

Линейные подшипники

Технические характеристики

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General Information

LINEAR

INTRODUCTION

Many years of field experience have contributed to the optimization of INA products and systems for linear movement to meet the high demands of modern machine design; they have the following advantages:

- Very low and uniform resistance to displacement, giving improved positioning and running accuracy;
- The negative influences due to shock loading which occur in conventional rolling element guidance systems as the elements enter the load zone are reduced in INA guidance systems by means of special design features.

INA linear guidance systems have extremely high precision and operate virtually wear-free due to their rolling motion so that their high accuracy is maintained throughout the operating life.

A wide range of linear guidance systems are available, each designed for maximum rigidity. By selecting the optimum type of guidance and preloading of linear bearings, virtually any rigidity requirement can be fulfilled.

INA linear products have an extremely high load carrying capacity due to their optimum use of available space and manufacturing quality. Guidance systems for almost all load carrying requirements can be produced from the comprehensive product range.

INA Linear Roller Bearing And Guideway Assemblies Series RUE

INA linear recirculating roller bearing and guideway assemblies of series RUE are high accuracy, ready-to-assemble linear guidance units which can take high loads. They have a full complement rolling element system which is preloaded as standard and allows high running and positioning accuracy.

The basic static and dynamic load ratings of RUE assemblies are nearly twice that of comparable ball and guideway assemblies.

The rigidity of recirculating roller bearing and guideway assemblies is considerably higher than that of ball bearing and guideway assemblies. While some competitors argue that the rigidity can be improved by means of high preloads on the recirculating ball system, this is entirely at the expense of the life.

The linear recirculating roller bearing and guideway assembly also has a high crash safety.

The carriage is sealed on all sides. As opposed to the competition, the whole body of the guideways is ground which provides optimum sealing.

When these assemblies are used in machine tools, brass closing plugs are particularly advantageous.

The RUE unit is interchangeable with the ball bearing and guideway assemblies of the same section height produced by our competitors but they have considerably higher load ratings and rigidity. Due to the technical advantages of the roller system, the next smallest RUE unit can often be used compared to ball bearing and guideway assemblies.

The carriage can be fixed from above or below with 6 screws. The guideway has twice as many screws as the guideways produced by the competitors. Recirculating roller bearing and guideway assemblies may be combined with the damping carriage RUDS to counteract vibration, giving the benefits of both a sliding and a rolling guidance system. Plastic deformation of the rolling elements no longer occurs as the smaller damping gap and the increased surface area of the damping carriage reduce the specific contact load considerably.

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Linear Recirculating Ball Bearing And Guideway Assemblies Series KUSE

Six-track linear recirculating ball bearing and guideway assemblies of series KUSE have the highest load rating of any recirculating ball bearing guidance system with the same envelope dimensions, and allow very high accelerations and velocities. Linear ball bearing and guideway assemblies of series KUSE should be classified between the traditional linear ball bearing and linear roller bearing guideway assemblies.

Linear ball bearing and guideway assemblies of series KUSE derive their high load carrying capacity from the six tracks of preloaded balls. They can take loads from all directions and moments about all axes. The low friction characteristics of this new linear recirculating ball system allows very high accelerations and velocities.

Linear Ball Bearing And Guideway Assemblies Series KUVS

INA linear guidance systems with recirculating ball bearing units, series KUVS, are four row linear guidance systems. Two of the main features of these assemblies are wide support distances and adjustable bearing clearance.

Linear recirculating ball bearing units of series KUVS have a high load carrying capacity in spite of their small boundary dimensions. They run on guideways of series TKVD with raceways on one or both sides. These units can be screwed into a carriage KWVK..AL which can form a four row linear ball bearing and guideway assembly when combined with the TKVD guideways.

INA Linear Ball Bearing And Guideway Assemblies Series KUE

INA linear ball bearing and guideway assemblies are ready-to-assemble linear guidance systems. They consist of one or more carriages on a guideway TKD. Linear ball bearing and guideway assemblies of series KUE have a four point contact recirculating ball system.

Due to their special features, INA linear recirculating ball bearing and guideway assemblies can meet the demands of modern guidance designs:

- **Accuracy**
INA linear ball bearing and guideway assemblies are extremely accurate rolling bearings. They are clearance-free and operate with extremely low friction and completely free from stick-slip.
- **High load carrying capacity and rigidity**
INA linear ball bearing and guideway assemblies have an extremely high load carrying capacity and rigidity for their dimensions.
- **Load directions**
INA recirculating linear ball bearings can take loads in all perpendicular directions and moments about all axes. They need only one guideway for fixing: counterstay designs are therefore superfluous.
- **Low section height**
INA linear ball bearing and guideway assemblies have an extremely low section height. This allows a very compact design of guidance system.

In addition, KUE assemblies have the following important features:

- **High running and positioning accuracy**
(clearance-free)
- **High reliability**
- **Easy mounting**
INA linear ball bearing and guideway assemblies are supplied ready for assembly. This allows economical designs of guidance systems.
- **Interchangeability**
The components of a linear ball bearing and guideway assembly can be interchanged within the same preload and accuracy class.

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INA Track Roller Linear Guidance System Series LF

Due to its modern and innovative design, the INA track roller linear guidance system offers the following advantages:

- **Straightforward modular design**
The modular construction of the INA track roller linear guidance system allows individual guidance elements to be combined as required. Depending on the requirements, complete units may be used or variants may be produced with single guideways on the inside or outside combined with different rollers.
- **Robust, wear-resistant, reliable system**
Vertical and horizontal motion can be achieved even in contaminated environments. Reliable operation and a long operating life are ensured, together with low maintenance requirements.
- **High load carrying capacity**
Loads can be taken from all directions and moments about all axes. Depending on the load case, different guidance elements with differing high load carrying capacities are available to the user.
- **High accuracy**
Due to the production process, the guideways have a high accuracy, providing clearance-free and low-friction operation. LF systems can be used in any mounting position.
- **Unlimited stroke at high traverse speeds**
The INA track roller linear guidance system allows linear motion of any length and speeds up to 10 m/s.
- **Straightforward assembly**
INA track roller linear guidance systems are supplied ready for mounting. The user has the option, depending on the guideway type, of fixing from above or below. The premounted carriage can be set clearance-free. The system can be matched to the customer's specific requirements.
- **High wear resistance due to the optimized profile of the track rollers and the rolled precision steel shafts hardened to HRC 60**
- **Long life**
- **The load carrying capacity can be considerably increased if required by adding more track rollers**
- **Relubrication facility**
- **The individual components are easily interchangeable**
- **Systems have low mass due to the use of anodized aluminium components**
- **Systems are also available in corrosion resistant and black anodized versions**
- **There are many potential applications in almost all areas**
- **The standard version is readily available from stock**
- **The track rollers are lubricated for life**
- **Various sealing options and accessories are available**

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INA Linear Ball Bearings Series KH

INA linear ball bearings of series KH are linear recirculating ball bearing units of very small radial section height. They consist of a drawn and hardened outer cup and a plastic cage. The outer cup, cage and balls form a closed linear bearing which is ready to assemble. These units are suitable for applications where long travel distances, low space requirements and predominantly maintenance-free operation are required.

Linear ball bearings of series KH have the following advantages:

- Optimum price/performance ratio
- Very small radial section height
- Axial location is not required
- Double lip contact sealing rings on KH...P and KH...PP
- Optimum sealing
- Lubricant is retained in the bearing
- Relubrication via slots in the ball recirculation channel
- Long operating life
- Operating temperature up to 120°C
Cage: polyamide 66-GK
Sealing rings: polyester elastomer

INA ball bearings are superior bearings not only in terms of their resistance to temperature but also in their other features such as:

- Smooth running
- Load carrying capacity
- Rigidity

Good rigidity is achieved in all directions due to the uniform spacing of the rows.

INA Linear Ball Bearings Series KN/KS MAX³

INA linear ball bearings of series KN, KNO, KS and KSO are linear recirculating ball bearing units which can compensate for misalignments due to their special design.

Linear ball bearings of this series consist of a cage and several load plates. The high-strength plastic cage guides the balls. The hardened load plates have a ground profile on the raceway side.

The KN/KS series offer:

- Ground races for smoothest operation
- Self aligning in any housing
- Completely interchangeable with other standard makes
- Lower noise level
- Lighter weight
- Wiper seals float with the bearing
- Linear ball bearings KNO..PP with all-around sealing have additional reinforced longitudinal seals
- Cost effective bearings for round shaft rails

In addition, the KS offers:

- Larger load capability due to increased number of ball rows
- Greater misalignment capability
- Longer bearing life due to the internal lubrication reservoirs

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INA Linear Ball Bearings Series KB

INA linear ball bearings of series KB consist of a hardened and ground outer ring and a cage in which the balls are guided. The balls in the return zones are held in place by spring elements. This ensures that even heavily loaded or preloaded bearings have a uniform, low resistance to displacement.

INA linear ball bearings of closed (KB), adjustable (KBS) and open version (KBO) have 4 to 6 rows of balls to support the load and are used where high precision and load carrying capacity are required.

Linear ball bearings of series KBS have a split outer ring which allows the operating clearance to be adjusted.

Linear ball bearings of series KBO have a segment cut out of the outer ring:
they are suitable for applications with shafts with continuous support.

Linear ball bearings of series KB, KBS and KBO can be relubricated.

The ground outside diameter on the linear ball bearings series KB are suitable as raceways for rolling bearings so that bearing units for linear and rotary motion can be created.

The special recirculation design provides a uniform, low resistance to displacement with extremely smooth running even in highly loaded and preloaded linear ball bearings.

Bearings of series KB are completely interchangeable with the bearings of our competitors.

INA Shafts Series W, WH, WZ

INA shafts of series W, WH and WZ are suitable for guidance systems with closed, protected linear bearing units and are used in a wide range of applications in the construction of equipment and automatic machinery.

- INA shafts are surface hardened, precision ground and made from high grade steels.
- High material quality
- High surface hardness and surface quality
- High dimensional and geometrical accuracy ensure excellent running characteristics.
- Steel shafts are available in standard lengths ex stock and can be cut to the customer's requirements. They can be produced with various end configurations and other machined features.
- Special versions are available in other materials, e.g. corrosion-resistant steel.
- Shafts of 5 mm diameter are available in lengths up to about 3700 mm and shafts of 6 mm diameter and above in lengths up to about 4000 mm.
- INA can supply composite shafts where the length required exceeds the maximum single piece length.
- Special versions are available on request with other tolerances and special surface coatings and as unhardened shafts.

Shafts and support rails of series TSCW, TSNW, TSSW, TSUW, TSWW and TSWWA complete the INA linear range and remove the need for expensive, time consuming customer designs.

Support rails have the following advantages:

- They prevent flexing of the shaft
- They ensure correct functioning of the linear guidance system
- Low section height
- High rigidity

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INA Linear Ball Bearings Series KBZ

Linear ball bearings of series KBZ and KBZ..OP consist of a hardened and ground solid outer ring and a retainer. The outer ring is machined from high-carbon bearing steel. The retainer is manufactured from a high strength engineered resin. Series KBZ..OP have a segment removed from the outer ring for applications with supported shafts.

Series KNZ/KX MAX³

Linear ball bearings of series KNZ.. and KX.. consist of a precision molded retainer of a high strength engineered resin and hardened and ground bearing races. Series KNZ..OP.. and KXO.. bearings have a segment removed for applications requiring supported shafts.

The KNZ/KX series offer :

- Ground races for smoothest operation.
- Self Aligning in any housing.
- Completely interchangeable with other standard makes.
- Lower noise level.
- Lighter weight.
- Wiper seals float with the bearing.
- Cost effective bearings for round shaft rails.

In addition, the KX offers:

- Larger load capability due to increased number of ball rows
- Greater misalignment capability
- Longer bearing life due to the internal lubrication reservoirs

Linear Recirculating Ball Bearing And Guideway Assemblies Series KUVE

The four-row linear recirculating ball bearing and guideway assembly KUVE comprises a total of six carriage cross-sections. The four rows of balls are preloaded. The unit has a high load carrying capacity; it can take loads from all directions and moments about all axes.

The special design of the recirculating ball system ensures low resistance to displacement and allows high velocities and accelerations.

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Linear Modular Units Series MLF

The linear modular unit MLF allows small to medium loads to be moved with a high positional accuracy at speeds up to 7.5m/s^1) and with a maximum acceleration of 40m/s^2 ¹⁾. When combined with a suitable control drive, a high repeatability can be achieved, usually within $\pm 0.08\text{ mm}$.

The profiled support rails, which have high bending and torsional rigidity, allow the unit to operate without supports, even on longer modular units.

All the aluminium components are anodized.

A corrosion resistant execution is also available: suffix VA.

Design

- Profiled support rail LFS..M consisting of an anodized aluminium rail with hardened and ground steel rods inlaid on both sides. T-grooves provide various installation possibilities.
- Compact carriage in an enclosed design with integral toothed belt tensioner on both sides, lubrication and wiper unit. The carriage can be set clearance-free by means of two eccentric bolts.
- Return units with integral brush wipers and ball bearings which are lubricated for life.

Linear Modular Units Series MKUE

INA linear ball bearing and guideway assemblies are used in the linear modular units series MKUE. They are preloaded and operate virtually free from stick-slip.

The guidance accuracy of MKUE linear modular units is increased by machining the guideway seating surfaces on the support rail.

The INA linear modular unit with recirculating ball guidance system allows medium to high loads to be moved quickly and with a very high guidance accuracy.

The drive is via either a toothed belt or a ball screw.

Maximum traverse speeds are:

Toothed belt drive 3 m/s

Ball screw drive 1.73m/s

When the toothed belt drive is combined with a suitable control drive, a high repeatability can be achieved, usually within $\pm 0.08\text{ mm}$.

The profiled support rails, which have high bending and torsional rigidity, allow the unit to operate without supports, even on longer units.

All the aluminium components are anodized.

Design

- Profiled support rail made from anodized aluminium with integral ball bearing and guideway assembly KUE. T-grooves provide various installation possibilities.

Linear Modular Unit MKUE 25 ZR..N

- Carriage with two T-grooves (with threaded holes if required) and integral belt tensioners on both ends
- Return unit with ball bearing lubricated for life.

Linear Modular Unit MKUE 25 KGT

- Carriage with threaded holes
- Preloaded double nut for leads of 5 and 10 mm. Accuracy $50\text{ }\mu\text{m}/300\text{ mm}$
- INA axial angular contact ball bearings series ZKLF are used for the spindle bearing arrangements: the bearings are greased for life
- Bellows are used to protect the ball screw spindle and the KUE system.

¹⁾ These values are reduced when bellows are used.

General Information

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INA Linear Roller Bearings Series RUS

INA linear roller bearings are manufactured in several basic types and meet the highest technical demands. Linear recirculating roller bearing systems are suitable for linear guidance systems in machine tools where high guidance and positioning accuracy with long strokes are required.

Linear roller bearings have the following advantages:

- Very high accuracy
- Increased compressive rigidity
- High load carrying capacity
- High functional reliability
- Very low frictional values compared to other linear guidance systems
- Very smooth running due to the special design of the supporting elements with compensation for bounce

Due to their robustness, linear roller bearings of series PR are also suitable for use at high temperatures as well as for extremely high velocities and accelerations.

With INA linear roller bearings of series RUSV..KS, there is no need for a separate adjusting gib. This gives advantages including:

- Fewer components
- Low section height
- Quicker, simpler mounting

INA also supplies a setting device for exact, repeatable, quick and straightforward adjustment of preload in linear roller bearings.

INA Adjusting Gibs Series VUS and VUSZ

INA Adjusting Gibs of series VUS and VUSZ are used for height adjustment or preloading of linear roller bearings. They consist of two ground wedges which are guided together by a central key. A plate fixed on one end face supports the adjusting screw and the locking screw. Lubrication ducts in the adjusting gibs allow for the lubrication of the linear bearings through the rolling element return zone in their supporting face.

General Information

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INA Planetary Roller Screws Series RGT

The most significant advantage of these units over ball screws is the increased number of contact points per unit volume which provides a high load carrying capacity. The specific contact load of a roller screw drive is lower and the life longer compared to ball screw drives with the same dimensions.

Compared to the more widespread ball screw drives, planetary roller screws have greater rigidity, lower axial clearance and higher limiting speeds which are about three times those of ball screw drives. RGT units are very compact and robust, require only a small amount of space, and large ball screw drives can be replaced by small RGT units. Straightforward mounting and dismantling allow the nut to be mounted where access is difficult.

- Low sensitivity to shock loading
- High functional reliability under extreme conditions
- Extremely high displacement speeds
- Low internal friction — no stick-slip, high efficiency (up to 93%).

Excellent positioning and repeat accuracy throughout the operating life. Extremely accurate positioning is possible (2 µm) due to the small lead (1 mm) with very small advance movement. At high displacement speeds, a high positioning accuracy can be achieved with a large lead.

Special machining operations (e.g. shortening a spindle) can be quickly carried out.

The optimum solution for a particular application can be achieved with special setting of the nut e.g. reduction of the frictional moment.

INA planetary roller screws, Series RGT, basically consist of a screw (shaft) and a roller nut. Several planetary rollers are arranged parallel to the axis between the screw and the roller nut.

Roller Nut

The roller nut can be supplied split or as one piece. The two halves of the split roller nut (9), see next page, are held together by the key (7). During installation of the planetary roller screw the roller nut is preloaded. A shim (8) is used to control the preload. The one-piece roller nut cannot be preloaded.

Internally geared rings (4) are situated in the ends of the roller nut engaging with the external gearing provided at each end of the planetary rollers (5). The spacing of the planetary rollers, is provided by the carrier plates (3) which also function as labyrinth seal. The plates are retained by the snap rings (2).

Planetary Rollers

The planetary rollers (5) have a journal at each end which are guided by the holes of the carrier plates. The geared ends of the planetary rollers mesh with the internally geared rings in the nut. The planetary rollers have a single-start thread with a crowned flank. This allows the stresses created by the thread meshing to be distributed on larger ellipses which also reduce the harmful edge stresses. The planetary rollers rotate slip-free in the roller nut. They have no axial movement relative to the roller nut as the axial travel increments at the points of contact between both elements are equal.

Screw Shaft

Screws are manufactured from surface hardened, case hardening steel. The thread angle is 90 degrees. Screws in standard design are available with a nominal diameter d_0 from 5 mm to 20 mm. The standard ends configuration prescribes a straight journal on the floating side and provision for lock nut and driving system on the locating side. The screws are available in different lengths. Strokes from 25 mm to 1200 mm are possible, depending on the nominal diameter.

Screws with a nominal diameter d_0 between 24 and 63 mm are special designs. Their dimensions are pre-determined by the following dimension tables. The largest possible screw diameter d_0 is 250 mm.

All screws are available with custom tailored ends configuration.

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Special Request Variations

INA planetary roller screws are available upon request in the following special designs:

- One-piece roller nut (not preloaded, higher load ratings, small axial clearance)
- Roller nut with flanges, middle or side flange

INA Planetary roller screws are also available upon request with:

- Left hand thread
- Inch pitch thread
- Hollow shaft

If aggressive media is acting on the planetary roller screw, corrosion resistant material should be chosen. Contact INA for details.

Wipers

If planetary roller screws are subject to heavy contamination, the roller nut can be equipped with wiper seals upon request.

DESIGN OF THE INA PLANETARY ROLLER SCREW WITH SPLIT ROLLER NUT

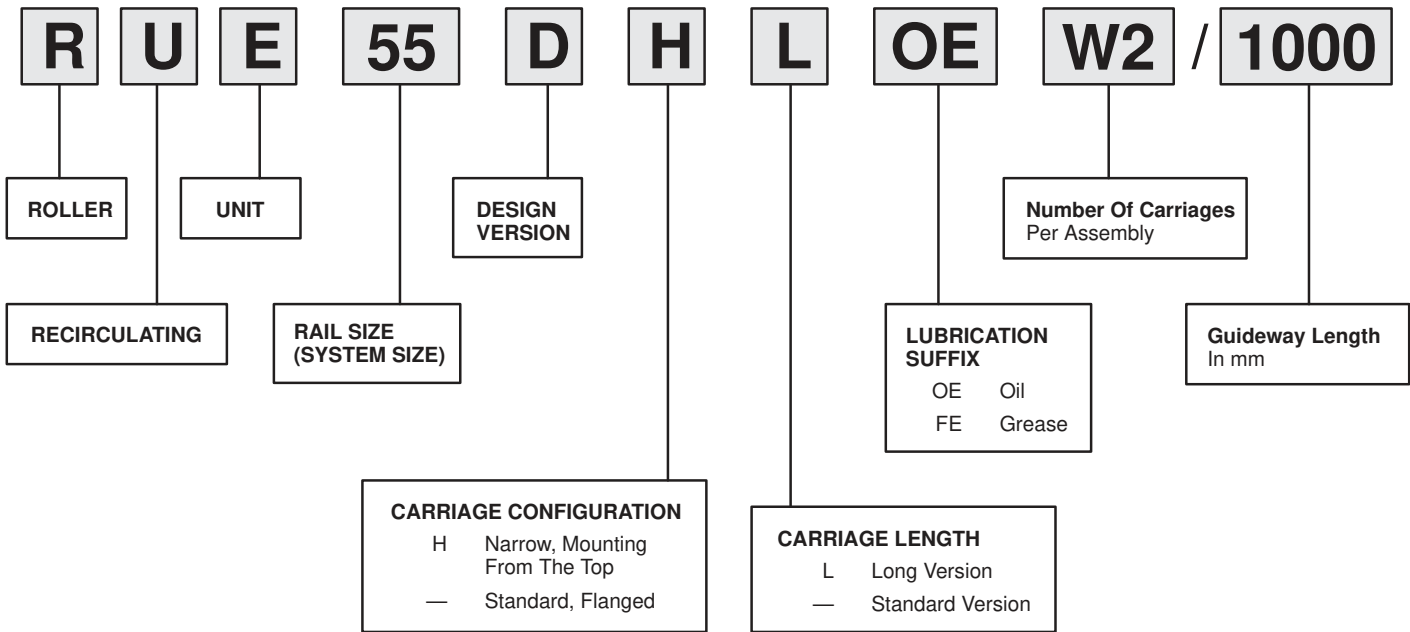
- | | |
|---|------------------------|
| 1 | SCREW (SHAFT) |
| 2 | SNAP RING |
| 3 | CARRIER PLATE |
| 4 | INTERNALLY GEARED RING |
| 5 | PLANETARY ROLLER |
| 6 | LOCATING PIN |
| 7 | KEY |
| 8 | SHIM |
| 9 | ROLLER NUT |



Part Number Identification

LINEAR

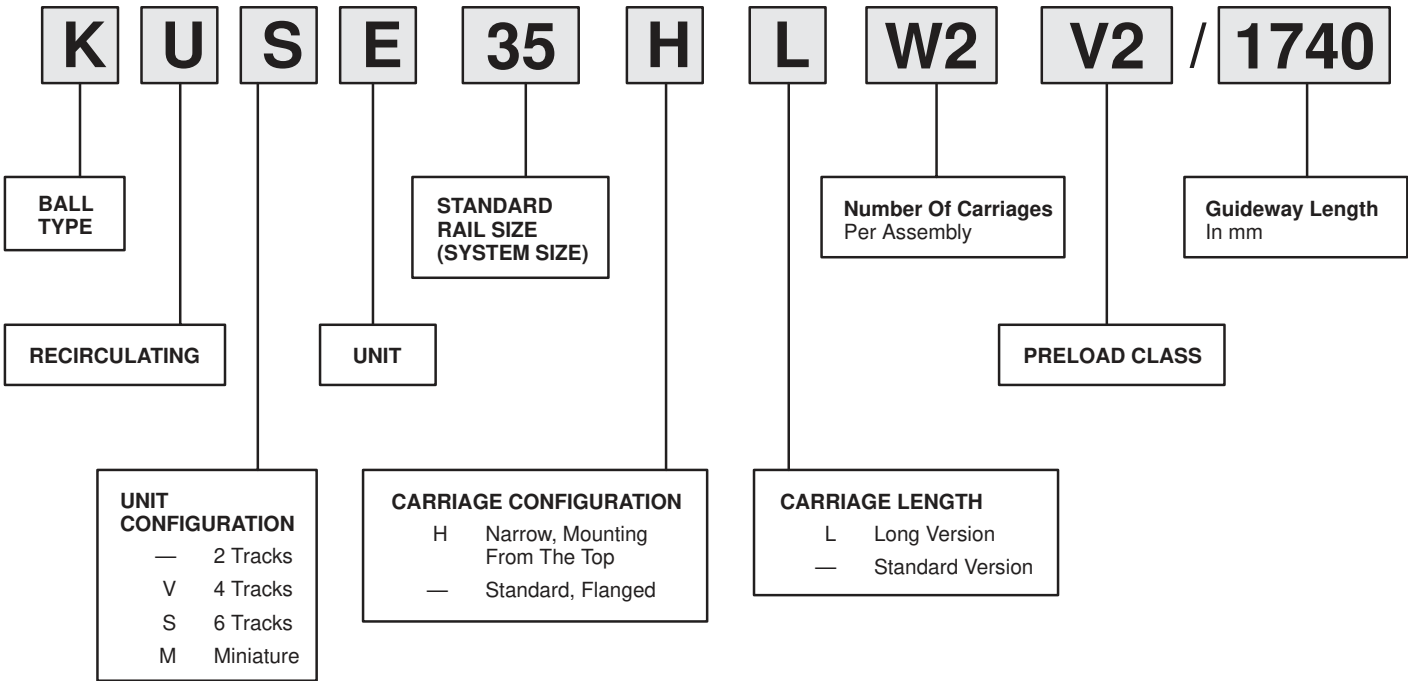
LINEAR RECIRCULATING ROLLER BEARING & GUIDEWAY ASSEMBLY



Part Number Identification

LINEAR

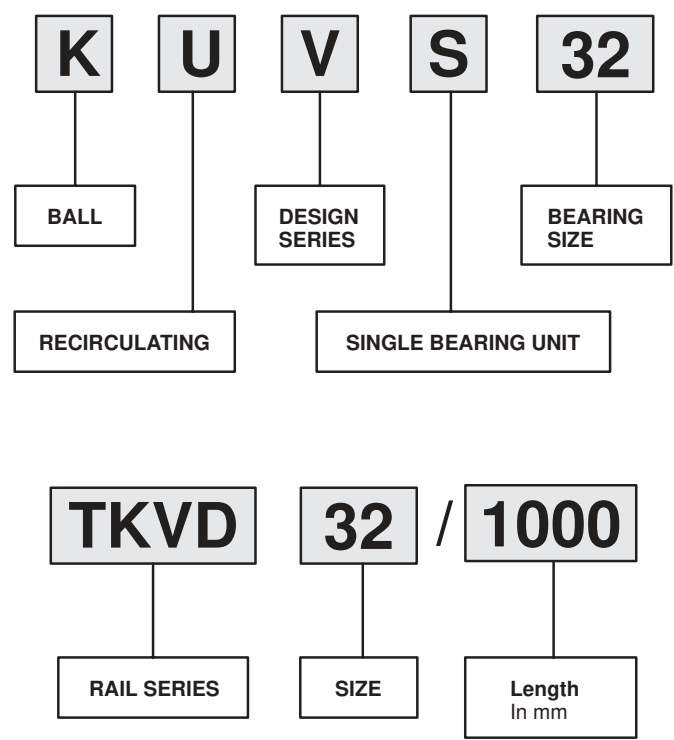
LINEAR RECIRCULATING ROLLER BEARING & GUIDEWAY ASSEMBLY



Part Number Identification

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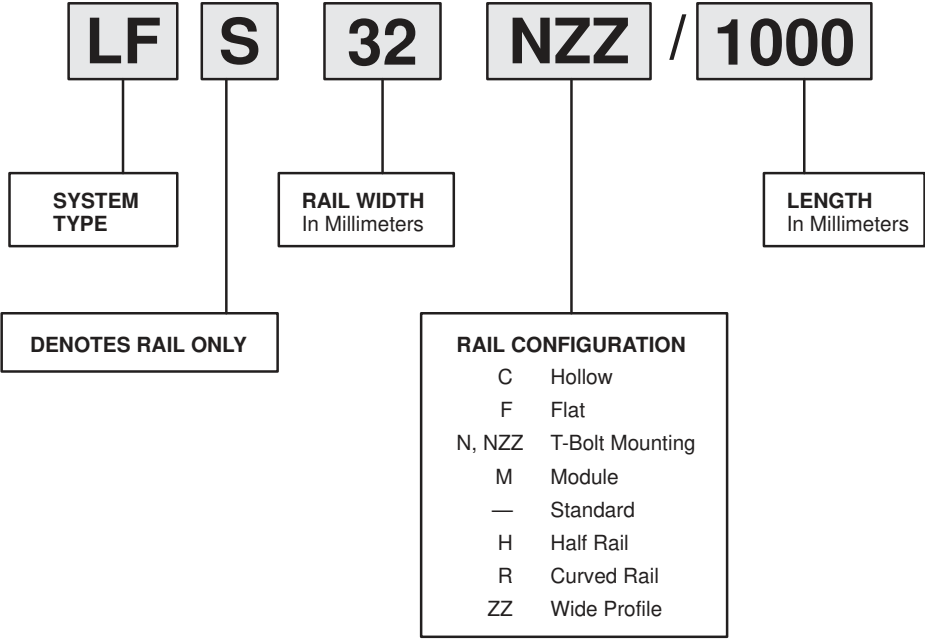
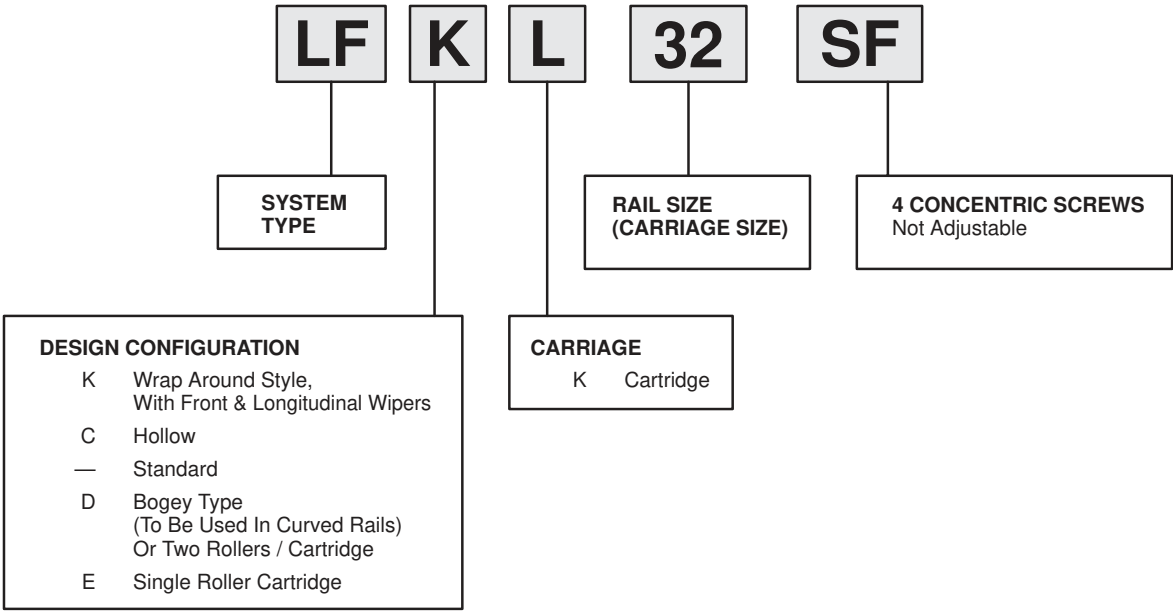
LINEAR GUIDANCE SYSTEMS



Part Number Identification

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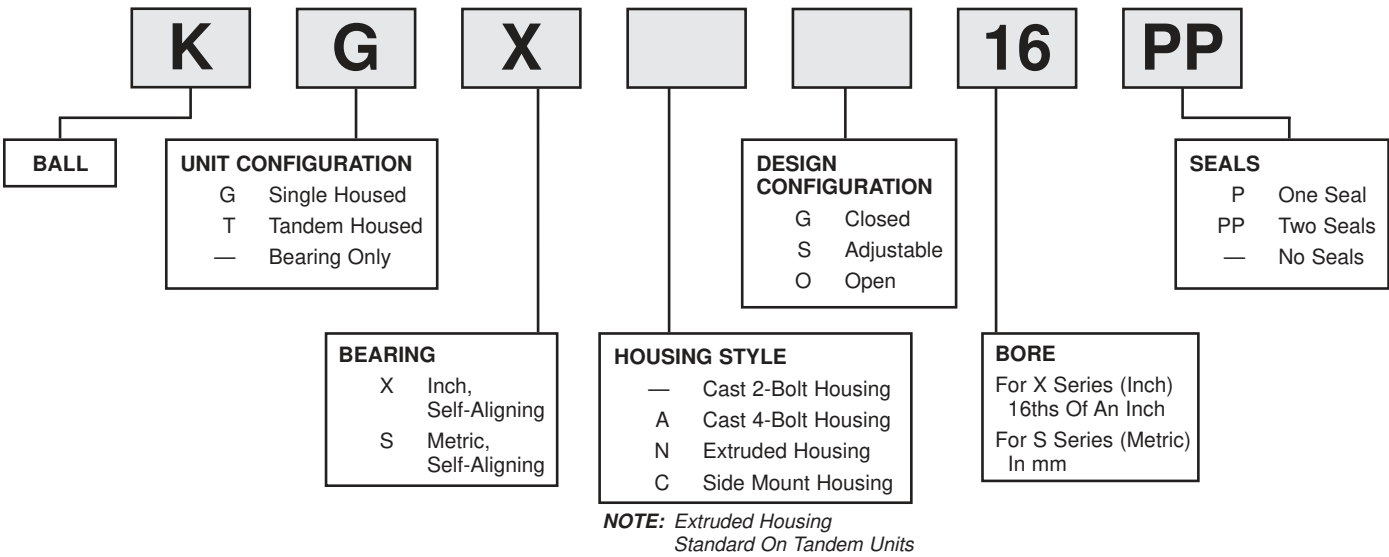
LF CARRIAGES & RAILS



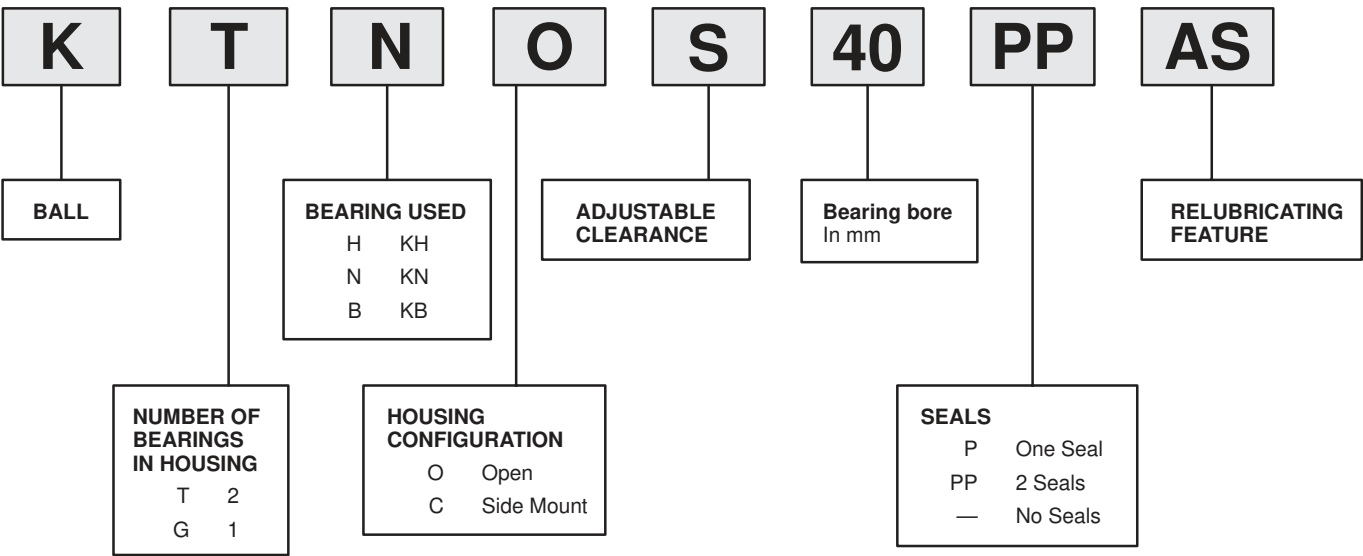
Part Number Identification

LINEAR

MAX³ INCH & METRIC BEARINGS & HOUSING UNITS



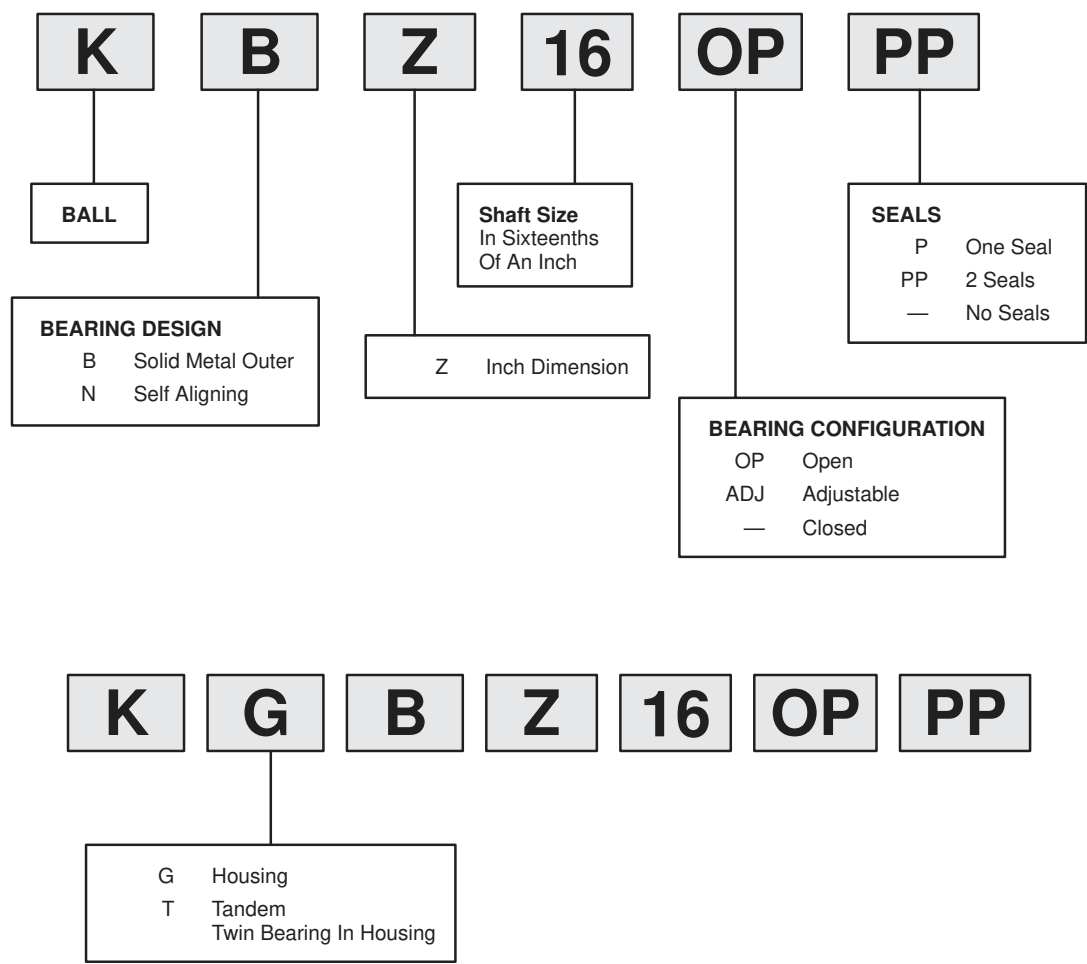
METRIC HOUSING UNITS



Part Number Identification

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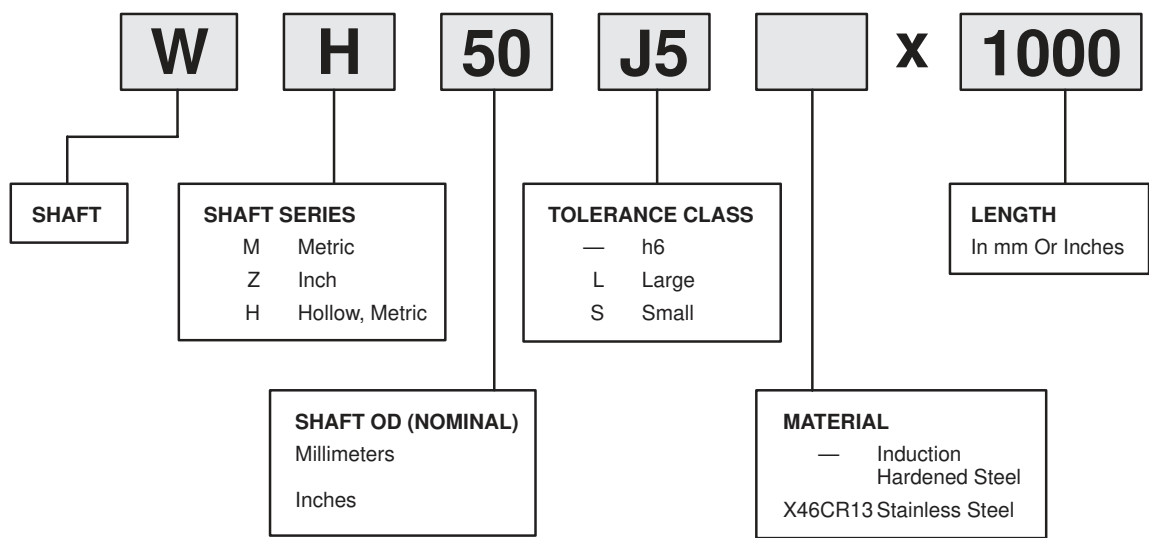
INCH BEARINGS & HOUSING UNITS



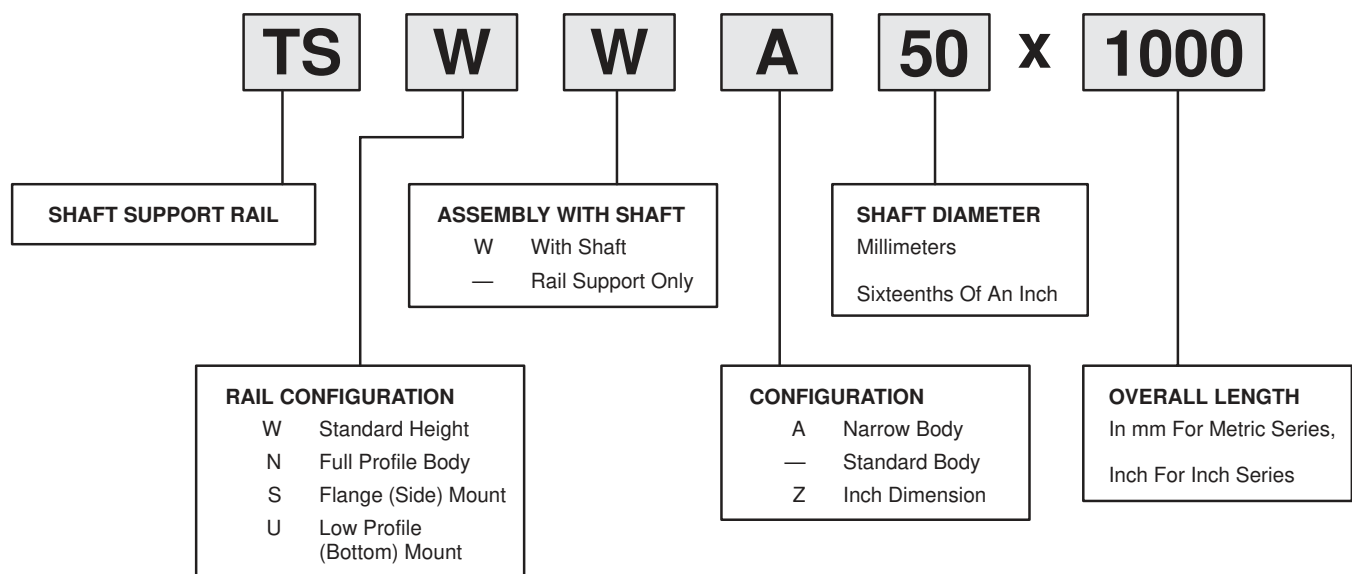
Part Number Identification

LINEAR

SHAFTS (METRIC & INCH)



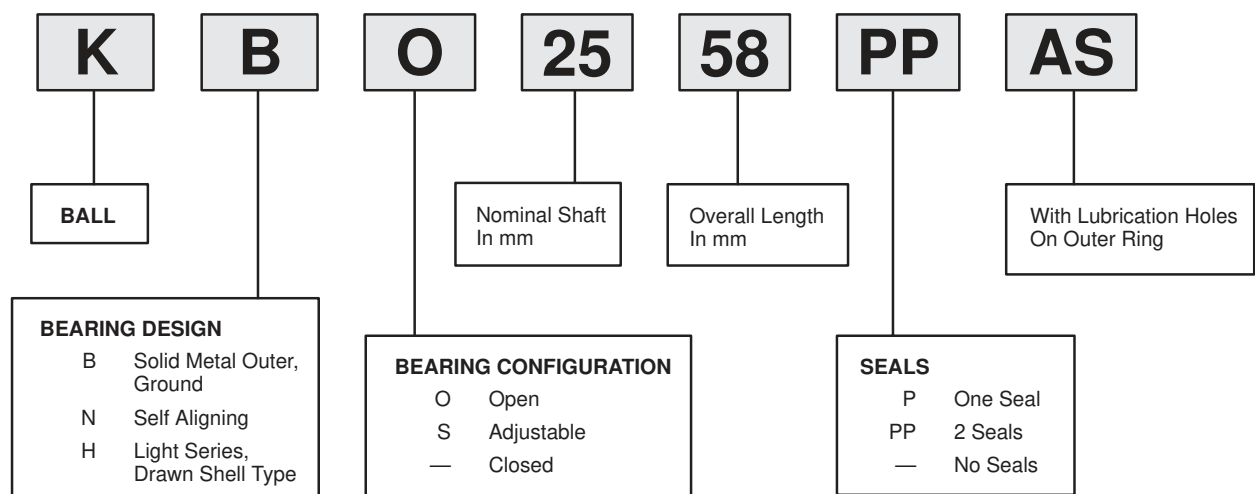
SUPPORT RAILS (METRIC & INCH)



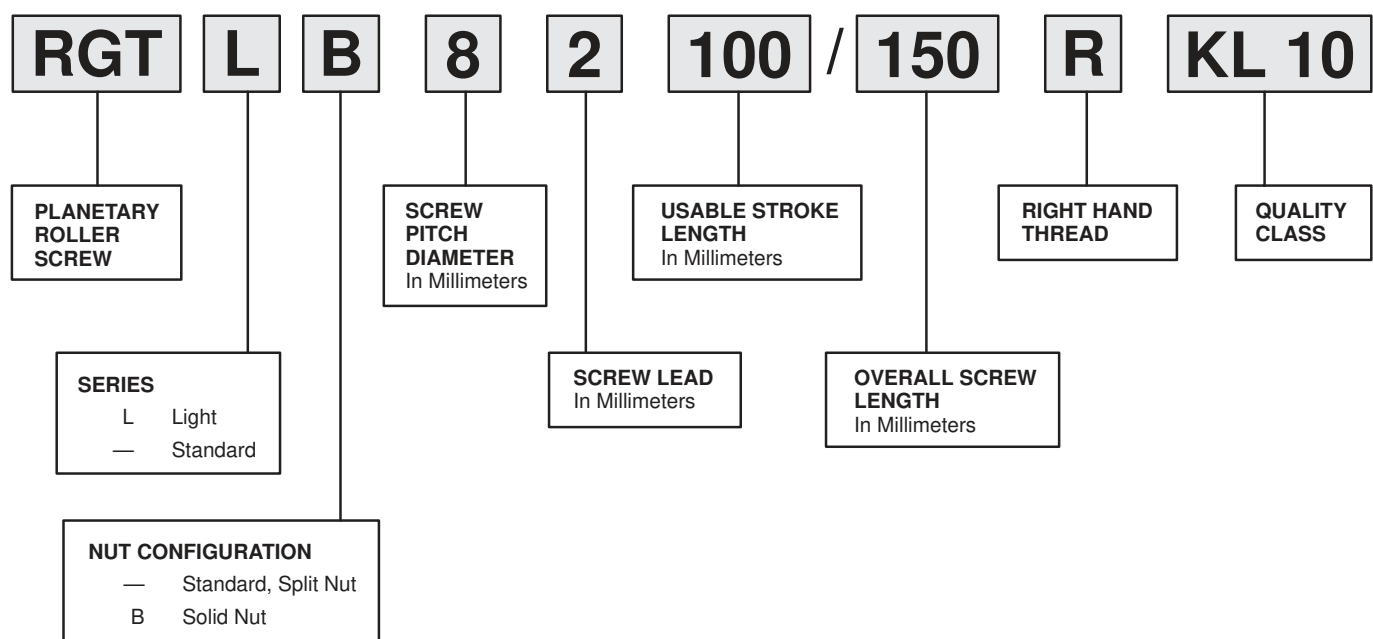
Part Number Identification

LINEAR

METRIC BALL BUSHINGS



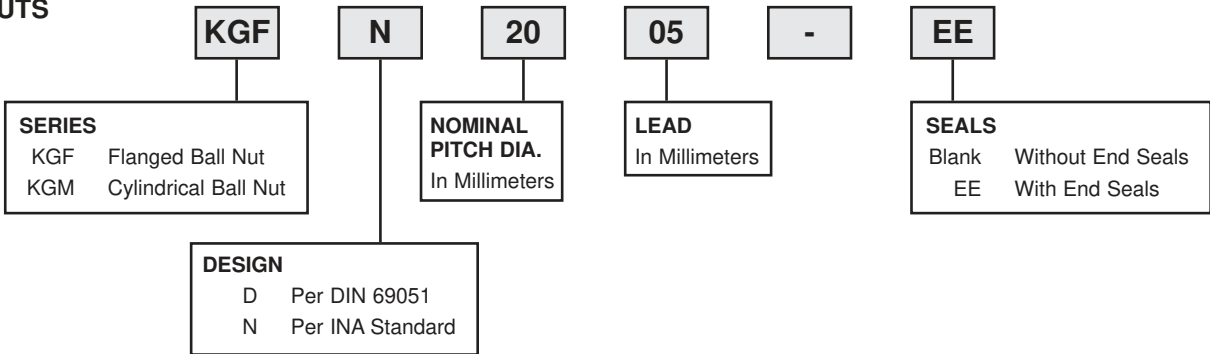
PLANETARY ROLLER SCREWS



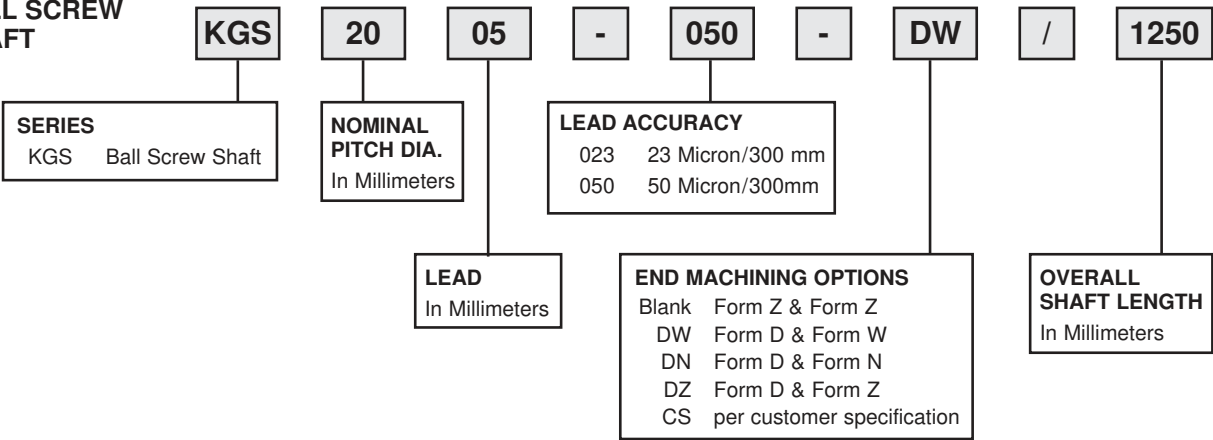
Part Number Identification

LINEAR

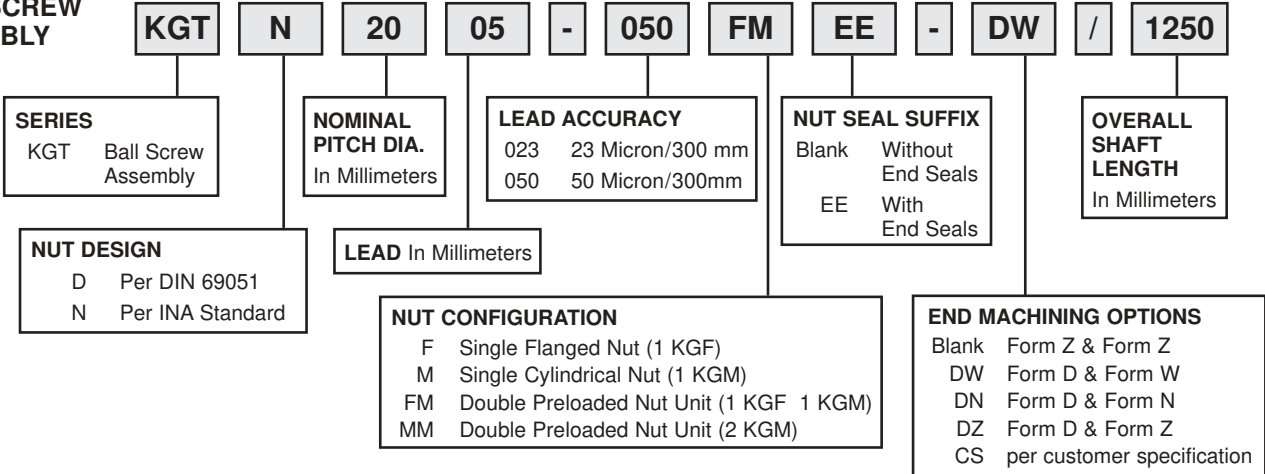
BALL NUTS



BALL SCREW SHAFT



BALL SCREW ASSEMBLY



Part Number Identification

LINEAR

COMPONENT / FAMILY

LFS, LFS..C, M, TS..W, LFL, LFCL, LFR..

COMPONENT	FAMILY					
	LFS	LFS..C,M	TS.W	LFL	LFCL	LFR..
Cap wiper	—	—	—	—	—	AB LFR
Lube & wiper unit	—	—	AB..W	AB/AB..LFL	—	AB..W
Side plates	—	—	—	ABAL	—	—
End stops	PAH	—	—	—	—	—
End plate	—	ANS LFS	—	—	—	—
End Cover	—	KA LFS..C,M,CH	—	—	KA LFS..CL	—
Cover strip	—	NAD	—	—	—	—
Measuring system	LMS	LMS	LMS	—	—	—

RUE, KUSE, KUVSE, KUVS, KUE, KUME

COMPONENT	FAMILY					
	RUE	KUSE	KUVSE	KUVS	KUE	KUME
Cap wiper	—	—	—	—	—	AB LFR
Closing plugs (plastic)	KA..TN	KA..TN	KA..TN	KA..TN	KA..TN	KA..TN
Closing plugs (brass)	KA..M	KA..M	—	—	KA..M	—
Mounting rail	MSX	MKSD	MKVD	—	MKD	MKMD
Hydraulic mounting device	MVH	—	—	—	—	—
Cover strip	ABDU	ADBSE	—	—	—	—
Sheet steel wiper	APLU	APLSE	APLVE	—	APLE	—
Spring loaded scraper	—	AB KOL KWSE	—	—	—	—
Braking element	RUKS..D	—	—	—	—	—
Lube adapter plate	BPLU	BLSE	—	—	BPLE	—
Grease lube adapter	—	SMAD KFE	SMAD KFE	—	SMAD KFE	—
Oil lube adapter	—	SMAD KOE	SMAD KOE	—	SMAD KOE	—
Lube metering unit	SMDE	—	—	—	—	—
Damping carriage	RUDS	—	—	—	—	—
Bellows	—	FBALG	—	—	FBALG	—



Linear Recirculating Roller Bearing And Guideway Assemblies

RUE..D, RUE..DL, RUE 65 L SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

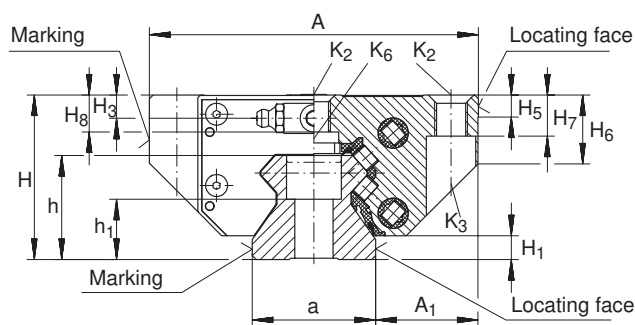
Linear roller bearing and guideway assembly Grease Lubrication PART NUMBER	Linear roller bearing and guideway assembly Oil Lubrication PART NUMBER	CARRIAGE ¹⁾ PART NUMBER	CARRIAGE MASS kg	GUIDEWAY PART NUMBER	GUIDEWAY MASS kg/m	GUIDEWAY Closing Plugs ²⁾	COVERING STRIP	L ³⁾ mm	H mm	A mm	C ⁴⁾ mm
RUE 35 D FE	RUE 35 D OE	RWU 35 D	2.0	TSX 35 D	5.9	KA 15	ADB 18	2960	48	100	120
RUE 35 D L FE	RUE 35 D L OE	RWU 35 D L	2.7	TSX 35 D	5.9	KA 15	ADB 18	2960	48	100	143
RUE 45 D FE	RUE 45 D OE	RWU 45 D	3.3	TSX 45 D	9.4	KA 20	ADB 23	2940	60	120	141
RUE 45 D L FE	RUE 45 D L OE	RWU 45 D L	4.4	TSX 45 D	9.4	KA 20	ADB 23	2940	60	120	175
RUE 55 D FE	RUE 55 D OE	RWU 55 D	5.6	TSX 55 D	13.3	KA 24	ADB 27	2520	70	140	170
RUE 55 D L FE	RUE 55 D L OE	RWU 55 D L	7.5	TSX 55 D	13.3	KA 24	ADB 27	2520	70	140	210
RUE 65 D L FE	RUE 65 D L OE	RWU 65 D L	14.4	TSX 65 D	21.5	KA 26	ADB 29	2520	90	170	252.8

RUE..D FE has lubrication nipple to DIN 71 412-A M8 ± 1.
RUE..D OE has connector with union nut similar to DIN 3 871-A.
RUE 25 available on request.
RUE..U: Linear roller bearing and guideway assembly with guideway for fixing from below, available on request.

- ¹⁾ Suffix FE for grease lubrication, suffix OE for oil lubrication.
- ²⁾ Closing plugs KA..TN are included with the delivery.
- ³⁾ Maximum length L of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- ⁴⁾ Minimum covered length for sealing the lubrication connections.
- ⁵⁾ Dimensions C₅ and C₆ are dependent on the guideway length L.
- ⁶⁾ Position of the lubrication hole in the adjacent construction.
- ⁷⁾ Maximum diameter of the lubrication hole in the adjacent construction.
- ⁸⁾ Maximum length of fixing screw: H₈ +3 mm.
- ⁹⁾ If there is a possibility of settling, the fixing screws should be secured against rotation.

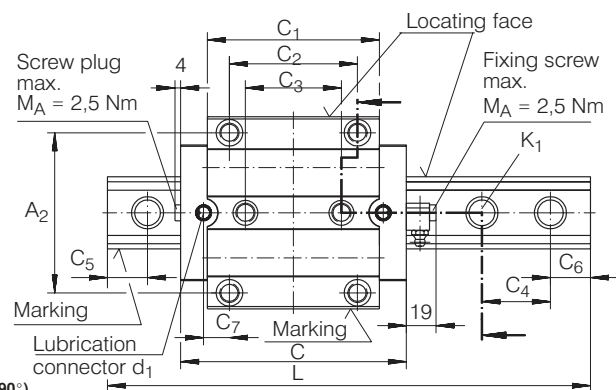
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁹⁾								
PART NUMBER	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₅ Through holes for screws to DIN 7 984-8.8	
		Nm max.		Nm max.		Nm max.		Nm max.
RUE 35 D	M8	41	M10	41	M8	41	M8	24
RUE 35 D L	M8	41	M10	41	M8	41	M8	24
RUE 45 D	M12	140	M12	83	M10	83	M10	48
RUE 45 D L	M12	140	M12	83	M10	83	M10	48
RUE 55 D	M14	220	M14	140	M12	140	M12	83
RUE 55 D L	M14	220	M14	140	M12	140	M12	83
RUE 65 L	M16	340	M16	220	M14	220	M14	130





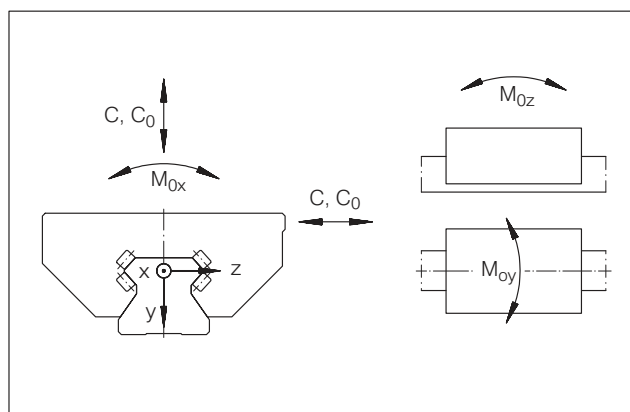
RUE..D

RUE..D
(View rotated through 90°)



A ₁	A ₂	a -0.005 -0.035	C ₁	C ₂	C ₃	C ₄	C ₅ ⁵⁾ min.	C ₅ ⁵⁾ max.	C ₆ ⁵⁾ min.	C ₆ ⁵⁾ max.	C ₇ ⁶⁾	d ₁ ⁷⁾ max.	H ₁	H ₃	H ₅	H ₆	H ₇	H ₈ ⁸⁾	h	h ₁
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
33	82	34	91.4	62	52	40	20	31	20	31	14.3	6	6.5	6.6	8	20	12	11.1	30	19
33	82	34	114.4	62	52	40	20	31	20	31	25.8	6	6.5	6.6	8	20	12	11.1	30	19
37.5	100	45	107.5	80	60	52.5	20	41	20	41	16.2	6	8.5	8.5	8	26	15	13.5	38	22
37.5	100	45	141.7	80	60	52.5	20	41	20	41	33.3	6	8.5	8.5	8	26	15	13.5	38	22
43.5	116	53	130.8	95	70	60	20	47	20	47	21.2	6	11	10	12	31	18	15.5	45	28
43.5	116	53	170.5	95	70	60	20	47	20	47	41	6	11	10	12	31	18	15.5	45	28
53.5	142	63	207.6	110	82	75	20	61	20	61	49	6	11	10.2	15	39.2	23	23	53.8	30.3

LOAD CARRYING CAPACITY TABLE					
PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RUE 35 D	59	134	990	2140	1925
RUE 35 D L	70	169	1255	3370	3035
RUE 45 D	92	205	1805	3870	3485
RUE 45 D L	115	275	2410	6770	6095
RUE 55 D	135	305	3130	7035	6335
RUE 55 D L	167	405	4120	12010	10815
RUE 65 D L	270	640	7600	24000	21500



Load directions



Linear Recirculating Roller Bearing And Guideway Assemblies

RUE..D H, RUE..D HL SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

Linear roller bearing and guideway assembly Grease Lubrication PART NUMBER	Linear roller bearing and guideway assembly Oil Lubrication PART NUMBER	CARRIAGE ¹⁾ PART NUMBER	CARRIAGE MASS kg	GUIDEWAY PART NUMBER	GUIDEWAY MASS kg/m	GUIDEWAY Closing Plugs ²⁾	COVERING STRIP	L ³⁾ mm	H mm	A mm	C ⁴⁾ mm
RUE 35 D H FE	RUE 35 D H OE	RWU 35 D H	1.7	TSX 35 D	5.9	KA 15	ADB 18	2960	55	70	120
RUE 35 D HL FE	RUE 35 D HL OE	RWU 35 D HL	2.4	TSX 35 D	5.9	KA 15	ADB 18	2960	55	70	143
RUE 45 D H FE	RUE 45 D H OE	RWU 45 D H	3.1	TSX 45 D	9.4	KA 20	ADB 23	2940	70	86	141
RUE 45 D HL FE	RUE 45 D HL OE	RWU 45 D HL	4.0	TSX 45 D	9.4	KA 20	ADB 23	2940	70	86	175
RUE 55 D H FE	RUE 55 D H OE	RWU 55 D H	5.3	TSX 55 D	13.3	KA 24	ADB 24	2520	80	100	170
RUE 55 D HL FE	RUE 55 D HL OE	RWU 55 D HL	6.7	TSX 55 D	13.3	KA 24	ADB 24	2520	80	100	210
RUE 65 D HL FE	RUE 65 D HL OE	RWU 65 D HL	13.6	TSX 65 D	21.5	KA 26	ADB 26	2 520	100	126	252.8

RUE..D H FE has lubrication nipple to DIN 71 412-A M8±1.
RUE..D H OE has connector with union nut similar to DIN 3 871-A.
RUE..DU: Linear roller bearing and guideway assembly with guideway for fixing from below, available on request.

- 1) Suffix FE for grease lubrication, suffix OE for oil lubrication.
- 2) Closing plugs KA..TN are included with the delivery.
- 3) Maximum length L of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 4) Minimum covered length for sealing the lubrication connections.
- 5) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 6) Position of the lubrication hole in the adjacent construction.
- 7) Maximum diameter of the lubrication hole in the adjacent construction.
- 8) If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁸⁾				
PART NUMBER	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9	
		Nm max.		Nm max.
RUE 35 D H	M8	41	M8	41
RUE 35 D HL	M8	41	M8	41
RUE 45 D H	M12	140	M10	83
RUE 45 D HL	M12	140	M10	83
RUE 55 D H	M14	220	M12	140
RUE 55 D HL	M14	220	M12	140
RUE 65 D HL	M16	340	M14	220

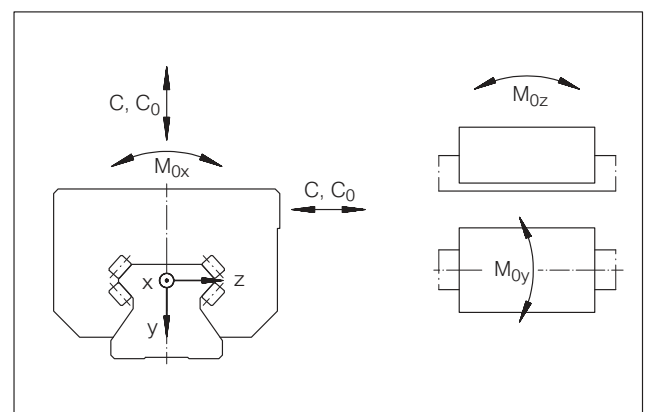


RUE..D H

RUE..D H
(View rotated through 90°)

A ₁	A ₂	a -0.005 -0.035	C ₁	C ₂	C ₄	C ₅ ⁵⁾ min.	C ₅ ⁵⁾ max.	C ₆ ⁵⁾ min.	C ₆ ⁵⁾ max.	C ₇ ⁶⁾	d ₁ ⁷⁾ max.	H ₁	H ₃	H ₅	H ₆	H ₇	h	h ₁
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
18	50	34	91.4	50	40	20	31	20	31	20.3	6	6.5	13.6	10.8	41	10	30	19
18	50	34	114.4	72	40	20	31	20	31	20.8	6	6.5	13.6	10.8	41	10	30	19
20.5	60	45	107.5	60	52.5	20	41	20	41	26.2	6	8.5	18.5	13.7	52	12.5	38	22
20.5	60	45	141.7	80	52.5	20	41	20	41	33.3	6	8.5	18.5	13.7	52	12.5	38	22
23.5	75	53	130.8	75	60	20	47	20	47	31.2	6	11	20	16	61	15	45	28
23.5	75	53	170.5	95	60	20	47	20	47	41	6	11	20	16	61	15	45	28
31.5	76	63	207.6	120	75	20	61	20	61	43.8	6	11	20.2	15	71.2	20	53.8	30.3

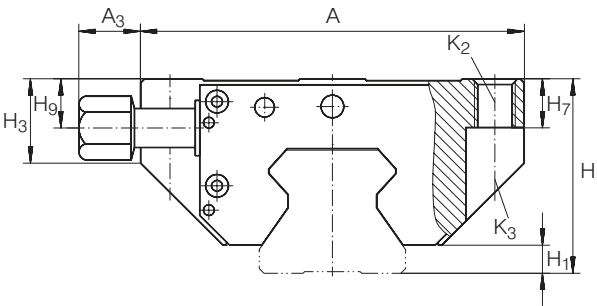
LOAD CARRYING CAPACITY TABLE					
PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
RUE 35 D H	59	134	990	2140	1925
RUE 35 D HL	70	169	1255	3370	3035
RUE 45 D H	92	205	1805	3870	3485
RUE 45 D HL	115	275	2410	6770	6095
RUE 55 D H	135	305	3130	7035	6335
RUE 55 D HL	167	405	4120	12010	10815
RUE 65 D HL	270	640	7600	24000	21500



Load directions

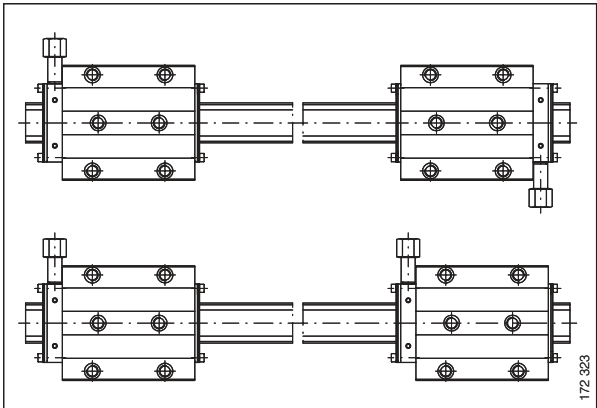


Locking Element RUKS..D SERIES

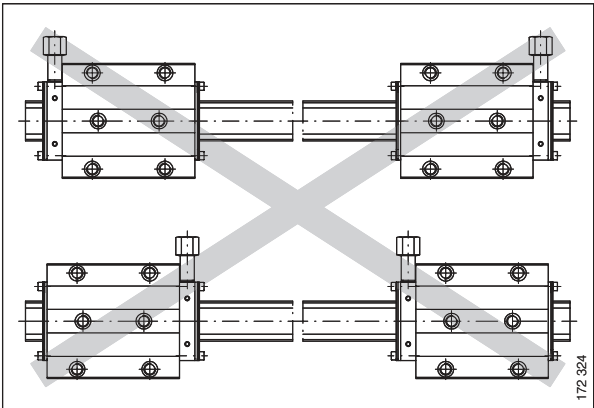


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER	MASS kg	A mm	H mm	C mm	A ₂ mm	A ₃ mm	C ₁ mm	C ₂ mm	C ₃ mm	C ₇ mm
RUKS 35 D S	2.8	98	48	135	82	24.5	113	62	52	32
RUKS 35 D O	2.8	98	48	135	82	—	113	62	52	32
RUKS 35 DH S	2.8	68	55	135	50	34.5	113	50	—	38
RUKS 35 DH O	2.8	68	55	135	50	—	113	50	—	38
RUKS 45 D S	4.5	118	60	156	100	22	134	80	60	33.5
RUKS 45 D O	4.5	118	60	156	100	—	134	80	60	33.5
RUKS 45 DH S	4.5	84	70	156	60	39	134	60	—	43.5
RUKS 45 DH O	4.5	84	70	156	60	—	134	60	—	43.5
RUKS 55 D S	7.6	138	70	185	116	18.5	163	95	70	40.5
RUKS 55 D O	7.6	138	70	185	116	—	163	95	70	40.5
RUKS 55 DH S	7.6	98	80	185	75	38.5	163	75	—	50.5
RUKS 55 DH O	7.6	98	80	185	75	—	163	75	—	50.5



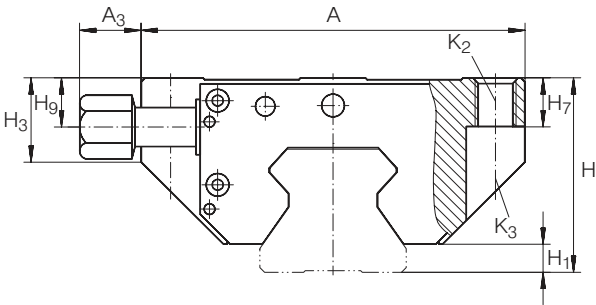
Position of oil connector, possible combinations



Position of oil connector, impermissible combinations

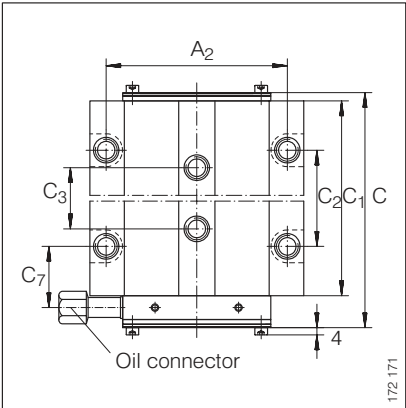


Locking Element RUKS..D SERIES

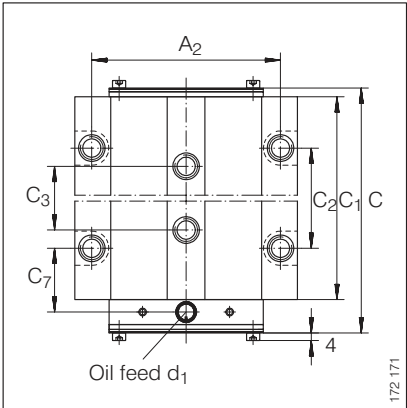


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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d ₁ max. mm	H ₁ mm	H ₃ mm	H ₇ mm	H ₉ mm	Suitable for guideway	K ₂ For screws to DIN 912-12.9	K ₂ max. Nm	K ₃ Through hole for screws to DIN 912-12.9	K ₃ max. Nm	PART NUMBER
6	6.5	21	12	13.2	TSX 35 D	M10	41	M8	41	RUKS 35 D S
6	6.5	21	12	—	TSX 35 D	M10	41	M8	41	RUKS 35 D O
6	6.5	42	10	20.2	TSX 35 D	M8	41	—	—	RUKS 35 DH S
6	6.5	42	10	—	TSX 35 D	M8	41	—	—	RUKS 35 DH O
6	8.5	27	15	15.6	TSX 45 D	M12	83	M10	83	RUKS 45 D S
6	8.5	27	15	—	TSX 45 D	M12	83	M10	83	RUKS 45 D O
6	8.5	53	10	25.6	TSX 45 D	M10	83	—	—	RUKS 45 DH S
6	8.5	53	10	—	TSX 45 D	M10	83	—	—	RUKS 45 DH O
6	11	32	18	18.8	TSX 55 D	M14	140	M12	140	RUKS 55 D S
6	11	32	18	—	TSX 55 D	M14	140	M12	140	RUKS 55 D O
6	11	62	15	28.8	TSX 55 D	M12	140	—	—	RUKS 55 DH S
6	11	62	15	—	TSX 55 D	M12	140	—	—	RUKS 55 DH O



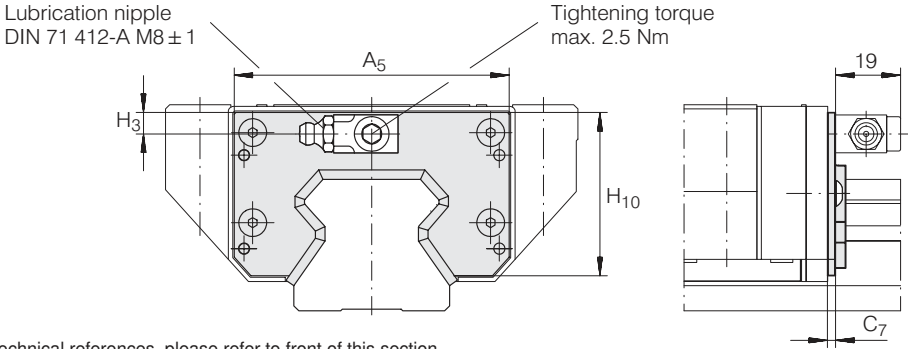
RUKS..D S



RUKS..D O



Sheet Steel Wiper APLU SERIES



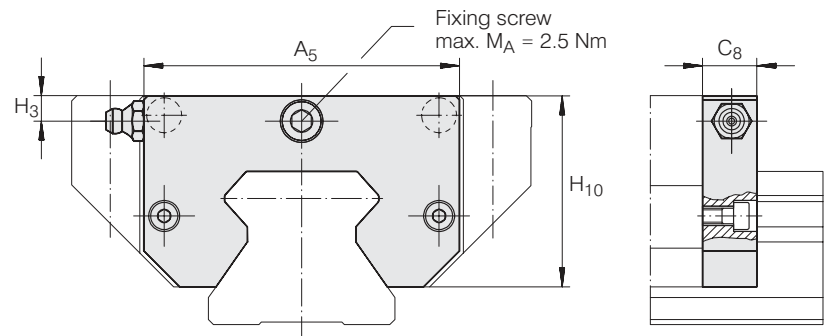
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER	MASS g	A ₅ mm	H ₃ mm	H ₁₀ mm	C ₇ mm	Suitable for linear recirculating roller bearing and guideway assembly	
APLU 35 D	60	66.7	6.6	39.7	6.5	RUE 35 D	RUE 35 D L
			13.6			RUE 35 D H	RUE 35 D HL
APLU 45 D	75	81.5	8.5	49.3	6.5	RUE 45 D	RUE 45 D L
			18.5			RUE 45 D H	RUE 45 D HL
APLU 55 D	90	94.8	10	56.8	7.5	RUE 55 D	RUE 55 D L
			20			RUE 55 D H	RUE 55 D HL
APLU 65 D	105	120.3	10.2	76.2	6.3	–	RUE 65 D L
			20.2			–	RUE 65 D HL



Lubrication Adapter Plate

BPLU SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

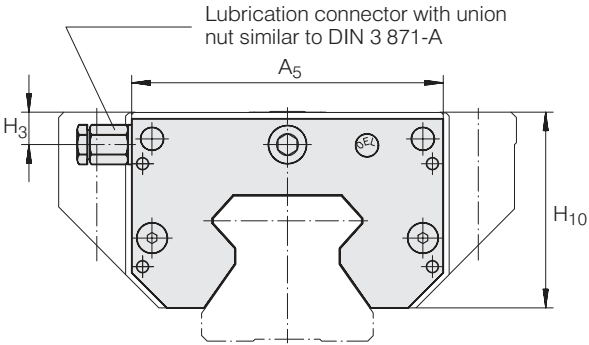
PART NUMBER GREASE LUBRICATION	PART NUMBER OIL LUBRICATION	MASS g	A ₅ mm	H ₃ mm	H ₁₀ mm	C ₈ mm	Suitable for linear recirculating roller bearing and guideway assembly	
BPLU 35 D FE	BPLU 35 D OE	95	66.7	7.5	39.7	14	RUE 35 D	RUE 35 D L
				11.5			RUE 35 D H	RUE 35 D HL
BPLU 45 D FE	BPLU 45 D OE	120	81.5	8	49.3	14	RUE 45 D	RUE 45 D L
				15			RUE 45 D H	RUE 45 D HL
BPLU 55 D FE	BPLU 55 D OE	150	94.8	10	56.8	14	RUE 55 D	RUE 55 D L
				20			RUE 55 D H	RUE 55 D HL
BPLU 65 D FE	BPLU 65 D OE	190	120.8	10.2	76.2	14	–	RUE 65 D L
				20.2			–	RUE 65 D HL

BPLU..D FE has lubrication nipple to DIN 71 412-A M8±1.
 BPLU..D OE has connector with union nut similar to DIN 3 871-A.
 The lubrication nipple or connector can be replaced by a screw plug M8±1.

In series RUE..D H and RUE..D HL, the lubrication nipple protrudes about 9 mm from the side of the carriage.



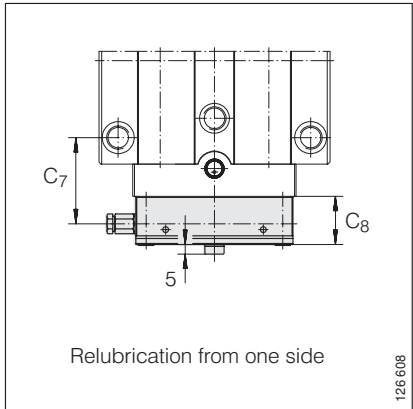
Minimal Quantity Lubricant Metering Unit SMDE SERIES



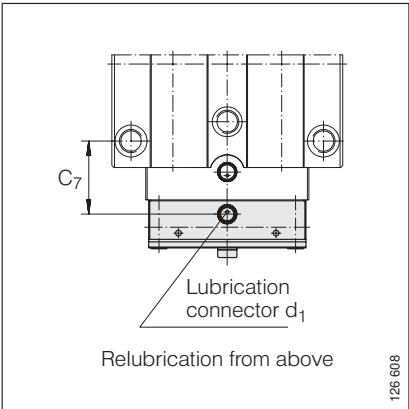
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER	MASS g	A ₅ mm	H ₃ mm	H ₁₀ mm	C ₇ with RUE..D RUE..D H mm	C ₇ with RUE..L RUE..D HL mm	C ₈ mm	d ₁ max mm	Suitable for linear recirculating roller bearing and guideway assembly	
SMDE 35 D S	170	66.9	6.6	41.1	44	55.5	25	—	RUE 35 D	RUE 35 D L
SMDE 35 D O	170	66.9	—	41.1	37.2	48.7	25	6	RUE 35 D	RUE 35 D L
SMDE 35 D HS	200	66.9	13.6	48.1	50	50.5	25	—	RUE 35 D H	RUE 35 D HL
SMDE 35 D HO	200	66.9	—	48.1	43.2	43.7	25	6	RUE 35 D H	RUE 35 D HL
SMDE 45 D S	200	81.7	8.5	51.2	44.8	61.8	25	—	RUE 45 D	RUE 45 D L
SMDE 45 D O	200	81.7	—	51.2	38	55	25	6	RUE 45 D	RUE 45 D L
SMDE 45 D HS	260	81.7	18.5	61.2	54.8	61.8	25	—	RUE 45 D H	RUE 45 D HL
SMDE 45 D HO	260	81.7	—	61.2	48	55	25	6	RUE 45 D H	RUE 45 D HL
SMDE 55 D S	240	95	10	58.9	51.5	71.5	25	—	RUE 55 D	RUE 55 D L
SMDE 55 D O	240	95	—	58.9	44.7	64.7	25	6	RUE 55 D	RUE 55 D L
SMDE 55 D HS	340	95	20	68.9	61.5	71.5	25	—	RUE 55 D H	RUE 55 D HL
SMDE 55 D HO	340	95	—	68.9	54.7	64.7	25	6	RUE 55 D H	RUE 55 D HL
SMDE 65 D S	500	121	10.2	78.5	—	85	25	—	—	RUE 65 D L
SMDE 65 D O	500	121	10.2	78.5	—	78.2	25	6	—	RUE 65 D L
SMDE 65 D HS	500	121	20.2	88.5	—	80	25	—	—	RUE 65 D HL
SMDE 65 D HO	500	121	20.2	88.5	—	73.2	25	6	—	RUE 65 D HL

In series RUE..D H and RUE..D HL, the lubrication connector protrudes about 9 mm from the side of the carriage.



SMDE..D S

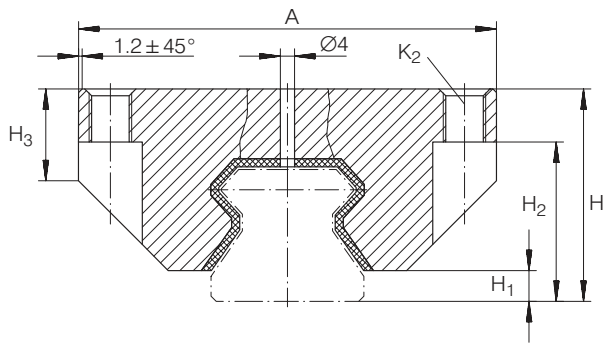


SMDE..D O



Damping Carriage

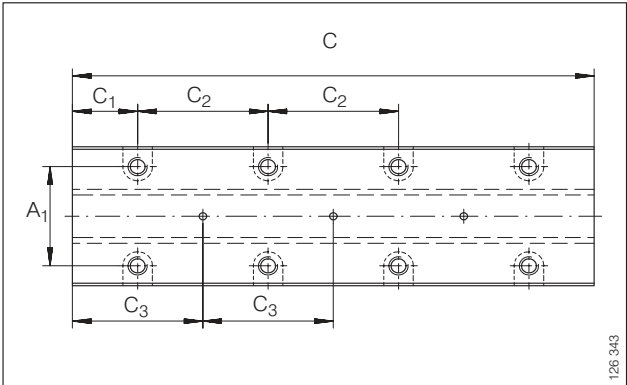
RUDS SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER	MASS kg/100 mm	A mm	H mm	H ₁ mm	H ₂ mm	H ₃ m	A ₁ mm	C ₁ mm	C ₂ mm	C ₃ mm	K ₂ ²⁾	3)	Suitable for linear recirculating roller bearing and guideway assembly	
RUDS 35 D	2.1	98	48	6.5	36	21	82	37.5	75	75	M10	M8	RUE 35 D	RUE 35 D L
RUDS 35 D H	1.8	68	55	6.5	—	42	50	37.5	75	75	M8	—	RUE 35 D H	RUE 35 D HL
RUDS 45 D	3.6	118	60	8.5	45	27	100	37.5	75	75	M12	M10	RUE 45 D	RUE 45 D L
RUDS 45 D H	3	84	70	8.5	—	53	60	37.5	75	75	M10	—	RUE 45 D H	RUE 45 D HL
RUDS 55 D	4.4	138	70	11	52	32	116	37.5	75	75	M14	M12	RUE 55 D	RUE 55 D L
RUDS 55 D H	3.7	98	80	11	—	62	75	37.5	75	75	M12	—	RUE 55 D H	RUE 55 D HL
RUDS 65 D	5	168	90	11	67	40.2	142	37.5	75	75	M16	M14	—	RUE 65 D L
RUDS 65 D H	4.6	124	100	11	—	72.2	76	37.5	75	75	M16	—	—	RUE 65 D HL

- 1) Standard lengths:
 C = 150 mm, not RUDS 65
 C = 225 mm, not RUDS 65
 C = 300 mm,
 2) For screws to DIN 912-12.9,
 thread length for RUDS..D H: at least 1.25 · K₂
 3) K₂ as through hole for screws to DIN 912-12.9,

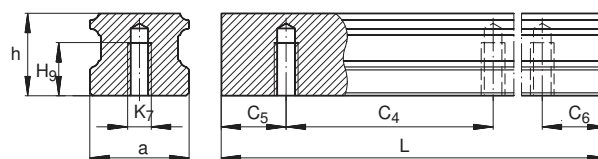


RUDS (View rotated through 90°)



Linear Recirculating Ball Bearing And Guideway Assemblies

KUSE SERIES



Guideway TKSD..U for mounting from below, suffix U (example: KUSE..U)

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

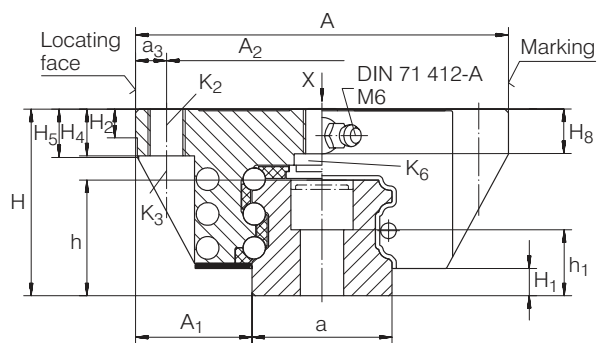
or Linear Sales

DIMENSION TABLE - Dimensions in mm													
UNIT	CARRIAGE		GUIDEWAY				DIMENSIONS				MOUNTING DIMENSIONS		
PART NUMBER	PART NUMBER	MASS	PART NUMBER	MASS	CLOSING PLUGS	COVERING STRIP	L ¹⁾	H	A	C ²⁾	A ₁	A ₂	a
		kg		kg/m									-0.005 -0.03
KUSE 20	KWSE 20	0.43	TKSD 20	2.3	KA 10 TN	ADB 13	1,980	30	63	71	21.5	53	20
KUSE 25	KWSE 25	0.6	TKSD 25	3.1	KA 11 TN	ADB 13	1,980	36	70	81.5	23.5	57	23
KUSE 30	KWSE 30	1.2	TKSD 30	4.4	KA 15 TN	ADB 18	2,000	42	90	91.2	31	72	28
KUSE 35	KWSE 35	1.5	TKSD 35	6.5	KA 15 TN	ADB 18	2,960	48	100	106.7	33	82	34
KUSE 45	KWSE 45	3.15	TKSD 45	11.3	KA 20 TN	ADB 23	2,940	60	120	136.5	37.5	100	45
KUSE 55	KWSE 55	4.9	TKSD 55	15.7	KA 24 TN	ADB 23	2,520	70	140	158	43.5	116	53
													12

- 1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Minimum covered length for sealing the lubrication connections.
- 3) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 4) Position of the lubrication hole in the adjacent construction.
- 5) Maximum diameter of the lubrication hole in the adjacent construction.
- 6) When mounting from above: maximum length of fixing screw for the central fixing holes H₈ +3 mm.
- 7) If there is a possibility of settling, the fixing screws should be secured against rotation.

