

norelem moves

Systems and components for machine and plant construction

23000

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

23010
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Beam couplings
with radial clamping hub, aluminium

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Beam couplings
with radial clamping hub, stainless steel

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Beam couplings
with removable clamping hub, aluminium

23012
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Beam couplings
with removable clamping hub, stainless steel

23021
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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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Keyless locking couplings Form A
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Keyless locking couplings Form A
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Keyless locking couplings Form B

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Keyless locking couplings Form C
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Keyless locking couplings Form D
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Keyless locking couplings, Form D
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Keyless locking couplings Form E
short version

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Keyless locking couplings Form F
short version with axial ring

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Universal joints double
with plain bearing, DIN 808

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Keyless locking couplings Form G
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Keyless locking couplings with central nut

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Shrink discs Form A

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Shrink discs stainless steel Form A

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Shrink discs Form B

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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

norelem moves

Systems and components for machine and plant construction

23000

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Universal joints single
with needle bearing, DIN 808

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Universal joints double
with needle bearing, DIN 808

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Universal joints single
with plain bearing, robust version DIN 808

23410
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Universal joints double
with plain bearing, robust version DIN 808

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Cardan shafts telescopic

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Protective rubber sleeves
for universal and cardan joints (single)

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Protective rubber sleeves
for universal and cardan joints (double)

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Quick-fit couplings
with radial offset compensation

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Quick-fit couplings
with radial offset compensation and
mounting flange

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Quick-fit couplings
with angular and radial offset
compensation

23500
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igubal® pillow block bearings

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Guide bushes, ceramic

23680
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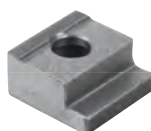
Guide bushes
bronze, maintenance-free

23681
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Guide bushes
DIN 9834 / ISO 9448, bronze,
maintenance-free with collar

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Retaining clips
DIN 9832

23710
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Plain bearings
plastic

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Thrust washers plastic

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Plain bearings
cylindrical

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Plain bearings
with collar

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Thrust washers

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Plain bearing sintered bronze
cylindrical

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Plain bearing sintered bronze
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Deep groove ball bearing FAG
single row

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Deep groove ball bearings
stainless steel, DIN 626

23800-03
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Ceramic ball bearings ZrO₂

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Ceramic ball bearings Si₃N₄

23805
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Angular contact ball bearing FAG
single-row

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Axial angular contact ball bearing,
steel double-row

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Axial angular contact ball bearing,
steel double-row, with flange

23815
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Spherical roller bearing FAG
cylindrical bore

23820
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Cylinder roller bearing FAG
with cage

23825
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Tapered roller bearing FAG
single row

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Axial ball bearing FAG
single direction

23900
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O-rings

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Rotary shaft lip seals
DIN 3760

+ New/Expanded Items

23000

Couplings

Rigid couplings

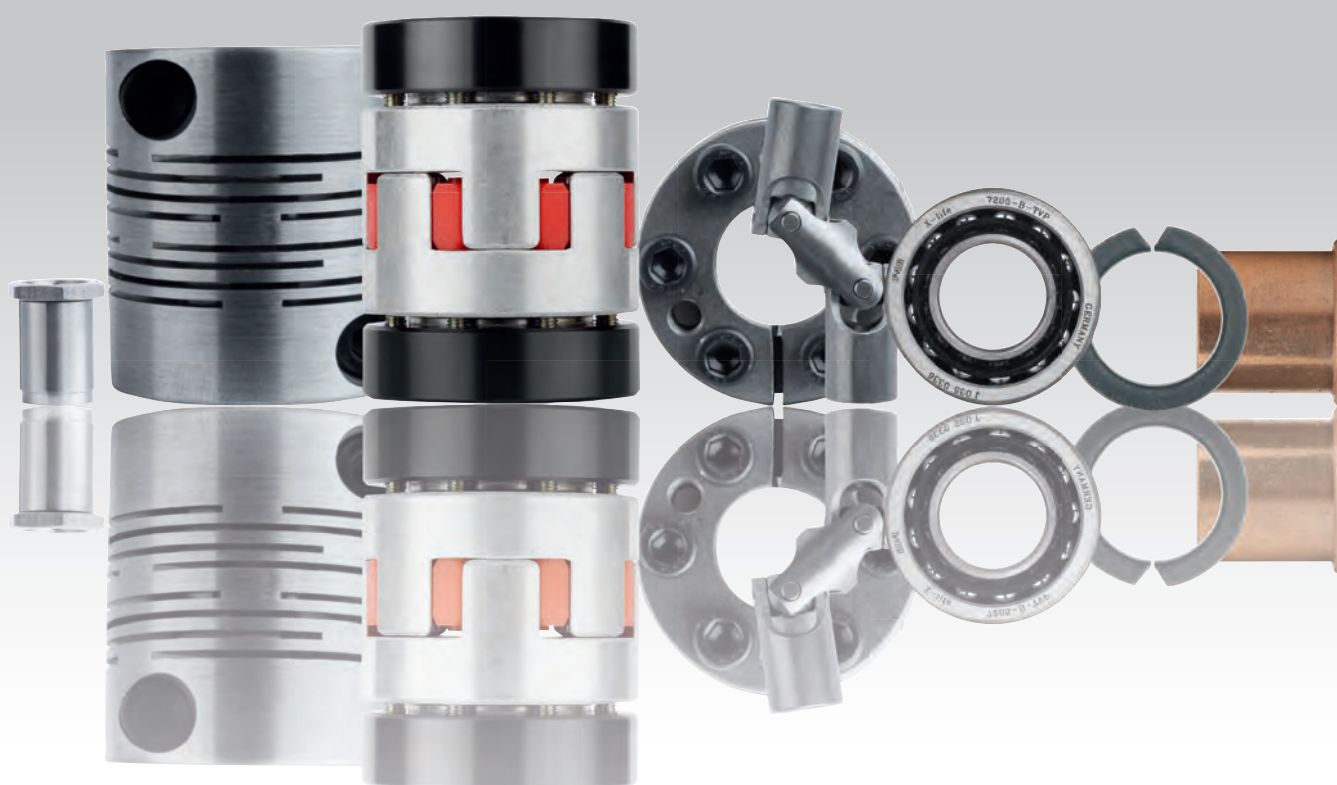
Keyless locking couplings

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

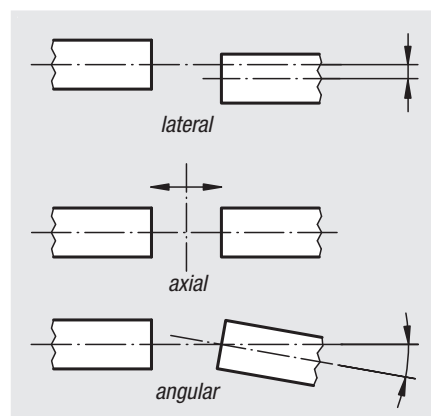
Rough calculation:

$$M_N \geq 1,5 \cdot M_{\max.} \text{ [Nm]}$$

$$M_N \triangleq \text{nom. torque of coupling}$$

$$M_{\max.} \triangleq \text{max. motor torque}$$

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:

nIm 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:

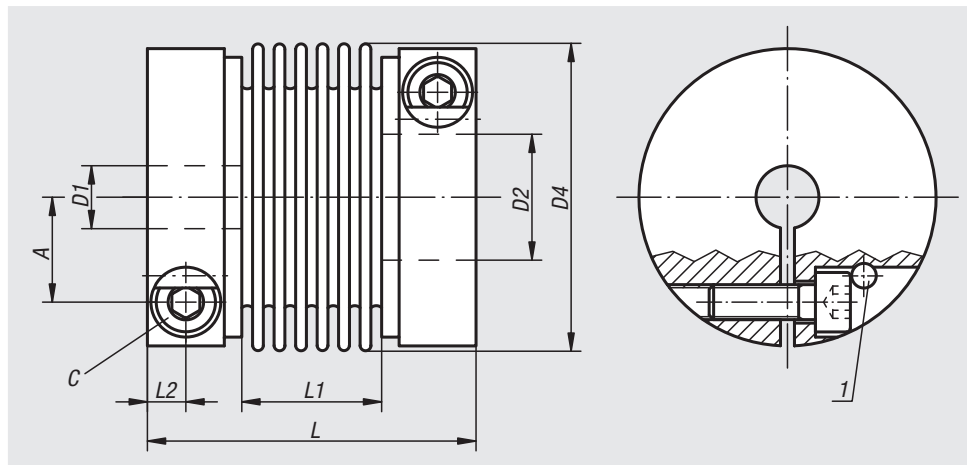
The shaft to hub bore fit should be a transition fit. The play should be min. 0.01 mm and max. 0.04 mm. i.e:

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:

nIm 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

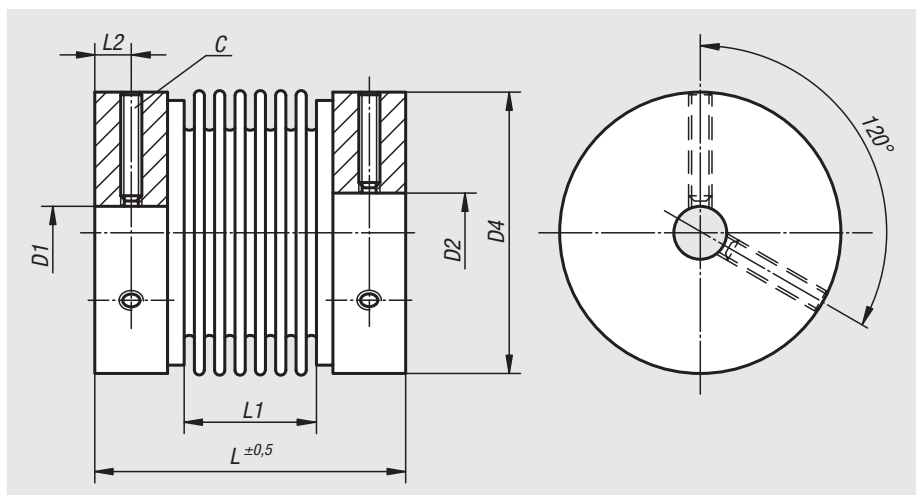
bore Ø 5 G7.

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 kgm ²)	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.

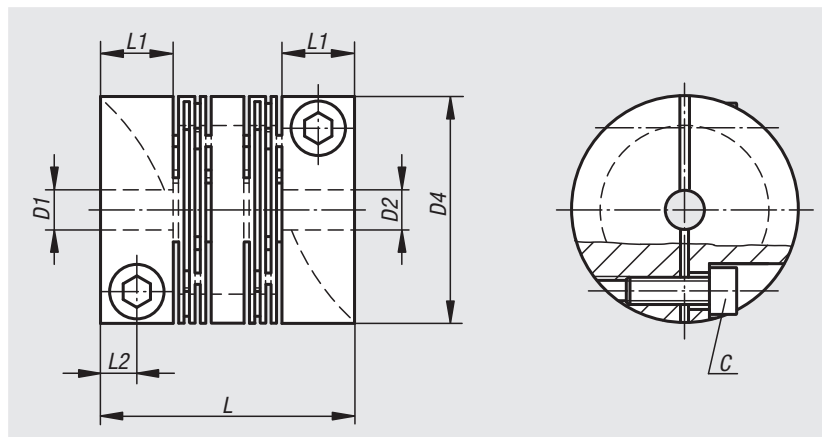
Sample order:
nlm 23010-1016,
D1 = 2.5
D2 = 2.5
(The hubs are supplied pre-bored).

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:

n1m 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:

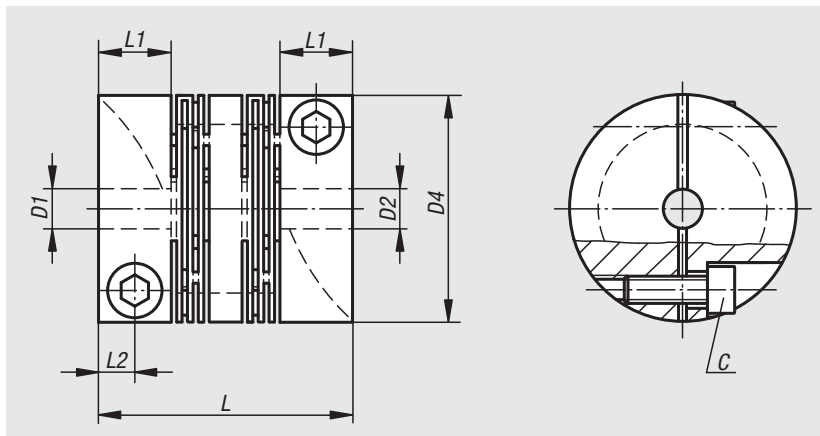
-50 °C to +150 °C.

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:

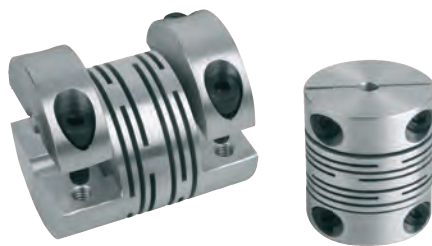
Drill the bore out using a small as possible drill or milling cutter. Use a single point tool to turn or bore the hole out to its finished size. Ensure that the coupling is securely held during the machining process and that the drill feed is not too high. The cut depth should not exceed 0.5 mm and the 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:

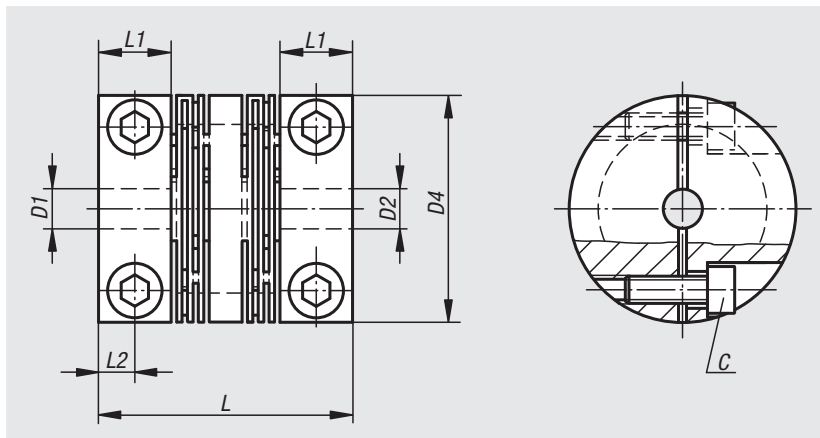
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

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:

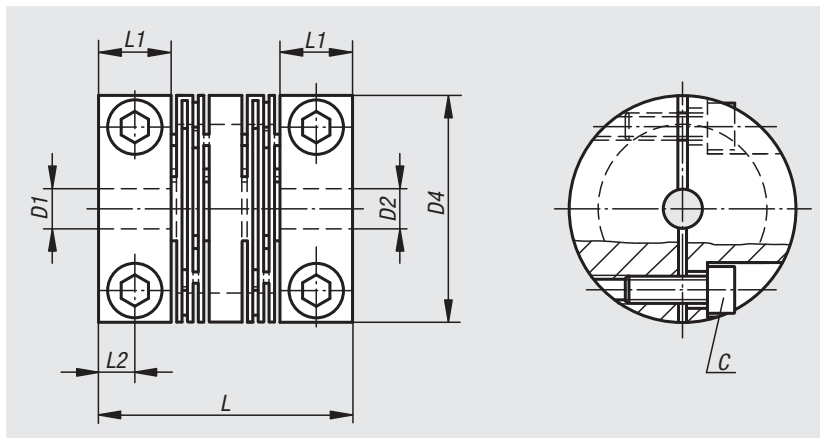
Zero backlash, torsionally rigid, resiliently flexible and maintenance-free full metal coupling for transmitting angle synchronous rotary movement. The innovative slit structure makes possible a very good axial, radial and angular flexibility with low reset force. Ideal for servomotors.

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:

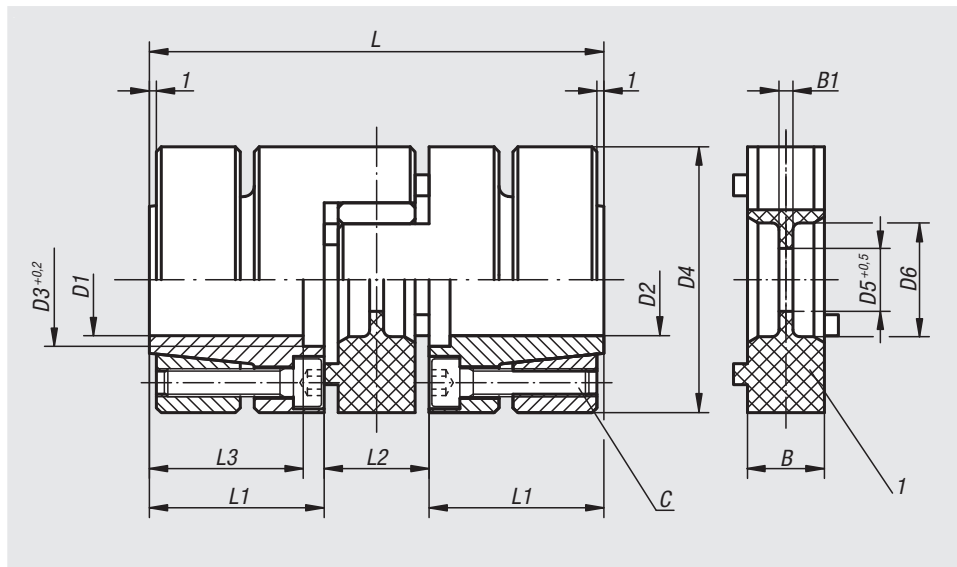
nIm 23021-010,
D1 = 6
D2 = 6
(The hubs are supplied pre-bored).

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	2	30000
23021-017	17	17	0,05	0,24	0,5	0,1	2100	3	24000
23021-043	43	43	0,19	0,4	0,5	0,1	2500	6	19000
23021-060	60	60	0,28	0,6	0,5	0,1	2600	6	17500
23021-150	150	150	0,65	1,05	1	0,1	3300	6	15000
23021-320	320	320	2	2	1	0,12	4500	30	12000
23021-500	500	500	5,6	5,8	1	0,15	5900	50	9500
23021-700	700	700	13	8	1	0,15	7000	100	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:

n1m 23022-008,

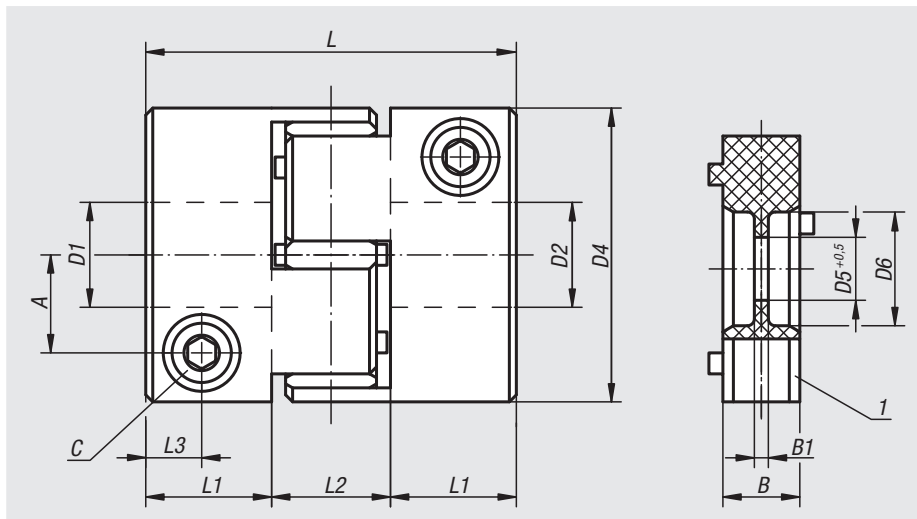
D1 = 6

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

clamping with grub screw



Material:

Spider polyurethane hardness Shore 98A.
Hub aluminium.

Version:

Bright.

Sample order:

nIm 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: $\varnothing 6 f7$

hub: $\varnothing 6 H8$.

Bores smaller than D1/D2 min. are possible, however an optimal transfer of the couplings nominal torque is no longer guaranteed.

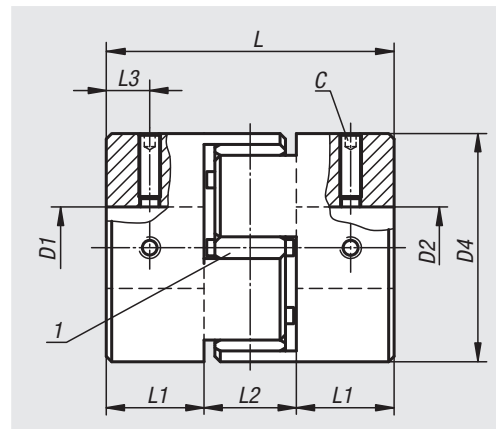
On request:

Hub bores D1 and D2 with separate tolerance class or range.

Drawing reference:

1) elastomer spider

miniature



Order No.	Size	Nominal torque Nm	Moment of inertia (10^{-3} kgm^2)	Static resistance to torsion Nm/arcmin	Max. axial shaft displacement $\pm$	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

with radial clamping hub

miniature



Material:

Centre disc polyacetal.
Hub aluminium.

