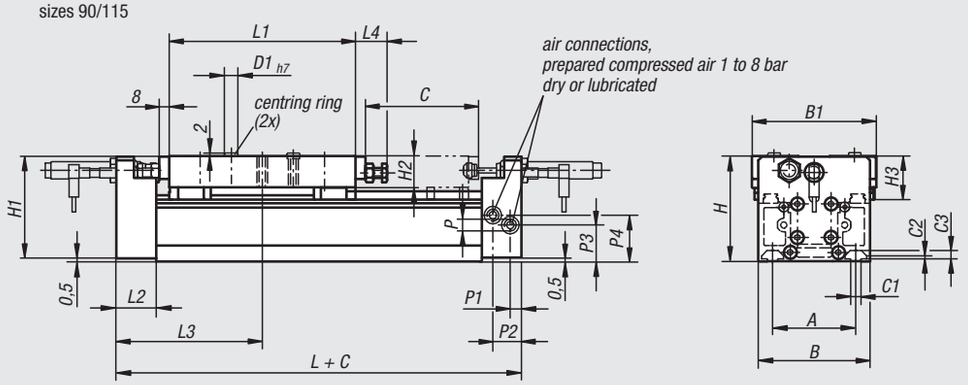
size 65

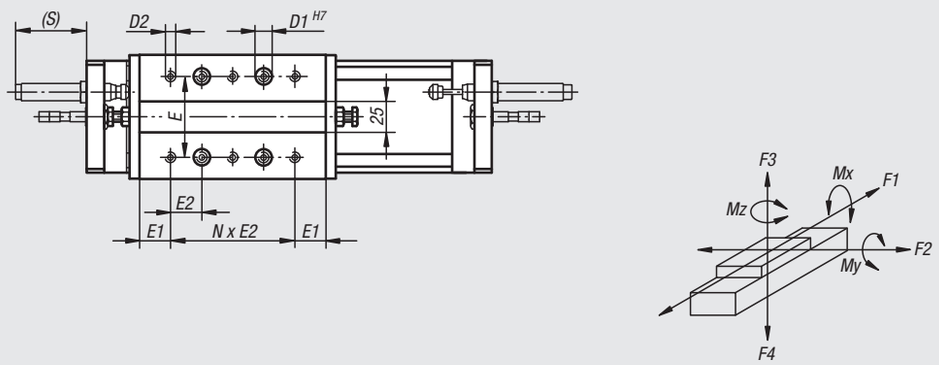


air connections,
prepared compressed air 1 to 8 bar dry or lubricated



sizes 90/115





Linear gantry module

with rail guides

Order No.	Size	A	B	B1	C1	C2	C3	C (travel)	D1	D2	E	E1	E2	H	H1	H2	H3	L
20200-1065X0500	65	42	65	75	8,1	2,5	6,8	500*	10	M5	50	15	20	70	69,5	11,5	21,5	175
20200-1090X0500	90	67	90	100	8,1	2,5	6,8	500*	10	M6	65	25	25	85	84,5	25	35	235
20200-1115X0500	115	97	125	135	10	5	8,5	500*	13	M8	90	20	30	115	114,5	25	44,8	305

Order No.	Size	L1	L2	L3	L4	N (number)	P	P1	P2	P3	P4	S
20200-1065X0500	65	110	27	87,5	17	4	M5	8,5	-	8,5	25,8	40
20200-1090X0500	90	150	32	117,5	25,5	4	G1/8	9	23	30	38	64,5
20200-1115X0500	115	220	32	152,5	25,5	6	G1/4	15,5	19,5	40,5	60,5	62,5

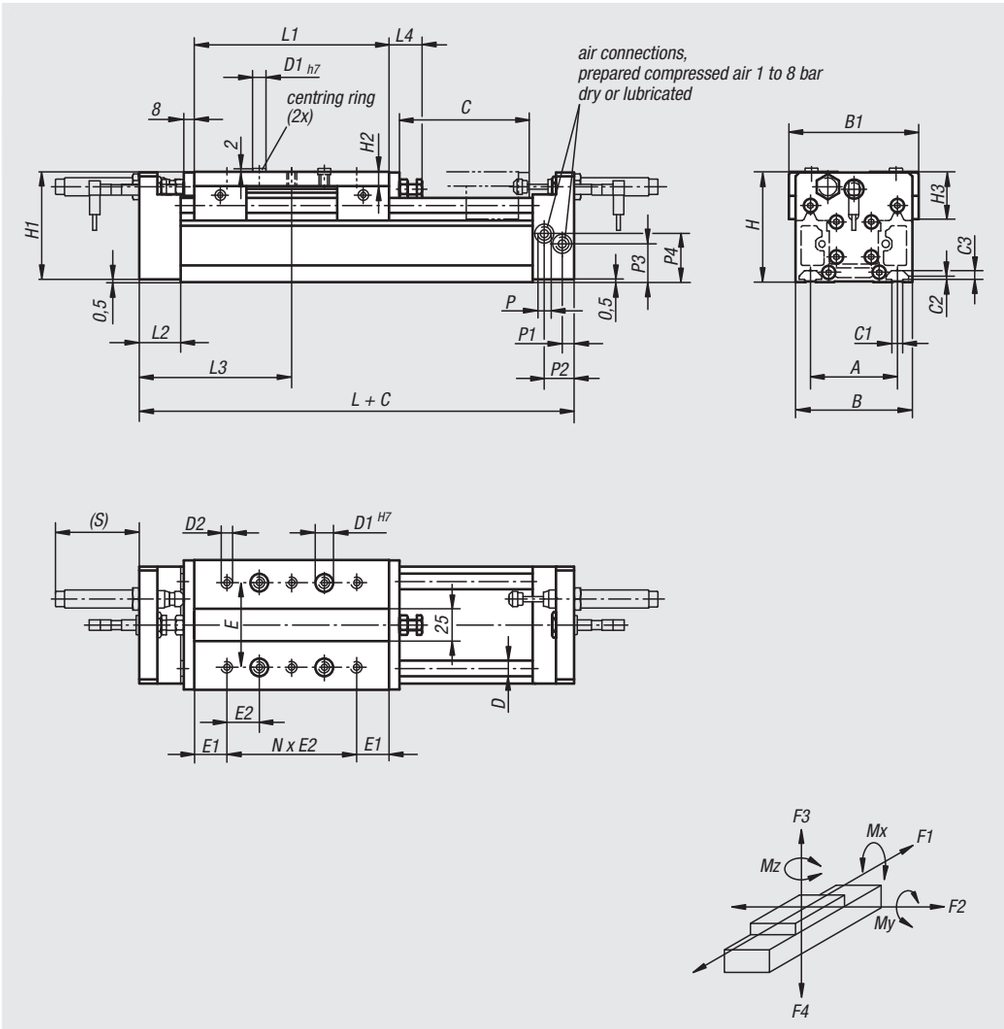
Order No.	Size	Piston force at 6 bar (N)	Cylinder-Ø	Air consumption per 10 mm travel at 6 bar (ccm)	Mx Nm	My Nm	Mz Nm	F1 N	F2 N	F3 N	F4 (N)
20200-1065X0500	65	150	18	18	155	260	260	460	610	610	610
20200-1090X0500	90	250	25	35	310	410	410	560	750	750	750
20200-1115X0500	115	640	40	88	1570	2270	2270	1550	2070	2070	2070

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20200-1065X0500	65	26300-1210010	20910-030	20950-010X2000
20200-1090X0500	90	26300-1415010	20910-030	20950-010X2000
20200-1115X0500	115	26300-2015016	20910-030	20950-010X2000

Linear gantry module

with round guides





Material:
Body, carriage and flange plate aluminium alloy.
Guide shafts steel.

Version:
Body anodised natural colour.
Carriage and flange plate anodised.
Rail guides hardened.

Sample order:
nlm 20200-2090X0500 or to DIN specifications.

Note:
Portal modules with precision steel shafts and ball guide bushes. Pneumatic drive through a rodless cylinder. High load rating due to stiffened self-supporting aluminium profiles. The modules can be mounted in any position. Specified loads apply to dynamic loads.

Repeat accuracy ±0.02 mm.

Temperature range:
+5 °C to +70 °C

On request:
* Other lengths (travel C max. 5000 mm) and intermediate positions.

Accessories:
See table for shock absorbers, proximity switches and plug connectors.

Linear gantry module

with round guides

Order No.	Size	A	B	B1	C1	C2	C3	C (travel)	D	D1	D2	E	E1	E2	H	H1	H2	H3	L
20200-2090X0500	90	67	90	100	8,1	2,5	6,8	500*	12	10	M6	65	25	25	85	84,5	11	36,5	235
20200-2115X0500	115	97	125	135	10	5	8,5	500*	16	13	M8	90	20	30	115	114,5	12,5	46,5	305

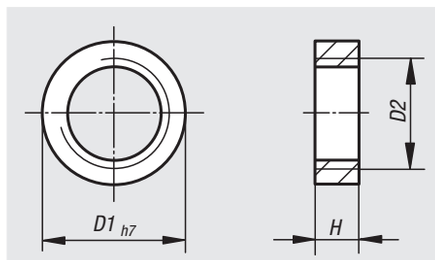
Order No.	Size	L1	L2	L3	L4	N (number)	P	P1	P2	P3	P4	S
20200-2090X0500	90	150	32	117,5	25,5	4	G1/8	9	23	30	38	64,5
20200-2115X0500	115	220	32	152,5	25,5	6	G1/4	15,5	19,5	40,5	60,5	62,5

Order No.	Size	Piston force at 6 bar (N)	Cylinder-Ø	Air consumption per 10 mm travel at 6 bar (ccm)	Mx Nm	My Nm	Mz Nm	F1 N	F2 N	F3 N	F4 (N)
20200-2090X0500	90	250	25	35	50	65	160	90	45	120	290
20200-2115X0500	115	640	40	88	70	130	310	180	90	145	340

Order No.	Size	Suitable shock absorber	Suitable proximity switch	Suitable plug connector
20200-2090X0500	90	26300-1415010	20910-030	20950-010X2000
20200-2115X0500	115	26300-2015016	20910-030	20950-010X2000

Centring rings





Material:
Stainless steel 1.4301.

Sample order:
nlm 20240-0705

Note:
Centring rings are for joining precisely or mounting modules indirectly by adapter plates.
The internal thread is for removing the centring rings.

Order No.	D1	D2	H
20240-0705	7	M5	3
20240-1008	10	M8	4
20240-1310	13	M10	4

Linear actuators with toothed belt drive

and profile rail guide



Material:
Body, extruded aluminium section.
Bearing housing and slide, aluminium.
Profile guide rail and guide carriage, steel.
Toothed belt, polyurethane with steel cord reinforcement.

Version:
Body natural colour anodised
Bearing housing and slide, black anodised.
Tracks of the profile guide rail, inductively hardened and ground.

Sample order:
nlm 20300-1060X1000

Note:
Compact and flexible linear actuators with toothed belt drive. The body consists of a self-supporting aluminium extruded section with integrated profile guide rail. This rail system is able to absorb highest forces from all directions, is low-wear, and is optimised for moving large masses.

Slots are located on the outer sides of the aluminium profile, ensuring easy, reliable assembly and enabling accessories mounted. Proximity switches can be positioned and fastened in the upper T-slot. The aluminium profile is fully compatible with our standard I series profiles.

The steel cord reinforced toothed belt enables high power transmission with alternating loads, and simultaneously ensures excellent positioning accuracy with low wear and very little noise generation. The toothed belt runs on the upper side of the aluminium profile in guide slots, thus protecting all parts housed within the profile from dirt.

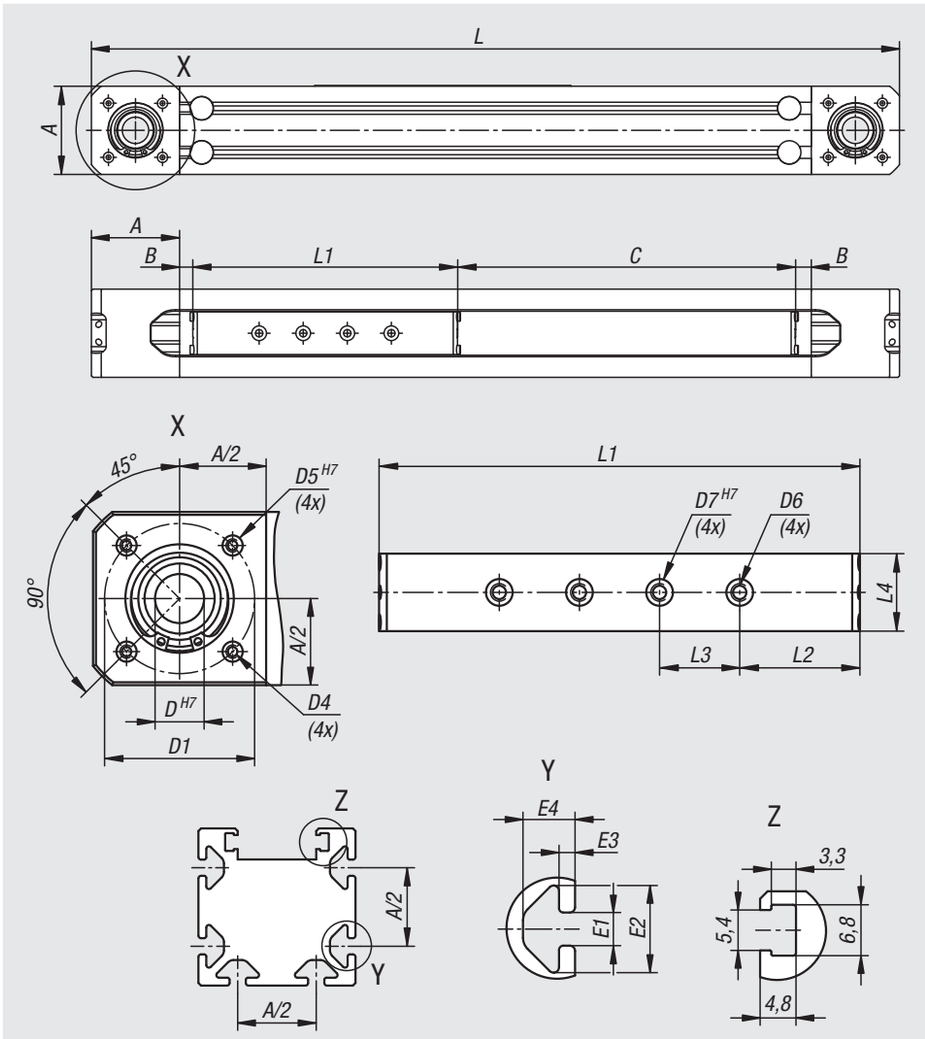
With its symmetrical design, the linear actuator enables motors and transmissions to be attached to all four sides of the bearing housing. The open ends of the unused hollow shafts on the bearing housing can be sealed using the optional protective caps 20300.

An additional centring hole is located on each tapped hole on the upper side of the slide. Other connecting elements can be precisely mounted on the slide in combination with the centring rings 20240.

Load specifications apply for dynamic loading.

Temperature range:
-20°C to +70°C.

On request:
Other lengths (travel C max. 4000 mm).



Accessories:
Protective caps. Slot table, motor adapter set, synchronisation set and proximity switch, see table.

Technical data:
Safety rating IP50.

Linear actuators with toothed belt drive

and profile rail guide

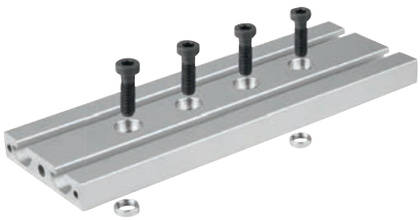
Order No.	Size	Matching cap	Matching slot table	Matching coupling set	Matching synchronisation set	Suitable proximitiy switch
20300-1060X0200	60	20300-91060	20310-06174	20320-604710	20330-6016	20905-015
20300-1060X0500	60	20300-91060	20310-06174	20320-604710	20330-6016	20905-015
20300-1060X1000	60	20300-91060	20310-06174	20320-604710	20330-6016	20905-015
20300-1060X1500	60	20300-91060	20310-06174	20320-604710	20330-6016	20905-015
20300-1080X0300	80	20300-91080	20310-08230	20320-806960	20330-8025	20905-015
20300-1080X0500	80	20300-91080	20310-08230	20320-806960	20330-8025	20905-015
20300-1080X1000	80	20300-91080	20310-08230	20320-806960	20330-8025	20905-015
20300-1080X1500	80	20300-91080	20310-08230	20320-806960	20330-8025	20905-015

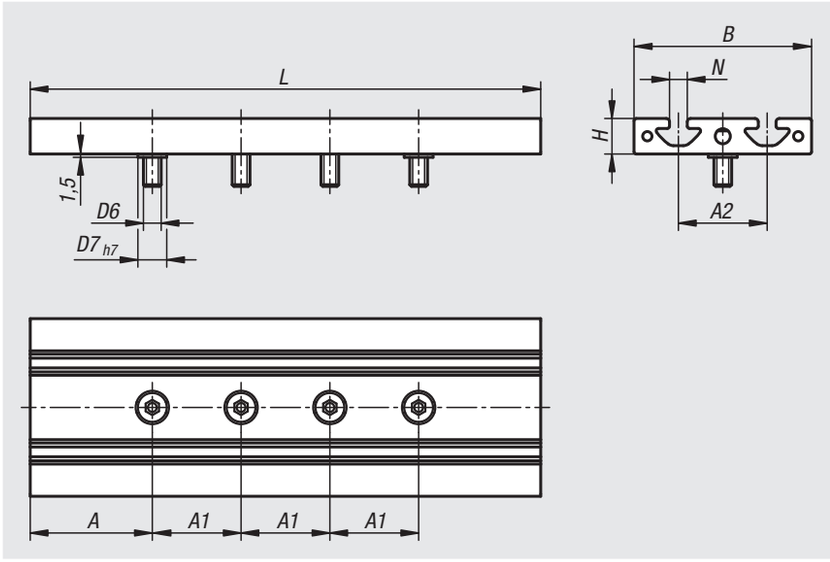
Order No.	Size	Slot width	A	B	C (travel)	D	D1	D4	D5	D6	D7	E1	E2	E3	E4	L	L1	L2	L3	L4
20300-1060X0200	60	6	60	25	200	17	52	M4	7	M6	10	6,2	16,3	3	9,75	550	180	45	30	29
20300-1060X0500	60	6	60	25	500	17	52	M4	7	M6	10	6,2	16,3	3	9,75	850	180	45	30	29
20300-1060X1000	60	6	60	25	1000	17	52	M4	7	M6	10	6,2	16,3	3	9,75	1350	180	45	30	29
20300-1060X1500	60	6	60	25	1500	17	52	M4	7	M6	10	6,2	16,3	3	9,75	1850	180	45	30	29
20300-1080X0300	80	8	80	30	300	24	76	M6	10	M8	13	8	20	4,5	12,25	760	240	60	40	45
20300-1080X0500	80	8	80	30	500	24	76	M6	10	M8	13	8	20	4,5	12,25	960	240	60	40	45
20300-1080X1000	80	8	80	30	1000	24	76	M6	10	M8	13	8	20	4,5	12,25	1460	240	60	40	45
20300-1080X1500	80	8	80	30	1500	24	76	M6	10	M8	13	8	20	4,5	12,25	1960	240	60	40	45

Order No.	Size	Repeat accuracy	Max. speed m/s	Max. acceleration m/s.	Weight of carriage kg	Weight Stroke 0 kg	Weight per 1000 mm stroke kg	Fx N	Fy dynamic N	Fz dynamic N
20300-1060X0200	60	±0,05	3	80	0,30	2,34	4,82	844	1384	1384
20300-1060X0500	60	±0,05	3	80	0,30	2,34	4,82	844	1384	1384
20300-1060X1000	60	±0,05	3	80	0,30	2,34	4,82	844	1384	1384
20300-1060X1500	60	±0,05	3	80	0,30	2,34	4,82	844	1384	1384
20300-1080X0300	80	±0,05	5	50	0,87	5,33	8,39	1572	3662	3662
20300-1080X0500	80	±0,05	5	50	0,87	5,33	8,39	1572	3662	3662
20300-1080X1000	80	±0,05	5	50	0,87	5,33	8,39	1572	3662	3662
20300-1080X1500	80	±0,05	5	50	0,87	5,33	8,39	1572	3662	3662

Order No.	Size	Mx dynamic Nm	My dynamic Nm	Mz dynamic Nm	Iy cm^4	Iz cm^4	Toothed belt type	Constant feed mm/rev	Idle torque Nm	Max. driving torque M Nm	Typical payload kg
20300-1060X0200	60	8	42	42	43,26	57,88	32AT5	101	0,3	14	15
20300-1060X0500	60	8	42	42	43,26	57,88	32AT5	101	0,3	14	15
20300-1060X1000	60	8	42	42	43,26	57,88	32AT5	101	0,3	14	15
20300-1060X1500	60	8	42	42	43,26	57,88	32AT5	101	0,3	14	15
20300-1080X0300	80	27	146	146	127,09	184,78	50AT5	146	0,7	38	50
20300-1080X0500	80	27	146	146	127,09	184,78	50AT5	146	0,7	38	50
20300-1080X1000	80	27	146	146	127,09	184,78	50AT5	146	0,7	38	50
20300-1080X1500	80	27	146	146	127,09	184,78	50AT5	146	0,7	38	50

T-slot tables





Material:
Table aluminium.
Centring rings 1.4301 stainless steel.
Screws steel.

Version:
Table natural tone anodised
Screws, bright.

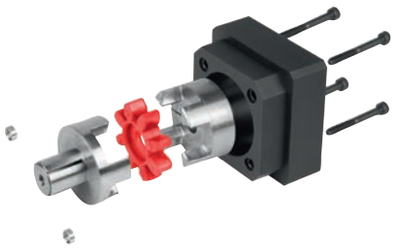
Sample order:
nlm 20310-06174

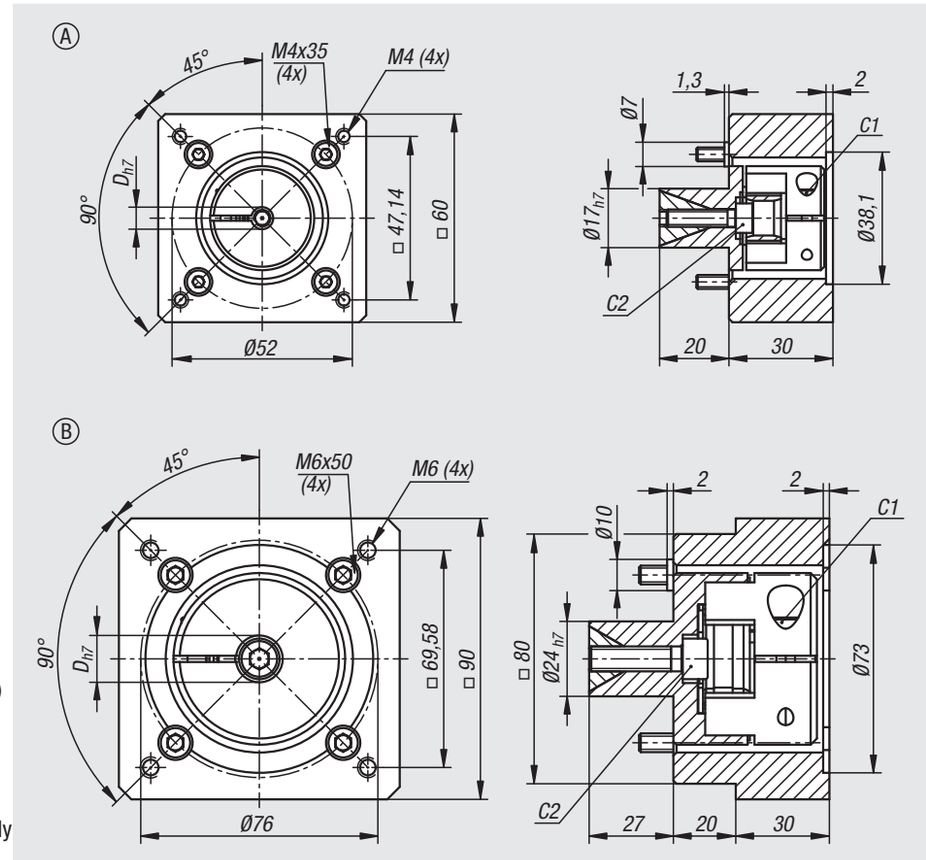
Note:
An additional centring hole is located on each tapped hole on the underside of the table, this enables the table to be precisely mounted on a linear guide slide using the centring rings.

The profile slots on the upper side enable universal mounting possibilities.

Order No.	Size	Type	Slot width	A	A1	A2	B	D6	D7	H	L	N
20310-06174	60	I	6	42	30	30	60	M6	10	12	174	6
20310-08230	80	I	8	55	40	40	80	M8	13	16	230	8

Motor adapter sets





Material:
Elastomer spider polyurethane Shore 98A.
Coupling housing and clamping hub, aluminium.
Expanding mandrel steel.
Screws steel.
Centring rings 1.4301 stainless steel.

Version:
Coupling housing black anodised.

Sample order:
nlm 20320-604710

Note:
The motor adapter set with elastomer dog coupling system (elastomer coupling with expanding mandrel) provides a simple and cost-effective solution for connecting electric motors.

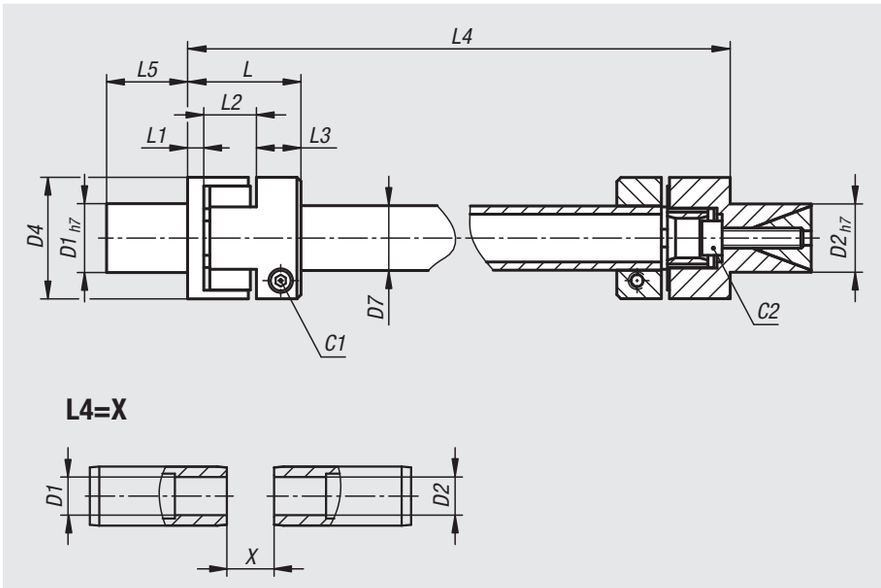
Advantages of the elastomer dog coupling:
- Hub with expanding mandrel can be mounted axially
- Play-free with vibration absorption
- Excellent retaining force
- Excellent concentric accuracy
- Short design
- Easy to assemble
- Can be mounted axially on spigot side
- Electrical insulation
- Nominal torque up to 30 Nm

On request:
Larger hub bore D.
Higher nominal torque.

Order No.	Form	Size	C1	C2	D	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Max. rpm	Tightening torque of screw C1 Nm	tightening torque of screw C2 Nm
20320-604710	A	60	M3	M5	6,35	4,8	0,01	20000	1,4	9
20320-806960	B	80	M6	M8	14	30	0,15	14000	15	32

Synchronisation sets





Material:
Elastomer spider, polyurethane Shore 98A.
Intermediate tube and clamping hub, aluminium.
Expanding mandrel steel.
Screws steel.

Version:
Bright.

Sample order:
nlm 20330-6016X500
(include length L4 = 500 mm)

Note:
The synchronisation set enables two parallel linear axles to be operated with just one motor.

Synchronisation sets consist of two couplings, which are connected with a synchronous shaft. They are produced to the appropriate length. Suitable for lengths up to max. 3000 mm.

Advantages of the elastomer dog coupling:
- Hub with expanding mandrel, can be mounted axially
- Play-free with vibration absorption
- Excellent retaining force
- Excellent concentric accuracy
- Short design
- Easy to assemble
- Can be mounted axially on spigot side
- Electrical insulation
- Nominal torque up to 53 Nm

Assembly:
An axial displacement of the attachment parts is not required as the intermediate tube can be inserted as a spacer between the coupling halves.

Both coupling halves with expanding mandrel are fully inserted into the hub bores of the linear units. The frictional connection is achieved by tightening the screws in the expanding mandrel to the specified torque. Push the coupling halves, together with the clamping hub and elastomer spider, onto the intermediate tube. Bring the intermediate tube into position and connect the coupling halves by manually applying a low level of axial force. Tighten the screws on both clamping hubs to the specified torque.

Drawing reference:
X = distance between shafts

Synchronisation sets



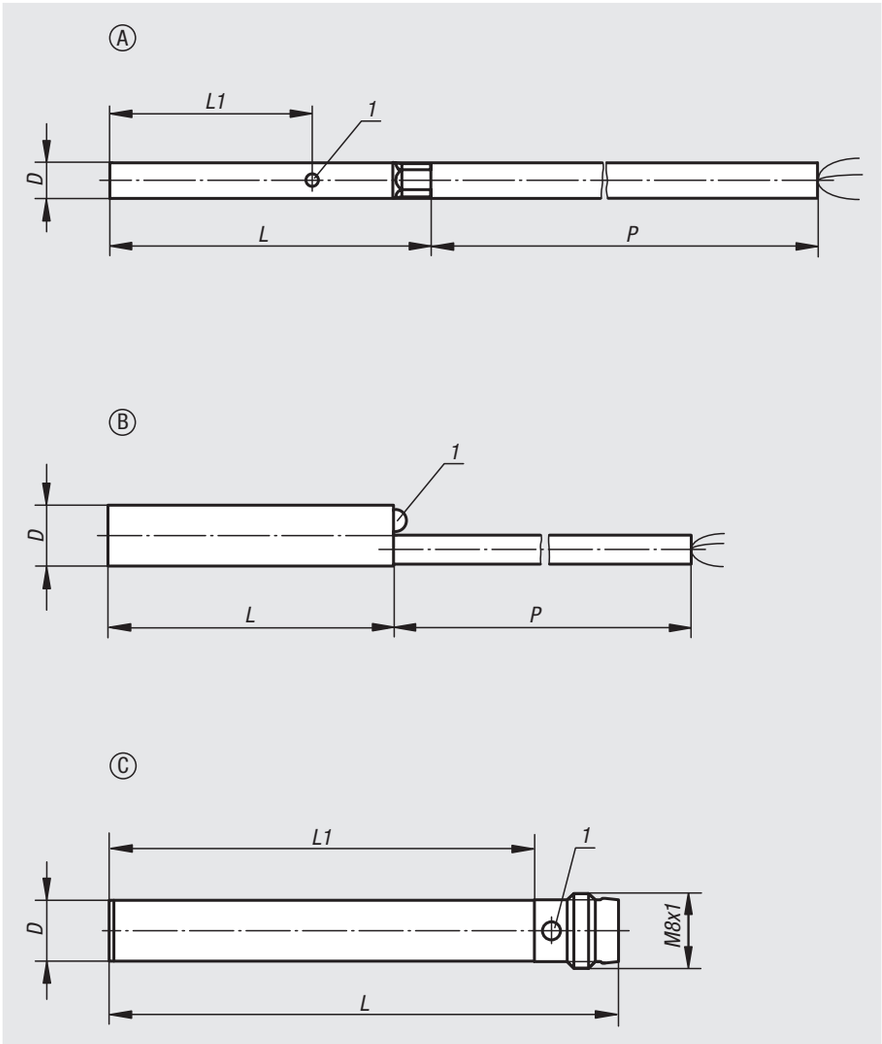
Order No.	Size	C1	C2	D1	D2	D4	D7	L	L1	L2	L3	L4 min.	L5	Nominal torque Nm
20330-6016X	60	M3	M5	17	17	32,2	16	28	4	13	11	80	20	6,5
20330-8025X	80	M6	M8	24	24	56,4	25	46	8	18	20	130	27	53

Order No.	Size	Moment of inertia (10^{-3} kgm^2) 0,5 m	Moment of inertia (10^{-3} kgm^2) 1,0 m	Moment of inertia (10^{-3} kgm^2) 2,0 m	Moment of inertia (10^{-3} kgm^2) 3.0 m	Max. rpm	tightening torque of screw C1 Nm	tightening torque of screw C2 Nm
20330-6016X	60	0,024	0,031	0,044	0,058	20000	1,4	9
20330-8025X	80	0,326	0,352	0,404	0,455	14000	15	32

Inductive proximity switches

round housing





Material:
Housing stainless steel.
Active face POM or PBT.

Version:
Voltage: U = 10 – 30 V DC
Function: Normally open
Switch type: PNP
Mounting type: flush
Security type: IP 67

Sample order:
nlm 20900-010X2000 or to DIN specifications.

Note:
Non-contact, wear-free operation. High switching frequency and switch accuracy. Non-sensitive to vibration, dust and moisture. Inductive sensors register all metals without contact.

Short-circuit and reverse-polarity proof.

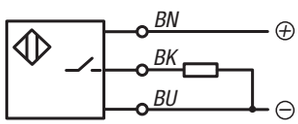
Temperature range:
-25 °C to +70 °C.

Safety:
This product is not suited as a sensor for the personal protection.

Drawing reference:
1) LED-indicator

P = cable length

BN = brown
BK = black
BU = blue

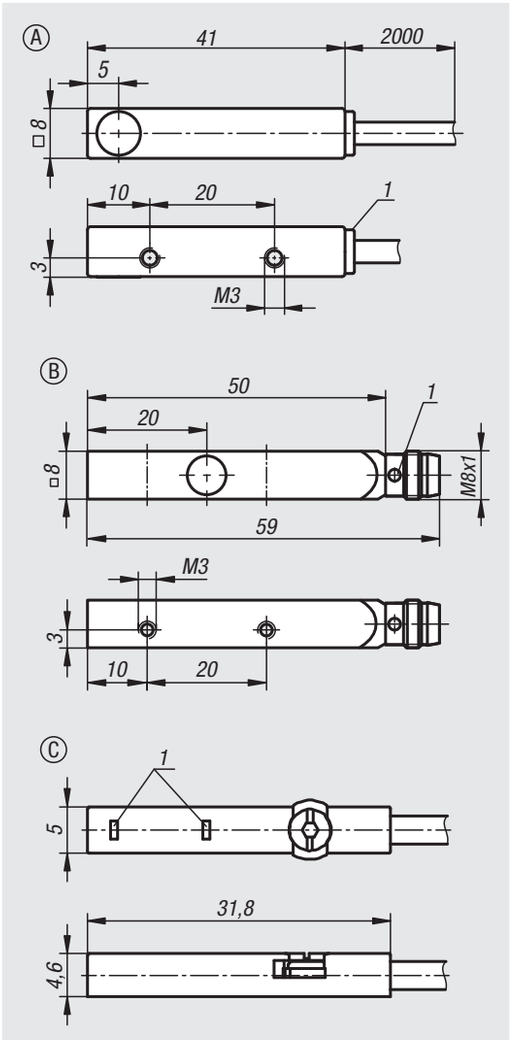


Order No.	Form	D	L	L1	P	material active surface	switching distance Sn (mm)	current I max. (mA)	switching frequency f (Hz)	connection type	No. of conductors x conductor cross-section
20900-010X2000	A	3	27	16,7	2000	POM	1	100	2000	PUR cable	3 x 0,09 mm²
20900-020X5000	A	4	27	15,4	5000	POM	1,5	100	3000	PUR cable	3 x 0,14 mm²
20900-030X3000	B	6,5	30	-	3000	PBT	1,5	200	3000	PVC cable	3 x 0,14 mm²
20900-040	C	6,5	55	43	-	PBT	1,5	200	3000	Connector	3
20900-050	C	6,5	60	48	-	PBT	1,5	200	5000	Connector	3

Inductive proximity switches

rectangular housing





Material:
Housing Form A plastic.
Housing Form B die-cast zinc alloy. Active face POM.
Housing Form C high-alloy stainless steel

Version:
Voltage: U = 10 – 30 V DC
Function: Normally open
Switch type: PNP
Mounting type: flush
Security type: IP 67

Sample order:
nlm 20905-010

Note:
Non-contact, functions wear-free with high switching frequency and accuracy. Non-sensitive to vibrations, dust and moisture. Inductive sensors record all metals without contact.

Form C enables screw fastening in a T-slot. Is safe and saves space as the proximity switch lays flush in the slot.

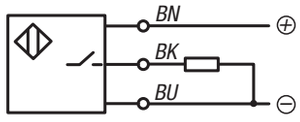
Short-circuit proof and reverse-polarity protected.

Temperature range:
-25 °C to +70 °C.

Safety:
This product is not suited as a sensor for the personal protection.

Drawing reference:
1) LED-indicator

BN = brown
BK = black
BU = blue

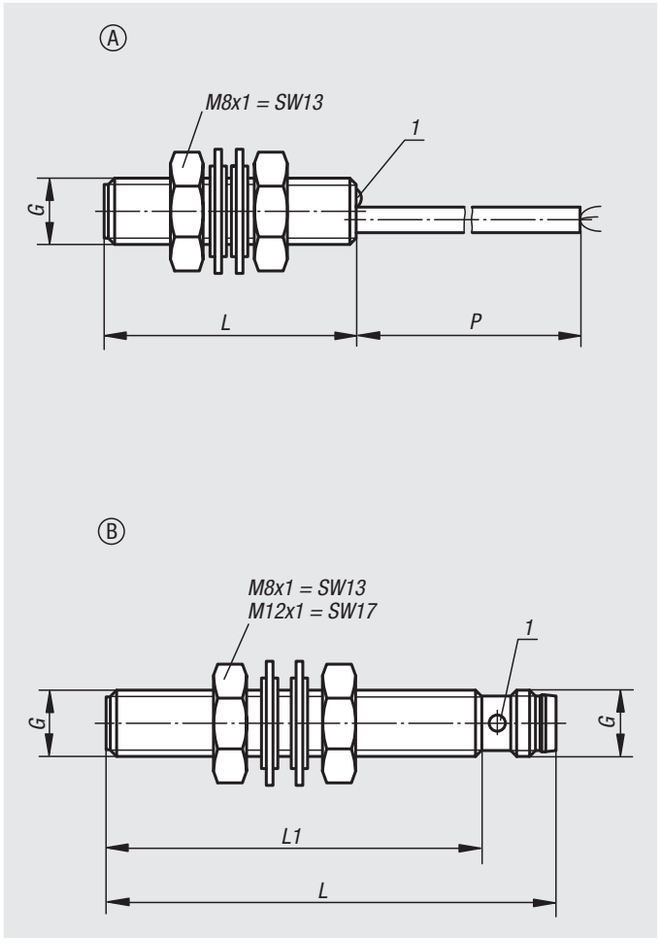


Order No.	Form	switching distance Sn (mm)	current I max. (mA)	switching frequency f (Hz)	connection type	No. of conductors x conductor cross-section
20905-005	A	2	100	1500	PUR cable	3 x 0,14 mm²
20905-010	B	1,5	200	5000	Connector	3
20905-015	C	1,5	150	4500	TPE-U (PU) CABLE	3 x 0,14 mm²

Inductive proximity switches

threaded housing





Material:
Housing stainless steel or nickel-plated brass.
Active face PBT or PA 12.

Version:
Voltage: U = 10 – 30 V DC
Function: Normally open
Switch type: PNP
Mounting type: flush
Security type: IP 67

Sample order:
nlm 20910-010X5000 or to DIN specifications.

Note:
Non-contact, wear-free operation. High switching frequency and switch accuracy. Non-sensitive to vibration, dust and moisture. Inductive sensors register all metals without contact.

Short-circuit and reverse-polarity proof.

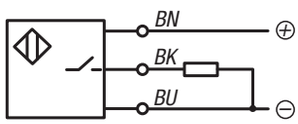
Temperature range:
-25 °C to +70 °C.

Safety:
This product is not suited as a sensor for the personal protection.

Drawing reference:
1) LED-indicator

P = cable length

BN = brown
BK = black
BU = blue

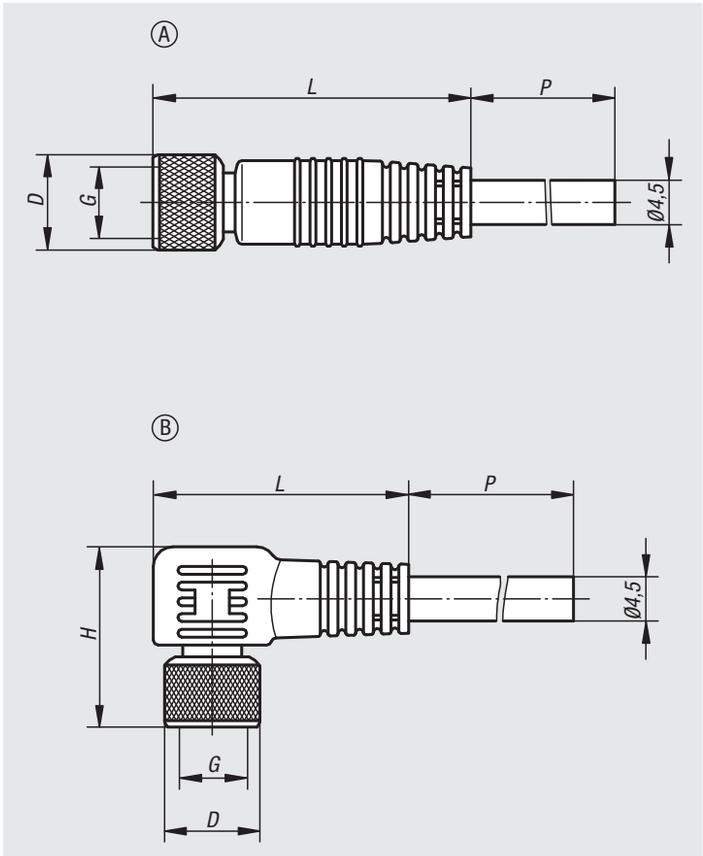


Order No.	Main material	Form	G	L	L1	P	material active surface	switching distance Sn (mm)	current I max. (mA)	switching frequency f (Hz)	connection type	No. of conductors x conductor cross-section
20910-010X5000	stainless steel	A	M8x1	30	-	5000	PBT	1,5	200	3000	PUR cable	3 x 0,14 mm²
20910-020	stainless steel	B	M8x1	45	34,5	-	PBT	2	200	1500	Connector	3
20910-030	stainless steel	B	M8x1	55	44,5	-	PBT	2	200	1500	Connector	3
20910-040	brass	B	M8x1	59	50	-	PA 12	1,5	100	1000	Connector	3
20910-050	brass	B	M8x1	59	50	-	PA 12	2	200	700	Connector	3
20910-060	brass	B	M12x1	65	50	-	PA 12	2	200	1200	Connector	3
20910-070	brass	B	M12x1	65	50	-	PA 12	4	200	500	Connector	3

Connectors

with screw fitting





Material:
Cable and housing PUR
Contacts gold-plated bronze.

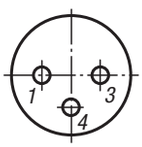
Version:
Bush (female)
Voltage: U max. 60 V
Current: I max. 4 A
Terminals: 3-pin
Security type: IP 67

Sample order:
nlm 20950-010X2000 or to DIN specifications.

Note:
Plug connector with screw fitting.
Plug encapsulated to cable.

Temperature range:
-25 °C to +70 °C.

Drawing reference:
1 = brown (BN)
3 = blue (BU)
4 = black (BK)

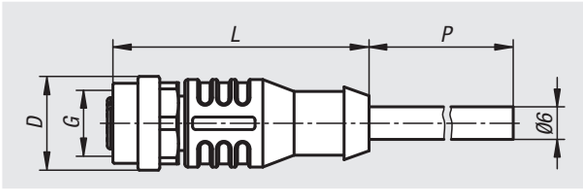


Order No.	Form	D	H	G	L	P	No. of conductors x conductor cross-section
20950-010X2000	A	9,7	-	M8x1	32	2000	3 x 0,25 mm²
20950-020X2000	A	14,5	-	M12x1	41,5	2000	3 x 0,34 mm²
20950-030X2000	B	9,7	18,2	M8x1	26	2000	3 x 0,25 mm²
20950-040X2000	B	14,5	26,5	M12x1	38,5	2000	3 x 0,34 mm²

Connectors

with screw fitting





Material:
Cable sheath and housing PVC.

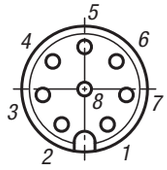
Version:
Bush (female)
Voltage: Ue 30 V
Current: Ie 2 A
No. of pins: 8
No. of wires: 8
Rating: IP 67
Grip body: black
Cable: grey

Sample order:
nlm 20952-1208X2500

Note:
Connector with screw lock. Connector moulded to cable.
Wires colour coded acc. to DIN 47100.
Coding A.
Limited dragchain compatibility.
Recommended tightening torque: 1.0 Nm.

Temperature range:
Moving: 0 °C to +80 °C
Fixed: –25 °C to +80 °C

Drawing reference:
1) White (WH)
2) Brown (BN)
3) Green (GN)
4) Yellow (YE)
5) Grey (GY)
6) Pink (PK)
7) Blue (BU)
8) Red (RD)



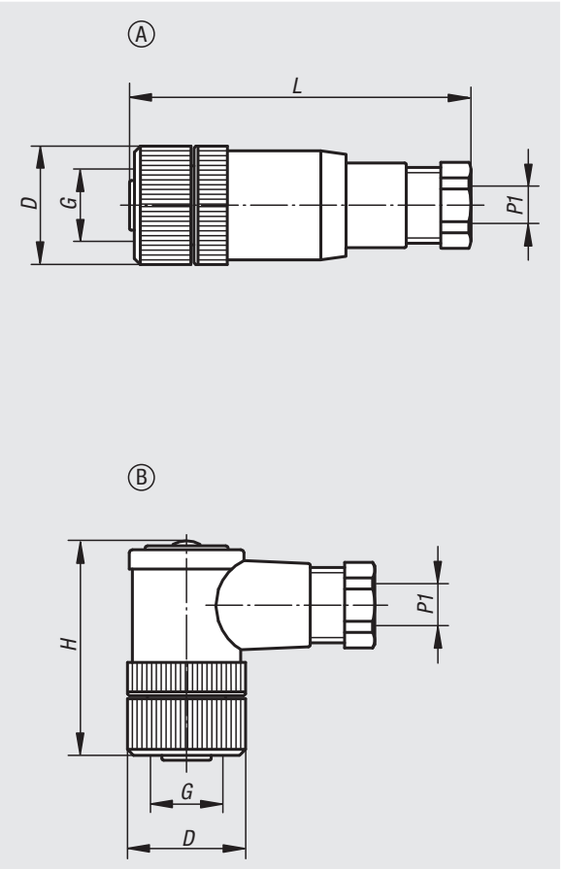


Order No.	D	G	L	P	No. of conductors x conductor cross-section
20952-1208X2500	14,5	M12x1	41,5	2500	8 x 0,25 mm²
20952-1208X5000	14,5	M12x1	41,5	5000	8 x 0,25 mm²
20952-1208X10000	14,5	M12x1	41,5	10000	8 x 0,25 mm²

Connectors

self-assembly with screw fitting





Material:
Housing, plastic
Contacts M8x1 gold-plated bronze.
Contacts M12x1 Optaloy-coated brass.

Version:
Bush (female)
Voltage: U max. 60 V
Current: I max. 4 A
Terminals: 3-pin (4-pin by M12x1)
Security type: IP 67

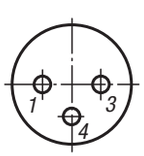
Sample order:
nlm 20955-010

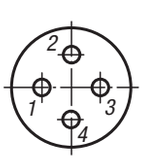
Note:
Plug connector for self-assembly with screw lock.

Temperature range:
-25 °C to +85 °C.

Drawing reference:
P1 = cable outlet

1 = brown (BN)
2 = white (WH)
3 = blue (BU)
4 = black (BK)



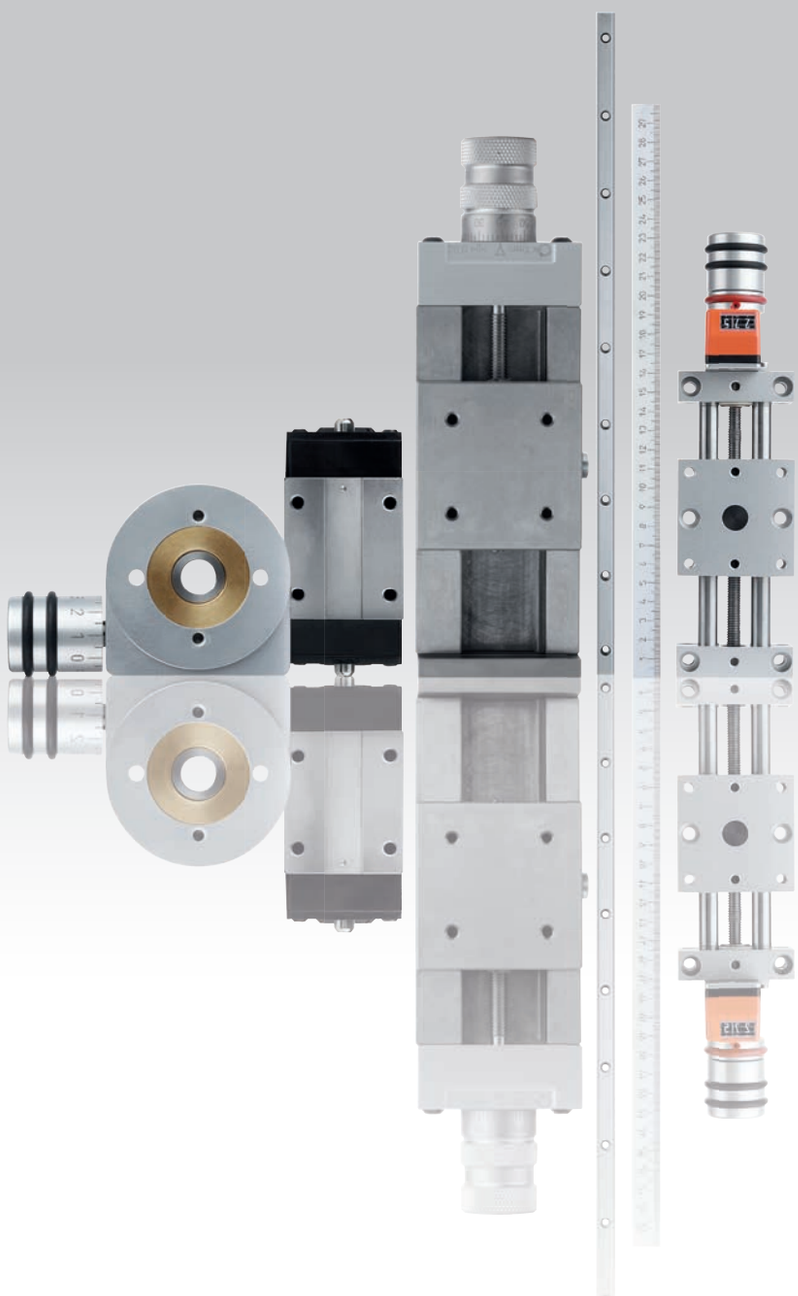


Order No.	Form	D	G	H	L	P1	connection type	Connection cross-section max. (mm²)
20955-010	A	12	M8x1	-	45	3,5 - 5	screw connection	0,5
20955-020	A	20	M12x1	-	54	4 - 6	screw connection	0,75
20955-030	B	12	M8x1	28	-	3,5 - 5	soldered connection	0,25
20955-040	B	20	M12x1	38	-	4 - 6	screw connection	0,75

Notes

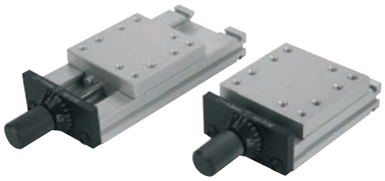
21000

Slides
Guide rails
Positioning stages
Linear guide systems
Position indicators



Dovetail slides

with micrometer spindle



Material:
Aluminium EN AW-6063

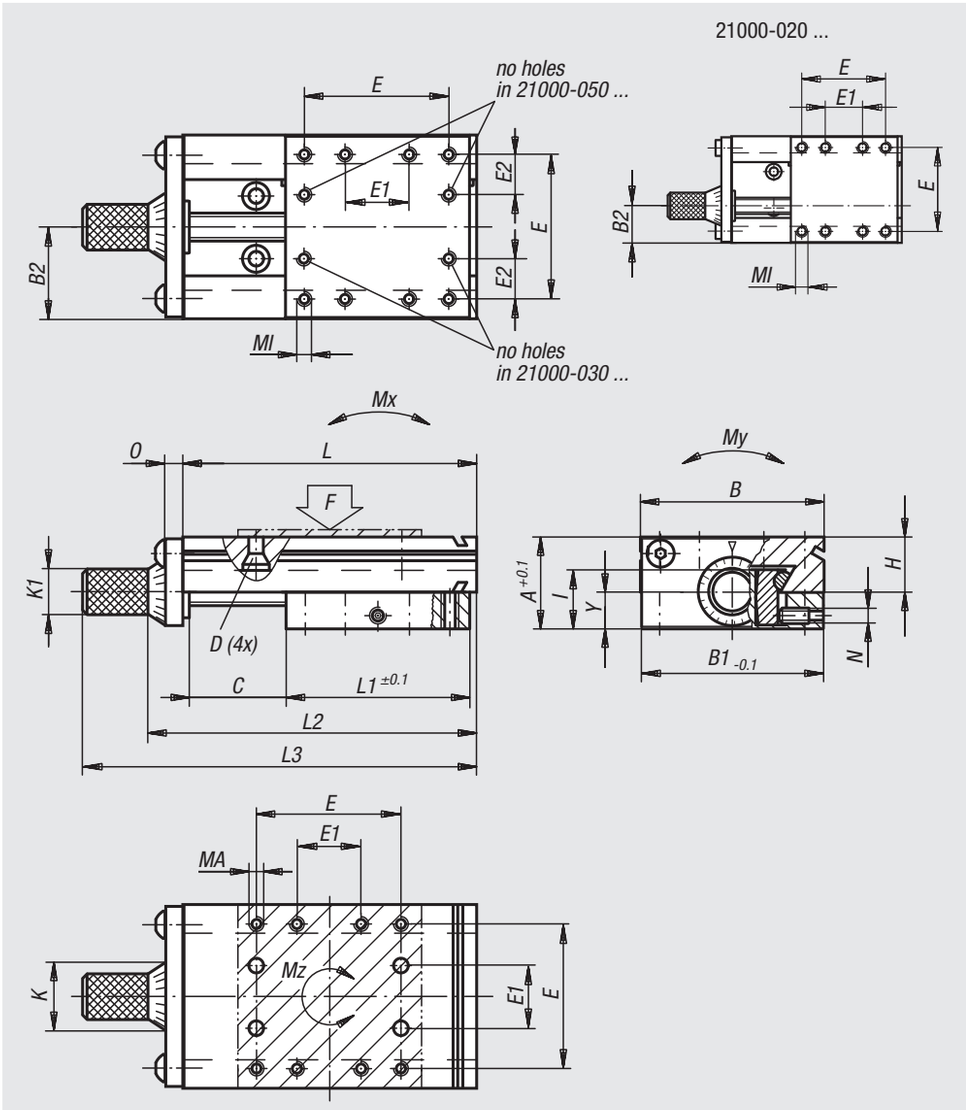
Sample order:
nlm 21000-050105

Note:
These precision dovetail slides find use in machine and fixture construction, metrology, optical instruments and fine mechanics.
The stated permissible load rating (F) is for static loads.
The torque values only apply for centred carriages.

M1 = counterbore for screw.
TI = number of fastening holes E1/E2/M1 inside.
TA = number of fastening holes E/E1/MA outside.

Advantages:
- Innovative and safe clamping system without height or lateral displacement.
- No play in guides.
- Rapid subsequent combination in X, Y and Z axes.

Applications:
- Adjustment of machining units, metrology cameras, mirrors, microscopes and laser heads (including the machining of surgical needles).
- Fine adjustment of brazing, plasma and welding heads.
- Focussing of flame nozzles.



Dovetail slides

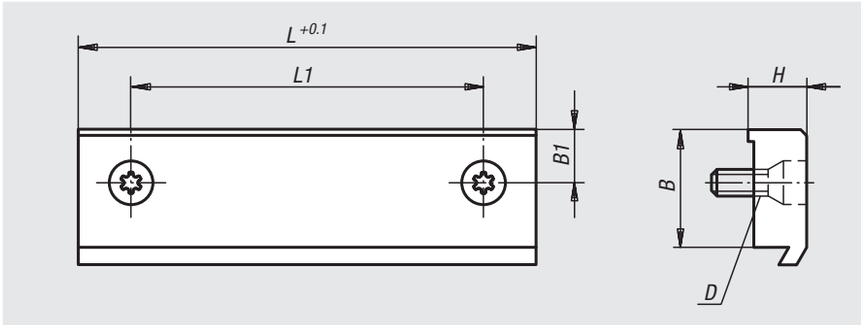
with micrometer spindle

Order No.	A	B	B1	B2	C travel	D for screw	E	E1	E2	TI	TA	H	I	K	K1
21000-020030	13	20 -0,3	19,5	8,1	5	M2	12	6	-	8	8	8	8,3	10	6,3
21000-020035	13	20 -0,3	19,5	8,1	10	M2	12	6	-	8	8	8	8,3	10	6,3
21000-020045	13	20 -0,3	19,5	8,1	20	M2	12	6	-	8	8	8	8,3	10	6,3
21000-030040	15	30 -0,3	29,5	13	5	M3	23	8	7,5	10	8	9,8	9,8	10	6,3
21000-030045	15	30 -0,3	29,5	13	10	M3	23	8	7,5	10	8	9,8	9,8	10	6,3
21000-030055	15	30 -0,3	29,5	13	20	M3	23	8	7,5	10	8	9,8	9,8	10	6,3
21000-050067	23	50 -0,3	49,5	25	12	M4	38	16	11	10	8	14,5	15,6	22	14,3
21000-050080	23	50 -0,3	49,5	25	25	M4	38	16	11	10	8	14,5	15,6	22	14,3
21000-050105	23	50 -0,3	49,5	25	50	M4	38	16	11	10	8	14,5	15,6	22	14,3
21000-080110	34	80 -0,5	79,5	40	25	M5	60	34	13	12	8	23	22,5	26	14,3
21000-080135	34	80 -0,5	79,5	40	50	M5	60	34	13	12	8	23	22,5	26	14,3
21000-080160	34	80 -0,5	79,5	40	75	M5	60	34	13	12	8	23	22,5	26	14,3
21000-080185	34	80 -0,5	79,5	40	100	M5	60	34	13	12	8	23	22,5	26	14,3
21000-120150	45	120 -0,5	119	60	25	M5	90	40	25	12	8	30	29	26	14,3
21000-120175	45	120 -0,5	119	60	50	M5	90	40	25	12	8	30	29	26	14,3
21000-120200	45	120 -0,5	119	60	75	M5	90	40	25	12	8	30	29	26	14,3
21000-120225	45	120 -0,5	119	60	100	M5	90	40	25	12	8	30	29	26	14,3

Order No.	L	L1	L2	L3	MI	MA	N	O	Y	Spindle	F N	Mx Nm	My Nm	Mz Nm
21000-020030	30	20	38,2	48,2	M2x3	M2x3	M3	3	5,2	M5x0,5	180	0,45	2	0,3
21000-020035	35	20	43,2	53,2	M2x3	M2x3	M3	3	5,2	M5x0,5	180	0,45	2	0,3
21000-020045	45	20	53,2	63,2	M2x3	M2x3	M3	3	5,2	M5x0,5	180	0,45	2	0,3
21000-030040	40	30	48,2	58,2	M3x4,5	M3x4,5	M4	3	5,8	M5x0,5	350	1,1	4	1
21000-030045	45	30	53,2	63,2	M3x4,5	M3x4,5	M4	3	5,8	M5x0,5	350	1,1	4	1
21000-030055	55	30	63,2	73,2	M3x4,5	M3x4,5	M4	3	5,8	M5x0,5	350	1,1	4	1
21000-050067	67	50	78,2	98,2	M4x6	M4x8	M4	5	11,5	M5x0,5	540	2,5	8	2,3
21000-050080	80	50	91,2	111,2	M4x6	M4x8	M4	5	11,5	M5x0,5	540	2,5	8	2,3
21000-050105	105	50	116,2	136,2	M4x6	M4x8	M4	5	11,5	M5x0,5	540	2,5	8	2,3
21000-080110	110	80	128,3	148,3	M5x7,5	M5x10	M6	8	14	M10x1	750	8	22	7
21000-080135	135	80	153,3	173,3	M5x7,5	M5x10	M6	8	14	M10x1	750	8	22	7
21000-080160	160	80	178,3	198,3	M5x7,5	M5x10	M6	8	14	M10x1	750	8	22	7
21000-080185	185	80	203,3	223,3	M5x7,5	M5x10	M6	8	14	M10x1	750	8	22	7
21000-120150	150	120	172,3	192,3	M5x10	M5x10	M6	12	18,5	M10x1	1500	30	45	18
21000-120175	175	120	197,3	217,3	M5x10	M5x10	M6	12	18,5	M10x1	1500	30	45	18
21000-120200	200	120	222,3	242,3	M5x10	M5x10	M6	12	18,5	M10x1	1500	30	45	18
21000-120225	225	120	247,3	267,3	M5x10	M5x10	M6	12	18,5	M10x1	1500	30	45	18

Straps

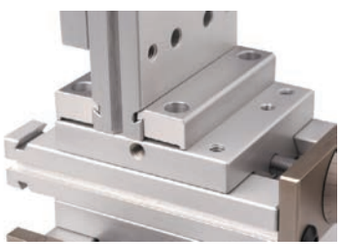




Material:
Aluminium EN AW-6063

Sample order:
nlm 21000-020 (1 strap with clamping screw)

Note:
The straps are used to clamp the dovetail slides in the X, Y and Z axes and to fix the slide unit in the machine.
End mounting will reduce the travel.



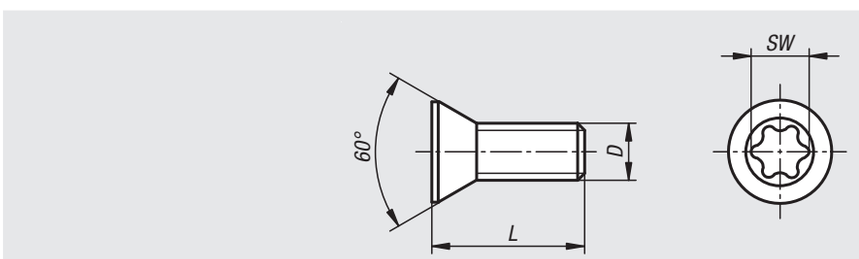
Order No.	B	B1	D for screw	H	L	L1	travel reduction	suitable for slide
21000-020	5,7	3,7	M2	3,5	19,5	12	3,5	21000-020 ...
21000-030	5,7	2,85	M3	3,5	29,5	23	3,5	21000-030 ...
21000-050	11,5	5,25	M4	8	49,3	38	8	21000-050 ...
21000-080	11,5	6	M5	8	78,9	60	8	21000-080 ...
21000-120	15	10	M5	11	118,4	90	10	21000-120 ...

21000

Fastening screws

for cross table mounting





Material:
Steel.

Version:
tempered.

Sample order:
nlm 21000-02055
(Supplied in sets of four)

Note:
Mounting set for constructing a cross table.
Four fastening screws per set.



Order No.	D	L	SW	suitable for slide
21000-02055	M2	5	Torx T7	21000-020 ...
21000-03070	M3	9	Torx T9	21000-030 ...
21000-04100	M4	10	Torx T15	21000-050 ...
21000-05140	M5	17	Torx T20	21000-080 ... / 21000-120 ...

Dovetail slides



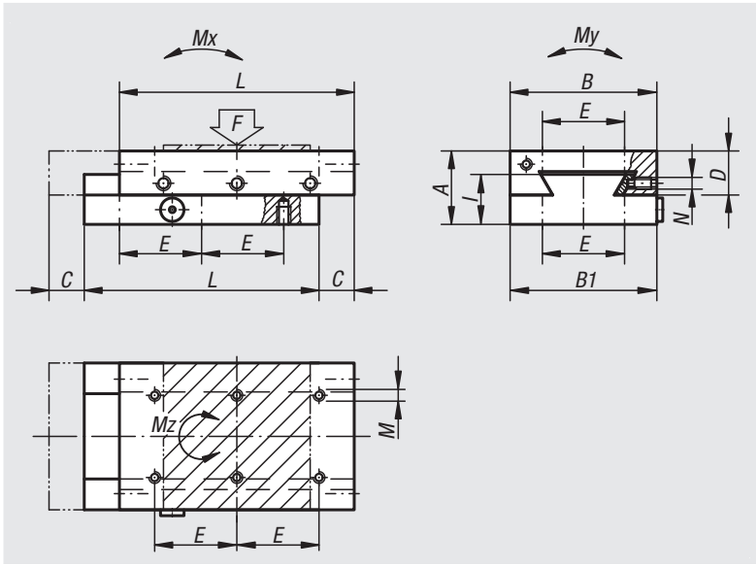
Material:
GJL 250

Version:
Bright, ground.

Sample order:
nlm 21030-050105

Note:
These precision dovetail slides find use in machine and fixture construction, metrology, optical instruments and fine mechanics.
The middle set screw “N” can be replaced by clamping lever Art. No. 06460.
The stated permissible load ratings (F) are designed for dynamic loads with a lifespan of 1 million travel cycles.
For static loads 10 times the F value is permitted.
The torque values apply only for centred carriages.

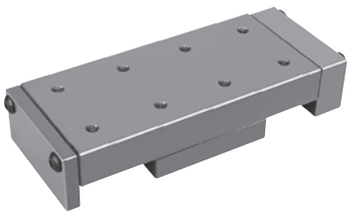
TI = number of fastening holes E/M inside
TA = number of fastening holes E/M outside

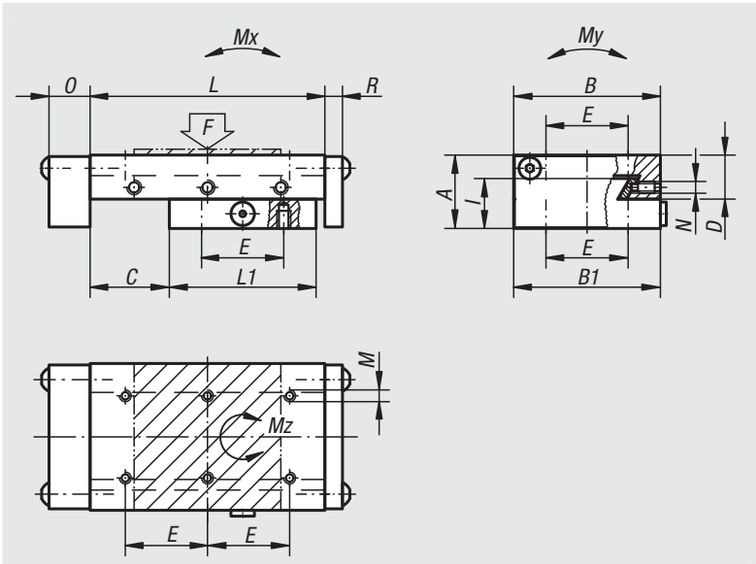


Order No.	A	B	B1	C	D	E	TI	TA	I	L	M	N	F N	Mx Nm	My Nm	Mz Nm
21030-050080	25	50	49,5	15	15	28	6	6	17,6	80	M4	M5	72	4	6	5
21030-050105	25	50	49,5	20	15	28	8	8	17,6	105	M4	M5	95	7	7	8
21030-050130	25	50	49,5	25	15	28	10	10	17,6	130	M4	M5	117	10	9	12
21030-075105	32	75	74,5	20	19,5	62	4	4	22,5	105	M5	M5	128	9	15	10
21030-075130	32	75	74,5	25	19,5	62	4	4	22,5	130	M5	M5	159	14	18	15
21030-100110	40	100	99,5	20	24	86	4	4	27,5	110	M6	M6	156	11	26	12
21030-100135	40	100	99,5	25	24	86	4	4	27,5	135	M6	M6	192	17	32	19
21030-100160	40	100	99,5	30	24	86	4	4	27,5	160	M6	M6	227	24	37	26

Dovetail slides

with end plates





Material:
GJL 250

Version:
Bright, ground.

Sample order:
nlm 21031-100135

Note:
The central set screw “N” can be replaced by a clamping lever 06460.
The stated permissible load values (F) are designed for dynamic loads with a lifespan of 1 million travel cycles.
For static loads 10 times the value F is permitted.
The torque values apply only to centred carriages.

TI = number of fastening holes E/M inside
TA = number of fastening holes E/M outside

Order No.	A	B	B1	C	D	E	TI	TA	I	L	L1	M	N	O	R	F N	Mx Nm	My Nm	Mz Nm
21031-050080	25	50	49,5	25	15	28	4	6	17,6	80	50	M4	M5	14	6	109	2	6	2
21031-050105	25	50	49,5	50	15	28	4	8	17,6	105	50	M4	M5	14	6	61	2	6	2
21031-075105	32	75	74,5	25	19,5	62	4	4	22,5	105	75	M5	M5	15	6	290	5	19	6
21031-075130	32	75	74,5	50	19,5	62	4	4	22,5	130	75	M5	M5	15	6	168	5	19	6
21031-100135	40	100	99,5	25	24	86	4	4	27,5	135	100	M6	M6	15	6	586	11	43	12
21031-100160	40	100	99,5	50	24	86	4	4	27,5	160	100	M6	M6	15	6	351	11	43	12
21031-100260	40	100	99,5	100	24	86	4	6	27,5	260	150	M6	M6	15	6	395	23	63	26

Dovetail slides

with micrometer spindle



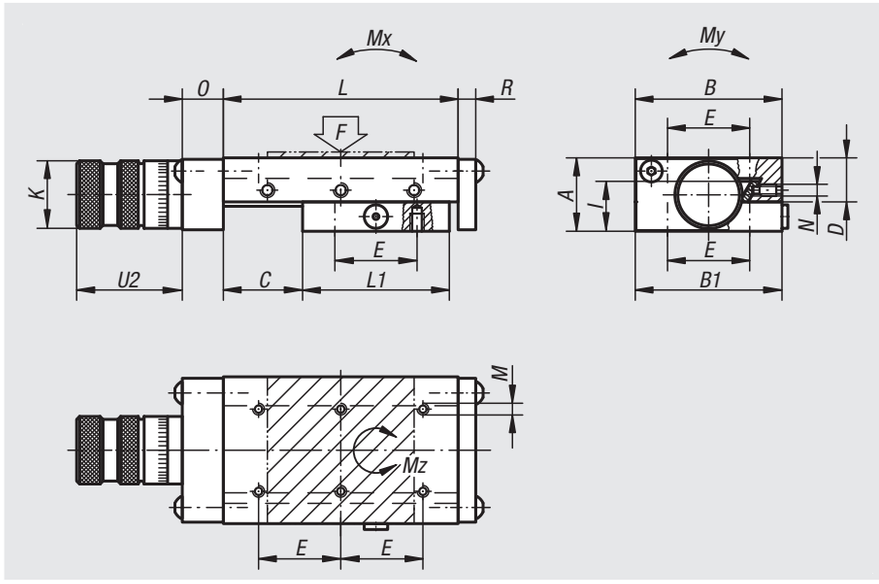
Material:
GJL 250

Version:
Bright, ground.

Sample order:
nlm 21032-075130

Note:
The central set screw „N“ can be replaced by a clamping lever 06460. The scale ring is graduated in 0.02 mm increments. Other graduations available on request.
The stated permissible load values (F) are designed for dynamic loads with a lifespan of 1 million travel cycles. For static loads 10 times the value F is permitted.
The torque values apply only to centred carriages.

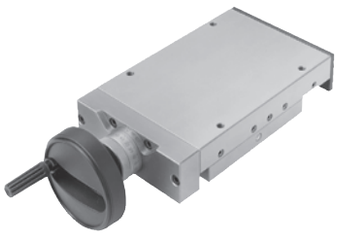
TI = number of fastening holes E/M inside
TA = number of fastening holes E/M outside

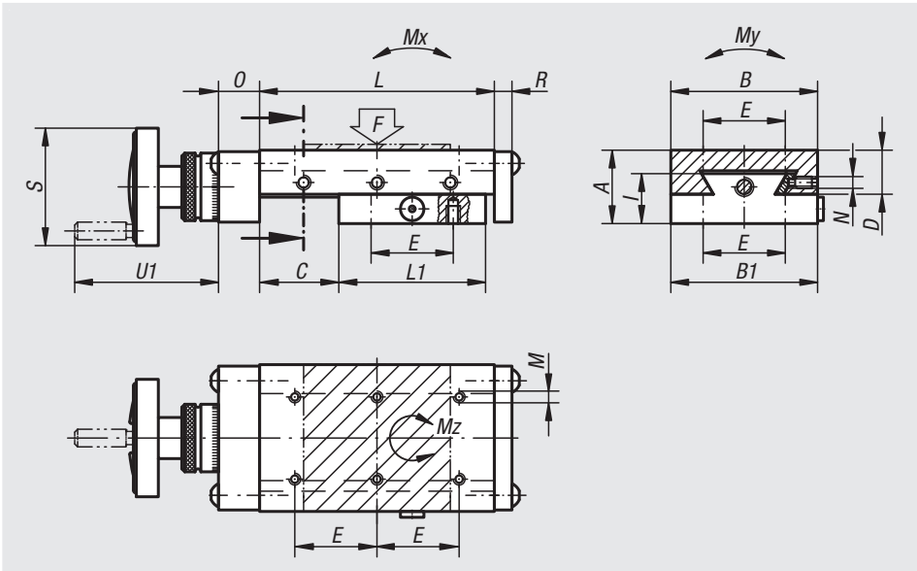


Order No.	A	B	B1	C	D	E	TI	TA	I	K	L	L1	M	N	O	R	U2	Spindle	F N	Mx Nm	My Nm	Mz Nm
21032-050080	25	50	49,5	25	15	28	4	6	17,6	23	80	50	M4	M5	19	6	31	M6x1	109	2	6	2
21032-050105	25	50	49,5	50	15	28	4	8	17,6	23	105	50	M4	M5	19	6	31	M6x1	61	4	9	4
21032-050205	25	50	49,5	100	15	28	8	16	17,6	23	205	100	M4	M5	19	6	31	M6x1	114	7	12	8
21032-075105	32	75	74,5	25	19,5	62	4	4	22,5	30	105	75	M5	M5	21	6	38	M10x1	290	5	19	6
21032-075130	32	75	74,5	50	19,5	62	4	4	22,5	30	130	75	M5	M5	21	6	38	M10x1	168	5	19	6
21032-075155	32	75	74,5	75	19,5	62	4	4	22,5	30	155	75	M5	M5	21	6	38	M10x1	118	5	19	6
21032-100135	40	100	99,5	25	24	86	4	4	27,5	30	135	100	M6	M6	21	6	38	M10x1	586	11	43	12
21032-100160	40	100	99,5	50	24	86	4	4	27,5	30	160	100	M6	M6	21	6	38	M10x1	351	11	43	12
21032-100260	40	100	99,5	100	24	86	4	6	27,5	30	260	150	M6	M6	21	6	38	M10x1	395	23	63	26
21032-200310	60	200	199	100	37	170	4	4	41,5	47	310	200	M8	M8	28	8	53	Tr16x2	1078	66	283	71

Dovetail slides

with micrometer spindle and handwheel





Material:
GJL 250

Version:
Bright, ground.

Sample order:
nlm 21033-150310

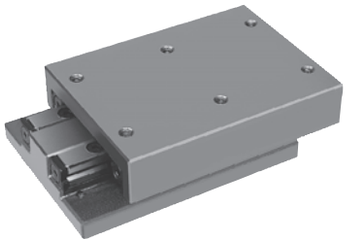
Note:
The central set screw “N” can be replaced by a clamping lever 06460. The micrometer scale is graduated in 0.02 mm increments. Other graduations available on request. The revolving grip on the handwheel can fold down.
The stated permissible load values (F) are designed for dynamic loads with a lifespan of 1 million travel cycles.
For static loads 10 times the value F is permitted.
The torque values apply only to centred carriages.

TI = number of fastening holes E/M inside
TA = number of fastening holes E/M outside

Order No.	A	B	B1	C	D	E	TI	TA	I	L	L1	M	N	O	R	S	U1	Spindle	F N	Mx Nm	My Nm	Mz Nm
21033-150210	50	150	149	50	29,5	130	4	4	35,5	210	150	M8	M8	28	8	80	100	Tr16x2	917	31	128	33
21033-150310	50	150	149	100	29,5	130	4	6	35,5	310	200	M8	M8	28	8	80	100	Tr16x2	868	53	169	58

Precision slides

roller mounted



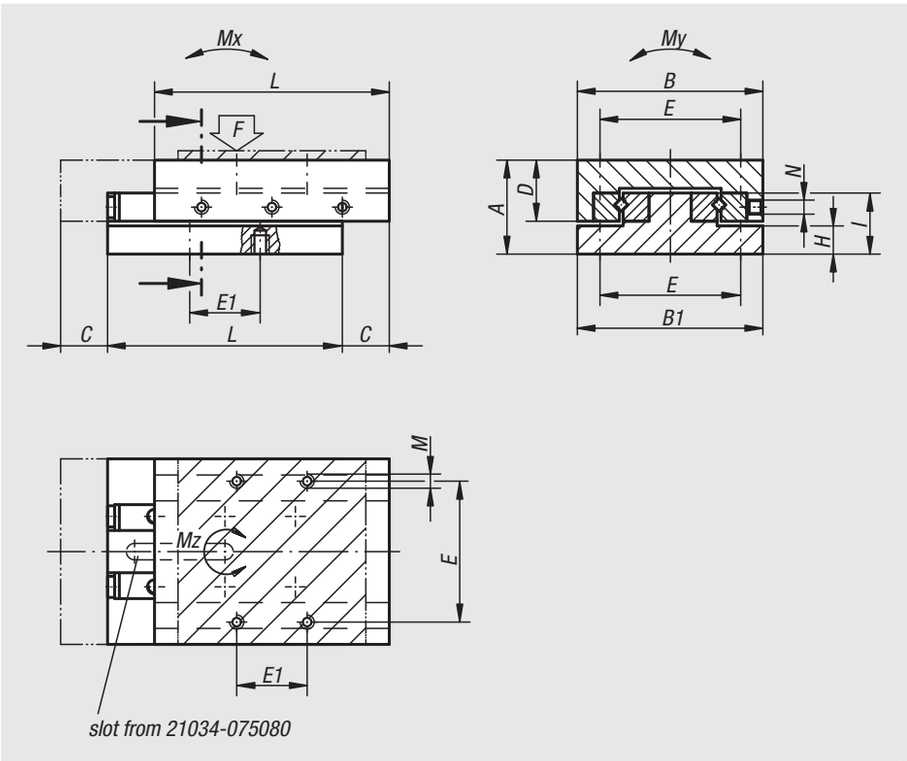
Material:
GJL 250

Version:
Ground

Sample order:
nlm 21034-050105

Note:
A clamp that acts on the side edge without loading the guide geometry can be supplied as an optional extra.
F = permissible dynamic or static load.
The stated permissible loads (F) are for a lifespan of 1 million travel cycles.
The torque values apply only to centred carriages.
Cross slides are also available on request.

TI = number of fastening holes E/M inside
TA = number of fastening holes E/M outside



Order No.	A	B	B1	C	D	E	E1	TI	TA	H	I	L	M	N	F N	Mx Nm	My Nm	Mz Nm
21034-040050	20	40	39,5	10	13	30	15	4	4	6,5	13	50	M3	M3	206	1	4	3
21034-0400501	20	40	39,5	17,5	13	30	15	4	4	6,5	13	50	M3	M3	85	1	3	2
21034-040065	20	40	39,5	25	13	30	15	6	6	6,5	13	65	M3	M3	114	1	4	3
21034-040080	20	40	39,5	32,5	13	30	15	8	8	6,5	13	80	M3	M3	143	3	5	5
21034-050055	25	50	49,5	10	17	28	28	4	4	7,5	18	55	M4	M3	283	4	7	6
21034-050080	25	50	49,5	30	17	28	28	6	6	7,5	18	80	M4	M3	189	3	9	7
21034-050105	25	50	49,5	40	17	28	28	8	8	7,5	18	105	M4	M3	301	10	11	15
21034-050155	25	50	49,5	60	17	28	28	12	12	7,5	18	155	M4	M3	476	23	19	33
21034-060055	25	60	59,5	10	17	34	34	4	4	7,5	18	55	M4	M3	288	4	8	6
21034-060080	25	60	59,5	30	17	34	34	6	6	7,5	18	80	M4	M3	192	3	11	7
21034-060105	25	60	59,5	40	17	34	34	6	6	7,5	18	105	M4	M4	305	10	14	15
21034-060155	25	60	59,5	60	17	34	34	10	10	7,5	18	155	M4	M4	483	23	23	34
21034-075080	32	75	74,5	15	21	62	62	4	4	10,5	23	80	M5	M5	487	10	18	15
21034-075105	32	75	74,5	20	21	62	62	4	4	10,5	23	105	M5	M5	690	18	26	27
21034-075130	32	75	74,5	25	21	62	62	4	4	10,5	23	130	M5	M5	895	29	33	42
21034-100110	40	100	99,5	15	27,5	86	86	4	4	12	28	110	M6	M6	1284	43	59	63
21034-100160	40	100	99,5	52,5	27,5	86	86	4	4	12	28	160	M6	M6	946	37	79	68
21034-100210	40	100	99,5	80	27,5	86	86	6	6	12	28	210	M6	M6	1066	60	99	105
21034-100260	40	100	99,5	105	27,5	86	86	6	6	12	28	260	M6	M6	1228	89	119	151

Slides mini

roller mounted



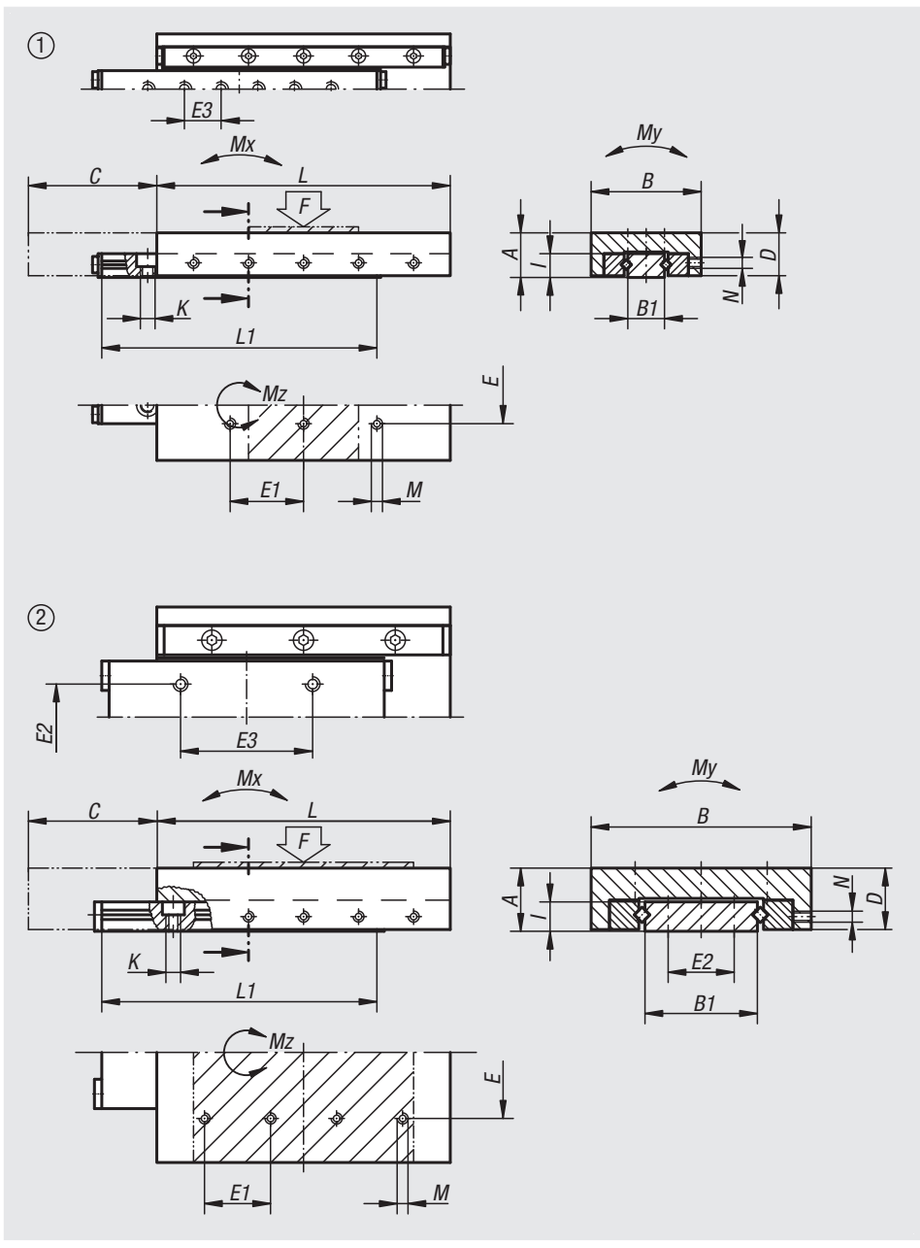
Material:
Outer housing aluminium.
Carriage and bearing steel.

Version:
Outer housing black anodised.
Carriage and bearings ground.
Internal parts hardened.

Sample order:
nlm 21035-030080

Note:
Roller slides run very lightly and can be adjusted with the set screw “N”.
The fastening holes “K” can be used as tapped holes or through holes.
The stated permissible loads (F) are for a lifespan of 1 million travel cycles.
The torque values apply only to centred carriages.

F = permissible loading for dynamic and static loads.
TI = number of fastening holes E3/K inside
TA = number of fastening holes E1/M outside
GI = number of hole rows internal
K = thread M4 countersunk for M3 DIN 974-1



Order No.	Size	A	B	B1	C	D	E	E1	E2	E3	TI	TA	GI	I	K	L	L1	M	N	F N	Mx Nm	My Nm	Mz Nm
21035-030035	1	12	30	10	12	11,7	10	10	-	10	2	6	1	6,3	M4	35	30	M3	M3	168	1	1,9	2
21035-030050	1	12	30	10	18	11,7	10	10	-	10	2	6	1	6,3	M4	50	45	M3	M3	245	3,5	2,6	5,2
21035-030065	1	12	30	10	24	11,7	10	20	-	10	4	6	1	6,3	M4	65	60	M3	M3	361	4,7	3,9	7,9
21035-0300501	1	12	30	10	34	11,7	10	10	-	10	2	6	1	6,3	M4	50	45	M3	M3	131	2,2	1,9	3,3
21035-0300651	1	12	30	10	48	11,7	10	20	-	10	4	6	1	6,3	M4	65	60	M3	M3	161	3,5	2,6	5,2
21035-030080	1	12	30	10	30	11,7	10	20	-	10	6	6	1	6,3	M4	80	75	M3	M3	432	9,1	4,5	13,3
21035-030095	1	12	30	10	40	11,7	10	20	-	10	8	10	1	6,3	M4	95	90	M3	M3	466	11,6	5,1	16,9
21035-040055	1	15	40	14,4	20	14,7	20	20	-	20	2	6	1	8,3	M4	55	50	M3	M3	231	4,6	4,6	6,8
21035-040080	1	15	40	14,4	30	14,7	20	20	-	20	2	6	1	8,3	M4	80	75	M3	M3	487	10,3	7,6	15,3
21035-040105	1	15	40	14,4	40	14,7	20	20	-	20	4	10	1	8,3	M4	105	100	M3	M3	689	18,6	10,6	27,3
21035-040155	1	15	40	14,4	120	14,7	20	20	-	20	6	14	1	8,3	M4	155	150	M3	M3	489	23,7	12,2	34,8
21035-060055	2	17	60	30,6	20	16,7	36	18	18	18	4	4	2	8,3	M4	55	50	M3	M4	294	4,6	7	6,9
21035-060080	2	17	60	30,6	30	16,7	36	18	18	36	4	8	2	8,3	M4	80	75	M3	M4	492	10,4	11,6	15,5
21035-060105	2	17	60	30,6	40	16,7	36	18	18	36	4	12	2	8,3	M4	105	100	M3	M4	697	18,8	16,2	27,6

Precision slides

roller mounted with end plates

Material:
GJL 250

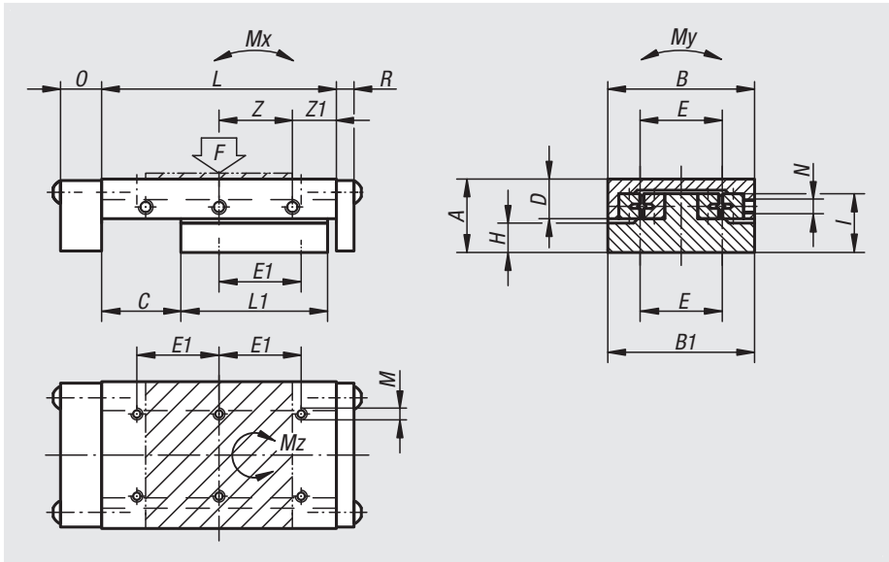


Version:
Ground

Sample order:
nlm 21038-040090

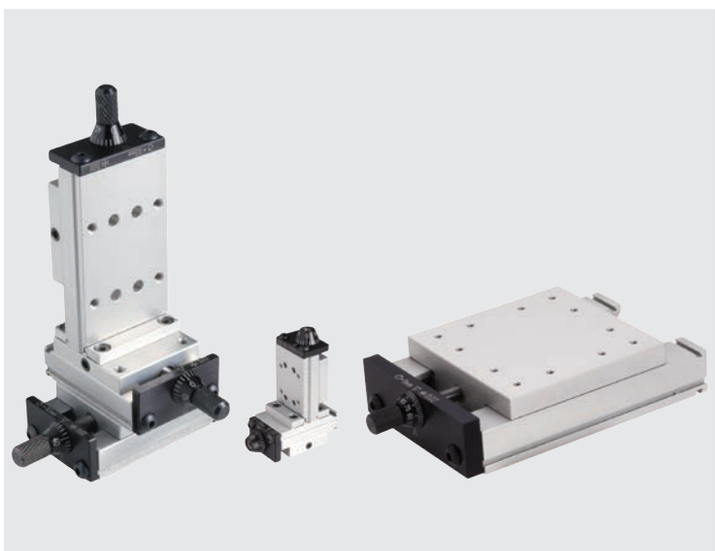
Note:
Slide is also available in aluminium on request.
The stated permissible loads (F) are for a lifespan of 1 million travel cycles.
The torque values apply only to centred carriages.

F = permissible loading for dynamic and static loads.
TI = number of fastening holes E1/M inside.
TA = number of fastening holes E1/M outside.

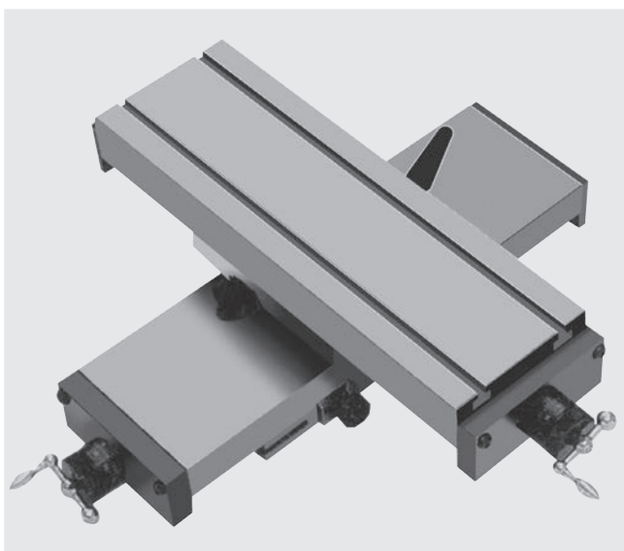


Order No.	A	B	B1	C	D	E	E1	TI	TA	H	I	L	L1	M	N	O	R	Z	Z1	F N	Mx Nm	My Nm	Mz Nm
21038-040090	20	40	39,5	40	13	30	15	6	8	6,5	13	90	45	M3	M3	12	3	15x2	30	77	1	3	2
21038-050105	25	50	49,5	25	17	28	28	6	8	7,5	18	105	75	M4	M3	14	6	25x2	27,5	623	9	14	15
21038-060180	25	60	59,5	75	17	34	34	6	12	7,5	18	180	100	M4	M4	14	6	25x3	52,5	349	9	17	16
21038-100260	40	100	99,5	100	27,5	86	86	4	6	12	28	260	150	M6	M6	15	6	50x2	80	990	37	80	69

Examples of dovetail slides



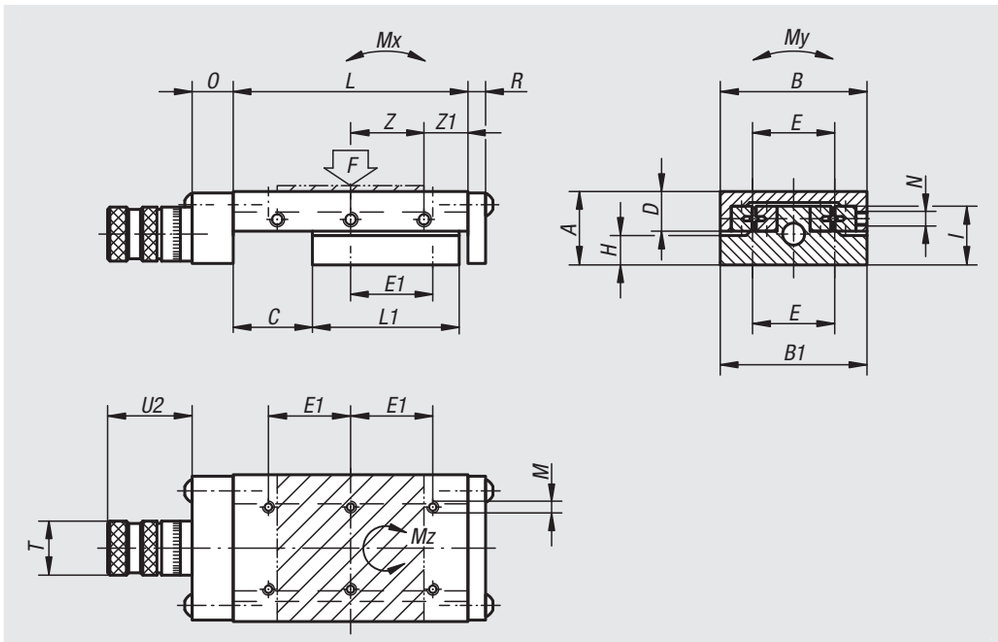
Example of slides mounted as a manual cross table



Precision slides

roller mounted with micrometer spindle





Material:
GJL 250

Version:
Bright, ground.

Sample order:
nlm 21040-040045

Note:
Slides available in aluminium on request. The scale ring is graduated in 0.02 mm increments. The version 21040-040045 is graduated in 0.01 mm increments. Other graduations are available on request. The stated permissible loads (F) are for a lifespan of 1 million travel cycles. The torque values apply only to centred carriages.

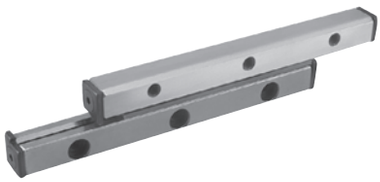
F = permissible loading for dynamic and static loads.
TI = number of fastening holes E1/M inside.
TA = number of fastening holes E1/M outside.

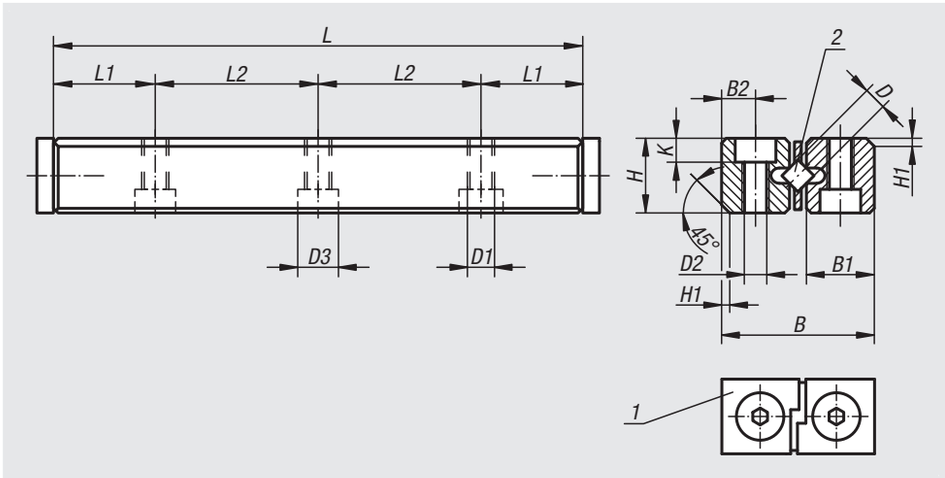
* Spacing of external fastening holes = 25 mm.

Order No.	A	B	B1	C	D	E	E1	TI	TA	H	I	L	L1	M	N	O	R	T	U2	Z	Z1	Spindle	F N	Mx Nm	My Nm	Mz Nm
21040-040045	20	40	39,5	10	13	30	15*	4	4	6,5	13	45	30	M3	M3	12	3	16	25	15x1	15	M5x0,5	183	1	3	2
21040-050075	25	50	49,5	20	17	28	28	4	6	7,5	18	75	50	M4	M3	14	6	23	36	25x1	25	M6x1	286	4	7	6
21040-060075	25	60	59,5	20	17	34	34	4	4	7,5	18	75	50	M4	M4	14	6	23	36	25x1	25	M6x1	289	4	8	6
21040-100360	40	100	99,5	150	27,5	86	86	6	8	12	28	360	200	M6	M6	15	6	30	44	50x3	105	M10x1	1130	61	100	107

Guide rails

with cross rollers





Material:
Guide rail tool steel 1.2842.
End pieces 1.0531.

Version:
Guide rails hardened (60-62 HRC) and ground.
End piece black oxidised.

Sample order:
nlm 21050-02030
(1 guide rail, without roller cage)

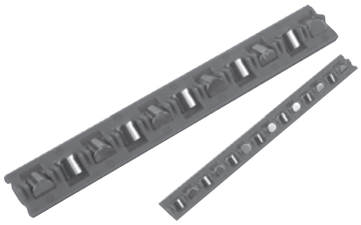
Note:
See 21052 for the suitable roller cage.
These guide rails are mounted on the slides 21034, 21035, 21038 and 21040 and can be used as replacement parts.

Drawing reference:
1) end part
2) without roller cage (21052)

Order No.	D	L	L1	L2	B	B1	B2	H	H1	K	D1	D2	D3
21050-02030	2	30	7,5	1x15	12	5,5	2,5	6	1	2,2	M3	2,55	4,4
21050-02045	2	45	7,5	2x15	12	5,5	2,5	6	1	2,2	M3	2,55	4,4
21050-02060	2	60	7,5	3x15	12	5,5	2,5	6	1	2,2	M3	2,55	4,4
21050-03050	3	50	12,5	1x25	18	8,3	3,5	8	1	3,2	M4	3,4	6
21050-03075	3	75	12,5	2x25	18	8,3	3,5	8	1	3,2	M4	3,4	6
21050-03100	3	100	12,5	3x25	18	8,3	3,5	8	1	3,2	M4	3,4	6
21050-03125	3	125	12,5	4x25	18	8,3	3,5	8	1	3,2	M4	3,4	6
21050-03150	3	150	12,5	5x25	18	8,3	3,5	8	1	3,2	M4	3,4	6
21050-06100	6	100	25	1x50	31	13,9	6	15	1,8	5,2	M6	5,4	10
21050-06150	6	150	25	2x50	31	13,9	6	15	1,8	5,2	M6	5,4	10
21050-06200	6	200	25	3x50	31	13,9	6	15	1,8	5,2	M6	5,4	10
21050-06250	6	250	25	4x50	31	13,9	6	15	1,8	5,2	M6	5,4	10
21050-06300	6	300	25	5x50	31	13,9	6	15	1,8	5,2	M6	5,4	10
21050-06350	6	350	25	6x50	31	13,9	6	15	1,8	5,2	M6	5,4	10

Roller cages

for guide rails

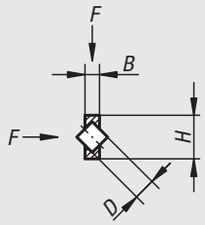


Material:
Cage plastic.
Rollers tool steel 1.2842

Sample order:
nlm 21052-02010 include number of rollers in cage (010 = 10 rollers).
Dimensioning formula see right.

Dimensioning formula:

$$\text{number of rollers in cage} = \frac{\text{length of guide rail - ½ travel}}{\text{division T}}$$



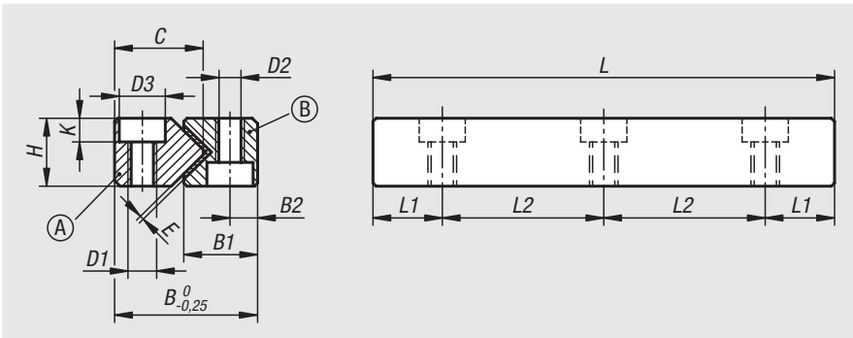
Order No.	D	No. of rollers	B	H	T (division)	Load F N/roller
21052-02* **	2	2-200	0,5	4,5	4	60
21052-03* **	3	2-200	1	7,5	5	100
21052-06* **	6	2-200	2,4	15	9	400

Notes

Guide rails

Teflon-coated





Material:
Form A:
tool steel, material hardness 58–62 HRC.
The surfaces are fine ground.
Form B:
free-cutting steel with PTFE coating.
The glide coating is self-lubricating.

Note for ordering:
A guide length of 300 mm and a travel of 100 mm is required for a complete guide with rail size 6:

2 x 21054-1060300
2 x 21054-2060200

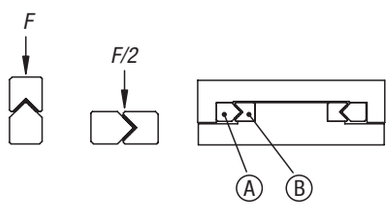
(include length L e.g. 300 for L=300 mm)

Note:
When lubricated and under normal conditions, speeds of up to 15 m/min. can be achieved.
Depending on the lubricant, the coefficient of friction can be calculated as 0.04–0.08.
Standard slideway lubricants are applied.
The longitudinal guides are used for moving, machining and positioning tasks.

Application:
- Industry automation
- Machine tools
- Special machinery
- Tool fixtures
- Metrology equipment

Temperature range:
-40 °C to +80 °C.

Advantages:
- Stick-slip free movement
- Very good dry-running properties
- Highly wear-resistant
- Very good vibration damping
- Resistant to dirt, shock and impact



Guide rails

Teflon-coated

Order No. Form A	Order No. Form B	B	B1	B2	C	D1	D2	D3	E	H	K	L	L1	L2	F N
21054-1020* **	**21054-2020*** **	12	7	2,5	7,5	M3	2,55	4,4	0,5	6	2,1	30	7,5	1x15	120
21054-1020* **	**21054-2020*** **	12	7	2,5	7,5	M3	2,55	4,4	0,5	6	2,1	45	7,5	2x15	180
21054-1020* **	**21054-2020*** **	12	7	2,5	7,5	M3	2,55	4,4	0,5	6	2,1	60	7,5	3x15	240
21054-1030* **	**21054-2030*** **	18	9	3,5	10,8	M4	3,3	6	0,6	8	3,1	50	12,5	1x25	142
21054-1030* **	**21054-2030*** **	18	9	3,5	10,8	M4	3,3	6	0,6	8	3,1	75	12,5	2x25	213
21054-1030* **	**21054-2030*** **	18	9	3,5	10,8	M4	3,3	6	0,6	8	3,1	100	12,5	3x25	285
21054-1030* **	**21054-2030*** **	18	9	3,5	10,8	M4	3,3	6	0,6	8	3,1	125	12,5	4x25	356
21054-1030* **	**21054-2030*** **	18	9	3,5	10,8	M4	3,3	6	0,6	8	3,1	150	12,5	5x25	427
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	100	25	1x50	684
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	150	25	2x50	1026
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	200	25	3x50	1368
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	250	25	4x50	1710
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	300	25	5x50	2052
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	350	25	6x50	2394
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	400	25	7X50	2736
21054-1060* **	**21054-2060*** **	31	16	6	19,3	M6	5,3	10	1	15	5,2	500	25	9x50	3420
21054-1090* **	**21054-2090*** **	44	23,5	9	28	M8	6,8	11	1,2	22	6,2	200	50	1x100	2390
21054-1090* **	**21054-2090*** **	44	23,5	9	28	M8	6,8	11	1,2	22	6,2	300	50	2x100	3586
21054-1090* **	**21054-2090*** **	44	23,5	9	28	M8	6,8	11	1,2	22	6,2	400	50	3x100	4781
21054-1090* **	**21054-2090*** **	44	23,5	9	28	M8	6,8	11	1,2	22	6,2	500	50	4x100	5976

Positioning stages short

with coaxial electric drive



Material:
Bearing block and carriage aluminium alloy.
Guide column and threaded spindle stainless steel.
Plain bearing for guide columns and spindle nut high-quality special plastic.
Claw coupling aluminium with polyurethane coupling spider.

Version:
Aluminium alloy anodised.
Stainless steel hardened and ground.
Threaded spindle with ball bearing.

Sample order:
nlm 21080-080

Note for ordering:
The unit is supplied with the position of cable outlet or control unit as shown in the drawing. Other combinations can be selected online with our configurator.

Note:
Positioning stages for motorised adjustment and positioning tasks. The plain bearings and spindle nuts are suitable for dry running, however lubrication with a grease for plastic plain bearings is recommended. The suitable programming software and interface cable for the stepper motor with positioning control are available as accessories (21088).
The stepper motor with a resolution of 200 increments per rotation allows a single direction calculated positioning accuracy of 0.005 mm. The absolute single direction positioning accuracy is 0.01 mm. The system can be operated with a switch-on time of 100%.

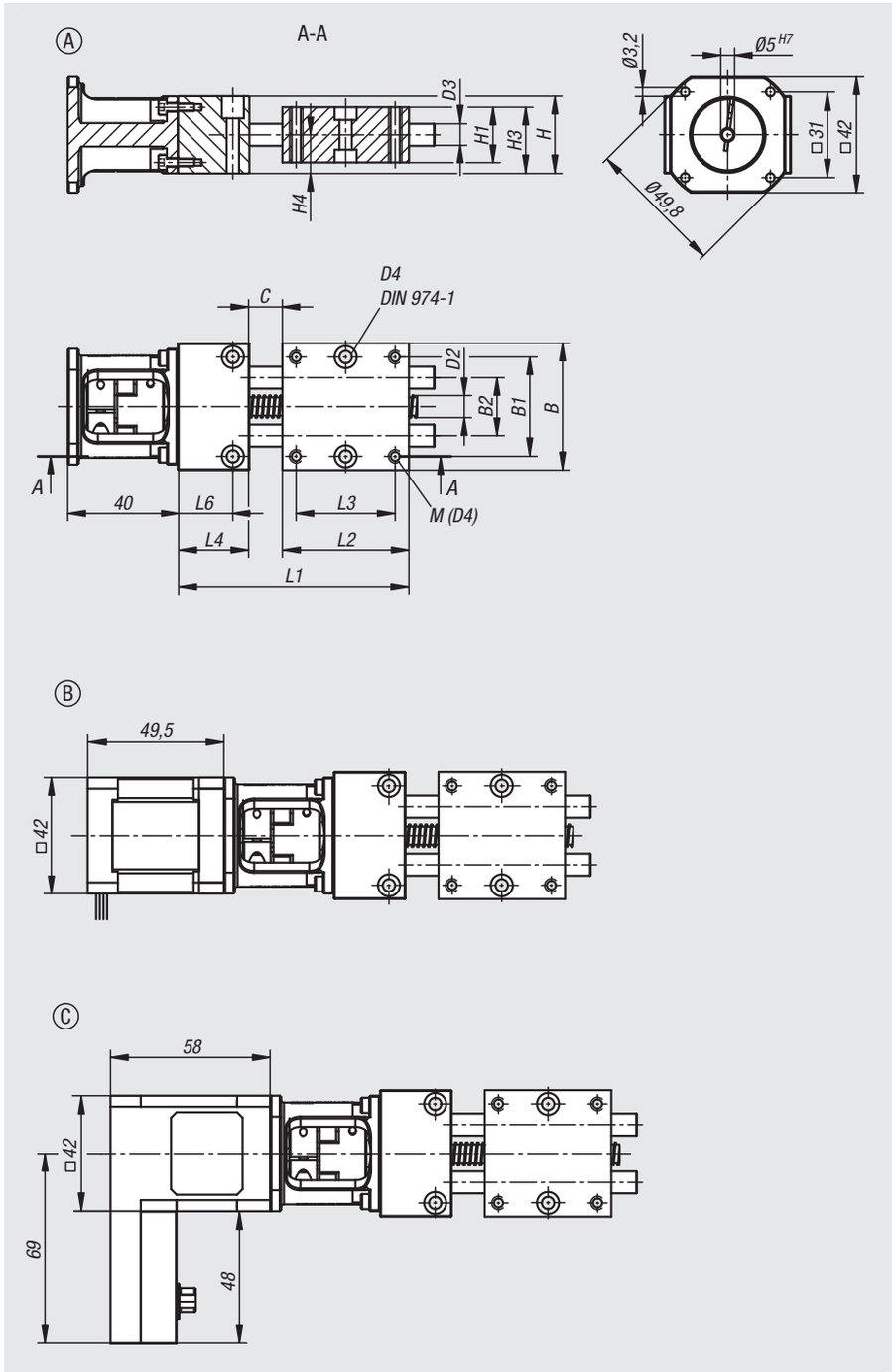
Can be combined with all other parts of the same size.

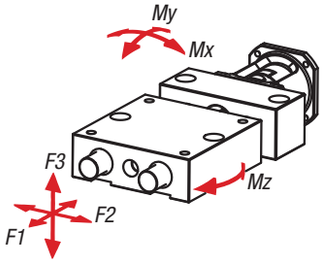
Technical data:
Threaded spindle pitch: 2 mm
Axial backlash of threaded spindle: <0.04 mm
Radial play of guides: <0.02 mm
Max. input speed: 600 rpm
Max. travel speed: 20 mm/s
Max. duty cycle: 100 %
Application temperature: +10 °C to +50 °C

Order No.	Size	Form	Version
21080-080	8	A	without motor
21080-0811	8	B	with stepper motor
21080-0821	8	C	with stepper motor with integrated positioning control
21080-120	12	A	without motor
21080-1211	12	B	with stepper motor
21080-1221	12	C	with stepper motor with integrated positioning control

Positioning stages short

with coaxial electric drive





Specifications

Size	B	B1	B2	C (travel)	D2	D3	D4	H	H1	H3	H4	L1	L2	L3	L4	L6
8	46	36	21	24	8x2	8	4	28	20	24	14	93,5	46	36	26	20
12	75	60	38	30	8x2	12	6	29,5	25	28	15,5	133	75	60	30	15

Force tables

Size	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
8	60	60	30	0,5	0,5	2
12	60	100	60	0,8	0,8	3

Positioning stages short

with lateral electric drive



Material:
Bearing block and carriage aluminium alloy.
Guide column and threaded spindle stainless steel.
Plain bearing for guide columns and spindle nut high-quality special plastic.
Toothed belts neoprene, profile 3M.

Version:
Aluminium alloy anodised.
Stainless steel hardened and ground.
Threaded spindle with ball bearing.

Sample order:
nlm 21081-0810

Note for ordering:
The unit is supplied with the position of the drive unit, cable outlet or control unit as shown in the drawing. Other combinations can be selected online with our configurator.

Note:
Positioning stages for motorised adjustment and positioning tasks. The plain bearings and spindle nuts are suitable for dry running, however lubrication with a grease for plastic plain bearings is recommended. The suitable programming software and interface cable for the stepper motor with positioning control are available as accessories (21088).
The stepper motor with a resolution of 200 increments per rotation allows a single direction calculated positioning accuracy of 0.005 mm. The absolute single direction positioning accuracy is 0.01 mm. The system can be operated with a switch-on time of 100%.

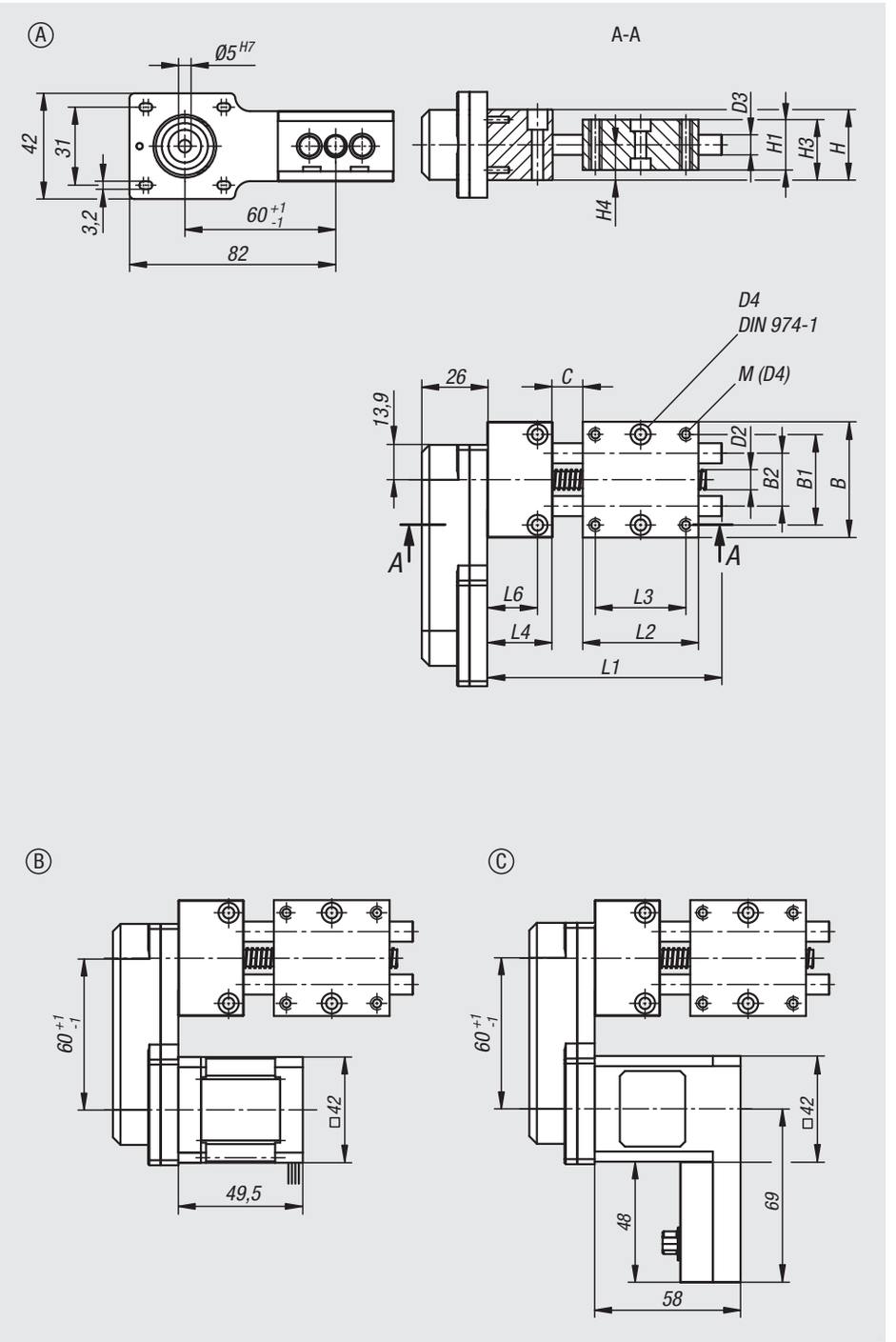
Can be combined with all other parts of the same size.

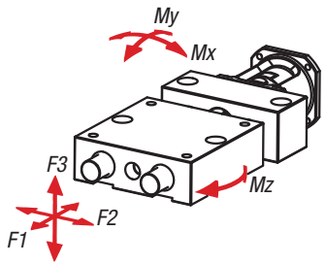
Technical data:
Threaded spindle pitch: 2 mm
Axial backlash of threaded spindle: <0.04 mm
Radial play of guides: <0.02 mm
Max. input speed: 600 rpm
Max. travel speed: 20 mm/s
Max. duty cycle: 100 %
Application temperature: +10 °C to +50 °C

Order No.	Size	Form	Version
21081-0810	8	A	without motor
21081-08111	8	B	with stepper motor
21081-08121	8	C	with stepper motor with integrated positioning control
21081-1210	12	A	without motor
21081-12111	12	B	with stepper motor
21081-12121	12	C	with stepper motor with integrated positioning control

Positioning stages short

with lateral electric drive





Specifications

Size	B	B1	B2	C (travel)	D2	D3	D4	H	H1	H3	H4	L1	L2	L3	L4	L6
8	46	36	21	24	8x2	8	4	28	20	24	14	93,5	46	36	26	20
12	75	60	38	30	8x2	12	6	29,5	25	28	15,5	133	75	60	30	15

Force tables

Size	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
8	60	60	30	0,5	0,5	2
12	60	100	60	0,8	0,8	3

Positioning stages long

with coaxial electric drive



Material:
Bearing block and carriage aluminium alloy.
Guide column and threaded spindle stainless steel.
Plain bearing for guide columns and spindle nut high-quality special plastic.
Claw coupling aluminium with polyurethane coupling spider.

Version:
Aluminium alloy anodised.
Stainless steel hardened and ground.
Threaded spindle with ball bearing.

Sample order:
nlm 21082-080

Note for ordering:
The unit is supplied with the position of cable outlet or control unit as shown in the drawing. Other combinations can be selected online with our configurator.

Note:
Positioning stages for motorised adjustment and positioning tasks. The plain bearings and spindle nuts are suitable for dry running, however lubrication with a grease for plastic plain bearings is recommended. The suitable programming software and interface cable for the stepper motor with positioning control are available as accessories (21088).
The stepper motor with a resolution of 200 increments per rotation allows a single direction calculated positioning accuracy of 0.005 mm. The absolute single direction positioning accuracy is 0.01 mm. The system can be operated with a switch-on time of 100%.

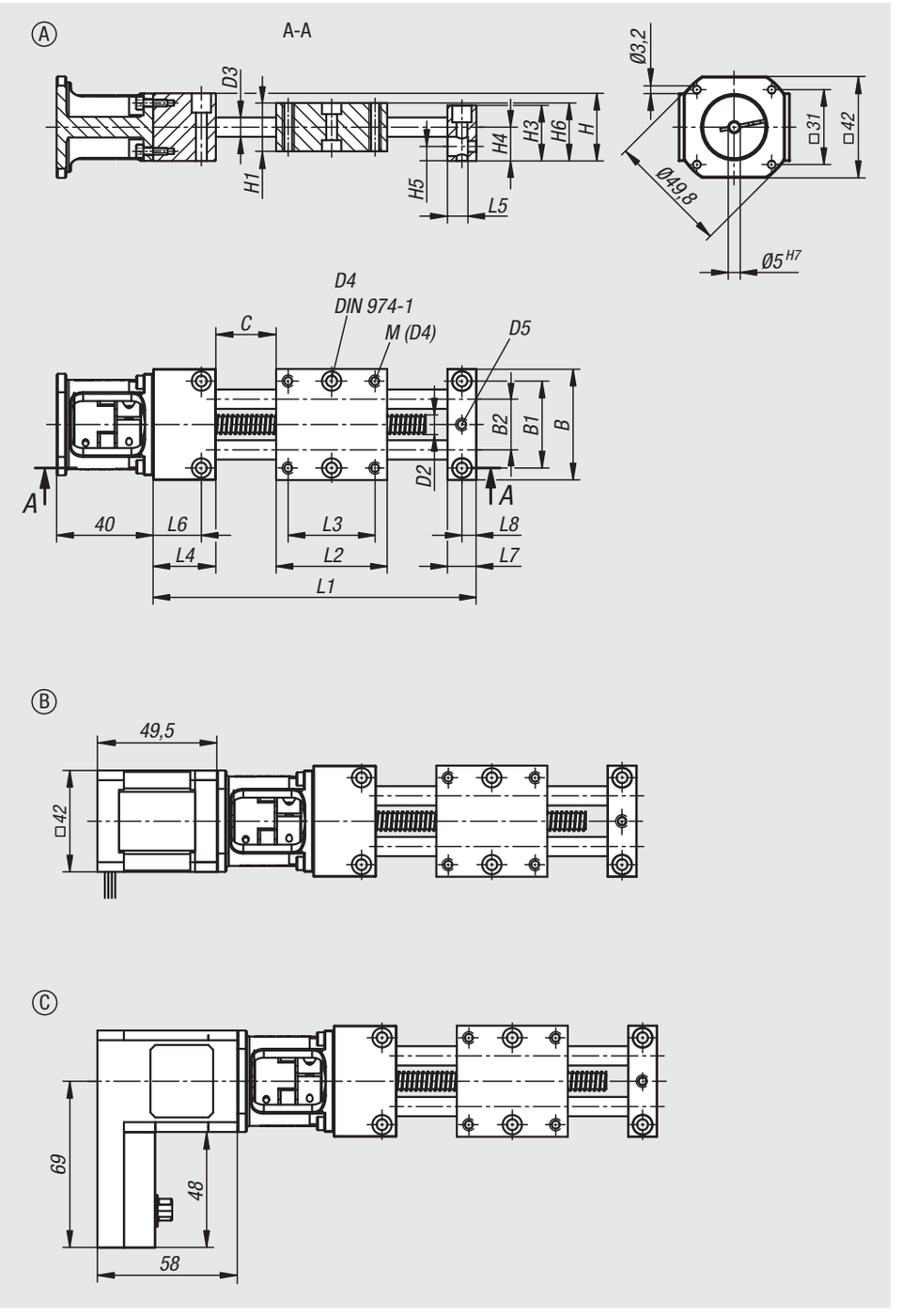
Can be combined with all other parts of the same size.

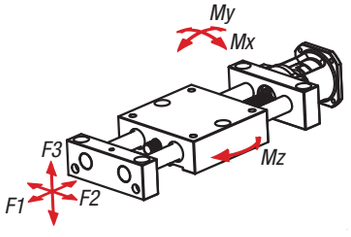
Technical data:
Threaded spindle pitch: 2 mm
Axial backlash of threaded spindle: <0.04 mm
Radial play of guides: <0.02 mm
Max. input speed: 600 rpm
Max. travel speed: 20 mm/s
Max. duty cycle: 100 %
Application temperature: +10 °C to +50 °C

Order No.	Size	Form	Version
21082-080	8	A	without motor
21082-0811	8	B	with stepper motor
21082-0821	8	C	with stepper motor with integrated positioning control
21082-120	12	A	without motor
21082-1211	12	B	with stepper motor
21082-1221	12	C	with stepper motor with integrated positioning control

Positioning stages long

with coaxial electric drive





Specifications

Size	B	B1	B2	C (travel)	D2	D3	D4	D5	H	H1	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6	L7	L8
8	46	36	21	50	8x2	8	4	M4	28	20	23	14	6	24	134	46	36	26	8,5	20	12	6
12	75	60	38	75	8x2	12	6	M4	29,5	25	27	15,5	7	28	180	75	60	15	11	7,5	15	7,5

Force tables

Size	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
8	60	80	60	0,7	0,7	2
12	60	120	100	1	1	3

Positioning stages long

with lateral electric drive



Material:
Bearing block and carriage aluminium alloy.
Guide column and threaded spindle stainless steel.
Plain bearing for guide columns and spindle nut high-quality special plastic.
Toothed belts neoprene, profile 3M.

Version:
Aluminium alloy anodised.
Stainless steel hardened and ground.
Threaded spindle with ball bearing.

Sample order:
nlm 21083-0810

Note for ordering:
The unit is supplied with the position of the drive unit, cable outlet or control unit as shown in the drawing. Other combinations can be selected online with our configurator.

Note:
Positioning stages for motorised adjustment and positioning tasks. The plain bearings and spindle nuts are suitable for dry running, however lubrication with a grease for plastic plain bearings is recommended. The suitable programming software and interface cable for the stepper motor with positioning control are available as accessories (21088).
The stepper motor with a resolution of 200 increments per rotation allows a single direction calculated positioning accuracy of 0.005 mm. The absolute single direction positioning accuracy is 0.01 mm. The system can be operated with a switch-on time of 100%.

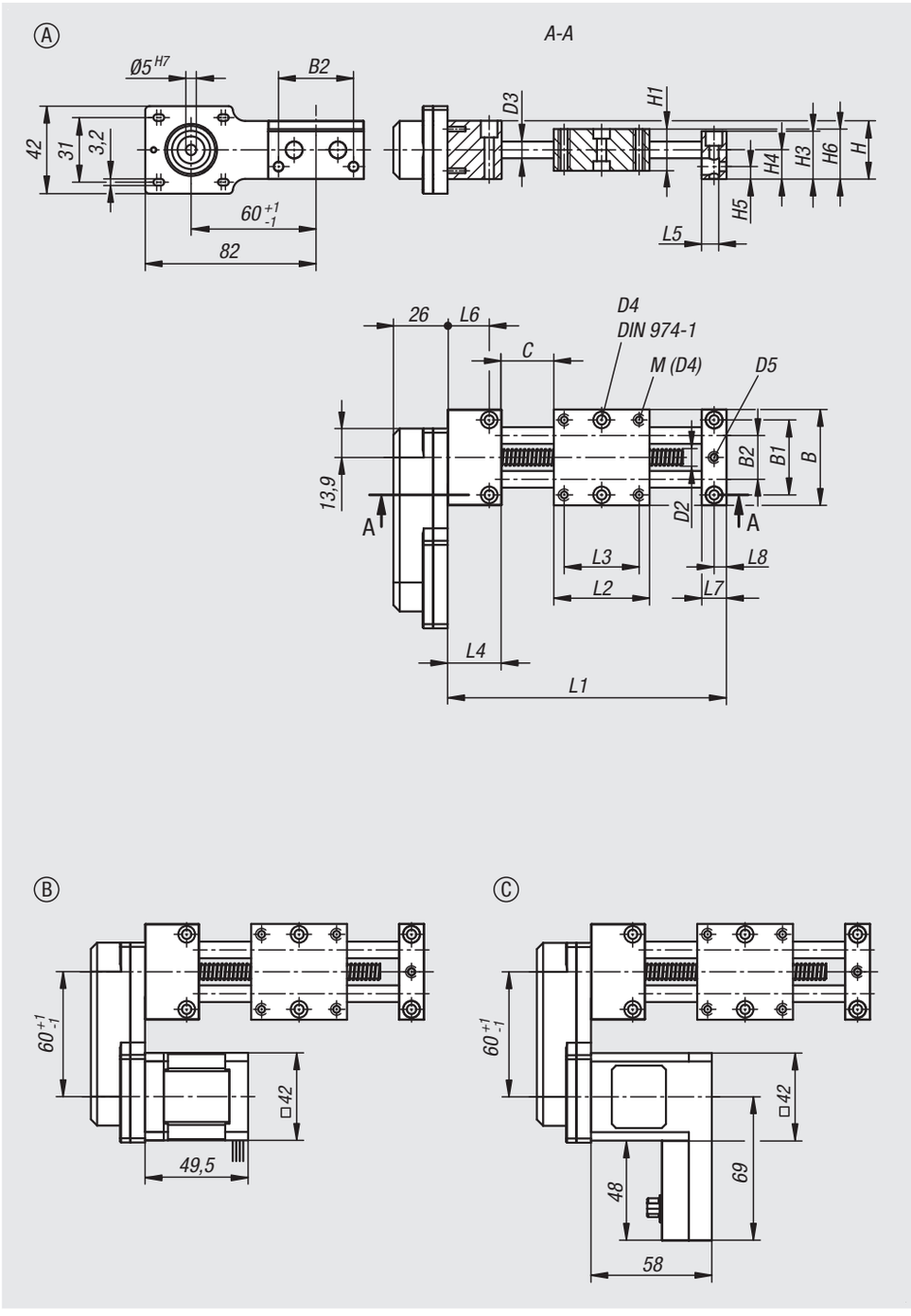
Can be combined with all other parts of the same size.

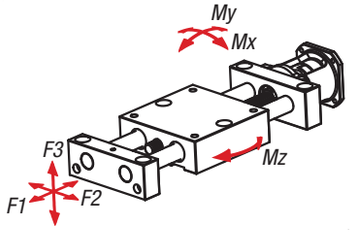
Technical data:
Threaded spindle pitch: 2 mm
Axial backlash of threaded spindle: <0.04 mm
Radial play of guides: <0.02 mm
Max. input speed: 600 rpm
Max. travel speed: 20 mm/s
Max. duty cycle: 100 %
Application temperature: +10 °C to +50 °C

Order No.	Size	Form	Version
21083-0810	8	A	without motor
21083-08111	8	B	with stepper motor
21083-08121	8	C	with stepper motor with integrated positioning control
21083-1210	12	A	without motor
21083-12111	12	B	with stepper motor
21083-12121	12	C	with stepper motor with integrated positioning control

Positioning stages long

with lateral electric drive





Specifications

Size	B	B1	B2	C (travel)	D2	D3	D4	D5	H	H1	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6	L7	L8
8	46	36	21	50	8x2	8	4	M4	28	20	23	14	6	24	134	46	36	26	8,5	20	12	6
12	75	60	38	75	8x2	12	6	M4	29,5	25	27	15,5	7	28	180	75	60	15	11	7,5	15	7,5

Force tables

Size	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
8	60	80	60	0,7	0,7	2
12	60	120	100	1	1	3

Positioning stages rotary

with coaxial electric drive



Material:
Base and rotary table aluminium alloy.
Hollow shaft stainless steel.
Pre-loaded worm gear steel.
Claw coupling aluminium with polyurethane coupling spider.

Version:
Aluminium alloy anodised.

Sample order:
nlm 21085-120

Note for ordering:
The unit is supplied with the position of cable outlet or control unit as shown in the drawing. Other combinations can be selected online with our configurator.

Note:
Rotary positioning stages for motorised adjustment and positioning tasks. The pre-loaded worm gear runs virtually play-free. The bearing of the worm shaft offers maximum radial rotational accuracy. Cables can be routed through the large bore in the hollow shaft. The adjustable positioning ring is used to determine the rotational reference point to the position of the assembled part. Proximity switches can be mounted with the optionally available sensor holder (21094). The suitable programming software and interface cable for the stepper motor with positioning control are available as accessories (21088).
The stepper motor with a resolution of 200 increments per rotation allows a single direction calculated positioning accuracy of 0.005 mm. The absolute single direction positioning accuracy is 0.01 mm. The system can be operated with a switch-on time of 100%.

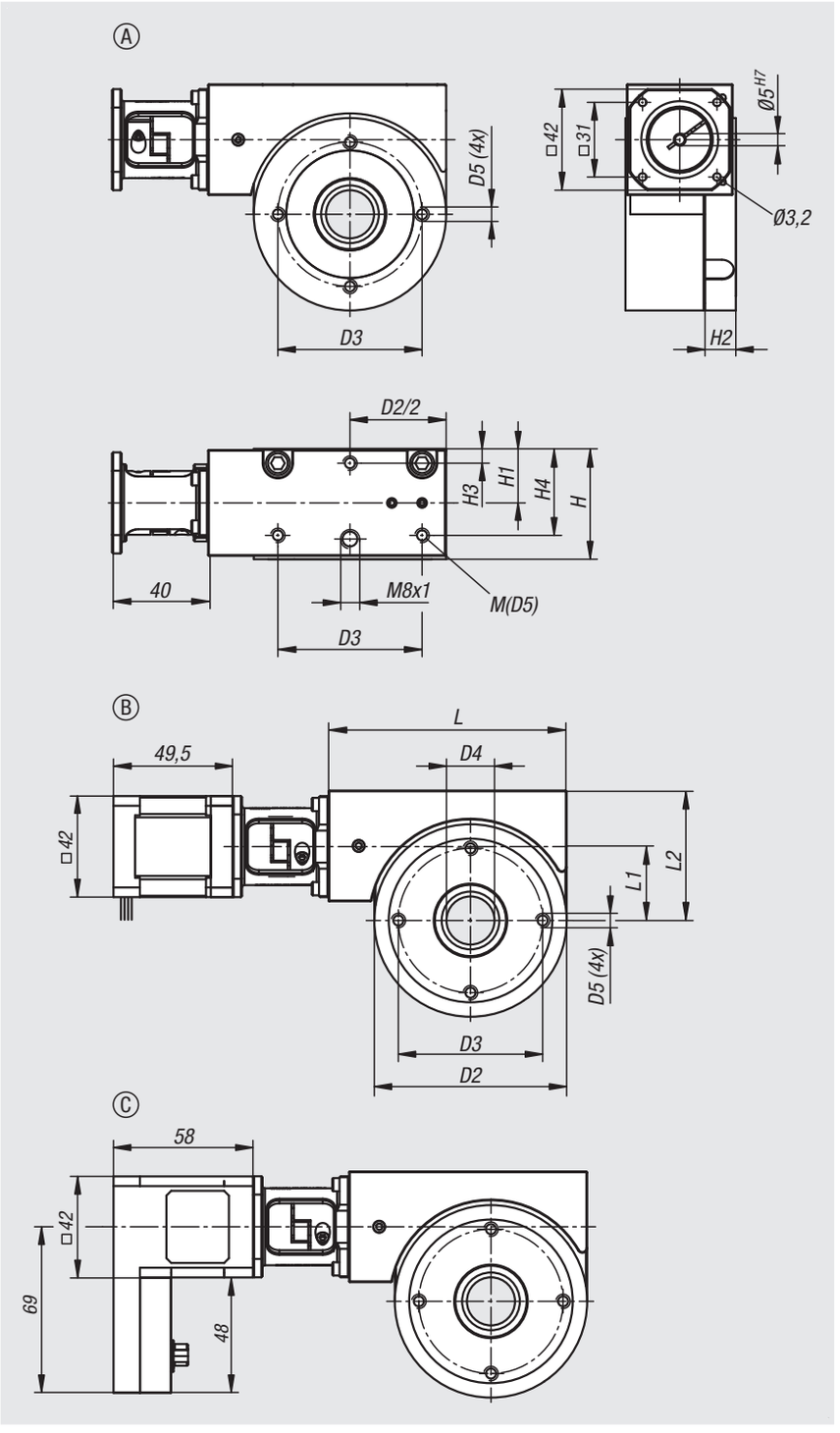
Can be combined with all other parts of the same size.

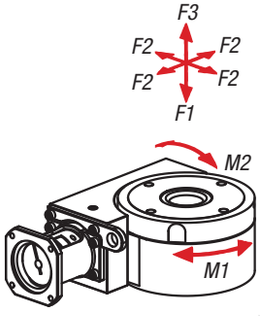
Technical data:
Transmission ratio: 55:1
Backlash: <0,1°
Radial play: <0.02 mm
Max. input speed: 600 rpm
Max. duty cycle: 100 %
Required input torque: 0.15 Nm
Rigidity: see diagram
Rotation: 360°, infinite
Application temperature: +10 °C to +50 °C

Order No.	Size	Form	Version
21085-120	12	A	without motor
21085-1211	12	B	with stepper motor
21085-1221	12	C	with stepper motor with integrated positioning control

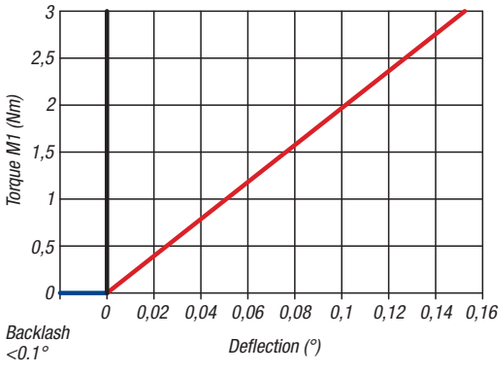
Positioning stages rotary

with coaxial electric drive





Rigidity chart



Specifications

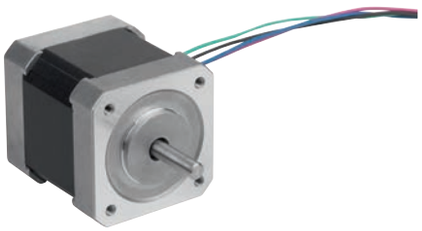
Size	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2
12	80	60	20	M6	46	22,5	13	6	36	99	31	54

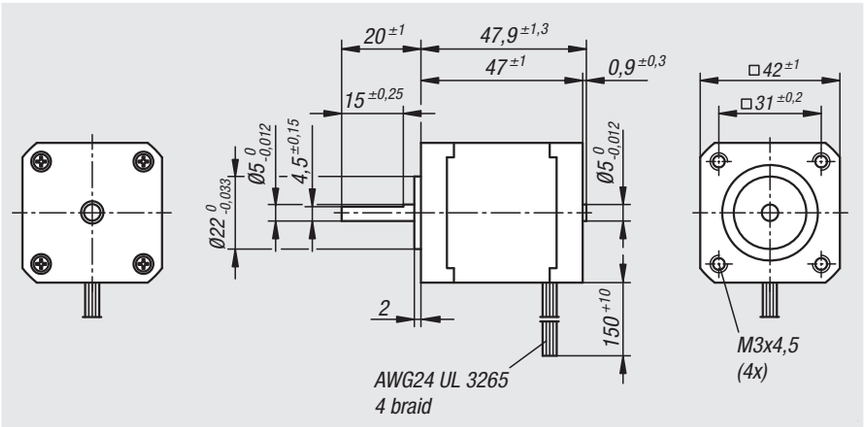
Force tables

Size	F1 N	F2 N	F3 N	M1 Nm	M2 Nm
12	500	500	200	3	3

Notes

Stepper motor





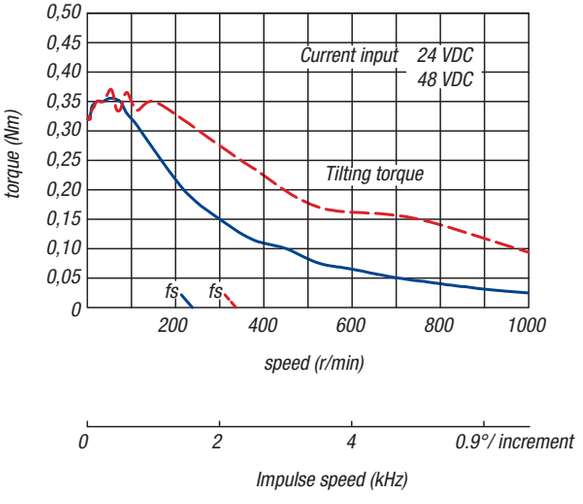
Version:
2-phase high-torque stepper motor in NEMA 17 (42 mm) size and 1.8° increment angle (full increment) with 4-wired connection line.

Sample order:
nlm 21086-1

Note:
The stepper motors deliver a high torque, high level of precision and convenient actuation. They function reliably in diverse ambient conditions. The stepper motors can be connected to conventional motor controllers via 4-wired connection cables.

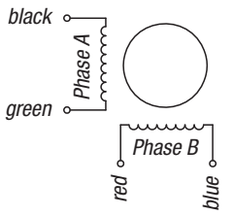
Technical data:
Increment angle: 1.8°
Increments per rotation: 200
Nominal current/phase: 1.7 A
Nominal voltage: 5.6 V DC
Retaining torque: 0.4 Nm
Rotor moment of inertia: 0.068 kgcm²
Resistance/phase: 1.65 Ohm ±15%
Inductivity/phase: 2.8 mH ±20%
Application temperature: -10 °C to +50 °C

Torque characteristic curve



Connection diagram:

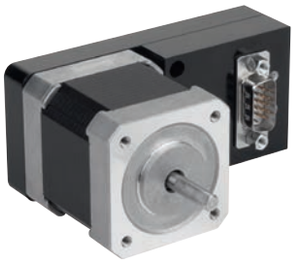
Pin	Colour	Phase	
1	black	A	
2	green	A\	
3	red	B	
4	blue	B\	

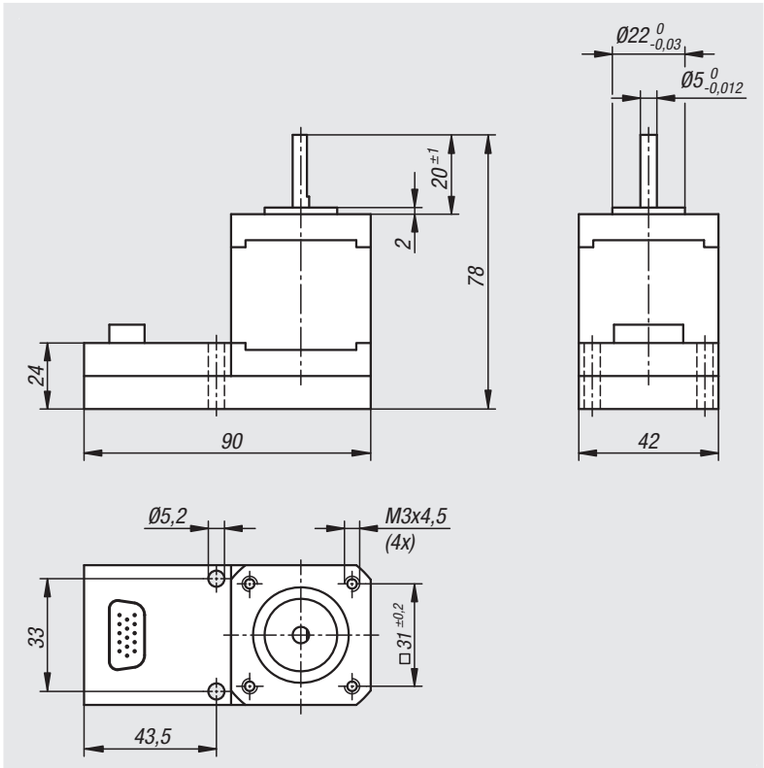


Order No.	Item
21086-1	stepper motor

Stepper motor

with integrated positioning control





Version:
2-phase high-torque stepper motor in NEMA 17 (42 mm) size and 1.8° increment angle (full increment) with integrated position control.

Sample order:
nlm 21088-2

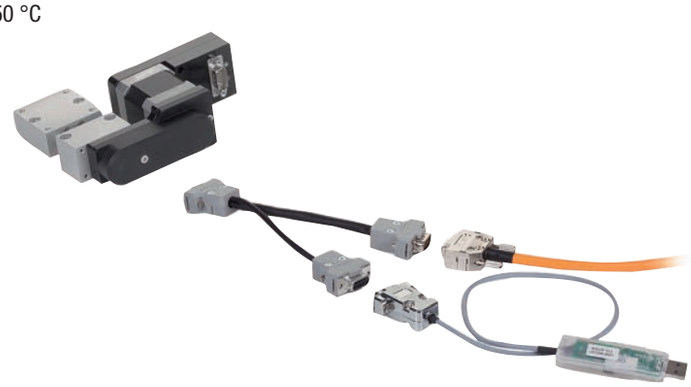
Note:
Stepper motor with integrated positioning control. A convenient unit consisting of stepper motor and intelligent controller. Reference travel is possible on a block with reduced electric current without proximity switch. Integrated rotational monitoring. Smooth running through dynamic switching of increment trip.

Actuation via single I/O interface, 31 position configurations and call-ups.

Control unit can be parametrised quickly and conveniently with the software. The software and manual for programming the positioning control are available as free of charge download.

Application:
Converter:
USB to RS-232 (9-pin SUB-D connector). This USB stick transfers serial data with TTL level to the PC or notebook via the USB interface. Length ca. 500mm with 1.8 m USB extension cable.
Adapter:
15-pin SUB-D socket to 15-pin SUB-D connector and 9-pin SUB-D socket, length approx. 170 mm.
Connection cable:
15-pin SUB-D HD socket, length 5 m. Drag-chain compatible.

Technical data:
Control voltage: +24 V to +36 V DC
Motor voltage: +24 V to +48 V DC
Interfaces: Digital I/O-BAC, frequency/direction
Retaining torque: up to 0.45 Nm
Rotor moment of inertia: 0.068 kgcm²
Current drop: adjustable
Inputs: 6 (+24 V to +36 V DC)
Outputs: 2 (+24 V)
Application temperature: 0 °C to +50 °C



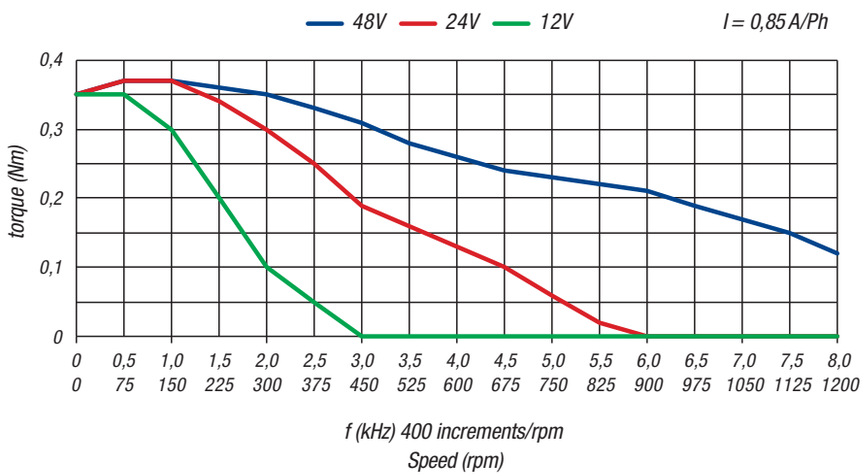


Stepper motor

with integrated positioning control

Pin	Digital I /O BAC	
1	Motor supply +24 V to +48 V DC	
2	Control voltage supply +24 V to +36 V DC	
3	GND	
4	Output "Ready" (RDY)	
5	Output "Motor standing" (MOST)	
6	Input "Start" or "Frequency"	
7	Input I5, or direction, or reference point or analog value	
8	Input 1 (binary 0)	
9	Input 2 (binary 1)	
10	Input 3 (binary 2)	
11	Input 4 (binary 3)	
12	n.c.	
13	n.c.	
14	n.c.	
15	n.c.	

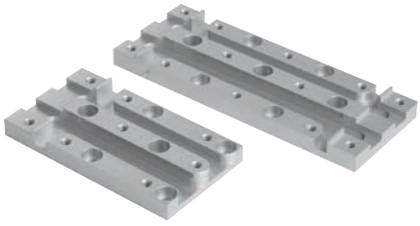
Torque characteristic curve



Order No.		Item
21088-2		stepper motor
21088-91		converter
21088-92		adapter
21088-93		connection cable

Notes

Mounting plates horizontal



Material:
Aluminium alloy.

Version:
anodised.

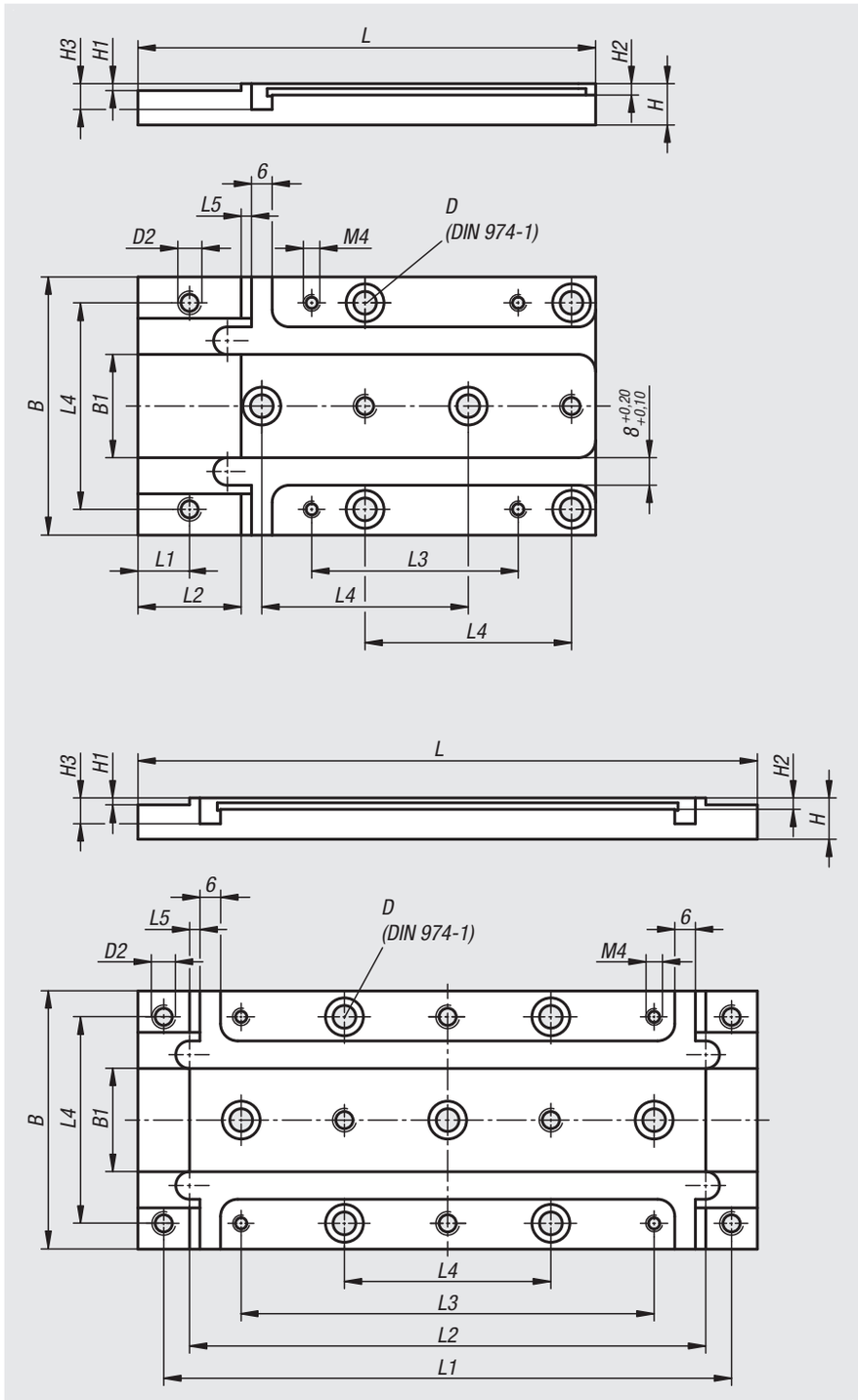
Sample order:
nlm 21090-081

Note:
The mounting plate is used for the horizontal mounting of the short or long positioning tables with electric drive. With slots for direct support of inductive proximity switch (20905-005). The proximity switch can be adjusted when the positioning unit is mounted. The threaded holes M4 are used to fasten the sensor holder 21093.

Can be combined with all other parts of the same size.



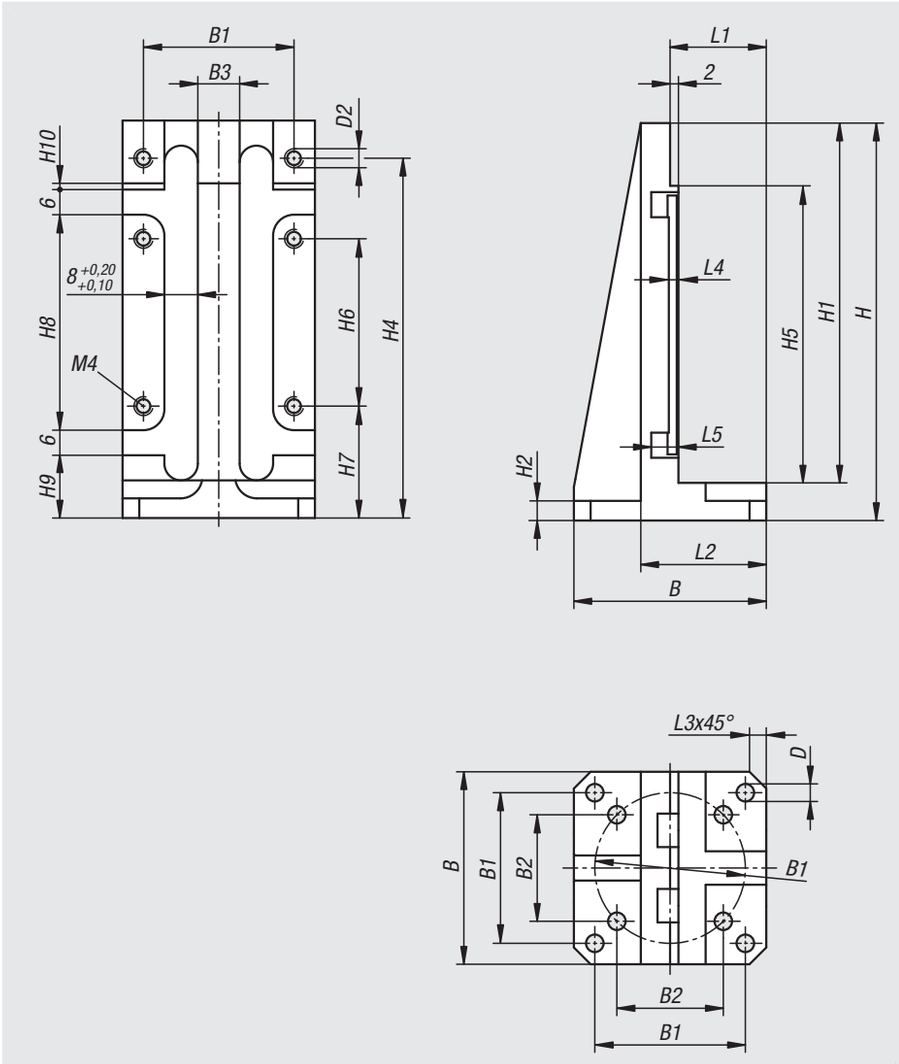




Order No.	Size	Version	B	B1	D	D2	H	H1	H2	H3	L	L1	L2	L3	L4	L5
21090-081	8	short	46	10	4	M4	10	2	2,3	6,5	82,5	9	15	40	36	1,5
21090-121	12	short	75	30	6	M6	12	2	3,3	7,5	133	15	30	60	60	3
21090-082	8	long	46	10	4	M4	10	2	2,3	6,5	120	108	96	72	36	1,5
21090-122	12	long	75	30	6	M6	12	2	3,3	7,5	180	165	150	120	60	3

Mounting plates vertical





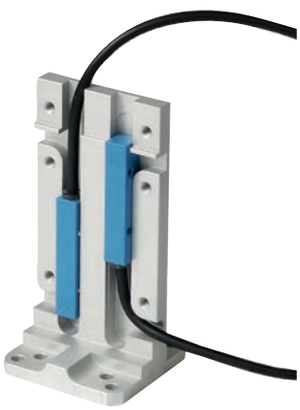
Material:
Aluminium alloy.

Version:
anodised.

Sample order:
nlm 21091-081

Note:
The mounting plate is used for the vertical mounting of the short or long positioning tables with electric drive. With slots for direct support of inductive proximity switch (20905-005). The proximity switch can be adjusted when the positioning unit is mounted. The threaded holes M4 are used to fasten the sensor holder 21093.

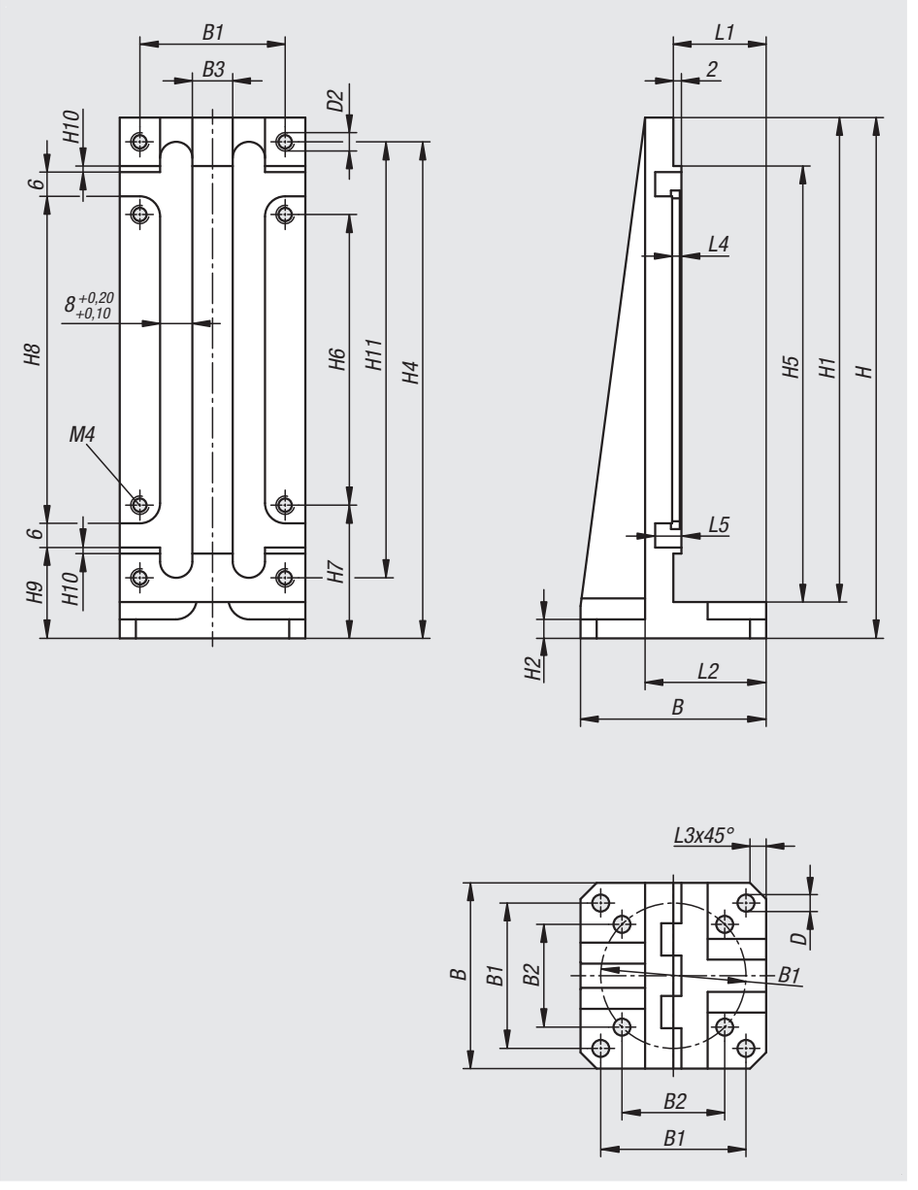
Can be combined with all other parts of the same size.





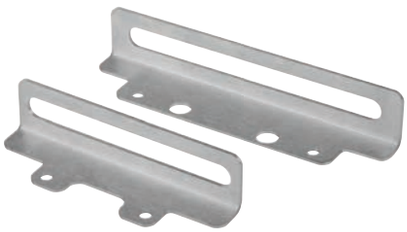
Order No.	Size	Version	B	B1	B2	B3	D	D2	H	H1	H2	H4	H5	H6	H7	H8	H9	H10	L1	L2	L3	L4	L5
21091-081	8	short	46	36	25,5	10	4,2	M4	95	86	4,7	86	71	40	26,75	51,5	15	1,5	23	30	4	2,3	6,5
21091-121	12	short	75	60	42,4	30	6,4	M6	146	136	5,7	131	106	60	35,5	83	18	3	27	36	7	3,3	7,5

Mounting plates vertical



Order No.	Size	Version	B	B1	B2	B3	D	D2	H	H1	H2	H4	H5	H6	H7	H8	H9	H10	H11	L1	L2	L3	L4	L5
21091-082	8	long	46	36	25,5	10	4,2	M4	129	120	4,7	123	108	72	33	81	22,9	1,5	108	23	30	4	2,3	6,5
21091-122	12	long	75	60	42,4	30	6,4	M6	192	180	5,7	184,5	177	120	42	132	30	3	165	27	36	7	3,3	7,5

Sensor holder

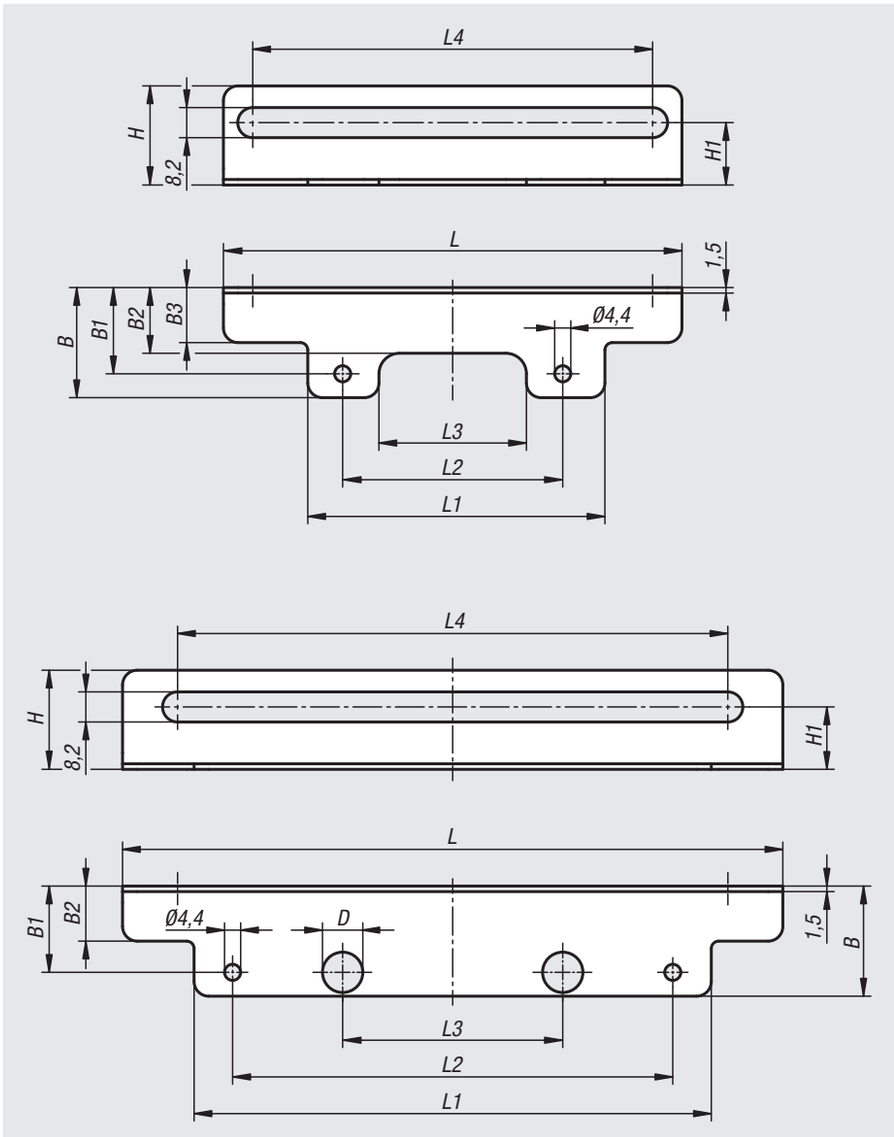


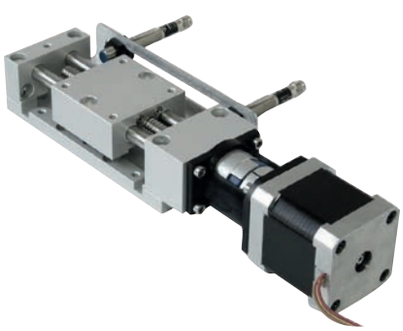
Material:
Aluminium alloy.

Version:
anodised.

Sample order:
nlm 21093-081

Note:
The sensor holder is used to fasten inductive proximity switches (e.g. 20910-050) to the mounting plate or on the customer‘s part.





Order No.	Size	Version	B	B1	B2	B3	D	H	H1	L	L1	L2	L3	L4
21093-081	8	short	25	20	15,9	13,5	4,1	22	12	90	50	40	21,7	74
21093-121	12	short	30	23,5	17,9	15	5,6	27	17	125	81	60	40,2	109
21093-082	8	long	25	20	12,5	-	8	22	12	120	88	72	36	96
21093-122	12	long	30	23,5	15	-	11	27	17	180	141	120	60	150

Sensor holder

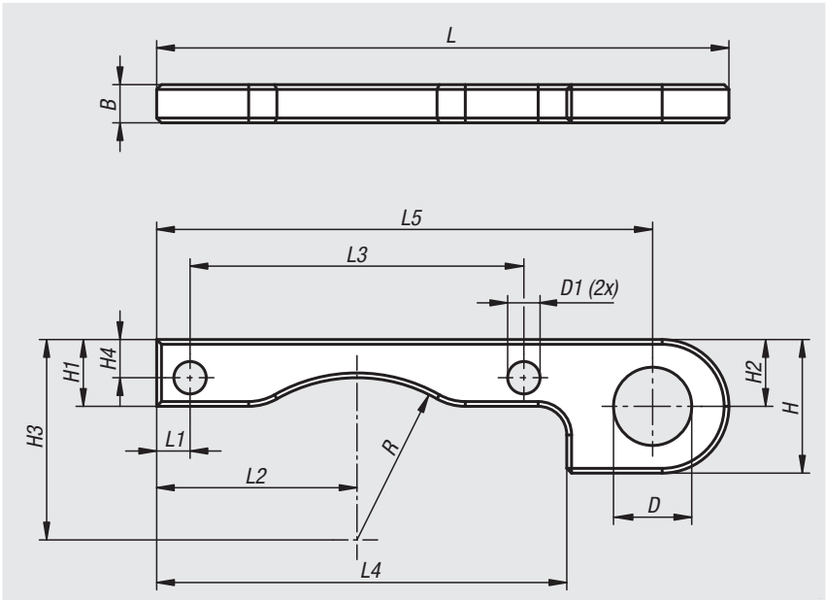


Material:
Aluminium alloy.

Version:
Black anodised

Sample order:
nlm 21094-12

Note:
The sensor holder is used to fasten inductive proximity switches (e.g. 20910-050) to the rotary positioning stages with electric drive allowing the switch point to be positioned anywhere. The ring with the switch slot can be freely rotated counter to the rotary disc.





Order No.	Size	B	D	D1	H	H1	H2	H3	H4	L	L1	L2	L3	L4	L5	R
21094-12	12	4	8,2	3,2	14	7	7	21	4	60	3,5	21	35	43	52	17

Positioning stages, short

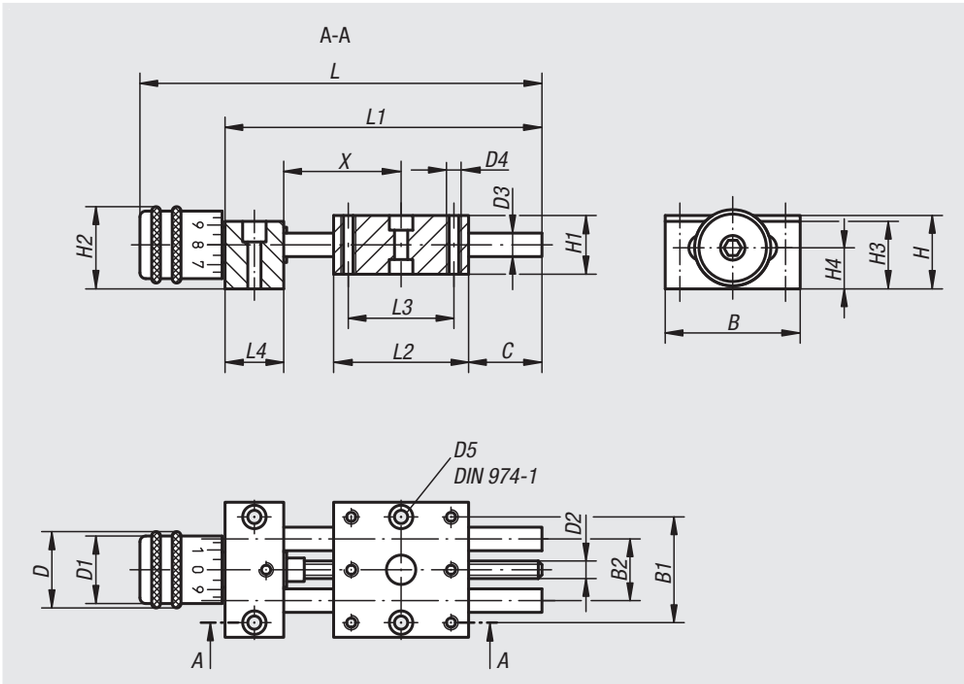


Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.

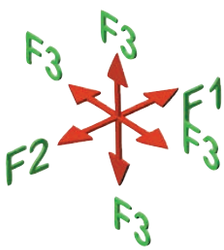
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

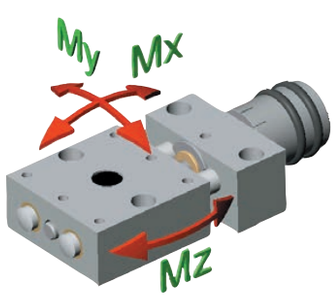
Sample order:
nlm 21100-04

Note:
Due to the practically play-free guides and absolutely play-free spindle, loosening or clamping of the spindle is not required during adjustments.
Scale graduation is 5 or 10 increments, 1 increment is equal to 0.1 mm travel.
Within the respective sizes, the positioning stages can be easily combined using the modular principle.





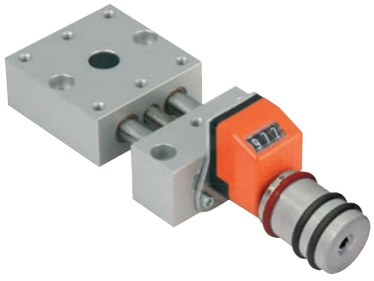


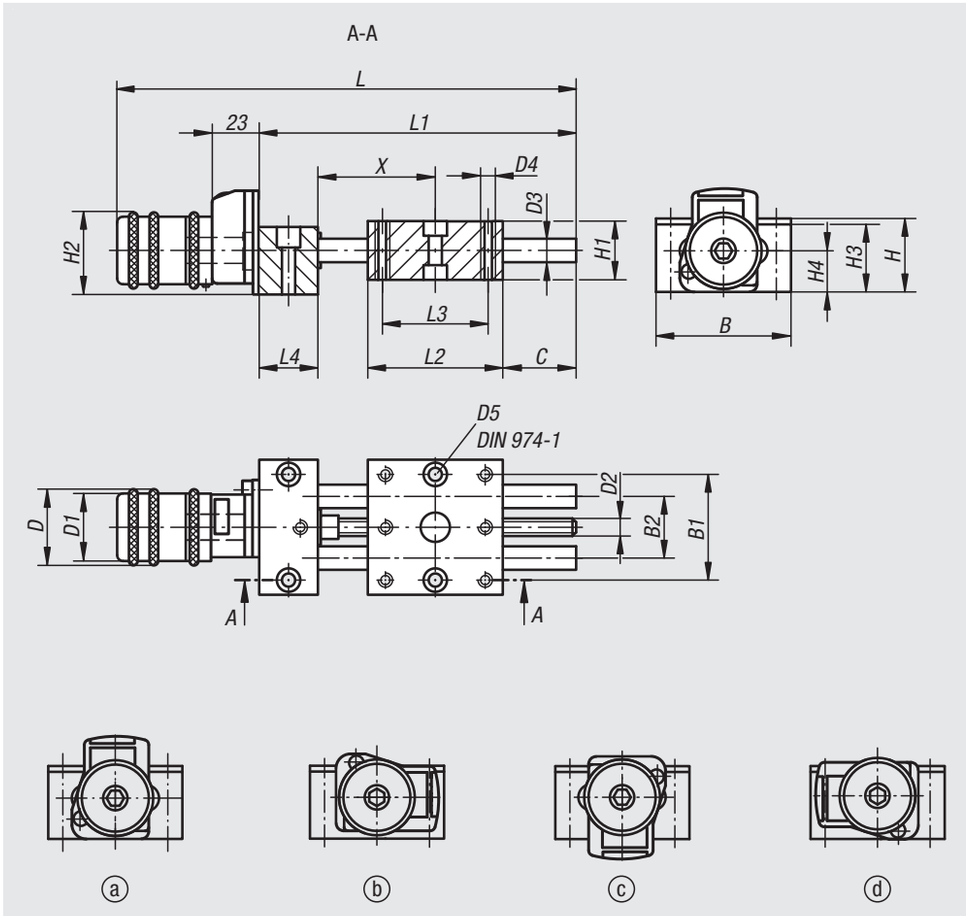


Order No.	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21100-04	29	22	12	11	13	11,5	M3x0,5	4	M3	3	14	12	14,5	13	8	64,5	50	29	22	10	70	70	X = 28 (10)	0,25	0,11	0,25
21100-08	46	36	21	14	26	23	M6x1	8	M4	4	24	20	27	23	14	108,5	80	46	36	20	200	200	X = 39 (50)	1,9	0,9	1,9
21100-12	75	60	38	25	26	23	M6x1	12	M6	6	28	25	29	27	15,5	162	133	75	60	30	300	300	X = 58 (100)	5,5	3	5,5

Positioning stages, short

with position indicator





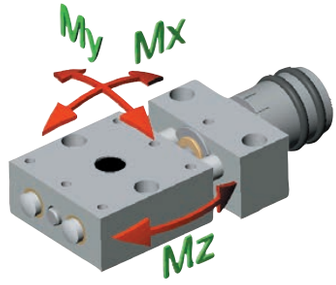
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

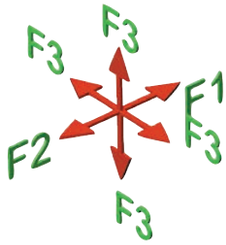
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21102-08

Note:
Due to the practically play-free guides and absolutely play-free spindle, loosening or clamping of the spindle is not required during adjustments.
Digital position indicators with 0.1 mm display accuracy, digits increase with right rotation.
The display value of the position indicator can be adjusted by turning the carrier ring. The mounted position of the position indicator can be set in 4 positions with a screw.
Within the respective sizes, the positioning stages can be easily combined using the modular principle.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left



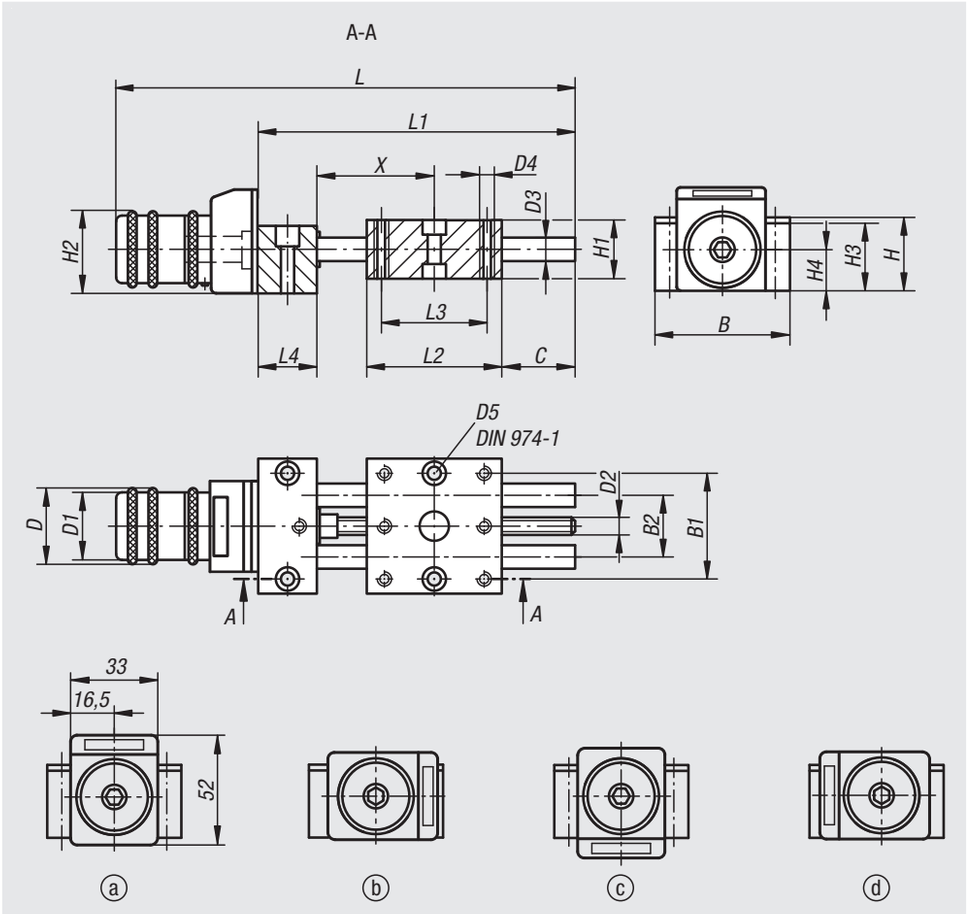


Order No.	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21102-08	46	36	21	14	26	23	M6x1	8	M4	4	24	20	27	23	14	135	80	46	36	20	200	200	X = 39 (50)	1,9	0,9	1,9
21102-12	75	60	38	25	26	23	M6x1	12	M6	6	28	25	29	27	15,5	187,5	133	75	60	30	300	300	X = 58 (100)	5,5	3	5,5

Positioning stages, short

with electronic position indicator





Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

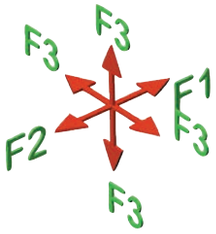
Sample order:
nlm 21104-08

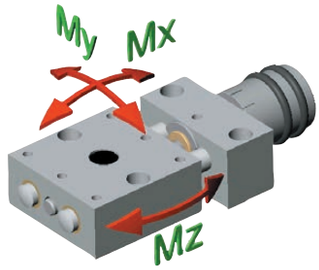
Note:
The almost play-free guides and absolutely play-free spindle enables adjustment without the need to loosen or clamp the spindle.
Electronic position indicator with 0.01 mm display accuracy and large LCD display.
Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.
The modular design enables the positioning stage to be easily combined with other items of the same size.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left



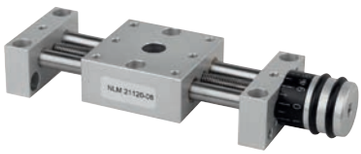


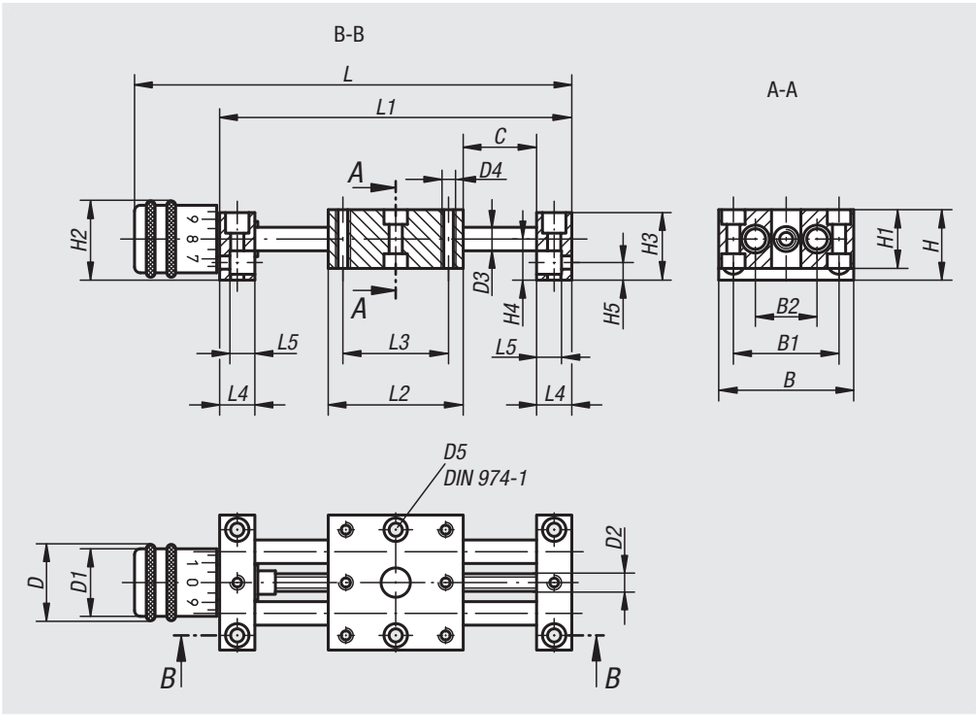




Order No.	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21104-08	46	36	21	14	26	23	M6x1	8	M4	4	24	20	27	23	14	139	80	46	36	20	200	200	X = 39 (50)	1,9	0,9	1,9
21104-12	75	60	38	25	26	23	M6x1	12	M6	6	28	25	29	27	15,5	192	133	75	60	30	300	300	X = 58 (100)	5,5	3	5,5

Positioning stages, long



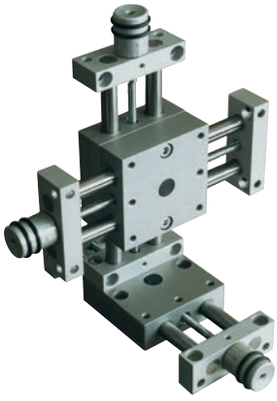


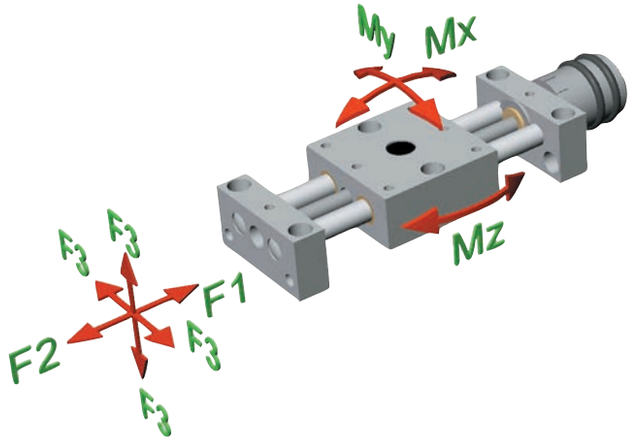
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.

Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21120-04

Note:
Due to the practically play-free guides and absolutely play-free spindle, loosening or clamping of the spindle is not required during adjustments.
Scale wgraduation is 5 or 10 increments, 1 increment is equal to 0.1 mm travel.
Within the respective sizes, the positioning stages can be easily combined using the modular principle.

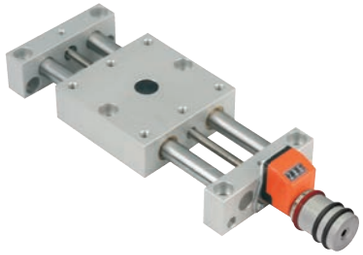


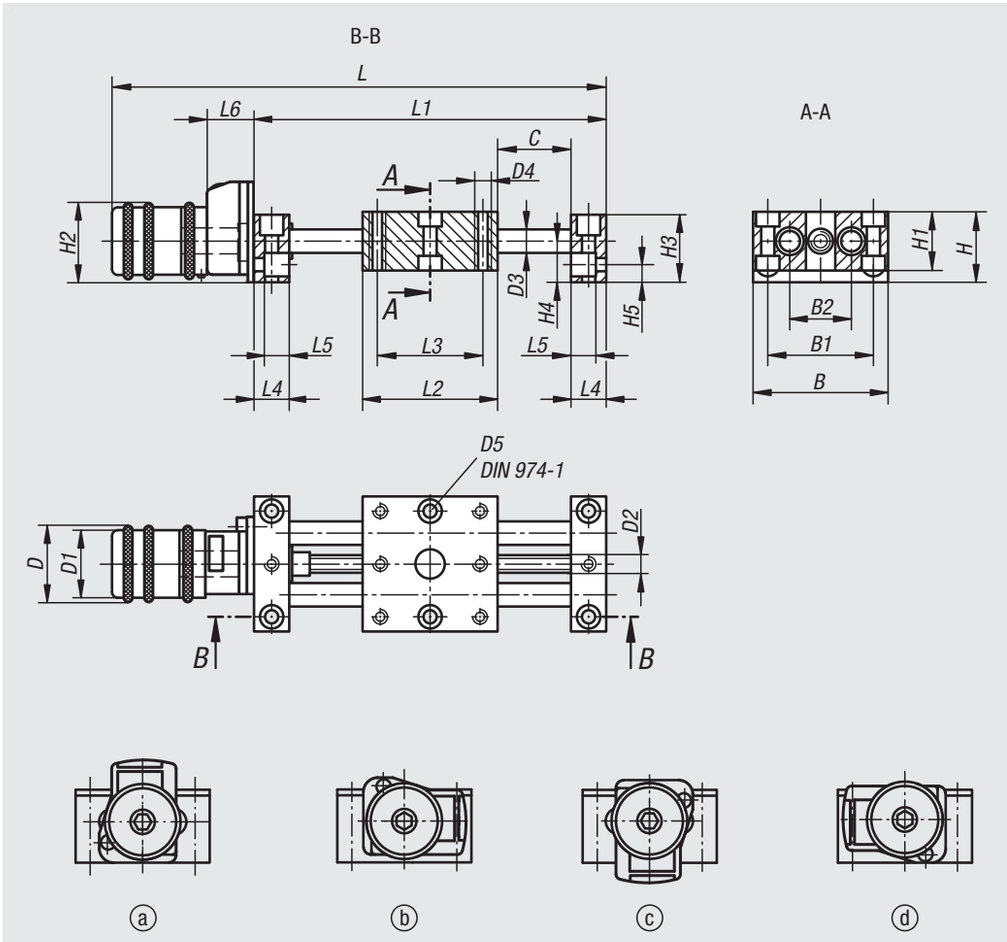


Order No.	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21120-04	29	22	12	23	13	12	M3x0,5	4	M3	3	14	12	14,5	13	8	4	84,5	70	29	22	8	6	70	70	70	0,77	0,77	0,77
21120-08	46	36	21	48	26	23	M6x1	8	M4	4	24	20	27	23	14	6	148,5	120	46	36	12	8,5	200	200	200	3,6	3,6	3,6
21120-12	75	60	38	73	26	23	M6x1	12	M6	6	28	25	28,5	27	15,5	7	209	180	75	60	15	11	300	300	300	18	18	18
21120-25	150	130	90	86	52	46	M16x2	25	M10	10	53	50	54	52	28	13	347	290	150	130	25	18	1000	1000	1000	65	65	65

Positioning stages, long

with position indicator





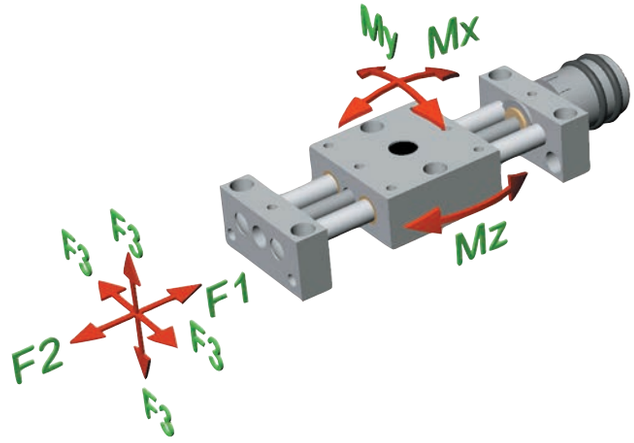
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21122-08

Note:
Due to the practically play-free guides and absolutely play-free spindle, loosening or clamping of the spindle is not required during adjustments.
Digital position indicators with 0.1 mm display accuracy, digits increase with right rotation. The display value of the position indicator can be adjusted by turning the carrier ring. The mounted position of the position indicator can be set in 4 positions with a screw. Size 25 can be mounted in 3 positions (up, right and left).
Within the respective sizes, the positioning stages can be easily combined using the modular principle.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left



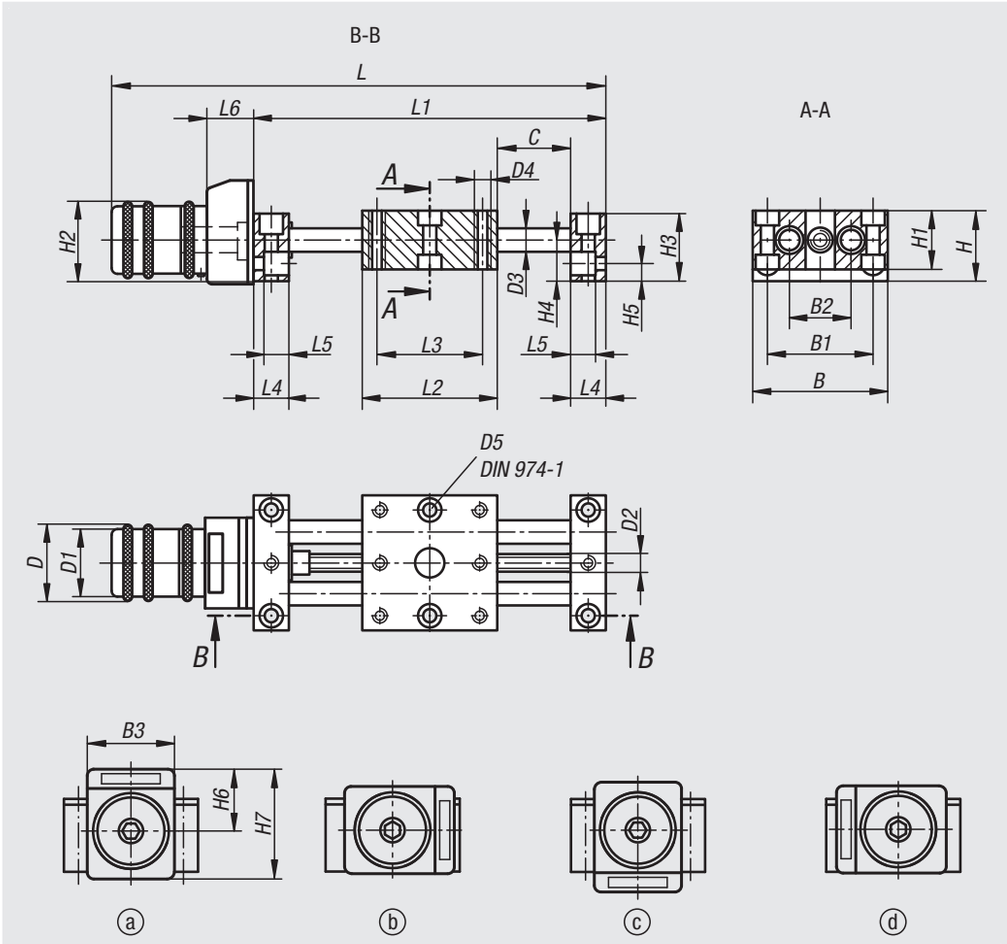
Order No.	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	L6	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21122-08	46	36	21	48	26	23	M6x1	8	M4	4	24	20	27	23	14	6	175	120	46	36	12	8,5	23	200	200	200	3,6	3,6	3,6
21122-12	75	60	38	73	26	23	M6x1	12	M6	6	28	25	28,5	27	15,5	7	235	180	75	60	15	11	23	300	300	300	18	18	18
21122-25	150	130	90	86	52	46	M16x2	25	M10	10	53	50	54	52	28	13	388	290	150	130	25	18	36	1000	1000	1000	65	65	18

Notes

Positioning stages, long

with electronic position indicator





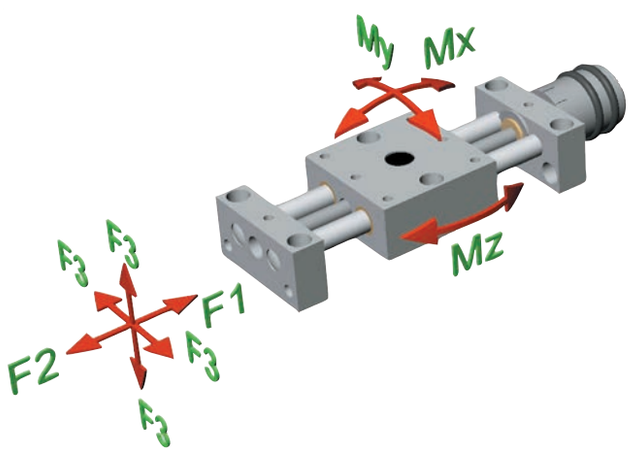
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21124-08

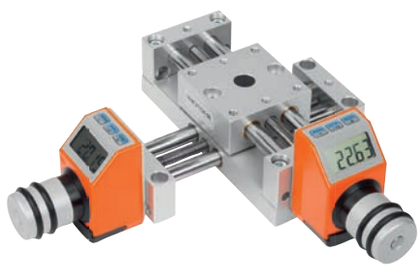
Note:
The almost play-free guides and absolutely play-free spindle enables adjustment without the need to loosen or clamp the spindle.
Electronic position indicator with 0.01 mm display accuracy and large LCD display.
Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.
The modular design enables the positioning stage to be easily combined with other items of the same size.

Drawing reference:
Mounting position of the position indicator:
a) top (standard)
b) right
c) bottom not possible for 21124-25
d) left



Positioning stages, long

with electronic position indicator

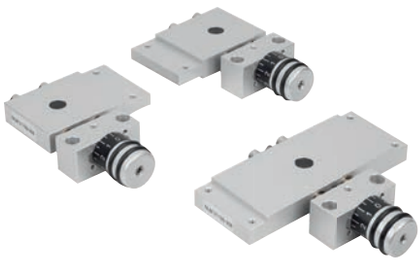


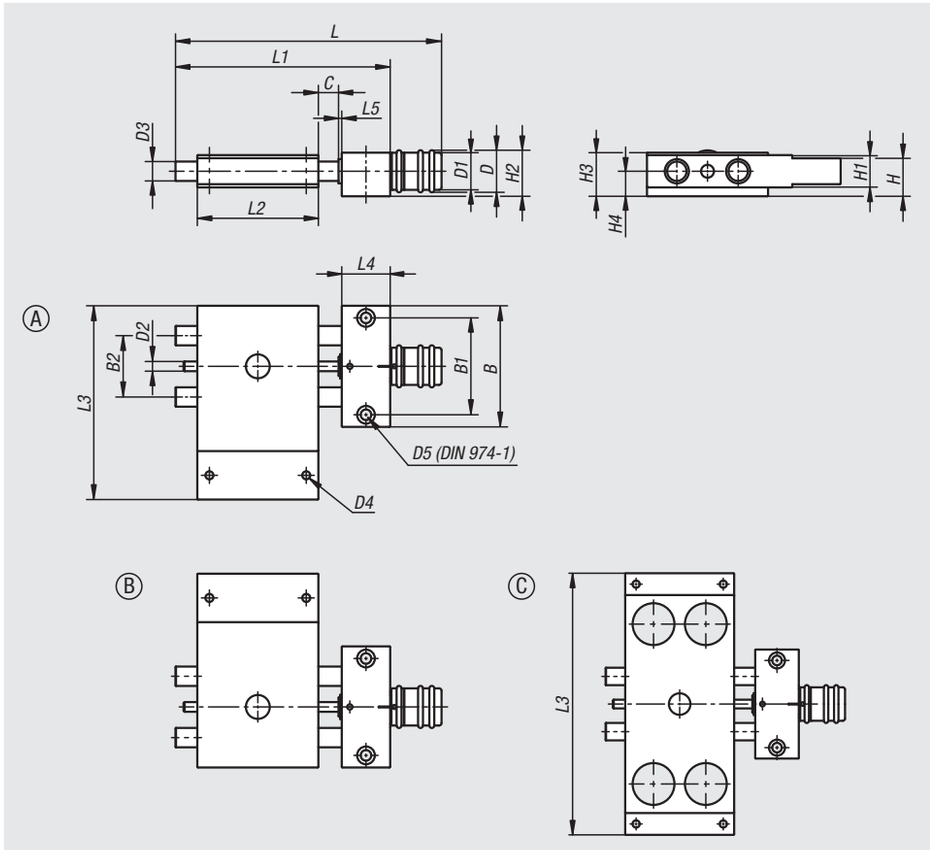


Order No.	B	B1	B2	B3	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4
21124-08	46	36	21	33	48	26	23	M6x1	8	M4	4	24	20	27	23	14
21124-12	75	60	38	33	73	26	23	M6x1	12	M6	6	28	25	28,5	27	15,5
21124-25	150	130	90	48	86	52	46	M16x2	25	M10	10	53	50	54	52	28

Order No.	H5	H6	H7	L	L1	L2	L3	L4	L5	L6	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21124-08	6	31	52	179	120	46	36	12	8,5	29,4	200	200	200	3,6	3,6	3,6
21124-12	7	31	52	239	180	75	60	15	11	29,4	300	300	300	18	18	18
21124-25	13	42,4	71,4	376	290	150	130	20	18	36,4	1000	1000	1000	65	65	18

Cross stages, short



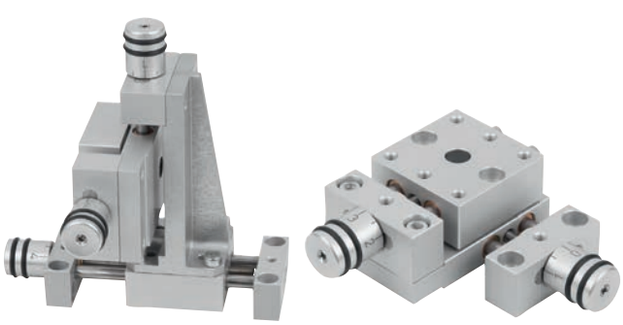


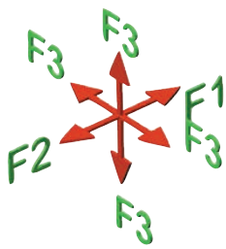
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.

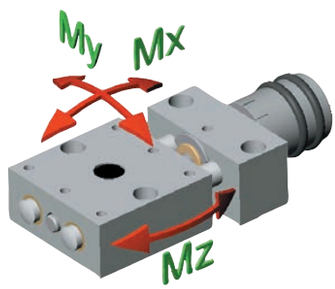
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21130-104

Note:
The almost play-free guides and absolutely play-free spindle allow for adjustment without the need to loosen or clamp the spindle.
The scale graduation is in 5 or 10 increments; 1 increment corresponds to 0.1 mm of travel.
The cross stage can be easily combined with positioning stages, vertical stages and other accessories of respective size by the modular principle.



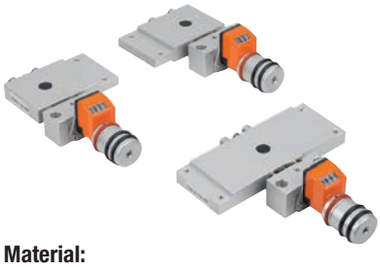




Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	L5	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21130-104	A	29	22	12	11	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	64,5	50	29	46	10	1,5	70	70	X = 28 (10)	0,25	0,11	0,25
21130-108	A	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	108,5	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21130-112	A	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	162	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21130-204	B	29	22	12	11	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	64,5	50	29	46	10	1,5	70	70	X = 28 (10)	0,25	0,11	0,25
21130-208	B	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	108,5	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21130-212	B	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	162	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21130-304	C	29	22	12	11	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	64,5	50	29	70	10	1,5	70	70	X = 28 (10)	0,25	0,11	0,25
21130-308	C	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	108,5	80	46	120	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21130-312	C	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	162	133	75	180	30	2	300	300	X = 58 (100)	5,5	3	5,5

Cross stages, short

with position indicators

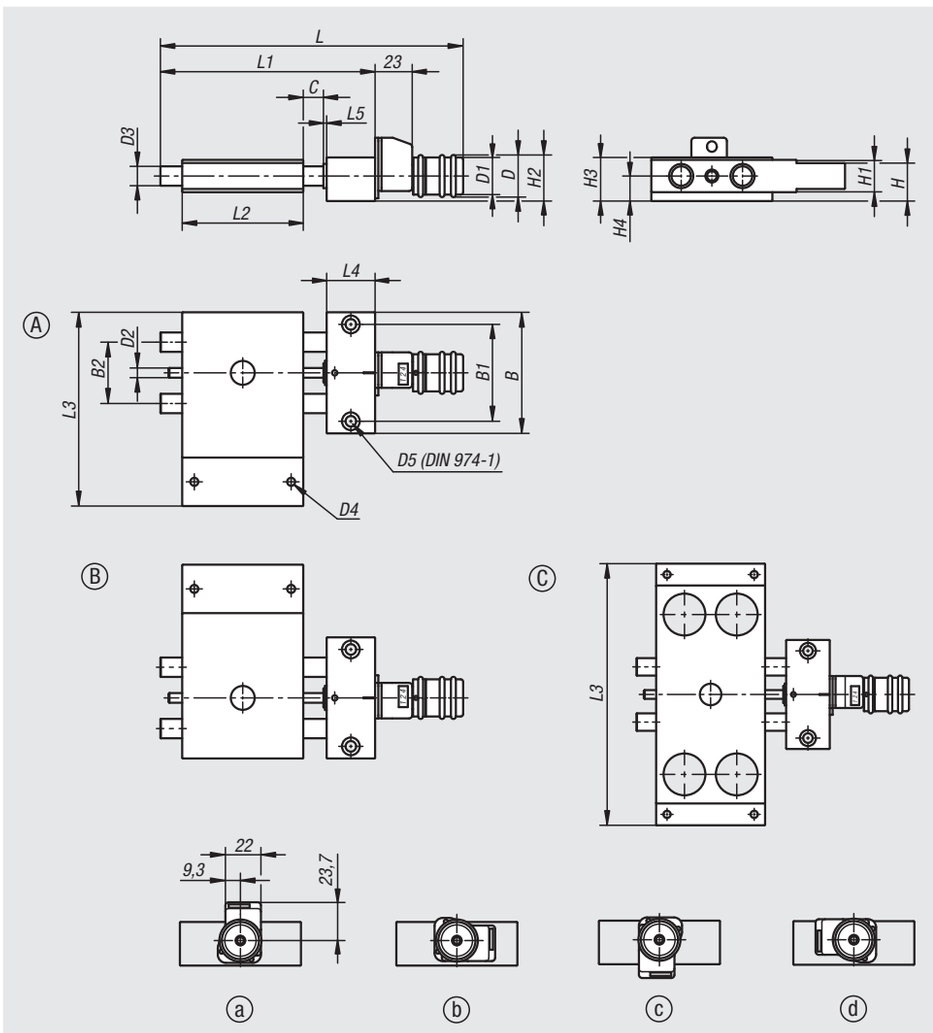


Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

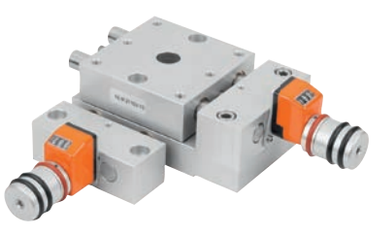
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

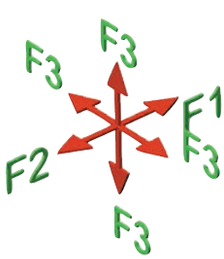
Sample order:
nlm 21132-108

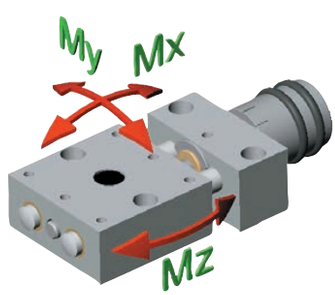
Note:
The almost play-free guides and absolutely play-free spindle allow for adjustment without the need to loosen or clamp the spindle.
Digital position indicator with 0.1 mm indicator accuracy, digits increase by clockwise rotation.
The display value is set by turning the outer ring.
The indicator can be mounted in 4 positions using a screw.
The cross stage can be easily combined with positioning stages, vertical stages and other accessories of respective size by the modular principle.



Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left





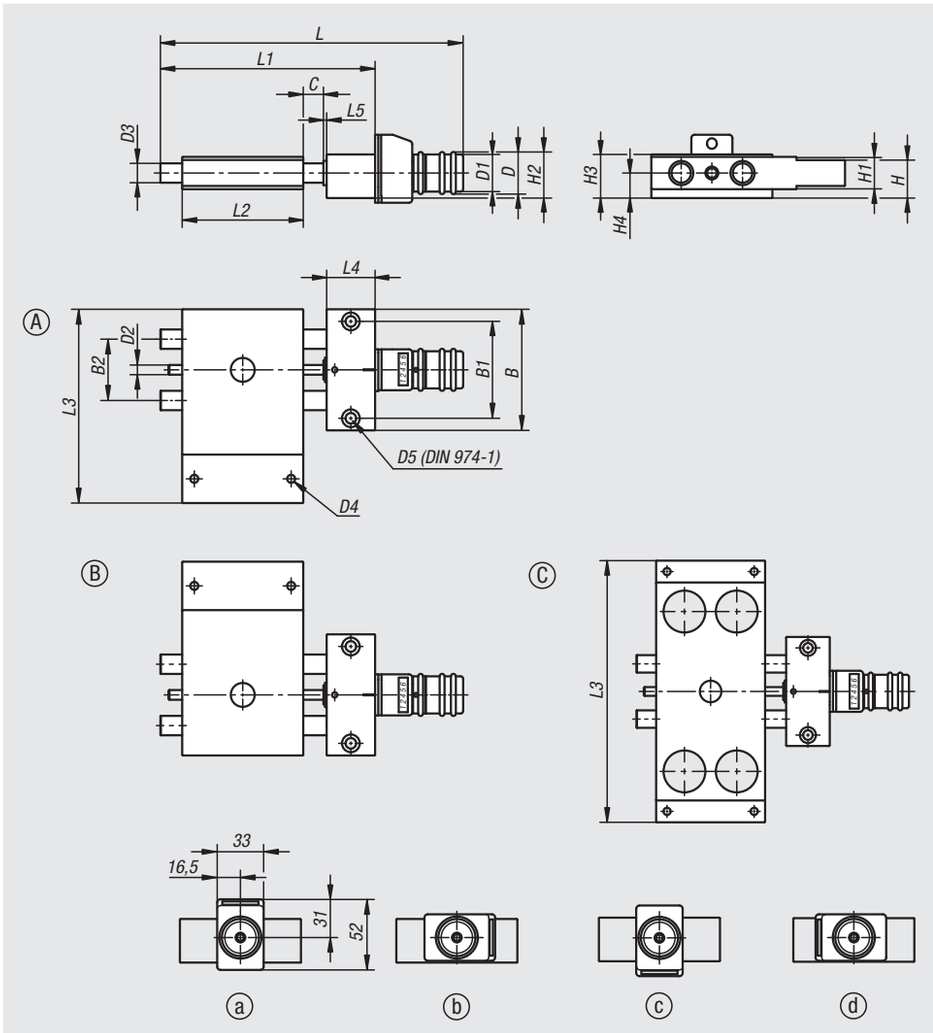


Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	L5	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21132-108	A	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	134,5	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21132-112	A	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	187,5	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21132-208	B	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	134,5	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21132-212	B	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	187,5	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21132-308	C	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	134,5	80	46	120	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21132-312	C	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	187,5	133	75	180	30	2	300	300	X = 58 (100)	5,5	3	5,5

Cross slides, short

with electronic position indicator





Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21133-108

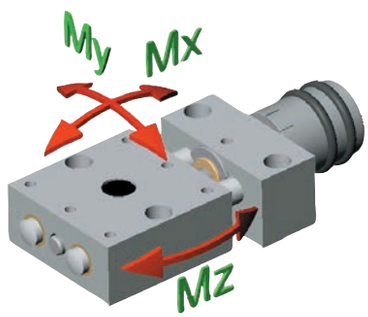
Note:
The almost play-free guides and absolutely play-free spindle enables adjustment without the need to loosen or clamp the spindle.
Electronic position indicator with 0.01 mm display accuracy and large LCD display. Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.
The modular design enables the cross slide to be easily combined with positioning stages, vertical stages and other accessories of the same size.

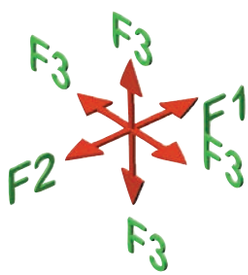
Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left



Cross slides, short

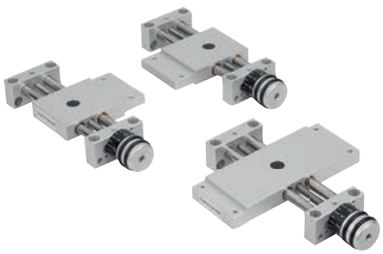
with electronic position indicator

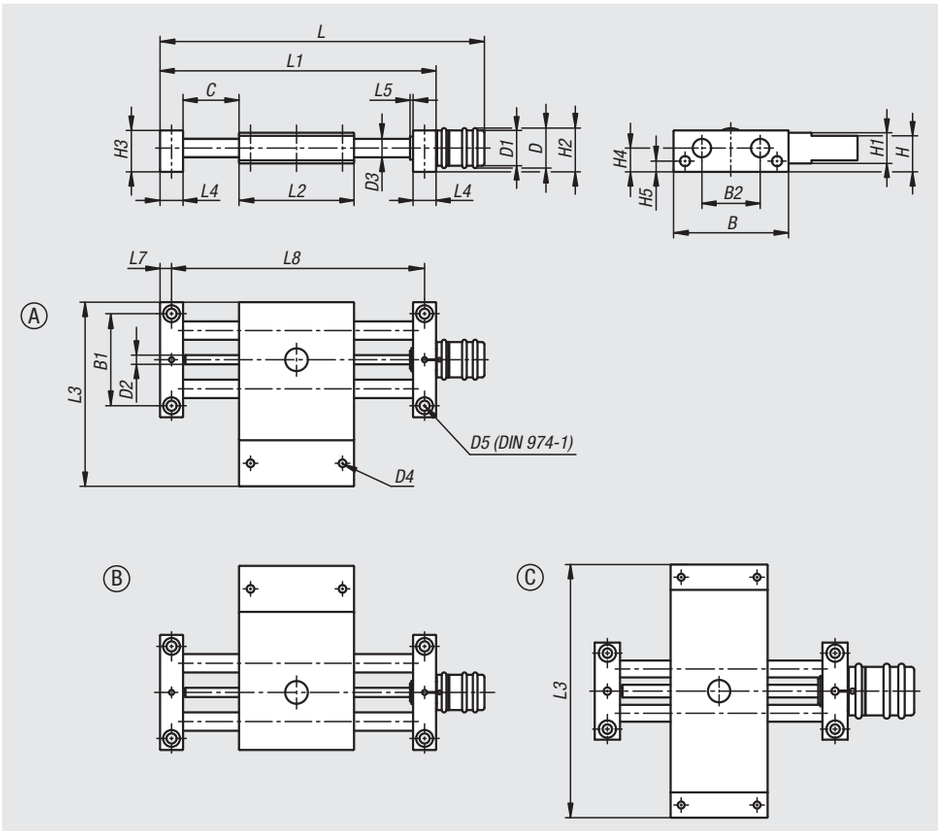




Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	L	L1	L2	L3	L4	L5	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21133-108	A	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	139	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21133-112	A	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	192	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21133-208	B	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	139	80	46	75	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21133-212	B	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	192	133	75	120	30	2	300	300	X = 58 (100)	5,5	3	5,5
21133-308	C	46	36	21	14	26	23	M6x1	8	M4	4	18	14	27	23	14	139	80	46	120	20	2	200	200	X = 39 (50)	1,9	0,9	1,9
21133-312	C	75	60	38	25	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	192	133	75	180	30	2	300	300	X = 58 (100)	5,5	3	5,5

Cross stages, long



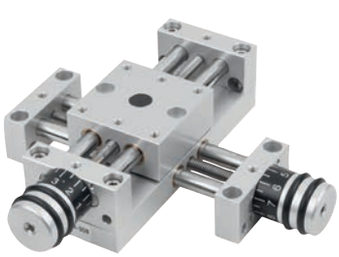


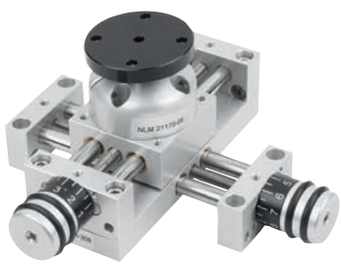
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.

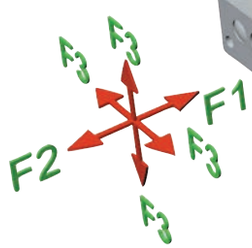
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

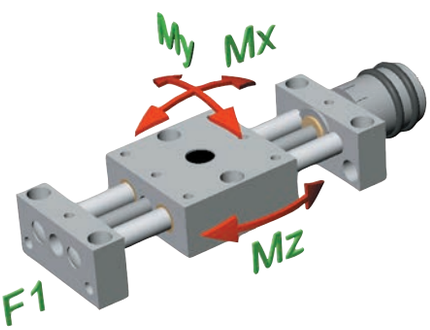
Sample order:
nlm 21134-104

Note:
The almost play-free guides and absolutely play-free spindle allow for adjustment without the need to loosen or clamp the spindle.
The scale graduation is in 5 or 10 increments; 1 increment corresponds to 0.1 mm of travel.
The cross stage can be easily combined with positioning stages, vertical stages and other accessories of respective size by the modular principle.





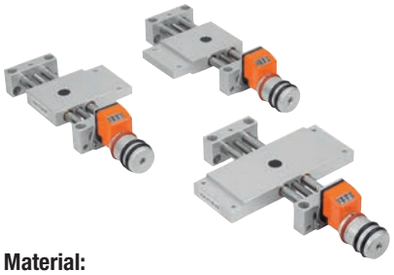




Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	L7	L8	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21134-104	A	29	22	12	23	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	4	84,5	70	29	46	8	1,5	4	62	70	70	70	0,77	0,77	0,77
21134-108	A	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	148,5	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21134-112	A	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	209	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21134-204	B	29	22	12	23	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	4	84,5	70	29	46	8	1,5	4	62	70	70	70	0,77	0,77	0,77
21134-208	B	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	148,5	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21134-212	B	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	209	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21134-304	C	29	22	12	23	13	11,5	M3x0,5	4	M3	3	11	8	14,5	13	8	4	84,5	70	29	70	8	1,5	4	62	70	70	70	0,77	0,77	0,77
21134-308	C	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	148,5	120	46	120	12	2	6	108	200	200	200	3,6	3,6	3,6
21134-312	C	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	209	180	75	180	15	2	7,5	165	300	300	300	18	18	18

Cross stages, long

with position indicators



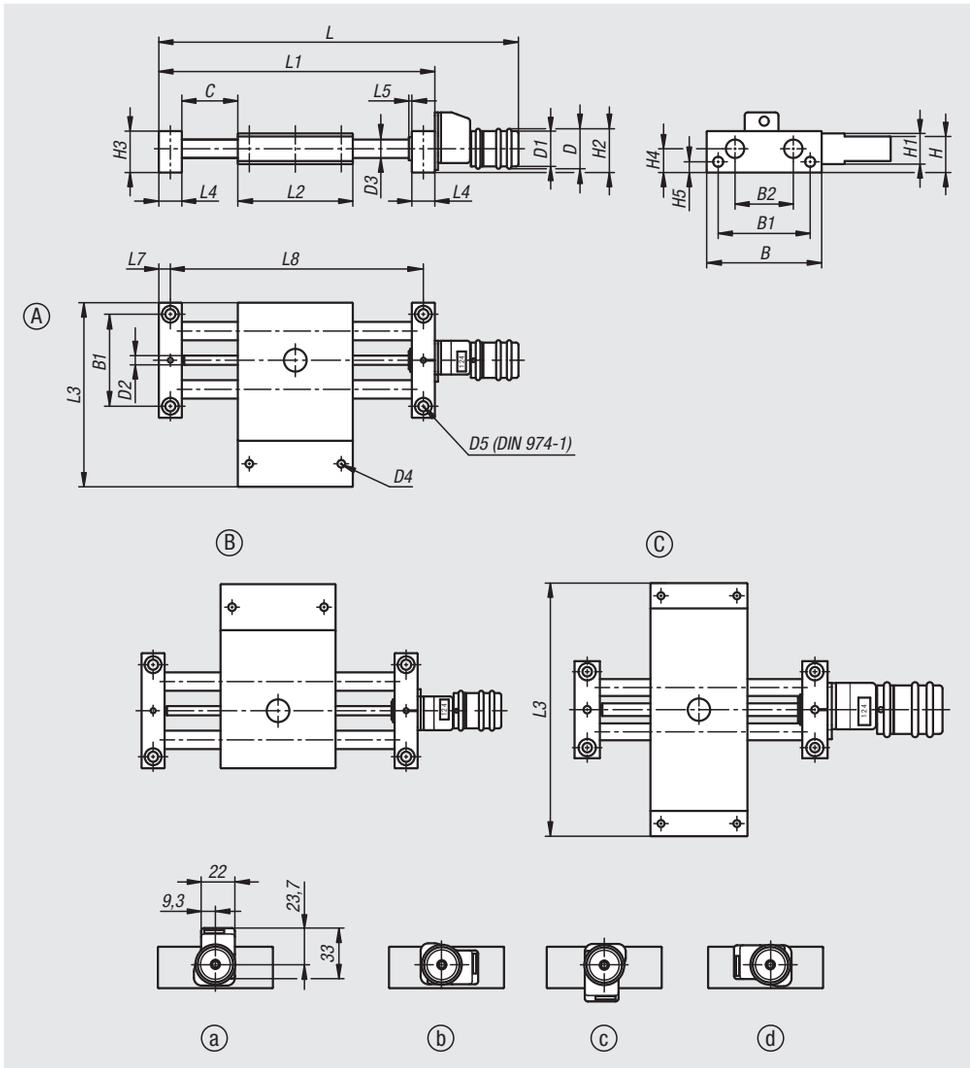
Material:
Bearing block and carriage
aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

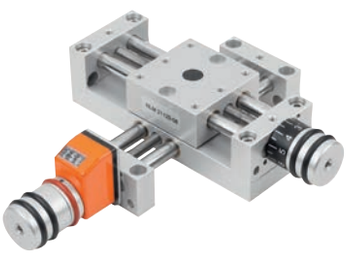
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

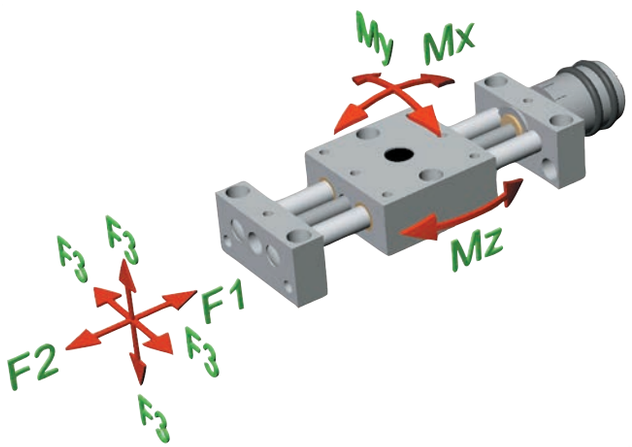
Sample order:
nlm 21136-108

Note:
The almost play-free guides and absolutely play-free spindle allow for adjustment without the need to loosen or clamp the spindle. Digital position indicator with 0.1 mm indicator accuracy, digits increase by clockwise rotation. The display value is set by turning the outer ring. The indicator can be mounted in 4 positions using a screw. The cross stage can be easily combined with positioning stages, vertical stages and other accessories of respective size by the modular principle.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left



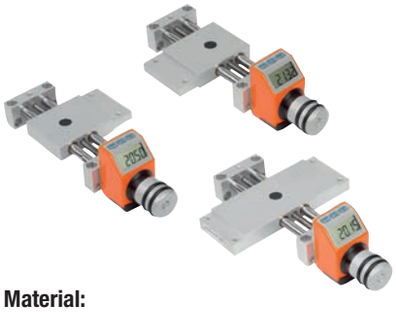


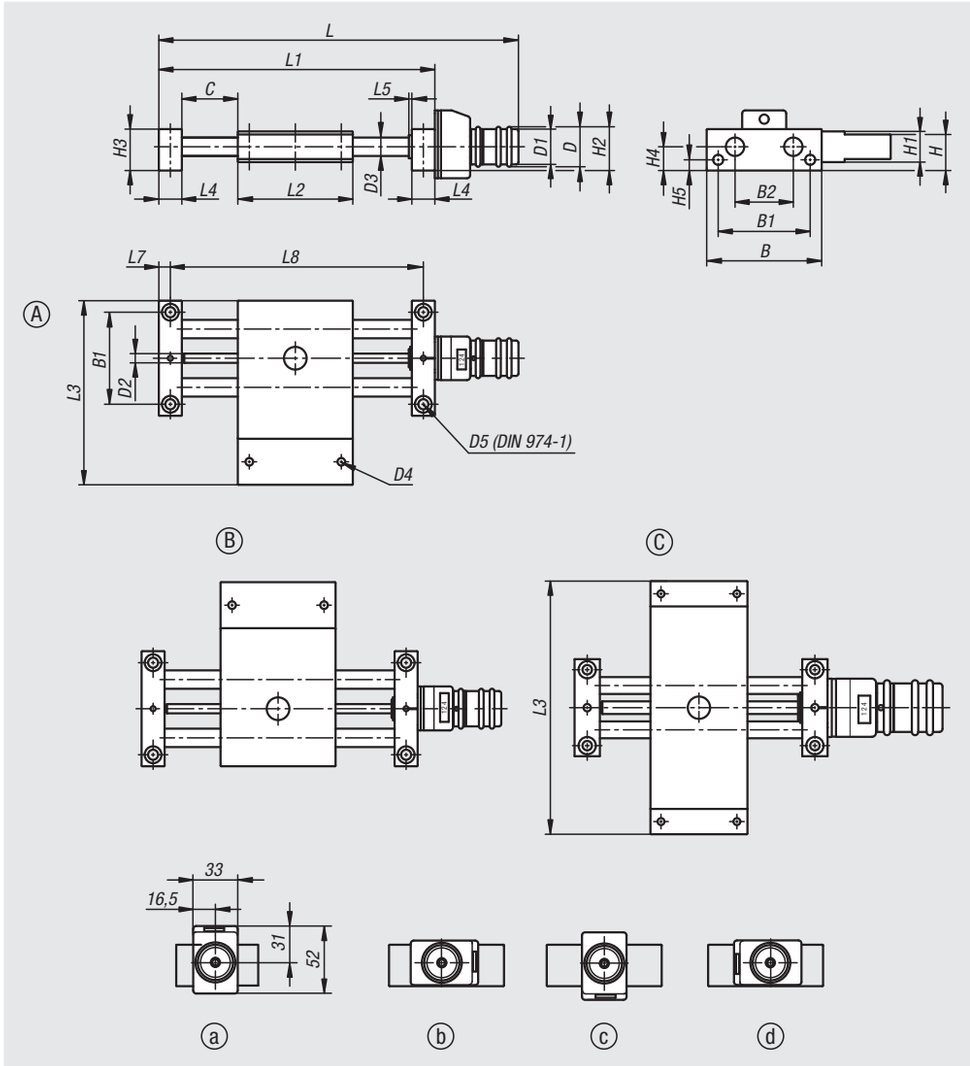


Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	L7	L8	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21136-108	A	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	174,5	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21136-112	A	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	235	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21136-208	B	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	174,5	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21136-212	B	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	235	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21136-308	C	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	174,5	120	46	120	12	2	6	108	200	200	200	3,6	3,6	3,6
21136-312	C	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	235	180	75	180	15	2	7,5	165	300	300	300	18	18	18

Cross slides, long

with electronic position indicator





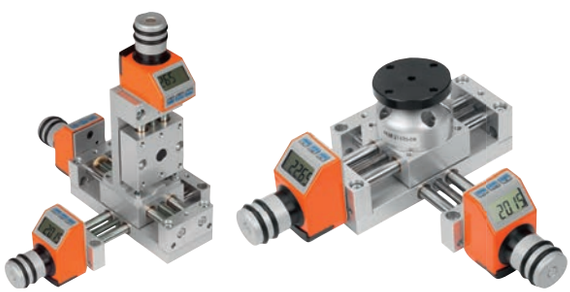
Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

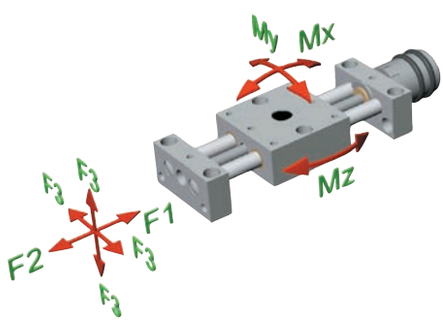
Version:
Radial play on guide < 0.02 mm.
No axial backlash.
Spindle self-locking, with additional lock.

Sample order:
nlm 21137-108

Note:
The almost play-free guides and absolutely play-free spindle enables adjustment without the need to loosen or clamp the spindle.
Electronic position indicator with 0.01 mm display accuracy and large LCD display.
Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.
The modular design enables the cross slide to be easily combined with positioning stages, vertical stages and other accessories of the same size.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left





Order No.	Form	B	B1	B2	C (travel)	D	D1	D2	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	L7	L8	F1 N	F2 N	F3 N	Mx Nm	My Nm	Mz Nm
21137-108	A	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	179	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21137-112	A	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	239	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21137-208	B	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	179	120	46	75	12	2	6	108	200	200	200	3,6	3,6	3,6
21137-212	B	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	239	180	75	120	15	2	7,5	165	300	300	300	18	18	18
21137-308	C	46	36	21	48	26	23	M6x1	8	M4	4	18	14	27	23	14	6	179	120	46	120	12	2	6	108	200	200	200	3,6	3,6	3,6
21137-312	C	75	60	38	73	26	23	M6x1	12	M6	6	23,5	20	29	27	15,5	7	239	180	75	180	15	2	7,5	165	300	300	300	18	18	18

Vertical bracket

short

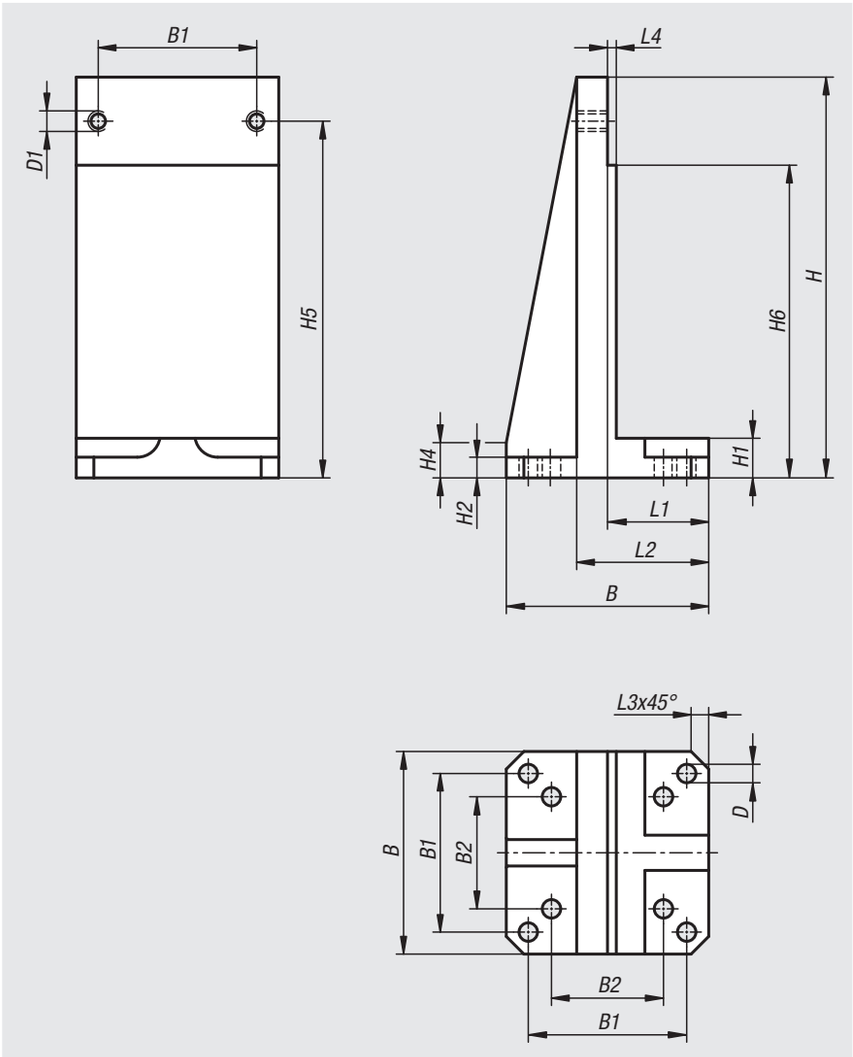


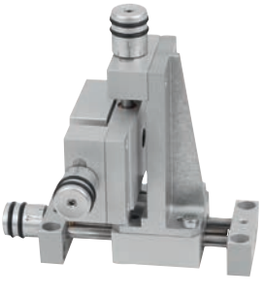
Material:
Aluminium alloy.

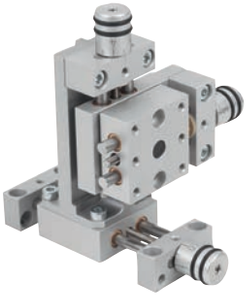
Version:
anodised.

Sample order:
nlm 21138-04

Note:
The vertical bracket is mounted vertically to the mounting surface.
Can be combined with positioning stages, cross stages, vertical stages and all other components of the same size.







Order No.	Size	B	B1	B2	D	D1	H	H1	H2	H4	H5	H6	L1	L2	L3	L4
21138-04	4	29	22	15,56	3,2	M3	58	6	2,8	6	53	48	13	18	3	1
21138-08	8	46	36	25,46	4,2	M4	91	9	4,7	8	81	71	23	30	4	2
21138-12	12	75	60	42,43	6,4	M6	146	12	5,7	8	131	116	27	36	7	2

Vertical bracket

long

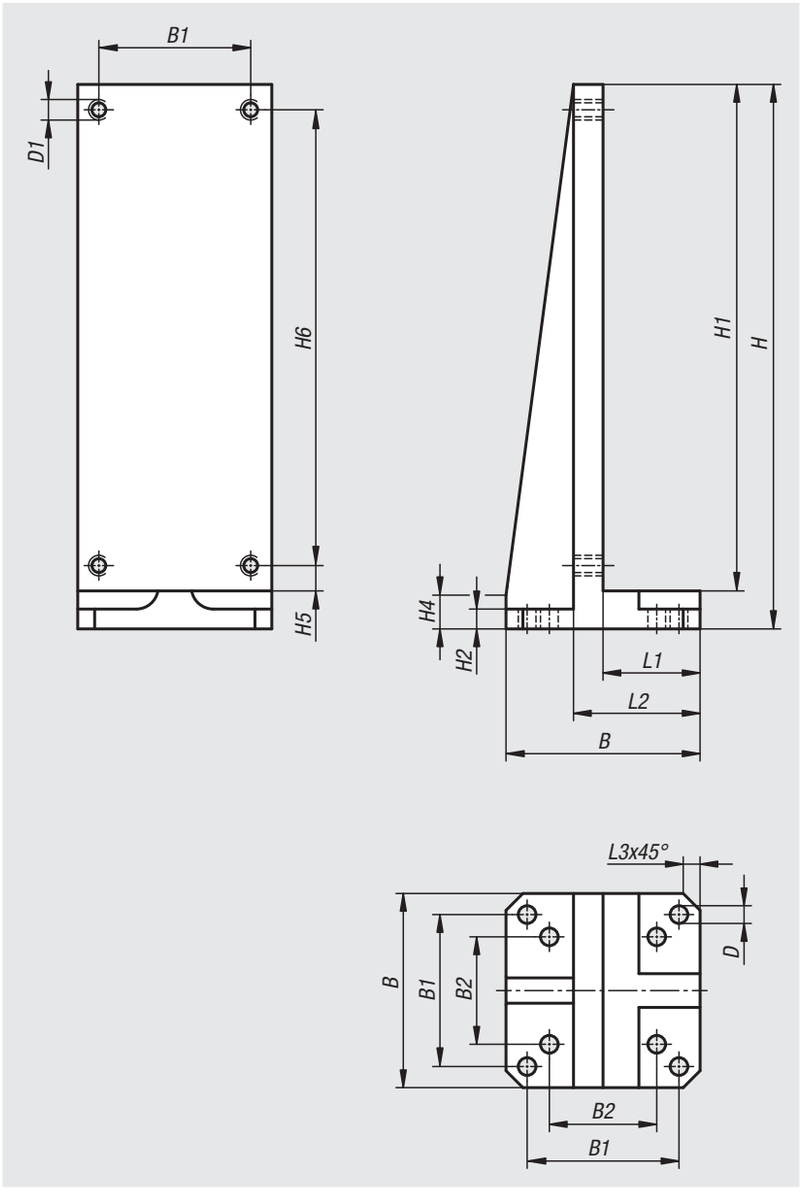


Material:
Aluminium alloy.

Version:
anodised.

Sample order:
nlm 21139-04

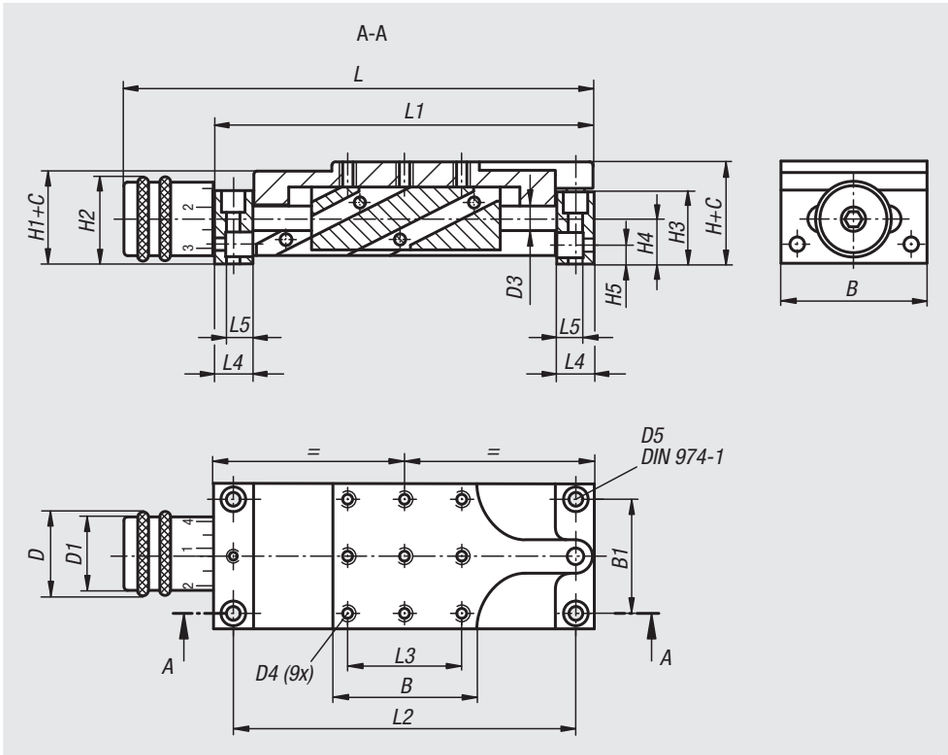
Note:
The vertical bracket is mounted vertically to the mounting surface.
Can be combined with positioning stages, cross stages, vertical stages and all other components of the same size.



Order No.	Size	B	B1	B2	D	D1	H	H1	H2	H4	H5	H6	L1	L2	L3
21139-04	4	29	22	15,56	3,2	M3	76	70	2,8	6	4	62	13	18	3
21139-08	8	46	36	25,46	4,2	M4	129	120	4,7	8	6	108	23	30	4
21139-12	12	75	60	42,43	6,4	M6	192	180	5,7	8	7,5	165	27	36	7

Vertical stages





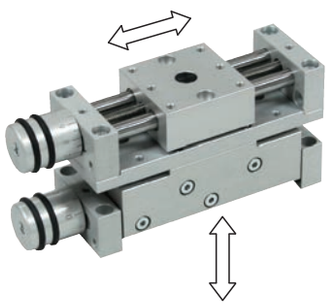
Material:
Vertical stage, bearing blocks and scale knob
Al alloy, anodised.
Guiding columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing, maintenance-free

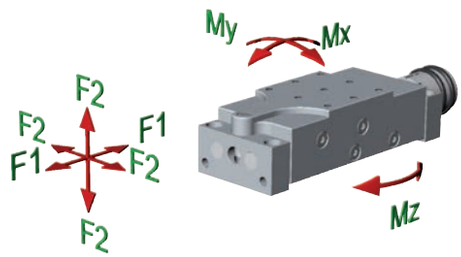
Version:
Guide backlash < 0.05 mm.
Spindle self-locking, with additional lock.

Sample order:
nlm 21140-04

Note:
For positioning the height of all types of components and assemblies e.g. stops, sensors, limit switches, tables, cameras, entire assemblies etc. The height of the stage is adjusted manually by turning the scale knob. 1 increment of the scale equals 0.1 mm travel.

Within the respective sizes, the vertical stages can be easily combined using the modular principle.



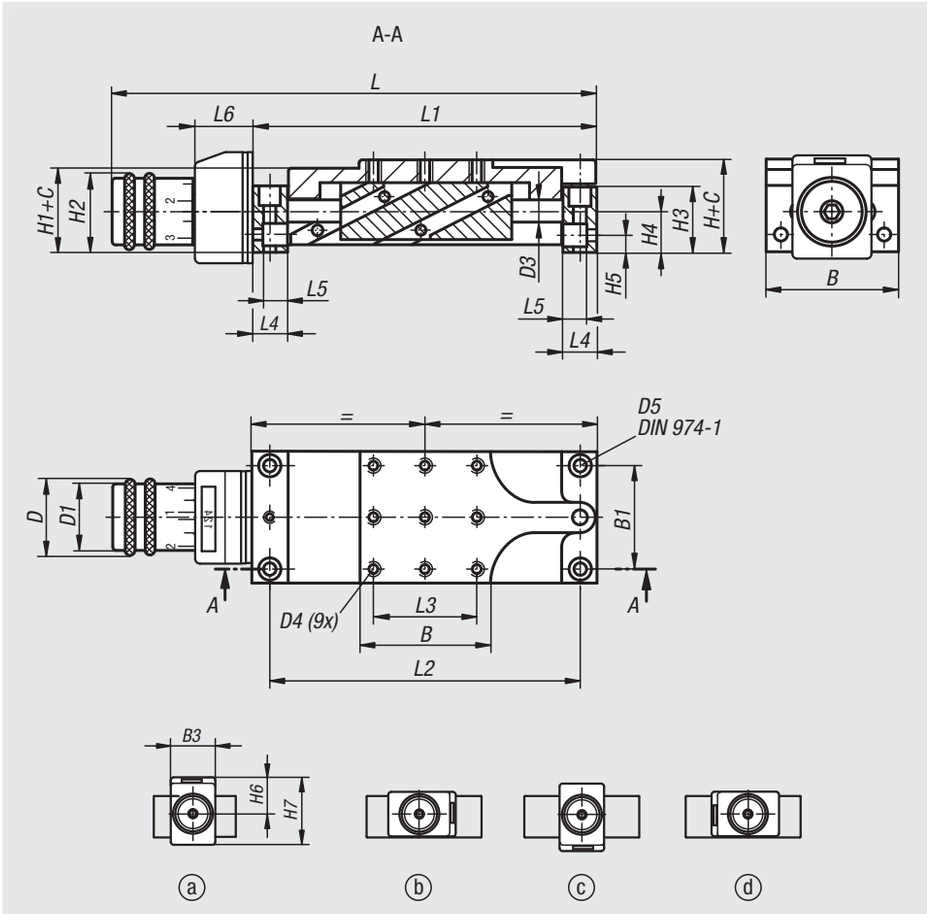


Order No.	B	B1	C (travel)	D	D1	D3	D4	D5	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	L5	F1 N	F2 N	Mx Nm	My Nm	Mz Nm
21140-04	29	22	4	13	12	4	M3	3	19	17	14	13	8	4	84,5	70	62	22	8	6	30	50	0,5	0,5	2
21140-08	46	36	8	26	23	8	M4	4	32	29	27	23	14	6	148,5	120	108	36	12	8,5	80	100	2,5	2,5	5
21140-12	75	60	12	26	23	12	M6	6	38	36	28,5	27	15,5	7	209	180	165	60	15	11	150	200	10	10	20
21140-25	150	130	25	52	46	25	M10	10	68	64	54	52	28	13	347	290	265	130	25	18	500	700	50	50	100

Vertical stages

with electronic position indicator





Material:
Bearing block and carriage aluminium alloy, anodised.
Guide columns stainless steel, ground.
Spindle stainless steel, rolled thread.
Guide bearing maintenance-free.
Position indicator plastic.

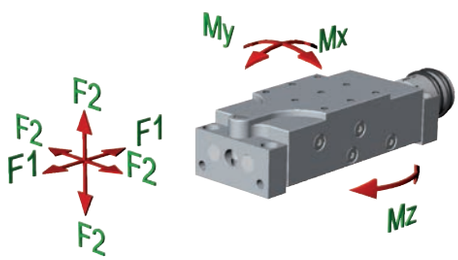
Version:
Guide backlash < 0.05 mm.
Spindle self-locking, with additional lock.

Sample order:
nlm 21142-08

Note:
For height-positioning of components and assemblies of all types (e.g. stops, sensors, limit switches, tables, cameras, entire assemblies, etc.).
Electronic position indicator with 0.01 mm display accuracy and large LCD display. Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.
The modular design enables the vertical stage to be easily combined with positioning stages, cross slides and other accessories of the same size.

Drawing reference:
Mounting position of the position indicator:
a) top (standard)
b) right
c) bottom not possible for 21142-25
d) left



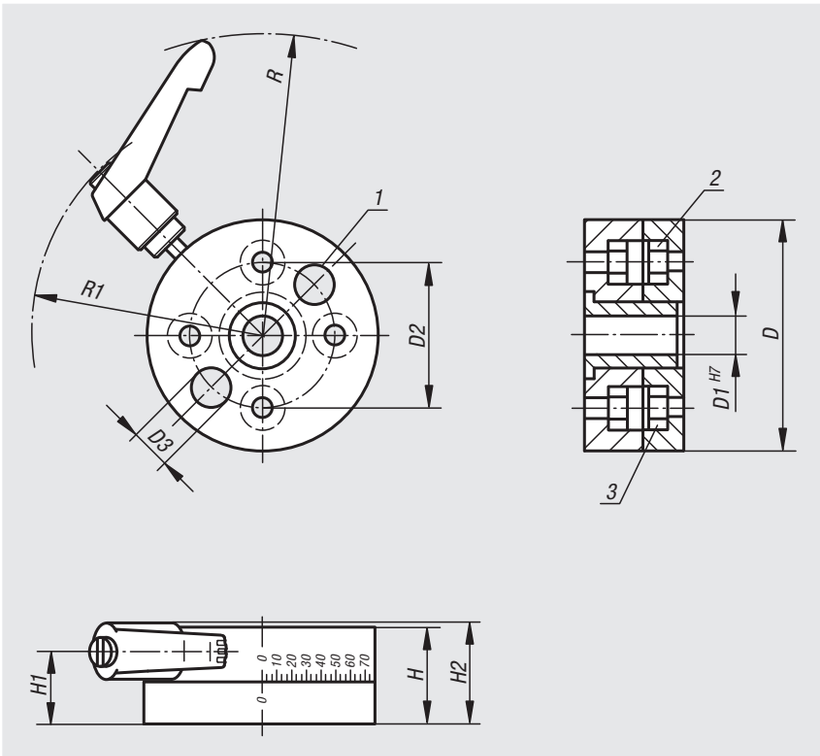


Order No.	B	B1	B3	C (travel)	D	D1	D3	D4	D5	H	H1	H2	H3	H4	H5	H6	H7
21142-08	46	36	33	8	26	23	8	M4	4	32	29	27	23	14	6	31	52
21142-12	75	60	33	12	26	23	12	M6	6	38	36	28,5	27	15,5	7	31	52
21142-25	150	130	48	25	52	46	25	M10	10	68	64	54	52	28	13	42,4	71,4

Order No.	L	L1	L2	L3	L4	L5	L6	F1 N	F2 N	Mx Nm	My Nm	Mz Nm
21142-08	179	120	108	36	12	8,5	29,4	80	100	2,5	2,5	5
21142-12	239	180	165	60	15	11	29,4	150	200	10	10	20
21142-25	376	290	265	130	25	18	36,4	500	700	50	50	100

Rotary discs





Material:
Body and rotary disc Al alloy.
Shaft stainless steel.

Version:
Body and rotary disc anodised.

Sample order:
nlm 21150-04

Note:
Loosen the clamping lever to revolve the rotary disc on the body. Rotates through 360°. The rotary disc indexes every 90° (21150-25 every 45°). Indexing is carried out by a ball plunger which can be easily removed.
Angular adjustment is set by a scale accurate to within 2°.
The rotary disc can be easily combined with other modules of the same size.

Drawing reference:
1) Assembly hole for pressing out the nut
2) DIN 934 nut (x8) can be pressed out M (D4)
3) DIN 974-1 countersink (D4)





Order No.	D	D1	D2	D3	D4	H	H1	H2	R	R1	F1 N	F2 N	F3 N	M1 Nm
21150-04	35	6	22	6	3	15	9,5	16,5	64	44	50	30	50	2
21150-08	54	16	36	8	4	20	13,5	20,5	73	56	100	70	100	10
21150-12	80	25	60	13	6	25	17,5	24,5	85	69	150	100	150	15
21150-25	150	55	130	18,5	10	40	26	35,5	139	110	300	200	300	50

Rotary positioning stages



Material:
Body and rotary table Al alloy, anodised.
Spindle steel, case-hardened.
Spindle bearing maintenance-free.

Version:
Radial play of rotation axis < 0.015 mm.
Axial play of rotation axis < 0.02 mm.
Repeat accuracy < 0.05°.
Spindle self-locking.

Sample order:
nlm 21160-08

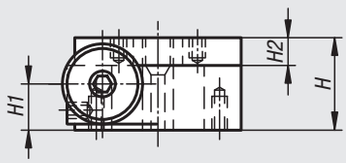
Note:
360° adjustment, no end stop.
Scale graduation is 10 increments.
Transmission ratio:
21160-08 = 50:1
21160-12 = 55:1
21160-25 = 50:1

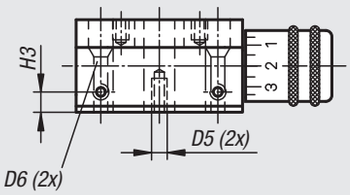
The rotary stage can be easily combined with other modules of the same size.

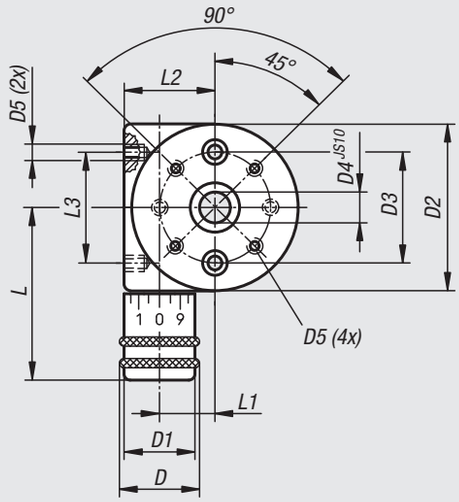
Drawing reference:
All counterbores to DIN 74-Bm (D6)



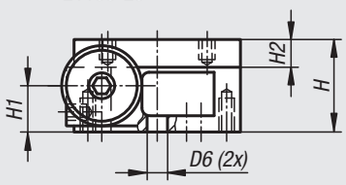
21160-08
21160-12

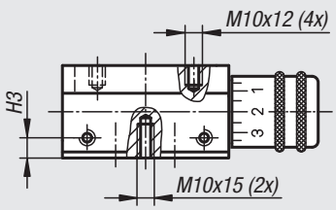


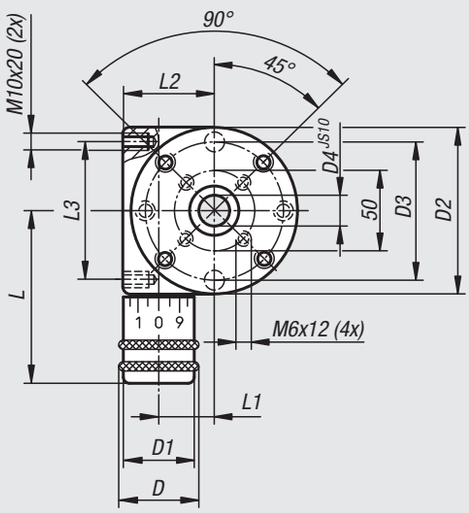




21160-25







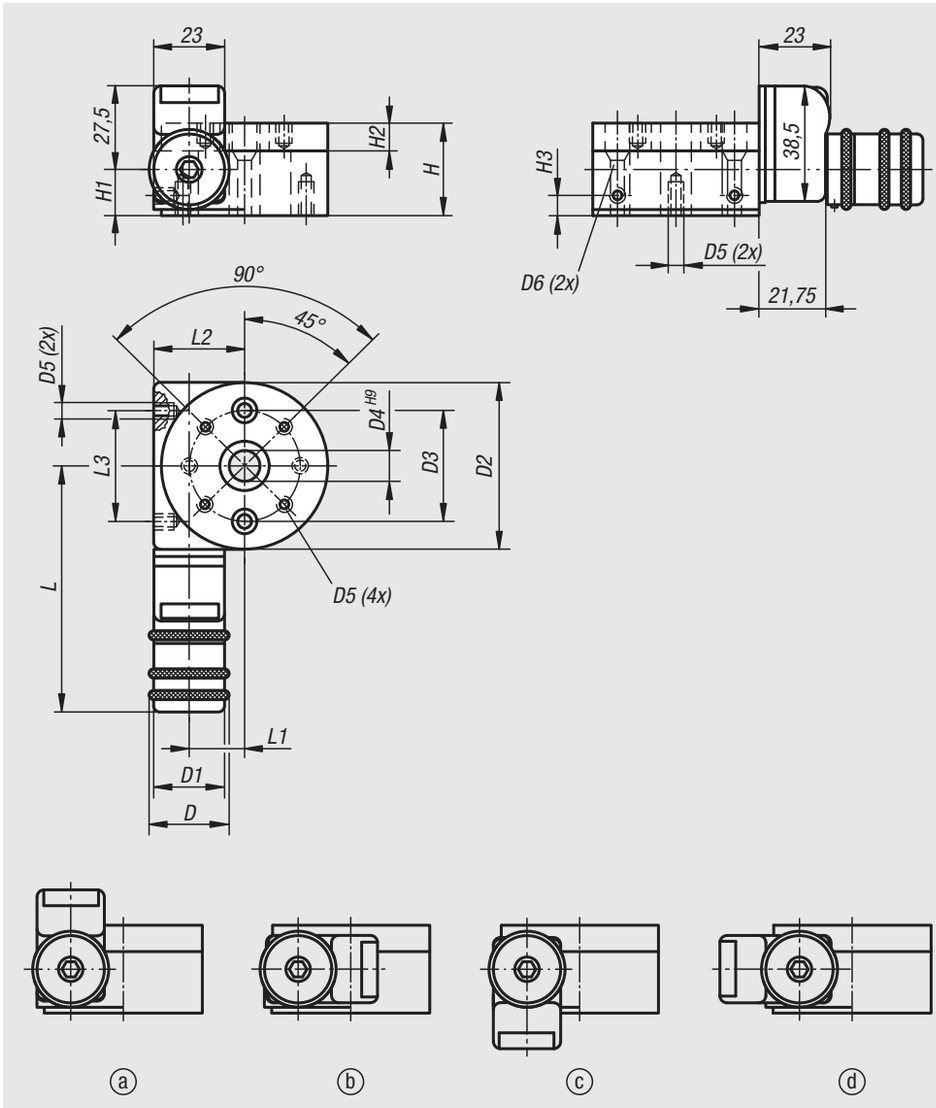


Order No.	D	D1	D2	D3	D4	D5	D6	H	H1	H2	H3	L	L1	L2	L3	F1 N	F2 N	F3 N	M1 Nm
21160-08	26	23	54	36	10	M4x6	4	30	14	9	6	56	17	29	36	500	500	200	3
21160-12	26	23	80	60	15	M6x9	6	40	17,5	12	6	69	31	43	60	500	500	200	5
21160-25	51	46	150	130	40	-	10,2	75	35	18	12	134	53	80	130	1000	1000	500	10

Rotary positioning stages

with position indicators





Material:
Body and rotary table Al alloy, anodised.
Spindle steel, case-hardened.
Spindle bearing maintenance-free.
Position indicator plastic.

Version:
Radial play of rotation axis < 0.015 mm.
Axial play of rotation axis < 0.02 mm.
Repeat accuracy < 0.05°.
Spindle self-locking.

Sample order:
nlm 21161-08

Note:
360° adjustment, no end stop.
The position indicator reads in increments of 0.1° increasing clockwise from 0.0° to 9.9° while the rotary table rotates counter-clockwise.
A scale on the circumference of the rotary stage is marked every 10°.
The position indicator can be re-mounted in any of 4 positions by removing the grip and loosening the two screws.

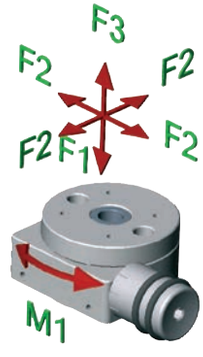
Transmission ratio:
21161-08 = 50:1
21161-12 = 55:1

The rotary stage can be easily combined with other modules of the same size.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left

All counterbores to DIN 74-Bm (D6)





Order No.	D	D1	D2	D3	D4	D5	D6	H	H1	H2	H3	L	L1	L2	L3	F1 N	F2 N	F3 N	M1 Nm
21161-08	26	23	54	36	10	M4x6	4	30	14	9	6	80	17	29	36	500	500	200	3
21161-12	26	23	80	60	15	M6x9	6	40	17,5	12	6	93	31	43	60	500	500	200	5

Rotary stages

with electronic position indicator



Material:
Body and rotary table Al alloy, anodised.
Spindle steel, case-hardened.
Spindle bearing maintenance-free.
Position indicator plastic.

Version:
Radial play of rotation axis < 0.015 mm.
Axial play of rotation axis < 0.02 mm.
Repeat accuracy < 0.05°.
Spindle self-locking.

Sample order:
nlm 21161-10-08

Note:
360° adjustment with no end stop.
The position indicator displays in 0.1° increments clockwise. The angle of rotation is indicated directly on the large LCD display.
The rotary stage rotates anti-clockwise. Reset, chain dimension and offset settings can be made via the keypad.
2 years battery life. The battery is quick and easy to replace.
The mounting position of the position indicator is set in 4 positions using one screw.

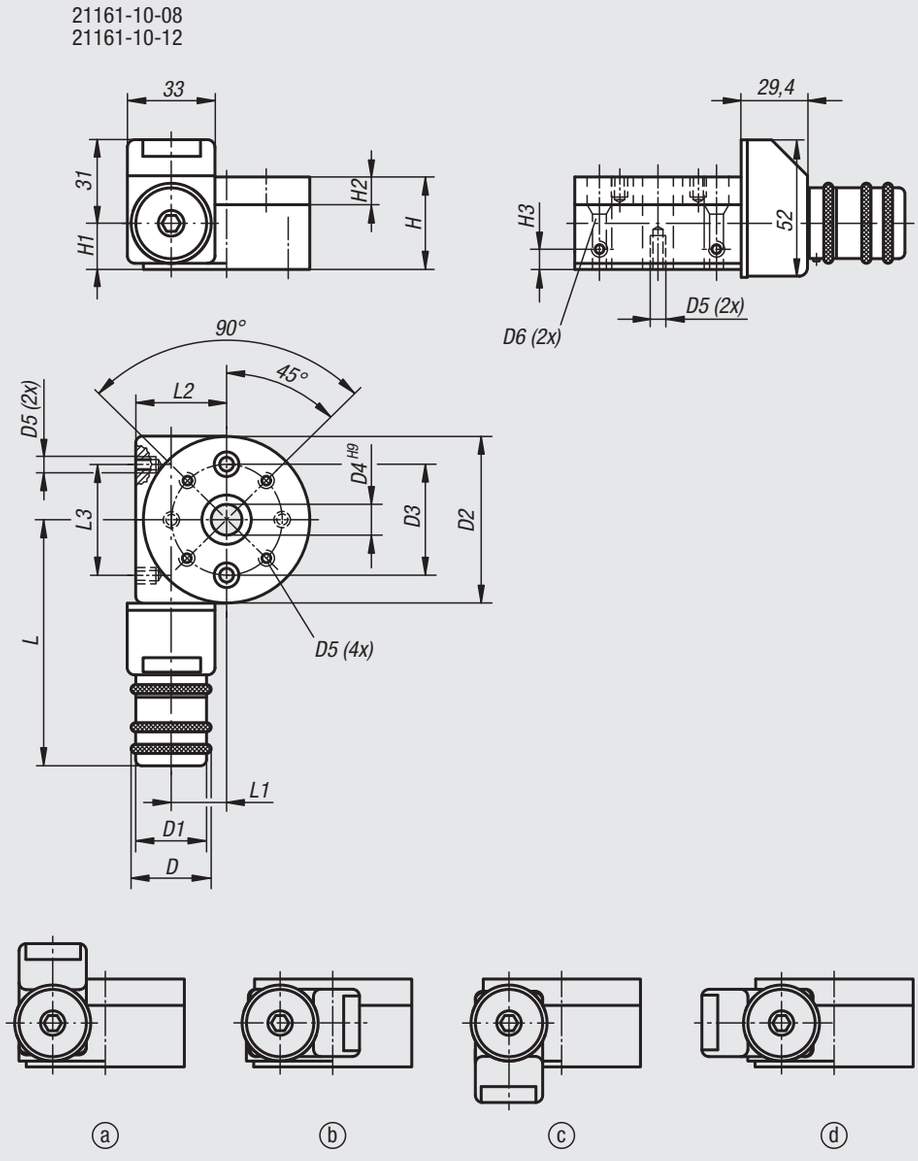
Transmission ratio:
21161-10-08 = 50:1
21161-10-12 = 55:1
21161-10-25 = 50:1

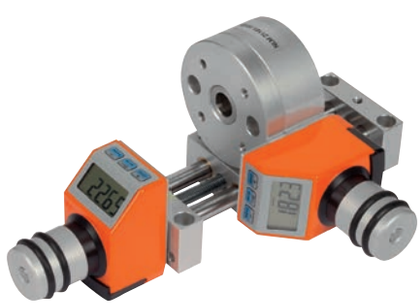
The modular design enables the rotary stage to be easily combined with other items of the same size.

Drawing reference:
Assembly position of position indicator:
a) top (standard)
b) right
c) bottom
d) left

All counterbores to DIN 74-Bm (D6)

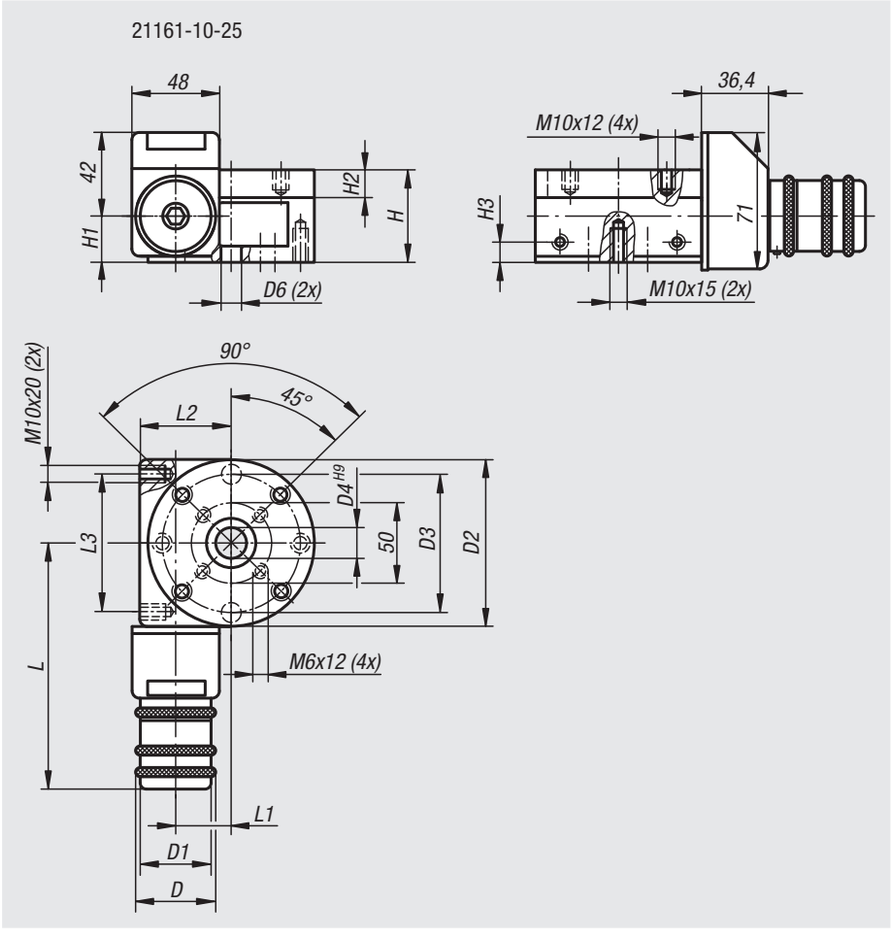
21161-10-08
21161-10-12





Rotary stages

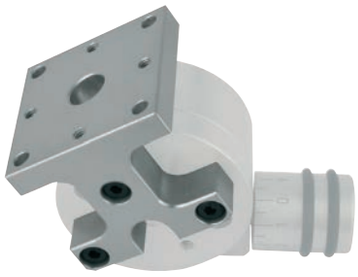
with electronic position indicator





Order No.	D	D1	D2	D3	D4	D5	D6	H	H1	H2	H3	L	L1	L2	L3	F1 N	F2 N	F3 N	M1 Nm
21161-10-08	26	23	54	36	10	M4x6	4	30	14	9	6	86	17	29	36	500	500	200	3
21161-10-12	26	23	80	60	15	M6x9	6	40	17,5	12	6	99	31	60	60	500	500	200	5
21161-10-25	51	46	150	130	40	-	10,4	75	35	18	12	161	53	80	130	1000	1000	500	10

Swivel angles



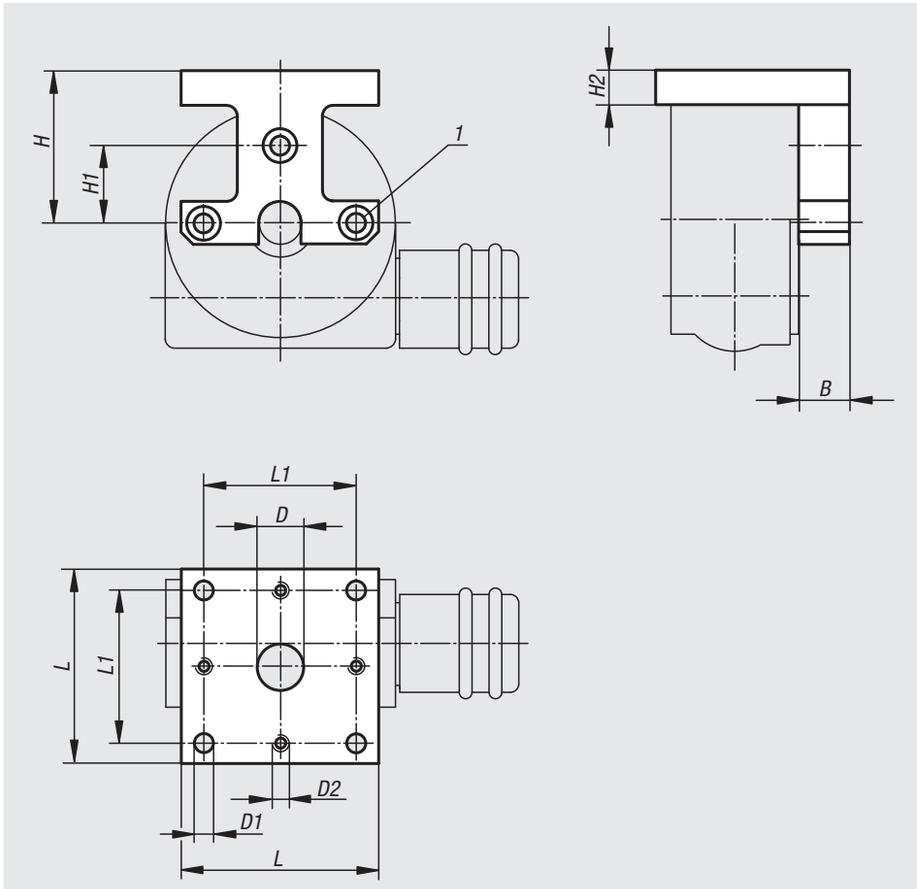
Material:
Aluminium alloy.

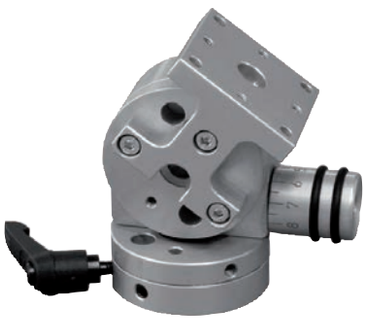
Version:
Milled and anodised

Sample order:
nlm 21162-04

Note:
The swivel angle is mounted on a rotary positioning table and offers further mounting possibilities. Suitable for 21160 in matching sizes.

Drawing reference:
1) D3 for socket head screw ISO 4762



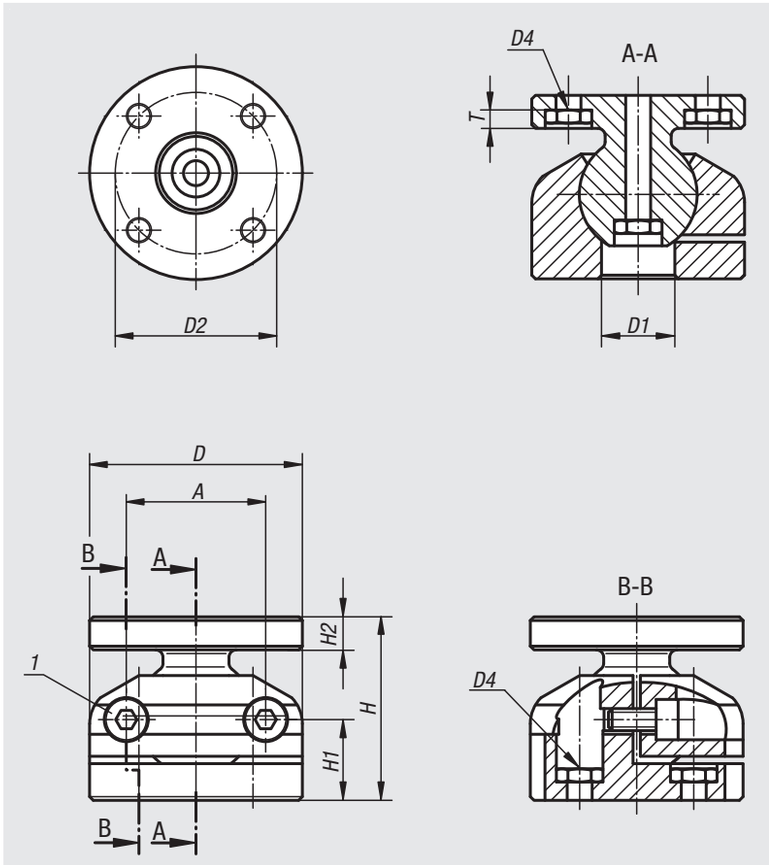


Order No.	B	D	D1	D2	D3	H	H1	H2	L	L1
21162-04	7	6	3,3	M3	M3	22	11	6	29	22
21162-08	12	11	4,5	M4	M4	36	18	8	46	36
21162-12	20	16	6,5	M6	M6	51	30	10	75	60
21162-25	25	40	11	M10	M10	98	65	20	150	130

Pivot heads

swivel angle 30°





Material:
Aluminium alloy.

Version:
anodised.

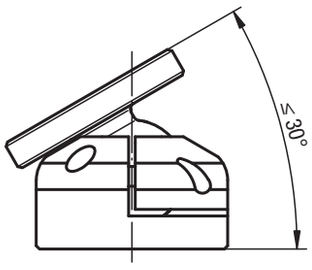
Sample order:
nlm 21170-12

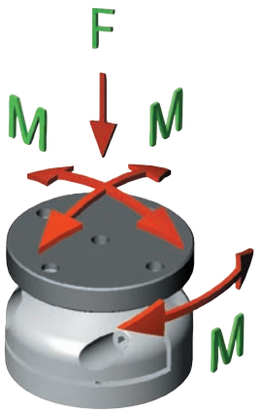
Note:
Suitable for 21100, 21102, 21120, 21122, 21150, 21160, 21162 and 21180.

Drawing reference:
all (9x) counterbores to DIN 974-1 (D4),
all (9x) nuts DIN 934 M (D4)

By pressing out the nuts countersinks for socket screws become available allowing both fastening variations to be used.

1) D3 clamping screw (2x)





Order No.	A	D	D1	D2	D3	D4	H	H1	H2	T	F N	M Nm	Tightening torque of clamping screws (Nm)
21170-04	19	29	10	22	M3	3	25	11	5,5	3,5	300	3	1,11
21170-08	30	46	13	36	M4	4	35	15,5	7	4,5	700	8	2,55
21170-12	46	75	24	60	M6	6	54	23	11	6,6	2200	30	8,6
21170-25	92	150	40	130	M10	10	105	49	20	11	9000	150	42

21180

Base plates



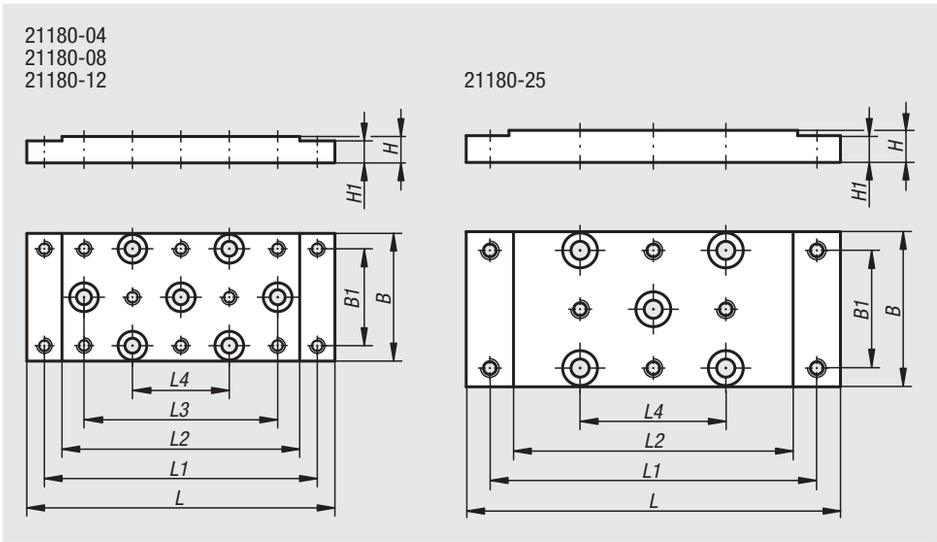
Material:
Aluminium alloy.

Version:
anodised.

Sample order:
nlm 21180-04

Note:
Suitable for 21100, 21102, 21120, 21122, 21150, 21160, 21162 and 21190 in the respective size.

Drawing reference:
All counterbores to DIN 974-1 (D), all threads M (D).



Order No.	B	B1	D	H	H1	L	L1	L2	L3	L4
21180-04	29	22	3	6	5	70	62	54	44	22
21180-08	46	36	4	8	6	120	108	96	72	36
21180-12	75	60	6	12	10	180	165	150	120	60
21180-25	150	130	10	20	18	290	265	240	-	130

21190

Angle plates

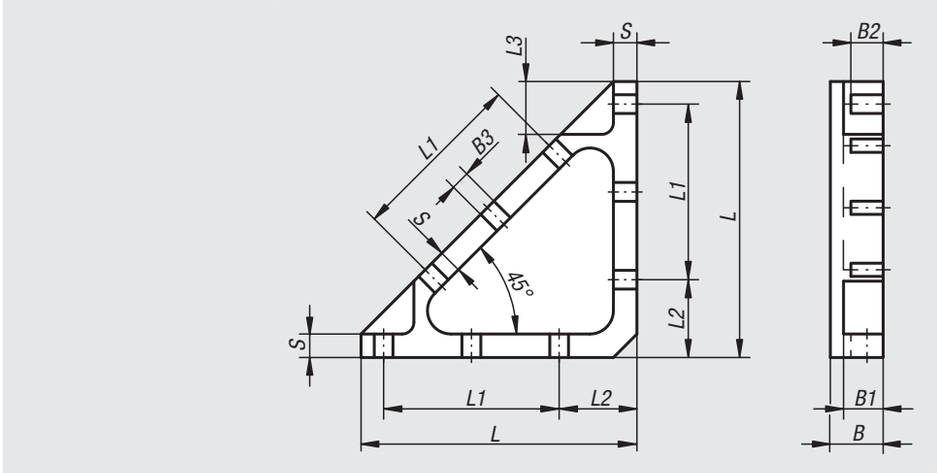


Material:
Aluminium alloy.

Version:
Milled and anodised

Sample order:
nlm 21190-04

Note:
Suitable for 21100, 21102, 21120, 21122, 21150, 21160, 21162 and 21180 in the respective size.



Order No.	B	B1	B2	B3	L	L1	L2	L3	S
21190-04	8	6	4,5	3,3	40	22	14,5	8	3
21190-08	12	10	8	4,5	58	36	17	11	4
21190-12	18	13,5	10,8	6,6	94	60	26,5	17,5	8
21190-25	25	20	15,5	11	180	130	35	31	15

Notes

Technical data for carriage rails

Off-centre forces
The following recommendations should be followed for the successful use of maintenance-free DryLin® linear bearings. A higher coefficient of friction compared to roller guides results in higher drive forces. The largest possible gap between bearings on a rail and lowest possible torque stress through drive and mass have a positive effect on the running and wear properties of the guide.

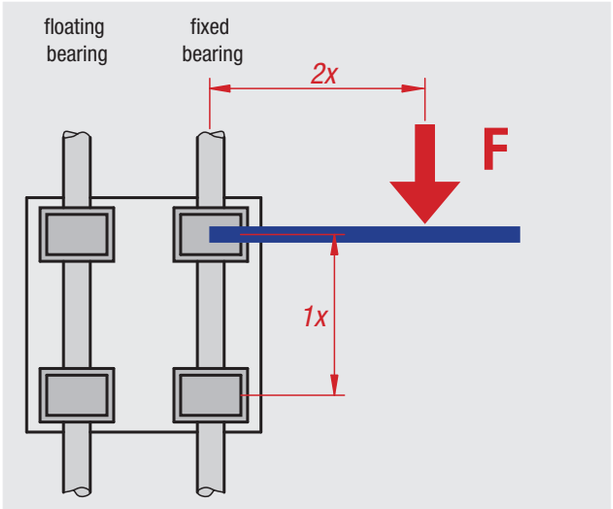
Quiet running
Plastic bearings which run on ground shafts or profiled rails are almost silent. Contrary to conventional ball-bearing guides, the noise level does not increase as the speed increases.

Design notes:
When using systems with two parallel rails, one side must be installed as a floating bearing. For every mounted position, whether horizontal, vertical or lateral, there is the correct fixed-floating bearing solution. This method of installation prevents difficulty of access or jamming of the guide where thre are differences in the parallelism between the rails.

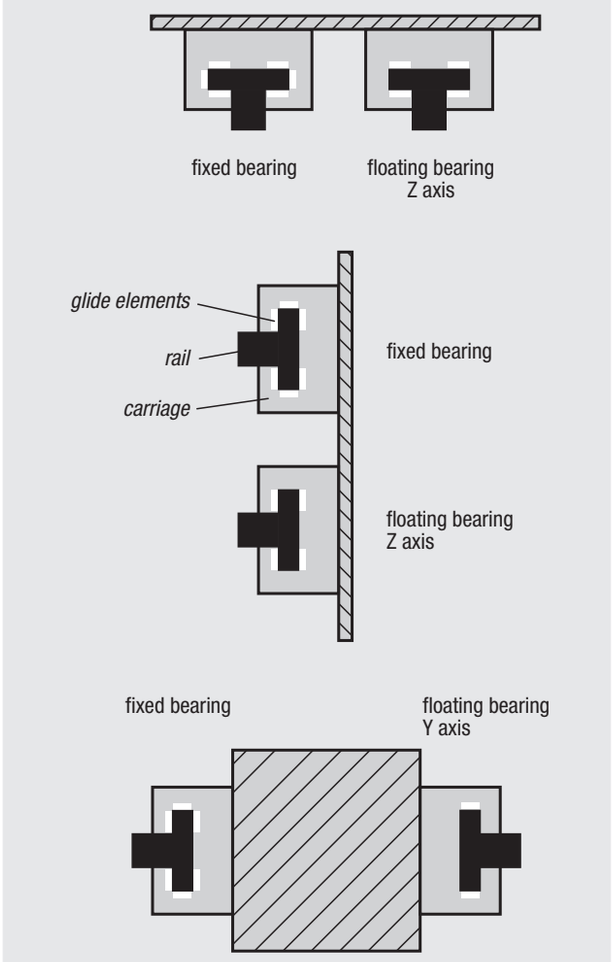
The floating bearing is made by removing the static overdefined glide elements. This creates an additional degree of freedom on one rail to compensate for possible errors in parallelism.

In a fixed-floating bearing installation, errors in parallelism between the mounted rails can be compensated up to a maximum of 0.5 mm. When installing, ensure that the floating bearing has an equal amount of play in both directions. You can see the layout of the fixed-floating bearing system in the adjacent diagrams.

To avoid warping in the system, the base surface for the rails and carriage should be flat and even (e.g. milled surface). Small amounts of unevenness on the base surface can be compensated for by up to 0.5 mm by allowing for more play between carriage and rail. Adjusting the amount of play is only effective when the system is unloaded.



The 2:1 rule
If the 2:1 rule is not followed when using linear glide bearings, uneven movements may occur or the system may even jam. Help can often be provided by relatively simple alterations. The principle does not depend on the load or the drive force, it is a product of friction and always relates to the fixed bearing. The further away the drive is from the guide bearing, the greater will be the wear and the drive force required. If the distance between the driving force and the fixed bearing is more than double the distance between the bearings (2:1 rule), the guide will, in theory, jam by an adhesion friction value of 0.25.



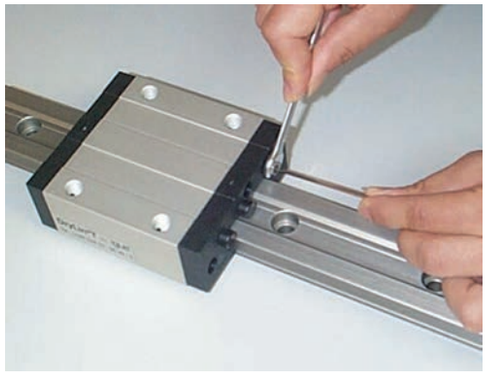
Horizontal variant with the floating bearing in the z axis

Lateral variant with the floating bearing in the z axis

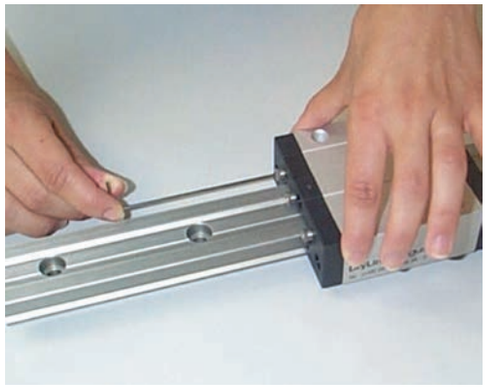
Horizontal variant with lateral positioned carriages and floating bearing in the y axis

Technical data for carriage rails

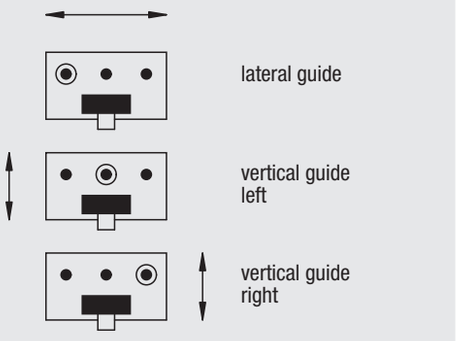
DryLin® T - play adjustment
DryLin® linear guide rails always require a minimum amount of play between the slide and rail. They are supplied ready to use with the play pre-set. If you have special requirements please state whether you require a particularly small or particularly large amount of play. The play in the bearing of the guide slides can be re-adjusted later if necessary. This should always be carried out while unloaded.

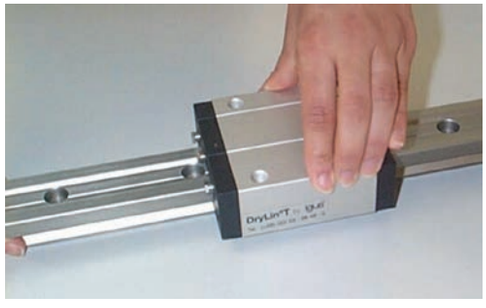


1. Loosen the locknuts after removing the caps.
   Spanner size:
   5 mm for 21200-15..
   5 mm for 21200-20..
   7 mm for 21200-25..
   7 mm for 21200-30..

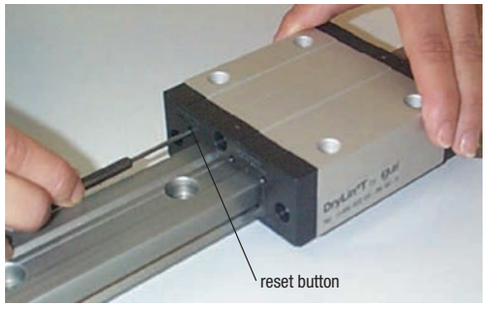


2. Re-adjust the bearing play for the three guide points with a hex key.
   Socket size:
   1.5 mm for 21200-15..
   1.5 mm for 21200-20..
   2.0 mm for 21200-25..
   2.0 mm for 21200-30..





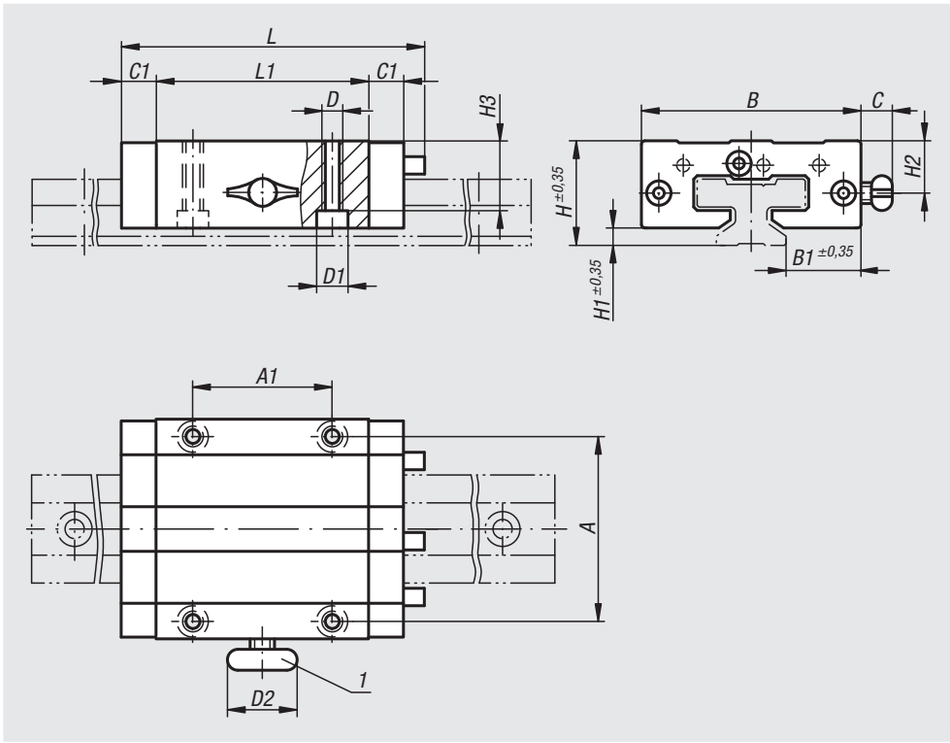
3. Check the play in the guide slides after adjustment. If it is sufficient, tighten the locknuts and replace the protective caps.



4. If too little play has been set so that the rail jams, it is not sufficient to just reset the cap screw. After resetting the screw, press the reset button on the side opposite the screw to release the slide elements.
   For this, use the following sized pins:
   2.5 mm for 21200-15..
   2.5 mm for 21200-20..
   3.0 mm for 21200-25..
   3.0 mm for 21200-30..

Carriages DryLin® T





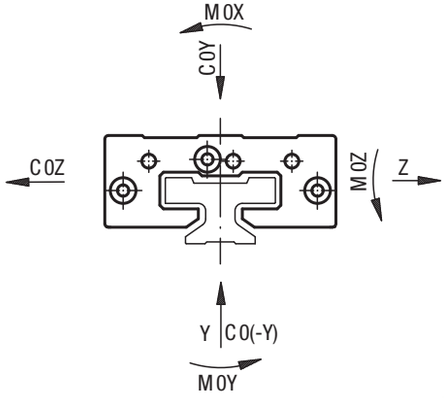
Material:
Sliding carriage: Base structure in extruded section, aluminium EN AW-6060.
Sliding elements: Maintenance free plain bearing iglidur® J.
Cap: Thermoplastic

Version:
Eloxal-coated E6/EV1. Black thermoplastic

Sample order:
nlm 21200-1500

Note:
With a low rate of inerita, high accelerations and short term extreme speeds up to 30 m/s are possible. DryLin® T linear glide guides are resistant to dirt and corrosion and are adjustable, maintenance-free and quiet.
Application temperature max. 80 °C.
As no lubricants are used they are recommended for use in food, medical, and clean room technologies.
Manual clamping was developed for simple functions. Polymer under constant pressure has a tendency to creep which causes a decrease in clamping force over time (up to 70%), which means that no safety-relevant parts should be clamped.
Suitable guide rails see 21200.

Drawing reference:
1) manual clamping

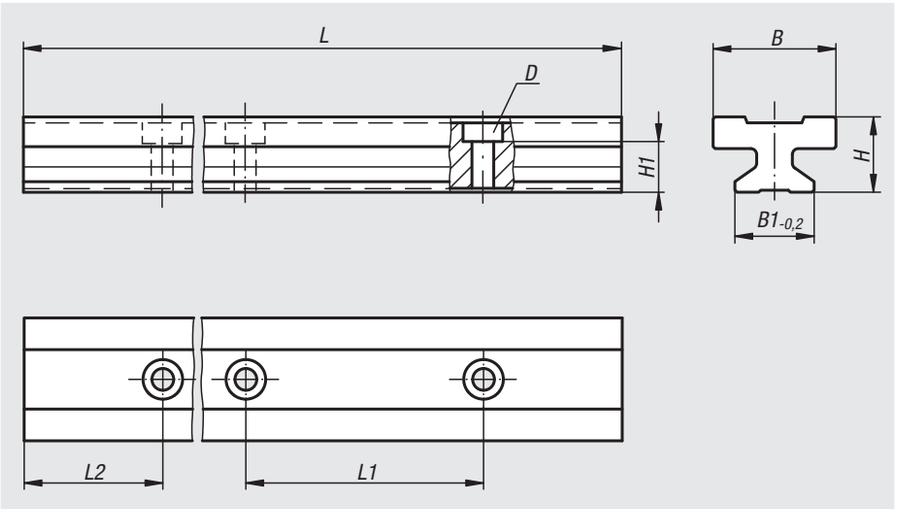


Order No. fixed bearing standard	Order No. fixed bearing with manual clamping	Order No. floating bearing Y axis	Order No. floating bearing Z axis	Size	C0Y kN	C0(-Y) kN	C0Z kN	M0X Nm	M0Y Nm	M0Z Nm	A	A1	B	B1
21200-1500	**21200-1510**	**21200-1520**	**21200-1530**	15	4	4	2	32	25	25	38	30	47	16
21200-2000	**21200-2010**	**21200-2020**	**21200-2030**	20	7,4	7,4	3,7	85	45	45	53	40	63	21,5
21200-2500	**21200-2510**	**21200-2520**	**21200-2530**	25	10	10	5	125	65	65	57	45	70	23,5
21200-3000	**21200-3010**	**21200-3020**	**21200-3030**	30	14	14	7	200	100	100	72	52	90	31

Order No. fixed bearing standard	Order No. fixed bearing with manual clamping	Order No. floating bearing Y axis	Order No. floating bearing Z axis	C	C1	D	D1 for screw to DIN 912	D2	H	H1	H2	H3	L	L1	Manual clamp thread
21200-1500	**21200-1510**	**21200-1520**	**21200-1530**	-/19/-/-	9	M5	M4	-/20/-/-	24	4	-/11,5/-/-	16	74	50	-/M6/-/-
21200-2000	**21200-2010**	**21200-2020**	**21200-2030**	-/18/-/-	10	M6	M5	-/28/-/-	30	5	-/15/-/-	19,8	87	61	-/M8/-/-
21200-2500	**21200-2510**	**21200-2520**	**21200-2530**	-/17/-/-	11	M8	M6	-/28/-/-	36	5	-/19/-/-	24,8	96	68	-/M8/-/-
21200-3000	**21200-3010**	**21200-3020**	**21200-3030**	-/20/-/-	12	M10	M8	-/28/-/-	42	6,5	-/21,5/-/-	27	109	79	-/M8/-/-

Guide rails DryLin® T





Material:
Extruded section, aluminium EN AW-6060.

Version:
Hard anodised aluminium, 50 µm. Hardness 500 HV.

Sample order:
nlm 21200-1530X3960 (L max.)

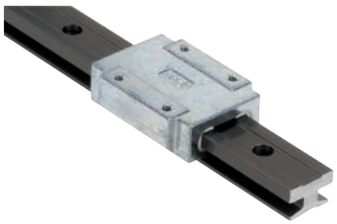
Ordering example guide rail:
nlm 21200-1520X500
(customer specific guide rail size 15)
** lengths L2 = 20 mm
* and L = 500 mm included
L2 and L only available in full mm.

Note:
The aluminium guide rail has good thermal conductivity and importantly heats only at continuously very high speeds.

Order No.	Version	Size	L max.	L2	B	B1	D for screw DIN 912	H	H1	L1
21200-1530X3960	L max.	15	3960	30	22	15	M4	15,5	10	60
21200-2030X3960	L max.	20	3960	30	31	20	M5	19	12,3	60
21200-2530X3960	L max.	25	3960	30	34	23	M6	21,5	13,8	60
21200-3020X3960	L max.	30	3960	20	40	28	M8	26	15,8	80

Order No.	Version	Size	L max.	L	L2	L2 min.	L2 max.	B	B1	D for screw DIN 912	H	H1	L1
21200-15X***	L2 and L customer specific	15	3960	*	**	20	49	22	15	M4	15,5	10	60
21200-20X***	L2 and L customer specific	20	3960	*	**	20	49	31	20	M5	19	12,3	60
21200-25X***	L2 and L customer specific	25	3960	*	**	20	49	34	23	M6	21,5	13,8	60
21200-30X***	L2 and L customer specific	30	3960	*	**	20	49	40	28	M8	26	15,8	80

Miniature linear guides DryLin® T



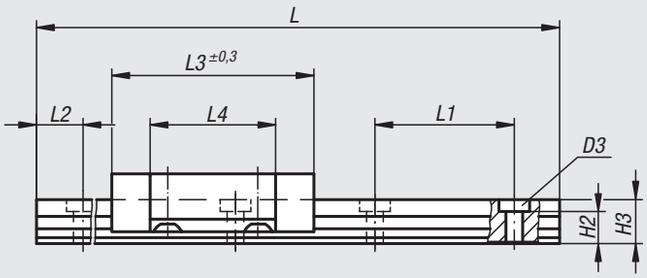
Material:
Slide carriage body die-cast zinc.
Slide elements maintenance-free iglidur® J.
Guide rail extruded profile EN AW-6060.

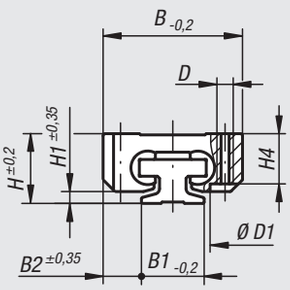
Version:
Hard anodised aluminium, 50 µm. Hardness 500 HV.

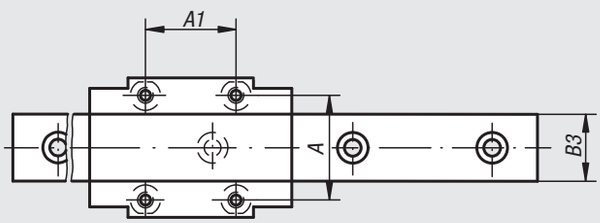
Sample order:
nlm 21210-0900 (Carriages)

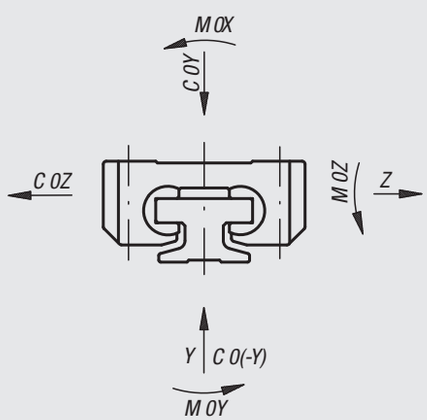
Ordering example guide rail:
nlm 21210-1212X0800 (L max.)
nlm 21210-1512X500 (customer specific guide rail size 15)
** lengths L2 = 12 mm
* and L = 500 mm included
L2 and L only available as full mm.

Note:
Due to their ability to run dry and their resistance to corrosion, miniature linear guides are completely maintenance-free. The slider components in iglidur® J are wear-resistant and replaceable. Can be use in a temperature range up to max. 80 °C. The small dimensions are a major advantage of these miniature linear guides.









Miniature linear guides DryLin® T

Carriages

Order No. fixed bearing standard	Order No. floating bearing Y axis	Order No. floating bearing Z axis	Size	C0Y N	C0(-Y) N	C0Z N	M0X Nm	M0Y Nm	M0Z Nm
21210-0900	**21210-0920**	**21210-0930**	9	480	480	240	3,4	1,8	1,8
21210-1200	**21210-1220**	**21210-1230**	12	960	960	480	9,2	4,4	4,4
21210-1500	**21210-1520**	**21210-1530**	15	1400	1400	700	17	8	8

Order No. fixed bearing standard	Order No. floating bearing Y axis	Order No. floating bearing Z axis	Size	A	A1	B	B2	D	D1	H	H1	H4	L3	L4
21210-0900	**21210-0920**	**21210-0930**	9	15	13	20	5,5	M2	4,4	10	1,7	7,2	29	18
21210-1200	**21210-1220**	**21210-1230**	12	20	15	27	7,5	M3	6,5	13	2,2	9,5	34	22
21210-1500	**21210-1520**	**21210-1530**	15	25	20	32	8,5	M3	6,5	16	2,8	11	42	31

Guide rails

Order No.	Version	Size	L max.	L2	B1	B3	D3 for screw to DIN 912	H2	H3	L1
21210-0910X0800	L max.	9	800	10	9	9,6	M2	4,6	6,3	20
21210-1212X0800	L max.	12	800	12,5	12	13	M3	5,9	8,6	25
21210-1520X3000	L max.	15	3000	20	15	17	M3	7	10,8	40

Order No.	Version	Size	L	L2	L2 min.	L2 max.	B1	B3	D3 for screw to DIN 912	H2	H3	L1
21210-09X***	L2 and L customer specific	9	*	**	5	14,5	6	9,6	M2	4,6	6,3	20
21210-12X***	L2 and L customer specific	12	*	**	5	17	12	13	M3	5,9	8,6	25
21210-15X***	L2 and L customer specific	15	*	**	10	29,5	15	17	M3	7	10,8	40

Miniature slide guides DryLin® N



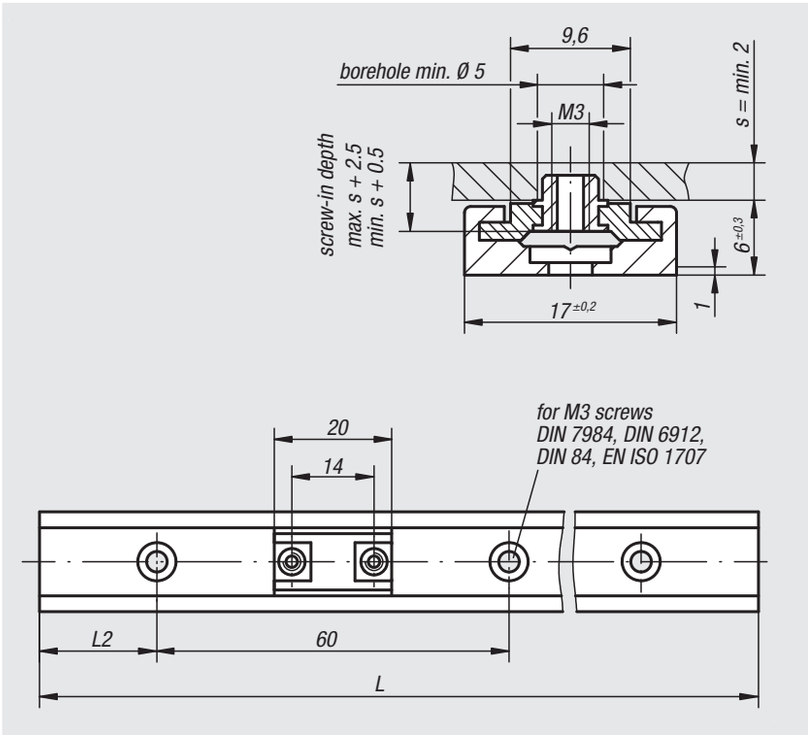
Material:
Bearing material maintenance-free iglidur® J.
Rails anodised aluminium.

Version:
Guide rail natural colour anodised.
Carriage fastening thread brass.

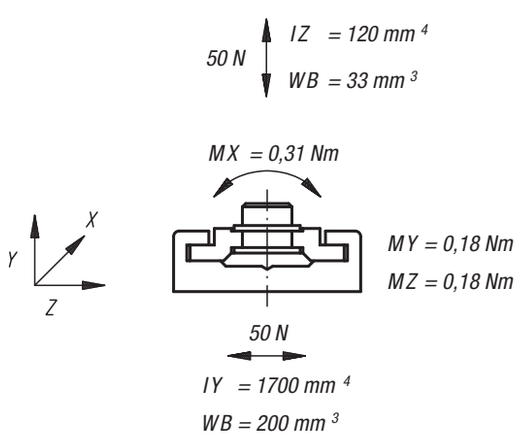
Sample order:
nlm 21320-1700 (Guide car, fixed bearing)

Ordering example guide rail:
nlm 21230-1720X1960 (L max.)
nlm 21230-1720X500 (customer specific guide rail)
** lengths L2 = 20 mm
* and L = 500 mm included
L2 and L only available in full mm.

Note:
Miniature slide guides are maintenance-free and corrosion resistant. Very high speeds and accelerations are possible due to the low weight. Applicable temperature max. 80 °C.
Miniature slide guides are insensitive to dust and ideally suited to dry running.



static load capacity and geometrical moment of inertia



Carriage

Order No.	Version
21230-1700	fixed bearing
21230-1710	floating bearing

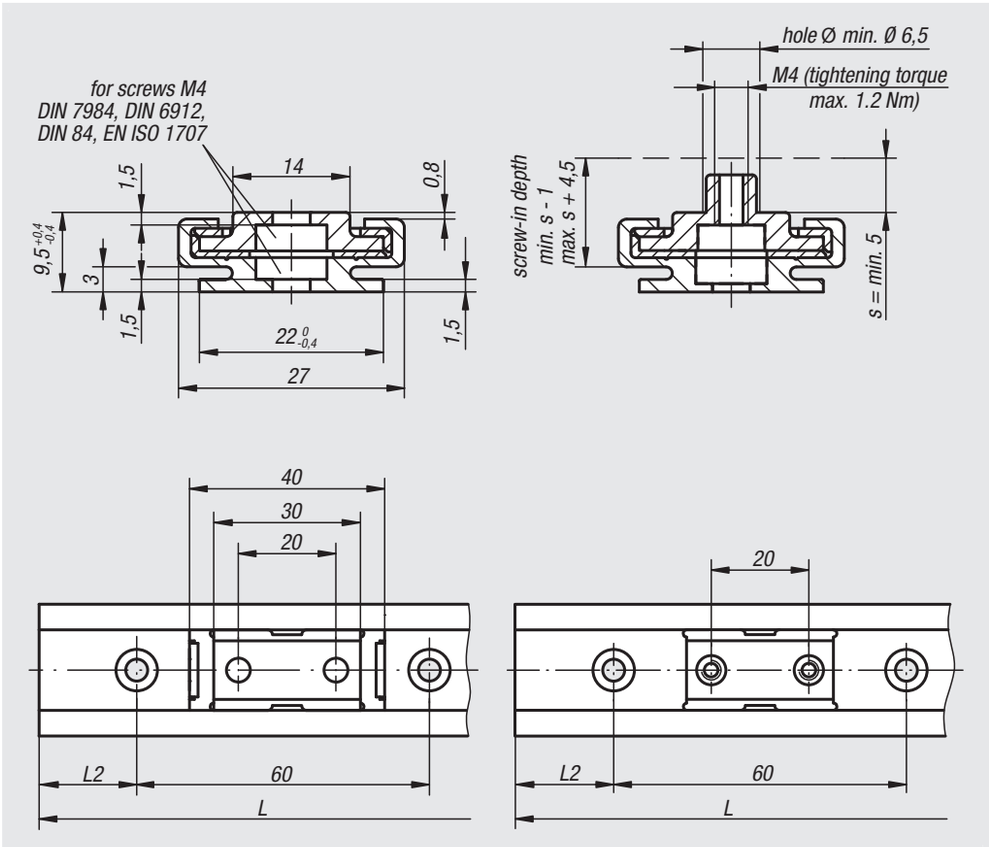
Guide rails

Order No.	Version	L max.	L2
21230-1720X1960	L max.	1960	20

Order No.	Version	L2	L2 min.	L2 max.
21230-17X***	L2 and L customer specific	**	20	49

Miniature slide guides DryLin® N





Material:
Carriage body zinc.
Plastic bearing material iglidur® J.
Rails anodised aluminium.

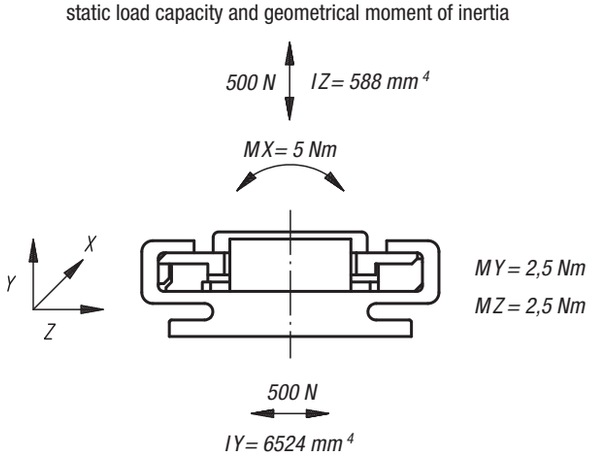
Version:
Body chromed.
Guide rail natural colour anodised.

Sample order:
nlm 21320-2700 (guide carriage with hole, fixed bearing)

Ordering example guide rail:
nlm 21230-2730X3000 (L max.)
nlm 21230-2730X1000 (customer specific guide rail)
** length L2 = 30 mm and
* L = 1000 mm included
L2 and L only available in full mm.

Note:
Miniature slide guides are maintenance-free and corrosion resistant. Very high speeds and accelerations are possible due to the low weight. Applicable temperature max. 80 °C.
Miniature slide guides are insensitive to dust and are ideal for dry running.

static load capacity and geometrical moment of inertia



Carriage

Order No. fixed bearing	Order No. floating bearing	Version
21230-2700	**21230-2701**	carriages drilled through
21230-2710	**21230-2711**	carriages with tapped hole

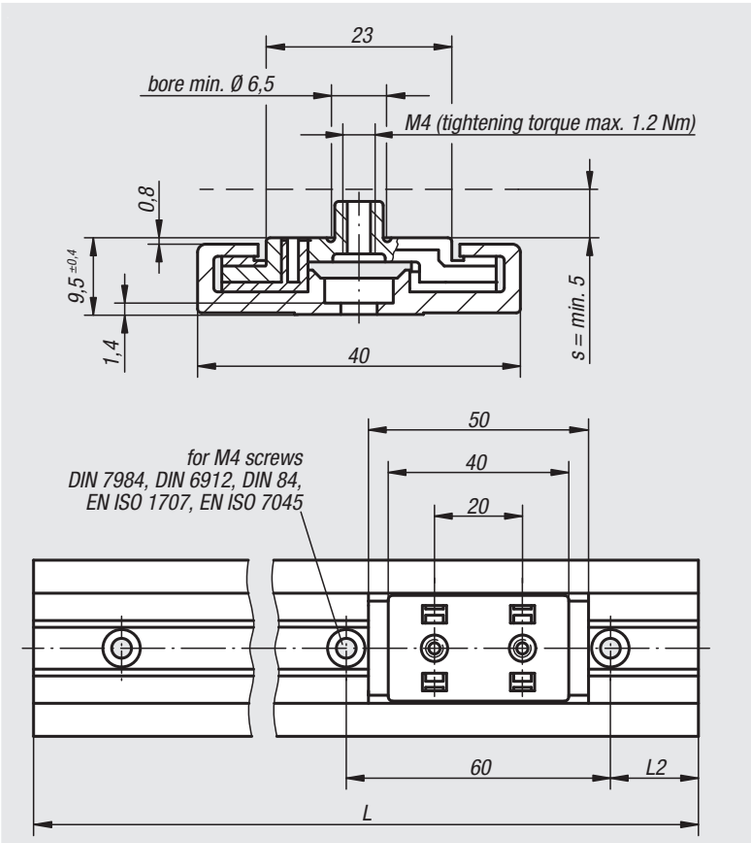
Guide rails

Order No.	Version	L max.	L2
21230-2730X3000	L max.	3000	30

Order No.	Version	L2	L2 min.	L2 max.
21230-27X***	L2 and L customer specific	**	20	49

Miniature slide guides DryLin® N





Material:
Carriage body zink.
Plastic bearing material iglidur® J.
Rail anodised aluminium.

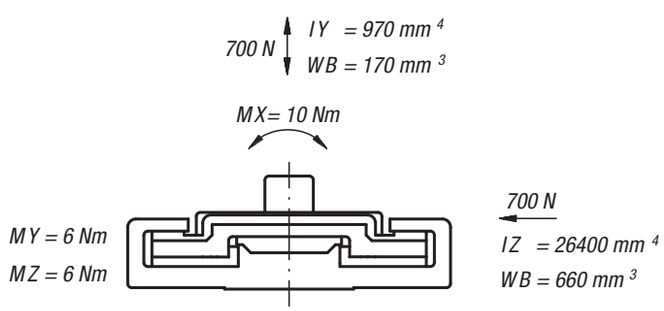
Version:
Body chromed.
Guide rail natural colour anodised.

Sample order:
nlm 21230-4000 (guide carriage, fixed bearing)

Ordering example guide rail:
nlm 21230-4030X3000 (L max.)
nlm 21230-4030X1000 (customer specific guide rail)
** length L2 = 30 mm and
* L = 1000 mm included
L2 and L only available in full mm.

Note:
Miniature slide guides are maintenance-free and corrosion resistant. Very high speeds and accelerations are possible due to the low weight. Applicable temperature max. 80 °C. Miniature slide guides are insensitive to dust and are ideal for dry running.

static load capacity and geometrical moment of inertia



Carriage

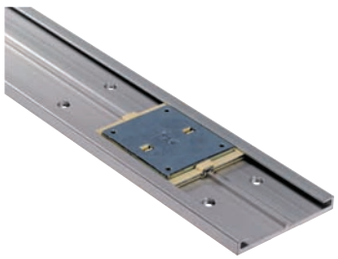
Order No.	Version
21230-4000	fixed bearing
21230-4010	floating bearing

Guide rails

Order No.	Version	L max.	L2
21230-4030X3000	L max.	3000	30

Order No.	Version	L2	L2 min.	L2 max.
21230-40X***	L2 and L customer specific	**	20	49

Flat guides DryLin® N



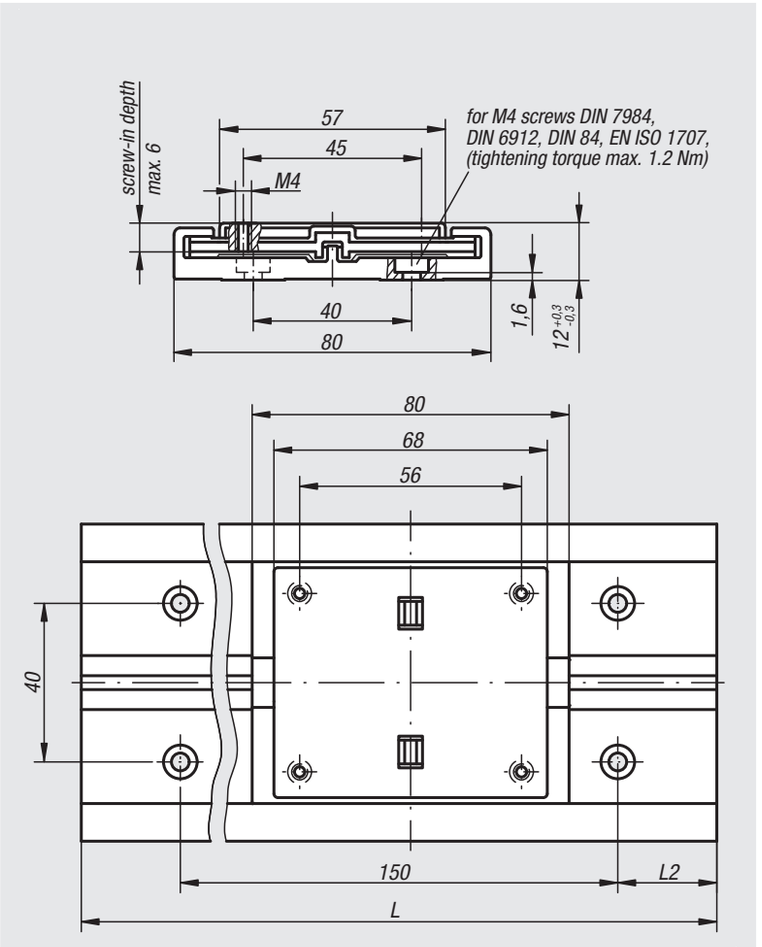
Material:
Carriage body zink.
Plastic bearing material iglidur® J.
Rail anodised aluminium.

Version:
Body chromed.
Guide rail natural colour anodised.

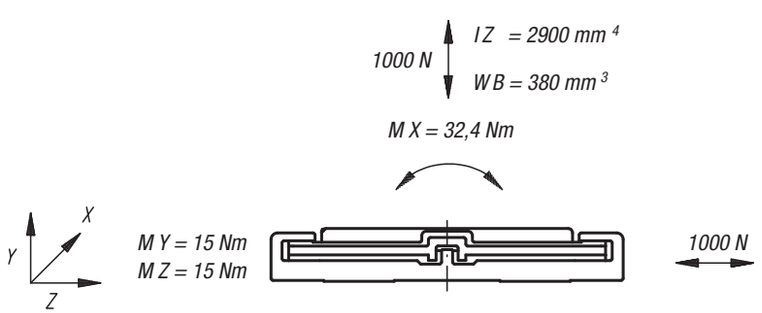
Sample order:
nlm 21230-8000 (guide carriage, fixed bearing)

Ordering example guide rail:
nlm 21230-8030X3960 (L max.)
nlm 21230-8030X1000 (customer specific guide rail)
** length L2 = 30 mm and
* L = 1000 mm included
L2 and L only available in full mm.

Note:
Flat slide guides are maintenance-free and corrosion resistant. Very high speeds and accelerations are possible due to the low weight. Applicable temperature max. 80 °C. Miniature slide guides are insensitive to dust and are ideal for dry running.



static load capacity and geometrical moment of inertia



Carriage

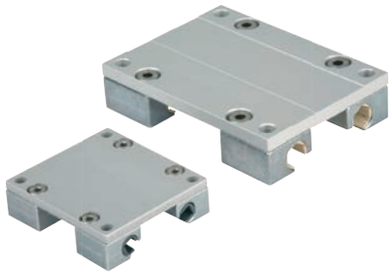
Order No.	Version
21230-8000	fixed bearing
21230-8010	floating bearing

Guide rails

Order No.	Version	L max.	L2
21230-8030X3960	L max.	3960	30

Order No.	Version	L2	L2 min.	L2 max.
21230-80X***	L2 and L customer specific	**	25	100

Carriages DryLin® W



Material:
Carriage die-cast zinc.
Mounting plate aluminium.
Bearing material iglidur® J.

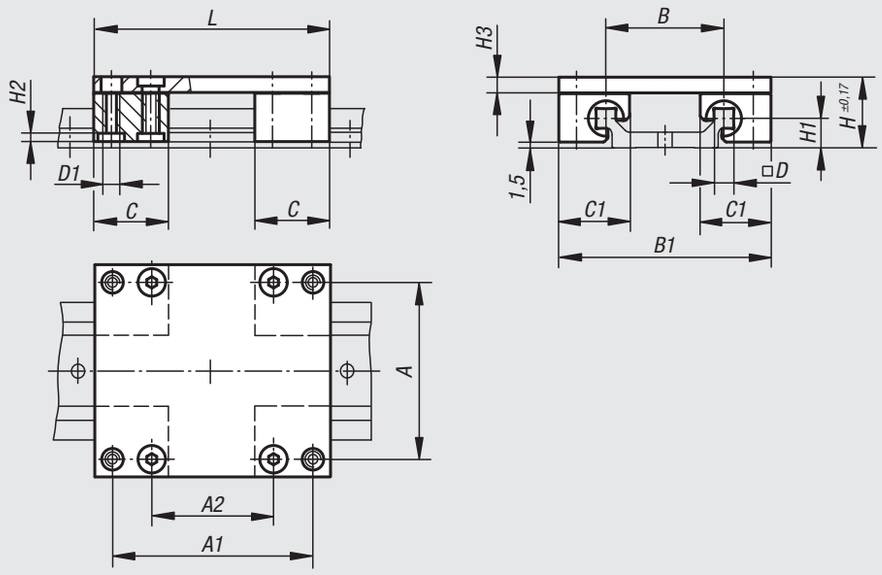
Version:
Carriage chromed.
Mounting plate anodised.

Sample order:
nlm 21240-0600060

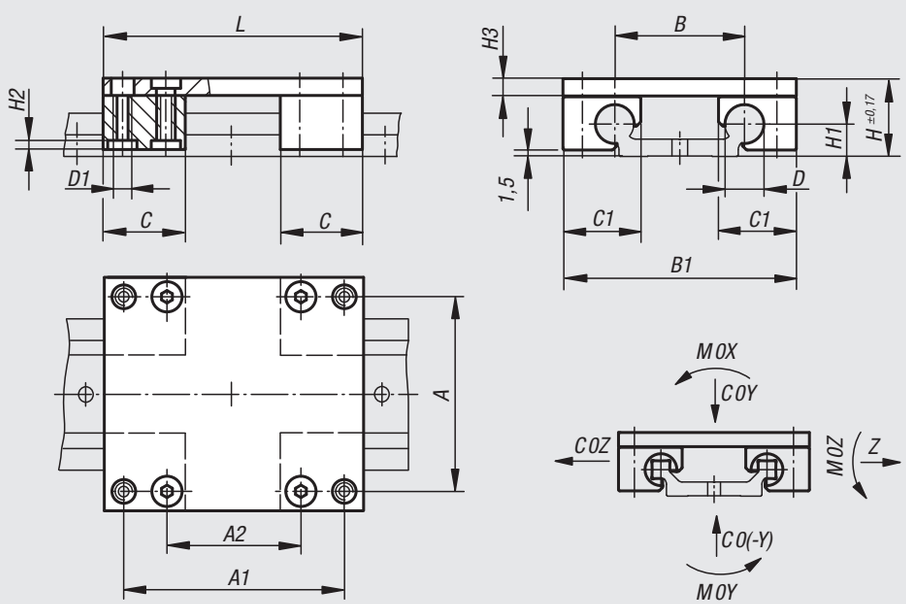
Note:
DryLin® W carriages are maintenance-free and corrosion resistant. Lacking the need of lubrication makes the system highly dirt resistant. Low friction coefficient in dry running and very quiet. Due to the flat and wide design, high torques are possible. Speeds up to 15 m/s. Applicable temperature -40 °C to +90 °C.

Accessories:
Double guide rails 21240.

size 06



sizes 10-20



Order No.	Size	A	A1	A2	B	B1	C	C1	D	D1	H	H1	H2	H3	L	C0Y kN	C0(-Y) kN	C0Z kN	M0X Nm	M0Y Nm	M0Z Nm
21240-0600060	6	45	51	31	30	54	19	18	5	M4	18	7,5	2	4	60	1,68	1,68	1,68	25	34	34
21240-0600080	6	45	71	51	30	54	19	18	5	M4	18	7,5	2	4	80	1,68	1,68	1,68	25	51	51
21240-0600100	6	45	91	71	30	54	19	18	5	M4	18	7,5	2	4	100	1,68	1,68	1,68	25	68	68
21240-1000100	10	60	87	55	40	73	29	26	10	M6	24	9	3,5	6	100	4,8	4,8	4,8	96	170	170
21240-1000150	10	60	137	105	40	73	29	26	10	M6	24	9	3,5	6	150	4,8	4,8	4,8	96	290	290
21240-1000200	10	60	187	155	40	73	29	26	10	M6	24	9	3,5	6	200	4,8	4,8	4,8	96	410	410
21240-1600100	16	86	82	46	58	104	36	34,5	16	M8	35	14	4	8	100	8,4	8,4	8,4	240	270	270
21240-1600150	16	86	132	96	58	104	36	34,5	16	M8	35	14	4	8	150	8,4	8,4	8,4	240	480	480
21240-1600200	16	86	182	146	58	104	36	34,5	16	M8	35	14	4	8	200	8,4	8,4	8,4	240	690	690
21240-2000150	20	116	132	78	82	134	45	42,5	20	M8	44	20	4	8	150	12,8	12,8	12,8	525	670	670
21240-2000200	20	116	182	128	82	134	45	42,5	20	M8	44	20	4	8	200	12,8	12,8	12,8	525	990	990
21240-2000250	20	116	232	178	82	134	45	42,5	20	M8	44	20	4	8	250	12,8	12,8	12,8	525	1250	1250

Slide carriages DryLin® W



Material:
Die-cast zinc.
Bearing material iglidur® J.

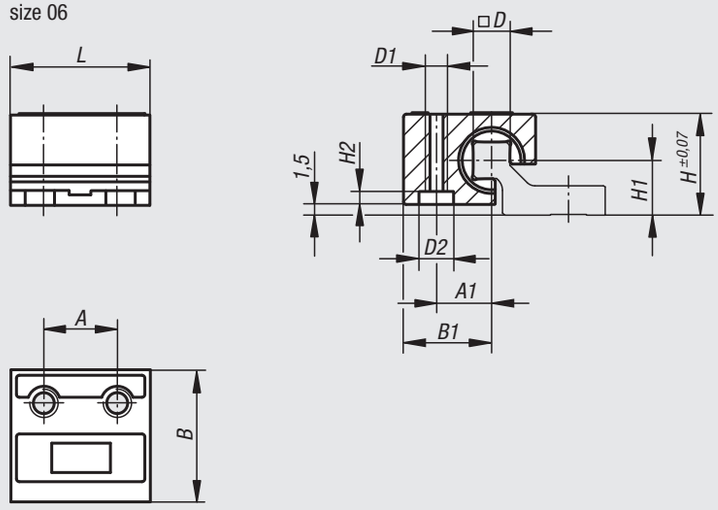
Version:
Chromed

Sample order:
nlm 21240-0600

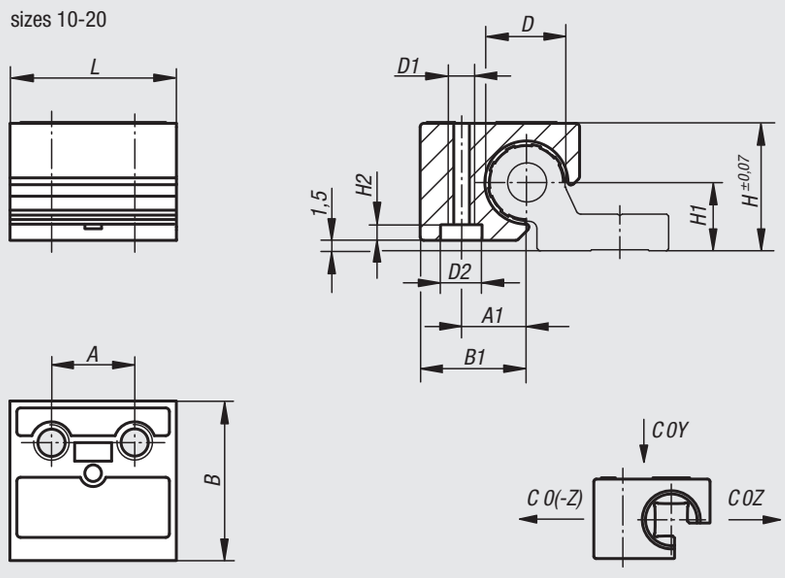
Note:
DryLin® W slide carriages are maintenance-free and corrosion resistant. Lacking the need of lubrication makes the system highly dirt resistant. Low friction coefficient in dry running and very quiet. Suitable for single or double rails. Speeds up to 15 m/s. Applicable temperature -40 °C to +90 °C.

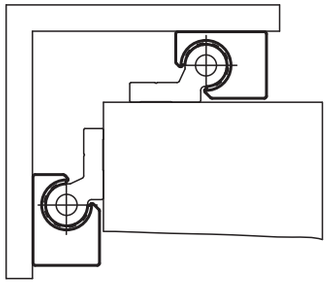
Accessories:
Guide rails 21240.

size 06



sizes 10-20

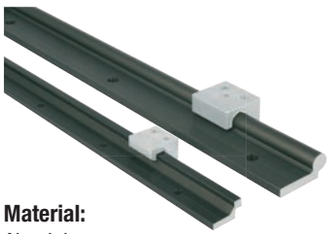




Order No.	Version	Size	A	A1	B	B1	D	D1	D2	H	H1	H2	L	C0Y kN	C0Z kN	C0(-Z) kN
21240-0600	fixed bearing standard	6	10	7,5	18	12	5	M4	7	14	7,5	2	19	0,42	0,42	0,14
21240-0620	floating bearing Y axis	6	10	7,5	18	12	5	M4	7	14	7,5	2	19	0,42	0,42	0,14
21240-0630	floating bearing Z axis	6	10	7,5	18	12	5	M4	7	14	7,5	2	19	0,42	0,42	0,14
21240-1000	fixed bearing standard	10	16	10	26	16,5	10	M6	9,5	18	9	3,5	29	1,2	1,2	0,25
21240-1020	floating bearing	10	16	10	26	16,5	10	M6	9,5	18	9	3,5	29	1,2	1,2	0,25
21240-1600	fixed bearing standard	16	18	14	34,5	23	16	M8	11,5	27	14	4	36	2,1	2,1	0,4
21240-2000	fixed bearing standard	20	27	17	42,5	26	20	M8	11,5	36	20	4	45	3,2	3,2	0,5
21240-2020	floating bearing	20	27	17	42,5	26	20	M8	11,5	36	20	4	45	3,2	3,2	0,5

Guide rails DryLin® W

single



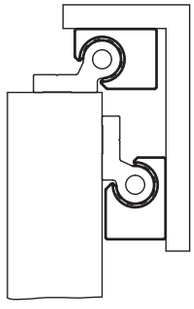
Material:
Aluminium.

Version:
Hard anodised, layer thickness 50 µm.
Hardness 500 HV

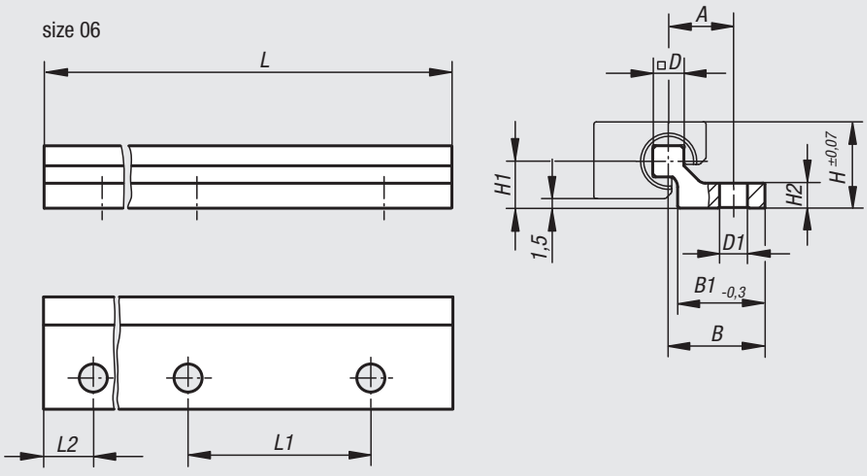
Sample order:
nlm 21240-10630X3000 (L max.)

Ordering example guide rail:
nlm 21240-10620X500
(customer specific guide rail size 06)
** include length L2 = 20 mm and
* L = 500 mm
L2 and L only available in full mm.

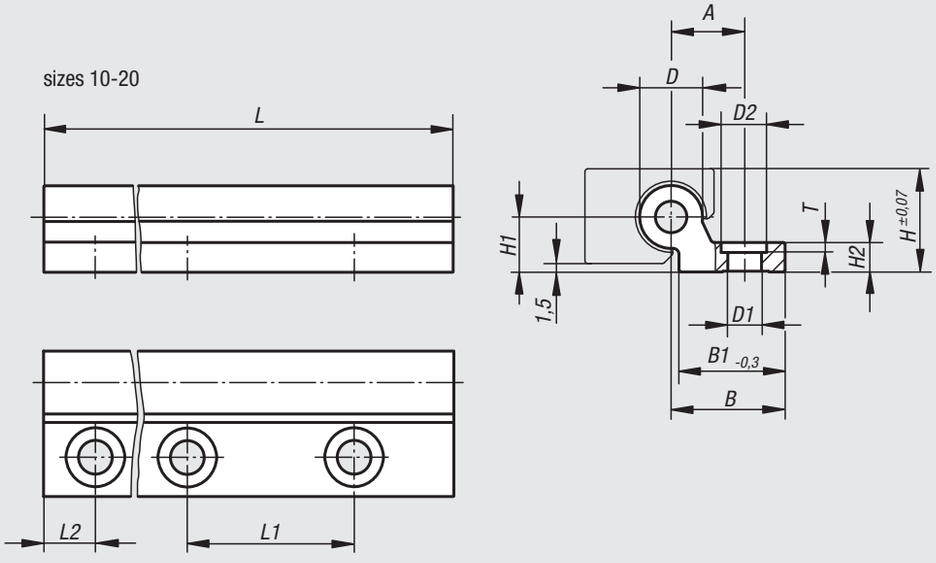
Note:
Single guide rails enable highest flexibility during construction and easy assembly. Can be used to to compensate for height differences in height. Hard anodised aluminium is used as rail material and ensures best friction and wear results. Robust and dirt resistant for transporting heavy loads safely and maintenance-free.



size 06



sizes 10-20

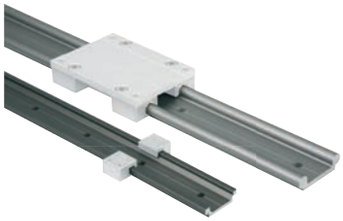


Order No.	Version	Size	L max.	L2	A	B	B1	D	D1	D2	H	H1	H2	L1	T
21240-10630X3000	L max.	6	3000	30	10,5	15,5	14	5	4,5	-	14	7,5	4	60	-
21240-11030X4000	L max.	10	4000	30	17	27	27	10	6,6	-	18	9	5,5	120	-
21240-11630X4000	L max.	16	4000	30	19	29	27	16	9	15	27	14	7,5	120	4
21240-12030X4000	L max.	20	4000	30	21	31	27	20	9	15	36	20	9,5	120	5

Order No.	Version	Size	L max.	L2	L2 min.	L2 max.	A	B	B1	D	D1	D2	H	H1	H2	L1	T
21240-106X***	L2 and L customer specific	6	*	**	20	49,5	10,5	15,5	14	5	4,5	-	14	7,5	4	60	-
21240-110X***	L2 and L customer specific	10	*	**	20	79,5	17	27	27	10	6,6	-	18	9	5,5	120	-
21240-116X***	L2 and L customer specific	16	*	**	20	79,5	19	29	27	16	9	15	27	14	7,5	120	4
21240-120X***	L2 and L customer specific	20	*	**	20	79,5	21	31	27	20	9	15	36	20	9,5	120	5

Guide rails DryLin® W

double



Material:
Aluminium.

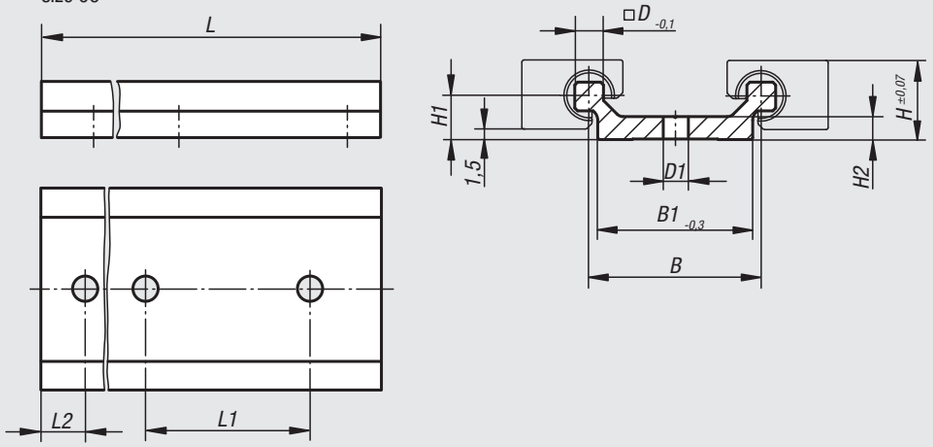
Version:
Hard anodised, layer thickness 50 µm.
Hardness 500 HV

Sample order:
nlm 21240-20630X3000 (L max.)

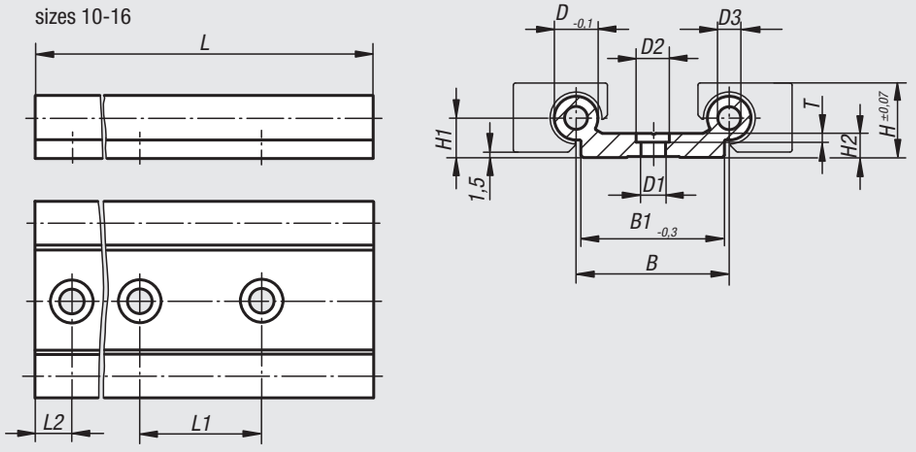
Ordering example guide rail:
nlm 21240-20620X500
(customer specific guide rail size 06)
** include length L2 = 20 mm and
* L = 500 mm
L2 and L only available in full mm.

Note:
Extremely flat rails with wide guides reaching to the edge for optimally support high torque. Robust and dirt resistant for transporting heavy loads safely and maintenance-free.

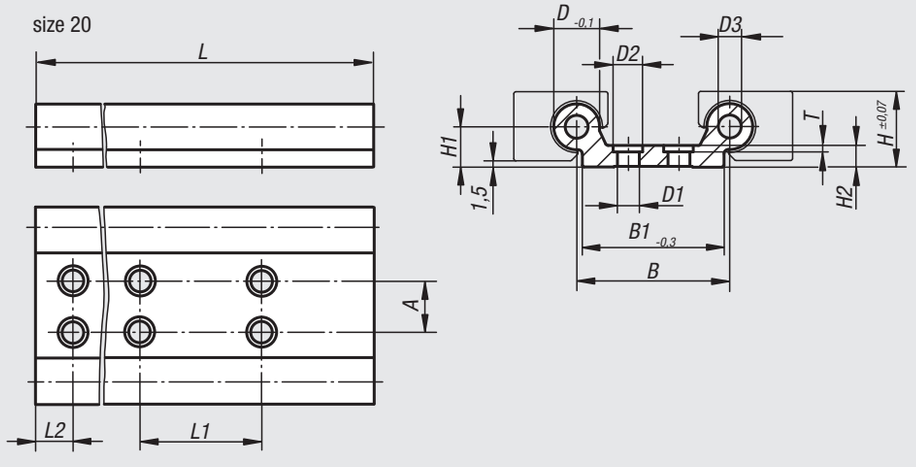
size 06



sizes 10-16



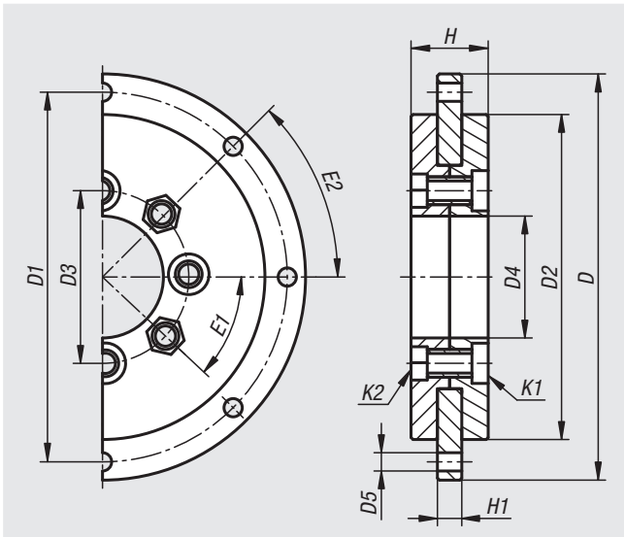
size 20



Order No.	Version	Size	L max.	L2	L2 min.	L2 max.	A	B	B1	D	D1	D2	D3	H	H1	H2	L1	T
21240-20630X3000	L max.	6	3000	30	-	-	-	30	27	5	4,5	-	-	14	7,5	4	60	-
21240-21030X4000	L max.	10	4000	30	-	-	-	40	40	10	6,6	-	-	18	9	5,5	120	-
21240-21630X4000	L max.	16	4000	30	-	-	-	58	54	16	9	15	8	27	14	7,5	120	4
21240-22030X4000	L max.	20	4000	30	-	-	40	82	74	20	9	15	14	36	20	9,5	120	5
21240-206X***	L2 and L customer specific	6	*	**	20	49,5	-	30	27	5	4,5	-	-	14	7,5	4	60	-
21240-210X***	L2 and L customer specific	10	*	**	20	79,5	-	40	40	10	6,6	-	-	18	9	5,5	120	-
21240-216X***	L2 and L customer specific	16	*	**	20	79,5	-	58	54	16	9	15	8	27	14	7,5	120	4
21240-220X***	L2 and L customer specific	20	*	**	20	79,5	40	82	74	20	9	15	14	36	20	9,5	120	5

Plain bearings for rotary stages





Material:
Aluminium outer ring
Inner ring made of Iglidur® J plain bearing plastic material.
Stainless steel A2 screws and nuts.

Version:
Anodised outer ring.

Sample order:
nlm 21245-1108020

Note:
Extremely low weight plain bearings for rotary stages. The inner ring is made of a high-performance bearing material that surrounds the anodised aluminium outer ring. Such a combination of materials guarantees absolutely lubricant and maintenance-free running.

Simple assembly.
High wear resistance.
For high loads, high rigidity.

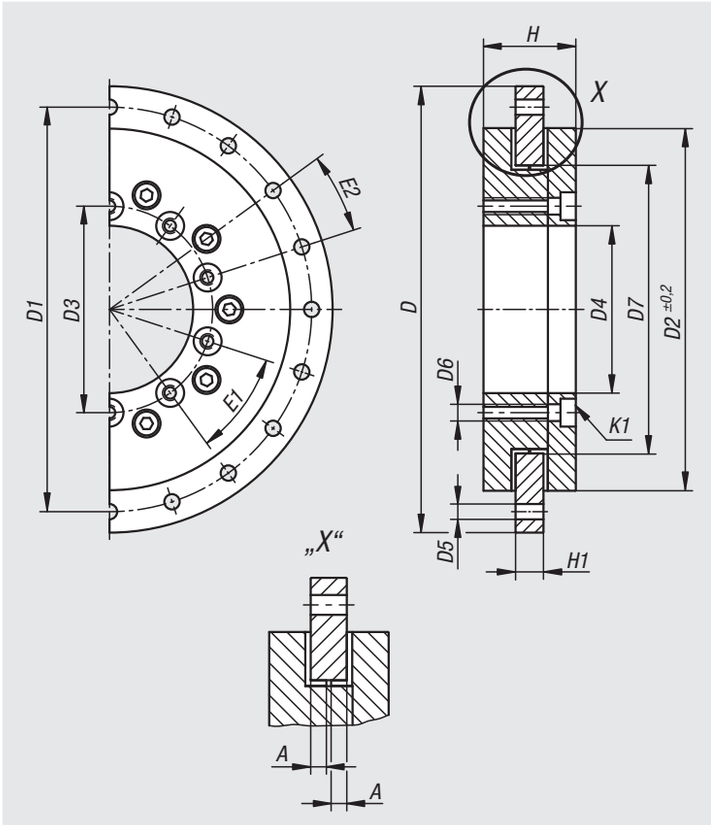
Temperature range:
-50°C to +90°C.

Order No.	D	D1	D2	D3	D4	D5	E1	E2	H	H1	K1	K2 for nut
21245-1108020	80	70	60	31	20	4,5	6X60°	6X60°	16	5	DIN 7984 M5	ISO 4035 M5
21245-1110030	100	91	80	42,5	30	4,5	8X45°	8X45°	19	6	DIN 7984 M5	ISO 4035 M5
21245-1116060	160	145	130	86	60	5,5	12X30°	20X18°	30	10	Ø 16 countersink 6,5 deep	Ø 16 countersink 6,5 deep

Order No.	Static axial load rating N	Dynamic axial load rating N	Static radial load rating N	Dynamic radial load rating N	tilt moment max. Nm	Rev. limit n max. rpm
21245-1108020	13000	4000	2000	500	60	250
21245-1110030	25000	7000	2500	700	100	200
21245-1116060	45000	12000	10000	2800	200	120

Plain bearing for rotary stages





Material:
Aluminium outer ring and inner ring.
Iglidur® J plastic slide elements.
Stainless steel A2 screws.

Version:
Anodised outer ring and inner ring.

Sample order:
nlm 21245-01-1108020

Note:
Aluminium plain bearings with replaceable, high performance material glide elements for rotary stages. Such a combination of materials guarantees absolutely lubricant and maintenance-free running.

Simple assembly.
High wear resistance.
For high loads, high rigidity.

Temperature range:
-50°C to +90°C.



Order No.	A	D	D1	D2	D3	D4	D5	D6	D7	E1	E2	H	H1
21245-01-1108020	3,5	80	70	60	31	20	4,5	M4	40	6X60°	6X60°	24	8
21245-01-1110030	4,5	100	91	82	42,5	30	4,5	M4	58	8X45°	8X45°	29	10
21245-01-1116060	4,5	160	145	130	74	60	5,5	M5	103	10X36°	20X18°	33	10

Order No.	K1	Static axial load rating N	Dynamic axial load rating N	Static radial load rating N	Dynamic radial load rating N	tilt moment max. Nm	Rev. limit n max. rpm
21245-01-1108020	DIN 7984 M4	15000	4000	2300	600	100	300
21245-01-1110030	DIN 7984 M4	27000	7000	5000	1500	200	250
21245-01-1116060	ISO 4762 M5	50000	15000	10000	3000	800	200

Clamping element

for rotary stage plain bearing



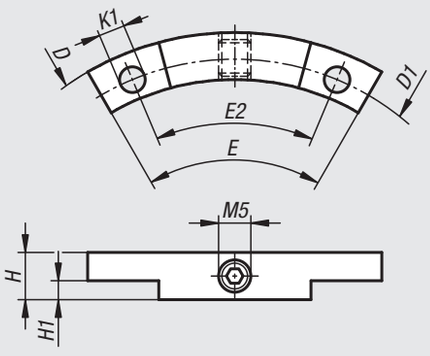
Material:
Clamping element steel, clamping screws brass.

Version:
Clamping element bright.

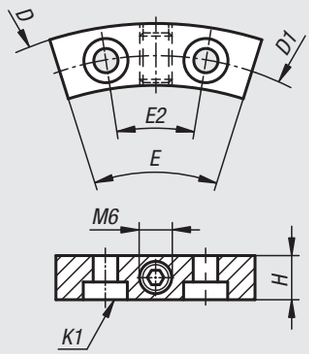
Sample order:
nlm 21245-01-9100

Note:
Clamping element for screwing onto the outer ring of the rotary stage plain bearing 21245-01. 1 Nm tightening torque gives 10 Nm retaining torque.

21245-01-9100



21245-01-9160





Order No.	D	D1	E	E2	H	H1	K1	Suitable for
21245-01-9100	100	91	60°	45°	8	3,2	Ø 4,5	21245-01-1110030
21245-01-9160	160	145	35°	18°	10	-	DIN 7984 M5	21245-01-1116060

Roller carriages

compact and heavy-duty version



Material:
Steel.

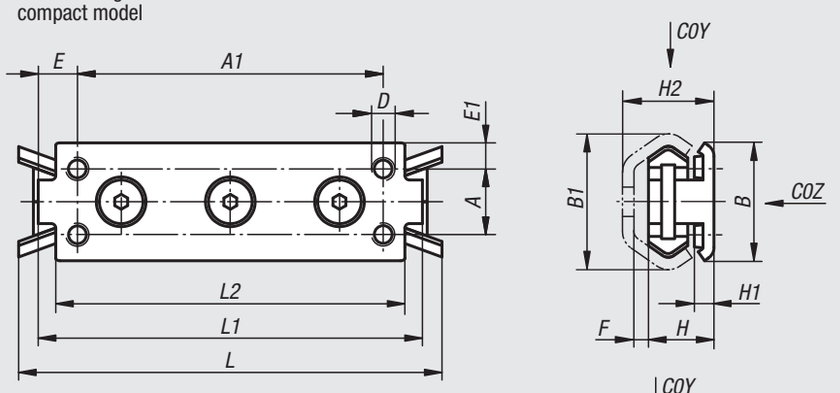
Version:
Electro zinc-plated.

Sample order:
nlm 21320-120080

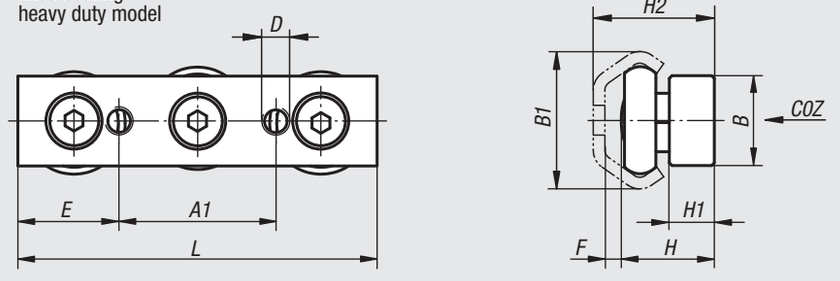
Note:
Roller carriage with low coefficient of friction, therefore very free-running. The roller journals are lifetime-lubricated and have a 2Z (dust cover) seal. By simply moving the centre cam roller, the roller carriage can adjusted to be play-free or under the desired initial tension in the rail. The compact version has a plastic stripper for cleaning the tracks.

Application temperature -30 °C to +120 °C.

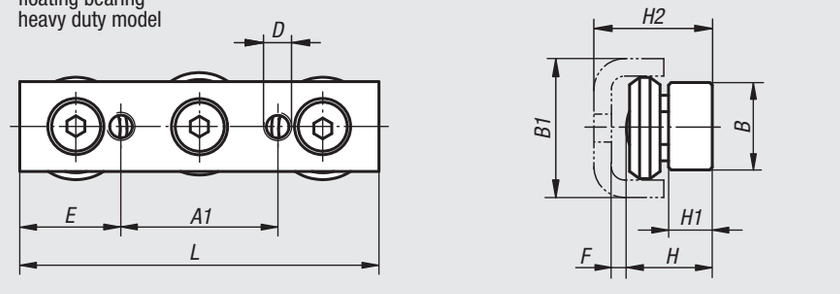
fixed bearing
compact model



fixed bearing
heavy duty model



floating bearing
heavy duty model



Fixed bearing, compact version

Order No.	Size	A	A1	B	B1	D	E	E1	F	H	H1	H2	L	L1	L2	C0Y N	C0Z N
21320-120080	20	-	60	18	19,2	M5	10	9	3	11,5	5,5	16	90	80	71	300	170
21320-130088	30	15	70	27	29,5	M5	5	6	4	15	4,5	20,5	97	88	80	800	400
21320-145150	45	23	120	40	46,4	M6	7,5	8,5	5	22	4	31	160	150	135	1600	860

Fixed bearing, heavy-duty version

Order No.	Size	A1	B	B1	D	E	F	H	H1	H2	L	C0Y N	C0Z N
21320-220060	20	20	10	19,2	M5	20	2,6	13	6	17,8	60	326	185
21320-230080	30	35	20	29,5	M6	22,5	3,3	20,7	10	26,5	80	870	435
21320-245120	45	55	25	46,4	M8	32,5	5,1	28,9	12	38	120	1740	935

Floating bearing, heavy-duty version

Order No.	Size	A1	B	B1	D	E	F	H	H1	H2	L	C0Y N
21320-320060	20	20	10	20,5	M5	20	2,5	11,55	6	18,25 ±0,6	60	300
21320-330080	30	35	20	31,8	M6	22,5	3,5	19,2	10	27,95 ±1,0	80	800
21320-345120	45	55	25	44,8	M8	32,5	5	25,5	12	37,25 ±1,75	120	1600

Roller guide rails



Material:
Steel.

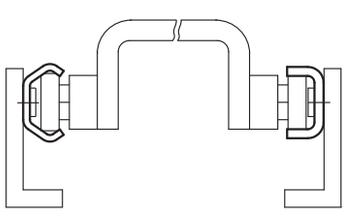
Version:
Electro zinc-plated.

Sample order:
nlm 21320-120X0800
(include length L)

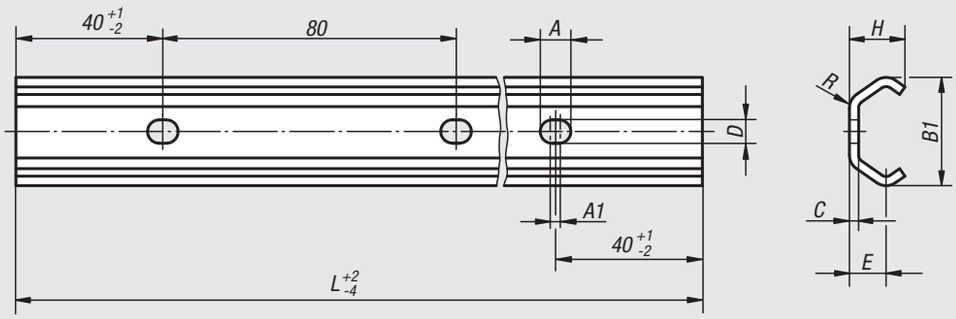
Note:
Stamped and rolled guide rails.

The fixed bearing rail is the main absorber of radial and axial forces. The floating bearing rail serves to absorb the load of radial forces and, in combination with the fixed bearing rail, as a support bearing for absorbing torques that occur. In the connection of the fixed and the floating bearings, the floating bearing rail compensates for parallelism errors and tolerances.

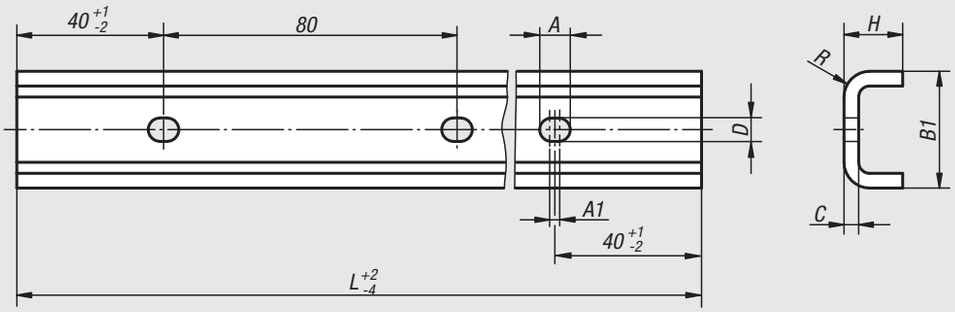
On request:
Lengths up to a max. 3120 mm.



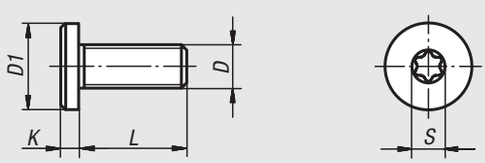
roller guide rail for
fixed bearing



roller guide rail for
floating bearing



fastening screw



Roller guide rails for fixed bearing

Order No.	Size	A	A1	B1	C	D	E	H	L	R
21320-120X	20	7	2	19,2	2	5	7	10	800/1040/2080/3120	3
21320-130X	30	8,4	2	29,5	2,5	6,4	10	15	800/1040/2080/3120	4,5
21320-145X	45	11	2	46,4	4	9	15,5	24	800/1040/2080/3120	6,5

Roller guide rails for floating bearing

Order No.	Size	A	A1	B1	C	D	H	L	R
21320-220X	20	7	2	20,5	3	5	11	800/1040/2080/3120	5,5
21320-230X	30	8,4	2	31,8	4	6,4	16	800/1040/2080/3120	7
21320-245X	45	11	2	44,8	4,5	9	24,5	800/1040/2080/3120	9,5

Fastening screws

Order No.	D	D1	K	L	S	Suitable for	Tightening torque Nm
21320-0408	M4	8	2	8	T20	size 20	4
21320-0510	M5	10	2	10	T25	size 30	9
21320-0816	M8	16	3	16	T40	size 45	22

Roller carriages

steel



Material:
Race body steel.
Wiper modified polyamide.
Rollers steel 1.3505.

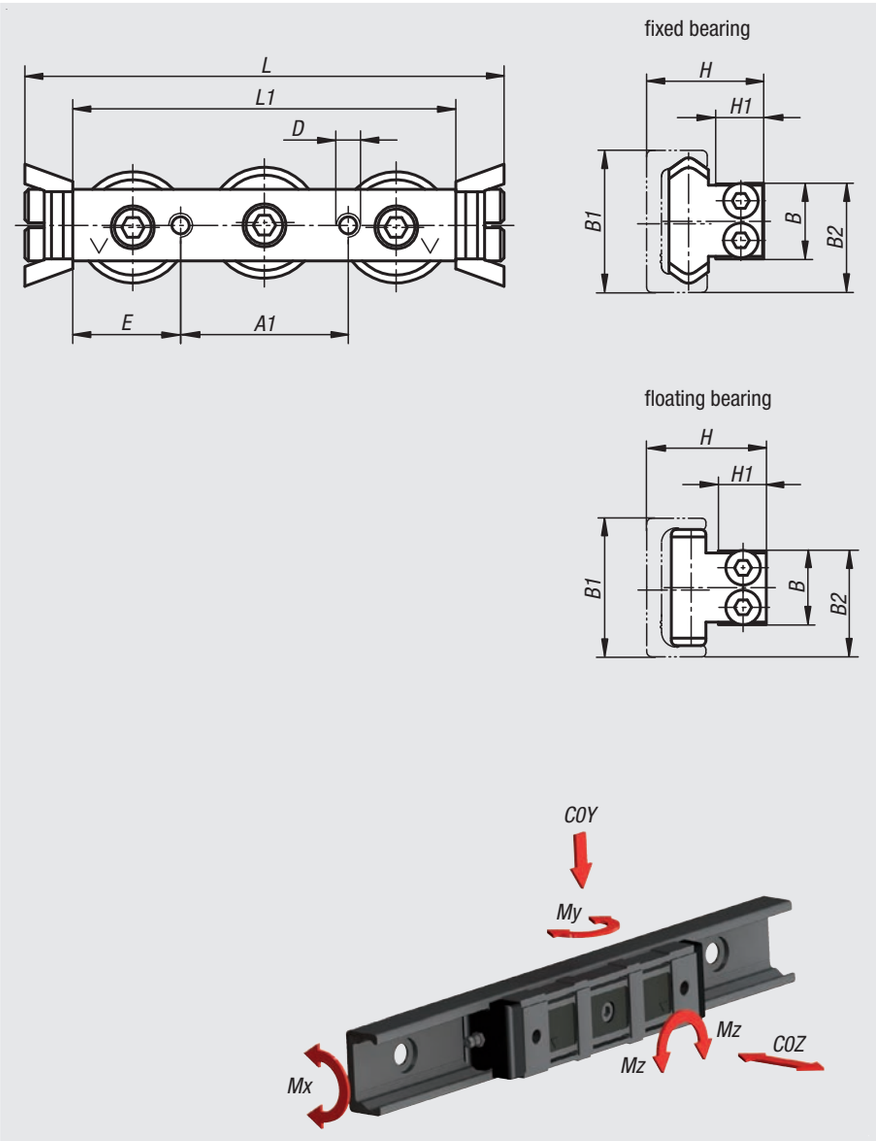
Version:
Race body electro zinc-plated.

Sample order:
nlm 21322-1128080

Note:
Roller carriages with lifetime lubricated ball bearings and polyamide wipers that protect the tracks from dirt. A simple adjustment of the middle roller makes the roller carriage play-free or sets the desired preload in the rail.
High traverse speeds of up to 7 m/s and extremely quiet (faster and quieter than systems with recycling ball bearings).

Application temperature -30°C to +120°C.

On request:
Roller carriages with 4 or 5 rollers.



Fixed bearing

Order No.	Size	A1	B	B1	B2	D	E	H	H1	L	L1	C dynamic N	C0Y N	C0Z N	Mx Nm	My Nm	Mz Nm
21322-1118060	18	20	9,5	18	14	M5	20	15	5,7	76	60	1530	820	260	1,5	4,7	8,2
21322-1128080	28	35	14,9	28	21,7	M5	22,5	23,9	9,7	100	80	4260	2170	640	6,2	16	27,2
21322-1135100	35	45	19,9	35	27,85	M6	27,5	30,2	11,9	120	100	8040	3510	1060	12,9	33,7	61,5
21322-1143120	43	55	24,9	43	34,3	M8	32,5	37	14,5	140	120	12280	5500	1570	23,6	60	104,5

Floating bearing

Order No.	Size	A1	B	B1	B2	D	E	H min.	H max.	H1	L	L1	C dynamic N	C0Y N	Mz Nm
21322-1218060	18	20	9,5	18	14	M5	20	14,7	16,1	5,7	76	60	1530	820	8,2
21322-1228080	28	35	14,9	28	21,7	M5	22,5	23,3	25,2	9,7	100	80	4260	2170	27,2
21322-1235100	35	45	19,9	35	27,85	M6	27,5	28,9	32,9	11,9	120	100	8040	3510	61,5
21322-1243120	43	55	24,9	43	34,3	M8	32,5	35,6	39,5	14,5	140	120	12280	5500	104,5

Roller carriages

aluminium



Material:
Race body die-cast aluminium.
End pieces polyester.
Wipers modified polyamide.
longitudinal seals rubber.
Rollers steel 1.3505.

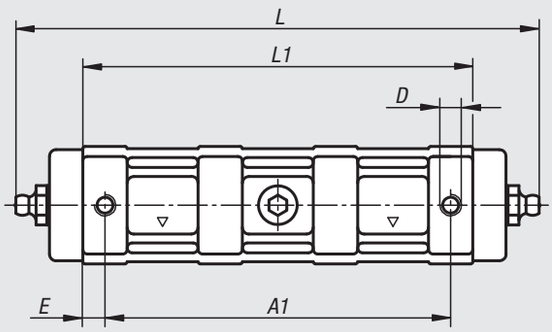
Version:
Runner body nickel-plated.

Sample order:
nlm 21322-2128088

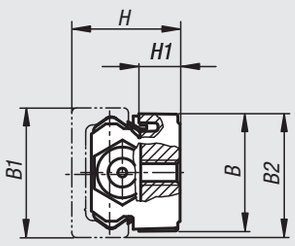
Note:
Roller carriage with lifetime lubricated ball bearings and patented wiper technology which lubricates the system while in motion.
A simple adjustment of the middle roller makes the roller carriage play-free or sets the desired preload in the rail.
High traverse speeds of up to 7 m/s and extremely quiet (faster and quieter than systems with recycling ball bearings).

Application temperature -30 °C to +120 °C.

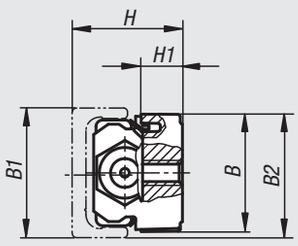
On request:
Roller carriages with 4 or 5 rollers.