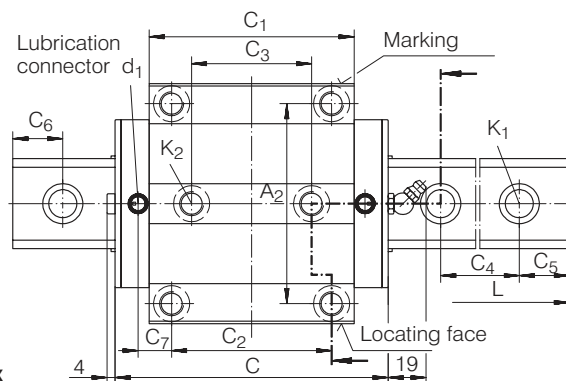
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁷⁾										
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₆ Through holes for screws to DIN 7 984-8.8		K ₇ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.		Nm max.		Nm max.
KUSE 20	M5	10	M6	10	M5	10	M5	5.8	M6	17
KUSE 25	M6	17	M8	24	M6	17	M6	10	M6	17
KUSE 30	M8	41	M10	41	M8	41	M8	24	M8	41
KUSE 35	M8	41	M10	41	M8	41	M8	24	M8	41
KUSE 45	M12	140	M12	83	M10	83	M10	48	M12	140
KUSE 55	M14	220	M14	140	M12	140	M12	83	M14	220



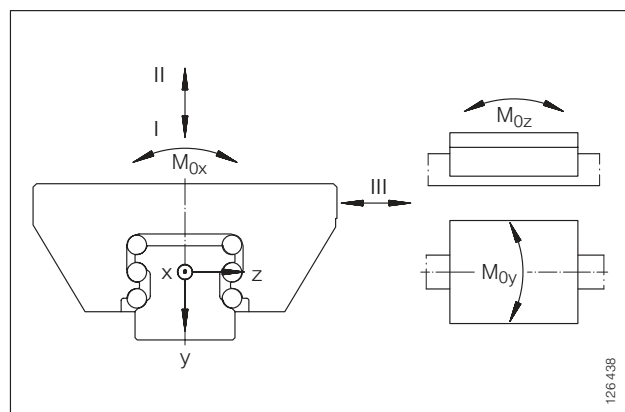


KUSE

KUSE, plan view X
(rotated through 90°)



C ₁	C ₂	C ₃	C ₄	C ₅ ³⁾		C ₆ ³⁾		C ₇ ⁴⁾	d ₁ ⁵⁾	H ₁	H ₂	H ₄	H ₅	H ₈ ⁶⁾	H ₉	h	h ₁
				min.	max.	min.	max.										
52	40	35	60	20	53	20	53	9.8	3	4.6	5	10	10.4	7.2	10	18	10.3
60.5	45	40	60	20	53	20	53	12.8	3	5.2	5	10	9.5	9.5	12	21.7	12.7
67.2	52	44	80	20	71	20	71	12.6	4.5	5.5	6	12	11.9	10	15	25	14
77.7	62	52	80	20	71	20	71	11.7	4.5	6.6	6.5	13	13	12	15	29.7	18.7
102.5	80	60	105	20	94	20	94	15.8	6	8.6	9	15	15.5	15	20	37.2	21.2
117.7	95	70	120	20	107	20	107	19.2	6	10.8	12	18	18.6	17	22	44	27



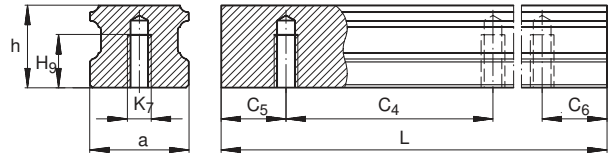
Load directions

LOAD CARRYING CAPACITY TABLE									
PART NUMBER	BASIC LOAD RATINGS						MOMENT RATINGS		
	LOAD DIRECTION I: COMPRESSIVE LOAD		LOAD DIRECTION II: TENSILE LOAD		LOAD DIRECTION III: LATERAL LOAD				
	C kN	C ₀ kN	C kN	C ₀ kN	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUSE 20	22	52	17.5	33.5	16.3	36	358	333	303
KUSE 25	28	67	22.9	43	21.3	46	535	486	442
KUSE 30	40	80	33	60	30.5	64	896	762	694
KUSE 35	55	102	45	79	42	85	1,454	1,173	1,069
KUSE 45	80	174	65	117	59	126	2,794	2,237	2,037
KUSE 55	102	230	81	147	75	157	4,114	3,141	2,861



Linear Recirculating Ball Bearing And Guideway Assemblies

KUSE..L SERIES



Guideway TKSD..U for mounting from below, suffix U (example: KUSE..U)

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

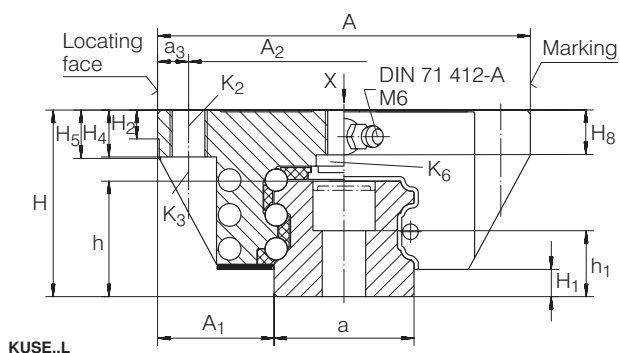
For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

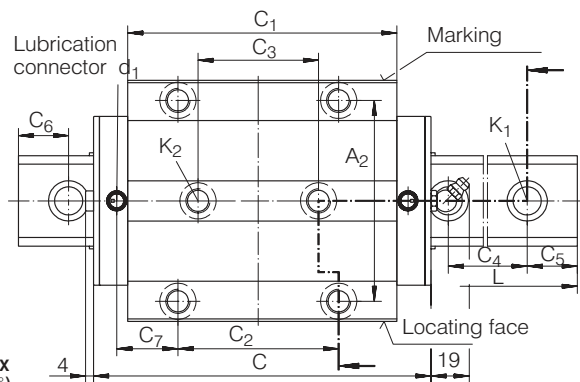
DIMENSION TABLE - Dimensions in mm														
UNIT	Carriage		GUIDEWAY				DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS	PART NUMBER	MASS	CLOSING PLUGS	COVERING STRIP	L ¹⁾	H	A	C ²⁾	A ₁	A ₂	a	a ₃
		kg		kg/m									-0.005 -0.03	
KUSE 20 L	KWSE 20 L	0.6	TKSD 20	2.3	KA 10 TN	ADB 13	1,980	30	63	90.8	21.5	53	20	5
KUSE 25 L	KWSE 25 L	0.82	TKSD 25	3.1	KA 11 TN	ADB 13	1,980	36	70	104	23.5	57	23	6.5
KUSE 30 L	KWSE 30 L	1.6	TKSD 30	4.4	KA 15 TN	ADB 18	2,000	42	90	118.7	31	72	28	9
KUSE 35 L	KWSE 35 L	2.1	TKSD 35	6.5	KA 15 TN	ADB 18	2,960	48	100	138.4	33	82	34	9
KUSE 45 L	KWSE 45 L	4.2	TKSD 45	11.3	KA 20 TN	ADB 23	2,940	60	120	172.2	37.5	100	45	10
KUSE 55 L	KWSE 55 L	6.6	TKSD 55	15.7	KA 24 TN	ADB 23	2,520	70	140	198	43.5	116	53	12

- 1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Minimum covered length for sealing the lubrication connections.
- 3) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 4) Position of the lubrication hole in the adjacent construction.
- 5) Maximum diameter of the lubrication hole in the adjacent construction.
- 6) When mounting from above: maximum length of fixing screw for the central fixing holes H₈ +3 mm.
- 7) If there is a possibility of settling, the fixing screws should be secured against rotation.

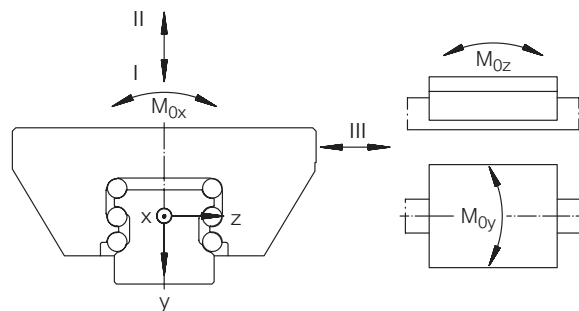
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁷⁾										
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₆ Through holes for screws to DIN 7 984-8.8		K ₇ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.		Nm max.		Nm max.
KUSE 20 L	M5	10	M6	10	M5	10	M5	5.8	M6	17
KUSE 25 L	M6	17	M8	24	M6	17	M6	10	M6	17
KUSE 30 L	M8	41	M10	41	M8	41	M8	24	M8	41
KUSE 35 L	M8	41	M10	41	M8	41	M8	24	M8	41
KUSE 45 L	M12	140	M12	83	M10	83	M10	48	M12	140
KUSE 55 L	M14	220	M14	140	M12	140	M12	83	M14	220



KUSE..L, plan view X
(rotated through 90°)



C ₁	C ₂	C ₃	C ₄	C ₅ ³⁾		C ₆ ³⁾		C ₇ ⁴⁾	d ₁ ⁵⁾ max.	H ₁	H ₂	H ₄	H ₅	H ₈ ⁶⁾	H ₉	h	h ₁
				min.	max.	min	max.										
71.8	40	35	60	20	53	20	53	19.7	3	4.6	5	10	10.4	7.2	10	18	10.3
83	45	40	60	20	53	20	53	24	3	5.2	5	10	9.5	9.5	12	21.7	12.7
94.7	52	44	80	20	71	20	71	26.3	4.5	5.5	6	12	11.9	10	15	25	14
109.4	62	52	80	20	71	20	71	27.5	4.5	6.6	6.5	13	13	12	15	29.7	18.7
138.2	80	60	105	20	94	20	94	33.6	6	8.6	9	15	15.5	15	20	37.2	21.2
157.7	95	70	120	20	107	20	107	39.2	6	10.8	12	18	18.6	17	22	44	27



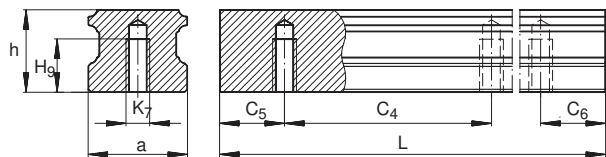
Load directions

LOAD CARRYING CAPACITY TABLE									
PART NUMBER	BASIC LOAD RATINGS						MOMENT RATINGS		
	LOAD DIRECTION I: COMPRESSIVE LOAD		LOAD DIRECTION II: TENSILE LOAD		LOAD DIRECTION III: LATERAL LOAD				
	C kN	C ₀ kN	C kN	C ₀ kN	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUSE 20 L	28	72	22.2	46.5	18.9	50	494	619	564.6
KUSE 25 L	35.3	93.7	28.9	59.8	24.7	64	736	903	823
KUSE 30 L	51	113	42.4	84.3	36.5	90	1,265	1,478	1,346
KUSE 35 L	70	145	57.3	112.4	49.5	120	2,054	2,275	2,072
KUSE 45 L	98	236	79.3	159	69	170	3,792	4,011	3,654
KUSE 55 L	125.4	312	100.6	199.4	87	214	5,584	5,633	5,132



Linear Recirculating Ball Bearing And Guideway Assemblies

KUSE..H SERIES



Guideway TKSD..U for mounting from below, suffix U (example: KUSE..U)

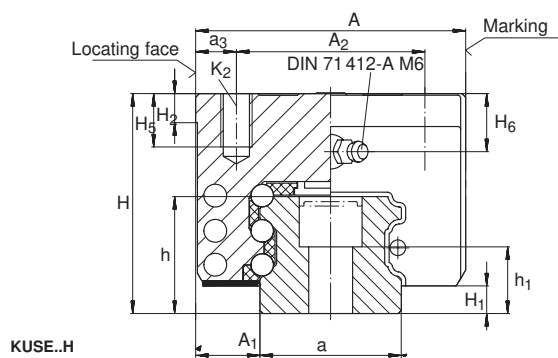
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm														
UNIT	CARRIAGE		GUIDEWAY				DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS	PART NUMBER	Mass	CLOSING PLUGS	COVERING STRIP	L ¹⁾	H	A	C ²⁾	A ₁	A ₂	a	a ₃
		kg		kg/m									−0.005 −0.03	
KUSE 20 H	KWSE 20 H	0.32	TKSD 20	2.3	KA 10 TN	ADB 13	1,980	30	44	71	12	32	20	6
KUSE 25 H	KWSE 25 H	0.5	TKSD 25	3.1	KA 11 TN	ADB 13	1,980	40	48	81.5	12.5	35	23	6.5
KUSE 30 H	KWSE 30 H	0.9	TKSD 30	4.4	KA 15 TN	ADB 18	2,000	45	60	91.2	16	40	28	10
KUSE 35 H	KWSE 35 H	1.3	TKSD 35	6.5	KA 15 TN	ADB 18	2,960	55	70	106.7	18	50	34	10
KUSE 45 H	KWSE 45 H	2.75	TKSD 45	11.3	KA 20 TN	ADB 23	2,940	70	86	136.5	20.5	60	45	13
KUSE 55 H	KWSE 55 H	4.5	TKSD 55	15.7	KA 24 TN	ADB 23	2,520	80	100	158	23.5	75	53	12.5

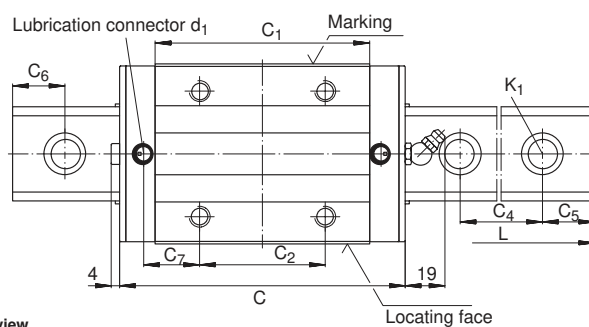
- Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- Minimum covered length for sealing the lubrication connections.
- Dimensions C₅ and C₆ are dependent on the guideway length L.
- Position of the lubrication hole in the adjacent construction.
- Maximum diameter of the lubrication hole in the adjacent construction.
- If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁶⁾						
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₇ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.
KUSE 20 H	M5	10	M5	10	M6	17
KUSE 25 H	M6	17	M6	17	M6	17
KUSE 30 H	M8	41	M8	41	M8	41
KUSE 35 H	M8	41	M8	41	M8	41
KUSE 45 H	M12	140	M10	83	M12	140
KUSE 55 H	M14	220	M12	140	M14	220

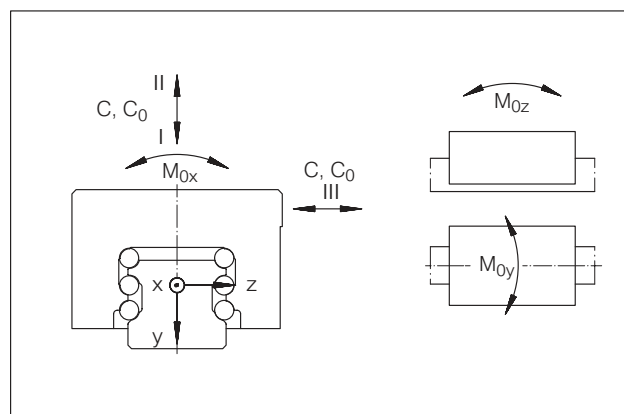




KUSE..H, plan view
(rotated through 90°)



C ₁	C ₂	C ₄	C ₅ ³⁾		C ₆ ³⁾		C ₇ ⁴⁾	d ₁ ⁵⁾ max.	H ₁	H ₂	H ₅	H ₆	H ₉	h	h ₁
			min.	max.	min.	max.									
52	36	60	20	53	20	53	11.8	3	4.6	5	6.25	5.8	10	18	10.3
60.5	35	60	20	53	20	53	17.8	3	5.2	5	10	10	12	21.7	12.7
67.2	40	80	20	71	20	71	18.6	4.5	5.5	6	11	9.5	15	25	14
77.7	50	80	20	71	20	71	17.7	4.5	6.6	6.5	14	14.2	15	29.7	18.7
102.5	60	105	20	94	20	94	25.8	6	8.6	9	17	18.5	20	37.2	21.2
117.7	75	120	20	107	20	107	29.2	6	10.8	12	19	20	22	44	27



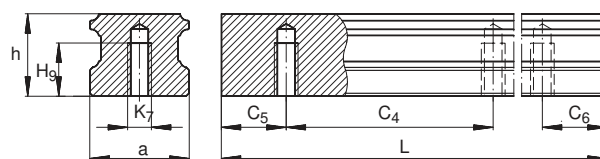
Load directions

LOAD CARRYING CAPACITY TABLE									
PART NUMBER	BASIC LOAD RATINGS						MOMENT RATINGS		
	LOAD DIRECTION I: COMPRESSIVE LOAD		LOAD DIRECTION II: TENSILE LOAD		LOAD DIRECTION III: LATERAL LOAD		M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
	C kN	C ₀ kN	C kN	C ₀ kN	C kN	C ₀ kN			
KUSE 20 H	22	52	17.5	33.5	16.3	36	358	333	303
KUSE 25 H	28	67	22.9	43	21.3	46	535	486	442
KUSE 30 H	40	80	33	60	30.5	64	896	762	694
KUSE 35 H	55	102	45	79	42	85	1,454	1,173	1,069
KUSE 45 H	80	174	65	117	59	126	2,794	2,237	2,037
KUSE 55 H	102	230	81	147	75	157	4,114	3,141	2,861



Linear Recirculating Ball Bearing And Guideway Assemblies

KUSE..HL SERIES



Guideway TKSD..U for mounting from below, suffix U (example: KUSE..U)

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm														
UNIT	CARRIAGE		GUIDEWAY				DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS	PART NUMBER	MASS	CLOSING PLUGS	COVERING STRIP	L ¹⁾	H	A	C ²⁾	A ₁	A ₂	a	a ₃
		kg		kg/m									-0.05 -0.03	
KUSE 20 HL	KWSE 20 HL	0.44	TKSD 20	2.3	KA 10 TN	ADB 13	1,980	30	44	90.8	12	32	20	6
KUSE 25 HL	KWSE 25 HL	0.7	TKSD 25	3.15	KA 11 TN	ADB 13	1,980	40	48	104	12.5	35	23	6.5
KUSE 30 HL	KWSE 30 HL	1.2	TKSD 30	4.4	KA 15 TN	ADB 18	2,000	45	60	118.7	16	40	28	10
KUSE 35 HL	KWSE 35 HL	1.8	TKSD 35	6.5	KA 15 TN	ADB 18	2,960	55	70	138.4	18	50	34	10
KUSE 45 HL	KWSE 45 HL	3.7	TKSD 45	11.3	KA 20 TN	ADB 23	2,940	70	86	172.2	20.5	60	45	13
KUSE 55 HL	KWSE 55 HL	5.9	TKSD 55	15.7	KA 24 TN	ADB 23	2,520	80	100	198	23.5	75	53	12.5

1) Maximum length L of single piece guideway;
longer guideways are supplied as multi-piece guideways and are marked accordingly.

2) Minimum covered length for sealing the lubrication connections.

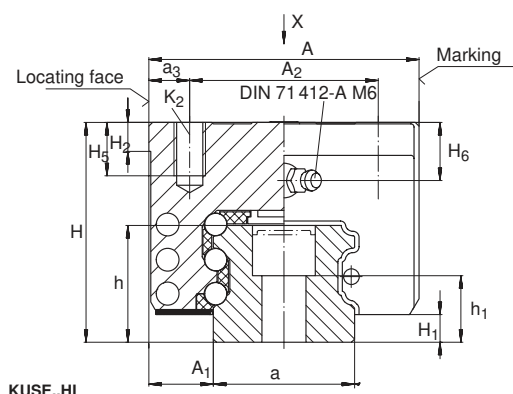
3) Dimensions C₅ and C₆ are dependent on the guideway length L.

4) Position of the lubrication hole in the adjacent construction.

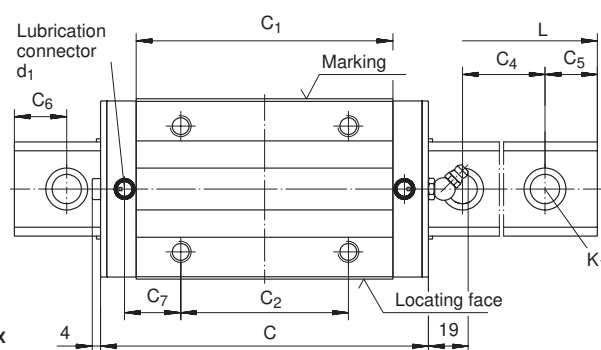
5) Maximum diameter of the lubrication hole in the adjacent construction.

6) If there is a possibility of settling, the fixing screws should be secured against rotation.

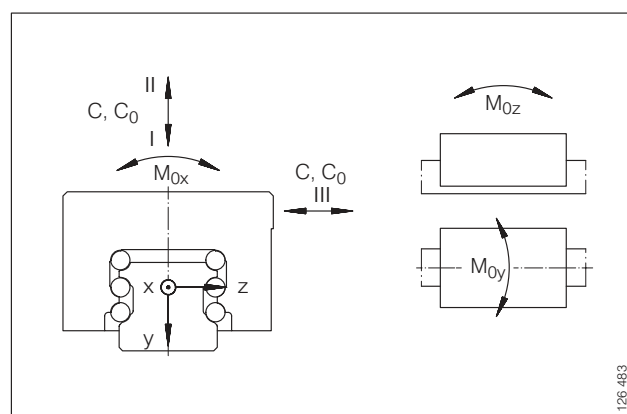
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁶⁾						
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₇ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.
KUSE 20 HL	M5	10	M5	10	M6	17
KUSE 25 HL	M6	17	M6	17	M6	17
KUSE 30 HL	M8	41	M8	41	M8	41
KUSE 35 HL	M8	41	M8	41	M8	41
KUSE 45 HL	M12	140	M10	83	M12	140
KUSE 55 HL	M14	220	M12	140	M14	220



KUSE..HL, plan view X
(rotated through 90°)



C ₁	C ₂	C ₄	C ₅ ³⁾		C ₆ ³⁾		C ₇ ⁴⁾	d ₁ ⁵⁾	H ₁	H ₂	H ₅	H ₆	H ₉	h	h ₁
			min.	max.	min.	max.									
71.8	50	60	20	53	20	53	14.7	3	4.6	5	6.25	5.8	10	18	10.3
83	50	60	20	53	20	53	21.5	3	5.2	5	10	10	12	21.7	12.7
94.7	60	80	20	71	20	71	22.3	4.5	5.5	6	11	9.5	15	25	14
109.4	72	80	20	71	20	71	22.5	4.5	6.6	6.5	14	14.2	15	29.7	18.7
138.2	80	105	20	94	20	94	33.6	6	8.6	9	17	18.5	20	37.2	21.2
157.7	95	120	20	107	20	107	39.2	6	10.8	12	19	20	22	44	27



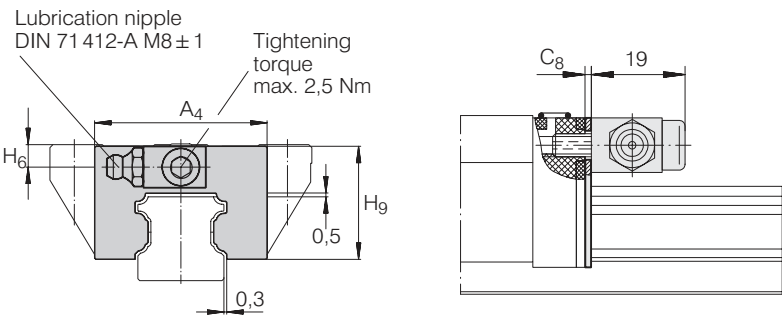
Load directions

PART NUMBER	LOAD CARRYING CAPACITY TABLE								
	BASIC LOAD RATINGS						MOMENT RATINGS		
	LOAD DIRECTION I: COMPRESSIVE LOAD		LOAD DIRECTION II: TENSILE LOAD		LOAD DIRECTION III: LATERAL LOAD		M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
	C kN	C ₀ kN	C kN	C ₀ kN	C kN	C ₀ kN			
KUSE 20 HL	28	72	22.2	46.5	18.9	50	494	619	564
KUSE 25 HL	35.3	93.7	28.9	59.8	24.7	64	736	903	823
KUSE 30 HL	51	113	42.4	84.3	36.5	90	1,265	1,478	1,346
KUSE 35 HL	70	145	57.3	112.4	49.5	120	2,054	2,275	2,072
KUSE 45 HL	98	236	79.3	159	69	170	3,792	4,011	3,654
KUSE 55 HL	125.4	312	100.6	199.4	87	214	5,584	5,633	5,132



Sheet Steel Wiper

APLSE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

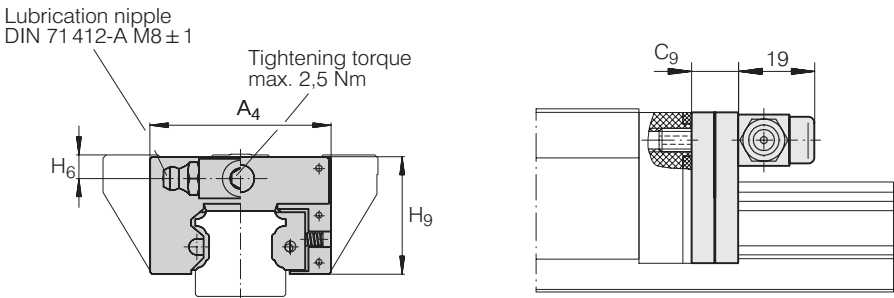
DIMENSION TABLE · Dimensions in mm							
PART NUMBER	MASS g	DIMENSIONS				SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY	
		A ₄	H ₉	C ₈	H ₆		
APLSE 20	26	42.8	24.9	0.8	5.8	KUSE 20	KUSE 20 L
					5.8	KUSE 20 H	KUSE 20 HL
APLSE 25	27	46	30.1	0.8	6	KUSE 25	KUSE 25 L
					10	KUSE 25 H	KUSE 25 HL
APLSE 30	31	58	35.8	0.8	6.5	KUSE 30	KUSE 30 L
					9.5	KUSE 30 H	KUSE 30 HL
APLSe 35	34	68	40.7	0.8	7.2	KUSE 35	KUSE 35 L
					14.2	KUSE 35 H	KUSE 35 HL
APLSE 45	40	84	50.7	0.8	8.5	KUSE 45	KUSE 45 L
					8.5	KUSE 45 H	KUSE 45 HL
APLSE 55	46	96.4	58.5	0.8	10	KUSE 55	KUSE 55 L
					20	KUSE 55 H	KUSE 55 HL

When fitting the wiper, it must be ensured that the gap between the guideway and the sheet steel wiper is of the correct size (see figure above).



Collector Wiper

AB KOL KWSE SERIES



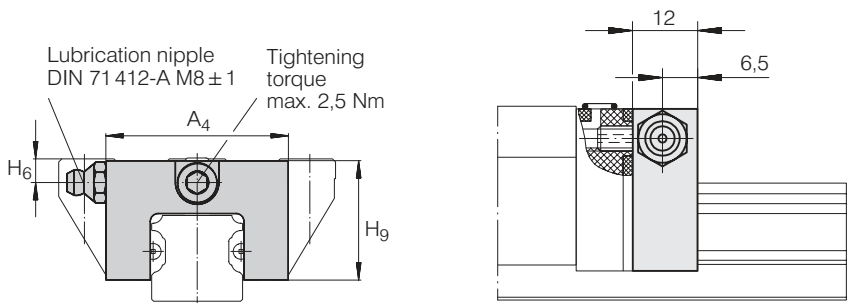
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm							
PART NUMBER	MASS g	DIMENSIONS				SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY	
		A ₄	H ₉	C ₉	H ₆		
AB KOL KWSE 20	46	42.8	24.9	9	5.8	KUSE 20	KUSE 20 L
					5.8	KUSE 20 H	KUSE 20 HL
AB KOL KWSE 25	51	46	30.1	9	6	KUSE 25	KUSE 25 L
					10	KUSE 25 H	KUSE 25 HL
AB KOL KWSE 30	69	58	35.8	9	6.5	KUSE 30	KUSE 30 L
					9.5	KUSE 30 H	KUSE 30 HL
AB KOL KWSE 35	82	68	40.7	9	7.2	KUSE 35	KUSE 35 L
					14.2	KUSE 35 H	KUSE 35 HL
AB KOL KWSE 45	109	84	50.7	11	8.5	KUSE 45	KUSE 45 L
					18.5	KUSE 45 H	KUSE 45 HL
AB KOL KWSE 55	136	96.4	58.5	11	10	KUSE 55	KUSE 55 L
					20	KUSE 55 H	KUSE 55 HL

If the collector wiper AB KOL KWSE is used,
 the covering strip ADBSE or closing plugs KA..M must be used.



Lubrication Adapter Plate BPLSE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm						
PART NUMBER	Mass g	DIMENSIONS			SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY	
		A ₄	H ₉	H ₆		
BPLSE 20	29	42.8	24.9	5.8	KUSE 20	KUSE 20 L
				5.8	KUSE 20 H	KUSE 20 HL
BPLSE 25	35	46	30.1	6	KUSE 25	KUSE 25 L
				10	KUSE 25 H	KUSE 25 HL
BPLSE 30	52	58	35.8	6.5	KUSE 30	KUSE 30 L
				9.5	KUSE 30 H	KUSE 30 HL
BPLSE 35	67	68	40.7	7.2	KUSE 35	KUSE 35 L
				14.2	KUSE 35 H	KUSE 35 HL
BPLSE 45	98	84	50.7	8.5	KUSE 45	KUSE 45 L
				18.5	KUSE 45 H	KUSE 45 HL
BPLSE 55	128	96.4	58.5	10	KUSE 55	KUSE 55 L
				20	KUSE 55 H	KUSE 55 HL

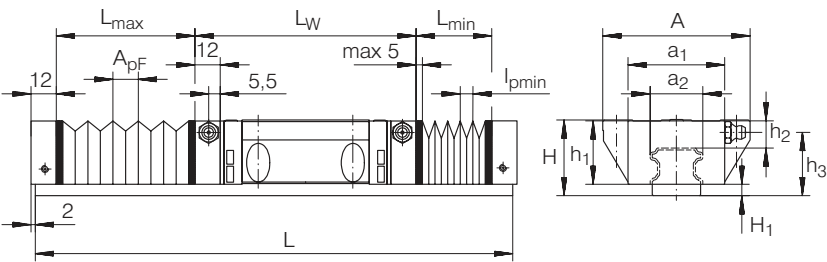
The lubrication nipple to DIN 71412-A M8 ± 1
 can be replaced by a screw plug M8 ± 1.

Note:
 In series KUSE..H and KUSE..HL, the lubrication nipple protrudes
 about 9 mm from the side of the carriage.



Bellows

FBALG KWSE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

Dimension table · Dimensions in mm												
PART NUMBER	DIMENSIONS										SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY	
	A	a ₁ ¹⁾	a ₂	H	H ₁	h ₁	h ₂	h ₃	A _{pF} ²⁾	l _{p min} ³⁾		
FBALG KWSE 20	63	42.8	21	30	4.8	24.9	11	24.2	14.5	2.5	KUSE 20	KUSE 20 L
	44			30							KUSE 20 H	KUSE 20 HL
FBALG KWSE 25	70	46	24	36	5.4	30.1	11	30	14.5	2.5	KUSE 25	KUSE 25 L
	48			40							KUSE 25 H	KUSE 25 HL
FBALG KWSE 30	90	58	29	42	5.7	35.8	14	35.5	18	2.5	KUSE 30	KUSE 30 L
	60			45							KUSE 30 H	KUSE 30 HL
FBALG KWSE 35	100	68	35	48	6.8	40.7	16	40.8	22.5	2.5	KUSE 35	KUSE 35 L
	70			55							KUSE 35 H	KUSE 35 HL
FBALG KWSE 45	120	84	46	60	8.8	50.7	19	51.5	27	2.5	KUSE 45	KUSE 45 L
	86			70							KUSE 45 H	KUSE 45 HL
FBALG KWSE 55	140	96.4	56	70	11	58.5	21	60	31.5	2.5	KUSE 55	KUSE 55 L
	100			80							KUSE 55 H	KUSE 55 HL

1) Maximum width of bellows in end gauge.
 2) Expansion per pleat.
 3) Compression per pleat.



Four-Row Linear Recirculating Ball Bearing And Guideway Assembly

KUVE, KUVE..L, KUVE..N SERIES

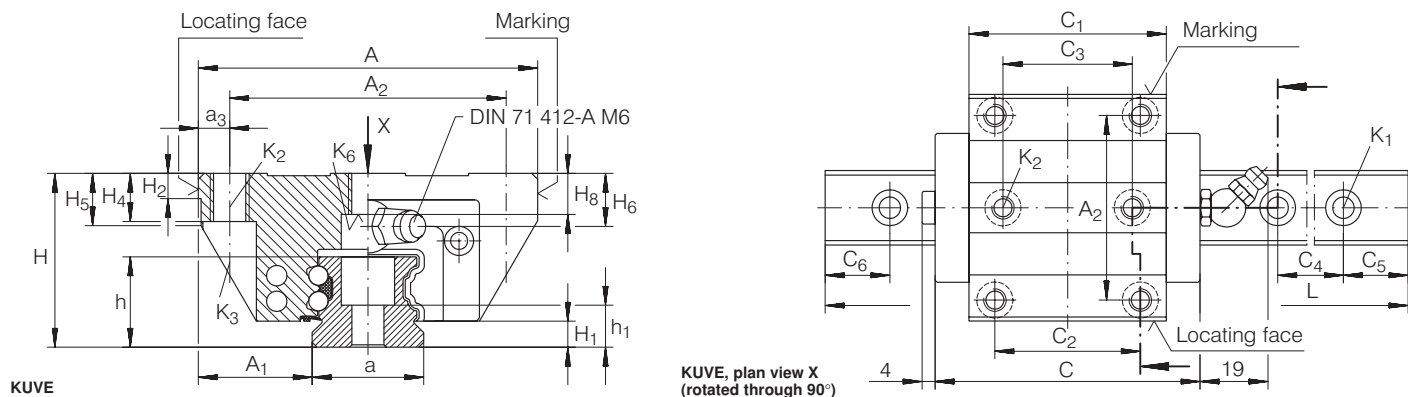
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm													
UNIT	CARRIAGE		GUIDEWAYS			DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	CLOSING PLUGS	L ¹⁾	H	A	C	A ₁	A ₂	a -0.005 -0.03	a ₃
KUVE 15	KWVE 15	0.25	TKVD 15	1.5	KA 08 TN A	1200	24	47	55.6	16	38	15	4.5
KUVE 20	KWVE 20	0.58	TKVD 20	2.2	KA 10 TN A	1980	30	63	69.8	21.5	53	20	5
KUVE 20 L	KWVE 20 L	0.8	TKVD 20	2.2	KA 10 TN A	1980	30	63	87.3	21.5	53	20	5
KUVE 20 N	KWVE 20 N	0.47	TKVD 20	2.2	KA 10 TN A	1980	27	63	69.8	21.5	53	20	5
KUVE 25	KWVE 25	0.71	TKVD 25	2.7	KA 11 TN A	1980	36	70	81.7	23.5	57	23	6.5
KUVE 25 L	KWVE 25 L	1	TKVD 25	2.7	KA 11 TN A	1980	36	70	107.5	23.5	57	23	6.5
KUVE 25 N	KWVE 25 N	0.57	TKVD 25	2.7	KA 11 TN A	1980	31	70	81.7	23.5	57	23	6.5
KUVE 30	KWVE 30	1.4	TKVD 30	4.3	KA 15 TN A	2000	42	90	97.6	31	72	28	9
KUVE 30 L	KWVE 30 L	1.83	TKVD 30	4.3	KA 15 TN A	2000	42	90	122.6	31	72	28	9
KUVE 30 N	KWVE 30 N	1.12	TKVD 30	4.3	KA 15 TN A	2000	38	90	97.6	31	72	28	9
KUVE 35	KWVE 35	2.02	TKVD 35	5.7	KA 15 TN A	2960	48	100	110.4	33	82	34	9
KUVE 35 L	KWVE 35 L	2.71	TKVD 35	5.7	KA 15 TN A	2960	48	100	140.2	33	82	34	9
KUVE 35 N	KWVE 35 N	1.62	TKVD 35	5.7	KA 15 TN A	2960	44	100	110.4	33	82	34	9
KUVE 45	KWVE 45	3.75	TKVD 45	9.2	KA 20 TN A	2940	60	120	139	37.5	100	45	10
KUVE 45 L	KWVE 45 L	4.7	TKVD 45	9.2	KA 20 TN A	2940	60	120	167.5	37.5	100	45	10
KUVE 45 N	KWVE 45 N	3	TKVD 45	9.2	KA 20 TN A	2940	52	120	139	37.5	100	45	10

- 1) Maximum length L of single piece guideway;
longer guideways are supplied as multi-piece guideways and are marked accordingly.
2) Dimensions C₅ and C₆ are dependent on the guideway length L; see page NO TAG for calculation method.
3) When mounting from above: maximum length of fixing screw for the central fixing holes H₆ +3mm.
4) If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁴⁾										
PART NUMBER	K ₁ For screws to DIN 912-12.9		K ₂ For screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₆ Through holes for screws to DIN 7 984-8.8		K ₆ Through holes for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.		Nm max.		Nm max.
KUVE 15	M4	5	M5	5.8	M4	5	M4	2.8	—	—
KUVE 20	M5	10	M6	10	M5	10	—	—	M5	10
KUVE 20 L	M5	10	M6	10	M5	10	—	—	M5	10
KUVE 20 N	M5	10	M6	10	M5	10	M5	5.8	—	—
KUVE 25	M6	17	M8	24	M6	17	—	—	M6	17
KUVE 25 L	M6	17	M8	24	M6	17	—	—	M6	17
KUVE 25 N	M6	17	M8	24	M6	17	M6	10	—	—
KUVE 30	M8	41	M10	41	M8	41	M8	24	—	—
KUVE 30 L	M8	41	M10	41	M8	41	M8	24	—	—
KUVE 30 N	M8	41	M10	41	M8	41	M8	24	—	—
KUVE 35	M8	41	M10	41	M8	41	—	—	M8	41
KUVE 35 L	M8	41	M10	41	M8	41	—	—	M8	41
KUVE 35 N	M8	41	M10	41	M8	41	M8	24	—	—
KUVE 45	M12	140	M12	83	M10	83	—	—	M10	83
KUVE 45 L	M12	140	M12	83	M10	83	—	—	M10	83
KUVE 45 N	M12	140	M12	83	M10	83	M10	48	—	—





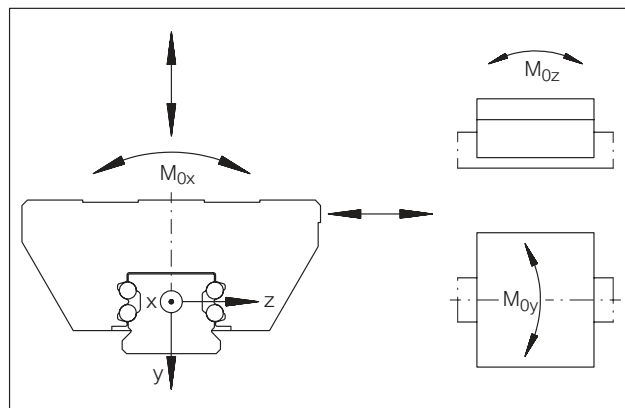
DIMENSION TABLE - Dimensions in mm

MOUNTING DIMENSIONS

C ₁	C ₂	C ₃	C ₄	C ₅ ²⁾ min.	C ₅ ²⁾ max.	C ₆ ²⁾ min.	C ₆ ²⁾ max.	H ₁	H ₂	H ₄	H ₅	H ₆	H ₈ ³⁾	h	h ₁
39.8	30	26	60	20	53	20	53	4.5	4.5	7.6	7.6	4	5.8	15.1	8.2
50.4	40	35	60	20	53	20	53	4.8	5	10	11	4.8	7.5	17	9.1
67.9	40	35	60	20	53	20	53	4.8	5	10	11	4.8	7.5	17	9.1
50.4	40	35	60	20	53	20	53	4.8	5	8	8.6	4.8	6	17	9.1
60.7	45	40	60	20	53	20	53	5.4	5	10	10.9	4.8	10	18.7	8.7
86.5	45	40	60	20	53	20	53	5.4	5	10	10.9	4.8	10	18.7	8.7
60.7	45	40	60	20	53	20	53	5.4	5	10	9.3	4.8	8	18.7	8.7
72	52	44	80	20	71	20	71	6.2	6	12	13.8	4.8	12	23.5	11.5
97	52	44	80	20	71	20	71	6.2	6	12	13.8	4.8	12	23.5	11.5
72	52	44	80	20	71	20	71	6.2	6	12	9.8	4.8	9	23.5	11.5
80	62	52	80	20	71	20	71	7	6.5	13	14.3	4.8	12	27	15
109.8	62	52	80	20	71	20	71	7	6.5	13	14.3	4.8	12	27	15
80	62	52	80	20	71	20	71	7	6.5	13	10.3	4.8	11.7	27	15
102.5	80	60	105	20	94	20	94	10	9	15	19.8	4.8	15	34.2	16.2
131.1	80	60	105	20	94	20	94	10	9	15	19.8	4.8	15	34.2	16.2
102.5	80	60	105	20	94	20	94	10	9	15	17.2	4.8	11	34.2	16.2

LOAD CARRYING CAPACITY TABLE

PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	C	C ₀	M _{0x}	M _{0y}	M _{0z}
	kN	kN	Nm	Nm	Nm
KUVE 15	7.2	14.5	150	100	100
KUVE 20	13.1	27	332	240	240
KUVE 20 L	16.2	36.5	452	430	430
KUVE 20 N	13.1	27	332	240	240
KUVE 25	17.9	37	510	395	395
KUVE 25 L	23.4	54	745	825	825
KUVE 25 N	17.9	37	510	395	395
KUVE 30	27.5	55	970	700	700
KUVE 30 L	34.5	74	1310	1240	1240
KUVE 30 N	27.5	55	970	700	700
KUVE 35	38	72	1465	1020	1020
KUVE 35 L	47.5	100	2025	1890	1890
KUVE 35 N	38	72	1465	1020	1020
KUVE 45	69	141	3610	2485	2485
KUVE 45 L	82	181	4635	4000	4000
KUVE 45 N	69	141	3610	2485	2485



Load directions

Four-Row Linear Recirculating Ball Bearing And Guideway Assembly

KUVE..S, KUVE..SN, KUVE..H SERIES

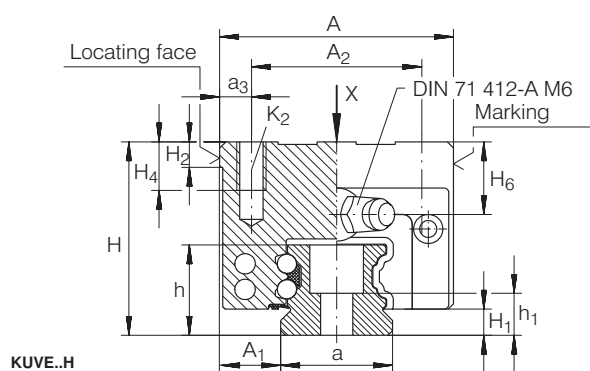
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm													
UNIT	CARRIAGE		GUIDEWAYS			DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	CLOSING PLUGS	L ¹⁾	H	A	C	A ₁	A ₂	a -0.005 -0.03	a ₃
KUVE 15 S	KWVE 15 S	0.19	TKVD 15	1.5	KA 08 TN A	1200	24	34	55.6	9.5	26	15	4
KUVE 15 H	KWVE 15 H	0.23	TKVD 15	1.5	KA 08 TN A	1200	28	34	55.6	9.5	26	15	4
KUVE 20 S	KWVE 20 S	0.46	TKVD 20	2.2	KA 10 TN A	1980	30	44	69.8	12	32	20	6
KUVE 20 SN	KWVE 20 SN	0.36	TKVD 20	2.2	KA 10 TN A	1980	27	44	69.8	12	32	20	6
KUVE 25 S	KWVE 25 S	0.56	TKVD 25	2.7	KA 11 TN A	1980	36	48	81.7	12.5	35	23	6.5
KUVE 25 SN	KWVE 25 SN	0.45	TKVD 25	2.7	KA 11 TN A	1980	31	48	81.7	12.5	35	23	6.5
KUVE 25 H	KWVE 25 H	0.65	TKVD 25	2.7	KA 11 TN A	1980	40	48	81.7	12.5	35	23	6.5
KUVE 30 S	KWVE 30 S	1.09	TKVD 30	4.3	KA 15 TN A	2000	42	60	97.6	16	40	28	10
KUVE 30 SN	KWVE 30 SN	0.87	TKVD 30	4.3	KA 15 TN A	2000	38	60	97.6	16	40	28	10
KUVE 30 H	KWVE 30 H	1.27	TKVD 30	4.3	KA 15 TN A	2000	45	60	97.6	16	40	28	10
KUVE 35 S	KWVE 35 S	1.6	TKVD 35	5.7	KA 15 TN A	2960	48	70	110.4	18	50	34	10
KUVE 35 SN	KWVE 35 SN	1.27	TKVD 35	5.7	KA 15 TN A	2960	44	70	110.4	18	50	34	10
KUVE 35 H	KWVE 35 H	1.84	TKVD 35	5.7	KA 15 TN A	2960	55	70	110.4	18	50	34	10
KUVE 45 S	KWVE 45 S	2.8	TKVD 45	9.2	KA 20 TN A	2940	60	86	139	20.5	60	45	13
KUVE 45 SN	KWVE 45 SN	2.3	TKVD 45	9.2	KA 20 TN A	2940	52	86	139	20.5	60	45	13
KUVE 45 H	KWVE 45 H	3.5	TKVD 45	9.2	KA 20 TN A	2940	70	86	139	20.5	60	45	13

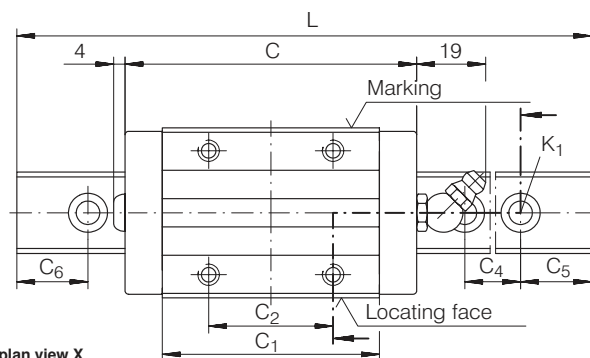
- 1) Maximum length L of single piece guideway;
longer guideways are supplied as multi-piece guideways and are marked accordingly.
2) Dimensions C_s and C_s are dependent on the guideway length L; see page NO TAG for calculation method.
3) When mounting from above: maximum length of fixing screw for the central fixing holes H₆ +3mm.
4) If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁴⁾				
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9	
		Nm max.		Nm max.
KUVE 15 S	M4	5	M4	5
KUVE 15 H	M4	5	M4	5
KUVE 20 S	M5	10	M5	10
KUVE 20 SN	M5	10	M5	10
KUVE 25 S	M6	17	M6	17
KUVE 25 SN	M6	17	M6	17
KUVE 25 H	M6	17	M6	17
KUVE 30 S	M8	41	M8	41
KUVE 30 SN	M8	41	M8	41
KUVE 30 H	M8	41	M8	41
KUVE 35 S	M8	41	M8	41
KUVE 35 SN	M8	41	M8	41
KUVE 35 H	M8	41	M8	41
KUVE 45 S	M12	140	M10	83
KUVE 45 SN	M12	140	M10	83
KUVE 45 H	M12	140	M10	83





KUVE..H, plan view X
(rotated through 90°)



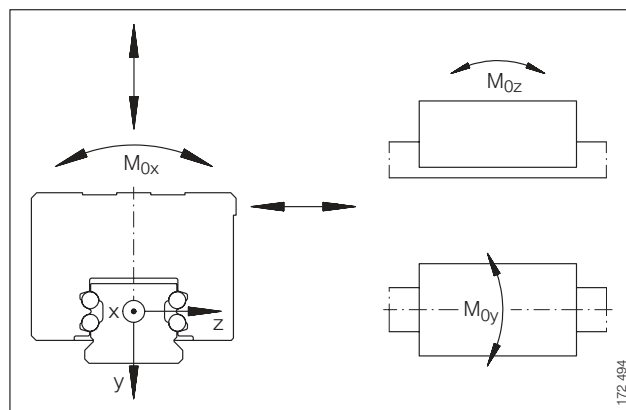
DIMENSION TABLE • Dimensions in mm

MOUNTING DIMENSIONS

C ₁	C ₂	C ₄	C ₅ ⁽²⁾ min.	C ₅ ⁽²⁾ max.	C ₆ ⁽²⁾ min.	C ₆ ⁽²⁾ max.	H ₁	H ₂	H ₄	H ₆	h	h ₁
39.8	26	60	20	53	20	53	4.5	4.5	6	4	15.1	8.2
39.8	26	60	20	53	20	53	4.5	4.5	6	8	15.1	8.2
50.4	36	60	20	53	20	53	4.8	5	7.5	8	17	9.1
50.4	36	60	20	53	20	53	4.8	5	7.5	5	17	9.1
60.7	35	60	20	53	20	53	5.4	5	10	11	18.7	8.7
60.7	35	60	20	53	20	53	5.4	5	8	6	18.7	8.7
60.7	35	60	20	53	20	53	5.4	5	10	15	18.7	8.7
72	40	80	20	71	20	71	6.2	6	13.5	11.25	23.5	11.5
72	40	80	20	71	20	71	6.2	6	11	7.25	23.5	11.5
72	40	80	20	71	20	71	6.2	6	13.5	14.25	23.5	11.5
80	50	80	20	71	20	71	7	6.5	13.5	12.3	27	15
80	50	80	20	71	20	71	7	6.5	13.5	8.3	27	15
80	50	80	20	71	20	71	7	6.5	13.5	19.3	27	15
102.5	60	105	20	94	20	94	10	9	17	16.5	34.2	16.2
102.5	60	105	20	94	20	94	10	9	16.5	8.5	34.2	16.2
102.5	60	105	20	94	20	94	10	9	17	26.5	34.2	16.2

LOAD CARRYING CAPACITY TABLE

PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE 15 S	7.2	14.5	150	100	100
KUVE 15 H	7.2	14.5	150	100	100
KUVE 20 S	13.1	27	332	240	240
KUVE 20 SN	13.1	27	332	240	240
KUVE 25 S	17.9	37	510	395	395
KUVE 25 SN	17.9	37	510	395	395
KUVE 25 H	17.9	37	510	395	395
KUVE 30 S	27.5	55	970	700	700
KUVE 30 SN	27.5	55	970	700	700
KUVE 30 H	27.5	55	970	700	700
KUVE 35 S	38	72	1465	1020	1020
KUVE 35 SN	38	72	1465	1020	1020
KUVE 35 H	38	72	1465	1020	1020
KUVE 45 S	69	141	3610	2485	2485
KUVE 45 SN	69	141	3610	2485	2485
KUVE 45 H	69	141	3610	2485	2485



Load directions

Four-row Linear Recirculating Ball Bearing And Guideway Assembly

KUVE..W, KUVE..WL SERIES

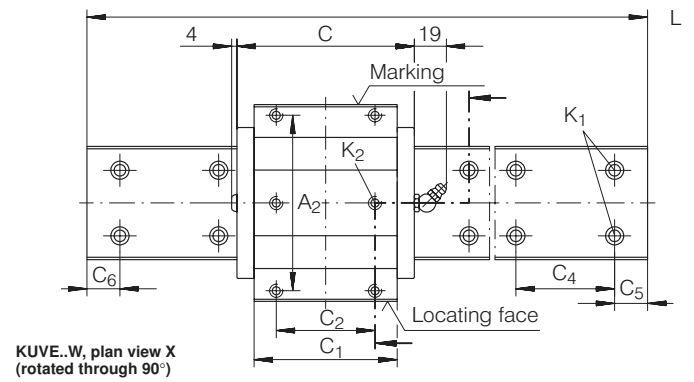
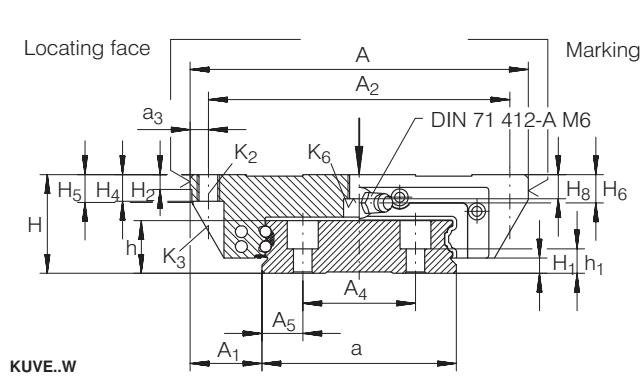
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
UNIT PART NUMBER	CARRIAGE		GUIDEWAY			DIMENSIONS				MOUNTING DIMENSIONS			
	PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	CLOSING PLUGS	L ¹⁾	H	A	C	A ₁	A ₂	A ₄	A ₅
KUVE 20 W	KWVE 20 W	0.56	TKVD 20 W	5	KA 08..A	1,500	27	80	69.8	19	70	24	9
KUVE 25 WL	KWVE 25 WL	1.46	TKVD 25 W	9.4	KA 11..A	1,980	35	120	107.8	25.5	107	40	14.5
KUVE 30 W	KWVE 30 W	1.95	TKVD 30 W	13.6	KA 15..A	2,000	42	142	97.6	31	124	50	15
KUVE 35 WL	KWVE 35 WL	4.11	TKVD 35 W	17.4	KA 15..A	2,960	50	162	140.2	36	144	60	15

- 1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 3) When mounting from above: maximum length of fixing screw for the central fixing holes H₈ +3 mm.
- 4) If there is a possibility of settling, the fixing screws should be secured against rotation.

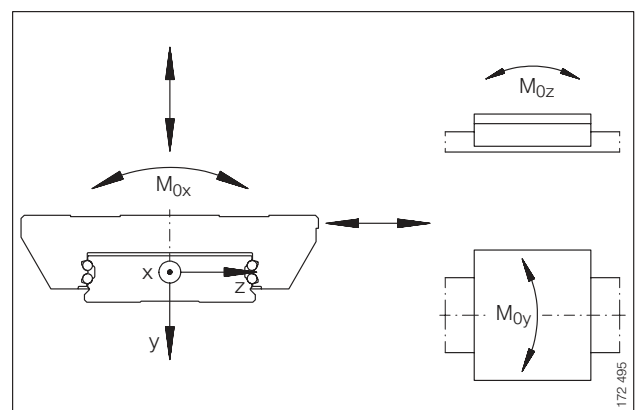
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁵⁾										
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₃ for screws to DIN 912-12.9		K ₆ for screws to DIN 7984–8.8		K ₆ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.		Nm max.		Nm max.
KUVE 20 W	M4	5	M6	10	M5	10	M5	5.8	–	–
KUVE 25 WL	M6	17	M8	24	M6	17	–	–	M6	17
KUVE 30 W	M8	41	M10	41	M8	41	M8	24	–	–
KUVE 35 WL	M8	41	M10	41	M8	41	–	–	M8	41





a -0.005 -0.030	a ₃	C ₁	C ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		H ₁	H ₂	H ₄	H ₅	H ₆	H ₈ ³⁾	h	h ₁
					min.	max.	min.	max.								
42	5	50.4	40	60	20	53	20	53	4.6	5	10	10.6	5	6	17	10
69	6.5	86.5	60	80	20	71	20	71	5.2	5	10	9.9	10	10	18.7	8.7
80	9	72	52	80	20	71	20	71	6	6	12	13.8	11.25	12	23.5	11.5
90	9	109.8	80	80	20	71	20	71	6.8	6.5	13	16.3	14.3	13	27	15

LOAD CARRYING CAPACITY TABLE						
PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS			
	C kN	C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm	
KUVE 20 W	13.1	26.9	687	240	240	
KUVE 25 WL	23.4	54	2,225	825	825	
KUVE 30 W	27.5	55	2,660	700	700	
KUVE 35 WL	47.5	100	5,550	1,890	1,890	



Linear Recirculating Ball Bearing And Guideway Assemblies KUE SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm												
UNIT	CARRIAGE		GUIDEWAY		DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	L ¹⁾	H	A	C	A ₁	A ₂	a -0,004 -0,05	a ₃
KUE 15	KWE 15	0.17	TKD 15	1.5	1,200	24	47	54.5	16	38	15	4.5
KUE 20	KWE 20	0.45	TKD 20	2.2	1,980	30	63	70.5	21.5	53	20	5
KUE 25	KWE 25	0.65	TKD 25	2.8	1,980	36	70	80.7	23.5	57	23	6.5
KUE 30	KWE 30	1.2	TKD 30	4.2	2,000	42	90	93	31	72	28	9
KUE 35	KWE 35	1.7	TKD 35	5.6	2,960	48	100	106.4	33	82	34	9

1) Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways.

2) Dimensions C₅ and C₆ are dependent on the guideway length L.

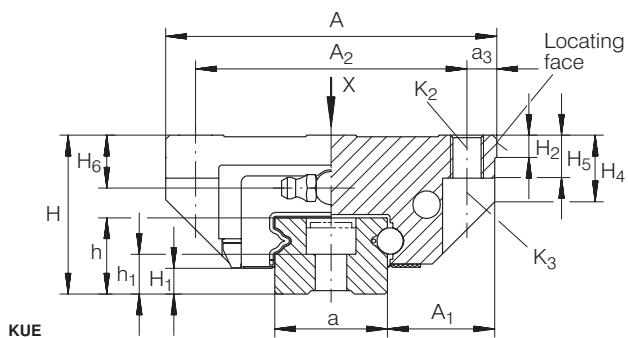
3) Lubrication nipple with tapered head to DIN 71 412, except for KUE 15 (drive fit lubrication nipple).

4) A drive fit lubrication nipple and closing plug are supplied loose with the carriage.

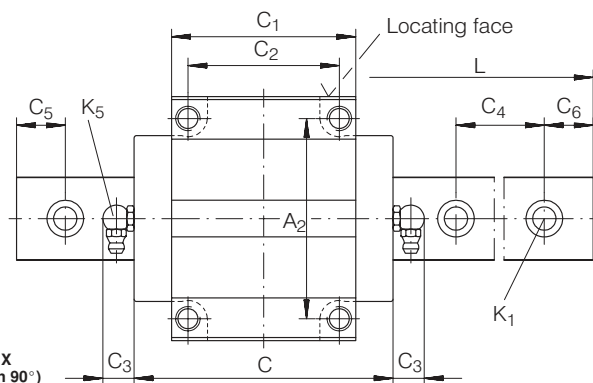
5) If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁵⁾							
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₃ Through holes for screws to DIN 912-12.9		K ₅ ³⁾ Lubrication connector
		Nm max.		Nm max.		Nm max.	
KUE 15	M4	5	M5	5.8	M4	5	NIP A1 ⁴⁾
KUE 20	M5	10	M6	10	M5	10	NIP KE M6
KUE 25	M6	17	M8	24	M6	17	NIP KE M6
KUE 30	M8	41	M10	41	M8	41	NIP KE M6
KuE 35	M8	41	M10	41	M8	41	NIP KE M6



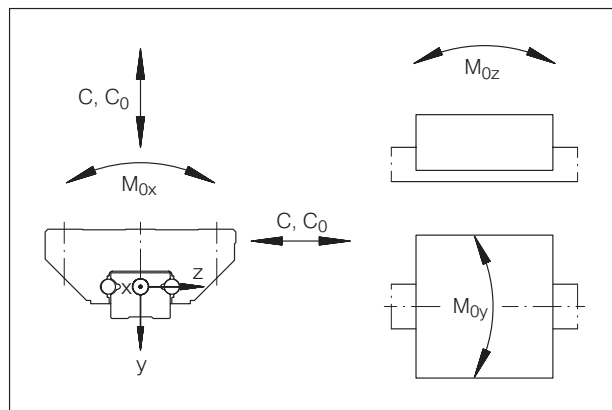


KUE, plan view X
(rotated through 90°)



															ACCESSORIES	
C ₁	C ₂	C ₃	C ₄	C ₅ ²⁾		C ₆ ²⁾		H ₁	H ₂	H ₄	H ₅	H ₆	h	h ₁	CLOSING PLUGS	
				min.	max.	min.	max.									
38.6	30	1.5	60	20	53	20	53	4.8	4.5	7.5	7	4	15	7.7	KA 08 TN	
49.3	40	14	60	20	53	20	53	5	5	11.6	10	6.5	16.5	8.3	KA 10 TN	
56.5	45	14	60	20	53	20	53	6.5	5	11.5	10	10	18	8.7	KA 11 TN	
65.7	52	14	80	20	71	20	71	7	6	14.6	10	13	21.5	10	KA 15 TN	
75.5	62	14	80	20	71	20	71	8	6.5	20.1	13	16	23	11.5	KA 15 TN	

LOAD CARRYING CAPACITY TABLE					
PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	dyn. C kN	stat. C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUE 15	6.5	9.2	73	56	56
KUE 20	13.3	18	190	154	154
KUE 25	16.2	20.9	253	185	185
KUE 30	22.5	29.7	437	335	335
KUE 35	28	37	658	450	450



Load directions



Linear Recirculating Ball Bearing And Guideway Assemblies KUE..H SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm												
Unit PART NUMBER	CARRIAGE		GUIDEWAY		DIMENSIONS				MOUNTING DIMENSIONS			
	PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	L ¹⁾	H	A	C	A ₁	A ₂	a -0.004 -0.05	a ₃
KUE 15 H	KWE 15 H	0.17	TKD 15	1.5	1,200	28	34	54.5	9.5	26	15	4
KUE 20 H	KWE 20 H	0.35	TKD 20	2.2	1,980	30	44	70.5	12	32	20	6
KUE 25 H	KWE 25 H	0.55	TKD 25	2.8	1,980	40	48	80.7	12.5	35	23	6.5
KUE 30 H	KWE 30 H	0.9	TKD 30	4.2	2,000	45	60	93	16	40	28	10
KUE 35 H	KWE 35 H	1.46	TKD 35	5.6	2,960	55	70	106.4	18	50	34	10

¹⁾ Maximum length L of single piece guideway; longer guideways are supplied as multi-piece guideways.

²⁾ Dimensions C₅ and C₆ are dependent on the guideway length L.

³⁾ Maximum length of fixing screw.

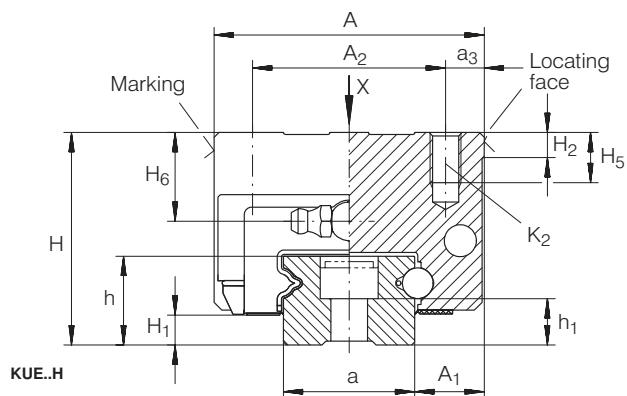
⁴⁾ Lubrication nipple with tapered head to DIN 71 412, except for KUE 15 H (drive fit lubrication nipple).

⁵⁾ A drive fit lubrication nipple and closing plug are supplied loose with the carriage.

⁶⁾ If there is a possibility of settling, the fixing screws should be secured against rotation.

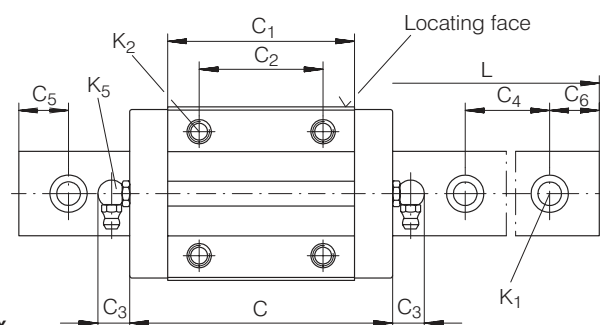
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁶⁾					
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₅ ⁴⁾ Lubrication connector
		Nm max.		Nm max.	
KUE 15 H	M4	5	M4	5	NIP A1 ⁵⁾
KUE 20 H	M5	10	M5	10	NIP KE M6
KUE 25 H	M6	17	M6	17	NIP KE M6
KUE 30 H	M8	41	M8	41	NIP KE M6
KuE 35 H	M8	41	M8	41	NIP KE M6





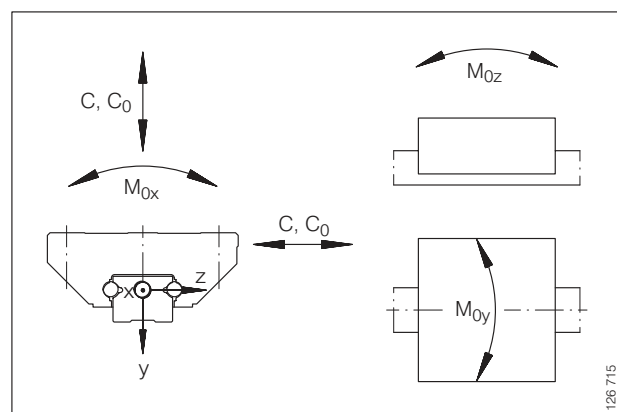
KUE..H

KUE, plan view X
(rotated through 90°)



														ACCESSORIES CLOSING PLUGS
C ₁	C ₂	C ₃	C ₄	C ₅ ²⁾		C ₆ ²⁾		H ₁	H ₂	H ₅ ³⁾	H ₆	h	h ₁	
				min.	max.	min.	max.							
38.6	26	1.5	60	20	53	20	53	4.8	4.5	5	8	15	7.7	KA 08 TN
49.3	36	14	60	20	53	20	53	5	5	6.25	6.5	16.5	8.3	KA 10 TN
56.5	35	14	60	20	53	20	53	6.5	5	8	14	18	8.7	KA 11 TN
65.7	40	14	80	20	71	20	71	7	6	10	16	21.5	10	KA 15 TN
75.5	50	14	80	20	71	20	71	8	6.5	12	23	23	11.5	KA 15 TN

LOAD CARRYING CAPACITY TABLE					
PART NUMBER	BASIC LOAD RATINGS		MOMENT RATINGS		
	dyn. C kN	stat. C ₀ kN	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUE 15 H	6.5	9.2	73	56	56
KUE 20 H	13.3	18	190	154	154
KUE 25 H	16.2	20.9	253	185	185
KUE 30 H	22.5	29.7	437	335	335
KUE 35 H	28	37	658	450	450

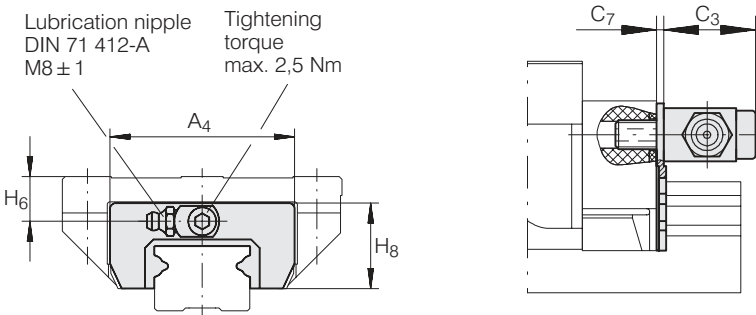


Load directions



Sheet Steel Wiper

APLE SERIES



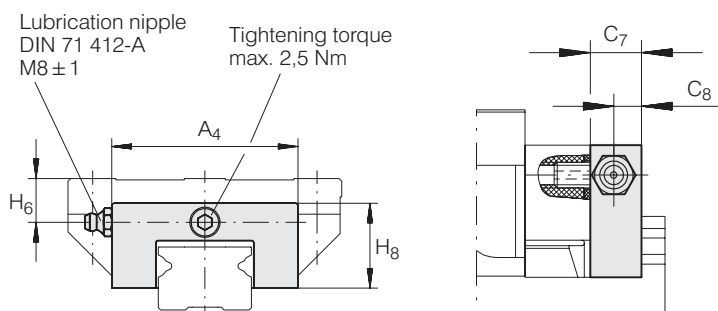
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm							
PART NUMBER	MASS g	DIMENSIONS					SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY
		A ₄	H ₈	C ₃	C ₇	H ₆	
APLE 20	35	40	24	19	1.2	6.5	KUE 20
						6.5	KUE 20 H
APLE 25	39	44	25.3	19	1.2	10	KUE 25
						14	KUE 25 H
APLE 30	43	55	28	19	1.2	13	KUE 30
						16	KUE 30 H
APLE 35	47	66	30.5	19	1.5	16	KUE 35
						23	KUE 35 H

1) When fitting the sheet steel wiper, it must be ensured that there is an even gap of ca. 0.1 mm between the guideway and the wiper.



Lubrication Adapter Plate BPLE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

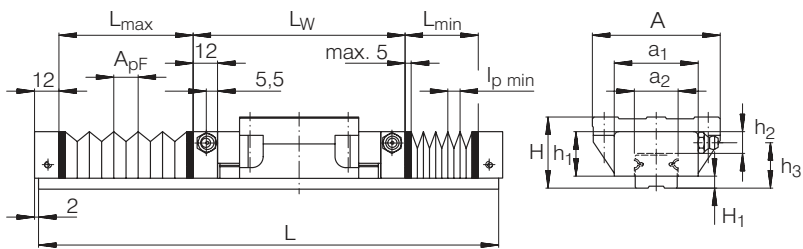
DIMENSION TABLE - Dimensions in mm							
PART NUMBER	MASS g	DIMENSIONS					SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY
		A ₄	H ₈	C ₇	C ₈	H ₆	
BPLE 20	25	42	23.5	12	6.5	6.5	KUE 20
						6.5	KUE 20 H
BPLE 25	34	46.5	26	12	6.5	10	KUE 25
						14	KUE 25 H
BPLE 30	44	58	28	12	6.5	13	KUE 30
						16	KUE 30 H
BPLE 35	54	68	31	12	6.5	16	KUE 35
						23	KUE 35 H

The lubrication nipple to DIN 71 412-A M8 ± 1
can be replaced by a screw plug M8 ± 1.

Note:
In series KUE..H, the lubrication nipple protrudes about 9 mm
from the side of the carriage.

Bellows

FBALG KWE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm											
PART NUMBER	DIMENSIONS										SUITABLE FOR LINEAR RECIRCULATING BALL BEARING AND GUIDEWAY ASSEMBLY
	A	a ₁ ¹⁾	a ₂	H	H ₁	h ₁	h ₂	h ₃	A _{pF} ²⁾	l _{p min} ³⁾	
FBALG KWE 20	63	42	21	30	5.5	23.5	12	23.5	13	2.5	KUE 20
	44	42	21	30	5.5	23.5	12	23.5	13	2.5	KUE 20 H
FBALG KWE 25	70	46.5	24	36	6.5	26	14	26	13	2.5	KUE 25
	48	46.5	24	40	6.5	26	14	26	13	2.5	KUE 25 H
FBALG KWE 30	90	58	29	42	7.5	28	13.5	29	15.5	2.5	KUE 30
	60	58	29	45	7.5	28	13.5	29	15.5	2.5	KUE 30 H
FBALG KWE 35	100	68	35	48	8	31	15.5	32	19	2.5	KUE 35
	70	68	35	55	8	31	15.5	32	19	2.5	KUE 35 H

1) Maximum width of bellows in end gauge.
 2) Expansion per pleat.
 3) Compression per pleat.



Linear Ball Bearing Units

KUVS SERIES

Guideways

TKVD SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

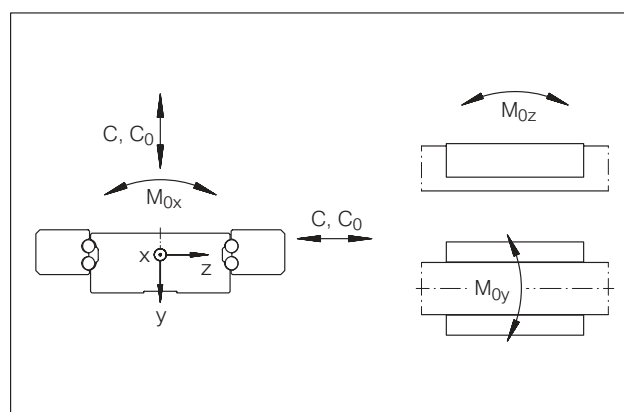
For engineering or technical information contact your local sales representative or call Distributor Sales

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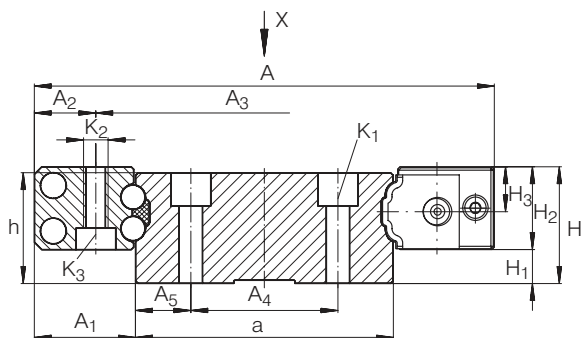
DIMENSION TABLE · Dimensions in mm															
LINEAR RECIRCULATING BALL BEARING UNITS		GUIDEWAYS			DIMENSIONS						MOUNTING DIMENSIONS				
PART NUMBER	MASS kg	PART NUMBER	MASS kg/m	CLOSING PLUGS	H	A	C	h	a	L ³⁾	A ₁	A ₂	A ₃	A ₄	A ₅
KUVS 32	0.025	TKVD 32	2.3	KA 8 TN	11	51.6	47	10	31.8	2,000	9.9	5.5	40.6	18	6.9
KUVS 42	0.085	TKVD 42	5.54	KA 8 TN	19	75	71	18	42	2,000	16.5	10	55	24	9
KUVS 42	0.085	TKVD 14	1.45	KA 8 TN	15	30	71	14	13.5	1,500	16.5	10	16.2	6	—
KUVS 69	0.2	TKVD 69	12.42	KA 11 TN	25	114	96	24	69	2,000	22.5	13	88	40	14.5
KUVS 69	0.2	TKVD 19	2.66	KA 11 TN	20	42	96	19	19.5	2,000	22.5	13	22.2	8	—

- 1) For two linear ball bearing units with TKVD 32, TKVD 42 and TKVD 69 and for one linear ball bearing unit with TKVD 14 and TKVD 19.
- 2) The usable load carrying capacity is influenced by the connections between the guidance elements and the adjacent construction.
- 3) Maximum length L of a single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 4) Dimensions C₅ and C₆ are dependent on the length of the guideway;
- 5) If there is a possibility of settling, the fixing screws should be secured against rotation.

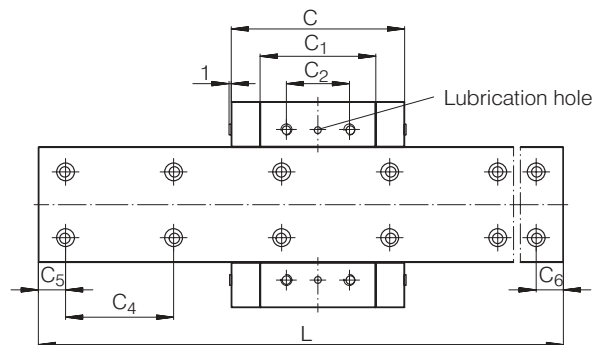
DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁵⁾						
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9		K ₃ for screws to DIN 912-12.9	
		Nm max.		Nm max.		Nm max.
KUVS 32	M3	2.5	M3	1.5	—	—
KUVS 42	M3	2.5	M4	3	M3	2.5
KUVS 69	M5	10	M6	10	M5	10
KUVS 69	M5	10	M6	10	M5	10



Load directions

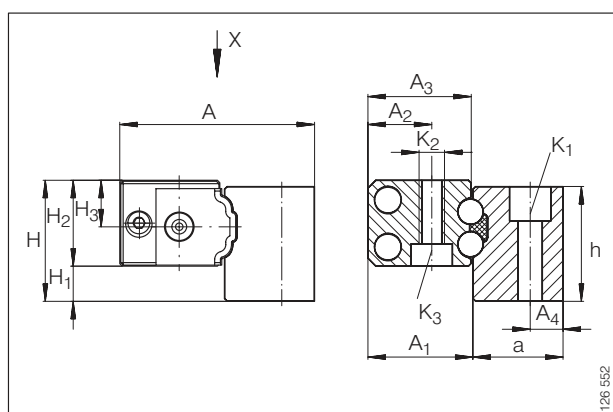


Two KUVS with TKVD 32, TKVD 42 and TKVD 69

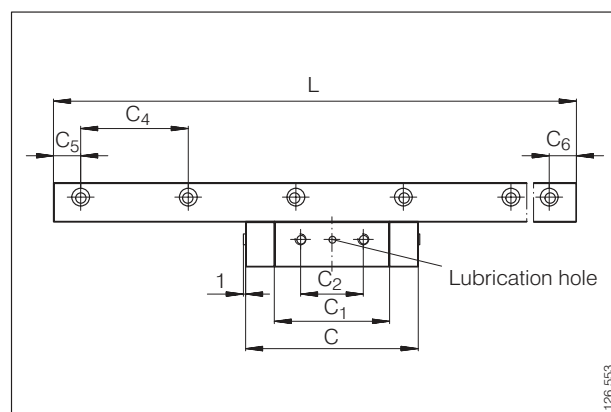


Plan view X (rotated through 90°)

										LOAD CARRYING CAPACITY ¹⁾²⁾				
										BASIC LOAD RATINGS		MOMENT RATINGS		
C ₁	C ₂	C ₄	C ₅ ⁴⁾		C ₆ ⁴⁾		H ₁	H ₂	H ₃	C	C ₀	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
			min.	max.	min.	max.								
29.8	15	40	5	35	5	35	0.5	10.5	6	5.7	10.6	203	51	51
48.5	20	60	5	55	5	55	5.5	13.5	7.3	13.5	26	648	211	211
48.5	20	60	5	55	5	55	1.5	13.5	7.3	6.75	13	—	—	—
64	35	60	7	53	7	53	7.5	17.5	9.5	26	46.5	1,872	492	492
64	35	60	7	53	7	53	2.5	17.5	9.5	13	23.25	—	—	—



KUVS with TKVD 14, TKVD 19 (end view and cross section)



Plan view X (rotated through 90°)

Carriages

KWVK..AL SERIES

Guideways

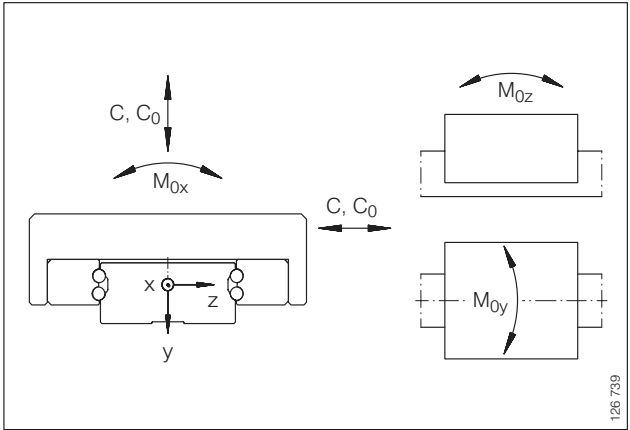
TKVD SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm																		
CARRIAGES		GUIDEWAYS			DIMENSIONS						MOUNTING DIMENSIONS							
PART NUMBER	MASS	PART NUMBER	MASS	CLOSING PLUGS	H	A	C	h	a	L ²⁾	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈
	kg		kg/m															
KWVK 32 AL	0.17	TKVD 32	2.3	KA 8 TN	26	62	50	10	31.8	2,000	15.1	10.7	40.6	18	6.9	51.6	—	—
KWVK 42 AL	0.45	TKVD 42	5.54	KA 8 TN	35	87	75	18	42	2,000	22.5	16	55	24	9	75	31	25
KWVK 69 AL	1.1	TKVD 69	12.42	KA 11 TN	47	130	100	24	69	2,000	30.5	21	88	40	14.5	114	42.5	45

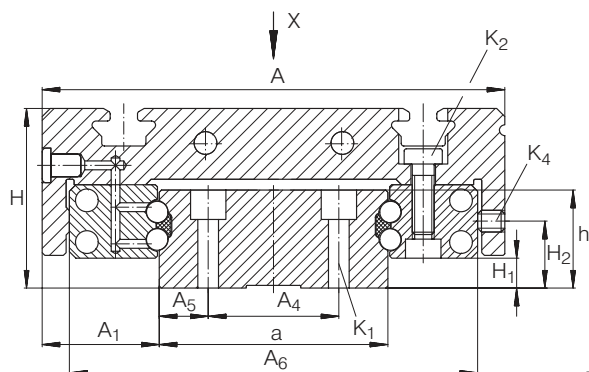
- ¹⁾ The usable load carrying capacity is influenced by the connections between the guidance elements and the adjacent construction.
- ²⁾ Maximum length L of a single piece guideway; longer guideways are supplied as multi-piece guideways and are marked accordingly.
- ³⁾ Dimensions C₅ and C₆ are dependent on the length of the guideway.
- ⁴⁾ If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ⁴⁾					
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 7 984-8.8		K ₄ for screws to DIN 913
		Nm max.		Nm max.	
KWVK 32 AL	M3	2.5	M3	0.6	M3
KWVK 42 AL	M3	2.5	M4	2.1	M4
KWVK 69 AL	M5	10	M6	4.8	M6



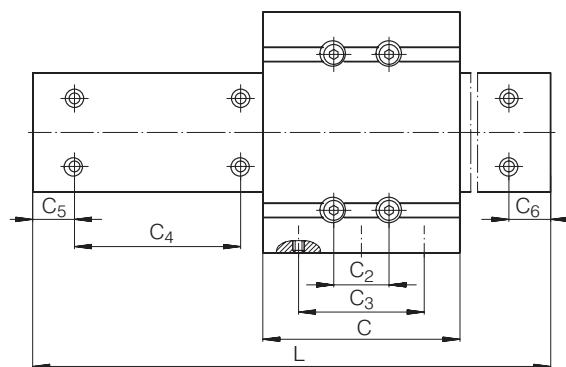
Load directions



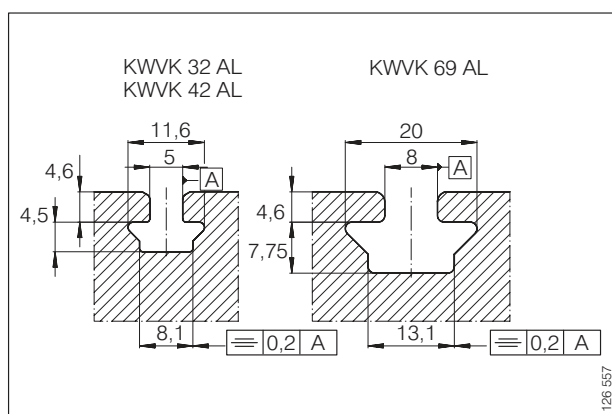


KWVK..AL on TKVD

Plan view X
(rotated through 90°)

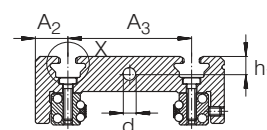


											LOAD CARRYING CAPACITY ¹⁾				
											BASIC LOAD RATINGS		MOMENT RATINGS		
C ₂	C ₃	C ₄	C ₅ ³⁾		C ₆ ³⁾		d	H ₁	H ₂	h ₁	C	C ₀	M _{0x}	M _{0y}	M _{0z}
			min.	max.	min.	max.									
15	25	40	5	35	5	35	4.2	0.5	6	7.5	5.7	10.6	203	51	51
20	40	60	5	55	5	55	4.2	5.5	12	8	13.5	26	648	211	211
35	55	60	7	53	7	53	4.2	7.5	17	11	26	46.5	1872	412	492

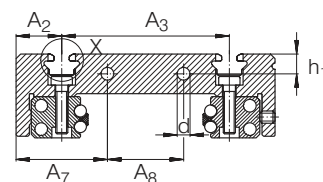


Detail X

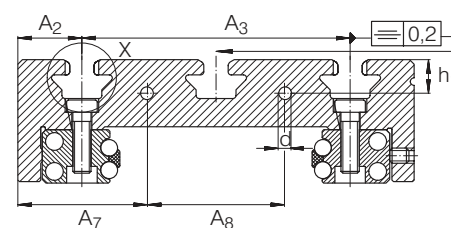
KWVK 32 AL



KWVK 42 AL



KWVK 69 AL



Cross-section of carriages KWVK..AL



Miniature Linear Recirculating Ball Bearing And Guideway Assemblies

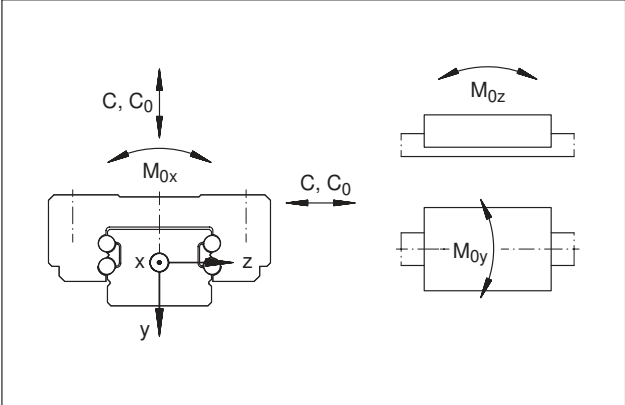
KUME SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
UNIT	CARRIAGE		GUIDEWAY		CLOSING PLUG	DIMENSIONS				MOUNTING DIMENSIONS			
PART NUMBER	PART NUMBER	MASS	PART NUMBER	MASS		L ¹⁾	H	A	C	A ₁	A ₂	a -0.005 -0.05	a ₃
		kg		kg/m									
KUME 9	KWME 9	0.016	TKMD 9	0.31	—	280	10	20	29.15	5.5	15	9	2.5
KUME 12	KWME 12	0.036	TKMD 12	0.56	—	470	13	27	34.3	7.5	20	12	3.5
KUME 15	KWME 15	0.06	TKMD 15	1.1	KA 8 TN	1200	16	32	42	8.5	25	15	3.5

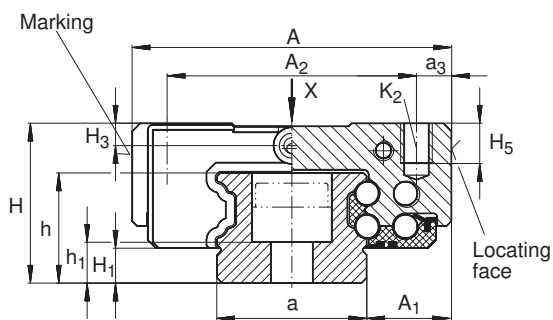
- 1) Maximum length L of single piece guideway;
longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Dimensions C₅ and C₆ are dependent on the guideway length.
- 3) If there is a possibility of settling, the fixing screws should be secured against rotation.