Sample order:

nIm 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:

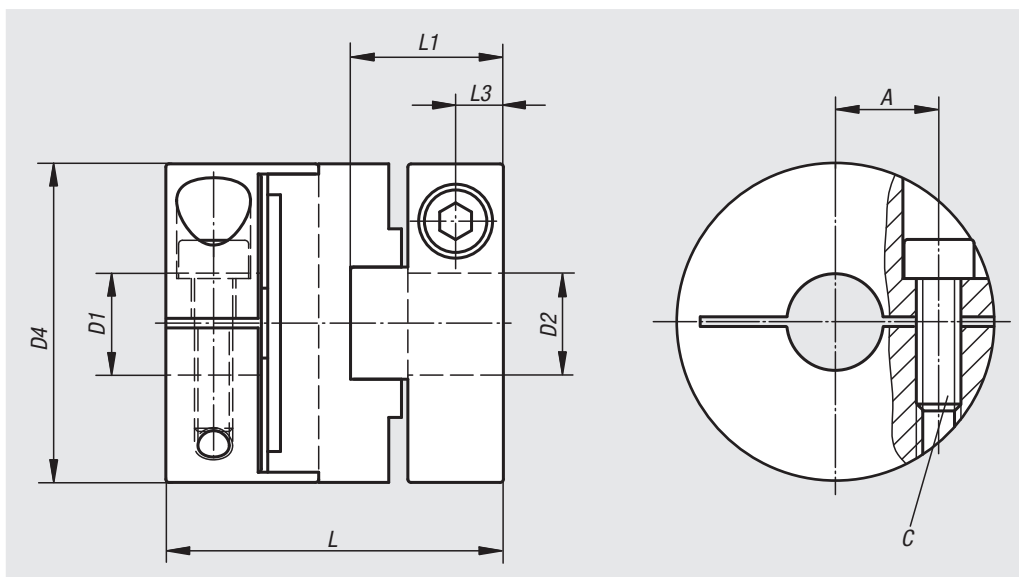
The shaft to hub hole fit is a transition fit.
The play should be min. 0.01 mm and max. 0.04 mm i.e.
shaft: $\varnothing 6 f7$
hub: $\varnothing 6 H8$.

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

clamping with grub screw

miniature



Material:

Centre disc polyacetal.
Hub aluminium.

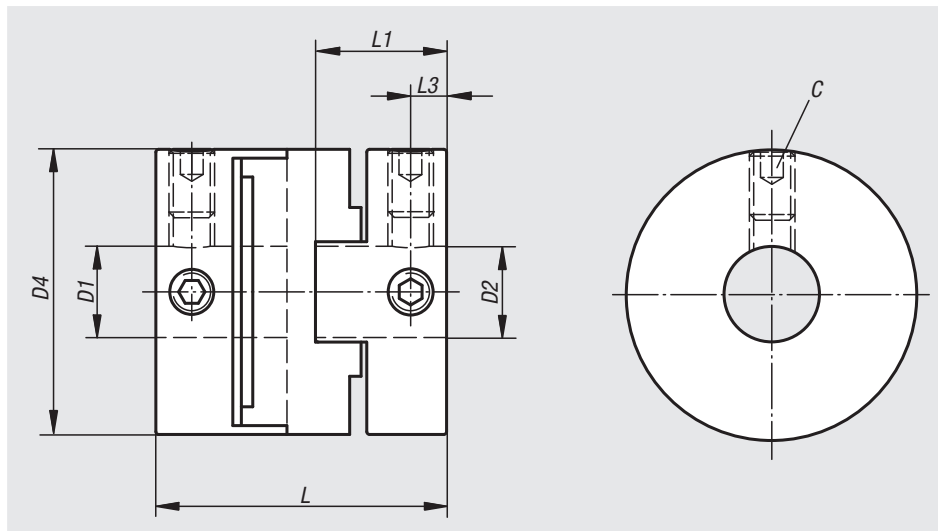
Sample order:

nIm 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: $\varnothing 6 f7$
hub: $\varnothing 6 H8$.

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 $^\circ$	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:

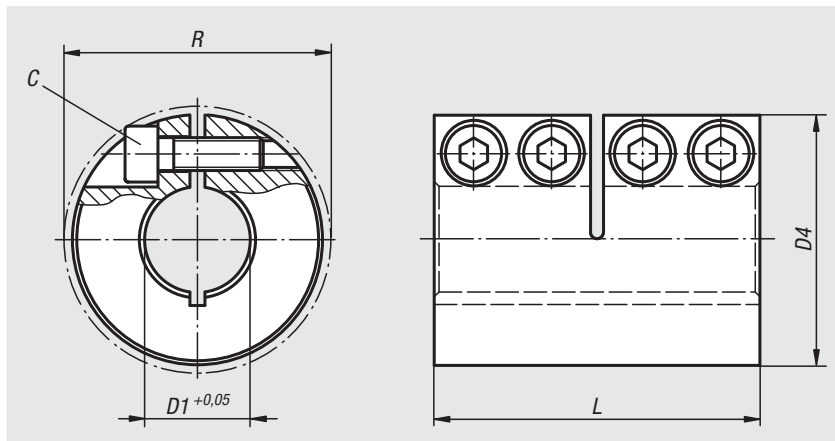
nIm 23050-1100

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:

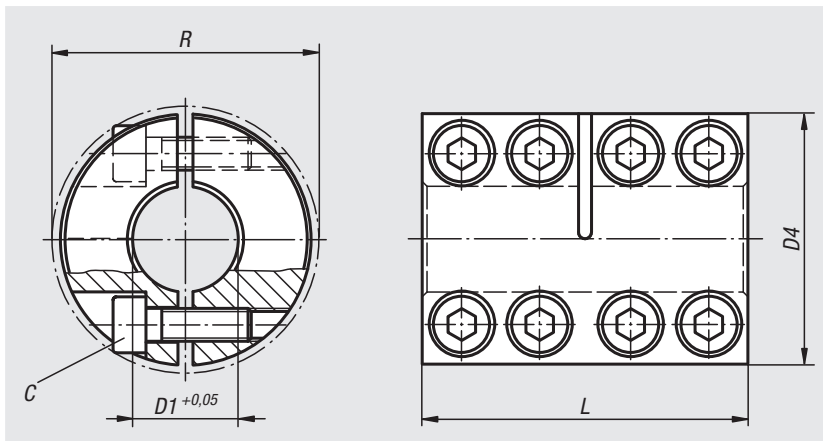
n1m 23052-1100

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:

nIm 23200-0351122

Note:

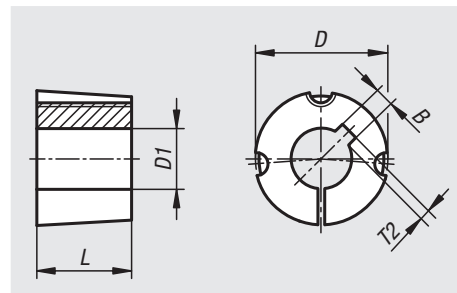
The taper clamping bushes enable easy and rapid mounting and removal of pulleys. The wide range of bore sizes available enable immediate mounting without any time-consuming and costly internal or external machining. The bushes have DIN 6885/1 keyways in addition to the locking screws. These taper clamping 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 1	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 1	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 1	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 1	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 1	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

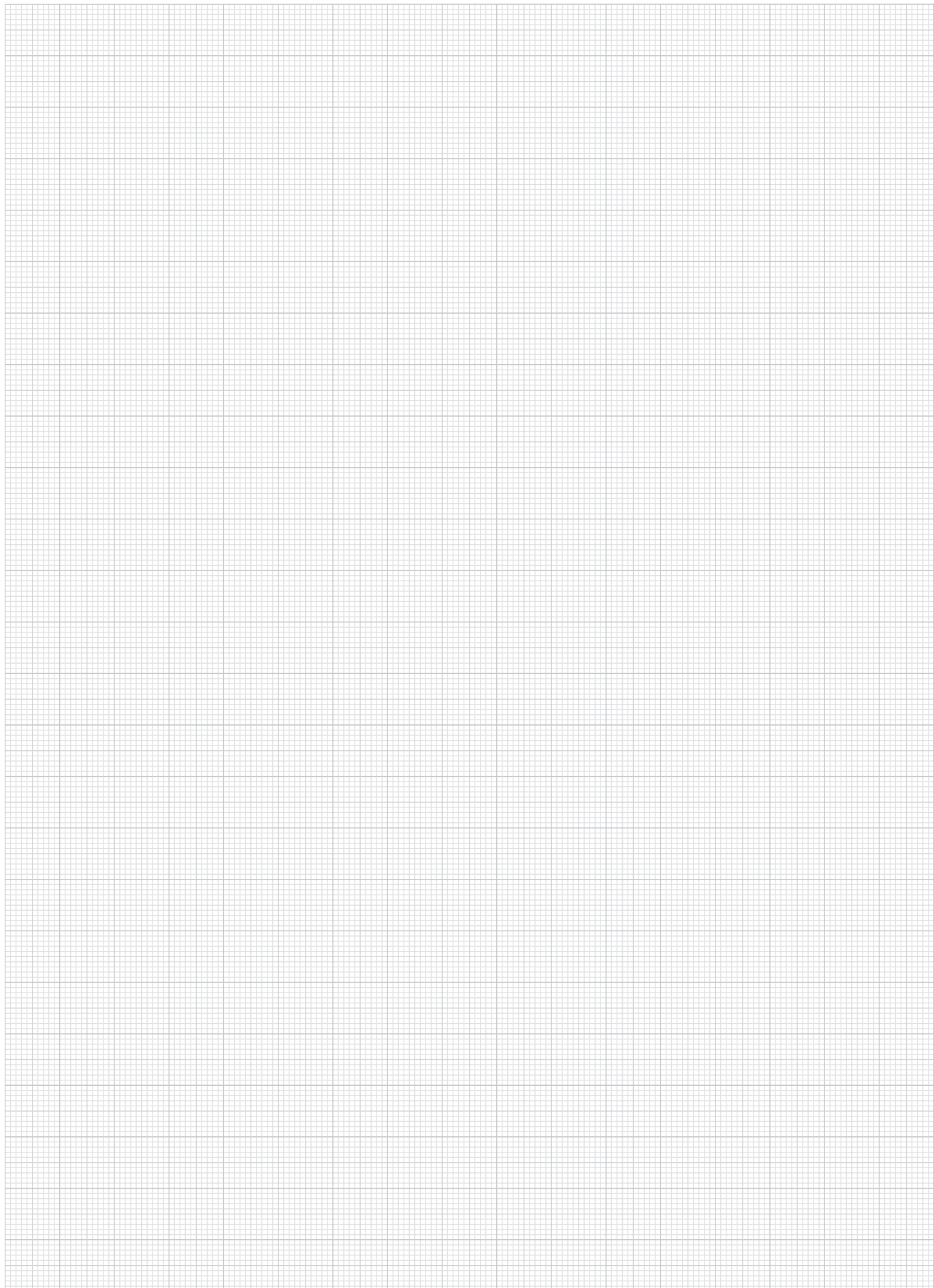
Order No.	Version 1	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0701431	type 2012	grey cast iron	31,8	5	70	14	2,3	7/16 BSW	30
23200-0701631	type 2012	grey cast iron	31,8	5	70	16	2,3	7/16 BSW	30
23200-0701831	type 2012	grey cast iron	31,8	6	70	18	2,8	7/16 BSW	30
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

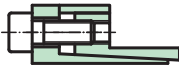
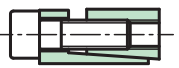
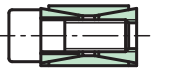
Order No.	Version 1	Main material	L	B	D	D1	T2	for screw	Tightening torque of clamping screws (Nm)
23200-0851844	type 2517	grey cast iron	44,5	6	85	18	2,8	1/2 BSW	50
23200-0851944	type 2517	grey cast iron	44,5	6	85	19	2,8	1/2 BSW	50
23200-0852044	type 2517	grey cast iron	44,5	6	85	20	2,8	1/2 BSW	50
23200-0852244	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 1	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
	23351		19 mm	high	medium	Yes	Yes			X		X	
	23352		19 mm	medium	low	Yes	No			X		X	
	23354		6 mm	medium	low	Yes	Yes		X		X		
	23356		19 mm	medium	medium	Yes	Yes			X	X		
	23358		19 mm	medium	medium	Yes	No			X	X		
	23360		19 mm	medium	high	No	No			X	X		
	23362		25 mm	high	medium	Yes	Yes			X			X
	23368		5 mm	low	slight	Yes	Yes	X				X	
Shrink discs	23380		14 mm	high	-	Yes	No		X			X	
	23382		18 mm	high	-	Yes	No		X			X	

Keyless locking couplings Form A

for thin walled hubs

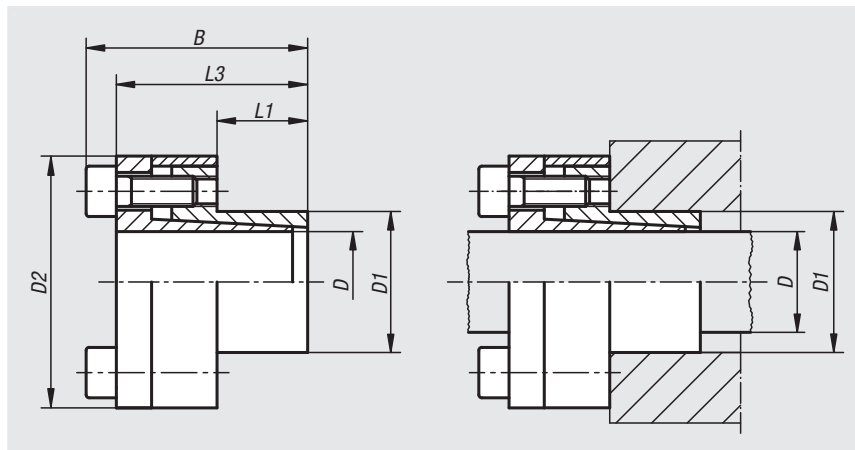
Material:
Steel.

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:

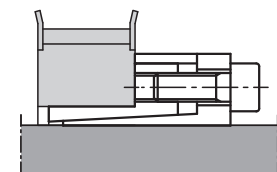
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

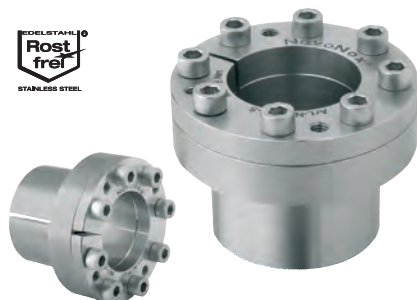
Surface quality $R_z \leq 16 \mu\text{m}$.



Order No.	Surface pressure on shaft P N/mm ²	Surface pressure on hub P N/mm ²	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:

nIm 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:

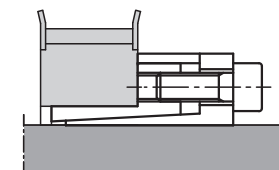
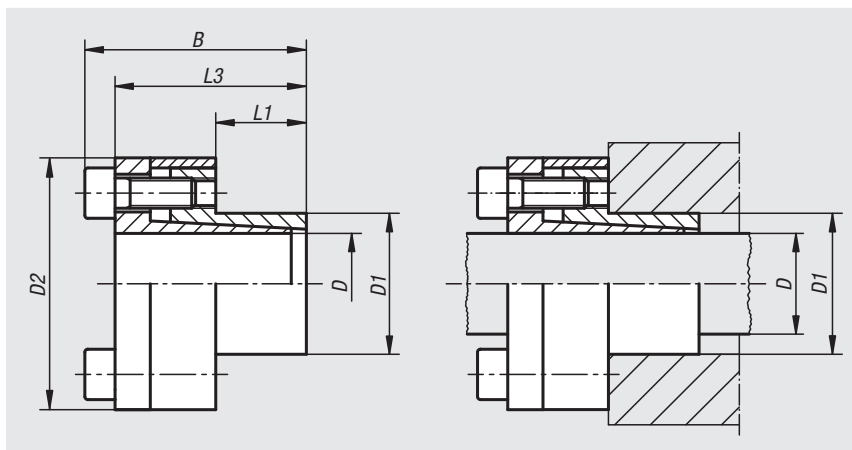
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

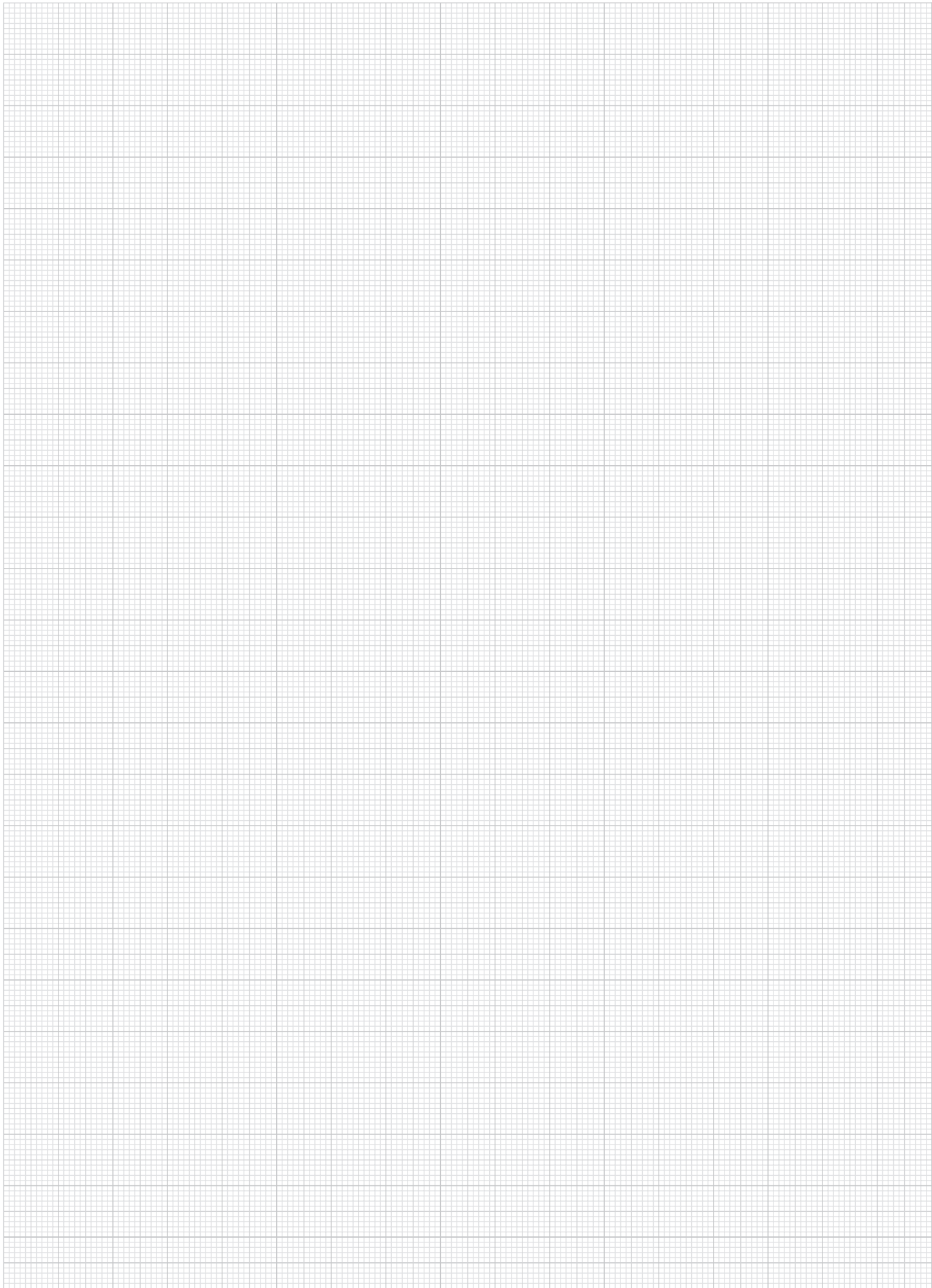
Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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



20000
21000
22000
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Keyless locking couplings Form B



Material:
Steel.

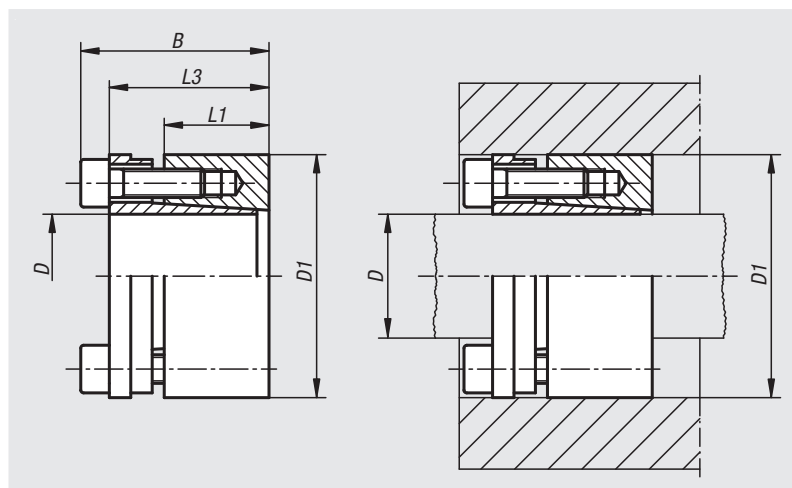
Version:
Bright.