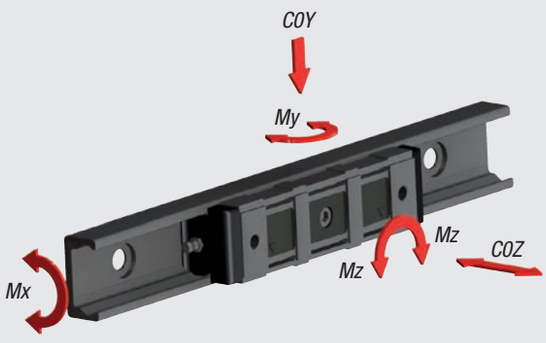


fixed bearing



floating bearing





Fixed bearing

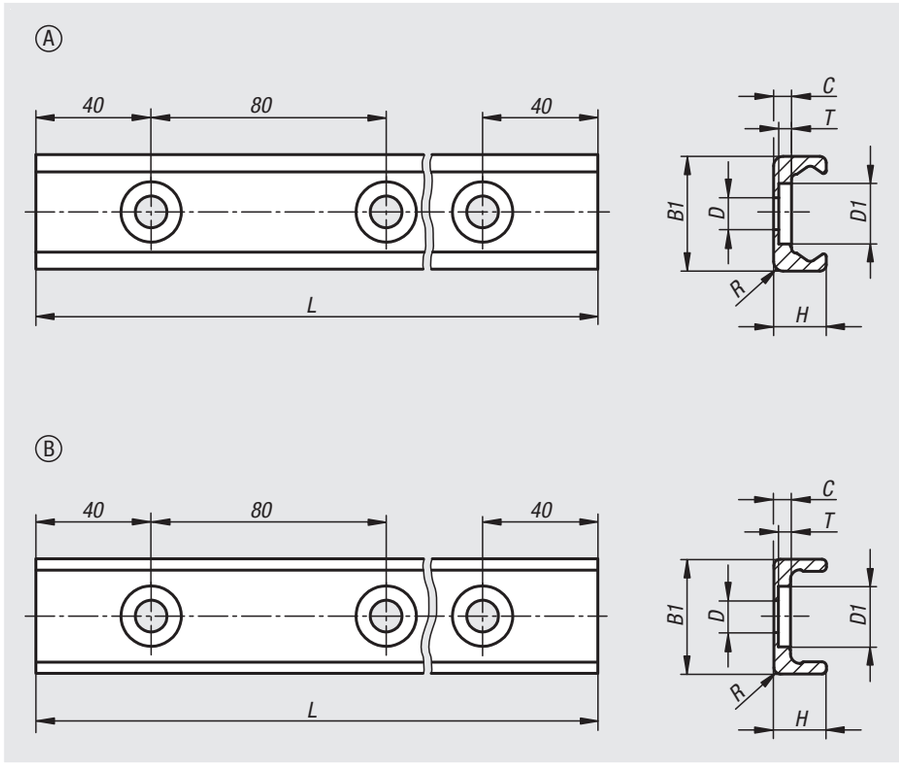
Order No.	Size	A1	B	B1	B2	D	E	H	H1	L	L1	C dynamic N	C0Y N	C0Z N	Mx Nm	My Nm	Mz Nm
21322-2118062	18	52	17,6	18	18,3	M5	5	16,5	6,4	74	62	1530	820	260	1,5	4,7	8,2
21322-2128088	28	78	26,5	28	28	M5	5	24	9,3	124	88	4260	2170	640	6,2	16	27,2
21322-2143134	43	114	41	43	41,9	M8	10	37	13,7	170	134	12280	5500	1570	23,6	60	104,5

Floating bearing

Order No.	Size	A1	B	B1	B2	D	E	H min.	H max.	H1	L	L1	C dynamic N	C0Y N	Mz Nm
21322-2218062	18	52	17,6	18	18,3	M5	5	16,5	17,6	6,4	74	62	1530	820	8,2
21322-2228088	28	78	26,5	28	28	M5	5	24	25,3	9,3	124	88	4260	2170	27,2
21322-2243134	43	114	41	43	41,9	M8	10	37	39,5	13,7	170	134	12280	5500	104,5

Roller guide rails





Material:
Ball bearing steel

Version:
Electro zinc-plated.
Tracks inductively hardened and ground.

Sample order:
nlm 21322-128X0400 (include length L)

Note for ordering:
Fastening screws are supplied.

Note:
Compact C-profile guide rails with internal hardened tracks. The system runs with low noise even under heavy loads.

There is play between the screw and the fastening hole to allow the rail to be aligned during installation.

To achieve the desired running properties there must always be a film of lubricant between track and roller, this also provides corrosion protection for the ground tracks.

On request:
Lengths up to max. 4080 mm.

Roller guide rails Form A for fixed bearings

Order No.	Form	Size	B1	C	D for screw	D1	H	L	R	T
21322-118X	A	18	18	2,8	M4	9,5	8,25	240/400/560/800/1040/1200	1,5	2
21322-128X	A	28	28	3	M5	11	12,25	400/560/800/1040/1200/1440	1	2
21322-135X	A	35	35	3,5	M6	14,5	16	400/560/800/1040/1200/1440	2	2,7
21322-143X	A	43	43	4,5	M8	18	21	400/560/800/1040/1200/1520/2000	2,5	3,1

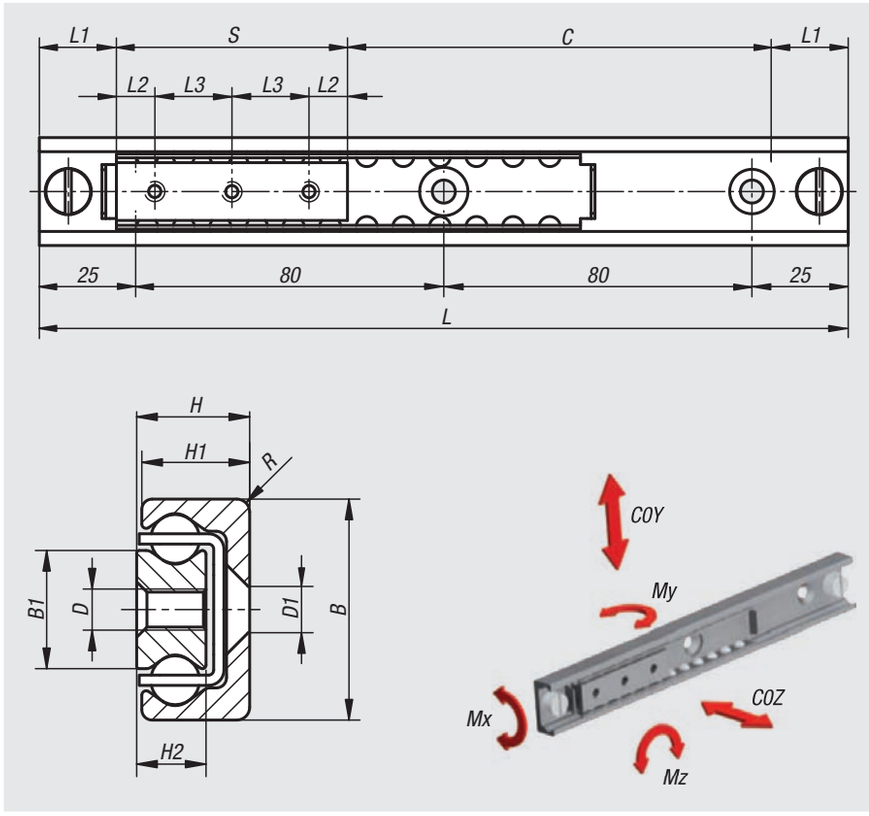
Roller guide rails Form B for floating bearings

Order No.	Form	Size	B1	C	D for screw	D1	H	L	R	T
21322-218X	B	18	18	2,6	M4	9,5	8,25	240/400/560/800/1040/1200	1	1,9
21322-228X	B	28	28	3	M5	11	12	400/560/800/1040/1200/1440	1	2
21322-235X	B	35	35	3,5	M6	14,5	16	400/560/800/1040/1200/1440	1	2,7
21322-243X	B	43	43	4,5	M8	18	21	400/560/800/1040/1200/1520/2000	1	3,1

Linear ball bearing

with internal race





Material:
Rail and race ball-bearing steel.
Balls, ball-bearing steel.
Ball cage steel.

Version:
Rail, runner and ball cage electro zinc-plated.
Race inductively hardened.
Balls hardened.

Sample order:
nlm 21330-280600130

Note:
Linear ball bearing consisting of a guide rail and a race which runs within the ball cage in the guide rail. Mounting should be carried out horizontally if possible.

The internal stops limit the cage. Provide external stops for a loaded system.

Use grade 10.9 DIN EN ISO 10642 countersunk head screws to install the rail.

The maximum traversing speed is 0.8 m/s.

Application temperature -30 °C to +170 °C.



Linear ball bearing

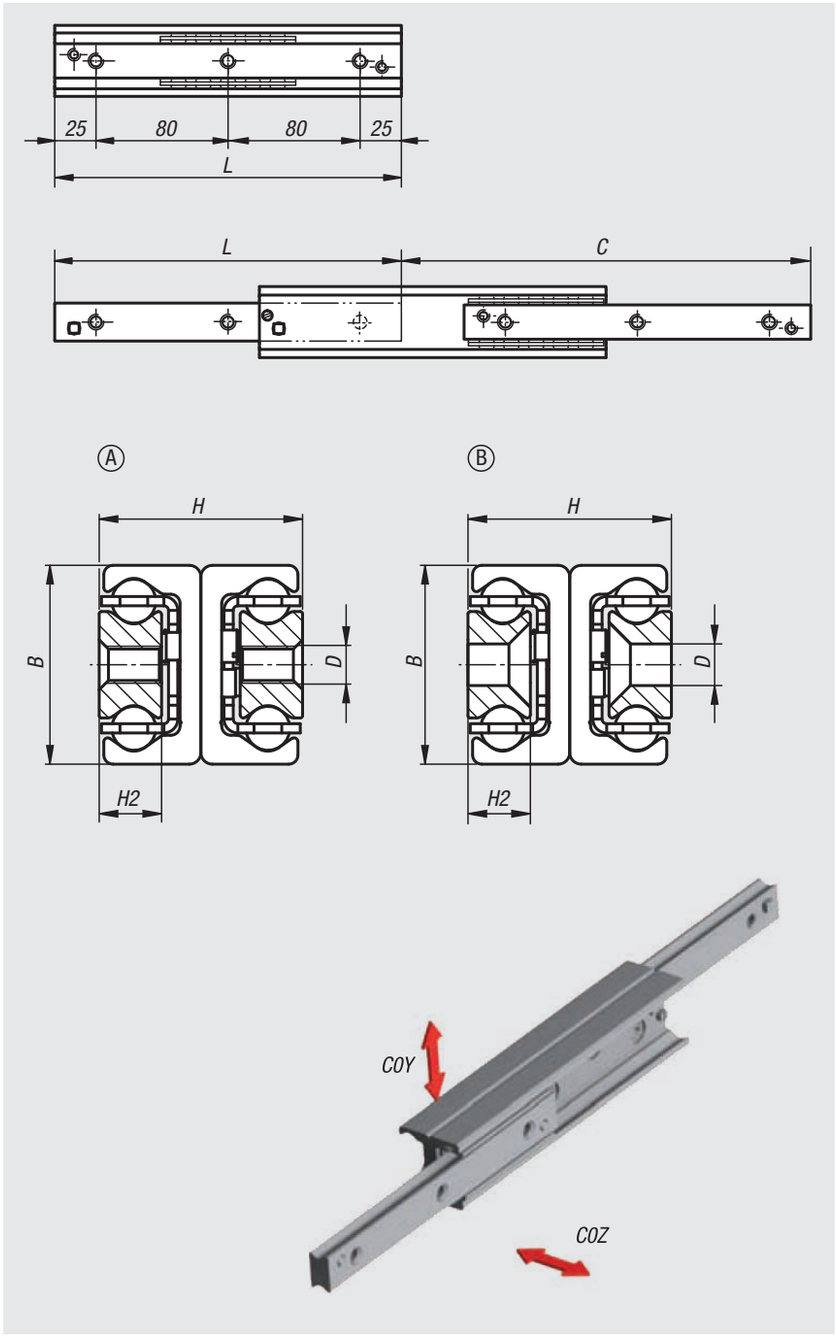
with internal race

Order No.	Size	B	B1	C (travel)	D for screw	D1	H	H1	H2	L	L1	L2	L3	R	S	C0Y N	C0Z N	Mx	My	Mz	No. of holes
21330-280600130	28	28	15	30	M5	M5	13	12,25	7,5	130	20	10	20	1	60	3480	2436	17,1	24	35	3
21330-280600210	28	28	15	110	M5	M5	13	12,25	7,5	210	20	10	20	1	60	3480	2436	17,1	24	35	3
21330-280600290	28	28	15	190	M5	M5	13	12,25	7,5	290	20	10	20	1	60	3480	2436	17,1	24	35	3
21330-280600370	28	28	15	270	M5	M5	13	12,25	7,5	370	20	10	20	1	60	3480	2436	17,1	24	35	3
21330-280800290	28	28	15	170	M5	M5	13	12,25	7,5	290	20	10	20	1	80	4640	3248	22,7	43	62	4
21330-280800370	28	28	15	250	M5	M5	13	12,25	7,5	370	20	10	20	1	80	4640	3248	22,7	43	62	4
21330-280800450	28	28	15	330	M5	M5	13	12,25	7,5	450	20	10	20	1	80	4640	3248	22,7	43	62	4
21330-280800610	28	28	15	490	M5	M5	13	12,25	7,5	610	20	10	20	1	80	4640	3248	22,7	43	62	4
21330-281300290	28	28	15	120	M5	M5	13	12,25	7,5	290	20	25	80	1	130	7540	5278	36,9	114	163	2
21330-281300370	28	28	15	200	M5	M5	13	12,25	7,5	370	20	25	80	1	130	7540	5278	36,9	114	163	2
21330-281300450	28	28	15	280	M5	M5	13	12,25	7,5	450	20	25	80	1	130	7540	5278	36,9	114	163	2
21330-281300610	28	28	15	440	M5	M5	13	12,25	7,5	610	20	25	80	1	130	7540	5278	36,9	114	163	2
21330-281300690	28	28	15	520	M5	M5	13	12,25	7,5	690	20	25	80	1	130	7540	5278	36,9	114	163	2
21330-282100450	28	28	15	200	M5	M5	13	12,25	7,5	450	20	25	80	1	210	12180	8526	59,7	298	426	3
21330-282100610	28	28	15	360	M5	M5	13	12,25	7,5	610	20	25	80	1	210	12180	8526	59,7	298	426	3
21330-282101010	28	28	15	760	M5	M5	13	12,25	7,5	1010	20	25	80	1	210	12180	8526	59,7	298	426	3
21330-351300290	35	35	15,8	110	M6	M6	17	16	10	290	25	25	80	2	130	9750	6825	47,2	148	211	2
21330-351300450	35	35	15,8	270	M6	M6	17	16	10	450	25	25	80	2	130	9750	6825	47,2	148	211	2
21330-351300770	35	35	15,8	590	M6	M6	17	16	10	770	25	25	80	2	130	9750	6825	47,2	148	211	2
21330-352100450	35	35	15,8	190	M6	M6	17	16	10	450	25	25	80	2	210	15750	11025	76,3	386	551	3
21330-352100690	35	35	15,8	430	M6	M6	17	16	10	690	25	25	80	2	210	15750	11025	76,3	386	551	3
21330-352101010	35	35	15,8	750	M6	M6	17	16	10	1010	25	25	80	2	210	15750	11025	76,3	386	551	3
21330-352900610	35	35	15,8	270	M6	M6	17	16	10	610	25	25	80	2	290	21750	15225	105,3	736	1051	4
21330-352900930	35	35	15,8	590	M6	M6	17	16	10	930	25	25	80	2	290	21750	15225	105,3	736	1051	4
21330-352901330	35	35	15,8	990	M6	M6	17	16	10	1330	25	25	80	2	290	21750	15225	105,3	736	1051	4
21330-432100450	43	43	23	190	M8	M8	22	21	13,5	450	25	25	80	2,5	210	22470	15729	155,1	551	786	3
21330-432100690	43	43	23	430	M8	M8	22	21	13,5	690	25	25	80	2,5	210	22470	15729	155,1	551	786	3
21330-432101010	43	43	23	750	M8	M8	22	21	13,5	1010	25	25	80	2,5	210	22470	15729	155,1	551	786	3
21330-433700770	43	43	23	350	M8	M8	22	21	13,5	770	25	25	80	2,5	370	39590	27713	273,2	1709	2441	5
21330-433701010	43	43	23	590	M8	M8	22	21	13,5	1010	25	25	80	2,5	370	39590	27713	273,2	1709	2441	5
21330-433701490	43	43	23	1070	M8	M8	22	21	13,5	1490	25	25	80	2,5	370	39590	27713	273,2	1709	2441	5

Telescopic rails

Double-T form





Material:
Rail and race ball-bearing steel.
Balls, ball-bearing steel.
Ball cage steel.

Version:
Rail, runner and ball cage electro zinc-plated.
Race inductively hardened.
Balls hardened.

Sample order:
nlm 21336-1280210

Note:
Full extension consisting of two guide rails which form the intermediate element when connected to each other to form a double T profile, plus two runners which form the link to the connection construction as fixed and moving elements. High load rating and low bending thanks to compact, square design with high base load. The maximum travel is greater than the closed length of the telescopic rail. Mounting should be carried out horizontally if possible. To allow access to all fastening holes, the locking screw in the rail must be removed before mounting and replaced afterwards. Travel in both directions is achieved by removing the locking screws.

The internal stops limit the cage. Provide external stops for a loaded system.

Form A:
Use grade 10.9 DIN EN ISO 10642 countersunk head screws to install the rail.
Form B:
Use grade 10.9 screws to install the rail.

The maximum traversing speed is 0.8 m/s.

Application temperature -30 °C to +170 °C.

Telescopic rails

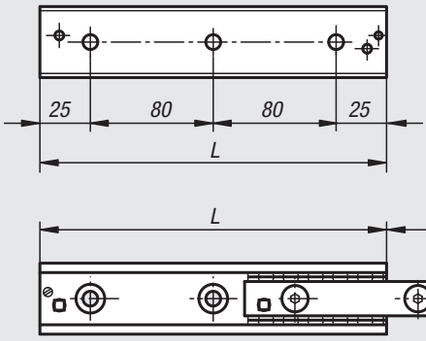
Double-T form

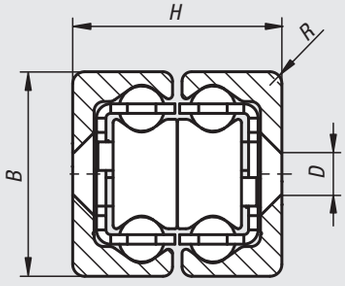
Order No.	Form	Version	Size	B	C (travel)	D	D for screw	H	H2	L	C0Y N	C0Z N	No. of holes
21336-1280210	A	tapped hole	28	28	232	M5	-	26	7,5	210	432	302	3
21336-1280370	A	tapped hole	28	28	380	M5	-	26	7,5	370	968	471	5
21336-1280450	A	tapped hole	28	28	464	M5	-	26	7,5	450	1169	385	6
21336-1280530	A	tapped hole	28	28	548	M5	-	26	7,5	530	1107	325	7
21336-1350370	A	tapped hole	35	35	406	M6	-	34	10	370	1025	718	5
21336-1350450	A	tapped hole	35	35	494	M6	-	34	10	450	1250	793	6
21336-1350530	A	tapped hole	35	35	558	M6	-	34	10	530	1685	728	7
21336-1350610	A	tapped hole	35	35	646	M6	-	34	10	610	1908	626	8
21336-1430450	A	tapped hole	43	43	486	M8	-	44	13,5	450	1828	1279	6
21336-1430530	A	tapped hole	43	43	556	M8	-	44	13,5	530	2375	1434	7
21336-1430610	A	tapped hole	43	43	626	M8	-	44	13,5	610	2934	1300	8
21336-1430770	A	tapped hole	43	43	796	M8	-	44	13,5	770	3055	1016	10
21336-1430930	A	tapped hole	43	43	966	M8	-	44	13,5	930	2506	833	12
21336-2280210	B	countersink	28	28	232	-	M5	26	7,5	210	432	302	3
21336-2280370	B	countersink	28	28	380	-	M5	26	7,5	370	968	471	5
21336-2280450	B	countersink	28	28	464	-	M5	26	7,5	450	1169	385	6
21336-2280530	B	countersink	28	28	548	-	M5	26	7,5	530	1107	325	7
21336-2350370	B	countersink	35	35	406	-	M6	34	10	370	1025	718	5
21336-2350450	B	countersink	35	35	494	-	M6	34	10	450	1250	793	6
21336-2350530	B	countersink	35	35	558	-	M6	34	10	530	1685	728	7
21336-2350610	B	countersink	35	35	646	-	M6	34	10	610	1908	626	8
21336-2430450	B	countersink	43	43	486	-	M8	44	13,5	450	1828	1279	6
21336-2430530	B	countersink	43	43	556	-	M8	44	13,5	530	2375	1434	7
21336-2430610	B	countersink	43	43	626	-	M8	44	13,5	610	2934	1300	8
21336-2430770	B	countersink	43	43	796	-	M8	44	13,5	770	3055	1016	10
21336-2430930	B	countersink	43	43	966	-	M8	44	13,5	930	2506	833	12

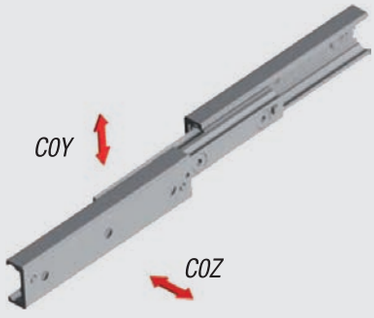
Telescopic rails

double arrangement









Material:
Rail and race ball-bearing steel.
Balls, ball-bearing steel.
Ball cage steel.

Version:
Rail, runner and ball cage electro zinc-plated.
Race inductively hardened.
Balls hardened.

Sample order:
nlm 21338-280210

Note:
Full extension consisting of two guide rails which serve as fixed and moving elements and two runners which form the intermediate element when connected to each other. This arrangement offers good protection for the open ball cages from dirt. The maximum travel is greater than the closed length of the telescopic rail. Mounting should be carried out horizontally if possible. To allow access to all fastening holes, the locking screw in the rail must be removed before mounting and replaced afterwards. Travel in both directions is achieved by removing the locking screws.

The internal stops limit the cage. Provide external stops for a loaded system.

Use grade 10.9 DIN EN ISO 10642 countersunk head screws to install the rail.

The maximum traversing speed is 0.8 m/s.

Application temperature -30 °C to +170 °C.

Order No.	Size	B	C (travel)	D for screw	H	L	R	C0Y N	C0Z N	No. of holes
21338-280210	28	28	232	M5	26	210	1	432	302	3
21338-280370	28	28	380	M5	26	370	1	482	482	5
21338-280450	28	28	434	M5	26	450	1	393	393	6
21338-280530	28	28	548	M5	26	530	1	332	332	7
21338-350370	35	35	406	M6	34	370	2	522	522	5
21338-350450	35	35	494	M6	34	450	2	429	429	6
21338-350530	35	35	558	M6	34	530	2	394	394	7
21338-350610	35	35	646	M6	34	610	2	338	338	8
21338-430450	43	43	486	M8	44	450	2,5	1331	1279	6
21338-430530	43	43	556	M8	44	530	2,5	1193	1193	7
21338-430610	43	43	626	M8	44	610	2,5	1082	1082	8
21338-430770	43	43	796	M8	44	770	2,5	845	845	10
21338-430930	43	43	966	M8	44	930	2,5	693	693	12

Telescope rails



Material:
Balls, rails and slides roller bearing steel.

Version:
Rail and slide electro zinc-plated.
Tracks inductively hardened.
Balls hardened.

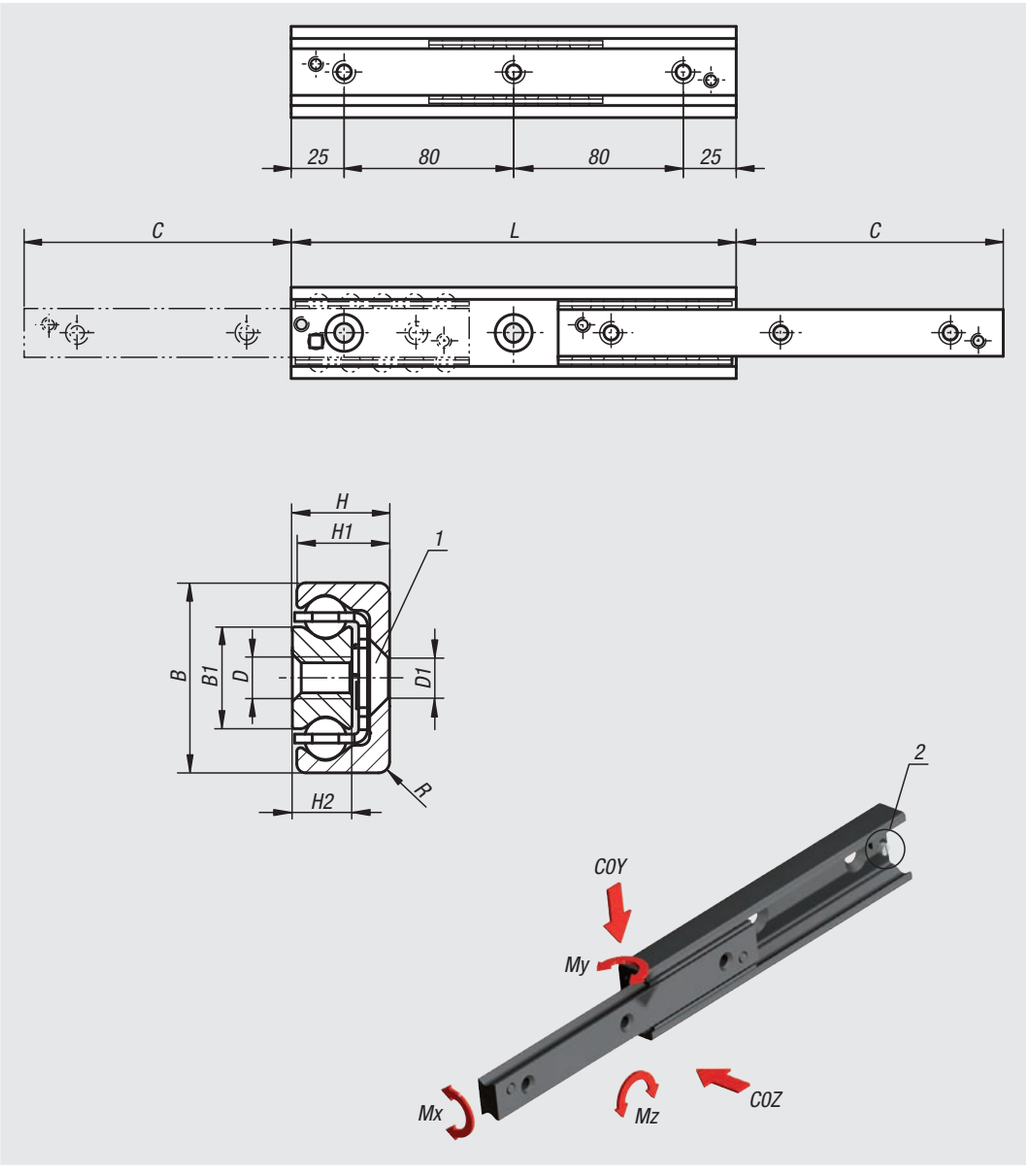
Sample order:
nlm 21340-280290

Note:
Partial extension consisting of a fixed guide rail and a movable slider. The slide can move somewhat more than half the length of the rail (C travel). By removing the locking screw, a partial extension with the travel length C is possible to both sides. The total travel is thus 2C.
This compact and simple construction allows very high load ratings.
The maximum traversing speed is 0.8 m/s.

Application temperature -30 °C to +170 °C.

On request:
Other lengths (pitch 80 mm).
Size 28 up to max. 1170 mm.
Size 35 up to max. 1490 mm.
Size 43 up to max. 1970 mm.

Drawing reference:
1) for countersunk screw DIN 7991
2) set screw



Order No.	Size	B	B1	C (travel)	D	D1	H	H1	H2	L	R	C0Y N	C0Z N	Mx Nm	My Nm	Mz Nm	No. of holes
21340-280290	28	28	15	148	M5	M5	13	12,25	7,5	290	1	1934	1345	39,6	132	188	4
21340-280370	28	28	15	190	M5	M5	13	12,25	7,5	370	1	2445	1711	50,4	213	305	5
21340-280450	28	28	15	232	M5	M5	13	12,25	7,5	450	1	2955	2069	61,2	314	449	6
21340-280530	28	28	15	274	M5	M5	13	12,25	7,5	530	1	3466	2426	72	435	621	7
21340-280610	28	28	15	315	M5	M5	13	12,25	7,5	610	1	3986	2790	82,8	575	821	8
21340-350290	35	35	15,8	159	M6	M6	17	16	10	290	2	2060	1442	46,9	146	208	4
21340-350370	35	35	15,8	203	M6	M6	17	16	10	370	2	2638	1847	59,9	238	340	5
21340-350450	35	35	15,8	247	M6	M6	17	16	10	450	2	3217	2252	73	345	505	6
21340-350530	35	35	15,8	279	M6	M6	17	16	10	530	2	4282	2997	90,4	543	775	7
21340-350610	35	35	15,8	323	M6	M6	17	16	10	610	2	4858	3401	103,5	711	1015	8
21340-430290	43	43	23	158	M8	M8	22	21	13,5	290	2,5	2872	2010	93,8	201	288	4
21340-430370	43	43	23	208	M8	M8	22	21	13,5	370	2,5	3377	2364	115,9	308	440	5
21340-430450	43	43	23	243	M8	M8	22	21	13,5	450	2,5	4690	3283	149,2	509	728	6
21340-430530	43	43	23	278	M8	M8	22	21	13,5	530	2,5	6039	4227	182,4	762	1088	7
21340-430610	43	43	23	313	M8	M8	22	21	13,5	610	2,5	7411	5188	215,6	1064	1521	8

Telescope rails

S-form



Material:
Balls, rails and runners roller bearing steel.

Version:
Rail and runner electro zinc-plated.
Tracks inductive hardened.
Balls hardened.

Sample order:
nlm 21342-280290

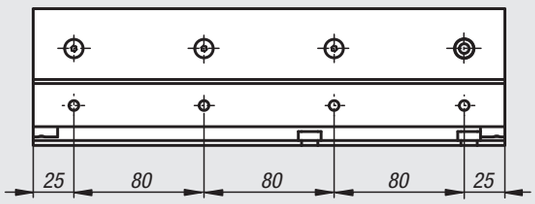
Note:
Full extension consisting of two guide rails as fixed and moving elements and an S-shaped intermediate element. The latter has a high area moment of inertia and high rigidity with a slim construction. This results in a high load rating with a low amount of bending in the extended state. The maximum travel is greater than the closed length of the telescopic rail.

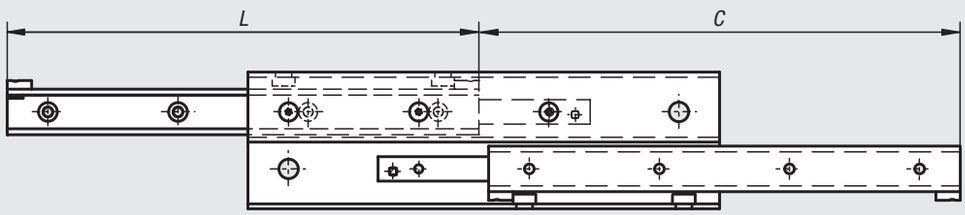
Use grade 10.9 DIN EN ISO 10642 countersunk head screws to install the rail.
The maximum traversing speed is 0.8 m/s.

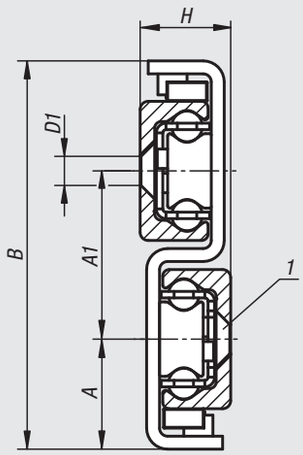
Application temperature -30 °C to +110 °C.

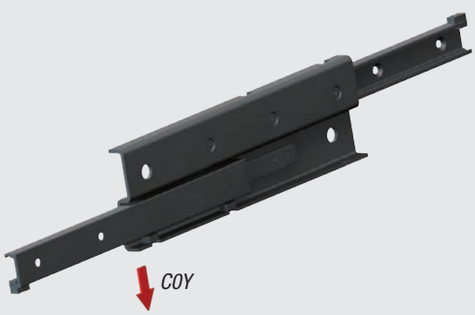
On request:
Other lengths (steps 80 mm).
Size 28 up to max. 1490 mm.
Size 43 up to max. 1970 mm.

Drawing reference:
1) for countersunk screw DIN 7991









Telescope rails

S-form

Order No.	Size	A	A1	B	C (travel)	D1	H	L	C0Y N	No. of holes
21342-280290	28	24,5	36	85	296	M5	17	290	570	4 (3 accessible)
21342-280370	28	24,5	36	85	380	M5	17	370	769	5 (4 accessible)
21342-280450	28	24,5	36	85	464	M5	17	450	969	6 (4 accessible)
21342-280530	28	24,5	36	85	548	M5	17	530	1170	7 (6 accessible)
21342-280610	28	24,5	36	85	630	M5	17	610	1376	8 (6 accessible)
21342-350450	35	30,5	43	104	494	M6	22,5	450	1250	6 (5 accessible)
21342-350530	35	30,5	43	104	558	M6	22,5	530	1685	7 (6 accessible)
21342-350690	35	30,5	43	104	734	M6	22,5	690	2132	9 (7 accessible)
21342-350850	35	30,5	43	104	886	M6	22,5	850	2801	11 (9 accessible)
21342-430530	43	34	52	120	556	M8	28	530	2061	7 (6 accessible)
21342-430610	43	34	52	120	626	M8	28	610	2603	8 (6 accessible)
21342-430690	43	34	52	120	726	M8	28	690	2775	9 (7 accessible)
21342-430770	43	34	52	120	796	M8	28	770	3319	10 (7 accessible)
21342-430850	43	34	52	120	866	M8	28	850	3873	11 (9 accessible)
21342-431010	43	34	52	120	1036	M8	34	1010	4590	13 (10 accessible)
21342-431490	43	34	52	120	1516	M8	34	1490	3713	19 (15 accessible)

Technical Information for profile guide rails

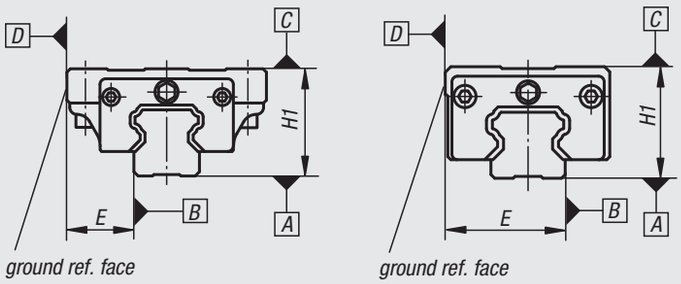
A profile guide rail allow linear motion with the aid of bearing balls. Using balls between rails and carriage allows a profile guide rail to attain extremely precise linear motion. Compared to a conventional glide rails the coefficient of friction is only one fiftieth.

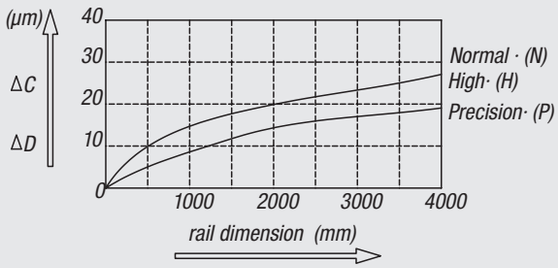
The ball row arrangement based on two-point contact with four ball arrays always at a 45° contact angle lends the profile guide rail consistent load ratings in all primary directions with excellent running properties. The profile guide rail can be mounted in various positions for diverse applications.

Profile guide rails of the same size can be exchanged with each other allowing individual carriages or rails to be exchanged or added to at any time. Our profile guide rails correspond to the market standard and can replace linear guides of the same design by other manufacturers.

Accuracy Classes

Profile guide rails are available in three accuracy classes. The maximum relative tolerance of each accuracy class is specified.





		Accuracy Class		
		Normal (N)	High(H)	Precision (P)
maximum deviation for systems with one carriage	height tolerance H1	±0,1	±0,04	-0,04
	length tolerance E	±0,1	±0,04	-0,04
maximum deviation for systems with several carriages	˜ H1	0,03	0,02	0,01
	˜ E	0,03	0,02	0,01
run parallelism of face C in relation to face A		see diagram		
run parallelism of face D in relation to face B		see diagram		

Pretensioning Classes

With regard to the diverse requirements of the user, profile guide rails are available in four different pre-load classes. A higher pre-load improves the rigidity and reduces the elastic deformation during load changes.

Class	Preload	Preload force	Applications with	Examples
Z0	no preload	0	- constant load direction - imprecise mounting surface	- linear axis - push and pull equipment
Z1	light preloading	0,02 C (C = dynamic load rating)	- constant load direction - light impacts and vibrations - low loading	- engraving machines - packaging machines - industrial handling
Z2	medium preloading	0,05 C (C = dynamic load rating)	- high precision requirements - torque loading	- positioning units - fast feeding units - metrology
Z3	heavy preloading	0,07 C (C = dynamic load rating)	- high rigidity requirements - impacts and vibrations - heavy loading	- machining centres - grinders - large boring machines

Calculating the service life

The nominal service life L can be calculated from the following equation:

$$L = \left(\frac{C_{dyn}}{P} \right)^3 \cdot 50000 \text{ m}$$

L = nominal service life (m)
C_{dyn} = dynamic load rating (N)
P = dynamic equivalent load (N)

Carriages



Material:
Body carbon steel.
Balls roller bearing steel.
Diverters plastic.

Version:
Bright.

Sample order:
nlm 21400-15106601

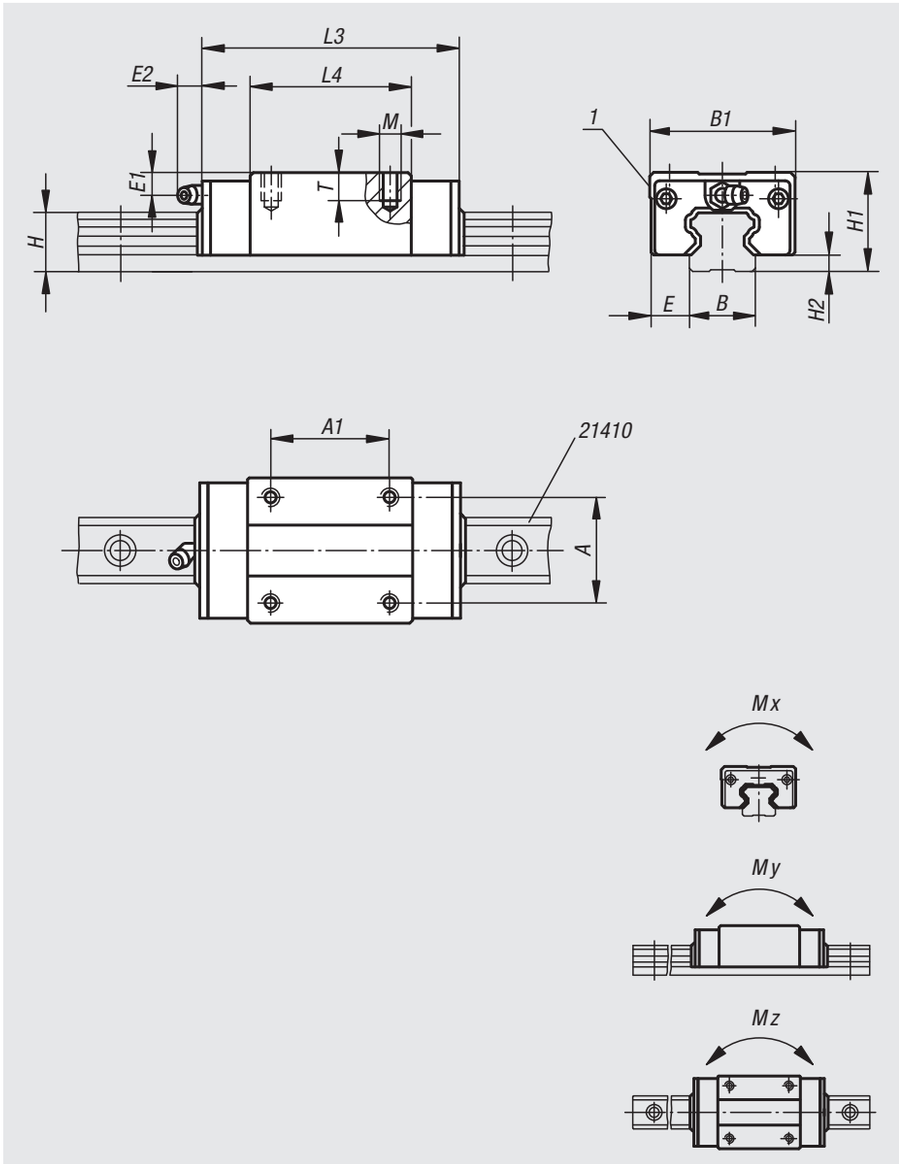
Note:
Standard guide carriage with recirculating ball guidance precision N not preloaded (Z0). With double-sided end seal. 4-row versions with round arch profile. The profile guide rail tracks are arranged at 45° and can accept loads from all directions.

High dynamic values: v = 5 m/s.

Applicable temperature in continuous use max. 80 °C.

On request:
Various precision and preload classes.

Drawing reference:
1) ground ref. edge

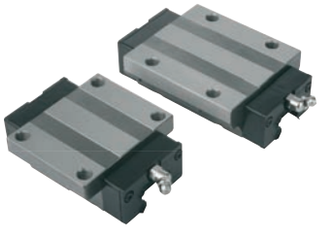


Order No.	Version	Size	Mx Nm	My Nm	Mz Nm	Dynamic load rating N	Static load rating N	Lubrication hole
21400-15106601	standard	15	70	50	50	6850	12700	Ø3
21400-20107801	standard	20	220	180	180	14500	25600	M6x1
21400-25108801	standard	25	360	320	310	21400	40000	M6x1
21400-30110901	standard	30	600	500	490	29800	54900	M6x1
21400-25211001	long	25	504	448	434	29960	56000	M6x1
21400-30213101	long	30	785	650	650	39000	71900	M6x1

Order No.	Version	Size	A	A1	B	B1	E	E1	E2	H	H1	H2	L3	L4	M	T
21400-15106601	standard	15	26	26	15	34	9,5	8,3	5	14	28	4,6	66	40	M4	6,4
21400-20107801	standard	20	32	36	20	44	12	7	13,5	18	30	5	77,8	48,8	M5	8
21400-25108801	standard	25	35	35	23	48	12,5	11	13,5	22	40	7	88	57	M6	9,6
21400-30110901	standard	30	40	40	28	60	16	10	13	26	45	9	109	72	M8	12,8
21400-25211001	long	25	35	50	23	48	12,5	11	13,5	22	40	7	110,1	79,1	M6	9,6
21400-30213101	long	30	40	60	28	60	16	10	13	26	45	9	131,3	94,3	M8	12,8

Carriages

with flange



Material:
Body carbon steel.
Balls roller bearing steel.
Diverters plastic.

Version:
Bright.

Sample order:
nlm 21402-15106601

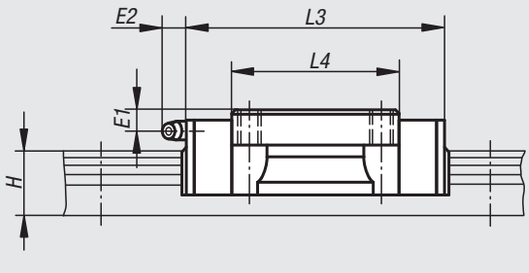
Note:
Guide carriage with flange with recirculating ball guidance precision N not preloaded (Z0). With double-sided end seal. 4-row versions with round arch profile. The profile guide rail tracks are arranged at 45° and can accept loads from all directions.

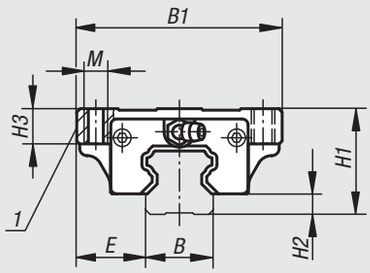
High dynamic values: v = 5 m/s.

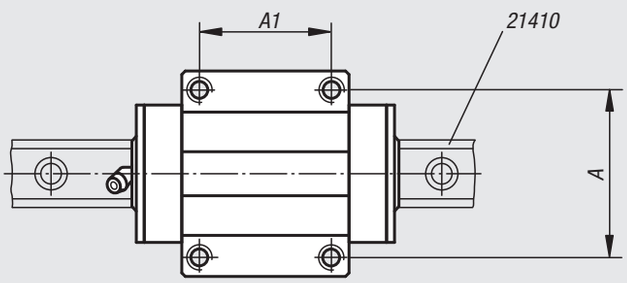
Applicable temperature in continuous use max. 80 °C.

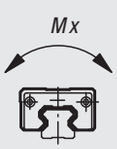
On request:
Various precision and preload classes.

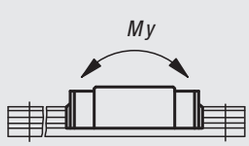
Drawing reference:
1) ground ref. edge

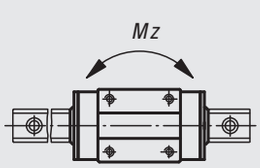










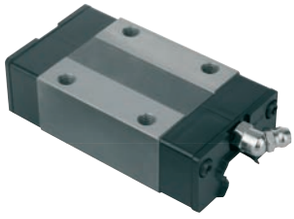


Order No.	Version	Size	Mx Nm	My Nm	Mz Nm	Dynamic load rating N	Static load rating N	Lubrication hole
21402-15106601	standard	15	70	50	50	6850	12700	Ø3
21402-20107801	standard	20	220	180	180	14500	25600	M6x1
21402-25108801	standard	25	360	320	310	21400	40000	M6x1
21402-30110901	standard	30	600	500	490	29800	54900	M6x1
21402-25211001	long	25	504	448	434	29960	56000	M6x1
21402-30213101	long	30	785	650	650	39000	71900	M6x1

Order No.	Version	Size	A	A1	B	B1	E	E1	E2	H	H1	H2	H3	L3	L4	M
21402-15106601	standard	15	38	30	15	47	16	4,3	5	14	24	4,6	8	66	40	M5
21402-20107801	standard	20	53	40	20	63	21,5	5	13,5	18	30	5	9	77,8	48,8	M6
21402-25108801	standard	25	57	45	23	70	23,5	5	13,5	22	36	7	12	88	57	M8
21402-30110901	standard	30	72	52	28	90	31	7	13	26	42	9	12	109	72	M10
21402-25211001	long	25	57	45	23	70	23,5	5	13,5	22	36	7	12	110,1	79,1	M8
21402-30213101	long	30	72	52	28	90	31	7	13	26	42	9	12	131,3	94,3	M10

Carriages

compact



Material:
Body carbon steel.
Balls roller bearing steel.
Diverters plastic.

Version:
Bright.

Sample order:
nlm 21404-15106601

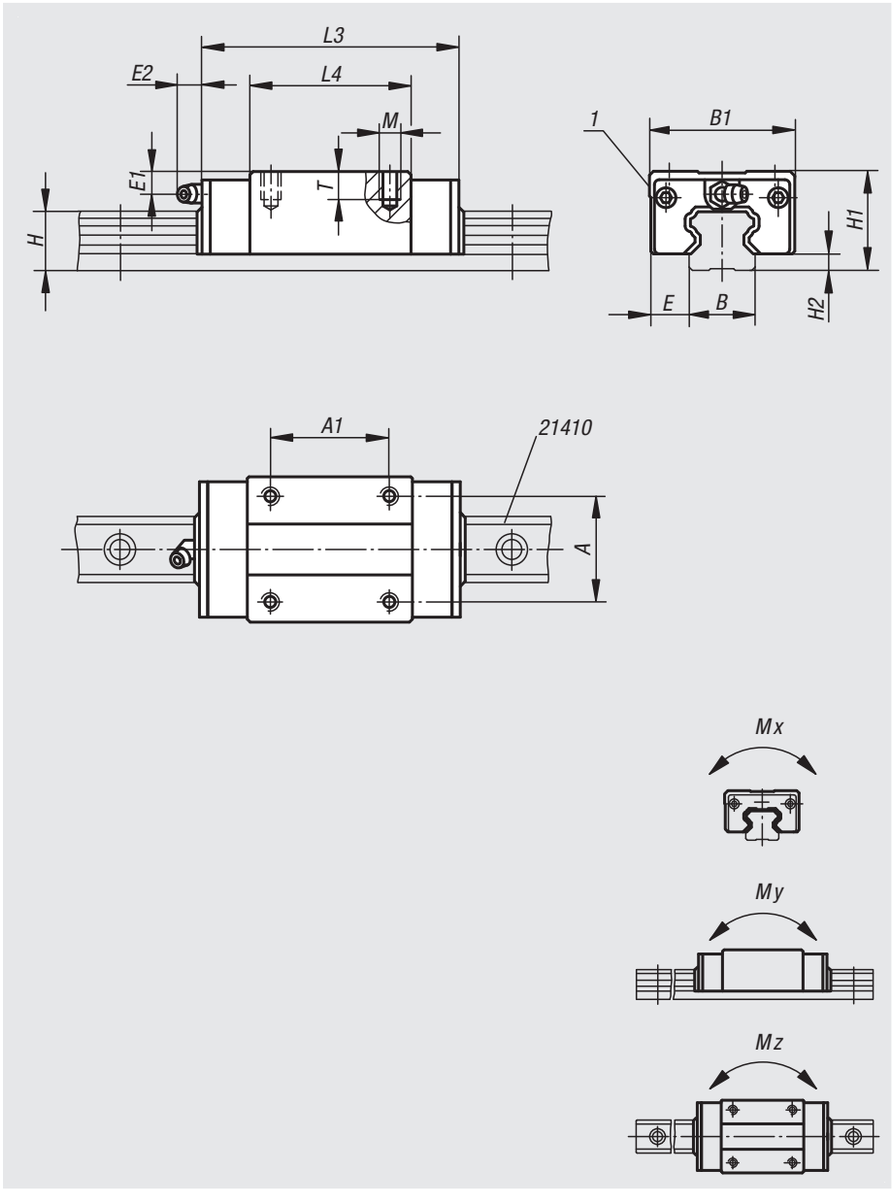
Note:
Compact guide carriage with recirculating ball guidance precision N not preloaded (Z0). With double-sided end seal. 4-row versions with round arch profile. The profile guide rail tracks are arranged at 45° and can accept loads from all directions.

High dynamic values: v = 5 m/s.

Applicable temperature in continuous use max. 80 °C.

On request:
Various precision and preload classes.

Drawing reference:
1) ground ref. edge



Order No.	Size	Mx Nm	My Nm	Mz Nm	Dynamic load rating N	Static load rating N	Lubrication hole
21404-15106601	15	70	50	50	6850	12700	Ø3
21404-20107801	20	220	180	180	14500	25600	M6x1
21404-25108801	25	360	320	310	21400	40000	M6x1
21404-30110901	30	600	500	490	29800	54900	M6x1

Order No.	Size	A	A1	B	B1	E	E1	E2	H	H1	H2	L3	L4	M	T
21404-15106601	15	26	26	15	34	9,5	4,3	5	14	24	4,6	66	40	M4	5,6
21404-20107801	20	32	32	20	42	11	5	13,5	18	28	5	77,8	48,8	M5	7
21404-25108801	25	35	35	23	48	12,5	4,8	13,5	22	33	7	88	57	M6	8,4
21404-30110901	30	40	40	28	60	16	7	13	26	42	9	109	72	M8	11,2

Carriages

compact, short



Material:
Body carbon steel.
Balls roller bearing steel.
Diverters plastic.

Version:
Bright.

Sample order:
nlm 21406-15004801

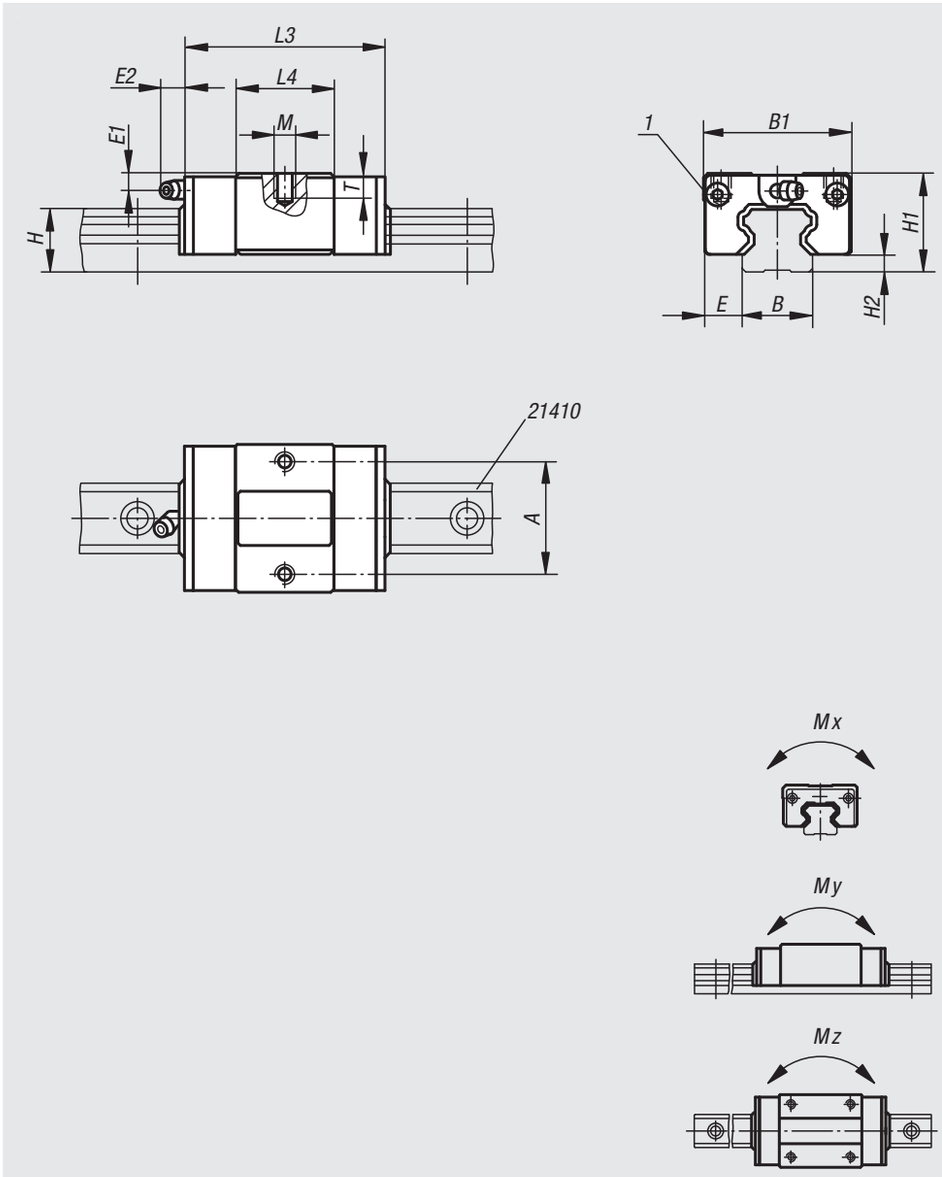
Note:
Compact guide carriage with recirculating ball guide precision N not preloaded (Z0). With double-sided end seal. 4-row versions with round arch profile. The profile guide rail tracks are arranged at 45° and can accept loads from all directions.

High dynamic values: v = 5 m/s.

Applicable temperature in continuous use max. 80 °C.

On request:
Various precision and preload classes.

Drawing reference:
1) ground ref. edge



Order No.	Size	Mx Nm	My Nm	Mz Nm	Dynamic load rating N	Static load rating N	Lubrication hole
21406-15004801	15	40	28	28	3900	7250	Ø3
21406-20005801	20	126	103	103	8300	14700	M6x1
21406-25006301	25	200	175	172	11900	22300	M6x1
21406-30007601	30	320	270	270	15950	29400	M6x1

Order No.	Size	A	B	B1	E	E1	E2	H	H1	H2	L3	L4	M	T
21406-15004801	15	26	15	34	9,5	4,3	5	14	24	4,6	47,6	21,6	M4	5,6
21406-20005801	20	32	20	42	11	5	13,5	18	28	5	58	28	M5	7
21406-25006301	25	35	23	48	12,5	4,8	13,5	22	33	7	62,5	31,5	M6	8,4
21406-30007601	30	40	28	60	16	7	13	26	42	9	75,6	38,6	M8	11,2

Profile guide rails



Material:
Steel.

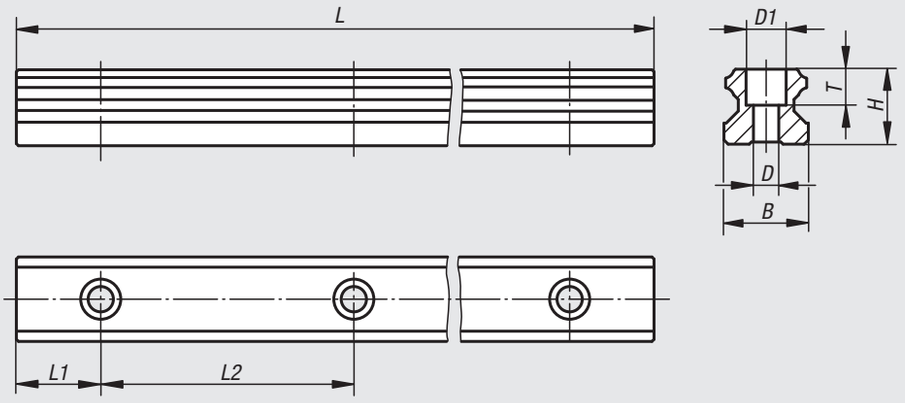
Version:
Tracks inductively hardened and ground.

Sample order:
nlm 21410-1520X0520

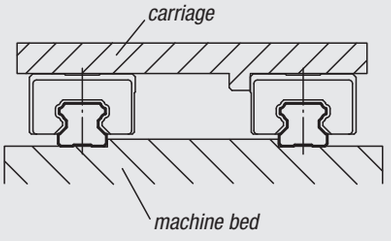
Note:
Profile guide rails can be screwed on from above. The profile guide rails are available in four sizes and one or more carriages can be assembled on them. 4-row versions with round arch profile. The tracks of the profile guide rails are set below an angle of 45° and thus can carry loads from all directions.

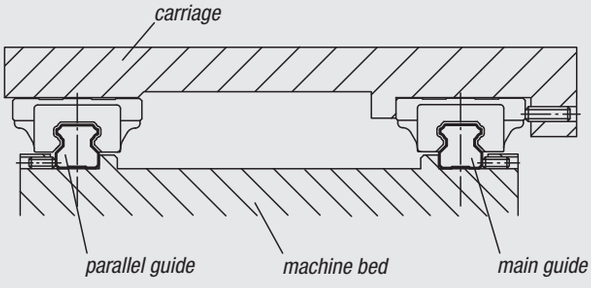
The profile guide rails correspond to the market standard and can replace linear guides of the same design by other manufacturers.

On request:
Lengths up to a max. 3960 mm.



Enables the arrangement of profile guide rails with carriages to form a guide system.





Order No.	Size	B	D	D1	H	L	L1	L2	T
21410-1520X0520	15	15	4,5	7,5	14	520	20	60	5,3
21410-2020X0520	20	20	6	9,5	18	520	20	60	8,5
21410-2520X0520	25	23	7	11	22	520	20	60	9
21410-3020X0520	30	28	9	14	26	520	20	80	12

Miniature carriages

stainless steel



Material:
Body and balls 1.4034 stainless steel.
Diverter plastic.

Version:
Bright.

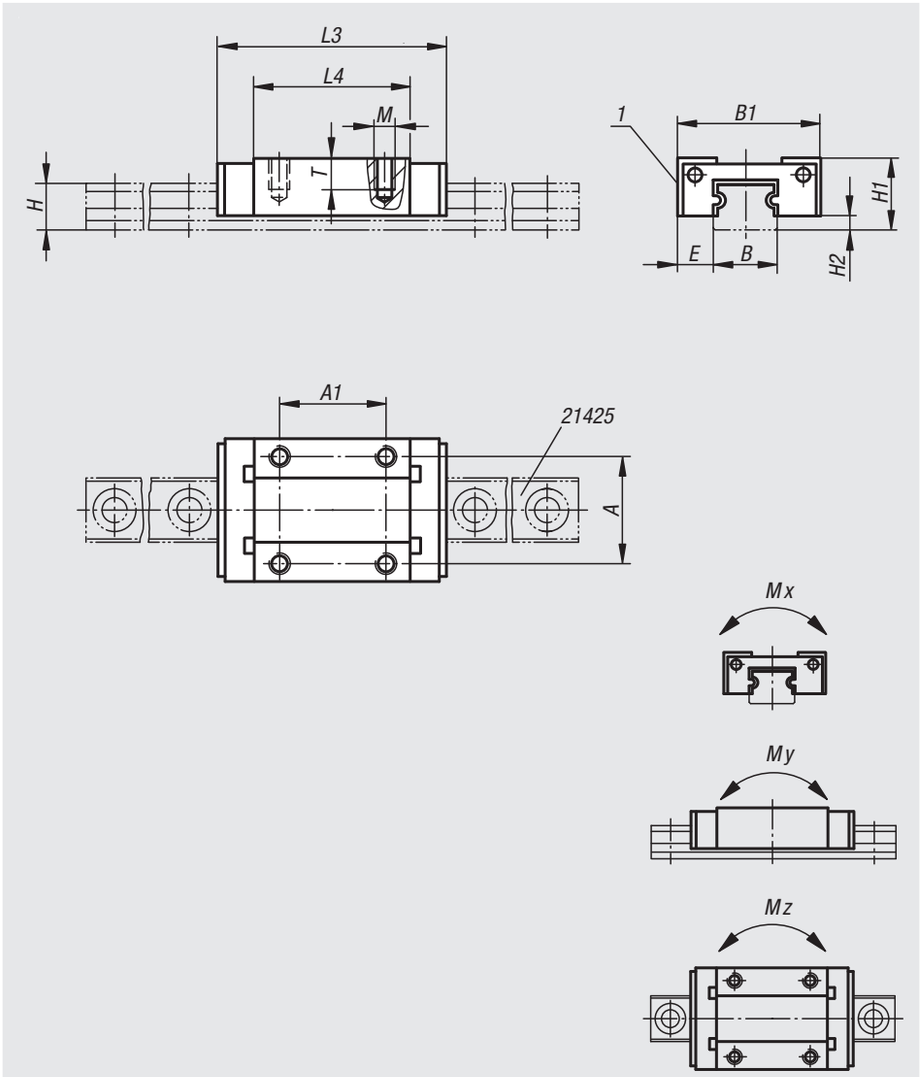
Sample order:
nlm 21420-07102301

Note:
Standard miniature guide carriage with recirculating ball guide precision N not preloaded (Z0). With double-sided end seal.
4-point ball recirculating ball system with equal load angles and 2 recirculating ball guides per carriage allowing loads to be accepted uniformly from all sides.

Max. acceleration: 80 m/s².
Maximum traverse speed 3 m/s.
Application temperature -20 °C to +80 °C.

Attention:
Always use the mounting rail supplied, otherwise the ball retainment in the carriage is not guaranteed.

Drawing reference:
1) ground ref. edge

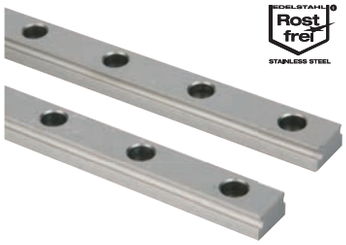


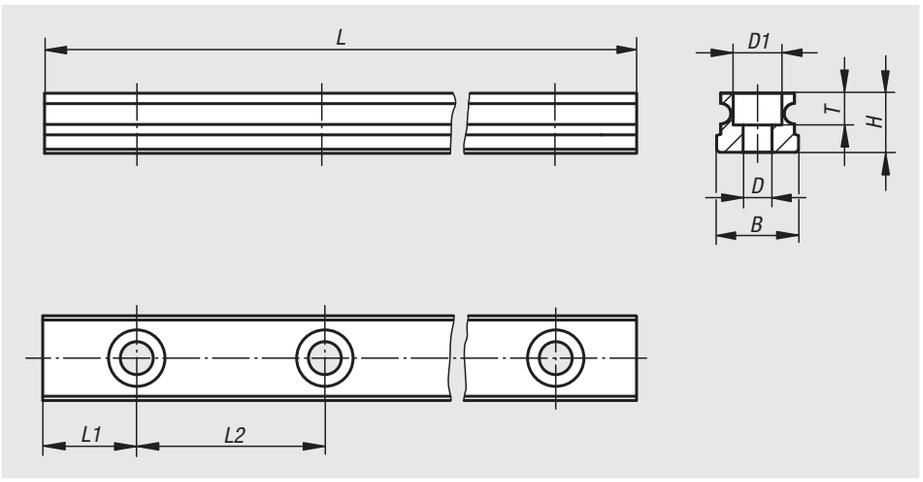
Order No.	Version	Size	Mx Nm	My Nm	Mz Nm	Dynamic load rating N	Static load rating N
21420-07102301	standard	7	5,1	2,55	2,55	880	1370
21420-09103101	standard	9	10,4	5,1	5,1	1470	2250
21420-12103501	standard	12	14,7	8,04	8,72	2665	4020
21420-15104301	standard	15	30,2	16,5	17,9	4410	6570

Order No.	Version	Size	A	A1	B	B1	E	H	H1	H2	L3	L4	M	T
21420-07102301	standard	7	12	8	7	17	5	4,7	8	1,5	23,5	13,5	M2	2,5
21420-09103101	standard	9	15	10	9	20	5,5	5,5	10	2,2	31	20	M3	3
21420-12103501	standard	12	20	15	12	27	7,5	7,5	13	3	35	20,8	M3	3,5
21420-15104301	standard	15	25	20	15	32	8,5	9,5	16	4	43	25,7	M3	4

Miniature profile guide rails

stainless steel





Material:
Stainless steel 1.4034.

Version:
Bright.
Hardened 52 HRC.

Sample order:
nlm 21425-0705X0240

Note:
Profile guide rails can be screwed on from above. The profile rails, on which one or more carriages can be mounted, are available in four miniature sizes.
4-point ball bearing system with identical load angles and 2 ball bearings per carriage. Thus loads can be uniformly absorbed from all sides.

Max. acceleration: 80 m/s^2.
Maximum traversing speed 3 m/s.
Application temperature -20 °C to +80 °C.

Combination of the rails is possible.

Order No.	Size	D	D1	H	L max.	L1	L2	B	T
21425-0705X0240	7	2,4	4,2	4,7	240	7,5	15	7	2,3
21425-0907X0495	9	3,5	6	5,5	495	7,5	20	9	3,3
21425-1210X0570	12	3,5	6	7,5	570	10	25	12	4,5
21425-1515X0790	15	3,5	6	9,5	790	15	40	15	4,5

Linear plain bearings

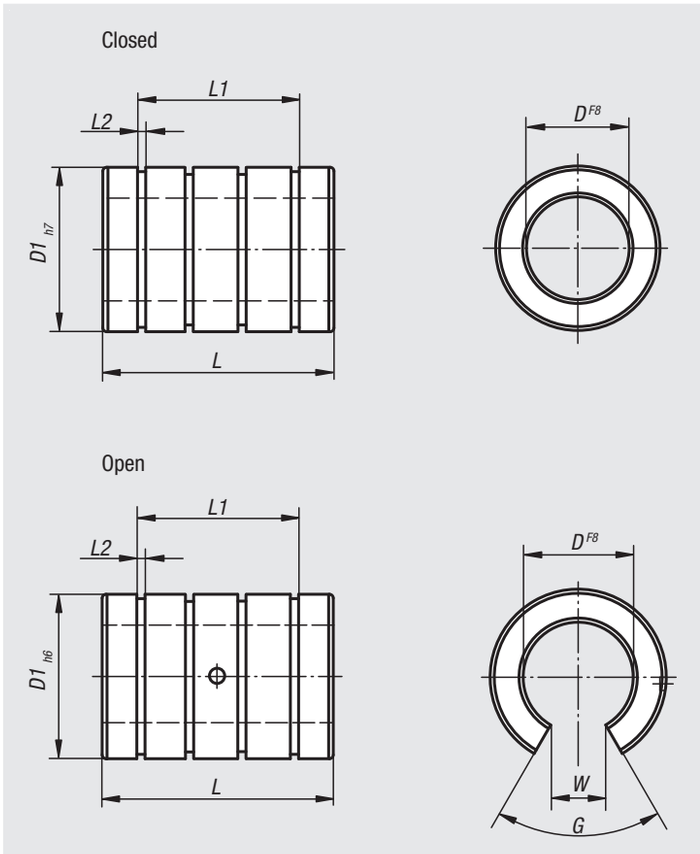


Material:
Housing anodised aluminium.
Bearing surface Frelon (Teflon plus proprietary fillers).

Version:
Linear plain bearing with Frelon coating.

Sample order:
nlm 21495-01-120

Note:
Virtually chemically inert.
Self-lubricating (no additional lubrication required).
High temperature range (-240 °C to +260 °C).
Dampens vibrations.
High static load capacity - projected surface area x P (P = 1034 N/cm^2)
Suitable for food, pharmaceutical, medical and chemical applications.
Insensitive to dirt.



Order No. closed	Order No. open	D	D1	G	L	L1	L2	W
21495-01-050	**-**	5	12	-	22	14,28	1,14	-
21495-01-080	**21495-01-081**	8	16	-/60°	25	16,28	1,14	-/5,1
21495-01-100	**21495-01-101**	10	19	-/60°	29	22,04	1,32	-/6,4
21495-01-120	**21495-01-121**	12	22	-/78°	32	22,64	1,32	-/7,6
21495-01-160	**21495-01-161**	16	26	-/78°	36	24,64	1,32	-/10,4
21495-01-200	**21495-01-201**	20	32	-/60°	45	31,26	1,63	-/10,8
21495-01-250	**21495-01-251**	25	40	-/60°	58	43,8	1,9	-/13,2
21495-01-300	**21495-01-301**	30	47	-/72°	68	51,8	1,9	-/14,2

Linear ball bearings

with plastic cage



Material:
Outer jacket ball bearing steel.
Cage plastic.
Balls steel.

Sample order:
nlm 21500-1202

Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-sided seal. The linear ball bearings have a plastic cage which results in quiet and outstanding running properties. We recommend using linear ball bearing with steel cages for application temperatures over +80 °C. The bearings are secured by DIN 471/472 circlips.

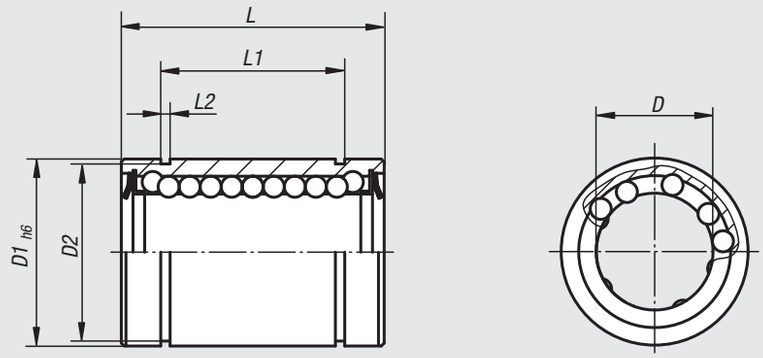
Recommended tolerances:
Shaft: h6
Housing: H7

Linear ball bearings with double-sided seal should be greased before installation.

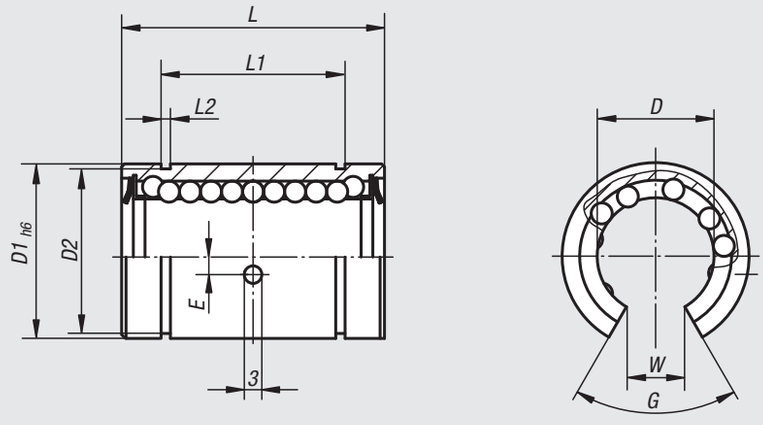
The specified load ratings apply with the use of hardened and ground shafts.

Temperature range:
-20 °C to +80 °C.

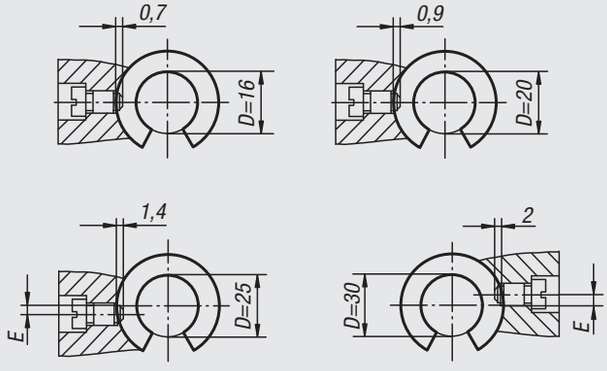
Closed



Open



Position of radial and axial fastener



Order No. closed	Order No. open	D	D1	D2	E	G	L	L1	L2	W	Dynamic load rating N	Static load rating N
21500-1202	**-**	12	22	21	-	-	32 -0,2	22,9 -0,2	1,3	-	520	800
21500-1602	**21500-1612**	16	26	24,9	-/0	-/78°	36 -0,2	24,9 -0,2	1,3	-/10	590	910
21500-2002	**21500-2012**	20	32	30,3	-/0	-/60°	45 -0,2	31,5 -0,2	1,6	-/10	880	1400
21500-2502	**21500-2512**	25	40	37,5	-/1,5	-/60°	58 -0,3	44,1 -0,3	1,85	-/12,5	1000	1600
21500-3002	**21500-3012**	30	47	44,5	-/2	-/50°	68 -0,3	52,1 -0,3	1,85	-/12,5	1600	2800

Linear ball bearings

with steel cage



Material:
Outer jacket ball bearing steel.
Cage steel.
Balls steel.

Sample order:
nlm 21505-1202

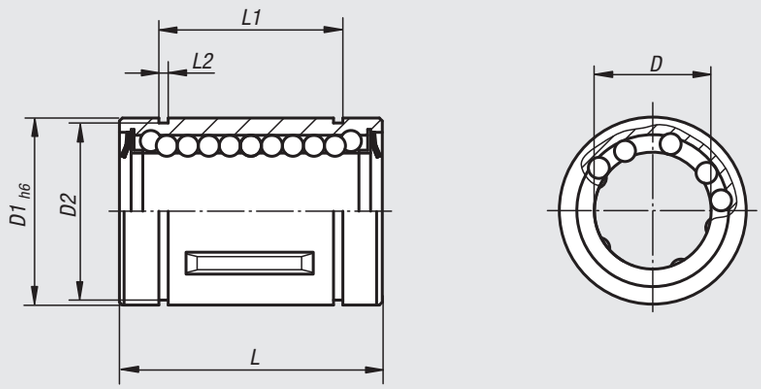
Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-sided seals and a steel cage. The bearing is secured with DIN 471/472 circlips.

Recommended tolerances:
Shaft: h6
Housing: H7

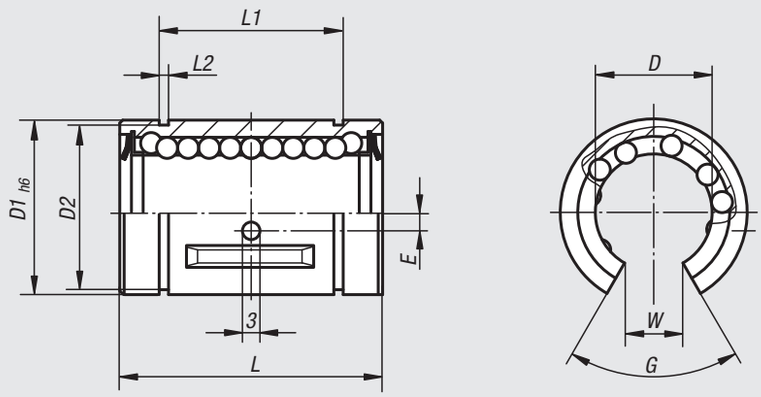
Linear ball bearings with double-sided seals should be greased before installation.

The specified load ratings apply with the use of hardened and ground shafts.

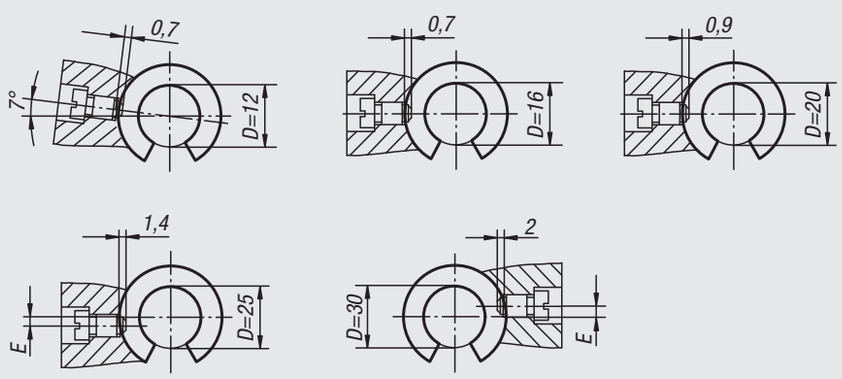
Closed



Open



Position of radial and axial fastener



Order No. closed	Order No. open	D	D1	D2	E	G	L	L1	L2	W	Dynamic load rating N	Static load rating N
21505-1202	**21505-1212**	12	22	21	-/1,35	-/78°	32 -0,2	22,9 -0,2	1,3	-/7,5	420	714
21505-1602	**21505-1612**	16	26	24,9	-/0	-/78°	36 -0,2	24,9 -0,2	1,3	-/10	686	1092
21505-2002	**21505-2012**	20	32	30,3	-/0	-/60°	45 -0,2	31,5 -0,2	1,6	-/10	924	1610
21505-2502	**21505-2512**	25	40	37,5	-/1,5	-/60°	58 -0,3	44,1 -0,3	1,85	-/12,5	1470	2590
21505-3002	**21505-3012**	30	47	44,5	-/2	-/50°	68 -0,3	52,1 -0,3	1,85	-/12,5	2100	3920

Linear ball bearings stainless steel



Material:
Outer jacket stainless steel.
Cage stainless steel.
Balls stainless steel.

Sample order:
nlm 21505-01-1202

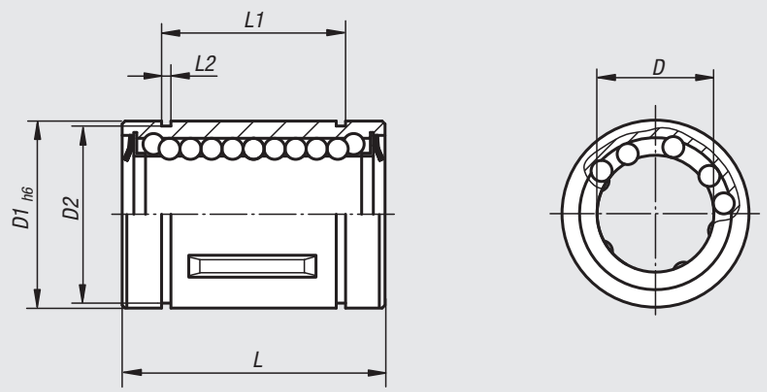
Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-sided seals and a stainless steel cage. The bearing is secured with DIN 471/472 circlips.

Recommended tolerances:
Shaft: h6
Housing: H7

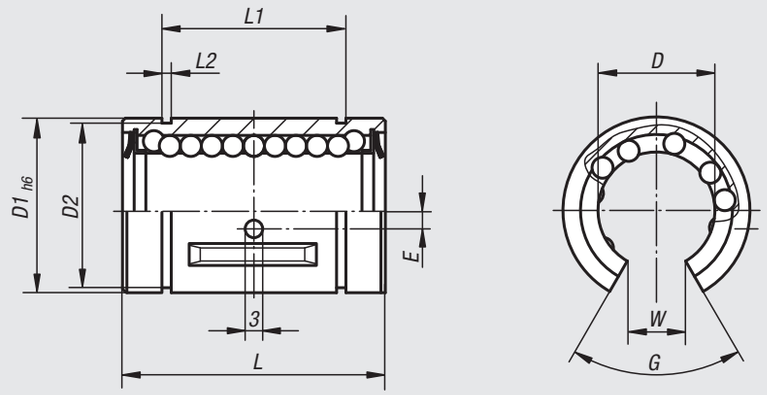
Linear ball bearings with double-sided seals should be greased before installation.

The specified load ratings apply with the use of hardened and ground shafts.

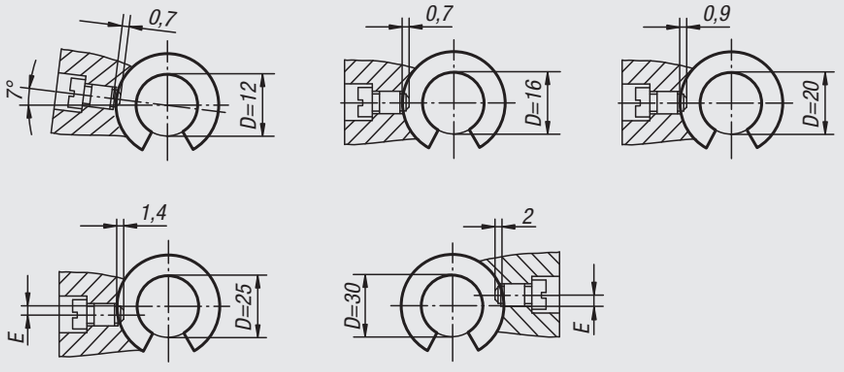
Closed



Open



Position of radial and axial fastener



Order No. closed	Order No. open	D	D1	D2	G	E	L	L1	L2	W	Dynamic load rating N	Static load rating N
21505-01-1202	**21505-01-1212**	12	22	21	-/78°	-/1,35	32 -0,2	22,9 -0,2	1,3	-/7,5	420	714
21505-01-1602	**21505-01-1612**	16	26	24,9	-/78°	-/0	36 -0,2	24,9 -0,2	1,3	-/10	686	1092
21505-01-2002	**21505-01-2012**	20	32	30,3	-/60°	-/0	45 -0,2	31,5 -0,2	1,6	-/10	924	1610
21505-01-2502	**21505-01-2512**	25	40	37,5	-/60°	-/1,5	58 -0,3	44,1 -0,3	1,85	-/12,5	1470	2590
21505-01-3002	**21505-01-3012**	30	47	44,5	-/50°	-/2	68 -0,3	52,1 -0,3	1,85	-/12,5	2100	3920

Linear ball bearings

self-aligning



Material:
Housing plastic
Raceways ball bearing steel.
Balls steel.

Sample order:
nlm 21510-1202

Note:
The linear ball bearings correspond to the self-aligning series 3 of ISO 10285. With double-sided seal. These bearings consist of high precision injection moulded plastic housings in which ball bearing steel raceway segments are clipped in. The plastic housing serves simultaneously for recycling and as seal retainer. The seal consists of a special polyamide material with a low coefficient of friction. The bearing is secured with DIN 471/472 circlips.

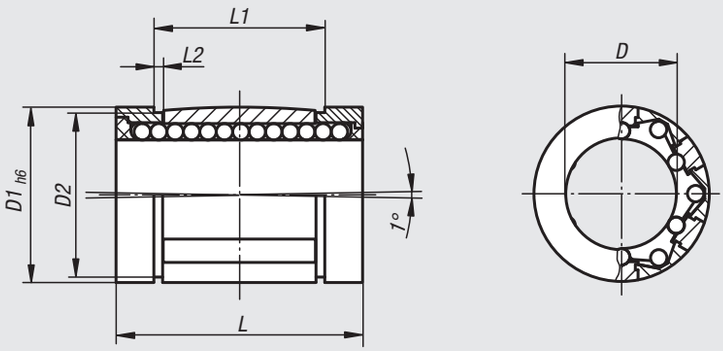
Recommended tolerances:
Shaft: h6
Housing: H7

Linear ball bearings with double-sided seal should be greased before installation.

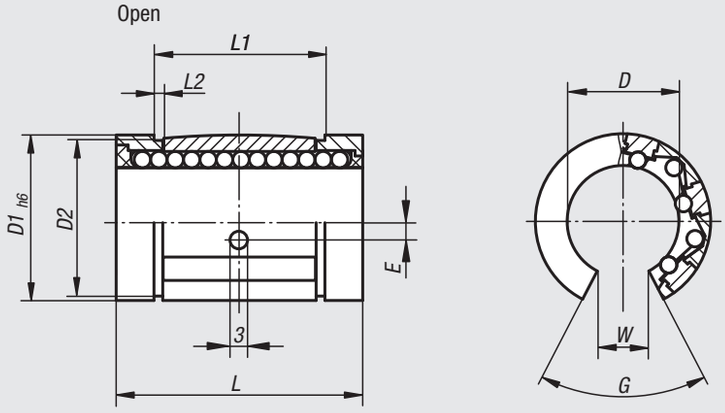
The specified load ratings apply with the use of hardened and ground shafts.

Temperature range:
-20 °C to +80 °C.

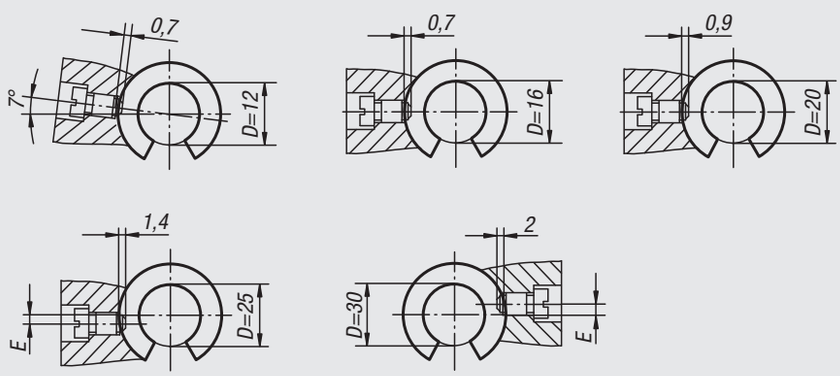
Closed



Open



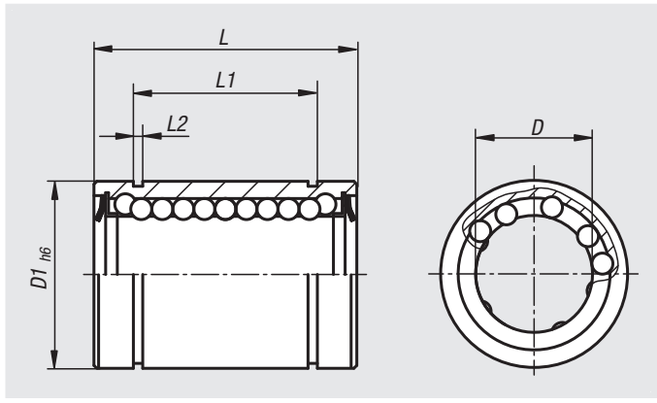
Position of radial and axial fixation



Order No. closed	Order No. open	D	D1	D2	E	G	L	L1	L2	W	Dynamic load rating N	Static load rating N
21510-1202	**21510-1212**	12	22	21	-/1,35	-/66°	32 -0,2	22,6 -0,2	1,3	-/7	830	910
21510-1602	**21510-1612**	16	26	24,9	-/0	-/68°	36 -0,2	24,6 -0,2	1,3	-/9,8	1020	1120
21510-2002	**21510-2012**	20	32	30,3	-/0	-/55°	45 -0,2	31,2 -0,2	1,6	-/10,5	2020	2220
21510-2502	**21510-2512**	25	40	37,5	-/1,5	-/57°	58 -0,3	43,7 -0,3	1,85	-/13	3950	4350
21510-3002	**21510-3012**	30	47	44,5	-/2	-/57°	68 -0,3	51,7 -0,3	1,85	-/15,3	4800	5280

Miniature linear ball bearing





Material:
Housing, plastic.
Raceway, stainless steel 1.4034.
Balls, stainless steel 1.4125.

Sample order:
nlm 21511-040802

Note:
Precision linear ball bearings with low friction.
From size 21511-122202, the bearings are fitted with wipers on both sides.

Recommended tolerances:
Shaft: h6
Housing: H6

The specified load ratings apply for hardened and ground shafts.

Temperature range:
-40 °C to +60 °C.

Order No.	D	D1	L	L1	L2	Dynamic load rating N	Static load rating N
21511-030702	3	7	10	-	-	26	27
21511-040802	4	8	12	-	-	44	50
21511-051002	5	10	15	-	-	72	84
21511-061202	6	12	19	-	-	114	132
21511-081502	8	15	24	23	1,1	167	204
21511-101702	10	17	26	25	1,1	186	234
21511-121902	12	19	28	26,4	1,3	202	257
21511-122202	12	22	32	22,6	1,3	310	352
21511-162602	16	26	36	24,6	1,3	372	440
21511-203202	20	32	45	31,2	1,6	591	689
21511-254002	25	40	58	43,7	1,85	1162	1332

Linear ball bearings

self-aligning, high load rating



Material:
Housing plastic
Raceways ball bearing steel.
Balls steel.

Sample order:
nlm 21515-1602

Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-lip seal both ends. In comparison to standard linear ball bearings, these bearing have twice the load rating or eight times longer working life. The self-aligning function means that housing bore misalignments or bent shafts can be compensated for, the load distribution optimised and uniform load on all balls over the entire bearing length assured. The bearing is secured with DIN 471/472 circlips.

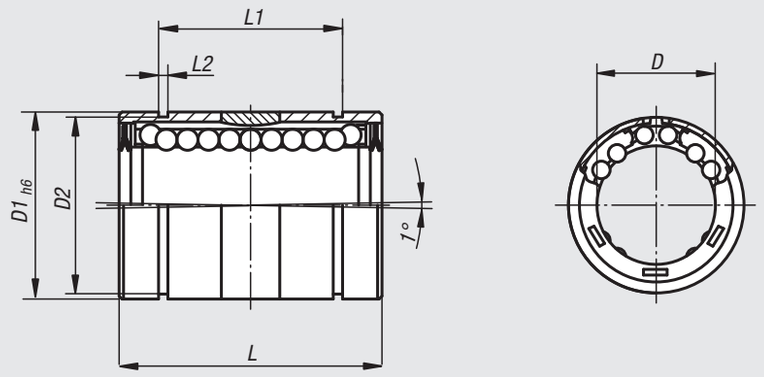
Recommended tolerances:
Shaft: h6
Housing: H7

Linear ball bearings with double-sided seal should be greased before installation.

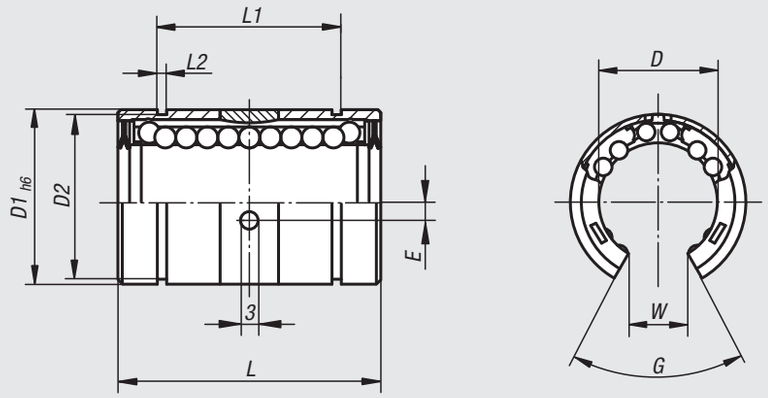
The specified load ratings apply with the use of hardened and ground shafts.

Temperature range:
-20 °C to +80 °C.

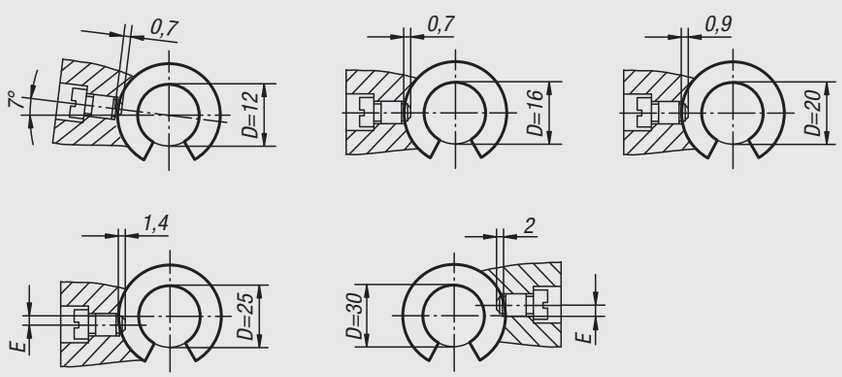
Closed



Open



Position of radial and axial fastener

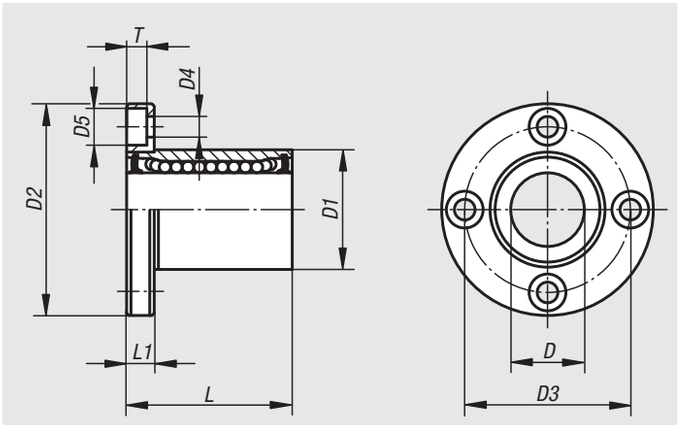


Order No. closed	Order No. open	D	D1	D2	E	G	L	L1	L2	W	Dynamic load rating N	Static load rating N
21515-1602	**21515-1612**	16	26	24,9	-/0	-/70°	36 -0,2	24,6 -0,2	1,3	-/9,4	2200	2400
21515-2002	**21515-2012**	20	32	30,3	-/0	-/60°	45 -0,2	31,2 -0,2	1,6	-/10,2	4000	4400
21515-2502	**21515-2512**	25	40	37,5	-/1,5	-/60°	58 -0,3	43,7 -0,3	1,85	-/14,4	6700	7300
21515-3002	**21515-3012**	30	47	44,5	-/2	-/55°	68 -0,3	51,7 -0,3	1,85	-/13,9	8300	9100

Linear ball bearings

with flange





Material:
Housing steel.
Cage plastic.
Balls steel.

Sample order:
nlm 21518-1202

Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-sided seal. The linear ball bearings have a plastic cage which results in quiet and outstanding running properties. With flange for direct mounting on the housing.

Recommended tolerances:
Shaft: h6
Housing: H7

Linear ball bearings with double-sided seal should be greased before installation.

The specified load ratings apply with the use of hardened and ground shafts.

Temperature range:
-20 °C to +80 °C.

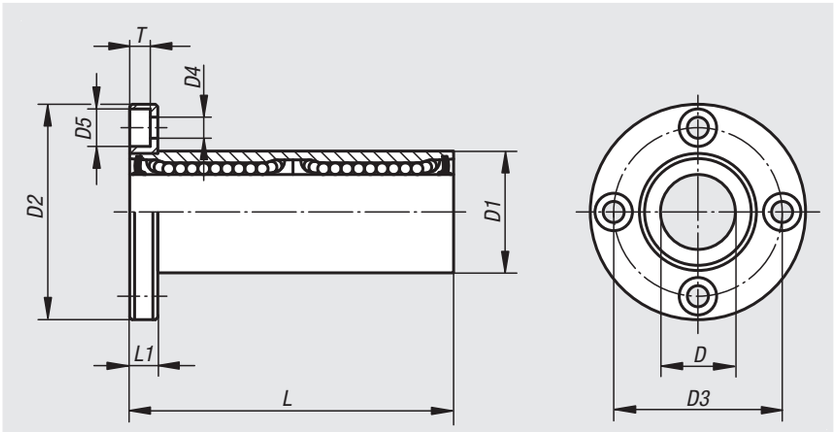
Accessories:
Precision guide shafts 21595.
Fastening screws 07160.

Order No.	D	D1	D2	D3	D4	D5	L	L1	T	Dynamic load rating N	Static load rating N
21518-0802	8	16	32	24	3,4	6	25	5	3,1	265	402
21518-1202	12	22	42	32	4,5	7,5	32	6	4,1	520	790
21518-1602	16	26	46	36	4,5	7,5	36	6	4,1	590	910
21518-2002	20	32	54	43	5,5	9	45	8	5,1	880	1400
21518-2502	25	40	62	51	5,5	9	58	8	5,1	1000	1600
21518-3002	30	47	76	62	6,6	11	68	10	6,1	1600	2800

Linear ball bearings

with flange, double bearing





Material:
Housing steel.
Cage plastic.
Balls steel.

Sample order:
nlm 21520-1202

Note:
The linear ball bearings correspond to series 3 of ISO 10285. With double-sided seal. The linear ball bearings have a plastic cage which results in quiet and outstanding running properties. With flange for direct mounting on the housing. Double bearing version for use under torque loads.

Recommended tolerances:
Shaft: h6
Housing: H7

Linear ball bearings with double-sided seal should be greased before installation.

The specified load ratings apply with the use of hardened and ground shafts.

Temperature range:
-20 °C to +80 °C.

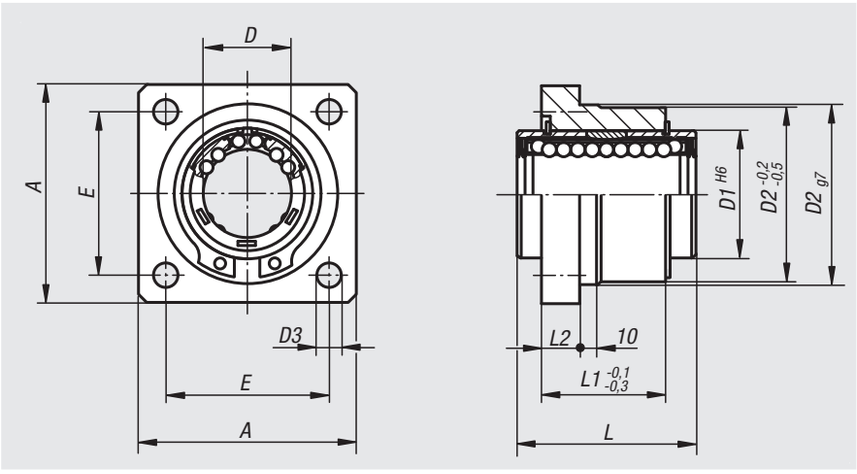
Accessories:
Precision guide shafts 21595.
Fastening screws 07160.

Order No.	D	D1	D2	D3	D4	D5	L	L1	T	Dynamic load rating N	Static load rating N
21520-0802	8	16	32	24	3,4	6	46	5	3,1	421	804
21520-1202	12	22	42	32	4,5	7,5	61	6	4,1	657	1200
21520-1602	16	26	46	36	4,5	7,5	68	6	4,1	1230	2350
21520-2002	20	32	54	43	5,5	9	80	8	5,1	1400	2750
21520-2502	25	40	62	51	5,5	9	112	8	5,1	1560	3140
21520-3002	30	47	76	62	6,6	11	123	10	6,1	2490	5490

Linear housing units

with flange





Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21522-121002

Note:
Ready to install linear housing units consisting of an extruded aluminium housing with a self-aligning linear ball bearing 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearings specifications.

On request:
Linear housing units can be equipped with any of our linear ball bearings.

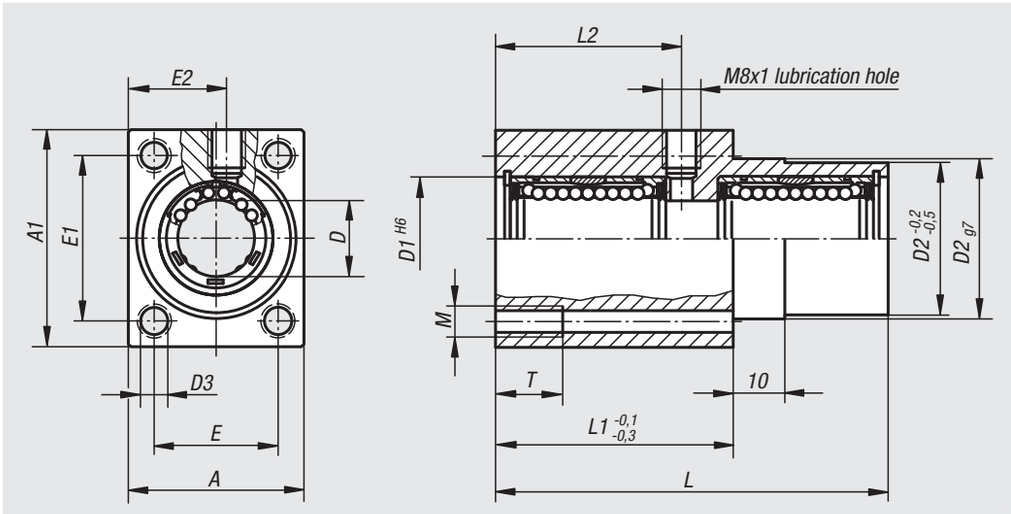
Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

Order No.	A	D	D1	D2	D3	E	L	L1	L2
21522-121002	40	12	22	32	5,5	30	32	22	6
21522-161002	50	16	26	38	5,5	35	36	24	8
21522-201002	60	20	32	46	6,6	42	45	30	10
21522-251002	70	25	40	58	6,6	54	58	42	12
21522-301002	80	30	47	66	9	60	68	50	14

Linear housing units

with flange, tandem





Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21524-121002

Note:
Ready to install linear housing units consisting of an extruded aluminium housing with two self-aligning linear ball bearings 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications (x2).

On request:
Linear housing units can be equipped with any of our linear ball bearings.

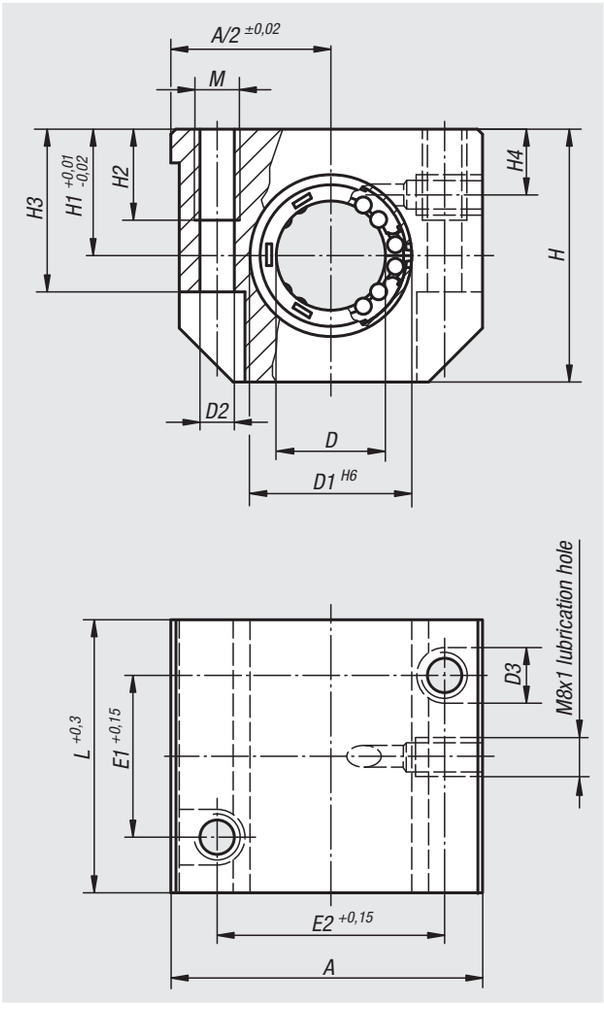
Accessories:
End seals 21560.
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

Order No.	A	A1	D	D1	D2	D3	E	E1	E2	L	L1	L2	M	T
21524-121002	34	42	12	22	30	5,3	24	32	19	76	46	36	M6	13
21524-161002	40	50	16	26	35	6,6	28	38	22	84	50	40	M8	18
21524-201002	50	60	20	32	42	8,4	35	45	27	104	60	50	M10	22
21524-251002	60	74	25	40	52	10,5	42	56	32	130	73	63	M12	26
21524-301002	70	84	30	47	61	13,5	50	64	37	152	82	74	M16	34

Linear housing units

single, closed





Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21530-121002

Note:
Ready to install linear housing units consisting of an extruded aluminium housing with a self-aligning linear ball bearing 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications.

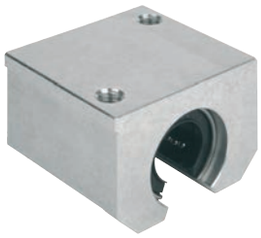
On request:
Linear housing units can be equipped with any of our linear ball bearings.

Accessories:
End seals 21560.
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

Order No.	A	D	D1	D2	D3	E1	E2	H	H1	H2	H3	H4	L	M
21530-121002	43	12	22	4,2	8	23	32	35	18	13	25	10	39	M5
21530-161002	53	16	26	5,2	10	26	40	42	22	13	30	12	43	M6
21530-201002	60	20	32	6,8	11	32	45	50	25	18	34	13	54	M8
21530-251002	78	25	40	8,6	15	40	60	60	30	22	40	15	67	M10
21530-301002	87	30	47	8,6	15	45	68	70	35	22	48	16	79	M10

Linear housing units

single, open



Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21535-121012

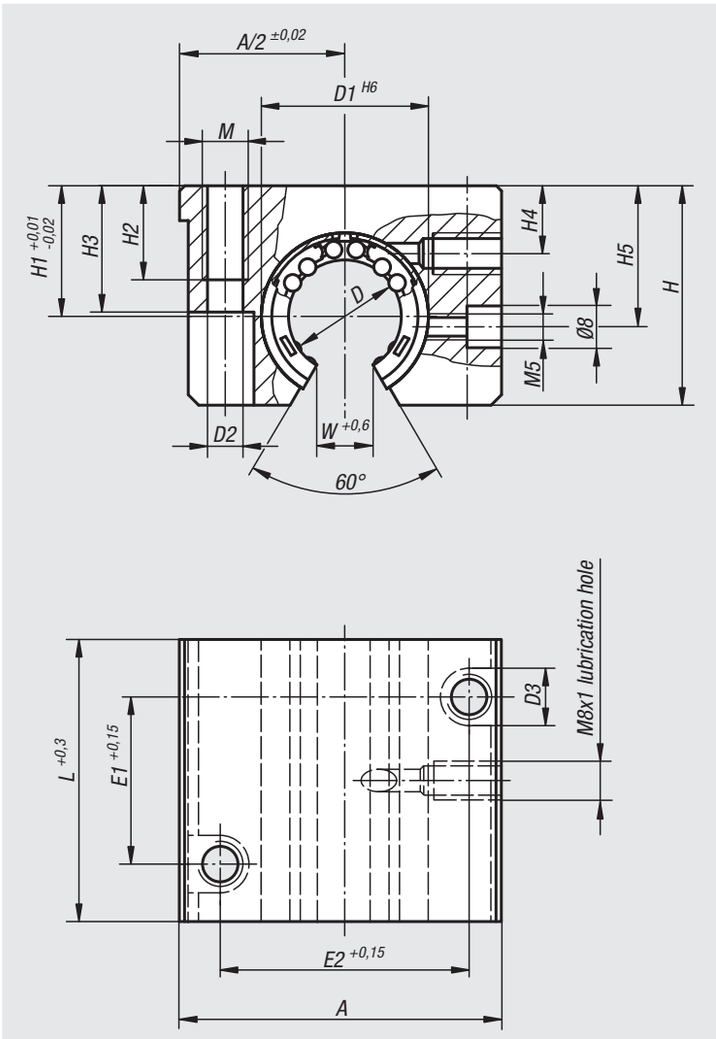
Note:
Ready to install linear housing units consisting of an extruded aluminium housing with a self-aligning linear ball bearing 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications.

On request:
Linear housing units can be equipped with any of our linear ball bearings.

Accessories:
End seals 21560.
Precision guide shafts 21590 or 21595.
Fastening screws 07160 or 07161.



Order No.	A	D	D1	D2	D3	E1	E2	H	H1	H2	H3	H4	H5	L	M	W
21535-121012	43	12	22	4,2	8	23	32	28	18	11	23,5	8	16,65	39	M5	7
21535-161012	53	16	26	5,2	10	26	40	35	22	13	30	12	22	43	M6	9,4
21535-201012	60	20	32	6,8	11	32	45	42	25	18	34	13	25	54	M8	10,2
21535-251012	78	25	40	8,6	15	40	60	51	30	22	40	15	31,5	67	M10	12,5
21535-301012	87	30	47	8,6	15	45	68	60	35	22	48	16	33	79	M10	13,9

Linear housing units

tandem, closed



Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21540-121002

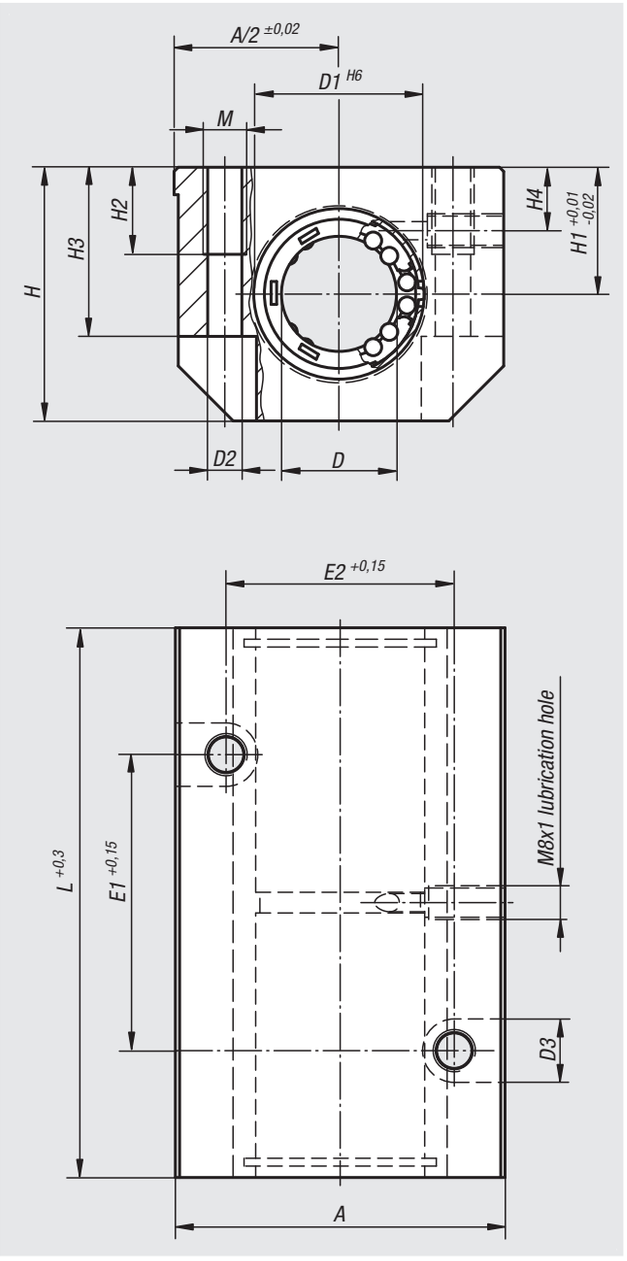
Note:
Ready to install linear housing units consisting of an extruded aluminium housing with two self-aligning linear ball bearings 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications (x2).

On request:
Linear housing units can be equipped with any of our linear ball bearings.

Accessories:
End seals 21560.
Precision guide shafts 21595.
Fastening screws 07160 or 07161.



Order No.	A	D	D1	D2	D3	E1	E2	H	H1	H2	H3	H4	L	M
21540-121002	43	12	22	5,2	10	40	30	35	18	13	25	10	76	M6
21540-161002	53	16	26	5,2	10	45	36	42	22	13	30	12	84	M6
21540-201002	60	20	32	6,8	11	55	45	50	25	18	34	13	104	M8
21540-251002	78	25	40	8,6	15	70	54	60	30	22	40	15	130	M10
21540-301002	87	30	47	10,3	18	85	62	70	35	26	48	16	152	M12

Linear housing units

tandem, open



Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21545-121012

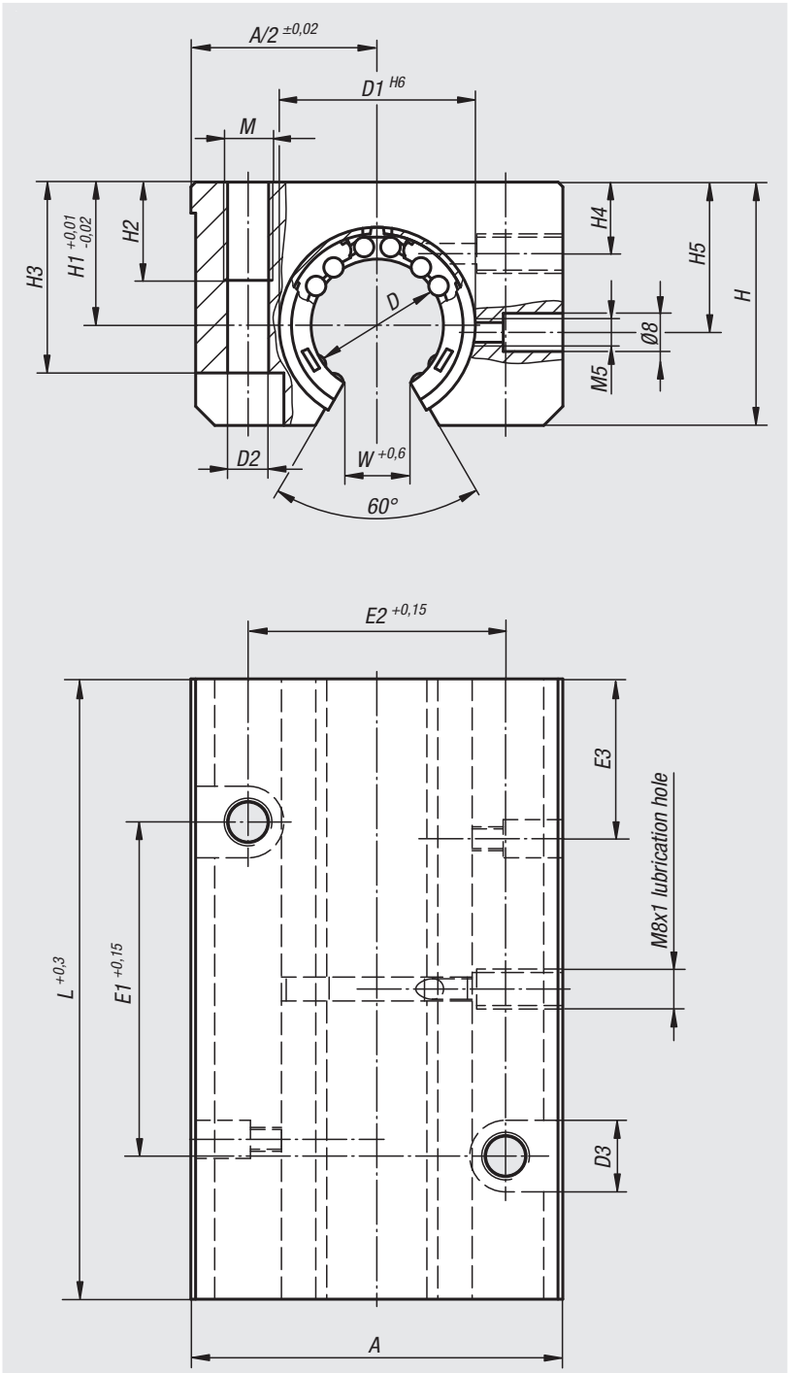
Note:
Ready to install linear housing units consisting of an extruded aluminium housing with two self-aligning linear ball bearings 21510 and seals both sides. The bearings are secured in the housing with cap screws.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications (x2).

On request:
Linear housing units can be equipped with any of our linear ball bearings.

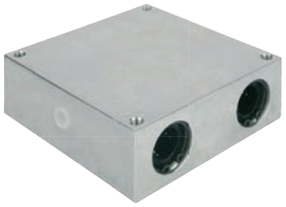
Accessories:
End seals 21560.
Precision guide shafts 21590 or 21595.
Fastening screws 07160 or 07161.

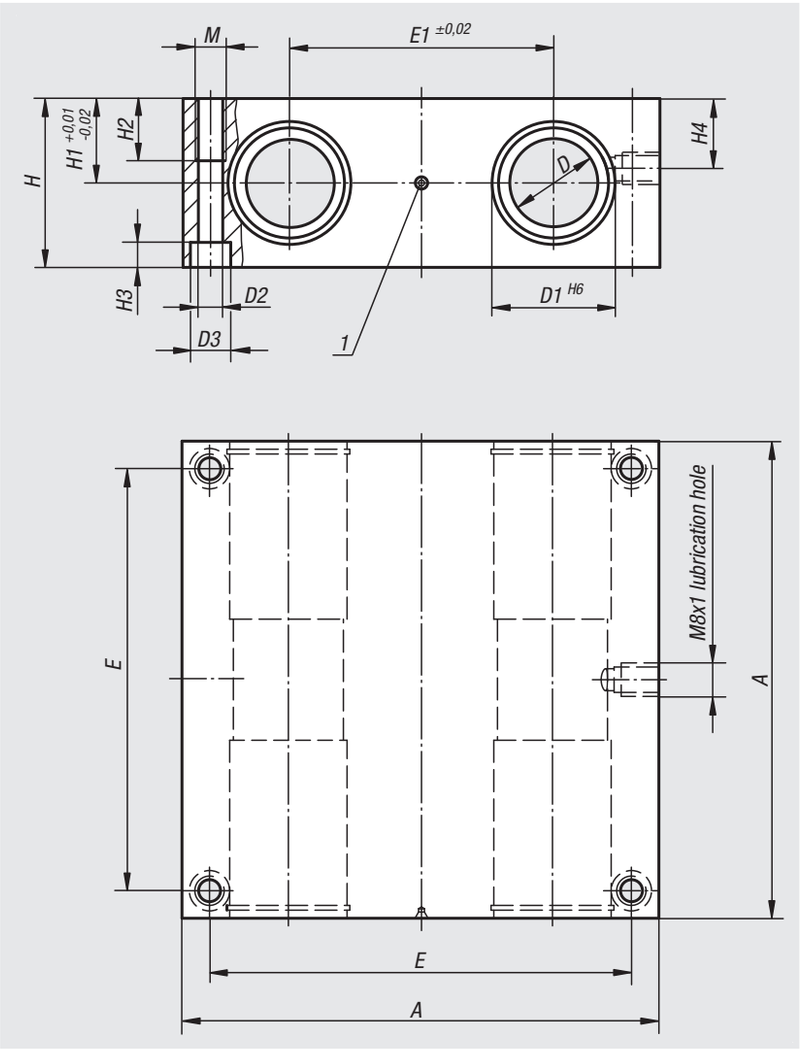


Order No.	A	D	D1	D2	D3	E1	E2	E3	H	H1	H2	H3	H4	H5	L	M	W
21545-121012	43	12	22	5,2	10	40	30	19,5	30	18	13	25	8	16,65	76	M6	7
21545-161012	53	16	26	5,2	10	45	36	21,5	35	22	13	30	12	22	84	M6	9,4
21545-201012	60	20	32	6,8	11	55	45	27	42	25	18	34	13	25	104	M8	10,2
21545-251012	78	25	40	8,6	15	70	54	33,5	51	30	22	40	15	31,5	130	M10	12,9
21545-301012	87	30	47	10,3	18	85	62	39,5	60	35	26	48	16	33	152	M12	14,4

Linear housing units

quadro, closed





Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21550-121002

Note:
Ready to install linear housing units consisting of an extruded aluminium housing with four self-aligning linear ball bearings 21510 and seals both sides. The bearings are secured in the housing with DIN 472 circlips.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications (x4).

On request:
Linear housing units can be equipped with any of our linear ball bearings.

Accessories:
End seals 21560.
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

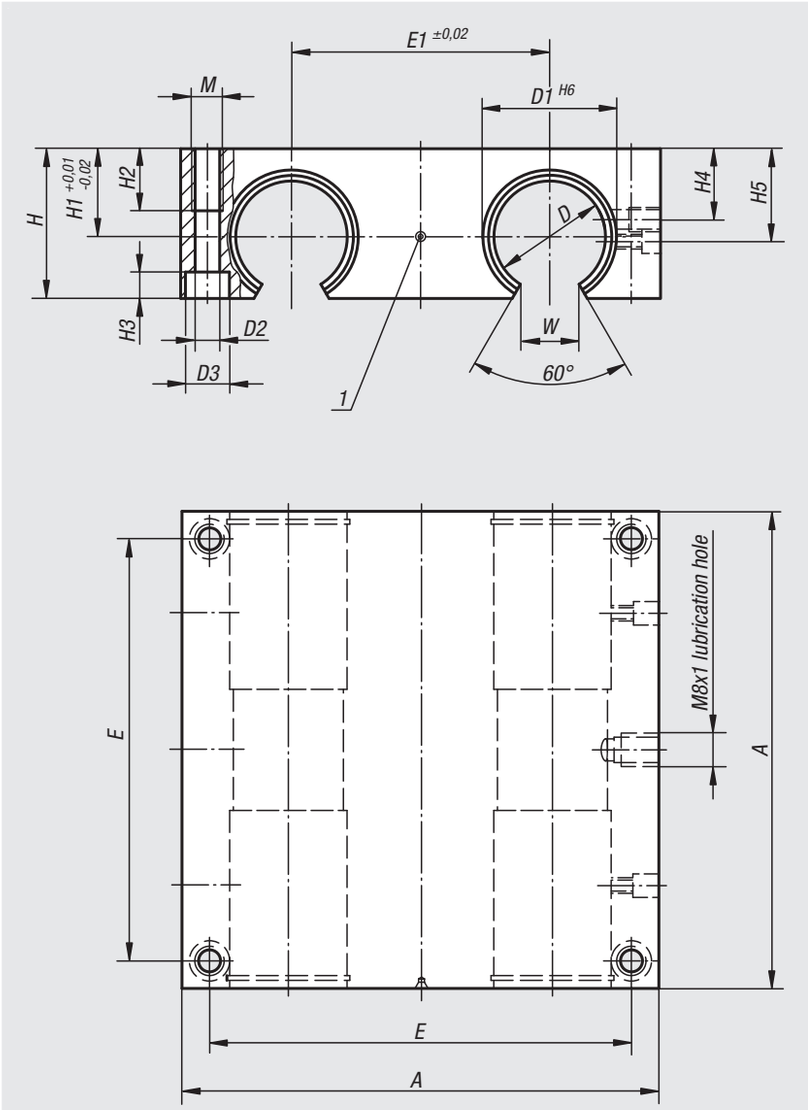
Drawing reference:
1) centring hole

Order No.	A	D	D1	D2	D3	E	E1	H	H1	H2	H3	H4	M
21550-121002	85	12	22	5,3	10	73	42	32	16	13	5,4	13	M6
21550-161002	100	16	26	5,3	10	88	54	36	18	13	5,4	15	M6
21550-201002	130	20	32	6,8	11	115	72	46	23	18	6,4	19	M8
21550-251002	160	25	40	9	15	140	88	56	28	22	8,6	24	M10
21550-301002	180	30	47	10,5	18	158	96	64	32	26	10,6	27	M12

Linear housing units

quadro, open





Material:
Housing aluminium

Version:
Housing bright.

Sample order:
nlm 21555-121012

Note:
Ready to install linear housing units consisting of an extruded aluminium housing with four self-aligning linear ball bearings 21510 and seals both sides. The bearings are secured in the housing with cap screws.

Recommended shaft tolerance: h6.

Load ratings according to the linear ball bearing specifications (x4).

On request:
Linear housing units can be equipped with any of our linear ball bearings.

Accessories:
End seals 21560.
Precision guide shafts 21590 or 21595.
Fastening screws 07160 or 07161.

Drawing reference:
1) centring hole

Order No.	A	D	D1	D2	D3	E	E1	H	H1	H2	H3	H4	H5	M	W
21555-121012	85	12	22	5,3	10	73	42	30	18	13	5,4	10	16,65	M6	7
21555-161012	100	16	26	5,3	10	88	54	35	22	13	5,4	12	22	M6	9,4
21555-201012	130	20	32	6,8	11	115	72	42	25	18	6,4	13	25	M8	10,2
21555-251012	160	25	40	9	15	140	88	51	30	22	8,6	15	31,5	M10	12,9
21555-301012	180	30	47	10,5	18	158	96	60	35	26	10,6	16	33	M12	13,9

End seals

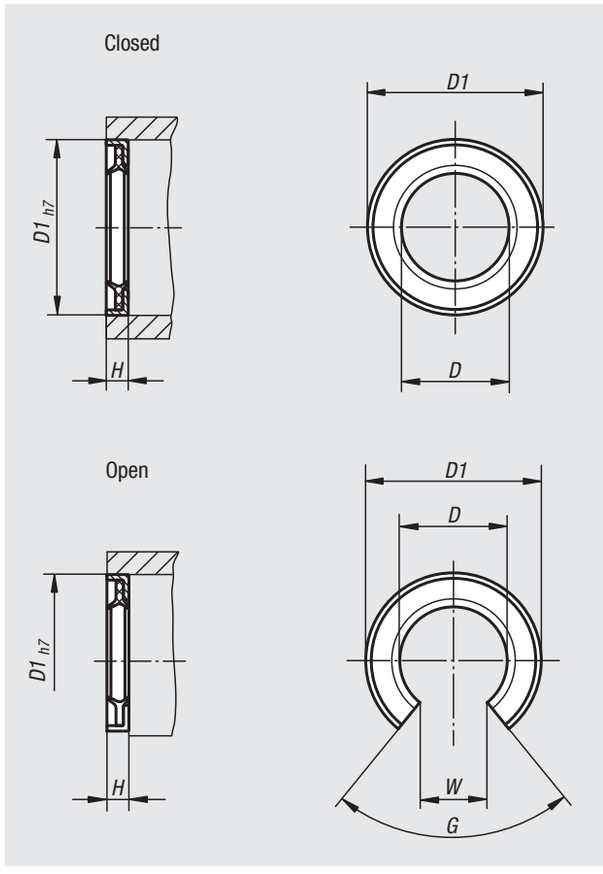
double-lip sealing rings



Material:
Ring steel.
Rubber NBR.

Sample order:
nlm 21560-120

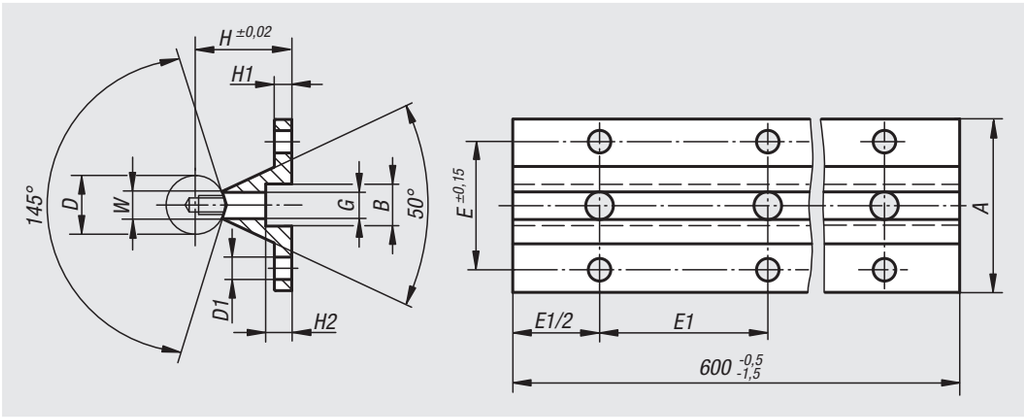
Note:
In addition to the standard seals for linear ball bearings, these end seals are also available.
The end seals give much better protection from dirt and dust.
The seals are inserted into the housing bores (tolerance H7) in front of the bearings and secured with glue.



Order No. closed	Order No. open	D	D1	H	G	W
21560-120	**21560-121**	12	22	3	-/78°	-/7,5
21560-160	**21560-161**	16	26	3	-/78°	-/10
21560-200	**21560-201**	20	32	4	-/60°	-/10
21560-250	**21560-251**	25	40	4	-/60°	-/12,5
21560-300	**21560-301**	30	47	5	-/50°	-/12,5

Shaft supports





Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 21565-12375X0600

Note:
Shaft supports are required to support shafts in conjunction with open linear ball bearings.
Shafts supported along the entire length result in particularly rigid assemblies, in many cases however, sectional supports suffice.
The standard length of our shaft supports is 600 mm. These can be shortened short or set in series to produce longer supports.

Accessories:
Precision guide shafts with fastening holes 21590.
Fastening screws 07160.

Order No.	Size	A	B	D	D1	E	E1	G hole for DIN 912 cap screw	H	H1	H2	W
21565-12375X0600	12	40	8	12	4,5	29	75	M4x16	22	5	5	5,8
21565-16500X0600	16	45	9,5	16	5,5	33	100	M5x20	26	5	6	7
21565-20500X0600	20	52	11	20	6,6	37	100	M6x25	32	6	6,5	8,3
21565-25600X0600	25	57	14	25	6,6	42	120	M8x25	36	6	8,5	10,8
21565-30750X0600	30	69	17	30	9	51	150	M10x30	42	7	10,5	11

Traverses fixed



Material:
Aluminium.

Version:
Bright.

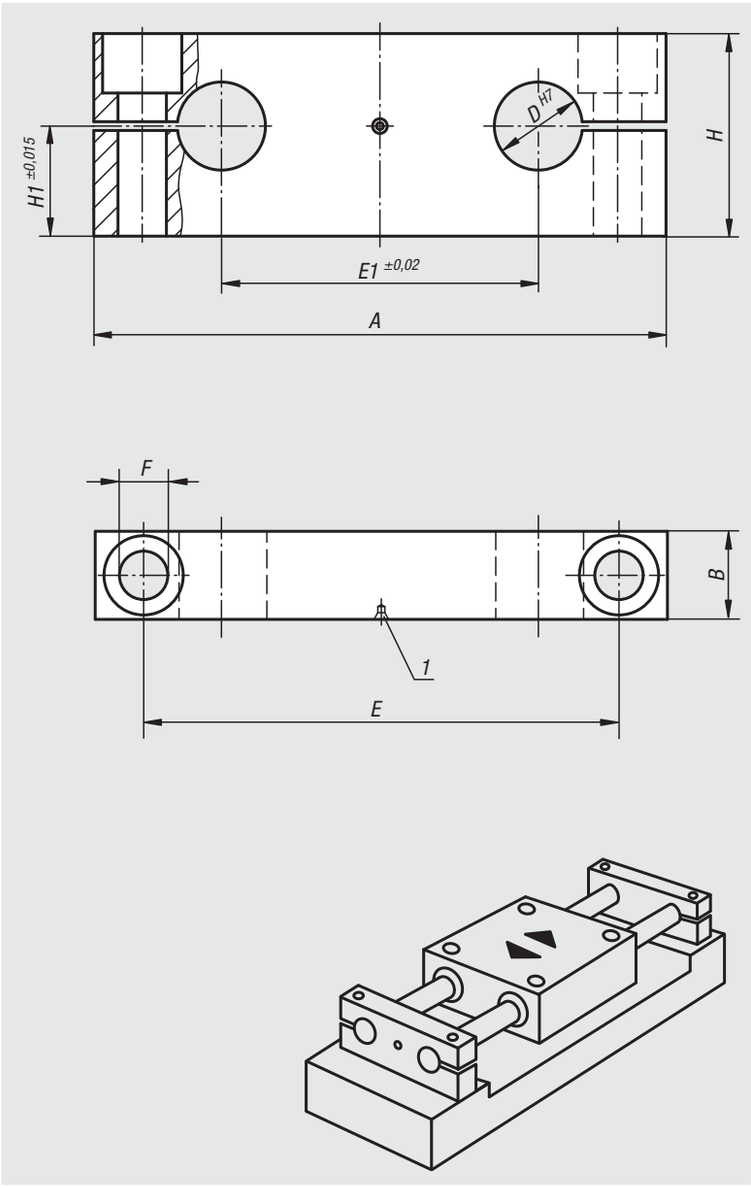
Sample order:
nlm 21575-12

Note:
Traverse with two bores for easy and secure clamping and fastening of guide shafts. For the assembly of prefabricated table units with our Quadro linear housing units 21550 or 21555.

This version permits the axial motion of the linear bearing unit i.e. the shafts are mounted fixed with the traverses on the machine bed.

Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

Drawing reference:
1) centring hole



Order No.	A	B	D	E	E1	F hole for ISO 4762 cap screw	H	H1
21575-12	85	14	12	70	42	6,6	32	18
21575-16	100	18	16	82	54	9	36	20
21575-20	130	20	20	108	72	11	46	25
21575-25	160	25	25	132	88	13,5	56	30
21575-30	180	25	30	150	96	13,5	64	35

Traverses moveable



Material:
Aluminium.

Version:
Bright.

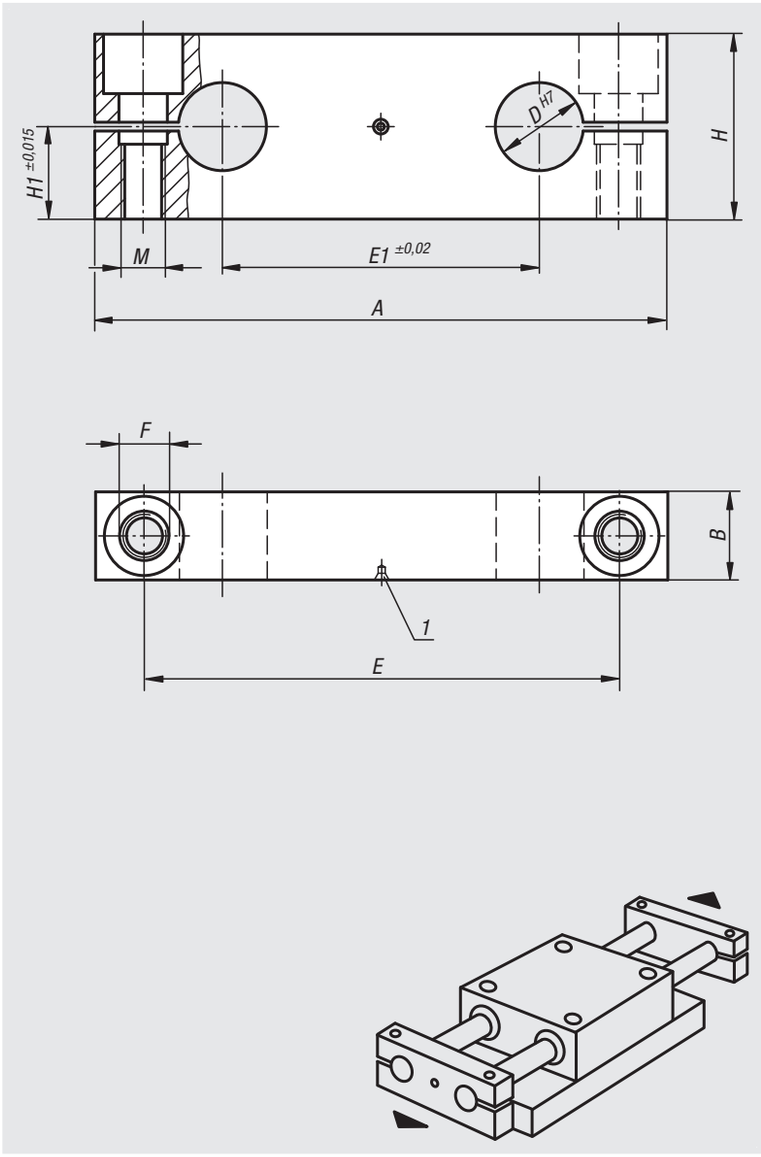
Sample order:
nlm 21577-12

Note:
Traverse with two bores for easy and secure clamping and fastening of guide shafts. For the assembly of prefabricated table units with our Quadro linear housing units 21550 or 21555.

By fixed mounted linear bearing units these traverses permit the shaft to travel with the travers.

Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

Drawing reference:
1) centring hole



Order No.	A	B	D	E	E1	F hole for ISO 4762 cap screw	H	H1	M
21577-12	85	14	12	70	42	6,6	28	14	M6
21577-16	100	18	16	82	54	9	32	16	M8
21577-20	130	20	20	108	72	11	42	21	M10
21577-25	160	25	25	132	88	13,5	52	26	M12
21577-30	180	25	30	150	96	13,5	58	29	M12

Shaft supports



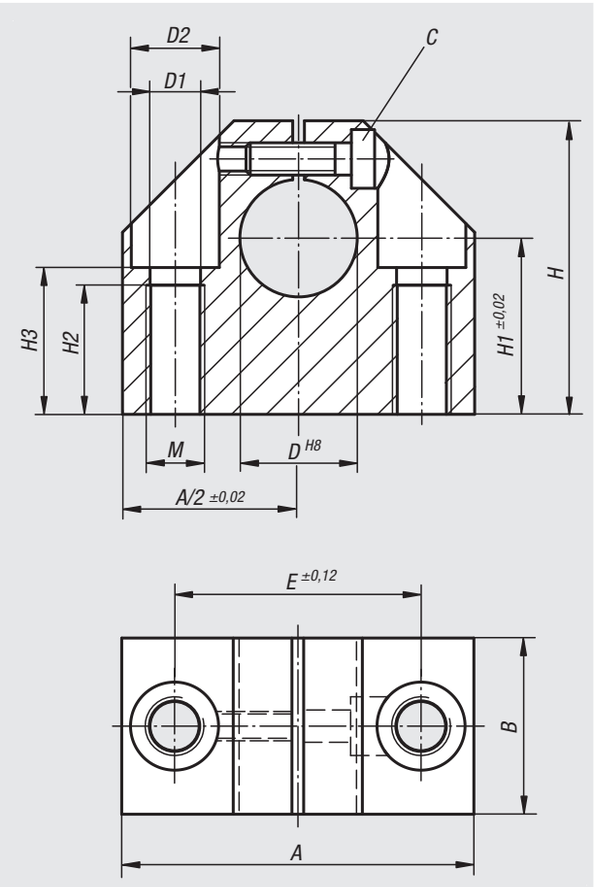
Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 21580-12

Note:
Shaft support with bore for easy and secure clamping and fastening the guide shafts.

Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.



Order No.	A	B	D	D1	D2	E	H	H1	H2	H3	M	C (DIN 912)
21580-12	43	20	12	5,2	10	30	35	20	13	16,5	M6	M4
21580-16	53	24	16	6,8	11	38	42	25	18	21	M8	M5
21580-20	60	30	20	8,6	15	42	50	30	22	25	M10	M6
21580-25	78	38	25	10,3	18	56	60	35	26	30	M12	M8
21580-30	87	40	30	10,3	18	64	70	40	26	34	M12	M8

Shaft supports

standard



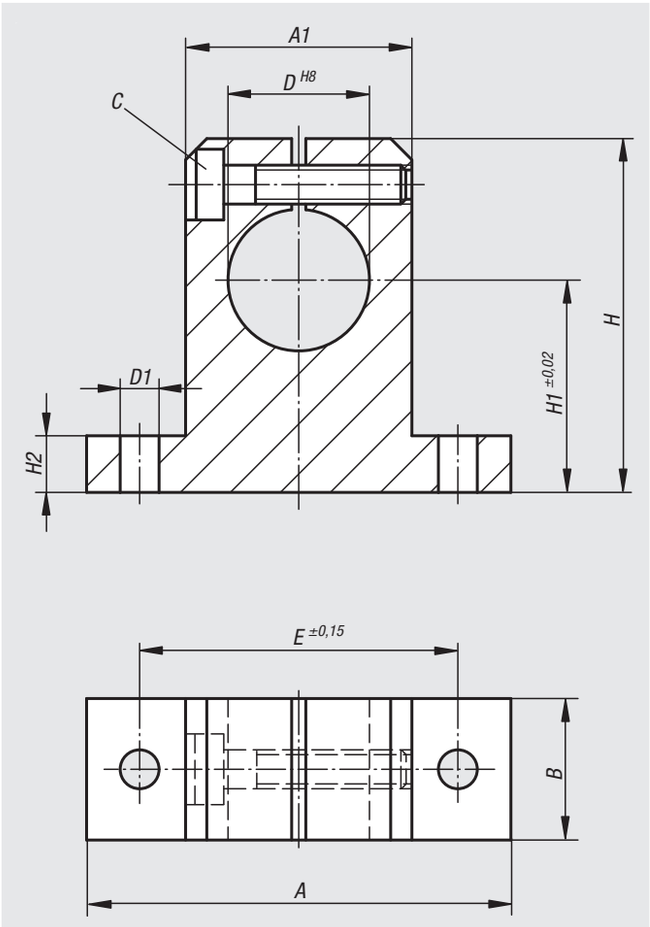
Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 21582-12

Note:
Shaft support with bore for easy and secure clamping and fastening the guide shafts.

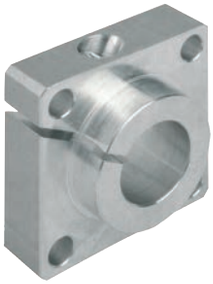
Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.



Order No.	A	A1	B	D	D1	E	H	H1	H2	C (DIN 912)
21582-12	42	20	12	12	5,5	32	35	20	5,5	M4
21582-16	50	26	16	16	5,5	40	42	25	6,5	M4
21582-20	60	32	20	20	5,5	45	50	30	8	M4
21582-25	74	38	25	25	6,6	60	58	35	9	M5
21582-30	84	45	28	30	9	68	68	40	10	M6

Shaft supports

flanged



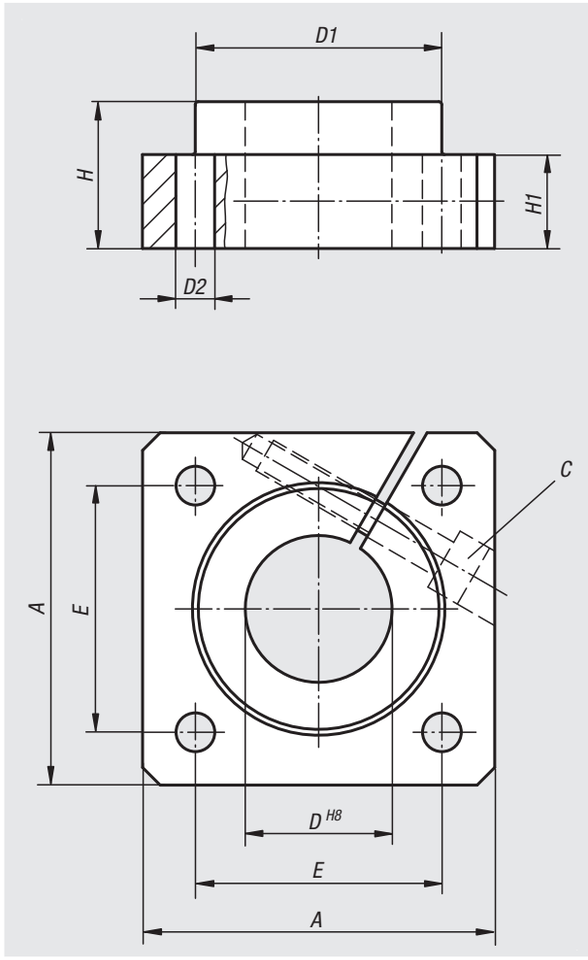
Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 21585-12

Note:
Flanged shaft support with standard bores for easy and secure clamping and fastening the guide shafts.

Accessories:
Precision guide shafts 21595.
Fastening screws 07160 or 07161.

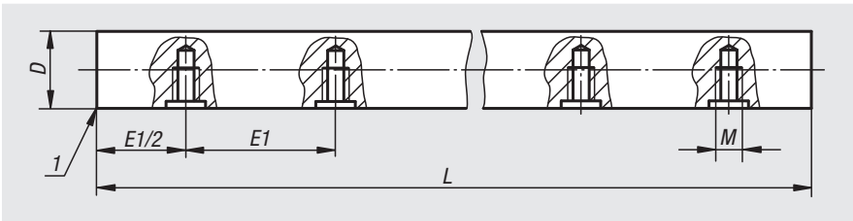


Order No.	A	D	D1	D2	E	H	H1	C (DIN 912)
21585-12	40	12	23,5	5,5	30 ±0,12	20	12	M4
21585-16	50	16	27,5	5,5	35 ±0,12	20	12	M4
21585-20	50	20	33,5	6,6	38 ±0,15	23	14	M5
21585-25	60	25	42	6,6	42 ±0,15	25	16	M6
21585-30	70	30	49,5	9	54 ±0,25	30	19	M8

Precision guide shafts

with fastening holes





Material:
Steel 1.1213.
Stainless steel 1.4034.
Stainless steel 1.4112.

Version:
Steel, ground.
Steel, ground and hard-chromed, chrome coating 5 - 10 µm.
Stainless steel, ground.

The precision steel shafts are generally inductively surface hardened.

Sample order:
nlm 21590-012375X0600

Note:
The surface value obtained during the inductive hardening process guarantees high surface wear resistance.

Suitable for shaft supports 21565.

On request:
Lengths up to a max. 4000 mm.

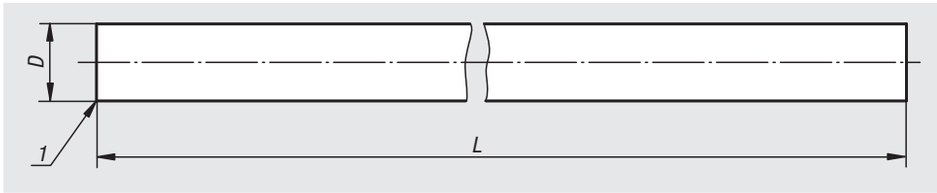
Accessories:
Shaft supports 21565.

Drawing reference:
1) chamfered

Order No.	Material	Surface finish body	Steel code	D	E1	L	M	Hardening depth max.	Surface hardness HRC
21590-012375X0600	steel	ground	1.1213	12h6	75	600	M4	1,3	62 ±2
21590-016500X0600	steel	ground	1.1213	16h6	100	600	M5	1,6	62 ±2
21590-020500X0600	steel	ground	1.1213	20h6	100	600	M6	1,6	62 ±2
21590-025600X0600	steel	ground	1.1213	25h6	120	600	M8	1,8	62 ±2
21590-030750X0600	steel	ground	1.1213	30h6	150	600	M10	2	62 ±2
21590-112375X0600	steel	ground and hard-chromed	1.1213	12h7	75	600	M4	1,3	65 - 70
21590-116500X0600	steel	ground and hard-chromed	1.1213	16h7	100	600	M5	1,6	65 - 70
21590-120500X0600	steel	ground and hard-chromed	1.1213	20h7	100	600	M6	1,6	65 - 70
21590-125600X0600	steel	ground and hard-chromed	1.1213	25h7	120	600	M8	1,8	65 - 70
21590-130750X0600	steel	ground and hard-chromed	1.1213	30h7	150	600	M10	2	65 - 70
21590-212375X0600	stainless steel	ground	1.4034	12h6	75	600	M4	1,3	51 - 55
21590-216500X0600	stainless steel	ground	1.4034	16h6	100	600	M5	1,6	51 - 55
21590-220500X0600	stainless steel	ground	1.4034	20h6	100	600	M6	1,8	51 - 55
21590-225600X0600	stainless steel	ground	1.4034	25h6	120	600	M8	2	51 - 55
21590-230750X0600	stainless steel	ground	1.4034	30h6	150	600	M10	2,4	51 - 55
21590-312375X0600	stainless steel	ground	1.4112	12h6	75	600	M4	1	52-56
21590-316500X0600	stainless steel	ground	1.4112	16h6	100	600	M5	1,5	52-56
21590-320500X0600	stainless steel	ground	1.4112	20h6	100	600	M6	1,5	52-56
21590-325600X0600	stainless steel	ground	1.4112	25h6	120	600	M8	1,7	52-56
21590-330750X0600	stainless steel	ground	1.4112	30h6	150	600	M10	1,7	52-56

Precision guide shafts





Material:
Steel 1.1213.
Stainless steel 1.4034.
Stainless steel 1.4112.

Version:
Steel, ground.
Steel, ground and hard-chromed, chrome coating 5 - 10 µm.
Stainless steel, ground.

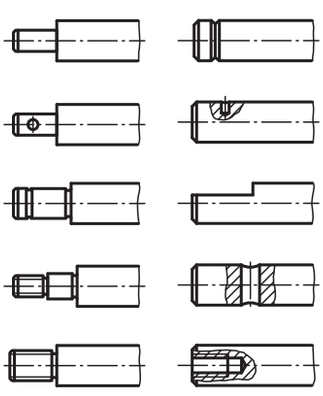
The precision steel shafts are generally inductively surface hardened.

Sample order:
nlm 21595-012X1000

Note:
The surface value obtained during the inductive hardening process guarantees high surface wear resistance.

On request:
Machining of the ends and cylindrical surfaces according to customer specifications.
Maximum length 4000 mm.
Where D < 6 mm lengths up to 2000 mm are available on request.

Drawing reference:
1) chamfered

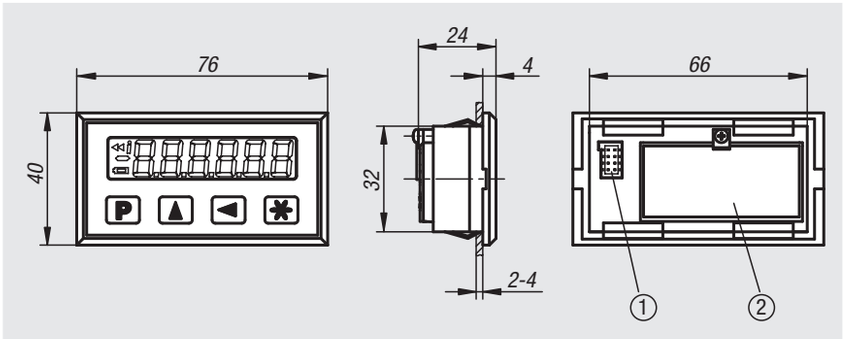


Order No.	Material	Surface finish body	Steel code	D	L	Hardening depth max.	Surface hardness HRC
21595-003X0330	steel	ground	1.1213	3h6	330	hardened	62 ±2
21595-004X1000	steel	ground	1.1213	4h6	1000	hardened	62 ±2
21595-005X1000	steel	ground	1.1213	5h6	1000	0,8	62 ±2
21595-006X1000	steel	ground	1.1213	6h6	1000	0,8	62 ±2
21595-008X1000	steel	ground	1.1213	8h6	1000	1	62 ±2
21595-010X1000	steel	ground	1.1213	10h6	1000	1	62 ±2
21595-012X1000	steel	ground	1.1213	12h6	1000	1,3	62 ±2
21595-016X1000	steel	ground	1.1213	16h6	1000	1,6	62 ±2
21595-020X1000	steel	ground	1.1213	20h6	1000	1,6	62 ±2
21595-025X1000	steel	ground	1.1213	25h6	1000	1,8	62 ±2
21595-030X1000	steel	ground	1.1213	30h6	1000	2	62 ±2
21595-105X1000	steel	ground and hard-chromed	1.1213	5H7	1000	0,8	65 - 70
21595-106X1000	steel	ground and hard-chromed	1.1213	6H7	1000	0,8	65 - 70
21595-108X1000	steel	ground and hard-chromed	1.1213	8h7	1000	1	65 - 70
21595-110X1000	steel	ground and hard-chromed	1.1213	10h7	1000	1	65 - 70
21595-112X1000	steel	ground and hard-chromed	1.1213	12h7	1000	1,3	65 - 70
21595-116X1000	steel	ground and hard-chromed	1.1213	16h7	1000	1,6	65 - 70
21595-120X1000	steel	ground and hard-chromed	1.1213	20h7	1000	1,6	65 - 70
21595-125X1000	steel	ground and hard-chromed	1.1213	25h7	1000	1,8	65 - 70
21595-130X1000	steel	ground and hard-chromed	1.1213	30h7	1000	2	65 - 70
21595-206X1000	stainless steel	ground	1.4034	6h6	1000	0,8	51 - 55
21595-208X1000	stainless steel	ground	1.4034	8h6	1000	1	51 - 55
21595-210X1000	stainless steel	ground	1.4034	10h6	1000	1	51 - 55
21595-212X1000	stainless steel	ground	1.4034	12h6	1000	1,3	51 - 55
21595-216X1000	stainless steel	ground	1.4034	16h6	1000	1,6	51 - 55
21595-220X1000	stainless steel	ground	1.4034	20h6	1000	1,8	51 - 55
21595-225X1000	stainless steel	ground	1.4034	25h6	1000	2	51 - 55
21595-230X1000	stainless steel	ground	1.4034	30h6	1000	2,4	51 - 55
21595-303X0300	stainless steel	ground	1.4112	3h6	300	hardened	52-56
21595-304X1000	stainless steel	ground	1.4112	4h6	1000	hardened	52-56
21595-305X1000	stainless steel	ground	1.4112	5h6	1000	0,8	52-56
21595-306X1000	stainless steel	ground	1.4112	6h6	1000	0,8	52-56
21595-308X1000	stainless steel	ground	1.4112	8h6	1000	1	52-56
21595-310X1000	stainless steel	ground	1.4112	10h6	1000	1	52-56
21595-312X1000	stainless steel	ground	1.4112	12h6	1000	1	52-56
21595-316X1000	stainless steel	ground	1.4112	16h6	1000	1,5	52-56
21595-320X1000	stainless steel	ground	1.4112	20h6	1000	1,5	52-56
21595-325X1000	stainless steel	ground	1.4112	25h6	1000	1,7	52-56
21595-330X1000	stainless steel	ground	1.4112	30h6	1000	1,7	52-56

Position indicator

quasi-absolute, mains-independent, indicator accuracy 10 µm, small design





Material:
Housing plastic.
Screen LCD display.

Version:
Position indicator with integrated battery compartment.
Plug-in sensor.
Low-power LCD.

Sample order:
nlm 21700-01

Note:
Digital, mains-independent measurement display for play-free position detection.
The system is often used in industry and trade for measuring tasks on length and angle stops (on panel saws, sheet punches, press breaks...).
The recommended dimensions for switchboard installation are 67+3 x 33+0.3.
The angle display is programmable.
The display is ~11 mm high and scaleable from -999999 to 999999.
The max. display accuracy is 10 µm.
The position indicator features a battery-backed memory and a battery monitoring system with a low-batt symbol at ~2.4 V.
The battery is easy to change via the battery compartment.
Energy is supplied via 2 micro AAA batteries (not supplied).

Temperature range:
- Ambient temperature 0…60°C
- Storage temperature -10…70°C

Assembly:
Installation must be carried out according to the enclosed user information.

Function:
- Chain dimension and reset function
- Direct entry of reference/offset value

Accessories:
- Magnetic sensors 21720
- Magnetic tapes 21725
- Hollow shaft sensors 21730

Attention:
The relative humidity must not exceed 95%. Dewing is not permissible.

Technical data:
- Resolution 0.01; 0.05; 0.1; 1 mm/ 0.001; 0.01 inch
- System accuracy ±(0.1 + 0.01 x L) mm, L in m
- Operating voltage 3 V DC, protected against polarity reversal
- Current consumption ~150 µA at 3 V DC
- Repeat accuracy ±0.01mm
- Travel speed max. 5 m/s
- EMC EN 61000-6-2; EN 61000-6-4
- Rating IP 40, general device
- Rating IP 54, front side

Drawing reference:
1) Sensor connection
2) Battery compartment

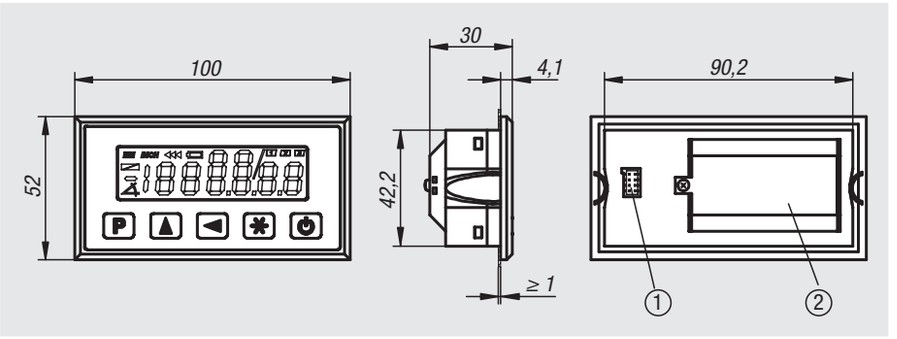


Order No.	Item
21700-01	position indicator

Position indicator

quasi-absolute, mains-independent, indicator accuracy 10 µm





Material:
Housing plastic.
Screen LCD display.

Version:
Position indicators with integrated battery compartment.
Plug-in sensor.
Low-power LCD with decimal and fraction inch function.

Sample order:
nlm 21702-01

Note:
Digital, mains-independent measurement display for play-free position detection.
The system is often used in industry and trade for measuring tasks on length and angle stops (on panel saws, sheet punches, press breaks...).
The recommended dimensions for switchboard installation are 92+0.8 x 45+0.6.
The angle display is programmable.
The display is ~13 mm high and scaleable from -1999999 to 1999999.
The max. display accuracy is 10 µm decimal to 1/64 inch.
The position indicator features a battery-backed memory and a battery monitoring system with a Low-Batt symbol at <1.1 V.
The battery is easy to change via the battery compartment.
Energy is supplied via 2 mignon AA batteries (not supplied).

Temperature range:
- Ambient temperature 0–60°C
- Storage temperature -10–70°C

Assembly:
Installation must be carried out according to the enclosed user information.

Function:
- Chain dimension and reset function
- Direct entry of reference/offset value

Accessories:
- Magnetic sensors 21720
- Magnetic tapes 21725
- Hollow shaft sensors 21730

Attention:
The relative humidity must not exceed 95%. Dewing is not permissible.

Technical data:
- Resolution 0.01; 0.05; 0.1; 1 mm/ 0.001; 0.01; 1/16; 1/32; 1/64
- System accuracy ±(0.1 + 0.01 x L) mm, L in m
- Operating voltage 3 V DC, protected against polarity reversal
- Current consumption ~220 µA at 3 V DC
- Repeat accuracy ±0.01mm
- Travel speed max. 5 m/s
- EMC EN 61000-6-2; EN 61000-6-4
- Rating IP 40, general device
- Rating IP 54, front side

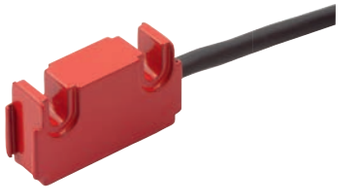
Drawing reference:
1) Sensor connection
2) Battery compartment

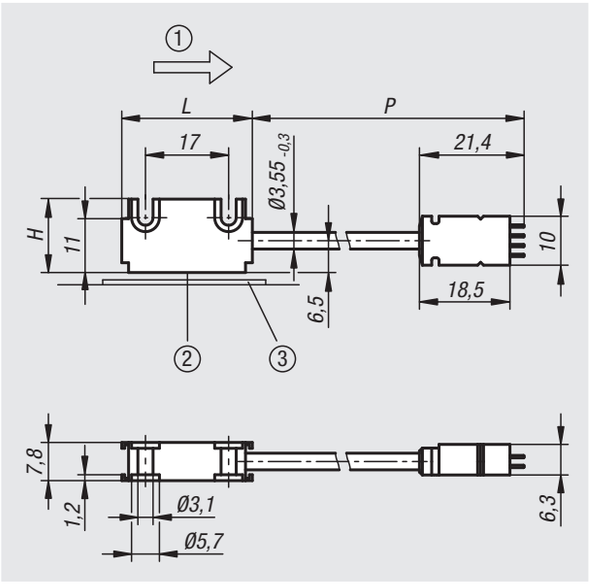


Order No.	Item
21702-01	position indicator

Magnetic sensors

passive sensors, miniature design





Material:
Housing aluminium.
Cable sheath PVC.

Version:
Compact sensor and plug design.
Flat connector, 8-pole, 1x pin.
Connection cable, 6-wire, ø 3.55–0.3 mm.
Cable bend radius, > 17 mm (static).

Sample order:
nlm 21720-00200

Note:
Works with magnetic tapes 21725.
The reading distance between the sensor and tape must be 0.1 to 2 mm.
The sensor is supplied with operating voltage and draws current via the electronics.
System accuracy, repeat accuracy and travel speed is dependent on the electronics.
Plug-in connection to position indicators 21700 and 21702.

Temperature range:
- Ambient temperature 0…60°C
- Storage temperature -10…70°C

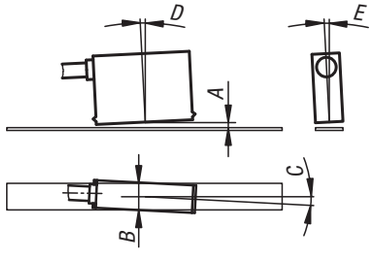
Assembly:
Installation must be carried out using the enclosed user information.
A, reading distance sensor/tape ≤ 2 mm
B, lateral offset ± 2 mm
C, misalignment ± 3°
D, pitch gradient ± 1°
E, lateral gradient ± 3°

Accessories:
Position indicators 21700 and 21702.
Magnetic tapes 21725.

Attention:
Relative humidity 100%. Dewing is not permissible (sensor head).

Technical data:
- Rating IP 67; EN 60529 (sensor head)
- Shock resistance 2000 m/s², 11 ms; EN 60068-2-27
- Vibration resistance 200 m/s², 50 Hz–2 kHz; EN 60068-2-6

Drawing reference:
1) Sine before cosine
2) Active measuring surface
3) Magnetic tape



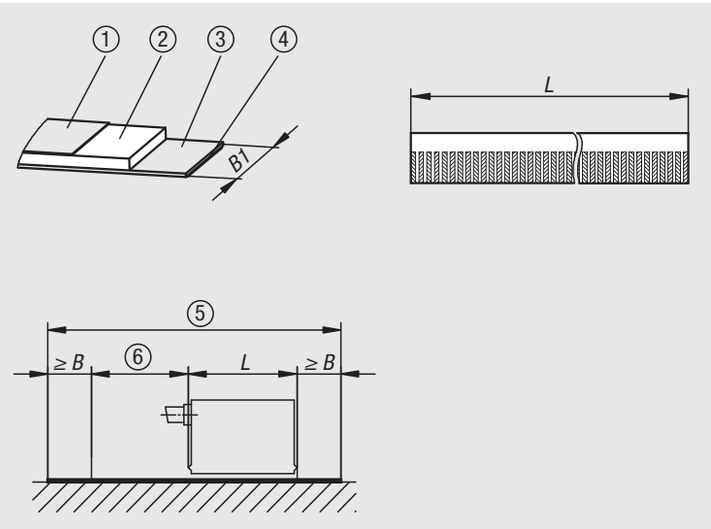


Order No.	P	L	H
21720-00200	200	26,7	15
21720-00500	500	26,7	15
21720-01000	1000	26,7	15
21720-02000	2000	26,7	15
21720-05000	5000	26,7	15
21720-10000	10000	26,7	15

Magnetic tape

scale with incremental coding, 5 mm pole length





Material:
Magnetic tape, magnetised plastic sheet.
Carrier band steel.
Cover band stainless steel.

Version:
Scale with incremented coding.
Pole length 5 mm.

Sample order:
nlm 21725-010X1000

Note:
Simple adhesive mounting; self-assembly possible.
Required tape length calculated from:
measuring path + sensor length „L“ + (2 x run or return „B“).
L = see drawing of sensor used.
B = 10 mm (run and return).

Temperature range:
- Ambient temperature -20–70°C
- Storage temperature -40–70°C

Assembly:
Installation using the pre-affixed double-sided adhesive tape must be carried out according to the enclosed user information.

On request:
Other lengths from 0.1–100 m, in increments of 0.1 m.

Attention:
Relative humidity 100%. Dewing is not permissible.

Technical data:
- Coefficient of expansion (11 ± 1) x 10-6/K (spring steel)

Drawing reference:
1) Cover band A = 0.176 mm
2) Magnetic tape M = 1.0 mm
3) Carrier band T = 0.3 mm
4) Adhesive tape K = 0.1 mm
5) Required tape length = measuring path + L + 2 x B
6) Measuring path

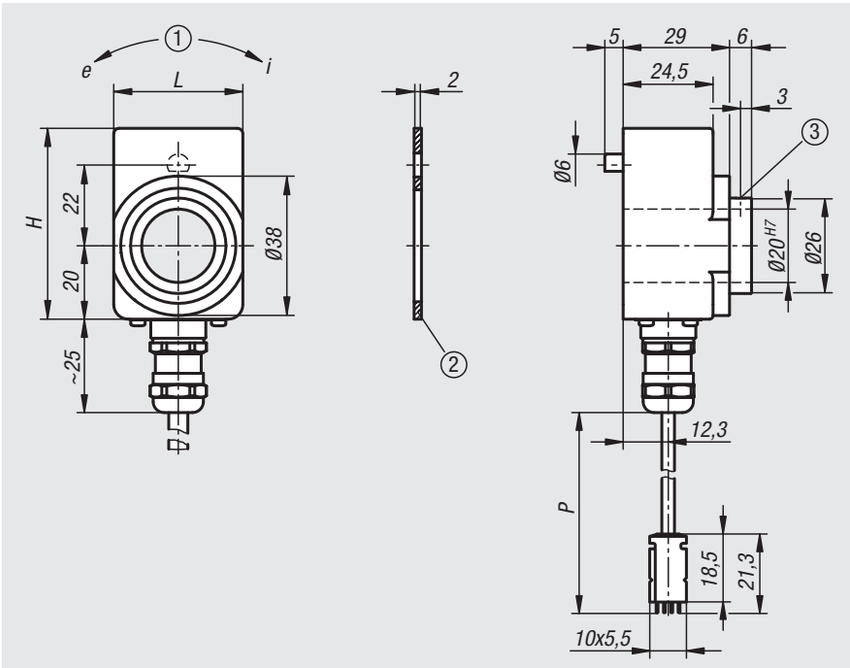


Order No.	B1	L	Precision mm
21725-010X1000	10	1000	0,1
21725-010X2000	10	2000	0,1
21725-010X3000	10	3000	0,1
21725-010X4000	10	4000	0,1
21725-010X5000	10	5000	0,1
21725-010X6000	10	6000	0,1
21725-010X7000	10	7000	0,1
21725-010X8000	10	8000	0,1
21725-010X9000	10	9000	0,1
21725-010X10000	10	10000	0,1

Hollow shaft sensors

with magnetic scanning





Material:
Shaft stainless-steel.
Housing plastic.
Cable sheath PVC.

Version:
Housing black.
Flat connector, 8-pole, 1x pin.
Cable bend radius, > 17 mm (fixed).

Sample order:
nlm 21730-0500

Note:
For speeds ≤ 600 rpm.
Simple assembly for hollow shafts up to max. 20 mm.
Plug-in connection to position indicators 21700 and 21702.
The sensor is supplied with operating voltage and draws current via the electronics.
The resolution and measuring range are dependent on the electronics.

Temperature range:
- Ambient temperature 0–60°C
- Storage temperature -10–70°C

Assembly:
Installation must be carried out according to the enclosed user information.

Accessories:
Position indicators 21700 and 21702.
Reducer sleeves 21740.

Attention:
Dewing is not permissible.

Technical data:
- Rotative sensor
- Magnetic scanning via a magnet wheel with 18 poles each 5 mm
- Rating IP 65; EN60529

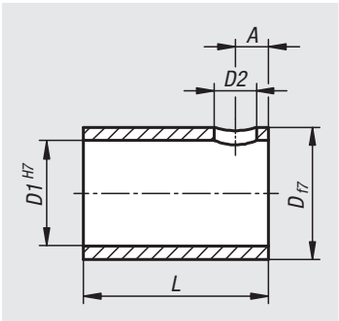
Drawing reference:
1) Direction of rotation
2) Sealing plate
3) Grub screw, M3 (2x120)



Order No.	H	L	P
21730-0500	52	35,2	500
21730-1000	52	35,2	1000
21730-2000	52	35,2	2000

Reducer sleeves





Material:
Stainless steel

Version:
Bright.

Sample order:
nlm 21740-112012

Note:
Reducer sleeves are used to change the diameter between the hollow shaft sensor and adjustment spindle.

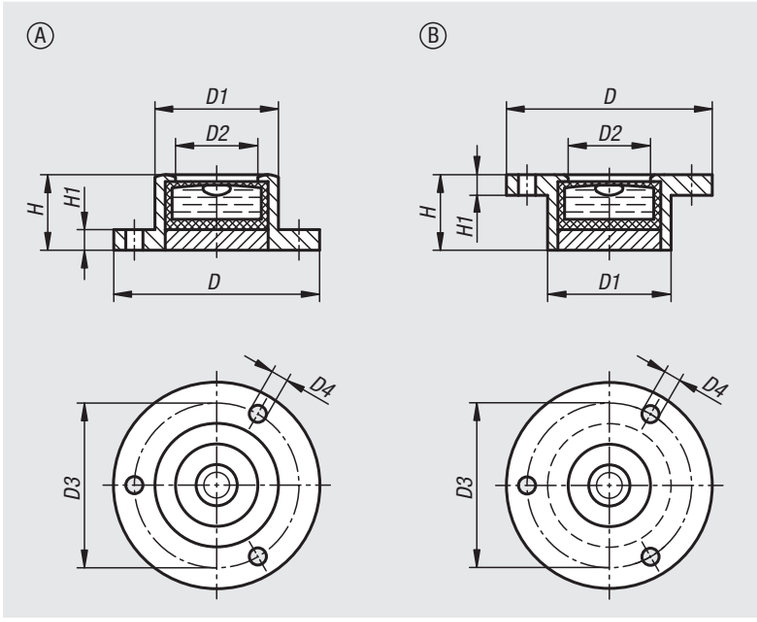
Order No.	A	D	D1	D2	L	Suitable for
21740-112012	3	20	12	3,6	20	21730
21740-112014	3	20	14	3,6	20	21730
21740-112016	3	20	16	3,6	20	21730
21740-112018	3	20	18	3,6	20	21730

Notes

Bullseye levels

in frame, to screw on





Material:
Frame brass.
Bullseye level body polyamide.

Version:
Nickel-plated and high-gloss polished.

Sample order:
nlm 21800-1141030

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
These bullseye levels can either be screwed down using the three holes (Form A) or recessed (Form B).
- Form A: calibrated to the ground bottom face
- Form B: calibrated to the underside of the flange
- Sensitivity in angular minutes for 2 mm bubble travel
- Clear filling
- Black contrast ring
- White level base

Temperature range:
-35 °C up to +55 °C.

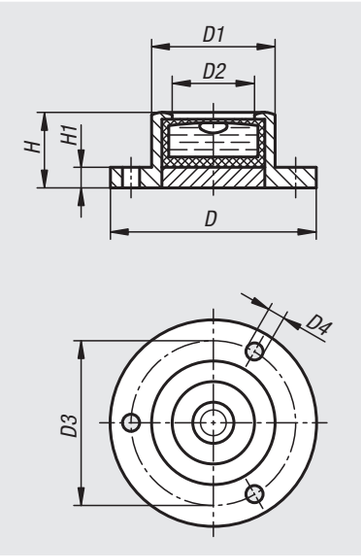
Order No.	Form	Version	D	D1	D2	D3	D4 Ø	H	H1	Sensitivity
21800-1141030	A	with mounting flange	20	14	10	17	1,6	10	1,8	30‘
21800-1171030	A	with mounting flange	25	17	12	21	2	10	2	30‘
21800-1181130	A	with mounting flange	30	18	12	24	2,5	11	3	30‘
21800-1281430	A	with mounting flange	40	28	20	34,5	2,5	14	4	30‘
21800-1341530	A	with mounting flange	50	34	25	43	3	15	5	30‘
21800-2141030	B	inlet flange	20	14	10	17	1,6	10	1,8	30‘
21800-2171030	B	inlet flange	25	17	12	21	2	10	2	30‘
21800-2181130	B	inlet flange	30	18	12	24	2,5	11	3	30‘
21800-2281430	B	inlet flange	40	28	20	34,5	2,5	14	4	30‘
21800-2341530	B	inlet flange	50	34	25	43	3	15	5	30‘

21802

Bullseye levels

in plastic frame





Material:
Frame PMMA.
Bullseye level body acrylic glass.

Version:
black.

Sample order:
nlm 21802-171053

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
These bullseye levels can be mounted using the three fastening holes.
- Calibrated to the ground bottom face
- Sensitivity in angular minutes for 2 mm bubble travel
- Clear filling
- Black contrast ring
- White level base

Temperature range:
-35 °C up to +55 °C.

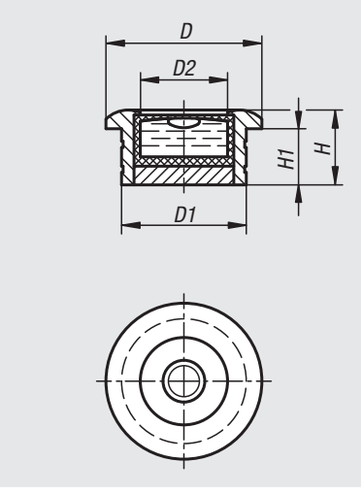
Order No.	D	D1	D2	D3	D4 Ø	H	H1	Sensitivity
21802-171053	26	17	11	21,5	2,3	10	3	53‘
21802-201140	30	20	14	25	2,3	11	3	40‘
21802-241153	36	24	18,5	29	3,2	11	3	53‘

21804

Bullseye levels

with bead-edged frame





Material:
Frame brass.
Bullseye level body polyamide.

Version:
Nickel-plated and high-gloss polished.

Sample order:
nlm 21804-181030

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
- Sensitivity in angular minutes for 2 mm bubble travel
- The bullseye level is calibrated to underside of the flange
- Bead edge with serrations for recessing
- Clear filling
- Black contrast ring
- White level base

Temperature range:
-35 °C up to +55 °C.

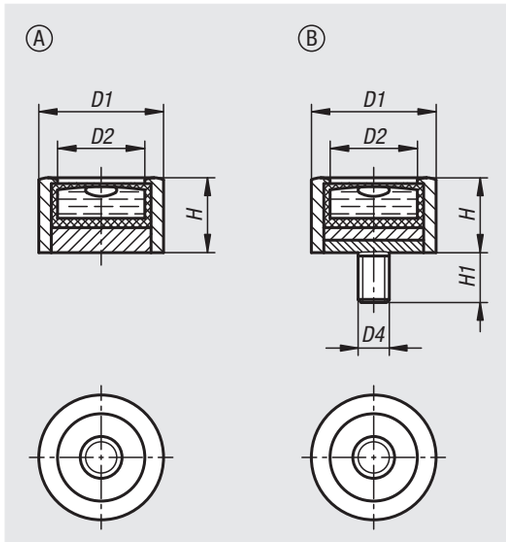
Assembly:
- Measure the level body
- Assemble by pressing in a hole that is 0.02 mm–0.03 mm smaller than the Ø of the level body
- A chamfer on the hole will ease pressing in

Order No.	D	D1	D2	H	H1	Sensitivity
21804-181030	20	18	12	10	8	30‘
21804-201230	25	20	14	12	9	30‘
21804-281330	30	28	20	13	10	30‘

Bullseye levels

in round frame





Material:
Frame brass.
Bullseye level body polyamide.

Version:
Nickel-plated and high-gloss polished.

Sample order:
nlm 21806-1140930

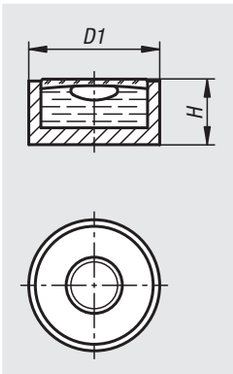
Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
Form B can be fastened using a grub screw.
- Sensitivity in angular minutes for 2 mm bubble travel
- The bullseye level is calibrated to the seating face of frame
- Various threads are available
- Clear filling
- Black contrast ring
- White level base

Temperature range:
-35 °C up to +55 °C.

Order No.	Form	D1	D2	D4 Ø	H	H1	Sensitivity
21806-1140930	A	14	10	-	9,5	-	30‘
21806-1181130	A	18	12	-	11	-	30‘
21806-1201230	A	20	14	-	12	-	30‘
21806-1301530	A	30	21	-	15	-	30‘
21806-2140730	B	14	10	M4	7,5	5	30‘
21806-2181230	B	18	12	M6	12	5	30‘
21806-2201230	B	20	14	M5	12	8	30‘
21806-2301530	B	30	21	M8	15	10	30‘

Bullseye level body





Material:
Bullseye level body stainless steel up to Ø14 mm, then aluminium.
Sight window glass.

Version:
Aluminium black anodised.

Sample order:
nlm 21808-120725

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
Excellent bubble contour, with internal bubble ring to eliminate planar parallaxes.
- Sensitivity in angular minutes for 2 mm bubble travel
- Clear filling

Temperature range:
-35 °C up to +55 °C.

Order No.	Main material	D1	H	Sensitivity
21808-120710	stainless steel	12	6	10‘
21808-120725	stainless steel	12	6	25‘
21808-140710	aluminium	14	6,5	10‘
21808-140720	aluminium	14	6,5	20‘
21808-150710	aluminium	15	6,5	10‘
21808-150720	aluminium	15	6,8	20‘
21808-200810	aluminium	20	8,5	10‘
21808-200820	aluminium	20	8,5	20‘
21808-250910	aluminium	25	8,5	10‘
21808-250920	aluminium	25	8,5	20‘

21810

Bullseye level body

plastic



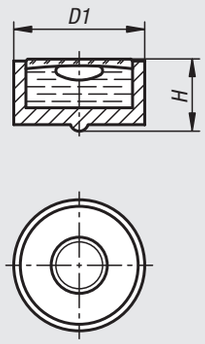
Material:
Polyamide

Version:
Ivory coloured.

Sample order:
nlm 21810-120720

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
With internal black contrast ring for better bubble contour.
- Protruding fill point underneath.
- Sensitivity in angular minutes for 2 mm bubble travel
- Clear filling

Temperature range:
-35 °C up to +55 °C.



Order No.	D1	H	Sensitivity
21810-120720	12	7	20‘
21810-140730	14	7,7	30‘
21810-150720	15	7,7	20‘
21810-180930	18	9,2	30‘
21810-201040	20	10,6	40‘
21810-251230	25	11,5	30‘

21812

Tubular bubble levels

with frame to screw on



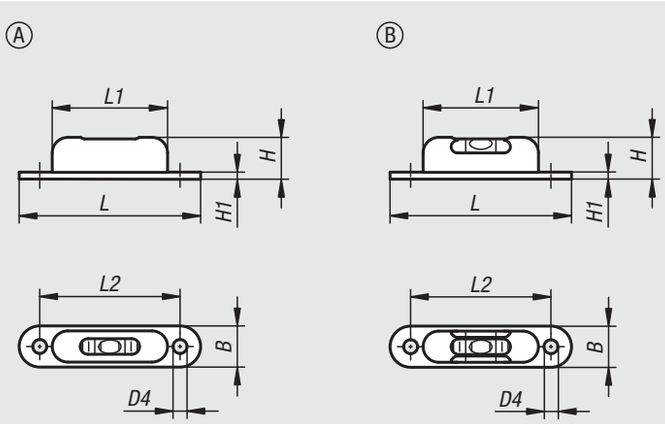
Material:
Frame brass.
Tubular bubble vial glass.

Version:
Nickel-plated and high-gloss polished.
Form B: black anodised.

Sample order:
nlm 21812-1571350

Note:
Bubble levels are used as a type of zero indicator instrument for checking horizontal inclination in e.g. spirit levels, inclinometers, metrology instruments and machine constructions.
The tubular levels can be fastened using the two holes.
- Form A: one sight window
- Form B: three sight windows
- Sensitivity in angular minutes for 2 mm bubble travel
- Green filling

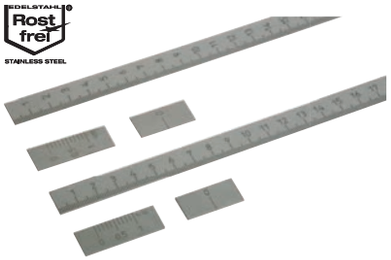
Temperature range:
-35 °C up to +55 °C.



Order No.	Form	B	D4 Ø	H	H1	L Nom. length	L1	L2	Sensitivity
21812-1571350	A	12,3	4,5	13	1	57	37	45	50‘
21812-2571305	B	12,3	4,5	13	1	57	37	45	5‘

Linear scales

self-adhesive, stainless steel



Material:
Stainless steel 1.4310.

Version:
Bright.

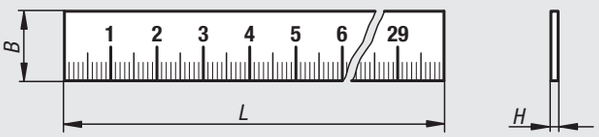
Sample order:
nlm 21880-000010X0300 (include length L)

Note:
Rigid design stainless steel linear scales with self-adhesive back.
Cross section 15 x 1 mm.

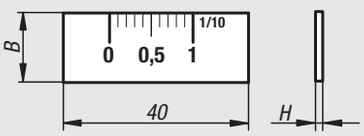
Matt surface and black high contrast graduations. The graduations are deep lasered.

On request:
– Zero mark lower right or centre
– Graduations upper right or both sides
– Other lengths

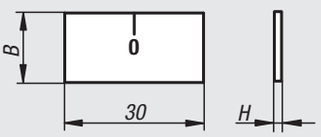
horizontal mounting



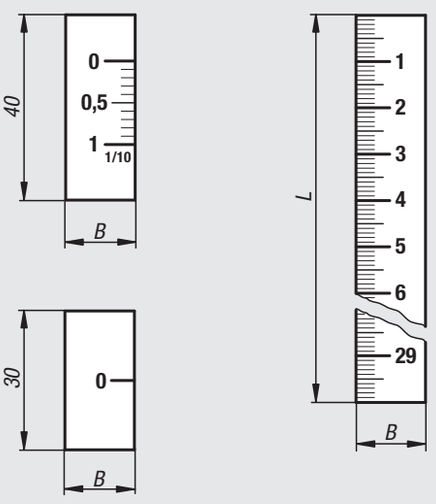
Vernier scale



zero mark



vertical mounting



Linear scales self-adhesive, stainless steel

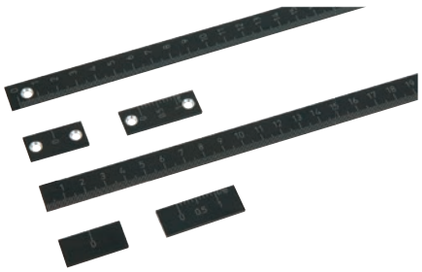
Order No. self adhesive	Product type	Assembly position	Zero point	Division	Graduations	B	H	L
21880-000010X	Scale	horizontal	left	1 mm	bottom	15	1	300/500/700/1000
21880-010010X	Scale	vertical	top	1 mm	left	15	1	300/500/700/1000

Vernier scale and zero reference, self-adhesive, stainless steel

Order No.	Kind of fastening	Product type	Assembly position	Zero point	Graduations	B	H
21880-0001	self adhesive	vernier scale	horizontal	left	top	15	1
21880-0101	self adhesive	vernier scale	vertical	top	right	15	1
21880-00	self adhesive	zero reference mark	horizontal	-	-	15	1
21880-01	self adhesive	zero reference mark	vertical	-	-	15	1

Linear scales

self adhesive or with screw holes, aluminium



Material:
Aluminium.

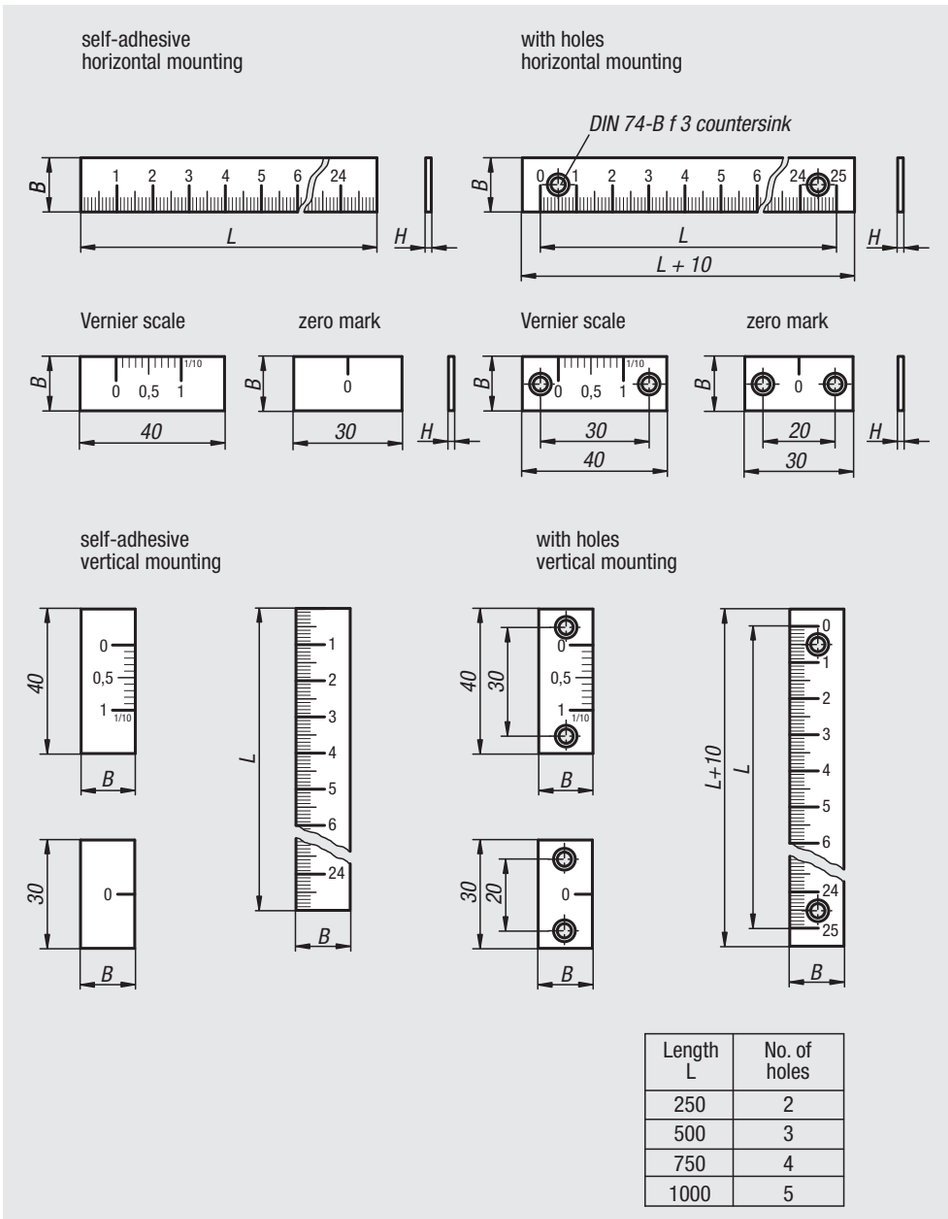
Version:
Black anodised

Sample order:
nlm 21882-000010X0250 (include length L)

Note:
Rigid design aluminium linear scales with self-adhesive back or with screw holes.
Cross section 15 x 2 mm.

Black anodised surface and high contrast graduations for legibility without shading. The graduations are deep lasered.

On request:
– Zero mark lower right or centre
– Graduations upper right or both sides
– Other lengths



Length L	No. of holes
250	2
500	3
750	4
1000	5

Linear scales, self adhesive or with screw holes, aluminium

Order No. self adhesive	Order No. fastening holes	Product type	Assembly position	Zero point	Division	Graduations	B	H	L
21882-000010X	**21882-100010X**	Scale	horizontal	left	1 mm	bottom	15	2	250/500/750/1000
21882-010010X	**21882-110010X**	Scale	vertical	top	1 mm	left	15	2	250/500/750/1000

Vernier scale and zero reference, self adhesive or with holes, aluminium

Order No. self adhesive	Order No. fastening holes	Product type	Assembly position	Zero point	Graduations	B	H
21882-0001	**21882-1001**	vernier scale	horizontal	left	top	15	2
21882-0101	**21882-1101**	vernier scale	vertical	top	right	15	2
21882-00	**21882-10**	zero reference mark	horizontal	-	-	15	2
21882-01	**21882-11**	zero reference mark	vertical	-	-	15	2

Linear scales

self-adhesive or with screw holes, aluminium



Material:
Aluminium.

Version:
Scale surface ground and black anodised

Sample order:
nlm 21884-000010X0500 (include length L)

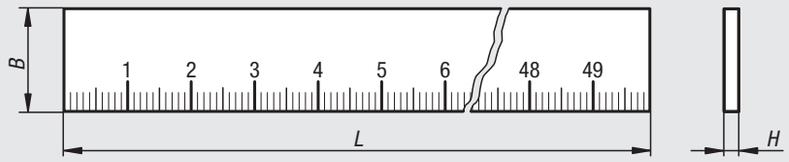
Note:
Rigid, heavy-duty design aluminium linear scales.
Cross section 30 x 6 mm.

Black anodised surface and high contrast graduations for legibility without shading.
The graduations are deep lasered.

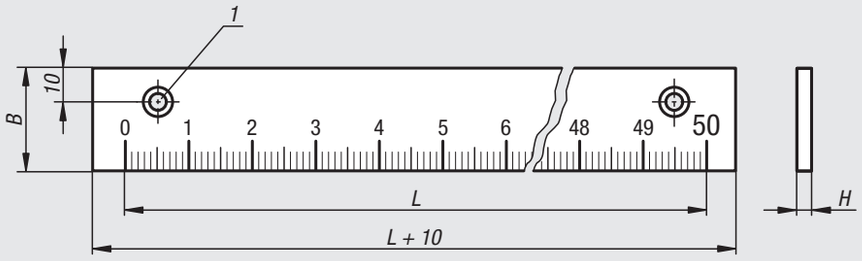
On request:
– Zero mark right or centre
– Graduations top or both sides
– Other lengths

Drawing reference:
1) counterbore to DIN 74-B f 5

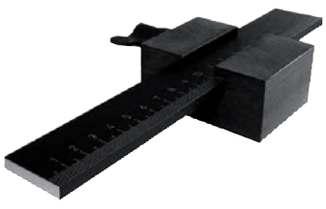
self-adhesive



with holes



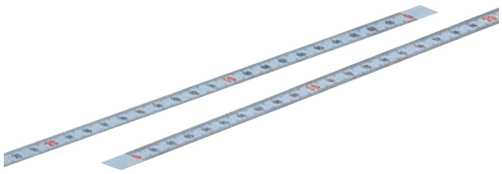
Length L	No. of holes
500	2
1000	3

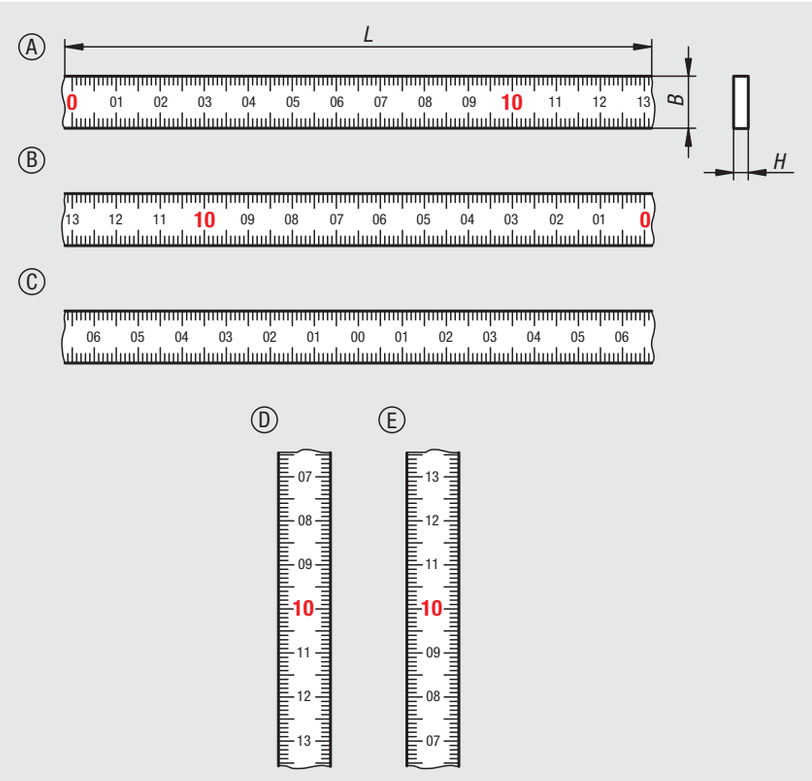


Order No. self adhesive	Order No. fastening holes	Assembly position	Zero point	Division	Graduations	B	H	L
21884-000010X	**21884-100010X**	horizontal	left	1 mm	bottom	30	6	500/1000

Scale tape, steel

self-adhesive





Material:
Steel.

Version:
Painted white.

Sample order:
nlm 21886-00021010X0300 (include length L)

Note:
Scale tapes with mm graduations on top and bottom edge in black and consecutive centimetre numbering. Decimal numbers in red (under 1 m lengths and with centre zero black only).
The scale tapes are self-adhesive with a peel-away foil film on the back. The film must be removed before use.

Application:
The scale tapes can be used where a precise measurement is required. They are used on machines, work tables and workbenches.





Order No.	Kind of fastening	Product type	Form	Assembly position	Zero point	Division	Graduations	B	H	L
21886-00021010X	self adhesive	Scale tape	A	horizontal	left	1 mm	both sides	10	0,5	300/500/1000/2000/3000/5000/6000
21886-00021013X	self adhesive	Scale tape	A	horizontal	left	1 mm	both sides	13	0,5	300/500/1000/2000/3000/5000/6000
21886-00221010X	self adhesive	Scale tape	B	horizontal	right	1 mm	both sides	10	0,5	300/500/1000/2000/3000/5000/6000
21886-00221013X	self adhesive	Scale tape	B	horizontal	right	1 mm	both sides	13	0,5	300/500/1000/2000/3000/5000/6000
21886-00121013X	self adhesive	Scale tape	C	horizontal	centre	1 mm	both sides	13	0,5	800/2000/2500/8000
21886-01021013X	self adhesive	Scale tape	D	vertical	top	1 mm	both sides	13	0,5	1000/2000/3000/5000
21886-01221013X	self adhesive	Scale tape	E	vertical	bottom	1 mm	both sides	13	0,5	1000/2000/3000/5000

Position indicators



Material:
Housing polyamide 6.
Hollow shaft steel.
Screen plastic.
Grub screw steel.

Version:
Impact-resistant housing.
Hollow shaft black oxidised.
Grub screw black.
Dial black, digits white.

Sample order:
nlm 21901-01001111
(Position indicator with 1 mm pitch, decimal point in first position from the right, assembly position 1, direction of count ascending clockwise, colour orange)

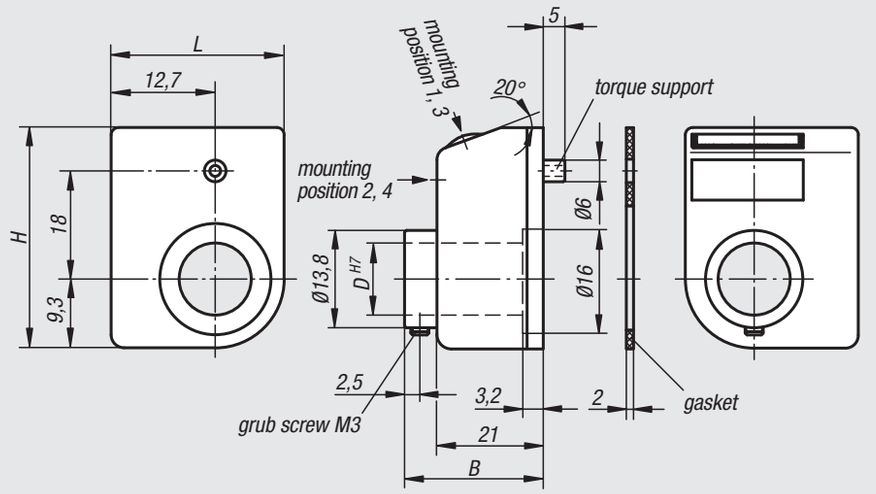
Note:
Position indicators allow direct reading of input measurement values at a glance.
In addition, the value indicated per spindle rotation (corresponding spindle pitch) can be selected and the various indicator values are realised by a transmission gear. The position indicators are distinguished by their small construction with very clear display.
They are especially suitable for small spindle distances and small shaft diameters and have a torque support that is positioned in a hole on the side.

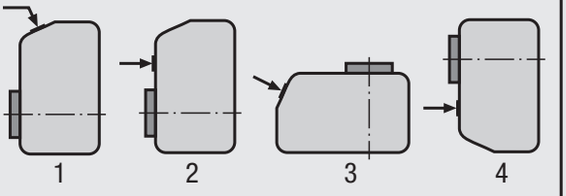
** At the 1st asterisk give assembly position and at the 2nd asterisk give the count direction (see sample order “assembly position, count direction”).

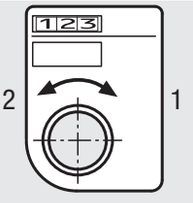
On request:
– Stainless steel driveshaft
– Indicator for inch

Accessories:
– Reducing bushes 21940

Technical data:
– Counter consisting of 3 10-position dials
– Height of figures about 4 mm
– Hollow shaft Ø 10 H7 mm
– Temperature resistant to 80 °C
– Oil and solvent resistant



Display after one rotation, with decimal point:	Mounting position (1 - 4):
 e. g. 21901-**01001**111 **0100** = 1mm increments **1** = decimal places	 e. g. 21901-0100**1**111 = mounting position **1**

Count direction (1 - 2):	Colour (1 - 2):
 e. g. 21901-0100111**1** **1** = clockwise (ascending values) **2** = anticlockwise (ascending values)	 e. g. 21901-0100111**1** **1** = orange **2** = black

Order No. orange	Order No. black	B	D	H	L	Pitch	Indicator after one rotation	Decimal point in position	Max. rpm
21901-010011**	**21901-01001**2**	26	10	33	22	1	01,0	1	500
21901-020011**	**21901-02001**2**	26	10	33	22	2	02,0	1	500
21901-025011**	**21901-02501**2**	26	10	33	22	2,5	02,5	1	500
21901-030011**	**21901-03001**2**	26	10	33	22	3	03,0	1	500
21901-040011**	**21901-04001**2**	26	10	33	22	4	04,0	1	375
21901-050011**	**21901-05001**2**	26	10	33	22	5	05,0	1	300
21901-060011**	**21901-06001**2**	26	10	33	22	6	06,0	1	250
21901-080011**	**21901-08001**2**	26	10	33	22	8	08,0	1	180
21901-100011**	**21901-10001**2**	26	10	33	22	10	10,0	1	150

Position indicators



Material:
Housing polyamide 6.
Hollow shaft steel.
Screen plastic.
Grub screw steel.

Version:
Impact-resistant housing.
Hollow shaft black oxidised.
Grub screw black.
Dial black, digits white.

Sample order:
nlm 21902-01002111
(Position indicator with 1 mm pitch, decimal point in second position from the right, assembly position 1, direction of count ascending clockwise, colour orange)

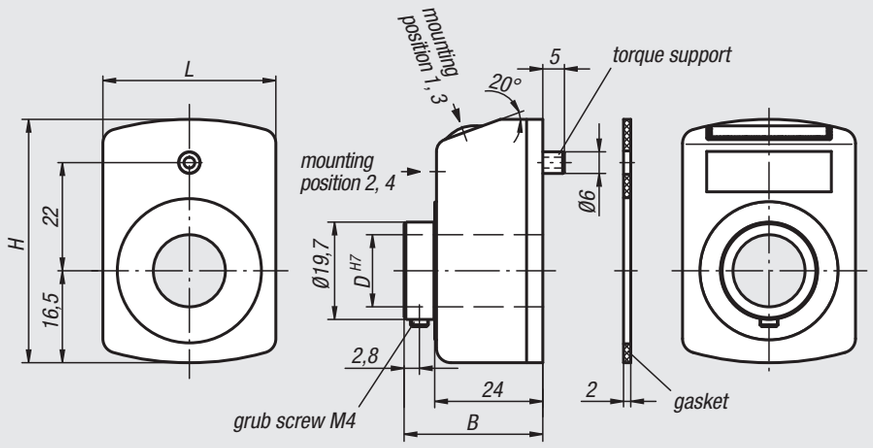
Note:
Position indicators allow direct reading of input measurement values at a glance.
In addition, the value indicated per spindle rotation (corresponding spindle pitch) can be selected and the various indicator values are realised by a transmission gear. The position indicators are distinguished by their small construction with very clear display and fine scale.
They are especially suitable for small spindle distances and small shaft diameters and have a torque support that is positioned in a hole on the side.

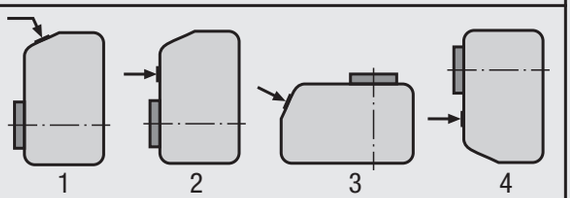
** At the 1st asterisk give assembly position and at the 2nd asterisk give the count direction (see sample order “assembly position, count direction”).

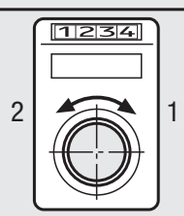
On request:
– Counter cover made of mineral glass
– Stainless steel driveshaft
– Axial sealing (dust-proof)
– Vibration protection

Accessories:
– Reducing bushes 21940
– Insert plate 21942
– Mounting plates 21944

Technical data:
– Counter consisting of 4 10-position dials + fine scale
– Height of figures about 6 mm
– Hollow shaft Ø 14 H7 mm
– Temperature resistant to 80 °C
– Oil and solvent resistant



Display after one rotation, with decimal point:	Mounting position (1 - 4):
	
e. g. 21902-**01002**111 **0100** = 1 mm increments **2** = decimal places	e. g. 21902-0100**2**111 = mounting position **1**

Count direction (1 - 2):	Colour (1 - 2):
	
e. g. 21902-0100211**1** **1** = clockwise (ascending values) **2** = anticlockwise (ascending values)	e. g. 21902-0100211**1** **1** = orange **2** = black

Order No. orange	Order No. black	B	D	H	L	Pitch	Indicator after one rotation	Decimal point in position	Max. rpm
21902-010021**	**21902-01002**2**	31	14	47	33	1	00,10	2	500
21902-010011**	**21902-01001**2**	31	14	47	33	1	001,0	1	500
21902-012511**	**21902-01251**2**	31	14	47	33	1,25	001,2/5	1	500
21902-015011**	**21902-01501**2**	31	14	47	33	1,5	001,5	1	500
21902-020011**	**21902-02001**2**	31	14	47	33	2	002,0	1	500
21902-025011**	**21902-02501**2**	31	14	47	33	2,5	002,5	1	500
21902-030011**	**21902-03001**2**	31	14	47	33	3	003,0	1	500
21902-040011**	**21902-04001**2**	31	14	47	33	4	004,0	1	375
21902-050011**	**21902-05001**2**	31	14	47	33	5	005,0	1	300
21902-060011**	**21902-06001**2**	31	14	47	33	6	006,0	1	250
21902-080011**	**21902-08001**2**	31	14	47	33	8	008,0	1	180
21902-100011**	**21902-10001**2**	31	14	47	33	10	010,0	1	150

Position indicators



Material:
Housing polyamide 6.
Hollow shaft steel.
Screen plastic.
Grub screw steel.

Version:
Impact-resistant housing.
Hollow shaft black oxidised.
Grub screw black.
Dial black, digits white.

Sample order:
nlm 21904-01002111
(Position indicator with 1 mm pitch, decimal point in second position from the right, assembly position 1, direction of count ascending clockwise, colour orange)

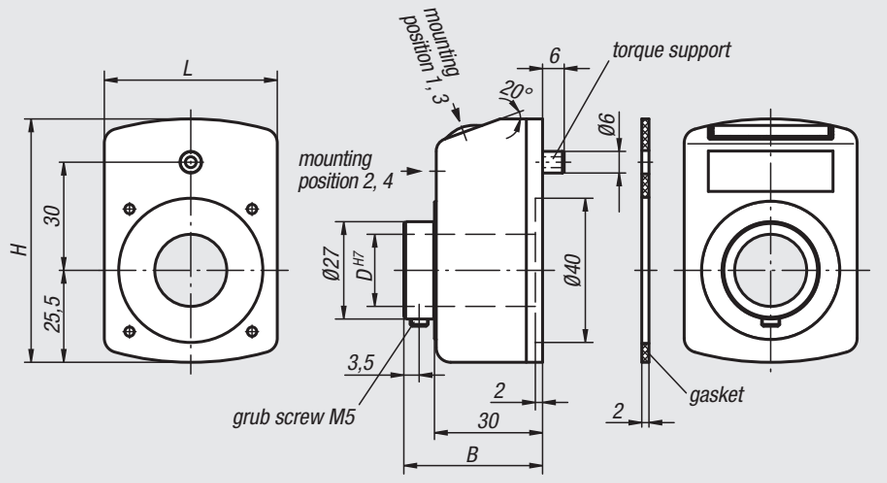
Note:
Position indicators allow direct reading of input measurement values at a glance.
In addition the value indicated per spindle rotation (corresponding spindle pitch) can be selected and the various indicator values are realised by a transmission gear.
The position indicators are distinguished by their very clear display and fine scale. They have a torque support that is positioned in a hole on the side.

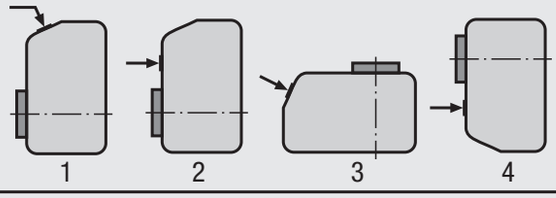
** At the 1st asterisk give assembly position and at the 2nd asterisk give the count direction (see sample order “assembly position, count direction”).

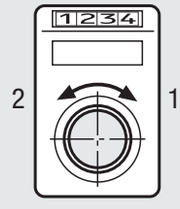
On request:
– Counter cover made of mineral glass
– Stainless steel driveshaft
– Axial sealing (dust-proof)
– Waterproof
– Vibration protection

Accessories:
– Reducing bushes 21940
– Insert plate 21942
– Mounting plates 21944

Technical data:
– Counter consisting of 5 10-position dials + fine scale
– Height of figures about 7 mm
– Hollow shaft Ø 20 H7 mm
– Temperature resistant to 80 °C
– Oil and solvent resistant
– Dust-proof



Display after one rotation, with decimal point:	Mounting position (1 - 4):
	
e. g. 21904-**01002**111 **0100** = 1 mm increments **2** = decimal places	e. g. 21904-0100**2**111 = mounting position **1**

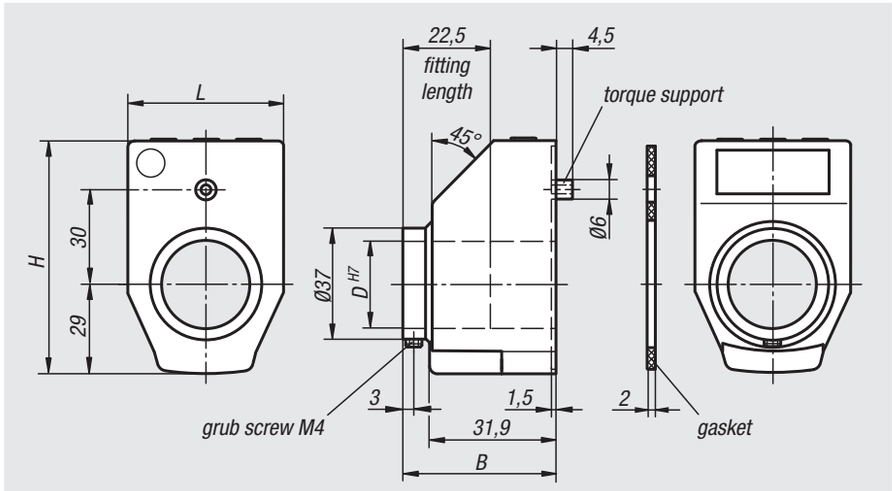
Count direction (1 - 2):	Colour (1 - 2):
	
e. g. 21904-0100211**1** **1** = clockwise (ascending values) **2** = anticlockwise (ascending values)	e. g. 21904-0100211**1** **1** = orange **2** = black

Order No. orange	Order No. black	B	D	H	L	Pitch	Indicator after one rotation	Decimal point in position	Max. rpm
21904-010021**	**21904-01002**2**	38,5	20	67,5	48	1	000,10	2	500
21904-010011**	**21904-01001**2**	38,5	20	67,5	48	1	0001,0	1	500
21904-015011**	**21904-01501**2**	38,5	20	67,5	48	1,5	0001,5	1	500
21904-020011**	**21904-02001**2**	38,5	20	67,5	48	2	0002,0	1	500
21904-025011**	**21904-02501**2**	38,5	20	67,5	48	2,5	0002,5	1	500
21904-030011**	**21904-03001**2**	38,5	20	67,5	48	3	0003,0	1	500
21904-040011**	**21904-04001**2**	38,5	20	67,5	48	4	0004,0	1	450
21904-050011**	**21904-05001**2**	38,5	20	67,5	48	5	0005,0	1	300
21904-060011**	**21904-06001**2**	38,5	20	67,5	48	6	0006,0	1	250
21904-100011**	**21904-10001**2**	38,5	20	67,5	48	10	0010,0	1	150

Position indicators

freely programmable





Material:
Housing plastic.
Hollow shaft steel.
Screen LCD display.
Grub screw steel.

Version:
Hollow shaft black oxidised.
Grub screw black.

Sample order not programmed:
nlm 21922-12
(Position indicator with assembly position 1, colour black)

Sample order programmed:
nlm 21922-0200021120
(see ordering example on the next page)

Note:
The electronic position indicators offer diverse opportunities compared to mechanical position indicators because they display angles as well as uncommon spindle pitches and record each fraction of spindle movement.

* Freely programmable parameters using the programming software 21922-09.

Features:
– indicated value and decimal point freely programmable
– linear or angle mode
– function key for zero-point position
– function key for switching between the absolute dimension and chain dimension
– programming of an offset value directly at the device
– easy battery change

Accessories:
– reducing bushes 21940
– programming software 21922-09

Technical data:
– LCD Display with 5 digits
– Digit size approx. 11.5 mm
– Display range from -19999 ... 99999
– Tunular shaft Ø 30 H7 mm
– Operating temperature -10 °C to +60 °C
– Storage temperature -30 °C to +80 °C
– Revolution max. 600 rpm
– Lithium battery Button cell 3V, type CR 2032. service life approx. 2 years
– Vibration-resistance according to DIN IEC 68-2-6 10 g / (5 ... 150 Hz), 20 g / (100 ... 2000 Hz)
– Shock-resistance according to DIN IEC 68-2-27 30 g / 15 ms
– EMC DIN EN 61000-4-2; DIN EN 61000-4-4
– Type of protection IP 51

Position indicators programmed

Order No.	Version	B	D	H	L
21922-	See sample order for position Indicators programmed	38,8	30	71	48

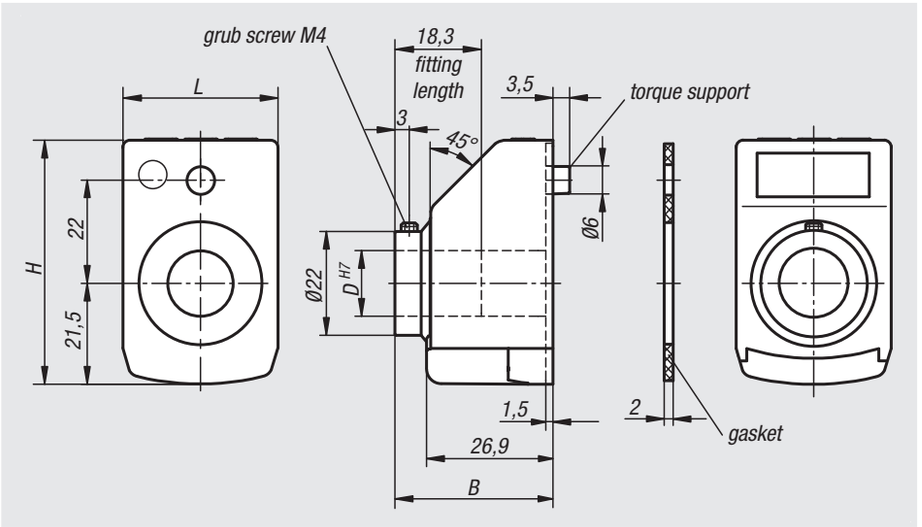
Position indicators not programmed*

Order No.	Assembly position	Colour	Type	Order No. software
21922-11	1	orange	freely programmable	21922-09
21922-12	1	black	freely programmable	21922-09
21922-31	3	orange	freely programmable	21922-09
21922-32	3	black	freely programmable	21922-09

Position indicators

freely programmable





Material:
Housing plastic.
Hollow shaft steel.
Screen LCD display.
Grub screw steel.

Version:
Hollow shaft black oxidised.
Grub screw black.

Sample order not programmed:
nlm 21923-12
(Position indicator with mounted position 1, colour black)

Sample order programmed:
nlm 21923-0200021120
(see ordering example on the next page)

Note:
The electronic position indicators offer diverse opportunities compared to mechanical position indicators because they display angles as well as uncommon spindle pitches and record each fraction of spindle movement.

* Freely programmable parameters using the programming software 21922-09.

Features:
– indicated value and decimal point freely programmable
– linear or angle mode
– function key for zero-point position
– function key for switching between the absolute dimension and chain dimension
– programming of an offset value directly at the device
– easy battery change

Accessories:
– reducing bushes 21940
– programming software 21922-09

Technical data:
– LCD Display with 5 digits
– Digit size approx. 8 mm
– Display range from -19999 ... 99999
– Hollow shaft Ø 14 H7 mm
– Operating temperature -10 °C to +60 °C
– Storage temperature -30 °C to +80 °C
– Revolution max. 600 rpm
– Lithium battery button cell 3V, type CR 2032. service life ca. 2 years
– Vibration-resistance acc. to DIN IEC 68-2-6 10 g / (5 ... 150 Hz), 20 g / (100 ... 2000 Hz)
– Shock-resistance acc. to DIN IEC 68-2-27 30 g / 15 ms
– EMC DIN EN 61000-4-2; DIN EN 61000-4-4
– Protection IP 51

Position indicators programmed

Order No.	Version	B	D	H	L
21923-	See sample order for position Indicators programmed	33,6	14	52	33

Position indicators not programmed*

Order No.	Assembly position	Colour	Type	Order No. software
21923-11	1	orange	freely programmable	21922-09
21923-12	1	black	freely programmable	21922-09
21923-31	3	orange	freely programmable	21922-09
21923-32	3	black	freely programmable	21922-09

Sample order
for Position Indicators programmed 21922 and 21923

Order code:

21922- _ _ _ _ _ | _ | _ | _ | _ | _

Indicator after one rotation:

e.g.
21922-**02000**21120
Please indicate here which value is to be displayed after one rotation (this is usually the spindle pitch).

Important:
Please note the decimal point position!



Angle mode:
(resolution 0.1°)
If you want the display to be in angle mode, enter 03600.

The display in angle mode is 03600 after one rotation and returns to 00000 for the next rotation.

Decimal point position:

e.g.
21922-0200**2**1120
Please indicate here how many decimal places you require.

0 = 00000
1 = 0000.0
2 = 000.00
3 = 00.000

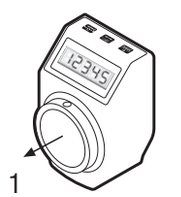


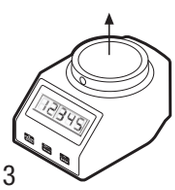
Angle mode:
If you want the display to be in angle mode, the decimal point is best put in position 1.

This means the display shows the value 0360.0 after one rotation.

Assembly position:

e.g.
21922-0200**1**120
1 = Mounting position for horizontal spindle
3 = Mounting position for vertical spindle





Count direction:

e.g.
21922-0200**1**120
1 = clockwise (ascending values)
2 = anticlockwise (ascending values)



Colour:

e.g.
21922-0200**1**120
1 = orange
2 = black



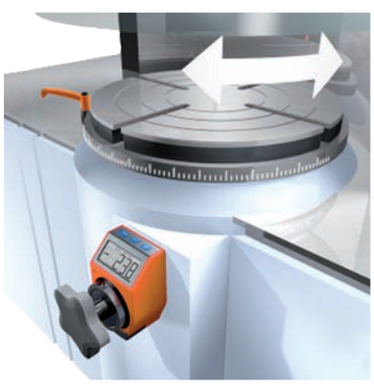
Zero-point position:

e.g.
21922-0200**1**120
0 = directly
5 = delayed by 5 sec.

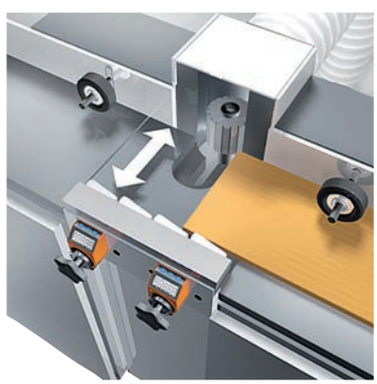


The Zero-point position can be delayed by 5 sec. by means of a parameter, in order to avoid accidental zero setting.

Application using position indicators



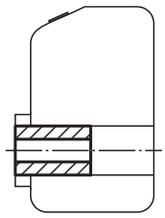


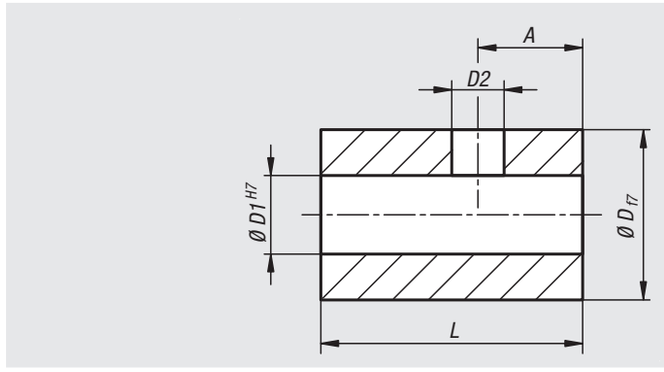


21940

Reducing bushings







Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 21940-14**08** (include Ø D1=8)

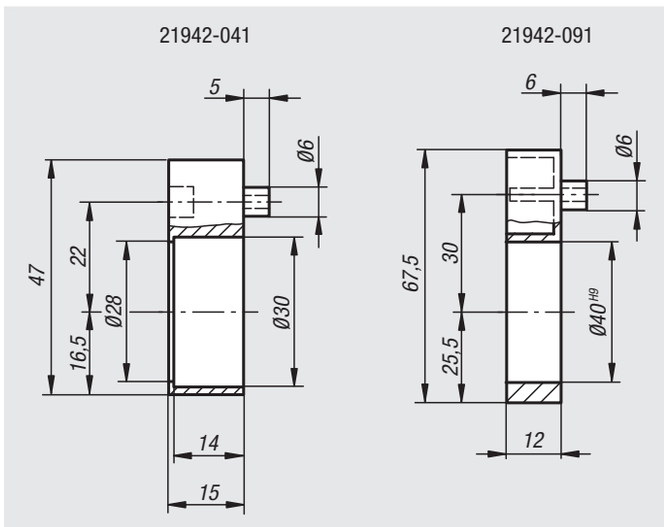
Note:
Reducing bushes are used for adapting the diameter between position indicator and positioning spindle.

Order No.	A	D	D1	D2	L	Suitable for position indicator
21940-10**	2,5	10	6/8	3,2	14	21901
21940-14**	3,5	14	6/8/10/12	4,2	17	21902, 21952
21940-20**	4,5	20	12/14/16/18	5,5	20	21904
21940-30**	4	30	12/14/16/18/20/25	5,5	30	21922

21942

Intermediate plates





Material:
Plastic

Sample order:
nlm 21942-041

Note:
Intermediate plates are used for mounting shaft collars and radial shaft seals.

Order No.	Suitable for position indicator
21942-041	21902, 21923
21942-091	21904, 21922

Mounting brackets



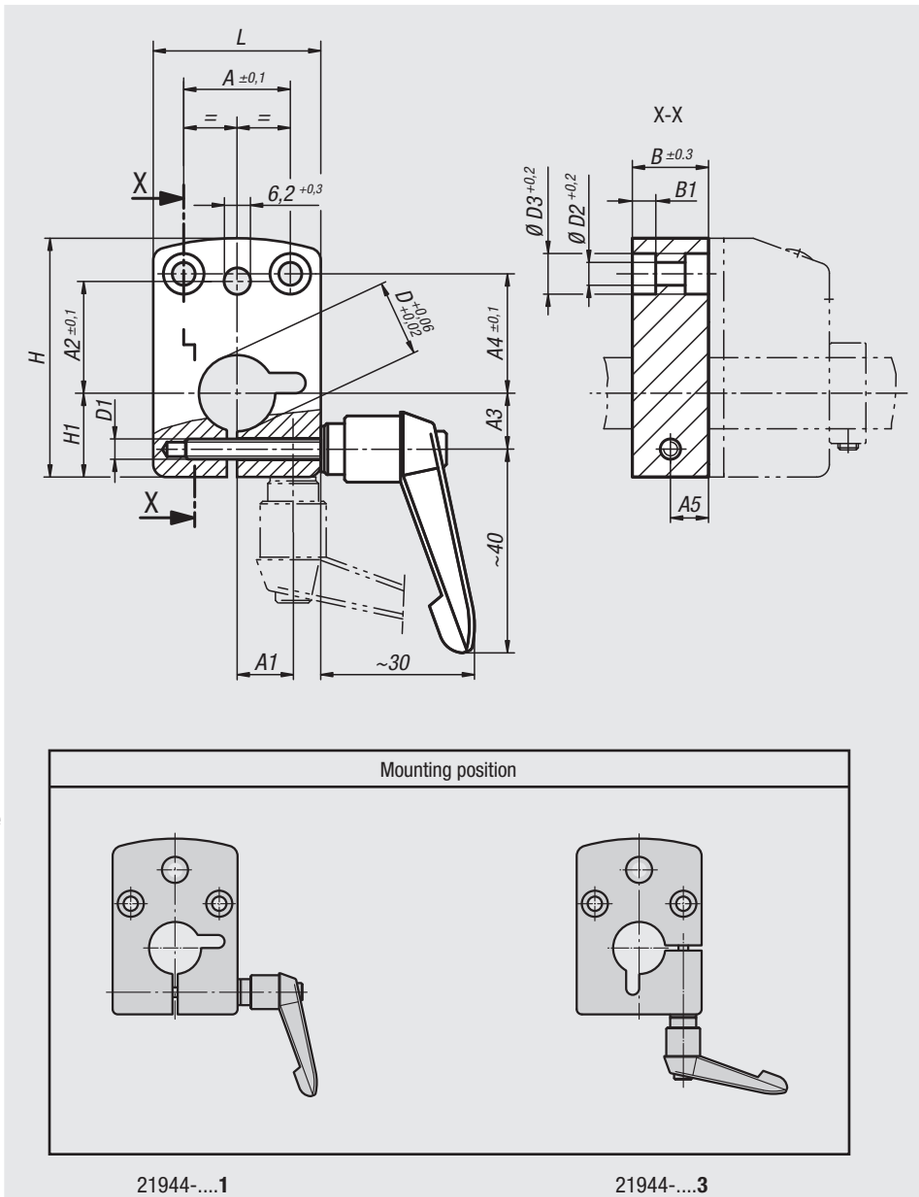
Material:
Mounting position 1, housing die-cast zinc
Mounting position 3, housing aluminium.

Clamping lever plastic.

Version:
Housing anodised.
Clamping lever black grey.

Sample order:
nlm 21944-09121

Note:
Mounting brackets and position indicators form a compact unit. The brackets guarantee reliable spindle clamping without additional construction work.
The simple assembly allows the retrofitting on existing equipment.



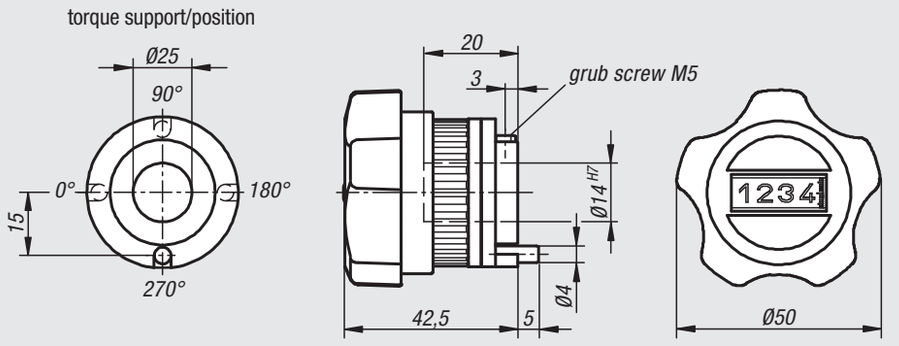


Order No. mounting position 1	Order No. mounting position 3	A	A1	A2	A3	A4	A5	B	B1	D	D1	D2	D3	H	H1	L	Suitable for position indicator
21944-04081	**21944-04083**	21	-/11	22	11/-	23,5	7,5	15	4,6	8	M4	4,5	8	47	16,5	33	21902
21944-04101	**21944-04103**	21	-/11	22	11/-	23,5	7,5	15	4,6	10	M4	4,5	8	47	16,5	33	21902
21944-04121	**21944-04123**	21	-/11	22	11/-	23,5	7,5	15	4,6	12	M4	4,5	8	47	16,5	33	21902
21944-04141	**21944-04143**	21	-/11	22	11/-	23,5	7,5	15	4,6	14	M4	4,5	8	47	16,5	33	21902
21944-09121	**21944-09123**	34	-/17	30	17/-	17	10	20	5,5	12	M5	5,5	10	67,5	25,5	48	21904
21944-09141	**21944-09143**	34	-/17	30	17/-	17	10	20	5,5	14	M5	5,5	10	67,5	25,5	48	21904
21944-09161	**21944-09163**	34	-/17	30	17/-	17	10	20	5,5	16	M5	5,5	10	67,5	25,5	48	21904
21944-09201	**21944-09203**	34	-/17	30	17/-	17	10	20	5,5	20	M5	5,5	10	67,5	25,5	48	21904

Adjusting knobs with position indicator

digital display





Material:
Housing plastic.
Hollow shaft steel.
Screen plastic.

Version:
Housing fibreglass reinforced.
Hollow shaft black oxidised.

Sample order:
nlm 21952-01501112
(Adjusting knob with 1.5 mm pitch, decimal point in first position from the right, torque support at 270°, direction of count ascending clockwise, colour black)

Note:
Adjusting knobs with integrated position indicators allow direct readout of set measurement values such as lengths, flow rates, speeds, etc, at a glance. In addition, the display value can be selected per spindle rotation (corresponding spindle pitch), with the different display values being realized by a variable ratio transmission. The torque support allows the use of the adjusting knobs in any assembly position, even in case of high vibrations.

** At the 1st asterisk give torque support and at the 2nd asterisk give the count direction (see sample order „torque support, count direction“).

On request:
Other pitches

Accessories:
– Reducing bushes 21940

Technical data:
– Counter consisting of 4 10-position dials + fine scale
– Height of figures about 6 mm
– Hollow shaft Ø 14 H7 mm
– Temperature resistant to 80 °C
– Oil and solvent resistant

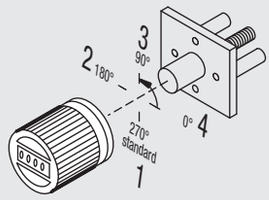
Indicator after one rotation, decimal point position:



order number	for pitch	display
0150	1.5	001,5
0200	2	002,0
0400	4	004,0
0500	5	005,0
1000	10	010,0

e. g. 21952-**01501**112
0150 = 1.5 mm pitch
1 = decimal point at the 1st position from the right

Torque support (1 - 4):



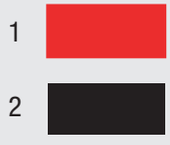
e.g. 21952-01501**1**12
1 = 270° (standard)

Count direction (1 - 2):



e.g. 21952-01501**1**2
1 = clockwise (ascending values)
2 = anticlockwise (ascending values)

Colour (1 - 2):



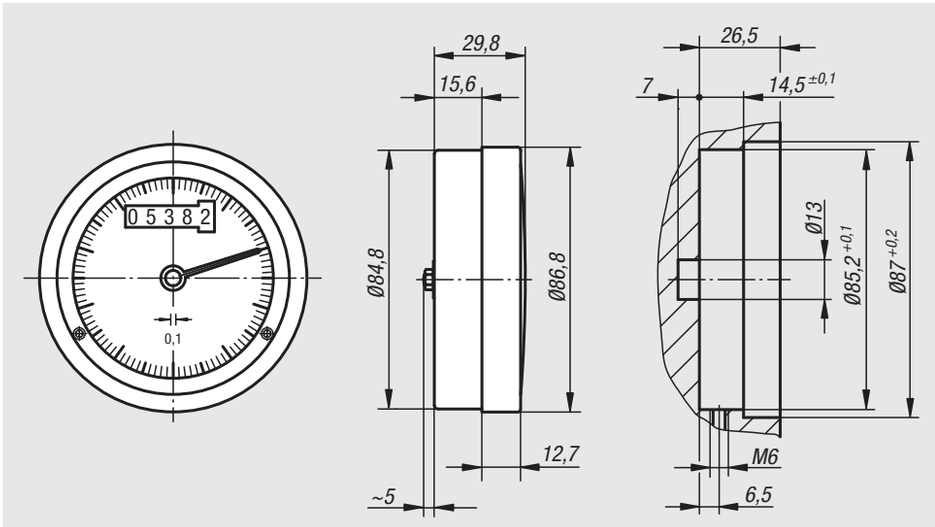
e.g. 21952-01501**1**1**2**
1 = red
2 = black

Order No. red	Order No. black	Pitch	Indicator after one rotation	Decimal point in position
21952-015011**	**21952-01501**2**	1,5	001,5	1
21952-020011**	**21952-02001**2**	2	002,0	1
21952-040011**	**21952-04001**2**	4	004,0	1
21952-050011**	**21952-05001**2**	5	005,0	1
21952-100011**	**21952-10001**2**	10	010,0	1

Position indicators for handwheels

analogue-digital display





Material:
Housing, screen plastic.

Version:
Housing black, fibreglass reinforced.
Screen dustproof.

Sample order:
nlm 21962-800201

Note:
Position indicators are provided for installation in handwheels. They allow direct readout of set measurement values such as lengths, flow rates, speeds, etc, at a glance.
The measurement values are acquired according to the gravity principle. Conceived for use on horizontal spindles.

One revolution of the black pointer corresponds to one spindle rotation. In combination with the 5-place digital display, a very precise and easy read out of the position is thus obtained

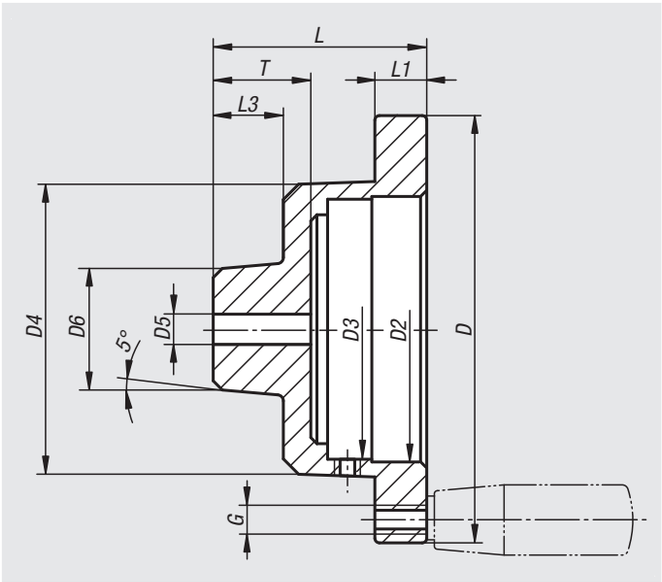
On request:
Other pitches

Accessories:
– Handwheels 21972

Order No.	Size	Pitch	Indicator after one rotation	Suitable for
21962-800201	80	2	00002	handwheel size 80
21962-800301	80	3	00003	handwheel size 80
21962-800401	80	4	00004	handwheel size 80
21962-800501	80	5	00005	handwheel size 80
21962-801001	80	10	00010	handwheel size 80

Handwheels for position indicators





Material:
Cast aluminium.

Version:
Bright.

Sample order:
nlm 21972-801201

Note:
The handwheels have a recess for receiving position indicators.

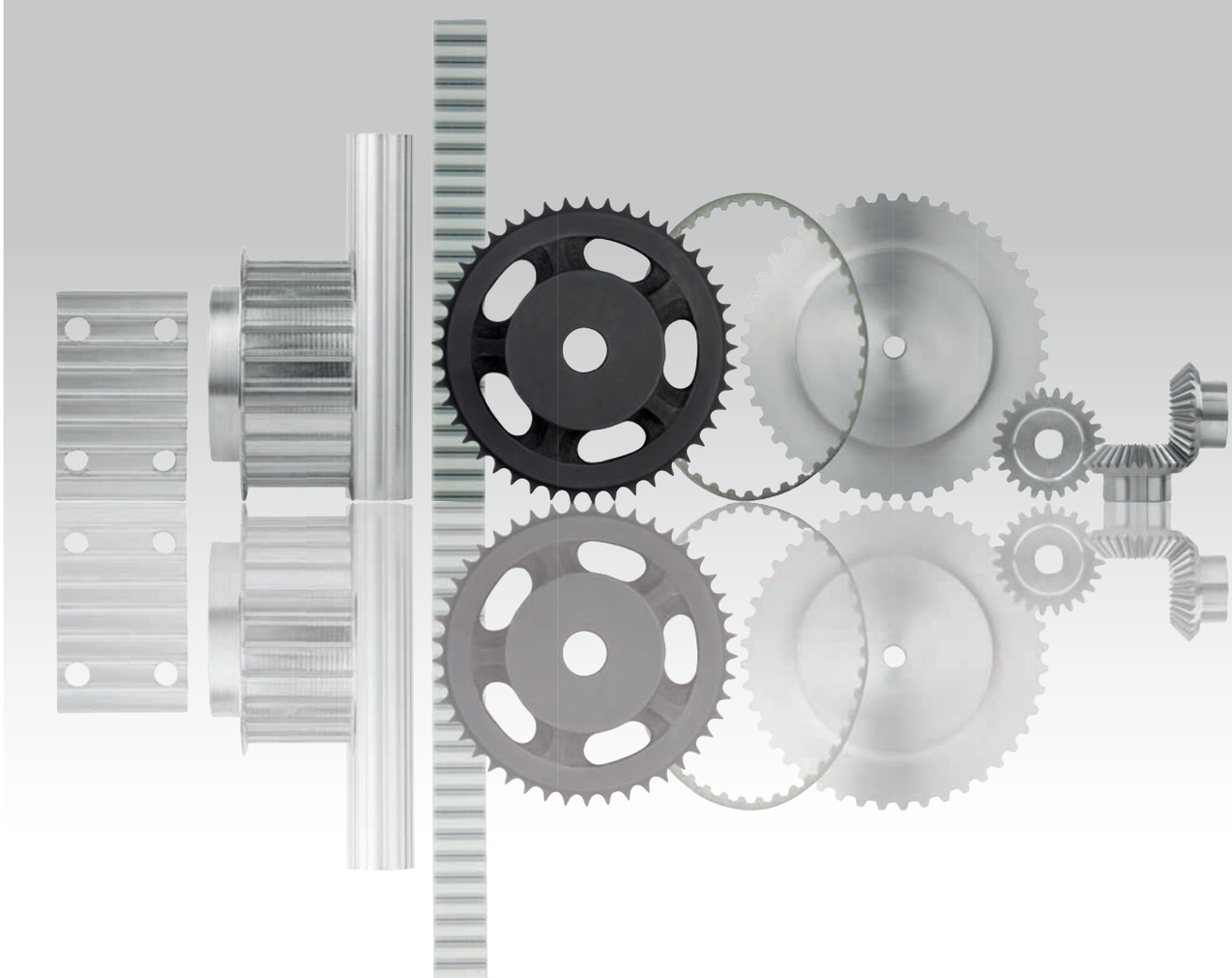
Accessories:
– Position Indicators 21962
– Handles 06290 – 06320

Order No.	Size	D	D2	D3	D4	D5 predrilled	D6	G	L	L1	L3	T	Suitable for
21972-801201	80	120	87	85,2	95	6,8	40	M6	64	15	23	30	position indicator size 80
21972-801401	80	140	87	85,2	95	6,8	40	M8	70	17	23	30	position indicator size 80

Notes

22000

Drive technology



Technical Information
for toothed belts 22052, 22054, 22057 and 22059

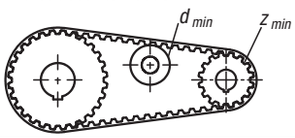
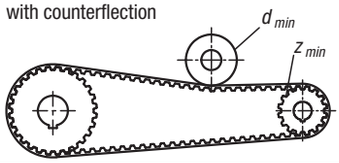
General
Our toothed belts are made of abrasion-resistant polyurethane and reinforced with high-tensile steel cording. They allow for a smooth and synchronous transmission of power. They are maintenance-free and extremely cost-efficient.

Drive installation
Diagrams and performance tables are available on these pages for selecting the size. The axles must be parallel to one another. It is possible to align the toothed pulleys very precisely using a straight edge or laser. Use the largest possible toothed pulleys. Make sure that at least one toothed pulley has rim flanges. When installing the toothed belts, never forcefully lever over the rim flange. Adjustment possibilities should be pre-planned for mounting and setting the correct belt tension.

Belt tension
In order to guarantee a long service life and low-noise operation, correct alignment and tensioning of the drive are absolutely necessary. Idlers are often used on drives with fixed centre distances in order to be able to set the the belt tension accurately. A smooth roller is the preferred idler to use on the slack side of the belt. Smooth idlers produce counter-flection which reduces the service life of the drive. If it is not possible to do without them, the idler should be at least 1.25 times as large as the drive's smallest toothed pulley and fitted as close as possible to the small pulley in order to maximise the number of teeth in mesh.

Belt storage
Never bend the toothed belt. When storing, prevent bending, direct solar radiation and chemical influences.

Minimum number of teeth and minimum diameter

	Profile		T5	T10	AT5	AT10
without counterflection 	Synchronising wheel	z_{min}	10	12	15	15
	Inner idler on teeth	d_{min} [mm]	30	60	30	50
with counterflection 	Synchronising wheel	z_{min}	15	20	25	25
	Outer idler on belt back	d_{min} [mm]	30	60	60	120

Technical information for toothed belts 22052 and 22057

Specific tooth force

Output “P” and torque “M” to be transferred via the belt are calculated using the following formulas:

P = Power [kW]
M = Torque [Nm]
P_{spez} = Specific power
M_{spez} = Specific torque
z_e = Engaging teeth of small gear wheel
z_{emax} = 12 for calculating max. permissible engaging teeth
z_k = Nr. of teeth of small gear wheel
b = Belt width [cm]
A = Centre distance [mm]

$P\ [kW] = P_{spez}$

$M\ [Nm] = M_{spez}$

Pitch T 5

Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]
0	2,523	0,000	**1200**	1,607	2,019	**3400**	1,248	4,444
20	2,458	0,051	**1300**	1,580	2,151	**3600**	1,229	4,632
40	2,403	0,101	**1400**	1,555	2,279	**3800**	1,209	4,812
60	2,354	0,148	**1440**	1,545	2,330	**4000**	1,191	4,988
80	2,312	0,194	**1500**	1,532	2,406	**4500**	1,149	5,414
100	2,276	0,238	**1600**	1,510	2,529	**5000**	1,111	5,818
200	2,135	0,447	**1700**	1,489	2,651	**5500**	1,078	6,206
300	2,032	0,638	**1800**	1,470	2,770	**6000**	1,046	6,571
400	1,951	0,817	**1900**	1,451	2,888	**6500**	1,017	6,924
500	1,884	0,987	**2000**	1,433	3,001	**7000**	0,991	7,262
600	1,829	1,149	**2200**	1,400	3,226	**7500**	0,966	7,588
700	1,781	1,306	**2400**	1,371	3,445	**8000**	0,943	7,897
800	1,738	1,456	**2600**	1,342	3,654	**8500**	0,920	8,191
900	1,701	1,603	**2800**	1,317	3,860	**9000**	0,900	8,480
1000	1,667	1,745	**3000**	1,306	3,940	**9500**	0,880	8,758
1100	1,635	1,884	**3200**	1,292	4,059	**10000**	0,862	9,027

Pitch T 10

Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]
0	8,244	0,000	**1200**	4,808	6,042	**3400**	3,460	12,318
20	8,009	0,168	**1300**	4,708	6,409	**3600**	3,385	12,761
40	7,805	0,327	**1400**	4,614	6,764	**3800**	3,312	13,179
60	7,627	0,479	**1440**	4,577	6,902	**4000**	3,245	13,592
80	7,472	0,626	**1500**	4,526	7,109	**4500**	3,088	14,549
100	7,339	0,768	**1600**	4,444	7,445	**5000**	2,946	15,424
200	6,804	1,425	**1700**	4,366	7,771	**5500**	2,817	16,224
300	6,411	2,014	**1800**	4,292	8,090	**6000**	2,701	16,969
400	6,105	2,557	**1900**	4,222	8,401	**6500**	2,593	17,646
500	5,857	3,066	**2000**	4,157	8,706	**7000**	2,492	18,269
600	5,648	3,549	**2200**	4,033	9,291	**7500**	2,398	18,836
700	5,467	4,007	**2400**	3,920	9,851	**8000**	2,311	19,359
800	5,306	4,445	**2600**	3,815	10,386	**8500**	2,228	19,832
900	5,163	4,866	**2800**	3,718	10,901	**9000**	2,150	20,264
1000	5,034	5,271	**3000**	3,680	11,097	**9500**	2,077	20,661
1100	4,916	5,663	**3200**	3,626	11,389	**10000**	2,007	21,015

Pitch AT 5

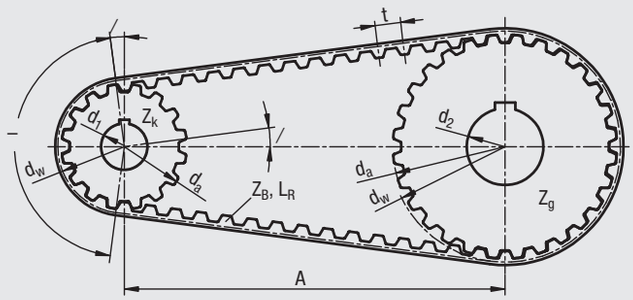
Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]
0	3,813	0,000	**1200**	2,668	3,352	**3400**	1,993	7,096
20	3,758	0,079	**1300**	2,620	3,566	**3600**	1,954	7,368
40	3,708	0,155	**1400**	2,574	3,773	**3800**	1,917	7,627
60	3,663	0,230	**1440**	2,557	3,855	**4000**	1,881	7,879
80	3,623	0,304	**1500**	2,531	3,975	**4500**	1,799	8,479
100	3,586	0,376	**1600**	2,491	4,173	**5000**	1,725	9,032
200	3,448	0,722	**1700**	2,452	4,365	**5500**	1,658	9,549
300	3,343	1,050	**1800**	2,416	4,554	**6000**	1,596	10,029
400	3,235	1,355	**1900**	2,381	4,737	**6500**	1,539	10,473
500	3,137	1,642	**2000**	2,348	4,918	**7000**	1,485	10,887
600	3,050	1,916	**2200**	2,285	5,265	**7500**	1,436	11,278
700	2,972	2,178	**2400**	2,229	5,601	**8000**	1,389	11,635
800	2,900	2,430	**2600**	2,175	5,923	**8500**	1,346	11,980
900	2,834	2,671	**2800**	2,125	6,231	**9000**	1,304	12,289
1000	2,775	2,905	**3000**	2,106	6,352	**9500**	1,264	12,576
1100	2,719	3,132	**3200**	2,079	6,531	**10000**	1,228	12,854

Pitch AT 10

Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]	Speed [min^{-1}]	M_{spez} [Ncm/cm]	P_{spez} [W/cm]
0	15,903	0,000	**1200**	10,174	12,785	**3400**	7,019	24,898
20	15,670	0,328	**1300**	9,945	13,538	**3600**	6,838	25,778
40	15,452	0,647	**1400**	9,731	14,266	**3800**	6,664	26,516
60	15,246	0,958	**1440**	9,649	14,550	**4000**	6,500	27,225
80	15,053	1,261	**1500**	9,529	14,968	**4500**	6,120	28,837
100	14,870	1,557	**1600**	9,340	15,649	**5000**	5,777	30,248
200	14,103	2,954	**1700**	9,160	16,305	**5500**	5,464	31,470
300	13,483	4,236	**1800**	8,990	16,944	**6000**	5,179	32,536
400	12,927	5,414	**1900**	8,828	17,563	**6500**	4,916	33,460
500	12,439	6,513	**2000**	8,672	18,162	**7000**	4,670	34,232
600	12,008	7,545	**2200**	8,380	19,305	**7500**	4,441	34,878
700	11,626	8,522	**2400**	8,113	20,390	**8000**	4,227	35,409
800	11,282	9,451	**2600**	7,866	21,414	**8500**	4,023	35,808
900	10,969	10,337	**2800**	7,632	22,378	**9000**	3,832	36,113
1000	10,683	11,186	**3000**	7,544	22,751	**9500**	3,651	36,322
1100	10,418	12,000	**3200**	7,416	23,296	**10000**	3,479	36,429

Technical information for toothed belts 22052 and 22057

b	(cm)	Belt width
L_R	(mm)	Belt length
z_R	-	Number of belt teeth
B	(mm)	Pulley width
A	(mm)	Centre distance
A_{eff}	(mm)	Effective centre distance
d	(mm)	Diameter of bore
d_a	(mm)	Outer diameter
d_{ak}	(mm)	Outer diameter of small pulley
d_{ag}	(mm)	Outer diameter of large pulley
d_w	(mm)	Effective diameter
d_{wk}	(mm)	Effective diameter of small pulley
d_{wg}	(mm)	Effective diameter of large pulley
F_{Wsta}	(N)	Static shaft power
F_{TV}	(N)	Pre-tensioning force per belt
F_{Tzul}	(N)	Maximum permissible belt tension
		Peripheral force
F_U	(N)	Torque
M	(Nm)	Output
P	(kW)	Acceleration time
t_{ab}	(s)	Deceleration time
t_{av}	(s)	Speed / peripheral speed
v	(m/s)	Number of teeth in mesh
z_e	-	Number of teeth on small pulley
z_k	-	Number of teeth on large pulley
z_g	-	Speed ratio n1 : n2
i	-	Density
ρ	(kg/dm³)	Mass moment of inertia
J	(kgm²)	Pitch
t	(mm)	Speed
n	(min⁻¹)	Drive pulley speed
n_1	(min⁻¹)	Angular speed
ω	(s⁻¹)	Wrap angle
β	(°)	



Formula's

Power

$$P = \frac{M \cdot n}{9550}$$

$$P = \frac{F_u \cdot d_w \cdot n}{19100 \cdot 10^3}$$

Circumferential force

$$F_u = \frac{19100 \cdot P \cdot 10^3}{n \cdot d_w}$$

$$F_u = \frac{2000 \cdot M}{d_w}$$

Torque

$$M = \frac{F_u \cdot d_w}{2000}$$

$$M = \frac{9550 \cdot P}{n}$$

Angular velocity

$$= \frac{\pi \cdot n}{30}$$

Circumferential speed

$$v = \frac{d_w \cdot n}{19100}$$

Acceleration torque

$$M_{ab} = \frac{J \cdot \text{“}n}{9{,}55 \cdot t_{ab}}$$

Moment of inertia

$$J = 98{,}2 \cdot 10^{-15} \cdot B \cdot \rho \cdot (d_a^4 - d^4)$$

Speed

$$n = \frac{19100 \cdot v}{d_w}$$

Eœective diameter

$$d_w = \frac{z \cdot t}{\pi}$$

Belt length for i=1

$$L_R = 2 \cdot A + \pi \cdot d_w$$

$$L_R = 2 \cdot A + z \cdot t$$

Belt length for i Š 1
(simplified)

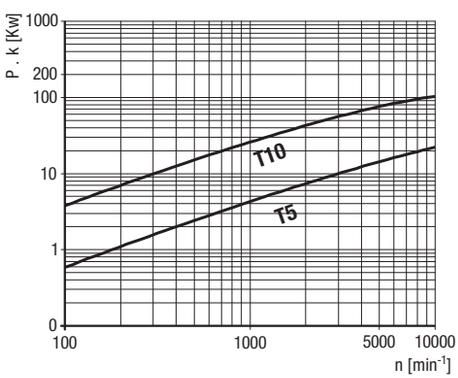
$$L_R \bullet \frac{t}{2} \cdot (z_g + z_k) + 2A + \frac{1}{4A} \cdot \left[\frac{(z_g - z_k) \cdot t}{\pi}\right]^2$$

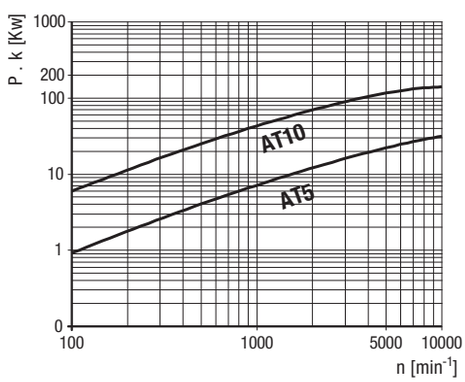
Belt length for i Š 1
(for greater accuracy)

$$L_R \bullet 2A \cdot \sin \cdot \frac{-}{2} + \frac{t}{2} \cdot \left[z_g + z_k + \left(1 - \frac{-}{180}\right) \cdot (z_g - z_k)\right]$$

Selection diagram

The selection diagrams enables the selection of the belt profile for the drive task in advance. The application c safety factors and the speed of the small pulley must be taken into account.





Technical information for toothed belts 22052 and 22057

Drive calculation
The following data are required for the calculation:

• drive output to be transferred	= P	[kW]
• drive speed	= n_1	[min^{-1}]
• motor starting torque	= M_{ab}	[Nm]
• centre distance required	= A	[mm]
• max. permissible drive pulley diameter	= d_{w1}	[mm]

Safety factor
Belts are selected for uniform loads. A c1 safety factor must be anticipated for peak and dynamic loads.
drive with uniform load c1 = 1.0
drive with peak or dynamic load:

light c1	=	1.4
medium c1	=	1.7
heavy c1	=	2.0

For speed step-up ratios a c2 acceleration factor must be anticipated:

i = from 0.66 to 1.0	c2	=	1.1
i = from 0.40 to 0.66	c2	=	1.2
i < 0.40	c2	=	1.3

The overall service factor is:
$c_0 = c_1 \times c_2$

Belt and washer selection
Use the selection diagram for belt pre-selection. Selecting the largest permissible pulley is recommended.

Calculating speed ratio i

$$i = \frac{n_1}{n_2}$$

Calculating the number of teeth in mesh

$$z_e = \frac{\hat{}}{360} \check{} z_k$$

with ^ [°] = wrap angle

$$\hat{} = 2 \check{} \arccos \check{} \left[\frac{t \check{} (z_g - z_k)}{2 \check{} \check{} A} \right]$$

Determining the belt width

$$b = \frac{P \text{˝} 1000 \text{˝} c_0}{z_k \text{˝} z_e \text{˝} P_{spez}} \qquad b = \frac{100 \text{˝} M \text{˝} c_0}{z_k \text{˝} z_e \text{˝} M_{spez}}$$

Checking the permissible belt tension
The permissible belt tension must be greater than the maximum peripheral force anticipated.

$$F_{Tzul} > c_0 \cdot F_U \quad \text{with} \quad F_U = \frac{2000 \cdot M}{d_w}$$

Static shaft power
FWsta = 2 x FTV x cos x β
FWsta = 2 x FTV (for i = 1)

Determining the tension
The belt is tensioned correctly if the slack side remains tensioned under every operating condition that occurs. More than the required tension should be avoided so that the lowest load possible on the shaft is achieved. The correct belt tension also depends on the belt length LR (number of belt teeth zR).
The following tension forces per side are recommended:
2 shaft drives:

$z_R < 75$	$F_{TV} = 1/3\ F_U$
$75 < z_R < 150$	$F_{TV} = 1/2\ F_U$
$z_R > 150$	$F_{TV} = 2/3\ F_U$
Multi-shaft drives:	$F_{TV} > F_U$

Use of an applicable measurement device is recommended to set the tension correctly.

Calculation example

- motor output to be transferred	10 kW
- drive speed n1	2600 1/min
- drive speed n2	2600 1/min
- motor starting torque	50 Nm
- centre distance required A	400 mm
- max. permissible drive pulley diameter dw	130 mm
- safety factor c1	1.4

Calculating the speed ratio

$$\frac{n_1}{n_2} = 1$$

Belt selection:
Belt pitch T10 is selected from the selection diagram taking into account safety factor 1.4 for calculated output PB of 14 kW corrected as a result.

Calculating the number of washer teeth z:
The number of teeth is calculated from the maximum permissible pulley diameter and the selected belt pitch T10. On the basis of speed ratio i = 1, driving and driven pulley are the same size.

$$z = \frac{130 \hat{} \check{}}{10} = 40.84 \text{ - selected } z = 40 \text{ with } d_w = 127.32 \text{ mm.}$$

The maximum permissible diameter was selected in order to minimise the belt width.
$z_1 = 40$, $z_2 = 40$

Calculating the belt length
$L_R = 2 \cdot A + \pi \cdot d \cdot w = 2 \cdot A + z \cdot t$
$L_R = 2 \cdot 400 + 40 \cdot 10 = 1200$ mm

Number of teeth in mesh
When i = 1 the number of teeth in mesh on both pulleys is z e = 20.

Determining belt width b:

$$b = \frac{1000 \cdot 10 \cdot 1{,}4}{40 \cdot 12 \cdot 10{,}386} = 2{,}81 \text{ cm} = 28{,}1 \text{ mm}$$

The next largest standard belt width of 32 mm is selected. The belt width selected is checked based on the motor starting torque for speed n = 0.

$$b = \frac{100 \cdot 50}{40 \cdot 12 \cdot 3{,}815} = 2{,}73 \text{ cm} = 27{,}3 \text{ mm}$$

The next largest standard width of 32 mm is selected.

Checking the permissable belt tension FTzul:

$$F_U = \frac{2000 \cdot 50}{127{,}32} = 785{,}4 \text{ N}$$

Tensioning force via No. of belt teeth

$$Z_R = \frac{1200}{10} = 120 \text{ teeth}$$

Belt tensioning force FTV per side is:

$$F_{TV} = \frac{1}{2} \check{} F_U = 392{,}7 \text{ N with } z_R = 120$$

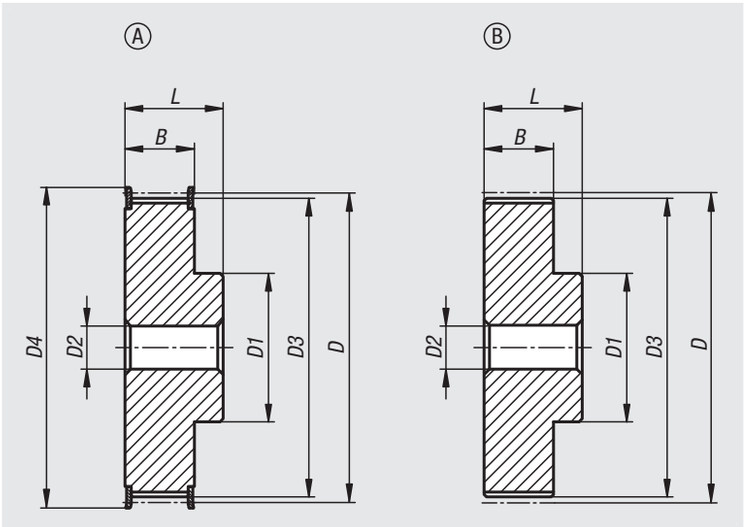
Flexibility:
The requisite minimum diameters are maintained.

Belt selected:
32 T10 - 1200

Toothed belt pulleys

T profile





Material:
Aluminium.
Rim flanges, steel.

Version:
Aluminium bright.
Steel electro zinc-plated.

Sample order:
nlm 22002-051010

Note:
Standard T-profile to DIN 7721 T2 with metric pitch (trapezoidal toothing). At least one toothed belt pulley must have rim flanges. The toothed belt pulleys have a centre or pilot hole.

Toothed belt pulleys, T5 profile

Order No. for 10 mm belt	Order No. for 16 mm belt	Order No. for 25 mm belt	Form	No. of teeth	D	D1	D2 max.	D3	D4	B	L
22002-051010	**22002-051610**	**22002-052510**	A	10	15,92	8	5	15,05	19,5	15/21/30	21/27/36
22002-051012	**22002-051612**	**22002-052512**	A	12	19,01	10	6	18,25	23	15/21/30	21/27/36
22002-051014	**22002-051614**	**22002-052514**	A	14	22,29	13	8	21,45	25	15/21/30	21/27/36
22002-051015	**22002-051615**	**22002-052515**	A	15	23,88	16	10	23,05	28	15/21/30	21/27/36
22002-051016	**22002-051616**	**22002-052516**	A	16	25,47	18	11	24,6	32	15/21/30	21/27/36
22002-051018	**22002-051618**	**22002-052518**	A	18	28,65	20	12	27,8	30	15/21/30	21/27/36
22002-051019	**22002-051619**	**22002-052519**	A	19	30,25	22	12	29,4	36	15/21/30	21/27/36
22002-051020	**22002-051620**	**22002-052520**	A	20	31,83	23	14	31	36	15/21/30	21/27/36
22002-051022	**22002-051622**	**22002-052522**	A	22	35,12	24	15	34,25	38	15/21/30	21/27/36
22002-051024	**22002-051624**	**22002-052524**	A	24	38,21	26	15	37,4	42	15/21/30	21/27/36
22002-051025	**22002-051625**	**22002-052525**	A	25	39,8	26	15	39	44	15/21/30	21/27/36
22002-051026	**22002-051626**	**22002-052526**	A	26	41,47	26	16	40,6	44	15/21/30	21/27/36
22002-051027	**22002-051627**	**22002-052527**	A	27	42,98	30	18	42,2	48	15/21/30	21/27/36
22002-051028	**22002-051628**	**22002-052528**	A	28	44,62	32	18	43,75	48	15/21/30	21/27/36
22002-051030	**22002-051630**	**22002-052530**	A	30	47,76	34	18	46,95	51	15/21/30	21/27/36
22002-051032	**22002-051632**	**22002-052532**	A	32	50,94	38	22	50,1	54	15/21/30	21/27/36
22002-051036	**22002-051636**	**22002-052536**	A	36	57,31	38	22	56,45	63	15/21/30	21/27/36
22002-051040	**22002-051640**	**22002-052540**	A	40	63,66	40	23	62,85	66	15/21/30	21/27/36
22002-051042	**22002-051642**	**22002-052542**	A	42	66,87	40	24	66	71	15/21/30	21/27/36
22002-051044	**22002-051644**	**22002-052544**	B	44	70,07	45	26	69,2	-	15/21/30	21/27/36
22002-051048	**22002-051648**	**22002-052548**	B	48	76,42	50	28	75,55	-	15/21/30	21/27/36
22002-051060	**22002-051660**	**22002-052560**	B	60	95,52	65	35	94,65	-	15/21/30	21/27/36

Toothed belt pulleys

T profile

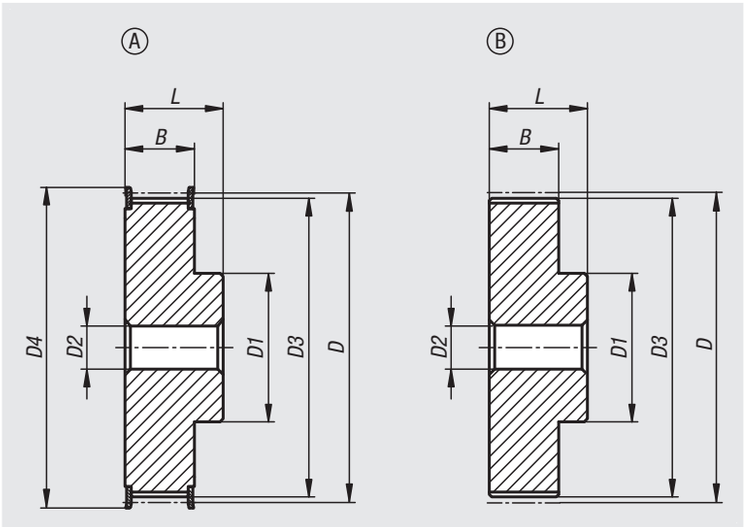
Toothed belt pulleys, T10 profile

Order No. for 16 mm belt	Order No. for 25 mm belt	Order No. for 32 mm belt	Form	No. of teeth	D	D1	D2 max.	D3	D4	B	L
22002-101612	**22002-102512**	**-**	A	12	38,2	28	16	36,35	42	21/30	31/40
22002-101614	**22002-102514**	**-**	A	14	44,56	32	18	42,7	48	21/30	31/40
22002-101615	**22002-102515**	**-**	A	15	47,75	32	18	45,9	51	21/30	31/40
22002-101616	**22002-102516**	**-**	A	16	50,93	35	20	49,05	54	21/30	31/40
22002-101618	**22002-102518**	**22002-103218**	A	18	57,29	40	22	55,45	60	21/30/37	31/40/47
22002-101619	**22002-102519**	**22002-103219**	A	19	60,48	44	22	58,6	66	21/30/37	31/40/47
22002-101620	**22002-102520**	**22002-103220**	A	20	63,66	46	24	61,8	66	21/30/37	31/40/47
22002-101622	**22002-102522**	**22002-103222**	A	22	70,03	52	28	68,15	75	21/30/37	31/40/47
22002-101624	**22002-102524**	**22002-103224**	A	24	76,39	58	30	74,55	83	21/30/37	31/40/47
22002-101625	**22002-102525**	**22002-103225**	A	25	79,58	60	30	77,7	83	21/30/37	31/40/47
22002-101626	**22002-102526**	**22002-103226**	A	26	82,76	60	30	80,9	87	21/30/37	31/40/47
22002-101627	**22002-102527**	**22002-103227**	A	27	85,95	60	30	84,1	91	21/30/37	31/40/47
22002-101628	**22002-102528**	**22002-103228**	A	28	89,13	60	30	87,25	93	21/30/37	31/40/47
22002-101630	**22002-102530**	**22002-103230**	A	30	95,49	60	30	93,65	97	21/30/37	31/40/47
22002-101632	**22002-102532**	**22002-103232**	A	32	101,86	65	32	100	106	21/30/37	31/40/47
22002-101636	**22002-102536**	**22002-103236**	A	36	114,59	70	35	112,75	119	21/30/37	31/40/47
22002-101640	**22002-102540**	**22002-103240**	A	40	127,32	80	40	125,45	131	21/30/37	31/40/47
22002-101644	**22002-102544**	**22002-103244**	B	44	140,06	88	46	138,2	-	21/30/37	31/40/47
22002-101648	**22002-102548**	**22002-103248**	B	48	152,78	95	48	150,95	-	21/30/37	31/40/47
22002-101660	**22002-102560**	**22002-103260**	B	60	190,98	110	60	189,1	-	21/30/37	31/40/47

Toothed belt pulleys

AT profile





Material:
Aluminium.
Rim flanges, steel.

Version:
Aluminium bright.
Steel electro zinc-plated.

Sample order:
nlm 22003-051012

Note:
Standard AT-profile with metric pitch (trapezoidal toothing). At least one toothed belt pulley must have rim flanges. The toothed belt pulleys have a centre or pilot hole.

Toothed belt pulleys, AT5 profile

Order No. for 10 mm belt	Order No. for 16 mm belt	Order No. for 25 mm belt	Form	No. of teeth	D	D1	D2 max.	D3	D4	B	L
22003-051012	**22003-051612**	**22003-052512**	A	12	19,01	10	6	17,85	23	15/21/30	21/27/36
22003-051014	**22003-051614**	**22003-052514**	A	14	22,29	13	8	21,05	25	15/21/30	21/27/36
22003-051015	**22003-051615**	**22003-052515**	A	15	23,88	16	10	22,65	28	15/21/30	21/27/36
22003-051016	**22003-051616**	**22003-052516**	A	16	25,47	18	11	24,2	32	15/21/30	21/27/36
22003-051018	**22003-051618**	**22003-052518**	A	18	28,65	20	12	27,4	32	15/21/30	21/27/36
22003-051019	**22003-051619**	**22003-052519**	A	19	30,25	22	12	29	36	15/21/30	21/27/36
22003-051020	**22003-051620**	**22003-052520**	A	20	31,83	23	14	30,6	36	15/21/30	21/27/36
22003-051022	**22003-051622**	**22003-052522**	A	22	35,12	24	15	33,85	38	15/21/30	21/27/36
22003-051024	**22003-051624**	**22003-052524**	A	24	38,21	26	15	37	42	15/21/30	21/27/36
22003-051025	**22003-051625**	**22003-052525**	A	25	39,8	26	15	38,6	44	15/21/30	21/27/36
22003-051026	**22003-051626**	**22003-052526**	A	26	41,47	26	16	40,2	44	15/21/30	21/27/36
22003-051027	**22003-051627**	**22003-052527**	A	27	42,98	30	18	41,8	48	15/21/30	21/27/36
22003-051028	**22003-051628**	**22003-052528**	A	28	44,62	32	18	43,35	48	15/21/30	21/27/36
22003-051030	**22003-051630**	**22003-052530**	A	30	47,76	34	18	46,55	51	15/21/30	21/27/36
22003-051032	**22003-051632**	**22003-052532**	A	32	50,94	36	22	49,7	54	15/21/30	21/27/36
22003-051036	**22003-051636**	**22003-052536**	A	36	57,31	38	22	56,05	63	15/21/30	21/27/36
22003-051040	**22003-051640**	**22003-052540**	A	40	63,66	40	23	62,45	66	15/21/30	21/27/36
22003-051042	**22003-051642**	**22003-052542**	A	42	66,87	40	24	65,6	71	15/21/30	21/27/36
22003-051044	**22003-051644**	**22003-052544**	B	44	70,07	45	26	68,8	-	15/21/30	21/27/36
22003-051048	**22003-051648**	**22003-052548**	B	48	76,42	50	28	75,15	-	15/21/30	21/27/36
22003-051060	**22003-051660**	**22003-052560**	B	60	95,52	65	35	94,25	-	15/21/30	21/27/36

Toothed belt pulleys

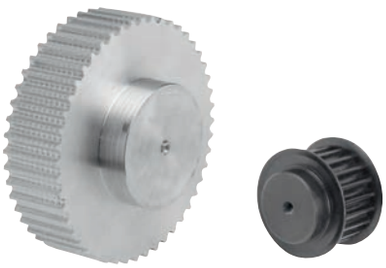
AT profile

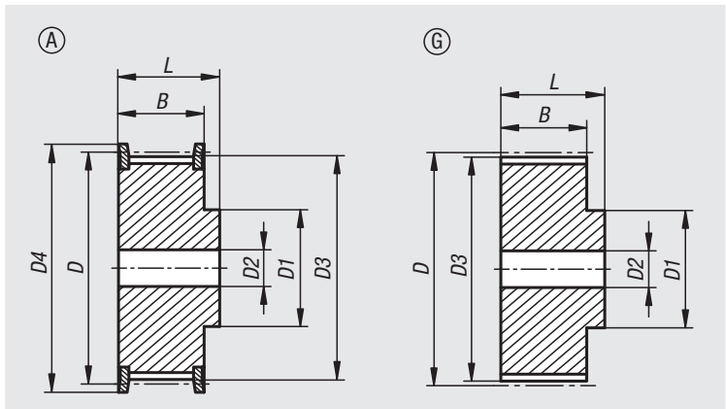
Toothed belt pulleys, AT10 profile

Order No. for 16 mm belt	Order No. for 25 mm belt	Order No. for 32 mm belt	Form	No. of teeth	D	D1	D2 max.	D3	D4	B	L
22003-101615	**22003-102515**	**-**	A	15	47,75	32	18	45,9	51	21/30	31/40
22003-101616	**22003-102516**	**-**	A	16	50,93	35	20	49,05	54	21/30	31/40
22003-101618	**22003-102518**	**22003-103218**	A	18	57,29	40	22	55,45	60	21/30/37	31/40/47
22003-101619	**22003-102519**	**22003-103219**	A	19	60,48	44	22	58,6	66	21/30/37	31/40/47
22003-101620	**22003-102520**	**22003-103220**	A	20	63,66	46	24	61,8	66	21/30/37	31/40/47
22003-101622	**22003-102522**	**22003-103222**	A	22	70,03	52	28	68,15	75	21/30/37	31/40/47
22003-101624	**22003-102524**	**22003-103224**	A	24	76,39	58	30	74,55	83	21/30/37	31/40/47
22003-101625	**22003-102525**	**22003-103225**	A	25	79,58	60	30	77,7	83	21/30/37	31/40/47
22003-101626	**22003-102526**	**22003-103226**	A	26	82,76	60	30	80,9	87	21/30/37	31/40/47
22003-101627	**22003-102527**	**22003-103227**	A	27	85,95	60	30	84,1	91	21/30/37	31/40/47
22003-101628	**22003-102528**	**22003-103228**	A	28	89,13	60	30	87,25	93	21/30/37	31/40/47
22003-101630	**22003-102530**	**22003-103230**	A	30	95,49	60	30	93,65	97	21/30/37	31/40/47
22003-101632	**22003-102532**	**22003-103232**	A	32	101,86	65	32	100	106	21/30/37	31/40/47
22003-101636	**22003-102536**	**22003-103236**	A	36	114,59	70	35	112,75	119	21/30/37	31/40/47
22003-101640	**22003-102540**	**22003-103240**	A	40	127,32	80	40	125,45	131	21/30/37	31/40/47
22003-101644	**22003-102544**	**22003-103244**	B	44	140,06	88	46	138,2	-	21/30/37	31/40/47
22003-101648	**22003-102548**	**22003-103248**	B	48	152,78	95	48	150,95	-	21/30/37	31/40/47
22003-101660	**22003-102560**	**22003-103260**	B	60	190,98	110	60	189,1	-	21/30/37	31/40/47

Toothed pulleys

profile HTD 5M





Material:
Steel.
Toothed pulleys without aluminium rim flanges.

Version:
Steel phosphated.
Aluminium bright.

Sample order:
nlm 22004-051512

Note:
Standard HTD profile with metric graduation (rounded toothing). At least one toothed belt pulley must have a rim flange. The toothed belt pulleys are centre bored or pre-drilled.

Order No.	Form	Main material	No. of teeth	D	D1 max.	D2 max.	D3	D4 max.	B	L
22004-051512	A	steel	12	19,1	13	6	17,96	23	20,5/30	26/36/26/36
22004-051514	A	steel	14	22,28	14	6	21,14	25	20,5/30	26/36/26/36
22004-051515	A	steel	15	23,87	16	6	22,73	28	20,5/30	26/36/26/36
22004-051516	A	steel	16	25,47	16,5	6	24,32	28	20,5/30	26/36/26/36
22004-051518	A	steel	18	28,65	20	6	27,51	32	20,5/30	26/36/26/36
22004-051520	A	steel	20	31,83	23	6	30,69	36	20,5/30	26/36/26/36
22004-051521	A	steel	21	33,42	24	6	32,28	38	20,5/30	26/38/26/38
22004-051522	A	steel	22	35,01	25,5	6	33,87	39	20,5/30	26/38/26/38
22004-051524	A	steel	24	38,19	27	6	37,06	42	20,5/30	28/38/28/38
22004-051526	A	steel	26	41,38	30	6	40,24	46	20,5/30	28/38/28/38
22004-051528	A	steel	28	44,56	30,5	6	43,42	50	20,5/30	28/38/28/38
22004-051530	A	steel	30	47,75	35	8	46,61	51	20,5/30	28/38/28/38
22004-051532	A	steel	32	50,93	38	8	49,79	55	20,5/30	28/38/28/38
22004-051536	A	steel	36	57,3	38	8	56,16	62	20,5/30	28/38/28/38
22004-051540	A	steel	40	63,66	38	8	62,52	71	20,5/30	28/38/28/38
22004-051544	G	aluminium	44	70,03	38	8	68,89	-	20,5/30	30/40/30/40
22004-051548	G	aluminium	48	76,39	45	8	75,25	-	20,5/30	30/40/30/40
22004-051560	G	aluminium	60	95,49	50	8	94,35	-	20,5/30	30/40/30/40
22004-051572	G	aluminium	72	114,59	50	8	113,45	-	20,5/30	30/40/30/40

Toothed pulleys

profile HTD 8M



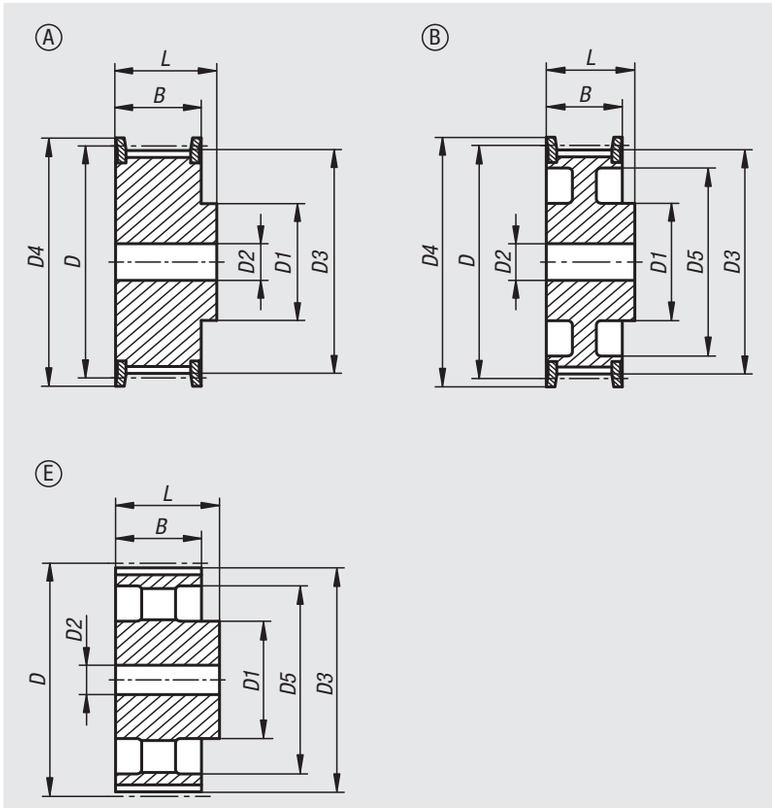


Material:
Steel or grey cast iron.

Version:
Phosphated

Sample order:
nlm 22004-0820018

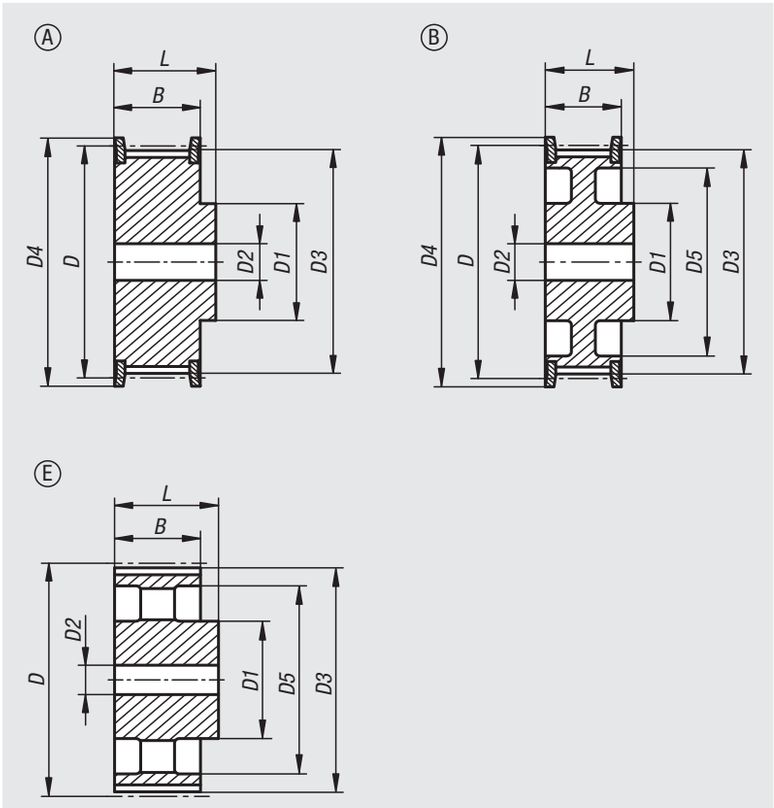
Note:
Standard HTD profile with metric graduation (rounded toothing). At least one toothed belt pulley must have a rim flange. The toothed belt pulleys are centre bored or pre-drilled.



Order No.	Version	Material	Form	No. of teeth	D	D1 max.	D2 max.	D3	D4 max.	D5	B	L
22004-0820018	for 20 mm belt	steel	A	18	45,84	32	12	44,46	51	-	28	38
22004-0820020	for 20 mm belt	steel	A	20	50,93	36	12	49,56	57	-	28	38
22004-0820022	for 20 mm belt	steel	A	22	56,02	43	12	54,65	62	-	28	38
22004-0820024	for 20 mm belt	steel	A	24	61,12	49	12	59,74	67	-	28	38
22004-0820026	for 20 mm belt	steel	A	26	66,21	50	12	64,84	73	-	28	38
22004-0820028	for 20 mm belt	steel	A	28	71,3	55	14	69,93	77	-	28	38
22004-0820030	for 20 mm belt	steel	A	30	76,39	60	14	75,02	84	-	28	38
22004-0820032	for 20 mm belt	steel	A	32	81,49	64	14	80,12	88	-	28	38
22004-0820034	for 20 mm belt	steel	A	34	86,58	70	14	85,21	94	-	28	38
22004-0820036	for 20 mm belt	steel	A	36	91,67	75	14	90,3	98	-	28	38
22004-0820038	for 20 mm belt	steel	A	38	96,77	80	14	95,39	104	-	28	38
22004-0820040	for 20 mm belt	steel	A	40	101,86	85	14	100,49	108	-	28	38
22004-0820044	for 20 mm belt	grey cast iron	A	44	112,05	96	14	110,67	121	-	28	38
22004-0820048	for 20 mm belt	grey cast iron	A	48	122,23	104	14	120,86	129	-	28	38
22004-0820056	for 20 mm belt	grey cast iron	B	56	142,6	80	14	141,23	150	117	28	38
22004-0820060	for 20 mm belt	grey cast iron	B	60	152,79	80	14	151,42	158	127	28	38
22004-0820064	for 20 mm belt	grey cast iron	B	64	162,97	80	14	161,6	168	137	28	38
22004-0820072	for 20 mm belt	grey cast iron	B	72	183,35	80	18	181,97	192	158	28	38
22004-0820080	for 20 mm belt	grey cast iron	E	80	203,72	90	14	202,35	-	179	28	38
22004-0820084	for 20 mm belt	grey cast iron	E	84	213,9	90	14	212,53	-	190	28	38
22004-0820090	for 20 mm belt	grey cast iron	E	90	229,18	90	14	227,81	-	204	28	38
22004-0820112	for 20 mm belt	grey cast iron	E	112	285,21	90	20	283,83	-	260	28	38
22004-0820144	for 20 mm belt	grey cast iron	E	144	366,69	90	20	365,32	-	342	28	38
22004-0820168	for 20 mm belt	grey cast iron	E	168	427,8	100	20	426,42	-	403	28	38
22004-0820192	for 20 mm belt	grey cast iron	E	192	488,92	100	20	487,54	-	465	28	38

Toothed pulleys

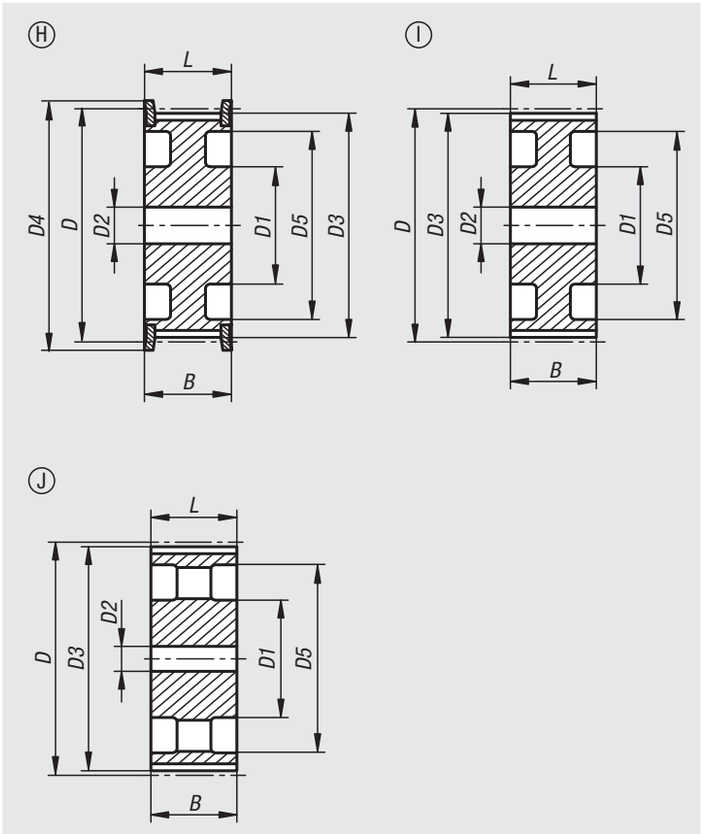
profile HTD 8M



Order No.	Version	Material	Form	No. of teeth	D	D1 max.	D2 max.	D3	D4 max.	D5	B	L
22004-0830018	for 30 mm belt	steel	A	18	45,84	32	12	44,46	51	-	38	48
22004-0830020	for 30 mm belt	steel	A	20	50,93	36	12	49,56	57	-	38	48
22004-0830022	for 30 mm belt	steel	A	22	56,02	43	12	54,65	62	-	38	48
22004-0830024	for 30 mm belt	steel	A	24	61,12	49	12	59,74	67	-	38	48
22004-0830026	for 30 mm belt	steel	A	26	66,21	50	12	64,84	73	-	38	48
22004-0830028	for 30 mm belt	steel	A	28	71,3	55	14	69,93	77	-	38	48
22004-0830030	for 30 mm belt	steel	A	30	76,39	60	14	75,02	84	-	38	48
22004-0830032	for 30 mm belt	steel	A	32	81,49	64	14	80,12	88	-	38	48
22004-0830034	for 30 mm belt	steel	A	34	86,58	70	14	85,21	94	-	38	48
22004-0830036	for 30 mm belt	steel	A	36	91,67	75	14	90,3	98	-	38	48
22004-0830038	for 30 mm belt	steel	A	38	96,77	80	14	95,39	104	-	38	48
22004-0830040	for 30 mm belt	steel	A	40	101,86	85	14	100,49	108	-	38	48
22004-0830044	for 30 mm belt	grey cast iron	A	44	112,05	96	14	110,67	121	-	38	48
22004-0830048	for 30 mm belt	grey cast iron	A	48	122,23	104	14	120,86	129	-	38	48
22004-0830056	for 30 mm belt	grey cast iron	B	56	142,6	90	14	141,23	150	117	38	48
22004-0830060	for 30 mm belt	grey cast iron	B	60	152,79	90	14	151,42	158	127	38	48
22004-0830064	for 30 mm belt	grey cast iron	B	64	162,97	90	14	161,6	168	137	38	48
22004-0830072	for 30 mm belt	grey cast iron	B	72	183,35	95	14	181,97	192	158	38	48
22004-0830080	for 30 mm belt	grey cast iron	E	80	203,72	100	14	202,35	-	179	38	48
22004-0830084	for 30 mm belt	grey cast iron	E	84	213,9	100	14	212,53	-	190	38	48
22004-0830090	for 30 mm belt	grey cast iron	E	90	229,18	100	14	227,81	-	204	38	48
22004-0830112	for 30 mm belt	grey cast iron	E	112	285,21	100	20	283,83	-	260	38	48
22004-0830144	for 30 mm belt	grey cast iron	E	144	366,69	100	20	365,32	-	342	38	48
22004-0830168	for 30 mm belt	grey cast iron	E	168	427,8	100	20	426,42	-	403	38	48
22004-0830192	for 30 mm belt	grey cast iron	E	192	488,92	100	20	487,54	-	465	38	48

Toothed pulleys

profile HTD 8M

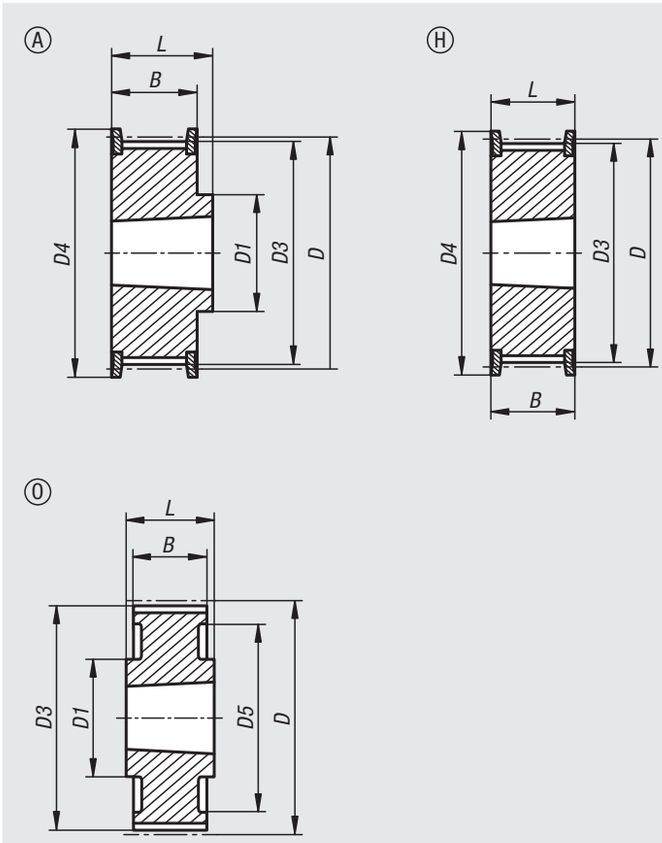


Order No.	Version	Material	Form	No. of teeth	D	D1 max.	D2 max.	D3	D4 max.	D5	B	L
22004-0850018	for 50 mm belt	steel	A	18	45,84	32	12	44,46	51	-	60	70
22004-0850020	for 50 mm belt	steel	A	20	50,93	36	12	49,56	57	-	60	70
22004-0850022	for 50 mm belt	steel	A	22	56,02	43	12	54,65	62	-	60	70
22004-0850024	for 50 mm belt	steel	A	24	61,12	49	12	59,74	67	-	60	70
22004-0850026	for 50 mm belt	steel	A	26	66,21	50	12	64,84	73	-	60	70
22004-0850028	for 50 mm belt	steel	A	28	71,3	55	14	69,93	77	-	60	70
22004-0850030	for 50 mm belt	steel	A	30	76,39	60	14	75,02	84	-	60	70
22004-0850032	for 50 mm belt	steel	A	32	81,49	64	14	80,12	88	-	60	70
22004-0850034	for 50 mm belt	steel	A	34	86,58	70	14	85,21	94	-	60	70
22004-0850036	for 50 mm belt	steel	A	36	91,67	75	14	90,3	98	-	60	70
22004-0850038	for 50 mm belt	steel	A	38	96,77	80	14	95,39	104	-	60	70
22004-0850040	for 50 mm belt	steel	A	40	101,86	85	14	100,49	108	-	60	70
22004-0850044	for 50 mm belt	grey cast iron	A	44	112,05	96	14	110,67	121	-	60	70
22004-0850048	for 50 mm belt	grey cast iron	A	48	122,23	104	14	120,86	129	-	60	70
22004-0850056	for 50 mm belt	grey cast iron	H	56	142,6	90	14	141,23	150	117	60	60
22004-0850060	for 50 mm belt	grey cast iron	H	60	152,79	100	14	151,42	158	127	60	60
22004-0850064	for 50 mm belt	grey cast iron	H	64	162,97	100	14	161,6	168	137	60	60
22004-0850072	for 50 mm belt	grey cast iron	H	72	183,35	100	18	181,97	192	158	60	60
22004-0850080	for 50 mm belt	grey cast iron	I	80	203,72	110	14	202,35	-	179	60	60
22004-0850084	for 50 mm belt	grey cast iron	J	84	213,9	110	14	212,53	-	190	60	60
22004-0850090	for 50 mm belt	grey cast iron	J	90	229,18	110	18	227,81	-	204	60	60
22004-0850112	for 50 mm belt	grey cast iron	J	112	285,21	110	20	283,83	-	260	60	60
22004-0850144	for 50 mm belt	grey cast iron	J	144	366,69	110	20	365,32	-	342	60	60
22004-0850168	for 50 mm belt	grey cast iron	J	168	427,8	120	20	426,42	-	403	60	60
22004-0850192	for 50 mm belt	grey cast iron	J	192	488,92	130	20	487,54	-	465	60	60

Toothed pulleys

profile HTD 5M, for assembly with taper clamping bushes





Material:
Steel or grey cast iron.

Version:
Phosphated

Sample order:
nlm 22005-0515034

Note:
Standard HTD profile with metric pitch (rounded toothing). At least one toothed belt pulley must have a rim flange. Conical hole for taper clamping bushes. The taper clamping bushes must be ordered separately and are available for various shaft diameters. Pulleys with a taper hole are statically balanced as per ISO 1940 grade G16.

Accessories:
Taper clamping bushes 23200.

Order No.	Version	Form	Main material	Type	No. of teeth	D	D1 max.	D3	D4 max.	D5	B	L
22005-0515034	for 15 mm belt	H	steel	for taper bush 1008	34	54,11	-	52,97	57	-	22	22
22005-0515036	for 15 mm belt	H	steel	for taper bush 1108	36	57,3	-	56,16	62	-	22	22
22005-0515038	for 15 mm belt	H	steel	for taper bush 1108	38	60,48	-	59,34	67	-	22	22
22005-0515040	for 15 mm belt	H	steel	for taper bush 1108	40	63,66	-	62,52	73	-	22	22
22005-0515044	for 15 mm belt	H	steel	for taper bush 1108	44	70,03	-	68,89	75	-	22	22
22005-0515048	for 15 mm belt	A	steel	for taper bush 1210	48	76,39	64	75,25	84	-	20,5	25
22005-0515056	for 15 mm belt	A	grey cast iron	for taper bush 1210	56	89,13	70	87,99	94	-	20,5	25
22005-0515064	for 15 mm belt	A	grey cast iron	for taper bush 1210	64	101,86	80	100,72	108	-	20,5	25
22005-0515072	for 15 mm belt	A	grey cast iron	for taper bush 1610	72	114,59	92	113,45	121	-	20,5	25
22005-0515080	for 15 mm belt	A	grey cast iron	for taper bush 1610	80	127,32	92	126,18	135	-	20,5	25
22005-0515090	for 15 mm belt	O	grey cast iron	for taper bush 1610	90	143,24	92	142,1	-	122	20,5	25
22005-0515112	for 15 mm belt	O	grey cast iron	for taper bush 1610	112	178,25	110	177,11	-	157	20,5	25

Toothed pulleys

profile HTD 8M, for assembly with taper clamping bushes



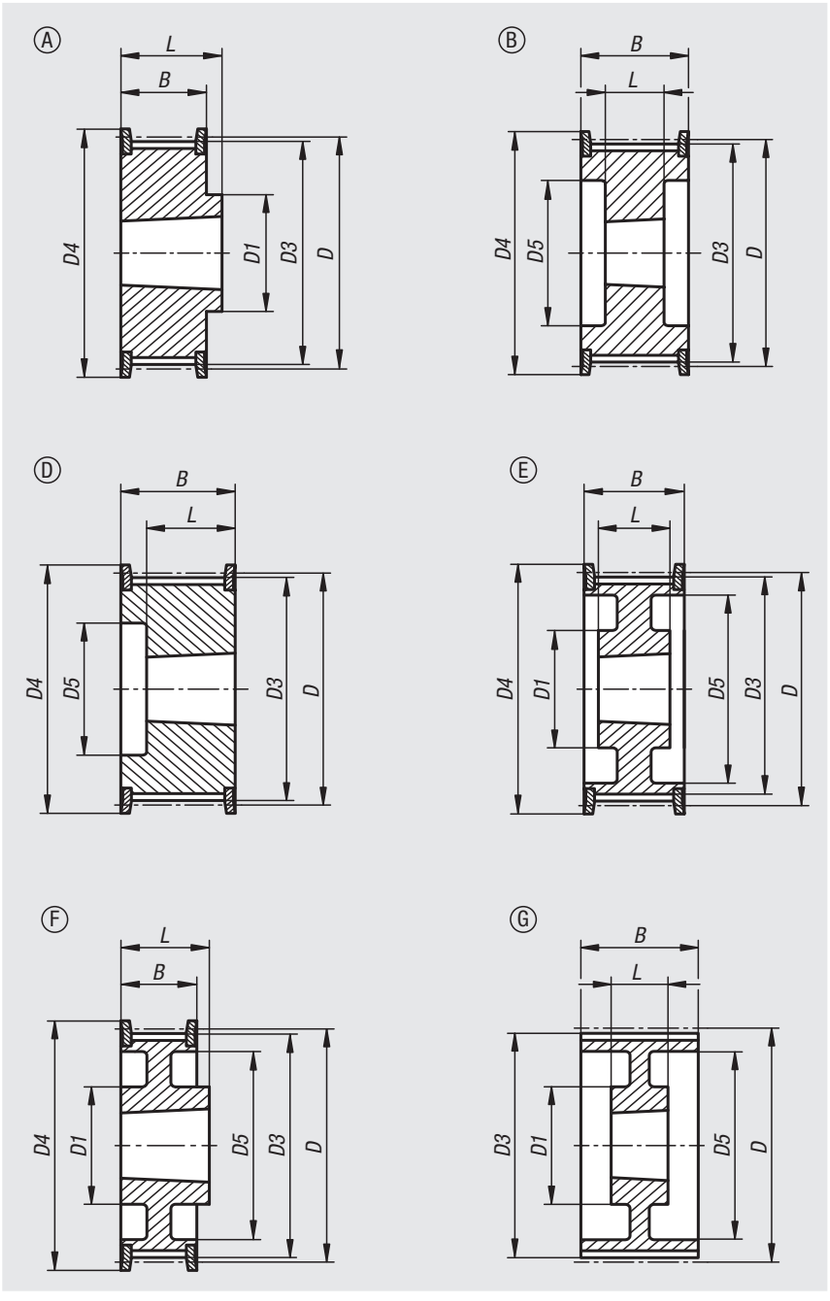
Material:
Cast Iron.

Version:
Phosphated

Sample order:
nlm 22005-0820022

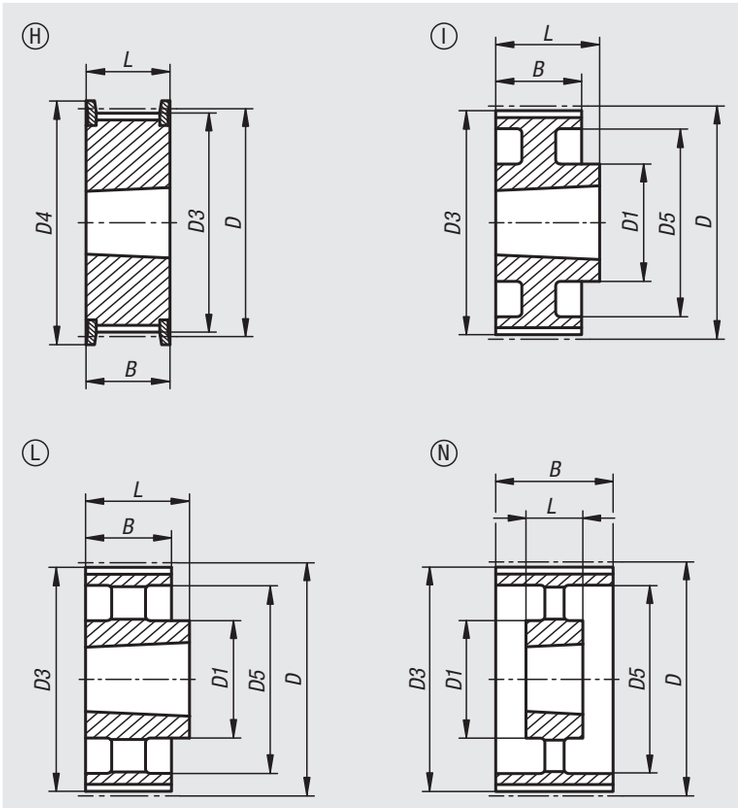
Note:
Standard HTD profile with metric pitch (rounded toothing). At least one toothed belt pulley must have a rim flange. Conical hole for taper clamping bushes. The taper clamping bushes must be ordered separately and are available for various shaft diameters. Pulleys with a taper hole are statically balanced as per ISO 1940 grade G16.

Accessories:
Taper clamping bushes 23200.



Toothed pulleys

profile HTD 8M, for assembly with taper clamping bushes



Order No.	Version	Form	Main material	Type	No. of teeth	D	D1 max.	D3	D4 max.	D5	B	L
22005-0820022	for 20 mm belt	D	grey cast iron	for taper bush 1008	22	56,02	-	54,65	62	38	28	22
22005-0820024	for 20 mm belt	D	grey cast iron	for taper bush 1108	24	61,12	-	59,74	67	42	28	22
22005-0820026	for 20 mm belt	D	grey cast iron	for taper bush 1108	26	66,21	-	64,84	73	45	28	22
22005-0820028	for 20 mm belt	D	grey cast iron	for taper bush 1108	28	71,3	-	69,93	77	52	28	22
22005-0820030	for 20 mm belt	D	grey cast iron	for taper bush 1108	30	76,39	-	75,02	84	56	28	22
22005-0820032	for 20 mm belt	D	grey cast iron	for taper bush 1610	32	81,49	-	80,12	88	65	28	25
22005-0820034	for 20 mm belt	D	grey cast iron	for taper bush 1610	34	86,58	-	85,21	94	66	28	25
22005-0820036	for 20 mm belt	D	grey cast iron	for taper bush 1610	36	91,67	-	90,3	98	68	28	25
22005-0820038	for 20 mm belt	D	grey cast iron	for taper bush 1610	38	96,77	-	95,39	104	76	28	25
22005-0820040	for 20 mm belt	D	grey cast iron	for taper bush 1610	40	101,86	-	100,49	108	80	28	25
22005-0820044	for 20 mm belt	A	grey cast iron	for taper bush 2012	44	112,05	99	110,67	121	-	28	32
22005-0820048	for 20 mm belt	A	grey cast iron	for taper bush 2012	48	122,23	105	120,86	129	-	28	32
22005-0820056	for 20 mm belt	A	grey cast iron	for taper bush 2012	56	142,6	110	141,23	150	-	28	32
22005-0820064	for 20 mm belt	F	grey cast iron	for taper bush 2012	64	162,97	110	161,6	168	140	28	32
22005-0820072	for 20 mm belt	F	grey cast iron	for taper bush 2012	72	183,35	110	181,97	192	158	28	32
22005-0820080	for 20 mm belt	I	grey cast iron	for taper bush 2012	80	203,74	110	202,35	-	178	28	32
22005-0820090	for 20 mm belt	L	grey cast iron	for taper bush 2012	90	229,18	110	227,81	-	204	28	32

Toothed pulleys

profile HTD 8M, for assembly with taper clamping bushes

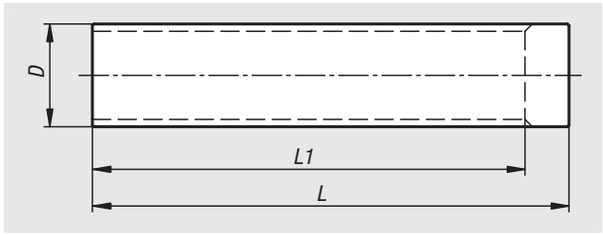
Order No.	Version	Form	Main material	Type	No. of teeth	D	D1 max.	D3	D4 max.	D5	B	L
22005-0830022	for 30 mm belt	D	grey cast iron	for taper bush 1008	22	56,02	-	54,65	62	38	38	22
22005-0830024	for 30 mm belt	D	grey cast iron	for taper bush 1108	24	61,12	-	59,74	67	42	38	22
22005-0830026	for 30 mm belt	D	grey cast iron	for taper bush 1108	26	66,21	-	64,84	73	45	38	22
22005-0830028	for 30 mm belt	D	grey cast iron	for taper bush 1108	28	71,3	-	69,93	77	52	38	22
22005-0830030	for 30 mm belt	H	grey cast iron	for taper bush 1615	30	76,39	-	75,02	84	-	38	38
22005-0830032	for 30 mm belt	H	grey cast iron	for taper bush 1615	32	81,49	-	80,12	88	-	38	38
22005-0830034	for 30 mm belt	H	grey cast iron	for taper bush 1615	34	86,58	-	85,21	94	-	38	38
22005-0830036	for 30 mm belt	H	grey cast iron	for taper bush 1615	36	91,67	-	90,3	98	-	38	38
22005-0830038	for 30 mm belt	H	grey cast iron	for taper bush 1615	38	96,77	-	95,39	104	-	38	38
22005-0830040	for 30 mm belt	H	grey cast iron	for taper bush 1615	40	101,86	-	100,49	108	-	38	38
22005-0830044	for 30 mm belt	B	grey cast iron	for taper bush 2012	44	112,05	-	110,67	121	90	38	32
22005-0830048	for 30 mm belt	B	grey cast iron	for taper bush 2012	48	122,23	-	120,86	129	98	38	32
22005-0830056	for 30 mm belt	B	grey cast iron	for taper bush 2012	56	142,6	-	141,23	150	118	38	32
22005-0830064	for 30 mm belt	F	grey cast iron	for taper bush 2517	64	162,97	125	161,6	168	140	38	45
22005-0830072	for 30 mm belt	F	grey cast iron	for taper bush 2517	72	183,35	125	181,97	192	158	38	45
22005-0830080	for 30 mm belt	I	grey cast iron	for taper bush 2517	80	203,74	125	202,35	-	178	38	45
22005-0830090	for 30 mm belt	L	grey cast iron	for taper bush 2517	90	229,18	125	227,81	-	204	38	45
22005-0830112	for 30 mm belt	L	grey cast iron	for taper bush 2517	112	285,21	125	283,83	-	260	38	45
22005-0830144	for 30 mm belt	L	grey cast iron	for taper bush 2517	144	366,69	125	365,32	-	341	38	45

Order No.	Version	Form	Main material	Type	No. of teeth	D	D1 max.	D3	D4 max.	D5	B	L
22005-0850028	for 50 mm belt	B	grey cast iron	for taper bush 1108	28	71,3	-	69,93	77	52	60	22
22005-0850030	for 50 mm belt	D	grey cast iron	for taper bush 1615	30	76,39	-	75,02	84	58	60	38
22005-0850032	for 50 mm belt	D	grey cast iron	for taper bush 1615	32	81,49	-	80,12	88	60	60	38
22005-0850034	for 50 mm belt	D	grey cast iron	for taper bush 1615	34	86,58	-	85,21	94	66	60	38
22005-0850036	for 50 mm belt	D	grey cast iron	for taper bush 1615	36	91,67	-	90,3	98	68	60	38
22005-0850038	for 50 mm belt	D	grey cast iron	for taper bush 1615	38	96,77	-	95,39	104	75	60	38
22005-0850040	for 50 mm belt	B	grey cast iron	for taper bush 2012	40	101,86	-	100,49	108	80	60	32
22005-0850044	for 50 mm belt	B	grey cast iron	for taper bush 2012	44	112,05	-	110,67	121	90	60	32
22005-0850048	for 50 mm belt	B	grey cast iron	for taper bush 2012	48	122,23	-	120,86	129	100	60	32
22005-0850056	for 50 mm belt	B	grey cast iron	for taper bush 2517	56	142,6	-	141,23	150	120	60	45
22005-0850064	for 50 mm belt	E	grey cast iron	for taper bush 2517	64	162,97	120	161,6	168	138	60	45
22005-0850072	for 50 mm belt	E	grey cast iron	for taper bush 2517	72	183,35	125	181,97	192	158	60	45
22005-0850080	for 50 mm belt	G	grey cast iron	for taper bush 3020	80	203,74	170	202,35	-	178	60	51
22005-0850090	for 50 mm belt	G	grey cast iron	for taper bush 3020	90	229,18	170	227,81	-	204	60	51
22005-0850112	for 50 mm belt	N	grey cast iron	for taper bush 3020	112	285,21	170	283,83	-	260	60	51
22005-0850144	for 50 mm belt	N	grey cast iron	for taper bush 3020	144	366,69	170	365,32	-	341	60	51
22005-0850168	for 50 mm belt	N	grey cast iron	for taper bush 3020	168	427,8	198	426,42	-	402	60	51
22005-0850192	for 50 mm belt	N	grey cast iron	for taper bush 3020	192	488,92	198	487,54	-	462	60	51

Splined shafts

T profile





Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 22007-05010

Note:
Standard T-profile to DIN 7721 T2 with metric pitch (trapezoidal toothing). For manufacturing your own toothed wheels

Splined shafts, T5 profile

Order No.	Profile	No. of teeth	D	L	L1
22007-05010	T5	10	15,05	140	125
22007-05011	T5	11	16,65	140	125
22007-05012	T5	12	18,25	140	125
22007-05013	T5	13	19,85	140	125
22007-05014	T5	14	21,45	140	132
22007-05015	T5	15	23,05	140	132
22007-05016	T5	16	24,6	140	140
22007-05017	T5	17	26,2	140	140
22007-05018	T5	18	27,8	140	140
22007-05019	T5	19	29,4	140	140
22007-05020	T5	20	31	160	160
22007-05021	T5	21	32,7	160	160
22007-05022	T5	22	34,15	160	160
22007-05023	T5	23	35,85	160	160
22007-05024	T5	24	37,4	160	160
22007-05025	T5	25	38,95	160	160
22007-05026	T5	26	40,6	160	160
22007-05027	T5	27	42,2	160	160
22007-05028	T5	28	43,75	160	160
22007-05029	T5	29	45,35	160	160
22007-05030	T5	30	46,95	160	160
22007-05032	T5	32	50,1	160	160
22007-05034	T5	34	53,25	160	160
22007-05035	T5	35	54,85	160	160
22007-05036	T5	36	56,45	160	160
22007-05037	T5	37	58,06	160	160
22007-05038	T5	38	59,65	160	160
22007-05040	T5	40	62,85	160	160
22007-05042	T5	42	66	160	160
22007-05044	T5	44	69,2	160	160
22007-05045	T5	45	70,8	160	160
22007-05046	T5	46	72,4	160	160
22007-05048	T5	48	75,55	160	160
22007-05050	T5	50	78,75	160	160
22007-05060	T5	60	94,65	160	160
22007-05072	T5	72	113,75	160	160
22007-05080	T5	80	126,48	160	160
22007-05090	T5	90	142,4	160	160
22007-05100	T5	100	158,31	160	160

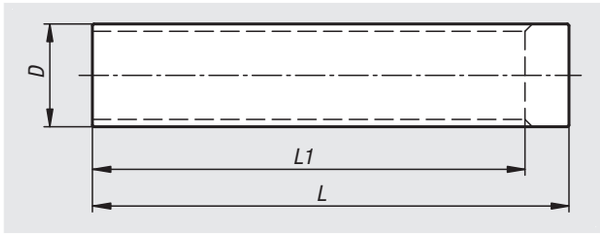
Splined shafts, T10 profile

Order No.	Profile	No. of teeth	D	L	L1
22007-10010	T10	10	29,98	140	140
22007-10011	T10	11	33,16	140	140
22007-10012	T10	12	36,35	140	140
22007-10013	T10	13	39,5	140	140
22007-10014	T10	14	42,7	160	160
22007-10015	T10	15	45,9	160	160
22007-10016	T10	16	49,1	160	160
22007-10017	T10	17	52,25	160	160
22007-10018	T10	18	55,45	160	160
22007-10019	T10	19	58,65	160	160
22007-10020	T10	20	61,8	160	160
22007-10021	T10	21	65	160	160
22007-10022	T10	22	68,2	160	160
22007-10023	T10	23	71,35	160	160
22007-10024	T10	24	74,55	160	160
22007-10026	T10	26	80,9	160	160
22007-10028	T10	28	87,25	160	160
22007-10030	T10	30	93,65	160	160
22007-10032	T10	32	100	160	160
22007-10034	T10	34	106,4	160	160
22007-10036	T10	36	112,75	160	160
22007-10038	T10	38	119,1	160	160
22007-10040	T10	40	125,45	160	160
22007-10045	T10	45	141,4	160	160
22007-10048	T10	48	150,95	160	160
22007-10060	T10	60	189,1	160	160
22007-10072	T10	72	227,29	160	160

Splined shafts

AT profile





Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 22008-05012

Note:
Standard AT-profile with metric pitch (trapezoidal toothing). For manufacturing your own toothed wheels

Splined shafts, AT5 profile

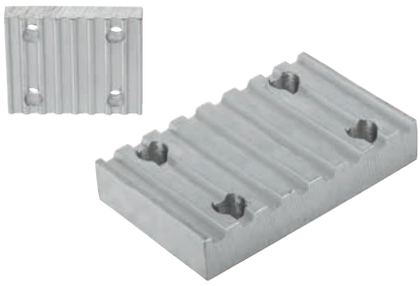
Order No.	Profile	No. of teeth	D	L	L1
22008-05012	AT5	12	17,85	140	125
22008-05013	AT5	13	19,45	140	125
22008-05014	AT5	14	21,05	140	132
22008-05015	AT5	15	22,65	140	132
22008-05016	AT5	16	24,2	140	140
22008-05017	AT5	17	25,8	140	140
22008-05018	AT5	18	27,4	140	140
22008-05019	AT5	19	29	140	140
22008-05020	AT5	20	30,6	160	160
22008-05021	AT5	21	32,3	160	160
22008-05022	AT5	22	33,85	160	160
22008-05023	AT5	23	35,45	160	160
22008-05024	AT5	24	37	160	160
22008-05025	AT5	25	38,6	160	160
22008-05026	AT5	26	40,2	160	160
22008-05027	AT5	27	41,8	160	160
22008-05028	AT5	28	43,35	160	160
22008-05030	AT5	30	46,55	160	160
22008-05032	AT5	32	49,7	160	160
22008-05034	AT5	34	52,85	160	160
22008-05036	AT5	36	56,05	160	160
22008-05038	AT5	38	59,25	160	160
22008-05040	AT5	40	62,45	160	160
22008-05042	AT5	42	65,6	160	160
22008-05044	AT5	44	68,8	160	160
22008-05046	AT5	46	72	160	160
22008-05048	AT5	48	75,15	160	160
22008-05052	AT5	52	81,55	160	160
22008-05056	AT5	56	87,9	160	160
22008-05058	AT5	58	91,1	160	160
22008-05060	AT5	60	94,25	160	160
22008-05064	AT5	64	100,65	160	160
22008-05072	AT5	72	113,25	160	160

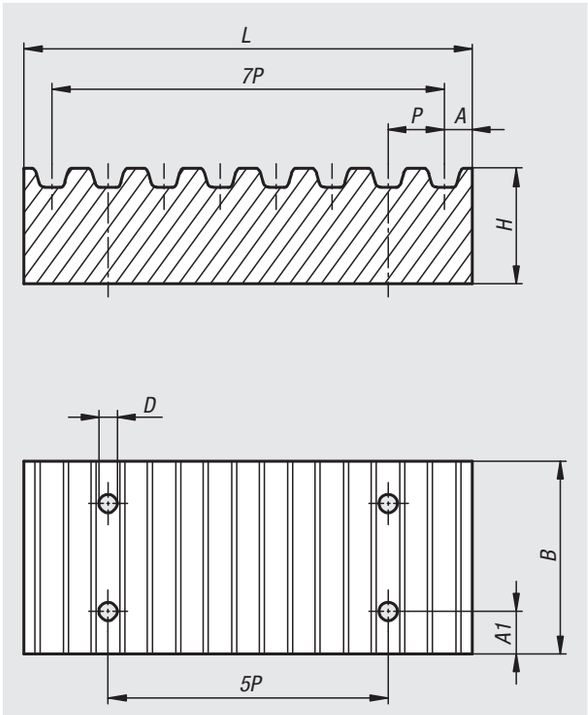
Splined shafts, AT10 profile

Order No.	Profile	No. of teeth	D	L	L1
22008-10015	AT10	15	45,9	160	160
22008-10016	AT10	16	49,05	160	160
22008-10017	AT10	17	52,25	160	160
22008-10018	AT10	18	55,45	160	160
22008-10019	AT10	19	58,6	160	160
22008-10020	AT10	20	61,8	160	160
22008-10021	AT10	21	65	160	160
22008-10022	AT10	22	68,15	160	160
22008-10023	AT10	23	71,35	160	160
22008-10024	AT10	24	74,55	160	160
22008-10025	AT10	25	77,7	160	160
22008-10026	AT10	26	80,9	160	160
22008-10027	AT10	27	84,1	160	160
22008-10028	AT10	28	87,25	160	160
22008-10030	AT10	30	93,65	160	160
22008-10032	AT10	32	100	160	160
22008-10034	AT10	34	106,4	160	160
22008-10036	AT10	36	112,75	160	160
22008-10038	AT10	38	119,1	160	160
22008-10040	AT10	40	125,45	160	160
22008-10042	AT10	42	131,85	160	160
22008-10044	AT10	44	138,2	160	160
22008-10046	AT10	46	144,55	160	160
22008-10048	AT10	48	150,95	160	160
22008-10052	AT10	52	163,65	160	160
22008-10056	AT10	56	176,4	160	160
22008-10058	AT10	58	182,75	160	160
22008-10060	AT10	60	189,1	160	160
22008-10070	AT10	70	220,95	160	160

Clamp plates for toothed belts

profile T and AT



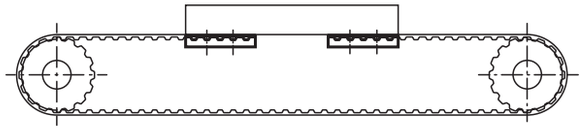


Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 22012-05101

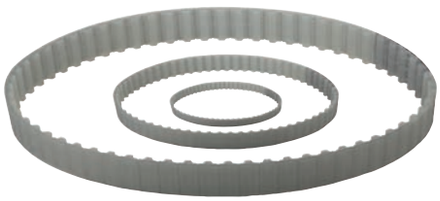
Note:
Clamp plates are used to mechanically secure the free belt end for numerous linear applications. The clamp plates must have matching tooth profiles to the belts to be secure to apply a uniform clamping force. For standard applications at least 7 belt teeth per belt end and must be engaged.



Order No.	Profile	belt width	P	A	A1	B	D	H	L
22012-05101	T5	10	5	3,4	6	29	5,5	8	41,8
22012-05161	T5	16	5	3,4	6	35	5,5	8	41,8
22012-05251	T5	25	5	3,4	6	44	5,5	8	41,8
22012-10161	T10	16	10	5	8	41	9	15	80
22012-10251	T10	25	10	5	8	50	9	15	80
22012-10321	T10	32	10	5	8	57	9	15	80
22012-05102	AT5	10	5	3,4	6	29	5,5	8	41,8
22012-05162	AT5	16	5	3,4	6	35	5,5	8	41,8
22012-05252	AT5	25	5	3,4	6	44	5,5	8	41,8
22012-10162	AT10	16	10	5	8	41	9	15	80
22012-10252	AT10	25	10	5	8	50	9	15	80
22012-10322	AT10	32	10	5	8	57	9	15	80

Toothed belts

T profile



Material:
Polyurethane (PU) with steel cord reinforcement.

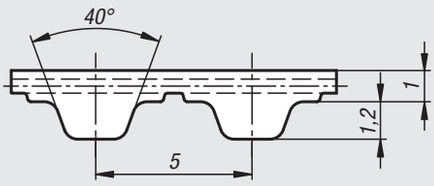
Sample order:
nlm 22052-0510X0165

Note:
Endless toothed belt with trapezoidal profile to DIN 7721 T1 with metric pitch. Ideal for drives with high belt flexibility. Permits smallest pulley diameters. The toothed belts are intended for drives where precision is a requirement, safety is important and the effects of chemicals are a concern.

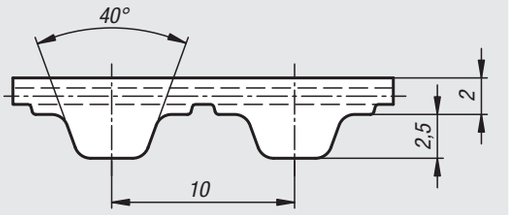
Temperature range:
from -30°C to +90°C

Features:
- maintenance-free
- high-power transmission
- minimal belt extension
- accurate positioning and angles
- very good chemical resistance, especially to oils, greases and fuels
- extremely high abrasion resistance
- transmits power up to 30 kW
- reliable speed up to 10,000 rpm

T5



T10



Toothed belts T5 profile

Order No. belt width 10	Order No. belt width 16	Order No. belt width 25	No. of teeth	Effective length
22052-0510X0165	22052-0516X0165	22052-0525X0165	33	165
22052-0510X0185	22052-0516X0185	22052-0525X0185	37	185
22052-0510X0200	22052-0516X0200	22052-0525X0200	40	200
22052-0510X0215	22052-0516X0215	22052-0525X0215	43	215
22052-0510X0220	22052-0516X0220	22052-0525X0220	44	220
22052-0510X0225	22052-0516X0225	22052-0525X0225	45	225
22052-0510X0245	22052-0516X0245	22052-0525X0245	49	245
22052-0510X0250	22052-0516X0250	22052-0525X0250	50	250
22052-0510X0255	22052-0516X0255	22052-0525X0255	51	255
22052-0510X0260	22052-0516X0260	22052-0525X0260	52	260
22052-0510X0270	22052-0516X0270	22052-0525X0270	54	270
22052-0510X0275	22052-0516X0275	22052-0525X0275	55	275
22052-0510X0280	22052-0516X0280	22052-0525X0280	56	280
22052-0510X0295	22052-0516X0295	22052-0525X0295	59	295
22052-0510X0300	22052-0516X0300	22052-0525X0300	60	300
22052-0510X0305	22052-0516X0305	22052-0525X0305	61	305
22052-0510X0325	22052-0516X0325	22052-0525X0325	65	325
22052-0510X0330	22052-0516X0330	22052-0525X0330	66	330
22052-0510X0340	22052-0516X0340	22052-0525X0340	68	340
22052-0510X0350	22052-0516X0350	22052-0525X0350	70	350
22052-0510X0355	22052-0516X0355	22052-0525X0355	71	355
22052-0510X0365	22052-0516X0365	22052-0525X0365	73	365
22052-0510X0375	22052-0516X0375	22052-0525X0375	75	375
22052-0510X0390	22052-0516X0390	22052-0525X0390	78	390
22052-0510X0400	22052-0516X0400	22052-0525X0400	80	400
22052-0510X0410	22052-0516X0410	22052-0525X0410	82	410
22052-0510X0420	22052-0516X0420	22052-0525X0420	84	420
22052-0510X0425	22052-0516X0425	22052-0525X0425	85	425
22052-0510X0450	22052-0516X0450	22052-0525X0450	90	450
22052-0510X0455	22052-0516X0455	22052-0525X0455	91	455
22052-0510X0475	22052-0516X0475	22052-0525X0475	95	475

Toothed belts

T profile

Toothed belts T5 profile

Order No. belt width 10	Order No. belt width 16	Order No. belt width 25	No. of teeth	Effective length
22052-0510X0480	22052-0516X0480	22052-0525X0480	96	480
22052-0510X0500	22052-0516X0500	22052-0525X0500	100	500
22052-0510X0510	22052-0516X0510	22052-0525X0510	102	510
22052-0510X0525	22052-0516X0525	22052-0525X0525	105	525
22052-0510X0545	22052-0516X0545	22052-0525X0545	109	545
22052-0510X0550	22052-0516X0550	22052-0525X0550	110	550
22052-0510X0560	22052-0516X0560	22052-0525X0560	112	560
22052-0510X0575	22052-0516X0575	22052-0525X0575	115	575
22052-0510X0600	22052-0516X0600	22052-0525X0600	120	600
22052-0510X0610	22052-0516X0610	22052-0525X0610	122	610
22052-0510X0620	22052-0516X0620	22052-0525X0620	124	620
22052-0510X0630	22052-0516X0630	22052-0525X0630	126	630
22052-0510X0640	22052-0516X0640	22052-0525X0640	128	640
22052-0510X0650	22052-0516X0650	22052-0525X0650	130	650
22052-0510X0660	22052-0516X0660	22052-0525X0660	132	660
22052-0510X0690	22052-0516X0690	22052-0525X0690	138	690
22052-0510X0700	22052-0516X0700	22052-0525X0700	140	700
22052-0510X0720	22052-0516X0720	22052-0525X0720	144	720
22052-0510X0750	22052-0516X0750	22052-0525X0750	150	750
22052-0510X0780	22052-0516X0780	22052-0525X0780	156	780
22052-0510X0815	22052-0516X0815	22052-0525X0815	163	815
22052-0510X0840	22052-0516X0840	22052-0525X0840	168	840
22052-0510X0850	22052-0516X0850	22052-0525X0850	170	850
22052-0510X0900	22052-0516X0900	22052-0525X0900	180	900
22052-0510X0990	22052-0516X0990	22052-0525X0990	198	990
22052-0510X1000	22052-0516X1000	22052-0525X1000	200	1000
22052-0510X1075	22052-0516X1075	22052-0525X1075	215	1075
22052-0510X1100	22052-0516X1100	22052-0525X1100	220	1100
22052-0510X1215	22052-0516X1215	22052-0525X1215	243	1215
22052-0510X1380	22052-0516X1380	22052-0525X1380	276	1380
22052-0510X1440	22052-0516X1440	22052-0525X1440	288	1440

Toothed belts T10 profile

Order No. belt width 16	Order No. belt width 25	Order No. belt width 32	No. of teeth	Effective length
22052-1016X0260	22052-1025X0260	22052-1032X0260	26	260
22052-1016X0370	22052-1025X0370	22052-1032X0370	37	370
22052-1016X0400	22052-1025X0400	22052-1032X0400	40	400
22052-1016X0410	22052-1025X0410	22052-1032X0410	41	410
22052-1016X0440	22052-1025X0440	22052-1032X0440	44	440
22052-1016X0450	22052-1025X0450	22052-1032X0450	45	450
22052-1016X0500	22052-1025X0500	22052-1032X0500	50	500
22052-1016X0530	22052-1025X0530	22052-1032X0530	53	530

Toothed belts

T profile

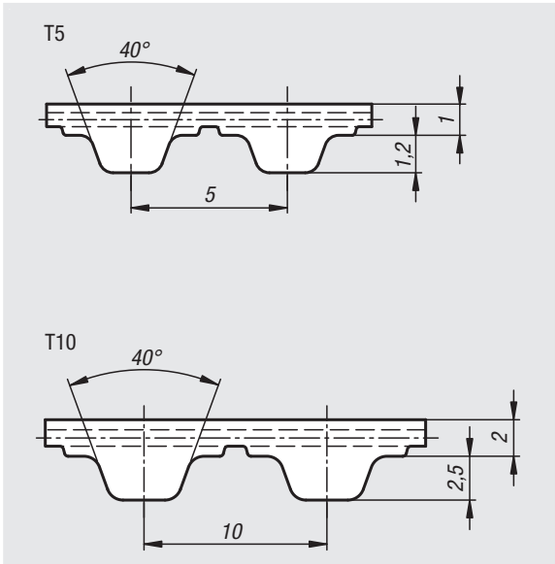
Toothed belts T10 profile

Order No. belt width 16	Order No. belt width 25	Order No. belt width 32	No. of teeth	Effective length
22052-1016X0560	22052-1025X0560	22052-1032X0560	56	560
22052-1016X0610	22052-1025X0610	22052-1032X0610	61	610
22052-1016X0630	22052-1025X0630	22052-1032X0630	63	630
22052-1016X0660	22052-1025X0660	22052-1032X0660	66	660
22052-1016X0690	22052-1025X0690	22052-1032X0690	69	690
22052-1016X0700	22052-1025X0700	22052-1032X0700	70	700
22052-1016X0720	22052-1025X0720	22052-1032X0720	72	720
22052-1016X0750	22052-1025X0750	22052-1032X0750	75	750
22052-1016X0780	22052-1025X0780	22052-1032X0780	78	780
22052-1016X0810	22052-1025X0810	22052-1032X0810	81	810
22052-1016X0840	22052-1025X0840	22052-1032X0840	84	840
22052-1016X0880	22052-1025X0880	22052-1032X0880	88	880
22052-1016X0890	22052-1025X0890	22052-1032X0890	89	890
22052-1016X0900	22052-1025X0900	22052-1032X0900	90	900
22052-1016X0920	22052-1025X0920	22052-1032X0920	92	920
22052-1016X0960	22052-1025X0960	22052-1032X0960	96	960
22052-1016X0970	22052-1025X0970	22052-1032X0970	97	970
22052-1016X0980	22052-1025X0980	22052-1032X0980	98	980
22052-1016X1010	22052-1025X1010	22052-1032X1010	101	1010
22052-1016X1080	22052-1025X1080	22052-1032X1080	108	1080
22052-1016X1110	22052-1025X1110	22052-1032X1110	111	1110
22052-1016X1140	22052-1025X1140	22052-1032X1140	114	1140
22052-1016X1150	22052-1025X1150	22052-1032X1150	115	1150
22052-1016X1210	22052-1025X1210	22052-1032X1210	121	1210
22052-1016X1240	22052-1025X1240	22052-1032X1240	124	1240
22052-1016X1250	22052-1025X1250	22052-1032X1250	125	1250
22052-1016X1300	22052-1025X1300	22052-1032X1300	130	1300
22052-1016X1320	22052-1025X1320	22052-1032X1320	132	1320
22052-1016X1350	22052-1025X1350	22052-1032X1350	135	1350
22052-1016X1390	22052-1025X1390	22052-1032X1390	139	1390
22052-1016X1400	22052-1025X1400	22052-1032X1400	140	1400
22052-1016X1420	22052-1025X1420	22052-1032X1420	142	1420
22052-1016X1440	22052-1025X1440	22052-1032X1440	144	1440
22052-1016X1450	22052-1025X1450	22052-1032X1450	145	1450
22052-1016X1460	22052-1025X1460	22052-1032X1460	146	1460
22052-1016X1500	22052-1025X1500	22052-1032X1500	150	1500
22052-1016X1560	22052-1025X1560	22052-1032X1560	156	1560
22052-1016X1610	22052-1025X1610	22052-1032X1610	161	1610
22052-1016X1750	22052-1025X1750	22052-1032X1750	175	1750
22052-1016X1780	22052-1025X1780	22052-1032X1780	178	1780
22052-1016X1880	22052-1025X1880	22052-1032X1880	188	1880
22052-1016X1960	22052-1025X1960	22052-1032X1960	196	1960
22052-1016X2250	22052-1025X2250	22052-1032X2250	225	2250

Toothed belts by the meter

T profile





Material:
Polyurethane (PU) with steel cord reinforcement.

Sample order:
nlm 22054-0510X0500
(include length L)

Note:
Toothed belt with trapezoidal profile to DIN 7721 T1. Intended especially for drives subject to high bending loads. May be used for pulleys with a very small diameter. Generally used for linear drives, low-power transmission and transport applications. Polyurethane belts may be welded. The power transmission rating of welded belts drops by about 50%.

Width tolerance: ±0.5 mm
Thickness tolerance: ±0.2 mm

On request:
Other lengths.
With T5 pitch, in 5 mm increments.
With T10 pitch, in 10 mm increments.
Maximum belt length 100 metres.

Order No.	Profile	belt width	Tension max. N	Length	matching clamp plate
22054-0510X	T5	10	320	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05101
22054-0516X	T5	16	540	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05161
22054-0525X	T5	25	900	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05251
22054-1016X	T10	16	1610	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10161
22054-1025X	T10	25	2650	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10251
22054-1032X	T10	32	3450	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10321

Toothed belts by the meter

T profile

Specific tooth force

The specific tooth force F_{Uspez} is the maximum force that a single engaged belt tooth 1 cm wide can transmit.
This force depends on the speed of the drive pulley. To calculate the transmissible longitudinal force F_U for the belt cross-section, the number z_e of engaged teeth is multiplied by the specific tooth force F_{Uspez} and the belt width b.

$$F_U = F_{Uspec} \bullet z_e \bullet b$$

F_U = transmissible longitudinal force
F_{Uspec} = specific tooth force
z_e = number of engaged teeth
z_{emax} = for the calculation, perm. maximum number of engaged teeth = 12
b = belt width in cm

Pitch T5

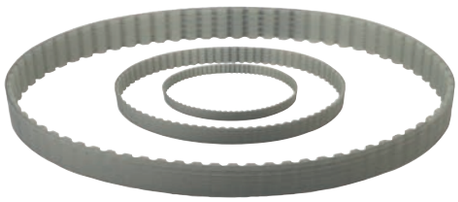
rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)
0	24,70	800	17,02	1900	14,21	4500	11,25
20	24,07	900	16,65	2000	14,03	5000	10,88
40	23,53	1000	16,32	2200	13,71	5500	10,55
60	23,05	1100	16,01	2400	13,42	6000	10,24
80	22,64	1200	15,73	2600	13,14	6500	9,96
100	22,28	1300	15,47	2800	12,89	7000	9,70
200	20,90	1400	15,22	3000	12,65	7500	9,46
300	19,89	1440	15,13	3200	12,43	8000	9,23
400	19,10	1500	15,00	3400	12,22	8500	9,01
500	18,45	1600	14,78	3600	12,03	9000	8,81
600	17,91	1700	14,58	3800	11,84	9500	8,62
700	17,44	1800	14,39	4000	11,66	10000	8,44

Pitch T10

rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)
0	51,80	800	33,34	1900	26,53	4500	19,40
20	50,32	900	32,44	2000	26,12	5000	18,51
40	49,04	1000	31,63	2200	25,34	5500	17,70
60	47,92	1100	30,89	2400	24,63	6000	16,97
80	46,95	1200	30,21	2600	23,97	6500	16,29
100	46,11	1300	29,58	2800	23,36	7000	15,66
200	42,75	1400	28,99	3000	22,78	7500	15,07
300	40,28	1440	28,76	3200	22,25	8000	14,52
400	38,36	1500	28,44	3400	21,74	8500	14,00
500	36,80	1600	27,92	3600	21,27	9000	13,51
600	35,49	1700	27,43	3800	20,81	9500	13,05
700	34,35	1800	26,97	4000	20,39	10000	12,61

Toothed belts

AT profile



Material:
Polyurethane (PU) with steel cord reinforcement.

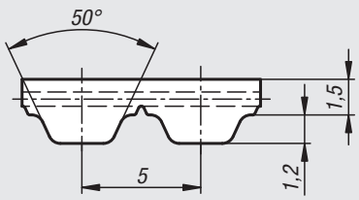
Sample order:
nlm 22057-0510X0225

Note:
Endless toothed belt with trapezoidal profile and reinforced steel cord (compared to T-Series) with metric pitch. Optimised tooth profile for more uniform force distribution and lower tooth deformation under load. Reduced polygon effect for quieter belt operation. The toothed belts are intended for drives where precision is a requirement, safety is important and the effects of chemicals are a concern.

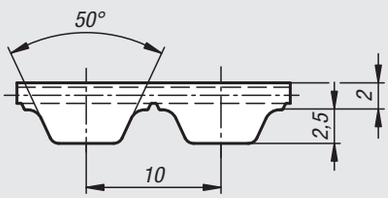
Temperature range:
from -30°C to +90°C

Features:
- maintenance-free
- high-power transmission
- minimal belt extension
- accurate positioning and angles
- very good chemical resistance, especially to oils, greases and fuels
- extremely high abrasion resistance
- transmits power up to 70 kW
- reliable speed up to 10,000 rpm

AT5



AT10



Toothed belts AT5 profile

Order No. belt width 10	Order No. belt width 16	Order No. belt width 25	No. of teeth	Effective length
22057-0510X0225	22057-0516X0225	22057-0525X0225	45	225
22057-0510X0255	22057-0516X0255	22057-0525X0255	51	255
22057-0510X0280	22057-0516X0280	22057-0525X0280	56	280
22057-0510X0300	22057-0516X0300	22057-0525X0300	60	300
22057-0510X0340	22057-0516X0340	22057-0525X0340	68	340
22057-0510X0375	22057-0516X0375	22057-0525X0375	75	375
22057-0510X0390	22057-0516X0390	22057-0525X0390	78	390
22057-0510X0420	22057-0516X0420	22057-0525X0420	84	420
22057-0510X0455	22057-0516X0455	22057-0525X0455	91	455
22057-0510X0500	22057-0516X0500	22057-0525X0500	100	500
22057-0510X0545	22057-0516X0545	22057-0525X0545	109	545
22057-0510X0600	22057-0516X0600	22057-0525X0600	120	600
22057-0510X0610	22057-0516X0610	22057-0525X0610	122	610
22057-0510X0660	22057-0516X0660	22057-0525X0660	132	660
22057-0510X0720	22057-0516X0720	22057-0525X0720	144	720
22057-0510X0750	22057-0516X0750	22057-0525X0750	150	750
22057-0510X0780	22057-0516X0780	22057-0525X0780	156	780
22057-0510X0825	22057-0516X0825	22057-0525X0825	165	825
22057-0510X0975	22057-0516X0975	22057-0525X0975	195	975
22057-0510X1050	22057-0516X1050	22057-0525X1050	210	1050
22057-0510X1125	22057-0516X1125	22057-0525X1125	225	1125
22057-0510X1500	22057-0516X1500	22057-0525X1500	300	1500

Toothed belts

AT profile

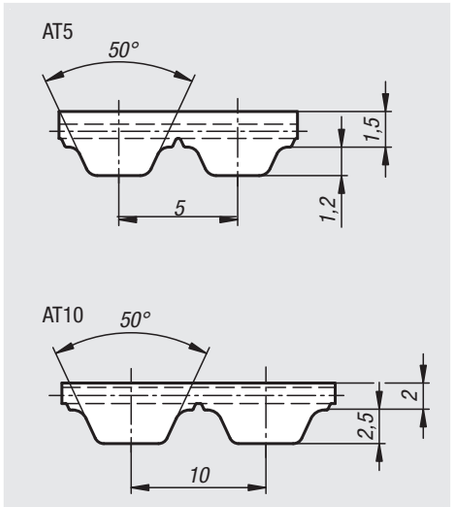
Toothed belts AT10 profile

Order No. belt width 16	Order No. belt width 25	Order No. belt width 32	No. of teeth	Effective length
22057-1016X0500	22057-1025X0500	22057-1032X0500	50	500
22057-1016X0560	22057-1025X0560	22057-1032X0560	56	560
22057-1016X0610	22057-1025X0610	22057-1032X0610	61	610
22057-1016X0660	22057-1025X0660	22057-1032X0660	66	660
22057-1016X0700	22057-1025X0700	22057-1032X0700	70	700
22057-1016X0730	22057-1025X0730	22057-1032X0730	73	730
22057-1016X0780	22057-1025X0780	22057-1032X0780	78	780
22057-1016X0800	22057-1025X0800	22057-1032X0800	80	800
22057-1016X0840	22057-1025X0840	22057-1032X0840	84	840
22057-1016X0890	22057-1025X0890	22057-1032X0890	89	890
22057-1016X0920	22057-1025X0920	22057-1032X0920	92	920
22057-1016X0960	22057-1025X0960	22057-1032X0960	96	960
22057-1016X0980	22057-1025X0980	22057-1032X0980	98	980
22057-1016X1010	22057-1025X1010	22057-1032X1010	101	1010
22057-1016X1050	22057-1025X1050	22057-1032X1050	105	1050
22057-1016X1080	22057-1025X1080	22057-1032X1080	108	1080
22057-1016X1150	22057-1025X1150	22057-1032X1150	115	1150
22057-1016X1210	22057-1025X1210	22057-1032X1210	121	1210
22057-1016X1250	22057-1025X1250	22057-1032X1250	125	1250
22057-1016X1320	22057-1025X1320	22057-1032X1320	132	1320
22057-1016X1400	22057-1025X1400	22057-1032X1400	140	1400
22057-1016X1500	22057-1025X1500	22057-1032X1500	150	1500
22057-1016X1600	22057-1025X1600	22057-1032X1600	160	1600
22057-1016X1700	22057-1025X1700	22057-1032X1700	170	1700
22057-1016X1800	22057-1025X1800	22057-1032X1800	180	1800

Toothed belts by the meter

AT profile





Material:
Polyurethane (PU) with steel cord reinforcement.

Sample order:
nlm 22059-0510X0500
(include length L)

Note:
Toothed belt with trapezoidal profile and reinforced steel cord (compared to T-Series). Optimised tooth profile for more uniform force distribution and lower tooth deformation under load. High-performance steel cord reinforcement for high breaking strength and low belt extension. Reduced polygon effect for quieter belt operation. Especially well-suited for linear drives and low power transmission where exact axial and angular positioning are required. Polyurethane belts may be welded. The power transmission rating of welded belts drops by about 50%.

Width tolerance: ±0.5 mm
Thickness tolerance: ±0.2 mm

On request:
Other lengths.
AT5 pitch in 5 mm length increases.
AT10 pitch in 10 mm length increases.
Maximum belt length 100 metres.

Order No.	Profile	belt width	Tension max. N	Length	matching clamp plate
22059-0510X	AT5	10	640	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05102
22059-0516X	AT5	16	1120	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05162
22059-0525X	AT5	25	1840	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-05252
22059-1016X	AT10	16	2450	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10162
22059-1025X	AT10	25	4170	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10252
22059-1032X	AT10	32	5390	500/1000/1500/2000/2500/3000/3500/4000/5000	22012-10322

Toothed belts by the meter

AT profile

Specific tooth force

The specific tooth force F_{Uspez} is the maximum force that a single engaged belt tooth 1 cm wide can transmit.
This force depends on the speed of the drive pulley. To calculate the transmissible longitudinal force F_U for the belt cross-section, the number z_e of engaged teeth is multiplied by the specific tooth force F_{Uspez} and the belt width b.

$$F_U = F_{Uspec} \bullet z_e \bullet b$$

F_U = transmissible longitudinal force
F_{Uspec} = specific tooth force
z_e = number of engaged teeth
z_{emax} = for the calculation, perm. maximum number of engaged teeth = 12
b = belt width in cm

Pitch AT5

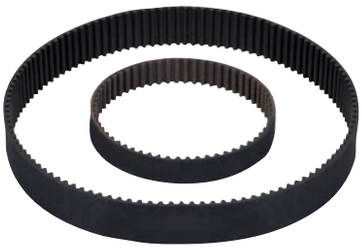
rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)
0	36,40	800	27,69	1900	22,73	4500	17,18
20	35,88	900	27,06	2000	22,42	5000	16,47
40	35,40	1000	26,49	2200	21,82	5500	15,83
60	34,97	1100	25,96	2400	21,28	6000	15,24
80	34,59	1200	25,47	2600	20,77	6500	14,69
100	34,24	1300	25,01	2800	20,29	7000	14,18
200	32,92	1400	24,57	3000	19,85	7500	13,71
300	31,92	1440	24,41	3200	19,43	8000	13,26
400	30,89	1500	24,16	3400	19,03	8500	12,85
500	29,95	1600	23,78	3600	18,66	9000	12,45
600	29,12	1700	23,41	3800	18,30	9500	12,07
700	28,37	1800	23,07	4000	17,96	10000	11,72

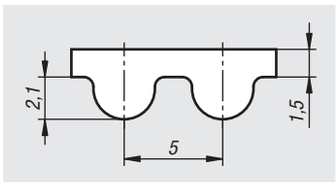
Pitch AT10

rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)	rpm	F_{Uspec} (N/cm)
0	75,70	800	53,70	1900	42,02	4500	29,13
20	74,59	900	52,21	2000	41,28	5000	27,50
40	73,55	1000	50,85	2200	39,89	5500	26,01
60	72,57	1100	49,59	2400	38,62	6000	24,65
80	71,65	1200	48,43	2600	37,44	6500	23,40
100	70,78	1300	47,34	2800	36,33	7000	22,23
200	67,13	1400	46,32	3000	35,30	7500	21,14
300	64,18	1440	45,93	3200	34,33	8000	20,12
400	61,53	1500	45,36	3400	33,41	8500	19,15
500	59,21	1600	44,46	3600	32,55	9000	18,24
600	57,16	1700	43,60	3800	31,72	9500	17,38
700	55,34	1800	42,79	4000	30,94	10000	16,56

Toothed belt

profile HTD 5M





Material:
Belt back and belt teeth CR.
Tension cords Glascord.
Tooth covering mesh polyamide.

Sample order:
nlm 22062-0515X0275

Note:
Endless toothed belts with an arched profile as per ISO 13050 with metric pitch. The rounded shape of the tooth contour provides a particularly high degree of safety against incorrect tooth interlocking, combined with a very rounded tooth mesh.
Operating noise is significantly reduced by the rounded tooth mesh.
The toothed belts are robust, economical and versatile.

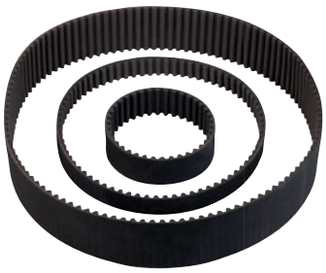
Temperature range:
From -20°C to +100°C

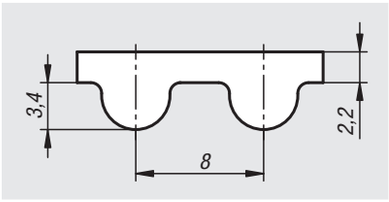
Features:
- Belt speed vmax perm. 50 m/s
- Transmissible power up to 8.42 kW
- Permissible speed up to 14000 rpm
- Low-noise and low-maintenance
- Very good chemical resistance, particularly against oils, greases and fuels
- Accurate positioning and angles

Order No. belt width 15	Order No. belt width 25	No. of teeth	Effective length
22062-0515X0275	22062-0525X0275	55	275
22062-0515X0300	22062-0525X0300	60	300
22062-0515X0330	22062-0525X0330	66	330
22062-0515X0350	22062-0525X0350	70	350
22062-0515X0375	22062-0525X0375	75	375
22062-0515X0385	22062-0525X0385	77	385
22062-0515X0400	22062-0525X0400	80	400
22062-0515X0425	22062-0525X0425	85	425
22062-0515X0450	22062-0525X0450	90	450
22062-0515X0460	22062-0525X0460	92	460
22062-0515X0475	22062-0525X0475	95	475
22062-0515X0500	22062-0525X0500	100	500
22062-0515X0535	22062-0525X0535	107	535
22062-0515X0550	22062-0525X0550	110	550
22062-0515X0565	22062-0525X0565	113	565
22062-0515X0600	22062-0525X0600	120	600
22062-0515X0615	22062-0525X0615	123	615
22062-0515X0620	22062-0525X0620	124	620
22062-0515X0630	22062-0525X0630	126	630
22062-0515X0635	22062-0525X0635	127	635
22062-0515X0665	22062-0525X0665	133	665
22062-0515X0700	22062-0525X0700	140	700
22062-0515X0710	22062-0525X0710	142	710
22062-0515X0740	22062-0525X0740	148	740
22062-0515X0755	22062-0525X0755	151	755
22062-0515X0800	22062-0525X0800	160	800
22062-0515X0835	22062-0525X0835	167	835
22062-0515X0840	22062-0525X0840	168	840
22062-0515X0860	22062-0525X0860	172	860
22062-0515X0890	22062-0525X0890	178	890
22062-0515X0900	22062-0525X0900	180	900
22062-0515X0925	22062-0525X0925	185	925
22062-0515X0950	22062-0525X0950	190	950
22062-0515X1000	22062-0525X1000	200	1000
22062-0515X1050	22062-0525X1050	210	1050
22062-0515X1125	22062-0525X1125	225	1125
22062-0515X1200	22062-0525X1200	240	1200
22062-0515X1270	22062-0525X1270	254	1270
22062-0515X1420	22062-0525X1420	284	1420
22062-0515X1500	22062-0525X1500	300	1500
22062-0515X1595	22062-0525X1595	319	1595
22062-0515X1690	22062-0525X1690	338	1690
22062-0515X1800	22062-0525X1800	360	1800
22062-0515X2000	22062-0525X2000	400	2000

Toothed belt

profile HTD 8M





Material:
Belt back and belt teeth CR.
Tension cords Glascord.
Tooth covering mesh polyamide.

Sample order:
nlm 22062-0820X0288

Note:
Endless toothed belts with an arched profile as per ISO 13050 with metric pitch. The rounded shape of the tooth contour provides a particularly high degree of safety against incorrect tooth interlocking, combined with a very rounded tooth mesh.
Operating noise is significantly reduced by the rounded tooth mesh.
The toothed belts are robust, economical and versatile.

Temperature range:
From -20°C to +100°C

Features:
- Belt speed vmax perm. 50 m/s
- Transmissible power up to 99.1 kW
- Permissible speed up to 6000 rpm
- Low-noise and low-maintenance
- Very good chemical resistance, particularly against oils, greases and fuels
- Accurate positioning and angles

Order No. belt width 20	Order No. belt width 30	Order No. belt width 50	No. of teeth	Effective length
22062-0820X0288	22062-0830X0288	22062-0850X0288	36	288
22062-0820X0304	22062-0830X0304	22062-0850X0304	38	304
22062-0820X0352	22062-0830X0352	22062-0850X0352	44	352
22062-0820X0376	22062-0830X0376	22062-0850X0376	47	376
22062-0820X0400	22062-0830X0400	22062-0850X0400	50	400
22062-0820X0416	22062-0830X0416	22062-0850X0416	52	416
22062-0820X0424	22062-0830X0424	22062-0850X0424	53	424
22062-0820X0480	22062-0830X0480	22062-0850X0480	60	480
22062-0820X0560	22062-0830X0560	22062-0850X0560	70	560
22062-0820X0600	22062-0830X0600	22062-0850X0600	75	600
22062-0820X0640	22062-0830X0640	22062-0850X0640	80	640
22062-0820X0656	22062-0830X0656	22062-0850X0656	82	656
22062-0820X0688	22062-0830X0688	22062-0850X0688	86	688
22062-0820X0720	22062-0830X0720	22062-0850X0720	90	720
22062-0820X0784	22062-0830X0784	22062-0850X0784	98	784
22062-0820X0800	22062-0830X0800	22062-0850X0800	100	800
22062-0820X0880	22062-0830X0880	22062-0850X0880	110	880
22062-0820X0920	22062-0830X0920	22062-0850X0920	115	920
22062-0820X0960	22062-0830X0960	22062-0850X0960	120	960
22062-0820X1040	22062-0830X1040	22062-0850X1040	130	1040
22062-0820X1120	22062-0830X1120	22062-0850X1120	140	1120
22062-0820X1160	22062-0830X1160	22062-0850X1160	145	1160
22062-0820X1200	22062-0830X1200	22062-0850X1200	150	1200
22062-0820X1280	22062-0830X1280	22062-0850X1280	160	1280
22062-0820X1304	22062-0830X1304	22062-0850X1304	163	1304
22062-0820X1360	22062-0830X1360	22062-0850X1360	170	1360
22062-0820X1424	22062-0830X1424	22062-0850X1424	178	1424
22062-0820X1440	22062-0830X1440	22062-0850X1440	180	1440
22062-0820X1520	22062-0830X1520	22062-0850X1520	190	1520
22062-0820X1600	22062-0830X1600	22062-0850X1600	200	1600
22062-0820X1760	22062-0830X1760	22062-0850X1760	220	1760
22062-0820X1800	22062-0830X1800	22062-0850X1800	225	1800
22062-0820X2000	22062-0830X2000	22062-0850X2000	250	2000
22062-0820X2248	22062-0830X2248	22062-0850X2248	281	2248
22062-0820X2400	22062-0830X2400	22062-0850X2400	300	2400
22062-0820X2600	22062-0830X2600	22062-0850X2600	325	2600
22062-0820X2800	22062-0830X2800	22062-0850X2800	350	2800
22062-0820X3008	22062-0830X3008	22062-0850X3008	376	3008
22062-0820X3280	22062-0830X3280	22062-0850X3280	410	3280
22062-0820X3408	22062-0830X3408	22062-0850X3408	426	3408
22062-0820X3808	22062-0830X3808	22062-0850X3808	476	3808

Belt tension meter



Sample order:
nlm 22100-01

Note:
The tension meter is used to perform a pre-tension test on commercially available belt systems quickly and easily by means of frequency measurement. Fully electronic and equipped with state-of-the-art microprocessor technology, the meter enables precise adjustment of all V, toothed and flat belts that have to be tensioned in the range from 10 to 600 Hz.

Attention:
- The measurement must never be performed while the drive is running
- The meter is not permitted or certified for use in potentially explosive areas.

Technical data:
- Measuring range: 10–600 Hz
- Measurement accuracy: 10–400 Hz ± 1% / >400 Hz ± 2%
- Resolution: 10–99.9 Hz: 0.1 Hz / >100 Hz: 1 Hz
- Measurement method: contact-free (acoustic with electronic interference noise suppression)
- Power supply: 2 x 1.5 V Micro (AAA cells)
- Operating time: >48 h permanent measurement (depending on the quality of the batteries used). Automatic shut down after 2 minutes of non-use
- Current consumption: max. 12 mA
- Indicator: - dual-row LCD, 2 x 8 characters

Order No.	Item
22100-01	belt tension meter

Line laser



Sample order:
nlm 22101-01

Note:
The line laser is a measuring device for aligning drive pulleys laterally, horizontally using a laser beam, preventing heavy wear to the edges of the belt.

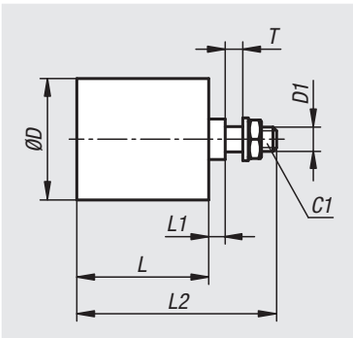
Attention:
- Never look directly into the laser beam and do not point it at other people, animals or strongly reflective surfaces.
- The device and the target points contain high-powered magnets.
- Individuals with pacemakers should not use the device due to safety reasons. Keep a safe distance away from electronic devices and wristwatches in order to prevent interference.
- The device must not be used in potentially explosive areas.

Technical data:
- Laser beam range approx. 5 to 10 m
- Laser class 2 (EN 60825-1:1997)
- Wavelength 630–680 mm
- Power < 1 mW
- Power supply 2 x 1.5 V (LR44)

Order No.	Item
22101-01	line laser

Tension pulleys





Material:
Pulley plastic PA6.
Ball bearing chrome steel.
Screw and nut steel.

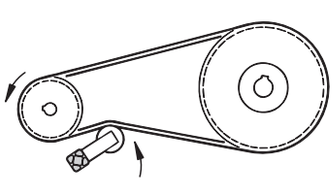
Version:
Ball bearing with sealing discs 2Z-C3.
Screw ISO 4017, grade 8.8, electro zinc-plated.
Nut ISO 4035, grade 8, electro zinc-plated.

Sample order:
nlm 22102-30035

Note:
Ready-to-install tension pulleys for belts, complete with ball bearing. The ball bearings are sealed both sides, permanently lubricated and maintenance-free.

For tensioning belts on the back of the belt. The tension pulleys can be combined with all tensioning elements to form an elastic belt tensioner. Rigid mounting without a tensioning element is also possible. Can also be used as an idler pulley.

Temperature range:
-40 °C to +100 °C.





Order No.	D	D1	L	L1	L2	T max.	belt width max.	Tightening torque of screw C1 Nm	Max. rpm	Suitable for clamping element size
22102-30035	30	M8	35	3	51	7	30	10	8000	1
22102-40045	40	M10	45	6	67	9	40	20	8000	2+3
22102-60060	60	M12	60	7,5	89	13	55	35	6000	4
22102-80090	80	M20	90	9	127	14	85	160	5000	5

Notes

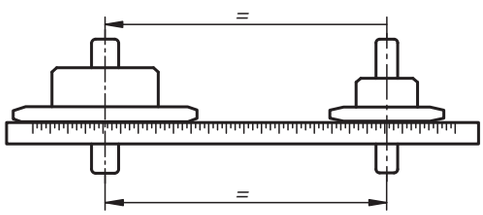
Technical information for roller chains

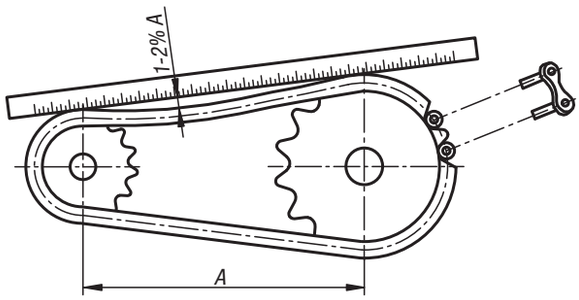
By steel link chains, roller chains have the greatest significance and the widest application possibilities. They are primarily used as drive chains but also as transport, conveyor and hoist chains. They offer positive and non-slip power transmission. As a result, constant transmission ratios are possible. The roller chains work without pre-tension. This means that bearings are only subjected to low loads. The direction of rotation always remains the same for a two sprocket chain drive. For a chain drive with more than two sprockets, economic solutions for the same or differing rotation directions can be easily solved. Chain speeds of 20 m/s and more are possible. With good lubrication, under normal operating conditions and at full load the efficiency of a chain drive is ca. 98% .

Mounting instructions:

The power to be transmitted, the speed of the smallest sprocket and the operating conditions must be known for correct chain selection. Where possible, sprockets with at least 17 teeth should be selected. At high speeds and high loads, the small sprocket should have at least 21 teeth and be hardened. The following numbers of teeth are recommended: 17, 19, 21, 23, 25, 38, 57, 76, 95 and 114. The distance between shafts can be freely selected. A value between 30 and 60 times the chain pitch is recommended. The chain should however have a wrap angle of at least 120° on the small sprocket. A ratio up to 4:1 per stage is usual for chain drives (a maximum of 7:1 should not be exceeded). The transmission ratio can be simply altered by exchanging the sprockets while maintaining the distance between the shafts.

The sprockets must be aligned and the shafts must be parallel. To ensure simple installation, place the connecting links on the sprocket. The chain slack should be between 1 and 2% of the shaft centre distance. The chains stretch while running due to wear; a method of tensioning the chain should be provided for this purpose. If the chains stretches too much (> 3%), the chain, and if necessary the sprockets should be replaced.

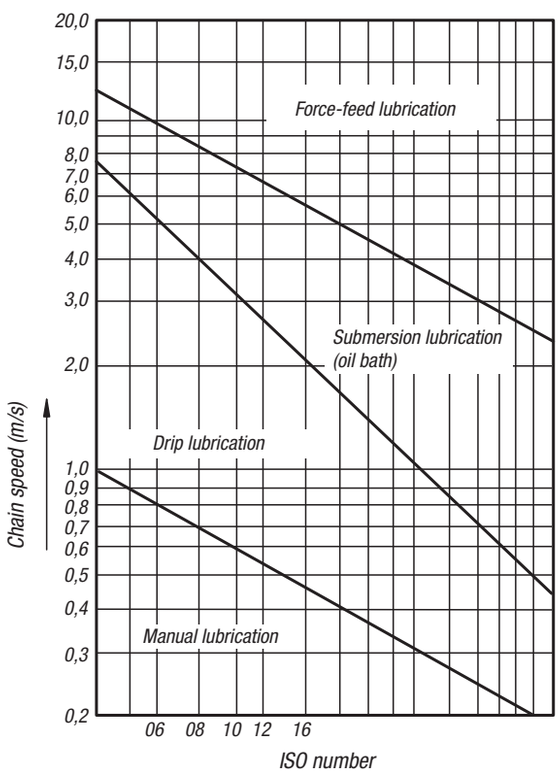




Maintenance and lubrication:

Regular maintenance of the chains is important in order to achieve a maximum service life. Our chains are supplied with corrosion protection and must be lubricated before commissioning. For a correctly dimensioned chain drive with suitable lubrication and maintenance, the service life is approx. 15,000 hours.

The type of lubrication is dependent on the power to be transmitted, the chain speed and the operating conditions. Highly viscous oil and greases are too thick to penetrate the chain and should be avoided. For roller chains, lubricants are used that are suitable for common lubricating methods such as manual lubrication, drip lubrication, submersion lubrication in an oil bath, force-feed lubrication or spray lubrication. Depending on the operating temperature, lubricating oils with SAE viscosity classes of between 30 and 50 should be used.



Ambient temperature:

-5°C to +25°C SAE 30
over +25°C to +45°C SAE 40
over +45°C to +65°C SAE 50

Technical information for roller chains

Calculation of chain drives with 2 sprockets

$P_1 = P_N * K_1 * K_2$

P_1 = corrected power (kW)

P_N = power to be transmitted (kW)

K_1 = factor for operating conditions

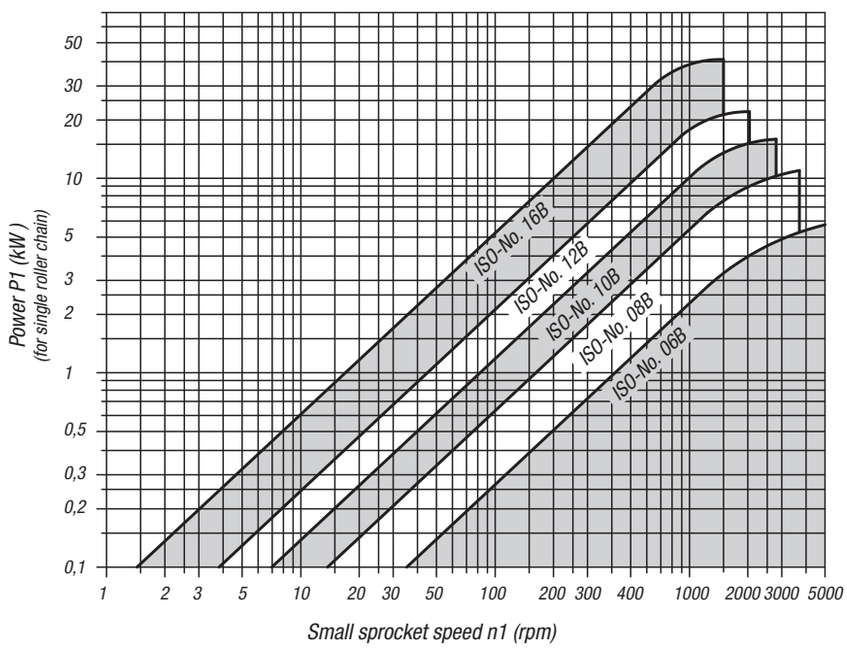
Running mode (examples)	*Transmission ratio*	*Factor K1 for operating conditions* *No. of teeth on the small wheel z1*							
	i = n1/n2 = z2/z1	*11*	*13*	*15*	*17*	*19*	*21*	*23*	*25*
Drive without shocks and normal power *Conveyors, generators, packaging machines, saws, centrifugal pumps, printing machines, escalators*	*1:1*	**2,22*	**1,85*	*1,59*	*1,39*	*1,22*	*1,10*	*0,99*	*0,91*
	2:1	**1,97*	*1,64*	*1,41*	*1,23*	*1,08*	*0,97*	*0,88*	*0,80*
	3:1	*1,82*	*1,52*	*1,30*	*1,14*	*1,00*	*0,90*	*0,81*	*0,74*
	5:1	*1,68*	*1,40*	*1,20*	*1,05*	*0,92*	*0,83*	*0,75*	*0,68*
Smooth drive with occasional slight shocks, normal to medium load *Blowers, rotary dryers, continuous conveyors, cellulose machines, agitators for solids, bending machines, winches, weaving looms, knitting machines*	*1:1*	**2,78*	**2,32*	*1,98*	*1,74*	*1,53*	*1,38*	*1,24*	*1,13*
	2:1	**2,46*	**2,05*	*1,76*	*1,55*	*1,35*	*1,22*	*1,10*	*1,05*
	3:1	**2,28*	*1,90*	*1,63*	*1,43*	*1,25*	*1,13*	*1,02*	*0,93*
	5:1	*2,10*	*1,75*	*1,50*	*1,31*	*1,15*	*1,04*	*0,93*	*0,85*
Slight shocks, medium load *Piston pumps, compressors, broaching machines, mills, mixing machines*	*1:1*	**3,33*	**2,79*	*2,38*	*2,09*	*1,83*	*1,65*	*1,49*	*1,36*
	2:1	**2,95*	**2,47*	*2,11*	*1,85*	*1,62*	*1,46*	*1,31*	*1,20*
	3:1	**2,73*	*2,28*	*1,95*	*1,71*	*1,50*	*1,35*	*1,22*	*1,11*
	5:1	**2,52*	*2,10*	*1,80*	*1,58*	*1,38*	*1,25*	*1,12*	*1,03*
Moderate shocks, heavy pulsating load *Planers, windlass, presses, compressors, mining machinery, stamping machines*	*1:1*	**3,89*	**3,25*	**2,78*	*2,44*	*2,14*	*1,92*	*1,73*	*1,58*
	2:1	**3,44*	**2,87*	*2,46*	*2,16*	*1,89*	*1,70*	*1,53*	*1,40*
	3:1	**3,19*	**2,66*	*2,28*	*2,00*	*1,75*	*1,58*	*1,42*	*1,30*
	5:1	**2,93*	**2,45*	*2,09*	*1,84*	*1,16*	*1,45*	*1,31*	*1,19*
Heavy shocks, alternating loads *Excavators, crushers, calender rollers, pile drivers, brickwork machinery, hammer mills, construction machinery*	*1:1*	**4,44*	**3,71*	**3,17*	**2,78*	*2,44*	*2,20*	*1,98*	*1,81*
	2:1	**3,93*	**3,28*	**2,81*	*2,46*	*2,16*	*1,95*	*1,75*	*1,60*
	3:1	**3,64*	**3,04*	*2,60*	*2,28*	*2,00*	*1,80*	*1,62*	*1,48*
	5:1	**3,35*	**2,80*	*2,39*	*2,10*	*1,84*	*1,66*	*1,49*	*1,36*

** Conditions for preventing slack*

For electric motors and smooth-running drive units.
For combustion engines and other non-smooth running drive types the factor increases by 0.5.