DIAMETERS AND TIGHTENING TORQUES FOR THREADS AND SCREWS ³⁾				
PART NUMBER	K ₁ for screws to DIN 912-12.9		K ₂ for screws to DIN 912-12.9	
		Nm max.		Nm max.
KUME 9	M2	1	M2	0.5
KUME 12	M3	2.5	M3	1.5
KUME 15	M3	2.5	M3	1.5



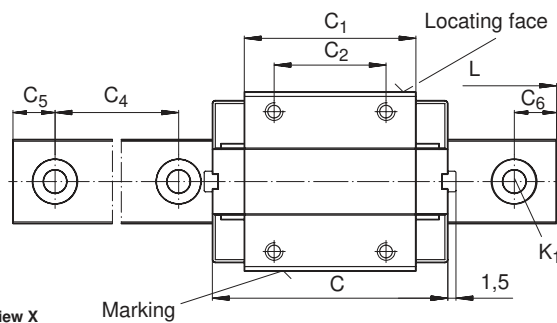
Load directions



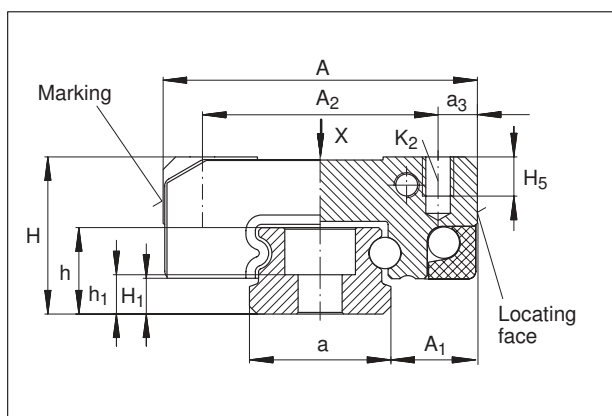


KUME 15

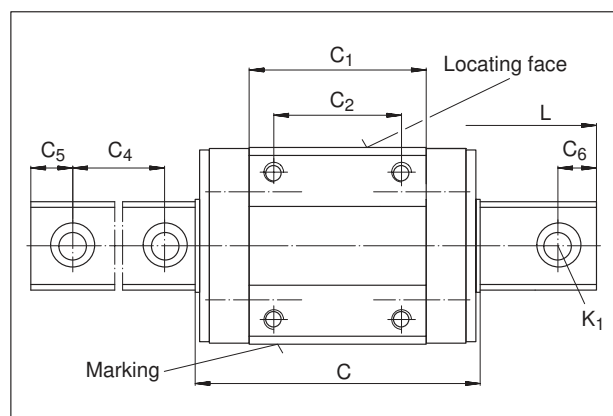
KUME 15, plan view X
(rotated through 90°)



											LOAD CARRYING CAPACITY				
											BASIC LOAD RATINGS		MOMENT RATINGS		
											C	C ₀	M _{0x}	M _{0y}	M _{0z}
C ₁	C ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		H ₁	H ₅	h	h ₁	N	N	Nm	Nm	Nm
			min.	max.	min.	max.									
18.35	13	20	5	15	5	15	2.25	2.5	5.5	2.5	1,340	2,060	8.8	5.8	5.8
22	15	25	5	20	5	20	3.05	3.5	7.5	3	2,150	3,200	20.8	11.3	11.3
30.6	20	40	6	34	6	34	3.5	4.0	11	4.1	3,750	6,800	65	33	33



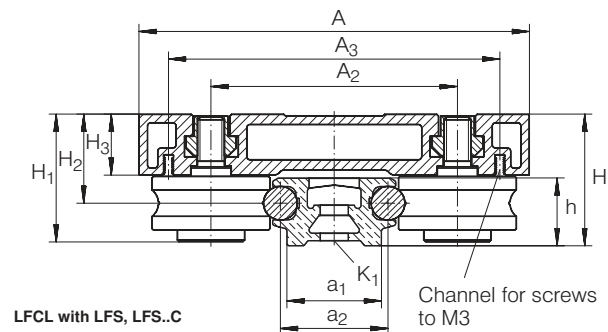
KUME 9, KUME 12



KUME 9, KUME 12, plan view X (rotated through 90°)



Track Roller Linear Guidance
Systems With Hollow Section
Carriage
LFCL SERIES
And Guideways
LFS,LFS..C,LFS..CE,LFS..N SERIES



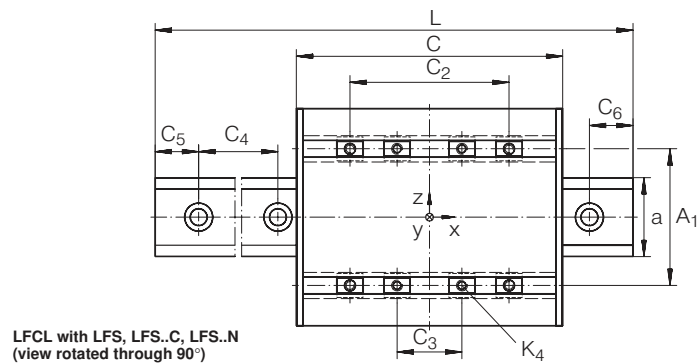
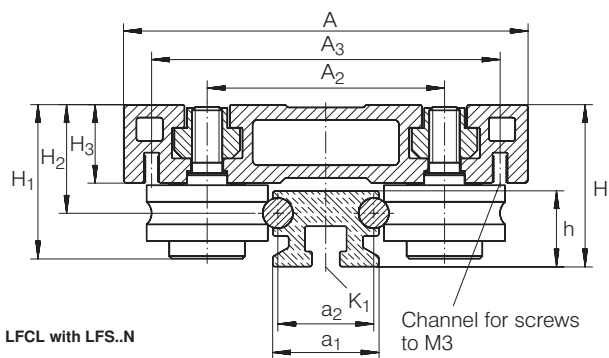
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
CARRIAGE ¹⁾	MASS	CONTAINS TRACK ROLLER	GUIDEWAYS	MASS	DIMENSIONS						MOUNTING DIMENSIONS		
					CARRIAGE			GUIDEWAY					
					H	A	C	h	a	L ²⁾	A ₁	A ₂	A ₃
	≈ g			≈ g/m									
LFCL 25	440	LFR 50/8 KDD	LFS 25	1,100	32	80	110	15	25	2,000	47	47	69
LFCL 25	440	LFR 50/8 KDD	LFS 25 N	1,000	32	80	110	15	25	2,000	47	47	69
LFCL 42	1,000	LFR 5201 KDD	LFS 42 C ¹⁾	2,200	39	116	150	20	42	8,000	73	73	98.5
LFCL 42	1,000	LFR 5201 KDD	LFS 42 CE ¹⁾	2,200	39	116	150	20	42	8,000	73	73	98.5
LFCL 86 ⁷⁾	2,200	LFR 5301 KDD	LFS 86 C ¹⁾	4,400	59	190	235	34	86	8,000	124	124	151.5

- Corrosion-resistant executions: LFCL..VA, LFS..VA. Guideway without holes: LFS..OL.
- 1) The shape of the hollow sections is dependent on the size.
- 2) Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 3) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 4) For screws to DIN 912-8.8, washers to DIN 433 are required for maximum loading.
- 5) Recommended distance between screws.
- 6) For screws to DIN 931/933-8.8, special washers are included in the delivery.
- 7) Additional T-groove in center of carriage.
- 8) Load carrying capacity table is not valid for LFCL..VA and LFS..VA.

LOAD CARRYING CAPACITY TABLE ⁸⁾											
PART NUMBER	LOADS				MOMENTS						
	F _y max N	F _{0y} max N	F _z max N	F _{0z} max N	M _x max Nm	M _{0x} max Nm	M _y max Nm	M _{0y} max Nm	M _z max Nm	M _{0z} max Nm	
LFCL 25 with LFS 25	850	1,400	1,000	1,000	9	15	26	26	22	36	
LFCL 25 with LFS 25 N	850	1,400	1,000	1,000	9	15	26	26	22	36	
LFCL 42 with LFS 42 C	1,500	2,500	3,000	3,000	27	42	127	127	63	106	
LFCL 42 with LFS 42 CE	1,500	2,500	3,500	3,500	27	42	148	148	63	106	
LFCL 86 with LFS 86 C	2,400	4,000	4,500	4,500	74	124	360	360	192	320	





a ₁	a ₂	C ₂	C ₃		C ₄	C ₅ ³⁾		C ₆ ³⁾		H ₁	H ₂	H ₃	K ₁ ⁴⁾	K ₄	MAXIMUM LENGTH OF MOUNTING SCREW FOR K ₄
			min.	max.		min.	max.	min.	max.						
21	19	52	13	26	62.5	10	54	10	54	30.5	21.5	15.4	M5	M6	10
21	19	52	13	26	62.5 ⁵⁾	—	—	—	—	30.5	21.5	15.4	M5 ⁶⁾	M6	10
28	32	85	15	55	125	12	113	12	113	38.1	26.4	18	M8	M8	12
28	32	85	15	55	62.5	12	51	12	51	38.1	26.4	18	M8	M8	12
71	76	155	18	119	250	17	235	17	235	48.4	33.9	23.4	M12	M10	14

Track Roller Linear Guidance Systems With Open Carriage

LFL..SF SERIES

And Guideways

LFS, LFS..C, LFS..CE, LFS..N, LFS..NZZ, LFS..F, LFS..FE SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

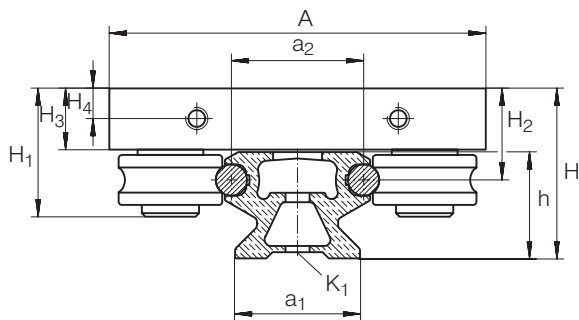
For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

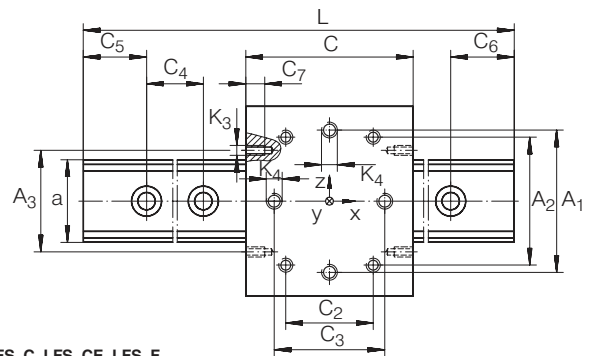
DIMENSION TABLE · Dimensions in mm															
CARRIAGE	MASS	CONTAINS TRACK ROLLER	GUIDEWAYS	MASS	DIMENSIONS						MOUNTING DIMENSIONS				
					CARRIAGE			GUIDEWAY							
					H	A	C	h	a	L ¹⁾	A ₁	A ₂	A ₃	a ₁	a ₂
≈ g	≈ g/m	± 0.2													
LFL 20 SF	160	LFR 50/5 KDD-4	LFS 20	600	22	55	50	12.2	20	2,000	40	34	— ⁸⁾	17	16
LFL 32 SF	400	LFR 50/8 KDD	LFS 32 C	1,100	35.5	80	90	20	32	6,000	59	54	56	24	26
LFL 32 SF	400	LFR 50/8 KDD	LFS 32 CE	1,100	35.5	80	90	20	32	6,000	59	54	56	24	26
LFL 32 SF	400	LFR 50/8 KDD	LFS 32 F	1,000	25.5	80	90	10	32	4,000	59	54	56	—	26
LFL 32 SF	400	LFR 50/8 KDD	LFS 32 N	1,400	35.5	80	90	20	32	6,000	59	54	56	24	26
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52 C	3,000	54.3	120	100	34	52	8,000	90	83	65	40	42
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52 CE	3,000	54.3	120	100	34	52	8,000	90	83	65	40	42
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52 F	3,000	44.2	120	100	18	52	4,000	90	83	65	—	42
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52 NZZ	3,900	54.3	120	100	34	52	8,000	90	83	65	46.5	42
LFL 52 E SF	1,900	LFR 5301 KDD	LFS 52 CE	3,000	60.4	135	150	34	52	8,000	105	90	65	40	42
LFL 52 E SF	1,900	LFR 5301 KDD	LFS 52 FE	3,000	44.2	135	150	18	52	4,000	105	90	65	40	42
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52	4,400	54.3	120	100	34	52	8,000	90	83	65	40	42
LFL 52 SF	1,000	LFR 5201 KDD	LFS 52 E	4,400	54.3	120	100	34	52	8,000	90	83	65	40	42

LOAD CARRYING CAPACITY TABLE ⁷⁾										
PART NUMBER	LOADS				MOMENTS					
	F _{y max} N	F _{0y max} N	F _{z max} N	F _{0z max} N	M _{x max} Nm	M _{0x max} Nm	M _{y max} Nm	M _{0y max} Nm	M _{z max} Nm	M _{0z max} Nm
LFL 20 SF with LFS 20	400	660	700	700	4	6	8.6	8.6	4.8	8
LFL 32 SF with LFS 32 C	850	1,400	930	930	11	18	27	27	26	43
LFL 32 SF with LFS 32 CE	850	1,400	1,300	1,300	11	18	39	39	26	43
LFL 32 SF with LFS 32 F	850	1,400	1,000	1,000	11	18	30	30	26	43
LFL 32 SF with LFS 32 N	850	1,400	1,000	1,000	11	18	30	30	26	43
LFL 52 SF with LFS 52 C	1,500	2,500	2,000	2,000	33	52	60	60	47	78
LFL 52 SF with LFS 52 CE	1,500	2,500	3,500	3,500	33	52	105	105	47	78
LFL 52 SF with LFS 52 F	1,500	2,500	2,500	2,500	33	52	75	75	47	78
LFL 52 SF with LFS 52 NZZ	1,500	2,500	2,500	2,500	33	52	75	75	47	78
LFL 52 E SF with LFS 52 CE	2,400	4,000	4,000	4,000	51	84	208	208	126	210
LFL 52 E SF with LFS 52 FE	2,400	4,000	4,000	4,000	51	84	208	208	126	210





LFL..SF with LFS, LFS..C, LFS..CE

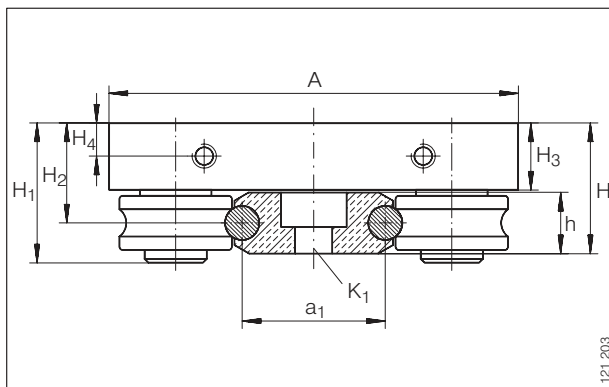


LFL..SF with LFS, LFS..C, LFS..CE, LFS..F, LFS..FE, LFS..N, LFS..NZZ (view rotated through 90°)

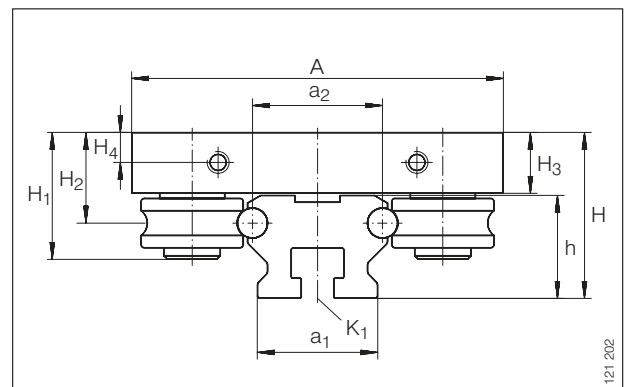
C ₂	C ₃ ±0.2	C ₄	C ₅ ²⁾		C ₆ ²⁾		C ₇	H ₁ max.	H ₂	H ₃	H ₄	K ₁ ³⁾	K ₃	K ₄	M _A ⁴⁾	
			min.	max.	min.	max.									STANDARD Nm	CORROSION- RESISTANT Nm
24	38	62.5	9	54	9	54	—	20.5	13	9	—	M4	M3 ⁸⁾	M5	2.5	2.5
60	70	125	11	116	11	116	7	31.9	20.4	14	7	M6	M6	M8	15	12
60	70	62.5	11	52	11	52	7	31.9	20.4	14	7	M6	M6	M8	15	12
60	70	125	11	116	11	116	7	31.9	20.4	14	7	M6 ⁹⁾	M6	M8	15	12
60	70	125 ⁵⁾	—	—	—	—	7	31.9	20.4	14	7	M6 ⁶⁾	M6	M8	15	12
60	70	250	17	235	17	235	12	46.3	29.2	19.5	9.75	M10	M6	M10	40	23
60	70	125	17	110	17	110	12	46.3	29.2	19.5	9.75	M10	M6	M10	40	23
60	70	250	17	235	17	235	12	46.3	29.2	19.5	9.75	M10 ⁹⁾	M6	M10	40	23
60	70	250 ⁵⁾	—	—	—	—	12	46.3	29.2	19.5	9.75	M10 ⁶⁾	M6	M10	40	23
105	110	125	17	110	17	110	12	53.7	35.2	24	12	M10	M6	M10	40	23
105	110	125	17	110	17	110	12	53.7	35.2	24	12	M10	M6	M10	40	23
60	70	250	17	235	17	235	12	53.5	29.2	19.5	9.75	M10	M6	M10	40	23
60	70	125	17	110	17	110	12	53.5	29.2	19.5	9.75	M10	M6	M10	40	23

Corrosion-resistant executions: LFL..VA, LFS..VA. Guideway without holes: LFS..OL.

- Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- Dimensions C₅ and C₆ are dependent on the guideway length L.
- For screws to DIN 912-8.8, washers to DIN 433 are required for maximum loading.
- Tightening torque for LFZ and LFE, bolts LFZ are supplied tightened to M_A.
- Recommended distance between screws.
- For screws to DIN 931/933-8.8, special washers are included in the delivery.
- Load carrying capacity table is not valid for LFL..VA and LFS..VA.
- Holes for mounting from below for AB LFL 20.
- Countersink depth for screws to DIN 6 912.



LFL..SF with LFS..F, LFS..FE



LFL..SF with LFS..N, LFS..NZZ

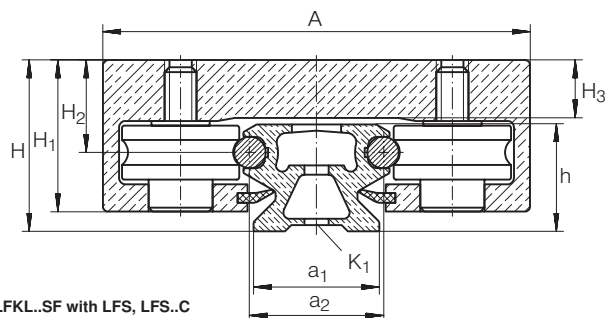


Track Roller Linear Guidance Systems With Compact Carriage

LFKL..SF SERIES

And Guideways

LFS, LFS..C, LFS..CE, LFS..CEE, LFS..F, LFS..FE, LFS..N, LFS..NZZ SERIES



LFKL..SF with LFS, LFS..C

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

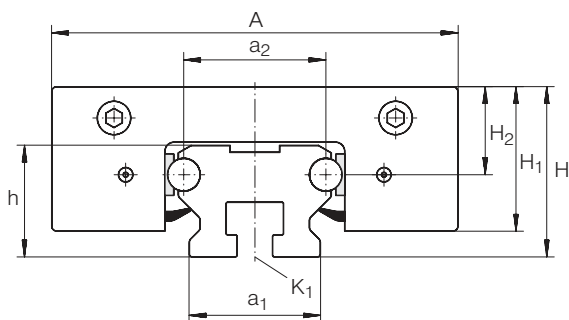
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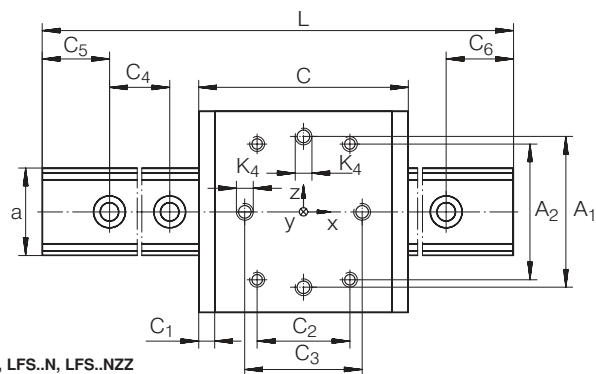
DIMENSION TABLE · Dimensions in mm														
CARRIAGE	MASS	CONTAINS TRACK ROLLER	GUIDEWAYS	MASS	DIMENSIONS						MOUNTING DIMENSIONS			
					CARRIAGE			GUIDEWAY						
					H	A	C	h	a	L ¹⁾	A ₁	A ₂	a ₁	a ₂
	≈ g			≈ g/m										
LFKL 20 SF ⁵⁾	200	LFR 50/5 KDD-4	LFS 20	600	22	56	69	12.2	20	2,000	39	34	17	16
LFKL 25 SF ⁵⁾	300	LFR 50/5 KDD	LFS 25	1,100	25	65	85	15	25	2,000	50	40	21	19
LFKL 25 SF ⁵⁾	300	LFR 50/5 KDD	LFS 25 N	1,000	25	65	85	15	25	2,000	50	40	21	19
LFKL 32 SF	700	LFR 50/8 KDD	LFS 32 C	1,100	35.5	86	112	20	32	6,000	59	54	24	26
LFKL 32 SF	700	LFR 50/8 KDD	LFS 32 CE	1,100	35.5	86	112	20	32	6,000	59	54	24	26
LFKL 32 SF	700	LFR 50/8 KDD	LFS 32 F	1,000	25.5	86	112	10	32	4,000	59	54	—	26
LFKL 32 SF	700	LFR 50/8 KDD	LFS 32 N	1,400	35.5	86	112	20	32	6,000	59	54	24	26
LFKL 52 SF	1,500	LFR 5201 KDD	LFS 52 C	3,000	54.3	130	136	34	52	8,000	90	83	40	42
LFKL 52 SF	1,500	LFR 5201 KDD	LFS 52 CE	3,000	54.3	130	136	34	52	8,000	90	83	40	42
LFKL 52 SF	1,500	LFR 5201 KDD	LFS 52 F	3,000	38.2	130	136	18	52	4,000	90	83	—	42
LFKL 52 SF	1,500	LFR 5201 KDD	LFS 52 NZZ	3,900	54.3	130	136	34	52	8,000	90	83	46.5	42
LFKL 52 E SF	2,900	LFR 5301 KDD	LFS 52 CE	3,000	60.4	145	186	34	52	8,000	105	90	40	42
LFKL 52 E SF	2,900	LFR 5301 KDD	LFS 52 FE	3,000	38.2	145	186	18	52	4,000	105	90	—	42
LFKL 52 EE SF	3,900	LFR 5302 KDD	LFS 52 CEE	4,300	60.4	155	205	34	52	8,000	115	95.3	40	42

LOAD CARRYING CAPACITY TABLE ⁸⁾											
PART NUMBER	LOADS				MOMENTS						
	F _y max N	F _{0y} max N	F _z max N	F _{0z} max N	M _x max Nm	M _{0x} max Nm	M _y max Nm	M _{0y} max Nm	M _z max Nm	M _{0z} max Nm	
LFKL 20 SF with LFS 20	400	660	700	700	4	6	12	12	6.8	11.4	
LFKL 25 SF with LFS 25	400	660	700	700	4	6	16	16	9	15	
LFKL 25 SF with LFS 25 N	400	660	700	700	4	6	16	16	9	15	
LFKL 32 SF with LFS 32 C	850	1,400	930	930	11	18	27	27	26	43	
LFKL 32 SF with LFS 32 CE	850	1,400	1,300	1,300	11	18	39	39	26	43	
LFKL 32 SF with LFS 32 F	850	1,400	1,000	1,000	11	18	30	30	26	43	
LFKL 32 SF with LFS 32 N	850	1,400	1,000	1,000	11	18	30	30	26	43	
LFKL 52 SF with LFS 52 C	1,500	2,500	2,000	2,000	33	52	60	60	47	78	
LFKL 52 SF with LFS 52 CE	1,500	2,500	3,500	3,500	33	52	105	105	47	78	
LFKL 52 SF with LFS 52 F	1,500	2,500	2,500	2,500	33	52	75	75	47	78	
LFKL 52 SF with LFS 52 NZZ	1,500	2,500	2,500	2,500	33	52	75	75	47	78	
LFKL 52 E SF with LFS 52 CE	2,400	4,000	4,000	4,000	51	84	208	208	126	210	
LFKL 52 E SF with LFS 52 FE	2,400	4,000	4,500	4,500	51	84	236	236	126	210	
LFKL 52 EE SF with LFS 52 CEE	4,800	8,000	6,500	6,500	101	166	390	390	288	480	





LFKL..SF with LFS..N

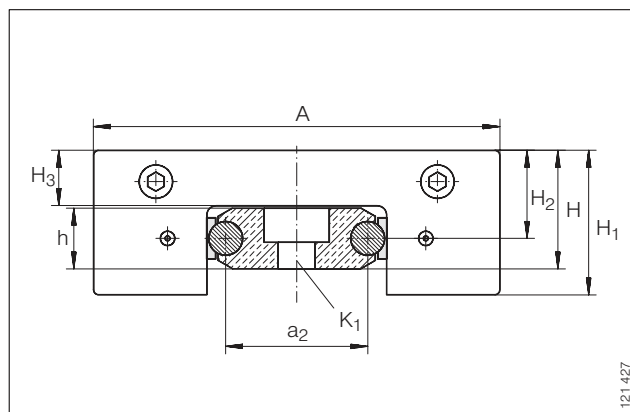


LFKL..SF with LFS, LFS..C, LFS..N, LFS..NZZ
(view rotated through 90°)

C ₁	C ₂	C ₃	C ₄	C ₅ ²⁾		C ₆ ³⁾		H ₁	H ₂	H ₃	K ₁ ³⁾	K ₄	M _A ⁴⁾	
				min.	max.	min.	max.						STANDARD	CORROSION-RESISTANT
													Nm	Nm
5	34	49	62.5	9	54	9	54	20.5	13	8.7	M4	M5	2.5	2.5
5	45	60	62.5	10	54	10	54	23.5	14.4	9	M5	M5	2.5	2.5
5	45	60	62.5 ⁶⁾	—	—	—	—	23.5	14.4	9	M5 ⁷⁾	M5	2.5	2.5
7	60	70	125	11	116	11	116	32	20.5	14	M6	M8	15	12
7	60	70	62.5	11	52	11	52	32	20.5	14	M6	M8	15	12
7	60	70	125	11	116	11	116	32	20.5	14	M6 ⁸⁾	M8	15	12
7	60	70	125 ⁶⁾	—	—	—	—	32	20.5	14	M6 ⁷⁾	M8	15	12
10	60	70	250	17	235	17	235	46.1	29.2	19.4	M10	M10	40	23
10	60	70	125	17	110	17	110	46.1	29.2	19.4	M10	M10	40	23
10	60	70	250	17	235	17	235	46.1	29.2	19.4	M10	M10	40	23
10	60	70	250 ⁶⁾	—	—	—	—	46.1	29.2	19.4	M10 ⁷⁾	M10	40	23
10	105	110	125	17	110	17	110	53.8	35.3	24	M10	M10	40	23
10	105	110	125	17	110	17	110	53.8	35.3	24	M10 ⁸⁾	M10	40	23
10	120	140	62.5	17	49	17	49	55	35.3	24	M10	M12	70	39

Corrosion-resistant executions: LFKL..VA, LFS..VA.
Guideway without holes: LFS..OL.

- 1) Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 3) For screws to DIN 912-8.8, washers to DIN 433 are required for maximum loading; for guideways LFS..F and LFS..FE, countersink depth for screws to DIN 6 912.
- 4) Tightening torque for track roller bolts, concentric bolts supplied tightened to M_A.
- 5) Without lubricating nipples, relubrication possible via end face holes.
- 6) Recommended distance between screws.
- 7) For screws to DIN 931/933-8.8, special washers are included in the delivery.
- 8) Load carrying capacity table is not valid for LFKL..VA and LFS..VA.



LFKL..SF with LFS..F

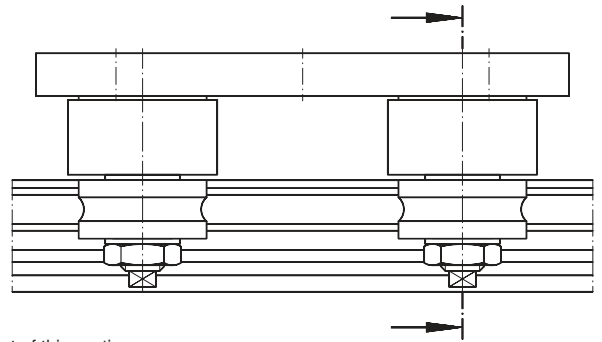


Track Roller Linear Guidance Systems With Bogie Carriage

LFDL SERIES

And Guideways

LFS..R SERIES



LFDL with LFS..R

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE - Dimensions in mm										
CARRIAGE	MASS ≈ g	CONTAINS TRACK ROLLER	GUIDEWAYS CURVED ELEMENT	MASS ≈ g	DIMENSIONS					
					CARRIAGE			GUIDEWAY		
					H	A	C	h	a	β
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-100/ 90	500	43.5	80	100	20	32	90●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-100/180	1,000	43.5	80	100	20	32	180●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-100/360	2,000	43.5	80	100	20	32	360●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-300/ 90	1,700	43.5	80	100	20	32	90●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-300/180	3,400	43.5	80	100	20	32	180●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-300/360	6,800	43.5	80	100	20	32	360●
LFDL 32	1,500	LFR 50/8 KDD	LFS 32 R-500/ 90	2,900	43.5	80	100	20	32	90●
LFDL 32	1 500	LFR 50/8 KDD	LFS 32 R-500/180	5,800	43.5	80	100	20	32	180●
LFDL 32	1 500	LFR 50/8 KDD	LFS 32 R-500/360	11,600	43.5	80	100	20	32	360●
LFDL 52	1,500	LFR 5201 KDD	LFS 52 R-150/ 90	2,000	66.1	120	150	34	52	90●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-150/180	4,000	66.1	120	150	34	52	180●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-150/360	8,000	66.1	120	150	34	52	360●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-300/ 90	4,500	66.1	120	150	34	52	90●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-300/180	9,000	66.1	120	150	34	52	180●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-300/360	18,000	66.1	120	150	34	52	360●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-500/ 90	7,800	66.1	120	150	34	52	90●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-500/180	15,600	66.1	120	150	34	52	180●
LFDL 52	2,500	LFR 5201 KDD	LFS 52 R-500/360	31,200	66.1	120	150	34	52	360●

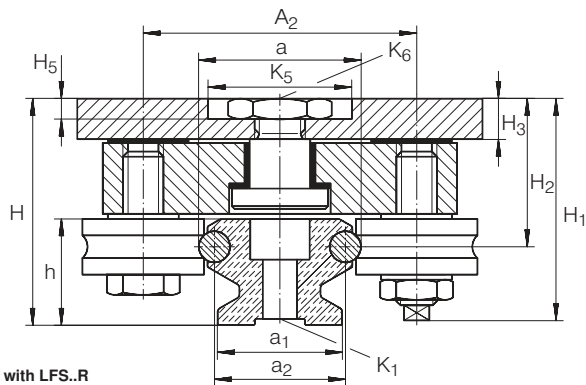
Corrosion-resistant executions: LFDL..VA, LFS..R VA. Guideway without holes: LFS..R OL.

1) For screws to DIN 912-8.8.

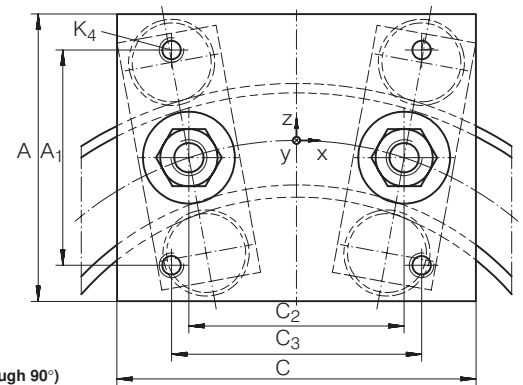
2) Number of holes on reference circle r_1 .

3) Tightening torque for bolts LFZ and LFE, bolts LFZ are supplied tightened to M_A .

LOAD CARRYING CAPACITY TABLE										
PART NUMBER	LOADS				MOMENTS					
	$F_{y \max}$ N	$F_{0y \max}$ N	$F_{z \max}$ N	$F_{0z \max}$ N	$M_{x \max}$ Nm	$M_{0x \max}$ Nm	$M_{y \max}$ Nm	$M_{0y \max}$ Nm	$M_{z \max}$ Nm	$M_{0z \max}$ Nm
LFDL 32 with LFS 32 R-100/ 90	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 32 with LFS 32 R-100/180	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 32 with LFS 32 R-300/ 90	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 32 with LFS 32 R-300/180	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 32 with LFS 32 R-500/ 90	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 32 with LFS 32 R-500/180	850	1,400	1,000	1,000	11	18	13	13	11	18
LFDL 52 with LFS 52 R-150/ 90	1,500	2,500	2,500	2,500	31	31	41	41	25	25
LFDL 52 with LFS 52 R-150/180	1,500	2,500	2,500	2,500	31	31	41	41	25	25
LFDL 52 with LFS 52 R-300/ 90	1,500	2,500	2,500	2,500	31	31	41	41	25	25
LFDL 52 with LFS 52 R-300/180	1,500	2,500	2,500	2,500	31	31	41	41	25	25
LFDL 52 with LFS 52 R-500/ 90	1,500	2,500	2,500	2,500	31	31	41	41	25	25
LFDL 52 with LFS 52 R-500/180	1,500	2,500	2,500	2,500	31	31	41	41	25	25

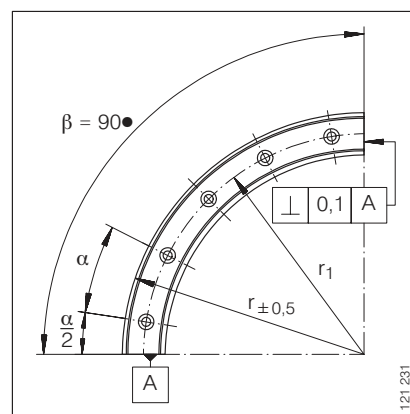


LFDL with LFS..R

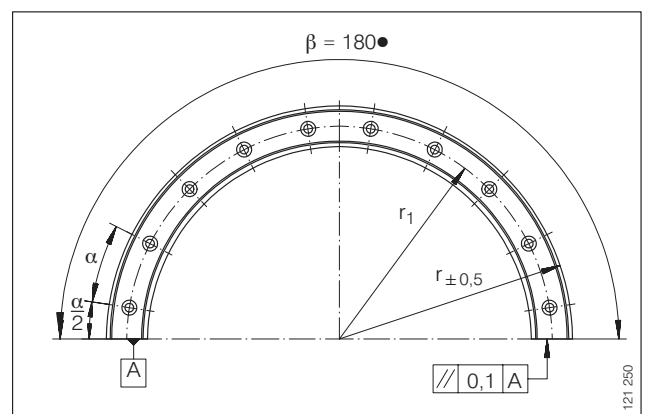


LFDL with LFS..R
(view rotated through 90°)

MOUNTING DIMENSIONS																			
A ₁	A ₂	a ₁	a ₂	C ₂	C ₃	H ₁	H ₂	H ₃	H ₅	K ₁ ¹⁾	K ₄	K ₅	K ₆	x ²⁾	r ₁	α	α/2	M _A ³⁾	
																		STANDARD Nm	CORROSION RESISTANT Nm
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	3	84	30	15	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	6	84	30	15	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	12	84	30	—	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	4	284	22.5	11.25	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	8	284	22.5	11.25	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	12	284	22.5	—	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	5	484	18	9	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	10	484	18	9	15	12
60	54	24	26	60	70	43	29.2	9	5	M6	M8	30	M10	12	484	18	—	15	12
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	3	124	30	15	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	6	124	30	15	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	12	124	30	—	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	4	274	22.5	11.25	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	8	274	22.5	11.25	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	12	274	22.5	—	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	5	474	18	9	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	10	474	18	9	40	23
90	83	40	42	76	90	65.3	41	11	6	M10	M10	34	M12	12	474	18	—	40	23



LFS..R../90

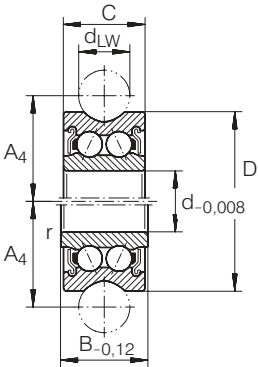


LFS..R../180



Track Rollers

LFR SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE – TRACK ROLLER · Dimensions in mm													
PART NUMBER		MASS ≈ g	DIMENSIONS							BASIC LOAD RATINGS			
			A ₄	B	C	D	d	d _{LW}	r to DIN 620	AS TRACK ROLLER			
										dyn. C _w (10 ⁵ m) N	stat. C _{0w} N	F _{rperm} N	F _{0rperm} N
LFR 50/5	KDD-4	10	9	8	7	16	5	4	0.2	1,200	860	1,300	1,780
LFR 50/5	KDD	10	10.5	8	7	17	5	6	0.2	1,270	890	1,300	1,780
LFR 50/8	KDD	20	14	—	11	24	8	6	0.3	3,670	2,280	1,300	4,560
LFR 5201	KDD	80	20.65	—	15.9	35	12	10	0.6	8,500	5,100	5,100	10,200
LFR 5301	KDD	100	24	—	19	42	12	10	0.6	13,000	7,700	7,500	14,200
LFR 5201-12	KDD	80	21.75	—	15.9	35	12	12	0.6	8,400	5,000	5,100	10,000
LFR 5302	KDD	170	26.65	—	19	47	15	10	1	16,200	9 200	6 200	18 400
LFR 5204-16	KDD	230	31.5	22.6	20.6	52	20	16	1	16,800	9,500	12,100	16,600
LFR 5206-20	KDD	250	41	25.8	23.8	72	25	20	1	24,500	16,600	20,700	33,200
LFR 5206-25	KDD	250	43.5	25.8	23.8	72	25	25	1	29,200	16,400	23,100	32,800
LFR 5207-30	KDD	660	51	29	27	80	30	30	1	38,000	20,800	21,400	36,200
LFR 5208-40	KDD	1,360	62.5	38	36	98	40	40	1.1	54,800	29,000	55,000	58,000

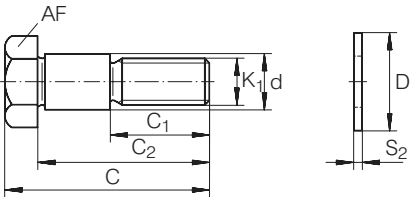
Track rollers LFR with an outside diameter of 52 mm or greater can be relubricated through the inner ring.
 Track rollers in corrosion-resistant execution: LFR..NPP VA.

1) Available on request.



Bolts

LFZ SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

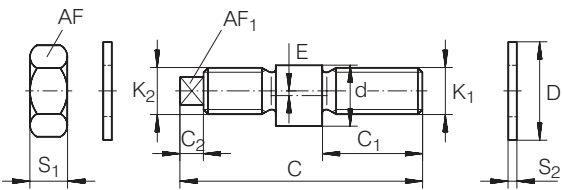
DIMENSION TABLE – CONCENTRIC BOLTS · Dimensions in mm										
PART NUMBER	MASS ≈ g	DIMENSIONS								SUITABLE FOR TRACK ROLLER
		C	C ₁	C ₂	D	d	K ₁	S ₂	AF	
LFZ 5 ¹⁾	10	19.5	9.5	16	– ¹⁾	5	M4	– ¹⁾	3 ²⁾	LFR 50/5..-4
LFZ 5 ¹⁾	10	19.5	9.5	16	– ¹⁾	5	M4	– ¹⁾	3 ²⁾	LFR 50/5
LFZ 8	20	28.3	14	24.3	14	8	M8	1	13	LFR 50/8
LFZ 12	40	43	22	36	21	12	M10	1.8	17	LFR 5201
LFZ 12/M12	60	50.8	24	43.8	19	12	M12	1.8	17	LFR 5301
LFZ 15	60	50.8	26	43.8	21	15	M12	1.8	19	LFR 5302

- Concentric bolts in corrosion-resistant execution: LFZ..VA.
 Washers included in the delivery.
- 1) No washers required.
 2) Hexagonal socket. Outside diameter of head 10 mm.



Bolts

LFE SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

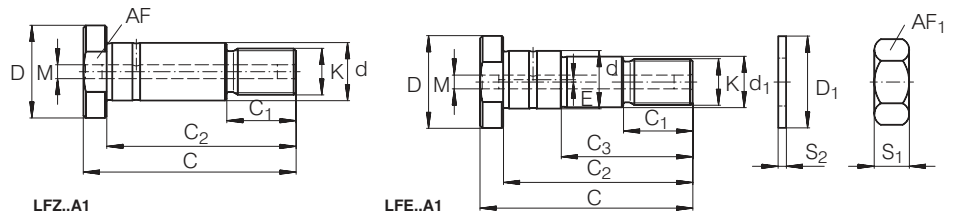
DIMENSION TABLE – ECCENTRIC BOLTS · Dimensions in mm														
PART NUMBER	MASS ≈ g	DIMENSIONS												SUITABLE FOR TRACK ROLLER
		C	C ₂	C ₁	D	d	E	K ₁	K ₂	S ₁	S ₂	AF	AF ₁	
LFE 5-0.5 ¹⁾	10	20.5	–	9	– ¹⁾	5	0.5	M4	M4	2.9	– ¹⁾	7	2 ²⁾	LFR 50/5...4
LFE 5-0.5 ¹⁾	10	20.5	–	9	– ¹⁾	5	0.5	M4	M4	2.9	– ¹⁾	7	2 ²⁾	LFR 50/5
LFE 8-1	20	33.2	3.5	13.7	14	8	1	M8	M8 × 0.75	4	1	13	5	LFR 50/8
LFE 12-1	40	50	5	19.5	21	12	1	M10	M10	8	1.8	17	6	LFR 5201
LFE 12-1/M12	60	57	5	24	19	12	1	M12	M12	6.5	1.8	17	6	LFR 5301
LFE 15-1	60	57	5	24	21	15	1	M12	M12	6.5	1.8	19	6	LFR 5302

Eccentric bolts in corrosion-resistant execution: LFE..VA.
 The nut and washer are included in the delivery.
 1) No washers required.
 2) Hexagonal socket.



Bolts

LFZ..A1, LFE..A1 SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

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DIMENSION TABLE · Dimensions in mm																		
PART NUMBER	MASS g	DIMENSIONS															SUITABLE FOR TRACK ROLLER	
		d	C	C ₁	C ₂	C ₃	D	D ₁	d ₁ h9	E	K	M	S ₁	S ₂	AF	AF ₁		
LFZ 12 × 45 A1	40	12	50	16	45	—	20	21	—	—	M10×1.5	—	8	2	17	17	LFR 5201-12 KDD	
LFE 12 × 45 A1	40	12	50	16	45	30	20	21	10	0.75	M10×1.5	—	8	2	17	17	LFR 5201-12 KDD	
LFZ 20 × 67 A1	200	20	75	23	67	—	30	30	—	—	M16×1.5	5.9	13	3	27	24	LFR 5204-16 KDD	
LFE 20 × 67 A1	200	20	75	23	67	45	30	30	17	1	M16×1.5	5.9	13	3	27	24	LFR 5204-16 KDD	
LFZ 25 × 82 A1	400	25	92	30	82	—	40	37	—	—	M20×1.5	5.9	16	3	36	30	LFR 5206-20, 25 KDD	
LFE 25 × 82 A1	400	25	92	30	82	57	40	37	22	1	M20×1.5	5.9	16	3	36	30	LFR 5206-20 25 KDD	
LFZ 30 × 95 A1	620	30	107	32	95	—	45	44	—	—	M24×1.5	5.9	19	4	41	36	LFR 5207-30 KDD	
LFE 30 × 95 A1	620	30	107	32	95	67	45	44	27	1	M24×1.5	5.9	19	4	41	36	LFR 5207-30 KDD	
LFZ 40 × 107 A1	1,100	40	117	42	107	—	55	56	36	—	M30×1.5	5.9	24	4	46	46	LFR 5208-40	
LFE 40 × 107 A1	1,100	40	117	42	107	72	55	56	36	1	M30×1.5	5.9	24	4	46	46	LFR 5208-40	

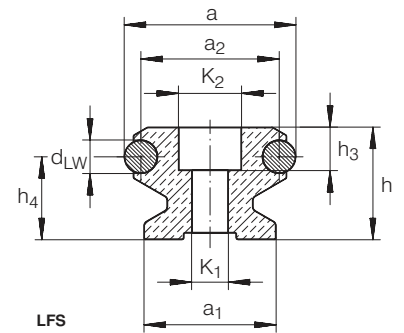
Bolts LFZ 40..A1 and LFE 40..A1 suitable for track roller LFR 5208 are available on request.

Bolts in corrosion-resistant execution: suffix VA.

The nut and washer are included in the delivery.

Guideways

LFS, LFS..C.,LFS..F. SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

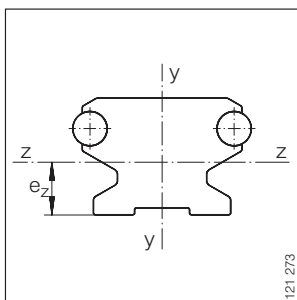
or Linear Sales

DIMENSION TABLE - Dimensions in mm												
PART NUMBER	MASS ≈ g/m	DIMENSIONS			MOUNTING DIMENSIONS							
		a	h	L ¹⁾	a ₁	a ₂	C ₄	C ₅ ²⁾		C ₆ ²⁾		d _{LW}
								min.	max.	min.	max.	
LFS 20	600	20	12.2	2,000	17	16	62.5	9	54	9	54	4
LFS 25	1,100	25	15	2,000	21	19	62.5	10	54	10	54	6
LFS 32	1,600	32	20	6,000	24	26	125	11	116	11	116	6
LFS 32 E	1,600	32	20	6,000	24	26	62.5	11	52	11	52	6
LFS 32 C ⁴⁾	1,100	32	20	6,000	24	26	125	11	116	11	116	6
LFS 32 CE ⁴⁾	1,100	32	20	6,000	24	26	62.5	11	52	11	52	6
LFS 32 F	1,000	32	10	4,000	—	26	125	11	116	11	116	6
LFS 42 C ⁴⁾	2,200	42	20	8,000	28	32	125	12	113	12	113	10
LFS 42 CE ⁴⁾	2,200	42	20	8,000	28	32	62.5	12	51	12	51	10
LFS 42 F	1,000	42	15	4,000	—	32	125	12	51	12	51	10
LFS 52	4,400	52	34	8,000	40	42	250	17	235	17	235	10
LFS 52 E	4,400	52	34	8,000	40	42	125	17	110	17	110	10
LFS 52 EE	4,400	52	34	8,000	40	42	62.5	17	49	17	49	10
LFS 52 C ⁴⁾	3,000	52	34	8,000	40	42	250	17	235	17	235	10
LFS 52 CE ⁴⁾	3,000	52	34	8,000	40	42	125	17	110	17	110	10
LFS 52 CEE ⁴⁾	3,000	52	34	8,000	40	42	62.5	17	49	17	49	10
LFS 52 F	3,000	52	18	4,000	—	42	250	17	235	17	235	10
LFS 52 FE	3,000	52	18	4,000	—	42	125	17	110	17	110	10
LFS 86 C ⁴⁾	4,400	86	34	8,000	71	76	250	17	235	17	235	10
LFS 86 CE ⁴⁾	4,400	86	34	8,000	71	76	125	17	110	17	110	10

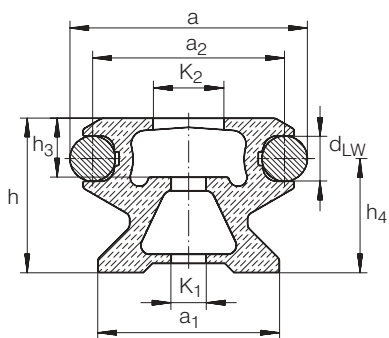
Guideway in corrosion-resistant execution: LFS..VA.

Guideways LFS, LFS..C and LFS..F available without holes: LFS..OL, LFS..C OL, LFS..F OL.

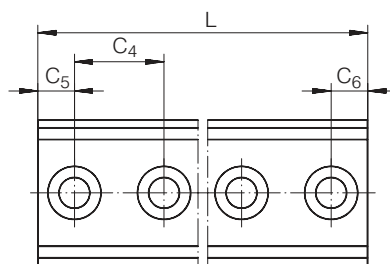
- 1) Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
- 2) Dimensions C₅ and C₆ are dependent on the guideway length L.
- 3) For maximum loading F_z or F_{0z}, washers to DIN 433 are required.
- 4) The shape of the hollow sections is dependent on the size.
- 5) Countersink depth for screws to DIN 6 912.
- 6) If washers to DIN 433 are used, screws to DIN 6 912 are recommended.



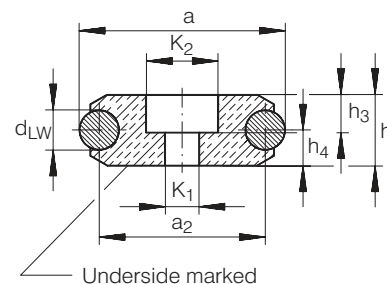
Neutral axes



LFS..C



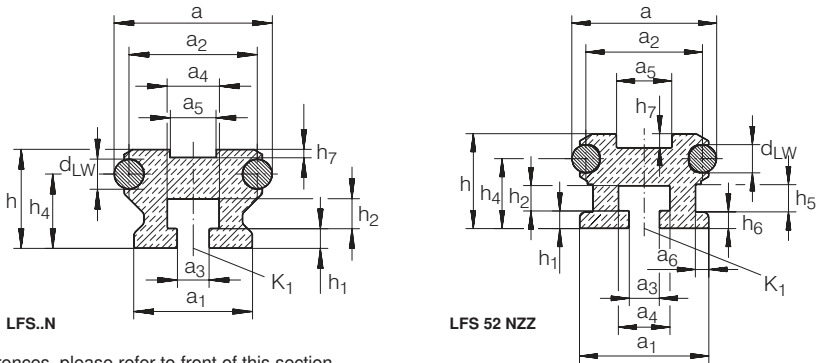
LFS, LFS..C, LFS..F
(view rotated through 90°)



LFS..F

				MODULUS OF ELASTICITY	SURFACE DATA						
h ₄	h ₃	K ₁ ³⁾	K ₂			CROSS-SECTIONAL AREA	NEUTRAL AXIS				
							y-y		z-z		
							I _y	W _y	e _z	I _z	W _z
				N/mm ²	mm ²	mm ⁴	mm ³	mm	mm ⁴	mm ³	
9	4.6	4.5	8	72,000	165	3,065	362	6.4	2,053	324	
10.6	6.5	5.5	10	72,000	237	6,390	608	7.5	4,510	600	
15	8	6.6	12	72,000	440	20,100	1,440	10.4	14,100	1,360	
15	8	6.6	12	72,000	440	20,100	1,440	10.4	14,100	1,360	
15	8	6.5	12	72,000	261	18,305	1,165	10.1	10,072	995	
15	8	6.5	12	72,000	261	18,305	1,165	10.1	10,072	995	
5	6.5 ⁵⁾	6.5	12	72,000	230	11,300	810	5	2,190	438	
12.6	8 ⁶⁾	9	15	72,000	358	33,929	1,858	10.1	14,052	1,391	
12.6	8 ⁶⁾	9	15	72,000	358	33,929	1,858	10.1	14,052	1,391	
7.5	7 ⁵⁾	9	15	72,000	370	29,280	1,864	7.5	16,200	2,160	
25.1	13	11	19	72,000	1,170	138,624	5,878	17.8	113,037	6,350	
25.1	13	11	19	72,000	1,170	138,624	5,878	17.8	113,037	6,350	
25.1	15	11	19	72,000	1,170	138,624	5,878	17.8	113,037	6,350	
25.1	13	11	19	72,000	649	113,821	4,896	17.1	74,878	4,378	
25.1	13	11	19	72,000	649	113,821	4,896	17.1	74,878	4,378	
25.1	13	11	19	72,000	649	113,821	4,896	17.1	74,878	4,378	
9	10 ⁵⁾	11	19	72,000	670	84,000	3,610	9	19,900	2,211	
9	10 ⁵⁾	11	19	72,000	670	84,000	3,610	9	19,900	2,211	
25.1	13 ⁶⁾	13	21	72,000	1,185	613,720	16,587	17.5	155,160	8,866	
25.1	13 ⁶⁾	13	21	72,000	1,185	613,720	16,587	17.5	155,160	8,866	

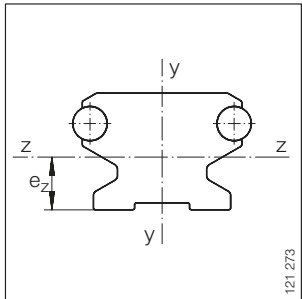
Guideways LFS..N, LFS..NZZ, LFS..M, LFS..ZZ SERIES



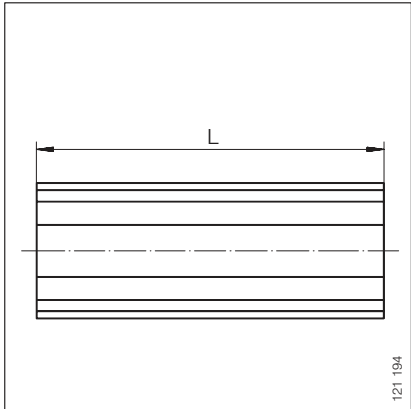
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm																
PART NUMBER	MASS ≈ g/m	DIMENSIONS			MOUNTING DIMENSIONS											
		a	h	L ¹⁾	a ₁	a ₂	a ₃ ²⁾	a ₄	a ₅	a ₆	a ₇	C ₄ ³⁾	d _{LW}	h ₁	h ₂	h ₃
LFS 25 N	1,000	25	15	2,000	21	19	5.5	8.2	—	—	—	62.5	6	3	5	—
LFS 25 M	3,500	25	46	2,000	56	19	—	26.5	5.2	30	—	—	6	—	22	—
LFS 32 N	1,400	32	20	6,000	24	26	6.5	10.5	10.5	—	—	125	6	4	6	—
LFS 32 M	6,400	32	66.5	6,000	75	26	—	—	10.2	43	—	—	6	—	25	—
LFS 52 NZZ	3,900	52	34	8,000	46.5	42	11	18.5	18.5	4.7	—	250	10	6.4	9	—
LFS 52 M	11,200	52	98.6	8,000	112	42	18	44	10.2	80	52	—	10	—	25	—
LFS 120 ZZ	7,900	120	25	6,000	100	110	—	—	18	68	28	250 ⁵⁾	10	—	—	13

- Guideway in corrosion-resistant execution: LFS..VA.
Guideway LFS 120 NZZ available without holes: LFS 120 NZZ OL.
- Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
 - For screws to DIN 931/933-8.8, special washers are included in the delivery for guideways LFS..N and LFS 52 NZZ.
 - Recommended distance between screws.
 - Core hole M8 centrally, distance from bottom edge of guideway: 57.5 mm.
 - C_{5 min}, C_{6 min} = 17 mm, C_{5 max}, C_{6 max} = 235 mm.

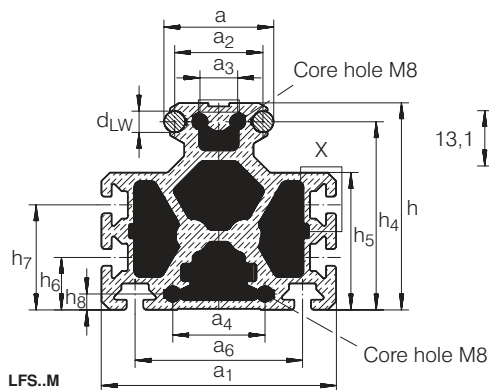


Neutral axes

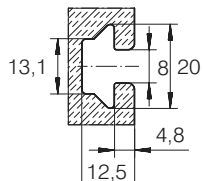


LFS..N, LFS 52 NZZ
(view rotated through 90°)

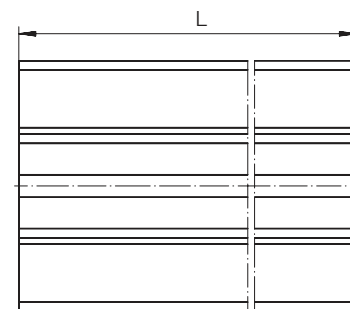
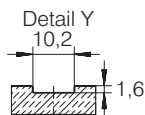
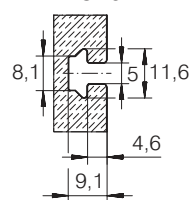




Detail X for
LFS 52 M & LFS 32 M

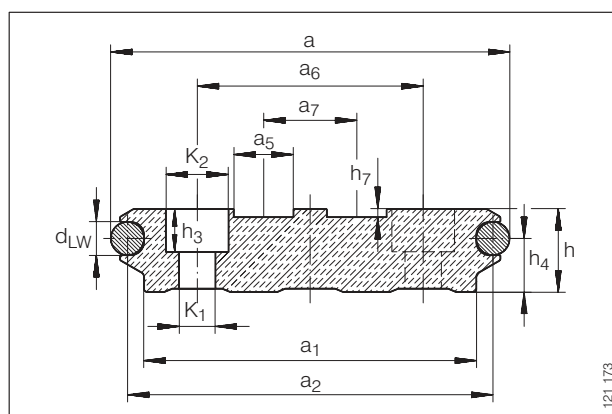


Detail X for
LFS 25 M

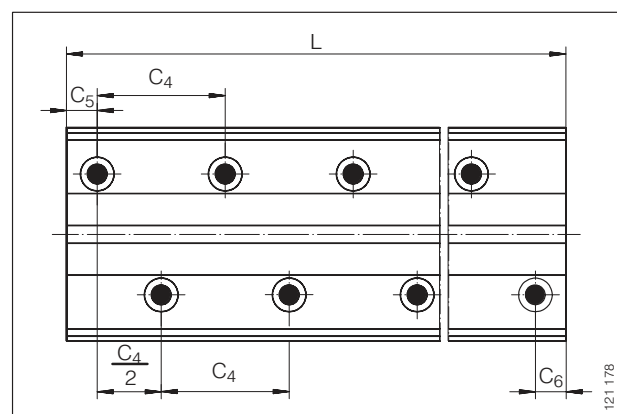


LFS..M (view rotated through 90°)

							MODULUS OF ELASTICITY	SURFACE DATA					
h ₄	h ₅	h ₆	h ₇	h ₈	K ₁	K ₂		CROSS- SECTIONAL AREA	NEUTRAL AXIS				
									y-y		z-z		
									I _y mm ⁴	W _y mm ³	e _z mm	I _z mm ⁴	W _z mm ³
N/mm ²							mm ²						
10.6	—	—	—	—	M5	—	72,000	192	5,980	570	8	4,420	530
41.6	31.5	—	1.6	—	—	—	72,000	1,156	314,429	11,230	19.4	186,693	9,623
15	—	—	1.6	—	M6	—	72,000	360	19,600	1,400	11.1	12,600	1,135
61	47	—	1.6	—	—	—	72,000	2,206	1,000,234	26,672	36.8	762,105	20,707
25.1	10	6	5	—	M10	—	72,000	994	170,350	7,327	16.8	82,786	4,927.
89.7	65.4	—	1.8	7.5	—	—	72,000	3,691	3,717,250	66,380	42.6	3,014,470	55,462
16.1	—	—	2.5	7.5	Ø 11	Ø 19	72,000	2,468	2,330,980	40,751	12.5	117,074	9,365



LFS 120 ZZ



LFS 120 ZZ5)
(view rotated through 90°)

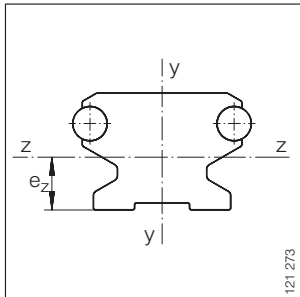
Guideways

LFS..CH, LFS..FH SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

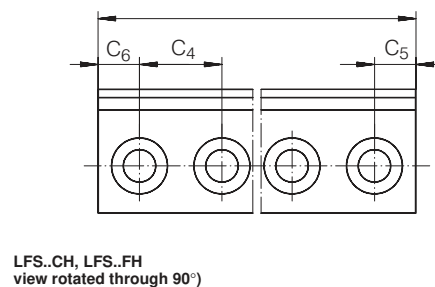
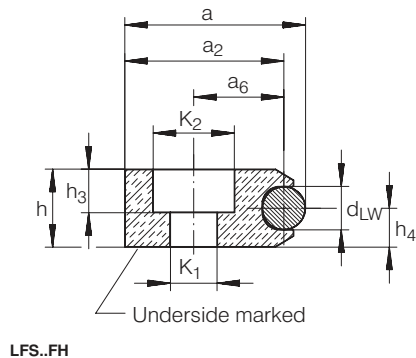
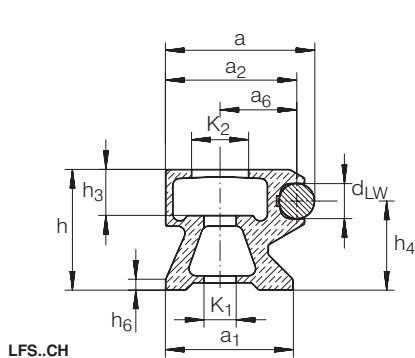
DIMENSION TABLE · Dimensions in mm												
PART NUMBER	MASS ≈ g/m	DIMENSIONS			MOUNTING DIMENSIONS							
		a	h	L ¹⁾	a ₁	a ₂	a ₆	C ₄	C ₅ ²⁾		C ₆ ²⁾	
									min.	max.	min.	max.
LFS 32 CH	900	26	20	4,000	24	23	13	125	11	116	11	116
LFS 32 CHE	900	26	20	4,000	24	23	13	62.5	11	52	11	52
LFS 32 FH	800	26	10	4,000	–	23	13	125	11	116	11	116
LFS 32 FHE	800	26	10	4,000	–	23	13	62.5	11	52	11	52
LFS 52 CH	2,100	42	34	8,000	36	37	21	250	17	235	17	235
LFS 52 CHE	2,100	42	34	8,000	36	37	21	125	17	110	17	110
LFS 52 CHEE	2,100	42	34	8,000	36	37	21	62.5	17	49	17	49
LFS 52 FH	2,300	42	18	8,000	–	37	21	250	17	235	17	235
LFS 52 FHE	2,300	42	18	8,000	–	37	21	125	17	110	17	110
LFS 52 FHEE	2,300	42	18	8,000	–	37	21	62.5	17	49	17	49

- Guideway in corrosion-resistant execution: LFS..VA.
 Guideways LFS..CH and LFS..FH available without holes: LFS..CH OL, LFS..FH OL.
- Maximum length of single-piece guideways, longer guideways are supplied as multi-piece guideways and are marked accordingly.
 - Dimensions C₅ and C₆ are dependent on the guideway length L.
 - For screws to DIN 912-8.8, washers to DIN 433 are required for maximum loading.
 - Countersink depth for screws to DIN 6 912.



Neutral axes

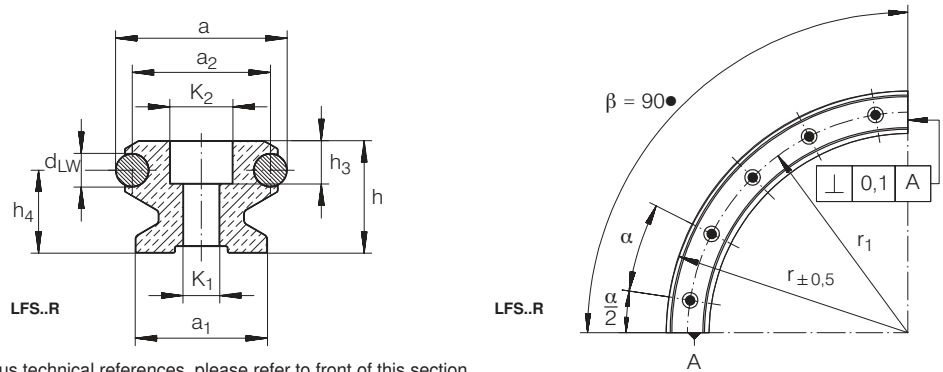




						MODULUS OF ELASTICITY	SURFACE DATA					
d _{LW}	h ₃	h ₄	h ₆	K ₁ ³⁾	K ₂		CROSS- SECTIONAL AREA	NEUTRAL AXIS				
								y-y		z-z		
								I _y mm ⁴	W _y mm ³	e _z mm	I _z mm ⁴	W _z mm ³
N/mm ²						mm ²	mm ⁴	mm ³	mm	mm ⁴	mm ³	
6	8	15	2	6.5	12	72,000	220	12,374	1,267	11.4	9,118	799
6	8	15	2	6.5	12	72,000	220	12,374	1,267	11.4	9,118	799
6	6.5	5	—	6.5	12	72,000	216	8,681	790	5	1,897	379
6	6.5	5	—	6.5	12	72,000	216	8,681	790	5	1,897	379
10	13	25.1	3	11	19	72,000	555	75,367	4,558	16	62,469	3,904
10	13	25.1	8	11	19	72,000	555	75,367	4,558	16	62,469	3,904
10	13	25.1	8	11	19	72,000	555	75,367	4,558	16	62,469	3,904
10	10 ⁴⁾	9	—	11	19	72,000	629	66,642	3,765	9	17,798	1,977
10	10 ⁴⁾	9	—	11	19	72,000	629	66,642	3,765	9	17,798	1,977
10	10 ⁴⁾	9	—	11	19	72,000	629	66,642	3,765	9	17,798	1,977

Curved Guideways

LFS..R SERIES

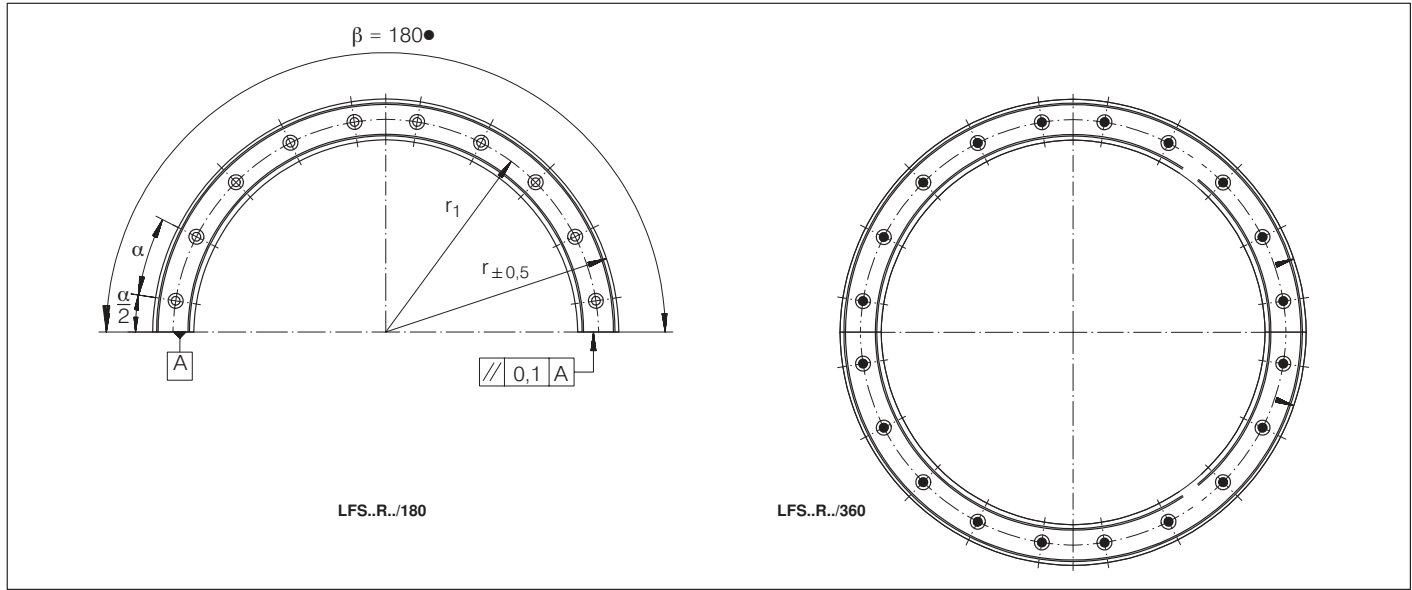


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm																
PART NUMBER	MASS g	DIMENSIONS														
CURVED ELEMENT		a	h	β	a ₁	a ₂	d _{LW}	h ₃	h ₄	K ₁ ¹⁾	K ₂	x ²⁾	r	r ₁	α	α/2
LFS 32 R 100/ 90	500	32	20	90●	24	26	6	6.5	15	6.5	12	3	100	84	30	15
LFS 32 R 100/180	1,000	32	20	180●	24	26	6	6.5	15	6.5	12	6	100	84	30	15
LFS 32 R 100/360	2,000	32	20	360●	24	26	6	6.5	15	6.5	12	12	100	84	30	—
LFS 32 R 300/ 90	1,700	32	20	90●	24	26	6	6.5	15	6.5	12	4	300	284	22.5	11.25
LFS 32 R 300/180	3,400	32	20	180●	24	26	6	6.5	15	6.5	12	8	300	284	22.5	11.25
LFS 32 R 300/360	6,800	32	20	360●	24	26	6	6.5	15	6.5	12	12	300	284	22.5	—
LFS 32 R 500/ 90	2,900	32	20	90●	24	26	6	6.5	15	6.5	12	5	500	484	18	9
LFS 32 R 500/180	5,800	32	20	180●	24	26	6	6.5	15	6.5	12	10	500	484	18	9
LFS 32 R 500/360	11,600	32	20	360●	24	26	6	6.5	15	6.5	12	12	500	484	18	—
LFS 52 R 150/ 90	2,000	52	34	90●	40	42	10	13	25.1	11	19	3	150	124	30	15
LFS 52 R 150/180	4,000	52	34	180●	40	42	10	13	25.1	11	19	6	150	124	30	15
LFS 52 R 150/360	8,000	52	34	360●	40	42	10	13	25.1	11	19	12	150	124	30	—
LFS 52 R 300/ 90	4,500	52	34	90●	40	42	10	13	25.1	11	19	4	300	274	22.5	11.25
LFS 52 R 300/180	9,000	52	34	180●	40	42	10	13	25.1	11	19	8	300	274	22.5	11.25
LFS 52 R 300/360	9,000	52	34	360●	40	42	10	13	25.1	11	19	12	300	274	22.5	—
LFS 52 R 500/ 90	7,800	52	34	90●	40	42	10	13	25.1	11	19	5	500	474	18	9
LFS 52 R 500/180	15,600	52	34	180●	40	42	10	13	25.1	11	19	10	500	474	18	9
LFS 52 R 500/360	15,600	52	34	360●	40	42	10	13	25.1	11	19	12	500	474	18	—

Guideway LFS..R in corrosion-resistant execution: LFS..R VA.
 Guideway LFS..R without holes: LFS..R OL.

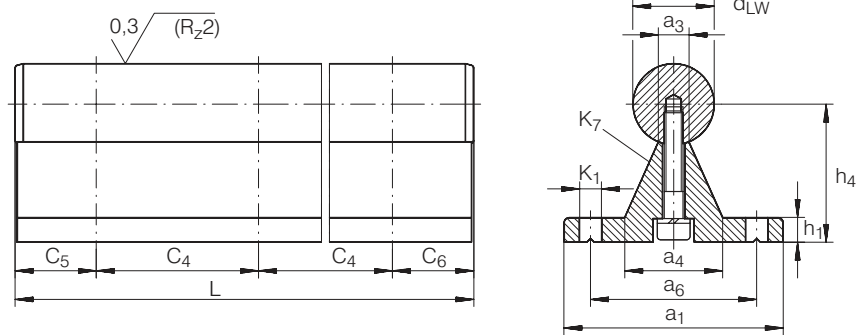
- 1) For screws to DIN 912-8.8.
 2) Number of holes on curved section r₁.



LFS..R



Shaft And Support Rail Units TSNW SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

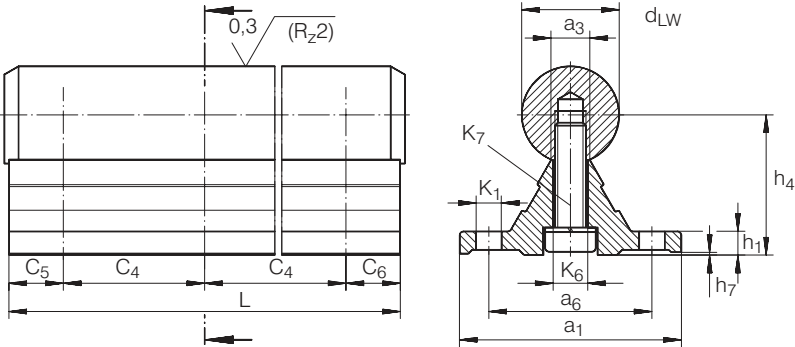
DIMENSION TABLE - Dimensions in mm														
SHAFT DIAMETER d _{LW} h6	PART NUMBER	MASS kg/m	DIMENSIONS			MOUNTING DIMENSIONS								
			a ₁	h ₄ ¹⁾	L ²⁾	a ₃	a ₄	a ₆	C ₄	C ₅ /C ₆ ³⁾ min.	C ₅ /C ₆ ³⁾ max.	h ₁	K ₁ ⁴⁾	K ₇
				± 0.02	± 3									DIN 6 912
12	TSNW 12	1.67	40	22	6,000	5.4	15	29	75	20	69	5	4.5	M4 × 20
16	TSNW 16	2.95	45	26	6,000	7	19	33	100	20	93	5	5.5	M5 × 20
20	TSNW 20	3.95	52	32	6,000	8.1	23	37	100	20	92	6	6.6	M6 × 25
25	TSNW 25	5.6	57	36	6,000	10.3	26	42	120	20	110	6	6.6	M8 × 30
30	TSNW 30	7.88	69	42	6,000	11	29	51	150	20	139	7	9	M10 × 35
40	TSNW 40	12.83	73	50	6,000	15	36	55	200	20	189	8	9	M10 × 40
50	TSNW 50	19.38	84	60	6,000	19	40	63	200	20	188	9	11	M12 × 45

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single-piece units, longer units are supplied as several pieces. Depending on the length of the shaft and support rail unit, the support rail is composed of several pieces.
- 3) Dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit.
- 4) For fixing screws to DIN 6 912 and spring washers to DIN 7 980.



Shaft And Support Rail Units

TSNW..G4 $d \leq 25\text{mm}$,
TSNW..G5 $d > 25\text{mm}$ SERIES



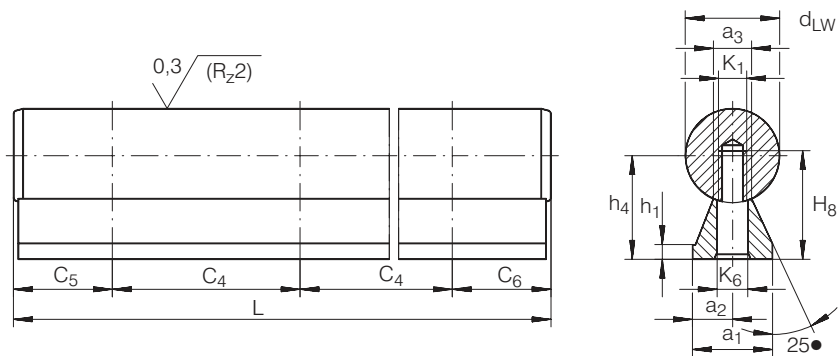
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm																
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS										
			a_1	$h_4^{1)}$	$L^{2)}$	a_3	a_6	C_4	$C_5/C_6^{3)}$	$C_5/C_6^{3)}$	h_1	h_7	$K_1^{4)}$	K_6	K_7	ACCURACY CLASS ⁵⁾
h_6		kg/m			± 2				min.	max.					DIN 6 912	
12	TSNW 12 G4	1.6	40	22 ± 0.1	4,000	5	29	75	20	69	5	0.2	4.5	4.5	M4 × 18	G4 0.03
16	TSNW 16 G4	2.5	45	26 ± 0.1	4,000	6.8	33	100	20	93	5	0.2	5.5	5.5	M5 × 20	G4 0.03
20	TSNW 20 G4	3.8	52	32 ± 0.1	4,000	7.8	37	100	20	92	6	0.2	6.6	6.6	M6 × 25	G4 0.03
25	TSNW 25 G4	5.3	57	36 ± 0.1	4,000	9.8	42	120	20	110	6	0.3	6.6	9	M8 × 30	G4 0.03
30	TSNW 30 G5	7.5	69	42 ± 0.15	4,000	11	51	150	20	139	7	0.3	9	11	M10 × 35	G5 0.04
40	TSNW 40 G5	12.4	73	50 ± 0.15	4,000	14.5	55	200	20	189	8	0.3	9	11	M10 × 40	G5 0.04
50	TSNW 50 G5	18.9	84	60 ± 0.15	4,000	18.5	63	200	20	188	9	0.3	11	13.5	M12 × 45	G5 0.05

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single-piece units, the shaft protrudes beyond the support rail by about 2.5 mm at each end; longer units are supplied as several pieces.
- 3) Dimensions C_5 and C_6 are dependent on the length of the shaft and support rail unit.
- 4) For fixing screws to DIN 6 912 and spring washers to DIN 7 980.
- 5) Value for the maximum variation of dimension h_4 , measured on the same rail over a distance of 1 000 mm.



Shaft And Support Rail Units TSUW SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

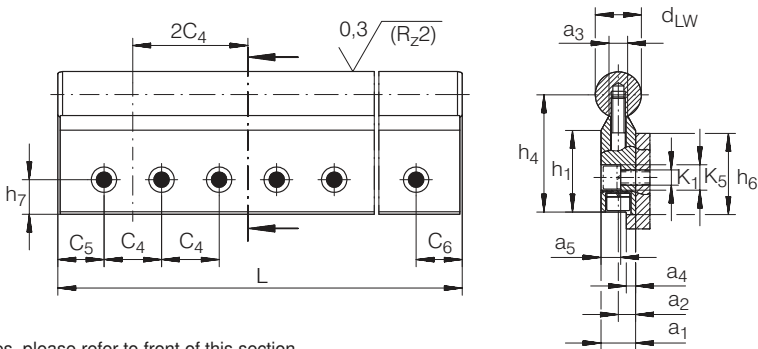
For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm														
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS								
			a ₁	h ₄ ¹⁾	L ²⁾	a ₂ ³⁾	a ₃	C ₄	C ₅ /C ₆ ⁴⁾	C ₅ /C ₆ ⁴⁾	h ₁	K ₁	K ₆	H ₈
h6		kg/m		± 0.02	± 3				min.	max.				
12	TSUW 12	1.1	11	14.5	6,000	5.5	5.4	75	20	70	3	M4	4.5	16
16	TSUW 16	1.88	14	18	6,000	7	7	75	20	70	3	M5	5.5	19
20	TSUW 20	2.92	17	22	6,000	8.5	8.1	75	20	69	3	M6	6.6	23
25	TSUW 25	4.42	21	26	6,000	10.5	10.3	75	20	68	3	M8	9	28.5
30	TSUW 30	6.22	23	30	6,000	11.5	11	100	20	92	3	M10	11	32
40	TSUW 40	11.03	30	39	6,000	15	15	100	20	91	4	M12	13.5	39.5
50	TSUW 50	16.98	35	46	6,000	17.5	19	100	20	90	5	M14	15.5	46

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single-piece units (TSUW 12: $L = 1600 \pm 1.2$ mm), longer units are supplied as several pieces.
Depending on the length of the shaft and support rail unit, the support rail is composed of several pieces.
- 3) Available on request with $a_2 \pm 0.02$.
- 4) Dimensions C_5 and C_6 are dependent on the length of the shaft and support rail unit.

Shaft and Support Rail Units TSSW SERIES



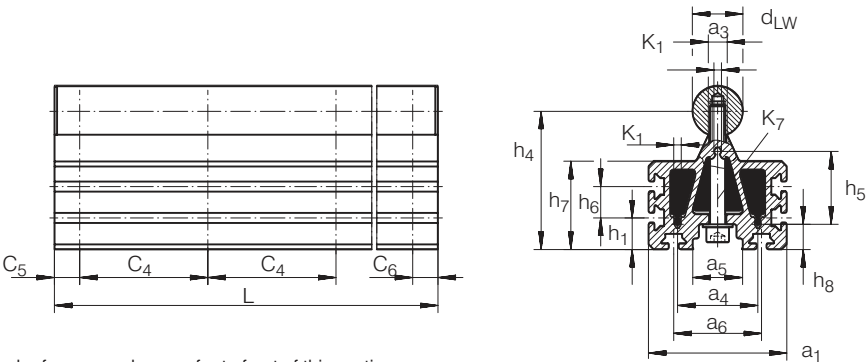
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm																	
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS											
			a ₁	h ₄ ¹⁾	L ²⁾	a ₂ ¹⁾	a ₃	a ₄	a ₅ ³⁾	C ₄	C ₅ /C ₆ ⁴⁾	C ₅ /C ₆ ⁴⁾	h ₁	h ₆	h ₇	K ₁ ³⁾	K ₅ ³⁾
h ₆		kg/m		± 0.01	± 3	± 0.012					min.	max.			± 0.15		
20	TSSW 20	4.12	15	52	6,000	7.5	8.1	4	8.5	50	20	42	36.5	30	15	6.6	11
25	TSSW 25	5.98	20	62	6,000	10	10.3	5.5	11	60	20	50	38.5	36	18	9	15
30	TSSW 30	8.68	25	72	6,000	12.5	11	7	13.5	75	20	64	43	42	21	11	18
40	TSSW 40	14.3	30	88	6,000	15	15	8.5	16	100	20	88	53	50	25	13.5	20
50	TSSW 50	21.47	35	105	6,000	17.5	19	9	18.5	100	20	86	64.5	60	30	15.5	24

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single-piece units, longer units are supplied as several pieces.
Depending on the length of the shaft and support rail unit, the support rail is composed of several pieces.
- 3) For fixing screws to DIN 912-8.8 and spring washers to DIN 7980.
- 4) Dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit



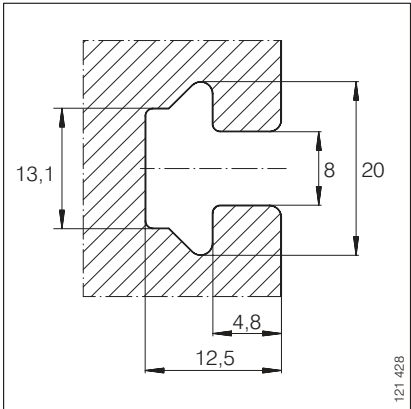
Shaft And Support Rail Units TSMW SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE - Dimensions in mm																			
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS																
			a ₁	h ₄ ¹⁾	L ²⁾	a ₃	a ₄	a ₅	a ₆	C ₄	C ₅ / C ₆ ⁴⁾	C ₅ / C ₆ ⁴⁾	h ₁	h ₅	h ₆	h ₇	h ₈	K ₁	K ₇
h ₆		kg/m			± 3						min.	max.							
20	TSMW 20	6.3	65	65	6,000	7.8	30	14	40	75	20	42	25	29	–	44	18	4.65	M6
25	TSMW 25	8.9	75	75	6,000	10	40	18	45	75	20	50	25	34	–	47	18	4.65	M8
30	TSMW 30	12.3	90	90	6,000	11	50	32	60	100	20	64	25	43	–	57	20	5.5	M10
40	TSMW 40 ³⁾	20.3	110	110	6,000	14.5	64	40	70	100	20	88	25	58	25	70	20	5.5	M12

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single-piece units, longer units are supplied as several pieces.
Shaft and support rail units up to the maximum length are supplied with a single-piece support rail.
- 3) Available on request.
- 4) Dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit



T-grooves

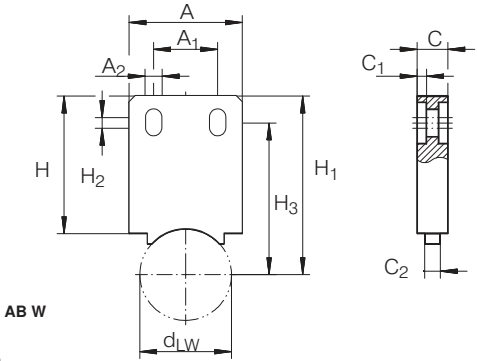


Lubrication And Wiper Units

AB W SERIES

Cap Wipers

AB LFR, AB LFL SERIES

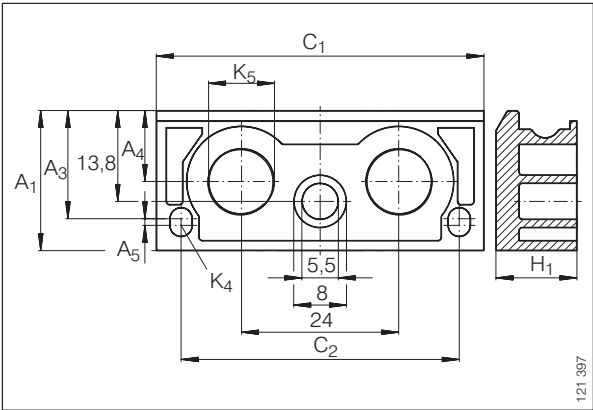
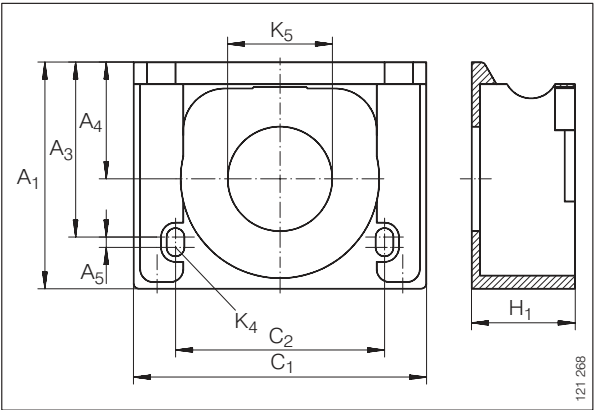


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
PART NUMBER	MASS	DIMENSIONS											SUITABLE FOR TRACK ROLLER LFR
		d _{LW}	A	C	H	A ₁	A ₂	C ₁	C ₂	H ₁	H ₂	H ₃	
	kg					± 0.1							
AB W 10	0.03	10	22.5	10	45	10	4.5	3	5	49	4	40.3	LFR 5201-10 KDD
AB W 12	0.03	12	22.5	10	45	10	4.5	3	5	51	4	42.3	LFR 5201-12 KDD
AB W 16	0.03	16	22.5	10	45	10	4.5	3	5	52	4	43.3	LFR 5204-16 KDD
AB W 20	0.03	20	22.5	10	45	10	4.5	3	5	54	4	45.3	LFR 5206-20 KDD
AB W 25	0.03	25	37	10	45	21	5.5	3	5	54	3.5	45.3	LFR 5206-25 KDD
AB W 30	0.03	30	37	10	45	21	5.5	3	5	59	3.5	50.3	LFR 5207-30 KDD
AB W 40	0.03	40	37	10	45	21	5.5	3	5	71	3.5	62.3	LFR 5208-40 KDD

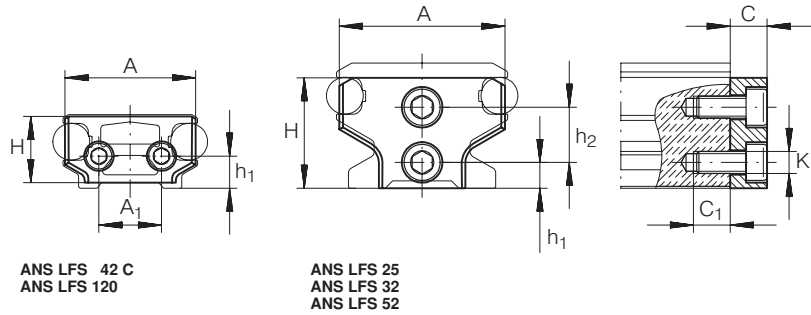
DIMENSION TABLE · Dimensions in mm												
PART NUMBER	MASS	DIMENSIONS									SUITABLE FOR	
	≈ g	A ₁	A ₃	A ₄	A ₅	C ₁	C ₂ ± 0.1	H ₁	K ₄	K ₅ +0.1	TRACK ROLLER	CARRIAGE
AB LFL 20	9	21.3	16.5	10.8	1	50	42.5	11.5	M3	10	LFR 50/..4	LFL 20
AB LFL 20	9	21.3	16.5	10.8	1	50	42.5	11.5	M3	10	LFR 50/5	—
AB LFR 50/8	20	31.6	25.9	15.6	2	51	28.5	15	M3	15	LFR 50/8	LFCL 25
AB LFR 5201	20	43.3	33.4	22.3	2	56	40	21.3	M3	20	LFR 5201	—
AB LFR 5201-LFCL	20	43.3	33.4	22.3	2	56	40	19.8	M3	20	—	LFCL 42
AB LFR 5301	30	50	38.7	26	2	76	46	25	M3	20	LFR 5301	LFCL 86
AB LFR 5302 ¹⁾	—	—	—	—	—	—	—	—	—	—	LFR 5302	—

1) Please consult INA engineering service.