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:

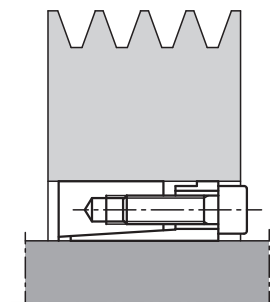
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



Order No.	Surface pressure on shaft P N/mm ²	Surface pressure on hub P N/mm ²	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



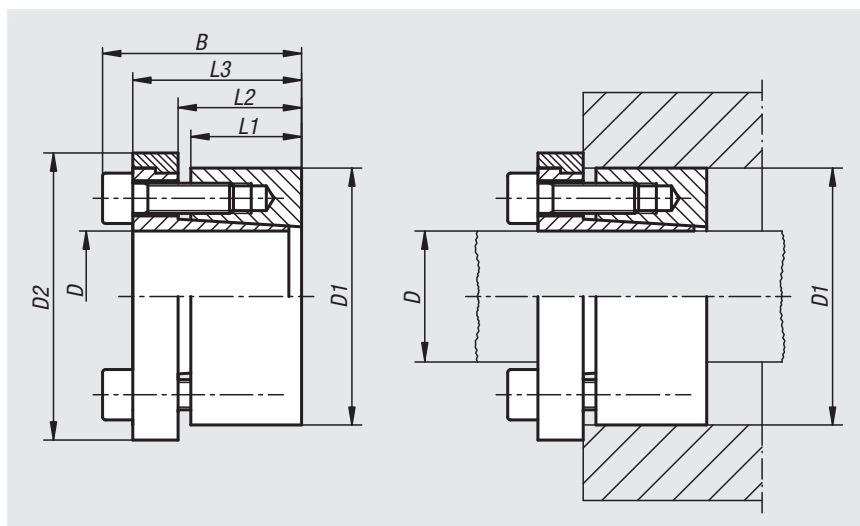
Material:
Steel.

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:

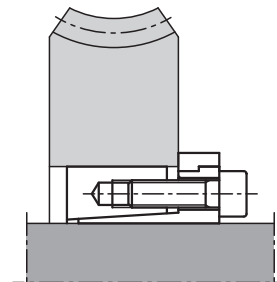
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



Order No.	Surface pressure on shaft P N/mm ²	Surface pressure on hub P N/mm ²	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.

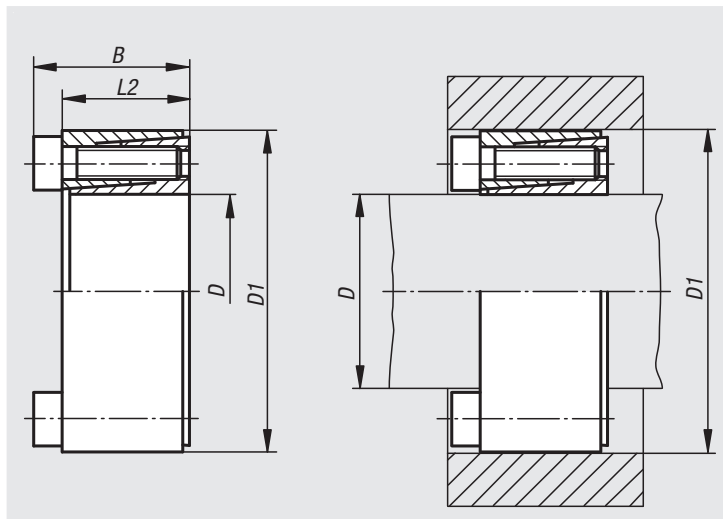
Version:
Bright.

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:

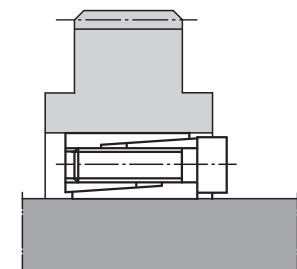
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



Order No.	Surface pressure on shaft P N/mm ²	Surface pressure on hub P N/mm ²	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:

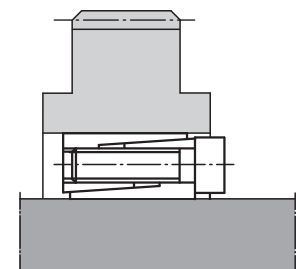
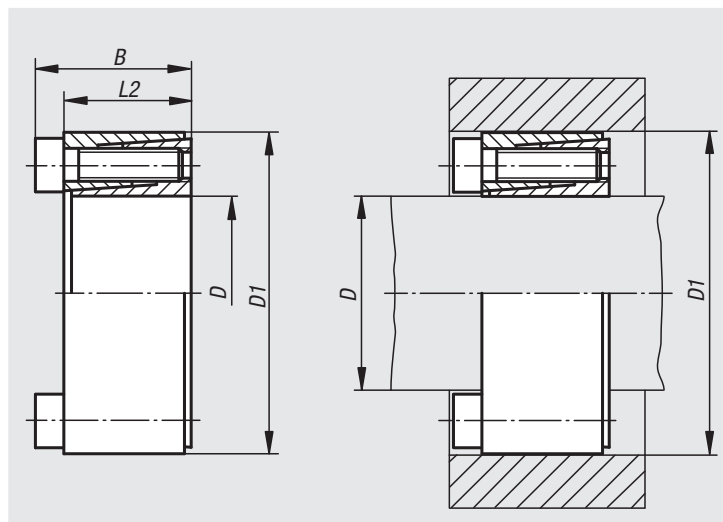
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

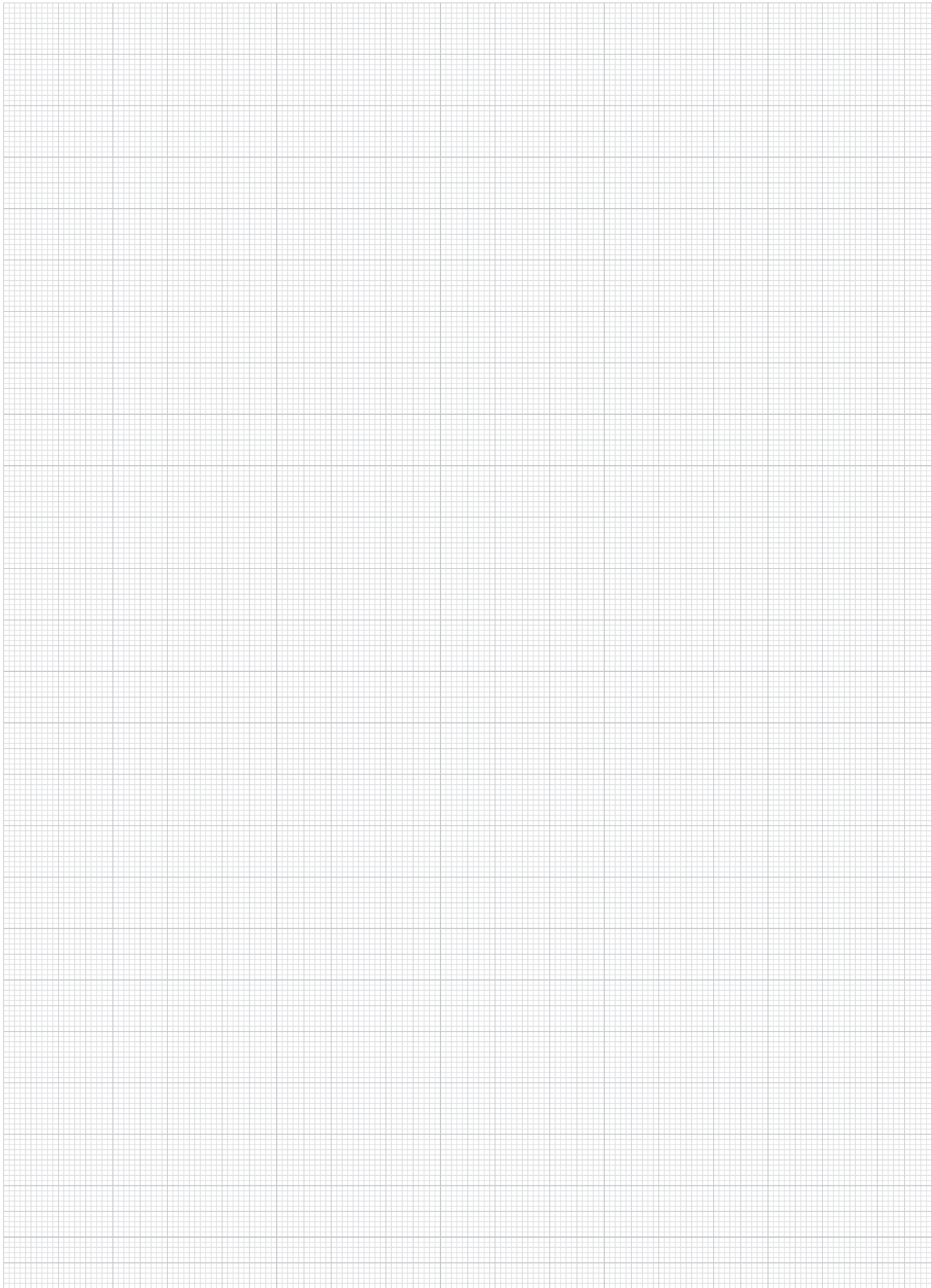
Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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



20000
21000
22000
23000
24000
26000
27000
28000
29000
31000
32000
33000

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.

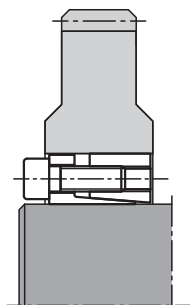
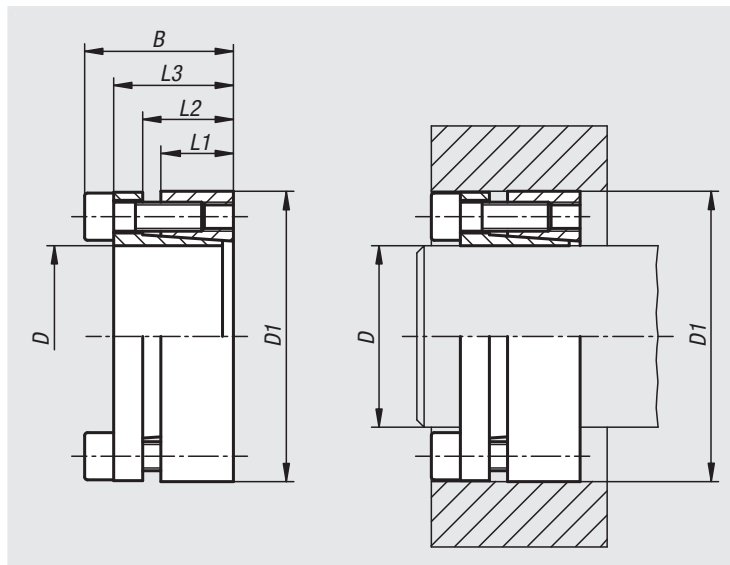
- for shaft diameters from 19 to 85 mm
- for medium to high torques
- minimum axial offset when mounting
- self-centring

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 $R_z \leq 16 \mu\text{m}$.

Hub:
Recommended tolerance H8.
Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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:

nIm 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:

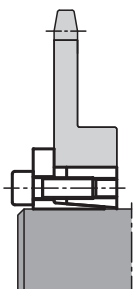
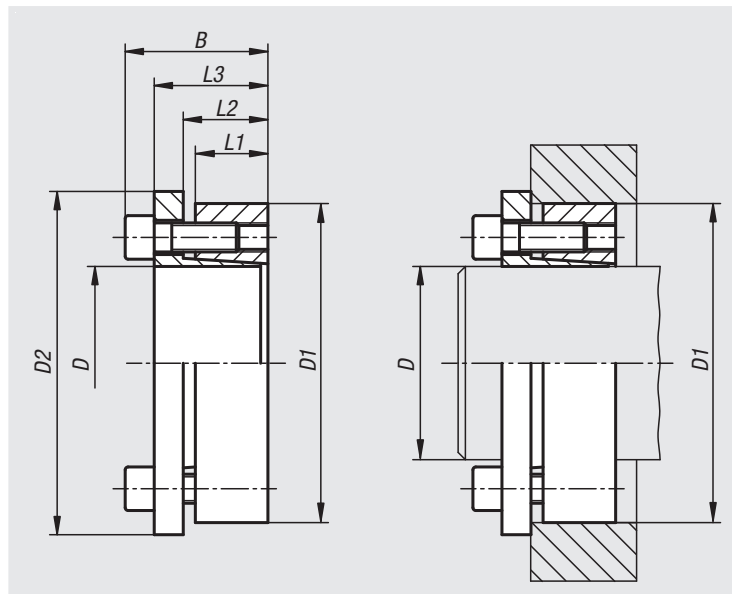
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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:

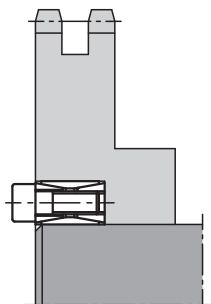
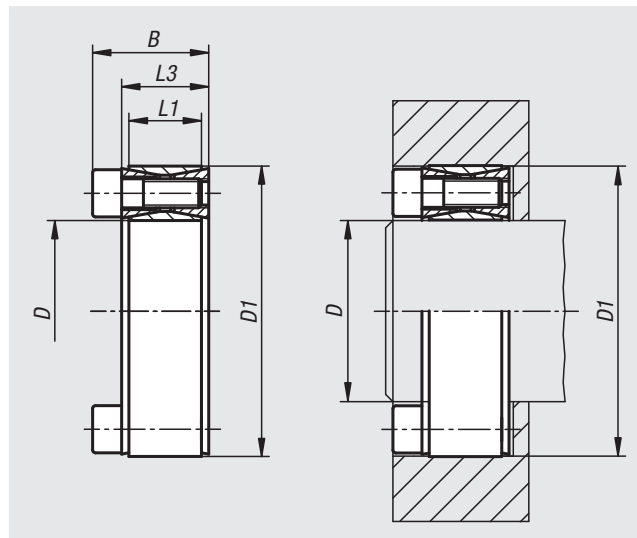
Lightly oil keyless locking coupling on the tapered faces and contact points of the shaft and hub. Do not use MoS2 or grease. Insert keyless locking coupling in the hub seat and slide onto shaft. Tighten screws crosswise in several increments to the defined tightening torque.

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 $R_z \leq 16 \mu\text{m}$.

Hub:
Recommended tolerance H11.
Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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:

nIm 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:

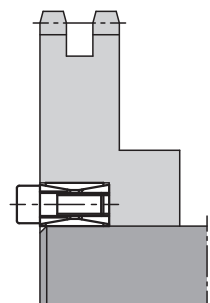
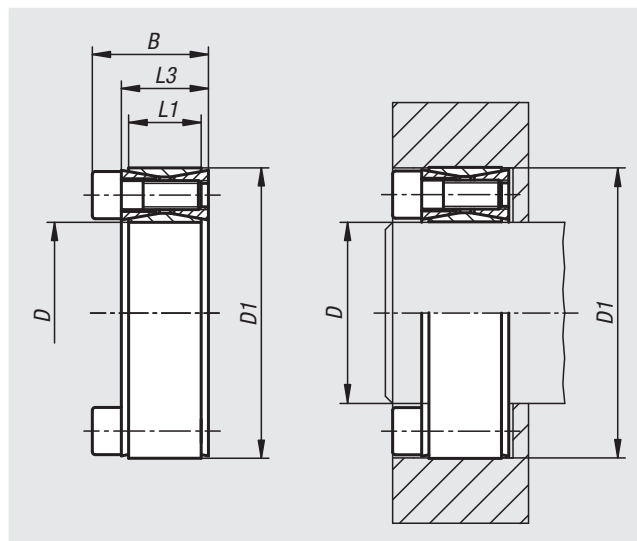
Recommended tolerance h11.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

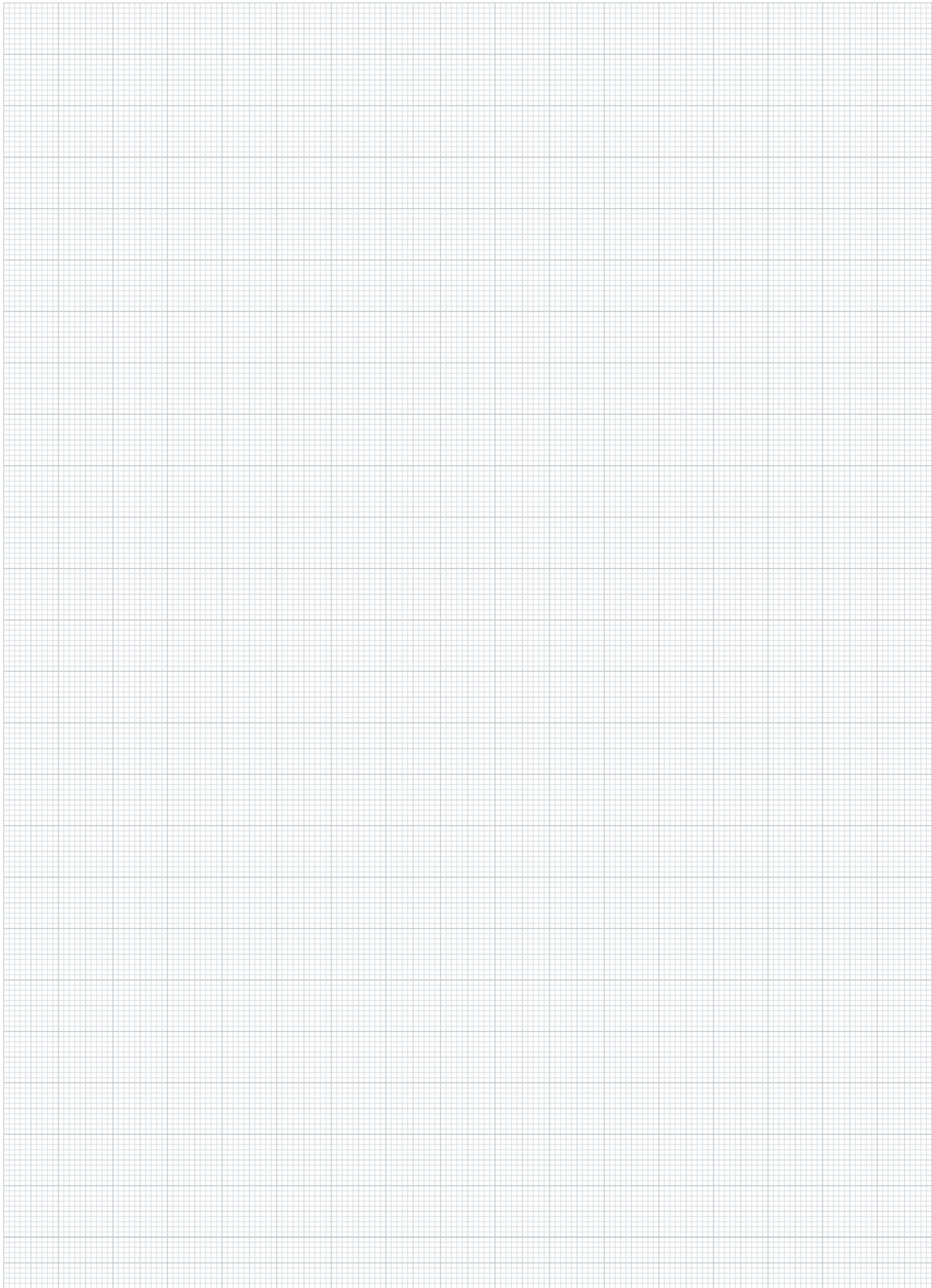
Recommended tolerance H11.

Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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

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Keyless locking couplings Form H

for high torques


Material:

Steel.

Version:

Bright.

Sample order:

nIm 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:

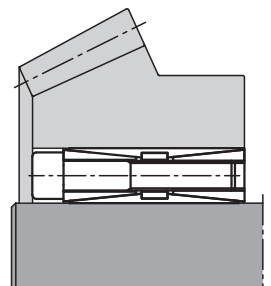
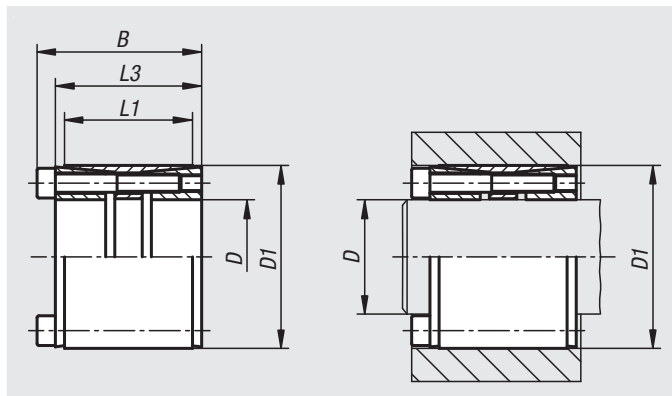
Recommended tolerance h8.

Surface quality $R_z \leq 16 \mu\text{m}$.

Hub:

Recommended tolerance H8.

Surface quality $R_z \leq 16 \mu\text{m}$.



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/mm ²	Surface pressure on hub P N/mm ²	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:

nln 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.