Power diagram for DIN ISO 606 roller chains

For chain drives with 19 teeth, a chain length of 100 links, a ratio of 1:3 and a life expectancy of 15,000 operating hours.



The power diagram is not binding. It assumes operation under optimum conditions and is based on empirical values.

Roller chains single

DIN ISO 606, curved link plate



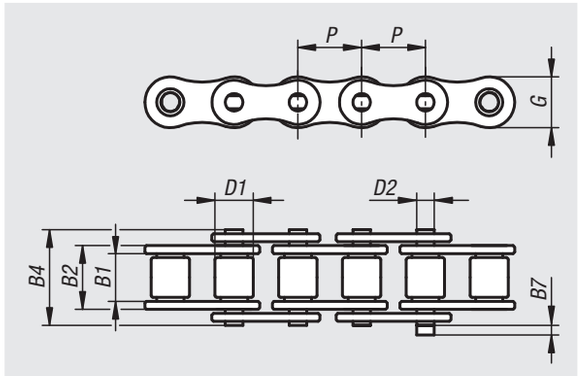
Material:
Steel.

Version:
Pre-stretched.

Sample order:
nlm 22200-0380732525

Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type roller chains acc. to DIN ISO 606 with curved link plates (ISO No. 06 with straight links). All chains are pre-stretched. Initial lubrication: anti-corrosion mineral based oil.
B7 = maximum value for links.
Pitch = PxB1



Temperature range:
-20°C to +120°C.

Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	G	~L	No. of links	Break force F min. kN
22200-0380732525	06 B-1	3/8 x 7/32	9,525 x 5,72	8,53	13.5	3,3	6,35	3,28	8,26	~5000	525	6,6
22200-0120516393	08 B-1	1/2 x 5/16	12,7 x 7,75	11,3	17	3,9	8,51	4,45	11,81	~5000	393	12
22200-0580308315	10 B-1	5/8 x 3/8	15,875 x 9,65	13,28	19,6	4,1	10,16	5,08	14,73	~5000	315	15
22200-0340716263	12 B-1	3/4 x 7/16	19,05 x 11,68	15,62	22,7	4,6	12,07	5,72	16,13	~5000	263	17
22200-1001702197	16 B-1	1 x 17,02mm	25,4 x 17,02	25,45	36,1	5,4	15,88	8,28	21,08	~5000	197	40

22200

Links

DIN ISO 606



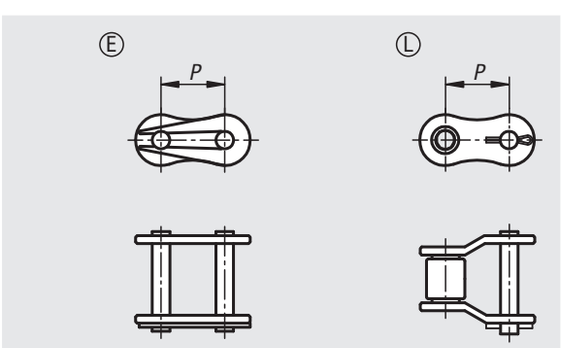
Material:
Steel.

Sample order:
nlm 22200-30380732

Note:
Links for single roller chains acc. to DIN ISO 606.

With Form E, the spring clips must be mounted with the closed end pointing in the direction of travel.

Offset links are required to close the chain if there is an odd number of links. Using offset links reduces the power and tensile strength by 20%.



Form E connecting links

Order No.	ISO No.	P	Suitable for chains
22200-30380732	06 B-1	9,525	3/8 x 7/32
22200-30120516	08 B-1	12,7	1/2 x 5/16
22200-30580308	10 B-1	15,875	5/8 x 3/8
22200-30340716	12 B-1	19,05	3/4 x 7/16
22200-31001702	16 B-1	25,4	1 x 17,02 mm

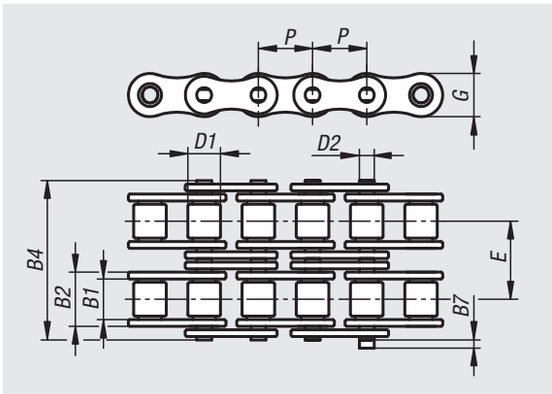
Form L offset links

Order No.	ISO No.	P	Suitable for chains
22200-40380732	06 B-1	9,525	3/8 x 7/32
22200-40120516	08 B-1	12,7	1/2 x 5/16
22200-40580308	10 B-1	15,875	5/8 x 3/8
22200-40340716	12 B-1	19,05	3/4 x 7/16
22200-41001702	16 B-1	25,4	1 x 17,02 mm

Roller chains duplex

DIN ISO 606, curved link plate





Material:
Steel.

Version:
Pre-stretched.

Sample order:
nlm 22201-0800030625

Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type roller chains acc. to DIN ISO 606 with curved link plates (ISO No. 06 with straight links). All chains are pre-stretched. Initial lubrication: anti-corrosion mineral based oil.
B7 = maximum value for links.
Pitch = PxB1

Temperature range:
-20°C to +120°C.

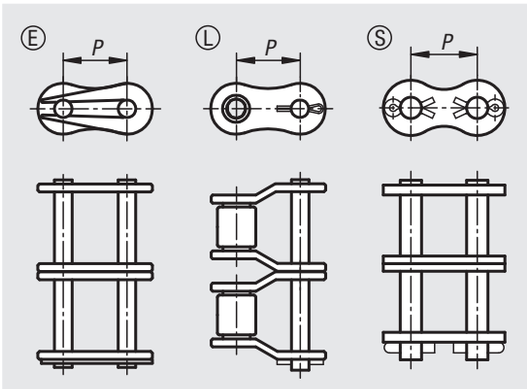


Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	E	G	~L	No. of links	Break force F min. kN
22201-0800030625	05 B-2	-	8,0 x 3,0	4,77	14,3	3,1	5	2,31	5,64	7,11	~5000	625	7,8
22201-0380732525	06 B-2	3/8 x 7/32	9,525 x 5,72	8,53	23,8	3,3	6,35	3,28	10,24	8,26	~5000	525	16,9
22201-0120516393	08 B-2	1/2 x 5/16	12,7 x 7,75	11,3	31	3,9	8,51	4,45	13,92	11,81	~5000	393	31,1
22201-0580308315	10 B-2	5/8 x 3/8	15,875 x 9,65	13,28	36,2	4,1	10,16	5,08	16,59	14,73	~5000	315	44,5
22201-0340716263	12 B-2	3/4 x 7/16	19,05 x 11,68	15,62	42,2	4,6	12,07	5,72	19,46	16,13	~5000	263	57,8
22201-1001702197	16 B-2	1 x 17,02mm	25,4 x 17,02	25,45	68	5,4	15,88	8,28	31,88	21,08	~5000	197	106
22201-1140340157	20 B-2	1 1/4X3/4	31,75 x 19,56	29,01	79,7	6,1	19,05	10,19	36,45	26,42	~5000	157	170
22201-1121000131	24 B-2	1 1/2X1	38,1 x 25,4	37,92	101,8	6,6	25,4	14,63	48,36	33,4	~5000	131	280

Connecting links duplex

DIN ISO 606





Material:
Steel.

Sample order:
nlm 22201-30800030

Note:
Connecting links for DIN ISO 606 duplex roller chains.

By Form E, the spring clip must be mounted with the closed end facing the direction of movement.

Offset links are required to close the chain if there is an odd number of links. Using offset links reduces the power and tensile strength by 20%.

Form E connecting links

Order No.	ISO No.	P	Suitable for chains
22201-30800030	05 B-2	8	8,0 x 3,0mm
22201-30380732	06 B-2	9,525	3/8 x 7/32
22201-30120516	08 B-2	12,7	1/2 x 5/16
22201-30580308	10 B-2	15,875	5/8 x 3/8
22201-30340716	12 B-2	19,05	3/4 x 7/16
22201-31001702	16 B-2	25,4	1 x 17,02 mm

Form L offset links

Order No.	ISO No.	P	Suitable for chains
22201-40800030	05 B-2	8	8,0 x 3,0mm
22201-40380732	06 B-2	9,525	3/8 x 7/32
22201-40120516	08 B-2	12,7	1/2 x 5/16
22201-40580308	10 B-2	15,875	5/8 x 3/8
22201-40340716	12 B-2	19,05	3/4 x 7/16
22201-41001702	16 B-2	25,4	1 x 17,02 mm
22201-41140340	20 B-2	31,75	1 1/4 x 3/4
22201-41121000	24 B-2	38,1	1 1/2 x 1

Form S, connecting links with cotter pin

Order No.	ISO No.	P	Suitable for chains
22201-51140340	20 B-2	31,75	1 1/4 x 3/4
22201-51121000	24 B-2	38,1	1 1/2 x 1

Roller chains triplex

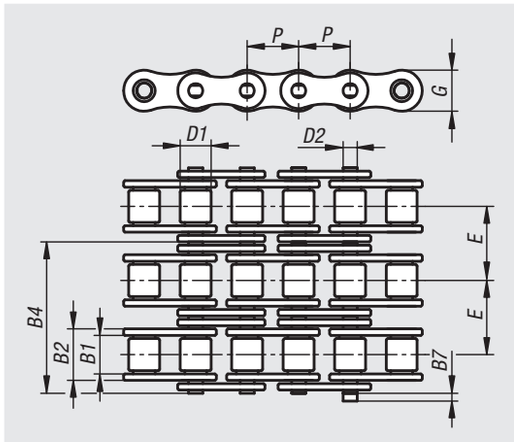
DIN ISO 606, curved link plate



Material:
Steel.

Version:
Pre-stretched.

Sample order:
nlm 22202-0380732525



Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type roller chains acc. to DIN ISO 606 with curved link plates (ISO No. 06 with straight links). All chains are pre-stretched. Initial lubrication: anti-corrosion mineral based oil.
B7 = maximum value for links.
Pitch = PxB1

Temperature range:
-20°C to +120°C.

Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	E	G	~L	No. of links	Break force F min. kN
22202-0380732525	06 B-2	3/8 x 7/32	9,525 x 5,72	8,53	34	3,3	6,35	3,28	10,24	8,26	~5000	525	24,9
22202-0120516393	08 B-2	1/2 x 5/16	12,7 x 7,75	11,3	44,9	3,9	8,51	4,45	13,92	11,81	~5000	393	44,5
22202-0580308315	10 B-2	5/8 x 3/8	15,875 x 9,65	13,28	52,8	4,1	10,16	5,08	16,59	14,73	~5000	315	66,7
22202-0340716263	12 B-2	3/4 x 7/16	19,05 x 11,68	15,62	61,7	4,6	12,07	5,72	19,46	16,13	~5000	263	86,7
22202-1001702197	16 B-2	1 x 17,02mm	25,4 x 17,02	25,45	99,9	5,4	15,88	8,28	31,88	21,08	~5000	197	160

22202

Connecting links triplex

DIN ISO 606



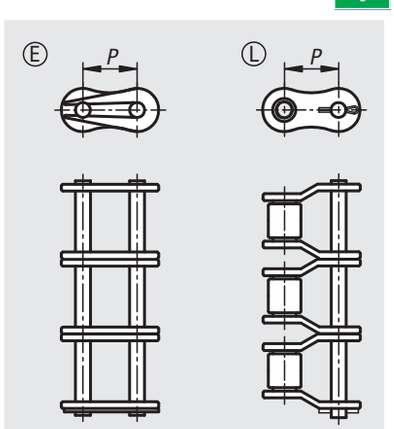
Material:
Steel.

Sample order:
nlm 22202-30380732

Note:
Connecting links for DIN ISO 606 triplex roller chains.

By Form E, the spring clip must be mounted with the closed end facing in the direction of movement.

Offset links are required to close the chain if there is an odd number of links. Using offset links reduces the power and tensile strength by 20%.



Form E connecting links

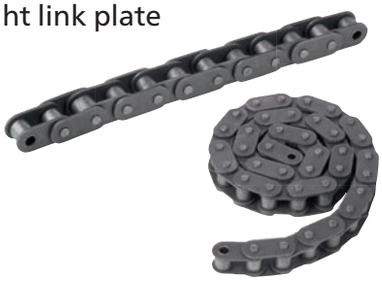
Order No.	ISO No.	P	Suitable for chains
22202-30380732	06 B-2	9,525	3/8 x 7/32
22202-30120516	08 B-2	12,7	1/2 x 5/16
22202-30580308	10 B-2	15,875	5/8 x 3/8
22202-30340716	12 B-2	19,05	3/4 x 7/16
22202-31001702	16 B-2	25,4	1 x 17,02 mm

Form L offset links

Order No.	ISO No.	P	Suitable for chains
22202-40380732	06 B-2	9,525	3/8 x 7/32
22202-40120516	08 B-2	12,7	1/2 x 5/16
22202-40580308	10 B-2	15,875	5/8 x 3/8
22202-40340716	12 B-2	19,05	3/4 x 7/16
22202-41001702	16 B-2	25,4	1 x 17,02 mm

Roller chains single

DIN ISO 606, straight link plate



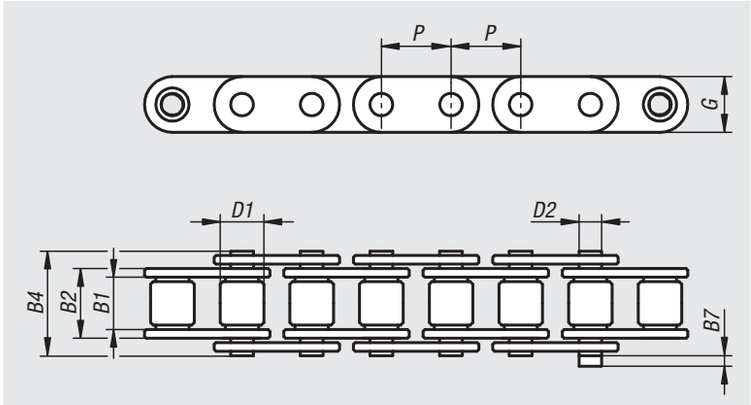
Material:
Steel.

Version:
Pre-stretched.

Sample order:
nlm 22208-0120516393

Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type roller chains acc. to DIN ISO 606 with straight link plates.
All chains are pre-stretched.
Initial lubrication: anti-corrosion mineral based oil.
B7 = maximum value for links.
Pitch = PxB1



Temperature range:
-20°C to +120°C.

Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	G	~L	No. of links	Break force F min. kN
22208-0120516393	08 B-1	1/2 x 5/16	12,7 x 7,75	11,3	17	1,5	8,51	4,45	11,8	~5000	393	18
22208-0580308315	10 B-1	5/8 x 3/8	15,875 x 9,65	13,28	19,6	2,4	10,16	5,08	14,7	~5000	315	22,4
22208-0340716263	12 B-1	3/4 x 7/16	19,05 x 11,68	15,62	22,7	2,7	12,07	5,72	16	~5000	263	29
22208-1001702197	16 B-1	1 x 17,02mm	25,4 x 17,02	25,45	36,1	3	15,88	8,28	21	~5000	197	60

22208

Links

DIN ISO 606

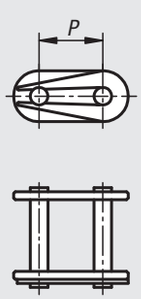


Material:
Steel.

Sample order:
nlm 22208-30120516

Note:
Links for single roller chains acc. to DIN ISO 606.

The spring clips must be mounted with the closed end pointing in the direction of travel.



Order No.	ISO No.	P	Suitable for chains
22208-30120516	08 B-1	12,7	1/2 x 5/16
22208-30580308	10 B-1	15,875	5/8 x 3/8
22208-30340716	12 B-1	19,05	3/4 x 7/16
22208-31001702	16 B-1	25,4	1 x 17,02 mm

Roller chains single stainless steel

DIN ISO 606, curved link plate



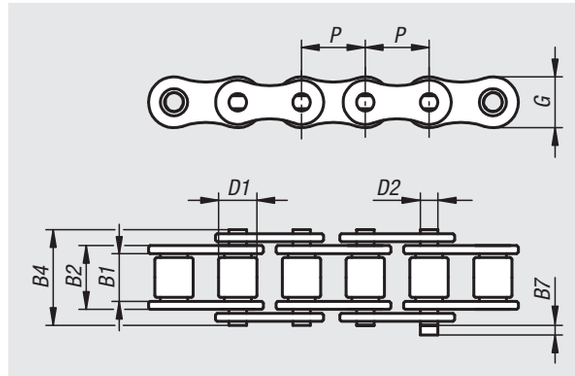
Material:
Stainless steel 1.4301.

Version:
Pre-stretched.

Sample order:
nlm 22212-0380732525

Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type DIN ISO 606 roller chains with curved link plates (ISO No. 06 with straight links). All chains are pre-stretched. Not lubricated, the chains must be lubricated depending on the application.
The stainless steel roller chains offer excellent corrosion protection and good chemical resistance. They can be used in applications with water and at high temperatures.



B7 = maximum value for links.
Pitch = PxB1

Temperature range:
-20°C to +400°C.

Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	G	~L	No. of links	Break force F min. kN
22212-0380732525	06 B-1	3/8 x 7/32	9,525 x 5,72	8,53	13.5	3,3	6,35	3,28	8,26	~5000	525	6,6
22212-0120516393	08 B-1	1/2 x 5/16	12,7 x 7,75	11,3	17	3,9	8,51	4,45	11,81	~5000	393	12
22212-0580308315	10 B-1	5/8 x 3/8	15,875 x 9,65	13,28	19,6	4,1	10,16	5,08	14,73	~5000	315	15
22212-0340716263	12 B-1	3/4 x 7/16	19,05 x 11,68	15,62	22,7	4,6	12,07	5,72	16,13	~5000	263	17
22212-1001702197	16 B-1	1 x 17,02mm	25,4 x 17,02	25,45	36,1	5,4	15,88	8,28	21,08	~5000	197	40

Links stainless steel

DIN ISO 606



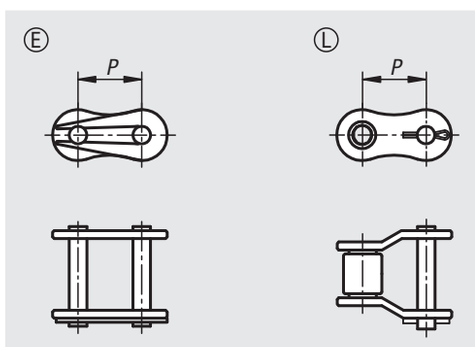
Material:
Stainless steel 1.4301.

Sample order:
nlm 22212-30380732

Note:
Links for single roller chains acc. to DIN ISO 606.

With Form E, the spring clips must be mounted with the closed end pointing in the direction of travel.

Offset links are required to close the chain if there is an odd number of links. Using offset links reduces the power and tensile strength by 20%.



Form E connecting links

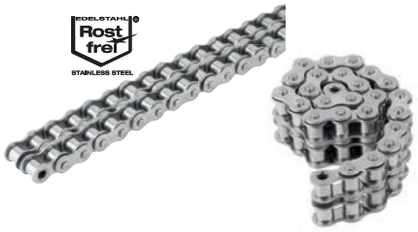
Order No.	ISO No.	P	Suitable for chains
22212-30380732	06 B-1	9,525	3/8 x 7/32
22212-30120516	08 B-1	12,7	1/2 x 5/16
22212-30580308	10 B-1	15,875	5/8 x 3/8
22212-30340716	12 B-1	19,05	3/4 x 7/16
22212-31001702	16 B-1	25,4	1 x 17,02 mm

Form L offset links

Order No.	ISO No.	P	Suitable for chains
22212-40380732	06 B-1	9,525	3/8 x 7/32
22212-40120516	08 B-1	12,7	1/2 x 5/16
22212-40580308	10 B-1	15,875	5/8 x 3/8
22212-40340716	12 B-1	19,05	3/4 x 7/16
22212-41001702	16 B-1	25,4	1 x 17,02 mm

Roller chain duplex, stainless steel

DIN ISO 606, curved link plate



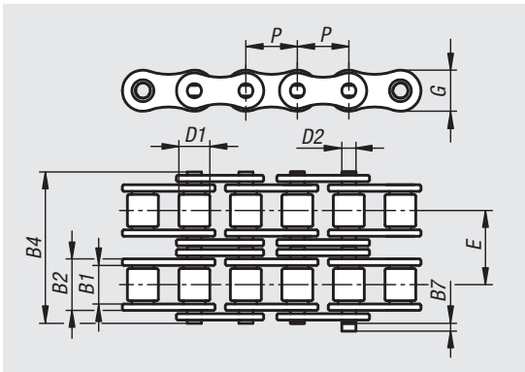
Material:
Stainless steel 1.4301.

Version:
Pre-stretched.

Sample order:
nlm 22213-0380732525

Note for ordering:
Packaging unit: 5 metres with odd number of links. Ending with an inner link at both ends. Connecting links must be ordered separately.

Note:
European-type DIN ISO 606 roller chains with curved link plates (ISO No. 06 with straight links). All chains are pre-stretched. Not lubricated, the chains must be lubricated depending on the application.
The stainless steel roller chains offer excellent corrosion protection and good chemical resistance. They can be used in applications with water and at high temperatures.



B7 = maximum value for links.
Pitch = PxB1

Temperature range:
-20°C to +400°C.

Order No.	ISO No.	Pitch inch	Pitch mm	B2	B4	B7	D1	D2	E	G	~L	No. of links	Break force F min. kN
22213-0380732525	06 B-2	3/8 x 7/32	9,525 x 5,72	8,53	23,8	3,3	6,35	3,28	10,24	8,26	~5000	525	10,5
22213-0120516393	08 B-2	1/2 x 5/16	12,7 x 7,75	11,3	31	3,9	8,51	4,45	13,92	11,81	~5000	393	22
22213-0580308315	10 B-2	5/8 x 3/8	15,875 x 9,65	13,28	36,2	4,1	10,16	5,08	16,59	14,73	~5000	315	28,4
22213-0340716263	12 B-2	3/4 x 7/16	19,05 x 11,68	15,62	42,2	4,6	12,07	5,72	19,46	16,13	~5000	263	33,3
22213-1001702197	16 B-2	1 x 17,02mm	25,4 x 17,02	25,45	68	5,4	15,88	8,28	31,88	21,08	~5000	197	74,4

22213

Connecting links duplex, stainless steel

DIN ISO 606



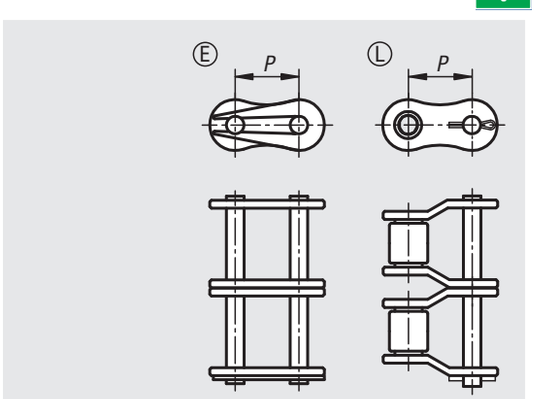
Material:
Stainless steel 1.4301.

Sample order:
nlm 22213-30380732

Note:
Connecting links for DIN ISO 606 duplex roller chains.

By Form E, the spring clip must be mounted with the closed end facing the direction of movement.

Offset links are required to close the chain if there is an odd number of links. Using offset links reduces the power and tensile strength by 20%.



Form E connecting links

Order No.	ISO No.	P	Suitable for chains
22213-30380732	06 B-2	9,525	3/8 x 7/32
22213-30120516	08 B-2	12,7	1/2 x 5/16
22213-30580308	10 B-2	15,875	5/8 x 3/8
22213-30340716	12 B-2	19,05	3/4 x 7/16
22213-31001702	16 B-2	25,4	1 x 17,02 mm

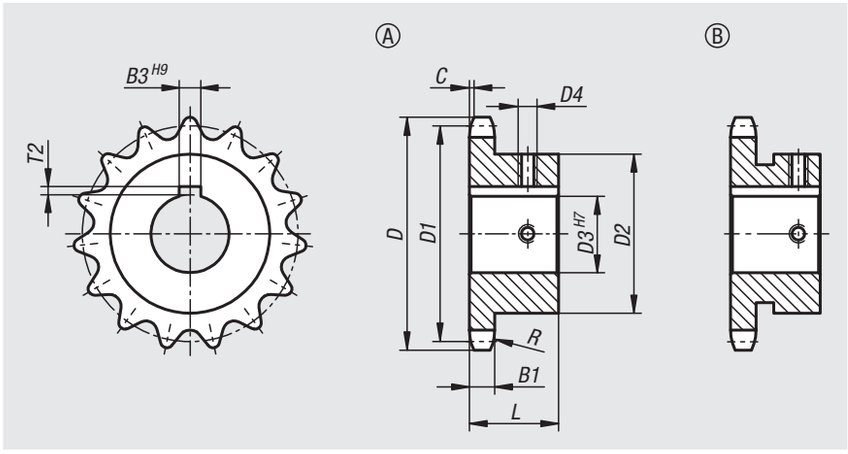
Form L offset links

Order No.	ISO No.	P	Suitable for chains
22213-40380732	06 B-2	9,525	3/8 x 7/32
22213-40120516	08 B-2	12,7	1/2 x 5/16
22213-40580308	10 B-2	15,875	5/8 x 3/8
22213-40340716	12 B-2	19,05	3/4 x 7/16
22213-41001702	16 B-2	25,4	1 x 17,02 mm

Sprockets single 3/8“ x 7/32“

DIN ISO 606, ready to install





Material:
Steel C45.

Version:
Bright.
Teeth inductively hardened ~HRC 50.

Sample order:
nlm 22250-1038073201010

Note:
Ready to install sprockets with hub on one side for DIN ISO 606 roller chains. Teeth are milled and inductively hardened. Keyway acc. to DIN 6885 / BS 4235. The keyway is aligned with the tooth tip.
With two grub screws. One tapped hole aligned with the keyway centre, the other offset by 90°.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22250	06 B-1	3/8 x 7/32	9,525 x 5,72	10	1	5,3

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1038073201010	B	10	34,5	30,82	24	10	M4	3	20	1,4
22250-1038073201012	B				26	12	M4	4	20	1,8
22250-1038073201014	B				29	14	M4	5	20	2,3
22250-1038073201110	B	11	37,5	33,8	24	10	M4	3	25	1,4
22250-1038073201112	B				26	12	M4	4	25	1,8
22250-1038073201114	B				29	14	M4	5	25	2,3
22250-1038073201115	B				30	15	M4	5	25	2,3
22250-1038073201116	B				31	16	M4	5	25	2,3
22250-1038073201210	A	12	40,5	36,8	25	10	M4	3	25	1,4
22250-1038073201212	B				26	12	M4	4	25	1,8
22250-1038073201214	B				29	14	M4	5	25	2,3
22250-1038073201215	B				30	15	M4	5	25	2,3
22250-1038073201216	B				31	16	M4	5	25	2,3
22250-1038073201312	A	13	43,5	39,8	28	12	M4	4	25	1,8
22250-1038073201314	A				28	14	M4	5	25	2,3
22250-1038073201310	A				28	10	M4	3	25	1,4
22250-1038073201315	A				28	15	M4	5	25	2,3
22250-1038073201316	B				31	16	M4	5	25	2,3
22250-1038073201318	B				34	18	M5	6	25	2,8
22250-1038073201418	A	14	46,5	42,8	31	18	M5	6	25	2,8

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1038073201412	A				31	12	M4	4	25	1,8
22250-1038073201416	A				31	16	M4	5	25	2,3
22250-1038073201410	A				31	10	M4	3	25	1,4
22250-1038073201415	A				31	15	M4	5	25	2,3
22250-1038073201414	A				31	14	M4	5	25	2,3
22250-1038073201419	B				35	19	M5	6	25	2,8
22250-1038073201515	A	15	49,5	45,81	34	15	M4	5	25	2,3
22250-1038073201516	A				34	16	M4	5	25	2,3
22250-1038073201518	A				34	18	M5	6	25	2,8
22250-1038073201519	A				34	19	M5	6	25	2,8
22250-1038073201512	A				34	12	M4	4	25	1,8
22250-1038073201520	A				34	20	M5	6	25	2,8
22250-1038073201514	A				34	14	M4	5	25	2,3
22250-1038073201525	B				42	25	M6	8	25	3,3
22250-1038073201522	B				42	22	M5	6	25	2,8
22250-1038073201524	B				42	24	M6	8	25	3,3
22250-1038073201616	A	16	52,5	48,82	37	16	M4	5	28	2,3
22250-1038073201612	A				37	12	M4	4	28	1,8
22250-1038073201618	A				37	18	M5	6	28	2,8
22250-1038073201614	A				37	14	M4	5	28	2,3

Sprockets single 3/8“ x 7/32“

DIN ISO 606, ready to install

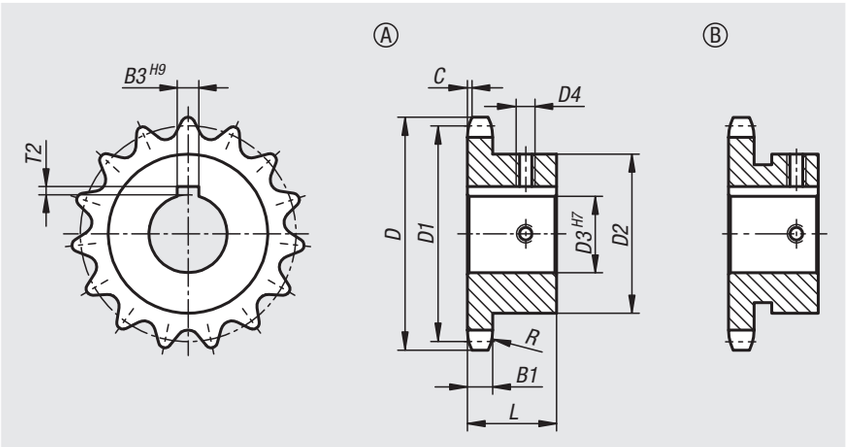
Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1038073201619	A				37	19	M5	6	28	2,8
22250-1038073201620	A				37	20	M5	6	28	2,8
22250-1038073201622	A				37	22	M5	6	28	2,8
22250-1038073201615	A				37	15	M4	5	28	2,3
22250-1038073201624	B				42	24	M6	8	28	3,3
22250-1038073201625	B				42	25	M6	8	28	3,3
22250-1038073201716	A	17	55,5	51,83	40	16	M4	5	28	2,3
22250-1038073201718	A				40	18	M5	6	28	2,8
22250-1038073201719	A				40	19	M5	6	28	2,8
22250-1038073201720	A				40	20	M5	6	28	2,8
22250-1038073201722	A				40	22	M5	6	28	2,8
22250-1038073201712	A				40	12	M4	4	28	1,8
22250-1038073201715	A				40	15	M4	5	28	2,3
22250-1038073201714	A				40	14	M4	5	28	2,3
22250-1038073201724	B				46	24	M6	8	28	3,3
22250-1038073201725	B				46	25	M6	8	28	3,3
22250-1038073201814	A	18	58,6	54,85	40	14	M4	5	28	2,3
22250-1038073201812	A				40	12	M4	4	28	1,8
22250-1038073201824	A				43	24	M6	8	28	3,3
22250-1038073201816	A				43	16	M4	5	28	2,3
22250-1038073201825	A				43	25	M6	8	28	3,3
22250-1038073201818	A				43	18	M5	6	28	2,8
22250-1038073201819	A				43	19	M5	6	28	2,8
22250-1038073201820	A				43	20	M5	6	28	2,8
22250-1038073201822	A				43	22	M5	6	28	2,8
22250-1038073201815	A				43	15	M4	5	28	2,3
22250-1038073201912	A	19	61,6	57,87	40	12	M4	4	28	1,8
22250-1038073201914	A				40	14	M4	5	28	2,3
22250-1038073201916	A				45	16	M4	5	28	2,3
22250-1038073201915	A				45	15	M4	5	28	2,3
22250-1038073201918	A				45	18	M5	6	28	2,8
22250-1038073201925	A				45	25	M6	8	28	3,3
22250-1038073201919	A				45	19	M5	6	28	2,8
22250-1038073201920	A				45	20	M5	6	28	2,8
22250-1038073201922	A				45	22	M5	6	28	2,8
22250-1038073201924	A				45	24	M6	8	28	3,3
22250-1038073202014	A	20	64,6	60,89	40	14	M4	5	28	2,3
22250-1038073202012	A				40	12	M4	4	28	1,8
22250-1038073202016	A				46	16	M4	5	28	2,3
22250-1038073202018	A				46	18	M5	6	28	2,8
22250-1038073202015	A				46	15	M4	5	28	2,3
22250-1038073202019	A				46	19	M5	6	28	2,8
22250-1038073202025	A				46	25	M6	8	28	3,3
22250-1038073202020	A				46	20	M5	6	28	2,8
22250-1038073202022	A				46	22	M5	6	28	2,8
22250-1038073202024	A				46	24	M6	8	28	3,3
22250-1038073202122	A	21	67,6	63,91	48	22	M5	6	28	2,8
22250-1038073202124	A				48	24	M6	8	28	3,3

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1038073202125	A				48	25	M6	8	28	3,3
22250-1038073202115	A				48	15	M4	5	28	2,3
22250-1038073202118	A				48	18	M5	6	28	2,8
22250-1038073202116	A				48	16	M4	5	28	2,3
22250-1038073202119	A				48	19	M5	6	28	2,8
22250-1038073202120	A				48	20	M5	6	28	2,8
22250-1038073202216	A	22	70,6	66,93	50	16	M4	5	28	2,3
22250-1038073202218	A				50	18	M5	6	28	2,8
22250-1038073202215	A				50	15	M4	5	28	2,3
22250-1038073202219	A				50	19	M5	6	28	2,8
22250-1038073202225	A				50	25	M6	8	28	3,3
22250-1038073202220	A				50	20	M5	6	28	2,8
22250-1038073202222	A				50	22	M5	6	28	2,8
22250-1038073202224	A				50	24	M6	8	28	3,3
22250-1038073202315	A	23	73,7	69,95	50	15	M4	5	28	2,3
22250-1038073202316	A				50	16	M4	5	28	2,3
22250-1038073202319	A				52	19	M5	6	28	2,8
22250-1038073202320	A				52	20	M5	6	28	2,8
22250-1038073202318	A				52	18	M5	6	28	2,8
22250-1038073202322	A				52	22	M5	6	28	2,8
22250-1038073202325	A				52	25	M6	8	28	3,3
22250-1038073202324	A				52	24	M6	8	28	3,3
22250-1038073202418	A	24	76,7	72,97	50	18	M5	6	28	2,8
22250-1038073202416	A				50	16	M4	5	28	2,3
22250-1038073202425	A				54	25	M6	8	28	3,3
22250-1038073202422	A				54	22	M5	6	28	2,8
22250-1038073202430	A				54	30	M6	8	28	3,3
22250-1038073202420	A				54	20	M5	6	28	2,8
22250-1038073202419	A				54	19	M5	6	28	2,8
22250-1038073202428	A				54	28	M6	8	28	3,3
22250-1038073202424	A				54	24	M6	8	28	3,3
22250-1038073202516	A	25	79,7	76	50	16	M4	5	28	2,3
22250-1038073202518	A				50	18	M5	6	28	2,8
22250-1038073202519	A				50	19	M5	6	28	2,8
22250-1038073202528	A				57	28	M6	8	28	3,3
22250-1038073202525	A				57	25	M6	8	28	3,3
22250-1038073202524	A				57	24	M6	8	28	3,3
22250-1038073202530	A				57	30	M6	8	28	3,3
22250-1038073202522	A				57	22	M5	6	28	2,8
22250-1038073202520	A				57	20	M5	6	28	2,8
22250-1038073203022	A	30	94,8	91,12	60	22	M5	6	30	2,8
22250-1038073203020	A				60	20	M5	6	30	2,8
22250-1038073203024	A				60	24	M6	8	30	3,3
22250-1038073203030	A				60	30	M6	8	30	3,3
22250-1038073203025	A				60	25	M6	8	30	3,3
22250-1038073203028	A				60	28	M6	8	30	3,3

Sprockets single 1/2“ x 5/16“

DIN ISO 606, ready to install





Material:
Steel C45.

Version:
Bright.
Teeth inductively hardened ~HRC 50.

Sample order:
nlm 22250-1012051601012

Note:
Ready to install sprockets with hub on one side for DIN ISO 606 roller chains. Teeth are milled and inductively hardened.
Keyway acc. to DIN 6885 / BS 4235. The keyway is aligned with the tooth tip.
With two grub screws. One tapped hole aligned with the keyway centre, the other offset by 90°.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22250	08 B-1	1/2 x 5/16	12,7 x 7,75	13	1,3	7,2

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1012051601012	A	10	45,9	41,1	26	12	M4	4	25	1,8
22250-1012051601014	A				26	14	M4	5	25	2,3
22250-1012051601015	B				31	15	M4	5	25	2,3
22250-1012051601016	B				31	16	M4	5	25	2,3
22250-1012051601114	A	11	49,9	45,07	29	14	M4	5	25	2,3
22250-1012051601112	A				29	12	M4	4	25	1,8
22250-1012051601115	B				31	15	M4	5	25	2,3
22250-1012051601116	B				31	16	M4	5	25	2,3
22250-1012051601119	B				37	19	M5	6	25	2,8
22250-1012051601118	B				37	18	M5	6	25	2,8
22250-1012051601220	A	12	53,9	49,07	33	20	M5	6	28	2,8
22250-1012051601214	A				33	14	M4	5	28	2,3
22250-1012051601215	A				33	15	M4	5	28	2,3
22250-1012051601216	A				33	16	M4	5	28	2,3
22250-1012051601218	A				33	18	M5	6	28	2,8
22250-1012051601219	A				33	19	M5	6	28	2,8
22250-1012051601212	A				33	12	M4	4	28	1,8
22250-1012051601222	B				40	22	M5	6	28	2,8
22250-1012051601224	B				41	24	M6	8	28	3,3
22250-1012051601225	B				42	25	M6	8	28	3,3

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1012051601314	A	13	57,9	56,06	33	14	M4	5	28	2,3
22250-1012051601312	A				33	12	M4	4	28	1,8
22250-1012051601319	A				37	19	M5	6	28	2,8
22250-1012051601316	A				37	16	M4	5	28	2,3
22250-1012051601320	A				37	20	M5	6	28	2,8
22250-1012051601322	A				37	22	M5	6	28	2,8
22250-1012051601318	A				37	18	M5	6	28	2,8
22250-1012051601315	A				37	15	M4	5	28	2,3
22250-1012051601324	B				42	24	M6	8	28	3,3
22250-1012051601325	B				42	25	M6	8	28	3,3
22250-1012051601328	B				45	28	M6	8	28	3,3
22250-1012051601414	A	14	61,9	57,07	37	14	M4	5	28	2,3
22250-1012051601412	A				37	12	M4	4	28	1,8
22250-1012051601419	A				41	19	M5	6	28	2,8
22250-1012051601420	A				41	20	M5	6	28	2,8
22250-1012051601422	A				41	22	M5	6	28	2,8
22250-1012051601424	A				41	24	M6	8	28	3,3
22250-1012051601425	A				41	25	M6	8	28	3,3
22250-1012051601415	A				41	15	M4	5	28	2,3
22250-1012051601416	A				41	16	M4	5	28	2,3

Sprockets single 1/2" x 5/16"

DIN ISO 606, ready to install

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1012051601418	A				41	18	M5	6	28	2,8
22250-1012051601428	B				48	28	M6	8	28	3,3
22250-1012051601514	A	15	65,9	61,09	37	14	M4	5	28	2,3
22250-1012051601512	A				37	12	M4	4	28	1,8
22250-1012051601519	A				45	19	M5	6	28	2,8
22250-1012051601520	A				45	20	M5	6	28	2,8
22250-1012051601522	A				45	22	M5	6	28	2,8
22250-1012051601524	A				45	24	M6	8	28	3,3
22250-1012051601525	A				45	25	M6	8	28	3,3
22250-1012051601528	A				45	28	M6	8	28	3,3
22250-1012051601516	A				45	16	M4	5	28	2,3
22250-1012051601515	A				45	15	M4	5	28	2,3
22250-1012051601518	A				45	18	M5	6	28	2,8
22250-1012051601532	B				52	32	M8	10	28	3,3
22250-1012051601530	B				52	30	M6	8	28	3,3
22250-1012051601624	A	16	69,9	65,1	50	24	M6	8	28	3,3
22250-1012051601622	A				50	22	M5	6	28	2,8
22250-1012051601620	A				50	20	M5	6	28	2,8
22250-1012051601630	A				50	30	M6	8	28	3,3
22250-1012051601619	A				50	19	M5	6	28	2,8
22250-1012051601628	A				50	28	M6	8	28	3,3
22250-1012051601618	A				50	18	M5	6	28	2,8
22250-1012051601616	A				50	16	M4	5	28	2,3
22250-1012051601615	A				50	15	M4	5	28	2,3
22250-1012051601625	A				50	25	M6	8	28	3,3
22250-1012051601632	B				57	32	M8	10	28	3,3
22250-1012051601720	A	17	74	69,11	52	20	M5	6	28	2,8
22250-1012051601722	A				52	22	M5	6	28	2,8
22250-1012051601724	A				52	24	M6	8	28	3,3
22250-1012051601725	A				52	25	M6	8	28	3,3
22250-1012051601728	A				52	28	M6	8	28	3,3
22250-1012051601730	A				52	30	M6	8	28	3,3
22250-1012051601732	A				52	32	M8	10	28	3,3
22250-1012051601715	A				52	15	M4	5	28	2,3
22250-1012051601716	A				52	16	M4	5	28	2,3
22250-1012051601718	A				52	18	M5	6	28	2,8
22250-1012051601719	A				52	19	M5	6	28	2,8
22250-1012051601816	A	18	78	73,14	52	16	M4	5	28	2,3
22250-1012051601818	A				52	18	M5	6	28	2,8
22250-1012051601819	A				52	19	M5	6	28	2,8
22250-1012051601822	A				56	22	M5	6	28	2,8
22250-1012051601820	A				56	20	M5	6	28	2,8
22250-1012051601824	A				56	24	M6	8	28	3,3
22250-1012051601835	A				56	35	M8	10	28	3,3
22250-1012051601825	A				56	25	M6	8	28	3,3
22250-1012051601828	A				56	28	M6	8	28	3,3
22250-1012051601830	A				56	30	M6	8	28	3,3
22250-1012051601832	A				56	32	M8	10	28	3,3
22250-1012051601838	A				56	38	M8	10	28	3,3
22250-1012051601918	A	19	82	77,16	52	18	M5	6	28	2,8
22250-1012051601919	A				52	19	M5	6	28	2,8
22250-1012051601916	A				52	16	M4	5	28	2,3
22250-1012051601938	A				60	38	M8	10	28	3,3
22250-1012051601935	A				60	35	M8	10	28	3,3
22250-1012051601932	A				60	32	M8	10	28	3,3
22250-1012051601920	A				60	20	M5	6	28	2,8
22250-1012051601930	A				60	30	M6	8	28	3,3
22250-1012051601922	A				60	22	M5	6	28	2,8
22250-1012051601928	A				60	28	M6	8	28	3,3
22250-1012051601925	A				60	25	M6	8	28	3,3
22250-1012051601924	A				60	24	M6	8	28	3,3
22250-1012051602018	A	20	86	81,19	55	18	M5	6	28	2,8
22250-1012051602016	A				55	16	M4	5	28	2,3
22250-1012051602019	A				55	19	M5	6	28	2,8
22250-1012051602025	A				64	25	M6	8	28	3,3
22250-1012051602020	A				64	20	M5	6	28	2,8
22250-1012051602022	A				64	22	M5	6	28	2,8
22250-1012051602038	A				64	38	M8	10	28	3,3
22250-1012051602035	A				64	35	M8	10	28	3,3
22250-1012051602024	A				64	24	M6	8	28	3,3
22250-1012051602032	A				64	32	M8	10	28	3,3
22250-1012051602028	A				64	28	M6	8	28	3,3
22250-1012051602030	A				64	30	M6	8	28	3,3
22250-1012051602119	A	21	90,1	85,22	55	19	M5	6	28	2,8
22250-1012051602118	A				55	18	M5	6	28	2,8
22250-1012051602116	A				55	16	M4	5	28	2,3
22250-1012051602120	A				60	20	M5	6	28	2,8
22250-1012051602122	A				60	22	M5	6	28	2,8
22250-1012051602124	A				68	24	M6	8	28	3,3
22250-1012051602135	A				68	35	M8	10	28	3,3
22250-1012051602132	A				68	32	M8	10	28	3,3
22250-1012051602130	A				68	30	M6	8	28	3,3
22250-1012051602128	A				68	28	M6	8	28	3,3
22250-1012051602125	A				68	25	M6	8	28	3,3
22250-1012051602138	A				68	38	M8	10	28	3,3
22250-1012051602218	A	22	94,1	89,24	55	18	M5	6	28	2,8
22250-1012051602216	A				55	16	M4	5	28	2,3
22250-1012051602219	A				55	19	M5	6	28	2,8
22250-1012051602220	A				65	20	M5	6	28	2,8
22250-1012051602222	A				65	22	M5	6	28	2,8
22250-1012051602230	A				70	30	M6	8	28	3,3
22250-1012051602232	A				70	32	M8	10	28	3,3
22250-1012051602235	A				70	35	M8	10	28	3,3
22250-1012051602224	A				70	24	M6	8	28	3,3
22250-1012051602238	A				70	38	M8	10	28	3,3
22250-1012051602225	A				70	25	M6	8	28	3,3

Sprockets single 1/2“ x 5/16“

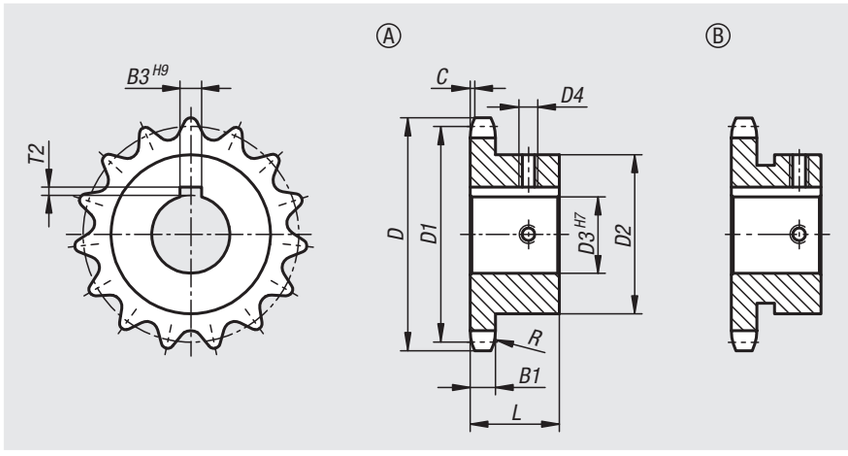
DIN ISO 606, ready to install

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1012051602228	A				70	28	M6	8	28	3,3
22250-1012051602320	A	23	98,1	93,27	65	20	M5	6	28	2,8
22250-1012051602319	A				65	19	M5	6	28	2,8
22250-1012051602338	A				70	38	M8	10	28	3,3
22250-1012051602325	A				70	25	M6	8	28	3,3
22250-1012051602322	A				70	22	M5	6	28	2,8
22250-1012051602328	A				70	28	M6	8	28	3,3
22250-1012051602324	A				70	24	M6	8	28	3,3
22250-1012051602330	A				70	30	M6	8	28	3,3
22250-1012051602332	A				70	32	M8	10	28	3,3
22250-1012051602335	A				70	35	M8	10	28	3,3
22250-1012051602420	A	24	102,1	97,29	65	20	M5	6	28	2,8
22250-1012051602419	A				65	19	M5	6	28	2,8
22250-1012051602438	A				70	38	M8	10	28	3,3
22250-1012051602425	A				70	25	M6	8	28	3,3
22250-1012051602428	A				70	28	M6	8	28	3,3
22250-1012051602430	A				70	30	M6	8	28	3,3
22250-1012051602422	A				70	22	M5	6	28	2,8
22250-1012051602432	A				70	32	M8	10	28	3,3
22250-1012051602424	A				70	24	M6	8	28	3,3
22250-1012051602435	A				70	35	M8	10	28	3,3
22250-1012051602519	A	25	106,2	101,33	65	19	M5	6	28	2,8
22250-1012051602520	A				65	20	M5	6	28	2,8
22250-1012051602530	A				70	30	M6	8	28	3,3
22250-1012051602528	A				70	28	M6	8	28	3,3
22250-1012051602525	A				70	25	M6	8	28	3,3
22250-1012051602538	A				70	38	M8	10	28	3,3
22250-1012051602524	A				70	24	M6	8	28	3,3
22250-1012051602535	A				70	35	M8	10	28	3,3
22250-1012051602522	A				70	22	M5	6	28	2,8
22250-1012051602532	A				70	32	M8	10	28	3,3
22250-1012051603028	A	30	126,3	121,5	75	28	M6	8	30	3,3
22250-1012051603025	A				75	25	M6	8	30	3,3
22250-1012051603030	A				80	30	M6	8	30	3,3
22250-1012051603032	A				80	32	M8	10	30	3,3
22250-1012051603035	A				80	35	M8	10	30	3,3
22250-1012051603038	A				80	38	M8	10	30	3,3

Sprockets single 5/8“ x 3/8“

DIN ISO 606, ready to install





Material:
Steel C45.

Version:
Bright.
Teeth inductively hardened ~HRC 50.

Sample order:
nlm 22250-1058030801015

Note:
Ready to install sprockets with hub on one side for DIN ISO 606 roller chains. Teeth are milled and inductively hardened.
Keyway acc. to DIN 6885 / BS 4235. The keyway is aligned with the tooth tip.
With two grub screws. One tapped hole aligned with the keyway centre, the other offset by 90°.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22250	10 B-1	5/8 x 3/8	15,875 x 9,65	16	1,6	9,1

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1058030801016	A	10	58,3	51,37	35	16	M4	5	25	2,3
22250-1058030801015	A				35	15	M4	5	25	2,3
22250-1058030801018	A				35	18	M5	6	25	2,8
22250-1058030801020	A				35	20	M5	6	25	2,8
22250-1058030801019	A				35	19	M5	6	25	2,8
22250-1058030801024	B				42	24	M6	8	25	3,3
22250-1058030801116	A	11	63,2	56,34	37	16	M4	5	30	2,3
22250-1058030801115	A				37	15	M4	5	30	2,3
22250-1058030801118	A				37	18	M5	6	30	2,8
22250-1058030801119	A				37	19	M5	6	30	2,8
22250-1058030801120	A				37	20	M5	6	30	2,8
22250-1058030801124	B				47	24	M6	8	30	3,3
22250-1058030801125	B				47	25	M6	8	30	3,3
22250-1058030801128	B				47	28	M6	8	30	3,3
22250-1058030801219	A	12	68,2	61,34	42	19	M5	6	30	2,8
22250-1058030801220	A				42	20	M5	6	30	2,8
22250-1058030801222	A				42	22	M5	6	30	2,8
22250-1058030801224	A				42	24	M6	8	30	3,3
22250-1058030801225	A				42	25	M6	8	30	3,3
22250-1058030801215	A				42	15	M4	5	30	2,3

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1058030801218	A				42	18	M5	6	30	2,8
22250-1058030801216	A				42	16	M4	5	30	2,3
22250-1058030801228	B				51	28	M6	8	30	3,3
22250-1058030801230	B				51	30	M6	8	30	3,3
22250-1058030801232	B				55	32	M8	10	30	3,3
22250-1058030801324	A	13	73,2	66,32	47	24	M6	8	30	3,3
22250-1058030801325	A				47	25	M6	8	30	3,3
22250-1058030801328	A				47	28	M6	8	30	3,3
22250-1058030801330	A				47	30	M6	8	30	3,3
22250-1058030801318	A				47	18	M5	6	30	2,8
22250-1058030801319	A				47	19	M5	6	30	2,8
22250-1058030801320	A				47	20	M5	6	30	2,8
22250-1058030801315	A				47	15	M4	5	30	2,3
22250-1058030801322	A				47	22	M5	6	30	2,8
22250-1058030801316	A				47	16	M4	5	30	2,3
22250-1058030801332	B				57	32	M8	10	30	3,3
22250-1058030801430	A	14	78,2	71,34	52	30	M6	8	30	3,3
22250-1058030801432	A				52	32	M8	10	30	3,3
22250-1058030801424	A				52	24	M6	8	30	3,3
22250-1058030801425	A				52	25	M6	8	30	3,3

Sprockets single 5/8“ x 3/8“

DIN ISO 606, ready to install

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1058030801422	A				52	22	M5	6	30	2,8
22250-1058030801428	A				52	28	M6	8	30	3,3
22250-1058030801420	A				52	20	M5	6	30	2,8
22250-1058030801419	A				52	19	M5	6	30	2,8
22250-1058030801418	A				52	18	M5	6	30	2,8
22250-1058030801416	A				52	16	M4	5	30	2,3
22250-1058030801415	A				52	15	M4	5	30	2,3
22250-1058030801532	A	15	83,2	76,36	57	32	M8	10	30	3,3
22250-1058030801535	A				57	35	M8	10	30	3,3
22250-1058030801522	A				57	22	M5	6	30	2,8
22250-1058030801524	A				57	24	M6	8	30	3,3
22250-1058030801525	A				57	25	M6	8	30	3,3
22250-1058030801519	A				57	19	M5	6	30	2,8
22250-1058030801528	A				57	28	M6	8	30	3,3
22250-1058030801520	A				57	20	M5	6	30	2,8
22250-1058030801530	A				57	30	M6	8	30	3,3
22250-1058030801638	A	16	88,3	81,37	60	38	M8	10	30	3,3
22250-1058030801624	A				60	24	M6	8	30	3,3
22250-1058030801625	A				60	25	M6	8	30	3,3
22250-1058030801635	A				60	35	M8	10	30	3,3
22250-1058030801628	A				60	28	M6	8	30	3,3
22250-1058030801630	A				60	30	M6	8	30	3,3
22250-1058030801619	A				60	19	M5	6	30	2,8
22250-1058030801620	A				60	20	M5	6	30	2,8
22250-1058030801622	A				60	22	M5	6	30	2,8
22250-1058030801632	A				60	32	M8	10	30	3,3
22250-1058030801735	A	17	93,3	86,39	60	35	M8	10	30	3,3
22250-1058030801720	A				60	20	M5	6	30	2,8
22250-1058030801738	A				60	38	M8	10	30	3,3
22250-1058030801722	A				60	22	M5	6	30	2,8
22250-1058030801724	A				60	24	M6	8	30	3,3
22250-1058030801725	A				60	25	M6	8	30	3,3
22250-1058030801728	A				60	28	M6	8	30	3,3
22250-1058030801730	A				60	30	M6	8	30	3,3
22250-1058030801732	A				60	32	M8	10	30	3,3
22250-1058030801719	A				60	19	M5	6	30	2,8
22250-1058030801820	A	18	98,3	91,42	60	20	M5	6	30	2,8
22250-1058030801819	A				60	19	M5	6	30	2,8
22250-1058030801838	A				70	38	M8	10	30	3,3
22250-1058030801840	A				70	40	M10	12	30	3,3
22250-1058030801842	A				70	42	M10	12	30	3,3
22250-1058030801822	A				70	22	M5	6	30	2,8
22250-1058030801825	A				70	25	M6	8	30	3,3
22250-1058030801824	A				70	24	M6	8	30	3,3
22250-1058030801828	A				70	28	M6	8	30	3,3
22250-1058030801830	A				70	30	M6	8	30	3,3
22250-1058030801832	A				70	32	M8	10	30	3,3
22250-1058030801835	A				70	35	M8	10	30	3,3

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1058030801920	A	19	103,3	96,45	60	20	M5	6	30	2,8
22250-1058030801919	A				60	19	M5	6	30	2,8
22250-1058030801938	A				70	38	M8	10	30	3,3
22250-1058030801940	A				70	40	M10	12	30	3,3
22250-1058030801942	A				70	42	M10	12	30	3,3
22250-1058030801925	A				70	25	M6	8	30	3,3
22250-1058030801922	A				70	22	M5	6	30	2,8
22250-1058030801928	A				70	28	M6	8	30	3,3
22250-1058030801924	A				70	24	M6	8	30	3,3
22250-1058030801930	A				70	30	M6	8	30	3,3
22250-1058030801932	A				70	32	M8	10	30	3,3
22250-1058030801935	A				70	35	M8	10	30	3,3
22250-1058030802019	A	20	108,4	101,49	65	19	M5	6	30	2,8
22250-1058030802022	A				65	22	M5	6	30	2,8
22250-1058030802020	A				65	20	M5	6	30	2,8
22250-1058030802025	A				70	25	M6	8	30	3,3
22250-1058030802024	A				70	24	M6	8	30	3,3
22250-1058030802035	A				75	35	M8	10	30	3,3
22250-1058030802032	A				75	32	M8	10	30	3,3
22250-1058030802042	A				75	42	M10	12	30	3,3
22250-1058030802030	A				75	30	M6	8	30	3,3
22250-1058030802040	A				75	40	M10	12	30	3,3
22250-1058030802028	A				75	28	M6	8	30	3,3
22250-1058030802038	A				75	38	M8	10	30	3,3
22250-1058030802120	A	21	113,4	106,52	65	20	M5	6	30	2,8
22250-1058030802122	A				65	22	M5	6	30	2,8
22250-1058030802119	A				65	19	M5	6	30	2,8
22250-1058030802124	A				70	24	M6	8	30	3,3
22250-1058030802125	A				70	25	M6	8	30	3,3
22250-1058030802132	A				75	32	M8	10	30	3,3
22250-1058030802135	A				75	35	M8	10	30	3,3
22250-1058030802128	A				75	28	M6	8	30	3,3
22250-1058030802138	A				75	38	M8	10	30	3,3
22250-1058030802130	A				75	30	M6	8	30	3,3
22250-1058030802140	A				75	40	M10	12	30	3,3
22250-1058030802142	A				75	42	M10	12	30	3,3
22250-1058030802222	A	22	118,4	111,55	65	22	M5	6	30	2,8
22250-1058030802220	A				65	20	M5	6	30	2,8
22250-1058030802219	A				65	19	M5	6	30	2,8
22250-1058030802224	A				70	24	M6	8	30	3,3
22250-1058030802225	A				70	25	M6	8	30	3,3
22250-1058030802240	A				80	40	M10	12	30	3,3
22250-1058030802238	A				80	38	M8	10	30	3,3
22250-1058030802235	A				80	35	M8	10	30	3,3
22250-1058030802232	A				80	32	M8	10	30	3,3
22250-1058030802230	A				80	30	M6	8	30	3,3
22250-1058030802242	A				80	42	M10	12	30	3,3
22250-1058030802228	A				80	28	M6	8	30	3,3

Sprockets single 5/8“ x 3/8“

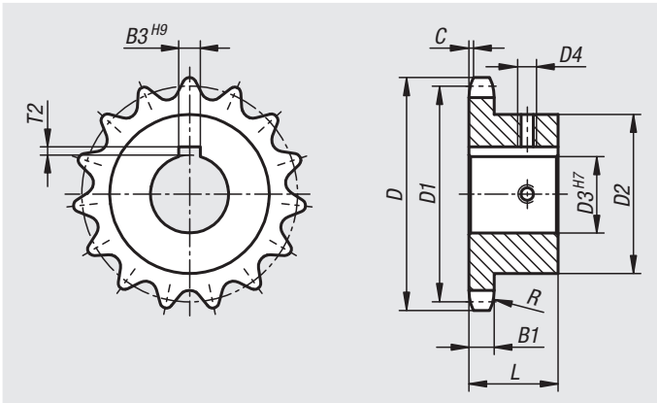
DIN ISO 606, ready to install

Order No.	Form	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1058030802322	A	23	123,5	116,58	65	22	M5	6	30	2,8
22250-1058030802319	A				65	19	M5	6	30	2,8
22250-1058030802320	A				65	20	M5	6	30	2,8
22250-1058030802324	A				70	24	M6	8	30	3,3
22250-1058030802325	A				70	25	M6	8	30	3,3
22250-1058030802328	A				80	28	M6	8	30	3,3
22250-1058030802332	A				80	32	M8	10	30	3,3
22250-1058030802330	A				80	30	M6	8	30	3,3
22250-1058030802335	A				80	35	M8	10	30	3,3
22250-1058030802338	A				80	38	M8	10	30	3,3
22250-1058030802340	A				80	40	M10	12	30	3,3
22250-1058030802342	A				80	42	M10	12	30	3,3
22250-1058030802419	A	24	128,5	121,62	65	19	M5	6	30	2,8
22250-1058030802420	A				65	20	M5	6	30	2,8
22250-1058030802422	A				65	22	M5	6	30	2,8
22250-1058030802424	A				70	24	M6	8	30	3,3
22250-1058030802425	A				70	25	M6	8	30	3,3
22250-1058030802432	A				80	32	M8	10	30	3,3
22250-1058030802438	A				80	38	M8	10	30	3,3
22250-1058030802435	A				80	35	M8	10	30	3,3
22250-1058030802440	A				80	40	M10	12	30	3,3
22250-1058030802430	A				80	30	M6	8	30	3,3
22250-1058030802428	A				80	28	M6	8	30	3,3
22250-1058030802442	A				80	42	M10	12	30	3,3
22250-1058030802520	A	25	133,6	126,66	65	20	M5	6	30	2,8
22250-1058030802519	A				65	19	M5	6	30	2,8
22250-1058030802522	A				65	22	M5	6	30	2,8
22250-1058030802524	A				70	24	M6	8	30	3,3
22250-1058030802525	A				70	25	M6	8	30	3,3
22250-1058030802528	A				80	28	M6	8	30	3,3
22250-1058030802532	A				80	32	M8	10	30	3,3
22250-1058030802530	A				80	30	M6	8	30	3,3
22250-1058030802535	A				80	35	M8	10	30	3,3
22250-1058030802538	A				80	38	M8	10	30	3,3
22250-1058030802540	A				80	40	M10	12	30	3,3
22250-1058030802542	A				80	42	M10	12	30	3,3

Sprockets single 3/4“ x 7/16“

DIN ISO 606, ready to install





Material:
Steel C45.

Version:
Bright.
Teeth inductively hardened ~HRC 50.

Sample order:
nlm 22250-1034071601019

Note:
Ready to install sprockets with hub on one side for DIN ISO 606 roller chains. Teeth are milled and inductively hardened.
Keyway acc. to DIN 6885 / BS 4235. The keyway is aligned with the tooth tip.
With two grub screws. One tapped hole aligned with the keyway centre, the other offset by 90°.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22250	12 B-1	3/4 x 7/16	19,05 x 11,68	19	2	11,1

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1034071601020	10	69,8	61,64	42	20	M5	6	30	2,8
22250-1034071601024				42	24	M6	8	30	3,3
22250-1034071601019				42	19	M5	6	30	2,8
22250-1034071601025				42	25	M6	8	30	3,3
22250-1034071601119	11	75,8	67,61	46	19	M5	6	35	2,8
22250-1034071601120				46	20	M5	6	35	2,8
22250-1034071601124				46	24	M6	8	35	3,3
22250-1034071601125				46	25	M6	8	35	3,3
22250-1034071601219	12	81,8	73,6	52	19	M5	6	35	2,8
22250-1034071601230				52	30	M6	8	35	3,3
22250-1034071601220				52	20	M5	6	35	2,8
22250-1034071601222				52	22	M5	6	35	2,8
22250-1034071601224				52	24	M6	8	35	3,3
22250-1034071601225				52	25	M6	8	35	3,3
22250-1034071601228				52	28	M6	8	35	3,3
22250-1034071601232				56	32	M8	10	35	3,3
22250-1034071601235				56	35	M8	10	35	3,3
22250-1034071601319	13	87,8	79,59	58	19	M5	6	35	2,8
22250-1034071601320				58	20	M5	6	35	2,8
22250-1034071601335				58	35	M8	10	35	3,3

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1034071601322				58	22	M5	6	35	2,8
22250-1034071601324				58	24	M6	8	35	3,3
22250-1034071601325				58	25	M6	8	35	3,3
22250-1034071601328				58	28	M6	8	35	3,3
22250-1034071601330				58	30	M6	8	35	3,3
22250-1034071601332				58	32	M8	10	35	3,3
22250-1034071601338				61	38	M8	10	35	3,3
22250-1034071601419	14	93,8	85,61	60	19	M5	6	35	2,8
22250-1034071601420				60	20	M5	6	35	2,8
22250-1034071601422				60	22	M5	6	35	2,8
22250-1034071601424				64	24	M6	8	35	3,3
22250-1034071601425				64	25	M6	8	35	3,3
22250-1034071601438				64	38	M8	10	35	3,3
22250-1034071601428				64	28	M6	8	35	3,3
22250-1034071601430				64	30	M6	8	35	3,3
22250-1034071601432				64	32	M8	10	35	3,3
22250-1034071601435				64	35	M8	10	35	3,3
22250-1034071601440				67	40	M10	12	35	3,3
22250-1034071601519	15	99,8	91,63	65	19	M5	6	35	2,8
22250-1034071601520				65	20	M5	6	35	2,8

Sprockets single 3/4“ x 7/16“

DIN ISO 606, ready to install

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1034071601522				65	22	M5	6	35	2,8
22250-1034071601525				70	25	M6	8	35	3,3
22250-1034071601528				70	28	M6	8	35	3,3
22250-1034071601530				70	30	M6	8	35	3,3
22250-1034071601524				70	24	M6	8	35	3,3
22250-1034071601532				70	32	M8	10	35	3,3
22250-1034071601540				70	40	M10	12	35	3,3
22250-1034071601535				70	35	M8	10	35	3,3
22250-1034071601538				70	38	M8	10	35	3,3
22250-1034071601619	16	105,8	97,65	65	19	M5	6	35	2,8
22250-1034071601620				65	20	M5	6	35	2,8
22250-1034071601622				65	22	M5	6	35	2,8
22250-1034071601624				70	24	M6	8	35	3,3
22250-1034071601625				70	25	M6	8	35	3,3
22250-1034071601630				75	30	M6	8	35	3,3
22250-1034071601628				75	28	M6	8	35	3,3
22250-1034071601632				75	32	M8	10	35	3,3
22250-1034071601640				75	40	M10	12	35	3,3
22250-1034071601635				75	35	M8	10	35	3,3
22250-1034071601638				75	38	M8	10	35	3,3
22250-1034071601725	17	111,9	103,67	70	25	M6	8	35	3,3
22250-1034071601730				80	30	M6	8	35	3,3
22250-1034071601732				80	32	M8	10	35	3,3
22250-1034071601735				80	35	M8	10	35	3,3
22250-1034071601738				80	38	M8	10	35	3,3
22250-1034071601740				80	40	M10	12	35	3,3
22250-1034071601728				80	28	M6	8	35	3,3
22250-1034071601742				80	42	M10	12	35	3,3
22250-1034071601825	18	117,9	109,71	70	25	M6	8	35	3,3
22250-1034071601830				80	30	M6	8	35	3,3
22250-1034071601828				80	28	M6	8	35	3,3
22250-1034071601832				80	32	M8	10	35	3,3
22250-1034071601842				80	42	M10	12	35	3,3
22250-1034071601835				80	35	M8	10	35	3,3
22250-1034071601838				80	38	M8	10	35	3,3
22250-1034071601840				80	40	M10	12	35	3,3
22250-1034071601925	19	123,9	115,75	70	25	M6	8	35	3,3
22250-1034071601930				80	30	M6	8	35	3,3
22250-1034071601932				80	32	M8	10	35	3,3
22250-1034071601935				80	35	M8	10	35	3,3
22250-1034071601938				80	38	M8	10	35	3,3
22250-1034071601928				80	28	M6	8	35	3,3
22250-1034071601940				80	40	M10	12	35	3,3
22250-1034071601950				80	50	M12	14	35	3,8
22250-1034071601942				80	42	M10	12	35	3,3
22250-1034071601945				80	45	M12	14	35	3,8
22250-1034071601948				80	48	M12	14	35	3,8
22250-1034071602025	20	130	121,78	70	25	M6	8	35	3,3

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1034071602030				80	30	M6	8	35	3,3
22250-1034071602032				80	32	M8	10	35	3,3
22250-1034071602035				80	35	M8	10	35	3,3
22250-1034071602038				80	38	M8	10	35	3,3
22250-1034071602040				80	40	M10	12	35	3,3
22250-1034071602028				80	28	M6	8	35	3,3
22250-1034071602042				80	42	M10	12	35	3,3
22250-1034071602050				80	50	M12	14	35	3,8
22250-1034071602045				80	45	M12	14	35	3,8
22250-1034071602048				80	48	M12	14	35	3,8
22250-1034071602125	21	136	127,82	70	25	M6	8	40	3,3
22250-1034071602128				80	28	M6	8	40	3,3
22250-1034071602130				80	30	M6	8	40	3,3
22250-1034071602135				90	35	M8	10	40	3,3
22250-1034071602138				90	38	M8	10	40	3,3
22250-1034071602132				90	32	M8	10	40	3,3
22250-1034071602140				90	40	M10	12	40	3,3
22250-1034071602150				90	50	M12	14	40	3,8
22250-1034071602142				90	42	M10	12	40	3,3
22250-1034071602145				90	45	M12	14	40	3,8
22250-1034071602148				90	48	M12	14	40	3,8
22250-1034071602225	22	142	133,86	70	25	M6	8	40	3,3
22250-1034071602228				80	28	M6	8	40	3,3
22250-1034071602230				80	30	M6	8	40	3,3
22250-1034071602235				90	35	M8	10	40	3,3
22250-1034071602232				90	32	M8	10	40	3,3
22250-1034071602238				90	38	M8	10	40	3,3
22250-1034071602250				90	50	M12	14	40	3,8
22250-1034071602240				90	40	M10	12	40	3,3
22250-1034071602242				90	42	M10	12	40	3,3
22250-1034071602245				90	45	M12	14	40	3,8
22250-1034071602248				90	48	M12	14	40	3,8
22250-1034071602325	23	148,1	139,9	70	25	M6	8	40	3,3
22250-1034071602328				80	28	M6	8	40	3,3
22250-1034071602330				80	30	M6	8	40	3,3
22250-1034071602335				90	35	M8	10	40	3,3
22250-1034071602338				90	38	M8	10	40	3,3
22250-1034071602332				90	32	M8	10	40	3,3
22250-1034071602340				90	40	M10	12	40	3,3
22250-1034071602350				90	50	M12	14	40	3,8
22250-1034071602342				90	42	M10	12	40	3,3
22250-1034071602345				90	45	M12	14	40	3,8
22250-1034071602348				90	48	M12	14	40	3,8
22250-1034071602425	24	154,1	145,94	70	25	M6	8	40	3,3
22250-1034071602428				80	28	M6	8	40	3,3
22250-1034071602430				80	30	M6	8	40	3,3
22250-1034071602435				90	35	M8	10	40	3,3
22250-1034071602432				90	32	M8	10	40	3,3

Sprockets single 3/4“ x 7/16“

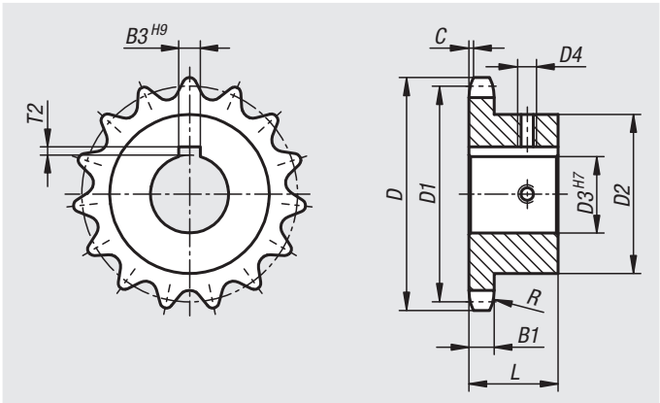
DIN ISO 606, ready to install

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1034071602438				90	38	M8	10	40	3,3
22250-1034071602450				90	50	M12	14	40	3,8
22250-1034071602440				90	40	M10	12	40	3,3
22250-1034071602442				90	42	M10	12	40	3,3
22250-1034071602445				90	45	M12	14	40	3,8
22250-1034071602448				90	48	M12	14	40	3,8
22250-1034071602525	25	160,2	152	70	25	M6	8	40	3,3
22250-1034071602528				80	28	M6	8	40	3,3
22250-1034071602530				80	30	M6	8	40	3,3
22250-1034071602535				90	35	M8	10	40	3,3
22250-1034071602532				90	32	M8	10	40	3,3
22250-1034071602538				90	38	M8	10	40	3,3
22250-1034071602550				90	50	M12	14	40	3,8
22250-1034071602540				90	40	M10	12	40	3,3
22250-1034071602542				90	42	M10	12	40	3,3
22250-1034071602545				90	45	M12	14	40	3,8
22250-1034071602548				90	48	M12	14	40	3,8

Sprockets single 1“ x 17.02 mm

DIN ISO 606, ready to install





Material:
Steel C45.

Version:
Bright.
Teeth inductively hardened ~HRC 50.

Sample order:
nlm 22250-1100170201125

Note:
Ready to install sprockets with hub on one side for DIN ISO 606 roller chains. Teeth are milled and inductively hardened.
Keyway acc. to DIN 6885 / BS 4235. The keyway is aligned with the tooth tip.
With two grub screws. One tapped hole aligned with the keyway centre, the other offset by 90°.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22250	16 B-1	1 x 17,02mm	25,4 x 17,02	26	2,5	16,2

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1100170201128	11	101,7	90,14	61	28	M6	8	40	3,3
22250-1100170201130				61	30	M6	8	40	3,3
22250-1100170201125				61	25	M6	8	40	3,3
22250-1100170201132				61	32	M8	10	40	3,3
22250-1100170201135				61	35	M8	10	40	3,3
22250-1100170201138				65	38	M8	10	40	3,3
22250-1100170201140				67	40	M10	12	40	3,3
22250-1100170201142				67	42	M10	12	40	3,3
22250-1100170201228	12	109,7	98,14	69	28	M6	8	40	3,3
22250-1100170201230				69	30	M6	8	40	3,3
22250-1100170201232				69	32	M8	10	40	3,3
22250-1100170201235				69	35	M8	10	40	3,3
22250-1100170201238				69	38	M8	10	40	3,3
22250-1100170201240				69	40	M10	12	40	3,3
22250-1100170201225				69	25	M6	8	40	3,3
22250-1100170201242				69	42	M10	12	40	3,3
22250-1100170201325	13	117,7	106,12	70	25	M6	8	40	3,3
22250-1100170201330				78	30	M6	8	40	3,3
22250-1100170201332				78	32	M8	10	40	3,3
22250-1100170201335				78	35	M8	10	40	3,3

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1100170201338				78	38	M8	10	40	3,3
22250-1100170201340				78	40	M10	12	40	3,3
22250-1100170201328				78	28	M6	8	40	3,3
22250-1100170201342				78	42	M10	12	40	3,3
22250-1100170201350				78	50	M12	14	40	3,8
22250-1100170201345				78	45	M12	14	40	3,8
22250-1100170201348				78	48	M12	14	40	3,8
22250-1100170201425	14	125,7	114,15	70	25	M6	8	40	3,3
22250-1100170201428				80	28	M6	8	40	3,3
22250-1100170201430				80	30	M6	8	40	3,3
22250-1100170201432				80	32	M8	10	40	3,3
22250-1100170201438				84	38	M8	10	40	3,3
22250-1100170201440				84	40	M10	12	40	3,3
22250-1100170201442				84	42	M10	12	40	3,3
22250-1100170201445				84	45	M12	14	40	3,8
22250-1100170201435				84	35	M8	10	40	3,3
22250-1100170201448				84	48	M12	14	40	3,8
22250-1100170201450				84	50	M12	14	40	3,8
22250-1100170201525	15	133,7	122,17	70	25	M6	8	40	3,3
22250-1100170201528				80	28	M6	8	40	3,3

Sprockets single 1“ x 17.02 mm

DIN ISO 606, ready to install

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1100170201530				80	30	M6	8	40	3,3
22250-1100170201532				80	32	M8	10	40	3,3
22250-1100170201538				92	38	M8	10	40	3,3
22250-1100170201535				92	35	M8	10	40	3,3
22250-1100170201540				92	40	M10	12	40	3,3
22250-1100170201550				92	50	M12	14	40	3,8
22250-1100170201542				92	42	M10	12	40	3,3
22250-1100170201545				92	45	M12	14	40	3,8
22250-1100170201548				92	48	M12	14	40	3,8
22250-1100170201625	16	141,8	130,2	80	25	M6	8	45	3,3
22250-1100170201628				80	28	M6	8	45	3,3
22250-1100170201630				80	30	M6	8	45	3,3
22250-1100170201635				100	35	M8	10	45	3,3
22250-1100170201638				100	38	M8	10	45	3,3
22250-1100170201632				100	32	M8	10	45	3,3
22250-1100170201640				100	40	M10	12	45	3,3
22250-1100170201650				100	50	M12	14	45	3,8
22250-1100170201642				100	42	M10	12	45	3,3
22250-1100170201645				100	45	M12	14	45	3,8
22250-1100170201648				100	48	M12	14	45	3,8
22250-1100170201725	17	149,8	138,22	80	25	M6	8	45	3,3
22250-1100170201728				80	28	M6	8	45	3,3
22250-1100170201730				80	30	M6	8	45	3,3
22250-1100170201735				100	35	M8	10	45	3,3
22250-1100170201738				100	38	M8	10	45	3,3
22250-1100170201732				100	32	M8	10	45	3,3
22250-1100170201740				100	40	M10	12	45	3,3
22250-1100170201750				100	50	M12	14	45	3,8
22250-1100170201742				100	42	M10	12	45	3,3
22250-1100170201745				100	45	M12	14	45	3,8
22250-1100170201748				100	48	M12	14	45	3,8
22250-1100170201825	18	157,8	146,28	80	25	M6	8	45	3,3
22250-1100170201828				80	28	M6	8	45	3,3
22250-1100170201830				80	30	M6	8	45	3,3
22250-1100170201835				100	35	M8	10	45	3,3
22250-1100170201838				100	38	M8	10	45	3,3
22250-1100170201840				100	40	M10	12	45	3,3
22250-1100170201842				100	42	M10	12	45	3,3
22250-1100170201832				100	32	M8	10	45	3,3
22250-1100170201845				100	45	M12	14	45	3,8
22250-1100170201850				100	50	M12	14	45	3,8
22250-1100170201848				100	48	M12	14	45	3,8
22250-1100170201925	19	165,9	154,33	80	25	M6	8	45	3,3
22250-1100170201928				80	28	M6	8	45	3,3
22250-1100170201930				80	30	M6	8	45	3,3
22250-1100170201935				100	35	M8	10	45	3,3
22250-1100170201938				100	38	M8	10	45	3,3
22250-1100170201932				100	32	M8	10	45	3,3

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1100170201940				100	40	M10	12	45	3,3
22250-1100170201950				100	50	M12	14	45	3,8
22250-1100170201942				100	42	M10	12	45	3,3
22250-1100170201945				100	45	M12	14	45	3,8
22250-1100170201948				100	48	M12	14	45	3,8
22250-1100170202025	20	173,9	162,38	80	25	M6	8	45	3,3
22250-1100170202028				80	28	M6	8	45	3,3
22250-1100170202030				80	30	M6	8	45	3,3
22250-1100170202035				100	35	M8	10	45	3,3
22250-1100170202038				100	38	M8	10	45	3,3
22250-1100170202032				100	32	M8	10	45	3,3
22250-1100170202040				100	40	M10	12	45	3,3
22250-1100170202050				100	50	M12	14	45	3,8
22250-1100170202042				100	42	M10	12	45	3,3
22250-1100170202045				100	45	M12	14	45	3,8
22250-1100170202048				100	48	M12	14	45	3,8
22250-1100170202128	21	182	170,43	80	28	M6	8	50	3,3
22250-1100170202125				80	25	M6	8	50	3,3
22250-1100170202130				80	30	M6	8	50	3,3
22250-1100170202132				100	32	M8	10	50	3,3
22250-1100170202135				100	35	M8	10	50	3,3
22250-1100170202138				100	38	M8	10	50	3,3
22250-1100170202140				110	40	M10	12	50	3,3
22250-1100170202150				110	50	M12	14	50	3,8
22250-1100170202142				110	42	M10	12	50	3,3
22250-1100170202145				110	45	M12	14	50	3,8
22250-1100170202148				110	48	M12	14	50	3,8
22250-1100170202225	22	190,1	178,48	80	25	M6	8	50	3,3
22250-1100170202228				80	28	M6	8	50	3,3
22250-1100170202230				80	30	M6	8	50	3,3
22250-1100170202235				100	35	M8	10	50	3,3
22250-1100170202232				100	32	M8	10	50	3,3
22250-1100170202238				100	38	M8	10	50	3,3
22250-1100170202240				110	40	M10	12	50	3,3
22250-1100170202242				110	42	M10	12	50	3,3
22250-1100170202245				110	45	M12	14	50	3,8
22250-1100170202248				110	48	M12	14	50	3,8
22250-1100170202250				110	50	M12	14	50	3,8
22250-1100170202328	23	198,1	186,53	80	28	M6	8	50	3,3
22250-1100170202325				80	25	M6	8	50	3,3
22250-1100170202330				80	30	M6	8	50	3,3
22250-1100170202332				100	32	M8	10	50	3,3
22250-1100170202335				100	35	M8	10	50	3,3
22250-1100170202338				100	38	M8	10	50	3,3
22250-1100170202340				110	40	M10	12	50	3,3
22250-1100170202350				110	50	M12	14	50	3,8
22250-1100170202342				110	42	M10	12	50	3,3
22250-1100170202345				110	45	M12	14	50	3,8

Sprockets single 1“ x 17.02 mm

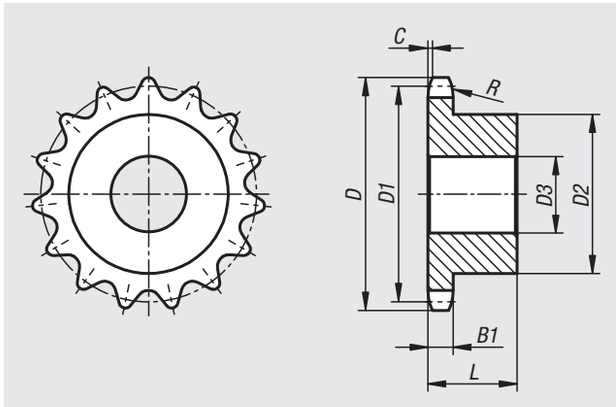
DIN ISO 606, ready to install

Order No.	No. of teeth	D	D1	D2	D3	D4	B3	L	T2
22250-1100170202348				110	48	M12	14	50	3,8
22250-1100170202428	24	206,2	194,59	80	28	M6	8	50	3,3
22250-1100170202425				80	25	M6	8	50	3,3
22250-1100170202430				80	30	M6	8	50	3,3
22250-1100170202432				100	32	M8	10	50	3,3
22250-1100170202435				100	35	M8	10	50	3,3
22250-1100170202438				100	38	M8	10	50	3,3
22250-1100170202440				110	40	M10	12	50	3,3
22250-1100170202450				110	50	M12	14	50	3,8
22250-1100170202442				110	42	M10	12	50	3,3
22250-1100170202445				110	45	M12	14	50	3,8
22250-1100170202448				110	48	M12	14	50	3,8
22250-1100170202525	25	214,2	202,66	80	25	M6	8	50	3,3
22250-1100170202528				80	28	M6	8	50	3,3
22250-1100170202530				80	30	M6	8	50	3,3
22250-1100170202532				100	32	M8	10	50	3,3
22250-1100170202535				100	35	M8	10	50	3,3
22250-1100170202538				100	38	M8	10	50	3,3
22250-1100170202540				110	40	M10	12	50	3,3
22250-1100170202550				110	50	M12	14	50	3,8
22250-1100170202542				110	42	M10	12	50	3,3
22250-1100170202545				110	45	M12	14	50	3,8
22250-1100170202548				110	48	M12	14	50	3,8

Sprockets single 3/8“ x 7/32“

DIN ISO 606





Material:
Steel C45.
Grey cast iron GG22 from 38 teeth.

Version:
Bright, not hardened.

Sample order:
nlm 22252-10380732008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22252	06 B-1	3/8 x 7/32	9,525 x 5,72	10	1	5,3

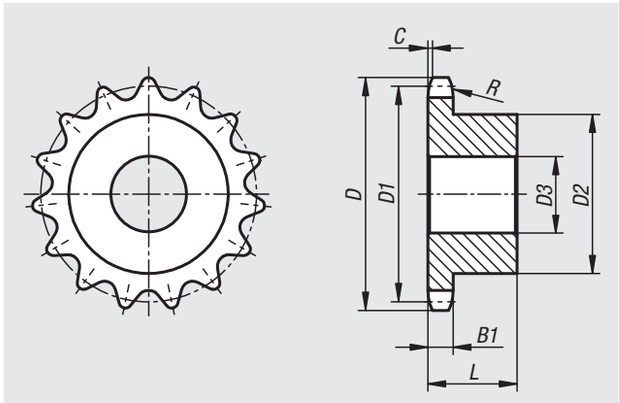
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10380732008	8	28,6	24,89	15	8	20
22252-10380732009	9	31,5	27,85	18	8	20
22252-10380732010	10	34,5	30,82	20	8	20
22252-10380732011	11	37,5	33,8	22	8	25
22252-10380732012	12	40,5	36,8	25	8	25
22252-10380732013	13	43,5	39,8	28	8	25
22252-10380732014	14	46,5	42,8	31	8	25
22252-10380732015	15	49,5	45,81	34	8	25
22252-10380732016	16	52,5	48,82	37	10	28
22252-10380732017	17	55,5	51,83	40	10	28
22252-10380732018	18	58,6	54,85	43	10	28
22252-10380732019	19	61,6	57,87	45	10	28
22252-10380732020	20	64,6	60,89	46	10	28
22252-10380732021	21	67,6	63,91	48	12	28
22252-10380732022	22	70,6	66,93	50	12	28
22252-10380732023	23	73,7	69,95	52	12	28
22252-10380732024	24	76,7	72,97	54	12	28
22252-10380732025	25	79,7	76	57	12	28
22252-10380732026	26	82,7	79,02	60	12	28
22252-10380732027	27	85,7	82,04	60	12	28

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10380732028	28	88,8	8985,07	60	12	28
22252-10380732029	29	91,8	88,09	60	12	28
22252-10380732030	30	94,8	91,12	60	12	30
22252-10380732031	31	97,9	94,15	65	14	30
22252-10380732032	32	100,9	97,17	65	14	30
22252-10380732033	33	103,9	100,2	65	14	30
22252-10380732034	34	106,9	103,23	65	14	30
22252-10380732035	35	110	106,26	65	14	30
22252-10380732036	36	113	109,29	70	16	30
22252-10380732037	37	116	112,32	70	16	30
22252-10380732038	38	119	115,34	70	20	32
22252-10380732045	45	141,1	136,54	70	20	32
22252-10380732057	57	177,5	172,91	70	20	32
22252-10380732076	76	235,1	230,49	70	20	35
22252-10380732095	95	292,7	288,08	80	20	40
22252-10380732114	114	350,3	345,68	80	20	40

Sprockets single 1/2“ x 5/16“

DIN ISO 606





Material:
Steel C45.
Grey cast iron GG22 from 38 teeth.

Version:
Bright, not hardened.

Sample order:
nlm 22252-10120516008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22252	08 B-1	1/2 x 5/16	12,7 x 7,75	13	1,3	7,2

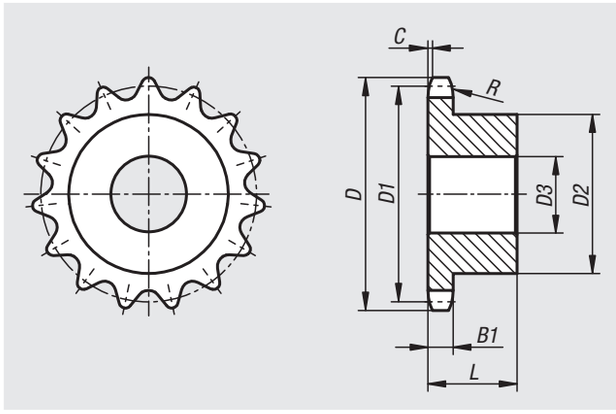
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10120516008	8	38	33,18	20	10	25
22252-10120516009	9	42	37,13	24	10	25
22252-10120516010	10	45,9	41,1	26	10	25
22252-10120516011	11	49,9	45,07	29	10	25
22252-10120516012	12	53,9	49,07	33	10	28
22252-10120516013	13	57,9	53,06	37	10	28
22252-10120516014	14	61,9	57,07	41	10	28
22252-10120516015	15	65,9	61,09	45	10	28
22252-10120516016	16	69,9	65,1	50	12	28
22252-10120516017	17	74	69,11	52	12	28
22252-10120516018	18	78	73,14	56	12	28
22252-10120516019	19	82	77,16	60	12	28
22252-10120516020	20	86	81,19	64	12	28
22252-10120516021	21	90,1	85,22	68	14	28
22252-10120516022	22	94,1	89,24	70	14	28
22252-10120516023	23	98,1	93,27	70	14	28
22252-10120516024	24	102,1	97,29	70	14	28
22252-10120516025	25	106,2	101,33	70	14	28
22252-10120516026	26	110,2	105,36	70	16	30
22252-10120516027	27	114,2	109,4	70	16	30

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10120516028	28	118,3	113,42	70	16	30
22252-10120516029	29	122,3	117,46	80	16	30
22252-10120516030	30	126,3	121,5	80	16	30
22252-10120516031	31	130,4	125,54	90	16	30
22252-10120516032	32	134,4	129,56	90	16	30
22252-10120516033	33	138,4	133,6	90	16	30
22252-10120516034	34	142,5	137,64	90	16	30
22252-10120516035	35	146,5	141,68	90	16	30
22252-10120516036	36	150,6	145,72	90	16	35
22252-10120516037	37	154,6	149,76	90	16	35
22252-10120516038	38	158,6	153,8	70	24	40
22252-10120516045	45	188,6	182,07	70	24	40
22252-10120516057	57	237,1	230,54	70	24	40
22252-10120516076	76	313,9	307,33	80	24	40
22252-10120516095	95	390,7	384,11	80	24	45
22252-10120516114	114	467,4	460,9	80	24	45

Sprockets single 5/8“ x 3/8“

DIN ISO 606





Material:
Steel C45.
Grey cast iron GG22 from 38 teeth.

Version:
Bright, not hardened.

Sample order:
nlm 22252-10580308008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22252	10 B-1	5/8 x 3/8	15,875 x 9,65	16	1,6	9,1

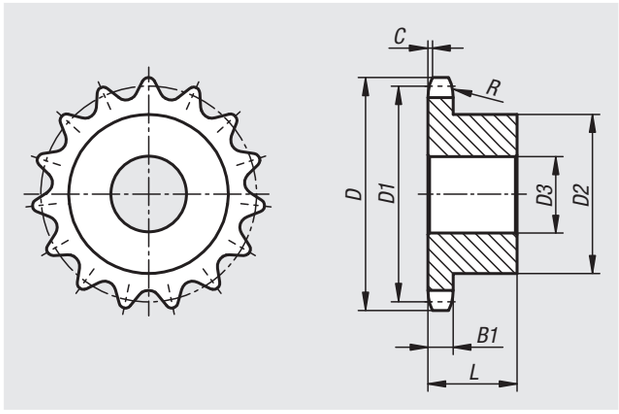
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10580308008	8	48,4	41,48	25	10	25
22252-10580308009	9	53,3	46,42	30	10	25
22252-10580308010	10	58,3	51,37	35	10	25
22252-10580308011	11	63,2	56,34	37	12	30
22252-10580308012	12	68,2	61,34	42	12	30
22252-10580308013	13	73,2	66,32	47	12	30
22252-10580308014	14	78,2	71,34	52	12	30
22252-10580308015	15	83,2	76,36	57	12	30
22252-10580308016	16	88,3	81,37	60	12	30
22252-10580308017	17	93,3	86,39	60	12	30
22252-10580308018	18	98,3	91,42	70	14	30
22252-10580308019	19	103,3	96,45	70	14	30
22252-10580308020	20	108,4	101,49	75	14	30
22252-10580308021	21	113,4	106,52	75	16	30
22252-10580308022	22	118,4	111,55	80	16	30
22252-10580308023	23	123,5	116,58	80	16	30
22252-10580308024	24	128,5	121,62	80	16	30
22252-10580308025	25	133,6	126,66	80	16	30
22252-10580308026	26	138,6	131,7	85	20	35
22252-10580308027	27	143,6	136,75	85	20	35

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10580308028	28	148,7	141,78	90	20	35
22252-10580308029	29	153,7	146,83	90	20	35
22252-10580308030	30	158,8	151,87	90	20	35
22252-10580308031	31	163,8	156,92	95	20	35
22252-10580308032	32	168,9	161,95	95	20	35
22252-10580308033	33	173,9	167	95	20	35
22252-10580308034	34	178,9	172,05	95	20	35
22252-10580308035	35	184	177,1	95	20	35
22252-10580308036	36	189	182,15	100	20	35
22252-10580308037	37	194,1	187,2	100	20	35
22252-10580308038	38	199,1	192,24	80	24	40
22252-10580308045	45	236	227,58	80	24	40
22252-10580308057	57	296,6	288,18	90	24	45
22252-10580308076	76	392,5	384,16	90	24	50
22252-10580308095	95	488,5	480,14	100	24	56
22252-10580308114	114	584,5	576,13	100	24	56

Sprockets single 3/4" x 7/16"

DIN ISO 606





Material:
Steel C45.
Grey cast iron GG22 from 38 teeth.

Version:
Bright, not hardened.

Sample order:
nlm 22252-10340716008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22252	12 B-1	3/4 x 7/16	19,05 x 11,68	19	2	11,1

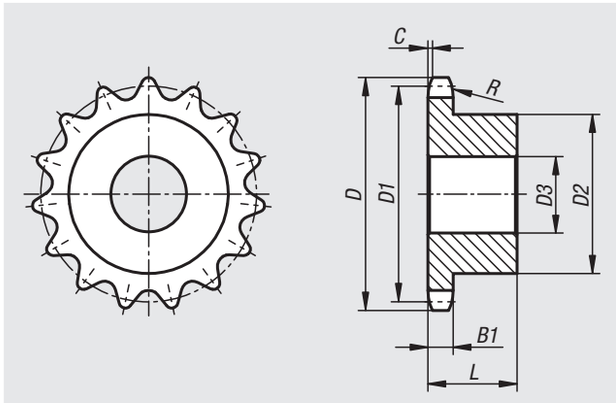
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10340716008	8	58	49,78	31	12	30
22252-10340716009	9	63,9	55,7	37	12	30
22252-10340716010	10	69,8	61,64	42	12	30
22252-10340716011	11	75,8	67,61	46	16	35
22252-10340716012	12	81,8	73,6	52	16	35
22252-10340716013	13	87,8	79,59	58	16	35
22252-10340716014	14	93,8	85,61	64	16	35
22252-10340716015	15	99,8	91,63	70	16	35
22252-10340716016	16	105,8	97,65	75	16	35
22252-10340716017	17	111,9	103,67	80	16	35
22252-10340716018	18	117,9	109,71	80	16	35
22252-10340716019	19	123,9	115,75	80	16	35
22252-10340716020	20	130	121,78	80	16	35
22252-10340716021	21	136	127,82	90	20	40
22252-10340716022	22	142	133,86	90	20	40
22252-10340716023	23	148,1	139,9	90	20	40
22252-10340716024	24	154,1	145,94	90	20	40
22252-10340716025	25	160,2	152	90	20	40
22252-10340716026	26	166,2	158,04	95	20	40
22252-10340716027	27	172,3	164,09	95	20	40

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-10340716028	28	178,3	170,13	95	20	40
22252-10340716029	29	184,4	176,19	95	20	40
22252-10340716030	30	190,4	182,25	95	20	40
22252-10340716031	31	196,5	188,31	95	20	40
22252-10340716032	32	202,5	194,35	95	20	40
22252-10340716033	33	208,6	200,4	95	20	40
22252-10340716034	34	214,6	206,46	95	20	40
22252-10340716035	35	220,7	212,52	95	20	40
22252-10340716036	36	226,8	218,58	100	20	40
22252-10340716037	37	232,8	224,64	100	20	40
22252-10340716038	38	238,9	230,69	100	24	56
22252-10340716045	45	283,2	273,1	100	24	56
22252-10340716057	57	355,9	345,81	100	30	56
22252-10340716076	76	471,1	460,99	100	30	56
22252-10340716095	95	586,2	576,17	100	30	65
22252-10340716114	114	701,4	691,36	100	30	65

Sprockets single 1“ x 17.02 mm

DIN ISO 606





Material:
Steel C45.
Grey cast iron GG22 from 38 teeth.

Version:
Bright, not hardened.

Sample order:
nlm 22252-11001702008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22252	16 B-1	1 x 17,02mm	25,4 x 17,02	26	2,5	16,2

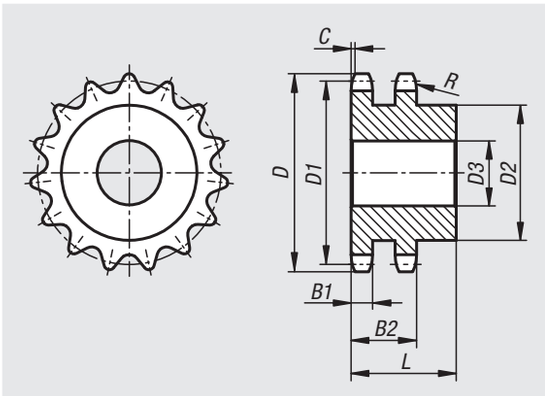
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-11001702008	8	77,9	66,37	42	16	35
22252-11001702009	9	85,8	74,27	50	16	35
22252-11001702010	10	93,8	82,19	55	16	35
22252-11001702011	11	101,7	90,14	61	16	40
22252-11001702012	12	109,7	98,14	69	16	40
22252-11001702013	13	117,7	106,12	78	16	40
22252-11001702014	14	125,7	114,15	84	16	40
22252-11001702015	15	133,7	122,17	92	16	40
22252-11001702016	16	141,8	130,2	100	20	45
22252-11001702017	17	149,8	138,22	100	20	45
22252-11001702018	18	157,8	146,28	100	20	45
22252-11001702019	19	165,9	154,33	100	20	45
22252-11001702020	20	173,9	162,38	100	20	45
22252-11001702021	21	182	170,43	110	20	50
22252-11001702022	22	190,1	178,48	110	20	50
22252-11001702023	23	198,1	186,53	110	20	50
22252-11001702024	24	206,2	194,59	110	20	50
22252-11001702025	25	214,2	202,66	110	20	50
22252-11001702026	26	222,3	210,72	120	20	50
22252-11001702027	27	230,4	218,79	120	20	50

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22252-11001702028	28	238,4	226,85	120	20	50
22252-11001702029	29	246,5	234,92	120	20	50
22252-11001702030	30	254,6	243	120	20	50
22252-11001702031	31	262,6	251,08	120	25	50
22252-11001702032	32	270,7	259,13	120	25	50
22252-11001702033	33	278,8	267,21	120	25	50
22252-11001702034	34	286,9	275,28	120	25	50
22252-11001702035	35	294,9	283,36	120	25	50
22252-11001702036	36	303	291,44	120	25	50
22252-11001702037	37	311,1	299,51	120	25	50
22252-11001702038	38	319,2	307,59	110	30	65
22252-11001702045	45	377,9	364,12	125	30	70
22252-11001702057	57	474,9	461,07	125	35	70
22252-11001702076	76	628,4	614,65	140	35	80
22252-11001702095	95	782	768,22	140	40	80
22252-11001702114	114	935,6	921,81	150	40	80

Sprockets duplex 8.0 mm x 3.0 mm

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-20800030008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

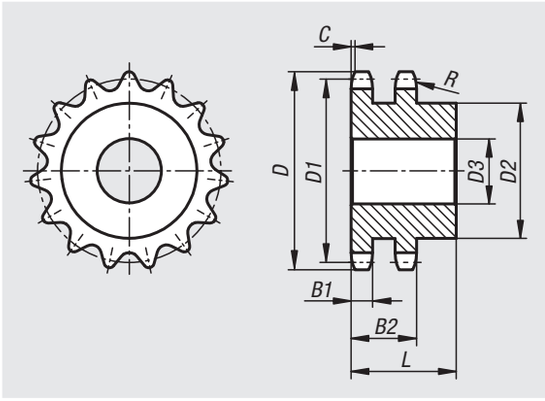
Order No.	ISO No.	Pitch mm	R	C	B1	B2
22253	05 B-2	8,0 x 3,0	8	0,8	2,7	8,3

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20800030008	8	23,4	20,9	12	6	18
22253-20800030009	9	25,9	23,39	15	6	18
22253-20800030010	10	28,4	25,89	17	8	18
22253-20800030011	11	31	28,39	19	8	18
22253-20800030012	12	33,7	30,91	21	8	18
22253-20800030013	13	36,7	33,42	24	8	18
22253-20800030014	14	39,2	35,95	26	8	18
22253-20800030015	15	41,7	38,48	29	8	18
22253-20800030016	16	44,2	41,01	32	10	20
22253-20800030017	17	46,7	43,53	34	10	20
22253-20800030018	18	49,2	46,07	37	10	20
22253-20800030019	19	51,7	48,61	39	10	20
22253-20800030020	20	54,2	51,14	40	10	20
22253-20800030021	21	57,2	53,67	45	12	20
22253-20800030022	22	59,4	56,21	45	12	20
22253-20800030023	23	62,2	58,75	45	12	20
22253-20800030024	24	64,7	61,29	45	12	20
22253-20800030025	25	67,2	63,83	45	12	20
22253-20800030026	26	69,7	66,37	50	12	22
22253-20800030027	27	72,3	68,91	50	12	22
22253-20800030030	30	80,2	76,53	50	12	22
22253-20800030032	32	85,2	81,61	60	12	22
22253-20800030035	35	92,7	89,24	60	12	22
22253-20800030036	36	95,2	91,79	60	12	22
22253-20800030038	38	100,2	96,88	60	12	22
22253-20800030040	40	105,7	101,97	60	12	22

Sprockets duplex 3/8" x 7/32"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-20380732008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	06 B-2	3/8 x 7/32	9,525 x 5,72	10	1	5,2	15,4

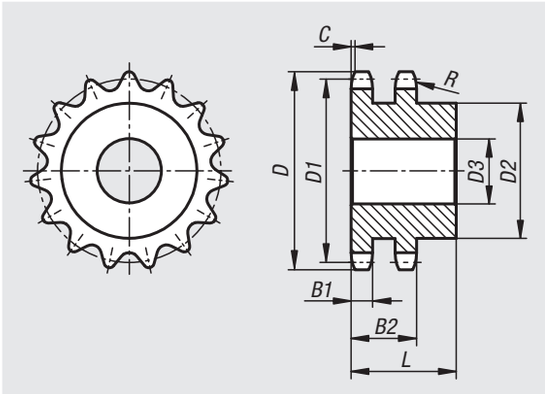
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20380732008	8	28,6	24,89	15	8	25
22253-20380732009	9	31,5	27,85	18	8	25
22253-20380732010	10	34,5	30,82	20	8	25
22253-20380732011	11	37,5	33,8	22	10	30
22253-20380732012	12	40,5	36,8	25	10	30
22253-20380732013	13	43,5	39,8	28	10	30
22253-20380732014	14	46,5	42,8	31	10	30
22253-20380732015	15	49,5	45,81	34	10	30
22253-20380732016	16	52,5	48,82	37	12	30
22253-20380732017	17	55,5	51,83	40	12	30
22253-20380732018	18	58,6	54,85	43	12	30
22253-20380732019	19	61,6	57,87	46	12	30
22253-20380732020	20	64,6	60,89	49	12	30
22253-20380732021	21	67,6	63,91	52	16	30
22253-20380732022	22	70,6	66,93	55	16	30
22253-20380732023	23	73,7	69,95	58	16	30
22253-20380732024	24	76,7	72,97	61	16	30
22253-20380732025	25	79,7	76	64	16	30
22253-20380732026	26	82,7	79,02	67	16	30
22253-20380732027	27	85,7	82,04	70	16	30
22253-20380732028	28	88,8	85,07	73	16	30

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20380732029	29	91,8	88,09	76	16	30
22253-20380732030	30	94,8	91,12	79	16	30
22253-20380732031	31	97,9	94,15	80	16	30
22253-20380732032	32	100,9	97,17	80	16	30
22253-20380732033	33	103,9	100,2	80	16	30
22253-20380732034	34	106,9	103,23	80	16	30
22253-20380732035	35	110	106,26	80	16	30
22253-20380732036	36	113	109,29	90	16	30
22253-20380732037	37	116	112,32	90	16	30
22253-20380732038	38	119	115,34	90	16	30
22253-20380732039	39	122,1	118,37	90	16	30
22253-20380732040	40	125,1	121,4	90	16	30
22253-20380732042	42	132,1	127,46	88	20	50
22253-20380732045	45	141,1	136,54	88	20	50
22253-20380732048	48	150,2	145,64	88	20	50
22253-20380732050	50	156,3	151,69	88	20	50
22253-20380732057	57	177,5	172,91	88	20	50
22253-20380732060	60	186,6	181,99	88	20	50
22253-20380732076	76	235,1	230,49	88	25	50
22253-20380732095	95	292,7	288,08	108	25	50

Sprockets duplex 1/2" x 5/16"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-20120516008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	08 B-2	1/2 x 5/16	12,7 x 7,75	13	1,3	7	21

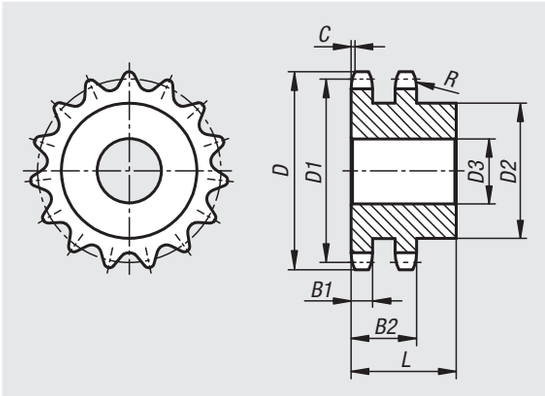
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20120516008	8	38	33,18	20	10	32
22253-20120516009	9	42	37,13	24	10	32
22253-20120516010	10	45,9	41,1	28	10	32
22253-20120516011	11	49,9	45,07	32	12	35
22253-20120516012	12	53,9	49,07	35	12	35
22253-20120516013	13	57,9	53,06	38	12	35
22253-20120516014	14	61,9	57,07	42	12	35
22253-20120516015	15	65,9	61,09	46	12	35
22253-20120516016	16	69,9	65,1	50	16	38
22253-20120516017	17	74	69,11	54	16	38
22253-20120516018	18	78	73,14	58	16	38
22253-20120516019	19	82	77,16	62	16	38
22253-20120516020	20	86	81,19	66	16	38
22253-20120516021	21	90,1	85,22	70	16	40
22253-20120516022	22	94,1	89,24	70	16	40
22253-20120516023	23	98,1	93,27	70	16	40
22253-20120516024	24	102,1	97,29	75	16	40
22253-20120516025	25	106,2	101,33	80	16	40
22253-20120516026	26	110,2	105,36	85	16	40
22253-20120516027	27	114,2	109,4	85	16	40
22253-20120516028	28	118,3	113,42	90	16	40

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20120516029	29	122,3	117,46	95	16	40
22253-20120516030	30	126,3	121,5	100	16	40
22253-20120516031	31	130,4	125,54	100	20	40
22253-20120516032	32	134,4	129,56	100	20	40
22253-20120516033	33	138,4	133,6	100	20	40
22253-20120516034	34	142,5	137,64	100	20	40
22253-20120516035	35	146,5	141,68	100	20	40
22253-20120516036	36	150,6	145,72	100	20	40
22253-20120516037	37	154,6	149,76	100	20	40
22253-20120516038	38	158,6	153,8	100	20	40
22253-20120516039	39	162,7	157,83	100	20	40
22253-20120516040	40	166,7	161,87	100	20	40
22253-20120516042	42	176,5	169,95	108	20	55
22253-20120516045	45	188,6	182,07	108	20	55
22253-20120516046	46	192,6	186,1	108	20	55
22253-20120516048	48	200,7	194,18	108	20	55
22253-20120516050	50	208,8	202,26	108	20	55
22253-20120516057	57	237,1	230,54	108	25	55
22253-20120516060	60	249,2	242,66	108	25	55
22253-20120516076	76	313,9	307,33	108	25	55
22253-20120516095	95	390,7	384,11	120	25	55

Sprockets duplex 5/8" x 3/8"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-20580308008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	10 B-2	5/8 x 3/8	15,875 x 9,65	16	1,6	9	25,5

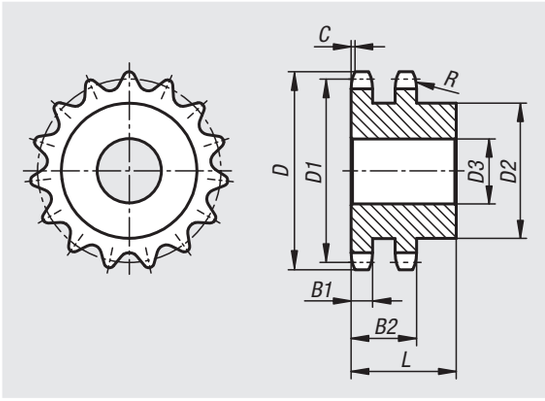
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20580308008	8	48,4	41,48	25	12	40
22253-20580308009	9	53,3	46,42	30	12	40
22253-20580308010	10	58,3	51,37	35	12	40
22253-20580308011	11	63,2	56,34	39	16	40
22253-20580308012	12	68,2	61,34	44	16	40
22253-20580308013	13	73,2	66,32	49	16	40
22253-20580308014	14	78,2	71,34	54	16	40
22253-20580308015	15	83,2	76,36	59	16	40
22253-20580308016	16	88,3	81,37	64	16	45
22253-20580308017	17	93,3	86,39	69	16	45
22253-20580308018	18	98,3	91,42	74	16	45
22253-20580308019	19	103,3	96,45	79	16	45
22253-20580308020	20	108,4	101,49	84	16	45
22253-20580308021	21	113,4	106,52	85	16	45
22253-20580308022	22	118,4	111,55	90	16	45
22253-20580308023	23	123,5	116,58	95	16	45
22253-20580308024	24	128,5	121,62	100	16	45
22253-20580308025	25	133,6	126,66	105	16	45
22253-20580308026	26	138,6	131,7	110	20	45
22253-20580308027	27	143,6	136,75	110	20	45
22253-20580308028	28	148,7	141,78	115	20	45

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20580308029	29	153,7	146,83	115	20	45
22253-20580308030	30	158,8	151,87	120	20	45
22253-20580308031	31	163,8	156,92	120	20	45
22253-20580308032	32	168,9	161,95	120	20	45
22253-20580308033	33	173,9	167	120	20	45
22253-20580308034	34	178,9	172,05	120	20	45
22253-20580308035	35	184	177,1	120	20	45
22253-20580308036	36	189	182,15	120	20	45
22253-20580308037	37	194,1	187,2	120	20	45
22253-20580308038	38	199,1	192,24	120	20	45
22253-20580308039	39	204,2	197,29	120	20	45
22253-20580308040	40	209,2	202,34	120	20	45
22253-20580308042	42	220,8	212,44	120	25	59
22253-20580308045	45	236	227,58	120	25	59
22253-20580308046	46	241	236,63	120	25	59
22253-20580308048	48	251,1	242,73	120	25	59
22253-20580308050	50	261,2	252,82	120	25	59
22253-20580308057	57	296,6	288,18	120	25	59
22253-20580308060	60	311,7	303,32	120	25	59
22253-20580308076	76	392,5	384,16	120	25	59
22253-20580308095	95	488,5	480,14	145	30	58

Sprockets duplex 3/4" x 7/16"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-20340716008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	12 B-2	3/4 x 7/16	19,05 x 11,68	19	2	10,8	30,3

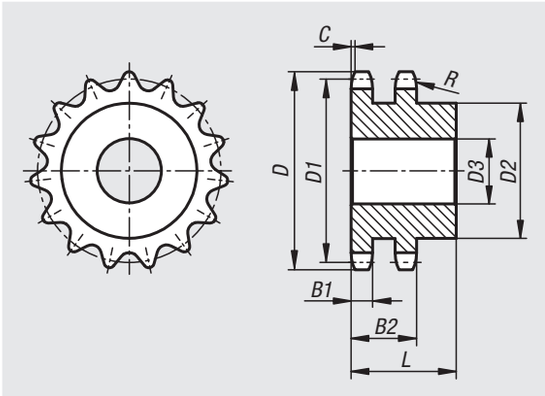
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20340716008	8	58	49,78	31	12	45
22253-20340716009	9	63,9	55,7	37	12	45
22253-20340716010	10	69,8	61,64	42	12	45
22253-20340716011	11	75,8	67,61	47	16	50
22253-20340716012	12	81,8	73,6	53	16	50
22253-20340716013	13	87,8	79,59	59	16	50
22253-20340716014	14	93,8	85,61	65	16	50
22253-20340716015	15	99,8	91,63	71	16	50
22253-20340716016	16	105,8	97,65	77	20	50
22253-20340716017	17	111,9	103,67	83	20	50
22253-20340716018	18	117,9	109,71	89	20	50
22253-20340716019	19	123,9	115,75	95	20	50
22253-20340716020	20	130	121,78	100	20	50
22253-20340716021	21	136	127,82	100	20	50
22253-20340716022	22	142	133,86	100	20	50
22253-20340716023	23	148,1	139,9	110	20	50
22253-20340716024	24	154,1	145,94	110	20	50
22253-20340716025	25	160,2	152	120	20	50
22253-20340716026	26	166,2	158,04	120	20	50
22253-20340716027	27	172,3	164,09	120	20	50
22253-20340716028	28	178,3	170,13	120	20	50

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-20340716029	29	184,4	176,19	120	20	50
22253-20340716030	30	190,4	182,25	120	20	50
22253-20340716031	31	196,5	188,31	120	20	50
22253-20340716032	32	202,5	194,35	120	20	50
22253-20340716033	33	208,6	200,4	120	20	50
22253-20340716034	34	214,6	206,46	120	20	50
22253-20340716035	35	220,7	212,52	120	20	50
22253-20340716036	36	226,8	218,58	120	25	50
22253-20340716037	37	232,8	224,64	120	25	50
22253-20340716038	38	238,9	230,69	120	25	50
22253-20340716039	39	244,9	236,75	120	25	50
22253-20340716040	40	251	242,81	120	25	50
22253-20340716042	42	265	254,93	136	25	62
22253-20340716045	45	283,2	273,1	136	25	62
22253-20340716046	46	289,2	279,16	136	25	62
22253-20340716048	48	301,4	291,27	136	25	62
22253-20340716050	50	313,5	303,39	136	25	62
22253-20340716057	57	355,9	345,81	136	25	62
22253-20340716060	60	374,1	363,99	136	25	62
22253-20340716076	76	471,1	460,99	145	30	63
22253-20340716095	95	586,2	576,17	145	30	63

Sprockets duplex 1“ x 17,02 mm

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-21001702008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	16 B-2	1 x 17,02mm	25,4 x 17,02	26	2,5	15,8	47,7

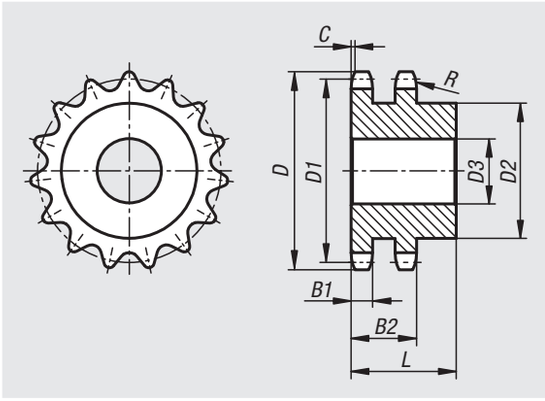
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21001702008	8	77,9	66,37	42	20	65
22253-21001702009	9	85,8	74,27	50	20	65
22253-21001702010	10	93,8	82,19	56	20	65
22253-21001702011	11	101,7	90,14	64	20	70
22253-21001702012	12	109,7	98,14	72	20	70
22253-21001702013	13	117,7	106,12	80	20	70
22253-21001702014	14	125,7	114,15	88	20	70
22253-21001702015	15	133,7	122,17	96	20	70
22253-21001702016	16	141,8	130,2	104	20	70
22253-21001702017	17	149,8	138,22	112	20	70
22253-21001702018	18	157,8	146,28	120	20	70
22253-21001702019	19	165,9	154,33	128	20	70
22253-21001702020	20	173,9	162,38	130	20	70
22253-21001702021	21	182	170,43	130	25	70
22253-21001702022	22	190,1	178,48	130	25	70
22253-21001702023	23	198,1	186,53	130	25	70
22253-21001702024	24	206,2	194,59	130	25	70
22253-21001702025	25	214,2	202,66	130	25	70
22253-21001702026	26	222,3	210,72	130	25	70
22253-21001702027	27	230,4	218,79	130	25	70
22253-21001702028	28	238,4	226,85	130	25	70

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21001702029	29	246,5	234,92	130	25	70
22253-21001702030	30	254,6	243	130	25	70
22253-21001702031	31	262,6	251,08	140	25	70
22253-21001702032	32	270,7	259,13	140	25	70
22253-21001702033	33	278,8	267,21	140	25	70
22253-21001702034	34	286,9	275,28	140	25	70
22253-21001702035	35	294,9	283,36	140	25	70
22253-21001702036	36	303	291,44	140	25	70
22253-21001702037	37	311,1	299,51	140	25	70
22253-21001702038	38	319,2	307,59	140	25	70
22253-21001702039	39	327,2	315,67	140	25	70
22253-21001702040	40	335,3	323,73	140	25	70
22253-21001702042	42	353,7	339,9	140	25	70
22253-21001702045	45	377,9	364,12	140	25	70
22253-21001702046	46	386	372,21	140	25	70
22253-21001702048	48	402,1	388,36	140	25	70
22253-21001702050	50	418,3	404,52	140	25	70
22253-21001702057	57	474,9	461,07	160	40	82
22253-21001702060	60	499,1	485,32	160	40	82
22253-21001702076	76	628,4	614,65	160	40	82
22253-21001702095	95	782	768,22	180	40	109

Sprockets duplex 1 1/4" x 3/4"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-21140340008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	20 B-2	1 1/4X3/4	31,75 x 19,56	32	3,5	18,2	54,6

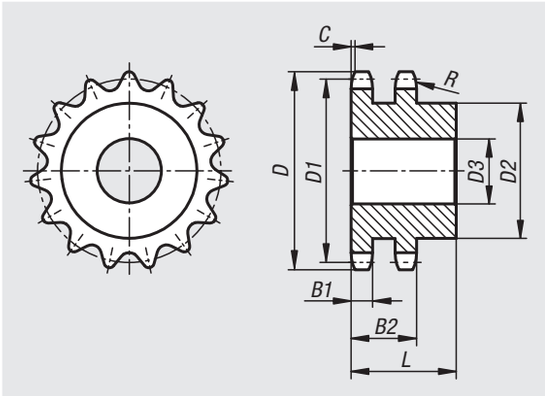
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21140340008	8	96	82,96	53	20	75
22253-21140340009	9	106,5	92,84	63	20	75
22253-21140340010	10	117	102,74	70	20	75
22253-21140340011	11	127	112,68	80	25	80
22253-21140340012	12	137	122,68	90	25	80
22253-21140340013	13	147,5	132,65	100	25	80
22253-21140340014	14	157,6	142,68	110	25	80
22253-21140340015	15	167,7	152,72	120	25	80
22253-21140340016	16	177,7	162,75	120	30	80
22253-21140340017	17	187,7	172,78	120	30	80
22253-21140340018	18	197,8	182,85	120	30	80
22253-21140340019	19	207,9	192,91	120	30	80
22253-21140340020	20	217,9	202,98	120	30	80
22253-21140340021	21	228	213,04	140	30	80
22253-21140340022	22	238,1	223,11	140	30	80
22253-21140340023	23	248,2	233,17	140	30	80
22253-21140340024	24	258,3	243,23	140	30	80
22253-21140340025	25	268,4	253,33	140	30	80
22253-21140340026	26	278,4	263,4	150	30	80
22253-21140340027	27	288,5	273,48	150	30	80
22253-21140340028	28	298,5	283,56	150	30	80

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21140340029	29	308,6	293,65	150	30	80
22253-21140340030	30	318,7	303,75	150	30	80
22253-21140340031	31	328,8	313,85	150	30	80
22253-21140340032	32	338,9	323,91	150	30	80
22253-21140340034	34	359,1	344,1	150	30	80
22253-21140340035	35	369,2	354,2	150	30	80
22253-21140340036	36	379,2	364,3	150	30	80
22253-21140340038	38	399,4	384,49	150	30	80
22253-21140340040	40	419,6	404,66	150	30	80
22253-21140340045	45	471,1	455,17	160	30	101
22253-21140340046	46	481,2	465,26	160	30	101
22253-21140340050	50	521,6	505,65	160	30	101
22253-21140340057	57	592,3	576,36	180	40	116
22253-21140340076	76	784,3	768,32	180	40	116
22253-21140340095	95	976,2	960,28	200	40	116

Sprockets duplex 1 1/2" x 1"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22253-21121000008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22253	24 B-2	1 1/2X1	38,1 x 25,4	38	4	23,6	72

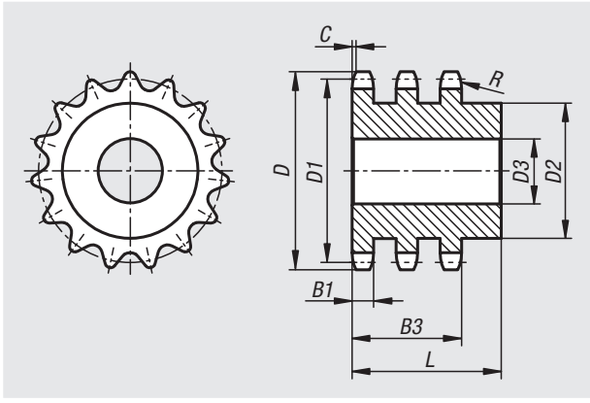
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21121000008	8	113	99,55	58	25	95
22253-21121000009	9	125	111,4	70	25	95
22253-21121000010	10	137	123,29	80	25	95
22253-21121000011	11	149	135,21	90	25	100
22253-21121000012	12	161	147,22	102	25	100
22253-21121000013	13	173	159,18	114	25	100
22253-21121000014	14	185	171,22	128	25	100
22253-21121000015	15	197	183,26	132	25	100
22253-21121000016	16	209	195,3	136	30	100
22253-21121000017	17	221	207,34	136	30	100
22253-21121000018	18	233	219,42	160	30	100
22253-21121000019	19	245,5	231,49	160	30	100
22253-21121000020	20	257,5	243,57	160	30	100
22253-21121000021	21	270,5	255,65	160	30	100
22253-21121000022	22	282,5	267,73	160	30	100
22253-21121000023	23	294,5	279,8	160	30	100
22253-21121000024	24	307	291,88	160	30	100
22253-21121000025	25	319	304	160	30	100
22253-21121000026	26	331	316,08	160	30	100
22253-21121000027	27	343	328,19	160	30	100
22253-21121000028	28	355	340,27	160	30	100

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22253-21121000029	29	367,5	352,38	160	30	100
22253-21121000030	30	379,5	364,5	160	30	100
22253-21121000031	31	391,5	376,62	160	40	100
22253-21121000032	32	403,5	388,69	160	40	100
22253-21121000033	33	415,5	400,81	160	40	100
22253-21121000034	34	428	412,83	160	40	100
22253-21121000035	35	440	425,04	160	40	100
22253-21121000036	36	452	437,16	160	40	100
22253-21121000037	37	464	449,27	160	40	100
22253-21121000038	38	476,5	461,39	160	40	100
22253-21121000040	40	501,5	485,62	160	40	100
22253-21121000045	45	562	546,2	180	40	133
22253-21121000050	50	622,5	606,78	180	40	133
22253-21121000057	57	707,5	691,63	180	40	133
22253-21121000076	76	939	921,98	200	40	133

Sprockets triplex 3/8“ x 7/32“

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22254-30380732008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22254	06 B-3	3/8 x 7/32	9,525 x 5,72	10	1	5,2	25,6

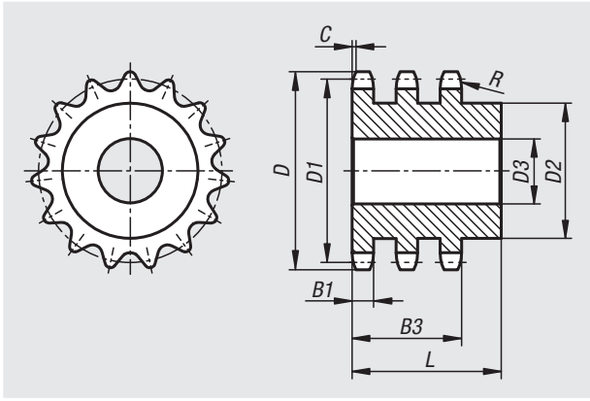
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30380732008	8	28,6	24,89	15	8	32
22254-30380732009	9	31,5	27,85	18	8	32
22254-30380732010	10	34,5	30,82	20	10	32
22254-30380732011	11	37,5	33,8	22	12	35
22254-30380732012	12	40,5	36,8	25	12	35
22254-30380732013	13	43,5	39,8	28	12	35
22254-30380732014	14	46,5	42,8	31	12	35
22254-30380732015	15	49,5	45,81	34	12	35
22254-30380732016	16	52,5	48,82	37	12	35
22254-30380732017	17	55,5	51,83	40	12	35
22254-30380732018	18	58,6	54,85	43	12	35
22254-30380732019	19	61,6	57,87	46	12	35
22254-30380732020	20	64,6	60,89	49	12	35
22254-30380732021	21	67,6	63,91	52	16	40
22254-30380732022	22	70,6	66,93	55	16	40
22254-30380732023	23	73,7	69,95	58	16	40
22254-30380732024	24	76,7	72,97	61	16	40
22254-30380732025	25	79,7	76	64	16	40
22254-30380732026	26	82,7	79,02	67	16	40
22254-30380732027	27	85,7	82,04	70	16	40
22254-30380732028	28	88,8	85,07	73	16	40

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30380732029	29	91,8	88,09	76	16	40
22254-30380732030	30	94,8	91,12	79	16	40
22254-30380732031	31	97,9	94,15	80	16	40
22254-30380732032	32	100,9	97,17	80	16	40
22254-30380732033	33	103,9	100,2	80	16	40
22254-30380732034	34	106,9	103,23	85	16	40
22254-30380732035	35	110	106,26	85	16	40
22254-30380732036	36	113	109,29	90	16	40
22254-30380732037	37	116	112,32	90	16	40
22254-30380732038	38	119	115,34	90	16	40
22254-30380732039	39	122,1	118,37	90	16	40
22254-30380732040	40	125,1	121,4	90	16	40
22254-30380732045	45	141,1	136,54	88	20	60
22254-30380732050	50	156,3	151,69	88	20	60
22254-30380732057	57	177,5	172,91	88	25	60
22254-30380732060	60	186,6	181,99	88	25	60
22254-30380732076	76	235,1	230,49	88	25	60
22254-30380732095	95	292,7	288,08	120	25	60

Sprockets triplex 1/2" x 5/16"

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22254-30120516008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22254	08 B-3	1/2 x 5/16	12,7 x 7,75	13	1,3	7	34,9

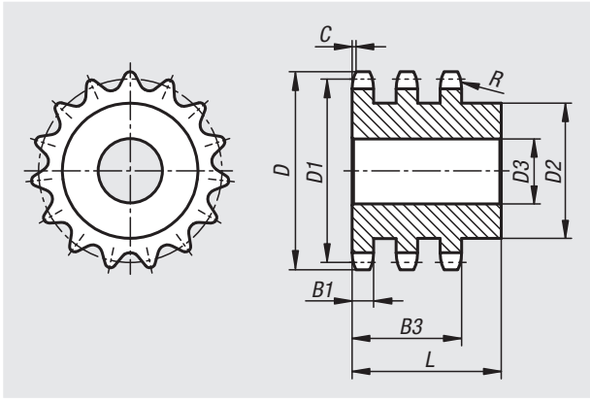
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30120516008	8	38	33,18	20	10	46
22254-30120516009	9	42	37,13	24	12	46
22254-30120516010	10	45,9	41,1	28	12	46
22254-30120516011	11	49,9	45,07	32	16	50
22254-30120516012	12	53,9	49,07	35	16	50
22254-30120516013	13	57,9	53,06	38	16	50
22254-30120516014	14	61,9	57,07	42	16	50
22254-30120516015	15	65,9	61,09	46	16	50
22254-30120516016	16	69,9	65,1	50	16	50
22254-30120516017	17	74	69,11	54	16	50
22254-30120516018	18	78	73,14	58	16	50
22254-30120516019	19	82	77,16	62	16	50
22254-30120516020	20	86	81,19	66	16	50
22254-30120516021	21	90,1	85,22	70	16	55
22254-30120516022	22	94,1	89,24	70	16	55
22254-30120516023	23	98,1	93,27	70	16	55
22254-30120516024	24	102,1	97,29	75	16	55
22254-30120516025	25	106,2	101,33	80	16	55
22254-30120516026	26	110,2	105,36	85	20	55
22254-30120516027	27	114,2	109,4	85	20	55
22254-30120516028	28	118,3	113,42	90	20	55

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30120516029	29	122,3	117,46	95	20	55
22254-30120516030	30	126,3	121,5	100	20	55
22254-30120516031	31	130,4	125,54	110	20	55
22254-30120516032	32	134,4	129,56	110	20	55
22254-30120516033	33	138,4	133,6	110	20	55
22254-30120516034	34	142,5	137,64	110	20	55
22254-30120516035	35	146,5	141,68	110	20	55
22254-30120516036	36	150,6	145,72	120	25	55
22254-30120516037	37	154,6	149,76	120	25	55
22254-30120516038	38	158,6	153,8	120	25	55
22254-30120516039	39	162,7	157,83	120	25	55
22254-30120516040	40	166,7	161,87	120	25	55
22254-30120516045	45	188,6	182,07	120	25	68
22254-30120516050	50	208,8	202,26	120	25	68
22254-30120516057	57	237,1	230,54	120	25	68
22254-30120516060	60	249,2	242,66	120	25	68
22254-30120516076	76	313,9	307,33	120	25	68
22254-30120516095	95	390,7	384,11	136	25	68

Sprockets triplex 5/8“ x 3/8“

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22254-30580308008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22254	10 B-3	5/8 x 3/8	15,875 x 9,65	16	1,6	9	42,1

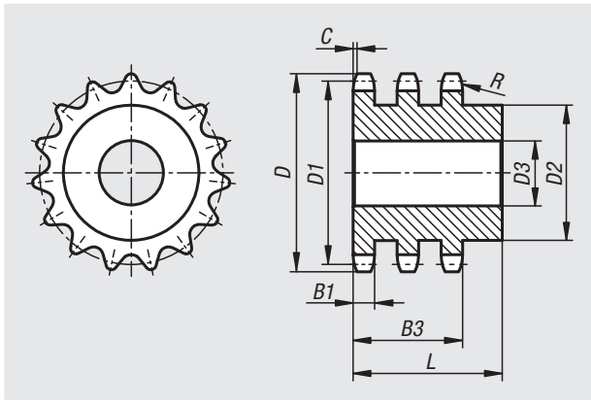
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30580308008	8	48,4	41,48	25	12	55
22254-30580308009	9	53,3	46,42	30	12	55
22254-30580308010	10	58,3	51,37	35	16	55
22254-30580308011	11	63,2	56,34	39	16	55
22254-30580308012	12	68,2	61,34	44	16	55
22254-30580308013	13	73,2	66,32	49	16	55
22254-30580308014	14	78,2	71,34	54	16	55
22254-30580308015	15	83,2	76,36	59	16	55
22254-30580308016	16	88,3	81,37	64	16	60
22254-30580308017	17	93,3	86,39	69	16	60
22254-30580308018	18	98,3	91,42	74	16	60
22254-30580308019	19	103,3	96,45	79	16	60
22254-30580308020	20	108,4	101,49	84	16	60
22254-30580308021	21	113,4	106,52	85	20	60
22254-30580308022	22	118,4	111,55	90	20	60
22254-30580308023	23	123,5	116,58	95	20	60
22254-30580308024	24	128,5	121,62	100	20	60
22254-30580308025	25	133,6	126,66	105	20	60
22254-30580308026	26	138,6	131,7	110	20	60
22254-30580308027	27	143,6	136,75	110	20	60
22254-30580308028	28	148,7	141,78	115	20	60

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30580308029	29	153,7	146,83	115	20	60
22254-30580308030	30	158,8	151,87	120	20	60
22254-30580308031	31	163,8	156,92	120	20	60
22254-30580308032	32	168,9	161,95	120	20	60
22254-30580308033	33	173,9	167	120	20	60
22254-30580308034	34	178,9	172,05	120	20	60
22254-30580308035	35	184	177,1	120	20	60
22254-30580308036	36	189	182,15	120	25	60
22254-30580308037	37	194,1	187,2	120	25	60
22254-30580308038	38	199,1	192,24	120	25	60
22254-30580308039	39	204,2	197,29	120	25	60
22254-30580308040	40	209,2	202,34	120	25	60
22254-30580308045	45	236	227,58	136	25	74
22254-30580308050	50	261,2	252,82	136	25	74
22254-30580308057	57	296,6	288,18	136	25	74
22254-30580308060	60	311,7	303,32	136	25	74
22254-30580308076	76	392,5	384,16	145	30	75
22254-30580308095	95	488,5	480,14	145	30	75

Sprockets triplex 3/4“ x 7/16“

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22254-30340716008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22254	12 B-3	3/4 x 7/16	19,05 x 11,68	19	2	10,8	49,8

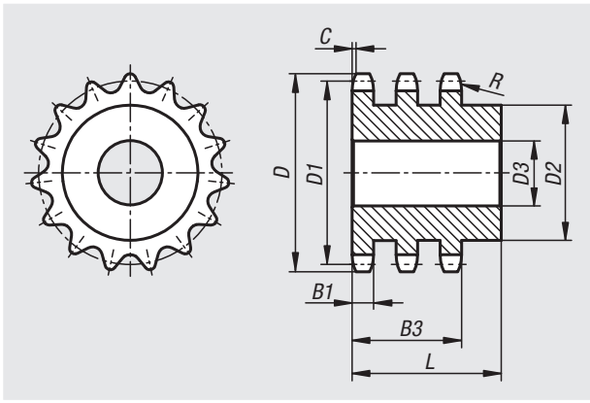
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30340716008	8	58	49,78	31	16	65
22254-30340716009	9	63,9	55,7	37	16	65
22254-30340716010	10	69,8	61,64	42	16	65
22254-30340716011	11	75,8	67,61	47	20	70
22254-30340716012	12	81,8	73,6	53	20	70
22254-30340716013	13	87,8	79,59	59	20	70
22254-30340716014	14	93,8	85,61	65	20	70
22254-30340716015	15	99,8	91,63	71	20	70
22254-30340716016	16	105,8	97,65	77	20	70
22254-30340716017	17	111,9	103,67	83	20	70
22254-30340716018	18	117,9	109,71	89	20	70
22254-30340716019	19	123,9	115,75	95	20	70
22254-30340716020	20	130	121,78	100	20	70
22254-30340716021	21	136	127,82	100	20	70
22254-30340716022	22	142	133,86	100	20	70
22254-30340716023	23	148,1	139,9	110	20	70
22254-30340716024	24	154,1	145,94	110	20	70
22254-30340716025	25	160,2	152	120	20	70
22254-30340716026	26	166,2	158,04	120	20	70
22254-30340716027	27	172,3	164,09	120	20	70
22254-30340716028	28	178,3	170,13	120	20	70

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-30340716029	29	184,4	176,19	120	20	70
22254-30340716030	30	190,4	182,25	120	20	70
22254-30340716031	31	196,5	188,31	130	25	70
22254-30340716032	32	202,5	194,35	130	25	70
22254-30340716033	33	208,6	200,4	130	25	70
22254-30340716034	34	214,6	206,46	130	25	70
22254-30340716035	35	220,7	212,52	130	25	70
22254-30340716036	36	226,8	218,58	130	25	70
22254-30340716037	37	232,8	224,64	130	25	70
22254-30340716038	38	238,9	230,69	130	25	70
22254-30340716039	39	244,9	236,75	130	25	70
22254-30340716040	40	251	242,81	130	25	70
22254-30340716045	45	283,2	273,1	140	25	72
22254-30340716050	50	313,5	303,39	140	25	72
22254-30340716057	57	355,9	345,81	140	30	75
22254-30340716060	60	374,1	363,99	140	30	75
22254-30340716076	76	471,1	460,99	150	30	75
22254-30340716095	95	586,2	576,17	150	30	75

Sprockets triplex 1“ x 17,02 mm

DIN ISO 606





Material:
Steel C45.

Version:
Bright, not hardened.

Sample order:
nlm 22254-31001702008

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22254	16 B-3	1 x 17,02mm	25,4 x 17,02	26	2,5	15,8	79,6

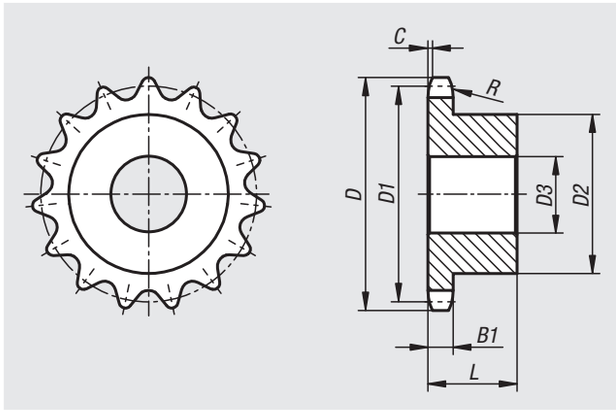
Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-31001702008	8	77,9	66,37	42	20	95
22254-31001702009	9	85,8	74,27	50	20	95
22254-31001702010	10	93,8	82,19	56	20	95
22254-31001702011	11	101,7	90,14	64	25	100
22254-31001702012	12	109,7	98,14	72	25	100
22254-31001702013	13	117,7	106,12	80	25	100
22254-31001702014	14	125,7	114,15	88	25	100
22254-31001702015	15	133,7	122,17	96	25	100
22254-31001702016	16	141,8	130,2	104	25	100
22254-31001702017	17	149,8	138,22	112	25	100
22254-31001702018	18	157,8	146,28	120	25	100
22254-31001702019	19	165,9	154,33	128	25	100
22254-31001702020	20	173,9	162,38	130	25	100
22254-31001702021	21	182	170,43	130	25	100
22254-31001702022	22	190,1	178,48	130	25	100
22254-31001702023	23	198,1	186,53	130	25	100
22254-31001702024	24	206,2	194,59	130	25	100
22254-31001702025	25	214,2	202,66	130	25	100
22254-31001702026	26	222,3	210,72	130	30	100
22254-31001702027	27	230,4	218,79	130	30	100
22254-31001702028	28	238,4	226,85	130	30	100

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22254-31001702029	29	246,5	234,92	130	30	100
22254-31001702030	30	254,6	243	130	30	100
22254-31001702031	31	262,6	251,08	140	30	100
22254-31001702032	32	270,7	259,13	140	30	100
22254-31001702033	33	278,8	267,21	140	30	100
22254-31001702034	34	286,9	275,28	140	30	100
22254-31001702035	35	294,9	283,36	140	30	100
22254-31001702036	36	303	291,44	140	30	100
22254-31001702038	38	319,2	307,59	140	30	100
22254-31001702040	40	335,3	323,73	140	30	100
22254-31001702045	45	377,9	364,12	160	30	110
22254-31001702050	50	418,3	404,52	160	30	110
22254-31001702057	57	474,9	461,07	180	40	112
22254-31001702076	76	628,4	614,65	180	40	112
22254-31001702095	95	782	768,22	180	40	112

Sprockets single 3/8“ x 7/32“ stainless steel

DIN ISO 606





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 22255-10380732013

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

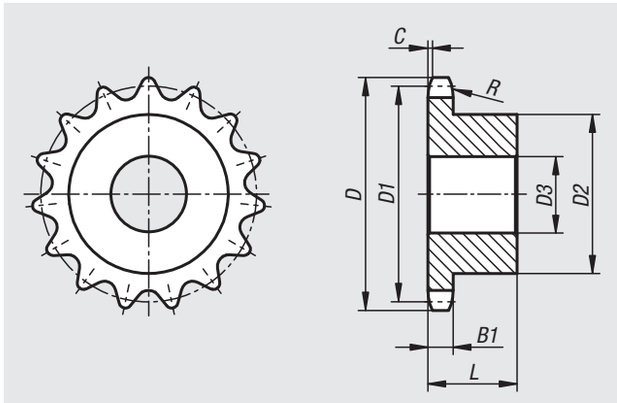
Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22255	06 B-1	3/8 x 7/32	9,525 x 5,72	10	1	5,3

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22255-10380732013	13	43,5	39,8	28	8	25
22255-10380732014	14	46,5	42,8	31	8	25
22255-10380732015	15	49,5	45,81	34	8	25
22255-10380732016	16	52,5	48,82	37	10	28
22255-10380732017	17	55,5	51,83	40	10	28
22255-10380732018	18	58,6	54,85	43	10	28
22255-10380732019	19	61,6	57,87	45	10	28
22255-10380732020	20	64,6	60,89	46	10	28
22255-10380732021	21	67,6	63,91	48	12	28
22255-10380732023	23	73,7	69,95	52	12	28
22255-10380732025	25	79,7	76	57	12	28
22255-10380732030	30	94,8	91,12	60	12	30

Sprockets single 1/2" x 5/16" stainless steel

DIN ISO 606





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 22255-10120516012

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

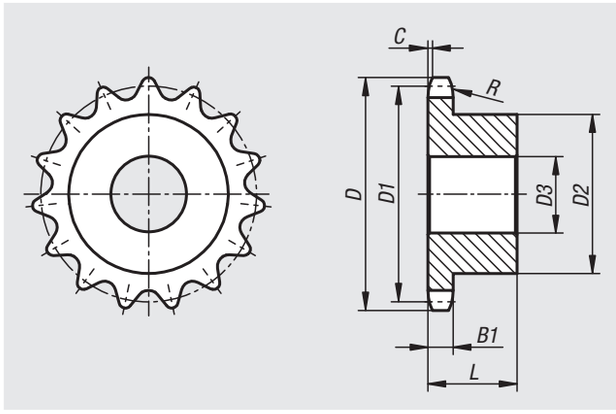
Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22255	08 B-1	1/2 x 5/16	12,7 x 7,75	13	1,3	7,2

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22255-10120516012	12	53,9	49,07	33	10	28
22255-10120516013	13	57,9	53,06	37	10	28
22255-10120516014	14	61,9	57,07	41	10	28
22255-10120516015	15	65,9	61,09	45	10	28
22255-10120516016	16	69,9	65,1	50	12	28
22255-10120516017	17	74	69,11	52	12	28
22255-10120516018	18	78	73,14	56	12	28
22255-10120516019	19	82	77,16	60	12	28
22255-10120516020	20	86	81,19	64	12	28
22255-10120516021	21	90,1	85,22	68	14	28
22255-10120516023	23	98,1	93,27	70	14	28
22255-10120516025	25	106,2	101,33	70	14	28
22255-10120516030	30	126,3	121,5	80	16	30

Sprockets single 5/8“ x 3/8“ stainless steel

DIN ISO 606





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 22255-10580308013

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

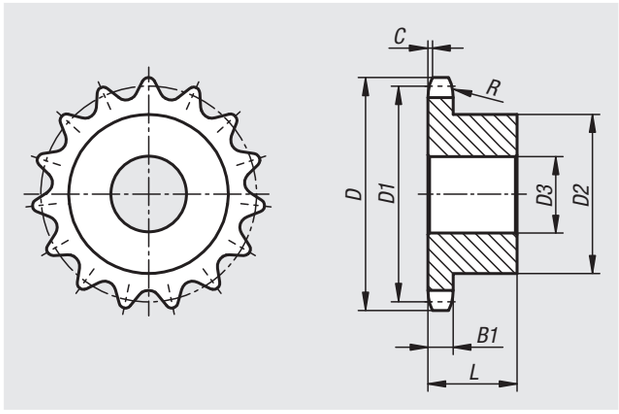
Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22255	10 B-1	5/8 x 3/8	15,875 x 9,65	16	1,6	9,1

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22255-10580308013	13	73,2	66,32	47	12	30
22255-10580308014	14	78,2	71,34	52	12	30
22255-10580308015	15	83,2	76,36	57	12	30
22255-10580308016	16	88,3	81,37	60	12	30
22255-10580308017	17	93,3	86,39	60	12	30
22255-10580308018	18	98,3	91,42	70	14	30
22255-10580308019	19	103,3	96,45	70	14	30
22255-10580308020	20	108,4	101,49	75	14	30
22255-10580308021	21	113,4	106,52	75	16	30
22255-10580308023	23	123,5	116,58	80	16	30
22255-10580308025	25	133,6	126,66	80	16	30
22255-10580308030	30	158,8	151,87	90	20	35

Sprockets single 3/4“ x 7/16“ stainless steel

DIN ISO 606





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 22255-10340716013

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

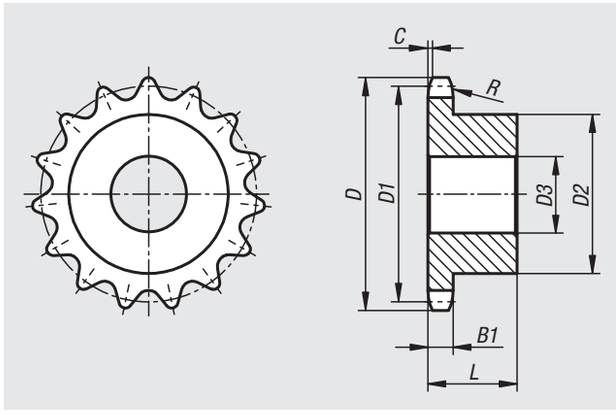
Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22255	12 B-1	3/4 x 7/16	19,05 x 11,68	19	2	11,1

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22255-10340716013	13	87,8	79,59	58	16	35
22255-10340716014	14	93,8	85,61	64	16	35
22255-10340716015	15	99,8	91,63	70	16	35
22255-10340716016	16	105,8	97,65	75	16	35
22255-10340716017	17	111,9	103,67	80	16	35
22255-10340716018	18	117,9	109,71	80	16	35
22255-10340716019	19	123,9	115,75	80	16	35
22255-10340716020	20	130	121,78	80	16	35
22255-10340716021	21	136	127,82	90	20	40
22255-10340716023	23	148,1	139,9	90	20	40
22255-10340716025	25	160,2	152	90	20	40

Sprockets single 1“ x 17.02 mm stainless steel

DIN ISO 606





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 22255-11001702013

Note:
Sprockets with hub one side for DIN ISO 606 roller chains.
The sprockets are pre-bored.

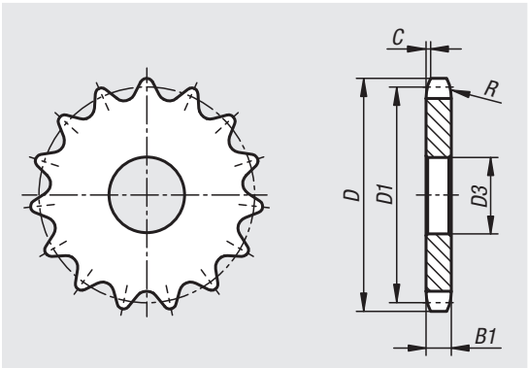
Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22255	16 B-1	1 x 17,02mm	25,4 x 17,02	26	2,5	16,2

Order No.	No. of teeth	D	D1	D2	D3 max.	L
22255-11001702013	13	117,7	106,12	78	16	40
22255-11001702014	14	125,7	114,15	84	16	40
22255-11001702015	15	133,7	122,17	92	16	40
22255-11001702016	16	141,8	130,2	100	20	45
22255-11001702017	17	149,8	138,22	100	20	45
22255-11001702018	18	157,8	146,28	100	20	45
22255-11001702019	19	165,9	154,33	100	20	45
22255-11001702020	20	173,9	162,38	100	20	45
22255-11001702021	21	182	170,43	110	20	50

Sprockets single 3/8“ x 7/32“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22264-10380732008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22264	06 B-1	3/8 x 7/32	9,525 x 5,72	10	1	5,3

Order No.	No. of teeth	D	D1	D3 max.
22264-10380732008	8	28,6	24,89	6
22264-10380732009	9	31,5	27,85	8
22264-10380732010	10	34,5	30,82	8
22264-10380732011	11	37,5	33,8	8
22264-10380732012	12	40,5	36,8	8
22264-10380732013	13	43,5	39,8	8
22264-10380732014	14	46,5	42,8	8
22264-10380732015	15	49,5	45,81	8
22264-10380732016	16	52,5	48,82	10
22264-10380732017	17	55,5	51,83	10
22264-10380732018	18	58,6	54,85	10
22264-10380732019	19	61,6	57,87	10
22264-10380732020	20	64,6	60,89	10
22264-10380732021	21	67,6	63,91	10
22264-10380732022	22	70,6	66,93	10
22264-10380732023	23	73,7	69,95	10
22264-10380732024	24	76,7	72,97	10
22264-10380732025	25	79,7	76	10
22264-10380732026	26	82,7	79,02	10
22264-10380732027	27	85,7	82,04	10

Order No.	No. of teeth	D	D1	D3 max.
22264-10380732028	28	88,8	8985,07	10
22264-10380732029	29	91,8	88,09	10
22264-10380732030	30	94,8	91,12	10
22264-10380732031	31	97,9	94,15	-
22264-10380732032	32	100,9	97,17	12
22264-10380732033	33	103,9	100,2	12
22264-10380732034	34	106,9	103,23	12
22264-10380732035	35	110	106,26	12
22264-10380732036	36	113	109,29	12
22264-10380732037	37	116	112,32	12
22264-10380732038	38	119	115,34	12
22264-10380732039	39	122,1	118,37	12
22264-10380732040	40	125,1	121,4	12
22264-10380732041	41	129	124,43	16
22264-10380732042	42	132,1	127,46	16
22264-10380732043	43	135,1	130,49	16
22264-10380732044	44	135,1	133,52	16
22264-10380732045	45	141,1	136,54	16
22264-10380732046	46	144,2	139,58	16
22264-10380732047	47	147,2	142,61	16

Sprockets single 3/8“ x 7/32“

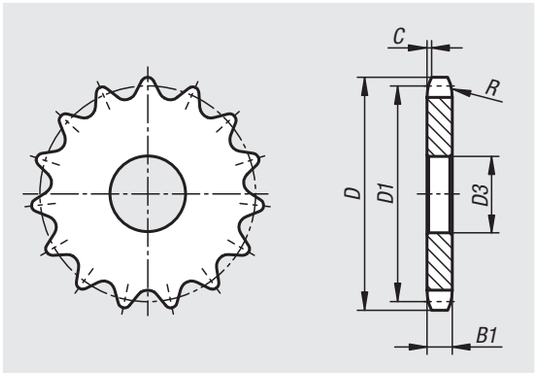
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22264-10380732048	48	150,2	145,64	16
22264-10380732049	49	153,3	148,66	16
22264-10380732050	50	156,3	151,69	20
22264-10380732051	51	159,3	154,72	20
22264-10380732052	52	162,4	157,75	20
22264-10380732053	53	165,4	160,78	20
22264-10380732054	54	168,4	163,82	20
22264-10380732055	55	171,4	166,85	20
22264-10380732056	56	174,5	169,88	20
22264-10380732057	57	177,5	172,91	20
22264-10380732058	58	180,5	175,93	20
22264-10380732060	60	186,6	181,99	20
22264-10380732062	62	192,7	188,06	20
22264-10380732064	64	198,7	194,12	20
22264-10380732065	65	201,8	197,15	20
22264-10380732066	66	204,8	200,18	20
22264-10380732068	68	210,8	206,24	20
22264-10380732070	70	216,9	212,3	20
22264-10380732072	72	223	218,37	20
22264-10380732075	75	232,1	227,46	20
22264-10380732076	76	235,1	230,49	20
22264-10380732080	80	247,2	242,61	20
22264-10380732085	85	262,4	257,77	20
22264-10380732090	90	277,5	272,93	20
22264-10380732095	95	292,7	288,08	20
22264-10380732100	100	307,8	303,25	20
22264-10380732110	110	338,2	333,55	20
22264-10380732114	114	350,3	345,68	20
22264-10380732120	120	368,5	363,86	20
22264-10380732125	125	383,6	379,02	20

Sprockets single 1/2“ x 5/16“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22264-10120516008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22264	08 B-1	1/2 x 5/16	12,7 x 7,75	13	1,3	7,2

Order No.	No. of teeth	D	D1	D3 max.
22264-10120516008	8	38	33,18	8
22264-10120516009	9	42	37,13	8
22264-10120516010	10	45,9	41,1	8
22264-10120516011	11	49,9	45,07	10
22264-10120516012	12	53,9	49,07	10
22264-10120516013	13	57,9	53,06	10
22264-10120516014	14	61,9	57,07	10
22264-10120516015	15	65,9	61,09	10
22264-10120516016	16	69,9	65,1	10
22264-10120516017	17	74	69,11	10
22264-10120516018	18	78	73,14	10
22264-10120516019	19	82	77,16	10
22264-10120516020	20	86	81,19	10
22264-10120516021	21	90,1	85,22	12
22264-10120516022	22	94,1	89,24	12
22264-10120516023	23	98,1	93,27	12
22264-10120516024	24	102,1	97,29	12
22264-10120516025	25	106,2	101,33	16
22264-10120516026	26	110,2	105,36	16
22264-10120516027	27	114,2	109,4	16

Order No.	No. of teeth	D	D1	D3 max.
22264-10120516028	28	118,3	113,42	16
22264-10120516029	29	122,3	117,46	16
22264-10120516030	30	126,3	121,5	16
22264-10120516031	31	130,4	125,54	16
22264-10120516032	32	134,4	129,56	16
22264-10120516033	33	138,4	133,6	16
22264-10120516034	34	142,5	137,64	16
22264-10120516035	35	146,5	141,68	16
22264-10120516036	36	150,6	145,72	16
22264-10120516037	37	154,6	149,76	16
22264-10120516038	38	158,6	153,8	16
22264-10120516039	39	162,7	157,83	16
22264-10120516040	40	166,7	161,87	16
22264-10120516041	41	172,4	165,91	20
22264-10120516042	42	176,5	169,95	20
22264-10120516043	43	180,5	173,99	20
22264-10120516044	44	184,6	178,03	20
22264-10120516045	45	188,6	182,07	20
22264-10120516046	46	192,6	186,1	20
22264-10120516047	47	196,7	190,14	20

Sprockets single 1/2“ x 5/16“

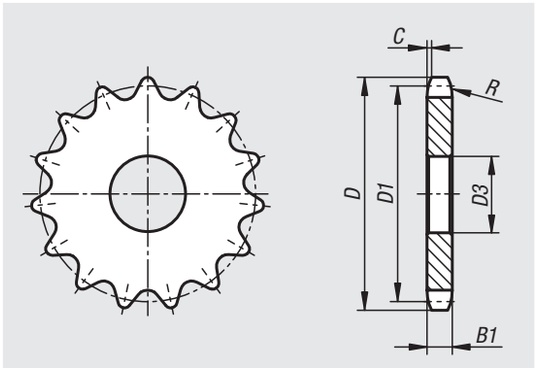
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22264-10120516048	48	200,7	194,18	20
22264-10120516049	49	204,8	198,22	20
22264-10120516050	50	208,8	202,26	20
22264-10120516051	51	212,8	206,3	20
22264-10120516052	52	216,9	210,34	20
22264-10120516053	53	220,9	214,37	20
22264-10120516054	54	225	218,43	20
22264-10120516055	55	229	222,46	20
22264-10120516056	56	233	226,5	20
22264-10120516057	57	237,1	230,54	20
22264-10120516058	58	241,1	234,58	20
22264-10120516060	60	249,2	242,66	20
22264-10120516062	62	257,3	250,75	25
22264-10120516064	64	265,4	258,82	25
22264-10120516065	65	269,4	262,86	25
22264-10120516066	66	273,4	266,9	25
22264-10120516068	68	281,5	274,99	25
22264-10120516070	70	289,6	283,07	25
22264-10120516072	72	297,7	291,16	25
22264-10120516075	75	309,8	303,27	25
22264-10120516076	76	313,9	307,33	25
22264-10120516078	78	321,9	315,4	25
22264-10120516080	80	330	323,48	25
22264-10120516085	85	350,2	343,69	25
22264-10120516090	90	370,4	363,9	25
22264-10120516095	95	390,7	384,11	25
22264-10120516100	100	410,9	404,31	25
22264-10120516110	110	451,3	444,74	25
22264-10120516114	114	467,4	460,9	25
22264-10120516120	120	491,7	485,16	25
22264-10120516125	125	511	505,37	25

Sprockets single 5/8“ x 3/8“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22264-10580308008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22264	10 B-1	5/8 x 3/8	15,875 x 9,65	16	1,6	9,1

Order No.	No. of teeth	D	D1	D3 max.
22264-10580308008	8	48,4	41,48	10
22264-10580308009	9	53,3	46,42	10
22264-10580308010	10	58,3	51,37	10
22264-10580308011	11	63,2	56,34	10
22264-10580308012	12	68,2	61,34	10
22264-10580308013	13	73,2	66,32	10
22264-10580308014	14	78,2	71,34	12
22264-10580308015	15	83,2	76,36	12
22264-10580308016	16	88,3	81,37	12
22264-10580308017	17	93,3	86,39	12
22264-10580308018	18	98,3	91,42	12
22264-10580308019	19	103,3	96,45	12
22264-10580308020	20	108,4	101,49	12
22264-10580308021	21	113,4	106,52	12
22264-10580308022	22	118,4	111,55	12
22264-10580308023	23	123,5	116,58	12
22264-10580308024	24	128,5	121,62	12
22264-10580308025	25	133,6	126,66	12
22264-10580308026	26	138,6	131,7	16
22264-10580308027	27	143,6	136,75	16

Order No.	No. of teeth	D	D1	D3 max.
22264-10580308028	28	148,7	141,78	16
22264-10580308029	29	153,7	146,83	16
22264-10580308030	30	158,8	151,87	16
22264-10580308031	31	163,8	156,92	16
22264-10580308032	32	168,9	161,95	16
22264-10580308033	33	173,9	167	16
22264-10580308034	34	178,9	172,05	16
22264-10580308035	35	184	177,1	16
22264-10580308036	36	189	182,15	20
22264-10580308037	37	194,1	187,2	20
22264-10580308038	38	199,1	192,24	20
22264-10580308039	39	204,2	197,29	20
22264-10580308040	40	209,2	202,34	20
22264-10580308041	41	215,8	207,39	20
22264-10580308042	42	220,8	212,44	20
22264-10580308043	43	225,9	217,49	20
22264-10580308044	44	230,9	222,53	20
22264-10580308045	45	236	227,58	20
22264-10580308046	46	241	236,63	20
22264-10580308047	47	246,1	237,68	20

Sprockets single 5/8“ x 3/8“

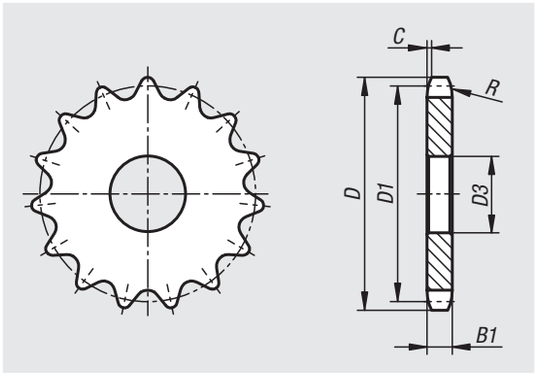
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22264-10580308048	48	251,1	242,73	20
22264-10580308049	49	256,2	247,78	20
22264-10580308050	50	261,2	252,82	20
22264-10580308051	51	266,3	257,87	20
22264-10580308052	52	271,3	262,92	20
22264-10580308053	53	276,4	267,97	20
22264-10580308054	54	281,4	273,03	20
22264-10580308055	55	286,5	278,08	20
22264-10580308056	56	291,5	283,13	25
22264-10580308057	57	296,6	288,18	25
22264-10580308058	58	301,6	293,23	25
22264-10580308060	60	311,7	303,32	25
22264-10580308062	62	321,8	313,43	25
22264-10580308064	64	331,9	323,53	25
22264-10580308065	65	337	328,58	25
22264-10580308068	68	352,1	343,74	25
22264-10580308070	70	362,2	353,84	25
22264-10580308072	72	372,2	363,95	25
22264-10580308075	75	387,5	379,09	25
22264-10580308076	76	392,5	384,16	25
22264-10580308078	78	402,6	394,25	25
22264-10580308080	80	412,7	404,35	25
22264-10580308085	85	438	429,62	30
22264-10580308090	90	463,3	454,88	30
22264-10580308095	95	488,5	480,14	30
22264-10580308100	100	513,8	505,4	30
22264-10580308110	110	564,3	555,92	30
22264-10580308114	114	584,5	576,13	30
22264-10580308120	120	614,8	606,44	30
22264-10580308125	125	640,1	631,71	30

Sprockets single 3/4“ x 7/16“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22264-10340716008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22264	12 B-1	3/4 x 7/16	19,05 x 11,68	19	2	11,1

Order No.	No. of teeth	D	D1	D3 max.
22264-10340716008	8	58	49,78	10
22264-10340716009	9	63,9	55,7	10
22264-10340716010	10	69,8	61,64	10
22264-10340716011	11	75,8	67,61	12
22264-10340716012	12	81,8	73,6	14
22264-10340716013	13	87,8	79,59	14
22264-10340716014	14	93,8	85,61	14
22264-10340716015	15	99,8	91,63	14
22264-10340716016	16	105,8	97,65	14
22264-10340716017	17	111,9	103,67	14
22264-10340716018	18	117,9	109,71	14
22264-10340716019	19	123,9	115,75	14
22264-10340716020	20	130	121,78	14
22264-10340716021	21	136	127,82	16
22264-10340716022	22	142	133,86	16
22264-10340716023	23	148,1	139,9	16
22264-10340716024	24	154,1	145,94	16
22264-10340716025	25	160,2	152	16
22264-10340716026	26	166,2	158,04	16
22264-10340716027	27	172,3	164,09	16

Order No.	No. of teeth	D	D1	D3 max.
22264-10340716028	28	178,3	170,13	16
22264-10340716029	29	184,4	176,19	16
22264-10340716030	30	190,4	182,25	16
22264-10340716031	31	196,5	188,31	20
22264-10340716032	32	202,5	194,35	20
22264-10340716033	33	208,6	200,4	20
22264-10340716034	34	214,6	206,46	20
22264-10340716035	35	220,7	212,52	20
22264-10340716036	36	226,8	218,58	20
22264-10340716037	37	232,8	224,64	20
22264-10340716038	38	238,9	230,69	20
22264-10340716039	39	244,9	236,75	20
22264-10340716040	40	251	242,81	20
22264-10340716041	41	258,9	248,87	25
22264-10340716042	42	265	254,93	25
22264-10340716043	43	271,1	260,98	25
22264-10340716044	44	277,1	267,03	25
22264-10340716045	45	283,2	273,1	25
22264-10340716046	46	289,2	279,16	25
22264-10340716047	47	295,3	285,21	25

Sprockets single 3/4“ x 7/16“

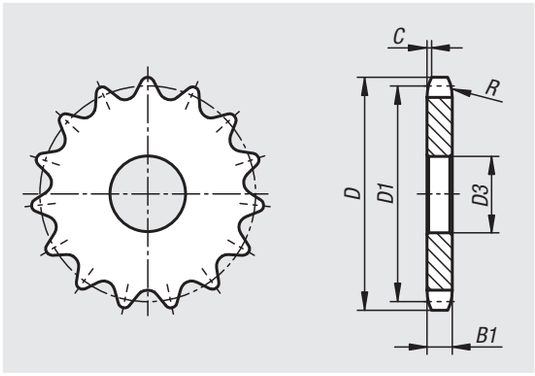
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22264-10340716048	48	301,4	291,27	25
22264-10340716049	49	307,4	297,33	25
22264-10340716050	50	313,5	303,39	25
22264-10340716051	51	319,5	309,45	25
22264-10340716052	52	325,6	315,5	25
22264-10340716053	53	331,6	321,56	25
22264-10340716054	54	337,7	327,64	25
22264-10340716055	55	343,8	333,7	25
22264-10340716056	56	349,8	339,75	25
22264-10340716057	57	355,9	345,81	25
22264-10340716058	58	362	351,87	25
22264-10340716060	60	374,1	363,99	25
22264-10340716062	62	386,2	376,12	25
22264-10340716064	64	398,3	388,24	25
22264-10340716065	65	404,4	394,29	25
22264-10340716068	68	422,6	412,49	30
22264-10340716070	70	434,7	424,61	30
22264-10340716072	72	446,8	436,74	30
22264-10340716075	75	465	454,91	30
22264-10340716076	76	471,1	460,99	30
22264-10340716078	78	483,2	473,1	30
22264-10340716080	80	495,3	485,22	30
22264-10340716085	85	525,6	515,55	30
22264-10340716090	90	555,9	545,86	30
22264-10340716095	95	586,2	576,17	30
22264-10340716100	100	616,6	606,47	30
22264-10340716110	110	677,2	667,11	30
22264-10340716114	114	701,4	691,36	30
22264-10340716120	120	737,8	727,74	30
22264-10340716125	125	768,1	758,05	30

Sprockets single 1“ x 17.02 mm

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22264-11001702008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1
22264	16 B-1	1 x 17,02mm	25,4 x 17,02	26	2,5	16,2

Order No.	No. of teeth	D	D1	D3 max.
22264-11001702008	8	77,9	66,37	16
22264-11001702009	9	85,8	74,27	16
22264-11001702010	10	93,8	82,19	16
22264-11001702011	11	101,7	90,14	16
22264-11001702012	12	109,7	98,14	16
22264-11001702013	13	117,7	106,12	16
22264-11001702014	14	125,7	114,15	16
22264-11001702015	15	133,7	122,17	16
22264-11001702016	16	141,8	130,2	20
22264-11001702017	17	149,8	138,22	20
22264-11001702018	18	157,8	146,28	20
22264-11001702019	19	165,9	154,33	20
22264-11001702020	20	173,9	162,38	20
22264-11001702021	21	182	170,43	20
22264-11001702022	22	190,1	178,48	20
22264-11001702023	23	198,1	186,53	20
22264-11001702024	24	206,2	194,59	20
22264-11001702025	25	214,2	202,66	20
22264-11001702026	26	222,3	210,72	20
22264-11001702027	27	230,4	218,79	20

Order No.	No. of teeth	D	D1	D3 max.
22264-11001702028	28	238,4	226,85	20
22264-11001702029	29	246,5	234,92	20
22264-11001702030	30	254,6	243	20
22264-11001702031	31	262,6	251,08	25
22264-11001702032	32	270,7	259,13	25
22264-11001702033	33	278,8	267,21	25
22264-11001702034	34	286,9	275,28	25
22264-11001702035	35	294,9	283,36	25
22264-11001702036	36	303	291,44	25
22264-11001702037	37	311,1	299,51	25
22264-11001702038	38	319,2	307,59	25
22264-11001702039	39	327,2	315,67	25
22264-11001702040	40	335,3	323,73	25
22264-11001702041	41	345,6	331,82	25
22264-11001702042	42	353,7	339,9	25
22264-11001702043	43	361,7	347,98	25
22264-11001702044	44	369,8	356,06	25
22264-11001702045	45	377,9	364,12	25
22264-11001702046	46	386	372,21	25
22264-11001702047	47	394,1	380,29	25

Sprockets single 1“ x 17.02 mm

DIN ISO 606

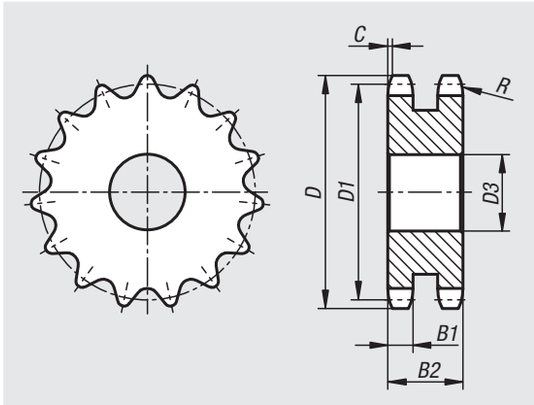
Order No.	No. of teeth	D	D1	D3 max.
22264-11001702048	48	402,1	388,36	25
22264-11001702049	49	410,2	396,44	25
22264-11001702050	50	418,3	404,52	25
22264-11001702051	51	426,4	412,6	30
22264-11001702052	52	434,5	420,67	30
22264-11001702053	53	442,5	428,75	30
22264-11001702054	54	450,6	436,85	30
22264-11001702055	55	458,7	444,93	30
22264-11001702056	56	466,8	453,01	30
22264-11001702057	57	474,9	461,07	30
22264-11001702058	58	482,9	469,16	30
22264-11001702060	60	499,1	485,32	30
22264-11001702062	62	515,3	501,5	30
22264-11001702064	64	531,4	517,65	30
22264-11001702065	65	539,5	525,73	30
22264-11001702068	68	563,8	549,98	30
22264-11001702070	70	579,9	566,14	30
22264-11001702072	72	596,1	582,32	30
22264-11001702075	75	620,3	606,55	30
22264-11001702076	76	628,4	614,65	30
22264-11001702078	78	644,6	630,8	30
22264-11001702080	80	660,7	646,96	30
22264-11001702085	85	701,2	687,4	30
22264-11001702090	90	741,63	727,81	30
22264-11001702095	95	782	768,22	30
22264-11001702100	100	822,4	808,63	30
22264-11001702110	110	903,3	889,48	30
22264-11001702114	114	935,6	921,82	30
22264-11001702120	120	984,1	970,33	30
22264-11001702125	125	1024,5	1010,73	30

Notes

Sprockets duplex 8.0 mm x 3.0 mm

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-20800030008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch mm	R	C	B1	B2
22265	05 B-2	8,0 x 3,0	8	0,8	2,7	8,3

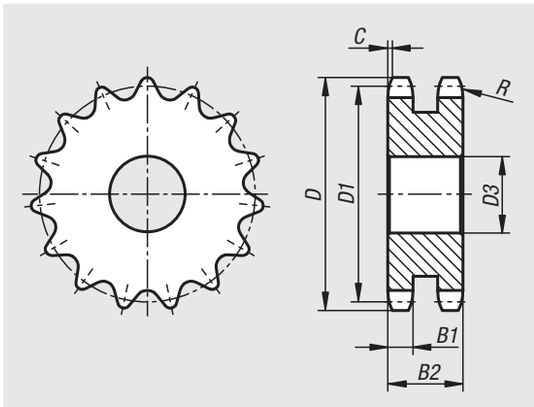
Order No.	No. of teeth	D	D1	D3 max.
22265-20800030008	8	23,4	20,9	8
22265-20800030009	9	25,9	23,39	8
22265-20800030010	10	28,4	25,89	8
22265-20800030011	11	31	28,39	8
22265-20800030012	12	33,7	30,91	8
22265-20800030013	13	36,7	33,42	8
22265-20800030014	14	39,2	35,95	8
22265-20800030015	15	41,7	38,48	8
22265-20800030016	16	44,2	41,01	10
22265-20800030017	17	46,7	43,53	10
22265-20800030018	18	49,2	46,07	10
22265-20800030019	19	51,7	48,61	10
22265-20800030021	21	57,2	53,67	10
22265-20800030022	22	59,4	56,21	10
22265-20800030023	23	62,2	58,75	10
22265-20800030024	24	64,7	61,29	10
22265-20800030025	25	67,2	63,83	10
22265-20800030026	26	69,7	66,37	12
22265-20800030028	28	74,7	71,45	12
22265-20800030030	30	80,2	76,53	12
22265-20800030032	32	85,2	81,61	12

Order No.	No. of teeth	D	D1	D3 max.
22265-20800030034	34	90,2	86,7	12
22265-20800030035	35	92,7	89,24	12
22265-20800030036	36	95,2	91,79	12
22265-20800030038	38	100,2	96,88	12
22265-20800030040	40	105,2	101,97	12
22265-20800030046	46	121,2	117,23	16
22265-20800030048	48	125,5	122,32	16
22265-20800030050	50	131,5	127,41	16
22265-20800030052	52	136,6	132,49	16
22265-20800030057	57	149,3	145,22	16
22265-20800030060	60	156	152,85	16
22265-20800030076	76	196,7	193,59	20
22265-20800030080	80	208,1	203,77	20

Sprockets duplex 3/8“ x 7/32“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-30380732008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	06 B-2	3/8 x 7/32	9,525 x 5,72	10	1	5,2	15,4

Order No.	No. of teeth	D	D1	D3 max.
22265-30380732008	8	28,6	24,89	8
22265-30380732009	9	31,5	27,85	8
22265-30380732010	10	34,5	30,82	8
22265-30380732011	11	37,5	33,8	10
22265-30380732012	12	40,5	36,8	10
22265-30380732013	13	43,5	39,8	10
22265-30380732014	14	46,5	42,8	10
22265-30380732015	15	49,5	45,81	10
22265-30380732016	16	52,5	48,82	12
22265-30380732017	17	55,5	51,83	12
22265-30380732018	18	58,6	54,85	12
22265-30380732019	19	61,6	57,87	12
22265-30380732020	20	64,6	60,89	12
22265-30380732021	21	67,6	63,91	12
22265-30380732022	22	70,6	66,93	12
22265-30380732023	23	73,7	69,95	12
22265-30380732024	24	76,7	72,97	12
22265-30380732025	25	79,7	76	12
22265-30380732026	26	82,7	79,02	16
22265-30380732027	27	85,7	82,04	16
22265-30380732028	28	88,8	85,07	16

Order No.	No. of teeth	D	D1	D3 max.
22265-30380732029	29	91,8	88,09	16
22265-30380732030	30	94,8	91,12	16
22265-30380732031	31	97,9	94,15	16
22265-30380732032	32	100,9	97,17	16
22265-30380732033	33	103,9	100,2	16
22265-30380732034	34	106,9	103,23	16
22265-30380732035	35	110	106,26	16
22265-30380732036	36	113	109,29	16
22265-30380732037	37	116	112,32	16
22265-30380732038	38	119	115,34	16
22265-30380732039	39	122,1	118,37	16
22265-30380732040	40	125,1	121,4	16
22265-30380732041	41	129	124,43	20
22265-30380732042	42	132,1	127,46	20
22265-30380732043	43	135,1	130,49	20
22265-30380732044	44	138,1	133,52	20
22265-30380732045	45	141,1	136,54	20
22265-30380732046	46	144,2	139,58	20
22265-30380732048	48	150,2	145,64	20
22265-30380732049	49	153,3	148,66	20
22265-30380732050	50	156,3	151,69	20

Sprockets duplex 3/8“ x 7/32“

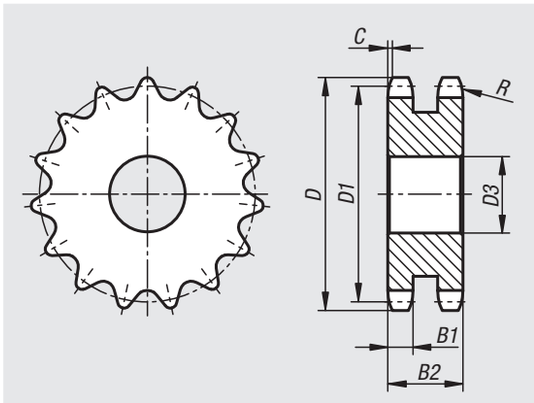
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22265-30380732051	51	159,3	154,72	20
22265-30380732052	52	162,4	157,75	20
22265-30380732053	53	165,4	160,78	20
22265-30380732054	54	168,4	163,82	20
22265-30380732055	55	171,4	166,85	20
22265-30380732056	56	174,5	169,88	20
22265-30380732057	57	177,5	172,91	20
22265-30380732058	58	180,5	175,93	20
22265-30380732060	60	186,6	181,99	20
22265-30380732062	62	192,7	188,06	25
22265-30380732064	64	198,7	194,12	25
22265-30380732065	65	201,8	197,15	25
22265-30380732068	68	210,8	206,24	25
22265-30380732070	70	216,9	212,3	25
22265-30380732072	72	223	218,37	25
22265-30380732075	75	232,1	227,46	25
22265-30380732076	76	235,1	230,49	25
22265-30380732080	80	247,2	242,61	25
22265-30380732085	85	262,4	257,77	25
22265-30380732090	90	277,5	272,93	25
22265-30380732095	95	292,7	288,08	25
22265-30380732100	100	307,8	303,25	25
22265-30380732110	110	338,2	333,55	25
22265-30380732114	114	350,3	345,68	25
22265-30380732120	120	368,5	363,86	25
22265-30380732125	125	383,6	379,02	25

Sprockets duplex 1/2" x 5/16"

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-30120516008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	08 B-2	1/2 x 5/16	12,7 x 7,75	13	1,3	7	21

Order No.	No. of teeth	D	D1	D3 max.
22265-30120516008	8	38	33,18	10
22265-30120516009	9	42	37,13	10
22265-30120516010	10	45,9	41,1	10
22265-30120516011	11	49,9	45,07	10
22265-30120516012	12	53,9	49,07	10
22265-30120516013	13	57,9	53,06	10
22265-30120516014	14	61,9	57,07	10
22265-30120516015	15	65,9	61,09	10
22265-30120516016	16	69,9	65,1	12
22265-30120516017	17	74	69,11	12
22265-30120516018	18	78	73,14	12
22265-30120516019	19	82	77,16	12
22265-30120516020	20	86	81,19	12
22265-30120516021	21	90,1	85,22	16
22265-30120516022	22	94,1	89,24	16
22265-30120516023	23	98,1	93,27	16
22265-30120516024	24	102,1	97,29	16
22265-30120516025	25	106,2	101,33	16
22265-30120516026	26	110,2	105,36	16
22265-30120516027	27	114,2	109,4	16
22265-30120516028	28	118,3	113,42	16

Order No.	No. of teeth	D	D1	D3 max.
22265-30120516029	29	122,3	117,46	16
22265-30120516030	30	126,3	121,5	16
22265-30120516031	31	130,4	125,54	16
22265-30120516032	32	134,4	129,56	16
22265-30120516033	33	138,4	133,6	16
22265-30120516034	34	142,5	137,64	16
22265-30120516035	35	146,5	141,68	16
22265-30120516036	36	150,6	145,72	20
22265-30120516037	37	154,6	149,76	20
22265-30120516038	38	158,6	153,8	20
22265-30120516039	39	162,7	157,83	20
22265-30120516040	40	166,7	161,87	20
22265-30120516041	41	172,4	165,91	20
22265-30120516042	42	176,5	169,95	20
22265-30120516043	43	180,5	173,99	20
22265-30120516044	44	184,6	178,03	20
22265-30120516045	45	188,6	182,07	20
22265-30120516046	46	192,6	186,1	20
22265-30120516048	48	200,7	194,18	20
22265-30120516049	49	204,8	198,22	20
22265-30120516050	50	208,8	202,26	20

Sprockets duplex 1/2" x 5/16"

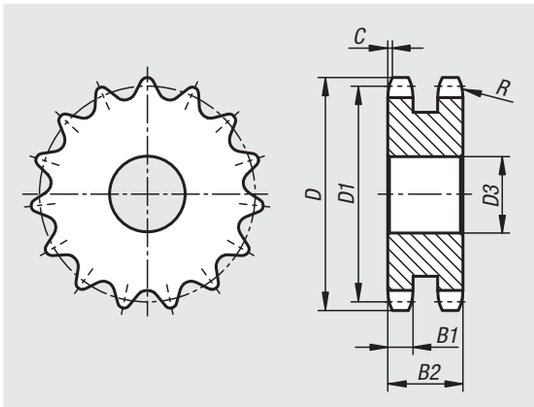
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22265-30120516051	51	212,8	206,3	25
22265-30120516052	52	216,9	210,34	25
22265-30120516053	53	220,9	214,37	25
22265-30120516054	54	225	218,43	25
22265-30120516055	55	229	222,46	25
22265-30120516056	56	233	226,5	25
22265-30120516057	57	237,1	230,54	25
22265-30120516058	58	241,1	234,58	25
22265-30120516060	60	249,2	242,66	25
22265-30120516062	62	257,3	250,75	25
22265-30120516064	64	265,4	258,82	25
22265-30120516065	65	269,4	262,86	25
22265-30120516068	68	281,5	274,99	25
22265-30120516070	70	289,6	283,07	25
22265-30120516072	72	297,7	291,16	25
22265-30120516075	75	309,8	303,27	25
22265-30120516076	76	313,9	307,33	25
22265-30120516080	80	330	323,48	25
22265-30120516085	85	350,2	343,69	25
22265-30120516090	90	370,4	363,9	25
22265-30120516095	95	390,7	384,11	25
22265-30120516100	100	410,9	404,31	25
22265-30120516110	110	451,3	444,74	25
22265-30120516114	114	467,4	460,9	25
22265-30120516120	120	491,7	485,16	25
22265-30120516125	125	511	505,37	25

Sprockets, duplex 5/8" x 3/8"

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-30580308008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	10 B-2	5/8 x 3/8	15,875 x 9,65	16	1,6	9	25,5

Order No.	No. of teeth	D	D1	D3 max.
22265-30580308008	8	48,4	41,48	10
22265-30580308009	9	53,3	46,42	10
22265-30580308010	10	58,3	51,37	10
22265-30580308011	11	63,2	56,34	10
22265-30580308012	12	68,2	61,34	10
22265-30580308013	13	73,2	66,32	10
22265-30580308014	14	78,2	71,34	10
22265-30580308015	15	83,2	76,36	12
22265-30580308016	16	88,3	81,37	12
22265-30580308017	17	93,3	86,39	12
22265-30580308018	18	98,3	91,42	12
22265-30580308019	19	103,3	96,45	12
22265-30580308020	20	108,4	101,49	12
22265-30580308021	21	113,4	106,52	16
22265-30580308022	22	118,4	111,55	16
22265-30580308023	23	123,5	116,58	16
22265-30580308024	24	128,5	121,62	16
22265-30580308025	25	133,6	126,66	16
22265-30580308026	26	138,6	131,7	20
22265-30580308027	27	143,6	136,75	20
22265-30580308028	28	148,7	141,78	20

Order No.	No. of teeth	D	D1	D3 max.
22265-30580308029	29	153,7	146,83	20
22265-30580308030	30	158,8	151,87	20
22265-30580308031	31	163,8	156,92	20
22265-30580308032	32	168,9	161,95	20
22265-30580308033	33	173,9	167	20
22265-30580308034	34	178,9	172,05	20
22265-30580308035	35	184	177,1	20
22265-30580308036	36	189	182,15	20
22265-30580308037	37	194,1	187,2	20
22265-30580308038	38	199,1	192,24	20
22265-30580308039	39	204,2	197,29	20
22265-30580308040	40	209,2	202,34	20
22265-30580308042	42	220,8	212,44	25
22265-30580308043	43	225,9	217,49	25
22265-30580308044	44	230,9	222,53	25
22265-30580308045	45	236	227,58	25
22265-30580308046	46	241	236,63	25
22265-30580308047	47	246,1	237,68	25
22265-30580308048	48	251,1	242,73	25
22265-30580308050	50	261,2	252,82	25
22265-30580308052	52	271,3	262,92	25

Sprockets, duplex 5/8“ x 3/8“

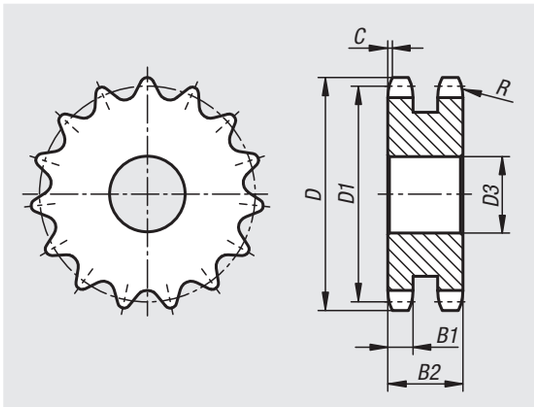
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22265-30580308053	53	276,4	267,97	25
22265-30580308054	54	281,4	273,03	25
22265-30580308055	55	286,5	278,08	25
22265-30580308056	56	291,5	283,13	25
22265-30580308057	57	296,6	288,18	25
22265-30580308058	58	301,6	293,23	25
22265-30580308060	60	311,7	303,32	25
22265-30580308062	62	321,8	313,43	25
22265-30580308065	65	337	328,58	25
22265-30580308066	66	342	333,63	25
22265-30580308070	70	362,2	353,84	25
22265-30580308072	72	372,3	363,95	25
22265-30580308075	75	387,5	379,09	25
22265-30580308076	76	392,5	384,16	25
22265-30580308080	80	412,7	404,35	25
22265-30580308085	85	438	429,62	30
22265-30580308090	90	463,3	454,88	30
22265-30580308095	95	488,5	480,14	30
22265-30580308100	100	513,8	505,4	30
22265-30580308114	114	584,5	576,13	30
22265-30580308120	120	614,8	606,44	30
22265-30580308125	125	640,1	631,71	30

Sprockets duplex 3/4“ x 7/16“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-30340716008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	12 B-2	3/4 x 7/16	19,05 x 11,68	19	2	10,8	30,3

Order No.	No. of teeth	D	D1	D3 max.
22265-30340716008	8	58	49,78	12
22265-30340716009	9	63,9	55,7	12
22265-30340716010	10	69,8	61,64	12
22265-30340716011	11	75,8	67,61	12
22265-30340716012	12	81,8	73,5	14
22265-30340716013	13	87,8	79,59	14
22265-30340716014	14	93,8	85,61	16
22265-30340716015	15	99,8	91,63	16
22265-30340716016	16	105,8	97,65	16
22265-30340716017	17	111,9	103,67	16
22265-30340716018	18	117,9	109,71	16
22265-30340716019	19	123,9	115,75	16
22265-30340716020	20	130	121,78	16
22265-30340716021	21	136	127,82	20
22265-30340716022	22	142	133,86	20
22265-30340716023	23	148,1	139,9	20
22265-30340716024	24	154,1	145,94	20
22265-30340716025	25	160,2	152	20
22265-30340716026	26	166,2	158,04	20
22265-30340716027	27	172,3	164,09	20
22265-30340716028	28	178,3	170,13	20

Order No.	No. of teeth	D	D1	D3 max.
22265-30340716029	29	184,4	176,19	20
22265-30340716030	30	190,4	182,25	20
22265-30340716031	31	196,5	188,31	20
22265-30340716032	32	202,5	194,35	20
22265-30340716033	33	208,6	200,4	20
22265-30340716034	34	214,6	206,46	20
22265-30340716035	35	220,7	212,52	20
22265-30340716036	36	226,8	218,58	25
22265-30340716037	37	232,8	224,64	25
22265-30340716038	38	238,9	230,69	25
22265-30340716039	39	244,9	236,75	25
22265-30340716040	40	251	242,81	25
22265-30340716041	41	258,9	248,87	25
22265-30340716042	42	265	254,93	25
22265-30340716043	43	271,1	260,98	25
22265-30340716044	44	277,1	267,03	25
22265-30340716045	45	283,2	273,1	25
22265-30340716046	46	289,2	279,16	25
22265-30340716047	47	295,3	285,21	25
22265-30340716048	48	301,4	291,27	25
22265-30340716050	50	313,5	303,39	25

Sprockets duplex 3/4“ x 7/16“

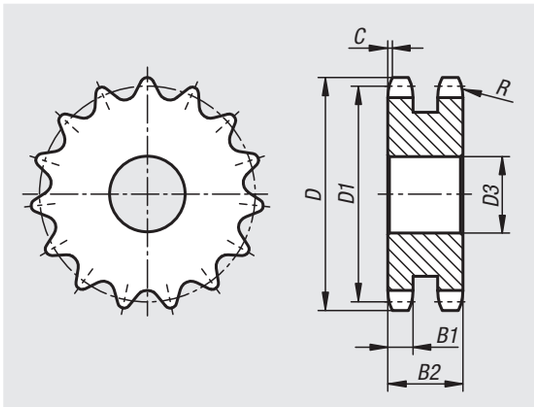
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22265-30340716052	52	325,6	315,5	25
22265-30340716054	54	337,7	327,64	25
22265-30340716055	55	343,8	333,7	25
22265-30340716056	56	349,8	339,75	25
22265-30340716057	57	355,9	345,81	25
22265-30340716058	58	362	351,87	25
22265-30340716060	60	374,1	363,99	25
22265-30340716064	64	398,3	388,24	30
22265-30340716065	65	404,4	394,29	30
22265-30340716068	68	422,6	412,49	30
22265-30340716070	70	434,7	424,61	30
22265-30340716072	72	446,8	436,74	30
22265-30340716075	75	465	454,91	30
22265-30340716076	76	471,1	460,99	30
22265-30340716080	80	495,3	485,22	30
22265-30340716085	85	525,6	515,55	30
22265-30340716090	90	555,9	545,86	30
22265-30340716095	95	586,2	576,17	30
22265-30340716100	100	616,6	606,47	30
22265-30340716114	114	701,4	691,36	30
22265-30340716125	125	768,1	758,05	30

Sprockets duplex 1“ x 17,02 mm

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-31001702008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	16 B-2	1 x 17,02mm	25,4 x 17,02	26	2,5	15,8	47,7

Order No.	No. of teeth	D	D1	D3 max.
22265-31001702008	8	77,9	66,37	16
22265-31001702009	9	85,8	74,27	16
22265-31001702010	10	93,8	82,19	16
22265-31001702011	11	101,7	90,14	20
22265-31001702012	12	109,7	98,14	20
22265-31001702013	13	117,7	106,12	20
22265-31001702014	14	125,7	114,15	20
22265-31001702015	15	133,7	122,17	20
22265-31001702016	16	141,8	130,2	20
22265-31001702017	17	149,8	138,22	20
22265-31001702018	18	157,8	146,28	20
22265-31001702019	19	165,9	154,33	20
22265-31001702020	20	173,9	162,38	20
22265-31001702021	21	182	170,43	25
22265-31001702022	22	190,1	178,48	25
22265-31001702023	23	198,1	186,53	25
22265-31001702024	24	206,2	194,59	25
22265-31001702025	25	214,2	202,66	25
22265-31001702026	26	222,3	210,72	25
22265-31001702027	27	230,4	218,79	25
22265-31001702028	28	238,4	226,85	25

Order No.	No. of teeth	D	D1	D3 max.
22265-31001702029	29	246,5	234,92	25
22265-31001702030	30	254,6	243	25
22265-31001702031	31	262,6	251,08	25
22265-31001702032	32	270,7	259,13	25
22265-31001702033	33	278,8	267,21	25
22265-31001702034	34	286,9	275,28	25
22265-31001702035	35	294,9	283,36	25
22265-31001702036	36	303	291,44	25
22265-31001702037	37	311,1	299,51	25
22265-31001702038	38	319,2	307,59	25
22265-31001702039	39	327,2	315,67	25
22265-31001702040	40	335,3	323,73	25
22265-31001702042	42	353,7	339,9	25
22265-31001702044	44	369,8	356,06	25
22265-31001702045	45	377,9	364,12	25
22265-31001702046	46	386	372,21	25
22265-31001702048	48	402,1	388,36	25
22265-31001702050	50	418,3	404,52	25
22265-31001702052	52	434,5	420,67	30
22265-31001702055	55	458,7	444,93	30
22265-31001702056	56	466,8	453,01	40

Sprockets duplex 1“ x 17,02 mm

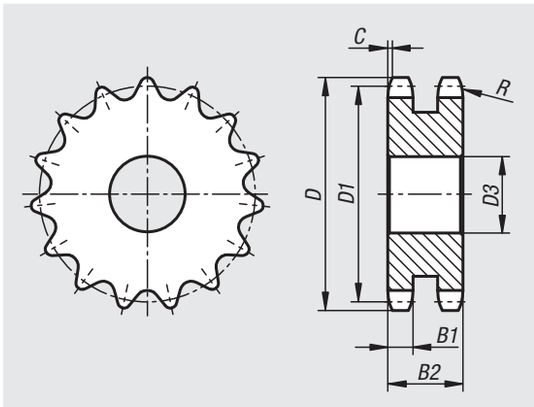
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22265-31001702057	57	474,9	461,07	40
22265-31001702060	60	499,1	485,32	40
22265-31001702062	62	515,3	501,5	40
22265-31001702065	65	539,5	525,73	40
22265-31001702068	68	563,8	549,98	40
22265-31001702070	70	579,9	566,14	40
22265-31001702072	72	596,1	582,32	40
22265-31001702075	75	620,3	606,55	40
22265-31001702076	76	628,4	614,65	40
22265-31001702080	80	660,7	646,96	40
22265-31001702085	85	701,2	687,4	40
22265-31001702090	90	741,6	727,81	40
22265-31001702095	95	782	768,22	40
22265-31001702100	100	822,4	808,63	40
22265-31001702114	114	935,6	921,82	40
22265-31001702125	125	1024,5	1010,73	40

Sprockets duplex 1 1/4" x 3/4"

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-21140340008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	20 B-2	1 1/4X3/4	31,75 x 19,56	32	3,5	18,2	54,6

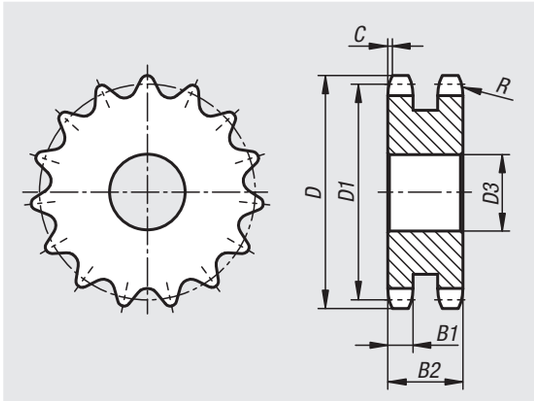
Order No.	No. of teeth	D	D1	D3 max.
22265-21140340008	8	96	82,96	20
22265-21140340009	9	106,5	92,84	20
22265-21140340010	10	117	102,74	20
22265-21140340011	11	127	112,68	20
22265-21140340012	12	137	122,68	20
22265-21140340013	13	147,5	132,65	20
22265-21140340014	14	157,6	142,68	20
22265-21140340015	15	167,7	152,72	20
22265-21140340016	16	177,7	162,75	30
22265-21140340017	17	187,7	172,78	30
22265-21140340018	18	197,8	182,85	30
22265-21140340019	19	207,9	192,91	30
22265-21140340020	20	217,9	202,98	30
22265-21140340021	21	228	213,04	30
22265-21140340022	22	238,1	223,11	30
22265-21140340023	23	248,2	233,17	30
22265-21140340024	24	258,3	243,23	30
22265-21140340025	25	268,4	253,33	30
22265-21140340026	26	278,4	263,4	30
22265-21140340027	27	288,5	273,48	30
22265-21140340028	28	298,5	283,56	30
22265-21140340029	29	308,6	293,65	30
22265-21140340030	30	318,7	303,75	30

Order No.	No. of teeth	D	D1	D3 max.
22265-21140340031	31	328,8	313,85	30
22265-21140340032	32	338,9	323,91	30
22265-21140340034	34	359,1	344,1	30
22265-21140340035	35	369,2	354,2	30
22265-21140340036	36	379,2	364,3	30
22265-21140340038	38	399,4	384,49	30
22265-21140340040	40	419,6	404,66	30
22265-21140340042	42	440,8	424,88	30
22265-21140340045	45	471,1	455,17	30
22265-21140340046	46	481,2	465,26	30
22265-21140340048	48	501,4	485,46	30
22265-21140340050	50	521,6	505,65	30
22265-21140340052	52	541,8	525,84	40
22265-21140340057	57	592,3	576,36	40
22265-21140340060	60	622,6	606,65	40
22265-21140340065	65	673,1	657,16	40
22265-21140340070	70	723,6	707,67	40
22265-21140340076	76	784,3	768,32	40
22265-21140340080	80	824,7	808,72	40
22265-21140340095	95	976,2	960,28	40
22265-21140340114	114	1168,2	1152,26	40

Sprockets duplex 1 1/2" x 1"

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22265-21121000008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B2
22265	24 B-2	1 1/2X1	38,1 x 25,4	38	4	23,6	72

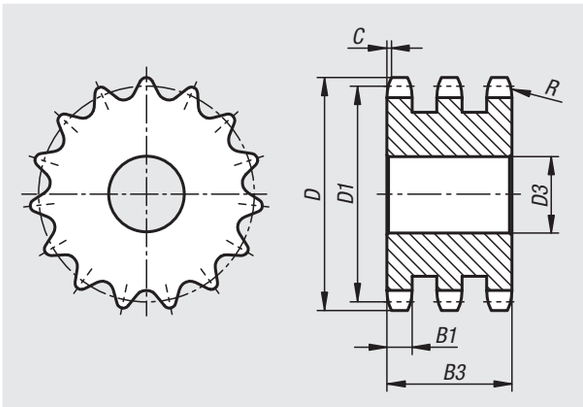
Order No.	No. of teeth	D	D1	D3 max.
22265-21121000008	8	113	99,55	25
22265-21121000009	9	125	111,4	25
22265-21121000010	10	137	123,29	25
22265-21121000011	11	149	135,21	25
22265-21121000012	12	161	147,22	25
22265-21121000013	13	173	159,18	25
22265-21121000014	14	185	171,22	25
22265-21121000015	15	197	183,26	25
22265-21121000016	16	209	195,3	30
22265-21121000017	17	221	207,34	30
22265-21121000018	18	233	219,42	30
22265-21121000019	19	245,5	231,49	30
22265-21121000020	20	257,5	243,57	30
22265-21121000021	21	270,5	255,65	30
22265-21121000022	22	282,5	267,73	30
22265-21121000023	23	294,5	279,8	30
22265-21121000024	24	307	291,88	30
22265-21121000025	25	319	304	30
22265-21121000026	26	331	316,08	30
22265-21121000027	27	343	328,19	30
22265-21121000028	28	355	340,27	30
22265-21121000029	29	367,5	352,38	30
22265-21121000030	30	379,5	364,5	30

Order No.	No. of teeth	D	D1	D3 max.
22265-21121000031	31	391,5	376,62	40
22265-21121000032	32	403,5	388,69	40
22265-21121000033	33	415,5	400,81	40
22265-21121000034	34	428	412,93	40
22265-21121000035	35	440	425,04	40
22265-21121000036	36	452	437,16	40
22265-21121000037	37	464	449,27	40
22265-21121000038	38	476,5	461,39	40
22265-21121000040	40	501,5	485,62	40
22265-21121000042	42	525,5	509,85	40
22265-21121000045	45	562	546,2	40
22265-21121000048	48	598,5	582,55	40
22265-21121000050	50	622,5	606,78	40
22265-21121000057	57	707,5	691,63	40
22265-21121000060	60	745	727,97	40
22265-21121000065	65	805,5	788,59	40
22265-21121000076	76	939	921,98	40
22265-21121000095	95	1169	1152,33	40

Sprockets triplex 3/8“ x 7/32“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22266-30380732008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22266	06 B-3	3/8 x 7/32	9,525 x 5,72	10	1	5,2	25,6

Order No.	No. of teeth	D	D1	D3 max.
22266-30380732008	8	28,6	24,89	8
22266-30380732009	9	31,5	27,85	8
22266-30380732010	10	34,5	30,82	10
22266-30380732011	11	37,5	33,8	12
22266-30380732012	12	40,5	36,8	12
22266-30380732013	13	43,5	39,8	12
22266-30380732014	14	46,5	42,8	12
22266-30380732015	15	49,5	45,81	12
22266-30380732016	16	52,5	48,82	12
22266-30380732017	17	55,5	51,83	12
22266-30380732018	18	58,6	54,85	12
22266-30380732019	19	61,6	57,87	12
22266-30380732020	20	64,6	60,89	12
22266-30380732021	21	67,6	63,91	16
22266-30380732022	22	70,6	66,93	16
22266-30380732023	23	73,7	69,95	16
22266-30380732024	24	76,7	72,97	16
22266-30380732025	25	79,7	76	16
22266-30380732026	26	82,7	79,02	16
22266-30380732027	27	85,7	82,04	16
22266-30380732028	28	88,8	85,07	16
22266-30380732029	29	91,8	88,09	16
22266-30380732030	30	94,8	91,12	16
22266-30380732031	31	97,9	94,15	16
22266-30380732032	32	100,9	97,17	16
22266-30380732034	34	106,9	103,23	16

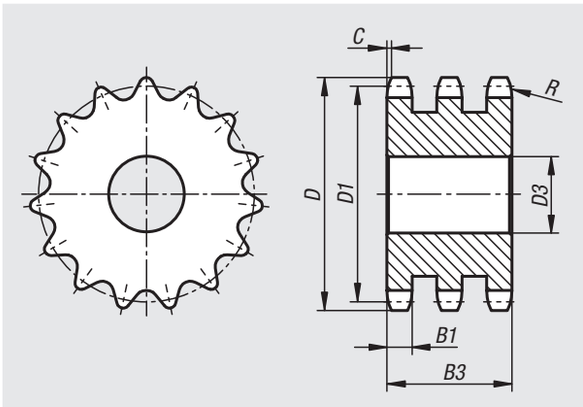
Order No.	No. of teeth	D	D1	D3 max.
22266-30380732035	35	110	106,26	16
22266-30380732036	36	113	109,29	20
22266-30380732038	38	119	115,34	20
22266-30380732040	40	125,1	121,4	20
22266-30380732042	42	132,1	127,46	20
22266-30380732044	44	138,1	133,52	20
22266-30380732045	45	141,1	136,54	20
22266-30380732048	48	150,2	145,64	20
22266-30380732050	50	156,3	151,69	20
22266-30380732057	57	177,5	172,91	25
22266-30380732058	58	180,5	175,93	25
22266-30380732060	60	186,6	181,99	25
22266-30380732064	64	198,7	194,12	25
22266-30380732065	65	201,8	197,15	25
22266-30380732066	66	204,8	200,18	25
22266-30380732070	70	216,9	212,3	25
22266-30380732072	72	223	218,37	25
22266-30380732076	76	235,1	230,49	25
22266-30380732080	80	247,2	242,61	25
22266-30380732085	85	262,4	257,77	25
22266-30380732090	90	277,5	272,93	25
22266-30380732095	95	292,7	288,08	25
22266-30380732100	100	307,8	303,25	25
22266-30380732114	114	350,3	345,68	25
22266-30380732125	125	383,6	379,02	25

Notes

Sprockets triplex 1/2“ x 5/16“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22266-30120516008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22266	08 B-3	1/2 x 5/16	12,7 x 7,75	13	1,3	7	34,9

Order No.	No. of teeth	D	D1	D3 max.
22266-30120516008	8	38	33,18	10
22266-30120516009	9	42	37,13	10
22266-30120516010	10	45,9	41,1	10
22266-30120516011	11	49,9	45,07	12
22266-30120516012	12	53,9	49,07	12
22266-30120516013	13	57,9	53,06	12
22266-30120516014	14	61,9	57,07	12
22266-30120516015	15	65,9	61,09	12
22266-30120516016	16	69,9	65,1	16
22266-30120516017	17	74	69,11	16
22266-30120516018	18	78	73,14	16
22266-30120516019	19	82	77,16	16
22266-30120516020	20	86	81,19	16
22266-30120516021	21	90,1	85,22	16
22266-30120516022	22	94,1	89,24	16
22266-30120516023	23	98,1	93,27	16
22266-30120516024	24	102,1	97,29	16
22266-30120516025	25	106,2	101,33	16
22266-30120516026	26	110,2	105,36	16
22266-30120516027	27	114,2	109,4	16

Order No.	No. of teeth	D	D1	D3 max.
22266-30120516028	28	118,3	113,42	16
22266-30120516029	29	122,3	117,46	16
22266-30120516030	30	126,3	121,5	16
22266-30120516032	32	134,4	129,56	20
22266-30120516033	33	138,4	133,6	20
22266-30120516034	34	142,5	137,64	20
22266-30120516035	35	146,5	141,68	20
22266-30120516036	36	150,6	145,72	20
22266-30120516038	38	158,6	153,8	20
22266-30120516040	40	166,7	161,87	20
22266-30120516042	42	176,5	169,95	25
22266-30120516043	43	180,5	173,99	25
22266-30120516044	44	184,6	178,03	25
22266-30120516045	45	188,6	182,07	25
22266-30120516046	46	192,6	186,1	25
22266-30120516047	47	196,7	190,14	25
22266-30120516048	48	200,7	194,18	25
22266-30120516050	50	208,8	202,26	25
22266-30120516052	52	216,9	210,34	25
22266-30120516054	54	225	218,43	25

Sprockets triplex 1/2“ x 5/16“

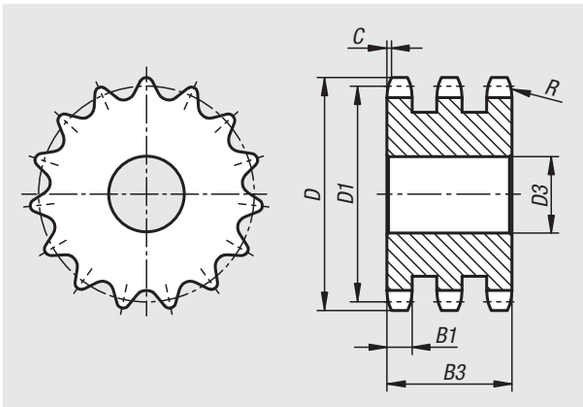
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22266-30120516055	55	229	222,46	25
22266-30120516056	56	233	226,5	25
22266-30120516057	57	237,1	230,54	25
22266-30120516060	60	249,2	242,66	25
22266-30120516062	62	257,3	250,75	25
22266-30120516065	65	269,4	262,86	25
22266-30120516068	68	281,5	274,99	25
22266-30120516070	70	289,6	283,07	25
22266-30120516072	72	297,7	291,16	25
22266-30120516075	75	309,8	303,27	25
22266-30120516076	76	313,9	307,33	25
22266-30120516080	80	330	323,48	25
22266-30120516085	85	350,2	343,69	25
22266-30120516090	90	370,4	363,9	25
22266-30120516095	95	390,7	384,11	25
22266-30120516100	100	410,9	404,31	25
22266-30120516114	114	467,4	460,9	25
22266-30120516125	125	511	505,37	25

Sprockets triplex 5/8“ x 3/8“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22266-30580308008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22266	10 B-3	5/8 x 3/8	15,875 x 9,65	16	1,6	9	42,1

Order No.	No. of teeth	D	D1	D3 max.
22266-30580308008	8	48,4	41,48	12
22266-30580308009	9	53,3	46,42	12
22266-30580308010	10	58,3	51,37	12
22266-30580308011	11	63,2	56,34	12
22266-30580308012	12	68,2	61,34	12
22266-30580308013	13	73,2	66,32	12
22266-30580308014	14	78,2	71,34	12
22266-30580308015	15	83,2	76,36	12
22266-30580308016	16	88,3	81,37	16
22266-30580308017	17	93,3	86,39	16
22266-30580308018	18	98,3	91,42	16
22266-30580308019	19	103,3	96,45	16
22266-30580308020	20	108,4	101,49	16
22266-30580308021	21	113,4	106,52	16
22266-30580308022	22	118,4	111,55	16
22266-30580308023	23	123,5	116,58	16
22266-30580308024	24	128,5	121,62	16
22266-30580308025	25	133,6	126,66	16
22266-30580308026	26	138,6	131,7	20
22266-30580308027	27	143,6	136,75	20

Order No.	No. of teeth	D	D1	D3 max.
22266-30580308028	28	148,7	141,78	20
22266-30580308029	29	153,7	146,83	20
22266-30580308030	30	158,8	151,87	20
22266-30580308032	32	168,9	161,95	20
22266-30580308033	33	173,9	167	20
22266-30580308034	34	178,9	172,05	20
22266-30580308035	35	184	177,1	20
22266-30580308036	36	189	182,15	25
22266-30580308037	37	194,1	187,2	25
22266-30580308038	38	199,1	192,24	25
22266-30580308039	39	204,2	197,29	25
22266-30580308040	40	209,2	202,34	25
22266-30580308041	41	215,8	207,39	25
22266-30580308042	42	220,8	212,44	25
22266-30580308044	44	230,9	222,53	25
22266-30580308045	45	236	227,58	25
22266-30580308046	46	241	236,63	25
22266-30580308048	48	251,1	242,73	25
22266-30580308050	50	261,2	252,82	25
22266-30580308052	52	271,3	262,92	25

Sprockets triplex 5/8“ x 3/8“

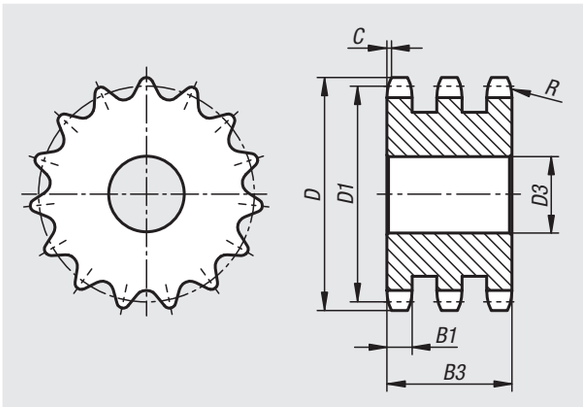
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22266-30580308055	55	286,5	278,08	25
22266-30580308057	57	296,6	288,18	25
22266-30580308060	60	311,7	303,32	25
22266-30580308064	64	331,9	323,53	30
22266-30580308065	65	337	328,58	30
22266-30580308070	70	362,2	353,84	30
22266-30580308075	75	387,5	379,09	30
22266-30580308076	76	392,5	384,16	30
22266-30580308080	80	412,7	404,35	30
22266-30580308090	90	463,3	454,88	30
22266-30580308095	95	488,5	480,14	30
22266-30580308114	114	584,5	576,13	30
22266-30580308125	125	640,1	631,71	30

Sprockets triplex 3/4“ x 7/16“

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22266-30340716008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22266	12 B-3	3/4 x 7/16	19,05 x 11,68	19	2	10,8	49,8

Order No.	No. of teeth	D	D1	D3 max.
22266-30340716008	8	58	49,78	12
22266-30340716009	9	63,9	55,7	12
22266-30340716010	10	69,8	61,64	12
22266-30340716011	11	75,8	67,61	16
22266-30340716012	12	81,8	73,5	16
22266-30340716013	13	87,8	79,59	16
22266-30340716014	14	93,8	85,61	16
22266-30340716015	15	99,8	91,63	16
22266-30340716016	16	105,8	97,65	20
22266-30340716017	17	111,9	103,67	20
22266-30340716018	18	117,9	109,71	20
22266-30340716019	19	123,9	115,75	20
22266-30340716020	20	130	121,78	20
22266-30340716021	21	136	127,82	20
22266-30340716022	22	142	133,86	20
22266-30340716023	23	148,1	139,9	20
22266-30340716024	24	154,1	145,94	20
22266-30340716025	25	160,2	152	20
22266-30340716026	26	166,2	158,04	20
22266-30340716027	27	172,3	164,09	20

Order No.	No. of teeth	D	D1	D3 max.
22266-30340716028	28	178,3	170,13	20
22266-30340716029	29	184,4	176,19	20
22266-30340716030	30	190,4	182,25	20
22266-30340716031	31	196,5	188,31	25
22266-30340716032	32	202,5	194,35	25
22266-30340716033	33	208,6	200,4	25
22266-30340716034	34	214,6	206,46	25
22266-30340716035	35	220,7	212,52	25
22266-30340716036	36	226,8	218,58	25
22266-30340716037	37	232,8	224,64	25
22266-30340716038	38	238,9	230,69	25
22266-30340716039	39	244,9	236,75	25
22266-30340716040	40	251	242,81	25
22266-30340716042	42	265	254,93	25
22266-30340716043	43	271,1	260,98	25
22266-30340716044	44	277,1	267,03	25
22266-30340716045	45	283,2	273,1	25
22266-30340716047	47	295,3	285,21	25
22266-30340716048	48	301,4	291,27	25
22266-30340716050	50	313,5	303,39	25

Sprockets triplex 3/4“ x 7/16“

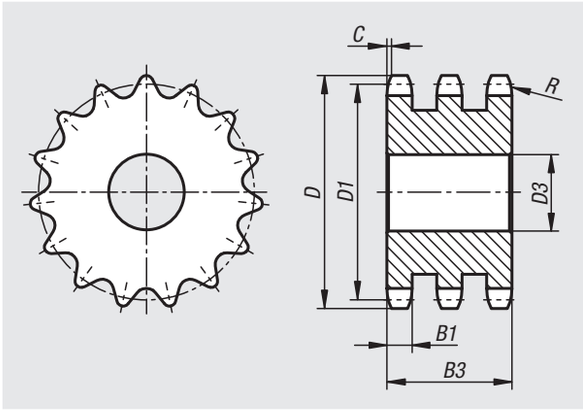
DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22266-30340716052	52	325,6	315,5	25
22266-30340716054	54	337,7	327,64	25
22266-30340716055	55	343,8	333,7	25
22266-30340716057	57	355,9	345,81	30
22266-30340716060	60	374,1	363,99	30
22266-30340716065	65	404,4	394,29	30
22266-30340716070	70	434,7	424,61	30
22266-30340716072	72	446,8	436,74	30
22266-30340716076	76	471,1	460,99	30
22266-30340716080	80	495,3	485,22	30
22266-30340716085	85	525,6	515,55	30
22266-30340716090	90	555,9	545,86	30
22266-30340716095	95	586,2	576,17	30
22266-30340716100	100	616,6	606,47	30
22266-30340716114	114	701,4	691,36	30
22266-30340716120	120	737,8	727,74	30
22266-30340716125	125	768,1	758,05	30

Sprockets triplex 1“ x 17,02 mm

DIN ISO 606





Material:
Low-carbon steel.

Version:
Bright, not hardened (cannot be hardened).

Sample order:
nlm 22266-31001702008

Note:
Sprockets for DIN ISO 606 roller chains. The sprockets are pre-bored.

Order No.	ISO No.	Pitch inch	Pitch mm	R	C	B1	B3
22266	16 B-3	1 x 17,02mm	25,4 x 17,02	26	2,5	15,8	79,6

Order No.	No. of teeth	D	D1	D3 max.
22266-31001702008	8	77,9	66,37	16
22266-31001702009	9	85,8	74,27	16
22266-31001702010	10	93,8	82,19	16
22266-31001702011	11	101,7	90,14	20
22266-31001702012	12	109,7	98,14	20
22266-31001702013	13	117,7	106,12	20
22266-31001702014	14	125,7	114,15	20
22266-31001702015	15	133,7	122,17	20
22266-31001702016	16	141,8	130,2	25
22266-31001702017	17	149,8	138,22	25
22266-31001702018	18	157,8	146,28	25
22266-31001702019	19	165,9	154,33	25
22266-31001702020	20	173,9	162,38	25
22266-31001702021	21	182	170,43	25
22266-31001702022	22	190,1	178,48	25
22266-31001702023	23	198,1	186,53	25
22266-31001702024	24	206,2	194,59	25
22266-31001702025	25	214,2	202,66	25
22266-31001702026	26	222,3	210,72	30
22266-31001702027	27	230,4	218,79	30

Order No.	No. of teeth	D	D1	D3 max.
22266-31001702028	28	238,4	226,85	30
22266-31001702029	29	246,5	234,92	30
22266-31001702030	30	254,6	243	30
22266-31001702031	31	262,6	251,08	30
22266-31001702032	32	270,7	259,13	30
22266-31001702033	33	278,8	267,21	30
22266-31001702034	34	286,9	275,28	30
22266-31001702035	35	294,9	283,36	30
22266-31001702036	36	303	291,44	30
22266-31001702038	38	319,2	307,59	30
22266-31001702040	40	335,3	323,73	30
22266-31001702042	42	353,7	339,9	30
22266-31001702044	44	369,8	356,06	30
22266-31001702045	45	377,9	364,12	30
22266-31001702046	46	386	372,21	30
22266-31001702048	48	402,1	388,36	30
22266-31001702050	50	418,3	404,52	30
22266-31001702052	52	434,5	420,67	40
22266-31001702055	55	458,7	444,93	40
22266-31001702057	57	474,9	461,07	40

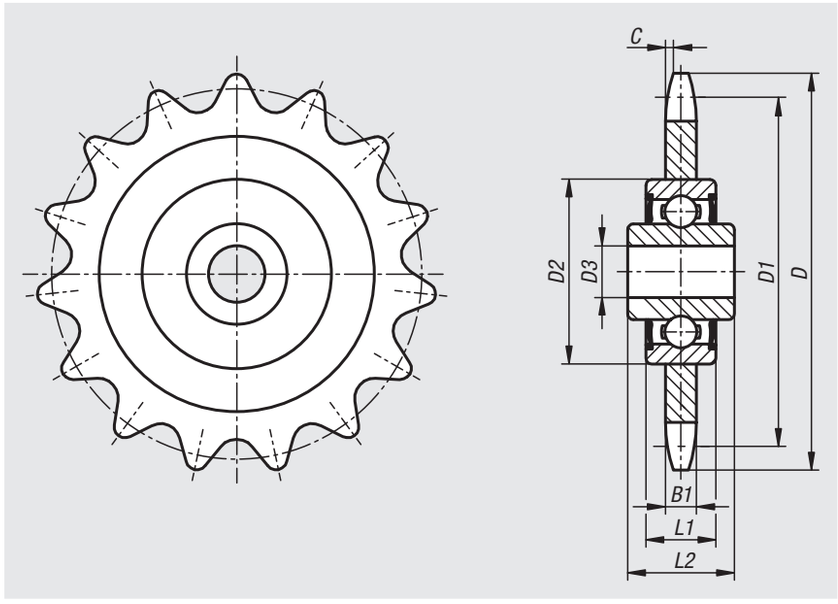
Sprockets triplex 1“ x 17,02 mm

DIN ISO 606

Order No.	No. of teeth	D	D1	D3 max.
22266-31001702060	60	499,1	485,32	40
22266-31001702065	65	539,5	525,73	40
22266-31001702070	70	579,9	566,14	40
22266-31001702072	72	596,1	582,32	40
22266-31001702076	76	628,4	614,65	40
22266-31001702080	80	660,7	646,96	40
22266-31001702085	85	701,2	687,4	40
22266-31001702090	90	741,6	727,81	40
22266-31001702095	95	782	768,22	40
22266-31001702114	114	935,6	921,82	40
22266-31001702125	125	1024,5	1010,73	40

Idler sprockets with ball bearing





Material:
Sprocket steel C45.
Ball bearing made from ball-bearing steel.

Version:
Sprocket black oxidised.

Sample order:
nlm 22280-038073221

Note:
Ready-to-install idler sprockets complete with ball bearing. For DIN ISO 606 roller chains. The ball bearings are sealed both sides, permanently lubricated and therefore maintenance-free.

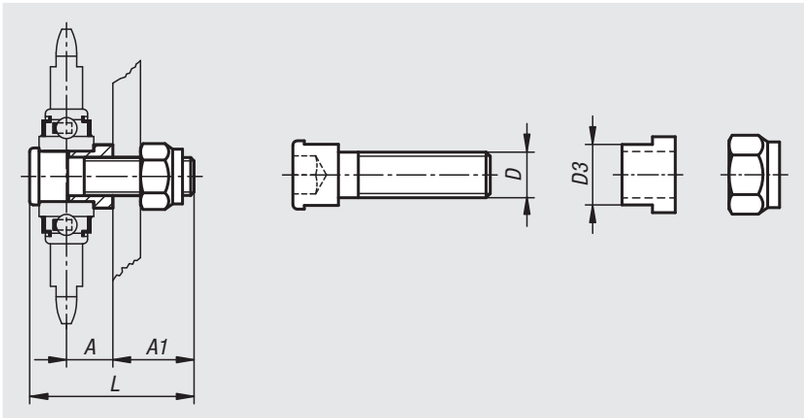
Temperature range:
-20°C to +120°C.

Order No.	ISO No.	Pitch inch	Pitch mm	No. of teeth	D	D1	D2	D3	B1	L1	L2	C
22280-038073221	06 B-1	3/8 x 7/32	9,525 x 5,72	21	67,6	63,91	40	16	5,3	12	18,3	1
22280-038073222	06 B-1	3/8 x 7/32	9,525 x 5,72	22	70,6	66,93	40	16	5,3	12	18,3	1
22280-012051614	08 B-1	1/2 x 5/16	12,7 x 7,75	14	61,9	57,07	40	16	7,2	12	18,3	1,3
22280-012051616	08 B-1	1/2 x 5/16	12,7 x 7,75	16	69,9	65,1	40	16	7,2	12	18,3	1,3
22280-012051618	08 B-1	1/2 x 5/16	12,7 x 7,75	18	78	73,14	40	16	7,2	12	18,3	1,3
22280-058030814	10 B-1	5/8 x 3/8	15,875 x 9,65	14	78,2	71,34	40	16	9,1	12	18,3	1,6
22280-058030815	10 B-1	5/8 x 3/8	15,875 x 9,65	15	83,2	76,36	40	16	9,1	12	18,3	1,6
22280-058030817	10 B-1	5/8 x 3/8	15,875 x 9,65	17	93,3	86,39	40	16	9,1	12	18,3	1,6
22280-034071613	12 B-1	3/4 x 7/16	19,05 x 11,68	13	87,8	79,59	40	16	11,1	12	18,3	2
22280-034071615	12 B-1	3/4 x 7/16	19,05 x 11,68	15	99,8	91,63	40	16	11,1	12	18,3	2
22280-100170212	16 B-1	1 x 17,02mm	25,4 x 17,02	12	109,7	98,14	47	20	16,2	14	17,7	2,5

Mounting screws

for idler sprockets





Material:
Steel C45.

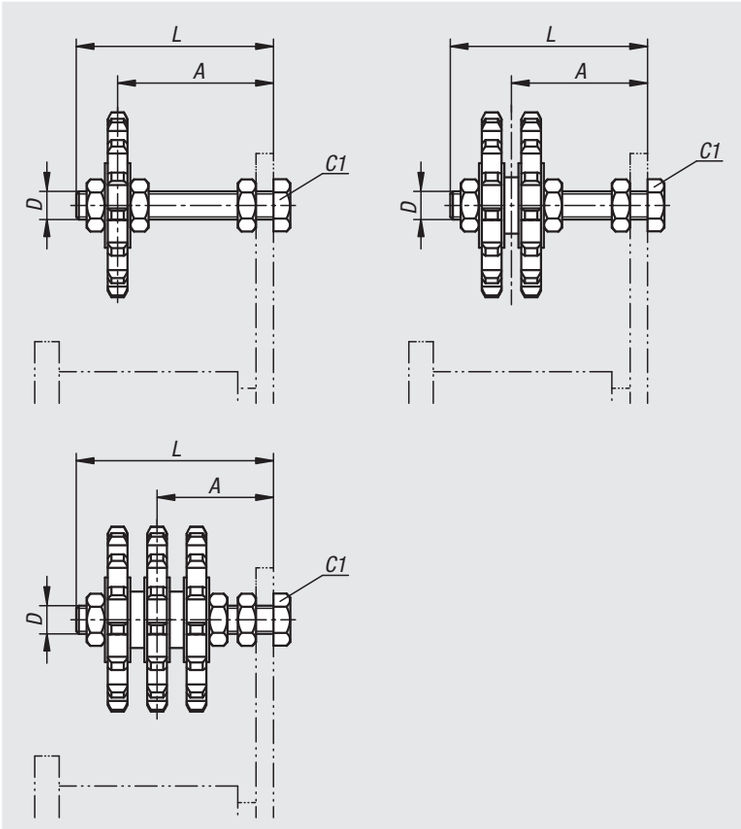
Version:
Electro zinc-plated.

Sample order:
nlm 22280-1216

Order No.	A	A1	D	D3	L	Suitable for
22280-1216	15	25	M12	16	52	idler sprocket to ISO 12 B-1
22280-1620	25	28	M16	20	66	idler sprocket from ISO 16 B-1

Sprocket sets





Material:
Sprocket steel.
Ball bearing chrome steel.
Screw and nut steel.

Version:
Sprocket teeth hardened to HRC 50, electro zinc-plated.
Ball bearing with sealing discs 2Z-C3.
Screw ISO 4017, grade 8.8, electro zinc-plated.
Nut ISO 4035, grade 8, electro zinc-plated.

Sample order:
nlm 22281-06110

Note:
For tensioning roller chains. The sprocket set can be combined with all tensioning elements to form a ready-to-install chain tensioner. The ball bearings are sealed both sides, permanently lubricated and maintenance-free.

The sprocket can be moved on the screw and thus adapted to the chain track. With the duplex and triplex version, precision spacer sleeves ensure correct chain guidance.

Rigid mounting without a tensioning element is also possible. Can also be used as an idler sprocket.

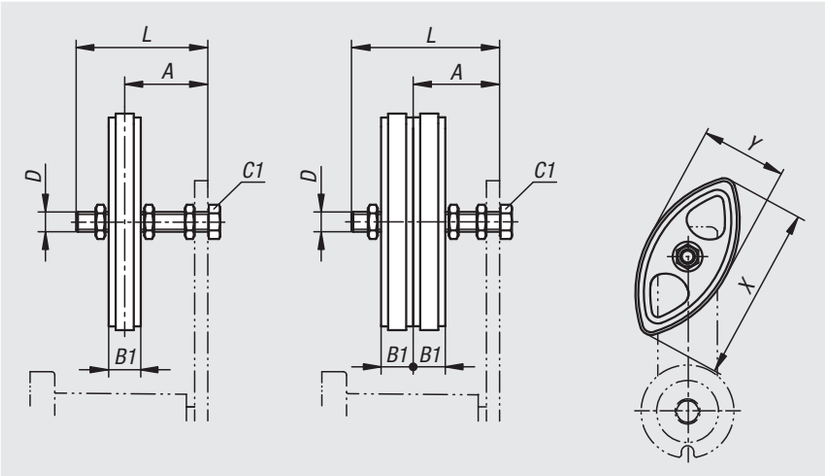
Temperature range:
-40 °C to +120 °C.



Order No.	Version	ISO No.	Pitch inch	Pitch mm	No. of teeth	A	D	L	Tightening torque of screw C1 Nm	Suitable for clamping element size
22281-06110	single	06 B-1	3/8 x 7/32	9,525 x 5,72	15	21 - 50	M10	60	20	2+3
22281-08110	single	08 B-1	1/2 x 5/16	12,7 x 7,75	15	21 - 50	M10	60	20	3
22281-10112	single	10 B-1	5/8 x 3/8	15,875 x 9,65	15	27 - 67	M12	80	35	4
22281-12112	single	12 B-1	3/4 x 7/16	19,05 x 11,68	15	27 - 67	M12	80	35	4
22281-12120	single	12 B-1	3/4 x 7/16	19,05 x 11,68	15	38 - 101	M20	120	160	5
22281-16120	single	16 B-1	1 x 17,02mm	25,4 x 17,02	13	38 - 101	M20	120	160	5
22281-06210	-	06 B-2	3/8 x 7/32	9,525 x 5,72	15	26 - 44	M10	60	20	2+3
22281-08210	-	08 B-2	1/2 x 5/16	12,7 x 7,75	15	28 - 42	M10	60	20	3
22281-10212	-	10 B-2	5/8 x 3/8	15,875 x 9,65	15	35 - 59	M12	80	35	4
22281-12212	-	12 B-2	3/4 x 7/16	19,05 x 11,68	15	37 - 57	M12	80	35	4
22281-12220	-	12 B-2	3/4 x 7/16	19,05 x 11,68	15	38 - 101	M20	120	160	5
22281-16220	-	16 B-2	1 x 17,02mm	25,4 x 17,02	13	48 - 92	M20	120	160	5
22281-06310	-	06 B-3	3/8 x 7/32	9,525 x 5,72	15	32 - 39	M10	60	20	3
22281-08312	-	08 B-3	1/2 x 5/16	12,7 x 7,75	15	41 - 53	M12	80	35	4
22281-10312	-	10 B-3	5/8 x 3/8	15,875 x 9,65	15	43 - 51	M12	80	35	4
22281-10320	-	10 B-3	5/8 x 3/8	15,875 x 9,65	15	55 - 85	M20	120	160	5
22281-12320	-	12 B-3	3/4 x 7/16	19,05 x 11,68	15	58 - 82	M20	120	160	5

Chain tensioner sets





Material:
Tensioner Vesconite® plastic.
Screw and nut steel.

Version:
Screw ISO 4017, grade 8.8, electro zinc-plated.
Nut ISO 4035, grade 8, electro zinc-plated.

Sample order:
nlm 22281-01-06108

Note:
For tensioning roller chains. The chain tensioner set can be combined with all tensioning elements to form a ready-to-install chain tensioner. The symmetrical design enables use on both sides. Large radii ensure very quiet running. The high-quality plastic does not require any lubrication.

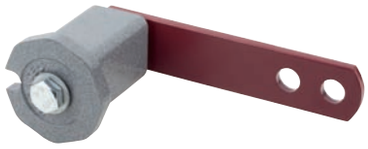
The maximum chain speed should not exceed 1.5 m/s in continuous use.

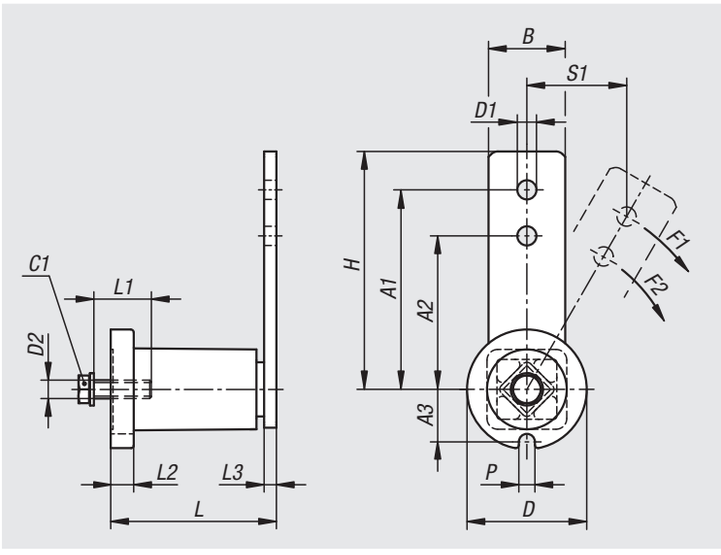
Temperature range:
-40 °C to +120 °C.



Order No.	Version	ISO No.	A	B1	D	L	X	Y	Tightening torque of screw C1 Nm	Suitable for clamping element size
22281-01-06108	single	06 B-1	21-34	10,2	M8	45	74	40	10	1
22281-01-08110	single	08 B-1	23-47	13,9	M10	60	96	50	20	2+3
22281-01-10110	single	10 B-1	25-48	16,5	M10	60	125	55	20	3
22281-01-12112	single	12 B-1	29-64	19,5	M12	80	147	80	35	4
22281-01-06208	-	06 B-2	26-29	10,2	M8	45	74	40	10	1
22281-01-08210	-	08 B-2	30-40	13,9	M10	60	96	50	20	2+3
22281-01-10210	-	10 B-2	34-47	16,5	M10	60	125	55	20	3
22281-01-12212	-	12 B-2	39-54	19,5	M12	80	147	80	35	4

Clamping elements





Material:
Housing sintered steel, from size 5 EN-GJS-400-15.
Clamping arm S235JR steel.
Buffer natural rubber.
Screw steel.

Version:
Steel parts painted.
Screw ISO 4762, grade 8.8, electro zinc-plated.

Sample order:
nlm 22281-10-1

Note:
Clamping element with integrated highly elastic, shape-retaining natural rubber buffer.

Together with a chain tensioner set, sprocket set or a tension pulley, the clamping element makes a ready-to-install tensioning unit suitable for tensioning chain and belt drives. Suitable for both tensioning directions. The clamping elements are maintenance-free and tear-off resistant.

The clamping element is fastened to the machine component through a bore. If necessary, a heavy-duty dowel pin can be inserted in the positioning notch “P” for torque support.

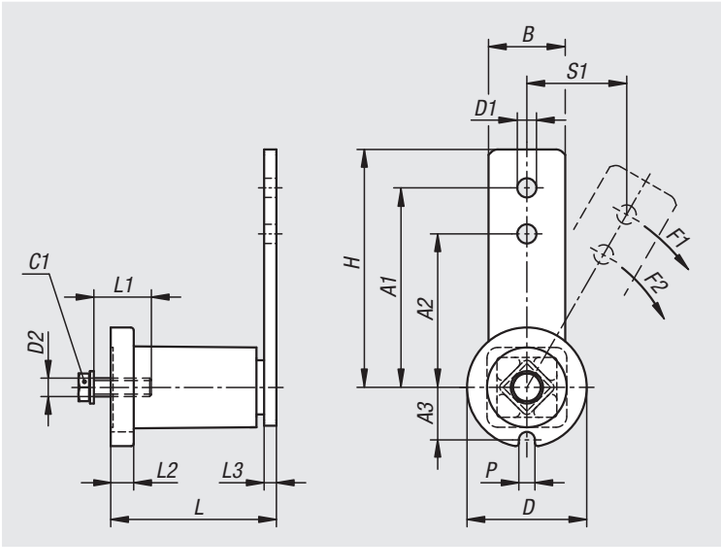
Temperature range:
-55 °C to +85 °C.



Order No.	Size	A1	A2	A3	B	D	D1	D2	H	L	L1	L2	L3	P	S1	Tightening torque of screw C1 Nm	F1 N	F2 N
22281-10-1	1	80	60	16,6	20	37,5	8,5	M6	90	52+1 -0,5	25	6	5	8	42	10	90	110
22281-10-2	2	100	80	19,5	25	48	10,5	M8	115	63+1 -0,5	25	8	5	8,5	53	25	140	170
22281-10-3	3	100	80	24,5	30	60	10,5	M10	115	78+1,5 -0,5	30	10	6	8,5	53	49	320	430
22281-10-4	4	130	100	34	50	78	12,5	M12	155	108+2 -0,5	40	14	8	10,5	69	86	820	1050
22281-10-5	5	175	140	42	60	100	20,5	M16	205	145+2 -0,5	40	15	10	12,5	93	210	1500	1880

Clamping elements stainless steel





Material:
Housing 1.4308 stainless steel, from size 5 1.4301.
Clamping arm 1.4301 stainless steel.
Buffer natural rubber.
Screw stainless steel A2.

Version:
Housing and lever arm bright.
Screw ISO 4017, grade 70, bright.

Sample order:
nlm 22281-14-1

Note:
Clamping element with integrated highly elastic, shape-retaining natural rubber buffer.

Together with a chain tensioner set, sprocket set or a tension pulley, the clamping element makes a ready-to-install tensioning unit suitable for tensioning chain and belt drives. Suitable for both tensioning directions. The clamping elements are maintenance-free and tear-off resistant.

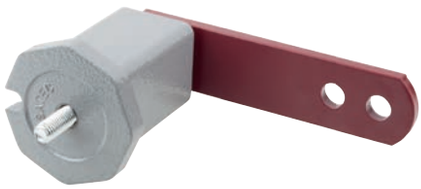
The clamping element is fastened to the machine component through a bore. If necessary, a heavy-duty dowel pin can be inserted in the positioning notch “P” for torque support.

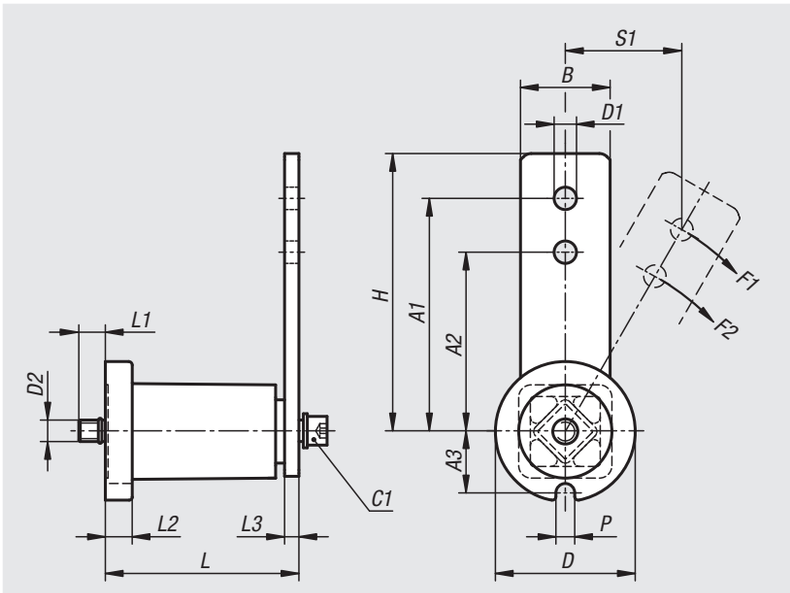
Temperature range:
-55 °C to +85 °C.



Order No.	Size	A1	A2	A3	B	D	D1	D2	H	L	L1	L2	L3	P	S1	Tightening torque of screw C1 Nm	F1 N	F2 N
22281-14-1	1	80	60	16,6	20	37,5	8,5	M6	90	52+1 -0,5	25	6	5	8	42	10	90	110
22281-14-2	2	100	80	19,5	25	48	10,5	M8	115	63+1 -0,5	25	8	5	8,5	53	25	140	170
22281-14-3	3	100	80	24,5	30	60	10,5	M10	115	78+1,5 -0,5	30	10	6	8,5	53	48	320	430
22281-14-4	4	130	100	34	50	78	12,5	M12	155	108+2 -0,5	40	14	8	10,5	69	82	820	1050
22281-14-5	5	175	135	42	60	98	20,5	M16	205	130+2 -0,5	40	15	8	12	93	199	1500	1940

Clamping elements with front fastening





Material:
Housing sintered steel, from size 5 EN-GJS-400-15.
Clamping arm S235JR steel.
Buffer natural rubber.
Screw steel.

Version:
Steel parts painted.
Screw ISO 4762, grade 8.8, electro zinc-plated.

Sample order:
nlm 22281-16-2

Note:
Clamping element with integrated highly elastic, shape-retaining natural rubber buffer.

Together with a chain tensioner set, sprocket set or a tension pulley, the clamping element makes a ready-to-install tensioning unit suitable for tensioning chain and belt drives. Suitable for both tensioning directions. The clamping elements are maintenance-free and tear-off resistant.

The clamping element is fastened to the machine component with a screw. If necessary, a heavy-duty dowel pin can be inserted in the positioning notch “P” for torque support.

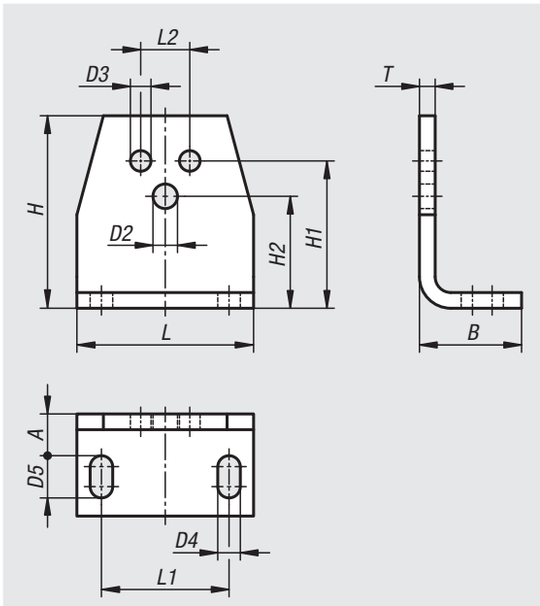
Temperature range:
-55 °C to +85 °C.



Order No.	Size	A1	A2	A3	B	D	D1	D2	H	L	L1	L2	L3	P	S1	Tightening torque of screw C1 Nm	F1 N	F2 N
22281-16-2	2	100	80	19,5	25	48	10,5	M6	115	63+1 -0,5	13	8	5	8,5	53	10	140	170
22281-16-3	3	100	80	24,5	30	60	10,5	M8	115	78+1,5 -0,5	17	10	6	8,5	53	25	320	430
22281-16-4	4	130	100	34	50	78	12,5	M10	155	108+2 -0,5	17	14	8	10,5	69	49	820	1050
22281-16-5	5	175	140	42	60	100	20,5	M12	205	145+2 -0,5	10	15	10	12,5	93	145	1500	1880

Angle bracket for clamping elements





Material:
Steel.

Version:
Electro zinc-plated (size 5 painted).

Sample order:
nlm 22281-20-1

Note:
The angle bracket enables easy mounting of the clamping elements directly on the machine component. The bore D2 serves to hold the clamping element. The clamping element can be mounted on the front or rear of the bracket.

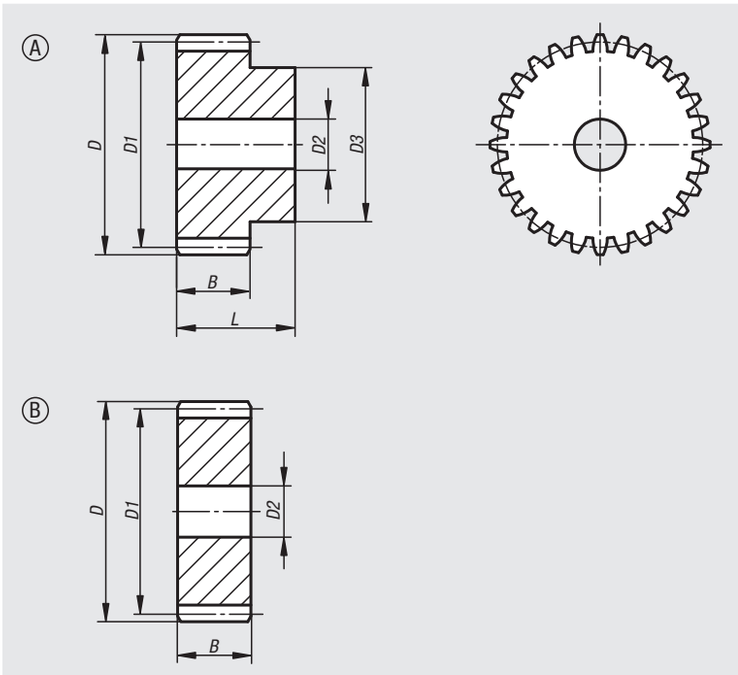
The bores D3 enable the bracket to used for other applications.

Order No.	Size	A	B	D2	D3	D4	D5	H	H1	H2	L	L1	L2	T	Suitable for clamping element size
22281-20-1	1	12	30	6,5	5,5	7	13	46	35	27	50	30	10	4	1
22281-20-2	2	14	32	8,5	6,5	7	13	58	44	34	60	40	12	6	2
22281-20-3	3	16	38	10,5	8,5	9,5	16	75	55	45	70	50	20	6	3
22281-20-4	4	21	52	12,5	10,5	11,5	22	98	75	57	90	65	25	8	4
22281-20-5	5	21	55	16,5	12,5	14	24	116	85	66	110	80	35	8	5

Spur gears in steel, module 1

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22400-0110150012

Note:
Up to 70 teeth with hub one side, from 72 teeth disc form.
The spur gears have a centre or pilot hole.

Drawing reference:
Form A: with hub
Form B: without hub

Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0110150012	A	12	14	12	6	9	15	25
22400-0110150013	A	13	15	13	-	10	15	25
22400-0110150014	A	14	16	14	-	11	15	25
22400-0110150015	A	15	17	15	-	12	15	25
22400-0110150016	A	16	18	16	-	13	15	25
22400-0110150017	A	17	19	17	-	14	15	25
22400-0110150018	A	18	20	18	8	15	15	25
22400-0110150019	A	19	21	19	8	15	15	25
22400-0110150020	A	20	22	20	8	16	15	25
22400-0110150021	A	21	23	21	8	16	15	25
22400-0110150022	A	22	24	22	8	16	15	25
22400-0110150023	A	23	25	23	8	18	15	25
22400-0110150024	A	24	26	24	10	20	15	25
22400-0110150025	A	25	27	25	10	20	15	25
22400-0110150026	A	26	28	26	10	20	15	25
22400-0110150027	A	27	29	27	10	20	15	25
22400-0110150028	A	28	30	28	10	20	15	25
22400-0110150029	A	29	31	29	10	20	15	25
22400-0110150030	A	30	32	30	10	20	15	25
22400-0110150031	A	31	33	31	10	25	15	25
22400-0110150032	A	32	34	32	10	25	15	25
22400-0110150033	A	33	35	33	10	25	15	25
22400-0110150034	A	34	36	34	10	25	15	25
22400-0110150035	A	35	37	35	10	25	15	25
22400-0110150036	A	36	38	36	10	25	15	25
22400-0110150037	A	37	39	37	10	25	15	25
22400-0110150038	A	38	40	38	10	25	15	25

Spur gears in steel, module 1

toothing milled, straight teeth, engagement angle 20°

Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0110150039	A	39	41	39	10	25	15	25
22400-0110150040	A	40	42	40	10	25	15	25
22400-0110150041	A	41	43	41	10	30	15	25
22400-0110150042	A	42	44	42	10	30	15	25
22400-0110150043	A	43	45	43	10	30	15	25
22400-0110150044	A	44	46	44	10	30	15	25
22400-0110150045	A	45	47	45	10	30	15	25
22400-0110150046	A	46	48	46	10	30	15	25
22400-0110150047	A	47	49	47	10	30	15	25
22400-0110150048	A	48	50	48	10	30	15	25
22400-0110150049	A	49	51	49	10	30	15	25
22400-0110150050	A	50	52	50	12	30	15	25
22400-0110150051	A	51	53	51	12	40	15	25
22400-0110150052	A	52	54	52	12	40	15	25
22400-0110150053	A	53	55	53	12	40	15	25
22400-0110150054	A	54	56	54	12	40	15	25
22400-0110150055	A	55	57	55	12	40	15	25
22400-0110150056	A	56	58	56	12	40	15	25
22400-0110150057	A	57	59	57	12	40	15	25
22400-0110150058	A	58	60	58	12	40	15	25
22400-0110150059	A	59	61	59	12	40	15	25
22400-0110150060	A	60	62	60	12	40	15	25
22400-0110150061	A	61	63	61	12	50	15	25
22400-0110150062	A	62	64	62	12	50	15	25
22400-0110150063	A	63	65	63	12	50	15	25
22400-0110150064	A	64	66	64	12	50	15	25
22400-0110150065	A	65	67	65	12	50	15	25
22400-0110150066	A	66	68	66	12	50	15	25
22400-0110150067	A	67	69	67	12	50	15	25
22400-0110150068	A	68	70	68	12	50	15	25
22400-0110150069	A	69	71	69	12	50	15	25
22400-0110150070	A	70	72	70	12	50	15	25

Order No.	Form	No. of teeth	D	D1	D2 max.	B
22400-0210150072	B	72	74	72	12	15
22400-0210150075	B	75	77	75	12	15
22400-0210150076	B	76	78	76	12	15
22400-0210150080	B	80	82	80	12	15
22400-0210150085	B	85	87	85	12	15
22400-0210150090	B	90	92	90	12	15
22400-0210150095	B	95	97	95	12	15
22400-0210150100	B	100	102	100	12	15
22400-0210150110	B	110	112	110	12	15
22400-0210150114	B	114	116	114	12	15
22400-0210150120	B	120	122	120	12	15
22400-0210150127	B	127	129	127	12	15

Spur gears in steel, module 1.5

toothing milled, straight teeth, engagement angle 20°



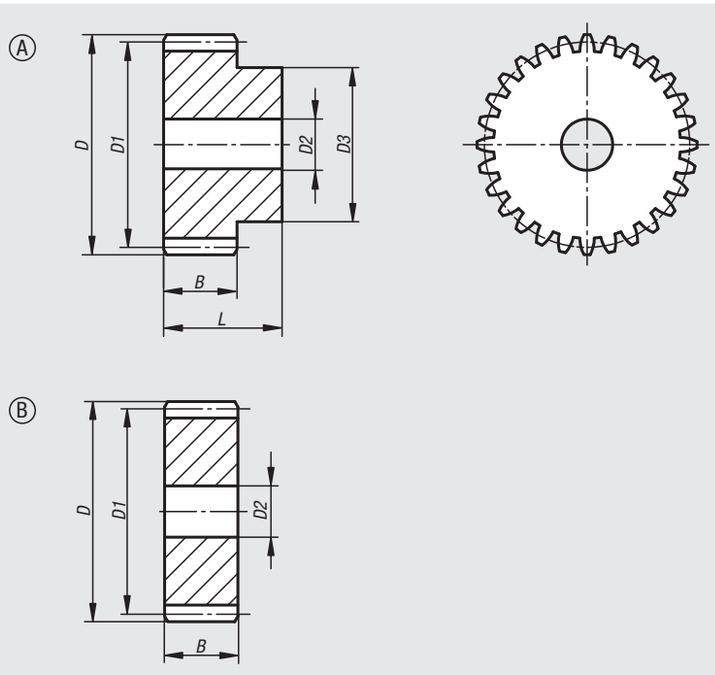
Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22400-0115170012

Note:
Up to 70 teeth with hub one side, from 72 teeth disc form.
The spur gears have a centre or pilot hole.

Drawing reference:
Form A: with hub
Form B: without hub



Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0115170012	A	12	21	18	8	14	17	30
22400-0115170013	A	13	22,5	19,5	8	15	17	30
22400-0115170014	A	14	24	21	8	17	17	30
22400-0115170015	A	15	25,5	22,5	8	18	17	30
22400-0115170016	A	16	27	24	8	19	17	30
22400-0115170017	A	17	28,5	25,5	8	20	17	30
22400-0115170018	A	18	30	27	8	20	17	30
22400-0115170019	A	19	31,5	28,5	8	20	17	30
22400-0115170020	A	20	33	30	8	25	17	30
22400-0115170021	A	21	34,5	31,5	10	25	17	30
22400-0115170022	A	22	36	33	10	25	17	30
22400-0115170023	A	23	37,5	34,5	10	25	17	30
22400-0115170024	A	24	39	36	10	25	17	30
22400-0115170025	A	25	40,5	37,5	10	25	17	30
22400-0115170026	A	26	42	39	12	30	17	30
22400-0115170027	A	27	43,5	40,5	12	30	17	30
22400-0115170028	A	28	45	42	12	30	17	30
22400-0115170029	A	29	46,5	43,5	12	30	17	30
22400-0115170030	A	30	48	45	12	30	17	30
22400-0115170031	A	31	49,5	46,5	12	35	17	30
22400-0115170032	A	32	51	48	12	35	17	30
22400-0115170033	A	33	52,5	49,5	12	35	17	30
22400-0115170034	A	34	54	51	12	35	17	30
22400-0115170035	A	35	55,5	52,5	12	35	17	30
22400-0115170036	A	36	57	54	12	35	17	30
22400-0115170037	A	37	58,5	55,5	12	40	17	30
22400-0115170038	A	38	60	57	12	40	17	30

Spur gears in steel, module 1.5

toothing milled, straight teeth, engagement angle 20°

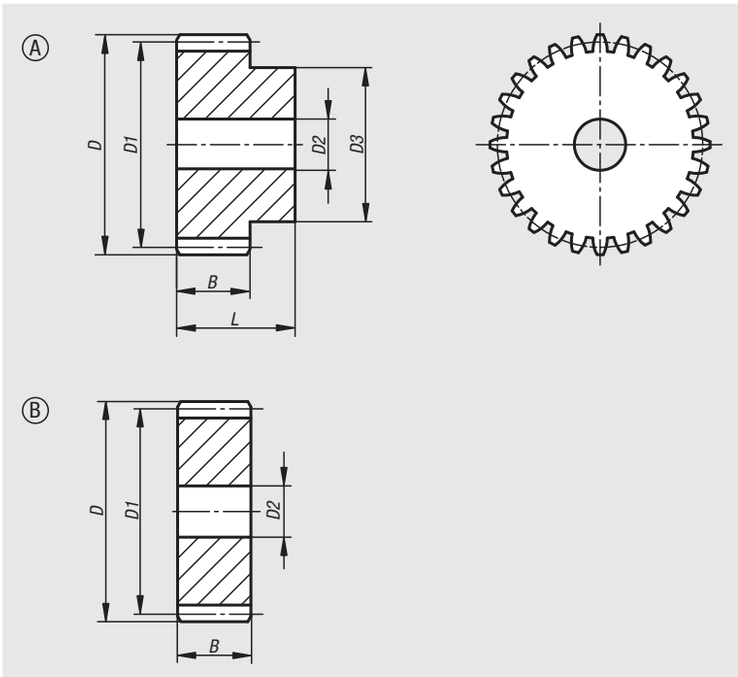
Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0115170039	A	39	61,5	58,5	12	40	17	30
22400-0115170040	A	40	63	60	12	40	17	30
22400-0115170041	A	41	64,5	61,5	12	40	17	30
22400-0115170042	A	42	66	63	12	50	17	30
22400-0115170043	A	43	67,5	64,5	12	50	17	30
22400-0115170044	A	44	69	66	12	50	17	30
22400-0115170045	A	45	70,5	67,5	12	50	17	30
22400-0115170046	A	46	72	69	14	50	17	30
22400-0115170047	A	47	73,5	70,5	14	50	17	30
22400-0115170048	A	48	75	72	14	50	17	30
22400-0115170049	A	49	76,5	73,5	14	50	17	30
22400-0115170050	A	50	78	75	14	50	17	30
22400-0115170051	A	51	79,5	76,5	14	60	17	30
22400-0115170052	A	52	81	78	14	60	17	30
22400-0115170053	A	53	82,5	79,5	14	60	17	30
22400-0115170054	A	54	84	81	14	60	17	30
22400-0115170055	A	55	85,5	82,5	14	60	17	30
22400-0115170056	A	56	87	84	20	60	17	30
22400-0115170057	A	57	88,5	85,5	20	60	17	30
22400-0115170058	A	58	90	87	20	60	17	30
22400-0115170059	A	59	91,5	88,5	20	60	17	30
22400-0115170060	A	60	93	90	20	60	17	30
22400-0115170061	A	61	94,5	91,5	20	70	17	30
22400-0115170062	A	62	96	93	20	70	17	30
22400-0115170063	A	63	97,5	94,5	20	70	17	30
22400-0115170064	A	64	99	96	20	70	17	30
22400-0115170065	A	65	100,5	97,5	20	70	17	30
22400-0115170066	A	66	102	99	20	70	17	30
22400-0115170067	A	67	103,5	100,5	20	70	17	30
22400-0115170068	A	68	105	102	20	70	17	30
22400-0115170069	A	69	106,5	103,5	20	70	17	30
22400-0115170070	A	70	108	105	20	70	17	30

Order No.	Form	No. of teeth	D	D1	D2 max.	B
22400-0215170072	B	72	111	108	20	17
22400-0215170075	B	75	115,5	112,5	20	17
22400-0215170076	B	76	117	114	20	17
22400-0215170080	B	80	123	120	20	17
22400-0215170085	B	85	130,5	127,5	20	17
22400-0215170090	B	90	138	135	20	17
22400-0215170095	B	95	145,5	142,5	20	17
22400-0215170100	B	100	153	150	20	17
22400-0215170110	B	110	168	165	20	17
22400-0215170114	B	114	174	171	20	17
22400-0215170120	B	120	183	180	20	17
22400-0215170127	B	127	193,5	190,5	20	17

Spur gears in steel, module 2

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22400-0120200012

Note:
Up to 70 teeth with hub one side, from 72 teeth disc form.
The spur gears have a centre or pilot hole.

Drawing reference:
Form A: with hub
Form B: without hub

Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0120200012	A	12	28	24	10	18	20	35
22400-0120200013	A	13	30	26	10	20	20	35
22400-0120200014	A	14	32	28	10	22	20	35
22400-0120200015	A	15	34	30	10	24	20	35
22400-0120200016	A	16	36	32	10	25	20	35
22400-0120200017	A	17	38	34	10	25	20	35
22400-0120200018	A	18	40	36	10	25	20	35
22400-0120200019	A	19	42	38	10	25	20	35
22400-0120200020	A	20	44	40	10	30	20	35
22400-0120200021	A	21	46	42	12	30	20	35
22400-0120200022	A	22	48	44	12	30	20	35
22400-0120200023	A	23	50	46	12	30	20	35
22400-0120200024	A	24	52	48	12	35	20	35
22400-0120200025	A	25	54	50	12	35	20	35
22400-0120200026	A	26	56	52	12	40	20	35
22400-0120200027	A	27	58	54	12	40	20	35
22400-0120200028	A	28	60	56	12	40	20	35
22400-0120200029	A	29	62	58	14	40	20	35
22400-0120200030	A	30	64	60	14	40	20	35
22400-0120200031	A	31	66	62	14	45	20	35
22400-0120200032	A	32	68	64	14	45	20	35
22400-0120200033	A	33	70	66	14	45	20	35
22400-0120200034	A	34	72	68	14	45	20	35
22400-0120200035	A	35	74	70	14	45	20	35
22400-0120200036	A	36	76	72	14	45	20	35
22400-0120200037	A	37	78	74	14	50	20	35
22400-0120200038	A	38	80	76	14	50	20	35

Spur gears in steel, module 2

toothing milled, straight teeth, engagement angle 20°

Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0120200039	A	39	82	78	14	50	20	35
22400-0120200040	A	40	84	80	14	50	20	35
22400-0120200041	A	41	86	82	20	55	20	35
22400-0120200042	A	42	88	84	20	55	20	35
22400-0120200043	A	43	90	86	20	55	20	35
22400-0120200044	A	44	92	88	20	60	20	35
22400-0120200045	A	45	94	90	20	60	20	35
22400-0120200046	A	46	96	92	20	60	20	35
22400-0120200047	A	47	98	94	20	70	20	35
22400-0120200048	A	48	100	96	20	70	20	35
22400-0120200049	A	49	102	98	20	70	20	35
22400-0120200050	A	50	104	100	20	70	20	35
22400-0120200051	A	51	106	102	20	70	20	35
22400-0120200052	A	52	108	104	20	70	20	35
22400-0120200053	A	53	110	106	20	70	20	35
22400-0120200054	A	54	112	108	20	70	20	35
22400-0120200055	A	55	114	110	20	70	20	35
22400-0120200056	A	56	116	112	20	70	20	35
22400-0120200057	A	57	118	114	20	70	20	35
22400-0120200058	A	58	120	116	20	70	20	35
22400-0120200059	A	59	122	118	20	70	20	35
22400-0120200060	A	60	124	120	20	70	20	35
22400-0120200061	A	61	126	122	20	80	20	35
22400-0120200062	A	62	128	124	20	80	20	35
22400-0120200063	A	63	130	126	20	80	20	35
22400-0120200064	A	64	132	128	20	80	20	35
22400-0120200065	A	65	134	130	20	80	20	35
22400-0120200066	A	66	136	132	20	80	20	35
22400-0120200067	A	67	138	134	20	80	20	35
22400-0120200068	A	68	140	136	20	80	20	35
22400-0120200069	A	69	142	138	20	80	20	35
22400-0120200070	A	70	144	140	20	80	20	35

Order No.	Form	No. of teeth	D	D1	D2 max.	B
22400-0220200072	B	72	148	144	20	20
22400-0220200075	B	75	154	150	20	20
22400-0220200076	B	76	156	152	20	20
22400-0220200080	B	80	164	160	20	20
22400-0220200085	B	85	174	170	20	20
22400-0220200090	B	90	184	180	20	20
22400-0220200095	B	95	194	190	20	20
22400-0220200100	B	100	204	200	20	20
22400-0220200110	B	110	224	220	20	20
22400-0220200114	B	114	232	228	20	20
22400-0220200120	B	120	244	240	20	20
22400-0220200127	B	127	258	254	20	20

Spur gears in steel, module 2.5

toothing milled, straight teeth, engagement angle 20°



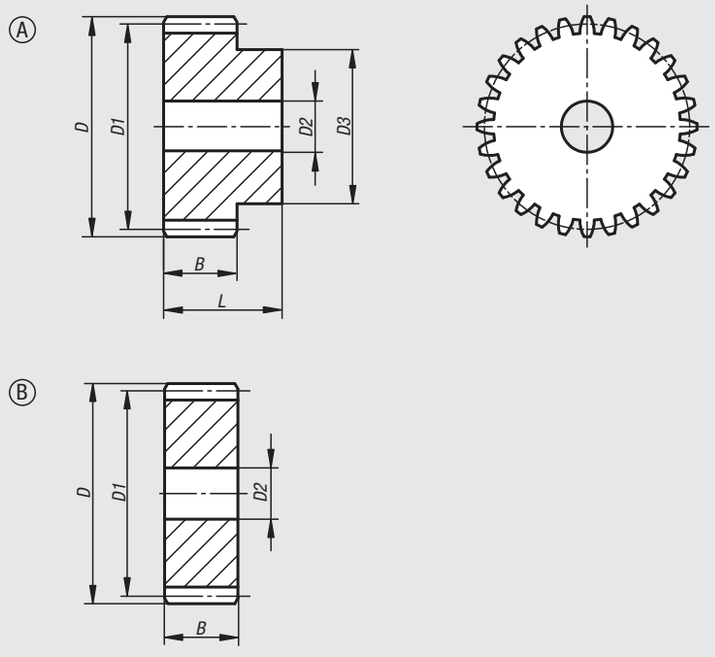
Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22400-0125250012

Note:
Up to 60 teeth with hub, from 65 teeth disc form.

Drawing reference:
Form A: with hub
Form B: without hub



Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0125250012	A	12	35	30	10	22	25	45
22400-0125250013	A	13	37,5	32,5	10	25	25	45
22400-0125250014	A	14	40	35	10	28	25	45
22400-0125250015	A	15	42,5	37,5	10	30	25	45
22400-0125250016	A	16	45	40	12	32	25	45
22400-0125250017	A	17	47,5	42,5	12	35	25	45
22400-0125250018	A	18	50	45	12	35	25	45
22400-0125250019	A	19	52,5	47,5	12	35	25	45
22400-0125250020	A	20	55	50	12	40	25	45
22400-0125250021	A	21	57,5	52,5	14	40	25	45
22400-0125250022	A	22	60	55	14	45	25	45
22400-0125250023	A	23	62,5	57,5	14	45	25	45
22400-0125250024	A	24	65	60	14	45	25	45
22400-0125250025	A	25	67,5	62,5	14	50	25	45
22400-0125250026	A	26	70	65	14	50	25	45
22400-0125250027	A	27	72,5	67,5	14	50	25	45
22400-0125250028	A	28	75	70	14	50	25	45
22400-0125250029	A	29	77,5	72,5	14	50	25	45
22400-0125250030	A	30	80	75	14	55	25	45

Spur gears in steel, module 2.5

toothing milled, straight teeth, engagement angle 20°

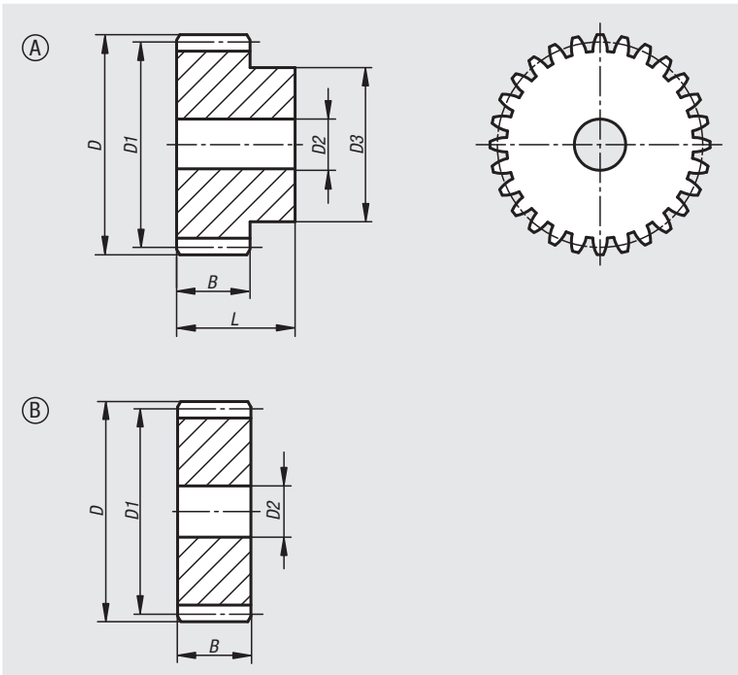
Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0125250031	A	31	82,5	77,5	20	55	25	45
22400-0125250032	A	32	85	80	20	55	25	45
22400-0125250033	A	33	87,5	82,5	20	55	25	45
22400-0125250034	A	34	90	85	20	55	25	45
22400-0125250035	A	35	92,5	87,5	20	60	25	45
22400-0125250036	A	36	95	90	20	60	25	45
22400-0125250037	A	37	97,5	92,5	20	60	25	45
22400-0125250038	A	38	100	95	20	60	25	45
22400-0125250039	A	39	102,5	97,5	20	60	25	45
22400-0125250040	A	40	105	100	20	70	25	45
22400-0125250041	A	41	107,5	102,5	20	70	25	45
22400-0125250042	A	42	110	105	20	70	25	45
22400-0125250043	A	43	112,5	107,5	20	70	25	45
22400-0125250044	A	44	115	110	20	70	25	45
22400-0125250045	A	45	117,5	112,5	20	70	25	45
22400-0125250046	A	46	120	115	20	70	25	45
22400-0125250047	A	47	122,5	117,5	20	80	25	45
22400-0125250048	A	48	125	120	20	80	25	45
22400-0125250049	A	49	127,5	122,5	20	80	25	45
22400-0125250050	A	50	130	125	20	80	25	45
22400-0125250051	A	51	132,5	127,5	20	80	25	45
22400-0125250052	A	52	135	130	20	90	25	45
22400-0125250053	A	53	137,5	132,5	20	90	25	45
22400-0125250054	A	54	140	135	20	90	25	45
22400-0125250055	A	55	142,5	137,5	20	90	25	45
22400-0125250056	A	56	145	140	20	100	25	45
22400-0125250057	A	57	147,5	142,5	20	100	25	45
22400-0125250058	A	58	150	145	20	100	25	45
22400-0125250059	A	59	152,5	147,5	20	100	25	45
22400-0125250060	A	60	155	150	20	100	25	45

Order No.	Form	No. of teeth	D	D1	D2 max.	B
22400-0225250065	B	65	167,5	162,5	20	25
22400-0225250070	B	70	180	175	20	25
22400-0225250072	B	72	185	180	20	25
22400-0225250075	B	75	192,5	187,5	20	25
22400-0225250076	B	76	195	190	20	25
22400-0225250080	B	80	205	200	25	25
22400-0225250085	B	85	217,5	212,5	25	25
22400-0225250090	B	90	230	225	25	25
22400-0225250095	B	95	242,5	237,5	25	25
22400-0225250100	B	100	255	250	25	25
22400-0225250110	B	110	280	275	25	25
22400-0225250114	B	114	290	285	25	25
22400-0225250120	B	120	305	300	25	25
22400-0225250127	B	127	322,5	317,5	25	25

Spur gears in steel, module 3

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22400-0130300012

Note:
Up to 48 teeth with hub, from 50 teeth disc form.

Drawing reference:
Form A: with hub
Form B: without hub

Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0130300012	A	12	42	36	12	27	30	50
22400-0130300013	A	13	45	39	12	30	30	50
22400-0130300014	A	14	48	42	12	33	30	50
22400-0130300015	A	15	51	45	12	35	30	50
22400-0130300016	A	16	54	48	14	38	30	50
22400-0130300017	A	17	57	51	14	42	30	50
22400-0130300018	A	18	60	54	14	45	30	50
22400-0130300019	A	19	63	57	14	45	30	50
22400-0130300020	A	20	66	60	14	45	30	50
22400-0130300021	A	21	69	63	20	45	30	50
22400-0130300022	A	22	72	66	20	50	30	50
22400-0130300023	A	23	75	69	20	50	30	50
22400-0130300024	A	24	78	72	20	50	30	50

Spur gears in steel, module 3

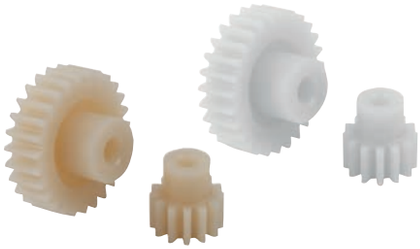
toothing milled, straight teeth, engagement angle 20°

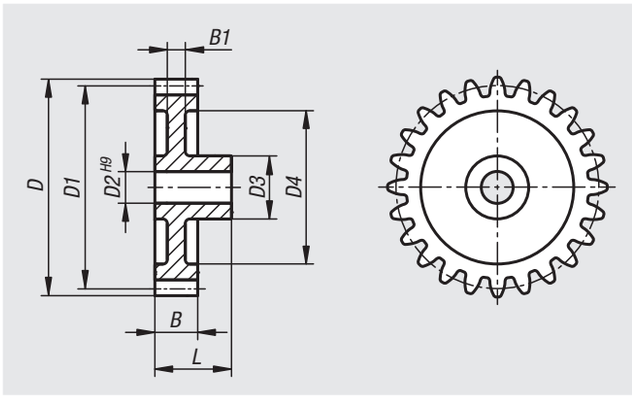
Order No.	Form	No. of teeth	D	D1	D2 max.	D3	B	L
22400-0130300025	A	25	81	75	20	60	30	50
22400-0130300026	A	26	84	78	20	60	30	50
22400-0130300027	A	27	87	81	20	60	30	50
22400-0130300028	A	28	90	84	20	60	30	50
22400-0130300029	A	29	93	87	20	60	30	50
22400-0130300030	A	30	96	90	20	60	30	50
22400-0130300031	A	31	99	93	20	60	30	50
22400-0130300032	A	32	102	96	20	70	30	50
22400-0130300033	A	33	105	99	20	70	30	50
22400-0130300034	A	34	108	102	20	70	30	50
22400-0130300035	A	35	111	105	20	70	30	50
22400-0130300036	A	36	114	108	20	70	30	50
22400-0130300037	A	37	117	111	20	70	30	50
22400-0130300038	A	38	120	114	20	80	30	50
22400-0130300039	A	39	123	117	20	80	30	50
22400-0130300040	A	40	126	120	20	80	30	50
22400-0130300041	A	41	129	123	20	80	30	50
22400-0130300042	A	42	132	126	20	80	30	50
22400-0130300043	A	43	135	129	20	80	30	50
22400-0130300044	A	44	138	132	20	90	30	50
22400-0130300045	A	45	141	135	20	90	30	50
22400-0130300046	A	46	144	138	20	90	30	50
22400-0130300047	A	47	147	141	20	100	30	50
22400-0130300048	A	48	150	144	20	100	30	50

Order No.	Form	No. of teeth	D	D1	D2 max.	B
22400-0230300050	B	50	156	150	20	30
22400-0230300052	B	52	162	156	20	30
22400-0230300055	B	55	171	165	20	30
22400-0230300057	B	57	177	171	20	30
22400-0230300060	B	60	186	180	20	30
22400-0230300065	B	65	201	195	20	30
22400-0230300070	B	70	216	210	25	30
22400-0230300072	B	72	222	216	25	30
22400-0230300075	B	75	231	225	25	30
22400-0230300076	B	76	234	228	25	30
22400-0230300080	B	80	246	240	25	30
22400-0230300085	B	85	261	255	25	30
22400-0230300090	B	90	276	270	25	30
22400-0230300095	B	95	291	285	25	30
22400-0230300100	B	100	306	300	25	30
22400-0230300110	B	110	336	330	25	30
22400-0230300114	B	114	348	342	30	30
22400-0230300120	B	120	366	360	30	30
22400-0230300127	B	127	387	381	30	30

Spur gears, plastic, module 0.5

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1050012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

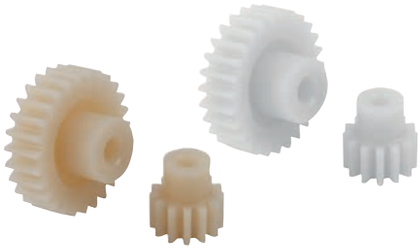
Spur gears, plastic, module 0.5

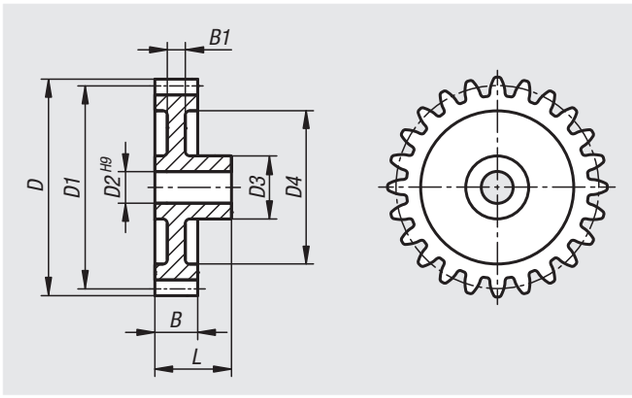
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1050012	22402-2050012	12	7	6	2	4	-	3	3	7	1,4/1,4
22402-1050013	22402-2050013	13	7,5	6,5	2	4	-	3	3	7	1,5/1,6
22402-1050014	22402-2050014	14	8	7	2	5	-	3	3	7	1,6/1,7
22402-1050015	22402-2050015	15	8,5	7,5	3	6	-	3	3	10	1,7/1,8
22402-1050016	22402-2050016	16	9	8	3	6	-	3	3	10	1,8/1,9
22402-1050017	22402-2050017	17	9,5	8,5	3	6	-	3	3	10	2/2,1
22402-1050018	22402-2050018	18	10	9	4	7,8	-	3	3	10	2,1/2,2
22402-1050019	22402-2050019	19	10,5	9,5	4	7,8	-	3	3	10	2,2/2,3
22402-1050020	22402-2050020	20	11	10	4	7,9	-	3	3	10	2,3/2,4
22402-1050021	22402-2050021	21	11,5	10,5	4	8	-	3	3	10	2,4/2,5
22402-1050022	22402-2050022	22	12	11	4	10	-	3	3	10	2,5/2,7
22402-1050023	22402-2050023	23	12,5	11,5	4	9,9	-	3	3	10	2,7/2,8
22402-1050024	22402-2050024	24	13	12	4	9,9	-	3	3	10	2,8/2,9
22402-1050025	22402-2050025	25	13,5	12,5	4	9,9	-	3	3	10	2,9/3,1
22402-1050026	22402-2050026	26	14	13	4	9,9	-	3	3	10	3/3,2
22402-1050027	22402-2050027	27	14,5	13,5	4	9,9	-	3	3	10	3,1/3,3
22402-1050028	22402-2050028	28	15	14	4	10	-	3	3	10	3,3/3,4
22402-1050030	22402-2050030	30	16	15	4	11,9	-	3	3	10	3,5/3,7
22402-1050032	22402-2050032	32	17	16	4	12	-	3	3	10	3,7/3,9
22402-1050035	22402-2050035	35	18,5	17,5	4	12	-	3	3	10	4,1/4,3
22402-1050036	22402-2050036	36	19	18	4	11,9	-	3	3	10	4,2/4,4
22402-1050038	22402-2050038	38	20	19	4	12	-	3	3	10	4,4/4,7
22402-1050040	22402-2050040	40	21	20	4	12	14,8	3	2	10	4,7/4,9
22402-1050042	22402-2050042	42	22	21	4	12,15	17	3	2	10	4,9/5,2
22402-1050045	22402-2050045	45	23,5	22,5	4	12,15	18	3	2	10	5,3/5,5
22402-1050048	22402-2050048	48	25	24	6	15	19	3	2	10	5,6/5,9
22402-1050050	22402-2050050	50	26	25	6	15	20	3	2	10	5,8/6,1
22402-1050052	22402-2050052	52	27	26	6	15	21	3	2	10	6,1/6,4
22402-1050054	22402-2050054	54	28	27	6	15	21	3	2	10	6,3/6,6
22402-1050055	22402-2050055	55	28,5	27,5	6	15	23	3	2	10	6,4/6,8
22402-1050056	22402-2050056	56	29	28	6	15	23	3	2	10	6,6/6,9
22402-1050060	22402-2050060	60	31	30	6	15	23	3	2	10	7/7,4
22402-1050064	22402-2050064	64	33	32	6	15	23	3	2	10	7,5/7,9
22402-1050065	22402-2050065	65	33,5	32,5	6	15	23	3	2	10	7,6/8
22402-1050070	22402-2050070	70	36	35	6	15	29	3	2	10	8,2/8,6
22402-1050072	22402-2050072	72	37	36	6	15	30	3	2	10	8,4/8,9
22402-1050075	22402-2050075	75	38,5	37,5	6	15	33	3	2	10	8,8/9,2
22402-1050080	22402-2050080	80	41	40	6	15	33	3	2	10	9,4/9,8
22402-1050090	22402-2050090	90	46	45	6	15	39	3	2	10	10,6/11,1
22402-1050096	22402-2050096	96	49	48	6	15	42	3	2	10	11,3/11,8
22402-1050100	22402-2050100	100	51	50	6	15	44	3	2	10	11,7/12,3
22402-1050120	22402-2050120	120	61	60	6	15	54	3	2	10	14,1/14,8

Spur gears, plastic, module 0.7

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1070012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

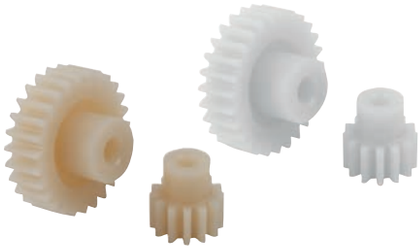
Spur gears, plastic, module 0.7

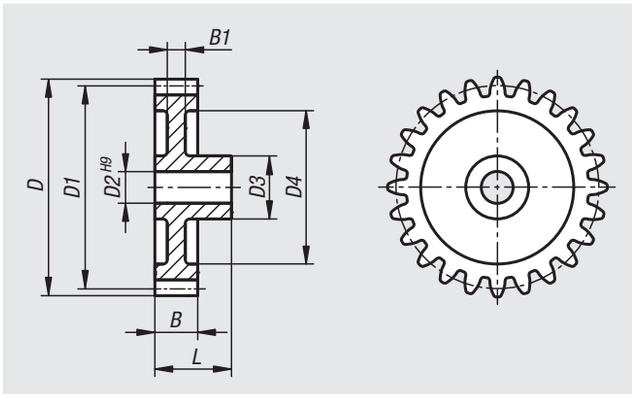
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1070012	**22402-2070012**	12	9,8	8,4	3	6	-	6	6	15	5,5/5,8
22402-1070013	**22402-2070013**	13	10,5	9,1	3	6	-	6	6	15	6/6,3
22402-1070014	**22402-2070014**	14	11,2	9,8	3	6	-	6	6	15	6,4/6,7
22402-1070015	**22402-2070015**	15	11,9	10,5	3	6	-	6	6	15	6,9/7,2
22402-1070016	**22402-2070016**	16	12,6	11,2	4	9	-	6	6	15	7,3/7,7
22402-1070017	**22402-2070017**	17	13,3	11,9	4	9	-	6	6	15	7,8/8,2
22402-1070018	**22402-2070018**	18	14	12,6	4	9	-	6	6	15	8,3/8,7
22402-1070019	**22402-2070019**	19	14,7	13,3	4	9	-	6	6	15	8,7/9,2
22402-1070020	**22402-2070020**	20	15,4	14	4	9	-	6	6	15	9,2/9,7
22402-1070021	**22402-2070021**	21	16,1	14,7	4	9	-	6	6	15	9,7/10,1
22402-1070022	**22402-2070022**	22	16,8	15,4	4	9	-	6	6	15	10,1/10,6
22402-1070023	**22402-2070023**	23	17,5	16,1	4	9	-	6	6	15	10,6/11,1
22402-1070024	**22402-2070024**	24	18,2	16,8	4	9	13	6	3	15	11/11,6
22402-1070025	**22402-2070025**	25	18,9	17,5	6	9	13	6	3	15	11,5/12,1
22402-1070026	**22402-2070026**	26	19,6	18,2	6	9	13	6	3	15	12/12,6
22402-1070027	**22402-2070027**	27	20,3	18,9	6	9	13	6	3	15	12,4/13
22402-1070028	**22402-2070028**	28	21	19,6	6	9	13	6	3	15	12,9/13,5
22402-1070030	**22402-2070030**	30	22,4	21	6	12	16	6	3	15	12,8/14,5
22402-1070032	**22402-2070032**	32	23,8	22,4	6	12	16	6	3	15	14,7/15,5
22402-1070035	**22402-2070035**	35	25,9	24,5	6	15	18,5	6	3	15	16,1/16,9
22402-1070036	**22402-2070036**	36	26,6	25,2	6	15	18,5	6	3	15	16,6/17,4
22402-1070038	**22402-2070038**	38	28	26,6	6	15	21	6	3	15	17,5/18,4
22402-1070040	**22402-2070040**	40	29,4	28	6	15	21	6	3	15	18,4/19,3
22402-1070042	**22402-2070042**	42	30,8	29,4	6	18	24	6	2	15	19,4/20,3
22402-1070045	**22402-2070045**	45	32,9	31,5	6	18	24	6	2	15	20,7/21,8
22402-1070048	**22402-2070048**	48	35	33,6	8	18	24	6	2	15	22,1/23,2
22402-1070050	**22402-2070050**	50	36,4	35	8	18	27,5	6	2	15	23/24,2
22402-1070052	**22402-2070052**	52	37,8	36,4	8	18	27,5	6	2	15	24/25,2
22402-1070054	**22402-2070054**	54	39,2	37,8	8	18	27,5	6	2	15	24,9/26,1
22402-1070055	**22402-2070055**	55	39,9	38,5	8	18	30	6	2	15	25,4/26,6
22402-1070056	**22402-2070056**	56	40,6	39,2	8	18	30	6	2	15	25,8/27,1
22402-1070060	**22402-2070060**	60	43,4	42	8	18	30	6	2	15	27,7/29,1
22402-1070064	**22402-2070064**	64	46,2	44,8	8	18	37	6	2	15	29,5/31
22402-1070065	**22402-2070065**	65	46,9	45,5	8	18	37	6	2	15	30/31,5
22402-1070070	**22402-2070070**	70	50,4	49	8	18	37	6	2	15	32,3/33,9
22402-1070072	**22402-2070072**	72	51,8	50,4	8	18	37	6	2	15	33,2/34,9
22402-1070075	**22402-2070075**	75	53,9	52,5	10	18	37	6	2	15	34,6/36,3
22402-1070080	**22402-2070080**	80	57,4	56	10	21	46,5	6	2	15	36,9/38,8
22402-1070090	**22402-2070090**	90	64,4	63	10	21	57	6	2	15	41,5/43,6
22402-1070096	**22402-2070096**	96	68,6	67,2	10	21	57	6	2	15	44,3/46,5
22402-1070100	**22402-2070100**	100	71,4	70	10	21	57	6	2	15	46,1/48,4
22402-1070120	**22402-2070120**	120	85,4	84	10	21	77	6	2	15	55,4/58,1

Spur gears, plastic, module 1

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°. Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1100012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

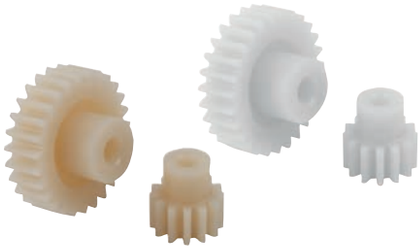
Spur gears, plastic, module 1

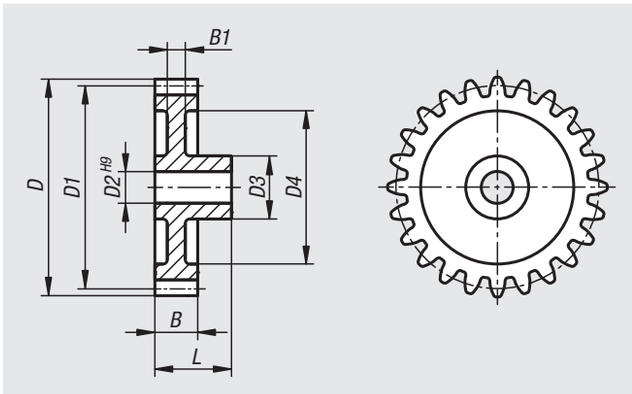
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1100012	22402-2100012	12	14	12	4	9	-	9	9	17	16,9/17,8
22402-1100013	22402-2100013	13	15	13	4	9	-	9	9	17	18,3/19,3
22402-1100014	22402-2100014	14	16	14	4	9	-	9	9	17	19,7/20,7
22402-1100015	22402-2100015	15	17	15	4	9	-	9	9	17	21,2/22,2
22402-1100016	22402-2100016	16	18	16	4	9	-	9	9	17	22,6/23,7
22402-1100017	22402-2100017	17	19	17	4	9	12	9	6	17	24/25,2
22402-1100018	22402-2100018	18	20	18	4	9	13	9	6	17	25,4/26,7
22402-1100019	22402-2100019	19	21	19	4	9	13	9	6	17	26,8/28,2
22402-1100020	22402-2100020	20	22	20	4	9	13	9	6	17	28,2/29,6
22402-1100021	22402-2100021	21	23	21	5	12	16	9	6	17	29,6/31,1
22402-1100022	22402-2100022	22	24	22	5	12	16	9	6	17	31,1/32,6
22402-1100023	22402-2100023	23	25	23	5	12	16	9	6	17	32,5/34,1
22402-1100024	22402-2100024	24	26	24	6	15	18,5	9	6	18	33,9/35,6
22402-1100025	22402-2100025	25	27	25	6	15	18,5	9	6	18	35,3/37,1
22402-1100026	22402-2100026	26	28	26	6	15	18,5	9	6	18	36,7/38,6
22402-1100027	22402-2100027	27	29	27	6	15	18,5	9	6	18	38,1/40
22402-1100028	22402-2100028	28	30	28	6	15	21	9	6	18	39,5/41,5
22402-1100030	22402-2100030	30	32	30	6	15	21	9	6	18	42,4/44,5
22402-1100032	22402-2100032	32	34	32	6	18	23,5	9	4,6	18	45,2/47,5
22402-1100035	22402-2100035	35	37	35	8	18	23,5	9	4,6	18	49,4/51,9
22402-1100036	22402-2100036	36	38	36	8	18	27	9	4,6	18	50,8/53,4
22402-1100038	22402-2100038	38	40	38	8	18	27	9	4,6	18	53,7/56,4
22402-1100040	22402-2100040	40	42	40	8	18	27	9	4,6	18	56,5/59,3
22402-1100042	22402-2100042	42	44	42	8	18	27	9	4,6	18	59,3/62,3
22402-1100045	22402-2100045	45	47	45	8	18	36,5	9	4,6	18	63,6/66,8
22402-1100048	22402-2100048	48	50	48	8	18	36,5	9	4,6	18	67,8/71,2
22402-1100050	22402-2100050	50	52	50	8	18	36,5	9	4,6	18	70,6/74,2
22402-1100052	22402-2100052	52	54	52	8	21	46	9	4,6	18	73,5/77,1
22402-1100054	22402-2100054	54	56	54	8	21	46	9	4,6	18	76,3/80,1
22402-1100055	22402-2100055	55	57	55	8	21	46	9	4,6	18	77,7/81,6
22402-1100056	22402-2100056	56	58	56	8	21	46	9	4,6	18	79,1/83,1
22402-1100058	22402-2100058	58	60	58	8	21	46	9	4,6	18	82/86,1
22402-1100060	22402-2100060	60	62	60	8	21	46	9	4,6	18	84,8/89
22402-1100064	22402-2100064	64	66	64	10	21	56,5	9	4,6	18	90,4/95
22402-1100065	22402-2100065	65	67	65	10	21	56,5	9	4,6	18	91,8/96,4
22402-1100070	22402-2100070	70	72	70	10	21	56,5	9	4,6	18	98,9/103,9
22402-1100072	22402-2100072	72	74	72	10	21	66	9	4,6	18	101,7/106,8
22402-1100075	22402-2100075	75	77	75	10	21	66	9	4,6	18	106/111,3
22402-1100080	22402-2100080	80	82	80	10	21	66	9	4,6	18	113,1/118,7
22402-1100085	22402-2100085	85	87	85	10	21	66	9	4,6	18	120,1/126,1
22402-1100090	22402-2100090	90	92	90	10	21	76	9	4,6	18	127,2/133,5
22402-1100100	22402-2100100	100	102	100	12	24	86	9	4,6	18	141,3/148,4
22402-1100110	22402-2100110	110	112	110	12	24	96	9	4,6	18	155,5/163,2
22402-1100120	22402-2100120	120	122	120	12	24	105,5	9	4,6	18	169,6/178,1
22402-1100130	22402-2100130	130	132	130	12	24	115	9	4,6	18	183,7/192,9
22402-1100140	22402-2100140	140	142	140	12	24	125	9	4,6	18	197,9/207,8

Spur gears, plastic, module 1.25

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1125012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

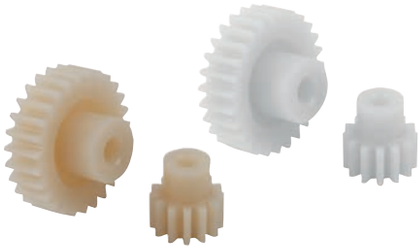
Spur gears, plastic, module 1.25

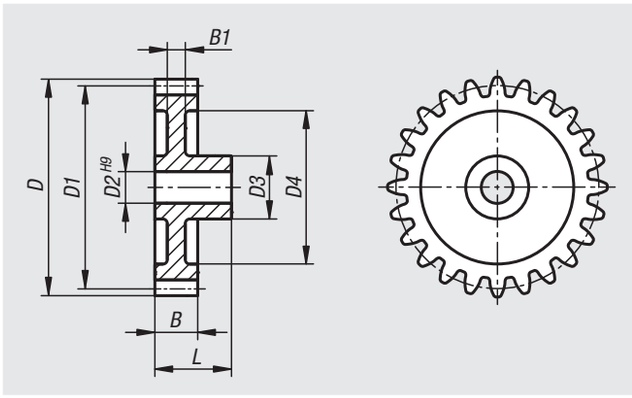
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1125012	**22402-2125012**	12	17,5	15	5	9	-	10	10	19	29,4/30,9
22402-1125013	**22402-2125013**	13	18,75	16,25	5	9	-	10	10	19	31,9/33,5
22402-1125014	**22402-2125014**	14	20	17,5	5	9	-	10	10	19	34,3/36
22402-1125015	**22402-2125015**	15	21,25	18,75	5	9	13	10	7	19	36,8/38,6
22402-1125016	**22402-2125016**	16	22,5	20	5	9	13	10	7	19	39,7/41,7
22402-1125017	**22402-2125017**	17	23,75	21,25	5	9	13	10	7	19	41,7/43,8
22402-1125018	**22402-2125018**	18	25	22,5	5	12	16	10	7	19	44,1/46,3
22402-1125019	**22402-2125019**	19	26,25	23,75	5	12	16	10	7	19	46,6/48,9
22402-1125020	**22402-2125020**	20	27,5	25	5	12	16	10	7	19	49/51,5
22402-1125021	**22402-2125021**	21	28,75	26,25	6	15	18,5	10	7	19	51,5/54,1
22402-1125022	**22402-2125022**	22	30	27,5	6	15	18,5	10	7	19	54/56,7
22402-1125023	**22402-2125023**	23	31,25	28,75	6	15	18,5	10	7	19	56,4/59,2
22402-1125024	**22402-2125024**	24	32,5	30	6	15	21	10	7	19	58,9/61,8
22402-1125025	**22402-2125025**	25	33,75	31,25	6	15	21	10	7	19	61,3/64,4
22402-1125026	**22402-2125026**	26	35	32,5	6	18	23,5	10	5,5	19	63,8/67
22402-1125027	**22402-2125027**	27	36,25	33,75	6	18	23,5	10	5,5	19	66,2/69,5
22402-1125028	**22402-2125028**	28	37,5	35	8	18	23,5	10	5,5	19	68,7/72,1
22402-1125030	**22402-2125030**	30	40	37,5	8	18	27	10	5,5	19	73,6/77,3
22402-1125032	**22402-2125032**	32	42,5	40	8	18	27	10	5,5	19	78,5/82,4
22402-1125035	**22402-2125035**	35	46,25	43,75	8	18	27	10	5,5	19	85,9/90,2
22402-1125036	**22402-2125036**	36	47,5	45	8	18	36	10	5,5	19	88,3/92,7
22402-1125038	**22402-2125038**	38	50	47,5	8	18	36	10	5,5	19	93,2/97,9
22402-1125040	**22402-2125040**	40	52,5	50	8	18	36	10	5,5	19	98,1/103
22402-1125042	**22402-2125042**	42	55	52,5	8	18	36	10	5,5	19	103/108,2
22402-1125045	**22402-2125045**	45	58,75	56,25	8	21	46	10	5,5	19	110,4/115,9
22402-1125048	**22402-2125048**	48	62,5	60	8	21	46	10	5,5	19	117,8/123,7
22402-1125050	**22402-2125050**	50	65	62,5	8	21	46	10	5,5	19	122,7/128,8
22402-1125052	**22402-2125052**	52	67,5	65	10	21	56	10	5,5	19	127,6/134
22402-1125054	**22402-2125054**	54	70	67,5	10	21	56	10	5,5	19	132,5/139,1
22402-1125055	**22402-2125055**	55	71,25	68,75	10	21	56	10	5,5	19	134,9/141,7
22402-1125056	**22402-2125056**	56	72,5	70	10	21	56	10	5,5	19	137,4/144,3
22402-1125060	**22402-2125060**	60	77,5	75	10	21	66	10	5,5	19	147,2/154,6
22402-1125064	**22402-2125064**	64	82,5	80	10	21	66	10	5,5	19	157/164,9
22402-1125065	**22402-2125065**	65	83,75	81,25	10	21	66	10	5,5	19	159,5/167,5
22402-1125070	**22402-2125070**	70	90	87,5	10	21	76	10	5,5	19	171,8/180,4
22402-1125072	**22402-2125072**	72	92,5	90	12	21	76	10	5,5	19	176,7/185,5
22402-1125075	**22402-2125075**	75	96,25	93,75	10	21	76	10	5,5	19	184/193,2
22402-1125080	**22402-2125080**	80	102,5	100	12	24	86	10	5,5	19	196,3/206,1
22402-1125090	**22402-2125090**	90	115	112,5	12	24	95	10	5,5	19	220,8/231,9
22402-1125100	**22402-2125100**	100	127,5	125	12	24	105,5	10	5,5	19	245,4/257,7
22402-1125110	**22402-2125110**	110	140	137,5	12	24	115	10	5,5	19	269,9/283,4

Spur gears, plastic, module 1.5

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1150012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

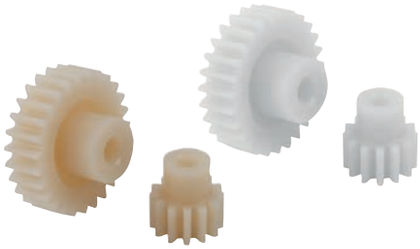
Spur gears, plastic, module 1.5

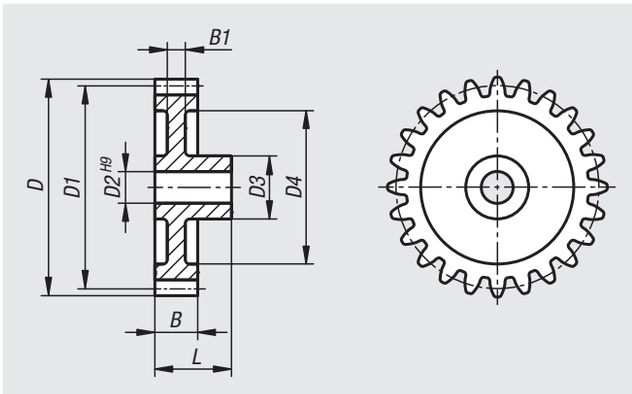
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1150012	**22402-2150012**	12	21	18	6	14	-	12	12	23	50,8/53,4
22402-1150013	**22402-2150013**	13	22,5	19,5	6	14	-	12	12	23	55,1/57,8
22402-1150014	**22402-2150014**	14	24	21	6	14	13	12	10,5	23	59,3/62,3
22402-1150015	**22402-2150015**	15	25,5	22,5	6	14	16	12	10,5	23	63,6/66,8
22402-1150016	**22402-2150016**	16	27	24	6	14	16	12	10,5	23	67,8/71,2
22402-1150017	**22402-2150017**	17	28,5	25,5	6	14	16	12	10,5	23	72,1/75,7
22402-1150018	**22402-2150018**	18	30	27	8	17	18,5	12	10,5	23	76,3/80,1
22402-1150019	**22402-2150019**	19	31,5	28,5	8	17	18,5	12	10,5	23	80,5/84,6
22402-1150020	**22402-2150020**	20	33	30	8	17	22,5	12	9	23	84,8/89
22402-1150021	**22402-2150021**	21	34,5	31,5	8	17	22,5	12	5	23	89/93,5
22402-1150022	**22402-2150022**	22	36	33	8	17	22,5	12	5	23	93,3/97,9
22402-1150023	**22402-2150023**	23	37,5	34,5	8	17	22,5	12	5	23	97,5/102,4
22402-1150024	**22402-2150024**	24	39	36	8	19	26,5	12	5	23	101,7/106,8
22402-1150025	**22402-2150025**	25	40,5	37,5	8	19	26,5	12	5	23	106/111,3
22402-1150026	**22402-2150026**	26	42	39	8	19	26,5	12	5	23	110,2/115,7
22402-1150027	**22402-2150027**	27	43,5	40,5	8	19	25,5	12	5	23	114,5/120,2
22402-1150028	**22402-2150028**	28	45	42	8	19	25,5	12	5	23	118,7/124,6
22402-1150030	**22402-2150030**	30	48	45	10	24	33,5	12	5	23	127,2/133,5
22402-1150032	**22402-2150032**	32	51	48	10	24	33,5	12	5	23	135,7/142,5
22402-1150035	**22402-2150035**	35	55,5	52,5	10	24	41,5	12	5	23	148,4/155,8
22402-1150036	**22402-2150036**	36	57	54	10	24	41,5	12	5	23	152,6/160,3
22402-1150038	**22402-2150038**	38	60	57	10	24	41,5	12	5	23	161,1/169,2
22402-1150040	**22402-2150040**	40	63	60	10	24	48,5	12	5	23	169,6/178,1
22402-1150042	**22402-2150042**	42	66	63	10	24	48,5	12	5	23	178,1/187
22402-1150045	**22402-2150045**	45	70,5	67,5	10	24	48,5	12	5	23	190,8/200,3
22402-1150048	**22402-2150048**	48	75	72	10	24	48,5	12	5	23	203,5/213,7
22402-1150050	**22402-2150050**	50	78	75	12	27	63	12	5	23	212/222,6
22402-1150052	**22402-2150052**	52	81	78	12	27	63	12	5	23	220,5/231,5
22402-1150054	**22402-2150054**	54	84	81	12	27	63	12	5	23	229/240,4
22402-1150055	**22402-2150055**	55	85,5	82,5	12	27	63	12	5	23	233,2/244,9
22402-1150060	**22402-2150060**	60	93	90	12	27	63	12	5	23	254,4/267,1
22402-1150070	**22402-2150070**	70	108	105	14	30	88	12	5	23	296,8/311,7
22402-1150080	**22402-2150080**	80	123	120	14	30	104	12	5	23	339,2/356,2
22402-1150090	**22402-2150090**	90	138	135	14	30	116	12	5	23	381,7/400,7
22402-1150100	**22402-2150100**	100	153	150	20	40	133	19	8	34 +1,5	671,5/705,1
22402-1150110	**22402-2150110**	110	168	165	20	40	148	19	8	34 +1,5	738,6/775,6
22402-1150120	**22402-2150120**	120	183	180	20	40	163	19	8	34 +1,5	805,8/846,1
22402-1150130	**22402-2150130**	130	198	195	20	40	178	19	8	34 +1,5	872,9/916,6
22402-1150140	**22402-2150140**	140	213	210	20	40	193	19	8	34 +1,5	940,1/987,1
22402-1150150	**22402-2150150**	150	228	225	20	40	208	19	8	34 +1,5	1007,2/1057,6

Spur gears, plastic, module 2

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1200012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

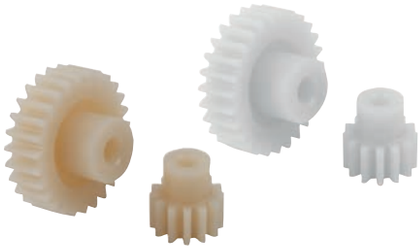
Spur gears, plastic, module 2

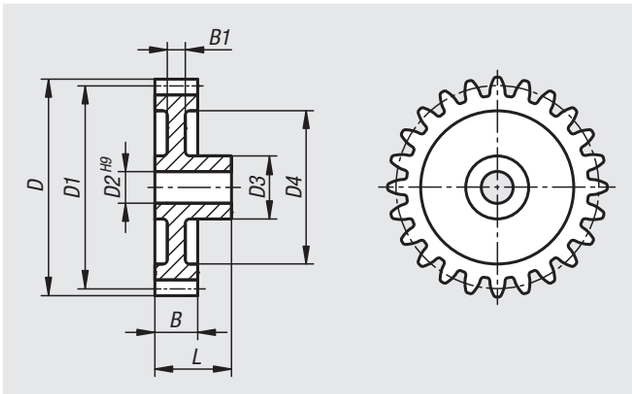
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1200012	**22402-2200012**	12	28	24	8	18,5	16	15	13,5	27	113,1/118,7
22402-1200013	**22402-2200013**	13	30	26	8	18,5	18,5	15	13,5	27	122,5/128,6
22402-1200014	**22402-2200014**	14	32	28	8	18,5	18,5	15	13,5	27	131,9/138,5
22402-1200015	**22402-2200015**	15	34	30	8	18,5	22	15	12	27	141,3/148,4
22402-1200016	**22402-2200016**	16	36	32	8	17,5	22	15	6	27	150,8/158,3
22402-1200017	**22402-2200017**	17	38	34	8	17,5	24	15	6	27	160,2/168,2
22402-1200018	**22402-2200018**	18	40	36	8	17,5	25	15	6	27	169,6/178,1
22402-1200019	**22402-2200019**	19	42	38	8	17,5	27	15	6	27	179/188
22402-1200020	**22402-2200020**	20	44	40	10	20	28	15	6	27	188,5/197,9
22402-1200021	**22402-2200021**	21	46	42	10	20	28	15	6	27	197,9/207,8
22402-1200022	**22402-2200022**	22	48	44	10	20	28	15	6	27	207,3/217,7
22402-1200023	**22402-2200023**	23	50	46	10	24	35	15	6	27	216,7/227,6
22402-1200024	**22402-2200024**	24	52	48	10	24	35	15	6	27	226,1/237,5
22402-1200025	**22402-2200025**	25	54	50	10	24	35	15	6	27	235,6/247,4
22402-1200026	**22402-2200026**	26	56	52	10	24	38,5	15	6	27	245/257,2
22402-1200027	**22402-2200027**	27	58	54	10	24	38,5	15	6	27	254,4/267,1
22402-1200028	**22402-2200028**	28	60	56	10	24	38,5	15	6	27	263,8/277
22402-1200030	**22402-2200030**	30	64	60	10	24	43,5	15	6	27	282,7/296,8
22402-1200032	**22402-2200032**	32	68	64	10	26	44	15	6	27	301,5/316,6
22402-1200035	**22402-2200035**	35	74	70	12	26	54	15	6	27	329,8/346,3
22402-1200036	**22402-2200036**	36	76	72	12	26	54	15	6	27	339,2/356,2
22402-1200038	**22402-2200038**	38	80	76	12	26	61,5	15	6	27	358,1/376
22402-1200040	**22402-2200040**	40	84	80	12	26	61,5	15	6	27	376,9/395,8
22402-1200042	**22402-2200042**	42	88	84	12	26	61,5	15	6	27	395,8/415,6
22402-1200045	**22402-2200045**	45	94	90	14	30	68	15	6	27	424,1/445,3
22402-1200048	**22402-2200048**	48	100	96	14	30	74	15	6	27	452,3/475
22402-1200050	**22402-2200050**	50	104	100	14	30	78	15	6	27	471,2/494,8
22402-1200055	**22402-2200055**	55	114	110	14	30	87,5	15	6	27	518,3/544,2
22402-1200060	**22402-2200060**	60	124	120	14	30	97,5	15	6	27	565,4/593,7
22402-1200070	**22402-2200070**	70	144	140	14	30	117	15	6	27	659,7/692,7
22402-1200075	**22402-2200075**	75	154	150	20	40	133	19	8	34	895,3/940,1
22402-1200080	**22402-2200080**	80	164	160	20	40	133	19	8	34	955/1002,7
22402-1200085	**22402-2200085**	85	174	170	20	40	148	19	8	34	1014,7/1065,4
22402-1200090	**22402-2200090**	90	184	180	20	40	163	19	8	34	1074,4/1128,1
22402-1200095	**22402-2200095**	95	194	190	20	40	163	19	8	34	1134,1/1190,8
22402-1200100	**22402-2200100**	100	204	200	20	40	178	19	8	34	1193,8/1253,5
22402-1200110	**22402-2200110**	110	224	220	20	40	193	19	8	34	1313,1/1378,8

Spur gears, plastic, module 2.5

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1250012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

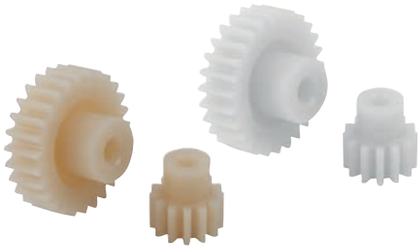
Spur gears, plastic, module 2.5

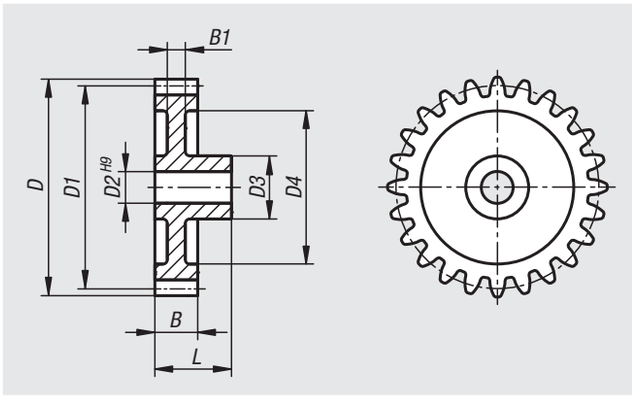
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1250012	**22402-2250012**	12	35	30	10	20	-	17	-	30	200,2/210,2
22402-1250013	**22402-2250013**	13	37,5	32,5	10	20	-	17	-	30	216,9/227,8
22402-1250014	**22402-2250014**	14	40	35	10	20	-	17	-	30	233,6/245,3
22402-1250015	**22402-2250015**	15	42,5	37,5	10	20	27	17	7	30	250,3/262,8
22402-1250016	**22402-2250016**	16	45	40	10	20	27	17	7	30	267/280,3
22402-1250017	**22402-2250017**	17	47,5	42,5	10	20	27	17	7	30	283,7/297,9
22402-1250018	**22402-2250018**	18	50	45	10	20	34	17	7	30	300,4/315,4
22402-1250019	**22402-2250019**	19	52,5	47,5	10	20	34	17	7	30	317,1/332,9
22402-1250020	**22402-2250020**	20	55	50	10	20	34	17	7	30	333,7/350,4
22402-1250021	**22402-2250021**	21	57,5	52,5	12	24	41	17	7	30	350,4/368
22402-1250022	**22402-2250022**	22	60	55	12	24	41	17	7	30	367,1/385,5
22402-1250023	**22402-2250023**	23	62,5	57,5	12	24	41	17	7	30	383,8/403
22402-1250024	**22402-2250024**	24	65	60	12	24	49	17	7	30	400,5/420,5
22402-1250025	**22402-2250025**	25	67,5	62,5	12	24	49	17	7	30	417,2/438,1
22402-1250026	**22402-2250026**	26	70	65	12	24	49	17	7	30	433,9/455,6
22402-1250027	**22402-2250027**	27	72,5	67,5	12	24	56	17	7	30	450,6/473,1
22402-1250028	**22402-2250028**	28	75	70	12	24	56	17	7	30	467,3/490,6
22402-1250030	**22402-2250030**	30	80	75	12	24	56	17	7	30	500,6/525,7
22402-1250032	**22402-2250032**	32	85	80	14	30	68	17	7	30	534/560,7
22402-1250035	**22402-2250035**	35	92,5	87,5	14	30	68	17	7	30	584,1/613,3
22402-1250036	**22402-2250036**	36	95	90	14	30	72	17	7	30	600,8/630,8
22402-1250038	**22402-2250038**	38	100	95	14	30	72	17	7	30	634,2/665,9
22402-1250040	**22402-2250040**	40	105	100	14	30	84	17	7	30	667,5/700,9
22402-1250042	**22402-2250042**	42	110	105	16	30	84	17	7	30	700,9/736
22402-1250045	**22402-2250045**	45	117,5	112,5	16	30	84	17	7	30	751/788,5
22402-1250048	**22402-2250048**	48	125	120	16	30	100	17	7	30	801,1/841,1
22402-1250050	**22402-2250050**	50	130	125	16	30	100	17	7	30	834,4/876,2
22402-1250055	**22402-2250055**	55	142,5	137,5	20	30	100	17	7	30	917,9/963,8
22402-1250060	**22402-2250060**	60	155	150	20	40	133	19	8	34	1119,1/1175,1
22402-1250065	**22402-2250065**	65	167,5	162,5	20	40	133	19	8	34	1212,4/1273
22402-1250070	**22402-2250070**	70	180	175	20	40	148	19	8	34	1305,7/1371
22402-1250075	**22402-2250075**	75	192,5	187,5	20	40	163	19	8	34	1398,9/1468,9
22402-1250080	**22402-2250080**	80	205	200	20	40	178	19	8	34	1492,2/1566,8
22402-1250085	**22402-2250085**	85	217,5	212,5	20	40	178	19	8	34	1585,5/1664,7
22402-1250090	**22402-2250090**	90	230	225	20	40	193	19	8	34	1678,7/1762,7
22402-1250095	**22402-2250095**	95	242,5	237,5	20	40	208	19	8	34	1772/1860,6

Spur gears, plastic, module 3

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Machined bore.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22402-1300012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

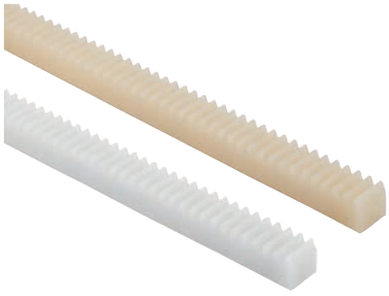
Spur gears, plastic, module 3

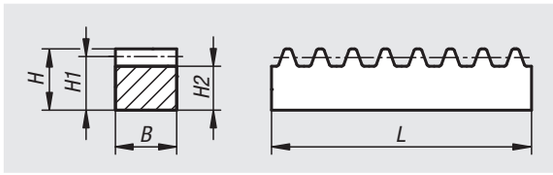
injection moulded, straight teeth, engagement angle 20°

Order No. polyacetal	Order No. polyketone	No. of teeth	D	D1	D2	D3	D4	B	B1	L	Max. torque Ncm
22402-1300012	**22402-2300012**	12	42	36	12	24	-	19	19	34	322,3/338,4
22402-1300013	**22402-2300013**	13	45	39	12	24	-	19	19	34	349/366,6
22402-1300014	**22402-2300014**	14	48	42	12	24	-	19	19	34	376/394,8
22402-1300015	**22402-2300015**	15	51	45	12	24	30,5	19	8	34	402,9/423
22402-1300016	**22402-2300016**	16	54	48	12	24	30,5	19	8	34	429,7/451,2
22402-1300017	**22402-2300017**	17	57	51	12	24	30,5	19	8	34	456,6/479,4
22402-1300018	**22402-2300018**	18	60	54	12	24	38	19	8	34	483,4/507,6
22402-1300019	**22402-2300019**	19	63	57	12	24	38	19	8	34	510,3/535,8
22402-1300020	**22402-2300020**	20	66	60	12	24	38	19	8	34	537,2/564
22402-1300021	**22402-2300021**	21	69	63	12	24	45	19	8	34	564/592,2
22402-1300022	**22402-2300022**	22	72	66	12	24	45	19	8	34	590,9/620,4
22402-1300023	**22402-2300023**	23	75	69	12	24	52	19	8	34	617,7/648,6
22402-1300024	**22402-2300024**	24	78	72	12	24	52	19	8	34	644,6/676,8
22402-1300025	**22402-2300025**	25	81	75	14	28	58	19	8	34	671,5/705,1
22402-1300026	**22402-2300026**	26	84	78	14	28	58	19	8	34	698,3/733,3
22402-1300027	**22402-2300027**	27	87	81	14	28	58	19	8	34	725,2/761,5
22402-1300028	**22402-2300028**	28	90	84	14	28	65	19	8	34	752,1/789,7
22402-1300030	**22402-2300030**	30	96	90	14	28	68	19	8	34	805,8/846,1
22402-1300032	**22402-2300032**	32	102	96	16	32	69	19	8	34	859,5/902,5
22402-1300033	**22402-2300033**	33	105	99	16	32	69	19	8	34	886,4/930,7
22402-1300034	**22402-2300034**	34	108	102	16	32	78	19	8	34	913,2/958,9
22402-1300035	**22402-2300035**	35	111	105	16	32	78	19	8	34	940,1/987,1
22402-1300038	**22402-2300038**	38	120	114	16	32	87	19	8	34	1020,7/1071,7
22402-1300040	**22402-2300040**	40	126	120	16	32	93	19	8	34	1074,4/1128,1
22402-1300045	**22402-2300045**	45	141	135	16	32	108	19	8	34	1208,7/1269,1
22402-1300050	**22402-2300050**	50	156	150	20	40	133	19	8	34	1343/1410,1
22402-1300055	**22402-2300055**	55	171	165	20	40	148	19	8	34	1477,3/1551,2
22402-1300060	**22402-2300060**	60	186	180	20	40	163	19	8	34	1611,6/1692,2
22402-1300065	**22402-2300065**	65	201	195	20	40	178	19	8	34	1745,9/1833,2
22402-1300070	**22402-2300070**	70	216	210	20	40	193	19	8	34	1880,2/1974,2
22402-1300075	**22402-2300075**	75	231	225	20	40	208	19	8	34	2014,5/2115,2

Gear racks, plastic

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22422-10500404250

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Due to the material properties, plastic gear racks are not straightened.

L= nominal length 250 mm. The actual length is roughly a whole multiple of the pitch.

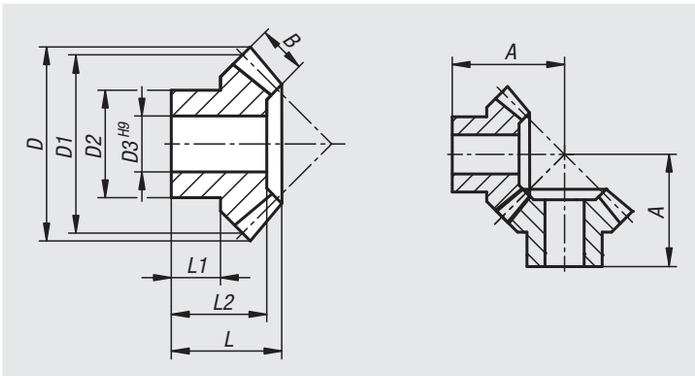
Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

Order No. polyacetal	Order No. polyketone	Module	B	H	H1	H2	L
22422-10500404250	**22422-20500404250**	0,5	4	4,5	4	3,4	250
22422-10500406250	**22422-20500406250**	0,5	4	6	5,5	4,9	250
22422-10700606250	**22422-20700606250**	0,7	6	6,7	6	5,1	250
22422-11000909250	**22422-21000909250**	1	9	9	8	6,8	250
22422-11251011250	**22422-21251011250**	1,25	10	11	9,75	8,3	250
22422-11501212250	**22422-21501212250**	1,5	12	12	10,5	8,75	250
22422-12001511250	**22422-22001511250**	2	15,4	11	9	6,6	250
22422-13001915250	**22422-23001915250**	3	19,4	15	12	8,5	250

Bevel gears, plastic, ratio 1:1

injection-moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°. Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-105110016

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

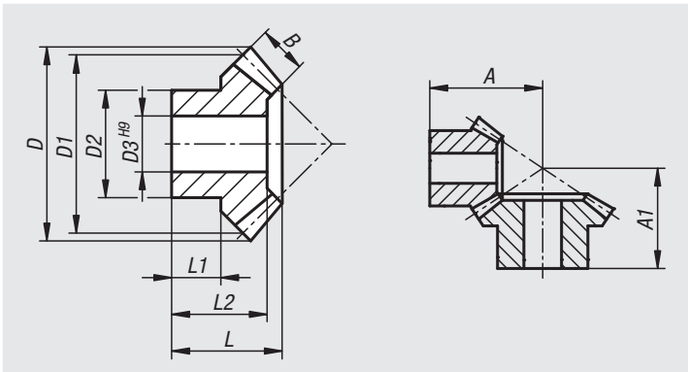
Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Main material	Transmission ratio	Module	No. of teeth	A	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-105110016	polyacetal	1:1	0,5	16	10,5	2	8,7	8	7	3	8,1	6	8,1	1	22432-105110016
22432-110110016	polyacetal	1:1	1	16	18,4	4,7	17,6	16	12	5	13,6	8	13,6	9,4	22432-110110016
22432-110110030	polyacetal	1:1	1	30	25,1	7	31	30	15	6	15,4	7,6	13,3	26,3	22432-110110030
22432-115110016	polyacetal	1:1	1,5	16	25,8	7	26,4	24	18,5	8	18,4	10	16,2	31,6	22432-115110016
22432-120110016	polyacetal	1:1	2	16	30,4	10	34,9	32	21,9	10	21,2	9,7	18,3	80,4	22432-120110016
22432-125110016	polyacetal	1:1	2,5	16	37	12,3	43,5	40	25,2	12	25,5	11,5	22,9	154,5	22432-125110016
22432-130110016	polyacetal	1:1	3	16	43	13,8	52,3	48	28,8	14	29,2	13,2	25,7	249,7	22432-130110016
22432-135110016	polyacetal	1:1	3,5	16	49,5	15,8	61,4	56	33,3	18	33,1	14,6	28	389,1	22432-135110016
22432-205110016	polyketone	1:1	0,5	16	10,5	2	8,7	8	7	3	8,1	6	8,1	1	22432-205110016
22432-210110016	polyketone	1:1	1	16	18,4	4,7	17,6	16	12	5	13,6	8	13,6	9,9	22432-210110016
22432-210110030	polyketone	1:1	1	30	25,1	7	31	30	15	6	15,4	7,6	13,3	27,7	22432-210110030
22432-215110016	polyketone	1:1	1,5	16	25,8	7	26,4	24	18,5	8	18,4	10	16,2	33,2	22432-215110016
22432-220110016	polyketone	1:1	2	16	30,4	10	34,9	32	21,9	10	21,2	9,7	18,3	84,4	22432-220110016
22432-225110016	polyketone	1:1	2,5	16	37	12,3	43,5	40	25,2	12	25,5	11,5	22,9	162,3	22432-225110016
22432-230110016	polyketone	1:1	3	16	43	13,8	52,3	48	28,8	14	29,2	13,2	25,7	262,2	22432-230110016
22432-235110016	polyketone	1:1	3,5	16	49,5	15,8	61,4	56	33,3	18	33,1	14,6	28	408,6	22432-235110016

Bevel gears, plastic, ratio 1:1.5

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°. Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-115115016

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

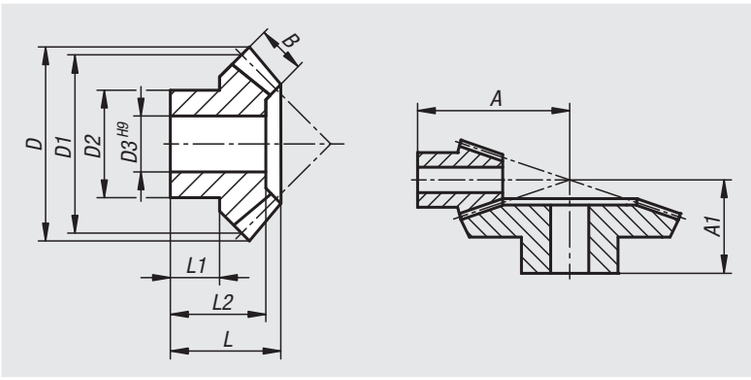
Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Main material	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-115115016	polyacetal	1:1,5	1,5	16	30	-	8	26	24	20	8	18,8	10,8	17,8	36,1	22432-115115024
22432-115115024	polyacetal	1:1,5	1,5	24	-	26,6	8	37	36	24	10	19,5	11,3	18	54,2	22432-115115016
22432-215115016	polyketone	1:1,5	1,5	16	30	-	8	26	24	20	8	18,8	10,8	17,8	38	22432-215115024
22432-215115024	polyketone	1:1,5	1,5	24	-	26,6	8	37	36	24	10	19,5	11,3	18	57	22432-215115016

Bevel gears, plastic, ratio 1:2

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-110120015

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

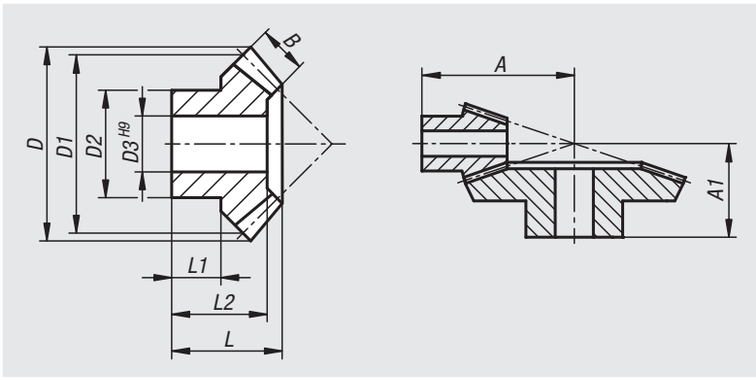
Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Main material	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-110120015	polyacetal	1:2	1	15	26,3	-	6,4	16,6	15	12,2	5	17,1	10,5	17,1	12	22432-110120030
22432-110120030	polyacetal	1:2	1	30	-	20,8	6,9	31	30	18	8	16	9	14,7	26	22432-110120015
22432-115120015	polyacetal	1:2	1,5	15	35,8	-	10,5	25	22,5	17	8	22,8	11,7	22,8	44,5	22432-115120030
22432-115120030	polyacetal	1:2	1,5	30	-	25,9	10,7	46,3	45	23,4	10	19,6	9,6	17,5	90,7	22432-115120015
22432-120120015	polyacetal	1:2	2	15	44	-	14,5	33,3	30	22,6	10	27	12	26	109,3	22432-120120030
22432-120120030	polyacetal	1:2	2	30	-	35	14,2	62	60	30,2	12	24,5	12	22,4	214,1	22432-120120015
22432-125120015	polyacetal	1:2	2,5	15	53,3	-	17,1	42	37,5	26,5	12	31,1	12,7	29,5	201,4	22432-125120030
22432-125120030	polyacetal	1:2	2,5	30	-	40,8	17,4	77,2	75	35,8	16	29,6	15,2	27,6	409,9	22432-125120015
22432-130120015	polyacetal	1:2	3	15	63,3	-	20,2	50	45	31,2	14	36,4	15,3	34,8	342,6	22432-130120030
22432-130120030	polyacetal	1:2	3	30	-	49,9	20,5	92,5	90	45	18	37,5	19	33,8	695,5	22432-130120015
22432-210120015	polyketone	1:2	1	15	26,3	-	6,4	16,6	15	12,2	5	17,1	10,5	17,1	12,6	22432-210120030
22432-210120030	polyketone	1:2	1	30	-	20,8	6,9	31	30	18	8	16	9	14,7	27,3	22432-210120015
22432-215120015	polyketone	1:2	1,5	15	35,8	-	10,5	25	22,5	17	8	22,8	11,7	22,8	46,7	22432-215120030
22432-215120030	polyketone	1:2	1,5	30	-	25,9	10,7	46,3	45	23,4	10	19,6	9,6	17,5	95,3	22432-215120015
22432-220120015	polyketone	1:2	2	15	44	-	14,5	33,3	30	22,6	10	27	12	26	114,8	22432-220120030
22432-220120030	polyketone	1:2	2	30	-	35	14,2	62	60	30,2	12	24,5	12	22,4	224,8	22432-220120015
22432-225120015	polyketone	1:2	2,5	15	53,3	-	17,1	42	37,5	26,5	12	31,1	12,7	29,5	211,5	22432-225120030
22432-225120030	polyketone	1:2	2,5	30	-	40,8	17,4	77,2	75	35,8	16	29,6	15,2	27,6	430,4	22432-225120015
22432-230120015	polyketone	1:2	3	15	63,3	-	20,2	50	45	31,2	14	36,4	15,3	34,8	359,8	22432-230120030
22432-230120030	polyketone	1:2	3	30	-	49,9	20,5	92,5	90	45	18	37,5	19	33,8	730,3	22432-230120015

Bevel gears, plastic, ratio 1:3

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-110130015

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

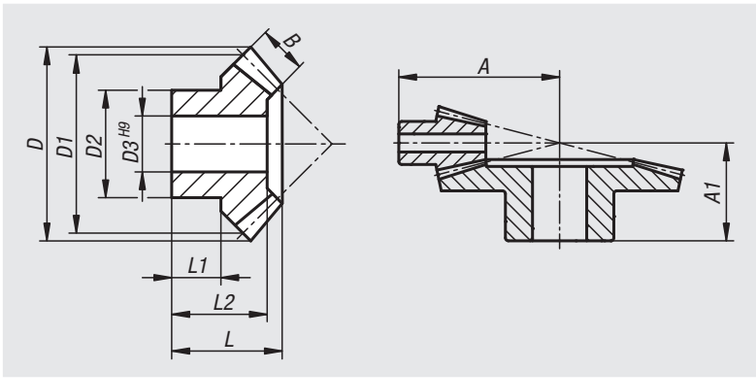
Attention:
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Order No.	Main material	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-110130015	polyacetal	1:3	1	15	34,3	-	9	16,4	15	12,3	5	20,5	11,4	-	16,9	22432-110130045
22432-110130045	polyacetal	1:3	1	45	-	22,4	8,8	45,7	45	23,4	10	17,9	9,6	16,2	49,7	22432-110130015
22432-115130015	polyacetal	1:3	1,5	15	47,3	-	14	25,1	22,5	17,2	8	26,6	12,3	-	59,3	22432-115130045
22432-115130045	polyacetal	1:3	1,5	45	-	29,7	14	68,5	67,5	30,4	12	23,2	11,8	21,4	178,1	22432-115130015
22432-120130010	polyacetal	1:3	2	10	43,3	-	12,2	23,6	20	15,5	6	25	12	-	61,3	22432-120130030
22432-120130030	polyacetal	1:3	2	30	-	28	12,5	61,7	60	30,3	12	22,5	11,8	19,8	188,5	22432-120130010
22432-125130010	polyacetal	1:3	2,5	10	52,4	-	15,2	29,6	25	18,8	8	28,7	13	-	119,3	22432-125130030
22432-125130030	polyacetal	1:3	2,5	30	-	35,8	15,7	77,2	75	36	18	29	15,9	25	369,9	22432-125130010
22432-210130015	polyketone	1:3	1	15	34,3	-	9	16,4	15	12,3	5	20,5	11,4	-	17,8	22432-210130045
22432-210130045	polyketone	1:3	1	45	-	22,4	8,8	45,7	45	23,4	10	17,9	9,6	16,2	52,2	22432-210130015
22432-215130015	polyketone	1:3	1,5	15	47,3	-	14	25,1	22,5	17,2	8	26,6	12,3	-	62,3	22432-215130045
22432-215130045	polyketone	1:3	1,5	45	-	29,7	14	68,5	67,5	30,4	12	23,2	11,8	21,4	187	22432-215130015
22432-220130010	polyketone	1:3	2	10	43,3	-	12,2	23,6	20	15,5	6	25	12	-	64,3	22432-220130030
22432-220130030	polyketone	1:3	2	30	-	28	12,5	61,7	60	30,3	12	22,5	11,8	19,8	197,9	22432-220130010
22432-225130010	polyketone	1:3	2,5	10	52,4	-	15,2	29,6	25	18,8	8	28,7	13	-	125,3	22432-225130030
22432-225130030	polyketone	1:3	2,5	30	-	35,8	15,7	77,2	75	36	18	29	15,9	25	388,4	22432-225130010

Bevel gears, plastic, ratio 1:4

injection-moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-110140010

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

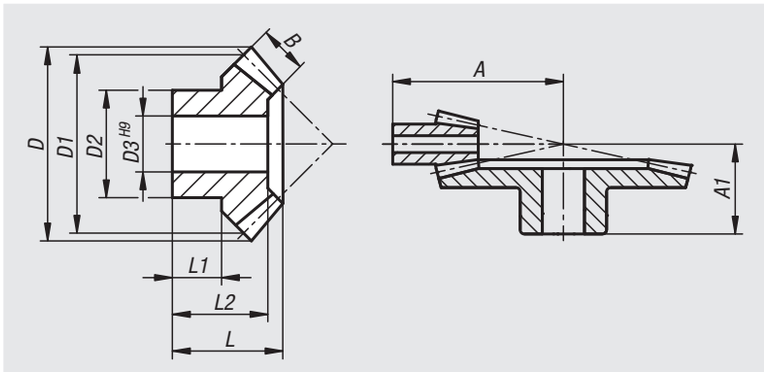
Attention:
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Order No.	Main material	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-110140010	polyacetal	1:4	1	10	30,2	-	8	12	10	7,9	4	17,7	9,6	-	10	22432-110140040
22432-110140040	polyacetal	1:4	1	40	-	20,2	8,4	41	40	23,4	10	16,9	10,8	15,5	42,2	22432-110140010
22432-115140010	polyacetal	1:4	1,5	10	41,5	-	12,2	18	15	11,3	5	23,2	11	-	34,5	22432-115140040
22432-115140040	polyacetal	1:4	1,5	40	-	25,2	12,3	60,7	60	30,4	12	21	12,8	19	139,1	22432-115140010
22432-120140010	polyacetal	1:4	2	10	53,5	-	16	23,7	20	14	6	28,7	12,8	-	80,4	22432-120140040
22432-120140040	polyacetal	1:4	2	40	-	32,5	16,2	81,2	80	36,1	18	27	17	24,4	325,7	22432-120140010
22432-210140010	polyketone	1:4	1	10	30,2	-	8	12	10	7,9	4	17,7	9,6	-	10,5	22432-210140040
22432-210140040	polyketone	1:4	1	40	-	20,2	8,4	41	40	23,4	10	16,9	10,8	15,5	44,3	22432-210140010
22432-215140010	polyketone	1:4	1,5	10	41,5	-	12,2	18	15	11,3	5	23,2	11	-	36,2	22432-215140040
22432-215140040	polyketone	1:4	1,5	40	-	25,2	12,3	60,7	60	30,4	12	21	12,8	19	146	22432-215140010
22432-220140010	polyketone	1:4	2	10	53,5	-	16	23,7	20	14	6	28,7	12,8	-	84,4	22432-220140040
22432-220140040	polyketone	1:4	2	40	-	32,5	16,2	81,2	80	36,1	18	27	17	24,4	342	22432-220140010

Bevel gears, plastic, ratio 1:5

injection moulded, straight teeth, engagement angle 20°





Material:
Polyacetal (POM) or polyketone (PK).

Version:
Injection moulded, straight teeth. Engagement angle 20°.
Axis angle = 90°.
Machined bores from module 1.5.
Polyacetal, white.
Polyketone, ivory tone.

Sample order:
nlm 22432-110150012

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.

Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Can be used under water and other media.

Injection moulded gear wheels may have internal manufacture-related cavities. These may become visible during drilling or broaching. They do not impair the function.

Bevel gear wheels are supplied as single components. To obtain a pair of bevel gear wheels, please order the specified mating gear as well.

Temperature range:
-40 °C to +140 °C (taking amount and duration of load into account).

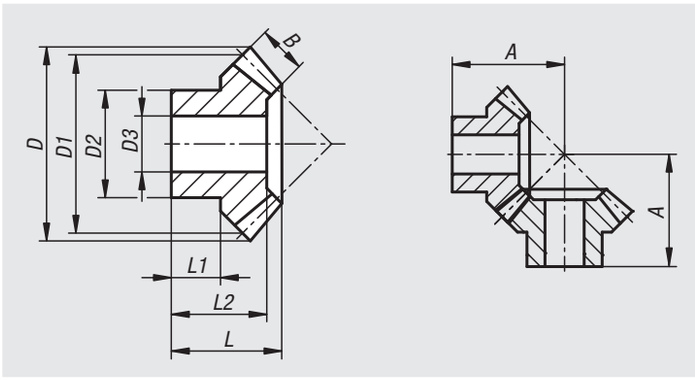
Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Main material	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22432-110150012	polyacetal	1:5	1	12	40,6	-	9,9	13,7	12	9,5	4	20,2	10,1	-	14,9	22432-110150060
22432-110150060	polyacetal	1:5	1	60	-	21,2	9,5	60,3	60	20,5	10	17,4	11,2	15,3	71,6	22432-110150012
22432-210150012	polyketone	1:5	1	12	40,6	-	9,9	13,7	12	9,5	4	20,2	10,1	-	15,6	22432-210150060
22432-210150060	polyketone	1:5	1	60	-	21,2	9,5	60,3	60	20,5	10	17,4	11,2	15,3	75,2	22432-210150012

Bevel gears, zinc, ratio 1:1

cast, straight teeth, engagement angle 20°





Material:
Zinc ZnAl4Cu1.

Version:
Cast, straight teeth. Engagement angle 20°. Axis angle = 90°.
Bright.
Machined bore.

Sample order:
nlm 22433-05110016

Note:
Bevel gears are supplied singly. To obtain a pair of bevel gears, please order the specified mating gear as well.

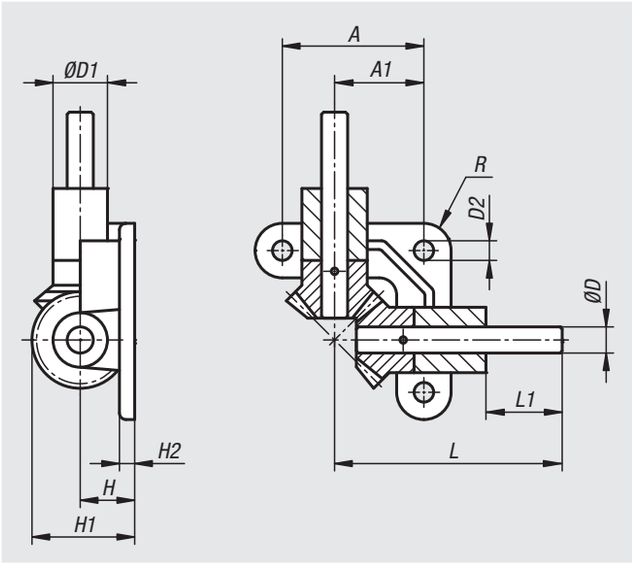
Temperature range:
Zinc bevel gears can only be used up to a maximum of temperature of +100°C under load.

Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Transmission ratio	Module	No. of teeth	A	B	D	D1	D2	D3	L	L1	L2	Max. torque Ncm	matching opposing gear
22433-05110016	1:1	1	16	17,9	4,5	17,3	16	12	6	13	7,5	13	21,8	22433-05110016
22433-15110016	1:1	1,5	16	25,2	6,9	26	24	19	8	18,6	10,7	17	73,1	22433-15110016
22433-20110016	1:1	2	16	30	9,6	34,8	32	23	10	21,3	10	19,2	185,7	22433-20110016
22433-25110016	1:1	2,5	16	36,2	12,3	43,3	40	26	12	25,5	12	23	357	22433-25110016
22433-30110016	1:1	3	16	42,7	14	52,3	48	30	14	29,3	13	26	576,8	22433-30110016
22433-35110016	1:1	3,5	16	49,4	15,5	61,4	56	34	16	33,2	14	29,2	898,9	22433-35110016

Bevel gear drive with plastic bevel gears





Material:
Housing, ZnAl4Cu1 die-cast zinc.
Shafts, 1.4301 stainless steel.
Bevel gears, polyacetal (POM) or polyketone (PK).

Version:
Housing and shafts, bright.
Bevel gears, injection moulded, straight teeth. Engagement angle 20°.
Polyacetal, white.
Polyketone, ivory-tone.

Sample order:
nlm 22715-1210

Note:
Polyacetal: Standard material with high hardness grade and low coefficient of friction.
Polyketone: Material with significantly longer service life, higher power transmission and greater security against tooth breakage due to the extraordinarily high wear resistance and very good tribological properties.

Universally applicable and maintenance-free bevel gear drives in six different sizes with the ratio 1:1. The rotation direction is arbitrary. The shafts are mounted in the housing on self-lubricating plain bearings. The axis angle is 90°.

These bevel gears are suitable for manual drives and for temporary power drives at low speeds and with a low load.

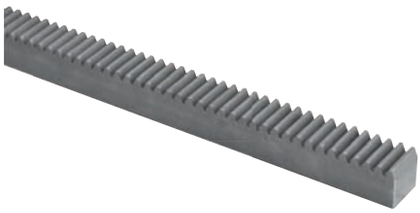
Temperature range:
-20 °C to +100 °C.

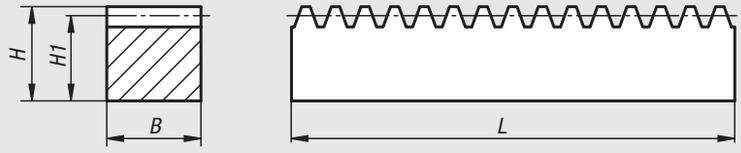
Attention:
The torques specified in the tables relate exclusively to the toothing. The shaft diameter, key size, etc. are not taken into account. The permissible load calculations are based on the basic principles of the pitting load capacity of the tooth flanks as well as the occurring tooth root stress. The respective permissible load of a gear wheel depends on so many different factors that the values specified can only be reference values meant to make selection easier. The torque specifications relate to a single tooth. The overlap, which is essential for determining the transmissible torque, occurs depending on the pitch diameter, gear wheel pairing, etc. In the simplest straight tooth cases, an overlap ratio of 1.1 to 1.25 is normal. To increase the overlap, a higher number of teeth with smaller modules is used. A good profile overlap can minimise damage such as pitting.

Order No.	Component material	Transmission ratio	Module	No. of teeth	A	A1	D	D1	D2	H	H1	H2	L	L1	R	Max. torque Ncm
22715-1210	polyacetal	1:1	1	16/16	32	19,4	5h9	12	4,8	10	18,8	4	50	15	6	8,3
22715-1215	polyacetal	1:1	1,5	16/16	45	28,4	8h9	18	5,8	15	28,2	5	70	20	9	29
22715-1220	polyacetal	1:1	2	16/16	55	35	10h6	22	7	20	37,5	6	90	30	11	73
22715-1225	polyacetal	1:1	2,5	16/16	65	41	12h6	25	9	25	46,8	7	105	35	12,5	145
22715-1230	polyacetal	1:1	3	16/16	75	47,5	15h6	30	9	30	56,2	8	120	40	15	250
22715-1235	polyacetal	1:1	3,5	16/16	85	54	18h6	33	11	35	65,7	9	135	45	16	440
22715-2210	polyketone	1:1	1	16/16	32	19,4	5h9	12	4,8	10	18,8	4	50	15	6	8,7
22715-2215	polyketone	1:1	1,5	16/16	45	28,4	8h9	18	5,8	15	28,2	5	70	20	9	30,4
22715-2220	polyketone	1:1	2	16/16	55	35	10h6	22	7	20	37,5	6	90	30	11	76,6
22715-2225	polyketone	1:1	2,5	16/16	65	41	12h6	25	9	25	46,8	7	105	35	12,5	152,2
22715-2230	polyketone	1:1	3	16/16	75	47,5	15h6	30	9	30	56,2	8	120	40	15	262,5
22715-2235	polyketone	1:1	3,5	16/16	85	54	18h6	33	11	35	65,7	9	135	45	16	462

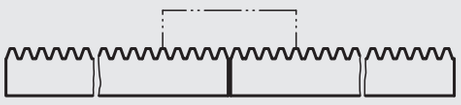
Gear racks in steel

toothing milled, straight teeth, engagement angle 20°





mounting in series



Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.

Sample order:
nlm 22420-010150X500

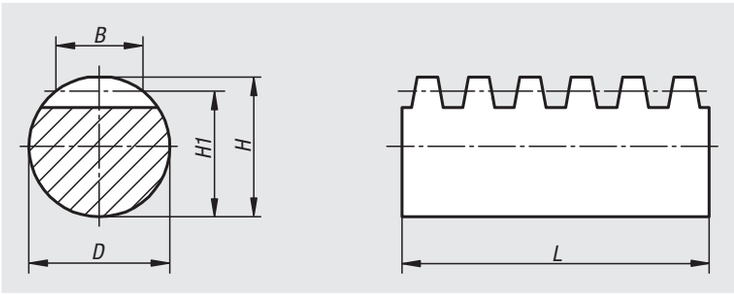
Note:
The gear racks are suitable for mounting in series.

Order No.	Module	B	H	H1	L	L Actual length
22420-010150X500	1	15	15	14	500	499,51
22420-010150X1000	1	15	15	14	1000	1002,17
22420-010150X2000	1	15	15	14	2000	2001,19
22420-015170X500	1,5	17	17	15,5	500	504,22
22420-015170X1000	1,5	17	17	15,5	1000	1003,74
22420-015170X2000	1,5	17	17	15,5	2000	2002,77
22420-020200X500	2	20	20	18	500	502,65
22420-020200X1000	2	20	20	18	1000	1005,31
22420-020200X2000	2	20	20	18	2000	2004,34
22420-025250X500	2,5	25	25	22,5	500	502,65
22420-025250X1000	2,5	25	25	22,5	1000	1005,31
22420-025250X2000	2,5	25	25	22,5	2000	2002,77
22420-030300X500	3	30	30	27	500	508,94
22420-030300X1000	3	30	30	27	1000	1008,45
22420-030300X2000	3	30	30	27	2000	2007,48

Gear racks in steel

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.
Outside diameter ground, tolerance h6.

Sample order:
nlm 22425-010060X500

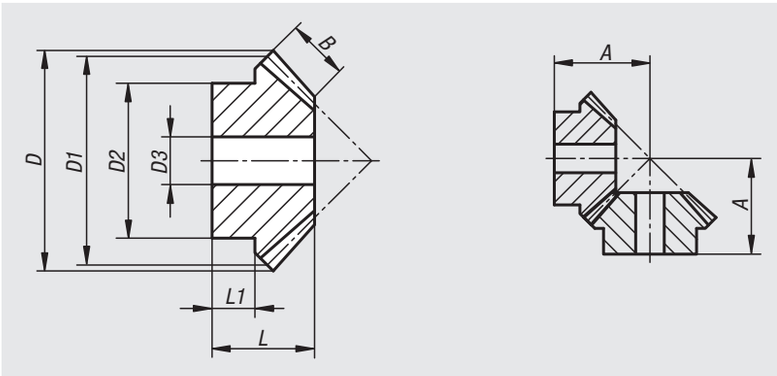
Note:
The gear rack teeth are cut using a hob mill.
This results in minus tolerances for dimensions H and H1:
up to module 2: -0.2 mm.
module 2.5 to 3: -0.3 mm.

Order No.	Module	B	D	H	H1	L
22425-010060X500	1	6	10	10	9	500
22425-010060X1000	1	6	10	10	9	1000
22425-010060X2000	1	6	10	10	9	2000
22425-015090X500	1,5	9	15	15	13,5	500
22425-015090X1000	1,5	9	15	15	13,5	1000
22425-015090X2000	1,5	9	15	15	13,5	2000
22425-020120X500	2	12	20	20	18	500
22425-020120X1000	2	12	20	20	18	1000
22425-020120X2000	2	12	20	20	18	2000
22425-025150X500	2,5	15	25	25	22,5	500
22425-025150X1000	2,5	15	25	25	22,5	1000
22425-025150X2000	2,5	15	25	25	22,5	2000
22425-030180X500	3	18	30	30	27	500
22425-030180X1000	3	18	30	30	27	1000
22425-030180X2000	3	18	30	30	27	2000

Bevel gears in steel, ratio 1:1

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.
Axis angle = 90°.

Sample order:
nlm 22430-010110016

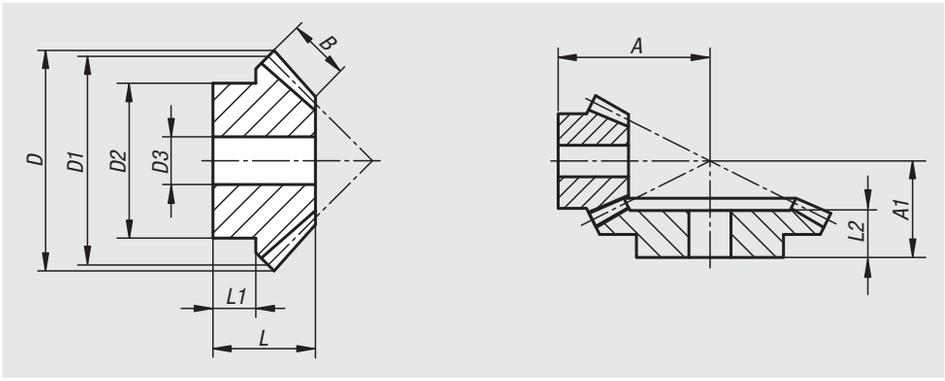
Note for ordering:
Bevel gears are supplied singly. To obtain a pair of bevel gears, please order the specified mating gear as well.

Order No.	Transmission ratio	Module	No. of teeth	A	B	D	D1	D2	D3	L	L1	matching opposing gear
22430-010110016	1:1	1	16	16	4	17,4	16	13,3	4	11,2	6,7	22430-010110016
22430-010110019	1:1	1	19	18	4	20,4	19	15,3	4	11,8	6,6	22430-010110019
22430-010110022	1:1	1	22	20	4,7	23,4	22	16,3	5	12,8	6,1	22430-010110022
22430-010110026	1:1	1	26	22	5,5	27,4	26	20,3	5	13,3	7	22430-010110026
22430-010110030	1:1	1	30	26	6,4	31,4	30	20,3	5	16	8	22430-010110030
22430-015110016	1:1	1,5	16	26	6	26,1	24	20,3	8	18,9	12,2	22430-015110016
22430-015110019	1:1	1,5	19	30	7	30,6	28,5	20,3	8	21,3	11,6	22430-015110019
22430-015110022	1:1	1,5	22	33	7,5	35,1	33	25,3	8	22,5	12,7	22430-015110022
22430-015110026	1:1	1,5	26	36	8,5	41,1	39	28,3	8	23,2	12	22430-015110026
22430-015110030	1:1	1,5	30	42	10	47,1	45	30	12	27,2	12,1	22430-015110030
22430-020110016	1:1	2	16	33	8	34,8	32	25,3	8	23,5	13,6	22430-020110016
22430-020110019	1:1	2	19	36	9	40,8	38	25,3	8	24,2	12	22430-020110019
22430-020110022	1:1	2	22	42	10	46,8	44	30,3	10	27,9	14	22430-020110022
22430-020110026	1:1	2	26	48	12	54,8	52	35,3	12	31,4	13,7	22430-020110026
22430-020110030	1:1	2	30	54	13	62,8	60	40,3	12	34,1	17	22430-020110030
22430-025110016	1:1	2,5	16	40	10	43,5	40	30,3	12	28,1	15,2	22430-025110016
22430-025110019	1:1	2,5	19	42	11	51	47,5	35,3	12	27,1	13	22430-025110019
22430-025110022	1:1	2,5	22	48	12	58,5	55	45,3	12	30,1	15,7	22430-025110022
22430-025110026	1:1	2,5	26	54	15	68,5	65	45,3	15	33,2	16	22430-025110026
22430-025110030	1:1	2,5	30	64	16	78,5	75	50,3	15	39	20	22430-025110030
22430-030110016	1:1	3	16	46	12	52,2	48	40,3	12	31,7	18,1	22430-030110016
22430-030110019	1:1	3	19	54	13	61,2	57	40,3	14	36	17,1	22430-030110019
22430-030110022	1:1	3	22	58	15	70,2	66	50,3	15	36,9	17,1	22430-030110022
22430-030110026	1:1	3	26	64	17	82,2	78	50,3	15	38,4	18	22430-030110026
22430-030110030	1:1	3	30	74	19	94,2	90	60,3	20	43,8	22	22430-030110030

Bevel gears in steel, ratio 1:2

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.
Axis angle = 90°.

Sample order:
nlm 22430-010120015

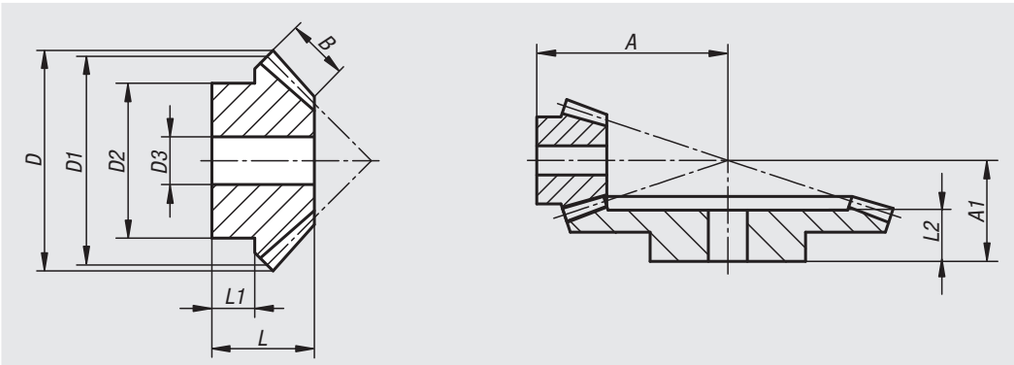
Note for ordering:
Bevel gears are supplied singly. To obtain a pair of bevel gears, please order the specified mating gear as well.

Order No.	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	matching opposing gear
22430-010120015	1:2	1	15	22	-	5	17,4	15	13,3	4	11,9	6,6	-	22430-010120030
22430-010120030	1:2	1	30	-	20	5	30,6	30	20,3	5	15,1	9	14	22430-010120015
22430-015120015	1:2	1,5	15	35	-	9	26,1	22,5	20,3	8	21,1	12	-	22430-015120030
22430-015120030	1:2	1,5	30	-	32	9	45,9	45	32,3	8	25,2	16	23	22430-015120015
22430-020120015	1:2	2	15	45	-	11,5	34,8	30	25,3	8	26	13,8	-	22430-020120030
22430-020120030	1:2	2	30	-	39	11,5	61,2	60	40,3	12	29,8	18	27	22430-020120015
22430-025120015	1:2	2,5	15	55	-	15	43,5	37,5	32,3	12	31,8	16,2	-	22430-025120030
22430-025120030	1:2	2,5	30	-	45	15	76,5	75	45,3	15	33,7	20	30	22430-025120015
22430-030120015	1:2	3	15	66	-	17	52,2	45	40,3	12	37,3	19,8	-	22430-030120030
22430-030120030	1:2	3	30	-	56	17	91,8	90	55,3	15	42,1	25	38	22430-030120015

Bevel gears in steel, ratio 1:3

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.
Axis angle = 90°.

Sample order:
nlm 22430-010130015

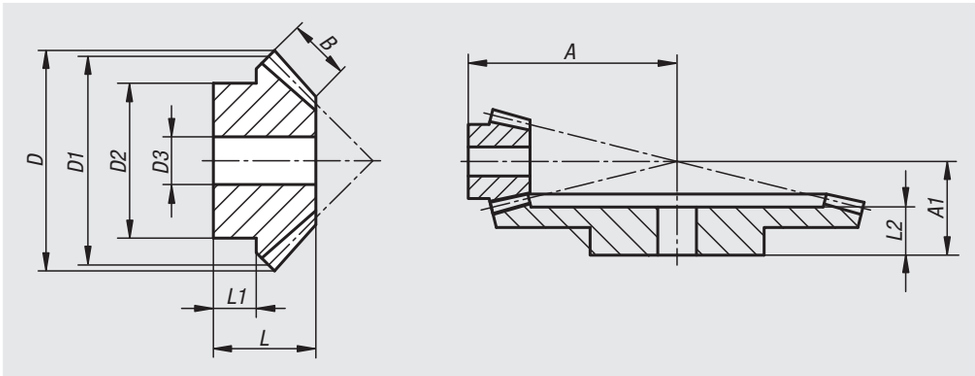
Note for ordering:
Bevel gears are supplied singly. To obtain a pair of bevel gears, please order the specified mating gear as well.

Order No.	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	matching opposing gear
22430-010130015	1:3	1	15	32	-	7,1	17,7	15	13,3	4	16,6	9,3	-	22430-010130045
22430-010130045	1:3	1	45	-	22	7,1	45,3	45	25,3	8	17,1	10	15	22430-010130015
22430-015130015	1:3	1,5	15	46	-	10,5	26,5	22,5	19,3	8	22,6	11,7	-	22430-015130045
22430-015130045	1:3	1,5	45	-	37	10,5	68,1	67,5	45,3	14	29,6	20	27	22430-015130015
22430-020130015	1:3	2	15	60	-	14	35,4	30	25,3	8	28,9	14,2	-	22430-020130045
22430-020130045	1:3	2	45	-	42	14	90,8	90	45,3	15	32,1	20	29	22430-020130015
22430-025130015	1:3	2,5	15	73	-	18	44,2	37,5	32,3	12	34,6	15,9	-	22430-025130045
22430-025130045	1:3	2,5	45	-	52	18	113,4	112,5	60,3	20	39,7	25	36	22430-025130015
22430-030130015	1:3	3	15	88	-	21	53	45	40,3	15	41,3	19,7	-	22430-030130045
22430-030130045	1:3	3	45	-	62	21	136,1	135	60,3	20	47,2	30	42,5	22430-030130015

Bevel gears in steel, ratio 1:4

toothing milled, straight teeth, engagement angle 20°





Material:
Steel 1.0503 (C45).

Version:
Milled toothing, straight teeth.
Engagement angle 20°, bright.
Axis angle = 90°.

Sample order:
nlm 22430-010140015

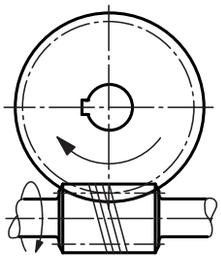
Note for ordering:
Bevel gears are supplied singly. To obtain a pair of bevel gears, please order the specified mating gear as well.

Order No.	Transmission ratio	Module	No. of teeth	A	A1	B	D	D1	D2	D3	L	L1	L2	matching opposing gear
22430-010140015	1:4	1	15	38	-	9,3	17,8	15	13,3	4	17,2	7,7	-	22430-010140060
22430-010140060	1:4	1	60	-	22	9,3	60,3	60	30,3	8	17,1	10	15	22430-010140015
22430-015140015	1:4	1,5	15	57	-	11	26,7	22,5	20,3	8	23	11,7	-	22430-015140060
22430-015140060	1:4	1,5	60	-	42	11	90,4	90	50,3	15	34	25	31	22430-015140015
22430-020140015	1:4	2	15	75	-	16	35,6	30	25,3	8	31	14,4	-	22430-020140060
22430-020140060	1:4	2	60	-	48	16	120,6	120	60,3	16	37,6	25	34	22430-020140015
22430-025140015	1:4	2,5	15	94	-	19	44,5	37,5	32,3	14	38,1	18,4	-	22430-025140060
22430-025140060	1:4	2,5	60	-	58	19	150,7	150	60,3	20	44,8	30	40	22430-025140015
22430-030140015	1:4	3	15	115	-	23	53,3	45	40,3	15	48,1	24,5	-	22430-030140060
22430-030140060	1:4	3	60	-	69	23	180,8	180	80,3	20	53,2	35	48	22430-030140015

Notes

Technical information for worm gears

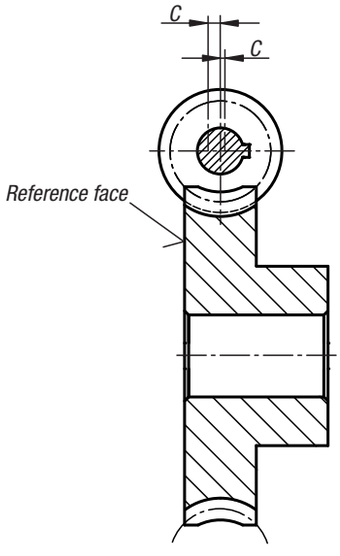
Worm gears right hand



The parts available from the catalogue are right hand. Custom made left hand gears for opposite direction of rotation are only available on request.



Installing the worm wheel



For lateral mounting of the worm wheel, the toleranced reference face is decisive. The lateral tolerance “c” must not exceed 0.15 mm for all centre distances.



Slide the wheel in the direction of the arrow

Correct marking

Slide the wheel in the direction of the arrow

Check the contact pattern to ensure that the worm wheel is correctly installed with regard to axial positioning. The contact pattern should tend towards the runout edge of the wheel. When the worm gear is put into reverse, the contact pattern should tend towards the centre.

Important: Some of the slots are not DIN standard. Please observe the specified slot widths.