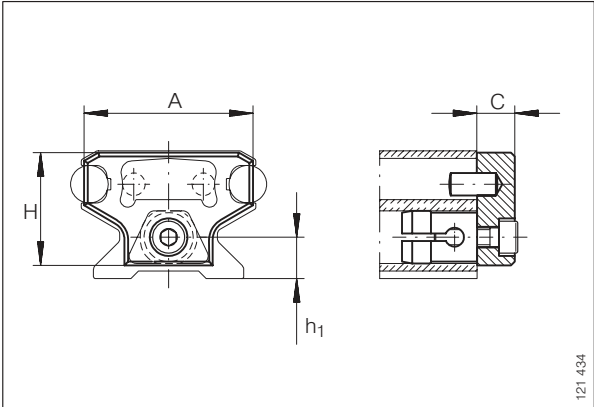
End Plates

ANS LFS SERIES

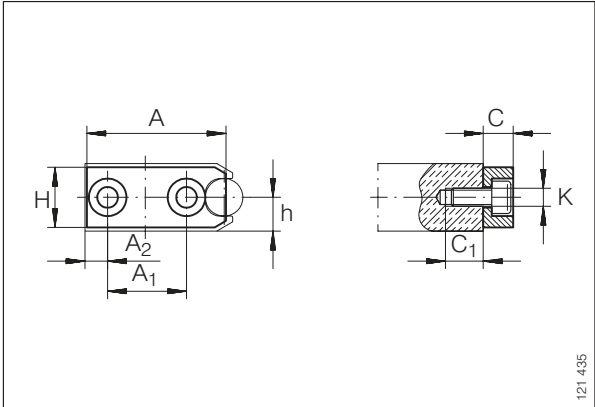


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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DIMENSION TABLE - Dimensions in mm										
PART NUMBER	DIMENSIONS									SUITABLE FOR GUIDEWAY
	A	A ₁	A ₂	C	C ₁	H	h ₁	h ₂	K	
ANS LFS 20	14.5	—	—	6	12	11	6.2	—	M5	LFS 20
ANS LFS 25	20	—	—	5	7	14	4	7	M3	LFS 25
ANS LFS 32	30	—	—	6	7	20	5	10	M4	LFS 32
ANS LFS 32 F	26	11	—	6	7	9	5	—	M4	LFS 32 F
ANS LFS 32 FH	22	9	9	6	7	9	5	—	M3	LFS 32 FH
ANS LFS 32 N	26	11	—	6	7	9	15	—	M4	LFS 32 N
ANS LFS 42 C	35.5	17	—	8	7	18	8	—	M4	LFS 42 C
ANS LFS 52	45	—	—	10	10	30	7	15	M6	LFS 52
ANS LFS 52 F	42	21	—	8	10	16	9	—	M5	LFS 52 F
ANS LFS 52 FH	37	6.5	21	8	10	16	9	—	M5	LFS 52 FH
ANS LFS 52 NZZ	42	21	—	8	10	16	24	—	M4	LFS 52 NZZ
ANS LFS 86C	80	54	—	8	10	30	17.5	—	M5	LFS 86 C
ANS LFS 120	114	80	—	5	10	16	8	—	M6	LFS 120



ANS LFS 52 C



ANS LFS..FH

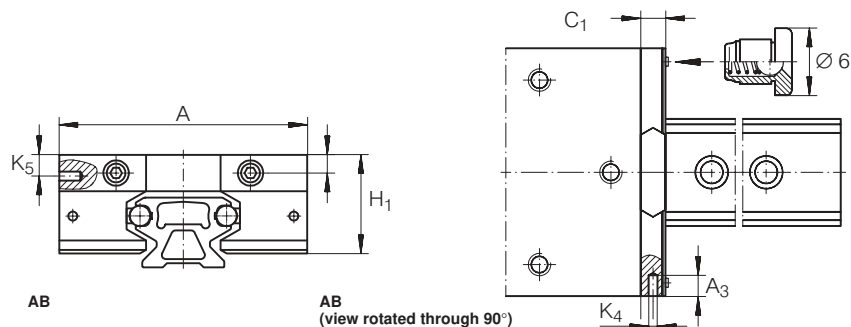


Lubrication And Wiper Units

AB SERIES

Side Plates

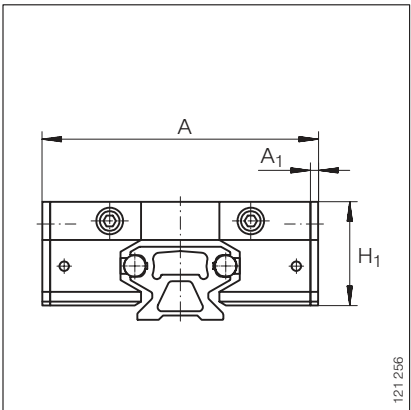
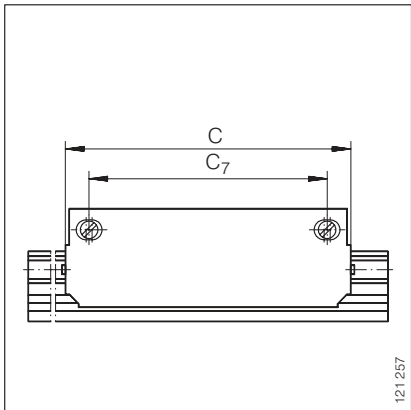
ABAL SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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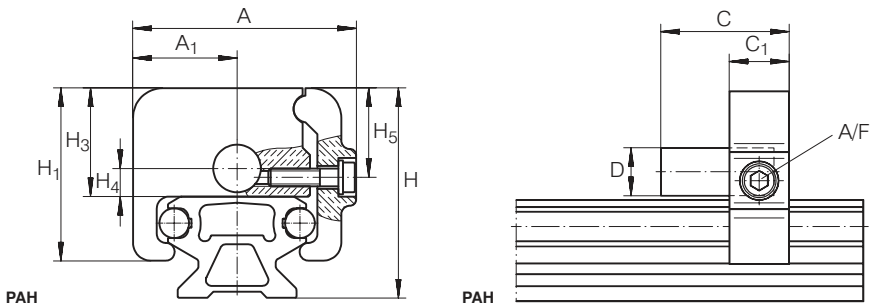
DIMENSION TABLE · Dimensions in mm										
PART NUMBER	MASS ≈ g	DIMENSIONS								SUITABLE FOR TRACK ROLLER
		A	A ₃	C ₁	C ₇	H ₁	H ₄	H ₅	K ₄ for screws to DIN 7972	
AB 32	30	80	6	11	5	32	7	7	St 2.9	LFL 32
AB 32	30	80	6	11	5	32	7	7	St 2.9	LFDL 32
AB 52	100	120	20	18	8.5	49.5	9.5	15	St 4.8	LFL 52
AB 52	100	120	20	18	8.5	49.5	9.5	15	St 4.8	LFDL 52
AB 52/1	130	135	20	18	8.5	55	12	20.6	St 4.8	LFL 52 E

DIMENSION TABLE · Dimensions in mm							
PART NUMBER	MASS ≈ g	DIMENSIONS					SUITABLE FOR CARRIAGE
		A	A ₁	C	C ₇	H ₁	
ABAL 32	30	86	3	112	100	32	LFL 32
ABAL 52	40	130	5	136	117	49.5	LFL 52
ABAL 52/1	50	145	5	186	167	55	LFL 52 E



End Stops

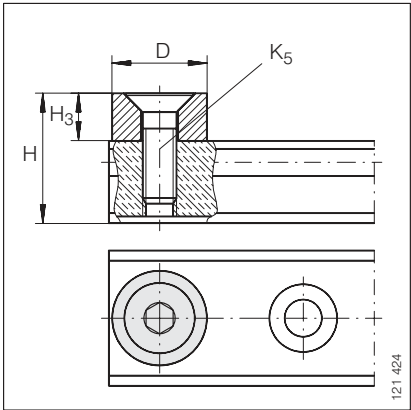
PAH, PASTP SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE - Dimensions in mm													
PART NUMBER	MASS ≈ g	DIMENSIONS											SUITABLE FOR GUIDEWAY
		A	A ₁	C	C ₁	D	H	H ₁	H ₃	H ₄	H ₅	A/F	
PAH 32	50	46	21	30	15	10	39	32	19	7	14	5	LFS 32 C, N
PAH 52	170	75	35	43	20	16	70.5	58	36.5	9.5	30	6	LFS 52 C, NZZ

DIMENSION TABLE - Dimensions in mm						
PART NUMBER	MASS ≈ g	DIMENSIONS				SUITABLE FOR GUIDEWAY
		D	H ₃	K ₅	H	
PASTP 20	8	20	7	M5	22.2	LFS 20
PASTP 25	8	20	7	M5	25	LFS 25
PASTP 32	10	16	11	M6	31	LFS 32
PASTP 42	10	16	11	M6	31	LFS 42 C
PASTP 52	10	20	11	M8	45	LFS 52
PASTP 86	10	20	11	M8	45	LFS 86 C



PASTP

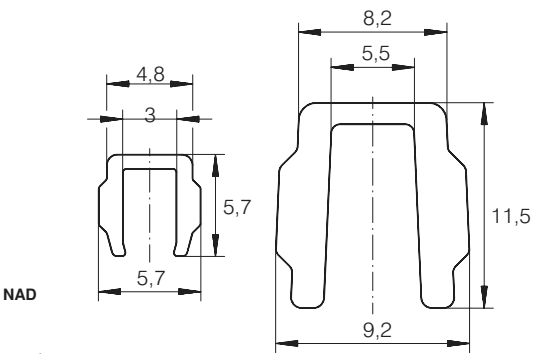


Groove Strips

NAD SERIES

End Covers

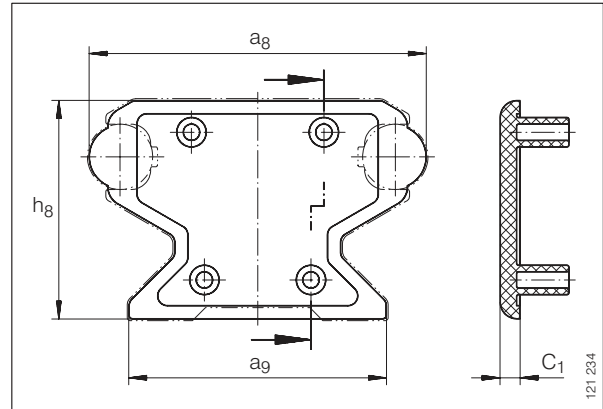
KA LFS..C, KA LFS..M SERIES



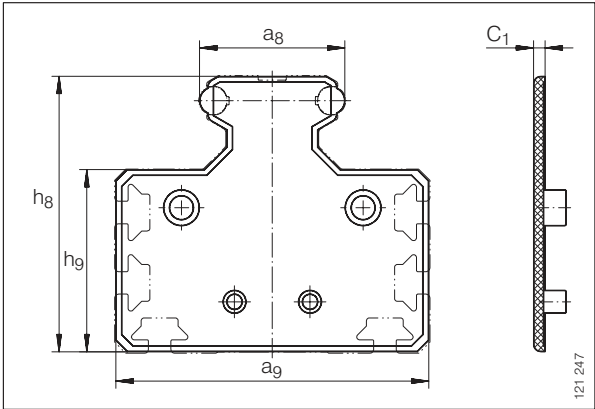
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm		
PART NUMBER	MASS	SUITABLE FOR GUIDEWAY
	≈ g/m	
NAD 5 × 5,7	12	LFS 25 M
NAD 8 × 11,5	27	LFS 32 M
NAD 8 × 11,5	27	LFS 52 M

DIMENSION TABLE - Dimensions in mm							
PART NUMBER	MASS	DIMENSIONS					SUITABLE FOR GUIDEWAY
		a ₈	a ₉	c ₁	h ₈	h ₉	
KA LFS 25 M	10	24.4	55.4	3	45.4	30.9	LFS 25 M
KA LFS 32 C	10	31.4	23.4	3	19.4	—	LFS 32 C
KA LFS 32 M	12	31.4	74.4	3	59.9	46.4	LFS 32 M
KA LFS 42 C	12	41.4	27.4	3	19.4	—	LFS 42 C
KA LFS 52 C	13	51.6	39.4	3	33.4	—	LFS 52 C
KA LFS 52 M	15	51.6	111.4	4	98	64.8	LFS 52 M
KA LFS 86 C	15	85.6	70.4	4	33.4	—	LFS 86 C



KA LFS..C

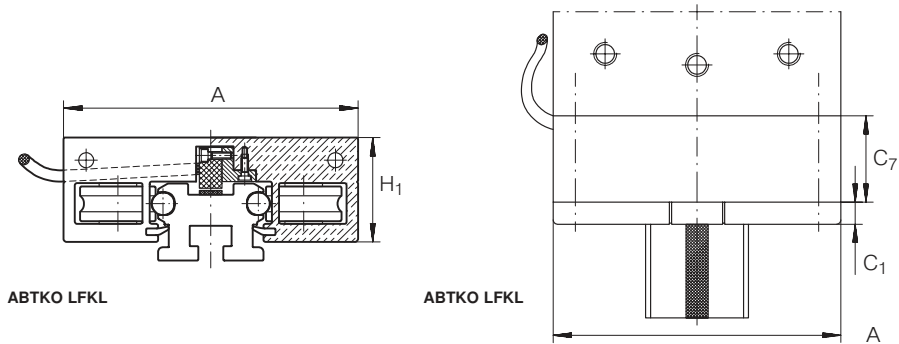


KA LFS..M



Adapter

ABTKO LFKL SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

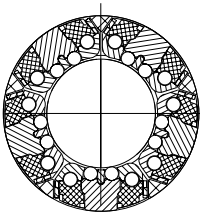
DIMENSION TABLE - Dimensions in mm						
PART NUMBER	MASS ≈ g	DIMENSIONS				SUITABLE FOR CARRIAGE
		A	H ₁	C ₇	C ₁	
ABTKO LFKL 32	200	86	32	39	7	LFKL 32
ABTKO LFKL 52	400	130	46.1	39	10	LFKL 52
ABTKO LFKL 52 E	500	145	53.8	39	10	LFKL 52 E
ABTKO LFKL 52 EE	500	155	55	39	10	LFKL 52 EE



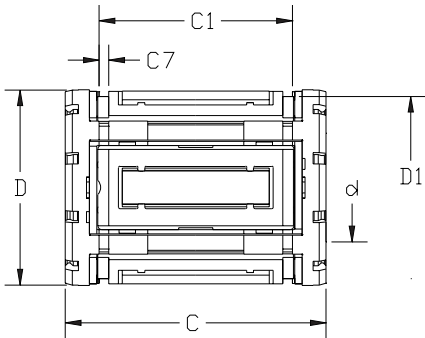
Self-Aligning Linear Ball Bearings

KX, KX..PP, KXO, KXO..PP SERIES

- MAX³ Maximum Performance
- Closed and open
- With gap seal or contact seal on both sides



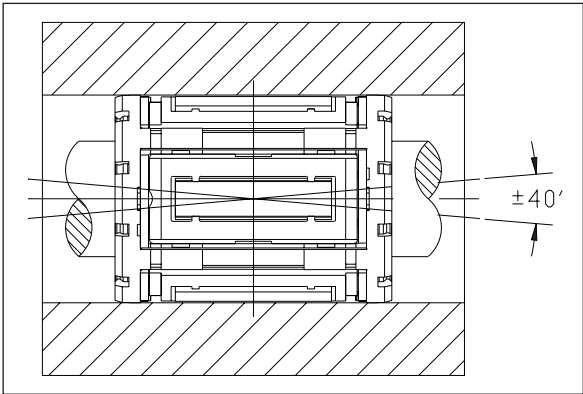
KX, KX..PP



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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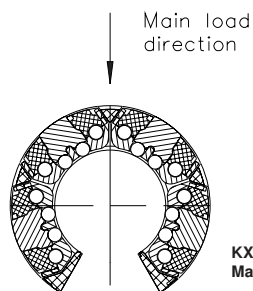
DIMENSION TABLE • Inch Dimensions					
SHAFT DIAMETER	PART NUMBER ¹⁾	WEIGHT	DIMENSIONS		
			d	D	C
		lbs			
1/2	KX 08	0.0430	0.500 _{-0.005}	0.875	1.250 _{-0.020}
	KXO 08	0.0317	0.500 _{-0.005}	0.875	1.250 _{-0.020}
5/8	KX 10	0.0875	0.625 _{-0.005}	1.125	1.500 _{-0.020}
	KXO 10	0.0719	0.625 _{-0.005}	1.125	1.500 _{-0.020}
3/4	KX 12	0.1155	0.750 _{-0.005}	1.250	1.625 _{-0.020}
	KXO 12	0.0948	0.750 _{-0.005}	1.250	1.625 _{-0.020}
1	KX 16	0.2425	1.000 _{-0.005}	1.563	2.250 _{-0.020}
	KXO 16	0.1962	1.000 _{-0.005}	1.563	2.250 _{-0.020}
1 1/4	KX 20	0.4861	1.250 _{-0.006}	2.000	2.625 _{-0.025}
	KXO 20	0.3933	1.250 _{-0.006}	2.000	2.625 _{-0.025}
1 1/2	KX 24	0.7749	1.500 _{-0.006}	2.375	3.000 _{-0.030}
	KXO 24	0.6283	1.500 _{-0.006}	2.375	3.000 _{-0.030}
2	KX 32	1.5139	2.000 _{-0.008}	3.000	4.000 _{-0.040}
	KXO 32	1.2269	2.000 _{-0.008}	3.000	4.000 _{-0.040}

1) Linear ball bearings sealed on both sides: suffix "PP".
2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.
3) Load rating in main load direction.
4) Load ratings to ISO/C 14 728-1 (maximum values).

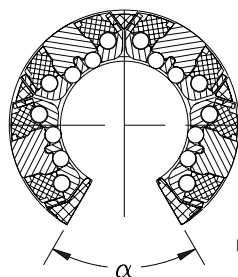


Misalignment compensation ±40'

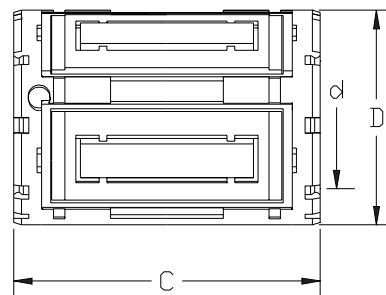




KXO, KXO..PP
Main load direction⁴⁾

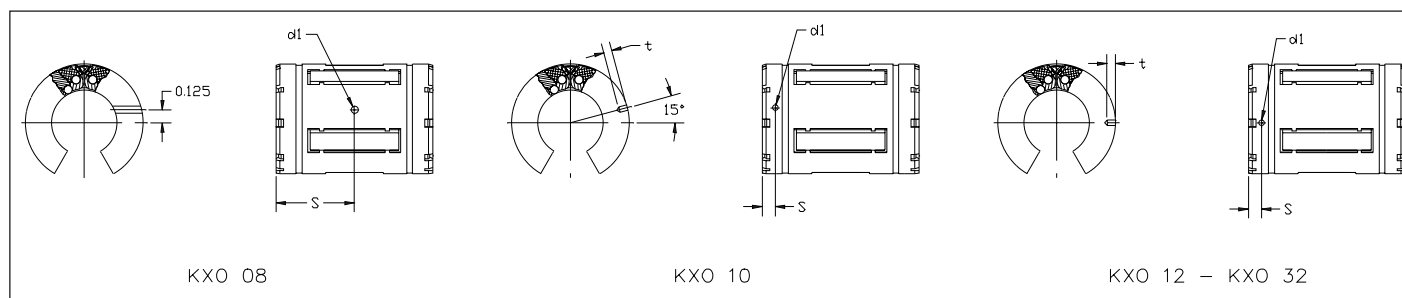


KXO, KXO..PP



DIMENSION TABLE • Inch Dimensions

MOUNTING DIMENSION							NUMBER OF BALL ROWS	LOAD RATINGS ²⁾⁴⁾		ACCESSORIES	SHAFT DIAMETER
D ₁	C ₇	C ₁	α deg.	d ₁	t	S		DYN. C ₀ lbf	STAT. C ₀ lbf	SUITABLE SNAP RINGS TO N1400	
0.821	0.046	1.032 _{-0.020}	-	-	-	-	6	275	200	1/2 x .035	1/2
-	-	1.032 _{-0.020}	60	0.136	-	0.625	4	260 ³⁾	190 ³⁾	1/2 x .035	5/8
1.059	0.056	1.112 _{-0.020}	-	-	-	-	10	290	260	5/8 x .035	5/8
-	-	1.112 _{-0.020}	60	0.105	0.039	0.125	8	290 ³⁾	260 ³⁾	5/8 x .035	5/8
1.176	0.056	1.272 _{-0.020}	-	-	-	-	10	430	370	3/4 x .042	3/4
-	-	1.272 _{-0.020}	60	0.136	0.059	0.125	8	430 ³⁾	370 ³⁾	3/4 x .042	3/4
1.469	0.068	1.886 _{-0.020}	-	-	-	-	10	810	720	1 x .042	1
-	-	1.886 _{-0.020}	64	0.136	0.047	0.125	8	810 ³⁾	720 ³⁾	1 x .042	1
1.886	0.068	2.011 _{-0.025}	-	-	-	-	10	1490	1190	1 1/4 x .050	1 1/4
-	-	2.011 _{-0.025}	64	0.201	0.090	0.188	8	1490 ³⁾	1190 ³⁾	1 1/4 x .050	1 1/4
2.239	0.086	2.422 _{-0.030}	-	-	-	-	10	2090	1550	1 1/2 x .050	1 1/2
-	-	2.422 _{-0.030}	64	0.201	0.090	0.188	8	2090 ³⁾	1550 ³⁾	1 1/2 x .050	1 1/2
2.838	0.103	3.206 _{-0.040}	-	-	-	-	10	3500	2750	2 x .062	2
-	-	3.206 _{-0.040}	60	0.265	0.090	0.312	8	3500 ³⁾	2750 ³⁾	2 x .062	2



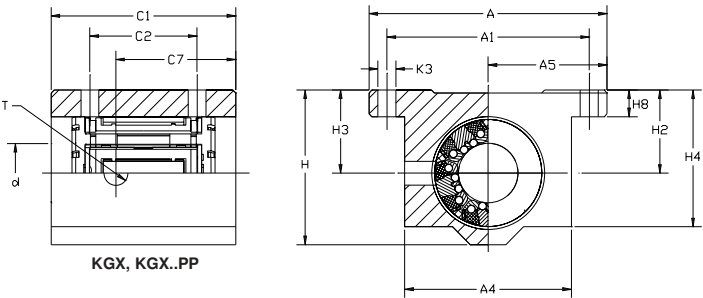
Location holes



Self-Aligning Mounted Units

KGX, KGX..PP, KGXO, KGXO..PP SERIES

- MAX³ Maximum Performance
- Closed and open
- Linear ball bearing with gap seal or contact seal on both sides

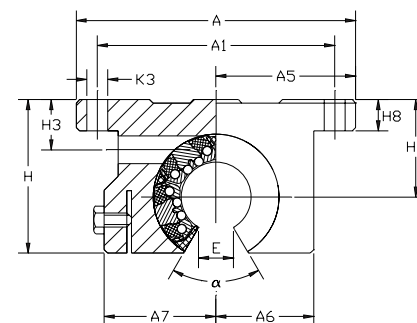
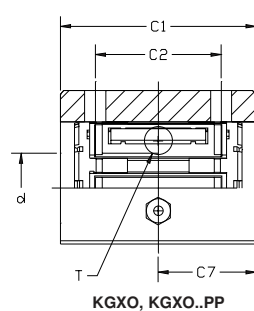


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Inch Dimensions										
SHAFT DIAMETER	PART NUMBER ¹⁾	WEIGHT lbs	d	DIMENSIONS			MOUNTING DIMENSIONS			
				A	C ₁	H	A ₄	A ₅ ±0.001	A ₆	A ₇
1/2	KGX 08	0.249	0.500	2.000	1.688	1.250	1.375	1.000	-	-
	KGXO 08	0.216	0.500	2.000	1.500	1.100	-	1.000	0.688	0.905
5/8	KGX 10	0.464	0.625	2.500	1.938	1.625	1.750	1.250	-	-
	KGXO 10	0.395	0.625	2.500	1.750	1.375	-	1.250	0.875	1.095
3/4	KGX 12	0.581	0.750	2.750	2.063	1.750	1.875	1.375	-	-
	KGXO 12	0.495	0.750	2.750	1.875	1.535	-	1.375	0.937	1.161
1	KGX 16	1.213	1.000	3.250	2.813	2.188	2.375	1.625	-	-
	KGXO 16	1.053	1.000	3.250	2.625	1.975	-	1.625	1.188	1.457
1 1/4	KGX 20	2.430	1.250	4.000	3.625	2.813	3.000	2.000	-	-
	KGXO 20	2.104	1.250	4.000	3.375	2.458	-	2.000	1.500	1.831
1 1/2	KGX 24	3.573	1.500	4.750	4.000	3.250	3.500	2.375	-	-
	KGXO 24	3.154	1.500	4.750	3.750	2.910	-	2.375	1.750	2.087
2	KGX 32	7.196	2.000	6.000	5.000	4.063	4.500	3.000	-	-
	KGXO 32	6.306	2.000	6.000	4.750	3.660	-	3.000	2.250	2.638

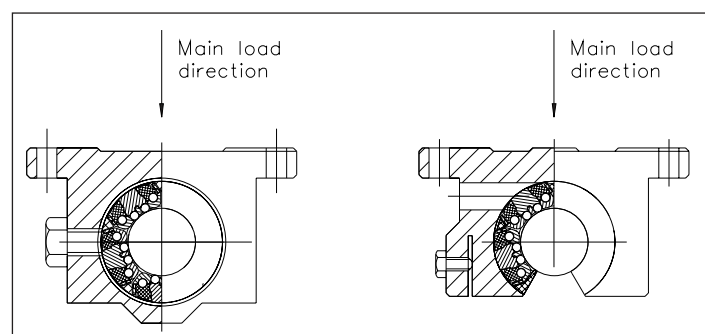
1) Linear ball bearings sealed on both sides: suffix "PP".
 2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.
 3) Load rating in main load direction.
 4) Load ratings to ISO/C 14 728-1 (maximum values).





DIMENSION TABLE • Inch Dimensions

MOUNTING DIMENSIONS											LOAD RATINGS ²⁾⁴⁾		SHAFT DIAMETER
C ₇	H ₂ ±0.001	H ₃	H ₄	H ₈	T	E	α deg.	A ₁ ±0.01	C ₂ ±0.01	K ₃	dyn. C lbf	stat. C ₀ lbf	
0.844	0.687	0.690	1.125	0.250	NIP A1	-	-	1.688	1.000	0.156	275	200	1/2
0.520	0.687	0.370	-	0.250	NIP A1	0.313	60	1.688	1.000	0.156	260 ³⁾	190 ³⁾	5/8
1.260	0.875	0.700	1.437	0.281	1/4-28	-	-	2.125	1.125	0.188	290	260	5/8
0.875	0.875	0.450	-	0.281	1/4-28	0.375	60	2.125	1.130	0.188	290 ³⁾	260 ³⁾	5/8
1.340	0.937	0.937	1.563	0.313	1/4-28	-	-	2.375	1.250	0.188	430	370	3/4
0.937	0.937	0.510	-	0.313	1/4-28	0.438	60	2.375	1.250	0.188	430 ³⁾	370 ³⁾	3/4
1.950	1.187	1.187	1.938	0.375	1/4-28	-	-	2.875	1.750	0.218	810	720	1
1.312	1.187	0.730	-	0.375	1/4-28	0.563	60	2.875	1.750	0.218	810 ³⁾	720 ³⁾	1
2.430	1.500	1.500	2.500	0.437	1/4-28	-	-	3.500	2.000	0.218	1490	1190	1 1/4
1.688	1.500	0.800	-	0.437	1/4-28	0.625	60	3.500	2.000	0.218	1490 ³⁾	1190 ³⁾	1 1/4
2.750	1.750	1.750	2.875	0.500	1/4-28	-	-	4.125	2.500	0.281	2090	1550	1 1/2
1.875	1.750	0.840	-	0.500	1/4-28	0.750	60	4.125	2.500	0.281	2090 ³⁾	1550 ³⁾	1 1/2
3.420	2.125	2.125	3.625	0.625	1/4-28	-	-	5.250	3.250	0.406	3500	2750	2
2.375	2.125	1.100	-	0.625	1/4-28	1.000	60	5.250	3.250	0.406	3500 ³⁾	2750 ³⁾	2



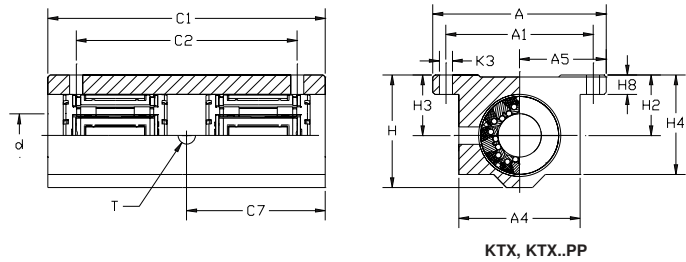
KGX, KGX..PP, KGXO, KGXO..PP
Main load direction⁴⁾



Self-Aligning Tandem Mounted Units

KTX, KTX..PP, KTXO, KTXO..PP SERIES

- MAX³ Maximum Performance
- Closed and open
- Linear ball bearing with gap seal or contact seal on both sides

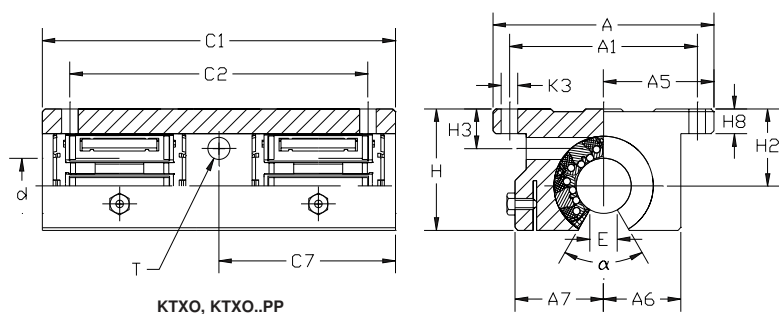


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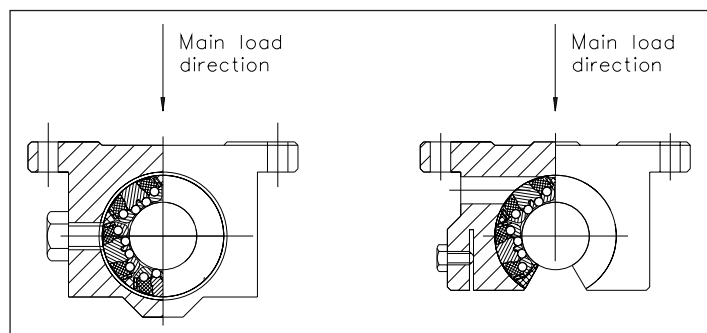
DIMENSION TABLE • Inch Dimensions										
SHAFT DIAMETER	PART NUMBER ¹⁾	WEIGHT lbs	d	DIMENSIONS			MOUNTING DIMENSIONS			
				A	C ₁	H	A ₄	A ₅ ±0.001	A ₆	A ₇
1/2	KTX 08	0.443	0.500	2.000	3.50	1.250	1.375	1.000	-	-
	KTXO 08	0.369	0.500	2.000	3.50	1.100	-	1.000	0.688	0.905
5/8	KTX 10	1.065	0.625	2.500	4.00	1.625	1.750	1.250	-	-
	KTXO 10	0.887	0.625	2.500	4.00	1.375	-	1.250	0.875	1.095
3/4	KTX 12	1.253	0.750	2.750	4.50	1.750	1.875	1.375	-	-
	KTXO 12	1.071	0.750	2.750	4.50	1.535	-	1.375	0.937	1.161
1	KTX 16	2.597	1.000	3.250	6.00	2.188	2.375	1.625	-	-
	KTXO 16	2.228	1.000	3.250	6.00	1.975	-	1.625	1.188	1.457
1 1/4	KTX 20	5.529	1.250	4.000	7.50	2.813	3.000	2.000	-	-
	KTXO 20	4.774	1.250	4.000	7.50	2.485	-	2.000	1.500	1.831
1 1/2	KTX 24	8.316	1.500	4.750	9.00	3.250	3.500	2.375	-	-
	KTXO 24	7.378	1.500	4.750	9.00	2.910	-	2.375	1.750	2.087

1) Linear ball bearings sealed on both sides: suffix "PP".
2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.
3) Load rating in main load direction.
4) Load ratings to ISO/C 14 728-1 (maximum values).





DIMENSION TABLE • Inch Dimensions													
MOUNTING DIMENSIONS											LOAD RATINGS ²⁾⁴⁾		SHAFT DIAMETER
C ₇	H ₂ ±0.001	H ₃	H ₄	H ₈	T	E	α deg.	A ₁ ±0.01	C ₂ ±0.01	K ₃	dyn. C lbf	stat. C lbf	
1.750	0.687	0.687	1.125	0.250	NIP A1	-	-	1.688	2.500	0.156	550	400	1/2
1.750	0.687	0.370	-	0.250	NIP A1	0.313	60	1.688	2.500	0.156	520 ³⁾	380 ³⁾	5/8
2.000	0.875	0.875	1.437	0.281	1/4-28	-	-	2.125	3.000	0.188	580	520	5/8
2.000	0.875	0.450	-	0.281	1/4-28	0.375	60	2.125	3.000	0.188	580 ³⁾	520 ³⁾	5/8
2.250	0.937	0.937	1.563	0.313	1/4-28	-	-	2.375	3.500	0.188	860	740	3/4
2.250	0.937	0.510	-	0.313	1/4-28	0.438	60	2.375	3.500	0.188	860 ³⁾	740 ³⁾	3/4
3.000	1.187	1.187	1.938	0.375	1/4-28	-	-	2.875	4.500	0.218	1620	1440	1
3.000	1.187	0.730	-	0.375	1/4-28	0.563	60	2.875	4.500	0.218	1620 ³⁾	1440 ³⁾	1
3.750	1.500	1.500	2.500	0.437	1/4-28	-	-	3.500	5.500	0.218	3000	2380	1 1/4
3.750	1.500	0.800	-	0.437	1/4-28	0.625	60	3.500	5.500	0.218	3000 ³⁾	2380 ³⁾	1 1/4
4.500	1.750	1.750	2.875	0.500	1/4-28	-	-	4.125	6.500	0.281	4200	3100	1 1/2
4.500	1.750	0.800	-	0.500	1/4-28	0.750	60	4.125	6.500	0.281	4200 ³⁾	3100 ³⁾	1 1/2

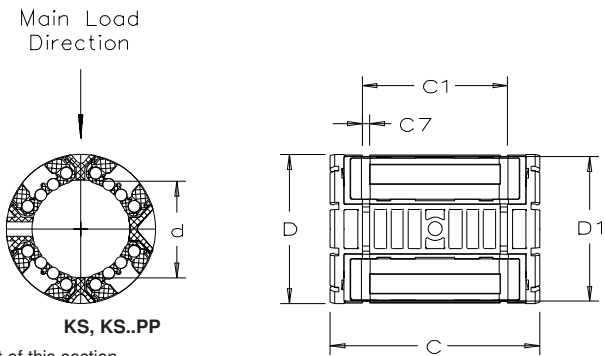


KTX, KTX..PP, KTXO, KTXO..PP
Main load direction⁴⁾

Self-Aligning Linear Ball Bearings

KS, KS..PP, KSO, KSO..PP SERIES

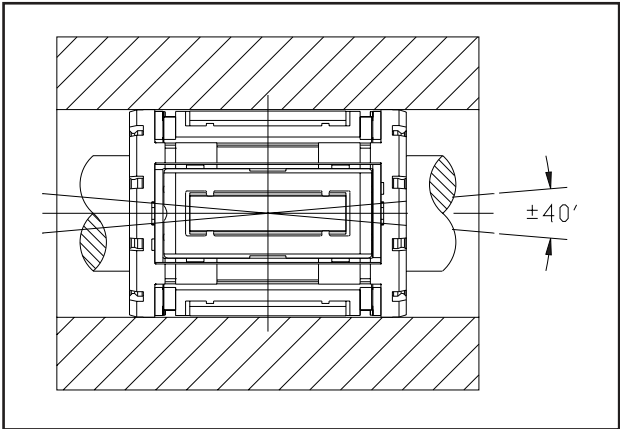
- MAX³ Maximum Performance
- Light range - metric sizes
- Closed and open designs
- Gap seals or contact seals on both sides



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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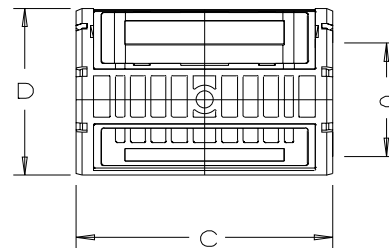
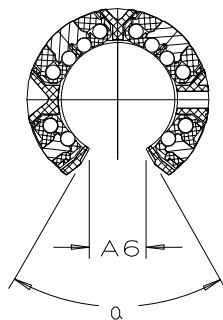
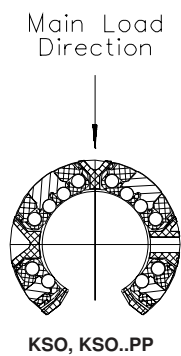
DIMENSION TABLE • Dimensions in mm							
SHAFT DIAMETER d	PART NUMBER ¹⁾	MASS ≈kg	DIMENSIONS			MOUNTING DIMENSIONS	
			d	D	C	A ₆ ²⁾	C ₁ H13
12	KS 12	0.018	12	22	32	-	22.6
	KSO 12	0.013	12	22	32	7.6	-
16	KS 16	0.028	16	26	36	-	24.6
	KSO 16	0.019	16	26	36	10.1	-
20	KS 20	0.051	20	32	45	-	31.2
	KSO 20	0.038	20	32	45	10	-
25	KS 25	0.102	25	40	58	-	43.7
	KSO 25	0.075	25	40	58	12.5	-
30	KS 30	0.172	30	47	68	-	51.7
	KSO 30	0.135	30	47	68	14.3	-
40	KS 40	0.335	40	62	80	-	60.3
	KSO 40	0.259	40	62	80	18.2	-
50	KS 50	0.589	50	75	100	-	77.3
	KSO 50	0.454	50	75	100	22.7	-

1) Linear ball bearings sealed on both sides: suffix "PP".
 2) Dimension A₆ on diameter d.
 3) Hole arrangement symmetrical with bearing width C.
 4) The basic load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.
 Basic load ratings in accordance with DIN 636-1.
 5) Basic load rating in main load direction.

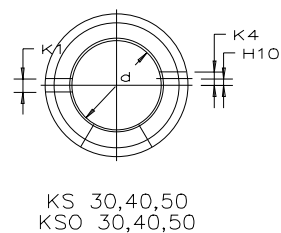
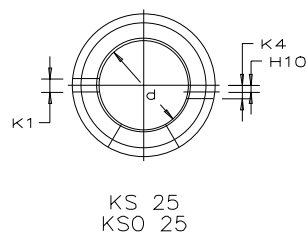
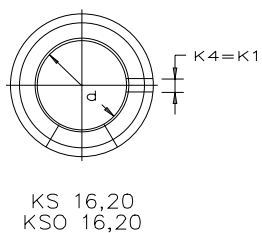
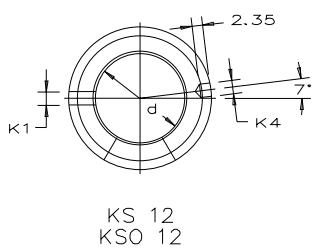


Compensation of misalignment ±40'





DIMENSION TABLE • Dimensions in mm										
MOUNTING DIMENSIONS						BALL ROWS	BASIC LOAD RATINGS 4)5)		ACCESSORIES	
C ₇	D ₁	H ₁₀	K ₁ ³⁾	K ₄ ³⁾	α DEGREES	QUANTITY	dyn. C _{max} N	stat. C _{0max} N	SUITABLE SNAP RING TO DIN 471	SHAFT DIAMETER d
1.3	21	-	3	-	-	8	900	810	22x1.2	12
-	-	-	3	3	78	6	900	810	-	16
1.3	25	-	3	-	-	8	1,430	1,160	27x1.2	
-	-	-	3	3	78	6	1,430	1,160	-	20
1.6	30.7	-	3	-	-	8	2,200	1,730	33x1.5	
-	-	-	3	3	60	6	2,200	1,730	-	25
1.85	38	-	3.5	-	-	8	3,950	3,250	42x1.75	
-	-	1.5	3.5	3	60	6	3,950	3,250	-	30
1.85	44.7	-	3.5	-	-	8	5,900	4,500	48x1.75	
-	-	2	3.5	3	57	6	5,900	4,500	-	40
2.15	59.4	-	3.5	-	-	8	10,200	7,200	63x2	
-	-	1.5	3.5	3	54	6	10,200	7,200	-	50
2.65	71.4	-	4.5	-	-	8	15,100	10,400	75x2.5	
-	-	2.5	4.5	5	54	6	15,100	10,400	-	



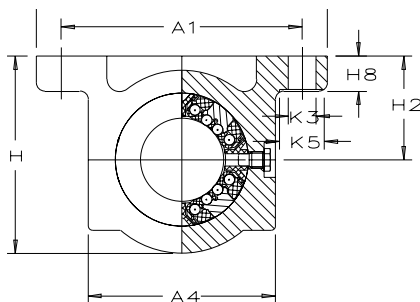
Fixing holes



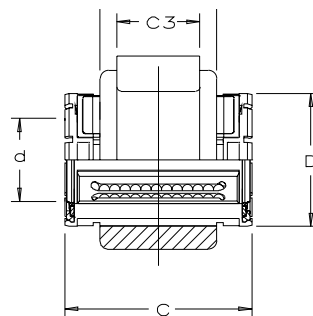
Linear Ball Bearings

KGSG..PP, KGSS..PP, KGSO..PP SERIES

- MAX³ Maximum Performance
- Closed and open designs
- Contact seals on both sides



KGSG..PP



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm

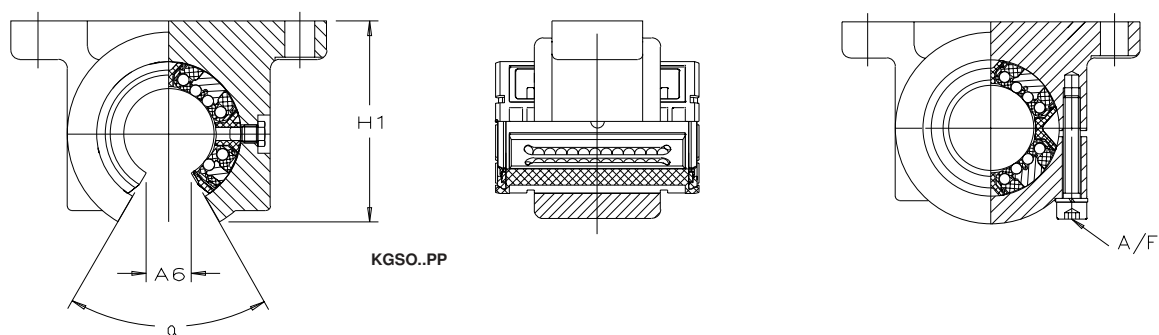
SHAFT DIAMETER d	PART NUMBER	MASS ≈kg	DIMENSIONS				MOUNTING DIMENSIONS		
			d	A	C	H	A ₁ ±0.15	A ₄	A ₆ ¹⁾
12	KGSG 12 PP	0.08	12	52	32	35.8	42	31.6	-
	KGSS 12 PP	0.08	12	52	32	35.8	42	31.6	-
	KGSO 12 PP	0.07	12	52	32	-	42	31.6	7.6
16	KGSG 16 PP	0.13	16	56	36	37.5	46	35	-
	KGSS 16 PP	0.13	16	56	36	37.5	46	35	-
	KGSO 16 PP	0.12	16	56	36	-	46	35	10.1
20	KGSG 20 PP	0.27	20	70	45	47.5	58	45	-
	KGSS 20 PP	0.27	20	70	45	47.5	58	45	-
	KGSO 20 PP	0.23	20	70	45	-	58	45	10
25	KGSG 25 PP	0.51	25	80	58	57.5	68	55	-
	KGSS 25 PP	0.51	25	80	58	57.5	68	55	-
	KGSO 25 PP	0.44	25	80	58	-	68	55	12.5
30	KGSG 30 PP	0.83	30	88	68	66.5	76	63	-
	KGSS 30 PP	0.83	30	88	68	66.5	76	63	-
	KGSO 30 PP	0.73	30	88	68	-	76	63	13.6
40	KGSG 40 PP	1.21	40	108	80	83.5	94	77	-
	KGSS 40 PP	1.21	40	108	80	83.5	94	77	-
	KGSO 40 PP	1.05	40	108	80	-	94	77	18.2
50	KGSG 50 PP	2.53	50	135	100	98	116	96	-
	KGSS 50 PP	2.53	50	135	100	98	116	96	-
	KGSO 50 PP	1.98	50	135	100	-	116	96	22.7

¹⁾ Dimensions A₆ on diameter d.

²⁾ For fixing screws to EN ISO 4762-8.8.

If there is a possibility of settling, the fixing screws should be secured against rotation.

³⁾ The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.
Basic load ratings in accordance with DIN 636-1.

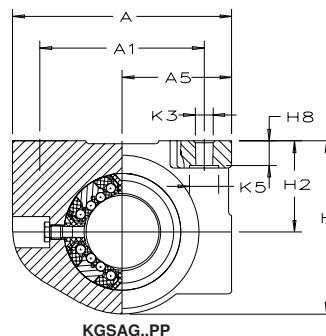


DIMENSION TABLE • Dimensions in mm													
MOUNTING DIMENSIONS										BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER
C ₁	C ₃	D	H ₁	H ₂ ±0.015	H ₈	K ₃ ²⁾	K ₅ ²⁾	α Degrees	A/F		dyn. C _{max} N	stat. C _{0max} N	
20	12	22	-	20	6	5.5	10	-	-	8	900	810	12
20	12	22	-	20	6	5.5	10	-	2	8	900	810	
20	12	22	32.3	20	6	5.5	10	78	-	6	900	810	
22	15	26	-	20	6	5.5	10	-	-	8	1,430	1,160	16
22	15	26	-	20	6	5.5	10	-	2	8	1,430	1,160	
22	15	26	33.6	20	6	5.5	10	78	-	6	1,430	1,160	
28	20	32	-	25	8	6.6	11	-	-	8	2,200	1,730	20
28	20	32	-	25	8	6.6	11	-	3	8	2,200	1,730	
28	20	32	44.5	25	8	6.6	11	60	-	6	2,200	1,730	
40	28	40	-	30	10	6.6	11	-	-	8	3,950	3,250	25
40	28	40	-	30	10	6.6	11	-	3	8	3,950	3,250	
40	28	40	53.8	30	10	6.6	11	60	-	6	3,950	3,250	
48	32	47	-	35	10	6.6	11	-	-	8	5,900	4,500	30
48	32	47	-	35	10	6.6	11	-	4	8	5,900	4,500	
48	32	47	63.1	35	10	6.6	11	54	-	6	5,900	4,500	
56	40	62	-	45	12	9	15	-	-	8	10,200	7,200	40
56	40	62	-	45	12	9	15	-	4	8	10,200	7,200	
56	40	62	79.3	45	12	9	15	54	-	6	10,200	7,200	
72	52	75	-	50	14	11	18	-	-	8	15,100	10,400	50
72	52	75	-	50	14	11	18	-	5	8	15,100	10,400	
72	52	75	92.8	50	14	11	18	54	-	6	15,100	10,400	

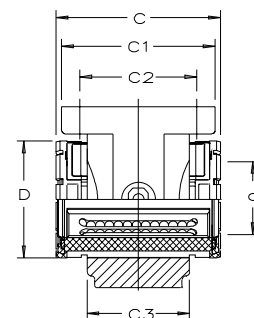
Linear Ball Bearing Units

KGSAG..PP, KGSAS..PP, KGSAG..PP SERIES

- MAX³ Maximum Performance
- Closed and open designs
- Contact seals on both sides



KGSAG..PP



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm

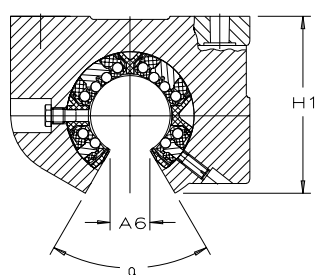
SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS				MOUNTING DIMENSIONS		
			d	A	C	H	A ₁ ±0.15	A ₅	A ₆ ¹⁾
12	KGSAG 12 PP	0.06	12	42	32	34	32	21	-
	KGSAS 12 PP	0.06	12	42	32	34	32	21	-
	KGSAO 12 PP	0.05	12	42	32	-	32	21	7.6
16	KGSAG 16 PP	0.11	16	50	36	41	40	25	-
	KGSAS 16 PP	0.11	16	50	36	41	40	25	-
	KGSAO 16 PP	0.1	16	50	36	-	40	25	10.1
20	KGSAG 20 PP	0.17	20	60	45	47.5	45	30	-
	KGSAS 20 PP	0.17	20	60	45	47.5	45	30	-
	KGSAO 20 PP	0.15	20	60	45	-	45	30	10
25	KGSAG 25 PP	0.34	25	74	58	60	60	37	-
	KGSAS 25 PP	0.34	25	74	58	60	60	37	-
	KGSAO 25 PP	0.3	25	74	58	-	60	37	12.5
30	KGSAG 30 PP	0.54	30	84	68	67	68	42	-
	KGSAS 30 PP	0.54	30	84	68	67	68	42	-
	KGSAO 30 PP	0.48	30	84	68	-	68	42	13.6
40	KGSAG 40 PP	0.98	40	108	80	87	86	54	-
	KGSAS 40 PP	0.98	40	108	80	87	86	54	-
	KGSAO 40 PP	0.84	40	108	80	-	86	54	18.2
50	KGSAG 50 PP	1.63	50	130	100	98	108	65	-
	KGSAS 50 PP	1.63	50	130	100	98	108	65	-
	KGSAO 50 PP	1.17	50	130	100	-	108	65	22.7

¹⁾ Dimensions A₆ on diameter d.

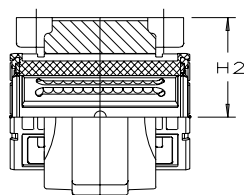
²⁾ For fixing screws to EN ISO 4762-8.8.

If there is a possibility of settling, the fixing screws should be secured against rotation.

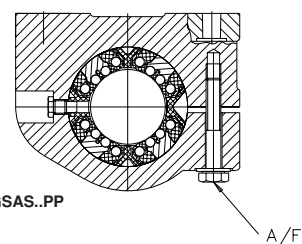
³⁾ The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.
Basic load ratings in accordance with DIN 636-1.



KGS AO..PP



KGS AS..PP



A/F

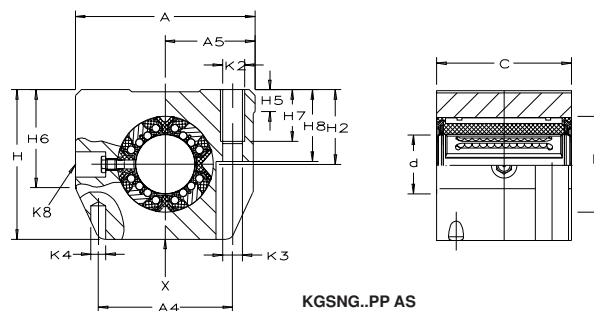
DIMENSION TABLE • Dimensions in mm

MOUNTING DIMENSIONS											BALL ROWS	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER
C ₁	C ₂ ±0.015	C ₃	D h5	H ₁	H ₂ ±0.01	H ₈ -0.5	K ₃ ²⁾	K ₅ ²⁾	α Degrees	A/F		dyn. C _{max} N	stat. C _{0max} N	
32	23	20	22	-	18	4.8	4.7	8	-	-	8	900	810	12
32	23	20	22	-	18	4.8	4.7	8	-	7	8	900	810	
32	23	20	22	30.4	18	4.8	4.7	8	78	-	6	900	810	
35	26	22	26	-	22	5.4	4.7	8	-	-	8	1,430	1,160	16
35	26	22	26	-	22	5.4	4.7	8	-	7	8	1,430	1,160	
35	26	22	26	36.8	22	5.4	4.7	8	78	-	6	1,430	1,160	
42	32	28	32	-	25	6.7	4.7	8	-	-	8	2,200	1,730	20
42	32	28	32	-	25	6.7	4.7	8	-	7	8	2,200	1,730	
42	32	28	32	44.5	25	6.7	4.7	8	60	-	6	2,200	1,730	
54	40	40	40	-	30	7.8	5.7	10	-	-	8	3,950	3,250	25
54	40	40	40	-	30	7.8	5.7	10	-	8	8	3,950	3,250	
54	40	40	40	56	30	7.8	5.7	10	60	-	6	3,950	3,250	
60	45	48	47	-	35	8.7	6.8	11	-	-	8	5,900	4,500	30
60	45	48	47	-	35	8.7	6.8	11	-	10	8	5,900	4,500	
60	45	48	47	63.5	35	8.7	6.8	11	54	-	6	5,900	4,500	
78	58	56	62	-	45	11	9.2	15	-	-	8	10,200	7,200	40
78	58	56	62	-	45	11	9.2	15	-	13	8	10,200	7,200	
78	58	56	62	82.4	45	11	9.2	15	54	-	6	10,200	7,200	
70	50	72	75	-	50	12.5	9.2	15	-	-	8	15,100	10,400	50
70	50	72	75	-	50	12.5	9.2	15	-	13	8	15,100	10,400	
70	50	72	75	92.8	50	12.5	9.2	15	54	-	6	15,100	10,400	

Linear Ball Bearing Units

KGSNG..PP AS, KGSNS..PP AS SERIES

- MAX³ Maximum Performance
- Light range - metric sizes
- Sealed, greased with relubrication facility



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm

SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS				MOUNTING DIMENSIONS				
			d	A	C	H	A ₁ ±0.15	A ₄	A ₅ ±0.01	C ₂ ¹⁾ ±0.15	D
12	KGSNG 12 PP AS	0.1	12	43	32	35	32	34	21.5	23	22
	KGSNS 12 PP AS	0.1	12	43	32	35	32	34	21.5	23	22
16	KGSNG 16 PP AS	0.17	16	53	37	42	40	40	26.5	26	26
	KGSNS 16 PP AS	0.17	16	53	37	42	40	40	26.5	26	26
20	KGSNG 20 PP AS	0.27	20	60	45	50	45	44	30	32	32
	KGSNS 20 PP AS	0.27	20	60	45	50	45	44	30	32	32
25	KGSNG 25 PP AS	0.56	25	78	58	60	60	59.4	39	40	40
	KGSNS 25 PP AS	0.56	25	78	58	60	60	59.4	39	40	40
30	KGSNG 30 PP AS	0.83	30	87	68	70	68	63	43.5	45	47
	KGSNS 30 PP AS	0.83	30	87	68	70	68	63	43.5	45	47
40	KGSNG 40 PP AS	1.55	40	108	80	90	86	76	54	58	62
	KGSNS 40 PP AS	1.55	40	108	80	90	86	76	54	58	62
50	KGSNG 50 PP AS	2.7	50	132	100	105	108	90	66	50	75
	KGSNS 50 PP AS	2.7	50	132	100	105	108	90	66	50	75

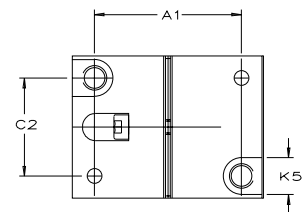
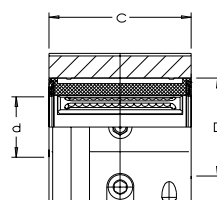
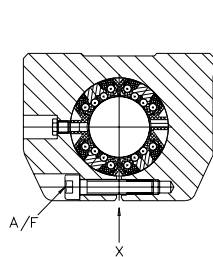
¹⁾ Dimension C₂ and lubrication hole symmetrical with bearing width C.

²⁾ For fixing screws to EN ISO 4762-8.8.

If there is a possibility of settling, the fixing screws should be secured against rotation.

³⁾ Centring for dowel hole.

⁴⁾ The basic load ratings apply only to hardened (670 to 840



KGSNS..PP AS

View X (rotated 90°)

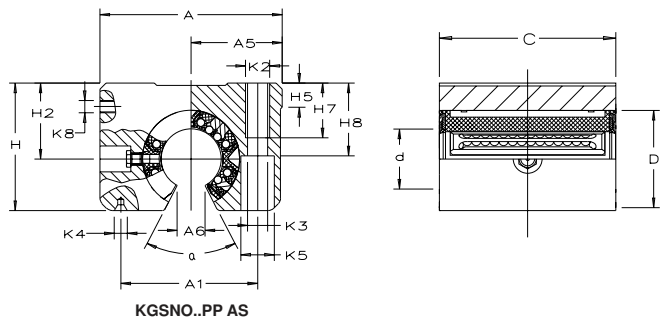
DIMENSION TABLE • Dimensions in mm

MOUNTING DIMENSIONS											BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER d
H ₂ +0.008 -0.016	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ²⁾	K ₄ ³⁾	K ₅ ²⁾	K ₈ ¹⁾	A/F		dyn. C _{max} N	stat. C _{0max} N	
18	5.4	25.3	11	16.5	M 5	4.3	4	8	NIP 4 MZ	-	8	900	810	12
18	5.4	25.3	11	16.5	M 5	4.3	4	8	NIP 4 MZ	2.5	8	900	810	
22	6.9	28	13	21	M 6	5.3	4	10	NIP 4 MZ	-	8	1,430	1,160	16
22	6.9	28	13	21	M 6	5.3	4	10	NIP 4 MZ	3	8	1,430	1,160	
25	7.4	32.8	18	24	M 8	6.6	5	11	NIP 4 MZ	-	8	2,200	1,730	20
25	7.4	32.8	18	24	M 8	6.6	5	11	NIP 4 MZ	4	8	2,200	1,730	
30	8.3	40	22	29	M10	8.4	6	15	NIP 5 MZ	-	8	3,950	3,250	25
30	8.3	40	22	29	M10	8.4	6	15	NIP 5 MZ	5	8	3,950	3,250	
35	9.3	44.7	22	34	M10	8.4	6	15	NIP 5 MZ	-	8	5,900	4,500	30
35	9.3	44.7	22	34	M10	8.4	6	15	NIP 5 MZ	5	8	5,900	4,500	
45	11.7	55.9	26	44	M12	10.5	8	18	NIP 5 MZ	-	8	10,200	7,200	40
45	11.7	55.9	26	44	M12	10.5	8	18	NIP 5 MZ	6	8	10,200	7,200	
50	10.6	60	35	49	M16	13.5	10	20	NIP 6 MZ	-	8	15,100	10,400	50
50	10.6	60	35	49	M16	13.5	10	20	NIP 6 MZ	8	8	15,100	10,400	

Linear Ball Bearing Units

KGSNO..PP AS, KGSNOS..PP AS SERIES

- MAX³ Maximum Performance
- Light range - metric sizes
- Sealed, greased with relubrication facility

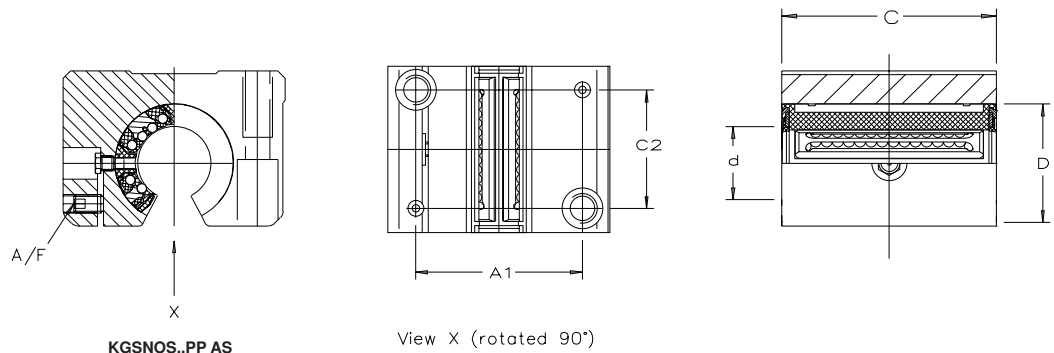


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales .

DIMENSION TABLE • Dimensions in mm											
SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS				MOUNTING DIMENSIONS				
			d	A	C	H	A ₁ ±0.15	A ₅ ±0.01	A ₆ ¹⁾	C ₂ ²⁾ ±0.15	D
12	KGSNO 12 PP AS	0.09	12	43	32	28	32	21.5	7.6	23	22
	KGSNOS 12 PP AS	0.09	12	43	32	28	32	21.5	7.6	23	22
16	KGSNO 16 PP AS	0.15	16	53	37	35	40	26.5	8.9	26	26
	KGSNOS 16 PP AS	0.15	16	53	37	35	40	26.5	8.9	26	26
20	KGSNO 20 PP AS	0.25	20	60	45	42	45	30	9.2	32	32
	KGSNOS 20 PP AS	0.25	20	60	45	42	45	30	9.2	32	32
25	KGSNO 25 PP AS	0.52	25	78	58	51	60	39	11.9	40	40
	KGSNOS 25 PP AS	0.52	25	78	58	51	60	39	11.9	40	40
30	KGSNO 30 PP AS	0.76	30	87	68	60	68	43.5	14.3	45	47
	KGSNOS 30 PP AS	0.76	30	87	68	60	68	43.5	14.3	45	47
40	KGSNO 40 PP AS	1.4	40	108	80	77	86	54	18.8	58	62
	KGSNOS 40 PP AS	1.4	40	108	80	77	86	54	18.8	58	62
50	KGSNO 50 PP AS	2.4	50	132	100	88	108	66	22.7	50	75
	KGSNOS 50 PP AS	2.4	50	132	100	88	108	66	22.7	50	75

1) Dimension A₆ on diameter C.
2) Dimension C₂ and luration hole symmetrical with bearings width C.
3) For fixing screws to EN ISO 4762-8.8.
If there is a possibility of settling, the fixing screws should be secured against rotation.
4) The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.
5) Centring hole to DIN 332, type A.



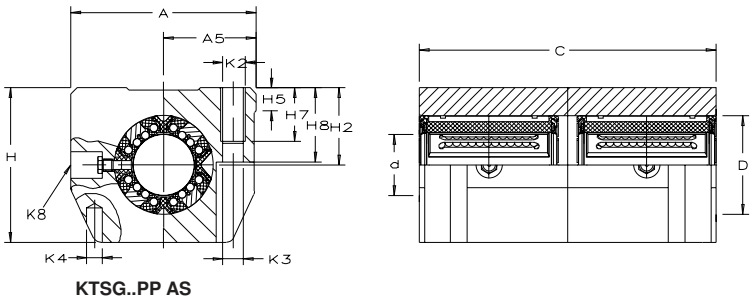


DIMENSION TABLE • Dimensions in mm														
MOUNTING DIMENSIONS											BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER d
H ₂ +0.008 -0.016	H ₅	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁵⁾	K ₅ ³⁾	K ₆ ²⁾	A/F	α Degrees		dyn. C _{max} N	stat. C _{0max} N	
18	6.1	11	16.5	M 5	4.3	1.6 x 3.35	8	NIP 4 MZ	-	78	6	900	810	12
18	6.1	11	16.5	M 5	4.3	1.6 x 3.35	8	NIP 4 MZ	2.5	78	6	900	810	
22	7.5	13	21	M 6	5.3	1.6 x 3.35	10	NIP 4 MZ	-	68	6	1,430	1,160	16
22	7.5	13	21	M 6	5.3	1.6 x 3.35	10	NIP 4 MZ	2.5	68	6	1,430	1,160	
25	8	18	24	M 8	6.6	2 x 4.25	11	NIP 4 MZ	-	55	6	2,200	1,730	20
25	8	18	24	M 8	6.6	2 x 4.25	11	NIP 4 MZ	2.5	55	6	2,200	1,730	
30	8.8	22	29	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	-	57	6	3,950	3,250	25
30	8.8	22	29	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	3	57	6	3,950	3,250	
35	9.7	22	34	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	-	57	6	5,900	4,500	30
35	9.7	22	34	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	3	57	6	5,900	4,500	
45	12.4	26	44	M12	10.5	3.15 x 6.7	18	NIP 5 MZ	-	56	6	10,200	7,200	40
45	12.4	26	44	M12	10.5	3.15 x 6.7	18	NIP 5 MZ	4	56	6	10,200	7,200	
50	11.1	35	49	M16	13.5	4 x 8.5	20	NIP 6 MZ	-	54	6	15,100	10,400	50
50	11.1	35	49	M16	13.5	4 x 8.5	20	NIP 6 MZ	5	54	6	15,100	10,400	

Linear Ball Bearing Units

KTSG..PP AS, KTSS..PP AS SERIES

- MAX³ Maximum Performance
- Closed and open designs
- Contact seals on both sides

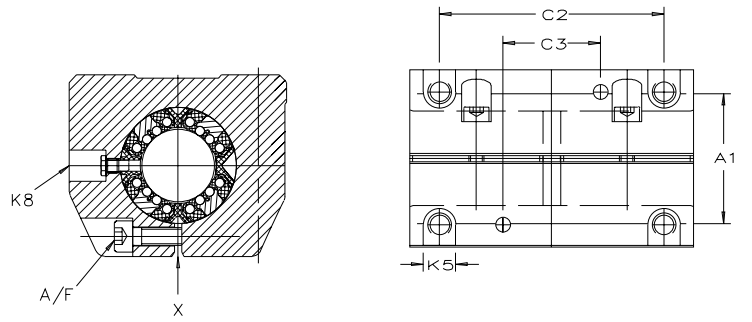


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales .

DIMENSION TABLE • Dimensions in mm											
SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS				MOUNTING DIMENSIONS				
			d	A	C	H	A ₁ ±0.15	A ₅ ±0.01	C ₂ ¹⁾ ±0.15	C ₃ ¹⁾	D
12	KTSG 12 PP AS	0.21	12	43	70	35	32	21.5	56	24	22
	KTSS 12 PP AS	0.21	12	43	70	35	32	21.5	56	24	22
16	KTSG 16 PP AS	0.38	16	53	78	42	40	26.5	64	26	26
	KTSS 16 PP AS	0.38	16	53	78	42	40	26.5	64	26	26
20	KTSG 20 PP AS	0.55	20	60	96	50	45	30	76	33	32
	KTSS 20 PP AS	0.55	20	60	96	50	45	30	76	33	32
25	KTSG 25 PP AS	1.13	25	78	122	60	60	39	94	44	40
	KTSS 25 PP AS	1.13	25	78	122	60	60	39	94	44	40
30	KTSG 30 PP AS	1.78	30	87	142	70	68	43.5	106	54	47
	KTSS 30 PP AS	1.78	30	87	142	70	68	43.5	106	54	47

¹⁾ Dimensions and lubrication hole symmetrical with bearing width C.
²⁾ For fixing screws to EN ISO 4762-8.8.
If there is a possibility of settling, the fixing screws should be secured against rotation.
³⁾ Centring for dowel hole.
⁴⁾ Lubrication nipple.
⁵⁾ The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.
Basic load ratings in accordance with DIN 636-1.





KTSS..PP AS
(same dimensions as KTSG..PP AS)

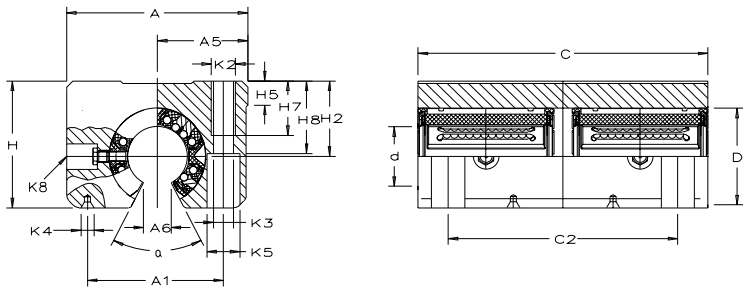
View X (rotated 90°)

DIMENSION TABLE • Dimensions in mm														
MOUNTING DIMENSIONS											BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER d
H ₂ +0.008 -0.016	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ²⁾	K ₄ ³⁾	K ₅ ²⁾	K ₆ ⁴⁾	A/F		dyn. C _{max} N	stat. C _{0max} N	
18	6	25.3	11	16.5	M 5	4.3	4	8	NIP 4 MZ	-	8	1,460	1,620	12
18	6	25.3	11	16.5	M 5	4.3	4	8	NIP 4 MZ	2.5	8	1,460	1,620	
22	7.5	28	13	21	M 6	5.3	4	10	NIP 4 MZ	-	8	2,330	2,320	16
22	7.5	28	13	21	M 6	5.3	4	10	NIP 4 MZ	3	8	2,330	2,320	
25	8	32.8	18	24	M 8	6.6	5	11	NIP 4 MZ	-	8	3,650	3,450	20
25	8	32.8	18	24	M 8	6.6	5	11	NIP 4 MZ	4	8	3,650	3,450	
30	9	40	22	29	M10	8.4	6	15	NIP 5 MZ	-	8	6,400	6,500	25
30	9	40	22	29	M10	8.4	6	15	NIP 5 MZ	5	8	6,400	6,500	
35	10	44.7	22	34	M10	8.4	6	15	NIP 5 MZ	-	8	9,600	9,000	30
35	10	44.7	22	34	M10	8.4	6	15	NIP 5 MZ	5	8	9,600	9,000	

Linear Ball Bearing Units

KTSO..PP AS, KTSOS..PP AS SERIES

- MAX³ Maximum Performance
- Open design
- Contact seals on both sides



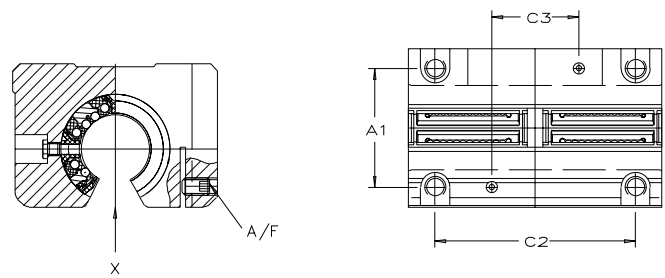
KTSO..PP AS

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm												
SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS				MOUNTING DIMENSIONS					
			d	A	C	H	A ₁ ±0.15	A ₅ ±0.01	A ₆ ¹⁾	C ₂ ²⁾ ±0.15	C ₃ ²⁾	D
12	KTSO 12 PP AS	0.118	12	43	70	28	32	21.5	6.5	56	24	22
	KTSOS 12 PP AS	0.18	12	43	70	28	32	21.5	6.5	56	24	22
16	KTSO 16 PP AS	0.34	16	53	78	35	40	26.5	8.9	64	26	26
	KTSOS 16 PP AS	0.34	16	53	78	35	40	26.5	8.9	64	26	26
20	KTSO 20 PP AS	0.51	20	60	96	42	45	30	9.2	76	33	32
	KTSOS 20 PP AS	0.51	20	60	96	42	45	30	9.2	76	33	32
25	KTSO 25 PP AS	1.03	25	78	122	51	60	39	11.9	94	44	40
	KTSOS 25 PP AS	1.03	25	78	122	51	60	39	11.9	94	44	40
30	KTSO 30 PP AS	1.8	30	87	142	60	68	43.5	14.3	106	54	47
	KTSOS 30 PP AS	1.8	30	87	142	60	68	43.5	14.3	106	54	47

1) Dimensions A₆ on diameter d.
 2) Dimensions and lubrication hole symmetrical with bearing width C.
 3) For fixing screws to EN ISO 4762-8.8.
 If there is a possibility of settling, the fixing screws should be secured against rotation.
 4) Lubrication nipple.
 5) The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.
 Basic load ratings in accordance with DIN 636-1.
 6) Centring hole to DIN 332, type A.





KTSOS..PP AS
(Same dimensions as KTSO..PP AS)

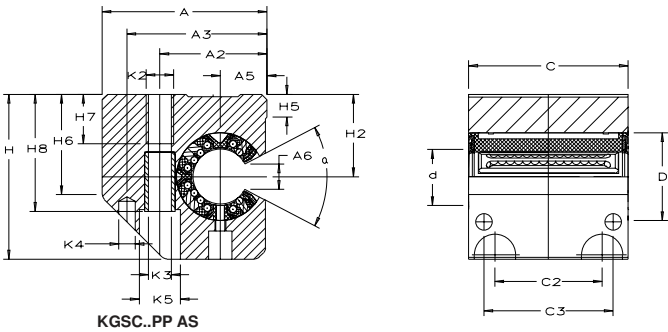
View X (rotated 90°)

DIMENSION TABLE • Dimensions in mm														
MOUNTING DIMENSIONS											BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER d
H ₂ +0.008 -0.016	H ₅	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁶⁾	K ₅ ³⁾	K ₆ ⁴⁾	A/F	α Degrees		dyn. C _{max} N	stat. C _{0max} N	
18	6.1	11	16.5	M 5	4.3	1.6 x 3.35	8	NIP 4 MZ	-	66	6	1,460	1,620	12
18	6.1	11	16.5	M 5	4.3	1.6 x 3.35	8	NIP 4 MZ	2.5	66	6	1,460	1,620	12
22	7.5	13	21	M 6	5.3	1.6 x 3.35	10	NIP 4 MZ	-	68	6	2,330	2,320	16
22	7.5	13	21	M 6	5.3	1.6 x 3.35	10	NIP 4 MZ	2.5	68	6	2,330	2,320	16
25	8	18	24	M 8	6.6	2.0 x 4.25	11	NIP 4 MZ	-	55	6	3,650	3,450	20
25	8	18	24	M 8	6.6	2.0 x 4.25	11	NIP 4 MZ	2.5	55	6	3,650	3,450	20
30	8.8	22	29	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	-	57	6	6,400	6,500	25
30	8.8	22	29	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	3	57	6	6,400	6,500	25
35	9.7	22	34	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	-	57	6	9,600	9,000	30
35	9.7	22	34	M10	8.4	2.5 x 5.3	15	NIP 5 MZ	3	57	6	9,600	9,000	30

Linear Ball Bearing Units

KGSC..PP AS, KGSCS..PP AS SERIES

- MAX³ Maximum Performance
- Light range - metric sizes
- Sealed, greased with relubrication facility

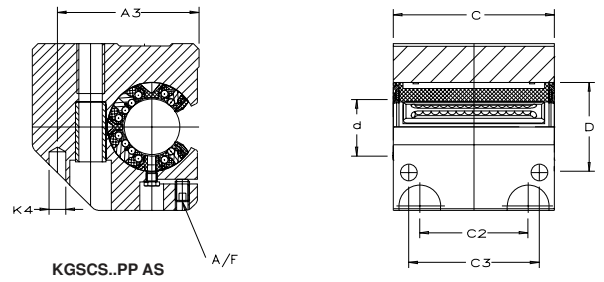


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

DIMENSION TABLE • Dimensions in mm												
SHAFT DIAMETER d	PART NUMBER	MASS =kg	DIMENSIONS					MOUNTING DIMENSIONS				
			d	A	C	H	A ₂ ±0.15	A ₃	A ₅ ±0.01	A ₆ ¹⁾	C ₂ ²⁾ ±0.15	C ₃ ²⁾
20	KGSC 20 PP AS	0.35	20	60	47	60	39	51	17	9.2	30	36
	KGSCS 20 PP AS	0.35	20	60	47	60	39	51	17	9.2	30	36
25	KGSC 25 PP AS	0.68	25	75	58	72	49	64	21	12	36	45
	KGSCS 25 PP AS	0.68	25	75	58	72	49	64	21	12	36	45
30	KGSC 30 PP AS	1	30	86	68	82	59	76	25	14.3	42	52
	KGSCS 30 PP AS	1	30	86	68	82	59	76	25	14.3	42	52
40	KGSC 40 PP AS	1.8	40	110	80	100	75	97	32	18.8	48	60
	KGSCS 40 PP AS	1.8	40	110	80	100	75	97	32	18.8	48	60
50	KGSC 50 PP AS	2.9	50	127	100	115	88	109	38	22.7	62	80
	KGSCS 50 PP AS	2.9	50	127	100	115	88	109	38	22.7	62	80

1) Dimension A₆ on diameter d.
2) Dimension C₂ and lubrication hole symmetrical with bearing width C.
3) Centring for dowel hole.
4) For fixing screws to EN ISO 4762-8.8.
If there is a possibility of settling, the fixing screws should be secured against rotation.
5) The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.





DIMENSION TABLE • Dimensions in mm																
MOUNTING DIMENSIONS													BALL ROWS	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER
D	H ₂ +0.008 -0.016	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁴⁾	K ₅ ³⁾	K ₆ ²⁾	A/F	α Degrees		QUANTITY	dyn. C _{max} N	stat. C _{0max} N
32	30	8.3	37.5	18	42.6	M10	8.4	6	15	NIP 4 MZ	-	55	6	2,200	1,730	20
32	30	8.3	37.5	18	42.6	M10	8.4	6	15	NIP 4 MZ	2.5	55	6	2,200	1,730	
40	35	8.2	45	22	50.6	M12	10.5	8	18	NIP 5 MZ	-	57	6	3,950	3,250	25
40	35	8.2	45	22	50.6	M12	10.5	8	18	NIP 5 MZ	3	57	6	3,950	3,250	
47	40	9	52	29	55.6	M16	13.5	10	20	NIP 5 MZ	-	57	6	5,900	4,500	30
47	40	9	52	29	55.6	M16	13.5	10	20	NIP 5 MZ	3	57	6	5,900	4,500	
62	45	9.5	60	36	67.6	M20	15.5	12	24	NIP 5 MZ	-	56	6	10,200	7,200	40
62	45	9.5	60	36	67.6	M20	15.5	12	24	NIP 5 MZ	4	56	6	10,200	7,200	
75	50	8.6	70	36	78.8	M20	17.5	12	26	NIP 6 MZ	-	54	6	15,100	10,400	50
75	50	8.6	70	36	78.8	M20	17.5	12	26	NIP 6 MZ	5	54	6	15,100	10,400	

Linear Ball Bearing Units

KTFS..PP AS SERIES

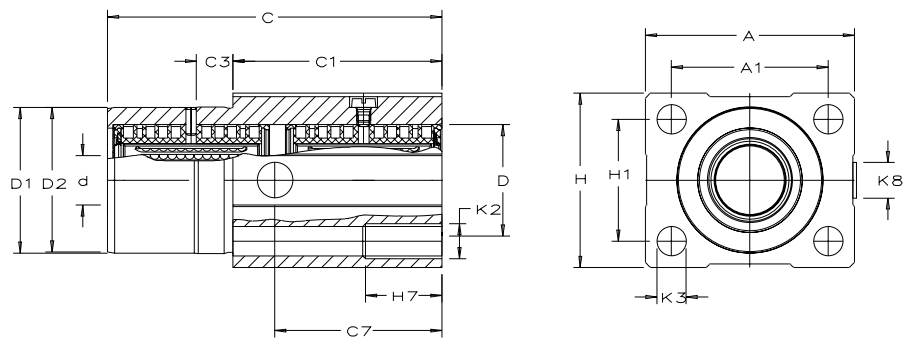
- MAX³ Maximum Performance
- Light range - metric sizes
- Sealed, greased with relubrication facility

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales .

DIMENSION TABLE • Dimensions in mm											
SHAFT DIAMETER d	PART NUMBER	MASS ≈kg	DIMENSIONS				MOUNTING DIMENSIONS				
			d	A	C	H	A ₁ ±0.15	C ₁	C ₃	C ₇	D
12	KTFS 12 PP AS	0.2	12	41	70	34	32	40	10	35	22
16	KTFS 16 PP AS	0.3	16	50	78	40	38	50	10	39	26
20	KTFS 20 PP AS	0.5	20	60	96	50	45	60	10	48	32
25	KTFS 25 PP AS	1	25	74	122	60	56	73	10	61	40
30	KTFS 30 PP AS	1.4	30	84	142	70	64	82	10	71	47

1) Recommendation: locating bore D₁ H7.
 2) The basic load ratings apply only to hardened (670 to 840 HV) and ground shaft raceways.





KTFS..PP AS

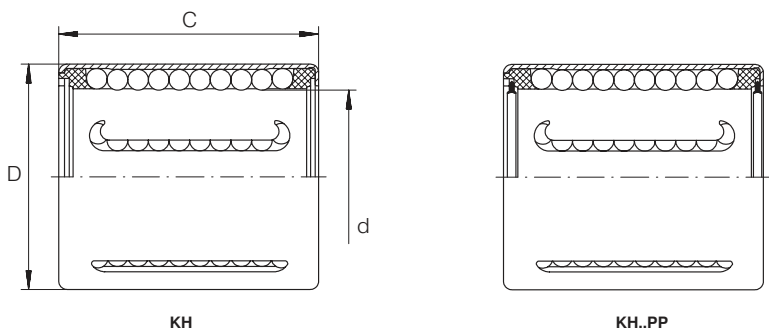
DIMENSION TABLE • Dimensions in mm

MOUNTING DIMENSIONS							BALL ROWS QUANTITY	BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER d
D ₁ ¹⁾ g7	D ₂ -0.1 -0.3	H ₁ ±0.15	H ₇	K ₂	K ₃	K ₈		dyn. C _{max} N	stat. C _{0max} N	
30	30	24	13	M 6	5.3	M8x1	8	1,460	1,620	12
35	35	28	18	M 8	6.6	M8x1	8	2,330	2,320	16
42	42	35	22	M10	8.4	M8x1	8	3,650	3,450	20
52	52	42	26	M12	10.5	M8x1	8	6,400	6,500	25
61	61	50	35	M16	13.5	M8x1	8	9,600	9,000	30

Linear Ball Bearings

KH SERIES

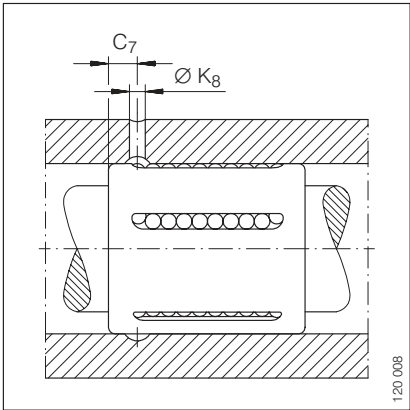
- Compact Range
- With Relubrication Facility



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm											
SHAFT DIA.	PART NUMBER ¹⁾	MASS g	DIMENSIONS			MOUNTING DIMENSIONS		BASIC LOAD RATINGS ²⁾			
			d	D	C	C ₇	K ₈	dyn. C _{min} N	stat. C _{0min} N	dyn. C _{max} N	stat. C _{0max} N
6	KH 0622	7	6	12	22	4	2	340	239	390	340
8	KH 0824	12	8	15	24	6	2	410	280	475	400
10	KH 1026	14.5	10	17	26	6	2.5	510	370	590	520
12	KH 1228	18.5	12	19	28	6	2.5	670	510	800	740
14	KH 1428	20.5	14	21	28	6	2.5	690	520	830	760
16	KH 1630	27.5	16	24	30	7	2.5	890	620	1,060	910
20	KH 2030	32.5	20	28	30	7	2.5	1,110	790	1,170	1,010
25	KH 2540	66	25	35	40	8	2.5	2,280	1,670	2,420	2,130
30	KH 3050	95	30	40	50	8	2.5	3,300	2,700	3,300	3,100
40	KH 4060	182	40	52	60	9	2.5	5,300	4,450	5,300	4,950
50	KH 5070	252	50	62	70	9	2.5	6,800	6,300	6,800	7,000

1) Linear ball bearings sealed on both sides: suffix "PP".
 2) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



Linear Ball Bearing And Housing Units KGHK..B PP AS SERIES

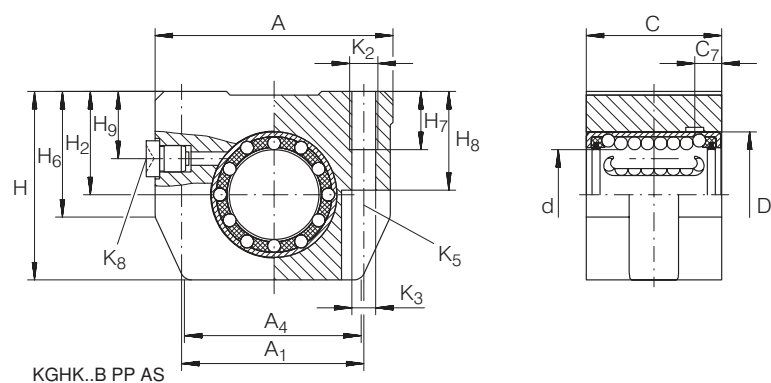
- Compact Range
- Sealed, Greased, With Relubrication Facility

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm									
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS		
			d	A	C	H	A ₁ ± 0.15	A ₄	C ₇
6	KGHK 06 B PP AS	0.04	6	32	22	27	23	25	4
8	KGHK 08 B PP AS	0.05	8	32	24	27	23	25	5
10	KGHK 10 B PP AS	0.07	10	40	26	33	29	32	5
12	KGHK 12 B PP AS	0.08	12	40	28	33	29	32	5.5
14	KGHK 14 B PP AS	0.1	14	43	28	36.5	34	34	5.5
16	KGHK 16 B PP AS	0.11	16	43	30	36.5	34	34	6
20	KGHK 20 B PP AS	0.15	20	53	30	42.5	40	40	6
25	KGHK 25 B PP AS	0.27	25	60	40	52.5	48	44	8
30	KGHK 30 B PP AS	0.4	30	67	50	60	53	49.5	9
40	KGHK 40 B PP AS	0.75	40	87	60	73.5	69	63	10
50	KGHK 50 B PP AS	1.25	50	103	70	92	82	74	12

- 1) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
 2) Lubrication nipple.
 3) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.





										BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER
D	H ₂ +0.010 -0.014	H ₆	H ₇	H ₈	H ₉	K ₂	K ₃ ¹⁾	K ₅ ¹⁾	K ₈ ²⁾	dyn. C N	stat. C ₀ N	
12	13	19.5	9	13	9	M4	3.4	M3	NIP A1	340	239	6
15	14	19.5	9	13	9	M4	3.4	M3	NIP A1	410	280	8
17	16	24	11	16	11	M5	4.3	M4	NIP A1	510	370	10
19	17	24	11	16	11	M5	4.3	M4	NIP A1	670	510	12
21	18	26.8	11	18	13	M5	4.3	M4	NIP A1	690	520	14
24	19	26.8	11	18	13	M5	4.3	M4	NIP A1	890	620	16
28	23	28.5	13	22	15	M6	5.3	M5	NIP A2	1,110	790	20
35	27	35.5	18	26	17.5	M8	6.6	M6	NIP A2	2,280	1,670	25
40	30	41.5	18	29	18	M8	6.6	M6	NIP A2	3,300	2,700	30
52	39	48	22	38	23	M10	8.4	M8	NIP A2	5,300	4,450	40
62	47	61	26	46	28	M12	10.5	M10	NIP A2	6,800	6,300	50

Linear Ball Bearing And Housing Units KTHK..B PP AS SERIES

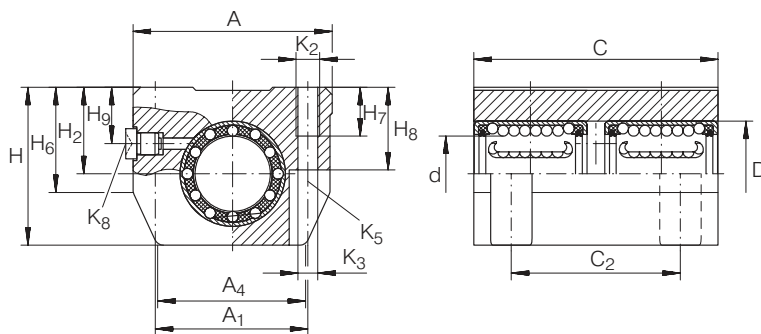
- Compact Range
- Sealed, Greased, With Relubrication Facility

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm									
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS		
			d	A	C	H	A ₁ ± 0.15	A ₄	C ₂ ¹⁾ ± 0.15
12	KTHK 12 B PP AS	0.17	12	40	60	33	29	32	35
16	KTHK 16 B PP AS	0.23	16	43	65	36.5	34	34	40
20	KTHK 20 B PP AS	0.32	20	53	65	42.5	40	40	45
25	KTHK 25 B PP AS	0.58	25	60	85	52.5	48	44	55
30	KTHK 30 B PP AS	0.85	30	67	105	60	53	49.6	70
40	KTHK 40 B PP AS	1.6	40	87	125	73.5	69	63	85
50	KTHK 50 B PP AS	2.7	50	103	145	92	82	74	100

- 1) Dimension C₂ and lubrication hole centered on bearing width C.
- 2) For fixing screws to DIN 912-8.8 and spring washer to DIN 7 980.
- 3) Lubrication nipple.
- 4) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways and uniform loading on both the linear ball bearings.





KTHK..B PP AS

										BASIC LOAD RATINGS ⁴⁾		SHAFT DIAMETER
D	H ₂ +0.010 -0.014	H ₆	H ₇	H ₈	H ₉	K ₂	K ₃ ²⁾	K ₅ ²⁾	K ₈ ³⁾	dyn. C N	stat. C ₀ N	
19	17	24	11	16	11	M5	4.3	M4	NIP A1	1,090	1,020	12
24	19	26.8	11	18	13	M5	4.3	M4	NIP A1	1,440	1,240	16
28	23	28.5	13	22	15	M6	5.3	M5	NIP A2	1,800	1,580	20
35	27	35.5	18	26	17.5	M8	6.6	M6	NIP A2	3,700	3,350	25
40	30	41.5	18	29	18	M8	6.6	M6	NIP A2	5,400	5,400	30
52	39	48	22	38	22	M10	8.4	M8	NIP A2	8,600	8,900	40
62	47	61	26	46	26	M12	10.5	M10	NIP M8x1	11,000	12,600	50

Linear Ball Bearing And Housing Units KGHW..PP SERIES

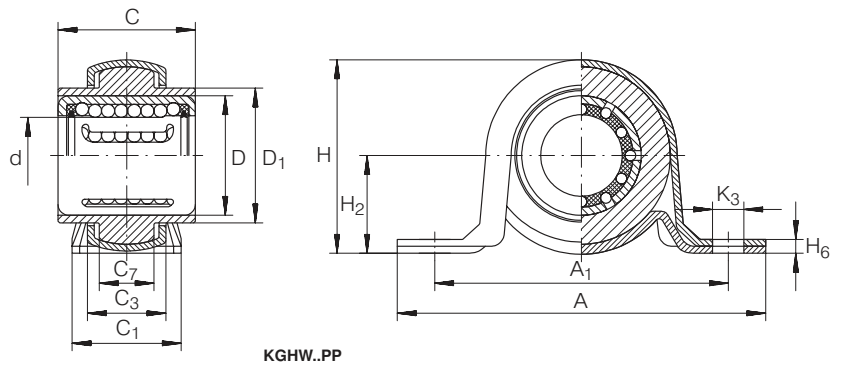
- Adjusting Range
- Sealed, Greased

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm						
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS			
			d	A ± 0.5	C	H
16	KGHW 16 PP	0.2	16	85.7	30	43.2
20	KGHW 20 PP	0.25	20	85.7	30	43.2
25	KGHW 25 PP	0.39	25	108	40	56.5

1) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.