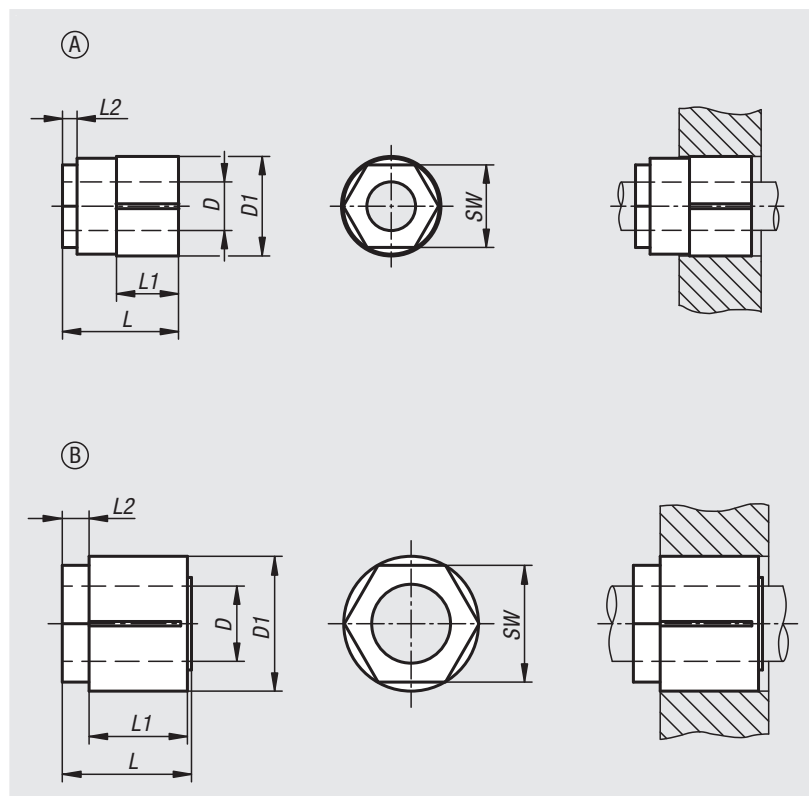
Tolerances:

Shaft diameter and hub hole

Form A ± 0.04 mm.

Form B ± 0.08 mm.

Surface quality $R_z \leq 16$ 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/mm ²	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:

nln 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.

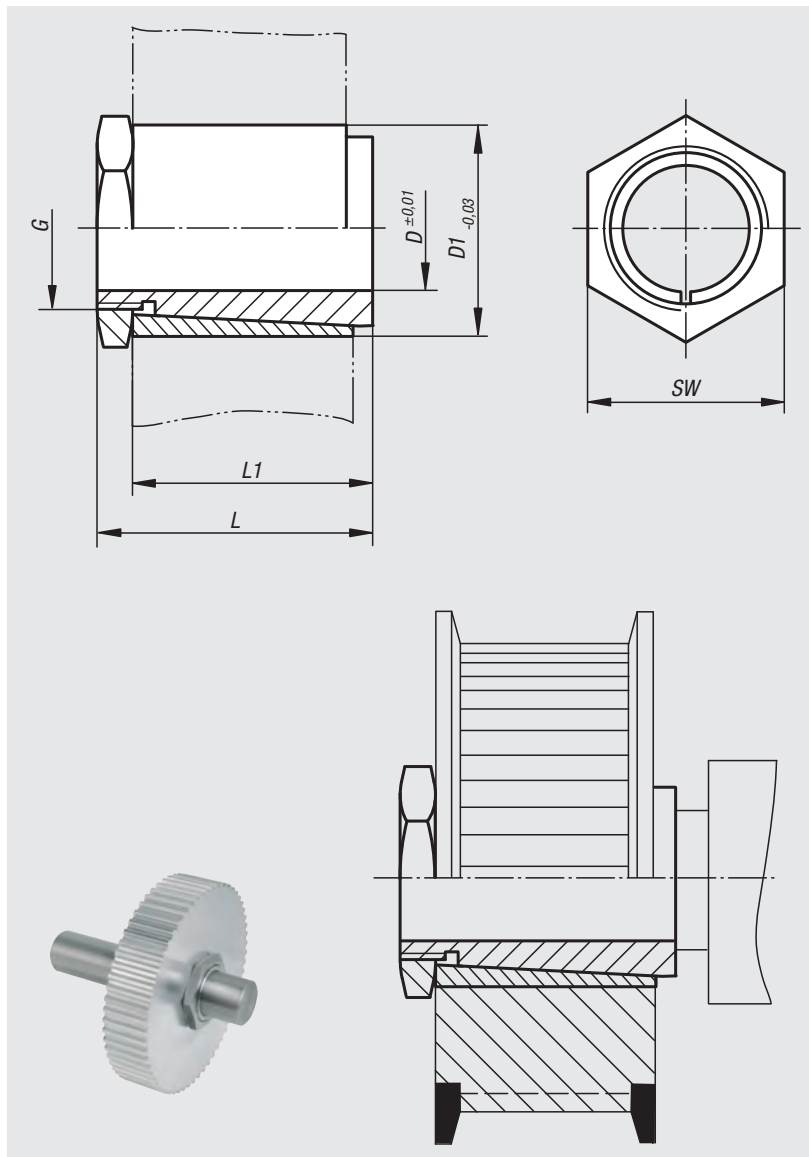
Assembly:

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:

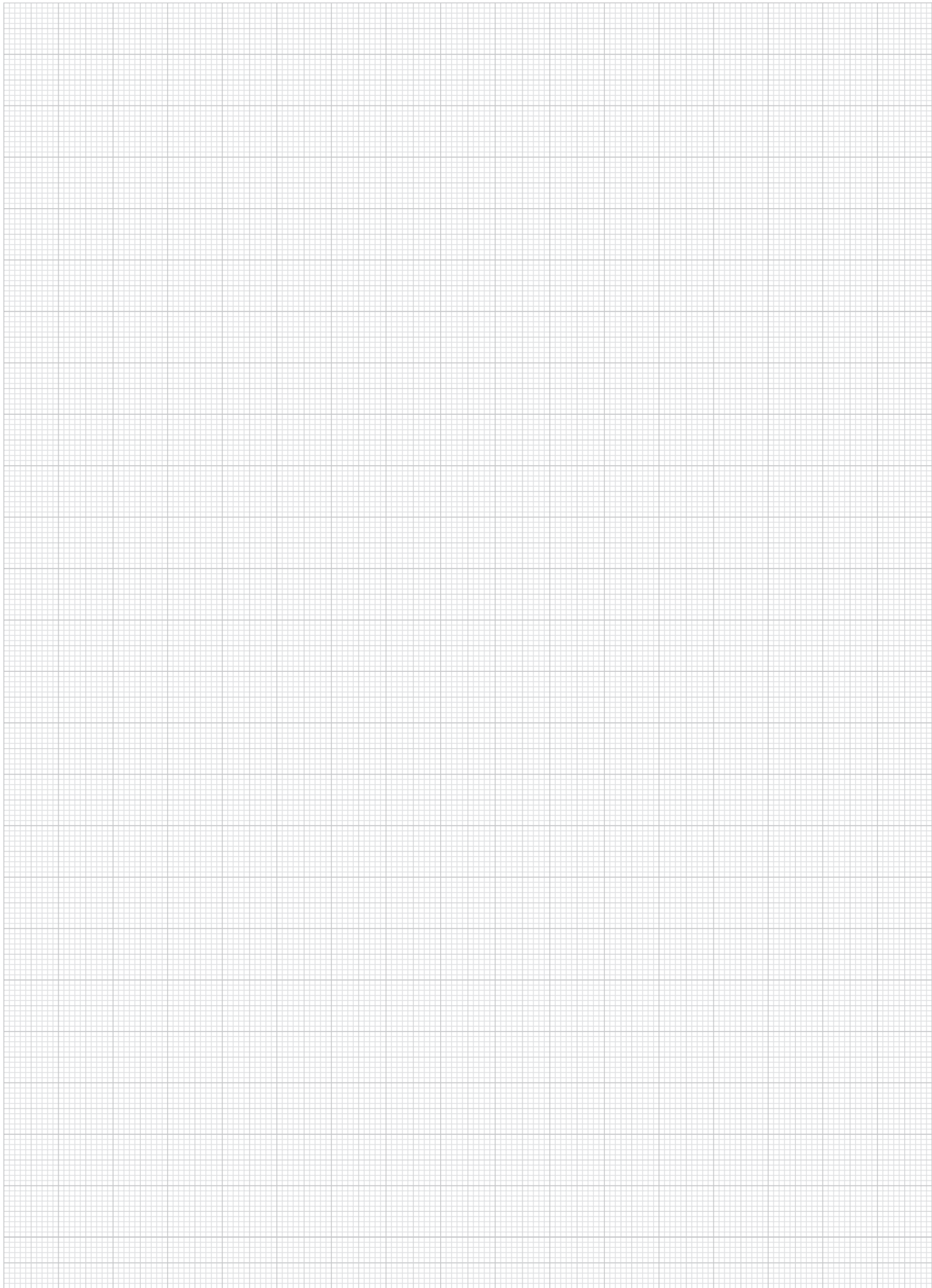
Shaft: h7

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

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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:

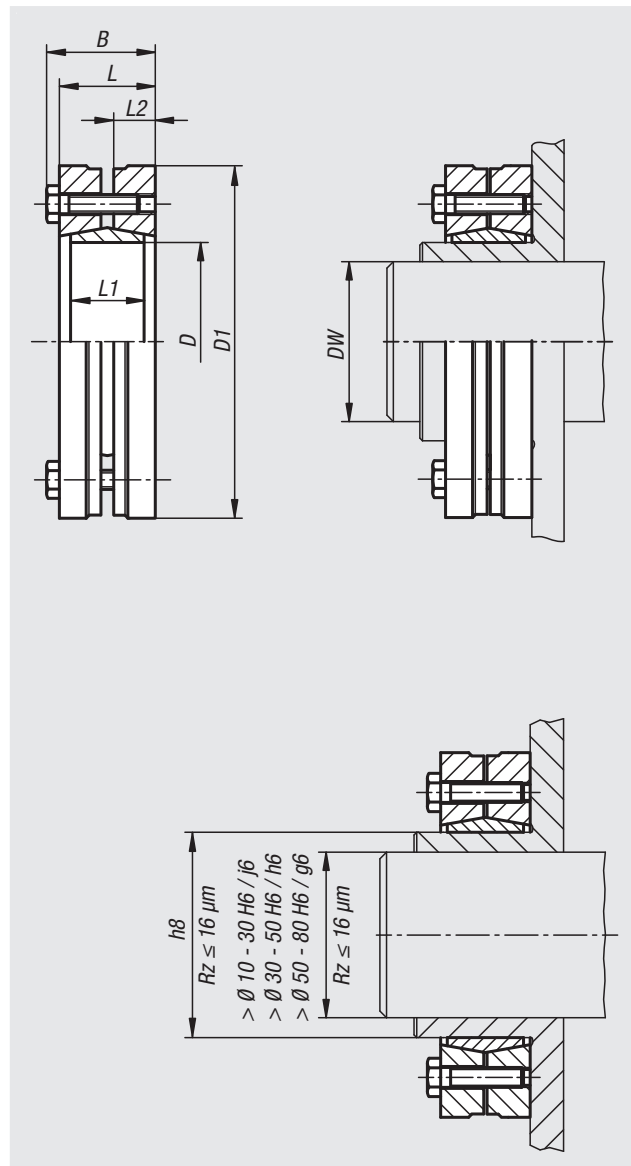
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque 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/mm ²	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:

nIm 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:

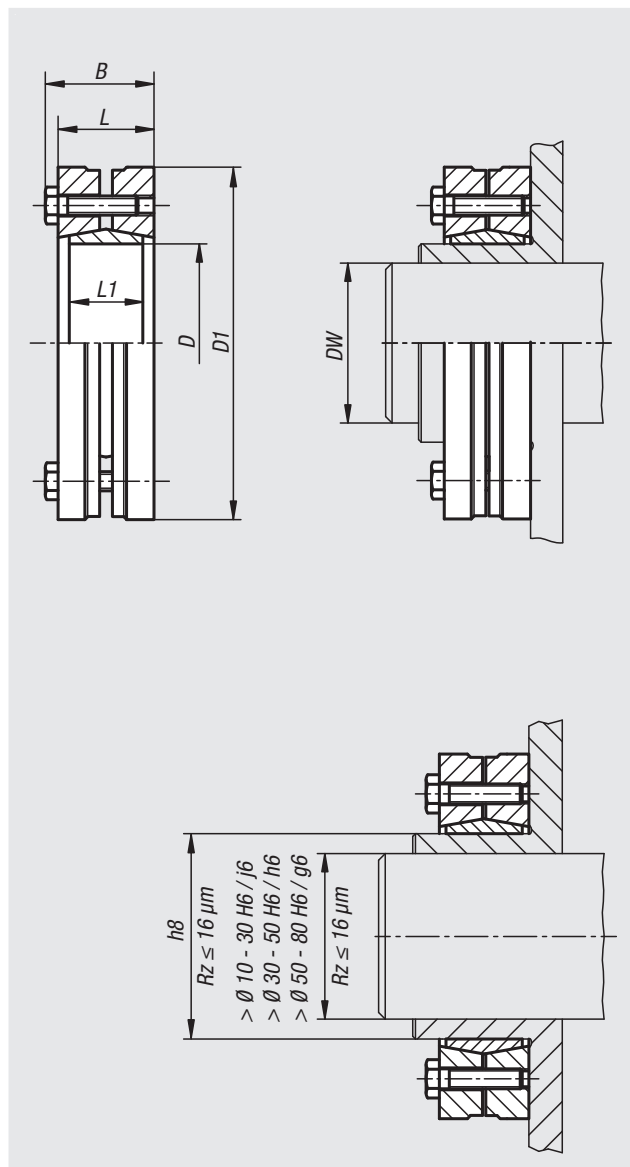
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque 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/mm ²	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:

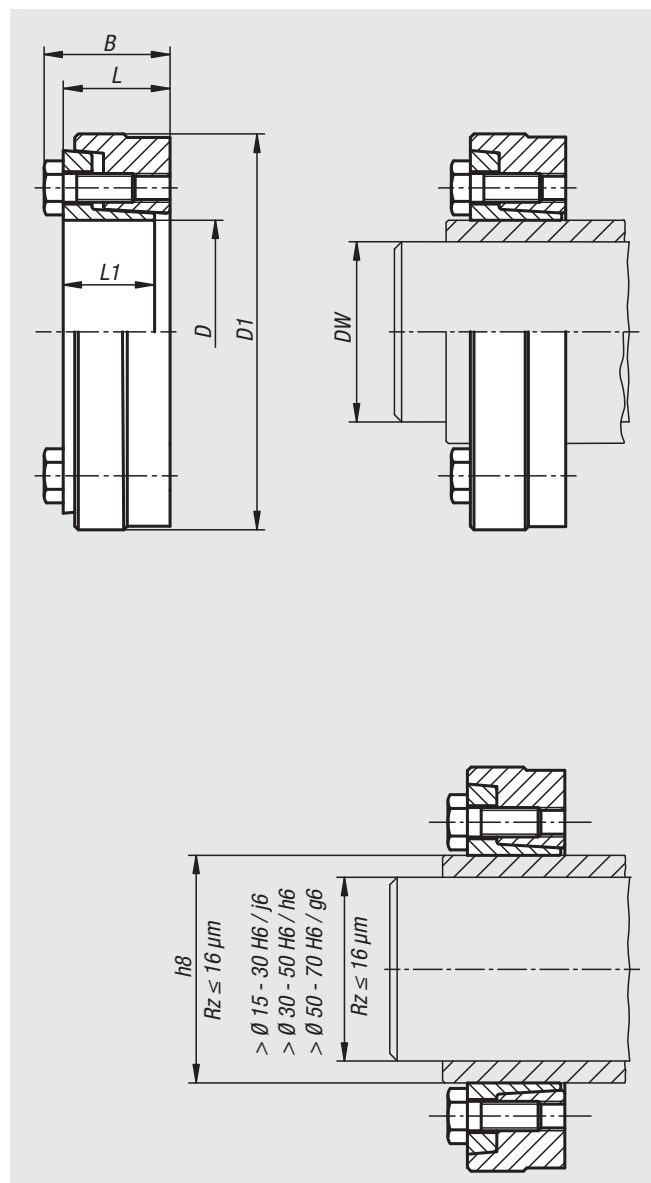
Remove existing transportation locks. Clean and lightly oil shaft, internal and external hub diameters. Do not use MoS2 or grease. Slide shrink disc onto hub. Then slide unit (shrink disc/hub) onto shaft and position correctly. Gently tighten clamping screws one after the other by hand. Then use a torque 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/mm ²	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:

$$DM \geq D1 \cdot K$$

D1 = outer diameter of KLC (mm)

K = factor (see table)

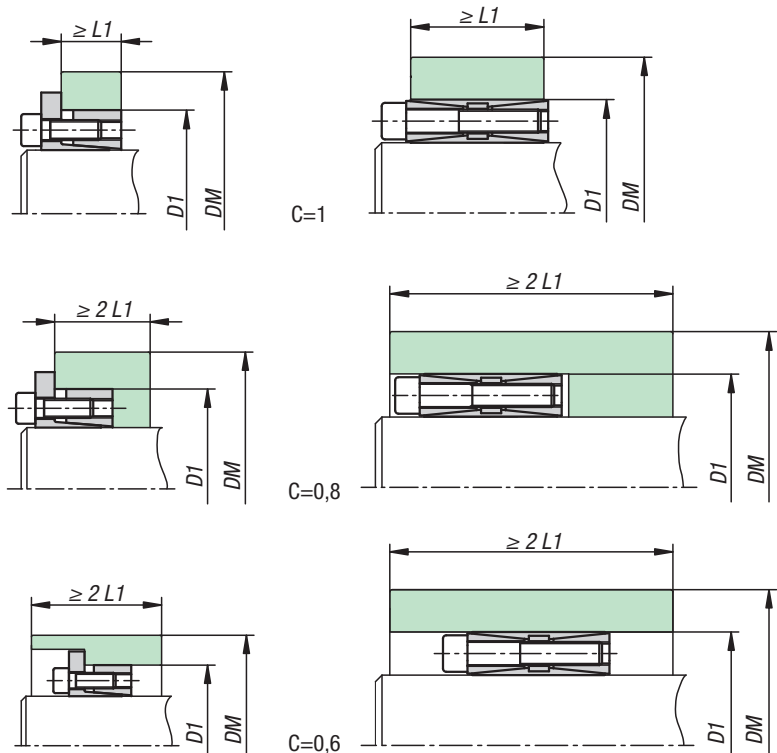
If factor K is not specified in the table, then the following formula applies:

$$K = \sqrt{\frac{\sigma_{0.2} + (C \cdot PN)}{\sigma_{0.2} - (C \cdot PN)}} \quad (\text{mm})$$

$\sigma_{0.2}$ = 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 $\sigma_{0.2} = 250 \text{ N/mm}^2$

Selected KLC:

23360-4065 KLC Form G

with D = 40 mm, D1 = 65 mm and PN = 139 N/mm²

hub width and form correspond 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:

$$DW_{\text{int}} < D \cdot \sqrt{\frac{\sigma_{0.2 \text{ shaft}} - 2 \cdot PW \cdot 0.8}{\sigma_{0.2 \text{ shaft}}}} \quad (\text{mm})$$

DW_{internal} = hollow hub ID (mm)

D = ID of KLC (mm)

$\sigma_{0.2 \text{ shaft}}$ = yield point of hub material (N/mm²)

PW = surface pressure on shaft (N/mm²)

Calculating the minimum hub diameter

Table for factor K												
PN N/mm ²		σ 0.2 yield point N/mm ²										
		150	180	200	220	250	270	300	350	400	450	600
		hub materials										
PN N/mm ²	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	1,20
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).

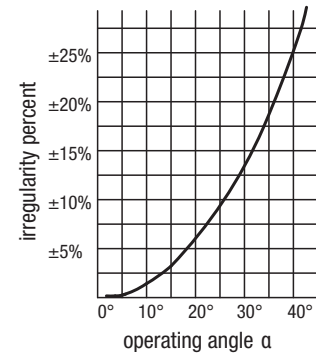
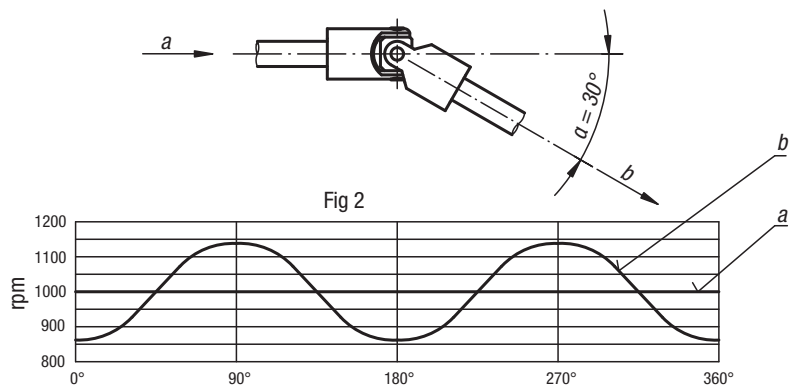


Fig 1



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.