Efficiency

The efficiency is generally dependent on the following conditions:

- Worm screw gradient angle
- Glide velocity
- Lubricant
- Surface finish
- Installation dimensions

The efficiency improves with increasing axial distance. For reasons of space and economy, plain bearings are often used by smaller centre distances. These have a higher co-efficient of friction compared to ball bearings and can strongly effect the overall efficiency. The specified efficiency values are only valid under optimum conditions.
Start-up efficiency: The lubricating film between the tooth flanks only forms once the transmission is in motion causing the start-up efficiency to be ca. 30% lower than the operating efficiency specified in the catalogue.

Self-locking

Self-locking is influenced by the gradient angle, the surface finish on the flanks, the glide velocity, the lubricant and the resulting heating. There is a difference between dynamic and static self-locking.
Dynamic self-locking: up to 3° gradient angle with grease lubrication; up to 2.5° gradient angle with synthetic oil lubrication.
Static self-locking: from 3° to 5° gradient angle with grease lubrication; from 2.5° to 4.5° gradient angle with synthetic oil lubrication. There is no self-locking by gradient angles over 4.5° or 5°. Shocks and vibrations can hinder the self-locking function. A number of factors relating to lubrication, glide velocity and load can create glide characteristics such that the self-locking function is negatively influenced and for this reason, no guarantees can be made with regard to the self-locking function.

Technical information for worm gears

Torque data and service life

The torque data is based on a screw speed of 2800 rpm. By reduced screw, the torque increases by the following factors:

n1	2800 rpm	1400 rpm	950 rpm	700 rpm	500 rpm	250 rpm	125 rpm
Factor n1	1	1,12	1,2	1,26	1,33	1,49	1,67

A service life of ca. 3000 hours is basic. The following factors are used for a shortened or increased service life:

Service life	approx. 3000 hours	approx. 1500 hours	approx. 6000 hours
Factor SI	1	1,4	0,71

Calculation example (operating conditions not taken into account)

Gear size centre distance 40 mm; transmission ratio 1:35; mineral oil lubrication; screw speed 700 rpm; service life 1500 hours

What output torque does this produce on the worm wheel?

Output torque = T2 (mineral oil) x n (factor) x L (factor) <= breaking point

= 37.2 Nm x 1.26 x 1.4

= 65.6 Nm

Warning! The output torque is limited by attainment of the yield point of the gear wheel. The yield point is attained at factor ca. 3 (or 300%) of the catalogue data.

T2 for mineral oil = 37.2 Nm x 3 = 111.6 Nm.

Calculation example (operating conditions taken into account)

Operating factors

Due to the wide spectrum of possible applications, the operating factors are guideline values that should be used at ones own discretion. When commissioning it must be taken into account that, independent of the type of operation, the housing temperature does not exceed 80 °C.

Shocks at the drive	None	Medium	Strong
Operating factor f1	1	1,2	1,5

Start-up frequency	10/h	60/h	360/h
Start-up factor f2	1	1,1	1,2

Duty cycle DC	<40%	<70%	<100%
Duty cycle factor f3	1	1,15	1,3

Gear set size 40 mm centre distance, transmission ration 1:35, T2=65.6 Nm (see above calculation) however with severe jolts / 360 starts per hour / 100% duty cycle operating conditions.

$$\textbf{Output torque} = \frac{T2}{f1 \times f2 \times f3} = \frac{65{,}6\text{Nm}}{1{,}5 \times 1{,}2 \times 1{,}3} = 28\text{Nm}$$

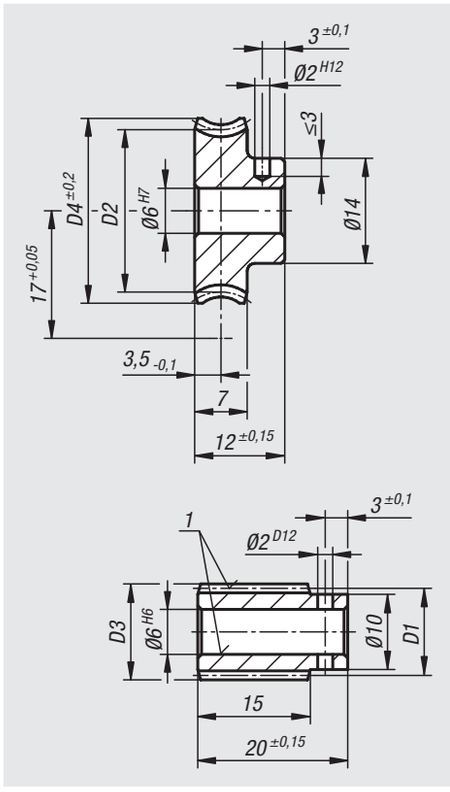
The relationship between service life, speed and torque can be calculated using the following simplified formula

Calculation of the service life (Lh new) with the required torque (T2 new)	$L_{h\,new} = \left(\frac{T2_{Nom.} \times \text{Factor n1}}{T2_{new}}\right)^2 \bullet L_{h\,Nom.}$	T2 Nom. = Output torque acc. to catalogue specifications Lh Nom. = Service life estimate acc. to catalogue ca. 3000 h
Calculation of the torque (T2 new) with the required service life (Lh new)	$T2_{new} = \frac{T2_{Nom.} \times \text{Factor } n_1}{\sqrt{\frac{L_{h\,new}}{L_{h\,Nom.}}}}$	

Worm gears, right-hand

centre distance 17 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-171002 Worm screw
nlm 22500-172002 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Attention:
22500-171002: Screw polished only.
22500-172002: Worm wheel with helical gear toothing.

22500-171050: Screw has a Ø9 mm hub.

Drawing reference:
1) ground

Worm gears, right-hand

centre distance 17 mm



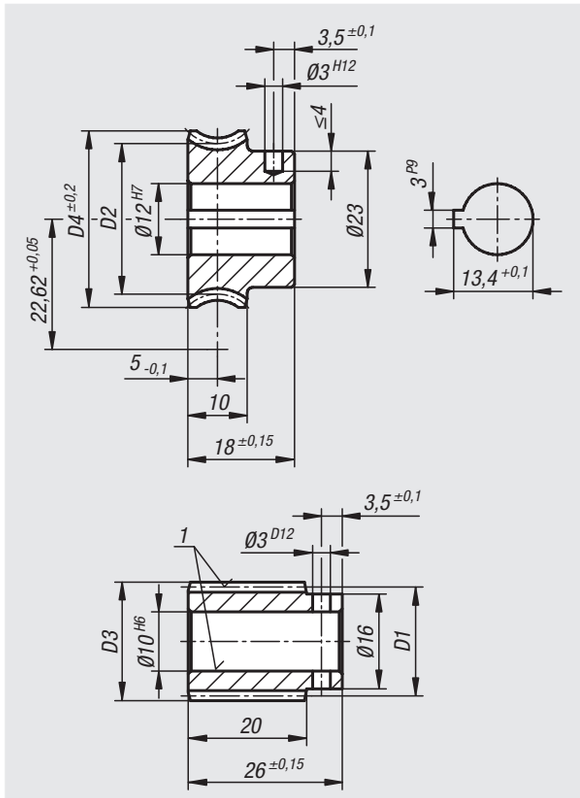
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-171002	**22500-172002**	-/2,25:1	48° 15	0,9	8/-	10,15/-	11,95/-	-/18	-/23,85	-/25,63
22500-171004	**22500-172004**	-/4,5:1	21° 50	0,75	6/-	12,1/-	13,6/-	-/27	-/21,9	-/24,6
22500-171005	**22500-172005**	-/5:1	21° 37	0,7	6/-	11,4/-	12,8/-	-/30	-/22,6	-/24,6
22500-171007	**22500-172007**	-/7:1	14° 4	1	3/-	12,34/-	14,34/-	-/21	-/21,66	-/24,6
22500-171009	**22500-172009**	-/9:1	9° 40	0,75	3/-	13,4/-	14,9/-	-/27	-/20,6	-/22,7
22500-171010	**22500-172010**	-/10:1	11° 48	0,75	3/-	11/-	12,5/-	-/30	-/23	-/24,6
22500-171015	**22500-172015**	-/15:1	7° 38	0,75	2/-	11,3/-	12,8/-	-/30	-/22,7	-/24,6
22500-171025	**22500-172025**	-/25:1	4° 32	0,9	1/-	11,4/-	13,2/-	-/25	-/22,6	-/24,6
22500-171030	**22500-172030**	-/30:1	3° 45	0,75	1/-	11,45/-	12,95/-	-/30	-/22,55	-/24,6
22500-171040	**22500-172040**	-/40:1	2° 3	0,5	1/-	13,98/-	14,98/-	-/40	-/20,02	-/21,6
22500-171050	**22500-172050**	-/50:1	3° 12	0,5	1/-	8,95/-	9,95/-	-/50	-/25,05	-/27,2
22500-171060	**22500-172060**	-/60:1	2° 18	0,4	1/-	9,95/-	10,75/-	-/60	-/24,05	-/26
22500-171075	**22500-172075**	-/75:1	1° 28	0,3	1/-	11,74/-	12,34/-	-/75	-/22,26	-/24
22500-171080	**22500-172080**	-/80:1	1° 43	0,3	1/-	10/-	10,84/-	-/80	-/24	-/25,1

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-171002	**22500-172002**	-/2,25:1	1,1	1,3	1,6
22500-171004	**22500-172004**	-/4,5:1	1,7	2	2,6
22500-171005	**22500-172005**	-/5:1	1,8	2,2	2,7
22500-171007	**22500-172007**	-/7:1	1,6	1,9	2,4
22500-171009	**22500-172009**	-/9:1	1,5	1,8	2,2
22500-171010	**22500-172010**	-/10:1	1,9	2,3	2,8
22500-171015	**22500-172015**	-/15:1	1,9	2,3	2,8
22500-171025	**22500-172025**	-/25:1	1,8	2,2	2,7
22500-171030	**22500-172030**	-/30:1	1,9	2,3	2,8
22500-171040	**22500-172040**	-/40:1	1,4	1,7	2,1
22500-171050	**22500-172050**	-/50:1	1	1,2	1,5
22500-171060	**22500-172060**	-/60:1	1,6	1,9	2,4
22500-171075	**22500-172075**	-/75:1	1,5	1,8	2,2
22500-171080	**22500-172080**	-/80:1	1,5	1,8	2,2

Worm gears, right-hand

centre distance 22.62 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-221003 Worm screw
nlm 22500-222003 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 22.62 mm

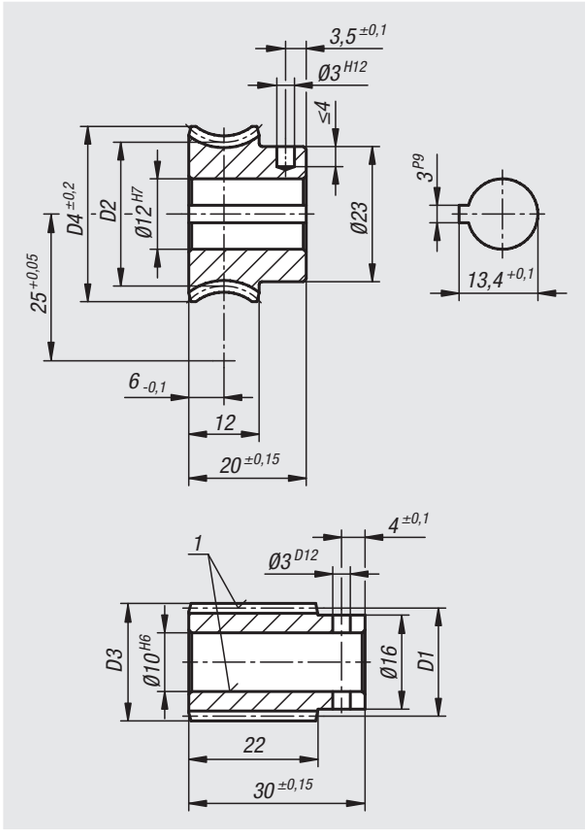
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-221003	**22500-222003**	-/3:1	17° 36	1	7/-	23,15/-	25,15/-	-/21	-/22,09	-/24,8
22500-221004	**22500-222004**	-/4:1	19° 32	1,25	5/-	18,7/-	21,2/-	-/20	-/26,54	-/29,8
22500-221007	**22500-222007**	-/7:1	11° 46	1,25	3/-	18,4/-	20,9/-	-/21	-/26,84	-/29,8
22500-221010	**22500-222010**	-/10,5:1	7° 41	1,25	2/-	18,7/-	21,2/-	-/21	-/26,54	-/29,8
22500-221021	**22500-222021**	-/21:1	3° 48	1,25	1/-	18,9/-	21,4/-	-/21	-/26,34	-/29,8
22500-221030	**22500-222030**	-/30:1	2° 50	0,9	1/-	18,2/-	20/-	-/30	-/27,04	-/29,8
22500-221040	**22500-222040**	-/40:1	2° 20	0,7	1/-	17,2/-	18,6/-	-/40	-/28,04	-/29,8

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-221003	**22500-222003**	/3:1	2,2	2,6	3,3
22500-221004	**22500-222004**	/4:1	3,6	4,3	5,4
22500-221007	**22500-222007**	/7:1	3,6	4,3	5,4
22500-221010	**22500-222010**	/10,5:1	3,4	4,1	5,1
22500-221021	**22500-222021**	/21:1	3,4	4,1	5,1
22500-221030	**22500-222030**	/30:1	3,6	4,3	5,4
22500-221040	**22500-222040**	/40:1	3,9	4,7	5,8

Worm gears, right-hand

centre distance 25 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-251004 Worm screw
nlm 22500-252004 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

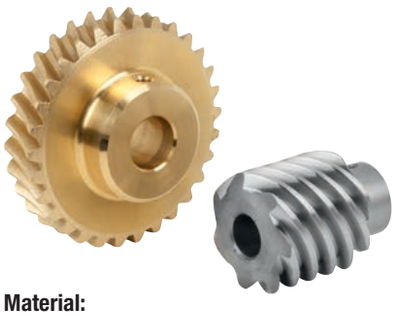
centre distance 25 mm

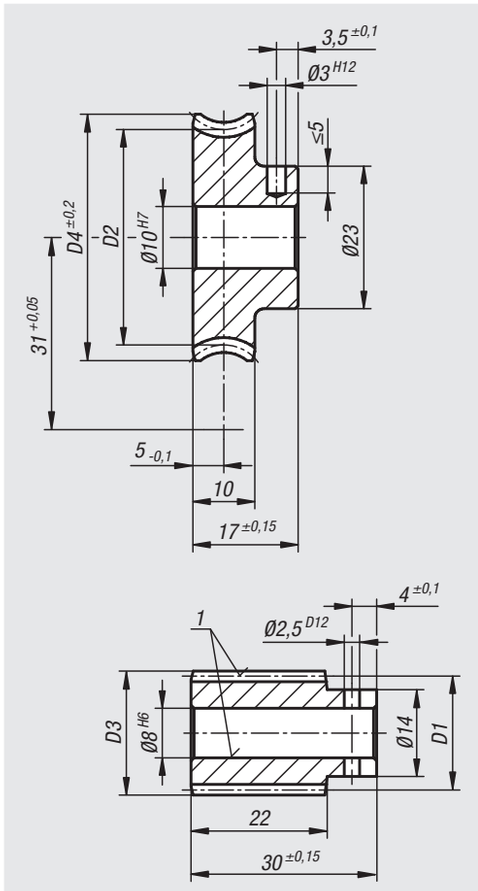
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-251004	**22500-252004**	-/4:1	20° 29	1,4	5/-	20/-	22,8/-	-/20	-/30	-/33,5
22500-251005	**22500-252005**	-/5:1	19° 15	1,5	4/-	18,2/-	21,2/-	-/20	-/31,8	-/34,8
22500-251006	**22500-252006**	-/6,5:1	13° 52	1,15	4/-	19,2/-	21,5/-	-/26	-/30,8	-/34,8
22500-251010	**22500-252010**	-/10:1	8° 48	1,5	2/-	19,6/-	22,6/-	-/20	-/30,4	-/34,8
22500-251015	**22500-252015**	-/15:1	6° 29	1	2/-	17,7/-	19,7/-	-/30	-/32,3	-/34,8
22500-251020	**22500-252020**	-/20:1	4° 19	1,5	1/-	19,9/-	22,9/-	-/20	-/30,1	-/34,8
22500-251025	**22500-252025**	-/25:1	2° 18	1	1/-	24,96/-	26,96/-	-/25	-/25,04	-/27,8
22500-251030	**22500-252030**	-/30:1	2° 53	1	1/-	19,9/-	21,9/-	-/30	-/30,1	-/33,5
22500-251040	**22500-252040**	-/40:1	2° 33	0,8	1/-	17,96/-	19,56/-	-/40	-/32,04	-/34,8
22500-251050	**22500-252050**	-/50:1	1° 43	0,6	1/-	19,96/-	21,16/-	-/50	-/30,04	-/33,5

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-251004	**22500-252004**	-/4:1	5,1	6,1	7,6
22500-251005	**22500-252005**	-/5:1	6,5	7,8	9,7
22500-251006	**22500-252006**	-/6,5:1	6	7,2	9
22500-251010	**22500-252010**	-/10:1	5,9	7,1	8,8
22500-251015	**22500-252015**	-/15:1	5,7	6,8	8,5
22500-251020	**22500-252020**	-/20:1	5,8	7	8,7
22500-251025	**22500-252025**	-/25:1	4,1	4,9	6,1
22500-251030	**22500-252030**	-/30:1	5,9	7,1	8,8
22500-251040	**22500-252040**	-/40:1	6,2	7,4	9,3
22500-251050	**22500-252050**	-/50:1	5,1	6,1	7,6

Worm gears, right-hand

centre distance 31 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-311002 Worm
nlm 22500-312002 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-311002	**22500-312002**	-/2,5:1	45° 15	1,25	10/-	17,6/-	20,1/-	-/25	-/44,4	-/46,9
22500-311003	**22500-312003**	-/3:1	35° 10	1,15	10/-	19,97/-	22,27/-	-/30	-/42,03	-/44,5
22500-311004	**22500-312004**	-/4,28:1	25° 24	1,25	7/-	20,4/-	22,9/-	-/30	-/41,6	-/45
22500-311005	**22500-312005**	-/5:1	23° 46	1,3	6/-	19,35/-	21,95/-	-/30	-/42,65	-/46,5
22500-311006	**22500-312006**	-/6:1	18° 13	1,3	5/-	20,8/-	23,4/-	-/30	-/41,2	-/45
22500-311007	**22500-312007**	-/7:1	20° 32	1,5	4/-	17,1/-	20,1/-	-/28	-/44,9	-/48,8
22500-311008	**22500-312008**	-/8,33:1	19° 49	1,75	3/-	15,5/-	19/-	-/25	-/46,5	-/51
22500-311010	**22500-312010**	-/10:1	12° 50	1,4	3/-	18,9/-	21,7/-	-/30	-/43,1	-/47
22500-311012	**22500-312012**	-/12:1	13° 55	1,25	3/-	15,6/-	18,1/-	-/36	-/46,4	-/50
22500-311015	**22500-312015**	-/15:1	10° 40	1,5	2/-	16,2/-	19,2/-	-/30	-/45,8	-/50
22500-311018	**22500-312018**	-/18:1	8° 44	1,25	2/-	16,46/-	18,96/-	-/36	-/45,54	-/48,8
22500-311020	**22500-312020**	-/20:1	7° 49	0,75	3/-	16,54/-	18,04/-	-/60	-/45,46	-/48
22500-311022	**22500-312022**	-/22:1	6° 29	1	2/-	17,7/-	19,7/-	-/44	-/44,3	-/48

Worm gears, right-hand

centre distance 31 mm

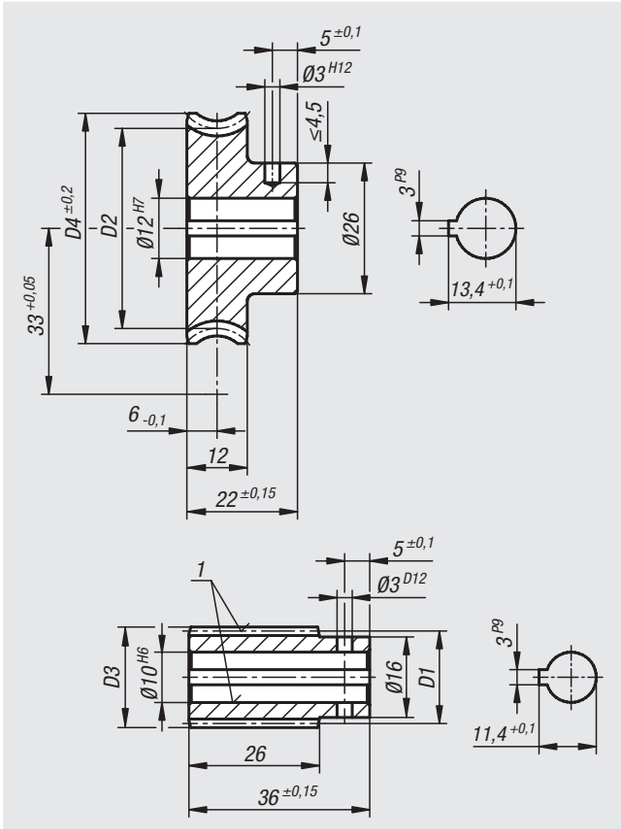
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-311023	**22500-312023**	-/23:1	7° 29	2	1/-	15,35/-	19,35/-	-/23	-/46,65	-/52
22500-311024	**22500-312024**	-/24:1	5° 4	1,75	1/-	19,8/-	23,3/-	-/24	-/42,2	-/47
22500-311025	**22500-312025**	-/25:1	5° 35	1,75	1/-	18/-	21,5/-	-/25	-/44	-/48,5
22500-311028	**22500-312028**	-/28:1	4° 20	1,5	1/-	19,85/-	22,85/-	-/28	-/42,15	-/46,5
22500-311030	**22500-312030**	-/30:1	5° 7	1,5	1/-	16,8/-	19,8/-	-/30	-/45,2	-/48,8
22500-311032	**22500-312032**	-/32:1	4° 45	1,4	1/-	16,9/-	19,7/-	-/32	-/45,1	-/48,8
22500-311038	**22500-312038**	-/38:1	5° 1	1,25	1/-	14,3/-	16,8/-	-/38	-/47,7	-/51,2
22500-311045	**22500-312045**	-/45:1	3° 23	1	1/-	16,93/-	18,93/-	-/45	-/45,07	-/48
22500-311050	**22500-312050**	-/50:1	3° 3	0,9	1/-	16,9/-	18,7/-	-/50	-/45,1	-/48
22500-311055	**22500-312055**	-/55:1	4° 12	0,9	1/-	12,3/-	14,1/-	-/55	-/49,7	-/52
22500-311060	**22500-312060**	-/60:1	2° 33	0,75	1/-	16,9/-	18,4/-	-/60	-/45,1	-/48
22500-311070	**22500-312070**	-/70:1	3° 7	0,7	1/-	12,9/-	14,3/-	-/70	-/49,1	-/52
22500-311075	**22500-312075**	-/75:1	2° 2	0,6	1/-	16,9/-	18,1/-	-/75	-/45,1	-/47
22500-311090	**22500-312090**	-/90:1	1° 41	0,5	1/-	17/-	18/-	-/90	-/45	-/48
22500-311100	**22500-312100**	-/100:1	2° 24	0,5	1/-	11,96/-	12,96/-	-/100	-/50,04	-/52,7

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-311002	**22500-312002**	-/2,5:1	4,4	5,3	6,6
22500-311003	**22500-312003**	-/3:1	4,5	5,4	6,7
22500-311004	**22500-312004**	-/4,28:1	9	10,8	13,5
22500-311005	**22500-312005**	-/5:1	9,5	11,4	14,2
22500-311006	**22500-312006**	-/6:1	7,6	9,1	11,4
22500-311007	**22500-312007**	-/7:1	9,7	11,6	14,5
22500-311008	**22500-312008**	-/8,33:1	10	12	15
22500-311010	**22500-312010**	-/10:1	9,5	11,4	14,2
22500-311012	**22500-312012**	-/12:1	12,1	14,5	18,1
22500-311015	**22500-312015**	-/15:1	10,7	12,8	16
22500-311018	**22500-312018**	-/18:1	10,3	12,4	15,4
22500-311020	**22500-312020**	-/20:1	8,3	10	12,4
22500-311022	**22500-312022**	-/22:1	9,6	11,5	14,4
22500-311023	**22500-312023**	-/23:1	10,5	12,6	15,7
22500-311024	**22500-312024**	-/24:1	9,2	11	13,8
22500-311025	**22500-312025**	-/25:1	9,6	11,5	14,4
22500-311028	**22500-312028**	-/28:1	9,1	10,9	13,6
22500-311030	**22500-312030**	-/30:1	10,3	12,4	15,4
22500-311032	**22500-312032**	-/32:1	10,2	12,2	15,3
22500-311038	**22500-312038**	-/38:1	11,4	13,7	17,1
22500-311045	**22500-312045**	-/45:1	9,5	11,4	14,2
22500-311050	**22500-312050**	-/50:1	9	10,8	13,5
22500-311055	**22500-312055**	-/55:1	10,4	12,5	15,6
22500-311060	**22500-312060**	-/60:1	8,2	9,8	12,3
22500-311070	**22500-312070**	-/70:1	9	10,8	13,5
22500-311075	**22500-312075**	-/75:1	7,3	8,8	10,9
22500-311090	**22500-312090**	-/90:1	6,4	7,7	9,6
22500-311100	**22500-312100**	-/100:1	7,4	8,9	11,1

Worm gears, right-hand

centre distance 33 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-331003 Worm
nlm 22500-332003 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 33 mm

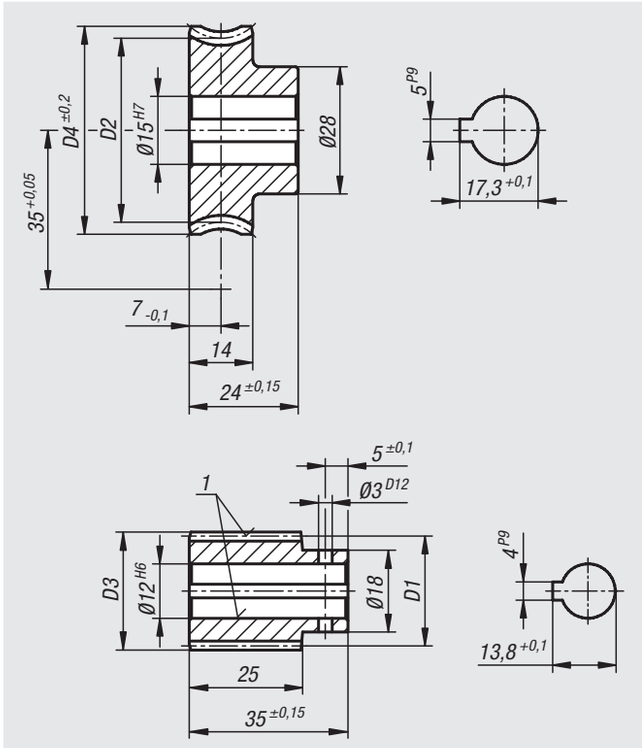
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-331003	**22500-332003**	-/3,5:1	25° 57	1,75	6/-	24/-	27,5/-	-/21	-/42	-/47
22500-331005	**22500-332005**	-/5:1	20° 50	2	4/-	22,5/-	26,5/-	-/20	-/43,5	-/49
22500-331007	**22500-332007**	-/7:1	15° 32	1,5	4/-	22,4/-	25,4/-	-/28	-/43,6	-/48
22500-331010	**22500-332010**	-/10:1	13° 10	1,5	3/-	19,75/-	22,75/-	-/30	-/46,25	-/51
22500-331011	**22500-332011**	-/11,33:1	10° 42	1,3	3/-	21/-	23,6/-	-/34	-/45	-/49,2
22500-331012	**22500-332012**	-/12:1	11° 14	1,9	2/-	19,5/-	23,3/-	-/24	-/46,5	-/52
22500-331015	**22500-332015**	-/15:1	8° 25	1,5	2/-	20,5/-	23,5/-	-/30	-/45,5	-/50
22500-331016	**22500-332016**	-/16:1	10° 1	1,5	2/-	17,24/-	20,24/-	-/32	-/48,76	-/53
22500-331017	**22500-332017**	-/17:1	9° 3	1,4	2/-	17,8/-	20,6/-	-/34	-/48,2	-/52,5
22500-331018	**22500-332018**	-/18:1	6° 57	1,25	2/-	20,65/-	23,15/-	-/36	-/45,35	-/49,2
22500-331020	**22500-332020**	-/20:1	6° 43	1,15	2/-	19,66/-	21,96/-	-/40	-/46,34	-/50,5
22500-331024	**22500-332024**	-/24:1	5° 27	1,9	1/-	20/-	23,8/-	-/24	-/46	-/51
22500-331028	**22500-332028**	-/28:1	3° 36	1,5	1/-	23,9/-	26,9/-	-/28	-/42,1	-/46,6
22500-331030	**22500-332030**	-/30:1	4° 8	1,5	1/-	20,85/-	23,85/-	-/30	-/45,15	-/50
22500-331032	**22500-332032**	-/32:1	4° 50	1,5	1/-	17,8/-	20,8/-	-/32	-/48,2	-/52,5
22500-331038	**22500-332038**	-/38:1	3° 55	1,25	1/-	18,28/-	20,76/-	-/38	-/47,74	-/51,6
22500-331050	**22500-332050**	-/50:1	2° 27	0,9	1/-	21/-	22,8/-	-/50	-/45	-/48
22500-331056	**22500-332056**	-/56:1	2° 10	0,8	1/-	21,15/-	22,75/-	-/56	-/44,85	-/48
22500-331060	**22500-332060**	-/60:1	2° 33	0,8	1/-	17,96/-	19,56/-	-/60	-/48,04	-/51,5
22500-331072	**22500-332072**	-/72:1	1° 30	0,6	1/-	22,8/-	24/-	-/72	-/43,2	-/46
22500-331075	**22500-332075**	-/75:1	1° 41	0,6	1/-	20,5/-	21,7/-	-/75	-/45,5	-/48

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-331003	**22500-332003**	-/3,5:1	10,1	12,1	15,1
22500-331005	**22500-332005**	-/5:1	10,6	12,7	15,9
22500-331007	**22500-332007**	-/7:1	12,2	14,6	18,3
22500-331010	**22500-332010**	-/10:1	13,3	16	19,9
22500-331011	**22500-332011**	-/11,33:1	13,3	16	19,9
22500-331012	**22500-332012**	-/12:1	13,5	16,2	20,2
22500-331015	**22500-332015**	-/15:1	13	15,6	19,5
22500-331016	**22500-332016**	-/16:1	14	16,8	21
22500-331017	**22500-332017**	-/17:1	14,2	17	21,3
22500-331018	**22500-332018**	-/18:1	12,6	15,1	18,9
22500-331020	**22500-332020**	-/20:1	12,7	15,2	19
22500-331024	**22500-332024**	-/24:1	13,2	15,8	19,8
22500-331028	**22500-332028**	-/28:1	11,2	13,4	16,8
22500-331030	**22500-332030**	-/30:1	12,7	15,2	19
22500-331032	**22500-332032**	-/32:1	13,5	16,2	20,2
22500-331038	**22500-332038**	-/38:1	13,9	16,7	20,8
22500-331050	**22500-332050**	-/50:1	10	12	15
22500-331056	**22500-332056**	-/56:1	10,1	12,1	15,1
22500-331060	**22500-332060**	-/60:1	11,4	13,7	17,1
22500-331072	**22500-332072**	-/72:1	8,4	10,01	12,6
22500-331075	**22500-332075**	-/75:1	9	10,8	13,5

Worm gears, right-hand

centre distance 35 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-351002 Worm screw
nlm 22500-352002 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 35 mm

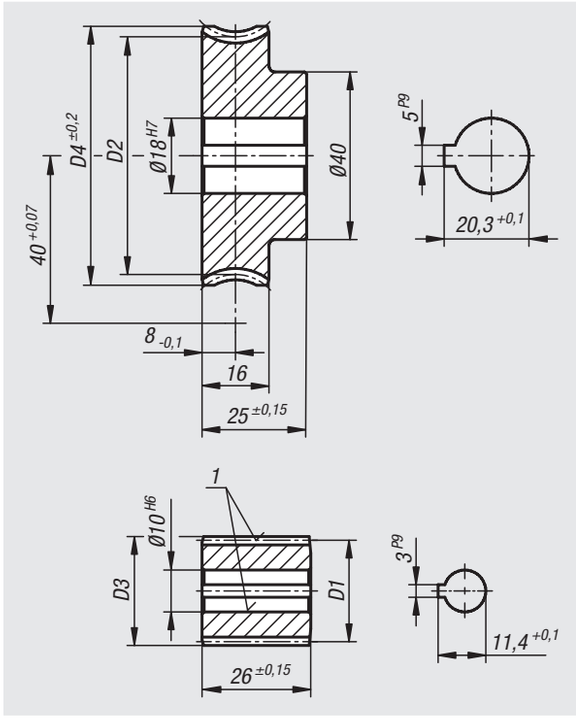
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-351002	**22500-352002**	-/2,78:1	31° 01	1,5	9/-	26,2/-	29,2/-	-/25	-/43,8	-/46,76
22500-351005	**22500-352005**	-/5:1	22° 52	1,75	5/-	22,52/-	26,02/-	-/25	-/47,48	-/53
22500-351007	**22500-352007**	-/7,25:1	13° 47	1,5	4/-	25,18/-	28,18/-	-/29	-/44,82	-/50
22500-351008	**22500-352008**	-/8:1	14° 25	1,9	3/-	22,89/-	26,69/-	-/24	-/47,11	-/53
22500-351010	**22500-352010**	-/10:1	10° 43	1,5	3/-	24,2/-	27,2/-	-/30	-/45,8	-/51
22500-351011	**22500-352011**	-/11:1	10° 32	1,4	3/-	22,98/-	25,78/-	-/33	-/47,02	-/52
22500-351012	**22500-352012**	-/12:1	9° 11	1,9	2/-	23,8/-	27,6/-	-/24	-/46,2	-/52
22500-351015	**22500-352015**	-/15:1	7°	1,5	2/-	24,62/-	27,62/-	-/30	-/45,38	-/50
22500-351020	**22500-352020**	-/20:1	5° 33	1,15	2/-	23,78/-	26,08/-	-/40	-/46,22	-/50,5
22500-351025	**22500-352025**	-/25:1	4° 9	0,9	2/-	24,87/-	26,67/-	-/50	-/45,13	-/49
22500-351030	**22500-352030**	-/30:1	3° 27	1,5	1/-	24,92/-	27,92/-	-/30	-/45,08	-/50
22500-351035	**22500-352035**	-/35:1	3° 51	1,4	1/-	20,85/-	23,65/-	-/35	-/49,15	-/53
22500-351040	**22500-352040**	-/40:1	2° 45	1,15	1/-	23,91/-	26,21/-	-/40	-/46,09	-/50,5
22500-351050	**22500-352050**	-/50:1	2° 4	0,9	1/-	24,93/-	26,73/-	-/50	-/45,07	-/49
22500-351058	**22500-352058**	-/58:1	2° 21	0,85	1/-	20,65/-	22,35/-	-/58	-/49,35	-/53
22500-351090	**22500-352090**	-/90:1	1° 9	0,5	1/-	25/-	26/-	-/90	-/45	-/49

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-351002	**22500-352002**	-/2,78:1	6,6	8,2	10,2
22500-351005	**22500-352005**	-/5:1	15,3	18,4	22,9
22500-351007	**22500-352007**	-/7,25:1	14,7	17,6	22
22500-351008	**22500-352008**	-/8:1	16,7	20	25
22500-351010	**22500-352010**	-/10:1	16	19,2	24
22500-351011	**22500-352011**	-/11:1	16,7	20	25
22500-351012	**22500-352012**	-/12:1	16,1	19,3	24
22500-351015	**22500-352015**	-/15:1	15,3	18,4	22,9
22500-351020	**22500-352020**	-/20:1	14,8	17,8	22,2
22500-351025	**22500-352025**	-/25:1	12,9	15,5	19,3
22500-351030	**22500-352030**	-/30:1	15	18	22,5
22500-351035	**22500-352035**	-/35:1	17,1	20,5	25,6
22500-351040	**22500-352040**	-/40:1	14,7	17,6	22
22500-351050	**22500-352050**	-/50:1	12,9	15,5	19,3
22500-351058	**22500-352058**	-/58:1	14,5	17,4	21,7
22500-351090	**22500-352090**	-/90:1	9,1	10,9	13,6

Worm gears, right-hand

centre distance 40 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-401006 Worm screw
nlm 22500-402006 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 40 mm

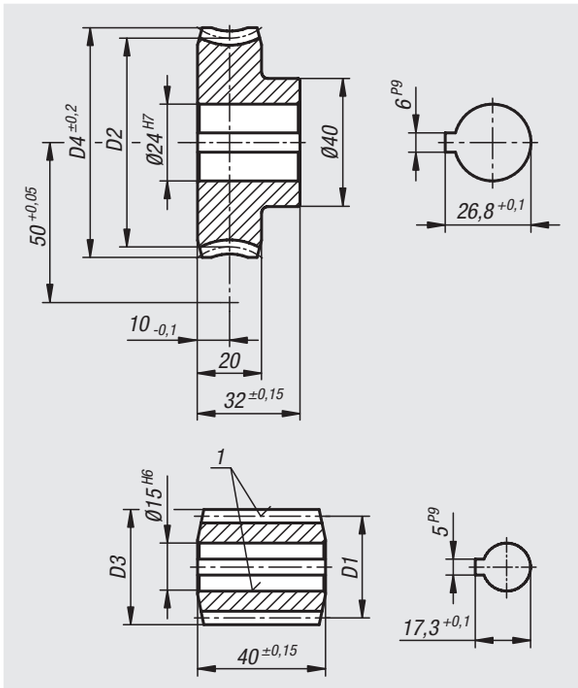
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-401006	**22500-402006**	-/6,75:1	21° 19	2	4/-	22/-	26/-	-/27	-/58	-/64
22500-401008	**22500-402008**	-/8:1	16° 35	2,25	3/-	23,64/-	28,14/-	-/24	-/56,36	-/62,5
22500-401010	**22500-402010**	-/10:1	16° 1	1,9	3/-	20,66/-	24,46/-	-/30	-/59,34	-/65
22500-401012	**22500-402012**	-/12:1	10° 21	1,5	3/-	25,05/-	28,05/-	-/36	-/54,95	-/60
22500-401015	**22500-402015**	-/15:1	9° 53	1,9	2/-	22,14/-	25,94/-	-/30	-/57,86	-/64
22500-401020	**22500-402020**	-/20:1	8° 59	1,5	2/-	19,2/-	22,2/-	-/40	-/60,8	-/66
22500-401025	**22500-402025**	-/25:1	5° 58	1,15	2/-	22,15/-	24,45/-	-/50	-/57,85	-/62
22500-401028	**22500-402028**	-/28:1	4° 47	2	1/-	24/-	28/-	-/28	-/56	-/61,5
22500-401030	**22500-402030**	-/30:1	5° 50	2	1/-	19,68/-	23,68/-	-/30	-/60,32	-/66
22500-401035	**22500-402035**	-/35:1	5° 26	1,75	1/-	18,48/-	21,98/-	-/35	-/61,52	-/67
22500-401036	**22500-402036**	-/36:1	3° 19	1,5	1/-	25,91/-	28,91/-	-/36	-/54,09	-/59
22500-401040	**22500-402040**	-/40:1	4° 20	1,5	1/-	19,83/-	22,83/-	-/40	-/60,17	-/65
22500-401050	**22500-402050**	-/50:1	4° 8	1,25	1/-	17,3/-	19,8/-	-/50	-/62,7	-/68
22500-401056	**22500-402056**	-/56:1	2° 23	1	1/-	24/-	26/-	-/56	-/56	-/59
22500-401060	**22500-402060**	-/60:1	1° 59	0,9	1/-	25,92/-	27,72/-	-/60	-/54,08	-/57,5
22500-401070	**22500-402070**	-/70:1	3° 3	0,9	1/-	16,91/-	18,71/-	-/70	-/63,09	-/67
22500-401075	**22500-402075**	-/75:1	1° 48	0,75	1/-	23,75/-	25,25/-	-/75	-/56,26	-/60
22500-401080	**22500-402080**	-/80:1	2° 10	0,75	1/-	19,9/-	21,4/-	-/80	-/60,1	-/64
22500-401090	**22500-402090**	-/90:1	2° 22	0,7	1/-	16,95/-	18,35/-	-/90	-/63,05	-/67

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-401006	**22500-402006**	-/6,75:1	29,5	35,4	44,2
22500-401008	**22500-402008**	-/8:1	27,5	33	41,2
22500-401010	**22500-402010**	-/10:1	29,5	35,4	44,2
22500-401012	**22500-402012**	-/12:1	25,2	30,2	37,8
22500-401015	**22500-402015**	-/15:1	28	33,6	42
22500-401020	**22500-402020**	-/20:1	28,9	34,6	43,3
22500-401025	**22500-402025**	-/25:1	24,4	29,2	36,6
22500-401028	**22500-402028**	-/28:1	28,4	34	42,6
22500-401030	**22500-402030**	-/30:1	30,1	36,1	45,1
22500-401035	**22500-402035**	-/35:1	31	37,2	46,5
22500-401036	**22500-402036**	-/36:1	23,9	28,6	35,8
22500-401040	**22500-402040**	-/40:1	28,3	33,9	42,4
22500-401050	**22500-402050**	-/50:1	27	32,4	40,5
22500-401056	**22500-402056**	-/56:1	21,9	26,2	32,8
22500-401060	**22500-402060**	-/60:1	19,3	23,1	28,9
22500-401070	**22500-402070**	-/70:1	24,1	28,9	36,1
22500-401075	**22500-402075**	-/75:1	18,8	22,5	28,2
22500-401080	**22500-402080**	-/80:1	20,1	24,1	30,1
22500-401090	**22500-402090**	-/90:1	19,1	22,9	28,6

Worm gears, right-hand

centre distance 50 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-531004 Worm screw
nlm 22500-502004 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 50 mm

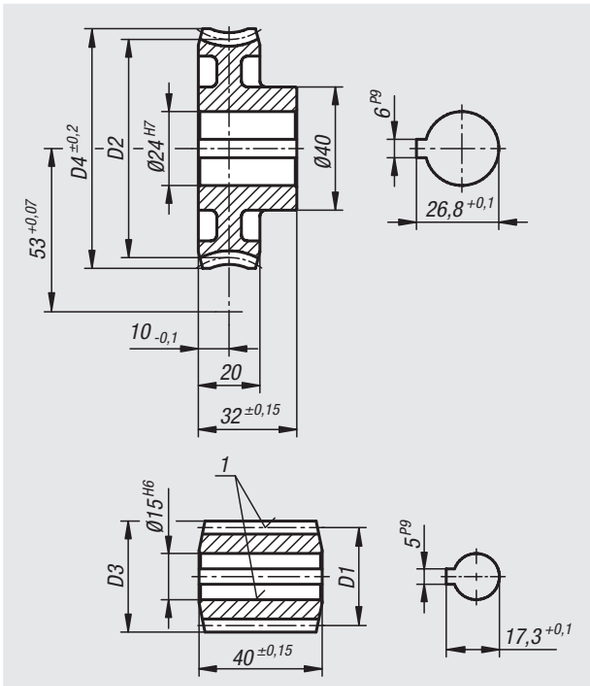
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-531004	**22500-502004**	-/4,25:1	25° 51	3,5	4/-	32,1/-	39,1/-	-/17	-/67,9	-/77
22500-531006	**22500-502006**	-/6:1	19° 17	3,5	3/-	31,8/-	38,8/-	-/18	-/68,2	-/77
22500-531008	**22500-502008**	-/8,66:1	13° 52	2,5	3/-	31,29/-	36,29/-	-/26	-/68,71	-/77
22500-531012	**22500-502012**	-/12:1	10° 23	2,75	2/-	30,5/-	36/-	-/24	-/69,5	-/77
22500-531013	**22500-502014**	-/13,5:1	9° 38	2,5	2/-	29,9/-	34,9/-	-/27	-/70,1	-/77
22500-531019	**22500-502019**	-/19:1	6° 17	3,5	1/-	32/-	39/-	-/19	-/68	-/77
22500-531023	**22500-502023**	-/23:1	5° 38	3	1/-	30,58/-	36,58/-	-/23	-/69,42	-/77
22500-531027	**22500-502027**	-/27:1	4° 40	2,5	1/-	30,73/-	35,73/-	-/27	-/69,27	-/77
22500-531035	**22500-502035**	-/35:1	3° 51	2	1/-	29,78/-	33,78/-	-/35	-/70,22	-/77
22500-531046	**22500-502046**	-/46:1	2° 47	1,5	1/-	30,85/-	33,85/-	-/46	-/69,15	-/74
22500-531055	**22500-502055**	-/55:1	2° 19	1,25	1/-	30,9/-	33,4/-	-/55	-/69,1	-/74
22500-531075	**22500-502069**	-/69:1	1° 51	1	1/-	30,9/-	32,9/-	-/69	-/69,1	-/74

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-531004	**22500-502004**	-/4,25:1	-/34	-/40,8	-/51
22500-531006	**22500-502006**	-/6:1	-/52	-/62,4	-/78
22500-531008	**22500-502008**	-/8,66:1	-/64,3	-/77,1	-/96,4
22500-531012	**22500-502012**	-/12:1	-/66,4	-/79,6	-/99,6
22500-531013	**22500-502014**	-/13,5:1	-/62,8	-/75,4	-/94,2
22500-531019	**22500-502019**	-/19:1	-/78,2	-/93,8	-/117,3
22500-531023	**22500-502023**	-/23:1	-/71,1	-/85,3	-/106,6
22500-531027	**22500-502027**	-/27:1	-/64,5	-/77,4	-/96,7
22500-531035	**22500-502035**	-/35:1	-/56,7	-/68	-/85
22500-531046	**22500-502046**	-/46:1	-/50,6	-/60,7	-/75,9
22500-531055	**22500-502055**	-/55:1	-/46,2	-/55,4	-/69,3
22500-531075	**22500-502069**	-/69:1	-/41,4	-/49,6	-/62,8

Worm gears, right-hand

centre distance 53 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-531004 Worm screw
nlm 22500-532004 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 53 mm

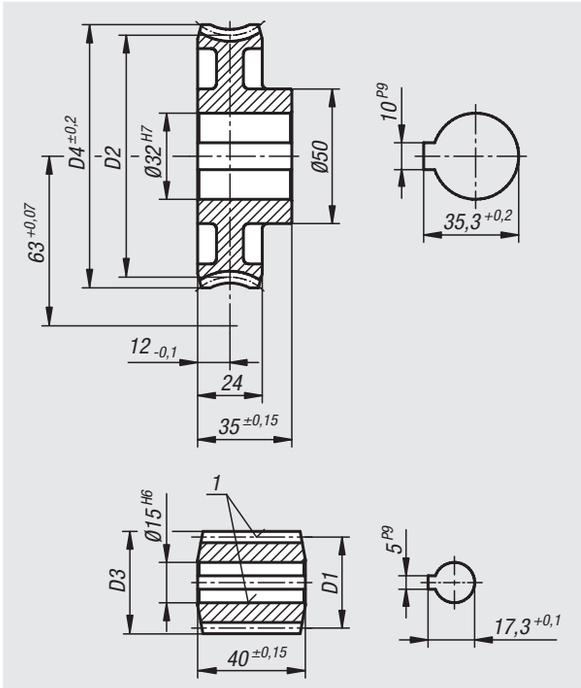
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-531004	**22500-532004**	-/4,75:1	25° 51	3,5	4/-	32,1/-	39,1/-	-/19	-/73,9	-/83
22500-531006	**22500-532006**	-/6,67:1	19° 17	3,5	3/-	31,8/-	38,8/-	-/20	-/74,2	-/84
22500-531008	**22500-532009**	-/9,67:1	13° 52	2,5	3/-	31,29/-	36,29/-	-/29	-/74,71	-/82
22500-531012	**22500-532013**	-/13,5:1	10° 23	2,75	2/-	30,5/-	36/-	-/27	-/75,5	-/84
22500-531013	**22500-532015**	-/15:1	9° 38	2,5	2/-	29,9/-	34,9/-	-/30	-/76,1	-/83
22500-531019	**22500-532021**	-/21:1	6° 17	3,5	1/-	32/-	39/-	-/21	-/74	-/83
22500-531023	**22500-532025**	-/25:1	5° 38	3	1/-	30,58/-	36,58/-	-/25	-/75,42	-/84
22500-531028	**22500-532028**	-/28:1	3° 59	2,5	1/-	36/-	41/-	-/28	-/70	-/77,5
22500-531027	**22500-532030**	-/30:1	4° 40	2,5	1/-	30,73/-	35,73/-	-/30	-/75,27	-/83
22500-531035	**22500-532038**	-/38:1	3° 51	2	1/-	29,78/-	33,78/-	-/38	-/76,21	-/83
22500-531046	**22500-532050**	-/50:1	2° 47	1,5	1/-	30,85/-	33,85/-	-/50	-/75,15	-/81
22500-531055	**22500-532060**	-/60:1	2° 19	1,25	1/-	30,9/-	33,4/-	-/60	-/75,1	-/80
22500-531075	**22500-532075**	-/75:1	1° 51	1	1/-	30,9/-	32,9/-	-/75	-/75,1	-/78

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-531004	**22500-532004**	-/4,75:1	-/45	-/54	-/67,5
22500-531006	**22500-532006**	-/6,67:1	-/67	-/81	-/101
22500-531008	**22500-532009**	-/9,67:1	-/77	-/93	-/116
22500-531012	**22500-532013**	-/13,5:1	-/80	-/96	-/120
22500-531013	**22500-532015**	-/15:1	-/75	-/90	-/113
22500-531019	**22500-532021**	-/21:1	-/94	-/113	-/141
22500-531023	**22500-532025**	-/25:1	-/84	-/101	-/127
22500-531028	**22500-532028**	-/28:1	-/87	-/104	-/130
22500-531027	**22500-532030**	-/30:1	-/77	-/93	-/116
22500-531035	**22500-532038**	-/38:1	-/68	-/81	-/102
22500-531046	**22500-532050**	-/50:1	-/60	-/72	-/90
22500-531055	**22500-532060**	-/60:1	-/55	-/66	-/82
22500-531075	**22500-532075**	-/75:1	-/49	-/59	-/74

Worm gears, right-hand

centre distance 63 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-531004 Worm screw
nlm 22500-632006 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 63 mm

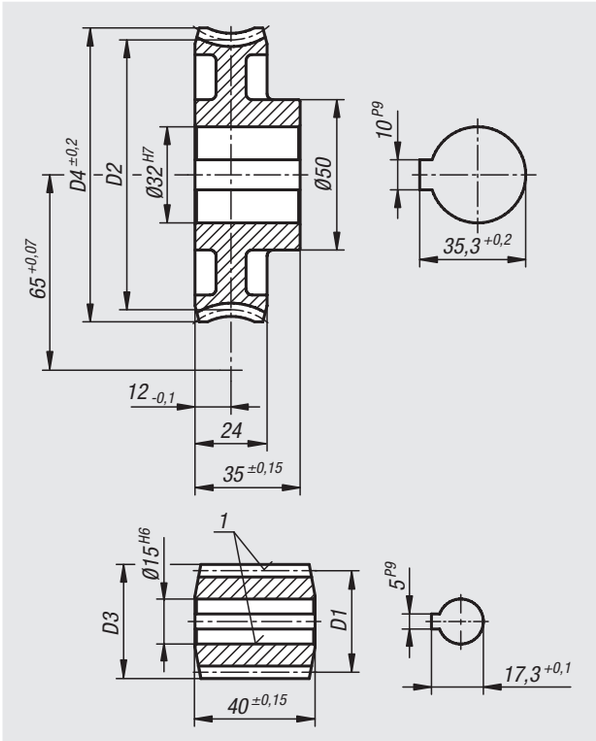
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-531004	**22500-632006**	-/6:1	25° 51	3,5	4/-	32,1/-	39,1/-	-/24	-/93,9	-/104
22500-531008	**22500-632012**	-/12:1	13° 52	2,5	3/-	31,29/-	36,29/-	-/36	-/94,71	-/104
22500-631019	**22500-632019**	-/19:1	10° 8	2,5	2/-	28,4/-	33,4/-	-/38	-/97,6	-/104
22500-531019	**22500-632026**	-/26:1	6° 17	3,5	1/-	32/-	39/-	-/26	-/94	-/104
22500-631034	**22500-632034**	-/34:1	5° 9	2,75	1/-	30,6/-	36,1/-	-/34	-/95,4	-/104
22500-531035	**22500-632048**	-/48:1	3° 51	2	1/-	29,78/-	33,78/-	-/48	-/96,22	-/104
22500-531046	**22500-632063**	-/63:1	2° 47	1,5	1/-	30,85/-	33,85/-	-/63	-/95,15	-/101
22500-651075	**22500-632070**	-/70:1	1° 59	1,25	1/-	36,1/-	38,6/-	-/70	-/89,9	-/97

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-531004	**22500-632006**	-/6:1	-/89	-/107	-/134
22500-531008	**22500-632012**	-/12:1	-/141	-/170	-/212
22500-631019	**22500-632019**	-/19:1	-/133	-/159	-/199
22500-531019	**22500-632026**	-/26:1	-/172	-/206	-/258
22500-631034	**22500-632034**	-/34:1	-/148	-/178	-/222
22500-531035	**22500-632048**	-/48:1	-/125	-/150	-/187
22500-531046	**22500-632063**	-/63:1	-/111	-/133	-/166
22500-651075	**22500-632070**	-/70:1	-/112	-/135	-/169

Worm gears, right-hand

centre distance 65 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-531004 Worm screw
nlm 22500-652006 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

centre distance 65 mm

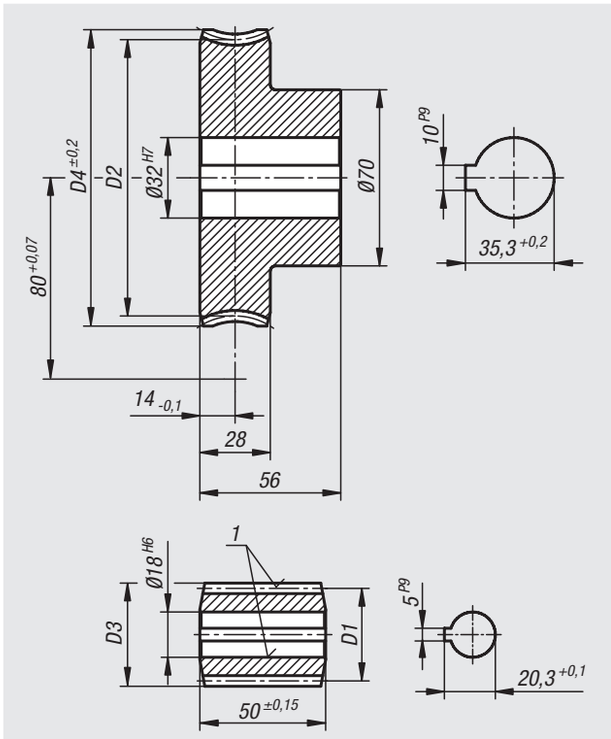
Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-531004	**22500-652006**	-/6,25:1	25° 51	3,5	4/-	32,1/-	39,1/-	-/25	-/97,9	-/108
22500-531008	**22500-652012**	-/12,66:1	13° 52	2,5	3/-	31,29/-	36,29/-	-/38	-/98,71	-/108
22500-631019	**22500-652020**	-/20:1	10° 8	2,5	2/-	28,4/-	33,4/-	-/40	-/101,6	-/108
22500-531019	**22500-652028**	-/28:1	6° 17	3,5	1/-	32/-	39/-	-/28	-/98	-/108
22500-631034	**22500-652036**	-/36:1	5° 9	2,75	1/-	30,6/-	36,1/-	-/36	-/99,4	-/108
22500-531035	**22500-652050**	-/50:1	3° 51	2	1/-	29,78/-	33,78/-	-/50	-/100,22	-/108
22500-531046	**22500-652066**	-/66:1	2° 47	1,5	1/-	30,85/-	33,85/-	-/66	-/99,15	-/107
22500-651075	**22500-652075**	-/75:1	1° 59	1,25	1/-	36,1/-	38,6/-	-/75	-/93,9	-/100

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-531004	**22500-652006**	-/6,25:1	-/101	-/121	-/151
22500-531008	**22500-652012**	-/12,66:1	-/156	-/187	-/234
22500-631019	**22500-652020**	-/20:1	-/146	-/176	-/220
22500-531019	**22500-652028**	-/28:1	-/192	-/230	-/288
22500-631034	**22500-652036**	-/36:1	-/164	-/197	-/246
22500-531035	**22500-652050**	-/50:1	-/137	-/164	-/205
22500-531046	**22500-652066**	-/66:1	-/122	-/146	-/183
22500-651075	**22500-652075**	-/75:1	-/125	-/150	-/188

Worm gears, right-hand

centre distance 80 mm





Material:
Worm screw steel.
Worm wheel CuZn37Mn3Al2PbSi-S40.

Version:
Worm screw with right-hand pitch, case-hardened HV 620 – 700, flanks and hole ground.

Sample order:
nlm 22500-801006 Worm screw
nlm 22500-802006 Worm wheel

Note for ordering:
Wheels/screws can only be combined to form a worm gear if they have the same centre distance and transmission ratio.

Note:
A worm gear consists of a worm screw (shaft) and a worm wheel. Suitable for forming worm drives with a 90° shaft angle. A worm drive enables very large speed reduction ratios with a single stage.

The toothing has the flank shape K. The engagement angle is 15°. The worm gears are pre-bored.

The stated T2 output torques are the permissible output torques on the worm wheel. These apply for an input speed of 2800 rpm of the worm screw.

The worm gears are suitable for continuous operation at high speeds and high torques.

Drawing reference:
1) ground



Worm gears, right-hand

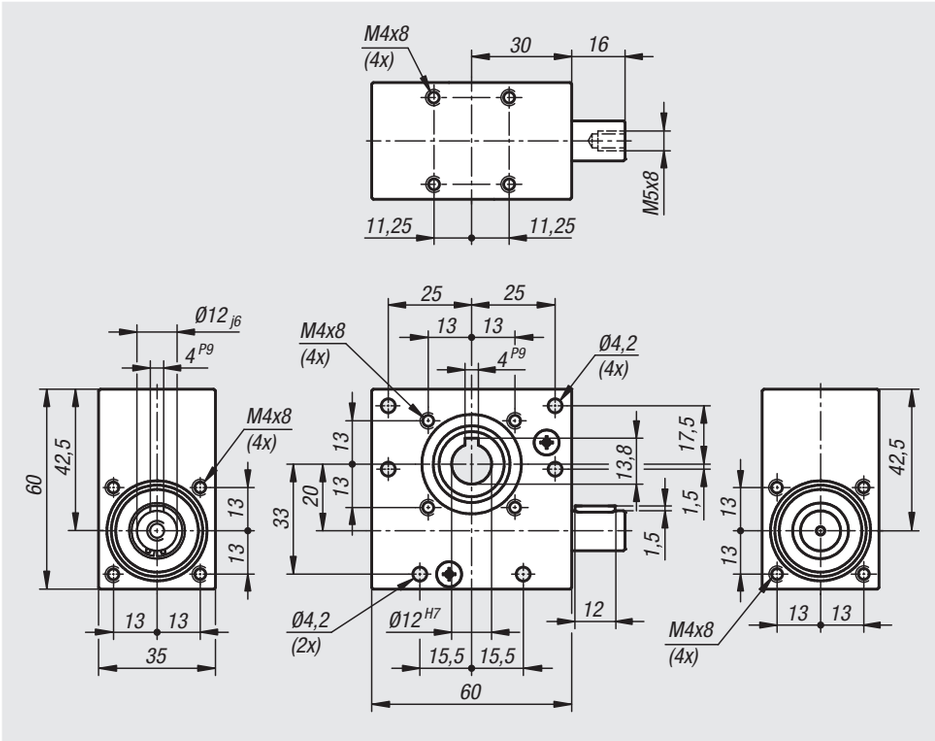
centre distance 80 mm

Order No. worm	Order No. worm wheel	Transmission ratio	Pitch angle	Module	Z1	D1	D3	Z2	D2	D4
22500-801006	**22500-802006**	-/6,75:1	23° 35	4	4/-	40/-	48/-	-/27	-/120	-/132
22500-801012	**22500-802012**	-/12:1	16° 36	2,5	4/-	35/-	40/-	-/48	-/125	-/132,5
22500-801020	**22500-802020**	-/20:1	8° 58	3	2/-	38,5/-	44,5/-	-/40	-/121,5	-/130,5
22500-801030	**22500-802030**	-/30:1	5° 44	4	1/-	40/-	48/-	-/30	-/120	-/132,5
22500-801050	**22500-802050**	-/50:1	4° 6	2,5	1/-	35/-	40/-	-/50	-/125	-/132,5
22500-801080	**22500-802080**	-/80:1	2° 9	1,5	1/-	40/-	43/-	-/80	-/120	-/124,5

Order No. worm	Order No. worm wheel	Transmission ratio	Output torque T2 (Nm) mineral grease	Output torque T2 (Nm) mineral oil	Output torque T2 (Nm) synthetic oil
22500-801006	**22500-802006**	-/6,75:1	150	180	225
22500-801012	**22500-802012**	-/12:1	243	290	365
22500-801020	**22500-802020**	-/20:1	290	348	435
22500-801030	**22500-802030**	-/30:1	348	417	522
22500-801050	**22500-802050**	-/50:1	248	297	372
22500-801080	**22500-802080**	-/80:1	213	255	320

Worm drives





Material:
Housing aluminium.
Worm screw steel, worm wheel special brass.

Version:
Housing anodised.
Worm screw case hardened.
Ball bearing with rubber sealing washer RS.

Sample order:
nlm 22700-13

Note:
Universally applicable and maintenance-free worm drive in one size with a centre distance of 20 mm and 7 different ratios. The housing is sealed to prevent grease leakage and keep dust out. These are left hand worm gears. The rotation direction on the shaft is arbitrary.

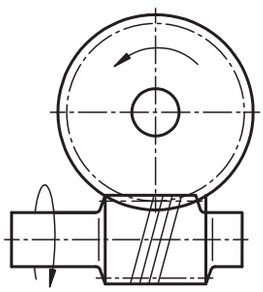
- smooth power transmission
- simple screw fastening
- quiet

Temperature range:
-20 °C to +60 °C.

Attention:
FR permissible radial force at FA=0
FA permissible axial force at FR=0

Technical data:
Radial backlash: ±1°
Duty cycle: 20% (at 5 min.)
Service life: ca. 1000 hours (at full load, speed 500 rpm and duty cycle 20%)

Worm drives

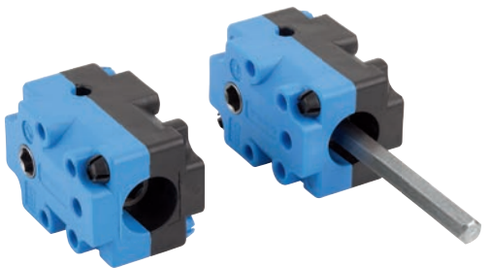


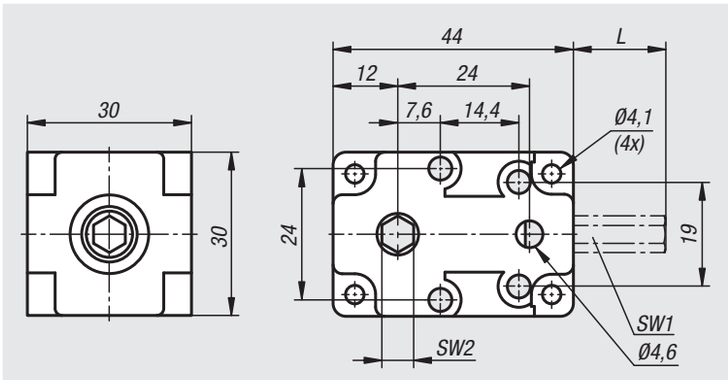
Order No.	Transmission ratio	Self-locking	speed range n rpm	Max. driving torque M Nm
22700-13	13:1	no	100 / 500 / 1000	2,1 / 1,8 / 1,5
22700-15	15:1	no	100 / 500 / 1000	1,5 / 1,3 / 1,0
22700-18	18:1	yes	100 / 500 / 1000	1,1 / 0,9 / 0,7
22700-23	23:1	yes	100 / 500 / 1000	0,9 / 0,7 / 0,5
22700-30	30:1	yes	100 / 500 / 1000	0,6 / 0,5 / 0,4
22700-40	40:1	yes	100 / 500 / 1000	0,4 / 0,3 / 0,3
22700-65	65:1	yes	100 / 500 / 1000	0,2 / 0,2 / 0,2

Order No.	Max. output torque M Nm	Shaft load FR N	Shaft load FA N	Efficiency %
22700-13	15 / 13 / 11	200	200	56
22700-15	12 / 10 / 8	250	250	52
22700-18	11 / 9 / 7	250	250	55
22700-23	10 / 8 / 6	250	250	50
22700-30	8,5 / 7 / 5,5	350	350	45
22700-40	5,5 / 4,8 / 4	400	400	39
22700-65	4,5 / 3,8 / 3	500	500	29

Bevel gears

plastic housing





Material:
Housing fibreglass reinforced plastic.
Bevel gears steel.

Version:
Bevel gears case hardened.
Ball bearings with sealing washers.

Sample order:
nlm 22710-111000

Note:
Universally applicable and maintenance-free bevel gear transmission for redirecting rotational movements by 90°. The rotation direction is arbitrary.

These bevel gears are suitable for manual drives and for temporary mechanical drives at a low speed.

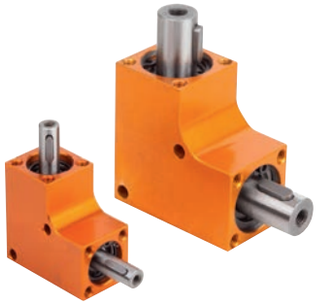
Power input over a hexagon socket. Power output over a hexagon socket or an hexagonal drive shaft.

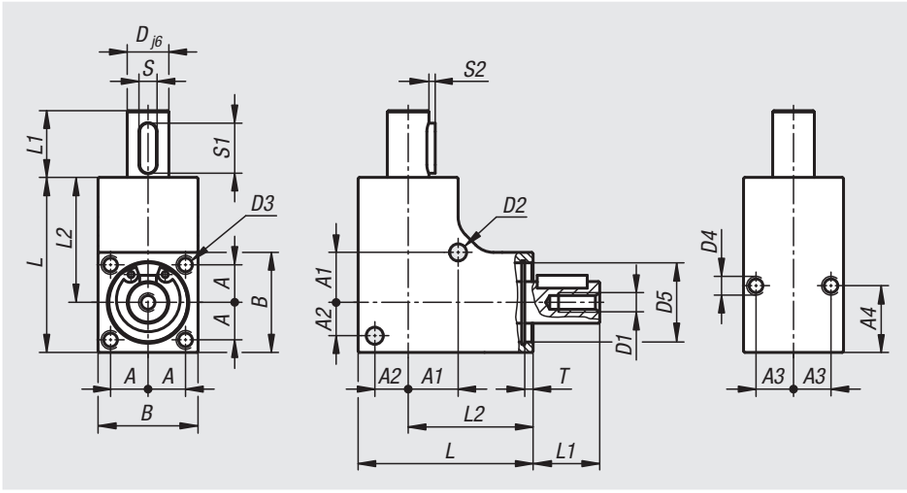
Temperature range:
0 °C to +40 °C.

Technical data:
Duty cycle: 20% (at 5 min.)

Order No.	Transmission ratio	Max. rpm	Max. driving torque M Nm	SW1	SW2	L
22710-111000	1:1	150	4	6	6	-
22710-111050	1:1	150	4	6	6	50
22710-111080	1:1	150	4	6	6	80
22710-111100	1:1	150	4	6	6	100

Bevel gears





Material:
Housing aluminium. Bevel gears steel.

Version:
Housing anodised.
Bevel gears surface hardened.
Ball bearing with rubber sealing washer RS.

Sample order:
nlm 22712-1832

Note:
Universally applicable and maintenance-free bevel gear in seven different sizes with the ratio 1:1.
The housing is sealed to prevent grease leakage and keep dust out. Can be mounted in any position.
The rotation direction is arbitrary.

- smooth power transmission
- simple screw fastening
- quiet

Temperature range:
-20 °C to +60 °C.

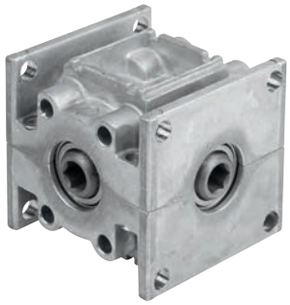
Attention:
FR permissible radial force at FA=0
FA permissible axial force at FR=0

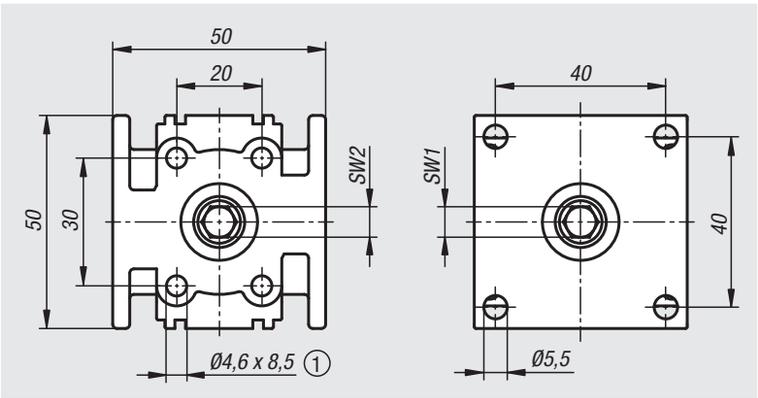
Technical data:
Duty cycle: 20% (at 5 min.)
Service life: ca. 1000 hours (at full load, speed 500 rpm and duty cycle 20%)

Order No.	Transmission ratio	speed range n rpm	Max. torque Nm	D	A	A1	A2	A3	A4	B
22712-1832	1:1	100 / 500 / 1000	0,35 / 0,1 / 0,05	6	6,5	8,5	6	6,5	11	18
22712-2035	1:1	100 / 500 / 1000	0,75 / 0,3 / 0,15	8	7,5	10	7	7,5	10	20
22712-2442	1:1	100 / 500 / 1000	2,5 / 1 / 0,5	10	9	12	8	9	16	24
22712-2646	1:1	100 / 500 / 1000	4 / 1,5 / 0,75	12	10	13	9	10	16	26
22712-3053	1:1	100 / 500 / 1000	5 / 2 / 1	12	11	15	11	11	16	30
22712-3256	1:1	100 / 500 / 1000	8 / 3 / 1,5	12	12	17	12	12	16	32
22712-3560	1:1	100 / 500 / 1000	10 / 4 / 2	12	13	17,5	13,5	13	16	35

Order No.	D1	D2	D3	D4	D5	L	L1	L2	S	S1	S2	T	Shaft load FR N	Shaft load FA N
22712-1832	M3x8	3,1	M3x10	M3x6	13	32	12	23	2	8	0,8	2,1	60	60
22712-2035	M3x8	3,1	M3x10	M3x6	16	35	12	25	2	8	0,8	2,05	100	100
22712-2442	M4x8	4,1	M4x10	M4x8	19	42	16	30	4	12	1,5	2	120	120
22712-2646	M5x8	4,1	M4x10	M4x8	21	46	16	33	4	12	1,5	2	140	140
22712-3053	M5x8	4,1	M4x10	M4x8	24	53	16	38	4	12	1,5	2,1	240	240
22712-3256	M5x8	4,1	M4x10	M4x8	28	56	16	40	4	12	1,5	2,1	550	550
22712-3560	M5x8	4,1	M4x10	M4x8	30	60	16	42,5	4	12	1,5	2,1	550	550

Bevel gears





Material:
Housing die-cast zinc.
Bevel gears steel.

Version:
Housing bright.
Bevel gears surface hardened.
Ball bearing with sealing washer RS.

Sample order:
nlm 22714-1171

Note:
Universally applicable and maintenance-free bevel gear, particularly suitable for drives with electric motors. The housing is sealed to prevent grease leakage and keep dust out. Can be mounted in any position. The rotation direction is arbitrary.

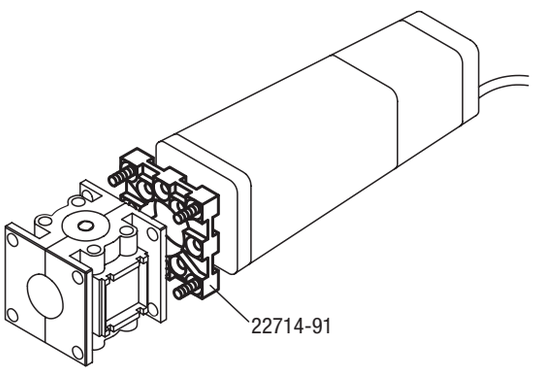
Drive and output over a hexagon socket.

This bevel gear transmission is ideal for use as a diversion drive, distribution transmission or gear reducer for electric motors; e.g. for louvre or actuators in special machine constructions.

Temperature range:
-20 °C to +40 °C.

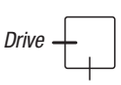
Technical data:
Duty cycle: 20% (at 5 min.)

Drawing reference:
1) For DIN 7500 M5 self-tapping screws.



Number and arrangement of drive/output:

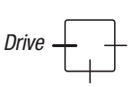
One output
22714-1171



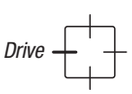
Two outputs opposing
22714-1172



Two outputs 90°
22714-1173



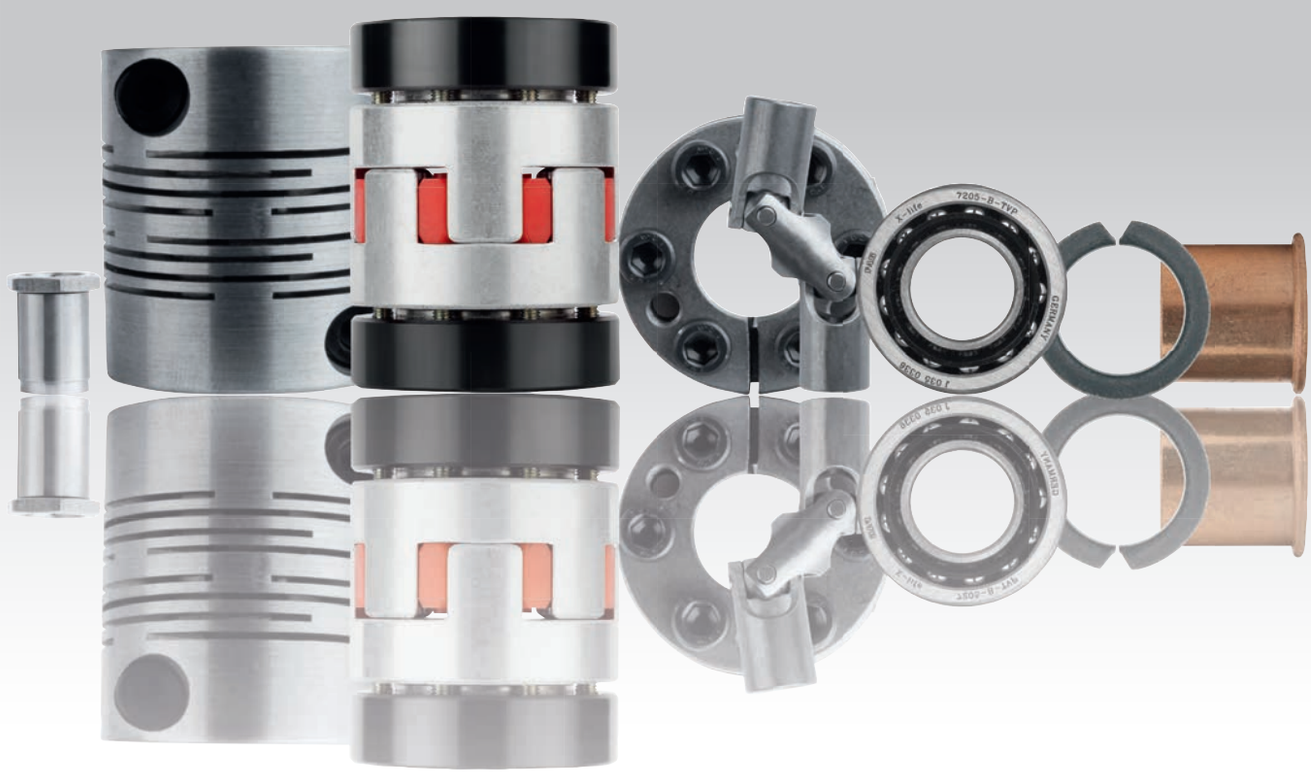
Three outputs
22714-1174



Order No.	Item	Transmission ratio	Max. rpm	Max. driving torque M Nm	SW1	SW2
22714-1171	bevel gear	1:1	150	10	7	7
22714-1172	bevel gear	1:1	150	10	7	7
22714-1173	bevel gear	1:1	150	10	7	7
22714-1174	bevel gear	1:1	150	10	7	7
22714-91	mounting flange	-	-	-	-	-

23000

Couplings
Rigid couplings
Keyless locking couplings
Cardan joints
Quick-fit couplings
Bearings
Seals



Technical information for couplings

Note:
The zero backlash, flexible metal bellows or elastomer couplings are particularly suited to highly accurate drives with average torque values. They are the ideal solution for accurately connecting two shaft journals at a true angle. Axial, radial and angular displacement between two ends of a shaft can be compensated within defined limits. This produces minimal bearing stresses as a result of the low restoring forces. A strong shaft to hub connection guarantees zero backlash transmission of torque, even without additional parallel key. Low mass moments of inertia and a high quality kinetic energy guarantee excellent dynamic behaviour, even at high revolutions. As a basic principle, the couplings are wear and maintenance-free. The range of possible uses extends from challenging drive systems in general mechanical engineering through applications in metrology and automatic control to the spindle and axial drives of machine tools. Other typical examples of their use include textile, packaging and timber processing machines as well as industrial robots and multi-spindle drilling heads.

Specifications

Comparison	Metal bellows couplings	Elastomer couplings	Beam couplings
Major functional features	– very high torsion resistance, therefore accurate transfer of the angle of rotation – low mass moments of inertia – full metal version – minimal restoring forces on the bearing	– plug-in (blind assembly is possible) – vibration dampening – no-play, due to pre-tensioning of the coupling star in the claws – 23021 DIN 69002 suitable for the highest speeds	– compact design – play-free, absolute synchronism – high torsion resistance – low mass moments of inertia – full metal version – models in aluminium and stainless steel
Connection or compensating elements	– stainless steel metal bellows	– polyurethane elastomer star	– full metal version with slotted structure
Hub version	– easy to assemble clamp hub (strong, no-play)	– easy to assemble clamp hub – conical connection to clamping ring hub	– easy to assemble clamp hub, fixed or removable (strong, no-play)
Temperature range	max. 200 °C	-30 °C to +90 °C	-50 °C to +150 °C
Speeds	Couplings are prebalanced. Additional balancing is recommended for revolutions in excess of 5000 r.p.m.	Version with clamping ring hub (23021) is suitable for up to 20000 r.p.m.	Depending on model, suitable for speeds up to 10000 r.p.m.

Configuration

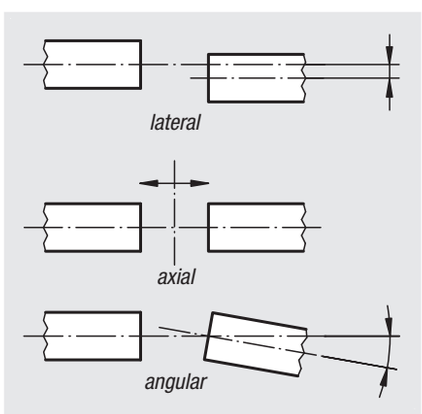
Rough calculation:

$$M_N \geqq 1{,}5 \cdot M_{max.}\ [Nm]$$

$M_N \triangleq$ nom. torque of coupling

$M_{max.} \triangleq$ max. motor torque

For accurate dimensioning the actual acting torques must be calculated from the cutting or acceleration forces. In exceptional cases and only for short periods, e.g. during a collision, increased loading of up to twice the nominal torque is possible.

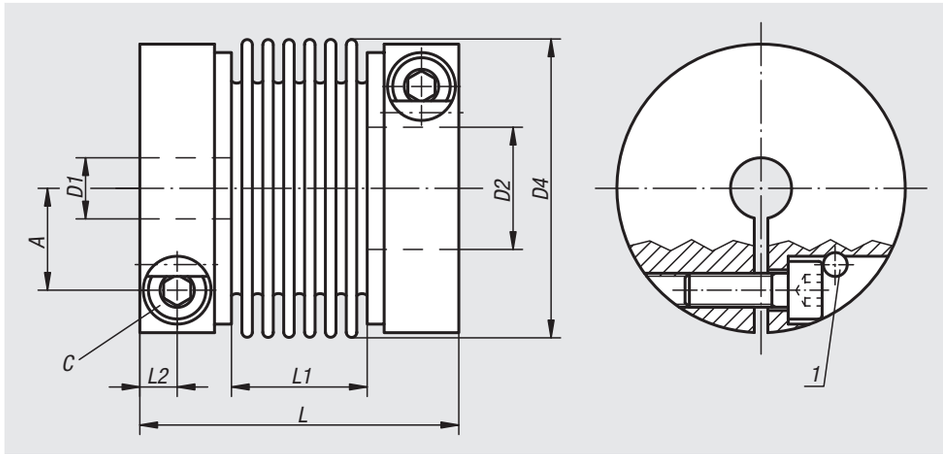


Shaft displacement
Axial and angular displacement are generally not a problem and are also easy to check. Conversely, great attention should be paid to radial shaft displacement, i.e. the lateral parallel displacement of the axes of rotation. This error must not exceed the value prescribed in the table.

Metal bellows couplings

with radial clamping hub





Material:
Hub aluminium.
Bellows stainless steel.

Version:
Bright.

Sample order:
nlm 23000-012,
D1 = 6
D2 = 6
(The hubs are supplied pre-bored).

Note:
Radial clamping of the hub for short mounting times and easy installation even in difficult to reach spaces. Take note of the required clamping screw tightening torque.

Temperature range:
-40 °C to +200 °C

Assembly:
The shaft to hub bore fit should be a transition fit. The play should be min. 0.01 mm and max. 0.04 mm. i.e:
shaft Ø 28 k6
bore Ø 28 F6.
Bores smaller than D1/D2 min. are possible, however an optimal transfer of the nominal torque is no longer guaranteed.
As the metal bellows are made of thin stainless steel plate, special care should be taken during installation and removal. Damages to the bellows can render the coupling unusable.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Drawing reference:
1) EASY clamp system from size 20

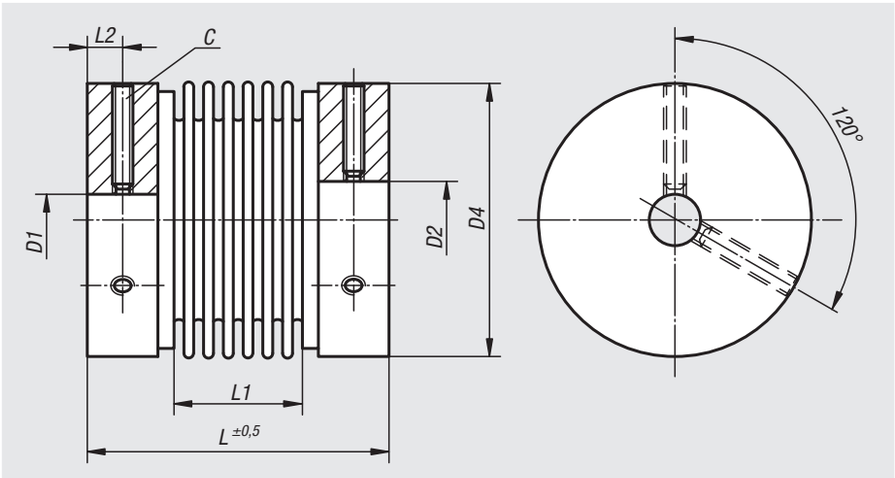
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Torsion resistance Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm	Tightening torque of screws Nm
23000-001	1	1	0,0004	0,09	0,3	0,2	21	26	1
23000-004	4	4	0,003	0,46	0,4	0,2	35	65	2
23000-007	7	7	0,014	1,1	0,6	0,25	45	60	4
23000-012	12	12	0,03	2,05	0,7	0,25	40	70	7
23000-020	20	20	0,14	5,2	0,8	0,25	51	190	14
23000-060	60	60	0,29	8,7	0,9	0,3	49	260	35
23000-170	170	170	0,83	17,5	1	0,3	80	470	65
23000-400	400	400	2,42	47,1	1	0,3	100	640	115
23000-600	600	600	4,7	66,9	1	0,3	100	980	200

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	A	C DIN 912-10.9	L	L1	L2
23000-001	3	3	6	16,5	4,6	M2,5	31,5	13,5	3,3
23000-004	4	5	10	24,5	7,5	M3	43,5	17,5	4,4
23000-007	5	6	17	34	11	M4	57	29	5
23000-012	5	6	19	39,5	13	M5	62	29	6
23000-020	7	9	30	56	19	M6	70	30	7,5
23000-060	12	18	34	66	22	M8	77	33	8,5
23000-170	15	22	43	82	28,5	M10	92	40	10,5
23000-400	24	34	55	101	35	M12	106	48	12
23000-600	31	35	70	122	43,5	M14	120	52	13,5

Metal bellows couplings

clamping with grub screw





Material:
Hub aluminium.
Bellows stainless steel.

Version:
Bright.

Sample order:
nlm 23002-0004,
D1 = 3
D2 = 3
(The hubs are supplied pre-bored).

Note:
Clamping the hub with a grub screw is a cost-effective alternative to the metal bellows couplings with radial clamping hub (23000). Short mounting times and an easy installation even in difficult to reach places. Take note of the required tightening torque for the grub screw. To ease removal, a flat milled on the shaft is recommended.

Temperature range:
-20 °C to +90 °C.

Assembly:
The shaft to hub bore fit should be a transition fit. The play should be min. 0.01 mm and max. 0.04 mm. i.e:
shaft Ø 5 k6
bore Ø 5 G7.
Bores smaller than D1/D2 min. are possible, however an optimal transfer of the nominal torque is no longer guaranteed. As the metal bellows are made of thin stainless steel plate, special care should be taken during installation and removal. Damages to the bellows can render the coupling unusable.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

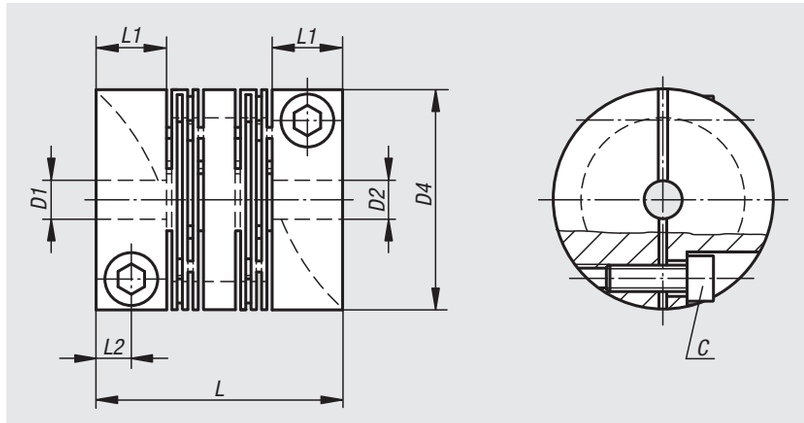
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm²)	Torsion resistance (10^{-3} Nm/arcmin)	Max. axial shaft displacement ±	Max. lateral shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm
23002-0004	0,4	0,4	0,00019	50	0,35	0,1	10	15
23002-0005	0,9	0,9	0,00019	90	0,3	0,1	21	26
23002-0020	2	2	0,0029	230	0,5	0,1	15	15
23002-0040	4	4	0,0032	460	0,4	0,1	35	65
23002-0060	6	6	0,016	1100	0,6	0,25	45	60
23002-0080	8	9	0,028	1300	0,8	0,25	16	24

Order No.	Tightening torque of screws Nm	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	C (DIN 916)	L	L1	L2
23002-0004	1	3	3	8	16	M3	26	12	2,3
23002-0005	1	3	3	8	16	M3	27	13	2,3
23002-0020	4	5	5	15	25	M4	38	16	3,5
23002-0040	4	5	5	15	25	M4	39	17	3,5
23002-0060	8	6	6	20	35	M5	54	29	4,3
23002-0080	10	6	6	26	41	M6	54	26	5

Beam couplings

with radial clamping hub, aluminium





Material:
Aluminium.

Version:
Bright.

Sample order:
nlm 23010-1016,
D1 = 2.5
D2 = 2.5
(The hubs are supplied pre-bored).

Note:
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

Temperature range:
-50 °C to +150 °C.

Assembly:
Recommended shaft tolerances h7.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Attention:
Procedure for enlarging pre-drilled bores D1/D2:

Drill the bore out using a small as possible drill or milling cutter. Use a single point tool to turn or bore the hole out to its finished size. Ensure that the coupling is securely held during the machining process and that the drill feed is not too high. The cut depth should not exceed 0.5 mm and the feed for the single point tool should also be not too high.

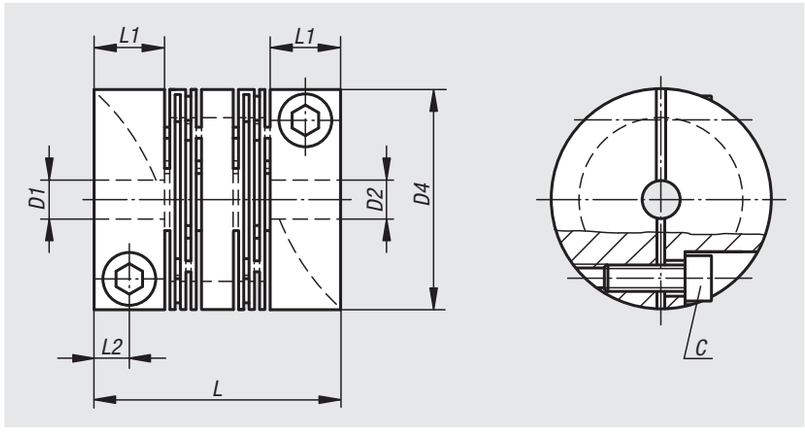
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Torsion resistance Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Max. angular shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm	Max. rpm
23010-1016	16	3	0,001	0,09	0,3	0,2	1°	155	234	10000
23010-1018	18	3	0,0003	0,12	0,3	0,2	1°	39	176	10000
23010-1020	20	5	0,0015	0,15	0,3	0,2	1°	192	243	9500
23010-1022	22	3	0,0008	0,17	0,3	0,2	1°	80	369	9500
23010-1025	25	7	0,0043	1,02	0,3	0,2	1°	140	437	8000
23010-1030	30	10	0,011	1,45	0,4	0,3	1°	170	363	6000
23010-1040	40	19	0,035	3,35	0,4	0,3	1°	270	379	5000
23010-1050	50	35	0,114	10,18	0,5	0,3	1°	410	853	5000
23010-1060	60	70	0,285	20,65	0,5	0,3	1°	510	1201	4500
23010-1070	70	130	0,480	27,55	0,5	0,3	1°	1900	2002	4000

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L2	C (DIN 912-12.9)	Tightening torque of screws Nm
23010-1016	2,5	3	6	16	23	7	3,5	M2,5x6	1
23010-1018	2,5	3	6	18	16,6	5,5	2,75	M2,5x8	1
23010-1020	2,5	3	8	20	28	8	4	M2,5x8	1
23010-1022	2,5	3	10	22	20	5,5	2,75	M2,5x8	1
23010-1025	3,5	4	12	25	28	8	4	M3x10	2
23010-1030	5,5	6	14	30	40	11	5,5	M4x10	4
23010-1040	5,5	6	18	40	48	11	5,5	M5x14	9
23010-1050	9,5	10	26	50	65	19	9,5	M6x16	14
23010-1060	9,5	10	30	60	80	25	12,5	M8x18	30
23010-1070	14,5	15	35	70	95	25	12,5	M8x25	30

Beam couplings

with radial clamping hub, stainless steel





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 23010-2016,
D1 = 2.5
D2 = 2.5
(The hubs are supplied pre-bored).

Note:
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

Temperature range:
-50 °C to +150 °C.

Assembly:
Recommended shaft tolerances h7.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Attention:
Procedure for enlarging pre-drilled bores D1/D2:

Drill the bore out using a small as possible drill or milling cutter. Use a single point tool to turn or bore the hole out to its finished size. Ensure that the coupling is securely held during the machining process and that the drill feed is not too high. The cut depth should not exceed 0.5 mm and the feed for the single point tool should also be not too high.

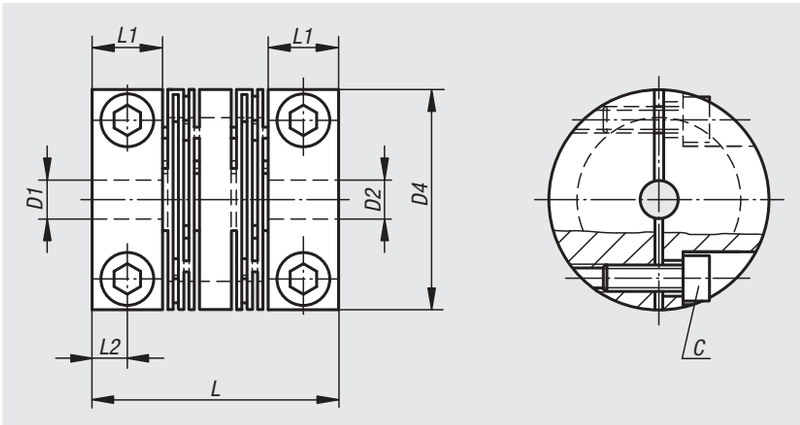
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Torsion resistance Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Max. angular shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm	Max. rpm
23010-2016	16	6	0,0025	0,23	0,3	0,2	1°	325	940	10000
23010-2018	18	6	0,001	0,2	0,3	0,2	1°	98	435	10000
23010-2020	20	12	0,0032	0,23	0,3	0,2	1°	435	508	9500
23010-2022	22	6	0,0024	0,9	0,3	0,2	1°	136	450	9500
23010-2025	25	16	0,00784	1,45	0,3	0,2	1°	285	927	8000
23010-2030	30	25	0,022	2,47	0,4	0,3	1°	400	903	6000
23010-2040	40	36	0,09	5,82	0,4	0,3	1°	660	1229	5000
23010-2050	50	73	0,254	16	0,5	0,3	1°	950	1619	5000

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L2	C (DIN 912-12.9)	Tightening torque of screws Nm
23010-2016	2,5	3	6	16	23	7	3,5	M2,5x6	1
23010-2018	2,5	3	6	18	16,6	5,5	2,75	M2,5x8	1
23010-2020	2,5	3	8	20	28	8	4	M2,5x8	1
23010-2022	2,5	3	10	22	20	5,5	2,75	M2,5x8	1
23010-2025	3,5	4	12	25	28	8	4	M3x10	2
23010-2030	5,5	6	14	30	40	11	5,5	M4x10	4
23010-2040	5,5	6	18	40	48	11	5,5	M5x14	9
23010-2050	9,5	10	26	50	65	19	9,5	M6x16	14

Beam couplings

with removable clamping hub, aluminium





Material:
Aluminium.

Version:
Bright.

Note for ordering:
D1 and D2 are customer specific
e.g. 23012-1025; D1 = 5^{H7}, D2 = 8^{H7}

Note:
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

Temperature range:
-50 °C to +150 °C.

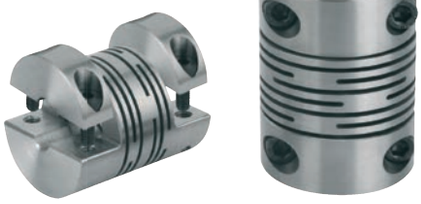
Assembly:
Recommended shaft tolerances h7.

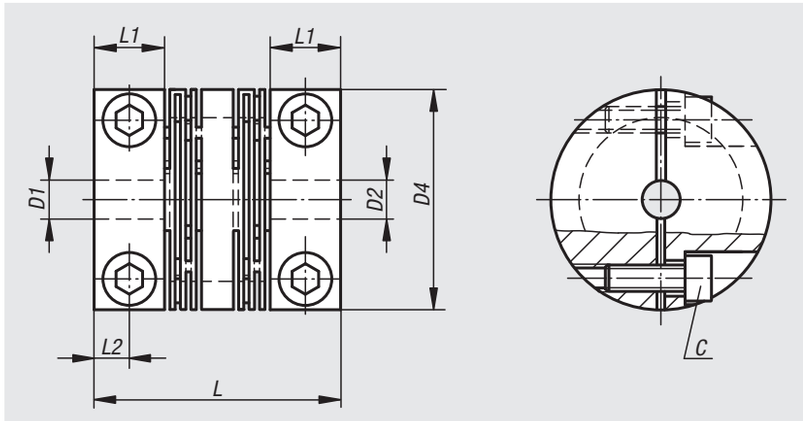
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Max. axial shaft displacement ±	Max. lateral shaft displacement	Torsion resistance Nm/arcmin	Max. angular shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm	Max. rpm
23012-1025	25	7	0,0043	0,3	0,2	1,02	1°	140	437	8000
23012-1030	30	10	0,011	0,4	0,3	1,45	1°	170	363	6000
23012-1040	40	19	0,035	0,4	0,3	3,35	1°	270	379	5000
23012-1050	50	35	0,114	0,5	0,3	10,18	1°	410	853	5000

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L2	C (DIN 912-12.9)	Tightening torque of screws Nm
23012-1025	customer specific	4	12	25	28	8	4	M3x10	2
23012-1030	customer specific	6	14	30	40	11	5,5	M4x10	4
23012-1040	customer specific	6	18	40	48	11	5,5	M5x14	9
23012-1050	customer specific	10	26	50	65	19	9,5	M6x16	14

Beam couplings

with removable clamping hub, stainless steel





Material:
Stainless steel 1.4305.

Version:
Bright.

Note for ordering:
D1 and D2 are customer specific
e.g. 23012-2025; D1 = 5^{H7}, D2 = 8^{H7}

Note:
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

Temperature range:
-50 °C to +150 °C.

Assembly:
Recommended shaft tolerances h7.

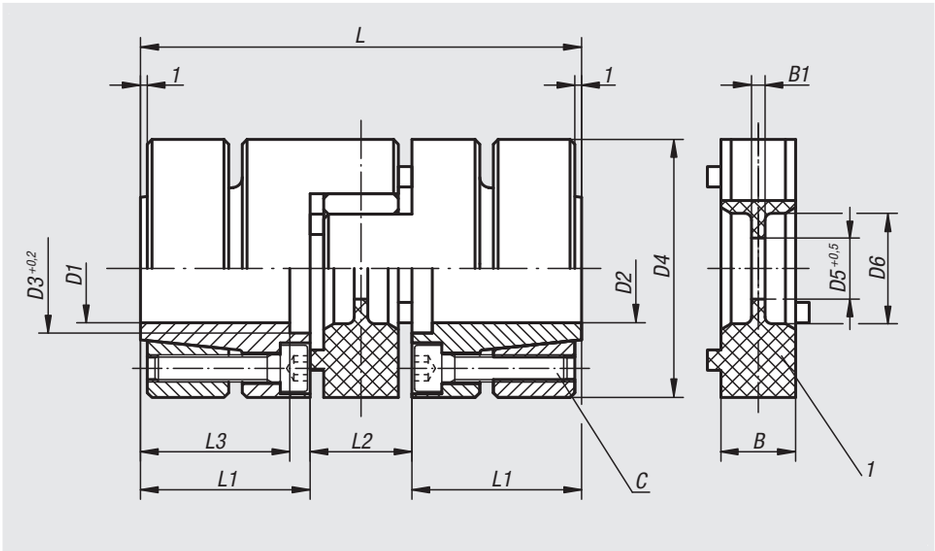
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Torsion resistance Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Max. angular shaft displacement	Axial spring stiffness N/mm	Lateral spring stiffness N/mm	Max. rpm
23012-2025	25	16	0,00784	1,45	0,3	0,2	1°	285	927	8000
23012-2030	30	25	0,022	2,47	0,4	0,3	1°	400	903	6000
23012-2040	40	36	0,09	5,82	0,4	0,3	1°	660	1229	5000
23012-2050	50	73	0,254	16	0,5	0,3	1°	950	1619	5000

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L2	C (DIN 912-12.9)	Tightening torque of screws Nm
23012-2025	customer specific	6	12	25	28	8	4	M3x10	2
23012-2030	customer specific	6	14	30	40	11	5,5	M4x10	4
23012-2040	customer specific	6	18	40	48	11	5,5	M5x14	9
23012-2050	customer specific	10	26	50	65	19	9,5	M6x16	14

Elastomer dog couplings

with conical hub and clamping ring (similar to DIN 69002)





Material:
Spider polyurethane hardness Shore 98A.
Hub aluminium.
Conical ring carbon steel.

Sample order:
nlm 23021-010,
D1 = 6
D2 = 6
(The hubs are supplied pre-bored).

Note:
This coupling series is particularly suitable for use in high speed main spindle or drill spindle drives. Before the plug-in assembly, both clamping ring hubs must be fastened to the shafts with the correct tightening torque. Lightly oil the spider to ease assembly.

Assembly:
The shaft to hub bore fit should be a transition fit. The play should be max. 0.02 mm. i.e:
shaft Ø 25 k6
bore Ø 25 G6.
Bores smaller than D1/D2 min. are possible, however an optimal transfer of the nominal torque is no longer guaranteed.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Drawing reference:
1) elastomer spider

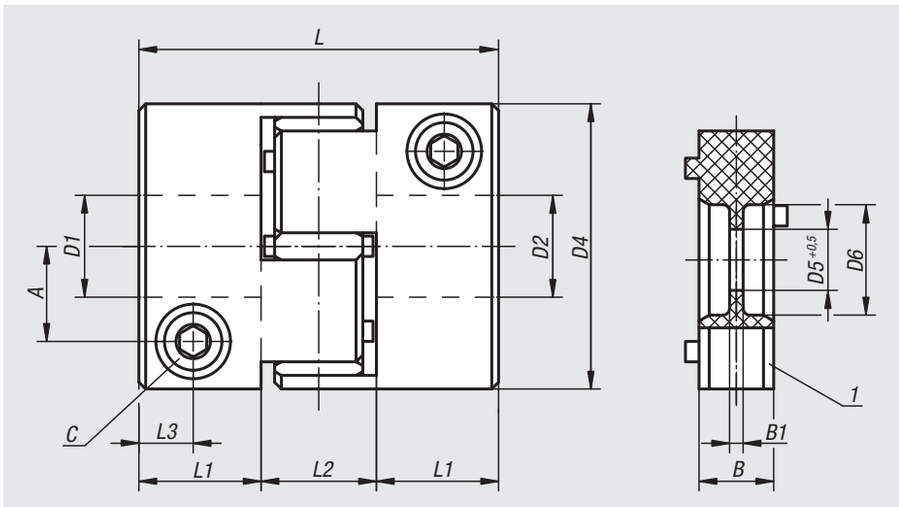
Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Static resistance to torsion Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Radial spring stiffness N/mm	Tightening torque of screws Nm	Max. rpm
23021-010	10	10	0,015	0,04	0,5	0,1	600	1,8	30000
23021-017	17	17	0,05	0,24	0,5	0,1	2100	4	24000
23021-043	43	43	0,19	0,4	0,5	0,1	2500	8	19000
23021-060	60	60	0,28	0,6	0,5	0,1	2600	8	17500
23021-150	150	150	0,65	1,05	1	0,1	3300	8	15000
23021-320	320	320	2	2	1	0,12	4500	35	12000
23021-500	500	500	5,6	5,8	1	0,15	5900	67	9500
23021-700	700	700	13	8	1	0,15	7000	115	8000

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D3	D4	D5	D6	L	L1	L2	L3	B	B1	C (DIN 912-12.9)
23021-010	6	6	14	17	32	8,5	10,5	50	18,5	13	15,5	10	2	4x M3
23021-017	9	9	19	22	40	9,5	18	66	25	16	21	12	3	6x M4
23021-043	10	12	24	29	50	12,5	27	78	30	18	25	14	3	4x M5
23021-060	12	12	26	30	55	12,5	27	78	30	18	25	14	3	4x M5
23021-150	12	17	36	40	65	14,5	30	90	35	20	30	15	4	8x M5
23021-320	18	20	40	46	80	16,5	38	114	45	24	40	18	4	4x M8
23021-500	20	22	48	58	100	20,5	47	138	55	28	49	22	5	4x M10
23021-700	24	25	60	72	120	22,5	58	155	61	33	54	25	6	4x M12

Elastomer dog couplings

with radial clamping hub





Material:
Spider polyurethane hardness Shore 98A.
Hub aluminium.

Version:
Bright.

Sample order:
nlm 23022-008,
D1 = 6
D2 = 6
(The hubs are supplied pre-bored).

Note:
Radial clamping of the hub for short mounting times. The couplings can be mounted completely assembled or a plug-in assembly is also possible. Lightly oil the spider to ease assembly. Take note of the require tightening torque for the clamping screw.

Assembly:
The shaft to hub bore fit is a transition fit. The play should be min. 0.01 mm and max. 0.04 mm i.e.
shaft: Ø 28 k6
hub: Ø 28 F6
Bores smaller than D1/D2 min. are possible, however an optimal transfer of the couplings nominal torque is no longer guaranteed.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Drawing reference:
1) elastomer spider

Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Static resistance to torsion Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Radial spring stiffness N/mm	Tightening torque of screws Nm
23022-002	2	2	0,00016	0,007	0,6	0,1	405	0,5
23022-005	5	5	0,0011	0,016	0,8	0,1	510	1
23022-008	8	8	0,01	0,04	0,5	0,1	600	4
23022-015	15	15	0,03	0,24	0,5	0,1	2100	8
23022-030	30	30	0,09	0,41	0,5	0,1	2500	14
23022-060	60	60	0,18	0,61	0,5	0,1	2600	35
23022-150	150	150	0,38	1,05	1	0,1	3300	67
23022-300	300	300	1	2	1	0,12	4500	115
23022-500	500	500	2,2	5,8	1	0,15	5900	115
23022-700	700	700	5,2	8	1	0,15	7000	185

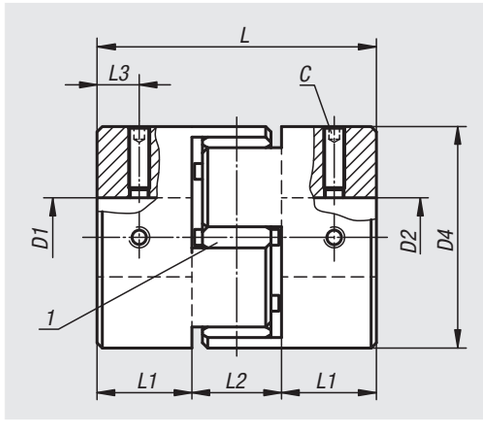
Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	D5	D6	A	L	L1	L2	L3	B	B1	C DIN 912-10.9
23022-002	3	3	5	14	-	-	4	22	7	8	3,5	6	-	M2
23022-005	5	5	8	20	-	-	6,5	30	10	10	5	8	-	M2,5
23022-008	6	8	15	32	8,5	10,5	10,5	40	13,5	13	6	10	2	M4
23022-015	7	10	20	40	9,5	18	13,5	50	17	16	8	12	3	M5
23022-030	9	13	26	50	12,5	27	16,5	58	20	18	9	14	3	M6
23022-060	12	15	29	60	12,5	27	19,5	62	22	18	10	14	3	M8
23022-150	15	22	33	70	14,5	30	23	73	26,5	20	12	15	4	M10
23022-300	18	30	42	85	16,5	38	29	86	31	24	14	18	4	M12
23022-500	20	38	56	100	20,5	47	36	94	33	28	16	22	5	M12
23022-700	24	40	70	120	22,5	58	44	109	38	33	18	25	6	M14

Elastomer dog couplings

miniature

clamping with grub screw





Material:
Spider polyurethane hardness Shore 98A.
Hub aluminium.

Version:
Bright.

Sample order:
nlm 23023-0020,
D1 = 3
D2 = 3
(The hubs are supplied pre-bored).

Note:
Clamping the hub with a grub screw is a cost-effective alternative to the elastomer dog couplings with radial clamping hub (23022). Short mounting times.
The couplings can be mounted completely assembled or plug-in mounting is also possible. Lightly oil the spider to ease assembly.
Take note of the required tightening torque for the grub screw. To ease removal we recommend milling a flat on the shaft.

Assembly:
The shaft to hub bore fit is a transition fit. The play should be min. 0.01 mm and max. 0.04 mm i.e.
shaft: Ø 6 f7
hub: Ø 6 H8.
Bores smaller than D1/D2 min. are possible, however an optimal transfer of the couplings nominal torque is no longer guaranteed.

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Drawing reference:
1) elastomer spider

Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Static resistance to torsion Nm/arcmin	Max. axial shaft displacement ±	Max. lateral shaft displacement	Tightening torque of screws Nm
23023-0020	2	2	0,00021	0,007	0,6	0,1	0,7
23023-0050	5	5	0,001	0,016	0,8	0,1	0,7
23023-0125	12,5	12,5	0,0059	0,038	1	0,1	1,7

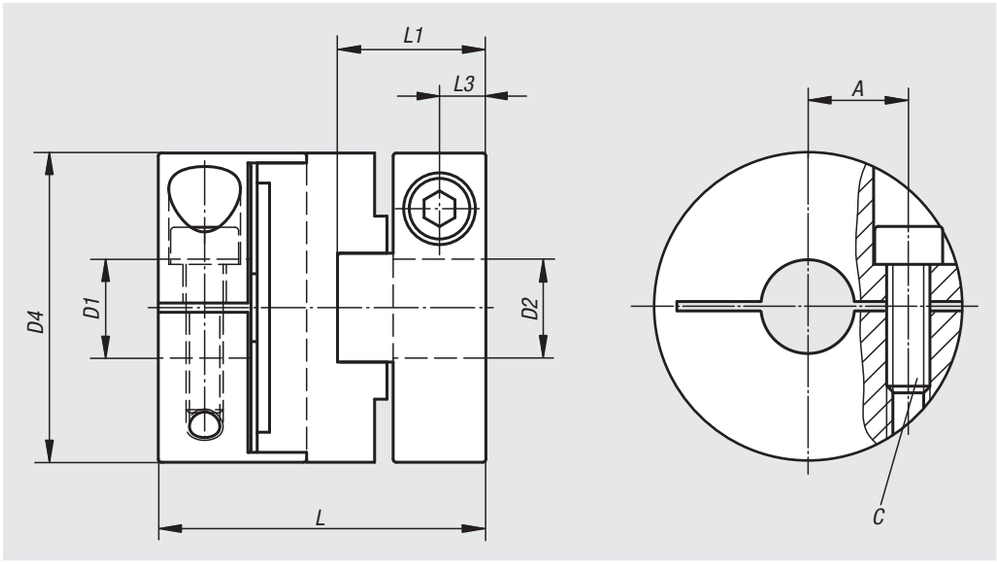
Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L2	L3	C (DIN 916)
23023-0020	3	3	6	14	22	7	8	3,5	M3
23023-0050	5	5	9,53	20	30	10	10	5	M3
23023-0125	8	8	14	30	35	11	13	5,5	M4

Oldham-type couplings

miniature

with radial clamping hub





Material:
Centre disc polyacetal.
Hub aluminium.

Sample order:
nlm 23030-0016,
D1 = 3
D2 = 3
(The hubs are supplied pre-bored).

Note:
Short mounting times with radial clamping hub. The couplings can be mounted completely assembled or a plug-in assembly is also possible. Take note of the required tightening torque for the of the clamping screw.

Assembly:
The shaft to hub hole fit is a transition fit. The play should be min. 0.01 mm and max. 0.04 mm i.e.
shaft: Ø 6 f7
hub: Ø 6 H8.

Advantages:
- robust
- plug-in
- play-free
- short design

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-6} kgm^2)	Static resistance to torsion Nm/arcmin	Max. angular shaft displacement	Max. lateral shaft displacement	Max. rpm	Tightening torque of screws Nm
23030-0016	16	1	0,0032	0,019	2°	1	8000	1
23030-0020	20	1,5	0,0082	0,035	2°	1,5	7000	1
23030-0025	25	2,5	0,026	0,058	2°	2	6000	1,5
23030-0032	32	7	0,083	0,18	2°	2,5	4800	2,5

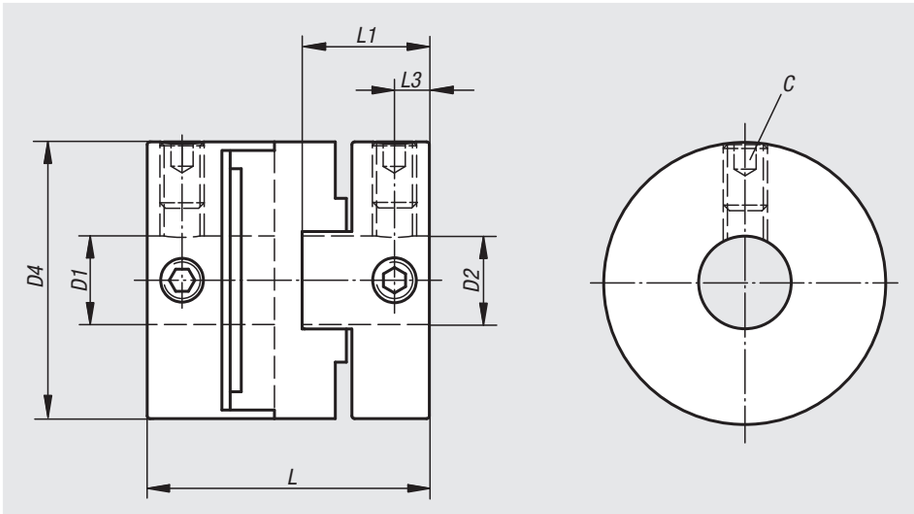
Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	A	L	L1	L3	C DIN 912-10.9
23030-0016	3	3	6	16	5	21	9,5	3	M2,6
23030-0020	5	5	8	20	6,5	22,5	10	3	M2,6
23030-0025	6,35	6,35	10	25	8	27	12	4	M3
23030-0032	8	8	14	32	11	35	16	5	M4

Oldham-type couplings

miniature

clamping with grub screw





Material:
Centre disc polyacetal.
Hub aluminium.

Sample order:
nlm 23032-0016,
D1 = 4
D2 = 4
(The hubs are supplied pre-bored).

Note:
Clamping the hub with a grub screw is a cost-effective alternative to the Oldham-type couplings with radial clamping hub (23030). Short mounting times.
The couplings can be mounted completely assembled or a plug-in assembly is also possible. Take note of the tightening torque for the grub screw. To ease removal we recommend milling a flat on the shaft.

Assembly:
The shaft to hub hole fit is a transition fit. The play should be min. 0.01 mm and max. 0.04 mm i.e.
shaft: Ø 6 f7
hub: Ø 6 H8.

Advantages:
- robust
- plug-in
- play-free
- short design

On request:
Hub bores D1 and D2 with separate tolerance class or range.

Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Static resistance to torsion Nm/arcmin	Max. angular shaft displacement	Max. lateral shaft displacement	Max. rpm	Tightening torque of screws Nm
23032-0016	16	1	0,0024	0,019	2°	1	8000	1
23032-0020	20	1,5	0,081	0,035	2°	1,5	7000	1,7
23032-0025	25	2,5	0,018	0,058	2°	2	6000	1,7
23032-0032	32	7	0,067	0,18	2°	2,5	4800	4

Order No.	D1/D2 predrilled	D1/D2 min.	D1/D2 max.	D4	L	L1	L3	C (DIN 916)
23032-0016	4	4	6,35	16	18	8	2,3	M3
23032-0020	4	4	8	20	20	9	2,5	M4
23032-0025	5	5	10	25	25,5	11,5	3	M4
23032-0032	8	8	14	32	32	14,5	4	M5

Rigid couplings

one-piece



Material:
Steel 1.0718.
Stainless steel 1.4305.

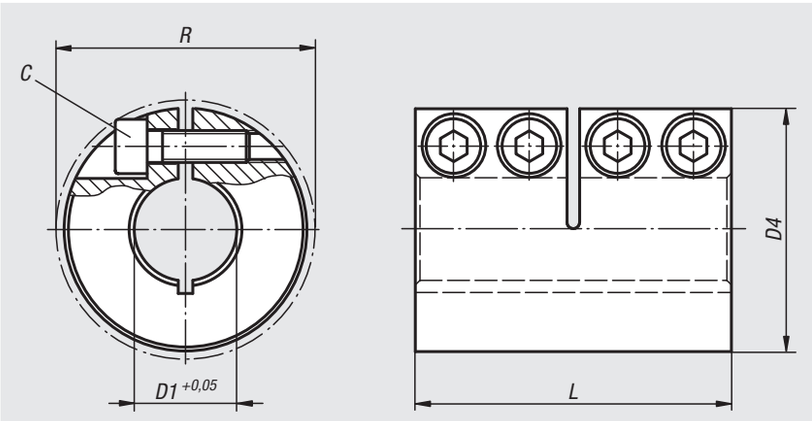
Version:
Steel black oxidised.
Stainless steel bright.

Sample order:
nlm 23050-1100

Note:
Rigid couplings transmit high torques without rotational play. They are used where there are no shaft displacements or alignment errors. Wear-free and maintenance-free. Screws secured to avoid vibration induced loosening.

The maximum torque transmission can only be achieved through optimal installation and correct shaft dimensions.

Maximum speed 4000 rpm.



Temperature range:
-40 °C to +175 °C.

On request:
Other dimensions.

One-piece rigid couplings, steel

Order No.	Main material	C (DIN 912-12.9)	Tightening torque of screws Nm	D1	D4	L	R	Nominal torque Nm
23050-1080	steel	M3x8	2,1	8	24	35	26,8	50
23050-1100	steel	M4x12	4,6	10	29	45	32,7	70
23050-1120	steel	M4x12	4,6	12	29	45	32,7	70
23050-1140	steel	M5x16	9,5	14	34	50	39,4	190
23050-1150	steel	M5x16	9,5	15	34	50	39,4	190
23050-1160	steel	M5x16	9,5	16	34	50	39,4	190
23050-1190	steel	M6x18	16	19	42	65	48,2	300
23050-1200	steel	M6x18	16	20	42	65	48,2	350
23050-1350	steel	M8x25	39	35	67	95	74,1	1100
23050-1250	steel	M6x18	16	25	45	75	50,8	390
23050-1300	steel	M6x18	16	30	54	83	58,6	475
23050-1400	steel	M8x25	39	40	77	108	83,4	1325
23050-1500	steel	M10x25	77	50	85	124	93,2	2250

One-piece rigid couplings, stainless steel

Order No.	Main material	C (DIN 912 A2-70)	Tightening torque of screws Nm	D1	D4	L	R	Nominal torque Nm
23050-2080	stainless steel	M3x8	1,1	8	24	35	26,8	16
23050-2100	stainless steel	M4x12	2,5	10	29	45	32,7	70
23050-2120	stainless steel	M4x12	2,5	12	29	45	32,7	70
23050-2140	stainless steel	M5x16	5,4	14	34	50	39,4	160
23050-2150	stainless steel	M5x16	5,4	15	34	50	39,4	160
23050-2160	stainless steel	M5x16	5,4	16	34	50	39,4	160
23050-2190	stainless steel	M6x18	9,6	19	42	65	48,2	260
23050-2200	stainless steel	M6x18	9,6	20	42	65	48,2	300
23050-2250	stainless steel	M6x18	9,6	25	45	75	50,8	325
23050-2300	stainless steel	M6x18	9,6	30	54	83	58,6	400
23050-2350	stainless steel	M8x25	23	35	67	95	74,1	330
23050-2400	stainless steel	M8x25	23	40	77	108	83,4	400
23050-2500	stainless steel	M10x25	46	50	85	124	93,2	688

Rigid couplings

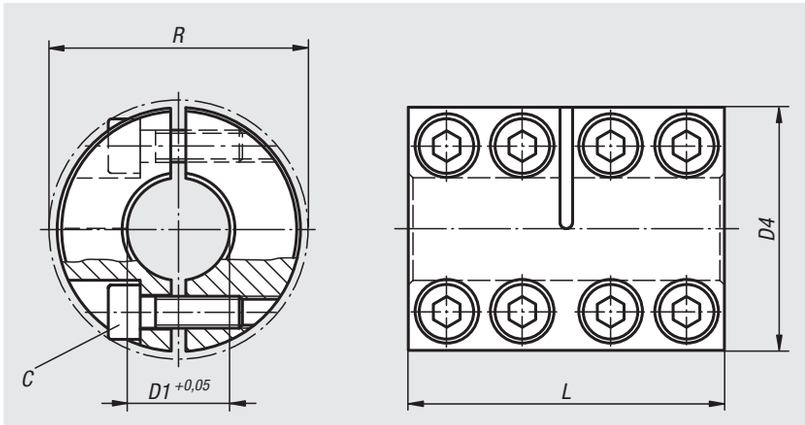
two-piece



Material:
Steel 1.0718.
Stainless steel 1.4305.

Version:
Steel black oxidised.
Stainless steel bright.

Sample order:
nlm 23052-1100



Note:
Rigid couplings transmit high torques without rotational play. They are used where there are no shaft displacements or alignment errors. Wear-free and maintenance-free. Screws secured to avoid vibration induced loosening.

The maximum torque transmission can only be achieved through optimal installation and correct shaft dimensions.

Maximum speed 4000 rpm.

Temperature range:
-40 °C to +175 °C.

On request:
Other dimensions.
Version with DIN 6885/1 parallel keyway, tolerance P9.

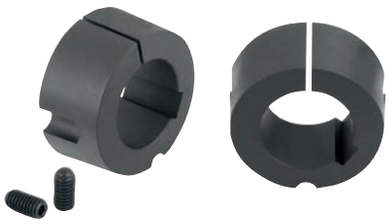
Two-piece rigid couplings, steel

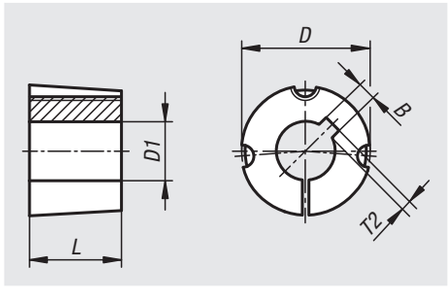
Order No.	Main material	C (DIN 912-12.9)	Tightening torque of screws Nm	D1	D4	L	R	Nominal torque Nm
23052-1080	steel	M3x8	2,1	8	24	35	26,8	50
23052-1100	steel	M4x12	4,6	10	29	45	32,7	70
23052-1120	steel	M4x12	4,6	12	29	45	32,7	70
23052-1140	steel	M5x16	9,5	14	34	50	39,4	190
23052-1150	steel	M5x16	9,5	15	34	50	39,4	190
23052-1160	steel	M5x16	9,5	16	34	50	39,4	190
23052-1190	steel	M6x18	16	19	42	65	48,2	300
23052-1200	steel	M6x18	16	20	42	65	48,2	350
23052-1250	steel	M6x18	16	25	45	75	50,8	390
23052-1300	steel	M6x18	16	30	54	83	58,6	475
23052-1350	steel	M8x25	39	35	67	95	74,1	1100
23052-1400	steel	M8x25	39	40	77	108	83,4	1325
23052-1500	steel	M10x25	77	50	85	124	93,2	2250

Two-piece rigid couplings, stainless steel

Order No.	Main material	C (DIN 912 A2-70)	Tightening torque of screws Nm	D1	D4	L	R	Nominal torque Nm
23052-2080	stainless steel	M3x8	1,1	8	24	35	26,8	16
23052-2100	stainless steel	M4x12	2,5	10	29	45	32,7	70
23052-2120	stainless steel	M4x12	2,5	12	29	45	32,7	70
23052-2140	stainless steel	M5x16	5,4	14	34	50	39,4	160
23052-2150	stainless steel	M5x16	5,4	15	34	50	39,4	160
23052-2160	stainless steel	M5x16	5,4	16	34	50	39,4	160
23052-2190	stainless steel	M6x18	9,6	19	42	65	48,2	260
23052-2200	stainless steel	M6x18	9,6	20	42	65	48,2	300
23052-2250	stainless steel	M6x18	9,6	25	45	75	50,8	325
23052-2300	stainless steel	M6x18	9,6	30	54	83	58,6	400
23052-2350	stainless steel	M8x25	23	35	67	95	74,1	438
23052-2400	stainless steel	M8x25	23	40	77	108	83,4	445
23052-2500	stainless steel	M10x25	46	50	85	124	93,2	688

Taper clamping bushes





Material:
Grey cast iron or steel.

Version:
Phosphated

Sample order:
nlm 23200-0351122

Note:
The taper clamping bushes enable easy and rapid mounting and removal of pulleys. The wide range of bore sizes available enable immediate mounting without any time-consuming and costly internal or external machining. The bushes have DIN 6885/1 keyways in addition to the locking screws. These taper clamping bushes are interchangeable with all other similar commercial types.

Assembly:
Installation must be carried out according to the enclosed user information.

Accessories:
Supplied complete with screws.

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0351122	type 1008	grey cast iron	22,3	4	35	11	1,8	1/4 BSW	5,5
23200-0351222	type 1008	grey cast iron	22,3	4	35	12	1,8	1/4 BSW	5,5
23200-0351422	type 1008	grey cast iron	22,3	5	35	14	2,3	1/4 BSW	5,5
23200-0351522	type 1008	grey cast iron	22,3	5	35	15	2,3	1/4 BSW	5,5
23200-0351622	type 1008	grey cast iron	22,3	5	35	16	2,3	1/4 BSW	5,5
23200-0351822	type 1008	grey cast iron	22,3	6	35	18	2,8	1/4 BSW	5,5
23200-0351922	type 1008	grey cast iron	22,3	6	35	19	2,8	1/4 BSW	5,5
23200-0352022	type 1008	grey cast iron	22,3	6	35	20	2,8	1/4 BSW	5,5
23200-0352222	type 1008	grey cast iron	22,3	6	35	22	2,8	1/4 BSW	5,5

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0381122	type 1108	grey cast iron	22,3	4	38	11	1,8	1/4 BSW	5,5
23200-0381222	type 1108	grey cast iron	22,3	4	38	12	1,8	1/4 BSW	5,5
23200-0381422	type 1108	grey cast iron	22,3	5	38	14	2,3	1/4 BSW	5,5
23200-0381522	type 1108	grey cast iron	22,3	5	38	15	2,3	1/4 BSW	5,5
23200-0381622	type 1108	grey cast iron	22,3	5	38	16	2,3	1/4 BSW	5,5
23200-0381722	type 1108	grey cast iron	22,3	5	38	17	2,3	1/4 BSW	5,5
23200-0381822	type 1108	grey cast iron	22,3	6	38	18	2,8	1/4 BSW	5,5
23200-0381922	type 1108	grey cast iron	22,3	6	38	19	2,8	1/4 BSW	5,5
23200-0382022	type 1108	grey cast iron	22,3	6	38	20	2,8	1/4 BSW	5,5
23200-0382222	type 1108	grey cast iron	22,3	6	38	22	2,8	1/4 BSW	5,5
23200-0382422	type 1108	grey cast iron	22,3	8	38	24	2,3	1/4 BSW	5,5
23200-0382522	type 1108	grey cast iron	22,3	8	38	25	2,3	1/4 BSW	5,5
23200-0382622	type 1108	grey cast iron	22,3	8	38	26	2,3	1/4 BSW	5,5

Taper clamping bushes

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0471125	type 1210	grey cast iron	25,4	4	47	11	1,8	3/8 BSW	20
23200-0471225	type 1210	grey cast iron	25,4	4	47	12	1,8	3/8 BSW	20
23200-0471425	type 1210	grey cast iron	25,4	5	47	14	2,3	3/8 BSW	20
23200-0471525	type 1210	grey cast iron	25,4	5	47	15	2,3	3/8 BSW	20
23200-0471625	type 1210	grey cast iron	25,4	5	47	16	2,3	3/8 BSW	20
23200-0471825	type 1210	grey cast iron	25,4	6	47	18	2,8	3/8 BSW	20
23200-0471925	type 1210	grey cast iron	25,4	6	47	19	2,8	3/8 BSW	20
23200-0472025	type 1210	grey cast iron	25,4	6	47	20	2,8	3/8 BSW	20
23200-0472225	type 1210	grey cast iron	25,4	6	47	22	2,8	3/8 BSW	20
23200-0472425	type 1210	grey cast iron	25,4	8	47	24	3,3	3/8 BSW	20
23200-0472525	type 1210	grey cast iron	25,4	8	47	25	3,3	3/8 BSW	20
23200-0472625	type 1210	grey cast iron	25,4	8	47	26	3,3	3/8 BSW	20
23200-0472825	type 1210	grey cast iron	25,4	8	47	28	3,3	3/8 BSW	20
23200-0473025	type 1210	steel	25,4	8	47	30	3,3	3/8 BSW	20
23200-0473225	type 1210	steel	25,4	10	47	32	2,3	3/8 BSW	20

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0571225	type 1610	grey cast iron	25,4	4	57	12	1,8	3/8 BSW	20
23200-0571425	type 1610	grey cast iron	25,4	5	57	14	2,3	3/8 BSW	20
23200-0571525	type 1610	grey cast iron	25,4	5	57	15	2,3	3/8 BSW	20
23200-0571625	type 1610	grey cast iron	25,4	5	57	16	2,3	3/8 BSW	20
23200-0571825	type 1610	grey cast iron	25,4	6	57	18	2,8	3/8 BSW	20
23200-0571925	type 1610	grey cast iron	25,4	6	57	19	2,8	3/8 BSW	20
23200-0572025	type 1610	grey cast iron	25,4	6	57	20	2,8	3/8 BSW	20
23200-0572225	type 1610	grey cast iron	25,4	6	57	22	2,8	3/8 BSW	20
23200-0572425	type 1610	grey cast iron	25,4	8	57	24	3,3	3/8 BSW	20
23200-0572525	type 1610	grey cast iron	25,4	8	57	25	3,3	3/8 BSW	20
23200-0572625	type 1610	grey cast iron	25,4	8	57	26	3,3	3/8 BSW	20
23200-0572825	type 1610	grey cast iron	25,4	8	57	28	3,3	3/8 BSW	20
23200-0573025	type 1610	grey cast iron	25,4	8	57	30	3,3	3/8 BSW	20
23200-0573225	type 1610	grey cast iron	25,4	10	57	32	3,3	3/8 BSW	20
23200-0573525	type 1610	grey cast iron	25,4	10	57	35	3,3	3/8 BSW	20
23200-0573825	type 1610	grey cast iron	25,4	10	57	38	3,3	3/8 BSW	20
23200-0574025	type 1610	steel	25,4	12	57	40	2,3	3/8 BSW	20
23200-0574225	type 1610	steel	25,4	12	57	42	2,3	3/8 BSW	20

Taper clamping bushes

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0571238	type 1615	grey cast iron	38,1	4	57	12	1,8	3/8 BSW	20
23200-0571438	type 1615	grey cast iron	38,1	5	57	14	2,3	3/8 BSW	20
23200-0571538	type 1615	grey cast iron	38,1	5	57	15	2,3	3/8 BSW	20
23200-0571638	type 1615	grey cast iron	38,1	5	57	16	2,3	3/8 BSW	20
23200-0571838	type 1615	grey cast iron	38,1	6	57	18	2,8	3/8 BSW	20
23200-0571938	type 1615	grey cast iron	38,1	6	57	19	2,8	3/8 BSW	20
23200-0572038	type 1615	grey cast iron	38,1	6	57	20	2,8	3/8 BSW	20
23200-0572238	type 1615	grey cast iron	38,1	6	57	22	2,8	3/8 BSW	20
23200-0572438	type 1615	grey cast iron	38,1	8	57	24	3,3	3/8 BSW	20
23200-0572538	type 1615	grey cast iron	38,1	8	57	25	3,3	3/8 BSW	20
23200-0572638	type 1615	grey cast iron	38,1	8	57	26	3,3	3/8 BSW	20
23200-0572838	type 1615	grey cast iron	38,1	8	57	28	3,3	3/8 BSW	20
23200-0573038	type 1615	grey cast iron	38,1	8	57	30	3,3	3/8 BSW	20
23200-0573238	type 1615	grey cast iron	38,1	10	57	32	3,3	3/8 BSW	20
23200-0573538	type 1615	grey cast iron	38,1	10	57	35	3,3	3/8 BSW	20
23200-0573838	type 1615	grey cast iron	38,1	10	57	38	3,3	3/8 BSW	20
23200-0574038	type 1615	steel	38,1	12	57	40	2,3	3/8 BSW	20

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0701431	type 2012	grey cast iron	31,8	5	70	14	2,3	7/16 BSW	30
23200-0701631	type 2012	grey cast iron	31,8	5	70	16	2,3	7/16 BSW	30
23200-0701831	type 2012	grey cast iron	31,8	6	70	18	2,8	7/16 BSW	30
23200-0701931	type 2012	grey cast iron	31,8	6	70	19	2,8	7/16 BSW	30
23200-0702031	type 2012	grey cast iron	31,8	6	70	20	2,8	7/16 BSW	30
23200-0702231	type 2012	grey cast iron	31,8	6	70	22	2,8	7/16 BSW	30
23200-0702431	type 2012	grey cast iron	31,8	8	70	24	3,3	7/16 BSW	30
23200-0702531	type 2012	grey cast iron	31,8	8	70	25	3,3	7/16 BSW	30
23200-0702631	type 2012	grey cast iron	31,8	8	70	26	3,3	7/16 BSW	30
23200-0702831	type 2012	grey cast iron	31,8	8	70	28	3,3	7/16 BSW	30
23200-0703031	type 2012	grey cast iron	31,8	8	70	30	3,3	7/16 BSW	30
23200-0703231	type 2012	grey cast iron	31,8	10	70	32	3,3	7/16 BSW	30
23200-0703531	type 2012	grey cast iron	31,8	10	70	35	3,3	7/16 BSW	30
23200-0703831	type 2012	grey cast iron	31,8	10	70	38	3,3	7/16 BSW	30
23200-0704031	type 2012	grey cast iron	31,8	12	70	40	3,3	7/16 BSW	30
23200-0704231	type 2012	grey cast iron	31,8	12	70	42	3,3	7/16 BSW	30
23200-0704531	type 2012	grey cast iron	31,8	14	70	45	3,8	7/16 BSW	30
23200-0704831	type 2012	grey cast iron	31,8	14	70	48	3,8	7/16 BSW	30
23200-0705031	type 2012	steel	31,8	14	70	50	3,8	7/16 BSW	30

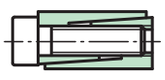
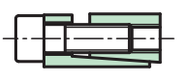
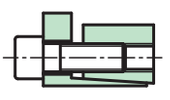
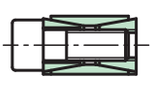
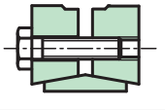
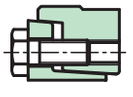
Taper clamping bushes

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0851844	type 2517	grey cast iron	44,5	6	85	18	2,8	1/2 BSW	50
23200-0851944	type 2517	grey cast iron	44,5	6	85	19	2,8	1/2 BSW	50
23200-0852044	type 2517	grey cast iron	44,5	6	85	20	2,8	1/2 BSW	50
23200-0852244	type 2517	grey cast iron	44,5	6	85	22	2,8	1/2 BSW	50
23200-0852444	type 2517	grey cast iron	44,5	8	85	24	3,3	1/2 BSW	50
23200-0852544	type 2517	grey cast iron	44,5	8	85	25	3,3	1/2 BSW	50
23200-0852844	type 2517	grey cast iron	44,5	8	85	28	3,3	1/2 BSW	50
23200-0853044	type 2517	grey cast iron	44,5	8	85	30	3,3	1/2 BSW	50
23200-0853244	type 2517	grey cast iron	44,5	10	85	32	3,3	1/2 BSW	50
23200-0853544	type 2517	grey cast iron	44,5	10	85	35	3,3	1/2 BSW	50
23200-0853844	type 2517	grey cast iron	44,5	10	85	38	3,3	1/2 BSW	50
23200-0854044	type 2517	grey cast iron	44,5	12	85	40	3,3	1/2 BSW	50
23200-0854244	type 2517	grey cast iron	44,5	12	85	42	3,3	1/2 BSW	50
23200-0854544	type 2517	grey cast iron	44,5	14	85	45	3,8	1/2 BSW	50
23200-0854844	type 2517	grey cast iron	44,5	14	85	48	3,8	1/2 BSW	50
23200-0855044	type 2517	grey cast iron	44,5	14	85	50	3,8	1/2 BSW	50
23200-0855544	type 2517	grey cast iron	44,5	16	85	55	4,3	1/2 BSW	50
23200-0856044	type 2517	grey cast iron	44,5	18	85	60	4,4	1/2 BSW	50

Order No.	Version	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-1082250	type 3020	grey cast iron	50,8	6	108	22	2,8	5/8 BSW	90
23200-1082550	type 3020	grey cast iron	50,8	8	108	25	3,3	5/8 BSW	90
23200-1082850	type 3020	grey cast iron	50,8	8	108	28	3,3	5/8 BSW	90
23200-1083050	type 3020	grey cast iron	50,8	8	108	30	3,3	5/8 BSW	90
23200-1083250	type 3020	grey cast iron	50,8	10	108	32	3,3	5/8 BSW	90
23200-1083550	type 3020	grey cast iron	50,8	10	108	35	3,3	5/8 BSW	90
23200-1083850	type 3020	grey cast iron	50,8	10	108	38	3,3	5/8 BSW	90
23200-1084050	type 3020	grey cast iron	50,8	12	108	40	3,3	5/8 BSW	90
23200-1084250	type 3020	grey cast iron	50,8	12	108	42	3,3	5/8 BSW	90
23200-1084550	type 3020	grey cast iron	50,8	14	108	45	3,8	5/8 BSW	90
23200-1084850	type 3020	grey cast iron	50,8	14	108	48	3,8	5/8 BSW	90
23200-1085050	type 3020	grey cast iron	50,8	14	108	50	3,8	5/8 BSW	90
23200-1085550	type 3020	grey cast iron	50,8	16	108	55	4,3	5/8 BSW	90
23200-1086050	type 3020	grey cast iron	50,8	18	108	60	4,4	5/8 BSW	90
23200-1086550	type 3020	grey cast iron	50,8	18	108	65	4,4	5/8 BSW	90
23200-1087050	type 3020	grey cast iron	50,8	20	108	70	4,9	5/8 BSW	90
23200-1087550	type 3020	steel	50,8	20	108	75	4,9	5/8 BSW	90

Notes

Overview keyless locking couplings and shrink discs

	Series		Shaft diameter from	Transmissible torque	Surface pressure on the hub	Self-centring	Axial displacement of the hub during assembly	Total height D2 / D			Overall length		
								flat	medium	high	short	medium	long
KLC's	23350		8 mm	medium	slight	Yes	No	X					X
KLC's	23351		19 mm	high	medium	Yes	Yes			X		X	
KLC's	23352		19 mm	medium	low	Yes	No			X		X	
KLC's	23354		6 mm	medium	low	Yes	Yes		X		X		
KLC's	23356		19 mm	medium	medium	Yes	Yes			X	X		
KLC's	23358		19 mm	medium	medium	Yes	No			X	X		
KLC's	23360		19 mm	medium	high	No	No			X	X		
KLC's	23362		25 mm	high	medium	Yes	Yes			X			X
KLC's	23368		5 mm	low	slight	Yes	Yes	X				X	
Shrink discs	23380		14 mm	high	-	Yes	No		X			X	
Shrink discs	23382		18 mm	high	-	Yes	No		X			X	

Keyless locking couplings Form A

for thin walled hubs

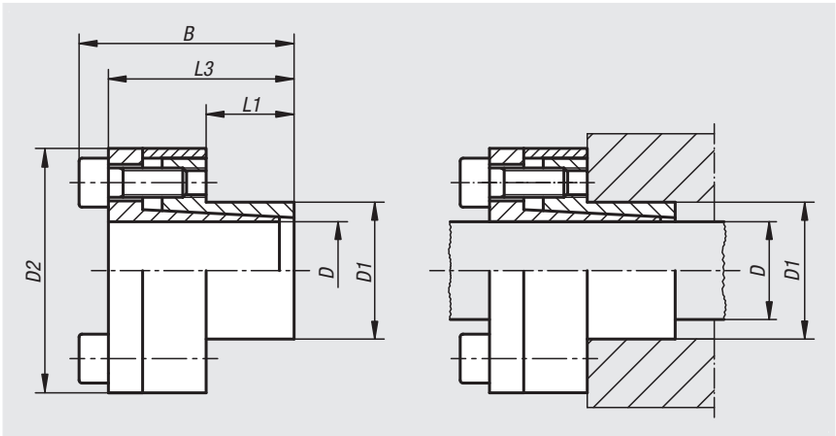


Material:
Steel.

Version:
Bright.

Sample order:
nlm 23350-0815

Note:
Particularly compact self-centring keyless locking coupling without axial offset.



- for shaft diameters from 8 to 85 mm
- for medium torques
- suitable for hubs with low wall thickness
- no axial offset
- self-centring

Order No.	D	D1	D2	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23350-0815	8	15	27	30	12	26	30	7
23350-0916	9	16	28	31	14	27	34	7
23350-1016	10	16	28	31	14	27	37	7
23350-1118	11	18	32	31	14	27	51	10
23350-1218	12	18	32	31	14	27	56	10
23350-1423	14	23	38	31	14	27	65	10
23350-1524	15	24	44	42	16	36	110	17
23350-1624	16	24	44	42	16	36	120	17
23350-1826	18	26	47	44	18	38	180	22
23350-1927	19	27	48	44	18	38	190	22
23350-2028	20	28	49	44	18	38	200	21
23350-2232	22	32	53	51	25	45	230	21
23350-2434	24	34	55	51	25	45	255	21
23350-2534	25	34	55	51	25	45	255	21
23350-2839	28	39	60	51	25	45	370	31
23350-3041	30	41	62	51	25	45	475	31
23350-3243	32	43	64	56	30	50	505	31
23350-3547	35	47	68	56	30	50	740	42
23350-3850	38	50	71	56	30	50	800	42
23350-4053	40	53	74	58	32	52	950	53
23350-4255	42	55	77	58	32	52	995	78
23350-4559	45	59	85	72	40	64	1750	78
23350-4862	48	62	87	72	40	64	1870	78
23350-5065	50	65	91	82	50	74	2430	97
23350-5571	55	71	98	82	50	74	2670	97
23350-6077	60	77	103	82	50	74	2920	97
23350-6584	65	84	110	82	50	74	3160	97
23350-7090	70	90	119	101	60	91	4330	123
23350-7595	75	95	126	101	60	91	5310	142
23350-80100	80	100	131	106	65	96	7580	190
23350-85106	85	106	137	106	65	96	7990	190

Keyless locking couplings Form A

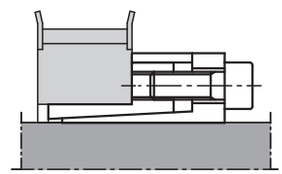
for thin walled hubs

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

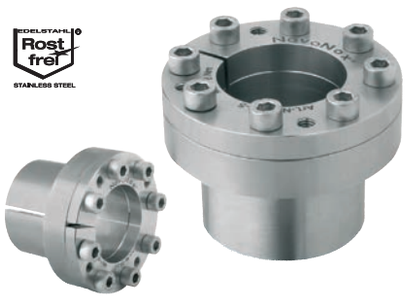
Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

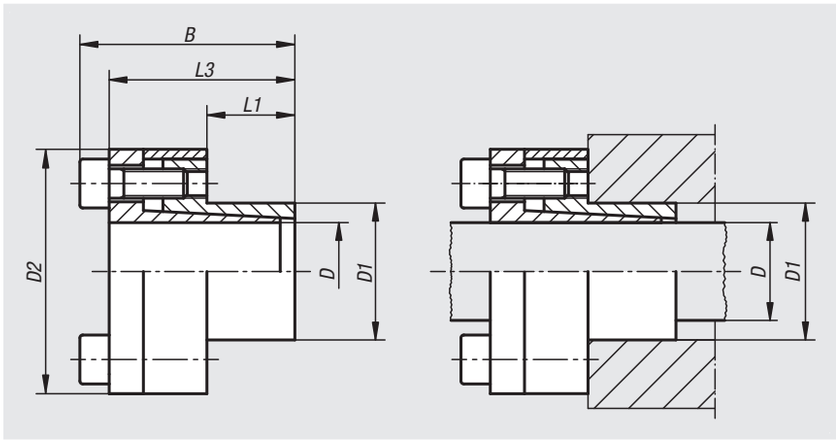
Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.



Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23350-0815	230	120	4 x M4	4
23350-0916	170	100	4 x M4	4
23350-1016	160	100	4 x M4	4
23350-1118	180	110	4 x M4	5
23350-1218	155	110	4 x M4	5
23350-1423	140	85	4 x M4	5
23350-1524	180	115	3 x M6	17
23350-1624	170	115	3 x M6	17
23350-1826	180	135	4 x M6	17
23350-1927	170	125	4 x M6	17
23350-2028	150	115	4 x M6	17
23350-2232	115	80	4 x M6	17
23350-2434	105	75	4 x M6	17
23350-2534	100	75	4 x M6	17
23350-2839	110	80	5 x M6	17
23350-3041	125	90	6 x M6	17
23350-3243	95	75	6 x M6	17
23350-3547	120	90	8 x M6	17
23350-3850	110	85	8 x M6	17
23350-4053	110	85	8 x M6	17
23350-4255	105	80	8 x M6	17
23350-4559	130	100	8 x M8	41
23350-4862	120	95	8 x M8	41
23350-5065	115	90	10 x M8	41
23350-5571	105	80	10 x M8	41
23350-6077	95	75	10 x M8	41
23350-6584	90	70	10 x M8	41
23350-7090	85	70	8 x M10	83
23350-7595	90	75	9 x M10	83
23350-80100	110	85	12 x M10	83
23350-85106	100	80	12 x M10	83

Keyless locking couplings Form A stainless steel





Material:
Coupling stainless steel 1.4057.
Screws stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 23350-01-2028

Note:
Particularly compact self-centring keyless locking coupling with no axial offset.

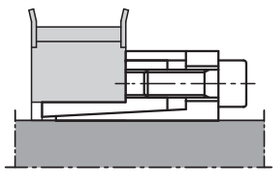
- for shaft diameters 20 - 60 mm
- for medium torques
- suitable for thin walled hubs
- no axial offset
- self-centring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.

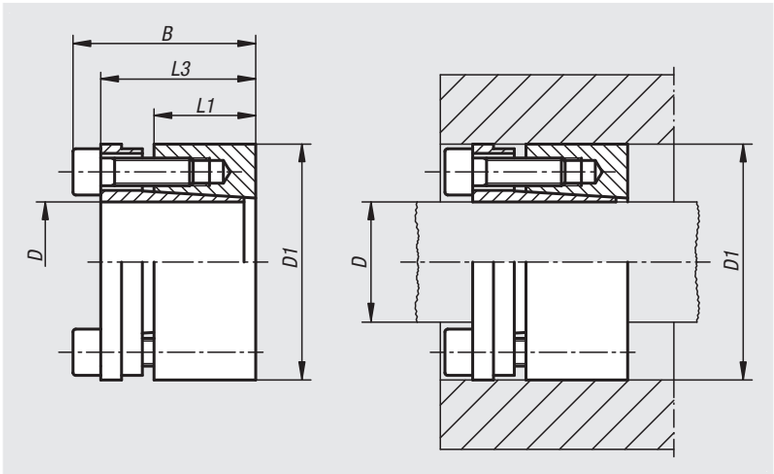


Order No.	D	D1	D2	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23350-01-2028	20	28	50	45	18	39	97	10	71	51	4 x M6	8
23350-01-2534	25	34	56	52	25	46	180	15	62	45	6 x M6	8
23350-01-3041	30	41	62	52	25	46	220	15	51	38	6 x M6	8
23350-01-3547	35	47	68	59	32	53	340	19	46	34	8 x M6	8
23350-01-4053	40	53	75	59	32	53	390	19	40	30	8 x M6	8
23350-01-4559	45	59	86	78	45	70	820	36	48	36	8 x M8	18
23350-01-5065	50	65	92	78	45	70	910	36	43	33	8 x M8	18
23350-01-5571	55	71	98	89	55	81	1100	41	36	28	9 x M8	18
23350-01-6077	60	77	104	89	55	81	1200	41	33	26	9 x M8	18

Notes

Keyless locking couplings Form B





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23351-1947

Note:
The keyless locking coupling can be fully recessed in a hub connection.

- for shaft diameters from 19 to 85 mm
- for high torques
- minimum axial offset possible
- self-centring

Order No.	D	D1	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23351-1947	19	47	45	26	39	530	56
23351-2047	20	47	45	26	39	550	56
23351-2247	22	47	45	26	39	610	56
23351-2450	24	50	45	26	39	660	56
23351-2550	25	50	45	26	39	690	56
23351-2855	28	55	45	26	39	770	56
23351-3055	30	55	45	26	39	830	56
23351-3260	32	60	45	26	39	1180	74
23351-3560	35	60	45	26	39	1295	74
23351-3865	38	65	45	26	39	1400	74
23351-4065	40	65	45	26	39	1480	74
23351-4275	42	75	55	30	47	2120	101
23351-4575	45	75	55	30	47	2270	101
23351-4880	48	80	55	30	47	3230	135
23351-5080	50	80	55	30	47	3365	135
23351-5585	55	85	55	30	47	3700	135
23351-6090	60	90	55	30	47	4035	135
23351-6595	65	95	55	30	47	4370	135
23351-70110	70	110	67	40	62	7615	218
23351-75115	75	115	72	40	62	8160	218
23351-80120	80	120	72	40	62	8700	218
23351-85125	85	125	72	40	62	11560	272

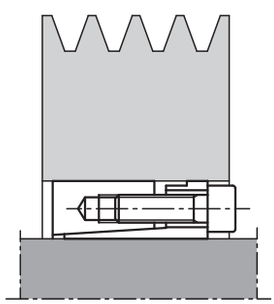
Keyless locking couplings Form B

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.

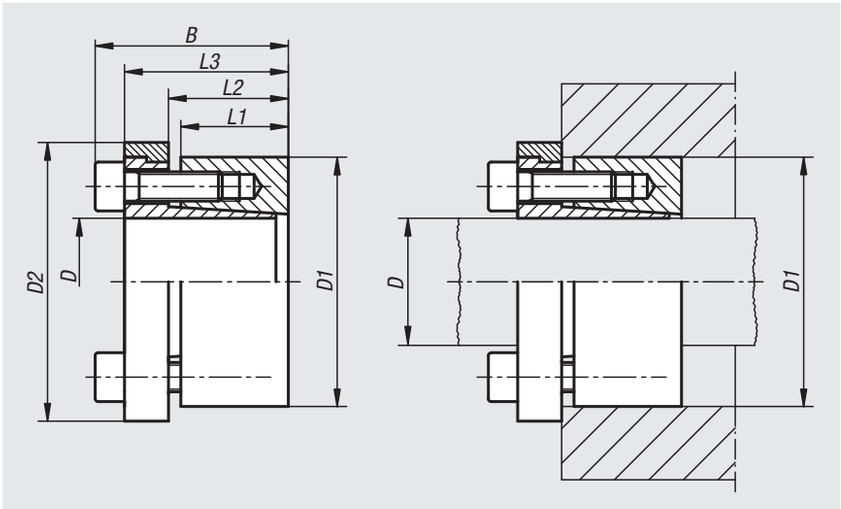


Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23351-1947	298	120	6 x M6	17
23351-2047	283	120	6 x M6	17
23351-2247	257	120	6 x M6	17
23351-2450	236	115	6 x M6	17
23351-2550	227	115	6 x M6	17
23351-2855	202	105	6 x M6	17
23351-3055	190	105	6 x M6	17
23351-3260	235	125	8 x M6	17
23351-3560	216	126	8 x M6	17
23351-3865	200	116	8 x M6	17
23351-4065	190	116	8 x M6	17
23351-4275	212	120	6 x M8	41
23351-4575	198	120	6 x M8	41
23351-4880	250	150	8 x M8	41
23351-5080	240	150	8 x M8	41
23351-5585	216	140	8 x M8	41
23351-6090	200	135	8 x M8	41
23351-6595	183	125	8 x M8	41
23351-70110	206	131	8 x M10	83
23351-75115	192	126	8 x M10	83
23351-80120	180	120	8 x M10	83
23351-85125	212	145	10 x M10	83

Keyless locking couplings Form C

with axial ring





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23352-1947

Note:
These keyless locking couplings are universally applicable.

- for shaft diameters from 19 to 85 mm
- for medium to high torques
- suitable for hubs with low wall thickness
- no axial offset
- self-centring

Order No.	D	D1	D2	B	L1	L2	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23352-1947	19	47	53	45	26	31	39	320	33
23352-2047	20	47	53	45	26	31	39	330	33
23352-2247	22	47	53	45	26	31	39	370	33
23352-2450	24	50	56	45	26	31	39	400	33
23352-2550	25	50	56	45	26	31	39	420	33
23352-2855	28	55	61	45	26	31	39	470	33
23352-3055	30	55	61	45	26	31	39	500	33
23352-3260	32	60	66	45	26	31	39	710	44
23352-3560	35	60	66	45	26	31	39	780	44
23352-3865	38	65	71	45	26	31	39	850	44
23352-4065	40	65	71	45	26	31	39	890	44
23352-4275	42	75	81	55	30	36	47	1270	61
23352-4575	45	75	81	55	30	36	47	1360	61
23352-4880	48	80	86	55	30	36	47	1940	81
23352-5080	50	80	86	55	30	36	47	2020	81
23352-5585	55	85	91	55	30	36	47	2220	81
23352-6090	60	90	96	55	30	36	47	2430	81
23352-6595	65	95	101	55	30	36	47	2630	81
23352-70110	70	110	116	72	40	46	62	4580	131
23352-75115	75	115	121	72	40	46	62	4900	131
23352-80120	80	120	126	72	40	46	62	5230	131
23352-85125	85	125	131	72	40	46	62	6950	163

Keyless locking couplings Form C

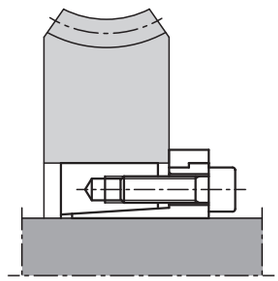
with axial ring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.



Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23352-1947	180	70	6 x M6	17
23352-2047	170	70	6 x M6	17
23352-2247	155	70	6 x M6	17
23352-2450	140	70	6 x M6	17
23352-2550	135	70	6 x M6	17
23352-2855	120	60	6 x M6	17
23352-3055	115	60	6 x M6	17
23352-3260	140	75	8 x M6	17
23352-3560	130	75	8 x M6	17
23352-3865	120	70	8 x M6	17
23352-4065	110	70	8 x M6	17
23352-4275	130	70	6 x M8	41
23352-4575	120	70	6 x M8	41
23352-4880	150	90	8 x M8	41
23352-5080	145	90	8 x M8	41
23352-5585	130	85	8 x M8	41
23352-6090	120	80	8 x M8	41
23352-6595	110	75	8 x M8	41
23352-70110	125	80	8 x M10	83
23352-75115	115	75	8 x M10	83
23352-80120	110	70	8 x M10	83
23352-85125	125	85	10 x M10	83

Keyless locking couplings Form D

compact design



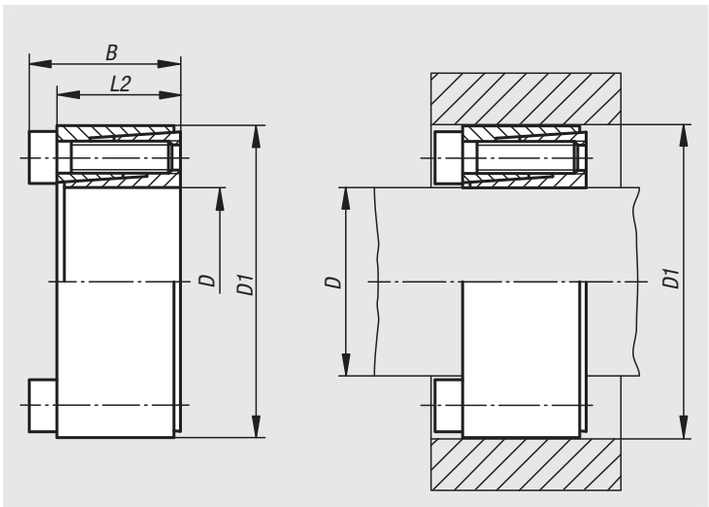
Material:
Steel.

Version:
Bright.

Sample order:
nlm 23354-0516

Note:
For applications that require a small construction volume and low surface pressure. The keyless locking coupling can be fully recessed in a hub connection.

- for shaft diameters from 5 to 50 mm
- for medium torques
- suitable for hubs with low wall thickness
- minimum axial offset possible
- self-centring



Order No.	D	D1	B	L2	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23354-0516	5	16	13,5	11	6	2
23354-0616	6	16	13,5	11	6	2
23354-063516	6,35	16	13,5	11	6	2
23354-0717	7	17	13,5	11	8	2
23354-0818	8	18	13,5	11	10	2,5
23354-0920	9	20	15,5	13	15	3
23354-095320	9,53	20	15,5	13	15	3
23354-1020	10	20	15,5	13	15	3
23354-1122	11	22	15,5	13	18	3
23354-1222	12	22	15,5	13	20	3
23354-1426	14	26	20	17	35	5
23354-1528	15	28	20	17	40	5
23354-1632	16	32	21	17	70	8
23354-1735	17	35	25	21	75	8
23354-1835	18	35	25	21	80	8
23354-1935	19	35	25	21	85	8
23354-2038	20	38	26	21	150	15
23354-2240	22	40	26	21	160	14
23354-2447	24	47	32	26	250	20
23354-2547	25	47	32	26	260	20
23354-25447	25,4	47	32	26	265	20
23354-2850	28	50	32	26	440	30
23354-3055	30	55	32	26	470	30
23354-3255	32	55	32	26	500	30
23354-3560	35	60	37	29	730	40
23354-3865	38	65	37	29	800	40
23354-4065	40	65	37	29	840	40
23354-4275	42	75	44	36	1200	55
23354-4575	45	75	44	36	1300	55
23354-4880	48	80	44	36	1850	75
23354-5080	50	80	44	36	1900	75

Keyless locking couplings Form D

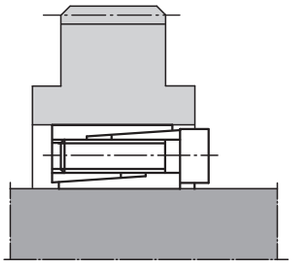
compact design

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.

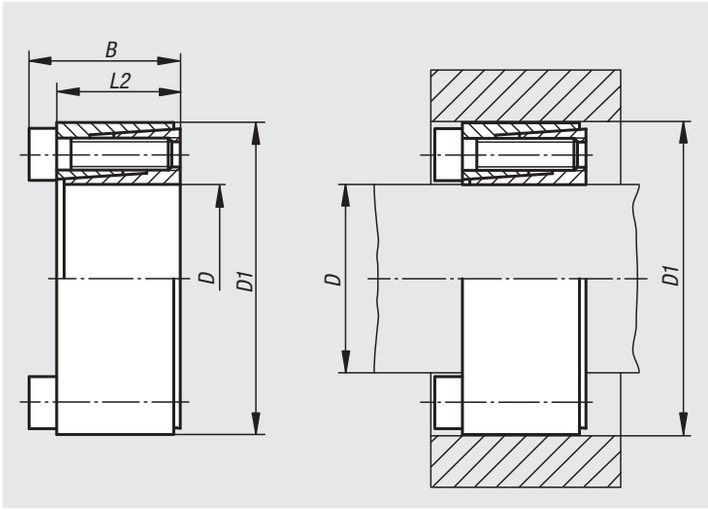


Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23354-0516	150	55	3 x M2,5	1,2
23354-0616	150	55	3 x M2,5	1,2
23354-063516	140	55	3 x M2,5	1,2
23354-0717	125	55	3 x M2,5	1,2
23354-0818	110	50	3 x M2,5	1,2
23354-0920	120	55	4 x M2,5	1,2
23354-095320	110	55	4 x M2,5	1,2
23354-1020	110	55	4 x M2,5	1,2
23354-1122	100	50	4 x M2,5	1,2
23354-1222	90	50	4 x M2,5	1,2
23354-1426	105	55	4 x M3	2,1
23354-1528	100	50	4 x M3	2,1
23354-1632	130	65	4 x M4	4,9
23354-1735	120	60	4 x M4	4,9
23354-1835	115	60	4 x M4	4,9
23354-1935	110	60	4 x M4	4,9
23354-2038	140	75	4 x M5	9,7
23354-2240	130	70	4 x M5	17
23354-2447	140	75	4 x M6	17
23354-2547	135	75	4 x M6	17
23354-25447	130	75	4 x M6	17
23354-2850	185	100	6 x M6	17
23354-3055	175	95	6 x M6	17
23354-3255	165	95	6 x M6	17
23354-3560	165	95	8 x M6	17
23354-3865	155	90	8 x M6	17
23354-4065	145	90	8 x M6	17
23354-4275	165	90	6 x M8	41
23354-4575	155	90	6 x M8	41
23354-4880	195	115	8 x M8	41
23354-5080	185	115	8 x M8	41

Keyless locking couplings, Form D

stainless steel





Material:
Coupling stainless steel 1.4057.
Screws stainless steel 1.4301.

Version:
Bright.

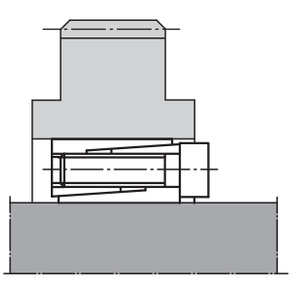
Sample order:
nlm 23354-01-0616

Note:
For applications that require a small construction volume and low surface pressure. The keyless locking coupling can be fully recessed in a hub connection.

- for shaft diameters 6 - 20 mm
- suitable for hubs with low wall thickness
- minimum axial offset possible
- self-centring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.



Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.

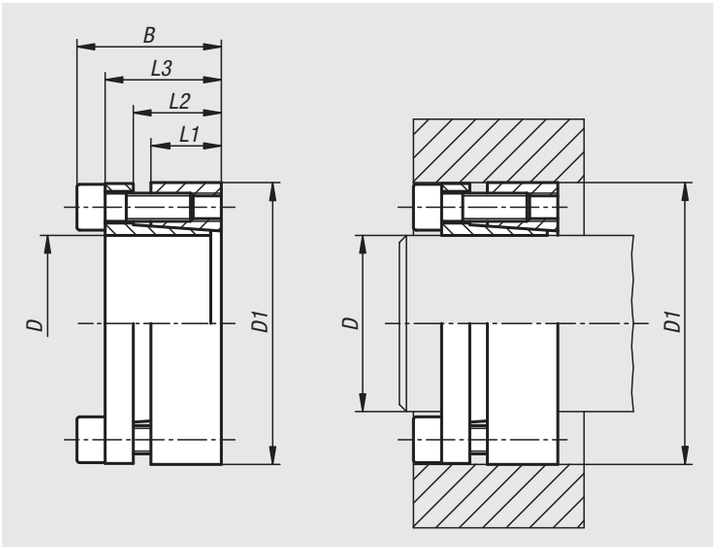
Order No.	D	D1	B	L2	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23354-01-0616	6	16	13,5	11	3	0,9	49	19	3 x M2,5	0,5
23354-01-0717	7	17	13,5	11	3	0,9	42	17	3 x M2,5	0,5
23351-01-0818	8	18	13,5	11	4	0,9	37	17	3 x M2,5	0,5
23354-01-0920	9	20	15,5	13	6	1,2	37	17	4 x M2,5	0,5
23354-01-1020	10	20	15,5	13	6	1,2	33	17	4 x M2,5	0,5
23354-01-1122	11	22	15,5	13	7	1,2	30	15	4 x M2,5	0,5
23354-01-1222	12	22	15,5	13	7	1,2	26	15	4 x M2,5	0,5
23354-01-1426	14	26	20	17	13	1,9	28	15	4 x M3	0,9
23354-01-1528	15	28	20	17	14	1,9	26	14	4 x M3	0,9
23354-01-1632	16	32	21	17	28	3,5	45	23	4 x M4	2,2
23354-01-1835	18	35	25	21	32	3,5	32	17	4 x M4	2,2
23354-01-1935	19	35	25	21	34	3,5	31	17	4 x M4	2,2
23354-01-2038	20	38	26	21	55	5,5	45	24	4 x M5	4,2

Notes

Keyless locking couplings Form E

short version





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23356-1947

Note:
Keyless locking coupling with short axial width. The keyless locking coupling can be fully recessed in a hub connection.

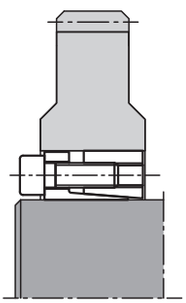
- for shaft diameters from 19 to 85 mm
- for medium to high torques
- minimum axial offset when mounting
- self-centring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.



Keyless locking couplings Form E

short version

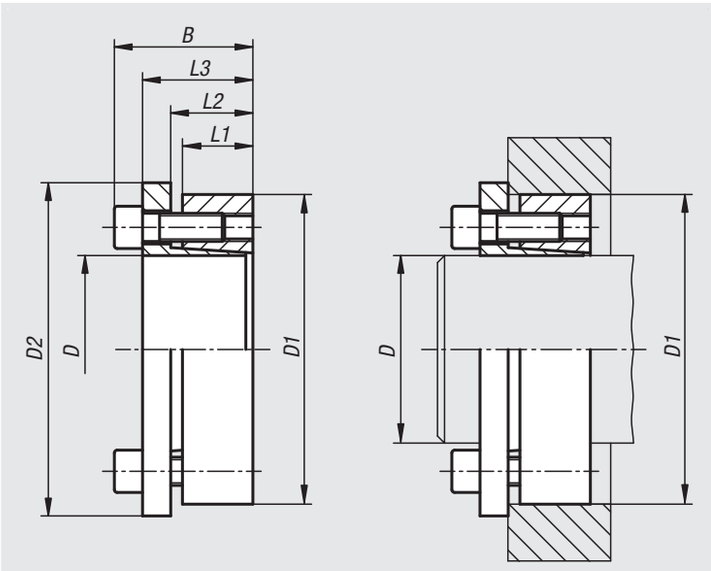
Order No.	D	D1	B	L1	L2	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23356-1947	19	47	34	17	22	28	355	31
23356-2047	20	47	34	17	22	28	360	33
23356-2247	22	47	34	17	22	28	400	33
23356-2450	24	50	34	17	22	28	440	36
23356-2550	25	50	34	17	22	28	560	36
23356-2855	28	55	34	17	22	28	625	36
23356-3055	30	55	34	17	22	28	650	36
23356-3260	32	60	34	17	22	28	950	50
23356-3560	35	60	34	17	22	28	1050	50
23356-3865	38	65	34	17	22	28	1140	50
23356-4065	40	65	34	17	22	28	1200	50
23356-4275	42	75	41	20	25	33	2030	70
23356-4575	45	75	41	20	25	33	2180	70
23356-4880	48	80	41	20	24	33	2330	80
23356-5080	50	80	41	20	24	33	2430	85
23356-5585	55	85	41	20	24	33	3050	100
23356-6090	60	90	41	20	24	33	3350	100
23356-6595	65	95	41	20	24	33	4080	110
23356-70110	70	110	50	24	29	40	6280	160
23356-75115	75	115	50	24	29	40	6680	160
23356-80120	80	120	50	24	29	40	7130	160
23356-85125	85	125	50	24	29	40	8750	180

Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23356-1947	280	120	5 x M6	14
23356-2047	280	120	5 x M6	14
23356-2247	260	125	5 x M6	14
23356-2450	245	120	6 x M6	14
23356-2550	280	140	6 x M6	14
23356-2855	250	130	6 x M6	14
23356-3055	235	130	6 x M6	14
23356-3260	290	150	8 x M6	14
23356-3560	290	150	8 x M6	14
23356-3865	250	145	8 x M6	14
23356-4065	230	145	8 x M6	14
23356-4275	305	170	7 x M8	35
23356-4575	285	170	7 x M8	35
23356-4880	270	160	7 x M8	35
23356-5080	260	160	7 x M8	35
23356-5585	270	175	8 x M8	35
23356-6090	245	165	8 x M8	35
23356-6595	255	175	9 x M8	35
23356-70110	280	180	8 x M10	70
23356-75115	260	170	8 x M10	70
23356-80120	250	170	8 x M10	70
23356-85125	260	180	9 x M10	70

Keyless locking couplings Form F

short version with axial ring





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23358-1947

Note:
Keyless locking coupling with short axial width.

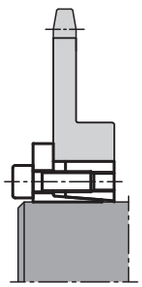
- for shaft diameters from 19 to 85 mm
- for medium to high torques
- no axial offset when mounting
- self-centring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.



Keyless locking couplings Form F

short version with axial ring

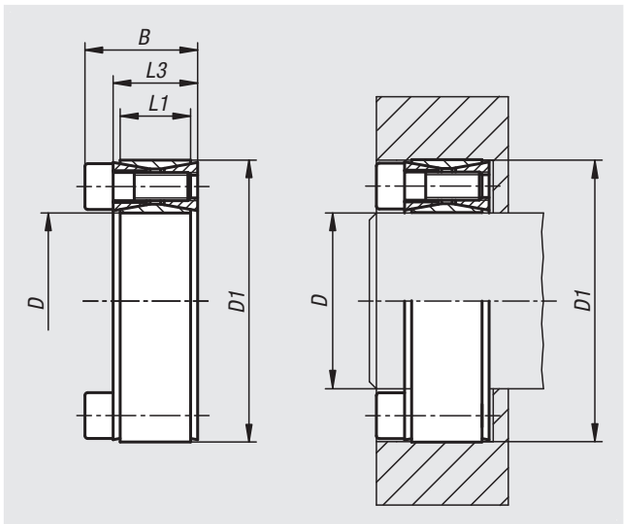
Order No.	D	D1	D2	B	L1	L2	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23358-1947	19	47	56	34	17	23	28	270	28
23358-2047	20	47	56	34	17	23	28	280	28
23358-2247	22	47	56	34	17	23	28	310	28
23358-2450	24	50	59	34	17	23	28	400	32
23358-2550	25	50	59	34	17	23	28	440	34
23358-2855	28	55	64	34	17	23	28	490	34
23358-3055	30	55	64	34	17	23	28	530	34
23358-3260	32	60	69	34	17	23	28	750	46
23358-3560	35	60	69	34	17	23	28	820	46
23358-3865	38	65	74	34	17	23	28	890	46
23358-4065	40	65	74	34	17	23	28	940	46
23358-4275	42	75	84	41	20	27	33	1600	70
23358-4575	45	75	84	41	20	27	33	1720	70
23358-4880	48	80	89	41	20	27	33	1740	70
23358-5080	50	80	89	41	20	27	33	1890	74
23358-5585	55	85	94	41	20	27	33	2400	76
23358-6090	60	90	99	41	20	27	33	2650	76
23358-6595	65	95	104	41	20	27	33	3190	80
23358-70110	70	110	119	50	24	32	40	4910	130
23358-75115	75	115	124	50	24	32	40	5150	130
23358-80120	80	120	129	50	24	32	40	5490	130
23358-85125	85	125	134	50	24	32	40	6620	140

Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23358-1947	215	95	5 x M6	17
23358-2047	215	95	5 x M6	17
23358-2247	195	95	5 x M6	17
23358-2450	215	105	6 x M6	17
23358-2550	210	105	6 x M6	17
23358-2855	195	100	6 x M6	17
23358-3055	185	100	6 x M6	17
23358-3260	210	110	8 x M6	17
23358-3560	185	110	8 x M6	17
23358-3865	190	110	8 x M6	17
23358-4065	185	110	8 x M6	17
23358-4275	240	130	7 x M8	41
23358-4575	225	130	7 x M8	41
23358-4880	234	130	7 x M8	41
23358-5080	205	125	7 x M8	41
23358-5585	210	130	8 x M8	41
23358-6090	185	120	8 x M8	41
23358-6595	195	130	9 x M8	41
23358-70110	215	135	8 x M10	83
23358-75115	195	125	8 x M10	83
23358-80120	185	120	8 x M10	83
23358-85125	195	130	9 x M10	83

Keyless locking couplings Form G

increased tolerance range





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23360-1947

Note:
Keyless locking coupling with increased tolerance range for shaft and hub. Extremely small design ideal for use when there is lack of space. Self-release when dismantling.

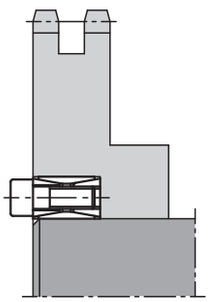
- for shaft diameters from 19 to 85 mm
- for high torques
- no axial offset when mounting
- not self-centring (concentricity of hub to shaft depends on the fit and length of the guide)

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h11.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H11.
Surface quality Rz ≤ 16 µm.



Keyless locking couplings Form G

increased tolerance range

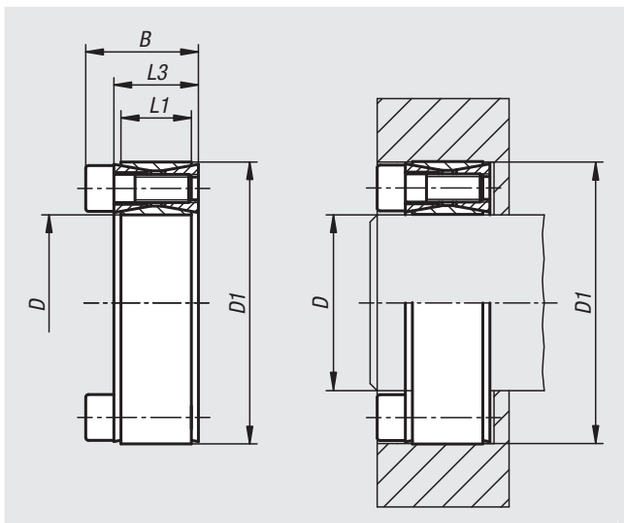
Order No.	D	D1	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23360-1947	19	47	27,5	17	20	306	32
23360-2047	20	47	27,5	17	20	321	32
23360-2247	22	47	27,5	17	20	351	32
23360-2450	24	50	27,5	17	20	429	36
23360-2550	25	50	27,5	17	20	446	36
23360-2855	28	55	27,5	17	20	496	35
23360-3055	30	55	27,5	17	20	529	35
23360-3260	32	60	27,5	17	20	749	47
23360-3560	35	60	27,5	17	20	815	47
23360-3865	38	65	27,5	17	20	1101	58
23360-4065	40	65	27,5	17	20	1154	58
23360-4275	42	75	33,5	20	24	1768	84
23360-4575	45	75	33,5	20	24	1886	84
23360-4880	48	80	33,5	20	24	2004	83
23360-5080	50	80	33,5	20	24	2082	83
23360-5585	55	85	33,5	20	24	2656	97
23360-6090	60	90	33,5	20	24	2881	96
23360-6595	65	95	33,5	20	24	3550	109
23360-70110	70	110	39,5	24	28	5432	155
23360-75115	75	115	39,5	24	28	5795	155
23360-80120	80	120	39,5	24	28	6156	154
23360-85125	85	125	39,5	24	28	7447	175

Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23360-1947	265	107	8 x M6	17
23360-2047	251	107	8 x M6	17
23360-2247	227	106	8 x M6	17
23360-2450	232	112	9 x M6	17
23360-2550	223	111	9 x M6	17
23360-2855	197	100	9 x M6	17
23360-3055	183	100	9 x M6	17
23360-3260	228	122	12 x M6	17
23360-3560	208	121	12 x M6	17
23360-3865	238	139	15 x M6	17
23360-4065	225	139	15 x M6	17
23360-4275	266	149	12 x M8	41
23360-4575	247	148	12 x M8	41
23360-4880	231	138	12 x M8	41
23360-5080	221	138	12 x M8	41
23360-5585	233	151	14 x M8	41
23360-6090	212	142	14 x M8	41
23360-6595	223	153	16 x M8	41
23360-70110	245	156	14 x M10	83
23360-75115	228	149	14 x M10	83
23360-80120	213	142	14 x M10	83
23360-85125	228	155	16 x M10	83

Keyless locking couplings Form G

stainless steel





Material:
Coupling stainless steel 1.4057.
Screws stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 23360-01-2047

Note:
Keyless locking coupling for shaft and hub. Extremely small design, ideal for use in tight spaces. Self-release during dismantling.

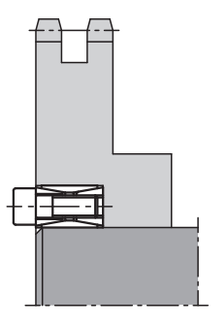
- for shaft diameters 20 - 80 mm
- no axial offset when mounting
- not self-centring (concentricity of hub to shaft depends on the fit and length of the guide)

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h11.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H11.
Surface quality Rz ≤ 16 µm.



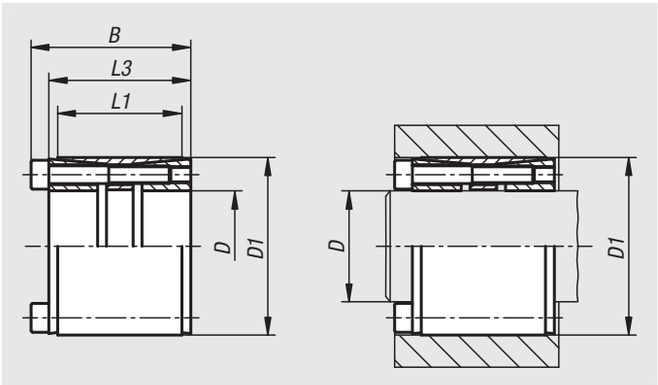
Order No.	D	D1	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23360-01-2047	20	47	26	17	20	110	11	133	57	8 x M6	8
23360-01-2550	25	50	26	17	20	155	12	120	60	9 x M6	8
23360-01-3055	30	55	26	17	20	185	12	100	55	10 x M6	8
23360-01-3560	35	60	26	17	20	290	16	114	67	12 x M6	8
23360-01-4065	40	65	26	17	20	410	20	125	77	15 x M6	8
23360-01-4575	45	75	32	20	24	635	28	129	78	12 x M8	18
23360-01-5080	50	80	32	20	24	700	28	116	73	12 x M8	18
23360-01-5585	55	85	32	20	24	905	33	123	80	14 x M8	18
23360-01-6090	60	90	32	20	24	990	33	113	76	14 x M8	18
23360-01-6595	65	95	32	20	24	1225	37	119	82	16 x M8	18
23360-01-70110	70	110	38	24	28	1875	53	131	84	14 x M10	35
23360-01-75115	75	115	38	24	28	2010	53	123	80	14 x M10	35
23360-01-80120	80	120	38	24	28	2145	53	115	77	14 x M10	35

Notes

Keyless locking couplings Form H

for high torques





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23362-2555

Note:
Keyless locking coupling for extremely high torques.

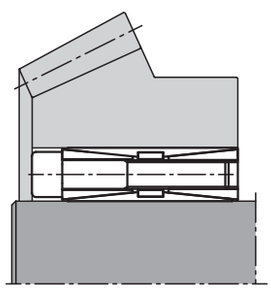
- for shaft diameters from 25 to 85 mm
- for high torques
- minimum axial offset when mounting
- self-centring

Assembly:
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

Dismantling: Remove all screws and screw into the extraction threads of the front flange. Tighten screws crosswise in several steps until the keyless locking coupling loosens.

Tolerances:
Shaft:
Recommended tolerance h8.
Surface quality Rz ≤ 16 µm.

Hub:
Recommended tolerance H8.
Surface quality Rz ≤ 16 µm.



Keyless locking couplings Form H

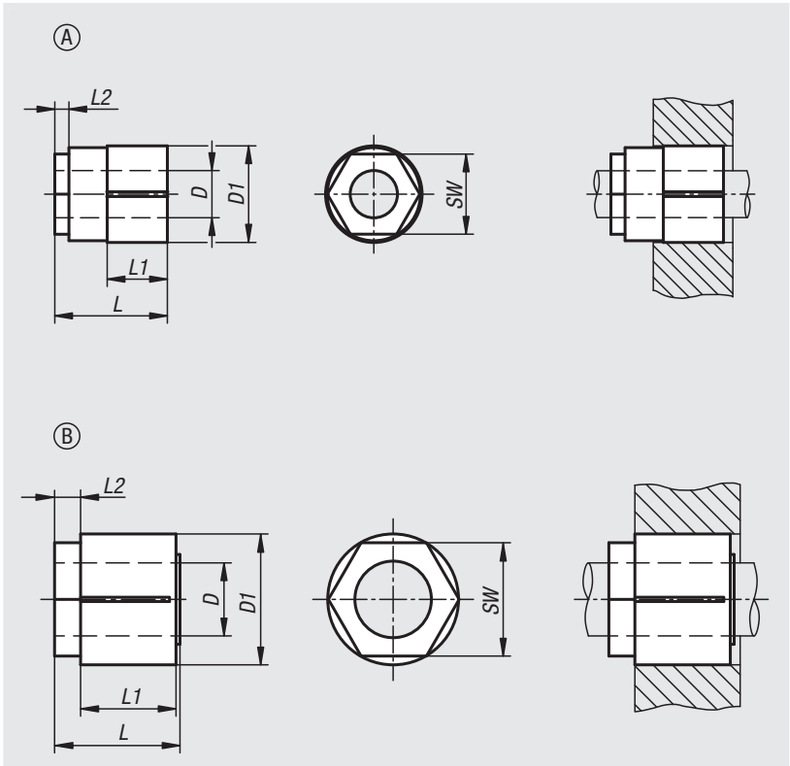
for high torques

Order No.	D	D1	B	L1	L3	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS
23362-2555	25	55	46	32	40	649	64
23362-2855	28	55	46	32	40	875	64
23362-3055	30	55	46	32	40	950	64
23362-3560	35	60	60	44	54	1300	74
23362-3865	38	65	60	45	54	1600	84
23362-4065	40	65	60	45	54	1680	84
23362-4275	42	75	62	44	54	2800	135
23362-4575	45	75	62	44	54	3050	135
23362-4880	48	80	75	56	67	3700	155
23362-5080	50	80	74	56	66	3950	155
23362-5585	55	85	74	56	66	4900	174
23362-6090	60	90	74	56	66	5900	193
23362-6595	65	95	74	56	66	6450	193
23362-70110	70	110	90	70	80	10950	313
23362-75115	75	115	90	70	80	11700	313
23362-80120	80	120	90	70	80	13750	344
23362-85125	85	125	90	70	80	16000	375

Order No.	Surface pressure on shaft P N/mm²	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23362-2555	155	80	6 x M6	17
23362-2855	250	95	6 x M6	17
23362-3055	235	95	6 x M6	17
23362-3560	165	75	7 x M6	17
23362-3865	165	95	8 x M6	17
23362-4065	155	95	8 x M6	17
23362-4275	250	110	7 x M8	41
23362-4575	235	110	7 x M8	41
23362-4880	195	90	8 x M8	41
23362-5080	185	90	8 x M8	41
23362-5585	190	100	9 x M8	41
23362-6090	195	100	10 x M8	41
23362-6595	180	95	10 x M8	41
23362-70110	210	110	10 x M10	83
23362-75115	200	105	10 x M10	83
23362-80120	205	110	11 x M10	83
23362-85125	210	115	12 x M10	83

Keyless locking couplings with central nut





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23368-0516

Note:
Keyless locking coupling with low mass and moment of inertia. Easy to connect and release – no jamming on the shaft. Perfect for zero backlash connections. Excellent concentricity and running. Suitable for keyed and keyless shafts.

- for shaft diameters from 5 to 35 mm
- for high torques
- minimum axial offset when mounting
- self-centring

Assembly:
Shaft and hub must be free of oil, grease and dirt. Do not lubricate keyless locking coupling. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten nut by hand and use a torque wrench to tighten to the defined tightening torque.

Tolerances:
Shaft diameter and hub hole
Form A ±0.04 mm.
Form B ±0.08 mm.
Surface quality Rz ≤ 16 µm.

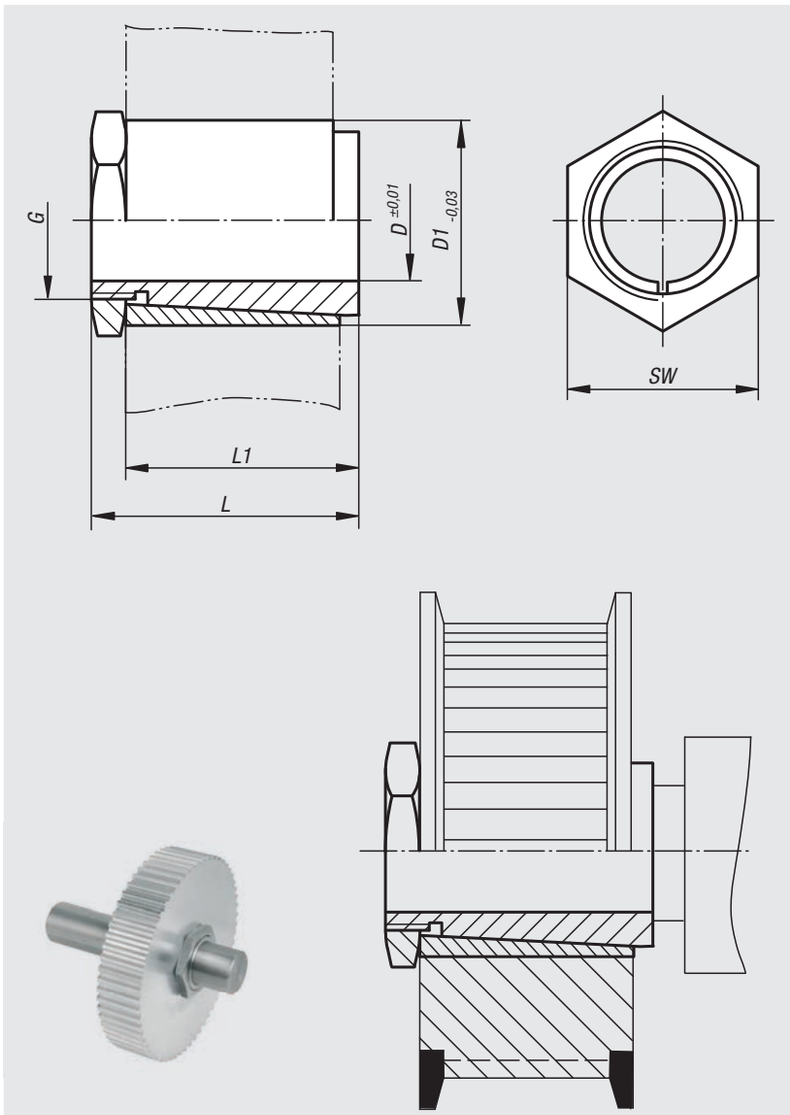
Keyless locking couplings with central nut

Order No.	Form	D	D1	L	L1	L2	SW	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on hub P N/mm²	Tightening torque MS Nm
23368-0516	A	5	16	19	9,5	3	13	10	4	110	18
23368-0616	A	6	16	19	9,5	3	13	13	4,3	110	18
23368-0720	A	7	20	22	11	3	16	13	3,7	65	20
23368-0820	A	8	20	22	11	3	16	15	3,75	65	20
23368-0920	A	9	20	22	11	3	16	18	4	65	20
23368-1023	A	10	23	25,5	12,5	5	19	23	4,6	55	25
23368-1123	A	11	23	25,5	12,5	5	19	25	4,5	55	25
23368-1223	A	12	23	25,5	12,5	5	19	28	4,6	55	25
23368-1426	A	14	26	28,5	16	5	22	46	6,6	64	50
23368-1526	A	15	26	28,5	16	5	22	49	6,59	64	50
23368-1626	A	16	26	28,5	16	5	22	52	6,5	64	50
23368-1732	B	17	32	33	21	11	30	174	18	100	110
23368-1832	B	18	32	33	21	11	30	198	21	92	110
23368-2035	B	20	35	35	23	11	32	258	26	82	150
23368-2235	B	22	35	35	23	11	32	293	27	80	150
23368-2438	B	24	38	35	23	11	36	330	29	87	185
23368-2538	B	25	38	35	23	11	36	368	31	94	185
23368-3045	B	30	45	37	25	11	46	550	45	108	300
23368-3250	B	32	50	41	28	12	50	616	44	100	265
23368-3550	B	35	50	41	28	12	50	681	42	91	265

Shaft-hub clamping sets

stainless steel





Material:
Stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 23370-040008

Note:
Self-centring and play-free shaft/hub clamping sets with a very low moment of inertia and minimal space requirement. The clamping sets produce a friction connection between shaft and hub. Central nut for quick mounting. After the nut is loosened, the set can be removed with a puller tool.
Clamping set concentricity ±0.01 mm.

Assembly:
To achieve the specified torque, the clamping set must be installed grease-free. The entire length of the clamping set must be in contact with the shaft. For maximum torque the shaft and hub must be sufficiently firm (min. yield strength 350 N/mm²).

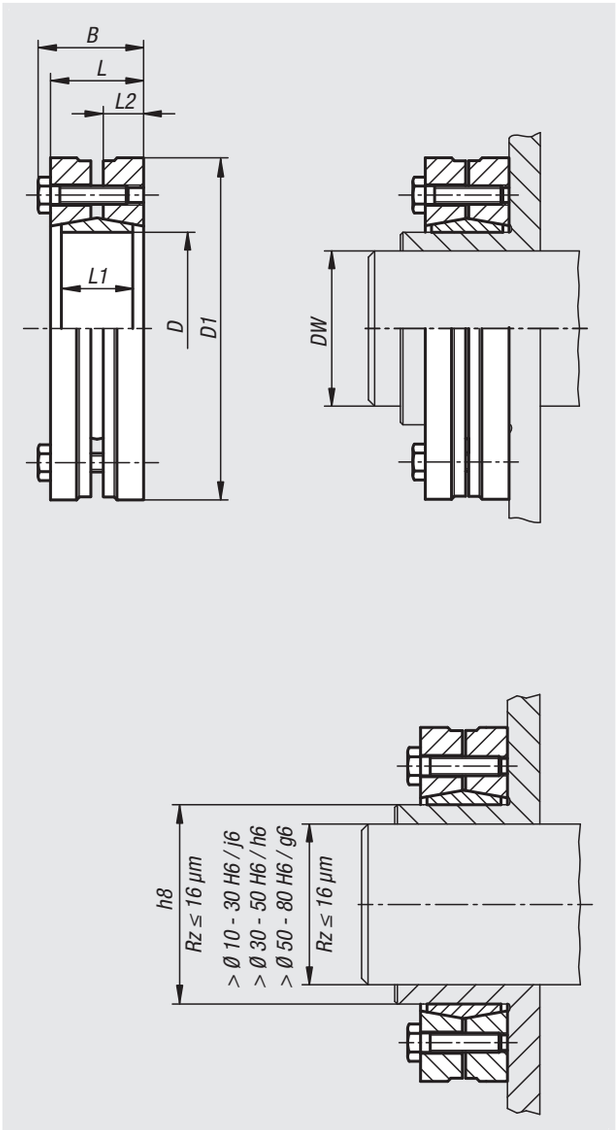
Required tolerances:
Shaft: h7
Hub: H7

Order No.	D	D1	L	L1	G	SW	Tightening torque max. Nm	Transmissible torque T Nm
23370-040008	4	8	15	12,5	M6x0,5	8	4	3
23370-050010	5	10	15	12,5	M8x0,5	10	5	4
23370-060010	6	10	15	12,5	M8x0,5	10	8	7
23370-063510	6,35	10	15	12,5	M8x0,5	10	8	7
23370-080014	8	14	22	19	M12x1	17	15	14
23370-090014	9	14	22	19	M12x1	17	15	14
23370-100017	10	17	22	18,5	M15x1	19	19	18
23370-120017	12	17	22	18,5	M15x1	19	19	18
23370-140020	14	20	28	23	M17x1	22	25	24
23370-150020	15	20	28	23	M17x1	22	25	24
23370-160023	16	23	28	23	M20x1	27	27	26
23370-190025	19	25	28	23	M22x1	27	30	29
23370-200028	20	28	28	23	M25x1	30	32	31

Notes

Shrink discs Form A





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23380-1437

Note:
Shrink disc to connect a hollow hub to a shaft. They are mounted on the OD of the hub and generate pressure on the hub wall by reducing the ID with wedge-formed rings, creating a press fit between the hub and shaft. They are suitable for static, dynamic and shock loads.

- for extremely high torques
- no axial shaft/hub offset when assembling
- self-centring

The version 23380-01-4072 has high tensile ISO 4762 screws.

Assembly:
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque wrench to tighten the clamping screws crosswise in several increments to the defined tightening torque MS.
1st increment approx. 33% MS
2nd increment approx. 66% MS
3rd increment 100% MS

Dismantling: Gradually loosen all screws one after the other but do not fully remove from the thread. The shrinking disc usually loosens itself.

Shrink discs Form A

Order No.	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23380-1437	30/37/48	8/8/10	278	3 x M4	2,4
23380-1641	70/90/110	15/18/20	336	4 x M5	4
23380-1844	90/100/120	16/18/20	299	4 x M5	4
23380-2046	110/140/160	20/22/24	336	5 x M5	4
23380-2150	200/230/260	31/34/37	384	6 x M5	5
23380-2450	240/270/300	32/35/38	336	6 x M5	5
23380-3052	350/400/440	38/41/43	261	7 x M5	5
23380-3672	590/690/700	53/58/58	303	5 x M6	12
23380-3872	700/770/780	62/65/63	295	6 x M6	12
23380-4072	720/730/790	61/59/62	310	6 x M6	12
23380-4480	800/1000/1050	63/73/76	312	7 x M6	12
23380-4880	900/1050/1200	65/72/78	260	7 x M6	12
23380-5090	1350/1500/1700	89/96/103	314	8 x M6	12
23380-55100	1300/1550/1800	78/87/96	248	8 x M6	12
23380-62110	2400/2650/2800	126/133/136	330	12 x M6	12
23380-68115	1900/2250/2850	95/104/121	245	10 x M6	12
23380-75138	2650/3300/4050	121/139/158	277	7 x M8	30
23380-80145	3200/3900/4600	126/143/160	259	7 x M8	30

Order No.	D	D1	DW	B	L	L1	L2
23380-1437	14	37	10/11/12	14,8	12	9	5
23380-1641	16	41	12/13/14	18,5	15	12	6,25
23380-1844	18	44	14/15/16	18,5	15	12	6,25
23380-2046	20	46	15/16/17	21	17,5	12	7
23380-2150	21	50	16/17/18	22,5	19	15	8
23380-2450	24	50	19/20/21	22,5	19	15	8
23380-3052	30	52	24/25/26	26	22,5	18	9,5
23380-3672	36	72	28/30/31	27,5	23,5	18	10
23380-3872	38	72	29/30/31	30	26	21	10,5
23380-4072	40	72	30/31/32	28,5	24,5	19	10,5
23380-4480	44	80	32/35/36	30	26	20	11
23380-4880	48	80	36/38/40	30	26	22	11
23380-5090	50	90	38/40/42	31,5	27,5	22,5	12
23380-55100	55	100	42/45/48	34,5	30,5	23	13
23380-62110	62	110	48/50/52	34,5	30,5	23	13
23380-68115	68	115	50/55/60	34,5	30,5	23,5	13
23380-75138	75	138	55/60/65	37,8	32,5	25	14
23380-80145	80	145	60/65/70	37,8	32,5	25	14

Shrink discs stainless steel Form A



Material:
Stainless steel 1.4057.

Version:
Bright.

Sample order:
nlm 23380-01-2450

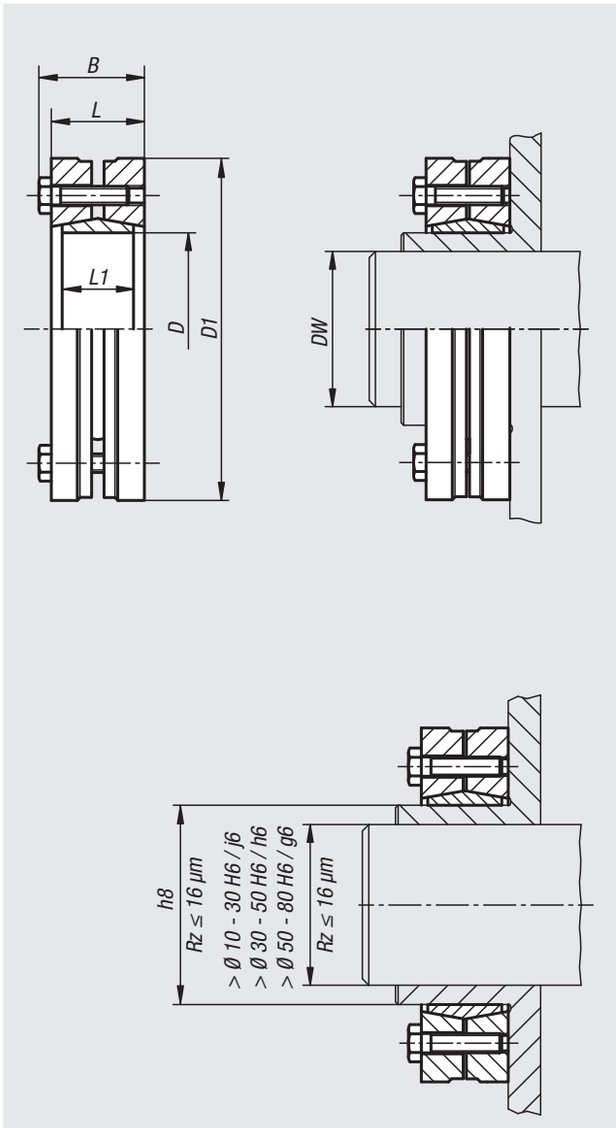
Note:
Shrink disc to connect a hollow hub to a shaft. They are mounted on the OD of the hub and generate pressure on the hub wall by reducing the ID with wedge-formed rings, creating a press fit between the hub and shaft. They are suitable for static, dynamic and shock loads.

- for extremely high torques
- no axial shaft/hub offset when assembling
- self-centring

The version 23380-01-4072 has high tensile ISO 4762 screws.

Assembly:
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque wrench to tighten the clamping screws crosswise in several increments to the defined tightening torque MS.
1st increment approx. 33% MS
2nd increment approx. 66% MS
3rd increment 100% MS

Dismantling: Gradually loosen all screws one after the other but do not fully remove from the thread. The shrinking disc usually loosens itself.



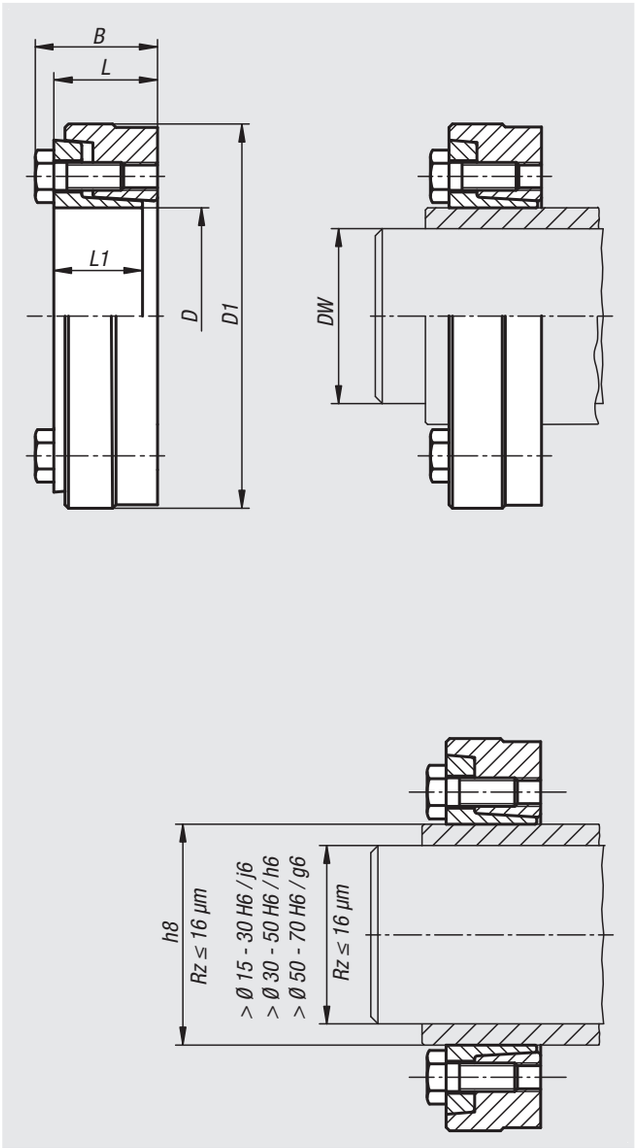
Shrink discs stainless steel Form A

Order No.	Max. torque M Nm with tightening torque MS	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23380-01-2450	141/185/220	213	6 x M5	3
23380-01-3060	212/240/265	180	7 x M5	3
23380-01-3672	325/405/485	175	5 x M6	7
23380-01-3872	490/515/560	207	6 x M6	8,5
23380-01-4072	622/631/691	304	6 x M6	12
23380-01-4480	340/480/525	185	7 x M6	7
23380-01-4880	615/720/841	185	7 x M6	8,5
23380-01-5090	635/740/850	181	9 x M6	7
23380-01-55100	595/745/900	146	8 x M6	7
23380-01-62110	1150/1275/1450	195	12 x M6	7
23380-01-68115	905/1060/1450	145	10 x M6	7
23380-01-75138	995/1310/1725	140	7 x M8	15
23380-01-80145	1150/1275/1450	132	7 x M8	15

Order No.	D	D1	DW	B	L	L1
23380-01-2450	24	50	19/20/21	25	21	15
23380-01-3060	30	60	24/25/26	27	23	18
23380-01-3672	36	72	28/30/31	29	25	19
23380-01-3872	38	72	29/30/31	31	27	21
23380-01-4072	40	72	30/31/32	31	27	21
23380-01-4480	44	80	32/35/36	30	28	22
23380-01-4880	48	80	36/38/40	33	30	22
23380-01-5090	50	90	38/40/42	34	30	22
23380-01-55100	55	100	42/45/48	35	31	23
23380-01-62110	62	110	48/50/52	36	32	23
23380-01-68115	68	115	50/55/60	37	33	23
23380-01-75138	75	138	55/60/65	39	33	25
23380-01-80145	80	145	60/65/70	39	33	25

Shrink discs Form B





Material:
Steel.

Version:
Bright.

Sample order:
nlm 23382-1844

Note:
Shrink disc to connect a hollow hub to a shaft. They are mounted on the OD of the hub and generate pressure on the hub wall by reducing the ID with wedge-formed rings, creating a press fit between the hub and shaft. They are suitable for static, dynamic and shock loads.

- for extremely high torques
- no axial shaft/hub offset when assembling
- self-centring

The version 23380-01-4072 has high tensile ISO 4762 screws.

Assembly:
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque wrench to tighten the clamping screws crosswise in several increments to the defined tightening torque MS.
1st increment approx. 33% MS
2nd increment approx. 66% MS
3rd increment 100% MS

Dismantling: Gradually loosen all screws one after the other but do not fully remove from the thread. The shrinking disc usually loosens itself.

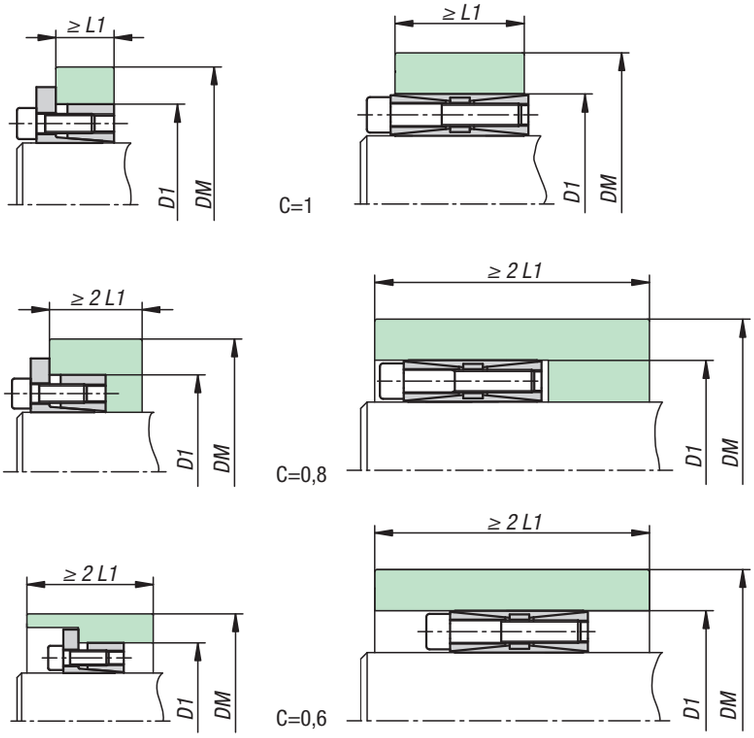
Shrink discs Form B

Order No.	Max. torque M Nm with tightening torque MS	Max. axial force F kN with tightening torque MS	Surface pressure on hub P N/mm²	No. of screws	Tightening torque MS Nm
23382-1844	80/110	11/14	389	4 x M6	12
23382-2047	150/180	18/20	342	4 x M6	12
23382-2450	160/210/280	17/20/25	329	5 x M6	12
23382-3060	270/320/360	23/25/28	341	6 x M6	12
23382-3672	510/710/950	37/47/58	483	5 x M8	35
23382-3872	480/650/860	36/43/52	460	5 x M8	35
23382-4080	810/880/960	48/50/52	339	6 x M8	35
23382-4480	800/890/1050	52/57/60	341	6 x M8	35
23382-5090	1500/1700/2000	79/87/94	386	8 x M8	35
23382-55100	1600/2000/2400	78/88/99	360	8 x M8	35
23382-60110	2200/2500/2700	92/98/105	316	9 x M8	35
23382-62110	2200/2500/2700	92/98/105	318	9 x M8	35
23382-68115	2400/3000/3800	94/111/128	329	9 x M8	35
23382-75138	3700/4700/5800	135/156/177	424	10 x M10	70
23382-80141	4200/5200/6300	141/160/180	399	10 x M10	70

Order No.	D	D1	DW	B	L	L1
23382-1844	18	44	15/16	19	15	13
23382-2047	20	47	17/18	19,3	15,3	13,5
23382-2450	24	50	19/20/22	22	18	15
23382-3060	30	60	24/25/26	24	20	17
23382-3672	36	72	27/30/33	27,5	22	18,5
23382-3872	38	72	27/30/33	27,5	22	18,5
23382-4080	40	80	34/35/37	29,5	24	20,5
23382-4480	44	80	35/36/37	29,5	24	20,5
23382-5090	50	90	38/40/42	31,5	26	22
23382-55100	55	100	42/45/48	34,5	29	25
23382-60110	60	110	48/50/52	34,5	29	24,5
23382-62110	62	110	48/50/52	34,5	29	24,5
23382-68115	68	115	50/55/60	34,5	29	24,5
23382-75138	75	138	55/60/65	37,5	31	26,3
23382-80141	80	141	60/65/70	37,5	31	26

Calculating the minimum hub diameter

The required minimum hub diameter depends on the hub form, the hub cross section and the yield point of the hub material. The formulas and values listed here are used to roughly estimate the minimum hub diameter. If the hub is weakened by boreholes, then the required outer diameter of the hub should be increased by the respective diameter of the drill hole.



To calculate the minimum hub diameter, the following formula applies:

$DM \geq D1 \bullet K$

D1 = outer diameter of KLC (mm)
K = factor (see table)

If factor K is not specified in the table, then the following formula applies:

$$K = \sqrt{\frac{\sigma_{0,2} + (C \bullet PN)}{\sigma_{0,2} - (C \bullet PN)}} \text{ (mm)}$$

$\sigma_{0.2}$ = yield point of the hub material (N/mm²)
C = factor for hub form
PN = surface pressure on hub (N/mm²)

Sample calculation:

shaft diameter D=40 mm
hub material GGG40
yield point $\sigma_{0.2}$ = 250 N/mm²
Selected KLC:
23360-4065 KLC Form G
with D = 40 mm, D1 = 65 mm and PN = 139 N/mm²
hub width and form corrospond to C = 1
factor K from table = 1.88 (approximate value from table PN = 140 N/mm² with C = 1)
DM = 65 mm • 1.88 = **122.2 mm**

For connections with hollow hubs, the required internal diameter of the hub is calculated with the following formula:

$$DW_{wewntrzna} \leq D \bullet \sqrt{\frac{\sigma_{0,2\ Wał} - 2 \bullet PW \bullet 0,8)}{\sigma_{0,2\ Wał}}} \text{ (mm)}$$

$DW_{internal}$ = hollow hub ID (mm)
D = ID of KLC (mm)
$\sigma_{0.2\ shaft}$ = yield point of hub material (N/mm²)
PW = surface pressure on shaft (N/mm²)

Calculating the minimum hub diameter

Table for factor K												
		σ 0.2 yield point N/mm²										
		150	180	200	220	250	270	300	350	400	450	600
		hub materials										
PN N/mm²	Hub form C	GG20	GG25 GS38	GG30 GTS35	GS45 St 37-2	GGG40 GS52	St 50-2 C35	GGG50 GS60 St 60-2	GGG60 GS62 St 70-2	GGG70 GS70 C60		
60	C = 0,6	1,28	1,25	1,20	1,18	1,15	1,14	1,12	1,10	1,09	1,08	1,06
	C = 0,8	1,39	1,30	1,24	1,23	1,22	1,20	1,18	1,15	1,12	1,11	1,08
	C = 1	1,52	1,42	1,36	1,32	1,28	1,25	1,22	1,18	1,16	1,14	1,10
65	C = 0,6	1,30	1,25	1,22	1,20	1,18	1,15	1,13	1,11	1,10	1,09	1,07
	C = 0,8	1,44	1,35	1,30	1,28	1,24	1,22	1,20	1,16	1,14	1,12	1,09
	C = 1	1,60	1,45	1,40	1,35	1,30	1,28	1,24	1,20	1,18	1,16	1,12
70	C = 0,6	1,34	1,26	1,24	1,22	1,18	1,16	1,15	1,12	1,11	1,10	1,07
	C = 0,8	1,48	1,38	1,34	1,30	1,25	1,23	1,20	1,18	1,15	1,13	1,10
	C = 1	1,65	1,50	1,45	1,40	1,34	1,30	1,26	1,22	1,20	1,17	1,13
75	C = 0,6	1,30	1,28	1,25	1,23	1,20	1,18	1,16	1,14	1,12	1,11	1,08
	C = 0,8	1,52	1,42	1,36	1,32	1,28	1,25	1,22	1,18	1,16	1,14	1,11
	C = 1	1,74	1,55	1,48	1,42	1,36	1,33	1,30	1,25	1,20	1,18	1,13
80	C = 0,6	1,39	1,31	1,28	1,25	1,21	1,20	1,18	1,15	1,13	1,11	1,08
	C = 0,8	1,58	1,45	1,39	1,35	1,30	1,27	1,24	1,20	1,18	1,15	1,11
	C = 1	1,81	1,61	1,53	1,46	1,39	1,36	1,31	1,26	1,22	1,20	1,14
85	C = 0,6	1,42	1,34	1,30	1,27	1,23	1,21	1,19	1,16	1,14	1,12	1,09
	C = 0,8	1,63	1,49	1,42	1,38	1,32	1,29	1,26	1,22	1,19	1,16	1,12
	C = 1	1,90	1,67	1,57	1,50	1,42	1,39	1,34	1,28	1,24	1,21	1,15
90	C = 0,6	1,46	1,36	1,32	1,28	1,25	1,22	1,20	1,17	1,15	1,13	1,09
	C = 0,8	1,69	1,53	1,46	1,40	1,34	1,31	1,28	1,23	1,20	1,18	1,13
	C = 1	2,00	1,73	1,62	1,54	1,46	1,41	1,36	1,30	1,26	1,22	1,16
95	C = 0,6	1,49	1,39	1,34	1,30	1,26	1,24	1,21	1,18	1,15	1,14	1,10
	C = 0,8	1,75	1,57	1,49	1,43	1,37	1,34	1,30	1,25	1,21	1,19	1,14
	C = 1	2,11	1,80	1,68	1,59	1,49	1,44	1,39	1,32	1,27	1,24	1,17
100	C = 0,6	1,53	1,41	1,36	1,32	1,28	1,25	1,22	1,19	1,16	1,14	1,11
	C = 0,8	1,81	1,61	1,53	1,46	1,39	1,36	1,31	1,26	1,22	1,20	1,14
	C = 1	2,24	1,87	1,73	1,63	1,53	1,48	1,41	1,34	1,29	1,25	1,18
105	C = 0,6	1,56	1,44	1,39	1,34	1,29	1,27	1,24	1,20	1,17	1,15	1,11
	C = 0,8	1,88	1,66	1,56	1,50	1,42	1,38	1,33	1,28	1,24	1,21	1,15
	C = 1	2,38	1,95	1,79	1,68	1,56	1,51	1,44	1,36	1,31	1,27	1,19
110	C = 0,6	1,60	1,47	1,41	1,36	1,31	1,28	1,25	1,21	1,18	1,16	1,12
	C = 0,8	1,96	1,71	1,60	1,53	1,44	1,41	1,35	1,29	1,25	1,22	1,16
	C = 1	2,55	2,04	1,86	1,73	1,60	1,54	1,47	1,38	1,33	1,28	120
115	C = 0,6	1,64	1,50	1,43	1,36	1,33	1,30	1,26	1,22	1,19	1,17	1,12
	C = 0,8	2,04	1,76	1,64	1,56	1,47	1,43	1,37	1,31	1,26	1,23	1,17
	C = 1	2,75	2,13	1,93	1,79	1,64	1,58	1,50	1,41	1,34	1,30	1,21
120	C = 0,6	1,69	1,53	1,46	1,40	1,34	1,31	1,28	1,23	1,20	1,18	1,13
	C = 0,8	2,13	1,81	1,69	1,60	1,50	1,45	1,39	1,33	1,28	1,24	1,18
	C = 1	3,00	2,24	2,00	1,84	1,69	1,61	1,53	1,43	1,36	1,31	1,22
125	C = 0,6	1,73	1,56	1,48	1,43	1,36	1,33	1,29	1,24	1,21	1,18	1,13
	C = 0,8	2,24	1,87	1,73	1,63	1,53	1,48	1,41	1,34	1,29	1,25	1,18
	C = 1	3,32	2,35	2,08	1,91	1,73	1,65	1,56	1,45	1,38	1,33	1,24
130	C = 0,6	1,78	1,59	1,51	1,45	1,38	1,35	1,30	1,25	1,22	1,19	1,14
	C = 0,8	2,35	1,93	1,78	1,67	1,56	1,50	1,44	1,36	1,30	1,27	1,19
	C = 1	3,74	2,49	2,17	1,97	1,78	1,69	1,59	1,48	1,40	1,35	1,25
135	C = 0,6	1,83	1,62	1,54	1,47	1,40	1,36	1,32	1,27	1,23	1,20	1,15
	C = 0,8	2,48	2,00	1,83	1,71	1,59	1,53	1,46	1,38	1,32	1,28	1,20
	C = 1	4,36	2,65	2,27	2,04	1,83	1,73	1,62	1,50	1,42	1,36	1,26
140	C = 0,6	1,88	1,66	1,56	1,50	1,42	1,38	1,33	1,28	1,24	1,21	1,15
	C = 0,8	2,63	2,07	1,88	1,75	1,62	1,55	1,48	1,39	1,33	1,29	1,21
	C = 1	5,39	2,83	2,38	2,12	1,88	1,78	1,66	1,53	1,44	1,38	1,27
145	C = 0,6	1,94	1,69	1,59	1,52	1,44	1,40	1,35	1,29	1,25	1,22	1,16
	C = 0,8	2,80	2,15	1,94	1,80	1,65	1,58	1,50	1,41	1,35	1,30	1,22
	C = 1	7,68	3,05	2,50	2,21	1,94	1,82	1,69	1,55	1,46	1,40	1,28
150	C = 0,6	2,00	1,73	1,62	1,54	1,46	1,41	1,36	1,30	1,26	1,23	1,16
	C = 0,8	3,00	2,24	2,00	1,84	1,69	1,61	1,53	1,43	1,36	1,31	1,23
	C = 1	-	3,32	2,65	2,30	2,00	1,87	1,73	1,58	1,48	1,41	1,29
155	C = 0,6	2,06	1,77	1,65	1,57	1,48	1,43	1,38	1,31	1,27	1,24	1,17
	C = 0,8	3,25	2,33	2,06	1,89	1,72	1,65	1,55	1,45	1,38	1,33	1,23
	C = 1	-	3,66	2,80	2,40	2,06	1,92	1,77	1,61	1,51	1,43	1,30
160	C = 0,6	2,13	1,81	1,69	1,60	1,50	1,45	1,39	1,33	1,28	1,24	1,18
	C = 0,8	3,55	2,43	2,13	1,94	1,76	1,67	1,58	1,47	1,39	1,34	1,24
	C = 1	-	4,12	3,00	2,52	2,13	1,98	1,81	1,64	1,53	1,45	1,31
165	C = 0,6	2,21	1,86	1,72	1,62	1,52	1,47	1,41	1,34	1,29	1,25	1,18
	C = 0,8	3,96	2,55	2,21	2,00	1,80	1,71	1,60	1,49	1,41	1,35	1,25
	C = 1	-	4,80	3,23	2,65	2,21	2,04	1,86	1,67	1,55	1,47	1,33

Universal joints: mounting and maintenance

Universal joints:
Universal joints are used for mechanical power transmission at high speeds. The speed limit is dependent on the working angle. The widest working angle is 45° for all joint types (90° for double joint). Lower speeds should be used at angles over 20° (40° for double joint). Standard universal joints can be used up to 2000 rpm and joints with needle bearings up to 4000 rpm. Needle bearing mounted joints are normally only used at speeds over 1000 rpm.

Movement progression
Single joints transfer uniform induced movement irregularly because by one revolution of the driving shaft, the driven shaft is accelerated twice and retarded twice. The degree of irregularity depends on the working angle (see Figures 1 and 2).

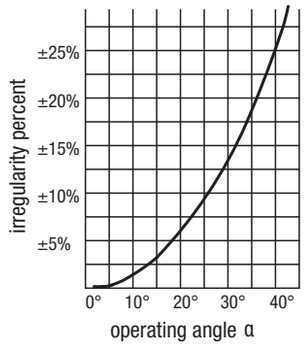


Fig 1

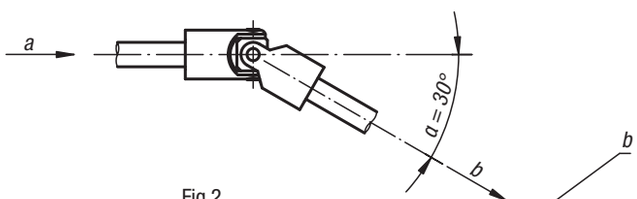
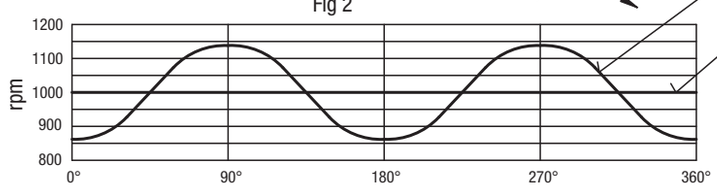


Fig 2



To achieve uniform movement 2 single or one double joint must be used. Where slight irregularities in rotation can be accepted or only small angles of diffraction are concerned, a single joint may be used. Furthermore, for universal rotation transfer the diffraction angle at both ends of the intermediate shaft must be the same (Figures 3 and 4).

Note:
It should be ensured that the bearing is located as closely as possible to the joint.

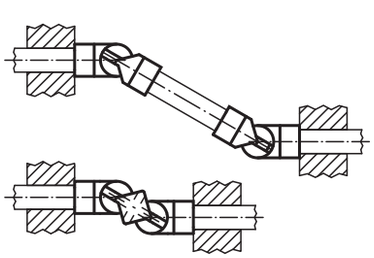
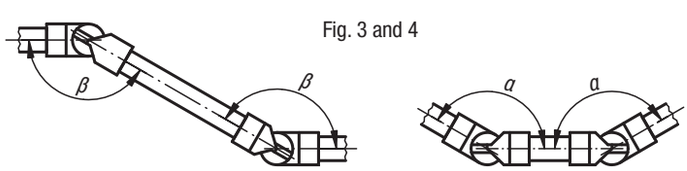


Fig. 3 and 4



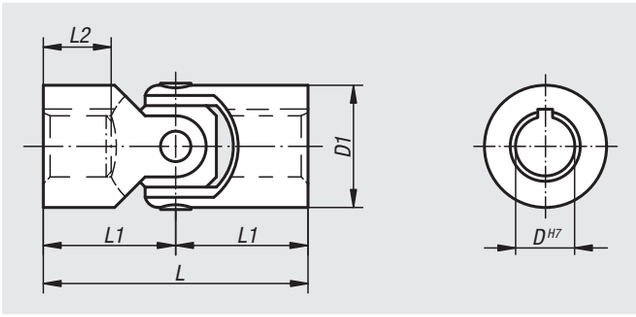
Maintenance
The joints should be lubricated at least once per day where they are in uninterrupted use. In dirty conditions we recommend covering the joints with a protective rubber sheath.

Where mounting is questionable, please consult our technical sales staff.

Universal joints single

with plain bearing, DIN 808





Material:
Steel.

Version:
Joint and bearing hardened

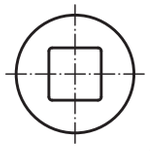
Sample order:
nlm 23403-06034

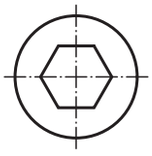
Note:
Universal joints with plain bearing can be swivelled by 45°.

Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

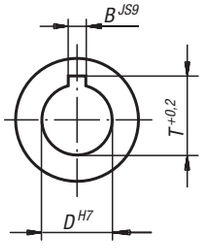
* Bore depth is less than by DIN 808.

On request:





DIN 6885-1

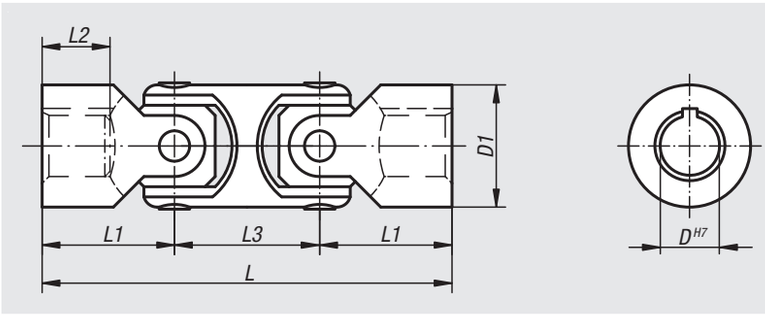


Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	B	T	Max. torque Nm	static fracture torque Nm
23403-06034	-	6	16	34	17	9*	2	7	7	40
23403-08040	**23403-108040**	8	16	40	20	11*	2	9	7	40
23403-10048	**23403-110048**	10	20	48	24	12*	3	11,4	16	90
23403-12056	**23403-112056**	12	25	56	28	14*	4	13,8	26	150
23403-16068	**23403-116068**	16	32	68	34	16*	5	18,3	52	300
23403-20082	**23403-120082**	20	40	82	41	20*	6	22,8	100	650
23403-25104	**23403-125104**	25	50	104	52	25*	8	28,3	210	1200

Universal joints double

with plain bearing, DIN 808





Material:
Steel.

Version:
Joint and bearing hardened

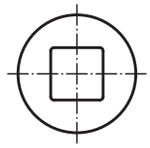
Sample order:
nlm 23404-06056

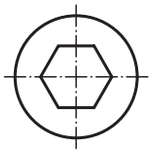
Note:
Double universal joints with plain bearing can be swivelled by 90°.

Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

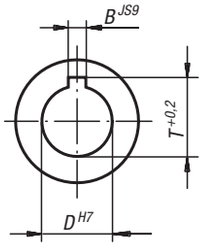
* Bore depth is less than by DIN 808.

On request:





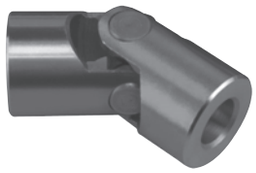
DIN 6885-1

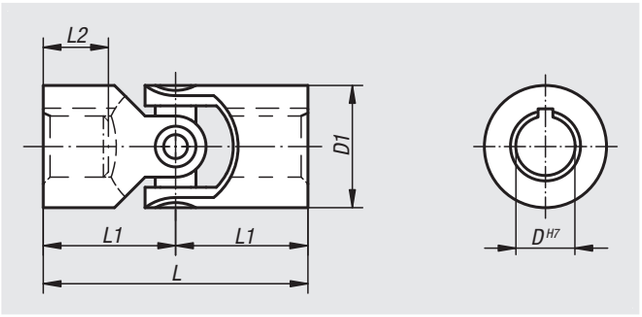


Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	L3	B	T	Max. torque Nm	static fracture torque Nm
23404-06056	**-**	6	16	56	17	9*	22	2	7	7	40
23404-08062	**23404-108062**	8	16	62	20	11*	22	2	9	7	40
23404-10074	**23404-110074**	10	20	74	24	12*	26	3	11,4	16	90
23404-12086	**23404-112086**	12	25	86	28	14*	30	4	13,8	26	150
23404-16104	**23404-116104**	16	32	104	34	16*	37	5	18,3	52	300
23404-20128	**23404-120128**	20	40	128	41	20*	47	6	22,8	100	650
23404-25160	**23404-125160**	25	50	160	52	25*	56	8	28,3	210	1200

Universal joints single

with needle bearing, DIN 808





Material:
Steel.

Version:
Joint ground, bright.

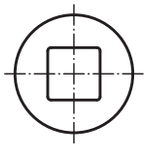
Sample order:
nlm 23406-10048

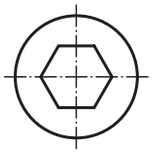
Note:
Single universal joints with needle bearings are used for speeds of 1000 to 4000 rpm. They have minimal play and are maintenance-free.

Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

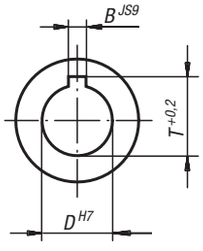
* Bore depth is less than by DIN 808.

On request:





DIN 6885-1

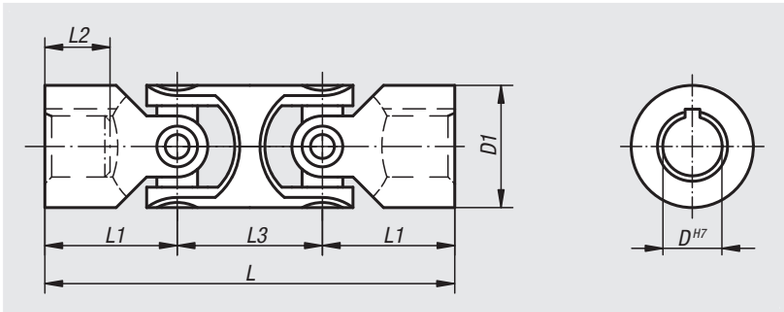


Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	B	T	Max. torque Nm	static fracture torque Nm
23406-10048	**23406-110048**	10	20	48	24	12*	3	11,4	10	80
23406-12056	**23406-112056**	12	25	56	28	14*	4	13,8	16	120
23406-16068	**23406-116068**	16	32	68	34	16*	5	18,3	35	250
23406-20082	**23406-120082**	20	40	82	41	20*	6	22,8	80	500
23406-25104	**23406-125104**	25	50	104	52	25*	8	28,3	130	800
23406-30166	**23406-130166**	30	63	166	83	38*	8	33,3	240	1500
23406-35140	**23406-135140**	35	70	140	70	35*	10	38,3	360	2200

Universal joints double

with needle bearing, DIN 808





Material:
Steel.

Version:
Joint ground, bright.

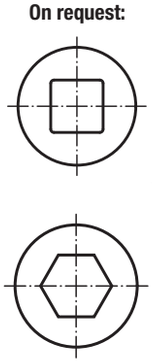
Sample order:
nlm 23407-12086

Note:
Double universal joints with needle bearing are used for speeds of 1000 to 4000 rpm. They have minimal play and are maintenance-free.

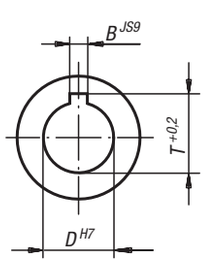
Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

* Bore depth is less than by DIN 808.

On request:



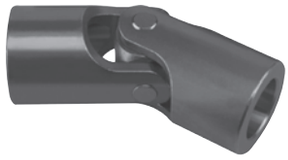
DIN 6885-1

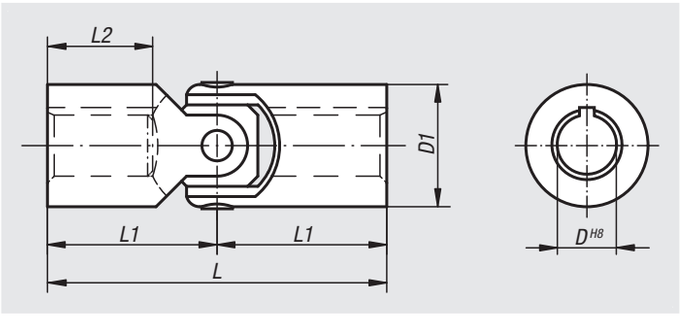


Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	L3	B	T	Max. torque Nm	static fracture torque Nm
23407-10074	**23407-110074**	10	20	74	24	12*	26	3	11,4	10	80
23407-12086	**23407-112086**	12	25	86	28	14*	30	4	13,8	16	120
23407-16104	**23407-116104**	16	32	104	34	16*	37	5	18,3	35	250
23407-20128	**23407-120128**	20	40	128	41	20*	47	6	22,8	80	500
23407-25160	**23407-125160**	25	50	160	52	25*	56	8	28,3	130	800
23407-30238	**23407-130238**	30	63	238	83	38*	72	8	33,3	240	1500
23407-35212	**23407-135212**	35	70	212	70	35*	72	10	38,3	360	2200

Universal joints single

with plain bearing, robust version DIN 808





Material:
Steel.

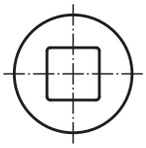
Version:
Bright.

Sample order:
nlm 23409-08042

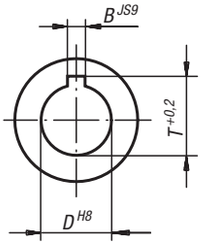
Note:
Robust universal joints are suitable for manual drives on elevating platforms, slides, shutters etc. or for short-time machine drives at low speed.
Single universal joints with plain bearing can be swivelled by 35°.

Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

On request:



DIN 6885-1

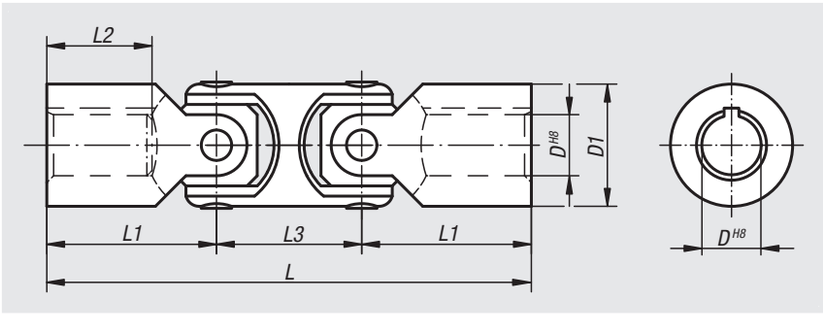


Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	B	T	Max. torque Nm	static fracture torque Nm
23409-08042	**23409-108042**	8	13	42	21	11	2	9	4	25
23409-10052	**23409-110052**	10	16	52	26	15	3	11,4	6	35
23409-12062	**23409-112062**	12	20	62	31	18	4	13,8	13	80
23409-16074	**23409-116074**	16	25	74	37	22	5	18,3	23	140
23409-20086	**23409-120086**	20	32	86	43	25	6	22,8	46	280
23409-25108	**23409-125108**	25	40	108	54	32	8	28,3	90	600
23409-32132	**23409-132132**	32	50	132	66	40	10	35,3	180	1100

Universal joints double

with plain bearing, robust version DIN 808





Material:
Steel.

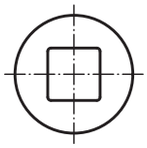
Version:
Bright.

Sample order:
nlm 23410-10074

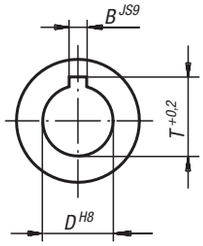
Note:
Robust universal joints are suitable for manual drives of elevating platforms, slides, shutters etc. or for short-time machine drives at low speed.
Double universal joints with plain bearing can be swivelled by 70°.

Max. transferable torque (Nm) at 150 rpm, operation angle α < 5°.

On request:



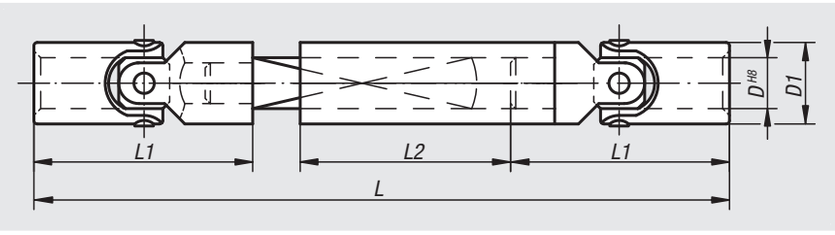
DIN 6885-1



Order No. reamed hole without slot	Order No. reamed hole with slot	D	D1	L	L1	L2	L3	B	T	Max. torque Nm	static fracture torque Nm
23410-08060	**23410-108060**	8	13	60	21	11	18	2	9	4	25
23410-10074	**23410-110074**	10	16	74	26	15	22	3	11,4	6	35
23410-12088	**23410-112088**	12	20	88	31	18	26	4	13,8	13	80
23410-16104	**23410-116104**	16	25	104	37	22	30	5	18,3	23	140
23410-20124	**23410-120124**	20	32	124	43	25	37	6	22,8	46	280
23410-25156	**23410-125156**	25	40	156	54	32	47	8	28,3	90	600
23410-32188	**23410-132188**	32	50	188	66	40	56	10	35,3	180	1100

Cardan shafts telescopic



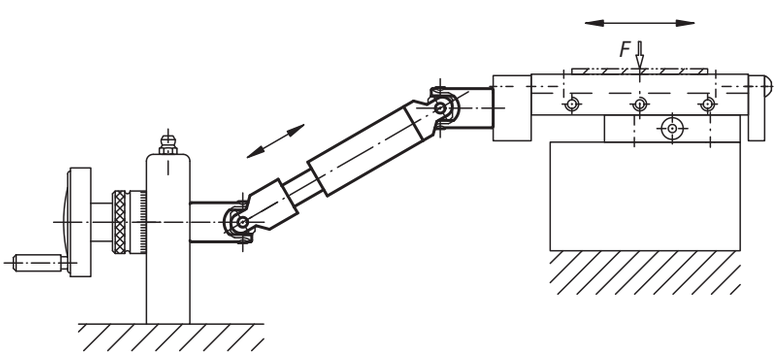


Material:
Steel.

Version:
Bright.

Sample order:
nlm 23412-120260

Note:
These cardan shafts consist of two robust universal joints, one square shaft and a sliding sleeve. They are available in any desired length on request. Telescopic cardan shafts are suitable for manual drives or short-term machine drives at low speed.



Order No.	D	D1	L	L1	L2	Extension	Shaft profile square	static fracture torque in Nm
23412-100230	10	16	230	52	120	80	8	35
23412-120260	12	20	260	62	130	90	10	80
23412-160340	16	25	340	74	160	110	12	140
23412-200420	20	32	420	86	200	130	16	280

23414

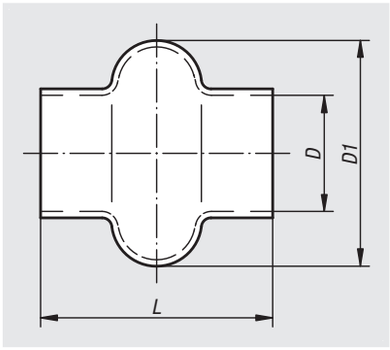
Protective rubber sleeves

for universal and cardan joints (single)



Sample order:
nlm 23414-16

Note:
These rubber sleeves fit over single joints from OD 16 mm. They are made of an elastic, oil-resistant plastic and are produced by a dipping method.
The No. 23414-50 is supplied with 4x bellows.
By diameter D, D1 can shrink by up to 10%. The length L can vary by ±5%.



Order No.	D	D1	L	Suitable for single joints of shaft Ø (D1)
23414-16	16	34,5	34	16
23414-20	18	35	44	20
23414-24	23	44	56	24
23414-28	28	49	66	28
23414-32	32	56	63	32
23414-36	35	64	65	36
23414-40	38	64,5	74	40
23414-45	41	69	78	45
23414-50	50	85	100	50
23414-65	65	109	132	63
23414-70	70	119	144	70

23415

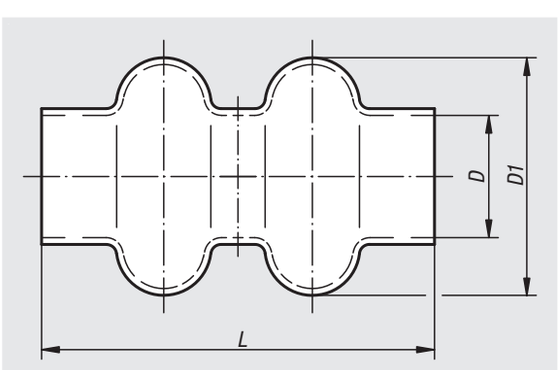
Protective rubber sleeves

for universal and cardan joints (double)



Sample order:
nlm 23415-16

Note:
These rubber sleeves fit over double joints from OD 16 mm. They are made of an elastic, oil-resistant plastic and are produced by a dipping method.
By diameter D, D1 can shrink by up to 10%. The length L can vary by ±5%.



Order No.	D	D1	L	Suitable for double joints of shaft Ø (D1)
23415-16	16	33	55	16
23415-20	20	34	66	20
23415-24	22,5	42	81	24
23415-28	26,5	49	93	28
23415-32	30,5	59	105,5	32
23415-40	38	72	131	40
23415-50	48	88	163	50

Notes

Quick-fit couplings

with radial offset compensation



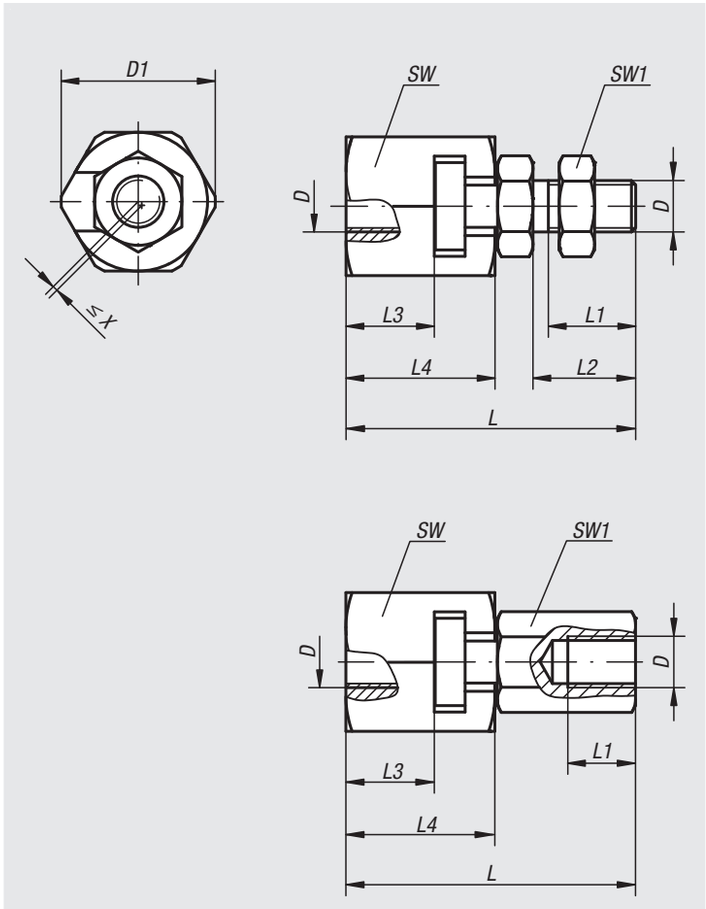
Material:
Coupling part and claw in steel.
Nut (DIN 439) in steel, grade 8.8.

Version:
Coupling part and claw tempered and phosphated.
Nut steel, black oxidised.

Sample order:
nlm 23450-16

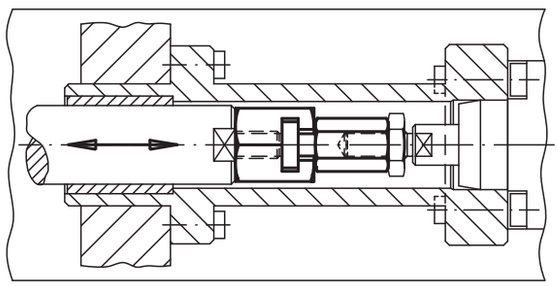
Note:
Quick-fit couplings with radial offset compensation for multiple applications, e.g. as a link between a piston rod and a linear-movement unit. Assembly and disassembly of this simple, solid and two-part coupling is carried out by means of a T-slot; a manual re-adjustment is not necessary. The quick-fit coupling can be linked to all commonly used pneumatic and hydraulic cylinders via the connecting thread.

The quick-fit coupling does not transmit any torque.



Quick-fit couplings

with radial offset compensation



Order No.	Version	D	D1	L	L1 min.	L2	L3 min.	L4	SW	SW1	radial offset compensation X max.	Max. permissible tensile and compressive stress kN
23450-06	internal thread	M6	21	37,5	11	-	9	18	19	10	0,6	2,5
23450-08	internal thread	M8	26	45	13,5	-	11,5	22,5	24	13	0,7	4,5
23450-10	internal thread	M10	30	56,2	15	-	16	29	27	17	0,7	6,5
23450-101	internal thread	M10x1,25	30	56,2	15	-	16	29	27	17	0,7	6,5
23450-12	internal thread	M12	32,5	66,7	17,5	-	17	34	30	19	0,8	10
23450-121	internal thread	M12x1,25	32,5	66,7	17,5	-	17	34	30	19	0,8	10
23450-16	internal thread	M16	39	83	22	-	23	42	36	24	1	18
23450-161	internal thread	M16x1,5	39	83	22	-	23	42	36	24	1	18
23450-20	internal thread	M20	44	93,5	25	-	23,5	45,5	41	30	1	30
23450-201	internal thread	M20x1,5	44	93,5	25	-	23,5	45,5	41	30	1	30
23450-0614	external thread	M6	21	37,5	11	14	9	18	19	10	0,6	2,5
23450-0817	external thread	M8	26	45	13,5	17	11,5	22,5	24	13	0,7	4,5
23450-1020	external thread	M10	30	56,2	16	20	16	29	27	17	0,7	6,5
23450-10201	external thread	M10x1,25	30	56,2	16	20	16	29	27	17	0,7	6,5
23450-1225	external thread	M12	32,5	66,7	21	25	17	34	30	19	0,8	10
23450-12251	external thread	M12x1,25	32,5	66,7	21	25	17	34	30	19	0,8	10
23450-1630	external thread	M16	39	83	25	30	23	42	36	24	1	18
23450-16301	external thread	M16x1,5	39	83	25	30	23	42	36	24	1	18
23450-2035	external thread	M20	44	93,5	29	35	23,5	45,5	41	30	1	30
23450-20351	external thread	M20x1,5	44	93,5	29	35	23,5	45,5	41	30	1	30

Quick-fit couplings

with radial offset compensation and mounting flange



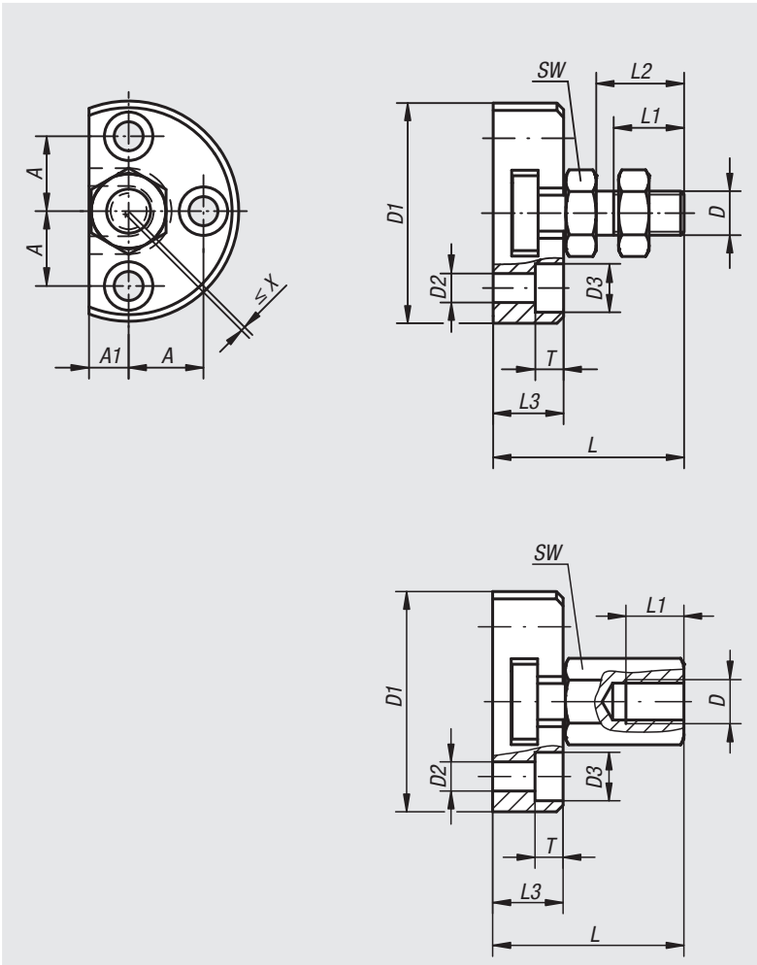
Material:
Coupling part and steel flange.
Nut (DIN 439), grade 8.8.

Version:
Coupling part and flange tempered and phosphated.
Nut black oxidised.

Sample order:
nlm 23452-20351

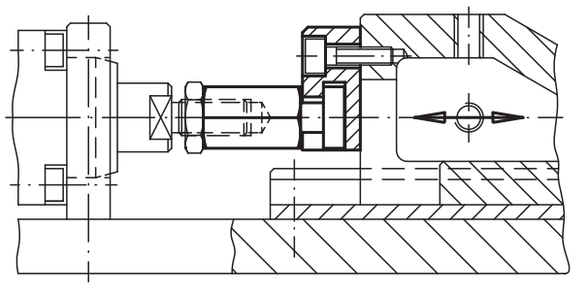
Note:
Space saving quick-fit couplings with radial offset compensation suitable for multiple applications, e.g. as a link between a piston rod and a linear-movement unit. Assembly and disassembly of this simple, solid and two-part coupling is with a T-slot, a manual re-adjustment is not necessary. The quick-fit coupling can be linked to all commonly used pneumatic and hydraulic lifting cylinders via the connecting thread.

The quick-fit coupling does not transmit any torque.



Quick-fit couplings

with radial offset compensation and mounting flange

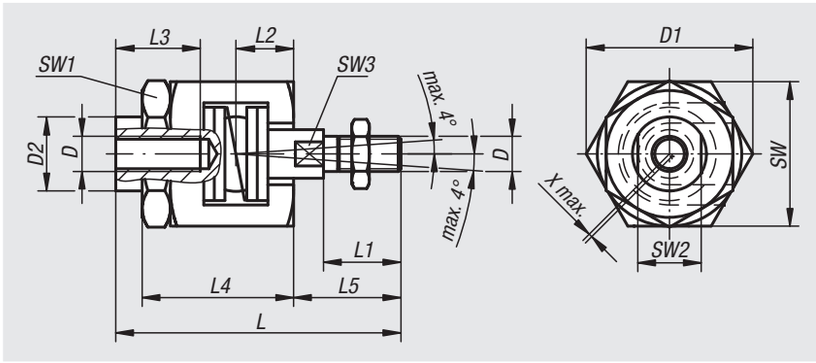


Order No.	Version	D	D1	D2	D3	A	A1	L	L1 min.	L2	L3	T	SW	radial offset compensation X max.	Max. permissible tensile and compressive stress kN
23452-06	internal thread	M6	42	5,5	10	14	7	30,5	11	-	11	5,4	10	0,6	2,5
23452-08	internal thread	M8	48	6,6	11	16	8	35,5	13,5	-	13	6,4	13	0,7	4,5
23452-10	internal thread	M10	50	6,6	11	17	9	43,2	15	-	16	6,4	17	0,7	6,5
23452-101	internal thread	M10x1,25	50	6,6	11	17	9	43,2	15	-	16	6,4	17	0,7	6,5
23452-12	internal thread	M12	55	6,6	11	19	10	53,2	17,5	-	20,5	6,4	19	0,8	10
23452-121	internal thread	M12x1,25	55	6,6	11	19	10	53,2	17,5	-	20,5	6,4	19	0,8	10
23452-16	internal thread	M16	65	9	15	22,5	12,5	64	22	-	23	8,5	24	1	18
23452-161	internal thread	M16x1,5	65	9	15	22,5	12,5	64	22	-	23	8,5	24	1	18
23452-20	internal thread	M20	80	11	18	28	17	74	25	-	26	10	30	1	30
23452-201	internal thread	M20x1,5	80	11	18	28	17	74	25	-	26	10	30	1	30
23452-0614	external thread	M6	42	5,5	10	14	7	30,5	11	14	11	5,4	10	0,6	2,5
23452-0817	external thread	M8	48	6,6	11	16	8	35,5	13,5	17	13	6,4	13	0,7	4,5
23452-1020	external thread	M10	50	6,6	11	17	9	43,2	16	20	16	6,4	17	0,7	6,5
23452-10201	external thread	M10x1,25	50	6,6	11	17	9	43,2	16	20	16	6,4	17	0,7	6,5
23452-1225	external thread	M12	55	6,6	11	19	10	53,2	21	25	20,5	6,4	19	0,8	10
23452-12251	external thread	M12x1,25	55	6,6	11	19	10	53,2	21	25	20,5	6,4	19	0,8	10
23452-1630	external thread	M16	65	9	15	22,5	12,5	64	25	30	23	8,5	24	1	18
23452-16301	external thread	M16x1,5	65	9	15	22,5	12,5	64	25	30	23	8,5	24	1	18
23452-2035	external thread	M20	80	11	18	28	17	74	29	35	26	10	30	1	30
23452-20351	external thread	M20x1,5	80	11	18	28	17	74	29	35	26	10	30	1	30

Quick-fit couplings

with angular and radial offset compensation





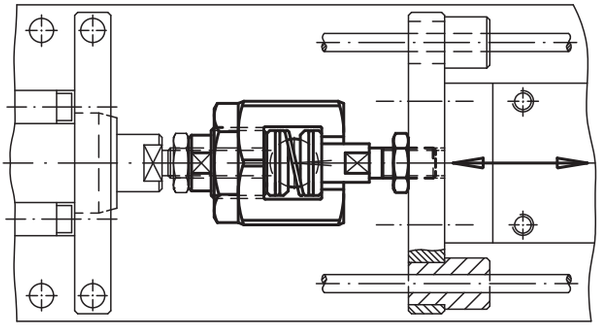
Material:
Coupling part carbon steel.
Claw and seat steel.
Nut carbon steel.
Locknut (EN 24035) grade 8.8 steel.
Spring stainless steel.

Version:
Coupling part nitrided, black.
Claw and seat tempered and phosphated.
Nut phosphated.
Locknut black.

Sample order:
nlm 23454-12

Note:
Quick-fit coupling, adjustable without axial play, including angular and radial offset compensation. Suitable for multiple applications, e.g. for non-aligned linear-movements. Solid and compact design, no loose elements. Assembly and disassembly with a T-slot; a manual re-adjustment is not necessary. The quick-fit coupling can be linked to all commonly used pneumatic and hydraulic lifting cylinders via the connecting thread.

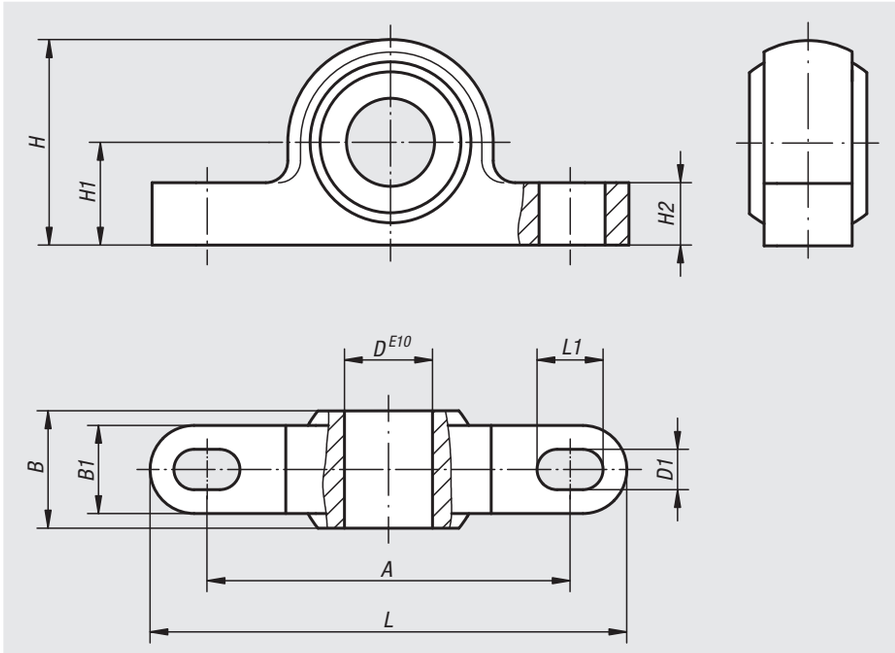
The quick-fit coupling does not transmit any torque.



Order No.	D	D1	D2	L	L1	L2	L3 min.	L4	L5	SW	SW1	SW2	SW3	radial offset compensation X max.	Max. permissible tensile and compressive stress kN
23454-06	M6	24,5	9,6	52	14	9,5	13	29	18,5	22	19	8	5	0,6	2,5
23454-08	M8	30	15	63	18	11,5	16	33	23,5	27	24	13	7	0,6	4,5
23454-10	M10	44	21	81	22	16	24	43	30,5	41	36	18	12	0,7	6,5
23454-101	M10x1,25	44	21	81	22	16	24	43	30,5	41	36	18	12	0,7	6,5
23454-12	M12	44	21	85	26	16	24	43	34,5	41	36	18	12	0,7	10
23454-121	M12x1,25	44	21	85	26	16	24	43	34,5	41	36	18	12	0,7	10
23454-16	M16	60	32	121	34	26	34	62	45	55	46	27	18	1	18
23454-161	M16x1,5	60	32	121	34	26	34	62	45	55	46	27	18	1	18
23454-20	M20	60	32	129	42	26	34	62	53	55	46	27	18	1	30
23454-201	M20x1,5	60	32	129	42	26	34	62	53	55	46	27	18	1	30

igubal® pillow block bearings





Material:
Housing igumid® G.
Swivel ball iglidur® W300

Version:
black.

Sample order:
nlm 23500-05

Note:
The ability to pivot allows pillow block bearings to compensate for misalignment and possible shaft deflection. They are easy to install and suitable for the accomodation of rotating, oscillating and linear movements.
igubal® pillow block bearings are maintenance free and conceived for dry running condition.

Assembly:
These pillow block bearings are designed for mounting with 2 screws.

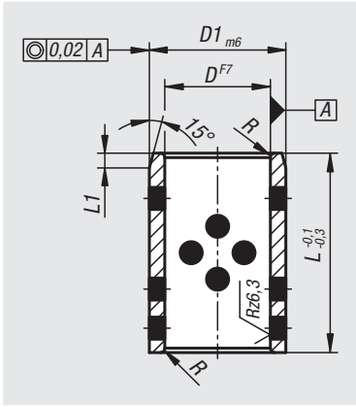
The ID tolerance is E10. The matching shaft should have a tolerance of h6 to h9.

Order No.	A	B	B1	D	D1	H	H1	H2	L	L1	Max. swivel angle	Max. static tensile stress N short-term	Max. static tensile stress N long-term	Max. static axial pressure stress N	Max. tightening torque for oblong holes Nm
23500-05	26,7	8	6	5	3,3	14	7	4	34	5	30°	700	350	400	0,6
23500-06	34,5	9	7	6	4,5	18	10	5,5	43	6	29°	1100	550	400	1,3
23500-08	35,5	12	9	8	4,5	20	10	6	47	7	25°	1300	650	800	1,3
23500-10	48,5	14	10,5	10	5,5	26	14	7,5	62	8	25°	1500	750	1100	2,5
23500-12	49,5	16	12	12	5,5	28	14	8,5	65	9	25°	2200	1100	1150	2,5
23500-14	64,4	19	13,5	14	6,6	34	18	9,5	82	11	23°	2400	1200	1200	4,5
23500-16	65,4	21	15	16	6,6	36	18	10,5	86	12	23°	3000	1500	1800	4,5
23500-18	72	23	16,5	18	9	42	22	11,5	93	13	23°	3500	1750	1900	10,5
23500-20	73	25	18	20	9	44	22	13	98	14	23°	4700	2350	2500	10,5
23500-22	81	28	20	22	9	48	24	14	108	16	22°	6100	3050	2700	10,5
23500-25	94	31	22	25	9	54	27	16	124	17	22°	6600	3300	3200	10,5
23500-30	105	37	25	30	11	64	32	17	139	20	22°	8100	4050	3750	21,5

Guide bushes

bronze, maintenance-free





Material:
Bronze with graphite inserts.

Version:
Self-lubricating.
Hardness 190-220 HB.

Sample order:
nlm 23680-050065070

Note:
The guide bushes are radially and axially applicable.
The bearing elements are maintenance-free and wear-resistant.
The graphite inserts provide life-long lubrication.

Preferably for travel speeds < 0.5 m/s. (Additional lubrication is recommended for extreme loading with a higher travel speeds).

Temperature range:
Temporary temperature peaks up to ca. 200°C.

Tolerances:
The bore for the bearings should correspond to ISO tolerance H7.

The tolerance h6 to h7 is recommended for the shaft.

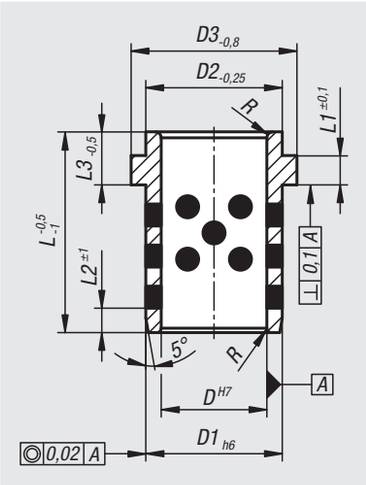
Technical data:
Material properties:
Base alloy: CuZn25Al6FeMn3
Density: 8.0 g/cm^3
Tensile strength Rm: 750 N/mm^2
Yield point: 450 N/mm^2
Ductile fracture A5: 5-8%
Friction coefficient: 0.05 - 0.12
Maximum speed: 15 m/min
Thermal conductivity: 50 W/m x k
Thermal expansion coefficient: 18 x 10^{-6}
Electrical conductivity: 7-8 m/(Ω x mm^2)
Solid lubricant content: 25-30 %

Order No.	D	D1	L	L1	R
23680-0080110**	8	11	14/15	1	1
23680-0080120**	8	12	8/10/12/15	1	1
23680-0100140**	10	14	8/10/12/15/20	1	1
23680-0100150**	10	15	10	1	1
23680-0120160**	12	16	10/12/20	1	1
23680-0120180**	12	18	10/12/15/16/20/25/30	1	1
23680-0130190**	13	19	10/16/20	2	1
23680-0140200**	14	20	10/12/15/20/25/30	2	1
23680-0150210**	15	21	10/12/15/20/25/30	2	1
23680-0160200**	16	20	16/20/25/28	2	1
23680-0160220**	16	22	10/12/15/16/20/25/30/35/40	2	1
23680-0180240**	18	24	12/15/16/18/20/25/30/35/40	2	1
23680-0190260**	19	26	15/20	2	1
23680-0200260**	20	26	15/20/25/30	3	1
23680-0200280**	20	28	10/12/15/16/20/25/30/35/40/50	2	1
23680-0200300**	20	30	16/20/25/30/35/40	2	1
23680-0220320**	22	32	12/15/20/25	3	2
23680-0250300**	25	30	20	3	2
23680-0250330**	25	33	12/16/20/25/30/35/40/50/60	3	2
23680-0250350**	25	35	12/16/20/25/30/35/40/50/60	3	2
23680-0300380**	30	38	15/20/25/30/35/40/45/50/60	3	2
23680-0300400**	30	40	20/25/30/35/40/50/60	3	2
23680-0300450**	30	45	40	3	2
23680-0310400**	31	40	30/40	3	2
23680-0320420**	32	42	30/40	3	2
23680-0350440**	35	44	25/35/40/50/60	3	2
23680-0350450**	35	45	20/25/30/35/40/45/50/60/100	3	2
23680-0380480**	38	48	30/40	3	2
23680-0400500**	40	50	20/25/30/35/40/50/60/80	3	2
23680-0400550**	40	55	25/30/35/40/50/60	3	2
23680-0450550**	45	55	30/35/40/50/60/110	3	2
23680-0450560**	45	56	30/35/40/50/60	3	2
23680-0450600**	45	60	30/40/50/60/70/80	3	2
23680-0500600**	50	60	30/35/40/50/60/70/80	3	2
23680-0500620**	50	62	30/35/40/50/60/70/80	3	2
23680-0500650**	50	65	30/40/50/60/70/80/100	3	2

Guide bushes

DIN 9834 / ISO 9448, bronze, maintenance-free with collar





Material:
Bronze with graphite inserts.

Version:
Self-lubricating.
Hardness 190-220 HB.

Sample order:
nlm 23681-02403204000

Note:
The guide bushes are radially and axially applicable.
The bearing elements are maintenance-free and wear-resistant.
The graphite inserts provide life-long lubrication.

Preferably for travel speeds < 0.5 m/s. (Additional lubrication is recommended for extreme loading with a higher travel speeds).

Temperature range:
Temporary temperature peaks up to ca. 200°C.

Accessories:
Retaining clips.23682.

Tolerances:
The bore for the bearings should correspond to ISO tolerance H7.

The tolerance h6 to h7 is recommended for the shaft.

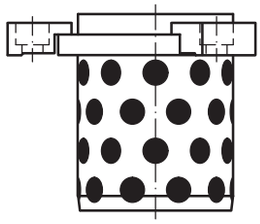
Technical data:
Material properties:
Base alloy: CuZn25Al6FeMn3
Density: 8.0 g/cm^3
Tensile strength Rm: 750 N/mm^2
Yield point: 450 N/mm^2
Ductile fracture A5: 5-8%
Friction coefficient: 0.05 - 0.12
Maximum speed: 15 m/min
Thermal conductivity: 50 W/m x k
Thermal expansion coefficient: 18 x 10^{-6}
Electrical conductivity: 7-8 m/(Ω x mm^2)
Solid lubricant content: 25-30 %

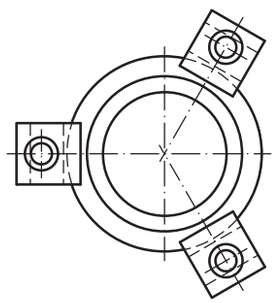
Order No.	D	D1	D2	D3	L	L1	L2	L3	R
23681-02403204000	24	32	32	40	40	6,3	3	-	3
23681-02503203200	25	32	32	40	32	6,3	4	-	3
23681-02503204010	25	32	32	40	40	6,3	3	10	3
23681-02503204000	25	32	32	40	40	6,3	4	-	3
23681-03204005012	32	40	40	50	50	6,3	4	12	3
23681-04005006315	40	50	50	63	63	6,3	5	15	3
23681-05006307117	50	63	63	71	71	6,3	6,3	17	5

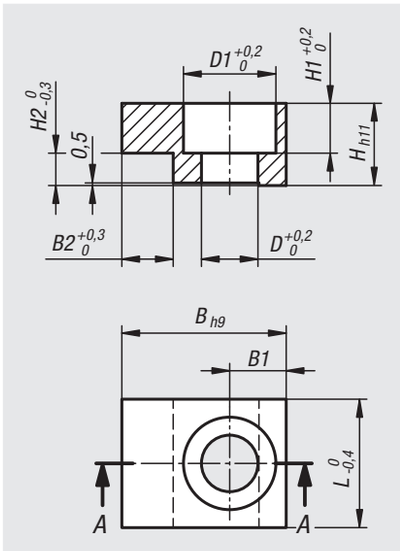
Retaining clips

DIN 9832









Material:
Steel.

Sample order:
nlm 23682-2020

Note:
The retaining clips are used to fixate the DIN 9834 / ISO 9448 guide bushes.

Order No.	B	B1	B2	D	D1	L	H	H1	H2
23682-2020	20	7,5	5	7	11	20	10	7	6,3
23682-2520	25	10	5	9	15	20	12	8,5	6,3
23682-3225	32	11	10	11	18	25	16	11,5	6,3

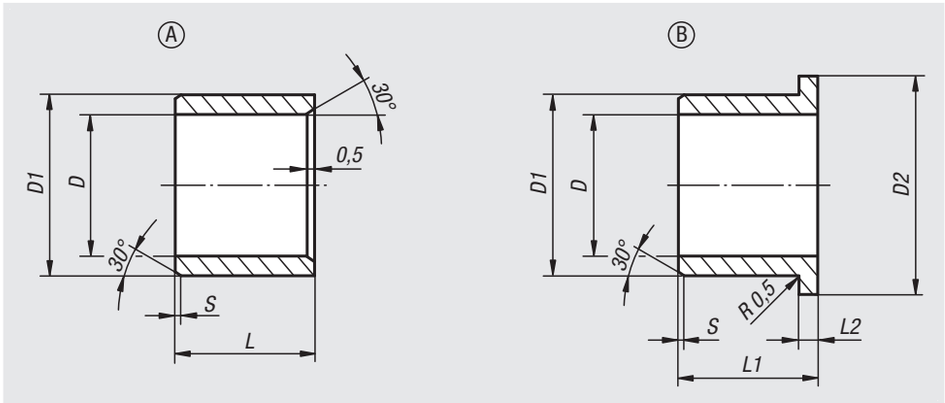
Notes

Notes

Plain bearings

plastic





Material:
High-performance polymer iglidur® G, iglidur® J or iglidur® X.

Version:
iglidur® G grey;
iglidur® J yellow;
iglidur® X black

Sample order:
nlm 23710-11030403

Note:
Plastic high-performance polymer plain bearings.

– maintenance-free
– lubricant-free
– corrosion-resistant
– resistant to dirt
– high dimensional precision
– high pressure resistance
– good heat dissipation
– very low creep tendencies
– high mechanical damping
– resistant to UV radiation.

Assembly:
The bearings are designed for press fits in H7 bores. After pressing in, the ID of the bearing will be diameter D with the relative tolerance.

The bearings are suitable for shafts with h tolerance (recommended min. h9).

		longest endurance times in dry run	for high loads	for high temperatures	low friction/ high speed	dirt-resistant	chemical-resistant	low water absorption	good for edge pressing	possible under water	cost-effective	electrically conducting
Material	Note											
iglidur® G	the all-rounder	●	●			●					●	
iglidur® J	low coecients of friction	●			●			●	●		●	
iglidur® X	temperature and chemical resistant	●	●	●			●	●		●		●

Plain bearings

plastic

iglidur® G bearings

Order No. Form A	Order No. Form B	D	D1	D2	L	L1	L2	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm²	Temperature range
23710-11050705	23710-12050705	5	7	-/11	5	-/5	-/1	0,3	E10	80	-40 °C to +130 °C
23710-11060806	23710-12060808	6	8	-/12	6	-/8	-/1	0,5	E10	80	-40 °C to +130 °C
23710-11081008	23710-12081007	8	10	-/15	8	-/7,5	-/1	0,5	E10	80	-40 °C to +130 °C
23710-11101210	23710-12101209	10	12	-/18	10	-/9	-/1	0,5	E10	80	-40 °C to +130 °C
23710-11121410	23710-12121412	12	14	-/20	10	-/12	-/1	0,8	E10	80	-40 °C to +130 °C
23710-11141615	23710-12141612	14	16	-/22	15	-/12	-/1	0,8	E10	80	-40 °C to +130 °C
23710-11151720	23710-12151712	15	17	-/23	20	-/12	-/1	0,8	E10	80	-40 °C to +130 °C
23710-11161820	23710-12161817	16	18	-/24	20	-/17	-/1	0,8	E10	80	-40 °C to +130 °C
23710-11202320	23710-12202321	20	23	-/30	20	-/21	-/1,5	0,8	E10	80	-40 °C to +130 °C
23710-11252820	23710-12252821	25	28	-/35	20	-/21	-/1,5	0,8	E10	80	-40 °C to +130 °C
23710-11303430	23710-12303426	30	34	-/42	30	-/26	-/2	0,8	E10	80	-40 °C to +130 °C

iglidur® J bearings

Order No. Form A	Order No. Form B	D	D1	D2	L	L1	L2	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm²	Temperature range
23710-21050705	23710-22050705	5	7	-/11	5	-/5	-/1	0,3	E10	35	-50 °C to +90 °C
23710-21060806	23710-22060808	6	8	-/12	6	-/8	-/1	0,5	E10	35	-50 °C to +90 °C
23710-21081008	23710-22081007	8	10	-/15	8	-/7,5	-/1	0,5	E10	35	-50 °C to +90 °C
23710-21101210	23710-22101209	10	12	-/18	10	-/9	-/1	0,5	E10	35	-50 °C to +90 °C
23710-21121410	23710-22121412	12	14	-/20	10	-/12	-/1	0,8	E10	35	-50 °C to +90 °C
23710-21141615	23710-22141612	14	16	-/22	15	-/12	-/1	0,8	E10	35	-50 °C to +90 °C
23710-21151720	23710-22151712	15	17	-/23	20	-/12	-/1	0,8	E10	35	-50 °C to +90 °C
23710-21161820	23710-22161817	16	18	-/24	20	-/17	-/1	0,8	E10	35	-50 °C to +90 °C
23710-21202320	23710-22202321	20	23	-/30	20	-/21	-/1,5	0,8	E10	35	-50 °C to +90 °C
23710-21252820	23710-22252821	25	28	-/35	20	-/21	-/1,5	0,8	E10	35	-50 °C to +90 °C
23710-21303430	23710-22303426	30	34	-/42	30	-/26	-/2	0,8	E10	35	-50 °C to +90 °C

iglidur® X bearings

Order No. Form A	Order No. Form B	D	D1	D2	L	L1	L2	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm²	Temperature range
23710-31050705	23710-32050705	5	7	-/11	5	-/5	-/1	0,3	F10	150	-100 °C to +250 °C
23710-31060806	23710-32060808	6	8	-/12	6	-/8	-/1	0,5	F10	150	-100 °C to +250 °C
23710-31081008	23710-32081007	8	10	-/15	8	-/7,5	-/1	0,5	F10	150	-100 °C to +250 °C
23710-31101210	23710-32101209	10	12	-/18	10	-/9	-/1	0,5	F10	150	-100 °C to +250 °C
23710-31121410	23710-32121412	12	14	-/20	10	-/12	-/1	0,8	F10	150	-100 °C to +250 °C
23710-31141615	23710-32141612	14	16	-/22	15	-/12	-/1	0,8	F10	150	-100 °C to +250 °C
23710-31151720	23710-32151712	15	17	-/23	20	-/12	-/1	0,8	F10	150	-100 °C to +250 °C
23710-31161820	23710-32161817	16	18	-/24	20	-/17	-/1	0,8	F10	150	-100 °C to +250 °C
23710-31202320	23710-32202321	20	23	-/30	20	-/21	-/1,5	0,8	F10	150	-100 °C to +250 °C
23710-31252820	23710-32252821	25	28	-/35	20	-/21	-/1,5	0,8	F10	150	-100 °C to +250 °C
23710-31303430	23710-32303426	30	34	-/42	30	-/26	-/2	0,8	F10	150	-100 °C to +250 °C

Thrust washers plastic

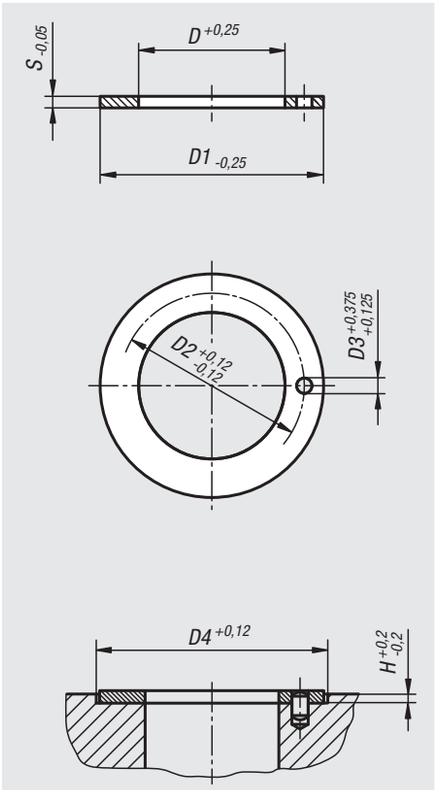


Material:
High-performance polymer iglidur® G.

Version:
grey.

Sample order:
nlm 23715-1050906

Note:
Maintenance-free and lubricant-free thrust washers. They take up axial loads by rotational motion. The loading can be either alternating or permanent.
Electrically insulating. Resistant to UV radiation.



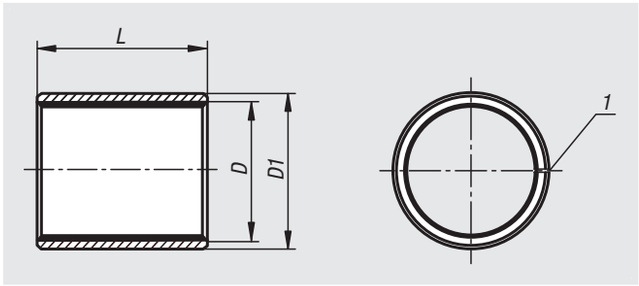
Order No.	D	D1	D2	D3	D4	H	S	Max. permissible static surface pressure N/mm²	Temperature range
23715-1050906	5	9,5	-	-	9,5	0,3	0,6	80	-40 °C to +130 °C
23715-1061515	6	15	-	-	15	1	1,5	80	-40 °C to +130 °C
23715-1081810	8	18	-	-	18	0,7	1	80	-40 °C to +130 °C
23715-1101810	10	18	-	-	18	0,7	1	80	-40 °C to +130 °C
23715-1122415	12	24	18	1,5	24	1	1,5	80	-40 °C to +130 °C
23715-1142015	14	20	-	-	20	1	1,5	80	-40 °C to +130 °C
23715-1152415	15	24	19,5	1,5	24	1	1,5	80	-40 °C to +130 °C
23715-1163015	16	30	22	2	30	1	1,5	80	-40 °C to +130 °C
23715-1183215	18	32	25	2	32	1	1,5	80	-40 °C to +130 °C
23715-1203615	20	36	28	3	36	1	1,5	80	-40 °C to +130 °C
23715-1223815	22	38	30	3	38	1	1,5	80	-40 °C to +130 °C
23715-1244215	24	42	33	3	42	1	1,5	80	-40 °C to +130 °C
23715-1264415	26	44	35	3	44	1	1,5	80	-40 °C to +130 °C
23715-1284815	28	48	38	4	48	1	1,5	80	-40 °C to +130 °C

Notes

Plain bearings

cylindrical





Material:
Base material, steel.
Intermediate layer sintered bronze.
Bearing surface PTFE.

Version:
Steel electro zinc-plated.

Sample order:
nlm 23730-00300404

Note:
Maintenance-free rolled composite steel plain bearings particularly suitable for dry running. Also highly suitable for lubricated applications (oil lubrication). Very low wear and friction, no stick-slip effect. Suitable for rotary and oscillating movements, high chemical resistance, low water absorption.

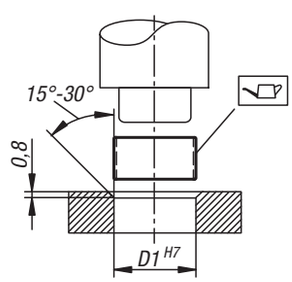
Assembly:
The use of a suitable press mandrel is recommended to avoid damaging the bearing surface. The butt joint must be opposite the load zone. The bearing has an interference fit after installation. Gluing is possible but not required.

Tolerances:
Housing:
Recommended tolerance H7.
Surface finish Ra 0.8 to 1.6.
Chamfer (press-in side 0.8 to 1.2 x 15°).

Shaft:
Recommended tolerance h8 to f7. For applications at a low speed and small loads drawn shafts with h9 can also be used.
Shaft surface Ra 0.4 to 0.8 (preferably ground shafts) for drawn shafts Ra 1.6 to 3.2.

Technical data:
Static load: max. 250 N/mm²
Dynamic load: max. 140 N/mm²
Friction coefficient, dry: 0.03 to 0.20
Sliding speed, dry: max. 2 m/s
Sliding speed, oil lubricated: max. 5 m/s
Thermal conductivity: 42 W(m*K)-1
Thermal expansion coefficient: 11*10-6 K-1
Temperature range: -195°C to +280°C

Drawing reference:
1) Butt joint



Order No.	D	D1	L
23730-00300404	3	4,5	4
23730-00300405	3	4,5	5
23730-00300406	3	4,5	6
23730-00400504	4	5,5	4
23730-00400506	4	5,5	6
23730-00400508	4	5,5	8
23730-00500705	5	7	5
23730-00500708	5	7	8
23730-00600805	6	8	5
23730-00600806	6	8	6
23730-00600810	6	8	10
23730-00700910	7	9	10
23730-00801006	8	10	6
23730-00801008	8	10	8
23730-00801010	8	10	10
23730-01001206	10	12	6
23730-01001208	10	12	8
23730-01001210	10	12	10
23730-01001212	10	12	12
23730-01001215	10	12	15
23730-01001220	10	12	20

Plain bearings

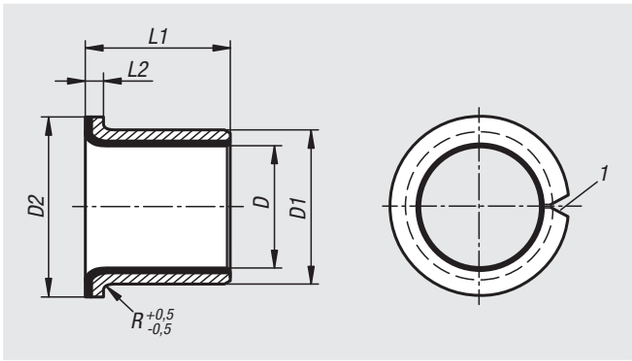
cylindrical

Order No.	D	D1	L
23730-01201406	12	14	6
23730-01201408	12	14	8
23730-01201410	12	14	10
23730-01201412	12	14	12
23730-01201415	12	14	15
23730-01201420	12	14	20
23730-01401610	14	16	10
23730-01401620	14	16	20
23730-01501710	15	17	10
23730-01501712	15	17	12
23730-01501715	15	17	15
23730-01501720	15	17	20
23730-01601810	16	18	10
23730-01601815	16	18	15
23730-01601820	16	18	20
23730-01601825	16	18	25
23730-01802020	18	20	20
23730-02002310	20	23	10
23730-02002312	20	23	12
23730-02002315	20	23	15
23730-02002320	20	23	20
23730-02002330	20	23	30
23730-02202520	22	25	20
23730-02402725	24	27	25
23730-02502815	25	28	15
23730-02502820	25	28	20
23730-02502825	25	28	25
23730-02502830	25	28	30
23730-02502840	25	28	40
23730-02602915	26	30	15
23730-02602920	26	30	20
23730-02602930	26	30	30
23730-02803220	28	32	20
23730-02803225	28	32	25
23730-03003412	30	34	12
23730-03003415	30	34	15
23730-03003420	30	34	20
23730-03003430	30	34	30
23730-03003435	30	34	35
23730-03203620	32	36	20
23730-03203625	32	36	25
23730-03503920	35	39	20
23730-03503940	35	39	40
23730-03804225	38	42	25
23730-04004420	40	44	20
23730-04004430	40	44	30
23730-04004450	40	44	50
23730-05005530	50	55	30
23730-05005550	50	55	50

Plain bearings

with collar





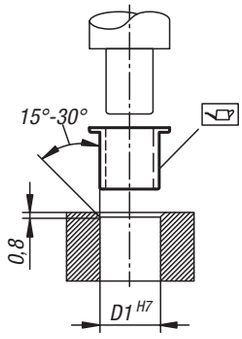
Material:
Base material, steel.
Intermediate layer sintered bronze.
Bearing surface PTFE.

Version:
Steel electro zinc-plated.

Sample order:
nlm 23731-00400505

Note:
Maintenance-free rolled composite steel plain bearings particularly suitable for dry running. Also highly suitable for lubricated applications (oil lubrication). Very low wear and friction, no stick-slip effect. Suitable for rotary and oscillating movements, high chemical resistance, low water absorption.

Assembly:
The use of a suitable press mandrel is recommended to avoid damaging the bearing surface. The butt joint must be opposite the load zone. The bearing has an interference fit after installation. Gluing is possible but not required.



Tolerances:
Housing:
Recommended tolerance H7.
Surface finish Ra 0.8 to 1.6.
Chamfer (press-in side 0.8 to 1.2 x 15°).

Shaft:
Recommended tolerance h8 to f7. For applications at a low speed and small loads drawn shafts with h9 can also be used.
Shaft surface Ra 0.4 to 0.8 (preferably ground shafts) for drawn shafts Ra 1.6 to 3.2.

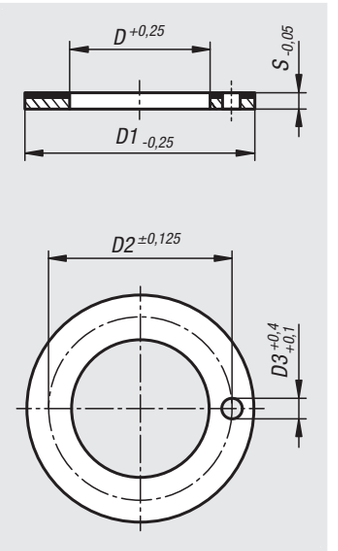
Technical data:
Static load: max. 250 N/mm²
Dynamic load: max. 140 N/mm²
Friction coefficient, dry: 0.03 to 0.20
Sliding speed, dry: max. 2 m/s
Sliding speed, oil lubricated: max. 5 m/s
Thermal conductivity: 42 W(m*K)-1
Thermal expansion coefficient: 11*10-6 K-1
Temperature range: -195°C to +280°C

Drawing reference:
1) Butt joint

Order No.	D	D1	D2	L1	L2	R
23731-00400505	4	5,5	9	5,6	1	0,5
23731-00600807	6	8	12	7	1	1
23731-00801005	8	10	15	5,5	1	1
23731-00801009	8	10	15	9,5	1	1
23731-01001209	10	12	18	9	1	1
23731-01001212	10	12	18	12	1	1
23731-01201417	12	14	20	17	1	1
23731-01401617	14	16	22	17	1	1
23731-01501712	15	17	23	12	1	1
23731-01501717	15	17	23	17	1	1
23731-01601817	16	18	24	17	1	1
23731-01802012	18	20	26	12	1	1
23731-02002311	20	23	30	11,5	1,5	1,5
23731-02202521	22	25	32	21,5	1,5	1,5
23731-02502826	25	28	35	26,5	1,5	1,5
23731-03003430	30	34	42	30	2	2
23731-03503926	35	39	47	26	2	2
23731-04004426	40	44	53	26	2	2
23731-05005522	50	55	65	22	2,5	2

Thrust washers





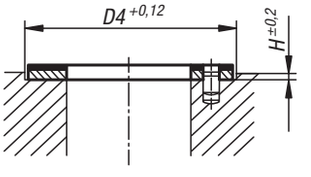
Material:
Base material, steel.
Intermediate layer sintered bronze.
Bearing surface PTFE.

Version:
Steel electro zinc-plated.

Sample order:
nlm 23732-01002015

Note:
Maintenance-free steel composite bearings particularly suitable for dry running. Also highly suitable for lubricated applications (oil lubrication). They take up axial loads by rotating movements. The axial loads that occur can be both cyclic or permanent. Very low wear and friction, no stick-slip effect. High chemical resistance, low water absorption.

Technical data:
Static load: max. 250 N/mm²
Dynamic load: max. 140 N/mm²
Friction coefficient, dry: 0.03 to 0.20
Sliding speed, dry: max. 2 m/s
Sliding speed, oil lubricated: max. 5 m/s
Thermal conductivity: 42 W(m*K)-1
Thermal expansion coefficient: 11*10-6 K-1
Temperature range: -195°C to +280°C

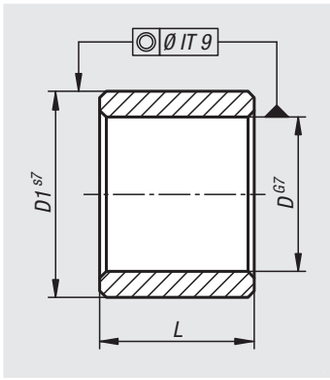


Order No.	D	D1	D2	D3	D4	H	S
23732-01002015	10	20	15	1,5	20	1	1,5
23732-01202415	12	24	18	1,5	24	1	1,5
23732-01402615	14	26	20	2	26	1	1,5
23732-01603015	16	30	23	2	30	1	1,5
23732-01803215	18	32	25	2	32	1	1,5
23732-02003615	20	36	28	3	36	1	1,5
23732-02203815	22	38	30	3	38	1	1,5
23732-02404215	24	42	33	3	42	1	1,5
23732-02604415	26	44	35	3	44	1	1,5
23732-02804815	28	48	38	4	48	1	1,5
23732-03205415	32	54	43	4	54	1	1,5
23732-03806215	38	62	50	4	62	1	1,5
23732-04206615	42	66	54	4	66	1	1,5
23732-04807420	48	74	61	4	74	1,5	2
23732-05207820	52	78	65	4	78	1,5	2
23732-06209020	62	90	76	4	90	1,5	2

Plain bearing sintered bronze

cylindrical



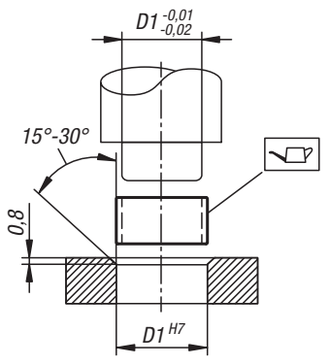


Material:
Sintered bronze similar to SINT A50.

Version:
Oil impregnated (ca. 25 percent by volume oil).
Hardness min. 25 HB.

Sample order:
nlm 23760-00300604

Note:
The sintered bronze plain bearings are oil impregnated, self-lubricating, maintenance-free and ready for installation. During rotation the oil is applied to the shaft and absorbed by the bearing through capillary effect when stationary. Additional lubrication is not required under normal operating conditions.



Assembly:
Press in plain bearings, do not hammer in. The use of a suitable press mandrel is advisable. Without a mandrel there is a risk that the bearing may deform during installation. After press-fitting into a housing with bore H7 the bore D has a H7 tolerance.

Tolerances:
Housing:
Recommended tolerance H7.

Shaft:
Recommended tolerance h6 to h9. Hardened or non-hardened ground shafts can be used (for secondary applications drawn shafts can also be used).

Technical data:
Static load: max. 50 N/mm²
Dynamic load: max. 10 N/mm²
Friction coefficient, dry: 0.05 to 0.10
Sliding speed: max. 5 m/s
Maximum pv value: 1.6 N/mm² * m/s
Temperature range: -20 °C to +100 °C

Order No.	D	D1	L
23760-00300604	3	6	4
23760-00300606	3	6	6
23760-00400704	4	7	4
23760-00400804	4	8	4
23760-00500808	5	8	8
23760-00500810	5	8	10
23760-00500816	5	8	16
23760-00600906	6	9	6
23760-00600910	6	9	10
23760-00600912	6	9	12
23760-00600916	6	9	16
23760-00601006	6	10	6
23760-00601010	6	10	10
23760-00601012	6	10	12
23760-00601016	6	10	16
23760-00601206	6	12	6
23760-00801108	8	11	8
23760-00801112	8	11	12
23760-00801208	8	12	8
23760-00801212	8	12	12
23760-00801220	8	12	20
23760-01001310	10	13	10
23760-01001416	10	14	16
23760-01001610	10	16	10
23760-01201512	12	15	12
23760-01201520	12	15	20
23760-01201612	12	16	12
23760-01201812	12	18	12
23760-01201816	12	18	16
23760-01201820	12	18	20
23760-01401822	14	18	22
23760-01402014	14	20	14
23760-01402018	14	20	18
23760-01501920	15	19	20
23760-01502116	15	21	16

Plain bearing sintered bronze

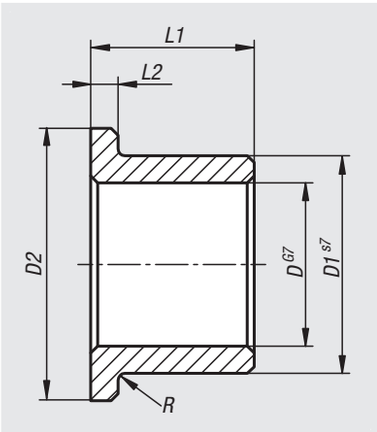
cylindrical

Order No.	D	D1	L
23760-01602016	16	20	16
23760-01602020	16	20	20
23760-01602025	16	20	25
23760-01602032	16	20	32
23760-01602216	16	22	16
23760-01602220	16	22	20
23760-01602232	16	22	32
23760-01802218	18	22	18
23760-01802418	18	24	18
23760-01802428	18	24	28
23760-01802518	18	25	18
23760-02002432	20	24	32
23760-02002516	20	25	16
23760-02002520	20	25	20
23760-02002525	20	25	25
23760-02002532	20	25	32
23760-02002620	20	26	20
23760-02002625	20	26	25
23760-02002632	20	26	32
23760-02002825	20	28	25
23760-02202822	22	28	22
23760-02503020	25	30	20
23760-02503025	25	30	25
23760-02503032	25	30	32
23760-02503040	25	30	40
23760-02503220	25	32	20
23760-02503225	25	32	25
23760-02503232	25	32	32
23760-02503240	25	32	40
23760-02803628	28	36	28
23760-03003824	30	38	24
23760-03003830	30	38	30
23760-03003838	30	38	38
23760-03204032	32	40	32
23760-03504428	35	44	28
23760-03504435	35	44	35
23760-03504535	35	45	35
23760-03604536	36	45	36
23760-04004632	40	46	32
23760-04004640	40	46	40
23760-04005025	40	50	25
23760-04005040	40	50	40
23760-04505545	45	55	45
23760-04505645	45	56	45
23760-05005632	50	56	32
23760-05005650	50	56	50
23760-05006032	50	60	32
23760-05006040	50	60	40
23760-05006050	50	60	50

Plain bearing sintered bronze

with collar



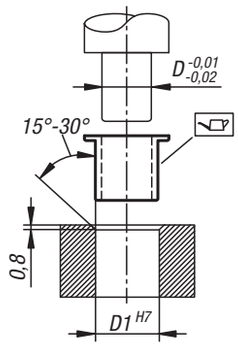


Material:
Sintered bronze similar to SINT A50.

Version:
Oil impregnated (ca. 25 percent by volume oil).
Hardness min. 25 HB.

Sample order:
nlm 23761-00400804

Note:
The sintered bronze plain bearings are oil impregnated, self-lubricating, maintenance-free and ready for installation. During rotation the oil is applied to the shaft and absorbed by the bearing through capillary effect when stationary. Additional lubrication is not required under normal operating conditions.



Assembly:
Press in plain bearings, do not hammer in. The use of a suitable press mandrel is advisable. Without a mandrel there is a risk that the bearing may deform during installation. After press-fitting into a housing with bore H7 the bore D has a H7 tolerance.

Tolerances:
Housing:
Recommended tolerance H7.

Shaft:
Recommended tolerance h6 to h9. Hardened or non-hardened ground shafts can be used (for secondary applications drawn shafts can also be used).

Technical data:
Static load: max. 50 N/mm²
Dynamic load: max. 10 N/mm²
Friction coefficient, dry: 0.05 to 0.10
Sliding speed: max. 5 m/s
Maximum pv value: 1.6 N/mm² * m/s
Temperature range: -20 °C to +100 °C

Order No.	D	D1	D2	L1	L2	R
23761-00400804	4	8	12	4	2	0,3
23761-00400808	4	8	12	8	2	0,3
23761-00601006	6	10	14	6	2	0,3
23761-00601010	6	10	14	10	2	0,3
23761-00601016	6	10	14	16	2	0,3
23761-00801208	8	12	16	8	2	0,3
23761-00801212	8	12	16	12	2	0,3
23761-00801216	8	12	16	16	2	0,3
23761-01001310	10	13	16	10	1,5	0,6
23761-01001316	10	13	16	16	1,5	0,6
23761-01001510	10	15	20	10	2,5	0,6
23761-01001516	10	15	20	16	2,5	0,6
23761-01001610	10	16	22	10	3	0,6
23761-01001616	10	16	22	16	3	0,6

Plain bearing sintered bronze

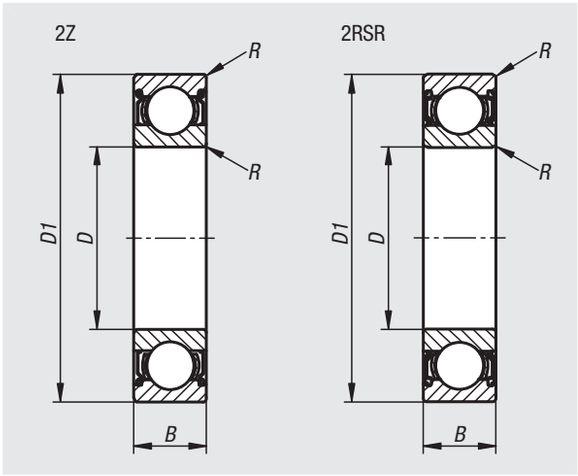
with collar

Order No.	D	D1	D2	L1	L2	R
23761-01201512	12	15	18	12	1,5	0,6
23761-01201516	12	15	18	16	1,5	0,6
23761-01201712	12	17	22	12	2,5	0,6
23761-01201716	12	17	22	16	2,5	0,6
23761-01201812	12	18	24	12	3	0,6
23761-01201820	12	18	24	20	3	0,6
23761-01401814	14	18	22	14	2	0,6
23761-01402014	14	20	26	14	3	0,6
23761-01502015	15	20	25	15	3	0,6
23761-01502020	15	20	25	20	3	0,6
23761-01602016	16	20	24	16	2	0,6
23761-01602020	16	20	24	20	2	0,6
23761-01602216	16	22	28	16	3	0,6
23761-01602220	16	22	28	20	3	0,6
23761-01602225	16	22	28	25	3	0,6
23761-01802218	18	22	26	18	2	0,6
23761-01802418	18	24	30	18	3	0,6
23761-02002416	20	24	28	16	2	0,6
23761-02002420	20	24	28	20	2	0,6
23761-02002616	20	26	32	16	3	0,6
23761-02002620	20	26	32	20	3	0,6
23761-02002625	20	26	32	25	3	0,6
23761-02002632	20	26	32	32	3	0,6
23761-02202815	22	28	34	15	3	0,6
23761-02202820	22	28	34	20	3	0,6
23761-02202825	22	28	34	25	3	0,6
23761-02503020	25	30	35	20	2,5	0,8
23761-02503025	25	30	35	25	2,5	0,8
23761-02503220	25	32	39	20	3,5	0,8
23761-02503225	25	32	39	25	3,5	0,8
23761-02803322	28	33	38	22	2,5	0,8
23761-02803336	28	33	38	36	2,5	0,8
23761-02803622	28	36	44	22	4	0,8
23761-02803636	28	36	44	36	4	0,8
23761-03003820	30	38	46	20	4	0,8
23761-03003825	30	38	46	25	4	0,8
23761-03003830	30	38	46	30	4	0,8
23761-03204020	32	40	48	20	4	0,8
23761-03204025	32	40	48	25	4	0,8
23761-03204030	32	40	48	30	4	0,8
23761-03604528	36	45	54	28	4,5	0,8
23761-03604536	36	45	54	36	4,5	0,8
23761-04005025	40	50	60	25	5	0,8
23761-04005040	40	50	60	40	5	0,8
23761-05006032	50	60	70	32	5	1
23761-05006050	50	60	70	50	5	1

Deep groove ball bearing FAG

single row





Material:
Inner ring, outer ring and rolling elements, bearing steel.
Cage sheet steel.
Labyrinth seal sheet steel. Lip seal NBR.

Version:
2Z = sealed both sides with non-contact labyrinth seals.
2RSR = sealed both sides with contact lip seals.

Sample order:
nlm 23800-100301004

Note:
Deep groove ball bearings accept high radial and axial loads. Axial loads are absorbed in both directions. The versions 2Z and 2RSR are lubricated for life with a high quality grease.

The main dimensions of the deep groove ball bearings conform to DIN 625-1. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. The radial internal clearance corresponds to the clearance CN acc. to DIN 620-4. These tolerance classes are standard and well suited for most applications.

Temperature range:
-30 °C to +110 °C.

On request:
Open deep groove ball bearing.
Other dimensions and versions.

Order No.	Abbreviation	Version	D	D1	B	R min.	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-100301004	623-2Z	2Z	3	10	4	0,15	640	220	45000
23800-100401305	624-2Z	2Z	4	13	5	0,2	1290	490	38000
23800-100501605	625-2Z	2Z	5	16	5	0,3	1320	440	36000
23800-200501605	625-2RSR	2RSR	5	16	5	0,3	1320	440	24000
23800-100601906	626-2Z	2Z	6	19	6	0,3	2600	1100	32000
23800-200601906	626-2RSR	2RSR	6	19	6	0,3	2600	1100	22000
23800-100701906	607-2Z	2Z	7	19	6	0,3	2600	1100	32000
23800-200701906	607-2RSR	2RSR	7	19	6	0,3	2600	1100	22000
23800-100702207	627-2Z	2Z	7	22	7	0,3	3250	1370	30000
23800-200702207	627-2RSR	2RSR	7	22	7	0,3	3250	1370	20000
23800-100802207	608-2Z	2Z	8	22	7	0,3	3250	1370	30000
23800-200802207	608-2RSR	2RSR	8	22	7	0,3	3250	1370	20000
23800-100902407	609-2Z	2Z	9	24	7	0,3	3650	1630	30000
23800-200902407	609-2RSR	2RSR	9	24	7	0,3	3650	1630	20000
23800-100902608	629-2Z	2Z	9	26	8	0,3	4550	1960	28000
23800-200902608	629-2RSR	2RSR	9	26	8	0,3	4550	1960	19000

Deep groove ball bearing FAG

single row

Order No.	Abbreviation	Version	D	D1	B	R min.	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-101001905	61800-2Z	2Z	10	19	5	0,3	1450	590	36000
23800-201001905	61800-2RSR	2RSR	10	19	5	0,3	1450	590	18000
23800-101002608	6000-2Z	2Z	10	26	8	0,3	4550	1960	28000
23800-201002608	6000-2RSR	2RSR	10	26	8	0,3	4550	1960	19000
23800-101003009	6200-2Z	2Z	10	30	9	0,6	6000	2600	26000
23800-201003009	6200-2RSR	2RSR	10	30	9	0,6	6000	2600	17000
23800-101003511	6300-2Z	2Z	10	35	11	0,6	8150	3450	22000
23800-201003511	6300-2RSR	2RSR	10	35	11	0,6	8150	3450	15000
23800-101202105	61801-2Z	2Z	12	21	5	0,3	1520	670	32000
23800-201202105	61801-2RSR	2RSR	12	21	5	0,3	1520	670	18000
23800-101202808	6001-2Z	2Z	12	28	8	0,3	5100	2360	26000
23800-201202808	6001-2RSR	2RSR	12	28	8	0,3	5100	2360	18000
23800-101203210	6201-2Z	2Z	12	32	10	0,6	6950	3100	24000
23800-201203210	6201-2RSR	2RSR	12	32	10	0,6	6950	3100	16000
23800-101203712	6301-2Z	2Z	12	37	12	1	9650	4150	20000
23800-201203712	6301-2RSR	2RSR	12	37	12	1	9650	4150	13000
23800-101502405	61802-2Z	2Z	15	24	5	0,3	1650	800	28000
23800-201502405	61802-2RSR	2RSR	15	24	5	0,3	1650	800	16000
23800-101503209	6002-2Z	2Z	15	32	9	0,3	5600	2850	24000
23800-201503209	6002-2RSR	2RSR	15	32	9	0,3	5600	2850	16000
23800-101503511	6202-2Z	2Z	15	35	11	0,6	7800	3750	20000
23800-201503511	6202-2RSR	2RSR	15	35	11	0,6	7800	3750	14000
23800-101504213	6302-2Z	2Z	15	42	13	1	11400	5400	18000
23800-201504213	6302-2RSR	2RSR	15	42	13	1	11400	5400	12000
23800-101703510	6003-2Z	2Z	17	35	10	0,3	6000	3250	22000
23800-201703510	6003-2RSR	2RSR	17	35	10	0,3	6000	3250	14000
23800-101704012	6203-2Z	2Z	17	40	12	0,6	9500	4750	18000
23800-201704012	6203-2RSR	2RSR	17	40	12	0,6	9500	4750	12000
23800-101704714	6303-2Z	2Z	17	47	14	1	13400	6550	16000
23800-201704714	6303-2RSR	2RSR	17	47	14	1	13400	6550	11000
23800-102004212	6004-2Z	2Z	20	42	12	0,6	9300	5000	17000
23800-202004212	6004-2RSR	2RSR	20	42	12	0,6	9300	5000	12000
23800-102004714	6204-2Z	2Z	20	47	14	1	12700	6550	15000
23800-202004714	6204-2RSR	2RSR	20	47	14	1	12700	6550	10000
23800-102005215	6304-2Z	2Z	20	52	15	1,1	16000	7800	14000
23800-202005215	6304-2RSR	2RSR	20	52	15	1,1	16000	7800	9500
23800-102504712	6005-2Z	2Z	25	47	12	0,6	10000	5850	15000
23800-202504712	6005-2RSR	2RSR	25	47	12	0,6	10000	5850	10000
23800-102505215	6205-2Z	2Z	25	52	15	1	14000	7800	14000
23800-202505215	6205-2RSR	2RSR	25	52	15	1	14000	7800	9000
23800-102506217	6305-2Z	2Z	25	62	17	1,1	22400	11400	11000
23800-202506217	6305-2RSR	2RSR	25	62	17	1,1	22400	11400	7500

Deep groove ball bearing FAG

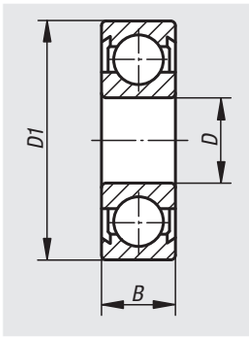
single row

Order No.	Abbreviation	Version	D	D1	B	R min.	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-103005513	6006-2Z	2Z	30	55	13	1	12700	8000	13000
23800-203005513	6006-2RSR	2RSR	30	55	13	1	12700	8000	8500
23800-103006216	6206-2Z	2Z	30	62	16	1	19300	11200	11000
23800-203006216	6206-2RSR	2RSR	30	62	16	1	19300	11200	7500
23800-103007219	6306-2Z	2Z	30	72	19	1,1	29000	16300	9500
23800-203007219	6306-2RSR	2RSR	30	72	19	1,1	29000	16300	6300
23800-103506214	6007-2Z	2Z	35	62	14	1	16000	10200	11000
23800-203506214	6007-2RSR	2RSR	35	62	14	1	16000	10200	7500
23800-103507217	6207-2Z	2Z	35	72	17	1,1	22500	15300	9500
23800-203507217	6207-2RSR	2RSR	35	72	17	1,1	22500	15300	6300
23800-103508021	6307-2Z	2Z	35	80	21	1,5	33500	19000	8500
23800-203508021	6307-2RSR	2RSR	35	80	21	1,5	33500	19000	5600
23800-104006815	6008-2Z	2Z	40	68	15	1	16600	11600	10000
23800-204006815	6008-2RSR	2RSR	40	68	15	1	16600	11600	6700
23800-104008018	6208-2Z	2Z	40	80	18	1,1	29000	18000	8500
23800-204008018	6208-2RSR	2RSR	40	80	18	1,1	29000	18000	5600
23800-104009023	6308-2Z	2Z	40	90	23	1,5	42500	25000	7500
23800-204009023	6308-2RSR	2RSR	40	90	23	1,5	42500	25000	5000
23800-104507516	6009-2Z	2Z	45	75	16	1	20000	14300	9000
23800-204507516	6009-2RSR	2RSR	45	75	16	1	20000	14300	6000
23800-104508519	6209-2Z	2Z	45	85	19	1,1	31000	20400	8000
23800-204508519	6209-2RSR	2RSR	45	85	19	1,1	31000	20400	5300
23800-104510025	6309-2Z	2Z	45	100	25	1,5	53000	31500	6700
23800-204510025	6309-2RSR	2RSR	45	100	25	1,5	53000	31500	4500
23800-105008016	6010-2Z	2Z	50	80	16	1	20800	15600	8500
23800-205008016	6010-2RSR	2RSR	50	80	16	1	20800	15600	5600
23800-105009020	6210-2Z	2Z	50	90	20	1,1	36500	24000	7500
23800-205009020	6210-2RSR	2RSR	50	90	20	1,1	36500	24000	4800
23800-105011027	6310-2Z	2Z	50	110	27	2	62000	38000	6000
23800-205011027	6310-2RSR	2RSR	50	110	27	2	62000	38000	4000

Deep groove ball bearings

stainless steel, DIN 626





Material:
Stainless steel 1.4125.

Version:
Bright.

Sample order:
nlm 23800-01-100802207

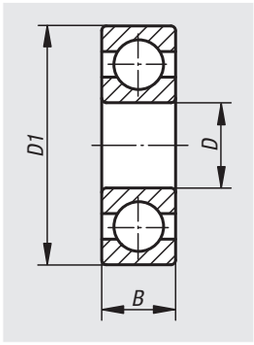
Note:
Sealed both sides with non-contact seals.
Used in food and pharmaceutical industries and special machine construction.
Good corrosion resistance.

On request:
Without sealing washer.
Without ball cage.

Order No.	B	D	D1	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-01-100802207	7	8	22	3320	1380	26000
23800-01-101002608	8	10	26	4580	1980	22000
23800-01-101202808	8	12	28	5100	2380	20000
23800-01-101503209	9	15	32	5580	2850	19000
23800-01-101703510	10	17	35	6000	3250	17000
23800-01-102004212	12	20	42	9380	5020	16000
23800-01-102504712	12	25	47	10000	5850	12000
23800-01-103005513	13	30	55	13200	8300	11000

Ceramic ball bearings ZrO2





Material:
Ceramic bearings ZrO2.
Bearing cage PTFE.

Version:
Natural, white.

Sample order:
nlm 23800-03-00802207

Note:
Zirconia (ZrO2) is a cost-effective alternative to Si3N4. It also has the advantage that the thermal expansion is similar to that of steel, which means that a shrink fit is not required as expansion differences between the bearing housing and a steel shaft do not occur.

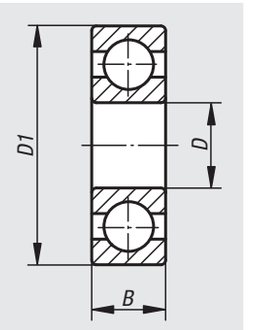
On request:
Special version with PEEK ball cage.
Without ball cage.

Safety:
Reacts with concentrated hydrochloric acid, nitric acid and sulphuric acid.

Order No.	B	D	D1	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-03-02004212	12	20	42	6000	3700	18000
23800-03-01002608	8	10	26	3000	1400	31000
23800-03-01503209	9	15	32	3600	2100	24000
23800-03-01703510	10	17	35	3900	2300	21000
23800-03-01202808	8	12	28	3300	1700	29000
23800-03-03005513	13	30	55	8500	7600	12500
23800-03-02504712	12	25	47	6500	5800	15000
23800-03-00802207	7	8	22	2000	1000	37000

Ceramic ball bearings Si3N4





Material:
Ceramic bearings Si3N4.
Bearing cage PTFE.

Version:
Natural, black.

Sample order:
nlm 23800-04-00802207

Note:
For most applications Si3N4 is the preferred material for ceramic bearings.
Silicon nitride bearings are light, very hard and highly wear resistant.
High and ultra-high performance bearings are used in e.g. aerospace technology, metal production industries (high application temperatures), machine manufacturing, chemical industries (chemically aggresive substances), pharmaceutical and medical industries, semiconductor and biotechnology (clean room enviroments which may not be contaminated by lubricants).

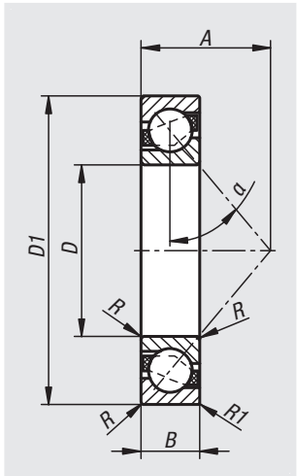
On request:
Special version with PEEK ball cage.
Without ball cage.

Order No.	B	D	D1	Dynamic load rating N	Static load rating N	Speed limit rpm
23800-04-00802207	7	8	22	2300	1100	41000
23800-04-01002608	8	10	26	3300	1600	34000
23800-04-01202808	8	12	28	3600	1900	32000
23800-04-01503209	9	15	32	4000	2300	27000
23800-04-01703510	10	17	35	4300	2600	23000
23800-04-02004212	12	20	42	6700	4100	20000
23800-04-02504712	12	25	47	7200	4800	17000
23800-04-03005513	13	30	55	9400	9400	14000

Angular contact ball bearing FAG

single-row





Material:
Inner ring, outer ring and rolling elements, bearing steel.
Cage reinforced fibre glass polyamide.

Version:
open.

Sample order:
nlm 23805-001003009

Note:
Single row angular contact ball bearings accept high radial and axial loads. Axial loads are absorbed in only one direction against the shoulder guide. For axial counter support a second bearing mounted inverse is required. The pressure angle of 40° make these bearings highly resilient. Suitable for high speeds.

The main dimensions of angular contact ball bearings conform to DIN 628-1. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

Temperature range:
-30 °C to +120 °C.

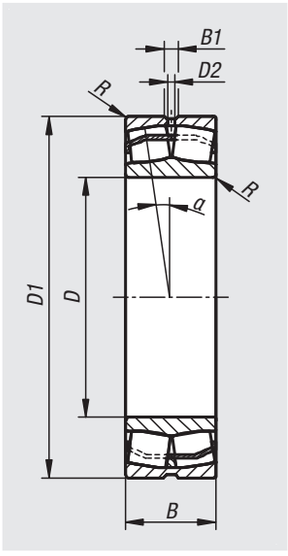
On request:
Sealed both sides with NBR contact lip seals. Other dimensions and versions.

Order No.	Abbreviation	Version	D	D1	B	R min.	R1 min.	α	A	Dynamic load rating N	Static load rating N	Speed limit rpm
23805-001003009	7200-B-TVP	open	10	30	9	0,6	0,3	40°	13	5300	2600	32000
23805-001203210	7201-B-TVP	open	12	32	10	0,6	0,3	40°	14	7400	3550	28000
23805-001503511	7202-B-TVP	open	15	35	11	0,6	0,3	40°	16	8400	4450	24000
23805-001704012	7203-B-TVP	open	17	40	12	0,6	0,3	40°	18	10500	5700	20000
23805-002004714	7204-B-TVP	open	20	47	14	1	0,6	40°	21	14400	7800	18000
23805-002505215	7205-B-TVP	open	25	52	15	1	0,6	40°	24	15300	9000	16000
23805-003006216	7206-B-TVP	open	30	62	16	1	0,6	40°	27	21700	14100	13000
23805-003507217	7207-B-TVP	open	35	72	17	1,1	0,6	40°	31	28000	19000	11000
23805-004008018	7208-B-TVP	open	40	80	18	1,1	0,6	40°	34	34000	23500	9500
23805-004508519	7209-B-TVP	open	45	85	19	1,1	0,6	40°	37	37500	27000	8500
23805-005009020	7210-B-TVP	open	50	90	20	1,1	0,6	40°	39	39000	28500	8000

Spherical roller bearing FAG

cylindrical bore





Material:
Inner ring, outer ring and rolling elements, bearing steel.
Cage, steel.

Version:
open.

Sample order:
nlm 23815-002505218

Note:
Spherical roller bearings accept high radial and axial loads. Axial loads are absorbed in both directions. They are designed for high loading. Spherical roller bearings compensate for angular errors (set angle α). With groove and lubrication holes.

The main dimensions of the spherical roller bearing conform to DIN 625-2. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. The radial internal clearance corresponds to the clearance CN acc. to DIN 620-4. These tolerance classes are standard and well suited for most applications.

Temperature range:
-30 °C to +200 °C.

On request:
Other dimensions and versions.

Order No.	Abbreviation	Version	D	D1	D2	B	B1	R min.	α	Dynamic load rating N	Static load rating N	Speed limit rpm
23815-002505218	22205-E1	open	25	52	3,2	18	4,8	1	1,5°	48000	42500	17000
23815-003006220	22206-E1	open	30	62	3,2	20	4,8	1	1,5°	64000	57000	13000
23815-003507223	22207-E1	open	35	72	3,2	23	4,8	1,1	1,5°	88000	81500	11000
23815-004008023	22208-E1	open	40	80	3,2	23	4,8	1,1	1,5°	101000	91000	10000
23815-004508523	22209-E1	open	45	85	3,2	23	4,8	1,1	1,5°	104000	99000	10000
23815-005009023	22210-E1	open	50	90	3,2	23	4,8	1,1	1,5°	109000	107000	9500

Cylinder roller bearing FAG

with cage



Material:
Inner ring, outer ring and rolling elements, bearing steel.
Cage reinforced fibre glass polyamide.

Version:
NU floating bearing.
NJ support bearing.

Sample order:
nlm 23820-001503511

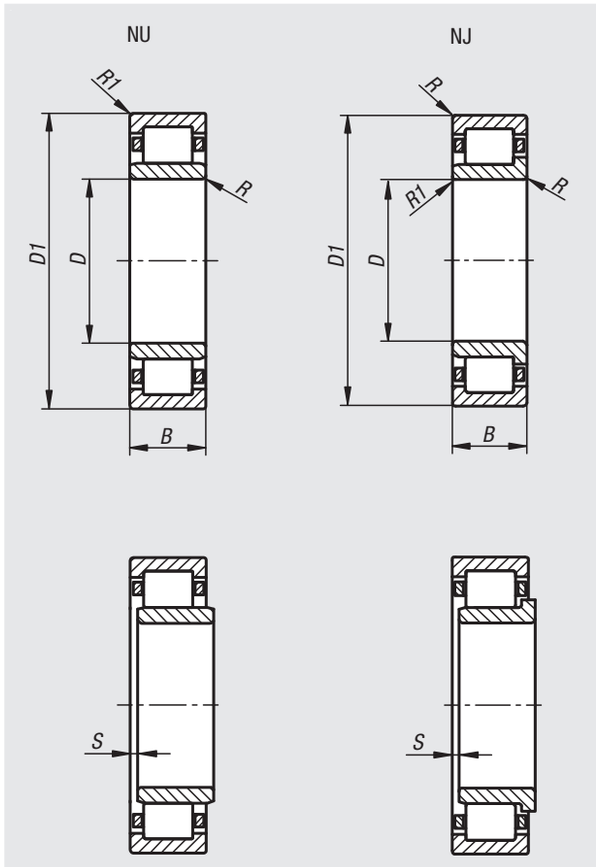
Note:
Cylinder roller bearings accept high radial loads. The bearings are separable. The bearing parts can be fitted independently of each other. This means that both bearing rings can have a tight fit. The bearings are supplied without seals. They can be lubricated with grease or oil from the side. Suitable for high speeds.
NU version are floating bearings and accept only radial forces. The outer ring has two flanges, the inner ring has none. Outer and inner rings can be displaced by the value S in both directions.

NJ versions are support bearings and accept axial loads in one direction in addition to radial loads. The outer ring has two flanges, the inner ring has one flange. Outer and inner rings can be displaced in one direction by the value S.

Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. This radial clearance corresponds to the clearance CN acc. to DIN 620-4. These tolerance classes are standard and are well suited for most applications.

Temperature range:
-30 °C to +120 °C.

On request:
Other dimensions and versions.

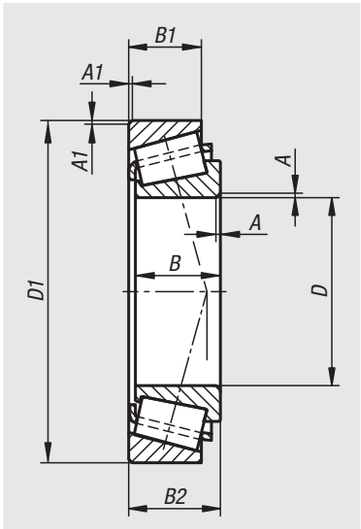


Order No.	Abbreviation	Version	D	D1	B	R min.	R1 min.	S	Dynamic load rating N	Static load rating N	Speed limit rpm
23820-001503511	NU-202-E-TVP2	NU floating bearing	15	35	11	0,6	0,3	1,6	15100	10400	22000
23820-101503511	NJ-202-E-TVP2	NJ support bearing	15	35	11	0,6	0,3	1,6	15100	10400	22000
23820-001704012	NU-203-E-TVP2	NU floating bearing	17	40	12	0,6	0,3	1,2	20800	14600	18000
23820-101704012	NJ-203-E-TVP2	NJ support bearing	17	40	12	0,6	0,3	1,2	20800	14600	18000
23820-002004714	NU-204-E-TVP2	NU floating bearing	20	47	14	1	0,6	0,8	32500	24700	16000
23820-102004714	NJ-204-E-TVP2	NJ support bearing	20	47	14	1	0,6	1	32500	24700	16000
23820-002505215	NU-205-E-TVP2	NU floating bearing	25	52	15	1	0,6	1,3	34500	27500	15000
23820-102505215	NJ-205-E-TVP2	NJ support bearing	25	52	15	1	0,6	1,2	34500	27500	15000
23820-003006216	NU-206-E-TVP2	NU floating bearing	30	62	16	1	0,6	1,5	45000	36000	12000
23820-103006216	NJ-206-E-TVP2	NJ support bearing	30	62	16	1	0,6	1,5	45000	36000	12000
23820-003507217	NU-207-E-TVP2	NU floating bearing	35	72	17	1,1	0,6	0,7	58000	48500	10000
23820-103507217	NJ-207-E-TVP2	NJ support bearing	35	72	17	1,1	0,6	0,7	58000	48500	10000
23820-004008018	NU-208-E-TVP2	NU floating bearing	40	80	18	1,1	1,1	1	63000	53000	9000
23820-104008018	NJ-208-E-TVP2	NJ support bearing	40	80	18	1,1	1,1	1	63000	53000	9000
23820-004508519	NU-209-E-TVP2	NU floating bearing	45	85	19	1,1	1,1	1	72000	63000	8500
23820-104508519	NJ-209-E-TVP2	NJ support bearing	45	85	19	1,1	1,1	1,9	72000	63000	8500
23820-005009020	NU-210-E-TVP2	NU floating bearing	50	90	20	1,1	1,1	1,3	75000	69000	8000
23820-105009020	NJ-210-E-TVP2	NJ support bearing	50	90	20	1,1	1,1	1,3	75000	69000	8000

Tapered roller bearing FAG

single row





Material:
Inner ring, outer ring and rolling elements, bearing steel.
Cage, steel.

Version:
Series 302
Series 303
Series 320 (ISO dimension)

Sample order:
nlm 23825-101504213

Note:
Tapered roller bearings can accept high radial and axial loads. Axial loads are absorbed in only one direction. For axial counter support a second bearing mounted inverse is required. Suitable for medium speeds.

The bearings are separable. This means the bearing parts can be fitted independently of each other. The bearings are supplied without seals. They can be lubricated with grease or oil from the side.

The main dimensions of the tapered roller bearings conform to DIN ISO 355 and DIN 720. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

Temperature range:
-30 °C to +120 °C.

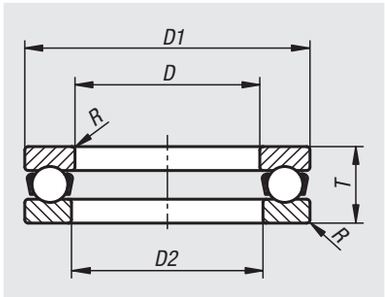
On request:
Other dimensions and versions.

Order No.	Abbreviation	Version	D	D1	B	B1	B2	A	A1	Dynamic load rating N	Static load rating N	Speed limit rpm
23825-101504213	30302-A	Series 303	15	42	13	11	14,25	1	1	23000	20500	21000
23825-001704012	30203-A	Series 302	17	40	12	11	13,25	1	1	18500	17800	21000
23825-101704714	30303-A	Series 303	17	47	14	12	15,25	1	1	27500	24500	18200
23825-302004215	32004-X	Series 320 (ISO dimensions)	20	42	15	12	15	0,6	0,6	24000	28500	18200
23825-002004714	30204-A	Series 302	20	47	14	12	15,25	1	1	27000	27000	16800
23825-102005215	30304-A	Series 303	20	52	15	13	16,25	1,5	1,5	34000	32500	15400
23825-302504715	32005-X	Series 320 (ISO dimensions)	25	47	15	11,5	15	0,6	0,6	26500	33500	15400
23825-102506217	30305-A	Series 303	25	62	17	15	18,25	1,5	1,5	47000	45500	12600
23825-303005517	32006-X	Series 320 (ISO dimensions)	30	55	17	13	17	1	1	38500	46500	12600
23825-003006216	30206-A	Series 302	30	62	16	14	17,25	1	1	43500	48000	11900
23825-103007219	30306-A	Series 303	30	72	19	16	20,75	1,5	1,5	60000	61000	10500
23825-303506218	32007-X	Series 320 (ISO dimensions)	35	62	18	14	18	1	1	45500	57000	11200
23825-003507217	30207-A	Series 302	35	72	17	15	18,25	1,5	1,5	54000	59000	9800
23825-103508021	30307-A	Series 303	35	80	21	18	22,75	2	1,5	73000	75000	9400
23825-304006819	32008-XA	Series 320 (ISO dimensions)	40	68	19	14,5	19	1	1	53000	71000	9800
23825-004008018	30208-A	Series 302	40	80	18	16	19,75	1,5	1,5	61000	67000	8800
23825-104009023	30308-A	Series 303	40	90	23	20	25,25	2	1,5	91000	102000	7800
23825-304507520	32009-XA	Series 320 (ISO dimensions)	45	75	20	15,5	20	1	1	61000	86000	8800
23825-104510025	30309-A	Series 303	45	100	25	18	27,25	2	1,5	96000	108000	6700
23825-305008020	32010-X	Series 320 (ISO dimensions)	50	80	20	15,5	20	1	1	64000	93000	7800
23825-105011027	30310-A	Series 303	50	110	27	23	29,25	2,5	2	130000	148000	6300

Axial ball bearing FAG

single direction





Material:
Housing washer, shaft washer and rolling elements, bearing steel.
Cage, steel.

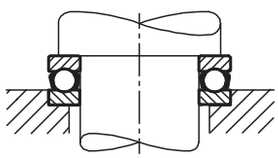
Sample order:
nlm 23830-001002409

Note:
Axial ball bearings accept high axial loads from one direction but may not be loaded radially.
The bearings are separable. This means the bearing parts can be fitted independently of each other.

The main dimensions of the axial ball bearing conform to ISO 104 and DIN 711. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

Temperature range:
-30 °C to +150 °C.

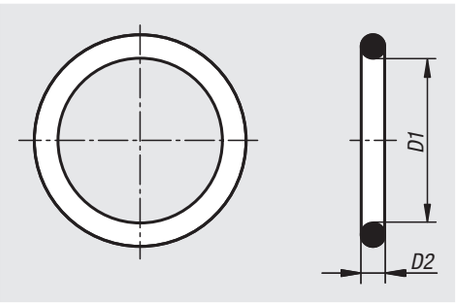
On request:
Other dimensions and versions.



Order No.	Abbreviation	D	D1	D2	T	R min.	Dynamic load rating N	Static load rating N	Speed limit rpm
23830-01002409	51100	10	24	11	9	0,3	10000	14000	13000
23830-01202609	51101	12	26	13	9	0,3	10400	15300	13000
23830-01202811	51201	12	28	14	11	0,6	13200	19000	10000
23830-01502809	51102	15	28	16	9	0,3	10600	16600	12000
23830-01503212	51202	15	32	17	12	0,6	16600	25000	9000
23830-01703009	51103	17	30	18	9	0,3	11400	19600	11000
23830-01703512	51203	17	35	19	12	0,6	17300	27500	8500
23830-02003510	51104	20	35	21	10	0,3	15000	26500	9500
23830-02004014	51204	20	40	22	14	0,6	22400	37500	7500
23830-02504211	51105	25	42	26	11	0,6	18000	35500	9000
23830-02504715	51205	25	47	27	15	0,6	28000	50000	6700
23830-03004711	51106	30	47	32	11	0,6	19000	40000	8000
23830-03005216	51206	30	52	32	16	0,6	25000	46500	6300
23830-03505212	51107	35	52	37	12	0,6	20000	46500	7500
23830-03506218	51207	35	62	37	18	1	35500	67000	5300
23830-04006013	51108	40	60	42	13	0,6	27000	63000	6300
23830-04006819	51208	40	68	42	19	1	46500	98000	4800
23830-04506514	51109	45	65	47	14	0,6	28000	69500	6000
23830-04507320	51209	45	73	47	20	1	39000	80000	4800
23830-05007014	51110	50	70	52	14	0,6	29000	75000	5600
23830-05007822	51210	50	78	52	22	1	50000	106000	4300

O-rings





Material:
Elastomer NBR.

Version:
Shore ~70, black.

Sample order:
nlm 23900-100074102
(include dimension D2 e.g. 102 for D2 = 1,02 mm.)

Note:
O-rings are universal sealing elements used to seal against liquid or gaseous median. They are suitable for static and minor dynamic applications. O-rings can be used for radial and axial sealing. The sealing occurs during installation by the radial or axial compression of the cross-section. During operation, the median pressure increases the deformation of the O-ring and so increases the sealing effectiveness. For best sealing effectiveness, the O-ring should have the largest possible cross-section.

During installation the correct groove size, compaction, elongation/compression should be ensured.

By static use the compaction should be 15 - 30% of the cross-section. By dynamic use it should be 10 - 18% (hydraulic), 4 - 12% (pneumatic).

With regard to the ID, when installed the O-ring should be
stretched max 6%
compressed max 3%

The material NBR has a high wear resistance and is resistant to mineral oil based lubricating oils and grease, hydraulic oils (H, H-L, H-LP), high-flashpoint pressure fluids (HFA, HFB, HFC), aliphatic hydrocarbons, silicon oil and grease, water up to ca. 80° C

Temperature range:
-30 °C to +100 °C.

Technical data:
Visit our website to see the technical information.

Order No.	D1	D2
23900-100074* **	0,74	1,02
23900-100100* **	1	1
23900-100107* **	1,07	1,27
23900-100120* **	1,2	1
23900-100142* **	1,42	1,52
23900-100150* **	1,5	1/1,5
23900-100200* **	2	1/1,5
23900-100240* **	2,4	1,9
23900-100250* **	2,5	1/1,2/1,5
23900-100257* **	2,57	1,78
23900-100260* **	2,6	1,2
23900-100290* **	2,9	1,78
23900-100300* **	3	1/1,5/2
23900-100310* **	3,1	1,6

O-rings

Order No.	D1	D2
23900-100317* **	3,17	1,78
23900-100330* **	3,3	2,4
23900-100340* **	3,4	1,9
23900-100350* **	3,5	1/1,2/1,5/3
23900-100360* **	3,6	2
23900-100363* **	3,63	2,62
23900-100368* **	3,68	1,78
23900-100400* **	4	1/1,2/1,5/2/2,5/3
23900-100420* **	4,2	1,9
23900-100430* **	4,3	2,4
23900-100442* **	4,42	2,62
23900-100447* **	4,47	1,78
23900-100450* **	4,5	1/1,5/2
23900-100460* **	4,6	2
23900-100490* **	4,9	1,9
23900-100500* **	5	1/1,5/2/2,5/3/3,5
23900-100510* **	5,1	1,6
23900-100523* **	5,23	2,62
23900-100528* **	5,28	1,78
23900-100550* **	5,5	1/1,5/2
23900-100570* **	5,7	1,9
23900-100600* **	6	1/1,5/2/2,5/3
23900-100602* **	6,02	2,62
23900-100607* **	6,07	1,78
23900-100610* **	6,1	1,6
23900-100630* **	6,3	2,4
23900-100635* **	6,35	1,78
23900-100640* **	6,4	1,9
23900-100650* **	6,5	1/1,5/2/2,5
23900-100675* **	6,75	1,78
23900-100700* **	7	1/1,5/2/2,5/3
23900-100710* **	7,1	1,6
23900-100720* **	7,2	1,9
23900-100750* **	7,5	1/1,5/2/2,4/2,5/3
23900-100752* **	7,52	3,53
23900-100765* **	7,65	1,78
23900-100800* **	8	1/1,25/1,5/1,8/1,9/2,4/2,5/3/3,5/4
23900-100810* **	8,1	1,6
23900-100830* **	8,3	2,4
23900-100850* **	8,5	1/1,5/2/2,5
23900-100873* **	8,73	1,78
23900-100890* **	8,9	1,9/2,7
23900-100900* **	9	1/1,2/1,5/2/2,5/3/3,5/4
23900-100910* **	9,1	1,6
23900-100919* **	9,19	2,62
23900-100930* **	9,3	2,4
23900-100950* **	9,5	1,5/2/2,5/3
23900-100992* **	9,92	2,62

Order No.	D1	D2
23900-101000* **	10	1/1,3/1,5/2/2,5/3/3,5/4/5
23900-101010* **	10,1	1,6
23900-101030* **	10,3	2,4
23900-101050* **	10,5	1,5/2/2,5/2,7
23900-101077* **	10,77	2,62
23900-101082* **	10,82	1,78
23900-101100* **	11	1/1,5/2/2,5/3/3,5/4/5
23900-101110* **	11,1	1,6
23900-101111* **	11,11	1,78
23900-101150* **	11,5	1/1,5/2/3
23900-101191* **	11,91	2,62
23900-101200* **	12	1/1,2/1,5/1,7/2/2,5/3/3,5/4/5
23900-101210* **	12,1	1,6/2,7
23900-101230* **	12,3	2,4
23900-101237* **	12,37	2,62
23900-101242* **	12,42	1,78
23900-101250* **	12,5	1/1,5/2/2,5
23900-101300* **	13	1/1,25/1,5/2/2,5/3/3,5/4/5
23900-101310* **	13,1	1,6/2,62
23900-101330* **	13,3	2,4
23900-101350* **	13,5	1,5/2,5
23900-101360* **	13,6	2,7
23900-101394* **	13,94	2,62
23900-101400* **	14	1/1,5/1,78/2/2,5/3/3,5/4/5
23900-101410* **	14,1	1,6
23900-101450* **	14,5	1/2,5
23900-101500* **	15	1/1,5/2/3/3,5/4/5/6
23900-101508* **	15,08	2,62
23900-101510* **	15,1	1,6
23900-101530* **	15,3	2,4
23900-101550* **	15,5	2,5
23900-101554* **	15,54	2,62
23900-101560* **	15,6	1,78
23900-101600* **	16	1/1,25/1,5/2/3/3,5/4/5
23900-101610* **	16,1	1,6
23900-101630* **	16,3	2,4
23900-101690* **	16,9	2,7
23900-101700* **	17	1/1,5/2/2,5/3/3,5/4
23900-101710* **	17,1	1,6
23900-101712* **	17,12	2,62
23900-101717* **	17,17	1,78
23900-101730* **	17,3	2,4
23900-101750* **	17,5	1,5/2,5
23900-101800* **	18	1/1,3/1,5/2/2,5/3/3,5/4/5/6
23900-101810* **	18,1	1,6
23900-101830* **	18,3	2,4
23900-101840* **	18,4	2,7
23900-101850* **	18,5	1,5/2/3

O-rings

Order No.	D1	D2
23900-101864* **	18,64	3,53
23900-101872* **	18,72	2,62
23900-101877* **	18,77	1,78
23900-101900* **	19	1/1,5/2/2,5/3/4/5
23900-101910* **	19,1	1,6
23900-101930* **	19,3	2,4
23900-101950* **	19,5	1,5/2
23900-101980* **	19,8	3,6
23900-102000* **	20	1/1,3/1,5/2/2,5/3/3,5/4/5/6
23900-102010* **	20,1	1,6
23900-102020* **	20,2	3
23900-102022* **	20,22	3,53
23900-102030* **	20,3	2,62/2,4
23900-102035* **	20,35	1,78
23900-102100* **	21	1,5/2/2,5/3/3,5/4/4,5/5/6
23900-102130* **	21,3	2,4/3,6
23900-102189* **	21,89	2,62
23900-102195* **	21,95	1,78
23900-102200* **	22	1/1,5/2/2,5/3/3,5/4/5/6
23900-102210* **	22,1	1,6
23900-102230* **	22,3	2,4
23900-102300* **	23	1,5/2/2,5/3/3,5/3,6/4/5
23900-102330* **	23,3	2,4
23900-102400* **	24	1/1,5/2/2,5/3/3,5/4/5/6
23900-102460* **	24,6	3,6
23900-102499* **	24,99	3,53
23900-102500* **	25	1/1,5/2/2,5/3/3,5/4/5/6
23900-102507* **	25,07	2,62
23900-102510* **	25,1	1,6
23900-102512* **	25,12	1,78
23900-102530* **	25,3	2,4
23900-102600* **	26	1/1,5/2/2,5/3/3,5/4/5
23900-102620* **	26,2	3,6
23900-102650* **	26,5	2,5
23900-102657* **	26,57	3,53
23900-102664* **	26,64	2,62
23900-102670* **	26,7	1,78
23900-102700* **	27	1/1,5/2/2,5/4/5/6
23900-102710* **	27,1	1,6
23900-102730* **	27,3	2,4
23900-102780* **	27,8	3,6
23900-102800* **	28	1,5/2/2,5/3/3,5/4/5/6
23900-102824* **	28,24	2,62
23900-102830* **	28,3	1,78
23900-102850* **	28,5	1,5
23900-102900* **	29	1,5/2/2,5/3/3,5/4/5/6
23900-102910* **	29,1	1,6
23900-102930* **	29,3	3,6

Order No.	D1	D2
23900-102974* **	29,74	3,53
23900-102982* **	29,82	2,62
23900-103000* **	30	2/2,5/3/3,5/4/5/6
23900-103030* **	30,3	2,4
23900-103080* **	30,8	3,6
23900-103100* **	31	1,5/2/2,5/3/3,5/4/5
23900-103134* **	31,34	3,53
23900-103142* **	31,42	2,62
23900-103147* **	31,47	1,78
23900-103200* **	32	1,5/2/2,5/3/3,5/4/4,5/5/6
23900-103210* **	32,1	1,6
23900-103250* **	32,5	3,6
23900-103269* **	32,69	5,33
23900-103292* **	32,92	3,53
23900-103300* **	33	2/2,5/3/4/5
23900-103305* **	33,05	1,78
23900-103330* **	33,3	2,4
23900-103400* **	34	1,5/2/2,5/3,5/4/5
23900-103410* **	34,1	3,6
23900-103452* **	34,52	3,53
23900-103459* **	34,59	2,62
23900-103465* **	34,65	1,78
23900-103500* **	35	1,5/2/2,5/3/3,5/4/5/6
23900-103510* **	35,1	1,6
23900-103520* **	35,2	5,7
23900-103560* **	35,6	3,6
23900-103600* **	36	1,5/2/2,5/3/4/5/6
23900-103609* **	36,09	3,53
23900-103617* **	36,17	2,62
23900-103620* **	36,2	5,7
23900-103700* **	37	1,5/2/2,5/3,5
23900-103710* **	37,1	1,6
23900-103747* **	37,47	5,33
23900-103750* **	37,5	2,5
23900-103769* **	37,69	3,53
23900-103782* **	37,82	1,78
23900-103800* **	38	2/2,5/3/4/5
23900-103900* **	39	2/2,5/3/3,5/4/5
23900-103920* **	39,2	3/5,7
23900-103934* **	39,34	2,62
23900-104000* **	40	1,5/2/2,5/3/3,5/4/4,5/5
23900-104064* **	40,64	5,33
23900-104087* **	40,87	3,53
23900-104094* **	40,94	2,62
23900-104100* **	41	1,5/1,78/2/2,5/3/3,5/4/5
23900-104120* **	41,2	5,7
23900-104200* **	42	1,5/2/2,5/3/3,5/4/5/6
23900-104252* **	42,52	2,62

O-rings

Order No.	D1	D2
23900-104300* **	43	1,5/2/2,5/3/3,5/4/5/6
23900-104382* **	43,82	5,33
23900-104400* **	44	2/2,5/3/4/5
23900-104404* **	44,04	3,53
23900-104412* **	44,12	2,62
23900-104417* **	44,17	1,78
23900-104500* **	45	1,5/2/2,5/3/3,5/4/4,5/5/6
23900-104569* **	45,69	2,62
23900-104600* **	46	1,5/2/2,5/3/4/5/6
23900-104604* **	46,04	3,53
23900-104700* **	47	2/2,5/3/4/5
23900-104720* **	47,2	5,7
23900-104722* **	47,22	3,53
23900-104729* **	47,29	2,62
23900-104763* **	47,63	3,53
23900-104800* **	48	1,5/2/2,5/3/4/5/6
23900-104890* **	48,9	2,62
23900-104900* **	49	1,5/2/3/4/4,5/5/6
23900-104920* **	49,2	5,7
23900-105000* **	50	2/2,5/3/4/5/6
23900-105017* **	50,17	5,33
23900-105039* **	50,39	3,53
23900-105047* **	50,47	2,62
23900-105052* **	50,52	1,78
23900-105100* **	51	2/2,5/3
23900-105120* **	51,2	5,7
23900-105200* **	52	2/2,5/3/4/5/6
23900-105207* **	52,07	2,62
23900-105300* **	53	1,5/2/2,5/3/4/4,5/5
23900-105334* **	53,34	5,33
23900-105357* **	53,57	3,53
23900-105364* **	53,64	2,62
23900-105400* **	54	1,5/2/2,5/3/4/5
23900-105420* **	54,2	5,7
23900-105500* **	55	1,5/2/2,5/3/3,5/4/5/6
23900-105520* **	55,2	5,7
23900-105525* **	55,25	2,62
23900-105556* **	55,56	3,53
23900-105600* **	56	2/2,5/3/3,5/4/5/6
23900-105652* **	56,52	5,33
23900-105674* **	56,74	3,53
23900-105682* **	56,82	2,62
23900-105687* **	56,87	1,78
23900-105700* **	57	1,5/2/2,5/3/3,5/4/5
23900-105715* **	57,15	3,53
23900-105720* **	57,2	5,7
23900-105800* **	58	2/2,5/3/4/5
23900-105842* **	58,42	2,62
23900-105874* **	58,74	3,53
23900-105900* **	59	1,5/2/2,5/3/4/5
23900-105969* **	59,69	5,33
23900-105992* **	59,92	3,53
23900-106000* **	60	1,5/2/2,5/3/4/5/6
23900-106005* **	60,05	1,78
23900-106200* **	62	2/3/3,5/4/5/6
23900-106220* **	62,2	5,7
23900-106287* **	62,87	5,33
23900-106300* **	63	1,5/2/2,5/3/4/5/6
23900-106309* **	63,09	3,53
23900-106317* **	63,17	2,62
23900-106400* **	64	2/3/3,5/4
23900-106420* **	64,2	5,7
23900-106477* **	64,77	2,62
23900-106500* **	65	1,5/2/2,5/3/4/5
23900-106600* **	66	2/2,5/3/4/5
23900-106604* **	66,04	5,33
23900-106627* **	66,27	3,53
23900-106634* **	66,34	2,62
23900-106640* **	66,4	1,78
23900-106700* **	67	2,5/3/4/5
23900-106720* **	67,2	5,7
23900-106795* **	67,95	2,62
23900-106800* **	68	2/2,5/3/3,5/4/5/6
23900-106900* **	69	1,5/2/3/4
23900-106920* **	69,2	5,7
23900-106922* **	69,22	5,33
23900-106944* **	69,44	3,53
23900-106952* **	69,52	2,62
23900-106957* **	69,57	1,78
23900-107000* **	70	2/2,5/3/3,5/4/5/5,5/6
23900-107100* **	71	2/3/4/4,5
23900-107112* **	71,12	2,62
23900-107120* **	71,2	5,7
23900-107144* **	71,44	3,53
23900-107200* **	72	2/2,5/3/4/5
23900-107220* **	72,2	5,7
23900-107239* **	72,39	5,33
23900-107262* **	72,62	3,53
23900-107269* **	72,69	2,62
23900-107275* **	72,75	1,78
23900-107300* **	73	2/2,5/3/4/5
23900-107303* **	73,03	3,53
23900-107400* **	74	1,5/2/3/4
23900-107420* **	74,2	5,7
23900-107430* **	74,3	2,62
23900-107500* **	75	2/2,5/3/4/5/6

O-rings

Order No.	D1	D2
23900-107557***	75,57	5,33
23900-107579***	75,79	3,53
23900-107587***	75,87	2,62
23900-107592***	75,92	1,78
23900-107600***	76	2/2,5/3/4/4,5
23900-107700***	77	2,5/3/4/5
23900-107720***	77,2	5,7
23900-107800***	78	1,5/2/2,5/3/3,5/4/5/6
23900-107874***	78,74	5,33
23900-107897***	78,97	3,53
23900-107900***	79	2,5/3/3,5
23900-108000***	80	1,5/2/2,5/3/3,5/4/4,5/5/6
23900-108100***	81	2/3
23900-108120***	81,2	5,7
23900-108192***	81,92	5,33
23900-108200***	82	2,5/3,5/4
23900-108214***	82,14	3,53
23900-108220***	82,2	5,7
23900-108222***	82,22	2,62
23900-108227***	82,27	1,78
23900-108300***	83	2/3
23900-108400***	84	1,5/2/3/3,5/4
23900-108420***	84,2	5,7
23900-108500***	85	2/2,5/3/4/5/6
23900-108509***	85,09	5,33
23900-108532***	85,32	3,53
23900-108600***	86	2/2,5/3/3,5/4
23900-108700***	87	2/3/4
23900-108720***	87,2	5,7
23900-108800***	88	2/2,5/3/4/5
23900-108827***	88,27	5,33
23900-108857***	88,57	2,62
23900-108862***	88,62	1,78
23900-108900***	89	3
23900-108920***	89,2	5,7
23900-109000***	90	1,5/2/2,5/3/3,5/4/4,5/5
23900-109100***	91	3/4
23900-109144***	91,44	5,33
23900-109167***	91,67	3,53
23900-109200***	92	1,5/2/3/4/5
23900-109220***	92,2	5,7
23900-109300***	93	2/3/4
23900-109400***	94	1,5/2/2,5/3/4/5
23900-109420***	94,2	5,7
23900-109462***	94,62	5,33
23900-109484***	94,84	3,53
23900-109492***	94,92	2,62
23900-109497***	94,97	1,78

Order No.	D1	D2
23900-109500***	95	2/2,5/3/4/4,5/5/6
23900-109600***	96	2/2,5/3/4/5/6
23900-109700***	97	4
23900-109720***	97,2	5,7
23900-109779***	97,79	5,33
23900-109800***	98	1,5/2/2,5/3/4/5
23900-109900***	99	3
23900-109920***	99,2	5,7
23900-110000***	100	1,5/2/2,5/3/3,5/4/5/6
23900-110097***	100,97	5,33
23900-110119***	101,19	3,53
23900-110127***	101,27	2,62
23900-110132***	101,32	1,78
23900-110200***	102	3/4/5
23900-110300***	103	6
23900-110400***	104	2,5/3/3,5/4
23900-110414***	104,14	5,33
23900-110420***	104,2	5,7
23900-110437***	104,37	3,53
23900-110450***	104,5	3
23900-110500***	105	2/2,5/3/4/5
23900-110600***	106	2/2,5/3/4
23900-110700***	107	2/2,5/3/4/5
23900-110732***	107,32	5,33
23900-110754***	107,54	3,53
23900-110762***	107,62	2,62
23900-110800***	108	3/4/5
23900-110920***	109,2	5,7
23900-110950***	109,5	3
23900-111000***	110	2/3/4/4,5/5/6
23900-111049***	110,49	5,33
23900-111072***	110,72	3,53
23900-111200***	112	2/2,5/3/4/5
23900-111367***	113,67	5,33/6,99
23900-111400***	114	3/4/6
23900-111420***	114,2	5,7
23900-111470***	114,7	6,99
23900-111500***	115	2/2,5/3/4/4,5/5
23900-111600***	116	3/4
23900-111684***	116,84	5,33/6,99
23900-111707***	117,07	3,53
23900-111800***	118	2/3/4/4,5/5/6
23900-111920***	119,2	5,7
23900-112000***	120	2/2,5/3/4/4,5/5/6
23900-112002***	120,02	5,33/6,99
23900-112024***	120,24	3,53

O-rings

Order No.	D1	D2
23900-112032* **	120,32	2,62
23900-112200* **	122	2/3/4
23900-112300* **	123	2,5/3/6
23900-112319* **	123,19	5,33/6,99
23900-112342* **	123,42	3,53
23900-112400* **	124	3/4
23900-112420* **	124,2	5,7
23900-112460* **	124,6	6,99
23900-112500* **	125	2/2,5/3,5/4/5/6
23900-112600* **	126	3/4/4,5/5
23900-112659* **	126,59	3,53
23900-112667* **	126,67	2,62
23900-112800* **	128	2/3/4/5/6
23900-112920* **	129,2	5,7
23900-112954* **	129,54	5,33/6,99
23900-112977* **	129,77	3,53
23900-113000* **	130	2/2,5/3/3,5/4/4,5/5/6
23900-113100* **	131	3,5
23900-113200* **	132	3/4/5
23900-113272* **	132,72	5,33/6,99
23900-113294* **	132,94	3,53
23900-113302* **	133,02	2,62
23900-113307* **	133,07	1,78
23900-113400* **	134	4
23900-113420* **	134,2	5,7
23900-113450* **	134,5	6,99
23900-113500* **	135	2,5/3/4/5/6
23900-113589* **	135,89	5,33/6,99
23900-113600* **	136	3/3,5/4
23900-113612* **	136,12	3,53
23900-113700* **	137	2,5
23900-113800* **	138	4
23900-113900* **	139	3
23900-113907* **	139,07	5,33/6,99
23900-113929* **	139,29	3,53
23900-113930* **	139,3	5,7
23900-113937* **	139,37	2,62
23900-113970* **	139,7	5,33
23900-114000* **	140	2/2,5/3/4/5/6
23900-114200* **	142	3/4/5/6
23900-114224* **	142,24	5,33/6,99
23900-114247* **	142,47	3,53
23900-114300* **	143	2/3/4
23900-114500* **	145	5/6
23900-114542* **	145,42	5,33/6,99
23900-114564* **	145,64	3,53
23900-114572* **	145,72	2,62
23900-114600* **	146	3/4

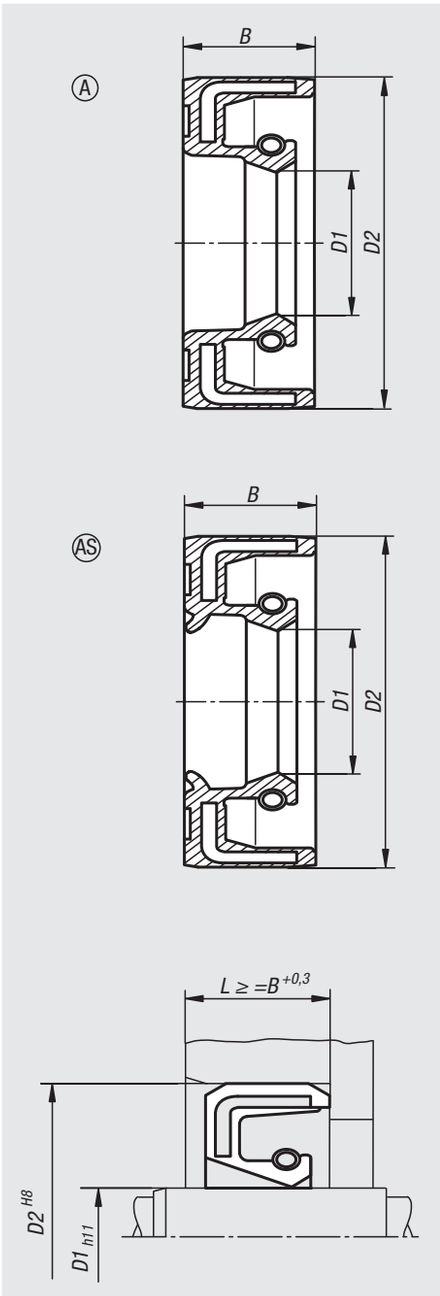
Order No.	D1	D2
23900-114800* **	148	3/4/5/6
23900-114859* **	148,59	5,33/6,99
23900-114882* **	148,82	3,53
23900-115000* **	150	2/2,5/3/4/4,5/5/6
23900-115177* **	151,77	5,33/6,99
23900-115199* **	151,99	3,53
23900-115200* **	152	3/3,5
23900-115207* **	152,07	2,62
23900-115300* **	153	3/4,5/6
23900-115600* **	156	3
23900-116000* **	160	3/4
23900-117000* **	170	4
23900-117500* **	175	2/3/3,5/4/5/6/8
23900-118600* **	186	3
23900-120500* **	205	5
23900-122184* **	221,84	3,53
23900-122500* **	225	5
23900-124500* **	245	3/4/5
23900-125000* **	250	3/3,5/4/4,5/5/6

Notes

Rotary shaft lip seals

DIN 3760





Material:
Elastomer NBR.
Brace ring and tension spring steel.

Version:
Shore ~70, black.

Sample order:
nlm 23915-11061605
(include dimension B e.g. 05 for B = 5 mm.)

Note:
Rotary shaft lip seals are ready-to-install seals for sealing rotating shafts. They are made from an elastomer outer sleeve and an internal bracing shim. The tension spring ensures increased pressure of the lip against the shaft and supports static sealing.

Form A: DIN 3760 (ISO 6194/1) version, smooth OD.
Form AS: DIN 3760 (ISO 6194/0) version, smooth OD with extra dust lip to protect from external dirt.

The material NBR has a high wear resistance and is resistant to motor fuels, oil, hydraulic oil and lubricating grease.

Operating limits:
Circumferential speed (m/s): ≤12
Pressure (MPa/bar): ≤0.05/0.5 (rotary shaft lip seals are generally meant for unpressurised operation).

Temperature range:
-40 °C to +100 °C.

Tolerances:
Housing:
Tolerance H8 is recommended.
Surface finish Ra 1.6 to 6.3 µm.

Shaft:
Tolerance h11 is recommended.
Surface finish Ra 0.2 to 0.8 µm.
The shaft hardness should be at least 45 HRC.

Rotary shaft lip seals

DIN 3760

Order No.	Form	D1	D2	B
23915-110616**	A	6	16	5/7
23915-110622**	A	6	22	7
23915-110722**	A	7	22	7
23915-110822**	A	8	22	7
23915-111019**	A	10	19	7
23915-111022**	A	10	22	7
23915-111024**	A	10	24	7
23915-111026**	A	10	26	7
23915-111219**	A	12	19	5
23915-111222**	A	12	22	5/6/7
23915-111224**	A	12	24	7
23915-111228**	A	12	28	7
23915-111230**	A	12	30	7
23915-111232**	A	12	32	7
23915-111424**	A	14	24	7
23915-111430**	A	14	30	7
23915-111524**	A	15	24	7
23915-111525**	A	15	25	5
23915-111526**	A	15	26	7
23915-111530**	A	15	30	7
23915-111532**	A	15	32	7
23915-111535**	A	15	35	7
23915-111540**	A	15	40	10
23915-111628**	A	16	28	7
23915-111630**	A	16	30	7
23915-111632**	A	16	32	7
23915-111635**	A	16	35	7
23915-111728**	A	17	28	7
23915-111729**	A	17	29	5
23915-111730**	A	17	30	7
23915-111732**	A	17	32	7
23915-111735**	A	17	35	7
23915-111740**	A	17	40	7/10
23915-111828**	A	18	28	7
23915-111830**	A	18	30	7
23915-111832**	A	18	32	7
23915-111835**	A	18	35	7
23915-111932**	A	19	32	7
23915-112030**	A	20	30	5/7
23915-112032**	A	20	32	7
23915-112035**	A	20	35	7/10
23915-112036**	A	20	36	7
23915-112040**	A	20	40	7
23915-112042**	A	20	42	7
23915-112047**	A	20	47	7/10
23915-112052**	A	20	52	7/10
23915-112232**	A	22	32	7
23915-112235**	A	22	35	7

Order No.	Form	D1	D2	B
23915-112238**	A	22	38	8
23915-112240**	A	22	40	7/10
23915-112247**	A	22	47	7
23915-112435**	A	24	35	7
23915-112437**	A	24	37	7
23915-112440**	A	24	40	7
23915-112535**	A	25	35	7
23915-112537**	A	25	37	5/7
23915-112538**	A	25	38	7
23915-112540**	A	25	40	5/7/8/10
23915-112542**	A	25	42	7/10
23915-112545**	A	25	45	10
23915-112547**	A	25	47	7/10
23915-112550**	A	25	50	10
23915-112552**	A	25	52	7/8/10
23915-112562**	A	25	62	7/10
23915-112637**	A	26	37	7
23915-112638**	A	26	38	7
23915-112647**	A	26	47	7
23915-112737**	A	27	37	7
23915-112838**	A	28	38	7
23915-112840**	A	28	40	7
23915-112842**	A	28	42	7/8
23915-112847**	A	28	47	7
23915-112852**	A	28	52	7/10
23915-113040**	A	30	40	7
23915-113042**	A	30	42	7/8
23915-113045**	A	30	45	7/8
23915-113047**	A	30	47	7/8/10
23915-113050**	A	30	50	7/10
23915-113052**	A	30	52	7/8/10
23915-113055**	A	30	55	7/10
23915-113062**	A	30	62	7/10
23915-113072**	A	30	72	10
23915-113242**	A	32	42	7
23915-113245**	A	32	45	7
23915-113247**	A	32	47	7
23915-113250**	A	32	50	8/10
23915-113252**	A	32	52	7
23915-113262**	A	32	62	10
23915-113345**	A	33	45	7
23915-113462**	A	34	62	10
23915-113545**	A	35	45	7
23915-113547**	A	35	47	7
23915-113550**	A	35	50	7/8/10
23915-113552**	A	35	52	7/8/10

Rotary shaft lip seals

DIN 3760

Order No.	Form	D1	D2	B
23915-113555**	A	35	55	8/10
23915-113556**	A	35	56	10
23915-113558**	A	35	58	10
23915-113562**	A	35	62	7/8/10
23915-113572**	A	35	72	10/12
23915-113580**	A	35	80	12
23915-113647**	A	36	47	7
23915-113650**	A	36	50	7
23915-113850**	A	38	50	7
23915-113852**	A	38	52	7
23915-113862**	A	38	62	10
23915-113872**	A	38	72	10
23915-114052**	A	40	52	7/8
23915-114055**	A	40	55	7/8
23915-114056**	A	40	56	8
23915-114058**	A	40	58	10
23915-114060**	A	40	60	10
23915-114062**	A	40	62	7/8/10
23915-114065**	A	40	65	10
23915-114068**	A	40	68	8/10
23915-114072**	A	40	72	7/10
23915-114080**	A	40	80	10
23915-114255**	A	42	55	7/8
23915-114262**	A	42	62	7/8/10
23915-114265**	A	42	65	10
23915-114272**	A	42	72	8/10
23915-114460**	A	44	60	10
23915-114462**	A	44	62	10
23915-114465**	A	44	65	10
23915-114558**	A	45	58	7
23915-114560**	A	45	60	7/8/10
23915-114565**	A	45	65	10/8
23915-114562**	A	45	62	8/10
23915-114572**	A	45	72	8/10
23915-114575**	A	45	75	8/10
23915-114580**	A	45	80	10
23915-114585**	A	45	85	10
23915-114862**	A	48	62	8
23915-114865**	A	48	65	10
23915-114872**	A	48	72	7/8/10
23915-115062**	A	50	62	7
23915-115065**	A	50	65	8/10
23915-115068**	A	50	68	8/10
23915-115070**	A	50	70	10
23915-115072**	A	50	72	8/10/12

Order No.	Form	D1	D2	B
23915-115075**	A	50	75	10
23915-115080**	A	50	80	8/10
23915-115085**	A	50	85	10
23915-115090**	A	50	90	10
23915-120616**	AS	6	16	5/7
23915-120622**	AS	6	22	7
23915-120822**	AS	8	22	7
23915-121019**	AS	10	19	7
23915-121022**	AS	10	22	7
23915-121024**	AS	10	24	7
23915-121026**	AS	10	26	7
23915-121219**	AS	12	19	5
23915-121222**	AS	12	22	5/6/7
23915-121224**	AS	12	24	7
23915-121228**	AS	12	28	7
23915-121230**	AS	12	30	7
23915-121232**	AS	12	32	7
23915-121424**	AS	14	24	7
23915-121430**	AS	14	30	7
23915-121524**	AS	15	24	7
23915-121525**	AS	15	25	5
23915-121526**	AS	15	26	7
23915-121530**	AS	15	30	7
23915-121532**	AS	15	32	7
23915-121535**	AS	15	35	7
23915-121628**	AS	16	28	7
23915-121630**	AS	16	30	7
23915-121632**	AS	16	32	7
23915-121728**	AS	17	28	7
23915-121730**	AS	17	30	7
23915-121735**	AS	17	35	7
23915-121740**	AS	17	40	7
23915-121828**	AS	18	28	7
23915-121832**	AS	18	32	7
23915-121835**	AS	18	35	7
23915-121930**	AS	19	30	7
23915-121932**	AS	19	32	7
23915-122030**	AS	20	30	5/7
23915-122032**	AS	20	32	7
23915-122035**	AS	20	35	7/10
23915-122036**	AS	20	36	7
23915-122040**	AS	20	40	7
23915-122042**	AS	20	42	7
23915-122047**	AS	20	47	7/10
23915-122052**	AS	20	52	7/10

Rotary shaft lip seals

DIN 3760

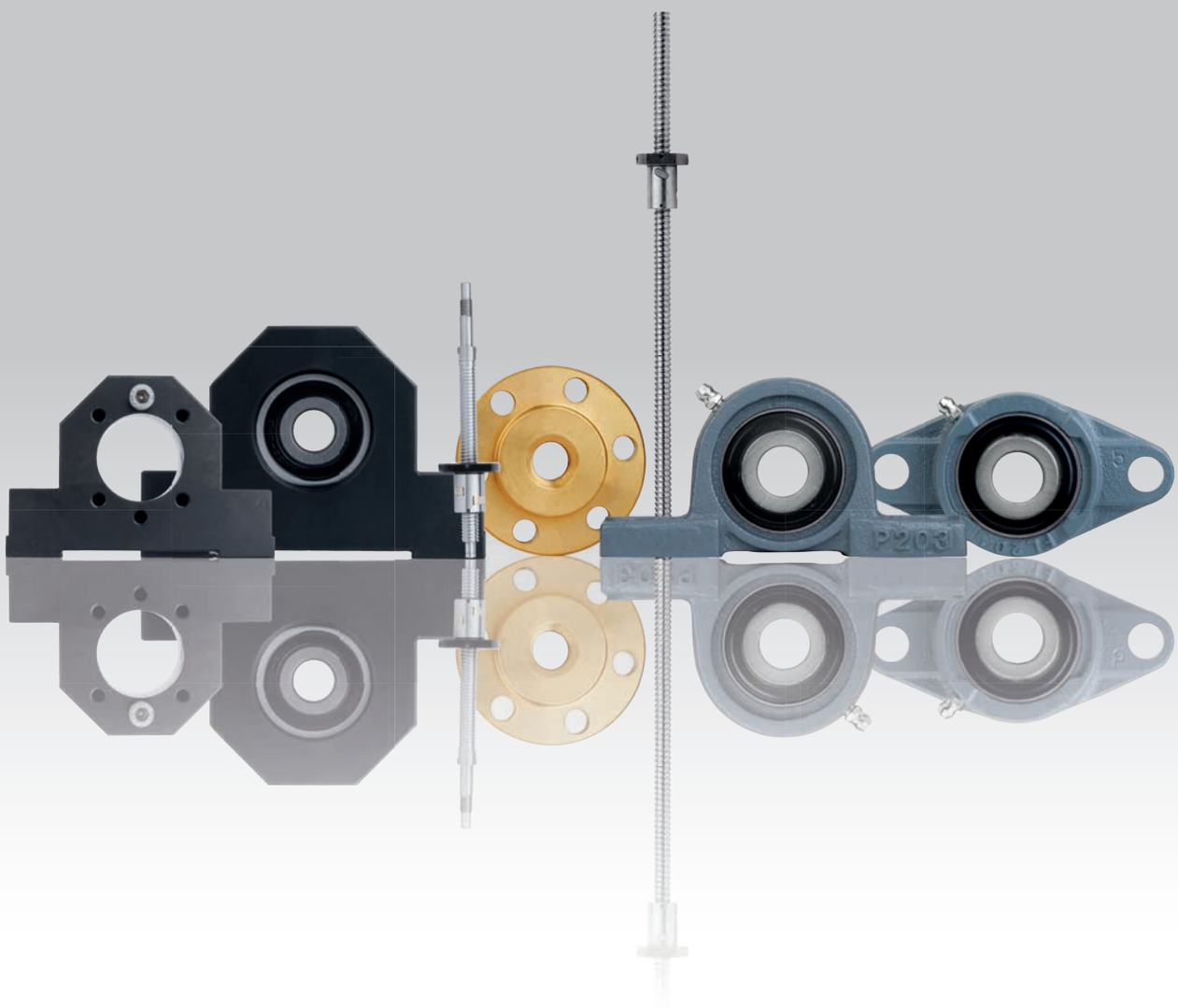
Order No.	Form	D1	D2	B
23915-122232**	AS	22	32	7
23915-122235**	AS	22	35	7
23915-122238**	AS	22	38	8
23915-122240**	AS	22	40	7/10
23915-122247**	AS	22	47	7
23915-122435**	AS	24	35	7
23915-122440**	AS	24	40	7
23915-122535**	AS	25	35	7
23915-122537**	AS	25	37	7
23915-122538**	AS	25	38	7
23915-122540**	AS	25	40	5/7/8/10
23915-122542**	AS	25	42	7/10
23915-122545**	AS	25	45	10
23915-122547**	AS	25	47	7/10
23915-122550**	AS	25	50	10
23915-122552**	AS	25	52	7/8/10
23915-122562**	AS	25	62	10
23915-122637**	AS	26	37	7
23915-122647**	AS	26	47	7
23915-122737**	AS	27	37	7
23915-122838**	AS	28	38	7
23915-122840**	AS	28	40	7
23915-122842**	AS	28	42	7/8
23915-122847**	AS	28	47	7
23915-122852**	AS	28	52	7/10
23915-123040**	AS	30	40	7
23915-123042**	AS	30	42	7/8
23915-123045**	AS	30	45	8
23915-123046**	AS	30	46	7
23915-123047**	AS	30	47	7/8/10
23915-123050**	AS	30	50	7/10
23915-123052**	AS	30	52	7/8/10
23915-123055**	AS	30	55	7/10
23915-123062**	AS	30	62	7/10
23915-123072**	AS	30	72	10
23915-123242**	AS	32	42	7
23915-123245**	AS	32	45	7
23915-123247**	AS	32	47	7
23915-123250**	AS	32	50	8
23915-123252**	AS	32	52	7
23915-123262**	AS	32	62	10
23915-123547**	AS	35	47	7
23915-123550**	AS	35	50	8/10
23915-123552**	AS	35	52	7/8
23915-123555**	AS	35	55	8/10

Order No.	Form	D1	D2	B
23915-123558**	AS	35	58	10
23915-123562**	AS	35	62	7/8/10
23915-123572**	AS	35	72	10
23915-123580**	AS	35	80	12
23915-123647**	AS	36	47	7
23915-123650**	AS	36	50	7
23915-123652**	AS	36	52	7
23915-123850**	AS	38	50	7
23915-123852**	AS	38	52	7
23915-123855**	AS	38	55	7
23915-123862**	AS	38	62	10
23915-123872**	AS	38	72	10
23915-124052**	AS	40	52	7
23915-124055**	AS	40	55	7/8
23915-124056**	AS	40	56	8
23915-124058**	AS	40	58	10
23915-124060**	AS	40	60	10
23915-124062**	AS	40	62	7/8/10
23915-124065**	AS	40	65	10
23915-124068**	AS	40	68	10
23915-124072**	AS	40	72	7/10
23915-124080**	AS	40	80	10
23915-124255**	AS	42	55	7/8
23915-124262**	AS	42	62	7/8/10
23915-124272**	AS	42	72	8
23915-124558**	AS	45	58	7
23915-124560**	AS	45	60	8/10
23915-124565**	AS	45	65	10/8
23915-124562**	AS	45	62	8/10
23915-124572**	AS	45	72	10
23915-124575**	AS	45	75	8/10
23915-124580**	AS	45	80	10
23915-124585**	AS	45	85	10
23915-124862**	AS	48	62	8
23915-124865**	AS	48	65	10
23915-124872**	AS	48	72	7/8/10
23915-125062**	AS	50	62	7
23915-125065**	AS	50	65	8/10
23915-125068**	AS	50	68	8/10
23915-125070**	AS	50	70	10
23915-125072**	AS	50	72	8/10/12
23915-125075**	AS	50	75	10
23915-125080**	AS	50	80	8/10
23915-125085**	AS	50	85	10
23915-125090**	AS	50	90	10

Notes

24000

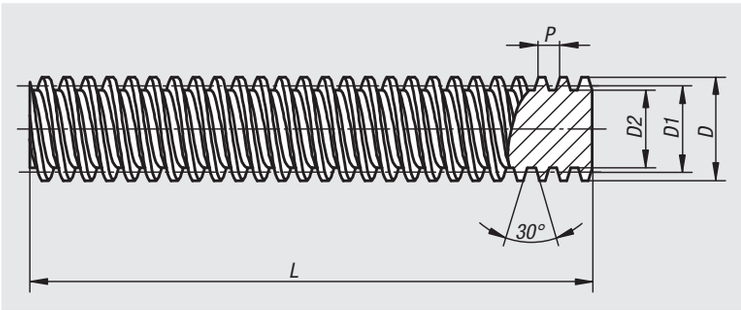
Trapezoidal thread spindles
Ball screw linear actuators
Bearings units
Splined shafts



Trapezoidal thread spindles

single-start, RH or LH thread





Material:
Steel 1.0401 (C15) or stainless steel 1.4301 (whirled spindles stainless steel 1.4305).