MOUNTING DIMENSIONS									BASIC LOAD RATINGS ¹⁾		SHAFT DIAMETER
A ₁ ± 0.25	C ₁	C ₃	C ₇	D	D ₁	H ₂ ± 0.2	H ₆	K ₃	dyn. C N	stat. C ₀ N	
68.3	25.4	18.8	13.2	24	32	22.2	3	9.5	890	620	16
68.3	25.4	18.8	13.2	28	32	22.2	3	9.5	1,110	790	20
86	32	23.5	14.5	35	39.5	28.6	4	11.5	2,280	1,670	25

Linear Ball Bearing And Housing Units KGHWT..PP SERIES

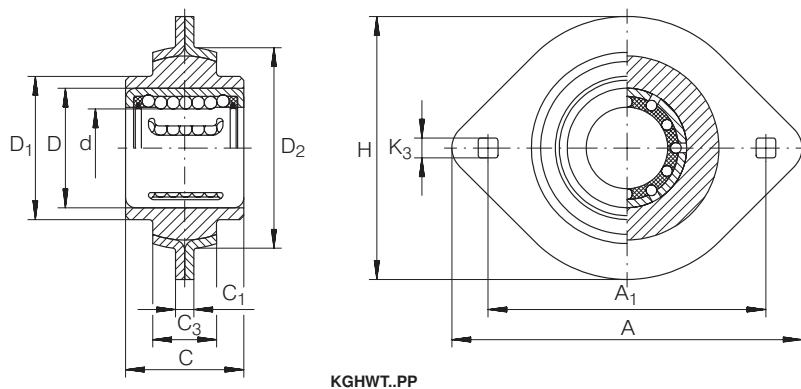
- Adjusting Range
- Sealed, Greased

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm						
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS			
			d	A	C	H
16	KGHWT 16 PP	0.19	16	81	30	58.7
20	KGHWT 20 PP	0.18	20	81	30	58.7
25	KGHWT 25 PP	0.28	25	90.5	40	66

1) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



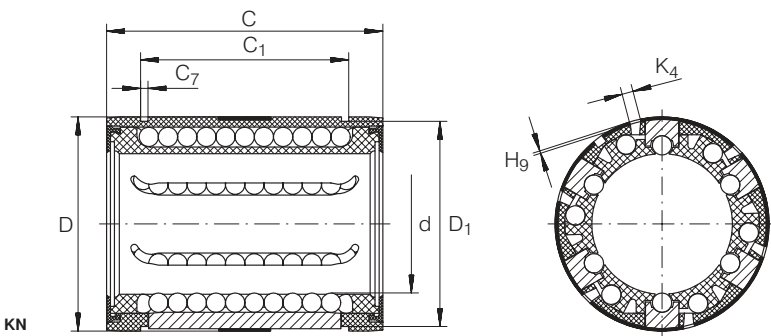


MOUNTING DIMENSIONS							BASIC LOAD RATINGS ¹⁾		SHAFT DIAMETER
A ₁ ± 0.15	C ₁ ± 0.5	C ₃ +1	D	D ₁	D ₂	K ₃	dyn. C N	stat. C ₀ N	
63.5	4	14	24	30	44	7	890	620	16
63.5	4	14	28	32	44	7	1,110	790	20
71.5	4.4	16	35	40	51	8.7	2,280	1,670	25

Linear Ball Bearings

KN, KNO SERIES

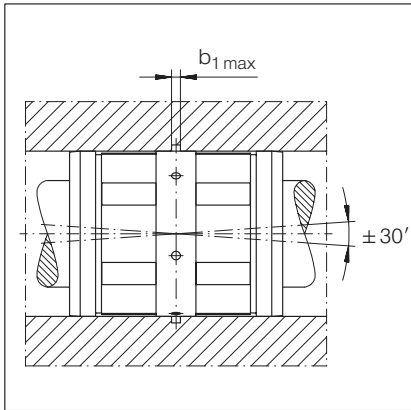
- Light Range
- With Relubrication Facility



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

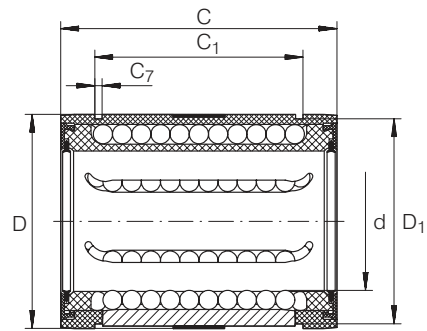
DIMENSION TABLE · Dimensions in mm										
SHAFT DIAMETER	PART NUMBER		MASS	DIMENSIONS			MOUNTING DIMENSIONS			
			kg	d	D	C	A ₆ ²⁾	C ₁ H13	C ₇	D ₁
12	KN 1232		0.02	12	22	32	—	22.6	1.3	21
		KNO 1232	0.02	12	22	32	6.5	—	—	—
16	KN 1636		0.03	16	26	36	—	24.6	1.3	25
		KNO 1636	0.02	16	26	36	9	—	—	—
20	KN 2045		0.06	20	32	45	—	31.2	1.6	30.7
		KNO 2045	0.05	20	32	45	9	—	—	—
25	KN 2558		0.13	25	40	58	—	43.7	1.85	38
		KNO 2558	0.11	25	40	58	11.5	—	—	—
30	KN 3068		0.19	30	47	68	—	51.7	1.85	44.7
		KNO 3068	0.16	30	47	68	14	—	—	—
40	KN 4080		0.35	40	62	80	—	60.3	2.15	59.4
		KNO 4080	0.3	40	62	80	19	—	—	—
50	KN 50100		0.56	50	75	100	—	77.3	2.65	71.4
		KNO 50100	0.47	50	75	100	22.5	—	—	—

- 1) Linear ball bearings sealed on both sides: suffix "PP".
2) Dimension A₆ on diameter d.
3) Hole position centered on bearing width C.
4) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.
5) Basic load rating in main load direction.

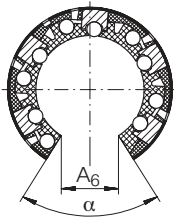


Misalignment compensation ±30'



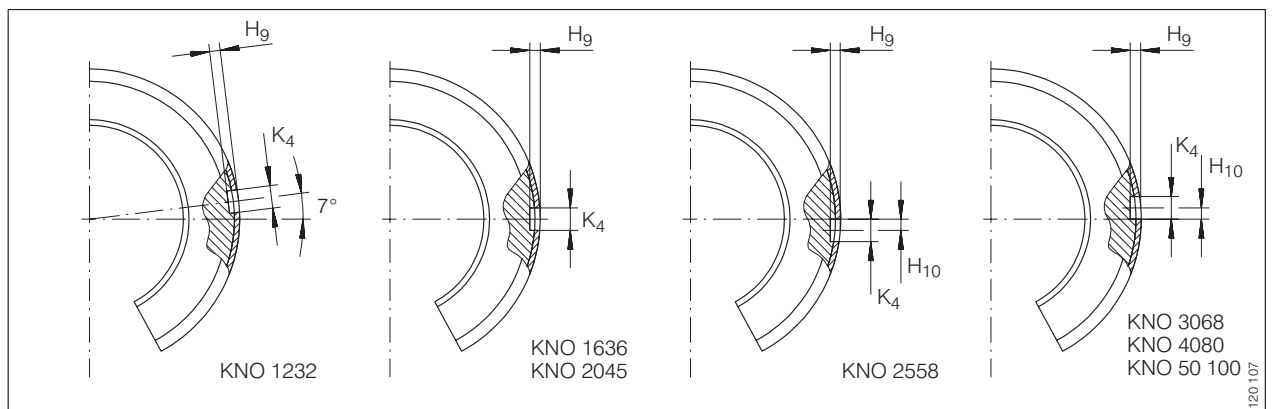


KN..PP



KNO, KNO..PP

										ACCESSORIES	
				MOUNTING DIMENSION	BALL ROWS	BASIC LOAD RATINGS ⁴⁾				SUITABLE CIRCLIPS TO DIN 471	SHAFT DIAMETER
H ₉	H ₁₀	K ₄ ³⁾	α Grad	b ₁ max.	NUMBER	dyn. C _{0 min} N	stat. C _{0 min} N	dyn. C _{0 max} N	stat. C _{0 max} N		
0.7	—	3	—	1.5	5	730	510	870	740	22 × 1.2	12
0.7	—	3	66	1.5	4	—	—	840 ⁵⁾	640 ⁵⁾	—	—
0.7	—	3	—	1.5	5	870	620	1,040	910	26 × 1.2	16
0.7	—	3	68	1.5	4	—	—	1,000 ⁵⁾	750 ⁵⁾	—	—
0.9	—	3	—	2.5	6	1,730	1,230	1,830	1,570	32 × 1.5	20
0.9	—	3	55	2.5	5	—	—	1,740 ⁵⁾	1,240 ⁵⁾	—	—
1.4	—	3	—	2.5	6	3,100	2,220	3,250	2,850	42 × 1.75	25
1.4	1.5	3	57	2.5	5	—	—	3,100 ⁵⁾	2,260 ⁵⁾	—	—
2.2	—	3	—	2.5	6	3,750	2,850	3,950	3,650	48 × 1.75	30
2.2	2	3	57	2.5	5	—	—	3,750 ⁵⁾	2,850 ⁵⁾	—	—
2.2	—	3	—	3	6	6,900	4,900	7,300	6,300	63 × 2	40
2.2	1.5	3	56	3	5	—	—	6,900 ⁵⁾	4,900 ⁵⁾	—	—
2.3	—	5	—	3	6	10,000	7,200	10,600	9,200	75 × 2.5	50
2.3	2.5	5	54	3	5	—	—	10,000 ⁵⁾	7,200 ⁵⁾	—	—



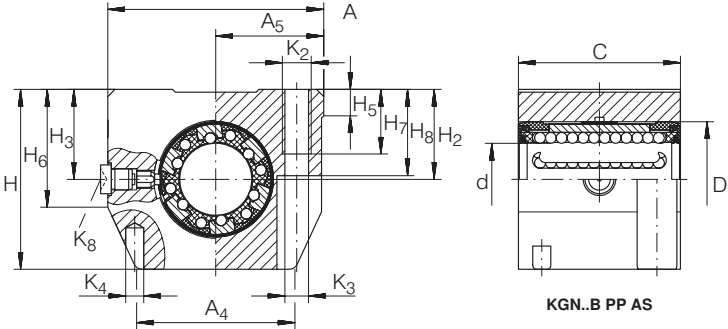
Fixing holes



Linear Ball Bearing And Housing Units

KGN..B PP AS, KGNS..B PP AS SERIES

- Light range
- Sealed, Greased, With Relubrication Facility



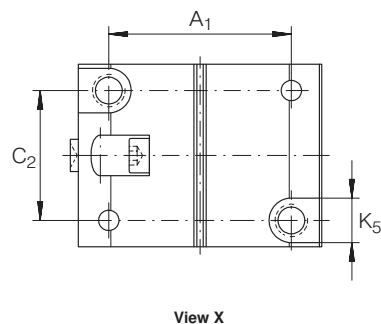
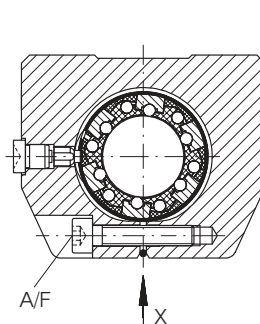
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm											
SHAFT DIAMETER	PART NUMBER	MASS kg	Dimensions				MOUNTING DIMENSIONS				
			d	A	C	H	A ₁	A ₄	A ₅ ± 0.01	C ₂ ¹⁾	D
12	KGN 12 B PP AS	0.1	12	43	32	35	32±0.15	34	21.5	23±0.15	22
	KGNS 12 B PP AS	0.1	12	43	32	35	32±0.15	34	21.5	23±0.15	22
16	KGN 16 B PP AS	0.17	16	53	37	42	40±0.15	40	26.5	26±0.15	26
	KGNS 16 B PP AS	0.17	16	53	37	42	40±0.15	40	26.5	26±0.15	26
20	KGN 20 B PP AS	0.27	20	60	45	50	45±0.15	44	30	32±0.15	32
	KGNS 20 B PP AS	0.27	20	60	45	50	45±0.15	44	30	32±0.15	32
25	KGN 25 B PP AS	0.56	25	78	58	60	60±0.15	59.5	39	40±0.15	40
	KGNS 25 B PP AS	0.56	25	78	58	60	60±0.15	59.5	39	40±0.15	40
30	KGN 30 B PP AS	0.83	30	87	68	70	68±0.15	63	43.5	45±0.15	47
	KGNS 30 B PP AS	0.83	30	87	68	70	68±0.15	63	43.5	45±0.15	47
40	KGN 40 B PP AS	1.55	40	108	80	90	86±0.15	76	54	58±0.15	62
	KGNS 40 B PP AS	1.55	40	108	80	90	86±0.15	76	54	58±0.15	62
50	KGN 50 B PP AS	2.7	50	132	100	105	108±0.2	90	66	50±0.2	75
	KGNS 50 B PP AS	2.7	50	132	100	105	108±0.2	90	66	50±0.2	75

- ¹⁾ Dimension C₂ and lubrication hole centered on bearing width C.
- ²⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
- ³⁾ Centring for dowel hole.
- ⁴⁾ Lubrication nipple.
- ⁵⁾ The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



KGNS..B PP AS



View X

												BALL ROWS	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
H ₂ +0.008 -0.016	H ₃	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ²⁾	K ₄ ³⁾	K ₅ ²⁾	K ₈ ¹⁾⁴⁾	A/F	NUMBER	dyn. C N	stat. C ₀ N	
18	18	6	25.5	11	16.5	M5	4.3	4	8	NIP A1	—	5	780	560	12
18	18	6	25.5	11	16.5	M5	4.3	4	8	NIP A1	2.5	5	780	560	
22	22	7	28	13	21	M6	5.3	4	10	NIP A1	—	5	1,000	750	16
22	22	7	28	13	21	M6	5.3	4	10	NIP A1	3	5	1,000	750	
25	25	7.5	33	18	24	M8	6.6	5	11	NIP A1	—	6	1,740	1,240	20
25	25	7.5	33	18	24	M8	6.6	5	11	NIP A1	4	6	1,740	1,240	
30	30	8.5	40	22	29	M10	8.4	6	15	NIP A2	—	6	3,100	2,230	25
30	30	8.5	40	22	29	M10	8.4	6	15	NIP A2	5	6	3,100	2,230	
35	35	9.5	44.5	22	34	M10	8.4	6	15	NIP A2	—	6	3,800	2,900	30
35	35	9.5	44.5	22	34	M10	8.4	6	15	NIP A2	5	6	3,800	2,900	
45	45	11	56	26	44	M12	10.5	8	18	NIP A2	—	6	6,900	4,950	40
45	45	11	56	26	44	M12	10.5	8	18	NIP A2	6	6	6,900	4,950	
50	50	11	60	35	49	M16	13.5	10	20	NIP A2	—	6	10,100	7,300	50
50	50	11	60	35	49	M16	13.5	10	20	NIP A2	8	6	10,100	7,300	

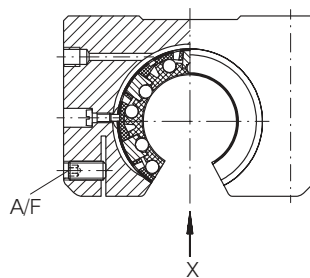
- Light Range
- Sealed, Greased, With Relubrication Facility



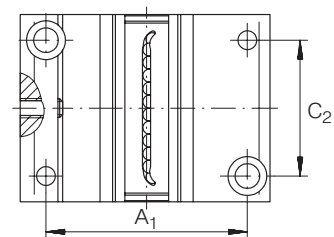
or Linear Sales

In the interim, linear ball bearing and housing units KGNO..PP AS and KGNOS..PP AS with profile grooves will still be supplied.

- 1) Dimension A_6 on diameter d .
- 2) Dimension C_2 and lubrication hole centered on bearing width C .
- 3) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
- 4) Centring for dowel hole.
- 5) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



KG NOS..PP AS



View X

											BALL ROWS	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
H ₃	H ₅	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁴⁾	K ₅ ³⁾	K ₈ ²⁾	A/F	α Grad	NUMBER	dyn. C N	stat. C ₀ N	
8	6	11	16.5	M5	4.3	4	8	M6	—	66	4	840	640	12
8	6	11	16.5	M5	4.3	4	8	M6	2.5	66	4	840	640	
10	7.5	13	21	M6	5.3	4	10	M6	—	68	4	1,000	750	16
10	7.5	13	21	M6	5.3	4	10	M6	2.5	68	4	1,000	750	
11	8	18	24	M8	6.6	5	11	M6	—	55	5	1,740	1,240	20
11	8	18	24	M8	6.6	5	11	M6	2.5	55	5	1,740	1,240	
12.5	9	22	29	M10	8.4	6	15	M8 × 1	—	57	5	3,100	2,260	25
12.5	9	22	29	M10	8.4	6	15	M8 × 1	3	57	5	3,100	2,260	
14	9.5	22	34	M10	8.4	6	15	M8 × 1	—	57	5	3,750	2,850	30
14	9.5	22	34	M10	8.4	6	15	M8 × 1	3	57	5	3,750	2,850	
17.5	12	26	44	M12	10.5	8	18	M8 × 1	—	56	5	6,900	4,900	40
17.5	12	26	44	M12	10.5	8	18	M8 × 1	4	56	5	6,900	4,900	
17.5	12	35	49	M16	13.5	10	20	M8 × 1	—	54	5	10,000	7,200	50
17.5	12	35	49	M16	13.5	10	20	M8 × 1	5	54	5	10,000	7,200	

Linear Ball Bearing And Housing Units KGNC..PP AS, KGNCS..PP AS SERIES

- Light Range
- Sealed, Greased,With Relubrication Facility

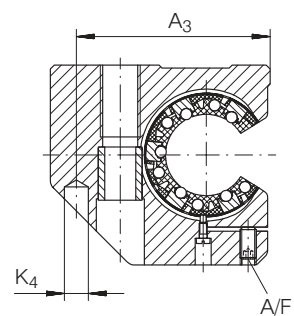
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS						
			d	A	C	H	A ₂	A ₃	A ₅	A ₆ ¹⁾	C ₂ ²⁾	C ₃ ²⁾	D
							± 0.15		± 0.01		± 0.15		
20	KGNC 20 PP AS	0.35	20	60	47	60	39	51	17	9	30	36	32
	KGNCS 20 PP AS	0.35	20	60	47	60	39	51	17	9	30	36	32
25	KGNC 25 PP AS	0.68	25	75	58	72	49	64	21	11.5	36	45	40
	KGNCS 25 PP AS	0.68	25	75	58	72	49	64	21	11.5	36	45	40
30	KGNC 30 PP AS	1	30	86	68	82	59	76	25	14	42	52	47
	KGNCS 30 PP AS	1	30	86	68	82	59	76	25	14	42	52	47
40	KGNC 40 PP AS	1.8	40	110	80	100	75	97	32	19	48	60	62
	KGNCS 40 PP AS	1.8	40	110	80	100	75	97	32	19	48	60	62
50	KGNC 50 PP AS	2.9	50	127	100	115	88	109	38	22.5	62	80	75
	KGNCS 50 PP AS	2.9	50	127	100	115	88	109	38	22.5	62	80	75

- In the interim, linear ball bearing and housing units KGNC..PP AS and KGNCS..PP AS with profile grooves will still be supplied.
- 1) Dimension A₆ on diameter d.
 - 2) Dimension C₂, C₃ and lubrication hole centered on bearing width C.
 - 3) Centring for dowel hole.
 - 4) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
 - 5) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.





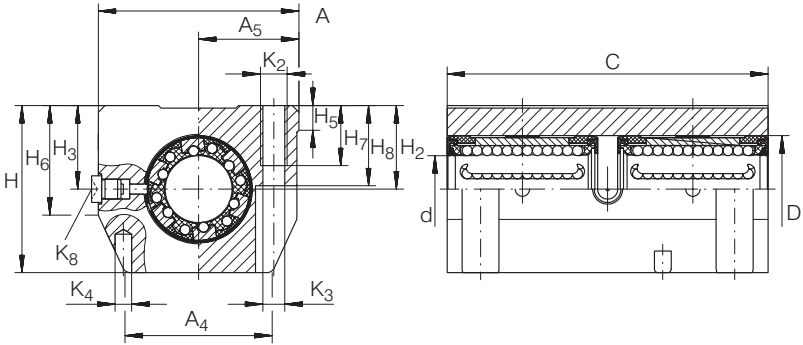
KGNCs..PP AS

												BALL ROWS	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
H ₂ +0.008 -0.016	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁴⁾	K ₅ ³⁾	K ₆ ²⁾	A/F	α Grad	NUMBER	dyn. C N	stat. C ₀ N	
30	8	37.5	18	42.5	M10	8.4	6	15	M6	—	55	5	1,740	1,240	20
30	8	37.5	18	42.5	M10	8.4	6	15	M6	2.5	55	5	1,740	1,240	
35	8	45	22	50.5	M12	10.5	8	18	M8×1	—	57	5	3,100	2,269	25
35	8	45	22	50.5	M12	10.5	8	18	M8×1	3	57	5	3,100	2,260	
40	9	52	29	55.5	M16	13.5	10	20	M8×1	—	57	5	3,750	2,850	30
40	9	52	29	55.5	M16	13.5	10	20	M8×1	3	57	5	3,750	2,850	
45	9	60	36	67.5	M20	15.5	12	24	M8×1	—	56	5	6,900	4,900	40
45	9	60	36	67.5	M20	15.5	12	24	M8×1	4	56	5	6,900	4,900	
50	9	70	36	79	M20	17.5	12	26	M8×1	—	54	5	10,000	7,200	50
50	9	70	36	79	M20	17.5	12	26	M8×1	5	54	5	10,000	7,200	

Linear Ball Bearing And Housing Units

KTN..B PP AS, KTNS..B PP AS SERIES

- Light Range
- Sealed, Greased, With Relubrication Facility

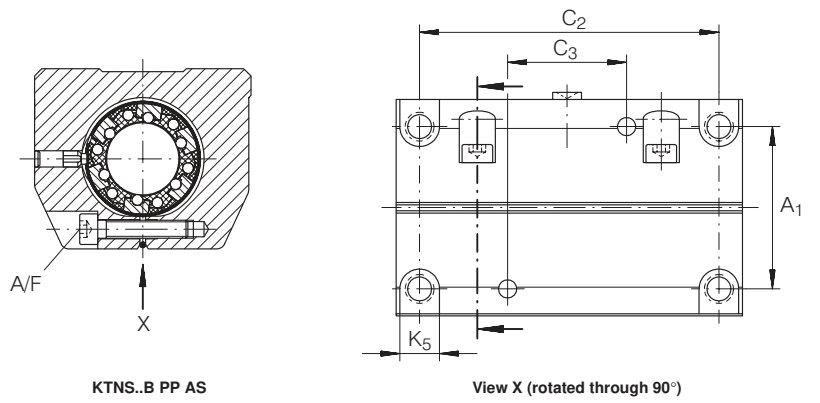


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE - Dimensions in mm												
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS					
			d	A	C	H	A ₁	A ₄	A ₅ ± 0.01	C ₂ ¹⁾	C ₃ ¹⁾	D
12	KTN 12 B PP AS	0.21	12	43	70	35	32 ± 0.15	34	21.5	56 ± 0.15	24	22
	KTNS 12 B PP AS	0.21	12	43	70	35	32 ± 0.15	34	21.5	56 ± 0.15	24	22
16	KTN 16 B PP AS	0.35	16	53	78	42	40 ± 0.15	40	26.5	64 ± 0.15	26	26
	KTNS 16 B PP AS	0.35	16	53	78	42	40 ± 0.15	40	26.5	64 ± 0.15	26	26
20	KTN 20 B PP AS	0.56	20	60	96	50	45 ± 0.15	44	30	76 ± 0.15	33	32
	KTNS 20 B PP AS	0.56	20	60	96	50	45 ± 0.15	44	30	76 ± 0.15	33	32
25	KTN 25 B PP AS	1.15	25	78	122	60	60 ± 0.15	59.5	39	94 ± 0.2	44	40
	KTNS 25 B PP AS	1.15	25	78	122	60	60 ± 0.15	59.5	39	94 ± 0.2	44	40
30	KTN 30 B PP AS	1.7	30	87	142	70	68 ± 0.15	63	43.5	106 ± 0.2	54	47
	KTNS 30 B PP AS	1.7	30	87	142	70	68 ± 0.15	63	43.5	106 ± 0.2	54	47

- In the interim, linear ball bearing and housing units KTN..B PP AS and KTNS..B PP AS with profile grooves will still be supplied.
- 1) Dimension C₂, C₃ and lubrication hole centered on bearing width C.
 - 2) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
 - 3) Centring for dowel hole.
 - 4) Lubrication nipple.
 - 5) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.

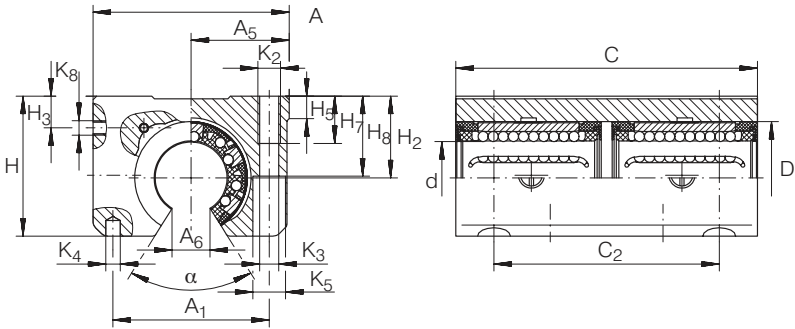




												BALL ROWS	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
H ₂ +0.008 -0.016	H ₃	H ₅	H ₆	H ₇	H ₈	K ₂	K ₃ ²⁾	K ₄ ³⁾	K ₅ ²⁾	K ₈ ⁴⁾	A/F	NUMBER	dyn. C N	stat. C ₀ N	
18	18	6	25.6	11	16.5	M5	4.3	4	8	NIP A1	—	5	1,270	1,110	12
18	18	6	25.6	11	16.5	M5	4.3	4	8	NIP A1	2.5	5	1,270	1,110	
22	22	7	28	13	21	M6	5.3	4	10	NIP A1	—	5	1,620	1,500	16
22	22	7	28	13	21	M6	5.3	4	10	NIP A1	3	5	1,620	1,500	
25	25	7.5	33	18	24	M8	6.6	5	11	NIP A1	—	6	2,850	2,480	20
25	25	7.5	33	18	24	M8	6.6	5	11	NIP A1	4	6	2,850	2,480	
30	30	8.5	40	22	29	M10	8.4	6	15	NIP A2	—	6	5,000	4,450	25
30	30	8.5	40	22	29	M10	8.4	6	15	NIP A2	5	6	5,000	4,450	
35	35	9.5	44.5	22	34	M10	8.4	6	15	NIP A2	—	6	6,100	5,800	30
35	35	9.5	44.5	22	34	M10	8.4	6	15	NIP A2	5	6	6,100	5,800	

Linear Ball Bearing And Housing Units KTNO..PP AS, KTNOS..PP AS SERIES

- Light Range
- Sealed, Greased, With Relubrication Facility

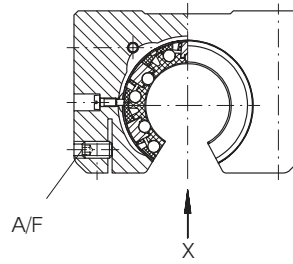


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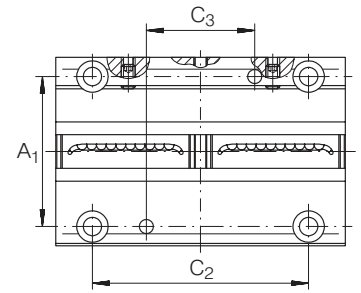
DIMENSION TABLE - Dimensions in mm													
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS						
			d	A	C	H	A ₁	A ₅ ± 0.01	A ₆ ¹⁾	C ₂ ²⁾	C ₃ ²⁾	D	H ₂ +0.008 -0.016
12	KTNO 12 PP AS	0.19	12	43	70	28	32±0.15	21.5	6.5	56±0.15	24	22	18
	KTNOS 12 PP AS	0.19	12	43	70	28	32±0.15	21.5	6.5	56±0.15	24	22	18
16	KTNO 16 PP AS	0.31	16	53	78	35	40±0.15	26.5	9	64±0.15	26	26	22
	KTNOS 16 PP AS	0.31	16	53	78	35	40±0.15	26.5	9	64±0.15	26	26	22
20	KTNO 20 PP AS	0.52	20	60	96	42	45±0.15	30	9	76±0.15	33	32	25
	KTNOS 20 PP AS	0.52	20	60	96	42	45±0.15	30	9	76±0.15	33	32	25
25	KTNO 25 PP AS	1.06	25	78	122	51	60±0.15	39	11.5	94±0.2	44	40	30
	KTNOS 25 PP AS	1.06	25	78	122	51	60±0.15	39	11.5	94±0.2	44	40	30
30	KTNO 30 PP AS	1.55	30	87	142	60	68±0.15	43.5	14	106±0.2	54	47	35
	KTNOS 30 PP AS	1.55	30	87	142	60	68±0.15	43.5	14	106±0.2	54	47	35

- In the interim, linear ball bearing and housing units KTNO..PP AS and KTNOS..PP AS with profile grooves will still be supplied.
- 1) Dimension A₆ on diameter d.
 - 2) Dimension C₂, C₃ and lubrication hole centered on bearing width C.
 - 3) For fixing screws to DIN 912-8.8 and spring washer to DIN 7 980.
 - 4) Centring for dowel hole.
 - 5) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.





KTNOS..PP AS



View X (rotated through 90°)

											BALL ROWS	BASIC LOAD RATINGS ⁵⁾		SHAFT
H ₃	H ₅	H ₇	H ₈	K ₂	K ₃ ³⁾	K ₄ ⁴⁾	K ₅ ³⁾	K ₆ ²⁾	A/F	α Grad	NUMBER	dyn. C N	stat. C ₀ N	DIAMETER
8	6	11	16.5	M5	4.3	4	8	M6	—	66	4	1,370	1,270	12
8	6	11	16.5	M5	4.3	4	8	M6	2.5	66	4	1,370	1,270	16
10	7.5	13	21	M6	5.3	4	10	M6	—	68	4	1,620	1,500	
10	7.5	13	21	M6	5.3	4	10	M6	2.5	68	4	1,620	1,500	
11	8	18	24	M8	6.6	5	11	M6	—	55	5	2,850	2,480	20
11	8	18	24	M8	6.6	5	11	M6	2.5	55	5	2,850	2,480	25
12.5	9	22	29	M10	8.4	6	15	M8 × 1	—	57	5	5,100	4,550	
12.5	9	22	29	M10	8.4	6	15	M8 × 1	3	57	5	5,100	4,550	
14	9.5	22	34	M10	8.4	6	15	M8 × 1	—	57	5	6,100	5,700	30
14	9.5	22	34	M10	8.4	6	15	M8 × 1	3	57	5	6,100	5,700	

Linear Ball Bearing And Housing Units KTFN..PP AS SERIES

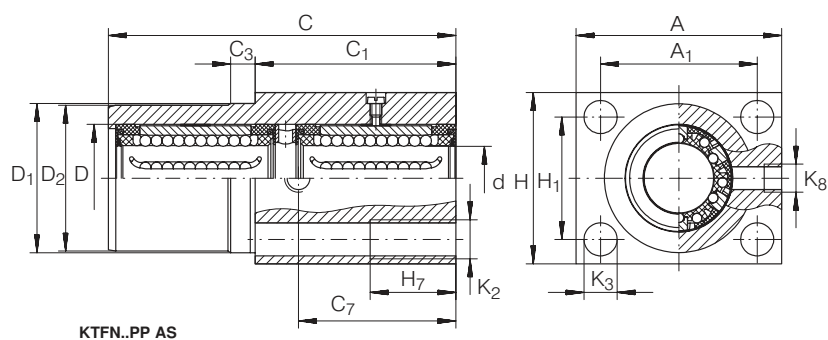
- Light Range
- Sealed, Greased, With Relubrication Facility

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm										
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS			
			d	A	C	H	A ₁ ± 0.15	C ₁	C ₃	C ₇
12	KTFN 12 PP AS	0.2	12	42	70	34	32	46	10	35
16	KTFN 16 PP AS	0.3	16	50	78	40	38	50	10	39
20	KTFN 20 PP AS	0.5	20	60	96	50	45	60	10	48
25	KTFN 25 PP AS	1	25	74	122	60	56	73	10	61
30	KTFN 30 PP AS	1.4	30	84	142	70	64	82	10	71

1) Recommended tolerance for housing bore: D₁ H7.
2) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



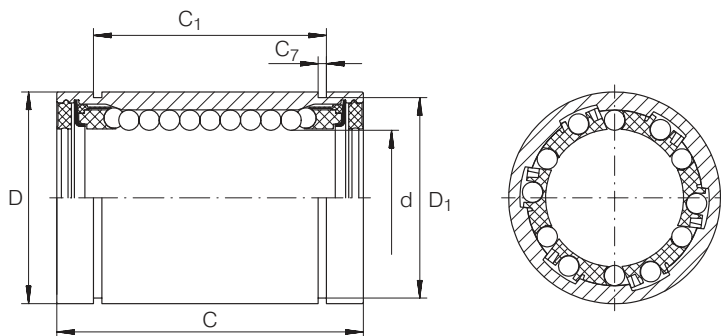


								BALL ROWS	BASIC LOAD RATINGS ²⁾		SHAFT
D	$D_1^{1)}$ g7	D_2 -0.1 -0.3	H_1 ± 0.15	H_7	K_2	K_3	K_8	NUMBER	dyn. C N	stat. C_0 N	DIAMETER
22	30	30	24	13	M6	5.3	$M8 \times 1$	5	1,270	1,110	12
26	35	35	28	18	M8	6.6	$M8 \times 1$	5	1,620	1,500	16
32	42	42	35	22	M10	8.4	$M8 \times 1$	6	2,850	2,480	20
40	52	52	42	26	M12	10.5	$M8 \times 1$	6	5,000	4,450	25
47	61	61	50	35	M16	13.5	$M8 \times 1$	6	6,100	5,800	30

Linear Ball Bearings

KB, KBS, KBO SERIES

• Heavy Range



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm									
SHAFT DIAMETER	PART NUMBER			MASS kg	DIMENSIONS			MOUNTING DIMENSIONS	
					d Deviations ²⁾	D ²⁾ h5	C h12	A ₆ ³⁾	C ₁ H13
12	KB 1232	—	—	0.04	—	—	—	—	—
	—	KBS 1232	—	0.04	12 ^{+0.008}	22	32	—	22.6
	—	—	KBO 1232	0.03	—	22	32	7.7	22.6
16	KB 1636	—	—	0.05	—	26	36	—	24.6
	—	KBS 1636	—	0.05	16 ^{+0.009 -0.001}	26	36	—	24.6
	—	—	KBO 1636	0.04	—	26	36	10.1	24.6
20	KB 2045	—	—	0.09	—	32	45	—	31.2
	—	KBS 2045	—	0.09	20 ^{+0.009 -0.001}	32	45	—	31.2
	—	—	KBO 2045	0.07	—	32	45	10	31.2
25	KB 2558	—	—	0.19	—	40	58	—	43.7
	—	KBS 2558	—	0.19	25 ^{+0.011 -0.001}	40	58	—	43.7
	—	—	KBO 2558	0.15	—	40	58	12.5	43.7
30	KB 3068	—	—	0.3	—	47	68	—	51.7
	—	KBS 3068	—	0.3	30 ^{+0.011 -0.001}	47	68	—	51.7
	—	—	KBO 3068	0.24	—	47	68	13.6	51.7
40	KB 4080	—	—	0.6	—	62	80	—	60.3
	—	KBS 4080	—	0.6	40 ^{+0.013 -0.002}	62	80	—	60.3
	—	—	KBO 4080	0.52	—	62	80	18.2	60.3
50	KB 50100	—	—	1	—	75	100	—	77.3
	—	KBS 50100	—	1	50 ^{+0.013 -0.002}	75	100	—	77.3
	—	—	KBO 50100	0.85	—	75	100	22.7	77.3

1) Linear ball bearings sealed on both sides: suffix "PP".
Linear ball bearings with relubrication facility: suffix "AS".

2) The tolerances are valid for series KB.

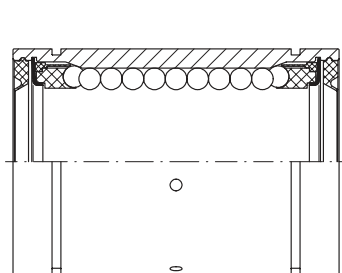
3) Dimension A₆ on diameter d.

4) Groove dimensions suitable for circlips to DIN 471.

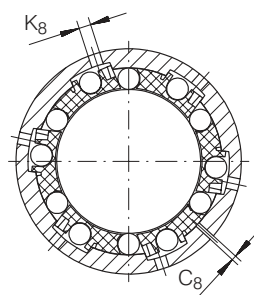
5) Bore position centered on bearing width C.

6) The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.

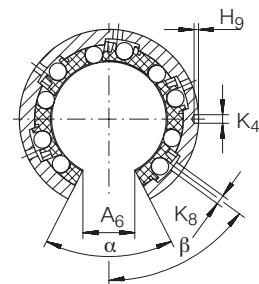
7) Basic load rating in main load direction.



KB..PP AS



KBS..AS, KBS..PP AS

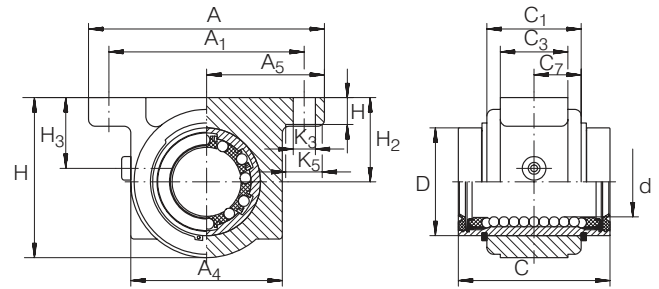


KBO..AS, KBO..PP AS

								BALL ROWS	BASIC LOAD RATINGS ⁶⁾				SHAFT DIAMETER
C ₇ ⁴⁾	C ₈	D ₁ ⁴⁾	H ₉	K ₄ ⁵⁾	K ₈	α Grad	β Grad	NUMBER	dyn. C _{0 min} N	stat. C _{0 min} N	dyn. C _{0 max} N	stat. C _{0 max} N	
1.3	—	21	—	—	1.5	—	—	5	540	385	640	570	12
1.3	1	21	—	—	1.5	—	—	5	540	385	640	570	
1.3	—	21	1.2	2.2	1.5	78	64	4	—	—	600 ⁷⁾	445 ⁷⁾	
1.3	—	24.9	—	—	2	—	—	5	710	530	840	780	
1.3	1	24.9	—	—	2	—	—	5	710	530	840	780	
1.3	—	24.9	1.2	2.2	2	78	64	4	—	—	800 ⁷⁾	620 ⁷⁾	
1.6	—	30.3	—	—	2	—	—	6	1,570	1,230	1,660	1,570	20
1.6	1	30.3	—	—	2	—	—	6	1,570	1,230	1,660	1,570	
1.6	—	30.3	1.2	2.2	2	60	52	5	—	—	1,600 ⁷⁾	1,280 ⁷⁾	
1.85	—	37.5	—	—	2.5	—	—	6	2,800	2,220	2,950	2,850	25
1.85	1	37.5	—	—	2.5	—	—	6	2,800	2,220	2,950	2,850	
1.85	—	37.5	1.5	3	2.5	60	53	5	—	—	2,850 ⁷⁾	2,330 ⁷⁾	
1.85	—	44.5	—	—	2.5	—	—	6	3,600	2,850	3,800	3,600	30
1.85	1	44.5	—	—	2.5	—	—	6	3,600	2,850	3,800	3,600	
1.85	—	44.5	1.5	3	2.5	54	55	5	—	—	3,700 ⁷⁾	3,000 ⁷⁾	
2.15	—	59	—	—	3	—	—	6	6,000	4,400	6,400	5,600	
2.15	1	59	—	—	3	—	—	6	6,000	4,400	6,400	5,600	
2.15	—	59	1.5	3	3	54	54	5	—	—	6,100 ⁷⁾	4,600 ⁷⁾	
2.65	—	72	—	—	4	—	—	6	8,700	6,300	9,200	8,000	50
2.65	1	72	—	—	4	—	—	6	8,700	6,300	9,200	8,000	
2.65	—	72	1.5	3	4	54	54	5	—	—	8,900 ⁷⁾	6,600 ⁷⁾	

Linear Ball Bearing And Housing Units KGB..PP AS, KGBS..PP AS, KGBO..PP AS SERIES

- Heavy Range
- Sealed, Greased, With Relubrication Facility



KGB..PP AS

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

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or Linear Sales

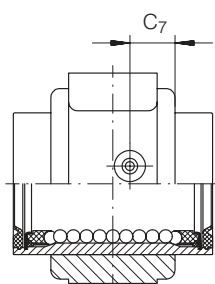
DIMENSION TABLE · Dimensions in mm													
SHAFT DIAMETER	PART NUMBER			MASS kg	DIMENSIONS				MOUNTING DIMENSIONS				
					d Deviations ¹⁾	A	C h12	H	A ₁	A ₄	A ₅		
12	KGB 1232 PP AS	—	—	0.1	12 ^{+0.008}	52	32	35.8	42±0.15	31.6	26±0.02		
	—	KGBS 1232 PP AS	—	0.1		52	32	35.8	42±0.15	31.6	26±0.02		
	—	—	KGBO 1232 PP AS	0.09		52	32	—	42±0.15	31.6	26±0.02		
	16	KGB 1636 PP AS	—	—		0.14	16 ^{+0.009 -0.001}	56	36	37.5	46±0.15	35	28±0.02
		—	KGBS 1636 PP AS	—		0.14		56	36	37.5	46±0.15	35	28±0.02
		—	—	KGBO 1636 PP AS		0.12		56	36	—	46±0.15	35	28±0.02
20		KGB 2045 PP AS	—	—	0.3	20 ^{+0.009 -0.001}		70	45	48	58±0.15	46	35±0.02
	—	KGBS 2045 PP AS	—	0.3	70		45	48	58±0.15	46	35±0.02		
	—	—	KGBO 2045 PP AS	0.25	70		45	—	58±0.15	46	35±0.02		
	25	KGB 2558 PP AS	—	—	0.58		25 ^{+0.011 -0.001}	80	58	58	68±0.15	56	40±0.02
		—	KGBS 2558 PP AS	—	0.58			80	58	58	68±0.15	56	40±0.02
		—	—	KGBO 2558 PP AS	0.49			80	58	—	68±0.15	56	40±0.02
30		KGB 3068 PP AS	—	—	0.9	30 ^{+0.011 -0.001}		88	68	67	76±0.2	64	44±0.02
	—	KGBS 3068 PP AS	—	0.9	88		68	67	76±0.2	64	44±0.02		
	—	—	KGBO 3068 PP AS	0.78	88		68	—	76±0.2	64	44±0.02		
	40	KGB 4080 PP AS	—	—	1.43		40 ^{+0.013 -0.002}	108	80	83.5	94±0.2	77	54±0.02
		—	KGBS 4080 PP AS	—	1.43			108	80	83.5	94±0.2	77	54±0.02
		—	—	KGBO 4080 PP AS	1.28			108	80	—	94±0.2	77	54±0.02
50		KGB 50100 PP AS	—	—	2.78	50 ^{+0.013 -0.002}		135	100	98	116±0.2	96	67.5±0.05
	—	KGBS 50100 PP AS	—	2.78	135		100	98	116±0.2	96	67.5±0.05		
	—	—	KGBO 50100 PP AS	2.46	135		100	—	116±0.2	96	67.5±0.05		

¹⁾ The tolerances are valid for series KGB..PP AS only.

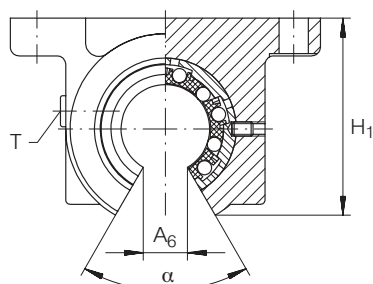
²⁾ Dimension A₆ on diameter d.

³⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.

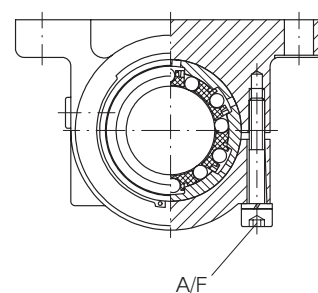
⁵⁾ The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



KGBO..PP AS



KGBO, KGBO..PP AS

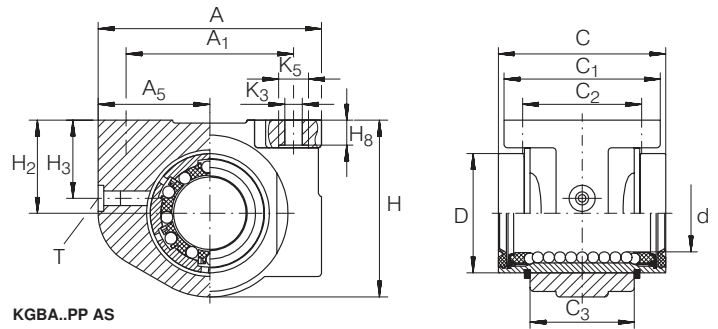


KGBS, KGBS..PP AS

													INA LUBRICATION NIPPLE ⁴⁾ T	BALL ROWS NUMBER	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
A ₆ ²⁾	C ₁	C ₃	C ₇	D ₁ ¹⁾ h5	H ₁	H ₂ ±0.015	H ₃	H ₈	K ₃ ³⁾	K ₅ ³⁾	α Grad	A/F			dyn. C N	stat. C ₀ N	
–	20	12	10	22	–	20	15	6	5.5	10	–	–	NIP A1	5	540	385	12
–	20	12	10	22	–	20	15	6	5.5	10	–	2	NIP A1	5	540	385	12
7.7	20	12	7	22	32	20	15	6	5.5	10	78	–	NIP A1	4	600	445	16
–	22	15	11	26	–	20	15	6	5.5	10	–	–	NIP A1	5	710	530	
–	22	15	11	26	–	20	15	6	5.5	10	–	2	NIP A1	5	710	530	
10.1	22	15	7	26	33.5	20	15	6	5.5	10	78	–	NIP A1	4	800	620	
–	28	20	14	32	–	25	21	8	6.6	11	–	–	NIP A1	6	1,570	1,230	20
–	28	20	14	32	–	25	21	8	6.6	11	–	3	NIP A1	6	1,570	1,230	25
10	28	20	10	32	45	25	21	8	6.6	11	60	–	NIP A1	5	1,600	1,280	
–	40	28	20	40	–	30	23	10	6.6	11	–	–	NIP A1	6	2,800	2,220	
–	40	28	20	40	–	30	23	10	6.6	11	–	3	NIP A1	6	2,800	2,220	
12.5	40	28	15	40	54.5	30	23	10	6.6	11	60	–	NIP A1	5	2,850	2,330	
–	48	32	24	47	–	35	25	10	6.6	11	–	–	NIP A2	6	3,600	2,850	30
–	48	32	24	47	–	35	25	10	6.6	11	–	4	NIP A2	6	3,600	2,850	40
13.6	48	32	19	47	63.5	35	25	10	6.6	11	54	–	NIP A2	5	3,700	3,000	
–	56	40	28	62	–	45	30	12	9	15	–	–	NIP A2	6	6,000	4,400	
–	56	40	28	62	–	45	30	12	9	15	–	4	NIP A2	6	6,000	4,400	
18.2	56	40	23	62	79.5	45	30	12	9	15	54	–	NIP A2	5	6,100	4,600	
–	72	52	36	75	–	50	34	14	11	18	–	–	NIP A2	6	8,700	6,300	50
–	72	52	36	75	–	50	34	14	11	18	–	5	NIP A2	6	8,700	6,300	50
22.7	72	52	28	75	93	50	34	14	11	18	54	–	NIP A2	5	8,900	6,600	

Linear Ball Bearing And Housing Units KGBA..PP AS, KGBAS..PP AS, KGBAO..PP AS SERIES

- Heavy Range
- Sealed, Greased, With Relubrication Facility



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

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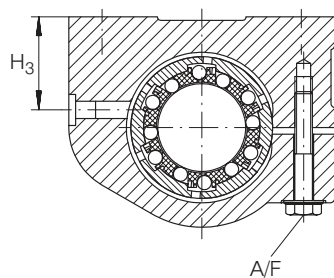
DIMENSION TABLE · Dimensions in mm										
SHAFT DIAMETER	PART NUMBER			MASS kg	DIMENSIONS				MOUNTING DIMENSIONS	
					d Deviations ¹⁾	A	C h12	H	A ₁	A ₅
12	KGBA 1232 PP AS	—	—	0.08	12 ^{+0.008}	42	32	34	32±0.15	21±0.01
16	—	KGBAS 1232 PP AS	—	0.08		42	32	34	32±0.15	21±0.01
	—	—	KGBAO 1232 PP AS	0.07		42	32	—	32±0.15	21±0.01
	KGBA 1636 PP AS	—	—	0.12	50	36	41	40±0.15	25±0.01	
	—	KGBAS 1636 PP AS	—	0.12	50	36	41	40±0.15	25±0.01	
—	—	—	KGBAO 1636 PP AS	0.1	50	36	—	40±0.15	25±0.01	
20	KGBA 2045 PP AS	—	—	0.2	20 ^{+0.009} −0.001	60	45	47.5	45±0.15	30±0.01
25	—	KGBAS 2045 PP AS	—	0.2		60	45	47.5	45±0.15	30±0.01
	—	—	KGBAO 2045 PP AS	0.17		60	45	—	45±0.15	30±0.01
	KGBA 2558 PP AS	—	—	0.41	74	58	60	60±0.2	37±0.01	
	—	KGBAS 2558 PP AS	—	0.41	74	58	60	60±0.2	37±0.01	
—	—	—	KGBAO 2558 PP AS	0.35	74	58	—	60±0.2	37±0.01	
30	KGBA 3068 PP AS	—	—	0.61	30 ^{+0.011} −0.001	84	68	67	68±0.2	42±0.01
40	—	KGBAS 3068 PP AS	—	0.61		84	68	67	68±0.2	42±0.01
	—	—	KGBAO 3068 PP AS	0.53		84	68	—	68±0.2	42±0.01
	KGBA 4080 PP AS	—	—	1.2	108	80	87	86±0.2	54±0.015	
	—	KGBAS 4080 PP AS	—	1.2	108	80	87	86±0.2	54±0.015	
—	—	—	KGBAO 4080 PP AS	1.07	108	80	—	86±0.2	54±0.015	
50	KGBA 50100 PP AS	—	—	1.88	50 ^{+0.013} −0.002	130	100	98	108±0.2	65±0.015
—	KGBAS 50100 PP AS	—	1.88	130		100	98	108±0.2	65±0.015	
—	—	KGBAO 50100 PP AS	1.65	130		100	—	108±0.2	65±0.015	

¹⁾ The tolerances are valid for series KGBA..PP AS only.

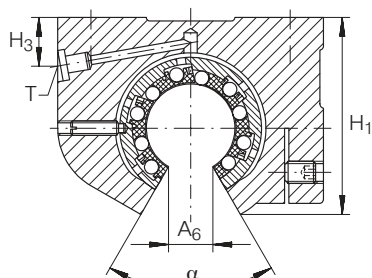
²⁾ Dimension A₆ on diameter d.

³⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7 980.

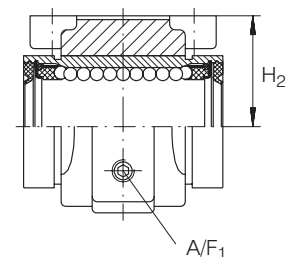
⁵⁾ The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways.



KGBAS.PP AS



KGBAO..PP AS

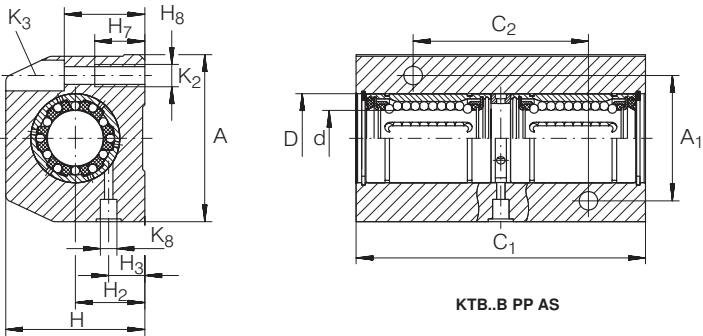


KGBAO..PP AS

														INA LUBRICATION NIPPLE T	BALL ROWS NUMBER	BASIC LOAD RATINGS ⁵⁾		SHAFT DIAMETER
A ₆ ²⁾	C ₁	C ₂	C ₃	D ₁ ¹⁾ h5	H ₁	H ₂ ¹⁾	H ₃	H ₈ -0.5	K ₃ ³⁾	K ₅ ³⁾	α Grad	A/F	A/F ₁			dyn. C N	stat. C ₀ N	
—	32	23 ^{±0.15}	20	22	—	18 ^{±0.01}	15	4.8	4.7	8	—	—	—	NIP A1	5	540	385	12
—	32	23 ^{±0.15}	20	22	—	18 ^{±0.01}	15	4.8	4.7	8	—	7	—	NIP A1	5	540	385	12
7.7	32	23 ^{±0.15}	20	22	30.5	18 ^{±0.01}	7.8	4.8	4.7	8	78	—	2	NIP A1	4	600	445	16
—	35	26 ^{±0.15}	22	26	—	22 ^{±0.01}	15	5.4	4.7	8	—	—	—	NIP A1	5	710	530	16
—	35	26 ^{±0.15}	22	26	—	22 ^{±0.01}	15	5.4	4.7	8	—	7	—	NIP A1	5	710	530	16
10.1	35	26 ^{±0.15}	22	26	37	22 ^{±0.01}	10	5.4	4.7	8	78	—	2.5	NIP A1	4	800	620	16
—	42	32 ^{±0.15}	28	32	—	25 ^{±0.01}	21	6.7	4.7	8	—	—	—	NIP A1	6	1,570	1,230	20
—	42	32 ^{±0.15}	28	32	—	25 ^{±0.01}	21	6.7	4.7	8	—	7	—	NIP A1	6	1,570	1,230	20
10	42	32 ^{±0.15}	28	32	44.5	25 ^{±0.01}	11	6.7	4.7	8	60	—	2.5	NIP A1	5	1,600	1,280	25
—	54	40 ^{±0.2}	40	40	—	30 ^{±0.01}	23	7.8	5.7	10	—	—	—	NIP A1	6	2,800	2,220	25
—	54	40 ^{±0.2}	40	40	—	30 ^{±0.01}	23	7.8	5.7	10	—	8	—	NIP A1	6	2,800	2,220	25
12.5	54	40 ^{±0.2}	40	40	56	30 ^{±0.01}	13	7.8	5.7	10	60	—	3	NIP A1	5	2,850	2,330	25
—	60	45 ^{±0.2}	48	47	—	35 ^{±0.01}	25	8.7	6.8	11	—	—	—	NIP A2	6	3,600	2,850	30
—	60	45 ^{±0.2}	48	47	—	35 ^{±0.01}	25	8.7	6.8	11	—	10	—	NIP A2	6	3,600	2,850	30
13.6	60	45 ^{±0.2}	48	47	63.5	35 ^{±0.01}	14	8.7	6.8	11	54	—	3	NIP A2	5	3,700	3,000	30
—	78	58 ^{±0.2}	56	62	—	45 ^{±0.01}	30	11	9.2	15	—	—	—	NIP A2	6	6,000	4,400	40
—	78	58 ^{±0.2}	56	62	—	45 ^{±0.01}	30	11	9.2	15	—	13	—	NIP A2	6	6,000	4,400	40
18.2	78	58 ^{±0.2}	56	62	82.5	45 ^{±0.01}	18	11	9.2	15	54	—	4	NIP A2	5	6,100	4,600	40
—	70	50 ^{±0.2}	72	75	—	50 ^{±0.015}	34	12.5	9.2	15	—	—	—	NIP A2	6	8,700	6,300	50
—	70	50 ^{±0.2}	72	75	—	50 ^{±0.015}	34	12.5	9.2	15	—	13	—	NIP A2	6	8,700	6,300	50
22.7	70	50 ^{±0.2}	72	75	93	50 ^{±0.015}	19	12.5	9.2	15	54	—	4	NIP A2	5	8,900	6,600	50

Linear Ball Bearing And Housing Units KTB..B PP AS, KTBO..PP AS SERIES

- Heavy Range
- Sealed, Greased, With Relubrication Facility

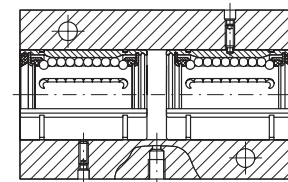
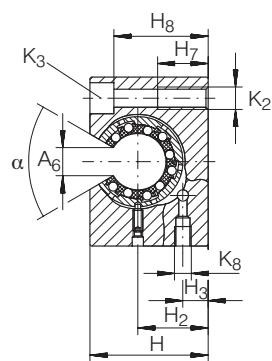


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm											
SHAFT DIAMETER	PART NUMBER		MASS kg	DIMENSIONS			MOUNTING DIMENSIONS				
				d Deviations ¹⁾	A	H	A ₁	A ₆ ²⁾	C ₁	C ₂	D
12	KTB 12 B PP AS	–	0.31	12 ^{+0.008}	43	35	30 ± 0.15	–	76	40 ± 0.15	22
	–	KTBO 12 PP AS	0.26		42	30	30 ± 0.15	7.7	76	40 ± 0.15	22
16	KTB 16 B PP AS	–	0.46	16 ^{+0.009} –0.001	53	42	36 ± 0.15	–	84	45 ± 0.15	26
	–	KTBO 16 PP AS	0.36		50	35	36 ± 0.15	10.1	84	45 ± 0.15	26
20	KTB 20 B PP AS	–	0.8	20 ^{+0.009} –0.001	60	50	45 ± 0.15	–	104	55 ± 0.15	32
	–	KTBO 20 PP AS	0.62		60	42	45 ± 0.15	10	104	55 ± 0.15	32
25	KTB 25 B PP AS	–	1.49	25 ^{+0.011} –0.001	78	60	54 ± 0.15	–	130	70 ± 0.2	40
	–	KTBO 25 PP AS	1.18		74	51	54 ± 0.15	12.5	130	70 ± 0.2	40
30	KTB 30 B PP AS	–	2.3	30 ^{+0.011} –0.001	87	70	62 ± 0.15	–	152	85 ± 0.2	47
	–	KTBO 30 PP AS	1.84		84	60	62 ± 0.15	13.6	152	85 ± 0.2	47

- ¹⁾ The tolerances are valid for series KTB..B PP AS only.
²⁾ Dimension A₆ on diameter d.
³⁾ The basic load ratings are only valid for hardened (670 to 840 HV) and ground shaft raceways and uniform loading on both the linear ball bearings.



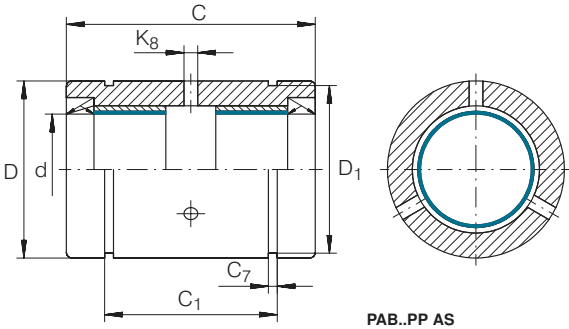


KTBO..PP AS

							K ₃ FOR FIXING SCREWS		BASIC LOAD RATINGS ³⁾		SHAFT DIAMETER
H ₂ ± 0.015	H ₃	H ₇	H ₈	K ₂	K ₈	α Grad	DIN 912	DIN 6 912	dyn. C N	stat. C ₀ N	
18	10	13	28	M6	NIP A1	—	M5	—	880	770	12
18	6	13	24.5	M6	M6	78	—	M5	980	890	
22	12	13	35	M6	NIP A1	—	M5	—	1,150	1,060	16
22	8	13	29.5	M6	M6	78	—	M5	1,290	1,240	
25	13	18	37	M8	NIP A1	—	M6	—	2,550	2,450	20
25	9	18	35.5	M8	M6	60	—	M6	2,600	2,550	
30	15	22	49	M10	NIP A2	—	M8	—	4,550	4,450	25
30	9	22	43	M10	M8 × 1	60	—	M8	4,650	4,650	
35	16	26	52	M12	NIP A2	—	M10	—	5,900	5,700	30
35	11	26	50.5	M12	M8 × 1	54	—	M10	6,000	6,000	

Permaglide® Linear
Plain Bearings
PAB..PP AS,
PABO..PP AS SERIES

- Plain Bearing Range
- Sealed, Greased, With Relubrication Facility

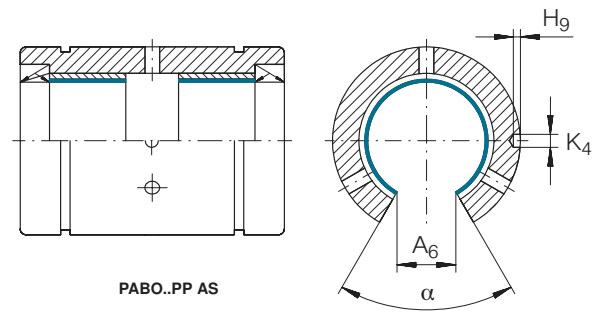


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm						
SHAFT DIAMETER	PART NUMBER		MASS kg	DIMENSIONS		
				d	D ¹⁾ h7	C h12
12	PAB 1232 PP AS	PABO 1232 PP AS	0.026	12	22	32
16	PAB 1636 PP AS		0.021	12	22	32
		PABO 1636 PP AS	0.034	16	26	36
			0.028	16	26	36
20	PAB 2045 PP AS	PABO 2045 PP AS	0.068	20	32	45
25	PAB 2558 PP AS		0.058	20	32	45
		PABO 2558 PP AS	0.132	25	40	58
			0.113	25	40	58
30	PAB 3068 PP AS	PABO 3068 PP AS	0.169	30	47	68
40	PAB 4080 PP AS		0.143	30	47	68
		PABO 4080 PP AS	0.426	40	62	80
			0.362	40	62	80
50	PAB 50100 PP AS	PABO 50100 PP AS	0.773	50	75	100
			0.657	50	75	100

- 1) The tolerances are valid for series PAB..PP AS only.
2) Bores and grooves centered on bearing width C.
3) Groove dimensions suitable for circlips to DIN 471.
4) Dimension A₆ on diameter d.
5) The basic static load ratings stated here are not valid if the above elements are fitted in housings – as shown on the following pages.



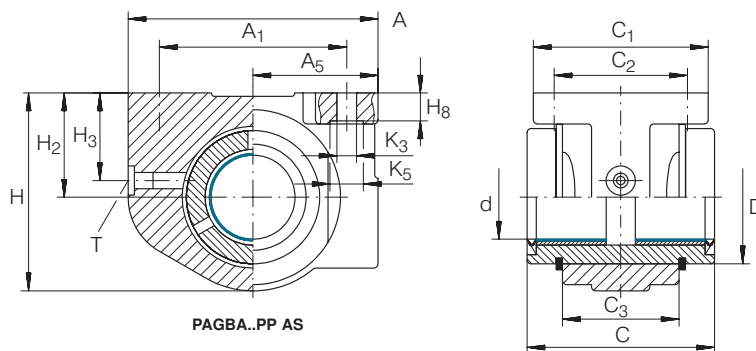


MOUNTING DIMENSIONS								BASIC LOAD RATINGS ⁵⁾	SHAFT DIAMETER
C ₁ ²⁾ H13	C ₇ ³⁾ H13	D ₁	A ₆ ⁴⁾	H ₉	K ₄ ³⁾	K ₈ ³⁾ H13	α Grad	stat. C ₀ N	
22.6	1.3	21	—	—	—	2.5	—	60,000	12
22.6	1.3	21	7.7	1.2	2.2	2.5	78	60,000	
24.6	1.3	24.9	—	—	—	2.5	—	96,000	16
24.6	1.3	24.9	10.1	1.2	2.2	2.5	78	96,000	
31.2	1.6	30.3	—	—	—	2.5	—	150,000	20
31.2	1.6	30.3	10	1.2	2.2	2.5	60	150,000	
43.7	1.85	37.5	—	—	—	2.5	—	250,000	25
43.7	1.85	37.5	12.5	1.5	3	2.5	60	250,000	
51.7	1.85	44.5	—	—	—	3	—	375,000	30
51.7	1.85	44.5	13.6	1.5	3	3	54	375,000	
60.3	2.15	59	—	—	—	3	—	600,000	40
60.3	2.15	59	18.2	1.5	3	3	54	600,000	
77.3	2.65	72	—	—	—	4	—	1,000,000	50
77.3	2.65	72	22.7	1.5	3	4	54	1,000,000	

Permaglide® Linear Plain Bearing Units

PAGBA..PP AS, PAGBAO..PP AS SERIES

- Plain Bearing Range
- Sealed, Greased, With Relubrication Facility



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

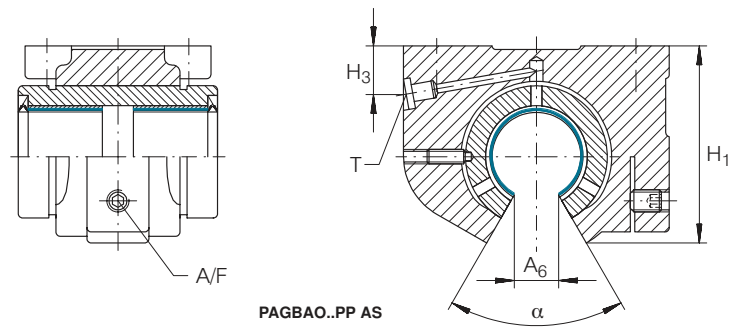
or Linear Sales

DIMENSION TABLE · Dimensions in mm										
SHAFT DIAMETER	PART NUMBER		MASS kg	DIMENSIONS				MOUNTING DIMENSIONS		
				d	A	C h12	H	A ₁	A ₅	A ₆ ¹⁾
12	PAGBA 1232 PP AS	—	0.07	12	42	32	34	32±0.15	21±0.01	—
	—	PAGBAO 1232 PP AS	0.06	12	42	32	—	32±0.15	21	7.7
16	PAGBA 1636 PP AS	—	0.1	16	50	36	41	40±0.15	25±0.01	—
	—	PAGBAO 1636 PP AS	0.09	16	50	36	—	40±0.15	25	10.1
20	PAGBA 2045 PP AS	—	0.18	20	60	45	47.5	45±0.15	30±0.01	—
	—	PAGBAO 2045 PP AS	0.16	20	60	45	—	45±0.15	30	10
25	PAGBA 2558 PP AS	—	0.35	25	74	58	60	60±0.2	37±0.01	—
	—	PAGBAO 2558 PP AS	0.31	25	74	58	—	60±0.2	37	12.5
30	PAGBA 3068 PP AS	—	0.48	30	84	68	67	68±0.2	42±0.01	—
	—	PAGBAO 3068 PP AS	0.43	30	84	68	—	68±0.2	42	13.6
40	PAGBA 4080 PP AS	—	1.07	40	108	80	87	86±0.2	54±0.015	—
	—	PAGBAO 4080 PP AS	0.91	40	108	80	—	86±0.2	54	18.2
50	PAGBA 50100 PP AS	—	1.65	50	130	100	98	108±0.2	65±0.015	—
	—	PAGBAO 50100 PP AS	1.46	50	130	100	—	108±0.2	65	22.7

¹⁾ Dimension A₆ on diameter d.

²⁾ The tolerances are valid for series PAGBA..PP AS only.

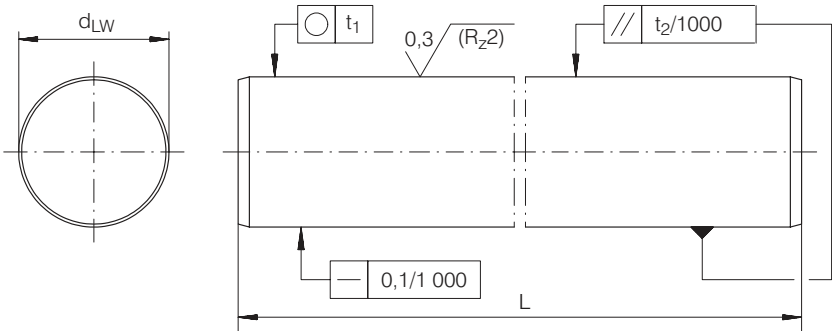
³⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.



												INA LUBRICATION NIPPLE ⁴⁾	SHAFT DIAMETER
C ₁	C ₂	C ₃	D ²⁾ h7	H ₁	H ₂	H ₃	H ₈ -0.5	K ₃ ³⁾	K ₅ ³⁾	A/F	α Grad	T	
32	23 ± 0.15	20	22	—	18 ± 0.01	15	4.8	4.7	8	—	—	NIP A1	12
32	23 ± 0.15	20	22	30.5	18	7.8	4.8	4.7	8	2	78	NIP A1	
35	26 ± 0.15	22	26	—	22 ± 0.01	15	5.4	4.7	8	—	—	NIP A1	16
35	26 ± 0.15	22	26	36.8	22	10	5.4	4.7	8	2.5	78	NIP A1	
42	32 ± 0.15	28	32	—	25 ± 0.01	21	6.7	4.7	8	—	—	NIP A1	20
42	32 ± 0.15	28	32	44.5	25	11	6.7	4.7	8	2.5	60	NIP A1	
54	40 ± 0.2	40	40	—	30 ± 0.01	23	7.8	5.7	10	—	—	NIP A1	25
54	40 ± 0.2	40	40	56	30	13	7.8	5.7	10	3	60	NIP A1	
60	45 ± 0.2	48	47	—	35 ± 0.01	25	8.7	6.8	11	—	—	NIP A2	30
60	45 ± 0.2	48	47	63.5	35	14	8.7	6.8	11	3	54	NIP A2	
78	58 ± 0.2	56	62	—	45 ± 0.01	30	11	9.2	15	—	—	NIP A2	40
78	58 ± 0.2	56	62	82.4	45	18	11	9.2	15	4	54	NIP A2	
70	50 ± 0.2	72	75	—	50 ± 0.015	34	12.5	9.2	15	—	—	NIP A2	50
70	50 ± 0.2	72	75	92.8	50	19	12.5	9.2	15	4	54	NIP A2	

Shafts

W SERIES



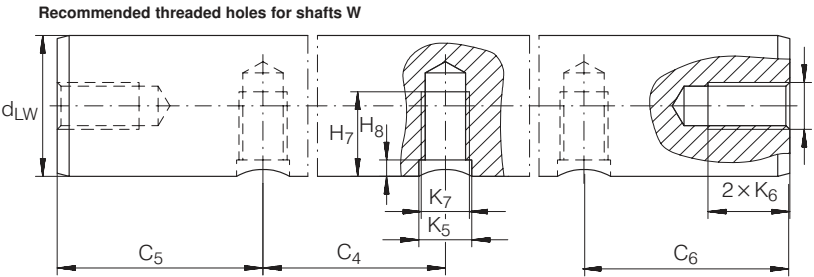
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm									
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS kg/m	LENGTH L _{max}	TOLERANCES IN μm			ROUNDNESS t ₁ μm	PARALLELISM t ₂ ²⁾ μm	SURFACE HARDNESS DEPTH RHT ³⁾ min.
				STANDARD TOLERANCE h6	SPECIAL TOLERANCES ¹⁾				
					j5	f7			
5	W 5	0.15	3,600	0-8	-	-	4	5	0.4
6	W 6	0.22	4,000	0-8	-	-	4	5	0.4
8	W 8	0.39	4,000	0-9	-	-	4	6	0.4
10	W 10	0.61	6,000	0-9	-	-	4	6	0.4
12	W 12	0.89	6,000	0-11	+5-3	-16-34	5	8	0.6
14	W 14	1.21	6,000	0-11	+5-3	-16-34	5	8	0.6
15	W 15	1.37	6,000	0-11	-	-16-34	5	8	0.6
16	W 16	1.57	6,000	0-11	+5-3	-16-34	5	8	0.6
18	W 18	1.98	6,000	0-11	-	-16-34	5	8	0.6
20	W 20	2.45	6,000	0-13	+5-4	-20-41	6	9	0.9
24	W 24	3.55	6,000	0-13	-	-	6	9	0.9
25	W 25	3.83	6,000	0-13	+5-4	-20-41	6	9	0.9
30	W 30	5.51	6,000	0-13	+5-4	-20-41	6	9	0.9
32	W 32	6.3	6,000	0-16	-	-25-50	7	11	1.5
40	W 40	9.8	6,000	0-16	+6-5	-	7	11	1.5
50	W 50	15.3	6,000	0-16	+6-5	-	7	11	1.5
60	W 60	22.1	6,000	0-19	-	-	8	13	2.2
80	W 80	39.2	6,000	0-19	-	-	8	13	2.2

1) Only for shafts made from quenched and tempered steel.
 2) Measured diameter variation.
 3) According to DIN 6 773, Part 3.



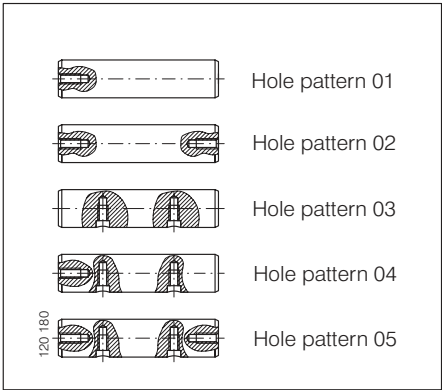
Recommended Threaded Holes



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm																			
PART NUMBER ¹⁾	AXIAL THREAD									RADIAL THREAD									
										DIMENSIONS									
	K ₆										C ₄			C _{5min} , C _{6min} ²⁾ HOLE PATTERN		H ₇	H ₈	K ₅	K ₇
													03	04–05					
W 5	M3 M3	M4	M5	M6							75		120	10	3 x K ₆ + K ₇	8	2	5	M4
W 6																			
W 8																			
W 10																			
W 12																			
W 14	M4 M4	M5 M5																	
W 15			M5 M5	M6 M6 M6 M6	M8 M8 M8 M8	M10 M10 M10 M10					75	100	150	10		9	2,5	6	M5
W 16																			
W 18																			
W 20																			
W 24																			
W 25					M8	M10	M12				75	120	150	15	11	3	7	M6	
W 30																			
W 32																			
W 40																			
W 50																			
W 60						M12	M16	M20											
W 80							M16	M20											

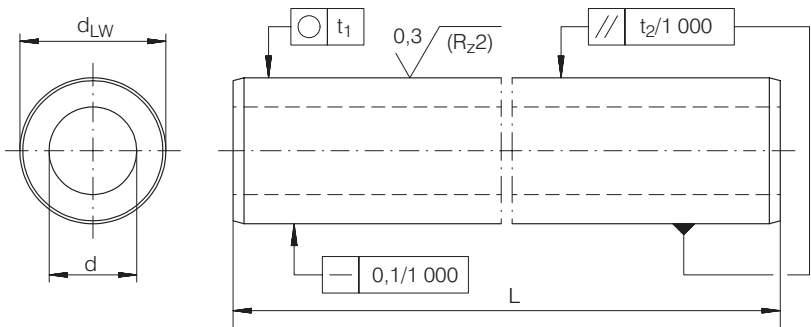
²⁾ The dimensions C₅ and C₆ are dependent on the length of the shaft.
The axial threaded holes should be taken into consideration when using hole patterns 04 and 05.



Shafts

WH SERIES

- Hollow shafts



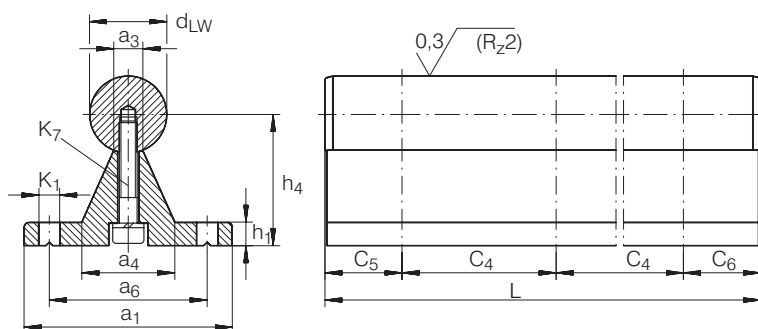
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm								
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS kg/m	Length L	INSIDE DIAMETER $d^1)$	TOLERANCES IN MM D h7	ROUNDNESS t_1 μm	PARALLELISM $t_2^2)$ μm	SURFACE HARDNESS DEPTH Rht ³⁾ min.
20	WH 20	1.25	6,000	14	0-21	6	9	0.9
25	WH 25	2.35	6,000	15.6	0-21	6	9	0.9
30	WH 30	3.5	6,000	18.2	0-21	6	9	0.9
40	WH 40	4.99	6,000	28.1	0-25	7	11	1.5
50	WH 50	9.97	6,000	29.7	0-25	7	11	1.5
60	WH 60	14.2	6,000	36	0-30	8	13	2.2
80	WH 80	19.5	6,000	56.9	0-30	8	13	2.2

¹⁾ Wall thickness tolerance of initial material: $\pm 4\%$.
²⁾ Measured diameter variation.
³⁾ According to DIN 6 773. Part 3.



Shaft And Support Rail Units TSWW, TSNW SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE - Dimensions in mm														
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS								
			a_1	$h_4^{1)}$	$L^{2)}$	a_3	a_4	a_6	C_4	$C_5/C_6^{3)}$	$C_5/C_6^{3)}$	h_1	$K_1^{4)}$	K_7
h_6		kg/m		± 0.02	± 3					min.	max.			DIN 6 912
12	TSWW 12	1.67	40	22	6,000	6	19.5	29	120	20	114	5	4.5	M4 $\times$ 20
	TSNW 12	1.67	40	22	6,000	5.4	15	29	75	20	69	5	4.5	M4 $\times$ 20
16	TSWW 16	3.15	54	32	6,000	7.5	24.2	41	150	20	143	6	5.5	M5 $\times$ 30
	TSNW 16	2.95	45	26	6,000	7	19	33	100	20	93	5	5.5	M5 $\times$ 20
20	TSWW 20	4.03	54	34.02	6,000	7.5	24.2	41	150	20	143	6	5.5	M5 $\times$ 30
	TSNW 20	3.95	52	32	6,000	8.1	23	37	100	20	92	6	6.6	M6 $\times$ 25
25	TSWW 25	5.9	65	39.66	6,000	10	29.8	51	150	20	142	6	6.6	M6 $\times$ 35
	TSNW 25	5.6	57	36	6,000	10.3	26	42	120	20	110	6	6.6	M8 $\times$ 30
30	TSWW 30	7.58	65	42.19	6,000	10	29.8	51	150	20	142	6	6.6	M6 $\times$ 35
	TSNW 30	7.88	69	42	6,000	11	29	51	150	20	139	7	9	M10 $\times$ 35
40	TSWW 40	14.25	85	60	6,000	17	46	65	150	20	139	10	9	M10 $\times$ 50
	TSNW 40	12.83	73	50	6,000	15	36	55	200	20	189	8	9	M10 $\times$ 40
50	TSWW 50	19.75	85	65.05	6,000	17	46	65	150	20	139	10	9	M10 $\times$ 50
	TSNW 50	19.38	84	60	6,000	19	40	63	200	20	188	9	11	M12 $\times$ 45

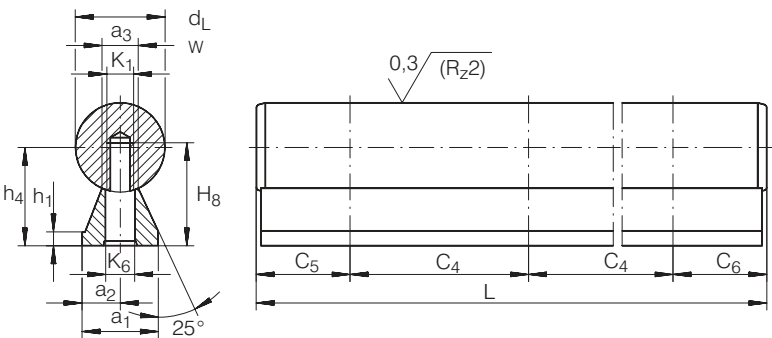
1) With reference to the nominal shaft diameter. measured while clamped.

2) Maximum length of single piece shaft and support rail units:
Depending on the length of the shaft and support rail unit,
the rail is composed of several individual sections.

3) The dimensions C_5 and C_6 are dependent on the length of the shaft and support rail unit.

4) TSWW: for fixing screws to DIN 912 or DIN 933 (TSWW 12, DIN 6 912)
and spring washer or washer to DIN 7 980 or DIN 125.
TSNW: for fixing screws to DIN 6 912 and spring washer to DIN 7 980.

Shaft And Support Rail Unit TSUW SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE - Dimensions in mm														
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS								
			a ₁	h ₄ ¹⁾	L ²⁾	a ₂ ³⁾	a ₃	C ₄	C ₅ /C ₆ ⁴⁾	C ₅ /C ₆ ⁴⁾	h ₁	K ₁	K ₆	H ₈
h6		kg/m		± 0.02	± 3				min.	max.				
12	TSUW 12	1.1	11	14.5	6,000	5.5	5.4	75	20	70	3	M4	4.5	16
16	TSUW 16	1.88	14	18	6,000	7	7	75	20	70	3	M5	5.5	19
20	TSUW 20	2.92	17	22	6,000	8.5	8.1	75	20	69	3	M6	6.6	23
25	TSUW 25	4.42	21	26	6,000	10.5	10.3	75	20	68	3	M8	9	28.5
30	TSUW 30	6.22	23	30	6,000	11.5	11	100	20	92	3	M10	11	32
40	TSUW 40	11.03	30	39	6,000	15	15	100	20	91	4	M12	13.5	39.5
50	TSUW 50	16.98	35	46	6,000	17.5	19	100	20	90	5	M14	15.5	46

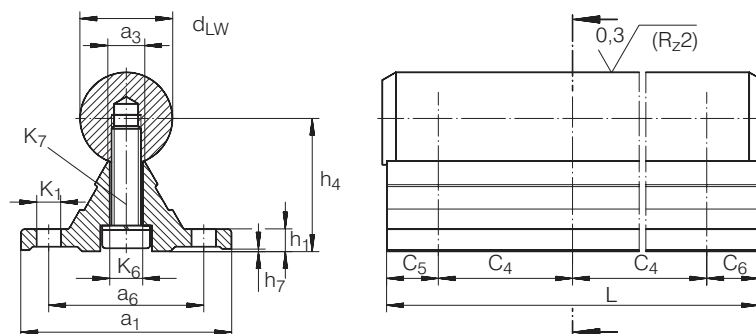
- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single piece shaft and support rail units (TSUW 12: L = 1,600 ± 1.2 mm);
Depending on the length of the shaft and support rail unit,
the rail is composed of several individual sections.
- 3) Available on request with a₂ ± 0.02.
- 4) The dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit.



Shaft And Support Rail Units

TSNW..G4 $d \leq 25$ mm,

TSNW..G5 $d > 25$ mm SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE - Dimensions in mm																
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS										
			a_1	$h_4^{1)}$	$L^{2)}$	a_3	a_6	C_4	$C_5/C_6^{3)}$	$C_5/C_6^{3)}$	h_1	h_7	$K_1^{4)}$	K_6	K_7	ACCURACY CLASS ⁵⁾
h_6		kg/m			± 2				min.	max.					DIN 6 912	
12	TSNW 12 G4	1.6	40	22 ± 0.1	4,000	5	29	75	20	69	5	0.2	4.5	4.5	M4 $\times$ 18	G4 0.03
16	TSNW 16 G4	2.5	45	26 ± 0.1	4,000	6.8	33	100	20	93	5	0.2	5.5	5.5	M5 $\times$ 20	G4 0.03
20	TSNW 20 G4	3.8	52	32 ± 0.1	4,000	7.8	37	100	20	92	6	0.2	6.6	6.6	M6 $\times$ 25	G4 0.03
25	TSNW 25 G4	5.3	57	36 ± 0.1	4,000	9.8	42	120	20	110	6	0.3	6.6	9	M8 $\times$ 30	G4 0.03
30	TSNW 30 G5	7.5	69	42 ± 0.15	4,000	11	51	150	20	139	7	0.3	9	11	M10 $\times$ 35	G5 0.04
40	TSNW 40 G5	12.4	73	50 ± 0.15	4,000	14.5	55	200	20	189	8	0.3	9	11	M10 $\times$ 40	G5 0.04
50	TSNW 50 G5	18.9	84	60 ± 0.15	4,000	18.5	63	200	20	188	9	0.3	11	13.5	M12 $\times$ 45	G5 0.05

¹⁾ With reference to the nominal shaft diameter, measured while clamped.

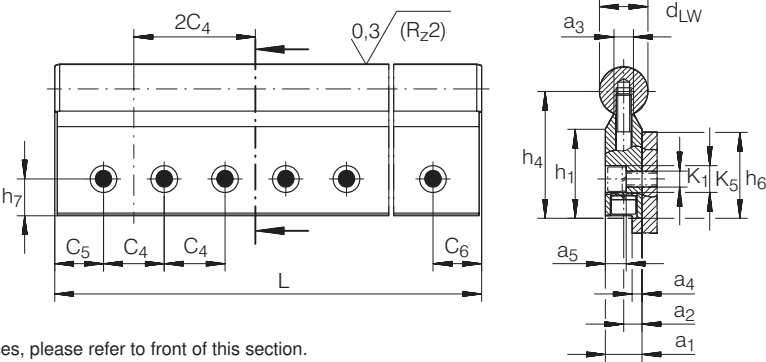
²⁾ Maximum length of single piece shaft and support rail units:
the shaft is longer than the support rail by 2.5 mm at each end.

³⁾ The dimensions C_5 and C_6 are dependent on the length of the shaft and support rail unit.

⁴⁾ For fixing screws to DIN 6 912 and spring washer to DIN 7 980.

⁵⁾ Maximum variation of dimension h_4 , measured on the same rail over a distance of 1,000 mm.

Shaft And Support Rail Unit TSSW SERIES



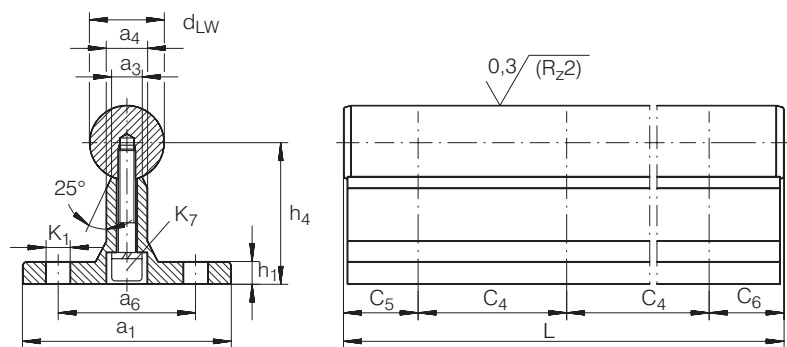
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm																	
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS											
			a ₁	h ₄ ¹⁾	L ²⁾	a ₂ ¹⁾	a ₃	a ₄	a ₅ ³⁾	C ₄	C ₅ /C ₆ ⁴⁾	C ₅ /C ₆ ⁴⁾	h ₁	h ₆	h ₇	K ₁ ³⁾	K ₅ ³⁾
h ₆		kg/m		± 0.01	± 3	± 0.012					min.	max.			± 0.15		
20	TSSW 20	4.12	15	52	6,000	7.5	8.1	4	8.5	50	20	42	36.5	30	15	6.6	11
25	TSSW 25	5.98	20	62	6,000	10	10.3	5.5	11	60	20	50	38.5	36	18	9	15
30	TSSW 30	8.68	25	72	6,000	12.5	11	7	13.5	75	20	64	43	42	21	11	18
40	TSSW 40	14.3	30	88	6,000	15	15	8.5	16	100	20	88	53	50	25	13.5	20
50	TSSW 50	21.47	35	105	6,000	17.5	19	9	18.5	100	20	86	64.5	60	30	15.5	24

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single piece shaft and support rail units.
Depending on the length of the shaft and support rail unit, the rail is composed of several individual sections.
- 3) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.
- 4) The dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit.



Shaft And Support Rail Unit TSWWA SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

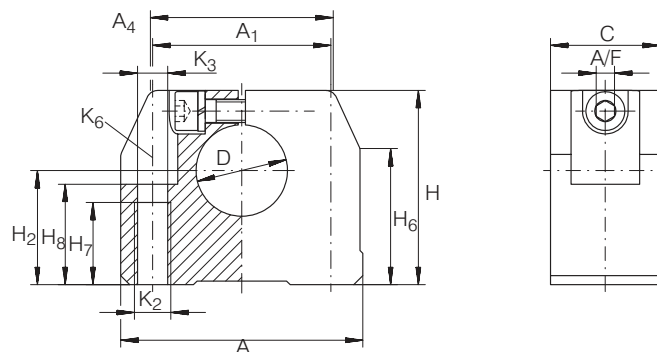
DIMENSION TABLE - Dimensions in mm													
SHAFT DIAMETER d _{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS							
			a ₁	h ₄ ¹⁾	L ²⁾	a ₃	a ₄	a ₆	C ₄	C ₅ /C ₆ ³⁾	C ₅ /C ₆ ³⁾	h ₁	K ₁ ⁴⁾
h ₆		kg/m		± 0.02	± 3					min.	max.		
12	TSWWA 12	1.93	43	28	6,000	5.4	9	29	75	20	69	5	4.5
16	TSWWA 16	2.8	48	30	6,000	7	10	33	100	20	93	5	5.5
20	TSWWA 20	4.12	56	38	6,000	8.1	11	37	100	20	92	6	6.6
25	TSWWA 25	5.83	60	42	6,000	10.3	14	42	120	20	110	6	6.6
30	TSWWA 30	8.5	74	53	6,000	11	14	51	150	20	139	8	9
40	TSWWA 40	13.33	78	60	6,000	15	18	55	200	20	189	8	9
50	TSWWA 50	20.33	90	75	6,000	19	22	63	200	20	188	10	11

- 1) With reference to the nominal shaft diameter, measured while clamped.
- 2) Maximum length of single piece shaft and support rail units.
Depending on the length of the shaft and support rail unit, the rail is composed of several individual sections.
- 3) The dimensions C₅ and C₆ are dependent on the length of the shaft and support rail unit.
- 4) For fixing screws to DIN 912 or DIN 933
and spring washer or washer to DIN 7 980 or DIN 125.