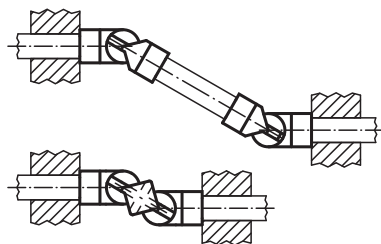
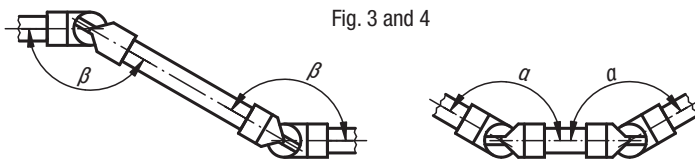


Fig. 3 and 4



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:

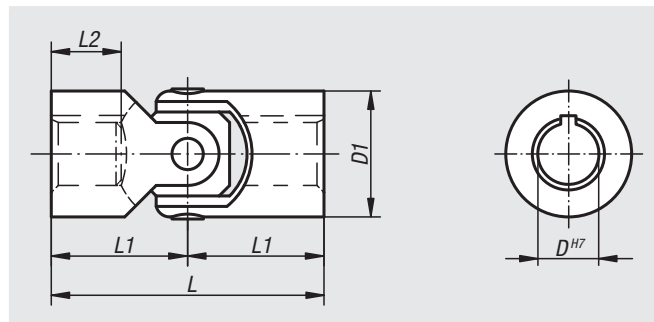
nIm 23403-06034

Note:

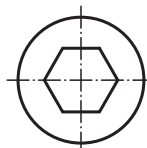
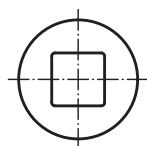
Universal joints with plain bearing can be swivelled by 45°.

Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.

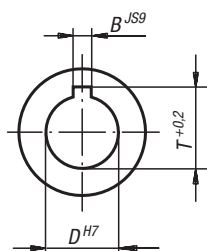
* Bore depth is less than by DIN 808.



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:

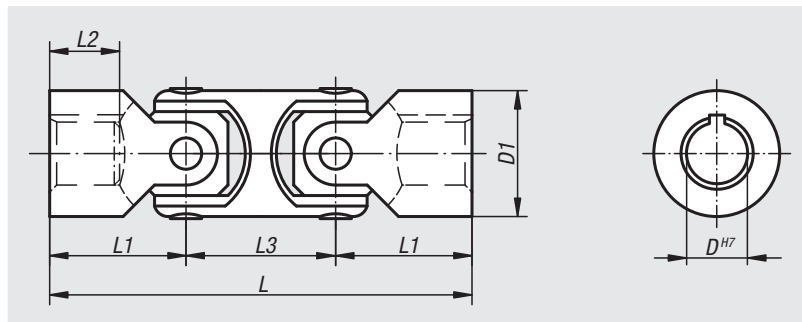
nln 23404-06056

Note:

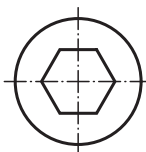
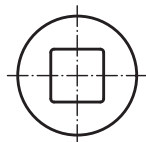
Double universal joints with plain bearing can be swivelled by 90°.

Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.

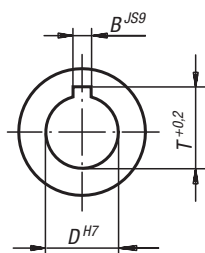
* Bore depth is less than by DIN 808.



On request:



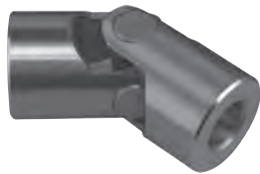
DIN 6885-1



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:

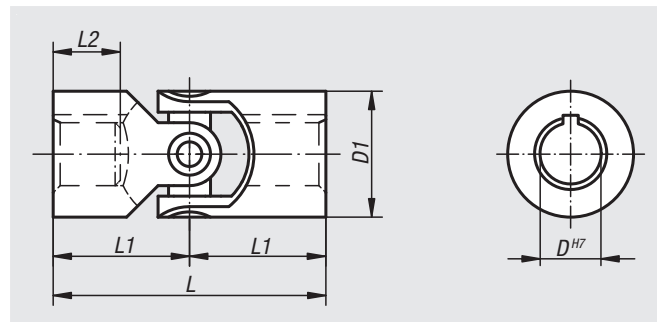
nIm 23406-10048

Note:

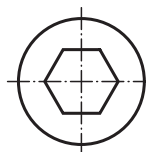
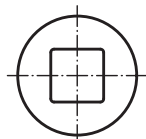
Single universal joints with needle bearings are used for speeds of 1000 to 4000 rpm. They have minimal play and are maintenance-free.

Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.

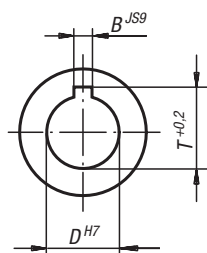
* Bore depth is less than by DIN 808.



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	58	122	61	29	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:

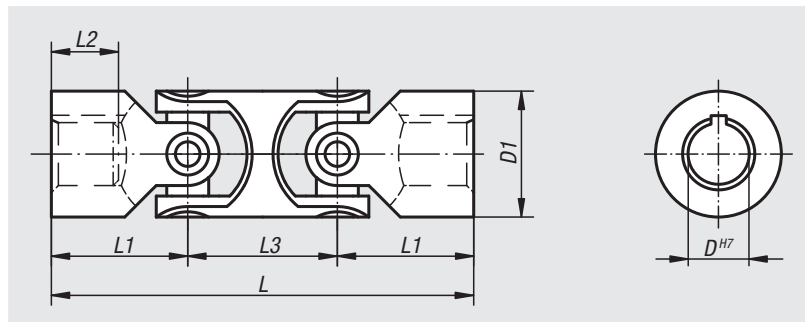
nlm 23407-12086

Note:

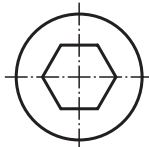
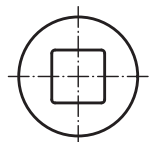
Double universal joints with needle bearing are used for speeds of 1000 to 4000 rpm. They have minimal play and are maintenance-free.

Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.

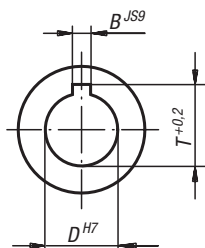
* Bore depth is less than by DIN 808.



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:

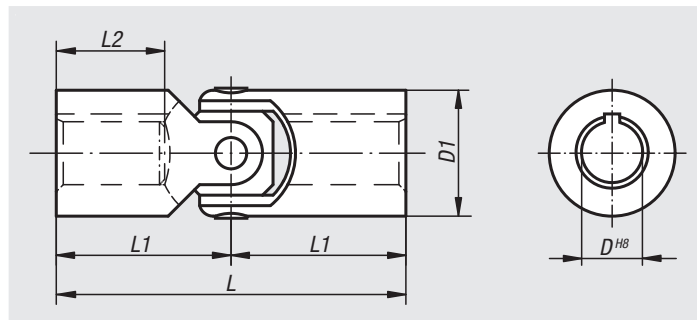
nIm 23409-08042

Note:

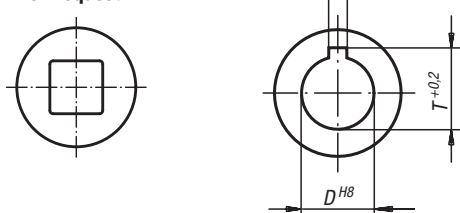
Robust universal joints are suitable for manual drives on elevating platforms, slides, shutters etc. or for short-time machine drives at low speed.

Single universal joints with plain bearing can be swivelled by 35°.

Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.



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:

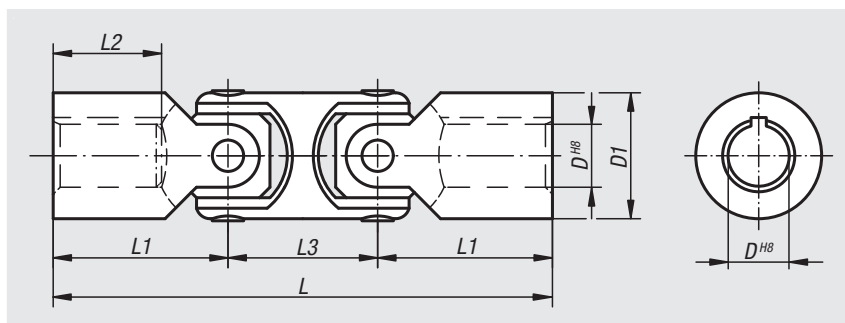
nlm 23410-10074

Note:

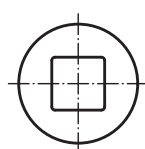
Robust universal joints are suitable for manual drives of elevating platforms, slides, shutters etc. or for short-time machine drives at low speed.

Double universal joints with plain bearing can be swivelled by 70°.

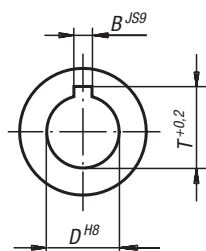
Max. transferable torque (Nm) at 150 rpm, operation angle $\alpha < 5^\circ$.



On request:

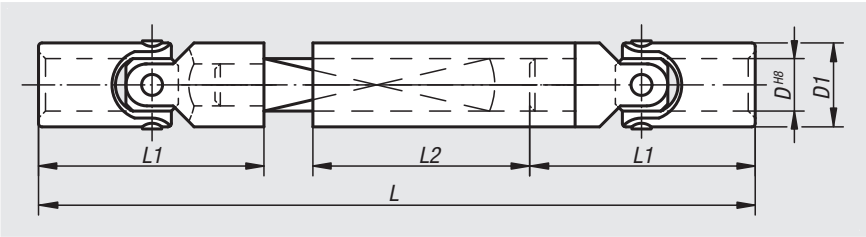


DIN 6885-1



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

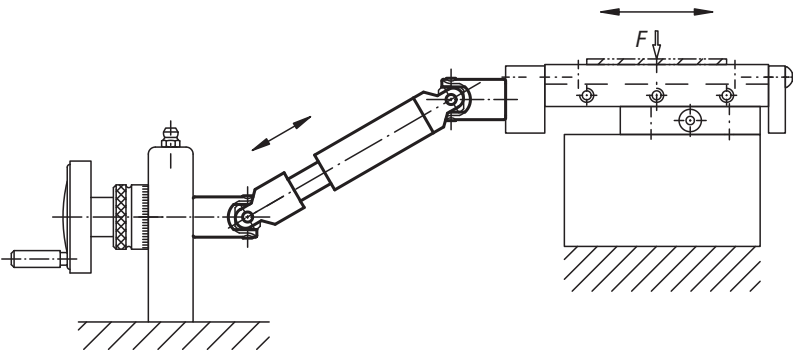


Material:
Steel.

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

Protective rubber sleeves

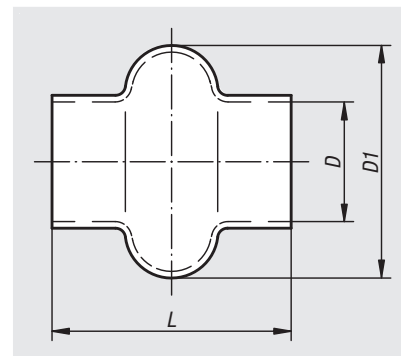
for universal and cardan joints (single)



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 $\pm 5\%$.



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

Protective rubber sleeves

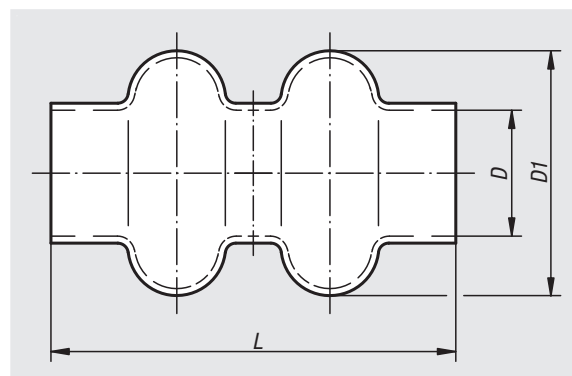
for universal and cardan joints (double)



Sample order:
nlm 23415-16

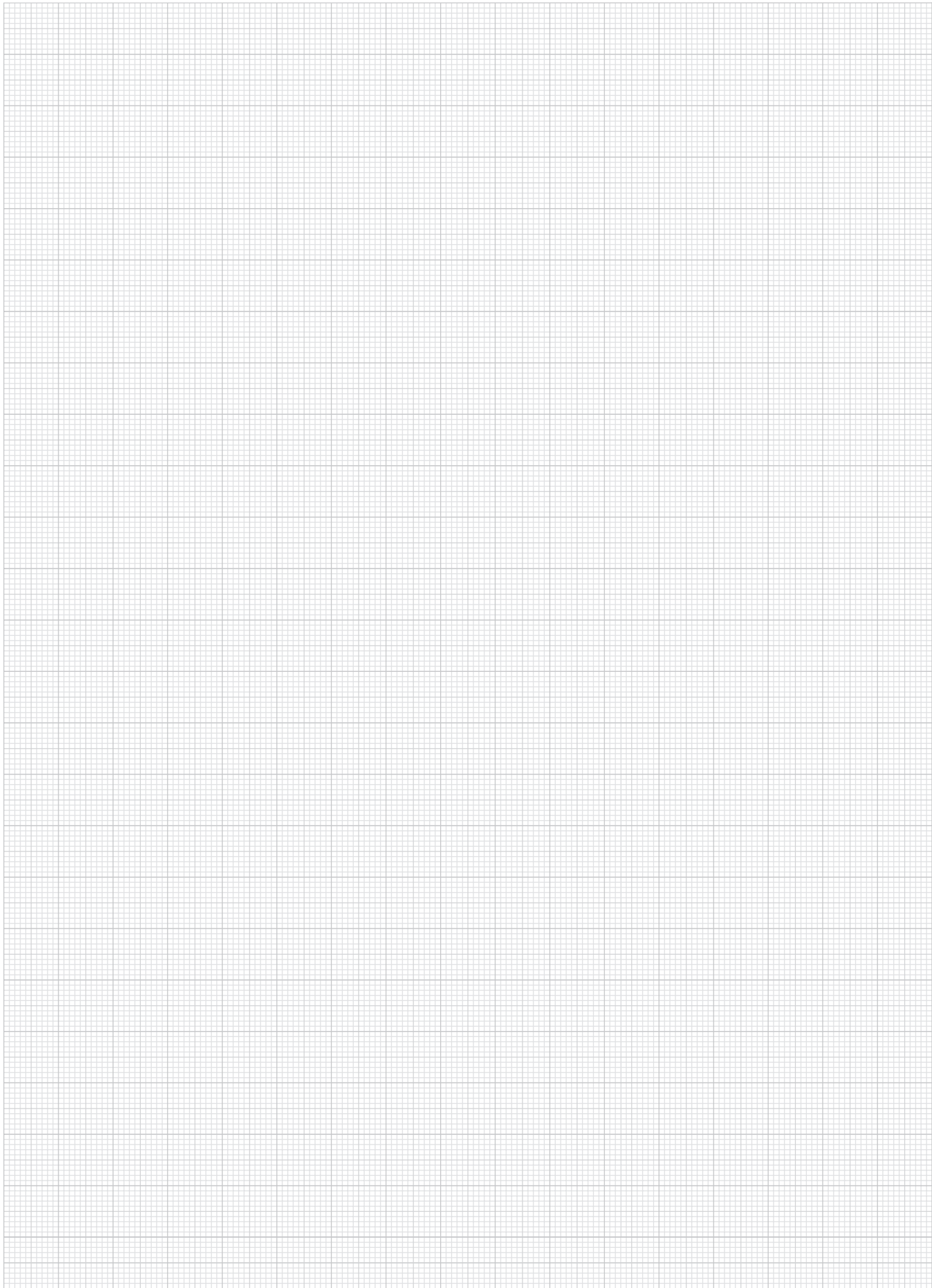
Note:

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 $\pm 5\%$.



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



20000
21000
22000
23000
24000
26000
27000
28000
29000
31000
32000
33000

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 flange tempered and phosphated.
Nut black oxidised.

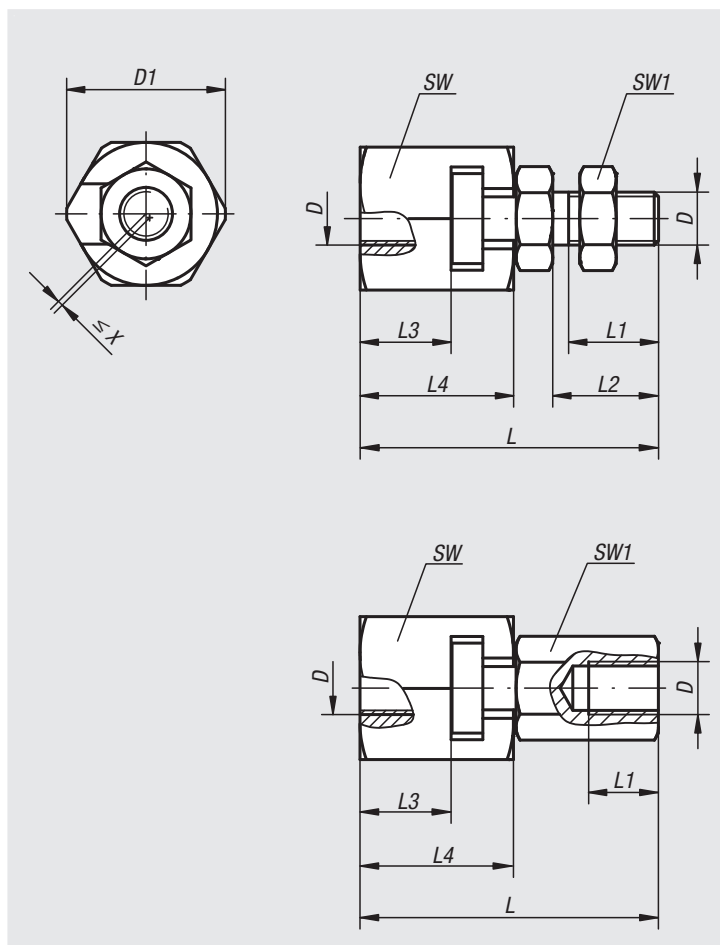
Sample order:

nIm 23450-16

Note:

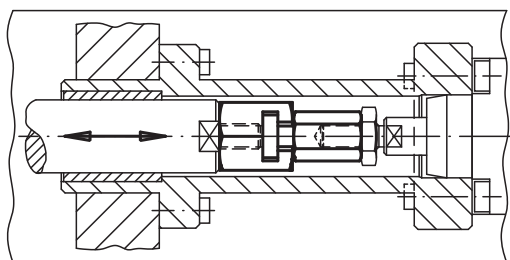
Quick-fit couplings with radial offset compensation for multiple applications, e.g. as a link between a piston rod and a linear-movement unit. Assembly and disassembly of this simple, solid and two-part coupling is carried out by means of a T-slot; a manual re-adjustment is not necessary. The quick-fit 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.

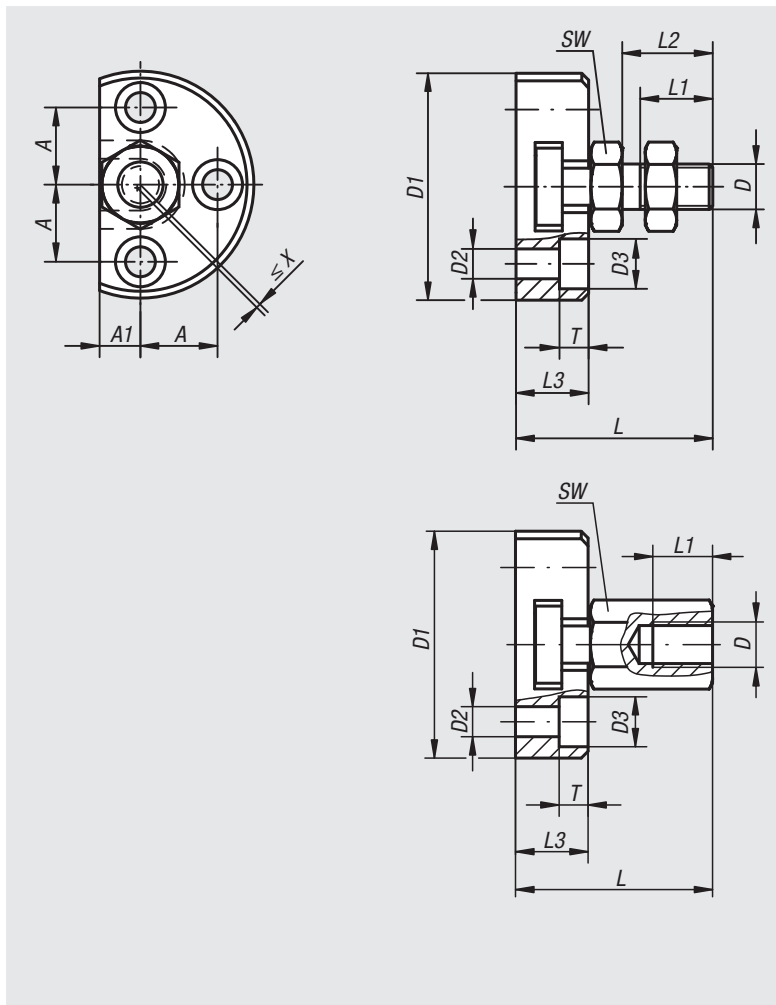
Sample order:

nlm 23452-20351

Note:

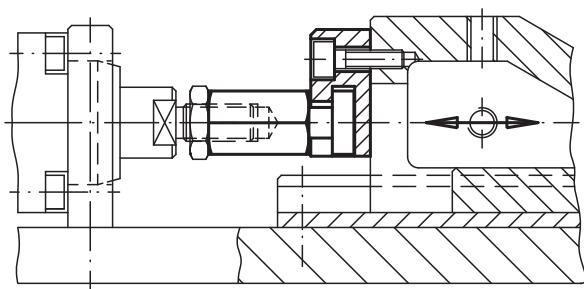
Space saving quick-fit couplings with radial offset compensation suitable for multiple applications, e.g. as a link between a piston rod and a linear-movement unit. Assembly and disassembly of this simple, solid and two-part coupling is with a T-slot, a manual re-adjustment is not necessary. The quick-fit 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.