Version:
Steel rolled, bright.
Stainless steel up to Tr 40x7 rolled, above this whirled, bright.

Sample order:
nlm 24000-100311X1000

Note:
Rolled, high precision trapezoidal thread spindles. ISO trapezoidal thread based on DIN 103.

The trapezoidal thread spindle is a transmission thread with relatively high friction. Standard thread forms are self-locking. This has the advantage that they generally do not need to be secured in the rest position.

Tolerance class 7e
Pitch precision 0.3/300 mm
Length sawed with excess, ends not deburred.

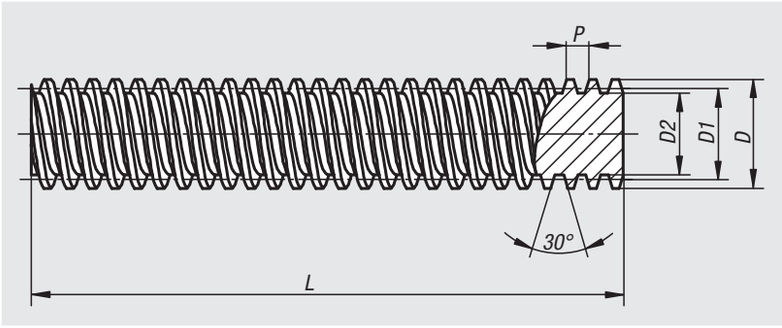
Order No. RH-thread rolled	Order No. LH-thread rolled	Main material	DxP	D1 min.	D1 max.	D2	L
24000-081511X1000	24000-081521X1000	mild steel	Tr 8x1,5	7,013	7,183	5,921	1000
24000-100211X1000	24000-100221X1000	mild steel	Tr 10x2	8,739	8,929	7,191	1000
24000-100311X1000	24000-100321X1000	mild steel	Tr 10x3	8,191	8,415	5,84	1000
24000-120311X1000	24000-120321X1000	mild steel	Tr 12x3	10,191	10,415	7,84	1000
24000-140311X1000	24000-140321X1000	mild steel	Tr 14x3	12,191	12,415	10,135	1000
24000-140411X1000	24000-140421X1000	mild steel	Tr 14x4	11,640	11,905	8,8	1000
24000-160411X1000	24000-160421X1000	mild steel	Tr 16x4	13,640	13,905	10,8	1000
24000-180411X1000	24000-180421X1000	mild steel	Tr 18x4	15,640	15,905	12,8	1000
24000-200411X1000	24000-200421X1000	mild steel	Tr 20x4	17,640	17,905	14,8	1000
24000-240511X1000	24000-240521X1000	mild steel	Tr 24x5	21,094	21,394	17,5	1000
24000-260511X1000	24000-260521X1000	mild steel	Tr 26x5	23,094	23,394	19,5	1000
24000-280511X1000	24000-280521X1000	mild steel	Tr 28x5	25,049	25,390	21,5	1000
24000-300611X1000	24000-300621X1000	mild steel	Tr 30x6	26,547	26,882	21,9	1000
24000-320611X1000	24000-320621X1000	mild steel	Tr 32x6	28,547	28,882	23,9	1000
24000-360611X1000	24000-360621X1000	mild steel	Tr 36x6	32,547	32,882	27,9	1000
24000-400711X1000	24000-400721X1000	mild steel	Tr 40x7	36,020	36,375	30,5	1000
24000-081512X1000	24000-081522X1000	stainless steel	Tr 8x1,5	7,013	7,183	5,921	1000
24000-100212X1000	24000-100222X1000	stainless steel	Tr 10x2	8,739	8,929	7,191	1000
24000-100312X1000	24000-100322X1000	stainless steel	Tr 10x3	8,191	8,415	5,84	1000
24000-120312X1000	24000-120322X1000	stainless steel	Tr 12x3	10,191	10,415	7,84	1000
24000-140312X1000	24000-140322X1000	stainless steel	Tr 14x3	12,191	12,415	10,135	1000
24000-140412X1000	24000-140422X1000	stainless steel	Tr 14x4	11,640	11,905	8,8	1000
24000-160412X1000	24000-160422X1000	stainless steel	Tr 16x4	13,640	13,905	10,8	1000
24000-180412X1000	24000-180422X1000	stainless steel	Tr 18x4	15,640	15,905	12,8	1000
24000-200412X1000	24000-200422X1000	stainless steel	Tr 20x4	17,640	17,905	14,8	1000
24000-240512X1000	24000-240522X1000	stainless steel	Tr 24x5	21,094	21,394	17,5	1000
24000-260512X1000	24000-260522X1000	stainless steel	Tr 26x5	23,094	23,394	19,5	1000
24000-280512X1000	24000-280522X1000	stainless steel	Tr 28x5	25,049	25,390	21,5	1000
24000-300612X1000	24000-300622X1000	stainless steel	Tr 30x6	26,547	26,882	21,9	1000
24000-320612X1000	24000-320622X1000	stainless steel	Tr 32x6	28,547	28,882	23,9	1000
24000-360612X1000	24000-360622X1000	stainless steel	Tr 36x6	32,547	32,882	27,9	1000
24000-400712X1000	24000-400722X1000	stainless steel	Tr 40x7	36,020	36,375	30,5	1000

Order No. RH-thread whirled	Order No. LH-thread whirled	Main material	DxP	D1 min.	D1 max.	D2	L
24000-440711X1000	24000-440721X1000	mild steel	Tr 44x7	40,020	40,375	34,5	1000
24000-500811X1000	24000-500821X1000	mild steel	Tr 50x8	45,468	45,868	39,3	1000
24000-440712X1000	24000-440722X1000	stainless steel	Tr 44x7	40,020	40,375	34,5	1000
24000-500812X1000	24000-500822X1000	stainless steel	Tr 50x8	45,468	45,868	39,3	1000

Trapezoidal thread spindles

double-start, right-hand thread





Material:
Low-carbon steel 1.0401 (C15) or stainless steel 1.4301.

Version:
Steel, rolled, bright.
Stainless steel, rolled, bright.

Sample order:
nlm 24001-120611X1000

Note:
Rolled trapezoidal thread spindles with high precision.
ISO trapezoidal thread based on DIN 103.

The feed movement is twice as high with double-start spindles as it is with single-start trapezoidal thread spindles. There is no self-locking due to the high pitch.

Description of a double-start thread drive based on Tr 12x6 P3.
Tr = trapezoidal thread.
12 = OD.
6 = Thread pitch (axial movement after one rotation).
P3 = distance between the two threads.

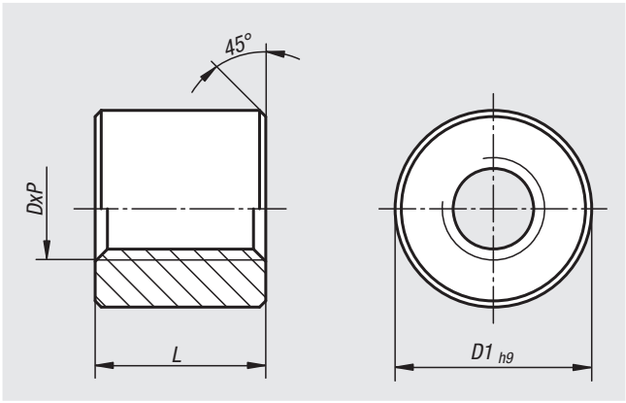
Tolerance class 7e
Pitch precision 0.3/300 mm
Length sawed with excess, ends not deburred.

Order No.	Main material	DxP	D1 min.	D1 max.	D2	L
24001-120611X1000	mild steel	Tr 12x6 P3	10,191	10,415	7,84	1000
24001-160811X1000	mild steel	Tr 16x8 P4	13,640	13,905	10,8	1000
24001-200811X1000	mild steel	Tr 20x8 P4	17,640	17,905	14,8	1000
24001-241011X1000	mild steel	Tr 24x10 P5	21,094	21,394	17,5	1000
24001-301211X1000	mild steel	Tr 30x12 P6	26,547	26,882	21,9	1000
24001-401411X1000	mild steel	Tr 40x14 P7	36,020	36,375	30,5	1000
24001-060212X1000	stainless steel	Tr 6x2 P1	5,287	5,437	4,461	1000
24001-120612X1000	stainless steel	Tr 12x6 P3	10,191	10,415	7,84	1000
24001-160812X1000	stainless steel	Tr 16x8 P4	13,640	13,905	10,8	1000
24001-200812X1000	stainless steel	Tr 20x8 P4	17,640	17,905	14,8	1000
24001-241012X1000	stainless steel	Tr 24x10 P5	21,094	21,394	17,5	1000
24001-301212X1000	stainless steel	Tr 30x12 P6	26,547	26,882	21,9	1000
24001-401412X1000	stainless steel	Tr 40x14 P7	36,020	36,375	30,5	1000

Trapezoidal thread nuts, round

single-start, RH or LH thread





Material:
Steel C35Pb.
Stainless steel 1.4305.
Gunmetal Rg7.
Plastic PA6.6 (with MoS2).

Version:
Bright.

Sample order:
nlm 24003-1003132

Note:
ISO trapezoidal thread based on DIN 103

Steel and stainless steel nuts: for adjustments during manual operation and as locking nuts. Not advised for use with motorised drives due to the steel/steel material pairing.

Gunmetal nuts: for motion drives with low and medium speed. By insufficient lubrication, gunmetal trapezoidal thread nuts have good dry-running properties on steel spindles.

Plastic nuts: for low-noise motion drives. Good dry-running properties.

Tolerance class 7H.

Order No. RH thread steel	Order No. RH thread stainless steel	Order No. LH thread steel	Order No. LH thread stainless steel	DxP	D1	L
24003-0815111	24003-0815121	24003-0815211	24003-0815221	Tr 8x1,5	18	12
24003-1002111	24003-1002121	24003-1002211	24003-1002221	Tr 10x2	22	15
24003-1003111	24003-1003121	24003-1003211	24003-1003221	Tr 10x3	22	15
24003-1203111	24003-1203121	24003-1203211	24003-1203221	Tr 12x3	26	18
24003-1403111	24003-1403121	24003-1403211	24003-1403221	Tr 14x3	30	21
24003-1404111	24003-1404121	24003-1404211	24003-1404221	Tr 14x4	30	21
24003-1604111	24003-1604121	24003-1604211	24003-1604221	Tr 16x4	36	24
24003-1804111	24003-1804121	24003-1804211	24003-1804221	Tr 18x4	40	27
24003-2004111	24003-2004121	24003-2004211	24003-2004221	Tr 20x4	45	30
24003-2405111	24003-2405121	24003-2405211	24003-2405221	Tr 24x5	50	36
24003-2605111	24003-2605121	24003-2605211	24003-2605221	Tr 26x5	60	39
24003-2805111	24003-2805121	24003-2805211	24003-2805221	Tr 28x5	60	42
24003-3006111	24003-3006121	24003-3006211	24003-3006221	Tr 30x6	60	45
24003-3206111	24003-3206121	24003-3206211	24003-3206221	Tr 32x6	60	48
24003-3606111	24003-3606121	24003-3606211	24003-3606221	Tr 36x6	75	54
24003-4007111	24003-4007121	24003-4007211	24003-4007221	Tr 40x7	80	60
24003-4407111	24003-4407121	24003-4407211	24003-4407221	Tr 44x7	80	66
24003-5008111	24003-5008121	24003-5008211	24003-5008221	Tr 50x8	90	75
24003-0815112	-	24003-0815212	-	Tr 8x1,5	18	16
24003-1002112	-	24003-1002212	-	Tr 10x2	22	20
24003-1003112	-	24003-1003212	-	Tr 10x3	22	20
24003-1203112	-	24003-1203212	-	Tr 12x3	26	24
24003-1403112	-	24003-1403212	-	Tr 14x3	30	28
24003-1404112	-	24003-1404212	-	Tr 14x4	30	28
24003-1604112	-	24003-1604212	-	Tr 16x4	36	32
24003-1804112	-	24003-1804212	-	Tr 18x4	40	36
24003-2004112	-	24003-2004212	-	Tr 20x4	45	40
24003-2405112	-	24003-2405212	-	Tr 24x5	50	48
24003-2605112	-	24003-2605212	-	Tr 26x5	60	52
24003-2805112	-	24003-2805212	-	Tr 28x5	60	56
24003-3006112	-	24003-3006212	-	Tr 30x6	60	60
24003-3206112	-	24003-3206212	-	Tr 32x6	60	64
24003-3606112	-	24003-3606212	-	Tr 36x6	75	72
24003-4007112	-	24003-4007212	-	Tr 40x7	80	80
24003-4407112	-	24003-4407212	-	Tr 44x7	80	88
24003-5008112	-	24003-5008212	-	Tr 50x8	90	100

Trapezoidal thread nuts, round

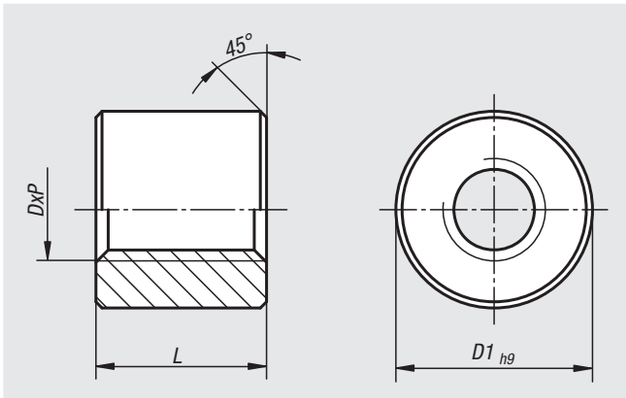
single-start, RH or LH thread

Order No. RH thread gunmetal	Order No. RH thread plastic	Order No. LH thread gunmetal	Order No. LH thread plastic	DxP	D1	L
24003-0815132	24003-0815142	24003-0815232	24003-0815242	Tr 8x1,5	18/18/18/18	16/16/16/16
24003-1002132	24003-1002142	24003-1002232	24003-1002242	Tr 10x2	22/22/22/22	20/20/20/20
24003-1003132	24003-1003142	24003-1003232	24003-1003242	Tr 10x3	22/22/22/22	20/20/20/20
24003-1203132	24003-1203142	24003-1203232	24003-1203242	Tr 12x3	26/26/26/26	24/24/24/24
24003-1403132	24003-1403142	24003-1403232	24003-1403242	Tr 14x3	30/30/30/30	28/28/28/28
24003-1404132	24003-1404142	24003-1404232	24003-1404242	Tr 14x4	30/30/30/30	28/28/28/28
24003-1604132	24003-1604142	24003-1604232	24003-1604242	Tr 16x4	36/36/36/36	32/32/32/32
24003-1804132	24003-1804142	24003-1804232	24003-1804242	Tr 18x4	40/40/40/40	36/36/36/36
24003-2004132	24003-2004142	24003-2004232	24003-2004242	Tr 20x4	45/45/45/45	40/40/40/40
24003-2405132	24003-2405142	24003-2405232	24003-2405242	Tr 24x5	50/50/50/50	48/48/48/48
24003-2605132	24003-2605142	24003-2605232	24003-2605242	Tr 26x5	50/60/60/60	48/52/52/52
24003-2805132	24003-2805142	24003-2805232	24003-2805242	Tr 28x5	60/60/60/60	56/56/56/56
24003-3006132	24003-3006142	24003-3006232	24003-3006242	Tr 30x6	60/60/60/60	60/60/60/60
24003-3206132	24003-3206142	24003-3206232	24003-3206242	Tr 32x6	60/60/60/60	64/64/64/64
24003-3606132	24003-3606142	24003-3606232	24003-3606242	Tr 36x6	75/75/75/75	72/72/72/72
24003-4007132	24003-4007142	24003-4007232	24003-4007242	Tr 40x7	80/80/80/80	80/80/80/80
24003-4407132	24003-4407142	24003-4407232	24003-4407242	Tr 44x7	80/80/80/80	88/88/88/88
24003-5008132	24003-5008142	24003-5008232	24003-5008242	Tr 50x8	90/90/90/90	100/100/100/100

Trapezoidal thread nuts, round

double-start, RH thread





Material:
Steel C35Pb.
Gunmetal Rg7.
Plastic PA6.6 with MoS2).

Version:
Bright.

Sample order:
nlm 24004-060213

Note:
ISO trapezoidal thread based on DIN 103

Steel nuts: for adjustments during manual operation and as fastening nuts. Not advised for use with motorised drives due to the steel-steel material combination.

Gunmetal nuts: for motion drives with low and medium speed. By insufficient lubrication, gunmetal trapezoidal thread nuts on steel spindles have good dry-running properties.

Plastic nuts: for low-noise motion drives. Good dry-running properties.

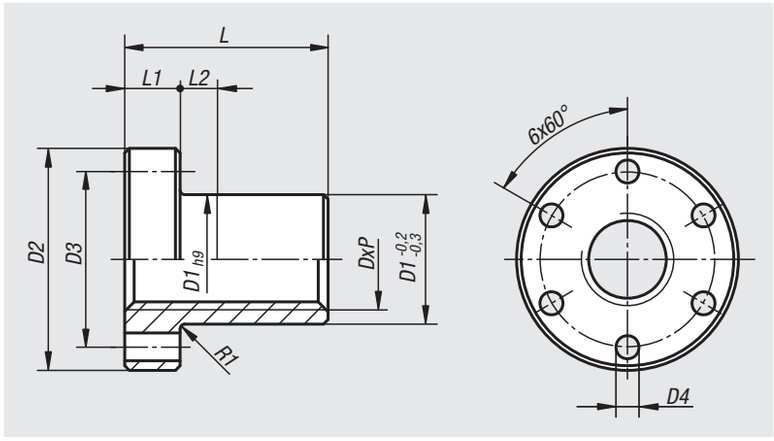
Tolerance class 7H.

Order No. steel	Order No. gunmetal	Order No. plastic	DxP	D1	L
24004-060211	**24004-060213**	**24004-060214**	Tr 6x2 P1	18	12
24004-120611	**24004-120613**	**24004-120614**	Tr 12x6 P3	26	24
24004-160811	**24004-160813**	**24004-160814**	Tr 16x8 P4	36	32
24004-200811	**24004-200813**	**24004-200814**	Tr 20x8 P4	45	40
24004-241011	**24004-241013**	**24004-241014**	Tr 24x10 P5	50	48
24004-301211	**24004-301213**	**24004-301214**	Tr 30x12 P6	60	60
24004-401411	**24004-401413**	**24004-401414**	Tr 40x14 P7	80	80

Trapezoidal thread flange nuts

single-start, RH or LH thread





Material:
Gunmetal Rg7

Version:
Bright.

Sample order:
nlm 24005-160411

Note:
ISO trapezoidal thread based on DIN 103.

For low and medium speed motion drives. By insufficient lubrication, gunmetal trapezoidal thread nuts on steel spindles have good dry-running properties.

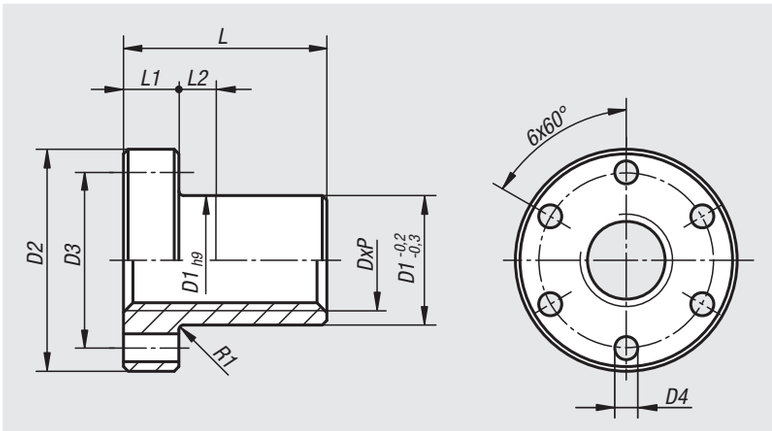
Tolerance class 7H.

Order No. RH thread	Order No. LH thread	DxP	D1	D2	D3	D4	L	L1	L2
24005-100213	**24005-100223**	Tr 10x2	25	42	34	5	25	10	6
24005-100313	**-**	Tr 10x3	25	42	34	5	15	10	5
24005-120313	**24005-120323**	Tr 12x3	28	48	38	6	18	12	6
24005-140313	**24005-140323**	Tr 14x3	28	48	38	6	35	12	8
24005-160413	**24005-160423**	Tr 16x4	28	48	38	6	24	12	8
24005-180413	**24005-180423**	Tr 18x4	28	48	38	6	35	12	12
24005-200413	**24005-200423**	Tr 20x4	32	55	45	7	30	12	8
24005-240513	**24005-240523**	Tr 24x5	32	55	45	7	36	12	8
24005-260513	**24005-260523**	Tr 26x5	38	62	50	7	39	14	8
24005-280513	**24005-280523**	Tr 28x5	38	62	50	6,5	46	14	15
24005-300613	**24005-300623**	Tr 30x6	38	62	50	7	45	14	8
24005-320613	**24005-320623**	Tr 32x6	45	70	58	6,5	54	16	16
24005-360613	**24005-360623**	Tr 36x6	45	70	58	6,5	54	16	15
24005-400713	**24005-400723**	Tr 40x7	63	95	78	8,5	66	16	20
24005-440713	**24005-440723**	Tr 44x7	63	95	78	8,5	66	16	20
24005-500813	**24005-500823**	Tr 50x8	72	110	90	10,5	75	18	20

Trapezoidal thread nuts with flange

double-start, RH thread





Material:
Gunmetal Rg7

Version:
Bright.

Sample order:
nlm 24006-060213

Note:
ISO trapezoidal thread based on DIN 103.

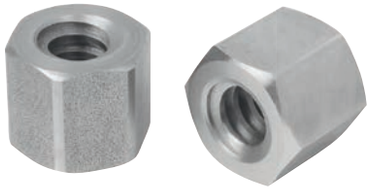
For low and medium speed motion drives. By insufficient lubrication, gunmetal trapezoidal thread nuts on steel spindles have good dry-running properties.

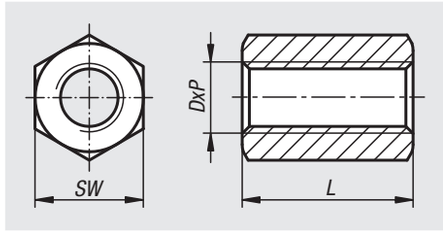
Tolerance class 7H.

Order No.	DxP	D1	D2	D3	D4	L	L1	L2
24006-060213	Tr 6x2 P1	13	25	19	3,2	15	5	3
24006-120613	Tr 12x6 P3	28	48	38	6	35	12	8
24006-160813	Tr 16x8 P4	28	48	38	6	35	12	8
24006-200813	Tr 20x8 P4	32	55	45	6,5	44	12	8
24006-241013	Tr 24x10 P5	32	55	45	6,5	44	12	8
24006-301213	Tr 30x12 P6	38	62	50	6,5	46	14	8
24006-401413	Tr 40x14 P7	63	95	78	9	66	16	12

Trapezoidal thread nuts, hexagon

single-start, RH or LH thread





Material:
Steel C35Pb.
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 24007-100211

Note:
ISO trapezoidal thread according to DIN 103

for adjustments during manual operation and as fastening nuts. Not advisable for use with motorised drives due to the steel/steel material pairing.

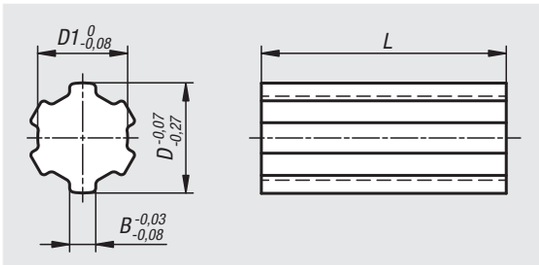
Tolerance class 7H.

Order No. RH thread steel	Order No. RH thread stainless steel	Order No. LH thread steel	Order No. LH thread stainless steel	DxP	L	SW
24007-100211	24007-100212	24007-100221	24007-100222	Tr 10x2	15	17
24007-100311	24007-100312	24007-100321	24007-100322	Tr 10x3	15	17
24007-120311	24007-120312	24007-120321	24007-120322	Tr 12x3	18	19
24007-140311	24007-140312	24007-140321	24007-140322	Tr 14x3	21	22
24007-140411	24007-140412	24007-140421	24007-140422	Tr 14x4	21	22
24007-160411	24007-160412	24007-160421	24007-160422	Tr 16x4	24	27
24007-180411	24007-180412	24007-180421	24007-180422	Tr 18x4	27	27
24007-200411	24007-200412	24007-200421	24007-200422	Tr 20x4	30	30
24007-240511	24007-240512	24007-240521	24007-240522	Tr 24x5	36	36
24007-260511	24007-260512	24007-260521	24007-260522	Tr 26x5	39	36
24007-280511	24007-280512	24007-280521	24007-280522	Tr 28x5	42	46
24007-300611	24007-300612	24007-300621	24007-300622	Tr 30x6	45	46
24007-320611	24007-320612	24007-320621	24007-320622	Tr 32x6	48	46
24007-360611	24007-360612	24007-360621	24007-360622	Tr 36x6	54	55
24007-400711	24007-400712	24007-400721	24007-400722	Tr 40x7	60	65
24007-440711	24007-440712	24007-440721	24007-440722	Tr 44x7	66	65
24007-500811	24007-500812	24007-500821	24007-500822	Tr 50x8	75	75

Splined shafts

similar to DIN ISO 14





Material:
C45 steel or 1.4301 stainless steel.

Version:
Cold-drawn, bright.

Sample order:
nlm 24010-11141X1000

Note:
Spline shafts based on DIN ISO 14 with straight parallel flanks. A spline shaft with spline hub is used to transmit high torques while enabling simultaneous axial movement. The spline shafts are cold-drawn. Cold drawing does not interrupt the grain flow of the base material, ensuring spline shafts of very high strength.

Tolerances:
Straightness 0.8 mm/m.
Torsion max. 0.5 mm/m.

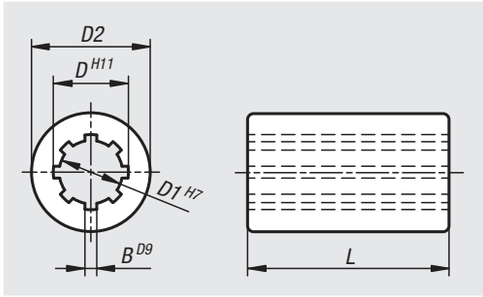
On request:
Other lengths.

Order No. steel	Order No. stainless steel	Profile	No. of splines	B	D	D1	L
24010-11141X1000	**24010-11142X1000**	KW11X14	6	3	14	11	1000
24010-13161X1000	**24010-13162X1000**	KW13X16	6	3,5	16	13	1000
24010-16201X1000	**24010-16202X1000**	KW16X20	6	4	20	16	1000
24010-18221X1000	**24010-18222X1000**	KW18X22	6	5	22	18	1000
24010-21251X1000	**24010-21252X1000**	KW21X25	6	5	25	21	1000
24010-23281X1000	**24010-23282X1000**	KW23X28	6	6	28	23	1000
24010-26321X1000	**24010-26322X1000**	KW26X32	6	6	32	26	1000
24010-32381X1000	**24010-32382X1000**	KW32X38	8	6	38	32	1000
24010-36421X1000	**24010-36422X1000**	KW36X42	8	7	42	36	1000
24010-42481X1000	**24010-42482X1000**	KW42X48	8	8	48	42	1000
24010-46541X1000	**24010-46542X1000**	KW46X54	8	9	54	46	1000

Splined hubs round

similar to DIN ISO 14





Material:
Steel C45.
Stainless steel 1.4305.
Gunmetal Rg 7.

Version:
Bright.

Sample order:
nlm 24011-11141

Note:
Spline hubs based on DIN ISO 14 with straight parallel flanks. A spline shaft with spline hub is used to transmit high torques while enabling simultaneous axial movement.

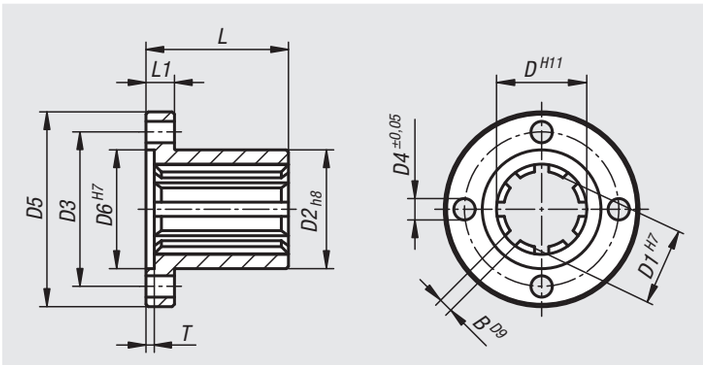


Order No. steel	Order No. stainless steel	Order No. gunmetal	Profile	No. of slots	B	D	D1	D2	L
24011-11141	**24011-11142**	**24011-11143**	KW11X14	6	3	14	11	20	40
24011-13161	**24011-13162**	**24011-13163**	KW13X16	6	3,5	16	13	28	45
24011-16201	**24011-16202**	**24011-16203**	KW16X20	6	4	20	16	32	45
24011-18221	**24011-18222**	**24011-18223**	KW18X22	6	5	22	18	40	50
24011-21251	**24011-21252**	**24011-21253**	KW21X25	6	5	25	21	40	55
24011-23281	**24011-23282**	**24011-23283**	KW23X28	6	6	28	23	50	55
24011-26321	**24011-26322**	**24011-26323**	KW26X32	6	6	32	26	52	60
24011-32381	**24011-32382**	**24011-32383**	KW32X38	8	6	38	32	60	60
24011-36421	**24011-36422**	**24011-36423**	KW36X42	8	7	42	36	70	65
24011-42481	**24011-42482**	**24011-42483**	KW42X48	8	8	48	42	80	70
24011-46541	**24011-46542**	**24011-46543**	KW46X54	8	9	54	46	80	90

Splined hubs with flange

similar to DIN ISO 14





Material:
Steel C45.
Stainless steel 1.4305.
Gunmetal Rg 7.

Version:
Bright.

Sample order:
nlm 24011-01-11141

Note:
Spline hubs based on DIN ISO 14 with straight parallel flanks. A spline shaft with spline hub is used to transmit high torques while enabling simultaneous axial movement.



Order No. steel	Order No. stainless steel	Order No. gunmetal	Profile	No. of slots	B	D	D1	D2	D3	D4	D5	D6	L	L1	T
24011-01-11141	**24011-01-11142**	**24011-01-11143**	KW11X14	6	3	14	11	20	28	4,5	42	20	35	8	3
24011-01-13161	**24011-01-13162**	**24011-01-13163**	KW13X16	6	3,5	16	13	25	36	4,5	50	22	40	8	3
24011-01-16201	**24011-01-16202**	**24011-01-16203**	KW16X20	6	4	20	16	28	38	5,5	52	25	40	10	3
24011-01-18221	**24011-01-18222**	**24011-01-18223**	KW18X22	6	5	22	18	30	40	5,5	54	30	45	10	3,5
24011-01-21251	**24011-01-21252**	**24011-01-21253**	KW21X25	6	5	25	21	34	48	6,6	62	35	50	10	3,5
24011-01-23281	**24011-01-23282**	**24011-01-23283**	KW23X28	6	6	28	23	36	50	6,6	64	36	55	10	3,5
24011-01-26321	**24011-01-26322**	**24011-01-26323**	KW26X32	6	6	32	26	42	56	6,6	70	40	60	10	3,5
24011-01-32381	**24011-01-32382**	**24011-01-32383**	KW32X38	8	6	38	32	50	65	9	82	50	60	12	3,5
24011-01-36421	**24011-01-36422**	**24011-01-36423**	KW36X42	8	7	42	36	52	70	9	90	52	80	16	4
24011-01-42481	**24011-01-42482**	**24011-01-42483**	KW42X48	8	8	48	42	60	75	11	95	60	80	16	4
24011-01-46541	**24011-01-46542**	**24011-01-46543**	KW46X54	8	9	54	46	65	80	11	100	65	100	16	4

Notes

Technical information for ball screw linear actuators

Efficiency and self-locking:
The low rolling friction of ball screw linear actuators give them a mechanical efficiency of up to 95%. Operating duration can be 100%. Due to low rolling friction ball screw linear actuators are not self-locking. A brake mechanism must be installed where self-locking is required (reduction gear or motor brake). This is a must by vertical installations.

Operating temperature:
Ball screw linear actuators can be used with normal loads within a temperature range of -20 to +80 °C. Temporarily up to +110 °C. A prerequisite is constant lubrication.

Lubrication:
Correct lubrication is important for ball screw linear actuators to achieve the calculated lifespan, avoid overheating and guarantee smooth and quiet operation. The same lubricants are used for ball screw linear actuators as those used for roller bearings. They should always be protected from dirt. This is normally carried out by the wiper in the ball screw nut. This wiper also prevents the lubricant seeping out of the ball screw nut.

Installation information:
When ordering ball screw nuts individually, they come mounted on a sleeve. This sleeve must not be removed prior to installation, as the balls could fall out of the ball screw nut. To install (Fig. 1), hold the sleeve on the end of the spindle, then slide the nut over the sleeve while simultaneously and without force twisting onto the spindle thread. Now the lubrication should be applied through the hole in the ball screw nut. To avoid damaging the ball screw linear actuator, limit switches and end position dampers should be installed on the machine.

Note:
Ball screw linear actuators consist of a ball screw spindle, a ball screw nut in which the balls are integrated and a ball re-circulator. They are used to convert a rotary motion into a linear motion and vice-versa. They are very accurate and highly efficient.

Manufacturing process:
The rolled threads of ball screw linear actuators are produced by a precision rolling process. The thread on the spindle and nut has a Gothic arch profile. The load angle is 45°. As by precision screw drives, the flank of the spindle nut is ground to give smooth running properties and a long life.

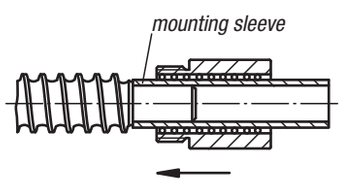
Gradient deviations:

Thread length over	Thread length under	Precision class C 3 (µm)	C 5 (µm)	C 7 (µm)	C 10 (µm)
0	315	8	18	±50 / 300 mm	±210 / 300 mm
315	500	10	20		
500	630	12	23		
630	800	13	25		
800	1000	15	27		
1000	1250	16	30		
1250	1600	18	35		
1600	2000	21	40		
2000	2500	24	46		
2500	3150	29	54		
3150	4000	35	65		
4000	5000	41	77		

Axial backlash and preload:
Differentiation is made between a play-afflicted (axial play > 0) and a play-free or preloaded (axial play < 0) ball screw linear actuator. Preloaded nuts have considerably less elastic deformation occurrence than in nuts without preloading. Preloaded nuts are recommended when positioning accuracy under load is required.

Spindle Ø	Axial backlash P0 (mm)	Zero backlash P1 (mm)	Light preload P2 single nut loosening torque N
16x5	0,08	0	1 - 3
20x5			1 - 3
25x5			2 - 5
32x5			2 - 5
32x10			3 - 6

Calculating the lifespan:
The lifespan can be calculated from the ratio of dynamic load rating and average load.



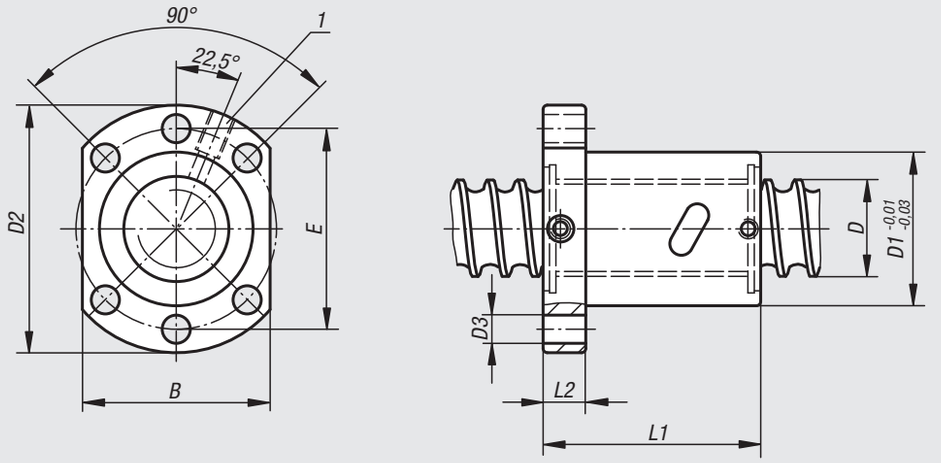
$$L = \left(\frac{C_{dyn}}{F_m}\right)^3 \cdot 10^6$$

L = lifespan in rotations
C_{dyn} = dynamic load rating (N)
F_m = average load (N)

Ball screw linear actuators

rolled, with flange nut DIN 69051 Part 5





Material:
Spindle, steel 1.1213.
Nut steel 1.3505.
Wiper plastic.

Version:
Spindle rolled, induction hardened to 62 ±2 HRC and polished.
Nut ground, flank induction hardened to 62 ±2 HRC and polished.

Sample order:
nlm 24055-16052X0600
(include total length L)
For spindle end form a detailed customer drawing is required.

Note:
Ball screw linear actuators with Gothic arch profile and 5 mm or 10 mm pitch. Single-start, right-hand. Ball screw flange nut acc. to DIN 69051 Part 5 with flange.
Manufactured acc. to precision class C7 (tolerance ±50 µ / 300 mm). Without preloading with axial backlash P0 (max. 0.08 mm)

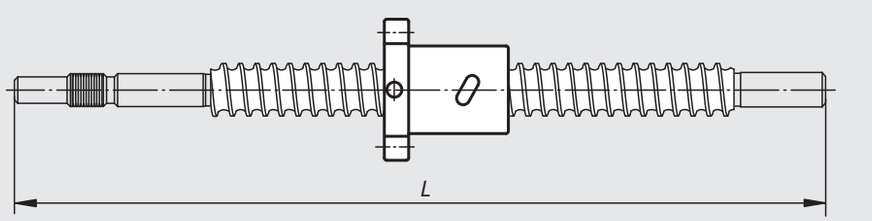
On request:
We can produce ball screw spindles to your design from a detailed drawing.
Max. production lengths 5600 mm.

Other precision classes and preloading are available (see technical information).

Attention:
The flange nut must not be removed from the spindle without a mounting aid as the balls will fall out.

Drawing reference:
1) M6 lubrication hole

Example of shaft machining:

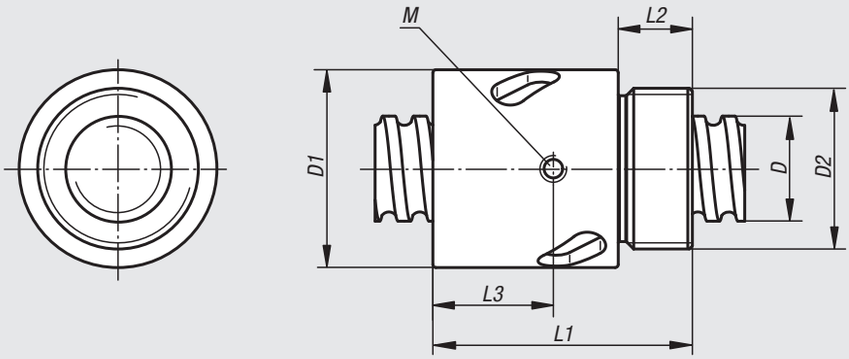


Order No.	D	D1	Pitch	D2	D3	B	E	L1	L2	Ball Ø	No. of support circulations	Dynamic load rating N	Static load rating N	Stiffness K (N/µm)
24055-16052X	16	28	5	48	5,5	40	38	45	10	3,175	4	8880	15250	200
24055-20052X	20	36	5	58	6,6	44	47	46	10	3,175	4	9990	19950	250
24055-25052X	25	40	5	62	6,6	48	51	51	10	3,175	4	11190	25810	350
24055-32052X	32	50	5	80	9	62	65	52	12	3,175	4	12640	34030	400
24055-32102X	32	50	10	80	9	62	65	80	12	6,35	4	30930	61020	400

Ball screw linear actuators

rolled, with screw-in cylinder nut





Material:
Spindle steel 1.1213.
Nut steel 1.3505.
Wiper plastic.

Version:
Spindle rolled, induction hardened to 62 ±2 HRC and polished.
Nut ground, flank induction hardened to 62 ±2 HRC and polished.

Sample order:
nlm 24060-16052X0600
(include total length L)
For spindle end form a detailed customer drawing is required.

Note:
Ball screw linear actuators with Gothic arch profile and 5 mm or 10 mm pitch. Single-start, right-hand.
Ball screw cylinder nut with screw-in thread acc. to ISO 3408 (DIN 69051).
Manufactured acc. to precision class C7 (tolerance ±50 µ / 300 mm). Without preloading with axial backlash P0 (max. 0.08 mm).

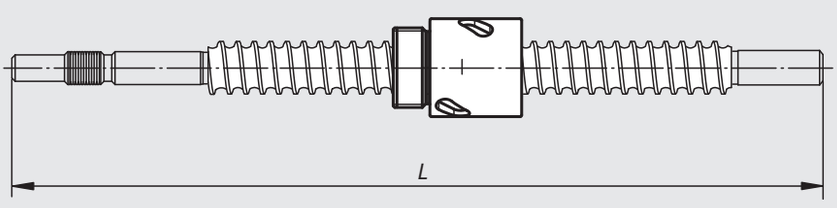
On request:
We can make ball screw spindles to your design from a detailed drawing.
Max. production lengths 5600 mm.

Other precision classes and preloading are available (see technical information).

Attention:
The nut must not be removed from the spindle without a mounting aid as the balls will fall out.

Drawing reference:
M) lubrication hole

Example of shaft machining:

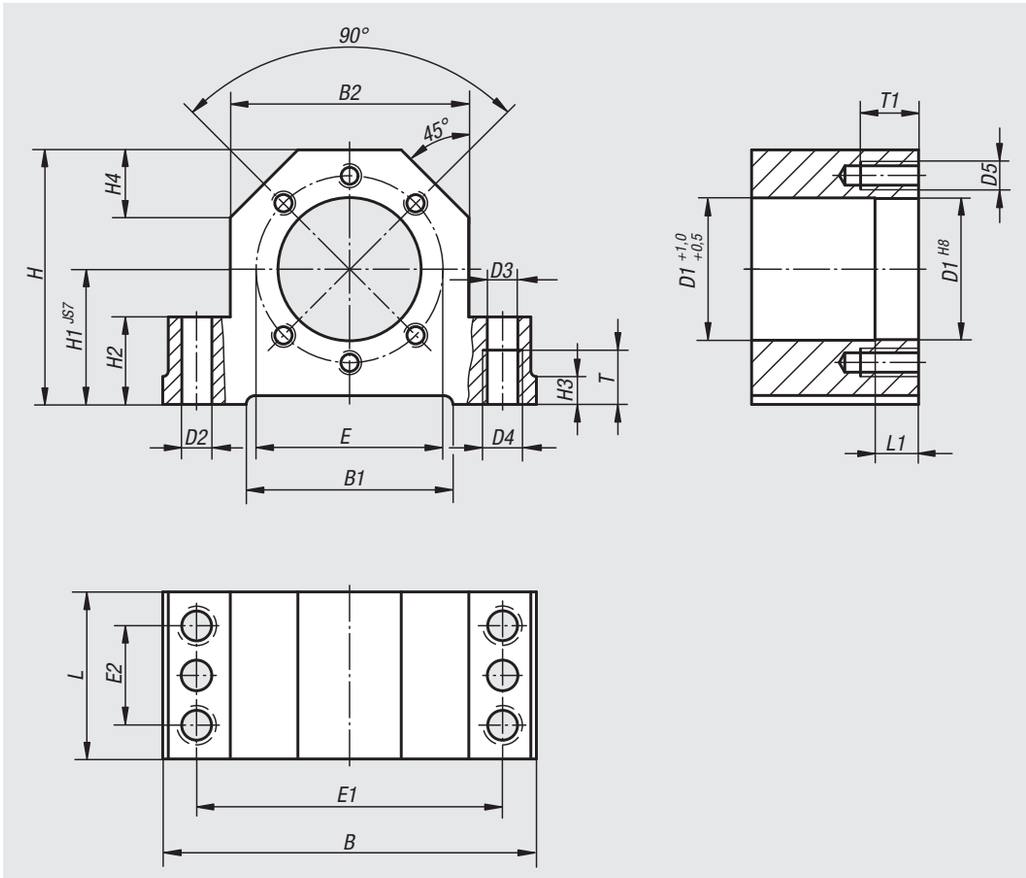


Order No.	D	Pitch	D1	D2	L1	L2	L3	M	Ball Ø	No. of support circulations	Dynamic load rating N	Static load rating N	Stiffness K (N/µm)
24060-16052X	16	5	32,5	M26x1,5	42	12	-	-	3,175	4	8880	15250	200
24060-20052X	20	5	38	M35x1,5	45	15	-	-	3,175	4	9990	19950	250
24060-25052X	25	5	43	M40x1,5	69	19	32	M6	3,175	4	11190	25810	350

Housings

for flange nuts





Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 24070-016

Note:
The housings are suitable for installing flange nuts acc. to DIN 69051 Part 5. The axis height of the spindle bearings is matched to the fixed bearing units 24072 and floating bearing units 24074. The housings can be screwed on from above or below and pinned with two taper pins or cylindrical pins.

Supplied with 6 fastening screws grade 8.8.

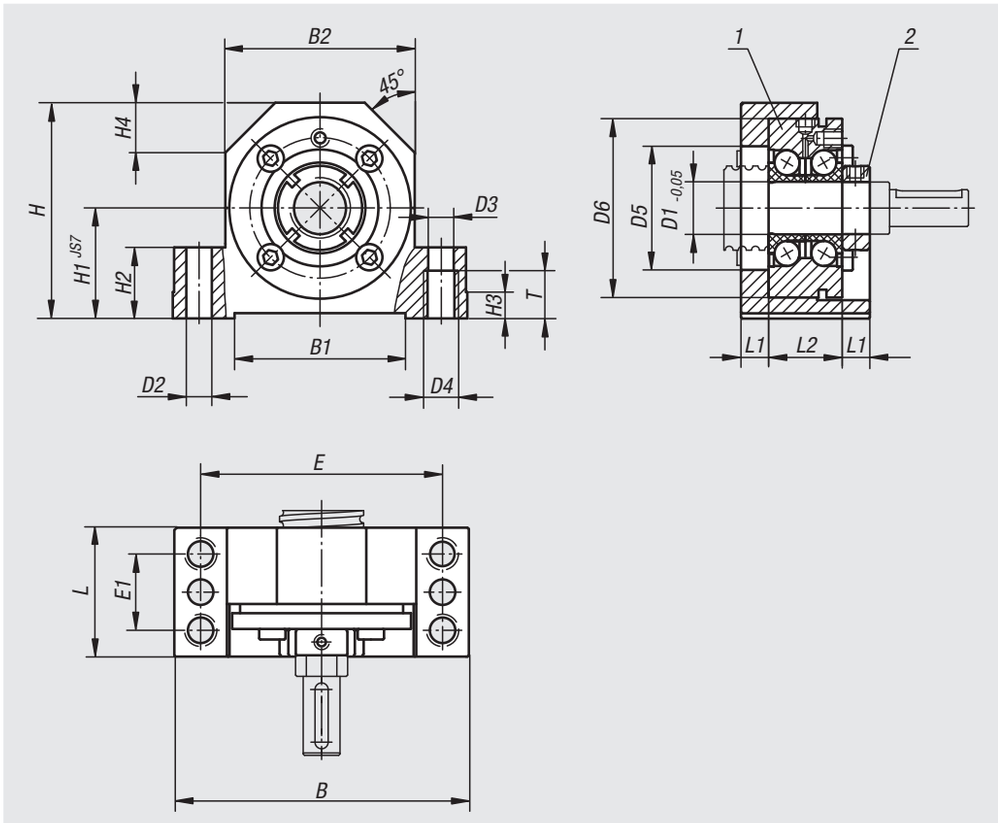
Ball screw linear actuator with flange nut installed in a housing



Order No.	Suitable for spindel Ø	B	B1	B2	D1	D2	D3	D4	D5	E	E1	E2	H	H1	H2	H3	H4	L	L1	T	T1
24070-016	16	86	50	52	28	7,7	8,4	M10	M5	38	68	23	58	32	22	7	15	42	10	15	12
24070-020	20	94	58	60	36	7,7	8,4	M10	M6	47	77	25	64	34	22	7	17	46	16	15	15
24070-025	25	108	63	66	40	9,7	10,5	M12	M6	51	88	29	72	39	27	10	19	46	16	18	15
24070-032	32	112	70	72	50	9,7	10,5	M12	M8	65	92	29	82	42	27	10	19	49	16	18	20

Fixed bearing units





Material:
Housing steel.

Version:
Housing black oxidised.

Sample order:
nlm 24072-010

Note:
The axis height of the spindle bearings is matched to the floating bearing units 24074 and the housings for flange nuts 24070. The housings may be screwed on from above or below and pinned with two taper pins or cylindrical pins. Reference faces on both sides ease unit alignment.

Ready to install fixed bearing units with double row preloaded high-accuracy bearings and a 60° thrust angle. They accept both radial and axial forces from both directions and, due to preloading provide for highest rigidity, concentricity, precise tool positioning and repeatability.

Drawing reference:
1) angular-contact thrust ball bearing
2) M slotted nut

Order No.	Suitable for spindel Ø	B	B1	B2	D1	D2	D3	D4	D5	D6	E	E1	H	H1	H2	H3	H4	L	L1	L2	M	T
24072-010	16	86	50	52	10	7,7	8,4	M10	32	50	68	23	58	32	22	7	15	37	8,5	20	M10x1	15
24072-012	20	94	58	60	12	7,7	8,4	M10	32	55	77	25	64	34	22	7	17	42	8,5	25	M12x1	15
24072-015	20	108	63	66	15	9,7	10,5	M12	32	60	88	29	72	39	27	10	19	46	10,5	25	M15x1	18
24072-017	25	108	63	66	17	9,7	10,5	M12	36	62	88	29	72	39	27	10	19	46	10,5	25	M17x1	18
24072-020	32	112	70	72	20	9,7	10,5	M12	43	68	92	29	78	42	27	10	20	49	10,5	28	M20x1	18

Order No.	Dynamic load rating N	Static load rating N	Stiffness K (N/µm)
24072-010	13400	18800	325
24072-012	16900	24700	375
24072-015	17900	28000	400
24072-017	18800	31000	450
24072-020	26000	47000	650

Floating bearing units



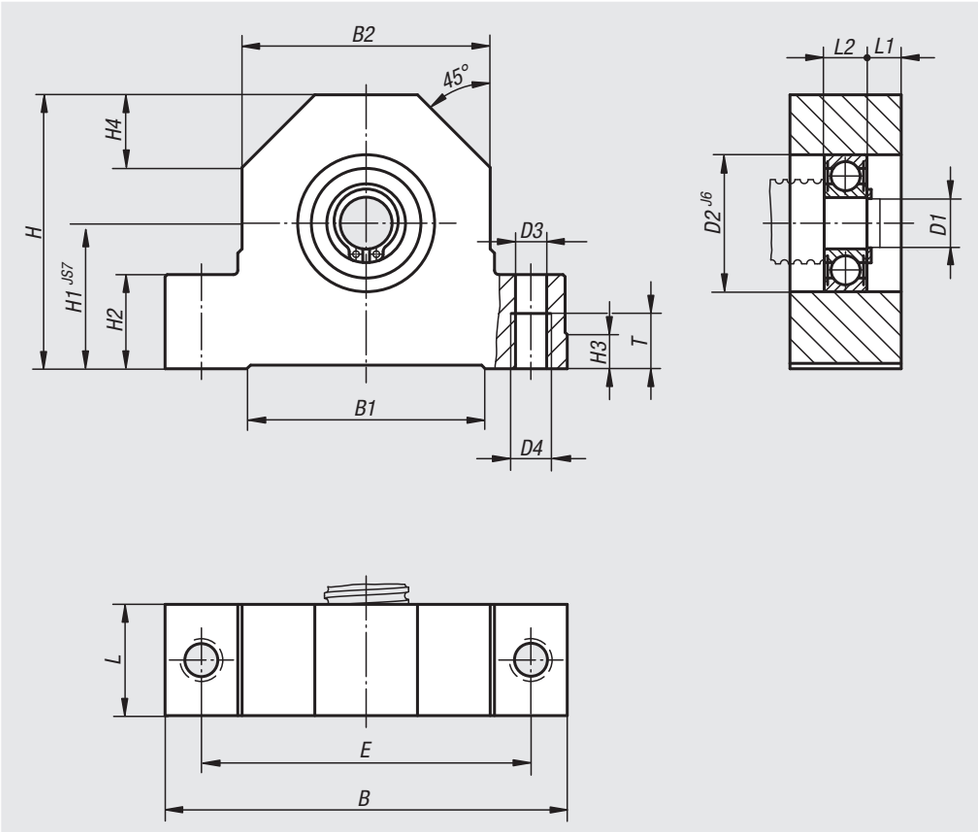
Material:
Housing steel.

Version:
Housing black oxidised.

Sample order:
nlm 24074-010

Note:
The axis height of the spindle bearings is matched to the fixed bearing units 24072 and the housings for flange nuts 24070. The housings may be screwed on from above or below. Reference faces on both sides ease unit alignment.

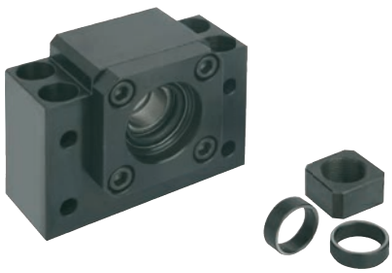
Ready to install floating bearing units with deep groove ball bearings.



Order No.	Suitable for spindel Ø	B	B1	B2	D1	D2	D3	D4	E	H	H1	H2	H3	H4	L	L1	L2	T
24074-010	16	86	50	52	10	30	8,4	M10	68	58	32	22	7	15	24	7,5	9	15
24074-012	20	94	58	60	12	32	8,4	M10	77	64	34	22	7	17	26	8	10	15
24074-015	20	108	63	66	15	35	10,5	M12	88	72	39	27	10	19	28	8	12	18
24074-017	25	108	63	66	17	35	10,5	M12	88	72	39	27	10	19	28	8	12	18
24074-020	32	112	70	72	20	47	10,5	M12	92	78	42	27	10	20	34	10	14	18

Fixed bearing units

block version



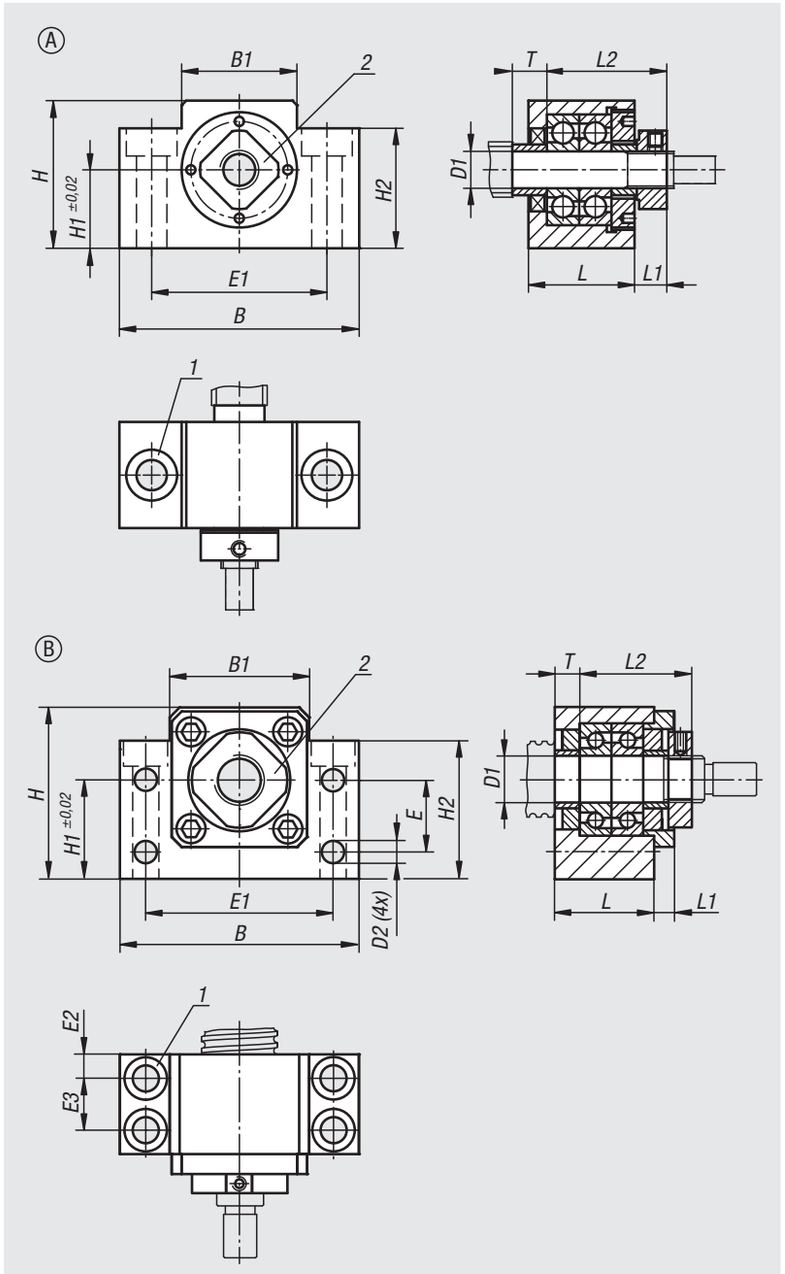
Material:
Housing steel.

Version:
Housing black oxidised.

Sample order:
nlm 24076-010

Note:
The axis height of the spindle bearings is matched to the floating bearing unit 24078. The fixed bearing units are composed of a housing with 2 angular contact thrust ball bearings with seals. Preloaded by a an initial flange. With backstops and a locknut.

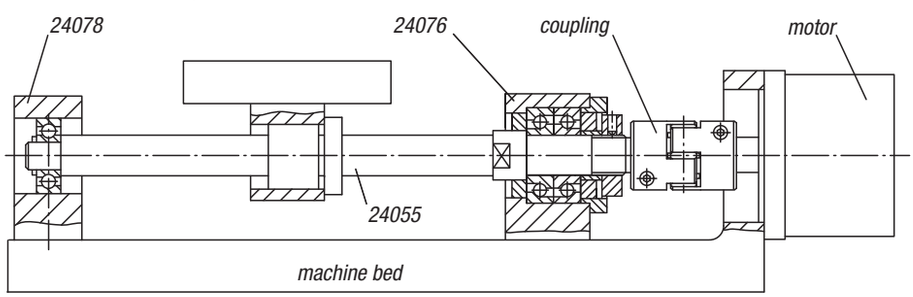
Drawing reference:
1) C for socket head screw ISO 4762
2) M slotted nut



Fixed bearing units

block version

A block version bearing unit assembly



Order No.	Form	Size	B	B1	C	D1	D2	E	E1	E2	E3	H	H1	H2	L	L1	L2	M	T
24076-006	A	6	52	25	M6	6	-	-	38	-	-	32	17	26	23	5	24	M6x0,75	5
24076-008	A	8	52	25	M6	8	-	-	38	-	-	32	17	26	23	7	26	M8x1	7,5
24076-010	B	10	60	34	M6	10	5,5	15	46	6	13	39	22	32,5	25	5	29	M10x1	5
24076-012	B	12	60	35	M6	12	5,5	18	46	6	13	43	25	35	25	5	29	M12x1	5
24076-015	B	15	70	40	M6	15	5,5	18	54	6	15	48	28	38	27	9	32	M15x1	6
24076-017	B	17	86	50	M8	17	6,6	28	68	8	19	64	39	55	35	8	44	M17x1	7
24076-020	B	20	88	52	M8	20	6,6	22	70	8	19	60	34	50	35	8	43	M20x1	8

Order No.	Dynamic load rating N	Static load rating N	Stiffness K (N/µm)
24076-006	-	-	-
24076-008	-	-	-
24076-010	6500	2800	95
24076-012	7000	3100	102
24076-015	7500	3500	114
24076-017	13000	5900	120
24076-020	16100	8400	145

Floating bearing units

block version



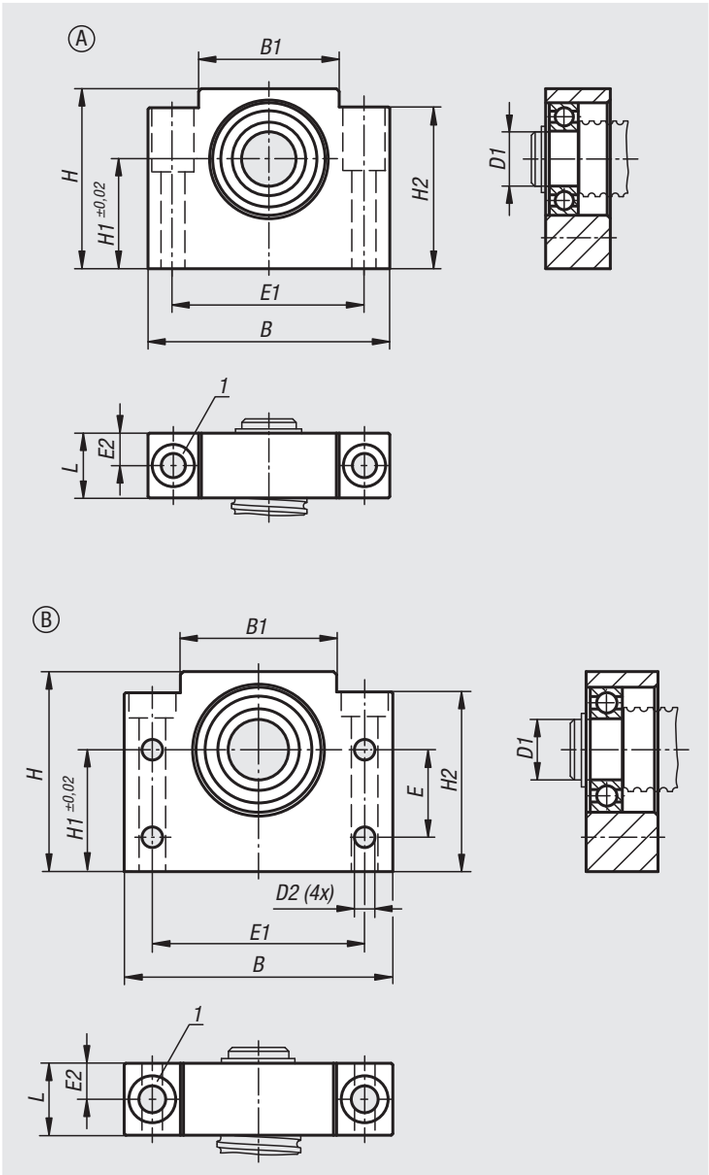
Material:
Housing steel.

Version:
Housing black oxidised.

Sample order:
nlm 24078-010

Note:
The axis height of the spindle bearings is matched with the fixed bearing unit 24076. The floating bearing units consist of a housing with deep grooved ball bearing which adapts axially to the linear expansion of the spindle.

Drawing reference:
1) C for socket head screw ISO 4762



Order No.	Form	Size	B	B1	C	D1	D2	E	E1	E2	H	H1	H2	L
24078-006	A	6	52	25	M6	6	-	-	38	7	32	17	26	14
24078-010	B	10	60	34	M6	8	5,5	15	46	10	39	22	32,5	20
24078-012	B	12	60	34	M6	10	5,5	18	46	10	43	25	35	20
24078-015	B	15	70	40	M6	15	5,5	18	54	10	48	28	38	20
24078-017	B	17	86	50	M8	17	6,6	28	68	11,5	64	39	55	23
24078-020	B	20	88	52	M8	20	6,6	22	70	13	60	34	50	26

Order No.	Dynamic load rating N	Static load rating N
24078-006	-	-
24078-010	3250	1400
24078-012	4550	1960
24078-015	5600	2840
24078-017	9500	4750
24078-020	9300	5000

Fixed bearing units

flange version



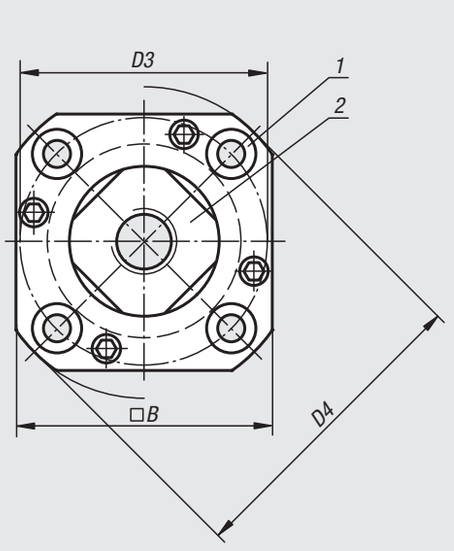
Material:
Housing steel.

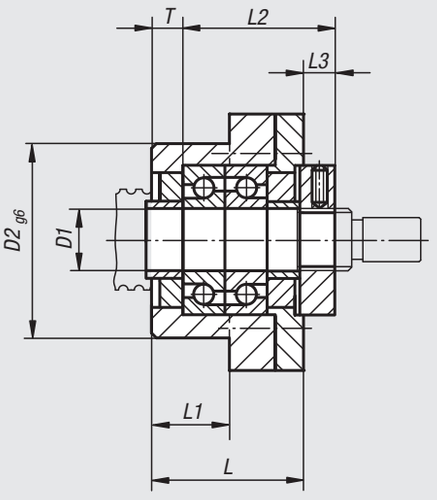
Version:
Housing black oxidised.

Sample order:
nlm 24080-010

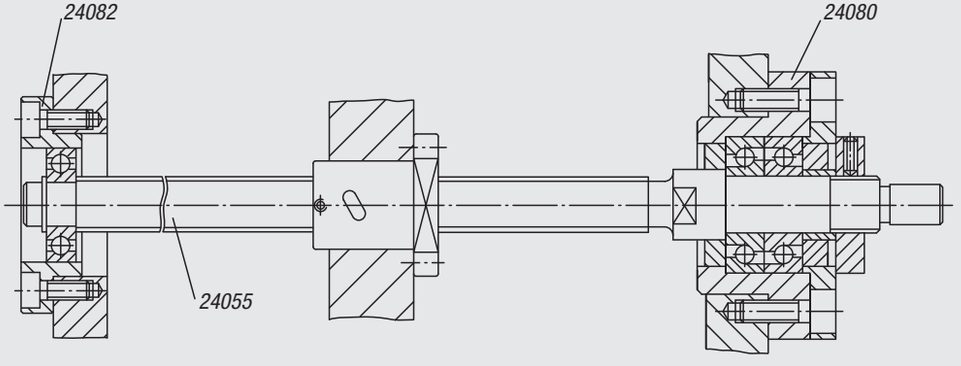
Note:
The fixed bearing unit is matched to the floating bearing unit 24082. The fixed bearing units are composed of a housing with 2 angular contact thrust ball bearings and seals. Preloaded with an initial flange. With backstops and a locknut.

Drawing reference:
1) C for socket head screw ISO 4762
2) M slotted nut





Bearing units fastened from outside



Order No.	Size	B	C	D1	D2	D3	D4	L	L1	L2	L3	M	T
24080-010	10	42	M4	10	34	42	52	27	17	29,5	7,5	M10x1	5
24080-012	12	44	M4	12	36	44	54	27	17	29,5	7,5	M12x1	5
24080-015	15	52	M5	15	40	50	63	32	17	36	8	M15x1	6
24080-020	20	68	M6	20	57	70	85	52	30	50	10	M20x1	10

Order No.	Dynamic load rating N	Static load rating N	Stiffness K (N/µm)
24080-010	6500	2800	95
24080-012	7000	3100	102
24080-015	7500	3500	114
24080-020	17500	8400	145

Floating bearing units

flange version



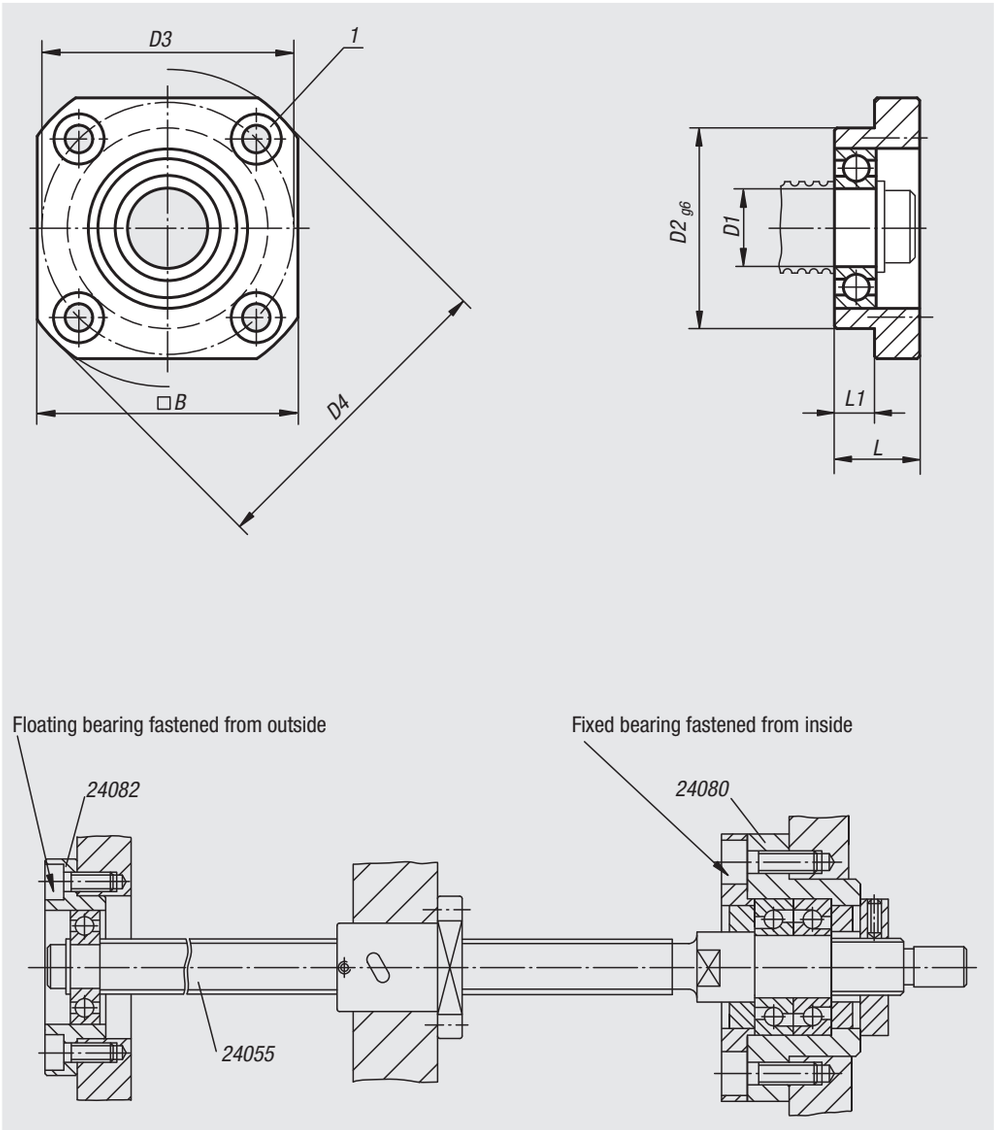
Material:
Housing steel.

Version:
Housing black oxidised.

Sample order:
nlm 24082-010

Note:
The floating bearing unit is matched with the fixed bearing unit 24080. The floating bearing units consist of a housing with deep groove ball bearing which adapts axially to the linear expansion of the spindle.

Drawing reference:
1) C for socket head screw ISO 4762



Order No.	Size	B	C	D1	D2	D3	D4	L	L1
24082-010	10	35	M3	8	28	35	43	12	5
24082-012	12	42	M4	10	34	42	52	15	8
24082-015	15	52	M5	15	40	50	63	17	8
24082-020	20	68	M6	20	57	70	85	20	9

Order No.	Dynamic load rating N	Static load rating N
24082-010	3250	1400
24082-012	4550	1960
24082-015	5600	2840
24082-020	9300	5000

Notes

Miniature ball screw linear actuators

ground, with flange nut



Material:
Spindle 1.1213 steel or 1.4112 stainless steel.
Nut 1.3505 steel or 1.4034 stainless steel.

Version:
Spindle and nut ground, induction hardened to 62 ±2 HRC and polished.

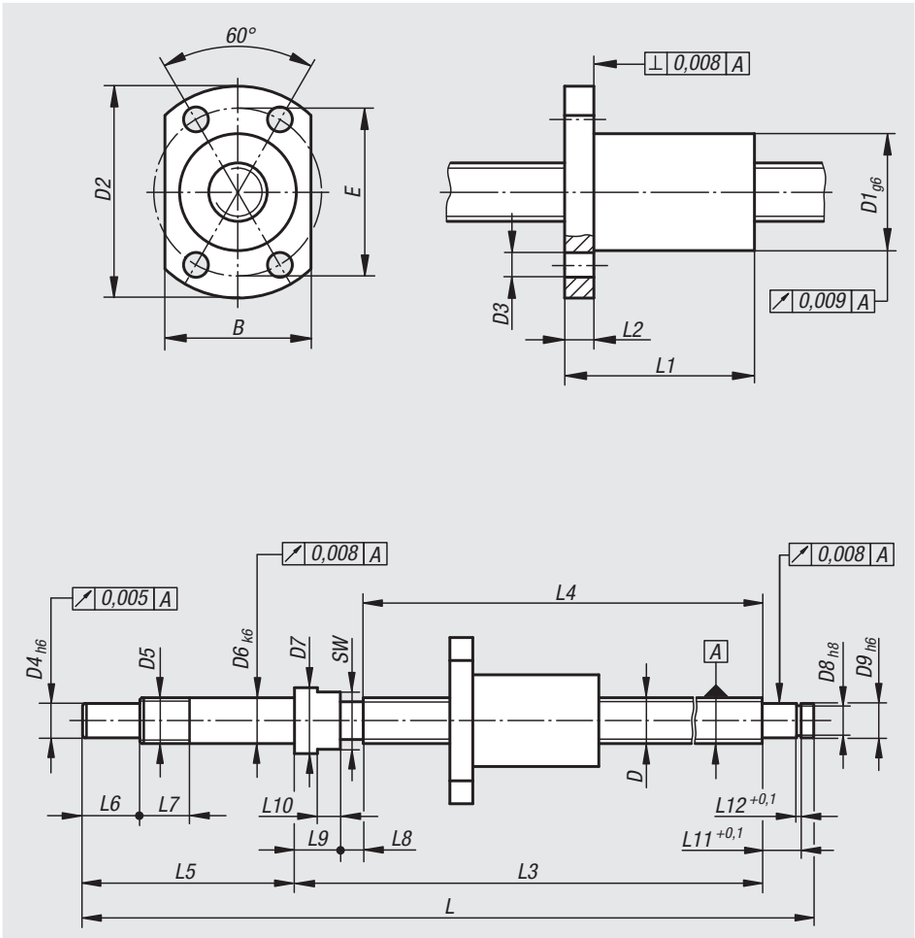
Sample order:
nlm 24100-0810050

Note:
Miniature ball screw linear actuators with machined shaft ends and flange nuts. Supplied with oil coating. Re-lubrication is recommended.

Produced acc. to precision class C5. Without preloading with backlash (max. 0.008 mm).

Precision spindles for use in optics, the food industry, automation, medical technology, the defence industry, aeronautics and precision tool technology.

Attention:
The flange nut must not be removed from the spindle, otherwise the balls fall out.



Order No.	Main material	D	Pitch	Stroke S	B	D1	D2	D3	D4	D5	D6	D7	D8	D9	E	L	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
24100-0810050	steel	8	1	50	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	148	16	4	102	90	37	10	9	4	8	4	6,8	0,8
24100-0810100	steel	8	1	100	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	198	16	4	152	140	37	10	9	4	8	4	6,8	0,8
24100-0810150	steel	8	1	150	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	248	16	4	202	190	37	10	9	4	8	4	6,8	0,8
24100-0820050	steel	8	2	50	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	148	26	4	102	90	37	10	9	4	8	4	6,8	0,8
24100-0820100	steel	8	2	100	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	198	26	4	152	140	37	10	9	4	8	4	6,8	0,8
24100-0820150	steel	8	2	150	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	248	26	4	202	190	37	10	9	4	8	4	6,8	0,8
24100-1020050	steel	10	2	50	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	158	28	5	112	100	37	10	9	4	8	4	6,8	0,8
24100-1020100	steel	10	2	100	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	208	28	5	162	150	37	10	9	4	8	4	6,8	0,8
24100-1020150	steel	10	2	150	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	258	28	5	212	200	37	10	9	4	8	4	6,8	0,8
24100-1020200	steel	10	2	200	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	308	28	5	262	250	37	10	9	4	8	4	6,8	0,8
24100-1220050	steel	12	2	50	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	180	28	5	125	110	45	15	10	5	10	5	7,9	0,9
24100-1220100	steel	12	2	100	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	230	28	5	175	160	45	15	10	5	10	5	7,9	0,9
24100-1220150	steel	12	2	150	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	280	28	5	225	210	45	15	10	5	10	5	7,9	0,9
24100-1220200	steel	12	2	200	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	330	28	5	275	260	45	15	10	5	10	5	7,9	0,9
24100-1220250	steel	12	2	250	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	380	28	5	325	310	45	15	10	5	10	5	7,9	0,9

Miniature ball screw linear actuators

ground, with flange nut

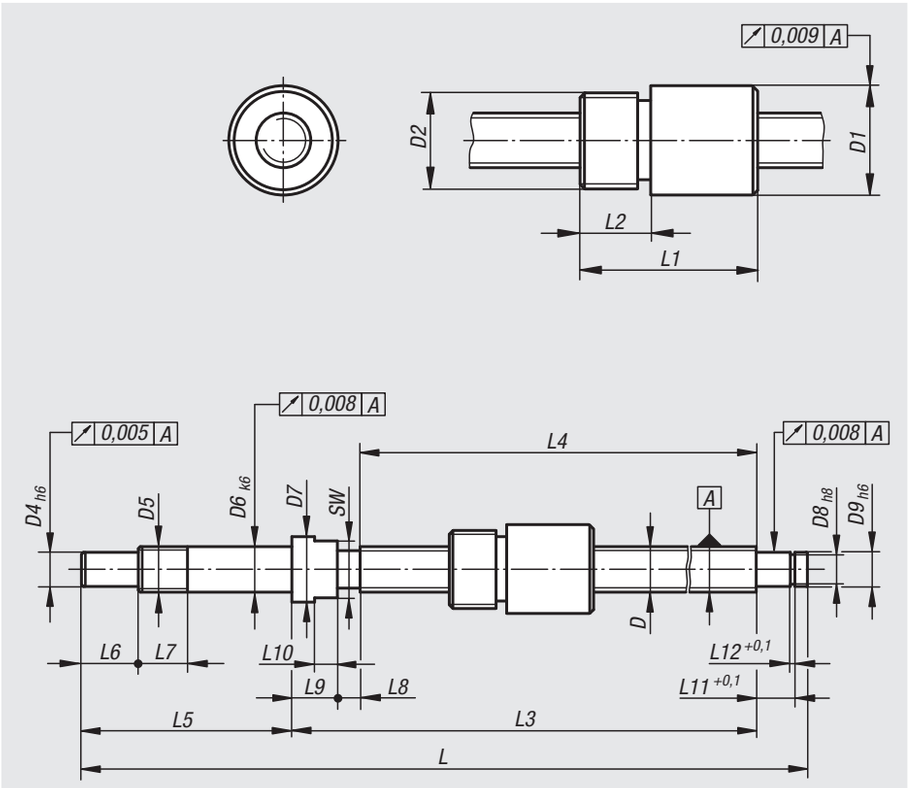
Order No.	Main material	D	Pitch	Stroke S	B	D1	D2	D3	D4	D5	D6	D7	D8	D9	E	L	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
24100-10810050	stainless steel	8	1	50	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	148	16	4	102	90	37	10	9	4	8	4	6,8	0,8
24100-10810100	stainless steel	8	1	100	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	198	16	4	152	140	37	10	9	4	8	4	6,8	0,8
24100-10810150	stainless steel	8	1	150	18	14	27	3,4	6	M8x1	8	11,5	5,7	6	21	248	16	4	202	190	37	10	9	4	8	4	6,8	0,8
24100-10820050	stainless steel	8	2	50	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	148	26	4	102	90	37	10	9	4	8	4	6,8	0,8
24100-10820100	stainless steel	8	2	100	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	198	26	4	152	140	37	10	9	4	8	4	6,8	0,8
24100-10820150	stainless steel	8	2	150	20	16	29	3,4	6	M8x1	8	11,5	5,7	6	23	248	26	4	202	190	37	10	9	4	8	4	6,8	0,8
24100-11020050	stainless steel	10	2	50	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	158	28	5	112	100	37	10	9	4	8	4	6,8	0,8
24100-11020100	stainless steel	10	2	100	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	208	28	5	162	150	37	10	9	4	8	4	6,8	0,8
24100-11020150	stainless steel	10	2	150	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	258	28	5	212	200	37	10	9	4	8	4	6,8	0,8
24100-11020200	stainless steel	10	2	200	22	18	35	4,5	6	M8x1	8	11,5	5,7	6	27	308	28	5	262	250	37	10	9	4	8	4	6,8	0,8
24100-11220050	stainless steel	12	2	50	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	180	28	5	125	110	45	15	10	5	10	5	7,9	0,9
24100-11220100	stainless steel	12	2	100	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	230	28	5	175	160	45	15	10	5	10	5	7,9	0,9
24100-11220150	stainless steel	12	2	150	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	280	28	5	225	210	45	15	10	5	10	5	7,9	0,9
24100-11220200	stainless steel	12	2	200	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	330	28	5	275	260	45	15	10	5	10	5	7,9	0,9
24100-11220250	stainless steel	12	2	250	24	20	37	4,5	8	M10x1	10	14	7,6	8	29	380	28	5	325	310	45	15	10	5	10	5	7,9	0,9

Order No.	Main material	SW	No. of support circulations	Pitch angle	Ball Ø	Dynamic load rating N	Static load rating N	Max. rpm
24100-0810050	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24100-0810100	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24100-0810150	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24100-0820050	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24100-0820100	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24100-0820150	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24100-1020050	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24100-1020100	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24100-1020150	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24100-1020200	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24100-1220050	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24100-1220100	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24100-1220150	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24100-1220200	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24100-1220250	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24100-10810050	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24100-10810100	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24100-10810150	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24100-10820050	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24100-10820100	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24100-10820150	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24100-11020050	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24100-11020100	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24100-11020150	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24100-11020200	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24100-11220050	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24100-11220100	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24100-11220150	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24100-11220200	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24100-11220250	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000

Miniature ball screw linear actuators

ground, with screw-in cylinder nut





Material:
Spindle 1.1213 steel or 1.4112 stainless steel.
Nut 1.3505 steel or 1.4034 stainless steel.

Version:
Spindle and nut ground, induction hardened to 62 ± 2 HRC and polished.

Sample order:
nlm 24105-0810050

Note:
Miniature ball screw linear actuators with machined shaft ends and screw-on barrel nut. Supplier with oil coating. Re-lubrication is recommended.

Produced acc. to precision class C5. Without preloading with backlash (max. 0.008 mm).

Precision spindles for use in optics, the food industry, automation, medical technology, the defence industry, aeronautics and precision tool technology.

Attention:
The screw-in cylinder nut must not be removed from the spindle, otherwise the balls fall out.

Order No.	Main material	D	Pitch	H	D1	D2	D4	D5	D6	D7	D8	D9	L	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
24105-0810050	steel	8	1	50	16	M14x1	6	M8x1	8	11,5	5,7	6	148	22	8	102	90	37	10	9	4	8	4	6,8	0,8
24105-0810100	steel	8	1	100	16	M14x1	6	M8x1	8	11,5	5,7	6	198	22	8	152	140	37	10	9	4	8	4	6,8	0,8
24105-0810150	steel	8	1	150	16	M14x1	6	M8x1	8	11,5	5,7	6	248	22	8	202	190	37	10	9	4	8	4	6,8	0,8
24105-0820050	steel	8	2	50	16	M14x1	6	M8x1	8	11,5	5,7	6	148	27	8	102	90	37	10	9	4	8	4	6,8	0,8
24105-0820100	steel	8	2	100	16	M14x1	6	M8x1	8	11,5	5,7	6	198	27	8	152	140	37	10	9	4	8	4	6,8	0,8
24105-0820150	steel	8	2	150	16	M14x1	6	M8x1	8	11,5	5,7	6	248	27	8	202	190	37	10	9	4	8	4	6,8	0,8
24105-1020050	steel	10	2	50	18	M16x1	6	M8x1	8	11,5	5,7	6	158	28,5	7	112	100	37	10	9	4	8	4	6,8	0,8
24105-1020100	steel	10	2	100	18	M16x1	6	M8x1	8	11,5	5,7	6	208	28,5	7	162	150	37	10	9	4	8	4	6,8	0,8
24105-1020150	steel	10	2	150	18	M16x1	6	M8x1	8	11,5	5,7	6	258	28,5	7	212	200	37	10	9	4	8	4	6,8	0,8
24105-1020200	steel	10	2	200	18	M16x1	6	M8x1	8	11,5	5,7	6	308	28,5	7	262	250	37	10	9	4	8	4	6,8	0,8
24105-1220050	steel	12	2	50	20,5	M18x1	8	M10x1	10	14	7,6	8	180	29	10	125	110	45	15	10	5	10	5	7,9	0,9
24105-1220100	steel	12	2	100	20,5	M18x1	8	M10x1	10	14	7,6	8	230	29	10	175	160	45	15	10	5	10	5	7,9	0,9
24105-1220150	steel	12	2	150	20,5	M18x1	8	M10x1	10	14	7,6	8	280	29	10	225	210	45	15	10	5	10	5	7,9	0,9
24105-1220200	steel	12	2	200	20,5	M18x1	8	M10x1	10	14	7,6	8	330	29	10	275	260	45	15	10	5	10	5	7,9	0,9
24105-1220250	steel	12	2	250	20,5	M18x1	8	M10x1	10	14	7,6	8	380	29	10	325	310	45	15	10	5	10	5	7,9	0,9

Miniature ball screw linear actuators

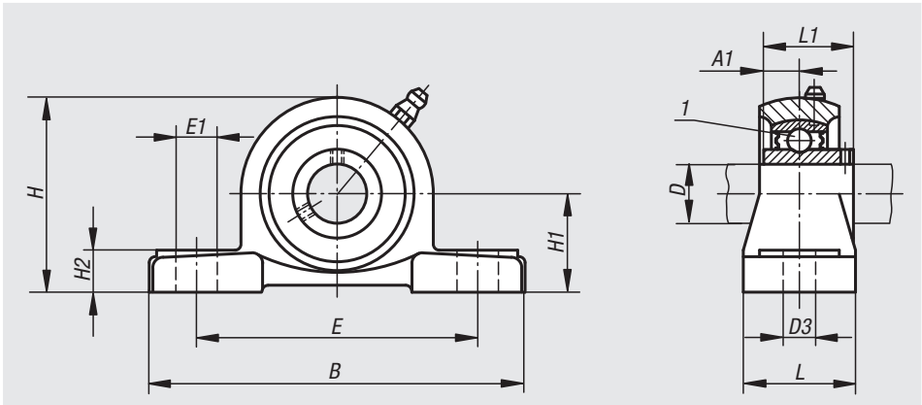
ground, with screw-in cylinder nut

Order No.	Main material	D	Pitch	H	D1	D2	D4	D5	D6	D7	D8	D9	L	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
24105-10810050	stainless steel	8	1	50	16	M14x1	6	M8x1	8	11,5	5,7	6	148	22	8	102	90	37	10	9	4	8	4	6,8	0,8
24105-10810100	stainless steel	8	1	100	16	M14x1	6	M8x1	8	11,5	5,7	6	198	22	8	152	140	37	10	9	4	8	4	6,8	0,8
24105-10810150	stainless steel	8	1	150	16	M14x1	6	M8x1	8	11,5	5,7	6	248	22	8	202	190	37	10	9	4	8	4	6,8	0,8
24105-10820050	stainless steel	8	2	50	16	M14x1	6	M8x1	8	11,5	5,7	6	148	27	8	102	90	37	10	9	4	8	4	6,8	0,8
24105-10820100	stainless steel	8	2	100	16	M14x1	6	M8x1	8	11,5	5,7	6	198	27	8	152	140	37	10	9	4	8	4	6,8	0,8
24105-10820150	stainless steel	8	2	150	16	M14x1	6	M8x1	8	11,5	5,7	6	248	27	8	202	190	37	10	9	4	8	4	6,8	0,8
24105-11020050	stainless steel	10	2	50	18	M16x1	6	M8x1	10	11,5	5,7	6	158	28,5	10	112	100	37	10	9	4	8	4	6,8	0,8
24105-11020100	stainless steel	10	2	100	18	M16x1	6	M8x1	10	11,5	5,7	6	208	28,5	10	162	150	37	10	9	4	8	4	6,8	0,8
24105-11020150	stainless steel	10	2	150	18	M16x1	6	M8x1	10	11,5	5,7	6	258	28,5	10	212	200	37	10	9	4	8	4	6,8	0,8
24105-11020200	stainless steel	10	2	200	18	M16x1	6	M8x1	10	11,5	5,7	6	308	28,5	10	262	250	37	10	9	4	8	4	6,8	0,8
24105-11220050	stainless steel	12	2	50	20,5	M18x1	8	M10x1	12	14	7,6	8	180	29	12	125	110	45	15	10	5	10	5	7,9	0,9
24105-11220100	stainless steel	12	2	100	20,5	M18x1	8	M10x1	12	14	7,6	8	230	29	12	175	160	45	15	10	5	10	5	7,9	0,9
24105-11220150	stainless steel	12	2	150	20,5	M18x1	8	M10x1	12	14	7,6	8	280	29	12	225	210	45	15	10	5	10	5	7,9	0,9
24105-11220200	stainless steel	12	2	200	20,5	M18x1	8	M10x1	12	14	7,6	8	330	29	12	275	260	45	15	10	5	10	5	7,9	0,9
24105-11220250	stainless steel	12	2	250	20,5	M18x1	8	M10x1	12	14	7,6	8	380	29	12	325	310	45	15	10	5	10	5	7,9	0,9

Order No.	Main material	SW	No. of support circulations	Pitch angle	Ball Ø	Dynamic load rating N	Static load rating N	Max. rpm
24105-0810050	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24105-0810100	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24105-0810150	steel	10	1 x 3	2° 13’	0,8	700	1300	3200
24105-0820050	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24105-0820100	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24105-0820150	steel	10	1 x 3	4° 23’	1,6	1350	2250	4200
24105-1020050	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24105-1020100	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24105-1020150	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24105-1020200	steel	10	1 x 3	2° 32’	1,6	1500	2900	4000
24105-1220050	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24105-1220100	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24105-1220150	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24105-1220200	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24105-1220250	steel	12	1 x 3	2° 58’	1,6	1700	3700	3400
24105-10810050	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24105-10810100	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24105-10810150	stainless steel	10	1 x 3	2° 13’	0,8	670	1290	3000
24105-10820050	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24105-10820100	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24105-10820150	stainless steel	10	1 x 3	4° 23’	1,6	900	1500	3000
24105-11020050	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24105-11020100	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24105-11020150	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24105-11020200	stainless steel	10	1 x 3	2° 32’	1,6	1500	2900	3000
24105-11220050	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24105-11220100	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24105-11220150	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24105-11220200	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000
24105-11220250	stainless steel	12	1 x 3	2° 58’	1,6	1660	3620	3000

Pillow block bearing pedestal type UCP





Material:
Housing, grey cast iron.
Bearing, ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Housing, painted.

Sample order:
nlm 24200-12201

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

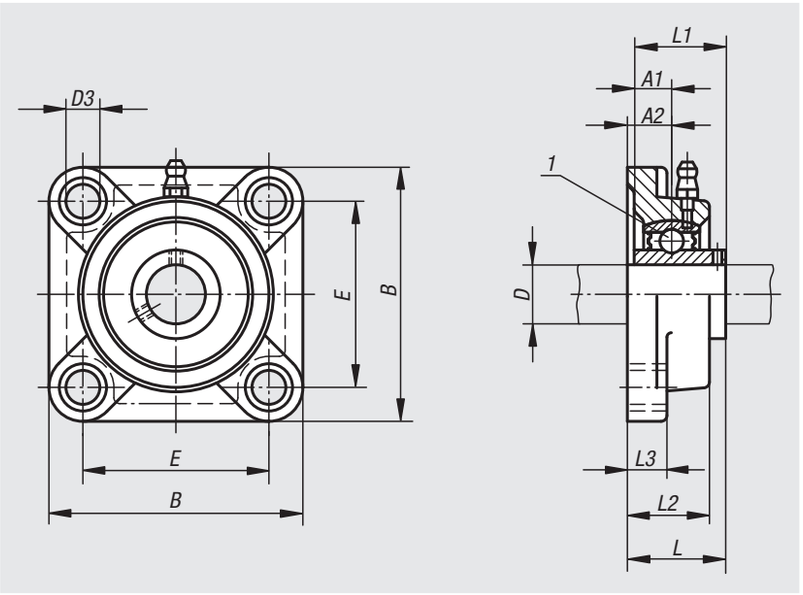
Temperature range:
-15 °C to +100 °C.

Drawing reference:
1) ball bearing

Order No.	Bearing	Housing	D	A1	B	D3	E	E1	H	H1	H2	L	L1	α	Fastening screw
24200-12201	UC 201	P 201	12	12,7	127	13	95	19	65	30,2	14	38	31	10°	M10
24200-15202	UC 202	P 202	15	12,7	127	13	95	19	65	30,2	14	38	31	10°	M10
24200-17203	UC 203	P 203	17	12,7	127	13	95	19	65	30,2	14	38	31	10°	M10
24200-20204	UC 204	P 204	20	12,7	127	13	95	19	65	33,3	14	38	31	10°	M10
24200-25205	UC 205	P 205	25	14,3	140	13	105	19	71	36,5	15	38	34	10°	M10
24200-30206	UC 206	P 206	30	15,9	165	17	121	20	84	42,9	17	44	38,1	10°	M14
24200-35207	UC 207	P 207	35	17,5	167	17	127	20	93	47,6	18	48	42,9	10°	M14
24200-40208	UC 208	P 208	40	19	184	17	137	20	100	49,2	18	54	49,2	10°	M14
24200-45209	UC 209	P 209	45	19	190	17	146	20	106	54	20	54	49,2	10°	M14
24200-50210	UC 210	P 210	50	19	206	20	159	23	113	57,2	21	60	51,6	10°	M16
24200-55211	UC 211	P 211	55	22,2	219	20	171	23	125	63,5	23	60	55,6	10°	M16
24200-60212	UC 212	P 212	60	25,4	241	20	184	23	138	69,8	25	70	65,1	10°	M16

Pillow block bearing flange type UCF





Material:
Housing, grey cast iron.
Bearing, ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Housing, painted.

Sample order:
nlm 24210-12201

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

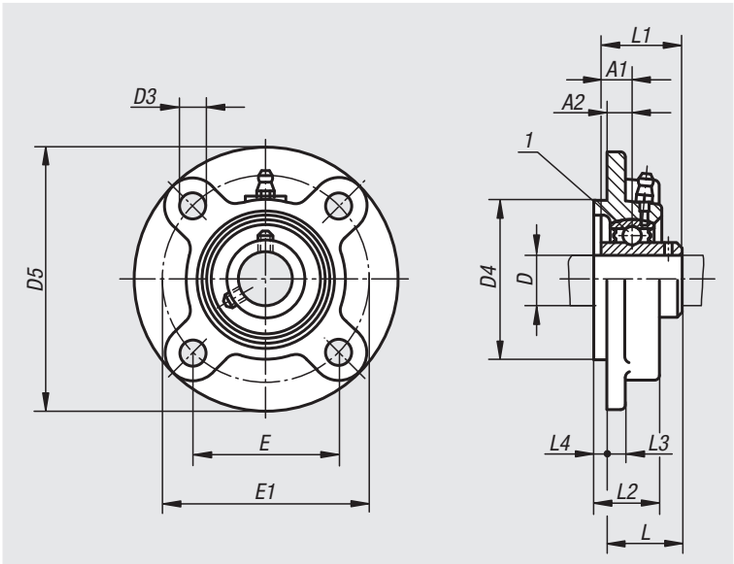
Drawing reference:
1) ball bearing

Order No.	Bearing	Housing	D	A1	A2	B	D3	E	L	L1	L2	L3	α	Fastening screw
24210-12201	UC 201	F 201	12	12,7	15	86	12	64	33,3	31	25,5	12	10°	M10
24210-15202	UC 202	F 202	15	12,7	15	86	12	64	33,3	31	25,5	12	10°	M10
24210-17203	UC 203	F 203	17	12,7	15	86	12	64	33,3	31	25,5	12	10°	M10
24210-20204	UC 204	F 204	20	12,7	15	86	12	64	33,3	31	25,5	12	10°	M10
24210-25205	UC 205	F 205	25	14,3	16	95	12	70	35,8	34	27	14	10°	M10
24210-30206	UC 206	F 206	30	15,9	18	108	12	83	40,2	38,1	31	14	10°	M10
24210-35207	UC 207	F 207	35	17,5	19	117	14	92	44,4	42,9	34	16	10°	M12
24210-40208	UC 208	F 208	40	19	21	130	16	102	51,2	49,2	36	16	10°	M14
24210-45209	UC 209	F 209	45	19	22	137	16	105	52,2	49,2	38	18	10°	M14
24210-50210	UC 210	F 210	50	19	22	143	16	111	54,6	51,6	40	18	10°	M14
24210-55211	UC 211	F 211	55	22,2	25	162	19	130	58,4	55,6	43	20	10°	M16
24210-60212	UC 212	F 212	60	25,4	29	175	19	143	68,7	65,1	48	20	10°	M16

Pillow block bearing flange type UCFC

with centring hub





Material:
Housing, grey cast iron.
Bearing, ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Housing, painted.

Sample order:
nlm 24212-20204

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

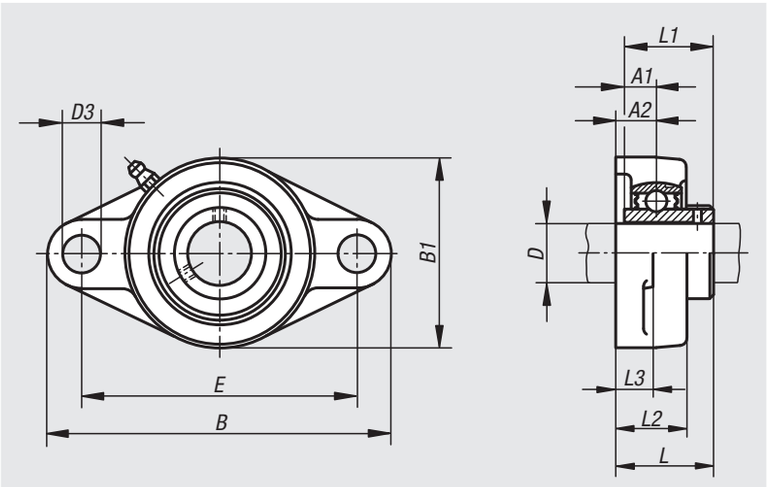
Drawing reference:
1) ball bearing

Order No.	Bearing	Housing	D	A1	A2	D3	D4	D5	E	E1	L	L1	L2	L3	L4	α	Fastening screw
24212-20204	UC 204	FC 204	20	12,7	10	12	62	100	55,1	78	28,3	31	20,5	7	5	10°	M10
24212-25205	UC 205	FC 205	25	14,3	10	12	70	115	63,6	90	29,8	34	21	7	6	10°	M10
24212-30206	UC 206	FC 206	30	15,9	10	12	80	125	70,7	100	32,2	38,1	23	8	8	10°	M10
24212-35207	UC 207	FC 207	35	17,5	11	14	90	135	77,8	110	36,4	42,9	26	9	8	10°	M12
24212-40208	UC 208	FC 208	40	19	11	14	100	145	84,8	120	41,2	49,2	26	9	10	10°	M12
24212-45209	UC 209	FC 209	45	19	10	16	105	160	93,3	132	40,2	49,2	26	14	12	10°	M14
24212-50210	UC 210	FC 210	50	19	10	16	110	165	97,6	138	42,6	51,6	28	14	12	10°	M14
24212-55211	UC 211	FC 211	55	22,2	13	19	125	185	106,1	150	46,4	55,6	31	15	12	10°	M16
24212-60212	UC 212	FC 212	60	25,4	17	19	135	195	113,1	160	56,7	65,1	36	15	12	10°	M16

Pillow block bearing flange type UCFL

2-hole





Material:
Housing, grey cast iron.
Bearing, ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Housing, painted.

Sample order:
nlm 24215-12201

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

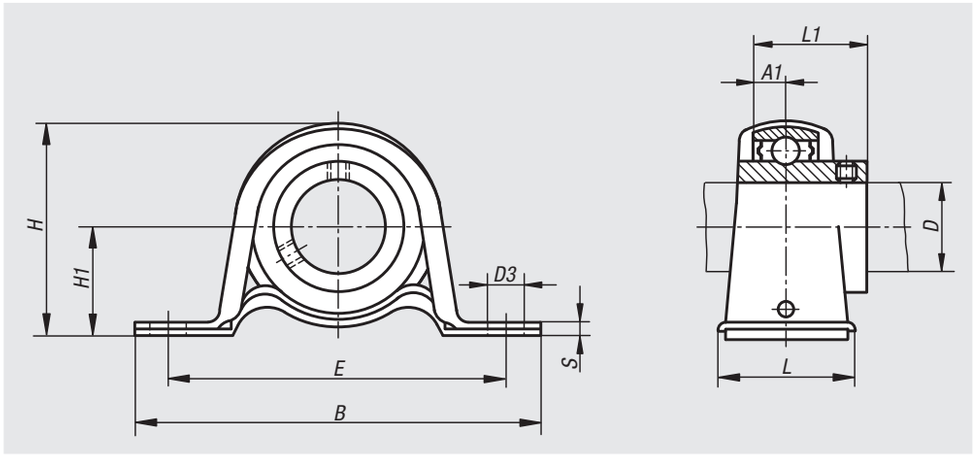
All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	Housing	D	A1	A2	B	B1	D3	E	L	L1	L2	L3	α	Fastening screw
24215-12201	UC 201	FL 201	12	12,7	15	113	60	12	90	33,3	31	25,5	11	10°	M10
24215-15202	UC 202	FL 202	15	12,7	15	113	60	12	90	33,3	31	25,5	11	10°	M10
24215-17203	UC 203	FL 203	17	12,7	15	113	60	12	90	33,3	31	25,5	11	10°	M10
24215-20204	UC 204	FL 204	20	12,7	15	113	60	12	90	33,3	31	25,5	11	10°	M10
24215-25205	UC 205	FL 205	25	14,3	16	130	68	16	99	35,8	34	27	13	10°	M14
24215-30206	UC 206	FL 206	30	15,9	18	148	80	16	117	40,2	38,1	31	13	10°	M14
24215-35207	UC 207	FL 207	35	17,5	19	161	90	16	130	44,4	42,9	34	14	10°	M14
24215-40208	UC 208	FL 208	40	19	21	175	100	16	144	51,2	49,2	36	14	10°	M14
24215-45209	UC 209	FL 209	45	19	22	188	108	19	148	52,2	49,2	38	15	10°	M16
24215-50210	UC 210	FL 210	50	19	22	197	115	19	157	54,6	51,6	40	15	10°	M16
24215-55211	UC 211	FL 211	55	22,2	25	224	130	19	184	58,4	55,6	43	18	10°	M16
24215-60212	UC 212	FL 212	60	25,4	29	250	140	23	202	68,7	65,1	48	18	10°	M20

Pillow block bearing pedestal type BPP





Material:
Housing, steel
Bearing, ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Housing, electro zinc-plated.

Sample order:
nlm 24225-12201

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a sheet steel housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication.

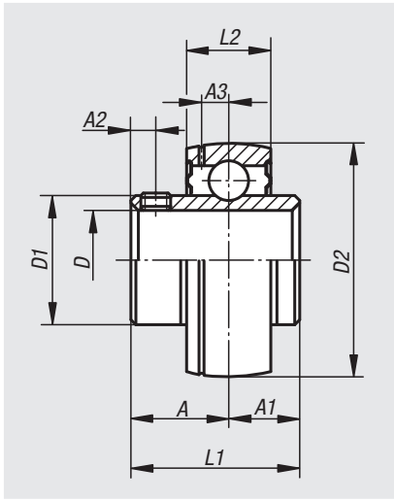
Do not exceed the housing load. It is less than the load rating of the bearings.

Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	Housing	D	A1	B	D3	E	H	H1	L	L1	S	α	Fastening screw	max. static load kN
24225-12201	B 201	PP 201	12	6	86	9,5	68	43,8	22,2	25	22	3,2	10°	M8	2,16
24225-15202	B 202	PP 202	15	6	86	9,5	68	43,8	22,2	25	22	3,2	10°	M8	2,16
24225-17203	B 203	PP 203	17	6	86	9,5	68	43,8	22,2	25	22	3,2	10°	M8	2,16
24225-20204	B 204	PP 204	20	7	98	9,5	76	50,5	25,4	32	25	3,2	10°	M8	2,62
24225-25205	B 205	PP 205	25	7,5	108	11,5	86	56,5	28,6	32	27	4	10°	M10	3,72
24225-30206	B 206	PP 206	30	8	117	11,5	95	66,3	33,3	38	30	4	10°	M10	4,41
24225-35207	B 207	PP 207	35	8,5	129	11,5	106	78	39,7	42	32	4,6	10°	M10	4,9

Insert bearing UC





Material:
Ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Sealed on both sides with a spherical outer ring.
Can be re-lubricated.

Sample order:
nlm 24230-20204

Note:
The internal construction of the insert bearings corresponds to that of standard Series 6200 and 6300 radial ball bearing. However, they have wider inner rings for easier fastening on shafts. The inner rings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by 2 grub screws positioned 120° apart on the inner ring.

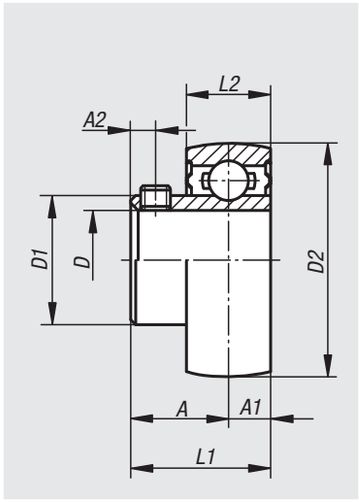
The insert bearings are ready to install and are permanently lubricated with a suitable ball bearing grease. In normal applications, re-lubrication is not necessary.

Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	D	A	A1	A2	A3	D1	D2	L1	L2	Grub screw	Dynamic base loads kN	Static base loads kN
24230-20204	UC 204	20	18,3	12,7	4,8	3,7	29	47	31	17	M6x0,75	9,88	6,2
24230-25205	UC 205	25	19,7	14,3	5	3,9	34	52	34	17	M6x0,75	10,78	6,98
24230-30206	UC 206	30	22,2	15,9	5	5	40,5	62	38,1	19	M6x0,75	14,97	10,04
24230-35207	UC 207	35	25,4	17,5	7	5,7	48	72	42,9	20	M8x1	19,75	13,67
24230-40208	UC 208	40	30,2	19	8	6,2	53	80	49,2	21	M8x1	22,71	15,94
24230-45209	UC 209	45	30,2	19	8	6,4	57,3	85	49,2	22	M8x1	24,36	17,71
24230-50210	UC 210	50	32,6	19	10	6,5	63	90	51,6	24	M10x1,25	26,98	19,84
24230-55211	UC 211	55	33,4	22,2	10	7	70	100	55,6	25	M10x1,25	33,37	25,11
24230-60212	UC 212	60	39,7	25,4	10	7,6	77	110	65,1	27	M10x1,25	36,74	27,97

Insert bearing B





Material:
Ball-bearing steel 100Cr6.
Seal, rubber NBR.

Version:
Sealed on both sides with a spherical outer ring.

Sample order:
nlm 24235-12201

Note:
The internal construction of the insert bearings corresponds to that of standard Series 6200 and 6300 radial ball bearing. However, they have wider inner rings for easier fastening on shafts. The inner rings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by 2 grub screws positioned 120° apart on the inner ring.

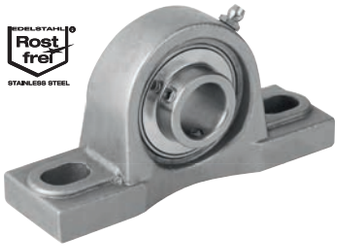
The insert bearings are ready to install and are permanently lubricated with a suitable ball bearing grease.

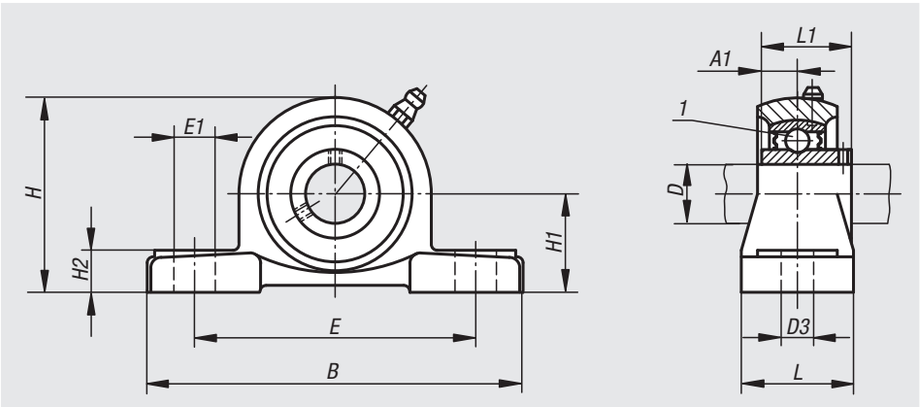
Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	D	A	A1	A2	D1	D2	L1	L2	Grub screw	Dynamic base loads kN	Static base loads kN
24235-12201	B 201	12	16	6	4,5	24,7	40	22	12	M5x0,8	7,36	4,48
24235-15202	B 202	15	16	6	4,5	24,7	40	22	12	M5x0,8	7,36	4,48
24235-17203	B 203	17	16	6	4,5	24,7	40	22	12	M5x0,8	7,36	4,48
24235-20204	B 204	20	18	7	4,5	29	47	25	14	M5x0,8	9,88	6,2
24235-25205	B 205	25	19,5	7,5	5,5	34	52	27	15	M6x0,75	10,78	6,98
24235-30206	B 206	30	22	8	6	40,5	62	30	16	M6x0,75	14,97	10,04
24235-35207	B 207	35	23,5	8,5	6,5	48	72	32	17	M8x1	19,75	13,67

Pillow block bearing pedestal type MUCP

stainless steel





Material:
Housing, stainless steel 1.4301.
Bearing, stainless steel 1.4125.
Seal, rubber NBR.

Version:
Bright.

Sample order:
nlm 24240-20204

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

Drawing reference:
1) ball bearing

Order No.	Bearing	Housing	D	A1	B	D3	E	E1	H	H1	H2	L	L1	α	Fastening screw
24240-20204	MUC 204	P 204	20	12,7	127	13	95	19	65	33,3	14	38	31	10°	M10
24240-25205	MUC 205	P 205	25	14,3	140	13	105	19	71	36,5	15	38	34,1	10°	M10
24240-30206	MUC 206	P 206	30	15,9	165	17	121	20	84	42,9	17	44	38,1	10°	M14
24240-35207	MUC 207	P 207	35	17,5	167	17	127	20	93	47,6	18	48	42,9	10°	M14
24240-40208	MUC 208	P 208	40	19	184	17	137	20	100	49,2	18	54	49,2	10°	M14
24240-45209	MUC 209	P 209	45	19	190	17	146	20	106	54	20	54	49,2	10°	M14
24240-50210	MUC 210	P 210	50	19	206	20	159	23	113	57,2	21	60	51,6	10°	M16

Pillow block bearing pedestal type



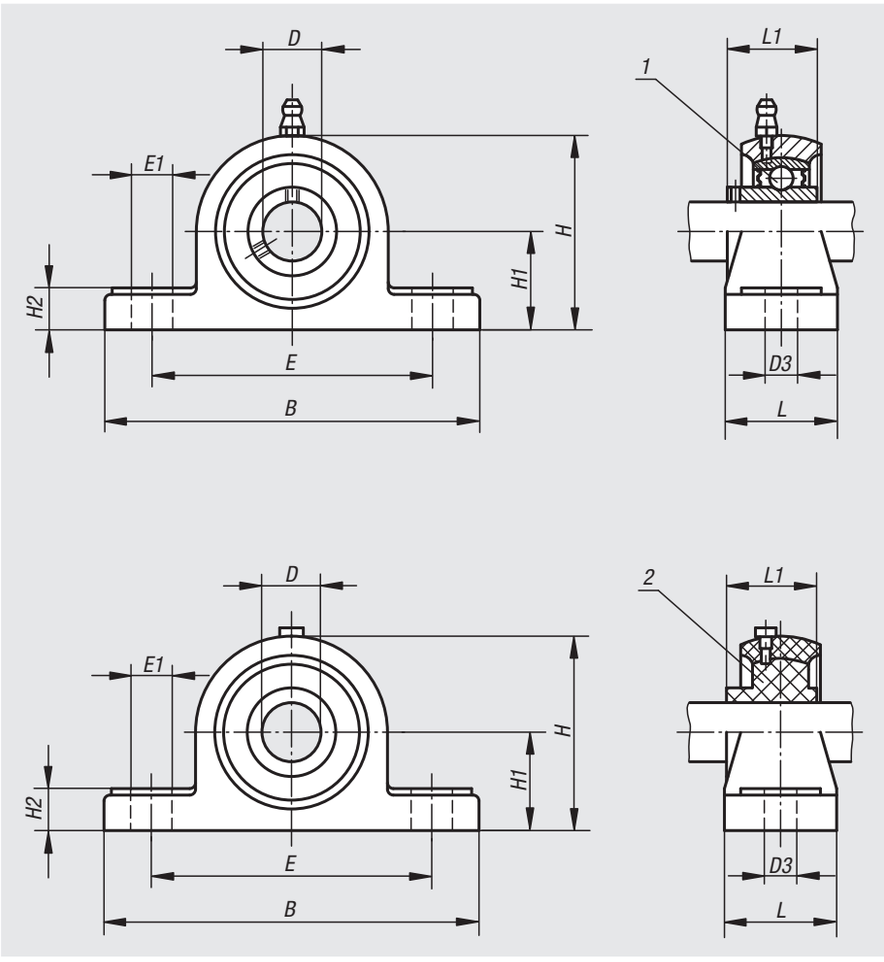
Material:
Housing 1.4301.
Ball bearing 1.4112.
Plain bearing POM.

Version:
Plain bearing white.
Stainless steel parts bright.

Sample order:
nlm 24240-01-12201

Note:
These stainless steel pillow block bearings have the same operating dimensions as the standard bearing housings of the major manufacturers, and can so be used or exchanged in existing constructions.

Drawing reference:
1) ball bearing
2) plain bearing



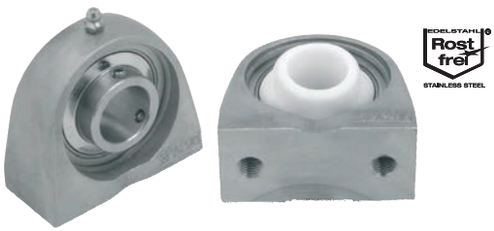
With ball bearing

Order No.	Housing	D	H1	B	H	E	E1	L	L1	D3	H2
24240-01-12201	201	12	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-15202	202	15	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-20204	204	20	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-25205	205	25	36,5	140,6	69,7	105	19	38,2	34	13	15,7
24240-01-30206	206	30	43	165	83,2	121	21	48,2	38,1	17	18,3
24240-01-35207	207	35	47,6	167	94	127	21	48	42,9	17	19
24240-01-40208	208	40	49,2	184	100	137	23	54	49,2	17	19

With POM plain bearing

Order No.	Housing	D	H1	B	H	E	E1	L	L1	D3	H2
24240-01-112201	201	12	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-115202	202	15	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-120204	204	20	33,3	126,1	64,4	95	19	38,2	31	13	15
24240-01-125205	205	25	36,5	140,6	69,7	105	21	38,2	34	13	18,3
24240-01-130206	206	30	43	165	83,2	121	21	48,2	38,1	17	19
24240-01-135207	207	35	47,6	167	94	127	21	48	42,9	17	19
24240-01-140208	208	40	49,2	184	100	137	23	54	49,2	17	19

Pillow block bearing pedestal type



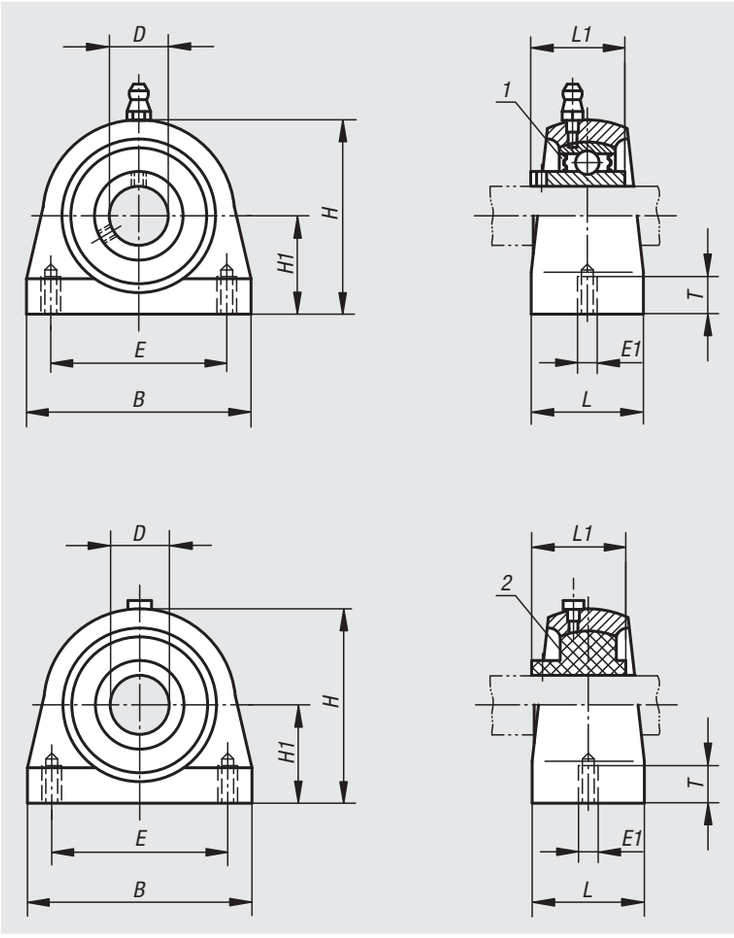
Material:
Housing 1.4301.
Ball bearing 1.4112.
Plain bearing POM.

Version:
Plain bearing white.
Stainless steel parts bright.

Sample order:
nlm 24241-01-12201

Note:
These stainless steel pillow block bearings have the same operating dimensions as the standard bearing housings of the major manufacturers, and can so be used or exchanged in existing constructions.

Drawing reference:
1) ball bearing
2) plain bearing



With ball bearing

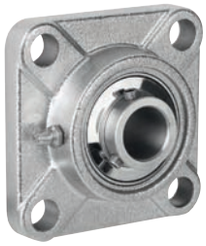
Order No.	Housing	D	H1	B	H	E	E1	T	L	L1
24241-01-12201	201	12	33,3	73	65	50,8	M8	10	38	31
24241-01-15202	202	15	33,3	73	65	50,8	M8	10	38	31
24241-01-20204	204	20	33,3	73	65	50,8	M8	10	38	31
24241-01-25205	205	25	36,7	76	71	50,8	M10	12,5	38	34
24241-01-30206	206	30	42,9	102	86	76,1	M10	12,5	38	38,1
24241-01-35207	207	35	47,6	108	95	82,6	M10	12,5	48	42,9
24241-01-40208	208	40	49,2	117	100	88,9	M12	15	48	49,2

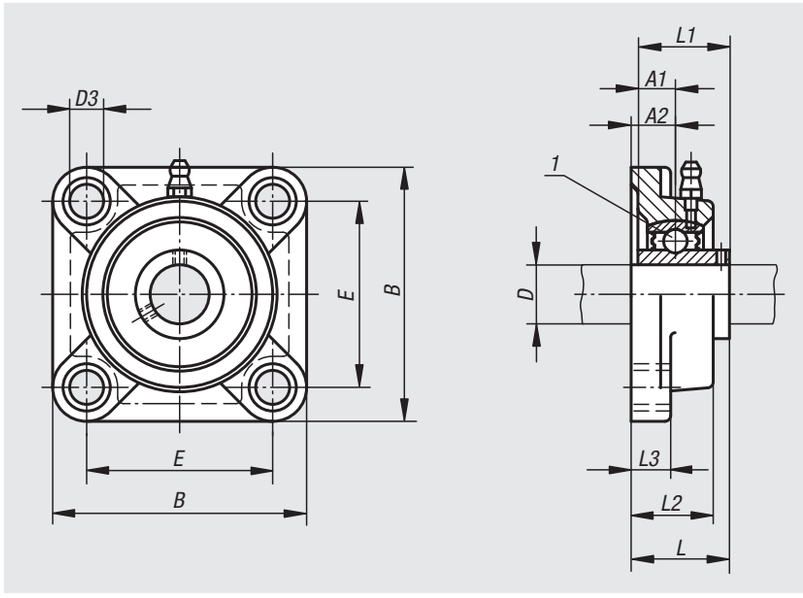
With POM plain bearing

Order No.	Housing	D	H1	B	H	E	E1	T	L	L1
24241-01-112201	201	12	33,3	73	65	50,8	M8	10	38	31
24241-01-115202	202	15	33,3	73	65	50,8	M8	10	38	31
24241-01-120204	204	20	33,3	73	65	50,8	M8	10	38	31
24241-01-125205	205	25	36,7	76	71	50,8	M10	12,5	38	34
24241-01-130206	206	30	42,9	102	86	76,1	M10	12,5	38	38,1
24241-01-135207	207	35	47,6	108	95	82,6	M10	12,5	48	42,9
24241-01-140208	208	40	49,2	117	100	88,9	M12	15	48	49,2

Pillow block bearing flange type MUCF

stainless steel





Material:
Housing, stainless steel 1.4301.
Bearing, stainless steel 1.4125.
Seal, rubber NBR.

Version:
Bright.

Sample order:
nlm 24242-20204

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

Drawing reference:
1) ball bearing

Order No.	Bearing	Housing	D	A1	A2	B	D3	E	L	L1	L2	L3	Fastening screw
24242-20204	MUC 204	F 204	20	12,7	15	86	12	64	33,3	31	25,5	12	M10
24242-25205	MUC 205	F 205	25	14,3	16	95	12	70	35,8	34,1	27	14,3	M10
24242-30206	MUC 206	F 206	30	15,9	18	108	12	83	40,2	38,1	31	14	M10
24242-35207	MUC 207	F 207	35	17,5	19	117	14	92	44,4	42,9	34	15,9	M12
24242-40208	MUC 208	F 208	40	19	21	130	16	102	51,2	49,2	36	15,9	M14
24242-45209	MUC 209	F 209	45	19	22	137	16	105	52,2	49,2	38	16,7	M14
24242-50210	MUC 210	F 210	50	19	22	143	16	111	54,6	51,6	40	15,9	M14

Pillow block bearing flange type



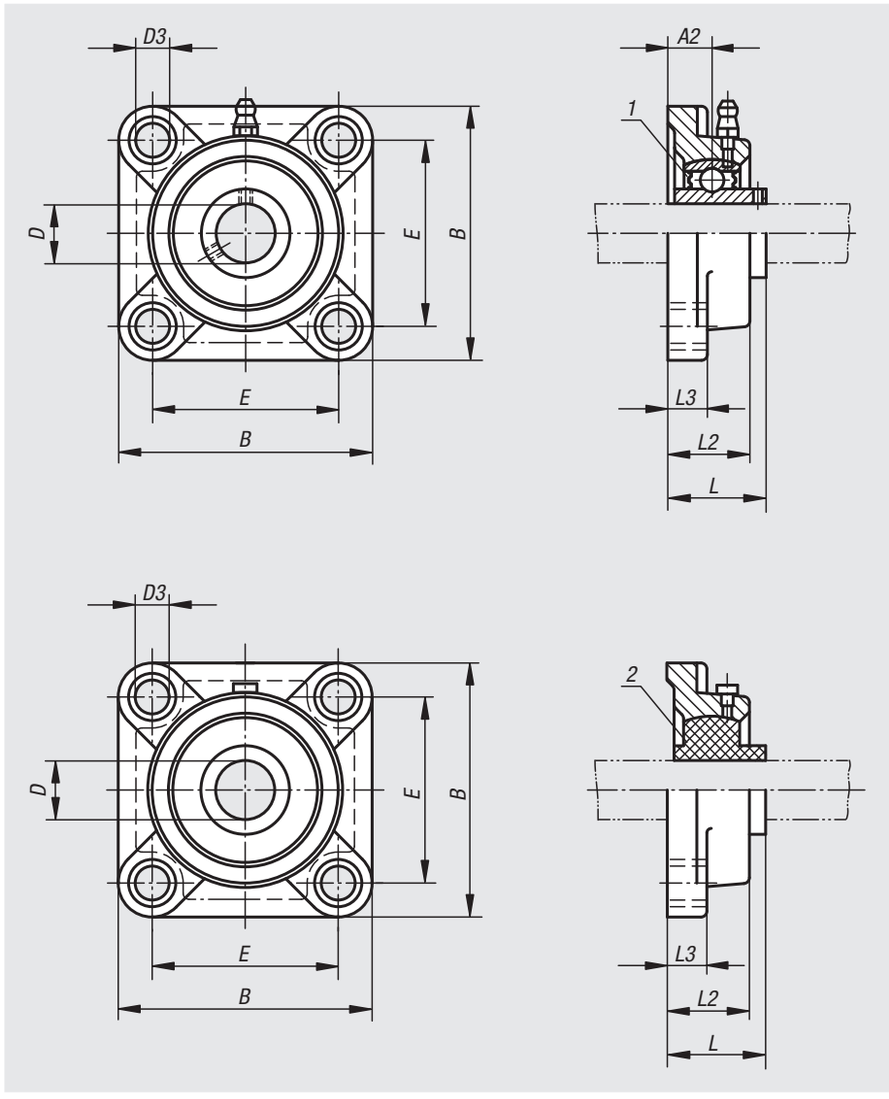
Material:
Housing 1.4301.
Ball bearing 1.4112.
Plain bearing POM.

Version:
Plain bearing white.
Stainless steel parts bright.

Sample order:
nlm 24242-01-12201

Note:
These stainless steel pillow block bearings have the same operating dimensions as the standard bearing housings of the major manufacturers, and can so be used or exchanged in existing constructions.

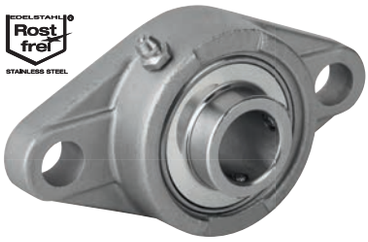
Drawing reference:
1) ball bearing
2) plain bearing

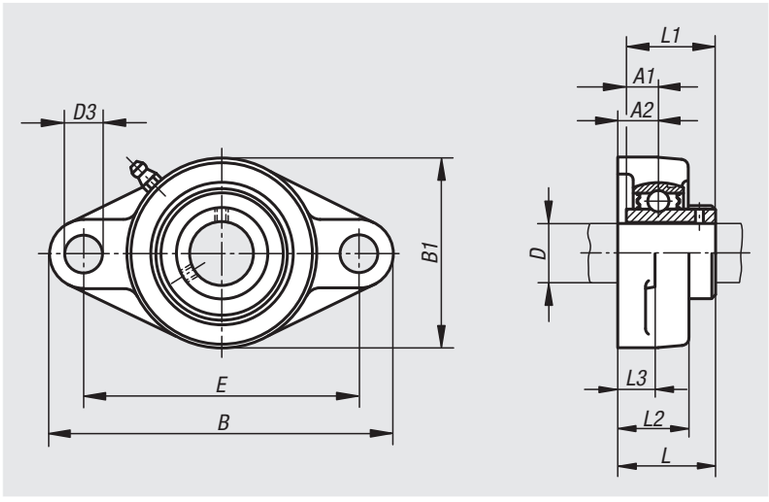


Order No.	Housing	D	B	E	D3	L	L2	L3	A2
24242-01-12201	201	12	86	64	64	33,2	25,7	12	14,9
24242-01-15202	202	15	86	64	64	33,2	25,7	12	14,9
24242-01-20204	204	20	86	64	64	33,2	25,7	12	14,9
24242-01-25205	205	25	95	70	70	35,5	27,3	14	15,8
24242-01-30206	206	30	108	83	83	40,1	30,7	14	17,9
24242-01-35207	207	35	117	92	92	44,4	34	14,3	19
24242-01-40208	208	40	130	102	102	51,2	36	14,3	21

Pillow block bearing flange type MUCF

2-hole stainless steel





Material:
Housing, stainless steel 1.4301.
Bearing, stainless steel 1.4125.
Seal, rubber NBR.

Version:
Bright.

Sample order:
nlm 24244-20204

Note:
Pillow block bearings consist of a sealed single-row ball bearing with a spherical outer ring which is mounted in a housing. Because of the spherical outer surface of the bearing, shaft misalignment can be compensated for. The bearings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by grub screws on the inner ring.

In normal applications, pillow block bearings are maintenance-free due to the lifetime lubrication. In difficult environmental conditions re-lubrication can be carried out over the grease nipple.

All housing dimensions are nominal dimensions for which the usual casting tolerances must be taken into consideration.

Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	Housing	D	A1	A2	B	B1	D3	E	L	L1	L2	L3	α	Fastening screw
24244-20204	MUC 204	FL 204	20	12,7	15	113	60	12	90	33,3	31	25,5	11	10°	M10
24244-25205	MUC 205	FL 205	25	14,3	16	130	68	16	99	35,8	34,1	27	13	10°	M14
24244-30206	MUC 206	FL 206	30	15,9	18	148	80	16	117	40,2	38,1	31	13	10°	M14
24244-35207	MUC 207	FL 207	35	17,5	19	161	90	16	130	44,4	42,9	34	14	10°	M14
24244-40208	MUC 208	FL 208	40	19	21	175	100	16	144	51,2	49,2	36	14	10°	M14
24244-45209	MUC 209	FL 209	45	19	22	188	108	19	148	52,2	49,2	38	15	10°	M16
24244-50210	MUC 210	FL 210	50	19	22	197	115	19	157	54,6	51,6	40	15	10°	M16

Pillow block bearing flange type

2-hole



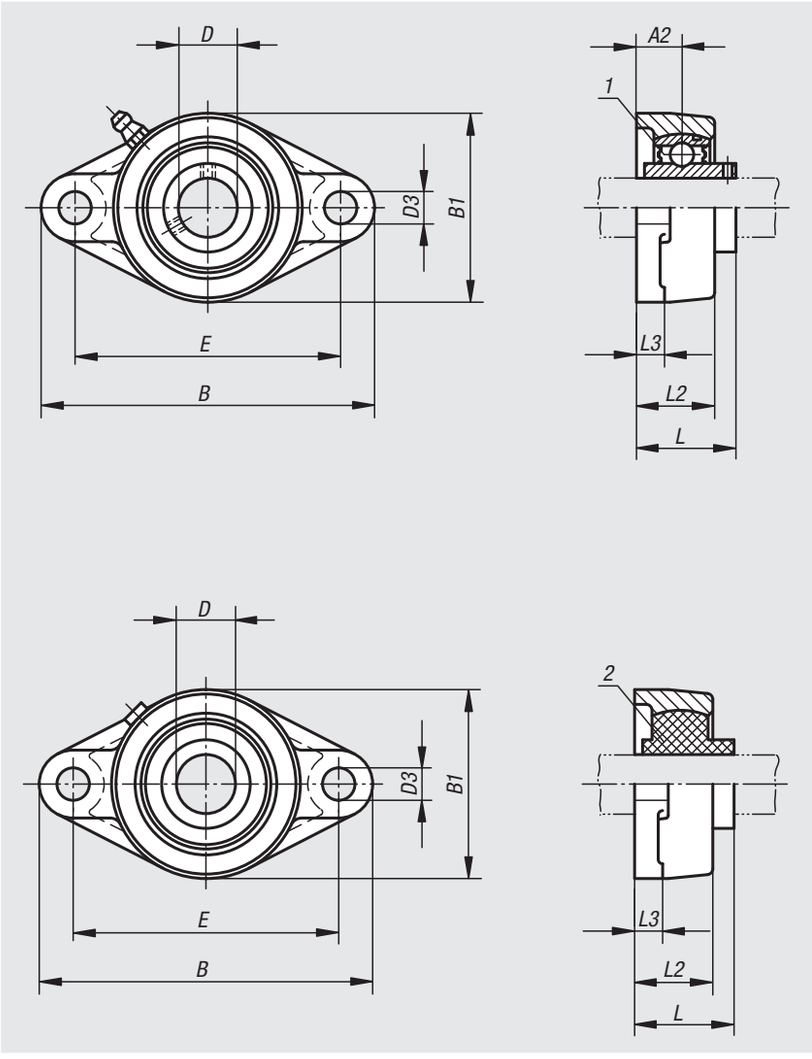
Material:
Housing 1.4301.
Ball bearing 1.4112.
Plain bearing POM.

Version:
Plain bearing white.
Stainless steel parts bright.

Sample order:
nlm 24244-01-12201

Note:
These stainless steel pillow block bearings have the same operating dimensions as the standard bearing housings of the major manufacturers, and can so be used or exchanged in existing constructions.

Drawing reference:
1) ball bearing
2) plain bearing



With ball bearing

Order No.	Housing	D	B	E	B1	D3	L	L2	L3	A2
24244-01-12201	201	12	112	90	60	11	33	26	11	14,7
24244-01-15202	202	15	112	90	60	11	33	26	11	14,7
24244-01-20204	204	20	112	90	60	11	33	26	11	14,7
24244-01-25205	205	25	125	99	67,5	11,5	35,5	27	13	15,8
24244-01-30206	206	30	141	117	80	11,5	40	30,2	14,3	17,8
24244-01-35207	207	35	156	130	90	13	44,5	34	14,3	19,1
24244-01-40208	208	40	172	144	100	13	51,2	36	14,3	21

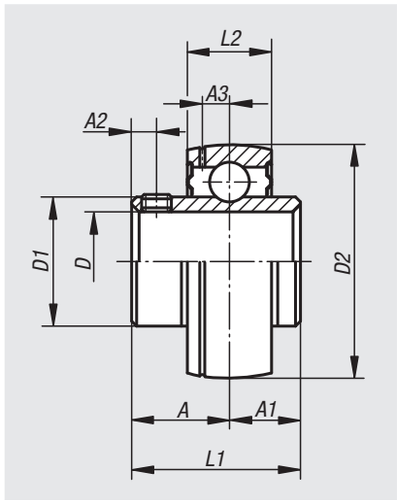
With POM plain bearing

Order No.	Housing	D	B	E	B1	D3	L	L2	L3
24244-01-112201	201	12	112	90	60	11	33	26	11
24244-01-115202	202	15	112	90	60	11	33	26	11
24244-01-120204	204	20	112	90	60	11	33	26	11
24244-01-125205	205	25	125	99	67,5	11,5	35,5	27	13
24244-01-130206	206	30	141	117	80	11,5	40	30,2	14,3
24244-01-135207	207	35	156	130	90	13	44,5	34	14,3
24244-01-140208	208	40	172	144	100	13	51,2	36	14,3

Insert bearing MUC

stainless steel





Material:
Stainless steel 1.4125.
Seal, rubber NBR.

Version:
Sealed on both sides with a spherical outer ring.
Can be re-lubricated.

Sample order:
nlm 24248-20204

Note:
The internal construction of the insert bearings corresponds to that of standard Series 6200 and 6300 radial ball bearing. However, they have wider inner rings for easier fastening on shafts. The inner rings are manufactured with a plus tolerance. This results in transition or press fits when using shafts with h-tolerances. The shaft is secured by 2 grub screws positioned 120° apart on the inner ring.

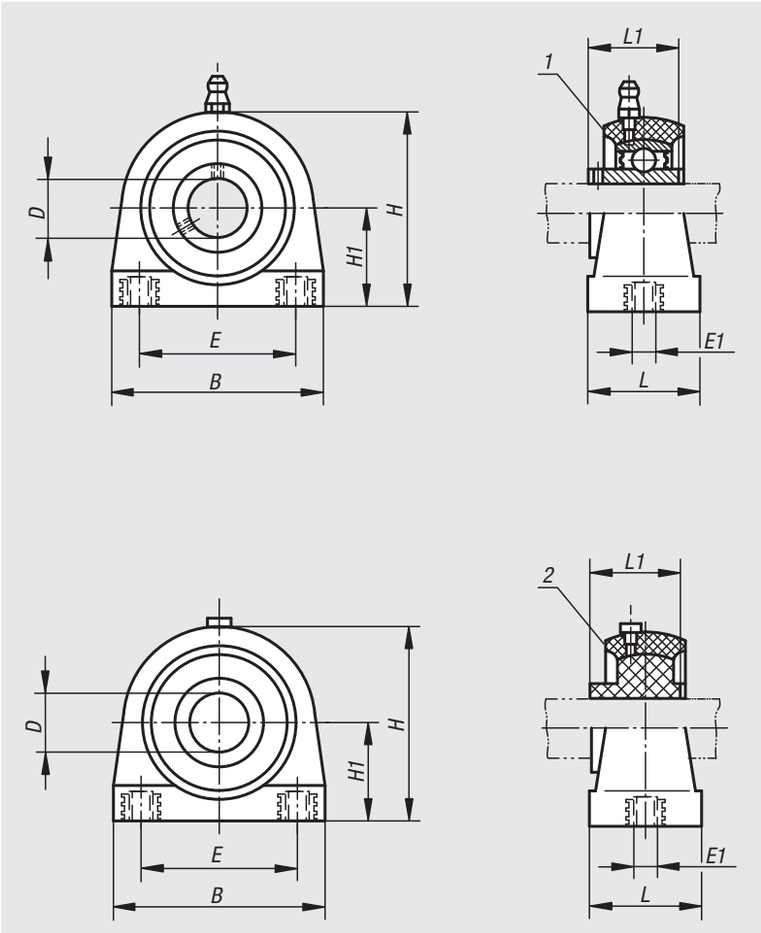
The insert bearings are ready to install and are permanently lubricated with a suitable ball bearing grease. In normal applications, re-lubrication is not necessary.

Temperature range:
-15 °C to +100 °C.

Order No.	Bearing	D	A	A1	A2	A3	D1	D2	L1	L2	Grub screw	Dynamic base loads kN	Static base loads kN
24248-20204	MUC 204	20	18,3	12,7	4,8	3,7	29	47	31	17	M6x0,75	9,88	6,2
24248-25205	MUC 205	25	19,8	14,3	5	3,9	34	52	34,1	17	M6x0,75	7,36	6,98
24248-30206	MUC 206	30	22,2	15,9	5	5	40,5	62	38,1	19	M6x0,75	14,97	10,04
24248-35207	MUC 207	35	25,4	17,5	7	5,7	48	72	42,9	20	M8x1	19,75	13,67
24248-40208	MUC 208	40	30,2	19	8	6,2	53	80	49,2	21	M8x1	22,71	15,94
24248-45209	MUC 209	45	30,2	19	8	6,4	57,3	85	49,2	22	M8x1	24,36	17,71
24248-50210	MUC 210	50	32,6	19	10	6,5	63	90	51,6	24	M10x1,25	26,98	19,84

Pillow block bearing pedestal type





Material:
Housing plastic.
Ball bearing stainless steel 1.4112.
Plain bearing insert POM.
Bushes and grease nipple stainless steel 1.4301.

Version:
Plain bearing insert white.
Housing green.
Stainless steel parts bright.

Sample order:
nlm 24262-01-12201

Note:
The housings are very robust, hard wearing and shock proof. They are resistant to most alkaline solutions, weak acids (PH 4-9) and brines. In contrast to cast or steel housings the special plastic in these housings prevent the formation of micro-organisms.

Drawing reference:
1) ball bearing
2) plain bearing

With ball bearing

Order No.	Housing	D	H1	B	H	E	E1	L	L1
24262-01-12201	201	12	33,3	72,8	66	50,8	M8	34,5	31
24262-01-15202	202	15	33,3	72,8	66	50,8	M8	34,5	31
24262-01-20204	204	20	33,3	72,8	66	50,8	M8	34,5	31
24262-01-25205	205	25	36,5	76,2	73,5	50,8	M10	39,5	34
24262-01-30206	206	30	42,9	101	84	76,2	M10	42,5	38,1
24262-01-35207	207	35	47,6	110	95	82,6	M10	47,5	42,9
24262-01-40208	208	40	49,2	120	100,5	88,9	M12	48	49,2

With POM plain bearing

Order No.	Housing	D	H1	B	H	E	E1	L	L1
24262-01-112201	201	12	33,3	72,8	66	50,8	M8	34,5	31
24262-01-115202	202	15	33,3	72,8	66	50,8	M8	34,5	31
24262-01-120204	204	20	33,3	72,8	66	50,8	M8	34,5	31
24262-01-125205	205	25	36,5	76,2	73,5	50,8	M10	39,5	34
24262-01-130206	206	30	42,5	101	84	76,2	M10	42,5	38,1
24262-01-135207	207	35	47,6	110	95	82,6	M10	47,5	42,9
24262-01-140208	208	40	49,2	120	100,5	88,9	M12	48	49,2

Pillow block bearing flange type



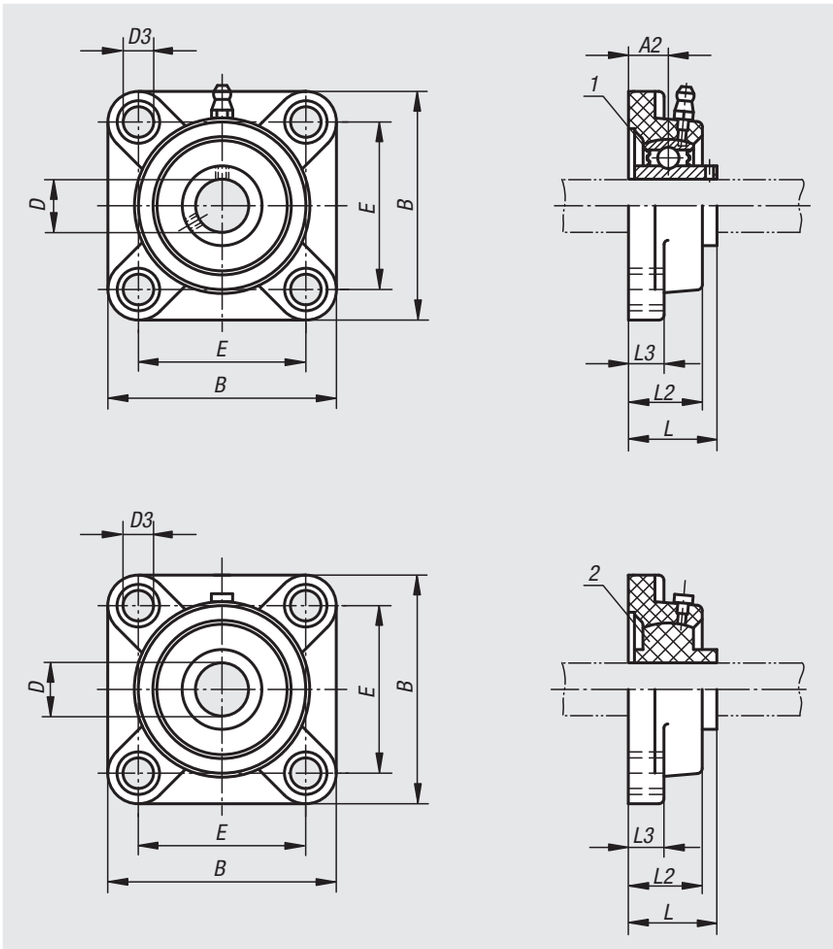
Material:
Housing plastic.
Ball bearing stainless steel 1.4112.
Plain bearing insert POM.
Bushes and grease nipple stainless steel 1.4301.

Version:
Plain bearing insert white.
Housing green.
Stainless steel parts bright.

Sample order:
nlm 24264-01-12201

Note:
The housings are very robust, hard wearing and shock proof. They are resistant to most alkaline solutions, weak acids (PH 4-9) and brines. In contrast to cast or steel housings the special plastic in these housings prevent the formation of micro-organisms.

Drawing reference:
1) ball bearing
2) plain bearing



With ball bearing

Order No.	Housing	D	B	E	D3	L	L2	L3	A2
24264-01-12201	201	12	87	63,5	11	36,3	27,8	13,4	17,8
24264-01-15202	202	15	87	63,5	11	36,3	27,8	13,4	17,8
24264-01-20204	204	20	87	63,5	11	36,3	27,8	13,4	17,8
24264-01-25205	205	25	95	70	11	36,7	28	14,3	17
24264-01-30206	206	30	107	83	11	41,4	31,5	14,3	19,2
24264-01-35207	207	35	118	92	13	46,9	34,8	15,5	21,5
24264-01-40208	208	40	130	102	14	53,2	37,5	17	23

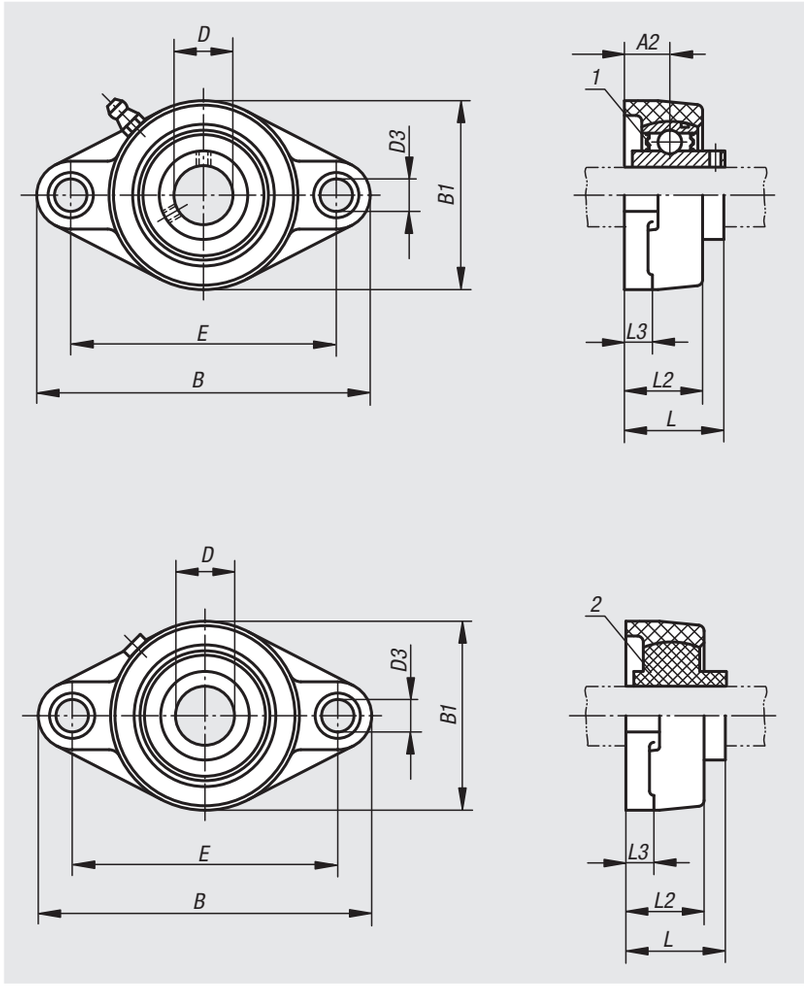
With POM plain bearing

Order No.	Housing	D	B	E	D3	L	L2	L3
24264-01-112201	201	12	87	63,5	11	36,3	27,8	13,4
24264-01-115202	202	15	87	63,5	11	36,3	27,8	13,4
24264-01-120204	204	20	87	63,5	11	36,3	27,8	13,4
24264-01-125205	205	25	95	70	11	36,7	28	14,3
24264-01-130206	206	30	107	83	11	41,4	31,5	14,3
24264-01-135207	207	35	118	92	13	46,9	34,8	15,5
24264-01-140208	208	40	130	102	14	53,2	37,5	17

Pillow block bearing flange type

2-hole





Material:
Housing plastic.
Ball bearing stainless steel 1.4112.
Plain bearing insert POM.
Bushes and grease nipple stainless steel 1.4301.

Version:
Plain bearing insert white.
Housing green.
Stainless steel parts bright.

Sample order:
nlm 24266-01-12201

Note:
The housings are very robust, hard wearing and shock proof. They are resistant to most alkaline solutions, weak acids (PH 4-9) and brines. In contrast to cast or steel housings the special plastic in these housings prevent the formation of micro-organisms.

Drawing reference:
1) ball bearing
2) plain bearing

With ball bearing

Order No.	Housing	D	B	E	B1	D3	L	L2	L3	A2
24266-01-12201	201	12	114	90	65	11	33,7	26,5	11,4	15,4
24266-01-15202	202	15	114	90	65	11	33,7	26,5	11,4	15,4
24266-01-20204	204	20	114	90	65	11	33,7	26,5	11,4	15,4
24266-01-25205	205	25	131	99	69,5	11	36,7	29,1	13,5	17
24266-01-30206	206	30	148	117	80	11	41,2	30,5	13,3	19
24266-01-35207	207	35	164	130	90	13	43,4	32,8	16,1	18
24266-01-40208	208	40	176	144	100	14	51,7	37,5	20	21,5

With POM plain bearing

Order No.	Housing	D	B	E	B1	D3	L	L2	L3
24266-01-112201	201	12	114	90	65	11	33,7	26,5	11,4
24266-01-115202	202	15	114	90	65	11	33,7	26,5	11,4
24266-01-120204	204	20	114	90	65	11	33,7	26,5	11,4
24266-01-125205	205	25	131	99	69,5	11	36,7	29,1	13,5
24266-01-130206	206	30	148	117	80	11	41,2	30,5	13,3
24266-01-135207	207	35	164	130	90	13	43,4	32,8	16,1
24266-01-140208	208	40	176	144	100	14	51,7	37,5	20

Notes

26000

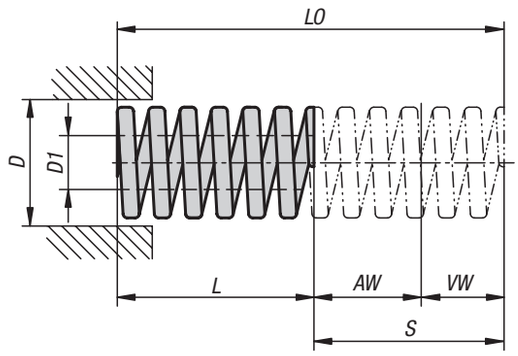
Compression springs
Elastomer springs
Rubber buffers
Shock absorbers
Gas springs



Notes

Technical information for compression springs

Note:
The compression springs are available in four colour coded load grades. Identical spring lengths and diameters enable the interchangeability of different load grades. The lengths, diameters, force and colours comply with ISO 10243.
To extend the service life, the springs have been heat-treated, abrasive blasted and pre-stressed to block height during production.

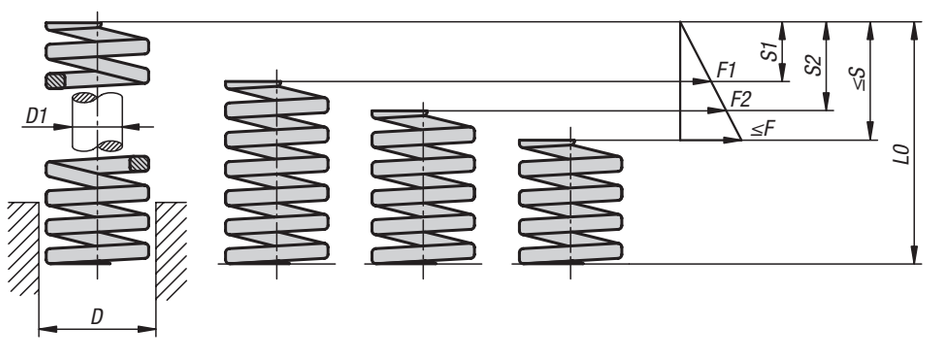


L0 = unloaded length
L = loaded length
AW = working travel
VW = preload travel
S = spring travel

Configuration:
The service life can be influenced by dividing the spring travel into the working travel and the preload travel.
The smaller the difference between the spring travel and the unloaded length, the higher the expected service life.
Select a preload as large as possible and a working travel that is as small as necessary to maximise the service life.

Ratio of loaded and unloaded spring length:

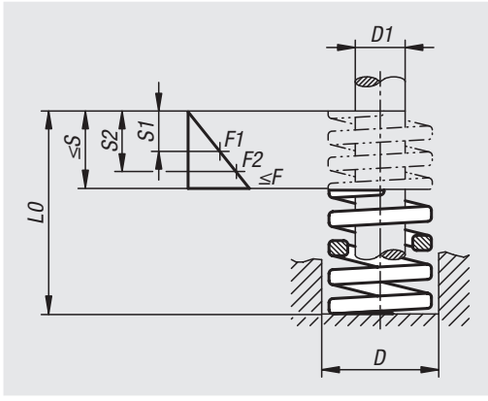
Light load				Medium load				Heavy load				Very heavy load			
Loaded length L (mm) spring travel S in % of L0			L0	Loaded length L (mm) spring travel S in % of L0			L0	Loaded length L (mm) spring travel S in % of L0			L0	Loaded length L (mm) spring travel S in % of L0			L0
Long service life S1 25 %	Medium service life S2 30 %	Maximum load ≤ S 40 %	Unloaded length L0 mm	Long service life S1 25 %	Medium service life S2 30 %	Maximum load ≤ S 37,5 %	Unloaded length L0 mm	Long service life S1 20 %	Medium service life S2 25 %	Maximum load ≤ S 30 %	Unloaded length L0 mm	Long service life S1 17 %	Medium service life S2 20 %	Maximum load ≤ S 25 %	Unloaded length L0 mm
19	17,5	14,8	25	19	17,5	15,5	25	20	19	17,5	25	20,8	20	19	25
24	22,5	19,5	32	24	22,5	20	32	26	24	22,5	32	26,5	26	24	32
25,8	27	23	38	28,5	27	24	38	30,5	28,5	27	38	31,5	30,5	28,5	38
33	31	26	44	33	31	27	44	35	33	31	44	36,5	35	33	44
38	36	31	51	38	36	32	51	41	38	36	51	42,5	41	38	51
48	45	39	64	48	45	40	64	51	48	45	64	53	51	48	64
57	53	46	76	57	53	47	76	61	57	53	76	63	61	57	76
67	62	54	89	67	62	56	89	71	67	62	89	74	71	67	89
77	71	61	102	77	71	64	102	82	77	71	102	85	82	77	102
86	81	69	115	86	81	72	115	92	86	81	115	95	92	86	115
95	89	76	127	95	89	79	127	102	95	89	127	105	102	95	127
105	98	84	140	105	98	88	140	112	105	98	140	116	112	105	140
114	106	91	152	114	106	95	152	122	114	106	152	126	122	114	152
133	125	107	178	133	125	111	178	143	133	125	178	148	143	133	178
152	142	122	203	152	142	127	203	162	152	142	203	168	162	152	203
-	-	-	-	172	160	143	229	-	-	-	-	-	-	-	-
191	178	152	254	191	178	159	254	203	191	178	254	211	203	191	254
229	213	183	305	229	213	191	305	244	229	213	305	253	244	229	305



Compression springs

ISO 10243, light load





Material:
Chrome silicon steel.

Version:
Green

Sample order:
nlm 26000-1005025

Note:
Lengths, diameters, forces and colour correspond to ISO 10243.

F1 indicates the load on the spring for a long service life with spring travel of 25% of L0.
F2 indicates the load on the spring for a medium service life with spring travel of 30% of L0.
Fmax. indicates the maximum load rating of the spring with spring travel of 40% of L0.

F = force required to compress the spring 1 mm.

Order No.	D	D1	L0	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26000-1005025	10	5	25	10	63	17	100	6,3	7,5	10
26000-1005032	10	5	32	8,5	68	82	109	8	9,6	13
26000-1005038	10	5	38	6,8	65	78	103	9,5	11	15
26000-1005044	10	5	44	6	66	78	106	11	13	18
26000-1005051	10	5	51	5	64	77	102	13	15	20
26000-1005064	10	5	64	4,3	69	83	110	16	19	26
26000-1005076	10	5	76	3,2	61	73	97	19	23	30
26000-1005305	10	5	305	1,1	84	101	134	76	92	122
26000-1206025	12,5	6,3	25	17,9	112	134	179	6,3	7,5	10
26000-1206032	12,5	6,3	32	16,4	131	157	210	8	9,6	13
26000-1206038	12,5	6,3	38	13,6	129	155	207	9,5	11	15
26000-1206044	12,5	6,3	44	12,1	133	160	213	11	13	18
26000-1206051	12,5	6,3	51	11,4	145	174	233	13	15	20
26000-1206064	12,5	6,3	64	9,3	149	179	238	16	19	26
26000-1206076	12,5	6,3	76	7,1	135	162	216	19	23	30
26000-1206089	12,5	6,3	89	5,4	120	144	192	22	27	36
26000-1206115	12,5	6,3	115	4,4	125	150	201	29	34	46
26000-1206140	12,5	6,3	140	3,7	130	155	207	35	42	56
26000-1206165	12,5	6,3	165	2,6	107	129	172	41	50	66
26000-1206190	12,5	6,3	190	2	95	114	152	48	57	76
26000-1206305	12,5	6,3	305	1,4	107	128	171	76	92	122

Compression springs

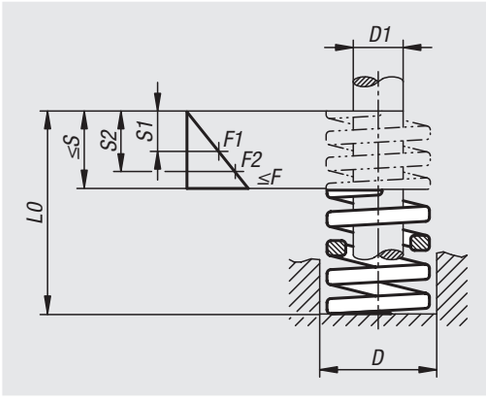
ISO 10243, light load

Order No.	D	D1	LO	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26000-1608025	16	8	25	23,4	146	176	234	6,3	7,5	10
26000-1608032	16	8	32	22,9	183	220	293	8	9,6	13
26000-1608038	16	8	38	19,3	183	220	293	9,5	11	15
26000-1608044	16	8	44	17,1	188	226	301	11	13	18
26000-1608051	16	8	51	15,7	200	240	320	13	15	20
26000-1608064	16	8	64	10,7	171	205	274	16	19	26
26000-1608076	16	8	76	10	190	228	304	19	23	30
26000-1608089	16	8	89	8,6	191	230	306	22	27	36
26000-1608102	16	8	102	7,8	199	239	318	26	31	41
26000-1608305	16	8	305	2,5	191	229	305	76	92	122
26000-2010025	20	10	25	55,6	348	417	556	6,3	7,5	10
26000-2010032	20	10	32	42,7	342	410	547	8	9,6	13
26000-2010038	20	10	38	33,9	322	386	515	9,5	11	15
26000-2010044	20	10	44	28,5	314	376	502	11	13	18
26000-2010051	20	10	51	24,7	315	378	504	13	15	20
26000-2010064	20	10	64	19,3	308	370	493	16	19	26
26000-2010076	20	10	76	16,1	306	367	489	19	23	30
26000-2010089	20	10	89	13,5	299	359	479	22	27	36
26000-2010102	20	10	102	11,8	301	362	482	26	31	41
26000-2010115	20	10	115	10,4	299	358	478	29	35	46
26000-2010127	20	10	127	9,4	298	358	478	32	38	51
26000-2010140	20	10	140	8,5	297	357	476	35	42	56
26000-2010152	20	10	152	7,9	299	359	479	38	46	61
26000-2010305	20	10	305	3,8	288	346	462	76	92	122
26000-2512025	25	12,5	25	100	625	750	1000	6,3	7,5	10
26000-2512032	25	12,5	32	80,6	644	773	1030	8	9,6	13
26000-2512038	25	12,5	38	64,8	616	739	985	9,5	11	15
26000-2512044	25	12,5	44	53,3	586	704	938	11	13	18
26000-2512051	25	12,5	51	46,2	589	707	942	13	15	20
26000-2512064	25	12,5	64	35,7	572	686	915	16	19	26
26000-2512076	25	12,5	76	29,2	556	667	889	19	23	30
26000-2512089	25	12,5	89	24,8	552	662	883	22	27	36
26000-2512102	25	12,5	102	21,2	540	648	865	26	31	41
26000-2512115	25	12,5	115	18,7	539	646	862	29	35	46
26000-2512127	25	12,5	127	16,7	532	638	851	32	38	51
26000-2512140	25	12,5	140	15,2	532	638	851	35	42	56
26000-2512152	25	12,5	152	13,9	528	634	845	38	46	61
26000-2512178	25	12,5	178	11,9	530	635	847	45	53	71
26000-2512203	25	12,5	203	10,5	534	641	855	51	61	81
26000-2512305	25	12,5	305	7	533	639	853	76	92	122

Compression springs

ISO 10243, moderate load





Material:
Chrome silicon steel.

Version:
blue.

Sample order:
nlm 26001-1005025

Note:
Lengths, diameters, forces and colour correspond to ISO 10243.

F1 indicates the load on the spring for a long service life with spring travel of 25% of L0.
F2 indicates the load on the spring for a medium service life with spring travel of 30% of L0.
Fmax. indicates the maximum load rating of the spring with spring travel of 37.5% of L0.

F = force required to compress the spring 1 mm.

Order No.	D	D1	L0	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26001-1005025	10	5	25	16	100	120	150	6,3	7,5	9,4
26001-1005032	10	5	32	13	104	125	156	8	9,6	12
26001-1005038	10	5	38	11,9	113	136	170	9,5	11	14
26001-1005044	10	5	44	10,3	113	136	170	11	13	17
26001-1005051	10	5	51	8,9	113	136	170	13	15	19
26001-1005064	10	5	64	7,5	120	144	180	16	19	24
26001-1005076	10	5	76	5,3	101	121	151	19	23	29
26001-1005305	10	5	305	1,6	122	146	183	76	92	114
26001-1206025	12,5	6,3	25	30	188	225	281	6,3	7,5	9,4
26001-1206032	12,5	6,3	32	24,8	198	238	298	8	9,6	12
26001-1206038	12,5	6,3	38	21,4	203	244	305	9,5	11	14
26001-1206044	12,5	6,3	44	18,5	204	244	305	11	13	17
26001-1206051	12,5	6,3	51	15,5	198	237	296	13	15	19
26001-1206064	12,5	6,3	64	12,1	194	232	290	16	19	24
26001-1206076	12,5	6,3	76	10,2	194	233	291	19	23	29
26001-1206089	12,5	6,3	89	8,4	187	224	280	22	27	33
26001-1206305	12,5	6,3	305	2,1	160	192	240	76	92	114

Compression springs

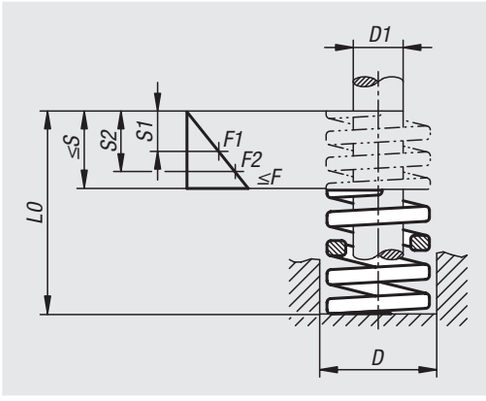
ISO 10243, moderate load

Order No.	D	D1	LO	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26001-1608025	16	8	25	49,4	309	371	463	6,3	7,5	9,4
26001-1608032	16	8	32	37,1	297	356	445	8	9,6	12
26001-1608038	16	8	38	33,9	322	386	483	9,5	11	14
26001-1608044	16	8	44	30	330	396	495	11	13	17
26001-1608051	16	8	51	26,4	337	404	505	13	15	19
26001-1608064	16	8	64	20,5	328	394	492	16	19	24
26001-1608076	16	8	76	17,8	338	406	507	19	23	29
26001-1608089	16	8	89	15,2	338	406	507	22	27	33
26001-1608102	16	8	102	13,5	344	413	516	26	31	38
26001-1608305	16	8	305	4,8	366	439	549	76	92	114
26001-2010025	20	10	25	90,3	564	677	847	6,3	7,5	9,4
26001-2010032	20	10	32	68,3	546	656	820	8	9,6	12
26001-2010038	20	10	38	55,1	523	628	785	9,5	11	14
26001-2010044	20	10	44	45	495	594	743	11	13	17
26001-2010051	20	10	51	38,9	496	595	744	13	15	19
26001-2010064	20	10	64	30,4	486	584	730	16	19	24
26001-2010076	20	10	76	24,8	471	565	707	19	23	29
26001-2010089	20	10	89	21,3	473	569	711	22	27	33
26001-2010102	20	10	102	18,6	474	568	710	26	31	38
26001-2010115	20	10	115	16,3	469	563	704	29	35	43
26001-2010127	20	10	127	14,7	467	560	700	32	38	48
26001-2010140	20	10	140	13,3	466	559	698	35	42	53
26001-2010152	20	10	152	12	456	547	684	38	46	57
26001-2010305	20	10	305	6,1	462	554	693	76	92	114
26001-2512025	25	12,5	25	151	942	1130	1410	6,3	7,5	9,4
26001-2512032	25	12,5	32	119	948	1140	1420	8	9,6	12
26001-2512038	25	12,5	38	93,4	887	1060	1330	9,5	11	14
26001-2512044	25	12,5	44	83,2	915	1100	1370	11	13	17
26001-2512051	25	12,5	51	68,9	878	1050	1320	13	15	19
26001-2512064	25	12,5	64	53,2	851	1020	1280	16	19	24
26001-2512076	25	12,5	76	43,3	823	987	1230	19	23	29
26001-2512089	25	12,5	89	38	846	1010	1270	22	27	33
26001-2512102	25	12,5	102	33	842	1010	1260	26	31	38
26001-2512115	25	12,5	115	29,3	842	1010	1260	29	35	43
26001-2512127	25	12,5	127	26,4	838	1010	1260	32	38	48
26001-2512140	25	12,5	140	23,8	833	1000	1250	35	42	53
26001-2512152	25	12,5	152	21,8	828	994	1240	38	46	57
26001-2512178	25	12,5	178	18,5	823	988	1230	45	53	67
26001-2512203	25	12,5	203	16	810	972	1210	51	61	76
26001-2512305	25	12,5	305	10,5	797	957	1200	76	92	114

Compression springs

ISO 10243, heavy load





Material:
Chrome silicon steel.

Version:
Red

Sample order:
nlm 26002-1005025

Note:
Lengths, diameters, forces and colour correspond to ISO 10243.

F1 indicates the load on the spring for a long service life with spring travel of 20% of L0.
F2 indicates the load on the spring for a medium service life with spring travel of 25% of L0.
Fmax. indicates the maximum load rating of the spring with spring travel of 30% of L0.

F = force required to compress the spring 1 mm.

Order No.	D	D1	L0	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26002-1005025	10	5	25	22,1	111	138	166	5	6,3	7,5
26002-1005032	10	5	32	17,5	112	140	168	6,4	8	9,6
26002-1005038	10	5	38	17,1	130	162	195	7,6	9,5	11
26002-1005044	10	5	44	15	132	165	198	8,8	11	13
26002-1005051	10	5	51	12,8	131	163	196	10	13	15
26002-1005064	10	5	64	10,7	137	171	205	13	16	19
26002-1005076	10	5	76	7,5	114	143	171	15	19	23
26002-1005305	10	5	305	2,1	128	160	192	61	76	92
26002-1206025	12,5	6,3	25	42,1	211	263	316	5	6,3	7,5
26002-1206032	12,5	6,3	32	33,2	212	266	319	6,4	8	9,6
26002-1206038	12,5	6,3	38	29,3	223	278	334	7,6	9,5	11
26002-1206044	12,5	6,3	44	24,6	216	271	325	8,8	11	13
26002-1206051	12,5	6,3	51	19,6	200	250	300	10	13	15
26002-1206064	12,5	6,3	64	15	192	240	288	13	16	19
26002-1206076	12,5	6,3	76	13,2	201	251	301	15	19	23
26002-1206089	12,5	6,3	89	11,4	203	254	304	18	22	27
26002-1206305	12,5	6,3	305	2,8	171	214	256	61	76	92

Compression springs

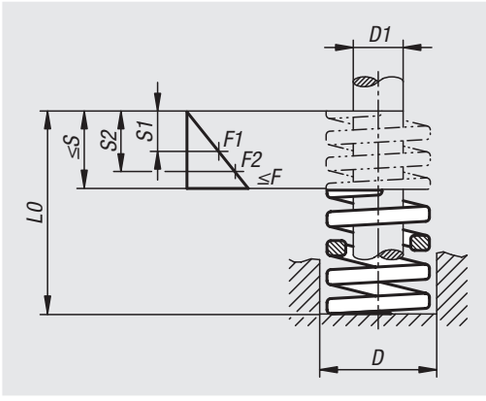
ISO 10243, heavy load

Order No.	D	D1	LO	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26002-1608025	16	8	25	75,7	379	473	568	5	6,3	7,5
26002-1608032	16	8	32	52,8	338	422	507	6,4	8	9,6
26002-1608038	16	8	38	48,5	369	461	553	7,6	9,5	11
26002-1608044	16	8	44	42,8	377	471	565	8,8	11	13
26002-1608051	16	8	51	37,1	378	473	568	10	13	15
26002-1608064	16	8	64	30,3	388	485	582	13	16	19
26002-1608076	16	8	76	25,7	391	488	586	15	19	23
26002-1608089	16	8	89	21,7	386	483	579	18	22	27
26002-1608102	16	8	102	19,3	394	492	591	20	26	31
26002-1608305	16	8	305	7,1	433	541	650	61	76	92
26002-2010025	20	10	25	216	1080	1350	1620	5	6,3	7,5
26002-2010032	20	10	32	168	1080	1340	1610	6,4	8	9,6
26002-2010038	20	10	38	129	980	1230	1470	7,6	9,5	11
26002-2010044	20	10	44	112	986	1230	1480	8,8	11	13
26002-2010051	20	10	51	94	959	1200	1440	10	13	15
26002-2010064	20	10	64	72,1	923	1150	1380	13	16	19
26002-2010076	20	10	76	59,7	907	1130	1360	15	19	23
26002-2010089	20	10	89	50,5	899	1120	1350	18	22	27
26002-2010102	20	10	102	44,2	902	1130	1350	20	26	31
26002-2010115	20	10	115	38,4	883	1100	1320	23	29	35
26002-2010127	20	10	127	34,1	866	1080	1300	25	32	38
26002-2010140	20	10	140	31	868	1090	1300	28	35	42
26002-2010152	20	10	152	28,2	857	1070	1290	30	38	46
26002-2010305	20	10	305	15	915	1140	1370	61	76	92
26002-2512025	25	12,5	25	380	1900	2380	2850	5	6,3	7,5
26002-2512032	25	12,5	32	276	1770	2210	2650	6,4	8	9,6
26002-2512038	25	12,5	38	220	1670	2090	2500	7,6	9,5	11
26002-2512044	25	12,5	44	185	1620	2030	2440	8,8	11	13
26002-2512051	25	12,5	51	157	1600	2010	2410	10	13	15
26002-2512064	25	12,5	64	122	1560	1950	2330	13	16	19
26002-2512076	25	12,5	76	100	1520	1900	2280	15	19	23
26002-2512089	25	12,5	89	84,4	1500	1880	2250	18	22	27
26002-2512102	25	12,5	102	73,5	1500	1870	2250	20	26	31
26002-2512115	25	12,5	115	65,2	1500	1870	2250	23	29	35
26002-2512127	25	12,5	127	57,5	1460	1830	2190	25	32	38
26002-2512140	25	12,5	140	52,1	1460	1820	2190	28	35	42
26002-2512152	25	12,5	152	48	1460	1820	2190	30	38	46
26002-2512178	25	12,5	178	40,9	1460	1820	2180	36	45	53
26002-2512203	25	12,5	203	35,7	1450	1810	2170	41	51	61
26002-2512305	25	12,5	305	22,9	1400	1750	2100	61	76	92

Compression springs

ISO 10243, very heavy load





Material:
Chrome silicon steel.

Version:
yellow.

Sample order:
nlm 26003-1005025

Note:
Lengths, diameters, forces and colour correspond to ISO 10243.

F1 indicates the load on the spring for a long service life with spring travel of 17% of L0.
F2 indicates the load on the spring for a medium service life with spring travel of 20% of L0.
Fmax. indicates the maximum load rating of the spring with spring travel of 25% of L0.

F = force required to compress the spring 1 mm.

Order No.	D	D1	L0	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26003-1005025	10	5	25	32,5	138	163	203	4,3	5	6,3
26003-1005032	10	5	32	25,1	137	161	201	5,4	6,4	8
26003-1005038	10	5	38	20,9	135	159	199	6,5	7,6	9,5
26003-1005044	10	5	44	17,9	134	158	197	7,5	8,8	11
26003-1005051	10	5	51	15	130	153	191	8,7	10	13
26003-1005064	10	5	64	12	131	154	192	11	13	16
26003-1005076	10	5	76	10	129	152	190	13	15	19
26003-1005305	10	5	305	2,4	124	146	183	52	61	76
26003-1206025	12,5	6,3	25	58,4	248	292	365	4,3	5	6,3
26003-1206032	12,5	6,3	32	44,4	242	284	355	5,4	6,4	8
26003-1206038	12,5	6,3	38	36	233	274	342	6,5	7,6	9,5
26003-1206044	12,5	6,3	44	30,9	231	272	340	7,5	8,8	11
26003-1206051	12,5	6,3	51	27	234	275	344	8,7	10	13
26003-1206064	12,5	6,3	64	21,6	235	276	346	11	13	16
26003-1206076	12,5	6,3	76	17,8	230	271	338	13	15	19
26003-1206089	12,5	6,3	89	15,2	230	271	338	15	18	22
26003-1206305	12,5	6,3	305	4,3	223	262	328	52	61	76

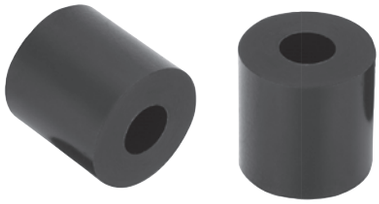
Compression springs

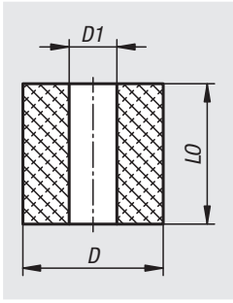
ISO 10243, very heavy load

Order No.	D	D1	L0	F N	F1 N	F2 N	F max. N	S1	S2	S max.
26003-1608025	16	8	25	126	533	628	784	4,3	5	6,3
26003-1608032	16	8	32	92,8	505	594	742	5,4	6,4	8
26003-1608038	16	8	38	74,9	484	569	712	6,5	7,6	9,5
26003-1608044	16	8	44	63	471	554	693	7,5	8,8	11
26003-1608051	16	8	51	55,1	478	562	703	8,7	10	13
26003-1608064	16	8	64	42,9	467	549	686	11	13	16
26003-1608076	16	8	76	35,3	456	537	671	13	15	19
26003-1608089	16	8	89	29,8	451	530	663	15	18	22
26003-1608102	16	8	102	26,1	453	532	666	17	20	26
26003-1608305	16	8	305	8,5	443	521	652	52	61	76
26003-2010025	20	10	25	293	1250	1470	1830	4,3	5	6,3
26003-2010032	20	10	32	224	1220	1430	1790	5,4	6,4	8
26003-2010038	20	10	38	177	1140	1350	1680	6,5	7,6	9,5
26003-2010044	20	10	44	149	1110	1310	1640	7,5	8,8	11
26003-2010051	20	10	51	128	1110	1310	1630	8,7	10	13
26003-2010064	20	10	64	99	1080	1270	1580	11	13	16
26003-2010076	20	10	76	81,7	1060	1240	1550	13	15	19
26003-2010089	20	10	89	69,5	1050	1240	1550	15	18	22
26003-2010102	20	10	102	60,6	1050	1240	1550	17	20	26
26003-2010115	20	10	115	53	1040	1220	1520	20	23	29
26003-2010127	20	10	127	47,6	1030	1210	1510	22	25	32
26003-2010140	20	10	140	43	1020	1200	1510	24	28	35
26003-2010152	20	10	152	39	1010	1190	1480	26	30	38
26003-2010305	20	10	305	21,2	1100	1290	1620	52	61	76
26003-2512032	25	12,5	32	354	1930	2270	2830	5,4	6,4	8
26003-2512038	25	12,5	38	280	1810	2130	2660	6,5	7,6	9,5
26003-2512044	25	12,5	44	232	1730	2040	2550	7,5	8,8	11
26003-2512051	25	12,5	51	198	1710	2020	2520	8,7	10	13
26003-2512064	25	12,5	64	154	1670	1970	2460	11	13	16
26003-2512076	25	12,5	76	125	1620	1900	2380	13	15	19
26003-2512089	25	12,5	89	106	1600	1880	2350	15	18	22
26003-2512102	25	12,5	102	91,2	1580	1860	2330	17	20	26
26003-2512115	25	12,5	115	81,1	1590	1870	2330	20	23	29
26003-2512127	25	12,5	127	72,1	1560	1830	2290	22	25	32
26003-2512140	25	12,5	140	65,5	1560	1830	2290	24	28	35
26003-2512152	25	12,5	152	60,1	1550	1830	2280	26	30	38
26003-2512178	25	12,5	178	51,3	1550	1830	2280	30	36	45
26003-2512203	25	12,5	203	44,7	1540	1810	2270	35	41	51
26003-2512305	25	12,5	305	29,6	1530	1810	2260	52	61	76

Elastomer buffers

Shore 70A





Material:
Polyurethane.

Version:
Soft Shore hardness 70A ±5.
Colour black.

Sample order:
nlm 26090-02001670

Note:
Elastomer buffers are characterised by high load capacity, long service life and high economy due to being entirely maintenance-free. They also provide outstanding protection for persons and machines since the buffers do not rupture when overloaded.
They are used to insulate and dampen air and structure-borne sound and offer progressive buffering characteristics with sustained excellent performance. They are also resistant to grease and oils and, in terms of performance and quality fulfil the requirements of the standard ISO 10069-1.

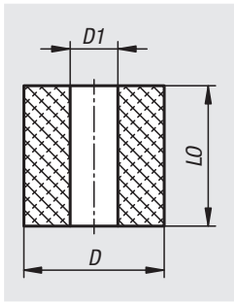
Temperature range:
-20 °C to +80 °C.

Order No.	D	D1	LO
26090-01601270	16	6,5	12,5
26090-01601670	16	6,5	16
26090-01602070	16	6,5	20
26090-01602570	16	6,5	25
26090-02001670	20	8,5	16
26090-02002070	20	8,5	20
26090-02002570	20	8,5	25
26090-02003270	20	8,5	32
26090-02502070	25	10,5	20
26090-02502570	25	10,5	25
26090-02503270	25	10,5	32
26090-02504070	25	10,5	40
26090-03203270	32	13,5	32
26090-03204070	32	13,5	40
26090-03205070	32	13,5	50
26090-03206370	32	13,5	63
26090-05003270	50	17	32
26090-05004070	50	17	40
26090-05005070	50	17	50
26090-05006370	50	17	63
26090-05008070	50	17	80
26090-05010070	50	17	100
26090-10003270	100	21	32
26090-10004070	100	21	40
26090-10005070	100	21	50
26090-10006370	100	21	63
26090-10008070	100	21	80
26090-10010070	100	21	100
26090-10012570	100	21	125

Elastomer buffers

Shore 80A





Material:
Polyurethane.

Version:
Medium Shore hardness 80A ±5.
Colour yellow.

Sample order:
nlm 26091-01601280

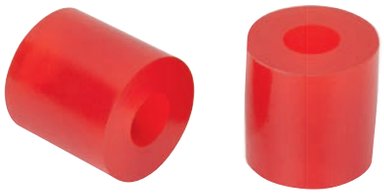
Note:
Elastomer buffers are characterised by high load capacity, long service life and high economy due to being entirely maintenance-free. They also provide outstanding protection for persons and machines since the buffers do not rupture when overloaded.
They are used to insulate and dampen air and structure-borne sound and offer progressive buffering characteristics with sustained excellent performance. They are also resistant to grease and oils and, in terms of performance and quality fulfil the requirements of the standard ISO 10069-1.

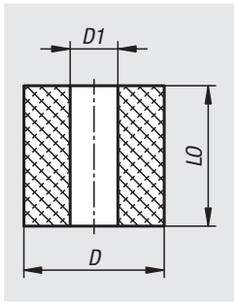
Temperature range:
-20 °C to +80 °C.

Order No.	D	D1	LO
26091-01601280	16	6,5	12,5
26091-01601680	16	6,5	16
26091-01602080	16	6,5	20
26091-01602580	16	6,5	25
26091-02001680	20	8,5	16
26091-02002080	20	8,5	20
26091-02002580	20	8,5	25
26091-02003280	20	8,5	32
26091-02502080	25	10,5	20
26091-02502580	25	10,5	25
26091-02503280	25	10,5	32
26091-02504080	25	10,5	40
26091-03203280	32	13,5	32
26091-03204080	32	13,5	40
26091-03205080	32	13,5	50
26091-03206380	32	13,5	63
26091-05003280	50	17	32
26091-05004080	50	17	40
26091-05005080	50	17	50
26091-05006380	50	17	63
26091-05008080	50	17	80
26091-05010080	50	17	100
26091-10003280	100	21	32
26091-10004080	100	21	40
26091-10005080	100	21	50
26091-10006380	100	21	63
26091-10008080	100	21	80
26091-10010080	100	21	100
26091-10012580	100	21	125

Elastomer buffers

Shore 90A





Material:
Polyurethane.

Version:
Hard Shore hardness 90A ±5.
Colour red.

Sample order:
nlm 26092-02001690

Note:
Elastomer buffers are characterised by high load capacity, long service life and high economy due to being entirely maintenance-free. They also provide outstanding protection for persons and machines since the buffers do not rupture when overloaded.
They are used to insulate and dampen air and structure-borne sound and offer progressive buffering characteristics with sustained excellent performance.
They are also resistant to grease and oils and, in terms of performance and quality fulfil the requirements of the standard ISO 10069-1.

Temperature range:
-20 °C to +80 °C.

Order No.	D	D1	LO
26092-01601290	16	6,5	12,5
26092-01601690	16	6,5	16
26092-01602090	16	6,5	20
26092-01602590	16	6,5	25
26092-02001690	20	8,5	16
26092-02002090	20	8,5	20
26092-02002590	20	8,5	25
26092-02003290	20	8,5	32
26092-02502090	25	10,5	20
26092-02502590	25	10,5	25
26092-02503290	25	10,5	32
26092-02504090	25	10,5	40
26092-03203290	32	13,5	32
26092-03204090	32	13,5	40
26092-03205090	32	13,5	50
26092-03206390	32	13,5	63
26092-05003290	50	17	32
26092-05004090	50	17	40
26092-05005090	50	17	50
26092-05006390	50	17	63
26092-05008090	50	17	80
26092-05010090	50	17	100
26092-10003290	100	21	32
26092-10004090	100	21	40
26092-10005090	100	21	50
26092-10006390	100	21	63
26092-10008090	100	21	80
26092-10010090	100	21	100
26092-10012590	100	21	125

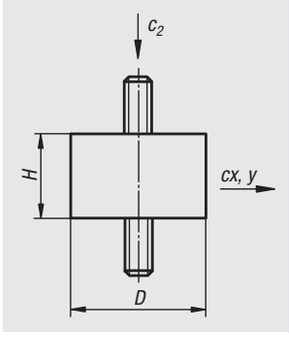
Technical information for rubber buffers

Note:
Our rubber buffers are simple and cost-efficient standard units for elastic mounting. They are ideally suited for compressive and axial loads of a diverse range of applications. With shear stress however, they are substantially less resilient than with compressive stress. The adjacent tables provide a guide to the static load values. By high dynamic alternating loads or high frequencies the loading should be reduced proportionately.

Guide values for static load (excerpt from 26100, 26102, 26104 and 26106)

Type	D	H	Compressive loads						Shear stresses					
			Spring rate c2 in N/mm			Permissible load F in N			Spring rate cx, y in N/mm			Permissible load F in N		
			hard	medium	soft	hard	medium	soft	hard	medium	soft	hard	medium	soft
A	20	15	300	190	120	500	320	200	60	40	30	190	120	70
A	30	15	670	410	250	1100	700	400	90	60	40	350	210	130
A	30	30	240	150	100	900	570	340	50	30	20	430	280	170
A	40	30	480	300	170	1800	1110	670	90	60	30	770	500	250
A	50	20	2400	1500	900	5000	3190	1870	240	160	100	1200	770	460
A	50	40	600	380	220	2800	1750	1050	120	80	50	1280	800	460
A	75	25	5000	1655	1700	8000	5000	3300	410	260	160	2800	1750	1030
A	75	55	650	400	240	4700	3000	1750	130	80	50	2100	1300	800
B	25	20	320	160	120	490	320	190	70	45	25	230	160	90
B	30	20	660	430	260	830	520	310	100	75	50	330	210	130
B	30	30	350	220	130	750	450	280	70	50	30	350	220	130
B	40	30	550	350	210	1250	750	450	110	70	40	520	330	200
B	50	40	560	370	220	2100	1270	760	120	80	45	930	580	350
B	50	50	350	220	130	1750	1100	650	80	50	30	800	510	310
B	75	50	950	630	330	4700	2910	1720	180	120	80	1900	1200	710
C	20	25	200	130	80	300	190	120	50	30	20	150	90	60
C	30	30	590	380	220	720	450	270	90	60	50	260	170	110
C	40	30	900	570	340	1080	680	410	150	90	60	380	240	140
C	50	30	1700	1090	650	2500	1750	950	210	150	70	470	290	170
C	50	50	360	220	140	1390	870	520	80	40	30	610	390	230
C	75	50	1010	630	370	3650	2050	1200	200	130	80	1560	980	580

Type	D	H	Compressive loads	
			Spring rate c2 in N/mm	Permissible load F in N
			medium	medium
D	25	20	150	260
D	30	20	330	730
D	40	30	250	950
D	50	20	660	1750
D	75	25	1430	4650



Rubber hardness:
hard = Shore 70 medium = Shore 55 soft = Shore 45

For general guidance natural rubber is ca. Shore 55.

static compression load: F (max.) = ca. 6.5 kg/cm² (63.77 N/cm²)

static axial load: F (max.) = ca. 1.5 kg/cm² (14.72 N/cm²)

by 10 % spring displacement, or transverse travel during axial load.

Naturally, much higher loads are possible without damage, but these considerably effect the rubber buffer in its primary purpose. Tensile loads are possible but should be avoided on account of the peak stress at the contact edges and the notch sensitivity of rubber.

Tolerances for rubber buffers
Permissible dimensional deviations per DIN 7751 Part 2. Permissible hardness deviation ±5 Shore A.

Synoptical Table - Properties of the Individual Material

Rubber material		Main Characteristics - Resistance to									
Abb.	Polymer	Temperature	Tensile strength	Fracture elongation	Aging	Ozone	Petrol	Oil	Acid	Alkalis	Tensile strain
NR (NK)	Natural rubber	-30 °C – +80 °C	1	1	3	4	6	6	3	3	600%
SBR	Styrene-butadiene rubber	-30 °C – +80 °C	5	2	3	4	4	5	3	3	450%
CR	Chloroprene rubber	-20 °C – +110 °C	3	2	2	2	2	2	2	2	450%
NBR	Acrylonitrile-butadiene rubber	-30 °C – +120 °C	5	2	3	3	1	1	4	3	450%
EPDM	Ethylene propylene terpolymer	-30 °C – +130 °C	5	3	1	1	5	4	1	2	450%
SI	Silicone rubber	-60 °C – +200 °C	6	4	1	1	5	4	5	5	500%

1 = excellent 2 = very good 3 = good 4 = moderate 5 = low 6 = insufficient

Rubber buffers

steel or stainless steel, type A



Material:
Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, Shore 55A.

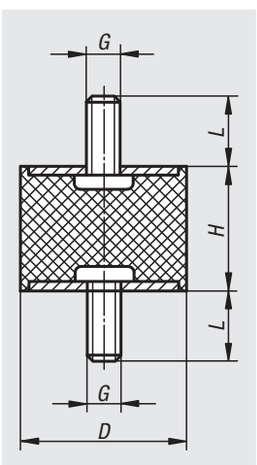
Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 26100-00800855

Note:
The rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

On request:
Other Shore grades.

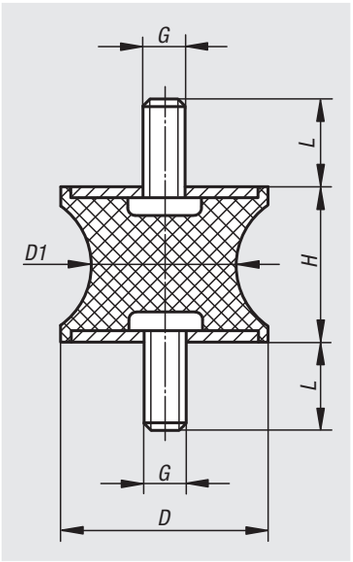


Order No.	Main material	D	G	L	H	Spring stiffness N/mm	Load N
26100-00800855	steel	8	M3	6	8	24	31
26100-01001055	steel	10	M4	10	10	35	32
26100-01001555	steel	10	M4	10	15	50	50
26100-01500855	steel	15	M4	10	8	130	104
26100-01501055	steel	15	M4	10	10	122	122
26100-01501555	steel	15	M4	10	15	59	88
26100-02000855	steel	20	M6	18	8	725	580
26100-02001055	steel	20	M6	18	10	300	300
26100-02001555	steel	20	M6	18	15	200	300
26100-02002055	steel	20	M6	18	20	133	332
26100-02002555	steel	20	M6	18	25	90	270
26100-02501055	steel	25	M6	18	10	800	800
26100-02501555	steel	25	M6	18	15	294	441
26100-02502055	steel	25	M6	18	20	200	500
26100-02502555	steel	25	M6	18	25	94	282
26100-02503055	steel	25	M6	18	30	70	280
26100-03001555	steel	30	M8	23	15	587	880
26100-03002055	steel	30	M8	23	20	318	795
26100-03002555	steel	30	M8	23	25	183	549
26100-03003055	steel	30	M8	23	30	150	600
26100-03004055	steel	30	M8	23	40	77	385
26100-04001555	steel	40	M8	23	15	1250	1875
26100-04002055	steel	40	M8	23	20	565	1412
26100-04003055	steel	40	M8	23	30	300	1200
26100-04004055	steel	40	M8	23	40	189	945
26100-05002055	steel	50	M10	28	20	1300	3250
26100-05002555	steel	50	M10	28	25	667	2000
26100-05003055	steel	50	M10	28	30	500	2000
26100-05004055	steel	50	M10	28	40	300	1500
26100-05005055	steel	50	M10	28	50	193	1153
26100-06004055	steel	60	M10	28	40	377	1885
26100-07004555	steel	70	M10	28	45	410	2255
26100-07502555	steel	75	M12	37	25	1655	4965
26100-07504055	steel	75	M12	37	40	717	3585
26100-07505055	steel	75	M12	37	50	470	2820
26100-07505555	steel	75	M12	37	55	405	2835
26100-015015551	stainless steel	15	M4	12	15	59	88
26100-020015551	stainless steel	20	M6	18	15	200	300
26100-025020551	stainless steel	25	M6	18	20	200	500
26100-030020551	stainless steel	30	M8	23	20	318	795
26100-030025551	stainless steel	30	M8	23	25	183	549
26100-040030551	stainless steel	40	M8	23	30	300	1200

Rubber buffers

type AT tapered





Material:
Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 57A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26101-01001057

Note:
These rubber buffers are widely used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.
Rubber buffers with tapered rubber contour reduce high edge loads of the rubber by radial deflection and so increase the components service life.

Temperature range:
-30°C to +80°C.

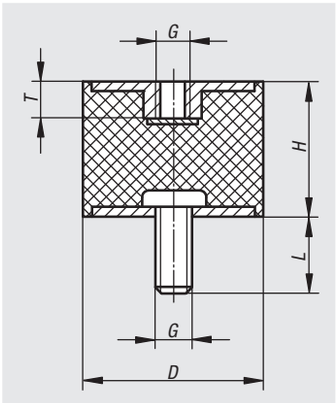
On request:
Other Shore grades.

Order No.	D	D1	H	G	L	Spring stiffness N/mm	Load N
26101-01001057	10	8	10	M4	13	31	37
26101-01501557	15	12	15	M4	13	71	135
26101-02001557	20	14	15	M6	18	177	283
26101-03002057	30	22	20	M8	23	212	763
26101-04003057	40	33	30	M8	23	202	1111
26101-04004857	40	20	48	M8	23	101	626
26101-05003057	50	40	30	M10	28	351	1229
26101-07504057	75	50	40	M12	37	466	2330

Rubber buffers

steel or stainless steel, type B





Material:
Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 26102-00800855

Note:
Rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

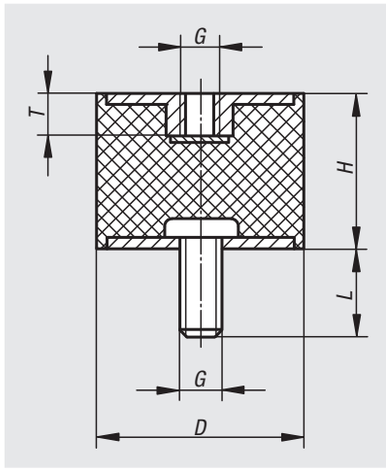
On request:
Other Shore grades.

Order No.	Main material	D	H	G	L	T	Spring stiffness N/mm	Load N
26102-00800855	steel	8	8	M3	6	3	35	17
26102-01001055	steel	10	10	M4	10	4	75	75
26102-01001555	steel	10	15	M4	10	4	50	60
26102-01500855	steel	15	10	M4	10	4	130	130
26102-01501555	steel	15	15	M4	10	4	100	120
26102-02001555	steel	20	15	M6	18	6	325	390
26102-02002055	steel	20	20	M6	18	6	130	260
26102-02002555	steel	20	25	M6	18	6	95	210
26102-02501555	steel	25	15	M6	18	6	333	399
26102-02502055	steel	25	20	M6	18	6	195	410
26102-02502555	steel	25	25	M6	18	6	117	257
26102-02503055	steel	25	30	M6	18	6	100	300
26102-03001555	steel	30	15	M8	23	8	590	708
26102-03002055	steel	30	20	M8	23	8	280	560
26102-03002555	steel	30	25	M8	23	8	180	396
26102-03003055	steel	30	30	M8	23	8	168	504
26102-03004055	steel	30	40	M8	23	8	88	308
26102-04002055	steel	40	20	M8	23	8	700	840
26102-04003055	steel	40	30	M8	23	8	273	820
26102-04004055	steel	40	40	M8	23	8	189	660
26102-05002055	steel	50	20	M10	28	10	1471	2500
26102-05002555	steel	50	25	M10	28	10	630	1386
26102-05003055	steel	50	30	M10	28	10	545	1635
26102-05004055	steel	50	40	M10	28	10	310	1116
26102-05005055	steel	50	50	M10	28	10	180	900
26102-06004055	steel	60	40	M10	28	10	500	1750
26102-07004555	steel	70	45	M10	28	10	600	2400
26102-07502555	steel	75	25	M12	37	12	2440	3660
26102-07504055	steel	75	40	M12	37	12	700	2450
26102-07505055	steel	75	50	M12	37	12	520	2600
26102-07505555	steel	75	55	M12	37	12	396	2178
26102-008008551	stainless steel	8	8	M3	8	3	35	17
26102-010010551	stainless steel	10	10	M4	12	4	75	75
26102-015010551	stainless steel	15	10	M4	12	4	-	-
26102-020020551	stainless steel	20	20	M6	18	6	130	260
26102-025020551	stainless steel	25	20	M6	18	6	195	410
26102-030020551	stainless steel	30	20	M8	23	8	280	560
26102-040020551	stainless steel	40	20	M8	23	8	700	840

Rubber buffers

stainless steel, type B





Material:
Metal parts 1.4401 stainless steel.
Elastomer natural rubber, medium hardness Shore 55A, grey.

Version:
Stainless steel bright.

Sample order:
nlm 26102-01-00800855

Note:
Rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

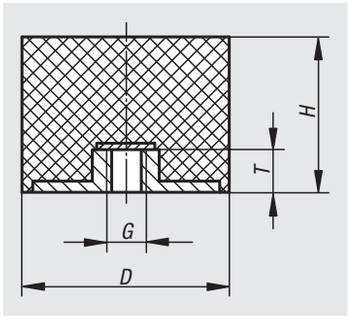
On request:
Metal parts 1.4301 stainless steel.

Order No.	D	H	G	L	T	Spring stiffness N/mm	Load N
26102-01-00800855	8	8	M3	6	3	35	17
26102-01-01001055	10	10	M4	10	4	75	75
26102-01-01001555	10	15	M4	10	4	50	60
26102-01-01501055	15	10	M4	10	4	130	130
26102-01-01501555	15	15	M4	10	4	100	120
26102-01-02001555	20	15	M6	18	5	325	390
26102-01-02002055	20	20	M6	18	5	130	260
26102-01-02002555	20	25	M6	18	5	95	210
26102-01-02501555	25	15	M6	18	5	333	399
26102-01-02502055	25	20	M6	18	5	195	410
26102-01-02502555	25	25	M6	18	5	117	257
26102-01-02503055	25	30	M6	18	5	100	300
26102-01-03001555	30	15	M8	23	7	590	708
26102-01-03002055	30	20	M8	23	7	280	560
26102-01-03002555	30	25	M8	23	7	180	396
26102-01-03003055	30	30	M8	23	7	168	504
26102-01-03004055	30	40	M8	23	7	88	308
26102-01-04002055	40	20	M8	23	7	700	840
26102-01-04003055	40	30	M8	23	7	273	820
26102-01-04004055	40	40	M8	23	7	189	660
26102-01-05002055	50	20	M10	28	8	1471	2500
26102-01-05002555	50	25	M10	28	8	630	1386
26102-01-05003055	50	30	M10	28	8	545	1635
26102-01-05004055	50	40	M10	28	8	310	1116
26102-01-05005055	50	50	M10	28	8	180	900
26102-01-06004055	60	40	M10	28	8	500	1750
26102-01-07004555	70	45	M10	28	8	600	2400
26102-01-07502555	75	25	M12	37	10	2440	3660
26102-01-07504055	75	40	M12	37	10	700	2450
26102-01-07505055	75	50	M12	37	10	520	2600
26102-01-07505555	75	55	M12	37	10	396	2178

Rubber buffers

type E





Material:
Metal parts steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26103-00800855

Note:
Rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

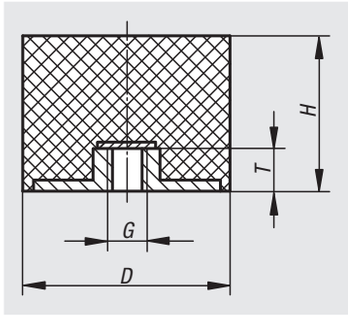
On request:
Other Shore grades.

Order No.	D	H	G	T	Spring stiffness N/mm	Load N
26103-00800855	8	8	M3	3	88	44
26103-01501255	15	12	M4	4	165	182
26103-01501555	15	15	M4	4	100	130
26103-01502055	15	20	M4	4	75	113
26103-02001555	20	15	M6	6	145	246
26103-02002055	20	20	M6	6	94	216
26103-02002555	20	25	M6	6	65	169
26103-02501555	25	15	M6	6	270	540
26103-02502555	25	25	M6	6	105	315
26103-02503055	25	30	M6	6	85	281
26103-02504055	25	40	M6	6	75	300
26103-03001555	30	15	M8	8	545	491
26103-03002555	30	25	M8	8	160	416
26103-03003055	30	30	M8	8	125	425
26103-03004055	30	40	M8	8	85	315
26103-04002055	40	20	M8	8	550	660
26103-04002555	40	25	M8	8	500	1000
26103-04003055	40	30	M8	8	300	870
26103-04004055	40	40	M8	8	260	1040
26103-05002055	50	20	M10	10	860	860
26103-05002555	50	25	M10	10	700	1400
26103-05003055	50	30	M10	10	450	1575
26103-05004055	50	40	M10	10	350	1400
26103-05005055	50	50	M10	10	170	850
26103-06003055	60	30	M10	10	700	1400
26103-06004055	60	40	M10	10	400	1600
26103-06005055	60	50	M10	10	240	1200
26103-07004255	70	42	M10	10	520	2600
26103-07004555	70	45	M10	10	680	3060
26103-07502555	75	25	M12	12	1211	1816
26103-07503055	75	30	M12	12	1090	2289
26103-07504055	75	40	M12	12	500	2000
26103-07505055	75	50	M12	12	550	2750

Rubber buffers

stainless steel, type E





Material:
Metal parts 1.4401 stainless steel.
Elastomer natural rubber, medium hardness Shore 55A, grey.

Version:
Stainless steel bright.

Sample order:
nlm 26103-01-00800855

Note:
Rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

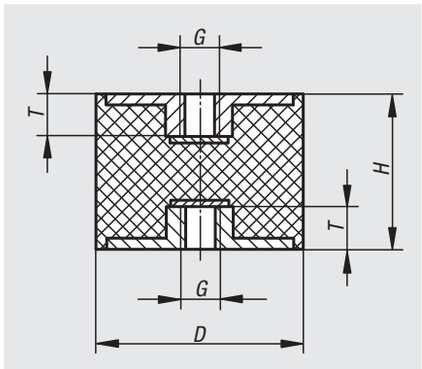
On request:
Metal parts 1.4301 stainless steel.

Order No.	D	H	G	T	Spring stiffness N/mm	Load N
26103-01-00800855	8	8	M3	3	88	44
26103-01-01501255	15	12	M4	4	165	182
26103-01-01501555	15	15	M4	4	100	130
26103-01-01502055	15	20	M4	4	75	113
26103-01-02001555	20	15	M6	6	145	246
26103-01-02002055	20	20	M6	6	94	216
26103-01-02002555	20	25	M6	6	65	169
26103-01-02501555	25	15	M8	6	270	540
26103-01-02502555	25	25	M8	6	105	315
26103-01-02503055	25	30	M8	6	85	281
26103-01-02504055	25	40	M8	6	75	300
26103-01-03001555	30	15	M8	8	545	491
26103-01-03002555	30	25	M8	8	160	416
26103-01-03003055	30	30	M8	8	125	425
26103-01-03004055	30	40	M8	8	85	315
26103-01-04002055	40	20	M8	8	550	660
26103-01-04002555	40	25	M8	8	500	1000
26103-01-04003055	40	30	M8	8	300	870
26103-01-04004055	40	40	M8	8	260	1040
26103-01-05002055	50	20	M10	10	860	860
26103-01-05002555	50	25	M10	10	700	1400
26103-01-05003055	50	30	M10	10	450	1575
26103-01-05004055	50	40	M10	10	350	1400
26103-01-05005055	50	50	M10	10	170	850
26103-01-06003055	60	30	M10	10	700	1400
26103-01-06004055	60	40	M10	10	400	1600
26103-01-06005055	60	50	M10	10	240	1200
26103-01-07004255	70	42	M10	10	520	2600
26103-01-07004555	70	45	M10	10	680	3060
26103-01-07502555	75	25	M12	12	1211	1816
26103-01-07503055	75	30	M12	12	1090	2289
26103-01-07504055	75	40	M12	12	500	2000
26103-01-07505055	75	50	M12	12	550	2750

Rubber buffers

steel or stainless steel, type C





Material:
Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 26104-01001055

Note:
The rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

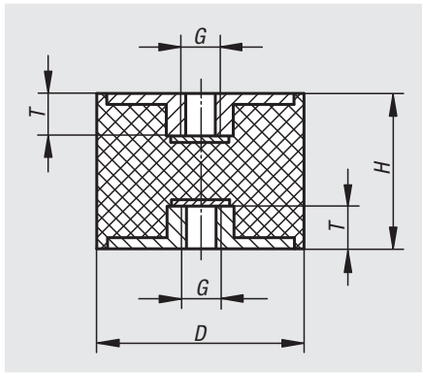
On request:
Other Shore grades.

Order No.	Main material	D	H	G	T	Spring stiffness N/mm	Load N
26104-01001055	steel	10	10	M4	4	100	50
26104-01001555	steel	10	15	M4	4	50	50
26104-01501555	steel	15	15	M4	4	100	100
26104-02002055	steel	20	20	M6	6	230	276
26104-02002555	steel	20	25	M6	6	120	180
26104-02502055	steel	25	20	M6	6	230	276
26104-02502555	steel	25	25	M6	6	110	165
26104-02503055	steel	25	30	M6	6	80	160
26104-03002055	steel	30	20	M8	8	425	637
26104-03003055	steel	30	30	M8	8	175	350
26104-03004055	steel	30	40	M8	8	133	400
26104-04003055	steel	40	30	M8	8	530	1060
26104-04004055	steel	40	40	M8	8	222	666
26104-05003055	steel	50	30	M10	10	680	1360
26104-05004055	steel	50	40	M10	10	333	1000
26104-05005055	steel	50	50	M10	10	190	665
26104-07504055	steel	75	40	M12	12	750	2250
26104-07505055	steel	75	50	M12	12	636	2225
26104-010010551	stainless steel	10	10	M4	4	100	50
26104-015015551	stainless steel	15	15	M4	4	100	100
26104-020020551	stainless steel	20	20	M6	6	230	276
26104-025025551	stainless steel	25	25	M6	6	110	165
26104-030020551	stainless steel	30	20	M8	8	425	637
26104-030030551	stainless steel	30	30	M8	8	175	350
26104-040030551	stainless steel	40	30	M8	8	530	1060

Rubber buffers

stainless steel, type C





Material:
Metal parts 1.4401 stainless steel.
Elastomer natural rubber, medium hardness Shore 55A, grey.

Version:
Stainless steel bright.

Sample order:
nlm 26104-01-01001055

Note:
The rubber buffers are widely-used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:
-30°C to +80°C.

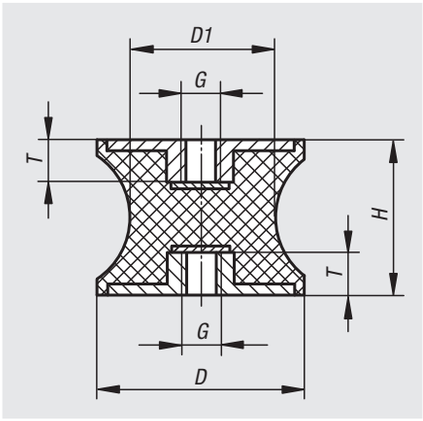
On request:
Metal parts 1.4301 stainless steel.

Order No.	D	H	G	T	Spring stiffness N/mm	Load N
26104-01-01001055	10	10	M4	4	175	350
26104-01-01001555	10	15	M4	4	100	100
26104-01-01501555	15	15	M4	4	230	276
26104-01-02002055	20	20	M6	4	120	180
26104-01-02002555	20	25	M6	4	230	276
26104-01-02502055	25	20	M6	4	110	165
26104-01-02502555	25	25	M6	4	80	160
26104-01-02503055	25	30	M6	4	425	637
26104-01-03002055	30	20	M8	4	425	637
26104-01-03003055	30	30	M8	4	133	400
26104-01-03004055	30	40	M8	4	530	1060
26104-01-04003055	40	30	M8	4	222	666
26104-01-04004055	40	40	M8	4	680	1360
26104-01-05003055	50	30	M10	4	333	1000
26104-01-05004055	50	40	M10	4	190	665
26104-01-05005055	50	50	M10	4	750	2250
26104-01-07504055	75	40	M12	4	636	2225
26104-01-07505055	75	50	M12	4	50	50

Rubber buffers

type CT tapered





Material:
Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 57A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26105-01001057

Note:
These rubber buffers are widely used construction elements for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.
Rubber buffers with tapered rubber contour reduce high edge loads of the rubber by radial deflection and so increase the components service life.

Temperature range:
-30°C to +80°C.

On request:
Other Shore grades.

Order No.	D	D1	H	G	T	Spring stiffness N/mm	Load N
26105-01501557	15	12	15	M4	4	111	122
26105-02001557	20	14	15	M6	6	227	227
26105-03002057	30	22	20	M8	8	252	504
26105-04003057	40	33	30	M8	8	199	796
26105-04004857	40	20	48	M8	8	111	555
26105-05003057	50	40	30	M10	10	499	998
26105-07504057	75	50	40	M12	12	597	2030

Rubber buffers

steel or stainless steel, type D



Material:
Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, Shore 55A.

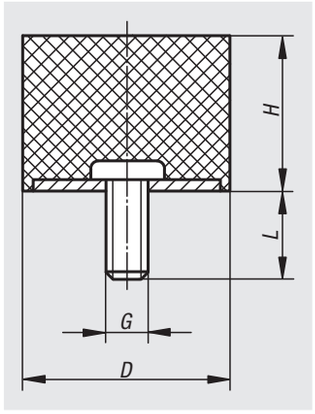
Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 26106-00800855

Note:
Rubber buffers are used, among other things for mounting aggregates and as elastic buffers to limit the travel of moving masses or as feet that are not firmly fixed in the floor or where the floor is sensitive i.e. office equipment.

Temperature range:
-30°C to +80°C.

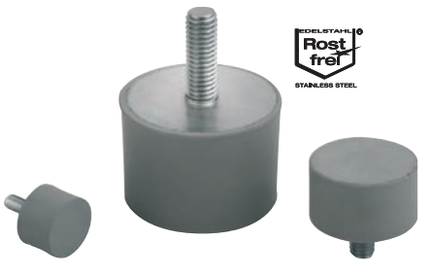
On request:
Other Shore grades.

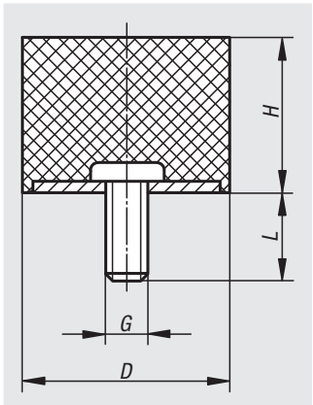


Order No.	Main material	D	H	G	L	Spring stiffness N/mm	Load N
26106-00800855	steel	8	8	M3	6	40	40
26106-01001055	steel	10	10	M4	10	35	35
26106-01001555	steel	10	15	M4	10	26	40
26106-01500655	steel	15	6	M4	10	175	88
26106-01500855	steel	15	8	M4	10	187	187
26106-01501055	steel	15	10	M4	10	100	100
26106-01501555	steel	15	15	M4	10	50	100
26106-02000555	steel	20	5	M6	18	135	95
26106-02000855	steel	20	8	M6	18	250	250
26106-02001055	steel	20	10	M6	18	240	240
26106-02001555	steel	20	15	M6	18	110	220
26106-02002055	steel	20	20	M6	18	75	225
26106-02002555	steel	20	25	M6	18	65	227,5
26106-02500855	steel	25	8	M6	18	850	850
26106-02501055	steel	25	10	M6	18	400	400
26106-02501555	steel	25	15	M6	18	210	420
26106-02502055	steel	25	20	M6	18	140	420
26106-02502555	steel	25	25	M6	18	100	350
26106-02503055	steel	25	30	M6	18	79	316
26106-03001555	steel	30	15	M8	23	270	540
26106-03002055	steel	30	20	M8	23	238	714
26106-03002555	steel	30	25	M8	23	153	535,5
26106-03003055	steel	30	30	M8	23	127	508
26106-03004055	steel	30	40	M8	23	88	528
26106-04001555	steel	40	15	M8	23	710	1420
26106-04002055	steel	40	20	M8	23	365	1095
26106-04003055	steel	40	30	M8	23	205	820
26106-04004055	steel	40	40	M8	23	143	858
26106-05002055	steel	50	20	M10	28	646	1938
26106-05003055	steel	50	30	M10	28	354	1416
26106-05004055	steel	50	40	M10	28	230	1380
26106-05005055	steel	50	50	M10	28	160	1280
26106-06004055	steel	60	40	M10	28	317	1902
26106-07002555	steel	70	25	M10	28	980	3430
26106-07004555	steel	70	45	M10	28	438	3066
26106-07502555	steel	75	25	M12	37	1318	4613
26106-07504055	steel	75	40	M12	37	643	3858
26106-07505055	steel	75	50	M12	37	472	3776
26106-07505555	steel	75	55	M12	37	310	3100
26106-008008551	stainless steel	8	8	M3	8	40	40
26106-010010551	stainless steel	10	10	M4	10	35	35
26106-015015551	stainless steel	15	15	M4	10	50	100
26106-020015551	stainless steel	20	15	M6	18	110	220
26106-025020551	stainless steel	25	20	M6	18	140	420
26106-030030551	stainless steel	30	30	M8	23	127	508
26106-040030551	stainless steel	40	30	M8	23	205	820

Rubber buffers

stainless steel, type D





Material:
Metal parts 1.4401 stainless steel.
Elastomer natural rubber, medium hardness Shore 55A, grey.

Version:
Stainless steel bright.

Sample order:
nlm 26106-01-00800855

Note:
Rubber buffers are used, among other things for mounting aggregates and as elastic buffers to limit the travel of moving masses or as feet that are not firmly fixed in the floor or where the floor is sensitive i.e. office equipment.

Temperature range:
-30°C to +80°C.

On request:
Metal parts 1.4301 stainless steel.

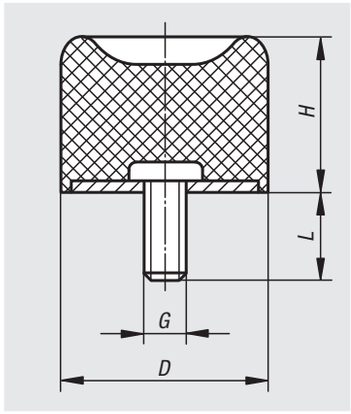
Order No.	D	H	G	L	Spring stiffness N/mm	Load N
26106-01-00800855	8	8	M3	6	40	40
26106-01-01001055	10	10	M4	10	35	35
26106-01-01001555	10	15	M4	10	26	40
26106-01-01500855	15	8	M4	10	187	187
26106-01-01501055	15	10	M4	10	100	100
26106-01-02000855	20	8	M6	18	250	250
26106-01-02001055	20	10	M6	18	240	240
26106-01-02001555	20	15	M6	18	110	220
26106-01-02002055	20	20	M6	18	75	225
26106-01-02500855	25	8	M6	18	850	850
26106-01-02501055	25	10	M6	18	400	400
26106-01-02501555	25	15	M6	18	210	420
26106-01-02502055	25	20	M6	18	140	420
26106-01-02502555	25	25	M6	18	100	350
26106-01-03001555	30	15	M8	23	270	540
26106-01-03002055	30	20	M8	23	238	714
26106-01-03003055	30	30	M8	23	127	508
26106-01-03004055	30	40	M8	23	88	528
26106-01-04001555	40	15	M8	23	710	1420
26106-01-04002055	40	20	M8	23	365	1095
26106-01-04003055	40	30	M8	23	205	820
26106-01-05002055	50	20	M10	28	646	1938
26106-01-05003055	50	30	M10	28	354	1416
26106-01-05004055	50	40	M10	28	230	1380

26107

Rubber buffers

type DS suction foot





Material:
Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 57A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26107-01501457

Note:
Rubber buffers are used, among other things for mounting aggregates and as elastic buffers to limit the travel of moving masses.

Temperature range:
-30°C to +80°C.

On request:
Other Shore grades.

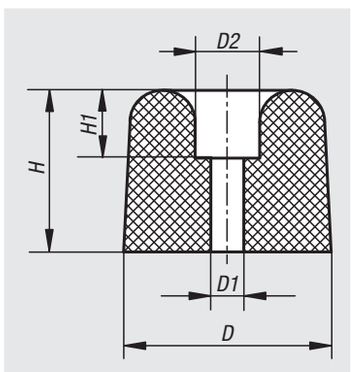
Order No.	D	H	G	L	Spring stiffness N/mm	Load N
26107-01501457	15	14	M4	13	50	100
26107-02501857	25	18,5	M6	18	95	285
26107-03002857	30	28,5	M8	23	97	340
26107-04002857	40	28	M8	23	120	480
26107-05002857	50	28	M10	28	220	990
26107-07003057	70	30	M10	28	360	2160
26107-07503757	75	37	M12	37	390	3510
26107-10005057	100	50	M16	42	540	8100

26108

Rubber impact buffers

type TP door buffer





Material:
Elastomer, natural rubber, medium hardness, 60 Shore A

Sample order:
nlm 26108-02601560

Note:
Screw on rubber impact buffers can also be used as equipment or machine feet.

Temperature range:
-30°C to +80°C.

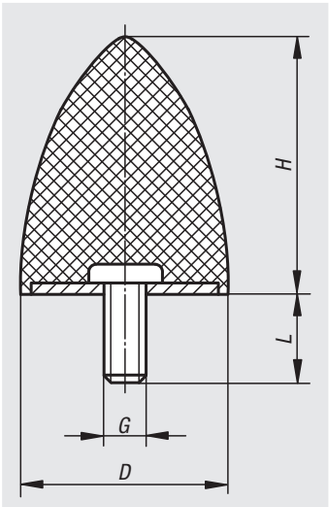
On request:
Other Shore grades.

Order No.	D	D1	D2	H	H1
26108-02601560	26	4	12	15	9
26108-03002260	30	7	11	21	5
26108-03503060	35	8	17	30	10
26108-04003560	40	7	20	35	8

Rubber buffers

parabolic





Material:
Metal parts steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26110-02002455

Note:
Rubber buffers are robust and effective elastic cushioning elements and shock absorbers. These buffers are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

Temperature range:
-30°C to +80°C.

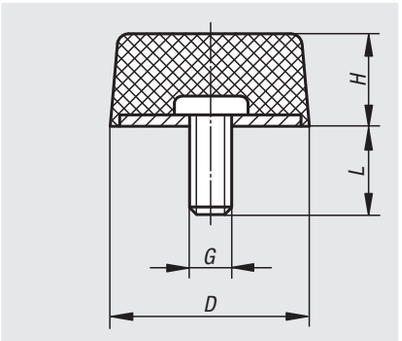
On request:
Other Shore grades.

Order No.	D	H	G	L	Spring stiffness N/mm	Load N
26110-02002455	20	24	M6	18	14	500
26110-03003655	30	36	M8	20	15	750
26110-03504055	35	40	M8	23	16	1750
26110-05005855	50	58	M10	28	30	3000
26110-05006755	50	67	M8	38	30	3200
26110-07508955	75	89	M12	37	50	8000

Rubber buffers

conical





Material:
Metal parts steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26112-02501755

Note:
Rubber buffers are robust and effective elastic cushioning elements and shock absorbers. These buffers are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

Temperature range:
-30°C to +80°C.

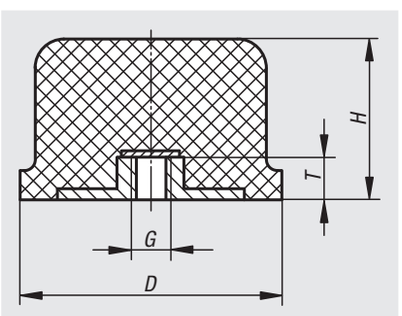
On request:
Other Shore grades.

Order No.	D	H	G	L	Spring stiffness N/mm	Load N
26112-02501755	25	17	M6	18	3,7	678
26112-05001855	50	18	M10	28	4	3600

Rubber buffers

spherical





Material:
Metal parts steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 55A.

Version:
Steel electro zinc-plated.

Sample order:
nlm 26115-05003555

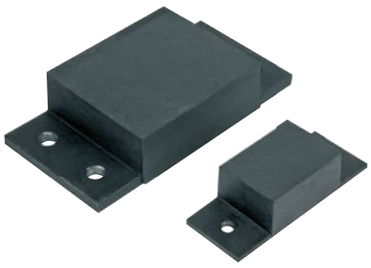
Note:
Rubber buffers are robust and effective elastic cushioning elements and shock absorbers. These buffers are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

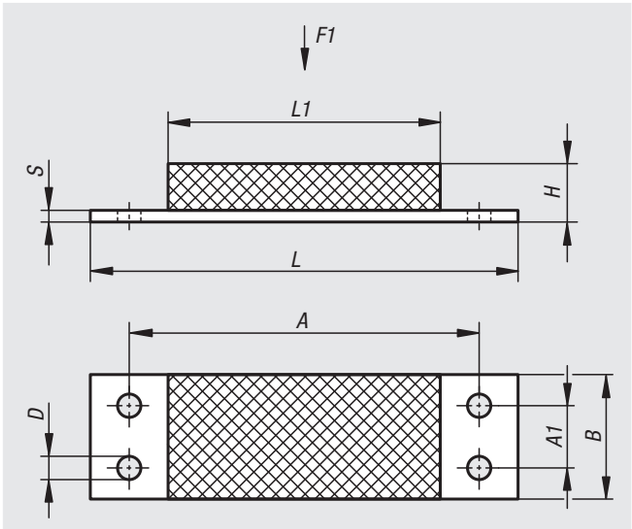
Temperature range:
-30°C to +80°C.

On request:
Other Shore grades.

Order No.	D	H	G	T	Spring stiffness N/mm	Load N
26115-05003555	50	35	M10	10	120	3000
26115-08006055	80	60	M12	12	150	11000
26115-12509055	125	93	M16	16	200	20000

Rubber-metal impact buffer rails





Material:
Steel.
Elastomer, natural rubber, medium hardness, Shore 57A.

Version:
Steel, painted black.
(26120-05003507057 and 26120-10004512057 electro zinc-plated).

Sample order:
nlm 26120-02501904557

Note:
For absorbing large impact forces and supporting heavy weights.

The indicated load data apply for static long-term loading on rubber with a Shore hardness 57A.

* Metal part 30 mm wide.

Temperature range:
-30°C to +80°C.

Order No.	A	A1	B	D	H	L	L1	S	F1 N
26120-02501904557	68,6	-	25*	6,5	19	84	45	3	500
26120-05003507057	100	-	50	8,5	35	130	70	5	3100
26120-05007007057	100	-	50	8,5	70	130	70	5	2500
26120-10004512057	160	50	100	13	45	200	120	10	14000
26120-10008012057	160	50	100	13	80	200	120	10	8500
26120-12004515057	200	60	120	15	45	250	150	10	18000
26120-15005020057	250	80	150	17	50	300	200	15	34000

O-shaped mounts



Material:
Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, Shore 57A.

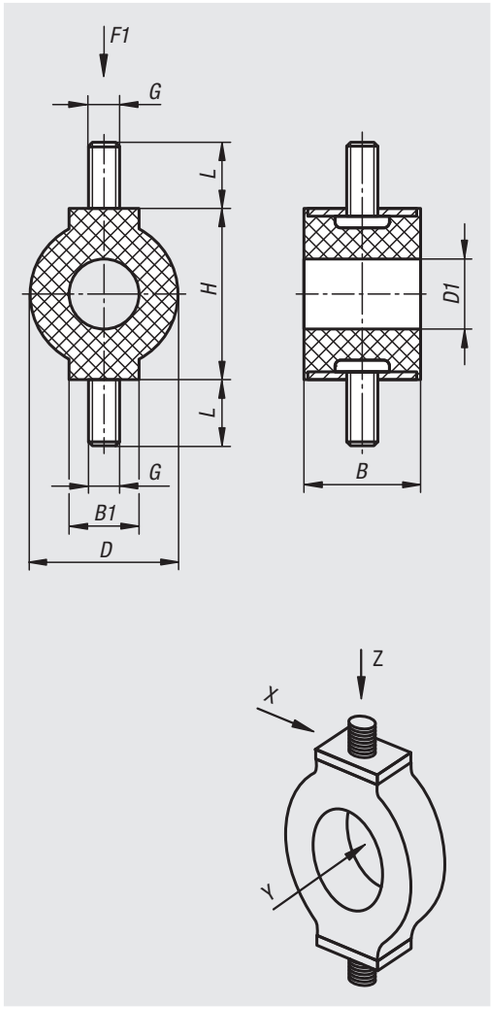
Version:
Steel electro zinc-plated.

Sample order:
nlm 26130-01201257

Note:
O-shapes mounts have a very soft spring characteristic, which is why they are also called low-frequency supports. They serve for low-vibration support of instruments, and electrical components, as well as for mounting light assemblies and precision mechanical equipment.

The spring characteristic of the O-shaped mounts increases in the order X, Y and Z. The main load direction is the longitudinal axis of the threaded bolts (Z direction).

Temperature range:
-30°C to +80°C.

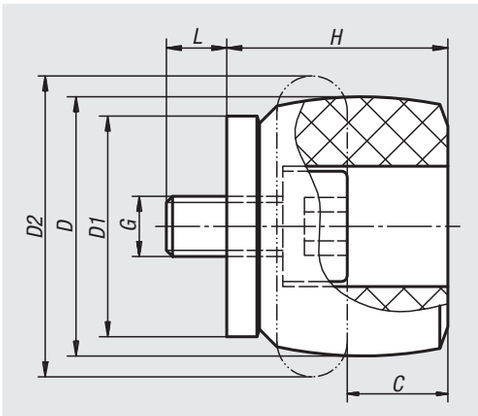


Order No.	B	B1	D	D1	G	H	L	F1 N
26130-01201257	9,5	9,5	10	6	M4	12,5	10	8
26130-01401757	13	6	14	6	M4	17	10	18
26130-02503057	20	12	25	12	M5	30	10	55

Profile dampers

axial damping





Material:
Co-polyester elastomer.

Version:
Material hardness Shore 55D.

Sample order:
nlm 26180-01205

Note:
Suitable for emergency stop and continual use.
Energy reduction: 58% to 73%.
Dynamic force absorption: 870 N to 35190 N
Impact velocity: max. 5 m/s.

The profile dampers are maintenance-free and are supplied ready to install with a special fastening screw.

Environment: Resistant to microbes, sea water, chemicals and with very good UV and ozone resistance. No water absorption or maceration.

Application:
Linear slides and linear guides, pneumatic cylinders, handling equipment, machines and plants

Temperature range:
-40°C to +90°C.

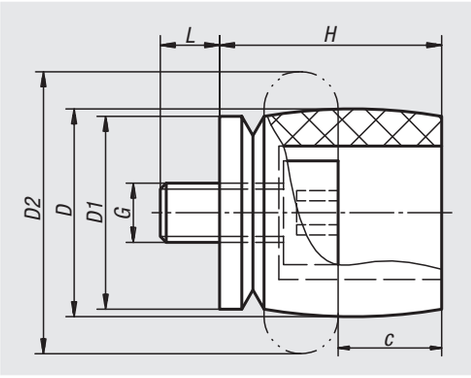
Assembly:
Mounting position: any.
Secure fastening screws with Loctite thread lock.

Order No.	C (travel)	D	D1	D2	G	H	L	max. energy absorption Nm per stroke by permanent load	max. energy absorption Nm per stroke by emergency stop	Tightening torque of screws Nm
26180-01205	5	12	11	15	M3	11	3	2	3	1
26180-01707	7	17	15	22	M4	16	4	6	9	1,7
26180-02109	9	21	18	26	M5	18	5	10	16	2,3
26180-02210	10	22	19	27	M6	19	6	11,5	21	6
26180-02812	12	28	25	36	M6	26	6	29	46	6
26180-03414	14	34	30	43	M6	30	6	48	87	6
26180-03716	16	37	33	48	M6	33	6	65	112	6
26180-04016	16	40	34	50	M8	35	8	82	130	20
26180-04318	18	43	38	55	M8	38	8	112	165	20
26180-04720	20	47	41	60	M12	41	12	140	173	50
26180-05022	22	50	44	64	M12	45	12	170	223	50
26180-05422	22	54	47	68	M12	47	12	201	334	50
26180-05724	24	57	50	73	M12	51	12	242	302	50
26180-06225	25	62	53	78	M12	54	12	304	361	50
26180-06527	27	65	57	82	M12	58	12	374	468	50
26180-07029	29	70	60	86	M12	61	12	421	524	50
26180-07231	31	72	63	91	M16	65	16	482	559	120
26180-08032	32	80	69	100	M16	69	16	570	831	120

Profile damper

axial damping, soft version





Material:
Co-polyester elastomer.

Version:
Material hardness Shore 40D.

Sample order:
nlm 26182-01407

Note:
Suitable for emergency stop and continual use.
Energy reduction: 35% to 64%.
Dynamic force absorption: 533 N to 10110 N
Impact velocity: max. 5 m/s.

The profile dampers are maintenance-free and are supplied ready to install with a special fastening screw.

Environment: Resistant to microbes, sea water, chemicals and with very good UV and ozone resistance. No water absorption or maceration.

Application:
Linear slides and linear guides, pneumatic cylinders, handling equipment, machines and plants

Temperature range:
-40°C to +90°C.

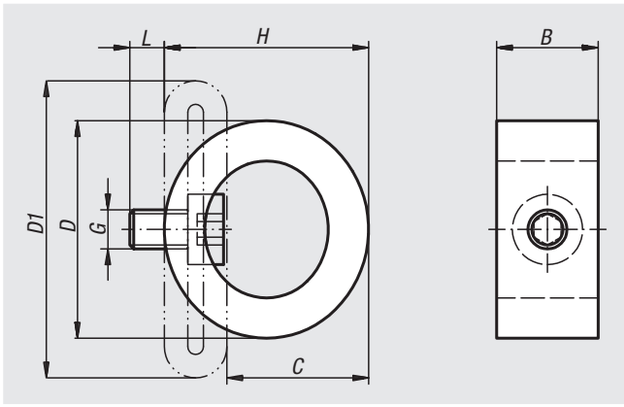
Assembly:
Mounting position: any.
Secure fastening screws with Loctite thread lock.

Order No.	C (travel)	D	D1	D2	G	H	L	max. energy absorption Nm per stroke by permanent load	max. energy absorption Nm per stroke by emergency stop	Tightening torque of screws Nm
26182-01407	7	14	13	19	M4	15	4	2	3	1,7
26182-01809	9	18	16	24	M5	18	5	4	6	2,3
26182-02010	10	20	19	27	M6	21	6	6	7	6
26182-02615	15	26	25	37	M6	28	6	11,5	15	6
26182-03216	16	32	30	44	M6	32	6	23	26	6
26182-03519	19	35	33	48	M6	36	6	30	36	6
26182-04019	19	40	34	51	M6	38	6	34	42	6
26182-04121	21	41	38	55	M12	41	12	48	63	50
26182-04423	23	44	40	60	M12	45	12	63	72	50
26182-04825	25	48	44	64	M12	49	12	81	91	50
26182-05127	27	51	47	69	M12	52	12	92	114	50
26182-05429	29	54	50	73	M12	55	12	122	158	50
26182-05830	30	58	53	78	M12	59	12	149	154	50
26182-06132	32	61	56	83	M16	62	16	163	169	120
26182-06434	34	64	60	87	M16	66	16	208	254	120

Profile damper

radial damping





Material:
Co-polyester elastomer.

Version:
Material hardness Shore 40D.

Sample order:
nlm 26184-02917

Note:
Suitable for emergency stop and continual use.
Energy reduction: 25% to 45%.
Dynamic force absorption: 218 N to 3730 N
Impact velocity: max. 5 m/s.

The profile dampers are maintenance-free and are supplied ready to install with a special fastening screw.

Environment: Resistant to microbes, sea water, chemicals and with very good UV and ozone resistance. No water absorption or maceration.

Application:
Linear slides and linear guides, pneumatic cylinders, furniture industry, machines and plants.

Temperature range:
-40°C to +90°C.

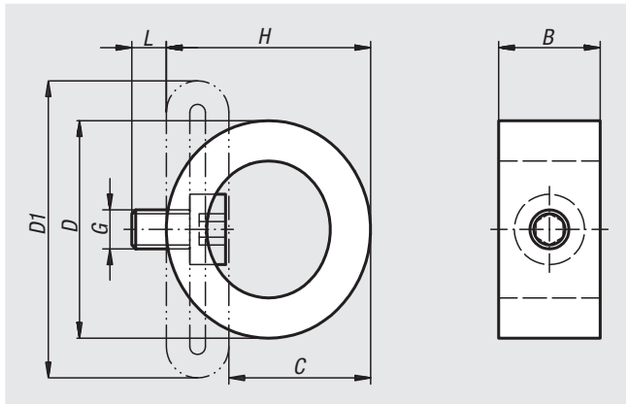
Assembly:
Mounting position: any.
Secure fastening screws with Loctite thread lock.

Order No.	B	C (travel)	D	D1	G	H	L	max. energy absorption Nm per stroke by permanent load	max. energy absorption Nm per stroke by emergency stop	Tightening torque of screws Nm
26184-02917	13	17	29	38	M5	25	5	1,2	1,8	3
26184-03722	19	22	37	50	M5	32	5	2,3	5,4	3
26184-04325	20	25	43	58	M5	37	5	3,5	8,1	3
26184-05035	34	35	50	68	M5	44	5	5,8	8,3	3
26184-06343	43	43	63	87	M5	55	5	12	17	3
26184-06740	46	40	67	88	M5	59	5	23	33	3
26184-07646	46	46	76	102	M6	67	6	34,5	43	6
26184-08350	51	50	83	109	M6	73	6	45	74	6
26184-08550	68	50	85	111	M8	73	8	68	92	20

Profile damper

radial damping, hard version





Material:
Co-polyester elastomer.

Version:
Material hardness Shore 55D.

Sample order:
nlm 26186-03015

Note:
Suitable for emergency stop and continual use.
Energy reduction: 39% to 62%.
Dynamic force absorption: 550 N to 7440 N
Impact velocity: max. 5 m/s.

The profile dampers are maintenance-free and are supplied ready to install with a special fastening screw.

Environment: Resistant to microbes, sea water, chemicals and with very good UV and ozone resistance. No water absorption or maceration.

Application:
Linear slides and linear guides, pneumatic cylinders, furniture industry, machines and plants.

Temperature range:
-40°C to +90°C.

Assembly:
Mounting position: any.
Secure fastening screws with Loctite thread lock.

Order No.	B	C (travel)	D	D1	G	H	L	max. energy absorption Nm per stroke by permanent load	max. energy absorption Nm per stroke by emergency stop	Tightening torque of screws Nm
26186-03015	13	15	30	38	M5	23	5	2,7	5,7	3
26186-03919	19	19	39	50	M5	30	5	6	18	3
26186-04523	20	23	45	58	M5	36	5	8,7	24	3
26186-05232	34	32	52	68	M5	42	5	11,7	20	3
26186-06441	43	41	64	87	M5	53	5	25	46	3
26186-06837	46	37	68	88	M5	56	5	66,5	98	3
26186-07942	46	42	79	102	M6	64	6	81,5	106	6
26186-08645	51	45	86	109	M6	69	6	124	206	6

Notes

Technical information for gas springs

Assembly position:
Gas pressure springs in the sizes 04/12 and 06/15 should if possible always be assembled with the piston rod extending downward. In this way, optimal lubrication of the guide and the sealing system is ensured. For gas springs sized 08/19 and up the assembly position is discretionary. Keep in mind, however, that end-of-travel damping is effective only when the piston rod extends downward. In order to prevent increased loss of gas, gas springs cannot be subject to bending loads, tensile loads or lateral forces. Whenever possible, we recommend the use of ball head connections.

The fitting and removal of gas springs may only be carried out in the no-load state.

Gas springs may be used as an end stop if the nominal force +30% is not exceeded in the process.

Gas springs must not be subjected to tensile stress.

Maintenance:
The gas springs are maintenance-free.
Lubrication or service is not required.

Temperature range:
-20 °C up to +80 °C.

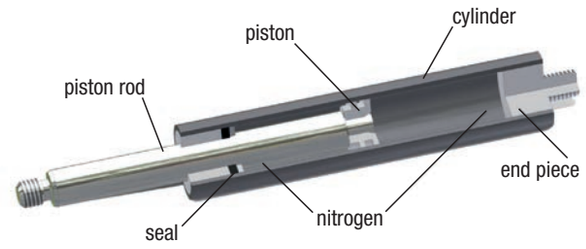
Influence of temperature:
Nominal force is measured at 20 °C.
Subject to physical conditions, the gas springs' force changes every 10 °C by 3.4 %.

Transport and storage:
Gas pressure springs in the sizes 04/12 and 06/15 should be stored with the piston rod extending downward at an ambient temperature of approx. 20 °C. As of size 08/19, storage in any orientation is possible. Actuate the gas springs after 6 months' storage at the latest. Storage of gas springs for a period of over 1 year should be avoided.

Valve:
The gas springs have a check valve inside the the pressure tube thread for subsequent increase and decrease of the nitrogen pressure.

Disposal
If gas springs are no longer needed, they must be disposed of in an environmentally responsible way. For this purpose, a hole is drilled at a suitable spot in order to release the compressed nitrogen gas and drain the oil contained in them. Our opening and disposal instructions are available at our website under the menu item Download.

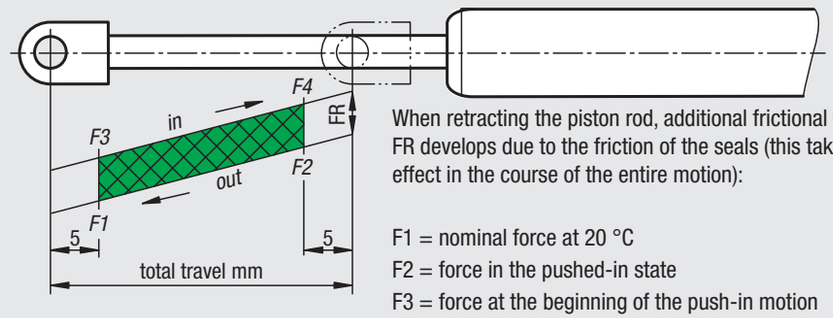
Design and function principle of gas springs



Gas springs are hydropneumatic, self-contained and maintenance-free adjustment elements. Spring force F1 results from the internal pressure (maximum 160 bar on no-load) in the cylinder, which is produced by the nitrogen fill medium. This pressure on the gas spring acts on the cross-sectional area of the piston rod. The piston rod is always extended in the no-load state.

In the course of pushing the piston rod in, the volume in the cylinder is reduced and the gas is compressed.. By doing this, an increase in the force (progression) of the gas springs results subject to the diameter of the piston rod and the cylinder volume. Norelem gas springs contain an oil filling for lubrication and end-of-travel damping.

Gas spring characteristic in the force/distance diagram

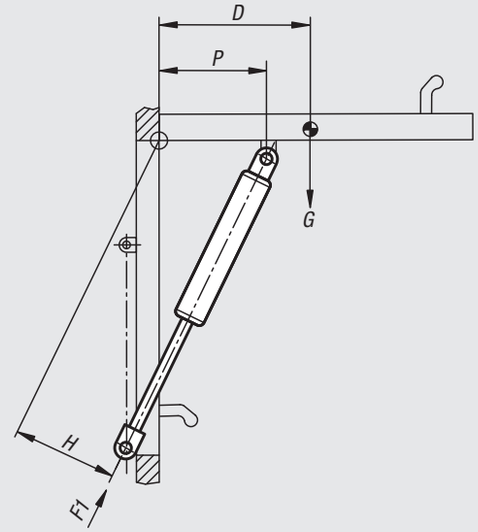


When retracting the piston rod, additional frictional force FR develops due to the friction of the seals (this takes effect in the course of the entire motion):

F1 = nominal force at 20 °C
F2 = force in the pushed-in state
F3 = force at the beginning of the push-in motion
F4 = force at the end of the push-in motion

The approximation formula and application sketch shown below assist in providing a rough estimate and in selecting the appropriate gas spring from the standard programme.

Calculating push-out force F1



Approximation formula for calculating the thrust F1 [N] at 20 °C

$$F1 = \frac{G \cdot D}{H \cdot n} \times 13\ [N]$$

G = hatch weight in kg
H = effective lever arm of gas spring in mm, hatch open
13 = conversion factor kg → N + safety margin
P = hatch fastening ca. 2/3 D
n = No. of gas springs (standard: n = 2)
D = effective centre of gravity in mm, hatch open

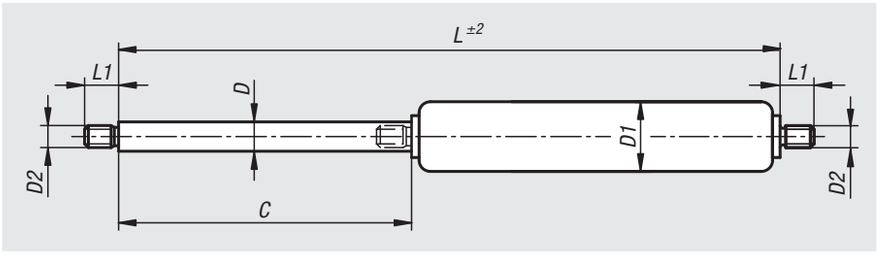
Example:

G = 25 kg, D = 300 mm, H = 150 mm, n = 2

$$F1 = \frac{25 \cdot 300}{150 \cdot 2} \times 13 = 325\ N$$

Gas springs





Material:
Piston rod and pressure tube steel.
Fill medium: oil, nitrogen.

Version:
Piston rod, hard chromed.
Piston rod Ø4 is stainless steel.
Pressure tube painted black.

Sample order:
nlm 26200-0412030X20
(include extension force F1)

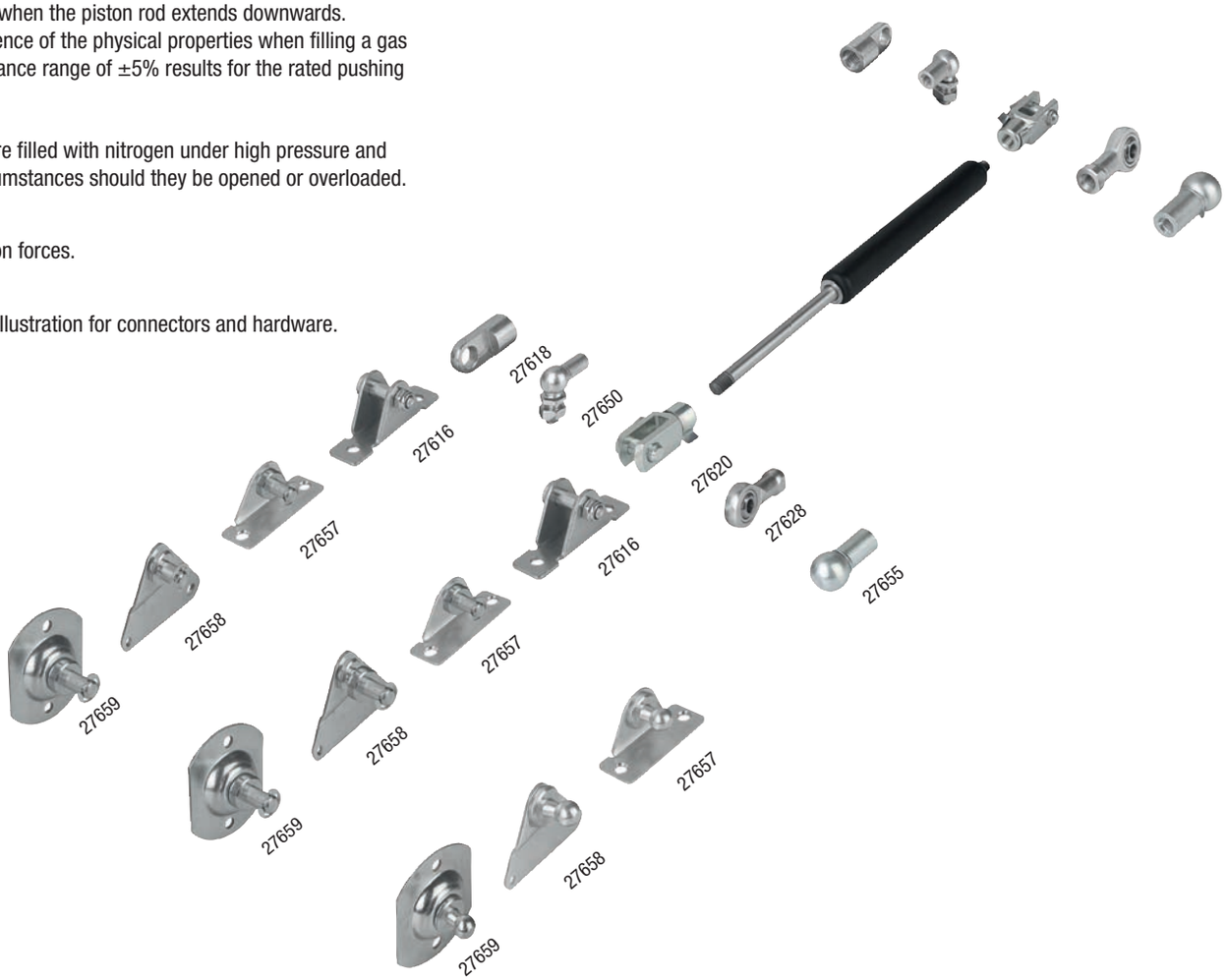
Note:
Gas springs are maintenance-free, self-contained systems that are filled with nitrogen under high pressure. For end-of-travel damping and lubrication, a defined amount of oil is also contained inside. The gas springs contain a nonreturn valve in a threaded pin on the pressurised pipe, which allows the pushing force to be lowered at a later time.

Gas pressure springs in the sizes 04/12 and 06/15 must be stored and installed with the piston rod extending downwards. As of size 08/19, storage and installation in any orientation is possible. Keep in mind, however, that end-of-travel damping is effective only when the piston rod extends downwards.
As a consequence of the physical properties when filling a gas spring, a tolerance range of ±5% results for the rated pushing force.

Gas springs are filled with nitrogen under high pressure and under no circumstances should they be opened or overloaded.

On request:
Other extension forces.

Accessories:
See adjacent illustration for connectors and hardware.



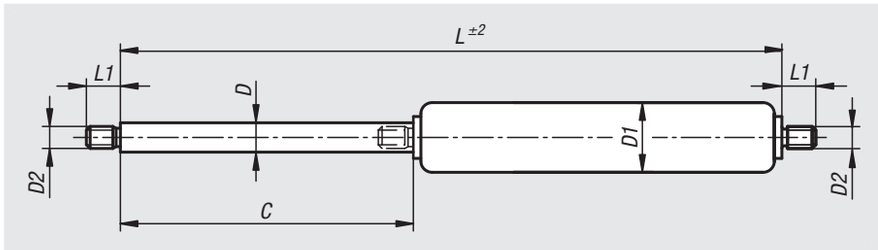
Gas springs

Order No.	Size	D	D1	D2	C (travel)	L	L1	Progression %	Extension force F1 N
26200-0412030X	04/12	4	12	M3,5	30	92	5	20	20/40/70/100/130/150/180
26200-0412040X	04/12	4	12	M3,5	40	112	5	20	20/40/70/100/130/150/180
26200-0412050X	04/12	4	12	M3,5	50	132	5	20	20/40/70/100/130/150/180
26200-0412060X	04/12	4	12	M3,5	60	152	5	20	20/40/70/100/130/150/180
26200-0412070X	04/12	4	12	M3,5	70	172	5	20	20/40/70/100/130/150/180
26200-0412080X	04/12	4	12	M3,5	80	192	5	20	20/40/70/100/130/150/180
26200-0412100X	04/12	4	12	M3,5	100	232	5	20	20/40/70/100/130/150/180
26200-0615020X	06/15	6	15,6	M5	20	95	5	22	100/150/200/250/300/350/400
26200-0615040X	06/15	6	15,6	M5	40	135	5	22	100/150/200/250/300/350/400
26200-0615060X	06/15	6	15,6	M5	60	175	5	22	100/150/200/250/300/350/400
26200-0615080X	06/15	6	15,6	M5	80	215	5	22	100/150/200/250/300/350/400
26200-0615100X	06/15	6	15,6	M5	100	255	5	22	100/150/200/250/300/350/400
26200-0615120X	06/15	6	15,6	M5	120	295	5	22	100/150/200/250/300/350/400
26200-0615150X	06/15	6	15,6	M5	150	355	5	22	100/150/200/250/300/350/400
26200-0819060X	08/19	8	19	M8	60	190	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819080X	08/19	8	19	M8	80	230	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819100X	08/19	8	19	M8	100	270	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819120X	08/19	8	19	M8	120	310	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819140X	08/19	8	19	M8	140	350	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819160X	08/19	8	19	M8	160	390	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819180X	08/19	8	19	M8	180	430	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819200X	08/19	8	19	M8	200	470	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819220X	08/19	8	19	M8	220	510	10	30	100/150/200/250/300/350/400/500/600/700
26200-0819250X	08/19	8	19	M8	250	570	10	30	100/150/200/250/300/350/400/500/600/700
26200-1023050X	10/23	10	23	M8	50	170	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023100X	10/23	10	23	M8	100	270	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023150X	10/23	10	23	M8	150	370	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023200X	10/23	10	23	M8	200	470	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023250X	10/23	10	23	M8	250	570	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023300X	10/23	10	23	M8	300	670	10	30	150/200/250/300/350/400/500/600/700/800
26200-1023350X	10/23	10	23	M8	350	770	10	30	150/200/250/300/350/400/500/600/700/800
26200-1428050X	14/28	14	28	M10	50	207	12	40	200/250/300/350/400/500/600/700/800
26200-1428100X	14/28	14	28	M10	100	307	12	40	200/250/300/350/400/500/600/700/800
26200-1428150X	14/28	14	28	M10	150	407	12	40	200/250/300/350/400/500/600/700/800
26200-1428200X	14/28	14	28	M10	200	507	12	40	200/250/300/350/400/500/600/700/800
26200-1428250X	14/28	14	28	M10	250	607	12	40	200/250/300/350/400/500/600/700/800
26200-1428300X	14/28	14	28	M10	300	707	12	40	200/250/300/350/400/500/600/700/800
26200-1428400X	14/28	14	28	M10	400	907	12	40	200/250/300/350/400/500/600/700/800

Gas springs

stainless steel





Material:
Piston rod, stainless steel 1.4305.
Pressure tube, stainless steel 1.4301.
Filling medium: oil, nitrogen.

Version:
Piston rod and pressure pipe, bright.

Sample order:
nlm 26201-0615040X100
(include extension force F1)

Note:
Gas springs are maintenance-free, self-contained systems that are filled with nitrogen under high pressure. There is also an internal defined quantity of oil for end position damping and lubrication purposes. The gas springs contain a check valve in the grub screw of the pressure pipe which enables the extension force to be subsequently reduced.

The gas springs must be stored and mounted with the piston rod extending downwards.

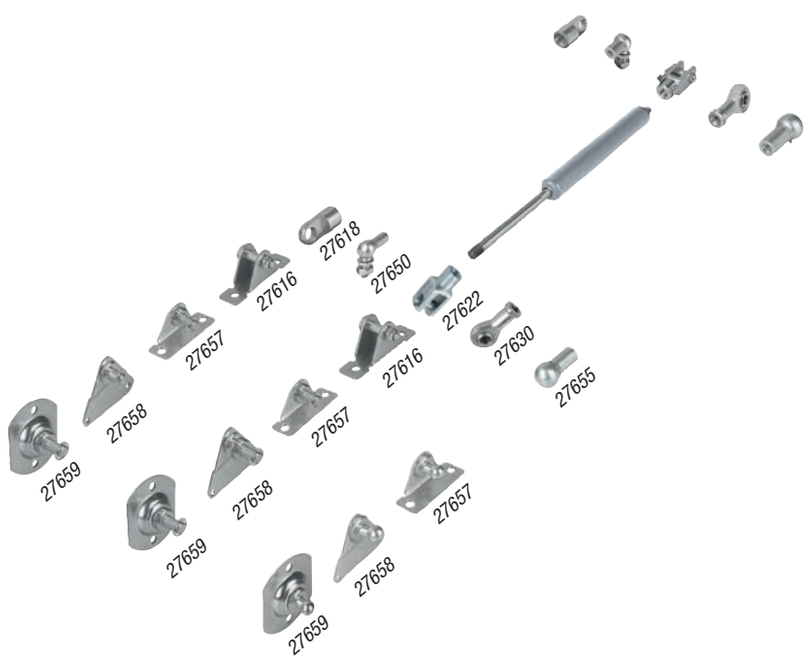
The physical properties that apply when a gas spring is being filled result in a tolerance range of ±5% for the rated extension force.

Gas springs are filled with nitrogen under high pressure and under no circumstances should they be opened or overloaded.

On request:
Other extension forces.

Potential extension force F1 (min.–max.)
Size 06/15: 40–400 N
Size 08/19: 50–700 N
Size 10/23: 100–1200 N
Size 14/28: 200–2500 N

Accessories:
See adjacent illustration for connectors and hardware.



Gas springs

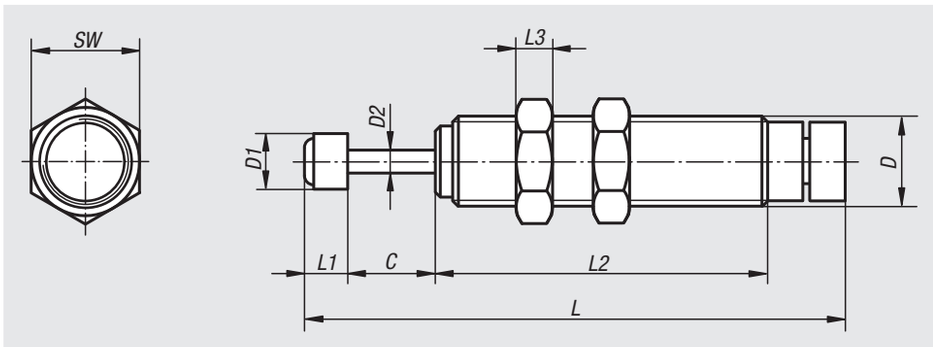
stainless steel

Order No.	Size	D	D1	D2	C (travel)	L	L1	Progression %	Extension force F1 N
26201-0615040X	06/15	6	15	M5	40	135	7	25	100/150/200/250/300/350/400
26201-0615050X	06/15	6	15	M5	50	155	7	25	100/150/200/250/300/350/400
26201-0615060X	06/15	6	15	M5	60	175	7	25	100/150/200/250/300/350/400
26201-0615080X	06/15	6	15	M5	80	215	7	25	100/150/200/250/300/350/400
26201-0615100X	06/15	6	15	M5	100	255	7	25	100/150/200/250/300/350/400
26201-0615120X	06/15	6	15	M5	120	295	7	25	100/150/200/250/300/350/400
26201-0615150X	06/15	6	15	M5	150	355	7	25	100/150/200/250/300/350/400
26201-0819060X	08/19	8	19	M8	60	190	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819080X	08/19	8	19	M8	80	230	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819100X	08/19	8	19	M8	100	270	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819120X	08/19	8	19	M8	120	310	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819150X	08/19	8	19	M8	150	370	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819160X	08/19	8	19	M8	160	390	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819180X	08/19	8	19	M8	180	430	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819200X	08/19	8	19	M8	200	470	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819220X	08/19	8	19	M8	220	510	10	30	100/150/200/250/300/350/400/500/600/700
26201-0819250X	08/19	8	19	M8	250	570	10	30	100/150/200/250/300/350/400/500/600/700
26201-1023050X	10/23	10	23	M8	50	170	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023060X	10/23	10	23	M8	60	190	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023080X	10/23	10	23	M8	80	230	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023100X	10/23	10	23	M8	100	270	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023150X	10/23	10	23	M8	150	370	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023200X	10/23	10	23	M8	200	470	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023250X	10/23	10	23	M8	250	570	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023300X	10/23	10	23	M8	300	670	10	30	150/200/250/300/350/400/500/600/700/800
26201-1023350X	10/23	10	23	M8	350	770	10	30	150/200/250/300/350/400/500/600/700/800
26201-1428050X	14/28	14	28	M10	50	207	12	40	200/250/300/350/400/500/600/700/800
26201-1428100X	14/28	14	28	M10	100	307	12	40	200/250/300/350/400/500/600/700/800
26201-1428150X	14/28	14	28	M10	150	407	12	40	200/250/300/350/400/500/600/700/800
26201-1428200X	14/28	14	28	M10	200	507	12	40	200/250/300/350/400/500/600/700/800
26201-1428250X	14/28	14	28	M10	250	607	12	40	200/250/300/350/400/500/600/700/800
26201-1428300X	14/28	14	28	M10	300	707	12	40	200/250/300/350/400/500/600/700/800
26201-1428350X	14/28	14	28	M10	350	807	12	40	200/250/300/350/400/500/600/700/800
26201-1428400X	14/28	14	28	M10	400	907	12	40	200/250/300/350/400/500/600/700/800

Industrial shock absorbers

adjustable





Material:
Housing, steel.
M8x0.75 housing in stainless steel.
Steel piston rod.
Steel nut.
Collision head in steel, plastic.

Version:
Housing nickel plated.
Housing M8x0.75, bright.
Housing M8x1 black oxidised.
Piston rod hard chromed.
Nut nickel plated.

Sample order:
nlm 26300-0807506

Note:
Industrial shock absorbers are maintenance-free, ready to install hydraulic components. They have an integrated fixed stop. The damping strength can be precisely set with the adjustable version. After installation, the equipment is run a few times and the adjustment screw rotated until the optimal braking is achieved.
Exceeding the max. energy input per hour is possible if a pause is made every now and then or the shock absorber is air cooled. The end position is optional.

Temperature range:
-5 °C to +70 °C.

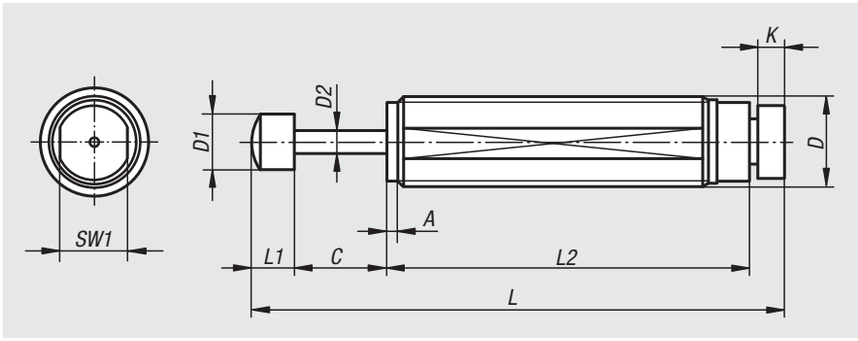
Order No.	D	D1	D2	C (travel)	L	L1	L2	L3	SW
26300-0807506	M8x0,75	6	2,5	6	58	5	41	2	11
26300-0810008	M8x1	6,4	2,5	8	61,1	5,1	43,9	3	10
26300-1010008	M10x1	6	2,4	8	65	6	41	3	13
26300-1210010	M12x1	8	3,5	10	84	8	61	4	14
26300-1415010	M14x1,5	10	3,5	10	88	8	59	6	17
26300-2015016	M20x1,5	18	6	16	127	17	76	8	24
26300-2515030	M25x1,5	22	8	30	173	18	111	10	32

Order No.	max. energy input per stroke Nm	max. energy input per hour Nm	effective mass max. kg	speed range m/s	return force N	axis deviation max. (°)
26300-0807506	1,4	2202	15	0,3 - 2	9	2,5
26300-0810008	3,5	5650	15	0,3 - 2	5,3	2
26300-1010008	1,76	3528	10	0,3 - 2	5,88	2,5
26300-1210010	4,9	5880	30	0,3 - 2	9,8	2,5
26300-1415010	5,88	8820	35	0,3 - 2	9,8	2,5
26300-2015016	29,4	20580	200	0,3 - 2	18,1	2,5
26300-2515030	49	29400	300	0,3 - 2	33,2	2,5

Industrial shock absorbers

adjustable, stainless steel





Material:
Housing stainless steel 1.4404.
Piston rod stainless steel 1.4125.
Collision head plastic.

Version:
Bright.
Filled with foodstuff compatible oil acc. to USDA-H1.

Sample order:
nlm 26301-0810007

Note:
Industrial shock absorbers are maintenance-free, ready to install hydraulic components. They have an integrated fixed stop. The adjustable version enables precise adjustment to the desired dampening level. After installation, operate and adjust the shock absorber a few times until the desired braking level is achieved.
Exceeding the max. energy intake per hour is possible if temporarily disconnected or the shock absorber is cooled with cylinder exhaust air. The installation position is arbitrary.

The shock absorbers are filled with special oil which meets the approval conditions (USDA-H1) for the food industry.

Temperature range:
-50°C to +120°C.

Order No.	A	C (travel)	D	D1	D2	K	L	L1	L2	SW1
26301-0810007	2,5	7	M8x1	6	2,5	3,5	61,5	5,5	45	-
26301-1010010	2,5	10	M10x1	6	3	3,5	68,5	6,5	48.5	-
26301-1210012	2,5	12	M12x1	10	4	3,5	89,5	8	66	-
26301-1410014	2,5	14	M14x1	10	4	4,5	105	8	78	13
26301-2010040	2,5	40	M20x1	12	6	6	181	10	125	18

Order No.	max. energy input per stroke Nm	max. energy input per hour Nm	effective mass max. kg	speed range m/s	return force N
26301-0810007	4	14400	50	V=0,2 - 3,5	6
26301-1010010	15	24000	500	V=0,2 - 3,5	8
26301-1210012	22	35200	800	V=0,2 - 3,5	7
26301-1410014	30	50000	1500	V=0,08 - 6	23
26301-2010040	125	95625	6300	V=0,08 - 6	23

Mounting flange

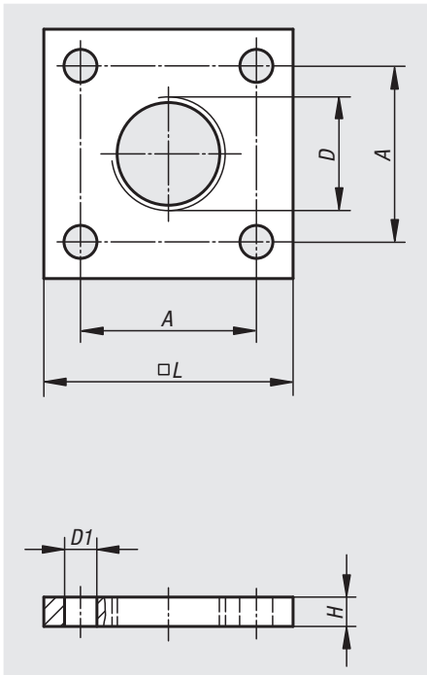


Material:
Steel.

Version:
nickel-plated.

Sample order:
nlm 26320-08075

Note:
When using the mounting flange use a locknut to secure the shock absorber. The compact form allows for space saving designs.



Order No.	A	D	D1	H	L
26320-08075	18	M8x0,75	3,2	4	25
26320-12100	18	M12x1	3,2	4	25
26320-14150	24	M14x1,5	4,5	4	34
26320-20150	28	M20x1,5	6,5	12	40
26320-25150	40	M25x1,5	9	12	54

Mounting brackets

stainless steel





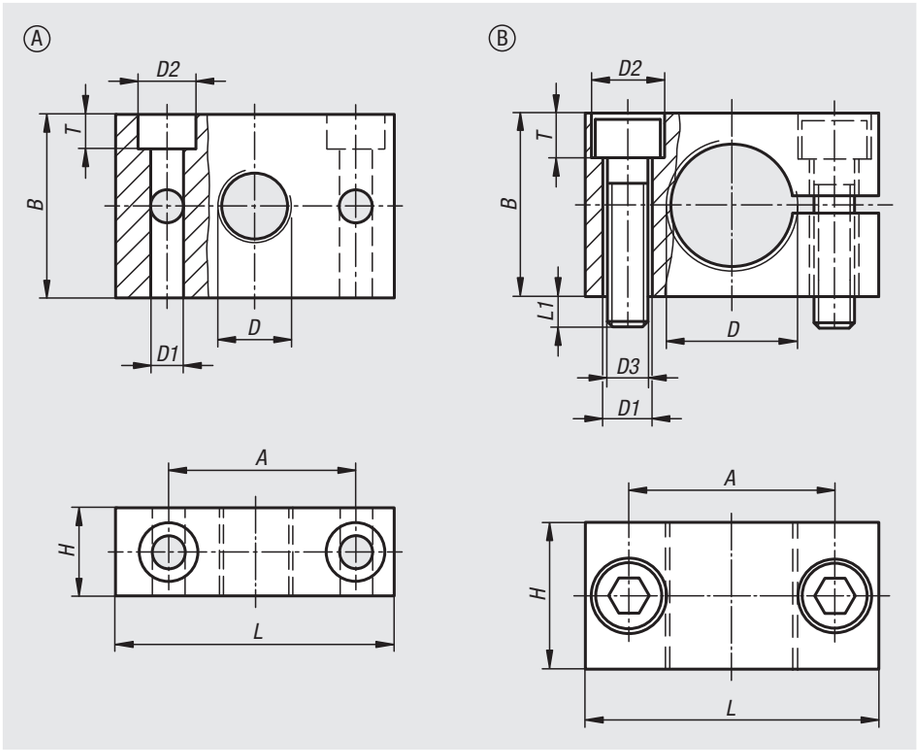
Material:
Stainless steel 1.4404.

Version:
Bright.

Sample order:
nlm 26320-10-10100

Note:
The compact form enables space saving designs.

Form A: A locknut must be used to secure the shock absorber.
Form B: No locknut required. The shock absorber is clamped into the split bracket using the screws provided.

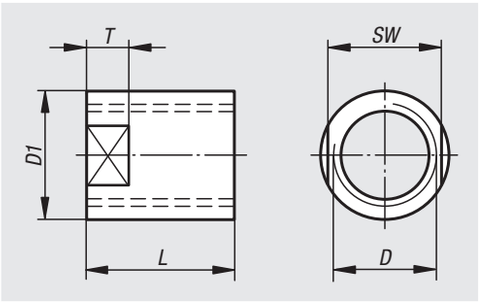


Order No.	Form	A	B	D	D1	D2	D3	H	L	L1	T
26320-10-10100	A	25,4	25	M10x1	4,5	8	-	12	38	-	4,5
26320-10-12100	A	25,4	25	M12x1	4,5	8	-	12	38	-	4,5
26320-10-14100	B	20	20	M14x1	5,5	9	M5	12	32	5	5,5
26320-10-20100	B	28	25	M20x1	6,5	11	M6	20	40	6	6,5

Stop nuts

stainless steel





Material:
Stainless steel 1.4404.

Version:
Bright.

Sample order:
nlm 26320-20-08100

Note:
All shock absorbers have an integrated fixed stop.
As an option, the stop nut can be screwed onto the external thread of the shock absorber in order to adjust the end stop precisely and individually.

Order No.	D	D1	L	SW	T
26320-20-08100	M8x1	11	12	-	-
26320-20-10100	M10x1	14	15	-	-
26320-20-12100	M12x1	16	20	-	-
26320-20-14100	M14x1	18	20	15	6
26320-20-20100	M20x1	25	35	22	8

27000

Clevis joints
Rod ends
Ball joints
Axial joints
Levelling sets
Swivel feet
Levelling feet
Tube-end plugs
Equipment feet
Hinges



Clevis joints for rod ends



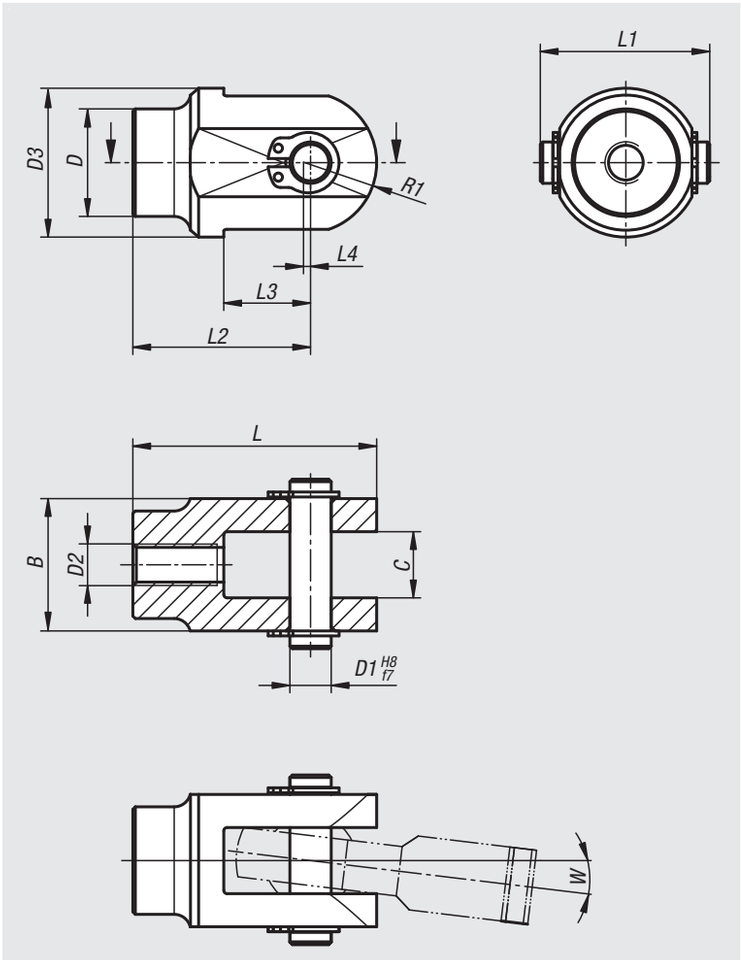
Material:
Clevis and pin, steel 1.7225

Version:
Electro zinc-plated.

Sample order:
nlm 27614-05080516

Note:
These clevises were developed as accessories for rod ends. The clevis opening size C was chosen to accept rod end joints.

Suitable for rod ends 27625, 27626, 27627 and 27628.

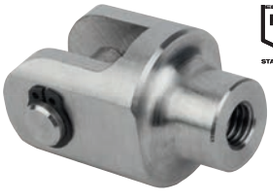




Order No.	B	C	D	D1	D2	D3	L	L1	L2	L3	L4	R1	W°	F static kN
27614-05080516	16	8	13	5	M5	18	29,5	20,5	21,5	10,5	0,5	8,5	6,5	8
27614-06090618	18	9	15	6	M6	20	33,5	22,9	25	11,5	0,5	9	7	9
27614-08120820	20	12	17	8	M8	24	41	24,9	31,5	13,5	1	10,5	8	14,5
27614-10141025	25	14	21	10	M10	28	49,5	30,3	38	16	1	12,5	8	19,5
27614-12161229	29	16	25	12	M12	32	57,5	34,3	44	18	1,5	15	8	23,5
27614-16211638	38	21	30	16	M16	42	76,5	43,3	58	23,5	1,5	20	9	32
27614-20252045	45	25	38	20	M20	50	90,5	51,9	68	29,5	-	22,5	9	43

Clevis joints for rod ends

stainless steel



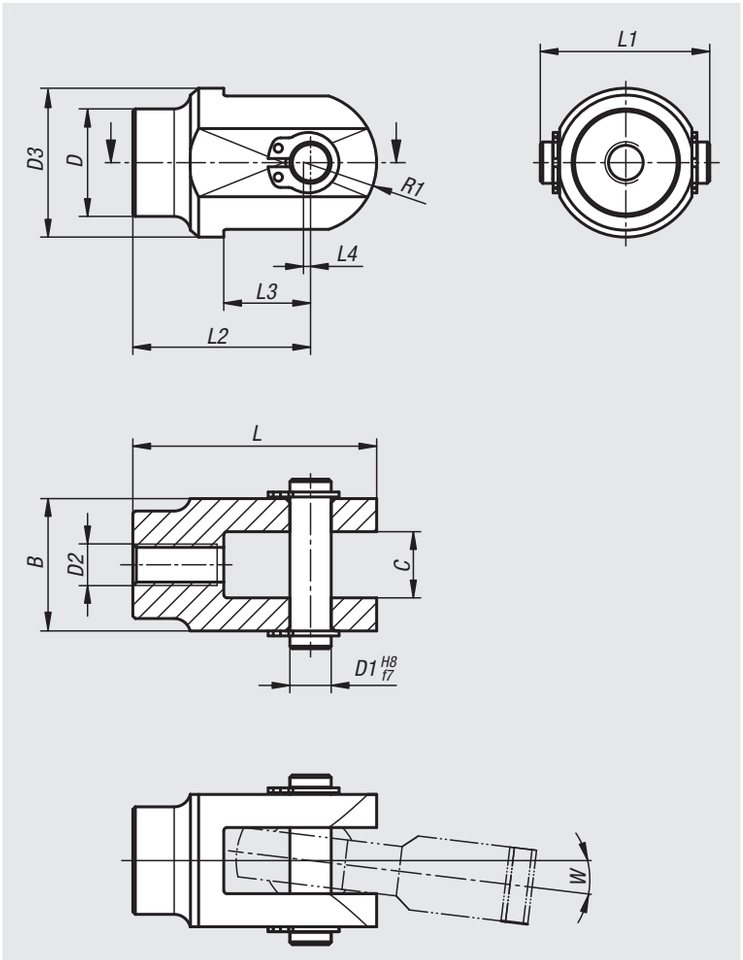
Material:
Clevis and pins stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 27615-05080516

Note:
These clevises were developed as accessories for rod ends. The clevis opening size C was chosen to accept rod end joints.

Suitable for rod ends 27629 and 27630.





Order No.	B	C	D	D1	D2	D3	L	L1	L2	L3	L4	R1	W°	F static kN
27615-05080516	16	8	13	5	M5	18	29,5	20,5	21,5	10,5	0,5	8,5	6,5	8
27615-06090618	18	9	15	6	M6	20	33,5	22,9	25	11,5	0,5	9	7	9
27615-08120820	20	12	17	8	M8	24	41	24,9	31,5	13,5	1	10,5	8	14,5
27615-10141025	25	14	21	10	M10	28	49,5	30,3	38	16	1	12,5	8	19,5
27615-12161229	29	16	25	12	M12	32	57,5	34,3	44	18	1,5	15	8	23,5
27615-16211638	38	21	30	16	M16	42	76,5	43,3	58	23,5	1,5	20	9	32
27615-20252045	45	25	38	20	M20	50	90,5	51,9	68	29,5	-	22,5	9	43

27616

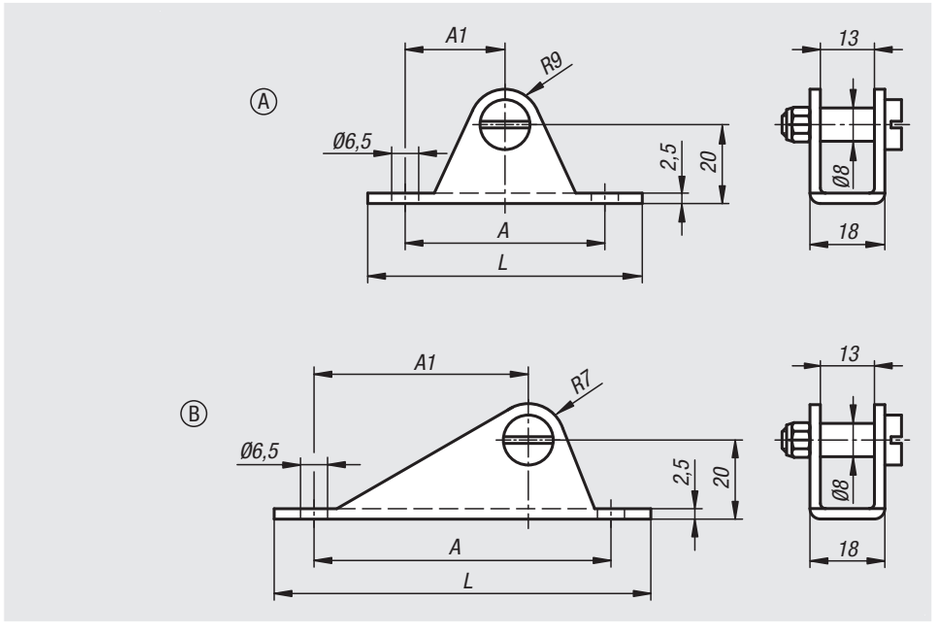
Hinge plates



Material:
Steel or stainless steel 1.4404.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27616-08070



Order No. steel	Order No. stainless steel	Form	A	A1	L	Strength N
27616-08070	**27616-080701**	A	51	25,5	70	1800
27616-08095	**27616-080951**	B	75	54	96	1800

27618

Rod-end eyes

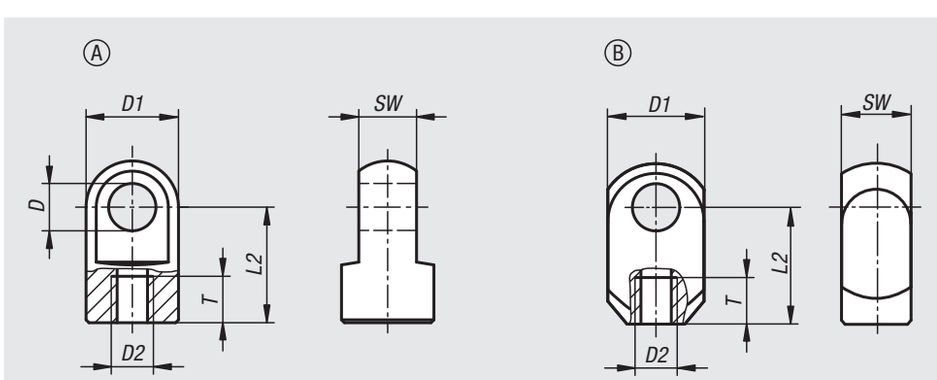


Material:
Steel or 1.4305 stainless steel

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27618-03504111

Note:
With internal thread.

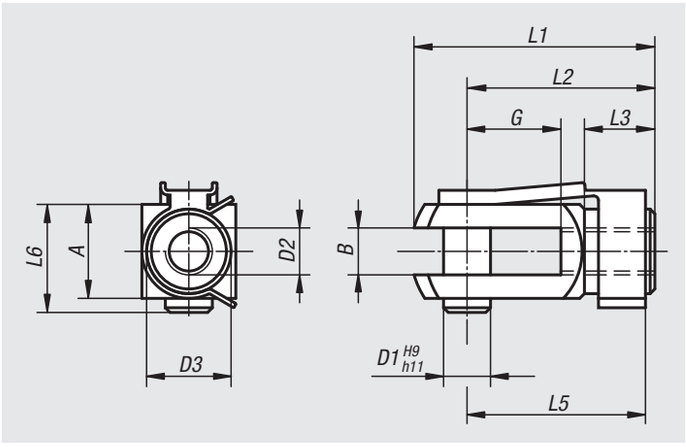


Order No. steel	Order No. stainless steel	Form	D	D1	D2	L2	SW	T
27618-03504111	-	A	4,1	8	M3,5	11	4	6
27618-0506116	**27618-05061161**	A	6,1	10	M5	16	6	8
27618-0508116	-	B	8,1	15	M5	16	10	8
27618-0808119	**27618-08081191**	A	8,1	14	M8	19	10	11
27618-1008127	**27618-10081271**	A	8,1	18	M10	27	10	12

Clevis joints with snap-in pin

DIN 71752





Material:
Clevis and pins free-cutting steel.
Spring, spring steel.

Version:
Trivalent passivated.

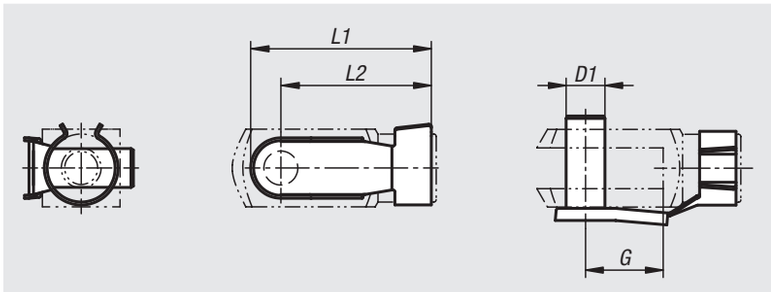
Sample order:
nlm 27620-0510

Order No.	Version	B	G	D1	D2	D3	L1	L2	L3	L5	L6	A
27620-03508	RH thread	4	8	4	M3,5	8	21	16	6	15	10	8
27620-0510	RH thread	5	10	5	M5	9	26	20	7,5	19	12	10
27620-0612	RH thread	6	12	6	M6	10	31	24	9	23	14	12
27620-0816	RH thread	8	16	8	M8	14	42	32	12	31	19	16
27620-0832	RH thread	8	32	8	M8	14	58	48	12	47	19	16
27620-1020	RH thread	10	20	10	M10	18	52	40	15	39	23	20
27620-10120	RH thread	10	20	10	M10x1,25	18	52	40	15	39	23	20
27620-1040	RH thread	10	40	10	M10	18	72	60	15	59	23	20
27620-10140	RH thread	10	40	10	M10x1,25	18	72	60	15	59	23	20
27620-1224	RH thread	12	24	12	M12	20	62	48	18	47	28	24
27620-12124	RH thread	12	24	12	M12x1,25	20	62	48	18	47	28	24
27620-1248	RH thread	12	48	12	M12	20	86	72	18	69	28	24
27620-12148	RH thread	12	48	12	M12x1,25	20	86	72	18	69	28	24
27620-1428	RH thread	14	28	14	M14	24	72	56	22,5	52	31	27
27620-1632	RH thread	16	32	16	M16	26	83	64	24	62	36	32
27620-16132	RH thread	16	32	16	M16x1,5	26	83	64	24	62	36	32
27620-05101	LH thread	5	10	5	M5	9	26	20	7,5	19	12	10
27620-06121	LH thread	6	12	6	M6	10	31	24	9	23	14	12
27620-08161	LH thread	8	16	8	M8	14	42	32	12	31	19	16
27620-08321	LH thread	8	32	8	M8	14	58	48	12	47	19	16
27620-10201	LH thread	10	20	10	M10	18	52	40	15	39	23	20
27620-10401	LH thread	10	40	10	M10	18	72	60	15	59	23	20
27620-12241	LH thread	12	24	12	M12	20	62	48	18	47	28	24
27620-16321	LH thread	16	32	16	M16	26	83	64	24	62	36	32

Snap-in pins

for DIN 71752 clevis joints





Material:
Steel bolts.
Spring, tempered leaf spring steel.

Version:
Electro zinc-plated.

Sample order:
nlm 27621-0408

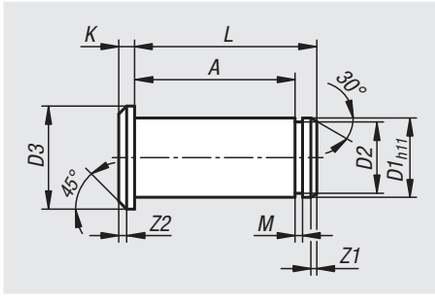
Note:
For DIN 71752 clevis.

Order No.	D1	G	L1	L2
27621-0408	4	8	18,5	15
27621-0510	5	10	23	19
27621-0612	6	12	28	23
27621-0816	8	16	37	30
27621-0832	8	32	52	46
27621-1020	10	20	46	38
27621-1040	10	40	66	58
27621-1224	12	24	53	45
27621-1248	12	48	78	69
27621-1428	14	28	62	52
27621-1632	16	32	73	62

Pin with circlip groove

suitable for clevis joints





Material:
Steel 1.0718 or 1.4305 stainless steel

Version:
Electro zinc-plated steel.
Bright stainless steel.

Sample order:
nlm 27621-01-004085

Note:
Pin with groove, suitable for DIN 71752 clevis. Secured with a DIN 6799 E-type circlip (alternatively a KL or SL clip).

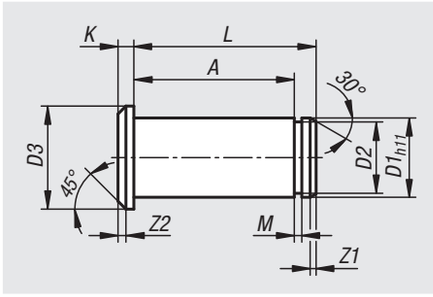
When combined with a suitable clevis and tang, forms a fully functional clevis joint.

Order No. steel	Order No. stainless steel	D1	D2	D3	A	K	L	M	Z1	Z2
27621-01-004085	**27621-01-104085**	4	3,2	6	8,5	1	10,5	0,64	0,5	0,5
27621-01-005105	**27621-01-105105**	5	4	8	10,5	1,5	13	0,74	0,5	0,5
27621-01-006125	**27621-01-106125**	6	5	9	12,5	1,5	15,5	0,74	1	0,5
27621-01-008165	**27621-01-108165**	8	6	12	16,5	2	20	0,94	0,5	1
27621-01-010205	**27621-01-110205**	10	8	14	20,5	2	25	1,05	1	1
27621-01-012245	**27621-01-112245**	12	9	17	24,5	3	30	1,15	1	1,5
27621-01-014275	**27621-01-114275**	14	10	19	27,5	3	33	1,25	1,25	1,5
27621-01-016325	**27621-01-116325**	16	12	21	32,5	3	38,5	1,35	1,5	1,5
27621-01-020405	**27621-01-120405**	20	17,5	26	40,5	4	46	1,9	1,5	2
27621-01-025505	**-**	25	18	32	50,5	5	57	1,9	1,5	2

Pin with circlip groove

suitable for clevis joints





Material:
Steel 1.0718 or 1.4305 stainless steel

Version:
Electro zinc-plated steel.
Bright stainless steel.

Sample order:
nlm 27621-02-004085

Note:
Pins with groove suitable for DIN 71752 clevis. Secured with a DIN 471 circlip.

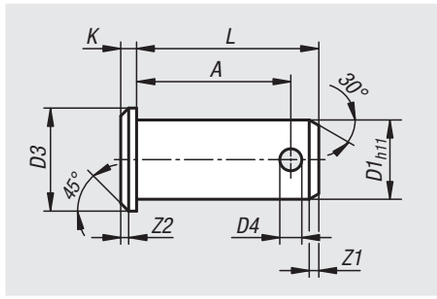
When combined with a suitable clevis and tang, forms a fully functional clevis joint.

Order No. steel	Order No. stainless steel	D1	D2	D3	A	K	L	M	Z1	Z2
27621-02-004085	**27621-02-104085**	4	3,8	6	8,5	1	10,5	0,64	0,5	0,5
27621-02-005105	**27621-02-105105**	5	4,8	8	10,5	1,5	13	0,74	0,5	0,5
27621-02-006125	**27621-02-106125**	6	5,7	9	12,5	1,5	15,5	0,74	1	0,5
27621-02-008165	**27621-02-108165**	8	7,6	12	16,5	2	20	0,94	0,5	1
27621-02-010205	**27621-02-110205**	10	9,6	14	20,5	2	25	1,05	1	1
27621-02-012245	**27621-02-112245**	12	11,5	17	24,5	3	28	1,15	1	1,5
27621-02-014275	-	14	13,4	19	27,5	3	33	1,25	1,25	1,5
27621-02-016325	**27621-02-116325**	16	15,2	21	32,5	3	38,5	1,35	1,5	1,5
27621-02-020405	**27621-02-120405**	20	19	26	40,5	4	46	1,9	1,5	2

Pin with hole for split pin

suitable for clevis joints





Material:
Steel 1.0718 or 1.4305 stainless steel

Version:
Electro zinc-plated steel.
Bright stainless steel.

Sample order:
nlm 27621-03-004100

Note:
Pins with a hole, suitable for DIN 71752 clevis. Secured with a split pin.

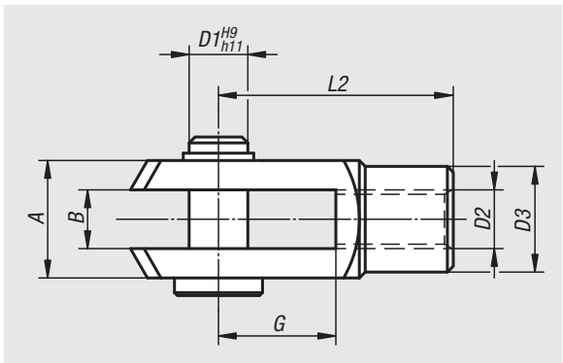
When combined with a suitable clevis and tang, forms a fully functional clevis joint.

Order No. steel	Order No. stainless steel	D1	D3	D4	A	K	L	Z1	Z2
27621-03-004100	**27621-03-104100**	4	6	1	10	1	12	1	0,5
27621-03-005123	**27621-03-105123**	5	8	1,2	12,3	1,5	15	1	0,5
27621-03-006153	**27621-03-106153**	6	9	1,6	15,3	1,5	18	1,5	0,5
27621-03-008195	**27621-03-108195**	8	12	2	19,5	2	23	2	1
27621-03-010245	**27621-03-110245**	10	14	3,2	24,5	2	29	2	1
27621-03-012295	**27621-03-112295**	12	17	4	29,5	3	35	2,5	1,5
27621-03-014325	**27621-03-114325**	14	19	4	32,5	3	40	2,5	1,5
27621-03-016382	**27621-03-116382**	16	21	4	38,2	3	45	2,5	1,5
27621-03-020470	**27621-03-120470**	20	26	5	47	4	53	3	2
27621-03-025590	**27621-03-125590**	25	32	6,3	59	5	67	4	2
27621-03-028632	-	28	34	6,3	63,2	5	72	4	2
27621-03-030590	**27621-03-130590**	30	36	6,3	59	5	67	4	2
27621-03-030682	-	30	36	6,3	68,2	5	77	4	2
27621-03-035765	-	35	44	8	76,5	6	87	5	2
27621-03-040900	-	40	48	8	90	6	100	5	2
27621-03-042900	-	42	48	8	90	7	100	5	2
27621-03-0501030	-	50	58	10	103	7	115	6	2

Clevis joints stainless steel

DIN 71752





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 27622-0816

Order No.	Version	B	G	D1	D2	D3	L2	A
27622-0510	RH thread	5	10	5	M5	9	20	10
27622-0612	RH thread	6	12	6	M6	10	24	12
27622-0816	RH thread	8	16	8	M8	14	32	16
27622-0832	RH thread	8	32	8	M8	14	48	16
27622-1020	RH thread	10	20	10	M10	18	40	20
27622-10120	RH thread	10	20	10	M10x1,25	18	40	20
27622-1040	RH thread	10	40	10	M10	18	60	20
27622-1224	RH thread	12	24	12	M12	20	48	24
27622-12124	RH thread	12	24	12	M12x1,25	20	48	24
27622-1248	RH thread	12	48	12	M12	20	72	24
27622-12148	RH thread	12	48	12	M12x1,25	20	72	24
27622-1428	RH thread	14	28	14	M14	24	56	27
27622-1632	RH thread	16	32	16	M16	26	64	32
27622-16132	RH thread	16	32	16	M16x1,5	26	64	32
27622-05101	LH thread	5	10	5	M5	9	20	10
27622-06121	LH thread	6	12	6	M6	10	24	12
27622-08161	LH thread	8	16	8	M8	14	32	16
27622-10201	LH thread	10	20	10	M10	18	40	20
27622-12241	LH thread	12	24	12	M12	20	48	24
27622-16321	LH thread	16	32	16	M16	26	64	32

Clevis joints

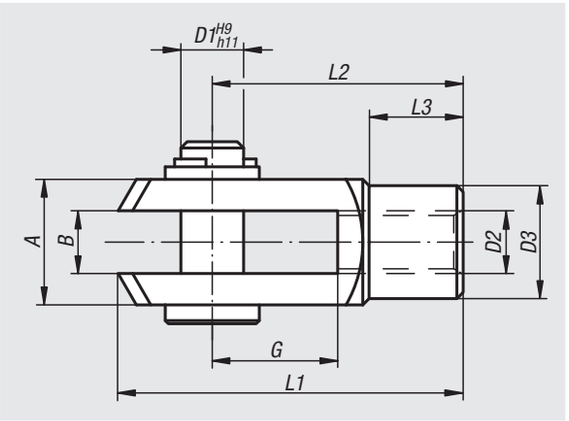
DIN 71752



Material:
Steel.

Version:
Electro zinc-plated.

Sample order:
nlm 27624-0510

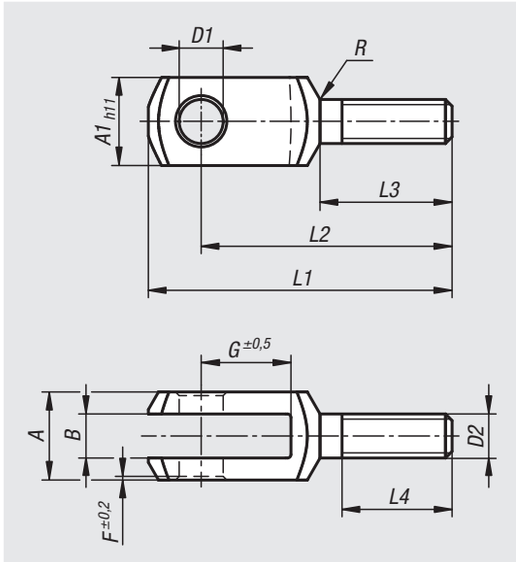


Order No.	Version	B	G	D1	D2	D3	L1	L2	L3	A
27624-0510	RH thread	5	10	5	M5	9	26	20	7,5	10
27624-0612	RH thread	6	12	6	M6	10	31	24	9	12
27624-0816	RH thread	8	16	8	M8	14	42	32	12	16
27624-0832	RH thread	8	32	8	M8	14	58	48	12	16
27624-1020	RH thread	10	20	10	M10	18	52	40	15	20
27624-10120	RH thread	10	20	10	M10x1,25	18	52	40	15	20
27624-1040	RH thread	10	40	10	M10	18	72	60	15	20
27624-10140	RH thread	10	40	10	M10x1,25	18	72	60	15	20
27624-1224	RH thread	12	24	12	M12	20	62	48	18	24
27624-12124	RH thread	12	24	12	M12x1,25	20	62	48	18	24
27624-1248	RH thread	12	48	12	M12	20	86	72	18	24
27624-12148	RH thread	12	48	12	M12x1,25	20	86	72	18	24
27624-1428	RH thread	14	28	14	M14	24	72	56	22,5	27
27624-1632	RH thread	16	32	16	M16	26	83	64	24	32
27624-16132	RH thread	16	32	16	M16x1,5	26	83	64	24	32
27624-05101	LH thread	5	10	5	M5	9	26	20	7,5	10
27624-06121	LH thread	6	12	6	M6	10	31	24	9	12
27624-08161	LH thread	8	16	8	M8	14	42	32	12	16
27624-10201	LH thread	10	20	10	M10	18	52	40	15	20
27624-12241	LH thread	12	24	12	M12	20	62	48	18	24
27624-16321	LH thread	16	32	16	M16	26	83	64	24	32

Clevis, steel or stainless steel

with male thread





Material:
Steel 1.0718 or stainless steel 1.4305.

Version:
Steel electro zinc-plated.
Stainless steel bright.

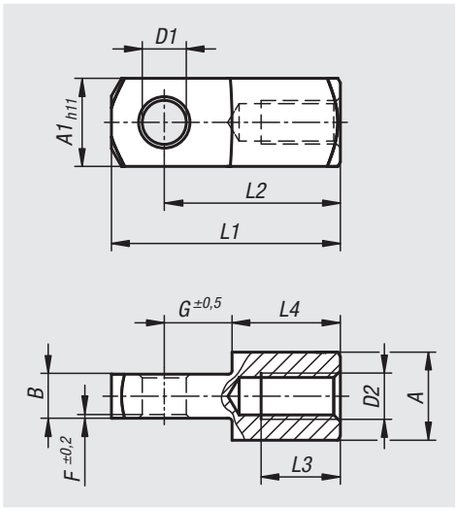
Sample order:
nlm 27624-05-0612



Order No. steel	Order No. stainless steel	A	A1	B	D1	D2	F	G	L1	L2	L3	L4	R
27624-05-0612	**27624-05-10612**	12	12	6	6	M6	0,5	12	44	37	20	15	0,8
27624-05-0816	**27624-05-10816**	16	16	8	8	M8	0,5	16	57	47	25	20	0,8
27624-05-1020	**27624-05-11020**	20	20	10	10	M10	0,5	20	69	57	30	25	0,8
27624-05-1224	**27624-05-11224**	24	24	12	12	M12	0,5	24	82	68	35	30	0,8
27624-05-1428	**27624-05-11428**	27	27	14	14	M14	1	28	94	78	40	35	1,2
27624-05-1632	**27624-05-11632**	32	32	16	16	M16	1	32	108	89	45	40	1,2
27624-05-2040	**27624-05-12040**	40	40	20	20	M20	1	40	134	109	55	50	1,5

Clevis tang, steel



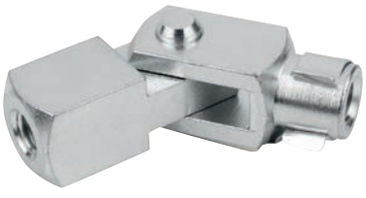


Material:
Steel 1.0718.

Version:
Electro zinc-plated.

Sample order:
nlm 27624-10-0406

Note:
The clevis tang can be combined with a DIN 71752 clevis.
These items are mainly used when connections are required to compensate for a directional shift in one direction.

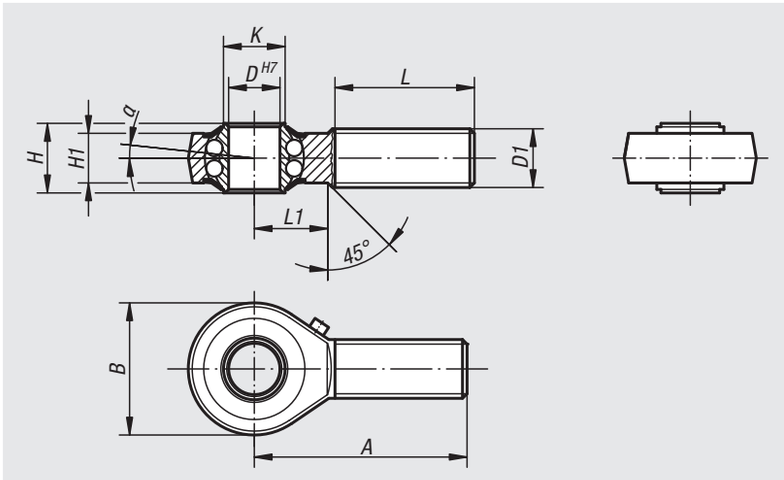


Order No.	A	A1	B	D1	D2	F	G	L1	L2	L3	L4
27624-10-0406	8	8	4	4	M4	0,5	6	21	16	6	10
27624-10-0507	10	10	5	5	M5	0,5	7,5	26	20	8	12,5
27624-10-0609	12	12	6	6	M6	0,5	9	31	24	11	15
27624-10-0812	16	16	8	8	M8	0,5	12	42	32	14	20
27624-10-1015	20	20	10	10	M10	0,5	15	52	40	18	25
27624-10-1218	24	24	12	12	M12	0,5	18	62	48	22	30
27624-10-1421	27	27	14	14	M14	1	21	72	56	25	35
27624-10-1624	32	32	16	16	M16	1	24	83	64	30	40

Rod ends with ball bearing

external thread





Material:
Casing drop-forged steel, tempered.

Version:
Electro zinc-plated.
Bearing play 15 - 40 µm.

Sample order:
nlm 27625-12

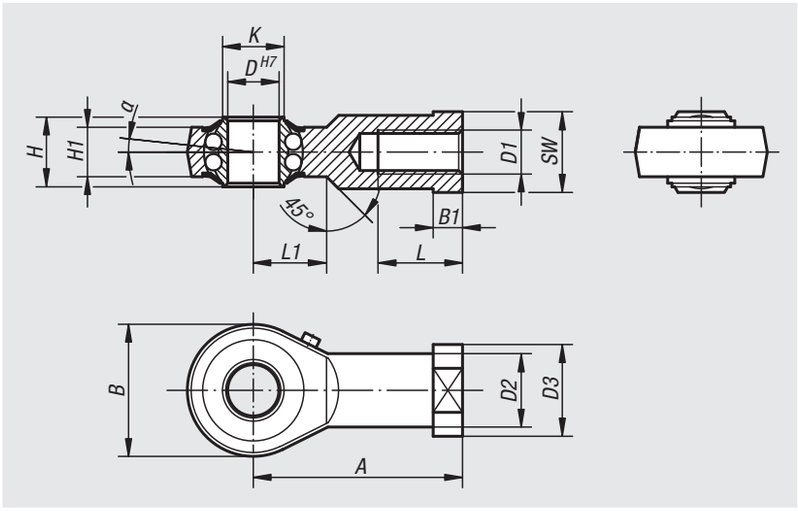
Note:
The hardened ball bearing is long-term greased and sealed with cover washers. The connection dimensions comply with DIN 648 Form series KA.
Rod ends are primarily used where movement processes are transmitted and there is no exact alignment. Up to D = 10 the rod ends have a DIN 3405/A flush type grease nipple. From D = 12 they have a DIN 71412/A conical head type grease nipple.

Order No. RH thread	Order No. LH thread	D	D1	A	B	H	H1	K	L	L1	α	Dynamic load rating N	Static load rating N	Rev. limit n max. rpm
27625-06	**27625-061**	6	M6	36	20	9	6,75	9	22	12	8°	2750	650	1350
27625-08	**27625-081**	8	M8	42	24	12	9	10,5	25	15	8,5°	4000	1000	1300
27625-10	**27625-101**	10	M10	48	28	14	10,5	12	29	15	8°	4450	1450	1225
27625-12	**27625-121**	12	M12	54	32	16	12	14,5	33	19	7,5°	4950	1800	1125
27625-16	**27625-161**	16	M16	66	42	21	15	19	40	22	8°	76250	2350	975
27625-20	**27625-201**	20	M20x1,5	78	50	25	18	24,5	47	28	7°	7900	3450	825
27625-22	**27625-221**	22	M22x1,5	84	54	28	20	26	51	26	8°	9300	3980	725

Rod ends with ball bearing

internal thread





Material:
Casing drop-forged steel, tempered.

Version:
Electro zinc-plated.
Bearing play 15 - 40 µm.

Sample order:
nlm 27626-16

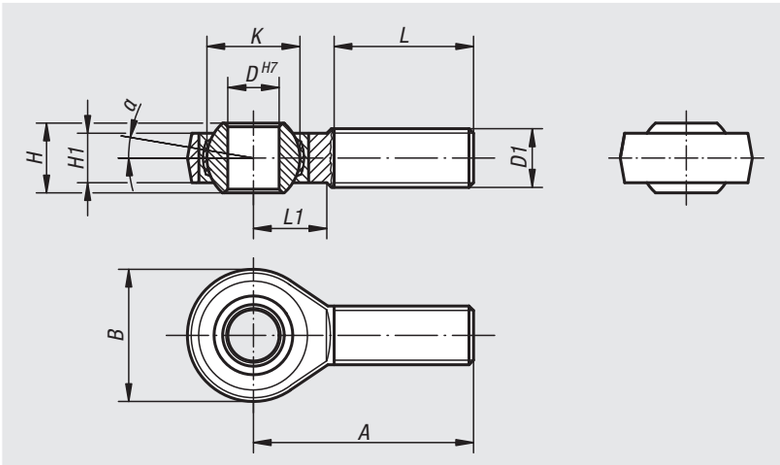
Note:
The hardened ball bearing is long-term greased and sealed with cover washers. The connection dimensions comply with DIN 648 Form Series KA.
Up to D = 10 the rod ends have a DIN 3405/A flush type grease nipple. From D = 12 they have a DIN 71412/A conical head type grease nipple.

Order No. RH thread	Order No. LH thread	D	D1	D2	D3	A	B	B1	H	H1	K	L	L1	SW	α	Dynamic load rating N	Static load rating N	Rev. limit n max. rpm
27626-06	**27626-061**	6	M6	10	13	30	20	5	9	6,75	9	12	10	11	8°	2750	650	1350
27626-08	**27626-081**	8	M8	12,5	16	36	24	5	12	9	10,5	16	12	14	8,5°	4000	1000	1300
27626-10	**27626-101**	10	M10	15	19	43	28	6,5	14	10,5	12	20	15	17	8°	4450	1450	1225
27626-12	**27626-121**	12	M12	17,5	22	50	32	6,5	16	12	14,5	22	16	19	7,5°	4950	1800	1125
27626-16	**27626-161**	16	M16	22	27	64	42	8	21	15	19	28	22	22	8°	76250	2350	975
27626-20	**27626-201**	20	M20x1,5	27,5	34	77	50	10	25	18	24,5	33	26	30	7°	7900	3450	825
27626-22	**27626-221**	22	M22x1,5	30	38	84	54	12	28	20	26	37	26	32	8°	9300	3980	725

Rod ends with plain bearing

external thread





Material:
Housing size (D) 5-12 turned steel.
From size (D) 16 forged steel.
Ball joint ball bearing steel, hardened, ground and polished.
Bearing shell steel with PTFE weave glued in.

Version:
Electro zinc-plated.

Sample order:
nlm 27627-20

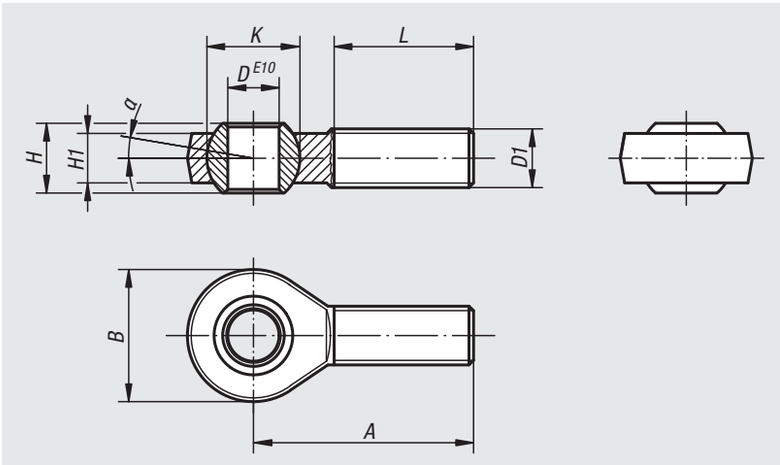
Note:
The rod end bearing is maintenance-free. The connection dimensions comply with DIN 648 series KA.

Order No. RH thread	Order No. LH thread	D	D1	A	B	H	H1	K	L	L1	α	Dynamic base loads kN	Static base loads kN
27627-05	**27627-051**	5	M5	33	18	8	6	11,11	20	9	13°	7,5	4,3
27627-06	**27627-061**	6	M6	36	20	9	6,75	12,7	22	12	13°	9,3	6
27627-08	**27627-081**	8	M8	42	24	12	9	15,87	25	15	13°	16,7	11
27627-10	**27627-101**	10	M10	48	28	14	10,5	19,05	29	15	13°	23,4	17,4
27627-12	**27627-121**	12	M12	54	32	16	12	22,22	33	19	13°	32	23,5
27627-16	**27627-161**	16	M16	66	42	21	15	28,57	40	22	15°	52,7	32
27627-20	**27627-201**	20	M20x1,5	78	50	25	18	34,92	47	28	15°	78,1	43,8
27627-22	**27627-221**	22	M22x1,5	84	54	28	20	38,1	51	26	15°	97,2	52,6

Rod ends igubal® with plain bearing

external thread





Material:
Housing igumid® G.
Bearing seat iglidur® W300.

Version:
black.

Sample order:
nlm 27627-105

Note:
The rod end has very high rigidity under alternating stresses, it is insensitive to dirt, dust and lint, and is both corrosion and chemical resistant. It is ideal for rotary, oscillating and linear movements.
The connection dimensions comply with DIN ISO 12240 series K.

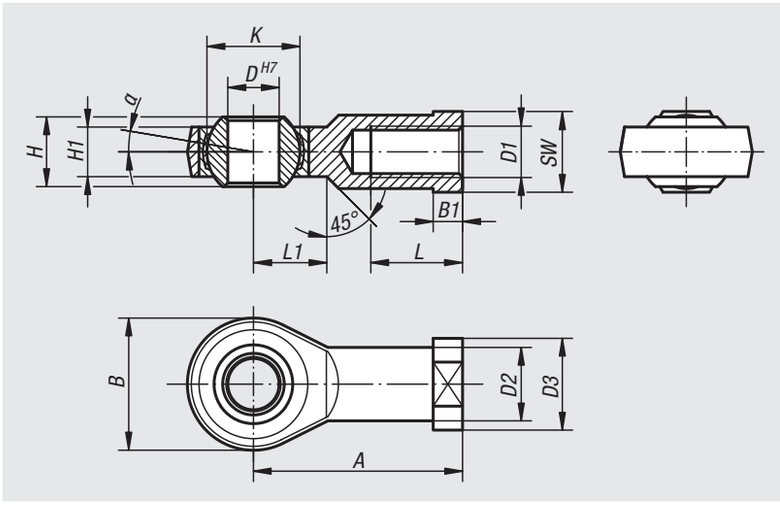
Tolerances:
The bore of the inner ring has an E10 tolerance. The shaft tolerance should be between h6 and h9.

Order No. RH thread	Order No. LH thread	D	D1	A	B	H	H1	K	L	α	Max. static tensile stress N short-term	Max. static tensile stress N long-term	Max. transverse stress N short-term	Max. transverse stress N long-term
27627-105	**27627-1051**	5	M5	33	18	8	6	11,1	19	15°	800	400	80	40
27627-106	**27627-1061**	6	M6	36	20	9	7	12,7	21	14,5°	1000	500	100	50
27627-108	**27627-1081**	8	M8	42	24	12	9	15,8	25	12,5°	1700	850	200	100
27627-110	**27627-1101**	10	M10	48	30	14	10,5	19	28	12,5°	2500	1250	300	150
27627-110125	**27627-1101251**	10	M10x1,25	48	30	14	10,5	19	28	12,5°	2500	1250	300	150
27627-112	**27627-1121**	12	M12	54	34	16	12	22,2	32	12,5°	2700	1350	400	200
27627-112125	**27627-1121251**	12	M12x1,25	54	34	16	12	22,2	32	12,5°	2700	1350	400	200
27627-114	**27627-1141**	14	M14	61	38	19	13,5	25,25	36	12,5°	3400	1700	700	350
27627-116	**27627-1161**	16	M16	66	42	21	15	28,3	37	11,5°	3900	1950	800	400
27627-116150	**27627-1161501**	16	M16x1,5	66	42	21	15	28,3	37	11,5°	3900	1950	800	400
27627-118150	**27627-1181501**	18	M18x1,5	72	46	23	16,5	31,35	41	11,5°	4200	2100	1000	500
27627-120	**27627-1201**	20	M20	78	50	25	18	34,9	45	11,5°	6000	3000	1300	650
27627-120150	**27627-1201501**	20	M20x1,5	78	50	25	18	34,9	45	11,5°	6000	3000	1300	650

Rod ends with plain bearing

internal thread





Material:
Housing size (D) 5-12 turned steel.
From size (D) 16 forged steel.
Ball joint ball bearing steel, hardened, ground and polished.
Bearing shell steel with PTFE weave glued in.

Version:
Electro zinc-plated.

Sample order:
nlm 27628-22

Note:
The rod end bearing is maintenance-free. The connection dimensions comply with DIN 648 series KJ.

Order No. RH thread	Order No. LH thread	D	D1	D2	D3	A	B	B1	H	H1	K	L	L1	SW	α	Dynamic base loads kN	Static base loads kN
27628-05	**27628-051**	5	M5	9	11	27	18	4	8	6	11,11	10	10	9	13°	7,5	8
27628-06	**27628-061**	6	M6	10	13	30	20	5	9	6,75	12,7	12	10	11	13°	9,3	8,9
27628-08	**27628-081**	8	M8	12,5	16	36	24	5	12	9	15,87	16	12	13	13°	16,7	14,1
27628-10	**27628-101**	10	M10	15	19	43	28	6,5	14	10,5	19,05	20	15	17	13°	23,4	19,3
27628-10125	**27628-101251**	10	M10x1,25	15	19	43	28	6,5	14	10,5	19,05	20	15	17	13°	23,4	19,3
27628-12	**27628-121**	12	M12	17,5	22	50	32	6,5	16	12	22,22	22	16	19	13°	32	23,5
27628-12125	**27628-121251**	12	M12x1,25	17,5	22	50	32	6,5	16	12	22,22	22	16	19	13°	32	23,5
27628-16	**27628-161**	16	M16	22	27	64	42	8	21	15	28,57	28	22	22	15°	52,7	32
27628-1615	**27628-16151**	16	M16x1,5	22	27	64	42	8	21	15	28,57	28	22	22	15°	52,7	32
27628-20	**27628-201**	20	M20x1,5	27,5	34	77	50	10	25	18	34,92	33	26	32	15°	78,1	43,8
27628-22	**27628-221**	22	M22x1,5	30	37	84	54	12	28	20	38,1	37	26	32	15°	97,2	52,6

Rod ends igubal® with plain bearing

internal thread



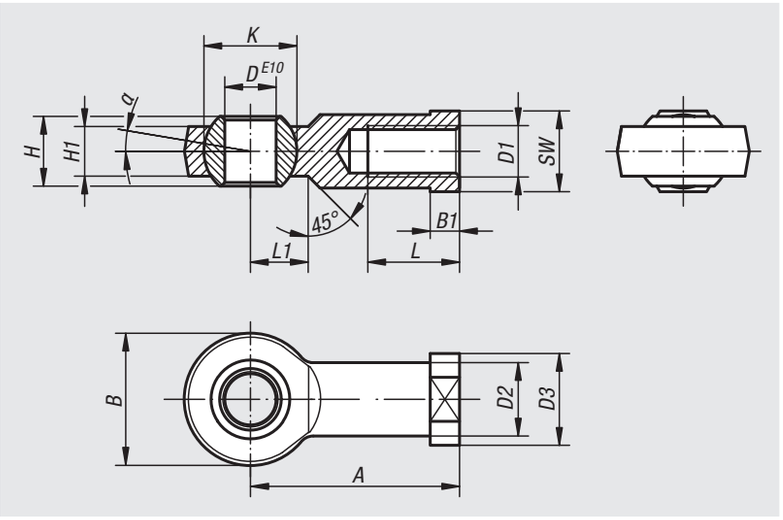
Material:
Housing igumid® G.
Bearing seat iglidur® W300.

Version:
black.

Sample order:
nlm 27628-104

Note:
The rod end has very high rigidity under alternating stresses, it is insensitive to dirt, dust and lint, and is both corrosion and chemical resistant. It is ideal for rotary, oscillating and linear movements. The connection dimensions comply DIN ISO 12240 series K.

Tolerances:
The bore of the inner ring has an E10 tolerance. The shaft tolerance should be between h6 and h9.



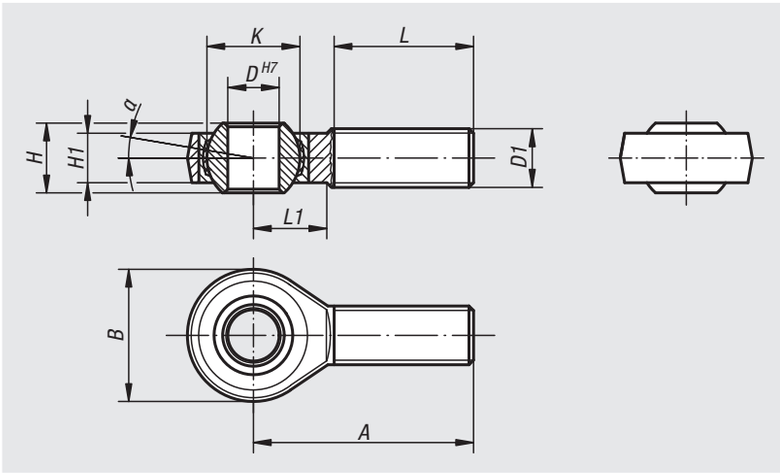
Order No. RH thread	Order No. LH thread	D	D1	D2	D3	A	B	B1	H	H1	K	L	L1	SW	α
27628-104	**27628-1041**	5	M4	9	12	27	18	4	8	6	11,1	10	9	9	15°
27628-105	**27628-1051**	5	M5	9	12	27	18	4	8	6	11,1	10	9	9	15°
27628-106	**27628-1061**	6	M6	10	13	30	20	5	9	7	12,7	12	10	11	14,5°
27628-108	**27628-1081**	8	M8	13	16	36	24	5	12	9	15,8	16	12	14	12,5°
27628-110	**27628-1101**	10	M10	15	19	43	30	6,5	14	10,5	19	20	14	17	12,5°
27628-110125	**27628-1101251**	10	M10x1,25	15	19	43	30	6,5	14	10,5	19	20	14	17	12,5°
27628-112	**27628-1121**	12	M12	18	22	50	34	6,5	16	12	22,2	22	16	17	12,5°
27628-112125	**27628-1121251**	12	M12x1,25	18	22	50	34	6,5	16	12	22,2	22	16	19	12,5°
27628-114	**27628-1141**	14	M14	20	25	57	38	8	19	13,5	25,25	25	18	22	11,5°
27628-116	**27628-1161**	16	M16	22	27	64	42	8	21	15	28,3	28	21	22	11,5°
27628-116150	**27628-1161501**	16	M16x1,5	22	27	64	42	8	21	15	28,3	28	21	22	11,5°
27628-118150	**27628-1181501**	18	M18x1,5	25	31	71	46	10	23	16,5	31,35	32	23	27	11,5°
27628-120	**27628-1201**	20	M20	28	34	77	50	10	25	18	34,9	33	25	30	11,5°
27628-120150	**27628-1201501**	20	M20x1,5	28	34	77	50	10	25	18	34,9	33	25	30	11,5°

Order No. RH thread	Order No. LH thread	D1	Max. static tensile stress N short-term	Max. static tensile stress N long-term	Max. transverse stress N short-term	Max. transverse stress N long-term
27628-104	**27628-1041**	M4	1000	500	250	125
27628-105	**27628-1051**	M5	1000	500	250	125
27628-106	**27628-1061**	M6	1400	700	400	200
27628-108	**27628-1081**	M8	2100	1050	700	350
27628-110	**27628-1101**	M10	3100	1550	800	400
27628-110125	**27628-1101251**	M10x1,25	3100	1550	800	400
27628-112	**27628-1121**	M12	3600	1800	900	450
27628-112125	**27628-1121251**	M12x1,25	3600	1800	900	450
27628-114	**27628-1141**	M14	4000	2000	1000	500
27628-116	**27628-1161**	M16	4200	2100	1300	650
27628-116150	**27628-1161501**	M16x1,5	4200	2100	1300	650
27628-118150	**27628-1181501**	M18x1,5	4600	2300	1600	800
27628-120	**27628-1201**	M20	5400	2700	2100	1050
27628-120150	**27628-1201501**	M20x1,5	5400	2700	2100	1050

Rod ends with plain bearing

external thread, stainless steel





Material:
Housing forged 1.4057 stainless steel.
Ball joint 1.4034 hardened and ground.
Bearing shell 1.4571 stainless steel.

Version:
Polished.

Sample order:
nlm 27629-20

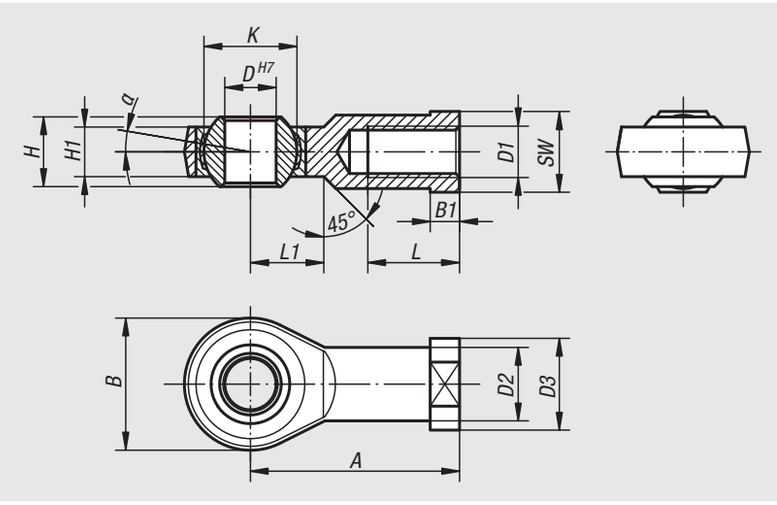
Note:
The rod end bearing is maintenance-free.
The connection dimensions comply with DIN 648 Form Series KA.

Order No. RH thread	Order No. LH thread	D	D1	A	B	H	H1	K	L	L1	α	Dynamic base loads kN	Static base loads kN
27629-05	**27629-051**	5	M5	33	18	8	6	11,11	20	9	13°	7,5	6,2
27629-06	**27629-061**	6	M6	36	20	9	6,75	12,7	22	12	13°	9,3	8,8
27629-08	**27629-081**	8	M8	42	24	12	9	15,87	25	15	13°	16,7	16,1
27629-10	**27629-101**	10	M10	48	28	14	10,5	19,05	29	15	13°	23,4	25,5
27629-12	**27629-121**	12	M12	54	32	16	12	22,22	33	19	13°	32	34,5
27629-16	**27629-161**	16	M16	66	42	21	15	28,57	40	22	15°	52,7	60,6
27629-20	**27629-201**	20	M20x1,5	78	50	25	18	34,92	47	28	15°	78,1	83,1
27629-22	**27629-221**	22	M22x1,5	84	54	28	20	38,1	51	26	15°	97,2	99,7

Rod ends with plain bearing

internal thread, stainless steel





Material:
Housing forged 1.4057 stainless steel.
Ball joint 1.4034 hardened and ground.
Bearing shell 1.4571 stainless steel.

Version:
Polished.

Sample order:
nlm 27630-22

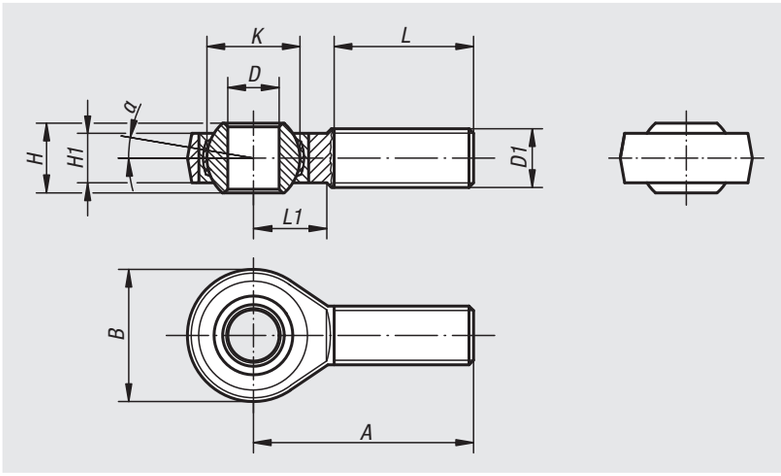
Note:
The rod end bearing is maintenance-free.
The connection dimensions comply with DIN 648 Form Series KJ.

Order No. RH thread	Order No. LH thread	D	D1	D2	D3	A	B	B1	H	H1	K	L	L1	SW	α	Dynamic base loads kN	Static base loads kN
27630-05	**27630-051**	5	M5	9	11	27	18	4	8	6	11,11	10	10	9	13°	7,5	11,8
27630-06	**27630-061**	6	M6	10	13	30	20	5	9	6,75	12,7	12	10	11	13°	9,3	13,1
27630-08	**27630-081**	8	M8	12,5	16	36	24	5	12	9	15,87	16	12	13	13°	16,7	20,7
27630-10	**27630-101**	10	M10	15	19	43	28	6,5	14	10,5	19,05	20	15	17	13°	23,4	28,3
27630-10125	**27630-101251**	10	M10x1,25	15	19	43	28	6,5	14	10,5	19,05	20	15	17	13°	23,4	28,3
27630-12	**27630-121**	12	M12	17,5	22	50	32	6,5	16	12	22,22	22	16	19	13°	32	34,5
27630-12125	**27630-121251**	12	M12x1,25	17,5	22	50	32	6,5	16	12	22,22	22	16	19	13°	32	34,5
27630-16	**27630-161**	16	M16	22	27	64	42	8	21	15	28,57	28	22	22	15°	52,7	60,6
27630-1615	**27630-16151**	16	M16x1,5	22	27	64	42	8	21	15	28,57	28	22	22	15°	52,7	60,6
27630-20	**27630-201**	20	M20x1,5	27,5	34	77	50	10	25	18	34,92	33	26	32	15°	78,1	83,1
27630-22	**27630-221**	22	M22x1,5	30	37	84	54	12	28	20	38,1	37	26	32	15°	97,2	99,7

Rod ends with plain bearing

external thread, narrow version





Material:
Housing size (D) 6-10 turned steel.
From size (D) 12 forged steel.
Ball joint ball bearing steel, hardened, ground, polished and hard chromed.
Bearing shell ball bearing steel with PTFE weave glued in.

Version:
Electro zinc-plated.

Sample order:
nlm 27631-20

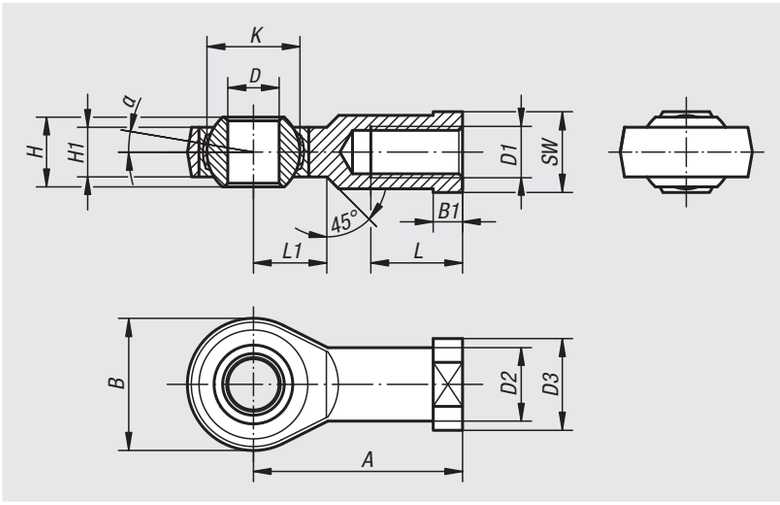
Note:
The rod end bearing is maintenance-free.
The connection dimensions comply with DIN 648 Form Series E.

Order No. RH thread	Order No. LH thread	D	D1	A	B	H	H1	K	L	L1	α	Dynamic base loads kN	Static base loads kN
27631-06	**27631-061**	6 -0,008	M6	36	20	6	4,4	10	18	11	12°	3,6	8,2
27631-08	**27631-081**	8 -0,008	M8	42	24	8	6	13	22	12	12°	5,8	12,9
27631-10	**27631-101**	10 -0,008	M10	48	28	9	7	16	26	15	12°	8,6	17,6
27631-12	**27631-121**	12 -0,008	M12	54	34	10	8	18	28	15	8°	11,4	24,5
27631-16	**27631-161**	17 -0,008	M16	69	46	14	11	25	36	23	8°	22	45
27631-20	**27631-201**	20 -0,010	M20x1,5	78	53	16	13	29	43	25	8°	31,5	60

Rod ends with plain bearing

internal thread, narrow version





Material:
Housing size (D) 6-10 turned steel.
From size (D) 12 forged steel.
Ball joint ball bearing steel, hardened, ground, polished and hard chromed.
Bearing shell ball bearing steel with PTFE weave glued in.

Version:
Electro zinc-plated.

Sample order:
nlm 27632-12

Note:
The rod end bearing is maintenance-free.
The connection dimensions comply with DIN 648 Form Series E.

Order No. RH thread	Order No. LH thread	D	D1	D2	D3	A	B	B1	H	H1	K	L	L1	SW	α	Dynamic base loads kN	Static base loads kN
27632-06	**27632-061**	6 -0,008	M6	10	13	30	20	5	6	4,4	10	12	11	11	12°	3,6	8,2
27632-08	**27632-081**	8 -0,008	M8	12,5	16	36	24	5	8	6	13	16	12	14	12°	5,8	12,9
27632-10	**27632-101**	10 -0,008	M10	15	19	43	28	6,5	9	7	16	20	13	17	12°	8,6	17,6
27632-10125	**27632-101251**	10 -0,008	M10x1,25	15	19	43	28	6,5	9	7	16	20	13	17	12°	8,6	17,6
27632-12	**27632-121**	12 -0,008	M12	17,5	22	50	34	6,5	10	8	18	22	15	19	8°	11,4	24,5
27632-12125	**27632-121251**	12 -0,008	M12x1,25	17,5	22	50	34	6,5	10	8	18	22	15	19	8°	11,4	24,5
27632-16	**27632-161**	17 -0,008	M16	24	30	67	46	10	14	11	25	33	20	27	8°	22	45
27632-20	**27632-201**	20 -0,010	M20x1,5	27,5	35	77	53	10	16	13	29	38	23	32	8°	31,5	60

Spherical bearings K/E series

DIN ISO 12240-1

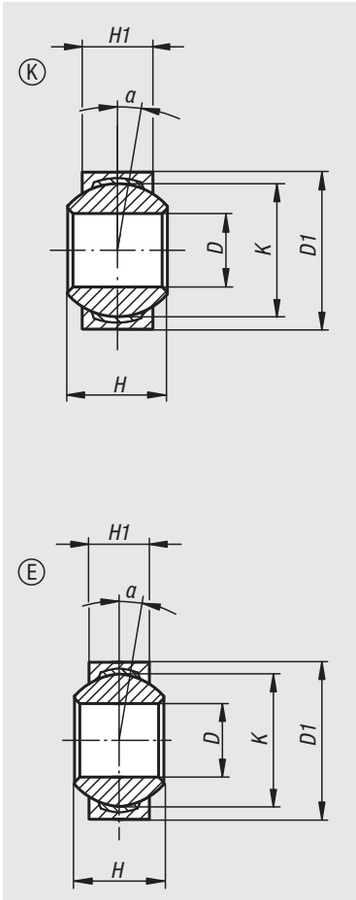


Material:
Bearing shell stainless steel 1.4571.
Ball joint stainless steel 1.4034.
Bearing surface PTFE/stainless steel insert.

Version:
Ground, polished.

Sample order:
nlm 27632-02-10513

Note:
Suitable for high dynamic loads. The fitting dimensions comply with DIN ISO 12240-1 E/K.



Pivot bearings K series DIN ISO 12240-1

Order No.	D	D1	H	H1	K	α	Dynamic load rating N	Static load rating N	Speed limit rpm
27632-02-10513	5 H7	13 h7	8	6	11,11	13°	7500	12500	600
27632-02-10615	6 H7	15 h7	9	6,75	12,7	13°	9300	15500	530
27632-02-10818	8 H7	18 h7	12	9	15,87	14°	16700	27800	420
27632-02-11021	10 H7	21 h7	14	10,5	19,05	13°	23400	39000	350
27632-02-11224	12 H7	24,5 h7	16	12	22,22	13°	32000	34500	300
27632-02-11631	16 H7	31,5 h7	21	15	28,57	15°	52500	88000	230

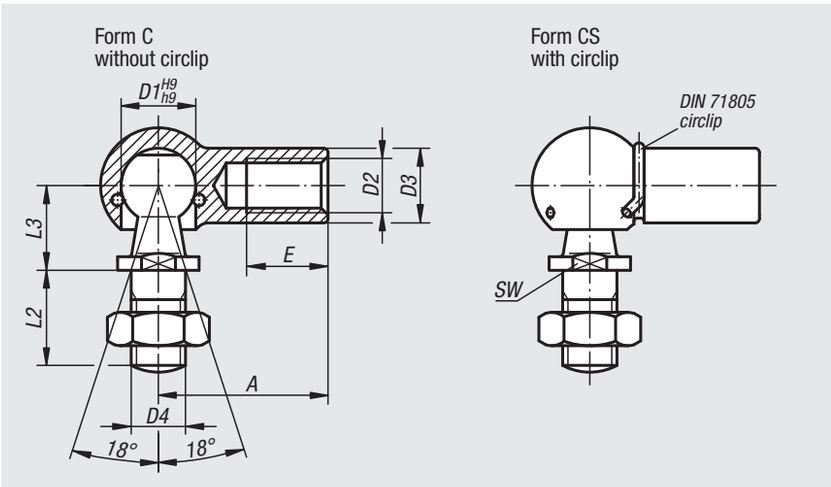
Pivot bearings E series DIN ISO 12240-1

Order No.	D	D1	H	H1	K	α	Dynamic load rating N	Static load rating N
27632-02-20614	6 -0,008	14 -0,008	6	4	10	13°	4000	9000
27632-02-20816	8 -0,008	16 -0,008	8	5	13	15°	7000	15600
27632-02-21019	10-0,008	19 -0,009	9	6	16	12°	10000	23400
27632-02-21222	12 -0,008	22 -0,009	10	7	18	11°	14000	32000
27632-02-21630	16-0,008	30 -0,009	14	10	25	10°	39000	65000

Ball joints

DIN 71802





Material:
Steel or 1.4305 stainless steel.
Neoprene seal.

Version:
Trivalent passivated.
Stainless steel version bright.

Sample order:
nlm 27650-08051

Note:
With snap ring.
Stainless steel version: protected against dust, dirt, water spray, vapours. For use in temperature range from -30 °C to +110 °C.
Seal, included.

Order No. RH thread	Order No. LH thread	Form	Main material	D1	D2	D3	D4	A	L2	L3	E	SW
27650-0805	**27650-080501**	C	steel	8	M5	8	M5	22	10,2	9	10,2	7
27650-1006	**27650-100601**	C	steel	10	M6	10	M6	25	12,5	11	11,5	8
27650-1308	**27650-130801**	C	steel	13	M8	13	M8	30	16,5	13	14	11
27650-1610	**27650-161001**	C	steel	16	M10	16	M10	35	20	16	15,5	13
27650-1612	**27650-161201**	C	steel	16	M12	16	M12	35	20	16	15,5	13
27650-1914	**27650-191401**	C	steel	19	M14x1,5	22	M14x1,5	45	28	20	21,5	16
27650-1916	**27650-191601**	C	steel	19	M16	22	M16	45	28	20	21,5	16

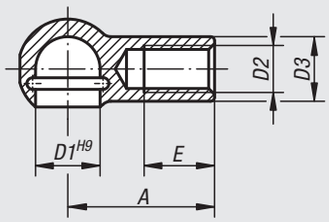
Order No. RH thread without seal	Order No. LH thread without seal	Order No. RH thread with seal	Order No. LH thread with seal	Form	Main material	D1	D2	D3	D4	A	L2	L3	E	SW
27650-080351	-	-	-	CS	steel	8	M3,5	8	M4	18	10,2	9	8	7
27650-08051	**27650-080511**	-	-	CS	steel	8	M5	8	M5	22	10,2	9	10,2	7
27650-10061	**27650-100611**	-	-	CS	steel	10	M6	10	M6	25	12,5	11	11,5	8
27650-13081	**27650-130811**	-	-	CS	steel	13	M8	13	M8	30	16,5	13	14	11
27650-16101	**27650-161011**	-	-	CS	steel	16	M10	16	M10	35	20	16	15,5	13
27650-16121	**27650-161211**	-	-	CS	steel	16	M12	16	M12	35	20	16	15,5	13
27650-19141	**27650-191411**	-	-	CS	steel	19	M14x1,5	22	M14x1,5	45	28	20	21,5	16
27650-19161	**27650-191611**	-	-	CS	steel	19	M16	22	M16	45	28	20	21,5	16
27650-08052	**27650-080521**	**27650-108052**	**27650-108051**	CS	stainless steel	8	M5	8	M5	22	10,2	9	10,2	7
27650-10062	**27650-100621**	**27650-110062**	**27650-110061**	CS	stainless steel	10	M6	10	M6	25	12,5	11	11,5	8
27650-13082	**27650-130821**	**27650-113082**	**27650-113081**	CS	stainless steel	13	M8	13	M8	30	16,5	13	14	11
27650-16102	**27650-161021**	**27650-116102**	**27650-116101**	CS	stainless steel	16	M10	16	M10	35	20	16	15,5	13
27650-16122	**27650-161221**	**27650-116122**	**27650-116121**	CS	stainless steel	16	M12	16	M12	35	20	16	15,5	13

Ball seats for ball joints

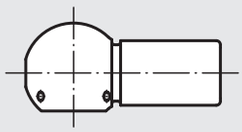
DIN 71805



Form A
with snap ring



Form B
with snap ring and
groove for circlip



Material:
Steel.

Version:
Trivalent passivated.

Sample order:
nlm 27655-08051

Note:
The ball sockets are spare parts for DIN 71802 ball joints. See circlips for ball seats for suitable retaining rings for Form B.

On request:
Stainless steel ball seats.

Order No.	Form	D1	D2	D3	A	E
27655-0805	A	8	M5	8	22	10,2
27655-1006	A	10	M6	10	25	11,5
27655-1308	A	13	M8	13	30	14
27655-1610	A	16	M10	16	35	15,5
27655-1612	A	16	M12	16	35	15,5
27655-1914	A	19	M14x1,5	22	45	21,5
27655-1916	A	19	M16	22	45	21,5

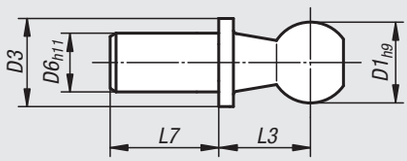
Order No.	Form	D1	D2	D3	A	E
27655-080351	B	8	M3,5	8	18	8
27655-08051	B	8	M5	8	22	10,2
27655-10061	B	10	M6	10	25	11,5
27655-13081	B	13	M8	13	30	14
27655-16101	B	16	M10	16	35	15,5
27655-16121	B	16	M12	16	35	15,5
27655-19141	B	19	M14x1,5	22	45	21,5
27655-19161	B	19	M16	22	45	21,5

Ball studs DIN 71803

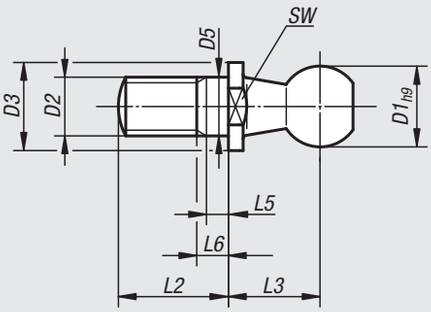
for DIN 71802 angle joints



Form B
with rivet pin



Form C
with thread and flats

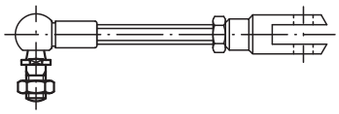


Material:
Steel.

Version:
Trivalent passivated.

Sample order:
nlm 27656-1006

Note:
The ball studs are spare parts for DIN 71802 ball joints.



Order No.	Form	Version	D1	D2	D3	D5	D6	L2	L3	L5 min.	L6 max.	L7	SW
27656-0840	B	short	8	-	8	-	5	-	9	-	-	4	-
27656-1045	B	short	10	-	10	-	6	-	11	-	-	4,5	-
27656-1305	B	short	13	-	13	-	8	-	13	-	-	5	-
27656-1606	B	short	16	-	16	-	10	-	16	-	-	6	-
27656-1912	B	short	19	-	19	-	14	-	20	-	-	12	-
27656-0875	B	long	8	-	8	-	5	-	9	-	-	7,5	-
27656-1080	B	long	10	-	10	-	6	-	11	-	-	8	-
27656-1310	B	long	13	-	13	-	8	-	13	-	-	10	-
27656-1613	B	long	16	-	16	-	10	-	16	-	-	13	-
27656-1918	B	long	19	-	19	-	14	-	20	-	-	18	-
27656-0805	C	-	8	M5	8	5	-	10,2	9	1,2	4	-	7
27656-1006	C	-	10	M6	10	6	-	12,5	11	1,2	4	-	8
27656-1308	C	-	13	M8	13	8	-	16,5	13	1,5	5,3	-	11
27656-1610	C	-	16	M10	16	10	-	20	16	2,5	7,3	-	13
27656-1612	C	-	16	M12	16	12	-	20	16	2,5	7,3	-	13
27656-1914	C	-	19	M14x1,5	19	14	-	28	20	5	10,8	-	16

27657

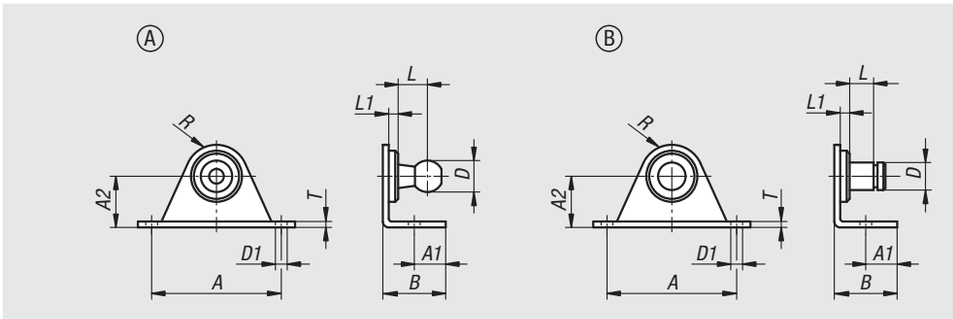
Angle brackets



Material:
Steel or stainless steel 1.4404.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27657-00810



Order No. steel	Order No. stainless steel	Form	A	A1	A2	B	D	D1	L	L1	R	T	Strength N
27657-00810	**27657-008101**	A	19	4,25	10	10	8	3,4	8	3	4	1,5	180
27657-00816	**27657-008161**	A	40	10	16	20	8	4,3	8	3	10	2	500
27657-01016	**27657-010161**	A	40	10	16	20	10	4,3	9	3	10	2	800
27657-01316	**27657-013161**	A	40	10	16	20	13	4,3	9,5	3	10	2	1200
27657-10410	**27657-104101**	B	19	4,25	10	10	4	3,4	5	2	4	1,5	180
27657-10610	**27657-106101**	B	19	4,25	10	10	6	3,4	7	4	4	1,5	180
27657-10616	**27657-106161**	B	40	10	16	20	6	4,3	7	4	10	2	500
27657-10816	**27657-108161**	B	40	10	16	20	8	4,3	11	5	10	2	1200

27658

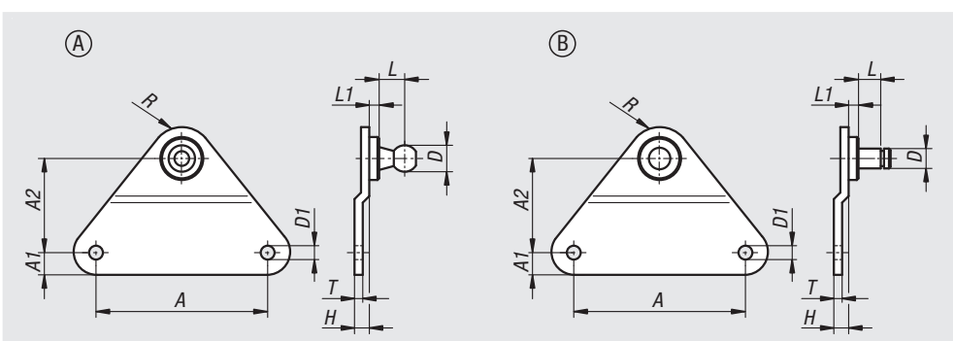
Side brackets



Material:
Steel or stainless steel 1.4404.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27658-00815



Order No. steel	Order No. stainless steel	Form	A	A1	A2	D	D1	H	L	L1	R	T	Strength N
27658-00815	**27658-008151**	A	18	5	15,5	8	4,3	2,5	8	3	5	1,5	180
27658-00830	**27658-008301**	A	55	7	30	8	5,3	5	8	3	10	3	500
27658-01030	**27658-010301**	A	55	7	30	10	5,3	5	8	3	10	3	800
27658-01330	**27658-013301**	A	55	7	30	13	5,3	5	9,5	3	10	3	1200
27658-10415	**27658-104151**	B	18	5	15,5	4	4,3	2,5	4,5	2	5	1,5	180
27658-10615	**27658-106151**	B	18	5	15,5	6	4,3	2,5	6,5	4	5	1,5	180
27658-10630	**27658-106301**	B	55	7	30	6	5,3	5	7	4	10	3	500
27658-10830	**27658-108301**	B	55	7	30	8	5,3	5	11	5	10	3	1200

27659

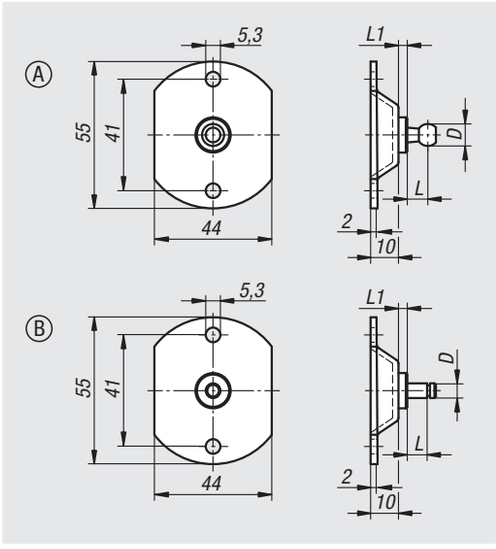
Round brackets



Material:
Steel or stainless steel 1.4404.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27659-00855



Order No. steel	Order No. stainless steel	Form	D	L	L1	Strength N
27659-00855	**27659-008551**	A	8	8	3	500
27659-01055	**27659-010551**	A	10	9	3	800
27659-01355	**27659-013551**	A	13	9,5	3	1200
27659-10655	**27659-106551**	B	6	7	4	500
27659-10855	**27659-108551**	B	8	11	5	1200

27660

Circlips for ball seats

DIN 71805

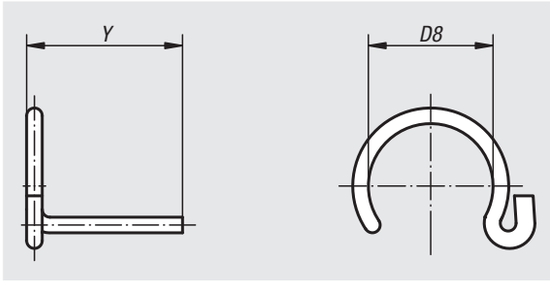


Material:
Spring steel

Version:
Trivalent passivated.

Sample order:
nlm 27660-08

Note:
For DIN 71805 ball seats.

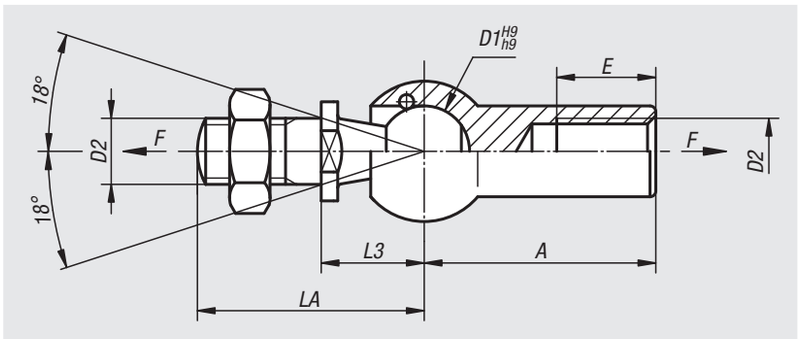


Order No.	D8	Y	Suitable for ball sockets with D1
27660-08	7	12	8
27660-10	8,7	12,5	10
27660-13	11	15,7	13
27660-16	13	19	16
27660-19	20	24	19

Axial joints

similar to DIN 71802





Material:
Steel or 1.4305 stainless steel.
Stainless steel versions have Neoprene seals.

Version:
Trivalent passivated.
Stainless steel version bright.

Sample order:
nlm 27665-10

Note:
Protected against dust, dirt, water spray and vapour.
Applicable temperature range from -30 °C to +110 °C.

On request:
Axial joints with greater extraction force and left-hand thread available.

Order No.	Main material	D1	D2	A	LA	L3	E	Extraction force F N
27665-08	steel	8	M5	22	19,2	9	10,2	30
27665-10	steel	10	M6	25	23,5	11	11,5	40
27665-13	steel	13	M8	30	29,5	13	14	60
27665-16	steel	16	M10	35	36	16	15,5	80
27665-19	steel	19	M14x1,5	45	48	20	21,5	100
27665-108	stainless steel	8	M5	22	19,2	9	10,2	30
27665-110	stainless steel	10	M6	25	23,5	11	11,5	40
27665-113	stainless steel	13	M8	30	29,5	13	14	60
27665-116	stainless steel	16	M10	35	36	16	15,5	80

Notes

Axial joints for tractive forces

adjustable

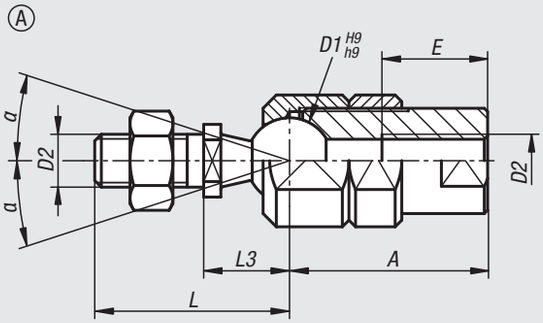


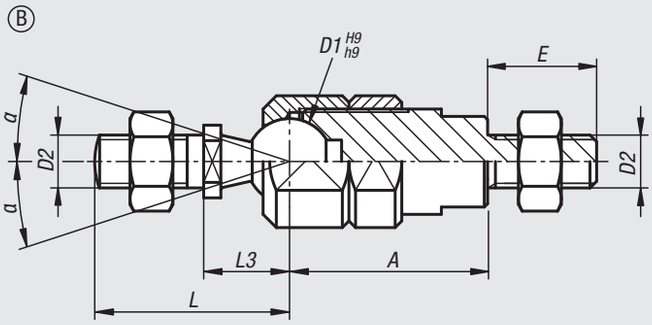
Material:
Steel.

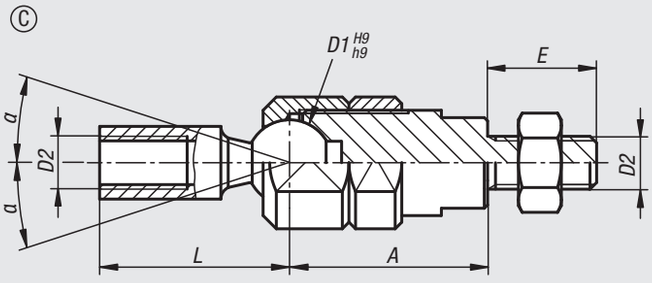
Version:
Ball thrust pins trivalent passivated.
Ball seat and nuts electro zinc-plated.

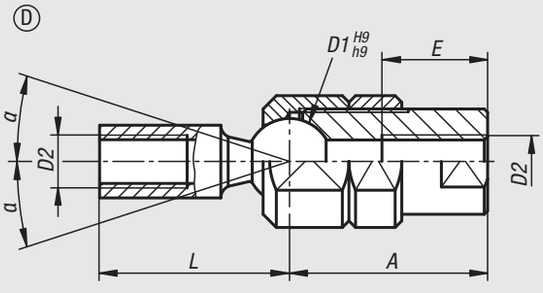
Sample order:
nlm 27670-1006

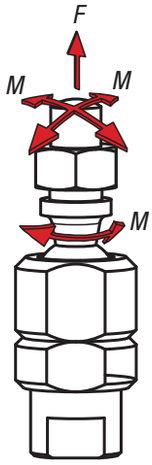
Note:
Axial joint suitable for taking up tractive forces. The ball's movement can be controlled or fully locked in position using the clamping nut.