Shaft Support Blocks

GWH..B SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

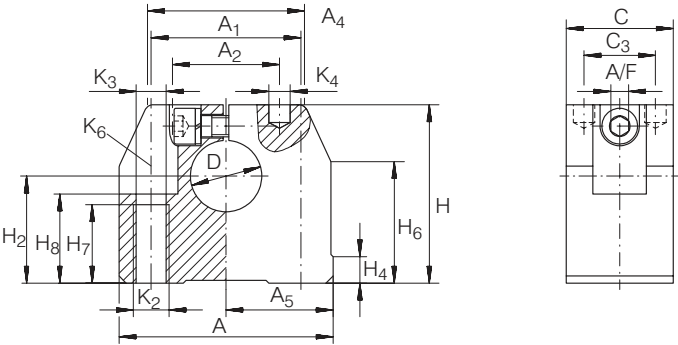
or Linear Sales

DIMENSION TABLE · Dimensions in mm																
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS									
			D H8	A	C	H	A ₁ ± 0.15	A ₄	H ₂ ± 0.01	H ₆	H ₇	H ₈	K ₂	K ₃ ¹⁾	K ₆ ¹⁾	A/F
6	GWH 06 B	0.03	6	32	16	27	22	25	15	19.5	11	13	M5	4.3	M4	2.5
8	GWH 08 B	0.03	8	32	16	27	22	25	16	19.5	11	13	M5	4.3	M4	2.5
10	GWH 10 B	0.05	10	40	18	33	27	32	18	24	13	16	M6	5.3	M5	3
12	GWH 12 B	0.05	12	40	18	33	27	32	19	24	13	16	M6	5.3	M5	3
14	GWH 14 B	0.07	14	43	20	36.5	32	34	20	25.5	13	18	M6	5.3	M5	3
16	GWH 16 B	0.07	16	43	20	36.5	32	34	22	25.5	13	18	M6	5.3	M5	3
20	GWH 20 B	0.12	20	53	24	42.5	39	40	25	28	18	22	M8	6.6	M6	4
25	GWH 25 B	0.17	25	60	28	52.5	44	44	31	33	22	26	M10	8.4	M8	5
30	GWH 30 B	0.22	30	67	30	60	49	49.5	34	41.5	22	29	M10	8.4	M8	5
40	GWH 40 B	0.48	40	87	40	79.5	66	63	42	44.5	26	38	M12	10.5	M10	6
50	GWH 50 B	0.82	50	103	50	92	80	74	50	61	34	46	M16	13.5	M12	8

In the interim, shaft support blocks GWH..B with profile grooves will still be supplied.

¹⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.

Shaft Support Blocks GWN..B SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

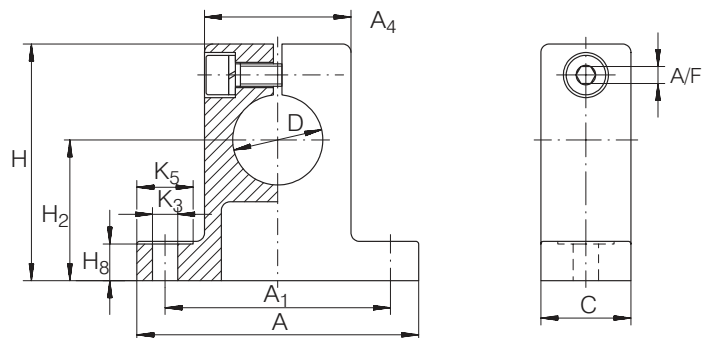
DIMENSION TABLE - Dimensions in mm																					
SHAFT DIAMETER	PART NUMBER	MASS	DIMENSIONS				MOUNTING DIMENSIONS														
			D	A	C	H	A ₁	A ₂	A ₄	A ₅	C ₃	H ₂	H ₄	H ₆	H ₇	H ₈	K ₂	K ₃	K ₄	K ₆ ¹⁾	A/F
		kg	H8							±0.01		±0.01									
12	GWN 12 B	0.06	12	43	20	35	30 ^{±0.15}	20	34	21.5	13	20	5.5	26.5	13	16.5	M6	5.3	4	M5	3
16	GWN 16 B	0.1	16	53	24	42	38 ^{±0.15}	26	40	26.5	16	25	7	29.5	18	21	M8	6.6	5	M6	4
20	GWN 20 B	0.17	20	60	30	50	42 ^{±0.15}	30	44	30	20	30	7.5	34	22	25	M10	8.4	6	M8	5
25	GWN 25 B	0.33	25	78	38	60	56 ^{±0.15}	40	59.5	39	25	35	8.5	41.5	26	30	M12	10.5	8	M10	6
30	GWN 30 B	0.45	30	87	40	70	64 ^{±0.15}	45	63	43.5	26	40	9.5	46	26	34	M12	10.5	8	M10	6
40	GWN 40 B	0.85	40	108	48	90	82 ^{±0.15}	65	76	54	32	50	11	57.5	34	44	M16	13.5	10	M12	8
50	GWN 50 B	1.4	50	132	58	105	100 ^{±0.2}	70	90	66	36	60	11	62	43	49	M20	17.5	12	M16	10

In the interim, shaft support blocks GWN..B with profile grooves will still be supplied.
 1) For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.



Shaft Support Blocks

GW, GWA SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm													
SHAFT DIAMETER	PART NUMBER	MASS kg	DIMENSIONS				MOUNTING DIMENSIONS						
			D	A	C	H	A ₁	A ₄	H ₂ ± 0.015	H ₈	K ₃ ¹⁾	K ₅ ¹⁾	A/F
10	GW 10	0.03	10	37	11	30	28 ^{±0.15}	18	17	5	3.4	8	2.5
	GWA 10	0.03	10	37	11	30	28 ^{±0.15}	18	17	5	4.5	9	2.5
12	GW 12	0.04	12	42	12	35	32 ^{±0.15}	20	20	5.5	4.5	10	3
	GWA 12	0.04	12	42	12	35	32 ^{±0.15}	20	20	5.5	5.5	11	3
14	GW 14	0.06	14	46	14	38	36 ^{±0.15}	23	22	6	4.5	10	3
	GWA 14	0.06	14	46	14	38	36 ^{±0.15}	23	22	6	5.5	11	3
16	GW 16	0.08	16	50	16	42	40 ^{±0.15}	26	25	6.5	4.5	10	3
	GWA 16	0.08	16	50	16	42	40 ^{±0.15}	26	25	6.5	5.5	11	3
20	GW 20	0.15	20	60	20	50	45 ^{±0.15}	32	30	7.5	4.5	10	3
	GWA 20	0.15	20	60	20	50	45 ^{±0.15}	32	30	8	5.5	11	3
25	GW 25	0.26	25	74	25	58	60 ^{±0.15}	38	35	8.5	5.5	11	4
	GWA 25	0.26	25	74	25	58	60 ^{±0.15}	38	35	9	6.6	13	4
30	GW 30	0.38	30	84	28	68	68 ^{±0.2}	45	40	9.5	6.6	13	5
	GWA 30	0.38	30	84	28	68	68 ^{±0.2}	45	40	10	9	18	5
40	GW 40	0.67	40	108	32	86	86 ^{±0.2}	56	50	12	9	18	6
	GWA 40	0.67	40	108	32	86	86 ^{±0.2}	56	50	12	11	22	6
50	GW 50	1.38	50	130	40	100	108 ^{±0.2}	80	60	14	9	18	6
	GWA 50	1.38	50	130	40	100	108 ^{±0.2}	80	60	14	11	22	6

¹⁾ For fixing screws to DIN 912-8.8 and spring washer to DIN 7980.

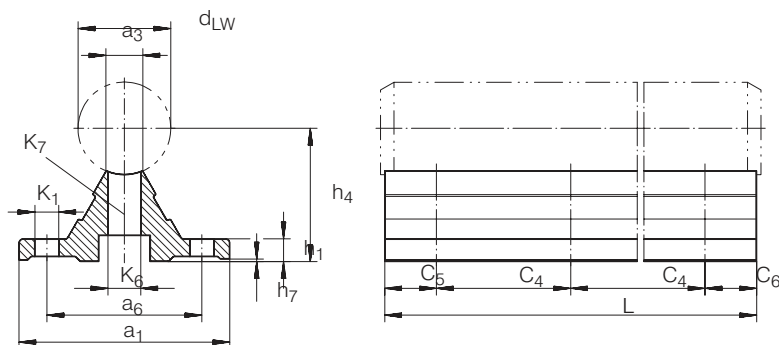
Support Rails

TSN..G G4 $d \leq 25$ mm,

TSN..G G5 $d > 25$ mm,

TSN..G4 $d \leq 25$ mm,

TSN..G5 $d > 25$ mm SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE - Dimensions in mm																
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS	DIMENSIONS			MOUNTING DIMENSIONS										
			a_1	$h_4^{1)}$	$L^{2)}$	a_3	a_6	C_4	$C_5/C_6^{3)}$		h_1	h_7	$K_1^{4)}$	K_6	K_7	ACCURACY CLASS ⁵⁾
h_6		kg/m			± 2				min.	max.					DIN 6912	
12	TSN 12 G G4	0.72	40	22 ± 0.1	4,000	5	29	75	20	69	5	0.2	4.5	4.5	M4 $\times$ 18	G4 0.03
	TSN 12 G4	0.72	40	22 ± 0.1	4,000	5	—	—	—	—	5	0.2	—	—	M4 $\times$ 18	G4 0.03
16	TSN 16 G G4	0.88	45	26 ± 0.1	4,000	6.8	33	100	20	93	5	0.2	5.5	5.5	M5 $\times$ 20	G4 0.03
	TSN 16 G4	0.93	45	26 ± 0.1	4,000	6.8	—	—	—	—	5	0.2	—	—	M5 $\times$ 20	G4 0.03
20	TSN 20 G G4	1.28	52	32 ± 0.1	4,000	7.8	37	100	20	92	6	0.2	6.6	6.6	M6 $\times$ 25	G4 0.03
	TSN 20 G4	1.35	52	32 ± 0.1	4,000	7.8	—	—	—	—	6	0.2	—	—	M6 $\times$ 25	G4 0.03
25	TSN 25 G G4	1.43	57	36 ± 0.1	4,000	9.8	42	120	20	110	6	0.3	6.6	9	M8 $\times$ 30	G4 0.03
	TSN 25 G4	1.47	57	36 ± 0.1	4,000	9.8	—	—	—	—	6	0.3	—	—	M8 $\times$ 30	G4 0.03
30	TSN 30 G G5	1.9	69	42 ± 0.15	4,000	11	51	150	20	119	7	0.3	9	11	M10 $\times$ 35	G5 0.04
	TSN 30 G5	1.99	69	42 ± 0.15	4,000	11	—	—	—	—	7	0.3	—	—	M10 $\times$ 35	G5 0.04
40	TSN 40 G G5	2.53	73	50 ± 0.15	4,000	14.5	55	200	20	189	8	0.3	9	11	M10 $\times$ 40	G5 0.04
	TSN 40 G5	2.6	73	50 ± 0.15	4,000	14.5	—	—	—	—	8	0.3	—	—	M10 $\times$ 40	G5 0.04
50	TSN 50 G G5	3.46	84	60 ± 0.15	4,000	18.5	63	200	20	188	9	0.3	11	13.5	M12 $\times$ 45	G5 0.05
	TSN 50 G5	3.6	84	60 ± 0.15	4,000	18.5	—	—	—	—	9	0.3	—	—	M12 $\times$ 45	G5 0.05

1) With reference to the nominal shaft diameter, measured while clamped.

2) Maximum length of support rail.

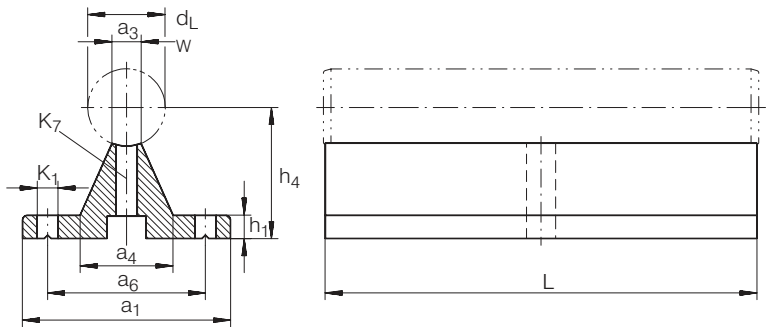
3) The dimensions C_5 and C_6 are dependent on the length of the shaft and support rail unit.

4) For fixing screws to DIN 6 912 and spring washer to DIN 7 980.

5) Maximum variation of dimension h_4 , measured on the same rail over a distance of 1,000 mm.

Support Rails

TSN..G SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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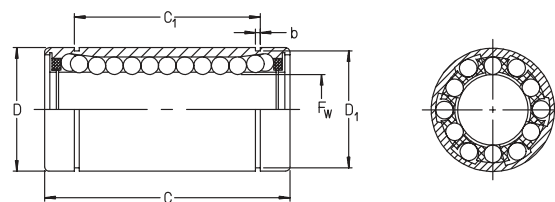
DIMENSION TABLE · Dimensions in mm										
SHAFT DIAMETER d_{LW}	PART NUMBER	MASS	DIMENSIONS		MOUNTING DIMENSIONS					
			a_1	$h_4^{1)}$	a_3	a_6	L	h_1	$K_1^{2)}$	K_7
h6		kg								DIN 6 912
12	TSN 1250 G	0.04	40	22 ± 0.02	5.4	29	50	5	4.5	M4 × 20
16	TSN 1660 G	0.07	45	26 ± 0.02	7	33	60	5	5.5	M5 × 20
20	TSN 2070 G	0.1	52	32 ± 0.02	8.1	37	70	6	6.6	M6 × 25
25	TSN 2580 G	0.15	57	36 ± 0.02	10.3	42	80	6	6.6	M8 × 30
30	TSN 3090 G	0.19	69	42 ± 0.02	11	51	90	7	9	M10 × 35
40	TSN 40120 G	0.3	73	50 ± 0.02	15	55	120	8	9	M10 × 40
50	TSN 50150 G	0.6	84	60 ± 0.02	19	63	150	9	11	M12 × 45

1) With reference to the nominal shaft diameter, measured while clamped.
 2) For fixing screws to DIN 6 912 and spring washer to DIN 7 980.



Linear Ball Bearings

KBZ..(PP) SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

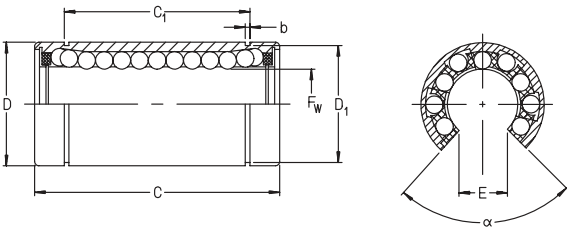
PART NUMBER576	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	F_w inch	D inch	C inch	D_1 inch	b inch	C_1 inch	NO. BALL ROWS	LOAD RATINGS dyn. lbf.
KBZ 04	PP	1/4	0.02	0.250	0.500	0.750	0.469	0.039	0.511	4	48
KBZ 06	PP	3/8	0.03	0.375	0.625	0.875	0.588	0.039	0.636	4	54
KBZ 08	PP	1/2	0.08	0.500	0.875	1.250	0.821	0.046	0.963	4	158
KBZ 10	PP	5/8	0.17	0.625	1.125	1.500	1.059	0.056	1.104	4	231
KBZ 12	PP	3/4	0.21	0.750	1.250	1.625	1.176	0.056	1.166	5	287
KBZ 16	PP	1	0.66	1.000	1.563	2.250	1.469	0.068	1.755	6	417
KBZ 20	PP	1-1/4	0.97	1.250	2.000	2.625	1.886	0.068	2.005	6	668
KBZ 24	PP	1-1/2	1.48	1.500	2.375	3.000	2.239	0.086	2.412	6	972
KBZ 32	PP	2	2.51	2.000	3.000	4.000	2.838	0.103	3.192	6	1800

The dynamic load rating is based on a travel life expectancy of 2×10^6 inches.



Linear Ball Bearings

KBZ..OP (PP) SERIES



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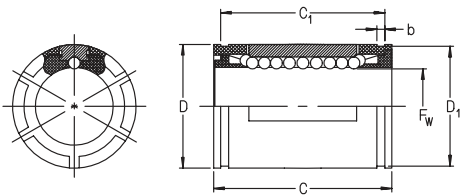
PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	F _w Nom. Dim. inch	D Nom. Dim. inch	C Nom. Dim. inch	D ₁ inch	b inch	C ₁ Nom. Dim. inch	E inch	a deg	NO. BALL ROWS	LOAD RATINGS dyn. lbf.
KBZ 08 OP	PP	1/2	0.06	0.500	0.875	1.250	0.821	0.046	0.963	0.313	80	3	158
KBZ 10 OP	PP	5/8	0.13	0.625	1.125	1.500	1.059	0.056	1.104	0.375	80	3	231
KBZ 12 OP	PP	3/4	0.17	0.750	1.250	1.625	1.176	0.056	1.166	0.438	60	4	259
KBZ 16 OP	PP	1	0.37	1.000	1.563	2.250	1.469	0.068	1.755	0.563	50	5	346
KBZ 20 OP	PP	1-1/4	1.26	1.250	2.000	2.625	1.886	0.068	2.005	0.625	50	5	555
KBZ 24 OP	PP	1-1/2	1.26	1.500	2.375	3.000	2.239	0.086	2.412	0.750	50	5	817
KBZ 32 OP	PP	2	2.16	2.000	3.000	4.000	2.838	0.103	3.192	1.000	50	5	1490

The dynamic load rating is based on a travel life expectancy of 2 x 10⁶ inches.



Self Aligning Linear Ball Bearings

KNZ..(PP) SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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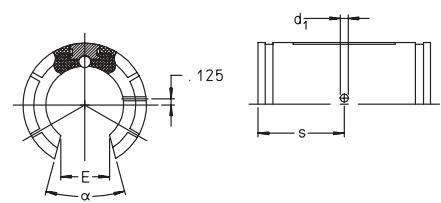
PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	F _w inch	D inch	C inch	D ₁ inch	b inch	C ₁ inch	NO. BALL ROWS	LOAD RATINGS dyn. lbf.	LOAD RATINGS stat. lbf.
KNZ 04	PP	1/4	0.008	0.250	0.500	0.750	0.469	0.039	0.515	4	50	30
KNZ 06	PP	3/8	0.013	0.375	0.625	0.875	0.588	0.039	0.703	4	80	40
KNZ 08	PP	1/2	0.042	0.500	0.875	1.250	0.821	0.046	1.032	4	200	110
KNZ 10	PP	5/8	0.101	0.625	1.125	1.500	1.059	0.056	1.112	5	340	190
KNZ 12	PP	3/4	0.123	0.750	1.250	1.625	1.176	0.056	1.272	6	480	270
KNZ 16	PP	1	0.265	1.000	1.563	2.250	1.469	0.068	1.886	6	840	490
KNZ 20	PP	1-1/4	0.485	1.250	2.000	2.625	1.886	0.068	2.011	6	1270	710
KNZ 24	PP	1-1/2	0.750	1.500	2.375	3.000	2.239	0.086	2.422	6	1600	850
KNZ 32	PP	2	1.400	2.000	3.000	4.000	2.838	0.103	3.206	6	2600	1460

The dynamic load rating is based on a travel life expectancy of 2 x 10⁶ inches.



Self Aligning Linear Ball Bearings

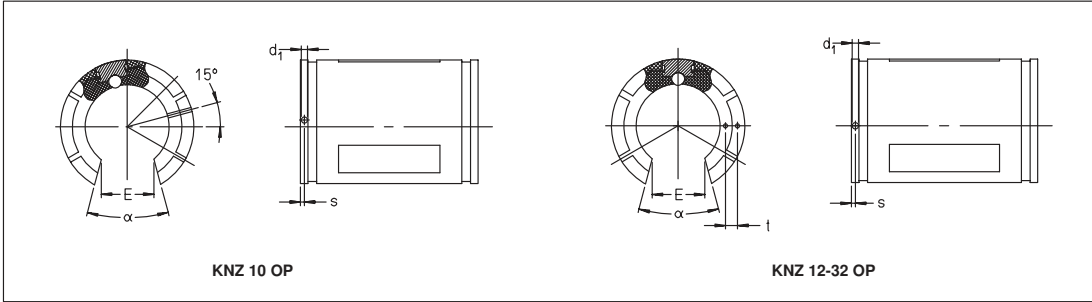
KNZ..OP (PP) SERIES



KNZ 08 OP

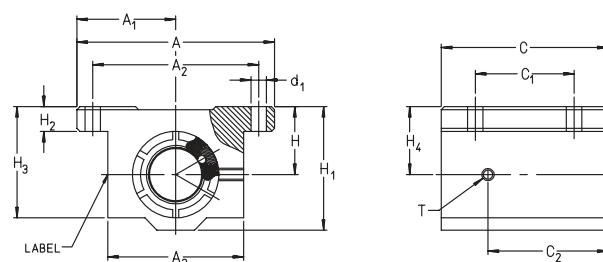
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	F _w inch	D inch	C inch	D ₁ inch	b inch	C ₁ inch	C ₂ inch	E inch	a deg	d ₁ inch	t inch	s inch	NO. BALL ROWS	LOAD RTGS. dyn. lbf.	LOAD RTGS. stat. lbf.
KNZ 08 OP	PP	1/2	0.033	0.500	0.875	1.250	0.821	0.046	1.032	0.063	0.313	30	0.136	—	0.625	3	200	110
KNZ 10 OP	PP	5/8	0.082	0.625	1.125	1.500	1.059	0.056	1.112	0.125	0.375	30	0.105	0.039	0.125	4	390	230
KNZ 12 OP	PP	3/4	0.101	0.750	1.250	1.625	1.176	0.056	1.272	0.125	0.438	30	0.136	0.059	0.125	5	480	280
KNZ 16 OP	PP	1	0.220	1.000	1.563	2.250	1.469	0.068	1.886	0.125	0.563	30	0.136	0.047	0.125	5	870	500
KNZ 20 OP	PP	1-1/4	0.400	1.250	2.000	2.625	1.886	0.068	2.011	0.188	0.625	30	0.201	0.090	0.188	5	1300	730
KNZ 24 OP	PP	1-1/2	0.620	1.500	2.375	3.000	2.239	0.086	2.422	0.188	0.750	30	0.201	0.090	0.188	5	1630	870
KNZ 32 OP	PP	2	1.158	2.000	3.000	4.000	2.838	0.103	3.206	0.312	1.000	30	0.265	—	0.312	5	2650	1490



Self Aligning Mounted Units

KGNZ..PP SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

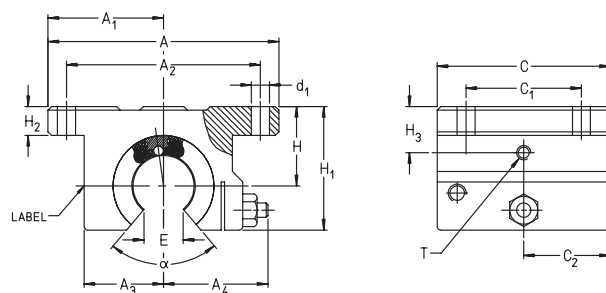
PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	d inch	A inch	C inch	A ₁ ±.001 inch	H ±.001 inch	A ₃ inch	H ₁ inch	H ₂ inch
KGNZ 04	PP	1/4	0.1	0.25	1.63	1.188	0.813	0.437	1.000	0.813	0.188
KGNZ 06	PP	3/8	0.14	0.375	1.75	1.313	0.875	0.500	1.125	0.938	0.188
KGNZ 08	PP	1/2	0.29	0.500	2.00	1.688	1.000	0.687	1.375	1.250	0.250
KGNZ 10	PP	5/8	0.53	0.625	2.50	1.938	1.250	0.875	1.750	1.625	0.281
KGNZ 12	PP	3/4	0.64	0.750	2.75	2.063	1.375	0.937	1.875	1.750	0.313
KGNZ 16	PP	1	1.36	1.000	3.25	2.813	1.625	1.187	2.375	2.188	0.375
KGNZ 20	PP	1-1/4	2.86	1.250	4.00	3.625	2.000	1.500	3.000	2.813	0.437
KGNZ 24	PP	1-1/2	4.19	1.500	4.75	4.000	2.375	1.750	3.500	3.250	0.500
KGNZ 32	PP	2	7.92	2.000	6.00	5.000	3.000	2.125	4.500	4.063	0.625

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	H ₃ inch	C ₂ inch	H ₄ inch	T inch	A ₂ ±.01 inch	C ₁ ±.01 inch	d ₁ inch	DYN. LOAD C lbf	STAT. LOAD C ₀ lbf
KGNZ 04	PP	1/4	0.750	0.590	0.437	NIP A1	1.312	0.750	0.156	50	30
KGNZ 06	PP	3/8	0.875	0.660	0.500	NIP A1	1.437	0.875	0.156	80	40
KGNZ 08	PP	1/2	1.125	0.844	0.690	NIP A1	1.688	1.000	0.156	200	110
KGNZ 10	PP	5/8	1.437	1.260	0.700	1/4-28	2.125	1.125	0.188	340	190
KGNZ 12	PP	3/4	1.563	1.340	0.937	1/4-28	2.375	1.250	0.188	480	270
KGNZ 16	PP	1	1.938	1.950	1.187	1/4-28	2.875	1.750	0.218	840	490
KGNZ 20	PP	1-1/4	2.500	2.430	1.500	1/4-28	3.500	2.000	0.218	1270	710
KGNZ 24	PP	1-1/2	2.875	2.750	1.750	1/4-28	4.125	2.500	0.281	1600	850
KGNZ 32	PP	2	3.625	3.420	2.125	1/4-28	5.250	3.250	0.406	2600	1460



Self Aligning Mounted Units

KGZ..OP PP SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

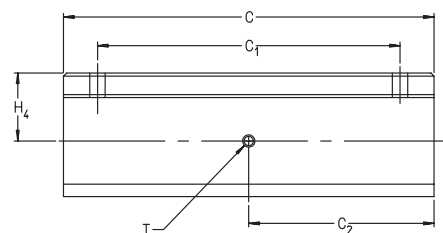
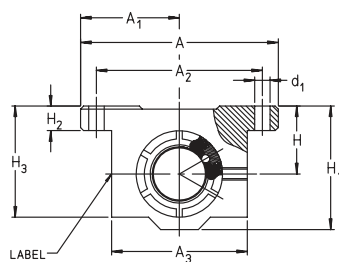
For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	d inch	A inch	C inch	A ₁ ±.001 inch	H ±.001 inch	A ₃ inch	A ₄ inch	H ₁ inch	H ₂ inch
KGZ OP 08	PP	1/2	0.22	0.500	2.000	1.500	1.000	0.687	0.688	0.905	1.100	0.250
KGZ OP 10	PP	5/8	0.41	0.625	2.500	1.750	1.250	0.875	0.875	1.095	1.375	0.281
KGZ OP 12	PP	3/4	0.52	0.750	2.750	1.875	1.375	0.937	0.937	1.161	1.535	0.313
KGZ OP 16	PP	1	1.17	1.000	3.250	2.625	1.625	1.187	1.188	1.457	1.975	0.375
KGZ OP 20	PP	1-1/4	2.38	1.250	4.000	3.375	2.000	1.500	1.500	1.831	2.485	0.437
KGZ OP 24	PP	1-1/2	3.57	1.500	4.750	3.750	2.375	1.750	1.750	2.087	2.910	0.500
KGZ OP 32	PP	2	6.38	2.000	6.000	4.750	3.000	2.125	2.250	2.638	3.660	0.625

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	H ₃ inch	C ₂ inch	T inch	E inch	α deg	A ₂ ±.01 inch	C ₁ ±.01 inch	d ₁ inch	DYN. LOAD C lbf	STAT. LOAD C ₀ lbf
KGZ OP 08	PP	1/2	0.370	0.520	NIP A1	0.313	30	1.688	1.00	0.156	200	110
KGZ OP 10	PP	5/8	0.450	0.875	1/4-28	0.375	30	2.125	1.13	0.188	390	230
KGZ OP 12	PP	3/4	0.510	0.937	1/4-28	0.438	30	2.375	1.25	0.188	480	280
KGZ OP 16	PP	1	0.730	1.312	1/4-28	0.563	30	2.875	1.75	0.218	870	500
KGZ OP 20	PP	1-1/4	0.800	1.688	1/4-28	0.625	30	3.500	2.00	0.218	1300	730
KGZ OP 24	PP	1-1/2	0.840	1.875	1/4-28	0.750	30	4.125	2.50	0.281	1630	870
KGZ OP 32	PP	2	1.100	2.375	1/4-28	1.000	30	5.250	3.25	0.406	2650	1490

Self Aligning Tandem Mounted Units KTNZ..PP SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

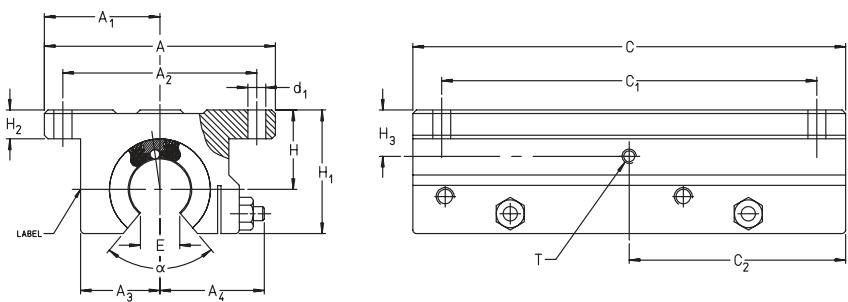
or Linear Sales

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	d inch	A inch	C inch	A ₁ ±.001 inch	H ±.001 inch	A ₃ inch	H ₁ inch	H ₂ inch
KTNZ 04	PP	1/4	0.21	0.250	1.63	2.50	0.813	0.437	1.000	0.813	0.188
KTNZ 06	PP	3/8	0.27	0.375	1.75	2.75	0.875	0.500	1.125	0.938	0.188
KTNZ 08	PP	1/2	0.51	0.500	2.00	3.50	1.000	0.687	1.375	1.250	0.250
KTNZ 10	PP	5/8	0.97	0.625	2.50	4.00	1.250	0.875	1.750	1.625	0.281
KTNZ 12	PP	3/4	1.25	0.750	2.75	4.50	1.375	0.937	1.875	1.750	0.313
KTNZ 16	PP	1	2.58	1.000	3.25	6.00	1.625	1.187	2.375	2.188	0.375
KTNZ 20	PP	1-1/4	4.94	1.250	4.00	7.50	2.000	1.500	3.000	2.813	0.437
KTNZ 24	PP	1-1/2	7.73	1.500	4.75	9.00	2.375	1.750	3.500	3.250	0.500

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	H ₃ inch	C ₂ inch	H ₄ inch	T inch	A ₂ ±.01 inch	C ₁ ±.01 inch	d ₁ inch	DYN. LOAD C lbf	STAT. LOAD C ₀ lbf
KTNZ 04	PP	1/4	0.750	1.250	0.437	NIP A1	1.312	2.000	0.156	80	60
KTNZ 06	PP	3/8	0.875	1.375	0.500	NIP A1	1.437	2.250	0.156	130	80
KTNZ 08	PP	1/2	1.125	1.750	0.687	NIP A1	1.688	2.500	0.156	320	220
KTNZ 10	PP	5/8	1.437	2.000	0.875	1/4-28	2.125	3.000	0.188	550	380
KTNZ 12	PP	3/4	1.563	2.250	0.937	1/4-28	2.375	3.500	0.188	780	540
KTNZ 16	PP	1	1.938	3.000	1.187	1/4-28	2.875	4.500	0.218	1360	980
KTNZ 20	PP	1-1/4	2.500	3.750	1.500	1/4-28	3.500	5.500	0.218	2060	1420
KTNZ 24	PP	1-1/2	2.875	4.500	1.750	1/4-28	4.125	6.500	0.281	2600	1700



Self Aligning Tandem Mounted Units KTNZ..OP PP SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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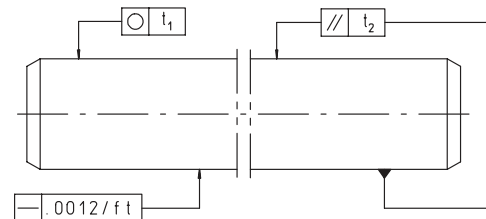
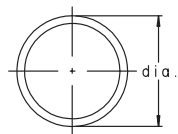
PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	WGT. lbs.	d inch	A inch	C inch	A ₁ ±.001 inch	H ±.001 inch	A ₃ inch	A ₄ inch	H ₁ inch	H ₂ inch
KTNZ 08 OP	PP	1/2	0.49	0.500	2.000	3.50	1.000	0.687	0.688	0.905	1.100	0.250
KTNZ 10 OP	PP	5/8	0.90	0.625	2.500	4.00	1.250	0.875	0.875	1.095	1.375	0.281
KTNZ 12 OP	PP	3/4	1.15	0.750	2.750	4.50	1.375	0.937	0.937	1.161	1.535	0.313
KTNZ 16 OP	PP	1	2.38	1.000	3.250	6.00	1.625	1.187	1.188	1.457	1.975	0.375
KTNZ 20 OP	PP	1-1/4	4.61	1.250	4.000	7.50	2.000	1.500	1.500	1.831	2.485	0.437
KTNZ 24 OP	PP	1-1/2	7.28	1.500	4.750	9.00	2.375	1.750	1.750	2.087	2.910	0.500

PART NUMBER	SEAL SUFFIX	SHAFT DIA. inch	H ₃ inch	C ₂ inch	T inch	E inch	∞ deg	A ₂ ±.01 inch	C ₁ ±.01 inch	d ₁ inch	DYN. LOAD C lbf	STAT. LOAD C ₀ lbf
KTNZ 08 OP	PP	1/2	0.370	1.75	NIP A1	0.313	30	1.688	2.50	0.156	320	220
KTNZ 10 OP	PP	5/8	0.450	2.00	1/4-28	0.375	30	2.125	3.00	0.188	630	460
KTNZ 12 OP	PP	3/4	0.510	2.25	1/4-28	0.438	30	2.375	3.50	0.188	780	560
KTNZ 16 OP	PP	1	0.730	3.00	1/4-28	0.563	30	2.875	4.50	0.218	1410	1000
KTNZ 20 OP	PP	1-1/4	0.800	3.75	1/4-28	0.625	30	3.500	5.50	0.218	2110	1460
KTNZ 24 OP	PP	1-1/2	0.800	4.50	1/4-28	0.750	30	4.125	6.50	0.281	2650	1740



Precision Ground Shafts

WZ, WZ..X46CR13 SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

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or Linear Sales

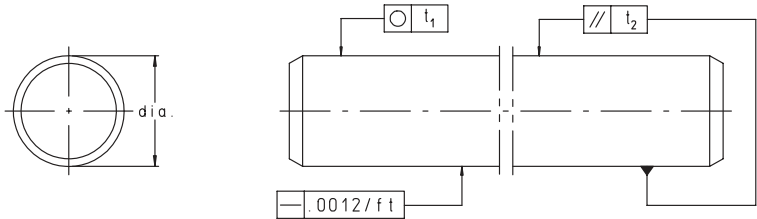
PART NUMBER STANDARD "L" CLASS	PART NUMBER STANDARD "S" CLASS	PART NUMBER STAINLESS STEEL	SHAFT DIA. nom inch	ROUNDNESS t ₁ inch	TAPER t ₂ ¹⁾ inch	HARDNESS DEPTH min inch	SURFACE FINISHING max
WZ1/4"L	WZ1/4"S	—	1/4	0.0002	0.0002	0.016	RMS 12
WZ3/8"L	WZ3/8"S	WZ3/8"X46CR13L	3/8	0.0002	0.0002	0.016	RMS 12
WZ1/2"L	WZ1/2"S	WZ1/2"X46CR13L	1/2	0.0002	0.0002	0.024	RMS 12
WZ5/8"L	WZ5/8"S	WZ5/8"X46CR13L	5/8	0.0002	0.0003	0.024	RMS 12
WZ3/4"L	WZ3/4"S	WZ3/4"X46CR13L	3/4	0.0002	0.0004	0.035	RMS 12
WZ1"L	WZ1"S	WZ1"X46CR13L	1	0.0002	0.0004	0.035	RMS 12
WZ1-1/8"L	—	—	1-1/8	0.0002	0.0004	0.035	RMS 12
WZ1-1/4"L	WZ1-1/4"S	—	1-1/4	0.0002	0.0004	0.059	RMS 12
WZ1-1/2"L	WZ1-1/2"S	WZ1-1/2"X46CR13L	1-1/2	0.0002	0.0004	0.059	RMS 12
WZ2"L	WZ2"S	—	2	0.0003	0.0004	0.087	RMS 12

1) Measurement of diameter difference



Precision Ground Shafts

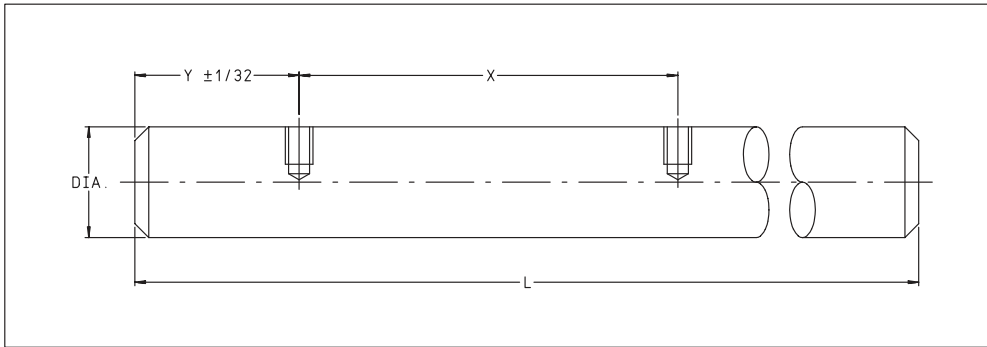
WZ..PDT, WZ..X46CR13 PDT SERIES



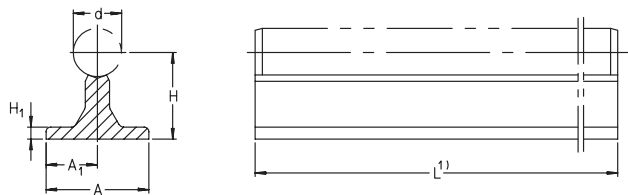
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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PART NUMBER STANDARD	PART NUMBER STAINLESS STEEL	SHAFT DIA. nom inch	HOLE SPACING X	THREAD SIZE d
WZ1/2" PDT	WZ1/2" X46CR13PDT	1/2	4	6-32
WZ5/8" PDT	—	5/8	4	8-32
WZ3/4" PDT	WZ0-3/4" X46CR13PDT	3/4	6	10-32
WZ1" PDT	WZ1-0/0" X46CR13PDT	1	6	1/4-20
WZ1-1/4" PDT	—	1-1/4	6	5/16-18
WZ1-1/2" PDT	WZ1-1/2" X46CR13PDT	1-1/2	8	3/8-16
WZ2" PDT	—	2	8	1/2-13

Please specify distance from shaft end to first hole with order



Shaft Support Rails TSWZ SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

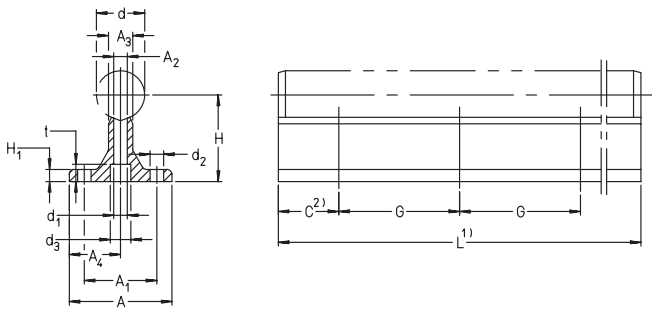
PART NUMBER	SHAFT DIA. inch	WGT. lbsft	A inch	H 2) ± .002 inch	H ₁ inch	A ₁ 3) ± .002 inch
TSWZ 08	1/2	0.60	1.50	1.125	0.188	0.750
TSWZ 10	5/8	0.78	1.63	1.125	0.250	0.813
TSWZ 12	3/4	1.01	1.75	1.500	0.250	0.875
TSWZ 16	1	1.37	2.13	1.750	0.250	1.063
TSWZ 20	1-1/4	1.98	2.50	2.125	0.313	1.250
TSWZ 24	1-1/2	3.03	3.00	2.500	0.375	1.500
TSWZ 32	2	4.80	3.75	3.250	0.500	1.875

1) Maximum length L = 48 inches
 2) With reference to the nominal shaft diameter, measured while clamped.



Shaft Support Rails

TSWZ..PD SERIES



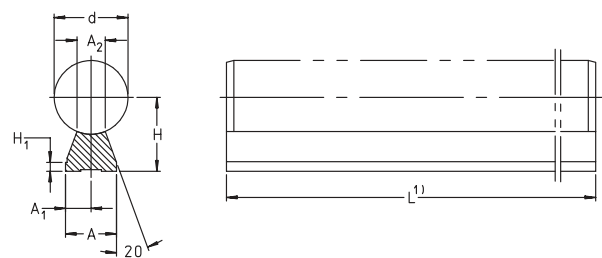
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

PART NUMBER	SHAFT DIA. inch	WGT. lbs.	A inch	H ³⁾ inch	H ₁ inch	A ₂ inch	A ₃ inch	A ₁ inch	d ₃ inch	t inch	d ₁ inch	d ₂ inch	A ₄ inch	G inch
TSWZ 08 PD	1/2	0.60	1.50	1.125	0.188	0.208	0.250	0.750	0.281	0.150	0.169	0.169	1.000	4
TSWZ 10 PD	5/8	0.78	1.63	1.125	0.250	0.251	0.313	0.813	0.312	0.180	0.193	0.193	1.125	4
TSWZ 12 PD	3/4	1.01	1.75	1.500	0.250	0.294	0.375	0.875	0.375	0.220	0.221	0.221	1.250	6
TSWZ 16 PD	1	1.37	2.13	1.750	0.250	0.379	0.500	1.063	0.437	0.272	0.281	0.281	1.500	6
TSWZ 20 PD	1-1/4	1.98	2.50	2.125	0.313	0.465	0.563	1.250	0.531	0.325	0.343	0.343	1.875	6
TSWZ 24 PD	1-1/2	3.03	3.00	2.500	0.375	0.550	0.688	1.500	0.625	0.390	0.406	0.343	2.250	8
TSWZ 32 PD	2	4.80	3.75	3.250	0.500	0.721	0.875	1.875	0.812	0.540	0.531	0.406	2.750	8

- 1) Maximum length L = 48 inches
- 2) The dimension C is dependent on the length of the support rail. It should always be equal at both ends.
- 3) With reference to the nominal shaft diameter, measured while clamped.



Shaft Support Rails TSUZ SERIES



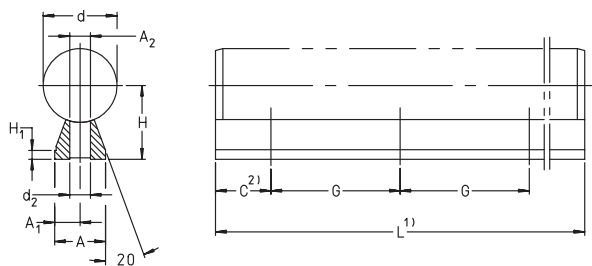
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

PART NUMBER	SHAFT DIA. inch	WGT. lbsft	d inch	A inch	H 2) ± .002 inch	H1 inch	A1 3) ± .002 inch	A2 inch
TSUZ 08	1/2	0.11	0.50	0.37	0.562	0.120	0.185	0.216
TSUZ 10	5/8	0.17	0.63	0.45	0.687	0.120	0.225	0.269
TSUZ 12	3/4	0.20	0.75	0.51	0.750	0.120	0.225	0.317
TSUZ 16	1	0.35	1.00	0.69	1.000	0.120	0.345	0.422
TSUZ 20	1-1/4	0.44	1.25	0.78	1.187	0.200	0.390	0.523
TSUZ 24	1-1/2	0.58	1.50	0.93	1.375	0.200	0.465	0.625
TSUZ 32	2	0.89	2.00	1.18	1.750	0.250	0.590	0.824

1) Maximum length L = 48 inches.
 2) With reference to the nominal shaft diameter, measured while clamped.



Shaft Support Rails TSUZ..PD SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales _____ or Linear Sales _____.

PART NUMBER	SHAFT DIA. inch	WGT. lbs/ft	d inch	A inch	H ₃ inch	H ₁ inch	A ₁ ⁴⁾ inch	A ₂ inch	d ₂ inch	G inch
TSUZ 08 PD	1/2	0.11	0.50	0.37	0.562	0.120	0.185	0.216	0.169	4
TSUZ 10 PD	5/8	0.17	0.63	0.45	0.687	0.120	0.225	0.269	0.193	4
TSUZ 12 PD	3/4	0.20	0.75	0.51	0.750	0.120	0.255	0.317	0.221	6
TSUZ 16 PD	1	0.35	1.00	0.69	1.000	0.120	0.345	0.422	0.281	6
TSUZ 20 PD	1-1/4	0.44	1.25	0.78	1.187	0.200	0.390	0.523	0.343	6
TSUZ 24 PD	1-1/2	0.58	1.50	0.93	1.375	0.200	0.465	0.623	0.406	8
TSUZ 32 PD	2	0.89	2.00	1.18	1.750	0.250	0.590	0.824	0.531	8

- 1) Maximum length L = 48 inches.
- 2) The dimension C is dependent on the length of the support rail. It should always be equal at both ends.
- 3) With reference to the nominal shaft diameter, measured while clamped.



Unitized Compact System

MLFZ SERIES

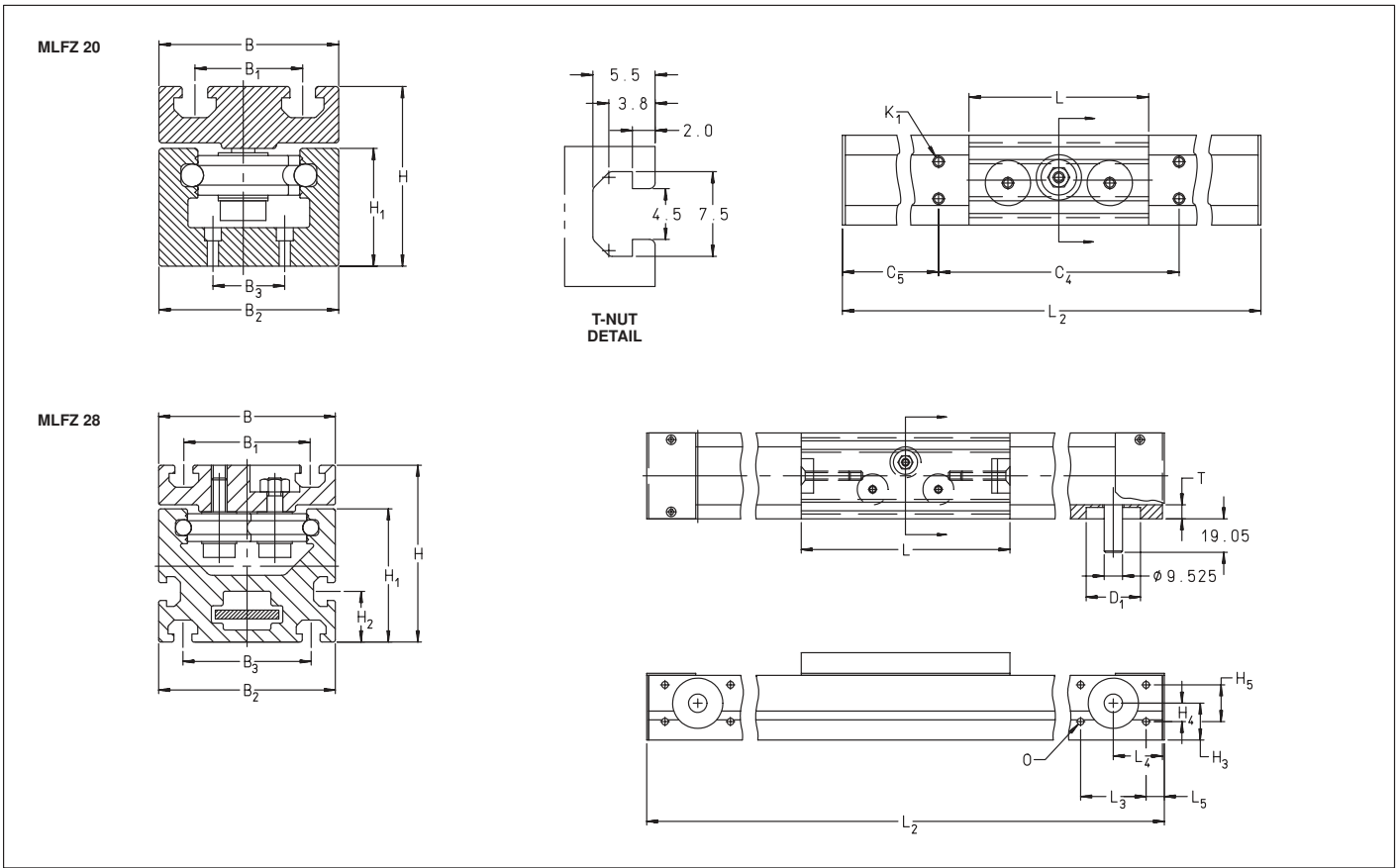
Rail, Integral Design Carriage

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE – Dimensions in mm																			
PART NUMBER	B	B ₁	B ₂	B ₃	D ₁	H	H ₁	H ₂	H ₃	H ₄	H ₅	K ₁	L	L ₁	L ₃	L ₄	L ₅	O	T
MLFZ 20 MI	31.75	19	31.75	19	–	31.8	20.8	–	–	–	–	#6-32	63.5	–	–	–	–	–	–
MLFZ 28 ZR	44.45	31.75	44.45	31.8	26	44.5	33.5	12.7	19.05	9.53	19.05	–	114.3	60	33.88	25.4	8.46	6-32	1.19

PART NUMBER	WEIGHTS			ALLOWABLE LOADS				ALLOWABLE MOMENTS						MOMENT OF INERTIA		BELT TYPE
	Go g	G100 g	Gc g	Fy	Foy	Fz	Foz	Mx	Mox	My	Moy	Mz	Moz	Iy mm^4	Iz mm^4	
MLFZ 20 MI	185	121	105	350	350	300	650	2	2.9	3.5	5.8	5.9	5.9	11950	31880	–
MLFZ 28 ZR	720	215	192	350	350	300	650	3.3	4.9	3.5	5.8	5.9	5.9	62300	159900	16T5

- For maximum lengths please contact factory.
- Custom carriages can be provided to suit individual requirements.
- Load ratings valid for fully supported elements.
- Load ratings not valid for corrosion resistant series.



Beam Rail

LFSB SERIES

Standard Carriage

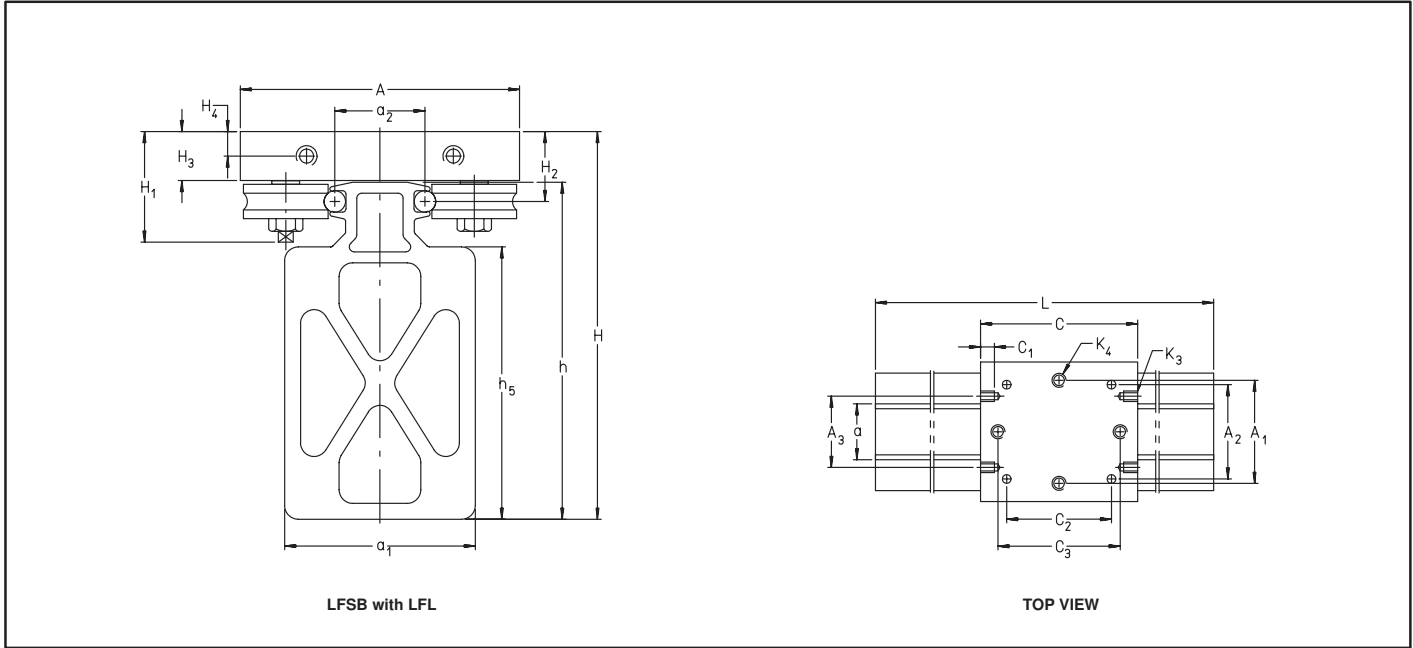
LFL SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE – Dimensions in mm																	
PART NUMBER RAIL	WEIGHT	PART NUMBER CARRIAGE	WEIGHT	DIMENSIONS						LOAD CALCULATIONS							
				CARRIAGE			RAIL			LOAD CURVE ³⁾	ALLOWABLE LOADS		ALLOWABLE MOMENTS				
				H	A	C	h	a	L ²⁾		Fy N	Fz N	Mx Nm	My Nm	Mz Nm	Iy mm ⁴	Iz mm ⁴
LFSB 32	9970	LFL 90-80	400	135.6	80	90	120.2	32	4000	2	850	1000	11	30	26	1.485 x 10 ⁶	4.72 x 10 ⁶
LFSB 52	18600	LFL 100-120	1000	177.4	120	100	157.2	52	4000	3	1500	2500	33	75	47	5.25 x 10 ⁶	15.9 x 10 ⁶
LFSB 52	18600	LFL 150-155	1900	183.4	135	150	157.2	52	4000	4	2400	4500	51	105	126	5.25 x 10 ⁶	15.9 x 10 ⁶

MOUNTING DIMENSIONS – Dimensions in mm																	
PART NUMBER RAIL	WEIGHT g/m	PART NUMBER CARRIAGE	A ₁	A ₂	A ₃	a ₁	a ₂	C ₁	C ₂	C ₃	H ₁	H ₂	H ₃	H ₄	h ₅	K ₃	K ₄
LFSB 32	9970	LFL 90-80	59	54	56	63.5	26	7	60	70	35	20.4	14	7	101.6	M6	M8
LFSB 52	18600	LFL 100-120	90	83	65	88.9	42	12	60	70	53.5	29.2	19.5	9.75	127	M6	M10
LFSB 52	18600	LFL 150-135	105	90	65	88.9	42	12	105	110	59	35.2	24	12	127	M6	M10

1. The beam rail is designed as a rigid, light weight beam, suitable for end mounting.
2. Contact factory for longer lengths.
3. Not valid for corrosion resistant series.



Beam Rail

LFSB SERIES

Enclosed, Sealed Carriage

LFKL SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

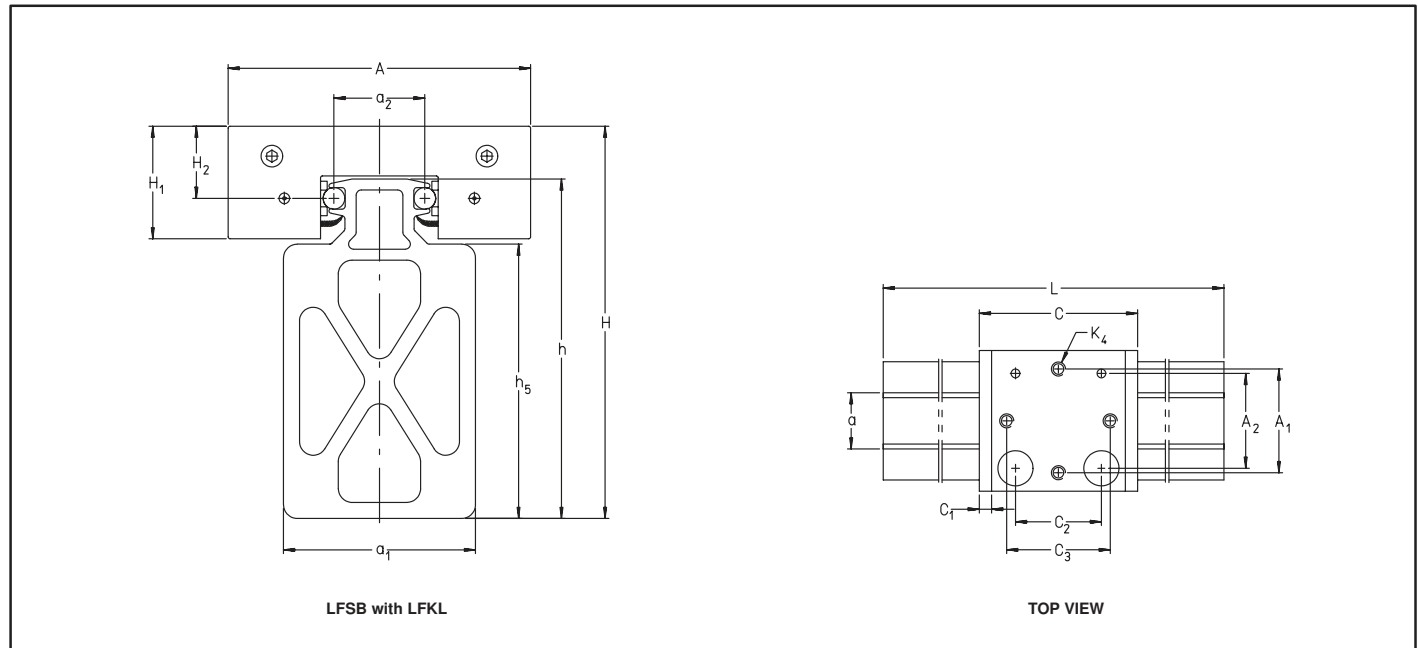
For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE – Dimensions in mm																	
PART NUMBER RAIL	WEIGHT g/m	PART NUMBER CARRIAGE	WEIGHT g	DIMENSIONS						LOAD CALCULATIONS							
				CARRIAGE			RAIL			LOAD CURVE ⁴⁾	ALLOWABLE LOADS		ALLOWABLE MOMENTS			MOMENT OF INERTIA	
				H	A	C	h	a	L ²⁾		Fy N	Fz N	Mx Nm	My Nm	Mz Nm	Iy mm ⁴	Iz mm ⁴
LFSB 32	9970	LFKL 112-86	700	135.7	86	112	120.2	32	4000	2	850	1000	11	30	26	1.485 x 10 ⁶	4.72 x 10 ⁶
LFSB 52	18600	LFKL 136-130	1500	177.2	130	136	157.2	52	4000	3	1500	2500	33	75	47	5.25 x 10 ⁶	15.9 x 10 ⁶
LFSB 52	18600	LFKL 186-145	2900	183.5	145	186	157.2	52	4000	4	2400	4500	51	105	126	5.25 x 10 ⁶	15.9 x 10 ⁶
LFSB 52	18600	LFKL 205-155	3900	183.5	155	205	157.2	52	4000	5	4800	8000	101	480	288	5.25 x 10 ⁶	15.9 x 10 ⁶

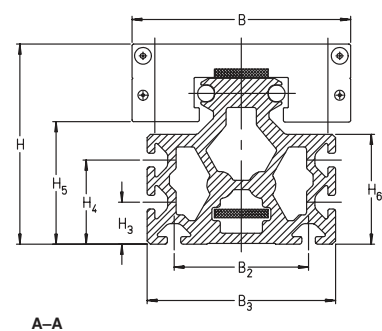
MOUNTING DIMENSIONS – Dimensions in mm															
PART NUMBER RAIL	WEIGHT g/m	PART NUMBER CARRIAGE	A ₁	A ₂	a ₁	a ₂	C ₁	C ₂	C ₃	H ₁	H ₂	H ₃	h ₅	K ₄	K ₅
LFSB 32	1000	LFKL 112-86	59	54	63.5	26	7	60	70	32	20.3	14	101.6	M8	18
LFSB 52	3000	LFKL 136-130	90	83	88.9	42	10	60	70	46.1	29	19.5	127	M10	30
LFSB 52	3000	LFKL 186-145	105	90	88.9	42	10	105	110	53.8	35.3	24	127	M10	30
LFSB 52	3000	LFKL 205-155	115	95	112	42	10	120	140	55	35.3	24	127	M12	34

1. Rail end support mounting holes can be provided to suit individual requirements.
2. Enclosed carriages are provided with felt shaft wipers with provision for lubrication, and a running bottom sealing element.
3. Contact factory for longer lengths.
4. Not valid for corrosion resistant series.



Linear Modular Unit With Track Roller Guidance System And Toothed Belt Drive

MLF..ZR SERIES



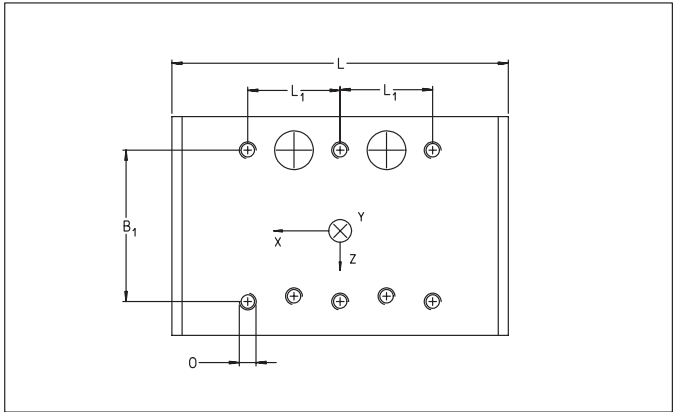
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm																				
PART NUMBER	DIMENSIONS																			
	L	B	H	L ₁ ± 0.1	B ₁ ± 0.1	O	H ₁	H ₂	B ₂	B ₃	H ₃	H ₄	H ₅	H ₆	L ₃	O ₁	D	D ₁ G7	D ₂	T ± 0.1
MLF 32 086 ZR	155	86	82	50	59	M8	40	81.5	43	75	25	—	50	47	80	M6	80	70	61	2.3
MLF 52 130 ZR	200	130	119	55	90	M10	57.7	117.75	80	112	25	50	72.8	65.4	115.4	M8	115	95	76	3.5
MLF 52 145 ZR	245	145	125	80	105	M10	57.7	117.75	80	112	25	50	71.2	65.4	115.4	M8	115	95	76	3.5
MLF 52 155 ZR	260	155	125	90	115	M12	57.7	117.75	80	112	25	50	70	65.4	115.4	M8	115	95	76	3.5

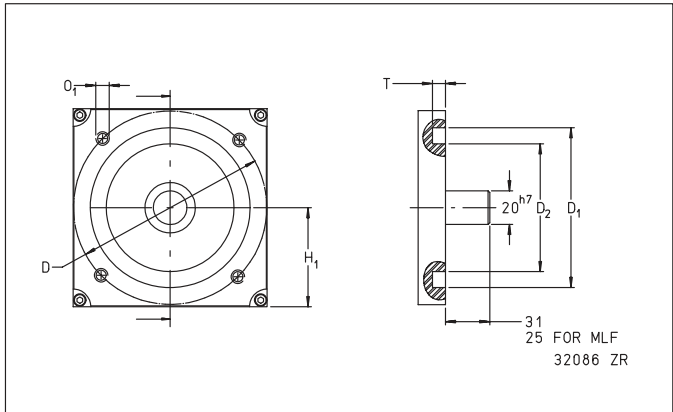
TOOTHED BELT / GEAR WHEELS					
	TOOTHED BELT	PERMISSIBLE TOOTHED BELT DRIVE FORCE	MASS	DISPLACEMENT	MASS MOMENT OF INERTIA OF BOTH GEAR WHEELS
	TYPE	N	kg/m	mm/rev.	kg·m ²
MLF 32 086 ZR	20 AT 5	640	0.068	175	2.2·10 ⁻⁴
MLF 52 130 ZR	32 AT 10	1750	0.2	270	12.6·10 ⁻⁴
MLF 52 145 ZR	32 AT 10	1750	0.2	270	12.6·10 ⁻⁴
MLF 52 155 ZR	32 AT 10	1750	0.2	270	12.6·10 ⁻⁴

- When using standard brush wipers:
 $L_2 = \text{Stroke} + L + 2 \times S$
 The additional factor S represents a security which is dependent on the specific application and must be at least 85 mm;
 Stroke in mm
 When using bellows: $L_2 = \text{Stroke} \times 1.4 + L + 2 \times S$
 The factor of 1.4 accounts for the compressed length of the bellows.
 Maximum length of profiled support rail $L_2 = 6000$ mm (longer profiled support rails available on request)
- Total weight $G_{\text{tot}} = G_0 + \frac{G_{100} \times (\text{Stroke} + 2 \times S)}{100}$ [kg]
 When using bellows:
 Total weight $G_{\text{tot}} = G_0 + \frac{G_{100} \times \text{Stroke} \times 1.4}{100}$ [kg]
- G_0 = weight of unit for stroke length 0
- G_{100} = weight of unit per 100 mm stroke of the carriage
- G_{LFKL} = weight of moving mass of the carriage
- Values for individual loads and with complete support for underside of the unit. These must be reduced for combined loading.

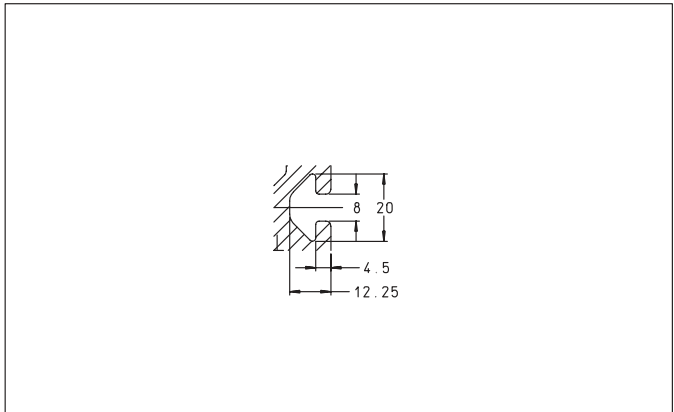
Mounting dimensions



Carriage



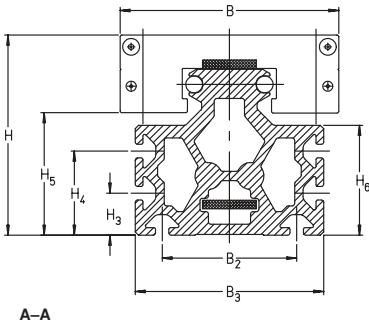
Coupling/Coupling Housing



T-grooves

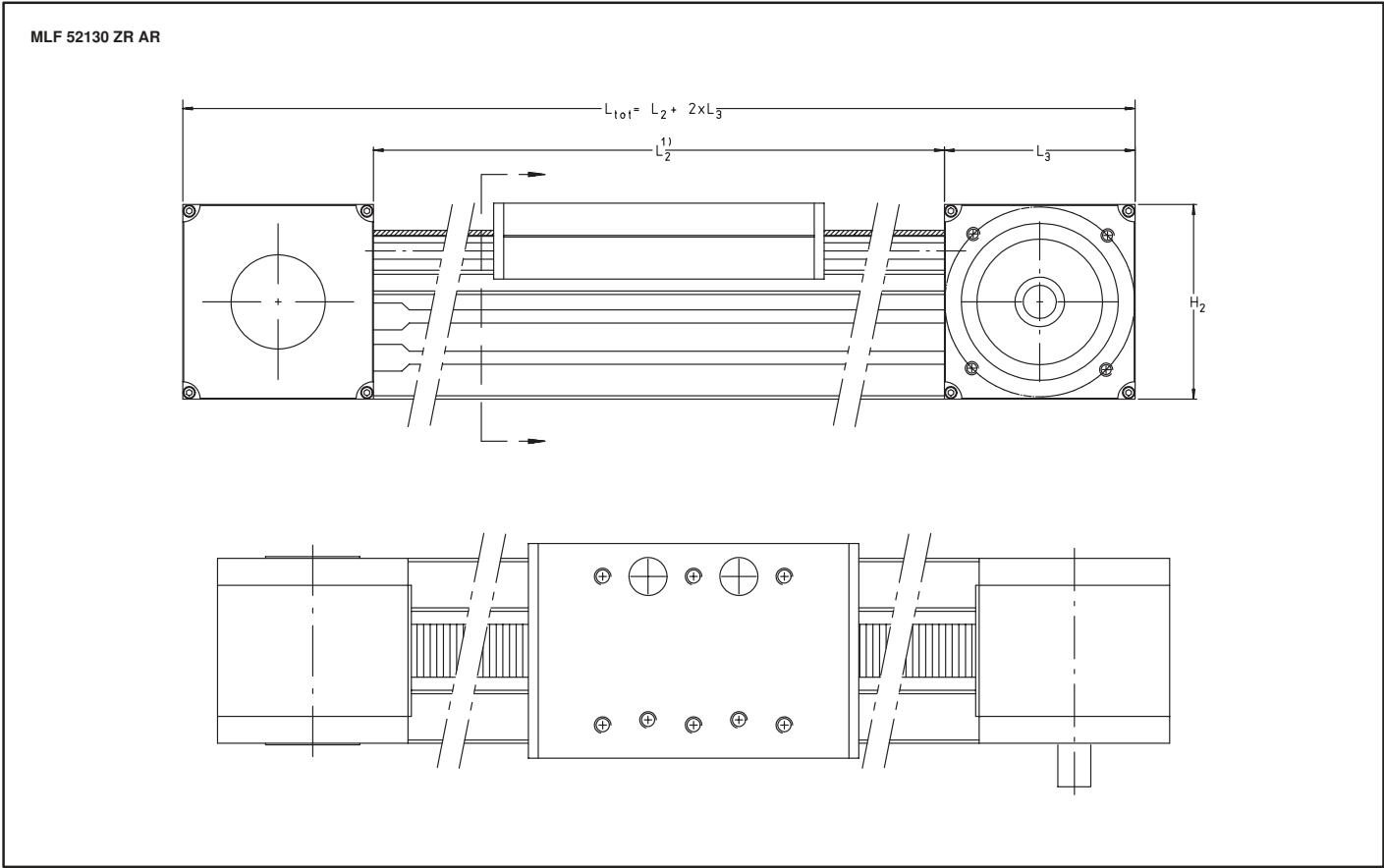


Linear Modular Unit With Track Roller Guidance System And Toothed Belt Drive MLF.ZR SERIES

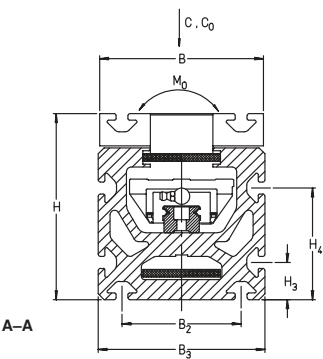


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

MASS ²⁾			PERMISSIBLE LOADS ⁶⁾				PERMISSIBLE MOMENTS ⁶⁾						GEOMETRICAL MOMENTS OF INERTIA cm ⁴	
G ₀ ³⁾ kg	G ₁₀₀ ⁴⁾ kg	G _{LFL} ⁵⁾ kg	F _{yp} ^{perm} N	F _{oy} ^{perm} N	F _{zp} ^{perm} N	F _{oz} ^{perm} N	M _x ^{perm} Nm	M _{ox} ^{perm} Nm	M _y ^{perm} Nm	M _{oy} ^{perm} Nm	M _z ^{perm} Nm	M _{oz} ^{perm} Nm	I _y	I _z
4.8	0.6	0.8	850	1400	1000	1000	11	18	30	30	26	43	100	76
12	1.28	2	1500	2500	3500	3500	33	52	105	105	47	78	392	304
13.9	1.28	3.2	2400	4000	4500	4500	51	84	236	236	126	210	392	304
15.7	1.28	5	4800	7900	8000	8000	101	166	480	480	288	474	392	304



Linear Modular Unit With Recirculating Ball Bearing Guidance System And Toothed Belt Drive MKUE..ZR..N SERIES



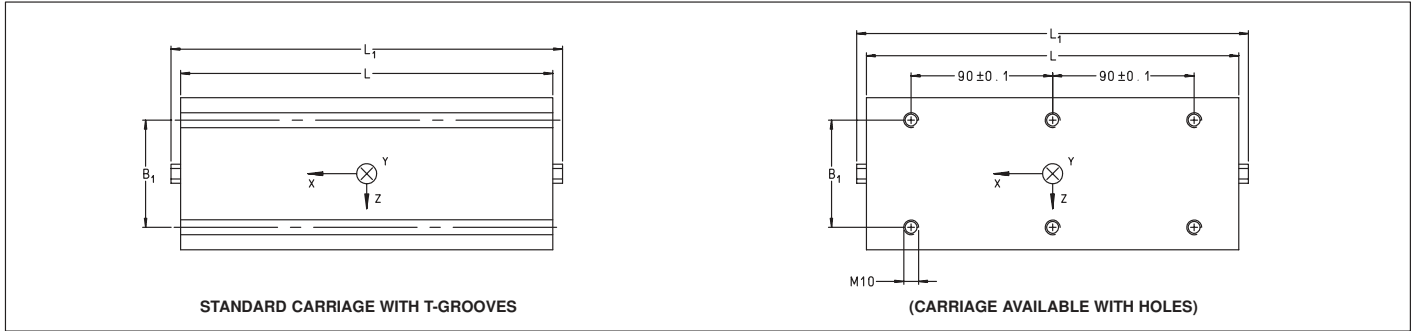
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm																
PART NUMBER	DIMENSIONS															
	L	B	H	B ₁ ±0.2	H ₁	H ₂	L ₁ ±0.1	H ₃	H ₄	B ₂	B ₃	O	D	D ₁ G7	D ₂	T ±0.1
MKUE 25 ZR..N	250	110	125	80	57.7	115.5	263	25	75	80	112	M8	115	95	76	3.5

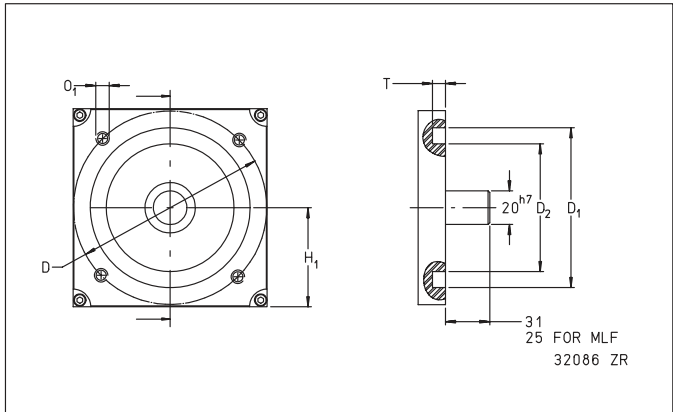
TOOTHED BELT / GEAR WHEELS					
	TOOTHED BELT TYPE	PERMISSIBLE TOOTHED BELT DRIVE FORCE N	MASS kg/m	DISPLACEMENT mm/rev.	MASS MOMENT OF INERTIA OF BOTH GEAR WHEELS kg·m ²
MKUE 25 ZR..N	50 AT 10	1880	0.315	250	30.6·10 ⁻⁴

- $L_2 = \text{Stroke} + L_1 + 2 \times S$
The additional factor S represents a security which is dependent on the specific application and must be at least 85 mm;
Stroke in mm
Maximum length of profiled support rail $L_2 = 4000$ mm (longer profiled support rails available on request)
- Total weight $G_{\text{tot}} = G_0 + \frac{G_{100} \times (\text{Stroke} + 2 \times S)}{100}$ [kg]
- G_0 = weight of unit for stroke length 0
- G_{100} = weight of unit per 100 mm stroke of the carriage
- G_{MKWE} = weight of moving mass of the carriage
- Values with complete support for underside of the unit

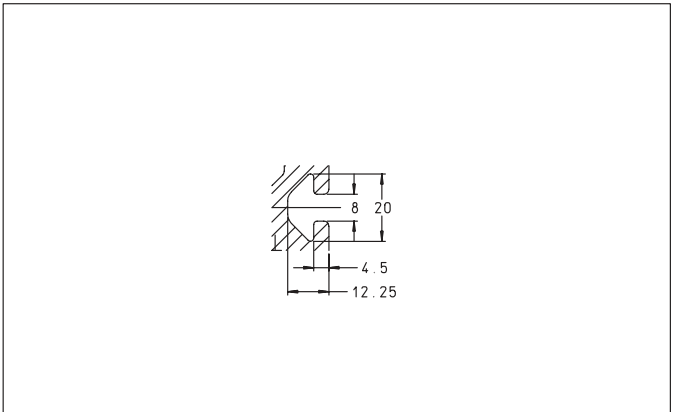
Mounting dimensions



Carriage



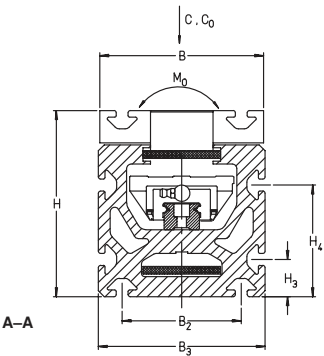
Coupling/Coupling Housing



T-grooves

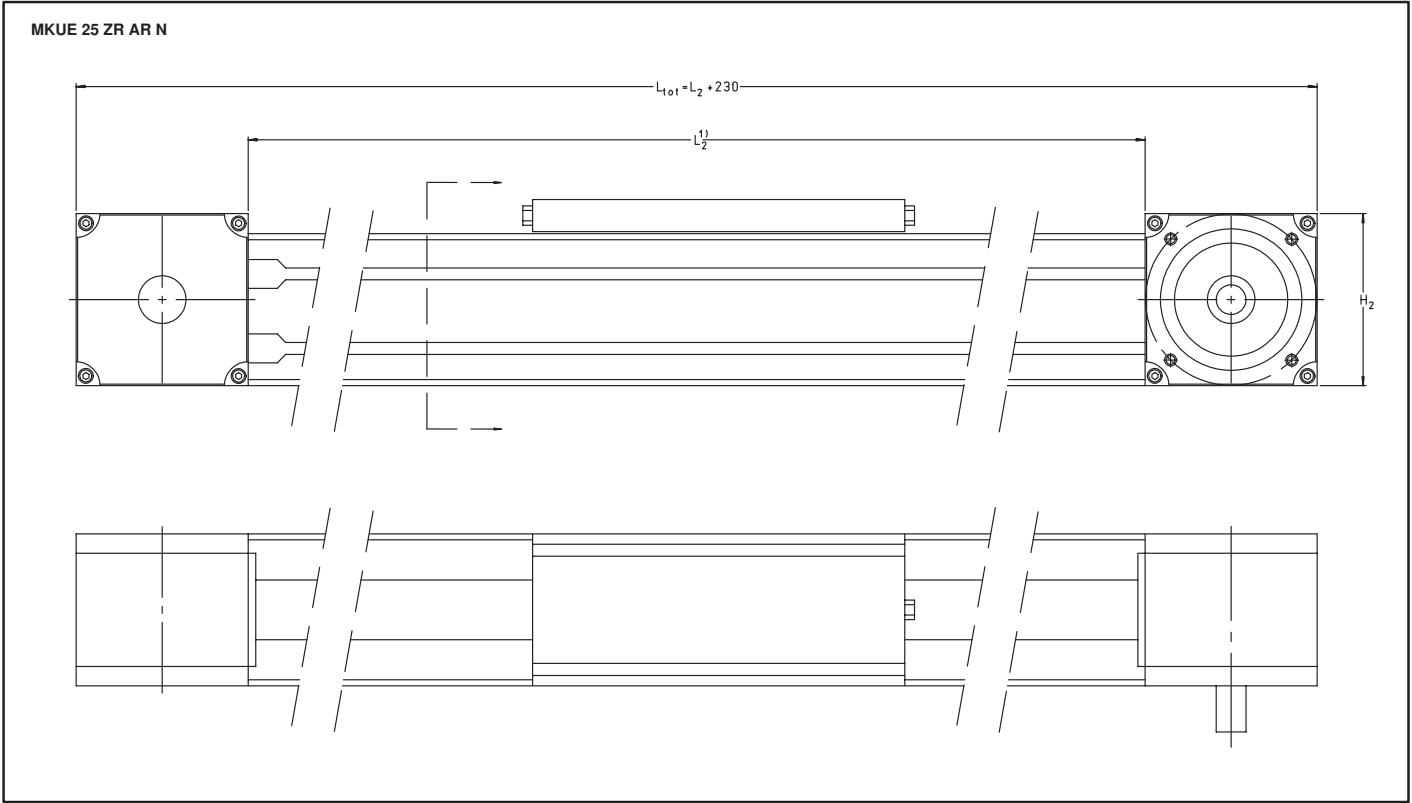


Linear Modular Unit With Recirculating Ball Bearing Guidance System And Toothed Belt Drive MKUE..ZR..N SERIES

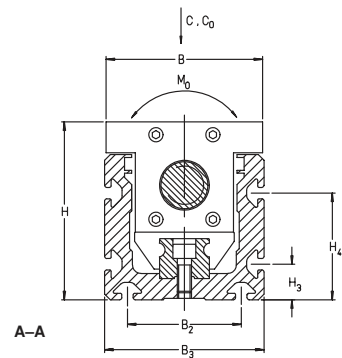


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

MASS ²⁾			BASIC LOAD RATINGS ⁶⁾		PERMISSIBLE STATIC MOMENT ⁶⁾	GEOMETRICAL MOMENTS OF INERTIA cm ⁴	
G_0 ³⁾ kg	G_{100} ⁴⁾ kg	G_{MKWE} ⁵⁾ kg	C kN	C_0 kN	M_0 STATIC Nm	I_y	I_z
16.2	1.66	3,8	26.3	41.8	411	733	517



Linear Modular Unit With Recirculating Ball Bearing Guidance System And Ball Screw Drive MKUE..KGT SERIES

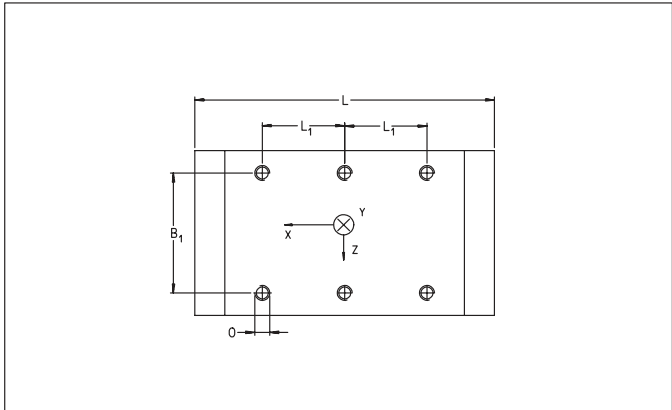


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

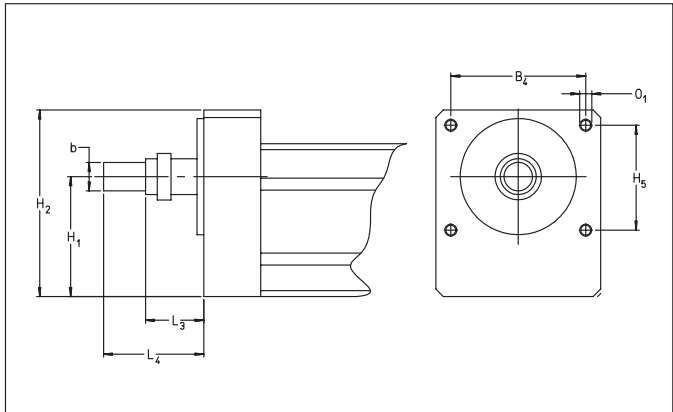
DIMENSION TABLE · Dimensions in mm															
PART NUMBER	SPINDLE d ₀ xP ⁷⁾	DIMENSIONS													
		L	B	H	L ₁ ± 0.1	B ₁ ± 0.1	O	d Øh6	H ₁	H ₂	L ₃	L ₄	H ₃	H ₄	B ₂
MKUE 25 KGT 5	32X5	200	110	125	55	80	M10	19	80	124.5	39	67	25	75	80
MKUE 25 KGT 10	32X10	200	110	125	55	80	M10	19	80	124.5	39	67	25	75	80
MKUE 25 KGT 40	32X40	200	110	125	55	80	M10	19	80	124.5	39	67	25	75	80

- 1) $L_2 = \text{Stroke} \times 1.2 + L + 2 \times S$
S=spindle lead P;stroke in mm
Maximum length of profiled Support rail L₂ = 4000 mm (longer profiled support rails available on request).
Modular units with a stroke length over 1200 mm can be fitted with movable spindle supports.
- 2) Total weight G_{tot} = G₀ + $\frac{G_{100} \times \text{Stroke} \times 1.2}{100}$ [kg]
- 3) G₀ = weight of unit for stroke length 0
- 4) G₁₀₀ = wieght of unit per 100 mm stroke of the carriage
- 5) G_{MKWE}= weight of moving mass of the carriage
- 6) Values with complete support for underside of the unit
- 7) d₀ × P = nominal spindle diameter×spindle lead

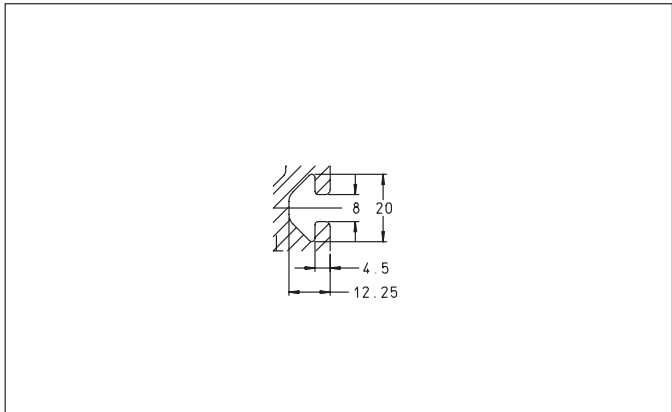
Mounting dimensions



Carriage



Coupling/Coupling Housing



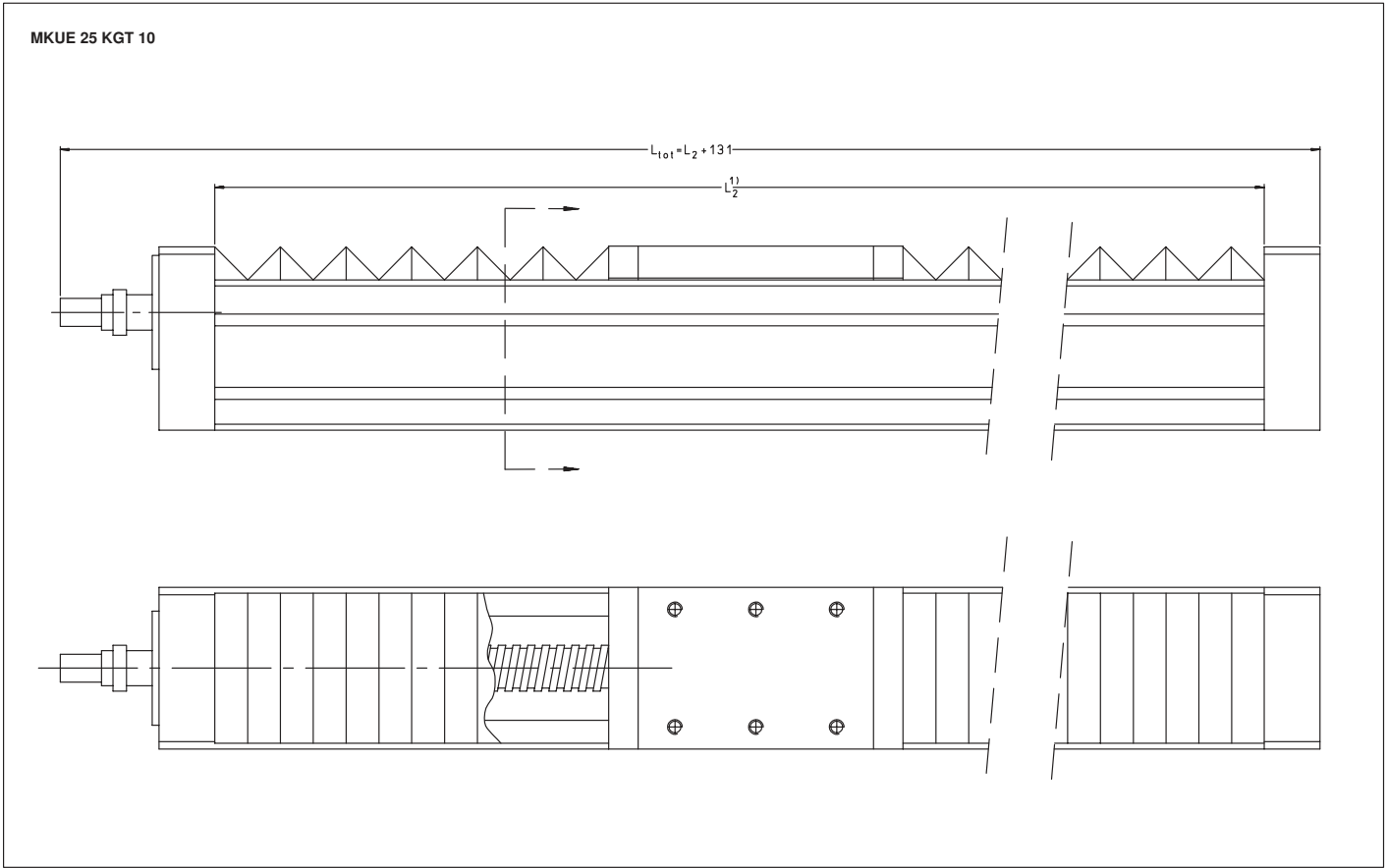
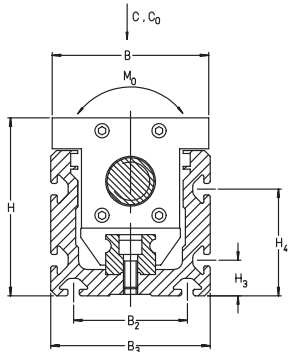
T-grooves



Linear Modular Unit With Recirculating Ball Bearing Guidance System And Ball Screw Drive MKUE..KGT SERIES

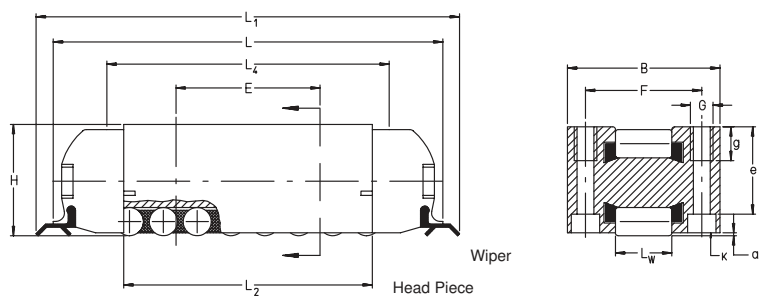
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

				MASS ²⁾			BASIC LOAD RATINGS ⁶⁾		PERMISSIBLE STATIC MOMENT ⁶⁾	GEOMETRICAL MOMENTS OF INERTIA cm ⁴	
B ₃	H ₅	B ₄	O ₁	G _O ³⁾ kg	G ₁₀₀ ⁴⁾ kg	G _{MKWE} ⁵⁾ kg	C kN	C ₀ kN	M ₀ STATIC Nm	I _y	I _z
112	70	90	M8	17.4	2	4.3	26.3	41.8	411	717	408
112	70	90	M8	17.4	2	4.3	26.3	41.8	411	717	408
112	70	90	M8	17.4	2	4.3	26.3	41.8	411	717	408



Linear Roller Bearings

RUS, RUS..KS SERIES



RUS 19 069 to RUS 38 206

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

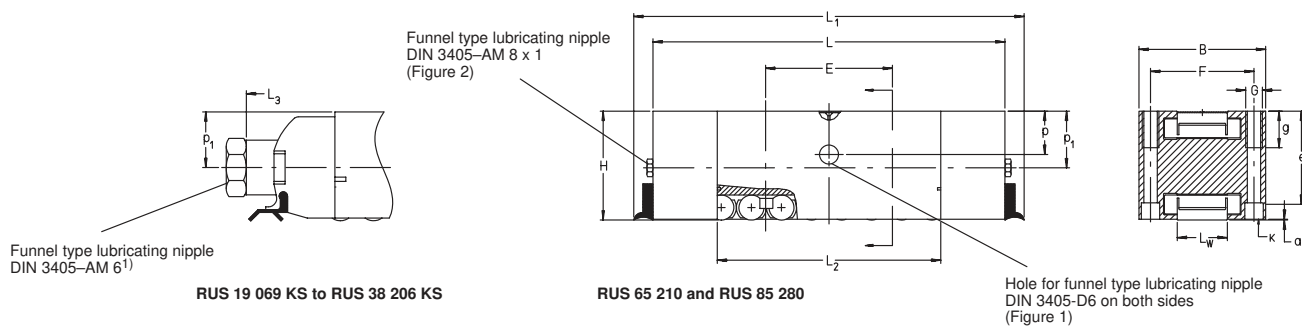
DIMENSION TABLE · Dimensions in mm										
PART NUMBER		MASS kg	DIMENSIONS							
			H	L	B	L ₁	L ₂	L ₃	L _w	a
RUS 19 069		0.16	19	69	27	75	44	—	10	0.2
	RUS 19 069 KS	0.19	19	—	27	—	44	76	10	0.2
RUS 19 105		0.27	19	105	27	111	78.5	—	10	0.2
	RUS 19 105 KS	0.29	19	—	27	—	78.5	112	10	0.2
RUS 26 086		0.41	26	86	40	92	53	—	14	0.2
	RUS 26 086 KS	0.49	26	—	40	—	53	92	14	0.2
RUS 26 102		0.53	26	102	40	108	69	—	14	0.2
	RUS 26 102 KS	0.61	26	—	40	—	69	108	14	0.2
RUS 26 126		0.70	26	126	40	132	93	—	14	0.2
	RUS 26 126 KS	0.78	26	—	40	—	93	132	14	0.2
RUS 38 134		1.27	38	133	52	133	85	—	20	0.2
	RUS 38 134 KS	1.53	38	—	52	—	85	136	20	0.2
RUS 38 206		2.28	38	206	52	206	158	—	20	0.2
	RUS 38 206 KS	2.53	38	—	52	—	158	209	20	0.2
RUS 65 210		7.5	65	211	76	234	134	—	30	0.5
RUS 85 280*)		16	85	281	104	303	185	—	40	0.5

1) If the lubricating nipple is replaced by tube or pipe connections, the thread length must not exceed 6 mm.