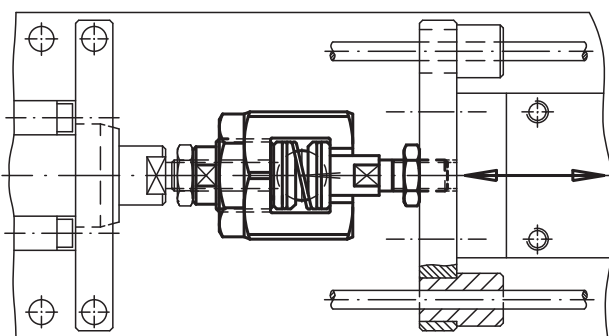
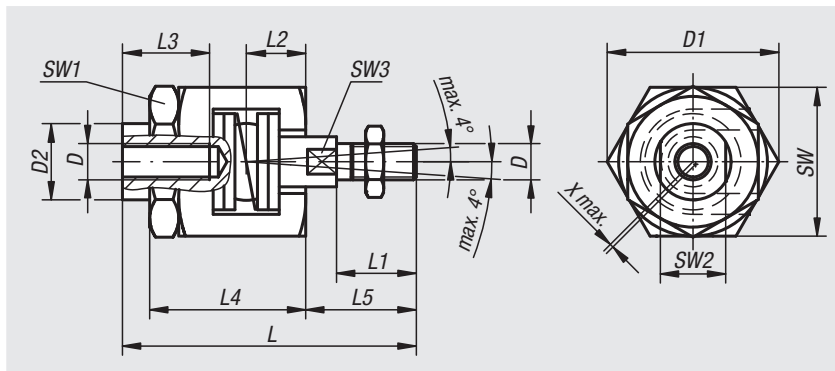
Sample order:

nIm 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:

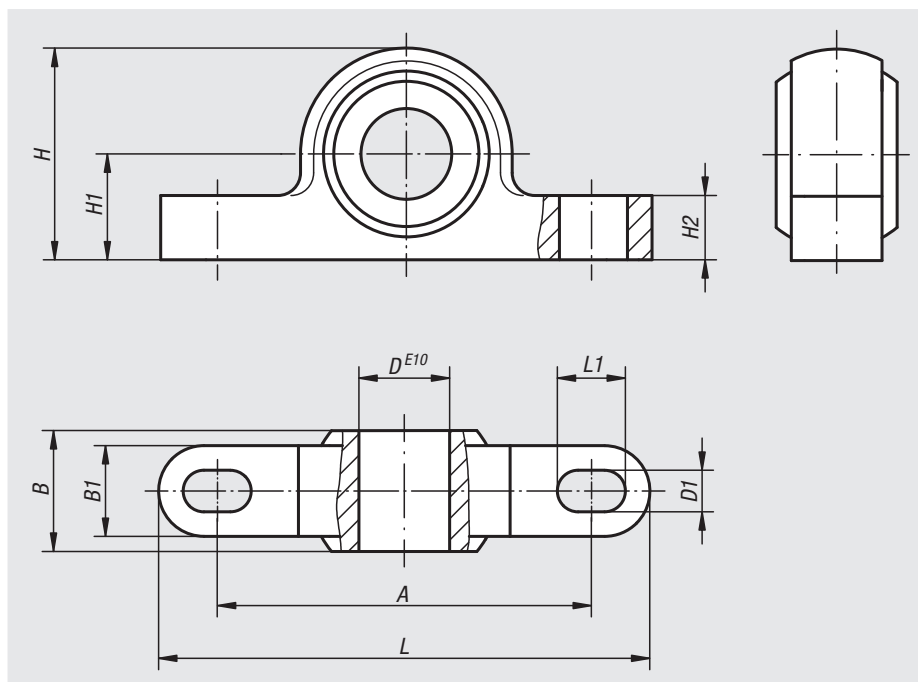
The ability to pivot allows pillow block bearings to compensate for misalignment and possible shaft deflection. They are easy to install and suitable for the accommodation of rotating, oscillating and linear movements.

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, ceramic


Material:

High performance ceramic Z141.

Version:

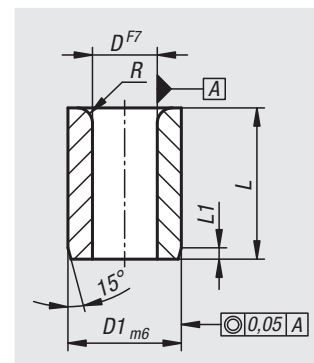
Ground

Sample order:

nIm 23679-0025005009

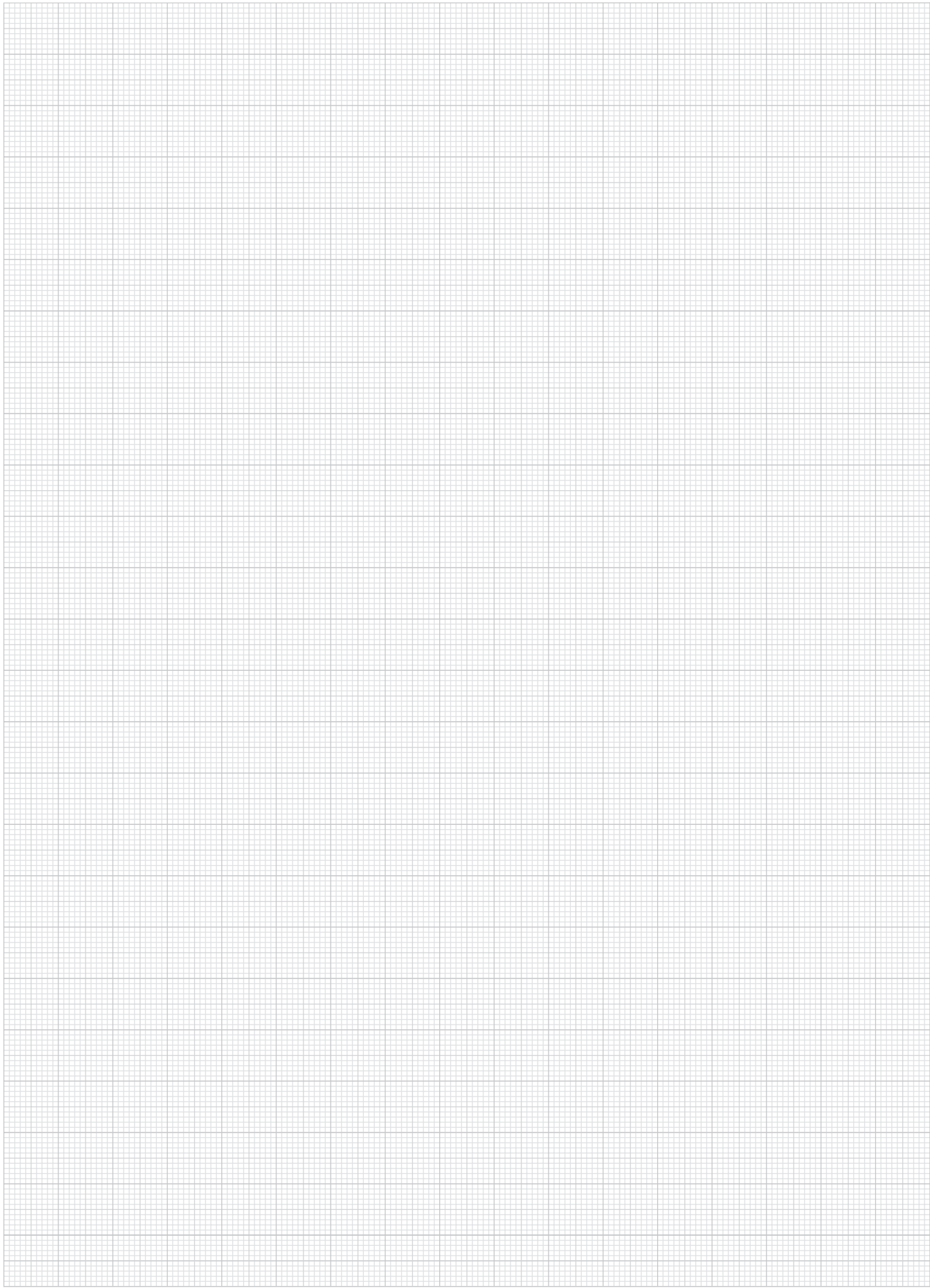
Advantages:

- Exceptionally wear-resistant
- Dimensionally stable even at high temperatures
- Electrically insulating
- Frequency neutral



Order No.	D	D1	L	L1	R
23679-0025005009	2,5	5	9	1	1
23679-0030006012	3	6	12	1	1
23679-0033006012	3,3	6	12	1	1
23679-0040007012	4	7	12	1	1
23679-0042008012	4,2	8	12	1	1
23679-0050008012	5	8	12	1	1
23679-0060010016	6	10	16	1,25	1,5
23679-0068012016	6,8	12	16	1,25	1,5
23679-0080012016	8	12	16	1,25	1,5
23679-0085015020	8,5	15	20	1,5	2

Notes



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Guide bushes

bronze, maintenance-free



Material:

Bronze with graphite inserts.

Version:

Self-lubricating.

Hardness 190-220 HB.

Sample order:

nln 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/cm³

Tensile strength Rm: 750 N/mm²

Yield point: 450 N/mm²

Ductile fracture A5: 5-8%

Friction coefficient: 0.05 - 0.12

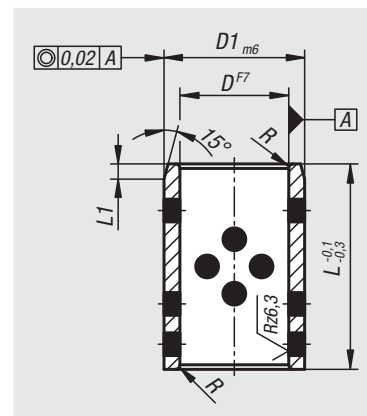
Maximum speed: 15 m/min

Thermal conductivity: 50 W/m x k

Thermal expansion coefficient: 18 x 10⁻⁶

Electrical conductivity: 7-8 m/(Ω x mm²)

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:

nIm 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/cm³

Tensile strength Rm: 750 N/mm²

Yield point: 450 N/mm²

Ductile fracture A5: 5-8%

Friction coefficient: 0.05 - 0.12

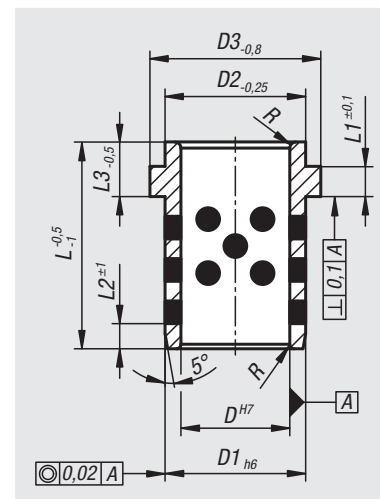
Maximum speed: 15 m/min

Thermal conductivity: 50 W/m x k

Thermal expansion coefficient: 18 x 10⁻⁶

Electrical conductivity: 7-8 m/(Ω x mm²)

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	10	3
23681-02503203200	25	32	32	40	32	6,3	4	8	3
23681-02503204010	25	32	32	40	40	6,3	3	10	3
23681-02503204000	25	32	32	40	40	6,3	4	8	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	15	5

Retaining clips

DIN 9832

**Material:**

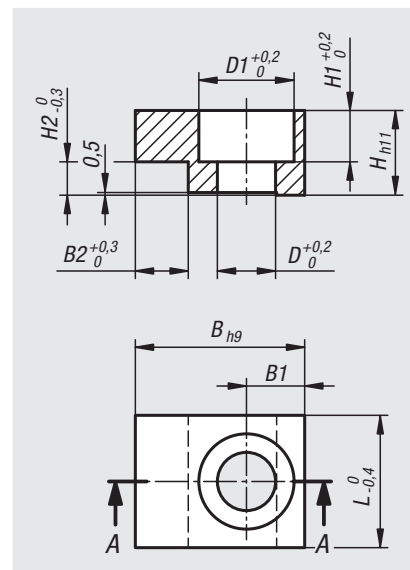
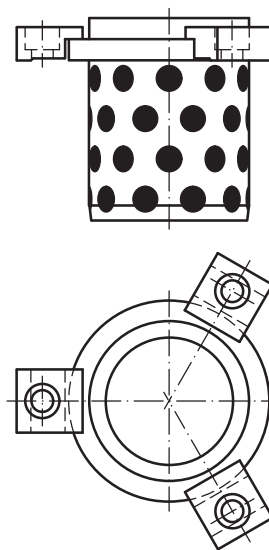
Steel.

Sample order:

nlm 23682-2020

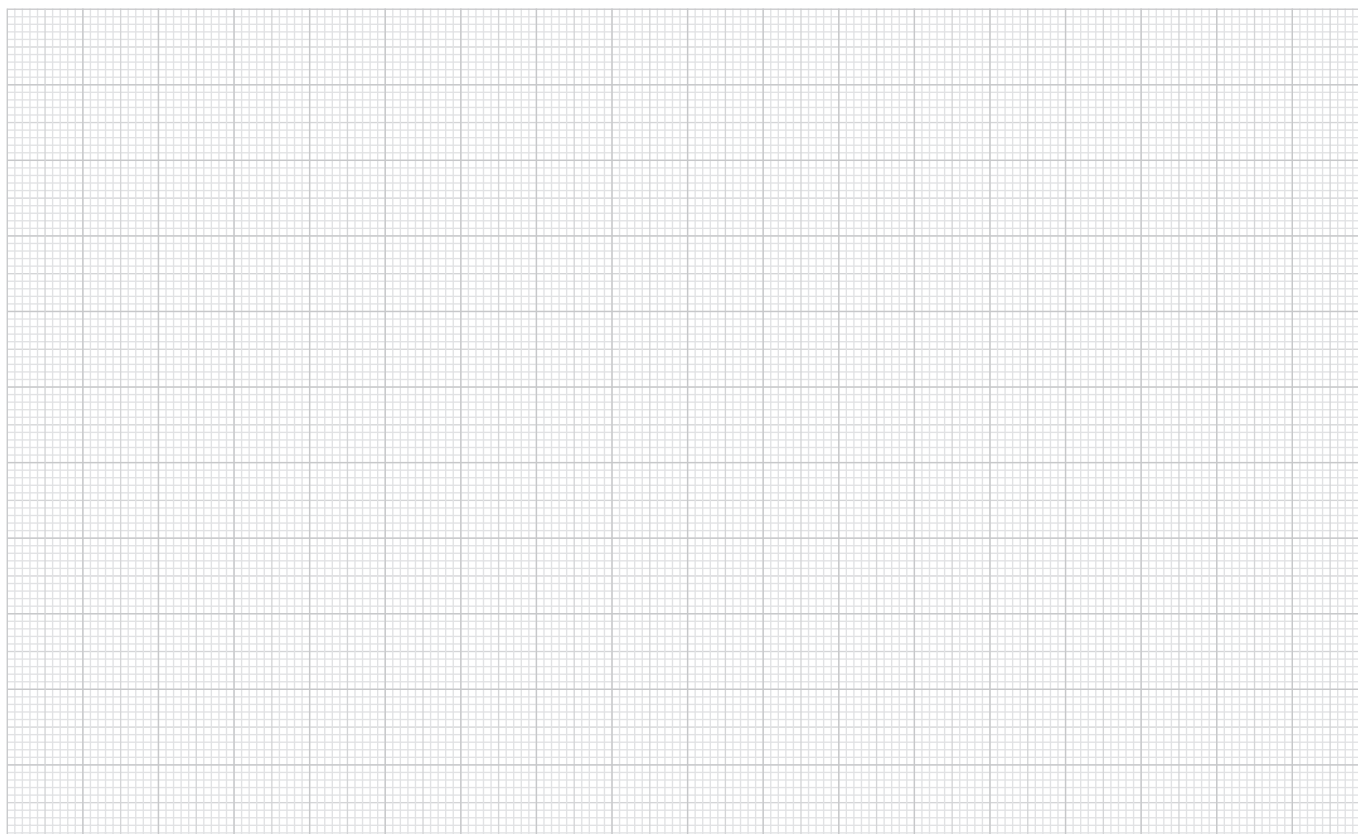
Note:

The retaining clips are used to fixate the DIN 9834 / ISO 9448 guide bushes.

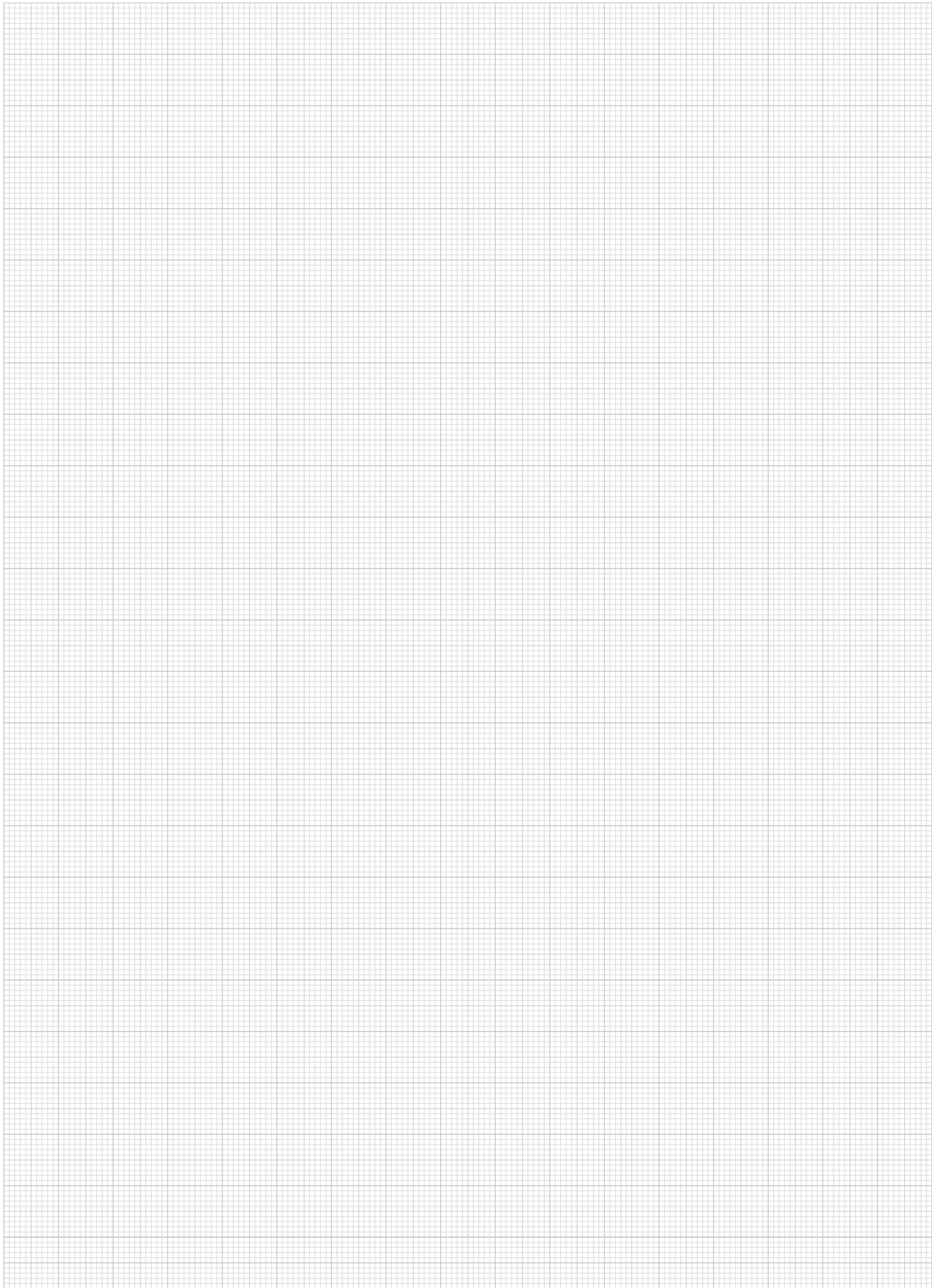


Order No.	B	B1	B2	D	D1	L	H	H1	H2
23682-2020	20	7,5	5	7	11	20	10	7	6,3
23682-2520	25	10	5	9	15	20	12	8,5	6,3
23682-3225	32	11	10	11	18	25	16	11,5	6,3

Notes



Notes



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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:

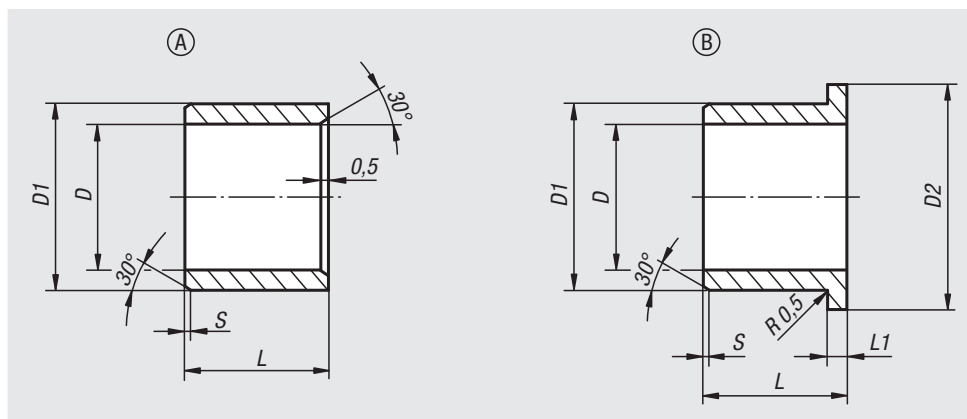
Plastic high-performance polymer plain bearings.