Axial joints for tractive forces

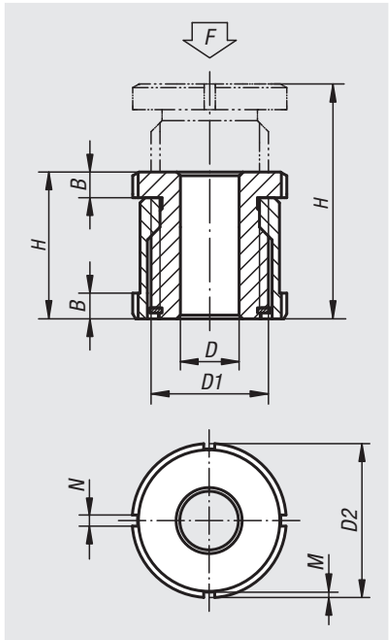
adjustable

Order No.	Form	D1	D2	A	L	L3	E	α	F kN	M Nm	Tightening torque max. Nm
27670-1006	A	10	M6	25	23,5	11	12	20°	2,5	5,2	12,4
27670-1308	A	13	M8	30	29,5	13	16	24°	5	8,8	13,2
27670-1610	A	16	M10	35	36	16	20	28°	7,5	14,5	16,4
27670-1612	A	16	M12	35	36	16	24	28°	7,5	14,5	16,4
27670-21006	B	10	M6	21	23,5	11	12	20°	2,5	5,2	12,4
27670-21308	B	13	M8	26	29,5	13	14	24°	5	8,8	13,2
27670-21610	B	16	M10	35	36	16	16	28°	7,5	14,5	16,4
27670-21612	B	16	M12	35	36	16	16	28°	7,5	14,5	16,4
27670-31006	C	10	M6	21	23,5	-	12	20°	2,5	5,2	12,4
27670-31308	C	13	M8	26	29,5	-	14	24°	5	8,8	13,2
27670-31610	C	16	M10	35	36	-	16	28°	7,5	14,5	16,4
27670-41006	D	10	M6	25	23,5	-	12	20°	2,5	5,2	12,4
27670-41308	D	13	M8	30	29,5	-	16	24°	5	8,8	13,2
27670-41610	D	16	M10	35	36	-	20	28°	7,5	14,5	16,4

Levelling sets

high version



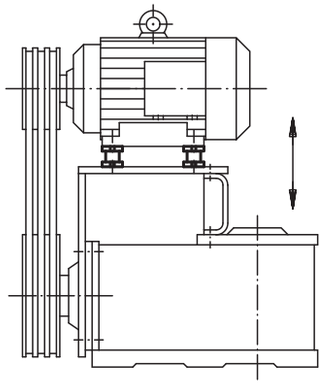


Material:
Steel 1.7225.
Stainless steel 1.4305.

Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27700-01505

Note:
Levelling sets are used for mounting, levelling and aligning motors, aggregates, drive units and assembly lines. They have a large adjustment range of 15 mm to 40 mm. Other sizes available on request.

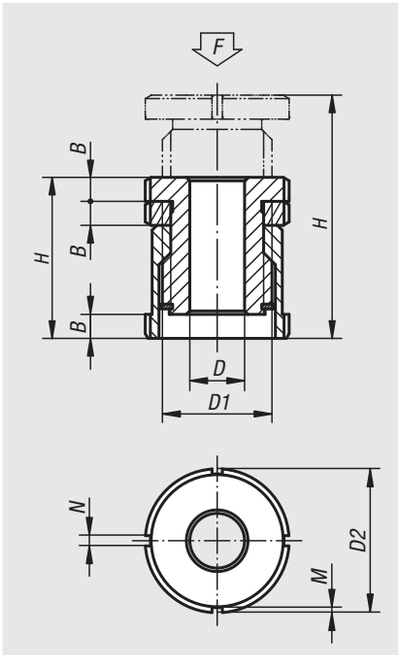


Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	F kN
27700-01504	high carbon steel	4,5	M4	M15x1	25	28	43	5	4	2	40
27700-01505	high carbon steel	5,5	M5	M15x1	25	28	43	5	4	2	40
27700-01506	high carbon steel	6,6	M6	M15x1	25	28	43	5	4	2	40
27700-02006	high carbon steel	6,6	M6	M20x1	32	35	55	6	4	2	65
27700-02008	high carbon steel	9	M8	M20x1	32	35	55	6	4	2	65
27700-02010	high carbon steel	11	M10	M20x1	32	35	55	6	4	2	65
27700-02510	high carbon steel	11	M10	M30x1,5	45	42	67	7	5	2	120
27700-02512	high carbon steel	13,5	M12	M30x1,5	45	42	67	7	5	2	120
27700-02516	high carbon steel	17,5	M16	M30x1,5	45	42	67	7	5	2	120
27700-03216	high carbon steel	17,5	M16	M40x1,5	58	54	86	9	6	2,5	210
27700-03220	high carbon steel	22	M20	M40x1,5	58	54	86	9	6	2,5	210
27700-03224	high carbon steel	26	M24	M40x1,5	58	54	86	9	6	2,5	210
27700-04020	high carbon steel	22	M20	M50x1,5	70	66	106	11	6	2,5	330
27700-04024	high carbon steel	26	M24	M50x1,5	70	66	106	11	6	2,5	330
27700-04030	high carbon steel	33	M30	M50x1,5	70	66	106	11	6	2,5	330
27700-015041	stainless steel	4,5	M4	M15x1	25	28	43	5	4	2	27,1
27700-015051	stainless steel	5,5	M5	M15x1	25	28	43	5	4	2	27,1
27700-015061	stainless steel	6,6	M6	M15x1	25	28	43	5	4	2	27,1
27700-020061	stainless steel	6,6	M6	M20x1	32	35	55	6	4	2	43,4
27700-020081	stainless steel	9	M8	M20x1	32	35	55	6	4	2	43,4
27700-020101	stainless steel	11	M10	M20x1	32	35	55	6	4	2	43,4
27700-025101	stainless steel	11	M10	M30x1,5	45	42	67	7	5	2	84
27700-025121	stainless steel	13,5	M12	M30x1,5	45	42	67	7	5	2	84
27700-025161	stainless steel	17,5	M16	M30x1,5	45	42	67	7	5	2	84
27700-032161	stainless steel	17,5	M16	M40x1,5	58	54	86	9	6	2,5	148
27700-032201	stainless steel	22	M20	M40x1,5	58	54	86	9	6	2,5	148
27700-032241	stainless steel	26	M24	M40x1,5	58	54	86	9	6	2,5	148
27700-040201	stainless steel	22	M20	M50x1,5	70	66	106	11	6	2,5	225
27700-040241	stainless steel	26	M24	M50x1,5	70	66	106	11	6	2,5	225
27700-040301	stainless steel	33	M30	M50x1,5	70	66	106	11	6	2,5	225

Levelling sets

with locknut





Material:
Steel 1.7225.
Stainless steel 1.4305.

Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27701-01004

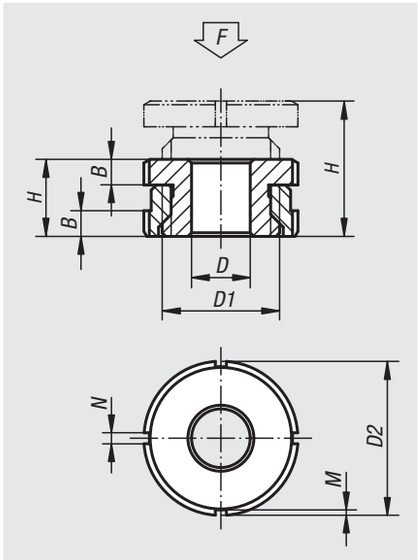
Note:
Levelling sets are used for mounting, levelling and aligning motors, aggregates, drive units and assembly lines. The locknut locks the set height. Other sizes available on request.

Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	F kN
27701-01004	high carbon steel	4,5	M4	M15x1	25	33	43	5	4	2	40
27701-01005	high carbon steel	5,5	M5	M15x1	25	33	43	5	4	2	40
27701-01006	high carbon steel	6,6	M6	M15x1	25	33	43	5	4	2	40
27701-01406	high carbon steel	6,6	M6	M20x1	32	41	55	6	4	2	65
27701-01408	high carbon steel	9	M8	M20x1	32	41	55	6	4	2	65
27701-01410	high carbon steel	11	M10	M20x1	32	41	55	6	4	2	65
27701-01810	high carbon steel	11	M10	M30x1,5	45	49	67	7	5	2	120
27701-01812	high carbon steel	13,5	M12	M30x1,5	45	49	67	7	5	2	120
27701-01816	high carbon steel	17,5	M16	M30x1,5	45	49	67	7	5	2	120
27701-02316	high carbon steel	17,5	M16	M40x1,5	58	63	86	9	6	2,5	210
27701-02320	high carbon steel	22	M20	M40x1,5	58	63	86	9	6	2,5	210
27701-02324	high carbon steel	26	M24	M40x1,5	58	63	86	9	6	2,5	210
27701-02920	high carbon steel	22	M20	M50x1,5	70	77	106	11	6	2,5	330
27701-02924	high carbon steel	26	M24	M50x1,5	70	77	106	11	6	2,5	330
27701-02930	high carbon steel	33	M30	M50x1,5	70	77	106	11	6	2,5	330
27701-010041	stainless steel	4,5	M4	M15x1	25	33	43	5	4	2	27,1
27701-010051	stainless steel	5,5	M5	M15x1	25	33	43	5	4	2	27,1
27701-010061	stainless steel	6,6	M6	M15x1	25	33	43	5	4	2	27,1
27701-014061	stainless steel	6,6	M6	M20x1	32	41	55	6	4	2	43,4
27701-014081	stainless steel	9	M8	M20x1	32	41	55	6	4	2	43,4
27701-014101	stainless steel	11	M10	M20x1	32	41	55	6	4	2	43,4
27701-018101	stainless steel	11	M10	M30x1,5	45	49	67	7	5	2	84
27701-018121	stainless steel	13,5	M12	M30x1,5	45	49	67	7	5	2	84
27701-018161	stainless steel	17,5	M16	M30x1,5	45	49	67	7	5	2	84
27701-023161	stainless steel	17,5	M16	M40x1,5	58	63	86	9	6	2,5	148
27701-023201	stainless steel	22	M20	M40x1,5	58	63	86	9	6	2,5	148
27701-023241	stainless steel	26	M24	M40x1,5	58	63	86	9	6	2,5	148
27701-029201	stainless steel	22	M20	M50x1,5	70	77	106	11	6	2,5	225
27701-029241	stainless steel	26	M24	M50x1,5	70	77	106	11	6	2,5	225
27701-029301	stainless steel	33	M30	M50x1,5	70	77	106	11	6	2,5	225

Levelling sets

low version





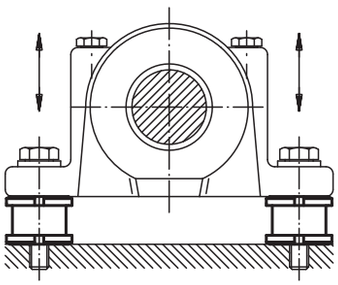
Material:
Steel 1.7225.
Stainless steel 1.4305.

Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27702-0404

Note:
Levelling sets are used for mounting, levelling and aligning motors, aggregates, drive units and assembly lines. This levelling set has an extremely low height. Single levelling sets can be set at several mounting points to achieve a precise and torsion-free alignment.

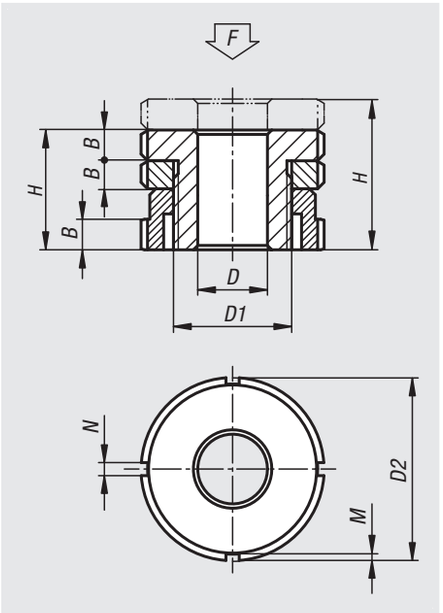
Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	F kN
27702-0404	high carbon steel	4,5	M4	M15x1	25	15	19	5	4	2	40
27702-0405	high carbon steel	5,5	M5	M15x1	25	15	19	5	4	2	40
27702-0406	high carbon steel	6,6	M6	M15x1	25	15	19	5	4	2	40
27702-0506	high carbon steel	6,6	M6	M20x1	32	18	23	6	4	2	65
27702-0508	high carbon steel	9	M8	M20x1	32	18	23	6	4	2	65
27702-0510	high carbon steel	11	M10	M20x1	32	18	23	6	4	2	65
27702-0710	high carbon steel	11	M10	M30x1,5	45	22	29	7	5	2	120
27702-0712	high carbon steel	13,5	M12	M30x1,5	45	22	29	7	5	2	120
27702-0716	high carbon steel	17,5	M16	M30x1,5	45	22	29	7	5	2	120
27702-0916	high carbon steel	17,5	M16	M40x1,5	58	28	37	9	6	2,5	210
27702-0920	high carbon steel	22	M20	M40x1,5	58	28	37	9	6	2,5	210
27702-0924	high carbon steel	26	M24	M40x1,5	58	28	37	9	6	2,5	210
27702-1020	high carbon steel	22	M20	M50x1,5	70	33	43	11	6	2,5	330
27702-1024	high carbon steel	26	M24	M50x1,5	70	33	43	11	6	2,5	330
27702-1030	high carbon steel	33	M30	M50x1,5	70	33	43	11	6	2,5	330
27702-04041	stainless steel	4,5	M4	M15x1	25	15	19	5	4	2	27,1
27702-04051	stainless steel	5,5	M5	M15x1	25	15	19	5	4	2	27,1
27702-04061	stainless steel	6,6	M6	M15x1	25	15	19	5	4	2	27,1
27702-05061	stainless steel	6,6	M6	M20x1	32	18	23	6	4	2	43,4
27702-05081	stainless steel	9	M8	M20x1	32	18	23	6	4	2	43,4
27702-05101	stainless steel	11	M10	M20x1	32	18	23	6	4	2	43,4
27702-07101	stainless steel	11	M10	M30x1,5	45	22	29	7	5	2	84
27702-07121	stainless steel	13,5	M12	M30x1,5	45	22	29	7	5	2	84
27702-07161	stainless steel	17,5	M16	M30x1,5	45	22	29	7	5	2	84
27702-09161	stainless steel	17,5	M16	M40x1,5	58	28	37	9	6	2,5	148
27702-09201	stainless steel	22	M20	M40x1,5	58	28	37	9	6	2,5	148
27702-09241	stainless steel	26	M24	M40x1,5	58	28	37	9	6	2,5	148
27702-10201	stainless steel	22	M20	M50x1,5	70	33	43	11	6	2,5	225
27702-10241	stainless steel	26	M24	M50x1,5	70	33	43	11	6	2,5	225
27702-10301	stainless steel	33	M30	M50x1,5	70	33	43	11	6	2,5	225



Levelling sets

low version with locknut





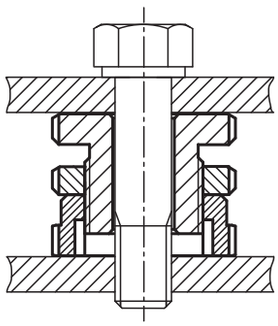
Material:
Steel 1.7225.
Stainless steel 1.4305.

Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27703-0404

Note:
These low version levelling sets with locknut are used to mount and align motors, aggregates, drive units and production lines. The advantage is the low height. Alignments can be made quickly and easily even with several levelling points. Distortion-free mounting is guaranteed. The locknut secures a prescribed adjustment.

Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	F kN
27703-0404	high carbon steel	4,5	M4	M15x1	25	20	24	5	4	2	40
27703-0405	high carbon steel	5,5	M5	M15x1	25	20	24	5	4	2	40
27703-0406	high carbon steel	6,6	M6	M15x1	25	20	24	5	4	2	40
27703-0506	high carbon steel	6,6	M6	M20x1	32	24	29	6	4	2	65
27703-0508	high carbon steel	9	M8	M20x1	32	24	29	6	4	2	65
27703-0510	high carbon steel	11	M10	M20x1	32	24	29	6	4	2	65
27703-0710	high carbon steel	11	M10	M30x1,5	45	29	36	7	5	2	120
27703-0712	high carbon steel	13,5	M12	M30x1,5	45	29	36	7	5	2	120
27703-0716	high carbon steel	17,5	M16	M30x1,5	45	29	36	7	5	2	120
27703-0916	high carbon steel	17,5	M16	M40x1,5	58	37	46	9	6	2,5	210
27703-0920	high carbon steel	22	M20	M40x1,5	58	37	46	9	6	2,5	210
27703-0924	high carbon steel	26	M24	M40x1,5	58	37	46	9	6	2,5	210
27703-1020	high carbon steel	22	M20	M50x1,5	70	44	54	11	6	2,5	330
27703-1024	high carbon steel	26	M24	M50x1,5	70	44	54	11	6	2,5	330
27703-1030	high carbon steel	33	M30	M50x1,5	70	44	54	11	6	2,5	330
27703-04041	stainless steel	4,5	M4	M15x1	25	20	24	5	4	2	27,1
27703-04051	stainless steel	5,5	M5	M15x1	25	20	24	5	4	2	27,1
27703-04061	stainless steel	6,6	M6	M15x1	25	20	24	5	4	2	27,1
27703-05061	stainless steel	6,6	M6	M20x1	32	24	29	6	4	2	43,4
27703-05081	stainless steel	9	M8	M20x1	32	24	29	6	4	2	43,4
27703-05101	stainless steel	11	M10	M20x1	32	24	29	6	4	2	43,4
27703-07101	stainless steel	11	M10	M30x1,5	45	29	36	7	5	2	84
27703-07121	stainless steel	13,5	M12	M30x1,5	45	29	36	7	5	2	84
27703-07161	stainless steel	17,5	M16	M30x1,5	45	29	36	7	5	2	84
27703-09161	stainless steel	17,5	M16	M40x1,5	58	37	46	9	6	2,5	148
27703-09201	stainless steel	22	M20	M40x1,5	58	37	46	9	6	2,5	148
27703-09241	stainless steel	26	M24	M40x1,5	58	37	46	9	6	2,5	148
27703-10201	stainless steel	22	M20	M50x1,5	70	44	54	11	6	2,5	225
27703-10241	stainless steel	26	M24	M50x1,5	70	44	54	11	6	2,5	225
27703-10301	stainless steel	33	M30	M50x1,5	70	44	54	11	6	2,5	225



Levelling sets

spherical washer



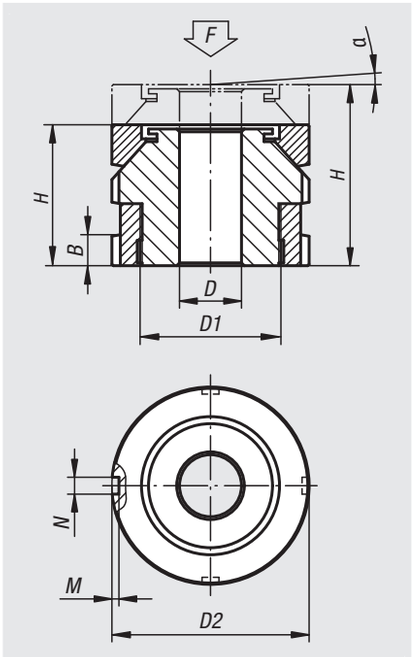
Material:
Steel 1.7225.
Stainless steel 1.4305.

Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27705-0406

Note:
Levelling sets with spherical washers are used for mounting, levelling and aligning motors, aggregates, drive units and assembly lines. The spherical washer permits exact alignment when mounting inclined surfaces of up to 4°.

Accessories:
Spherical levelling washers 07460



Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	α	F kN
27705-0406	high carbon steel	6,6	M6	M15x1	25	22	26	5	4	2	4°	40
27705-0506	high carbon steel	6,6	M6	M20x1	32	26	31	6	4	2	4°	65
27705-0508	high carbon steel	9	M8	M20x1	32	26	31	6	4	2	4°	65
27705-0510	high carbon steel	11	M10	M20x1	32	26	31	6	4	2	4°	65
27705-0710	high carbon steel	11	M10	M30x1,5	45	34	41	7	5	2	4°	120
27705-0712	high carbon steel	13,5	M12	M30x1,5	45	34	41	7	5	2	4°	120
27705-0716	high carbon steel	17,5	M16	M30x1,5	45	34	41	7	5	2	4°	120
27705-0916	high carbon steel	17,5	M16	M40x1,5	58	44	53	9	6	2,5	4°	210
27705-0920	high carbon steel	22	M20	M40x1,5	58	44	53	9	6	2,5	4°	210
27705-0924	high carbon steel	26	M24	M40x1,5	58	44	53	9	6	2,5	4°	210
27705-1020	high carbon steel	22	M20	M50x1,5	70	50	60	11	6	2,5	4°	330
27705-1024	high carbon steel	26	M24	M50x1,5	70	50	60	11	6	2,5	4°	330
27705-1030	high carbon steel	33	M30	M50x1,5	70	50	60	11	6	2,5	4°	330
27705-1224	high carbon steel	26	M24	M60x2	80	56	68	11	7	3	4°	495
27705-1230	high carbon steel	33	M30	M60x2	80	56	68	11	7	3	4°	495
27705-04061	stainless steel	6,6	M6	M15x1	25	22	26	5	4	2	4°	27,1
27705-05061	stainless steel	6,6	M6	M20x1	32	26	31	6	4	2	4°	43,4
27705-05081	stainless steel	9	M8	M20x1	32	26	31	6	4	2	4°	43,4
27705-05101	stainless steel	11	M10	M20x1	32	26	31	6	4	2	4°	43,4
27705-07101	stainless steel	11	M10	M30x1,5	45	34	41	7	5	2	4°	84
27705-07121	stainless steel	13,5	M12	M30x1,5	45	34	41	7	5	2	4°	84
27705-07161	stainless steel	17,5	M16	M30x1,5	45	34	41	7	5	2	4°	84
27705-09161	stainless steel	17,5	M16	M40x1,5	58	44	53	9	6	2,5	4°	148
27705-09201	stainless steel	22	M20	M40x1,5	58	44	53	9	6	2,5	4°	148
27705-09241	stainless steel	26	M24	M40x1,5	58	44	53	9	6	2,5	4°	148
27705-10201	stainless steel	22	M20	M50x1,5	70	50	60	11	6	2,5	4°	225
27705-10241	stainless steel	26	M24	M50x1,5	70	50	60	11	6	2,5	4°	225
27705-10301	stainless steel	33	M30	M50x1,5	70	50	60	11	6	2,5	4°	225
27705-12241	stainless steel	26	M24	M60x2	80	56	68	11	7	3	4°	323
27705-12301	stainless steel	33	M30	M60x2	80	56	68	11	7	3	4°	323

Levelling sets

spherical washer with locknut



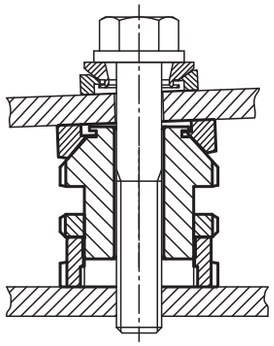
Material:
Steel 1.7225.
Stainless steel 1.4305.

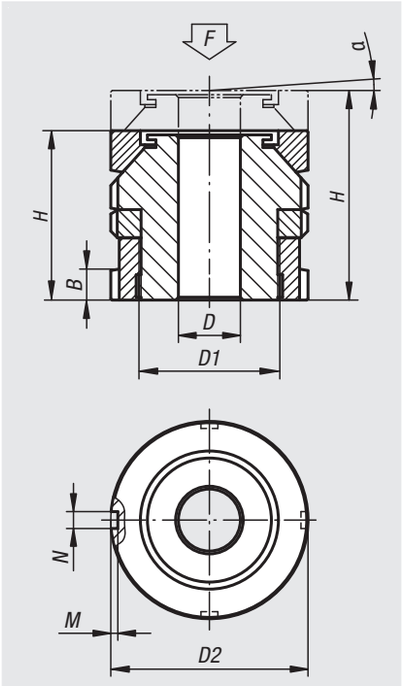
Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27706-0406

Note:
The spherical washer levelling set is used to mount and align motors, aggregates, drive units and production lines. The spherical washer gives exact alignment of sloping faces with an inclination of up to 4°. The locknut secures a prescribed adjustment.

Accessories:
Spherical levelling washers 07460



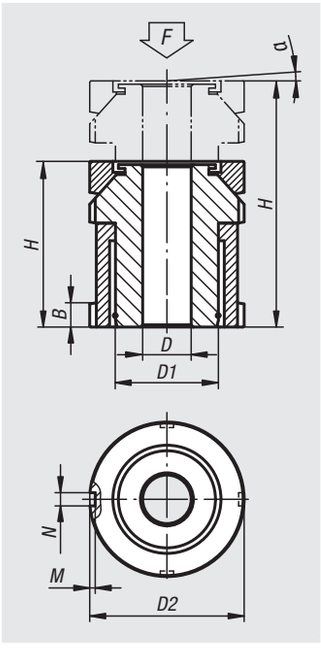


Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	α	F kN
27706-0406	high carbon steel	6,6	M6	M15x1	25	27	31	5	4	2	4°	40
27706-0506	high carbon steel	6,6	M6	M20x1	32	32	37	6	4	2	4°	65
27706-0508	high carbon steel	9	M8	M20x1	32	32	37	6	4	2	4°	65
27706-0510	high carbon steel	11	M10	M20x1	32	32	37	6	4	2	4°	65
27706-0710	high carbon steel	11	M10	M30x1,5	45	41	48	7	5	2	4°	120
27706-0712	high carbon steel	13,5	M12	M30x1,5	45	41	48	7	5	2	4°	120
27706-0716	high carbon steel	17,5	M16	M30x1,5	45	41	48	7	5	2	4°	120
27706-0916	high carbon steel	17,5	M16	M40x1,5	58	53	62	9	6	2,5	4°	210
27706-0920	high carbon steel	22	M20	M40x1,5	58	53	62	9	6	2,5	4°	210
27706-0924	high carbon steel	26	M24	M40x1,5	58	53	62	9	6	2,5	4°	210
27706-1020	high carbon steel	22	M20	M50x1,5	70	61	71	11	6	2,5	4°	330
27706-1024	high carbon steel	26	M24	M50x1,5	70	61	71	11	6	2,5	4°	330
27706-1030	high carbon steel	33	M30	M50x1,5	70	61	71	11	6	2,5	4°	330
27706-1224	high carbon steel	26	M24	M60x2	80	67	79	11	7	3	4°	495
27706-1230	high carbon steel	33	M30	M60x2	80	67	79	11	7	3	4°	495
27706-04061	stainless steel	6,6	M6	M15x1	25	27	31	5	4	2	4°	27,1
27706-05061	stainless steel	6,6	M6	M20x1	32	32	37	6	4	2	4°	43,4
27706-05081	stainless steel	9	M8	M20x1	32	32	37	6	4	2	4°	43,4
27706-05101	stainless steel	11	M10	M20x1	32	32	37	6	4	2	4°	43,4
27706-07101	stainless steel	11	M10	M30x1,5	45	41	48	7	5	2	4°	84
27706-07121	stainless steel	13,5	M12	M30x1,5	45	41	48	7	5	2	4°	84
27706-07161	stainless steel	17,5	M16	M30x1,5	45	41	48	7	5	2	4°	84
27706-09161	stainless steel	17,5	M16	M40x1,5	58	53	62	9	6	2,5	4°	148
27706-09201	stainless steel	22	M20	M40x1,5	58	53	62	9	6	2,5	4°	148
27706-09241	stainless steel	26	M24	M40x1,5	58	53	62	9	6	2,5	4°	148
27706-10201	stainless steel	22	M20	M50x1,5	70	61	71	11	6	2,5	4°	225
27706-10241	stainless steel	26	M24	M50x1,5	70	61	71	11	6	2,5	4°	225
27706-10301	stainless steel	33	M30	M50x1,5	70	61	71	11	6	2,5	4°	225
27706-12241	stainless steel	26	M24	M60x2	80	67	79	11	7	3	4°	323
27706-12301	stainless steel	33	M30	M60x2	80	67	79	11	7	3	4°	323

Levelling sets

spherical washer





Material:
Steel 1.7225.
Stainless steel 1.4305.

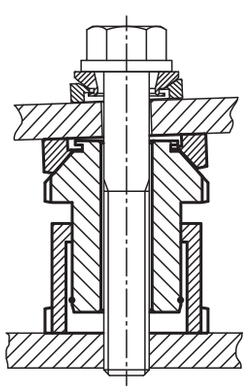
Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27707-1506

Note:
The spherical washer levelling sets are used to mount and align motors, aggregates, drive units and production lines. The spherical washer permits exact alignment when mounting sloping surfaces of up to 4°. These levellers have a long travel of 15 mm to 50 mm.

Accessories:
Spherical levelling washers 07460

Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	α	F kN
27707-1506	high carbon steel	6,6	M6	M15x1	25	35	50	5	4	2	4°	40
27707-2006	high carbon steel	6,6	M6	M20x1	32	43	63	6	4	2	4°	65
27707-2008	high carbon steel	9	M8	M20x1	32	43	63	6	4	2	4°	65
27707-2010	high carbon steel	11	M10	M20x1	32	43	63	6	4	2	4°	65
27707-2510	high carbon steel	11	M10	M30x1,5	45	54	79	7	5	2	4°	120
27707-2512	high carbon steel	13,5	M12	M30x1,5	45	54	79	7	5	2	4°	120
27707-2516	high carbon steel	17,5	M16	M30x1,5	45	54	79	7	5	2	4°	120
27707-3216	high carbon steel	17,5	M16	M40x1,5	58	70	102	9	6	2,5	4°	210
27707-3220	high carbon steel	22	M20	M40x1,5	58	70	102	9	6	2,5	4°	210
27707-3224	high carbon steel	26	M24	M40x1,5	58	70	102	9	6	2,5	4°	210
27707-4020	high carbon steel	22	M20	M50x1,5	70	83	123	11	6	2,5	4°	330
27707-4024	high carbon steel	26	M24	M50x1,5	70	83	123	11	6	2,5	4°	330
27707-4030	high carbon steel	33	M30	M50x1,5	70	83	123	11	6	2,5	4°	330
27707-5024	high carbon steel	26	M24	M60x2	80	94	144	11	7	3	4°	495
27707-5030	high carbon steel	33	M30	M60x2	80	94	144	11	7	3	4°	495
27707-15061	stainless steel	6,6	M6	M15x1	25	35	50	5	4	2	4°	27,1
27707-20061	stainless steel	6,6	M6	M20x1	32	43	63	6	4	2	4°	43,4
27707-20081	stainless steel	9	M8	M20x1	32	43	63	6	4	2	4°	43,4
27707-20101	stainless steel	11	M10	M20x1	32	43	63	6	4	2	4°	43,4
27707-25101	stainless steel	11	M10	M30x1,5	45	54	79	7	5	2	4°	84
27707-25121	stainless steel	13,5	M12	M30x1,5	45	54	79	7	5	2	4°	84
27707-25161	stainless steel	17,5	M16	M30x1,5	45	54	79	7	5	2	4°	84
27707-32161	stainless steel	17,5	M16	M40x1,5	58	70	102	9	6	2,5	4°	148
27707-32201	stainless steel	22	M20	M40x1,5	58	70	102	9	6	2,5	4°	148
27707-32241	stainless steel	26	M24	M40x1,5	58	70	102	9	6	2,5	4°	148
27707-40201	stainless steel	22	M20	M50x1,5	70	83	123	11	6	2,5	4°	225
27707-40241	stainless steel	26	M24	M50x1,5	70	83	123	11	6	2,5	4°	225
27707-40301	stainless steel	33	M30	M50x1,5	70	83	123	11	6	2,5	4°	225
27707-50241	stainless steel	26	M24	M60x2	80	94	144	11	7	3	4°	323
27707-50301	stainless steel	33	M30	M60x2	80	94	144	11	7	3	4°	323



Levelling sets

spherical washer with locknut



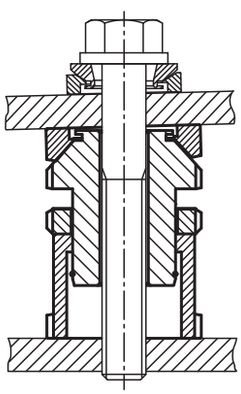
Material:
Steel 1.7225.
Stainless steel 1.4305.

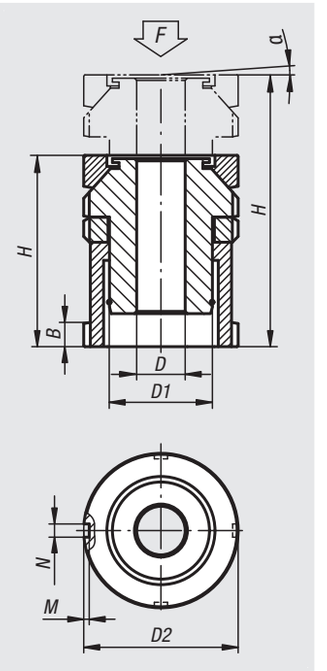
Version:
Seel version trivalent blue passivated.
Stainless steel version bright.

Sample order:
nlm 27708-1006

Note:
The spherical washer levelling sets are used to mount and align motors, aggregates, drive units and production lines. The spherical washer permits exact alignment when mounting sloping surfaces of up to 4°. The locknut secures a prescribed adjustment. These levellers have a long travel of 10 mm to 39 mm.

Accessories:
Spherical levelling washers 07460





Order No.	Main material	D	for screw	D1	D2	H min.	H max.	B	N	M	α	F kN
27708-1006	high carbon steel	6,6	M6	M15x1	25	40	50	5	4	2	4°	40
27708-1406	high carbon steel	6,6	M6	M20x1	32	49	63	6	4	2	4°	65
27708-1408	high carbon steel	9	M8	M20x1	32	49	63	6	4	2	4°	65
27708-1410	high carbon steel	11	M10	M20x1	32	49	63	6	4	2	4°	65
27708-1810	high carbon steel	11	M10	M30x1,5	45	61	79	7	5	2	4°	120
27708-1812	high carbon steel	13,5	M12	M30x1,5	45	61	79	7	5	2	4°	120
27708-1816	high carbon steel	17,5	M16	M30x1,5	45	61	79	7	5	2	4°	120
27708-2316	high carbon steel	17,5	M16	M40x1,5	58	79	102	9	6	2,5	4°	210
27708-2320	high carbon steel	22	M20	M40x1,5	58	79	102	9	6	2,5	4°	210
27708-2324	high carbon steel	26	M24	M40x1,5	58	79	102	9	6	2,5	4°	210
27708-2920	high carbon steel	22	M20	M50x1,5	70	94	123	11	6	2,5	4°	330
27708-2924	high carbon steel	26	M24	M50x1,5	70	94	123	11	6	2,5	4°	330
27708-2930	high carbon steel	33	M30	M50x1,5	70	94	123	11	6	2,5	4°	330
27708-3924	high carbon steel	26	M24	M60x2	80	105	144	11	7	3	4°	495
27708-3930	high carbon steel	33	M30	M60x2	80	105	144	11	7	3	4°	495
27708-10061	stainless steel	6,6	M6	M15x1	25	40	50	5	4	2	4°	27,1
27708-14061	stainless steel	6,6	M6	M20x1	32	49	63	6	4	2	4°	43,4
27708-14081	stainless steel	9	M8	M20x1	32	49	63	6	4	2	4°	43,4
27708-14101	stainless steel	11	M10	M20x1	32	49	63	6	4	2	4°	43,4
27708-18101	stainless steel	11	M10	M30x1,5	45	61	79	7	5	2	4°	84
27708-18121	stainless steel	13,5	M12	M30x1,5	45	61	79	7	5	2	4°	84
27708-18161	stainless steel	17,5	M16	M30x1,5	45	61	79	7	5	2	4°	84
27708-23161	stainless steel	17,5	M16	M40x1,5	58	79	102	9	6	2,5	4°	148
27708-23201	stainless steel	22	M20	M40x1,5	58	79	102	9	6	2,5	4°	148
27708-23241	stainless steel	26	M24	M40x1,5	58	79	102	9	6	2,5	4°	148
27708-29201	stainless steel	22	M20	M50x1,5	70	94	123	11	6	2,5	4°	225
27708-29241	stainless steel	26	M24	M50x1,5	70	94	123	11	6	2,5	4°	225
27708-29301	stainless steel	33	M30	M50x1,5	70	94	123	11	6	2,5	4°	225
27708-39241	stainless steel	26	M24	M60x2	80	105	144	11	7	3	4°	323
27708-39301	stainless steel	33	M30	M60x2	80	105	144	11	7	3	4°	323

Cup elements

type H2



Material:
Metal parts, steel, grade 5.6.
Natural rubber, hardness Shore 40 or 60 A.

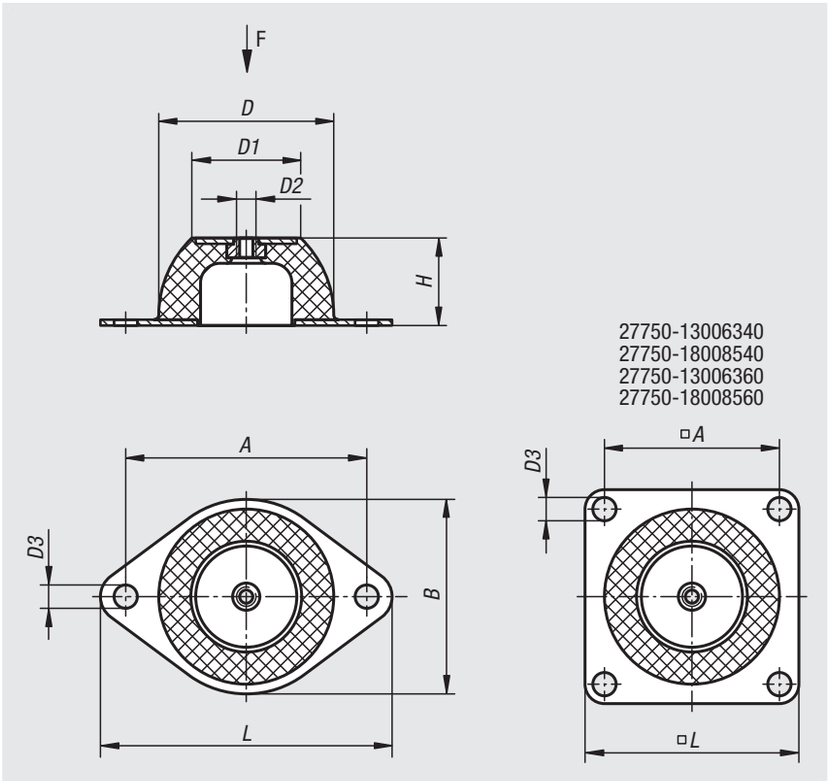
Version:
Steel electro zinc-plated.

Sample order:
nlm 27750-03502040

Note:
The cup elements are highly elastic both in radial and in axial direction and therefore offer an outstanding impact isolation.
The special shaping of the cup elements allows isolation of sound and vibrations of machines and assemblies with a low natural frequency. They are especially suitable for supporting sensitive instruments and small devices.

The elements must not be subjected to tensile stress.

Temperature range:
-30°C to +80°C.



Order No.	Version	A	B	D	D1	D2	D3	H	L	Load rating max. kN
27750-03502040	Shore 40A	50	43	35	18	M6	7	20	64	0,034
27750-05002540	Shore 40A	66	56	50	33	M8	8	25	85	0,2
27750-07003540	Shore 40A	92	76	70	45	M10	10	35	114	0,39
27750-08504040	Shore 40A	110	96	85	53	M10	11,5	40	136	0,68
27750-09004540	Shore 40A	124	101	90	58	M10	11,5	45	151	1,28
27750-13006340	Shore 40A	120	-	130	78	M12	14,5	63	150	2,7
27750-18008540	Shore 40A	160	-	180	100	M16	14,5	85	200	3,7
27750-03502060	Shore 60A	50	43	35	18	M6	7	20	64	0,09
27750-05002560	Shore 60A	66	56	50	33	M8	8	25	85	0,49
27750-07003560	Shore 60A	92	76	70	45	M10	10	35	114	0,78
27750-08504060	Shore 60A	110	96	85	53	M10	11,5	40	136	1,45
27750-09004560	Shore 60A	124	101	90	58	M10	11,5	45	151	2,15
27750-13006360	Shore 60A	120	-	130	78	M12	14,5	63	150	4,9
27750-18008560	Shore 60A	160	-	180	100	M16	14,5	85	200	7,35

Machine feet



Material:
Metal parts, steel grade 5.6.
Elastomer, natural rubber,
medium hardness, Shore 60.

Version:
Steel electro zinc-plated.

Sample order:
nlm 27760-062060

Note:
These machine feet have proven themselves to be universally applicable elements for the elastic support of all types of machine. They are commonly used wherever large horizontal movements are to be avoided. The horizontal rigidity is higher in all directions than the vertical rigidity. If used correctly they are excellent at preventing the transfer of vibration and noise.

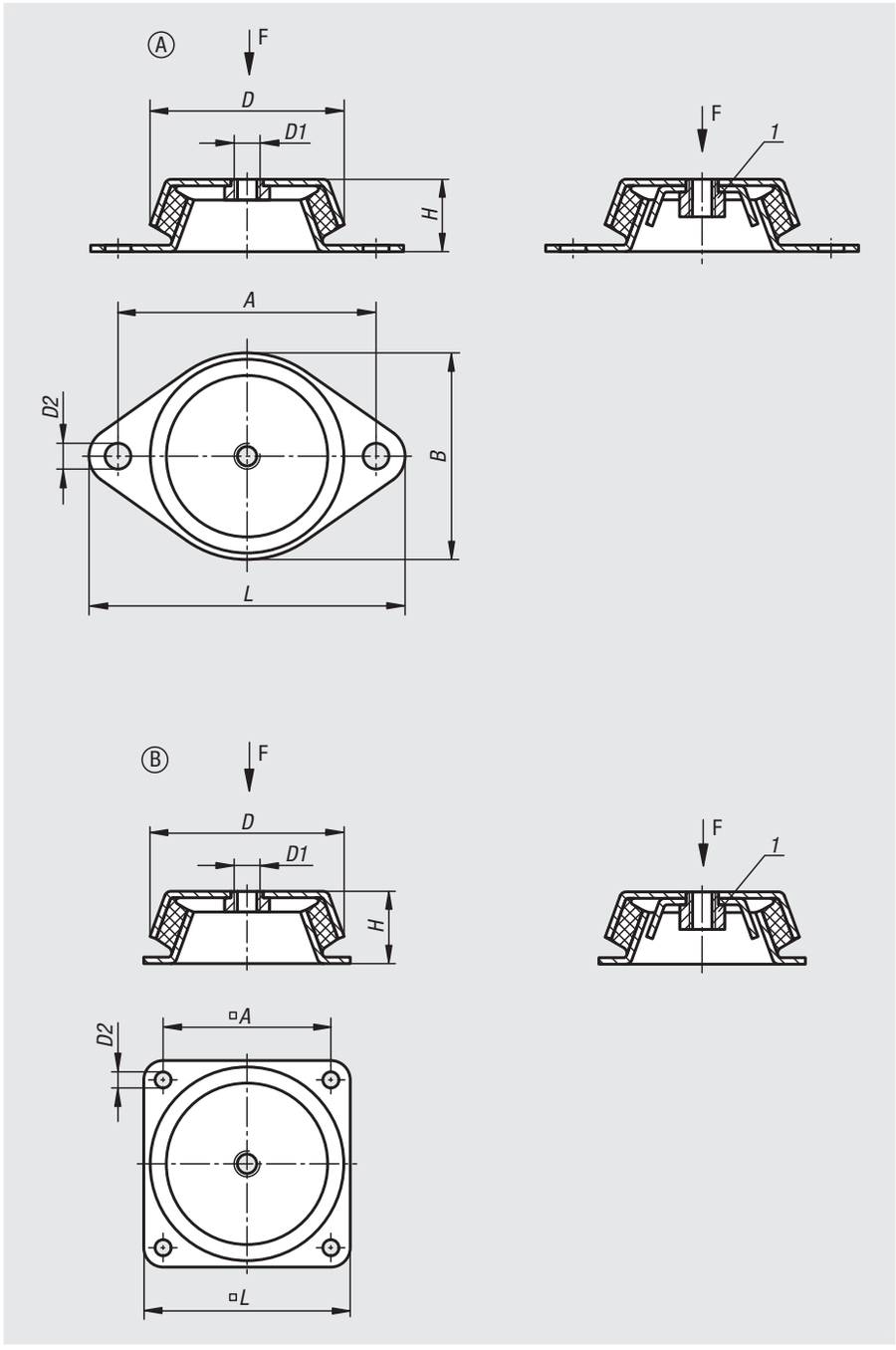
Machine feet with shear protection are available for situations where tensile forces are to be expected.

The indicated load data are reference values for static loads by rubber hardness of Shore 60A.

In contrast to those in the drawing, the holes D2 can also be elongated holes.

On request:
Rubber hardness Shore 40 or 70 A.

Drawing reference:
1) With shear protection



Order No. without shear protection	Order No. with shear protection	Form	A	B	D	D1	D2	H	L	Load rating max. kN
27760-062060	**27760-062160**	A	85	66	62	M10	8,2	30	110	1,5
27760-078060	**27760-078160**	A	110	78	78	M10	9	30	128	1,8
27760-092060	**27760-092160**	A	110	96	86	M12	10,2	45	140	3
27760-106060	**27760-106160**	A	140	110	106	M12	12,4	39	170	3,6
27760-150060	**27760-150160**	B	132	-	150	M16	12,5	51	168	8

Modular structure of a swivel foot

Application:
Swivel feet are of modular design. The components can be individually combined to match the application. The swivel feet are applicable for use on machines, plants and even office furniture.

Modular design:
Swivel feet consist of two components - a plate and a threaded spindle or ball joint. **Any** plate can be combined with **any** threaded spindle or ball joint (see Fig. 1).

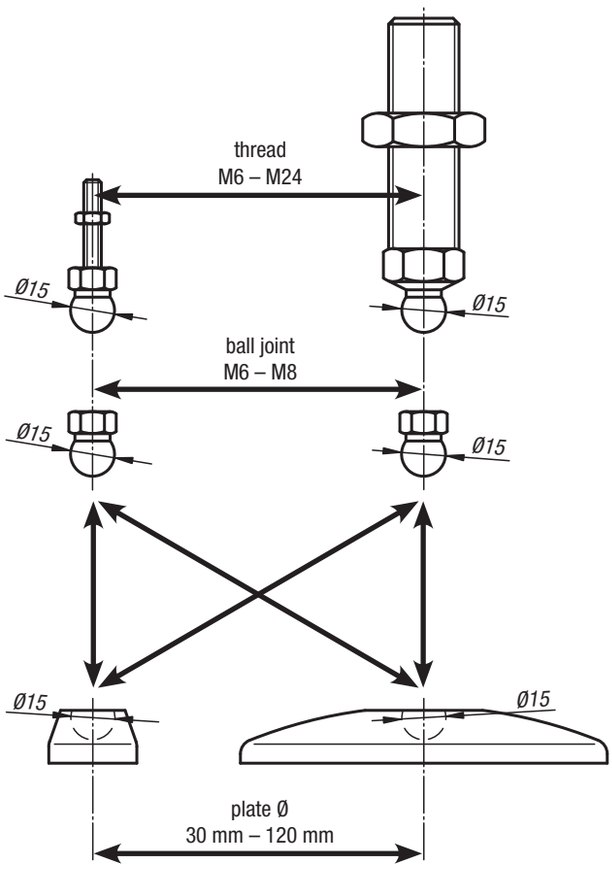
Assembly:
Using a plastic hammer, knock the ball of the threaded spindle or ball joint vertically into the swivel foot plate. If necessary, the two fastening holes (closed) in the swivel foot plate can be opened by simply punching them out to allow the swivel foot to be fastened to a base.

Height of swivel foot:
Swivel feet always have a minimum height of H = 22.5 mm independently of the plate, threaded spindle or ball joint size (see Fig. 2). When assembling with threaded spindle, the height of the complete swivel foot is calculated by adding 22.5 mm to the length of the threaded spindle + the height of the hexagon. (Total height of swivel foot = L + L1 + 22.5 mm).

When assembling with ball joint, the length L is void.

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint (see sample order on the relevant product page).

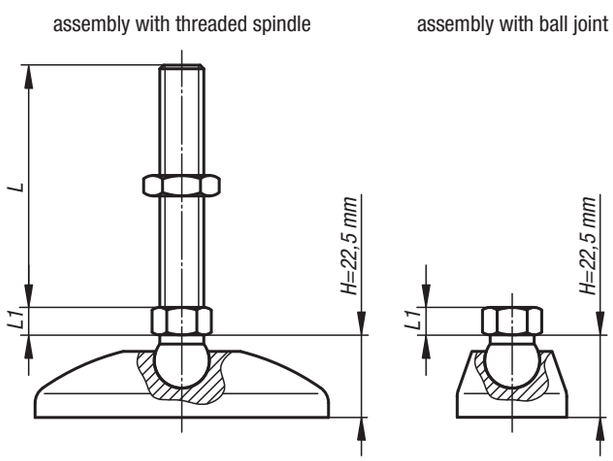
Fig. 1



Inclination angle of threaded spindle or ball joint:

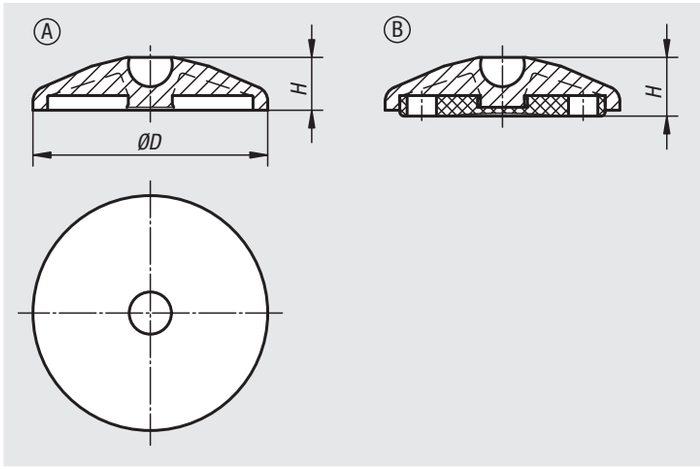


Fig. 2



Swivel feet plates antistatic





Material:
Plates, thermoplastic, glass bead reinforced.
Anti-slip plate thermoplastic elastomer.

Version:
black.

Sample order:
nlm 27800-11040

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27800-1030 and 27810-060151 **assembled**.)

Note:
Swivel feet consist of a plate and a threaded spindle or ball joint.
Any plate can be combined with any threaded spindle or ball joint.
The anti-slip plate absorbs vibrations and prevents the swivel foot slipping.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

Safety:
These ESD products can also be used for devices, components and protection systems in areas with high risk of explosion.
Use of these ESD products prevents the occurrence of electrostatic spark discharges, eliminating the potential ignition of gases and dusts which could lead to explosions in enclosed spaces.
Manufacturers and operators must use and conform to ATEX directives for the protection of persons working in areas with high risk of explosion.
These ESD products are certified by TÜV-Süd in relation to their electrical discharge capability.

Target groups:
Device manufacturers required to conform to ATEX product directive 2014/34/EU.
Operators required to conform to ATEX worker protection directive 1999/92/EC.

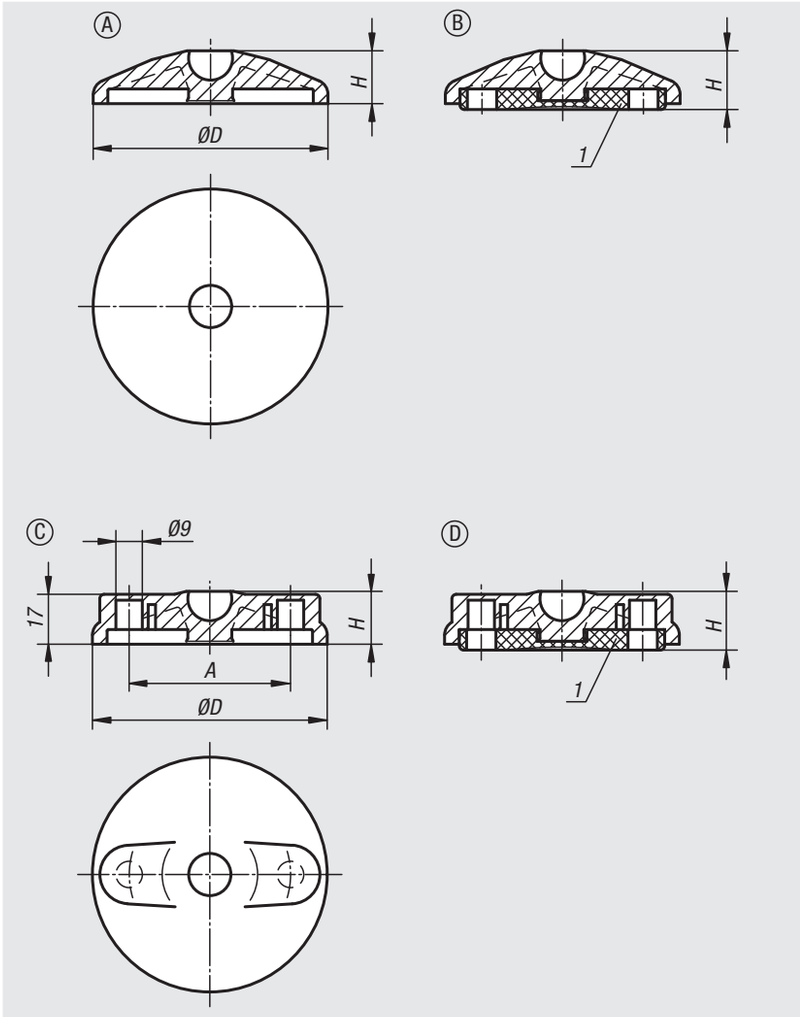
Drawing reference:
Form A without screw-on hole, without anti-slip plate
Form B without screw-on hole, with anti-slip plate

Order No.	Form	D	H	Load rating max. kN
27800-11040	A	40	18	9
27800-11050	A	50	18	9
27800-11060	A	60	18	9
27800-12040	B	40	20	9
27800-12050	B	50	20	9
27800-12060	B	60	20	9

Swivel feet plates

plastic





Material:
Plates, thermoplastic, glass bead reinforced.
Anti-slip plate thermoplastic elastomer.

Version:
black.

Sample order:
nlm 27800-1030
nlm 27800-1030 and 27810-060151 **assembled**

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27800-1030 and 27810-060151 **assembled**.)

Note:
Swivel feet consist of a plate and a threaded spindle or ball joint. Any plate can be combined with any threaded spindle or ball joint. The anti-slip plate absorbs vibrations and prevents the swivel foot slipping.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

Drawing reference:
Form A without screw-on hole, without anti-slip plate
Form B without screw-on hole, with anti-slip plate
Form C with screw-on hole (closed), without anti-slip plate
Form D with screw-on hole (closed), with anti-slip plate

1) From plate Ø 80

Swivel feet plates

plastic

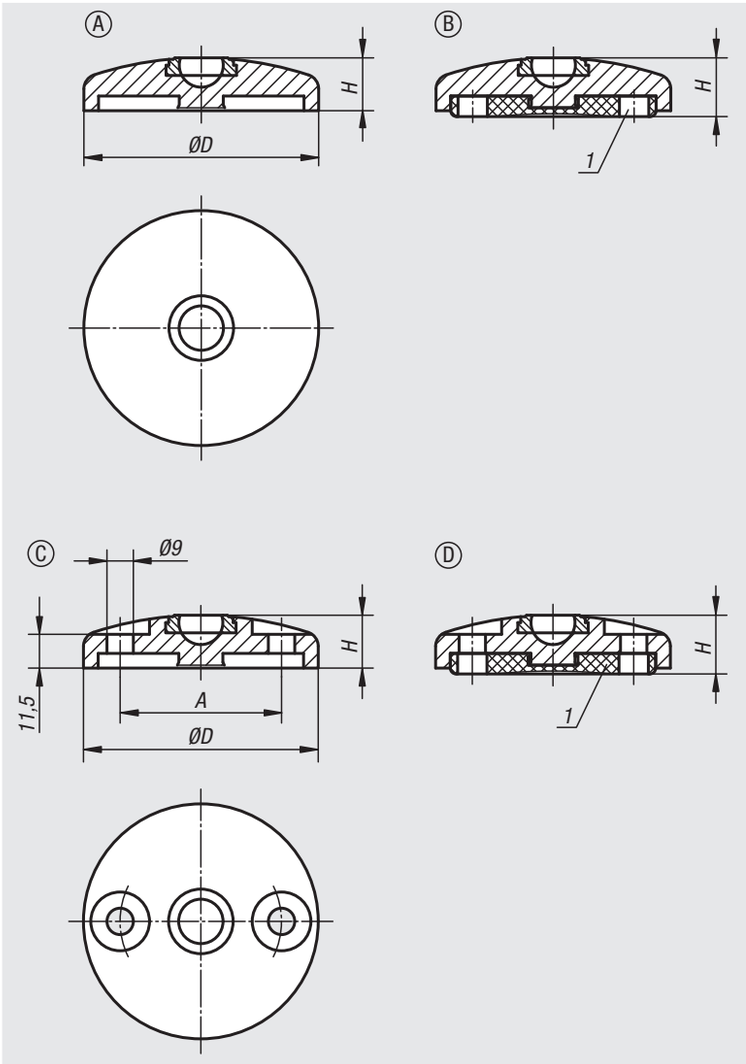
Order No. A	Order No. B	D	H	Load rating max. kN
27800-1030	**27800-2030**	30	18/20	5
27800-1040	**27800-2040**	40	18/20	9
27800-1045	**27800-2045**	45	18/20	9
27800-1050	**27800-2050**	50	18/20	9
27800-1060	**27800-2060**	60	18/20	9
27800-1080	**27800-2080**	80	18/20	9
27800-1100	**27800-2100**	100	18/20	9

Order No. Form C	Order No. Form D	D	A	H	Load rating max. kN
27800-3080	**27800-4080**	80	55	18/20	9
27800-3100	**27800-4100**	100	74	18/20	9
27800-3120	**27800-4120**	120	94	18/20	9

Swivel feet plates

die-cast zinc or stainless steel





Material:
Plate die-cast zinc or stainless steel 1.4305.
Anti-slip plate thermoplastic elastomer.

Version:
Die-cast zinc plate, black powder-coated.
Stainless steel plate, bright.

Sample order:
nlm 27801-10301
nlm 27801-10301 and 27810-060151 **assembled**

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27801-10301 and 27810-060151 **assembled**).

Note:
Swivel feet consist of a plate and a threaded spindle or ball joint. Any plate can be combined with any threaded spindle or ball joint. The anti-slip plate absorbs vibrations and prevents the swivel foot slipping.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

Drawing reference:
Form A without screw-on hole, without anti-slip plate
Form B without screw-on hole, with anti-slip plate
Form C with screw-on hole (open), without anti-slip plate
Form D with screw-on hole (open), with anti-slip plate

1) From plate Ø 80

Swivel feet plates

die-cast zinc or stainless steel

Order No. Form A	Order No. Form B	Main material	D	H	Load rating max. kN
27801-10301	**27801-20301**	zinc	30	18/20	20
27801-10401	**27801-20401**	zinc	40	18/20	30
27801-10451	**27801-20451**	zinc	45	18/20	30
27801-10501	**27801-20501**	zinc	50	18/20	30
27801-10601	**27801-20601**	zinc	60	18/20	30
27801-10801	**27801-20801**	zinc	80	18/20	30
27801-11001	**27801-21001**	zinc	100	18/20	35
27801-11201	**27801-21201**	zinc	120	18/20	35

Order No. Form C	Order No. Form D	Main material	D	A	H	Load rating max. kN
27801-30801	**27801-40801**	zinc	80	55	18/20	30
27801-31001	**27801-41001**	zinc	100	74	18/20	35
27801-31201	**27801-41201**	zinc	120	94	18/20	35

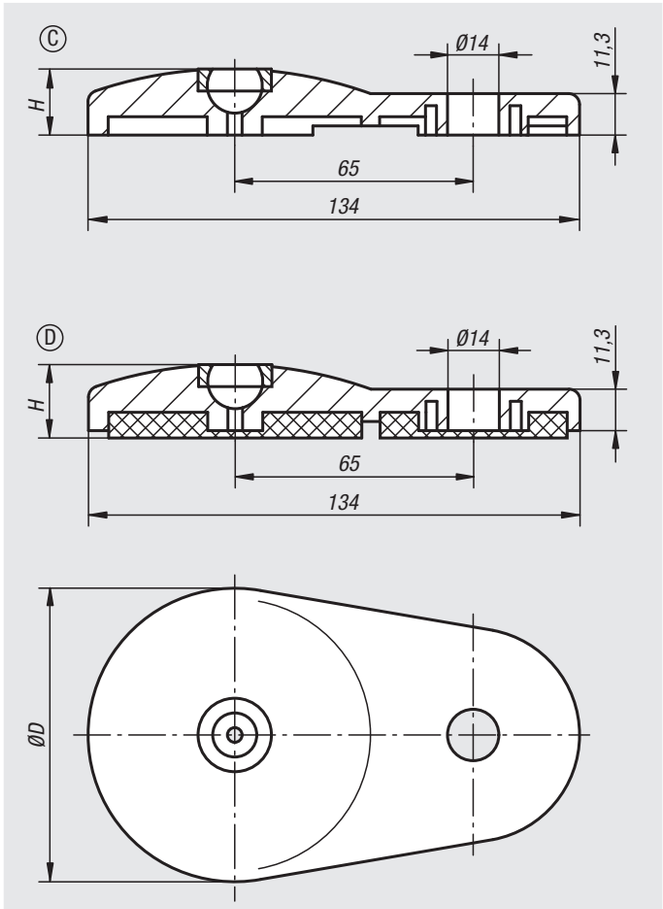
Order No. Form A	Order No. Form B	Main material	D	H	Load rating max. kN
27801-10302	**27801-20302**	stainless steel	30	18/20	20
27801-10402	**27801-20402**	stainless steel	40	18/20	30
27801-10452	**27801-20452**	stainless steel	45	18/20	30
27801-10502	**27801-20502**	stainless steel	50	18/20	35
27801-10602	**27801-20602**	stainless steel	60	18/20	35
27801-10802	**27801-20802**	stainless steel	80	18/20	35
27801-11002	**27801-21002**	stainless steel	100	18/20	40
27801-11202	**27801-21202**	stainless steel	120	18/20	40

Order No. Form C	Order No. Form D	Main material	D	A	H	Load rating max. kN
27801-30802	**27801-40802**	stainless steel	80	55	18/20	35
27801-31002	**27801-41002**	stainless steel	100	74	18/20	40
27801-31202	**27801-41202**	stainless steel	120	94	18/20	40

Swivel feet plates extended

die-cast zinc





Material:
Plate die-cast zinc.
Anti-slip plate thermoplastic elastomer.

Version:
Plate black powder-coated.

Sample order:
nlm 27802-30801
nlm 27802-30801 and 27810-060151 **assembled**

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27802-30801 and 27810-060151 **assembled**.)

Note:
Swivel feet consist of a plate and a threaded spindle or ball joint. Any plate can be combined with any threaded spindle or ball joint. The anti-slip plate absorbs vibrations and prevents the swivel foot slipping.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

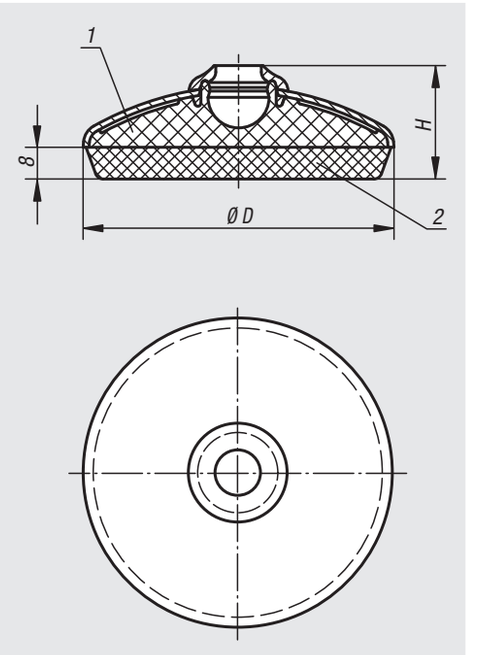
Drawing reference:
Form C with screw-on hole, without anti-slip plate
Form D with screw-on hole, with anti-slip plate

Order No.	Form	D	H	Load rating max. kN
27802-30801	C	80	18	30
27802-40801	D	80	20	30

Swivel feet plates

stainless steel





Material:
Plates, stainless steel 1.4301.
Core, thermoplastic PA.
Rubber support TPE.

Version:
Plate bright.
Rubber support light grey with sealing lip, hardness 70 Shore A.
Temp. range -20°C to +100°C.

Sample order:
nlm 27803-1060
nlm 27803-1060 and 27810-060152 **assembled**

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27803-1060 and 27810-060152 **assembled**).

Note:
The rubber support is joined with the stainless steel plate and the PA core by injection moulding. The rubber support is resistant to oil and water (up to 60 °C). In addition, it is furnished with antibacterial and antimicrobial protection and is thus outstandingly suited for sectors in the foods industry.

Swivel feet consist of a plate and a threaded spindle or ball joint. Any plate can be combined with any threaded spindle or ball joint.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

Drawing reference:
1) PA-core
2) rubber base



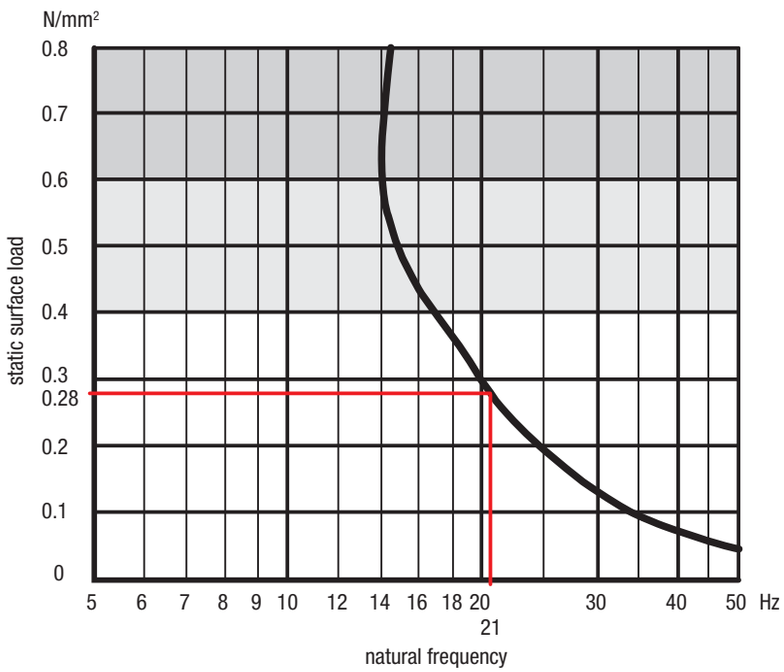
Order No.	D	H	Load rating max. kN
27803-1060	58,5	29	7
27803-1080	78,5	29	7
27803-1100	98,5	29	7

Technical information
Swivel feet and plates with vibration absorption

Natural frequency:
Every sprung weight, such as a machine or piece of equipment, that is standing on swivel feet with vibration absorbers vibrates after an initial impetus at its own natural frequency (resonance frequency). In the diagram to the side (Fig. 1) the natural frequency of Sylomer V12 under pressure by various forces can be read. The optimum range of use is with a pressure of ≤ 0.4 N/mm. A maximum pressure of 0.6 N/mm should not be exceeded.

Interference frequency:
The frequency emitted by a machine or a piece of equipment is known as its interference frequency. Effective vibration absorption is dependent on the interference frequency (the frequency to be absorbed) and the natural frequecy of the absorption unit. The greater the difference in frequency between the natural frequency and the interference frequency, the better the absorption. An absorbing effect will only be achieved if the interference frequency is over $\sqrt{2}$ times the natural frequency of the absorption unit.

Fig. 1



Calculation example:

Swivel foot: M12, D1=30,5
Loading: 300N

Pressure: $\frac{F}{A} = \frac{300\ N}{529{,}5\ mm^2} = 0{,}57\ N/mm^2$

$> 0{,}4\ N/mm^2$

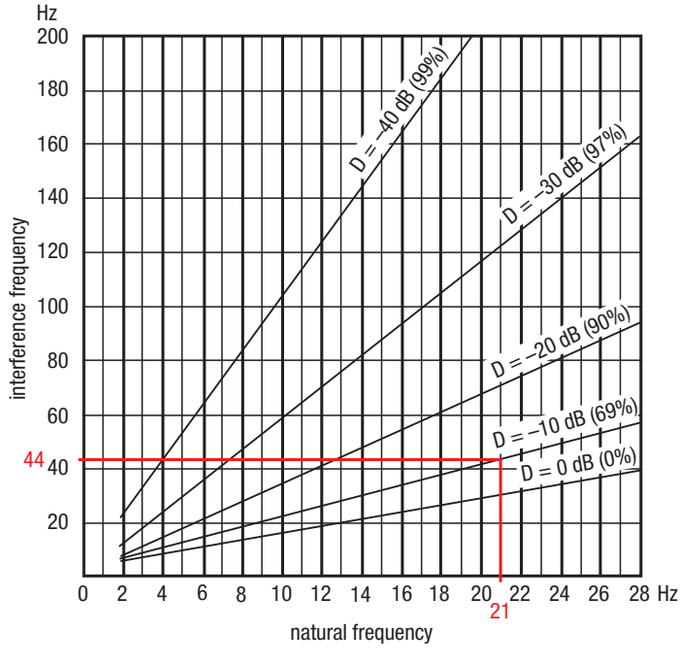
Swivel foot: M16, D1=40,5
Loading: 300N

Pressure: $\frac{F}{A} = \frac{300\ N}{1087{,}2\ mm^2} = \mathbf{0{,}28\ N/mm^2}$

$< 0{,}4\ N/mm^2$

The M16 swivel foot is chosen since the pressure is ≤ 0.4 N/mm².
From Fig. 1, a pressure of **0.28 N/mm²** gives a natural frequency of **21 Hz**.
With an interference frequency of **44 Hz** an absorption effect of 69% is achieved (Fig. 2).

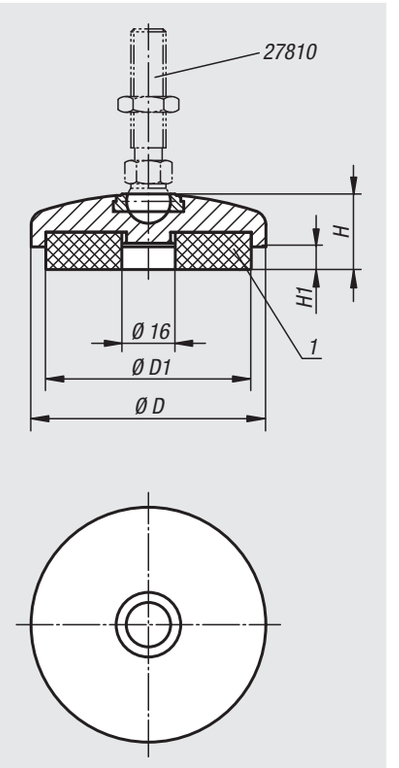
Fig. 2



Swivel feet plates

with vibration absorption





Material:
Plate die-cast zinc or stainless steel 1.4305.
Damper plate PUR elastomere (Sylomer V12).

Version:
Die-cast zinc plate, black powder-coated.
Stainless steel plate, bright.
Damper plate, grey, glued in, anti-slip.
Temp. range -30 °C to +70 °C.

Sample order:
nlm 27804-20601
nlm 27804-20601 and 27810-060151 **assembled**

Note for ordering:
If the swivel foot plate and the threaded spindle or ball joint are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and the spindle or ball joint. (e.g. 27804-20601 and 27810-060151 **assembled**.)

Note:
The load rating given in the table is a recommendation of the **permanent static** load up to which the absorption unit should be used. This static load corresponds to a pressure per area of 0.4 N/mm², at which the material achieves its optimum absorption properties. Here it is taken into account that under dynamic demands an additional load, up to 0.6 N/mm² may occur. The damper plate absorbs vibrations and prevents the swivel foot slipping. Swivel feet consist of a plate and a threaded spindle or ball joint. Any plate can be combined with any threaded spindle or ball joint.
For matching threaded spindles see 27810.
For matching ball joints see 27811.

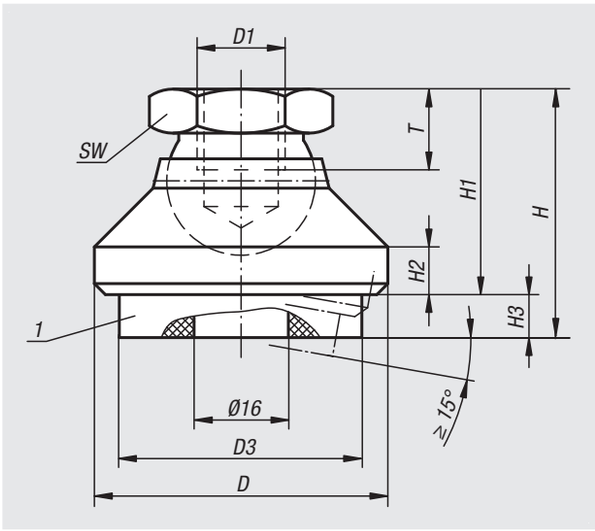
Drawing reference:
1) damper plate

Order No.	Main material	D	D1	H	H1 by 0 / 0.4 / 0.6 N/mm²	Load rating max. kN
27804-20401	zinc	40	30,5	25	7 / 5,9 / 4,8	0,062
27804-20501	zinc	50	40,5	25	7 / 5,9 / 4,8	0,212
27804-20601	zinc	60	50	25	7 / 5,9 / 4,8	0,433
27804-20801	zinc	80	68	25	7 / 5,9 / 4,8	0,614
27804-20402	stainless steel	40	30,5	25	7 / 5,8 / 4,9	0,212
27804-20502	stainless steel	50	40,5	25	7 / 5,8 / 4,9	0,435
27804-20602	stainless steel	60	50	25	7 / 5,8 / 4,9	0,705
27804-20802	stainless steel	80	68	25	7 / 5,8 / 4,9	1,372

Swivel feet

with vibration absorption





Material:
Steel version:
Foot high carbon steel.
Ball element free-cutting steel.

Stainless steel version:
Foot and ball element stainless steel.

Damper plate PUR elastomer (Sylomer V12).

Version:
Steel version:
Foot black oxidised.
Ball element case-hardened and black oxidised.

Stainless steel version:
Bright.

Anti-slip damper plate grey, glued in.
Temp. range -30 °C to +70 °C.

Sample order:
nlm 27806-110

Note:
The load rating given in the table is a recommendation of the **permanent static** load to which the damping element should be used.
This static load corresponds to a surface pressure of 0.4 N/mm² at which the material achieves its optimum absorption properties. It is taken into account that under dynamic loading an additional load of up to 0.6 N/mm² may occur.
The damper plate absorbs vibrations and prevents the swivel foot slipping.

For swivel feet without vibration absorption see article No. 07144.

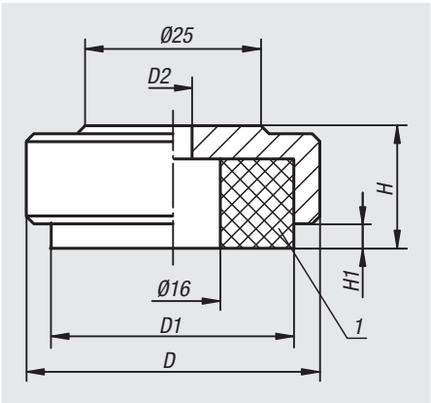
Drawing reference:
1) damper plate

Order No.	Main material	D	D1	D3	H	H1	H2	H3 by 0 / 0.4 / 0.6 N/mm²	T	SW	Load rating max. kN
27806-110	steel	32	M10	30,5	30	22	5	8 / 6,8 / 5,9	10	17	0,212
27806-112	steel	40	M12	30,5	34	26	6	8 / 6,8 / 5,9	12	19	0,212
27806-116	steel	50	M16	40,5	40	32	7	8 / 6,8 / 5,9	14	24	0,435
27806-120	steel	60	M20	50	50	42	8	8 / 6,8 / 5,9	18	30	0,705
27806-310	stainless steel	32	M10	30,5	30	22	5	8 / 6,8 / 5,9	10	17	0,212
27806-312	stainless steel	40	M12	30,5	34	26	6	8 / 6,8 / 5,9	12	19	0,212
27806-316	stainless steel	50	M16	40,5	40	32	7	8 / 6,8 / 5,9	14	24	0,435
27806-320	stainless steel	60	M20	50	50	42	8	8 / 6,8 / 5,9	18	30	0,705

Machine feet

with vibration absorption





Material:
Plate steel or stainless steel 1.4404.
Damper plate PUR elastomer (Sylomer V12).

Version:
Plate trivalent blue passivated.
Damper plate grey, glued in, anti-slip.
Temp. range -30 °C to +70 °C.

Sample order:
nlm 27808-046

Note:
The load rating given in the table is a recommendation of the **permanent static** load up to which the damper plate should be used. This static load corresponds to a surface pressure of 0.4 N/mm², at which the material reaches its optimum absorption properties. Here it is taken into account that under dynamic loading an additional load of up to 0.6 N/mm² may occur. The damper plate absorbs vibrations and prevents the machine foot slipping.

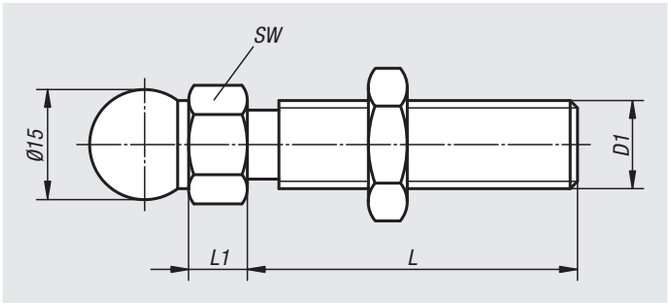
Drawing reference:
1) damper plate

Order No.	Main material	D	D1	D2	H	H1 by 0 / 0.4 / 0.6 N/mm²	Load rating max. kN
27808-036	steel	36	30,5	5,5	15	4 / 2,8 / 1,9	0,212
27808-046	steel	46	40,5	6,6	17	4 / 2,8 / 1,9	0,435
27808-056	steel	56	50	9	19	4 / 2,8 / 1,9	0,705
27808-074	steel	74	68	9	21	4 / 2,8 / 1,9	1,372
27808-1036	stainless steel	36	30,5	5,5	15	4 / 2,8 / 1,9	0,212
27808-1046	stainless steel	46	40,5	6,6	17	4 / 2,8 / 1,9	0,435
27808-1056	stainless steel	56	50	9	19	4 / 2,8 / 1,9	0,705

Swivel feet threaded spindles

steel or stainless steel





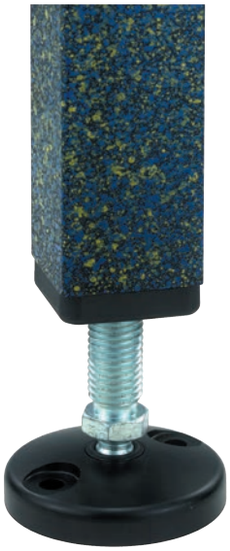
Material:
Steel or stainless steel 1.4301.

Version:
Steel trivalent blue passivated.
Stainless steel, bright.

Sample order:
nlm 27810-060151
nlm 27810-060151 and 27800-1030 **assembled**

Note for ordering:
If the threaded spindle and the plate are to be supplied assembled, please add the suffix **"assembled"** to the order number for the spindle and plate.
(e.g. 27810-060151 and 27800-1030 **assembled**.)

Note:
Swivel feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle. The height of the complete swivel foot is calculated by the length of the threaded spindle + height of hexagon + 22.5 mm.
(Overall height of swivel foot = L + L1 + 22.5 mm).

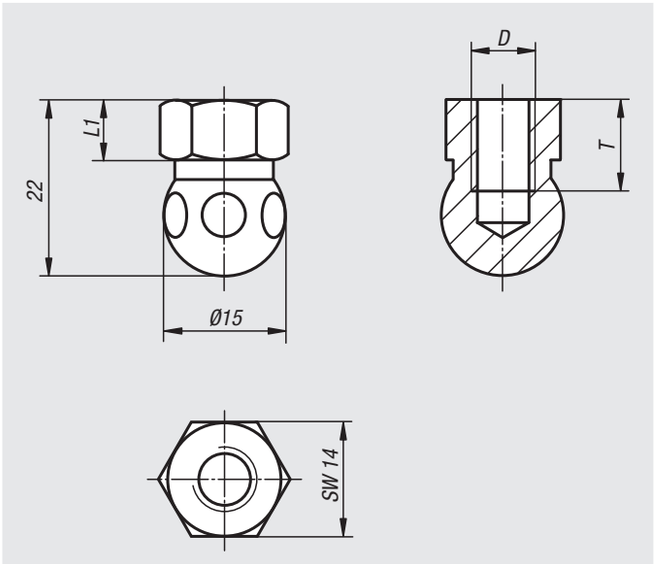


Order No. steel	Order No. stainless steel	D1	L	L1	SW	Load rating max. kN
27810-060151	**27810-060152**	M6	15	7,5	14	2
27810-060301	**27810-060302**	M6	30	7,5	14	2
27810-080401	**27810-080402**	M8	40	7,5	14	3,5
27810-080801	**27810-080802**	M8	80	7,5	14	3,5
27810-100451	**27810-100452**	M10	45	7,5	14	4,7
27810-100701	**27810-100702**	M10	70	7,5	14	4,7
27810-100901	**27810-100902**	M10	90	7,5	14	4,7
27810-101251	**27810-101252**	M10	125	7,5	14	4,7
27810-101501	**27810-101502**	M10	150	7,5	14	4,7
27810-120451	**27810-120452**	M12	45	7,5	14	7,7
27810-120661	**27810-120662**	M12	66	7,5	14	7,7
27810-121001	**27810-121002**	M12	100	7,5	14	7,7
27810-121251	**27810-121252**	M12	125	7,5	14	7,7
27810-121501	**27810-121502**	M12	150	7,5	14	7,7
27810-140661	**27810-140662**	M14	66	7,5	14	11,1
27810-141001	**27810-141002**	M14	100	7,5	14	11,1
27810-141251	**27810-141252**	M14	125	7,5	14	11,1
27810-141501	**27810-141502**	M14	150	7,5	14	11,1
27810-160661	**27810-160662**	M16	66	7,5	17	14,5
27810-161001	**27810-161002**	M16	100	7,5	17	14,5
27810-161251	**27810-161252**	M16	125	7,5	17	14,5
27810-161501	**27810-161502**	M16	150	7,5	17	14,5
27810-162001	**27810-162002**	M16	200	7,5	17	14,5
27810-200851	**27810-200852**	M20	85	10,5	22	24,3
27810-201001	**27810-201002**	M20	100	10,5	22	24,3
27810-201251	**27810-201252**	M20	125	10,5	22	24,3
27810-201501	**27810-201502**	M20	150	10,5	22	24,3
27810-202001	**27810-202002**	M20	200	10,5	22	24,3
27810-240851	**27810-240852**	M24	85	10,5	24	36,1
27810-241001	**27810-241002**	M24	100	10,5	24	36,1
27810-241251	**27810-241252**	M24	125	10,5	24	36,1
27810-241501	**27810-241502**	M24	150	10,5	24	36,1
27810-242001	**27810-242002**	M24	200	10,5	24	36,1

Swivel feet ball joints

with internal thread





Material:
Steel or stainless steel 1.4301.

Version:
Steel trivalent blue passivated.
Stainless steel, bright.

Sample order:
nlm 27811-061
nlm 27811-061 and 27800-1030 **assembled**

Note for ordering:
If the ball joint and the plate are to be supplied assembled, please add the suffix **"assembled"** to the order number for the ball joint and plate. (e.g. 27811-061 and 27800-1030 **assembled**.)

Note:
For fastening swivel feet with standard screws.

Swivel feet consist of a ball joint and a plate. Any ball joint can be combined with any plate.
The height of the complete swivel foot is calculated by the height of the hexagon + 22.5 mm.
(Overall height of swivel foot = L1 + 22.5 mm).



Order No. steel	Order No. stainless steel	D	L1	T
27811-061	**27811-062**	M6	7,5	10
27811-081	**27811-082**	M8	7,5	10

Modular structure of a levelling foot

Application:
Levelling feet are of modular design. The components can be individually combined to match the application. Levelling feet can be used on machines, plants and even office furniture.

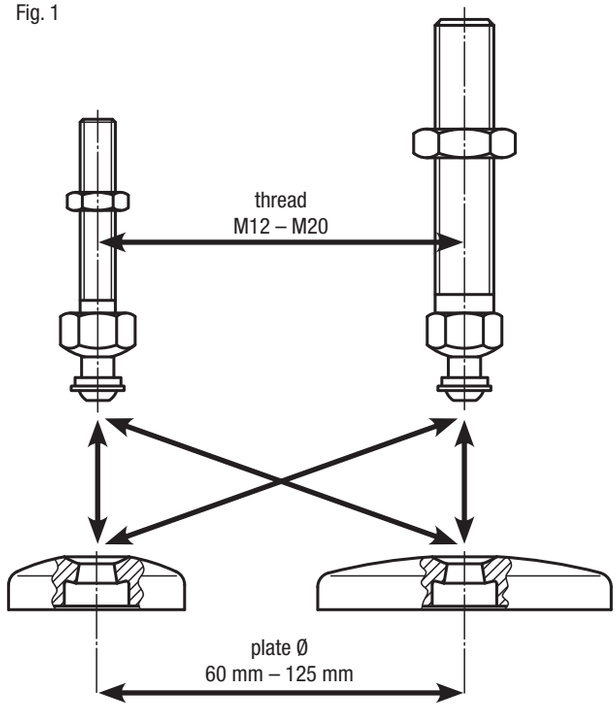
Modular design:
The levelling feet consist of two components - a plate and a threaded spindle. **Any** plate can be combined with **any** threaded spindle (see Fig. 1).

Assembly:
Insert the threaded spindle vertically into the levelling foot plate and fasten it from underneath with a spacer ring, washer and screw (no unintentional loosening of threaded spindle from the plate). If necessary, the two fastening holes (closed) in the levelling foot plate can be opened by simply punching them out to allow the levelling foot to be bolted to the floor.

Levelling feet height:
Regardless of the plate or threaded spindle size, levelling feet always have a minimum height of H = 30 mm (see Fig. 2). The height of the complete levelling foot is calculated from the length of the threaded spindle + 30 mm. (Total height of levelling foot = L + 30 mm).

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle (see sample order on the relevant product page).

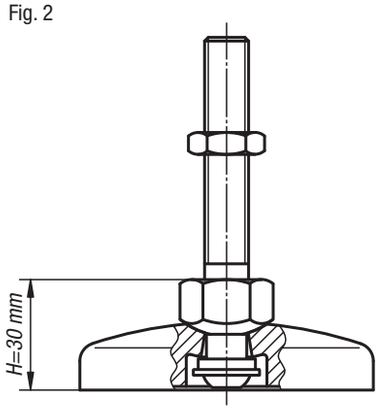
Fig. 1



Inclination angle of threaded spindle:



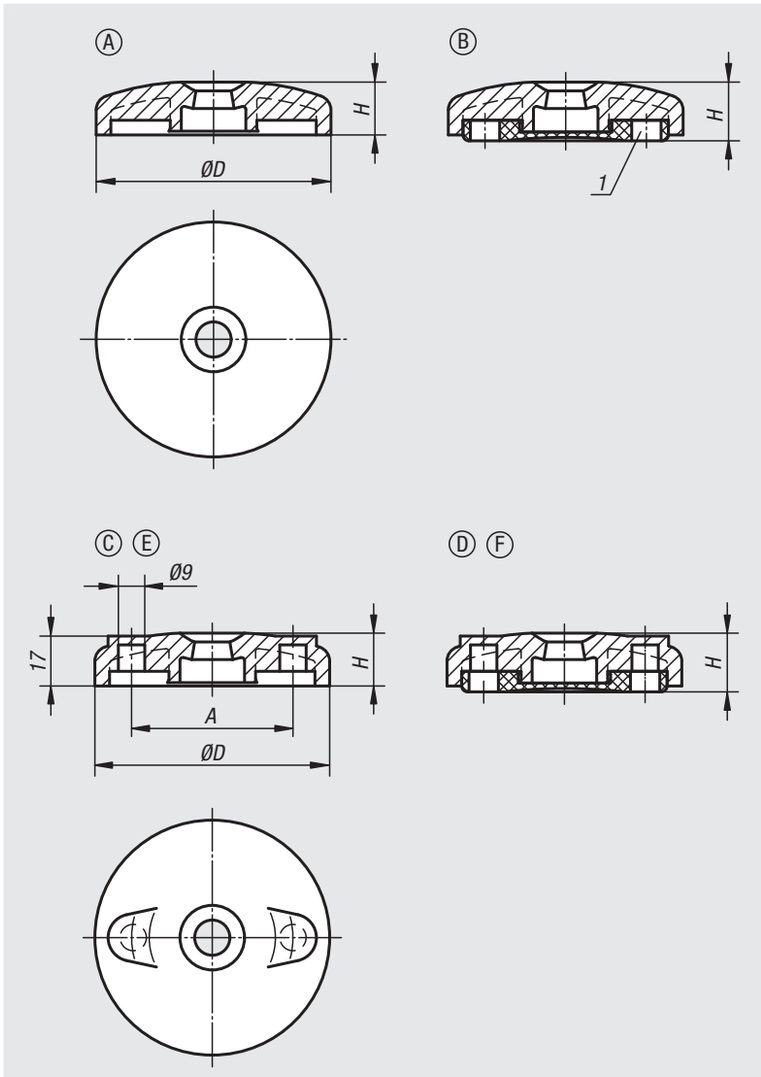
Fig. 2



Levelling feet plates

plastic





Material:
Plates, thermoplastic, fibreglass reinforced.
Anti-slip plate thermoplastic elastomer.

Version:
black.

Sample order:
nlm 27815-1060
nlm 27815-1060 and 27828-120661 **assembled**

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle. (e.g. 27815-1060 and 27828-120661 **assembled**.)

Note:
Levelling feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle.
The anti-slip plate absorbs vibrations and prevents the levelling foot slipping.
For matching threaded spindles see 27828.

Drawing reference:
Form A without screw-on hole, without anti-slip plate
Form B without screw-on hole, with anti-slip plate
Form C with screw-on hole (closed), without anti-slip plate
Form D with screw-on hole (closed), with anti-slip plate
Form E with screw-on hole (open), without anti-slip plate
Form F with screw-on hole (open), with anti-slip plate

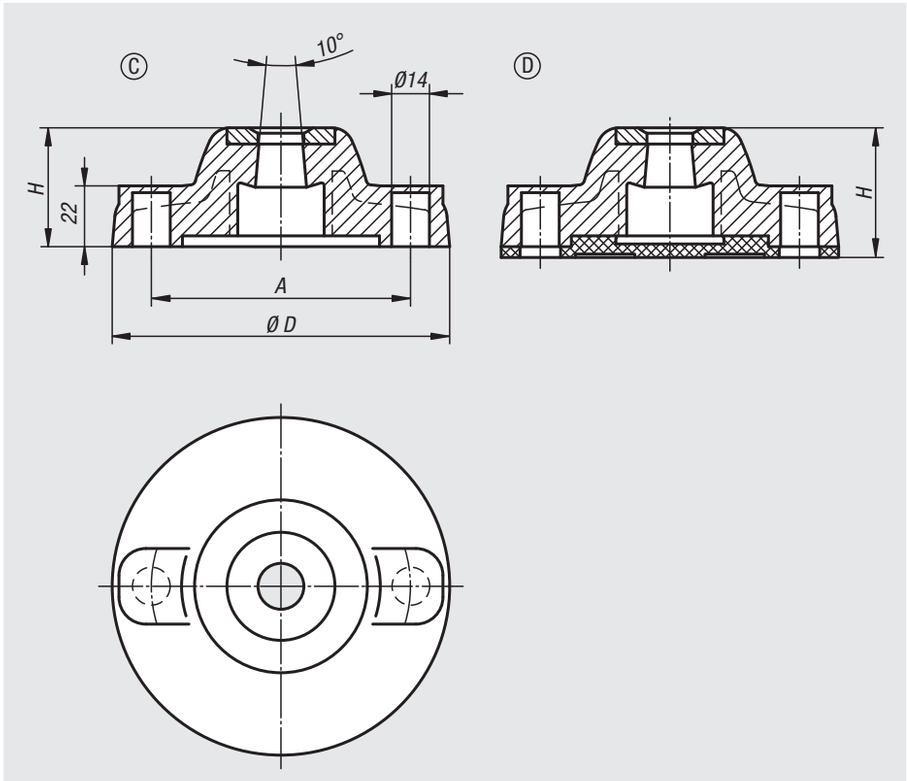
1) From plate Ø 80

Order No.	Form	D	A	H	Load rating max. kN
27815-1060	A	60	-	18	12
27815-1080	A	80	-	18	12
27815-1100	A	100	-	18	12
27815-2060	B	60	-	20	12
27815-2080	B	80	-	20	12
27815-2100	B	100	-	20	12
27815-3080	C	80	55	18	12
27815-3100	C	100	74	18	12
27815-4080	D	80	55	20	12
27815-4100	D	100	74	20	12
27815-5080	E	80	55	18	12
27815-5100	E	100	74	18	12
27815-6080	F	80	55	20	12
27815-6100	F	100	74	20	12

Levelling feet plates

plastic, heavy-duty version





Material:
Plates, thermoplastic, fibreglass reinforced.
Anti-slip plate thermoplastic elastomer.

Version:
black.

Sample order:
nlm 27816-31251
nlm 27816-31251 and 27828-120661 **assembled**

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle. (e.g. 27816-31251 and 27828-120661 **assembled**.)

Note:
Levelling feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle. The anti-slip plate absorbs vibrations and prevents the levelling foot slipping.
For matching threaded spindles see 27828.

Drawing reference:
Form C with screw-on hole (closed), without anti-slip plate
Form D with screw-on hole (closed), with anti-slip plate

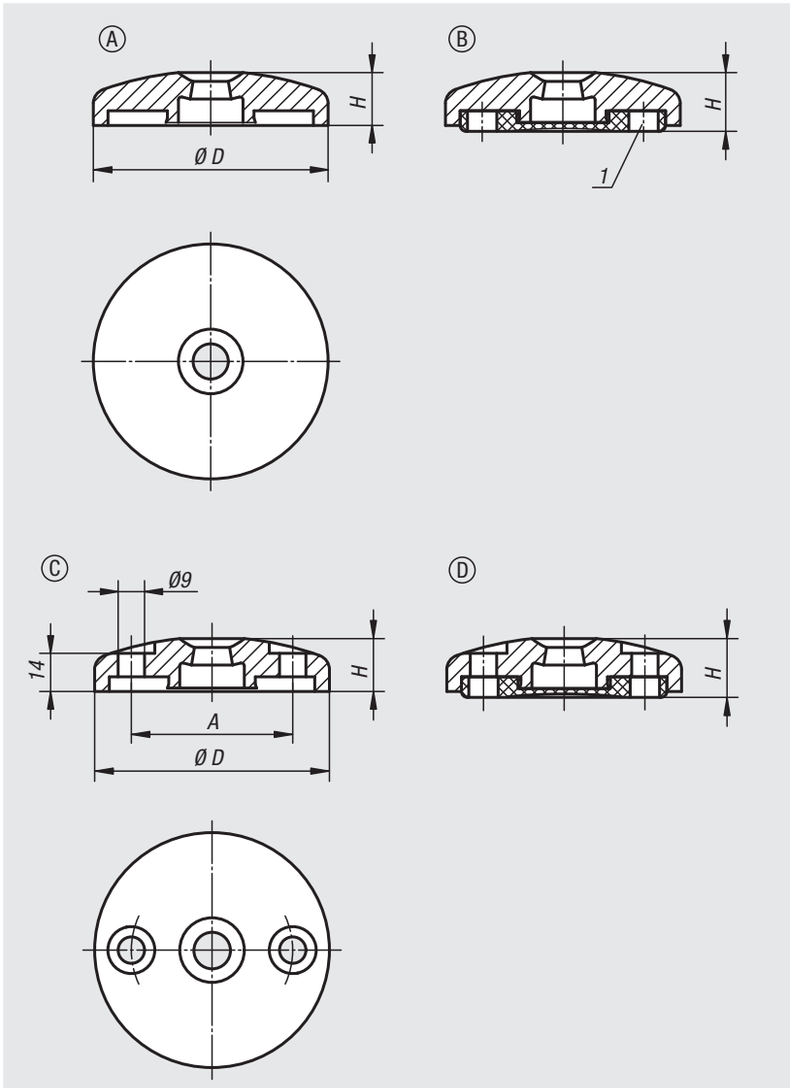
Order No.	Form	D	A	H	Load rating max. kN
27816-31251	C	125	96	44	18
27816-31751	C	175	135	45	25
27816-41251	D	125	96	48	18
27816-41751	D	175	135	49	25

Notes

Levelling feet plates

die-cast zinc or stainless steel





Material:
Plate die-cast zinc or stainless steel 1.4305.
Anti-slip plate thermoplastic elastomer.

Version:
Die-cast zinc plate, black powder-coated.
Stainless steel plate, bright.

Sample order:
nlm 27817-10601
nlm 27817-10601 and 27828-120661 **assembled**

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle.
(e.g. 27817-10601 and 27828-120661 **assembled**).

Note:
Levelling feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle.
The anti-slip plate absorbs vibrations and prevents the levelling foot slipping.
For matching threaded spindles see 27828.

Drawing reference:
Form A without screw-on hole, without anti-slip plate
Form B without screw-on hole, with anti-slip plate
Form C with screw-on hole (open), without anti-slip plate
Form D with screw-on hole (open), with anti-slip plate

1) From plate Ø 80

Levelling feet plates

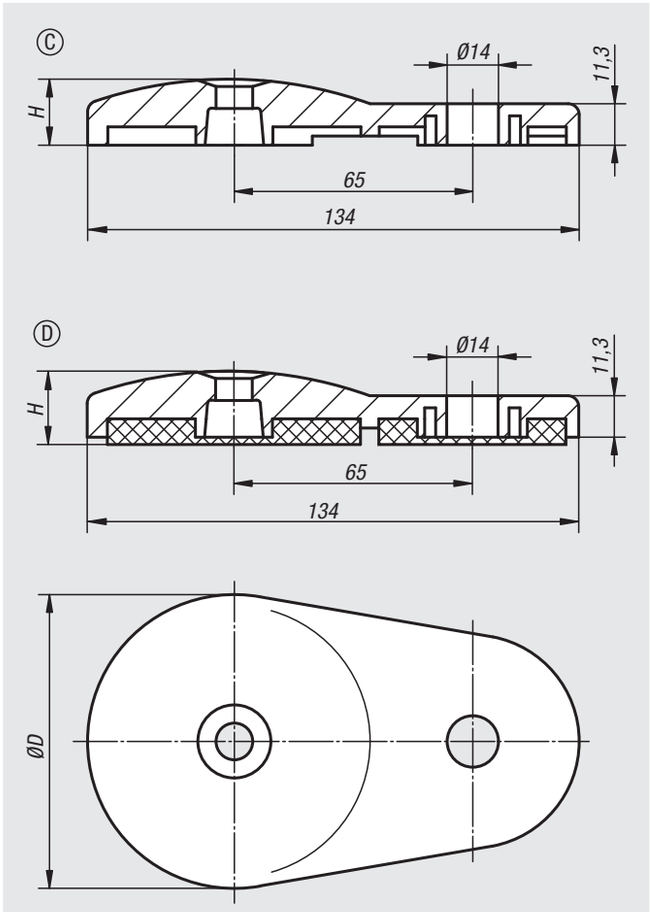
die-cast zinc or stainless steel

Order No.	Form	Main material	D	A	H	Load rating max. kN
27817-10401	A	zinc	40	-	18	20
27817-10451	A	zinc	45	-	18	25
27817-10501	A	zinc	50	-	18	25
27817-10601	A	zinc	60	-	18	35
27817-10801	A	zinc	80	-	18	35
27817-11001	A	zinc	100	-	18	35
27817-11201	A	zinc	120	-	18	35
27817-10602	A	stainless steel	60	-	18	45
27817-10802	A	stainless steel	80	-	18	45
27817-11002	A	stainless steel	100	-	18	45
27817-20601	B	zinc	60	-	20	35
27817-20801	B	zinc	80	-	20	35
27817-21001	B	zinc	100	-	20	35
27817-21201	B	zinc	120	-	20	35
27817-20602	B	stainless steel	60	-	20	45
27817-20802	B	stainless steel	80	-	20	45
27817-21002	B	stainless steel	100	-	20	45
27817-30801	C	zinc	80	55	18	35
27817-31001	C	zinc	100	74	18	35
27817-30802	C	stainless steel	80	55	18	45
27817-31002	C	stainless steel	100	74	18	45
27817-40801	D	zinc	80	55	20	35
27817-41001	D	zinc	100	74	20	35
27817-40802	D	stainless steel	80	55	20	45
27817-41002	D	stainless steel	100	74	20	45

Levelling feet plates extended

die-cast zinc





Material:
Plate die-cast zinc.
Anti-slip plate thermoplastic elastomer.

Version:
Plate black powder-coated.

Sample order:
nlm 27818-30801
nlm 27818-30801 and 27828-120661 **assembled**

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle. (e.g. 27818-30801 and 27828-120661 **assembled**.)

Note:
Levelling feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle. The anti-slip plate absorbs vibrations and prevents the levelling foot slipping. For matching threaded spindles see 27828.

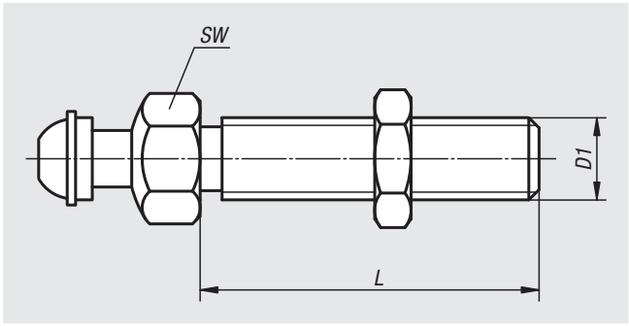
Drawing reference:
Form C with screw-on hole, without anti-slip plate
Form D with screw-on hole, with anti-slip plate

Order No.	Form	D	H	Load rating max. kN
27818-30801	C	80	18	35
27818-40801	D	80	20	35

Levelling feet threaded spindles

steel or stainless steel





Material:
Steel or 1.4305 stainless steel

Version:
Steel trivalent blue passivated.
Stainless steel, bright.

Sample order:
nlm 27828-120661
nlm 27828-120661 and 27815-1060 **assembled**

Note for ordering:
If the threaded spindle and the levelling foot plate are to be supplied assembled, please add the suffix **"assembled"** to the order number for the spindle and plate. (e.g. 27828-120661 and 27815-1060 **assembled**.)

Note:
Levelling feet consist of a plate and a threaded spindle. Any plate can be combined with any threaded spindle. The height of the complete levelling foot is calculated from the length of the threaded spindle + 30 mm. (Total height of levelling foot = L + 30 mm)

Order No. steel	Order No. stainless steel	D1	L	SW	Load rating max. kN
27828-120661	**27828-120662**	M12	66	22	7,7
27828-121001	**27828-121002**	M12	100	22	7,7
27828-121251	**27828-121252**	M12	125	22	7,7
27828-121501	**27828-121502**	M12	150	22	7,7
27828-160661	**27828-160662**	M16	66	22	14,5
27828-161001	**27828-161002**	M16	100	22	14,5
27828-161251	**27828-161252**	M16	125	22	14,5
27828-161501	**27828-161502**	M16	150	22	14,5
27828-162001	**27828-162002**	M16	200	22	14,5
27828-201001	**27828-201002**	M20	100	22	24,3
27828-201251	**27828-201252**	M20	125	22	24,3
27828-201501	**27828-201502**	M20	150	22	24,3
27828-202001	**27828-202002**	M20	200	22	24,3

Modular structure of an ECO levelling foot

Application:
ECO levelling feet are of modular design. The components can be individually combined to match the application. However, the threaded spindle is not screwed but pressed in permanently. The levelling feet are used for a wide range of machines, plants and even office furniture.

Modular design:
The levelling feet consist of two components - a plate and a threaded spindle. **Any** plate can be combined with **any** threaded spindle (see Fig. 1).

Assembly:
Place levelling foot plate on threaded spindle and press pin in up to collar (threaded spindle cannot be inadvertently removed from plate).

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle (see sample order on the relevant product page).

Fig. 1

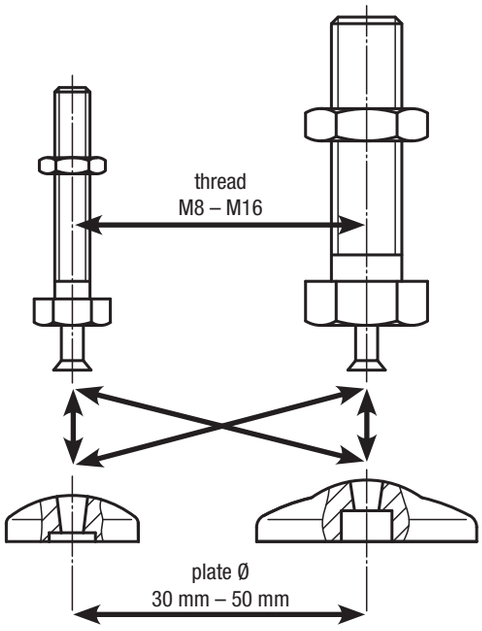
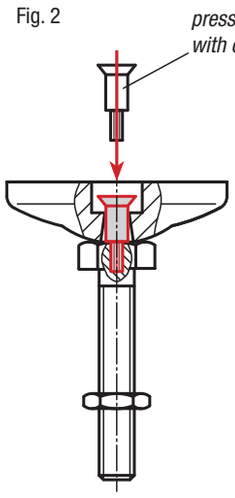
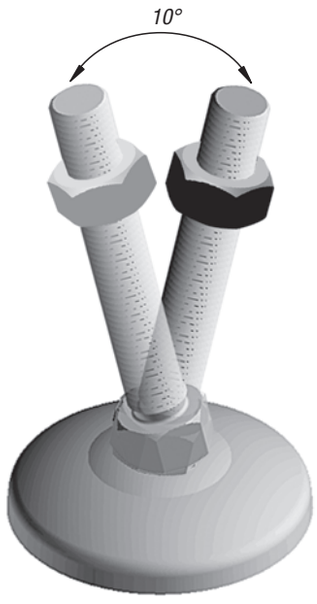


Fig. 2



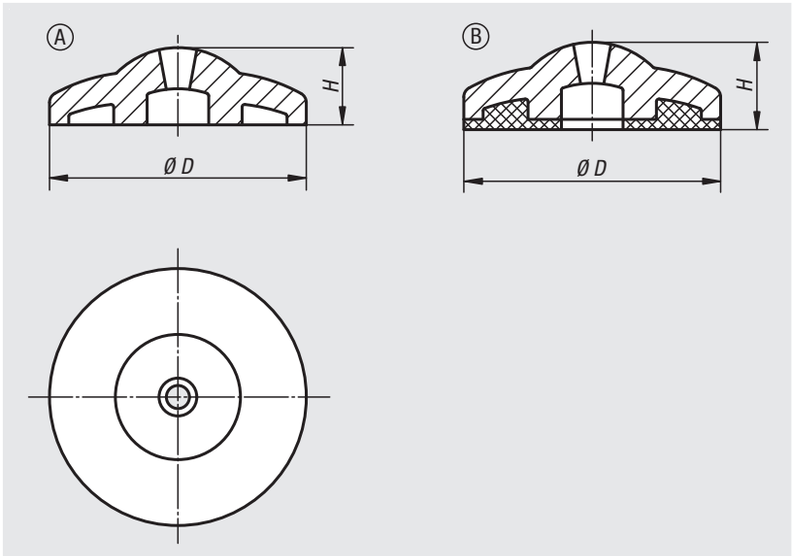
Inclination angle of threaded spindle:



Levelling feet plates ECO

die-cast zinc, stainless steel or plastic





Material:
Plate thermoplastic, die-cast zinc or stainless steel 1.4305.
Anti-slip plate thermoplastic elastomer.

Version:
Thermoplastic plate black.
Die-cast zinc plate blue electro zinc-plated.
Stainless steel plate bright.

Sample order:
nlm 27830-10303
nlm 27830-10303 and 27832-080801 **assembled**

Note for ordering:
If the levelling foot plate and the threaded spindle are to be supplied assembled, please add the suffix **"assembled"** to the order number for the plate and spindle. (e.g. 27830-10303 and 27832-080801 **assembled**).

Note:
ECO levelling feet consist of a plate and a threaded spindle.
Any plate can be combined with any threaded spindle.
The anti-slip plate absorbs vibrations and prevents the levelling foot slipping.
For matching threaded spindles see 27832.

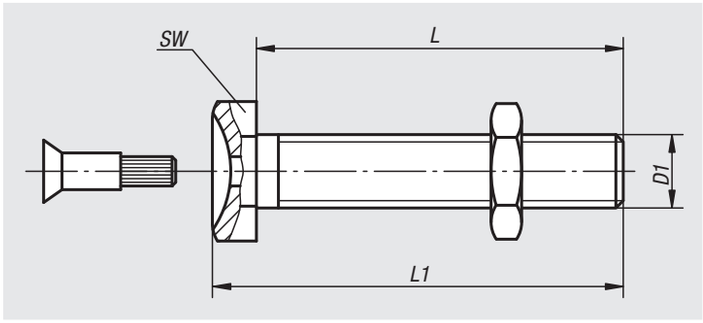
Drawing reference:
Form A without anti-slip plate
Form B with anti-slip plate

Order No.	Form	Main material	D	H	Load rating max. kN
27830-10301	A	zinc	30	11,5	16
27830-10401	A	zinc	40	12	18
27830-10501	A	zinc	50	14,5	20
27830-20301	B	zinc	30	13,5	16
27830-20401	B	zinc	40	14,5	18
27830-20501	B	zinc	50	17,5	20
27830-10302	A	stainless steel	30	11,5	22
27830-10402	A	stainless steel	40	12	24
27830-10502	A	stainless steel	50	14,5	26
27830-20302	B	stainless steel	30	13,5	22
27830-20402	B	stainless steel	40	14,5	24
27830-20502	B	stainless steel	50	17,5	26
27830-10303	A	thermoplastic	30	11,5	15
27830-10403	A	thermoplastic	40	12	15
27830-10503	A	thermoplastic	50	14,5	15
27830-20303	B	thermoplastic	30	13,5	15
27830-20403	B	thermoplastic	40	14,5	15
27830-20503	B	thermoplastic	50	17,5	15

Levelling feet ECO threaded spindles

steel or stainless steel





Material:
Steel or 1.4305 stainless steel

Version:
Steel trivalent blue passivated.
Stainless steel, bright.

Sample order:
nlm 27832-101201
nlm 27832-101201 and 27830-10301 **assembled**

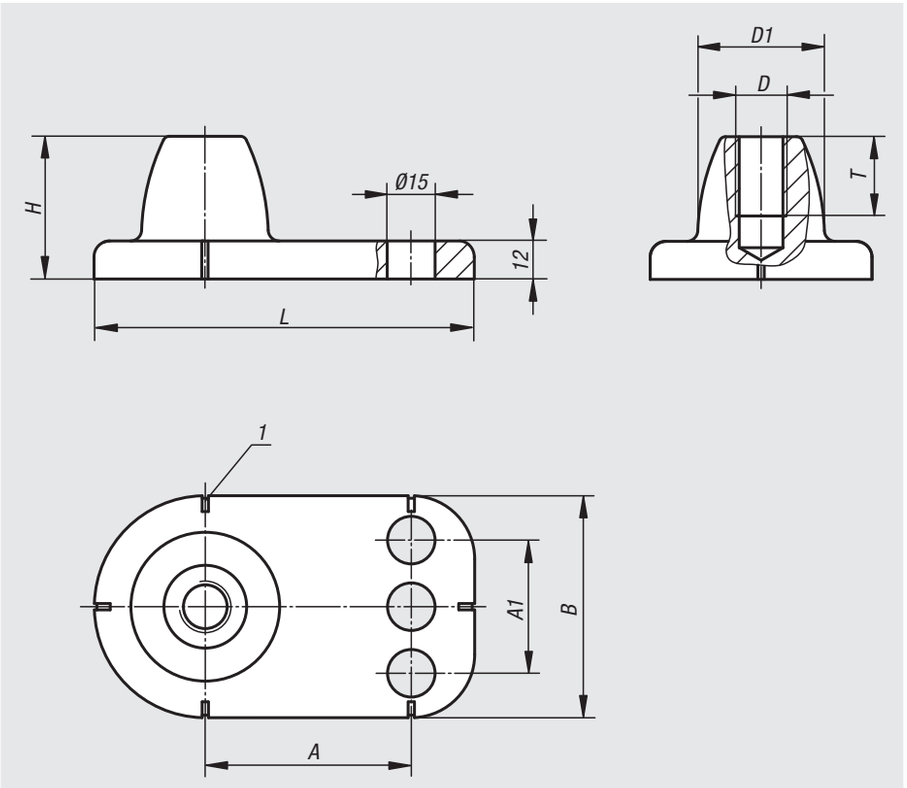
Note for ordering:
If the threaded spindle and the levelling foot plate are to be supplied assembled, please add the suffix **"assembled"** to the order number for the spindle and plate. (e.g. 27832-080251 and 27830-10301 **assembled**.)

Note:
ECO levelling feet consist of a threaded spindle and a plate. Any threaded spindle can be combined with any plate.

Order No. steel	Order No. stainless steel	D1	L	L1	SW	Load rating max. kN
27832-080251	**27832-080252**	M8	25	29,5	13	3,5
27832-080401	**27832-080402**	M8	40	44,5	13	3,5
27832-080501	**27832-080502**	M8	50	54,5	13	3,5
27832-080701	**27832-080702**	M8	70	74,5	13	3,5
27832-080801	**27832-080802**	M8	80	84,5	13	3,5
27832-081001	**27832-081002**	M8	100	104,5	13	3,5
27832-081201	**27832-081202**	M8	120	124,5	13	3,5
27832-100251	**27832-100252**	M10	25	30	17	4,7
27832-100401	**27832-100402**	M10	40	45	17	4,7
27832-100501	**27832-100502**	M10	50	55	17	4,7
27832-100701	**27832-100702**	M10	70	75	17	4,7
27832-100801	**27832-100802**	M10	80	85	17	4,7
27832-101001	**27832-101002**	M10	100	105	17	4,7
27832-101201	**27832-101202**	M10	120	125	17	4,7
27832-120251	**27832-120252**	M12	25	31	19	7,7
27832-120401	**27832-120402**	M12	40	46	19	7,7
27832-120501	**27832-120502**	M12	50	56	19	7,7
27832-120701	**27832-120702**	M12	70	76	19	7,7
27832-120801	**27832-120802**	M12	80	86	19	7,7
27832-121001	**27832-121002**	M12	100	106	19	7,7
27832-121201	**27832-121202**	M12	120	126	19	7,7
27832-160501	**27832-160502**	M16	50	58,5	24	14,5
27832-161001	**27832-161002**	M16	100	108,5	24	14,5
27832-161501	**27832-161502**	M16	150	158,5	24	14,5

Ducks feet





Material:
Die-cast aluminium.

Version:
Bright, vibratory ground.

Sample order:
nlm 27833-161

Note:
Stabile levelling foot which is ideally suited for conveyor units. With aligning markings to precisely position the ducks feet.

Accessories:
Matching threaded rods 07640.

Drawing reference:
1) alignment marks

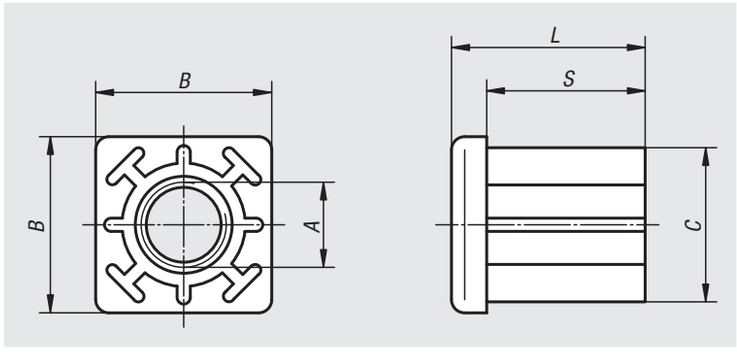


Order No.	A	A1	B	D	D1	H	L	T	Load capacity N
27833-161	65	-	70	M16	40	45	119,5	25	4000
27833-201	75	55	90	M20	52	50	139,5	27,5	6000

Tube inserts square

with tapped bush





Material:
Body fibreglass reinforced thermoplastic.
Threaded insert brass.

Version:
Insert black.
Tapped bush nickel-plated.

Sample order:
nlm 27835-103015

Note:
Threaded square inserts for attaching levelling feet, swivel feet and castors to square tubes.



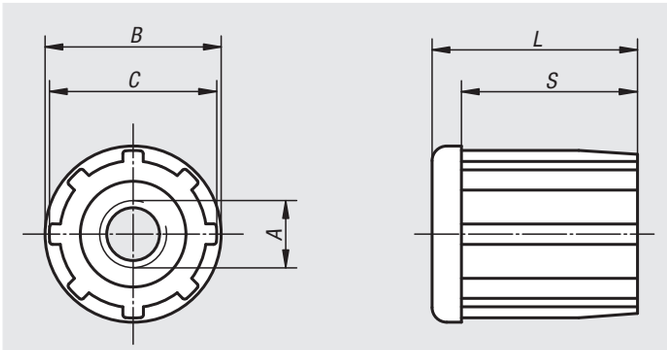
Order No.	A	B	C	L	S	Suitable for square tubes	Load rating max. kN
27835-103015	M10	30	27,5	33	27	30 x 1,5	5
27835-123015	M12	30	27,5	33	27	30 x 1,5	5
27835-143015	M14	30	27,5	33	27	30 x 1,5	5
27835-163015	M16	30	27,5	33	27	30 x 1,5	5
27835-103020	M10	30	26,5	33	27	30 x 2	5
27835-123020	M12	30	26,5	33	27	30 x 2	5
27835-143020	M14	30	26,5	33	27	30 x 2	5
27835-163020	M16	30	26,5	33	27	30 x 2	5
27835-104015	M10	40	37,5	43	35	40 x 1,5	8
27835-124015	M12	40	37,5	43	35	40 x 1,5	8
27835-144015	M14	40	37,5	43	35	40 x 1,5	8
27835-164015	M16	40	37,5	43	35	40 x 1,5	8
27835-204015	M20	40	37,5	43	35	40 x 1,5	8
27835-104020	M10	40	36,5	43	35	40 x 2	10
27835-124020	M12	40	36,5	43	35	40 x 2	10
27835-144020	M14	40	36,5	43	35	40 x 2	10
27835-164020	M16	40	36,5	43	35	40 x 2	10
27835-204020	M20	40	36,5	43	35	40 x 2	10
27835-104025	M10	40	35,5	43	35	40 x 2,5	10
27835-124025	M12	40	35,5	43	35	40 x 2,5	10
27835-144025	M14	40	35,5	43	35	40 x 2,5	10
27835-164025	M16	40	35,5	43	35	40 x 2,5	10
27835-204025	M20	40	35,5	43	35	40 x 2,5	10
27835-104030	M10	40	34,5	43	35	40 x 3	10
27835-124030	M12	40	34,5	43	35	40 x 3	10
27835-144030	M14	40	34,5	43	35	40 x 3	10
27835-164030	M16	40	34,5	43	35	40 x 3	10
27835-204030	M20	40	34,5	43	35	40 x 3	10
27835-104040	M10	40	32,5	43	35	40 x 4	10
27835-124040	M12	40	32,5	43	35	40 x 4	10
27835-144040	M14	40	32,5	43	35	40 x 4	10

Order No.	A	B	C	L	S	Suitable for square tubes	Load rating max. kN
27835-164040	M16	40	32,5	43	35	40 x 4	10
27835-204040	M20	40	32,5	43	35	40 x 4	10
27835-125015	M12	50	47,5	55	44	50 x 1,5	8
27835-145015	M14	50	47,5	55	44	50 x 1,5	8
27835-165015	M16	50	47,5	55	44	50 x 1,5	8
27835-205015	M20	50	47,5	55	44	50 x 1,5	8
27835-125020	M12	50	46,5	55	44	50 x 2	12
27835-145020	M14	50	46,5	55	44	50 x 2	12
27835-165020	M16	50	46,5	55	44	50 x 2	12
27835-205020	M20	50	46,5	55	44	50 x 2	12
27835-125025	M12	50	45,5	55	44	50 x 2,5	12
27835-145025	M14	50	45,5	55	44	50 x 2,5	12
27835-165025	M16	50	45,5	55	44	50 x 2,5	12
27835-205025	M20	50	45,5	55	44	50 x 2,5	12
27835-125030	M12	50	44,5	55	44	50 x 3	12
27835-145030	M14	50	44,5	55	44	50 x 3	12
27835-165030	M16	50	44,5	55	44	50 x 3	12
27835-205030	M20	50	44,5	55	44	50 x 3	12
27835-125040	M12	50	42,5	55	44	50 x 4	12
27835-145040	M14	50	42,5	55	44	50 x 4	12
27835-165040	M16	50	42,5	55	44	50 x 4	12
27835-205040	M20	50	42,5	55	44	50 x 4	12
27835-146020	M14	60	56,5	55	45	60 x 2	12
27835-166020	M16	60	56,5	55	45	60 x 2	12
27835-206020	M20	60	56,5	55	45	60 x 2	12
27835-146030	M14	60	54,5	55	45	60 x 3	12
27835-166030	M16	60	54,5	55	45	60 x 3	12
27835-206030	M20	60	54,5	55	45	60 x 3	12
27835-146040	M14	60	52,5	55	45	60 x 4	12
27835-166040	M16	60	52,5	55	45	60 x 4	12
27835-206040	M20	60	52,5	55	45	60 x 4	12

Tube inserts round

with tapped bush





Material:
Body fibreglass reinforced thermoplastic.
Threaded insert brass.

Version:
Insert black.
Tapped bush nickel-plated.

Sample order:
nlm 27836-103010

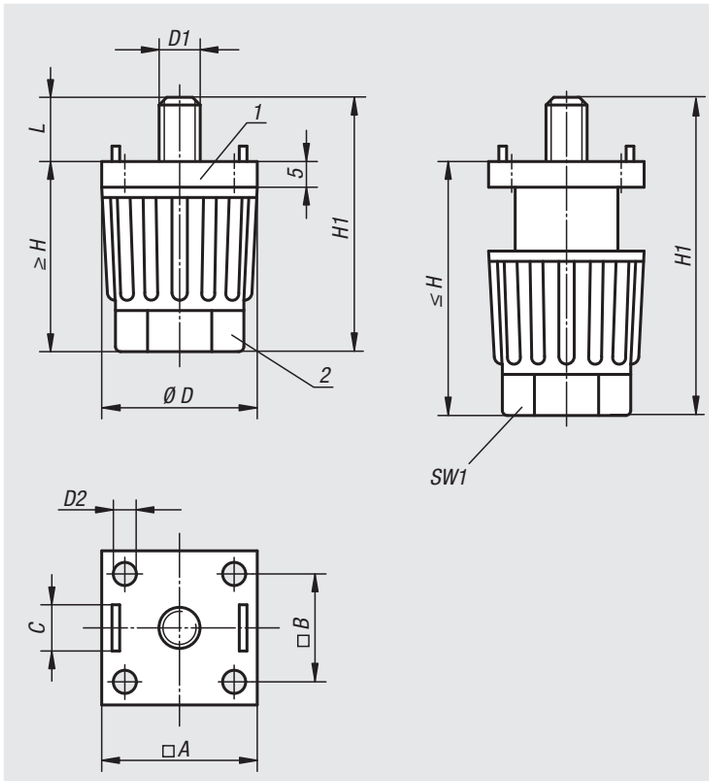
Note:
Threaded square inserts for attaching levelling feet, swivel feet and castors to round tubes.

Order No.	A	B	C	L	S	Suitable for tubes	Load rating max. kN
27836-103010	M10	30	28,4	33	27	Ø 30 x 1	5
27836-123010	M12	30	28,4	33	27	Ø 30 x 1	5
27836-143010	M14	30	28,4	33	27	Ø 30 x 1	5
27836-163010	M16	30	28,4	33	27	Ø 30 x 1	5
27836-103815	M10	38	35,5	43	35	Ø 38 x 1,5	5
27836-123815	M12	38	35,5	43	35	Ø 38 x 1,5	5
27836-143815	M14	38	35,5	43	35	Ø 38 x 1,5	5
27836-163815	M16	38	35,5	43	35	Ø 38 x 1,5	5
27836-104215	M10	42	39,9	43	35	Ø 42,4 x 1,5	6
27836-124215	M12	42	39,9	43	35	Ø 42,4 x 1,5	6
27836-144215	M14	42	39,9	43	35	Ø 42,4 x 1,5	6
27836-164215	M16	42	39,9	43	35	Ø 42,4 x 1,5	6
27836-204215	M20	42	39,9	43	35	Ø 42,4 x 1,5	6
27836-124815	M12	48	45,8	55	44	Ø 48,3 x 1,5	6
27836-144815	M14	48	45,8	55	44	Ø 48,3 x 1,5	6
27836-164815	M16	48	45,8	55	44	Ø 48,3 x 1,5	6
27836-204815	M20	48	45,8	55	44	Ø 48,3 x 1,5	6
27836-125015	M12	50	48,4	55	44	Ø 50,9 x 1,5	6
27836-145015	M14	50	48,4	55	44	Ø 50,9 x 1,5	6
27836-165015	M16	50	48,4	55	44	Ø 50,9 x 1,5	6
27836-205015	M20	50	48,4	55	44	Ø 50,9 x 1,5	6

Levelling feet

for aluminium profiles





Material:
Body fibreglass reinforced thermoplastic.
Spindle and washer steel.

Version:
Body black.
Spindle and washer electro zinc-plated.

Sample order:
nlm 27840-300806

Note:
These levelling feet are suitable for tables and lighter installations. The foot height is adjusted by turning the base nut by hand or spanner. The pins on the top flange centre the foot and prevent it turning. These levelling feet can be attached to aluminium profiles using T-slot nuts, no need for drilling.

Drawing reference:
1) support flange
2) nut

Side mounted in profile keyway
no drilling required when using a T-slot nut



Profile end mounted



Order No.	A for aluminium profile	B	C for slot	D	D1	D2 for countersunk screw	H	H1	L	SW1	Load rating max. kN (static load only)
27840-300806	30	20,5	8	30	M6	M4	35-50	44-59	9	22	1,5
27840-300808	30	20,5	8	30	M8	M4	35-50	44-59	9	22	1,5
27840-301006	30	20,5	10	30	M6	M4	35-50	44-59	9	22	1,5
27840-400808	40	28	8	40	M8	M6	45-65	54-74	9	30	1,5
27840-401006	40	28	10	40	M6	M6	45-65	54-74	9	30	1,5
27840-401008	40	28	10	40	M8	M6	45-65	54-74	9	30	1,5

Levelling feet



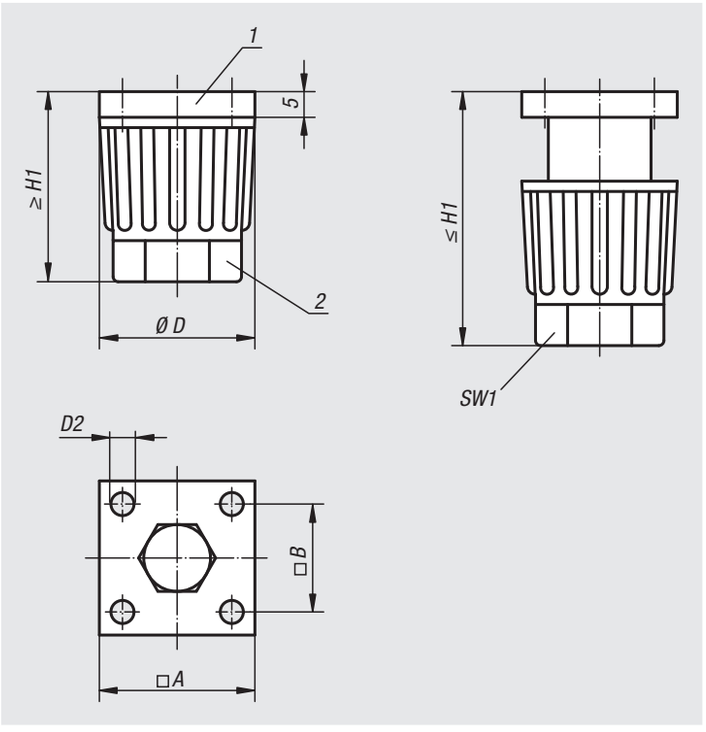
Material:
Body fibreglass reinforced thermoplastic.
Hexagon head screw steel.

Version:
Body black.
Hexagon head screw electro zinc-plated.

Sample order:
nlm 27841-3004

Note:
The flat top flange and sunken screw head make these levelling feet ideal for mounting on smooth surfaces.
The foot height is adjusted by turning the base nut by hand or spanner.

Drawing reference:
1) support flange
2) nut



Order No.	A	B	D	D2 for countersunk screw	H1	SW1	Load rating max. kN (static load only)
27841-3004	30	20,5	30	M4	35-50	22	1,5
27841-4006	40	28	40	M6	45-65	30	1,5

Technical information
Hinges

Hinges
We have listed a wide range of hinges on the following pages. Many more combinations are possible where hinges with guide tabs are required i.e. when combining aluminium profiles with different slot widths.

Guide tabs
Many hinges can be supplied on request with guide tabs for the slots of aluminium profiles. They secure the hinge against twisting and make it stronger. The hinges are designed in such a way that the guide tabs can simply be broken out with a screwdriver.



without
guide tabs



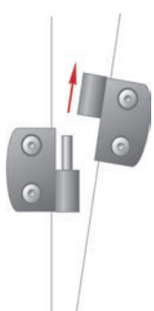


with
guide tabs
for aluminium
profiles with slot

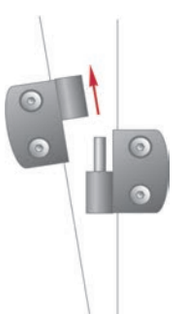


Left and right hinge
Each lift-off hinge has a left and right version. Before ordering it should be known on which side the door or hatch is to be mounted.

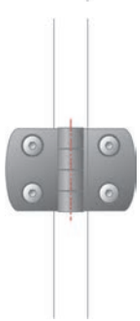
Left hinge.
The left hinge half is fixed.
The hatch or door opens from right to left.



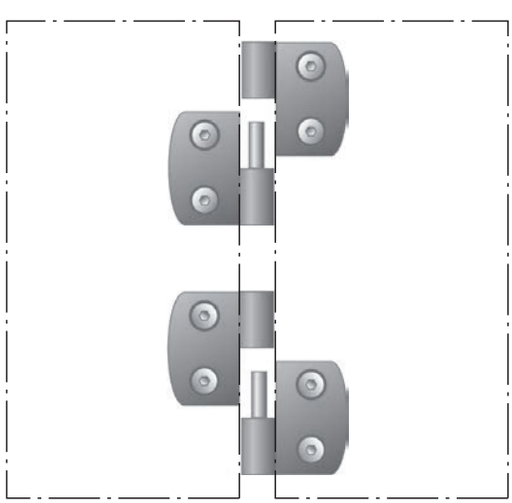
Right hinge.
The right hinge half is fixed.
The hatch or door opens from left to right.



Fixed hinge.
The hinge is non-liftoff.
It is suitable for opening left or right.



Tip
If you want to fit a door or hatch so that it cannot be lifted off, you can still use a left and right lift-off hinge. The two hinges are fitted in the end position and secure each other mutually.



Hinges

plastic, lift-off, left

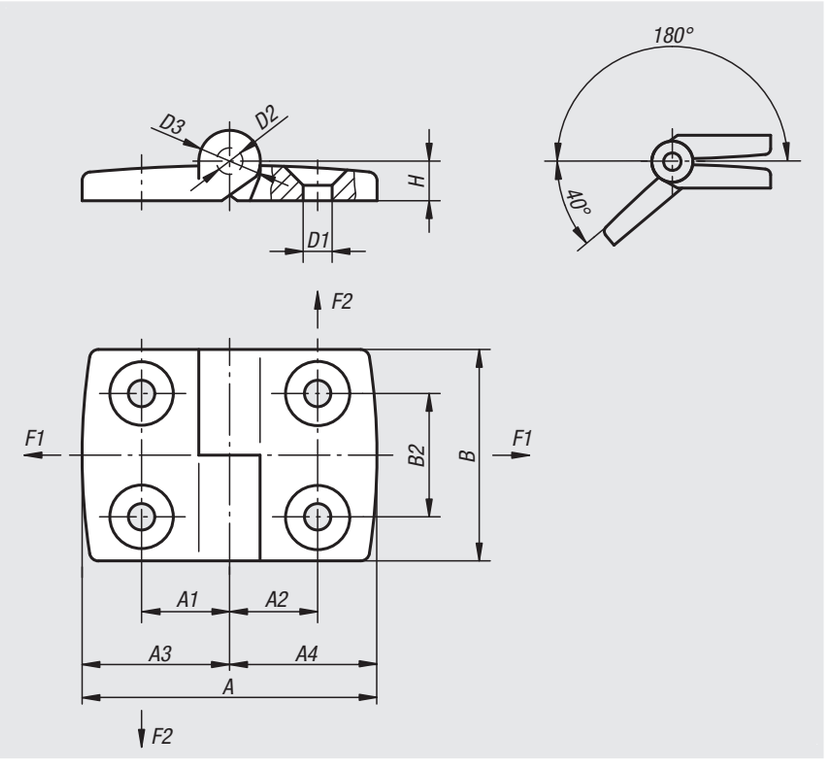


Material:
Fibreglass reinforced thermoplastic.
Hinge pin stainless steel.

Version:
Hinge black. Pin bright.

Sample order:
nlm 27850-1301825

Note:
All hinges can be supplied on request with guide tabs for the slots of aluminium profiles (slots 6, 8 and 10). They facilitate mounting, secure the hinge against twisting and make it stronger.



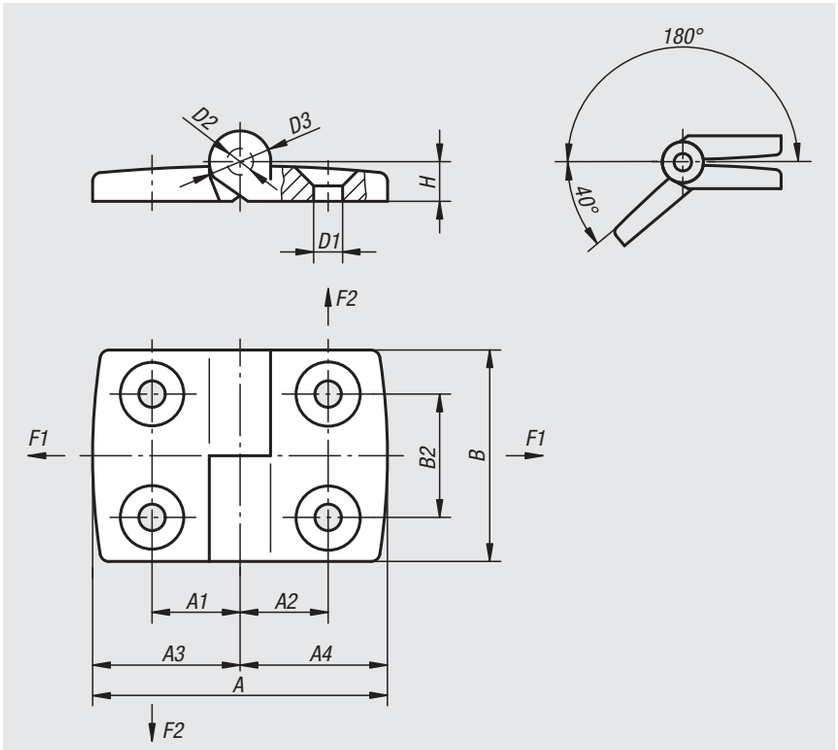
Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 max. kN	F2 max. kN
27850-1251515	52	15	15	26	26	48	28	6,6	6	14	9	0,625	0,425
27850-1251518	55,5	15	17,5	26	29,5	48	28	6,6	6	14	9	0,7	0,5
27850-1251520	61,5	15	20	26	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-1251523	64,5	15	22,5	26	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1251525	69,5	15	25	26	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-1251528	74,5	15	27,5	26	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-1251533	83,5	15	32,5	26	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-1301815	55,5	17,5	15	29,5	26	48	28	6,6	6	14	9	0,75	0,45
27850-1301818	59	17,5	17,5	29,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1301820	65	17,5	20	29,5	35,5	48	28	6,6	6	14	9	0,75	0,4
27850-1301823	68	17,5	22,5	29,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1301825	73	17,5	25	29,5	43,5	48	28	6,6	6	14	9	0,8	0,35
27850-1301828	78	17,5	27,5	29,5	48,5	48	28	6,6	6	14	9	0,8	0,35
27850-1301833	87	17,5	32,5	29,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-1352015	61,5	20	15	35,5	26	48	28	6,6	6	14	9	0,75	0,4
27850-1352018	65	20	17,5	35,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1352020	71	20	20	35,5	35,5	48	28	6,6	6	14	9	0,75	0,4
27850-1352023	74	20	22,5	35,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1352025	79	20	25	35,5	43,5	48	28	6,6	6	14	9	0,8	0,35
27850-1352028	84	20	27,5	35,5	48,5	48	28	6,6	6	14	9	0,9	0,35
27850-1352033	93	20	32,5	35,5	57,5	48	28	6,6	6	14	9	0,8	0,24

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 max. kN	F2 max. kN
27850-1402315	64,5	22,5	15	38,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-1402318	68	22,5	17,5	38,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1402320	74	22,5	20	38,5	35,5	48	28	6,6	6	14	9	0,75	0,4
27850-1402323	77	22,5	22,5	38,5	38,5	48	28	6,6	6	14	9	0,8	0,4
27850-1402328	87	22,5	27,5	38,5	48,5	48	28	6,6	6	14	9	0,8	0,35
27850-1402333	96	22,5	32,5	38,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-1452515	69,5	25	15	43,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-1452518	73	25	17,5	43,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1452520	79	25	20	43,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-1452523	82	25	22,5	43,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1452525	87	25	25	43,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-1452528	92	25	27,5	43,5	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-1452533	101	25	32,5	43,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-1502815	74,5	27,5	15	48,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-1502818	78	27,5	17,5	48,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1502820	84	27,5	20	48,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-1502823	87	27,5	22,5	48,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1502825	92	27,5	25	48,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-1502828	97	27,5	27,5	48,5	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-1502833	106	27,5	32,5	48,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-1603315	83,5	32,5	15	57,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-1603318	87	32,5	17,5	57,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-1603320	93	32,5	20	57,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-1603323	96	32,5	22,5	57,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-1603325	101	32,5	25	57,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-1603328	106	32,5	27,5	57,5	48,5	48	28	6,6	6	14	9	0,9	0,32
27850-1603333	115	32,5	32,5	57,5	57,5	48	28	6,6	6	14	9	0,9	0,24

Hinges

plastic, lift-off, right





Material:
Fibreglass reinforced thermoplastic.
Hinge pin stainless steel.

Version:
Hinge black. Pin bright.

Sample order:
nlm 27850-2251523

Note:
All hinges can be supplied on request with guide tabs for the slots of aluminium profiles (slots 6, 8 and 10). They facilitate mounting, secure the hinge against twisting and make it stronger.

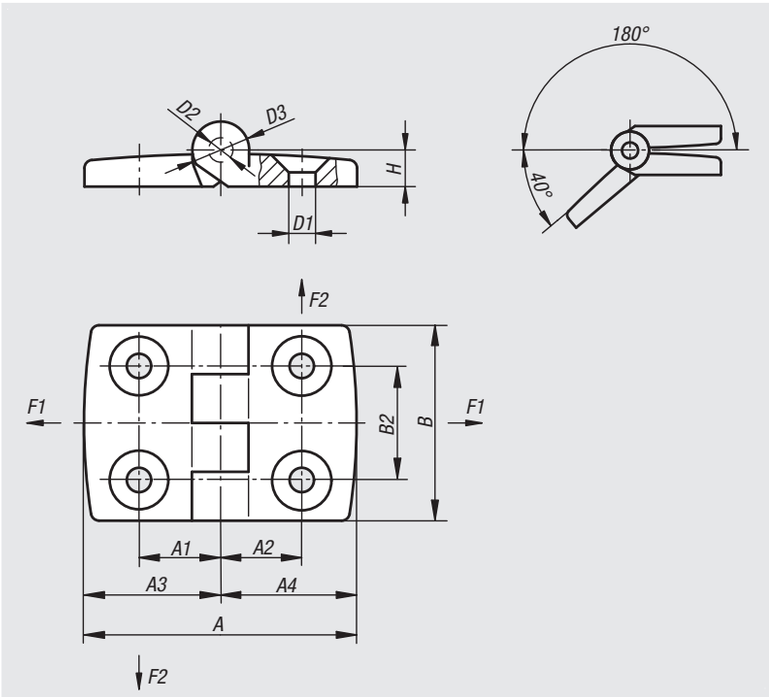
Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 max. kN	F2 max. kN
27850-2251515	52	15	15	26	26	48	28	6,6	6	14	9	0,625	0,425
27850-2251518	55,5	15	17,5	26	29,5	48	28	6,6	6	14	9	0,7	0,5
27850-2251520	61,5	15	20	26	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-2251523	64,5	15	22,5	26	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2251525	69,5	15	25	26	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-2251528	74,5	15	27,5	26	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-2251533	83,5	15	32,5	26	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2301815	55,5	17,5	15	29,5	26	48	28	6,6	6	14	9	0,75	0,45
27850-2301818	59	17,5	17,5	29,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2301820	65	17,5	20	29,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-2301823	68	17,5	22,5	29,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2301825	73	17,5	25	29,5	43,5	48	28	6,6	6	14	9	0,8	0,35
27850-2301828	78	17,5	27,5	29,5	48,5	48	28	6,6	6	14	9	0,8	0,35
27850-2301833	87	17,5	32,5	29,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2352015	61,5	20	15	35,5	26	48	28	6,6	6	14	9	0,7	0,4
27850-2352018	65	20	17,5	35,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2352020	71	20	20	35,5	35,5	48	28	6,6	6	14	9	0,75	0,4
27850-2352023	74	20	22,5	35,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2352025	79	20	25	35,5	43,5	48	28	6,6	6	14	9	0,8	0,35
27850-2352028	84	20	27,5	35,5	48,5	48	28	6,6	6	14	9	0,8	0,35
27850-2352033	93	20	32,5	35,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2402315	64,5	22,5	15	38,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-2402318	68	22,5	17,5	38,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2402320	74	22,5	20	38,5	35,5	48	28	6,6	6	14	9	0,75	0,4
27850-2402323	77	22,5	22,5	38,5	38,5	48	28	6,6	6	14	9	0,8	0,35

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 max. kN	F2 max. kN
27850-2402325	82	22,5	25	38,5	43,5	48	28	6,6	6	14	9	0,8	0,35
27850-2402328	87	22,5	27,5	38,5	48,5	48	28	6,6	6	14	9	0,8	0,35
27850-2402333	96	22,5	32,5	38,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2452515	69,5	25	15	43,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-2452518	73	25	17,5	43,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2452520	79	25	20	43,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-2452523	82	25	22,5	43,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2452525	87	25	25	43,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-2452528	92	25	27,5	43,5	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-2452533	101	25	32,5	43,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2502815	74,5	27,5	15	48,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-2502818	78	27,5	17,5	48,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2502820	84	27,5	20	48,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-2502823	87	27,5	22,5	48,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2502825	92	27,5	25	48,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-2502828	97	27,5	27,5	48,5	48,5	48	28	6,6	6	14	9	0,8	0,32
27850-2502833	106	27,5	32,5	48,5	57,5	48	28	6,6	6	14	9	0,8	0,24
27850-2603315	83,5	32,5	15	57,5	26	48	28	6,6	6	14	9	0,65	0,425
27850-2603318	87	32,5	17,5	57,5	29,5	48	28	6,6	6	14	9	0,75	0,5
27850-2603320	93	32,5	20	57,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27850-2603323	96	32,5	22,5	57,5	38,5	48	28	6,6	6	14	9	0,8	0,35
27850-2603325	101	32,5	25	57,5	43,5	48	28	6,6	6	14	9	0,8	0,325
27850-2603328	106	32,5	27,5	57,5	48,5	48	28	6,6	6	14	9	0,9	0,32
27850-2603333	115	32,5	32,5	57,5	57,5	48	28	6,6	6	14	9	0,9	0,24

Hinges

plastic





Material:
Fibreglass reinforced thermoplastic.
Hinge pin stainless steel.

Version:
Hinge black. Pin bright.

Sample order:
nlm 27852-251528

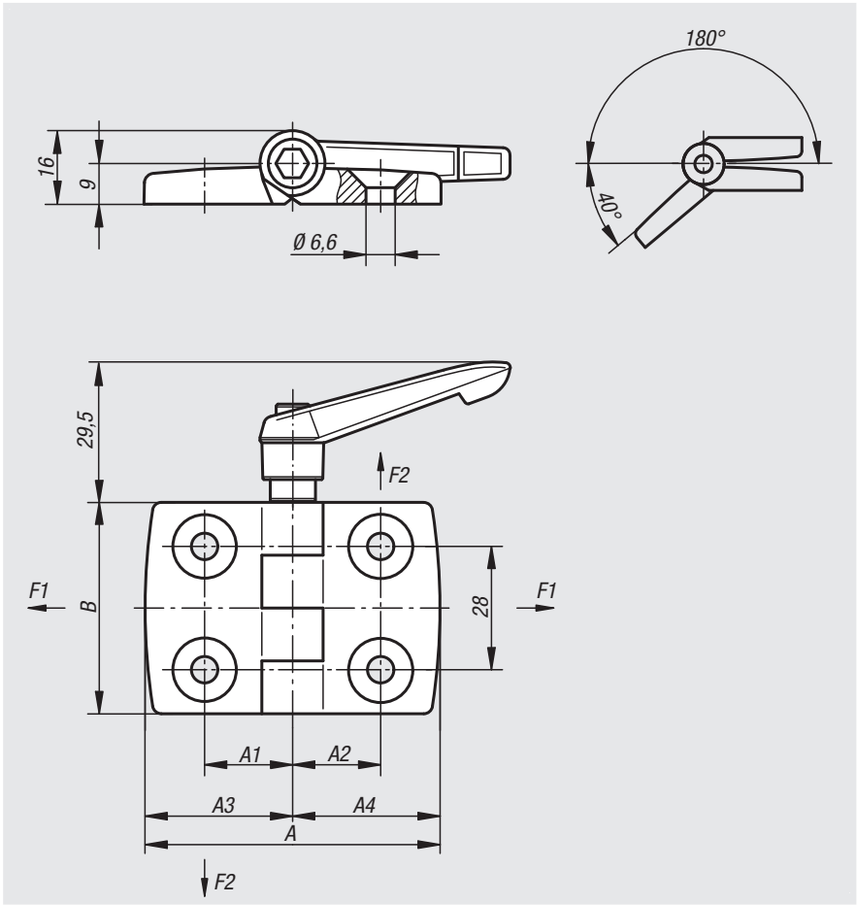
Note:
Unequal leaf hinges can be mounted left or right.
All hinges can be supplied on request with guide tabs for the slots of aluminium profiles (slots 6, 8 and 10). They facilitate mounting, secure the hinge against twisting and make it stronger.

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 max. kN	F2 max. kN
27852-201212	39	11,5	11,5	19,5	19,5	30	14	4,2	3	8	5,5	0,4	0,2
27852-251515	52	15	15	26	26	48	28	6,6	6	14	9	0,625	0,425
27852-251518	55,5	15	17,5	26	29,5	48	28	6,6	6	14	9	0,7	0,5
27852-251520	61,5	15	20	26	35,5	48	28	6,6	6	14	9	0,7	0,4
27852-251523	64,5	15	22,5	26	38,5	48	28	6,6	6	14	9	0,8	0,35
27852-251525	69,5	15	25	26	43,5	48	28	6,6	6	14	9	0,8	0,325
27852-251528	74,5	15	27,5	26	48,5	48	28	6,6	6	14	9	0,8	0,32
27852-251533	83,5	15	32,5	26	57,5	48	28	6,6	6	14	9	0,8	0,24
27852-301818	59	17,5	17,5	29,5	29,5	48	28	6,6	6	14	9	0,7	0,4
27852-301820	65	17,5	20	29,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27852-301823	68	17,5	22,5	29,5	38,5	48	28	6,6	6	14	9	0,75	0,45
27852-301825	73	17,5	25	29,5	43,5	48	28	6,6	6	14	9	0,75	0,45
27852-301828	78	17,5	27,5	29,5	48,5	48	28	6,6	6	14	9	0,9	0,425
27852-301833	87	17,5	32,5	29,5	57,5	48	28	6,6	6	14	9	0,85	0,2
27852-352020	71	20	20	35,5	35,5	48	28	6,6	6	14	9	0,7	0,4
27852-352023	74	20	22,5	35,5	38,5	48	28	6,6	6	14	9	0,75	0,45
27852-352025	79	20	25	35,5	43,5	48	28	6,6	6	14	9	0,75	0,45
27852-352028	84	20	27,5	35,5	48,5	48	28	6,6	6	14	9	0,8	0,425
27852-352033	93	20	32,5	35,5	57,5	48	28	6,6	6	14	9	0,8	0,175
27852-402323	77	22,5	22,5	38,5	38,5	48	28	6,6	6	14	9	0,75	0,45
27852-402325	82	22,5	25	38,5	43,5	48	28	6,6	6	14	9	0,75	0,45
27852-402328	87	22,5	27,5	38,5	48,5	48	28	6,6	6	14	9	0,8	0,425
27852-402333	96	22,5	32,5	38,5	57,5	48	28	6,6	6	14	9	0,85	0,175
27852-452525	87	25	25	43,5	43,5	48	28	6,6	6	14	9	0,75	0,45
27852-452528	92	25	27,5	43,5	48,5	48	28	6,6	6	14	9	0,8	0,425
27852-452533	101	25	32,5	43,5	57,5	48	28	6,6	6	14	9	0,85	0,2
27852-502828	97	27,5	27,5	48,5	48,5	48	28	6,6	6	14	9	0,8	0,425
27852-502833	106	27,5	32,5	48,5	57,5	48	28	6,6	6	14	9	0,85	0,2
27852-603333	115	32,5	32,5	57,5	57,5	48	28	6,6	6	14	9	0,85	0,175

Hinges

plastic, with locking lever





Material:
Hinge and lever fibreglass reinforced thermoplastic.
Hinge pin steel.
Mechanism steel.

Version:
Hinge black.
Pin electro zinc-plated.
Locking lever black.
Mechanism black electro zinc-plated.

Sample order:
nlm 27853-251515

Note:
The indexable lever enables the hinge to be locked in any position.

On request:
Hinges with guide tabs (slot 6, 8 and 10) for aluminium profiles.
Unequal leaf combinations.

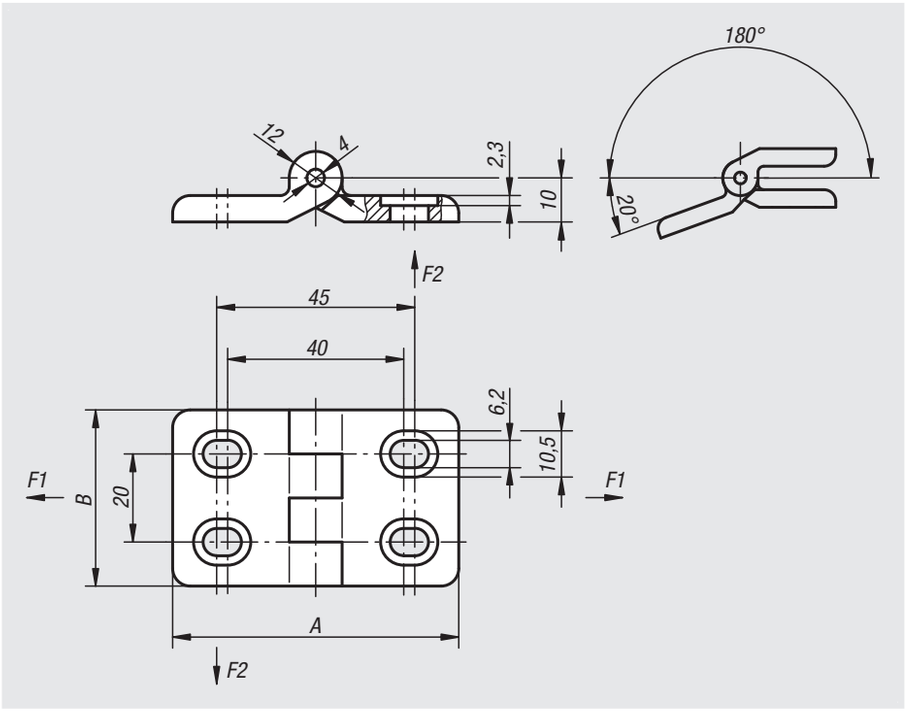


Order No.	A	A1	A2	A3	A4	B	F1 max. kN	F2 max. kN
27853-251515	52	15	15	26	26	48	0,5	0,38
27853-301818	59	17,5	17,5	29,5	29,5	48	0,7	0,4
27853-352020	72	20	20	36	36	48	0,7	0,4
27853-402323	77	22,5	22,5	38,5	38,5	48	0,75	0,45
27853-452525	87	25	25	43,5	43,5	48	0,75	0,45
27853-502828	97	27,5	27,5	48,5	48,5	48	0,8	0,425
27853-603333	115	32,5	32,5	57,5	57,5	48	0,85	0,175

Hinges

plastic, with elongated holes





Material:
Fibreglass reinforced thermoplastic.
Hinge pin stainless steel.

Version:
Hinge black. Pin bright.

Sample order:
nlm 27854-402020

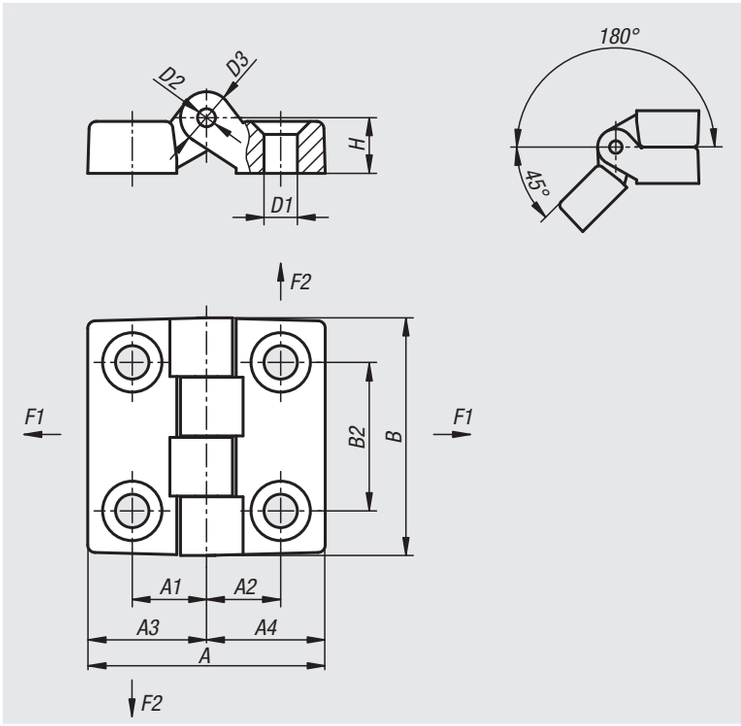
Note:
Elongated holes enable easy horizontal adjustment.

Order No.	A	B	F1 max. kN	F2 max. kN
27854-402020	65	40	0,5	0,3

Hinges

plastic with fastening holes





Material:
Fibreglass reinforced thermoplastic.
Hinge pin steel.

Version:
Hinge black.
Hinge pin electro zinc-plated.

Sample order:
nlm 27855-004161010

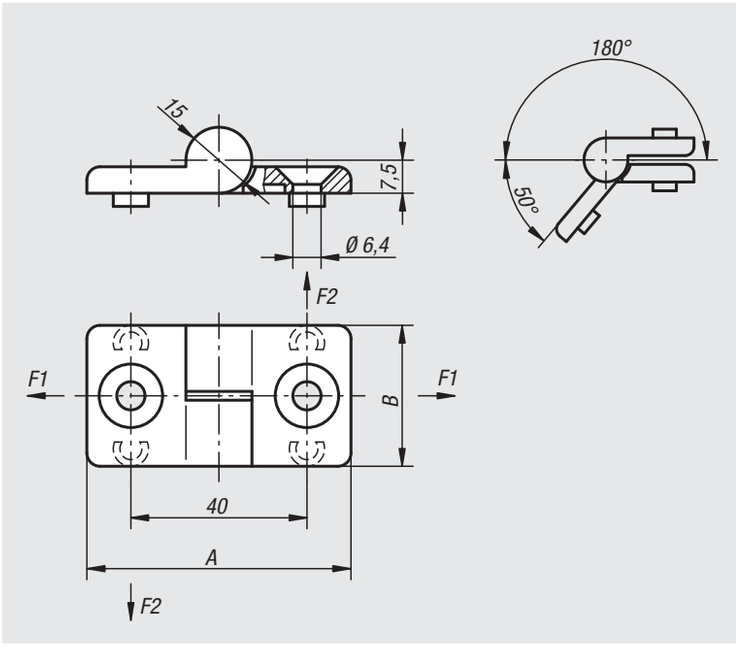
Note:
Hinge with fastening holes
for countersunk screw DIN 7991/UNI 5933.

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	F1 N	F2 N
27855-004161010	32	10	10	16	16	32	20	4,5	3	7	7	1440	490
27855-006241515	48	15	15	24	24	48	30	6,5	5	10	10,5	1960	1470
27855-006322020	64	20	20	32	32	64	40	6,5	5	12	13	2990	1520
27855-008483232	96	31,5	31,5	48	48	96	60	8,5	8	16	16	4300	1810
27855-010483232	96	31,5	31,5	48	48	96	60	10,5	8	16	16	4300	1810

Hinges

plastic, lift-off, with guide tabs





Material:
Fibreglass reinforced thermoplastic.
Hinge pin stainless steel.
Washer thermoplastic.

Version:
Hinge and washer black. Pin bright.

Sample order:
nlm 27856-1322020

Note:
The guide tabs permit the hinges to be mounted in slots (8 mm).

Order No.	Version	A	B	F1 max. kN	F2 max. kN
27856-1322020	left	60	32	0,2	0,1
27856-2322020	right	60	32	0,2	0,1

Hinges

plastic, detent

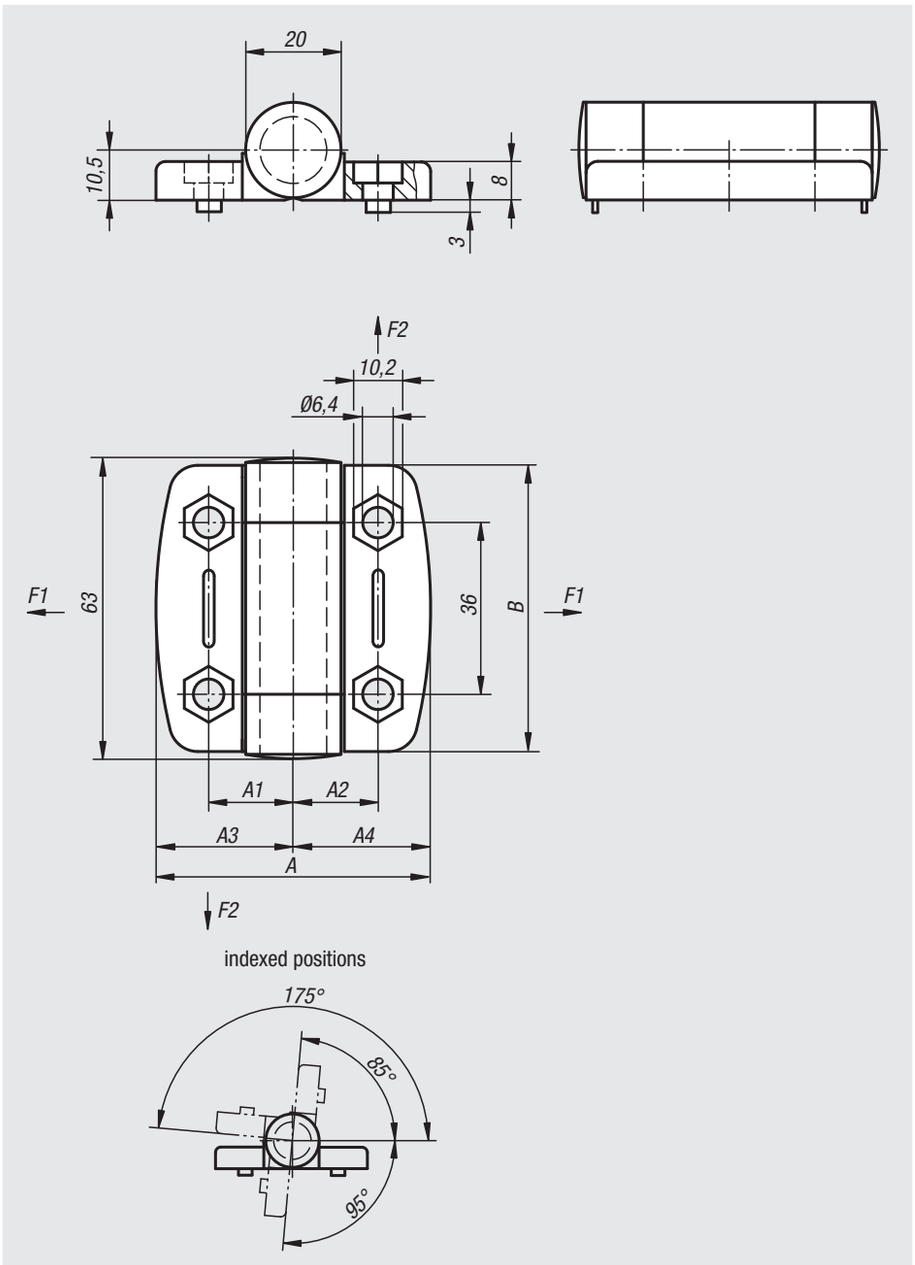


Material:
Hinge and caps fibreglass reinforced PA thermoplastic.
Hinge pin stainless steel.

Version:
Hinge and caps black.
Pin bright.

Sample order:
nlm 27857-56181800

Note:
These hinges have a detent mechanism. This mechanism holds a door or lid open at three different angles or tightly closed. The hinges are available with or without guide tabs for aluminium profile slots. The tabs locate the hinge in the slot and prevent twisting.

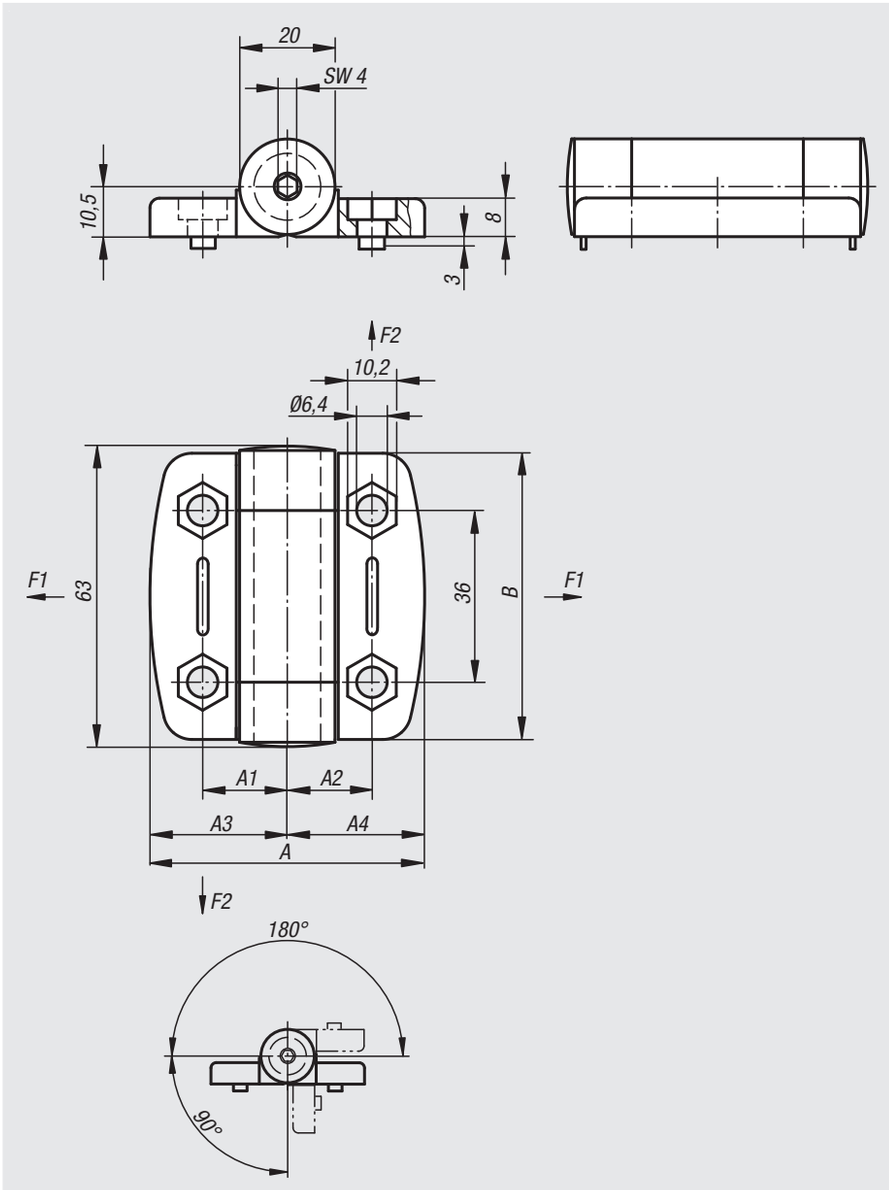


Order No.	A	A1	A2	A3	A4	B	Guide tabs for slot	F1 max. kN	F2 max. kN
27857-56181800	54	17,75	17,75	27	27	56	-	0,4	0,35
27857-56181806	54	17,75	17,75	27	27	56	6	0,4	0,35
27857-56181808	54	17,75	17,75	27	27	56	8	0,4	0,35
27857-56232300	73,5	22,75	22,75	36,75	36,75	56	-	0,6	0,425
27857-56232308	73,5	22,75	22,75	36,75	36,75	56	8	0,6	0,425
27857-56232310	73,5	22,75	22,75	36,75	36,75	56	10	0,6	0,425

Hinges

plastic, with adjustable friction





Material:
Hinge and caps, fibreglass reinforced PA thermoplastic.
Metal parts stainless steel.

Version:
Hinge and caps black.
Metal parts bright.

Sample order:
nlm 27858-56181800

Note:
These friction hinges allow doors or lids to remain open in any position. A set screw allows the amount of friction to be infinitely adjusted between 0-5 Nm. The hinges are available with or without guide tabs for aluminium profile slots. The tabs locate the hinge in the slot and prevent twisting.

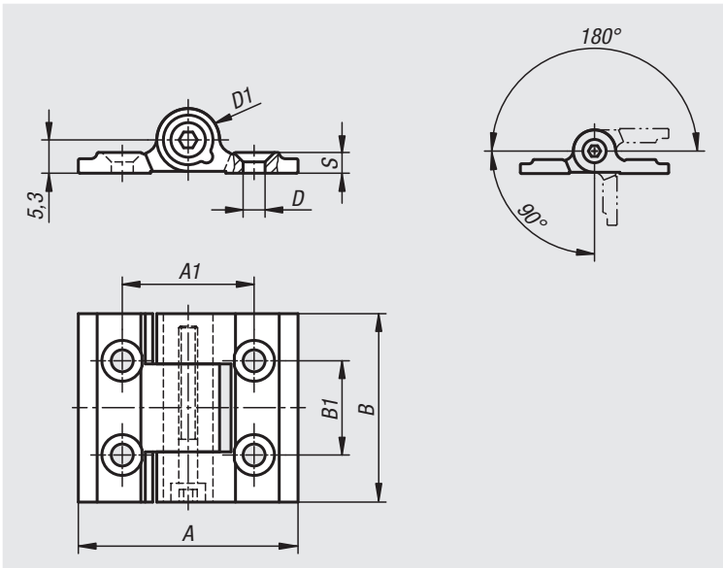


Order No.	A	A1	A2	A3	A4	B	Guide tabs for slot	F1 max. kN	F2 max. kN
27858-56181800	54	17,75	17,75	27	27	56	-	0,4	0,325
27858-56181806	54	17,75	17,75	27	27	56	6	0,4	0,325
27858-56181808	54	17,75	17,75	27	27	56	8	0,4	0,325
27858-56232300	73,5	22,75	22,75	36,75	36,75	56	-	0,6	0,425
27858-56232308	73,5	22,75	22,75	36,75	36,75	56	8	0,6	0,425
27858-56232310	73,5	22,75	22,75	36,75	36,75	56	10	0,6	0,425

Hinges

aluminium, with adjustable friction





Material:
Aluminium 6060 T5.
End caps PA 6.6.
Washers POM.

Version:
Black anodised

Sample order:
nlm 27859-35301

Note:
These friction hinges allow doors to remain open at any desired angle. A set screw allows the amount of friction to be infinitely adjusted between 0–1 Nm. Opening angle 270°.

Max. tensile strength: 2240 N
Max. shear strength: 1050 N

Fastened using DIN 7991 countersunk screws.

Temperature range:
From -20°C to +80°C

Order No.	A	A1	B	B1	D	D1	S
27859-35301	35	21	30	15	3,5	10	3,3

Hinges

aluminium, with adjustable friction



Material:
Aluminium 6060 T5.
Sleeve POM.
Set screw stainless steel.
Washers PA.
Fastening screws steel.

Version:
Black anodised.
Fastening screws electro zinc-plated.

Sample order:
nlm 27860-55651

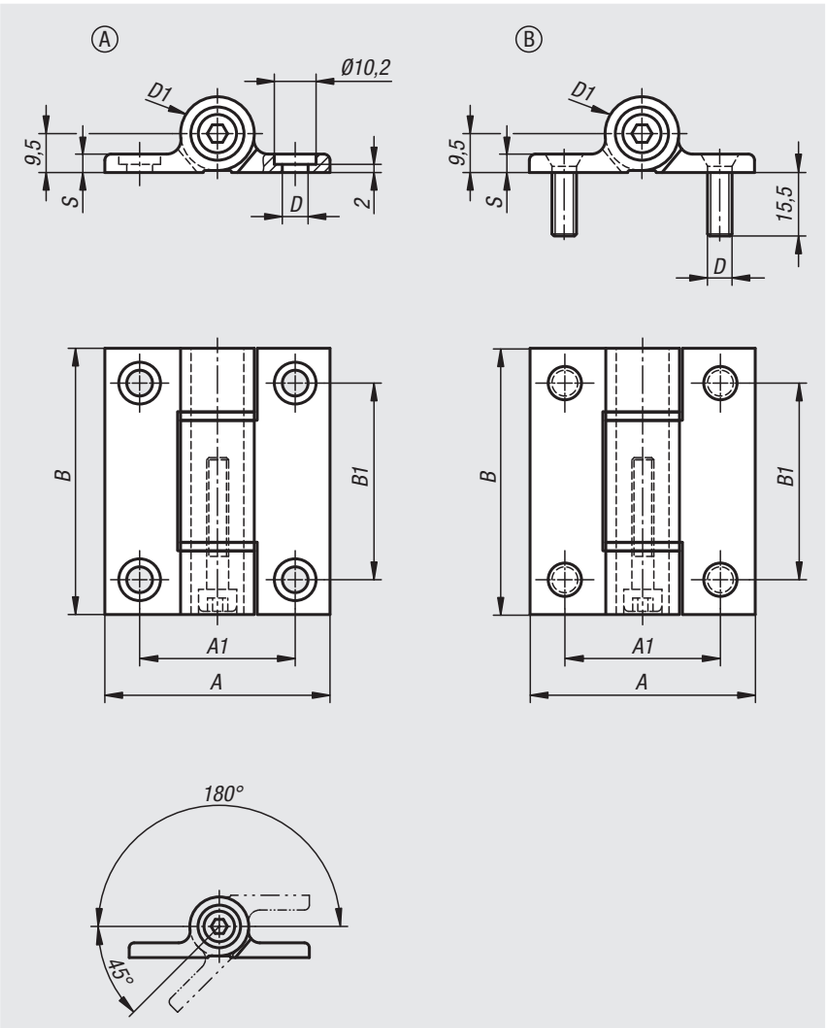
Note:
These friction hinges allow doors to remain open at any desired angle. A set screw allows the amount of friction to be infinitely adjusted between 0–5 Nm.
Opening angle 225°.

Max. tensile strength: 6000 N
Max. shear strength: 5000 N

Temperature range:
From -20°C to +80°C

Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Drawing reference:
Form A: fastened using DIN 912/EN ISO 4762 socket head screws.
Form B: fastened using threaded pins.

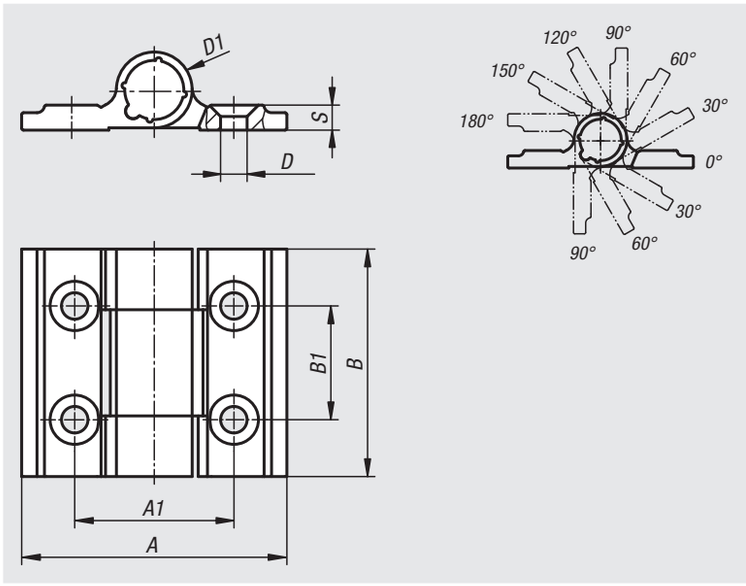


Order No.	Form	A	A1	B	B1	D	D1	S
27860-55651	A	55	38	65	48	6,3	18	4,5
27860-556511	B	55	38	65	48	6,3	18	4,5

Hinges

aluminium, with detent





Material:
Aluminium 6060 T5.
Screws and nuts stainless steel.
Washers PA.

Version:
Black anodised

Sample order:
nlm 27861-35301

Note:
These hinges have a detent mechanism that indexes every 30° from 0° to 270° and holds doors or hatches open or tightly closed.
The detent torque is not adjustable.
Torque tolerance ±20%

Fastened using DIN 7991 countersunk screws.

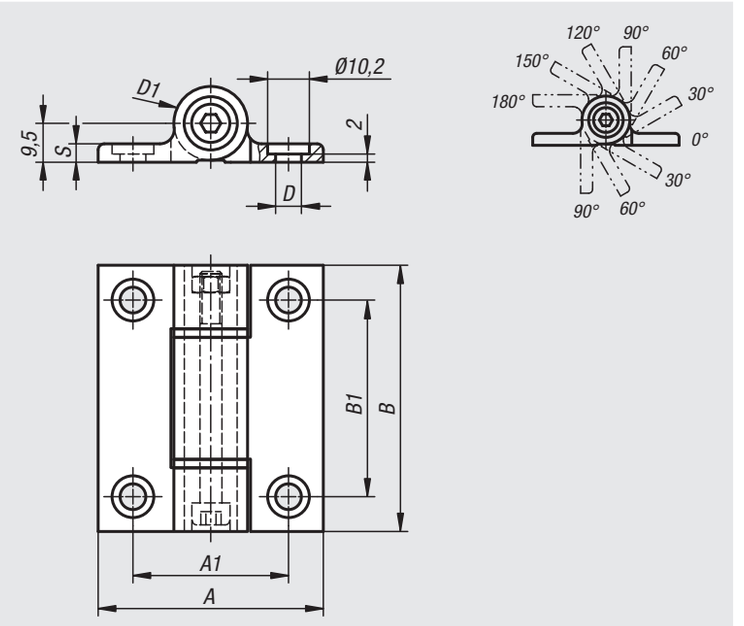
Temperature range:
From -30°C to +70°C

Order No.	A	A1	B	B1	D	D1	S	Max. torque Nm
27861-35301	35	21	30	15	3,5	10	3,3	0,3

Hinges

aluminium, with detent





Material:
Aluminium 6060 T5.
Screws and nuts stainless steel.
Washers PA.

Version:
Black anodised

Sample order:
nlm 27862-556711

Note:
These hinges have a detent mechanism that indexes every 30° from 0° to 270° and holds doors or hatches open or tightly closed.
The detent torque is not adjustable.

The hinges have a more than 30000 cycle service life.
Torque tolerance ±20%

Fastened using DIN 912/EN ISO 4762 socket head screws.

Temperature range:
From -30°C to +70°C

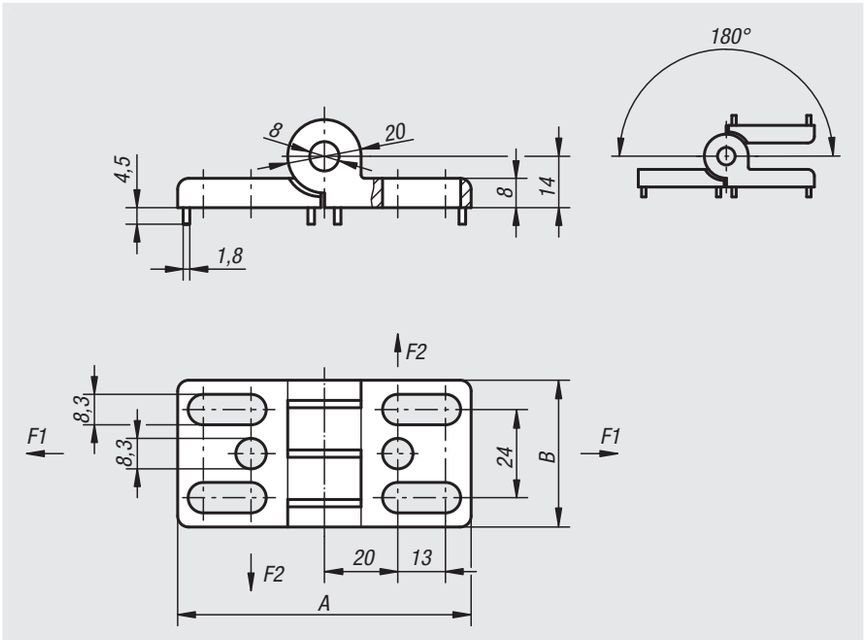
Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Order No.	A	A1	B	B1	D	D1	S	Max. torque Nm
27862-556711	55	38	67	48	6,3	18	4,5	1,8
27862-556712	55	38	67	48	6,3	18	4,5	2,5
27862-556713	55	38	67	48	6,3	18	4,5	3,2
27862-556715	55	38	67	48	6,3	18	4,5	5

Hinges

die-cast zinc, with elongated holes





Material:
Die-cast zinc.
Hinge pin stainless steel.
Washer thermoplastic.

Version:
Hinge black powder-coated.
Pin bright.
Washer black.

Sample order:
nlm 27865-402020

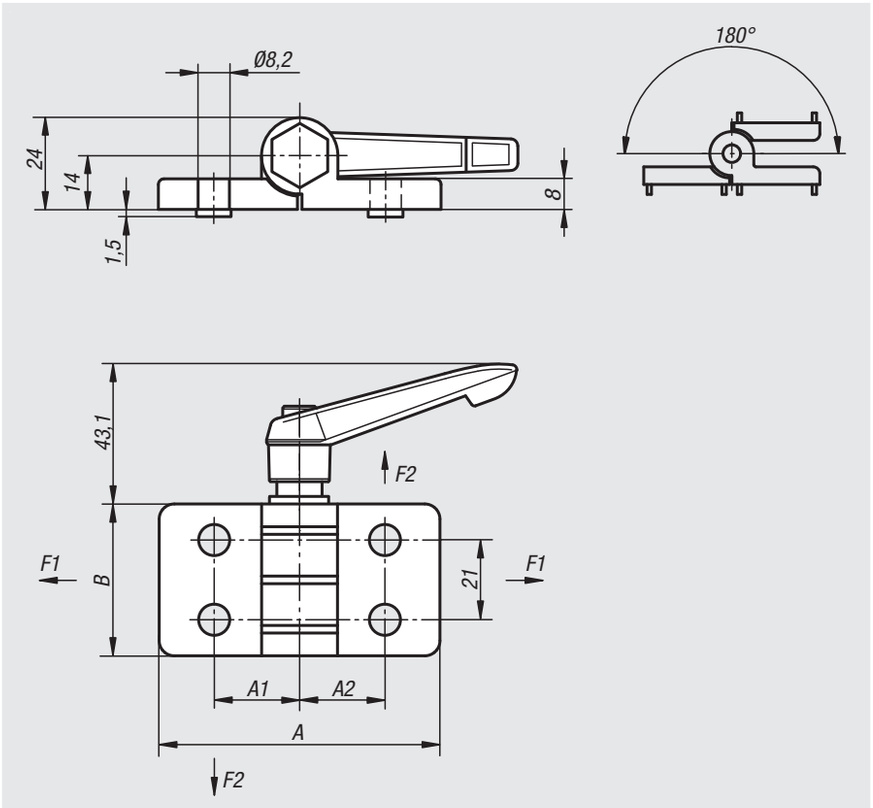
Note:
Elongated holes enable easy horizontal adjustment.

Order No.	A	B	Guide tabs for slot	F1 max. kN	F2 max. kN
27865-402020	80	40	-	1,2	0,5
27865-40202008	80	40	8	1,2	0,5
27865-40202010	80	40	10	1,2	0,5

Hinges

die-cast zinc, with locking lever





Material:
Hinge die-cast zinc.
Hinge pin steel.
Lever fibreglass reinforced thermoplastic.
Mechanism steel.

Version:
Hinge black powder-coated.
Pin electro zinc-plated.
Lever black.
Mechanism black electro zinc-plated.

Sample order:
nlm 27868-40232300

Note:
The indexable lever enables the hinge to be locked in any position.
Available with or without guide tabs for aluminium profile slots. The tabs locate the hinge in the slot and prevent twisting.



Order No.	A	A1	A2	B	Guide tabs for slot	F1 max. kN	F2 max. kN
27868-40232300	74	22,5	22,5	40	-	1,5	0,65
27868-40232308	74	22,5	22,5	40	8	1,5	0,65
27868-40232310	74	22,5	22,5	40	10	1,5	0,65
27868-40232500	74	22,5	25	40	-	1,5	0,65
27868-40232508	74	22,5	25	40	8	1,5	0,65
27868-40232510	74	22,5	25	40	10	1,5	0,65
27868-45252500	74	25	25	40	-	1,5	0,65
27868-45252508	74	25	25	40	8	1,5	0,65
27868-45252510	74	25	25	40	10	1,5	0,65

Hinges

aluminium, lift-off, left



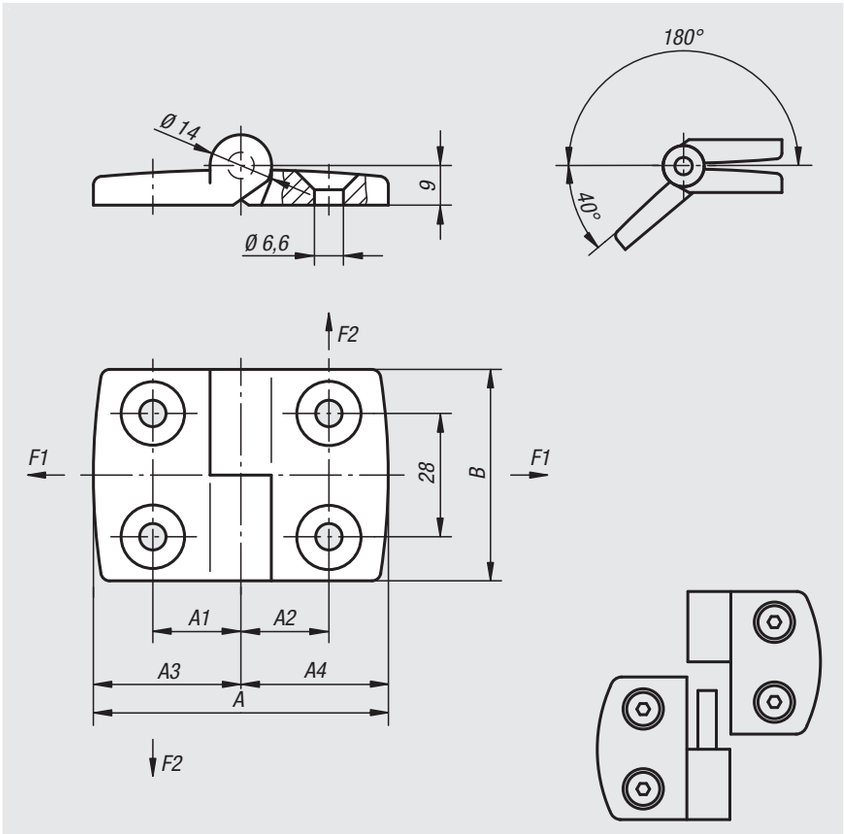
Material:
Die-cast aluminium.
Hinge pin stainless steel.

Version:
Hinge matt nickel-plated.
Pin bright.

Sample order:
nlm 27870-1251515

Note:
Hinges for panel elements and aluminium profiles.
The hinges can be fitted with a plastic spacer ring on the hinge pin.

On request:
Hinges with guide tabs for aluminium profiles (slots 5, 6, 8, 10, 12 and 14).
Unequal leaf combinations.

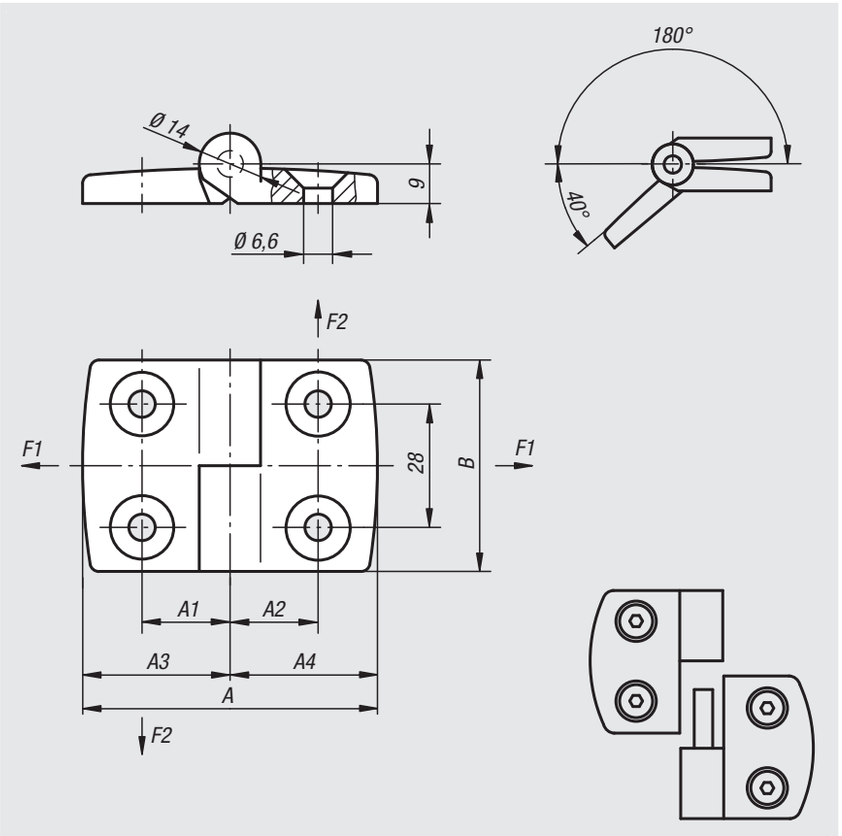


Order No.	A	A1	A2	A3	A4	B	F1 max. kN	F2 max. kN
27870-1251515	52	15	15	26	26	48	0,41	0,25
27870-1301818	59	17,5	17,5	29,5	29,5	48	0,45	0,28
27870-1352020	72	20	20	36	36	48	0,5	0,25
27870-1402323	77	22,5	22,5	38,5	38,5	48	0,55	0,2
27870-1452525	87	25	25	43,5	43,5	48	0,55	0,2
27870-1502828	97	27,5	27,5	48,5	48,5	48	0,55	0,175
27870-1603333	115	32,5	32,5	57,5	57,5	48	0,575	0,15

Hinges

aluminium, lift-off, right





Material:
Die-cast aluminium.
Hinge pin stainless steel.

Version:
Hinge matt nickel-plated.
Pin bright.

Sample order:
nlm 27870-2251515

Note:
Hinges for panel elements and aluminium profiles.
The hinges can be fitted with a plastic spacer ring on the hinge pin.

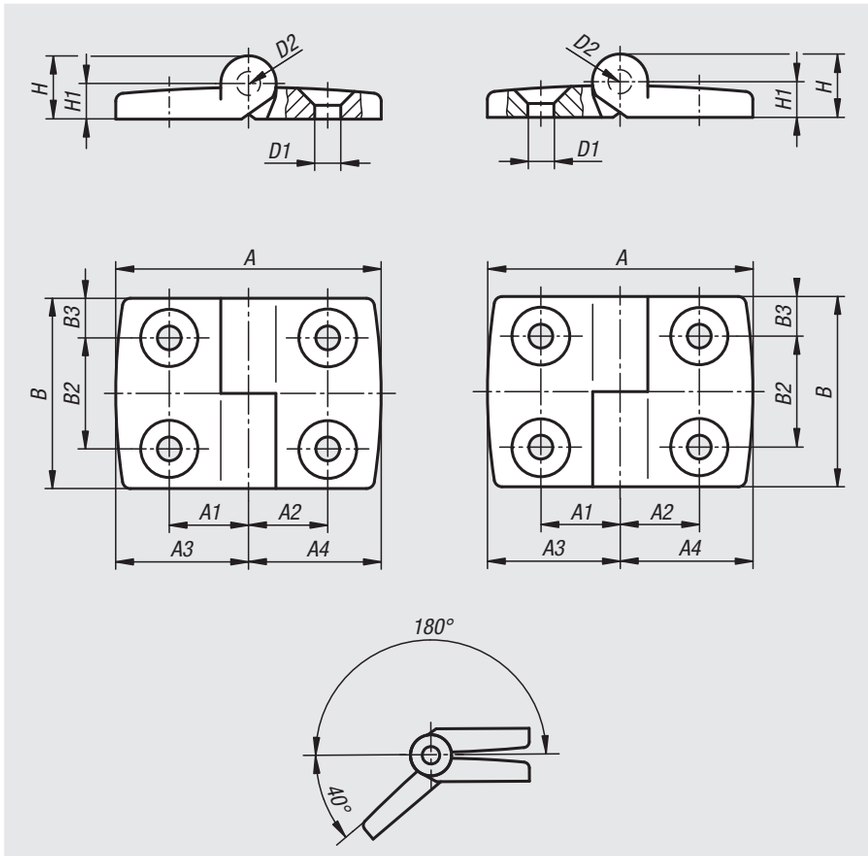
On request:
Hinges with guide tabs for aluminium profiles (slots 5, 6, 8, 10, 12 and 14).
Unequal leaf combinations.

Order No.	A	A1	A2	A3	A4	B	F1 max. kN	F2 max. kN
27870-2251515	52	15	15	26	26	48	0,41	0,25
27870-2301818	59	17,5	17,5	29,5	29,5	48	0,45	0,28
27870-2352020	72	20	20	36	36	48	0,5	0,25
27870-2402323	77	22,5	22,5	38,5	38,5	48	0,55	0,2
27870-2452525	87	25	25	43,5	43,5	48	0,55	0,2
27870-2502828	97	27,5	27,5	48,5	48,5	48	0,55	0,175
27870-2603333	115	32,5	32,5	57,5	57,5	48	0,575	0,15

Hinges lift-off

stainless steel





Material:
Hinge stainless steel 1.4401.
Pin stainless steel 1.4104.

Version:
High-gloss polished.

Sample order:
nlm 27870-01-06261515

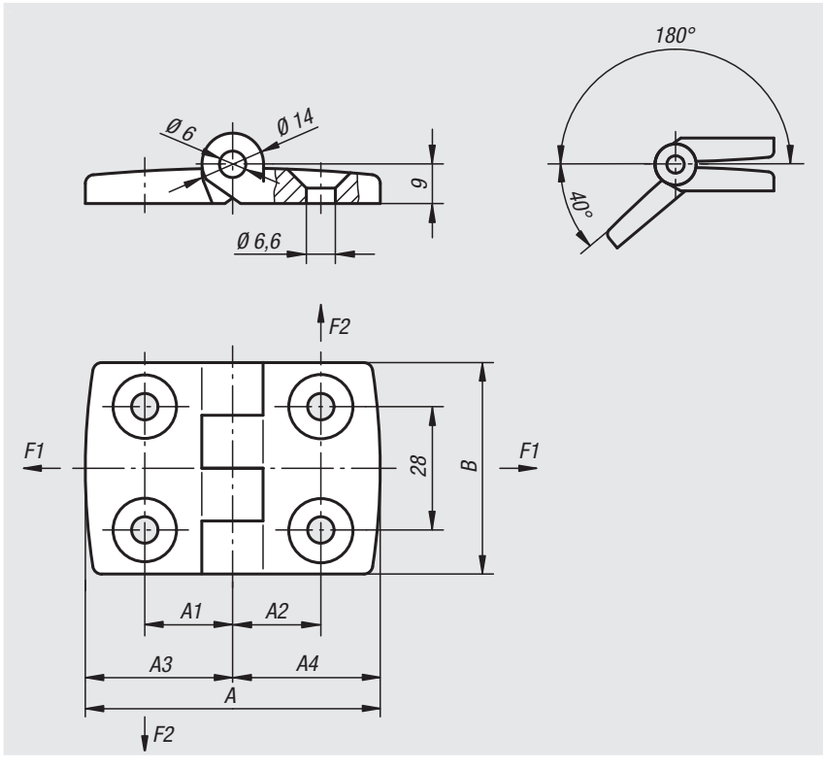
Note:
Lift-off hinge for panel elements and aluminium profiles. Pin end closed. Countersunk holes to minimize dirt accumulation.

Order No. left	Order No. right	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	H1	Load capacity N
27870-01-16261515	**27870-01-06261515**	52	15	15	26	26	48	28	10	6,6	6	16	9	5000
27870-01-16301818	**27870-01-06301818**	59	17,5	17,5	29,5	29,5	48	28	10	6,6	6	16	9	5000
27870-01-16392323	**27870-01-06392323**	77	22,5	22,5	38,5	38,5	48	28	10	6,6	6	16	9	5000
27870-01-16442525	**27870-01-06442525**	87	25	25	43,5	43,5	48	28	10	6,6	6	16	9	5000
27870-01-16583333	**27870-01-06583333**	115	32,5	32,5	57,5	57,5	48	28	10	6,6	6	16	9	5000

Hinges

aluminium





Material:
Die-cast aluminium.
Hinge pin stainless steel.

Version:
Hinge matt nickel-plated.
Pin bright.

Sample order:
nlm 27872-251515

Note:
Hinges for panel elements and aluminium profiles, non lift-off.
The hinges can be fitted with a plastic spacer on the hinge pin.

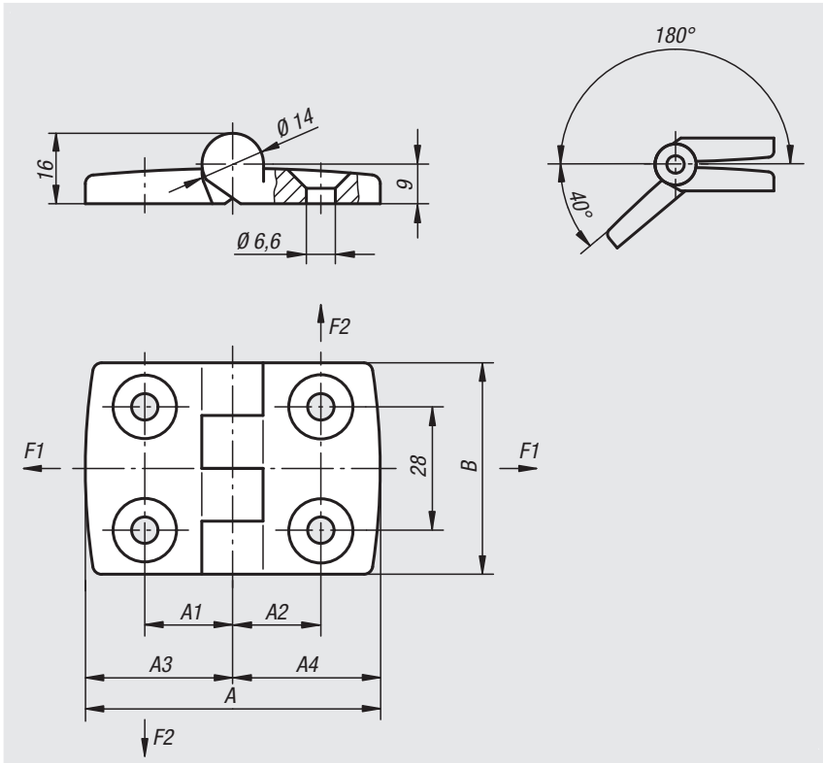
On request:
Hinges with guide tabs for aluminium profiles (slots 5, 6, 8, 10, 12 and 14).
Unequal leaf combinations.

Order No.	A	A1	A2	A3	A4	B	F1 max. kN	F2 max. kN
27872-251515	52	15	15	26	26	48	0,275	0,215
27872-301818	59	17,5	17,5	29,5	29,5	48	0,325	0,225
27872-352020	72	20	20	36	36	48	0,325	0,225
27872-402323	77	22,5	22,5	38,5	38,5	48	0,4	0,25
27872-452525	87	25	25	43,5	43,5	48	0,4	0,25
27872-502828	97	27,5	27,5	48,5	48,5	48	0,4	0,25
27872-603333	115	32,5	32,5	57,5	57,5	48	0,4	0,1

Hinges

stainless steel





Material:
Stainless steel 1.4401.

Version:
Polished.

Sample order:
nlm 27875-062615151

Note:
Hinges for panel elements and aluminium profiles.

Order No.	A	A1	A2	A3	A4	B	F1 max. kN	F2 max. kN
27875-062615151	52	15	15	26	26	48	0,7	0,560
27875-063018181	59	17,5	17,5	29,5	29,5	48	0,8	0,575
27875-064023231	77	22,5	22,5	38,5	38,5	48	0,9	0,675
27875-064525251	85	25	25	42,5	42,5	48	0,9	0,675
27875-066033331	113	32,5	32,5	56,5	56,5	48	0,9	0,260

Hinges

stainless steel

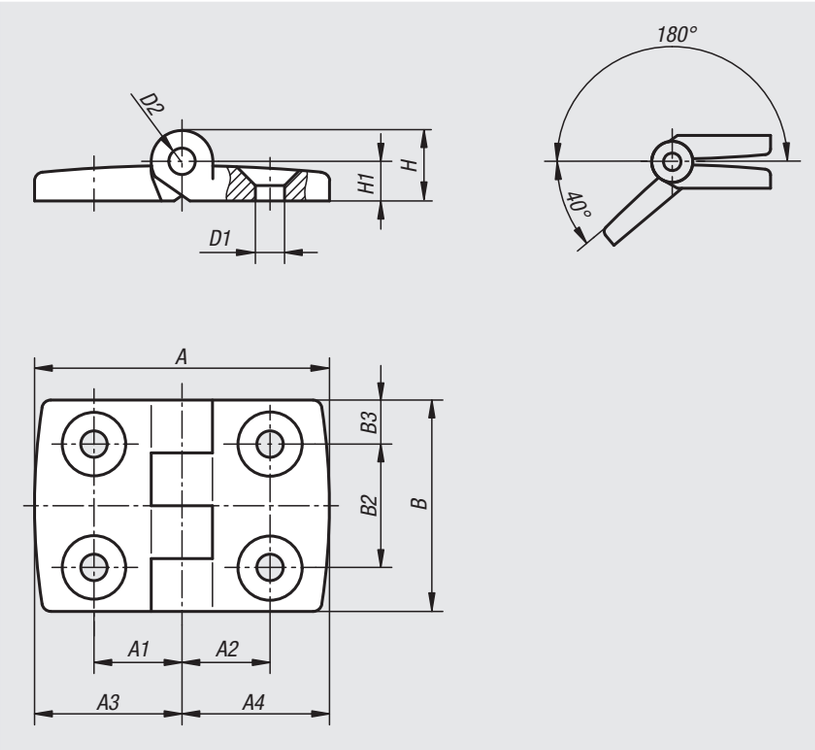


Material:
Hinge stainless steel 1.4401.
Pin stainless steel 1.4104.

Version:
High-gloss polished.

Sample order:
nlm 27875-01-04191212

Note:
Fixed hinge for surface elements and aluminium profiles. Pin end closed. Countersunk holes to minimize dirt accumulation.

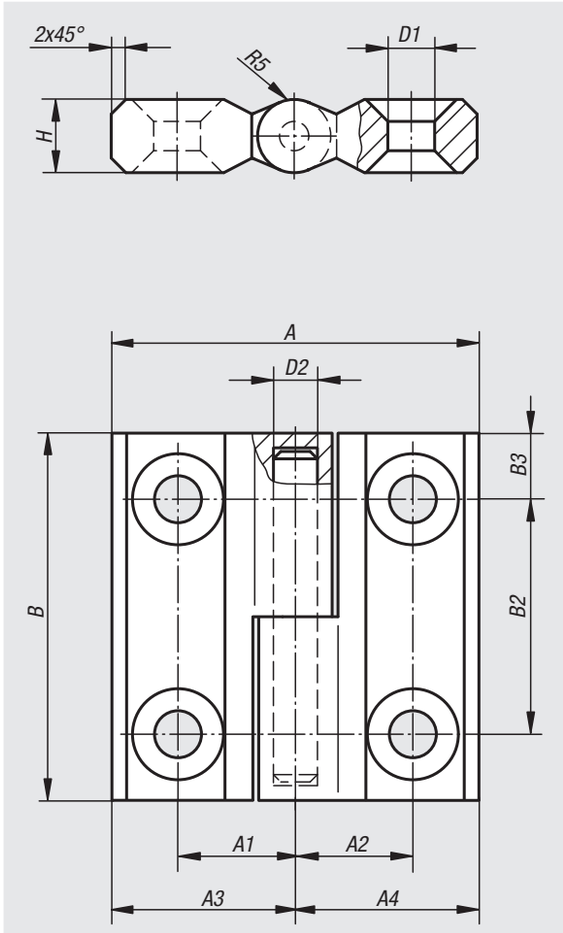


Order No.	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	H1	Load capacity N
27875-01-04191212	38	11,5	11,5	19	19	30	14	8	4,5	3	9,5	5,5	1000

Hinges lift-off

stainless steel





Material:
Hinge and pin stainless steel 1.4401.

Version:
Satin finished.

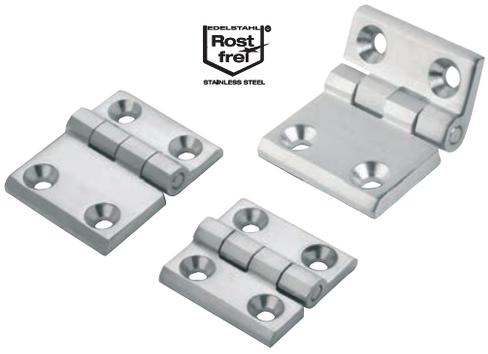
Sample order:
nlm 27875-89-06251616

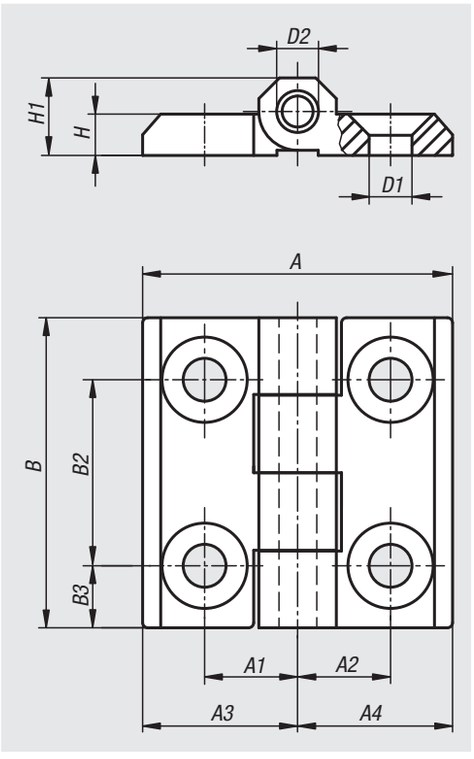
Note:
This double symmetry hinge can be mounted right or left.
The opening angle is max. 125°.

Order No.	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	Load capacity N
27875-89-06251616	50	16	16	25	25	50	32	9	6,4	6	10	5000

Hinges

stainless steel





Material:
Stainless steel 1.4401.

Version:
Satin finished.

Sample order:
nlm 27875-90-05201313

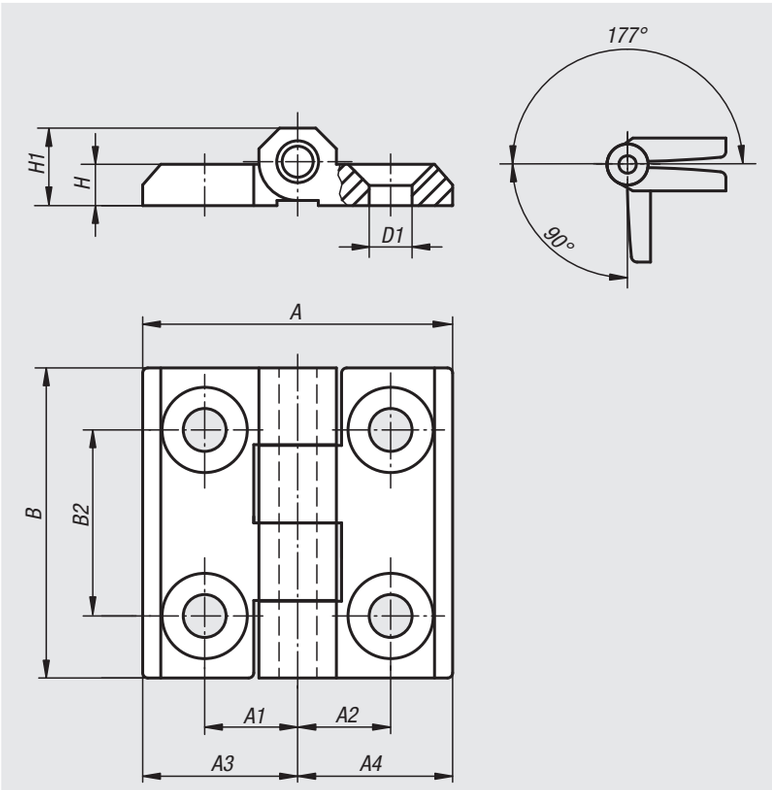
Note:
Hinge for extreme loads.
For right or left use.
Opening angle 270°.
Fastening with countersunk screws i.e. per DIN 7991.

Order No.	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	H1	Load capacity N
27875-90-05201313	40	12,5	12,5	20	20	40	25	7,5	5,2	4	5	9	2500
27875-90-06251515	50	15	15	25	25	50	30	10	6,2	6	6	11,5	5000
27875-90-08301818	60	18	18	30	30	60	36	12	8,3	8	8	15	8000
27875-90-06381528	63	28	15	38	25	50	30	10	6,5	6	6	11,5	5000
27875-90-06382828	76	28	28	38	38	50	30	10	6,5	6	6	11,5	5000

Hinges

stainless steel





Material:
Stainless steel 1.4401.

Version:
Polished or blasted.

Sample order:
nlm 27876-052013131

Note:
Hinges with fixed pin and countersunk holes.

Order No.	Surface finish body	A	A1	A2	A3	A4	B	B2	D1	H	H1
27876-052013130	polished	39	12,5	12,5	19,5	19,5	39	25	5,5	4	9
27876-052013131	blasted	39	12,5	12,5	19,5	19,5	39	25	5,5	4	9
27876-062515150	polished	50	15	15	25	25	50	30	6,5	6	12
27876-062515151	blasted	50	15	15	25	25	50	30	6,5	6	12
27876-083018180	polished	60	18	18	30	30	60	36	8,5	8	15
27876-083018181	blasted	60	18	18	30	30	60	36	8,5	8	15

Single leaf hinges

adjustable, stainless steel



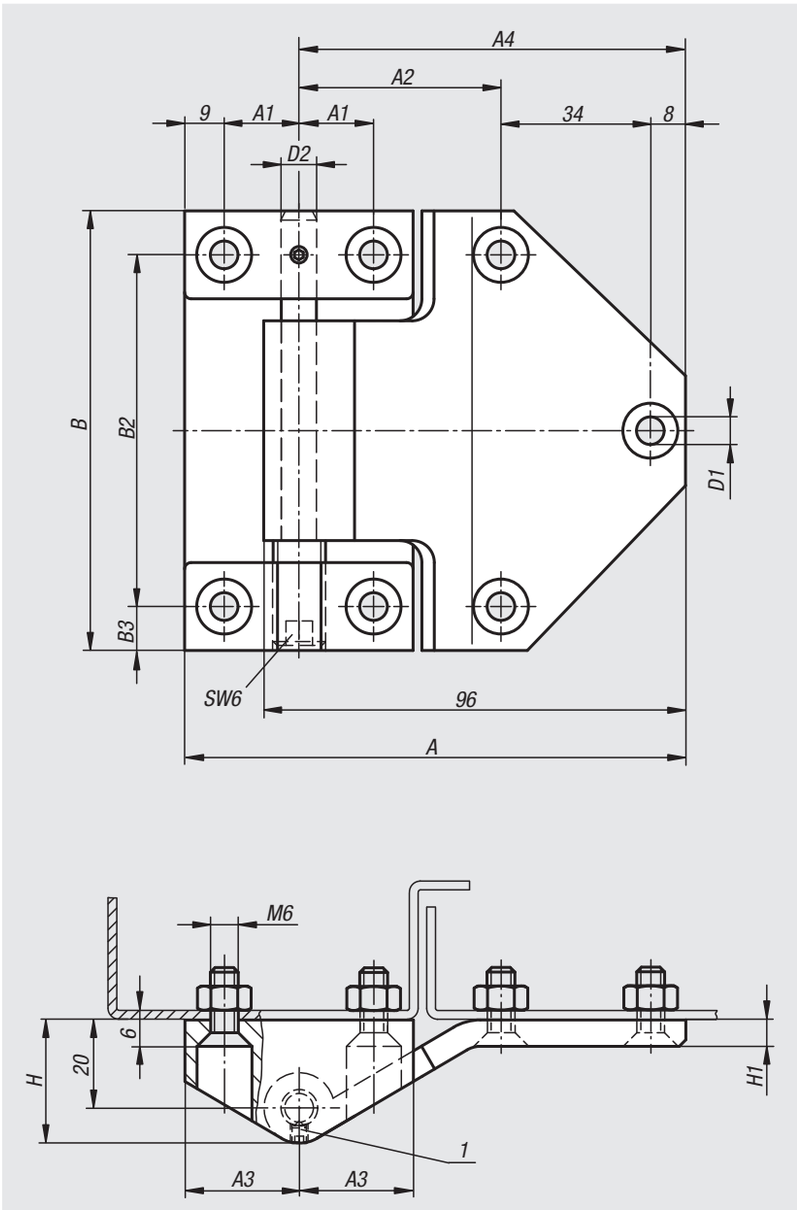
Material:
Stainless steel 1.4571.

Version:
Satin finished.

Sample order:
nlm 27876-01-06884617

Note:
Single leaf hinge for inwards opening doors, screws on from outside. A screw on the hinge pin allows height adjustment of ±4 mm.
The addition of titanium in stainless steel 1.4571 increases the corrosion resistance.
The opening angle is max. 180°.

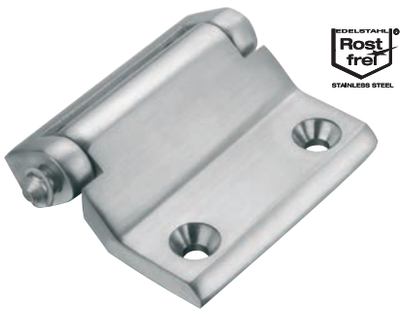
Drawing reference:
1) grub screw M4, DIN 916



Order No.	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	H1
27876-01-06884617	114	17	46	26	88	100	80	10	6,3	8	28	6

Hinges

stainless steel

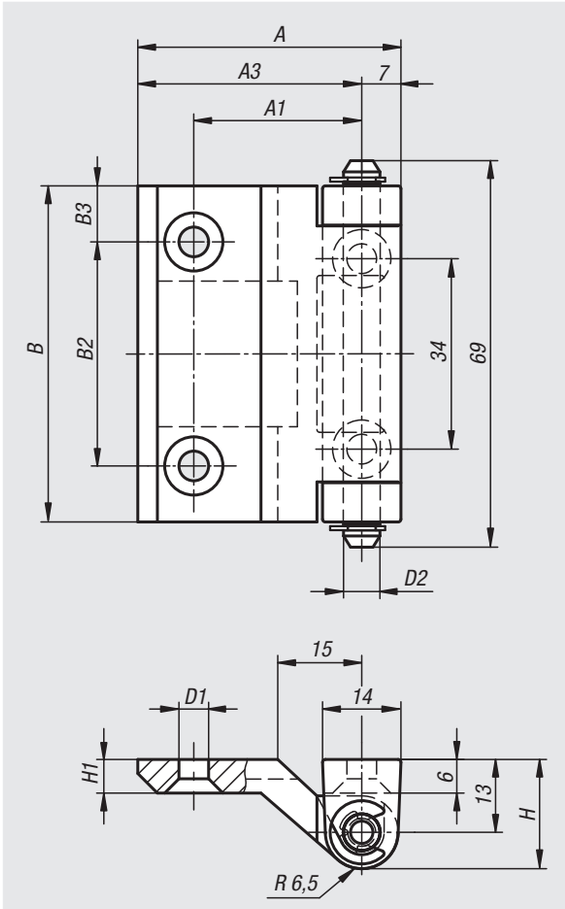


Material:
Hinge body stainless steel 1.4401.
Pin and retaining rings stainless steel 1.4305.

Version:
Satin finished.

Sample order:
nlm 27876-02-0540073000

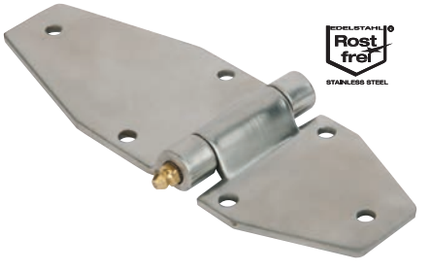
Note:
Hinge for flush constructions.
Right or left mounting.
Ideal for mounting on narrow frames.
The opening angle is max. 220°.



Order No.	A	A1	A3	B	B2	B3	D1	D2	H	H1
27876-02-0540073000	47	30	40	60	40	10	5,3	6,5	19,5	6

Strap hinges

stainless steel with grease nipple



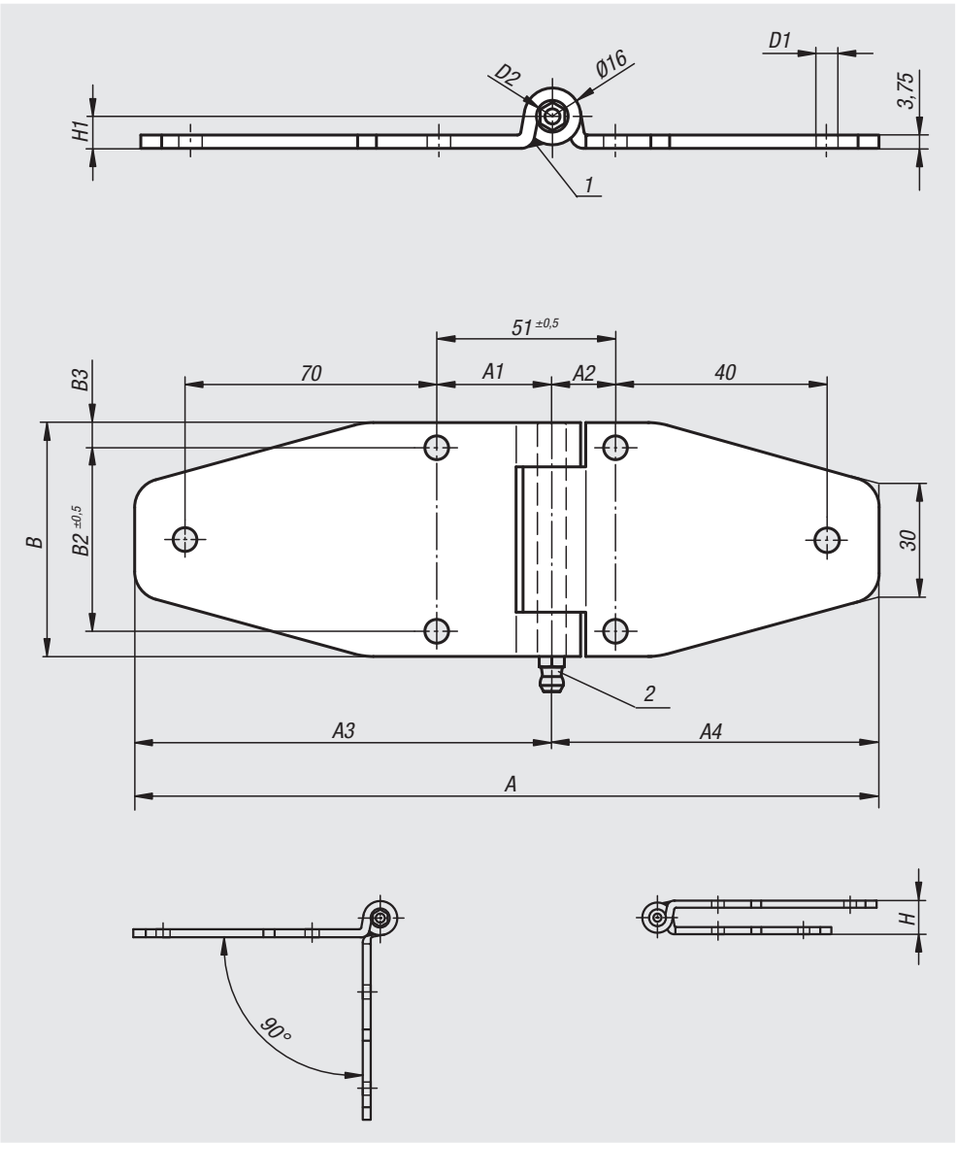
Material:
Stainless steel 1.4301.

Version:
Matt polished.

Sample order:
nlm 27876-05-06701161932

Note:
Strap hinge for inwards opening doors.
The opening angle is max. 270°.

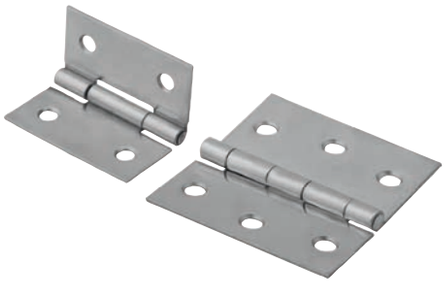
Drawing reference:
1) Rolled ends of long leaf welded
2) Grease nipple

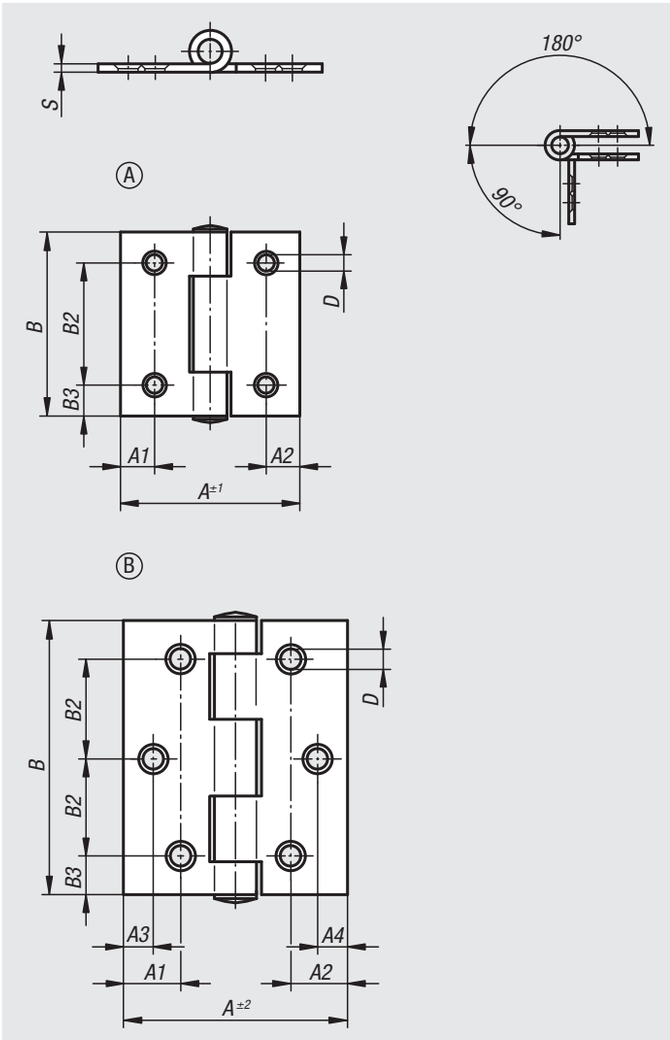


Order No.	A	A1	A2	A3	A4	B	B2	B3	D1	D2	H	H1
27876-05-06701161932	186	32	19	116	70	65	51	7	6,6	8	18	9

Hinges

plate, steel or stainless steel





Material:
Steel or stainless steel 1.4301.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27877-04201212

Note:
Rolled plate butt hinges.
Pins are riveted.
Screw holes countersunk.

Order No.	Material	Form	A1	A2	A3	A4	A	B	B2	B3	D	S
27877-04201212	steel	A	8,5	8,5	-	-	40	40	25	7,5	4	1
27877-04301515	steel	B	15	15	8	8	60	60	22,5	7,5	4,5	1,5
27877-104201212	stainless steel	A	8,5	8,5	-	-	40	40	25	7,5	4	1
27877-104251414	stainless steel	B	11	11	8	8	50	50	18	7	4,5	1,25
27877-104301515	stainless steel	B	15	15	8	8	60	60	22,5	7,5	4,5	1,5
27877-105401515	stainless steel	B	25,3	25,3	12	12	80	80	30	10	5,2	1,5

Butt hinges

stainless steel

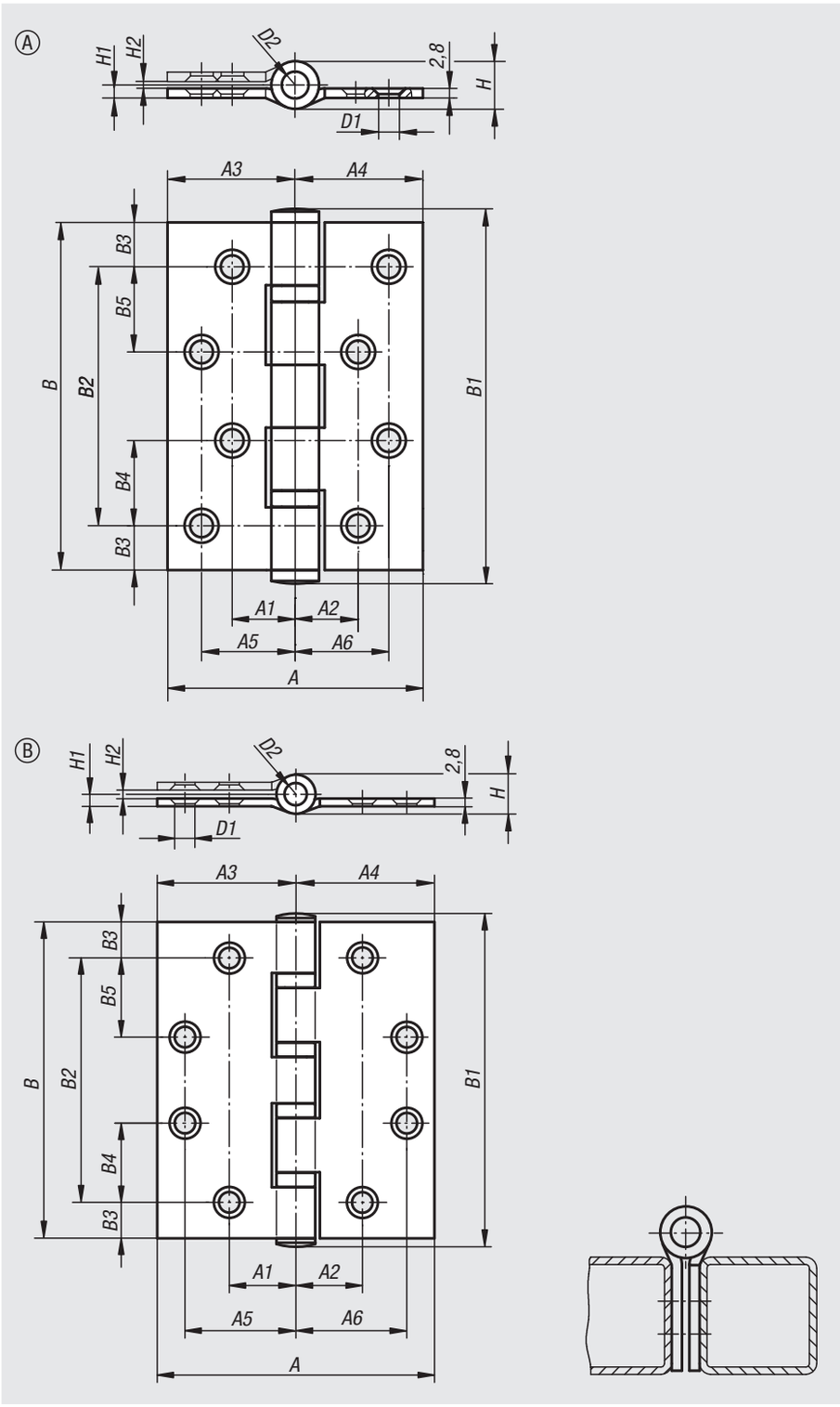


Material:
Stainless steel 1.4301.

Version:
Matt polished.

Sample order:
nlm 27877-01-06371919

Note:
Butt hinge for inwards opening doors.
The opening angle is max. 270°.

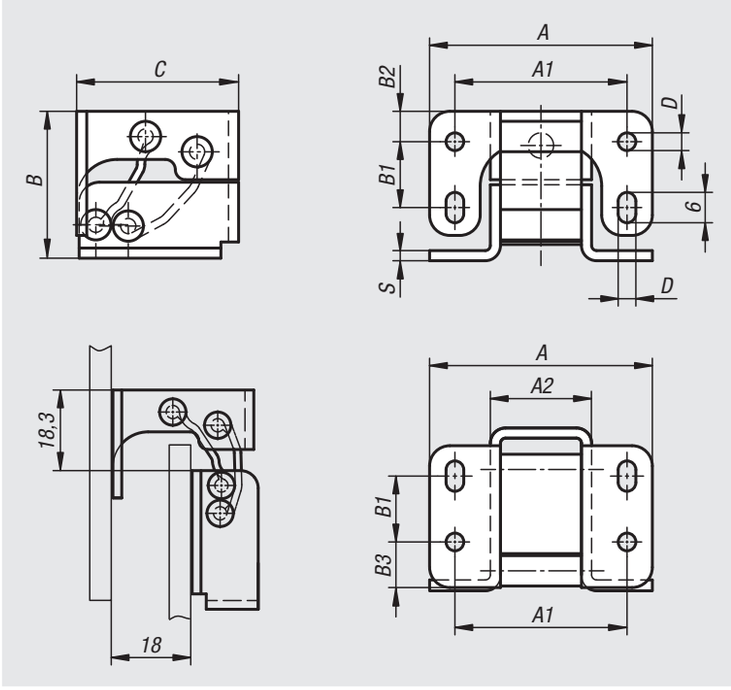


Order No.	Form	A	A1	A2	A3	A4	A5	A6	B	B1	B2	B3	B4	B5	D1	D2	H	H1	H2	Load capacity N
27877-01-06371919	A	75	18,5	18,5	37,5	37,5	27,5	27,5	102	110	76	13	25	25	6,7	8	14	3,8	2	8000
27877-01-07502424	B	100	24	24	50	50	40	40	114	120	88	13	28,5	28,5	7,3	8	14	4,3	3	8000

Hinges steel or stainless steel

internal, opening angle 90°





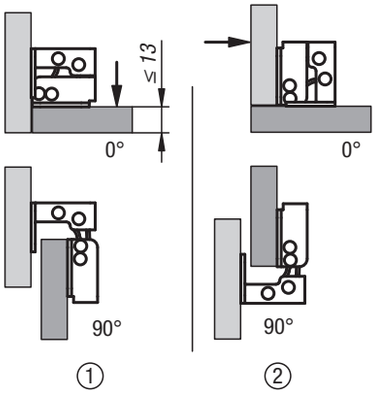
Material:
Steel, pins and connecting elements 1.4016 stainless steel.
Stainless steel, all components 1.4404 stainless steel.

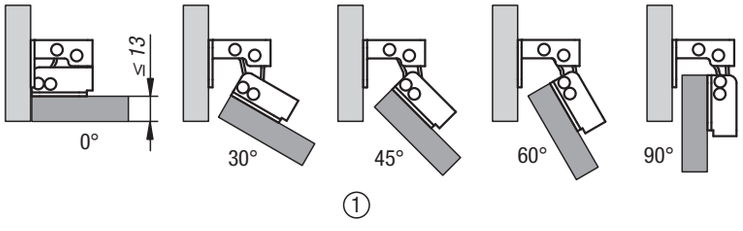
Version:
Electro zinc-plated.
Bright.

Sample order:
nlm 27879-442932

Assembly:
- For recessed or surface mounting.
- Can be mounted on right or left side.
- For horizontal or vertical applications.

Drawing reference:
1) recessed mounting
2) surface mounting

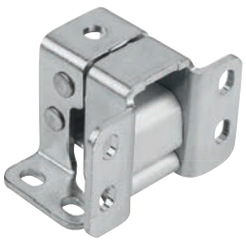


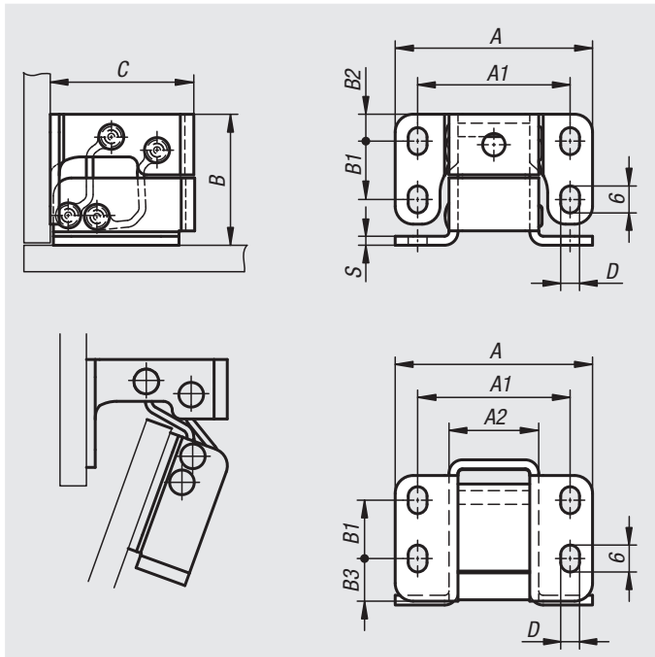


Order No.	Main material	A	A1	A2	B	B1	B2	B3	C	D	S
27879-442932	steel	44	34	20	29	13	6	9,5	32	3,5	2
27879-1442932	stainless steel	44	34	20	29	13	6	9,5	32	3,5	2

Hinges steel or stainless steel

internal, opening angle 125°





Material:
Steel, pins and connecting elements 1.4016 stainless steel.
Stainless steel, all components 1.4404 stainless steel.

Version:
Electro zinc-plated.
Bright.

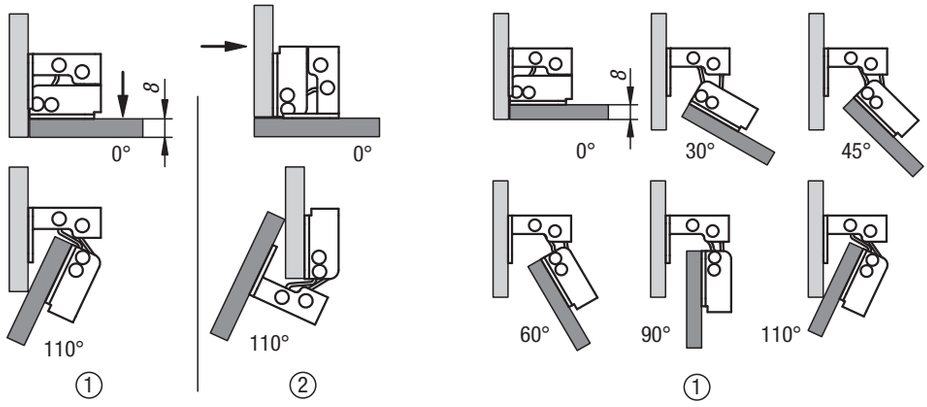
Sample order:
nlm 27879-01-442932

Note:
The hinges are resistant to bending and torsion.

The opening angle depends on the door thickness:
- max. 2 mm material thickness: opening angle 125°
- max. 8 mm material thickness: opening angle 110°
- max. 13 mm material thickness: opening angle 100°

Assembly:
- For recessed or surface mounting.
- Can be mounted on right or left side.
- For horizontal or vertical applications.

Drawing reference:
1) recessed mounting
2) surface mounting



Order No.	Main material	A	A1	A2	B	B1	B2	B3	C	D	S
27879-01-442932	steel	44	34	20	29	13	6	9,5	32	4,2	2
27879-01-1442932	stainless steel	44	34	20	29	13	6	9,5	32	4,2	2

Hinges steel

internal, opening angle 110°



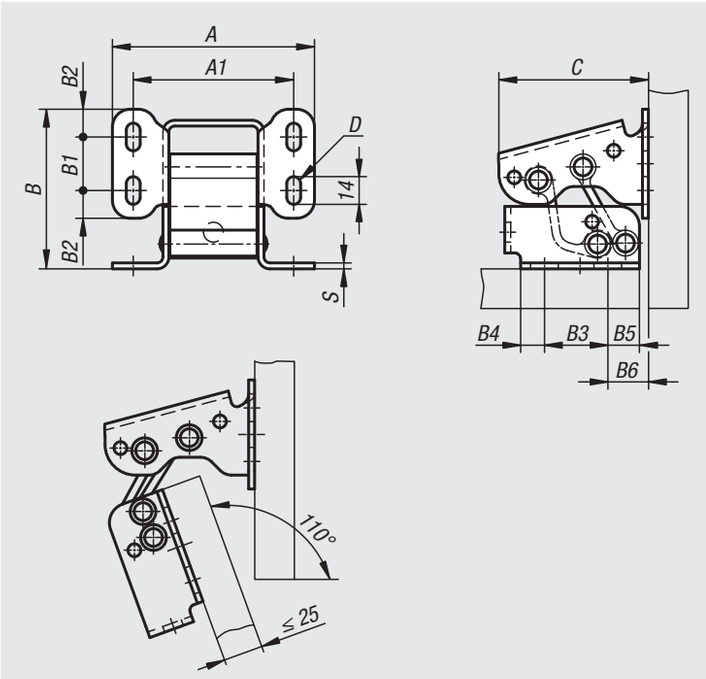
Material:
Steel, pins and connecting elements anodised aluminium.

Version:
Electro zinc-plated.

Sample order:
nlm 27879-02-1028076

Note:
These hinges are the reinforced version.
When hung on 2 hinges a 25 kg door can be opened and closed 10,000 times.

Application:
Invisible hinges for overlapping or inset doors.

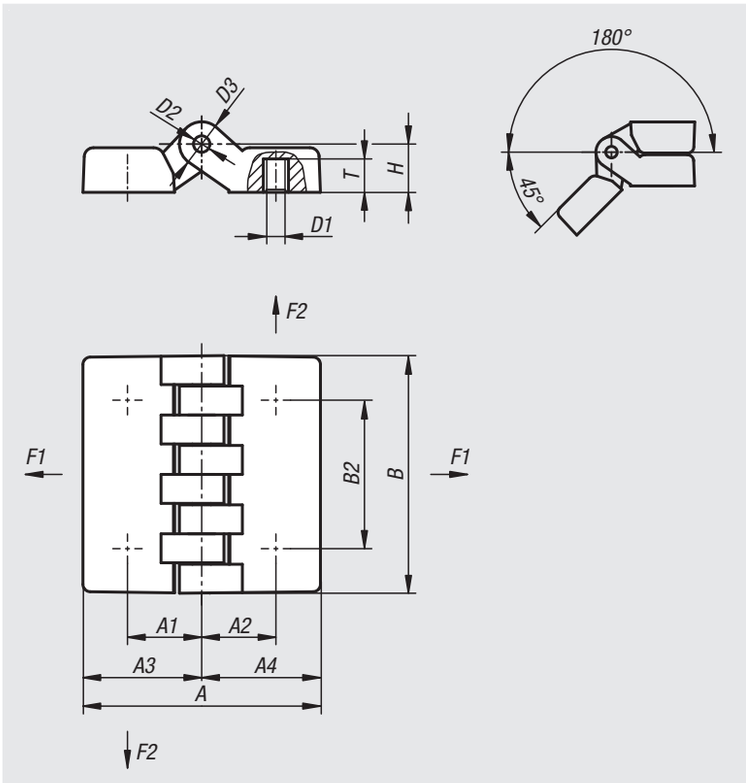


Order No.	A	A1	B	B1	B2	B3	B4	B5	B6	C	D	S
27879-02-1028076	102	81	80,5	27	14	32	12	16	20,5	76	7	3

Hinges

plastic with bushes





Material:
Fibreglass reinforced thermoplastic.
Hinge pin steel.
Bushes brass.

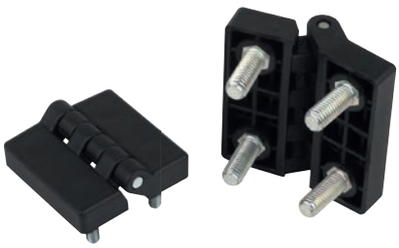
Version:
Hinge black.
Hinge pin electro zinc-plated.

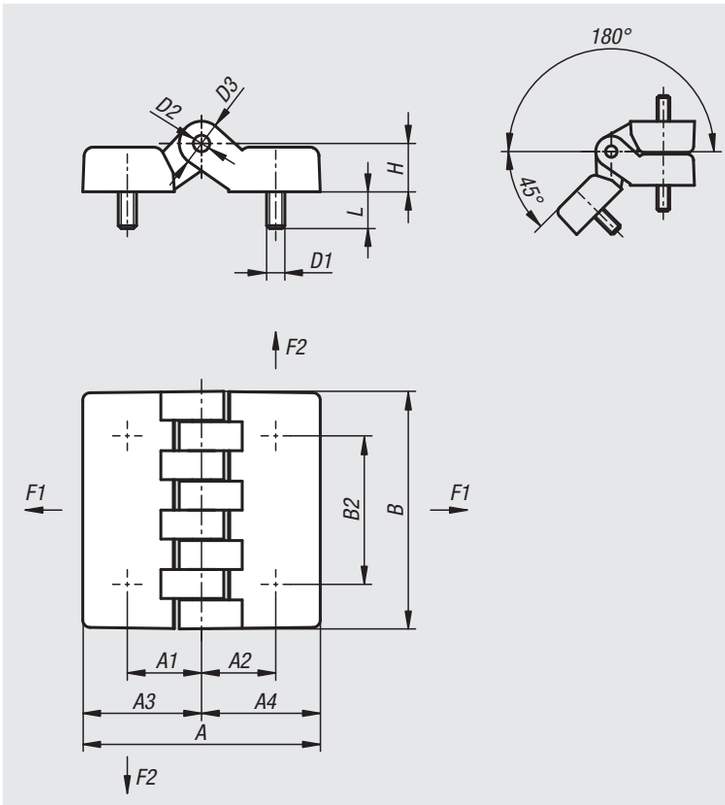
Sample order:
nlm 27880-05241515

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	T	F1 N	F2 N
27880-05241515	48	15	15	24	24	48	30	M5	5	10	10,5	7	2000	1370
27880-06241515	48	15	15	24	24	48	30	M6	5	10	10,5	7	2000	1370
27880-06322020	64	20	20	32	32	64	40	M6	5	12	13	9	4100	1800
27880-08322020	64	20	20	32	32	64	40	M8	5	12	13	9	4100	1800
27880-08483232	95	31,5	31,5	47,5	47,5	95	60	M8	8	18	19	13	2450	2650
27880-10483232	95	31,5	31,5	47,5	47,5	95	60	M10	8	18	19	13	2450	2650

Hinges

plastic with fastening screws





Material:
Fibreglass reinforced thermoplastic.
Hinge pin steel.

Version:
Hinge black.
Hinge pin electro zinc-plated.

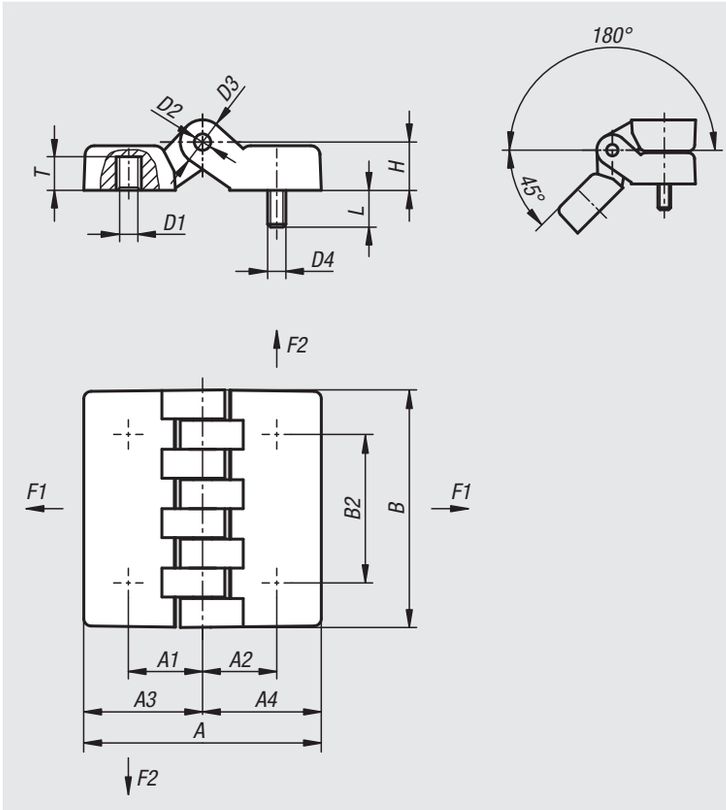
Sample order:
nlm 27882-05241515

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	H	L	F1 N	F2 N
27882-05241515	48	15	15	24	24	48	30	M5	5	10	10,5	15	1780	1370
27882-06241515	48	15	15	24	24	48	30	M6	5	10	10,5	15	1780	1370
27882-06322020	64	20	20	32	32	64	40	M6	5	12	13	20	4120	1760
27882-08322020	64	20	20	32	32	64	40	M8	5	12	13	20	4120	1760
27882-08483232	95	31,5	31,5	47,5	47,5	95	60	M8	8	18	19	20	4900	1275
27882-10483232	95	31,5	31,5	47,5	47,5	95	60	M10	8	18	19	20	4900	1275

Hinges

plastic with bushes and fastening screws





Material:
Fibreglass reinforced thermoplastic.
Hinge pin steel.
Bushes brass.

Version:
Hinge black.
Hinge pin electro zinc-plated.

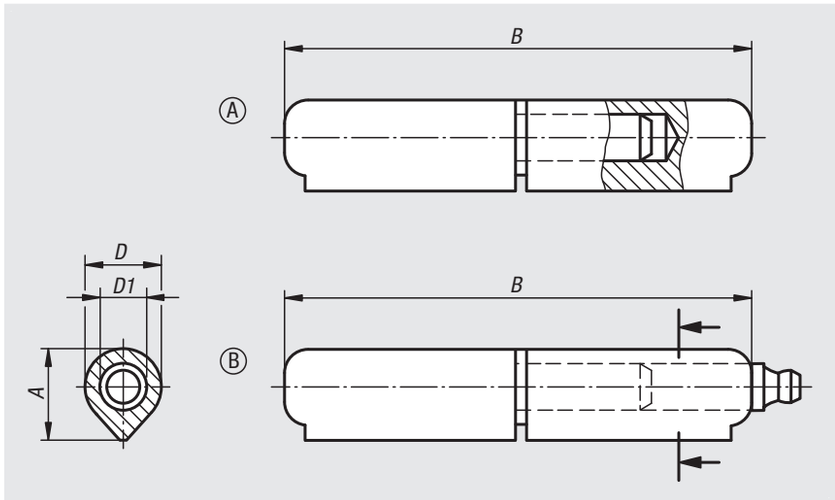
Sample order:
nlm 27884-05241515

Order No.	A	A1	A2	A3	A4	B	B2	D1	D2	D3	D4	H	L	T	F1 N	F2 N
27884-05241515	48	15	15	24	24	48	30	M5	5	10	M5	10,5	15	7	1850	1350
27884-06241515	48	15	15	24	24	48	30	M6	5	10	M6	10,5	15	7	1850	1350
27884-06322020	64	20	20	32	32	64	40	M6	5	12	M6	13	20	9	4000	1600
27884-08322020	64	20	20	32	32	64	40	M8	5	12	M8	13	20	9	4000	1600
27884-08483232	95	31,5	31,5	47,5	47,5	95	60	M8	8	18	M8	19	20	13	3100	1400
27884-10483232	95	31,5	31,5	47,5	47,5	95	60	M10	8	18	M10	19	20	13	3100	1400

Hinges

weldable



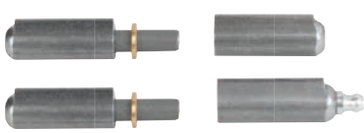


Material:
Hinge steel.
Spacer washer brass.
Hinge pin steel or brass.

Version:
Grease nipple DIN 71412-D, electro zinc-plated steel.
Steel parts, bright.

Sample order:
nlm 27885-008040012

Note:
The hinges are made of weldable profile steel.
The pin is fixed into the lower part of the hinge.
The differing steel qualities of the weld and the beam onto which the hinge is welded must be at least equal to or better than:
S235 JR+AR acc. to EN 10025-2:2004-10
DIN 8563 part 3 or Fe E 235 acc. to SIA 161

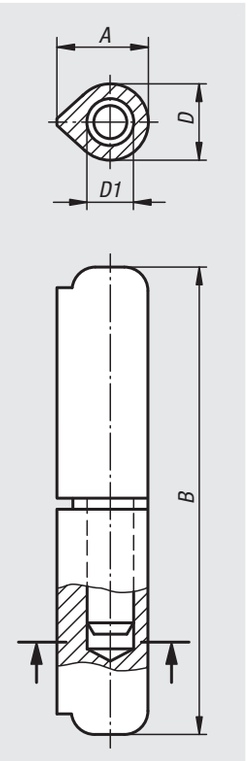


Order No.	Form	Component material	A	B	D	D1
27885-008040012	A	steel	9,7	40	8	5
27885-008050012	A	steel	9,7	50	8	5
27885-010060012	A	steel	12,7	60	10	6
27885-010070012	A	steel	12	70	10	6
27885-013080012	A	steel	15,5	80	13	8
27885-016100012	A	steel	20	100	16	10
27885-016120012	A	steel	20	120	16	11
27885-018135012	A	steel	22	135	18	12
27885-020150012	A	steel	25	150	20	13
27885-020180012	A	steel	25	180	20	14
27885-023200012	A	steel	28,5	200	23	16
27885-008040022	A	brass	9,7	40	8	5
27885-008050022	A	brass	9,7	50	8	5
27885-010060022	A	brass	12,7	60	10	6
27885-010070022	A	brass	12	70	10	6
27885-013080022	A	brass	15,5	80	13	8
27885-016100022	A	brass	20	100	16	10
27885-016120022	A	brass	20	120	16	11
27885-018135022	A	brass	22	135	18	12
27885-020150022	A	brass	25	150	20	13
27885-020180022	A	brass	25	180	20	14
27885-023200022	A	brass	28,5	200	23	16
27885-113080012	B	steel	16	80	13	8
27885-116100012	B	steel	20	100	16	10
27885-116120012	B	steel	20	120	16	10
27885-118135012	B	steel	22,5	135	18	12
27885-120150012	B	steel	25,5	150	20	13
27885-120180012	B	steel	25	180	20	14
27885-123200012	B	steel	29	200	23	16

Hinges

weldable, stainless steel





Material:
Stainless steel 1.4305.

Version:
Bright.

Sample order:
nlm 27886-010060033

Note:
The hinges are made of weldable profile steel.
The pin is fixed into the lower part of the hinge.
The differing steel qualities of the weld and the beam onto which the hinge is welded must be at least equal to or better than:
S235 JR+AR acc. to EN 10025-2:2004-10
DIN 8563 part 3 or Fe E 235 acc. to SIA 161

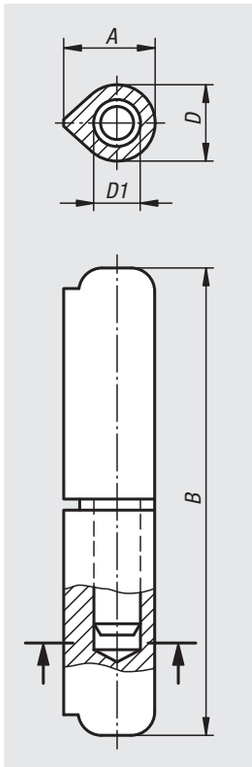


Order No.	A	B	D	D1
27886-010060033	12	60	10	6
27886-013080033	15,5	80	13	8
27886-016100033	20	100	16	10
27886-016120033	20	120	16	11
27886-020150033	25,5	150	20	13
27886-020180033	25,5	180	20	14

Hinges

weldable, stainless steel





Material:
Stainless steel 1.4404.

Version:
Satin finished.

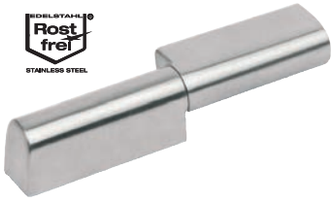
Sample order:
nlm 27886-01-013079

Note:
The hinges are made of weldable profile steel.
The pin is fixed into the lower part of the hinge.
The differing steel qualities of the weld and the beam onto which the hinge is welded must be at least equal to or better than:
S235 JR+AR acc. to EN 10025-2:2004-10
DIN 8563 part 3 or Fe E 235 acc. to SIA 161

Order No.	A	B	D	D1
27886-01-016080	20	80	16	10
27886-01-016100	20	100	16	10
27886-01-016120	20	120	16	11

In-line hinges stainless steel

lift-off, screw-on

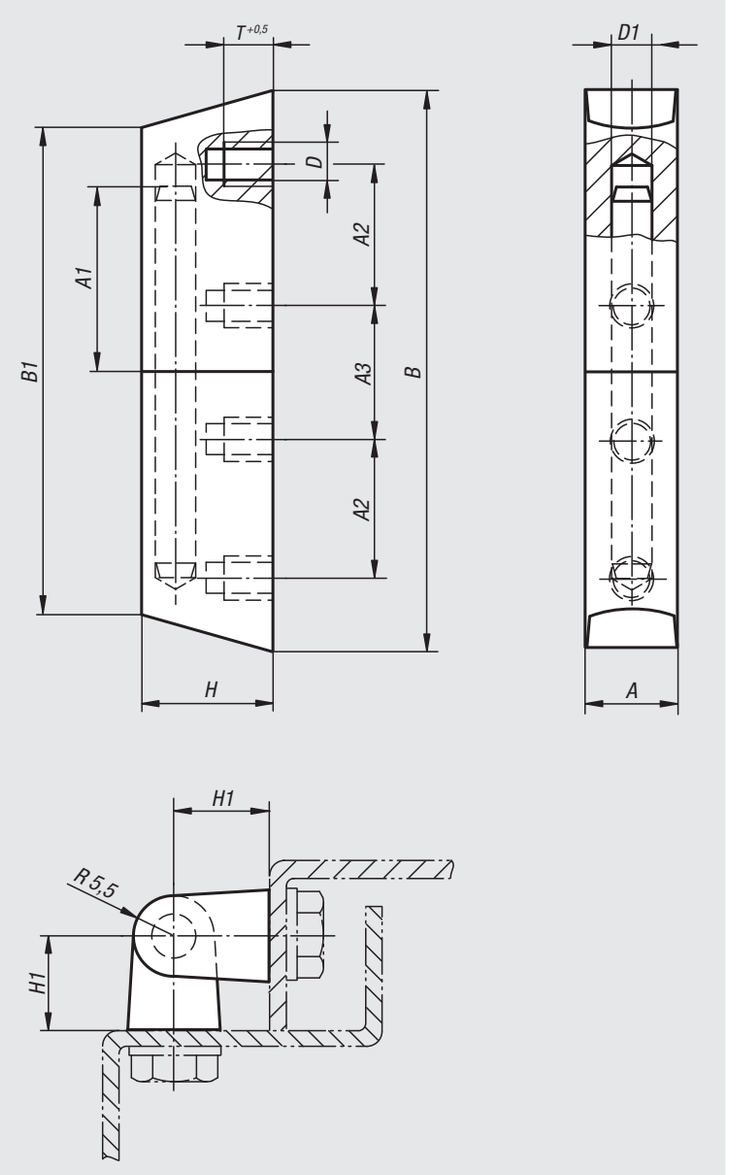


Material:
Stainless steel 1.4401.

Version:
Satin finished.

Sample order:
nlm 27886-03-1761218

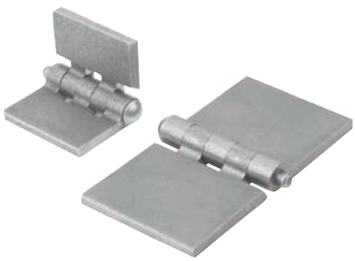
Note:
Lift-off inline hinge, right or left mounting.
The sloping hinge ends prevent the accumulation of dirt.

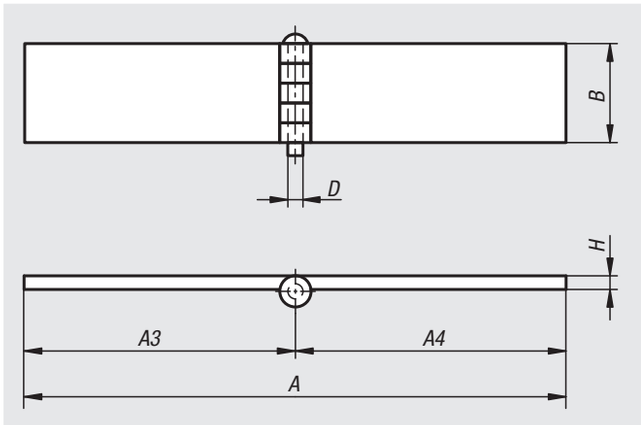


Order No.	A	A1	A2	A3	B	B1	D	D1	T	H	H1
27886-03-1761218	12,5	23	19	18	76	66	M6	6	6	18,5	13

Hinges

weldable





Material:
Steel.

Version:
Bright.

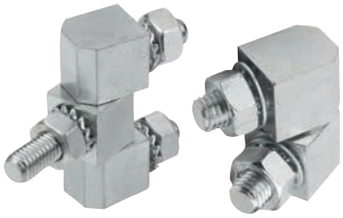
Sample order:
nlm 27888-04030040

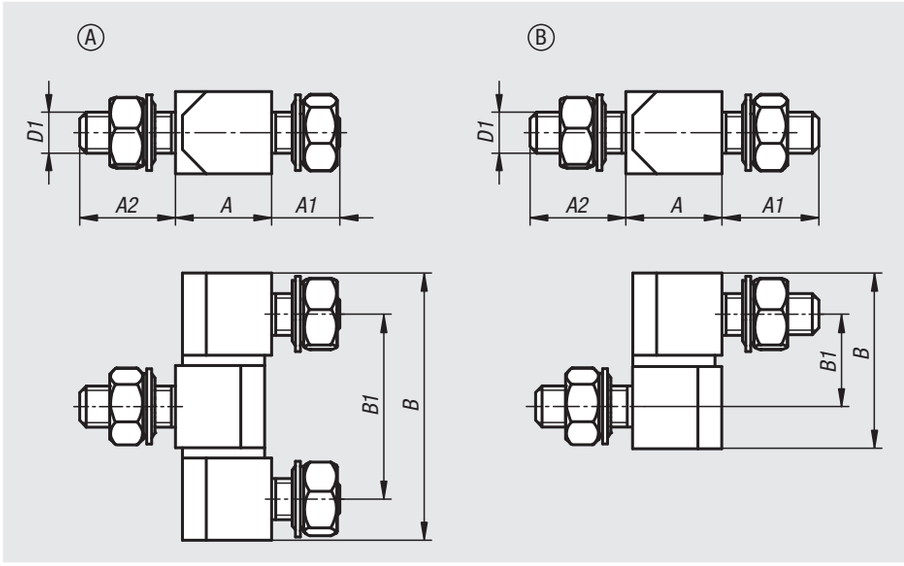
Note:
The hinges are made of weldable profile steel.

Order No.	A	A3	A4	B	D	H
27888-04030040	80	40	40	30	4	3
27888-04040040	80	40	40	40	4	3
27888-06040030	60	30	30	40	6	5
27888-06040060	120	60	60	40	6	5
27888-06050060	120	60	60	50	6	5
27888-06060060	120	60	60	60	6	5
27888-08060080	160	80	80	60	8	6

Block hinges

with fastening nuts





Material:
Steel.
Stainless steel 1.4305.
Stainless steel A4 1.4401.

Version:
Steel electro zinc-plated.
Stainless steel bright.

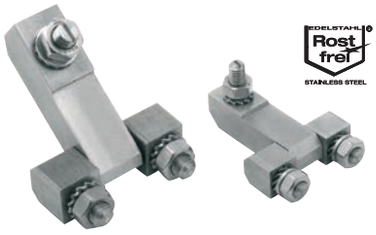
Sample order:
nlm 27890-0614027

Note:
Block hinges with fastening nuts for overlapping or inset doors.
Mounted with nuts (M6 or M8) from inside. The 3-part versions are not detachable.
The hinge can be used left or right. The opening angle is 180°. Supplied unassembled.
Fastening nuts and washers are supplied.

Order No.	Form	Main material	Steel code	A	A1	A2	B	B1	D1
27890-0614027	A	steel	-	13	10	14	39	27	M6
27890-0820033	A	steel	-	18	14	22	49	33	M8
27890-10614027	A	stainless steel	1.4305	13	10	14	39	27	M6
27890-10820033	A	stainless steel	1.4305	18	14	22	49	33	M8
27890-20614027	A	stainless steel	1.4401	13	10	14	39	27	M6
27890-20820033	A	stainless steel	1.4401	18	14	22	49	33	M8
27890-10610135	B	steel	-	13	10	10	25,3	13,5	M6
27890-10814165	B	steel	-	18	14	14	32,4	16,5	M8
27890-110610135	B	stainless steel	1.4305	13	10	10	25,3	13,5	M6
27890-110814165	B	stainless steel	1.4305	18	14	14	32,4	16,5	M8

Block hinges

with fastening nuts

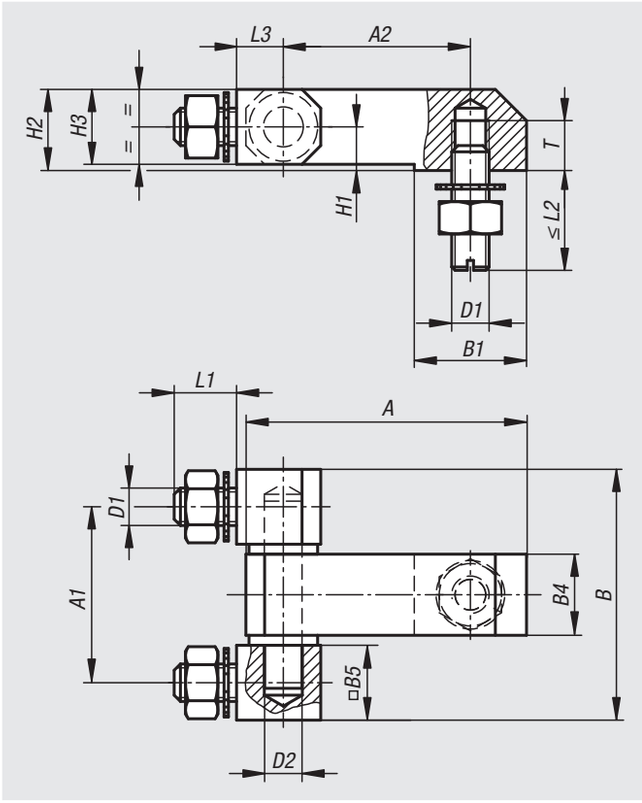


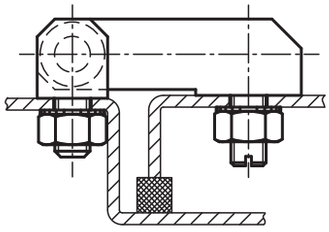
Material:
Hinges stainless 1.4305.
Fastening material stainless 1.4301.

Version:
Polished.

Sample order:
nlm 27890-02-10630028

Note:
Block hinge for flush constructions.
Light and heavy types.

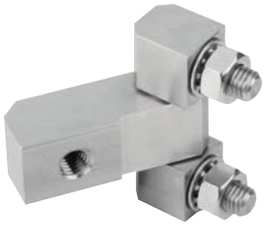


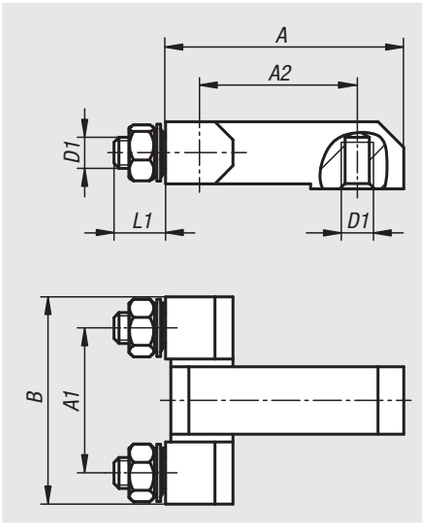


Order No.	A	A1	A2	B	B1	B4	B5	D1	D2	H1	H2	H3	L1	L2	L3	T	Load capacity N
27890-02-10630028	45	28,2	30	40,2	18	13	12	M6	6	7	13	12	10	16	7,5	8	2600
27890-02-10840035	61	35	40	51	26	18	16	M8	8	10	18	16	14	20	10	10	4800

Block hinges

with fastening nuts, long version





Material:
Steel.
Stainless steel 1.4305.
Stainless steel A4 1.4401.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 27891-0630028

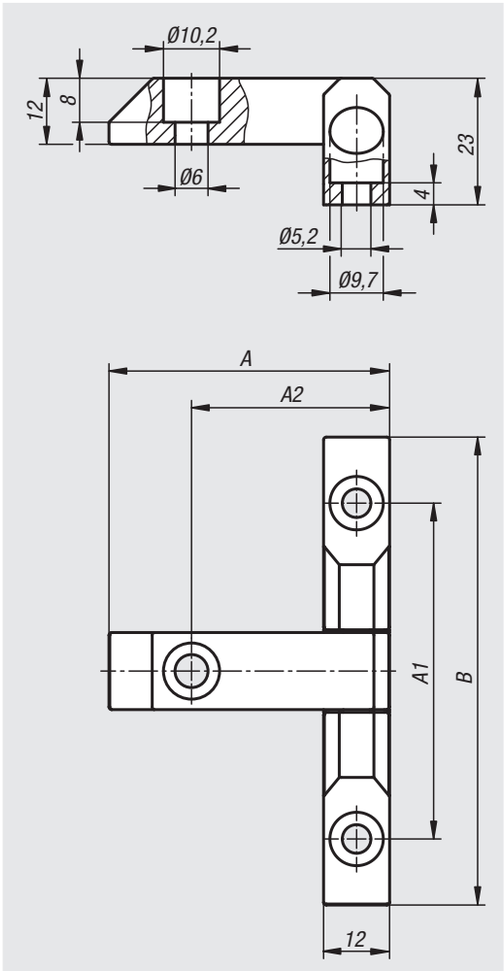
Note:
Block hinges with fastening nuts and extended middle section for inset doors.
Mounted with nuts (M6 or M8) from inside.
The hinge can be mounted left or right. The opening angle is 180°.
Supplied unassembled. Fastening nuts and washers are supplied.

Order No.	Main material	Steel code	A	A1	A2	B	D1	L1 length
27891-0630028	steel	-	45	28	30	40	M6	10
27891-0829035	steel	-	50	35	29	51	M8	14
27891-10630028	stainless steel	1.4305	45	28	30	40	M6	10
27891-10829035	stainless steel	1.4305	50	35	29	51	M8	14
27891-20630028	stainless steel	1.4401	45	28	30	40	M6	10
27891-20829035	stainless steel	1.4401	50	35	29	51	M8	14

Block hinges

with counterbore, long version





Material:
Die-cast zinc.

Version:
Electro zinc-plated or high-gloss trivalent passivated.

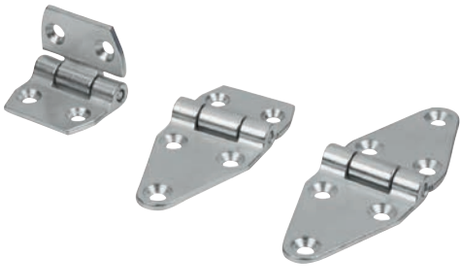
Sample order:
nlm 27892-00630061

Note:
Block hinges for overlapping doors. Can be mounted left or right. Opening angle 180°. The hinges are supplied assembled.

Order No.	Finish	A	A1	A2	B
27892-00630061	galvanised	51	61	30	85
27892-10630061	high-gloss chromed	51	61	30	85

Hinges

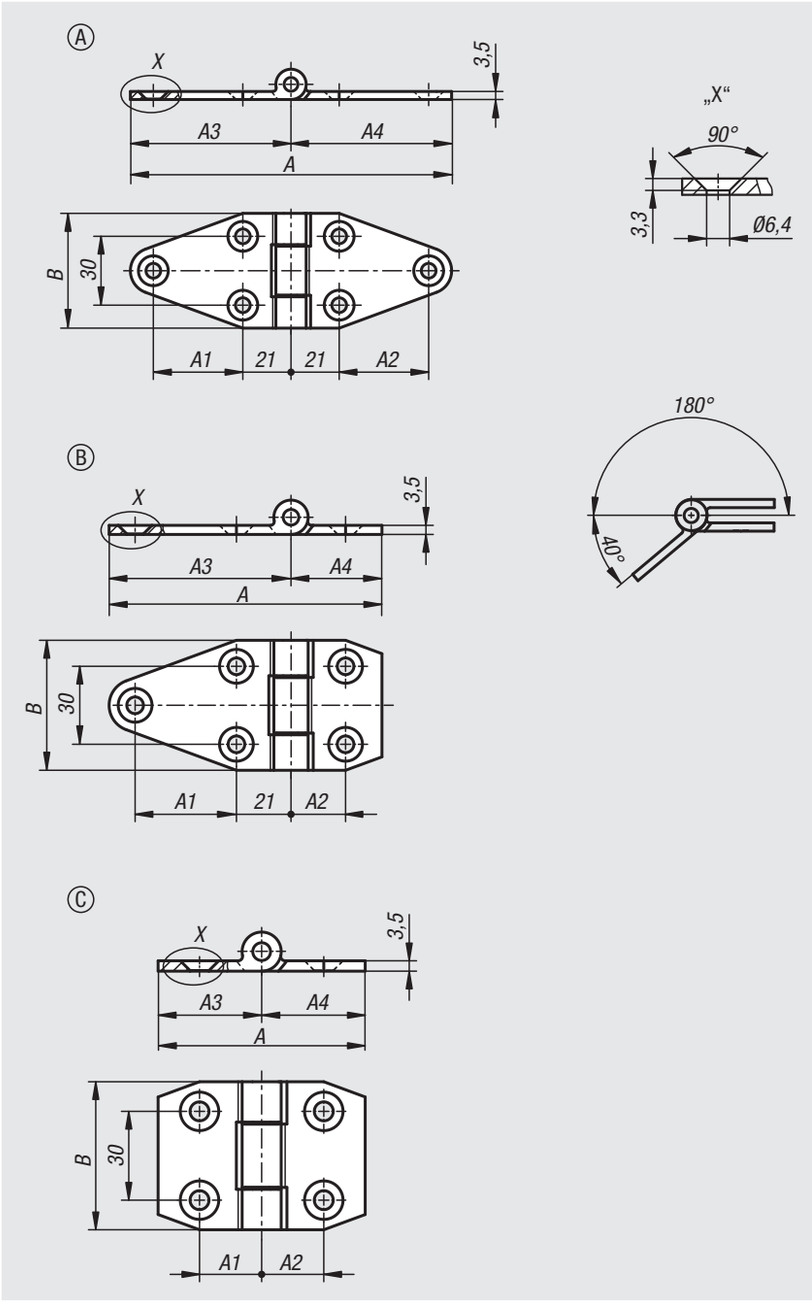
steel, maintenance-free



Material:
Profile steel.
Bush Metaloplast.

Version:
Steel parts electro zinc-plated.

Sample order:
nlm 27898-06707050

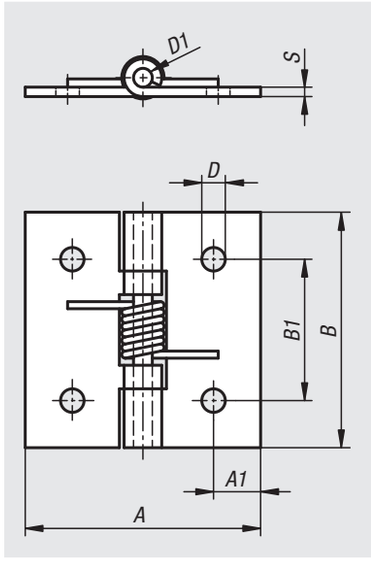


Order No.	Form	A	A1	A2	A3	A4	B
27898-06707050	A	140	39	39	70	70	50
27898-06703550	B	105	39	21	70	35	50
27898-06353550	C	70	21	21	35	35	50

Spring hinges

steel, stainless steel or aluminium, 50 mm





Material:
Steel, 1.4301 stainless steel or 5754 aluminium.
Tension spring steel or stainless steel.

Version:
Steel electro zinc-plated
Stainless steel and aluminium, bright.
Tension spring Zn/Al alloy.

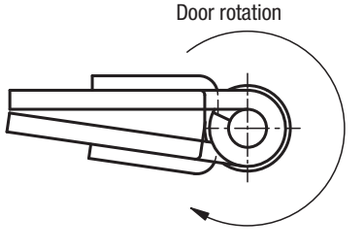
Sample order:
nlm 27900-50500

Note:
Barrel hinges.
Opening angle 270°.

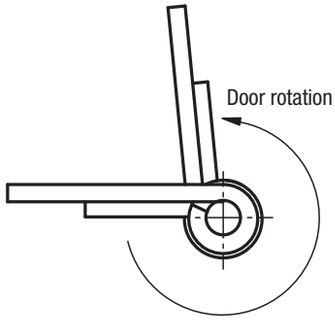
Opening spring torque:
M(0°) : 1.5 Nm / M(90°) : 1.1 Nm / M(180°) : 0.65 Nm
Closing spring torque:
M(0°) : 0.25 Nm / M(90°) : 0.65 Nm / M(180°) : 1.1 Nm

By the aluminium hinges, the tension springs are steel alloyed with Zn/Al.

Hinges with closing spring



Hinges with opening spring

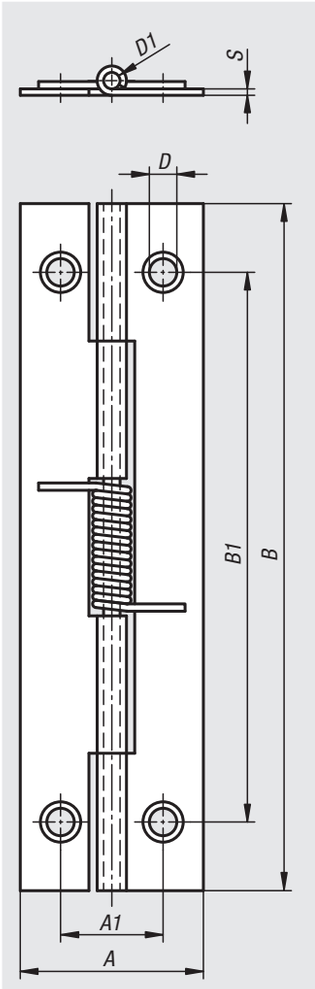


Order No.	Version	Main material	A	A1	B	B1	D	D1	S
27900-50500	spring open	steel	50	9	50	30	5	4	2
27900-150500	spring open	stainless steel	50	10	50	30	5	4	2
27900-250500	spring open	aluminium	50	9	50	30	5	4	2
27900-50501	spring closed	steel	50	9	50	30	5	4	2
27900-150501	spring closed	stainless steel	50	10	50	30	5	4	2
27900-250501	spring closed	aluminium	50	9	50	30	5	4	2

Spring hinges

steel or stainless steel, 75 mm





Material:
Steel or 1.4301 stainless steel.
Tension spring stainless steel.

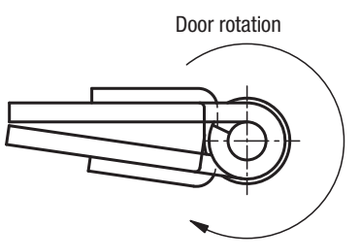
Version:
Bright.

Sample order:
nlm 27901-20750

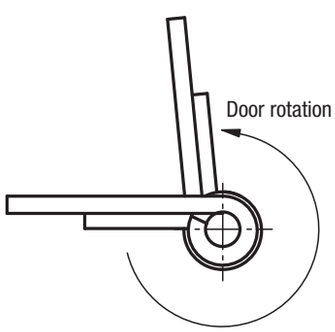
Note:
Butt type hinges.
Opening angle 270°.

Spring torque:
M(0°): 0.12 Nm / M(90°): 0.09 Nm / M(180°): 0.06 Nm

Hinges with closing spring



Hinges with opening spring

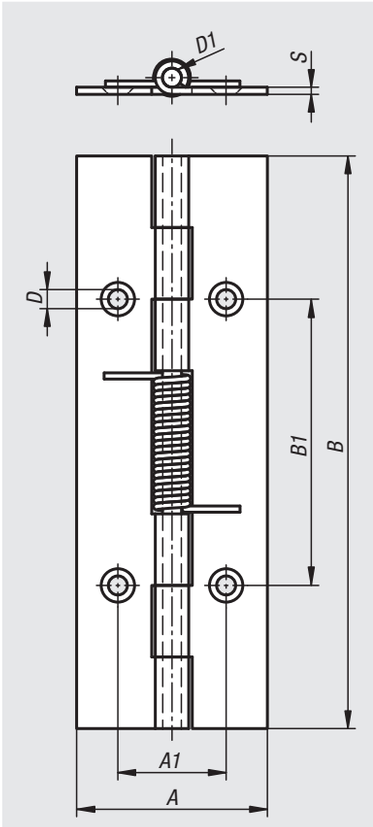


Order No.	Main material	A	A1	B	B1	D	D1	S
27901-20750	steel	20	11,2	75	60	2,8	1,8	0,8
27901-120750	stainless steel	20	11,2	75	60	2,8	1,8	0,8

Spring hinges

steel, stainless steel or aluminium, 120 mm





Material:
Steel, 1.4301 stainless steel or 5754 aluminium.
Tension spring steel or stainless steel.

Version:
Steel bright or electro zinc-plated
Stainless steel and aluminium, bright.
Tension spring Zn/Al alloy.

Sample order:
nlm 27902-4012000

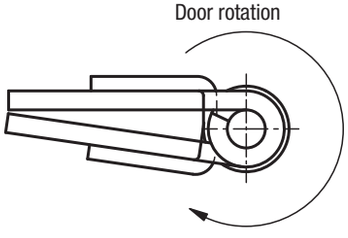
Note:
Barrel hinges.
Opening angle 270°.

Opening spring torque:
M(0°) : 0.85 Nm / M(90°) : 0.56 Nm / M(180°) : 0.28 Nm
Closing spring torque:
M(0°) : 0.28 Nm / M(90°) : 0.56 Nm / M(180°) : 0.85 Nm

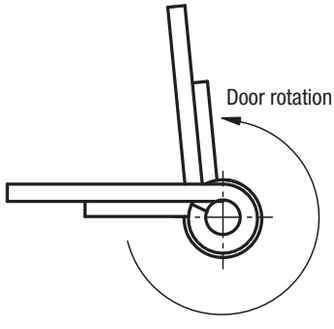
By the aluminium hinges, the tension springs are steel alloyed with Zn/Al.

Form A: without holes
Form B: with holes

Hinges with closing spring



Hinges with opening spring

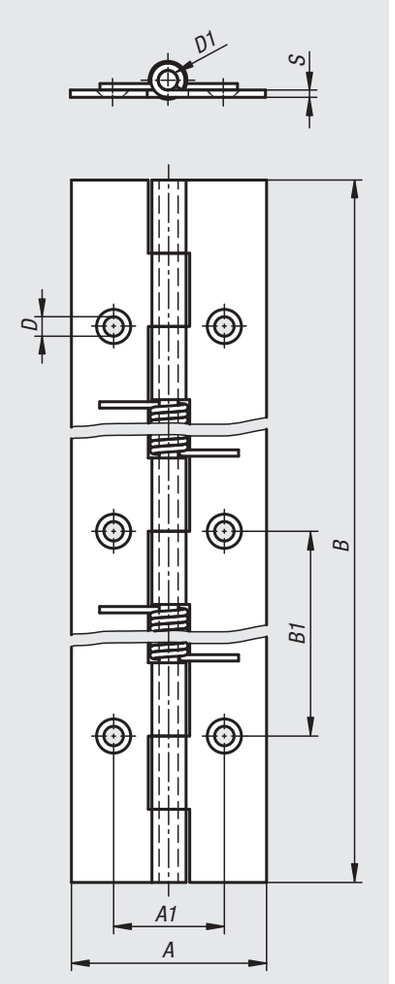


Order No.	Form	Version	Main material	Finish	A	A1	B	B1	D	D1	S
27902-4012000	A	spring open	steel	bright	40	-	120	-	-	4	1,5
27902-4012001	B	spring open	steel	galvanised	40	22,7	120	60	4	4	1,5
27902-14012000	A	spring open	stainless steel	bright	40	-	120	-	-	4	1,5
27902-14012001	B	spring open	stainless steel	bright	40	22,7	120	60	4	4	1,5
27902-24012000	A	spring open	aluminium	bright	40	-	120	-	-	4	1,5
27902-24012001	B	spring open	aluminium	bright	40	22,7	120	60	4	4	1,5
27902-4012010	A	spring closed	steel	bright	40	-	120	-	-	4	1,5
27902-4012011	B	spring closed	steel	galvanised	40	22,7	120	60	4	4	1,5
27902-14012010	A	spring closed	stainless steel	bright	40	-	120	-	-	4	1,5
27902-14012011	B	spring closed	stainless steel	bright	40	22,7	120	60	4	4	1,5
27902-24012010	A	spring closed	aluminium	bright	40	-	120	-	-	4	1,5
27902-24012011	B	spring closed	aluminium	bright	40	22,7	120	60	4	4	1,5

Spring hinges

steel or stainless steel, 180 mm





Material:
Steel or 1.4301 stainless steel.
Tension spring stainless steel.

Version:
Steel bright or electro zinc-plated.
Stainless steel bright.

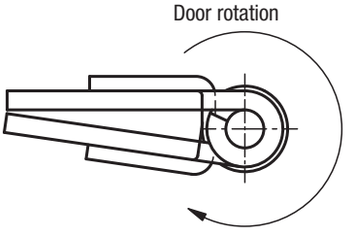
Sample order:
nlm 27903-4018000

Note:
Butt type hinges.
Opening angle 270°.

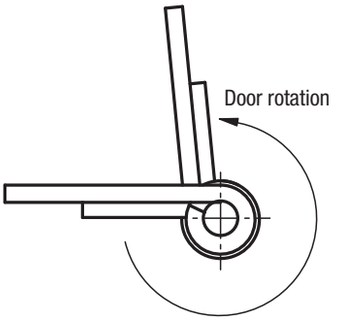
Spring torque opening:
M(0°): 1.7 Nm / M(90°): 1.1 Nm / M(180°): 0.56 Nm
Spring torque closing:
M(0°): 0.56 Nm / M(90°): 1.1 Nm / M(180°): 1.7 Nm

Form A: without holes
Form B: with holes

Hinges with closing spring



Hinges with opening spring

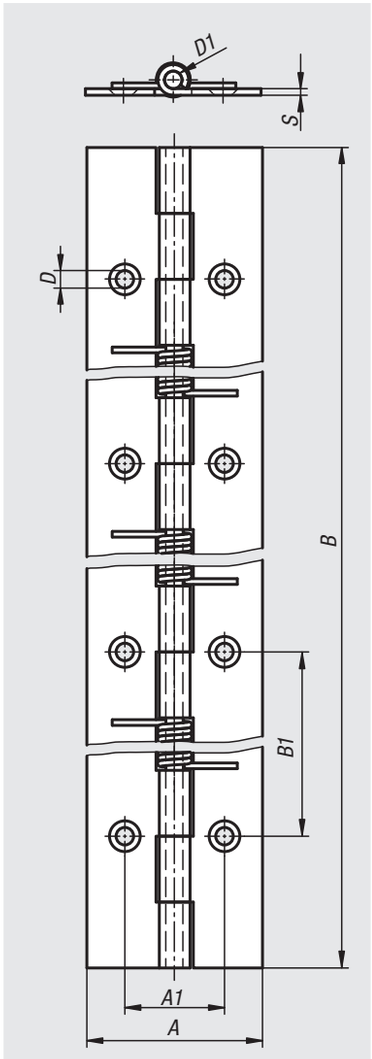


Order No.	Form	Version	Main material	Finish	A	A1	B	B1	D	D1	S
27903-4018000	A	spring open	steel	bright	40	-	180	-	-	4	1,5
27903-4018001	B	spring open	steel	galvanised	40	22,7	180	60	4	4	1,5
27903-14018000	A	spring open	stainless steel	bright	40	-	180	-	-	4	1,5
27903-14018001	B	spring open	stainless steel	bright	40	22,7	180	60	4	4	1,5
27903-4018010	A	spring closed	steel	bright	40	-	180	-	-	4	1,5
27903-4018011	B	spring closed	steel	galvanised	40	22,7	180	60	4	4	1,5
27903-14018010	A	spring closed	stainless steel	bright	40	-	180	-	-	4	1,5
27903-14018011	B	spring closed	stainless steel	bright	40	22,7	180	60	4	4	1,5

Spring hinges

steel or stainless steel, 240 mm





Material:
Steel or 1.4301 stainless steel.
Tension spring stainless steel.

Version:
Steel bright or electro zinc-plated.
Stainless steel bright.

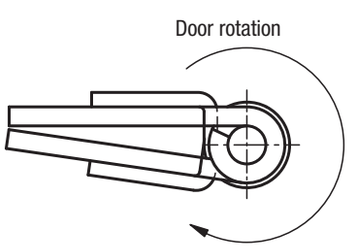
Sample order:
nlm 27904-4024000

Note:
Butt type hinges.
Opening angle 270°.

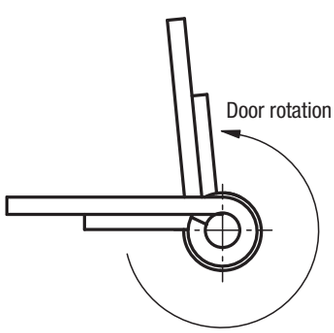
Spring torque opening:
M(0°): 2.55 Nm / M(90°): 1.68 Nm / M(180°): 0.84 Nm
Spring torque closing:
M(0°): 0.84 Nm / M(90°): 1.68 Nm / M(180°): 2.55 Nm

Form A: without holes
Form B: with holes

Hinges with closing spring



Hinges with opening spring

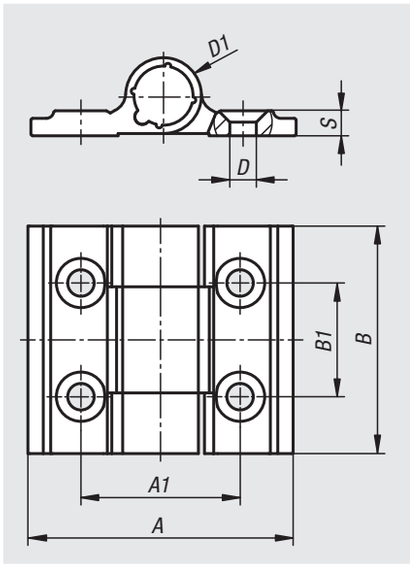


Order No.	Form	Version	Main material	Finish	A	A1	B	B1	D	D1	S
27904-4024000	A	spring open	steel	bright	40	-	240	-	-	4	1,5
27904-4024001	B	spring open	steel	galvanised	40	22,7	240	60	4	4	1,5
27904-14024000	A	spring open	stainless steel	bright	40	-	240	-	-	4	1,5
27904-14024001	B	spring open	stainless steel	bright	40	22,7	240	60	4	4	1,5
27904-4024010	A	spring closed	steel	bright	40	-	240	-	-	4	1,5
27904-4024011	B	spring closed	steel	galvanised	40	22,7	240	60	4	4	1,5
27904-14024010	A	spring closed	stainless steel	bright	40	-	240	-	-	4	1,5
27904-14024011	B	spring closed	stainless steel	bright	40	22,7	240	60	4	4	1,5

Spring hinges

aluminium profile tension spring hinges, 0.20 Nm





Material:
Aluminium 6060 T5.
Cover plug PA 6.6.

Version:
Black anodised

Sample order:
nlm 27905-353001

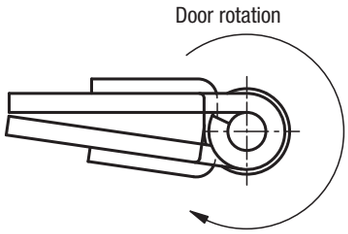
Note:
These hinges have stainless steel tension springs which enables doors and hatches to open or close automatically.
Opening angle 270°.

Spring torque opening:
M(0°): 0.23 Nm / M(90°): 0.15 Nm / M(180°): 0.08 Nm
Spring torque closing:
M(0°): 0.08 Nm / M(90°): 0.15 Nm / M(180°): 0.23 Nm

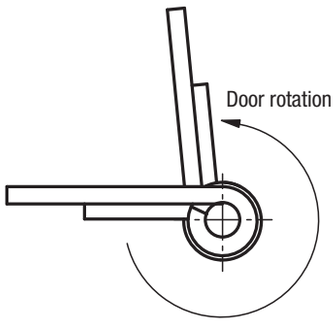
Fastened with DIN 7991 countersunk screws.

Temperature range:
From -20°C to +80°C

Hinges with closing spring



Hinges with opening spring

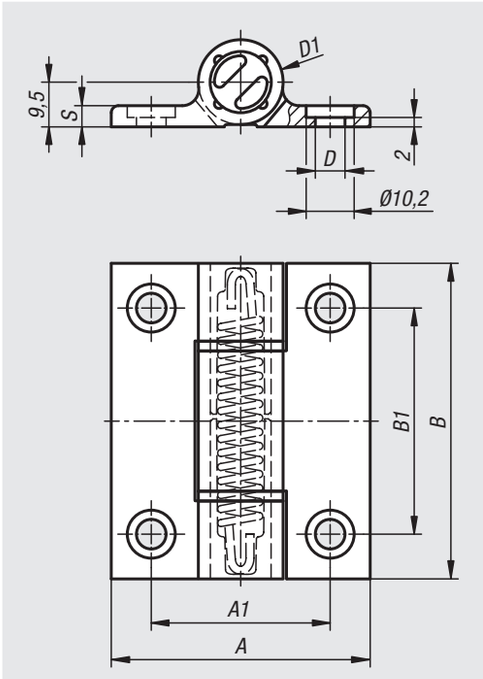


Order No.	Version	A	A1	B	B1	D	D1	S
27905-353001	spring open	35	21	30	15	3,5	10	3,3
27905-353011	spring closed	35	21	30	15	3,5	10	3,3

Spring hinges

aluminium profile tension spring hinges, 0.35 Nm





Material:
Aluminium 6060 T5.
End caps PA 6.6.
Washers POM.

Version:
Black anodised

Sample order:
nlm 27906-556701

Note:
These hinges have steel tension springs which enables doors and hatches to open or close automatically.
Opening angle 180°.

Spring torque opening:
M(0°): 0.35 Nm / M(90°): 0.24 Nm / M(180°): 0.12 Nm

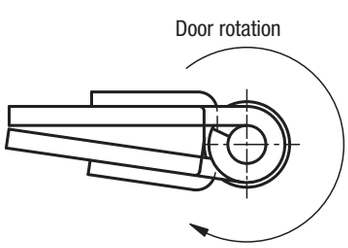
These hinges have a more than 30000 cycle service life.

Fastened using DIN 912/EN ISO 4762 socket head screws.

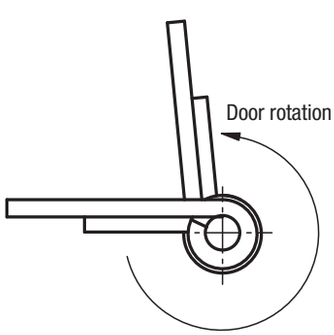
Temperature range:
From -20°C to +80°C

Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Hinges with closing spring



Hinges with opening spring

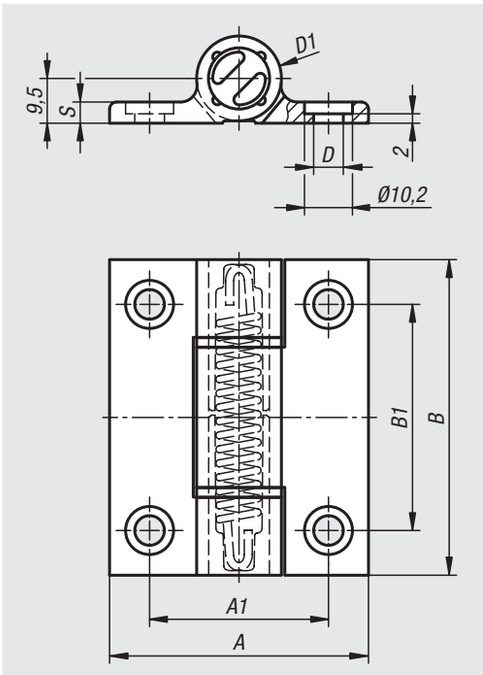


Order No.	Version	A	A1	B	B1	D	D1	S
27906-556701	spring open	55	38	67	48	6,3	18	4,5

Spring hinges

aluminium profile tension spring hinges, 0.7 Nm





Material:
Aluminium 6060 T5.
End caps PA 6.6.
Washers POM.

Version:
Black anodised

Sample order:
nlm 27907-556701

Note:
These hinges have steel tension springs which enables doors and hatches to open or close automatically.
Opening angle 180°.

Spring torque opening:
M(0°): 0.7 Nm / M(90°): 0.45 Nm / M(180°): 0.23 Nm
Spring torque closing:
M(0°): 0.23 Nm / M(90°): 0.45 Nm / M(180°): 0.7 Nm

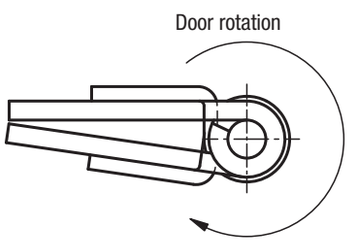
These hinges have a more than 30000 cycle service life.

Fastened using DIN 912/EN ISO 4762 socket head screws.

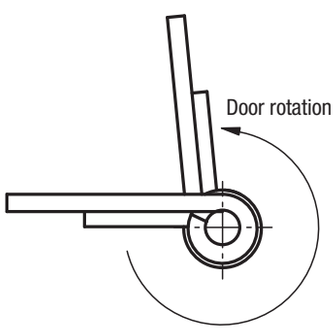
Temperature range:
From -20°C to +80°C

Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Hinges with closing spring



Hinges with opening spring

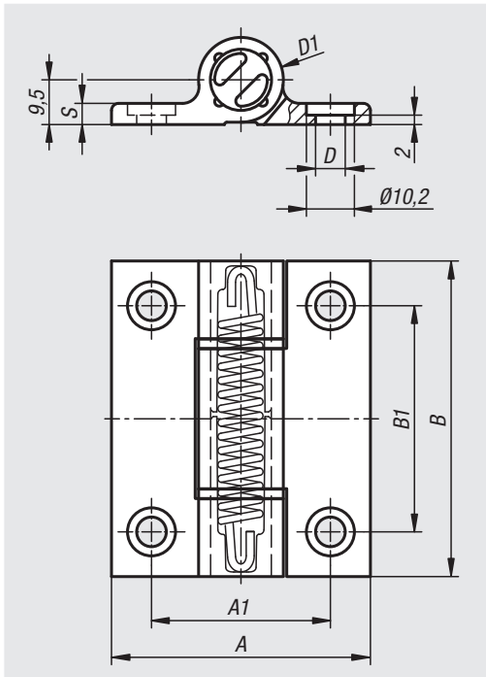


Order No.	Version	A	A1	B	B1	D	D1	S
27907-556701	spring open	55	38	67	48	6,3	18	4,5
27907-556711	spring closed	55	38	67	48	6,3	18	4,5

Spring hinges

aluminium profile tension spring hinges, 1.3 Nm





Material:
Aluminium 6060 T5.
End caps PA 6.6.
Washers POM.

Version:
Black anodised

Sample order:
nlm 27908-556701

Note:
These hinges have steel tension springs which enables doors and hatches to open or close automatically. Opening angle 180°.

Spring torque opening:
M(0°): 1.3 Nm / M(90°): 1.1 Nm / M(180°): 0.9 Nm
Spring torque closing:
M(0°): 0.5 Nm / M(90°): 0.7 Nm / M(180°): 1 Nm

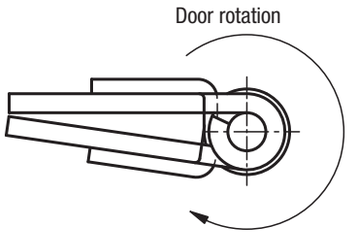
These hinges have a more than 10000 cycle service life.

Fastened using DIN 912/EN ISO 4762 socket head screws.

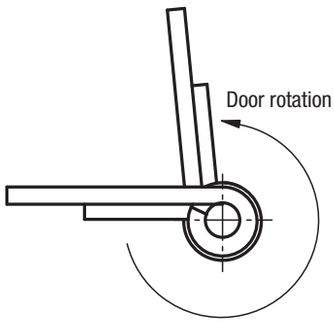
Temperature range:
From -20°C to +80°C

Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Hinges with closing spring



Hinges with opening spring

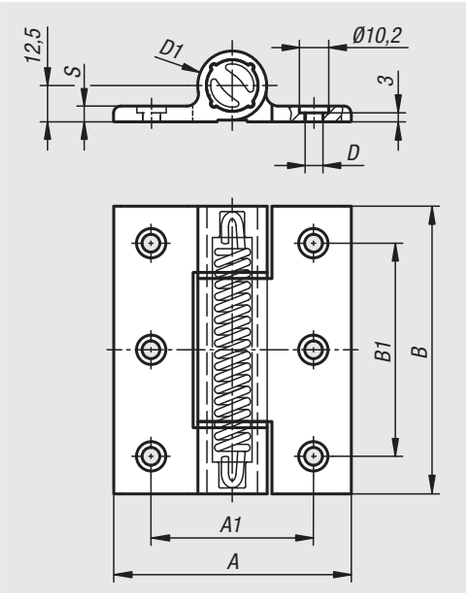


Order No.	Version	A	A1	B	B1	D	D1	S
27908-556701	spring open	55	38	67	48	6,3	18	4,5
27908-556711	spring closed	55	38	67	48	6,3	18	4,5

Spring hinges

aluminium profile tension spring hinges, 3.8 Nm





Material:
Aluminium 6060 T5.
End caps PA 6.6.
Washers POM.

Version:
Black anodised

Sample order:
nlm 27909-8210001

Note:
These hinges have steel tension springs which enables doors and hatches to open or close automatically.
Opening angle 270°.

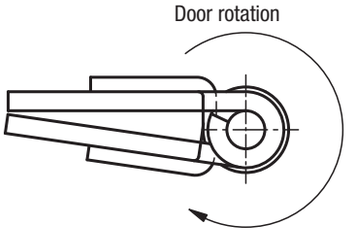
Spring torque opening:
M(0°): 3.80 Nm / M(90°): 3.10 Nm / M(180°): 2.40 Nm
Spring torque closing:
M(0°): 2.20 Nm / M(90°): 2.90 Nm / M(180°): 3.50 Nm

Fastened using DIN 912/EN ISO 4762 socket head screws.

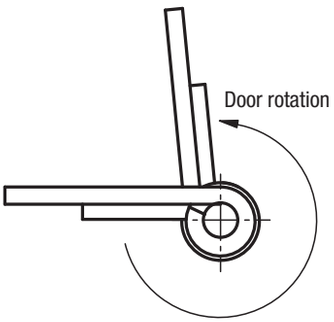
Temperature range:
From -20°C to +80°C

Accessories:
Socket head screws with hexagon socket DIN 912/EN ISO 4762.

Hinges with closing spring



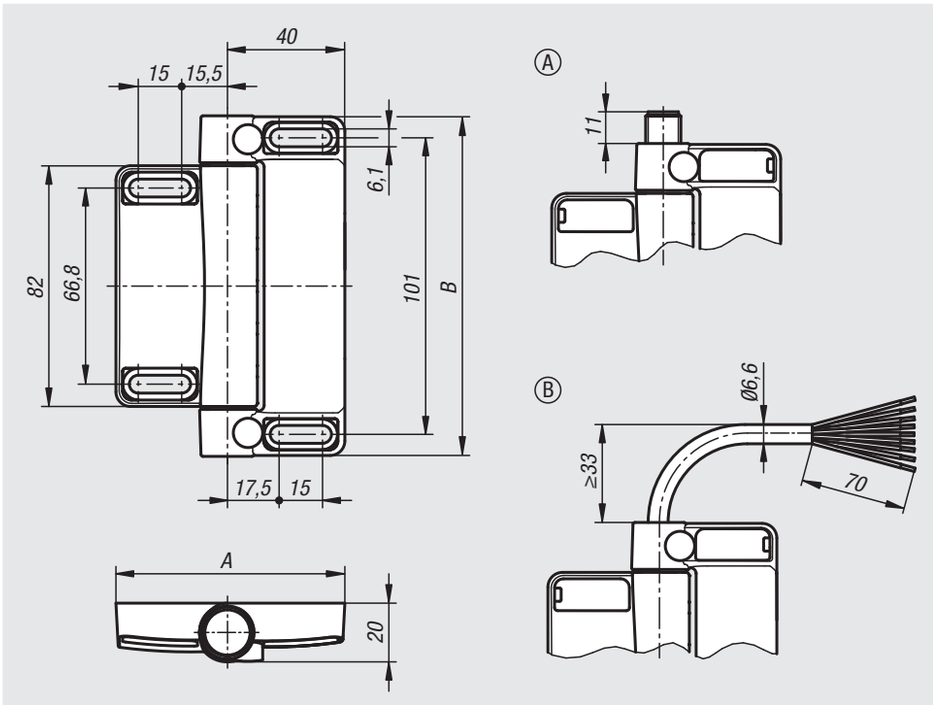
Hinges with opening spring



Order No.	Version	A	A1	B	B1	D	D1	S
27909-8210001	spring open	82,5	56,5	100	74	6,2	24	5,5
27909-8210011	spring closed	82,5	56,5	100	74	6,2	24	5,5

Security hinge switches





Material:
Housing, die-cast zinc.
Housing cover, plastic, self-extinguishing.
Hinge bolts, die-cast zinc/steel C45.
Contacts, silver-nickel alloy 10.

Sample order:
nlm 27950-781161111

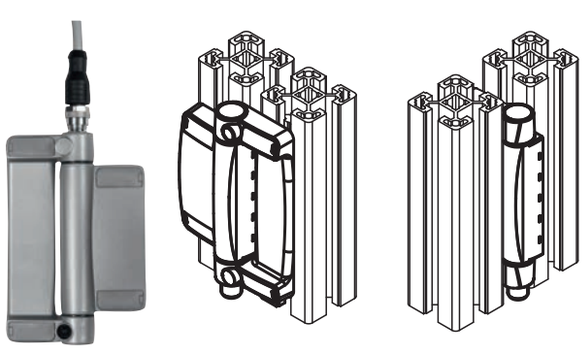
Note:
The security hinge switches are used for monitoring the position of pivoting safety doors, protective covers and protective hoods. The security is monitored directly in the hinge. The switching angle is freely adjustable over the entire working range. A mounting aid ensures quick alignment with doors and posts.

The additional hinges have the same appearance and dimensions as the security hinge switches.

Application:
- Special machine construction
- Electronics industry
- Packaging machines
- Enclosures/profile systems
- Machine tools
- Measuring, processing, testing and laboratory technology

Assembly:
4x DIN 7984 or ISO 4762 M6 screws,
Tightening torque 4.3 Nm
General assembly instructions can be found in the accompanying operating instructions.

Advantages:
- Suitable for securing pivot flaps and gates
- Minimum assembly required, especially on conventional aluminium profiles
- Optimum integration into the surrounding structure
- Additional protection against tampering
- Hardly any mechanical wear

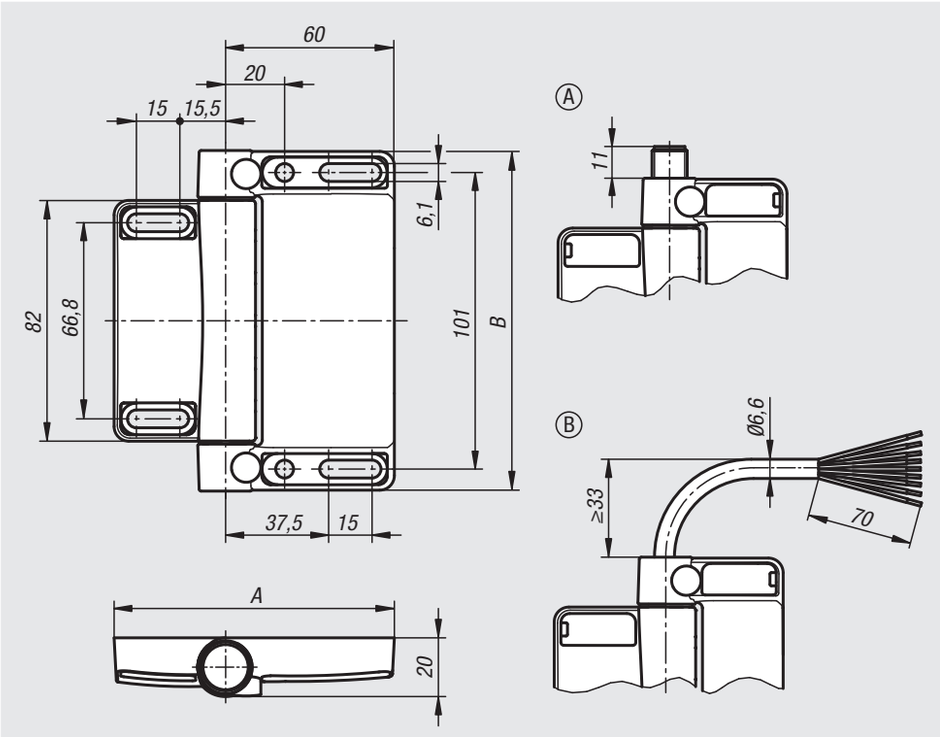


Order No.	Item	Form	A	B	Default setting	Contacts	Connection type	Connection position
27950-781161111	security hinge switch	A	78	116	external mounting	1C / 20	connector	bottom
27950-781161112	security hinge switch	A	78	116	external mounting	1C / 20	connector	top
27950-781162111	security hinge switch	A	78	116	universal	1C / 20	connector	bottom
27950-781162112	security hinge switch	A	78	116	universal	1C / 20	connector	top
27950-781161121	security hinge switch	B	78	116	external mounting	1C / 20	cable	bottom
27950-781161122	security hinge switch	B	78	116	external mounting	1C / 20	cable	top
27950-781162121	security hinge switch	B	78	116	universal	1C / 20	cable	bottom
27950-781162122	security hinge switch	B	78	116	universal	1C / 20	cable	top
27950-78116	additional hinge	-	78	116	-	-	-	-

Security hinge switches

long version





Material:
Housing, die-cast zinc.
Housing cover, plastic, self-extinguishing.
Hinge bolts, die-cast zinc/steel C45.
Contacts, silver-nickel alloy 10.

Sample order:
nlm 27951-981161111

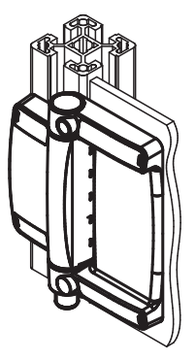
Note:
The security hinge switches are used for monitoring the position of pivoting safety doors, protective covers and protective hoods. The security is monitored directly in the hinge. The switching angle is freely adjustable over the entire working range. A mounting aid ensures quick alignment with doors and posts.

The additional hinges have the same appearance and dimensions as the security hinge switches.

Application:
- Special machine construction
- Electronics industry
- Packaging machines
- Enclosures/profile systems
- Machine tools
- Measuring, processing, testing and laboratory technology

Assembly:
4x DIN 7984 or ISO 4762 M6 screws,
Tightening torque 4.3 Nm
General assembly instructions can be found in the accompanying operating instructions.

Advantages:
- Suitable for securing pivot flaps and gates
- Minimum assembly required, especially on conventional aluminium profiles
- Optimum integration into the surrounding structure
- Additional protection against tampering
- Hardly any mechanical wear

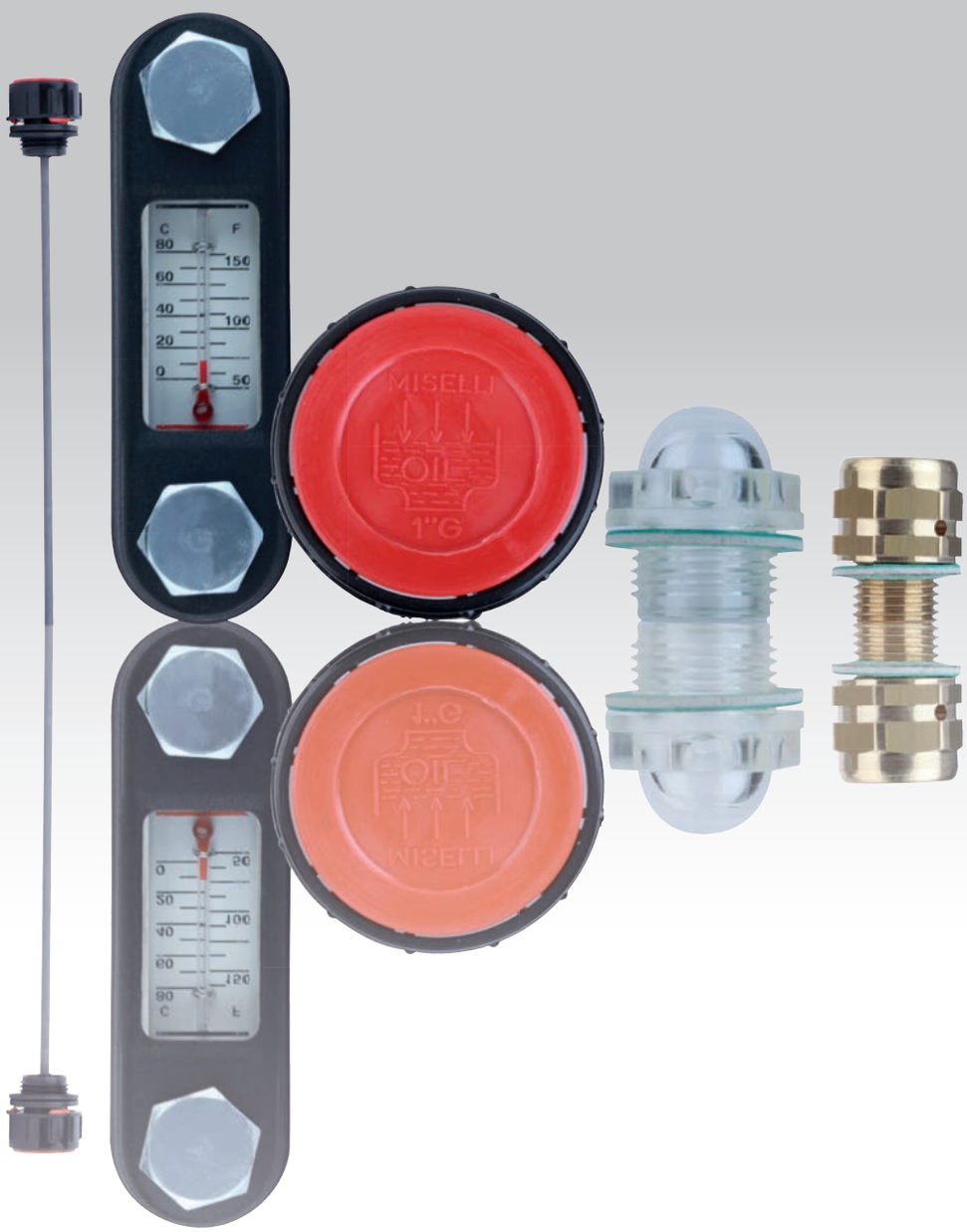


Order No.	Item	Form	A	B	Default setting	Contacts	Connection type	Connection position
27951-981161111	security hinge switch	A	98	116	external mounting	1C / 20	connector	bottom
27951-981161112	security hinge switch	A	98	116	external mounting	1C / 20	connector	top
27951-981162111	security hinge switch	A	98	116	universal	1C / 20	connector	bottom
27951-981162112	security hinge switch	A	98	116	universal	1C / 20	connector	top
27951-981161121	security hinge switch	B	98	116	external mounting	1C / 20	cable	bottom
27951-981161122	security hinge switch	B	98	116	external mounting	1C / 20	cable	top
27951-981162121	security hinge switch	B	98	116	universal	1C / 20	cable	bottom
27951-981162122	security hinge switch	B	98	116	universal	1C / 20	cable	top
27951-98116	additional hinge	-	98	116	-	-	-	-

Notes

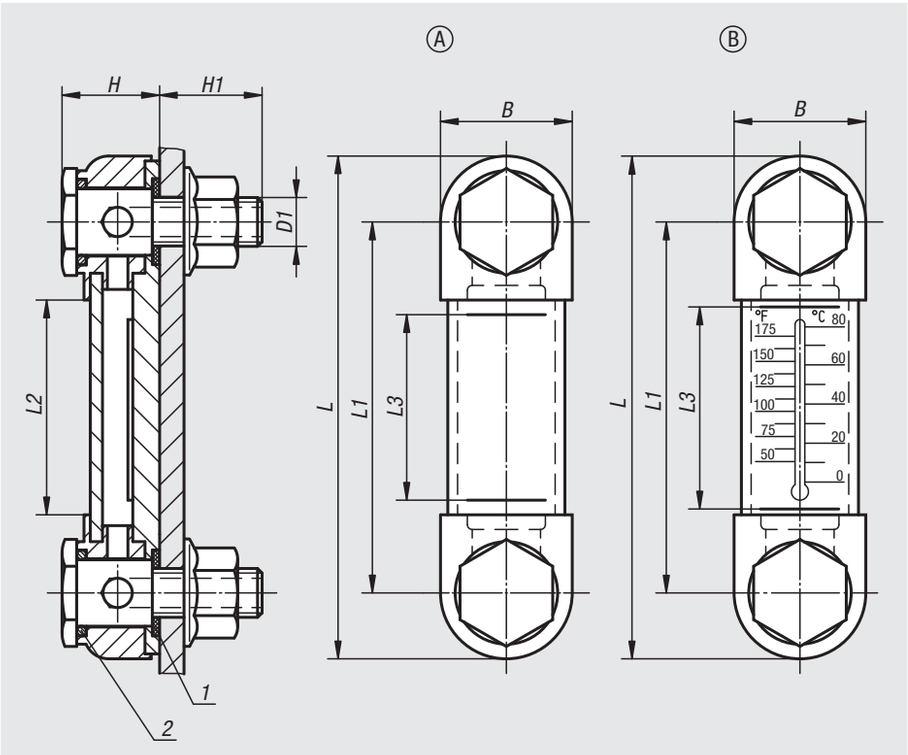
28000

Oil level gauges
Caps
Plugs
Vent screws
Dipsticks
Filler necks



Oil level gauges





Material:
Housing thermoplastic polyamide.
O-ring and flat seal rubber (NBR).
Reflector aluminium.
Screw and hex nut steel.

Version:
Transparent housing, high mechanical stability, non-ageing, temperature resistant up to 100 °C. Pressure resistant at 20 °C up to 10 bar, at 60 °C up to 8 bar.
Reflector painted white, line marks and scale black.
Screw and hexagon nut, electro zinc-plated.

Sample order:
nlm 28000-1127

Note:
The oil level gauges can either be fastened as shown in the illustration or screwed directly into a tapped hole. Centre distance for the fastening holes = L1 ±0.3.
The max. tightening torque for the fastening screws is 5 Nm.

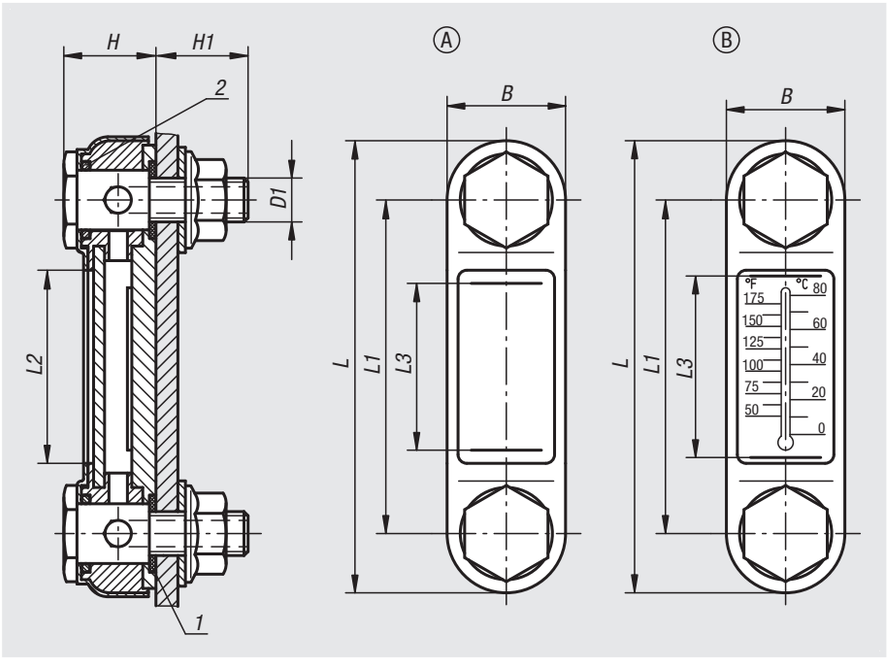
Drawing reference:
Form A: without thermometer
Form B: with thermometer

1) flat seal
2) O-ring

Order No.	Form	B	D1	H	H1	L	L1	L2	L3	Number of fastening screws	Thermometer scale
28000-1076	A	27	M10	20	21	103	76	44	37	2	-
28000-1127	A	27	M12	19	18	151	127	95	80	2	-
28000-2076	B	27	M10	20	21	103	76	44	37	2	0 - 80 °C / 50 - 175 °F
28000-2127	B	27	M12	19	18	151	127	95	80	2	0 - 100 °C / 50 - 200 °F

Oil level gauges





Material:
Housing steel.
Viewing glass thermoplastic polyamide.
O-ring and flat seal rubber (NBR).
Reflector aluminium.
Screw and hex nut steel.

Version:
Housing painted black.
Transparent viewing glass, high mechanical stability, non-ageing, temperature resistant with oil up to 100 °C, with water up to 70 °C.
Reflector painted white, markings and scale black.
Screw and hexagon nut, electro zinc-plated.

Sample order:
nlm 28000-107610

Note:
The oil level gauges can either be fastened as shown in the illustration or directly in the threaded hole.
Centre distance for the fastening holes = L1 ±0.5.
The oil level gauges are suitable for tanks operating without pressure.
Maximum operating temperature: 100 °C.

Drawing reference:
Form A: without thermometer
Form B: with thermometer

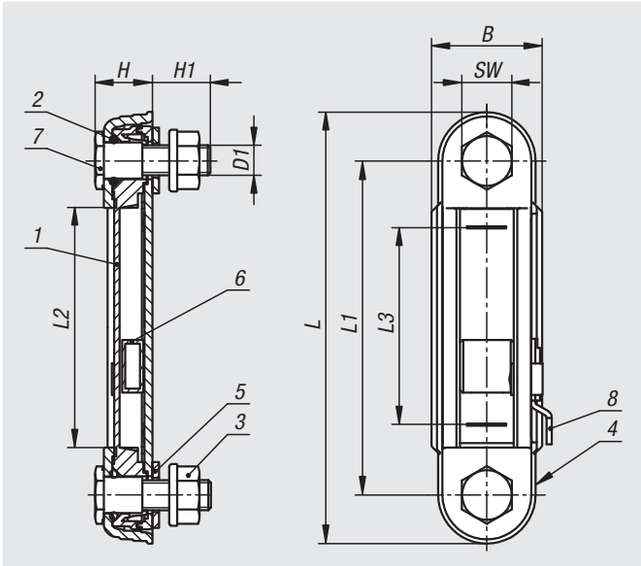
1) flat seal
2) O-ring

Order No.	Form	B	D1	H	H1	L	L1	L2	L3	Number of fastening screws	Thermometer scale
28000-107610	A	31	M10	24,5	20	107	76	39	37	2	-
28000-107612	A	31	M12	24,5	20	107	76	39	37	2	-
28000-112710	A	31	M10	24,5	20	156	127	90	80	2	-
28000-112712	A	31	M12	24,5	20	156	127	90	80	2	-
28000-125412	A	34	M12	33	17	286	254	200	178	2	-
28000-207610	B	31	M10	24,5	20	107	76	39	37	2	0 - 80 °C / 50 - 175 °F
28000-207612	B	31	M12	24,5	20	107	76	39	37	2	0 - 80 °C / 50 - 175 °F
28000-212710	B	31	M10	24,5	20	156	127	90	80	2	0 - 100 °C / 50 - 200 °F
28000-212712	B	31	M12	24,5	20	156	127	90	80	2	0 - 100 °C / 50 - 200 °F
28000-225412	B	34	M12	33	17	286	254	200	178	2	0 - 100 °C / 50 - 200 °F

Oil level gauges

with electronic oil level monitoring





Material:
Housing fibreglass reinforced thermoplastic polyamide.
Sight glass thermoplastic polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Float plastic.
Screw and nut, steel.

Version:
Housing black.
Sight glass crystal clear, high mechanical stability, non-ageing.
Reflector white.
Float red, with magnetic element.
Screw and nut electro zinc-plated.

Sample order:
nlm 28000-10-12712

Note:
The oil level gauge not only enables the oil level to be viewed but also recorded using a REED switch. When the float element reaches the selected minimum value after the circuit has been closed, the system emits an electric signal.
The sensor is located on the housing and its height can be adjusted in line with the control requirements for the oil level. The minimum level is ca. 35 mm from the centre of the lower fastening screw.

The reed switch is equipped with a normally open (NO) contact as standard.

The sight glass consists of two transparent components which are ultrasonically welded together following assembly. This ensures a seal around the entire body.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Temperature range:
Maximum operating temperature: 75 °C.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.3.

Function:
The oil level is measured using a float element with a magnet that activates the electrical contact when the REED level switch is reached. If the oil level falls below a particular level, an electrical pulse can be emitted.

Attention:
Strong magnetic fields can impair function.

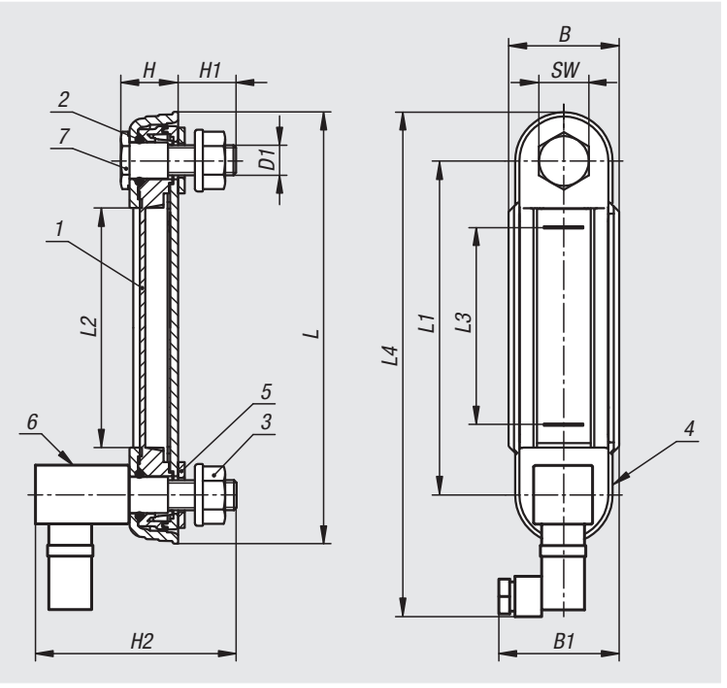
Drawing reference:
1) Sight glass
2) O-ring
3) M12 flange nut
4) Housing
5) Flat seal
6) Float with magnet
7) M12 hollow screw
8) Reed switch

Order No.	B	D1	H	H1	L	L1	L2	L3	SW	Number of fastening screws
28000-10-12712	42	M12	21	21	164	127	91	75	19	2

Oil level gauges

with electronic temperature monitoring





Material:
Housing fibreglass reinforced thermoplastic polyamide.
Sight galss thermoplastic polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Screw and nut, steel.

Version:
Housing black.
Sight glass crystal clear, high mechanical stability, non-ageing.
Reflector white.
Screw and nut electro zinc-plated.

Sample order:
nlm 28000-11-112712

Note:
In addition to a visual check, the oil level gauges can also emit an electric signal if the temperature of the liquid inside the container reaches the threshold of 70 °C.

The temperature is monitored by a temperature switch (bi-metal). When the specified temperature is reached, the sensor closes (NO) or opens (NC) the circuit depending on the model.

The sight glass consists of two transparent components which are ultrasonically welded together following assembly. This ensures a seal around the entire body.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Temperature range:
Maximum operating temperature: 75 °C.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.3.

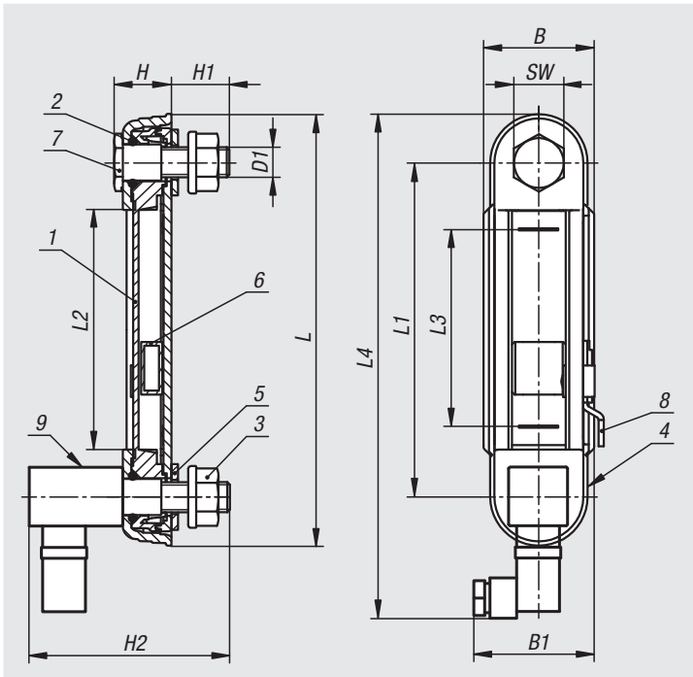
Drawing reference:
1) Inspection glass
2) O-ring
3) M12 flange nut
4) Housing
5) Flat seal
6) Temperature sensor
7) M12 hollow screw

Order No.	Type	B	B1	D1	H	H1	H2	L	L1	L2	L3	L4	SW	Number of fastening screws
28000-11-112712	NO	42	45	M12	21	21	80	164	127	91	75	191	19	2
28000-11-212712	NC	42	45	M12	21	21	80	164	127	91	75	191	19	2

Oil level gauges

with electronic oil level and temperature monitoring





Material:
Housing fibreglass reinforced thermoplastic polyamide.
Sight glass thermoplastic polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Float plastic.
Screw and nut, steel.

Version:
Housing black.
Sight glass crystal clear, high mechanical stability, non-ageing.
Reflector white.
Float red, with magnetic element.
Screw and nut electro zinc-plated.

Sample order:
nlm 28000-12-112712

Note:
The oil level gauge not only enables the oil level to be viewed but also recorded using a REED switch. In addition, the oil level gauges can also emit an electric signal if the temperature of the liquid inside the container reaches the threshold of 70 °C.

As soon as the float element approaches the selected minimum value after the circuit has been closed, the system emits an electric signal. The sensor is located on the housing and its height can be adjusted in line with the control requirements for the oil level. The minimum level is ca. 35 mm from the centre of the lower fastening screw.

The reed switch is equipped with a normally open (NO) contact as standard.

The temperature is monitored by a temperature switch (bi-metal). When the specified temperature is reached, the sensor closes (NO) or opens (NC) the circuit depending on the model.

The sight glass consists of two transparent components which are ultrasonically welded together following assembly. This ensures a seal around the entire body.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Temperature range:
Maximum operating temperature: 75 °C.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.3.

Function:
The oil level is measured using a float element with a magnet that activates the electrical contact when the REED level switch is reached. If the oil level falls below a particular level, an electrical pulse can be emitted.

Attention:
Strong magnetic fields can impair function.

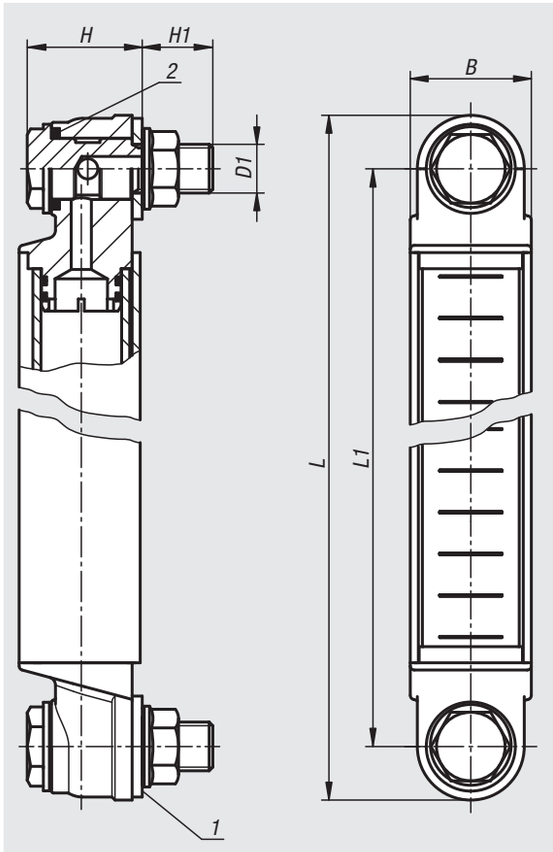
Drawing reference:
1) Sight glass
2) O-ring
3) M12 flange nut
4) Housing
5) Flat seal
6) Float with magnet
7) M12 hollow screw
8) Reed switch
9) Temperature sensor

Order No.	Type	B	B1	D1	H	H1	H2	L	L1	L2	L3	L4	SW	Number of fastening screws
28000-12-112712	NO	42	45	M12	21	21	80	164	127	91	75	191	19	2
28000-12-212712	NC	42	45	M12	21	21	80	164	127	91	75	191	19	2

Oil level gauges

long version





Material:
Housing aluminium.
Tube polycarbonate.
Caps polyamide.
O-ring and flat seal NBR, Shore 70.
Screw and hex. nut steel.

Version:
Viewing glass transparent.
Screws and nuts electro zinc-plated.

Sample order:
nlm 28001-1400

Note:
The oil level gauges can either be fastened as shown in the illustration or directly in the tapped hole. Centre distance for the fastening holes = L1±0.3. The maximum operating temperature is 90 °C. The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

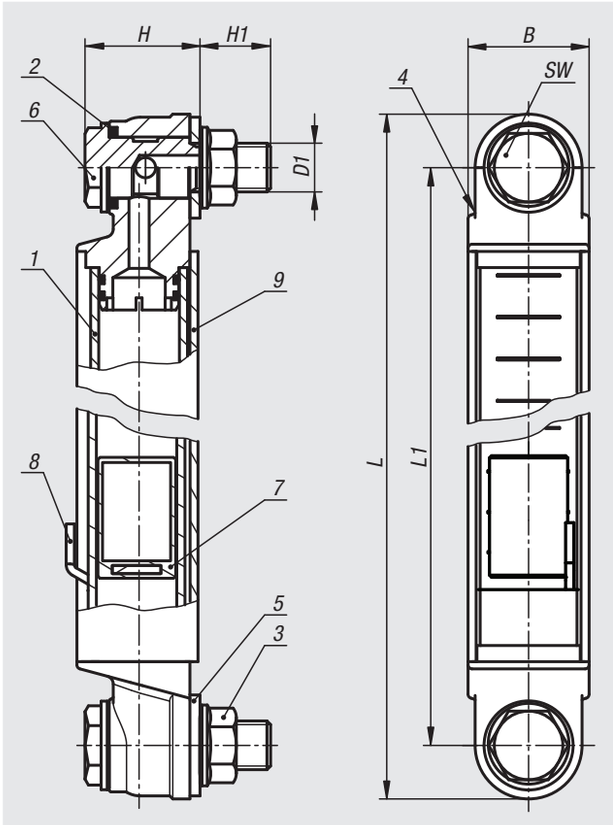
Drawing reference:
1) flat seal
2) O-ring

Order No.	B	D1	H	H1	L	L1
28001-1300	30	M12	30	16,5	325	300
28001-1400	30	M12	30	16,5	425	400
28001-1500	30	M12	30	16,5	525	500

Oil level gauges

with electronic oil level monitoring, long version





Material:
Housing aluminium.
Tube polycarbonate.
Caps polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Float plastic.
Screws and nuts, steel.

Version:
Sight glass crystal clear.
Reflector white.
Float red, with magnetic element.
Screws and nuts electro zinc-plated.

Sample order:
nlm 28001-10-300

Note:
The oil level gauge not only enables the oil level to be viewed but also recorded using a REED switch. If the float element reaches the selected minimum value after the circuit has been closed, the system emits an electric signal.
The sensor is located on the sight glass and its height can be adjusted in line with the control requirements for the oil level.
The minimum level is around 50 mm from the centre of the lower fastening screw.

The reed switch is equipped with a normally open (NO) contact as standard.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Temperature range:
Maximum operating temperature: 75 °C.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.5.

Function:
The oil level is measured using a float element with a magnet that activates the electrical contact when the REED level switch is reached. If the oil level falls below a particular level, an electrical pulse can be emitted.

Attention:
Strong magnetic fields can impair function.

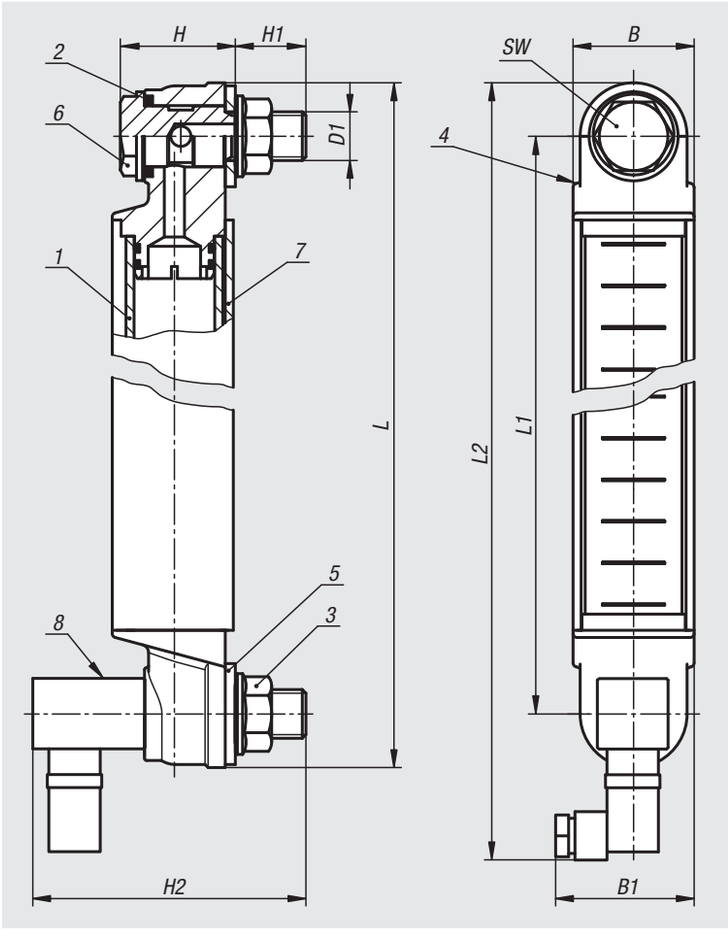
Drawing reference:
1) Sight glass
2) O-ring
3) M12 flange nut
4) Plastic end cap
5) Flat seal
6) M12 hollow screw
7) Float with magnet
8) Reed switch
9) Aluminium housing

Order No.	B	D1	H	H1	L	L1	SW	Number of fastening screws
28001-10-300	30	M12	30	16,5	326,6	300	17	2
28001-10-400	30	M12	30	16,5	426,6	400	17	2
28001-10-500	30	M12	30	16,5	526,6	500	17	2

Oil level gauges

with electronic temperature monitoring, long version





Material:
Housing aluminium.
Tube polycarbonate.
Caps polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Screws and nuts, steel.

Version:
Sight glass crystal clear.
Reflector white.
Screws and nuts electro zinc-plated.

Sample order:
nlm 28001-11-1300

Note:
In addition to a visual check, the oil level gauges can also emit an electric signal if the temperature of the liquid inside the container reaches the threshold of 70 °C.

The temperature is monitored by a temperature switch (bi-metal). When the specified temperature is reached, the sensor closes (NO) or opens (NC) the circuit depending on the model.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Temperature range:
Maximum operating temperature: 75 °C.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.5.

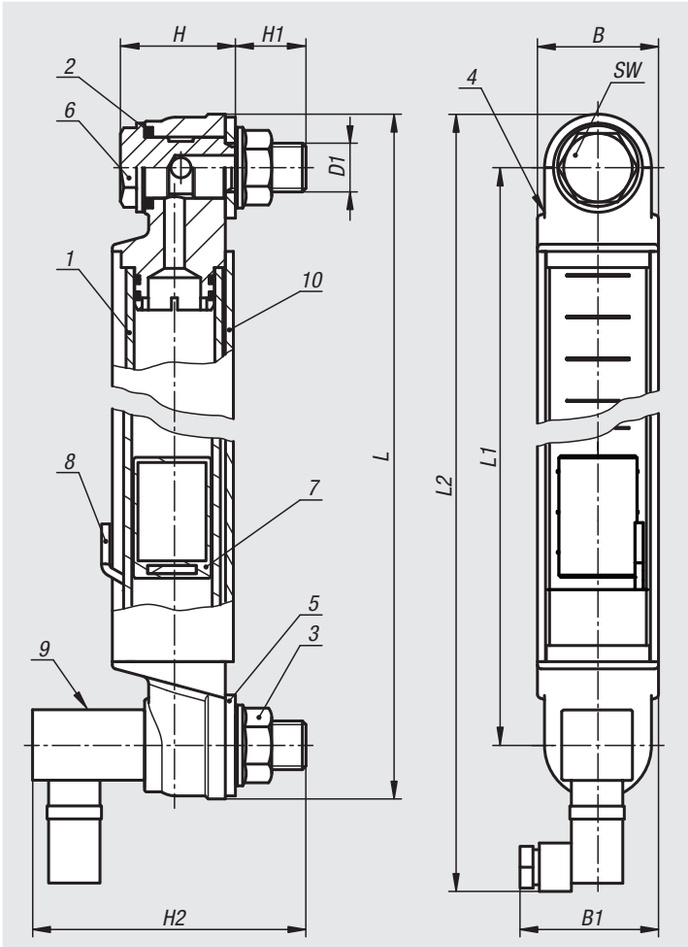
Drawing reference:
1) Sight glass
2) O-ring
3) M12 flange nut
4) Plastic end cap
5) Flat seal
6) M12 hollow screw
7) Aluminium housing
8) Temperature sensor

Order No.	Type	B	B1	D1	H	H1	H2	L	L1	L2	SW	Number of fastening screws
28001-11-1300	NO	30	39	M12	30	16,5	80	326,6	300	358,3	17	2
28001-11-2300	NC	30	39	M12	30	16,5	80	326,6	300	358,3	17	2
28001-11-1400	NO	30	39	M12	30	16,5	80	426,6	400	458,3	17	2
28001-11-2400	NC	30	39	M12	30	16,5	80	426,6	400	458,3	17	2
28001-11-1500	NO	30	39	M12	30	16,5	80	526,6	500	558,3	17	2
28001-11-2500	NC	30	39	M12	30	16,5	80	526,6	500	558,3	17	2

Oil level gauges

with electronic oil level and temperature monitoring, long version





Material:
Housing aluminium.
Tube polycarbonate.
Caps polyamide.
O-ring and flat seal NBR.
Reflector PVC.
Float plastic.
Screws and nuts, steel.

Version:
Sight glass crystal clear.
Reflector white.
Float red, with magnetic element.
Screws and nuts electro zinc-plated.

Sample order:
nlm 28001-12-1300

Note:
The oil level gauge not only enables the oil level to be viewed but also recorded using a REED switch. In addition, the oil level gauges can also emit an electric signal if the temperature of the liquid inside the container reaches the threshold of 70 °C.

As soon as the float element approaches the selected minimum value after the circuit has been closed, the system emits an electric signal.
The sensor is located on the housing and its height can be adjusted in line with the control requirements for the oil level. The minimum level is ca. 35 mm from the centre of the lower fastening screw.

The reed switch is equipped with a normally open (NO) contact as standard.

The temperature is monitored by a temperature switch (bi-metal). When the specified temperature is reached, the sensor closes (NO) or opens (NC) the circuit depending on the model.

The maximum pressure is 1 bar. The maximum tightening torque of the fastening screws is 5 Nm.

The sight glass has high mechanical strength and is resistant to mineral oil, petrol, lubricants, petroleum, solvents and most chemical substances. Avoid contact with alcoholic solutions and hot water.

Assembly:
The oil level gauge is secured using two M12 tapped holes or, two 12.2 mm (± 0.2 mm) holes and flange nuts. Centre distance for the fastening holes = L1 ±0.5.

Oil level gauges

with electronic oil level and temperature monitoring, long version

Function:
The oil level is measured using a float element with a magnet that activates the electrical contact when the REED level switch is reached. If the oil level falls below a particular level, an electrical pulse can be emitted.

Attention:
Strong magnetic fields can impair function.

Drawing reference:
1) Sight glass
2) O-ring
3) M12 flange nut
4) Plastic end cap
5) Flat seal
6) M12 hollow screw
7) Float with magnet
8) Reed switch
9) Temperature sensor
10) Aluminium housing

Order No.	Type	B	B1	D1	H	H1	H2	L	L1	L2	SW	Number of fastening screws
28001-12-1300	NO	30	39	M12	30	16,5	80	326,6	300	358,3	17	2
28001-12-2300	NC	30	39	M12	30	16,5	80	326,6	300	358,3	17	2
28001-12-1400	NO	30	39	M12	30	16,5	80	426,6	400	458,3	17	2
28001-12-2400	NC	30	39	M12	30	16,5	80	426,6	400	458,3	17	2
28001-12-1500	NO	30	39	M12	30	16,5	80	526,6	500	558,3	17	2
28001-12-2500	NC	30	39	M12	30	16,5	80	526,6	500	558,3	17	2

Oil level sight glasses



Material:
Housing in thermoplastic polyamide.
Plastic reflector.

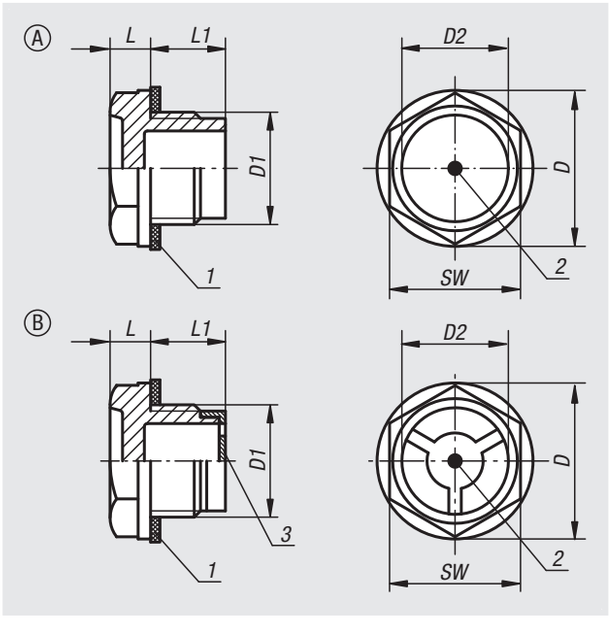
Version:
Housing, transparent, high mechanical stability, non-ageing, temperature resistant with oil up to 90 °C, resistant to solvents but not to alcohol or frost.
Flat seal, asbestos-free.
Reflector white.

Sample order:
nlm 28004-143100

On request:
Rubber gasket (NBR).

Drawing reference:
Form A: without reflector
Form B: with reflector

1) flat seal
2) check mark
3) reflector



Order No.	Form	D	D1	D2	L	L1	SW	Tightening torque max. Nm
28004-120014	A	20	G1/4	15	7	8	17	6
28004-122038	A	22	G 3/8	14	6,5	10,5	18	8
28004-128012	A	28	G 1/2	16	8	11	24	12
28004-135034	A	35	G 3/4	21	8	12	30	16
28004-143100	A	43	G 1	32	11	12	36	-
28004-151114	A	51	G1 1/4	33	10	16	42	-
28004-158112	A	58	G 1 1/2	40	12	16	50	-
28004-174200	A	74	G 2	48	12	22	64	-
28004-1201415	A	20	M14X1,5	15	7	8	17	7
28004-1221615	A	22	M16X1,5	14	6,5	10	18	8
28004-1251815	A	25	M18X1,5	16	7	10,5	21	10
28004-1282015	A	28	M20X1,5	18	7,5	11	24	16
28004-1282215	A	28	M22X1,5	16	7,5	12,5	24	12
28004-1362615	A	36	M26X1,5	21	8,5	13,5	30	21
28004-1362715	A	36	M27X1,5	21	8,5	13,5	30	21
28004-1514015	A	51	M40X1,5	32	10	17	42	-
28004-222038	B	22	G 3/8	14	6,5	10,5	18	8
28004-228012	B	28	G 1/2	16	8	11	24	12
28004-235034	B	35	G 3/4	21	8	12	30	16
28004-243100	B	43	G 1	32	11	12	36	-
28004-251114	B	51	G1 1/4	33	10	16	42	-
28004-258112	B	58	G 1 1/2	40	12	16	50	-
28004-274200	B	74	G 2	48	12	22	64	-
28004-2221615	B	22	M16X1,5	14	6,5	10	18	8
28004-2251815	B	25	M18X1,5	16	7	10,5	21	10
28004-2282015	B	28	M20X1,5	18	7,5	11	24	16
28004-2282215	B	28	M22X1,5	16	7,5	12,5	24	12
28004-2362615	B	36	M26X1,5	21	8,5	13,5	30	21
28004-2362715	B	36	M27X1,5	21	8,5	13,5	30	21
28004-2514015	B	51	M40X1,5	32	10	17	42	-

28006

Oil level sight glasses

press-in



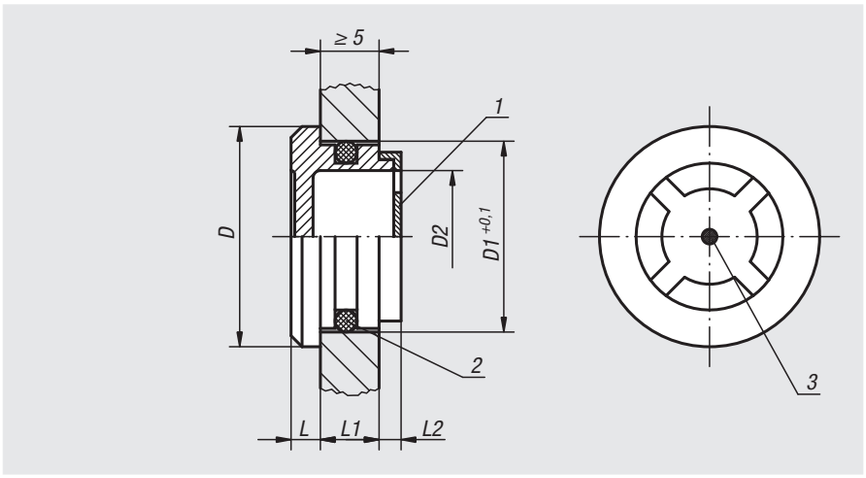
Material:
Housing thermoplastic polyamide.
O-ring NBR, Shore 70.
Reflector plastic.

Version:
Housing, transparent, high mechanical stability, non-ageing, temperature resistant up to 90 °C, resistant to solvents but not to alcohol or frost.
Reflector white.

Sample order:
nlm 28006-3026

Note:
For use where there is no internal pressure.

Drawing reference:
1) reflector
2) O-ring
3) check mark



Order No.	D	D1	D2	L	L1	L2
28006-2420	24	20	14	4	7	3
28006-3026	30	26	20	4	8	3,5
28006-3632	36	32	24	4	9	4
28006-4238	42	38	30	4	10	4
28006-4440	44	40	32	4	10	4

28008

Oil level sight glasses

domed



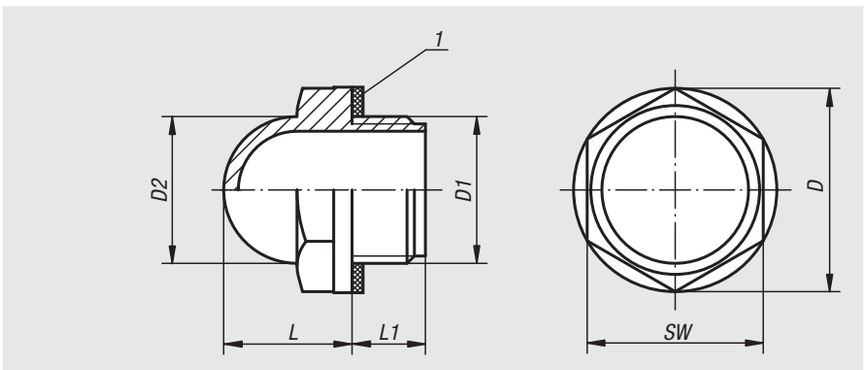
Material:
Housing in thermoplastic polyamide.

Version:
Housing, transparent, high mechanical stability, non-ageing,
temperature resistant with oil up to 100 °C,
with water up to 70 °C.
Resistant to solvents but not alcohol.
Flat seal, asbestos-free.

Sample order:
nlm 28008-28012

On request:
Rubber gasket (NBR).

Drawing reference:
1) flat seal



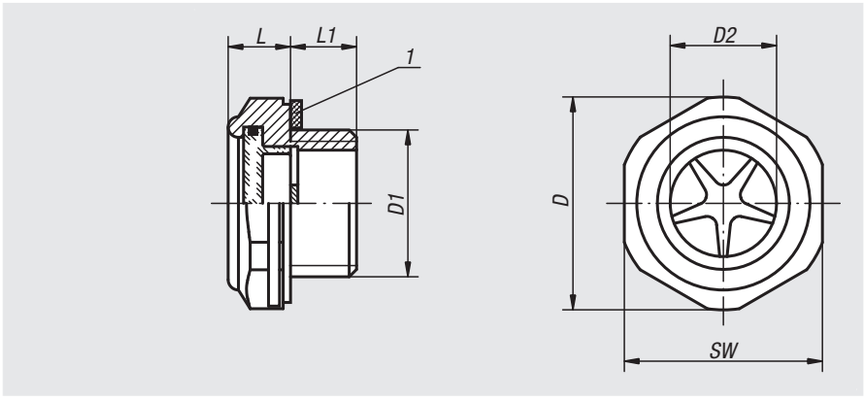
Order No.	D	D1	D2	L	L1	SW	Tightening torque max. Nm
28008-22038	22	G 3/8	15	14	10	19	8
28008-28012	28	G 1/2	20	17	10	24	12
28008-35034	35	G 3/4	25	20	10	30	16
28008-42100	42	G 1	31	24	10,5	36	20

28010

Oil level sight glasses

aluminium





Material:
Housing in aluminium.
Reflector in aluminium or white plastic.
Polyamide viewing lens.

Version:
Transparent viewing lens,
temperature-resistant with oil up to 100 °C,
with water up to 70 °C.
Flat seal, asbestos-free.

Sample order:
nlm 28010-29012

Note:
The G3/8“ and M18x1.5 versions have a white plastic reflector.

Drawing reference:
1) flat seal

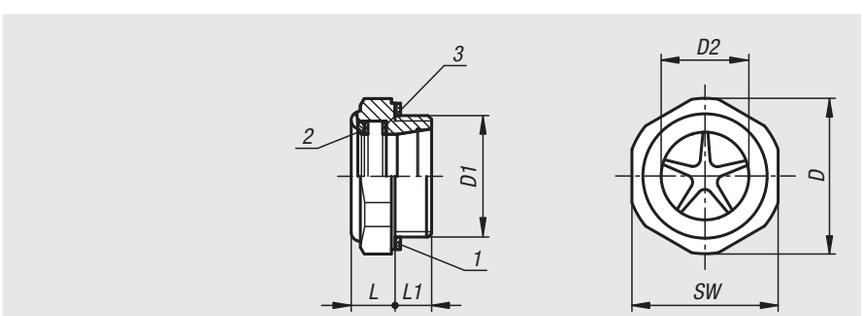
Order No.	D	D1	D2	L	L1	SW	Tightening torque max. Nm	Pressure load max. bar
28010-20014	20	G1/4	11	8	8	17	9	10
28010-24038	24,1	G 3/8	12,7	9,5	9	22	12	10
28010-29012	29,7	G 1/2	15	10	9	27	18	10
28010-36034	35,2	G 3/4	21,9	10	11	32	24	10
28010-42100	44,1	G 1	25,1	11	11	40	-	10
28010-52114	55	G1 1/4	34	13,5	12	50	-	10
28010-241815	24,5	M18X1,5	13	10	9	22	12	10
28010-292215	29,5	M22X1,5	16	10	9	27	18	10

28012

Oil level sight glasses

aluminium, glass window





Material:
Housing, reflector in aluminium.
Natural, clear glass viewing lens.
Internal seal, Viton®.

Version:
Viewing lens, temperature-resistant to 150 °C.
Flat seal, asbestos-free.

Sample order:
nlm 28012-29012

Note:
Resists high pressure and heat. Natural glass as the viewing lens ensures optimal light transmission and high surface hardness.

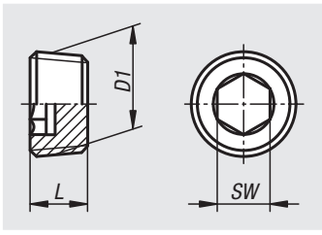
Drawing reference:
1) flat seal
2) external seal
3) internal seal

Order No.	D	D1	D2	L	L1	SW	Tightening torque max. Nm	Pressure load max. bar
28012-29012	29,5	G 1/2	12	10	9	27	18	20
28012-34034	34,5	G 3/4	16	12	10	32	24	20
28012-42100	42,5	G 1	23	12	10	40	-	20
28012-292015	29,5	M20x1,5	12	10	9	27	18	20
28012-423315	42,5	M33x1,5	23	12	10	40	-	20

Screw plugs with hexagon socket

DIN 906, tapered thread





Material:
Steel or stainless steel 1.4571.

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 28013-100810

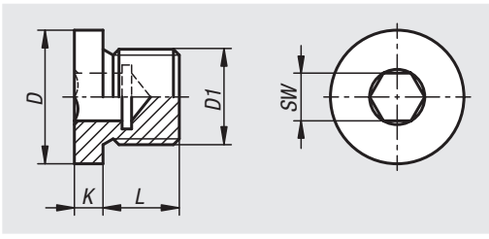
Note:
Screw plugs with hexagon socket and tapered threads are suitable for plugging holes with parallel threads.

Order No. steel	Order No. stainless steel	D1	L	SW
28013-100810	**28013-200810**	M8x1	8	4
28013-101010	**28013-201010**	M10X1	8	5
28013-101215	**28013-201215**	M12X1,5	10	6
28013-101415	**28013-201415**	M14X1,5	10	7
28013-101615	**28013-201615**	M16X1,5	10	8
28013-101015	**28013-201815**	M18X1,5	10	8
28013-102015	**28013-202015**	M20X1,5	10	10
28013-102215	**28013-202215**	M22X1,5	10	10
28013-102415	**28013-202415**	M24X1,5	12	12
28013-102615	-	M26X1,5	12	12
28013-103015	-	M30X1,5	12	17
28013-103615	-	M36X1,5	15	19
28013-104215	-	M42X1,5	18	22
28013-104815	-	M48X1,5	20	24
28013-10018	**28013-2001815**	R1/8	8	5
28013-10014	**28013-2001415**	R1/4	10	7
28013-10038	**28013-2003815**	R3/8	10	8
28013-10012	**28013-2001215**	R1/2	10	10
28013-10034	**28013-2003415**	R3/4	12	12
28013-10100	**28013-2010015**	R1	12	17
28013-10114	-	R1 1/4	18	22
28013-10112	-	R1 1/2	20	24

Screw plugs with collar and hexagon socket

DIN 908





Material:
Steel.

Version:
Electro zinc-plated.

Sample order:
nlm 28014-100810

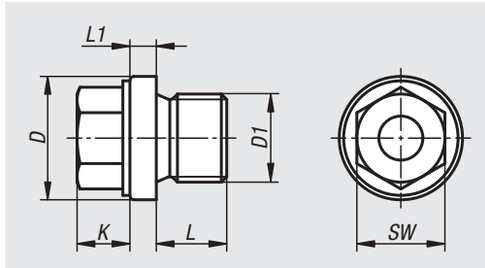
Note:
Screw plugs with collar and hexagon socket for plugging holes with parallel threads.

Order No.	D	D1	K	L	SW
28014-100810	12	M8x1	3	8	4
28014-101010	14	M10X1	3	8	5
28014-101215	17	M12X1,5	3	12	6
28014-101415	19	M14X1,5	3	12	6
28014-101615	21	M16X1,5	3	12	8
28014-101815	23	M18X1,5	4	12	8
28014-102015	25	M20X1,5	4	14	10
28014-102215	27	M22X1,5	4	14	10
28014-102415	29	M24X1,5	4	14	12
28014-102615	31	M26X1,5	4	16	12
28014-102720	32	M27X2	4	16	12
28014-103015	36	M30X1,5	4	16	17
28014-103320	39	M33X2	5	16	17
28014-103615	42	M36X1,5	5	16	19
28014-104215	49	M42X1,5	5	16	22
28014-104220	49	M42X2	5	16	22
28014-104815	55	M48X1,5	5	16	24
28014-104820	55	M48X2	5	16	24
28014-10018	14	G1/8	3	8	5
28014-10014	18	G1/4	3	12	6
28014-10038	22	G3/8	3	12	8
28014-10012	26	G1/2	4	14	10
28014-10034	32	G3/4	4	16	12
28014-10100	39	G1	5	16	17
28014-10114	49	G1 1/4	5	16	22
28014-10112	55	G1 1/2	5	16	24

Screw plugs hex head with collar

DIN 910





Material:
Steel.

Version:
Electro zinc-plated.

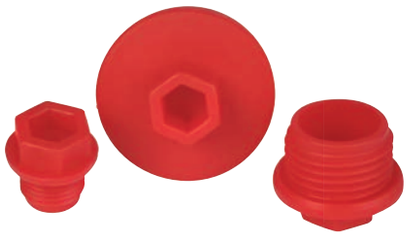
Sample order:
nlm 28016-101010

Note:
Screw plugs with collar and hexagonal head for plugging holes with parallel threads.

Order No.	D	D1	K	L	L1	SW
28016-101010	14	M10X1	6	8	3	10
28016-101215	17	M12X1,5	6	12	3	13
28016-101415	19	M14X1,5	6	12	3	13
28016-101615	21	M16X1,5	6	12	3	17
28016-101815	23	M18X1,5	8	12	4	17
28016-102015	25	M20X1,5	8	14	4	19
28016-102215	27	M22X1,5	8	14	4	19
28016-102415	29	M24X1,5	9	14	4	22
28016-102615	31	M26X1,5	10	16	4	24
28016-102720	32	M27X2	10	16	4	24
28016-103015	36	M30X1,5	10	16	4	24
28016-103320	39	M33X2	11	16	5	27
28016-103615	42	M36X1,5	11	16	5	27
28016-104215	49	M42X1,5	12	16	5	30
28016-104220	49	M42X2	12	16	5	30
28016-104815	55	M48X1,5	12	16	5	30
28016-104820	55	M48X2	12	16	5	30
28016-10018	14	G1/8	6	8	3	10
28016-10014	18	G1/4	6	12	3	13
28016-10038	22	G3/8	6	12	3	17
28016-10012	26	G1/2	8	14	4	19
28016-10034	32	G3/4	10	16	4	24
28016-10100	39	G1	11	16	5	27
28016-10114	49	G1 1/4	12	16	5	30
28016-10112	55	G1 1/2	12	16	5	30

28018

Screw plugs

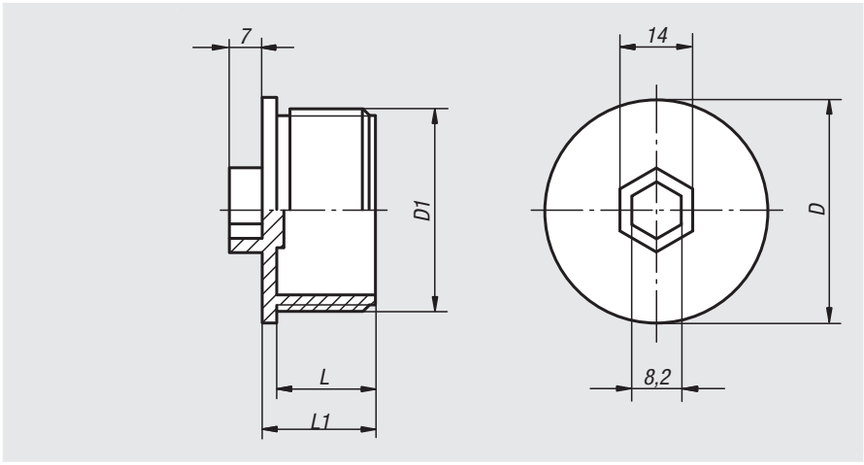


Material:
Elastomer, soft polyurethane

Version:
Red

Sample order:
nlm 28018-038

Note:
The double-lip seal guarantees a seal for pressures of 2-3 bar. It also keeps paint out during painting.