2) Minimum length to be supported

3) UG guideway for RUS 85 280 available on request

*) Available on request



BASIC LOAD RATINGS		MOUNTING DIMENSIONS								K FOR FIXING SCREWS TO DIN 912	MATCHING ADJUSTING GIBS	MATCHING GUIDEWAYS
dyn. C N	stat. C ₀ N	L ₄ ²⁾	E ± 0.1	F ± 0.1	G	e	g	p	p ₁			
42,000	33,000	50	25.5	20.6	M4	15.5	6	—	—	M3	VUS 19 069	UG 6628
42,000	33,000	50	25.5	20.6	M4	15.5	6	—	10	M3	VUS 19 069	UV 5323
68,000	61,000	85	50	20.6	M4	15.5	6	—	—	M3	VUS 19 105	UFA 3210
68,000	61,000	85	50	20.6	M4	15.5	6	—	10	M3	VUS 19 105	UFK 3210
												UFB 4710
76,000	56,000	63	28	30	M6	21	10	—	—	M4	VUS 26 086	UG 9741
76,000	56,000	63	28	30	M6	21	10	—	13.5	M4	VUS 26 086	UV 7532
95,000	75,000	79	44	30	M6	21	10	—	—	M4	VUS 26 102	UFA 4710
95,000	75,000	79	44	30	M6	21	10	—	13.5	M4	VUS 26 102	UFK 4710
												UFB 6412
122,000	103,000	103	68	30	M6	21	10	—	—	M4	VUS 26 126	
122,000	103,000	103	68	30	M6	21	10	—	13.5	M4	VUS 26 126	
179,000	133,000	100	51	41	M8	31	14	—	—	M6	VUS 38 134	UG 12 553
179,000	133,000	100	51	41	M8	31	14	—	19.5	M6	VUS 38 134	UV 9542
305,000	265,000	172	102	41	M8	31	14	—	—	M6	VUS 38 206	UFA 6412
305,000	265,000	172	102	41	M8	31	14	—	19.5	M6	VUS 38 206	UFK 6412
												UFB 7812
465,000	345,000	—	76	62	M10	55	22	26	34	M8	VUS 65 210	UG 16 260
												UV 13 863
												UFA 8815
												UFK 8815
												UFB 10 615
840,000	620,000	—	101.5	82.5	M14	73	30	33	45	M10	VUS 85 280	UG... ³⁾
												UV 16 977
												UFA 11 518
												UFK 11 518
												UFB 14 0185

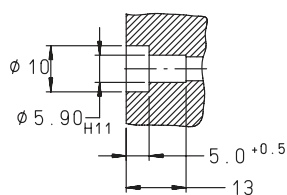


Figure 1

Lubrication holes are provided on both sides for funnel type grease nipples DIN 3405-D6 (supplied with the bearing) or either tube or pipe connection. If no lubrication connection is to be provided the holes should be plugged with the lubricating nipples.

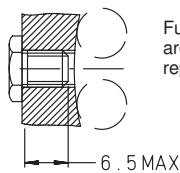


Figure 2

Funnel type lubricating nipples DIN 3405-AM 8x1 are mounted in the head pieces. They can be replaced by tube or pipe connections.

Linear Roller Bearings

RUSZ, RUSZ..KS SERIES



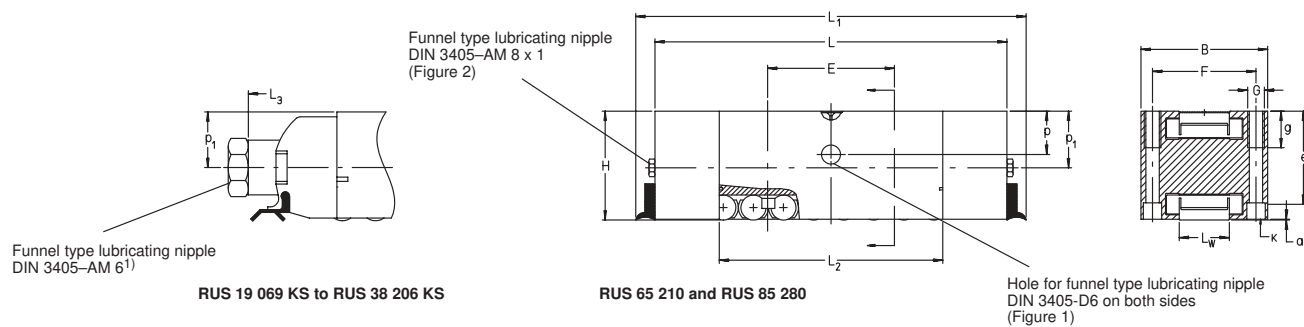
RUS 19 069 to RUS 38 206

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm								
PART NUMBER	DIMENSIONS							
	H	L	B	L ₁	L ₂	L ₃	L _w	a
RUSZ 12044	19.05	69	25.4	75	44	—	10	0.2
RUSZ 18059	28.57	94	38.1	100	60	—	14	0.2
RUSZ 24084	38.1	133	50.8	133	85	—	20	0.2
RUSZ 12044 KS	19.05	69	25.4	75	44	76	10	0.2
RUSZ 18059 KS	28.57	94	38.1	100	60	132	14	0.2
RUSZ 24084 KS	38.1	133	50.8	133	85	136	20	0.2

- 1) If the lubricating nipple is replaced by tube or pipe connections, the thread length must not exceed 6 mm.
- 2) Minimum length to be supported





BASIC LOAD RATINGS		MOUNTING DIMENSIONS								K FOR FIXING SCREWS TO DIN 912	MATCHING ADJUSTING GIBS	MATCHING GUIDEWAYS
dyn. C N	stat. C ₀ N	L ₄ ²⁾	E ± 0.1	F ± 0.1	G	e	g	p	p ₁			
42000	33000	50	25.5	20.6	—	15.5	—	—	—	M3x22	VUSZ 12044	UG6628 UV5323 UFA/UFK3210 UFB4710
86000	65000	71	38	31	—	23.6	—	—	—	M4x30	VUSZ 18059	UG9745 UV7532 UFA/UFK4710 UFB6412
179000	133000	100	51	41	—	32.1	—	—	—	M5x45	VUSZ 24084	UG12553 UV9542 UFA/UFK6412 UFB7812
42000	33000	50	25.5	20.6	—	15.5	—	—	—	M3x22	VUSZ 12044	UG6628 UV5323 UFA/UFK3210 UFB4710
86000	65000	71	38	31	—	23.6	—	—	—	M4x30	VUSZ 18059	UG9745 UV7532 UFA/UFK4710 UFB6412
179000	133000	100	51	41	—	32.1	—	—	—	M5x45	VUSZ 24084	UG12553 UV9542 UFA/UFK6412 UFB7812

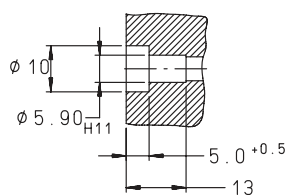


Figure 1

Lubrication holes are provided on both sides for funnel type grease nipples DIN 3405-D6 (supplied with the bearing) or either tube or pipe connection. If no lubrication connection is to be provided the holes should be plugged with the lubricating nipples.

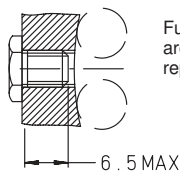
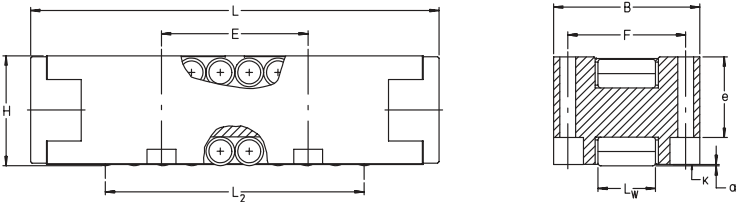


Figure 2

Funnel type lubricating nipples DIN 3405-AM 8x1 are mounted in the head pieces. They can be replaced by tube or pipe connections.

Linear Roller Bearings

PR SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm							
PART NUMBER	MASS kg	DIMENSIONS					
		H	L	B	L ₂	L _w	a
PR 14 032	0.095	14.285	51	22.23	31	9	0.2
PR 14 044	0.2	19.05	69	25.4	42	10	0.35
PR 14 061	0.65	28.57	96	38.1	58.5	16	0.35
PR 14 089	1.75	38.1	142	50.8	90	20	0.4
PR 14 135	5.65	57.15	196	76.2	126	30	0.5
PR 14 182	13.25	76.2	264	101.6	167	40	0.6

- 1) UG guideway for PR 14 182 available on request
- 2) Not available from stock. Please check delivery time.

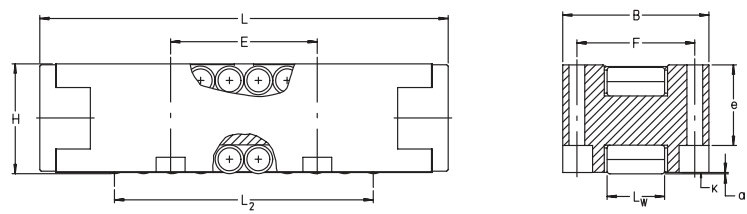
Ordering examples:

Linear roller bearing PR 14 061
 with a tolerance for the nominal height H of –10 to –15 µm:
 PR 14 061 –10 –15
 Linear roller bearing PR 14 135
 with a tolerance for the nominal height H of –10 to –20 µm:
 PR 14 135 –10 –20



Linear Roller Bearings

PR SERIES



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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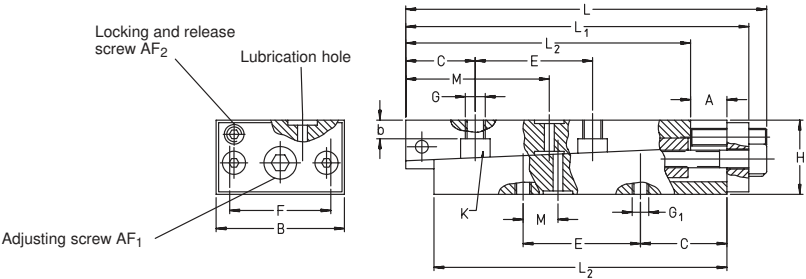
BASIC LOAD RATINGS		MOUNTING DIMENSIONS			K FOR FIXING SCREWS TO DIN 912	MATCHING ADJUSTING GIBS	MATCHING GUIDEWAYS	
dyn. C N	stat. C ₀ N	E ± 0.1	F ± 0.1	e				
21,700	17,600	19	17.1	10	M2.5	—	UG 6628 UV 5323	UFA 3210 UFK 3210
44,000	37,500	25.5	20.6	14	M3	VUSZ 12 044	UG 6628 UV 5323	UFA 3210 UFK 3210 UFB 4710
107,000	86,000	38	31	20.8	M4	VUSZ 18 059	UG 9741 UV 7532	UFA 4710 UFK 4710 UFB 6412
205,000	171,000	51	41	28	M5	VUSZ 24 084	UG 12 553 UV 9542	UFA 6412 UFK 6412 UFB 7812
435,000	345,000	76.2	62	42	M6	VUSZ 36 135 ²⁾	UG 16 260 UV 13 863	UFA 8815 UFK 8815 UFB 10 615
790,000	620,000	101.6	82.5	56	M8	VUSZ 48 182 ²⁾	UG.... ¹⁾ UV 16 977	UFA 11 518 UFK 11 518 UFB 14 018



Adjusting Gibs

VUS, METRIC SIZES SERIES

VUSZ, INCH SIZES SERIES



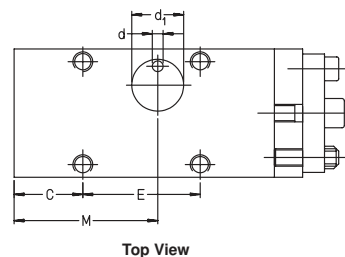
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE · Dimensions in mm										
PART NUMBER	MASS kg	DIMENSIONS			MOUNTING DIMENSIONS					
		B	H min.	L max.	L ₁ max.	L ₂	E ± 0.1	F ± 0.1	b	C
VUS 19 069	0.24	26.5	16	78	73	62	25.5	20.6	4	16.5
VUS 19 105	0.32	26.5	16	123	119	100	50	20.6	3.5	25
VUS 26 086	0.6	39.5	25	97	89	75	28	30	6	20.5
VUS 26 102	0.71	39.5	25	113	105	91	44	30	6	20.5
VUS 26 126	0.9	39.5	25	137	129	115	68	30	6	20.5
VUS 38 134	1.47	51.5	30	141	131	115	51	41	7	28
VUS 38 206	2.1	51.5	25	250	240	200	102	41	5	49

DIMENSION TABLE · Dimensions in mm										
PART NUMBER	MASS kg	DIMENSIONS			MOUNTING DIMENSIONS					
		B	H min.	L max.	L ₁ max.	L ₂	E ± 0.1	F ± 0.1	b	C
VUSZ 12 044	0.19	25	16	78	73	62	25.5	19 ¹⁾	4	16.5
VUSZ 18 059	0.63	37.6	25	107	99	85	38	31	6	20.5
VUSZ 24 084	1.38	50	30	141	131	115	51	41	7	28

1) Distance between the mounting holes in the top wedge of the gib; deviates from the bottom wedge

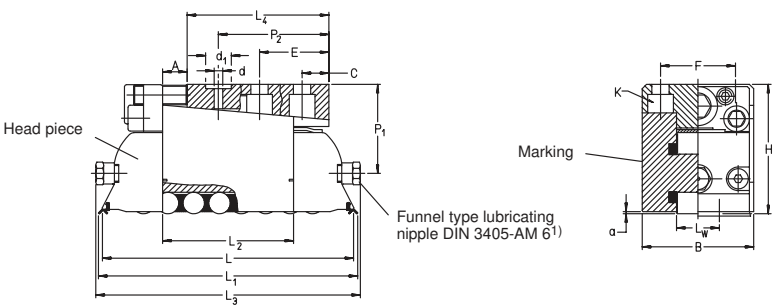




DIMENSION TABLE - Dimensions in mm										
M	d	d ₁	A max.	G	G ₁ , K FOR FIXING SCREW TO DIN 912	HEIGHT CHANGE		ADJUSTING SCREW AF ₁	LOCKING AND RELEASE SCREW AF ₂	MATCHING LINEAR ROLLER BEARINGS
						ΔH max.	PER SCREW ROTATION			
16.5	3.5	12	7	M 4	M 3	0.35	0.035	3	2	RUS 19 069
29	3.5	12	15	M 4	M 3	0.5	0.023	3	2.5	RUS 19 105
19.5	5	16	8	M 6	M 4	0.4	0.05	6	3	RUS 26 086
27.5	5	16	8	M 6	M 4	0.4	0.05	6	3	RUS 26 102
39.5	5	16	8	M 6	M 4	0.4	0.05	6	3	RUS 26 126
30.5	5	22	8	M 8	M 6	0.4	0.062	8	4	RUS 38 134
61	5	22	30	–	M 6	1	0.05	8	5	RUS 38 206

DIMENSION TABLE - Dimensions in mm										
M	d	d ₁	A max.	G	G ₁ , K FOR FIXING SCREW TO DIN 912	HEIGHT CHANGE		ADJUSTING SCREW AF ₁	LOCKING AND RELEASE SCREW AF ₂	MATCHING LINEAR ROLLER BEARINGS
						ΔH max.	PER SCREW ROTATION			
16.5	3.5	12	7	–	M 3	0.35	0.035	3	2	PR 14 044
20	5	16	8	–	M 4	0.4	0.05	6	3	PR 14 061
30.5	5	22	8	–	M 5	0.4	0.062	8	4	PR 14 089

Linear Roller Bearings With Integral Adjusting Gib RUSV..KS SERIES

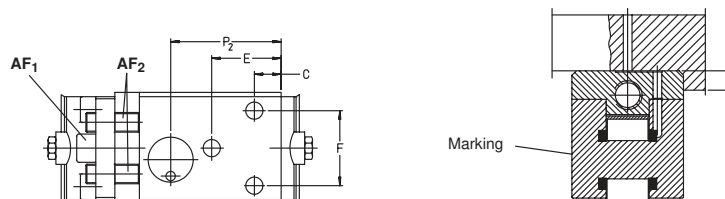


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

DIMENSION TABLE · Dimensions in mm													
PART NUMBER	MASS kg	DIMENSIONS										BASIC LOAD RATINGS	
		H	L	B	L _w	a	L ₁ ≈	L ₂	L ₃	L ₄	d ₁	dyn. C N	stat. C ₀ N
RUSV 30 069 KS	0.32	30	69	27	10	0.3	75	43.5	82	45	12	42,000	33,000
RUSV 30 105 KS	0.46	30	105	27	10	0.3	111	78.5	117	79	12	68,000	61,000
RUSV 42 086 KS	0.81	42	86	40	14	0.3	92	52.4	98	54	16	76,000	56,000
RUSV 42 102 KS	0.99	42	102	40	14	0.3	108	68.4	114	70	16	95,000	75,000
RUSV 42 126 KS	1.26	42	126	40	14	0.3	132	92.4	138	94	16	122,000	103,000
RUSV 60 134 KS	2.25	60	134	52	20	0.3	133	85	143	86	22	179,000	133,000
RUSV 60 206 KS	3.47	60	206	52	20	0.3	206	158	216	159	22	305,000	265,000

1) If the lubricating nipple is replaced by tube or pipe connections, the thread length must not exceed 6mm.





TOP VIEW

DIMENSION TABLE - Dimensions in mm															
MOUNTING DIMENSIONS									ADJUSTING SCREW AF ₁	LOCKING AND RELEASE SCREW AF ₂	HEIGHT CHANGE			MATCHING LINEAR ROLLER BEARINGS	MATCHING GUIDEWAY
C	E	F	i	P ₁	P ₂	P ₃	d	K			A	ΔH	PER SCREW ROTATION		
5	25	19	4	21	33	9	2.5	M 4	3	2	7	0.37	0.035	RUS 19 069 KS	UG 6628
5	45	19	4	21	53	9	2.5	M 4	3	2	7	0.37	0.023	RUS 19 105 KS	UV 5323 UFA 3210 UFK 3210 UFB 4710
8	23	26	6	29.5	38	14.5	3	M 6	6	3	10	0.52	0.05	RUS 26 086 KS	UG 9741
8	38	26	6	29.5	53	14.5	3	M 6	6	3	10	0.52	0.05	RUS 26 102 KS	UV 7532
8	58	26	6	29.5	73	14.5	3	M 6	6	3	10	0.52	0.05	RUS 26 126 KS	UFA 4710 UFK 4710 UFB 6412
10	45	35	8	41.5	65	18	4	M 8	8	4	15	0.78	0.062	RUS 38 134 KS	UG 12 553
10	115	35	8	41.5	145	18	4	M 8	8	4	15	0.78	0.05	RUS 38 206 KS	UV 9542 UFA 6412 UFK 6412 UFB 7812

Planetary Roller Screw

RGT SERIES

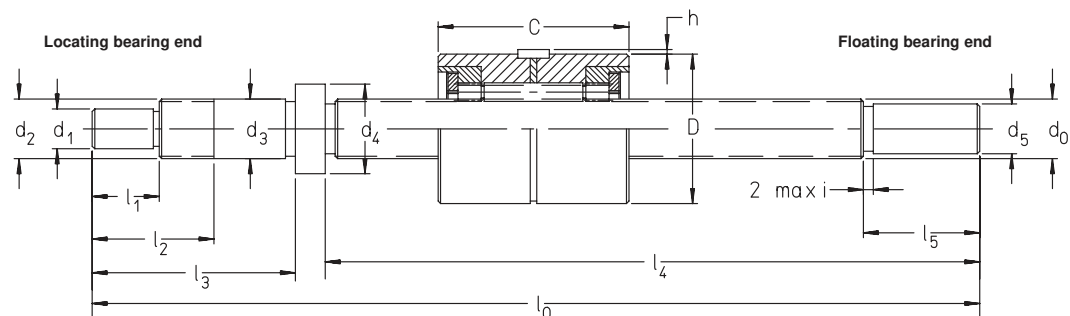
- Split roller nut, preloaded
- Standard ends configuration

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE - Dimensions in mm															
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	STROKE H	MASS kg	DIMENSIONS – SCREW SHAFT										
					d ₁ ISO h6	d ₂	d ₃ −0.005	d ₄	d ₅ ISO h6	l ₀	l ₁	l ₂	l ₃	l ₄	l ₅
5	RGT 5.	1.	25	0.084	5	M6X0.5	6	10	4	113	11	22	34	75	14
	RGT 5.	1.	50	0.088	5	M6X0.5	6	10	4	138	11	22	34	100	14
	RGT 5.	1.	75	0.092	5	M6X0.5	6	10	4	163	11	22	34	125	14
	RGT 5.	1.	100	0.096	5	M6X0.5	6	10	4	188	11	22	34	150	14
8	RGT 8.	1.	25	0.11	5	M6X0.5	6	10	6	120	11	22	34	82	16
	RGT 8.	1.	50	0.121	5	M6X0.5	6	10	6	145	11	22	34	107	16
	RGT 8.	1.	100	0.141	5	M6X0.5	6	10	6	195	11	22	34	157	16
	RGT 8.	1.	150	0.16	5	M6X0.5	6	10	6	245	11	22	34	207	16
	RGT 8.	1.	200	0.18	5	M6X0.5	6	10	6	295	11	22	34	257	16
	RGT 8.	2.	25	0.11	5	M6X0.5	6	10	6	120	11	22	34	82	16
	RGT 8.	2.	50	0.121	5	M6X0.5	6	10	6	145	11	22	34	107	16
	RGT 8.	2.	100	0.141	5	M6X0.5	6	10	6	195	11	22	34	157	16
	RGT 8.	2.	150	0.16	5	M6X0.5	6	10	6	245	11	22	34	207	16
	RGT 8.	2.	200	0.18	5	M6X0.5	6	10	6	295	11	22	34	257	16
	RGT 8.	4.	25	0.11	5	M6X0.5	6	10	6	120	11	22	34	82	16
	RGT 8.	4.	50	0.121	5	M6X0.5	6	10	6	145	11	22	34	107	16
	RGT 8.	4.	100	0.141	5	M6X0.5	6	10	6	195	11	22	34	157	16
	RGT 8.	4.	150	0.16	5	M6X0.5	6	10	6	245	11	22	34	207	16
	RGT 8.	4.	200	0.18	5	M6X0.5	6	10	6	295	11	22	34	257	16
	RGT 8.	5.	25	0.11	5	M6X0.5	6	10	6	120	11	22	34	82	16
	RGT 8.	5.	50	0.121	5	M6X0.5	6	10	6	145	11	22	34	107	16
	RGT 8.	5.	100	0.141	5	M6X0.5	6	10	6	195	11	22	34	157	16
	RGT 8.	5.	150	0.16	5	M6X0.5	6	10	6	245	11	22	34	207	16
	RGT 8.	5.	200	0.18	5	M6X0.5	6	10	6	295	11	22	34	257	16

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.





NUT			KEY TO DIN 6885	LOAD RATINGS		SPRINGS RATIO C_K $N^{2/3} / \mu m$	LIMITING SPEED ¹⁾ n_g grease rpm	LOCATING BEARING	FLOATING BEARING	SEAL	LOCK NUT
D ISO g6	h	C h12		dyn. C N	stat. C ₀ N						
19	1.3	31	3X3X10	5,300	5,400	27	6,000	ZKLN0624.2RS	HK0408TN	G4X8X2	ZM06
19	1.3	31	3X3X10	5,300	5,400	27	6,000	ZKLN0624.2RS	HK0408TN	G4X8X2	ZM06
19	1.3	31	3X3X10	5,300	5,400	27	6,000	ZKLN0624.2RS	HK0408TN	G4X8X2	ZM06
19	1.3	31	3X3X10	5,300	5,400	27	6,000	ZKLN0624.2RS	HK0408TN	G4X8X2	ZM06
21	1.3	31	3X3X10	3,100	3,950	31	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	3,100	3,950	31	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	3,100	3,950	31	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	3,100	3,950	31	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	3,100	3,950	31	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	6,200	4,550	21	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	6,200	4,550	21	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	6,200	4,550	21	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	6,200	4,550	21	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	6,200	4,550	21	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	12,200	4,800	15	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	12,200	4,800	15	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	12,200	4,800	15	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	12,200	4,800	15	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	12,200	4,800	15	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	15,200	4,800	13	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	15,200	4,800	13	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	15,200	4,800	13	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	15,200	4,800	13	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06
21	1.3	31	3X3X10	15,200	4,800	13	5,800	ZKLN0624.2RS	NK6/10TN	G6X12X2	ZM06

Planetary Roller Screw

RGT SERIES

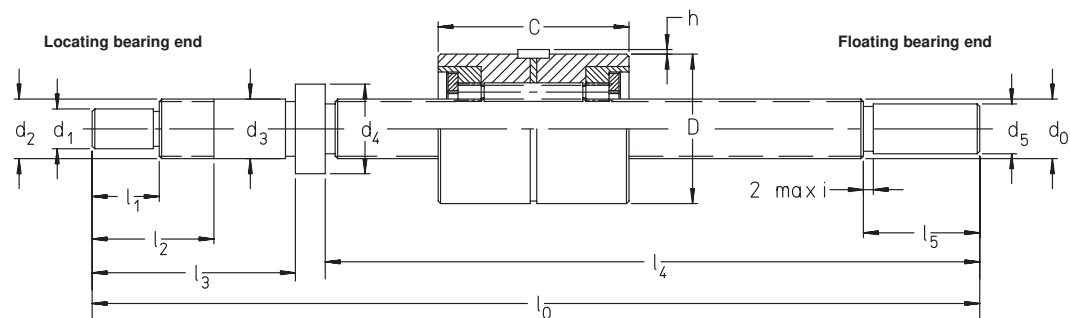
- Split roller nut, preloaded
- Standard ends configuration

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE (Contd.) · Dimensions in mm															
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	STROKE H	MASS kg	DIMENSIONS – SCREW SHAFT										
					d ₁ ISO h6	d ₂	d ₃ −0.005	d ₄	d ₅ ISO h6	l ₀	l ₁	l ₂	l ₃	l ₄	l ₅
12	RGT 12.	1.	100	0.293	10	M12X1	12	18	10	220	20	33	53	161	20
	RGT 12.	1.	200	0.382	10	M12X1	12	18	10	320	20	33	53	261	20
	RGT 12.	1.	300	0.47	10	M12X1	12	18	10	420	20	33	53	361	20
	RGT 12.	1.	400	0.559	10	M12X1	12	18	10	520	20	33	53	461	20
	RGT 12.	1.	500	0.648	10	M12X1	12	18	10	620	20	33	53	561	20
	RGT 12.	2.	100	0.293	10	M12X1	12	18	10	220	20	33	53	161	20
	RGT 12.	2.	200	0.382	10	M12X1	12	18	10	320	20	33	53	261	20
	RGT 12.	2.	300	0.47	10	M12X1	12	18	10	420	20	33	53	361	20
	RGT 12.	2.	400	0.559	10	M12X1	12	18	10	520	20	33	53	461	20
	RGT 12.	2.	500	0.648	10	M12X1	12	18	10	620	20	33	53	561	20
	RGT 12.	4.	100	0.293	10	M12X1	12	18	10	220	20	33	53	161	20
	RGT 12.	4.	200	0.382	10	M12X1	12	18	10	320	20	33	53	261	20
	RGT 12.	4.	300	0.47	10	M12X1	12	18	10	420	20	33	53	361	20
	RGT 12.	4.	400	0.559	10	M12X1	12	18	10	520	20	33	53	461	20
	RGT 12.	4.	500	0.648	10	M12X1	12	18	10	620	20	33	53	561	20
	RGT 12.	5.	100	0.293	10	M12X1	12	18	10	220	20	33	53	161	20
	RGT 12.	5.	200	0.382	10	M12X1	12	18	10	320	20	33	53	261	20
	RGT 12.	5.	300	0.47	10	M12X1	12	18	10	420	20	33	53	361	20
	RGT 12.	5.	400	0.559	10	M12X1	12	18	10	520	20	33	53	461	20
	RGT 12.	5.	500	0.648	10	M12X1	12	18	10	620	20	33	53	561	20

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.





NUT			KEY TO DIN 6885	LOAD RATINGS		SPRING RATIO C_K $N^{2/3} / \mu m$	LIMITING SPEED ¹⁾ n_g grease rpm	LOCATING BEARING		FLOATING BEARING	SEAL	LOCK NUT
D ISO g6	h	C h12		dyn. C_N	stat. C_0 N							
32	1.7	31	4X4X14	3,700	6,400	38	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
32	1.7	31	4X4X14	3,700	6,400	38	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
32	1.7	31	4X4X14	3,700	6,400	38	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
32	1.7	31	4X4X14	3,700	6,400	38	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
32	1.7	31	4X4X14	3,700	6,400	38	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	4,900	5,000	27	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	4,900	5,000	27	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	4,900	5,000	27	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	4,900	5,000	27	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	4,900	5,000	27	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	9,700	5,500	19	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	9,700	5,500	19	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	9,700	5,500	19	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	9,700	5,500	19	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	9,700	5,500	19	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	12,100	5,500	17	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	12,100	5,500	17	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	12,100	5,500	17	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	12,100	5,500	17	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12
26	2	31	4X4X14	12,100	5,500	17	5,600	ZKLN1242.2RS	ZKLF1255.2RS	NK10/12TN	G10X17X3	ZM12

Planetary Roller Screw

RGT SERIES

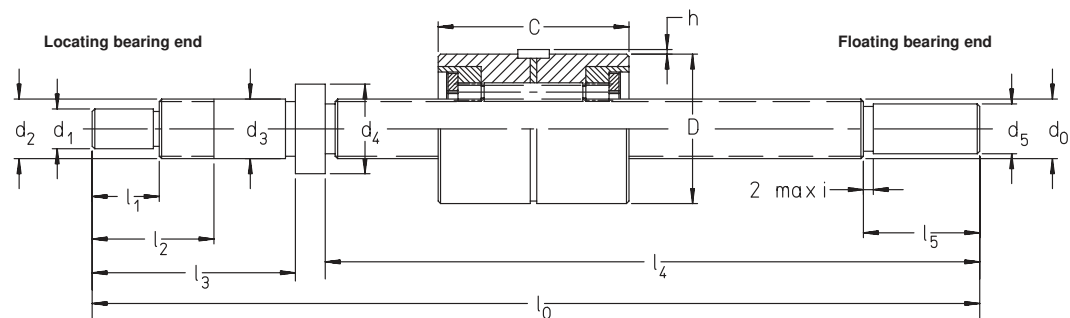
- Split roller nut, preloaded
- Standard ends configuration

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DIMENSION TABLE (Contd.) · Dimensions in mm															
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	STROKE H	MASS kg	DIMENSIONS – SCREW SHAFT										
					d ₁ ISO h6	d ₂	d ₃ −0.005	d ₄	d ₅ ISO h6	l ₀	l ₁	l ₂	l ₃	l ₄	l ₅
15	RGT 15.	2.	100	0.501	12	M15X1	15	22	12	224	20	31	53	165	20
	RGT 15.	2.	200	0.64	12	M15X1	15	22	12	324	20	31	53	265	20
	RGT 15.	2.	300	0.779	12	M15X1	15	22	12	424	20	31	53	365	20
	RGT 15.	2.	400	0.917	12	M15X1	15	22	12	524	20	31	53	465	20
	RGT 15.	2.	500	1.056	12	M15X1	15	22	12	624	20	31	53	565	20
	RGT 15.	2.	600	1.195	12	M15X1	15	22	12	724	20	31	53	665	20
	RGT 15.	4.	100	0.501	12	M15X1	15	22	12	224	20	31	53	165	20
	RGT 15.	4.	200	0.64	12	M15X1	15	22	12	324	20	31	53	265	20
	RGT 15.	4.	300	0.779	12	M15X1	15	22	12	424	20	31	53	365	20
	RGT 15.	4.	400	0.917	12	M15X1	15	22	12	524	20	31	53	465	20
	RGT 15.	4.	500	1.056	12	M15X1	15	22	12	624	20	31	53	565	20
	RGT 15.	4.	600	1.195	12	M15X1	15	22	12	724	20	31	53	665	20
	RGT 15.	5.	100	0.501	12	M15X1	15	22	12	224	20	31	53	165	20
	RGT 15.	5.	200	0.64	12	M15X1	15	22	12	324	20	31	53	265	20
	RGT 15.	5.	300	0.779	12	M15X1	15	22	12	424	20	31	53	365	20
	RGT 15.	5.	400	0.917	12	M15X1	15	22	12	524	20	31	53	465	20
	RGT 15.	5.	500	1.056	12	M15X1	15	22	12	624	20	31	53	565	20
	RGT 15.	5.	600	1.195	12	M15X1	15	22	12	724	20	31	53	665	20

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.





NUT			KEY TO DIN 6885	BASIC LOAD RATINGS		SPRING RATIO C_K $N^{2/3} / \mu m$	LIMITING SPEED ¹⁾ n_g grease rpm	LOCATING BEARING		FLOATING BEARING	SEAL	LOCK NUT
D ISO g6	h	C h12		dyn. C_N	stat. C_0 N							
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	6,100	8,000	34	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	12,200	8,900	24	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
34	1.7	35	4X4X14	15,200	9,100	21	5,500	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15

Planetary Roller Screw

RGT SERIES

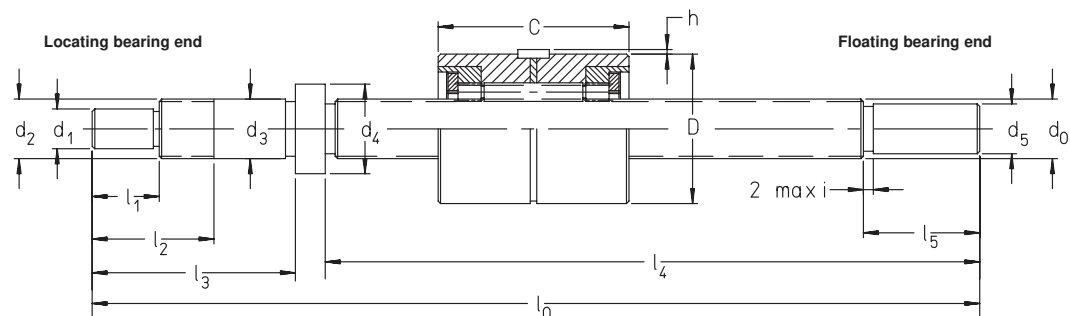
- Split roller nut, preloaded
- Standard ends configuration

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For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

DIMENSION TABLE (Contd.) · Dimensions in mm															
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	STROKE H	MASS kg	DIMENSIONS – SCREW SHAFT										
					d ₁ ISO h6	d ₂	d ₃ −0.005	d ₄	d ₅ ISO h6	l ₀	l ₁	l ₂	l ₃	l ₄	l ₅
20	RGT 20.	2.	400	1.713	12	M15X1	15	22	12	546	20	31	53	487	20
	RGT 20.	2.	500	1.96	12	M15X1	15	22	12	646	20	31	53	587	20
	RGT 20.	2.	600	2.207	12	M15X1	15	22	12	746	20	31	53	687	20
	RGT 20.	2.	800	2.7	12	M15X1	15	22	12	946	20	31	53	887	20
	RGT 20.	2.	1000	3.193	12	M15X1	15	22	12	1146	20	31	53	1087	20
	RGT 20.	2.	1200	3.686	12	M15X1	15	22	12	1346	20	31	53	1287	20
	RGT 20.	4.	400	1.713	12	M15X1	15	22	12	546	20	31	53	487	20
	RGT 20.	4.	500	1.96	12	M15X1	15	22	12	646	20	31	53	587	20
	RGT 20.	4.	600	2.207	12	M15X1	15	22	12	746	20	31	53	687	20
	RGT 20.	4.	800	2.7	12	M15X1	15	22	12	946	20	31	53	887	20
	RGT 20.	4.	1000	3.193	12	M15X1	15	22	12	1146	20	31	53	1087	20
	RGT 20.	4.	1200	3.686	12	M15X1	15	22	12	1346	20	31	53	1287	20
	RGT 20.	5.	400	1.713	12	M15X1	15	22	12	546	20	31	53	487	20
	RGT 20.	5.	500	1.96	12	M15X1	15	22	12	646	20	31	53	587	20
	RGT 20.	5.	600	2.207	12	M15X1	15	22	12	746	20	31	53	687	20
	RGT 20.	5.	800	2.7	12	M15X1	15	22	12	946	20	31	53	887	20
	RGT 20.	5.	1000	3.193	12	M15X1	15	22	12	1146	20	31	53	1087	20
	RGT 20.	5.	1200	3.686	12	M15X1	15	22	12	1346	20	31	53	1287	20
	RGT 20.	6.	400	1.713	12	M15X1	15	22	12	546	20	31	53	487	20
	RGT 20.	6.	500	1.96	12	M15X1	15	22	12	646	20	31	53	587	20
	RGT 20.	6.	600	2.207	12	M15X1	15	22	12	746	20	31	53	687	20
	RGT 20.	6.	800	2.7	12	M15X1	15	22	12	946	20	31	53	887	20
	RGT 20.	6.	1000	3.193	12	M15X1	15	22	12	1146	20	31	53	1087	20
	RGT 20.	6.	1200	3.686	12	M15X1	15	22	12	1346	20	31	53	1287	20

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.



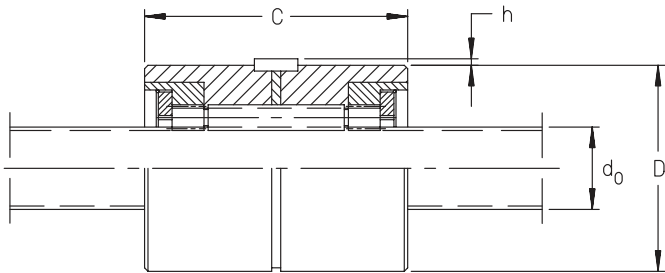


NUT			KEY TO DIN 6885	LOAD RATINGS		SPRING RATIO C_K $N^{2/3} / \mu m$	LIMITING SPEED ¹⁾ n_g grease rpm	LOCATING BEARING		FLOATING BEARING	SEAL	LOCK NUT
D ISO g6	h	C h12		dyn. C_N	stat. C_0 N							
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	10,900	21,800	61	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	21,700	25,000	42	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	27,000	26,000	38	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15
42	1.7	55	4X4X18	32,500	26,500	34	5,200	ZKLN1545.2RS	ZKLF1560.2RS	NK12/12TN	G12X19X3	ZM15

Planetary Roller Screw

RGT SERIES

- Split roller nut, preloaded
- Special ends configuration*)



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

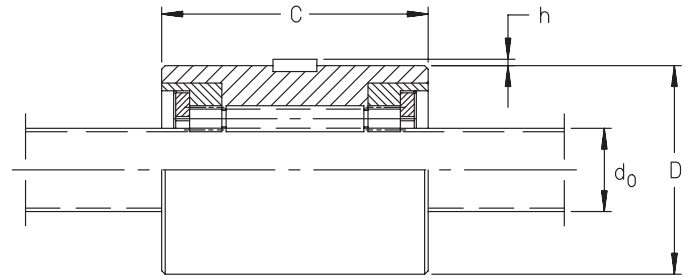
DIMENSION TABLE · Dimensions in mm											
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	NUT DIMENSIONS			KEY TO DIN 6885	SPRING RATIO C _K N ^{2/3} / μm	LIMITING SPEED ¹⁾ n _g grease rpm	LOAD RATINGS		
			D ISO g6	h	C h12				dyn. C N	stat. C ₀ N	
24	RGT 24.	2	48	1.7	55	4X4X18	75	5,000	13,200	32,000	
	RGT 24.	4	48	1.7	55	4X4X18	52	5,000	26,000	37,500	
	RGT 24.	5	48	1.7	55	4X4X18	46	5,000	32,500	39,000	
	RGT 24.	6	48	1.7	55	4X4X18	42	5,000	39,000	40,000	
27	RGT 27.	2	55	1.7	55	4X4X18	76	4,900	13,400	35,000	
	RGT 27.	4	55	1.7	55	4X4X18	53	4,900	26,500	41,500	
	RGT 27.	5	55	1.7	55	4X4X18	47	4,900	33,000	43,000	
	RGT 27.	6	55	1.7	55	4X4X18	43	4,900	39,500	44,500	
	RGT 27.	8	55	1.7	55	4X4X18	37	4,900	53,000	45,500	
30	RGT 30.	2	62	1.7	55	5X5X22	78	4,700	13,500	38,000	
	RGT 30.	4	62	1.7	55	5X5X22	54	4,700	27,000	45,000	
	RGT 30.	5	62	1.7	55	5X5X22	48	4,700	33,500	47,000	
	RGT 30.	6	62	1.7	55	5X5X22	44	4,700	40,000	48,500	
	RGT 30.	8	62	1.7	55	5X5X22	38	4,700	53,000	50,000	
36	RGT 36.	2	75	1.7	68	5X5X22	108	4,400	18,300	65,000	
	RGT 36.	4	75	1.7	68	5X5X22	74	4,400	36,000	78,000	
	RGT 36.	5	75	1.7	68	5X5X22	65	4,400	45,000	82,000	
	RGT 36.	6	75	1.7	68	5X5X22	59	4,400	54,000	85,000	
	RGT 36.	8	75	1.7	68	5X5X22	51	4,400	72,000	89,000	
39	RGT 39.	2	80	1.7	72	5X5X25	117	4,200	19,800	76,000	
	RGT 39.	4	80	1.7	72	5X5X25	80	4,200	39,500	92,000	
	RGT 39.	5	80	1.7	72	5X5X25	71	4,200	49,000	97,000	
	RGT 39.	10	80	1.7	72	5X5X25	56	4,200	97,000	109,000	
48	RGT 48.	5	96	2.7	95	6X6X40	91	3,800	62,000	155,000	
	RGT 48.	10	96	2.7	95	6X6X40	63	3,800	124,000	178,000	
63	RGT 63.	5	118	3.5	115	8X7X45	116	3,000	78,000	250,000	
	RGT 63.	10	118	3.5	115	8X7X45	80	3,000	155,000	295,000	

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.
 *) Available on request.



Planetary Roller Screw RGT SERIES

- One-piece roller nut, not preloaded
- Special ends configuration*)



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

DIMENSION TABLE · Dimensions in mm											
NOMINAL DIAMETER d ₀	PART NUMBER d ₀	PITCH P	NUT DIMENSIONS			KEY TO DIN 6885	SPRING RATIO C _K N ^{2/3} / μm	LIMITING SPEED ¹⁾ n _g grease rpm	LOAD RATINGS		
			D ISO g6	h	C h12				dyn. C N	stat. C ₀ N	
24	RGT	24.	2	48	1.7	55	4X4X18	124	5,000	22,400	69,000
	RGT	24.	4	48	1.7	55	4X4X18	86	5,000	44,500	80,000
	RGT	24.	5	48	1.7	55	4X4X18	64	5,000	55,000	83,000
	RGT	24.	6	48	1.7	55	4X4X18	69	5,000	66,000	85,000
27	RGT	27.	2	55	1.7	55	4X4X18	127	4,900	22,700	75,000
	RGT	27.	4	55	1.7	55	4X4X18	87	4,900	45,000	88,000
	RGT	27.	5	55	1.7	55	4X4X18	78	4,900	56,000	92,000
	RGT	27.	6	55	1.7	55	4X4X18	71	4,900	67,000	94,000
	RGT	27.	8	55	1.7	55	4X4X18	61	4,900	89,000	98,000
30	RGT	30.	2	62	1.7	55	5X5X22	130	4,700	23,000	81,000
	RGT	30.	4	62	1.7	55	5X5X22	89	4,700	45,500	96,000
	RGT	30.	5	62	1.7	55	5X5X22	79	4,700	57,000	100,000
	RGT	30.	6	62	1.7	55	5X5X22	72	4,700	68,000	103,000
	RGT	30.	8	62	1.7	55	5X5X22	62	4,700	90,000	107,000
36	RGT	36.	2	75	1.7	68	5X5X22	176	4,400	31,000	136,000
	RGT	36.	4	75	1.7	68	5X5X22	121	4,400	61,000	165,000
	RGT	36.	5	75	1.7	68	5X5X22	107	4,400	76,000	173,000
	RGT	36.	6	75	1.7	68	5X5X22	97	4,400	91,000	179,000
	RGT	36.	8	75	1.7	68	5X5X22	84	4,400	121,000	188,000
39	RGT	39.	2	80	1.7	72	5X5X25	191	4,200	33,000	159,000
	RGT	39.	4	80	1.7	72	5X5X25	131	4,200	66,000	193,000
	RGT	39.	5	80	1.7	72	5X5X25	116	4,200	82,000	203,000
	RGT	39.	10	80	1.7	72	5X5X25	91	4,200	163,000	228,000
48	RGT	48.	5	96	2.7	95	6X6X40	148	3,800	104,000	320,000
	RGT	48.	10	96	2.7	95	6X6X40	103	3,800	206,000	370,000
63	RGT	63.	5	118	3.5	115	8X7X45	188	3,000	129,000	520,000
	RGT	63.	10	118	3.5	115	8X7X45	129	3,000	255,000	610,000

1) Limiting speed of the planetary roller screw. Critical speed n_{max} and limiting speed of the rolling bearings should be considered.

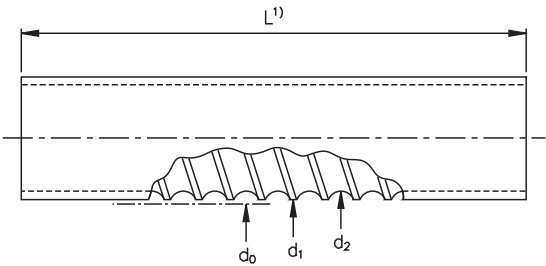
*) Available on request.



Rolled Ball Screws

SERIES KGS

- Metric dimensions
- High strength steel Cf53 (SAE1055)
- Induction hardened to 60 HRC
- Gothic arch thread form

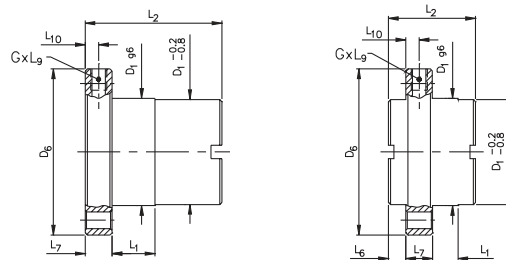


For details on part numbers, descriptive suffixes and various technical references, please refer to front
 For engineering or technical information contact your local sales representative or call Distributor Sales

NOMINAL PITCH DIAMETER d ₀	DESIGNATION	ACCURACY CLASS (µm/300 mm)	d ₀ mm	Lead P mm	d ₁ mm	d ₂ mm	NUMBER OF STARTS	L _{max} ¹⁾ mm	MASS (kg/m)
16	KGS 1605	23 / 50	16	5	15.5	12.9	1	5600	1.26
	KGS 1610	23 / 50	16	10	15.4	13.0	2	5600	1.26
20	KGS 2005	23 / 50	20	5	19.5	16.9	1	5600	2.04
	KGS 2020	23 / 50	20	20	19.5	16.9	4	5600	2.07
	KGS 2050	23 / 50	20	50	19.1	16.5	5	5600	2.04
25	KGS 2505	23 / 50	25	5	24.5	21.9	1	5600	3.33
	KGS 2510	23 / 50	25	10	24.5	21.9	1	5600	3.33
	KGS 2520	23 / 50	25	20	24.6	22.0	4	5600	3.33
	KGS 2525	23 / 50	25	25	24.5	22.0	5	5600	3.33
	KGS 2550	23 / 50	25	50	24.5	21.5	5	5600	3.33
32	KGS 3205	23 / 50	32	5	31.5	28.9	1	5600	5.61
	KGS 3210	23 / 50	32	10	31.7	27.3	1	5600	5.60
	KGS 3220	23 / 50	32	20	31.7	27.9	2	5600	5.61
	KGS 3240	23 / 50	32	40	30.9	28.3	4	5600	5.61
40	KGS 4005	23 / 50	40	5	39.5	36.9	1	5600	9.03
	KGS 4010	23 / 50	40	10	39.5	34.1	2	5600	8.33
	KGS 4020	23 / 50	40	20	39.7	35.9	2	5600	9.01
	KGS 4040	23 / 50	40	40	38.9	36.3	4	5600	9.01
50	KGS 5010	50	50	10	49.5	44.1	1	5600	13.48
	KGS 5020	50	50	20	49.5	44.1	2	5600	13.50
63	KGS 6310	50	63	10	62.5	57.1	1	5600	22.04
	KGS 6320	50	63	20	62.5	57.1	2	5600	22.03



- Metric dimensions
- Flange mounting
- Optimized internal ball return systems
- Buna contact seals
- Threaded lubrication port
- 3000 rpm speed limit

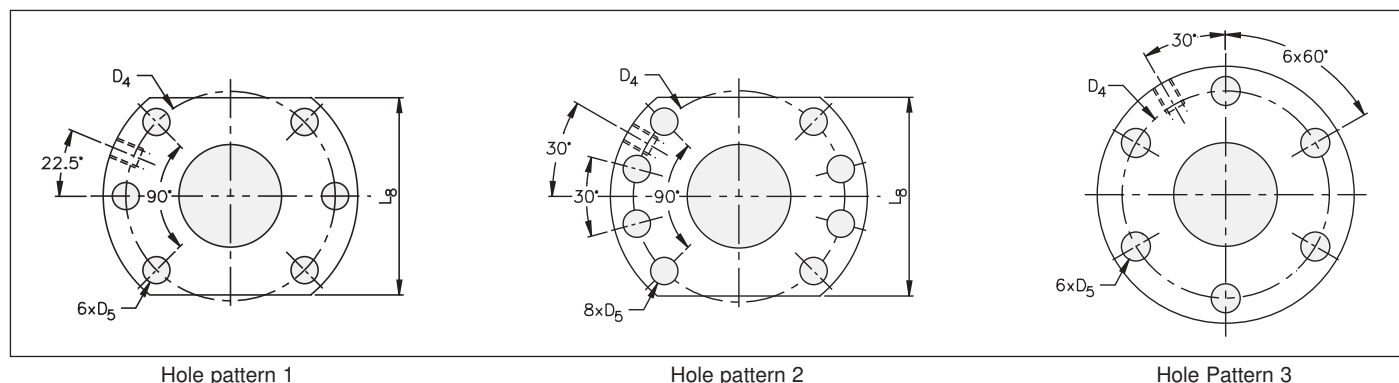


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NOMINAL PITCH DIAMETER d ₀	DESIGNATION d ₀ LEAD	SEAL SUFFIX	FORM	HOLE PATTERN	D ₁	D ₄	D ₅	D ₆	L ₁	L ₂	L ₆	L ₇	L ₈	L ₉	L ₁₀	LUBE HOLE G	AXIAL BACKLASH MAX	LOAD RATINGS	
					mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm			DYN C (kN)	STAT C (kN)
16	KGF D 16 05	EE	E	1	28	38	5.5	48	10	42	-	10	40	10	5	M6	0.08	12.0	12.7
	KGF D 16 10	EE	E	1	28	38	5.5	48	10	55	-	10	40	10	5	M6	0.08	23.0	26.0
20	KGF N 20 05	EE	E	3	32	45	7	55	8	44	-	12	-	8	6	M6	0.08	14.0	17.0
	KGF N 20 20	EE	S	3	35	50	7	62	4	30	8	10	-	8	5	M6	0.08	12.0	19.2
	KGF N 20 50	EE	S	3	35	50	7	62	10	56	9	10	-	8	5	M6	0.15	18.0	22.0
25	KGF D 25 05	EE	E	1	40	51	6.6	62	10	42	-	10	48	10	5	M6	0.08	15.0	22.4
	KGF D 25 10	EE	E	1	40	51	6.6	62	16	55	-	10	48	10	5	M6	0.08	17.5	25.0
	KGF D 25 20	EE	S	1	40	51	6.6	62	4	35	10.5	10	48	8	5	M6	0.15	19.0	23.5
	KGF D 25 25	EE	S	1	40	51	6.6	62	9	35	8	10	- ¹⁾	8	5	M6	0.08	21.0	31.0
	KGF D 25 50	EE	S	1	40	51	6.6	62	10	58	10.5	10	48	8	5	M6	0.15	22.5	29.0
32	KGF N 32 05	EE	E	3	45	58	7	70	10	59	-	16	-	8	8	M6	0.08	24.0	49.0
	KGF N 32 10	EE	E	3	53	68	7	80	10	73	-	16	-	8	8	M8x1	0.08	44.0	53.0
	KGF D 32 20	EE	E	1	53	65	9	80	16	80	-	12	62	10	6	M6	0.08	42.5	61.0
	KGF N 32 40	EE	S	3	53	68	7	80	14	45	7.5	16	-	10	8	M6	0.08	17.0	32.0
40	KGF D 40 05	EE	E	2	63	78	9	93	10	57	-	14	70	10	7	M6	0.08	26.0	63.5
	KGF D 40 10	EE	E	2	63	78	9	95	16	71	-	14	70	10	7	M8x1	0.08	50.0	70.0
	KGF D 40 20	EE	E	2	63	78	9	93	16	80	-	14	70	10	7	M8x1	0.08	44.5	77.0
	KGF D 40 40	EE	S	2	63	78	9	93	16	85	7.5	14	- ¹⁾	10	7	M8x1	0.08	42.0	93.0
50	KGF D 50 10	EE	E	2	75	93	11	110	16	95	-	16	85	10	8	M8x1	0.08	78.0	153.0
	KGF D 50 20	EE	E	2	85	103	11	125	22	95	-	18	95	10	9	M8x1	0.08	82.0	137.0
63	KGF D 63 10	EE	E	2	90	108	11	125	16	97	-	18	95	10	9	M8x1	0.08	86.0	200.0
	KGF D 63 20	EE	E	2	95	115	13.5	135	25	99	-	20	100	10	10	M8x1	0.08	85.0	170.0

Notes

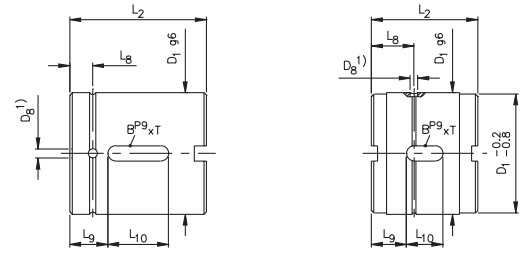
1) Round flange.



Cylindrical Ball Nuts

SERIES KGM

- Metric dimensions
- Cylindrical mounting
- Optimized internal ball return systems
- Buna contact seals
- Radial lubrication hole and groove
- 3000 rpm speed limit



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

NOMINAL PITCH DIAMETER d_0	DESIGNATION d_0 LEAD	SEAL SUFFIX	FORM	D_1 mm	$D_8^{(1)}$ mm	L_2 mm	L_8 mm	L_9 mm	L_{10} mm	BxT	AXIAL BACKLASH MAX	LOAD RATINGS	
												DYN C (kN)	STAT C (kN)
16	KGM D 16 05	EE	E	28	3	34	7	7	20	5x2	0.08	12.5	12.7
	KGM D 16 10	EE	E	28	3	50	7	15	20	5x2	0.08	23.0	26.0
20	KGM N 20 05	EE	E	32	3	34	7	7	20	5x2	0.08	14.0	17.0
	KGM N 20 20	EE	S	35	1.5	30	11.5	9	12	5x3	0.08	12.0	19.2
	KGM N 20 50	EE	S	35	1.5	56	16	18	20	5x3	0.15	18.0	22.0
25	KGM D 25 05	EE	E	40	3	34	7	7	20	5x2	0.08	15.0	22.4
	KGM D 25 10	EE	E	40	3	45	7.5	12.5	20	5x2	0.08	17.5	25.0
	KGM D 25 20	EE	S	40	1.5	35	14	11.5	12	5x3	0.15	19.0	23.5
	KGM D 25 25	EE	S	40	1.5	35	11.5	11	13	5x3	0.08	21.0	31.0
	KGM D 25 50	EE	S	40	1.5	58	17	19	20	5x3	0.15	22.5	29.0
32	KGM N 32 05	EE	E	45	3	45	7.5	8	30	6x2.5	0.08	24.0	49.0
	KGM N 32 10	EE	E	53	4	60	10	15	30	6x2.5	0.08	44.0	53.0
	KGM N 32 20	EE	E	53	3	70	7.5	20	30	6x2.5	0.08	42.5	61.0
	KGM N 32 40	EE	S	53 ⁽²⁾	1.5	45	13	10	25	6x4	0.08	17.0	32.0
40	KGM D 40 05	EE	E	63	3	45	7.5	8	30	6x2.5	0.08	26.0	63.5
	KGM D 40 10	EE	E	63	4	60	10	15	30	6x2.5	0.08	50.0	70.0
	KGM D 40 20	EE	E	63	3	70	7.5	20	30	6x2.5	0.08	44.5	77.0
	KGM D 40 40	EE	S	63	1.5	85	15	27.5	30	6x3.5	0.08	42.0	93.0
50	KGM D 50 10	EE	E	75	4	82	11	23	36	6x2.5	0.08	78.0	153.0
	KGM N 50 20	EE	E	85	4	82	10	23	36	6x2.5	0.08	82.0	137.0
63	KGM D 63 10	EE	E	90	4	82	11	23	36	6x2.5	0.08	86.0	200.0
	KGM D 63 20	EE	E	95	4	82	10	23	36	6x2.5	0.08	85.0	170.0

Notes

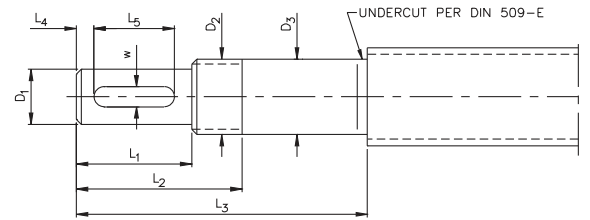
1) Position of lubrication hole not defined on circumference.

2) D1 -0.2/-0.8 is D1 -1/-1.5

Standard Screw Ends

FORM D

- “Fixed” drive end support configuration
- Designed for INA ballscrew support bearings and locknuts
- Locknut threads to 6g tolerance class
- Standard metric keyways

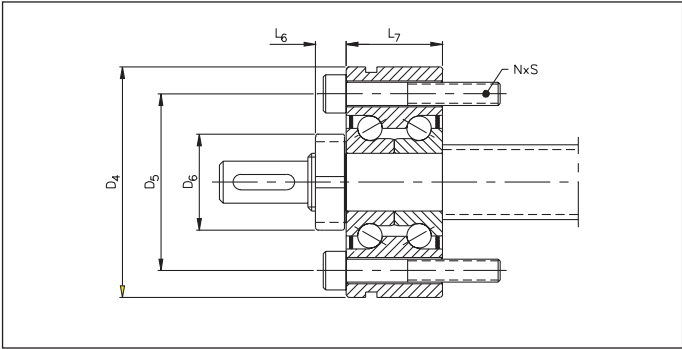


For details on part numbers, descriptive suffixes and various technical references, please refer to front
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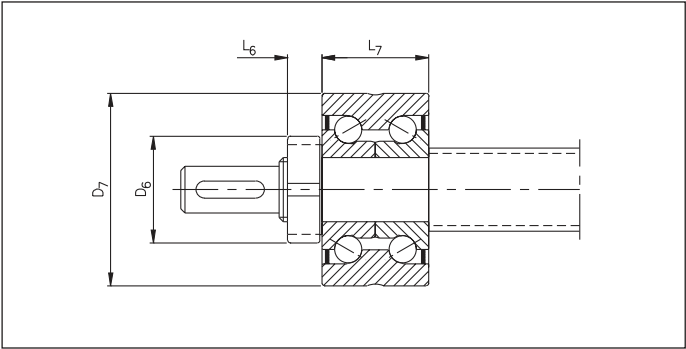
NOMINAL PITCH DIAMETER d ₀	D ₁ ^{k6} mm	D ₂ mm	D ₃ ^{k6} mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₄ mm	KEYWAY TO DIN 6885 w x depth x L ₅
16	9	M12x1	12	20	30	55	2.5	3 x 1.8 x 16
20	11	M15x1	15	23	33	58	3.5	4 x 2.5 x 16
25	14	M20x1	20	30	42	70	4	5 x 3 x 22
32	19	M25x1.5	25	40	54	82	6	6 x 3.5 x 28
40	24	M30x1.5	30	50	64	92	7	8 x 4 x 36

NOMINAL PITCH DIAMETER d ₀	D ₄ mm	D ₅ mm	D ₆ mm	D ₇ mm	L ₆ mm	L ₇ mm	N x S mm	BEARING		LOCKNUT	MAX. AXIAL LOAD (kN)
16	55	42	22	42	8	25	3 x M6	ZKLF 1255.2RS	ZKLN 1242.2RS	ZM12	12
20	60	46	25	45	8	25	3 x M6	ZKLF 1560.2RS	ZKLN 1545.2RS	ZM15	14
25	68	53	32	52	10	28	4 x M6	ZKLF 2068.2RS	ZKLN 2052.2RS	ZM20	16
32	75	58	38	57	12	28	4 x M6	ZKLF 2575.2RS	ZKLN 2557.2RS	ZM25	20
40	80	63	45	62	12	28	6 x M6	ZKLF 3080.2RS	ZKLN 3062.2RS	ZM30	22

Notes
 Bearings and locknut must be ordered separately. For more information, see INA publication ZAE.



Form D with 2KLF and 2M



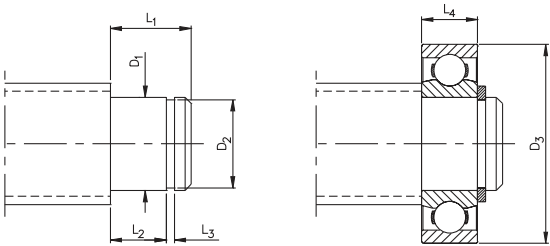
Form D with 2KLN and 2M



Standard Screw Ends

FORM W AND N AND Z

- Radial end support configurations W & N
- Designed for INA bearings and retaining rings
- Form Z - cut and chamfer only



Form W

For details on part numbers, descriptive suffixes and various technical references, please refer to front
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Form W

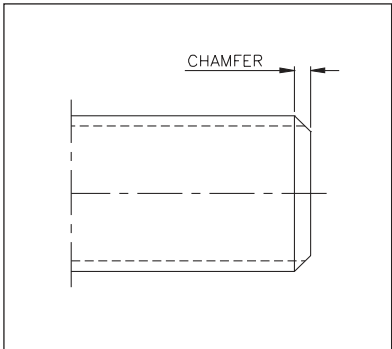
NOMINAL PITCH DIAMETER d_0	D_1^{k6} mm	D_2 mm	D_3 mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	BEARING	SHAFT RING PER DIN 471
16	12	11.5	28	12	8	1.1	8	6001 2RS	12x1
20	15	14.2	32	13	9	1.3	9	6002 2RS	15x1
25	20	18.8	42	16	12	1.3	12	6004 2RS	20x1.2
32	25	23.7	52	20	15	1.3	15	6205 2RS	25x1.2
40	30	28.6	62	21	16	1.6	16	6206 2RS	30x1.5
50	40	38.5	80	25	18	1.85	18	6208 2RS	40x1.75
63	55	52	100	29	21	2.15	21	6211 2RS	55x2

Notes
Bearings must be ordered separately. For more information, see INA publication 517.
Shaft rings not included.

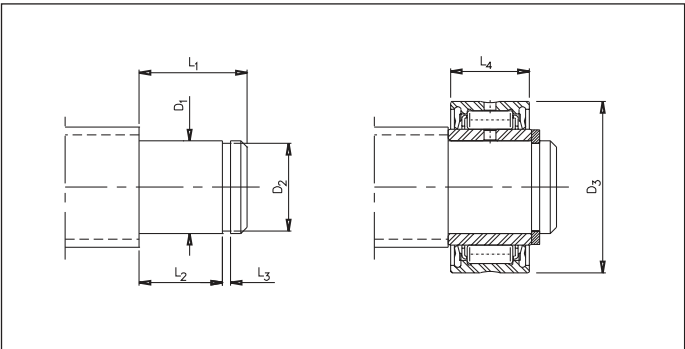
Form N

NOMINAL PITCH DIAMETER d_0	D_1^{k6} mm	D_2 mm	D_3 mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	INA NEEDLE ROLLER BEARING	INA SNAP RING
16	12	11.5	24	18	14	1.1	13	NA 4901 2RS	WR 12
20	15	14.4	28	18	14	1.3	13	NA 4902 2RS	WR 15
25	20	19.2	37	22	18	1.3	17	NA 4904 2RS	WR 20
32	25	24	42	23	18	1.3	17	NA 4905 2RS	WR 25
40	30	29	47	23	18	1.6	17	NA 4906 2RS	WR 30
50	40	38.5	62	30	23	1.6	22	NA 4908 2RS	WR 40
63	50	48.5	62	30.5	23	1.6	22	NA 4910 2RS	WR 50

Notes
Bearings must be ordered separately. For more information, see INA publication 517.
Shaft rings not included.



Form Z



Form N

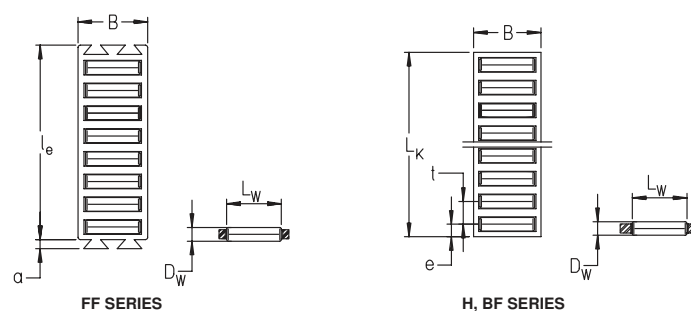


INA-HYDREL

Flat Cage Assemblies

FF, H, BF, HR SERIES

- Single row

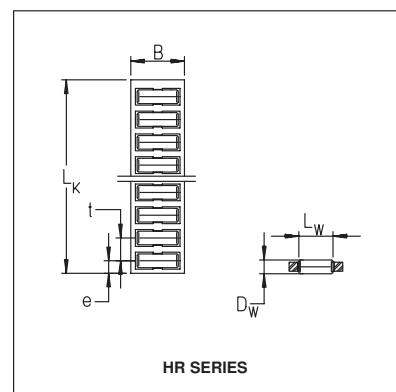


For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

or Linear Sales

PART NUMBER				WGT.	B	D _w	L _w	t	e	a	L _k max.	l ₃	Z _e ROLLERS PER CAGE	DYN. LOAD PER 10 ROLLERS C	STAT. LOAD PER 10 ROLLERS C ₀
				g/L _k =1000 mm	mm	mm	mm	mm	mm	mm	mm	mm	Number	N	N
FF2010	—	—	—	46	10	2	6.8	—	—	2	—	32	7	11800	28000
—	H10	—	—	63	10	2	6.8	4.5	3.5	—	3000	—	—	11800	28000
FF2515	—	—	—	84	15	2.5	9.8	—	—	2.5	—	45	8	21200	52000
—	H15	—	—	120	15	2.5	9.8	5	3.5	—	3000	—	—	21200	52000
FF3020	—	—	—	148	20	3	13.8	—	—	3	—	60	9	35500	88000
—	H20	—	—	202	20	3	13.8	6	4.5	—	3000	—	—	35500	88000
—	—	BF3020	—	342	20	3	15.8	6	4.5	—	2000	—	—	39500	102000
FF3525	—	—	—	221	25	3.5	17.8	—	—	3	—	75	10	53000	132000
—	H25	—	—	294	25	3.5	17.8	7	5	—	3000	—	—	53000	132000
—	—	BF5015	—	375	15	5	11.8	8	5.5	—	2000	—	—	60000	123000
—	—	BF5023	—	530	23	5	19.8	8	5.5	—	2000	—	—	91000	211000
—	—	BF5032	—	722	32	5	27.8	8	5.5	—	2000	—	—	119000	300000
—	—	—	HR50	105	10.5	5	5	10	6.5	—	3000	—	—	30000	51000
—	—	BF7028	—	875	28	7	24	11	7.5	—	2000	—	—	165000	365000
—	—	BF7035	—	1080	35	7	30	11	7.5	—	2000	—	—	197000	455000
—	—	—	HR70	295	17	7	10	13	8.5	—	3000	—	—	82000	148000
—	—	—	HR100	598	24	10	14	17	10	—	3000	—	—	169000	295000
—	—	BF12022	—	1220	22	12	18	16	10	—	2000	—	—	260000	460000
—	—	BF12040	—	1970	40	12	36	16	10	—	2000	—	—	455000	930000



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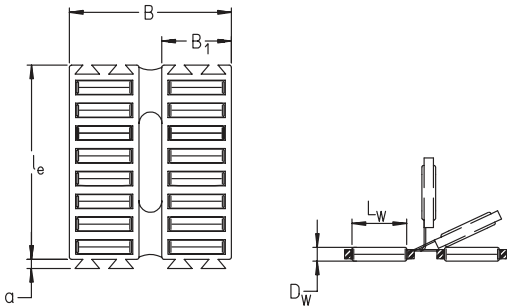


INA-HYDREL

Flat Cage Assemblies

FF.ZW, H.ZW, HR.ZW SERIES

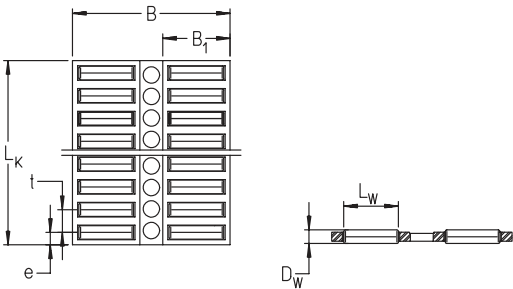
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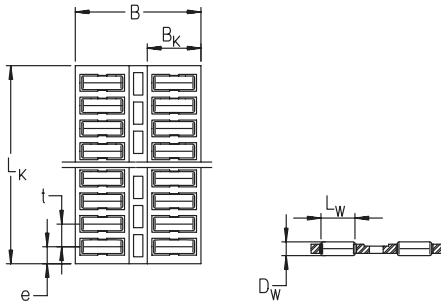
FF.ZW SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales

PART NUMBER			WGT.	B	B ₁	D _w	L _w	t	e	a	L _k max.	l ₃	Z _e ROLLERS PER CAGE	DYN. LOAD PER 10 ROLLERS C	STAT. LOAD PER 10 ROLLERS C ₀
			g/L _K =1000 mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Number	N	N
FF 2025 ZWA	–	–	94	25	10	2	6.8	–	–	2	–	32	7	20200	56000
–	H 24 ZW	–	138	24	10.5	2	6.8	4.5	3.5	–	3000	–	–	20200	56000
FF 2535 ZW	–	–	182	35	15	2.5	9.8	–	–	2.4	–	45	8	36500	103000
–	H 34 ZW	–	239	33.5	14.3	2.5	9.8	5.5	4	–	3000	–	–	36500	103000
FF 3045 ZW	–	–	315	45	20	3	13.8	–	–	3	–	60	9	61000	177000
–	H 44 ZW	–	408	44	19	3	13.8	6	4.5	–	3000	–	–	61000	177000
FF 3555 ZW	–	–	464	55	25	3.5	17.8	–	–	3.2	–	75	10	90000	265000
–	H 55 ZW	–	598	55	24	3.5	17.8	7	5	–	3000	–	–	90000	265000
–	–	HR 50 ZW	215	24	10.5	5	5	10	6.5	–	3000	–	–	51000	101000
–	–	HR 70 ZW	602	40	17	7	10	13	8.5	–	3000	–	–	141000	295000
–	–	HR 100 ZW	1233	55	24	10	14	17	10	–	3000	–	–	290000	590000



H.ZW SERIES



HR.ZW SERIES

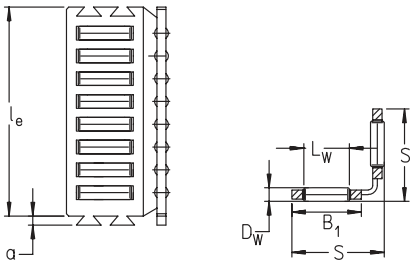


INA-HYDREL

Angled Flat Cage Assemblies

FFW, HW, HRW SERIES

- Double row with 90° bend



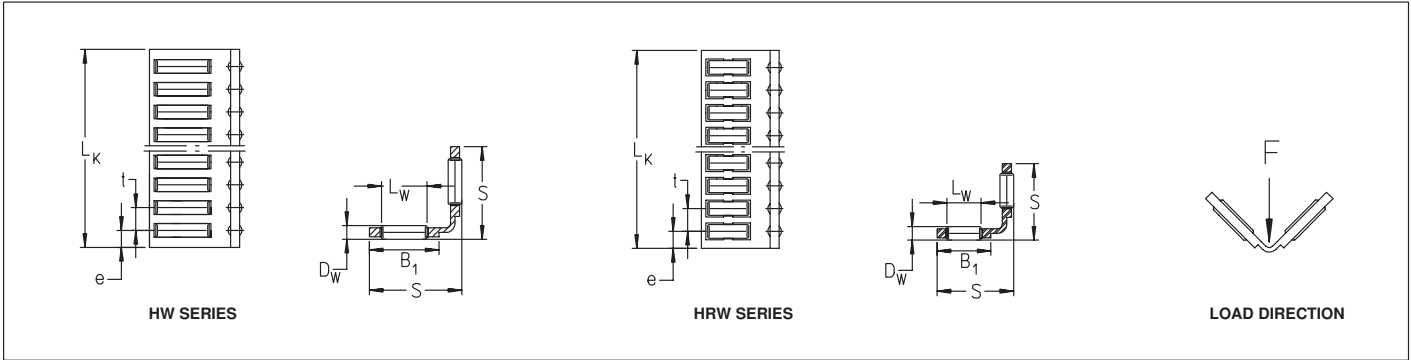
FFW SERIES

For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales or Linear Sales .

PART NUMBER			WGT.	S	B ₁	D _w	L _w	t	e	a	L _k max.	I ₃	Z _e ROLLERS PER CAGE	DYN. LOAD PER 10 ROLLERS C	STAT. LOAD PER 10 ROLLERS C ₀
			g/L _k =1000 mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Number	N	N
FFW 2025 ZWA	HW10	–	219	10	8	2	4.8	4	3	–	1000	–	–	10700	27400
	–	–	94	15	10	2	6.8	–	–	2	–	32	7	14300	40000
	HW15	–	138	15	10.5	2	6.8	4.5	3.5	–	3000	–	–	14300	40000
FFW 2535	–	–	182	20.5	15	2.5	9.8	–	–	2.4	–	45	8	25500	73000
	HW20	–	239	20	14.3	2.5	9.8	5.5	4	–	3000	–	–	25500	73000
FFW 3045	–	–	315	26	20	3	13.8	–	–	3	–	60	9	43000	125000
	HW25	–	408	25	19	3	13.8	6	4.5	–	3000	–	–	43000	125000
FFW 3555	–	–	464	31.5	25	3.5	17.8	–	–	3.2	–	75	10	64000	187000
	HW30	–	598	30	24	3.5	17.8	7	5	–	3000	–	–	64000	187000
–	–	HRW 50	215	15.5	10.5	5	5	10	6.5	–	3000	–	–	36500	72000
–	–	HRW 70	602	25	17	7	10	13	8.5	–	3000	–	–	99000	209000
–	–	HRW100	1233	34	24	10	14	17	10	–	3000	–	–	205000	415000

The basic load ratings are valid for the condition that the two sections of the cage are symmetrical to the load direction (see diagram below).



Curved guidance systems

with guideways and carriages



Well rounded

Curved guidance systems are compact, ready-to-fit guidance systems for unlimited stroke.

They comprise:

- curved and straight guideways and
- bogie carriages capable of supporting loads.

The curved and straight guideways can be combined with each other. As a result, it is possible to achieve particularly economical curved guidance systems as well as oval and circular guidance systems.

Curved guidance systems:

- can support forces from all directions and moments about all axes
- are suitable for high traverse speeds
- run clearance-free
- the carriages are adjusted against the raceways of the guideways by means of eccentric bolts (..B)
- the carriages can also be supplied preloaded and clearance-free (.. SF)
- are robust and resistant to wear

- are maintenance-free and give reliable operation even under challenging environmental conditions.

Applications

Curved guidance systems are highly suitable for applications:

- that require an economical modular principle
- in handling equipment
- as guidance systems in machinery
- in the automation sector.



Curved guidance systems

with guideways and carriages

Page



Design and safety guidelines..... 3



Accuracy 5



Ordering example and ordering designation..... 6



Features

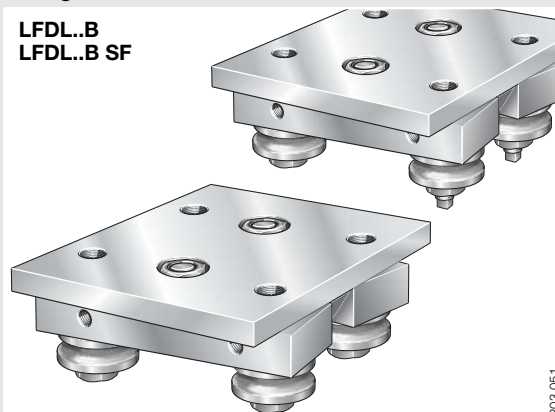
Curved guidance systems

- are compact units comprising:
 - bogie carriages LFDL..B or SF
 - curved guideways LFS..R
 - straight composite guideways LFS
- place only low demands on the adjacent construction
- can be fitted with a lubrication and wiper unit AB (special accessories) to protect the raceways
- with adjustable or preloaded carriages
 - the concentric bolts are tightened to the required tightening torque
 - the two eccentric bolts of the adjustable variant (..B) are screw mounted finger tight
- are particularly easy to install
 - the carriage is screw mounted on the adjacent construction.

Bogie carriage



LFDL..B
LFDL..B SF



203 051

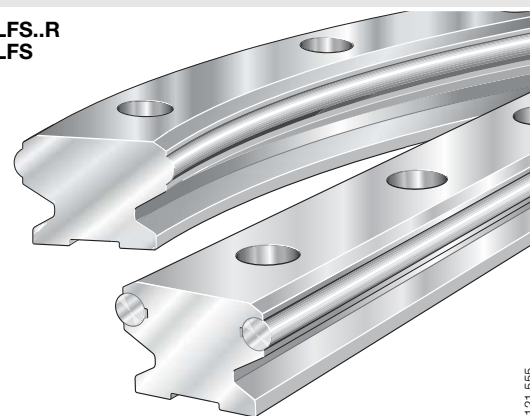
- for curved and straight guideways
- steel saddle plate, two swivelling carriers made from anodised aluminium, two concentric and two eccentric bolts (..B) or four concentric bolts (..SF), four profiled track rollers sealed on both sides and greased
- suitable for operating temperatures from -20 °C to +80 °C



8

Guideways

LFS..R
LFS



121 555

- LFS..R
curved guideway made from hardened steel; surface black oxide coated, raceways ground; location from above
- LFS
straight composite guideway, anodised aluminium support rail, hardened and ground steel shafts rolled into support rail, location from above



8



For information on track rollers, see INA Technical Product Information "TPI 99".



Design and safety guidelines

Guideways LFS

The hole pattern of the straight guideways is shown in Figure 1.

Guideways are supplied with a symmetrical hole pattern ①.

For a symmetrical hole pattern, $C_5 = C_6$. C_5 and C_6 are dependent on the guideway length.

For an asymmetrical hole pattern ②, please consult INA.

Joined guideways

Straight and curved guideways of the same width can be joined with or without the guideway connector VBS.

In the case of joined guideways, the individual sections are supplied matched to each other and consecutively numbered (Figure 2).

If C_5 exceeds a certain value, an additional hole C_7 is necessary. In the case of oval systems, this also applies to C_6 .

Guideway Designation	$C_5 >$ mm	C_7 mm
LFS 32	30	11
LFS 52	50	17

The deviation at the joints of two combined guideways must not exceed (Figure 3):

- dimension $a \pm 0,01$ mm
- dimension $h_4 \pm 0,1$ mm.

For dimensions a and h_4 , see *dimension table*, page 10/11.

A deviation in h_4 must if necessary be compensated by means of sheet metal. The sheet metal is not included in the delivery.



Combinations of curved guideways and combinations of curved and straight guideways must be treated as multi-piece guideways. Combinations must be ordered together.

Radii and angles of curved guideways

The available radii and angles of the curved guideways are shown in Table 1. Other radii and angles are available by agreement.

Table 1 · Radii and angles of curved guideways

Guideway Designation	Radius mm			Angle °		
LFS 32 R	100	300	500	90	180	360
LFS 52 R	150	300	500	90	180	360
LFS 32 OV	100	300	500	90	180	–
LFS 52 OV	150	300	500	90	180	–

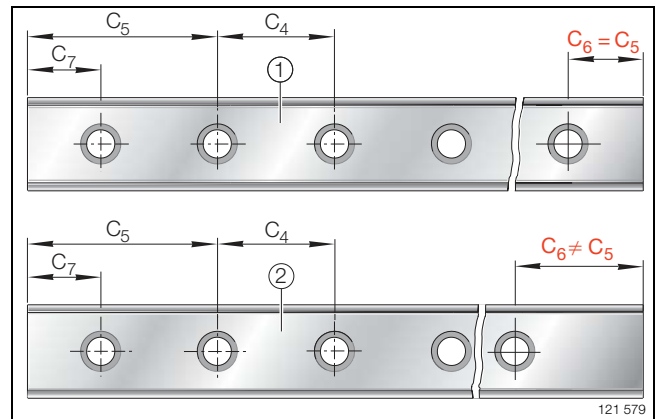


Figure 1 · Hole pattern of guideways

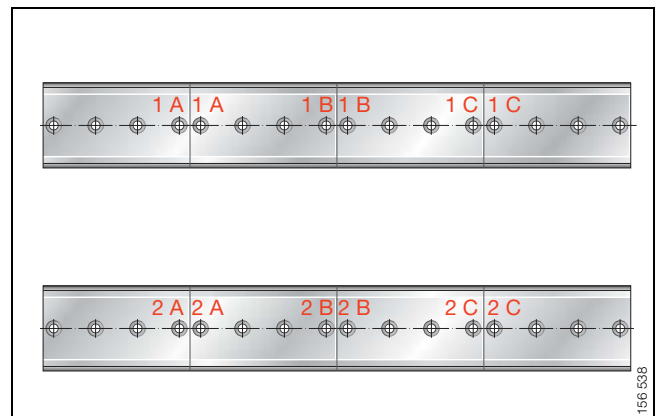


Figure 2 · Joined guideways LFS

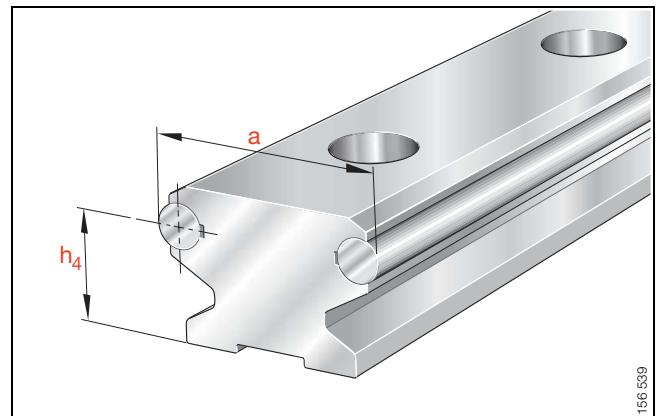


Figure 3 · Dimension a and dimension h_4

Curved guidance systems

with guideways and carriages

Fitting of track roller guidance system with guideways LFS without guideway connectors VBS

Fitting the guideway

- Place the guideway ① on the adjacent construction ② and screw mount finger tight (Figure 4)
- Align the guideway – if necessary clamping it against a locating edge – and screw firmly into place (Figure 4)

⚠ Observe the tightening torque M_A in Table 2.

Tabelle 2 · Tightening torque for guideway fixing screws

Fixing screw DIN ISO 4 762-8.8, DIN 7 984-8.8 Thread	Tightening torque M_A Nm
M 6	9,9
M10	48

Fitting and setting the carriage clearance-free using eccentric bolts

- Push the carriage LFDL..B ③ onto the guideway (Figure 5).

⚠ If lateral load is present, the main load should be supported by the concentric bolts.
Adjust the carriage LFDL..B without load.

- Turn the eccentric bolts using an open-end wrench or ring wrench so that the track rollers are set against the raceway (Figure 5). Note the direction or rotation.

⚠ The bogie must be easily movable and clearance-free.
If excessive adjustment is used, preload will occur that reduces the life of the guidance system.

- Tighten the hexagonal nut to the tightening torque M_A (Figure 5, Table 3).

Check the setting.

The guidance system is correctly set if:

- all the track rollers turn when the carriage is moved
- the carriage can be moved smoothly.