- 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).



Material	Note	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
iglidur® G	the all-rounder	•	•			•					•	
iglidur® J	low coefficients 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	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm ²	Temperature range
23710-11050705	23710-12050705	5	7	-/11	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	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm ²	Temperature range
23710-21050705	23710-22050705	5	7	-/11	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	-/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	S	Tolerance D after force fitting	Max. permissible static surface pressure N/mm ²	Temperature range
23710-31050705	23710-32050705	5	7	-/11	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.

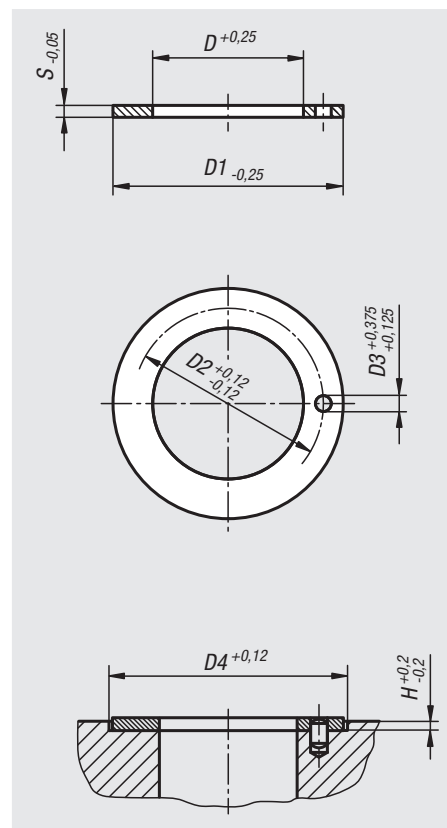
Sample order:

nlm 23715-1050906

Note:

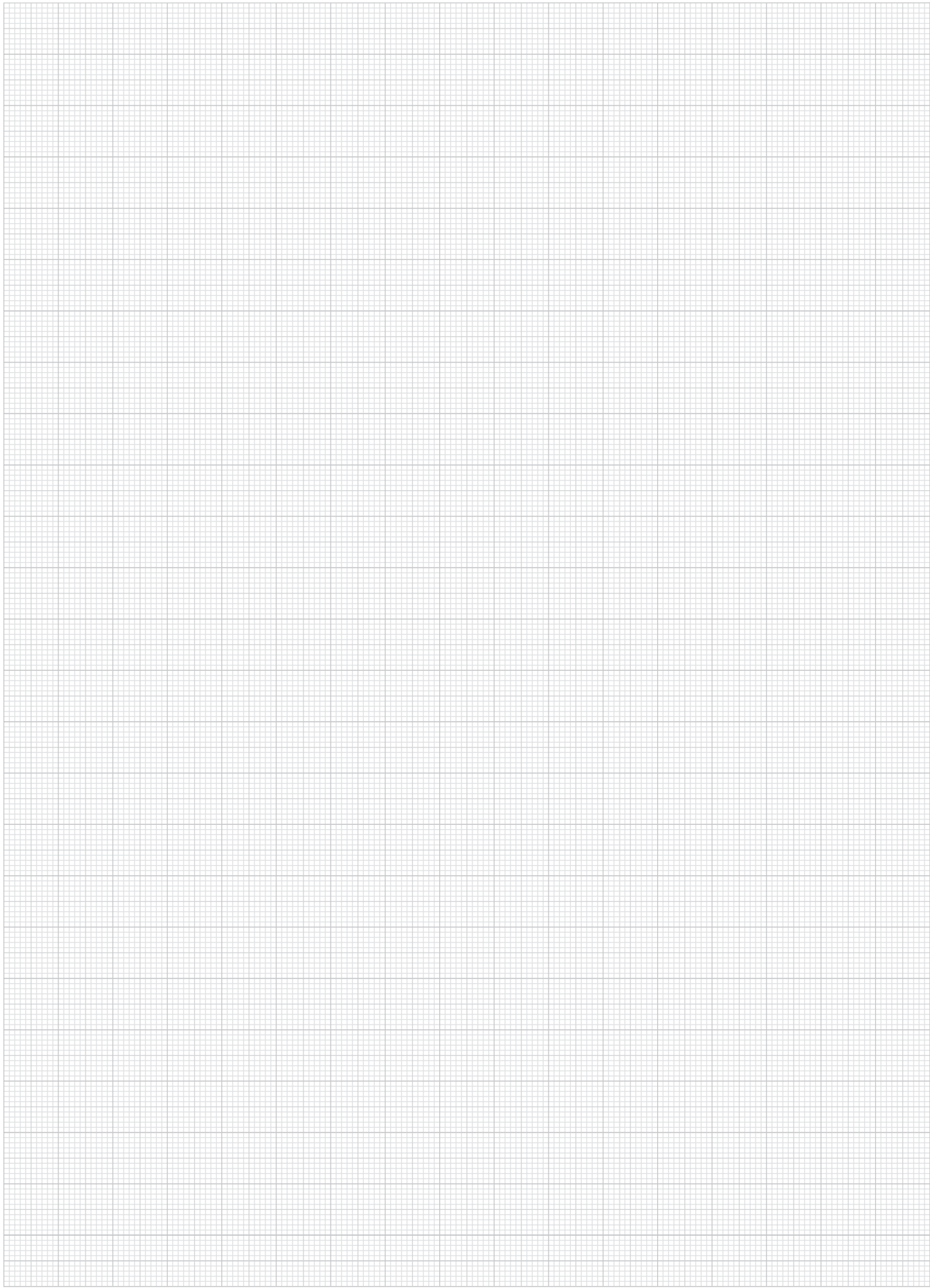
Maintenance-free and lubricant-free thrust washers. They take up axial loads by rotational motion. The loading can be either alternating or permanent.

Electrically insulating. Resistant to UV radiation.



Order No.	D	D1	D2	D3	D4	H	S	Max. permissible static surface pressure N/mm ²	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



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Plain bearings

cylindrical



Material:

Base material, steel.
Intermediate layer sintered bronze.
Bearing surface PTFE.

Version:

Steel electro zinc-plated.

Sample order:

nIm 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

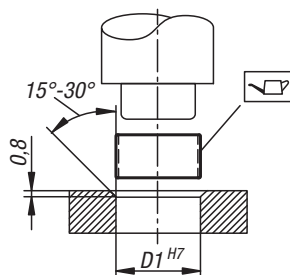
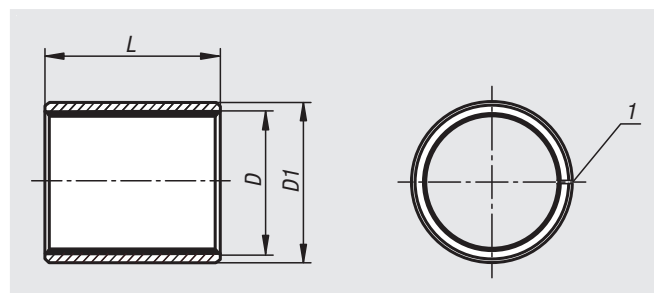
Thermal conductivity: 42 W/(m*K)-1

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:

nIm 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

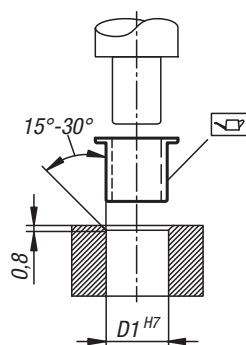
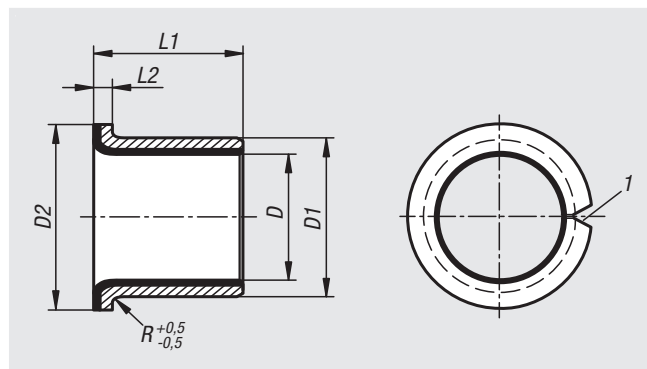
Thermal conductivity: 42 W/(m·K)-1

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:

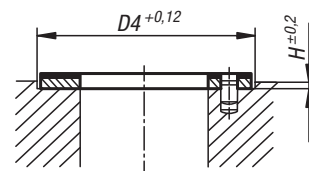
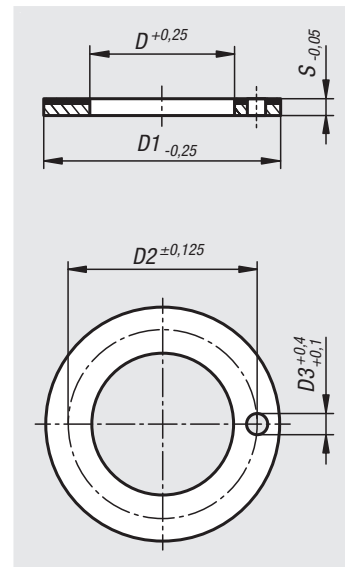
nlm 23732-01002015

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:

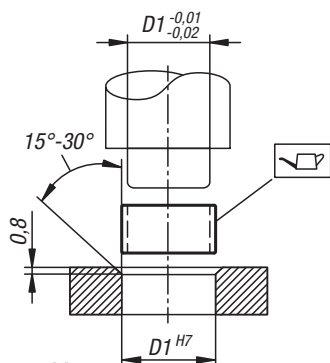
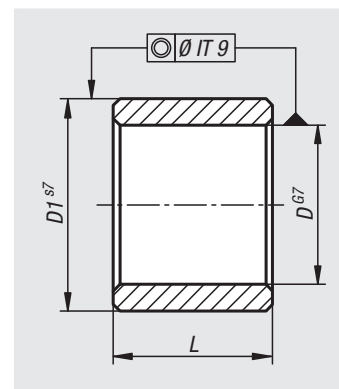
Oil impregnated (ca. 25 percent by volume oil).
Hardness min. 25 HB.

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:

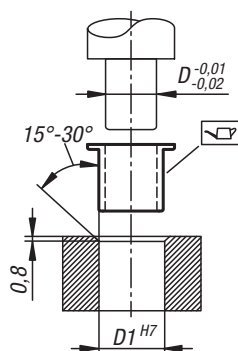
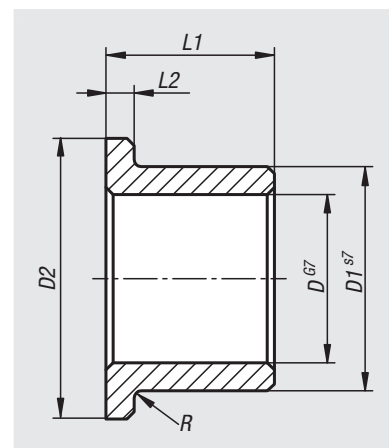
Oil impregnated (ca. 25 percent by volume oil).
Hardness min. 25 HB.

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:

nIm 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.

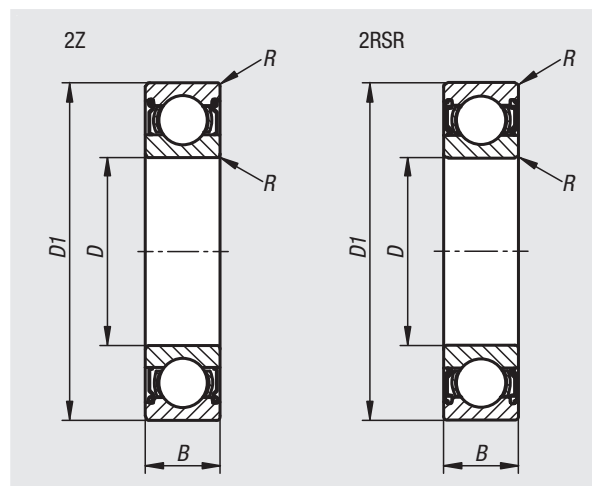
Temperature range:

-30 °C to +110 °C

On request:

Open deep groove ball bearing.

Other dimensions and versions.



Order No.	Abbreviation	Form	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	Form	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

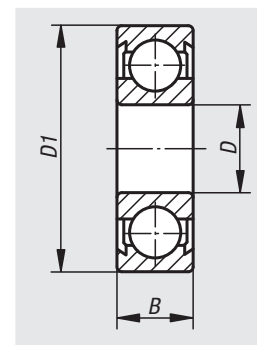
Deep groove ball bearing FAG

single row

Order No.	Abbreviation	Form	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:

nIm 23800-03-00802207

Note:

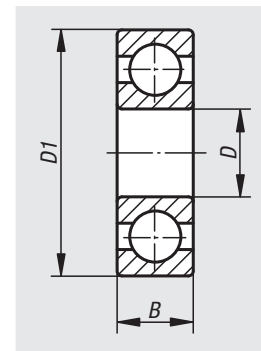
Zirconia (ZrO₂) is a cost-effective alternative to Si₃N₄. It also has the advantage that the thermal expansion is similar to that of steel, which means that a shrink fit is not required as expansion differences between the bearing housing and a steel shaft do not occur.

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.

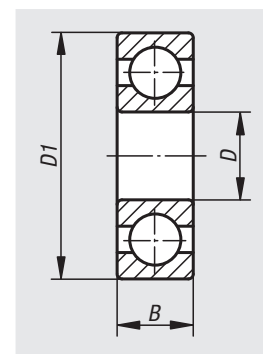
Silicon nitride bearings are light, very hard and highly wear resistant.

High and ultra-high performance bearings are used in e.g. aerospace technology, metal production industries (high application temperatures), machine manufacturing, chemical industries (chemically aggressive substances), pharmaceutical and medical industries, semiconductor and biotechnology (clean room environments 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.

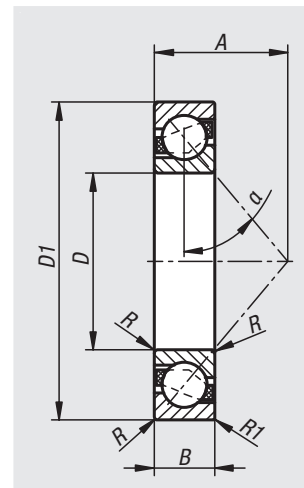
The main dimensions of angular contact ball bearings conform to DIN 628-1. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

Temperature range:

-30 °C to +120 °C.

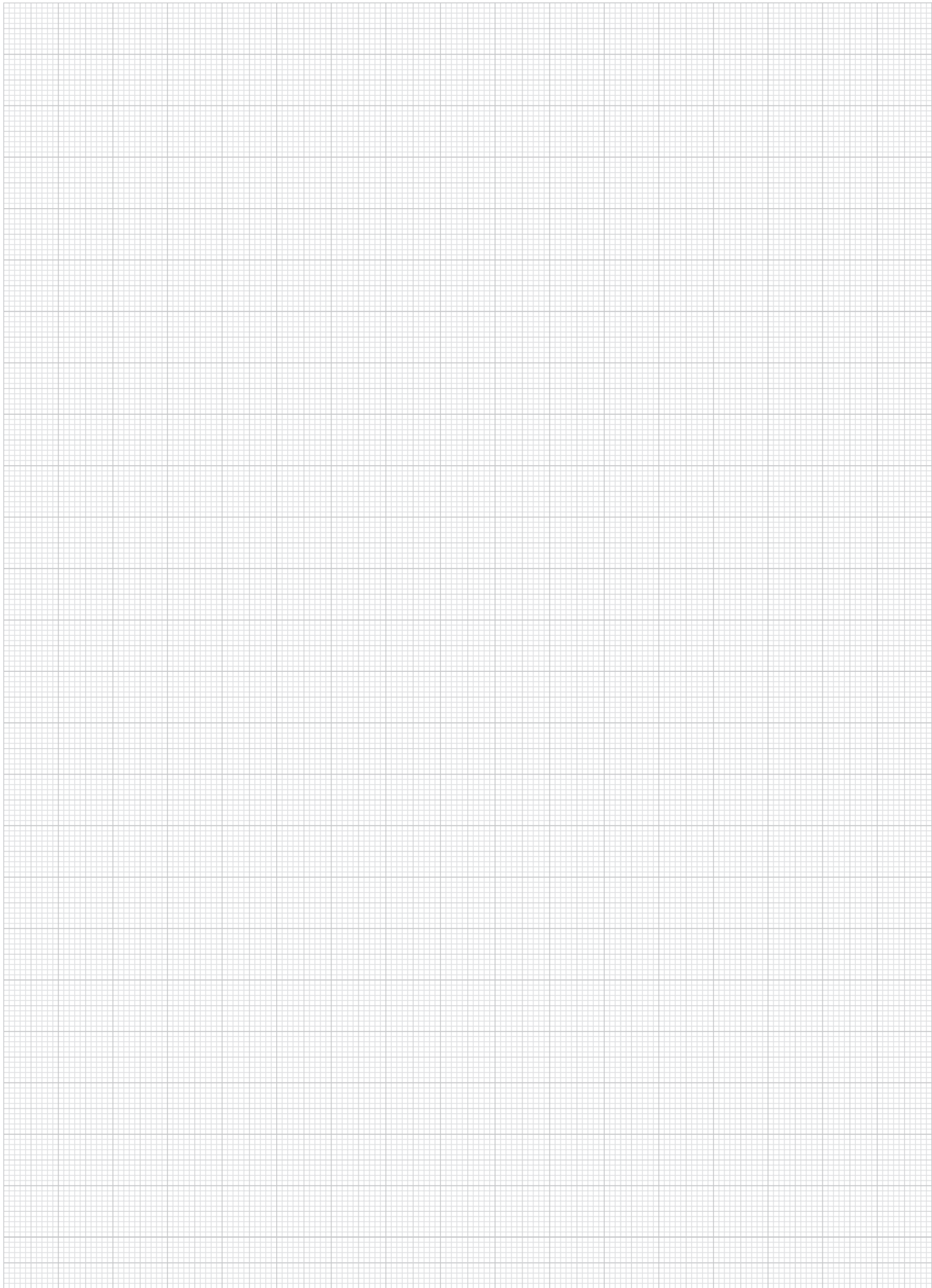
On request:

Sealed both sides with NBR contact lip seals. Other dimensions and versions.



Order No.	Abbreviation	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	10	30	9	0,6	0,3	40°	13	5300	2600	32000
23805-001203210	7201-B-TVP	12	32	10	0,6	0,3	40°	14	7400	3550	28000
23805-001503511	7202-B-TVP	15	35	11	0,6	0,3	40°	16	8400	4450	24000
23805-001704012	7203-B-TVP	17	40	12	0,6	0,3	40°	18	10500	5700	20000
23805-002004714	7204-B-TVP	20	47	14	1	0,6	40°	21	14400	7800	18000
23805-002505215	7205-B-TVP	25	52	15	1	0,6	40°	24	15300	9000	16000
23805-003006216	7206-B-TVP	30	62	16	1	0,6	40°	27	21700	14100	13000
23805-003507217	7207-B-TVP	35	72	17	1,1	0,6	40°	31	28000	19000	11000
23805-004008018	7208-B-TVP	40	80	18	1,1	0,6	40°	34	34000	23500	9500
23805-004508519	7209-B-TVP	45	85	19	1,1	0,6	40°	37	37500	27000	8500
23805-005009020	7210-B-TVP	50	90	20	1,1	0,6	40°	39	39000	28500	8000

Notes



2000
2100
2200
23000
2400
26000
27000
28000
29000
31000
32000
33000

Axial angular contact ball bearing, steel

double-row



Material:

Steel housing.
Nitrile rubber seal.

Version:

Ground edges.

Sample order:

nln 23806-101003420

Note:

Preloaded high-accuracy bearings with a 60° thrust angle. The bearings accept both radial and axial forces from both directions. Due to their preload, the angular contact ball bearings provide a high level of stiffness, excellent concentricity, precise tool positioning and repeatability.

The integrated low-friction seal effectively keeps dirt away from the bearing, thereby ensuring excellent operating safety and a long service life.

The bearing friction coefficient M_{rl} is a reference value.

The moment of inertia corresponds to that of the rotating inner ring.

The limiting speeds are applicable after grease is applied.

Application:

For thread drive bearing.

Temperature range:

-30 °C to +120 °C.