Order No.	D	D1	L	L1
28018-018	16,2	G1/8	8	10
28018-014	18,1	G1/4	9,9	12,5
28018-038	21	G3/8	9	11
28018-012	25,2	G1/2	11	14
28018-034	31,3	G3/4	11,5	14
28018-100	36	G1	12	15,5

28020

Screw plugs



Material:
Thermoplastic polyamide 66, reinforced with 30% fibreglass.

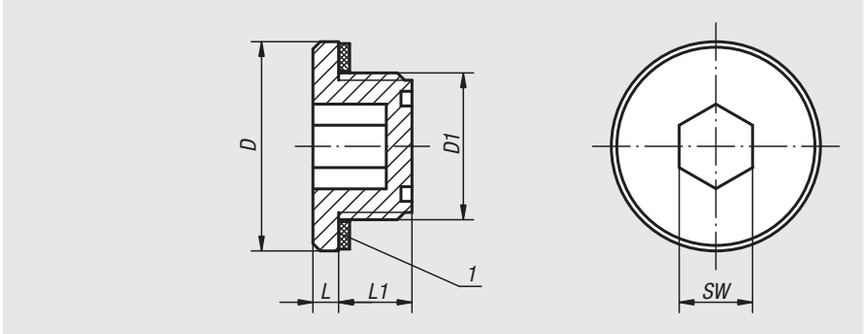
Version:
Black. Flat seal asbestos-free

Sample order:
nlm 28020-22038

Note:
Temperature resistance:
Continuous operating temperature 100°C.
Short-term operating temperature 120°C.

On request:
O-ring or materials with higher stability.

Drawing reference:
1) flat seal

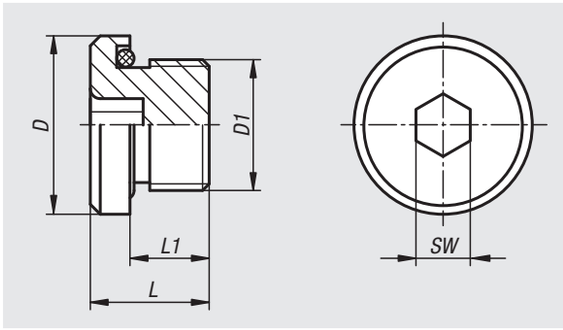


Order No.	D	D1	L	L1	SW	Tightening torque max. Nm
28020-18014	18,2	G1/4	2,5	8	6	3
28020-22038	22,5	G3/8	3,5	10,5	8	6
28020-28012	28,5	G1/2	3,5	10,5	10	8
28020-35034	35	G3/4	4	10,5	12	10
28020-201415	20	M14X1,5	2,5	8	6	3
28020-221615	22,5	M16X1,5	3,5	11	8	6
28020-261815	26	M18X1,5	3	10	10	7
28020-282015	28,5	M20X1,5	3	11	10	7
28020-282215	28,5	M22X1,5	3,5	10,5	10	7
28020-352615	35	M26X1,5	3	12	12	10

Screw plugs

with hexagon socket





Material:
Steel 1.0737.
O-ring NBR, Shore 90.

Version:
Electro zinc-plated.

Sample order:
nlm 28021-15018

Note:
Operating temperature: -20°C / +100°C.
Operating pressure: max. 70 bar for static application.

Order No.	D	D1	L	L1	SW
28021-15018	15	G1/8	13	9	4
28021-19014	19	G1/4	16	11	6
28021-22038	22	G3/8	17	11	6
28021-27012	27	G1/2	20	14	8
28021-32034	32	G3/4	20	14	12
28021-40001	40	G1	22	16	12
28021-50114	50	G1 1/4	25	18	12
28021-55112	55	G1 1/2	24	17	24
28021-141010	15	M10X1	12	8	5
28021-171215	17	M12X1,5	16	10	6
28021-191415	19	M14X1,5	16	10	6
28021-221615	22	M16X1,5	16	10	6
28021-251815	25	M18X1,5	17	11	8
28021-272015	27	M20X1,5	18	12	8
28021-282215	28	M22X1,5	18	12	10
28021-322615	32	M26X1,5	20	13,5	12
28021-322702	32	M27X2	20	13,5	12
28021-403302	40	M33X2	21	15	17
28021-504202	50	M42X2	24	17	22
28021-554802	55	M48X2	24	17	24

Press-in plugs



Material:
Housing and cap thermoplastic polyamide 66.
Air filter polyurethane (PU foam).
O-ring rubber (NBR).

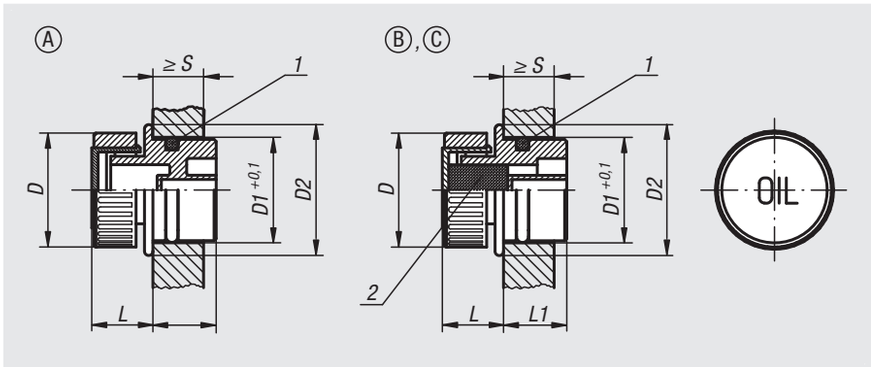
Version:
Housing black.
Cap red.
Filter mesh 50 µm.

Sample order:
nlm 28022-33030

Note:
Temperature resistant to 100°C.

Drawing reference:
Form A: without vent
Form B: with vent
Form C: with vent and air filter

1) O-ring
2) air filter Form C only



Order No. Form A	Order No. Form B	Order No. Form C	D	D1	D2	L	L1	S min.
28022-13018	**28022-23018**	**28022-33018**	30	18	23	14	14	8
28022-13020	**28022-23020**	**28022-33020**	30	20	24	14	15,5	8
28022-13026	**28022-23026**	**28022-33026**	30	26	30	14	16,5	9,5
28022-13030	**28022-23030**	**28022-33030**	30	30	34	14	17	9,5

Notes

28024

Screw plugs with magnet

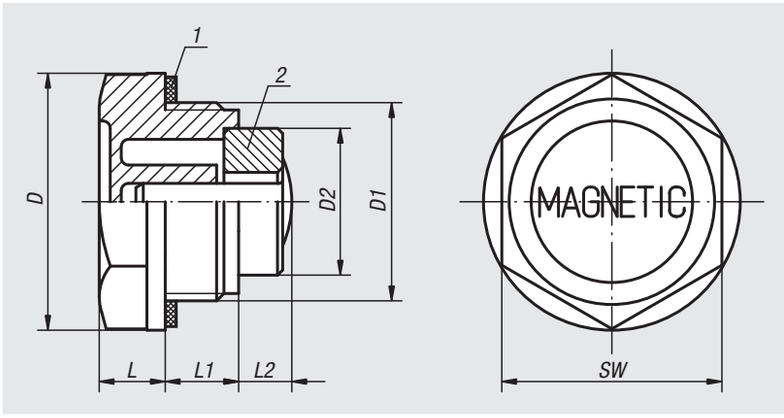


Material:
Thermoplastic polyamide 66. Ferrite permanent magnet.

Version:
Black. Flat seal asbestos-free

Sample order:
nlm 28024-22038

Note:
Temperature resistant with oil up to 100°C, with water up to 70°C.
The magnetic effect of the screw plug attracts iron particles in the oil.
Screwing the plug into the drain outlet diminishes possible damage to mechanical components.



Drawing reference:
1) flat seal
2) magnet

Order No.	D	D1	D2	L	L1	L2	SW
28024-20014	20	G1/4	8	7	9	5	17
28024-22038	22	G3/8	13	7,5	10	10	18
28024-27012	27	G1/2	13	8	11	9	24
28024-34034	34	G3/4	19,6	9	11	6,5	30
28024-42100	42	G1	19,6	10,5	12	14	35
28024-201415	20	M14X1,5	8	7	9	5	17

28026

Screw plugs aluminium with magnet

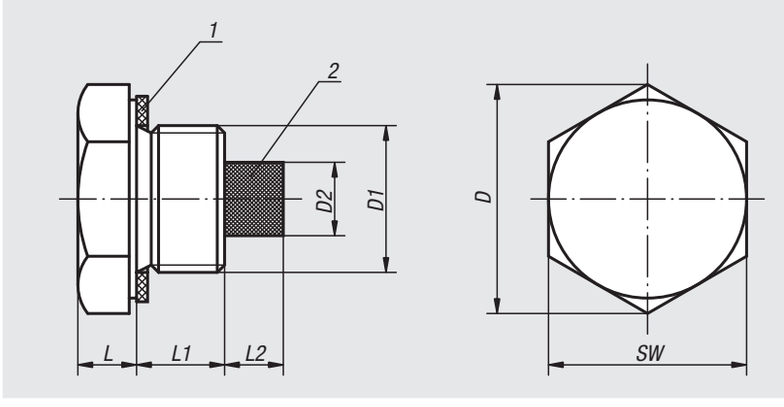


Material:
Aluminium. Ferrite permanent magnet.

Version:
Bright. Flat seal asbestos-free.

Sample order:
nlm 28026-24038

Note:
The magnetic effect of the screw plug attracts iron particles in the oil.
Screwing the plug into the drain outlet diminishes possible damage to mechanical components.



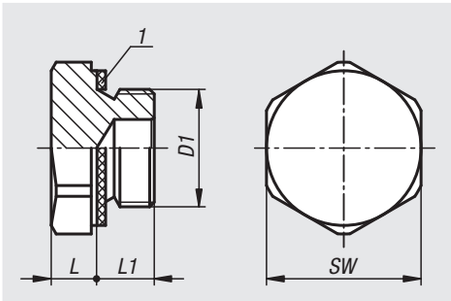
Drawing reference:
1) flat seal
2) magnet

Order No.	D	D1	D2	L	L1	L2	SW
28026-21014	21	G1/4	5	7	10	6	19
28026-24038	24,5	G3/8	8	7	10	7	22
28026-30012	30	G1/2	10	8	10	7	27
28026-36034	36,5	G3/4	13	8	10	7	34
28026-42100	42,5	G1	13	8	14	7	40

Screw plugs

aluminium





Material:
Aluminium.

Version:
Bright. Flat seal asbestos-free.

Sample order:
nlm 28027-19014

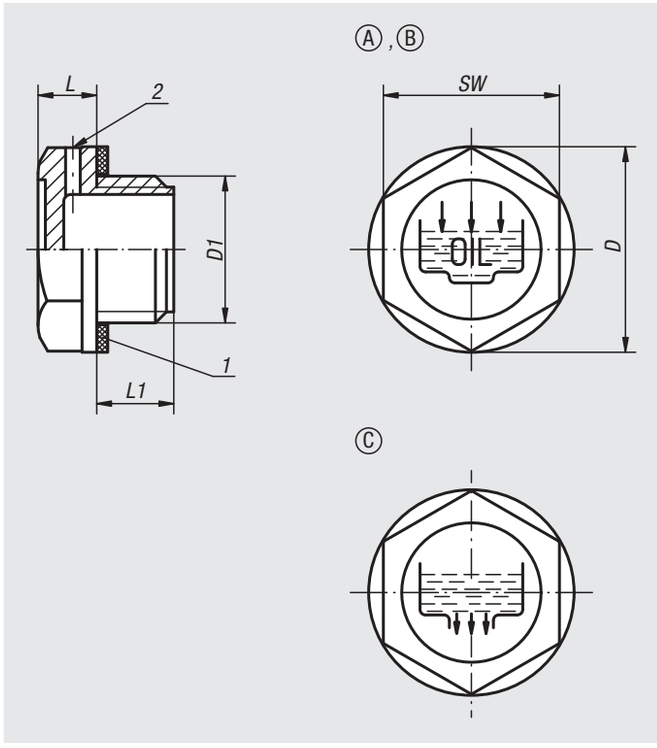
On request:
Cap marked OIL.

Drawing reference:
1) flat seal

Order No.	D1	L	L1	SW
28027-141010	M10X1	5	8	14
28027-171215	M12X1,5	6	8	17
28027-171415	M14X1,5	6	8	17
28027-221615	M16X1,5	7	10	22
28027-221815	M18X1,5	7	10	22
28027-242015	M20X1,5	7	10	24
28027-19014	G1/4	7	10	19
28027-22038	G3/8	7	10	22
28027-27012	G1/2	8	10	27
28027-34034	G3/4	8	10	34
28027-40100	G1	8	14	40

Screw plugs





Material:
Thermoplastic polyamide 66

Version:
Black. Flat seal asbestos-free

Sample order:
nlm 28028-142100

Note:
Temperature resistant to 100°C.

Drawing reference:
Form A: with fill symbol
Form B: with fill symbol and vent hole
Form C: with drain symbol

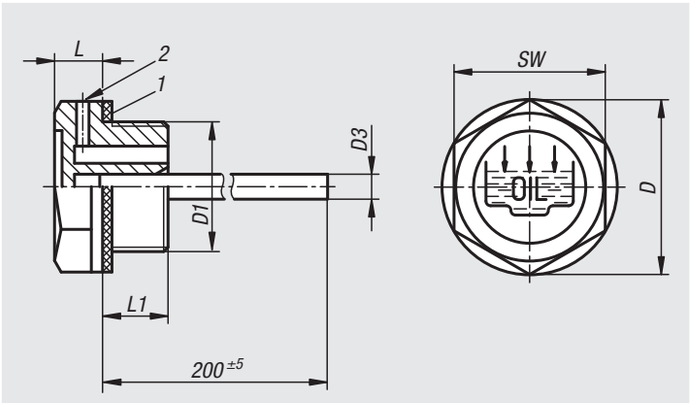
1) flat seal
2) vent hole Form B only

Order No. Form A	Order No. Form B	Order No. Form C	D	D1	L	L1	SW	Tightening torque max. Nm
28028-119014	**28028-219014**	**28028-319014**	19,5	G1/4	7	9	17	5
28028-122038	**28028-222038**	**28028-322038**	22	G3/8	7,5	10	18	8
28028-128012	**28028-228012**	**28028-328012**	28	G1/2	7,5	11	24	9
28028-134034	**28028-234034**	**28028-334034**	34	G3/4	9	11	30	11
28028-142100	**28028-242100**	**28028-342100**	42	G1	10,5	12	35	-
28028-151114	**28028-251114**	**28028-351114**	51	G1 1/4	12	13,5	42	-
28028-158112	**28028-258112**	**28028-358112**	58	G1 1/2	10	14,5	50	-
28028-174200	**28028-274200**	**28028-374200**	74	G2	13,5	16	64	-
28028-1191415	**28028-2191415**	**28028-3191415**	19,5	M14X1,5	7	9	17	5
28028-1211615	**28028-2211615**	**28028-3211615**	21	M16X1,5	7,5	10	18	6
28028-1261815	**28028-2261815**	**28028-3261815**	26	M18X1,5	7,5	10	21	7
28028-1282015	**28028-2282015**	**28028-3282015**	28	M20X1,5	8	10	24	8
28028-1282215	**28028-2282215**	**28028-3282215**	28	M22X1,5	8	11	24	10
28028-1524015	**28028-2524015**	**28028-3524015**	52	M40X1,5	10	13	42	-

Screw plugs

with dipstick





Material:
Thermoplast, polyamide 66.
Dipstick steel, zinc phosphated.

Version:
Flat seal asbestos-free.

Sample order:
nlm 28029-122038

Note:
Operating temperature: max. 100°C.
Form B has a vent hole on the side of the hexagon head with a diameter of between 2 and 3.5 mm, depending on the size of the screw plug.

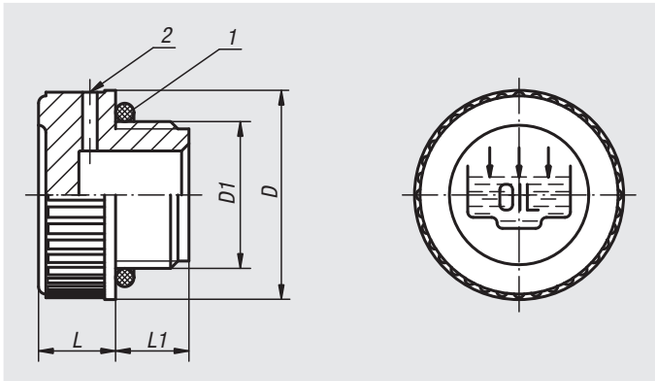
Drawing reference:
1) flat seal
2) vent hole Form B only

Order No.	Form	D	D1	D3	L	L1	SW
28029-119014	A	19	G1/4	4	7	9	17
28029-122038	A	22	G3/8	4	7,5	10	18
28029-128012	A	28	G1/2	4	7,5	11	24
28029-134034	A	34	G3/4	5	9	11	30
28029-142100	A	42	G1	5	10,5	12	35
28029-151114	A	51	G1 1/4	5	12	13,5	42
28029-1191415	A	19	M14X1,5	4	7	9	17
28029-1211615	A	21	M16X1,5	4	7,5	10	18
28029-1261815	A	26	M18X1,5	4	7,5	10	21
28029-1282015	A	28	M20X1,5	4	8	10	24
28029-1282215	A	28	M22X1,5	4	8	11	24
28029-219014	B	19	G1/4	4	7	9	17
28029-222038	B	22	G3/8	4	7,5	10	18
28029-228012	B	28	G1/2	4	7,5	11	24
28029-234034	B	34	G3/4	5	9	11	30
28029-242100	B	42	G1	5	10,5	12	35
28029-251114	B	51	G1 1/4	5	12	13,5	42
28029-2191415	B	19	M14X1,5	4	7	9	17
28029-2211615	B	21	M16X1,5	4	7,5	10	18
28029-2261815	B	26	M18X1,5	4	7,5	10	21
28029-2282015	B	28	M20X1,5	4	8	10	24

Plugs fill only

knurled cap





Material:
Thermoplastic polyamide 66;
O-ring in rubber (NBR)

Version:
black.

Sample order:
nlm 28030-128012

Note:
Temperature resistant:
oil up to 100 °C
water up to 70 °C.

Form A: with fill symbol
Form B: with fill symbol and vent hole

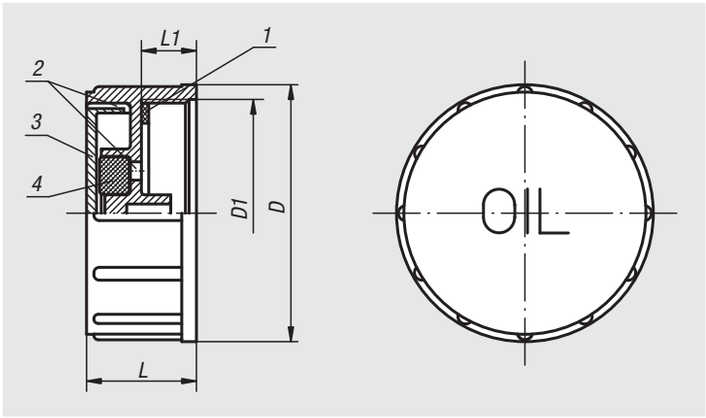
Drawing reference:
1) O-ring
2) vent hole only Form B

Order No.	Form	D	D1	L	L1
28030-120014	A	20	G1/4	9	9
28030-120038	A	20,5	G3/8	9	10
28030-128012	A	28	G1/2	10,5	10,5
28030-131034	A	31	G3/4	12	11
28030-139100	A	39	G1	12	12
28030-149114	A	49	G1 1/4	13	13,5
28030-155112	A	55	G1 1/2	14,7	14,5
28030-168200	A	68,5	G2	15	16
28030-1201415	A	20	M14X1,5	9	9
28030-1201615	A	20	M16X1,5	9	10
28030-1281815	A	28	M18X1,5	10,5	10
28030-1282015	A	28	M20X1,5	10,5	10
28030-1282215	A	28	M22X1,5	10,5	10
28030-220014	B	20	G1/4	9	9
28030-220038	B	20,5	G3/8	9	10
28030-228012	B	28	G1/2	10,5	10,5
28030-231034	B	31	G3/4	12	11
28030-239100	B	39	G1	12	12
28030-249114	B	49	G1 1/4	13	13,5
28030-255112	B	55	G1 1/2	14,7	14,5
28030-268200	B	68,5	G2	15	16
28030-2201415	B	20	M14X1,5	9	9
28030-2201615	B	20	M16X1,5	9	10
28030-2281815	B	28	M18X1,5	10,5	10
28030-2282015	B	28	M20X1,5	10,5	10
28030-2282215	B	28	M22X1,5	10,5	10

28032

Caps for filler necks





Material:
Housing and cap thermoplastic polyamide 66.
Air filter polyurethane (PU foam).
Flat seal NBR, Shore 70.

Version:
Black housing.
Red cap.
Filter mesh 40 µm.

Sample order:
nlm 28032-67200

Note:
Temperature resistant to 100°C.

On request:
Cap in yellow for diesel oil.

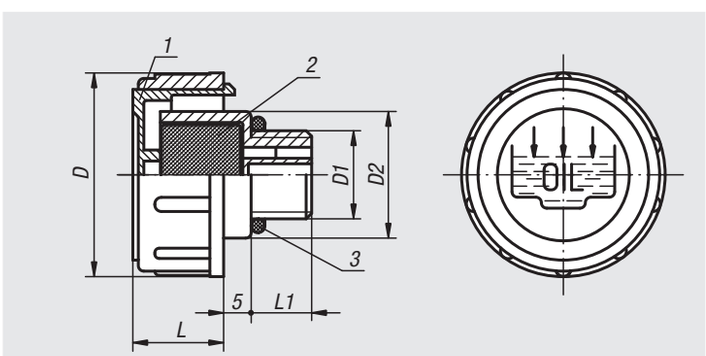
Drawing reference:
1) flat seal
2) vent
3) cap
4) air filter

Order No.	D	D1	L	L1
28032-67200	67,5	G2	30	15
28032-676020	67,5	M60x2	30	15

28034

Vent screws





Material:
Housing, cap in thermoplastic polyamide 66.
Air filter (Form B only) in polyurethane (PU foam).
O-ring in rubber (NBR).

Version:
Black housing. Red cap. Filter mesh 60 µm.

Sample order:
nlm 28034-147034

Note:
Temperature resistant:
oil up to 100 °C
water up to 70 °C.
The removable cap allows easy cleaning of the air filter.

Form A: without air filter
Form B: with air filter

Drawing reference:
1) cap
2) air filter Form B only
3) O-ring

Order No. Form A	Order No. Form B	D	D1	D2	L	L1
28034-136038	**28034-236038**	36	G3/8	23	17	11
28034-141012	**28034-241012**	41	G1/2	28	18	12
28034-147034	**28034-247034**	47	G3/4	33	17	12
28034-152100	**28034-252100**	52	G1	38	20	12
28034-163114	**28034-263114**	63	G1 1/4	49	23	13
28034-163112	**28034-263112**	63	G1 1/2	55	23	13,5
28034-1361615	**28034-2361615**	36	M16x1,5	23	17	11
28034-1411815	**28034-2411815**	41	M18x1,5	28	17,5	12
28034-1412015	**28034-2412015**	41	M20x1,5	28	17,5	12
28034-1412215	**28034-2412215**	41	M22x1,5	28	17,5	12

Vent screws

with splash guard



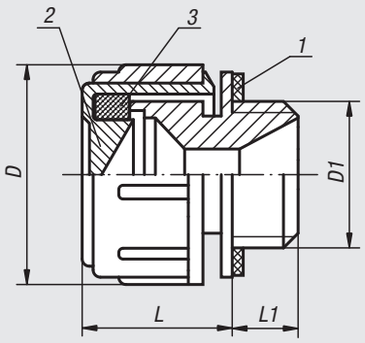
Material:
Housing and cap thermoplastic polyamide 66.
Air filter polyurethane (PU foam).
Flat seal NBR, Shore 70.

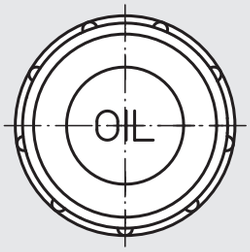
Version:
Black housing.
Red cap.
Filter mesh 40 µm.

Sample order:
nlm 28036-30038

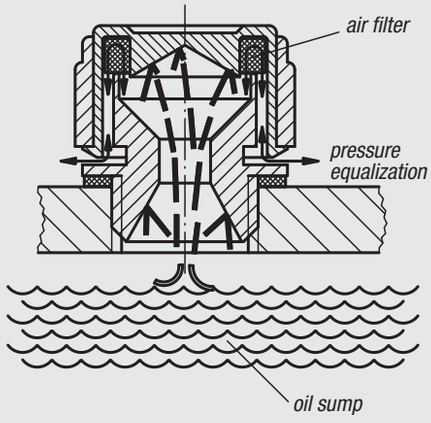
Note:
Temperature resistant to 100°C.

Drawing reference:
1) flat seal
2) cap
3) air filter





splash guard



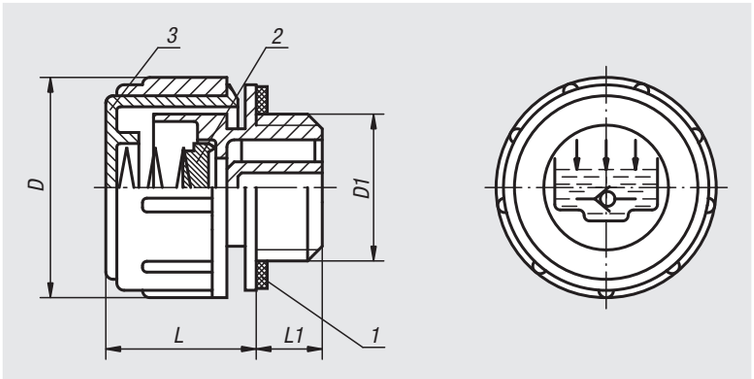
Gears partly immersed in an oil sump create an oil spray that may cause oil to leak from the vent cap. To avoid this the screw has been fitted with a splash guard. Only a small part of the oil spray can pass through the lower tapered bore. The oil that does reach the cap underside is redirected in such a way that it does not notably hinder the venting process.

Order No.	D	D1	L	L1
28036-30014	30	G1/4	21	10
28036-30038	30	G3/8	21	10
28036-30012	30	G1/2	21	10

Vent screws

with check valve





Material:
Housing and cap thermoplastic polyamide 66.
Spring stainless steel.
Lift disc and flat seal rubber (NBR).

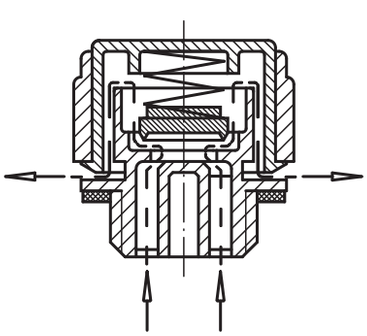
Version:
Housing black.
Cap red.

Sample order:
nlm 28038-30014

Note:
Temperature resistant:
oil up to 100 °C
water up to 70 °C.
Opening pressure 0.20 – 0.25 bar.

Drawing reference:
1) flat seal
2) lift disc
3) cap

Operating principle



opening pressure
0.2 - 0.25 bar

Order No.	D	D1	L	L1
28038-30014	30	G1/4	21	10
28038-30038	30	G3/8	21	10
28038-30012	30	G1/2	21	10

28040

Vent screws brass

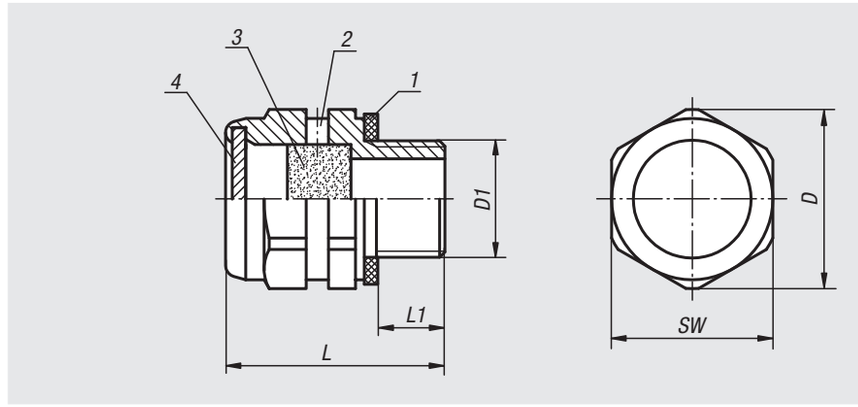


Material:
Housing and cap brass.
Air filter electro zinc-plated steel wire mesh.

Version:
Air filter mesh 50 - 60 µm.
Flat seal asbestos-free.

Sample order:
nlm 28040-20014

Drawing reference:
1) flat seal
2) vent hole 2x
3) air filter
4) cap



Order No.	D	D1	L	L1	SW
28040-20014	20	G1/4	24,5	7,5	18
28040-24038	24,5	G3/8	24,5	8,5	22
28040-30012	30	G1/2	24,5	8,5	27

28042

Vent screws brass

with check valve



Material:
Housing and cap brass.
Spring stainless steel.
Lift disc aluminium.
O-ring rubber (NBR).

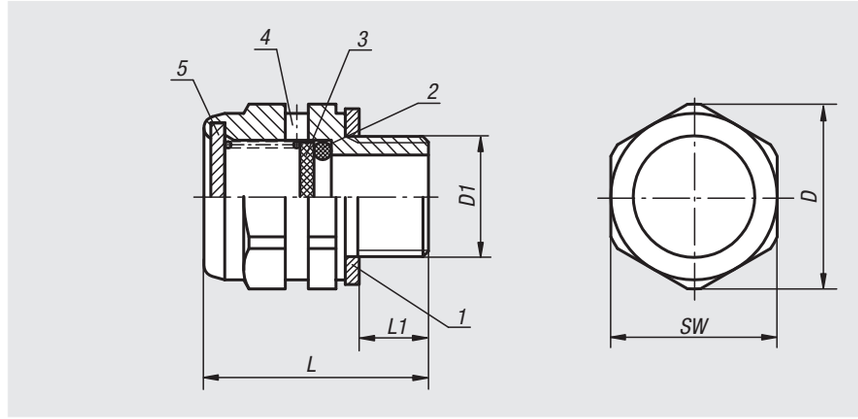
Version:
Flat seal asbestos-free.

Sample order:
nlm 28042-20014

Note:
Opening pressure 0.3 bar (±0.1).

Functional principle:
See 28038 vent screws with check valve.

Drawing reference:
1) flat seal
2) O-ring
3) lift disc
4) vent hole 2x
5) cap



Order No.	D	D1	L	L1	SW
28042-20014	20	G1/4	24,3	7,5	18
28042-24038	24,5	G3/8	24,5	8,5	22
28042-30012	30	G1/2	24,5	8,5	27

Press-in plugs

with dipstick



Material:
Housing and cap thermoplastic polyamide 66.
Air filter polyurethane (PU foam).
Dipstick zinc.
O-ring NBR, Shore 70.

Version:
Housing black.
Cap red.
Filter mesh 50 µm.
Dipstick phosphated.

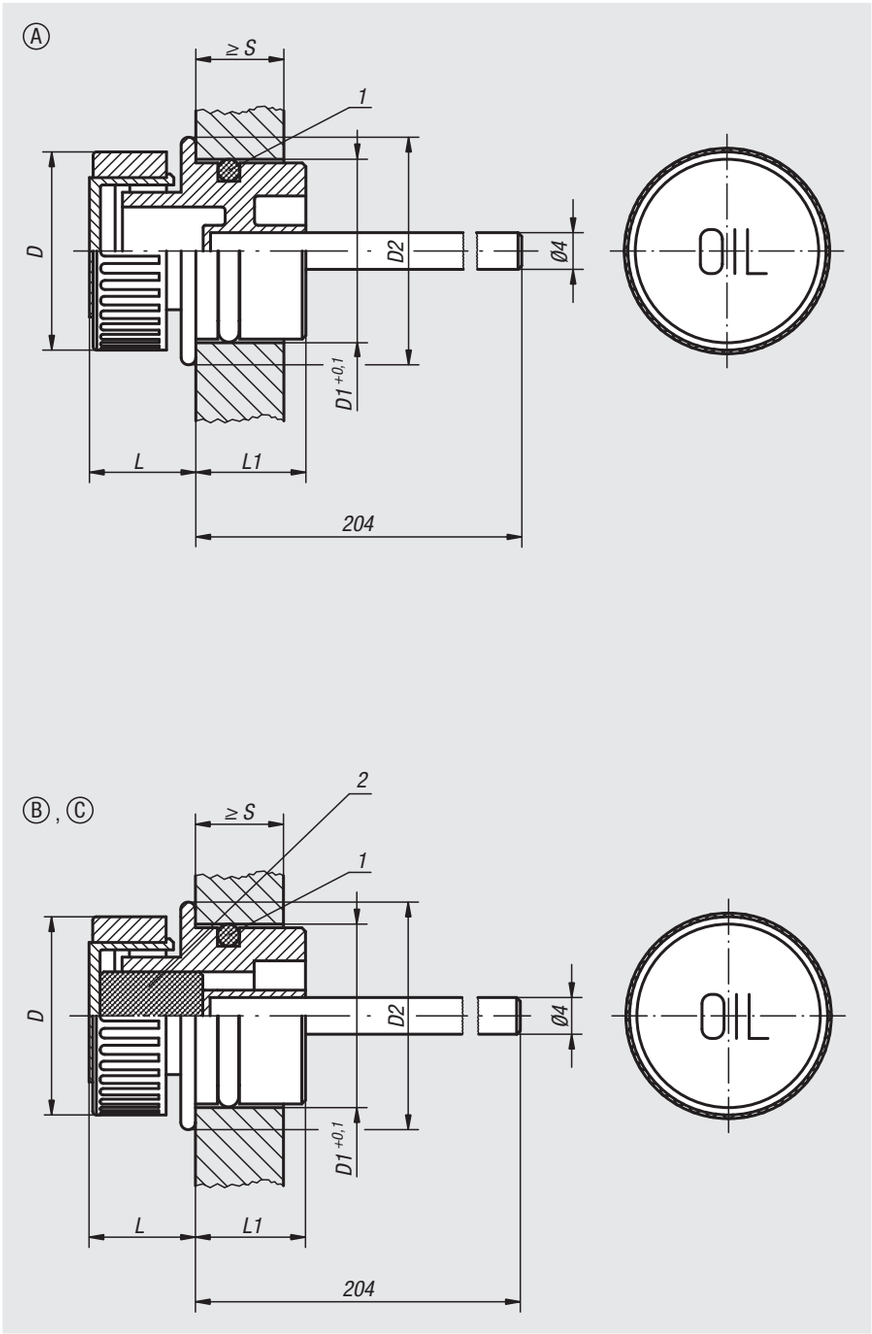
Sample order:
nlm 28048-13018

Note:
Temperature resistant up to 100°C.

On request:
Min-Max markings.

Drawing reference:
Form A: without vent
Form B: with vent
Form C: with vent and air filter

1) O-ring
2) air filter Form C only

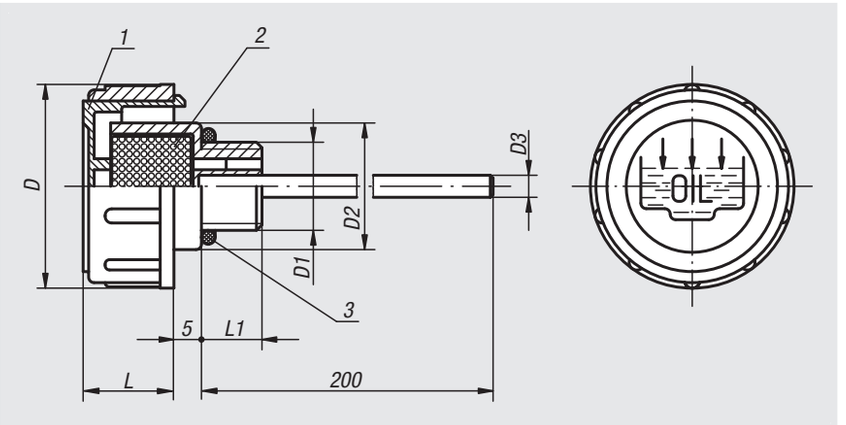


Order No. Form A	Order No. Form B	Order No. Form C	D	D1	D2	L	L1	S min.
28048-13018	**28048-23018**	**28048-33018**	30	18	23	14	14	8

Vent screws

with dipstick





Material:
Housing and cap thermoplastic polyamide 66.
Air filter polyurethane (PU foam).
Dipstick zinc.
O-ring NBR, Shore 70.

Version:
Housing black.
Cap red.
Filter mesh 50 µm.
Dipstick phosphated.

Sample order:
nlm 28054-141012

Note:
Temperature resistant up to 100 °C.
The removable cap allows easy cleaning of the air filter.

Form A: without air filter
Form B: with air filter

On request:
Min-Max markings.

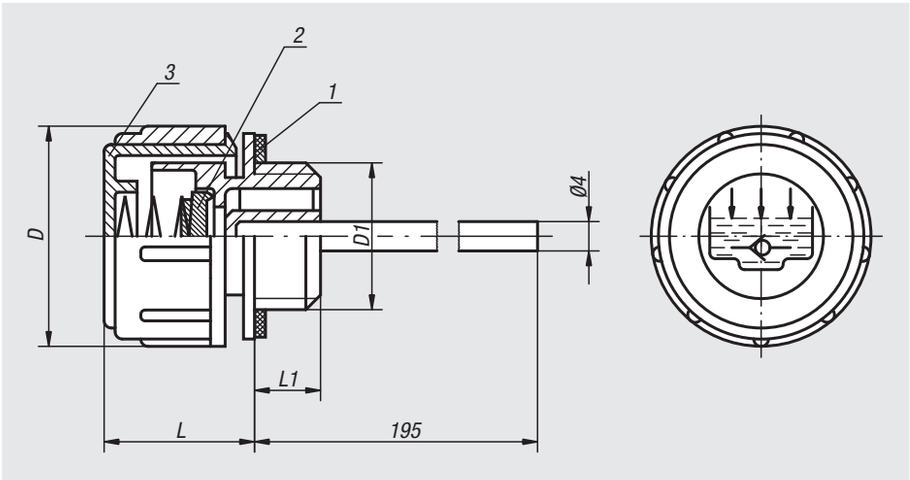
Drawing reference:
1) cap
2) air filter Form B only
3) O-ring

Order No.	Form	D	D1	D2	D3	L	L1
28054-136038	A	36	G3/8	23	4	17	11
28054-141012	A	41	G1/2	28	4	18	12
28054-147034	A	47	G3/4	33	5	17	12
28054-152100	A	52	G1	38	5	20	12
28054-163114	A	63	G1 1/4	49	5	23	13
28054-163112	A	63	G1 1/2	55	5	23	13,5
28054-1361615	A	36	M16x1,5	23	4	17	11
28054-1411815	A	41	M18x1,5	28	4	17,5	12
28054-1412015	A	41	M20x1,5	28	4	17,5	12
28054-1412215	A	41	M22x1,5	28	4	17,5	12
28054-236038	B	36	G3/8	23	4	17	11
28054-241012	B	41	G1/2	28	4	18	12
28054-247034	B	47	G3/4	33	5	17	12
28054-252100	B	52	G1	38	5	20	12
28054-263114	B	63	G1 1/4	49	5	23	13
28054-263112	B	63	G1 1/2	55	5	23	13,5
28054-2361615	B	36	M16x1,5	23	4	17	11
28054-2411815	B	41	M18x1,5	28	4	17,5	12
28054-2412015	B	41	M20x1,5	28	4	17,5	12
28054-2412215	B	41	M22x1,5	28	4	17,5	12

Vent screws

with check valve and dipstick





Material:
Housing and cap thermoplastic polyamide.
Spring stainless steel.
Dipstick zinc.
Lift disc and seal rubber (NBR).

Version:
Housing black.
Cap red.
Dipstick phosphated.

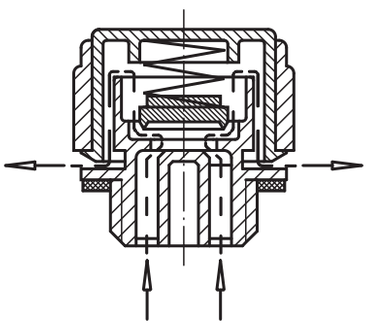
Sample order:
nlm 28058-30038

Note:
Temperature resistant:
oil up to 100 °C
water up to 70 °C.
Opening pressure 0.20 – 0.25 bar.

On request:
Min-Max markings.

Drawing reference:
1) flat seal
2) lift disc
3) cap

Operating principle



opening pressure
0.2 - 0.25 bar

Order No.	D	D1	L	L1
28058-30038	30	G3/8	21	10
28058-30012	30	G1/2	21	10

Dipsticks



Material:
Grip thermoplastic polyamide.
Dipstick steel.
O-ring NBR, Shore 70.

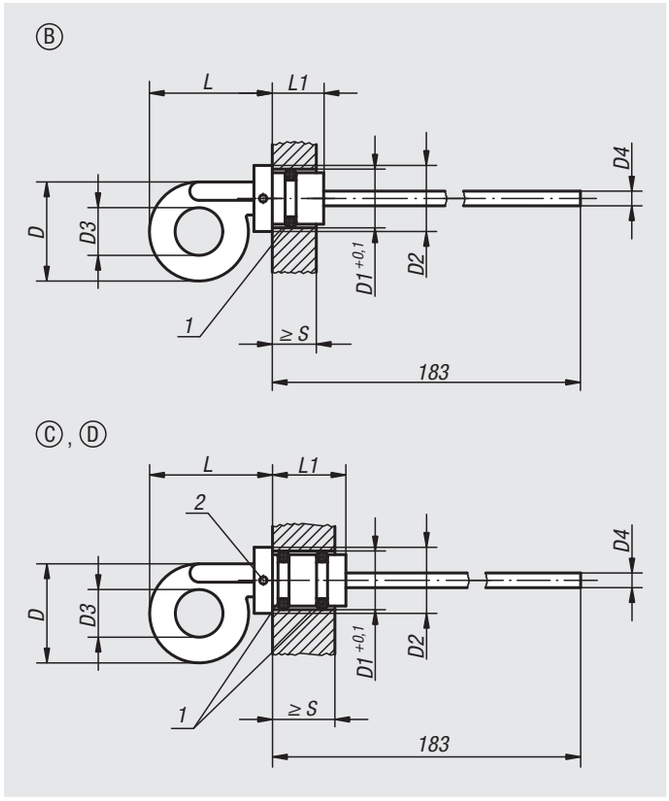
Version:
Black handle.
Dipstick, phosphated.

Sample order:
nlm 28060-23218

Note:
Temperature resistant up to 100°C.

Drawing reference:
Form B: with vent hole
Form C: without vent hole
Form D: with vent hole

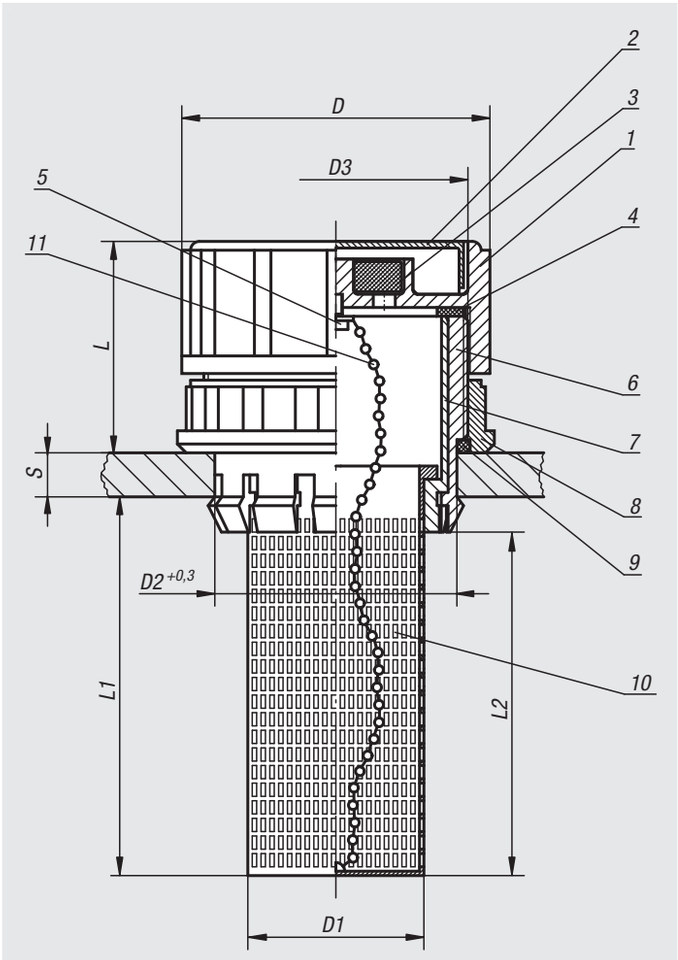
1) O-ring
2) Form D only



Order No.	Form	D	D1	D2	D3	D4 Ø	L	L1	S min.
28060-22714	B	27	14	18	13	4	34	13	10
28060-23218	B	32	18	24	14	5	45	17	9
28060-23220	B	32	20	24	14	5	44,5	18	10
28060-32714	C	27	14	18	13	4	34	20	17
28060-33012	C	27	12	18	14	4	36	20	16
28060-33318	C	33	18	24	14	5	44	21	17,5
28060-33520	C	35	20	24	16	5	46	21	17,5
28060-42714	D	27	14	18	13	4	34	20	17
28060-43318	D	33	18	24	14	5	44	21	17,5

Filler necks





Material, version:
1. Housing black thermoplastic polyamide 66.

2. Sealing cap red thermoplastic polyamide 66.

3. Air filter polyurethane (PU foam), filter grade 40 µm.

4. Flat seal NBR

5. Fastening screw nickel-plated steel.

6. Press-in unit black thermoplastic polyamide 66.

7. Stop sleeve black thermoplastic polyamide 66.

8. Fastening nut black polyamide 66.

9. O-ring NBR, Shore 70.

10. Filler sieve black thermoplastic polypropylene.

11. Chain nickel-plated brass.

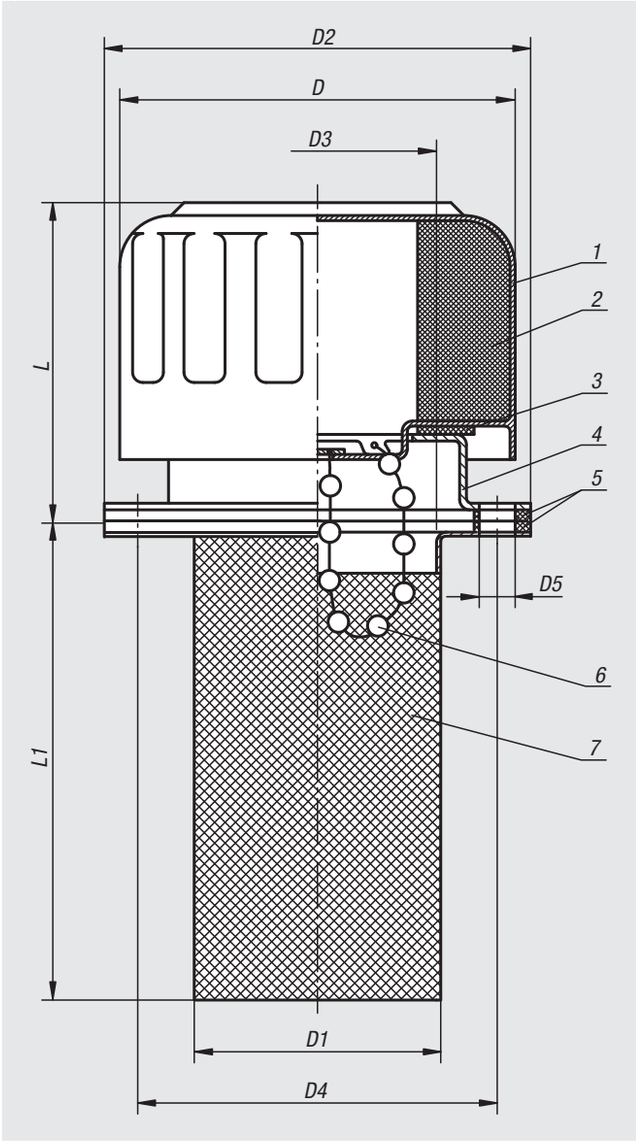
Sample order:
nlm 28070-706020

Note:
Temperature resistant up to 80 °C.

Order No.	D	D1	D2	D3	L	L1	L2	S
28070-706020	70	38	55	M60X2	46,5	88	80	2 - 8

Filler necks





Material, version:
1. Filler housing chrome steel

2. Air filter polyurethane (PU foam), filter mesh 40 µm. Flow rate up to 720 l/min

3. Flat seal cork

4. Mounting flange with fastening screws, bayonet fitting

5. Flat seal cork

6. Chain nickel-plated brass

7. Filler sieve electro zinc-plated steel

Sample order:
nlm 28071-45

Note:
The filler necks are supplied with seals and M5 fastening screws.

Not suitable for water tanks.

Order No.	Version	D	D1	D2	D3	D4	D5	L	L1
28071-45	without chain	46,5	27,5	52	25	41,3	6 (3x)	43	66
28071-77	with chain	80	49	83	44	71,5	6 (6x)	57	80

Filler necks



Material, version:
1. Sealing cap red Polyamide 66 thermoplastic.

2. Filler sieve black Polypropylene thermoplastic.

3 Flange electro zinc-plated steel.

4. Fastening screws electro zinc-plated steel.

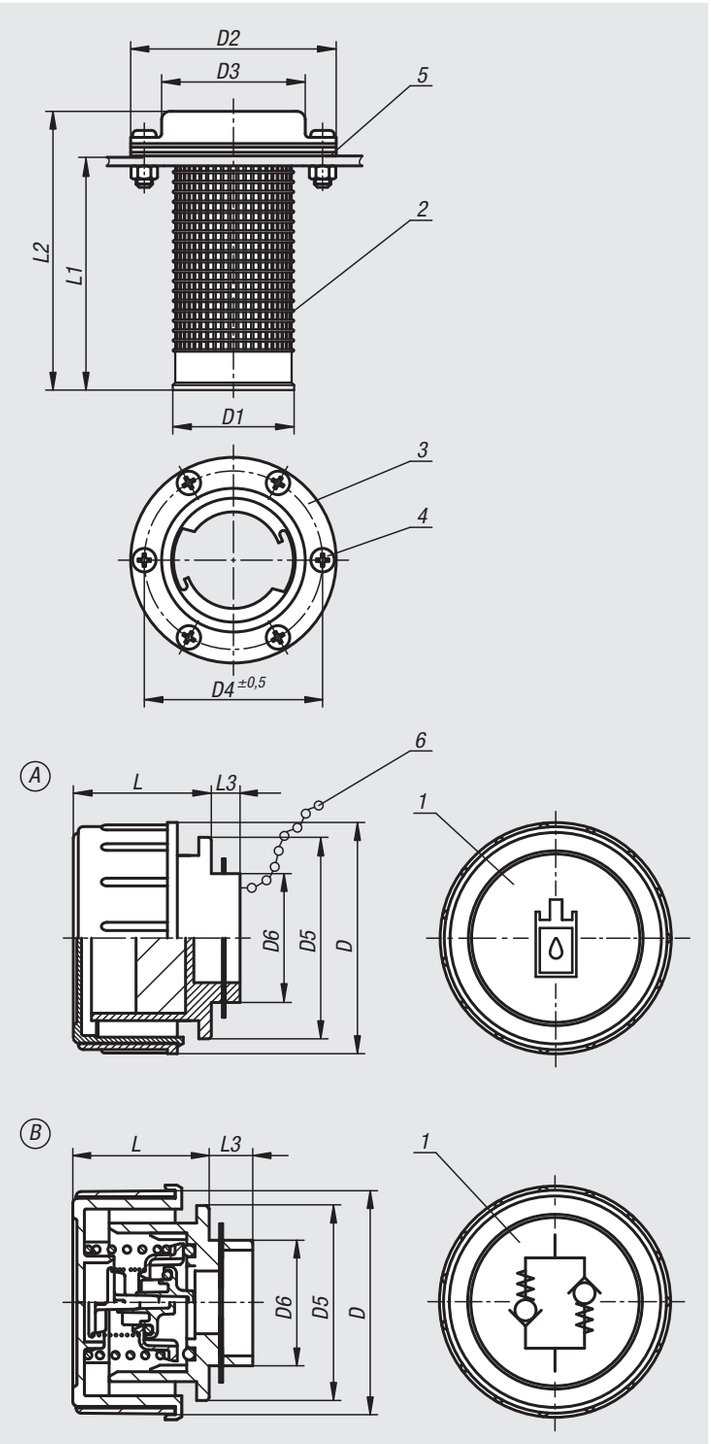
5 Flange seal cork.

6. Chain brass.

Sample order:
nlm 28072-170

Note:
Form A: the max. pressure while venting is 50 mbar (0.73 psi) with a max. air volume of 500 l/min. The air filter prevents dirt entering.

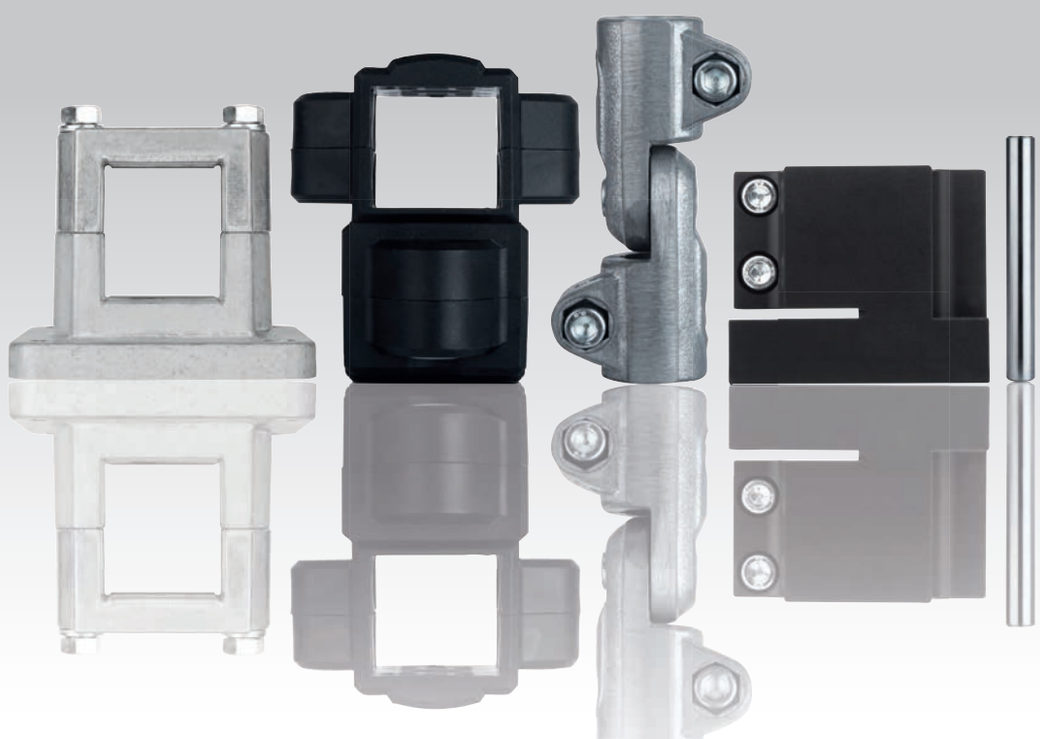
Form B: contains a plastic vent and aeration valve. The opening pressure while venting is 0.35 bar (±0.05 bar). The opening pressure while aerating is 0.05 bar. This form is suitable for applications where the airflow needs to be controlled in both directions.



Order No.	Form	Type	D	D1	D2	D3	D4	D5	D6	L	L1	L2	L3
28072-170	A	with filter	70	46	83	58	72	60	37	41	94	115	14
28072-270	B	vent valve	70	46	83	58	72	60	37	41	94	115	14

29000

Tube connectors
Tube clamps
Tube joints
Tubes
Columns



Technical information
Thermoplastic tube clamping system

The tube clamping system is characterised by the attractive design and a special reducing sleeve concept.

This unique concept and the associated clamping of different diameters and tube forms permit a flexibility never before achieved.

By simply exchanging a sleeve an existing tubular construction can be transformed into one with a different diameter or cross-section.

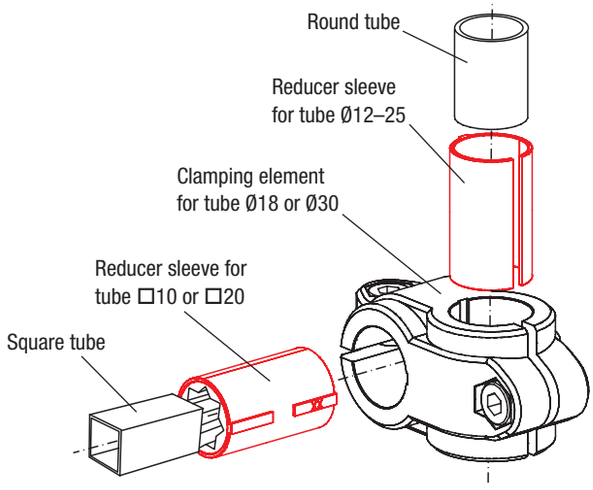
Benefits:

- Only one clamping element per construction type.
- Tube reduction (from Ø30–12 or 25x25–10x10) with different reducer sleeves for round or square tubes.
- Tube diameter marked on each reducer sleeve.
- Locking tab on the sleeves prevents rotation in the clamping element.

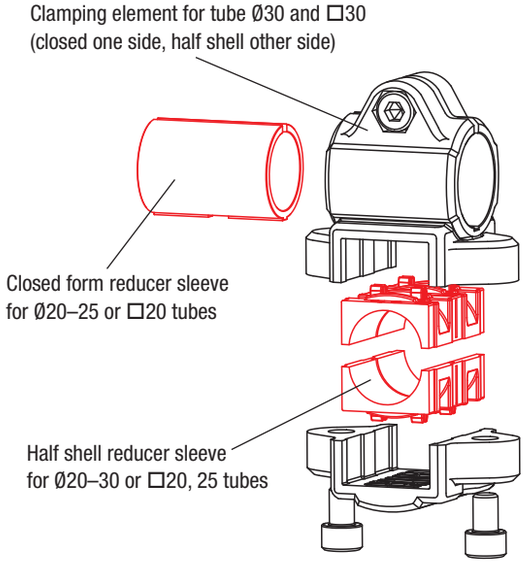
Note:

The clamping elements are supplied as standard with a DIN 7984 screw and a DIN 985 self-locking nut. Plastic clamp levers for locking available on request.

Closed system (one-piece, slitted)



Half shell elements (two-piece)



Application using tube clamps



Tube clamps

cross, plastic



Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

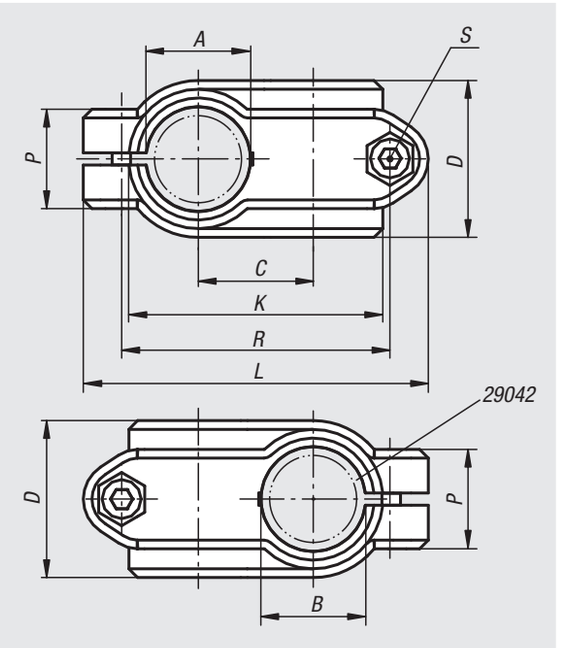
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29000-1818

Note:
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050



Order No.	A	B	C	D	K	L	P	R	S
29000-1818	18	18	20	30	48	63	21	48	M6x18
29000-3030	30	30	33	45	72	99	28,5	77	M8x25

29000

Tube clamps

cross, aluminium



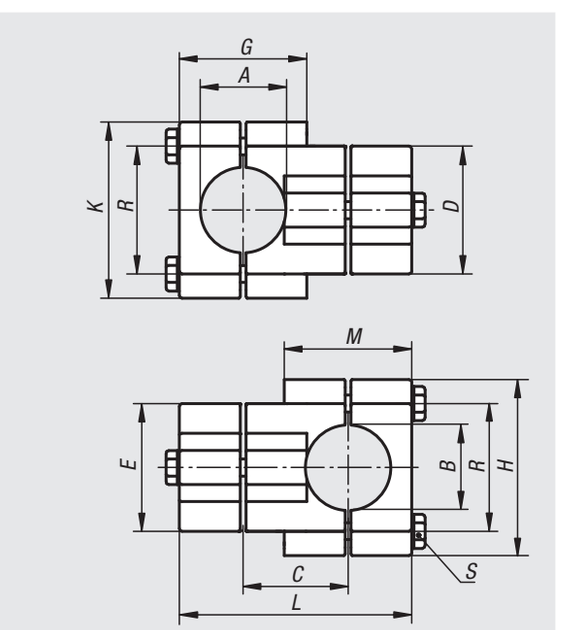
Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29000-523030

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050

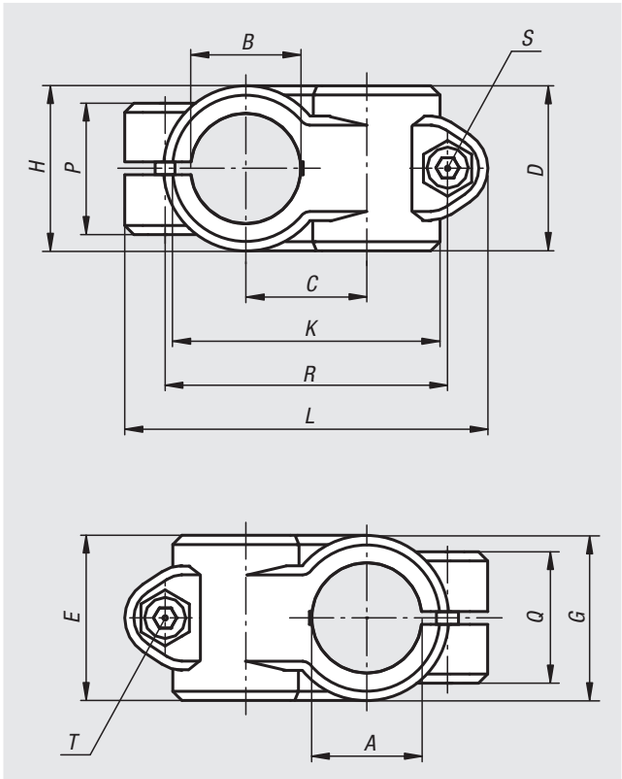


Order No.	A	B	C	D	E	G	H	K	L	M	R	S
29000-523030	30,2	30,2	38	45	45	44	64	64	83	44	46	M8x45
29000-524040	40,2	40,2	50	60	60	61	75	75	111	61	57	M8x60

Tube clamps

cross, aluminium





Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29000-51818

On request:
Clamping levers for tightening.

Accessories:
- Round and square tubes 29050



Order No.	A	B	C	D	E	G	H	K	L	P	Q	R	S	T
29000-51212	12,1	12,1	20	25,5	25,5	-	-	43,5	67	23	23	49	M6x20	M6x20
29000-51414	14,1	14,1	20	25,5	25,5	-	-	43,5	67	23	23	49	M6x20	M6x20
29000-51515	15,1	15,1	20	25,5	25,5	-	-	43,5	67	23	23	49	M6x20	M6x20
29000-51616	16,1	16,1	20	25,5	25,5	-	-	43,5	67	23	23	49	M6x20	M6x20
29000-51818	18,1	18,1	20	25,5	25,5	-	-	43,5	67	23	23	49	M6x20	M6x20
29000-52014	20,1	14,1	27	40	33	40	26	59	84	21	33	65	M8x25	M6x20
29000-52020	20,1	20,1	33	40	40	-	-	73	101	33	33	78	M8x25	M8x25
29000-52514	25,1	14,1	27	40	33	40	26	59	84	21	33	65	M8x25	M6x20
29000-52525	25,1	25,1	33	40	40	-	-	73	101	33	33	78	M8x25	M8x25
29000-53014	30,1	14,1	27	40	33	40	26	59	84	21	33	65	M8x25	M6x20
29000-53030	30,1	30,1	33	40	40	-	-	73	101	33	33	78	M8x25	M8x25
29000-54020	40,17	20,1	36	50	40	52	32	60	110	33	40	86,5	M10x30	M8x25
29000-54030	40,17	30,1	45	65	65	65	45	98	137,5	44	44	108,5	M10x30	M10x30
29000-54040	40,17	40,17	45	60	60	-	-	100	137	40	40	111	M10x30	M10x30
29000-55030	50,22	30,1	45	65	65	65	45	98	137,5	44	44	108,5	M10x35	M10x35
29000-55050	50,2	50,2	53	70	70	-	-	118	154	45	45	128	M10x35	M10x35

Tube clamps

cross, stainless steel



Material:
Investment cast 1.4308 stainless steel.
ISO 4762 cap screw and ISO 4032 hex nut, stainless steel.
From ø30 mm ISO 4017 hex head bolt, stainless steel.

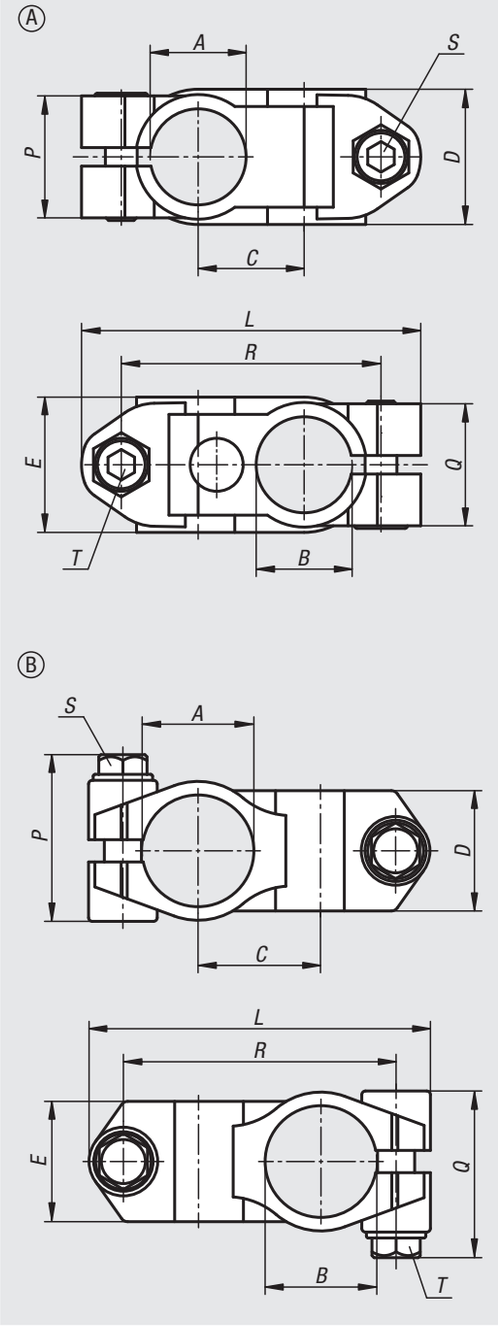
Version:
Electropolished.

Sample order:
nlm 29000-11212

Note:
The tube clamps with diameters 30 and 40 mm have a silicone sleeve that protects the thread of the hex head screw from contamination and damage.

On request:
Clamping levers for tightening.

Accessories:
- Round and square tubes 29050



Order No.	Form	A	B	C	D	E	L	P	Q	R	S	T
29000-11212	A	12,1	12,1	20	25,5	25,5	64	23	23	49	M6x18	M6x18
29000-11414	A	14,1	14,1	20	25,5	25,5	64	23	23	49	M6x18	M6x18
29000-11616	A	16,1	16,1	20	25,5	25,5	64	23	23	49	M6x18	M6x18
29000-11818	A	18,1	18,1	20	25,5	25,5	64	23	23	49	M6x18	M6x18
29000-12020	A	20,1	20,1	21	25,5	25,5	64	23	23	49	M6x18	M6x18
29000-13030	B	30,1	30,1	33	32,4	32,4	92	45.5	45.5	73,5	M8x30	M8x30
29000-14040	B	40,17	40,17	42	40,4	40,4	118	52	52	95,5	M10x35	M10x35

Tube clamps

cross, plastic



Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

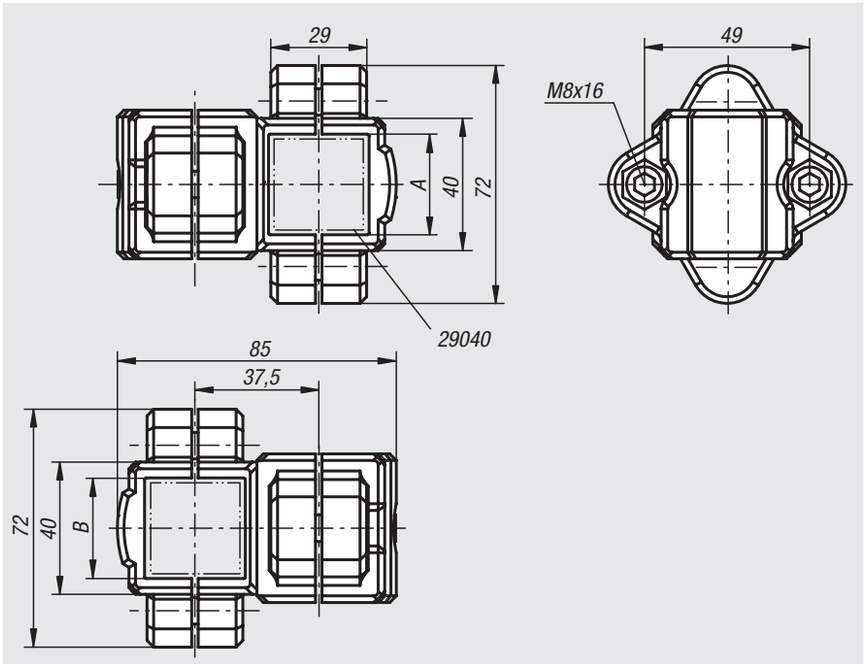
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29002-3030

Note:
These cross clamps are for 30 mm square tubes.
Use reducer sleeves 29040 if smaller tubes are to be clamped or a conversion from square to round tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29040
- Round and square tubes 29050

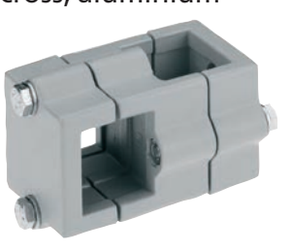


Order No.	A	B
29002-3030	30	30

29002

Tube clamps

cross, aluminium



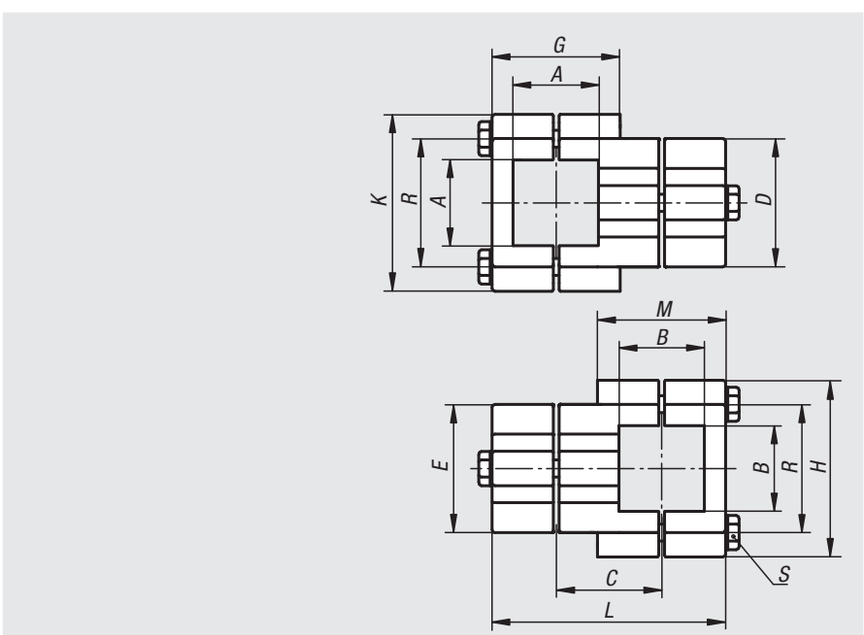
Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29002-523030

On request:
Levers for locking and other sizes for square tube.

Accessories:
- Round and square tubes 29050



Order No.	A	B	C	D	E	G	H	K	L	M	R	S
29002-523030	30,2	30,2	38	45	45	44	64	64	83	44	46	M8x45
29002-524040	40,3	40,3	50	60	60	61	75	75	111	61	57	M8x60

29004

Tube clamps

cross, plastic



Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

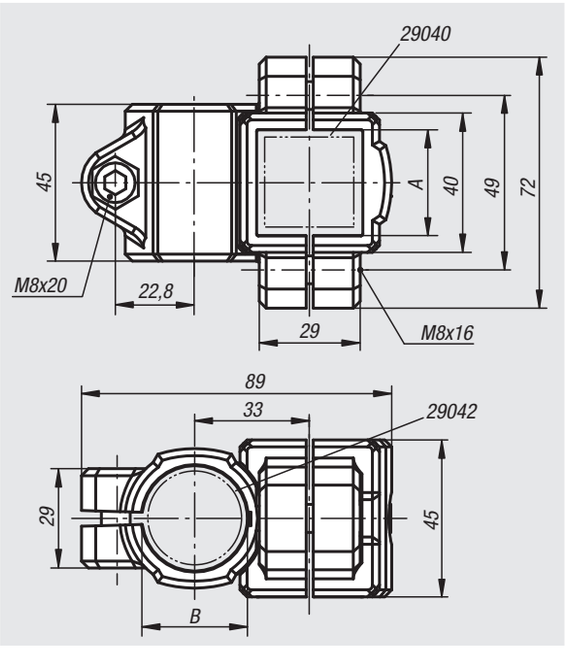
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29004-3030

Note:
These cross clamps are for 30 mm square and round tubes. Use reducer sleeves 209040 or 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29040 and 29042
- Round and square tubes 29050



Order No.	A	B
29004-3030	30	30

29004

Tube clamps

cross, aluminium



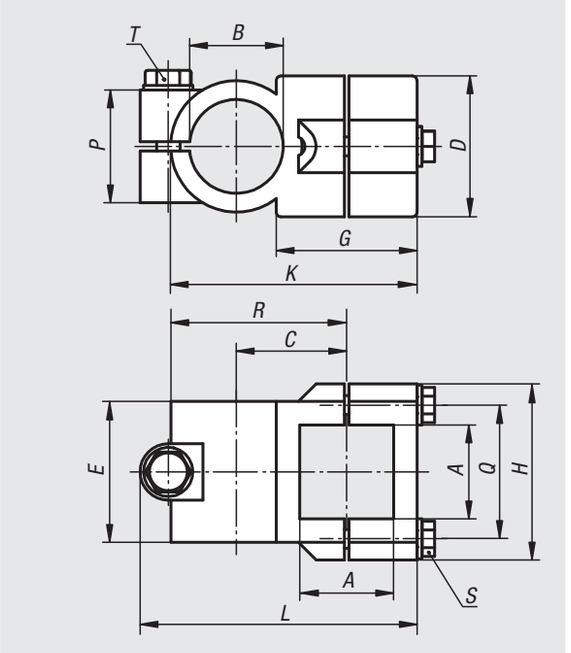
Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29004-53030

On request:
Clamping levers for fastening and other diameters.

Accessories:
- Round and square tubes 29050

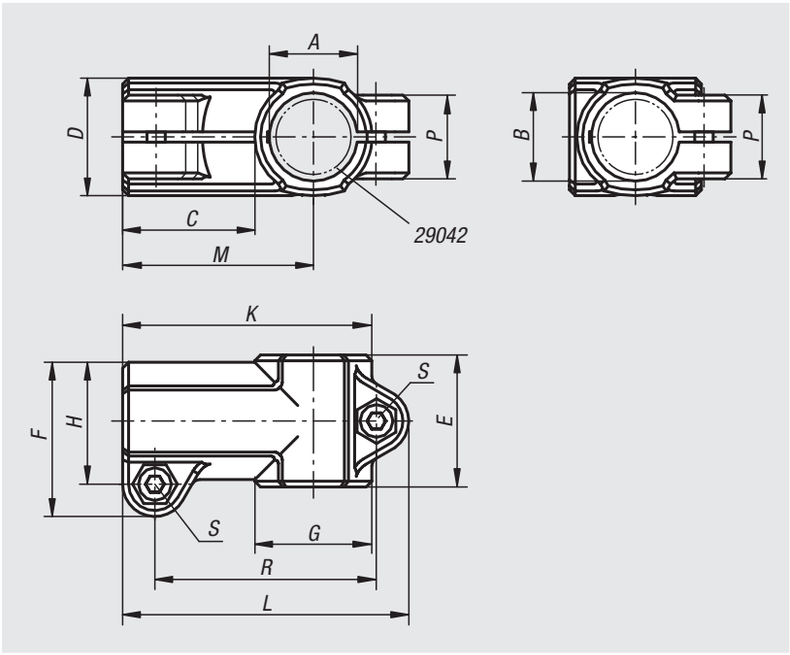


Order No.	A	B	C	D	E	G	H	K	L	P	Q	R	S	T
29004-53030	30,2	30,1	33	45	45	40	62	76	86	33	46	55	M8x35	M8x35
29004-54040	40,3	40,2	47	60	60	60	75	105	117	48	57	75	M8x45	M10x50

Tube clamps

T-angle, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29006-1818

Note:
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

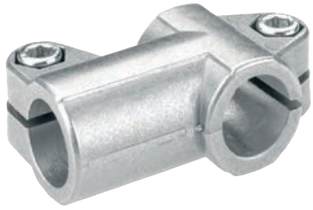
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

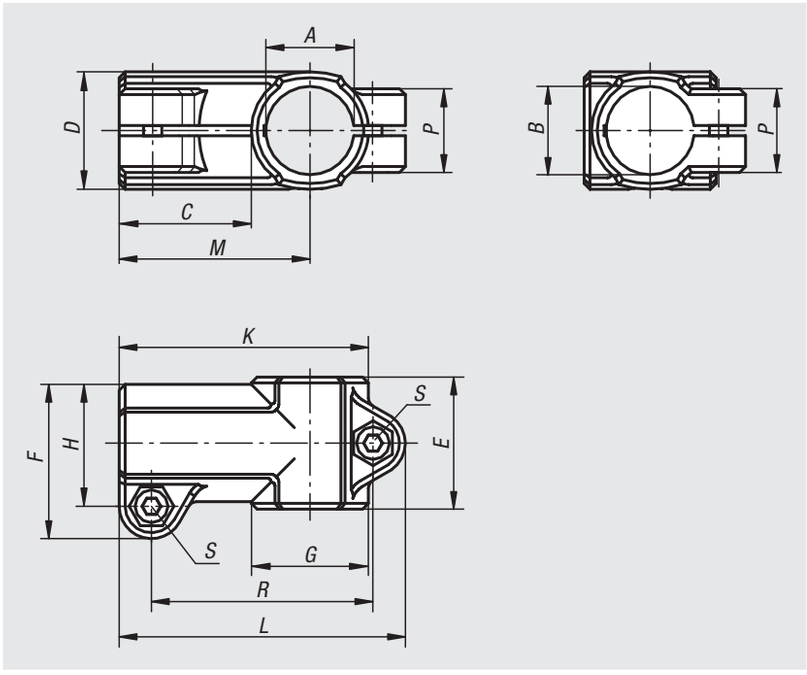


Order No.	A	B	C	D	E	F	G	H	K	L	M	P	R	S
29006-1818	18	18	30,5	25	30	34	25	26,5	55,5	64,5	43	21	49,5	M6x18
29006-3030	30	30	45	40	45	52,5	40	41,5	85	97,5	65	28,5	75,5	M8x25

Tube clamps

T-angle, aluminium





Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29006-51818

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050

Order No.	A	B	C	D	E	F	G	H	K	L	M	P	R	S
29006-51212	12,1	12,1	28	25	32	35,5	25	30	56	66	43	23	49	M6x20
29006-51414	14,1	14,1	28	25	32	35,5	25	30	56	66	43	23	49	M6x20
29006-51515	15,1	15,1	28	25	32	35,5	25	30	56	66	43	23	49	M6x20
29006-51616	16,1	16,1	28	25	32	35,5	25	30	56	66	43	23	49	M6x20
29006-51818	18,1	18,1	28	25	32	35,5	25	30	56	66	43	23	49	M6x20
29006-52020	20,1	20,1	38	40	45	53	40	42,5	80	93	60	33	72,5	M8x25
29006-52525	25,1	25,1	38	40	45	53	40	42,5	80	93	60	33	72,5	M8x25
29006-53030	30,1	30,1	38	40	45	53	40	42,5	80	93	60	33	72,5	M8x25
29006-54040	40,15	40,15	55	56	60	74	56	61	116	134	88	40	108	M10x30
29006-55050	50,22	50,22	63	66	66	84	66	71	131	149	98	45	123	M10x35

Tube clamps

T-angle, stainless steel



Material:
Investment cast 1.4308 stainless steel.
ISO 4762 cap screw and ISO 4032 hex nut, stainless steel.
From ø30 mm ISO 4017 hex head bolt, stainless steel.

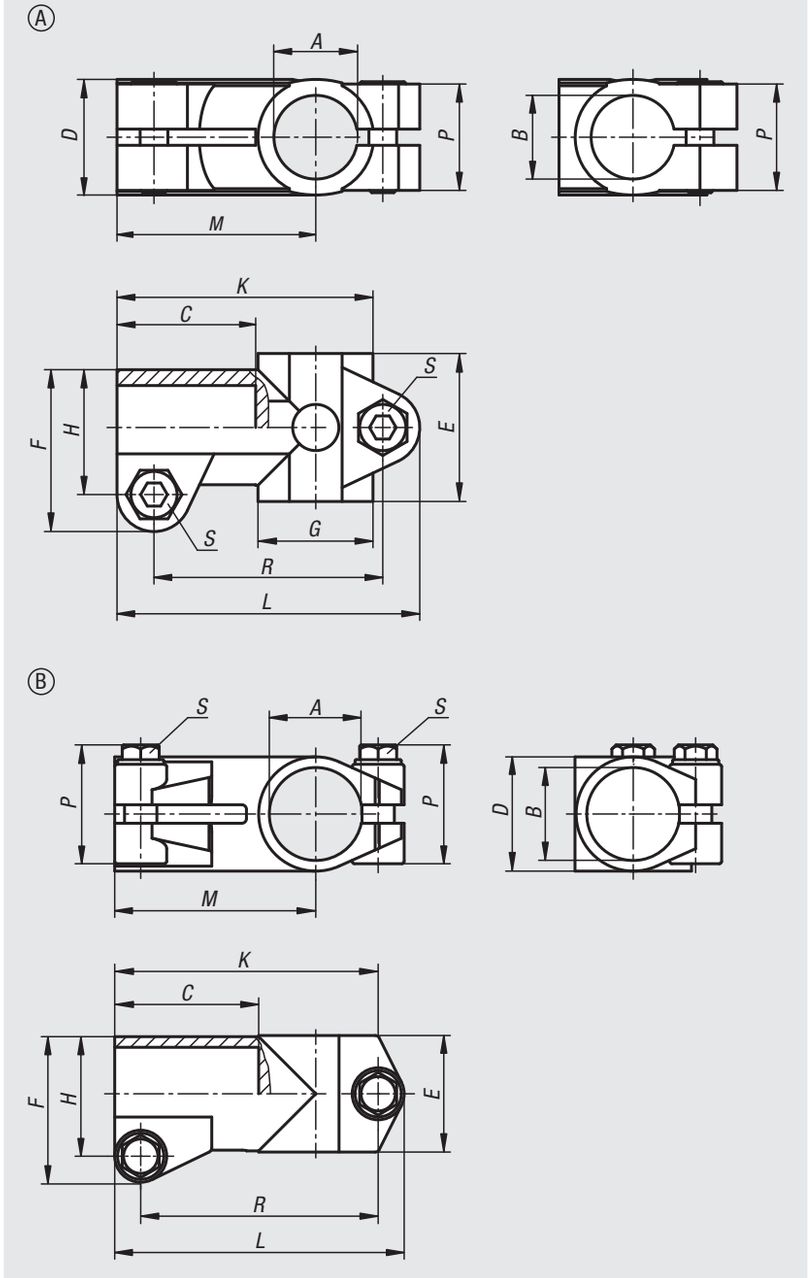
Version:
Electropolished.

Sample order:
nlm 29006-11212

Note:
The tube clamps with diameters 30 and 40 mm have a silicone sleeve that protects the thread of the hex head screw from contamination and damage.

On request:
Clamping levers for tightening.

Accessories:
- Round and square tubes 29050

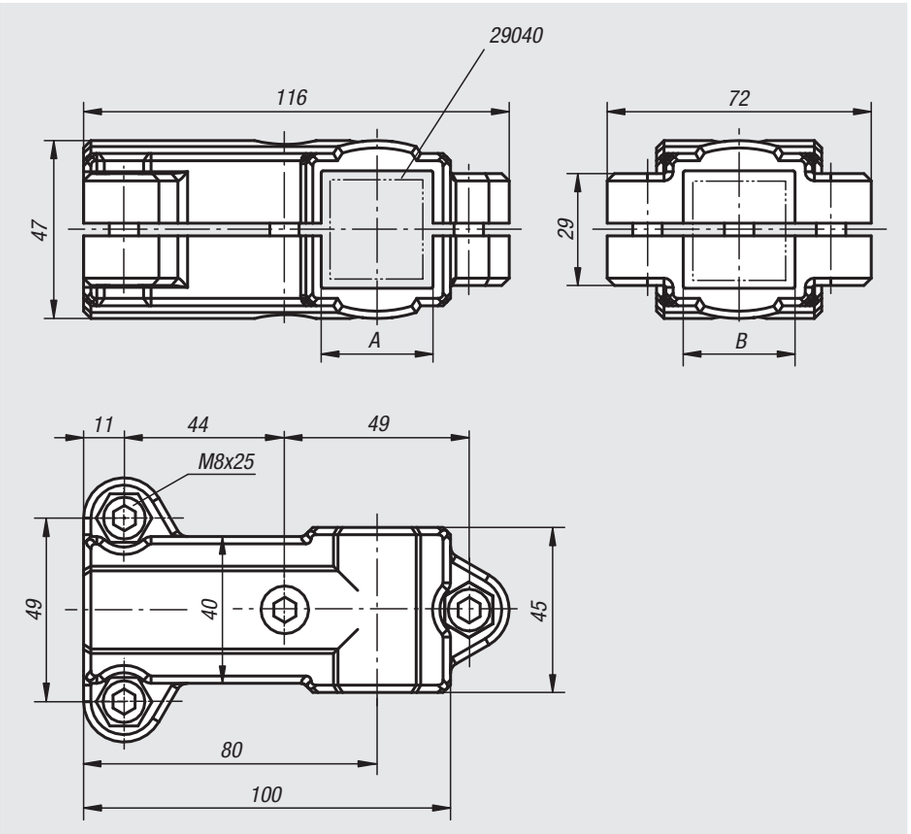


Order No.	Form	A	B	C	D	E	F	G	H	K	L	M	P	R	S
29006-11212	A	12,1	12,1	30,5	25	32	35	25	27	55,5	65,5	43	23	49,5	M6x18
29006-11414	A	14,1	14,1	30,5	25	32	35	25	27	55,5	65,5	43	23	49,5	M6x18
29006-11616	A	16,1	16,1	30,5	25	32	35	25	27	55,5	65,5	43	23	49,5	M6x18
29006-11818	A	18,1	18,1	30,5	25	32	35	25	27	55,5	65,5	43	23	49,5	M6x18
29006-12020	A	20,1	20,1	30,5	25	32	35	25	27	55,5	65,5	43	23	49,5	M6x18
29006-13030	B	30,1	30,1	40	38,4	38	48	-	39	78	87	58	45.5	69	M8x30
29006-14040	B	40,17	40,17	60	50,4	50	63	-	51,8	112	124,9	87	52	102,5	M10x35

Tube clamps

T-angle, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29008-3030

Note:
These T-clamps are for 30 mm square tubes. Use reducer sleeves 29040 if smaller tubes are to be clamped or a conversion from square to round tubes is required.

On request:
Plastic levers for locking.

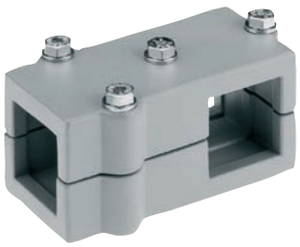
Accessories:
- Reducer sleeves 29040
- Round and square tubes 29050

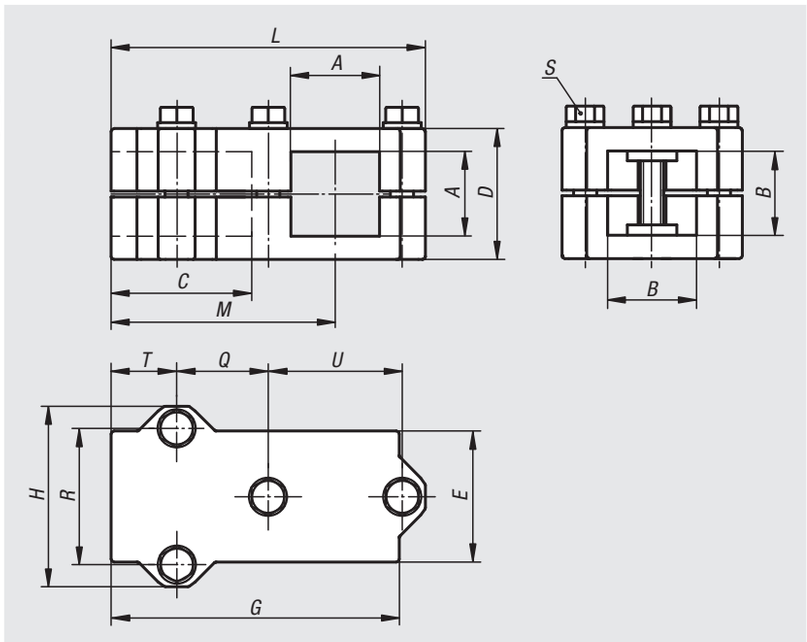
Order No.	A	B
29008-3030	30	30

29008

Tube clamps

T-angle, aluminium





Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29008-523030

On request:
Levers for locking and other sizes for square tube.

Accessories:
- Round and square tubes 29050

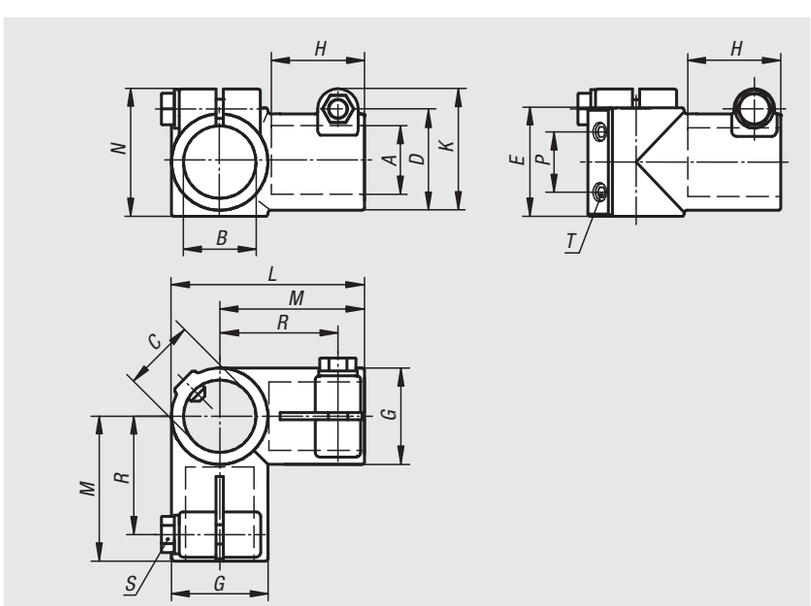
Order No.	A	B	C	D	E	G	H	L	M	Q	R	S	T	U
29008-523030	30,3	30,3	46	45	45	100	62	108	77	31,5	46	M8x45	23	46
29008-524040	40,4	40,4	60	60	60	129	75	136	99	40	57	M8x60	30	57

29008

Tube clamps

right-angle, aluminium





Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29008-530

On request:
Levers for locking and other diameters.

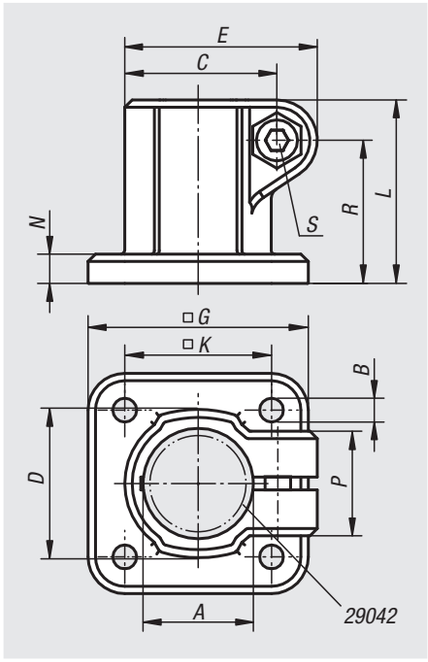
Accessories:
- Round and square tubes 29050

Order No.	A	B	C	D	E	G	H	K	L	M	N	P	R	S	T
29008-530	30,1	30,1	30,1	40	45	40	38	51	80	60	53	25	49	M8x25	M8x15
29008-540	40,15	40,15	40,15	56	60	56	58	71	116	88	73	35	70	M10x30	M8x10
29008-550	50,22	50,22	50,22	66	70	66	70	78	136	108	80	40	90	M10x35	M10x15

Tube clamps

base, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29010-18

Note:
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

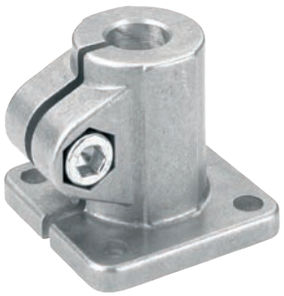
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050



Order No.	A	B	C	D	E	G	K	L	N	P	R	S
29010-18	18	5,3	26,5	26	34	45	30	32	5	21	24,5	M6x18
29010-30	30	6,5	41,5	42	52,5	60	40	50	8	28,5	39	M8x25

Tube clamps

base, aluminium



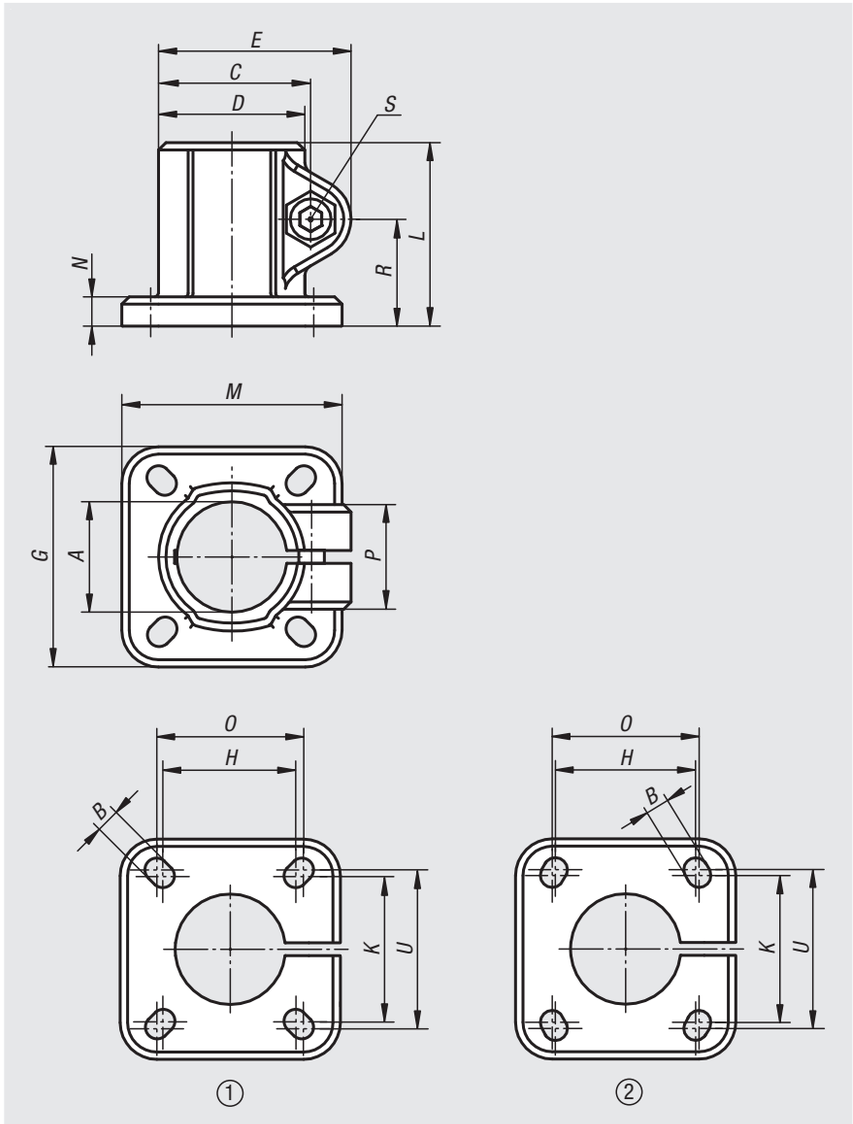
Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29010-518

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050



Order No.	hole arrangement	A	B	C	D	E	G	H	K	L	M	N	O	P	R	S	U
29010-512	1	12,1	6	27	25	35,5	42	28	28	37	42	5	30	23	21	M6x20	30
29010-514	1	14,1	6	27	25	35,5	42	28	28	37	42	5	30	23	21	M6x20	30
29010-515	1	15,1	6	27	25	35,5	42	28	28	37	42	5	30	23	21	M6x20	30
29010-516	1	16,1	6	27	25	35,5	42	28	28	37	42	5	30	23	21	M6x20	30
29010-518	1	18,1	6	27	25	35,5	42	28	28	37	42	5	30	23	21	M6x20	30
29010-520	2	20,1	7	42,5	40	53	60	40	42	50	60	8	42	33	29	M8x25	45
29010-525	2	25,1	7	42,5	40	53	60	40	42	50	60	8	42	33	29	M8x25	45
29010-530	2	30,1	7	42,5	40	53	60	40	42	50	60	8	42	33	29	M8x25	45
29010-540	1	40,17	9	61	56	74	90	60	60	70	90	10	64	40	40	M10x30	64
29010-550	1	50,22	11	70	66	84	105	74	74	85	105	14	80	45	49,5	M10x35	80

Tube clamps

base, stainless steel



Material:
Investment cast 1.4308 stainless steel.
ISO 4762 cap screw and ISO 4032 hex nut, stainless steel.
From ø30 mm ISO 4017 hex head bolt, stainless steel.

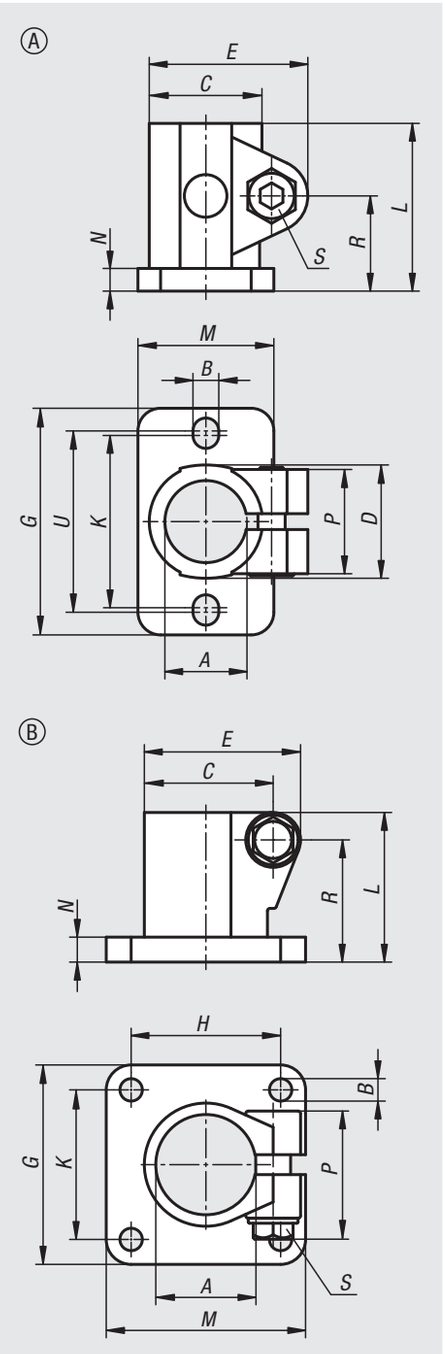
Version:
Electropolished.

Sample order:
nlm 29010-112

Note:
The tube clamps with diameters 30 and 40 mm have a silicone sleeve that protects the thread of the hex head screw from contamination and damage.

On request:
Clamping levers for tightening.

Accessories:
- Round and square tubes 29050



Order No.	Form	A	B	C	D	E	G	H	K	L	M	N	P	R	S	U
29010-112	A	12,1	5,7	27	25	35	50	-	38	37	30	5	23	21	M6x18	40
29010-114	A	14,1	5,7	27	25	35	50	-	38	37	30	5	23	21	M6x18	40
29010-116	A	16,1	5,7	27	25	35	50	-	38	37	30	5	23	21	M6x18	40
29010-118	A	18,1	5,7	27	25	35	50	-	38	37	30	5	23	21	M6x18	40
29010-120	A	20,1	5,7	27	25	35	50	-	38	37	30	5	23	21	M6x18	40
29010-130	B	30,1	7	39	37,4	48	60	40	40	50	60	7	45.5	41	M8x30	-
29010-140	B	40,17	9	51,7	49,4	63	80	60	60	60	80	10	52	48,7	M10x35	-

29012

Tube clamps

base, plastic



Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

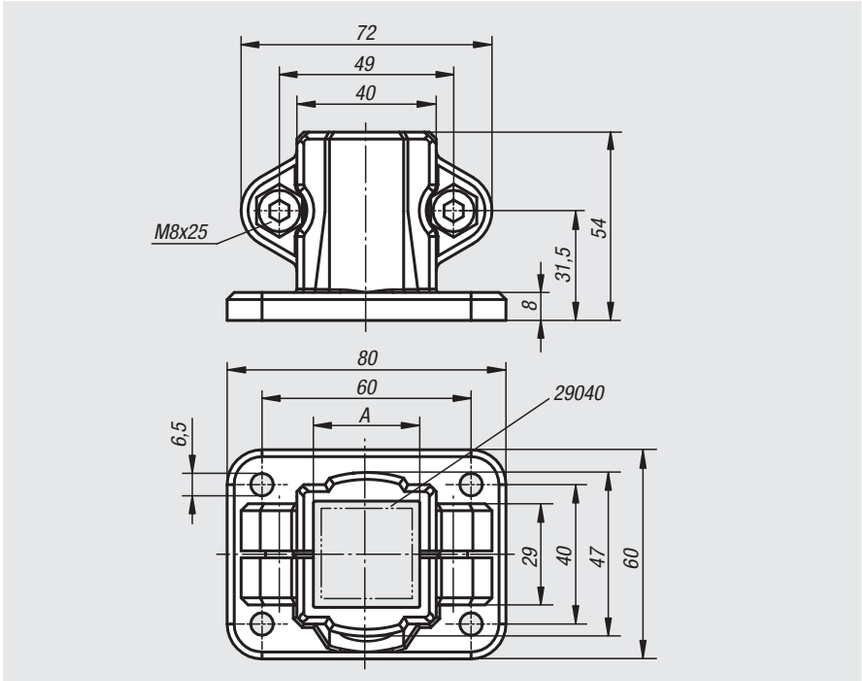
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29012-30

Note:
These base clamps are for 30 mm square tubes. Use reducer sleeves 29040 if smaller tubes are to be clamped or a conversion from square to round tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29040
- Round and square tubes 29050



Order No.	A
29012-30	30

29012

Tube clamps

base, aluminium



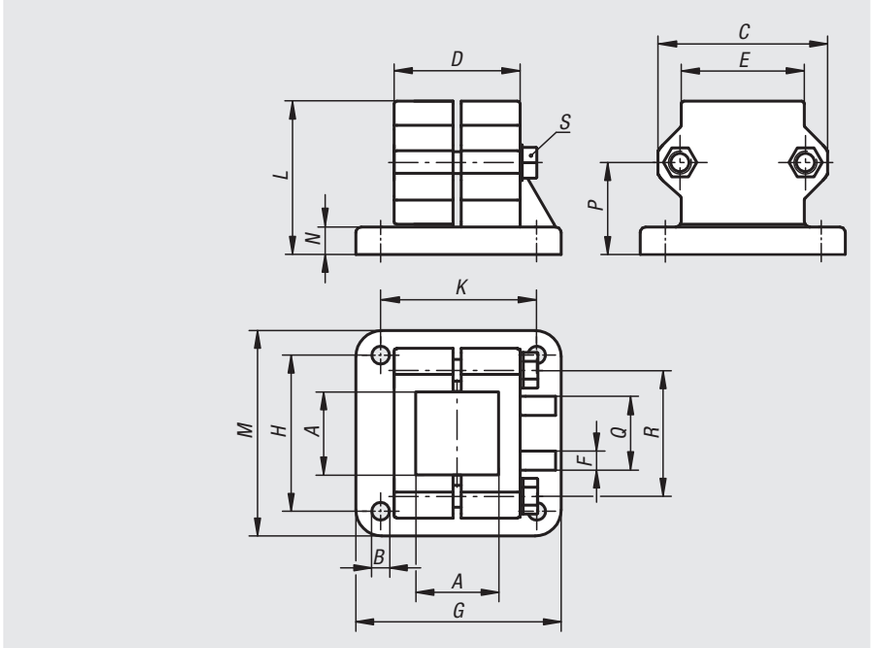
Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29012-5230

On request:
Levers for locking and other sizes for square tube.

Accessories:
- Round and square tubes 29050

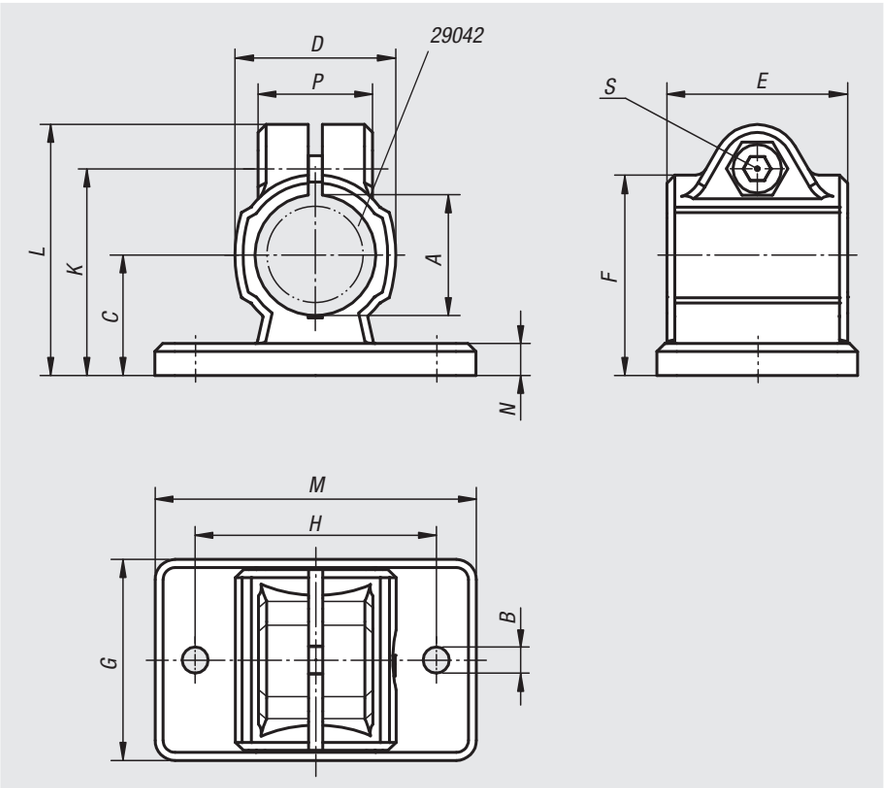


Order No.	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S
29012-5230	30,3	7	62	45	45	5	75	57	57	56	75	10	33,5	25	46	M8x45
29012-5240	40,4	9	75	60	60	5	100	76	76	73	100	12	43	32	57	M8x60

Tube clamps

flange, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

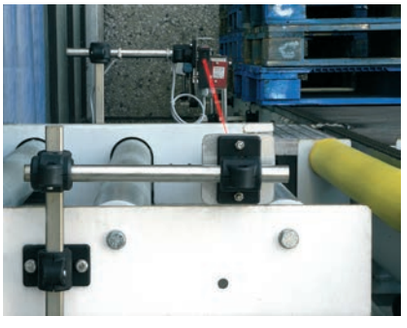
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29014-18

Note:
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050



Order No.	A	B	C	D	E	F	G	H	K	L	M	N	P	S
29014-18	18	5,3	18	25	30	30,5	35	40	32	39,5	50	5	21	M6x18
29014-30	30	6,5	30	40	45	50	50	60	51,5	62,5	80	8	28,5	M8x25

Tube clamps

flange, aluminium



Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

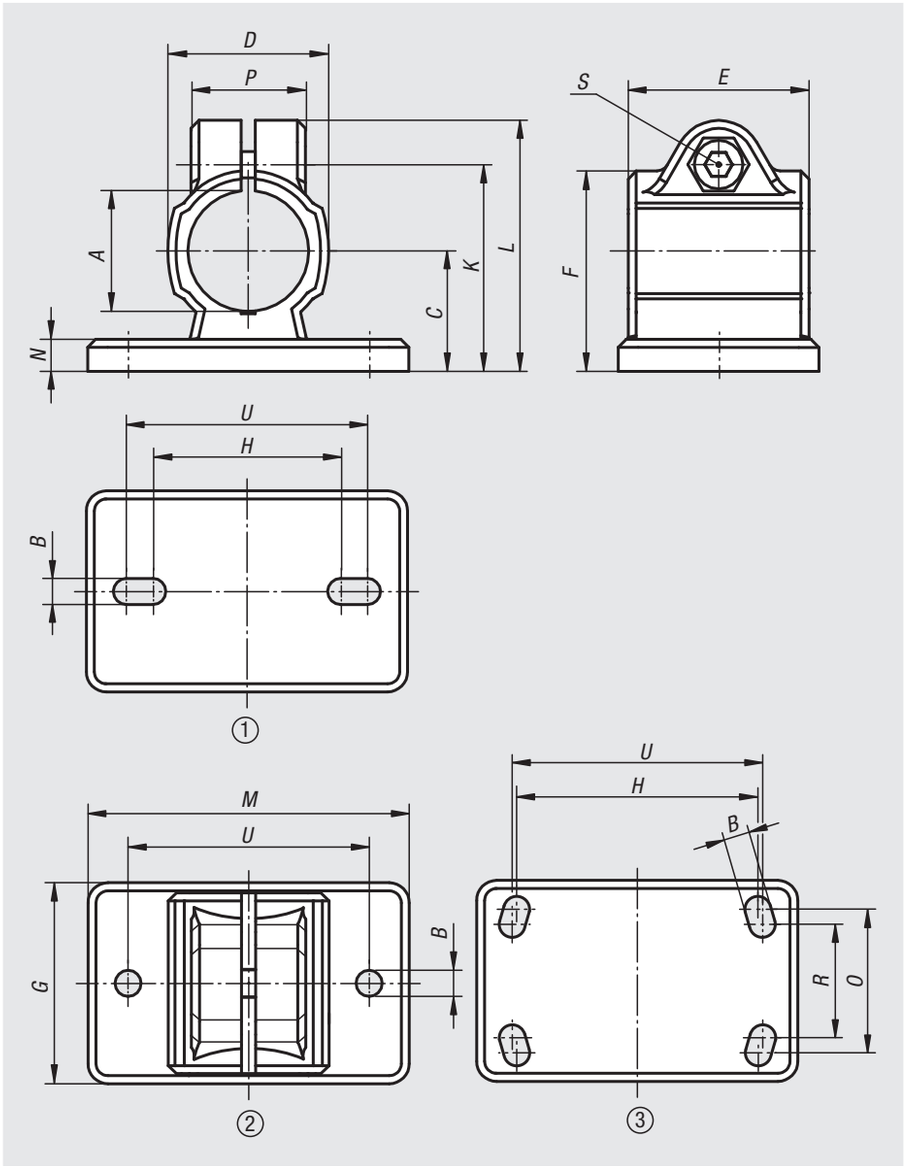
Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29014-518

Note:
* Elongated hole

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050

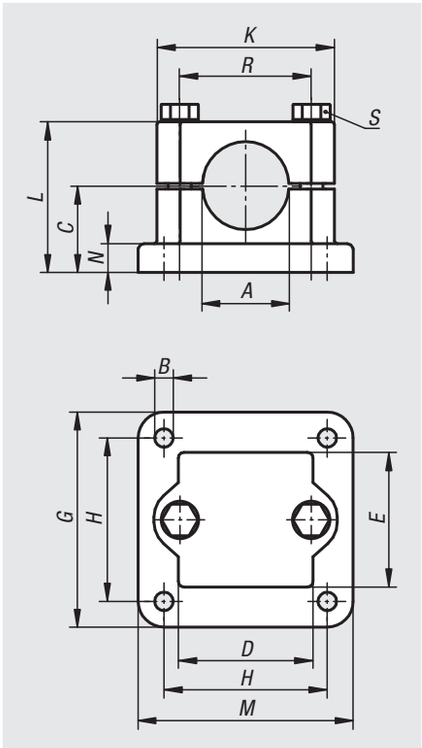


Order No.	hole arrangement	A	B	C	D	E	F	G	H	K	L	M	N	O	P	R	S	U
29014-512	1	12,1	5,5* (2x)	18	27	35	31	35	38	32,5	41	50	5	-	23	-	M6x20	40
29014-514	2	14,1	5,5 (2x)	18	25	35	31	35	-	32,5	41	50	5	-	23	-	M6x20	40
29014-515	2	15,1	5,5 (2x)	18	25	35	31	35	-	32,5	41	50	5	-	23	-	M6x20	40
29014-516	1	16,1	5,5* (2x)	18	25	35	31	35	38	32,5	41	50	5	-	23	-	M6x20	40
29014-518	2	18,1	5,5 (2x)	18	25	35	31	35	-	32,5	41	50	5	-	23	-	M6x20	40
29014-520	1	20,1	6,5* (2x)	30	40	40	50	55	53	53	63	78	7	-	33	-	M8x25	60
29014-525	1	25,1	6,5* (2x)	30	40	40	50	55	53	53	63	78	7	-	33	-	M8x25	60
29014-530	1	30,1	6,5* (2x)	30	40	40	50	55	53	53	63	78	7	-	33	-	M8x25	60
29014-540	3	40,17	8,5* (4x)	42	56	60	70	80	80	74	87	105	10	60	40	52	M10x30	82
29014-550	3	50,22	10,5* (4x)	50	66	65	83	90	98	85	98	128	14	62	45	60	M10x35	100

Tube clamps

flange, aluminium





Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29014-5230

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050

Order No.	A	B	C	D	E	G	H	K	L	M	N	R	S
29014-5220	20,2	7	30	45	45	75	57	62	52,5	75	10	46	M8x50
29014-5225	25,2	7	30	45	45	75	57	62	52,5	75	10	46	M8x50
29014-5230	30,2	7	30	45	45	75	57	62	52,5	75	10	46	M8x50
29014-5240	40,2	9	40	60	60	100	76	75	70	100	10	57	M8x70

Tube clamps

flange, stainless steel



Material:
Investment cast 1.4308 stainless steel.
ISO 4762 cap screw and ISO 4032 hex nut, stainless steel.
From ø30 mm ISO 4017 hex head bolt, stainless steel.

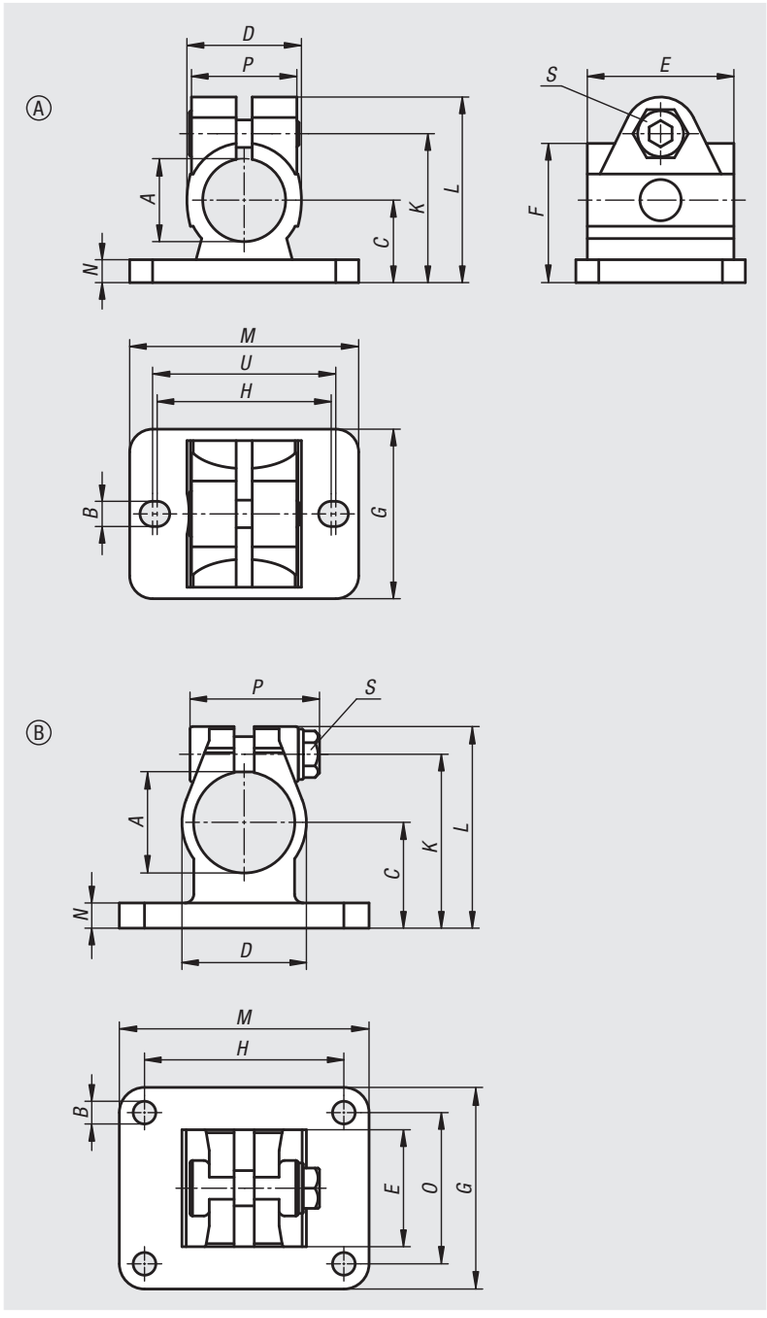
Version:
Electropolished.

Sample order:
nlm 29014-112

Note:
The tube clamps with diameters 30 and 40 mm have a silicone sleeve that protects the thread of the hex head screw from contamination and damage.

On request:
Clamping levers for tightening.

Accessories:
- Round and square tubes 29050



Order No.	Form	A	B	C	D	E	F	G	H	K	L	M	N	O	P	S	U
29014-112	A	12,1	5,5	18	25	32	30,4	37	38	32,5	40.5	50	5	-	23	M6x18	40
29014-114	A	14,1	5,5	18	25	32	30,4	37	38	32,5	40.5	50	5	-	23	M6x18	40
29014-116	A	16,1	5,5	18	25	32	30,4	37	38	32,5	40.5	50	5	-	23	M6x18	40
29014-118	A	18,1	5,5	18	25	32	30,4	37	38	32,5	40.5	50	5	-	23	M6x18	40
29014-120	A	20,1	5,5	18	25	32	30,4	37	38	32,5	40.5	50	5	-	23	M6x18	40
29014-130	B	30,1	7	30	37,4	32,4	-	55	60	50	59,2	78	7	40	45.5	M8x30	-
29014-140	B	40,17	9	42	49,4	46,4	-	80	60	69	80	80	10	60	52	M10x35	-

Tube clamps

flange, plastic



Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

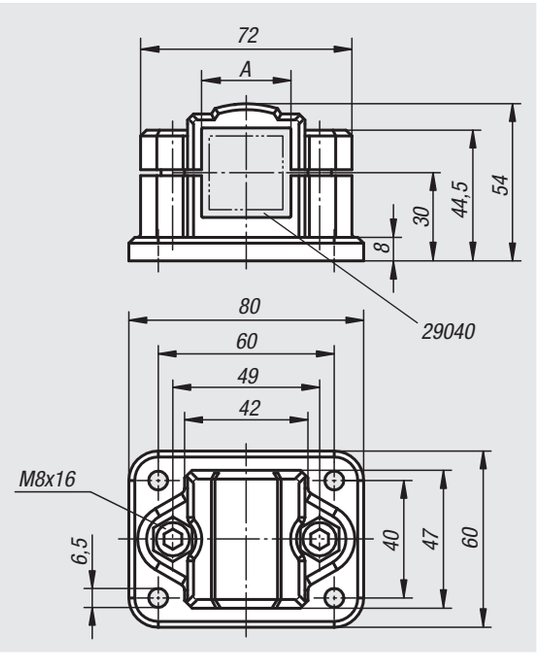
Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29016-30

Note:
These flange clamps are for 30 mm square tubes. Use reducer sleeves 29040 if smaller tubes are to be clamped or a conversion from square to round tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29040
- Round and square tubes 29050



Order No.	A
29016-30	30

29016

Tube clamps

flange, aluminium



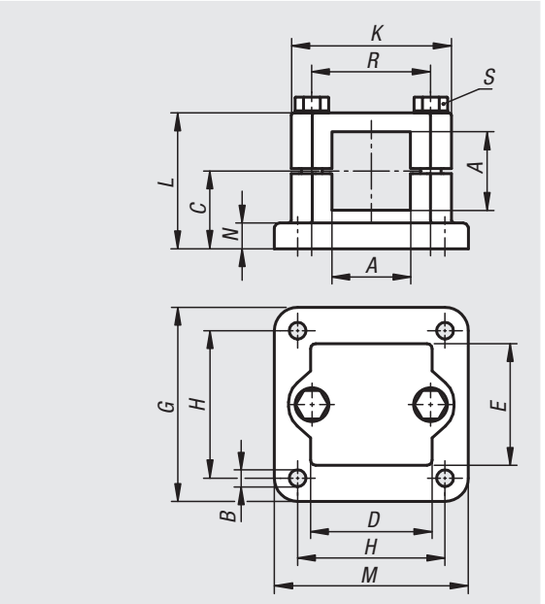
Material:
Cast aluminium.
Screws and nuts steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29016-5230

On request:
Levers for locking and other sizes for square tube.

Accessories:
- Round and square tubes 29050

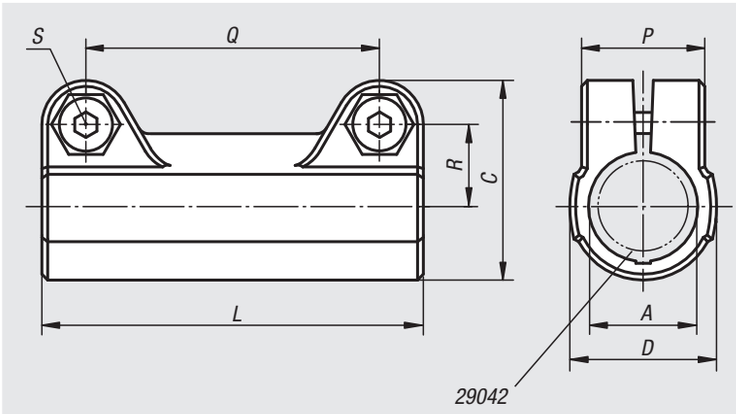


Order No.	A	B	C	D	E	G	H	K	L	M	N	R	S
29016-5225	25,3	7	30	45	45	75	57	62	52,5	75	10	46	M8x50
29016-5230	30,3	7	30	45	45	75	57	62	52,5	75	10	46	M8x50
29016-5240	40,4	9	40	60	60	100	76	75	70	100	10	57	M8x70

Tube clamps

straight, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29022-18

Note:
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

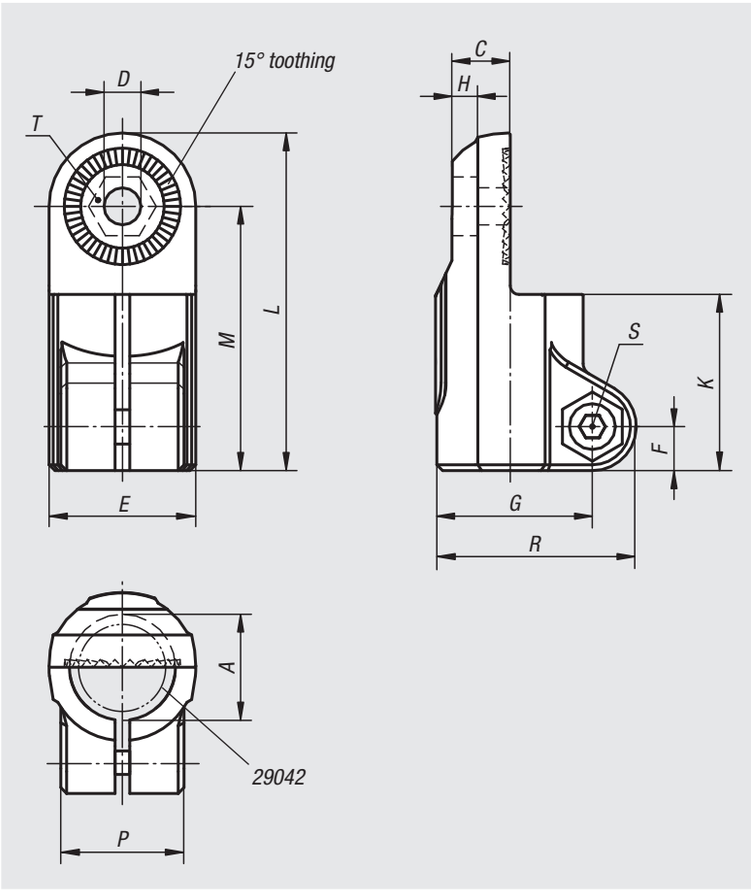
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	C	D	L	P	Q	R	S
29022-18	18	34	25	65	21	50	14	M6x18
29022-30	30	52,5	40	95	28,5	73	22,8	M8x25

Tube clamps

swivel half, sunken teeth, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29024-18

Note:
Swivel half clamps with sunken teeth can be combined with swivel half clamps with raised teeth (29026) to make a complete swivel clamp.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

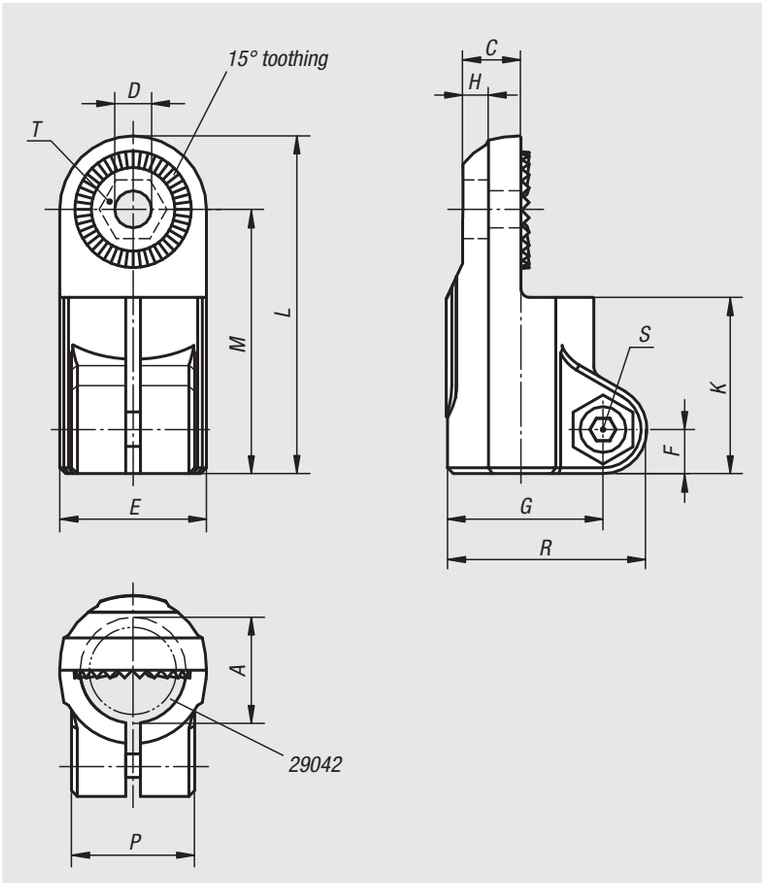
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	C	D	E	F	G	H	K	L	M	P	R	S	T
29024-18	18	9,9	6,1	25	7,5	26,5	5,9	30	57,5	45	21	34	M6x18	M6-DIN 985
29024-30	30	16,5	8,1	40	11	41,5	6,5	45	88	68	28,5	52,5	M8x25	M8-DIN 985

Tube clamps

swivel half, raised teeth, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29026-18

Note:
Swivel half clamps with raised teeth can be combined with swivel half clamps with sunken teeth (29024, 29028 or 29030) to make a complete swivel clamp.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

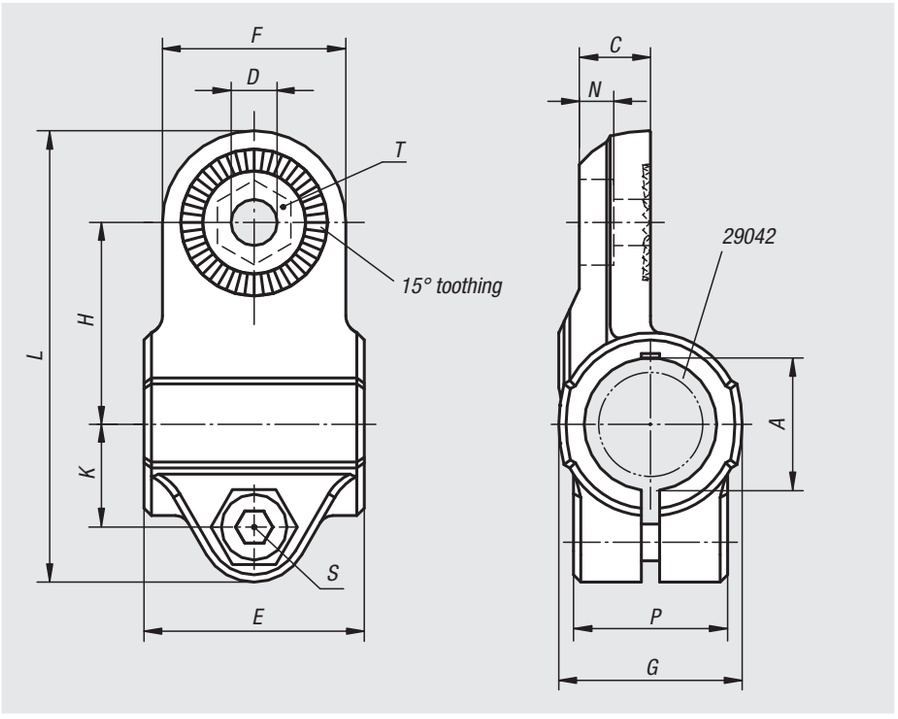
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	C	D	E	F	G	H	K	L	M	P	R	S	T
29026-18	18	9,9	6,1	25	7,5	26,5	5,9	30	57,5	45	21	34	M6x18	M6-DIN 985
29026-30	30	16,5	8,1	40	11	41,5	6,5	45	88	68	28,5	52,5	M8x25	M8-DIN 985

Tube clamps

swivel half, sunken teeth, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29028-18

Note:
Swivel half clamps with sunken teeth can be combined with swivel half clamps with raised teeth (29026) to make a complete swivel clamp.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	C	D	E	F	G	H	K	L	N	P	S	T
29028-18	18	9,7	6,1	30	25	25	27,5	14	61,5	5,7	21	M6x18	M6-DIN 985
29028-30	30	16,5	8,1	45	40	40	43	22,5	95,5	6,5	28,5	M8x25	M8-DIN 985

Tube clamps

swivel base, sunken teeth, plastic



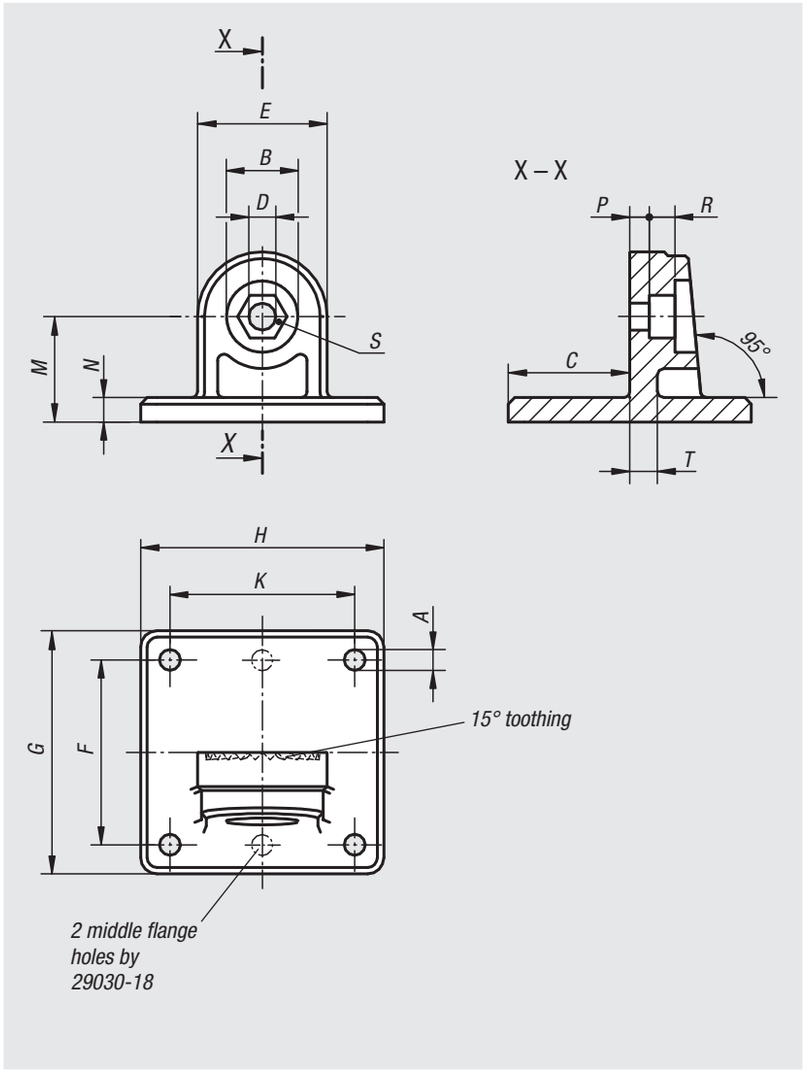
Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29030-18

Note:
Swivel clamp bases can be combined with swivel half clamps with raised teeth (29026) to make a complete swivel clamp.

On request:
Plastic levers for locking.



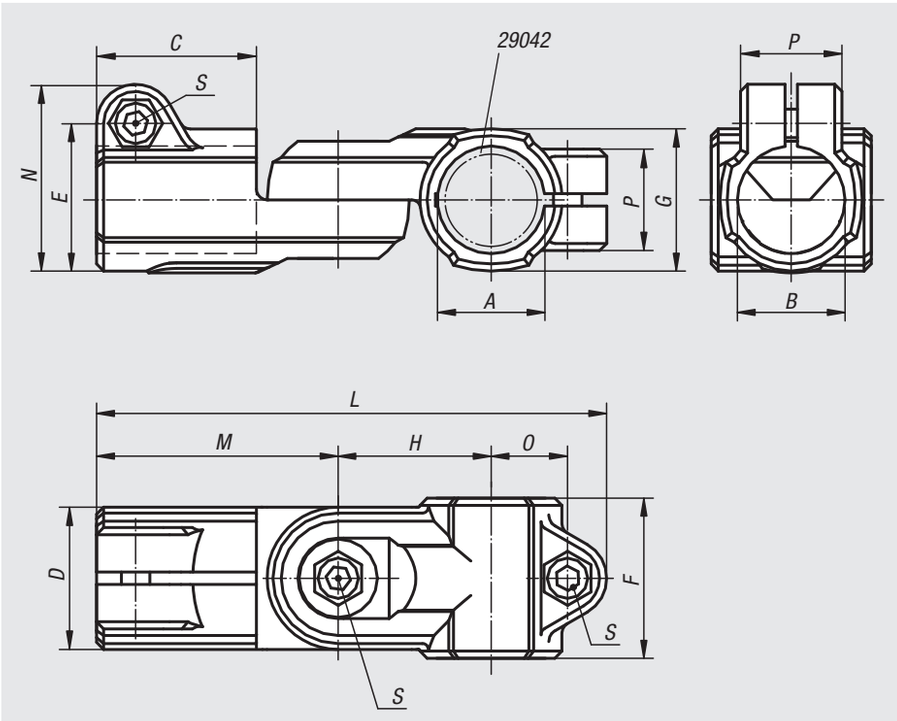


Order No.	A	B	C	D	E	F	G	H	K	M	N	P	R	S	T
29030-18	5,3 (2x)	15	25	6,1	25	40	50	35	-	20	5	4,5	5,5	M6-DIN 985	5
29030-30	6,5 (4x)	22	37,5	8,1	40	60	75	75	60	32,5	7,5	6,6	8,2	M8-DIN 985	7

Tube clamps

swivel, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29032-18

Note:
Tube swivel clamps can be seamlessly rotated through 180°.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

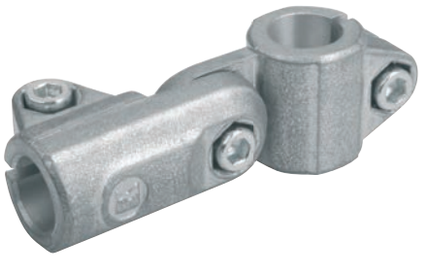
On request:
Plastic levers for locking.

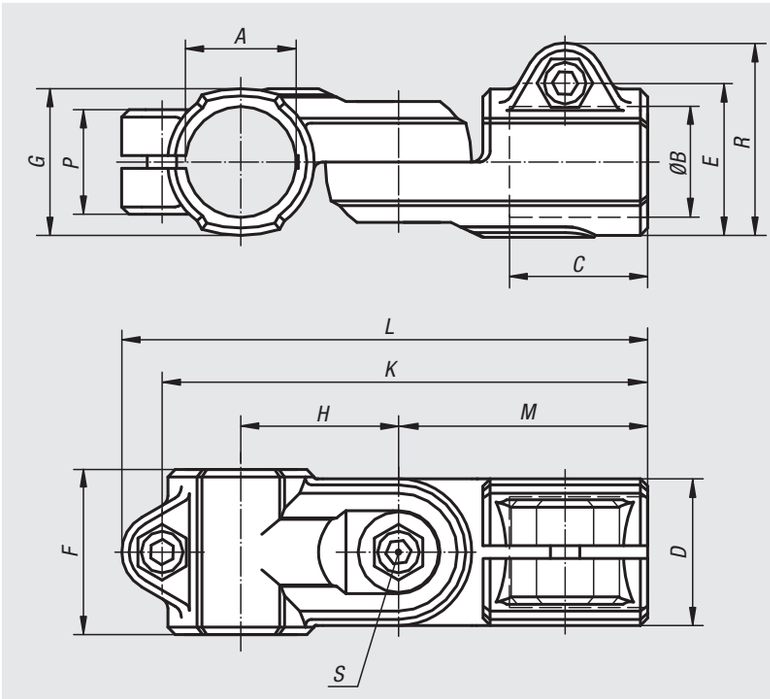
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	B	C	D	E	F	G	H	L	M	N	O	P	S
29032-18	18	18	30	25	26,5	30	25	27,5	94	45	34	14	21	M6x18
29032-30	30	30	45	40	41,5	45	40	43	143,5	68	52,5	22,5	28,5	M8x25

Tube clamps

swivel, aluminium





Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29032-518

Note:
Tube swivel clamps can be seamlessly rotated through 180°.

On request:
Levers for locking and other diameters.

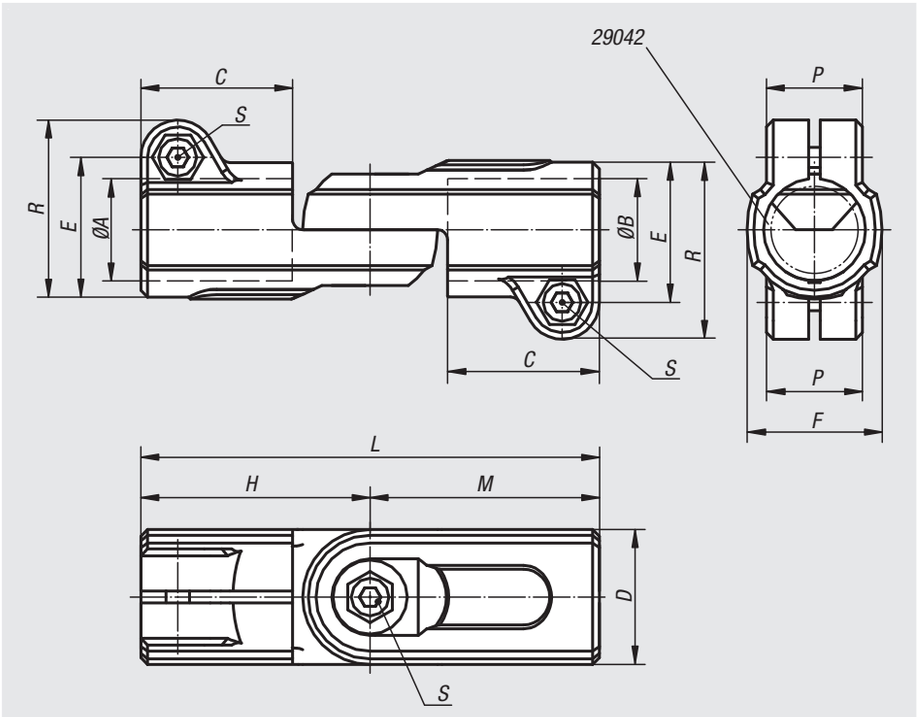
Accessories:
- Round and square tubes 29050

Order No.	A	B	C	D	E	F	G	H	K	L	M	P	R	S
29032-512	12,1	12,1	25	26	29,4	30	26	27	87	95,5	44	21	37,5	M6x18
29032-514	14,1	14,1	25	26	29,4	30	26	27	87	95,5	44	21	37,5	M6x18
29032-516	16,1	16,1	25	26	29,4	30	26	27	87	95,5	44	21	37,5	M6x18
29032-518	18,1	18,1	25	26	29,4	30	26	27	87	95,5	44	21	37,5	M6x18
29032-520	20,1	20,1	45	40	42	-	40	43	138	147	73	33	52	M8x35
29032-525	25,1	25,1	45	40	42	-	40	43	138	147	73	33	52	M8x35
29032-530	30,1	30,1	45	40	42	-	40	43	138	147	73	33	52	M8x35
29032-540	40,2	40,2	60	56	57	-	56	60	188	200	100	48	69	M10x50

Tube clamps

swivel, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29034-18

Note:
Tube swivel clamps can be seamlessly rotated through 180°.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

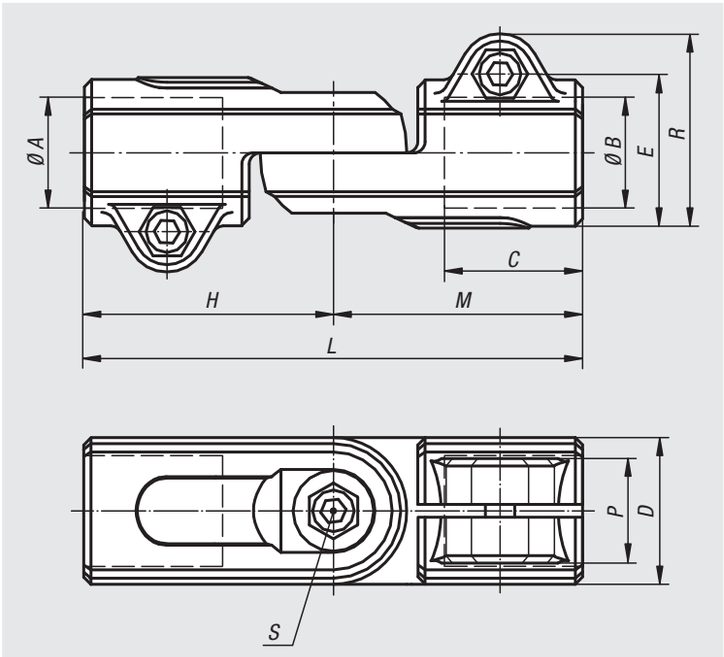
Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	B	C	D	E	F	H	L	M	P	R	S
29034-18	18	18	30	25	26,5	25	45	90	45	21	34	M6x18
29034-30	30	30	45	40	41,5	40	68	136	68	28,5	52,5	M8x25

Tube clamps

swivel, aluminium





Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29034-540

Note:
Tube swivel clamps can be seamlessly rotated through 180°.

On request:
Levers for locking and other diameters.

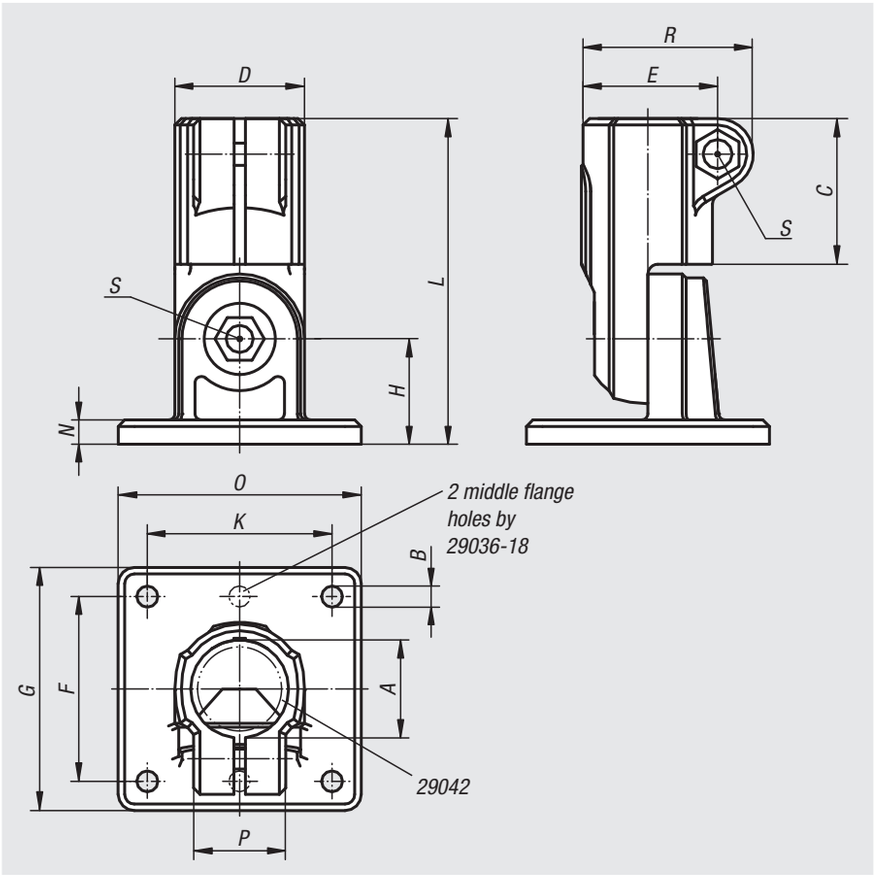
Accessories:
- Round and square tubes 29050

Order No.	A	B	C	D	E	H	L	M	P	R	S
29034-512	12,1	12,1	25	26	29,4	44	88	44	21	37,5	M6x18
29034-514	14,1	14,1	25	26	29,4	44	88	44	21	37,5	M6x18
29034-516	16,1	16,1	25	26	29,4	44	88	44	21	37,5	M6x18
29034-518	18,1	18,1	25	26	29,4	44	88	44	21	37,5	M6x18
29034-520	20,1	20,1	45	40	40	73	146	73	33	51	M8x35
29034-525	25,1	25,1	45	40	40	73	146	73	33	51	M8x35
29034-530	30,1	30,1	45	40	40	73	146	73	33	51	M8x35
29034-540	40,15	40,15	60	56	56	100	200	100	48	70	M10x50

Tube clamps

swivel base, plastic





Material:
Thermoplastic.
DIN 7984 screws and DIN 985 nuts steel.

Version:
Black.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29036-18

Note:
Tube swivel clamps can be seamlessly rotated through 180°.
The standard size for round tubes is Ø18 mm or Ø30 mm. Use reducer sleeves 29042 if smaller tubes are to be clamped or a conversion from round to square tubes is required.

On request:
Plastic levers for locking.

Accessories:
- Reducer sleeves 29042
- Round and square tubes 29050

Order No.	A	B	C	D	E	F	G	H	K	L	N	O	P	R	S
29036-18	18	5,3 (2x)	30	25	26,5	40	50	20	-	65	5	35	21	34	M6x18
29036-30	30	6,5 (4x)	45	40	41,5	60	75	32,5	60	100,5	7,5	75	28,5	52,5	M8x25

Tube clamps

swivel base, aluminium



Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Vibratory ground.
Screws and nuts electro zinc-plated.

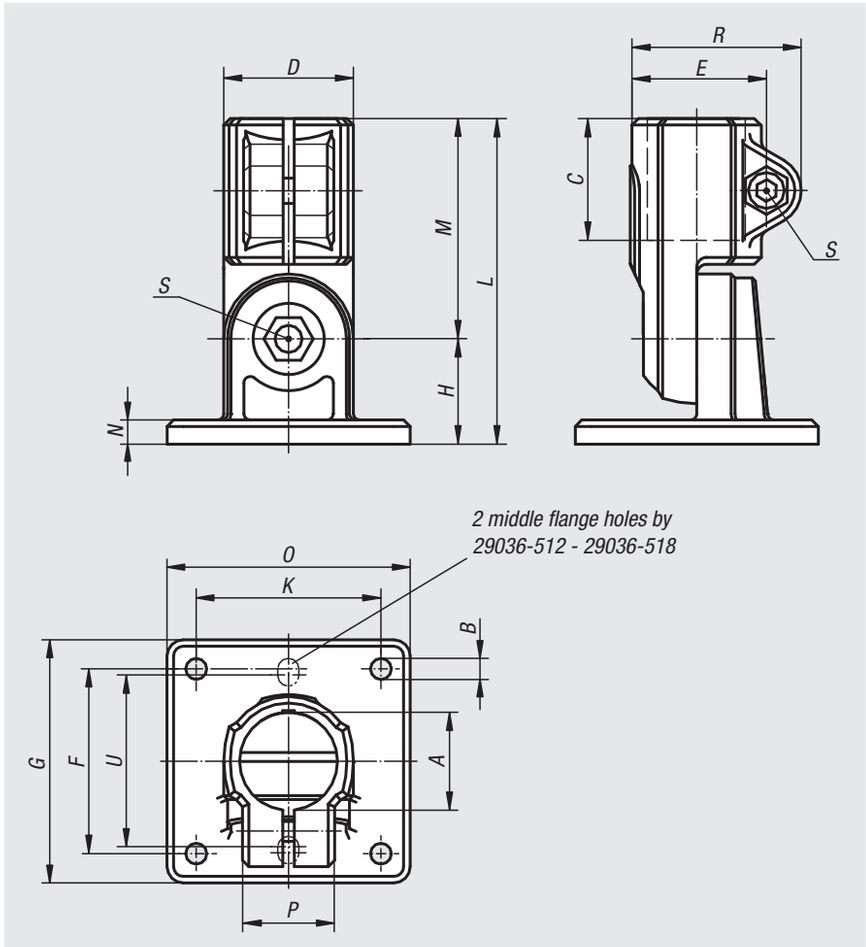
Sample order:
nlm 29036-518

Note:
Tube swivel clamps can be seamlessly rotated through 180°.

* Elongated hole

On request:
Levers for locking and other diameters.

Accessories:
- Round and square tubes 29050

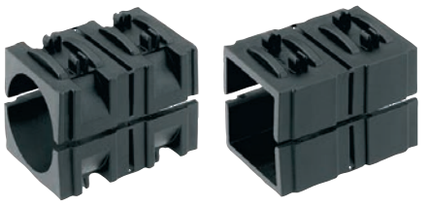


Order No.	A	B	C	D	E	F	G	H	K	L	M	N	O	P	R	S	U
29036-512	12,1	6* (2x)	25	26	29,4	40	50	20	-	64	44	5	35	21	37,5	M6x18	38
29036-514	14,1	6* (2x)	25	26	29,4	40	50	20	-	64	44	5	35	21	37,5	M6x18	38
29036-516	16,1	6* (2x)	25	26	29,4	40	50	20	-	64	44	5	35	21	37,5	M6x18	38
29036-518	18,1	6* (2x)	25	26	29,4	40	50	20	-	64	44	5	35	21	37,5	M6x18	38
29036-520	20,1	7* (4x)	45	40	42	57	75	33	57	106	73	7	75	33	52	M8x35	-
29036-525	25,1	7* (4x)	45	40	42	57	75	33	57	106	73	7	75	33	52	M8x35	-
29036-530	30,1	7* (4x)	45	40	42	57	75	33	57	106	73	7	75	33	52	M8x35	-
29036-540	40,2	9* (4x)	60	56	57	76	100	44	76	144	100	10	100	48	69	M10x50	-

29040

Reducer sleeves

square

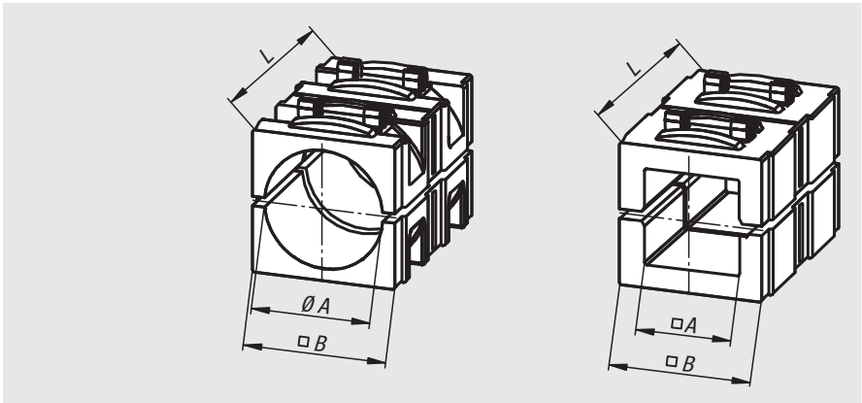


Material:
Thermoplastic.

Version:
black.

Sample order:
nlm 29040-03020

Note:
Reducer sleeves are for clamping smaller tubes or where a conversion of square to round tubes is required.



Order No.	Type	A	B	L
29040-03020	for round tubes	Ø 20,25	30,3	45
29040-03025	for round tubes	Ø 25,25	30,3	45
29040-03030	for round tubes	Ø 30,25	30,3	45
29040-13020	for square tubes	20,5	30,3	45
29040-13025	for square tubes	25,5	30,3	45

29042

Reducer sleeves

round

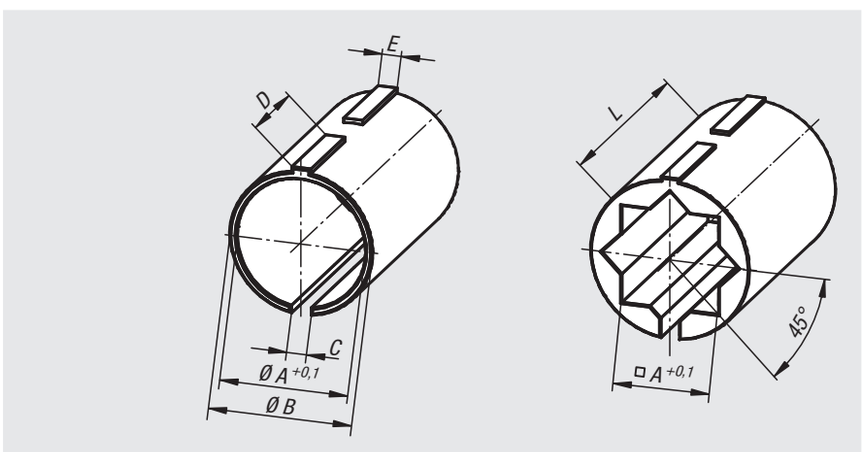


Material:
Thermoplastic.

Version:
black.

Sample order:
nlm 29042-03020

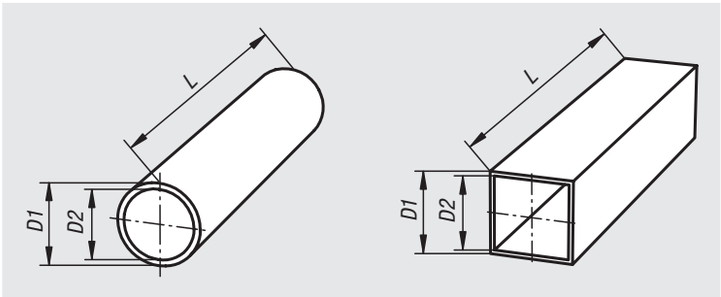
Note:
Reducer sleeves are for clamping smaller tubes or where a conversion of round to square tubes is required.



Order No.	Type	A	B	C	D	E	L
29042-01812	for round tubes	12,25	18	2,5	11,9	2,4	30
29042-01814	for round tubes	14,25	18	2,5	11,9	2,4	30
29042-01815	for round tubes	15,25	18	2,5	11,9	2,4	30
29042-01816	for round tubes	16,25	18	2,5	11,9	2,4	30
29042-03020	for round tubes	20,25	30	3,5	18,9	3,4	45
29042-03025	for round tubes	25,25	30	3,5	18,9	3,4	45
29042-11810	for square tubes	10,25	18	2,5	11,9	2,4	30
29042-13020	for square tubes	20,25	30	3,5	18,9	3,4	45

Round and square tubes





Material:
Steel 1.0037.
Aluminium EN AW-6060.

Version:
Steel electro zinc-plated.
Aluminium clear anodised.

Sample order:
nlm 29050-0112X500 (include length L)

Note:
The machining tolerances of these round and square tubes are specially suited to the tube clamping system.

* solid bar.

On request:
- stainless steel tubes
- customer specific lengths

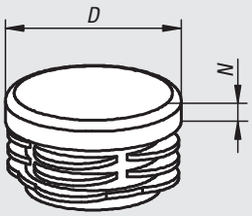
Order No.	Item	Main material	Description	D1	D2	L
29050-0112X	round tube	steel	Ø12 x 1,5	12 ±0,1	9	500/1000/2000
29050-0114X	round tube	steel	Ø14 x 1,5	14 ±0,1	11	500/1000/2000
29050-0115X	round tube	steel	Ø15 x 1,5	15 ±0,1	12	500/1000/2000
29050-0116X	round tube	steel	Ø16 x 1,5	16 ±0,1	13	500/1000/2000
29050-0118X	round tube	steel	Ø18 x 1,5	18 ±0,1	15	500/1000/2000
29050-0120X	round tube	steel	Ø20 x 2	20 ±0,1	16	500/1000/2000
29050-0125X	round tube	steel	Ø25 x 2	25 ±0,1	21	500/1000/2000
29050-0130X	round tube	steel	Ø30 x 2	30 ±0,1	26	500/1000/2000
29050-0140X	round tube	steel	Ø40 x 4	40 ±0,15	32	500/1000/2000
29050-0150X	round tube	steel	Ø50 x 4	50 ±0,2	42	500/1000/2000
29050-0220X	round tube	aluminium	Ø20 x 3	20	14	500/1000/2000
29050-0230X	round tube	aluminium	Ø30 x 2	30 ±0,1	26	500/1000/2000
29050-0240X	round tube	aluminium	Ø40 x 3	40 ±0,15	34	500/1000/2000
29050-0250X	round tube	aluminium	Ø50 x 3	50 ±0,2	44	500/1000/2000

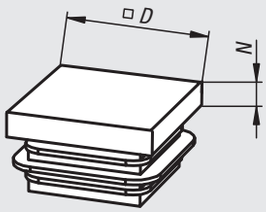
Order No.	Item	Main material	Description	D1	D2	L
29050-4120X	square tube	steel	20 x 20 x 1	20 ±0,3	18	500/1000/2000
29050-4125X	square tube	steel	25 x 25 x 1,5	25 ±0,3	22	500/1000/2000
29050-4130X	square tube	steel	30 x 30 x 2	30 ±0,3	26	500/1000/2000
29050-4140X	square tube	steel	40 x 40 x 3	40 ±0,4	34	500/1000/2000
29050-4210X	square tube	aluminium	10 x 10	10*	-	500/1000/2000
29050-4220X	square tube	aluminium	20 x 20 x 1,5	20 ±0,2	17	500/1000/2000
29050-4230X	square tube	aluminium	30 x 30 x 2	30 ±0,2	26	500/1000/2000
29050-4240X	square tube	aluminium	40 x 40 x 4	40 ±0,3	32	500/1000/2000

Tube end plugs









Material:
Thermoplastic.

Version:
black.

Sample order:
nlm 29056-025200

Note:
These plugs are for corner protection and plugging the tube ends. They can be pushed in by hand or tapped in with a plastic hammer.

Order No.	Type	D	N	Suitable for
29056-018150	for round tubes	18	5	Ø18X1,5
29056-020200	for round tubes	20	5	Ø20X2
29056-025200	for round tubes	25	5	Ø25X2
29056-030200	for round tubes	30	5	Ø30X2
29056-040300	for round tubes	40	5	Ø40X3
29056-040400	for round tubes	40	5	Ø40X4
29056-050400	for round tubes	50	5	Ø50X3 / Ø50X4
29056-420100	for square tubes	20	5	20X20X1
29056-425150	for square tubes	25	5	25X25X1,5
29056-430200	for square tubes	30	5	30X30X2
29056-440300	for square tubes	40	5	40X40X3
29056-440400	for square tubes	40	5	40X40X4

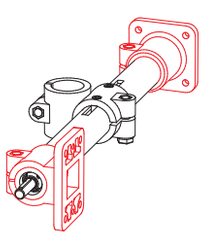
Technical information on linear actuators

These linear actuators are efficient, economical and universally applicable. They ideally combine high rigidity, low deflection, high loads and easy handling. Four sizes are available for different applications and loads (tube sizes from Ø18 mm to Ø50 mm).

Features:
– Standard travel over 2000 mm possible
– Position accuracy up to ±0.2 mm / 300 mm
– Travel speed up to 1.5 m/min
– Drive by trapezoid thread spindle
– Mounting position optional

Technical description:
In a tube, a threaded spindle mounted on bearings with guide nut converts a rotation into linear movement of a carriage. The nut has a carrier key to prevent it turning.

Mounting the linear actuator:
Depending on the mounting position and application, linear actuators can be mounted using our tube clamping elements.



Speed:

n = required spindle speed.
max. spindle speed with:
plain bearing 80 rpm.
ball bearing 250 rpm.

Type E	Pitch mm
18	2
30	3
40	4
50	4

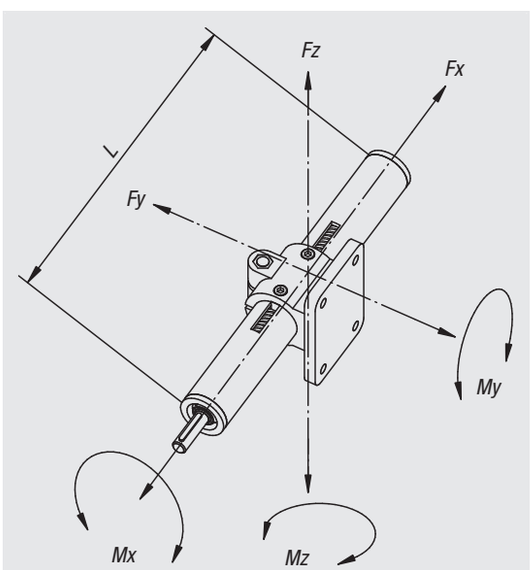
$$n\ [rpm] = \frac{\text{Speed [m/min] x 1000[mm]}}{\text{Spindle pitch [mm]}}$$

Idling torques:

Type E	Spindle with plain bearing [Nm]	Spindle with ball bearings [Nm]
18	-	0,20
30	0,45	0,35
40	0,65	0,50
50	1,20	0,90

Load data*:

F force [N]
M moment [Nm]
I area moment of inertia [cm4]

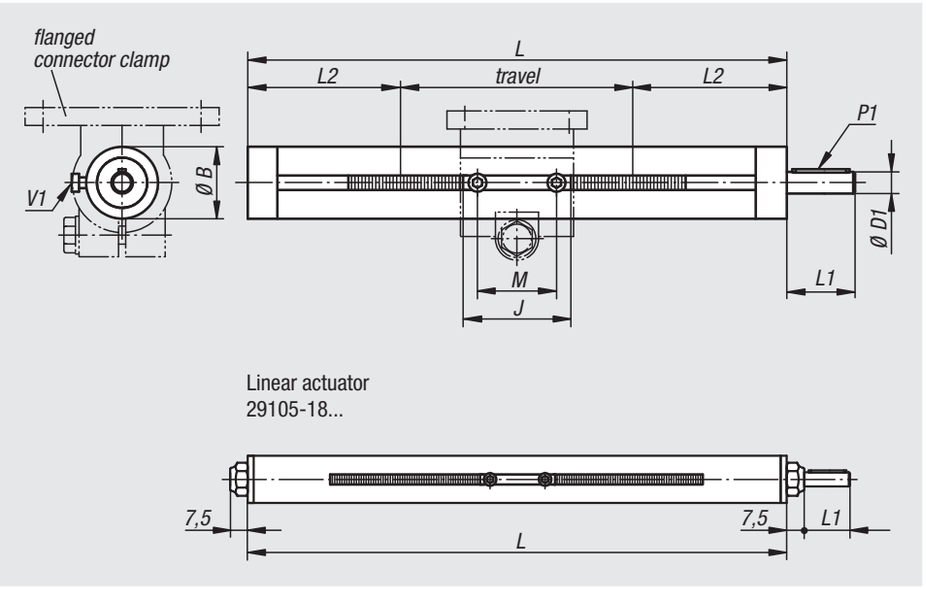


Length	Fx 500	Fy 500/1000/1500	Fz 500/1000/1500
Type E 18	400	90 / 10 / -	60 / 8 / -
Type E 30	800	500 / 60 / 10	500 / 50 / 9
Type E 40	1000	2100 / 250 / 60	1900 / 140 / 50
Type E 50	1700	3000 / 600 / 140	3000 / 600 / 140

Type E	Mx	My	Mz	Iy	Iz
18	1,5	4	4	0,22	0,27
30	6	15	15	1,34	1,56
40	14	40	40	4,58	5,24
50	30	65	65	11,31	12,32

Linear actuators





Material, version:
Precision tube DIN EN 10305, stainless steel 1.4301.
For type E 18, electro zinc-plated steel.
Trapezoid thread spindle steel, RH thread, rolled.

Sample order:
nlm 29105-300001X500

Note:
Medium speed range, self-locking.

On request:
LH thread, stainless steel, 2 drive pins, other travel lengths, handwheels.

Accessories:
- Guide clamps 29120, 29125, 29130, 29135
- Tube clamps form our tube clamping system

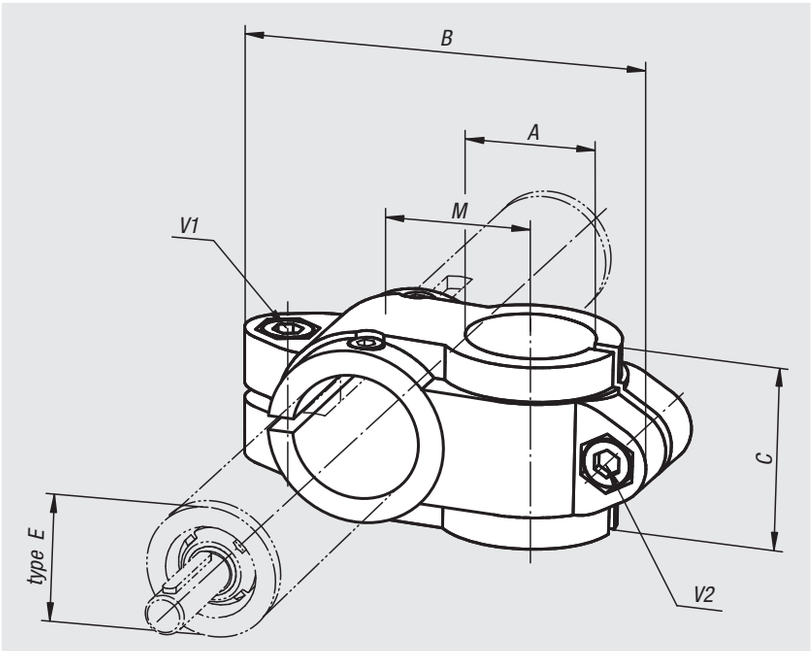
Functional principle:
A rotating movement of the threaded spindle is converted into a linear movement of the guide carriage.

Order No.	Version	Type E	Spindle	L Standard length	H	B	D1	J	L1	L2	M	P1 parallel key DIN 6885	V1
29105-300001X300	plain bearing	30	Tr 14x3	300	100	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-300001X500	plain bearing	30	Tr 14x3	500	300	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-300001X800	plain bearing	30	Tr 14x3	800	600	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-400001X300	plain bearing	40	Tr 20x4	300	91	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400001X500	plain bearing	40	Tr 20x4	500	291	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400001X800	plain bearing	40	Tr 20x4	800	591	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400001X1000	plain bearing	40	Tr 20x4	1000	791	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-500001X500	plain bearing	50	Tr 20x4	500	265	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10
29105-500001X800	plain bearing	50	Tr 20x4	800	565	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10
29105-500001X1000	plain bearing	50	Tr 20x4	1000	765	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10
29105-180101X300	ball bearing	18	Tr 10x2	300	145	18	6 h9	24	17	77,5	18	2 x 2 x 12	M3x5
29105-180101X500	ball bearing	18	Tr 10x2	500	345	18	6 h9	24	17	77,5	18	2 x 2 x 12	M3x5
29105-300101X300	ball bearing	30	Tr 14x3	300	100	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-300101X500	ball bearing	30	Tr 14x3	500	300	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-300101X800	ball bearing	30	Tr 14x3	800	600	30	8 h8	38	26	100	28	2 x 2 x 20	M4x8
29105-400101X300	ball bearing	40	Tr 20x4	300	91	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400101X500	ball bearing	40	Tr 20x4	500	291	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400101X800	ball bearing	40	Tr 20x4	800	591	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-400101X1000	ball bearing	40	Tr 20x4	1000	791	40	12 h8	55	38	104,5	44	4 x 4 x 32	M6x10
29105-500101X500	ball bearing	50	Tr 20x4	500	265	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10
29105-500101X800	ball bearing	50	Tr 20x4	800	565	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10
29105-500101X1000	ball bearing	50	Tr 20x4	1000	765	50	12 h8	63	38	117,5	44	4 x 4 x 32	M6x10

Linear actuator connector clamps

cross



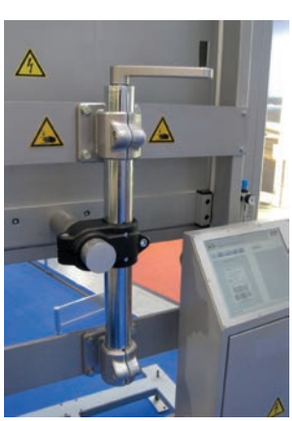


Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Black powder-coated.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29120-1818

On request:
Clamping levers for tightening.



Order No.	Type E	A	B	C	M	V1	V2
29120-1818	18	18	66	25,5	20	M6x16	M6x16
29120-3020	30	20	99	40	33	M8x25	M8x25
29120-3030	30	30	99	40	33	M8x25	M8x25
29120-4020	40	20	109	40	36	M10x30	M8x25
29120-4040	40	40	137	60	45	M10x30	M10x30
29120-5040	50	40	154	70	54	M10x35	M10x35
29120-5050	50	50	154	70	54	M10x35	M10x35

Linear actuator connector clamps

cross

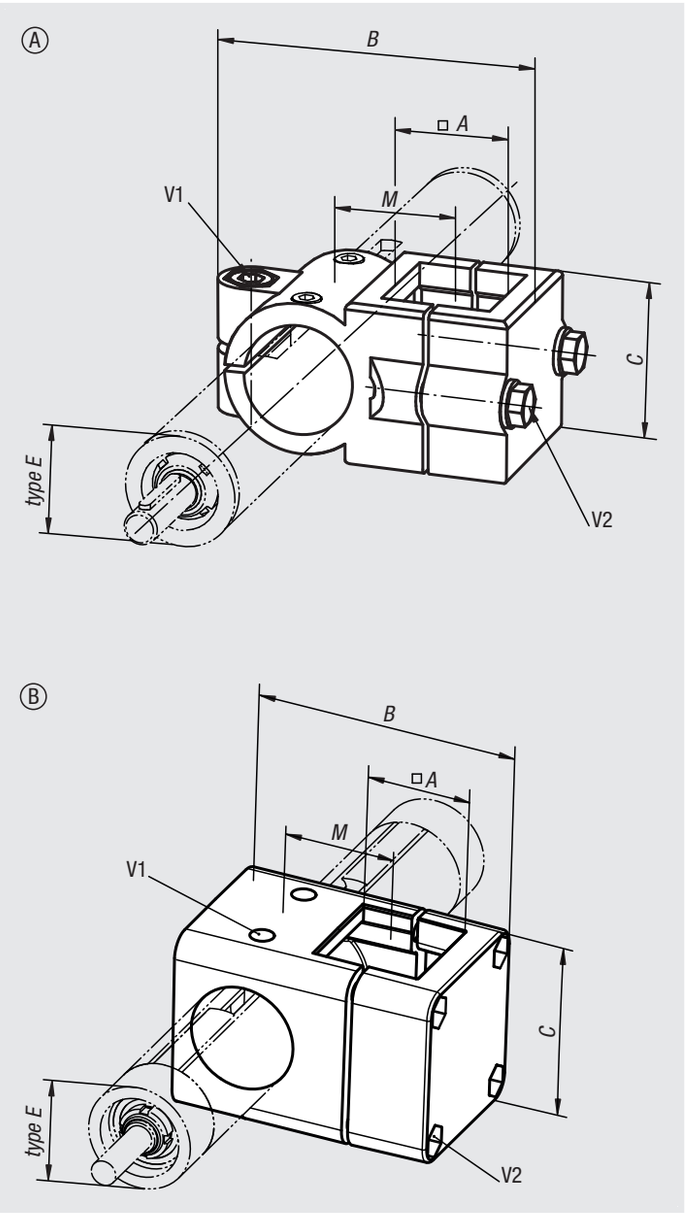


Material:
Cast aluminium.
Screws and nuts steel.

Version:
Black powder-coated.
Clamping screws and nuts electro zinc-plated.

Sample order:
nlm 29125-4040

On request:
Clamping levers for tightening.

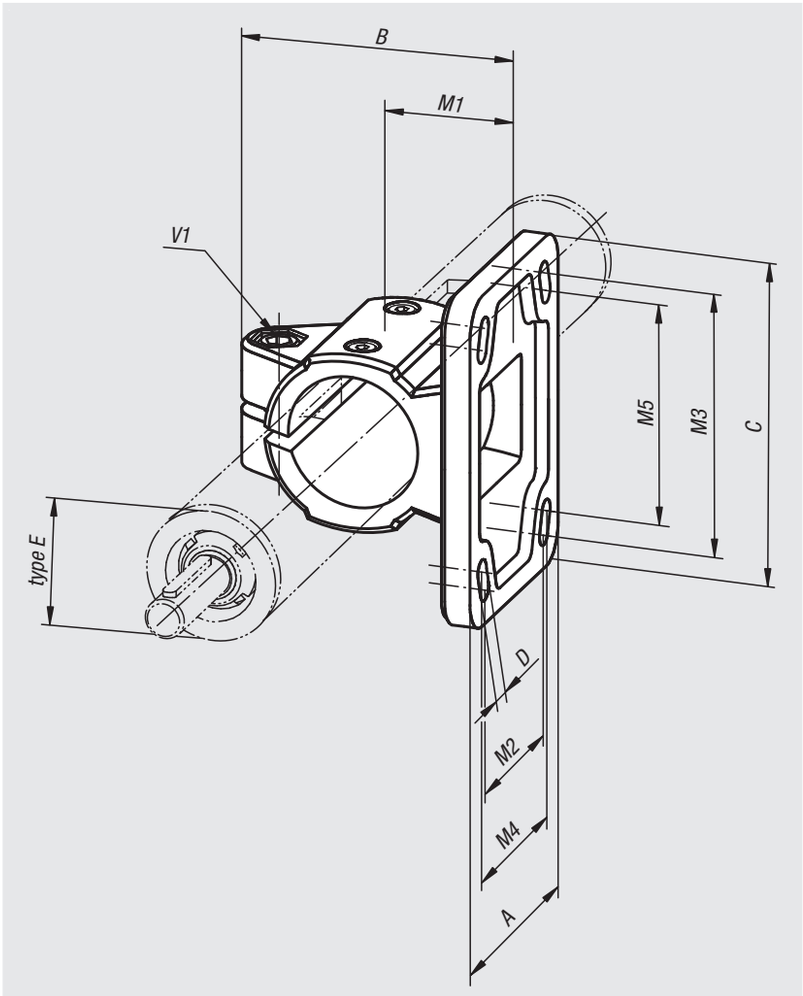


Order No.	Form	Type E	A	B	C	M	V1	V2
29125-3030	A	30	30	86	45	33	M8x35	M8x35
29125-4040	A	40	40	117	60	47	M10x50	M8x45
29125-5050	B	50	50	126	86	53	M8x50	M8x50

Linear actuator connector clamps

flange





Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Black powder-coated.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29130-50

Note:
* Elongated hole

On request:
Clamping levers for tightening.



Order No.	Type E	A	B	C	D	M1	M2	M3	M4	M5	V1
29130-18	18	37	42,5	50	5,5 (2x)	18	-	40	-	-	M6x16
29130-30	30	55	63	78	6,5* (2x)	30	-	60	-	53	M8x25
29130-40	40	80	87	105	8,5* (4x)	42	52	82	60	80	M10x30
29130-50	50	92	100	130	10,5* (4x)	50	60	100	62	98	M10x35

Linear actuator connector clamps

base

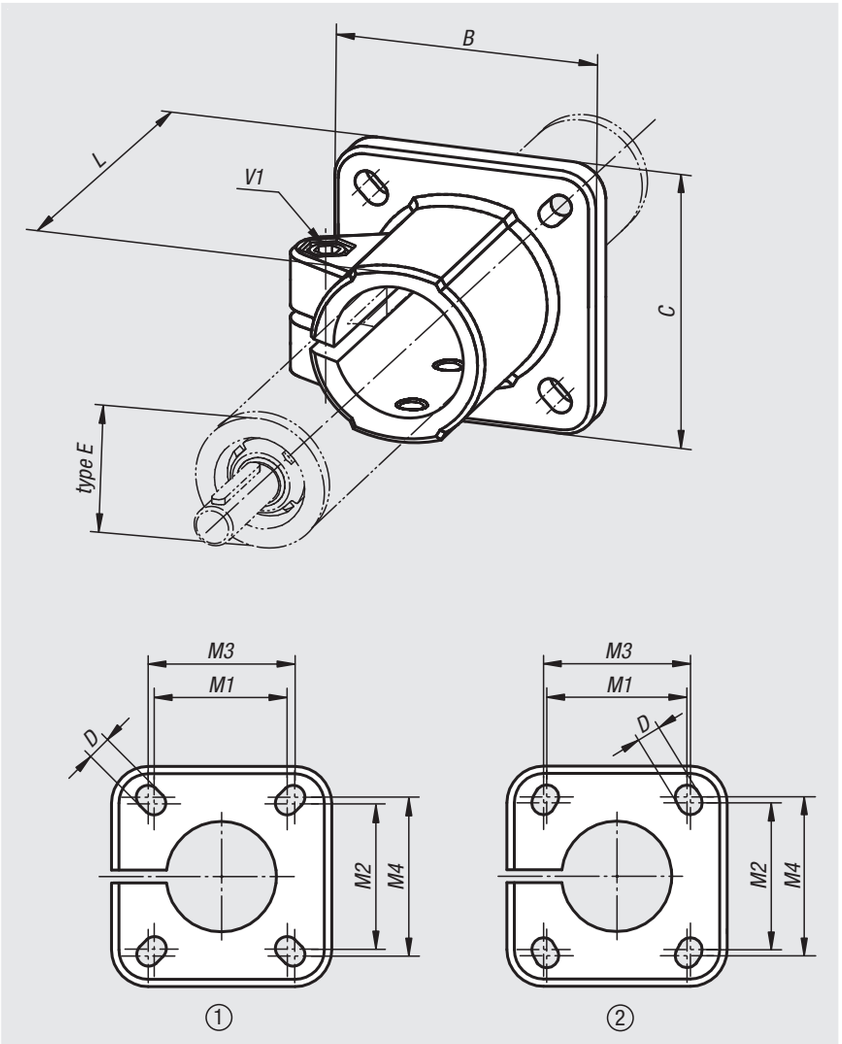


Material:
Cast aluminium.
DIN 7984 screws and DIN 985 nuts, steel.

Version:
Black powder-coated.
Screws and nuts electro zinc-plated.

Sample order:
nlm 29135-30

On request:
Clamping levers for tightening.



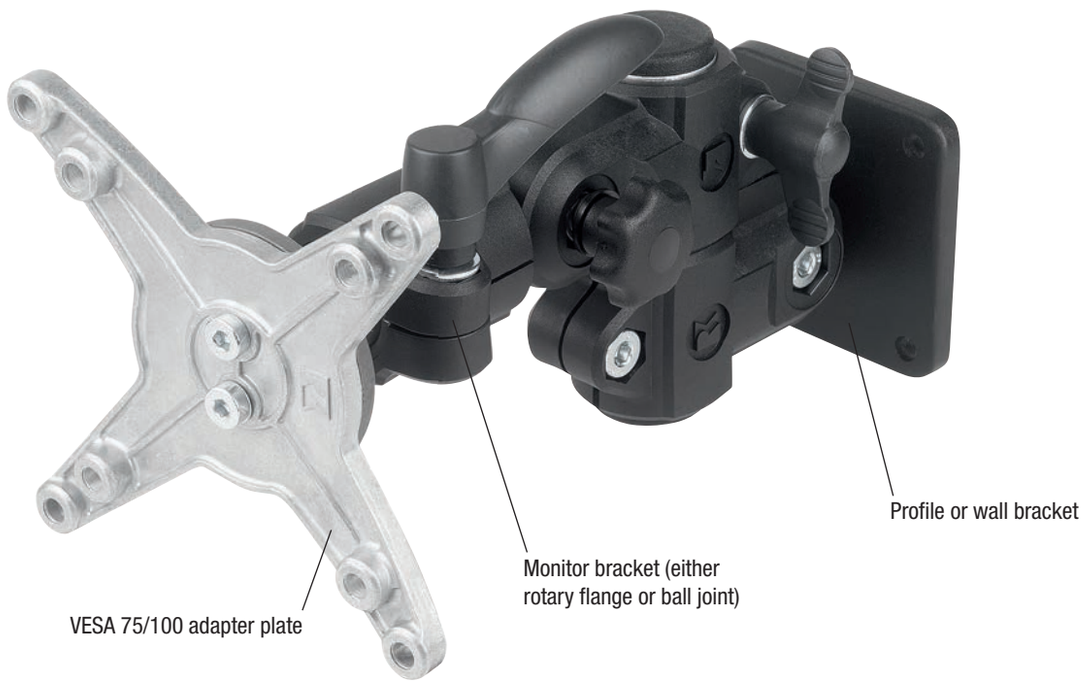
Order No.	hole arrangement	Type E	B	C	D	L	M1	M2	M3	M4	V1
29135-18	1	18	42	42	5,5	37	28	28	30	30	M6x20
29135-30	2	30	60	60	6,5	50	40	42	42	45	M8x25
29135-40	1	40	90	90	8,5	70	60	60	64	64	M10x30
29135-50	1	50	105	105	10,5	85	74	74	80	80	M10x35

Notes

Technical information for monitor brackets

Universal brackets for monitors, touch panels and control units

Bracket with high load capacity for industrial monitors, control units, and touch panels. All movable parts can be adjusted separately from one another without tools using manual elements. The adjusted position is locked reliably even when subjected to vibrations.
A significant advantage of these brackets is the extensive flexibility of end device fastening dimensions and mounting possibilities. The monitor or control unit can be mounted using the round, aluminium fastening element or using a VESA standard 75/100 adapter plate i.e. with a 75 x 75 mm or 100 x 100 mm mounting hole pattern. This means that, in theory almost any housing can be easily attached without using any special elements. The monitor bracket can be installed using the tube clamp to any standard Ø30 mm tube, or with the profile bracket to the slot of any aluminium profile or with the wall bracket to any panel element or wall.

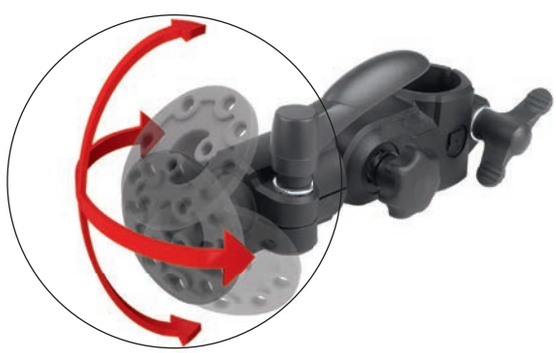


Characteristics
- High-strength materials guarantees permanent loads
- Device connection via universal or VESA adapter plate
- High working ergonomics through absolute freedom of movement
- Vibration resistant angle adjustment (locking in 15° increments)
- Connection to the slot of aluminium profiles or wall mounting

Monitor bracket rotary flange
Max. load 25 kg (static),
90° rotatable

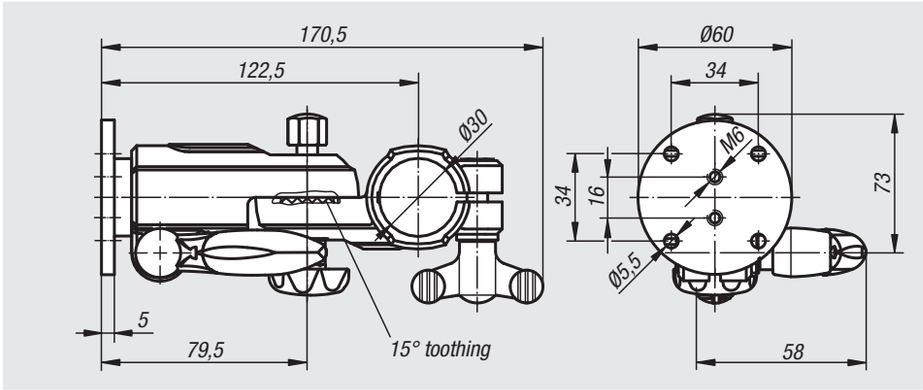


Monitor bracket ball joint
Max. load 10 kg (static),
60° free swivelling

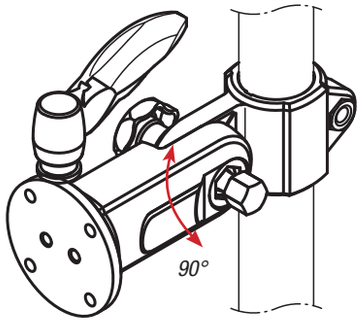


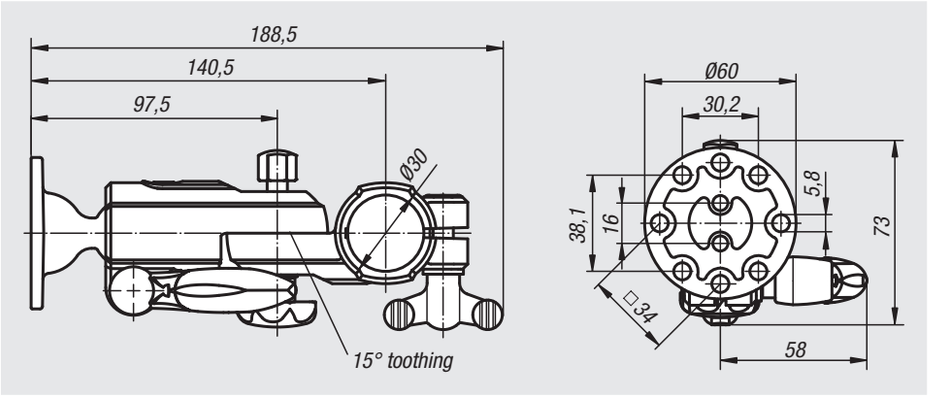
Monitor brackets



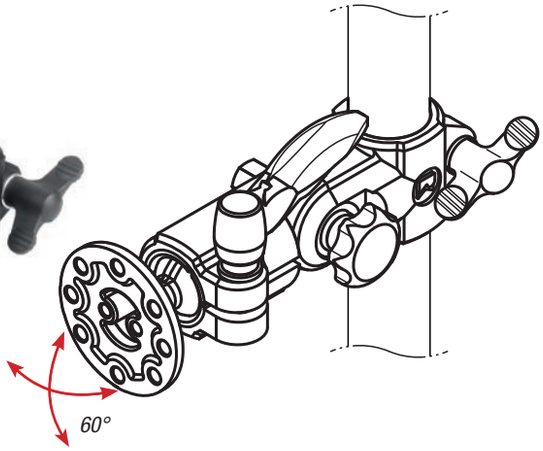












Material:
High-strength material mix of thermoplastic/ aluminium.

Version:
Black/bright.

Sample order:
nlm 29180-3001

Note:
norelem offers two different basic supports for monitors and touch panels used in industrial environments:

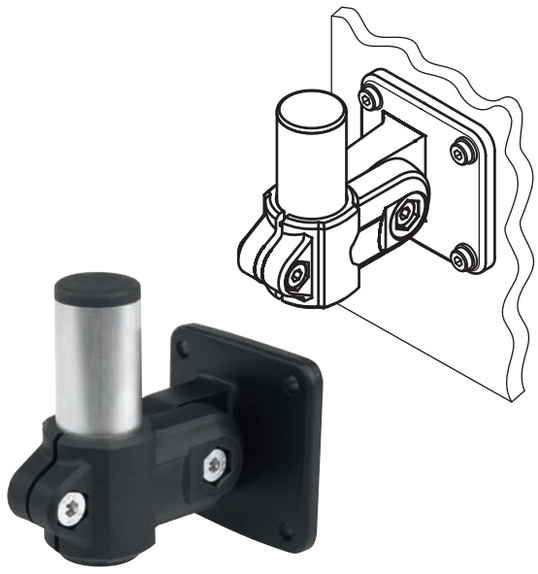
With rotary flange: vibration-resistant, lockable monitor bracket with angle adjustment in 15° increments for monitors/control units up to 25 kg (static) and universal adapter plate. Suitable for attachment to Ø30 mm round tubes.

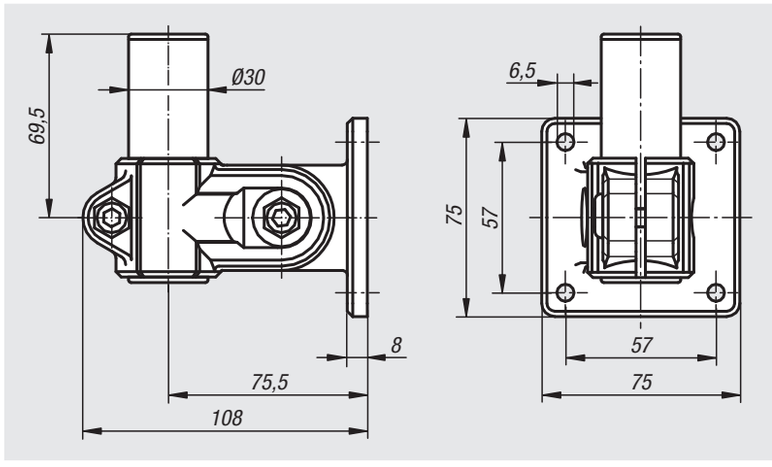
With ball joint: enables a swivel range of 60° for loads up to 10 kg (static) and universal adapter plate. Suitable for attachment to Ø30 mm round tubes.

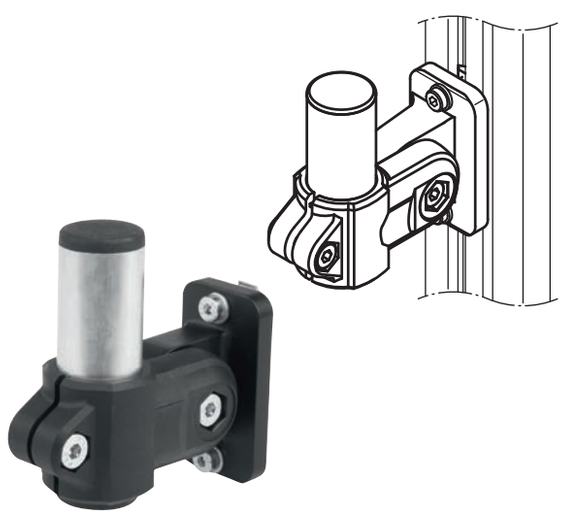
A wall bracket, profile bracket or a VESA 75/100 adapter plate is available as an option for the different connections.

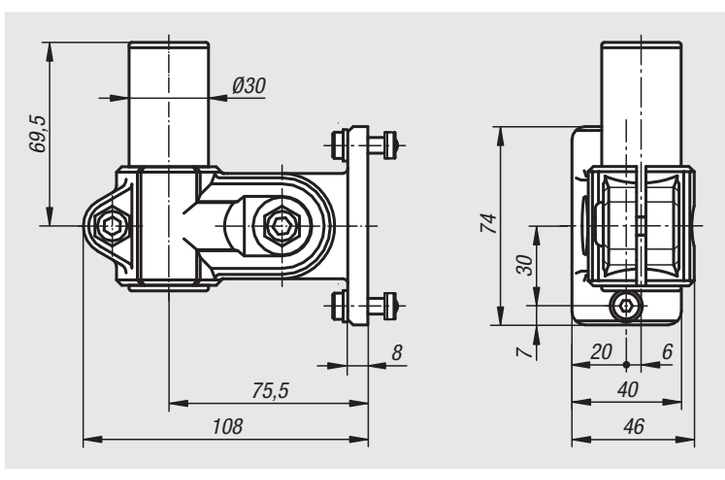
Order No.	Image	Version
29180-3001		with rotary flange
29180-3002		with ball joint
29180-3003		wall bracket
29180-3004		profile bracket
29180-75100		VESA adapter plate

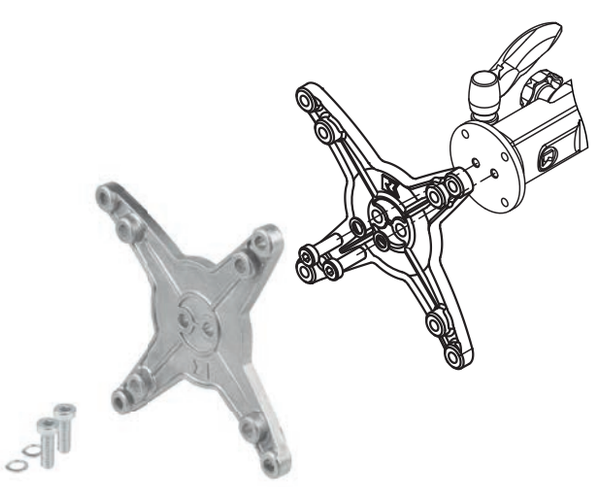
Monitor brackets

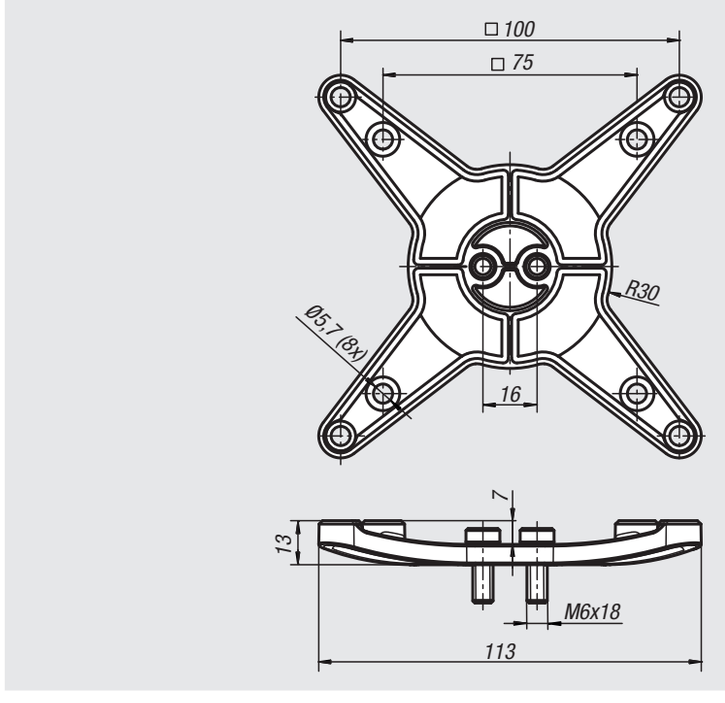












Column bases single



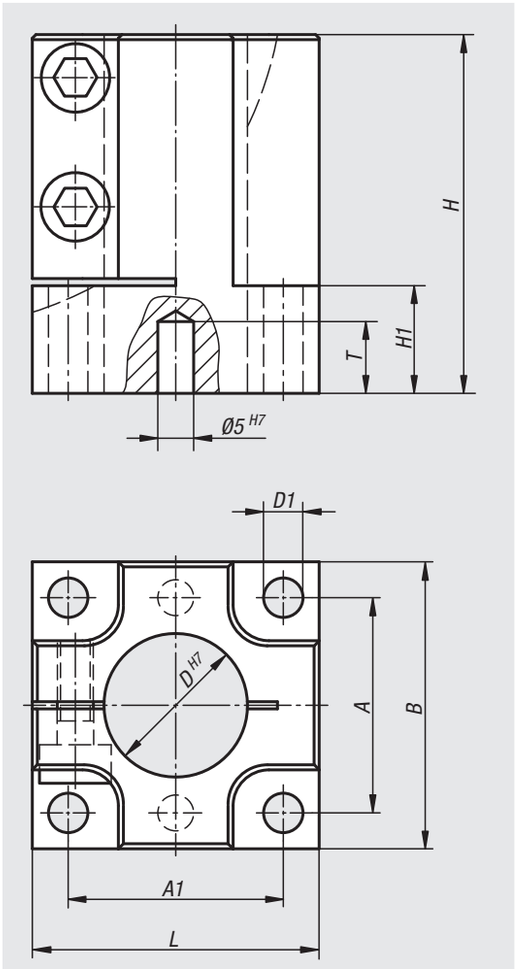
Material:
Aluminium EN AW-6060

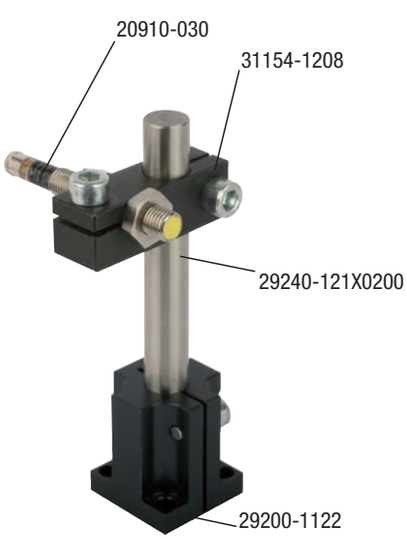
Version:
Black anodised

Sample order:
nlm 29200-1122

Note:
Single base for holding columns in four different sizes. Machined contact faces with mounting and centring holes guarantee precise mounting of elements.

Drawing reference:
position tolerance of reamed holes: ±0,01
position tolerance of holes: ±0,1

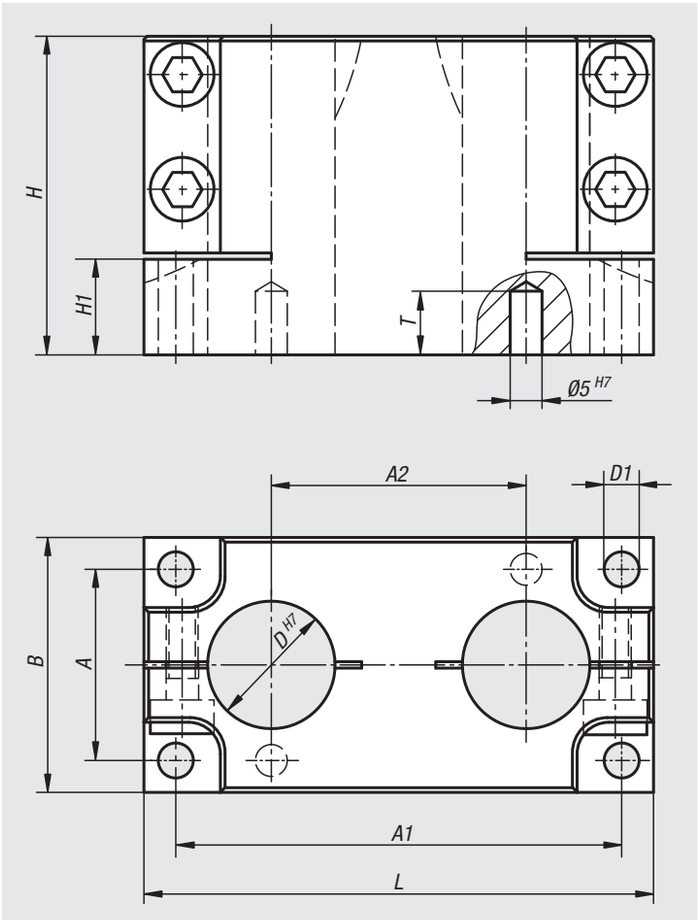




Order No.	Size	A	A1	B	D	D1	H	H1	L	T
29200-1122	12	22	22	30	12	5,5	35	7	30	8
29200-1202	20	30	30	40	20	5,5	50	15	40	10
29200-1302	30	40	40	50	30	6,5	50	15	50	10
29200-1402	40	48	48	60	40	8,5	50	15	60	10

Column bases double





Material:
Aluminium EN AW-6060

Version:
Black anodised

Sample order:
nlm 29205-2122

Note:
Double base for holding columns in four different sizes. Machined contact faces with mounting and centring holes guarantee precise mounting of elements.

Drawing reference:
position tolerance of reamed holes: ±0,01
position tolerance of holes: ±0,1



Order No.	Size	A	A1	A2	B	D	D1	H	H1	L	T
29205-2122	12	22	52	30	30	12	5,5	35	7	60	8
29205-2202	20	30	70	40	40	20	5,5	50	15	80	10
29205-2302	30	40	90	50	50	30	6,5	50	15	100	10
29205-2402	40	48	108	60	60	40	8,5	50	15	120	10

Column clamps double



Material:
Aluminium EN AW-6060

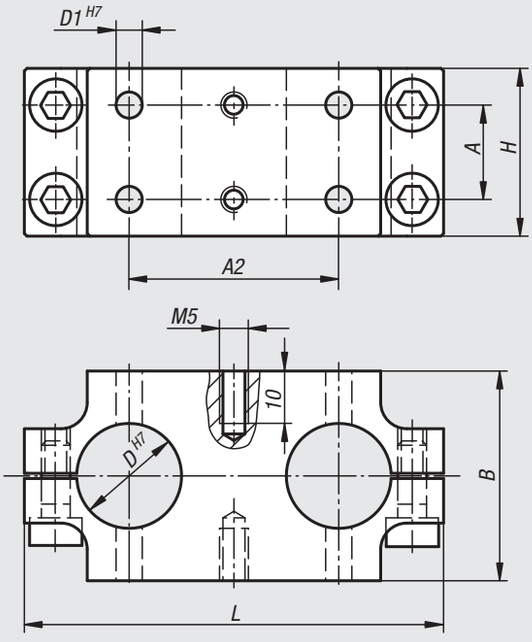
Version:
Black anodised

Sample order:
nlm 29207-2122

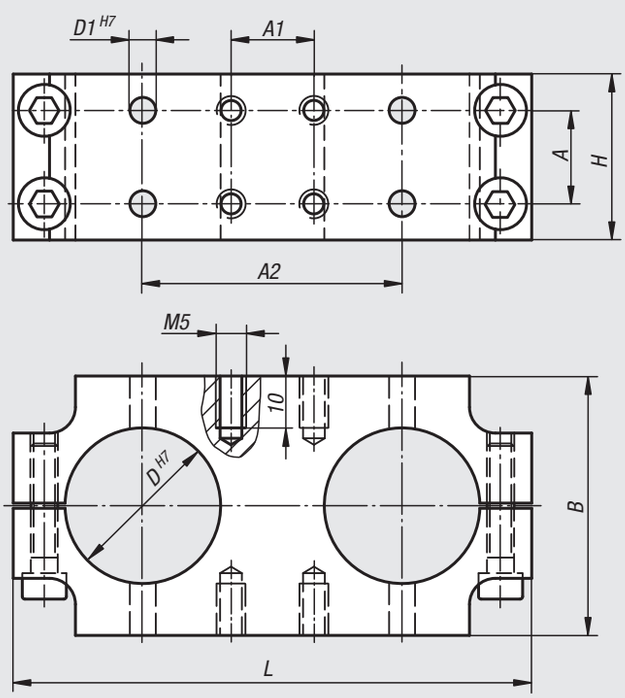
Note:
Double column clamps in four different sizes. Machined mounting faces with mounting and centring holes guarantee precise mounting of elements.

Drawing reference:
position tolerance of reamed holes: ±0,01
position tolerance of holes: ±0,1

29207-2122
29207-2202



29207-2302
29207-2402



Order No.	Size	A	A1	A2	B	D	D1	H	L
29207-2122	12	12	-	30	30	12	5	26	60
29207-2202	20	18	-	40	40	20	5	32	80
29207-2302	30	18	16	50	50	30	5	32	100
29207-2402	40	18	26	60	60	40	6	32	120

Adjustment units



Material:
Aluminium EN AW-6060

Version:
Black anodised

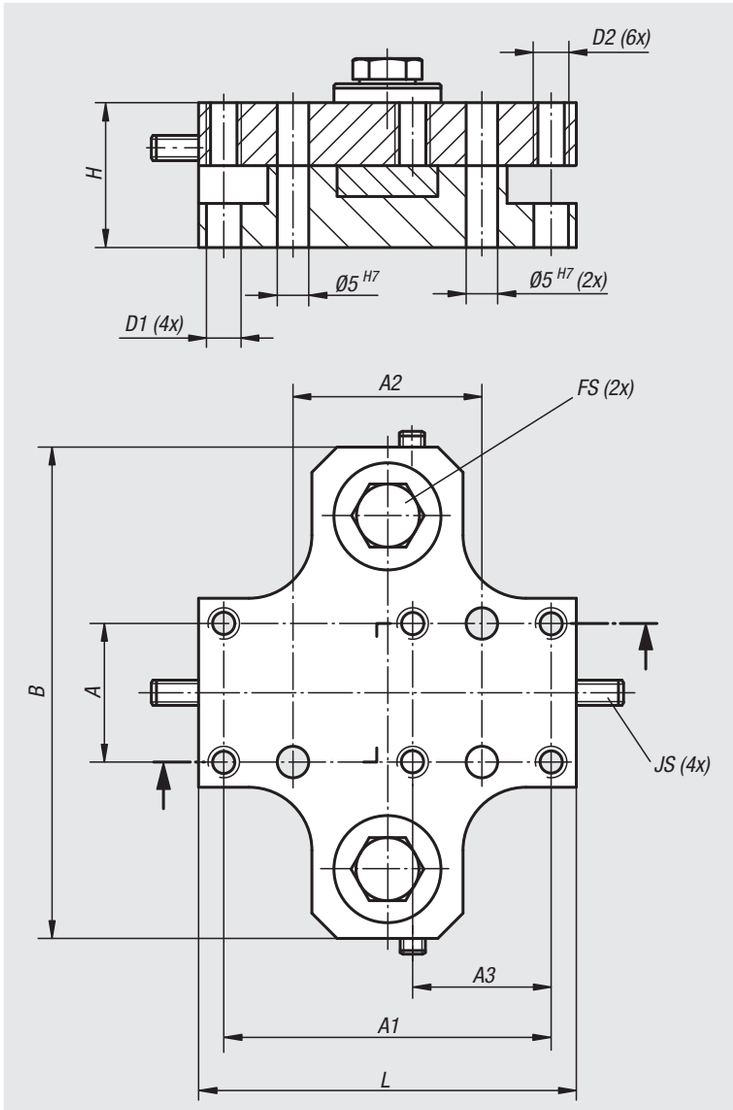
Sample order:
nlm 29210-122

Note:
Units for precise adjustment of components in the X-Y axis. Allows compensation for machining tolerances in mechanical assemblies. Matches our single and double bases. The uniform hole pattern of the respective sizes allows the adjustment units to be fitted under the base at a later date.

Adjustment range: X: ±3 mm
Adjustment range: Y: ±3 mm

Drawing reference:
position tolerance of reamed holes: ±0,01
position tolerance of holes: ±0,1

FS = lock screw (2x)
JS = setscrew (4x)



Order No.	Size	A	A1	A2	A3	B	D1	D2	H	L
29210-122	12	22	52	30	22	78	5,5	M5	23	60
29210-202	20	30	70	40	30	88	5,5	M5	23	80
29210-302	30	40	90	50	40	110	6,5	M6	32	100
29210-402	40	48	108	60	48	120	8,5	M8	32	120

Column shaft collars

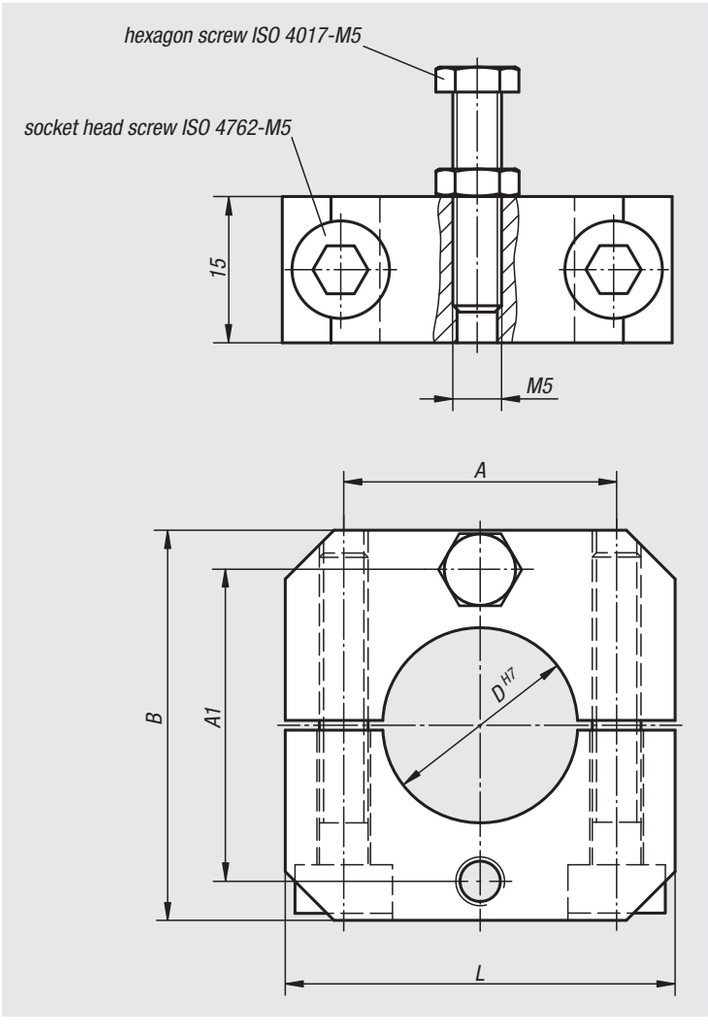


Material:
Aluminium EN AW-6060

Version:
Black anodised

Sample order:
nlm 29215-122

Note:
These shaft collars enable column bases and clamps to the precisely adjusted in the height and so guarantee the exact positioning of elements.



Order No.	Size	A	A1	B	D	L
29215-122	12	19	22	30	12	30
29215-202	20	28	32	40	20	40
29215-302	30	38	42	50	30	50
29215-402	40	48	52	60	40	60

Rods stainless steel



Material:
Ø12 and Ø20 stainless steel 1.4034.
Ø30 and Ø40 stainless steel 1.4305.

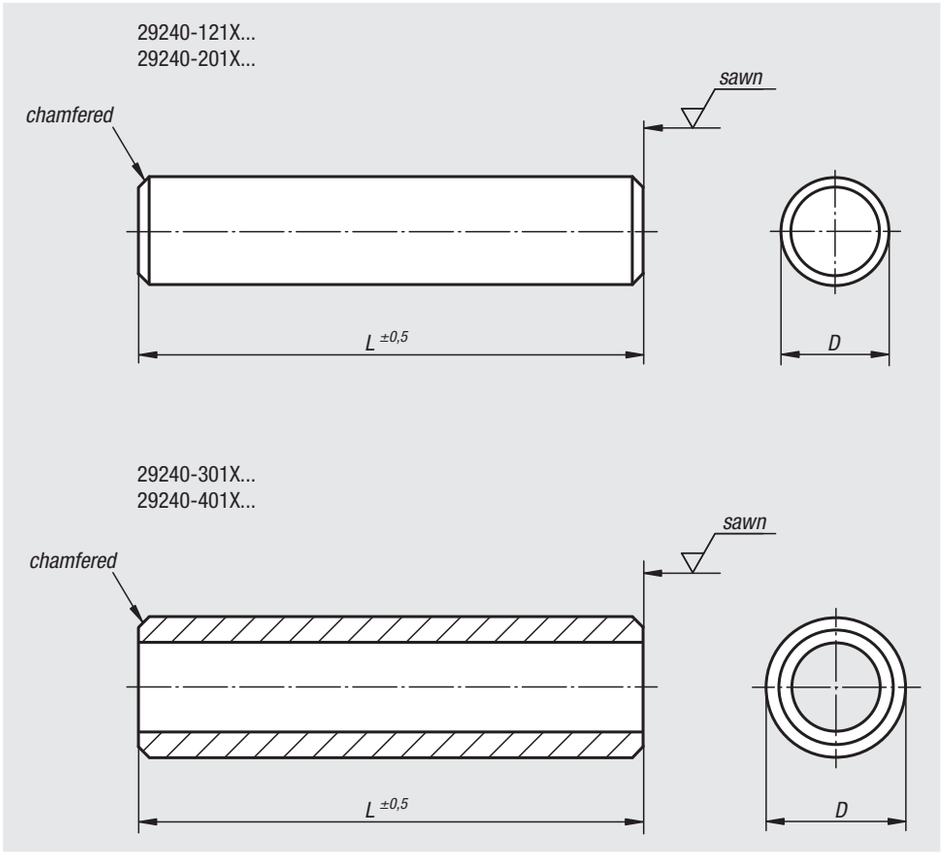
Version:
Bright, ground.

Sample order:
nlm 29240-121X0100 (include length L)

Note:
These ground stainless steel columns enable the versatile construction of many assembly configurations with only a few standard components.

Ø12 and Ø20 = solid bar.
Ø30 and Ø40 = tubes (wall thickness 5 mm).

On request:
Other lengths.



Order No.	Item	Size	D	L
29240-121X	rod	12	12	100/200/300/400/500
29240-201X	rod	20	20	100/200/300/400/500
29240-301X	round tube	30	30	100/200/300/400/500
29240-401X	round tube	40	40	100/200/300/400/500

Notes

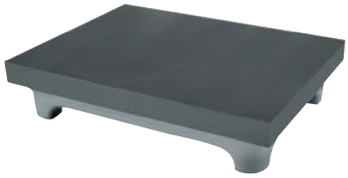
31000

Inspection tables
Gauge stands
Gauge joints



31000

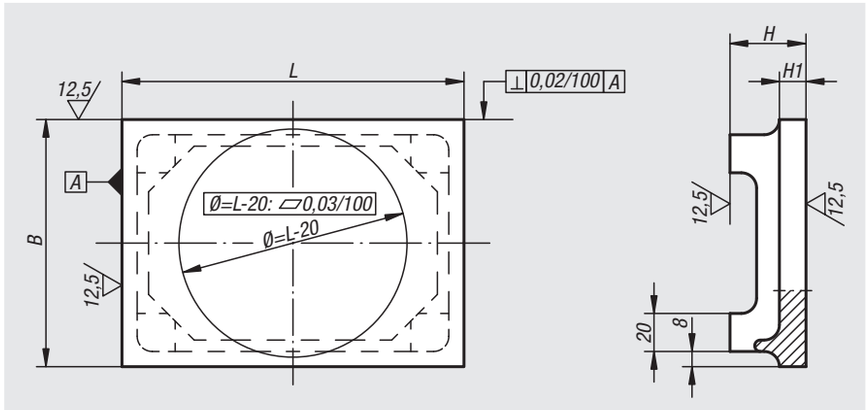
Inspection tables



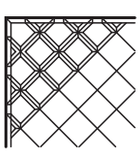
Material:
GJL 250 annealed.

Sample order:
nlm 31000-03

Note:
Plate surface with dust grooves on request.



Order No.	L	B	H	H1
31000-01	200	150	45	15
31000-02	250	200	45	15
31000-03	300	200	45	15
31000-04	350	250	45	15
31000-05	350	300	45	15
31000-06	400	350	60	20



31020

Inspection blocks

with column

Material:
Black granite (primary stone).

Version:
Block precision grade 0

Sample order:
nlm 31020-01

Note:
Primary stone has major benefits over conventional granite:
- 3 times more wear resistance.
- 20% greater density.
- 3 times less heat expansion.

Suitable dial gauge holders see 31140 and 31141.



Order No.	Base plate length x width x height	column
31020-01	200 x 150 x 40	ø25 x 260

31090

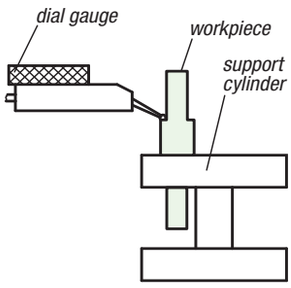
Support cylinders

for workpieces with collar

Material:
Hardened steel

Version:
Ground

Sample order:
nlm 31090-111





Order No.	Hole diameters	Diameter increments	No. of holes	Parallelism of contact faces	Distance between contact faces
31090-111	1 - 11	0,5	21	< 0,01	46
31090-220	2 - 20	1	19	< 0,01	52

31100

Gauge holders articulated arm

with central hydraulic lock

Sample order:
nlm 31100-12

Note:
The 4-part articulated arm is locked by the centre knob. Including screw for fine adjustment.



Order No.	total height	Effective radius	Magnetic base length	Magnetic base width	Magnetic base height	Magnetic force N
31100-01	310	260	61	50	55	600
31100-02	480	400	76	50	55	900

Order No.	Version	Connecting thread	total height	Effective radius
31100-11	without magnetic foot	M8x8	255	260
31100-12	without magnetic foot	M10x11	425	400

31102

Gauge stands magnetic

Sample order:
nlm 31102-01

Note:
Base 900 N magnetic force.



Order No.	total height	Column height	Ø column	Magnetic base length	Magnetic base width	Magnetic base height	Connecting thread	Magnetic force N
31102-01	287	232	16	76	50	55	M10	900

31120

Magnetic stands

Sample order:
nlm 31120-01

Note:
Magnetic base with On/Off switch
(see also 09210-03)



Order No.	total height	Column height	Ø column	Magnetic base length	Magnetic base width	Magnetic base height	Connecting thread	Magnetic force N
31120-01	287	232	16	76	50	55	M10	900

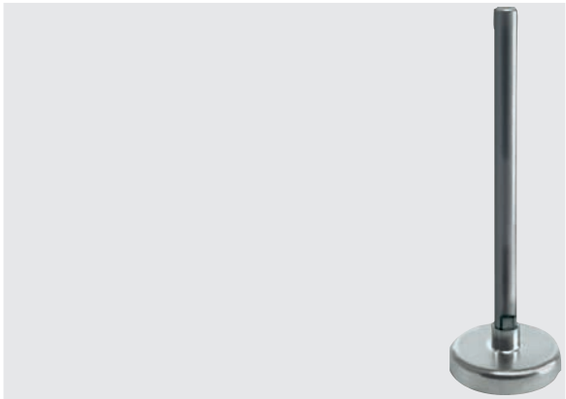
31125

Magnetic stands

Version:
Magnetic base: shielded system, surface electro zinc-plated.

Sample order:
nlm 31125-01

Note:
Magnetic force 450 N. Application temperature up to 100 °C. Hairline cracks in the magnetic material are unavoidable for technical reasons. They do not impair the function of the magnets in any way. (see also 09065-10).



Order No.	total height	Column height	Ø column	Magnetic base Ø	Magnetic base height	Magnetic stand overall height	Connecting thread
31125-01	284	250	16	80	18	34	M10

31130

Dial gauge arms

Sample order:
nlm 31130-01

Note:
With screw for fine adjustment.



Order No.	total length	Ø of column or bar	Fixation holes, e.g. for dial gauge
31130-01	270	16	3 x Ø8

31140

Dial gauge holders

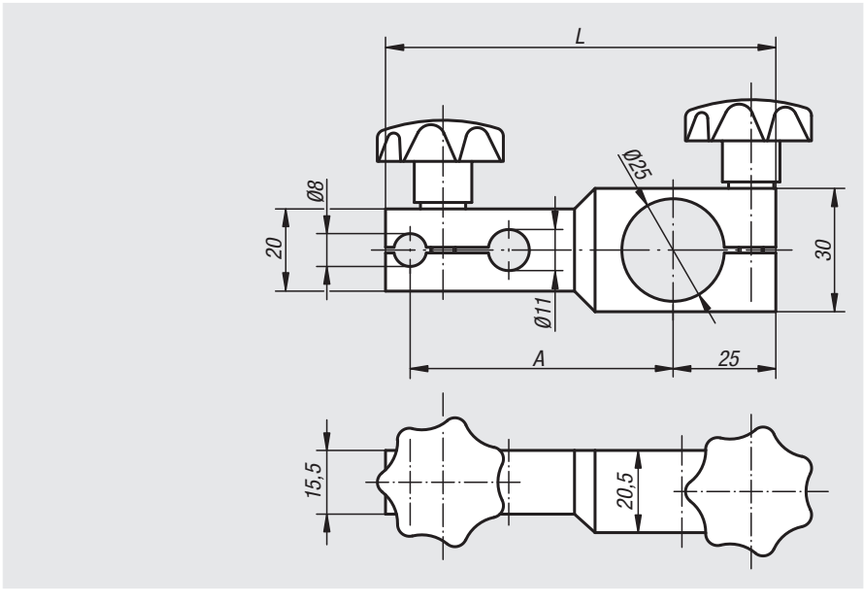


Material:
Aluminium.

Version:
Black anodised

Sample order:
nlm 31140-065

Note:
Fits on 31020.



Order No.	A	L
31140-065	65	95
31140-100	100	130

31141

Dial gauge holders

with fine adjustment

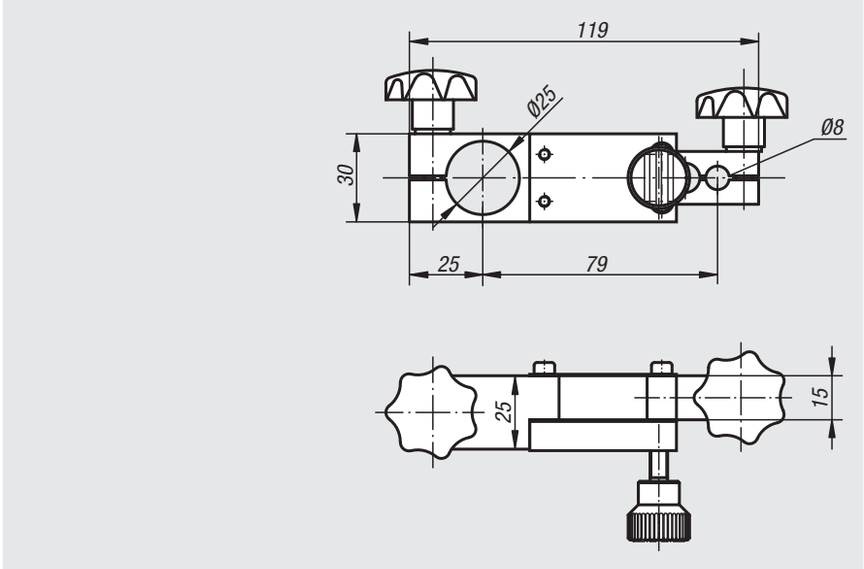


Material:
Aluminium.

Version:
Black anodised

Sample order:
nlm 31141-079

Note:
Fits on 31020.



Order No.	Dimensions
31141-079	see drawing

31150

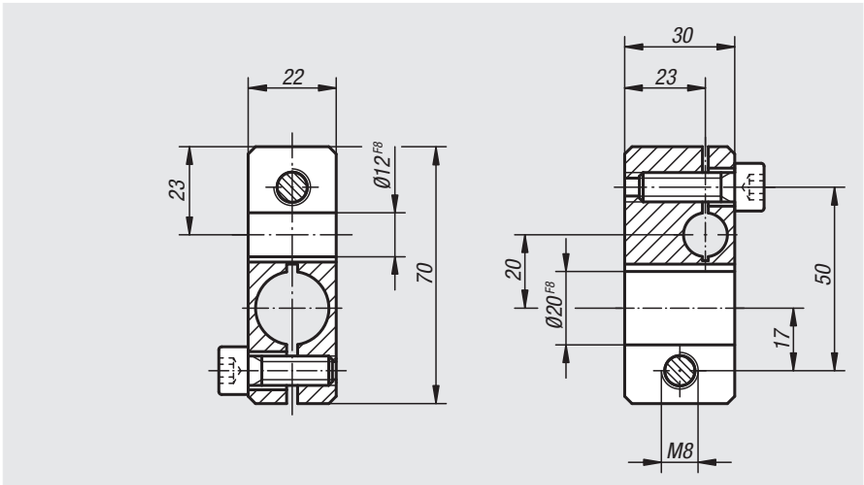
Joint blocks



Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 31150-1220



Order No.	Dimensions
31150-1220	see drawing

31152

Joint blocks

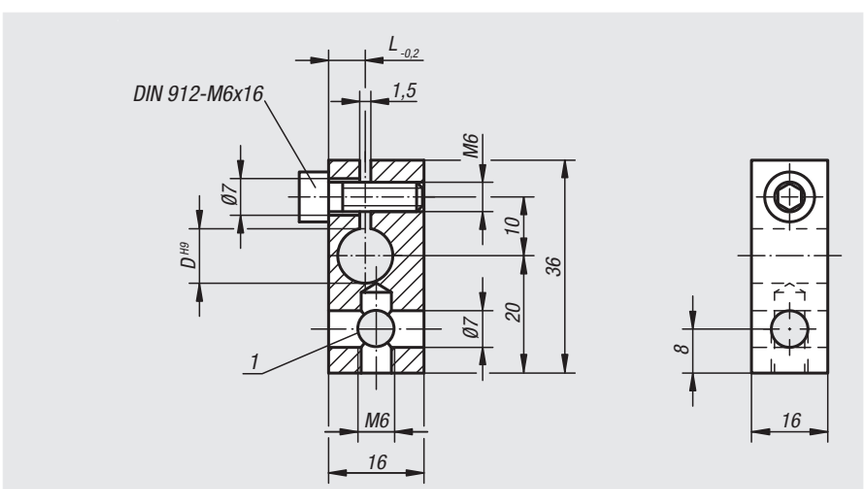


Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 31152-0712

Drawing reference:
1) hole only in 31152-0708



Order No.	D	L
31152-0708	8	5
31152-0710	10	6
31152-0712	12	7

31154

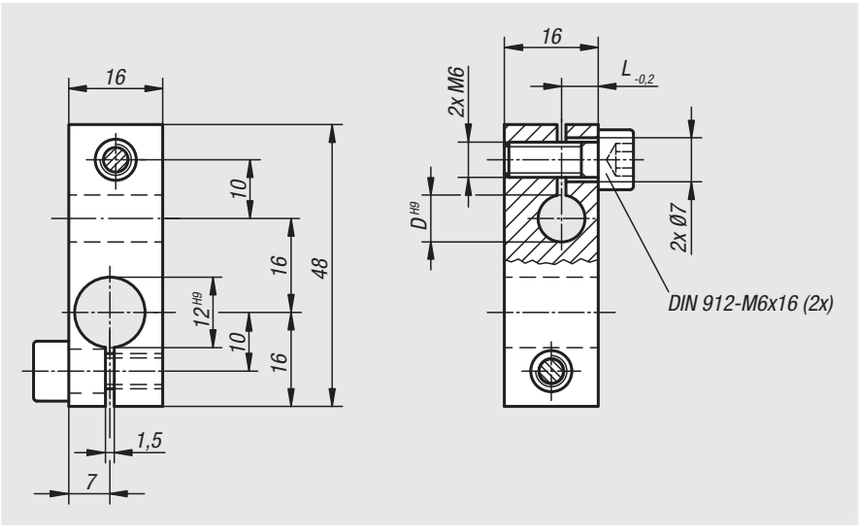
Joint blocks



Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 31154-1210



Order No.	D	L
31154-1208	8	5
31154-1210	10	6
31154-1212	12	7

31156

Clamping joints



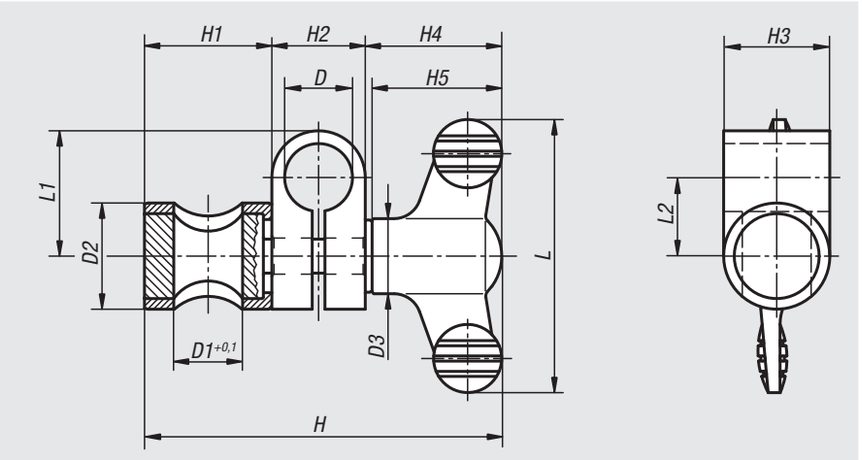
Material:
Sleeve and pin steel.
Clamp block high-strength aluminium.
Wing grip black grey thermoplastic.

Version:
Sleeve and pin high-gloss chromed.
Clamp block black anodised.

Sample order:
nlm 31156-1616

Note:
Infinitely adjustable.
Wing grip for rapid clamping.

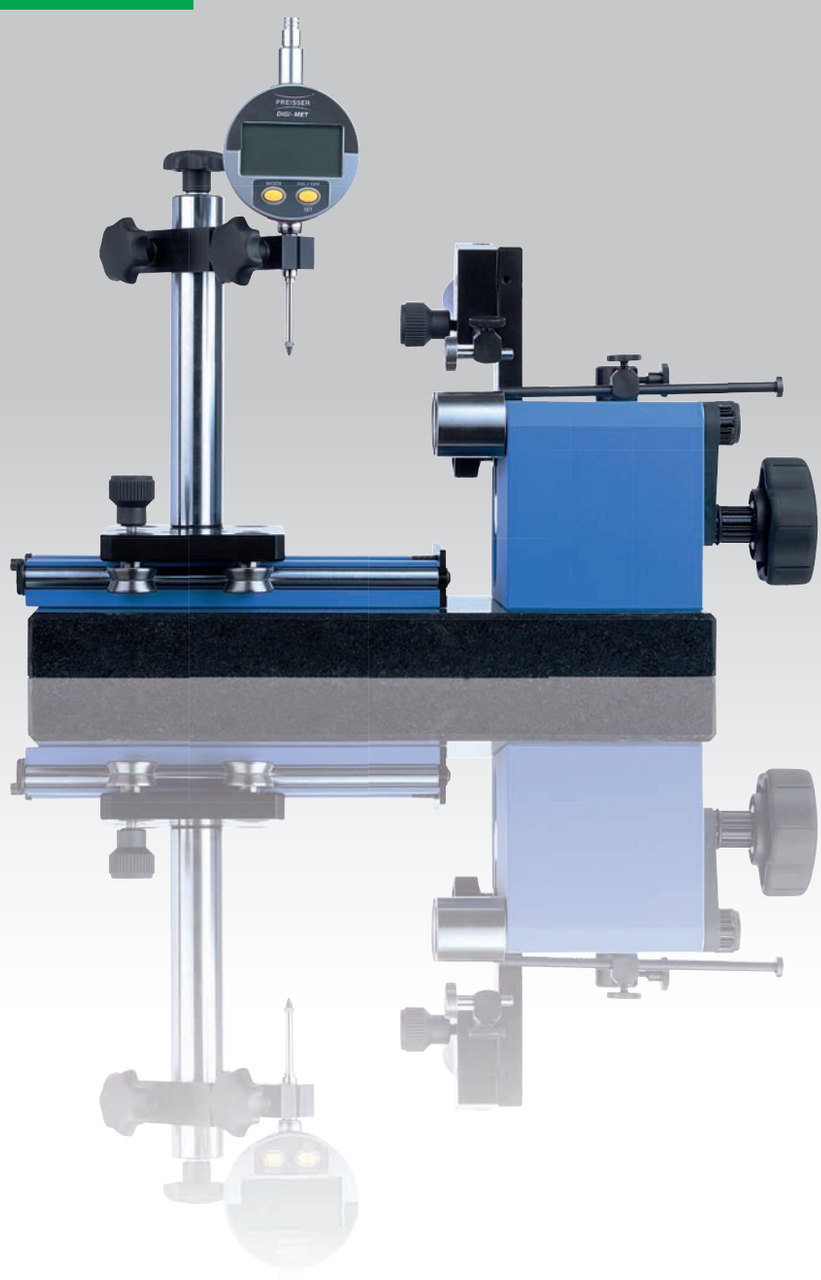
On request:
Different combinations diameters D and D1.



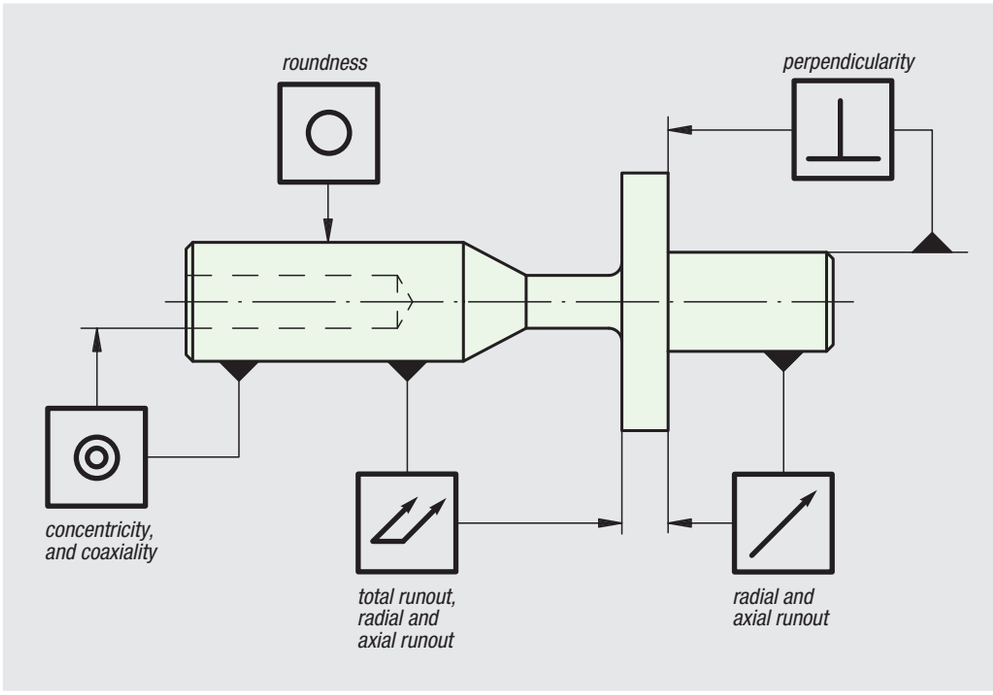
Order No.	Size	D	D1	D2	D3	H	H1	H2	H3	H4	H5	L	L1	L2
31156-0606	1	6	6	14	12	43,6	15	9	14	19,6	18	38	13	8,5
31156-0808	2	8	8	16	14	54,6	17	12	16	25,6	24	50	18	12
31156-1010	3	10	10	18	14	60,6	20	15	18	25,6	24	50	22	14,5
31156-1212	4	12	12	20	21	77,2	23	17	20	37,2	35,6	75	24	15,5
31156-1616	5	16	16	25	21	90,2	31	22	25	37,2	35,6	75	29,5	18,5
31156-2020	6	20	20	30	21	98,2	36	25	30	37,2	35,6	75	30	17,5

32000

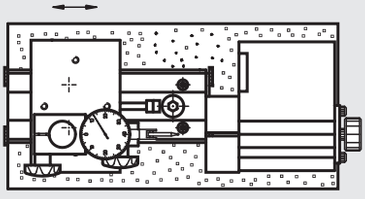
Concentricity gauges
Dial gauges

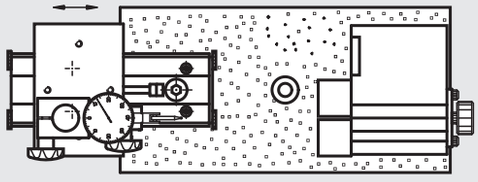


Geometric tolerances

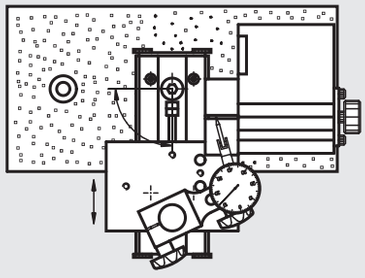


Mounting information for concentricity gauges

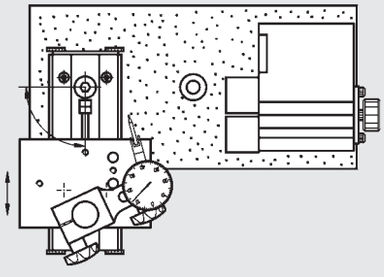




measuring internal diameters

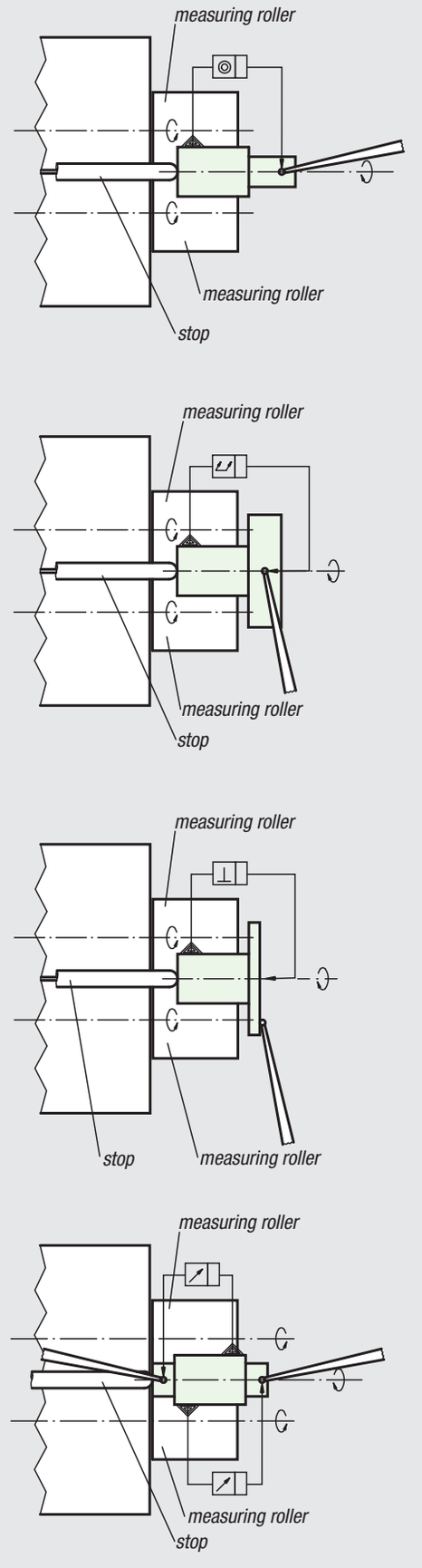


The slide can be rotated through 90° allowing rapid clearance and positioning for changing parts



The slide is adjusted with a a screw. The two positioning holes allow for an extended working area.

Testing possibilities



Concentricity gauges

max. Ø 35 mm

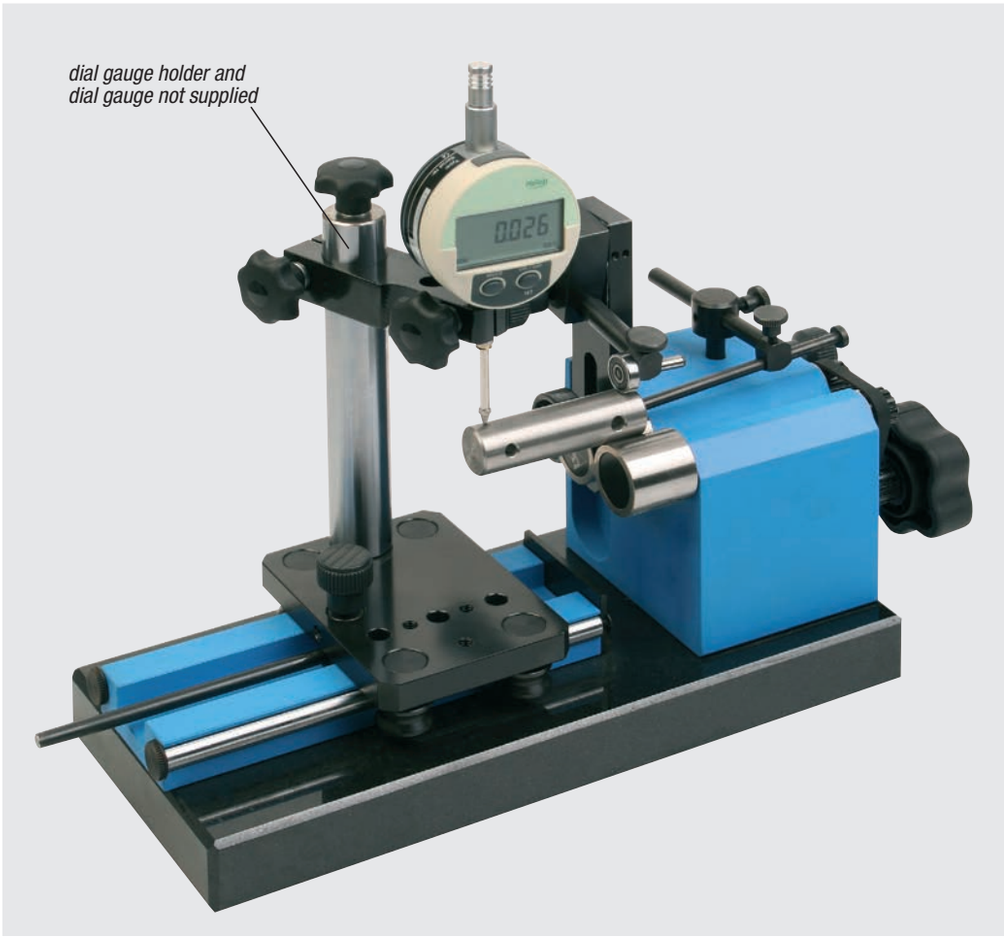
Sample order:
nlm 32501-01

Note:
Gauge unit suitable for measuring concentricity, run-out and perpendicularity.
The robust design allows the unit to be used in the workshop and metrology room. A swivel contact roller simplifies positioning of the workpiece. The light sliding guides allow the dial gauges to be placed anywhere.

Technical data:
Inspection range Ø 5 mm to Ø 35 mm
Roller spacing min. 29 mm.
Carriage travel max. 100 mm.
Contact roller thrust is adjustable.
Gear driven rollers.

Roller precision: parallelism and coaxialism of both rollers max. 2 µm.

Base plate granite:
300 mm x 130 mm x 25 mm



Order No.	Item
32501-01	Concentricity gauge

Concentricity gauges

max. Ø 80 mm

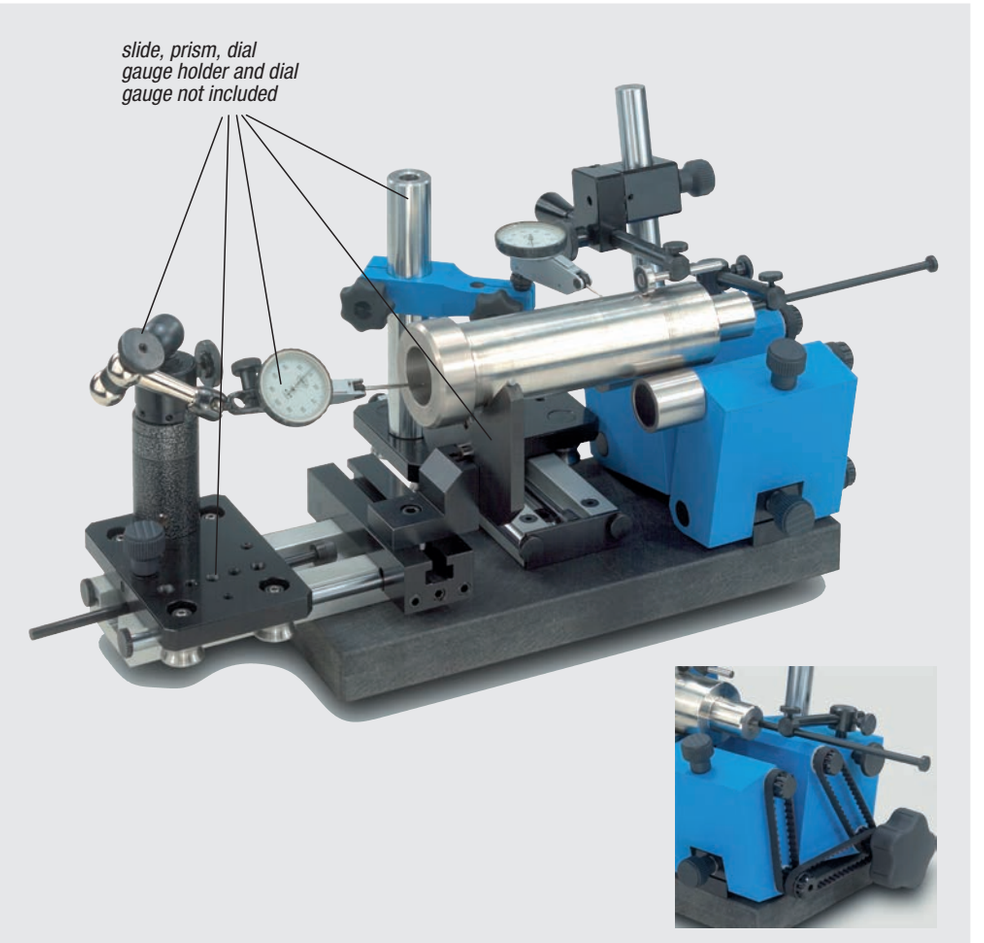
Sample order:
nlm 32506-01

Note:
Gauge unit suitable for measuring concentricity, run-out and perpendicularity. The robust design allows the unit to be used in the workshop and metrology room. A swivel contact roller simplifies positioning of the workpiece. The light sliding guides allow the dial gauges to be placed anywhere.

Technical data:
Inspection range Ø 5 mm to Ø 80 mm
Roller spacing min. 29 mm, max. 89 mm.
Carriage travel max. 100 mm.
Contact roller thrust is adjustable.
Gear driven rollers.

Roller precision: parallelism and coaxialism of both rollers max. 2 µm.

Base plate granite:
300 mm x 130 mm x 25 mm

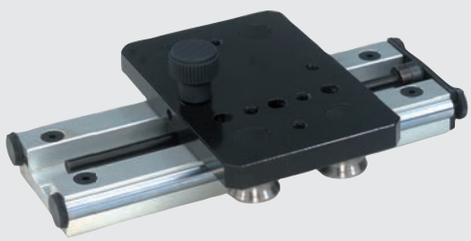


Order No.	Item
32506-01	Concentricity gauge

Accessories

for concentricity gauges

32501-02



32501-03



32501-04



32513-90



32513-98



32501-05

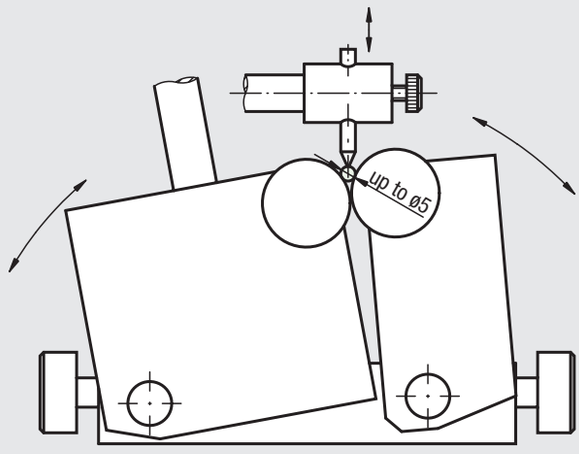


Order No.	Version
32501-02	additional carriage for concentricity gauge 32506
32501-03	dial gauge holder
32501-04	dial gauge holder
32501-05	thrust pin
32513-90	prism for concentricity gauge 32501
32513-98	prism for concentricity gauge 32506

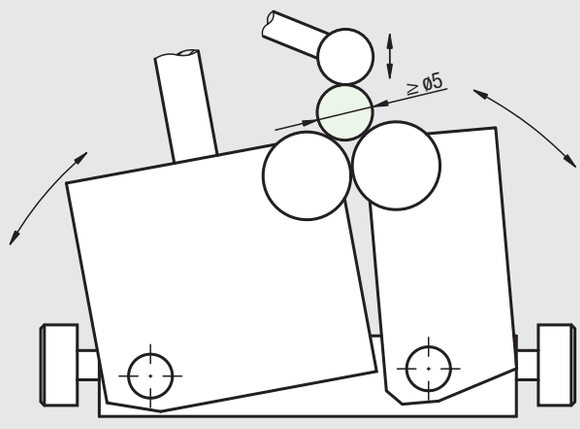
Position of rollers

Note:
The test range can be extended to Ø 80 mm by positioning the rollers.
The teflon pin allows parts as small as Ø 0.5 mm to be checked.

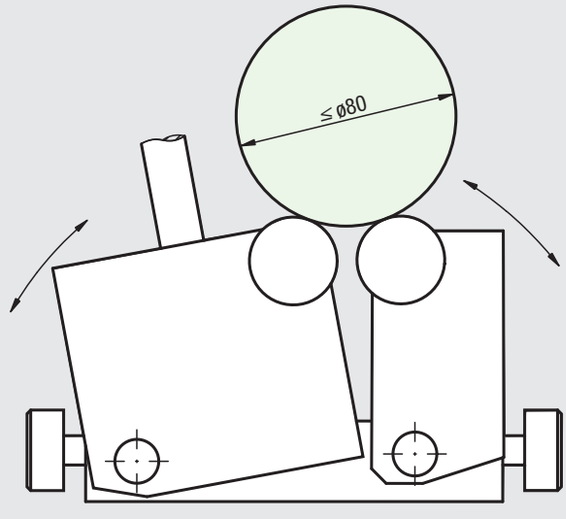
teflon contact pin
instead of contact roller



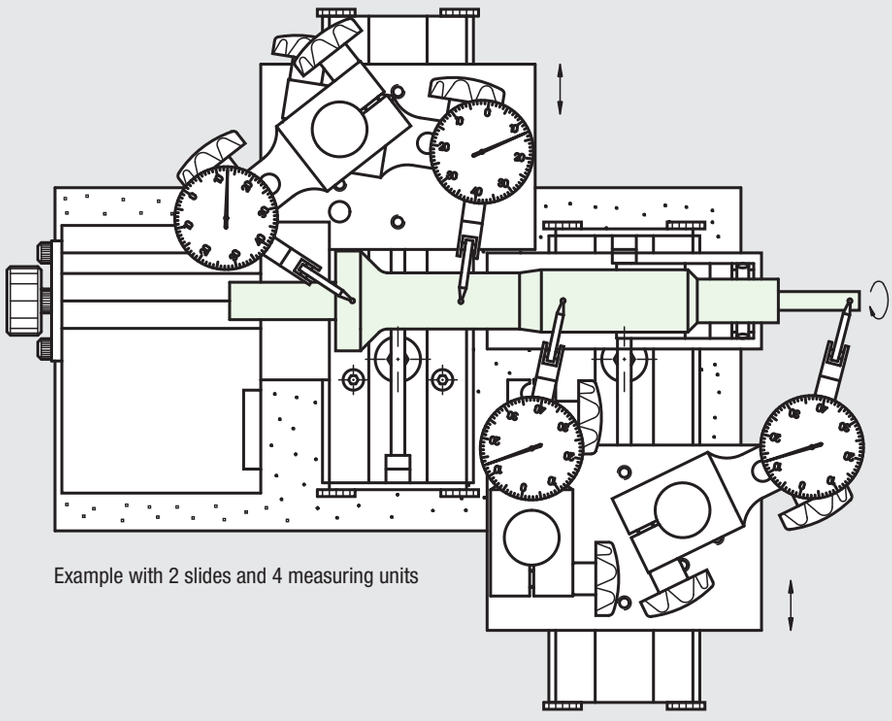
measuring rollers in closed position



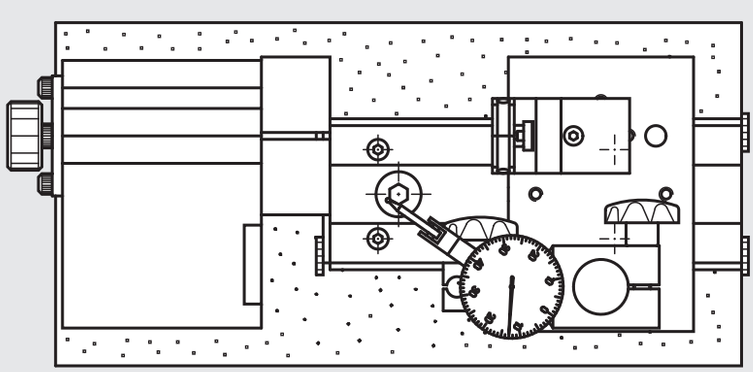
measuring rollers in opened position



Applications



Example with 2 slides and 4 measuring units



Example with support prism for long parts

Dial gauges

DIN 878

Material, version:
Robust metal housing, chromium-plated

Sample order:
nlm 32540-01

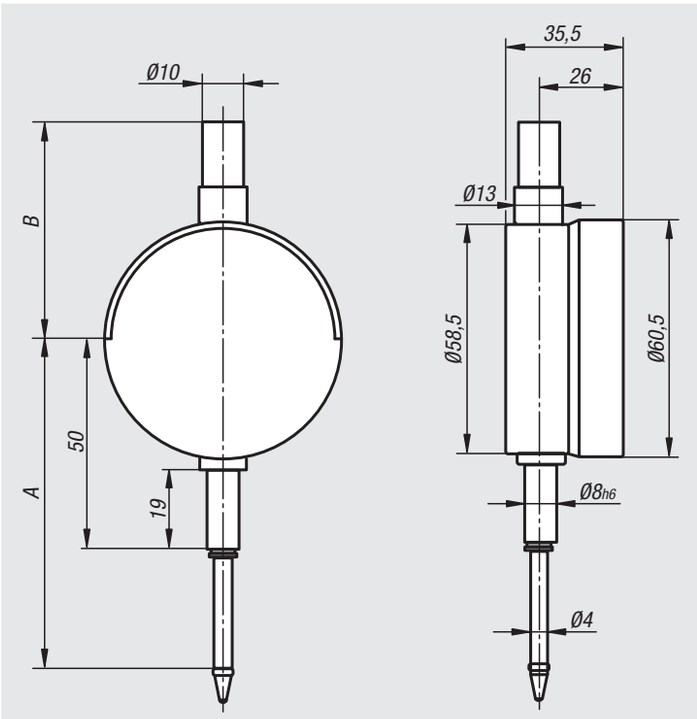
Note:
Standard clamping shank Ø 8h6
Measuring range 10 mm
Scale graduation 0.01 mm
Spindle travel 1 mm per revolution of large pointer
Housing Ø 58 mm
Rotation counter
Tolerance marks



Order No.	Version
32540-01	dial gauge
32540-012	dial gauge with calibration certificate

Dial gauges digital





Material:
Housing aluminium.
Measuring spindle stainless steel.

Version:
Measuring spindle hardened and ground.

Sample order:
nlm 32542-04

Note:
Display rotatable by 270°
Standard holding shank Ø 8h6
Exchangeable probe
Thread M2.5
Protection class IP54

Function:
– Measures in mm or inch
– Preset

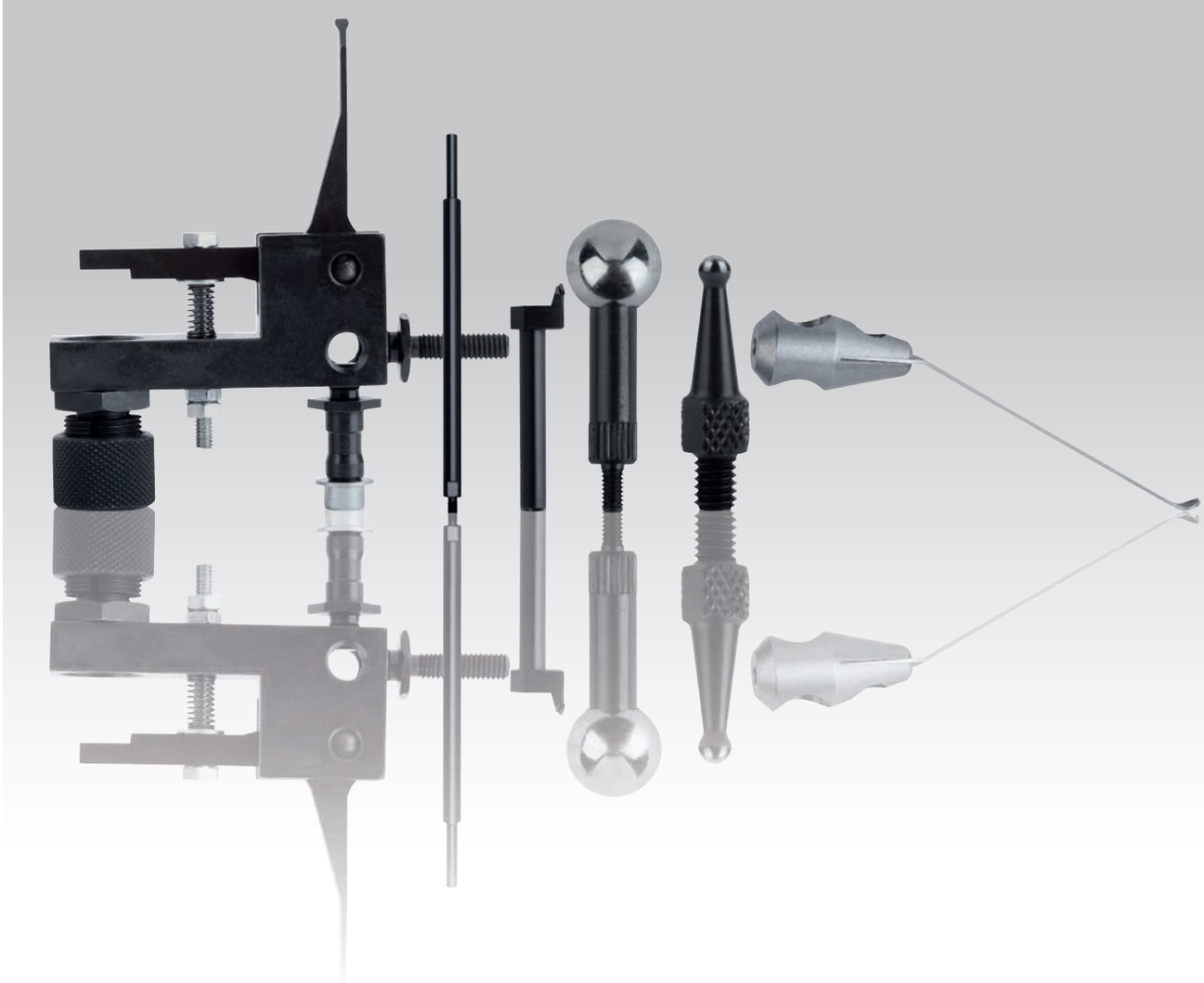
Switch-off electronics.
6 digit LCD display.
Extra large digits.
Digit height 8.5 mm.
Max. transverse speed 1.5 m/s.
interface Opto RS232C.
Battery life ca. 2000 hours.
Supplied with CR2032 battery.

Accessories:
Spare CR2032 battery
order No. 32510-20.

Order No.	Version	Type	A	B	Measuring range mm	Resolution mm	Precision mm	Repeat precision µm	Probe force N
32542-01	dial gauge	Preset	78,4	53,4	25	0,001	0,005	2 (±2s)	0,6 - 1,10
32542-02	dial gauge	Preset	78,4	53,4	25	0,01	0,010	2 (±2s)	0,6 - 1,10
32542-03	dial gauge	Preset	65,9	53,4	12,5	0,001	0,005	2 (±2s)	0,7 - 0,95
32542-04	dial gauge	Preset	65,9	53,4	12,5	0,001	0,004	2 (±2s)	0,65 - 0,9
32542-012	dial gauge with calibration certificate	Preset	78,4	53,4	25	0,001	0,005	2 (±2s)	0,6 - 1,10
32542-022	dial gauge with calibration certificate	Preset	78,4	53,4	25	0,01	0,010	2 (±2s)	0,6 - 1,10
32542-032	dial gauge with calibration certificate	Preset	65,9	53,4	12,5	0,001	0,005	2 (±2s)	0,7 - 0,95
32542-042	dial gauge with calibration certificate	Preset	65,9	53,4	12,5	0,01	0,010	2 (±2s)	0,7 - 0,95

33000

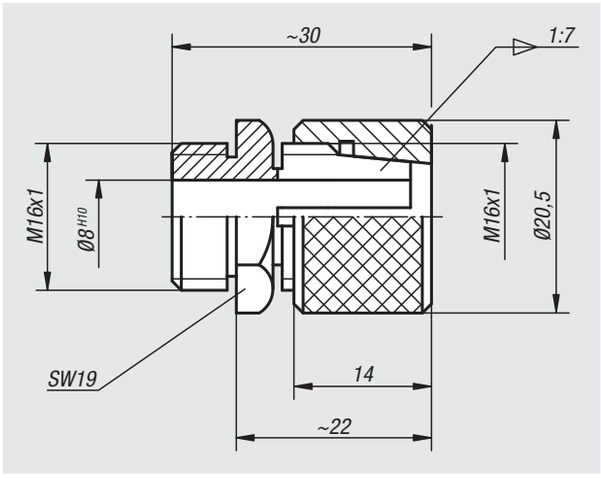
Standard inspection and test fixture elements



Dial gauge collets

for Ø8 shafts

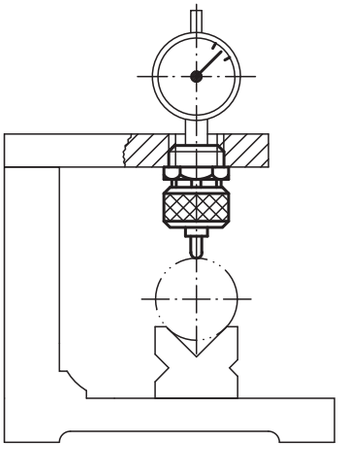




Material:
Carbon steel.

Version:
Black oxidised.
Collet tempered.

Sample order:
nlm 33000-08



Order No.	Dimensions
33000-08	see drawing

33010

Dial gauge holders

sliding

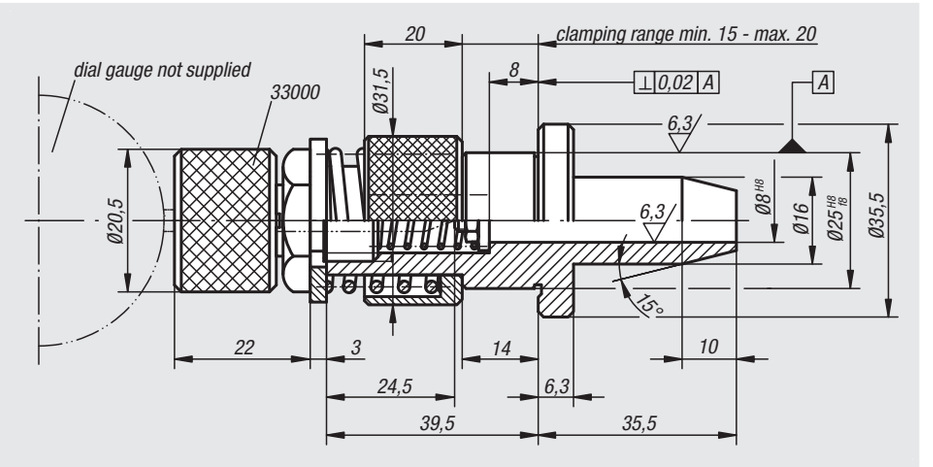


Material:
Carbon steel.

Version:
Black oxidised.
Collet and body tempered.

Sample order:
nlm 33010-08025

Note:
Dial gauge and probe are not included.
Dial gauges see 32540 and 32542.
Probes see 33020 up to 33026.



Order No.	Supplied for the probe pin
33010-08025	1 washer 5.3 x 14 x 1 1 hex nut M5 1 spring

33012

Dial gauge holders

short version with thread

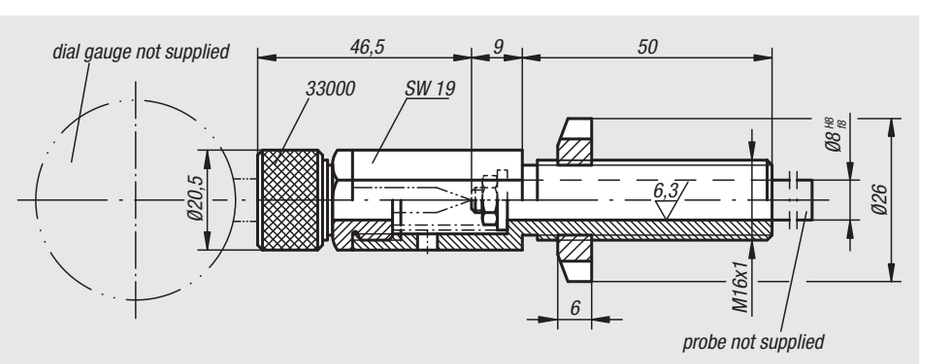


Material:
Carbon steel.

Version:
Black oxidised.
Collet and body tempered.

Sample order:
nlm 33012-08050

Note:
Dial gauge and probe are not included.
Dial gauges see 32540 and 32542.
Probes see 33020 up to 33026.



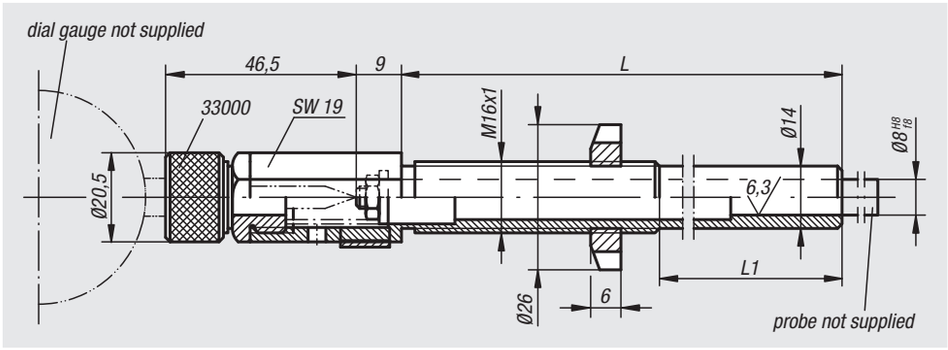
Order No.	Supplied for the probe pin
33012-08050	1 washer 5.3 x 14 x 1 1 hex nut M5 1 spring

33014

Dial gauge holders

long version with thread





Material:
Carbon steel.

Version:
Black oxidised.
Collet and body tempered.

Sample order:
nlm 33014-08125

Note:
Dial gauge and probe are not included.
Dial gauges see 32540 and 32542.
Probes see 33020 up to 33026.

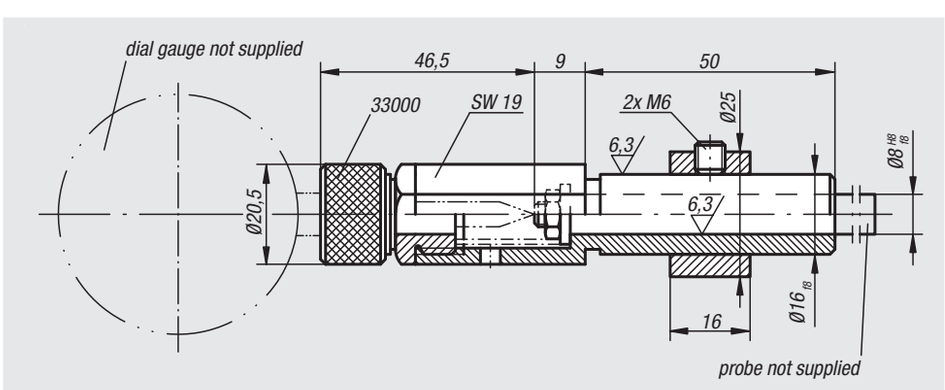
Order No.	L	L1	Supplied for the probe pin
33014-08125	125	75	1 washer 5.3 x 14 x 1 1 hex nut M5 1 spring
33014-08180	180	130	1 washer 5.3 x 14 x 1 1 hex nut M5 1 spring

33016

Dial gauge holders

short version with smooth shaft





Material:
Carbon steel.

Version:
Black oxidised.
Collet and body tempered.

Sample order:
nlm 33016-08050

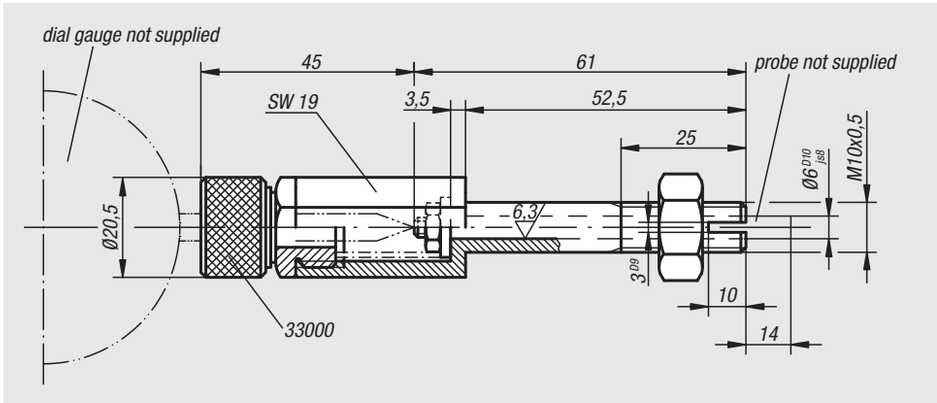
Note:
Dial gauge and probe are not included.
Dial gauges see 32540 and 32542.
Probes see 33020 up to 33026.

Order No.	Supplied for the probe pin
33016-08050	1 washer 5.3 x 14 x 1 1 hex nut M5 1 spring

Dial gauge holders

for measuring frame





Material:
Carbon steel.

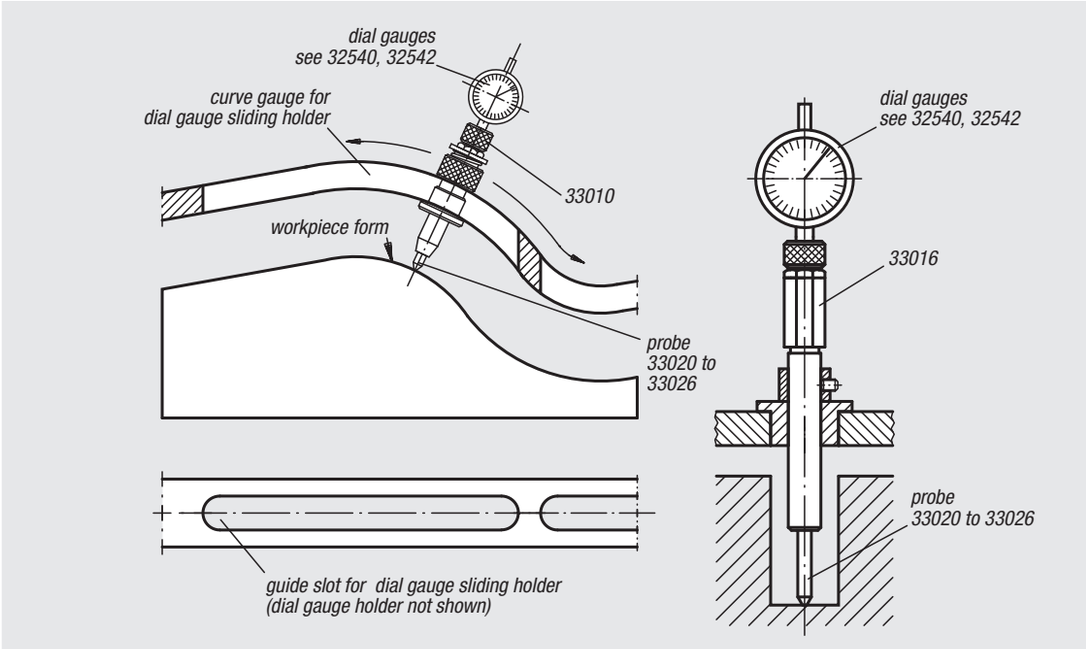
Version:
Black oxidised.
Collet and body tempered.

Sample order:
nlm 33018-06053

Note:
Dial gauges and probes are not included.
Dial gauges see 32540 and 32542.
Probes see 33028 up to 33032.

Order No.	Supplied for the probe pin
33018-06053	1 washer 4.3 x 14 x 0.9 1 hex nut M4 1 spring

Example of dial gauge holders



33020

Probe

with flat face

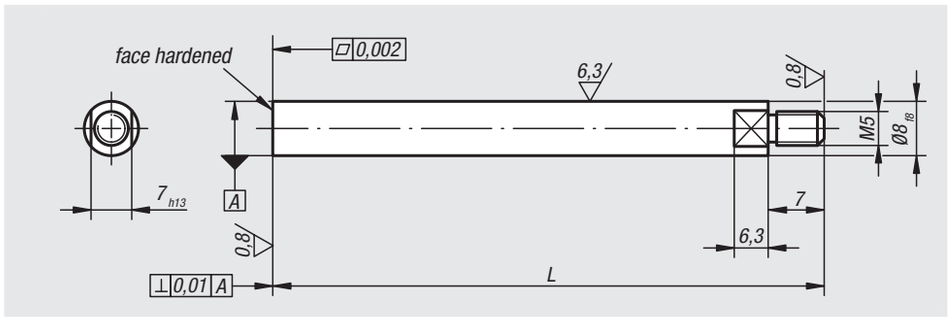


Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33020-08100

Note:
These probes are suitable for dial gauge holders 33010 to 33016.



Order No.	L
33020-08063	63
33020-08080	80
33020-08100	100
33020-08160	160
33020-08250	250

33022

Probe

with flat point

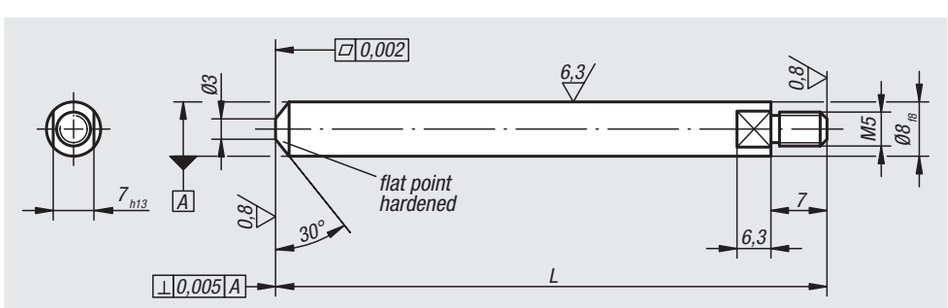


Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33022-08063

Note:
These probes are suitable for dial gauge holders 33010 to 33016.



Order No.	L
33022-08063	63
33022-08080	80
33022-08100	100

33024

Probe

with reduced flat face

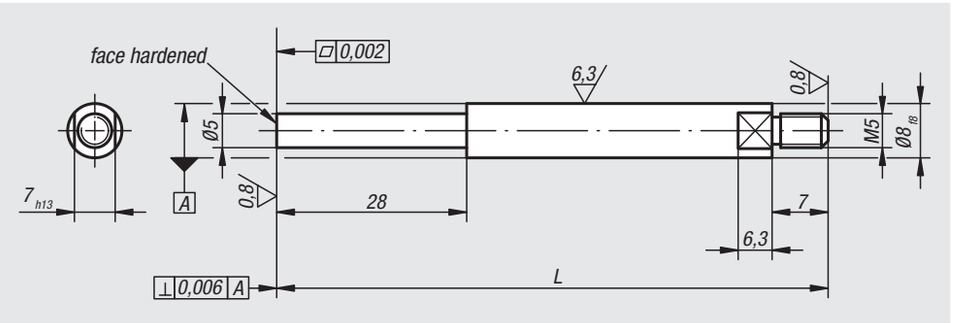


Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33024-08160

Note:
These probes are suitable for dial gauge holders 33010 to 33016.



Order No.	L
33024-08080	80
33024-08100	100
33024-08160	160
33024-08250	250

33026

Probe

with reduced domed point

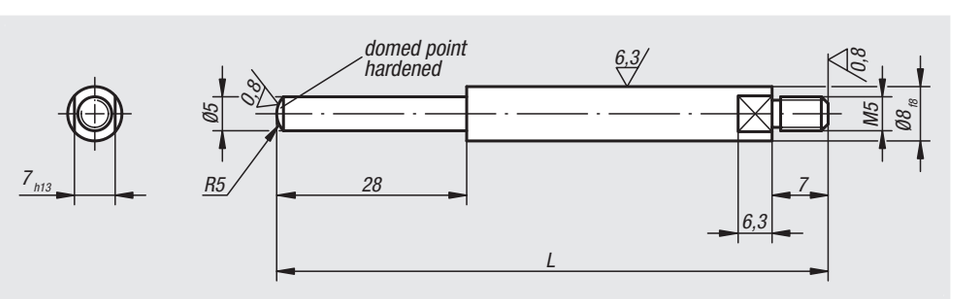


Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33026-08080

Note:
These probes are suitable for dial gauge holders 33010 to 33016.



Order No.	L
33026-08080	80
33026-08100	100
33026-08160	160

33028

Probe knife point

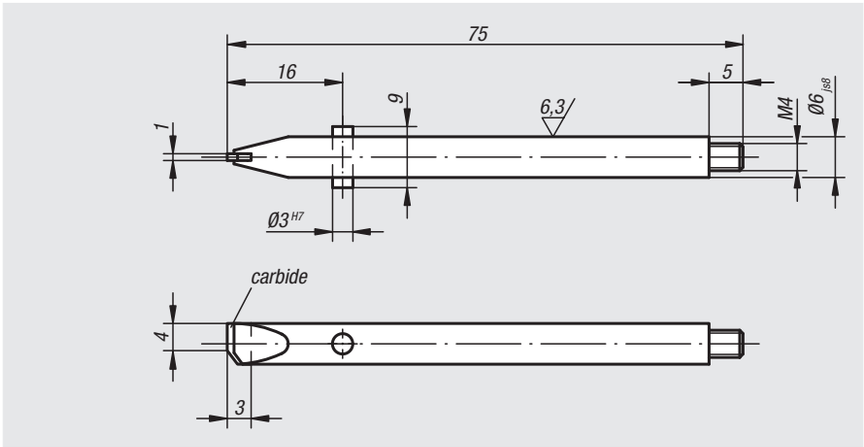


Material:
Tool steel.
Contact face carbide

Version:
Black oxidised.

Sample order:
nlm 33028-06075

Note:
These probes are suitable for dial gauge holder 33018.



Order No.	Dimensions
33028-06075	see drawing

33029

Probe knife point

offset

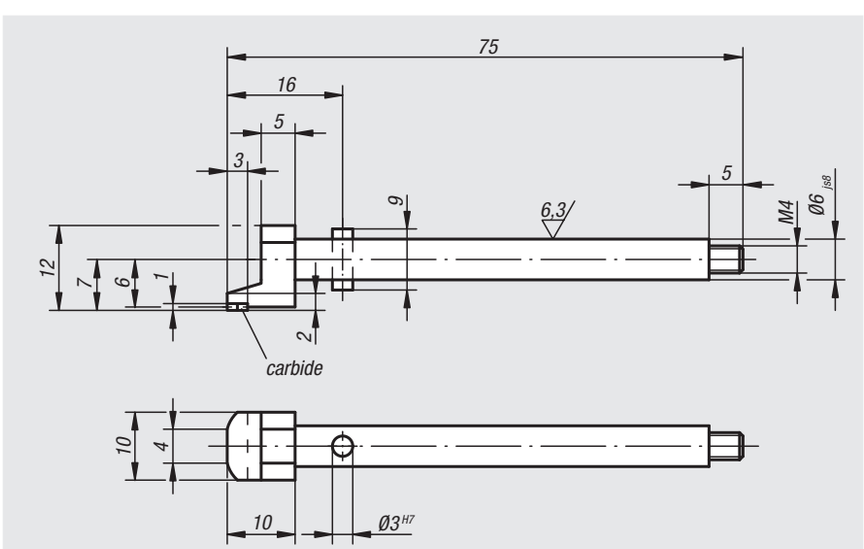


Material:
Tool steel.
Contact face carbide

Version:
Black oxidised.

Sample order:
nlm 33029-06075

Note:
These probes are suitable for dial gauge holder 33018.



Order No.	Dimensions
33029-06075	see drawing

33032

Extension

for probe inserts

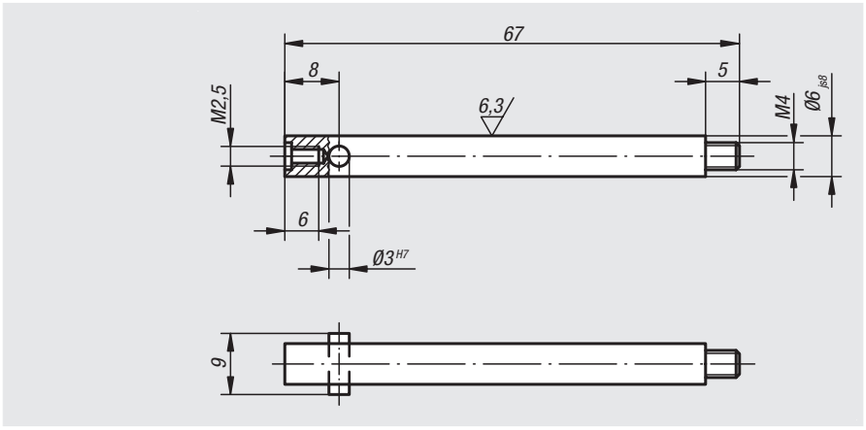


Material:
Tool steel.

Version:
Black oxidised.

Sample order:
nlm 33032-06067

Note:
These extension are suitable for dial gauge holder 33018.
For probe inserts see 33040 to 33052.



Order No.	Dimensions
33032-06067	see drawing

33035

Probe knife point

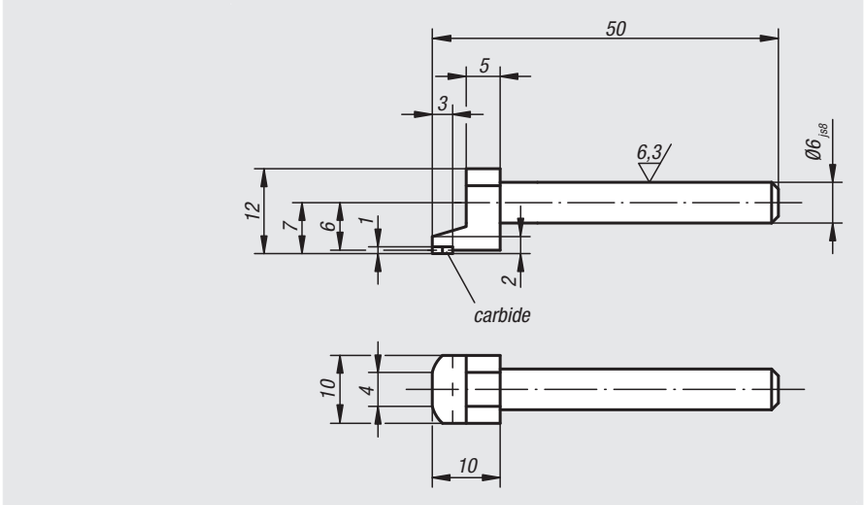
offset, for fixed stop



Material:
Tool steel.
Contact face carbide

Version:
Black oxidised.

Sample order:
nlm 33035-06050



Order No.	Dimensions
33035-06050	see drawing

33040

Probe inserts

with domed point

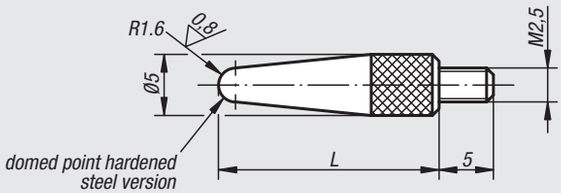


Material:
Steel or carbide point

Version:
Black oxidised.

Sample order:
nlm 33040-1025250

Note:
Dial gauges see 32540 and 32542.



Order No. steel	Order No. carbide	L
33040-1025080	**33040-2025080**	8
33040-1025125	**33040-2025125**	12,5
33040-1025160	**33040-2025160**	16
33040-1025200	**33040-2025200**	20
33040-1025250	**33040-2025250**	25
33040-1025280	**33040-2025280**	28
33040-1025355	**33040-2025355**	35,5

33042

Probe inserts

with ball point

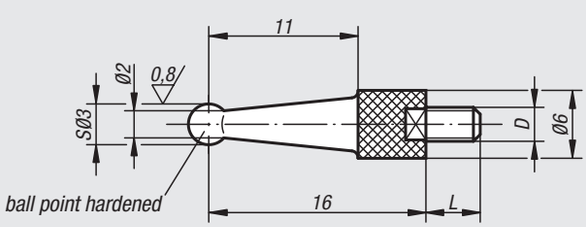


Material:
Tool steel.

Version:
Hardened, black oxidised.

Sample order:
nlm 33042-040016

Note:
Dial gauges see 32540 and 32542.



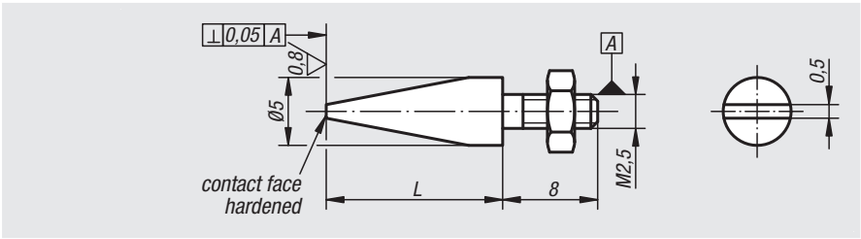
Order No.	D	L
33042-025016	M2,5	5
33042-040016	M4	5

33044

Probe inserts

knife point





Material:
Steel.

Version:
Black oxidised.
Contact faces hardened.

Sample order:
nlm 33044-025080

Note:
Dial gauges see 32540 and 32542.

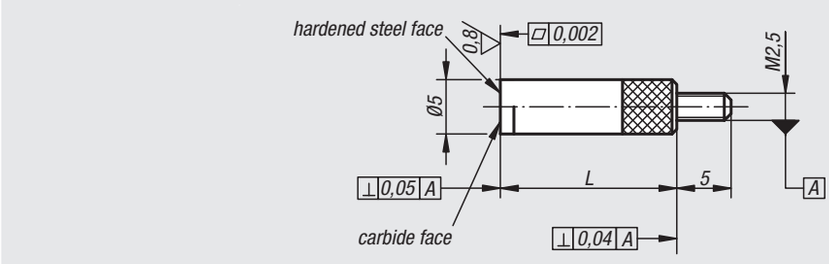
Order No.	L
33044-025080	8
33044-025125	12,5
33044-025160	16
33044-025200	20
33044-025280	28

33046

Probe inserts

with flat face





Material:
Steel or carbide contact face

Version:
Black oxidised.

Sample order:
nlm 33046-2025160

Note:
Dial gauges see 32540 and 32542.

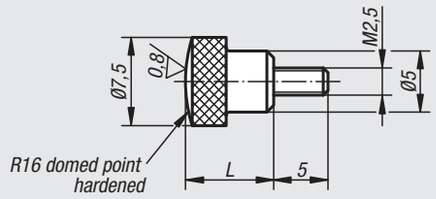
Order No. steel	Order No. carbide	L
33046-1025080	**33046-2025080**	8
33046-1025125	**33046-2025125**	12,5
33046-1025160	**33046-2025160**	16

33048

Probe inserts

with domed face





Material:
Steel.

Version:
Hardened, black oxidised.

Sample order:
nlm 33048-025080

Note:
Dial gauges see 32540 and 32542.

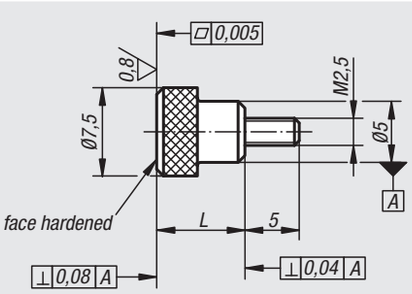
Order No.	L
33048-025080	8

33050

Probe inserts

with enlarged flat face





Material:
Steel.

Version:
Hardened, black oxidised.

Sample order:
nlm 33050-025080

Note:
Dial gauges see 32540 and 32542.

Order No.	L
33050-025080	8

33052

Extensions

for probe inserts

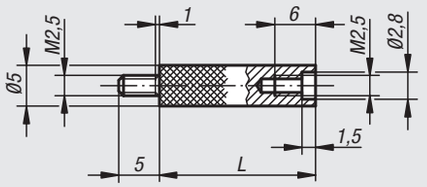


Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33052-025120

Note:
Suitable for probe inserts 33040 to 33050 and probe insert set 33058.
Dial gauges see 32540 and 32542.



Order No.	L
33052-025080	8
33052-025100	10
33052-025120	12
33052-025160	16
33052-025200	20
33052-025240	24
33052-025300	30
33052-025320	32
33052-025400	40
33052-025500	50
33052-025600	60
33052-025700	70
33052-025800	80
33052-025900	90

33058

Probe insert set

11-piece

Material:
Probe inserts hardened steel.
Box plastic.

Version:
Black oxidised.

Sample order:
nlm 33058-01

Threaded version:
Thread M2.5
Contents:
9 inserts
1 extension (length 30 mm)
1 storage box



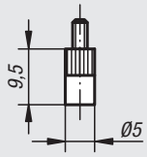
Order No.	Item	Version	Material
33058-01	Probe	11 piece	steel

Probe inserts hardened steel

thread M2.5

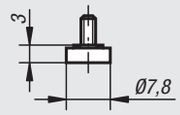


Steel, hardened
flat Ø5



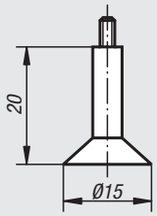
Order No.
33058-015

Steel, hardened
flat Ø7.5



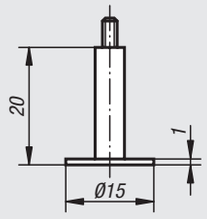
Order No.
33058-020

Steel, hardened
flat Ø15



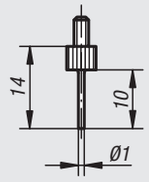
Order No.
33058-025

Steel, hardened
disc Ø15



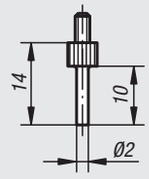
Order No.
33058-030

Steel, hardened
pin Ø1



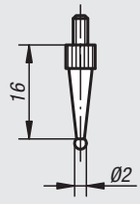
Order No.
33058-035

Steel, hardened
pin Ø2



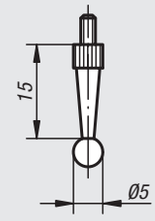
Order No.
33058-040

Steel, hardened
ball Ø2



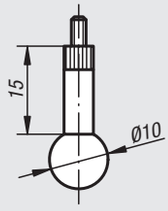
Order No.
33058-045

Steel, hardened
ball Ø5



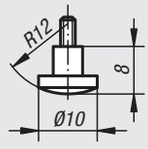
Order No.
33058-050

Steel, hardened
ball Ø10



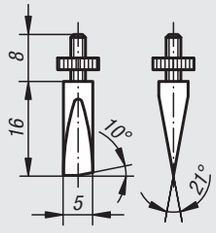
Order No.
33058-055

Steel, hardened
domed R12



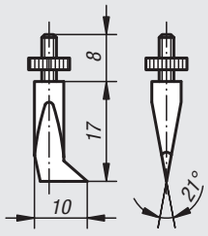
Order No.
33058-060

Steel, hardened
knife
angled 10°



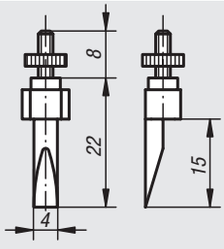
Order No.
33058-065

Steel, hardened
knife
laterally off-set



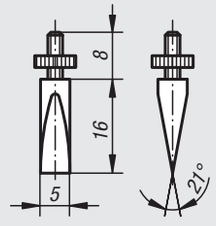
Order No.
33058-070

Steel, hardened
knife
one-sided



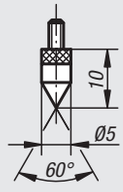
Order No.
33058-075

Steel, hardened
knife



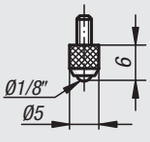
Order No.
33058-080

Steel, hardened
point 60°



Order No.
33058-085

Steel, hardened
standard inch
ball Ø 1/8“



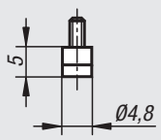
Order No.
33058-090

Probe inserts carbide

thread M2.5

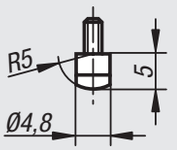


Carbide
flat Ø5



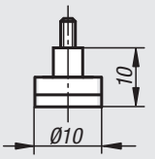
Order No.
33058-515

Carbide
domed R5



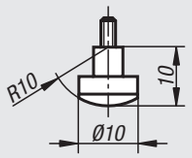
Order No.
33058-520

Carbide
flat Ø10



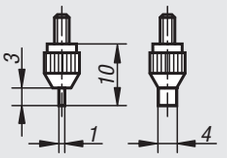
Order No.
33058-525

Carbidel
domed R10



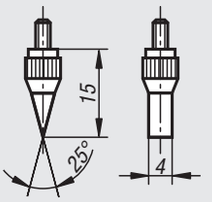
Order No.
33058-530

Carbide
blade 1x4



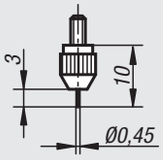
Order No.
33058-540

Carbide
knife 25°x4



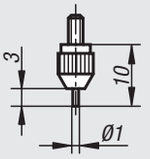
Order No.
33058-545

Carbide
pin Ø0,45



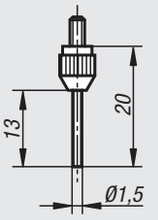
Order No.
33058-550

Carbide
pin Ø1.0



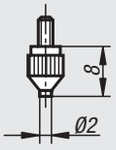
Order No.
33058-555

Carbide
pin Ø1.5



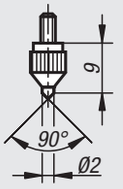
Order No.
33058-560

Carbide
flat Ø2



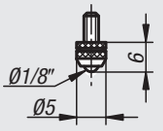
Order No.
33058-565

Carbide
point 90°x2



Order No.
33058-570

Carbide
standard inch
ball Ø1/8“



Order No.
33058-575

Protection frames

for dial gauges

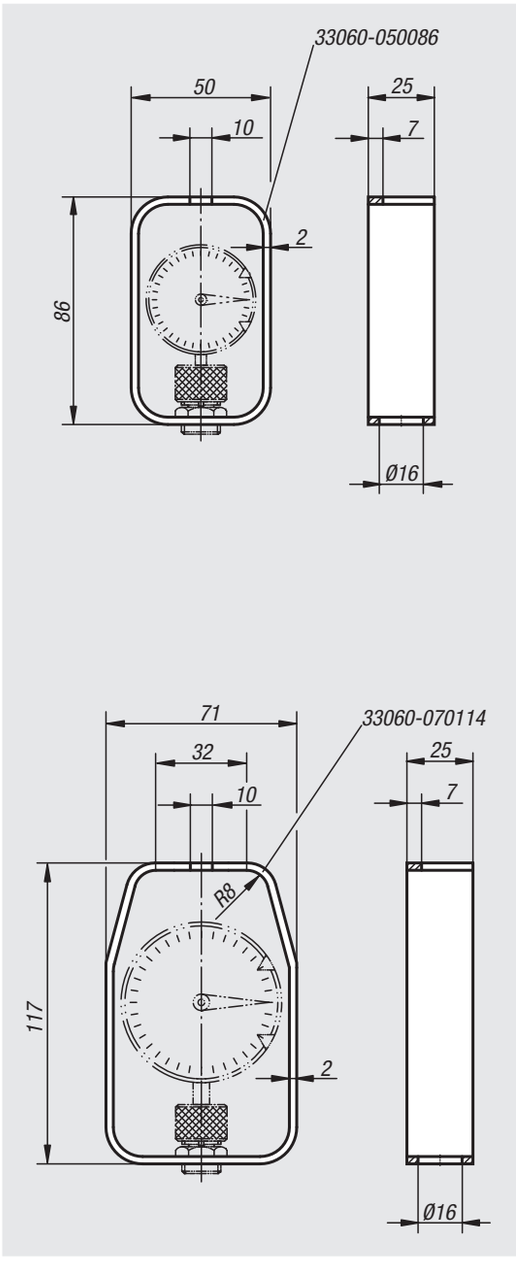


Material:
Steel.

Version:
Painted yellow

Sample order:
nlm 33060-050086

Note:
Dial gauges see 32540 and 32542.
Dial gauge collets see 33000.
Dial gauge holders see 33010 to 33018.



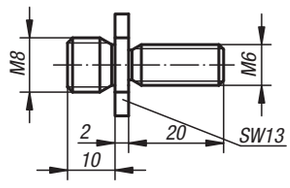
Order No.	Dimensions
33060-050086	see drawing
33060-070114	see drawing

Technical information for deflection dial gauge holders

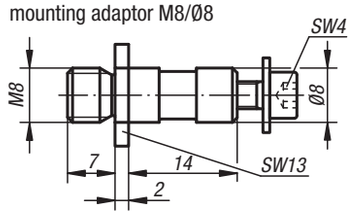
For alternative mounting for the deflection dial gauge holder:
– mounting adapter M8/M6 (double thread)
– mounting adapter M8/Ø8 (thread and smooth pin)

Both adapters are supplied with each deflection dial gauge holder.

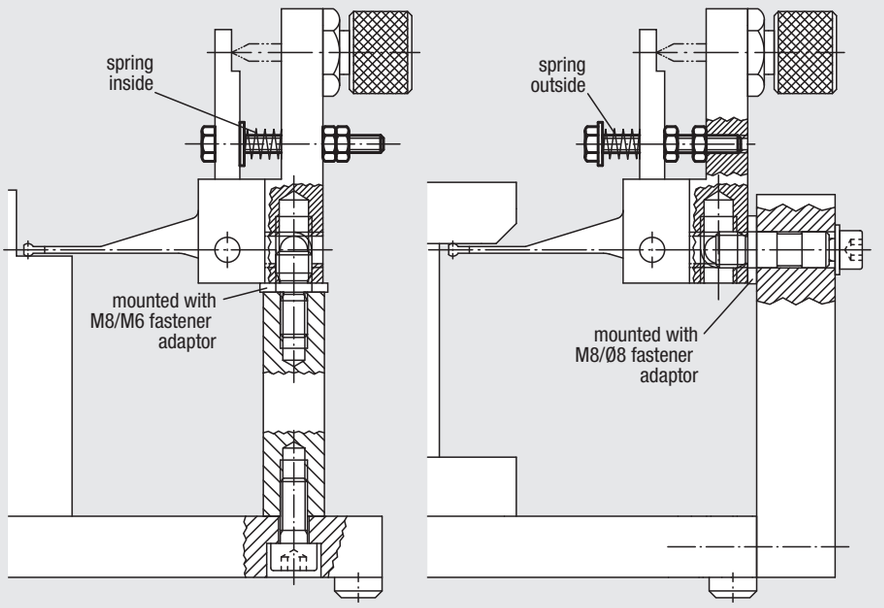
mounting adaptor M8/M6



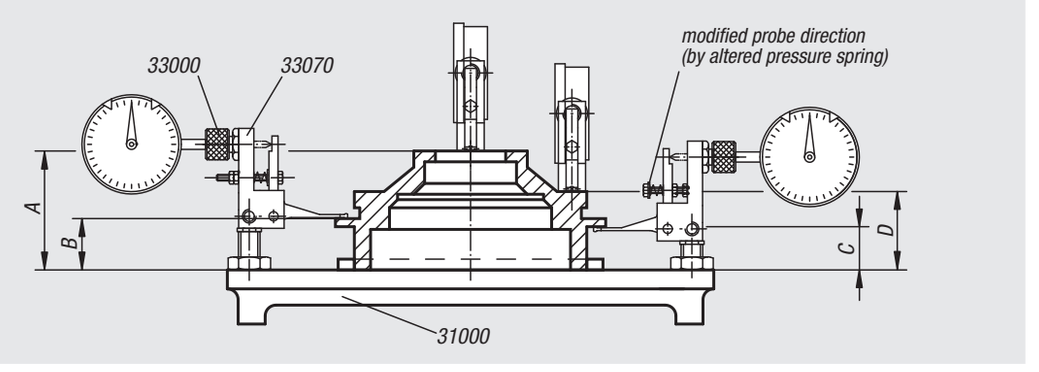
mounting adaptor M8/Ø8



Modification of the probe direction:
the probe direction can be changed by simply moving the spring from inside to outside



Example of simultaneous control of 4 height dimensions using deflection dial gauge holders



33070

Deflection dial gauge holders 90°



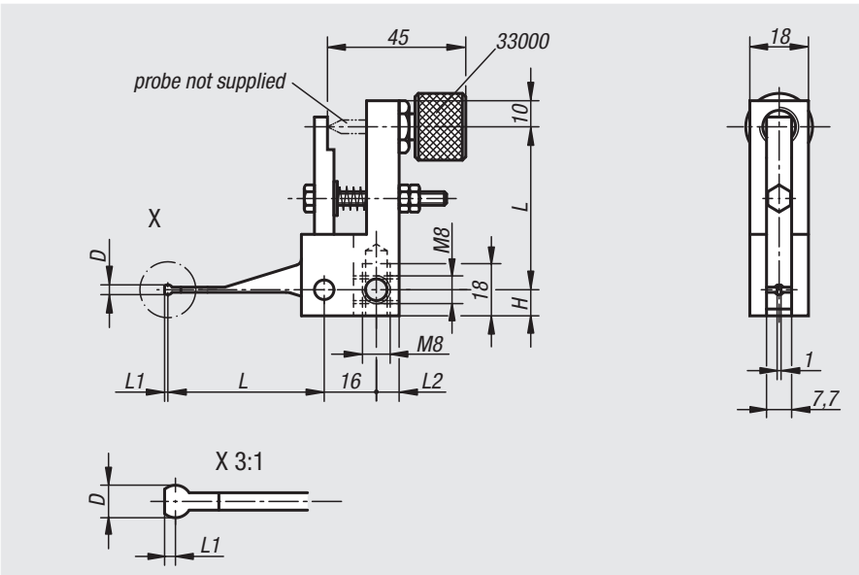
Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33070-04803

Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

Accessories:
Dial gauges see 32540 and 32542.



Order No.	L	D	L1	L2	H
33070-04803	48	3	1	7	8
33070-07008	70	8	1,5	6	10

33072

Deflection dial gauge holders 90°

probe lever with thread



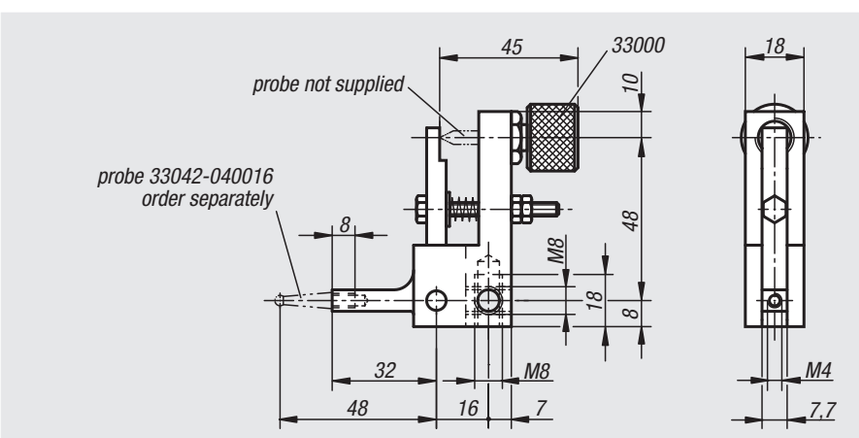
Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33072-048

Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

Accessories:
Dial gauges see 32540 and 32542.
Probe inserts see 33042-040016.



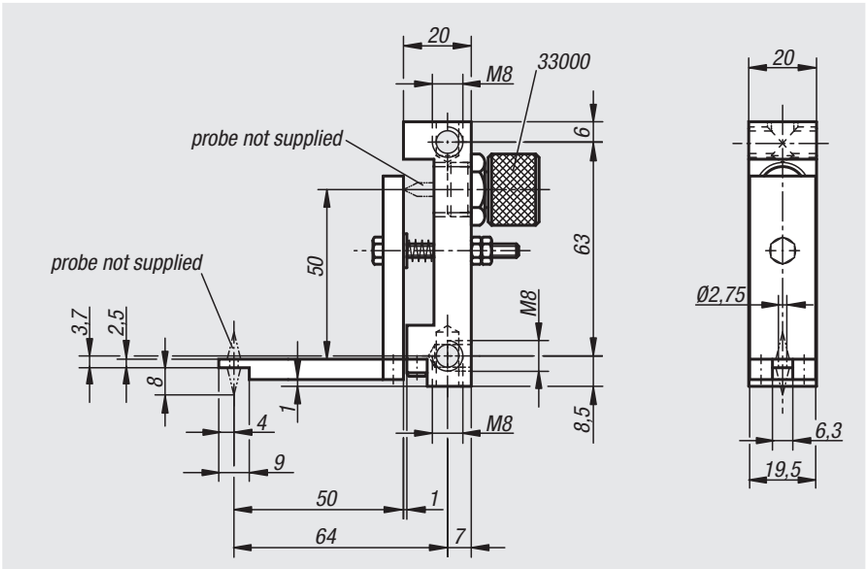
Order No.	Dimensions
33072-048	see drawing

33074

Deflection dial gauge holders 90°

probe lever with hole





Material:
Body aluminium.
Probe lever investment cast steel.

Version:
Body black anodised.
Probe lever black oxidised.

Sample order:
nlm 33074-050

Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

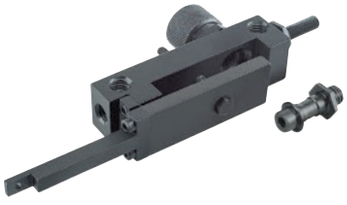
Accessories:
Dial gauges see 32540 and 32542.
Probe inserts see 33040 to 33052.

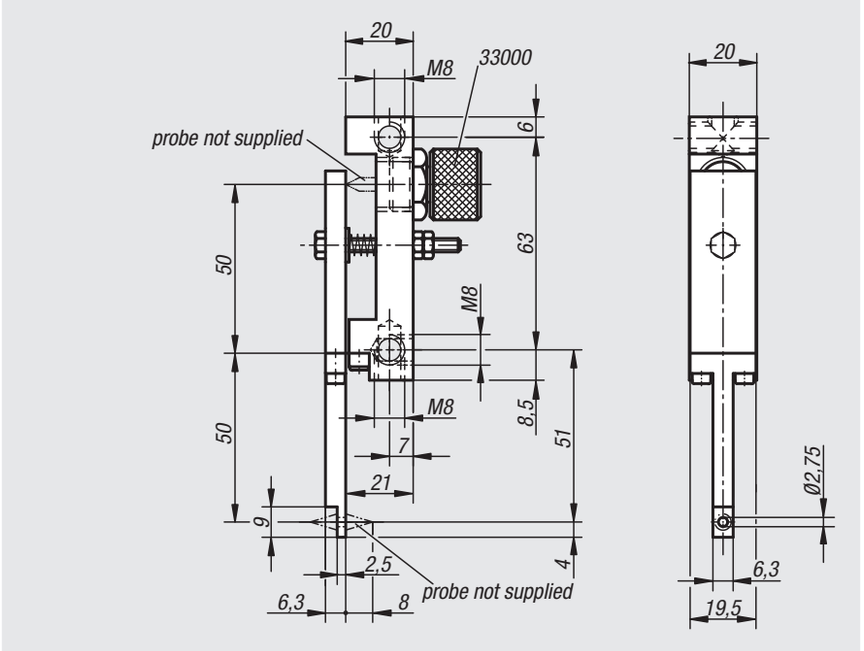
Order No.	Dimensions
33074-050	see drawing

33076

Deflection dial gauge holders 180°

probe lever with hole





Material:
Body aluminium.
Probe lever investment cast steel.

Version:
Body black anodised.
Probe lever black oxidised.

Sample order:
nlm 33076-050

Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

Accessories:
Dial gauges see 32540 and 32542.
Probe inserts see 33040 to 33052.

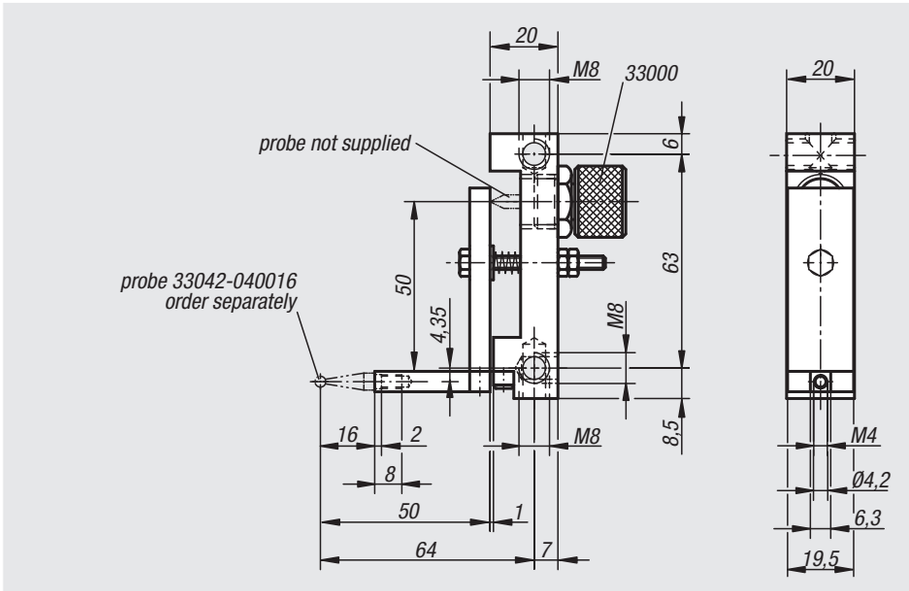
Order No.	Dimensions
33076-050	see drawing

33078

Deflection dial gauge holders 90°

probe lever with thread





Material:
Body aluminium.
Probe lever investment cast steel.

Version:
Body black anodised.
Probe lever black oxidised.

Sample order:
nlm 33078-050

Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

Accessories:
Dial gauges see 32540 and 32542.
Probe inserts see 33042-040016.

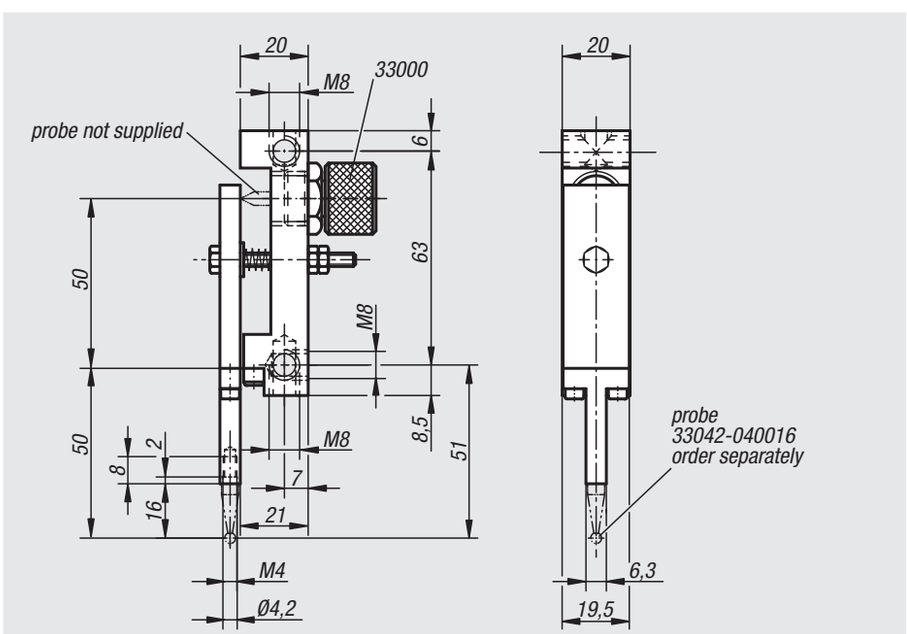
Order No.	Dimensions
33078-050	see drawing

33080

Deflection dial gauge holders 180°

probe lever with thread





Material:
Body aluminium.
Probe lever investment cast steel.

Version:
Body black anodised.
Probe lever black oxidised.

Sample order:
nlm 33080-050

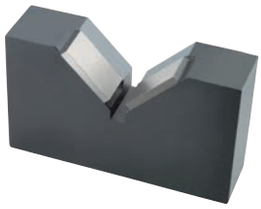
Note:
To alter the probe direction and mounting of the deflection dial gauge holder with the fastening adaptors (supplied) see technical information.

Accessories:
Dial gauges see 32540 and 32542.
Probe inserts see 33042-040016.

Order No.	Dimensions
33080-050	see drawing

33090

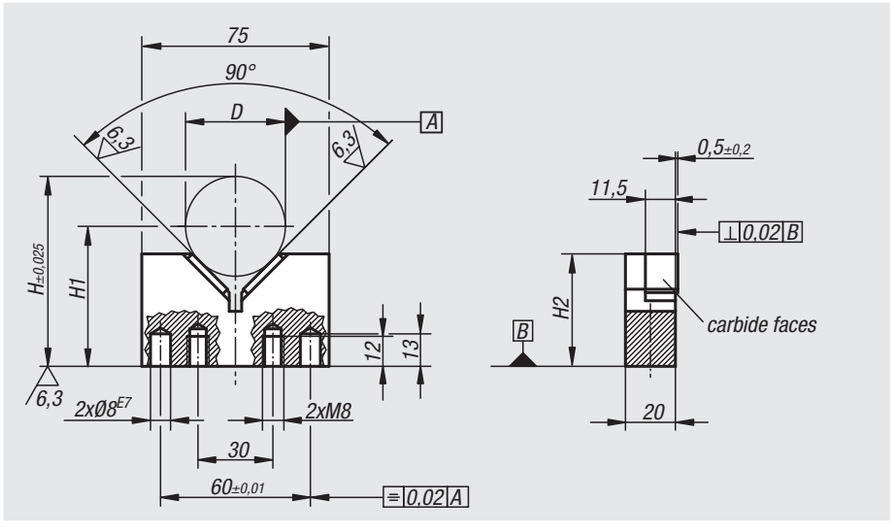
Prism attachments



Material:
Carbon steel.
Contact face carbide.

Version:
Black oxidised.
Contact faces ground, bright.

Sample order:
nlm 33090-010020



Order No.	D min.	D max.	D Test-Ø	H	H1	H2
33090-010020	10	20	20	66	D/2 x √2 + 41,857	53
33090-020040	20	40	40	76	D/2 x √2 + 27,716	45

33092

Spacers

for prisms attachments

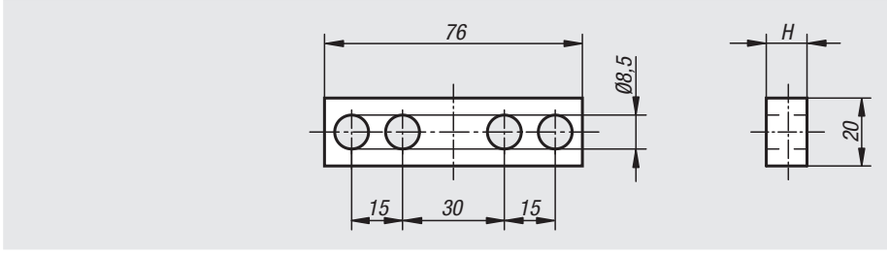


Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 33092-012

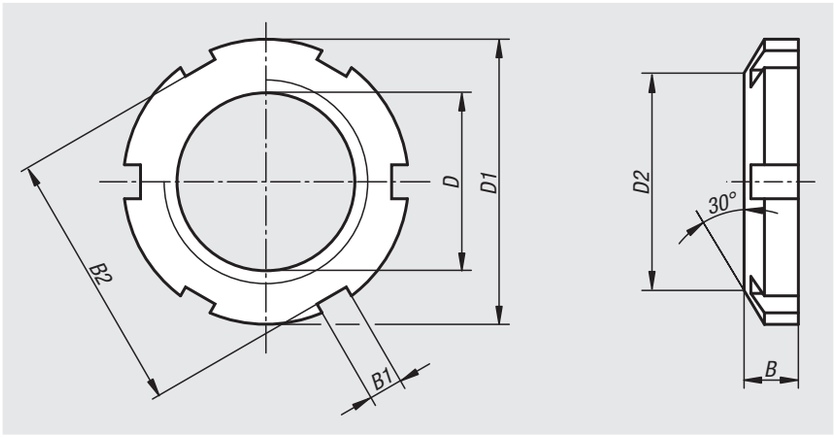
Note:
These spacers are used as riser elements for prisms attachments 33090.



Order No.	H
33092-005	5
33092-008	8
33092-012	12
33092-015	15
33092-020	20

Slotted round nuts





Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 33105-16

Order No.	D	D1	D2	B	B1	B2	No. of slots
33105-16	M16x1	26	21	6	4	22	4
33105-36	M36x1,5	52	44	9	6	46	6

Pivoting columns



Material:
Steel.

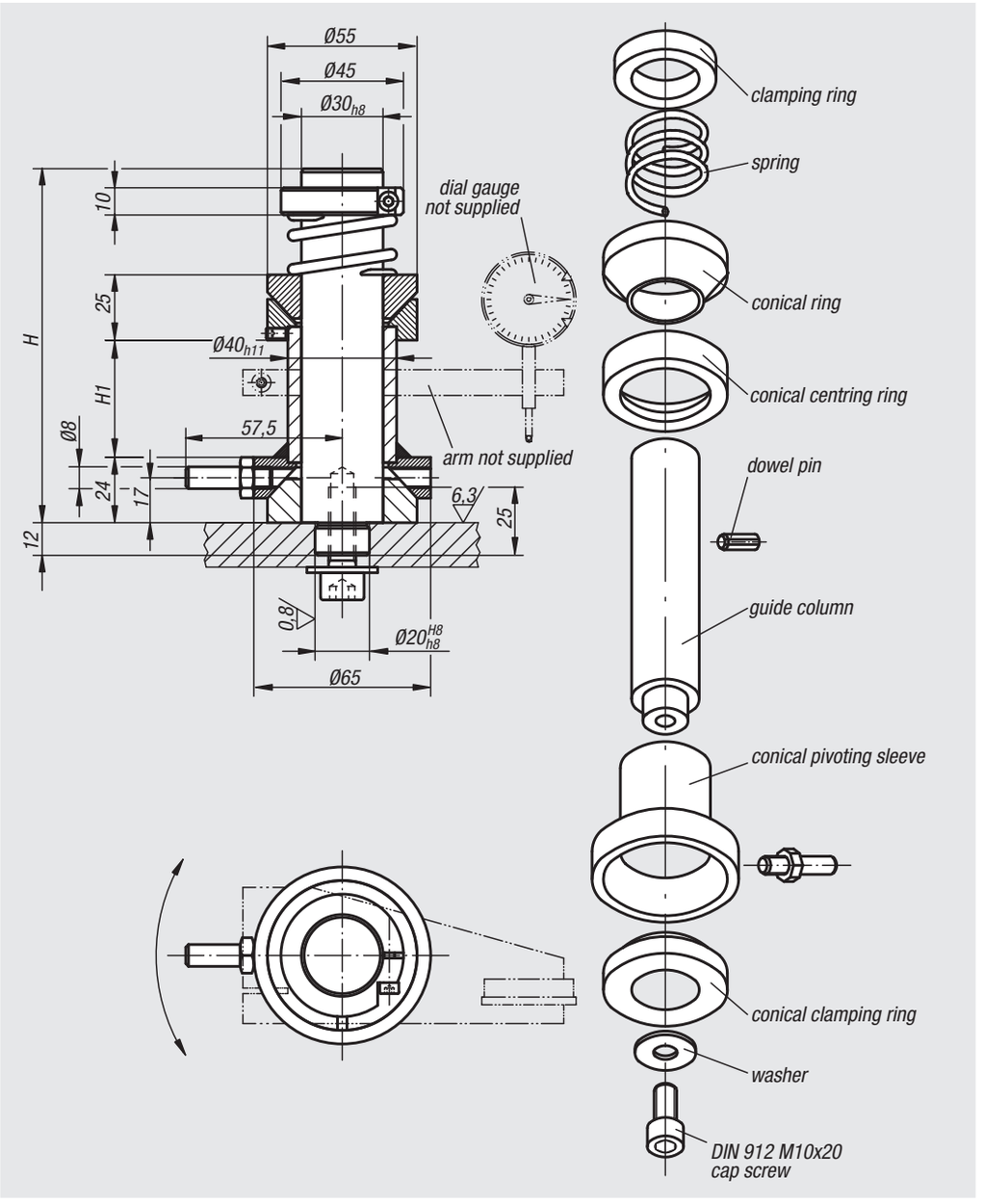
Version:
Black oxidised.

Sample order:
nlm 33110-200

Note:
Dial gauges see 32540 and 32542.
Measuring arms see 33150.

Application:
For height measurements.

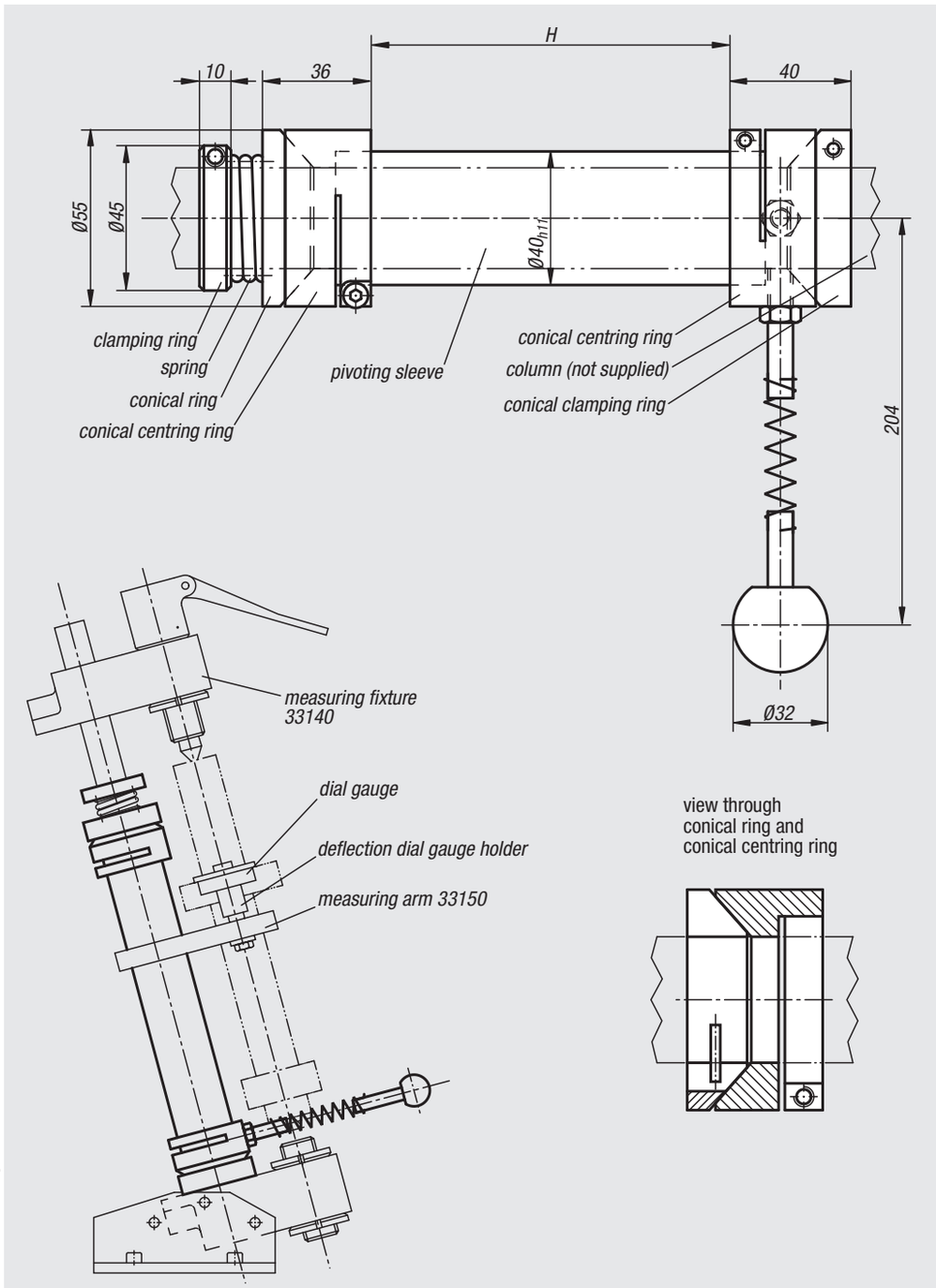
Assembly:
- Fully dismantle the pivoting column.
- Fasten guide column to the table with washer and cap screw.
- Slide the conical clamping ring on the column and press down while tightening the screw.
- Slide the conical pivoting sleeve on.
- Fasten the measuring arm onto the conical pivoting sleeve.
- Fasten the conical centring ring onto the conical pivoting sleeve with two grub screws.
- Insert the dowel pin into the guide column.
- Slide the conical ring onto the guide column so that the dowel pin engages in the slot. Ensure the conical ring has no play.
- Mount the spring on the top with the clamping ring to prevent axial play.
- Lubricate all moving parts.



Order No.	H	H1
33110-130	130	43
33110-160	160	73
33110-200	200	113
33110-250	250	163

Pivoting systems





Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33115-426

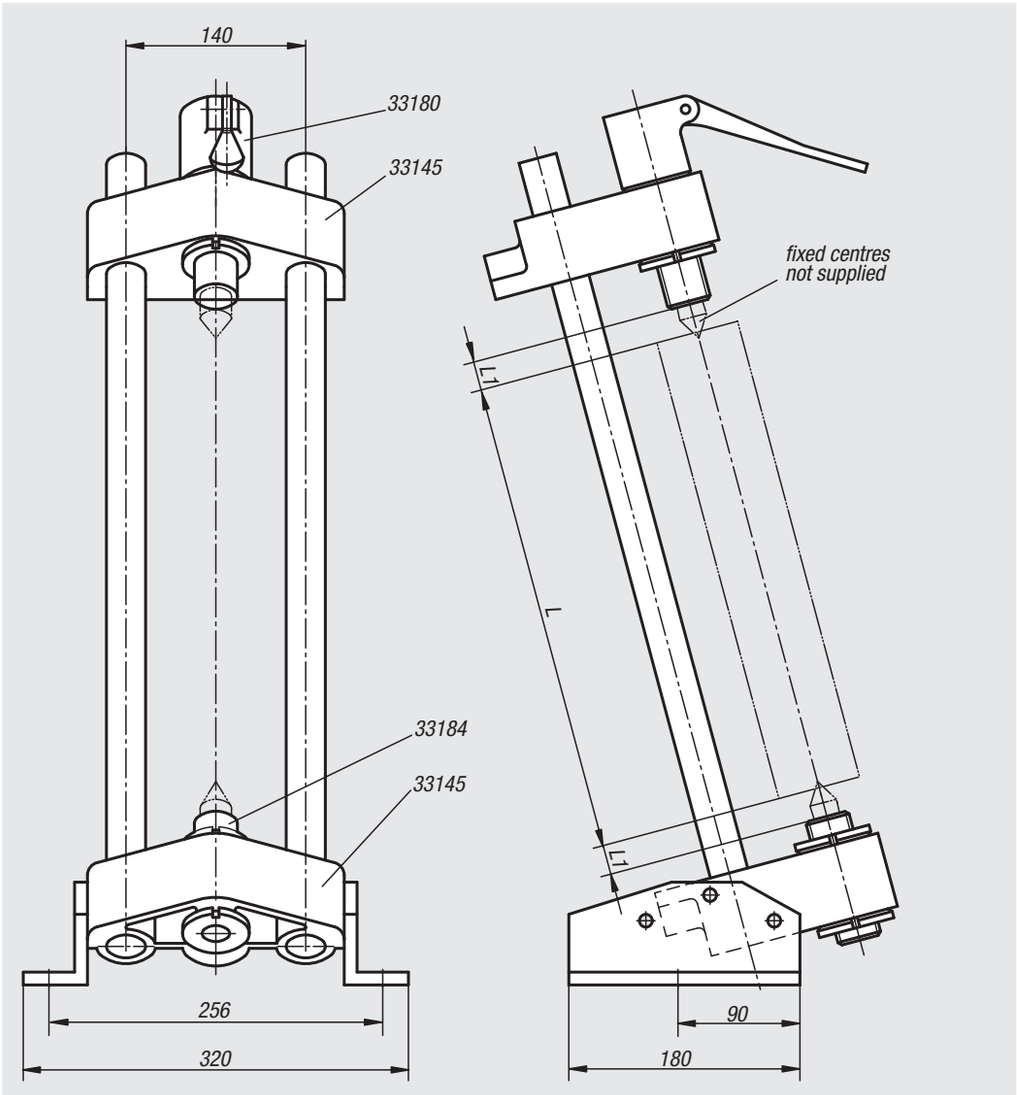
Note:
The pivoting systems are adapted to measuring fixtures 33140.
Measuring arms see 33150.

Assembly:
- Place the conical clamping ring on the guide column and clamp in the desired position.
- Fix the conical centring ring to the pivoting sleeve and insert it such that the conical centring ring lies on top of the conical clamping ring.
- Fix the measuring arm onto the pivoting sleeve.
- Fix the second conical centring ring onto the pivoting sleeve.
- Insert the conical ring and pressure spring.
- Mount the pressure spring on the block with the clamping ring to prevent axial play.
- Lubricate all moving parts.

Order No.	H
33115-200	200
33115-276	276
33115-426	426
33115-536	536

Measuring fixtures





Material:
Steel.
Shaft bearing GJL 200

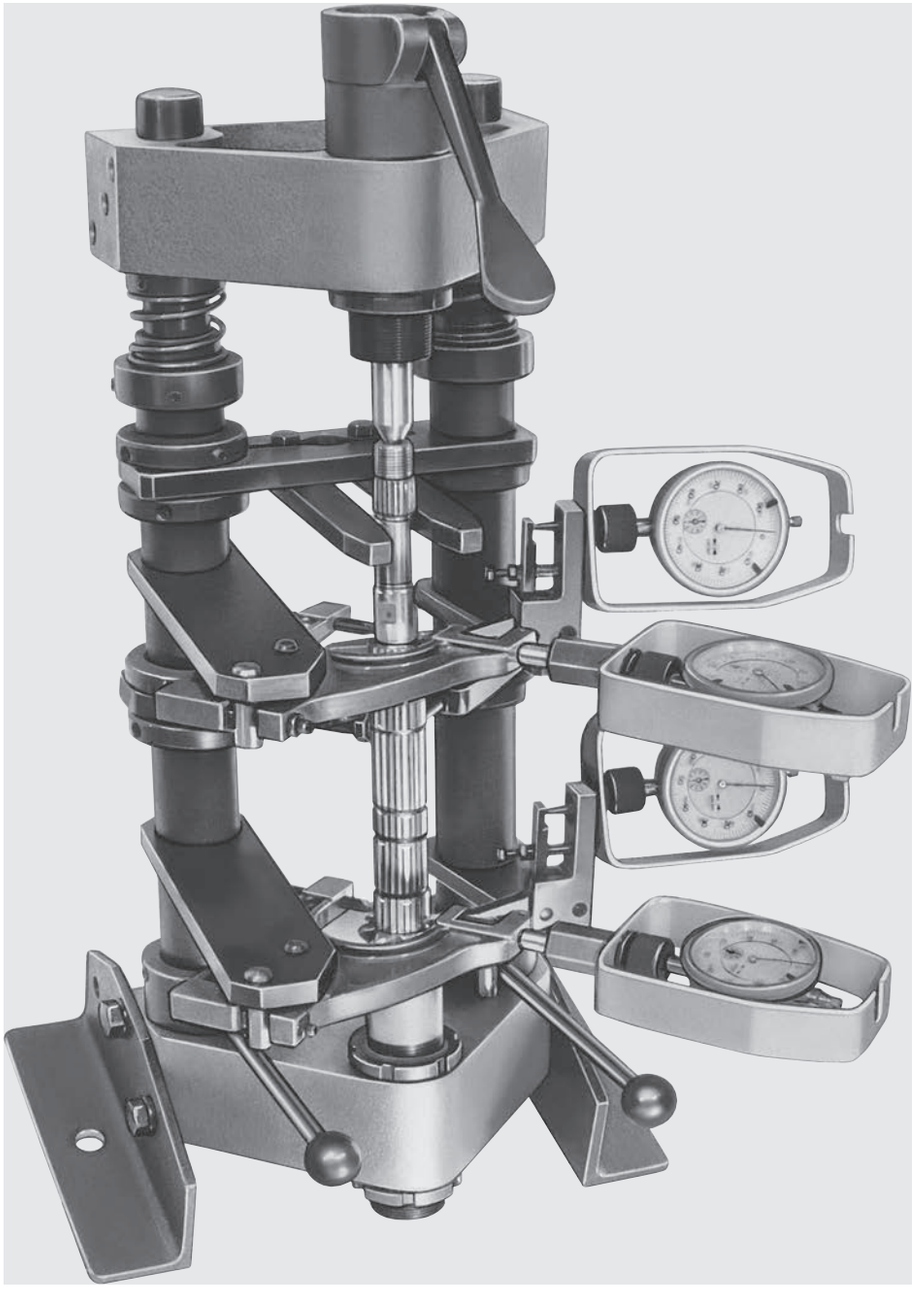
Version:
Steel parts black oxidised.
Shaft bearing painted.

Sample order:
nlm 33140-240444

Note:
See example of a measuring fixture.

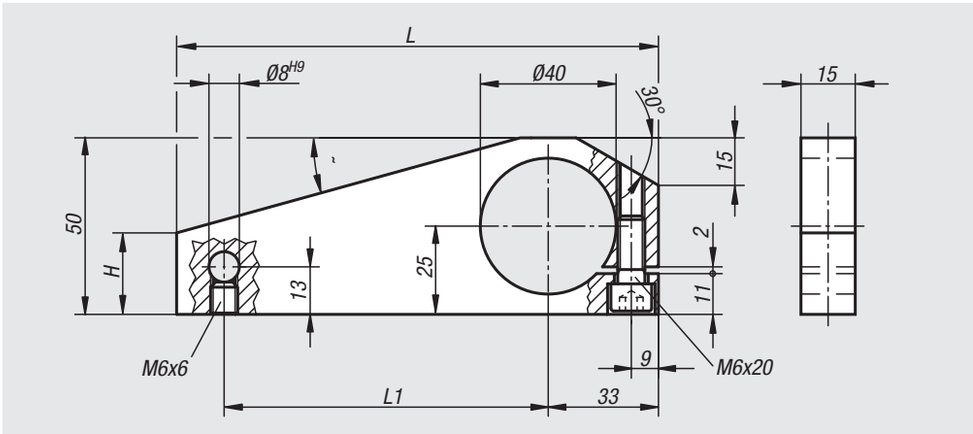
Order No.	L when L1 = 32 with fixed centre 33190-02096	L when L1 = 49 with fixed centre 33190-02113
33140-240444	274-444	240-410
33140-410524	444-524	410-490

Example of a measuring fixture



Measuring arms





Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33150-095

Note:
The measuring arms are suitable for pivoting columns 33110 and pivoting systems 33115.

Order No.	L	L1	H	α
33150-095	95	50	18	30°
33150-140	140	95	23	15°

Spring mounted centre sleeves

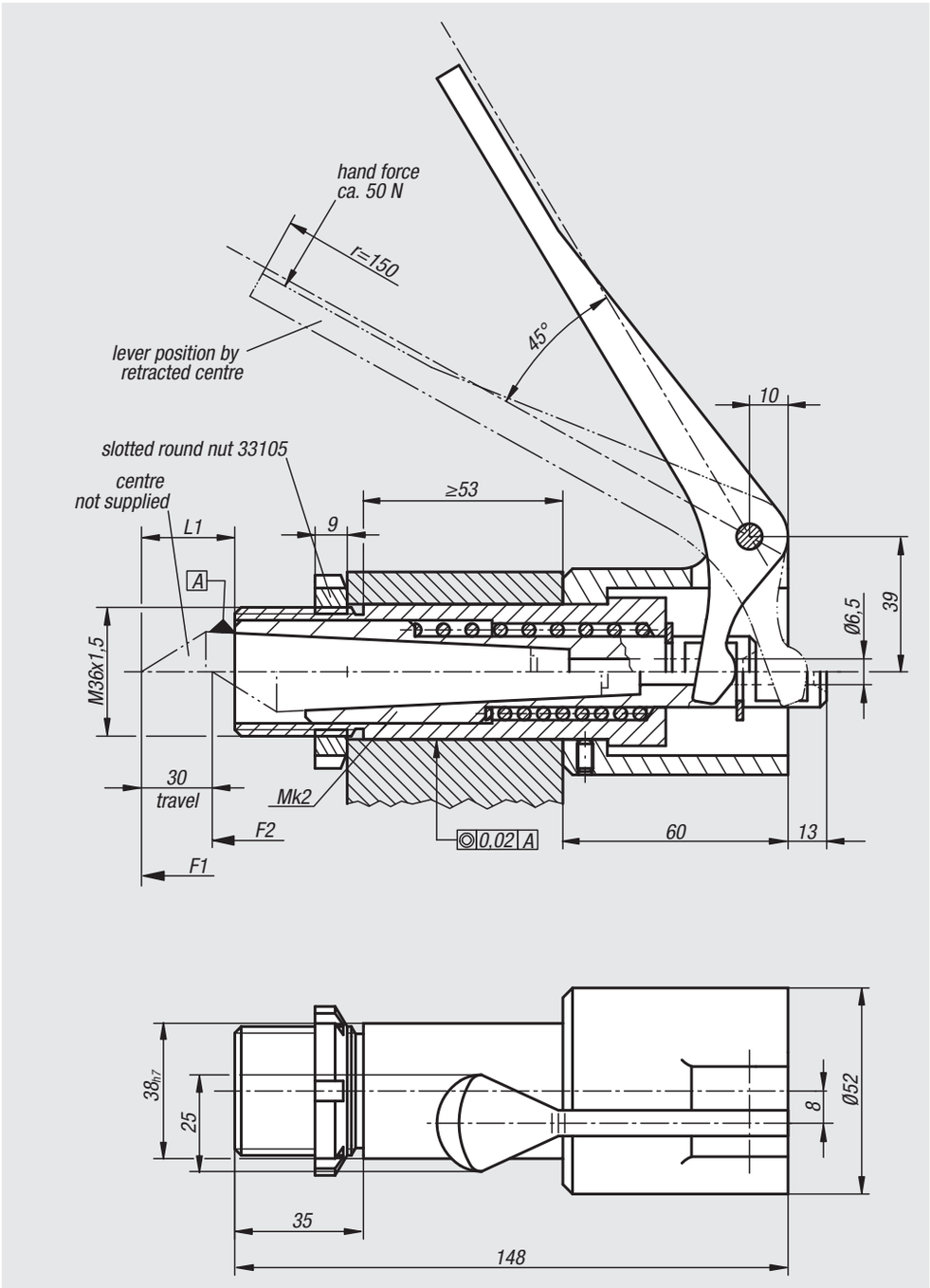
with tension lever



Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 33180-02

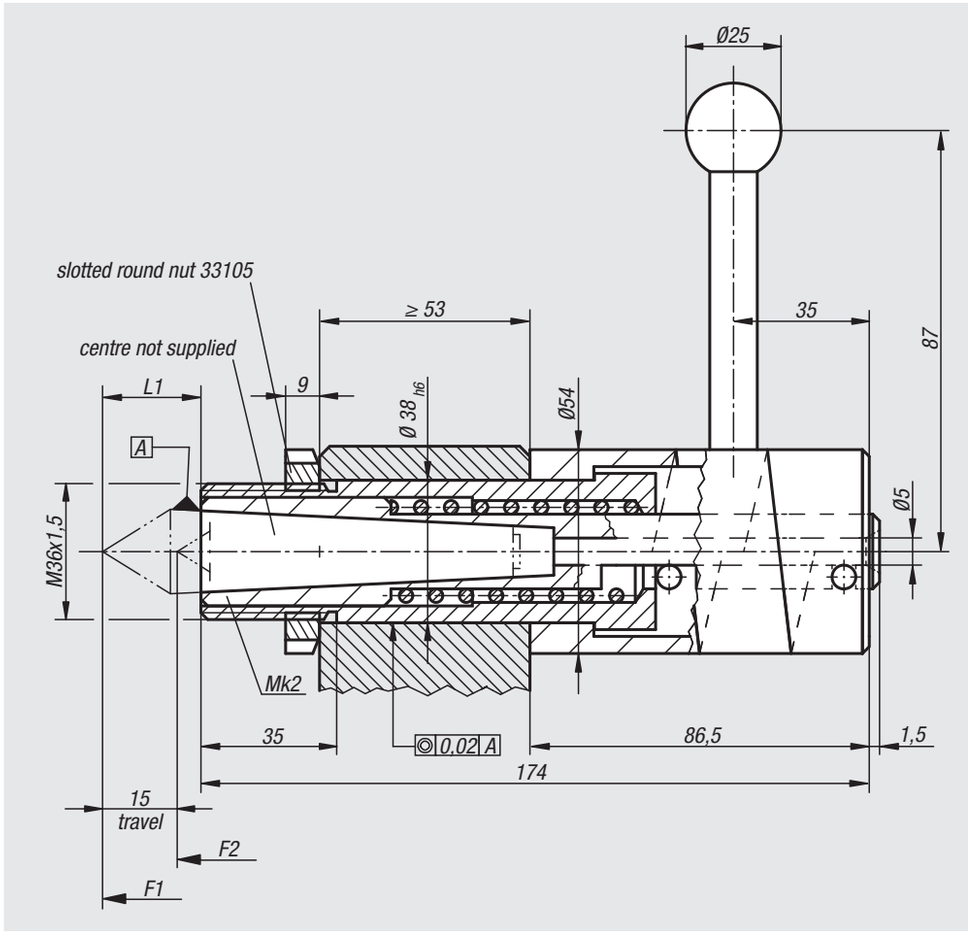


Order No.	L1	Matching fixed centre	Spring force initial pressure F1 approx. N	Final pressure F2 approx. N
33180-02	32	33190-02096	100	150
	41	33190-02105		
	49	33190-02113		

Centre sleeves

spring mounted with retraction cam





Material:
Steel.
Ball black thermoset PF 31.

Version:
Black oxidised.

Sample order:
nlm 33182-02

Note:
The max. travel of 15 mm is achieved by rotating the cam 180°.

Order No.	L1	Matching fixed centre	Spring force initial pressure F1 approx. N	Final pressure F2 approx. N
33182-02	32	33190-02096	100	137
	41	33190-02113		
	49	33190-02105		

33184

Adjustable holder

for fixed centres

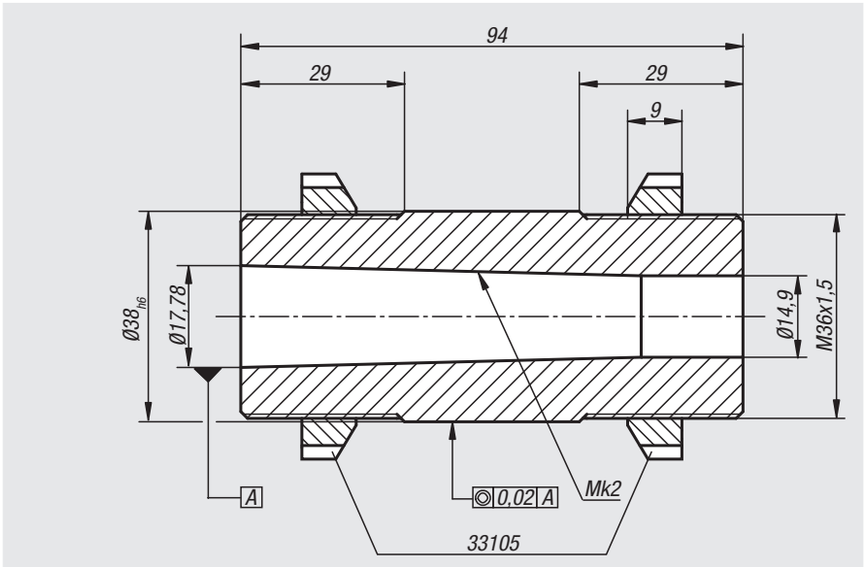


Material:
Body 1.7220

Version:
Black oxidised.

Sample order:
nlm 33184-02

Note:
Matching fixed centre 33190.



Order No.	Dimensions
33184-02	see drawing

33190

Fixed centres

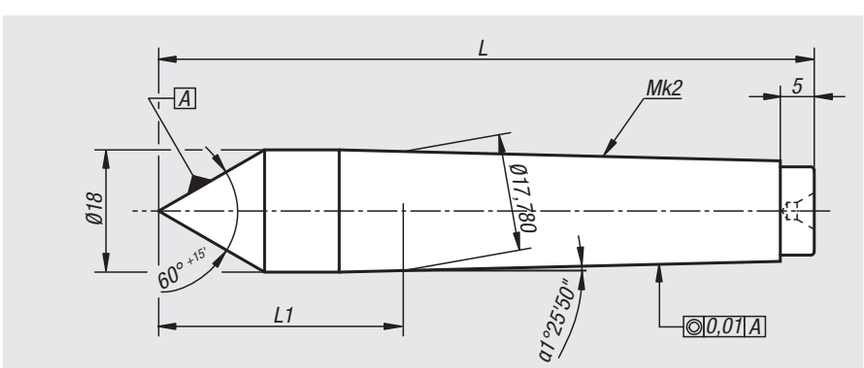


Material:
1.2067

Version:
Hardened and ground, bright.

Sample order:
nlm 33190-02105

Note:
These fixed centres fit in 33180, 33182 and 33184.



Order No.	L	L1
33190-02096	96	32
33190-02105	105	41
33190-02113	113	49

Notes

Measuring element

for gear wheels



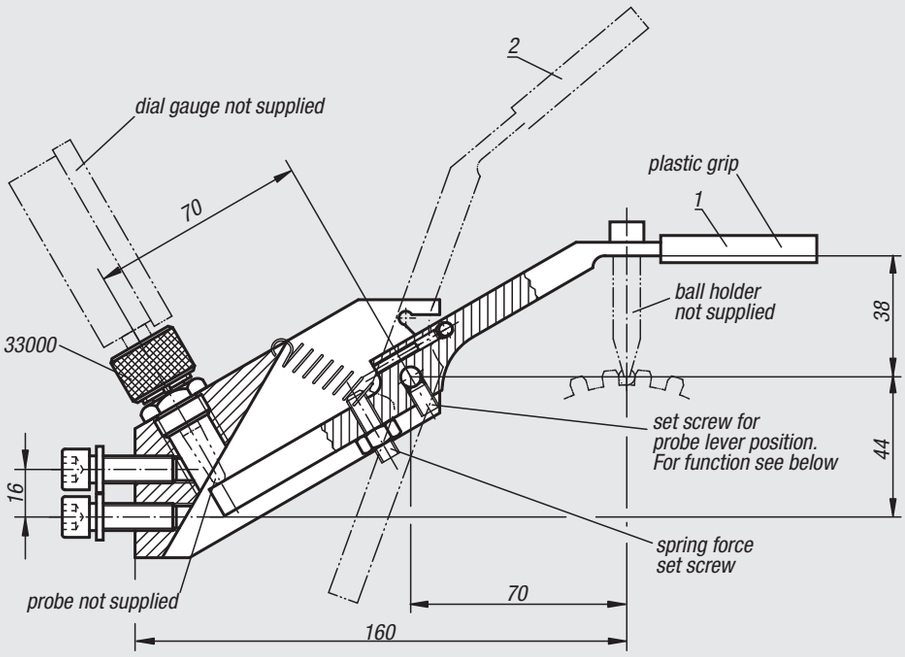
Material:
Steel.

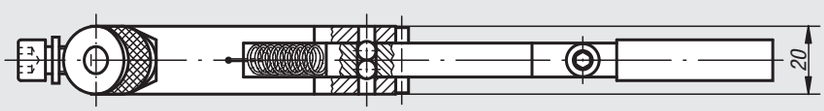
Version:
Black oxidised.

Sample order:
nlm 33202-070

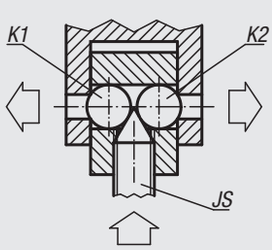
Note:
1 = Probe lever in test position
2 = Probe lever at rest, engaged

Suitable ball holder see 32205.
Dial gauges see 32540 and 32542.
Probe inserts see 33040 up to 33052.

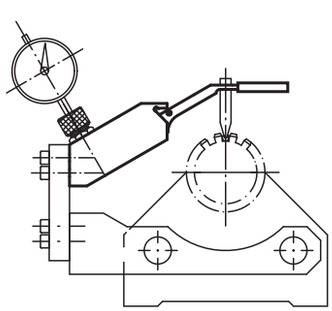




Setting the probe lever position



Screwing the set screw (JS) in forces the balls K1 and K2 apart and presses them against the walls enabling play-free adjustment.



Order No.	Dimensions
33202-070	see drawing

Ball holders

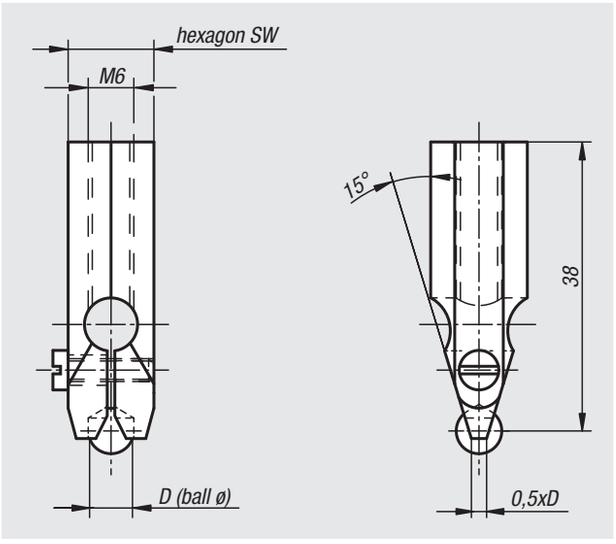


Material:
Spring steel

Version:
Black oxidised.

Sample order:
nlm 33205-03500

Note:
Carbide balls available on request.
The ball holders fit in the measuring element for gear wheels 33202.



Order No.	D	SW
33205-02000	2	10
33205-02380	2,38	10
33205-02500	2,5	10
33205-03000	3	10
33205-03500	3,5	10
33205-03960	3,96	10
33205-04000	4	10
33205-04500	4,5	10
33205-04760	4,76	10
33205-05000	5	10
33205-05560	5,56	10
33205-06000	6	10
33205-06500	6,5	13
33205-07000	7	13
33205-07540	7,54	13
33205-07938	7,938	13
33205-08500	8,5	13
33205-09520	9,52	13
33205-10000	10	13

Precision vice



Material:
Steel.

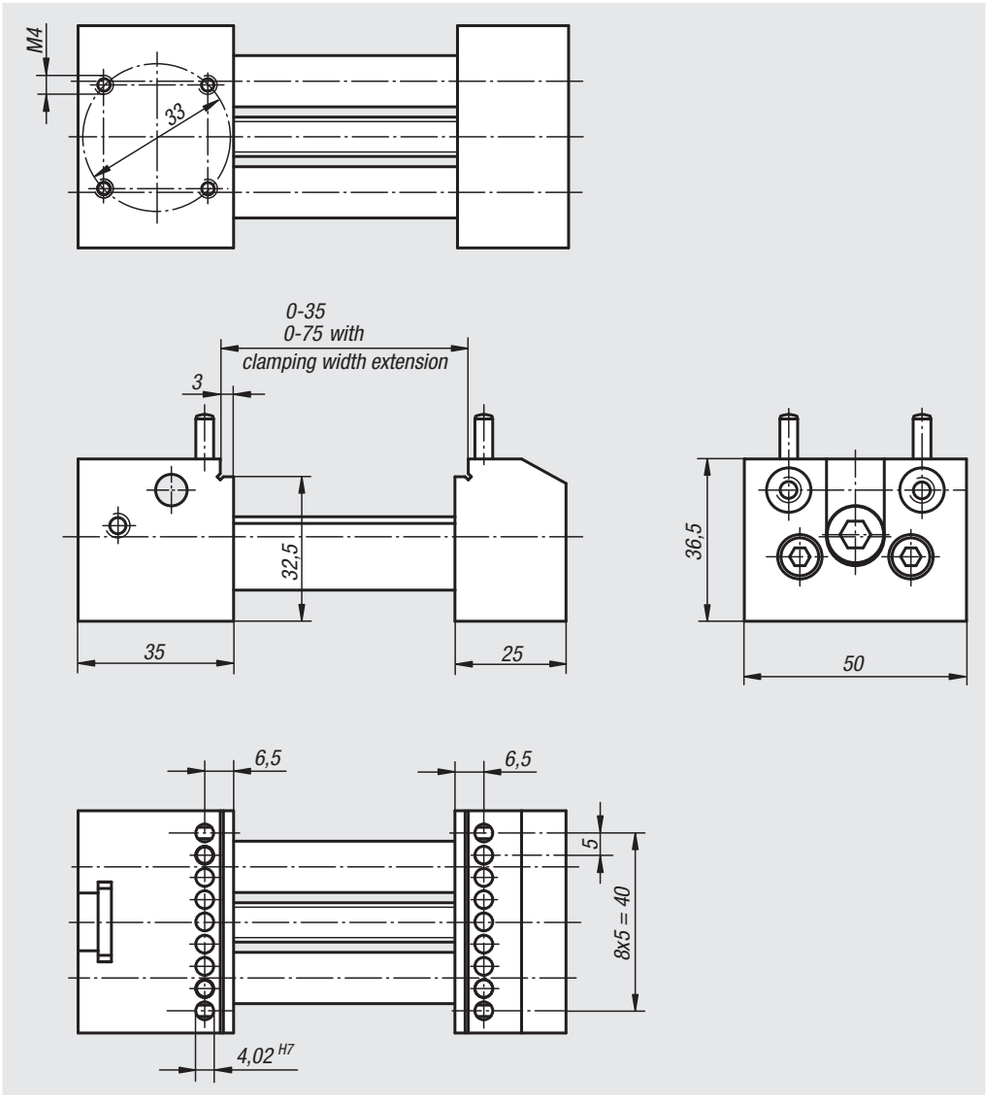
Version:
surface-hardened and precision-ground.

Sample order:
nlm 33225-500351

Note:
The precision vice is a flexible solution for positioning and securing workpieces quickly and easily for metrology machines. Parts are held in the offset jaws or pins that can be inserted into the jaws. The pins allow workpieces to be held in bores. The interchangeable guide columns allow the clamping width to be increased from 35 mm to up to 75 mm. The vice can be placed on the inspection table in 4 positions at right angles to each other.

The vice is supplied with an adjustable stop, a set of columns for extending the clamping width up to 75 mm, a spindle extension, 4 pins and operating tool.

On request:
Set of columns for extending the clamping width 100 mm or 150 mm.





Order No.	Dimensions
33225-500351	see drawing

Accessories for precision vice



33225-01
Offset cylindrical pins
for clamping tall parts



33225-03
Offset cylindrical pins
for clamping tall parts
with 120° vee block



33225-05
Jaws for small parts



33225-06
Prism jaws



33225-07
Prism jaws
with two-point contact

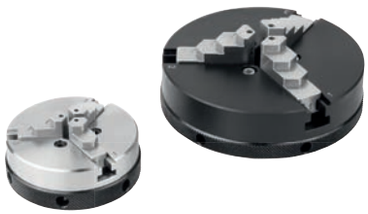


33225-08
Prism jaws
with three-point contact

Order No.	Item	Material	Clamp range	Supplied with
33225-01	**Dowel pin**	steel	-	4-piece set
33225-03	**Dowel pin**	steel	-	4-piece set
33225-05	**Jaw**	stainless steel	<3	single with fastening screws
33225-06	**Prism jaw**	stainless steel	Ø2-Ø10	1 pair with fastening screws
33225-07	**Prism jaw**	aluminium	Ø5-Ø20	1 pair with fastening screws
33225-08	**Prism jaw**	aluminium	≤ Ø30	1 pair with fastening screws

Precision three-jaw chuck

maunual operation



Material:
Body and jaws steel.
Bodies over Ø100 aluminium, jaws steel.

Version:
Steel bodies bright, jaws hardened and bright.
Aluminium bodies hard anodised.

Sample order:
nlm 33226-50

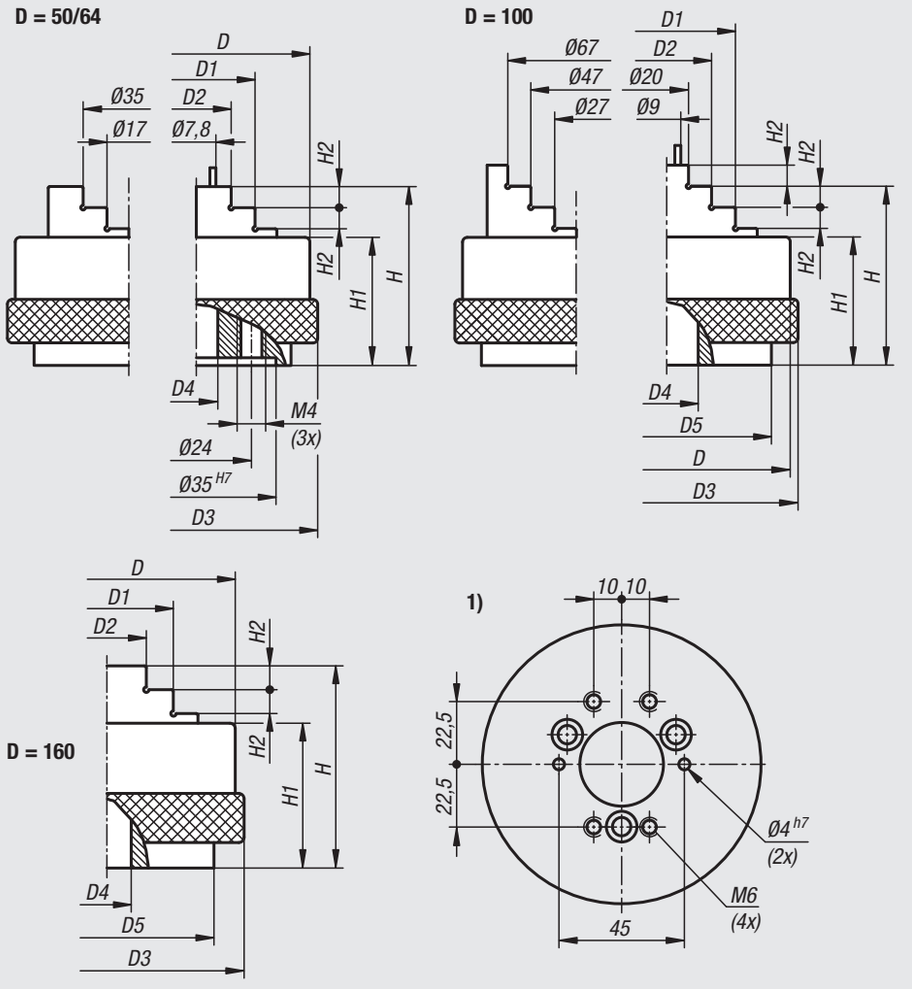
Note:
These chucks have been specifically designed to meet requirements for a low clamping force with high precision. For internal and external holding of cylindrical workpieces. The jaws are moved in and out by simply rotating the clamping ring by hand or using the supplied lever. The hardened internal jaws, supplied as standard are reversible. The jaw number is marked on the top and bottom face of each jaw. The jaw number is marked on the matching slot of the chuck body.

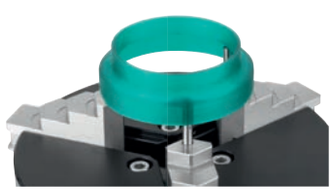
Chuck D=50 with operating tool and Ø2 mm pins, 3x12 mm and 3x18 mm long.
Chuck D=64 with operating tool and Ø2 mm pins, 3x12 mm and 3x18 mm long.
Chuck D=104 with operating tool and Ø2 mm pins, 3x12 mm, 3x18 mm and 3x24 mm long.
Chuck D=160 with operating tool.

The pins can be inserted into the hole in the front face of each jaw and are used for raised holding of light parts. The pins can be removed again.

Concentricity < 0.03 mm
Circular runout < 0.01 mm
Repeat clamping accuracy < 0.01 mm

Drawing reference:
1) Connection dimensions for 100 and 160 mm chucks.







Order No.	Main material	D	D1	D2	D3	D4	D5	H	H1	H2
33226-50	steel	50	34,8	16,8	52,5	11	-	37,5	28	4
33226-64	steel	64	34,8	16,8	66	13	-	37,5	28	4
33226-100	aluminium	104	59,8	39,8	105,5	18	89	48	33	4,5
33226-160	aluminium	160	80	37	164	34	96	78,5	53	10

Needle support

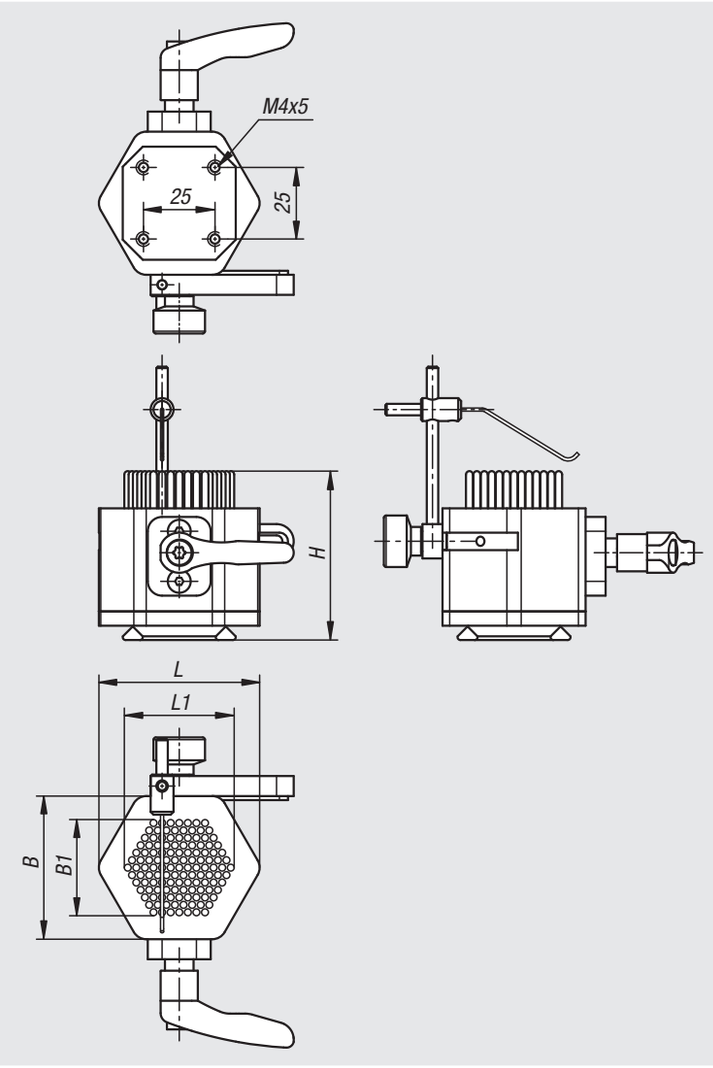


Material:
Steel.

Sample order:
nlm 33227-253834

Note:
Ideal for holding die-cast and injection moulded parts. The spring-loaded needles adapt to the shape of a workpiece when it is pushed in. The needles are then locked in this position. A series of workpieces can now be positioned and fixated in the pre-formed fixture.

Supplied are: needle support fixture and holding unit comprising of arm, column and spring finger.





Order No.	B	B1	H	L	L1	Pin Ø	Spring travel max.
33227-253834	50	34	55	56	38	2,5	10
33227-505548	72	48	80	81	55	5	12
33227-509583	110	83	90	125	95	5	12

Clamping component set



Sample order:
nlm 33250-12

Note:
Clamping component set for microscopes and optical measurement devices to quickly and flexibly clamp small parts. A wide variety of workpieces such as plastic, punched or turned parts can be precisely positioned and securely held. Holding parts, a frequent problem in measuring, is largely solved.

The basis of the clamping system is a high-quality clamping joint that is fixed to the measuring table. A quick-change interface allows elements such as chucks or clamps to be easily mounted on the clamping joint.

Supplied in a wooden case.

Application:
– chuck and V-block for holding rotationally symmetric parts
– stop angle, clamping clip and small parts clamps for clamping e.g. plate or sheet metal and bent parts.



12 piece

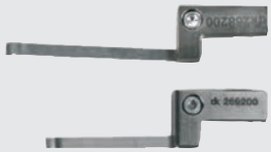
small parts clamp



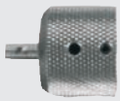
clamping clip



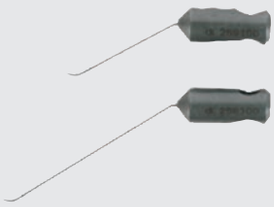
spring clamp for horizontal clamping right/left



rotational unit 90° pitch



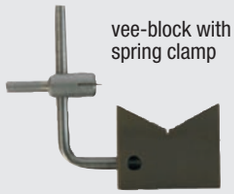
spring clamp 34/50 mm



clamping joint



vee-block with spring clamp



universal hex socket key

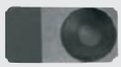


column

stop angle

18-part (in addition to the 12-part)

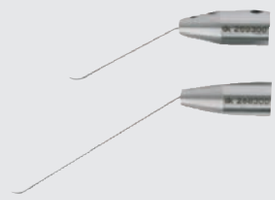
clamping joint holder, vertical



small parts clamp "screw clamping"



spring clamp 34/50 for vertical clamping



column



precision chuck



Clamping joint with precision small chuck



Clamping joint with small parts clamp



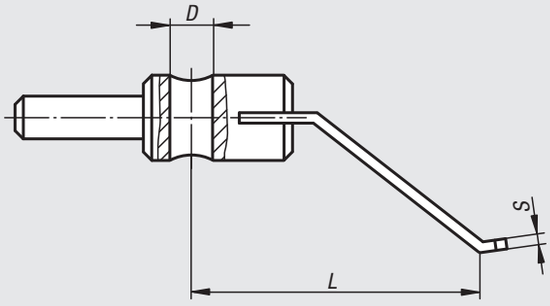
Clamping joint with vee-block and spring clamp



Order No.	Version
33250-12	12 piece
33250-18	18 piece

Spring fingers

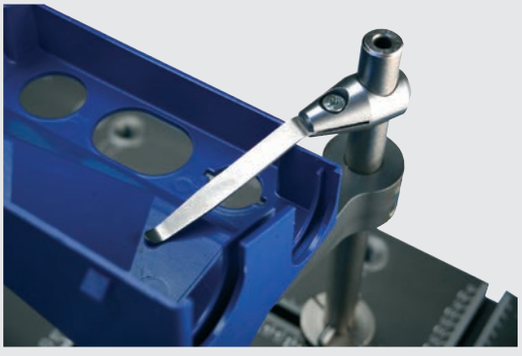




Spring finger, flat

Spring finger with fork

Spring finger, round wire



Material:
Stainless steel

Version:
Bright.

Sample order:
nlm 33260-10605010

Note:
For holding small parts on measurement and control plates.

Accessories:
Columns for spring fingers 33262.

Order No.	Version	D	L	S
33260-10403004	flat	4	30	0,4
33260-10403008	flat	4	30	0,8
33260-10605010	flat	6	50	1
33260-10607510	flat	6	75	1
33260-11207510	flat	12	75	1
33260-11209510	flat	12	95	1
33260-21207515	fork	12	75	1,5
33260-21209515	fork	12	95	1,5
33260-30404011	round	4	40	1,1
33260-30406011	round	4	60	1,1
33260-31208025	round	12	80	2,5
33260-31208030	round	12	80	3

Columns

for spring fingers



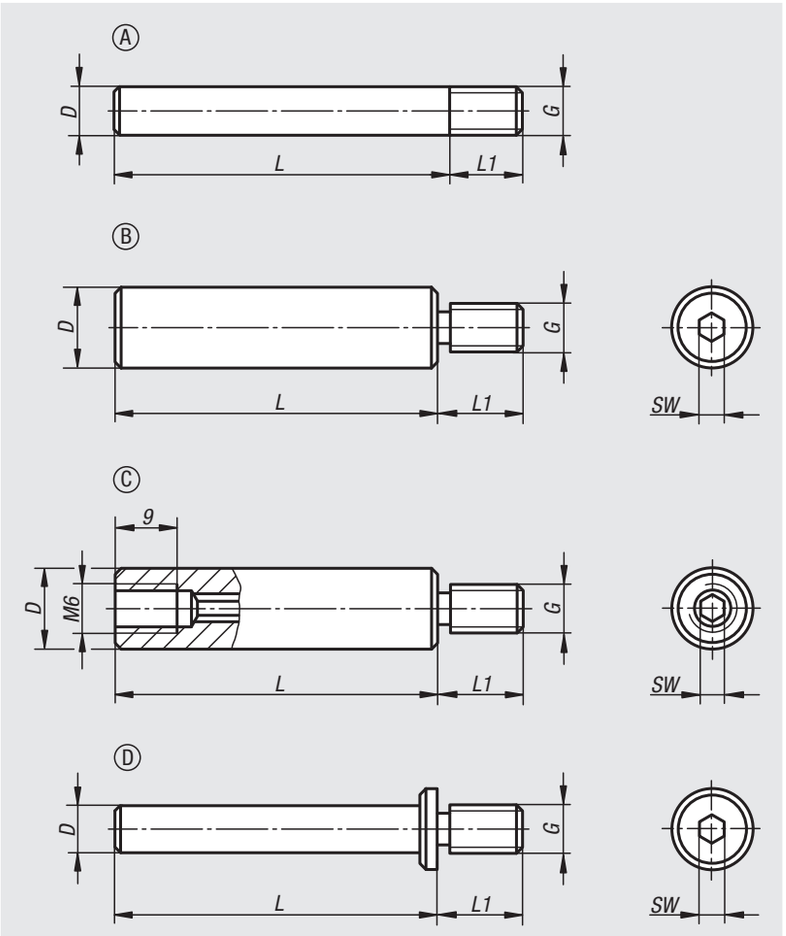
Material:
Stainless steel 1.4301.

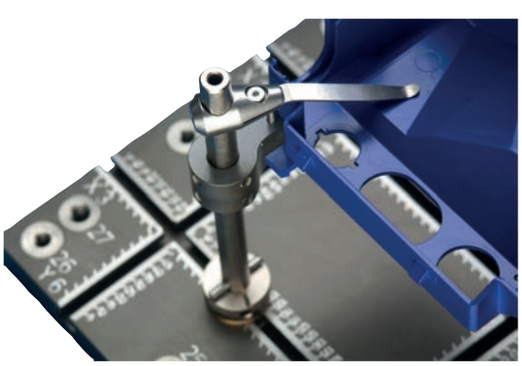
Version:
Bright.

Sample order:
nlm 33262-0606X030 (include length L)

Note:
Columns for holding our spring fingers.

Accessories:
Spring clamp 33260.

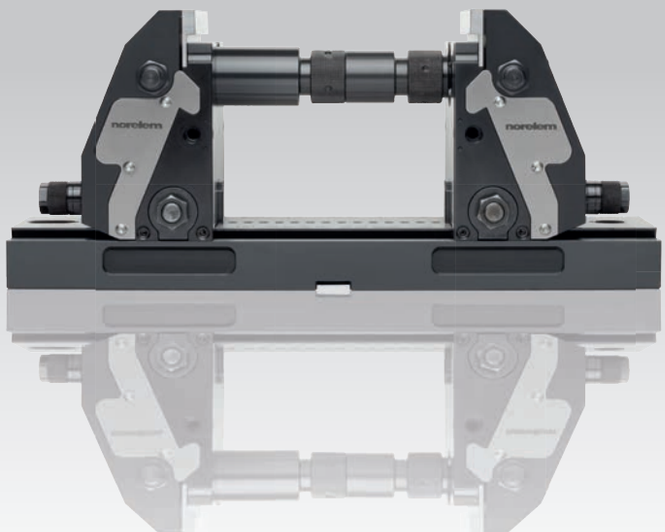




Order No.	Form	D	G	L	L1	SW
33262-0404X	A	4	M4	30/50	5	-
33262-0606X	A	6	M6	30/50	8	-
33262-0608X	D	6	M8	30/50	10	3
33262-1206X	C	12	M6	50/100	8	3
33262-1208X	B	12	M8	50/100	11,5	4
33262-1210X	B	12	M10	50/100/150	11,5	4

41000

Vices



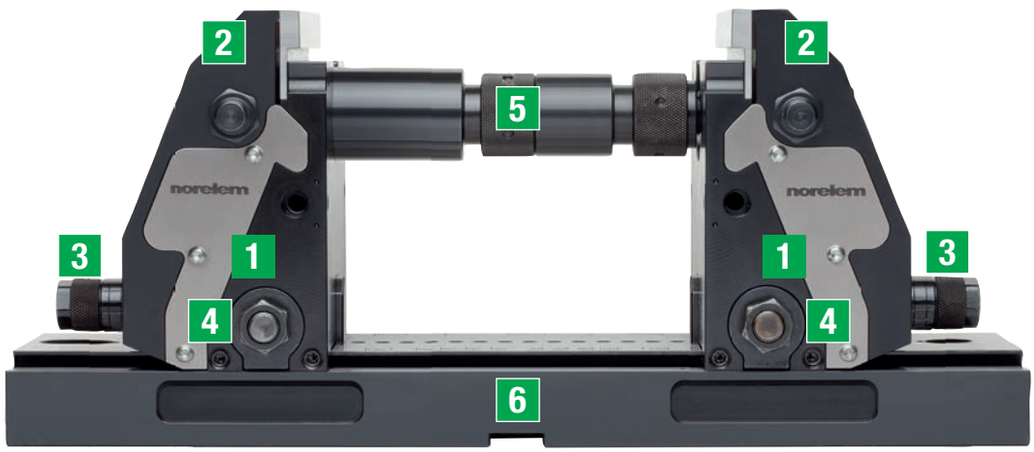


5-axis clamping system compact

Function

We are setting standards with the new „5-axis clamping system compact“ in this field. The system was specifically designed for the optimal machining of complex workpieces on modern 5-axis machines.

The intelligent clamping technology increases clamping rigidity for the highest cutting and feed forces. The optimal accessibility to the workpiece allows short, standard tooling to be used. Tooling costs are significantly reduced.



1 Positioning unit with jaw plate
2 Clamping element
3 Fine adjustment with knurled screw
4 Clamping screw
5 Extension shafts
6 Base plate

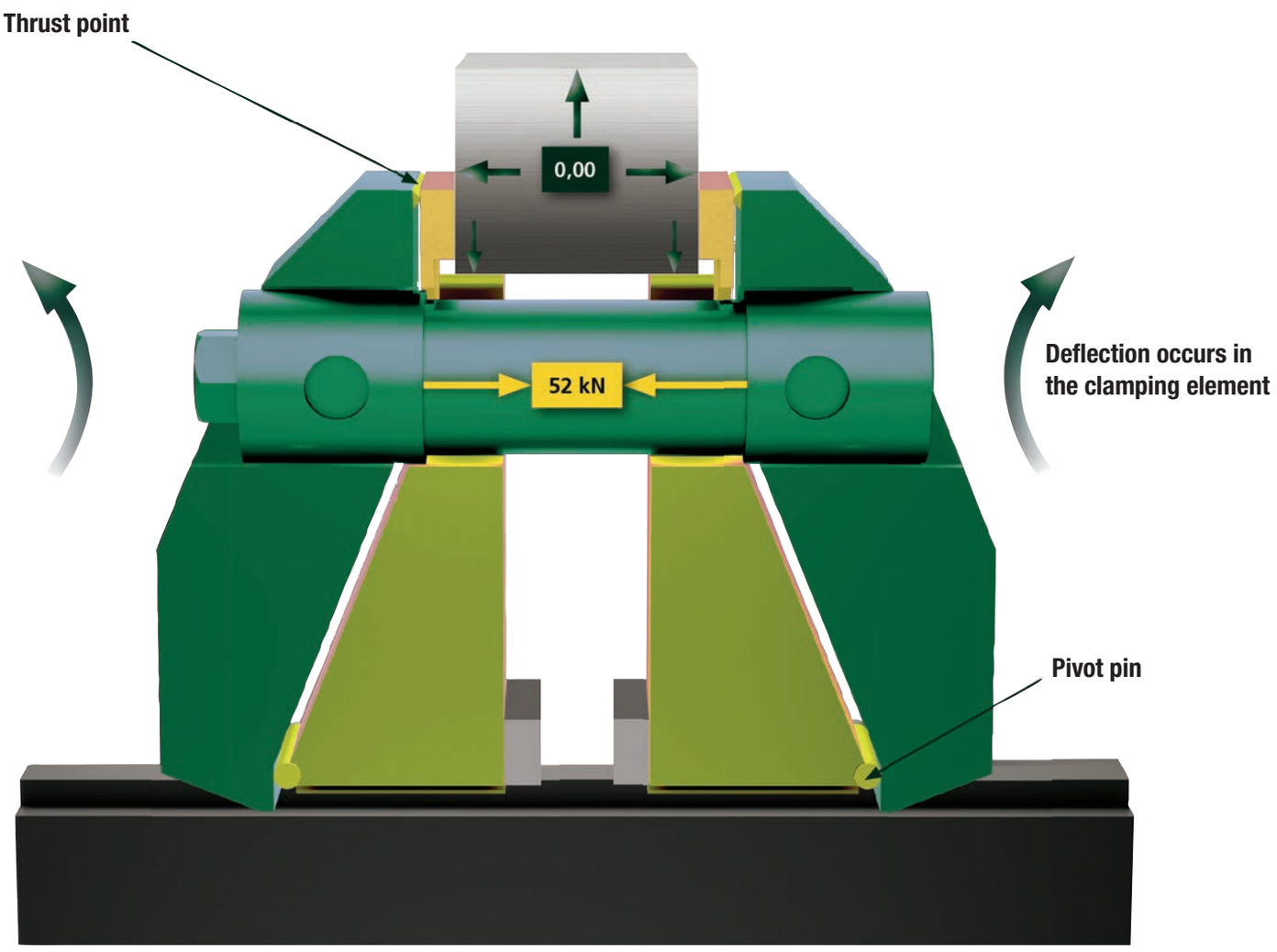
ADVANTAGES:

- Very high tractive force
- High stiffness in the system
- Pull-down function of the jaw plates on both sides
- Optimum fine adjustment of the jaw plates on the workpiece
- Increased tool service life
- The workpiece is always centred due to the systematic construction
- Large clamping width, 20 mm to 320 mm, freely extendable
- Clamping depth adjustable from 3 to 20 mm using seating ledges
- Best tool accessibility from all sides
- Easy to clean

Forces

The new clamping technology ensures force flow separation and workpiece positioning. The intelligent force distribution in the system allows only weak forces to be transferred to the machine table.

- **Division of force flow and positioning**
- **Highest clamping force on the workpiece**
- **Maximum stiffness**
- **Centric tension**

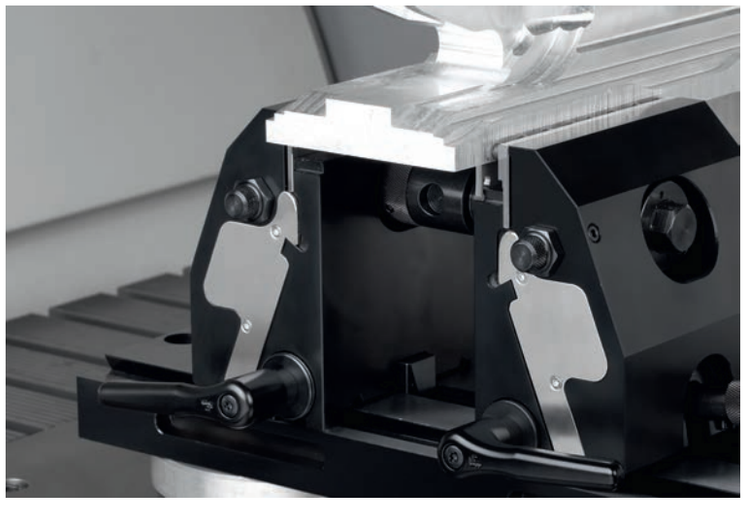


Locators

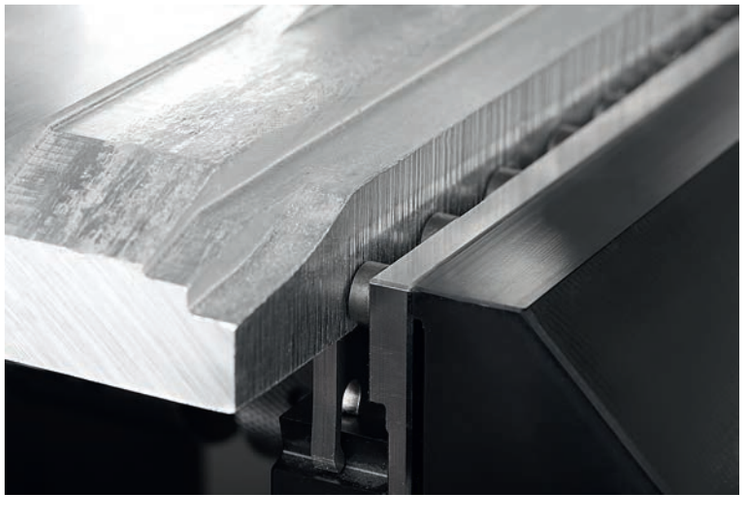
Clamping elements

Applications

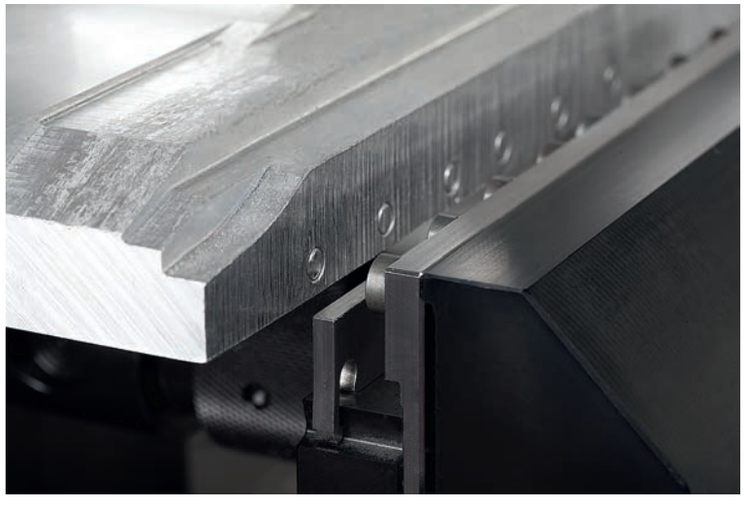
Clamped workpiece using jaw plates with pins. The high tractive force creates a positive clamping situation.



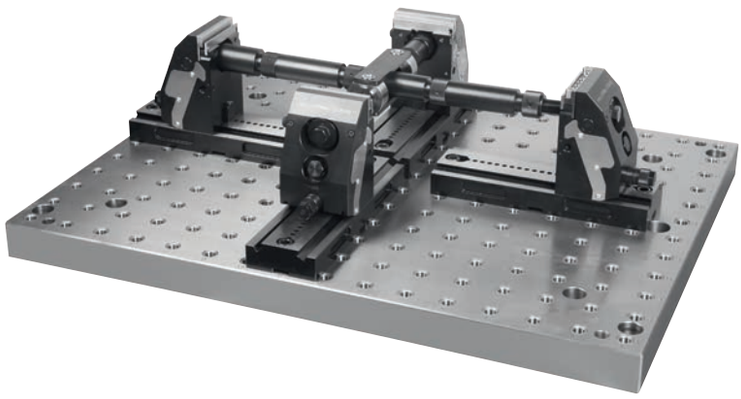
Clamped blank. Sure set-up through positive clamping pins.



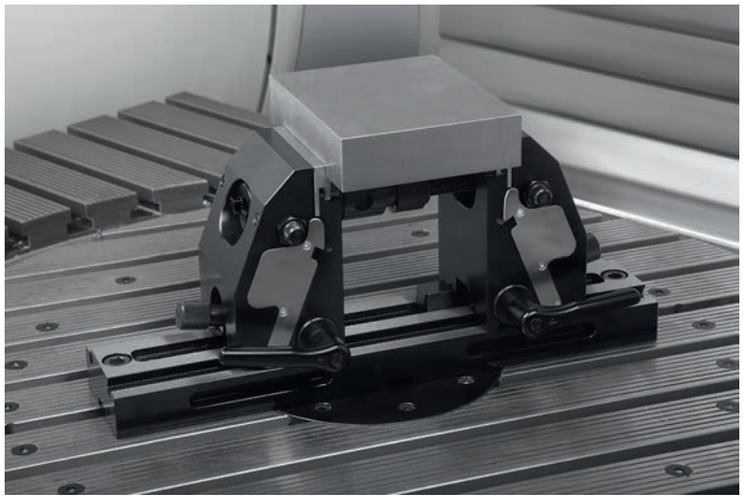
Blank after clamping. Clamping pin imprint is visible on the edge of the workpiece.



With the coupling for cross-clamping, two 5-axis clamping systems can be compactly connected with each other offset by 90 degrees. Setups for workpieces with different dimensions of 4 sides are possible.



5-axis clamping system compact direct on the machine table.
Workpiece clamping with smooth jaws.

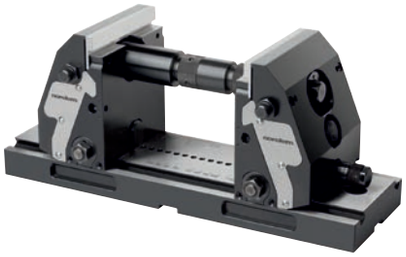


The jaws can be quickly tightened or loosened using the adjustable handles.
When the clamping lever is open, the jaws can be fine adjusted with the knurled knob.



5-axis clamping system compact

jaw plate, smooth



Material:
Base plate and jaw hardened steel.
Vice jaws tool steel.

Version:
Jaws black oxidised.
Jaw plates bright.

Sample order:
nlm 41300-124000901500

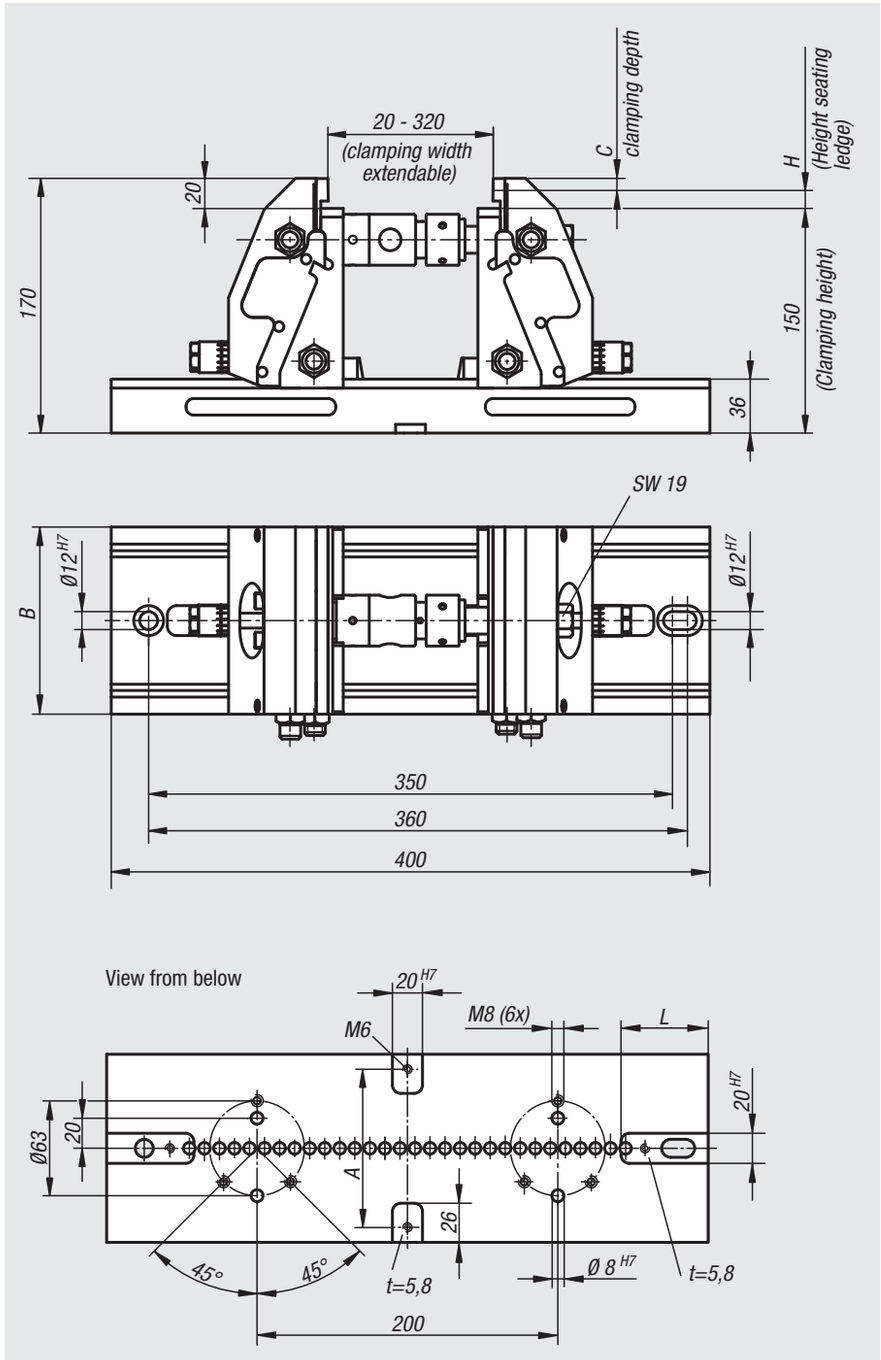
Note:
The easy operability and rapid adjustment using a scale means that the clamping jaws can be quickly and surely adapted to new workpieces
The workpiece is always centred through the systematic construction of the 5-axis compact clamping system. The optimal accessibility to the workpiece allows short, standard tooling to be used. Tooling costs are significantly reduced.

Positive down force by a clamping depth of >5 mm.
Clamping widths of 20 mm to 320 mm are possible.

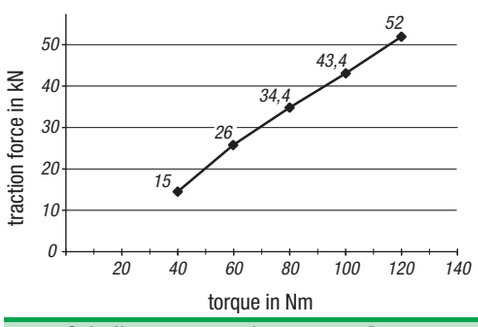
Assembly:
The 5-axis clamping system compact can be mounted on T-slot tables, grid systems or, using an adapter flange on conventional zero-point clamping systems.

Accessories:
Seating ledge 41345
Jaw plates 41320
Pendulum jaws 41325
Centre jaws 41335
Coupling for cross-clamping 41365

Order the seating ledges and jaw plates with pins separately.



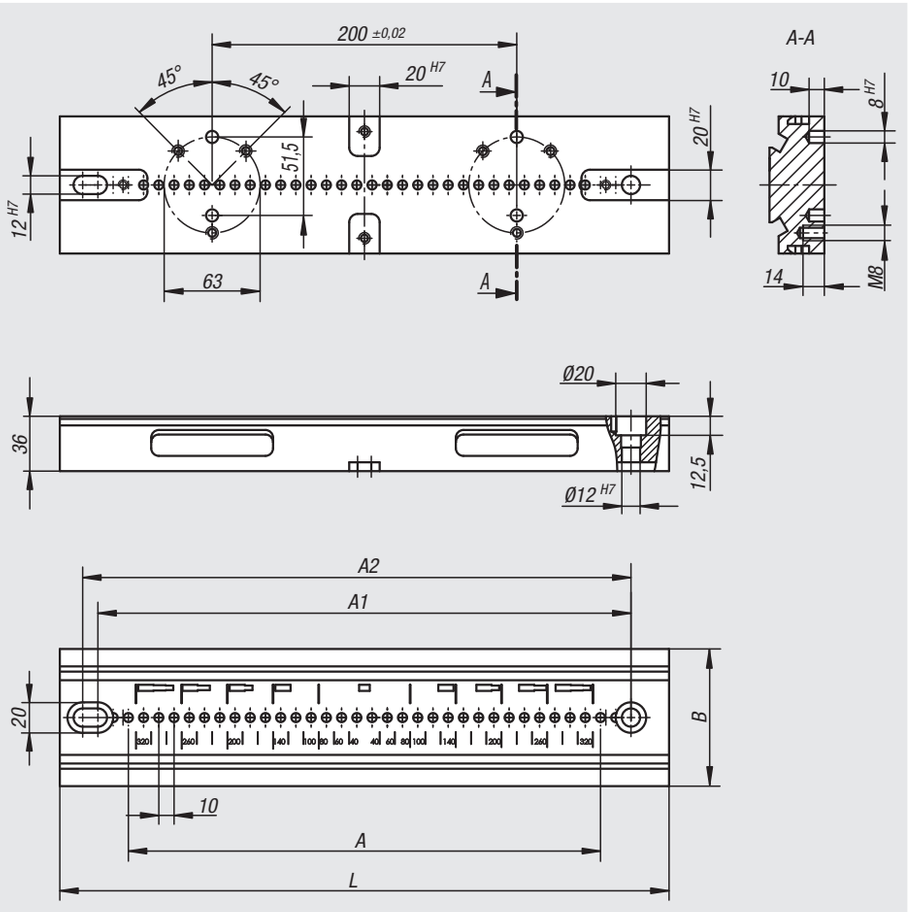
Tractive force 5-axis clamping system compact



Order No.	A	B	C	H	L	Tractive force max. kN	Suitable shoulder screw	weight kg
41300-124000901500	70	90	8/3	12/17	57,5	52	07533-12055	22,272
41300-124001251500	105	125	8/3	12/17	58	52	07533-12055	31

Base plates





Material:
Steel.

Version:
Black oxidised.
Function faces ground.

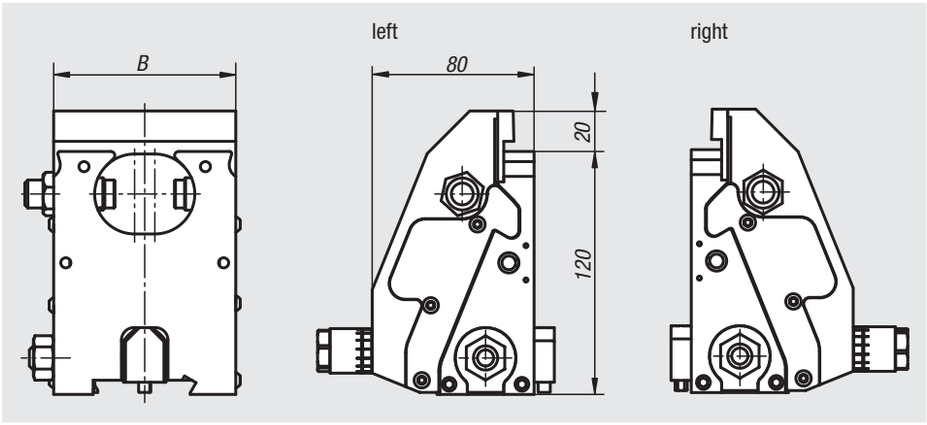
Sample order:
nlm 41305-090280

Note:
Base plates with locating slots on the underside for easy alignment of the plate on the machine table.
Securing via grid holes 12F7 for 40 mm and 50 mm grid spacing possible.
Lateral recesses provided for separate clamping means.

Order No.	A	A1	A2	B	L	Suitable shoulder screw	weight kg
41305-090280	20x10	240	250	90	280	07533-12055	6,14
41305-125280	20x10	240	250	125	280	07533-12055	8,86
41305-090400	31x10	350	360	90	400	07533-12055	8,58
41305-125400	31x10	350	360	125	400	07533-12055	12,24

Vice jaws complete





Material:
Jaws mild steel.
Jaw plates tool steel.

Version:
Jaws black oxidised.
Vice jaws bright.

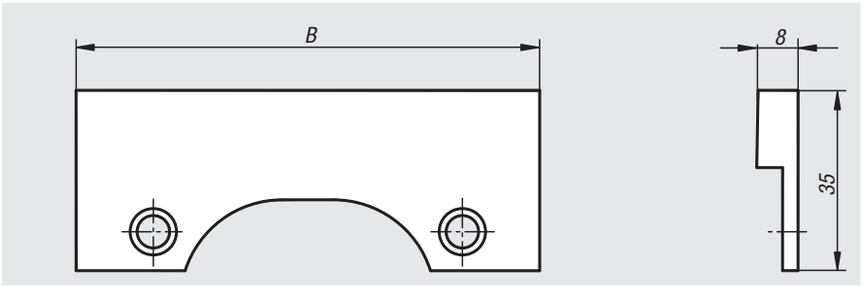
Sample order:
nlm 41315-09015010

Note:
These vice jaws are for expanding the 5-axis clamping system compact.
With these vice jaws large workpieces can be held on all four sides by cross clamping. Base plates, extension shafts and the coupling for cross-clamping are also needed for this set up.

Order No.	Version	B	weight kg
41315-12515020	left	125	7,416
41315-12515010	right	125	7,416
41315-09015020	left	90	5,18
41315-09015010	right	90	5,18

Jaw plates smooth





Material:
Tool steel.

Version:
Hardened, bright.

Sample order:
nlm 41320-0900

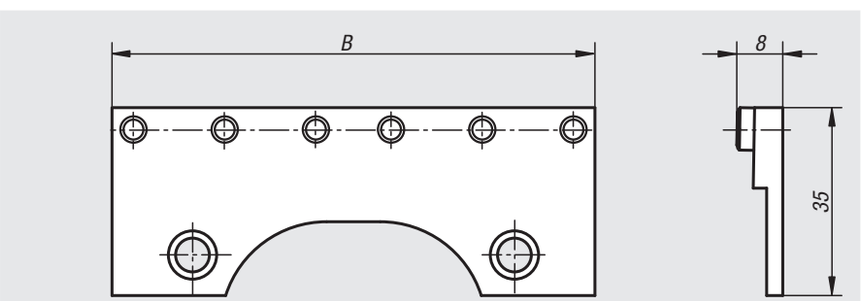
Note:
For clamping pre-machined workpieces and for final machining.

Supplied singly.

Order No.	B
41320-0900	90
41320-1250	125

Jaw plates with pins





Material:
Tool steel.

Version:
Plate hardened, bright.
Pins hardened, black oxidised.

Sample order:
nlm 41320-0901

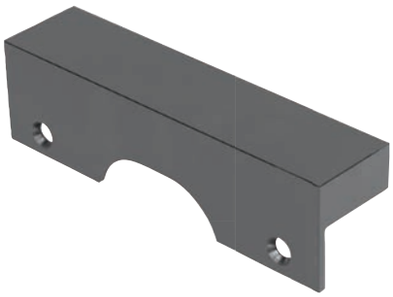
Note:
For positive clamping without preforming, e.g. rough pieces, heavy cutting, castings etc.

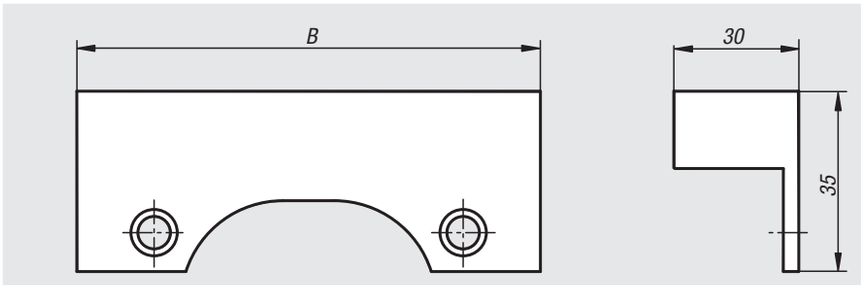
Supplied singly.

Order No.	B	No. of pins
41320-0901	90	6
41320-1251	125	8

Jaw plates

machinable





Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 41320-0902

Note for ordering:
Supplied singly.

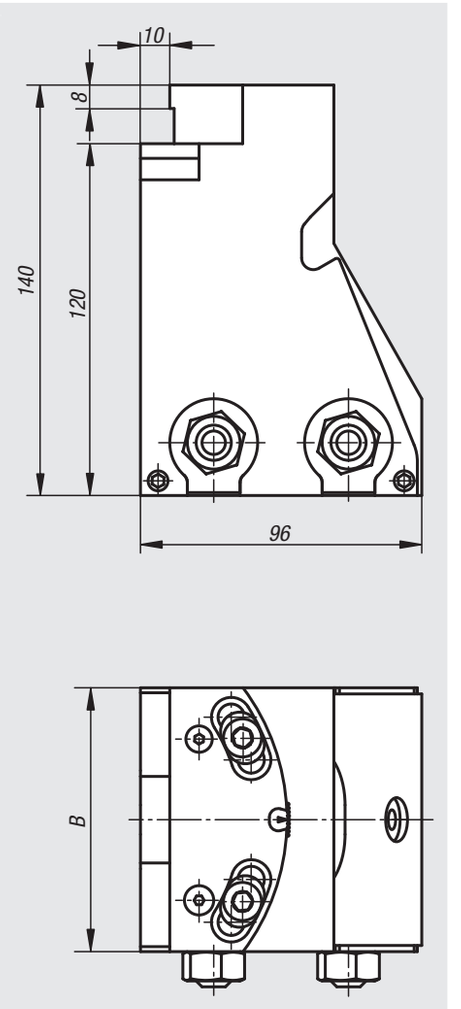
Note:
Machinable jaw plates are ideal for gripping on workpiece contours and machining in steps.

Order No.	B
41320-0902	90
41320-1252	125

Notes

Pendulum jaws



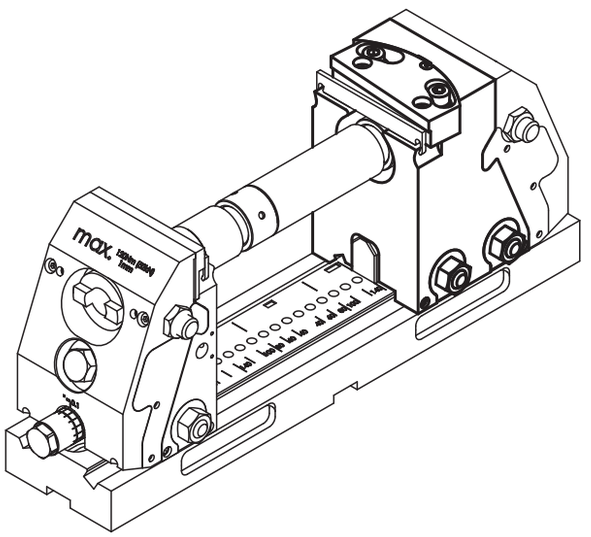


Material:
Body mild steel.
Jaw plates tool steel.

Version:
Body black oxidised.
Vice jaws hardened, bright.

Sample order:
nlm 41325-09015010

Note:
Pendulum jaws are used to hold oblique workpieces.
The jaw plates of the pendulum jaws can be swivelled by ± 4°.
Pendulum jaws can also be used as fixed jaws.
Rigid design with 2 fastening screws.

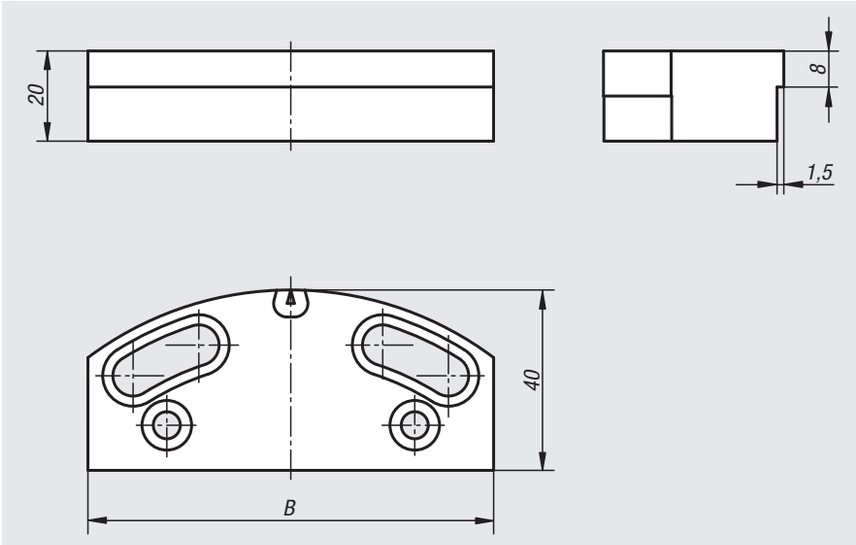


Order No.	B	weight kg
41325-09015010	90	6
41325-12515010	125	8,77

Jaw plates smooth

for pendulum jaws





Material:
Tool steel.

Version:
Hardened, bright.

Sample order:
nlm 41330-0900

Note:
For clamping pre-machined and ground workpieces.

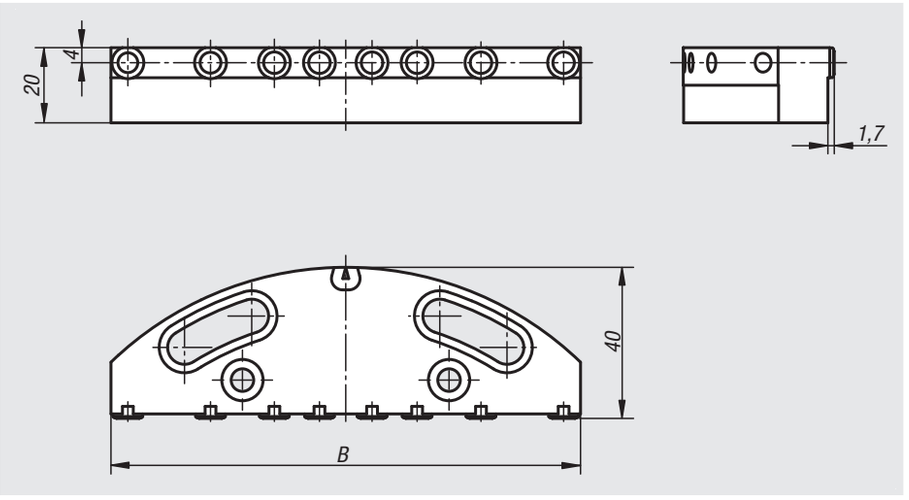
Supplied singly.

Order No.	B
41330-0900	90
41330-1250	125

Jaw plates with pins

for pendulum jaws





Material:
Tool steel.

Version:
Vice jaw hardened, bright.
Pins hardened, black oxidised.

Note for ordering:
41330-0901

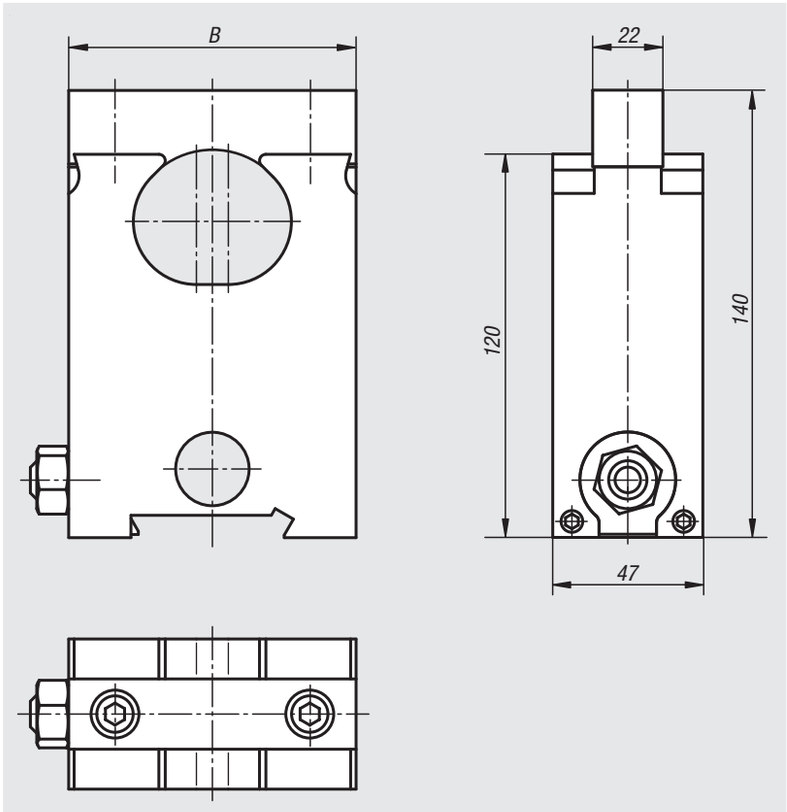
Note:
For positive clamping without preforming, e.g. rough pieces, heavy cutting, castings etc.

Supplied singly.

Order No.	B	No. of pins
41330-0901	90	6
41330-1251	125	8

Centre jaws



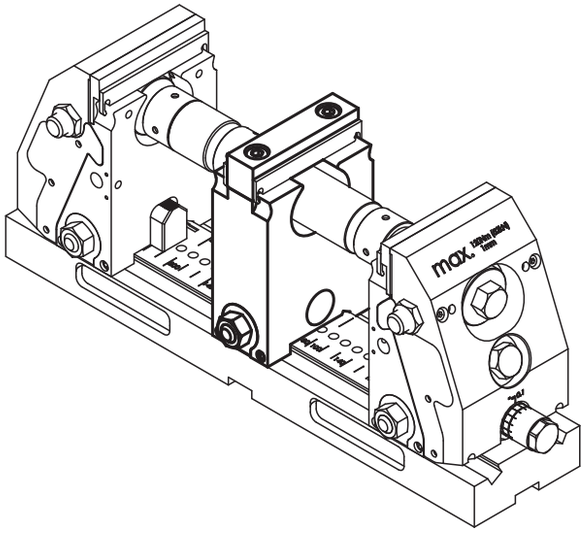


Material:
Body mild steel.
Jaw plates tool steel.

Version:
Body black oxidised.
Vice jaws hardened, bright.

Sample order:
nlm 41335-0901500

Note:
Centre jaws are used to clamp 2 workpieces simultaneously.
The centre jaws can be moved to suit the size of the workpiece. 2 different sized workpiece can be clamped.

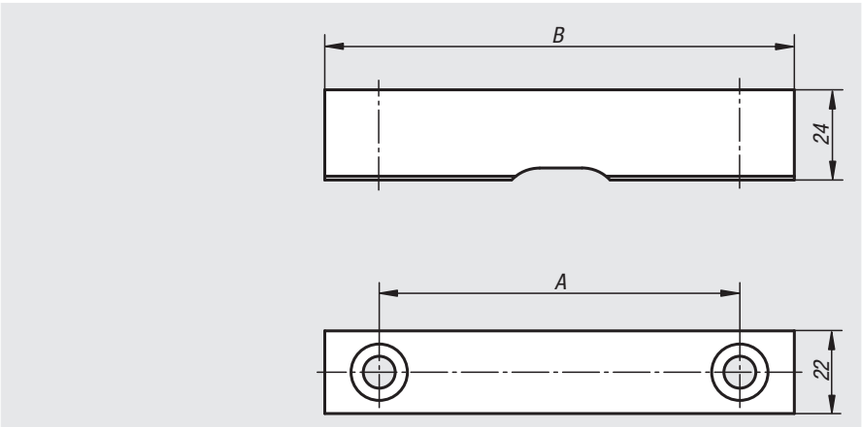


Order No.	B	weight kg
41335-0901500	90	3,38
41335-1251500	125	5,1

Jaw plates smooth

for centre jaws





Material:
Tool steel.

Version:
Hardened, bright.

Sample order:
nlm 41340-0900

Note:
For clamping pre-machined and ground workpieces.

Supplied singly.

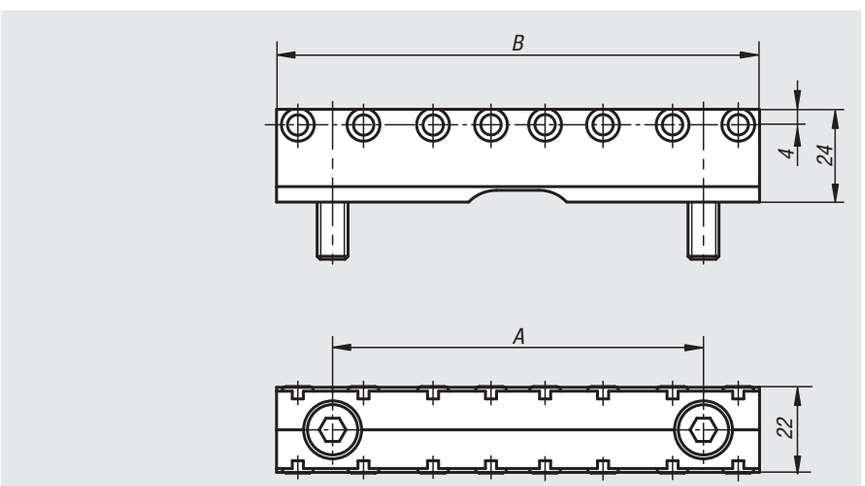
Order No.	A	B
41340-0900	61	90
41340-1250	96	125

41340

Jaw plates with pins

for centre jaws





Material:
Tool steel.

Version:
Vice jaw hardened, bright.
Pins hardened, black oxidised.

Sample order:
nlm 41340-0901

Note:
For positive clamping without preforming, e.g. rough pieces, heavy cutting, castings etc.

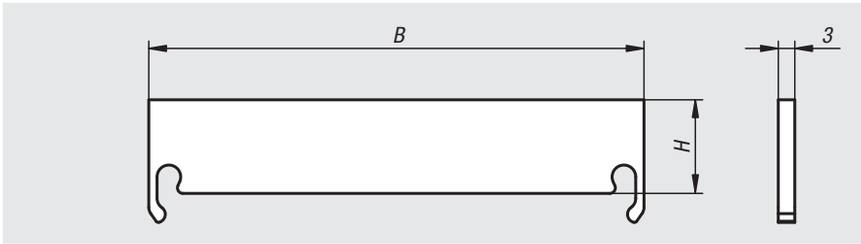
Supplied singly.

Order No.	A	B	No. of pins
41340-0901	61	90	6
41340-1251	96	125	8

41345

Seating ledges





Material:
Hardened steel

Version:
Bright.

Sample order:
nlm 41345-0900312

Note:
The seating ledges are suitable for adjusting the clamping depth of the workpiece on the compact 5-axis clamping system.
The 12 mm version does not interfere with the positive-down effect.
By the 17 mm version, the positive-down force is reduced but causes less edge deformation.

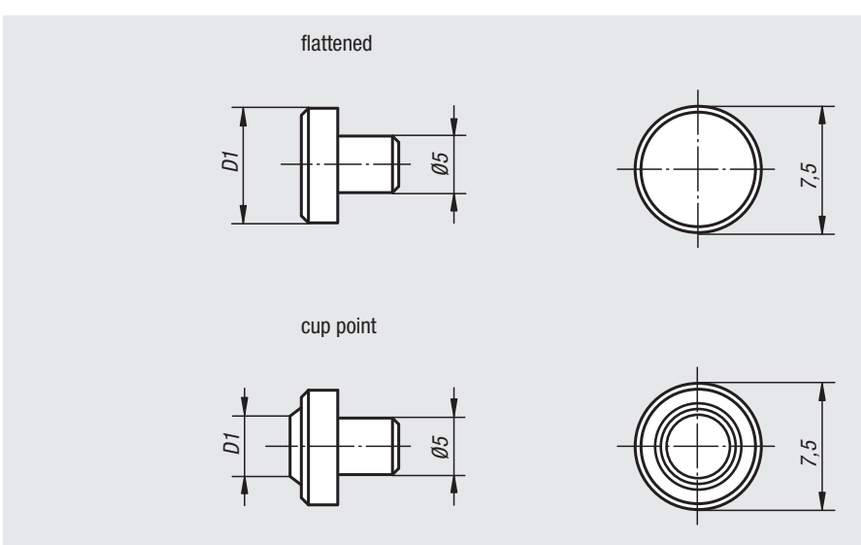
Supplied in pairs.

Order No.	B	H
41345-0900312	90	12
41345-0900317	90	17
41345-1250312	125	12
41345-1250317	125	17

41060

Jaw pins





Material:
Tool steel.

Version:
Hardened.

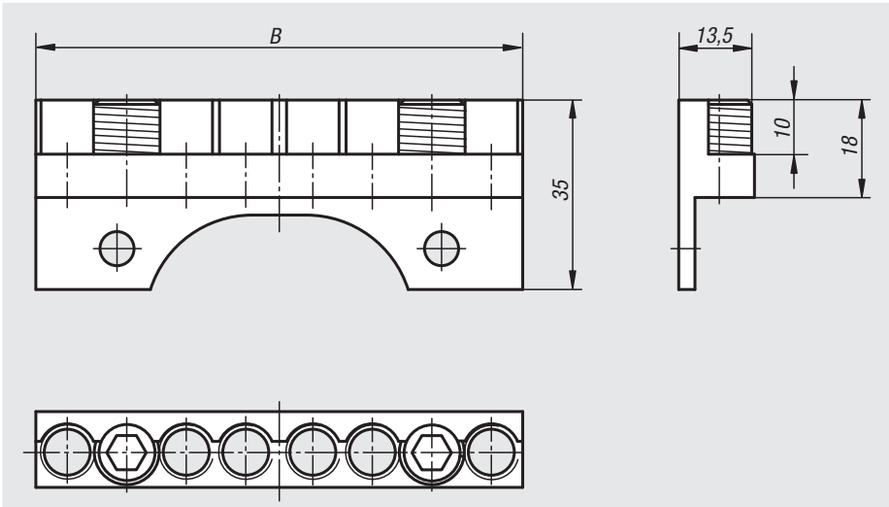
Sample order:
nlm 41060-05000

Note:
Suitable for standard jaw plates and jaw adapters of round workpieces.
Installed by pressing in.

Order No.	Version	D1	Application
41060-05000	flattened	7,5	Material over 1000 N/mm² tensile strength
41060-05400	cup point	4	Material up to ca. 1000 N/mm² tensile strength
41060-05600	cup point	6	Material up to ca. 1000 N/mm² tensile strength

Cylinder clamping sets





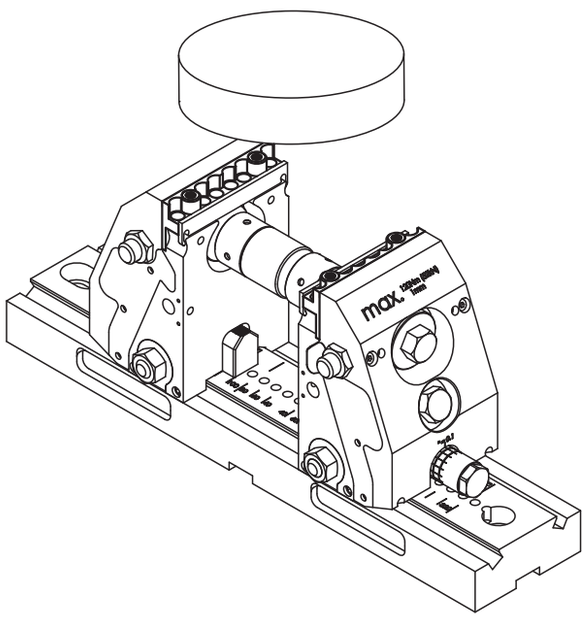
Material:
Tool steel.

Version:
Vice jaw hardened, bright.
Pins hardened, black oxidised.

Sample order:
nlm 41350-09035

Note:
For holding round workpieces.

Supplied in pairs.



Order No.	B	Clamping range min. - max.
41350-09035	90	20 mm - 250 mm
41350-12535	125	20 mm - 320 mm

41355

Extension shafts

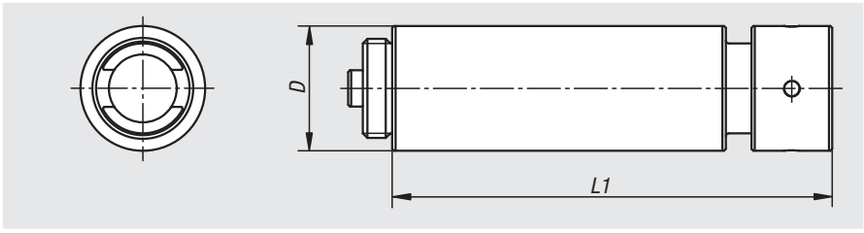


Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 41355-060

Note:
For setting the clamping width.
Supplied with union nut.
The extension shafts can be combined as required.



Order No.	D	L1	Clamp range
41355-060	34	60	Extension by 60 mm
41355-120	34	120	Extension by 120 mm
41355-240	34	240	Extension by 240 mm
41355-480	34	480	Extension by 480 mm

41360

Adapter shafts

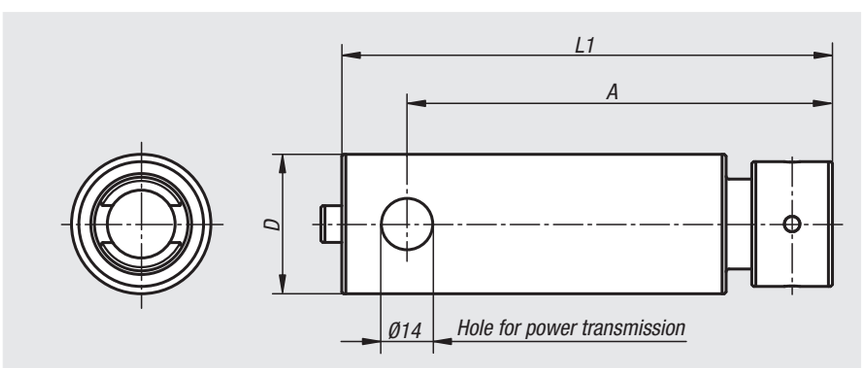


Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 41360-060

Note:
For setting the clamping width.
Supplied with union nut.
The adapter shafts are linked to the vice jaws by the lateral holes.
An adapter shaft must be mounted in every compact 5-axis clamp.

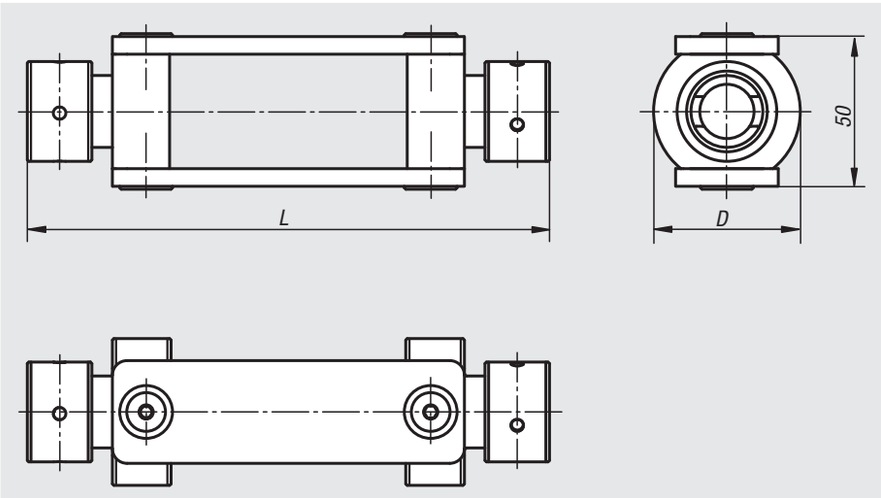


Order No.	A	D	L1	Clamp range
41360-060	56	38	74	20-80
41360-120	116	38	134	80-140

Couplings

for cross-clamping



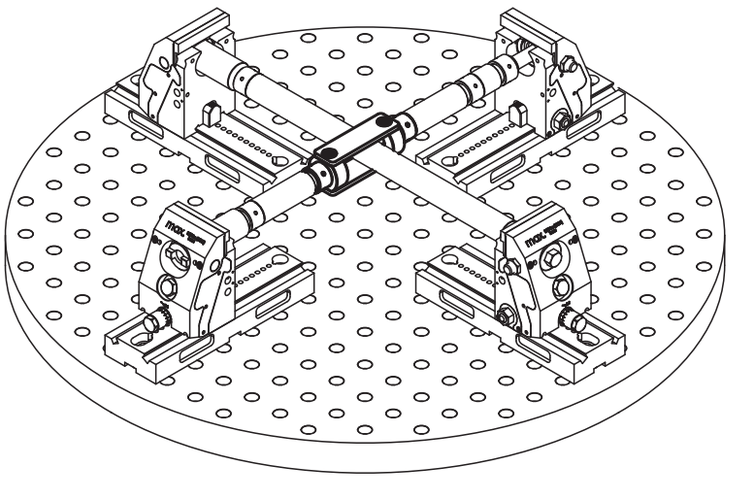


Material:
Carbon steel.

Version:
Black oxidised.

Sample order:
nlm 41365-178

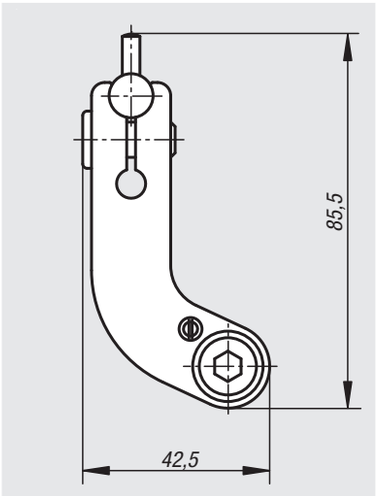
Note:
Two 5-axis clamping systems can be connected using a coupling for cross-clamping, allowing a workpiece to be held on four sides.

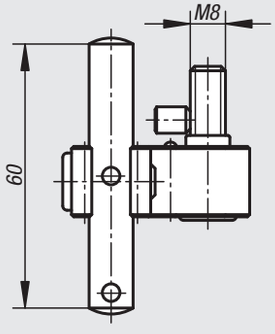


Order No.	D	L
41365-178	50	178

Stop sets







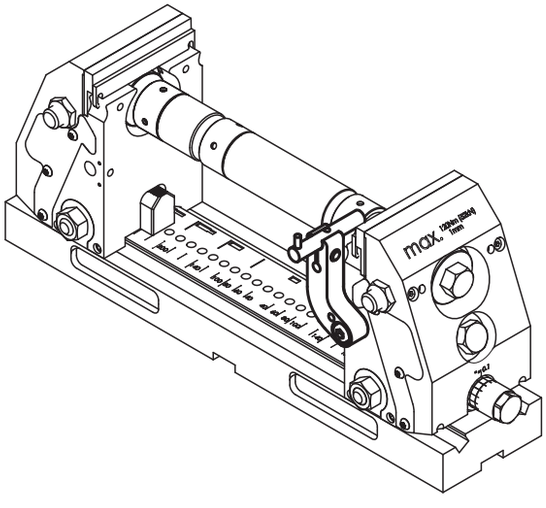
Material:
Steel.

Version:
Swivel arm, black oxidised.
Stop pin bright.

Sample order:
nlm 41370-150

Note:
Stop set for direct fastening to jaws.The stop can be swivelled aside for machining the workpiece without losing the stop dimension.

Supplied complete with attachment parts.



Order No.	Suitable for
41370-150	5-axis vice

Clamping claw sets



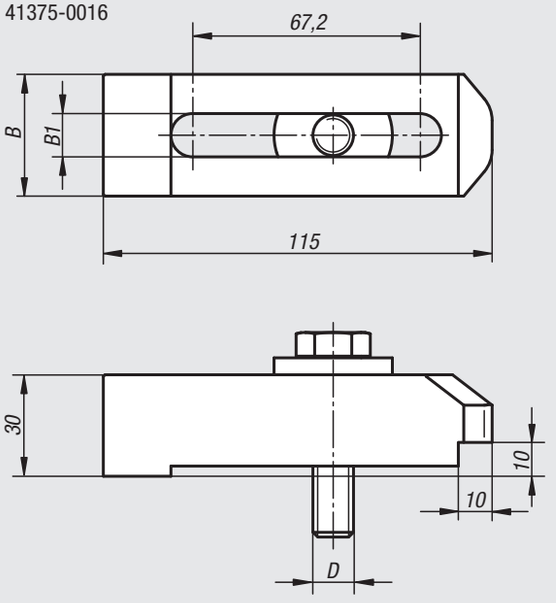
Material:
Carbon steel.

Version:
Black oxidised.

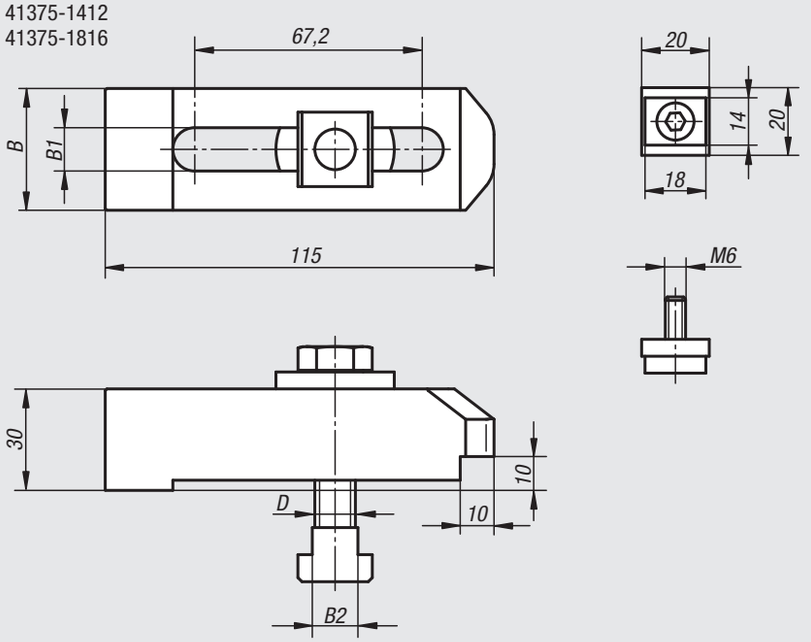
Sample order:
nlm 41375-0012

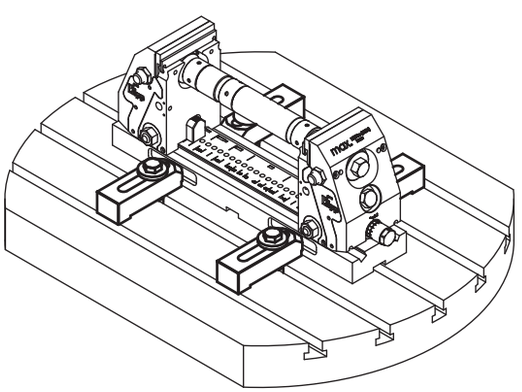
Note:
Clamping claw set for compact 5-axis clamping system.
All common T-slots, grid and fastening hole spacings can be covered.

41375-0012
41375-0016



41375-1412
41375-1816





Order No.	B	B1	B2	D
41375-0012	36	12,8	-	M12
41375-0016	40	16,8	-	M16
41375-1412	36	12,8	13,5	M12
41375-1816	40	16,8	17,5	M16

Notes

95000

Material handling and transport



Swivel and fixed castors

standard version

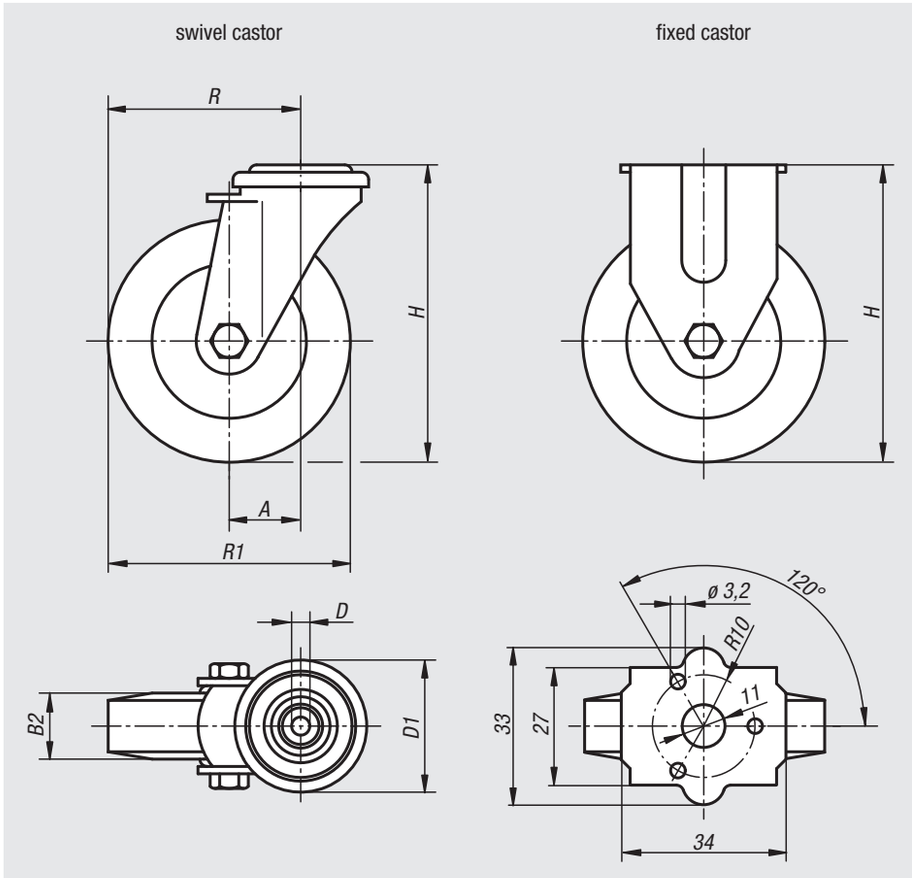


Material:
Housing steel plate.
Wheel treads solid rubber.
Wheel rims polyamide.

Version:
Housing press formed.
Double ball bearing in the castor head.
Plain bearing in wheels.

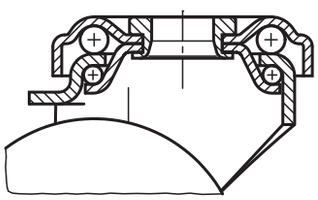
Sample order:
nlm 95010-07525

Note:
Wheel axle bolted.
Swivel and fixed castors with bolt hole.
Wheels grey, non-marking.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B2	D	D1	H	R	R1	Permissible load kg
95010-050181	**95010-05018**	**95010-050182**	plain bearing	-/25/25	18	-/11/11	-/43/43	69	-/50/50	50	40
95010-075251	**95010-07525**	**95010-075252**	plain bearing	-/28/28	25	-/11/11	-/43/43	98	-/65,5/65,5	75	60
-	**95010-10025**	**95010-100252**	plain bearing	33/33	25	11/11	43/43	121	83/83	100	70

Swivel and fixed castors

electrically conductive, standard version



Material:
Housing steel plate.
Wheels with thermoplastic rubber tread.
Wheel body polypropylene.

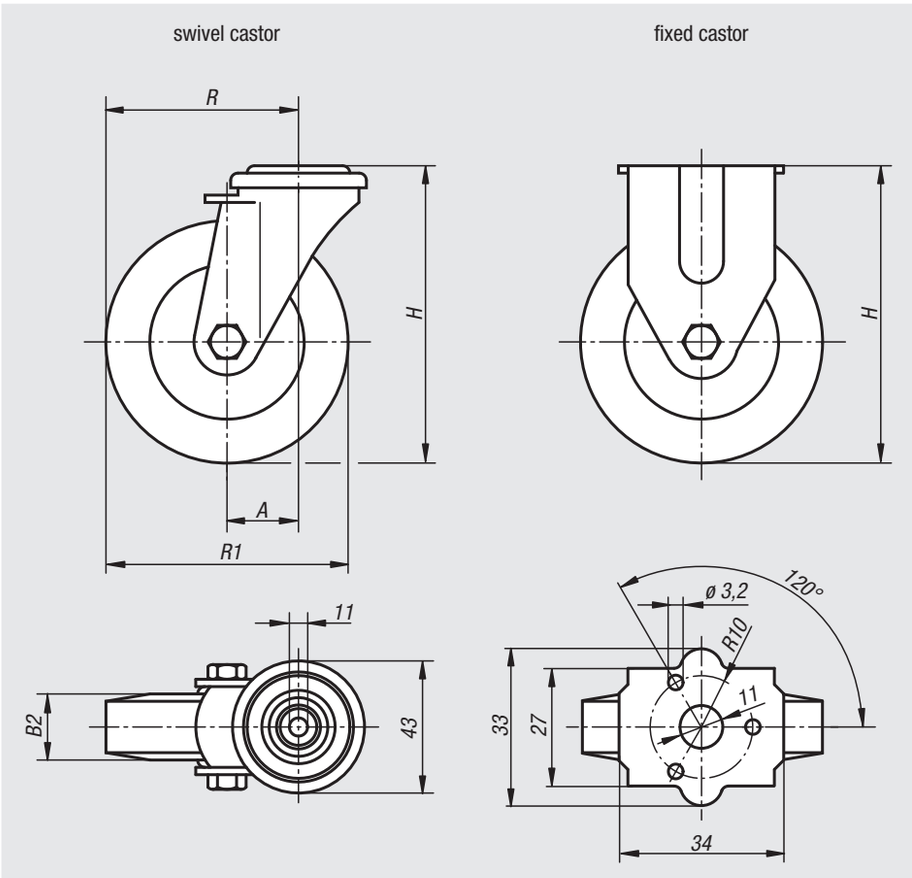
Version:
Housing press formed.
Double ball bearing in the castor head.
Plain bearing in wheels.

Sample order:
nlm 95010-1105019

Note:
Wheel axle threaded. Swivel and fixed castors with bolt hole. Electrically conductive wheels, non-marking grey. The ohmic resistance of the wheel is less than $10^4\Omega$.

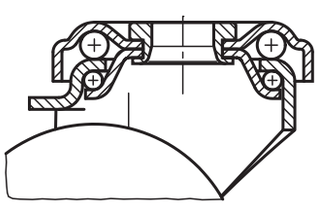
Application:
Electrically conductive wheels on swivel and fixed castors are used to protect against electrostatic discharge generated by transport equipment or the transported goods. Damage to sensitive goods and painful electrostatic shocks to the personal is so prevented.

Temperature range:
-20 °C to +60 °C.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B2	H	R	R1	Permissible load kg
95010-11050191	**95010-1105019**	**95010-11050192**	plain bearing	-/25/25	19	69	-/50/50	50	30
95010-11075251	**95010-1107525**	**95010-11075252**	plain bearing	-/29/29	25	98	-/66,5/66,5	75	50
-	**95010-1110025**	**95010-11100252**	plain bearing	33/33	25	121	83/83	100	60

Swivel and fixed castors

heavy-duty version

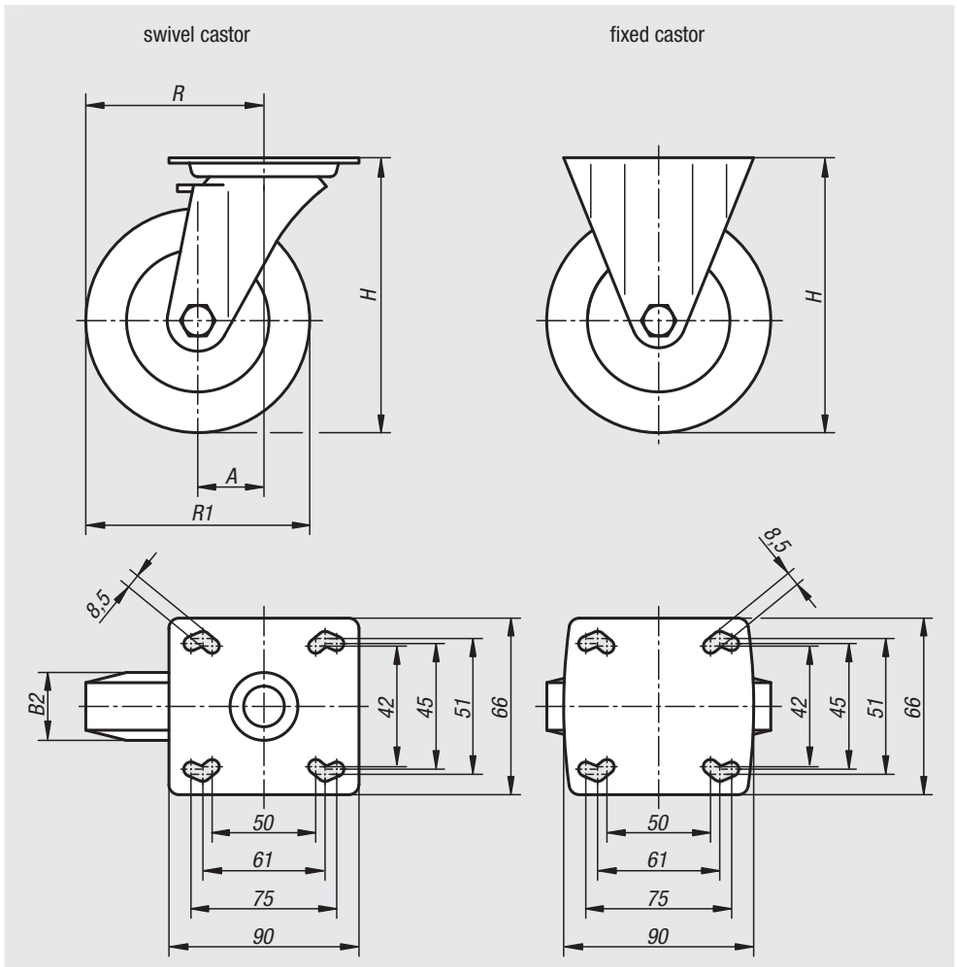


Material:
Housing steel plate.
Wheel treads solid rubber.
Wheel rims polyamide.

Version:
Housing press formed.
Double ball bearing in the castor head.
Plain bearing in wheels.

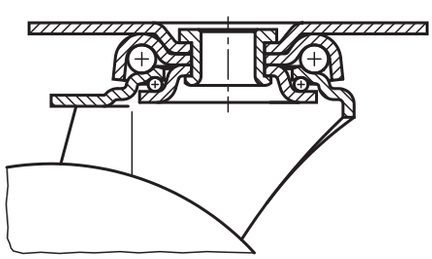
Sample order:
nlm 95012-10032

Note:
Wheel axle bolted.
Solid rubber tyres are shock and impact proof and non-corroding.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B2	H	R	R1	Permissible load kg
95012-080251	**95012-08025**	**95012-080252**	plain bearing	-/40/40	25	111	-/80/80	80	60
95012-100321	**95012-10032**	**95012-100322**	plain bearing	-/40/40	32	136	-/90/90	100	90
95012-125251	**95012-12525**	**95012-125252**	plain bearing	-/40/40	25	161	-/102,5/102,5	125	80
95012-125321	**95012-12532**	**95012-125322**	plain bearing	-/40/40	32	161	-/102,5/102,5	125	100

Swivel and fixed castors

steel plate, electrically conductive, heavy-duty version



Material:
Housing steel plate.
Wheels with thermoplastic rubber tread.
Wheel body polypropylene.

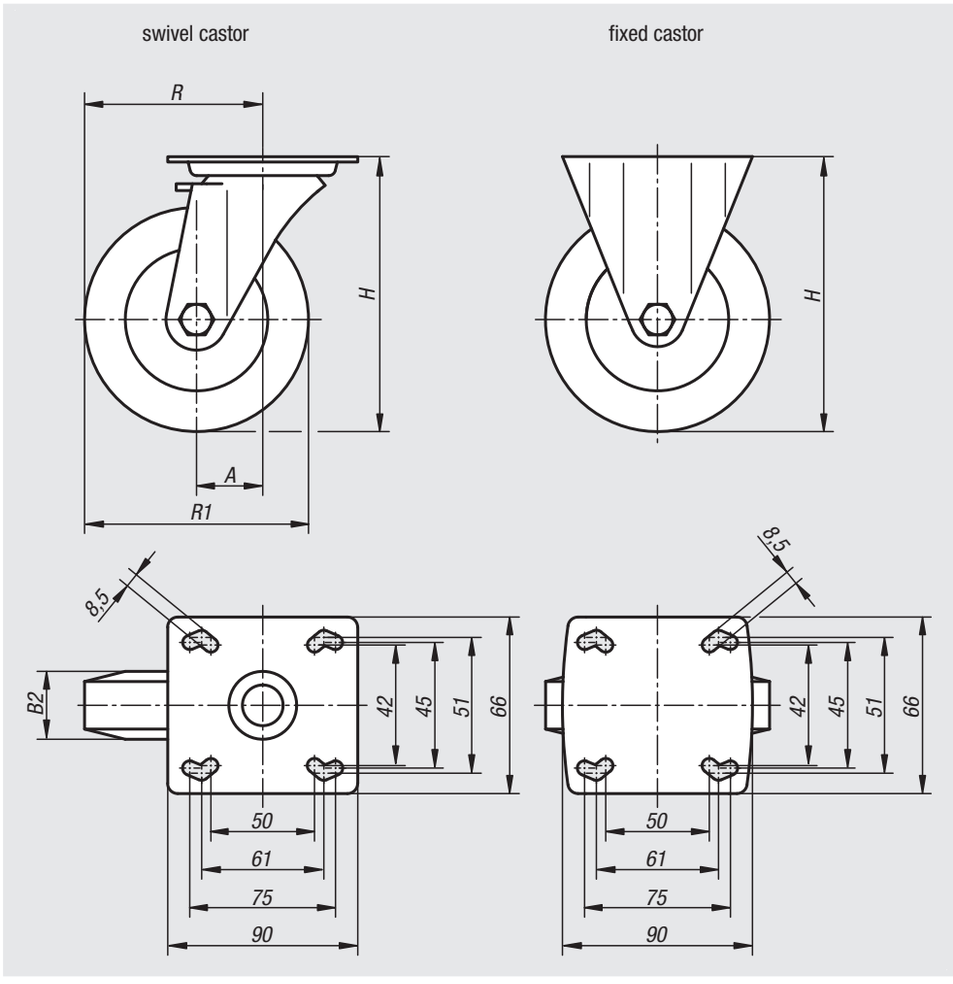
Version:
Housing press formed.
Double ball bearing in the castor head.
Plain bearing in wheels.

Sample order:
nlm 95012-1108032

Note:
Wheel axle threaded. Swivel and fixed castors with mounting plate. Electrically conductive wheels, non-marking grey. The ohmic resistance of the wheel is less than $10^4\Omega$.

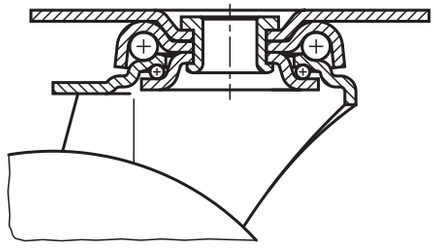
Application:
Electrically conductive wheels on swivel and fixed castors are used to protect against electrostatic discharge generated by transport equipment or the transported goods. Damage to sensitive goods and painful electrostatic shocks to the personal is so prevented.

Temperature range:
-20 °C to +60 °C.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B2	H	R	R1	Permissible load kg
95012-11080321	**95012-1108032**	**95012-11080322**	plain bearing	-/40/40	32	111	-/80/80	80	65
95012-11100321	**95012-1110032**	**95012-11100322**	plain bearing	-/40/40	32	136	-/90/90	100	70
95012-11125321	**95012-1112532**	**95012-11125322**	plain bearing	-/40/40	32	161	-/102,5/102,5	125	80

Swivel and fixed castors

standard version

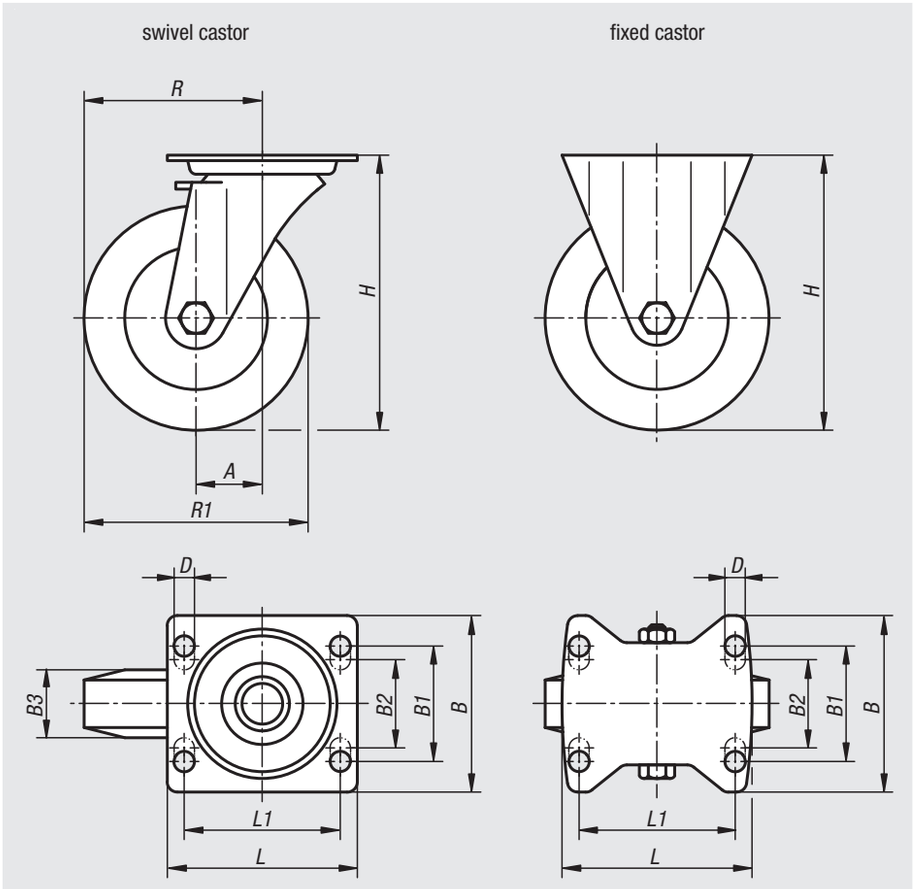


Material:
Housing and wheel rim steel plate.
Tyres solid rubber.
Wheel hub steel tube.

Version:
Housing and rim press formed.
Double ball bearing with ball shield in castor head.
Roller bearings in the wheels.

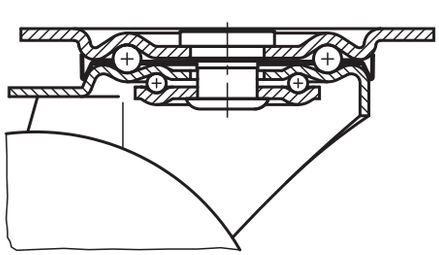
Sample order:
nlm 95016-10030

Note:
Wheel axle bolted.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95016-125381	**95016-12538**	**95016-125382**	roller bearing	-/40/40	85	60	-	37,5	100	80	150	9	-/102,5/102,5	125	100
95016-200501	**95016-20050**	**95016-200502**	roller bearing	-/65/65	110	80	75	50	140	105	235	11	-/165/165	200	205
95016-080251	**95016-08025**	**95016-080252**	roller bearing	-/38/38	85	60	-	25	100	80	102	9	-/78/78	80	50
95016-100301	**95016-10030**	**95016-100302**	roller bearing	-/36/36	85	60	-	30	100	80	125	9	-/86/86	100	70
95016-160401	**95016-16040**	**95016-160402**	roller bearing	-/60/60	110	80	75	40	140	105	195	11	-/140/140	160	135

Swivel and fixed castors

steel plate, electrically conductive standard version



Material:
Housing steel plate.
Wheels with thermoplastic rubber tread.
Wheel body polypropylene.

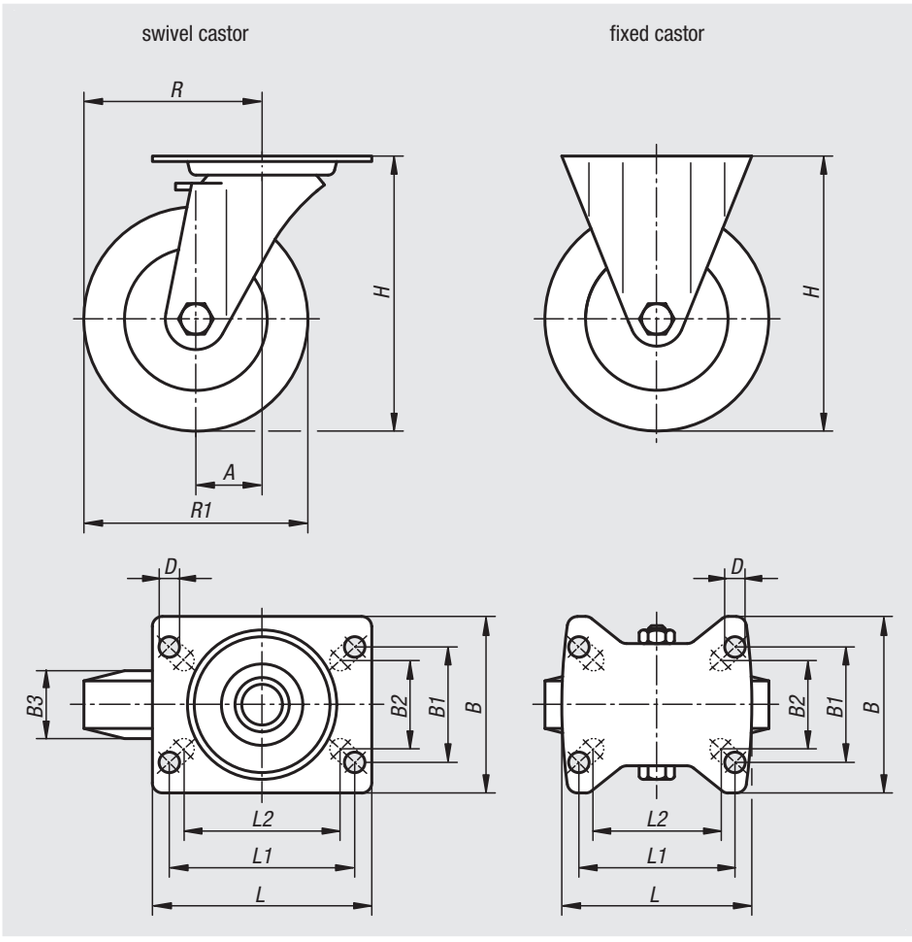
Version:
Housing press formed.
Double ball bearing in the castor head.
Plain bearing in wheels.

Sample order:
nlm 95016-1108032

Note:
Wheel axle threaded. Swivel and fixed castors with mounting plate. Electrically conductive wheels, non-marking grey. The ohmic resistance of the wheel is less than $10^4\Omega$.

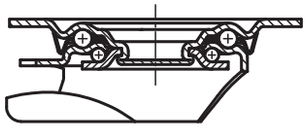
Application:
Electrically conductive wheels on swivel and fixed castors are used to protect against electrostatic discharge generated by transport equipment or the transported goods. Damage to sensitive goods and painful electrostatic shocks to the personal is so prevented.

Temperature range:
-20 °C to +60 °C.





swivel head bearing:



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B	B1	B2	B3	L	L1	L2	H	D	R	R1	Permissible load kg
95016-11080321	**95016-1108032**	**95016-11080322**	plain bearing	-/38/38	85	60	55	32	100	80	76	102	9	-/78/78	80	65
95016-11100321	**95016-1110032**	**95016-11100322**	plain bearing	-/36/36	85	60	55	32	100	80	76	125	9	-/86/86	100	70
95016-11125321	**95016-1112532**	**95016-11125322**	plain bearing	-/40/40	85	60	55	32	100	80	76	150	9	-/102,5/102,5	125	80
95016-11160401	**95016-1116040**	**95016-11160402**	plain bearing	-/54/54	110	80	75	40	140	105	-	195	11	-/134/134	160	130
95016-11200401	**95016-1120040**	**95016-11200402**	plain bearing	-/54/54	110	80	75	40	140	105	-	235	11	-/154/154	200	160

Swivel and fixed castors

standard version

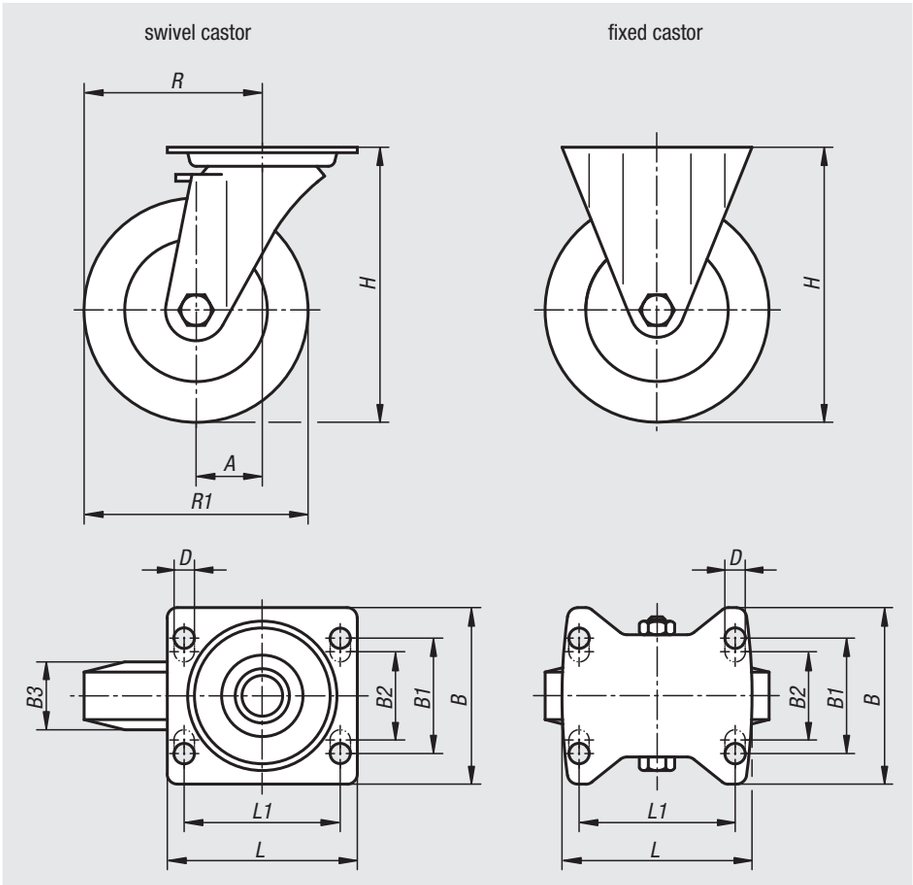


Material:
Housing steel plate.
Wheel body PA 6 with vulcanised elastic solid rubber tyre.

Version:
Housing press formed.
Double ball bearing with ball shield in castor head.
Roller bearings in the wheels.

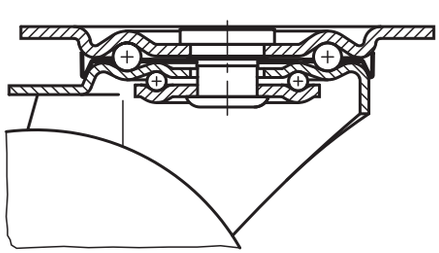
Sample order:
nlm 95018-12537

Note:
Wheel axle bolted.
Wheels are shock and impact proof.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95018-100371	**95018-10037**	**95018-100372**	roller bearing	-/36/36	85	60	-	38	100	80	125	9	-/86/86	100	170
95018-125371	**95018-12537**	**95018-125372**	roller bearing	-/40/40	85	60	-	40	100	80	150	9	-/102,5/102,5	125	200
95018-160501	**95018-16050**	**95018-160502**	roller bearing	-/60/60	110	80	75	50	140	105	195	11	-/140/140	160	350
95018-200501	**95018-20050**	**95018-200502**	roller bearing	-/65/65	110	80	75	50	140	105	235	11	-/165/165	200	400

Swivel and fixed castors

heavy-duty version

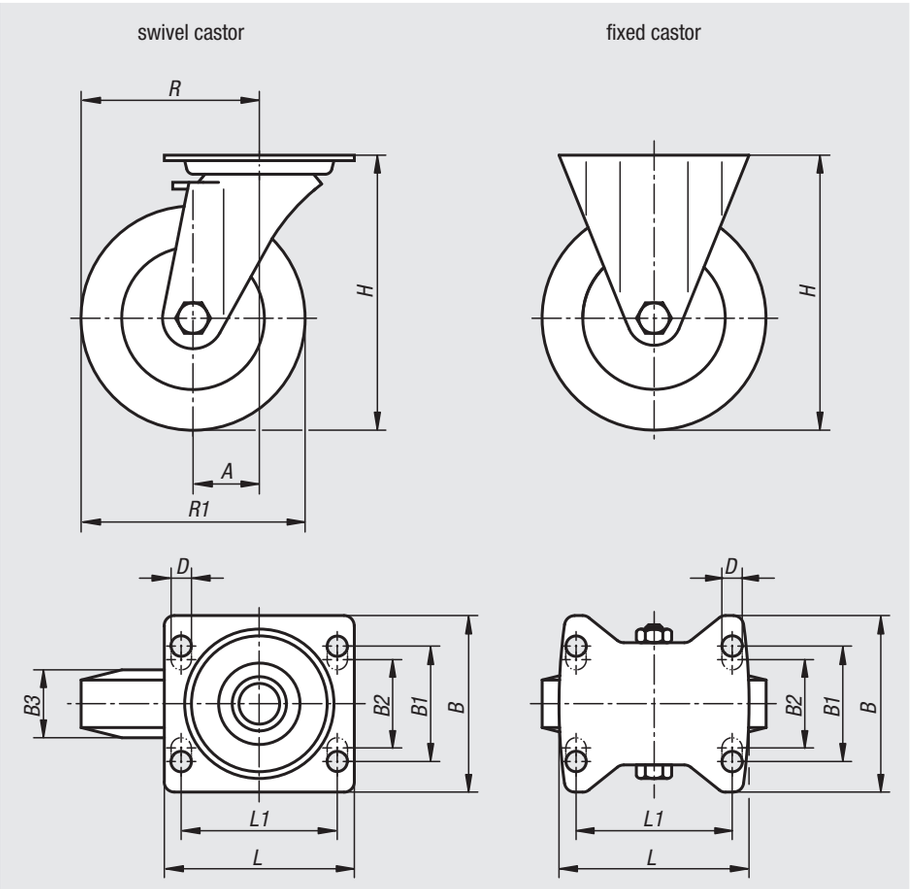


Material:
Housing thick steel plate.
Tyres steel-wire reinforced elastic solid rubber.
Wheel body welded steel.

Version:
Housing press formed.
Reinforced fork, base plate and centre pin.
Double ball bearing with hardened shells in the castor head.
Precision ball bearings in the wheels.

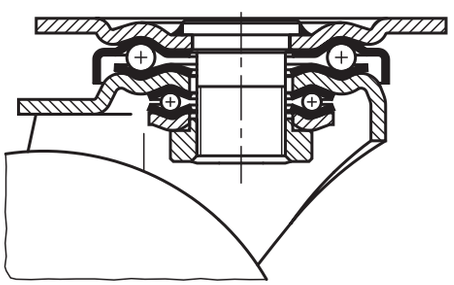
Sample order:
nlm 95020-12550

Note:
These castors are particularly impact and shock proof and assure a high service life.
Wheel axle bolted.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95020-100401	**95020-10040**	**95020-100402**	ball bearing	-/45/45	85	60	-	40	100	80	140	9	-/95/95	100	180
95020-125501	**95020-12550**	**95020-125502**	ball bearing	-/55/55	110	80	75	50	140	105	170	11	-/117,5/117,5	125	280
95020-160501	**95020-16050**	**95020-160502**	ball bearing	-/65/65	110	80	75	50	140	105	202	11	-/145/145	160	400
95020-200501	**95020-20050**	**95020-200502**	ball bearing	-/70/70	110	80	75	50	140	105	245	11	-/170/170	200	500
95020-250601	**95020-25060**	**95020-250602**	ball bearing	-/82/82	110	80	75	60	140	105	295	11	-/207/207	250	700

Swivel and fixed castors

standard version

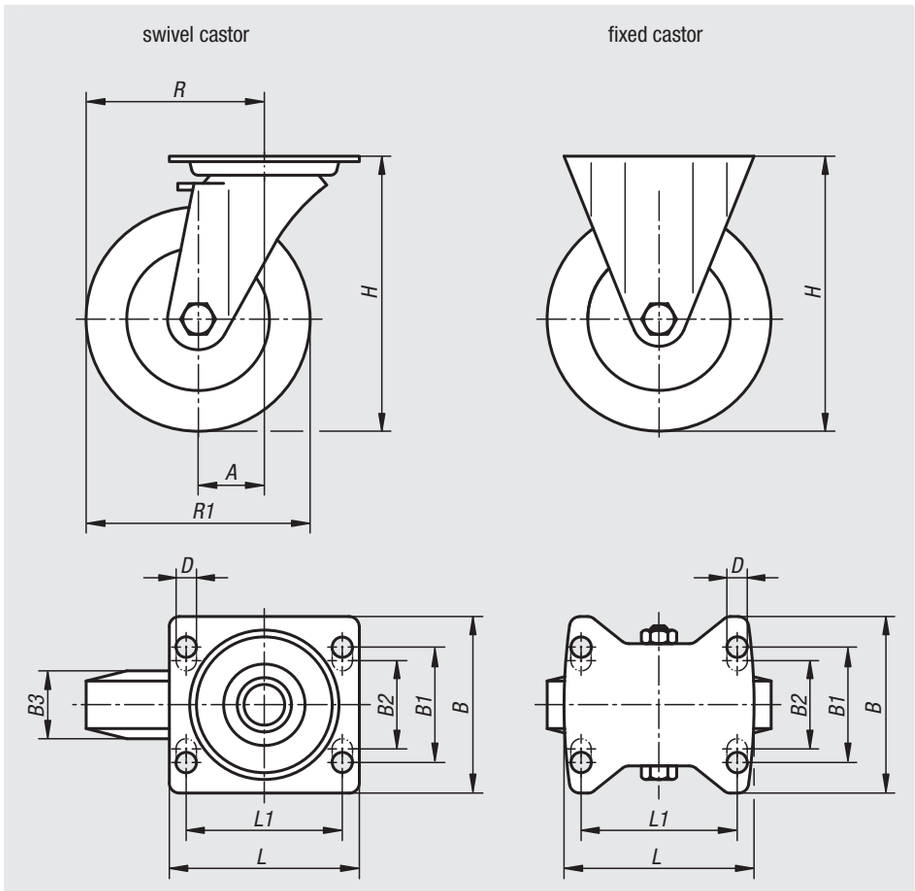


Material:
Housing steel plate.
Wheel body PA 6 with abrasion-resistant polyurethane tread.

Version:
Housing press formed.
Double ball bearing with ball shield in the castor head.
Plain bearing in the wheels.

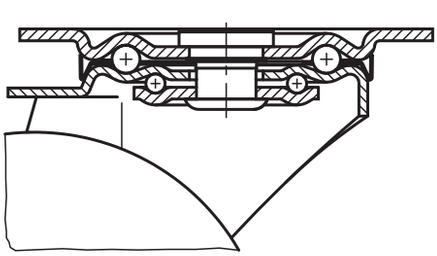
Sample order:
nlm 95024-12535

Note:
The wheels are unbreakable, maintenance-free and non-corroding. Wheel axle bolted. Tread non-marking.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95024-100351	**95024-10035**	**95024-100352**	plain bearing	-/36/36	85	60	-	35	100	80	125	9	-/86/86	100	200
95024-125351	**95024-12535**	**95024-125352**	plain bearing	-/40/40	85	60	-	40	100	80	150	9	-/102,5/102,5	125	200
95024-150401	**95024-15040**	**95024-150402**	plain bearing	-/60/60	110	80	75	45	140	105	190	11	-/135/135	150	400
95024-200501	**95024-20050**	**95024-200502**	plain bearing	-/65/65	110	80	75	50	140	105	235	11	-/165/165	200	400

Swivel and fixed castors

medium-duty version

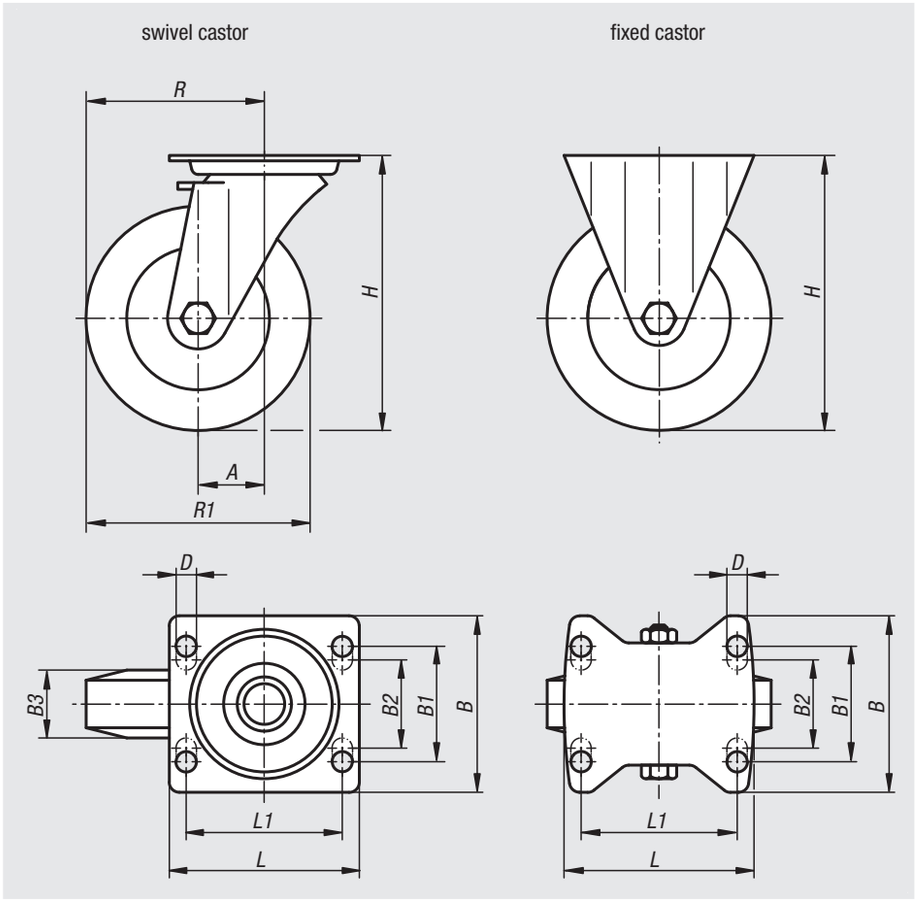


Material:
Housing steel plate.
Wheel body die-cast aluminium with Extrathane® tread.

Version:
Housing press formed.
Double ball bearing with ball shield in the castor head.
Precision ball bearings in the wheels.

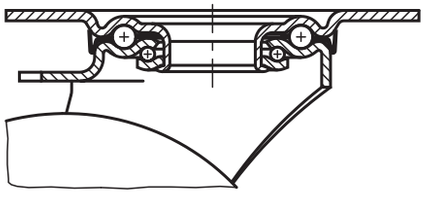
Sample order:
nlm 95028-12540

Note:
The wheels are non-corroding and have a low rolling resistance. Wheel axle bolted.

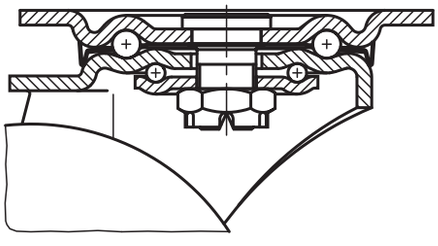




swivel head bearing R1 ≤ 125



swivel head bearing R1 ≥ 160



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95028-100401	**95028-10040**	**95028-100402**	ball bearing	-/45/45	85	60	-	40	100	80	130	9	-/95/95	100	250
95028-125401	**95028-12540**	**95028-125402**	ball bearing	-/48/48	85	60	-	40	100	80	155	9	-/110,5/110,5	125	250
95028-160501	**95028-16050**	**95028-160502**	ball bearing	-/63/63	110	80	75	50	140	105	202	11	-/143/143	160	550
95028-200501	**95028-20050**	**95028-200502**	ball bearing	-/70/70	110	80	75	50	140	105	245	11	-/170/170	200	800

Swivel and fixed castors

heavy-duty version

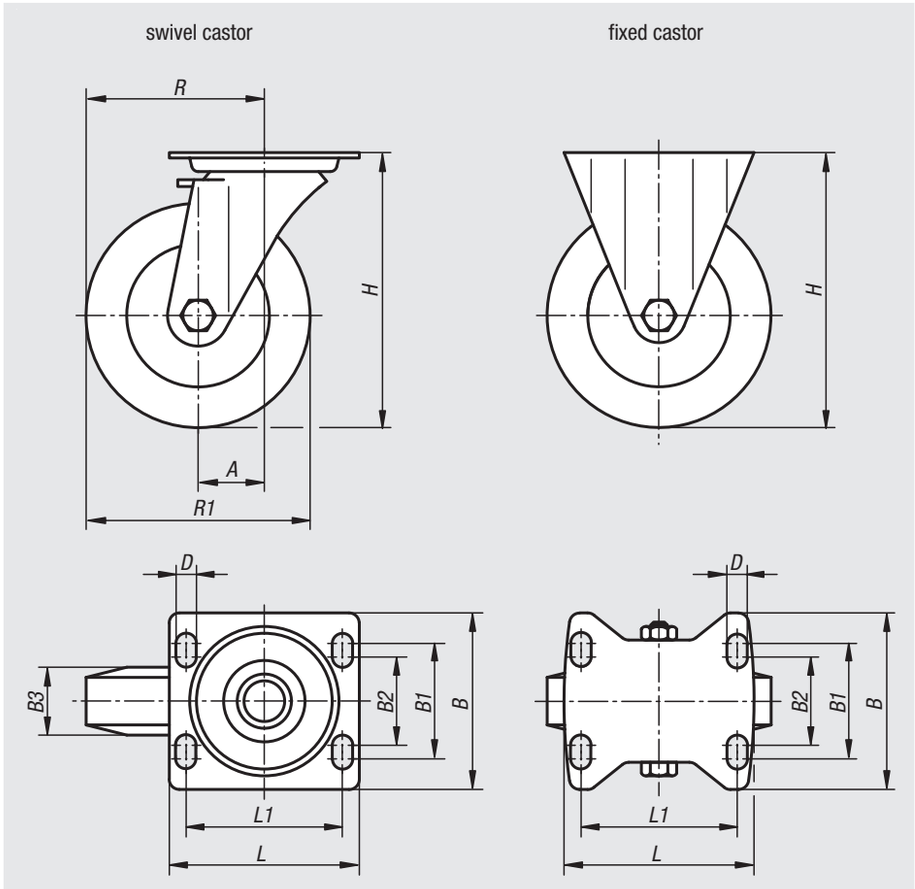


Material:
Housing thick steel plate.
Wheels welded steel body and Extrathane® tread.

Version:
Housing press formed.
Swivel castor housing with strong fork and base plate, very robust centre pin bolted and secured. The swivel head is additionally reinforced with specially formed and hardened bearing shells.

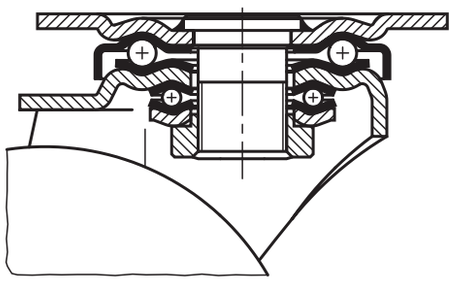
Sample order:
nlm 95030-16050

Note:
These castors are particularly shock and impact proof. The treads resist abrasion and are elastic and low-noise. Wheel axle bolted.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95030-125501	**95030-12550**	**95030-125502**	ball bearing	-/55/55	110	80	75	50	140	105	170	11	-/117,5/117,5	125	500
95030-160501	**95030-16050**	**95030-160502**	ball bearing	-/65/65	110	80	75	50	140	105	202	11	-/145/145	160	700
95030-200501	**95030-20050**	**95030-200502**	ball bearing	-/70/70	110	80	75	50	140	105	245	11	-/170/170	200	900

Swivel and fixed castors

welded steel heavy-duty version

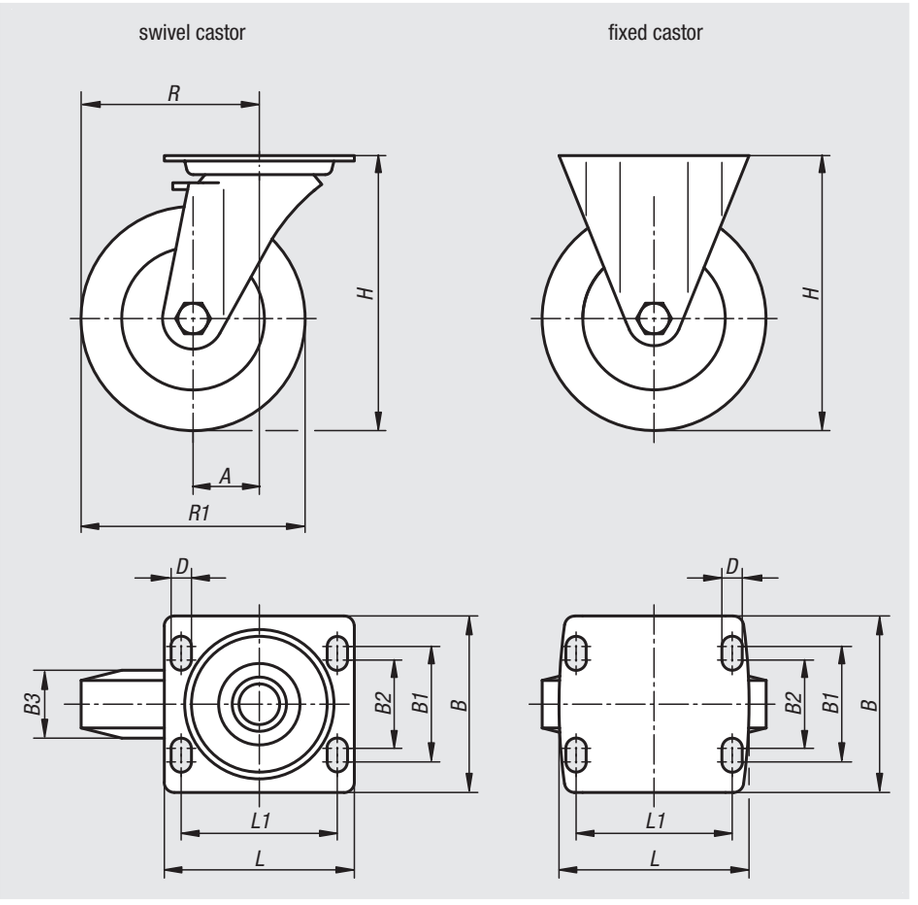


Material:
Housing solid welded steel construction.
Wheels with welded steel body and Extrathane® tread.

Version:
The housing is a rugged welded steel construction.
Swivel castor housing with DIN 711 axial groove ball bearing and DIN 720 tapered roller bearing in the swivel head. Dust and splash-proof, with grease nipple. Precision ball bearings in the wheels.

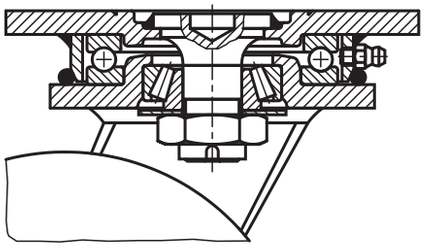
Sample order:
nlm 95032-20050

Note:
Centre pin welded in, bolted and secured. Wheel axle bolted.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95032-160501	**95032-16050**	**95032-160502**	ball bearing	-/55/55	110	80	75	50	140	105	205	11	-/135/135	160	700
95032-200501	**95032-20050**	**95032-200502**	ball bearing	-/60/60	110	80	75	50	140	105	245	11	-/160/160	200	1000
95032-250601	**95032-25060**	**95032-250602**	ball bearing	-/75/75	140	105	-	60	175	140	305	14	-/200/200	250	1350

Swivel and fixed castors

standard version

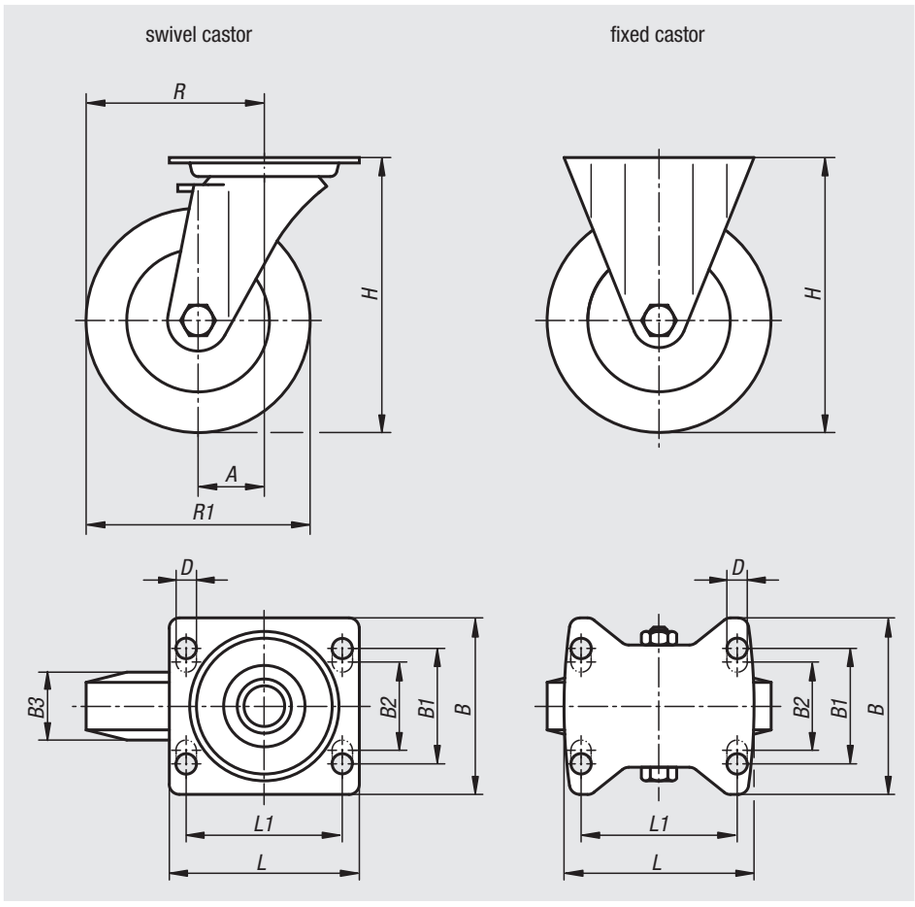


Material:
Housing steel plate.
Wheels PA 6.

Version:
Housing press formed.
Double ball bearing with ball shield in the castor head.
Plain bearings in the wheels.

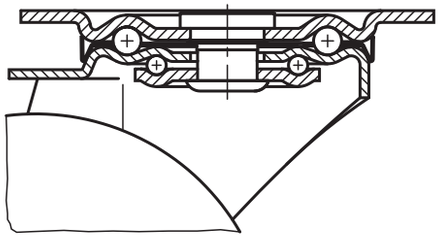
Sample order:
nlm 95034-10037

Note:
The PA 6 wheels have a low rolling resistance, are non-corroding, resist abrasion and are particularly shock and impact proof.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-fix	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95034-075321	**95034-07532**	**95034-075322**	plain bearing	-/35/35	85	60	-	32	100	80	98	9	-/72,5/72,5	75	200
95034-100371	**95034-10037**	**95034-100372**	plain bearing	-/35/35	85	60	-	37	100	80	125	9	-/85/85	100	200
95034-125401	**95034-12540**	**95034-125402**	plain bearing	-/40/40	85	60	-	40	100	80	150	9	-/102,5/102,5	125	200
95034-150501	**95034-15050**	**95034-150502**	plain bearing	-/60/60	110	80	75	50	140	105	190	11	-/135/135	150	400

Swivel and fixed castors

heavy-duty version

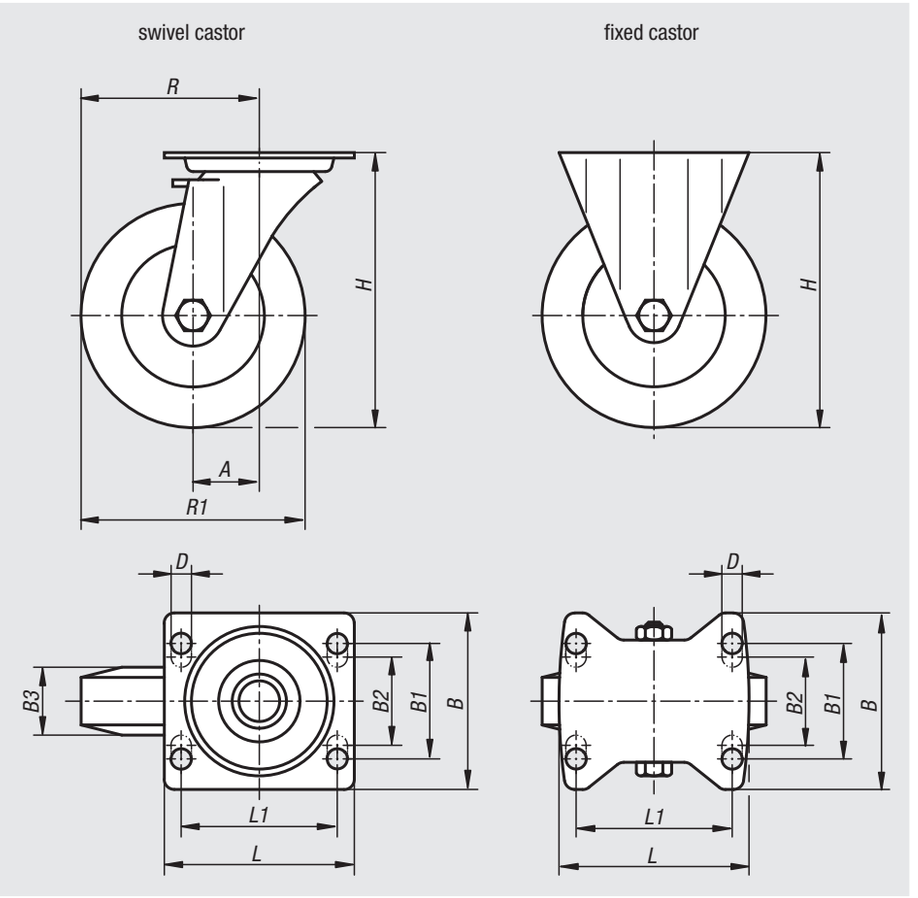


Material:
Housing thick steel plate.
Wheels PA 6.

Version:
Housing press formed.
Swivel castor housing with strong fork and base plate, very robust centre pin bolted and secured. The swivel head is additionally reinforced with specially formed and hardened bearing shells. Plain bearings in the wheels.

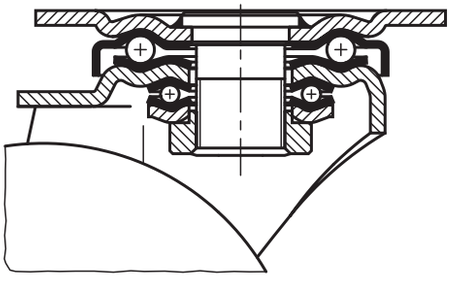
Sample order:
nlm 95036-12540

Note:
Wheel axle bolted. The wheels are particularly shock and impact proof and have high abrasion resistance.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95036-100371	**95036-10037**	**95036-100372**	plain bearing	-/45/45	85	60	-	37	100	80	140	9	-/95/95	100	280
95036-125401	**95036-12540**	**95036-125402**	plain bearing	-/45/45	85	60	-	40	100	80	165	9	-/107,5/107,5	125	300
95036-150501	**95036-15050**	**95036-150502**	plain bearing	-/65/65	110	80	75	50	140	105	197	11	-/140/140	150	400
95036-200501	**95036-20050**	**95036-200502**	plain bearing	-/70/70	110	80	75	50	140	105	245	11	-/170/170	200	600

Swivel and fixed castors

heavy-duty version

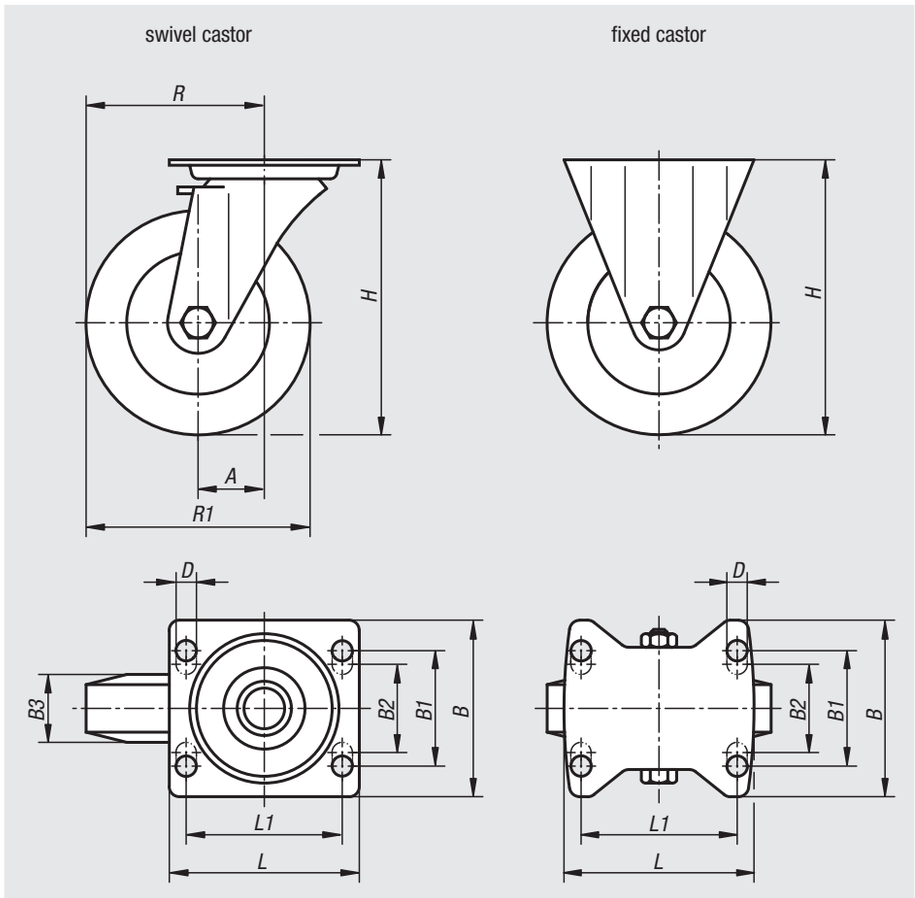


Material:
Housing thick steel plate.
Wheels high-quality PA 6.

Version:
Housing press formed.
Swivel castor housing with strong fork and base plate, very robust centre pin bolted and secured. The swivel head is additionally reinforced with specially formed and hardened bearing shells.

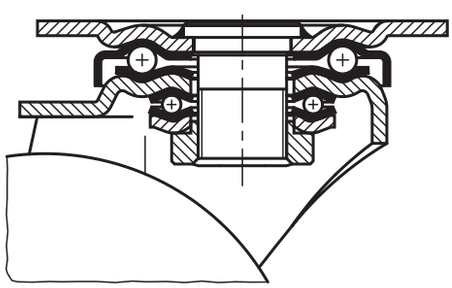
Sample order:
nlm 95040-10037

Note:
The hardened bearing shells make these castors particularly shock and impact proof. The wheels have high abrasion resistance. Wheel axle bolted.





swivel head bearing



Order No. fixed castors	Order No. swivel castors	Order No. with stop-top	Wheel bearing	A	B	B1	B2	B3	L	L1	H	D	R	R1	Permissible load kg
95040-075321	**95040-07532**	**95040-075322**	plain bearing	-/45/45	85	60	-	32	100	80	118	9	-/82,5/82,5	75	300
95040-075324	**95040-075323**	**95040-075325**	ball bearing	-/45/45	85	60	-	32	100	80	118	9	-/82,5/82,5	75	300
95040-100371	**95040-10037**	**95040-100372**	plain bearing	-/45/45	85	60	-	37	100	80	140	9	-/95/95	100	500
95040-100374	**95040-100373**	**95040-100375**	ball bearing	-/45/45	85	60	-	37	100	80	140	9	-/95/95	100	500
95040-125401	**95040-12540**	**95040-125402**	plain bearing	-/45/45	85	60	-	40	100	80	165	9	-/107,5/107,5	125	700
95040-125404	**95040-125403**	**95040-125405**	ball bearing	-/45/45	85	60	-	40	100	80	165	9	-/107,5/107,5	125	700
95040-150501	**95040-15050**	**95040-150502**	plain bearing	-/65/65	110	80	75	50	140	105	197	11	-/140/140	150	800
95040-150504	**95040-150503**	**95040-150505**	ball bearing	-/65/65	110	80	75	50	140	105	197	11	-/140/140	150	800

Swivel castors

compact version



Material:
Housing steel plate, trivalent blue passivated.
Roller light brown polyurethane, Shore 92 A
or white polyamide, Shore 80 D.

Version:
Housing press formed.
Swivel castor housing with 2x ball bearing in the swivel head and ball shield.
Roller with two pressed-in ball bearings.

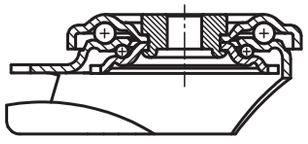
Sample order:
nlm 95045-0352701

Note:
Wheel axle bolted.

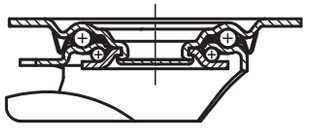
Polyurethane roller: low-noise, low rolling resistance, elastic, floor-protecting, very wear resistant , non-staining.

Polyamide roller: very low roll and pivot resistance, smooth running on smooth floors, very wear resistant.

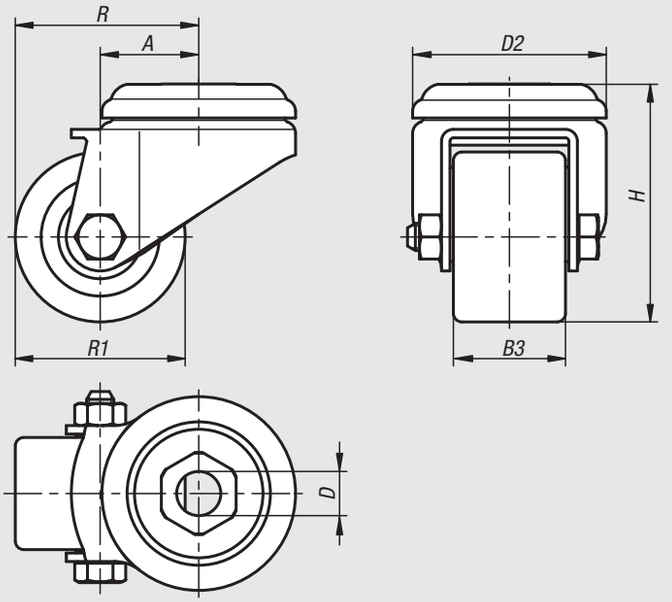
Swivel head bearing:
bolt hole



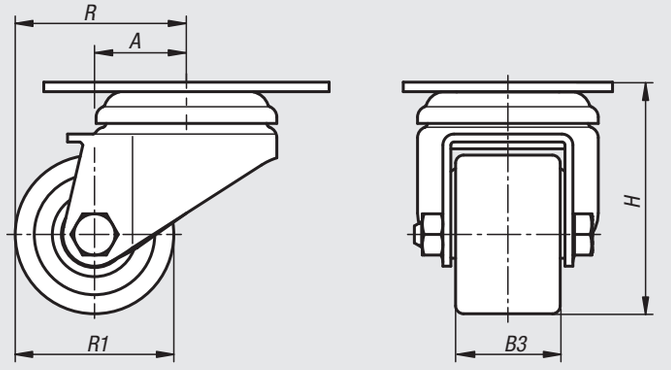
Swivel head bearing:
mounting plate



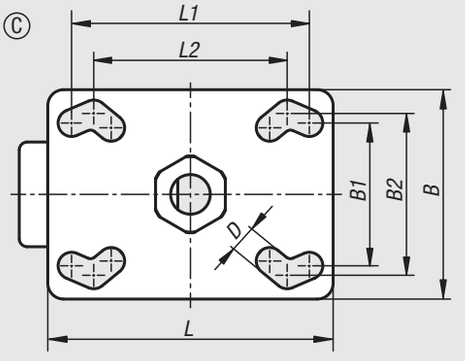
Ⓐ bolt hole



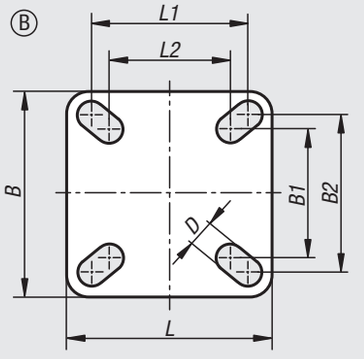
mounting plate



Ⓒ



Ⓑ

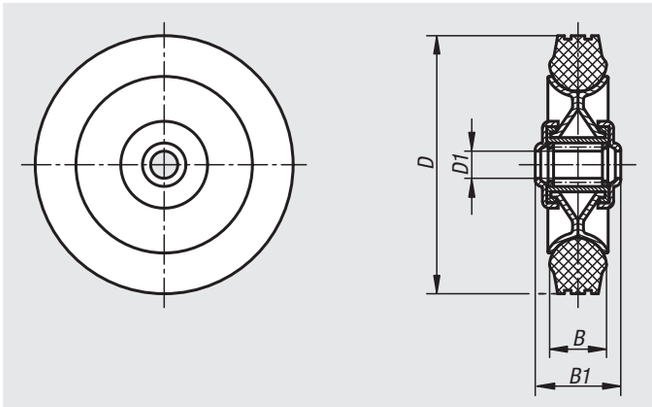


Order No.	Form	Version	Material roller	Wheel bearing	D	D2	A	B	B1	B2	B3	H	L	L1	L2	R	R1	Permissible load kg
95045-0352701	A	with bolt hole	polyurethane	ball bearing	11	43	15	-	-	-	27	50	-	-	-	32,5	35	100
95045-0352802	A	with bolt hole	Polyamide	ball bearing	11	43	15	-	-	-	28	50	-	-	-	32,5	35	100
95045-0503301	A	with bolt hole	polyurethane	ball bearing	13	57	29	-	-	-	33	70	-	-	-	54	50	150
95045-0503202	A	with bolt hole	Polyamide	ball bearing	13	57	29	-	-	-	32	70	-	-	-	54	50	150
95045-0352711	B	with mounting plate	polyurethane	ball bearing	6,2	-	15	60	38	48	27	52	60	48	38	32,5	35	100
95045-0352812	B	with mounting plate	Polyamide	ball bearing	6,2	-	15	60	38	48	28	52	60	48	38	32,5	35	100
95045-0503311	C	with mounting plate	polyurethane	ball bearing	8,5	-	29	66	45	51	33	73	90	75	61	54	50	150
95045-0503212	C	with mounting plate	Polyamide	ball bearing	8,5	-	29	66	45	51	32	73	90	75	61	54	50	150

Wheels

rubber tyres on steel plate rims





Material:
Rim steel plate.
Tyre solid rubber.

Version:
Rims trivalent passivated.
Tyres black.

Sample order:
nlm 95050-14038

Note:
This special rim design is exceptionally ridged even with extreme shocks and impacts. Low rolling resistance.
Temperature resistant from -30 °C to +80 °C.
Suitable for 95016.

Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95050-08025	roller bearing	80	12	25	35	50
95050-10030	roller bearing	100	15	30	45	70
95050-12538	roller bearing	125	15	37,5	45	100
95050-14038	roller bearing	140	15	37,5	45	115
95050-16040	roller bearing	160	20	40	60	135
95050-18050	roller bearing	180	20	50	60	170
95050-20050	roller bearing	200	20	50	60	205

Wheels

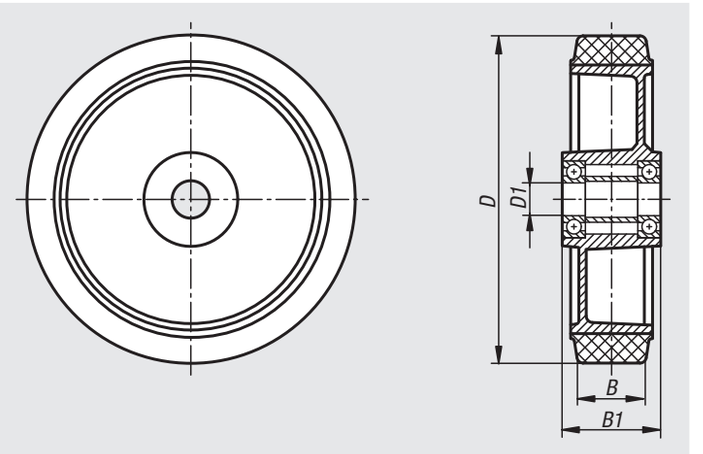
rubber tyres on die-cast aluminium rims



Material:
Wheel rims die-cast aluminium.
Tyre elastic solid rubber.

Sample order:
nlm 95053-200501

Note:
The tyre is vulcanised onto the rim. Wheels with elastic solid rubber tyres have a high wear resistance, low rolling resistance and excellent drive comfort.
Application temperature from -30 °C to +80 °C.
These wheels are used as the front wheels on fork-lift trucks.
Other sizes on request.



Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95053-200501	ball bearing	200	20	35	60	450

Wheels

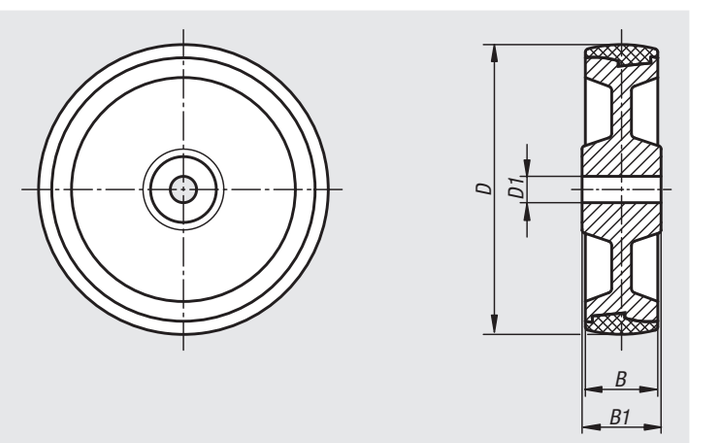
polyamide with injection-moulded tread



Material:
Wheel body PA.
Tread thermoplastic polyurethane elastomer.

Sample order:
nlm 95056-12535

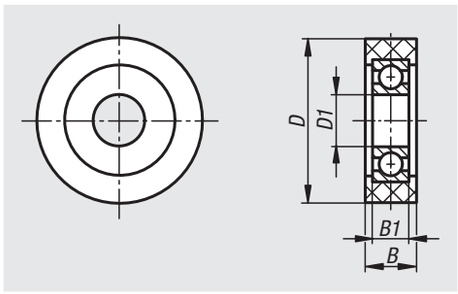
Note:
Wheels with polyurethane tread have a high load capacity, resist abrasion, are gentle to floors, absorb shocks and vibration and are resistant to many chemicals and acids.
Temperature resistant from -30 °C to +80 °C.
Suitable as replacement rollers for the castors 95024.



Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95056-10035	plain bearing	100	15	35	45	200
95056-12535	plain bearing	125	15	35	45	250
95056-15040	plain bearing	150	20	40	60	400
95056-20050	plain bearing	200	20	50	60	700

Guide rollers





Material:
Tread light brown Extrathane® Shore 92A or white polyamide 6 Shore 80D.

Sample order:
nlm 95057-05015

Note:
The tread is firmly bonded onto a ball bearing.

Extrathane tread: quiet running, low roll resistance, elastic, gentle on floors, very wear resistant, high cut and tear resistance, non-marking, non-staining.

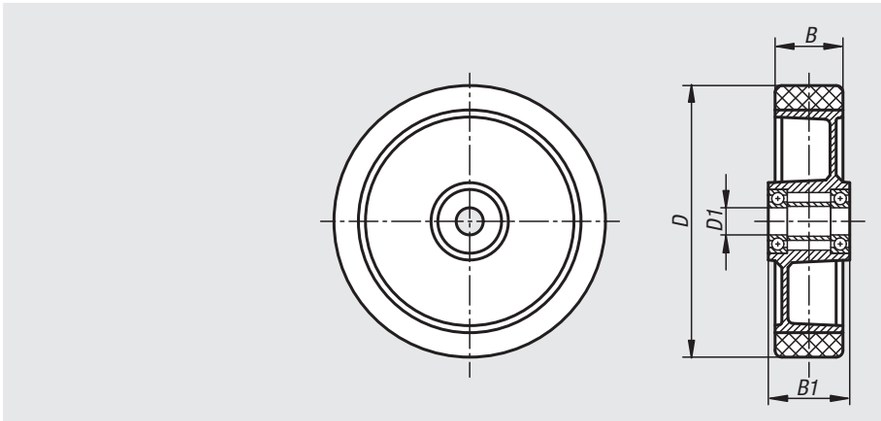
Polyamide 6 tread: unbreakable, very low roll resistance, light running on smooth floors, very wear resistant.
Uses: conveyor belts, doors, etc.
Other sizes on request.

Order No.	Material tread	Wheel bearing	D	D1	B	B1	Permissible load kg	Ball bearing
95057-03008	extrathane	ball bearing	30	6	8	6	20	626 2RS
95057-03514	extrathane	ball bearing	35	12	14	8	40	6001 2RS
95057-04020	extrathane	ball bearing	40	10	20	9	40	6000 2RS
95057-05015	extrathane	ball bearing	50	10	15	9	60	6200 2RS
95057-06020	extrathane	ball bearing	60	17	20	12	90	6203 2RS
95057-07020	extrathane	ball bearing	70	25	20	15	125	6205 2RS
95057-030081	polyamide 6	ball bearing	30	6	8	6	35	626 2RS
95057-035111	polyamide 6	ball bearing	35	8	11	7	55	608 2RS
95057-040201	polyamide 6	ball bearing	40	10	20	9	100	6200 2RS
95057-050151	polyamide 6	ball bearing	50	10	15	9	100	6200 2RS
95057-060201	polyamide 6	ball bearing	60	17	20	12	165	6203 2RS
95057-070201	polyamide 6	ball bearing	70	25	20	15	185	6205 2RS

Wheels

aluminium rims with injection-moulded tread





Material:
Wheel rim die-cast aluminium.
Tread Extrathane®.

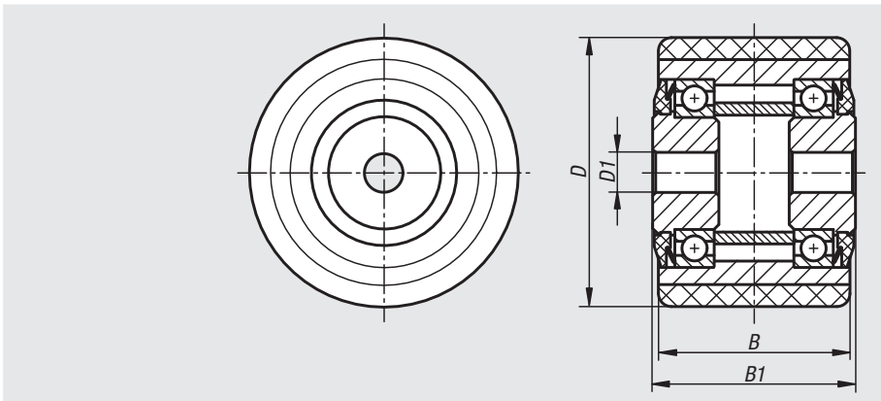
Sample order:
nlm 95058-12540

Note:
These wheels are elastic, abrasion-resistant, gentle to floors, low-noise and have low roll resistance.
Suitable as replacement rollers for castors 95028.

Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95058-10040	ball bearing	100	15	40	45	250
95058-12540	ball bearing	125	15	40	45	350
95058-16050	ball bearing	160	20	50	60	550
95058-18050	ball bearing	180	20	50	60	600
95058-20050	ball bearing	200	20	50	60	800

Rollers heavy-load





Material:
Wheel body steel tube with ball bearing.
Tread Extrathane® 92 Shore A.

Sample order:
nlm 95059-0857520

Note:
The ball bearing is splashproof. The tread is firmly bonded. These rollers resist abrasion, are non-staining, gentle to floors, low-noise, elastic, have low roll resistance and have a particularly high elastic restoration after long standing high cut and tear resistance.
Uses: pallet trucks, forklift, etc.
Other sizes on request.

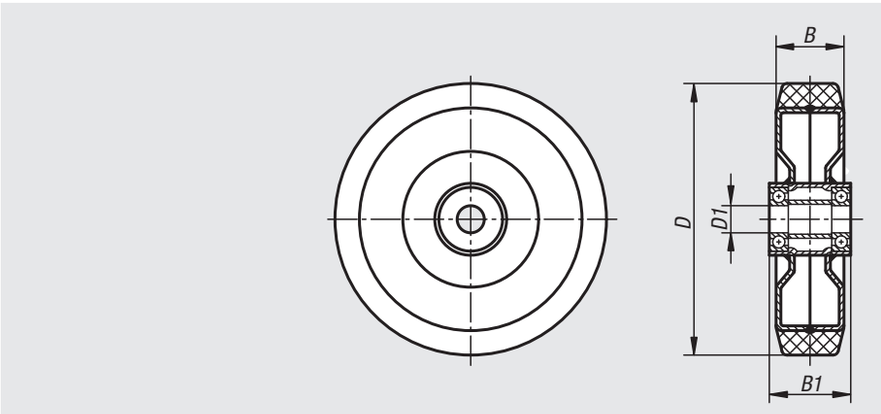
Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95059-0856020	ball bearing	85	20	60	65	450
95059-0856025	ball bearing	85	25	60	65	450
95059-0857520	ball bearing	85	20	75	80	570
95059-0857525	ball bearing	85	25	75	80	570
95059-0859525	ball bearing	85	25	95	100	720

95060

Wheels heavy-load

wheel body welded





Material:
Wheel body welded steel construction.
Tread Extrathane®.

Sample order:
nlm 95060-16050

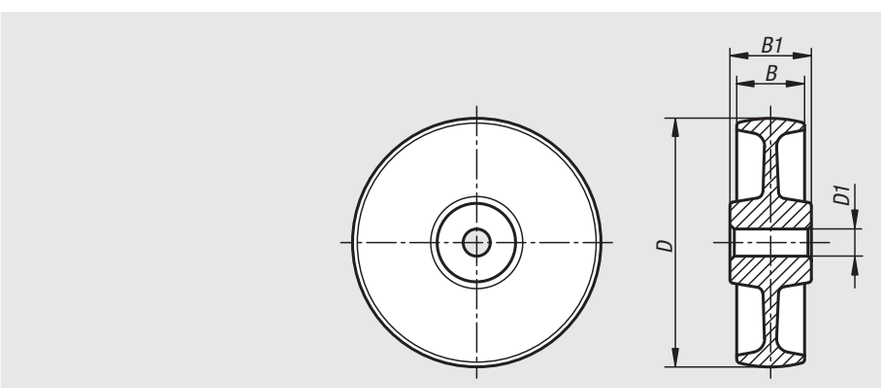
Note:
Extrathane treads are elastic, resist abrasion, gentle to floors, low-noise and have particularly high elastic restoration after long standing.
Application temperature from -40 °C to +80 °C.
Suitable as replacement rollers for the castors 95030 and 95032.

Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95060-12550	ball bearing	125	20	50	60	500
95060-16050	ball bearing	160	20	50	60	700
95060-20050	ball bearing	200	20	50	60	1000
95060-25060	ball bearing	250	25	60	70	1350

95062

Wheels polyamide





Material:
Polyamide

Sample order:
nlm 95062-12540

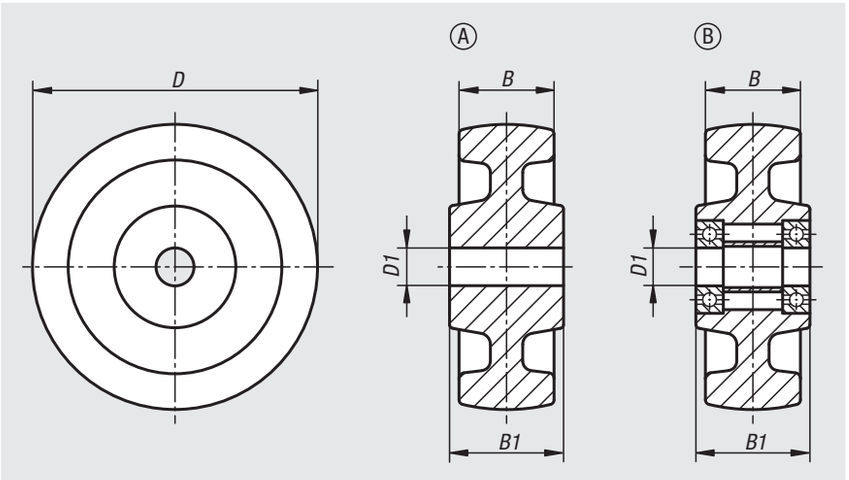
Note:
Polyamide wheels are unbreakable, non-corroding, shock and impact proof and chemical resistant.
They also have high abrasion resistance and low roll resistance.
Other sizes or with ball bearing on request.

Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95062-07532	plain bearing	75	12	32	35	200
95062-10037	plain bearing	100	15	37	45	280
95062-12540	plain bearing	125	15	40	45	300
95062-15050	plain bearing	150	20	50	60	400
95062-20050	plain bearing	200	20	50	60	600

Wheels polyamide

heavy-duty version





Material:
Polyamide

Sample order:
nlm 95064-10037

Note:
Polyamide wheels are unbreakable, non-corroding, shock and impact proof and chemical resistant.
They also have high abrasion resistance and low roll resistance.
Suitable as replacement rollers for the castors 95040.

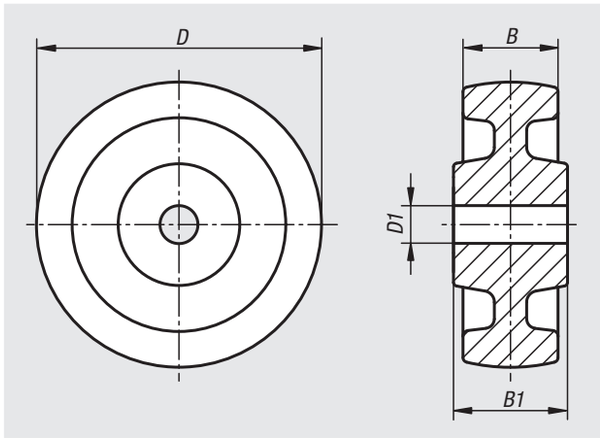
Drawing reference:
Form A: plain bearing
Form B: ball bearing

Order No.	Form	Wheel bearing	D	D1	B	B1	Permissible load kg
95064-07532	A	plain bearing	75	12	32	35	300
95064-10037	A	plain bearing	100	15	37	45	500
95064-12540	A	plain bearing	125	15	40	45	700
95064-15050	A	plain bearing	150	20	50	60	800
95064-20050	A	plain bearing	200	20	50	60	1500
95064-25065	A	plain bearing	250	25	65	65	2000
95064-075321	B	ball bearing	75	15	32	35	300
95064-100371	B	ball bearing	100	15	37	45	500
95064-125401	B	ball bearing	125	20	40	45	700
95064-150501	B	ball bearing	150	20	50	60	800
95064-200501	B	ball bearing	200	25	50	60	1500
95064-250651	B	ball bearing	250	25	65	65	2000

Thermoset wheels

heat-resistant





Material:
Thermoset PF.

Version:
Hardness Shore 90D, black.
Notch impact strength ca. 2.5 kJ/m².

Sample order:
nlm 95065-07528

Note:
Thermoset wheels for high-heat sectors, with exceptional running characteristics on smooth floors.

Excellent chemical resistance to many aggressive types of media. Typical uses are in hot plants, paint shops, bakers and smoking ovens.

Higher abrasion is unavoidable on rough floors. Running against curbs or bumps should be avoided due to the limited mechanical durability of phenolic resin.

Temperature range:
-35°C to +260°C, short-term up to +300°C.

Order No.	Wheel bearing	D	D1	B	B1	Permissible load kg
95065-07528	plain bearing	75	8,4	28	31	100
95065-10030	plain bearing	100	15,2	30	40	150
95065-10038	plain bearing	100	15,2	38	42	200
95065-12546	plain bearing	125	20,2	46	58	275
95065-15050	plain bearing	150	20,2	50	58	300
95065-20050	plain bearing	200	20,2	50	60	350
95065-25050	plain bearing	250	20,2	50	58	350

Elevating castors with foot

with bolt hole or mounting plate

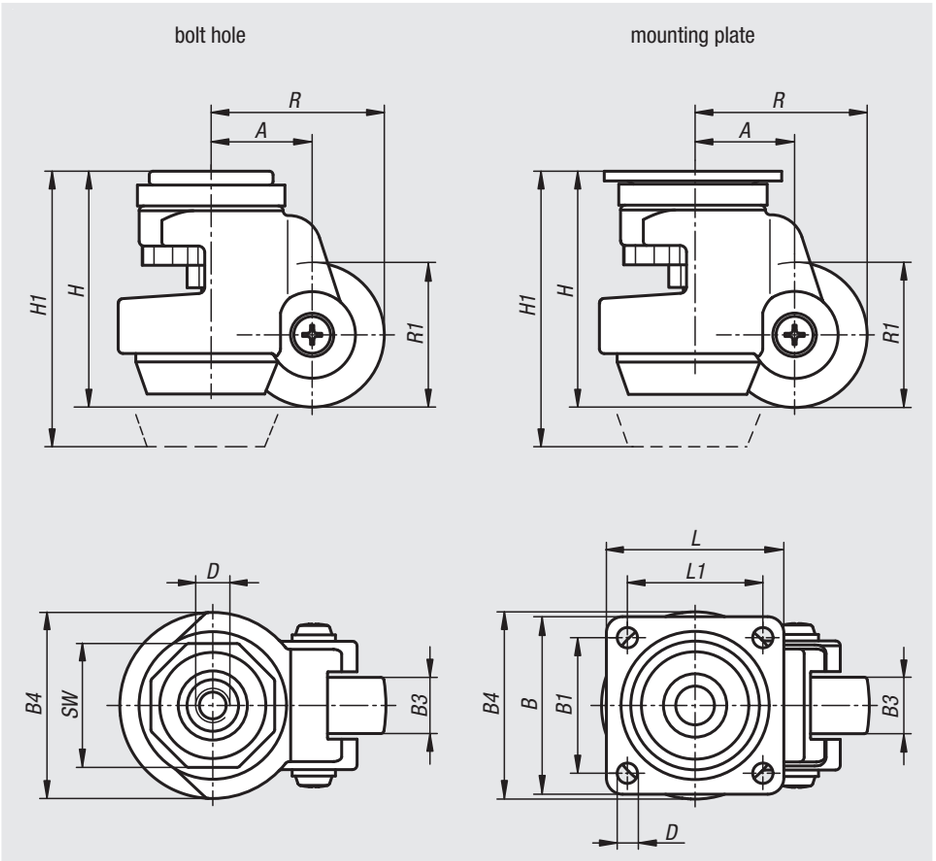


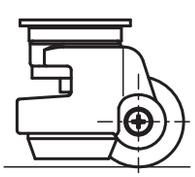
Material:
Housing die-cast aluminium.
Roller break resistant polyamide 6, Shore 70D.
Foot hard rubber.

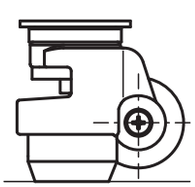
Version:
Housing, powder-coated, ivory.
Steel parts trivalent blue passivated.
Roller and foot black.

Sample order:
nlm 95090-045180

Note:
Elevating castor with foot. With sealed ball bearing in the swivel head. Height adjustment with a 13 mm spanner or by the integrated adjustment screw. Wheel axle bolted.





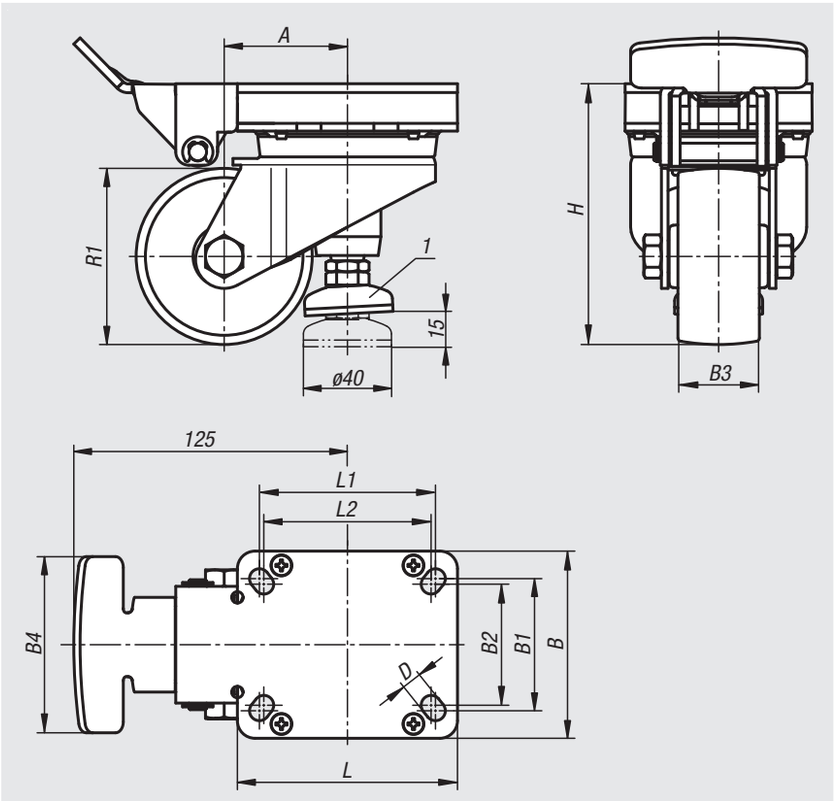


Order No.	Version	Wheel bearing	D	A	B	B1	B3	B4	H	H1	L	L1	R	R1	SW	Permissible load kg
95090-045180	with bolt hole	plain bearing	M8x12	32	-	-	18	58	72	82	-	-	54,5	45	40	180
95090-050220	with bolt hole	plain bearing	M12x15	38	-	-	22	72	84	94	-	-	63	50	46	250
95090-063290	with bolt hole	plain bearing	M12x15	46	-	-	29	85	104	119	-	-	77,5	63	65	500
95090-045181	with mounting plate	plain bearing	7	32	55	42	18	58	72	82	55	42	54,5	45	-	180
95090-050221	with mounting plate	plain bearing	7	38	73	58	22	72	84	94	73	58	63	50	-	250
95090-063291	with mounting plate	plain bearing	9	46	90	70	29	85	104	119	90	70	77,5	63	-	500

Elevating castors

with integrated machine foot





Material:
Housing steel plate.
Roller break resistant polyamide 6, Shore 70D.
Machine foot steel.

Version:
Housing trivalent blue passivated.
Roller white.
Machine foot electro zinc-plated with grey rubber pads.

Sample order:
nlm 95092-08037

Note:
Elevating castor swivel version with integrated levelling machine foot. With sealed ball bearing in the swivel head. Wheel axle bolted. The ergonomic form of the non-swivelling actuating lever enables ease of operation. The short actuation travel with simultaneous long plunger stroke and very high lifting force enables heavy weights to be easily raised and safely fixated.

Drawing reference:
1) swivelling



Order No.	Wheel bearing	D	A	B	B1	B2	B3	B4	H	L	L1	L2	R1	Permissible load kg
95092-08037	plain bearing	9	56	85	60	55	37	80	120	100	80	76	80	230
95092-10037	plain bearing	9	65	85	60	55	37	80	142	100	80	76	100	230

Notes

Mounting instructions and specifications
Ball transfer units

Ball transfer units allow bulky goods to be easily transported, rotated and directed. They have long proven their worth in conveyor systems, feeder systems, machining centres and packaging plants.

Applications:

Conveyor technology

– ball pallets, rotary tables and sorting and distribution switch points
– crossing points in permanent conveyance systems
– Airport luggage sorting plants
– Steel pipe transport
– Lifting platforms

General machine shops

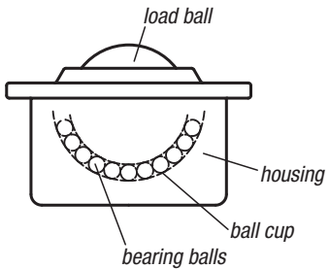
– Feed tables for sheetmetal handling machines
– Fixtures for bending machines
– Conveyors for machining centres
– Motor driven assembly aids in heavy engineering

Other applications

– Custom machine construction
– Aerospace technology
– Beverage production
– Stone processing

Ball transfer units have a steel housing with a hardened ball cup. This serves as the track for a number of small bearing balls. These bearing balls roll in the cup with the rotation of the load ball.

Ball transfer units are designed so that precise rolling and load carrying is guaranteed in all positions. Ball transfer units are low maintenance and almost all types have an oil soaked felt seal to protect from dirt.



Calculating the ball transfer unit loading

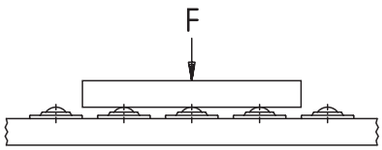
To calculate the loading for ball transfer units, divide the weight of the transported goods by 3. With good coordination of the load ball surface and, depending on the properties of the goods transported, the number of load bearing ball transfer units can also be calculated.

Example:

Weight of the transported goods = 300 kg

Ball transfer unit loading:

$$F = \frac{300\ kg}{3} = 100\ kg$$



Arrangement of the ball transfer units

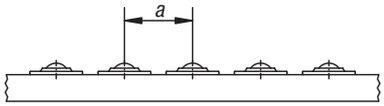
The arrangement of the ball transfer units depends on the surface area of the goods to be transported. By goods with a uniform, level surface area, such as the base of boxes, the distance between the ball transfer units is simply calculated from the length of the shortest edge divided by 2.5.

Example:

Surface area of goods
= 500 x 1000 mm

Distance between ball transfer units:

$$a = \frac{500\ mm}{2,5} = 200\ mm$$



Transport speed and load capacity

The recommended conveyance speed is 1 m/sec. With polyamid load balls 0.25 m/sec. The specified load rating applies to all mounting positions and relates to 106 revolutions of the load ball. By extended use in excess of 1 m/sec and depending on the loading, the temperature can be expected to rise and the useful life reduced, particularly with balls Ø60 to Ø90.

Calculating the lifespan

$$L = \left(\frac{C}{F}\right)^3 . 10^6 \quad revs$$

L = lifespan
C = load rating (N)
F = loading (N)

Attention:
Use high temperature lubricant!
Follow manufacturer's instructions!
It is possible that the existing lubrication oil may have to be washed out.

Temperature load ball		Temperature factor fT
steel °C	polyamid °C	
125	40	0,9
150	50	0,8
175	60	0,7
-	70	0,6
200	80	0,5

Temperature resistance

For ball transfer units with a felt seal the temperature resistance is 100 °C by constant temperature.

Only non-galvanised ball transfer units with a steel ball and no felt seal can be used at temperatures in excess of 100 °C. Note the load rating reduction! Multiply the load rating by the temperature factor (table).

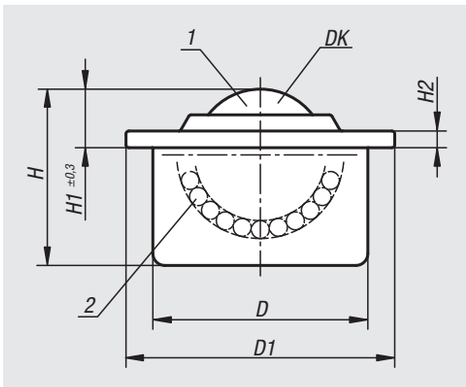
Calculating the loading by undersprung ball transfer units.

For these types the determining factor is the value given in the "Pre-tension" column of the table. The weight of the transported goods is divided by the number of supporting ball transfer units.

Ball transfer units

with steel housing





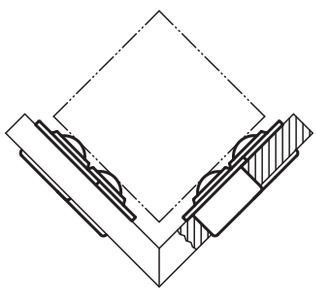
Material:
Electro zinc-plated steel or stainless steel.

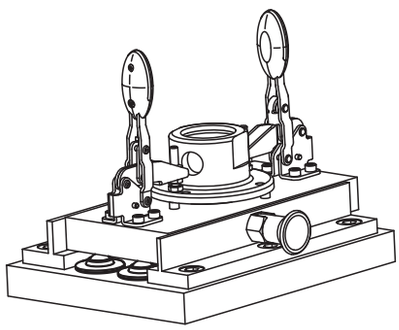
Sample order:
nlm 95150-122

Note:
Ball transfer units with steel housing have a felt seal to protect against dirt.
95150-115 has no felt seal.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, balls steel
Form C: cap and housing electro zinc-plated, balls stainless steel
Form D: cap, housing and balls stainless steel



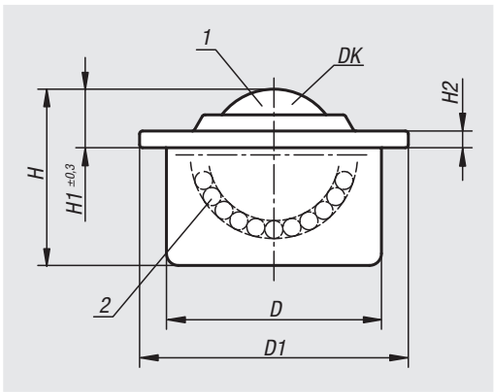


Order No.	Form	DK	D	D1	H	H1	H2	Load rating C (N)	Suitable tolerance ring
95150-115	B	15,8	24±0,065	31	21	9,5	2,8	600	95164-024
95150-122	B	22,2	36±0,080	45	30	9,8	2,8	1600	95164-036
95150-130	B	30	45±0,080	55	37	13,8	4	3000	95164-045
95150-145	B	44,5	62±0,095	75	53,5	19	4	6100	95164-062
95150-215	C	15,8	24±0,065	31	21	9,5	2,8	600	95164-024
95150-222	C	22,2	36±0,080	45	30	9,8	2,8	1600	95164-036
95150-230	C	30	45±0,080	55	37	13,8	4	3000	95164-045
95150-245	C	44,5	62±0,095	75	53,5	19	4	6100	95164-062
95150-315	D	15,8	24±0,065	31	21	9,5	2,8	380	95164-024
95150-322	D	22,2	36±0,080	45	30	9,8	2,8	1000	95164-036
95150-330	D	30	45±0,080	55	37	13,8	4	2000	95164-045

Ball transfer units

with steel housing and plastic ball





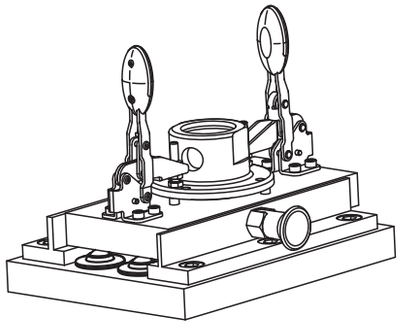
Material:
Electro zinc-plated steel.
Polyamid PA 66 ball.

Sample order:
nlm 95152-122

Note:
Ball transfer units with plastic balls are particularly suitable for transporting sensitive materials such as polished aluminium, brass and steel sheets or glass. They have a felt seal to protect against dirt.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, bearing balls steel.
Form C: cap and housing electro zinc-plated, bearing balls stainless steel

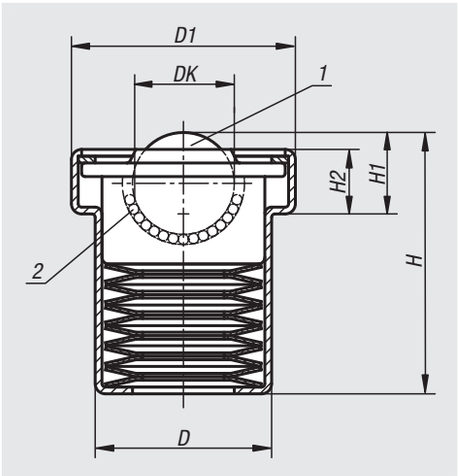


Order No.	Form	DK	D	D1	H	H1	H2	Load rating C (N)	Suitable tolerance ring
95152-115	B	15,8	24±0,065	31	21	9,5	2,8	100	95164-024
95152-122	B	22,2	36±0,080	45	30	9,6	2,8	200	95164-036
95152-130	B	30	45±0,080	55	37	13,6	4	250	95164-045
95152-215	C	15,8	24±0,065	31	21	9,5	2,8	100	95164-024
95152-222	C	22,2	36±0,080	45	30	9,6	2,8	200	95164-036
95152-230	C	30	45±0,080	55	37	13,6	4	250	95164-045

Ball transfer units

undersprung





Material:
Steel electro zinc-plated.

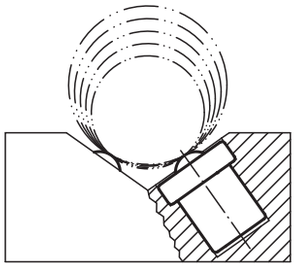
Sample order:
nlm 95154-122

Note:
Undersprung ball transfer units allow for even distribution of loads for goods with uneven surfaces.
When used in machines such as punch presses and bend form machines the ball rollers spring back up after the forming process and the finished article can be rolled off.

By the “End tension (N)” the ball has completely receded into the housing.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, balls steel
Form C: cap and housing electro zinc-plated, balls stainless steel



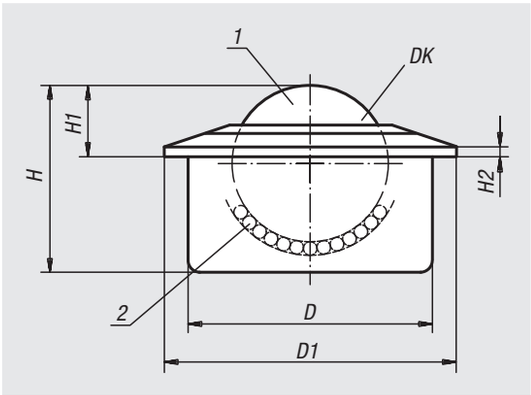
Order No.	Form	DK	D	D1	H	H1	H2	Pre-tension (N)	End tension (N)	Tol. for pre and end tension (%)
95154-122	B	22,2	39	50	51,5	18,5	14	730	860	+25 / -7,5
95154-130	B	30	48,2	62	70	24,4	17,7	1350	1600	+15 / -7,5
95154-145	B	45	66,4	85	100,5	35,6	24,2	2280	2770	+15 / -7,5
95154-222	C	22,2	39	50	51,5	18,5	14	730	860	+25 / -7,5
95154-230	C	30	48,2	62	70	24,4	17,7	1350	1600	+15 / -7,5
95154-245	C	45	66,4	85	100,5	35,6	24,2	2280	2770	+15 / -7,5

95156

Ball transfer units

with solid steel housing





Material:
Steel electro zinc-plated.

Sample order:
nlm 95156-160

Note:
Ball transfer units with solid housings remain functional even under heavy impact loads and extreme conditions.
They have a felt seal to protect against dirt.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, balls steel
Form C: cap and housing electro zinc-plated, balls stainless steel

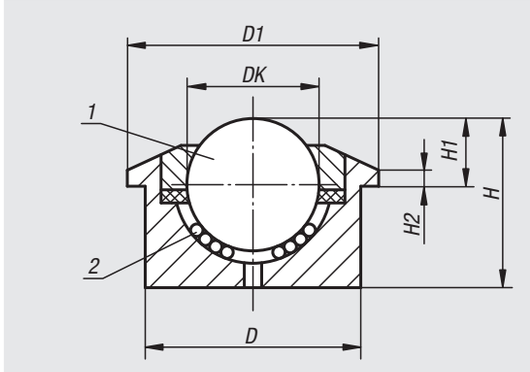
Order No.	Form	DK	D	D1	H	H1	H2	Load rating C (N)	Suitable tolerance ring
95156-160	B	57,1	100±0,1	117	77,5	29,5	5	15000	95164-100
95156-260	C	57,1	100±0,1	117	77,5	29,5	5	10000	95164-100

95156-01

Ball transfer units heavy duty

stainless steel





Material:
Balls stainless steel 1.4021.
Housing stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 95156-01-322

Note:
Solid steel ball transfer units are designed for long life by impact loading.
The unit includes dust seals and self-cleaning apertures.
All units are supplied with solid steel housings and hardened surfaces.

Drawing reference:
1) load ball
2) bearing balls

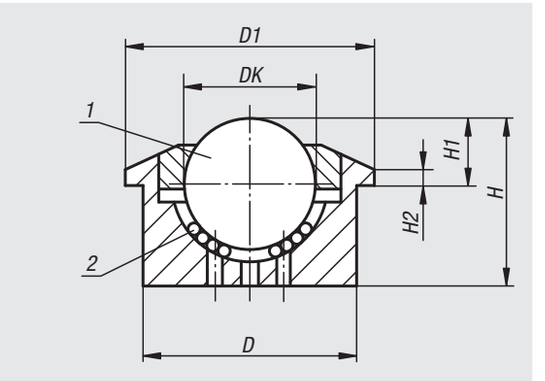
Order No.	DK	D1	D	H	H1	H2	Load rating C (N)
95156-01-322	22,2	45	36±0,080	30,5	9,8±0,2	3	1200
95156-01-330	30	55	45±0,080	36,8	13,8±0,2	3,4	2000
95156-01-345	44,5	75	62±0,1	53,5	19	3,8	3000

95156-02

Ball transfer units heavy duty

stainless steel, suitable for outdoor use





Material:
Balls stainless steel 1.4021.
Housing stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 95156-02-330

Note:
Solid steel ball transfer units are designed for long life by impact loading.
All units are supplied with solid steel housings and hardened surfaces.
The large number of self-cleaning apertures give the ball transfer units a high self-cleaning efficiency making them suitable for outdoor use.

Drawing reference:
1) load ball
2) bearing balls

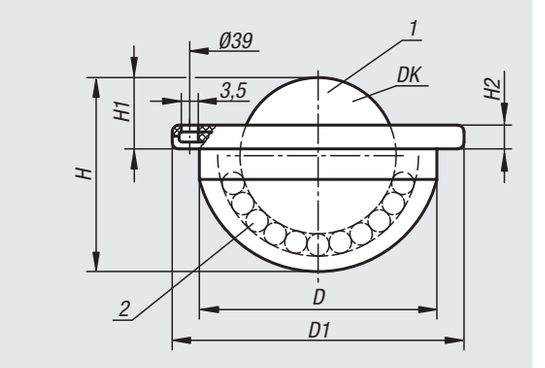
Order No.	DK	D1	D	H	H1	H2	Load rating C (N)
95156-02-330	30	55	45±0,080	36,8	13,8±0,2	3,4	2000
95156-02-345	44,5	75	62±0,1	53,5	19	3,8	3000

95158

Ball transfer units

with fastening holes, without housing





Material:
Steel electro zinc-plated.

Sample order:
nlm 95158-122

Note:
Ball transfer units with fastening holes for easy installation and removal.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, balls steel
Form C: cap and housing electro zinc-plated, balls stainless steel

Order No.	Form	DK	D	D1	H	H1	H2	No. of fastening holes	Load rating C (N)
95158-122	B	22	33-0,2	45	27,7	9,8±0,2	5	3	1200
95158-222	C	22	33-0,2	45	27,7	9,8±0,2	5	3	900

95160

Ball transfer units

with spring clips



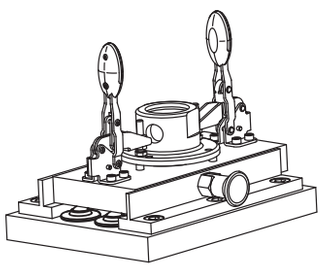
Material:
Steel electro zinc-plated.

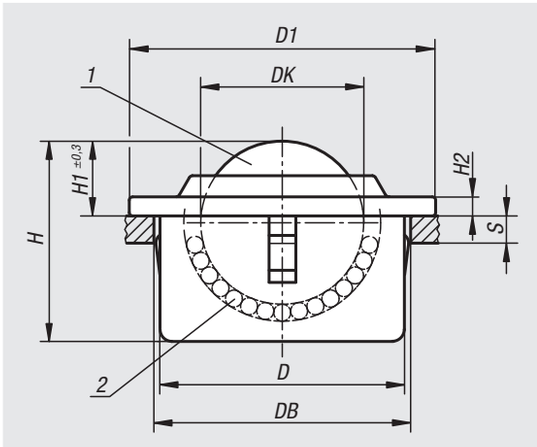
Sample order:
nlm 95160-122

Note:
Ball transfer units with spring clips for easy installation and removal from the functional side. The roller is held in place with spring clips, this permits generous tolerances in the receiving hole.
They have a felt seal to protect against dirt.
S = Minimum nominal thickness of mounting base.

Drawing reference:
1) load ball
2) bearing balls

Form B: cap and housing electro zinc-plated, balls steel
Form C: cap and housing electro zinc-plated, balls stainless steel





Order No.	Form	DK	D	D1	Receiver-Ø DB	H	H1	H2	S	Load rating C (N)
95160-115	B	15,8	24±0,1	31	25 +0,5	21	9,5	2,8	2	600
95160-122	B	22,2	-	45	37 +0,5	30	9,8	2,8	3	1600
95160-130	B	30	45±0,1	55	46 +0,5	37	13,8	4	6	3000
95160-215	C	15,8	24±0,1	31	25 +0,5	21	9,5	2,8	2	600
95160-222	C	22,2	-	45	37 +0,5	30	9,8	2,8	3	1600
95160-230	C	30	45±0,1	55	46 +0,5	37	13,8	4	6	3000

95164

Tolerance rings

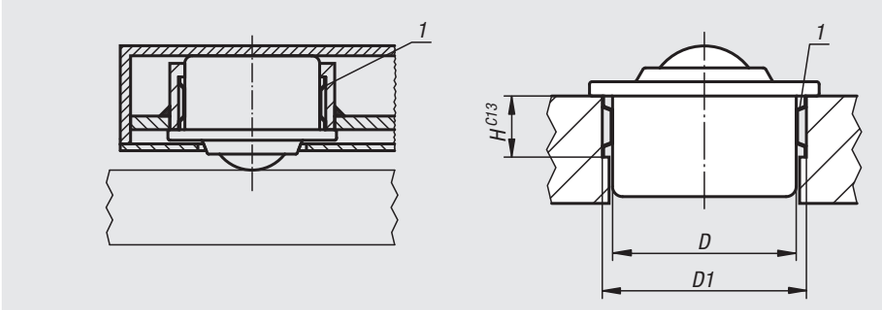


Material:
Spring band steel

Sample order:
nlm 95164-024

Note:
The use of tolerance rings allows for a greater tolerance range between the parts being assemble.
The ball transfer units can be fitted quickly and cost effectively.

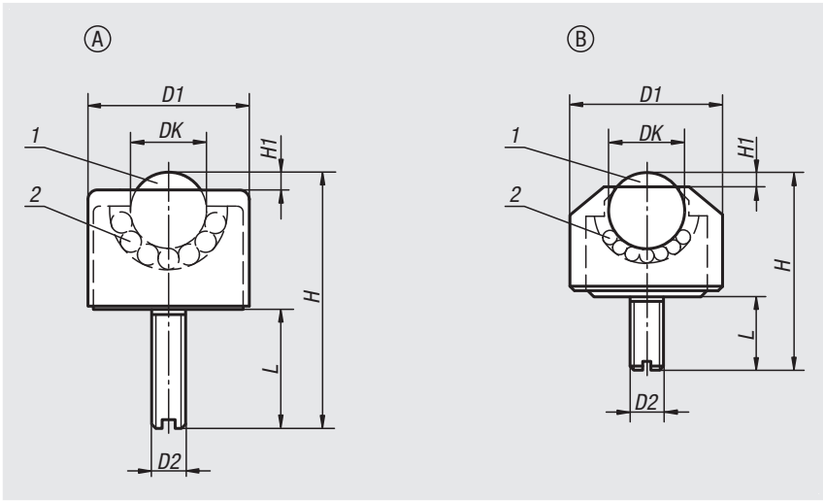
Drawing reference:
1) tolerance ring



Order No.	D	Assembly dimensions D1	Assembly dimensions H
95164-024	24	25,7 +0,2	7
95164-036	36	37,7 +0,2	12
95164-045	45	46,7 +0,2	12
95164-062	62	64,1 +0,3	15
95164-100	100	102,5 +0,35	19

Ball transfer units mini





Material:
Steel version:
Load ball steel.
Bearing balls steel.
Housing electro zinc-plated steel.
Cover electro zinc-plated steel.

Stainless steel version:
Load ball stainless steel.
Bearing balls stainless steel.
Housing stainless steel.
Cover aluminium.

Sample order:
nlm 95180-1105

Note:
The ball transfer units comprise a housing with integrated bearing shell, a cover, a load ball and several supporting balls. For use in measuring instruments, material conveyance in clean rooms and miniature mechanisms.

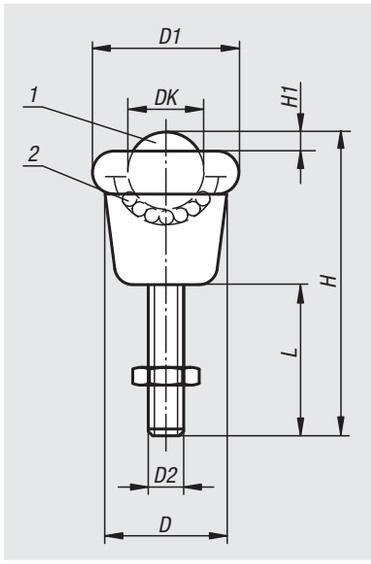
Drawing reference:
1) load ball
2) bearing balls

Order No.	Form	Main material	DK	D1	D2	H	H1	L	Load rating C (N)
95180-1105	A	steel	4,8	13	M6	24	1	15	100
95180-1106	A	steel	6,4	17	M6	26	2	15	200
95180-1108	A	steel	7,9	18	M8	32	2	18	300
95180-1110	A	steel	9,6	23	M8	40	2	20	400
95180-1113	A	steel	12,7	28	M8	48	3,5	23	500
95180-1216	B	steel	15,8	24	M6	32,5	4	12	700
95180-2205	B	stainless steel	4,8	8	M2	8,5	1	2,5	50
95180-2206	B	stainless steel	6,4	13	M3	16,5	2	6	100
95180-2208	B	stainless steel	7,9	15	M4	20,5	2	8	150

Ball transfer units with stud

stainless steel





Material:
Balls stainless steel 1.4021.
Housing stainless steel 1.4301.

Version:
Bright.

Sample order:
nlm 95182-01-190820

Note:
The ball transfer units has a large support area.
The stud fastening allows for high stability and heavy loading.
The formed wiper seal is external.

Drawing reference:
1) load ball
2) bearing balls

Order No.	DK	D	D1	D2	H	H1	L	Tightening torque of screws Nm	Load rating C (N)
95182-01-190820	19	25,4	32,1	M8	50,2	4,7	20	15	250
95182-01-190835	19	25,4	32,1	M8	65,2	4,7	35	15	250

Small conveyor belts

with internal drive



Material:
Frame aluminium profile 45x45 type B.
Bearing flanges aluminium.
Screws steel.
Belt support stainless steel 1.4301.
Deflector rollers aluminium.
Belt support plate 2 mm VA plate.
Axles stainless steel.
Conveyor belt transport side PVC hardness Shore 70A (±5).

Version:
Frame and bearing flanges anodised.
Screws electro zinc-plated.

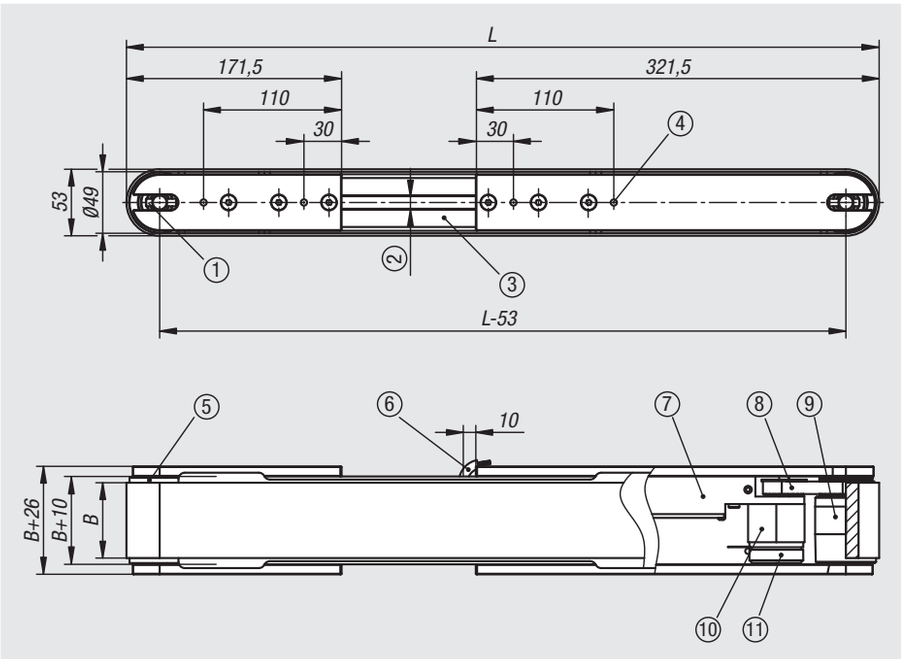
Sample order:
nlm 95300-010047060X520

Note:
- internal drive
- 24 V DC electrically commutated, highly durable
- minimum installation space, no protruding edges
- integrated control technology
- widths and lengths in 1 mm increments on request
- flexible mounting options with profile system type B
- motor externally adjustable via control cables
- running side of the conveyor belt fabric polyurethane impregnated (TPU)
- conveyor belt fabric polyester (PET)
- conveyor belt transport side has a smooth surface

Assembly:
Electrical connections/functions (7-wire cable with exposed ends 5 m):

white: +24 V power supply +24 V, protected against polarity reversal
brown: -Gnd power supply -24 V protected against polarity reversal
green: direction switched to Gnd, changes the direction
yellow: disable switched to Gnd, belt stops
grey: brake switched to Gnd, briefly closes the winding, belt brakes
pink: speed 0–5 V speed control from 1.25% to 100% of nominal speed
blue: monitor N digital speed output

On request:
- belt width B from 60 to 400 mm
- overall length L from 520 to 2000 mm
- other belt materials
- other transmission ratios



Technical data:
- nominal voltage: 24 V
- type power: 30 W
- starting current: 2 A
- motor speed: 5000 rpm
- cable length: 5 m
- conveyor belt thickness: max. 2 mm
- cable outlet: right (standard)

Conveyor belt drive:
- brushless EC motor 24 V, 30 W
- control electronics integrated in conveyor belt
- spur gear transmission
- toothed belt drive underneath conveyor belt

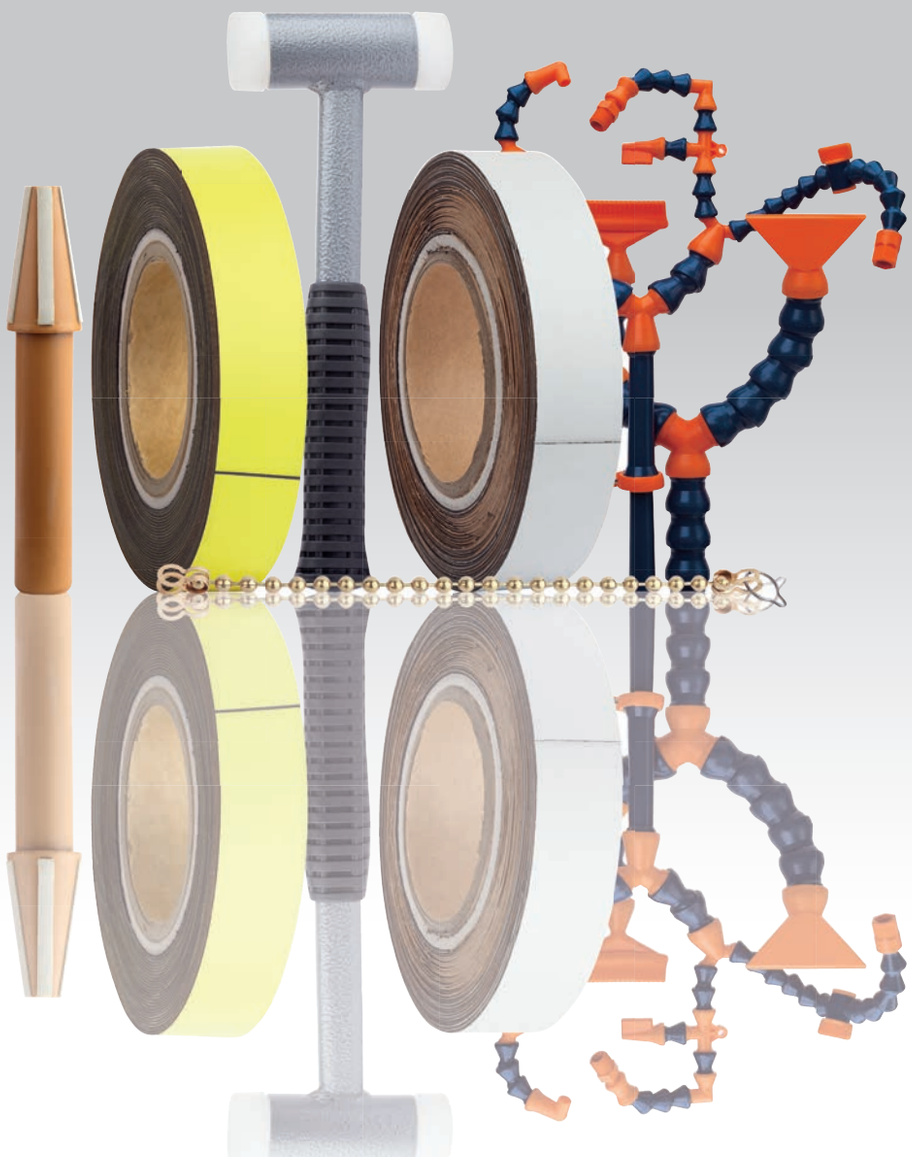
Drawing reference:
1) Self-locking setscrew (4x)
2) Slot width 10
3) Aluminium profile 45x45 type B
4) M6 (both sides)
5) Crowned pulley
6) Cable, 7 wire, 5 m
7) Motor control housing
8) Toothed belt profile T5
9) Drive roller, crowned
10) Spur gear transmission
11) Motor 24 V EC (brushless)

Order No.	B	L	Belt speed m/min max.	Transmission ratio	Max. load kg	Belt material transport side
95300-010047060X520	60	520	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047060X750	60	750	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047060X1000	60	1000	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047060X1500	60	1500	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047100X520	100	520	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047100X750	100	750	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047100X1000	100	1000	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047100X1500	100	1500	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047150X520	150	520	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047150X750	150	750	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047150X1000	150	1000	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047150X1500	150	1500	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047200X520	200	520	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047200X750	200	750	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047200X1000	200	1000	11,5	1:47	3	smooth PVC, Shore 70A
95300-010047200X1500	200	1500	11,5	1:47	3	smooth PVC, Shore 70A

Notes

96000

Coolant hoses
Feeler gauge strips
Magnetic labels and envelopes
Protective nets
Supercraft mallets and inserts
Taper and cylinder cleaners



Coolant hose LOC-LINE® Flexi





Material:
Polyoxymethylene (POM).

Version:
Flexible hose blue or black.
Accessories orange .

Sample order:
nlm 96200-1400141

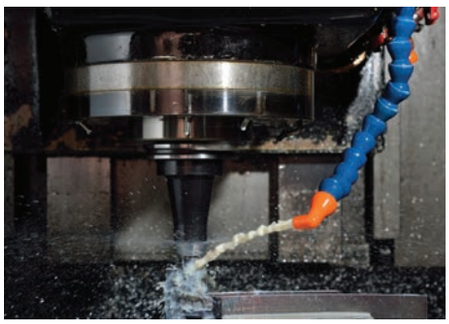
Note:
The flexible hose is used to direct liquids or extract liquids, dust, steam or smoke. It can be extended and shortened as needed. The material is resistant to most chemicals and solvents. It is not electrically conductive, so it is also suitable for use on EDM's.

Precise adjustment, vibration resistant, position reliability, pressure stability. Freely combinable with nozzles, fasteners, junctions, T-pieces, reducers, extensions etc.

Recommneded line pressure:
Size 1/4″ 2 - 3.5 bar
Size 1/2″ 1.4 - 2 bar
Size 3/4″ 0.7 - 1.4 bar

Flow rate:
Size 1/4″ 950 l/min.
Size 1/2″ 1800 l/min.
Size 3/4″ 4300 l/min.

Temperature range:
-20 °C to +80 °C.



90° angle nozzle ø6



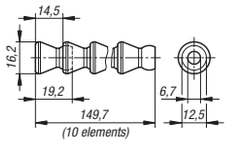
Flat nozzle with joint
16 hole ø1.5



Ring system

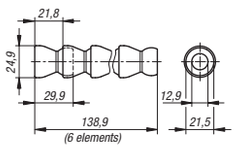
Coolant hose LOC-LINE® Flexi

1/4”

Order No.	Image	Article description	Application
96200-1400141		FLEXIBLE HOSE SIZE:1/4 L=140, BLUE	
96200-1400142		FLEXIBLE HOSE SIZE:1/4 L=140, BLACK	
96200-1415001		FLEXIBLE HOSE SIZE:1/4 L=15M, BLUE	
96200-1415002		FLEXIBLE HOSE SIZE:1/4 L=15M, BLACK	
96200-1401		ROUND NOZZLE SIZE:1/4, D=1,5	punctiform jet
96200-1402		ROUND NOZZLE SIZE:1/4, D=3	punctiform jet
96200-1403		ROUND NOZZLE SIZE:1/4, D=6	punctiform jet
96200-1404		FLAT NOZZLE WIDE SPRAY SIZE:1/4 B=25	flat wide jet
96200-1405		FLAT NOZZLE SIZE:1/4 B=12X1	jet with constant profile
96200-1406		FLAT NOZZLE SIZE:1/4 B=12X1,5	jet with constant profile
96200-1407		FLAT NOZZLE SIZE:1/4, 5-HOLE	several parallel single jets
96200-1408		FLAT NOZZLE SIZE:1/4, 7-HOLE	several parallel single jets
96200-1409		GRINDING NOZZLE SIZE:1/4 B=25	straight bundled jet
96200-1410		FLAT NOZZLE WITH BALL JOINT SIZE:1/4, 16-HOLE, D=1	several parallel single jets
96200-1411		FLAT NOZZLE WITH BALL JOINT SIZE:1/4, 16-HOLE, D=1,5	several parallel single jets
96200-1412		FLAT NOZZLE WITH BALL JOINT SIZE:1/4, 20-HOLE, D=2	several parallel single jets
96200-1413		ANGLED NOZZLE 90° SIZE:1/4, D=1,5	punctiform jet
96200-1414		ANGLED NOZZLE 90° SIZE:1/4, D=3	punctiform jet
96200-1415		ANGLED NOZZLE 90° SIZE:1/4, D=6	punctiform jet
96200-1416		ANGLED NOZZLE 90° SIZE:1/4, 6-HOLE	several parallel single jets
96200-1417		SCREW CONNECTION 1/8 NPT SIZE:1/4	with ball and male thread
96200-1418		SCREW CONNECTION 1/4 NPT SIZE:1/4	with ball and male thread
96200-1419		DISTRIBUTOR SIZE:1/4	2 hoses from 1 supply line
96200-1420		DISTRIBUTOR SIZE:1/4	2 hoses at 90° from 1 supply line
96200-1421		CONNECTING PIECE SIZE:1/4	for tight bends
96200-1422		COUPLING SIZE:1/4	socket both sides
96200-1423		ADAPTER SIZE:1/4, D=1/8	with socket and female thread
96200-1424		EXTENSION SIZE:1/4 L=95	for bridging long stretches
96200-1425		HOSE BEND 90° SIZE:1/4	for bends
96200-1426		RING SYSTEM SIZE:1/4	lateral spray
96200-1427		LOCKING RING WITH SCREW SIZE:1/4	prevents bending or positional change at high pressure
96200-1428		CHECK VALVE SIZE:1/4	prevents dripping
96200-1429		SHUT-OFF VALVE EXTERNAL THREAD SIZE:1/4, 1/4 NPT	regulates and stops the flow
96200-1430		SHUT-OFF VALVE INTERNAL THREAD SIZE:1/4, 1/4 NPT	regulates and stops the flow
96200-1431		SHUT-OFF VALVE WITH SEGMENT ADAPTER SIZE:1/4	regulates and stops the flow
96200-1499		ASSEMBLY TOOL SIZE:1/4	for assembling hose elements

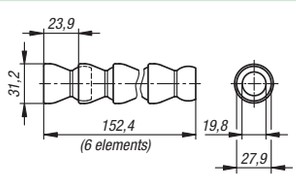
Coolant hose LOC-LINE® Flexi

1/2”

Order No.	Image	Article description	Application
96200-1200141		FLEXIBLE HOSE SIZE:1/2 L=140, BLUE	
96200-1200142		FLEXIBLE HOSE SIZE:1/2 L=140, BLACK	
96200-1215001		FLEXIBLE HOSE SIZE:1/2 L=15M, BLUE	
96200-1215002		FLEXIBLE HOSE SIZE:1/2 L=15M, BLACK	
96200-1201		ROUND NOZZLE SIZE:1/2, D=6	punctiform jet
96200-1202		ROUND NOZZLE SIZE:1/2, D=9	punctiform jet
96200-1203		ROUND NOZZLE SIZE:1/2, D=12	punctiform jet
96200-1204		FLAT NOZZLE WIDE SPRAY SIZE:1/2 B=32	flat wide jet
96200-1205		FLAT NOZZLE WIDE SPRAY SIZE:1/2 B=63	flat wide jet
96200-1206		FLAT NOZZLE SIZE:1/2 B=18X2	jet with constant profile
96200-1207		FLAT NOZZLE SIZE:1/2 B=18X3,2	jet with constant profile
96200-1208		FLAT NOZZLE SIZE:1/2, 5-HOLE, D=3,2	several parallel single jets
96200-1209		FLAT NOZZLE SIZE:1/2, 7-HOLE, D=2	several parallel single jets
96200-1210		GRINDING NOZZLE SIZE:1/2 B=32	straight bundled jet
96200-1211		GRINDING NOZZLE SIZE:1/2 B=42	straight bundled jet
96200-1212		FLAT NOZZLE WITH BALL JOINT SIZE:1/2, 20-HOLE, D=2	several parallel single jets
96200-1213		ANGLED NOZZLE 90° SIZE:1/2, D=6	punctiform jet
96200-1214		ANGLED NOZZLE 90° SIZE:1/2, D=9	punctiform jet
96200-1215		ANGLED NOZZLE 90° SIZE:1/2, D=12	punctiform jet
96200-1216		ANGLED NOZZLE 90° SIZE:1/2, 8-HOLE	several parallel single jets
96200-1217		SCREW CONNECTION 3/8 NPT SIZE:1/2	with ball and male thread
96200-1218		SCREW CONNECTION 1/2 NPT SIZE:1/2	with ball and male thread
96200-1219		DISTRIBUTOR SIZE:1/2	2 hoses from 1 supply line
96200-1220		DISTRIBUTOR REDUCED SIZE:1/2-1/4	2 hoses from 1 supply line
96200-1221		DISTRIBUTOR SIZE:1/2	2 hoses at 90° from 1 supply line
96200-1222		CONNECTING PIECE SIZE:1/2	for tight bends
96200-1223		COUPLING SIZE:1/2	socket both sides
96200-1224		REDUCING BUSH SIZE:1/2-1/4	reduces from 1/2“ to 1/4“
96200-1225		EXTENSION SIZE:1/2 L=95	for bridging long stretches
96200-1226		HOSE BEND 90° SIZE:1/2	for bends
96200-1227		RING SYSTEM SIZE:1/2	lateral spray
96200-1228		LOCKING RING WITH SCREW SIZE:1/2	prevents bending or positional change at high pressure
96200-1229		CHECK VALVE SIZE:1/2	prevents dripping
96200-1230		SHUT-OFF VALVE EXTERNAL THREAD SIZE:1/2, 1/2 NPT	regulates and stops the flow
96200-1231		SHUT-OFF VALVE INTERNAL THREAD SIZE:1/2, 1/2 NPT	regulates and stops the flow
96200-1232		SHUT-OFF VALVE WITH SEGMENT ADAPTER SIZE:1/2	regulates and stops the flow
96200-1299		ASSEMBLY TOOL SIZE:1/2	for assembling hose elements

Coolant hose LOC-LINE® Flexi

3/4”

Order No.	Image	Article description	Application
96200-3400151		FLEXIBLE HOSE SIZE:3/4 L=152, BLUE	
96200-3400152		FLEXIBLE HOSE SIZE:3/4 L=152, BLACK	
96200-3401501		FLEXIBLE HOSE SIZE:3/4 L=1,5M, BLUE	
96200-3401502		FLEXIBLE HOSE SIZE:3/4 L=1,5M, BLACK	
96200-3415001		FLEXIBLE HOSE SIZE:3/4 L=15M, BLUE	
96200-3415002		FLEXIBLE HOSE SIZE:3/4 L=15M, BLACK	
96200-3401		ROUND NOZZLE SIZE:3/4, D=16	punctiform jet
96200-3402		ROUND NOZZLE SIZE:3/4, D=19	punctiform jet
96200-3403		FLAT NOZZLE WIDE SPRAY SIZE:3/4 B=76	flat wide jet
96200-3404		SCREW CONNECTION NPT 3/4 SIZE:3/4	with ball and male thread
96200-3405		SCREW CONNECTION BSPT 3/4 SIZE:3/4	with ball and male thread
96200-3406		CONNECTING FOOT WITH SCREW HOLE SIZE:3/4	-
96200-3407		DISTRIBUTOR SIZE:3/4	2 hoses from 1 supply line
96200-3408		DISTRIBUTOR REDUCED SIZE:3/4-1/2	reduces from 3/4“ to 1/2“
96200-3409		REDUCING BUSH SIZE:3/4-1/2	reduces from 1/2“ to 1/4“
96200-3410		COUPLING SIZE:3/4	socket both sides
96200-3411		CONNECTING PIECE SIZE:3/4	for tight bends
96200-3412		SHUT-OFF VALVE EXTERNAL THREAD SIZE:3/4, NPT 3/4	regulates and stops the flow
96200-3413		SHUT-OFF VALVE INTERNAL THREAD SIZE:3/4, NPT 3/4	regulates and stops the flow
96200-3414		SHUT-OFF VALVE WITH SEGMENT ADAPTER SIZE:3/4	regulates and stops the flow
96200-3499		ASSEMBLY TOOL SIZE:3/4	for assembling hose elements

Suction hoses LOC-LINE® Flexi 75



Material:
Polyoxymethylene (POM).

Version:
Flexible hose, blue.
Accessories, orange.

Sample order:
nlm 96202-75300

Note:
Flexible hose for extracting swarf, smoke, lubricant mist, steam, gases and other media; can be connected to a central extraction system or an industrial vacuum cleaner. It can be extended and shortened as needed. Free hanging lengths of up to 100 cm are possible without the need for support; 360° loops can be formed with a radius of 150 mm. Precise adjustment, vibration resistant, position reliability. Combinable with nozzles and accessories as required.

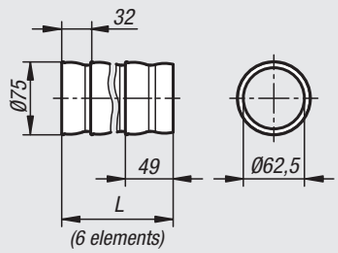
Resistant to: acids below 65 °C, alcohols, aromatic solvents, petrol, grease, hydrocarbons, oil, saline solutions.

Not resistant to: chlorine, acetone, chlorinated solvents, strong bases, ethyl acetate, water above 65 °C.

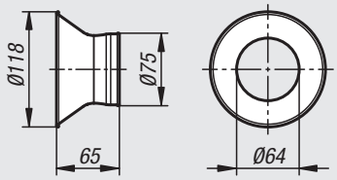
The material is not electrically conductive, so it is also suitable for use on EDM's.

Temperature range:
Maximum temperature 80 °C.
The melting point is 165 °C.

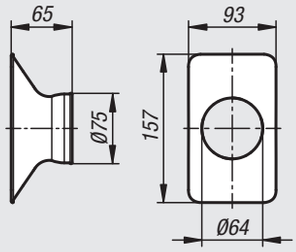
96202-75300



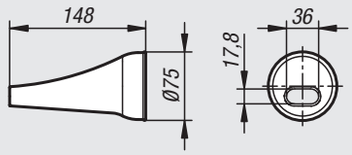
96202-7501



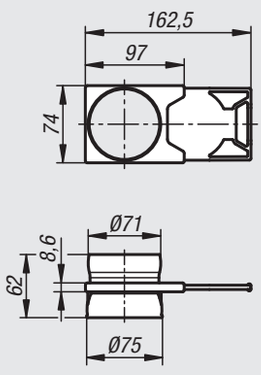
96202-7502



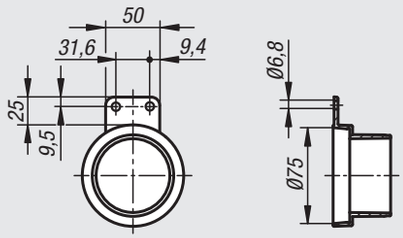
96202-7503



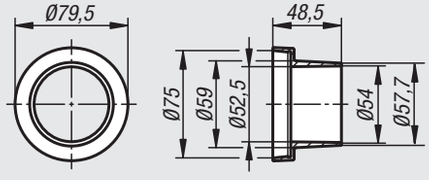
96202-7504



96202-7505



96202-7506



Order No.	Image	Article description
96202-75300		FLEXIBLE HOSE SIZE:75 L=300, BLUE
96202-7501		ROUND NOZZLE SIZE:75
96202-7502		RECTANGULAR NOZZLE SIZE:75
96202-7503		OVAL NOZZLE CONICAL SIZE:75
96202-7504		GATE VALVE SIZE:75
96202-7505		ADAPTER F. INDUST. VACUUM CLEANER SIZE:75
96202-7506		ADAPTER F. INDUST. VACUUM CLEANER SIZE:75

Suction hoses LOC-LINE® Flexi 75

antistatic



Material:
Electrically conductive polyoxymethylene (POM).

Version:
Flexible hose, black.
Accessories, black.

Sample order:
nlm 96203-75300

Note:
Flexible hose for extracting swarf, smoke, lubricant mist, steam, gases and other media; can be connected to a central extraction system or an industrial vacuum cleaner. It can be extended and shortened as needed. Free hanging lengths of up to 100 cm are possible without the need for support; 360° loops can be formed with a radius of 150 mm. Precise adjustment, vibration resistant, position reliability. Combinable with nozzles and accessories as required.

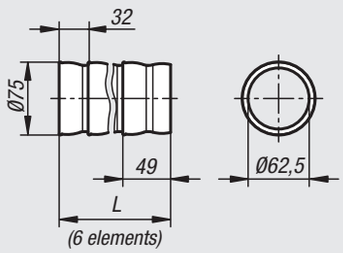
Resistant to: acids below 65 °C, alcohols, aromatic solvents, petrol, grease, hydrocarbons, oil, saline solutions.

Not resistant to: chlorine, acetone, chlorinated solvents, strong bases, ethyl acetate, water above 65 °C.

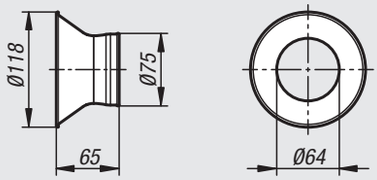
Antistatic and electric properties:
specific surface resistivity: 1000 E3 ˜
specific electrical resistance: < 6000 E2 ˜

Temperature range:
Maximum temperature 80 °C.
The melting point is 165 °C.

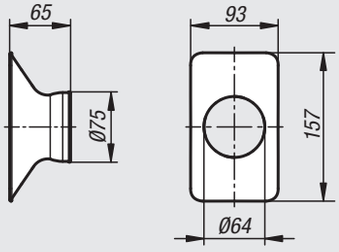
96203-75300



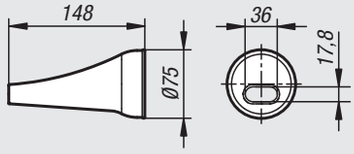
96203-7501



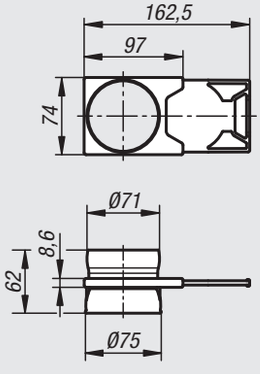
96203-7502



96203-7503



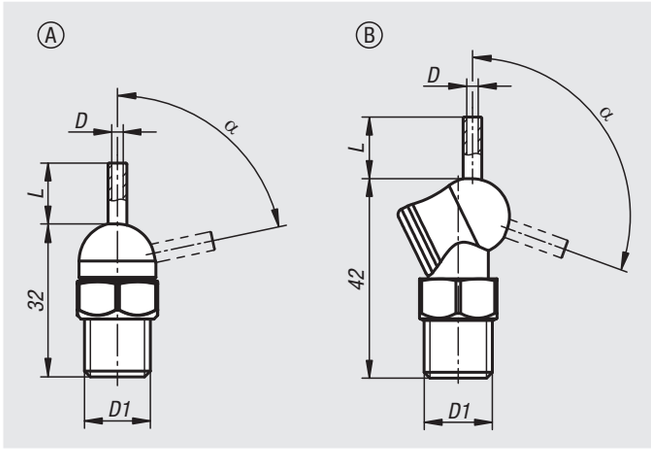
96203-7504



Order No.	Image	Article description
96203-75300		FLEXIBLE HOSE ANTISTATIC SIZE:75 L=300, BLACK
96203-7501		ROUND NOZZLE ANTISTATIC SIZE:75
96203-7502		RECTANGULAR NOZZLE ANTISTATIC SIZE:75
96203-7503		OVAL NOZZLE ANTISTATIC SIZE:75, CONICAL
96203-7504		GATE VALVE ANTISTATIC SIZE:75

High pressure nozzles LOC-LINE®





Material:
Polyoxymethylene (POM).
Nozzle stainless steel.

Version:
Colour blue/orange.

Sample order:
nlm 96205-11816064
(include length L e.g. 064 for L = 6,4 mm)

Note:
The extremely compact design makes this high-pressure nozzle ideal for use where space is at a premium. When screwed in position, the nozzle can be adjusted using a pin and retains its positional stability. Additional security is not required. It can be rotated 360° and withstands working pressure ranges of up to 70 bar.

Resistant to: acetone, alcohol, ethyl, grease, oil, commercially available dishwashing detergent, petrol, paint, solvents, sodium hydroxide.

Not resistant to: chlorine, acids, ammonium hydroxide, strong bases, hypochlorite ionic solutions, sodium hypochlorite.

Form A: nozzle pivot range up to 72°
Form B: nozzle pivot range up to 110° (for applications where the jet is also required below the screw-on level)

Temperature range:
Maximum temperature range 50 °C.





Order No.	Form	D	D1	L	α
96205-11816* **	A	1,6	R1/8	-/6,4/12,7/31,8	72°
96205-11822* **	A	2,2	R1/8	-/6,4/12,7/31,8	72°
96205-11830* **	A	3	R1/8	-/6,4/12,7/31,8	72°
96205-11841* **	A	4,1	R1/8	-/6,4/12,7/31,8	70°
96205-11416* **	A	1,6	R1/4	-/6,4/12,7/31,8	72°
96205-11422* **	A	2,2	R1/4	-/6,4/12,7/31,8	72°
96205-11430* **	A	3	R1/4	-/6,4/12,7/31,8	72°
96205-11441* **	A	4,1	R1/4	-/6,4/12,7/31,8	70°
96205-21816* **	B	1,6	R1/8	-/6,4/12,7/31,8	110°
96205-21822* **	B	2,2	R1/8	-/6,4/12,7/31,8	110°
96205-21830* **	B	3	R1/8	-/6,4/12,7/31,8	110°
96205-21841* **	B	4,1	R1/8	-/6,4/12,7/31,8	102°
96205-21416* **	B	1,6	R1/4	-/6,4/12,7/31,8	110°
96205-21422* **	B	2,2	R1/4	-/6,4/12,7/31,8	110°
96205-21430* **	B	3	R1/4	-/6,4/12,7/31,8	110°
96205-21441* **	B	4,1	R1/4	-/6,4/12,7/31,8	102°

Feeler gauge strips

Material:
1.1274 spring steel (0.005 is 1.4301 stainless steel)

Version:
Spring hard, cold rolled

Sample order:
nlm 96382-0010

Note:
These feeler gauges are supplied in a practical dispenser.
They are used for adjusting, aligning and as shims for tools, workpieces, forms etc, checking tolerances, controlling and adjusting guides, print rollers, profile templates and many other applications.



Order No.	thickness	strip width (mm)	length (m)	thickness tolerance mm
96382-0005	0,005	12,7	2	±0,001
96382-0010	0,01	12,7	2	±0,002
96382-0020	0,02	12,7	2	±0,002
96382-0030	0,03	12,7	2	±0,002
96382-0040	0,04	12,7	2	±0,003
96382-0050	0,05	12,7	2	±0,003
96382-0100	0,1	12,7	2	±0,004
96382-0200	0,2	12,7	2	±0,006
96382-0300	0,3	12,7	2	±0,007

Notes

Ball chains



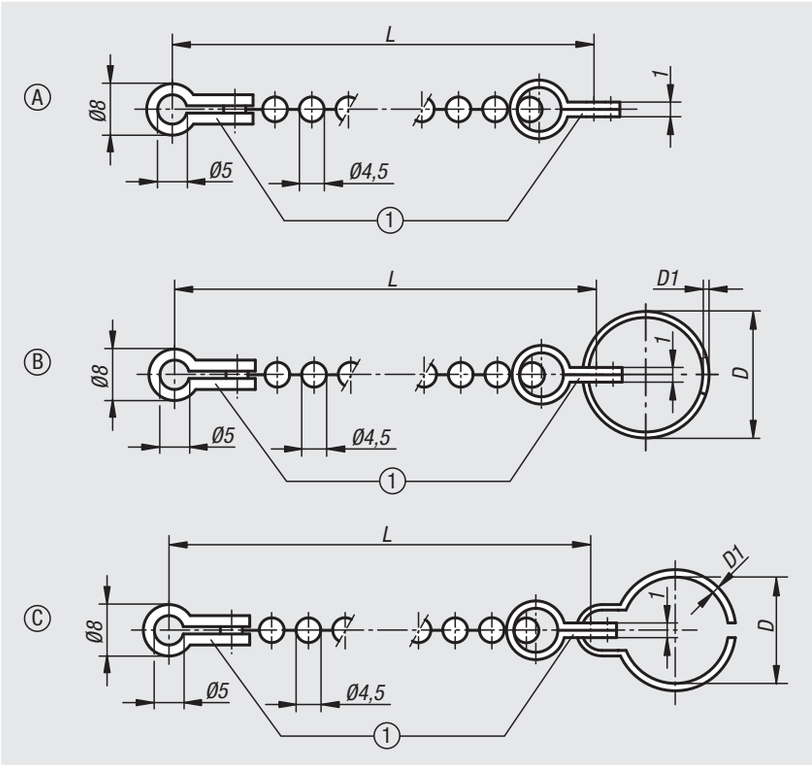
Material:
A: Chain brass or stainless steel.
B: Chain brass or stainless steel, key ring stainless steel.
C: Chain brass, ring 1.4310 stainless steel.

Sample order:
nlm 96390-16X320 (include length L)

Note:
If no length is specified 1000 mm will be supplied.

Drawing reference:
1) same parts

Form A: ball chain, single
Form B: ball chain with key ring
Form C: ball chain with ring clip



Form A, ball chain single

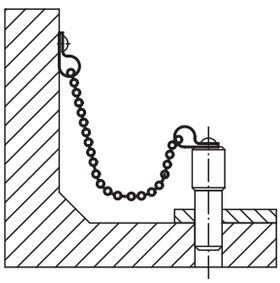
Order No.	Form	Version	Main material	L
96390-00X	A	single	brass	160/320/500/1000
96390-01X	A	single	stainless steel	160/320/500/1000

Form B, ball chain with keyring

Order No.	Form	Version	Main material	L	D	D1
96390-015X	B	with key ring	brass	160/320/500/1000	15	1
96390-019X	B	with key ring	brass	160/320/500/1000	19	1
96390-023X	B	with key ring	brass	160/320/500/1000	23	1,2
96390-028X	B	with key ring	brass	160/320/500/1000	28	1,7
96390-115X	B	with key ring	stainless steel	160/320/500/1000	15	1
96390-119X	B	with key ring	stainless steel	160/320/500/1000	19	1
96390-123X	B	with key ring	stainless steel	160/320/500/1000	23	1,2
96390-128X	B	with key ring	stainless steel	160/320/500/1000	28	1,7

Form C, ball chain with ring clip

Order No.	Form	Version	Main material	L	D	D1
96390-09X	C	with ring clip	brass	160/320/500/1000	9	1
96390-12X	C	with ring clip	brass	160/320/500/1000	12	1,2
96390-14X	C	with ring clip	brass	160/320/500/1000	14	1,6
96390-16X	C	with ring clip	brass	160/320/500/1000	16	1,6
96390-20X	C	with ring clip	brass	160/320/500/1000	20	2
96390-24X	C	with ring clip	brass	160/320/500/1000	24	2
96390-30X	C	with ring clip	brass	160/320/500/1000	30	2,6
96390-36X	C	with ring clip	brass	160/320/500/1000	36	2,6



Notes

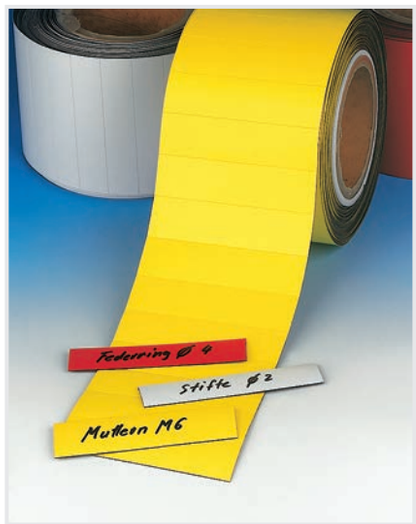
96450

Magnetic labels

on a roll, perforated

Sample order:
nlm 96450-0800201

Note:
Store shelf magnetic labels on a roll, 10 m long, perforated magnetic strips that can be separated without scissors.
Other colours and dimensions available on request.



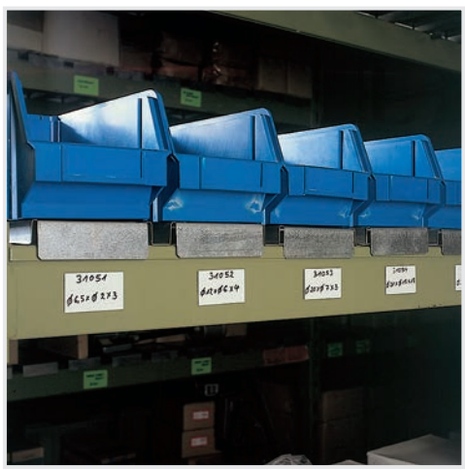
Order No. white	Order No. yellow	length x width	Magnetic tape thickness	Labels per roll
96450-0800201	**96450-0800202**	80 x 20	0,9	500
96450-0800401	**96450-0800402**	80 x 40	0,9	250
96450-1000501	**96450-1000502**	100 x 50	0,9	200

96455

Magnetic labels

Sample order:
nlm 96455-0700202

Note:
These labels are small magnetic plaques for identifying the contents of store shelves. Product positions can be quickly and easily identified.
Other colours and dimensions available on request.



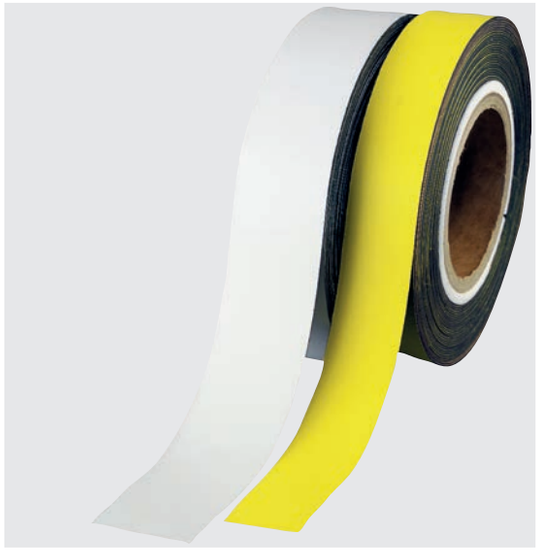
Order No. white	Order No. yellow	length x width	Magnetic tape thickness
96455-0600101	**96455-0600102**	60 x 10	0,9
96455-0700201	**96455-0700202**	70 x 20	0,9
96455-0800301	**96455-0800302**	80 x 30	0,9
96455-1000401	**96455-1000402**	100 x 40	0,9
96455-1500501	**96455-1500502**	150 x 50	0,9
96455-2000801	**96455-2000802**	200 x 80	0,9

96460

Magnetic tape rolls

Sample order:
nlm 96460-301

Note:
Magnetic tape solves labelling problems. They adhere to any steel surface and can be repeatedly written on and wiped.
Other colours and dimensions available on request.



Order No. white	Order No. yellow	Magnetic band: width (mm)	Magnetic tape thickness	Length
96460-301	**96460-302**	30	0,9	10 m
96460-401	**96460-402**	40	0,9	10 m

96465

Magnetic C profiles

Sample order:
nlm 96465-100030

Note:
Magnetic C profiles are full face magnetic strips for labelling shelves or for headers or name tags on planning boards. They are supplied with card backing and a transparent cover.
Other dimensions available on request.





Order No.	length x width
96465-100030	100 x 30
96465-100040	100 x 40
96465-150050	150 x 50

96470

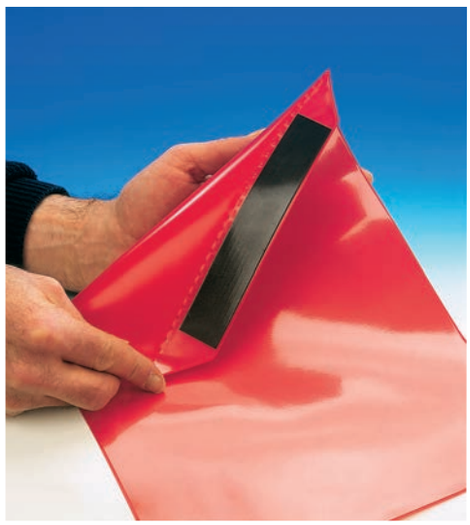
Magnetic envelopes



Sample order:
nlm 96470-217155

Note:
Magnetic envelopes are used to hold documents accompanying the goods during the production process.





Order No.	length x height	for sheet size
96470-217155	217 x 155	DIN A5
96470-220300	220 x 300	DIN A4

96471

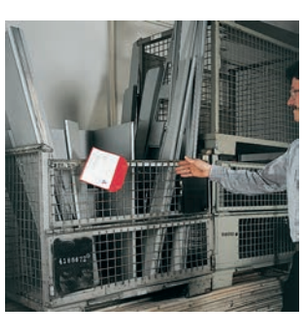
Magnetic envelopes

with strong magnetics

Sample order:
nlm 96471-217155

Note:
Standard magnetic envelopes do not provide sufficient hold by severe vibration or poor surface area i.e. wire crates. These magnetic envelopes have two strong neodymium magnets which simplify handling in such a way that an envelope only has to be thrown at the wire box. The magnets sealed into the envelopes seek their own surface and ensure a secure hold.



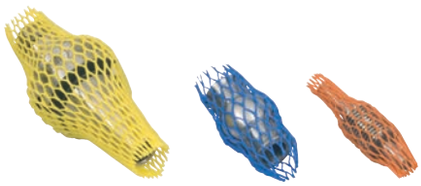


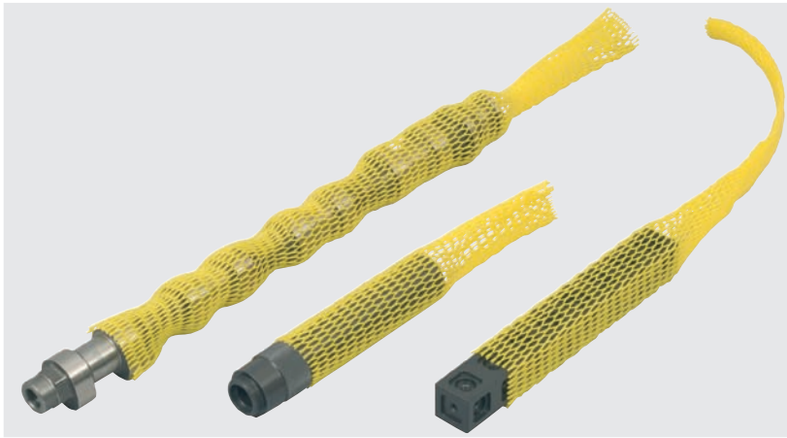


Order No.	length x height	for sheet size
96471-217155	217 x 155	DIN A5
96471-220300	220 x 300	DIN A4

96500

Net sleeves





Material:
Polyethylene

Sample order:
nlm 96500-007X25000

Note for ordering:
Supplied on rolls only.

Note:
Effective protection for surfaces and delicate goods. Very resistant to external influences and environmentally friendly (recyclable). Cut to length as required. Good elastic properties return the sleeve to the original diameter, so can be reused many times.

Order No.	Recommended Ø	Colour	Length
96500-007X25000	7-15 mm	orange	250 m / on the roll
96500-015X20000	15-25 mm	blue	200 m / on the roll
96500-025X10000	25-50 mm	yellow	100 m / on the roll
96500-050X10000	50-100 mm	red	100 m / on the roll
96500-100X05000	100-200 mm	green	50 m / on the roll
96500-200X05000	200-300 mm	orange	50 m / on the roll
96500-300X05000	300-600 mm	white	50 m / on the roll

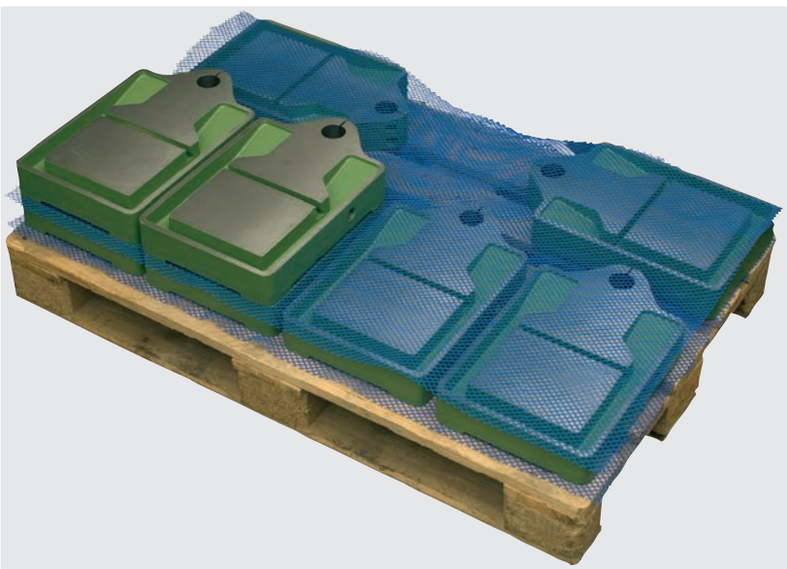
96510

Net mats

Material:
Polyethylene

Sample order:
nlm 96510-07500950

Note:
Effective protection for surfaces and delicate goods. Very resistant to external influences and environmentally friendly (recyclable). Cut to size as required.

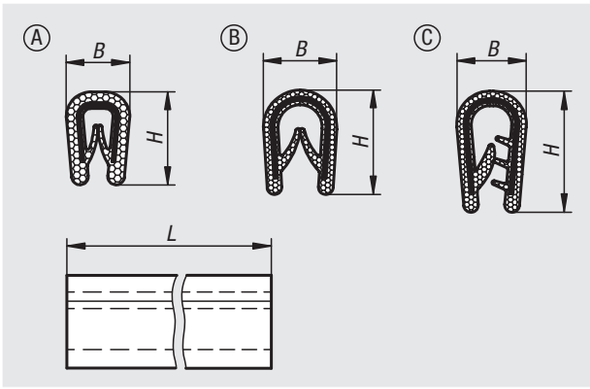


Order No.	Dimensions	Mesh size	Mat thickness	Colour
96510-07500950	750x950 mm	11x11 mm	3,8 mm	blue
96510-078011804	780x1180 mm	4x4 mm	3,7 mm	black
96510-078011806	780x1180 mm	6x6 mm	2,8 mm	black

Edge protection profiles

with steel retaining strip





Material:
PVC.

Version:
black.

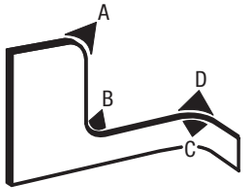
Sample order:
nlm 96520-010X2000
(include length L)

Note:
The edge protection profiles are used to cover and decorate the sharp edges of cut plate so that no additional processing is required.

Assembly:
Easy, quick and smooth assembly. The edge protection profile is easy to push on by hand, and remains in place even on radii or bends. No adhesive or fastening material required.

On request:
Other lengths.

Minimum bend radius:

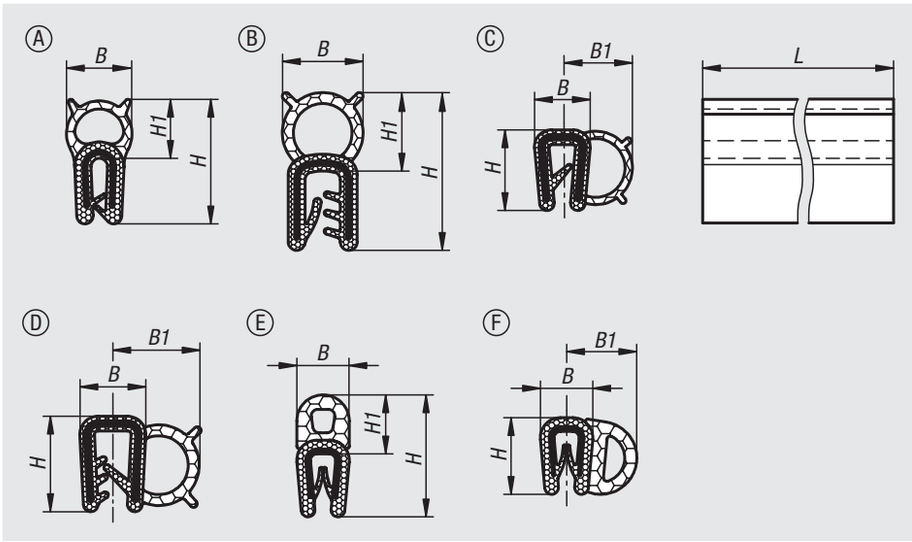


Order No.	Form	L	Clamping range mm	Minimum bend radius mm	B	H
96520-010X	A	2000/5000/10000/20000/50000	1,0-2,0	A=15 B=15 C=10 D=10	6,5	10
96520-114X	B	2000/5000/10000/20000/50000	1,0-4,0	A=30 B=20 C=20 D=20	10	14,5
96520-217X	C	2000/5000/10000/20000/50000	4,0-6,0	A=50 B=40 C=30 D=30	11	15,8

Edge protection profiles

with integrated steel wire core





Material:
EPDM or PVC and EPDM foam rubber.

Version:
black.

Sample order:
nlm 96521-015X2000
(include length L)

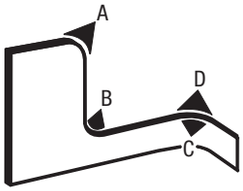
Note:
In addition to edge protection, these profiles also provide a sealing function against moisture, dust and dirt for other elements such as doors, hatches or housing covers. Depending on the shape of the foam rubber profile, they can be used in a wide range of applications.

EPDM rubber sizes 11, 13, 15 and 22 are UL50, UL50E and UL94HB certified.

Assembly:
Easy, quick and smooth assembly. The edge protection profile is easy to push on by hand and remains in place. No adhesive or fastening material required.

On request:
Other lengths.

Minimum bend radius:



Order No.	Form	Main material	L	Clamping range mm	Minimum bend radius mm	B	B1	H	H1
96521-015X	A	EPDM	2000/5000/10000/20000/50000	0,5-1,5	A=50 B=180 C=25 D=25	8	-	15	7
96521-122X	B	EPDM	2000/5000/10000/20000/50000	1,0-3,0	A=50 B=180 C=30 D=30	11	-	22	11
96521-211X	C	EPDM	2000/5000/10000/20000/50000	1,0-2,0	A=100 B=200 C=100 D=60	8	9	11	-
96521-313X	D	EPDM	2000/5000/10000/20000/50000	2,0	A=50 B=20 C=120 D=40	9	12	13	-
96521-415X	E	PVC	2000/5000/10000/20000/50000	1,0-2,0	A=20 B=40 C=10 D=10	6,5	-	15	7
96521-510X	F	PVC	2000/5000/10000/20000/50000	1,0-2,0	A=20 B=15 C=30 D=30	7	9	10	-

96610

Supercraft soft faced hammer

recoilless

Material:
Housing steel tube filled with steel balls.
Shaft steel tube with rubber grip or Hickory.
Inserts white nylon (grease and oil resistant).

Sample order:
nlm 96610-05002

Note:
Inserts to reorder 96614.



Order No.	Version	Head-Ø	Height	Length
96610-03001	with wooden shaft	30	110	330
96610-04001	with wooden shaft	40	115	360
96610-05001	with wooden shaft	50	120	370
96610-06001	with wooden shaft	60	145	370
96610-03002	with steel tube shaft	30	110	290
96610-04002	with steel tube shaft	40	115	300
96610-05002	with steel tube shaft	50	120	310
96610-06002	with steel tube shaft	60	145	325

96614

Hammer inserts

for Supercraft hammers

Material:
White nylon, grease and oil resistant.

Sample order:
nlm 96614-04001



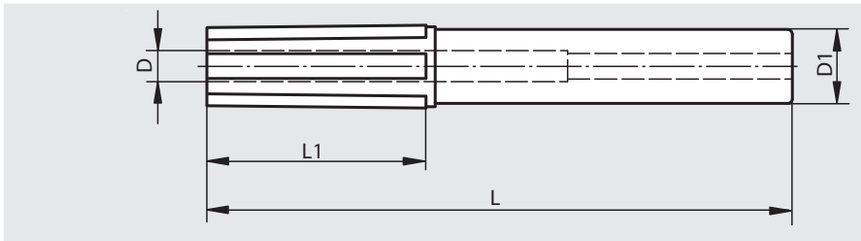
Order No.	for Head-Ø	Suitable for Supercraft soft hammers
96614-03001	30	96610-030..
96614-04001	40	96610-040..
96614-05001	50	96610-050..
96614-06001	60	96610-060..

96630

Taper cleaners

for Morse tapers





Material:
Plastic, felt facing.

Sample order:
nlm 96630-001

Note:
For cleaning Morse taper tool holders. The taper cleaner consists of a plastic body with form retentive felt facing. No abrasive particles remain in the felt material, dirt particles collect in the large gaps between the felt strips.

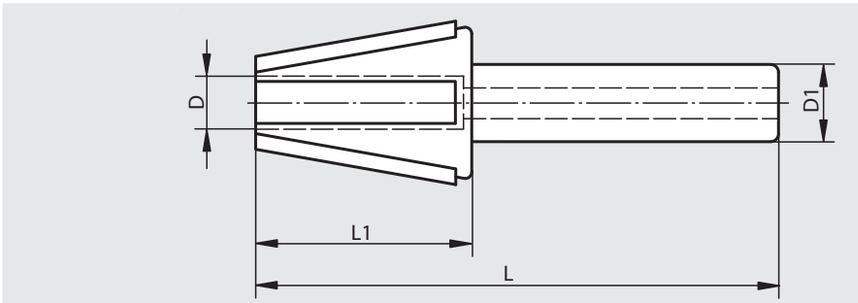
Order No.	Size	D	D1	L	L1
96630-001	MK 1	-	22	136	59
96630-002	MK 2	10	24	190	71
96630-003	MK 3	13	24	196	87
96630-004	MK 4	17	24	222	110
96630-005	MK 5	21	30	258	136
96630-006	MK 6	29	34	315	195

96632

Taper cleaners

for short tapers





Material:
Plastic, felt facing.

Sample order:
nlm 96632-020

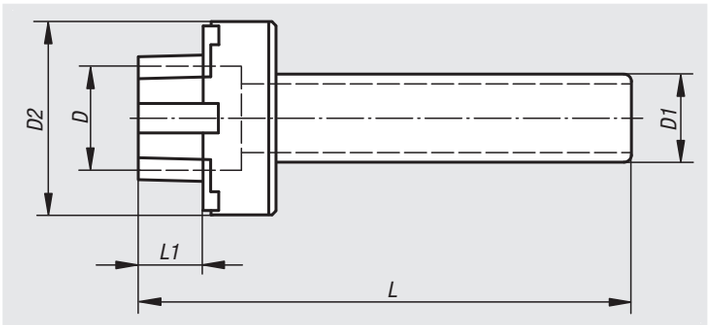
Note:
For cleaning short taper tool holders. The taper cleaner consists of a plastic body with form retentive felt facing. No abrasive particles remain in the felt material, dirt particles collect in the large gaps between the felt strips.

Order No.	Size	D	D1	L	L1
96632-020	SK 20	7,5	15	102	39
96632-030	SK 30	9,5	24	168	55
96632-040	SK 40	16	24	188	73
96632-045	SK 45	21	26	215	96
96632-050	SK 50	26	30	240	116

Taper cleaners

for hollow shank tapers





Material:
Plastic, felt facing.

Sample order:
nlm 96634-025

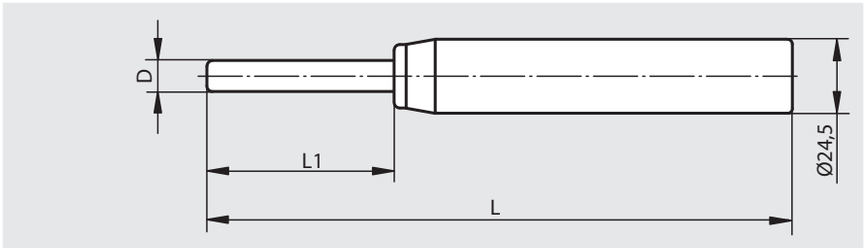
Note:
For cleaning hollow shank taper tool holders. The taper cleaner consists of a plastic body with form retentive felt facing. No abrasive particles remain in the felt material, dirt particles collect in the large gaps between the felt strips.

Order No.	Size	D	D1	D2	L	L1
96634-025	HSK 25	14	22	33	114	9
96634-032	HSK 32	17	24	35	138	10
96634-040	HSK 40	22,2	24	45	142	13
96634-050	HSK 50	27,5	24	53	152	17
96634-063	HSK 63	35	30	66	168	22
96634-080	HSK 80	44	30	83	178	27
96634-100	HSK 100	57	30	103	199	34

96636

Cylinder cleaners





Material:
Body ABS;
cleaner PA-flock,
holohedrally coated

Sample order:
nlm 96636-006

Note:
For gentle and efficient cleaning of cylindrical tool holders and bores of every kind.

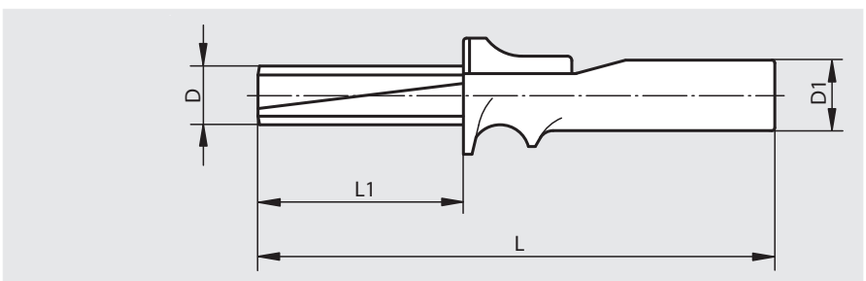
Order No.	D	L	L1
96636-006	6	158	37
96636-008	8	158	37
96636-010	10	168	47
96636-012	12	168	47
96636-014	14	168	47

96638

Cylinder cleaners

two-part





Material:
Body ABS.
Cleaner felt facing.

Sample order:
nlm 96638-016

Note:
For gentle and efficient cleaning of cylindrical tool holders and bores of every kind.

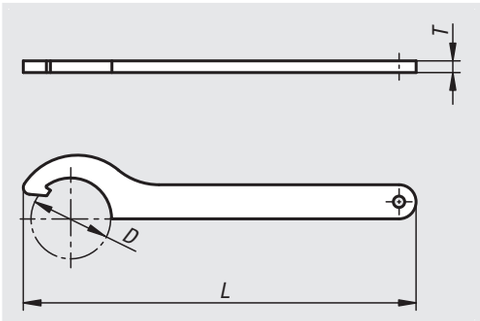
Application:
1. Push the thumb button to draw cleaning pads in.
2. Releasing the thumb button, rotate 360°, pull out.

Order No.	D	D1	L	L1
96638-016	16	24	176	70
96638-018	18	24	176	70
96638-020	20	24	176	70
96638-025	25	24	186	80
96638-032	32	30	221	100
96638-040	40	30	226	105
96638-042	42	30	226	105

Hook wrench with lug

DIN 1810A enhanced





Material:
Special steel.

Version:
Hardened and annealed in black oxide tone.

Sample order:
nlm 96650-012014

Note:
For DIN 1804 slotted round nuts, DIN 981 bearing nuts and for our levelling sets 27700 to 27708 (two hook wrenches will be required for the levelling sets). With rounded edges for better handling.

Order No.	D min.	D max.	L	T	for slotted nuts DIN 1804	for bearing locknuts DIN 981
96650-012014	12	14	110	3	-	-
96650-016020	16	20	110	3	M6, M8	M10
96650-025028	25	28	136	4	M10, M12	M16
96650-030032	30	32	136	4	M14, M16	M18, M20
96650-034036	34	36	170	5	M18, M20	M22
96650-038045	38	45	170	5	M26	M24 - M30
96650-040042	40	42	170	5	M22, M24	M26, M28
96650-045050	45	50	206	6	M26 - M30	M32, M35
96650-052055	52	55	206	6	M32, M35	M38
96650-058062	58	62	240	7	M38 - M42	M42 - M45
96650-065070	65	70	240	7	-	M48 - M52
96650-068075	68	75	240	7	M45 - M50	M50 - M55
96650-080090	80	90	280	8	M52 - M60	M60 - M70

Face pin spanner

adjustable, cranked





Material:
Steel.

Version:
Black oxidised.

Sample order:
nlm 96651-08

Note:
Assembly tool for screwing in the flat versions of the locating bushes ball lifting pins 07781.
D1 pertains to dimension D1 of the locating bush for ball lifting pins.

Order No.	D1
96651-08	8/10/12
96651-16	16/20

Notes

97000

Lubricants
Adhesives
Grease nipples



97900

Klüber “Quietsch-Ex”



Sample order:
nlm 97900-250

Safety:
Safety information is available on our internet site.

Description:
“Quietsch-Ex” (no squeak) the universal lubricant for industry, home, garden, automobile, motorbike, hobby and sport.

Application:
Approved for lubricating bearings, slides, chains, locks and hinges.
Cleaning and lubricating oil for the motorbike and to protect machines, equipment, tools and vehicles, etc., from corrosion, e.g. in winter.
It is particularly good for machines and equipment, which are often used outdoors in all weathers.
Rusty screws, hinges and bolts that are rusted solid can be loosened or moved again without destroying them.

Advantages:
Lubricates, repels moisture, counteracts corrosion, improves sliding, loosens rust, protects from freezing and is also good for sawing and drilling.
It penetrates into the smallest gap and reaches every accessible friction point.

Order No.	Container	Viscosity class
97900-250	250 ml spray	ISO VG 32

97901

Klüber lubricating paste



Sample order:
nlm 97901-060

Safety:
Safety information is available on our internet site.

Description:
Klüber 46 MR 401 paste is a white multi-purpose lubricating paste, which provides very high reliability against friction, wear and friction rust.

Application:
Approved as a lubricant for long-term and lifetime lubrication, as an assembly aid and a thread lubricant for CrNi fastenings. Kluber paste is an assembly aid for press fits, it also brings advantages and safety anywhere that low sliding speeds, very high pressures, high wear, stick-slip, oscillating movements, vibrations and tribocorrosion occur.
Preferred uses are by low sliding speeds, screw spindles, adjustment nuts, splined shafts, ball joints, pivot bearings, gear wheels, radial packing rings, O-ring seals, V-rings, elastic rubber collars and roller bearings.

Advantages:
Protects from corrosion, is water-resistant, actively adhesive and is neutral to non-ferrous metals. Due to the white colour, which after appliance forms an almost invisible highly efficient lubricating film, it is particularly suited for places in which dark pastes are undesirable for visual reasons and cleanliness is required.

Order No.	Container	Working temperature	NLGI Class
97901-060	60 g tube	-40 °C to 150 °C	1
97901-750	750 g can	-40 °C to 150 °C	1

97903

Klüber copper paste

lead-free



Description:
The copper paste “Wolfracoat C” is a metallic paste for temperatures up to 1200 °C.

Application:
A proven assembly, cutting, lubricating and fastener paste for plain bearings and slide points, chains, roller bearings, in foundries for cores and ejectors, in die-casting machines, exhaust systems of internal combustion engines and furnaces.

Advantages:
The synthetic base oil evaporates at over 200 °C. A dry, metallic lubricant film gradually forms. Good lubrication of friction points with slide and rolling friction, good separation and lubrication for fastenings with static and dynamic friction, improved sliding for easy assembly of interference and transition fits, easy dismantling when loosening screw fastenings.

Sample order:
nlm 97903-400

Safety:
Safety information is available on our internet site.

Order No.	Container	Working temperature	NLGI Class
97903-060	60 g tube	-30 °C to 1200 °C, over 200 °C is a dry lubricant	2
97903-400	400 ml spray	-30 °C to 1200 °C, over 200 °C is a dry lubricant	2

97905

Klüber safety lubricating grease



Description:
The safety grease “Microlube GL 261” is a lubricant for high loads at low and high temperatures.

Application:
Lubricating grease for roller and plain bearings, sprockets, gear racks, small gears, adjustment gears, hoists and winches, roller guides, cams and cam plates.
Sealing and lubricating grease for oil and grease-resistant rubber seals such as radial packing rings, O-rings, cylinder and piston seals in pneumatics, rotary shaft lip seals (shaft seals), plastics, slide rails, sunroofs and seat rails.
Anticorrosive grease for bare metal parts, locks, fastening systems, ship fittings, antennas, battery poles and to counter saltwater corrosion.

Advantages:
The combination of ingredients in MICROLUBE increase the metallic surface contact area by micro-slide friction. This wear-free smoothing (friction-point tempering) counteracts corrosion and fitting rust.

Sample order:
nlm 97905-250

Safety:
Safety information is available on our internet site.

Order No.	Container	Working temperature	NLGI Class	Rev. characteristic n x dm
97905-250	250 ml spray	-30 °C to 140 °C	1	3X100000
97905-400	400 g cartridge	-30 °C to 140 °C	1	3X100000

97907

Klüber molybdenum disulphide lubricant



Description:
The molybdenum disulphide lubricant UNIMOLY GL 82 is a lubricating grease with MoS2 for improved fail-safe performance.

Application:
Proven use with roller and plain bearings, slide rails and guides, cams and cam plates, bolts, joints, hinges, cardan shafts, gear racks, screw spindles in all machine and plant construction.
A proven lubricant for wheel bearings and a multi-purpose lubricant for king pins, track and rod joints, cardan shafts and spline shafts.

Advantages:
Contains molybdenum disulphide (MoS2) for improved wear protection by boundary lubrication, waterproof and corrosion preventive.
Based on automobile manufacturers' requirements.

Sample order:
nlm 97907-1000

Safety:
Safety information is available on our internet site.

Order No.	Container	Working temperature	NLGI Class	Rev. characteristic n x dm
97907-0400	400 g cartridge	-20 °C to 130 °C	2	5X100000
97907-1000	1 kg can	-20 °C to 130 °C	2	5X100000

97909

Klüber liquid chain grease



Description:
STRUCTOVIS BHD liquid chain grease is "chain honey" for drive and control chains.

Application:
Approved for long-term lubrication for all drive and control chains. Also ideal for water damp chains or open running gear wheels and gearboxes, on forklifts, conveyors, packaging machines, textile machines, robots, paper and wood processing machines.
Ideal for long-term lubrication of motorcycle chains. Is not washed off by rain or water spray. Ideal for road racing, particularly for derailleur chains, rear derailleurs, sprockets. Protects and lubricates by sun, rain and snow.

Advantages:
Clings and sticks like honey. This "chain honey" is colourless, transparent, creeps well, is wear and corrosion preventive, noise reducing and temperature resistant.

Sample order:
nlm 97909-250

Safety:
Safety information is available on our internet site.

Order No.	Container	Working temperature	Kinematic viscosity DIN 51561 at 40 °C mm^2/s
97909-250	250 ml spray	-5 °C to 120 °C	~4750

Klüber bonded coating

UNIMOLY C 220



Description:
Bonded coatings consist of a solid lubricant, bonding agent and solvent. After it has been applied and dried, the bonded coating forms a thin lubricating layer that reduces friction and wear. It is dry, adheres firmly to the surface and cannot drip.

Application:
For dry lubricating under high loads, oscillating movements or to counter stick-slip. For lifetime lubrication of screw spindles, hinge pins, cylinder pins and during assembly. Improves wear on gearwheels and sprockets, reduces friction on cap screws.

Advantages:
Dry lubricants cannot drip, therefore a pollution of the environment, as by oil or grease-based lubricants, can be excluded.

Sample order:
nlm 97920-400

Safety:
Safety information is available on our internet site.

Order No.	Container	Working temperature	Water Hazard Class
97920-400	400 ml aerosol	-180 °C to 450 °C	WGK 2

Ballistol all-purpose oil

in food industry quality



Sample order:
nlm 97930-100200

Note:
Ballistol all-purpose oil is approved in the foodstuff industry for product contact surfaces. All Ballistol components are biodegradable and harmless to the environment.
It is skin-friendly and completely harmless if accidentally swallowed.
As spray without CFC.

Safety:
Safety information is available on our internet site.

Description:
Ballistol as a high-quality special oil combines anti-rust, lubricating oil, maintenance and cleaning agent with high creep-ability and disinfection power all in one.

Application:
The all-purpose oil is used versatilely in machine and tool manufacturing, for the fabrication and maintenance of precision devices, scales and in light engineering.
Due to its high pharmaceutical quality, it is outstandingly suited for the foods processing sector.
It finds multiple use in industrial art, industry, agriculture, housekeeping, garden, for automobiles, fishing, hunting and shooting, in the maintenance of metal, wood, plastic, leather, rubber, skin, fur and much more.

Advantages:
Due to its low surface tension and terrific creep ability, it penetrates into the narrowest nooks and finest cracks.
Ballistol forms an alkaline protective film on metals, neutralises hand sweat and other acidic rust promoting residues and thus protects against corrosion.
Its oil base is medicinally clean white oil. It is non-ageing and does not resinify ven after years.

Storage:
The packaging is tightly sealed, indefinitely durable.

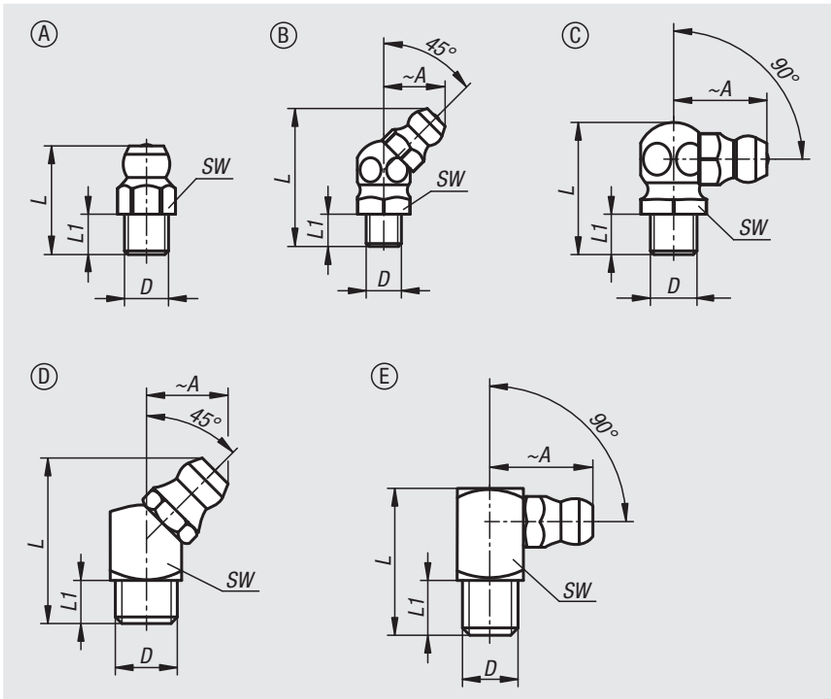
Order No.	Container
97930-100200	200 ml aerosol
97930-100400	400 ml aerosol
97930-205000	5 litre liquid canister

Notes

Grease nipples

conical head DIN 71412





Material:
Steel or 1.4305 stainless steel

Version:
Steel hardened, min. 550 HV 1, electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 97940-1106100

Note:
The conical head grease nipples have a tapered thread. They are suitable for grease points which must be lubricated often and reliably. Their versatility makes them the most widespread type of grease nipple.

Form A, straight

Order No. steel	Order No. stainless steel	Form	Type	D	L	L1	SW
97940-1106100	**97940-2106100**	A	hexagon	M6x1	15	5,5	7
97940-1108100	**97940-2108100**	A	hexagon	M8x1	15	5,5	9
97940-1108125	**97940-2108125**	A	hexagon	M8x1,25	15	5,5	9
97940-1110100	**97940-2110100**	A	hexagon	M10x1	15	5,5	11
97940-1110150	**97940-2110150**	A	hexagon	M10x1,5	15	5,5	11
97940-1118	**97940-2118**	A	hexagon	R1/8	15	5,5	11
97940-1114	**97940-2114**	A	hexagon	R1/4	17,5	6,5	14

Form B, 45°, hexagonal

Order No. steel	Order No. stainless steel	Form	Type	A	D	L	L1	SW
97940-1206100	**97940-2206100**	B	hexagon	10,5	M6x1	23,5	5,5	9
97940-1208100	**97940-2208100**	B	hexagon	10,5	M8x1	23,5	5,5	9
97940-1208125	**97940-2208125**	B	hexagon	10,5	M8x1,25	23,5	5,5	9
97940-1210100	**97940-2210100**	B	hexagon	11,5	M10x1	25	5,5	11
97940-1210150	**97940-2210150**	B	hexagon	11,5	M10x1,5	25	5,5	11
97940-1218	**97940-2218**	B	hexagon	11,5	R1/8	25	5,5	11
97940-1214	**97940-2214**	B	hexagon	12	R1/4	22,5	6,5	14

Grease nipples

conical head DIN 71412

Form C, 90°, hexagonal

Order No. steel	Order No. stainless steel	Form	Type	A	D	L	L1	SW
97940-1306100	**97940-2306100**	C	hexagon	13	M6x1	18	5,5	9
97940-1308100	**97940-2308100**	C	hexagon	13	M8x1	18	5,5	9
97940-1308125	**97940-2308125**	C	hexagon	13	M8x1,25	18	5,5	9
97940-1310100	**97940-2310100**	C	hexagon	14	M10x1	20	5,5	11
97940-1310150	**97940-2310150**	C	hexagon	14	M10x1,5	20	5,5	11
97940-1318	**97940-2318**	C	hexagon	14	R1/8	20	5,5	11
97940-1314	**97940-2314**	C	hexagon	14	R1/4	22	6,5	14

Form D, 45°, square

Order No.	Form	Main material	Type	A	D	L	L1	SW
97940-1406100	D	steel	square	10,5	M6x1	20,5	5,5	9
97940-1408100	D	steel	square	10,5	M8x1	20,5	5,5	9
97940-1408125	D	steel	square	10,5	M8x1,25	20,5	5,5	9
97940-1410100	D	steel	square	11	M10x1	20,5	5,5	11
97940-1418	D	steel	square	11	R1/8	20,5	5,5	11

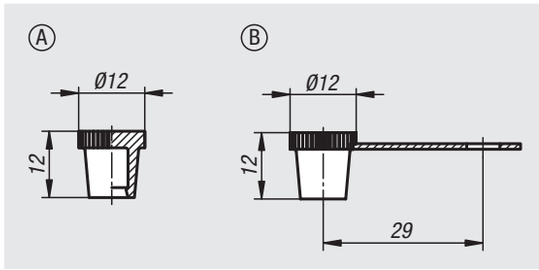
Form E, 90°, square

Order No.	Form	Main material	Type	A	D	L	L1	SW
97940-1506100	E	steel	square	14	M6x1	18	5,5	9
97940-1508100	E	steel	square	14	M8x1	18	5,5	9
97940-1508125	E	steel	square	14	M8x1,25	18	5,5	9
97940-1510100	E	steel	square	15	M10x1	18	5,5	11
97940-1518	E	steel	square	15	R1/8	18	5,5	11

Grease nipple caps

for conical grease nipples





Material:
Polyethylene (PE-LLD).

Version:
red, green, yellow or black.

Sample order:
nlm 97941-911

Note:
Suitable for all DIN 71412 conical head grease nipples. They keep dirt out of the head of the nipple. The different colours are for e.g. identifying the lubrication intervals.

Application temperature: -70°C to +85°C.

Form A: without tab
Form B: with tab

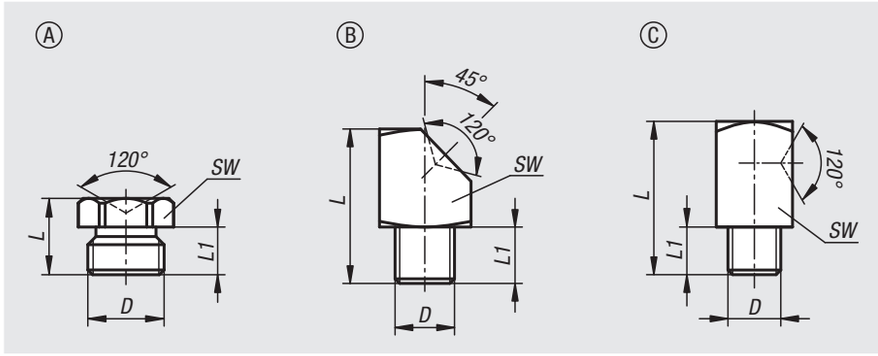


Order No.	Form	Colour
97941-911	A	red
97941-912	A	green
97941-913	A	yellow
97941-914	A	black
97941-921	B	red
97941-922	B	green
97941-923	B	yellow
97941-924	B	black

Grease nipples

flush type, DIN 3405





Material:
Steel or 1.4305 stainless steel

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 97942-1106100

Note:
Flush type grease nipples are particularly suitable for flush or recessed installation.
By using flush type nipples, the required lubrication can also be carried out on points with poor accessibility.

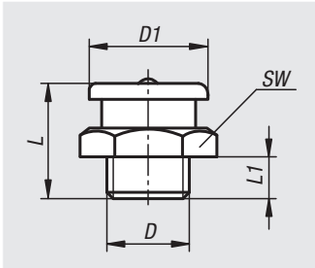
Drawing reference:
Form A: straight
Form B: 45°
Form C: 90°

Order No.	Form	Main material	Type	D	L	L1	SW
97942-1106100	A	steel	hexagon	M6x1	9	6	7
97942-1108100	A	steel	hexagon	M8x1	9,5	6,5	9
97942-1108125	A	steel	hexagon	M8x1,25	9,5	6,5	9
97942-1110100	A	steel	hexagon	M10x1	9,5	6,5	11
97942-1118	A	steel	hexagon	R1/8	9,5	6,5	11
97942-2106100	A	stainless steel	hexagon	M6x1	9	6	7
97942-2108100	A	stainless steel	hexagon	M8x1	9,5	6,5	9
97942-2108125	A	stainless steel	hexagon	M8x1,25	9,5	6,5	9
97942-2110100	A	stainless steel	hexagon	M10x1	9,5	6,5	11
97942-2118	A	stainless steel	hexagon	G1/8	9,5	6,5	11
97942-1206100	B	steel	square	M6x1	15	5,5	9
97942-1208100	B	steel	square	M8x1	15	5,5	9
97942-1208125	B	steel	square	M8x1,25	15	5,5	9
97942-1210100	B	steel	square	M10x1	15	5,5	11
97942-1218	B	steel	square	R1/8	15	5,5	11
97942-1306100	C	steel	square	M6x1	18	5,5	9
97942-1308100	C	steel	square	M8x1	18	5,5	9
97942-1308125	C	steel	square	M8x1,25	18	5,5	9
97942-1310100	C	steel	square	M10x1	18	5,5	11
97942-1318	C	steel	square	R1/8	18	5,5	11

Grease nipples

button head DIN 3404





Material:
Steel or 1.4305 stainless steel

Version:
Steel electro zinc-plated.
Stainless steel bright.

Sample order:
nlm 97944-11006100

Note:
As the construction of button head grease nipples allow for a high lubrication flow rate, they are especially useful for lubrication points which require a large grease volume. Because of the robust design, button head grease nipples are preferred for machines that are subjected to high external stress.

Order No.	Main material	D	D1	L	L1	SW
97944-11006100	steel	M6x1	10	13,5	5,5	11
97944-11008100	steel	M8x1	10	13,5	5,5	11
97944-11010100	steel	M10x1	10	13,5	5,5	11
97944-11018	steel	G1/8	10	13,5	5,5	11
97944-11606100	steel	M6x1	16	17	6	17
97944-11608100	steel	M8x1	16	17	6	17
97944-11608125	steel	M8x1,25	16	17	6	17
97944-11610100	steel	M10x1	16	17	6	17
97944-11610150	steel	M10x1,5	16	17	6	17
97944-11612150	steel	M12x1,5	16	17	6	17
97944-11616150	steel	M16x1,5	16	18	7	17
97944-11618	steel	G1/8	16	17	6	17
97944-11614	steel	G1/4	16	17	6	17
97944-12216150	steel	M16x1,5	22	21,5	8	22
97944-12214	steel	G1/4	22	21,5	8	22
97944-12238	steel	G3/8	22	21,5	8	22
97944-21606100	stainless steel	M6x1	16	17	6	17
97944-21608100	stainless steel	M8x1	16	17	6	17
97944-21608125	stainless steel	M8x1,25	16	17	6	17
97944-21610100	stainless steel	M10x1	16	17	6	17
97944-21610150	stainless steel	M10x1,5	16	17	6	17
97944-21612150	stainless steel	M12x1,5	16	17	6	17
97944-21618	stainless steel	G1/8	16	17	6	17
97944-21614	stainless steel	R1/4	16	17	6	17
97944-22216150	stainless steel	M16x1,5	22	21,5	8	22
97944-22214	stainless steel	G1/4	22	21,5	8	22
97944-22238	stainless steel	G3/8	22	21,5	8	22

LOCTITE liquid epoxy metals



Sample order:
nlm 97990-3471500

Safety:
Visit our website to see the safety and technical data.

Description:
LOCTITE metal set liquid metals are steel or aluminium-based epoxy resins. They set new standards in repairs: great strength, very good adhesion, no shrinkage, resistant to most solvents and lubricants. After hardening they can be worked like metal by hand or machine and can be painted over.
Cracks, porous spots, faulty holes or damage to pipes, tanks, chassis and machine parts can be quickly and durably repaired using LOCTITE metal set products. They adhere well to metals, glass, ceramics and other materials.

Type S1 – 97990-3471500
Suitable as filler. Steel based, two-component epoxy adhesive that is used to repair and reproduce damaged and worn parts.

Type S2 – 97990-3472500
Suitable for casting. Steel based, two-component epoxy adhesive that is used to repair and reproduce damaged and worn parts.

Type M – 97990-3474500
Suitable for filling. Mineral based, two-component epoxy adhesive that, after hardening forms a self-lubricating surface that reduces the wear on moving parts. The product is easy and practical to use and finds application in workshops or by maintenance work directly on site.



Repairs using epoxy liquid metal

Order No.	Container	Intern. Ident. No.	Product	Mixture ratio	Handling strength in min.	Temperature resistance
97990-3471500	pair of cans, 500 g	3471	metal-Set S1	1:1	180	-20 °C – +120 °C
97990-3472500	pair of cans, 500 g	3472	metal-Set S2	1:1	180	-20 °C – +120 °C
97990-3474500	pair of cans, 500 g	3474	metal-Set M	1:1	180	-20 °C – +120 °C

97990

LOCTITE liquid epoxy metals



Sample order:
nlm 97990-3450025

Safety:
Visit our website to see the safety and technical data.

Twin syringe – Epoxy-liquid metal 97990-3450025
Two-component epoxy adhesive that after mixing quickly hardens at room temperature. The adhesive has a high strength on metal surfaces. The gap filling ability makes this adhesive ideal for use on rough and badly fitting faces made from metal, ceramic, thermoset or wood.
The twin syringes automatically guarantee the correct mix ratio.



Repairs using epoxy liquid metal

Order No.	Container	Intern. Ident. No.	Product	Mixture ratio	Handling strength in min.	Temperature resistance
97990-3450025	25 ml	3450	twin syringe	1:1	15	-55 °C – +100 °C

LOCTITE threadlocker



Sample order:
nlm 97990-2220050

Note:
LOCTITE threadlocker mid-strength, 97990-243... has a PW recommendation from the German Federal Ministry of Health in the D2 sealant joints industry based on an inspection carried out by the DVGW Research Institute: suitable for use in the foodstuffs and potable water industries.

* Values break-away torque acc. to ISO 10964.

Safety:
Visit our website to see the safety and technical data.

Description:
For use with all screw connections. Applied as a liquid, it hardens in the absence of air and on contact with metal after being screwed into the thread.

LOCTITE threadlocker low-strength, 97990-222....
To secure set and adjustment screws up to thread size M36. Even parts with a high length to diameter ratio can be loosened again. Prevents corrosion. Good vibration resistance. Easy to remove and adjust.
Temperature-resistant from -55 °C to +150 °C.

LOCTITE threadlocker mid-strength, 97990-243....
To lock and seal threaded connections up to M36. Also hardens on lightly oiled surfaces. Resists loosening by vibration. Can be loosened again with standard tools.
Temperature-resistant from -55 °C to +180 °C.
PW recommended.

LOCTITE threadlocker high-temperature, 97990-2720050
Provides high-strength locking of threaded connections for thread sizes up to M36. Temperature resistant up to 200 °C. Easily applied due to thixotropic components.
Temperature-resistant from -55 °C to +200 °C.

LOCTITE threadlocker capillary, 97990-290....
Locks and seals by capillary action when applied subsequently, e.g. by already tightened threads or in porosities and cracks. Secures pre-mounted bolts against vibration and loss of tension. For connections up to M8.
Temperature-resistant from -55 °C to +155 °C.

LOCTITE threadlocker high-strength, 97990-2701...
To secure and seal threaded connections up to M20, which no longer have to be loosened. Resists loosening by vibration under high dynamic load. The product is also suitable for high-strength fastening connections. Can only be removed after heating to 300 °C.
Temperature resistant from -55 °C to +150 °C



Thread lock

Order No.	Container	Intern. Ident. No.	Hardening system	Viscosity m Pa · s	Handling strength in min.	Ultimate hardness in hours	Break-away torque Nm	Thread size
97990-2220010	10 ml bottle	222	anaerobic	900-1500	15	12	6	≤M36
97990-2220050	50 ml bottle	222	anaerobic	900-1500	15	12	6	≤M36
97990-2430010	10 ml bottle	243	anaerobic	1300-3000	10	12	26	≤M36
97990-2430050	50 ml bottle	243	anaerobic	1300-3000	10	12	26	≤M36
97990-2720050	50 ml bottle	272	anaerobic	4000-15000	40	12	23	≤M36
97990-2900010	10 ml bottle	290	anaerobic	20-55	20	12	10	M6
97990-2900050	50 ml bottle	290	anaerobic	20-55	20	12	10	M6
97990-2701010	10 ml bottle	2701	anaerobic	500-900	10	12	38	≤M20
97990-2701050	50 ml bottle	2701	anaerobic	500-900	10	12	38	≤M20

LOCTITE universal adhesive



Sample order:
nlm 97990-4010050

Safety:
Visit our website to see the safety and technical data.

Description:
These adhesives bond metals, rubber, plastics and other materials with and to each other. Bonds strongly in a few seconds.

LOCTITE instant adhesive universal (cyanoacrylate), 97990-401....
This adhesive bonds the most varied material mixtures (metals, plastics, leather, rubber, wood, cardboard, ceramics, etc.) and achieves great strength by small gaps.
Temperature-resistant from -40 °C to +120 °C.

LOCTITE instant adhesive universal gel (cyanoacrylate), 97990-454....
This gel adhesive can be applied exactly where required, with no running and no drips, even on vertical surfaces. Bonds different materials, even porous materials.
Good gap-filling capacity.
Temperature-resistant from -40 °C to +120 °C.

LOCTITE instant adhesive for plastic and rubbers, 97990-4060770
The combination for plastics, contact adhesive 406 (cyanoacrylate) and the primer 770 for difficult to bond plastics e.g. polyethylene (PE) and polypropylene (PP).
Temperature-resistant from -40 °C to +120 °C.

Order No.	Container	Intern. Ident. No.	Hardening system	Viscosity m Pa · s	Handling strength in sec.	Ultimate hardness in hours	Adhesion gap in mm
97990-4010020	20 g bottle	401	air humidity	100	3-10	12	0,05-0,1
97990-4010050	50 g bottle	401	air humidity	100	3-10	12	0,05-0,1
97990-4060770	20/10 g set	406/770	air humidity	20	2-10	12	0,05-0,1
97990-4540020	20 g tube	454	air humidity	gel	5-10	12	0,05-0,1

LOCTITE thread sealant



Sample order:
nlm 97990-5110250

Note:
LOCTITE plastic thread sealant, 97990-5331100 has a PW recommendation from the German Federal Ministry of Health in the D2 sealant joints industry based on an inspection carried out by the DVGW Research Institute: suitable for use in the foodstuffs and potable water industries.

Safety:
Visit our website to see the safety and technical data.

Description:
The liquid thread sealant replaces hemp, pastes and PTFE-tapes.
Parts can be immediately realigned after jointing.

LOCTITE-liquid pipe thread sealant, 97990-511....
This product is for securing and sealing metal pipe threads and attachment parts. It hardens quickly by air deprivation between close fitting metal parts.
Temperature resistant from -55 °C to +150 °C.

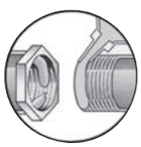
Approvals:
DVGW approval (EN 751-1): NG-5146CQ0312

LOCTITE liquid pipe thread sealant low strength, 97990-577....
This product is for securing and sealing metal pipe threads and attachment parts. Especially suitable for use on stainless steel parts without the need to activate the surfaces. It hardens by air deprivation between close fitting metal parts and prevents independent loosening and leaking through knocks or vibration.
Temperature resistance from -55 °C to +150 °C.

Approvals:
P1 NSF Reg. No.: 123001
DVGW approval (EN 751-1): NG-5146AR0621
WRAS approval (BS 6920): 0711506

LOCTITE plastic thread seal, 97990-5331100
This product is recommended for sealing plastic thread connections on cold and warm water system plastic pipes, and plastic/metal combinations. It hardens through air humidity by ambient temperatures to a low strength, permanently elastic seal against cold and warm water.
Temperature resistant from -55 °C to +150 °C.

Approvals:
WRAS approval (BS 6920) for potable water: 0706521
DVGW approval (EN 751-1): NG-5146AR0618 P1
NSF Reg. No: 123620



sealing pipe threads

Order No.	Container	Intern. Ident. No.	Hardening system	Viscosity m Pa · s	Handling strength	Ultimate hardness in hours	Break-away torque Nm	Thread size
97990-5110050	50 ml bottle	511	anaerobic	9000-22000	25 min.	12	6	≤R3
97990-5110250	250 ml tube	511	anaerobic	9000-22000	25 min.	12	6	≤R3
97990-5770050	50 ml bottle	577	anaerobic	16000-33000	30 min.	24	11	≤R3
97990-5770250	250 ml tube	577	anaerobic	16000-33000	30 min.	24	11	≤R3
97990-5331100	100 ml tube	5331	air humidity	50000	immediately	12	1,5	≤R3

LOCTITE flange sealant



Sample order:
nlm 97990-5730250

Note:
* Skin formation time.

Safety:
Visit our website to see the safety and technical data.

Description:
The adaptability of liquid or paste flange sealants solves almost every sealant problem.

LOCTITE flange sealant low strength, 97990-573…
Resistant to the majority of lubricating and hydraulic oils, petrol, diesel and water. To seal close fitting joints between rigid metallic sealing and flange faces. The product hardens under air deprivation between close fitting metal surfaces. Typical applications are the production of liquid seals on torsionally stiff flange connections e.g. transmission and motor housings etc.
Temperature resistant from -55 °C to +150 °C.

LOCTITE flange sealant removable, 97990-5203300
To seal close fitting joints between rigid metallic sealing and flange faces. The product quickly hardens under air deprivation between close fitting metal surfaces. A seal against low pressures is produced shortly after the flange is mounted. Can be removed easily, is simply pulled off as a thin film. Typical applications are the production of liquid seals on torsionally stiff flange connections e.g. transmission and motor housings etc.
Temperature resistant from -55 °C to +150 °C.

LOCTITE flange sealant permanently elastic, 97900-5910300
Low strength flange sealant for flexible flanges. For plastic/plastic and plastic/metal combinations. Good resistance to oil and against relative movements. Typical applications are amongst others sealing flange like covers on such as control casings and oil tanks.
Temperature resistant from -55 °C to +200 °C.



Sealing faces

Order No.	Container	Intern. Ident. No.	Hardening system	Viscosity m Pa · s	Handling strength	Tensile shear strength N/mm²	Adhesion gap in mm
97990-5730050	50 ml bottle	573	anaerobic	13500-33000	9 hours	1,3	≤0,1
97990-5730250	250 ml tube	573	anaerobic	13500-33000	9 hours	1,3	≤0,1
97990-5731000	1000 ml can	573	anaerobic	13500-33000	9 hours	1,3	≤0,1
97990-5203300	300 ml cartridge	5203	anaerobic	50000-100000	10 min.*	1	≤0,125
97990-5910300	300 ml cartridge	5910	air humidity	paste	40 min.	1,2	>0,3

LOCTITE adhesive and sealant



Sample order:
nlm 97990-5366310

Note:
* Skin formation time.

Safety:
Visit our website to see the safety and technical data.

Description:
For permanently elastic adhesive joints and a simultaneous sealant effect against water and dust, etc.

LOCTITE permanently elastic adhesive and sealant, 97990-5366310
Clear paste. Is used as an adhesive to optimally seal, glue and protect. Typical applications are the sealing of wall panels on trains, sealing heat sources (ovens, heat exchangers, steam pipes, hot water boilers), protection and insulation of switchboxes and gluing HCR silicon. Also used in the maintenance sector.
Temperature resistant from -50 °C to +200 °C.

LOCTITE permanently elastic black adhesive and sealant, 97990-5368310
Black paste. Used mainly to seal. Is also suitable for gluing and high temperature applications. Used in many industrial sectors, such as electrical household equipment and the automobile and airspace industries.
Temperature resistant from -50 °C to +200 °C.



Elastic bonding and sealing

Order No.	Container	Intern. Ident. No.	Hardening system	Handling strength in min.	Tensile strength N/mm²	Elongation %	Shore grade
97990-5366310	310 ml cartridge	5366	air humidity	5*	2	530	25A
97990-5368310	310 ml cartridge	5368	air humidity	5*	2	435	26A

LOCTITE retaining compound



Sample order:
nlm 97990-6030010

Safety:
Visit our website to see the safety and technical data.

Description:
For bonding bushes, bearings and sleeves with push, interference and shrink fits.
Full surface contact prevents play, corrosion and contact rust.

LOCTITE retaining compound, oil-tolerant, 97990-603....
This product is used for gluing cylindrical fastener parts. It tolerates small amounts of oily dirt. Hardens under air deprivation between close fitting metal surfaces and prevents independent loosening and leaks caused by knocks and vibrations. Typical applications are amongst others securing roller bearings or oil impregnated bushes in bearing houses.
Temperature resistant from -55 °C to +150 °C.

LOCTITE retaining compound special, 97990-638....
The product is used for gluing cylindrical fastener parts, especially where a gap of up to 0.25 mm is present and maximum strength at room temperature is required. Hardens under air deprivation between close fitting metal surfaces and prevents independent loosening and leaks caused by knocks and vibrations.
Temperature resistant from -55 °C to +180 °C.

LOCTITE retaining compound universal, 97990-648....
This product is used for gluing cylindrical fastener parts. Hardens under air deprivation between close fitting metal surfaces and prevents independent loosening and leaks caused by knocks and vibrations. Typical applications are amonst others gluing gear wheels and chain sprockets to drive shafts.
Temperature resistant from -55 °C to +180 °C.



Bonds bushes and bearings

Order No.	Container	Intern. Ident. No.	Hardening system	Viscosity m Pa · s	Handling strength in min.	Adhesion gap in mm
97990-6030010	10 ml bottle	603	anaerobic	100-150	8	0,1
97990-6030050	50 ml bottle	603	anaerobic	100-150	8	0,1
97990-6380010	10 ml bottle	638	anaerobic	2000-3000	4	0,25
97990-6380050	50 ml bottle	638	anaerobic	2000-3000	4	0,25
97990-6480010	10 ml bottle	648	anaerobic	400-600	3	0,15
97990-6480050	50 ml bottle	648	anaerobic	400-600	3	0,15

LOCTITE cleaner



Sample order:
nlm 97990-7063400

Safety:
Visit our website to see the safety and technical data.

Description:
Cleaning increases the quality of sealed and bonded joints.

LOCTITE super clean, 97990-7063…
CFC free solvent based cleaner, used to clean and degrease surfaces. Ideal for preparing surfaces before applying adhesives or sealants. Quick, residue-free drying.

LOCTITE super clean, 97990-7070400
CFC free solvent based cleaner, used especially for cleaning, degreasing and preparing plastic parts before applying adhesives. Can be used as a spray or immersion bath by room temperature or by higher temperatures. Removes most greases, oils, lubricating liquids, metal swarf and fine particles from plastic parts without the danger of stress cracking. Compatible with metals and most plastics and elastomers.

LOCTITE adhesive and sealant remover, 97990-7080300
This product is used to help remove hardened chemical flange sealants in that it softens the sealant on the flange and so prevents damage caused by forcible scraping. After application a foaming film is formed that prevents the product running off the surface being treated. This allows it to work on the flange sealant for the required time. Typical application is the removal of all liquid flange sealants from metal flanges.



Surface preparation

Order No.	Container	Intern. Ident. No.
97990-7063150	150 ml aerosol	7063
97990-7063400	400 ml vaporizer	7063
97990-7070400	400 ml vaporizer	7070
97990-7080300	400 ml aerosol	7200

LOCTITE activators





Description:
To harden cyanoacrylate (CA) adhesives and anaerobically hardened adhesives; activators are used in passive materials for rapid and complete hardening. To that end the liquid activator is applied to one or both surfaces of the joint before the adhesive is applied.

Sample order:
nlm 97990-7386000

Note:
The activators are supplied in 500 ml sets.

Safety:
Visit our website to see the safety and technical data.

Order No.	Activator type	Intern. Ident. No.	Open time	Carrier medium	Application
97990-7386000	activator for 3298	7386	1 hour	heptane	only for single side activation
97990-7471000	activator T for anaerobic products	7471	30 days	acetone/isopropanol	cure accelerator, may be applicated on both sides
97990-7649000	activator N for anaerobic products	7649	30 days	acetone	can be applied to both sides of the fastening

97990

Application equipment



Description:
Suitable equipment simplifies the work and promotes correct practice in handling LOCTITE products.

LOCTITE Peristaltic Hand Pump, 97990-9700100
This hand pump is an inexpensive, accurate hand dosing pump, which screws onto the 50 ml or the 250 ml pack. LOCTITE screw locks and LOCTITE jointing products can be dosed from 0.01 to 0.4 ml with viscosities up to 30000 m Pa · s using this manual system. The system is functional in any situation, is non-drip and optimises product consumption. It also needs no cleaning and no connection for electricity or compressed air.

Teroson cartridge press, 97990-9150310
To hold standard cartridges with a content of 150/310 ml.
Stable plastic semi-shells for a regular use. With toothed rack drive.

Sample order:
nlm 97990-9700100

Order No.	Item name
97990-9700100	peristaltic hand pump
97990-9150310	teroson cartridge applicator

Notes

Technical data

Index and list of DIN Standards

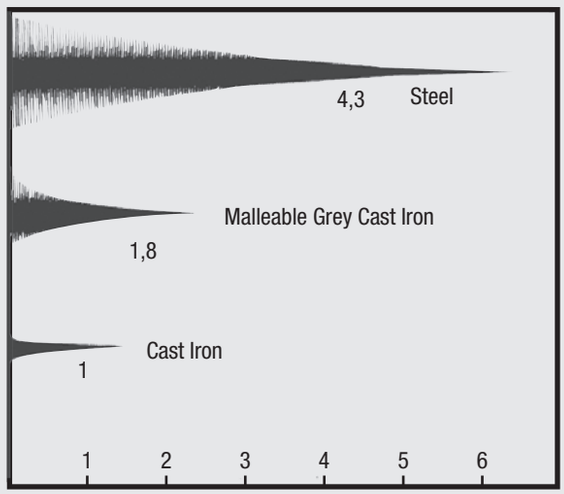
Notes

Technical data for grey cast iron (cast iron with flake graphite)

If cast iron is used for the base of drilling, milling, turning fixtures etc, it can give these crucial advantages over traditional steel fixtures:

– Cast iron has very good vibration damping properties (ratio of cast iron's damping effect to that of steel = 1 : 4.3. See also the comparative diagram).
– Cast iron has good fail-safe properties and good resistance to corrosion.
– Cast iron is easy to machine.

Comparison diagram of oscillation amplitude



Micrograph of cast iron with flake graphite



Material			GJL 250	GJL 300
Tensile strength	R_m	N/mm²	250 – 350	300 – 400
0.1 technical elastic limit	$R_{p\,0,1}$	N/mm²	–	195 – 260
Elasticity limit 0,1	R_e	N/mm²	165 – 228	195 – 260
Compressive strength	δ_{dB}	N/mm²	840	960
Shearing strength	τ_{aB}	N/mm²	290	345
Modulus of elasticity	E	(kN/mm²)	103 – 118	108 – 137
Density	e	g/cm³	7,2	7,25
Hardness	–	HB 30	180 – 250	200 – 275
Coefficient of linear expansion	α	$1 \cdot 10^{-6}$/K	10	11,7

Length tolerances for special lengths:
Grey iron and aluminium profiles and steel and plastic offcuts (Group 01000) are mostly cut to length with saw cuts and they may therefore have the following length tolerances because of their variations relative to the standard design:

Linear Dimensions	Deviations in mm
100-290	+ 10 + 3
300-590	+ 15 + 8
over 600	+ 50 + 20

All other nominal sizes are according to "DIN ISO 2768-mk".

ISO fits for standard bores

DK 621.753.2(100) GERMAN STANDARDS August 1966

Amended August 1966: dimensions coordinated to ISO recommendations ISO/R 286-1962

Previous editions: DIN 7154: 10.36
DIN 7154 sheet 1: 12.50, 9.56

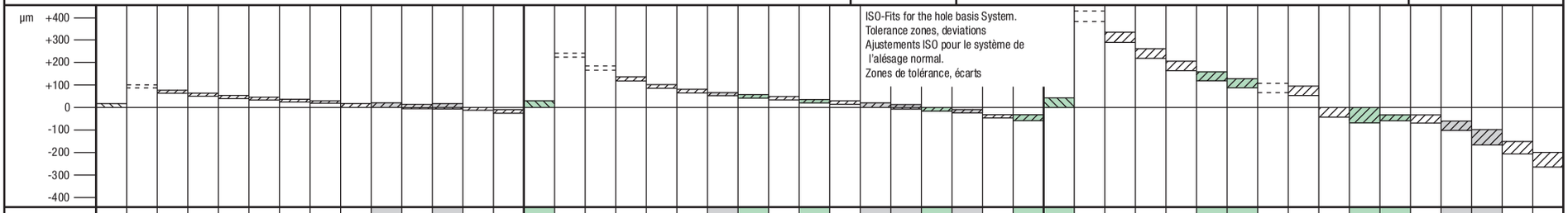
Tolerance examples for nominal diameter 60 mm

ID (bores) — OD (shafts) — Do not apply to nominal diameter 60 mm — Tolerance ranges acc. to DIN 7157 [1] — Series 1 — Series 2

ISO fits for standard bores

Tolerance ranges dimensions in µm

DIN 7154 sheet 1



Nominal dimension range in mm		Tolerance range	H6	u5	t5	s5	r5	p5	n5	m5	k5	k6	j5	j6	h5	g5	H7	za6	z6	x6	u6	t6	s6	r6	p6	n6	m6	k6	j6	h6	g6	f6	f7	H8	zc8	zb8	za8	z8	x8	u8	t8	s8	h8	h9	f7	f8	e8	d9	c9	b9
>	1	Š	+ 6	+ 22	—	+ 18	+ 14	+ 10	+ 8	+ 6	+ 4	+ 6	+ 2	+ 4	0	- 2	+ 10	+ 38	+ 32	+ 26	+ 24	—	+ 20	+ 16	+ 12	+ 10	+ 8	+ 6	+ 4	0	- 2	- 6	- 6	+ 14	+ 74	+ 54	—	+ 40	+ 34	—	—	+ 28	0	0	- 6	- 6	- 14	- 20	- 60	-140
	3	Ÿ	0	+ 18		+ 14	+ 10	+ 6	+ 4	+ 2	0	0	- 2	- 2	- 4	- 6	0	+ 32	+ 26	+ 20	+ 18		+ 14	+ 10	+ 6	+ 4	+ 2	0	- 2	- 6	- 8	- 12	- 16	0	+ 60	+ 40		+ 26	+ 20			+ 14	- 14	- 25	- 16	- 20	- 28	- 45	- 85	-165
>	3		+ 8	+ 28	—	+ 24	+ 20	+ 17	+ 13	+ 9	+ 6	+ 9	+ 3	+ 6	0	- 4	+ 12	+ 50	+ 43	+ 36	+ 31	—	+ 27	+ 23	+ 20	+ 16	+ 12	+ 9	+ 6	0	- 4	- 10	- 10	+ 18	+ 98	+ 68	—	+ 53	+ 46	—	—	+ 37	0	0	- 10	- 10	- 20	- 30	- 70	-140
	6	Ÿ	0	+ 23		+ 19	+ 15	+ 12	+ 8	+ 4	+ 1	+ 1	- 2	- 2	- 5	- 9	0	+ 42	+ 35	+ 28	+ 23		+ 19	+ 15	+ 12	+ 8	+ 4	+ 1	- 2	- 8	- 12	- 18	- 22	0	+ 80	+ 50		+ 35	+ 28			+ 19	- 18	- 30	- 22	- 28	- 38	- 60	-100	-170
>	6		+ 9	+ 34	—	+ 29	+ 25	+ 21	+ 16	+ 12	+ 7	+ 10	+ 4	+ 7	0	- 5	+ 15	+ 61	+ 51	+ 43	+ 37	—	+ 32	+ 28	+ 24	+ 19	+ 15	+ 10	+ 7	0	- 5	- 13	- 13	+ 22	+119	+ 89	+ 74	+ 64	+ 56	—	—	+ 45	0	0	- 13	- 13	- 25	- 40	- 80	-150
	10	Ÿ	0	+ 28		+ 23	+ 19	+ 15	+ 10	+ 6	+ 1	+ 1	- 2	- 2	- 6	- 11	0	+ 52	+ 42	+ 34	+ 28		+ 23	+ 19	+ 15	+ 10	+ 6	+ 1	- 2	- 9	- 14	- 22	- 28	0	+ 97	+ 67	+ 52	+ 42	+ 34			+ 23	- 22	- 36	- 28	- 35	- 47	- 76	-116	-186
>	10																	+ 75	+ 61	+ 51															+157	+117	+ 91	+ 77	+ 67										
	14	Ÿ	+ 11	+ 41	—	+ 36	+ 31	+ 26	+ 20	+ 15	+ 9	+ 12	+ 5	+ 8	0	- 6	+ 18	+ 64	+ 50	+ 40	+ 44	—	+ 39	+ 34	+ 29	+ 23	+ 18	+ 12	+ 8	0	- 6	- 16	- 16	+ 27	+130	+ 90	+ 64	+ 50	+ 40	—	—	+ 55	0	0	- 16	- 16	- 32	- 50	- 95	-150
>	14		0	+ 33		+ 28	+ 23	+ 18	+ 12	+ 7	+ 1	+ 1	- 3	- 3	- 8	- 14	0	+ 88	+ 71	+ 56	+ 33		+ 28	+ 23	+ 18	+ 12	+ 7	+ 1	- 3	- 11	- 17	- 27	- 34	0	+177	+135	+104	+ 87	+ 72			+ 28	- 27	- 43	- 34	- 43	- 59	- 93	-138	-193
	18	Ÿ																+ 77	+ 60	+ 45															+150	+108	+ 77	+ 60	+ 45										
>	18			+ 50	—													+ 86	+ 67	+ 54	—														+221	+169	+131	+106	+ 87	—									
	24	Ÿ	+ 13	+ 41		+ 44	+ 37	+ 31	+ 24	+ 17	+ 11	+ 15	+ 5	+ 9	0	- 7	+ 21	+ 73	+ 54	+ 41			+ 48	+ 41	+ 35	+ 28	+ 21	+ 15	+ 9	0	- 7	- 20	- 20	+ 33	+188	+136	+ 98	+ 73	+ 54			+ 68	0	0	- 20	- 20	- 40	- 65	-110	-160
>	24		0	—	+ 50													+101	+ 77	+ 61	+ 54														+251	+193	+151	+121	+ 97	+ 81									
	30	Ÿ			+ 41	+ 35	+ 28	+ 22	+ 15	+ 8	+ 2	+ 2	- 4	- 4	- 9	- 16	0	+ 88	+ 64	+ 48	+ 41		+ 35	+ 28	+ 22	+ 15	+ 8	+ 2	- 4	- 13	- 20	- 33	- 41	0	+218	+160	+118	+ 88	+ 64	+ 48	—	+ 35	- 33	- 52	- 41	- 53	- 73	-117	-162	-212
>	30				+ 59													+128	+ 96	+ 76	+ 64															+239	+187	+151	+119	+ 99									-120	-170
	40	Ÿ	+ 16	—	+ 48	+ 54	+ 45	+ 37	+ 28	+ 20	+ 13	+ 18	+ 6	+ 11	0	- 9	+ 25	+112	+ 80	+ 60	+ 48	—	+ 59	+ 50	+ 42	+ 33	+ 25	+ 18	+ 11	0	- 9	- 25	- 25	+ 39	—	+200	+148	+112	+ 80	+ 48	—	+ 82	0	0	- 25	- 25	- 50	- 80	-182	-232
>	40		0	—	+ 65	+ 43	+ 34	+ 26	+ 17	+ 9	+ 2	+ 2	- 5	- 5	- 11	- 20	0	—	—	+113	+ 86	+ 70	+ 43	+ 34	+ 26	+ 17	+ 9	+ 2	- 5	- 16	- 25	- 41	- 50	0		+281	+219	+175	+136	+109			+ 43	- 39	- 62	- 50	- 64	- 89	-142	-130	-180
	50	Ÿ			+ 54															+ 97	+ 70	+ 54														+242	+180	+136	+ 97	+ 70									-192	-242
>	50				+ 79	+ 66	+ 54													+141	+106	+ 85	+ 72	+ 60												+346	+272	+218	+168	+133			+ 99							-140	-190
	65	Ÿ	+ 19	—	+ 66	+ 53	+ 41	+ 45	+ 33	+ 24	+ 15	+ 21	+ 6	+ 12	0	- 10	+ 30	—	—	+122	+ 87	+ 66	+ 53	+ 41	+ 51	+ 39	+ 30	+ 21	+ 12	0	- 10	- 30	- 30	+ 46	—	+300	+226	+172	+122	+ 87	—		+ 53	0	0	- 30	- 30	- 60	-100	-214	-264
>	65		0	—	—	+ 72	+ 56	+ 32	+ 20	+ 11	+ 2	+ 2	- 7	- 7	- 13	- 23	0			—	+121	+ 94	+ 78	+ 62	+ 32	+ 20	+ 11	+ 2	- 7	- 19	- 29	- 49	- 60	0		—	+320	+256	+192	+148			+105	- 46	- 74	- 60	- 76	-106	-174	-150	-200
	80	Ÿ				+ 59	+ 43														+102	+ 75	+ 59	+ 43												+274	+210	+146	+102			+ 59							-224	-274
>	80					+ 86	+ 66														+146	+113	+ 93	+ 73												+389	+312	+232	+178		+125							-170	-220
	100	Ÿ	+ 22	—	—	+ 71	+ 51	+ 52	+ 38	+ 28	+ 18	+ 25	+ 6	+ 13	0	- 12	+ 35	—	—	—	+124	+ 91	+ 71	+ 51	+ 59	+ 45	+ 35	+ 25	+ 13	0	- 12	- 36	- 36	+ 54	—	—	+335	+258	+178	+124	—	+ 71	0	0	- 36	- 36	- 72	-120	-257	-307
>	100		0			—	+ 69	+ 37	+ 23	+ 13	+ 3	+ 3	- 9	- 9	- 15	- 27	0				+166	+126	+101	+ 76	+ 37	+ 23	+ 13	+ 3	- 9	- 22	- 34	- 58	- 71	0			—	+364	+264	+198	+158	+133	- 54	- 87	- 71	- 90	-126	-207	-180	-240
	120	Ÿ					+ 54														+144	+104	+ 79	+ 54													+310	+210	+144	+104	+ 79							-267	-327

Black numbers = GO limit
Green numbers = NO-GO limit
Fits for standard bores, fit tolerances (clearances and interferences) see DIN 7154, sheet 2
Fits for standard shaft, see DIN 7155, sheet 1 and sheet 2

[1]) DIN 7157 tolerance ranges are recommended.
Series 1 is preferable to Series 2

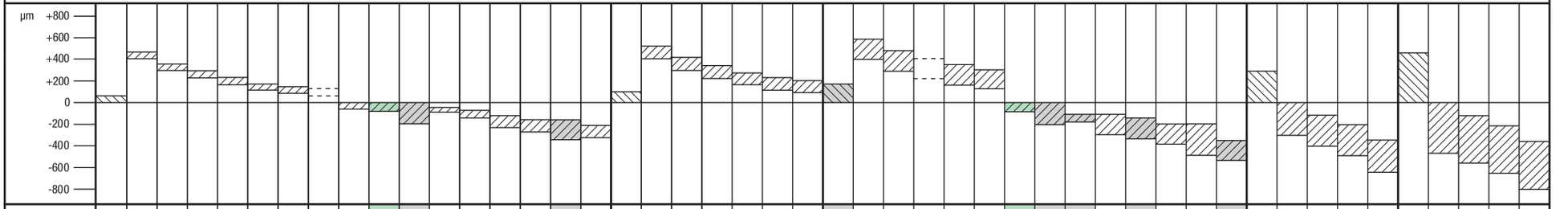
Continued on page 2

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Tolerance examples for nominal diameter 60 mm

ID (bores) | OD (shafts) | Do not apply to nominal diameter 60 mm | Tolerance ranges acc. to DIN 7157 [1] | Series 1 | Series 2 | Dimensions in µm



Tolerance range		H9	zc9	zb9	za9	z9	x9	u9	t9	h8	h9	h11	f8	e9	d10	c10	c11	b10	H10	zc10	zb10	za10	z10	x10	u10	H11	zc11	zb11	za11	z11	x11	h9	h11	d9	d11	c11	b11	b12	a11	H12	h12	d12	b12	a12	H13	h13	d13	b13	a13
Nominal dimension range in mm	‹ 1	+25	+85	+65	—	+51	+45	—	—	0	0	0	-6	-14	-20	-60	-60	-140	+40	+100	—	—	+66	—	—	+60	+120	—	—	—	—	0	0	-20	-20	-60	-140	-140	-270	+100	0	-20	-140	-270	+140	0	-20	-140	-270
	› 3	0	+60	+40		+26	+20			-14	-25	-60	-20	-39	-60	-100	-120	-180	0	+60			+26			0	+60					-25	-60	-45	-80	-120	-200	-240	-330	0	-100	-120	-240	-370	0	-140	-160	-280	-410
	> 3	+30	+110	+80	—	+65	+58	—	—	0	0	0	-10	-20	-30	-70	-70	-140	+48	+128	—	—	+83	—	—	+75	+155	—	—	—	—	0	0	-30	-30	-70	-140	-140	-270	+120	0	-30	-140	-270	+180	0	-30	-140	-270
	› 6	0	+80	+50		+35	+28			-18	-30	-75	-28	-50	-78	-118	-145	-188	0	+80			+35			0	+80					-30	-75	-60	-105	-145	-215	-260	-345	0	-120	-150	-260	-390	0	-180	-210	-320	-450
	> 6	+36	+133	+103	—	+78	+70	—	—	0	0	0	-13	-25	-40	-80	-80	-150	+58	+155	+125	—	+100	—	—	+90	+187	+157	—	—	—	0	0	-40	-40	-80	-150	-150	-280	+150	0	-40	-150	-280	+220	0	-40	-150	-280
	› 10	0	+97	+67		+42	+34			-22	-36	-90	-35	-61	-98	-138	-170	-208	0	+97	+67		+42			0	+97	+67				-36	-90	-76	-130	-170	-240	-300	-370	0	-150	-190	-300	-430	0	-220	-260	-370	-500
	> 10		+173	+133	—	+93	+83													+200	+160	—	+120	—			+240	+200																					
	› 14	+43	+130	+90		+50	+40	—	—	0	0	0	-16	-32	-50	-95	-95	-150	+70	+130	+90		+42			+110	+130	+90	—	—	—	0	0	-50	-50	-95	-150	-150	-290	+180	0	-50	-150	-290	+270	0	-50	-150	-290
	> 14	0	+193	+151	—	+103	+88													+220	+178	—	+130	+115			+260	+218																					
	› 18		+150	+108		+60	+45			-27	-43	-110	-43	-75	-112	-165	-205	-220	0	+150	+108		+60	+45		0	+150	+108				-43	-110	-93	-160	-205	-260	-330	-400	0	-180	-230	-330	-470	0	-270	-320	-420	-560
	> 18		+240	+188	+150	+125	+106	—												+272	+220	—	+157	+138			+318	+266	—	—																		
	› 24	+52	+188	+136	+98	+73	+54		—	0	0	0	-20	-40	-65	-110	-110	-160	+84	+188	+136		+73	+54		+130	+188	+136			—	0	0	-65	-65	-110	-160	-160	-300	+210	0	-65	-160	-300	+330	0	-65	-160	-300
	> 24	0	+270	+212	+170	+140	+116	+100												+302	+244	—	+172	+148			+348	+290	—	+218																		
	› 30		+218	+160	+118	+88	+64	+48		-33	-52	-130	-53	-92	-149	-194	-240	-244	0	+218	+160		+88	+64		0	+218	+160		+88		-52	-130	-117	-195	-240	-290	-370	-430	0	-210	-275	-370	-510	0	-330	-395	-490	-630
	> 30		+336	+262	+210	+174	+142	+122								-120	-120	-170		+374	+300	—	+212	+180	—		+434	+360	—	+272						-120	-170	-170	-310				-170	-310				-170	-310
	› 40	+62	+274	+200	+148	+112	+80	+60	—	0	0	0	-25	-50	-80	-220	-280	-270	+100	+274	+200		+112	+80		+160	+274	+200		+112	—	0	0	-80	-80	-280	-330	-420	-470	+250	0	-80	-420	-560	+390	0	-80	-560	-700
	> 40	0	+387	+304	+242	+198	+159	+132								-130	-130	-180	0	+425	+342	+280	+236	+197	+170	0	+485	+402	—	+296						-130	-180	-180	-320	0	-250	-330	-180	-320	0	-390	-470	-180	-320
	› 50		+325	+242	+180	+136	+97	+70		-39	-62	-160	-64	-112	-180	-230	-290	-280		+325	+242	+180	+136	+97	+70		+325	+242		+136		-62	-160	-142	-240	-290	-340	-430	-480				-430	-570				-570	-710
	> 50		+479	+374	+300	+245	+196	+161								-140	-140	-190		+525	+420	+346	+292	+242	+207		+595	+490	—	+362	+312					-140	-190	-190	-340				-190	-340				-190	-340
	› 65	+74	+405	+300	+226	+172	+122	+87	—	0	0	0	-30	-60	-100	-260	-330	-310	+120	+405	+300	+226	+172	+122	+87	+190	+405	+300		+172	+122	0	0	-100	-100	-330	-380	-490	-530	+300	0	-100	-490	-640	+460	0	-100	-650	-800
	> 65	0	—	+434	+348	+284	+220	+176								-150	-150	-200	0	+600	+480	+394	+330	+266	+222	0	+670	+550	—	+400	+336	-74	-190	-174	-290	-150	-200	-200	-360	0	-300	-400	-200	-360	0	-460	-560	-200	-360
	› 80			+360	+274	+210	+146	+102		-46	-74	-190	-76	-134	-220	-270	-340	-320		+480	+360	+274	+210	+146	+102		+480	+360		+210	+146					-340	-390	-500	-550				-500	-660				-660	-820
	> 80			+532	+422	+345	+265	+211								-170	-170	-220		+725	+585	+475	+398	+318	+264		+805	+665	—	+478	+398					-170	-220	-220	-380				-220	-380				-220	-380
	› 100	+87	—	+445	+335	+258	+178	+124	—	0	0	0	-36	-72	-120	-310	-390	-360	+140	+585	+445	+335	+258	+178	+124	+220	+585	+445		+258	+178	0	0	-120	-120	-390	-440	-570	-600	+350	0	-120	-500	-730	+540	0	-120	-760	-920
	> 100	0		—	+487	+397	+297	+231								-180	-180	-240	0	+830	+665	+540	+450	+350	+284	0	+910	+745	+620	+530	+430	-87	-220	-207	-340	-180	-240	-240	-410	0	-350	-470	-240	-410	0	-540	-660	-240	-410
	› 120				+400	+310	+210	+144								-320	-400	-380		+690	+525	+400	+310	+210	+144		+690	+525	+400	+310	+210					-400	-460	-590	-630				-590	-760				-780	-950

Black numbers = GO limit
Green numbers = NO-GO limit

[1] DIN 7157 tolerance ranges are recommended.
Series 1 is preferable to Series 2

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ISO fits for standard shafts

DK 621.753.2(100) GERMAN STANDARDS August 1966

Amended August 1966: dimensions coordinated to ISO recommendations ISO/R 286-1962

Previous editions: DIN 7155: 10.36
DIN 7155 sheet 1: 12.50, 9.56

Tolerance examples for nominal diameter 60 mm

ID (bores) | OD (shafts) | Do not apply to nominal diameter 60 mm

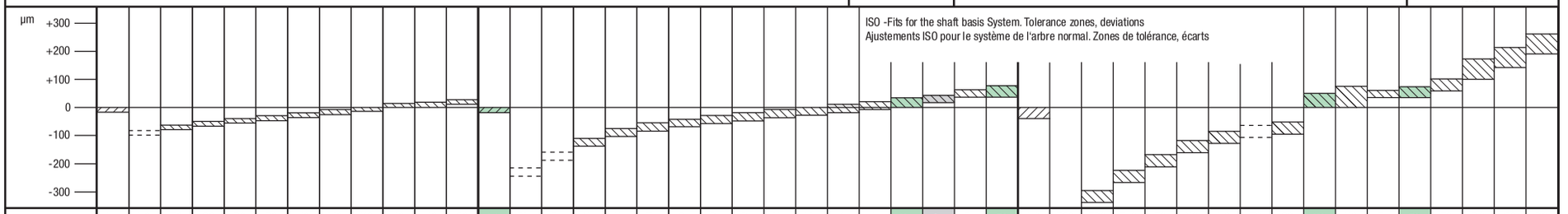
Tolerance ranges acc. to DIN 7157 [1]) — Series 1 | Series 2

ISO fits for standard shafts

Tolerance ranges
dimensions in µm

DIN 7155 sheet 1

ISO -Fits for the shaft basis System. Tolerance zones, deviations
Ajustements ISO pour le système de l'arbre normal. Zones de tolérance, écarts



Nominal dimension range in mm

Tolerance range	h5	U6	T6	S6	R6	P6	N6	M6	K6	J6	H6	G6	h6	ZA7	Z7	X7	U7	T7	S7	R7	P7	N7	M7	K7	J7	H7	G7	F7	F8	h8	ZC8	ZB8	ZA8	Z8	X8	U8	T8	S8	H8	H9	F7	F8	E8	D9	C9	B9
¡ 1	0	-18	—	-14	-10	-6	-4	-2	0	+2	+6	+8	0	-32	-26	-20	-18	—	-14	-10	-6	-4	-2	0	+4	+10	+12	+16	+20	0	-60	-40	—	-26	-20	—	—	-14	+14	+25	+16	+20	+28	+45	+85	+165
¢ 3	-4	-24		-20	-16	-12	-10	-8	-6	-4	0	+2	-6	-42	-36	-30	-28		-24	-20	-16	-14	-12	-10	-6	0	+2	+6	+6	-14	-74	-54		-40	-34			-28	0	0	+6	+6	+14	+20	+60	+140
> 3	0	-20	—	-16	-12	-9	-5	-1	+2	+5	+8	+12	0	-38	-31	-24	-19	—	-15	-11	-8	-4	0	+3	+6	+12	+16	+22	+28	0	-80	-50	—	-35	-28	—	—	-19	+18	+30	+22	+28	+38	+60	+100	+170
¢ 6	-5	-28		-24	-20	-17	-13	-9	-6	-3	0	+4	-8	-50	-43	-36	-31		-27	-23	-20	-16	-12	-9	-6	0	+4	+10	+10	-18	-98	-68		-53	-46			-37	0	0	+10	+10	+20	+30	+70	+140
> 6	0	-25	—	-20	-16	-12	-7	-3	+2	+5	+9	+14	0	-46	-36	-28	-22	—	-17	-13	-9	-4	0	+5	+8	+15	+20	+28	+35	0	-97	-67	-52	-42	-34	—	—	-23	+22	+36	+28	+35	+47	+76	+116	+186
¢ 10	-6	-34		-29	-25	-21	-16	-12	-7	-4	0	+5	-9	-61	-51	-43	-37		-32	-28	-24	-19	-15	-10	-7	0	+5	+13	+13	-22	-119	-89	-74	-64	-56			-45	0	0	+13	+13	+25	+40	+80	+150
> 10														-57	-43	-33															-130	-90	-64	-50	-40											
¢ 14	0	-30	—	-25	-20	-15	-9	-4	+2	+6	+11	+17	0	-75	-61	-51	-26	—	-21	-16	-11	-5	0	+6	+10	+18	+24	+34	+43	0	-157	-117	-91	-77	-67	—	—	-28	+27	+43	+34	+43	+59	+93	+138	+193
> 14	-8	-41		-36	-31	-26	-20	-15	-9	-5	0	+6	-11	-70	-53	-38	-44		-39	-34	-29	-23	-18	-12	-8	0	+6	+16	+16	-27	-150	-108	-77	-60	-45			-55	0	0	+16	+16	+32	+50	+95	+150
¢ 18														-88	-71	-56															-177	-135	-104	-87	-72											
> 18		-37	—												-65	-46	-33	—													-188	-136	-98	-73	-54	—										
¢ 24	0	-50		-31	-24	-18	-11	-4	+2	+8	+13	+20	0	—	-86	-67	-54		-27	-20	-14	-7	0	+6	+12	+21	+28	+41	+53	0	-221	-169	-131	-106	-87		—	-35	+33	+52	+41	+53	+73	+117	+162	+212
> 24	-9	—	-37	-44	-37	-31	-24	-17	-11	-5	0	+7	-13		-80	-56	-40	-33	-48	-41	-35	-28	-21	-15	-9	0	+7	+20	+20	-33	-218	-160	-118	-88	-64	-48		-68	0	0	+20	+20	+40	+65	+110	+160
¢ 30			-50												-101	-77	-61	-54													-251	-193	-151	-121	-97	-81										
> 30			-43												-103	-71	-51	-39														-200	-148	-112	-80	-60									+182	+232
¢ 40	0	—	-59	-38	-29	-21	-12	-4	+3	+10	+16	+25	0	—	-128	-96	-76	-64	-34	-25	-17	-8	0	+7	+14	+25	+34	+50	+64	0	—	-239	-187	-151	-119	-99	—	-43	+39	+62	+50	+64	+89	+142	+120	+170
> 40	-11		-49	-54	-45	-37	-28	-20	-13	-6	0	+9	-16	—	—	-88	-61	-45	-59	-50	-42	-33	-25	-18	-11	0	+9	+25	+25	-39		-242	-180	-136	-97	-70	—	-82	0	0	+25	+25	+50	+80	+192	+242
¢ 50			-65													-113	-86	-70													-281	-219	-175	-136	-109									+130	+180
> 50			-60	-47	-35											-111	-76	-55	-42	-30											-300	-226	-172	-122	-87	—	-53							+214	+264
¢ 65	0	—	-79	-66	-54	-26	-14	-5	+4	+13	+19	+29	0	—	—	-141	-106	-85	-72	-60	-21	-9	0	+9	+18	+30	+40	+60	+76	0	—	-346	-272	-218	-168	-133	—	-99	+46	+74	+60	+76	+106	+174	+140	+190
> 65	-13		—	-53	-37	-45	-33	-24	-15	-6	0	+10	-19			—	-91	-64	-48	-32	-51	-39	-30	-21	-12	0	+10	+30	+30	-46		—	-274	-210	-146	-102	—	-59	0	0	+30	+30	+60	+100	+224	+274
¢ 80				-72	-56												-121	-94	-78	-62												-320	-256	-192	-148		-105								+150	+200
> 80				-64	-44												-111	-78	-58	-38												-335	-285	-178	-124	—	-71								+257	+307
¢ 100	0	—	—	-86	-66	-30	-16	-6	+4	+16	+22	+34	0	—	—	—	-146	-113	-93	-73	-24	-10	0	+10	+22	+35	+47	+71	+90	0	—	—	-389	-312	-232	-178		-125	+54	+87	+71	+90	+126	+207	+170	+220
> 100	-15			—	-47	-52	-38	-28	-18	-6	0	+12	-22				-131	-91	-66	-41	-59	-45	-35	-25	-13	0	+12	+36	+36	-54			—	-310	-210	-144	-104	-79	0	0	+36	+36	+72	+120	+267	+327
¢ 120					-69												-166	-126	-101	-76													-364	-264	-198	-158	-133							+180	+240

Black numbers = GO limit
Green numbers = NO-GO limit
Fits for standard shaft, fit tolerances (clearances and interferences) see DIN 7155, sheet 2
Fits for standard borehole, see DIN 7154, sheet 1 and sheet 2

[1]) DIN 7157 tolerance ranges are recommended.
Series 1 is preferable to Series 2

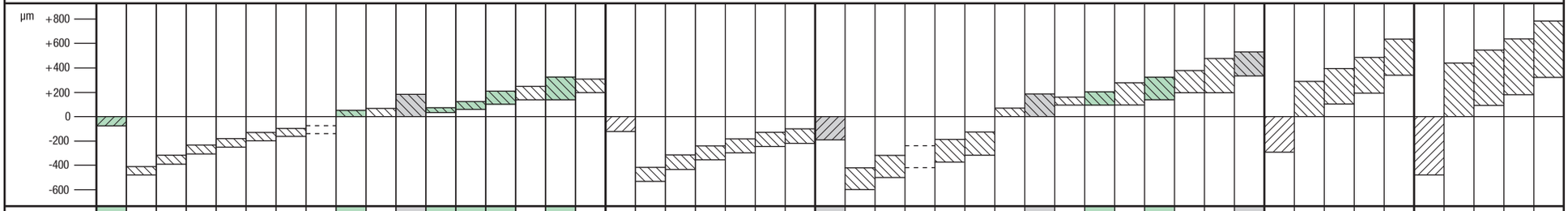
Continued on page 2

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Tolerance examples for nominal diameter 60 mm

ID (bores) — OD (shafts) — Do not apply to nominal diameter 60 mm — Tolerance ranges acc. to DIN 7157 [1] — Series 1 — Series 2 — Dimensions in µm



Nominal dimension range in mm	Tolerance range	h9	ZC9	ZB9	ZA9	Z9	X9	U9	T9	H8	H9	H11	F8	E9	D10	C10	C11	B10	h10	ZC10	ZB10	ZA10	Z10	X10	U10	h11	ZC11	ZB11	ZA11	Z11	X11	H9	H11	D9	D10	D11	C11	B11	B12	A11	h12	H12	D12	B12	A12	h13	H13	D13	B13	A13
, 1		0	-60	-40	—	-26	-20	—	—	+14	+25	+60	+20	+39	+60	+100	+120	+180	0	-60	—	—	-26	—	—	0	-60	—	—	—	—	+25	+60	+45	+60	+80	+120	+200	+240	+330	0	+100	+120	+240	+370	0	+140	+160	+280	+410
™ 3		-25	-85	-65		-51	-45			0	0	0	+6	+14	+20	+60	+60	+140	-40	-100			-66			-60	-120					0	0	+20	+20	+20	+60	+140	+140	+270	-100	0	+20	+140	+270	-140	0	+20	+140	+270
> 3		0	-80	-50	—	-35	-28	—	—	+18	+30	+75	+28	+50	+78	+118	+145	+188	0	-80	—	—	-35	—	—	0	-80	—	—	—	—	+30	+75	+60	+78	+105	+145	+215	+260	+345	0	+120	+150	+260	+390	0	+180	+210	+320	+450
™ 6		-30	-110	-80		-65	-58			0	0	0	+10	+20	+30	+70	+70	+140	-48	-128			-83			-75	-155					0	0	+30	+30	+30	+70	+140	+140	+270	-120	0	+30	+140	+270	-180	0	+30	+140	+270
> 6		0	-97	-67	—	-42	-34	—	—	+22	+36	+90	+35	+61	+98	+138	+170	+208	0	-97	-67	—	-42	—	—	0	-97	-67	—	—	—	+36	+90	+76	+98	+130	+170	+240	+300	+370	0	+150	+190	+300	+430	0	+220	+260	+370	+500
™ 10		-36	-133	-103		-78	-70			0	0	0	+13	+25	+40	+80	+80	+150	-58	-155	-125		-100			-90	-187	-157				0	0	+40	+40	+40	+80	+150	+150	+280	-150	0	40	+150	+280	-220	0	+40	+150	+280
> 10			-130	-90	—	-50	-40													-130	-90	—	-50	—			-130	-90																						
™ 14		0	-173	-133		-93	-83	—	—	+27	+43	+110	+43	+75	+120	+165	+205	+220	0	-200	-160		-120			0	-240	-200	—	—	—	+43	+110	+93	+120	+160	+205	+260	+330	+400	0	+180	+230	+330	+470	0	+270	+320	+420	+560
> 14		-43	-150	-108	—	-60	-45													-150	-108	—	-60	-45			-150	-108																						
™ 18			-193	-151		-103	-88			0	0	0	+16	+32	+50	+95	+95	+150	-70	-220	-178		-130	-115		-110	-260	-218				0	0	+50	+50	+50	+95	+150	+150	+290	-180	0	+50	+150	+290	-270	0	+50	+150	+290
> 18			-188	-136	-98	-73	-54	—												-188	-136	—	-73	-54			-188	-136	—	—																					
™ 24		0	-240	-188	-150	-125	-106		—	+33	+52	+130	+53	+92	+149	+194	+240	+244	0	-272	-220		-157	-138	—	0	-318	-266			—	+52	+130	+117	+149	+195	+240	+290	+370	+430	0	+210	+275	+370	+510	0	+330	+395	+490	+630
> 24		-52	-218	-160	-118	-88	-64	-48												-218	-160	—	-88	-64			-218	-160	—	-88																					
™ 30			-270	-212	-170	-140	-116	-100		0	0	0	+20	+40	+65	+110	+110	+160	-84	-302	-244		-172	-148		-130	-348	-290		-218		0	0	+65	+65	+65	+110	+160	+160	+300	-210	0	+65	+160	+300	-330	0	65	+160	+300
> 30			-274	-200	-148	-112	-80	-60								+220	+280	+270		-274	-200	—	-112	-80	—		-274	-200	—	-112							+280	+330	+420	+470								+560	+700
™ 40		0	-336	-262	-210	-174	-142	-122	—	+39	+62	+160	+64	+112	+180	+120	+120	+170	0	-374	-300		-212	-180		0	-434	-360	—	-272	—	+62	+160	+142	+180	+240	+120	+170	+170	+310	0	+250	+330	+170	+310	0	+390	+470	+170	+310
> 40		-62	-325	-242	-180	-136	-97	-70								+230	+290	+280	-100	-325	-242	-180	-136	-97	-70	-160	-325	-242	—	-136							+290	+340	+430	+480	-250	0	+80	+430	+570	-390	0	+80	+570	+710
™ 50			-387	-304	-242	-198	-159	-132		0	0	0	+25	+50	+80	+130	+130	+180		-425	-342	-280	-236	-197	-170		-485	-402		-296		0	0	+80	+80	+80	+130	+180	+180	+320				+180	+320				+180	+320
> 50			-405	-300	-226	-172	-122	-87								+260	+330	+310		-405	-300	-226	-172	-122	-87		-405	-300	—	-172	-122						+330	+380	+490	+530				+490	+640				+650	+800
™ 65		0	-479	-374	-300	-246	-196	-161	—	+46	+74	+190	+76	+134	+220	+140	+140	+190	0	-525	-420	-346	-292	-242	-207	0	-595	-490	—	-362	-312	+74	+190	+174	+220	+290	+140	+190	+190	+340	0	+300	+400	+190	+340	0	+460	+560	+190	+340
> 65		-74	—	-360	-274	-210	-146	-102								+270	+340	+320	-120	-480	-360	-274	-210	-146	-102	-190	-480	-360	—	-210	-146	0	0	+100	+100	+100	+340	+390	+500	+550	-300	0	+100	+500	+660	-460	0	+100	+660	+820
™ 80				-434	-348	-284	-220	-179		0	0	0	+30	+60	+100	+150	+150	+200		-600	-480	-394	-330	-266	-222		-670	-550		-400	-336						+150	+200	+200	+360				+200	+360				+200	+360
> 80			-445	-335	-258	-178	-124									+310	+390	+360		-585	-445	-335	-258	-178	-124		-585	-445	—	-258	-178						+390	+440	+570	+600				+570	+730				+760	+920
™ 100		0	—	-532	-422	-345	-265	-211	—	+54	+87	+220	+90	+159	+260	+170	+170	+220	0	-725	-585	-475	-398	-318	-264	0	-805	-665	—	-478	-398	+87	+220	+207	+260	+340	+170	+220	+220	+380	0	+350	+470	+220	+380	0	+540	+660	+220	+380
> 100		-87		—	-400	-310	-210	-144								+320	+400	+380	-140	-690	-525	-400	-310	-210	-144	-220	-690	-525	-400	-310	-210						+400	+460	+590	+630	-350	0	+120	+590	+760	-540	0	+120	+780	+950
™ 120					-487	-397	-297	-231								+180	+180	+240		-830	-665	-540	-450	-350	-284		-910	-745	-620	-530	-430						+180	+240	+240	+410				+240	+410				+240	+410

Black numbers = GO limit
Green numbers = NO-GO limit

[1]) DIN 7157 tolerance ranges are recommended.
Series 1 is preferable to Series 2

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Technical Information
General tolerances. Surface finishes

– norelem products are adapted and manufactured in such a way that they are suitable for their general purpose with reference to material and surface finish. As such, they meet all normal tolerance requirements.
– All dimensions are indicated in mm.
– All weights are approx. data.
– The latest DIN standard sheet version applies to all parts made to DIN standards.
– Variations on dimensions without tolerance values are according to „DIN ISO 2768-mk“ (except linear dimensions of grey cast iron- and Al-profiles).

General Tolerances DIN ISO 2768 T1 and T2

General Tolerances for Linear and Angular Dimensions — DIN ISO 2768 T1

Tolerance class		Linear Dimensions							
		Permissible deviations in mm for ranges of nominal sizes							
designation	description	0,5 to 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000
f	fine	± 0,05	± 0,05	± 0,1	± 0,15	± 0,2	± 0,3	± 0,5	–
m	medium	± 0,10	± 0,10	± 0,2	± 0,30	± 0,5	± 0,8	± 1,2	± 2
c	coarse	± 0,20	± 0,30	± 0,5	± 0,80	± 1,2	± 2,0	± 3,0	± 4
v	very coarse	–	± 0,50	± 1,0	± 1,50	± 2,5	± 4,0	± 6,0	± 8

Tolerance class		External Radii and Chamfer Heights			Angular Dimensions				
		Permissible deviations in mm for ranges of nominal sizes			Permissible deviations in degrees or minutes for ranges of nominal sizes (shorten leg)				
designation	description	0,5 to 3	over 3 to 6	over 6	to 10	over 10 to 50	over 50 to 120	over 120 to 400	over 400
f	fine	± 0,2	± 0,5	± 1	± 1°	± 0°30‘	± 0°20‘	± 0°10‘	± 0° 5‘
m	medium								
c	coarse	± 0,4	± 1,0	± 2	± 1°30‘	± 1°30‘	± 0°30‘	± 0°15‘	± 0°10‘
v	very coarse				± 3°30‘	± 2°30‘	± 1°30‘	± 0°30’	± 0°20‘

General Tolerances for Form and Position — DIN ISO 2768 T2

Tolerance class	Straightness and Flatness						Perpendicularity				Symmetry				Run-out
	Ranges of nominal sizes in mm						Ranges of nominal sizes in mm				Ranges of nominal sizes in mm				Tolerances in mm for
	to 10	over 10 to 30	over 30 to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000	to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000	to 100	over 100 to 300	over 300 to 1000	over 1000 to 3000	
H	0,02	0,05	0,1	0,2	0,3	0,4	0,2	0,3	0,4	0,5	0,5				0,1
K	0,05	0,10	0,2	0,4	0,6	0,8	0,4	0,6	0,8	1,0	0,6		0,8	1	0,2
L	0,10	0,20	0,4	0,8	1,2	1,6	0,6	1,0	1,5	2,0	0,6	1,0	1,5	2	0,5

Method of Indicating Surface Finish to DIN ISO 1302

Graphical symbol of surface finish to DIN 3141	Surface finish values, R_a for permissible roughness height R_t assignation according to DIN 3141 line 1 | line 2	meaning according to ISO 1302
(Surface without graphical symbol)		Surfaces which do not need to meet specific requirements
	even	Surfaces which only have to meet requirements of general evenness and better appearance
	rough	Individual raw surfaces which may be remachined
	6,3	Clean raw surface with higher requirements
	25 | 12,5	Surface with a roughness value which must not exceed the highest permissible medium roughness value
	6,3 | 3,2	
	1,6 | 0,8	

Technical Information
Screws and Nuts

The values for clamping forces F_{sp} and tightening torques M_{sp} specified in the table apply to standard metric thread according to DIN 13 and head contact surfaces according to DIN 912, 931-934, 6912, 7984, 7990.

The F_{sp} clamping force values result in a 90% utilisation of yield point σ 0.2 (DIN 267 pg. 3) subject to the respective coefficient of friction in threads.

It can be inferred from the table which screw with which quality is required for a particular coefficient of friction in thread in order to apply a given F_M assembly force ($F_{sp} >= F_M$).

The M_{sp} tightening torques are calculated based on the F_{sp} clamping forces assuming $\mu_G = \mu_K = \mu_{ges}$.

Determination of the M_{sp} tightening torque at 90 % yield point utilisation for a screw specified in size and quality is made according to the table at the right subject to the underhead friction occurring (μ_K), irregardless of a coefficient of friction in thread deviating from it.

To attain the applicable rated load torque it is still necessary to reduce half the spread of the designated torque wrench by the particular tightening torque M_{sp}.

Calculation of the table values and information for applications according to VDI guideline 2230.

Clamping force and tightening torques

Standard thread	μ_{total}* = μ_G = μ_K	Set screws clamping force F_{sp} in kN by grade			tightening torque M_{sp} in Nm by grade		
		8.8	10.9	12.9	8.8	10.9	12.9
M4	0,08	4,40	6,40	7,5	2,2	3,2	3,8
	0,10	4,20	6,20	7,3	2,5	3,7	4,3
	0,12	4,05	6,00	7,0	2,8	4,1	4,8
	0,14	3,90	5,70	6,7	3,1	4,5	5,3
M5	0,08	7,16	10,50	12,3	4,3	6,3	7,3
	0,10	6,90	10,10	11,9	4,9	7,2	8,5
	0,12	6,63	9,74	11,4	5,5	8,1	9,5
	0,14	6,36	9,34	10,9	6,0	8,9	10,4
M6	0,08	10,10	14,90	17,4	7,4	10,9	12,7
	0,10	9,74	14,30	16,7	8,5	12,5	14,7
	0,12	9,35	13,70	16,1	9,5	14,0	16,4
	0,14	8,97	13,20	15,4	10,4	15,3	17,9
M8	0,08	18,50	27,20	31,9	17,9	26,2	30,7
	0,10	17,90	26,20	30,7	20,6	30,3	35,5
	0,12	17,20	25,20	29,5	23,1	34,0	39,7
	0,14	16,50	24,20	28,3	25,3	37,2	43,6
M10	0,08	29,50	43,30	50,7	36,0	53,0	61,0
	0,10	28,40	41,80	48,9	41,0	61,0	71,0
	0,12	27,30	40,20	47,0	46,0	68,0	80,0
	0,14	26,20	38,50	45,1	51,0	75,0	88,0
M12	0,08	43,00	63,10	73,9	61,0	90,0	105,0
	0,10	41,40	60,90	71,2	71,0	104,0	122,0
	0,12	39,90	58,50	68,5	80,0	117,0	137,0
	0,14	38,30	56,20	65,8	87,0	128,0	150,0

Standard thread	μ_{total}* = μ_G = μ_K	Set screws clamping force F_{sp} in kN by grade			tightening torque M_{sp} in Nm by grade		
		8.8	10.9	12.9	8.8	10.9	12.9
M14	0,08	59,0	86,7	101,0	97	143	167
	0,10	56,9	83,6	97,8	113	165	194
	0,12	54,7	80,4	94,1	127	186	218
	0,14	52,6	77,2	90,3	139	205	239
M16	0,08	81,0	119,0	139,0	147	216	253
	0,10	78,2	115,0	134,0	172	252	295
	0,12	75,3	111,0	130,0	194	285	333
	0,14	72,4	106,0	124,0	214	314	367
M20	0,08	131,0	186,0	218,0	298	424	496
	0,10	126,0	180,0	210,0	347	494	578
	0,12	121,0	173,0	202,0	392	558	653
	0,14	117,0	166,0	194,0	431	615	719
M24	0,08	188,0	268,0	313,0	512	730	854
	0,10	182,0	259,0	303,0	597	850	995
	0,12	175,0	249,0	291,0	673	959	1122
	0,14	168,0	239,0	280,0	742	1057	1237
M30	0,08	300,0	430,0	500,0	1000	1450	1700
	0,10	290,0	415,0	485,0	1190	1700	2000
	0,12	280,0	400,0	465,0	1350	1900	2250
	0,14	270,0	385,0	450,0	1500	2100	2500
M36	0,08	440,0	630,0	730,0	1750	2500	3000
	0,10	425,0	600,0	710,0	2100	3000	3500
	0,12	410,0	580,0	680,0	2350	3300	3900
	0,14	395,0	560,0	660,0	2600	3700	4300

Screw stability according to DIN ISO 20898 T 1 (4.92)

Grades	5.8	6.8	8.8	10.9	12.9
Minimum tensile strength R_m N/mm²	500	600	800	1000	1200
Minimum yield point R_e N/mm²	400	480	640	900	1080
0.2-proof stress $R_{p0,2}$ N/mm²	–	–	640	900	1080
Test stress S_p N/mm²	364	440	582	792	950
Failure strain A_5 %	10	8	12	9	8
Impact strength (ISO test piece) Nm/cm²	–	–	60	40	30

The respective grades mean (as shown with 8.8):

$$\text{First number 8.} = \frac{\text{minimum tensile strength } R_m}{100} = 800 \text{ N/mm}^2$$

$$\text{Second number .8} = \frac{\text{minimum yield point } R_e}{\text{minimum tensile strength } R_m} \cdot 10 = 640 \text{ N/mm}^2 \text{ (80 \% von } R_m\text{)}$$

Nut stability according to DIN ISO 20898 T 2 (2.94)

Grade ID numbers	5	6	8	10	12
Test stress S_p N/mm²	500	600	800	1000	1200

The grades mean (as shown with 10):

$$10 = \frac{\text{test stress } S_p}{100}$$

This test stress is equal to the minimum tensile strength of a screw that can be loaded when pairing with the corresponding nut up to the minimum yield point of the screw.

Technical Information
Screws and Nuts

The coefficients of friction (see table) fluctuate over a wide range. They fluctuate even when tightening and by production run of the same screws.
Because μ_G and μ_K are generally of different sizes a wide range of tightening torques arise as a result.
Calculation is performed using various coefficients of friction in accordance with VDI guideline 2230. By contrast Illgner/Blume in their „Schrauben Vademecum“ calculate using a coefficient of friction $\mu_{ges} = \mu_G = \mu_K$.

Here it proceeds according to VDI methods. However if μ_G and/or μ_K are unknown,
$\mu_G = 0{,}12$ or $\mu_K = 0{,}12$ would typically be used.

Coefficient of friction μ_G in the thread (according to Strelow or VDI 2230)

μ_G	Thread			External thread (screw)								
	Material			Steel								
	Surface			black tempered or phosphated				electro zinc-plated (Zn6)		electro cadmium-plated (Cd6)		adhesive
	Tapping			rolled			machine-cut	machine-cut or rolled				
Thread	Material	Surface	Tapping	lubrication	dry	lubricated	MoS_2*	lubricated	dry	lubricated	dry	lubricated	dry
Internal thread (nut)	Steel	bright	machine-cut	dry	0,12	0,10*	0,08	0,10	–	0,10	–	0,08	0,16
		electro cadmium-plated			0,10	–	–	–	0,12	0,10	–	–	0,14
					0,08	–	–	–	–	–	0,12	0,12	–
	GJL/GJMB	bright			–	0,10	–	0,10	–	0,10	–	0,08	–
	AlMg	bright			–	0,08	–	–	–	–	–	–	–

* Molybdenum disulfide

Coefficient of friction μ_K on the head or nut engaging surface (according to Strelow or VDI 2230)

μ_K	Support suface			Screw head									
	Material			Steel									
	Surface			black tempered or phosphated						electro zinc-plated (Zn6)		electro cadmium-plated (Cd6)	
	Manu-facture			pressed			turned		smoothed	pressed			
Support suface	Material	Surface	Manuf-acture	lubrication	dry	lubricated	MoS_2*	lubricated	MoS_2*	lubricated	dry	lubricated	dry	lubricated
Counter support	Steel	bright	smoothed	dry	–	0,16	–	0,10	–	0,16	0,10	–	0,08	–
			machined		0,12	0,10	0,08	0,10	0,08	–	0,10		0,08	0,08
		electro cadmium-plated			0,10		–	0,10	–	0,10	0,16	0,10	–	–
					0,08						–	–	0,12	0,12
	GJL/GJMB	bright	smoothed		–	0,10	–	–	–	0,10 to 0,18			0,08	–
			machined		–	0,14	–	0,10	–	0,14	0,10	0,10	0,08	–
	AlMg				–	0,08				–	–	–	–	–

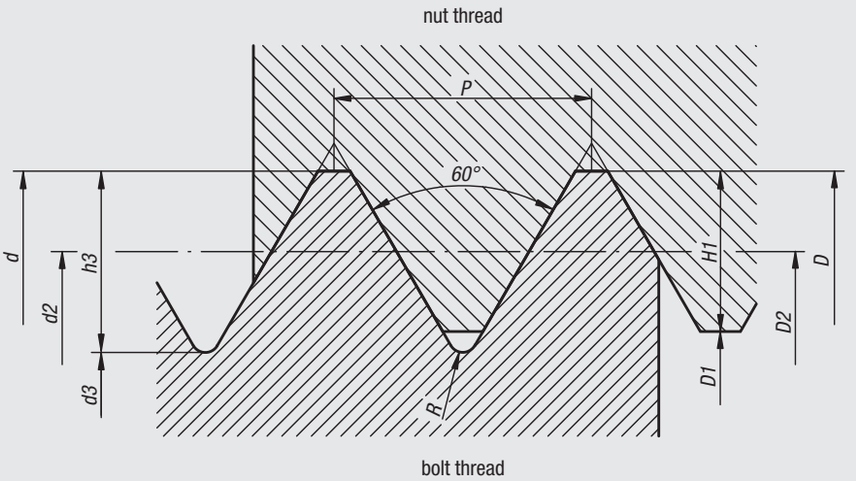
* Molybdenum disulfide

Metric ISO Threads

The medium tolerance class applies to the threads listed, i.e. 6H for nut threads and 6g for bolt threads. The (metal) threads in this catalogue are manufactured according to these tolerance classes.

Technical Information about threads of aluminium grips:

Especially threads of aluminium grips cannot be true to gauge size due to final surface finish refinement and the removal of material during related pretreatment.
The majority of these threads are moulded in order to strengthen the material. As a result, the tearing resistance of aluminium for a thread with M5 x 10 is higher than 2000 N.



Coarse thread series 1

Thread description	Pitch	Thread-pitch Ø	Minor Ø		Thread depth		Radius	Core hole drill
			bolt	nut	bolt	nut		
d = D	P	d2 = D2	d3	D1	h3	H1	R	Ø
M 3	0,50	2,68	2,39	2,46	0,31	0,27	0,07	2,5
M 4	0,70	3,55	3,14	3,24	0,43	0,38	0,10	3,3
M 5	0,80	4,48	4,02	4,13	0,49	0,43	0,12	4,2
M 6	1,00	5,35	4,77	4,92	0,61	0,54	0,14	5,0
M 8	1,25	7,19	6,47	6,65	0,77	0,68	0,18	6,8
M10	1,50	9,03	8,16	8,38	0,92	0,81	0,22	8,5
M12	1,75	10,86	9,85	10,11	1,07	0,95	0,25	10,2
M16	2,00	14,70	13,55	13,84	1,23	1,08	0,29	14,0
M20	2,50	18,38	16,93	17,29	1,53	1,35	0,36	17,5
M24	3,00	22,05	20,32	20,75	1,84	1,62	0,43	21,0
M30	3,50	27,73	25,71	26,21	2,15	1,89	0,51	26,5
M36	4,00	33,40	31,09	31,67	2,45	2,17	0,58	32,0

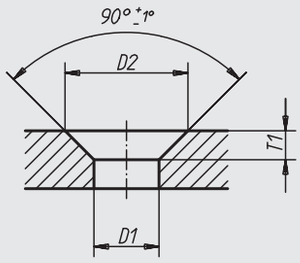
Threads
Threads are manufactured to ISO DIN 13 medium tolerance class, i.e. 6H for nut threads and 6g for bolt threads. External threads up to 60 mm are generally supplied fully threaded. Screw lengths of 70 mm and more are supplied with 60 mm long threads.

Spot facing for countersunk screws and socket head screws

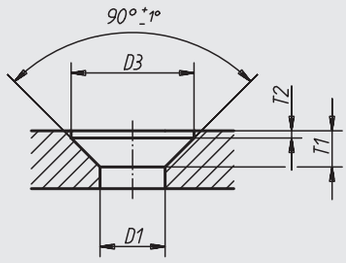
Spot facing model B:
– for countersunk screws DIN 7991.
Spot facing model J:
– for socket head screws DIN 6912.
Spot facing model K:
– for socket head screws DIN 912.

Note:
* Clearance hole medium according to DIN ISO 273.
** Clearance hole fine according to DIN ISO 273.
*** 90° counterbore or rounded, under 12 mm thread diameter only deburred.

Form A
Medium version (m)

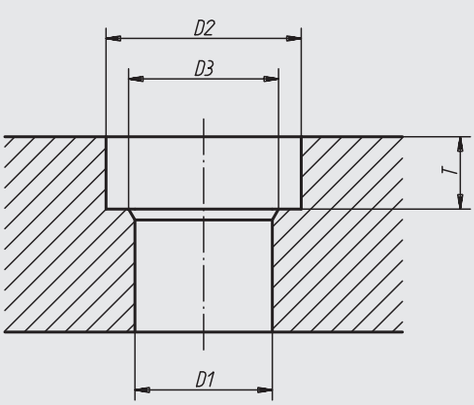


Form B
Fine version (f)



For Thread Ø	medium (m) version			fine (f) versions			
	D1 H13*	D2 H13	T1 ≈	D1 H12**	D3 H12	T1 ≈	T2 +0,1
M3	3,4	6,6	1,6	3,2	6,3	1,7	0,2
M4	4,5	9,0	2,3	4,3	8,3	2,4	0,4
M5	5,5	11,0	2,8	5,3	10,4	2,9	0,5
M6	6,6	13,0	3,2	6,4	12,4	3,3	0,5
M8	9,0	17,2	4,1	8,4	16,5	4,4	0,5
M10	11,0	21,5	5,3	10,5	20,5	5,5	0,5
M12	13,5	25,5	6,0	13,0	25,0	6,5	0,5
M16	17,5	31,5	7,0	17,0	31,0	7,5	0,5
M20	22,0	38,0	8,0	21,0	37,0	8,5	0,5

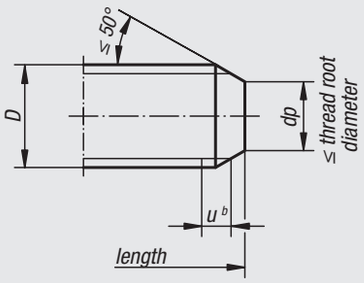
Form J, Form K



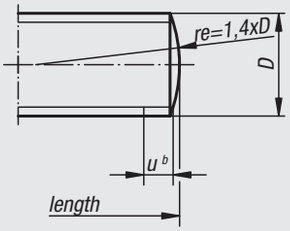
For Thread Ø	D1 medium (m) H13*	D1 fine (f) H12**	D2	D3***	T model J	T model K	acceptable deviation
M3	3,4	3,2	6	–	–	3,4	+0,2 0
M4	4,5	4,3	8	–	3,4	4,6	+0,4 0
M5	5,5	5,3	10	–	4,2	5,7	+0,4 0
M6	6,6	6,4	11	–	4,8	6,8	+0,4 0
M8	9,0	8,4	15	–	6,0	9,0	+0,4 0
M10	11,0	10,5	18	–	7,5	11,0	+0,4 0
M12	13,5	13,0	20	16	8,5	13,0	+0,4 0
M16	17,5	17,0	26	20	11,5	17,5	+0,4 0
M20	22,0	21,0	33	24	13,5	21,5	+0,4 0

DIN 78 thread ends
DIN 6332 thrust points

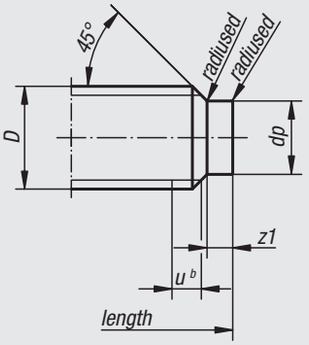
FL flat point



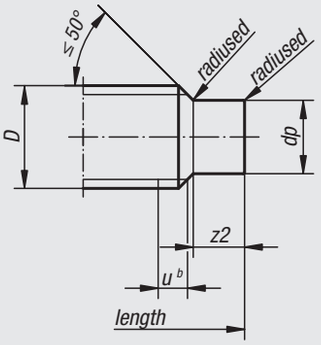
RN rounded end



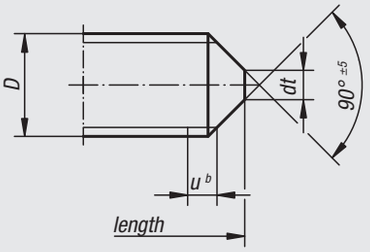
SD short dog



LD long dog



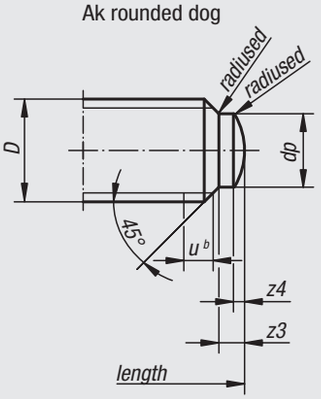
TC truncated cone



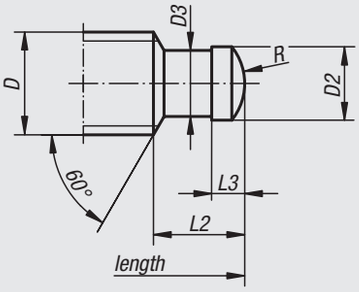
Standard form:
DIN EN ISO 4753 flat point.
Any other thread end available at extra cost, depending on the quantity ordered.

u^b = max. 2P incomplete thread

Ak rounded dog



thrust point DIN 6332



Thread- Ø	Thread ends to DIN EN ISO 4753						Thread ends with thrust points to DIN 6332				
D	dp h13	dt h16*	z1 + IT14	z2 + IT14	z3 + IT14	z4 ≈	D2 h11	D3 –0,1	L2	L3	R
M4	2,5	–	1,00	2,0	1,00	0,50	–	–	–	–	–
M5	3,5	–	1,25	2,5	1,25	0,60	–	–	–	–	–
M6	4,0	1,5	1,50	3,0	1,50	0,70	4,5	4,0	6,0	2,5	3
M8	5,5	2,0	2,00	4,0	2,00	1,00	6,0	5,4	7,5	3,0	5
M10	7,0	2,5	2,50	5,0	2,50	1,00	8,0	7,2	9,0	4,5	6
M12	8,5	3,0	3,00	6,0	3,00	1,25	8,0	7,2	10,0	4,5	6
M14	10,0	4,0	3,50	7,0	3,50	1,50	–	–	–	–	–
M16	12,0	4,0	4,00	8,0	4,00	1,75	12,0	11,0	12,0	5,0	9
M18	13,0	5,0	4,50	9,0	4,50	2,00	–	–	–	–	–
M20	15,0	5,0	5,00	10,0	5,00	2,00	15,5	14,4	14,0	5,5	13
M22	17,0	6,0	5,50	11,0	5,50	2,50	–	–	–	–	–
M24	18,0	6,0	6,00	12,0	6,00	2,50	–	–	–	–	–
M27	21,0	8,0	6,70	13,5	6,70	3,00	–	–	–	–	–

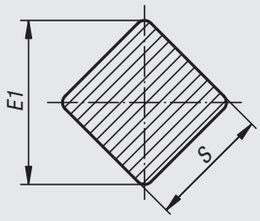
* Point up to 5 mm Ø thread end lightly flattened or lightly rounded.

Squares ends for spindles and operating parts

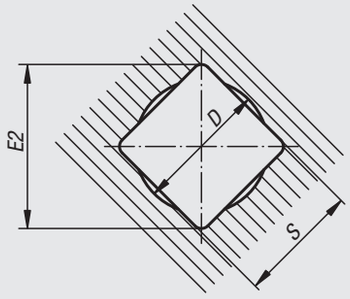
* Internal squares are allowed to be recessed in the middle third of each side. D max. defines the borehole diameter which leaves appropriate clearance when disposed concentrically to the internal square.

** External squares made on round steel bar may fall below the minimum size by the amount of tolerance on the steel bar, i.e. by h11.

A External square

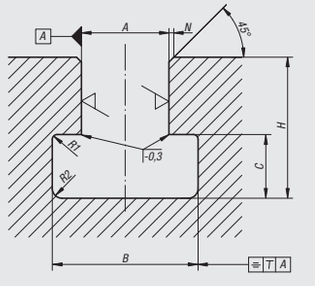


B Internal square



S H11/h11	D* max.	E1 max.	E1 min.**	E2 min.
4,0 5,0 5,5 6,0	4,2 5,3 5,8 6,3	5,0 6,5 7,0 8,0	4,8 6,0 6,6 7,2	5,3 6,6 7,2 8,1
7,0 8,0 9,0 10,0	7,3 8,4 9,5 10,5	9,0 10,0 12,0 13,0	8,4 9,6 10,8 12,0	9,1 10,1 12,1 13,1
11,0 12,0 13,0 14,0	11,6 12,6 13,7 14,7	14,0 16,0 17,0 18,0	13,2 14,4 15,6 16,8	14,1 16,1 17,1 18,1
16,0 17,0 19,0 22,0	16,8 17,9 20,0 23,1	21,0 22,0 25,0 28,0	19,2 20,4 22,8 26,4	21,2 22,2 25,2 28,2

T-slots



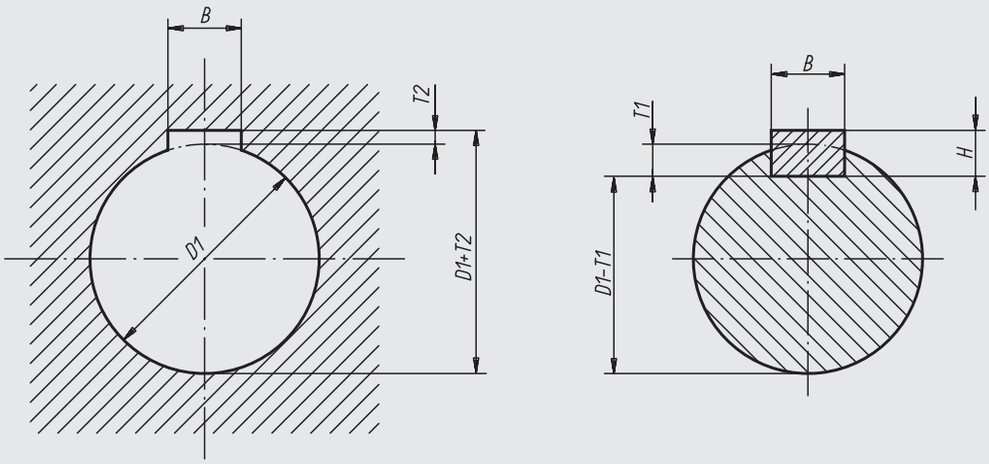
6.3 (1.6 for tolerance H8 or 3.2 for tolerance H12)

A*	B	adm. dev.	C	adm. dev.	H max.	H min.	N max.	R1 max.	R2 max.	T
6	11,0	+1,5 0	5	+1 0	13	11	1,0	0,6	1,0	0,5
8	14,5		7		18	15				
10	16,0	+2 0	7		21	17				
12	19,0		8		25	20				
14	23,0		9	+2 0	28	23	1,6		1,6	
18	30,0		12		36	30		1,0		
22	37,0	+3 0	16		45	38			2,5	
28	46,0	+4 0	20		56	48				
36	56,0		25	+3 0	71	61	2,5			1,0
42	68,0		32		85	74		1,6	4,0	

* Tolerance H8 for tenon and clamping slots, H12 for clamping slots

Keyways and parallel keys

high form (sheet 1), high form for machine tools (sheet 2)



high form (sheet 1)

For shaft Ø D1	Shaft slot B* tight fit P9	Shaft slot B* sliding fit N9	Hub slot B* tight fit P9	Hub slot B* sliding fit JS9	H	T1 with top clearance	T2 by top clearance	T2 oversize
over 8 to 10	3	3	3	3	3	1,8 $^{+0,1}$	1,4 $^{+0,1}$	0,9 $^{+0,1}$
over 10 to 12	4	4	4	4	4	2,5 $^{+0,1}$	1,8 $^{+0,1}$	1,2 $^{+0,1}$
over 12 to 17	5	5	5	5	5	3,0 $^{+0,1}$	2,3 $^{+0,1}$	1,7 $^{+0,1}$
over 17 to 22	6	6	6	6	6	3,5 $^{+0,1}$	2,8 $^{+0,1}$	2,2 $^{+0,1}$
over 22 to 30	8	8	8	8	7	4,0 $^{+0,2}$	3,3 $^{+0,2}$	2,4 $^{+0,2}$
over 30 to 38	10	10	10	10	8	5,0 $^{+0,2}$	3,3 $^{+0,2}$	2,4 $^{+0,2}$
over 38 to 44	12	12	12	12	8	5,0 $^{+0,2}$	3,3 $^{+0,2}$	2,4 $^{+0,2}$
over 44 to 50	14	14	14	14	9	5,5 $^{+0,2}$	3,8 $^{+0,2}$	2,9 $^{+0,2}$
over 50 to 58	16	16	16	16	10	6,0 $^{+0,2}$	4,3 $^{+0,2}$	3,4 $^{+0,2}$

high form for machine tools (sheet 2)

For shaft Ø D1	Shaft slot B* tight fit P9	Shaft slot B* sliding fit N9	Hub slot B* tight fit P9	Hub slot B* sliding fit JS9	H	T1	T2
over 10 to 12	4	4	4	4	4	3,0 $^{+0,1}$	1,1 $^{+0,1}$
over 12 to 17	5	5	5	5	5	3,8 $^{+0,1}$	1,3 $^{+0,1}$
over 17 to 22	6	6	6	6	6	4,4 $^{+0,1}$	1,7 $^{+0,1}$
over 22 to 30	8	8	8	8	7	5,4 $^{+0,2}$	1,7 $^{+0,2}$
over 30 to 38	10	10	10	10	8	6,0 $^{+0,2}$	2,1 $^{+0,2}$
over 38 to 44	12	12	12	12	8	6,0 $^{+0,2}$	2,1 $^{+0,2}$
over 44 to 50	14	14	14	14	9	6,0 $^{+0,2}$	2,6 $^{+0,2}$
over 50 to 58	16	16	16	16	10	7,5 $^{+0,2}$	2,6 $^{+0,2}$

* The indicated tolerances for slot widths apply, as a rule, for milled slots.
ISO quality IT8 (i.e. P8 instead of P9, N8 instead of N9 and IS8 instead of IS9) are recommended for the width of broached slots. Tolerance H9 for the shaft keyway and D10 for the hub keyway are recommended for sliding fits.

ESD

Sensitive electrical or electronic equipment, components and devices (ESD sensitive elements) may be damaged or destroyed by electrostatic discharges (ESD) in the immediate vicinity.

Electrostatic discharges can come from people or through handling ESD sensitive components (e.g. during production, assembly, transport, storage etc).

Electrically conductive products which conform to
DIN EN 61340-5-1 – Protection of electronic devices from electrostatic phenomena –
are essential within electronic environments to prevent an electrostatic discharge.

Our products are manufactured from a special, electrically conductive plastic and can therefore be used for ESD applications or in ESD protection areas (EPA) in accordance with DIN EN 61340-5-1.

These high-quality products are regularly tested by us to assess their electrical conductivity in accordance with DIN EN 61340-5-1.

The yellow ESD logo is printed on the side of the product to clearly identify it.



These ESD products can also be used for devices, components and protection systems in areas with high risk of explosion.

Use of these ESD products prevents the occurrence of electrostatic spark discharges, eliminating the potential ignition of gases and dusts which could lead to explosions in enclosed spaces.

Manufacturers and operators must use and conform to ATEX directives for the protection of persons working in areas with high risk of explosion.

These ESD products are certified by TÜV-Süd in relation to their electrical discharge capability accordance with EN 60079-0:2012+A11:2013 Areas with high risk of explosion-Operating material-General requirements.

Target groups:

Device manufacturers required to conform to ATEX product directive 2014/34/EU.
Operators required to conform to ATEX worker protection directive 1999/92/EC.

Notes

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DIN 9834/ ISO 9448	Guide bushes DIN 9834 / ISO 9448, bronze, maintenance-free with collar	23681	Book 2	511
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DIN 25201	Wedge lock washers DIN 25201	07310	Book 1	976
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DIN 71412	Grease nipples conical head DIN 71412	97940	Book 2	1012-1013
DIN 71752	Clevis joints with snap-in pin DIN 71752	27620	Book 2	647
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