Assembly:

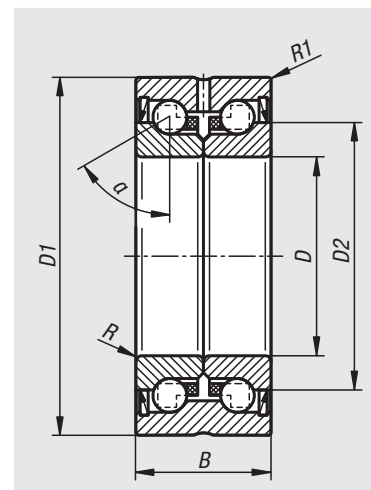
Precision slotted nuts must be used for mounting the threaded spindles.

To compensate for any material settling during assembly, tighten the slotted nuts using 2x tightening torque, loosen slightly and then tighten using the prescribed tightening torque.

Technical data:

All bearings are supplied ready for mounting with lubricating grease type KE2P-35 acc. to DIN 51825.

Housing and shaft tolerances correspond to roundness tolerance class IT2 and perpendicularity tolerance class IT4.



Axial angular contact ball bearing, steel

double-row



Order No.	Abbreviation	Version 1	B	D	D1	D2	R min.	R1 min.	α	Tightening torque, precision locknut Nm
23806-101003420	1034-2RS	Double-row	20 -0,25	10-0,008	34-0,011	21	0,3	0,6	60°	6
23806-101204225	1242-2RS	Double-row	25 -0,25	12-0,005	42-0,010	25	0,3	0,6	60°	8
23806-101504525	1545-2RS	Double-row	25 -0,25	15-0,005	45-0,01	27,5	0,3	0,6	60°	10
23806-101704725	1747-2RS	Double-row	25 -0,25	17-0,005	47-0,01	29,5	0,3	0,6	60°	15
23806-102005228	2052-2RS	Double-row	28 -0,25	25-0,005	52-0,01	35	0,3	0,6	60°	18
23806-102505728	2557-2RS	Double-row	28 -0,25	25-0,005	57-0,01	40	0,3	0,6	60°	25
23806-103006228	3062-2RS	Double-row	28 -0,25	30-0,005	62-0,01	45	0,3	0,6	60°	32
23806-104007534	4075-2RS	Double-row	34 -0,25	40-0,005	75-0,01	57	0,3	0,6	60°	55

Order No.	Abbreviation	Speed limit rpm	Static load rating N	Dynamic load rating N	Axial rigidity N/ μ m	Tilt rigidity Nm/mrad	Bearing friction torque Nm
23806-101003420	1034-2RS	4600	18800	13400	325	25	0,12
23806-101204225	1242-2RS	3800	24700	16900	375	50	0,16
23806-101504525	1545-2RS	3500	28000	17900	400	65	0,20
23806-101704725	1747-2RS	3300	31000	18800	450	80	0,24
23806-102005228	2052-2RS	3000	47000	26000	650	140	0,30
23806-102505728	2557-2RS	2600	55000	27500	750	200	0,40
23806-103006228	3062-2RS	2200	64000	29000	850	300	0,50
23806-104007534	4075-2RS	1800	101000	43000	1000	550	0,70

Order No.	Abbreviation	Moment of inertia kg.cm ²	Circular runout μ m	Radial bearing clearance	Hole tolerance μ m	OD tolerance μ m	Width tolerance μ m
23806-101003420	1034-2RS	0,029	2,0	Preloaded	0-5	0-10	0-250
23806-101204225	1242-2RS	0,068	2,0	Preloaded	0-5	0-10	0-250
23806-101504525	1545-2RS	0,102	2,0	Preloaded	0-5	0-10	0-250
23806-101704725	1747-2RS	0,132	2,0	Preloaded	0-5	0-10	0-250
23806-102005228	2052-2RS	0,273	2,0	Preloaded	0-5	0-10	0-250
23806-102505728	2557-2RS	0,486	2,0	Preloaded	0-5	0-10	0-250
23806-103006228	3062-2RS	0,730	2,5	Preloaded	0-5	0-10	0-250
23806-104007534	4075-2RS	2,260	2,5	Preloaded	0-5	0-10	0-250

Axial angular contact ball bearing, steel

double-row, with flange



Material:

Steel housing.
Nitrile rubber seal.

Version:

Ground edges.

Sample order:

n1m 23806-01-101205525

Note:

Preloaded high-accuracy bearings with a 60° thrust angle. The bearings accept both radial and axial forces from both directions. Due to their preload, the angular contact ball bearings provide a high level of stiffness, excellent concentricity, precise tool positioning and repeatability.

The integrated low-friction seal effectively keeps dirt away from the bearing, thereby ensuring excellent operating safety and a long service life.

The bearing friction coefficient M_{rl} is a reference value.

The moment of inertia corresponds to that of the rotating inner ring.

The limiting speeds are applicable after grease is applied.

Application:

For thread drive bearing.

Temperature range:

-30 °C to +120 °C.

Assembly:

Precision slotted nuts must be used for mounting the threaded spindles.

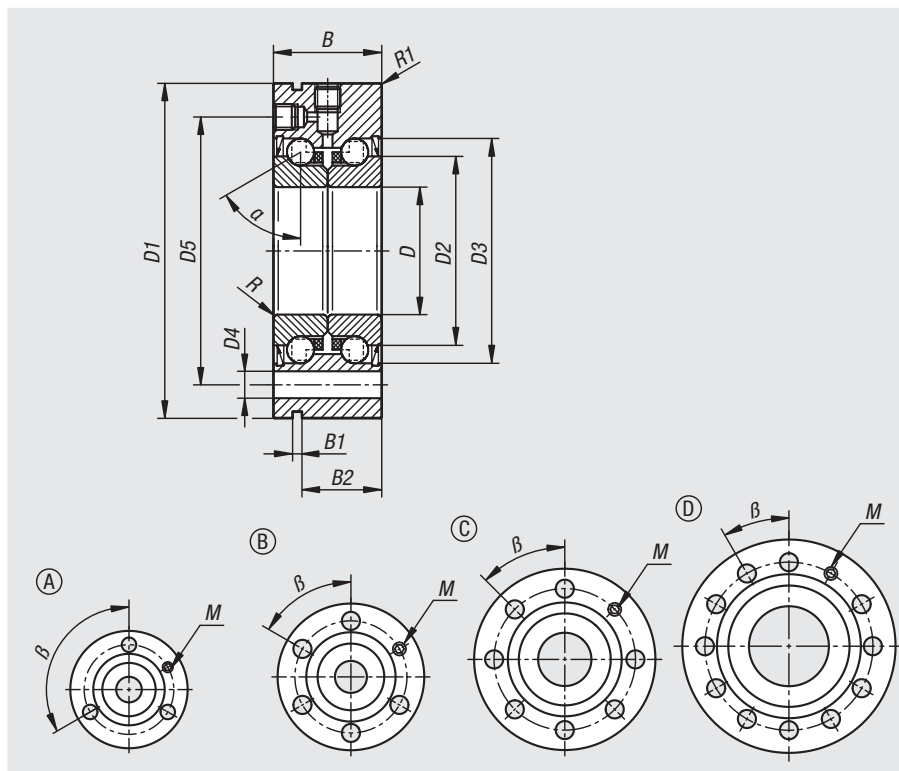
To compensate for any material settling during assembly, tighten the slotted nuts using 2x tightening torque, loosen slightly and then tighten using the prescribed tightening torque.

Tighten fastening screws crosswise up to max. 70% of the yield point.

Technical data:

All bearings are supplied ready for mounting with lubricating grease type KE2P-35 acc. to DIN 51825.

Housing and shaft tolerances correspond to roundness tolerance class IT2 and perpendicularity tolerance class IT4.



Axial angular contact ball bearing, steel

double-row, with flange



Order No.	Abbreviation	Version 1	Form	B	B1	B2	D	D1	D2	D3	D4	D5	R	R1	α	β	M
23806-01-101205525	1255-2RS	double-row	A	25 -0,25	3	17	12-0,005	55-0,01	25	-	6,6	42	0,3	0,6	60°	120°	M6
23806-01-101506025	1560-2RS	double-row	B	25 -0,25	3	17	15-0,005	60-0,01	28	36	6,6	46	0,3	0,6	60°	60°	M6
23806-01-101706225	1762-2RS	double-row	B	25 -0,25	3	17	17-0,005	62-0,01	30	38	6,6	48	0,3	0,6	60°	60°	M6
23806-01-102006828	2068-2RS	double-row	C	28 -0,25	3	19	20-0,005	68-0,01	34,5	44	6,6	53	0,3	0,6	60°	45°	M6
23806-01-102507528	2575-2RS	double-row	C	28 -0,25	3	19	25-0,005	75-0,01	40,5	49	6,6	58	0,3	0,6	60°	45°	M6
23806-01-103008028	3080-2RS	double-row	D	28 -0,25	3	19	30-0,005	80-0,01	45,5	54	6,6	63	0,3	0,6	60°	30°	M6
23806-01-104010034	40100-2RS	double-row	C	34 -0,25	3	25	40-0,005	100-0,01	58	68	8,8	80	0,3	0,6	60°	45°	M6

Order No.	Abbreviation	Tightening torque, precision locknut Nm	Speed limit rpm	Static load rating N	Dynamic load rating N	Axial rigidity N/ μ m	Tilt rigidity Nm/mrad
23806-01-101205525	1255-2RS	8	3800	24700	16900	375	50
23806-01-101506025	1560-2RS	10	3500	28000	17900	400	65
23806-01-101706225	1762-2RS	15	3300	31000	18800	450	80
23806-01-102006828	2068-2RS	18	3000	47000	26000	650	140
23806-01-102507528	2575-2RS	25	2600	55000	27500	750	200
23806-01-103008028	3080-2RS	32	2200	64000	29000	850	300
23806-01-104010034	40100-2RS	55	1800	101000	43000	1000	550

Order No.	Abbreviation	Bearing friction torque Nm	Moment of inertia kg.cm ²	Circular runout μ m	Radial bearing clearance	Hole tolerance μ m	OD tolerance μ m	Width tolerance μ m
23806-01-101205525	1255-2RS	0,16	0,068	2,0	pre-tensioned	0-5	0-10	0-250
23806-01-101506025	1560-2RS	0,20	0,102	2,0	pre-tensioned	0-5	0-10	0-250
23806-01-101706225	1762-2RS	0,24	0,132	2,0	pre-tensioned	0-5	0-10	0-250
23806-01-102006828	2068-2RS	0,30	0,273	2,0	pre-tensioned	0-5	0-10	0-250
23806-01-102507528	2575-2RS	0,40	0,486	2,0	pre-tensioned	0-5	0-10	0-250
23806-01-103008028	3080-2RS	0,50	0,730	2,5	pre-tensioned	0-5	0-10	0-250
23806-01-104010034	40100-2RS	0,70	2,260	2,5	pre-tensioned	0-5	0-10	0-250

Spherical roller bearing FAG

cylindrical bore


Material:

Inner ring, outer ring and rolling elements, bearing steel.
Cage, steel.

Version:

open.

Sample order:

nIm 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.

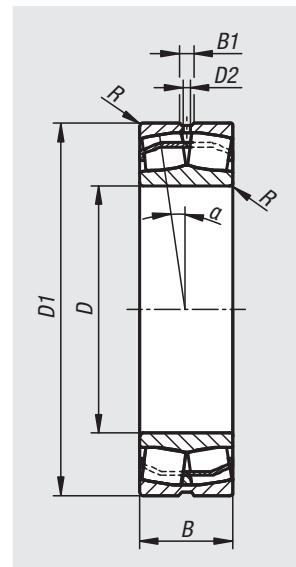
The main dimensions of the spherical roller bearing conform to DIN 625-2. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. The radial internal clearance corresponds to the clearance CN acc. to DIN 620-4. These tolerance classes are standard and well suited for most applications.

Temperature range:

-30 °C to +200 °C.

On request:

Other dimensions and versions.



Order No.	Abbreviation	D	D1	D2	B	B1	R min.	α	Dynamic load rating N	Static load rating N	Speed limit rpm
23815-002505218	22205-E1	25	52	3,2	18	4,8	1	1,5°	48000	42500	17000
23815-003006220	22206-E1	30	62	3,2	20	4,8	1	1,5°	64000	57000	13000
23815-003507223	22207-E1	35	72	3,2	23	4,8	1,1	1,5°	88000	81500	11000
23815-004008023	22208-E1	40	80	3,2	23	4,8	1,1	1,5°	101000	91000	10000
23815-004508523	22209-E1	45	85	3,2	23	4,8	1,1	1,5°	104000	99000	10000
23815-005009023	22210-E1	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.

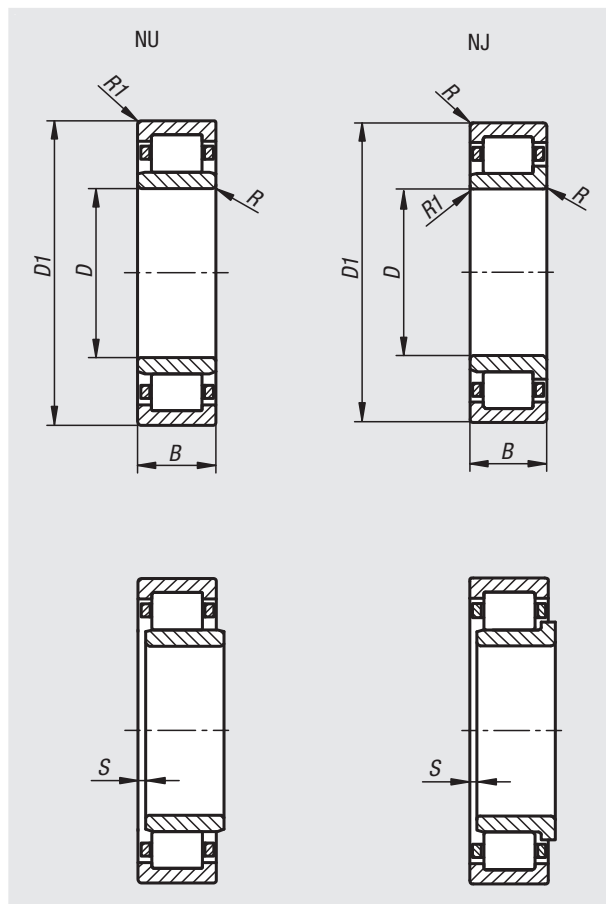
Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. This radial clearance corresponds to the clearance CN acc. to DIN 620-4. These tolerance classes are standard and are well suited for most applications.

Temperature range:

-30 °C to +120 °C.

On request:

Other dimensions and versions.



Order No.	Abbreviation	Form-Type	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	floating bearing	15	35	11	0,6	0,3	1,6	15100	10400	22000
23820-101503511	NJ-202-E-TVP2	-	15	35	11	0,6	0,3	1,6	15100	10400	22000
23820-001704012	NU-203-E-TVP2	floating bearing	17	40	12	0,6	0,3	1,2	20800	14600	18000
23820-101704012	NJ-203-E-TVP2	-	17	40	12	0,6	0,3	1,2	20800	14600	18000
23820-002004714	NU-204-E-TVP2	floating bearing	20	47	14	1	0,6	0,8	32500	24700	16000
23820-102004714	NJ-204-E-TVP2	-	20	47	14	1	0,6	1	32500	24700	16000
23820-002505215	NU-205-E-TVP2	floating bearing	25	52	15	1	0,6	1,3	34500	27500	15000
23820-102505215	NJ-205-E-TVP2	-	25	52	15	1	0,6	1,2	34500	27500	15000
23820-003006216	NU-206-E-TVP2	floating bearing	30	62	16	1	0,6	1,5	45000	36000	12000
23820-103006216	NJ-206-E-TVP2	-	30	62	16	1	0,6	1,5	45000	36000	12000
23820-003507217	NU-207-E-TVP2	floating bearing	35	72	17	1,1	0,6	0,7	58000	48500	10000
23820-103507217	NJ-207-E-TVP2	-	35	72	17	1,1	0,6	0,7	58000	48500	10000
23820-004008018	NU-208-E-TVP2	floating bearing	40	80	18	1,1	1,1	1	63000	53000	9000
23820-104008018	NJ-208-E-TVP2	-	40	80	18	1,1	1,1	1	63000	53000	9000
23820-004508519	NU-209-E-TVP2	floating bearing	45	85	19	1,1	1,1	1	72000	63000	8500
23820-104508519	NJ-209-E-TVP2	-	45	85	19	1,1	1,1	1,9	72000	63000	8500
23820-005009020	NU-210-E-TVP2	floating bearing	50	90	20	1,1	1,1	1,3	75000	69000	8000
23820-105009020	NJ-210-E-TVP2	-	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:

nln 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.

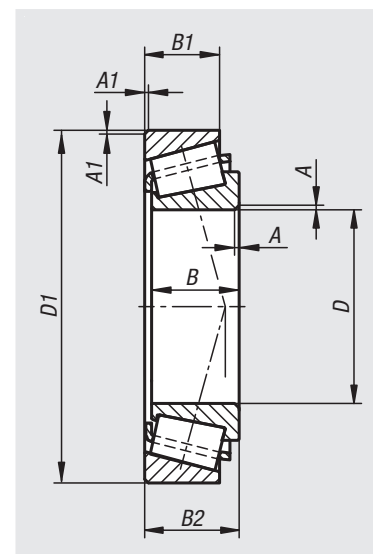
The main dimensions of the tapered roller bearings conform to DIN ISO 355 and DIN 720. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

Temperature range:

-30 °C to +120 °C.

On request:

Other dimensions and versions.



Order No.	Abbreviation	Form-Type	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.

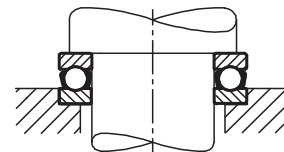
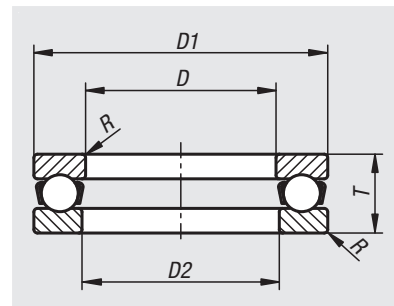
The main dimensions of the axial ball bearing conform to ISO 104 and DIN 711. Dimensional and running tolerances correspond to tolerance class PN acc. to DIN 620. These tolerance classes are standard and are well suited for most applications.

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:

nln 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%

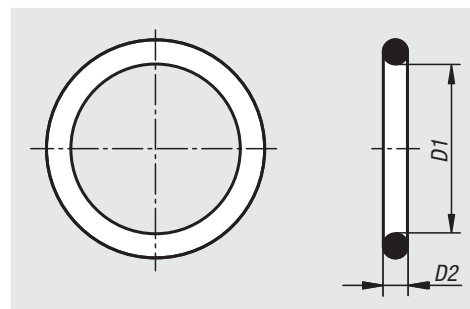
The material NBR has a high wear resistance and is resistant to mineral oil based lubricating oils and grease, hydraulic oils (H, H-L, H-LP), high-flashpoint pressure fluids (HFA, HFB, HFC), aliphatic hydrocarbons, silicon oil and grease, water up to ca. 80° C

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

Order No.	D1	D2
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

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): $\leq 0.05/0.5$ (rotary shaft lip seals are generally meant for unpressurised operation).
Temperature range:

-40 °C to +100 °C.

Tolerances:
Housing:

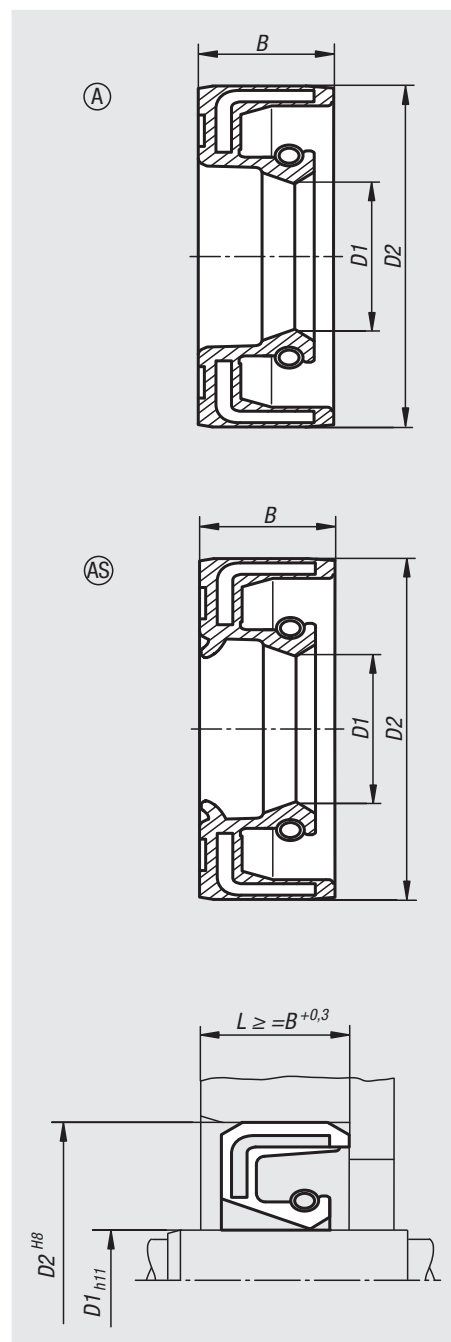
Tolerance H8 is recommended.

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

A large grid of graph paper, consisting of many small squares, intended for taking notes or drawing.