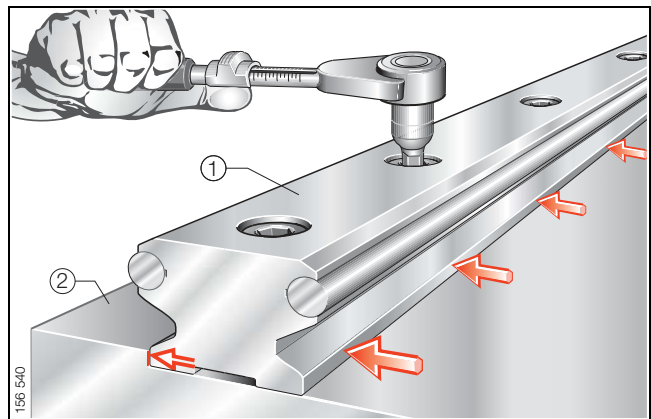


Figure 4 · Fitting the guideway

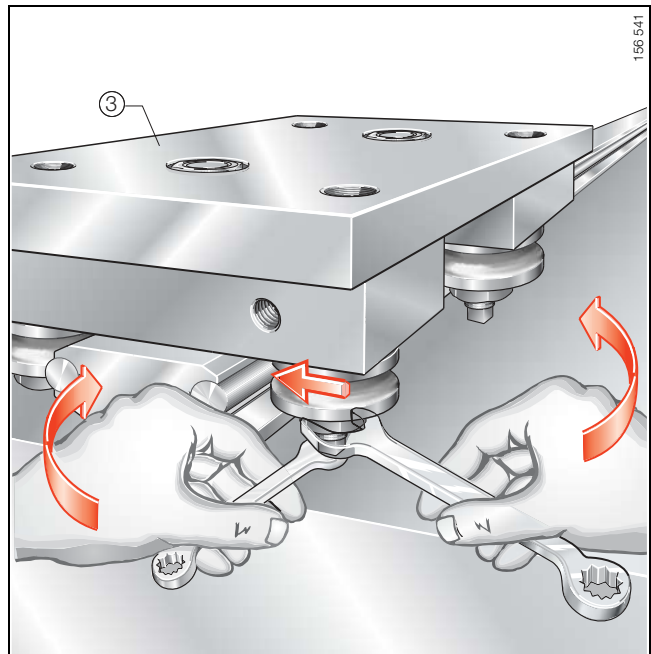


Figure 5 · Fitting the carriage and setting the profiled track rollers clearance-free



Joined guideways can also be ordered with guideway connectors. For further information on guideway connectors VBS, see INA publication "MAI 83".

Tabelle 3 · Tightening torque for eccentric bolts

Profiled track roller	Bolt thread	Tightening torque M_A N
Designation	K	
LFR 50/8 KDD	M 8	15
LFR 5201 KDD	M10	40

Mounting on the adjacent construction

■ Screw the carriage to the adjacent construction (Figure 6).

⚠ Observe the tightening torque M_A in Table 4.

Tabelle 4 · Tightening torque for fixing screws

Fixing screw DIN ISO 4 762-8.8 Thread	Tightening torque M_A Nm
M 8	24
M10	48



Accuracy

Length tolerances of guideways LFS

The length tolerances are shown in Table 5.

Tabelle 5 · Length tolerances

Guideway	Length L mm	Tolerance
Single-piece	$L < 1000$	± 1 mm
	$1000 \leq L < 2000$	± 2 mm
	$2000 \leq L < 4000$	± 2 mm
	$4000 \leq L$	± 5 mm
Multi-piece	Total length L	$\pm 1\%$

Parallelism and positional tolerances of guideways

The parallelism and positional tolerances are shown in Figure 7.

⚠ In applications with two parallel guideways or oval systems where, due to the design, one locating and one non-locating side is necessary, see also INA publication "MAI 103".

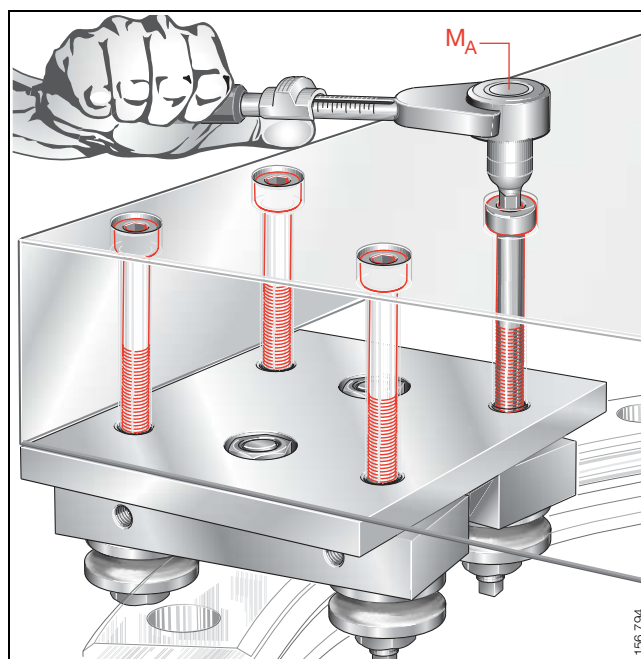


Figure 6 · Screw mounting the carriage on the adjacent construction

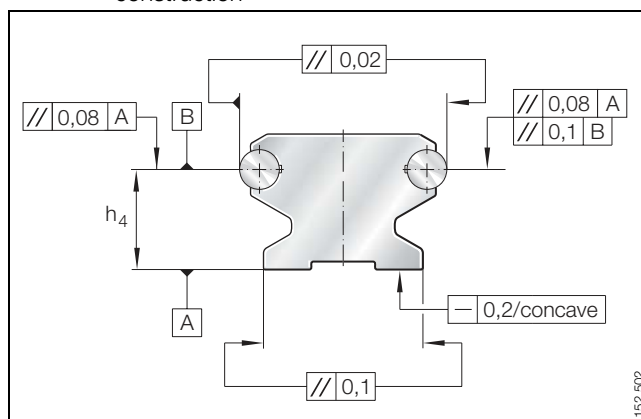


Figure 7 · Parallelism and positional tolerances

Curved guidance systems

with guideways and carriages



Ordering example and ordering designation

Adjustable bogie carriage

Bogie carriage LFDL...B
Size a 32 B

Ordering designation:
1×LFDL 32 B (Figure 8).

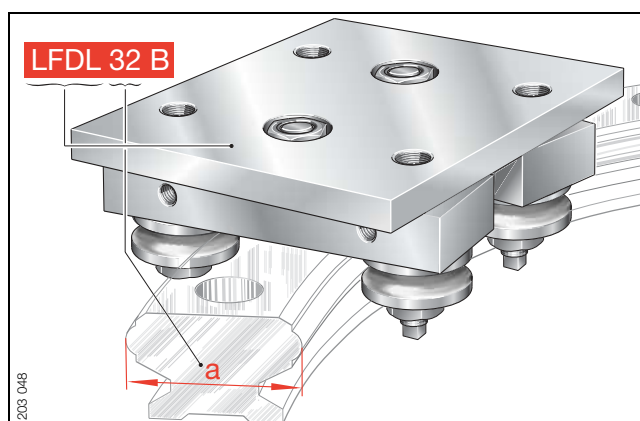


Figure 8 · Bogie carriage LFDL 52 B

Curved guideway

Guideway LFS...R
Guideway width a 32 mm
Radius of curve 300 mm
Arc 180°
Steel version St

Ordering designation:
1×LFS 32 R-300/180 St (Figure 9).

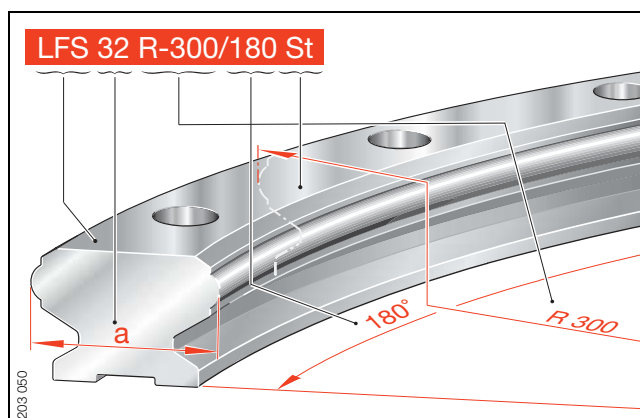


Figure 9 · Guideway LFS 52 R-300/180 St

Closed oval system with $2 \times 180^\circ$ arcs

Guideways	LFS
Guideway width a	52 mm
Closed oval system	OV
Radius of curve	300 mm
Arc	180°
Length of straight guideways	2 000 mm
Ordering designation:	
1 $\times$ LFS 52 OV 300/180-2000	(Figure 10).

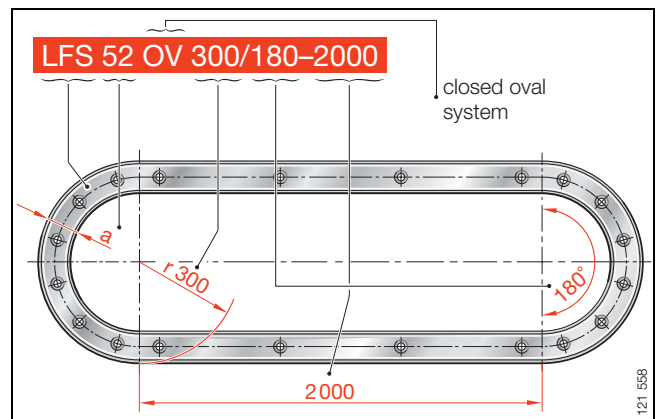


Figure 10 · Closed oval system with 180° arcs
LFS 52 OV 300/180-2000

Closed oval system with $4 \times 90^\circ$ arcs

Guideways	LFS
Guideway width a	52 mm
Closed oval system	OV
Radius of curve	300 mm
Arc	90°
Length of	
1 st straight guideway pair	2 000 mm
2 nd straight guideway pair	3 000 mm
Ordering designation:	
1 $\times$ LFS 52 OV 300/90-2000/3000	(Figure 11).

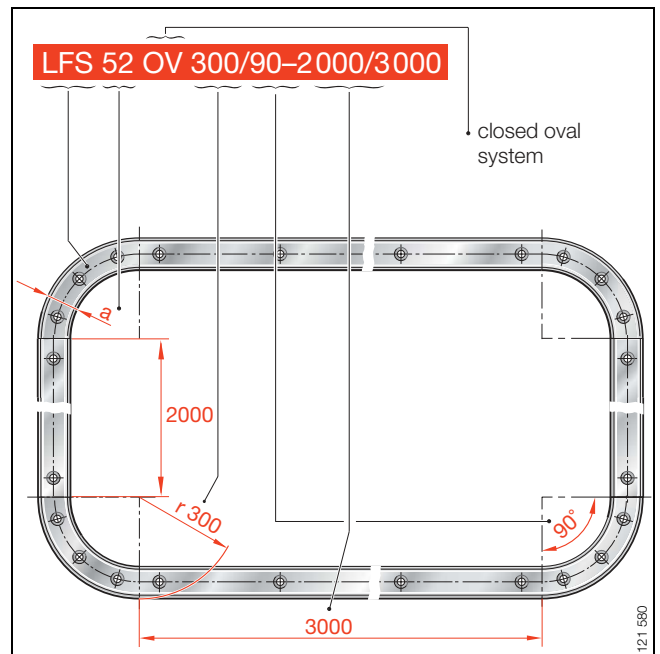


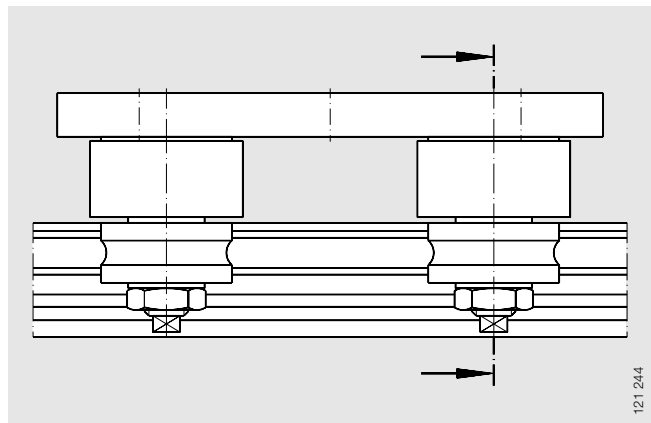
Figure 11 · Closed oval system with 90° arcs
LFS 52 OV 300/90-2000/3000

Bogie carriages

Serie LFDL..B (SF)

Guideways

Serie LFS..R



LFDL..B with LFS..R

Dimension table • Dimensions in mm

Bogie carriage			Curved guideways ⁵⁾		Dimensions					
Designation	Mass	With profiled track rollers	Designation ¹⁾	Mass	Carriage			Guideway		
	≈kg			≈kg	H	A	C	h	a	β ⁵⁾
LFDL 32 B (SF)⁶⁾	1	LFR 50/8 KDD	LFS 32 R-100/ 90 St	0,5	44,2	80	100	20	32	90
			LFS 32 R-100/180 St	1						180
			LFS 32 R-100/360 St	2						360
			LFS 32 R-300/ 90 St	1,7						90
			LFS 32 R-300/180 St	3,4						180
			LFS 32 R-300/360 St	6,8						360
			LFS 32 R-500/ 90 St	2,9						90
			LFS 32 R-500/180 St	5,8						180
			LFS 32 R-500/360 St	11,6						360
LFDL 52 B (SF)⁶⁾	2,5	LFR 5201 KDD	LFS 52 R-150/ 90 St	2	66,1	120	150	34	52	90
			LFS 52 R-150/180 St	4						180
			LFS 52 R-150/360 St	8						360
			LFS 52 R-300/ 90 St	4,5						90
			LFS 52 R-300/180 St	9						180
			LFS 52 R-300/360 St	18						360
			LFS 52 R-500/ 90 St	7,8						90
			LFS 52 R-500/180 St	15,6						180
			LFS 52 R-500/360 St	31,2						360

1) Corrosion-resistant design available by agreement.

2) For fixing screw to DIN ISO 4762-8.8.

3) Number of holes on pitch circle r_1 .

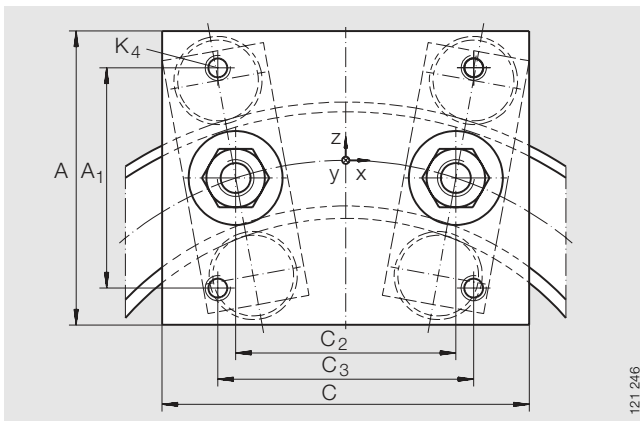
4) Tightening torque for bolts LFZ and LFE, bolts LFZ are supplied tightened to M_A .

5) Other radii and segment sections are available by agreement.

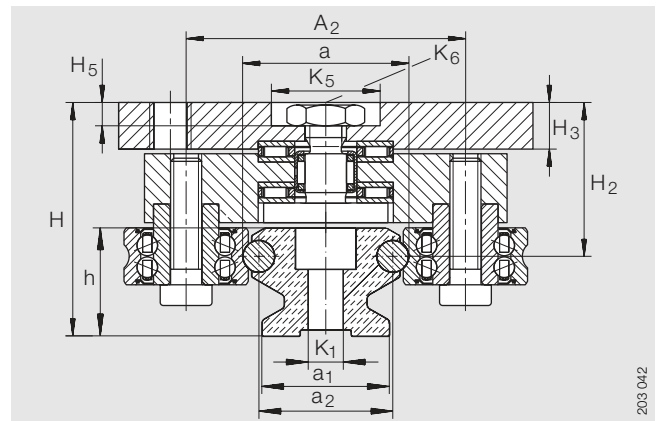
6) The carriages can also be fitted with the lubrication and wiper unit AB (special accessories) to protect the guideways.
Please consult INA in this case.

Load carrying capacity table

Bogie carriage with guideway Designation	Forces				Moment ratings					
	$F_{y \max}$ N	$F_{0y \max}$ N	$F_{z \max}$ N	$F_{0z \max}$ N	$M_{x \max}$ Nm	$M_{0x \max}$ Nm	$M_{y \max}$ Nm	$M_{0y \max}$ Nm	$M_{z \max}$ Nm	$M_{0z \max}$ Nm
LFDL 32 B (SF) with LFS 32 R	850	1400	1000	1000	11	18	13	13	11	18
LFDL 52 B (SF) with LFS 52 R	1500	2500	2500	2500	31	31	41	41	25	25



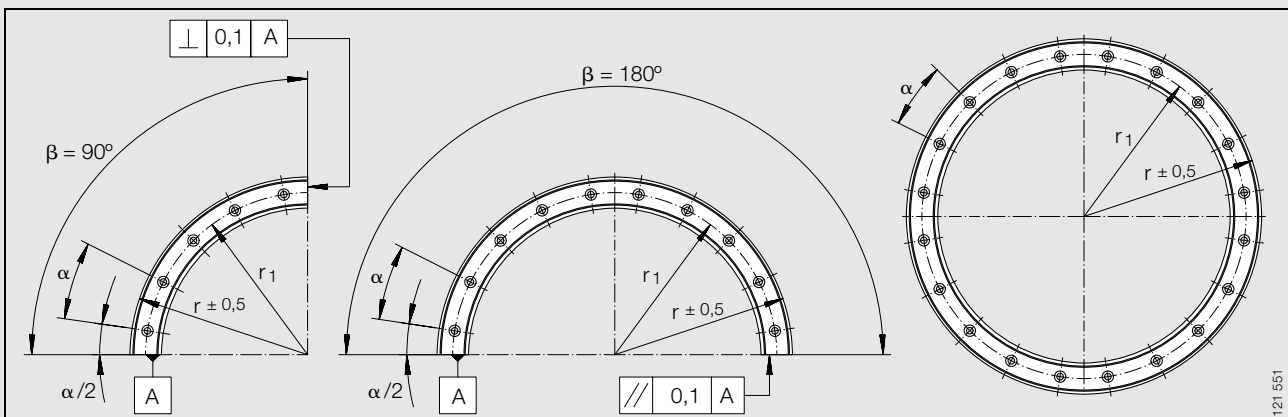
LFDL..B with LFS..R (view rotated 90°)



LFDL..B SF

Mounting dimensions

A ₁	A ₂	a ₁	a ₂	C ₂	C ₃	H ₁ max.	H ₂	H ₃	H ₅	K ₁ ²⁾	K ₄	K ₅	K ₆	x ³⁾	r °	r ₁	α	M _A ⁴⁾ Standard Nm
60	54	24	26	60	70	43	29,2	9	4	M 6	M 8	21	M 8	3	100	84	30	15
														6				
														12				
														4	300	284	22,5	
														8				
														16				
														5	500	484	18	
														10				
20																		
90	83	40	42	76	90	65,1	41	11	6	M10	M10	26	M10	3	150	124	30	40
														6				
														12				
														4	300	274	22,5	
														8				
														16				
														5	500	474	18	
														10				
20																		



Curved guideway – available arc values

Closed oval systems without guideway connectors VBS

Arc values 90° and 180°

Series LFS..OV

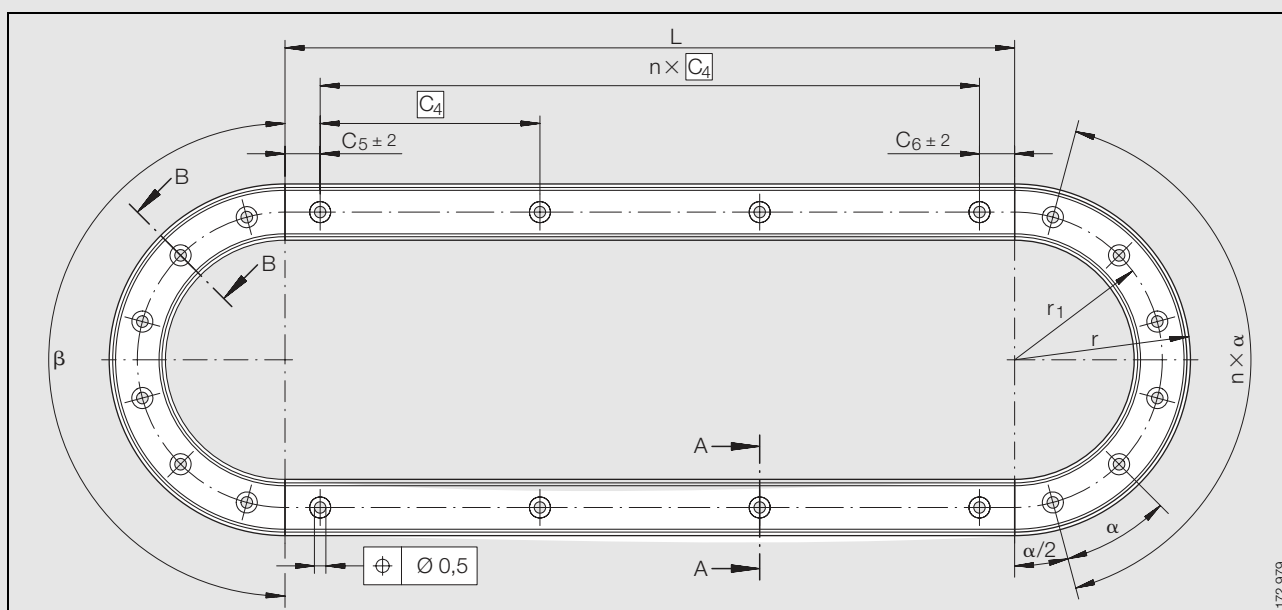
Dimension table · Dimensions in mm											
Closed oval Designation		Dimensions				Mounting dimensions					
		a	h	β	$L_{\max}^{1)}$	a_1	a_2	C_4	C_5/C_6		d_{Lw}
									min.	max.	
LFS 32 OV 100/180	–	32	20	180	6 000	24	26	125	11	116	6
–	LFS 32 OV 100/90			90							
LFS 32 OV 300/180	–			180							
–	LFS 32 OV 300/90			90							
LFS 32 OV 500/180	–			180							
–	LFS 32 OV 500/90			90							
LFS 52 OV 150/180	–	52	34	180	8 000	40	42	250	17	235	10
–	LFS 52 OV 150/90			90							
LFS 52 OV 300/180	–			180							
–	LFS 52 OV 300/90			90							
LFS 52 OV 500/180	–			180							
–	LFS 52 OV 500/90			90							

⚠ Closed oval systems can only be ordered as a single unit.
Each unit consists of two curved guideways LFS..R with an arc value 180° and two straight guideways LFS (Figure below) or each unit consists of four curved guideways LFS..R with an arc value 90° and four straight guideways LFS (figure, page 11).

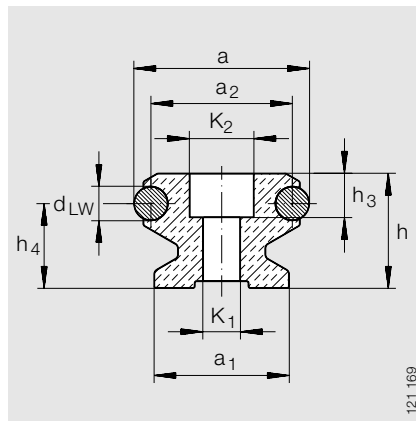
1) Maximum length of single-piece guideways.

2) For fixing screw to DIN ISO 4762-8.8.

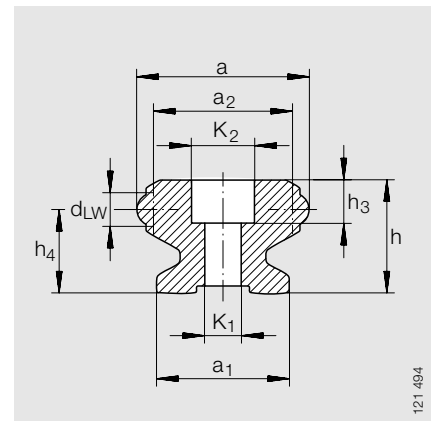
3) Number of holes on pitch circle r_1 .



Oval system with two curved and two straight guideways – arc value 180°

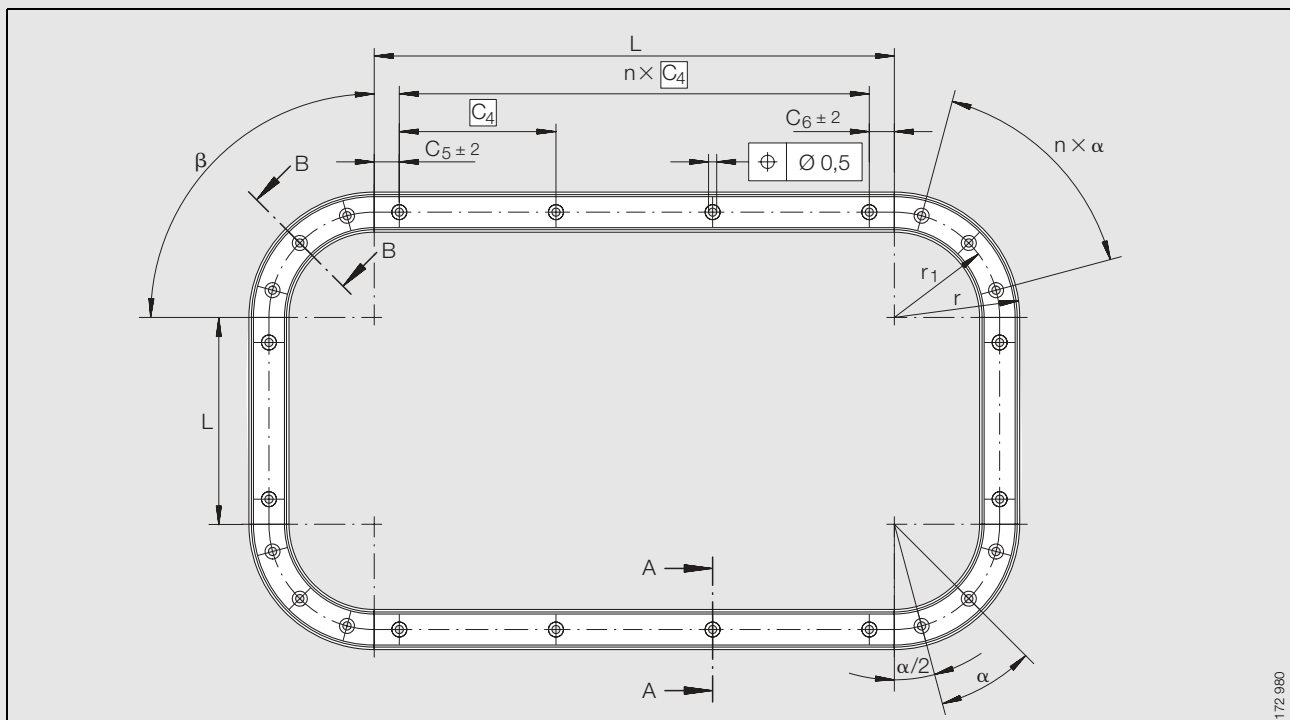


LFS (section A-A)



LFS..R (section B-B)

								Closed oval Designation	
h_3	h_4	$K_1^{(2)}$	K_2	$x^{(3)}$	r	r_1	α		
8	15	6,5	12	6	100	84	30	LFS 32 OV 100/180	–
				3	100	84	30	–	LFS 32 OV 100/90
				8	300	284	22,5	LFS 32 OV 300/180	–
				4	300	284	22,5	–	LFS 32 OV 300/90
				10	500	484	18	LFS 32 OV 500/180	–
				5	500	484	18	–	LFS 32 OV 500/90
13	25	11	19	6	150	124	30	LFS 52 OV 150/180	–
				3	150	124	30	–	LFS 52 OV 150/90
				8	300	274	22,5	LFS 52 OV 300/180	–
				4	300	274	22,5	–	LFS 52 OV 300/90
				10	500	474	18	LFS 52 OV 500/180	–
				5	500	474	18	–	LFS 52 OV 500/90



Oval system with four curved and four straight guideways – arc value 90°

Closed oval systems with guideway connectors VBS

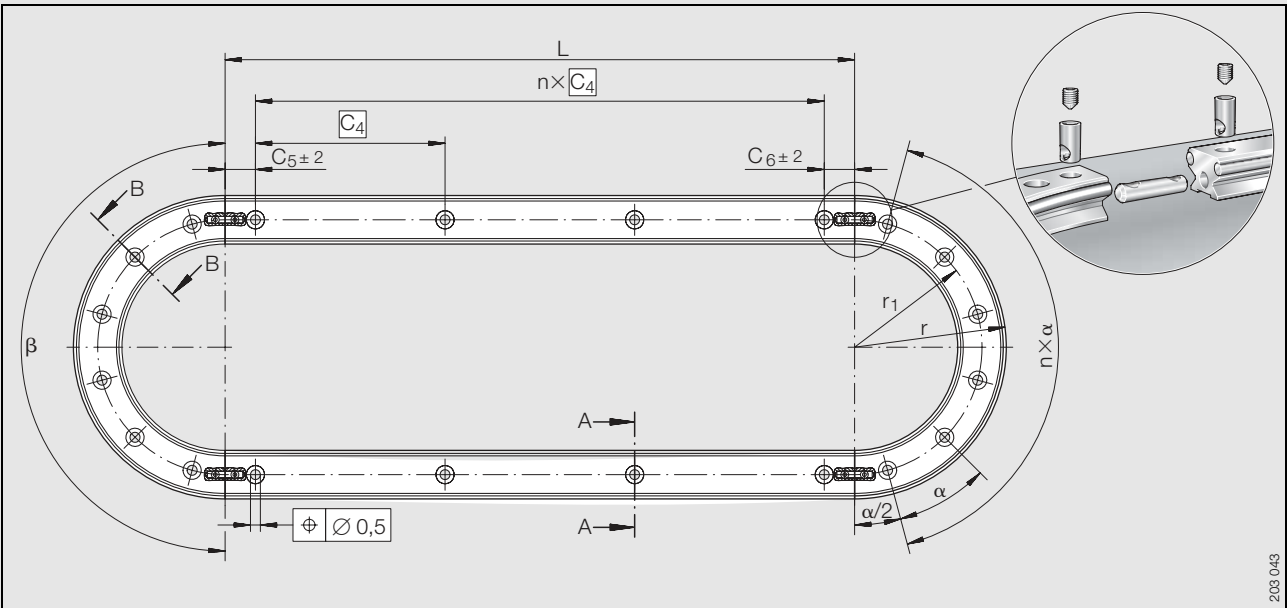
Arc values 90° and 180°

Series LFS..OV..VBS

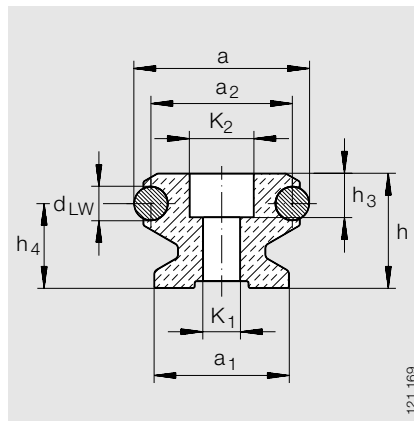
Dimension table · Dimensions in mm											
Closed oval Designation		Dimensions				Mounting dimensions					
		a	h	β	L _{max} ¹⁾	a ₁	a ₂	C ₄	C ₅ /C ₆		d _{Lw}
									min.	max.	
LFS 32 OV 100/180 VBS	–	32	20	180	6 000	24	26	125	36	116	6
–	LFS 32 OV 100/90 VBS			90							
LFS 32 OV 300/180 VBS	–			180							
–	LFS 32 OV 300/90 VBS			90							
LFS 32 OV 500/180 VBS	–			180							
–	LFS 32 OV 500/90 VBS			90							
LFS 52 OV 150/180 VBS	–	52	34	180	8 000	40	42	250	49	235	10
–	LFS 52 OV 150/90 VBS			90							
LFS 52 OV 300/180 VBS	–			180							
–	LFS 52 OV 300/90 VBS			90							
LFS 52 OV 500/180 VBS	–			180							
–	LFS 52 OV 500/90 VBS			90							

⚠ Closed oval systems can only be ordered as a single unit.
Each unit consists of two curved guideways LFS..R VBS with an arc value 180° and two straight guideways LFS..VBS (figure below) or each unit consists of four curved guideways LFS..R VBS with an arc value 90° and four straight guideways LFS..VBS (figure, page 13).
For information on guideway connectors VBS, see *INA publication "MAI 83"*.

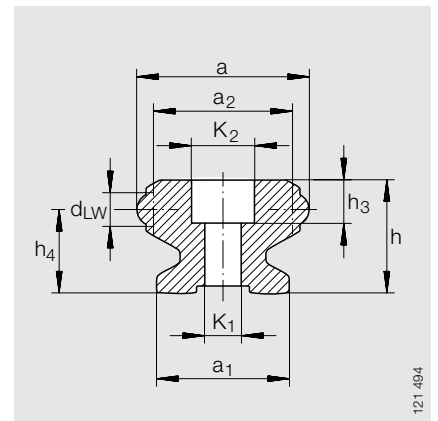
- 1) Maximum length of single-piece guideways.
- 2) For fixing screw to DIN ISO 4762-8.8.
- 3) Number of holes on pitch circle r_1 .



Oval system with two curved and two straight guideways – arc value 180°

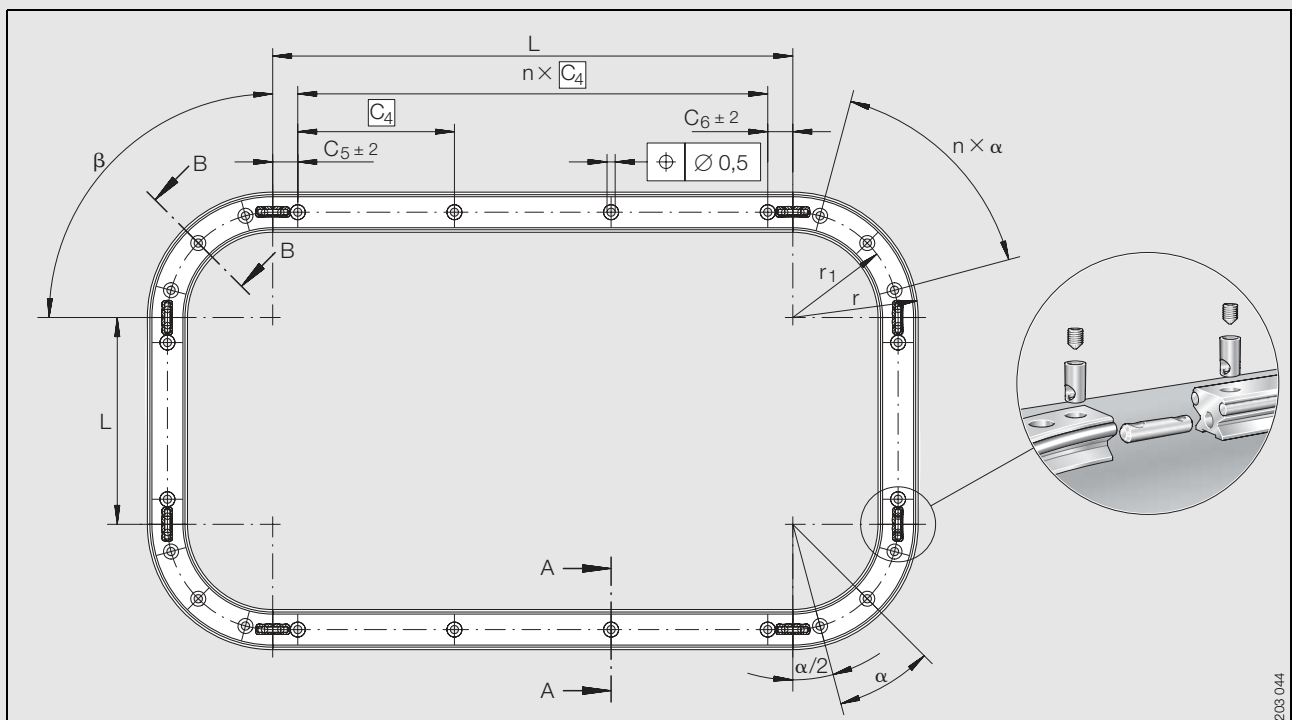


LFS (section A-A)



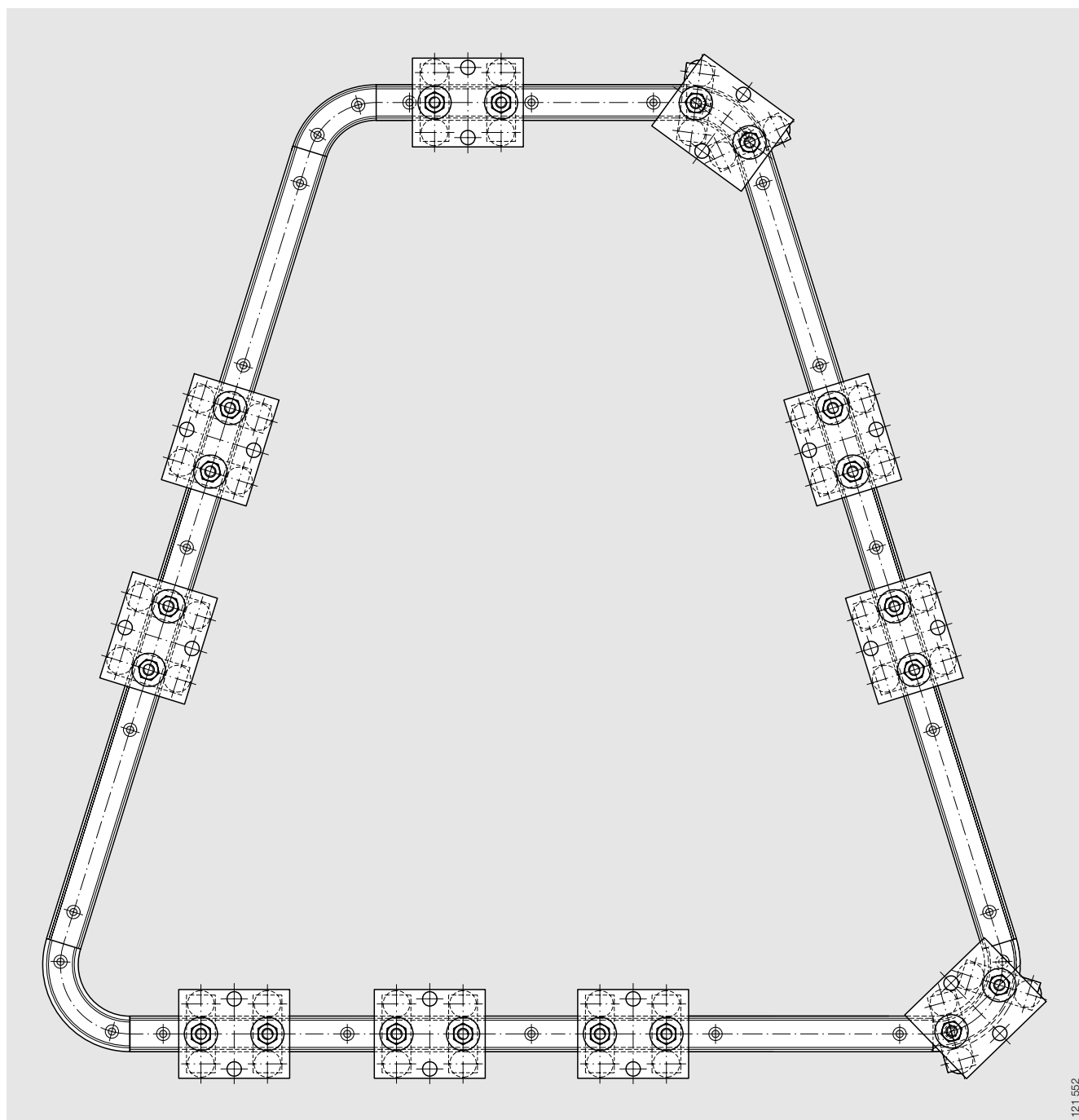
LFS..R (section B-B)

h_3	h_4	$K_1^{(2)}$	K_2	$x^{(3)}$	r	r_1	α	Closed oval Designation	
8	15	6,5	12	6	100	84	30	LFS 32 OV 100/180 VBS	-
				3	100	84	30	-	LFS 32 OV 100/90 VBS
				8	300	284	22,5	LFS 32 OV 300/180 VBS	-
				4	300	284	22,5	-	LFS 32 OV 300/90 VBS
				10	500	484	18	LFS 32 OV 500/180 VBS	-
				5	500	484	18	-	LFS 32 OV 500/90 VBS
13	25	11	19	6	150	124	30	LFS 52 OV 150/180 VBS	-
				3	150	124	30	-	LFS 52 OV 150/90 VBS
				8	300	274	22,5	LFS 52 OV 300/180 VBS	-
				4	300	274	22,5	-	LFS 52 OV 300/90 VBS
				10	500	474	18	LFS 52 OV 500/180 VBS	-
				5	500	474	18	-	LFS 52 OV 500/90 VBS

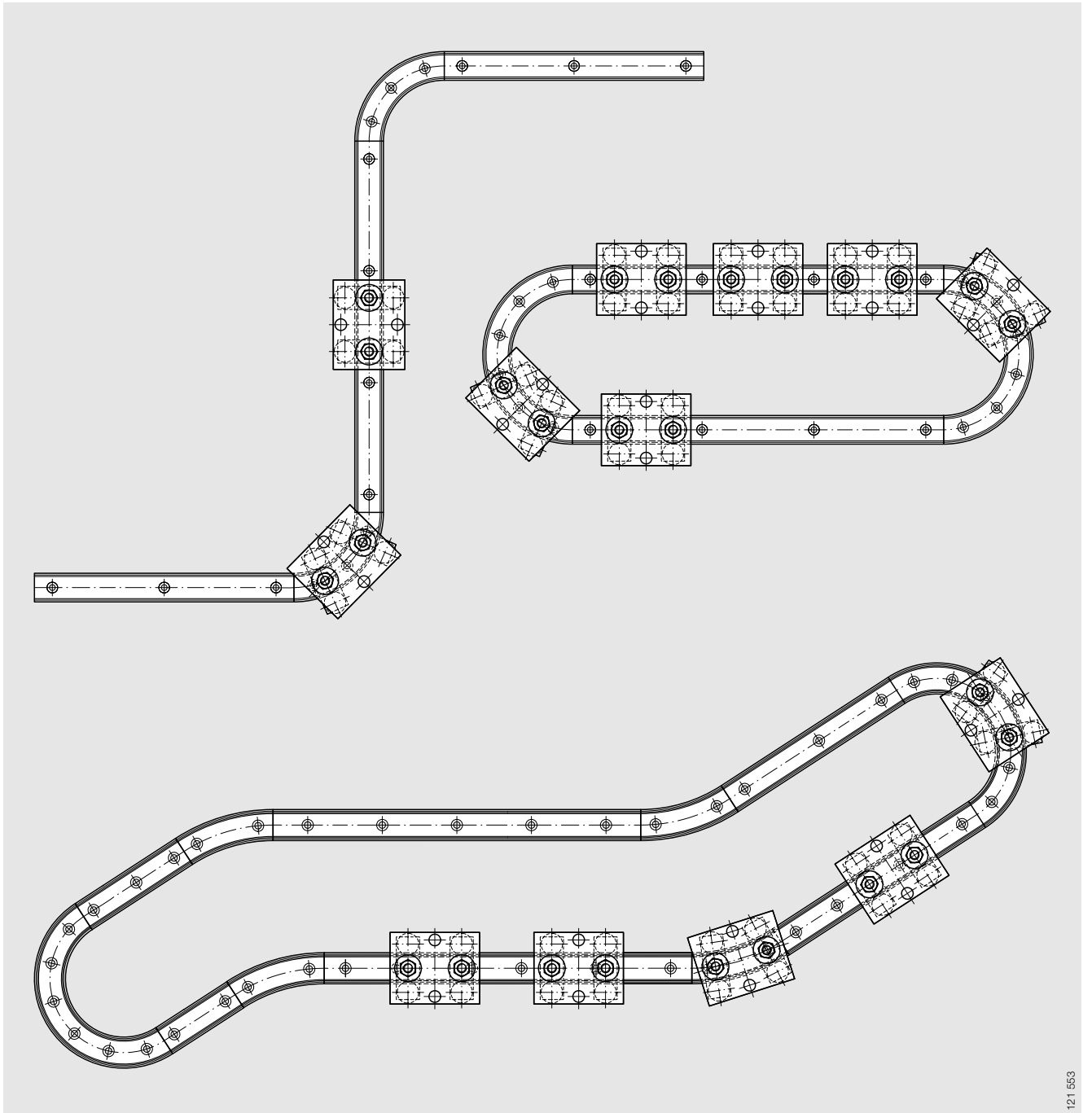


Oval system with four curved and four straight guideways – arc value 90°

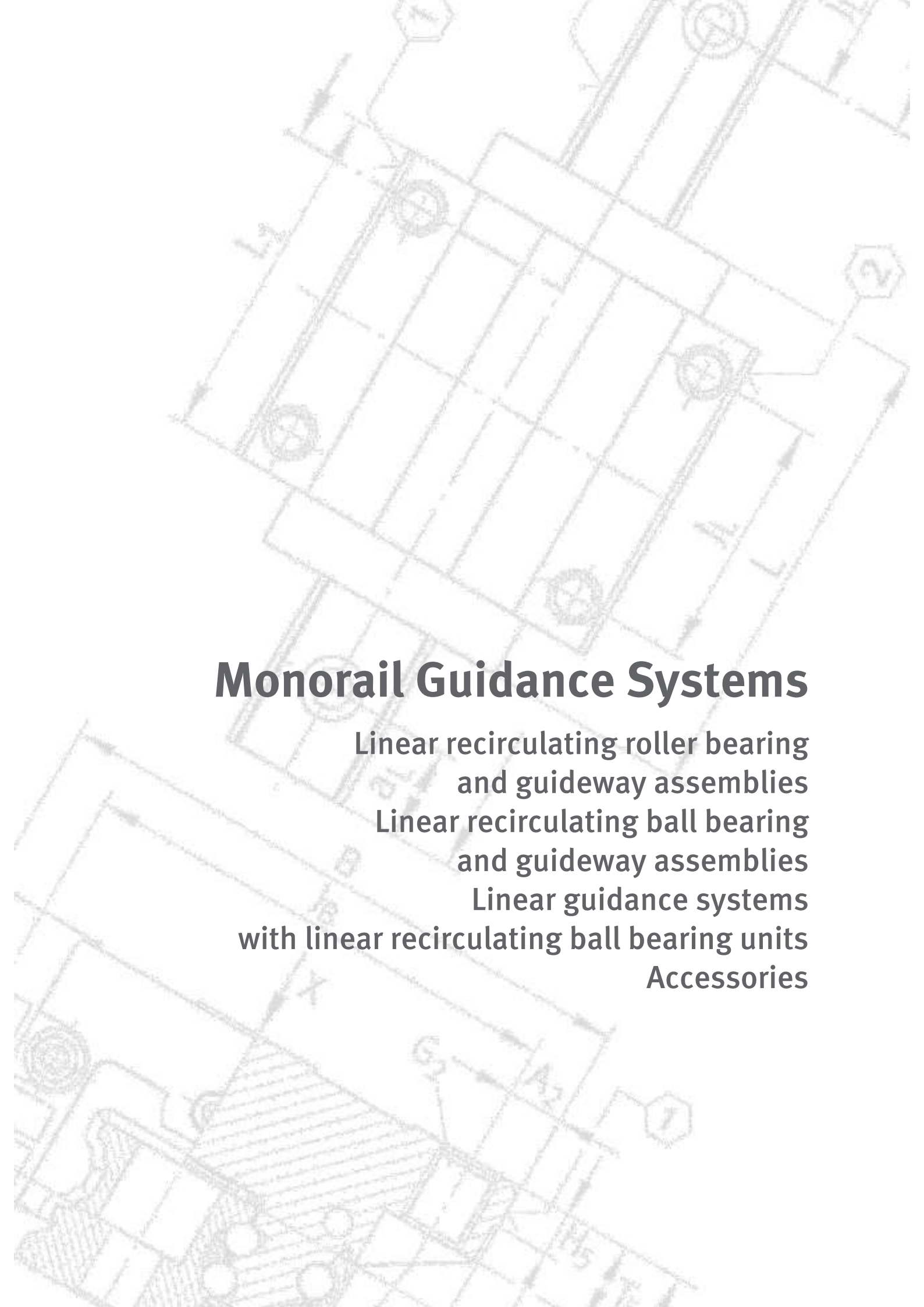
Design examples



Example of special arrangement



Example of special arrangement

The background of the page is a technical drawing of a mechanical assembly, likely a linear guidance system. It features various components such as bearings, rollers, and structural frames, with dimensions and labels like 'L', 'A', 'B', 'G', 'A2', 'P5', and 'X' indicating specific parts and measurements. The drawing is oriented diagonally across the page.

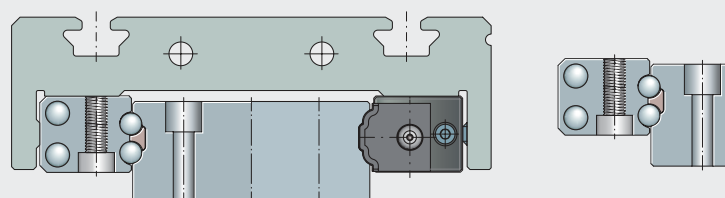
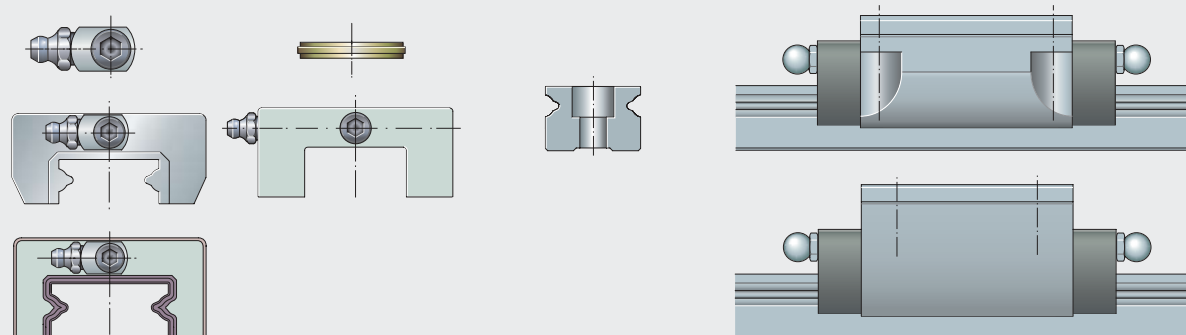
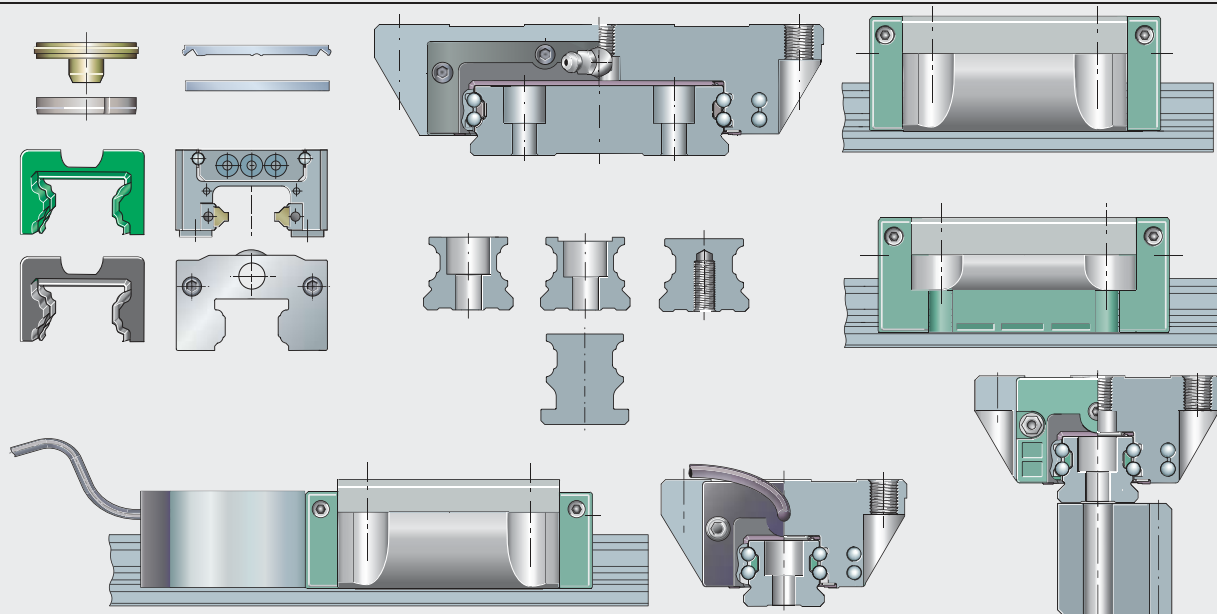
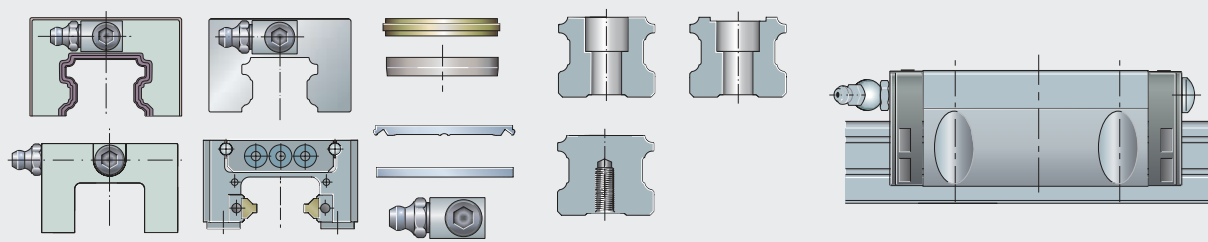
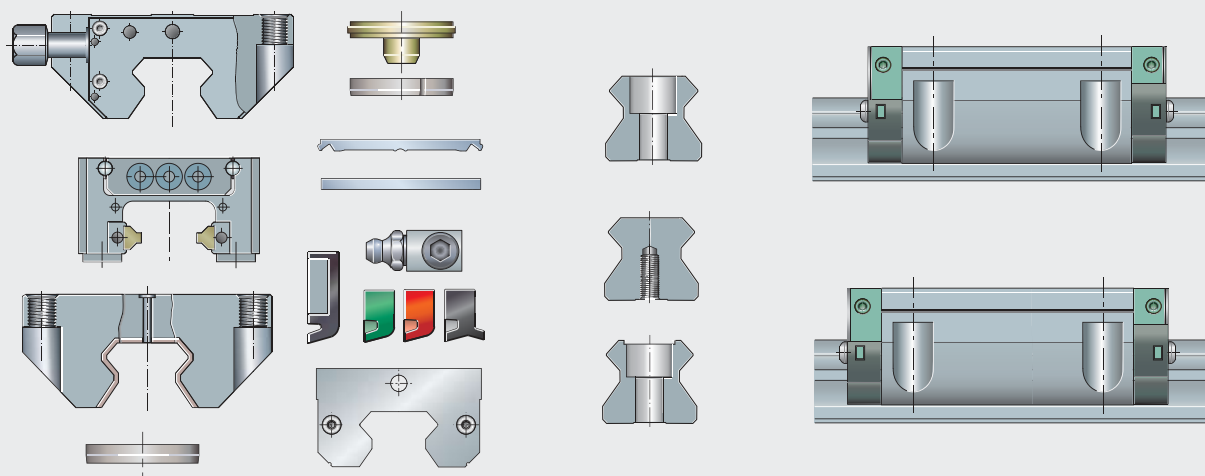
Monorail Guidance Systems

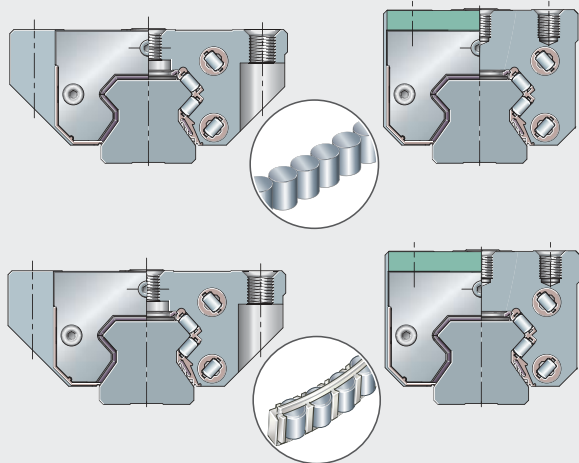
Linear recirculating roller bearing
and guideway assemblies

Linear recirculating ball bearing
and guideway assemblies

Linear guidance systems
with linear recirculating ball bearing units

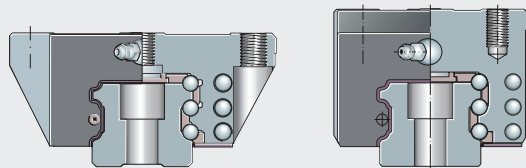
Accessories





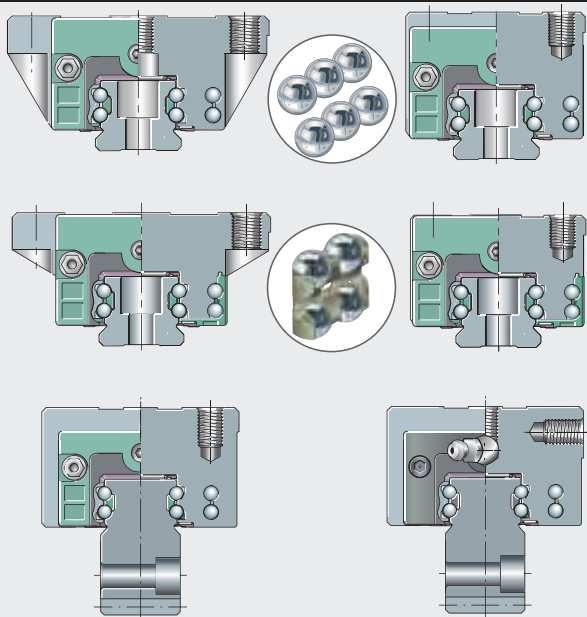
207 101

Linear recirculating roller bearing and guideway assemblies



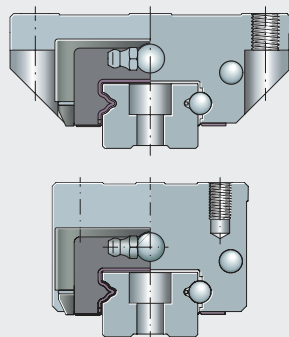
206 050

Six-row linear recirculating ball bearing and guideway assemblies



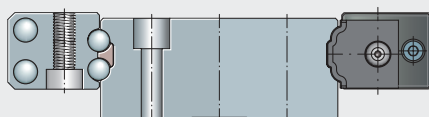
205 266

Four-row linear recirculating ball bearing and guideway assemblies



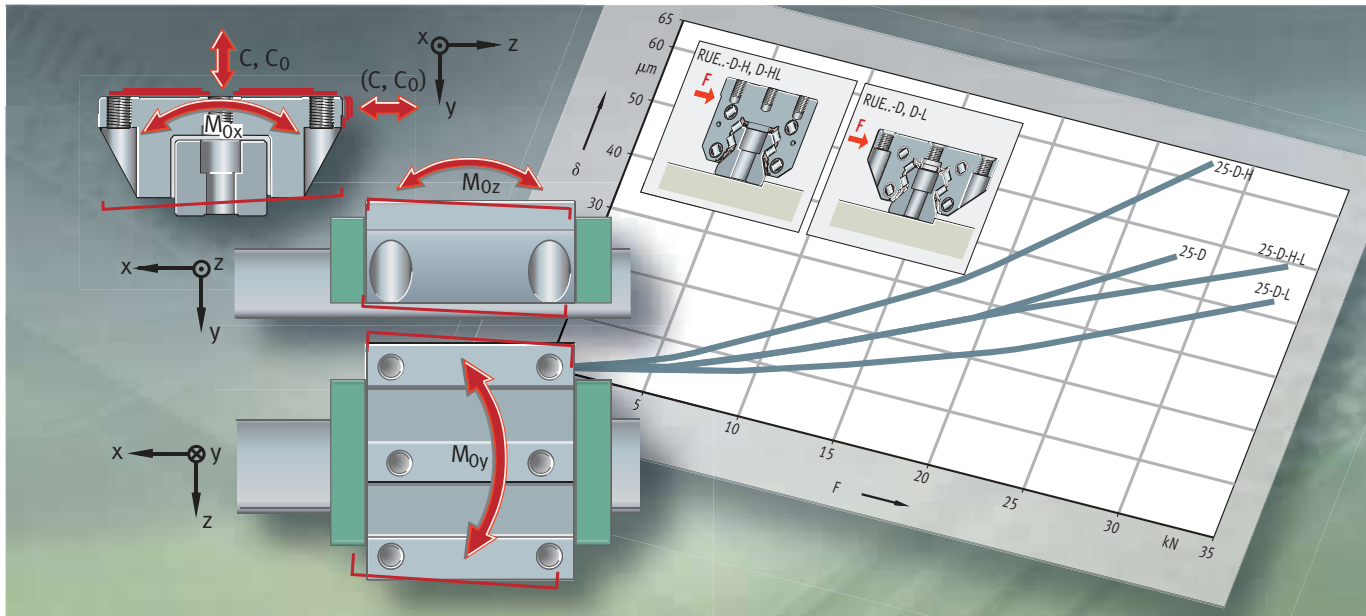
204 047

Two-row linear recirculating ball bearing and guideway assemblies



205 268

Linear guidance systems with linear recirculating ball bearing units



Technical principles

Load carrying capacity and life
INA calculation program
Preload
Friction
Lubrication
Special coatings
Special materials
Fitting variants
Fitting

Load carrying capacity and life

The size of a monorail guidance system is determined by the demands made on its load carrying capacity, rating life and operational security.

Load carrying capacity

The load carrying capacity is described in terms of the basic dynamic load rating C , the basic static load rating C_0 and the static moment ratings M_{0x} , M_{0y} and M_{0z} , *Figure 1*.

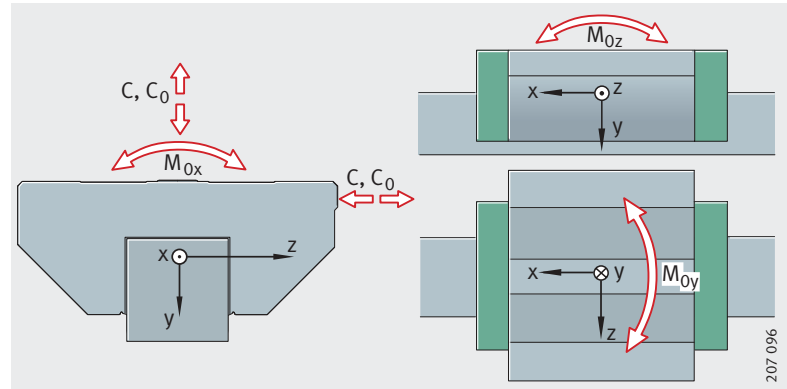


Figure 1
Load carrying capacity
and load directions

Calculation of basic load ratings according to DIN

The calculation of the basic dynamic and static load ratings given in the dimension tables is based on DIN 636-1 and 2.

Differences between DIN and suppliers from the Far East

Suppliers from the Far East frequently calculate basic load ratings using a basic rating life based on a distance of only 50 km compared with 100 km to DIN.

Conversion of basic load ratings Linear recirculating ball bearing and guideway assemblies

$$C_{50} = 1,26 \cdot C_{100}$$

$$C_{100} = 0,79 \cdot C_{50}$$

Linear recirculating roller bearing and guideway assemblies

$$C_{50} = 1,23 \cdot C_{100}$$

$$C_{100} = 0,81 \cdot C_{50}$$

C_{100} N
Basic dynamic load rating C for distance of 100 km –
definition according to DIN 636

C_{50} N
Basic dynamic load rating C for distance of 50 km.

Dynamic load carrying capacity and life

The dynamic load carrying capacity is described in terms of the basic dynamic load rating and the basic rating life.

The basic dynamic load rating is the load in N at which the guidance system achieves a distance of 100 km at a survival probability of 90% (C_{100}).



Basic rating life

The basic rating life L and L_h is achieved by 90% of a sufficiently large group of apparently identical bearings before the first evidence of material fatigue occurs.

$$L = \left(\frac{C}{P} \right)^p$$

$$L_h = \frac{833}{H \cdot n_{osc}} \cdot \left(\frac{C}{P} \right)^p$$

$$L_h = \frac{1666}{\bar{v}} \cdot \left(\frac{C}{P} \right)^p$$

Attention!

According to DIN 636-1, the equivalent dynamic load P should not exceed the value $0,5 \cdot C$.

Equivalent load and speed

The formulae for calculating the basic rating life assume that the load P and speed $\bar{v}$ are constant. Non-constant operating conditions can be taken into consideration by means of equivalent operating values. These have the same effect on the life as the loads occurring in practice.

Equivalent dynamic load

Where the load varies in steps, the equivalent dynamic load is calculated as follows:

$$P = \sqrt[p]{\frac{q_1 \cdot v_1 \cdot F_1^p + q_2 \cdot v_2 \cdot F_2^p + \dots + q_z \cdot v_z \cdot F_z^p}{q_1 \cdot v_1 + q_2 \cdot v_2 + \dots + q_z \cdot v_z}}$$

Equivalent dynamic speed

Where the speed varies in steps, the equivalent dynamic speed is calculated as follows:

$$\bar{v} = \frac{q_1 \cdot v_1 + q_2 \cdot v_2 + \dots + q_z \cdot v_z}{100}$$

Combined load

If the direction of the load acting on an element does not coincide with one of the main load directions, an approximate value for the equivalent load is calculated as follows:

$$P = |F_y| + |F_z|$$

If an element is simultaneously subjected to a force F and a moment M , an approximate value for the equivalent dynamic load is calculated as follows:

$$P = |F| + |M| \cdot \frac{C_0}{M_0}$$

Load carrying capacity and life

Symbols, units and definitions

C	N
Basic dynamic load rating	
C_0	N
Basic static load rating in the direction of the force acting on the element	
F	N
Force acting on the element	
F_y	N
Vertical component	
F_z	N
Horizontal component	
H	m
Single stroke length for reciprocating motion	
L, L_h	m, h
Basic rating life in 100 km or in operating hours	
M	Nm
Moment acting on the element	
M_0	Nm
Static moment rating	
n_{osc}	min^{-1}
Number of return strokes per minute	
P	N
Equivalent dynamic load	
p	–
Life exponent:	
monorail guidance systems based on balls: $p = 3$	
monorail guidance systems based on rollers: $p = 10/3$	
q_z	%
Duration as a proportion of the total operating time	
v_z	m/min
Variable speed	
$\bar{v}$	m/min
Equivalent dynamic speed.	



Operating life

The operating life is defined as the life actually achieved by monorail guidance systems. It may differ significantly from the calculated life. The following influences can lead to premature failure through wear or fatigue:

- excess load due to misalignment as a result of temperature differences and manufacturing tolerances (elasticity of the adjacent construction)
- contamination of the guidance systems
- inadequate lubrication
- reciprocating motion with very small stroke lengths (false brinelling)
- vibration while stationary (false brinelling)
- overloading of the guidance system (even for short periods)
- plastic deformation.

Static load carrying capacity

The static load carrying capacity of the monorail guidance system is limited by:

- the permissible load on the monorail guidance system
- the load carrying capacity of the raceway
- the permissible load on the screw connections
- the permissible load on the adjacent construction.

Attention!

For design purposes, the static load safety factor S_0 required for the application must be observed, see tables starting page 24.

Basic static load ratings and moment ratings

The basic static load ratings and static moment ratings are those loads under which the raceways and rolling elements undergo a permanent overall deformation corresponding to $1/10\,000$ of the rolling element diameter.

Load carrying capacity and life

Static load safety factor

The static load safety factor S_0 is the security against permanent deformation at the rolling contact:

$$S_0 = \frac{C_0}{P_0}$$

$$S_0 = \frac{M_0}{M}$$

S_0 –
Static load safety factor

C_0 N
Basic static load rating in the load direction (for KUSE: C_{0I} , C_{0II} , C_{0III}) according to dimension tables

P_0 N
Equivalent static bearing load in load direction

M_0 Nm
Basic static moment rating in load direction (M_{0x} , M_{0y} , M_{0z}) according to dimension tables

M Nm
Equivalent static moment in load direction

P N
Equivalent dynamic load.

The equivalent static bearing load is determined in approximate terms from the maximum loads:

$$P_0 = F_{\max}$$

$$M_0 = M_{\max}$$

Attention!

Static load safety factor S_0 for design of linear guidance systems, see tables starting page 24.

Application-oriented static load safety factor

For the design of linear guidance systems, the static load safety factor S_0 according to the following tables must be taken into consideration.

Application in machine tools

Precondition	S_0
Critical case - High dynamic loading with one axis stationary - Severe contamination - Actual load parameters are not defined - Catalogue specifications for accuracy of adjacent construction are not observed	8 to 12
Normal case - Not all load parameters are completely known or: - Cutting forces are estimated from the performance data of the machine	5 to 8
All load parameters are known	4 to 5
All load parameters are known (and definitely correspond to reality)	3 to 4



Application in general usage with overhead arrangement¹⁾

Precondition	S_0
☐ Not all load parameters are known and fewer than 4 carriages support a coherent weight	20
☐ Not all load parameters are known and at least 4 carriages support a coherent weight or: ☐ All load parameters are known and fewer than 4 carriages support a coherent weight	8 to 12
☐ All load parameters are known and at least 4 carriages support a coherent weight	5 to 8

¹⁾ If the guidance system is in a suspended arrangement, a drop guard is recommended, see page 67.

Application in general usage

Precondition	S_0
☐ Predominantly oscillating load with stationary guidance system	20
☐ All load parameters are completely known and catalogue specifications for accuracy of the adjacent construction accuracy are observed, with smooth and vibration-free running	3 to 4

Strength of guidance systems

Attention!

If the fixing screw threads are of a sufficient size, monorail guidance systems can be subjected to loads up to the static load carrying capacity C_0 and M_0 according to the dimension tables. The load must be transmitted via locating surfaces.

INA calculation program

The calculation on pages 20 to 23 is used for the preliminary selection of monorail guidance systems. They allow an approximate calculation of the equivalent static and dynamic bearing loads.

BEARINX[®] for precise design

In order to achieve precise design of linear guidance elements in relation to basic rating life and static load safety factor, it is necessary to calculate the bearing load in a statically indeterminate system and the internal load distribution of the linear guidance elements (Loading of individual rolling elements, *Figure 1*). This requires a complex calculation process.

For this reason, INA developed the rolling bearing analysis program BEARINX[®] which can be used to calculate linear and rotary bearings as a part of the complete system (e.g. machine tool, automotive gearbox, etc.) and thereby ensure reliable designs.

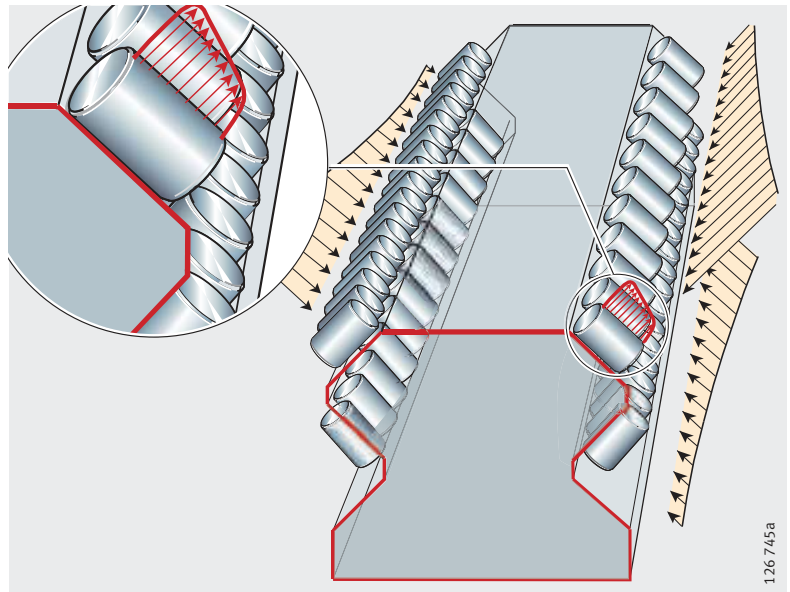


Figure 1
Internal load distribution under
combined load

BEARINX[®] linear module

The linear module of BEARINX[®] can be used to calculate linear guidance elements in multi-axis systems (e.g. machine tools) under any load combination down to the level of the rolling element contact. The integral analysis method can be used to investigate the influence of nearly all parameters of the complete system on relevant results.



Taking account of elasticities in the system

This sophisticated calculation model takes account of all the elasticities in the system, ranging from the rigidity of the saddle plate and guideways through to the non-linear deflection behaviour of the rolling elements.

In order to determine even more precisely the pressure between the rolling elements and raceway in linear recirculating roller bearing and guideway assemblies, the end profiling of the rolling elements is also taken into consideration. The adjacent construction is assumed to be rigid in the first instance but can, if necessary, be modelled on an elastic basis by means of reduced rigidity matrices (e.g. from FE calculation).

Very precise results

This model gives significantly more precise results than calculation programs that only take account of elasticity in rolling contact. This means an increased level of security in the design.

BEARINX[®] allows the calculation of systems with any number of: travel axes, linear guidance elements and linear drives, load situations, loads and masses.

The results provided by BEARINX[®] include the static load safety factor, the basic rating life and the displacements that arise from the elasticity of the bearing arrangement.

Calculation using BEARINX[®] is available as a service.

Linear BEARINX[®] online

The linear calculation program BEARINX[®] online assists in the calculation and design of the linear guidance system, *Figure 2*; for information and registration. A fee will be charged for usage.

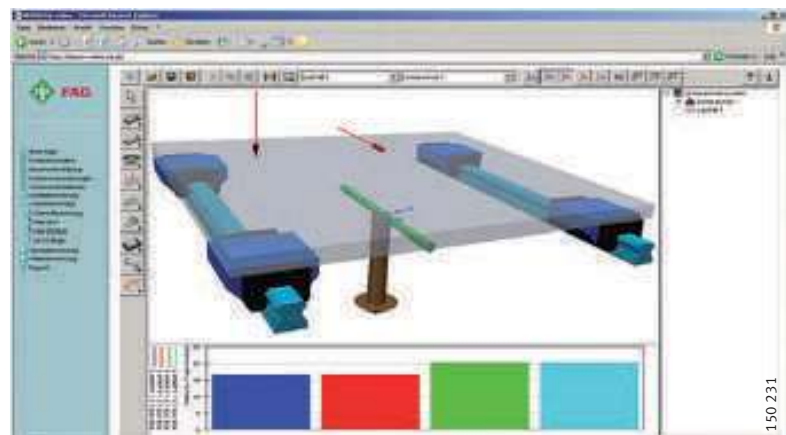


Figure 2
Example page
from the online program

INA calculation program

Calculation program – example of input data for a design brief

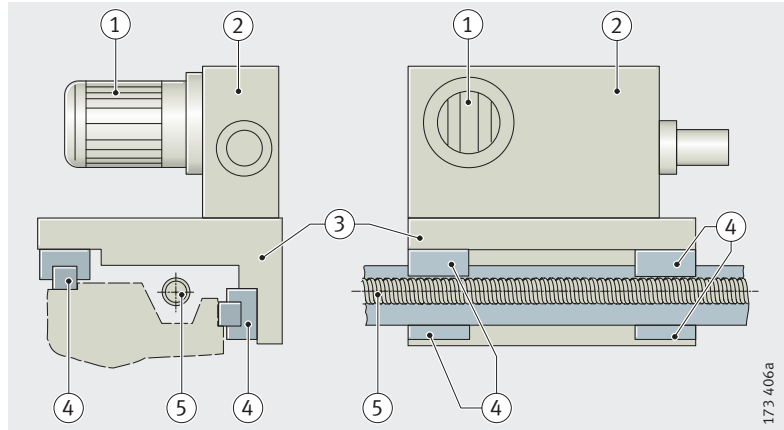
Step 1 Define the components

The input data for the calculation program should be compiled from the design brief (with clearly dimensioned drawings or diagrams in at least two views). Here is a step-by-step guide based on a simple example to show the dimensioning process.

The relevant factors for calculation, apart from the linear guidance elements and the drive system for the table, are those components that induce loads on the linear guidance elements (the inherent mass of the components or their inertia forces), *Figure 3*.

- ① Motor
- ② Headstock
- ③ Base plate
- ④ Linear guidance elements
- ⑤ Drive

Figure 3
Defining the components





Step 2 Define the table co-ordinate system

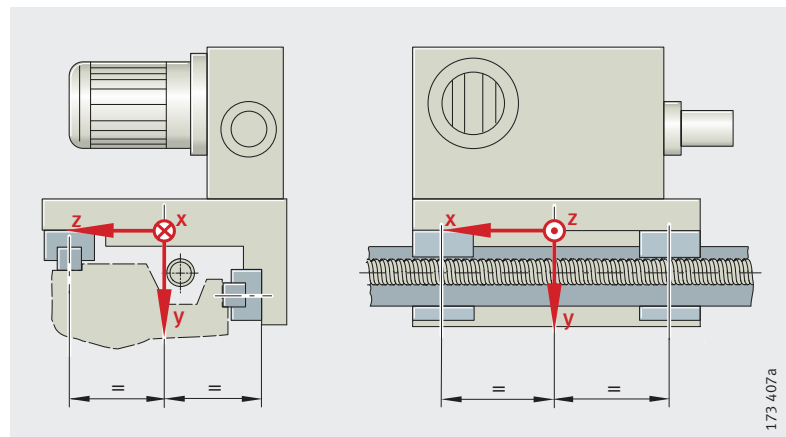
The table co-ordinate system is a Cartesian, right hand co-ordinate system.

The directions in the table co-ordinate system are defined as follows, *Figure 4*:

- X axis: travel direction of the table
- Y axis: main load direction on the system (direction of weight)
- Z axis: derived from the right hand rule (lateral direction).

The (translational) position of the table co-ordinate system is freely selectable. It is recommended that this should be located centrally between the carriages for directions X and Y.

Figure 4
Defining the
table co-ordinate system



INA calculation program

Step 3 Define the linear guidance elements

The translational position of the linear guidance elements is stated in relation to the table co-ordinate system. In order to determine the torsion angle of the linear guidance elements, their co-ordinate system is rotated about the X axis into the table co-ordinate system, *Figure 5*.

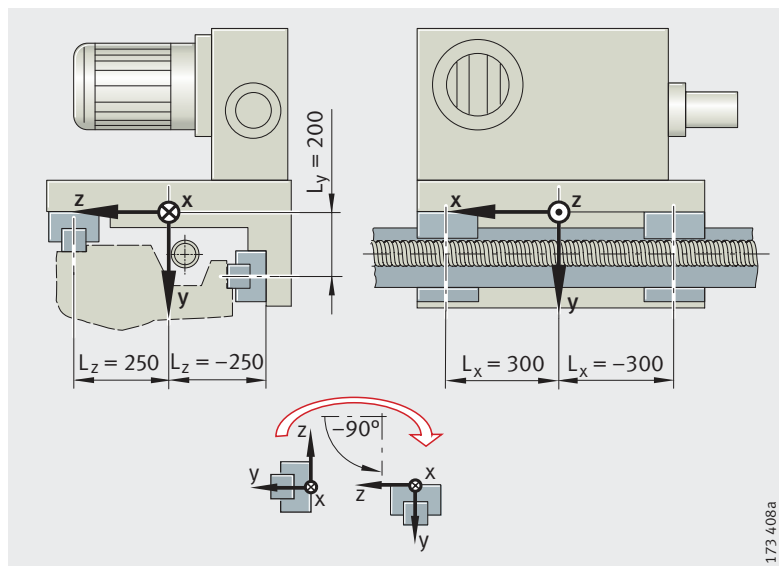


Figure 5
Defining the position of the linear guidance elements

Step 4 Define the position of the drives

The translational position of the drives (support function in the traverse direction) is stated in relation to the table co-ordinate system as Y and Z co-ordinates, *Figure 6*.

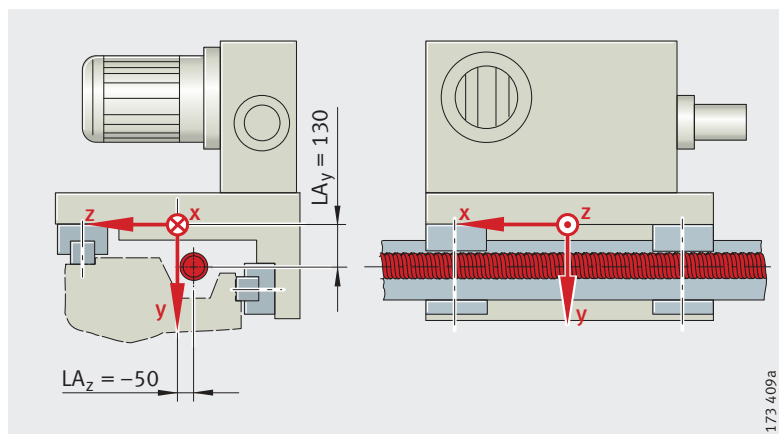
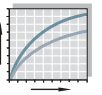


Figure 6
Defining the position of the drives



Step 5 Define the centres of gravity of the components

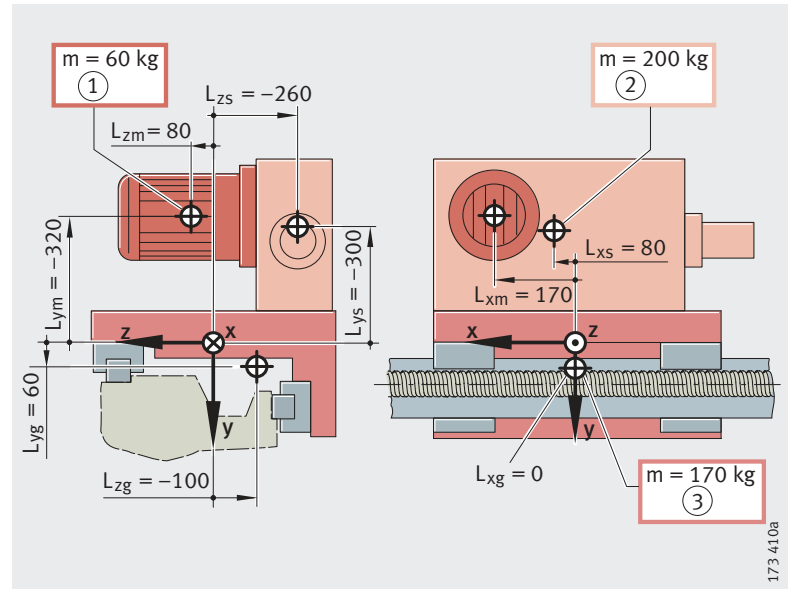
The mass of the components is concentrated at a mass point at its centre.

The translational position of the centres is again stated in relation to the table co-ordinate system, *Figure 7*.

- ① Mass of motor
- ② Mass of headstock
- ③ Mass of base plate

Figure 7

Defining the centres of gravity
of the components



Step 6 Define the external loads

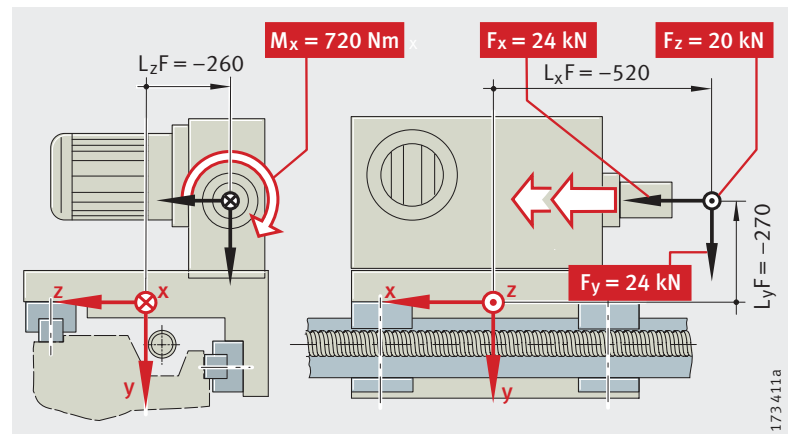
External loads such as machining forces on the linear table, are stated in relation to the table co-ordinate system.

The following must be stated, *Figure 8*:

- in which of the defined load cases the load acts on the table co-ordinate system
- the position of its loading point
- the force and moment components.

Figure 8

Defining the external loads



INA calculation program

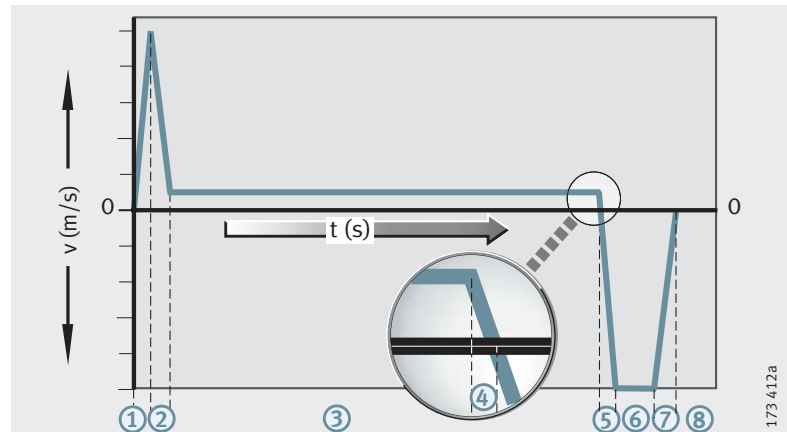
Step 7 Define the duty cycle

In order to depict the working cycle of the machine, a duty cycle must be described. This is composed of the motion parameters of the machine and their loading due to external loads (e.g. machining forces).

On the basis of a speed/time diagram, the working cycle should be subdivided logically into individual load cases, *Figure 9*, ① to ⑧.

With the aid of the basic motion formulae for uniform motion ($v = \text{const.}$) or uniform acceleration ($a = \text{const.}$) as appropriate, the missing values (travel, acceleration) can then be determined.

① to ⑧ = load cases
Figure 9
Defining the duty cycle



Travel

$$s(t) = s_0 + \left(\frac{v + v_0}{2} \cdot t \right)$$

Velocity

$$v(t) = v_0 + a \cdot t$$

Acceleration

$$a(t) = \frac{\Delta v}{\Delta t}$$

INA calculation program

Machining

Constant velocity

v_3 (0,05 m/s) for t_3 (1,105 s);
additional effect of machining force, *Figure 9*, page 32, ③.

$$a_3 = 0 \text{ m/s}^2$$

$$s_3 = s_2 + \frac{v_3 + v_2}{2} \cdot t_3$$

$$s_3 = 0,0249 + \frac{0,05 + 0,05}{2} \cdot 1,105 = 0,0801 \text{ m} = 80,1 \text{ mm}$$

Machining force

Position:

■ $x = -520 \text{ mm}$

■ $y = -270 \text{ mm}$

■ $z = -260 \text{ mm}$.

Value:

■ $M_x = 720 \text{ Nm}$

■ $F_x = 24 \text{ Nm}$

■ $M_y = 24 \text{ Nm}$

■ $F_z = 20 \text{ Nm}$.

Deceleration

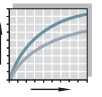
In t_4 (0,0025 s) to v_4 (0 m/s), *Figure 9*, page 32, ④.

$$a_4 = \frac{v_4 - v_3}{t_4}$$

$$a_4 = \frac{0,0 - 0,05}{0,0025} = -20 \text{ m/s}^2$$

$$s_4 = s_3 + \frac{v_4 + v_3}{2} \cdot t_4$$

$$s_4 = 0,0801 + \frac{0,0 + 0,05}{2} \cdot 0,0025 = 0,0802 \text{ m} = 80,2 \text{ mm}$$



Rapid traverse back to original position

Acceleration

In t_5 (0,025) to v_5 (-0,5 m/s);
opposing direction, *Figure 9*, page 32, ⑤.

$$a_5 = \frac{v_5 - v_4}{t_5}$$

$$a_5 = \frac{-0,5 - 0,0}{0,025} = -20 \text{ m/s}^2$$

$$s_5 = s_4 + \frac{v_5 + v_4}{2} \cdot t_5$$

$$s_5 = 0,0802 + \frac{-0,5 + 0,0}{2} \cdot 0,025 = 0,0739 \text{ m} = 73,9 \text{ mm}$$

Constant velocity

v_6 (-0,5 m/s) for t_6 (0,135 s);
opposing direction, *Figure 9*, page 32, ⑥.

$$a_6 = 0 \text{ m/s}^2$$

$$s_6 = s_5 + \frac{v_6 + v_5}{2} \cdot t_6$$

$$s_6 = 0,0739 + \frac{-0,5 + (-0,5)}{2} \cdot 0,135 = 0,0064 \text{ m} = 6,4 \text{ mm}$$

Deceleration

In t_7 (0,0257 s) to v_7 (0 m/s), *Figure 9*, page 32, ⑦.

$$a_7 = \frac{v_7 - v_6}{t_7}$$

$$a_7 = \frac{0 - (-0,5)}{0,0257} = 19,46 \text{ m/s}^2$$

$$s_7 = s_6 + \frac{v_7 + v_6}{2} \cdot t_7$$

$$s_7 = 0,064 + \frac{0,0 + (-0,5)}{2} \cdot 0,0257 \approx 0 \text{ m}$$

Standstill in original position

Duration

t_8 (1,5 s), v_8 (0 m/s), *Figure 9*, page 32, ⑧.

$$a_8 = 0 \text{ m/s}^2$$

$$s_8 = 0 \text{ mm}$$

Preload

Influence of preload

Preload increases the rigidity of the bearing arrangement (reduced deflection), the equivalent bearing load and the guidance accuracy.

Preload and damping

The damping of linear guidance systems based on rolling elements is not influenced by preload. A significant level of damping is only achieved by means of additional design measures, such as the damping carriage RUDS...-D for RUE.

Attention!

The approximate calculation of the equivalent static and dynamic load, see page 21, does not take bearing preload into consideration. Under low load and high preload, the values for rating life and static load safety factor may be lower than those calculated using the approximation formulae for equivalent static and dynamic load. The correct preload is only achieved once the guidance system is completely assembled (due to deflection of the back of the carriage).

Preload class and suitable applications

Preload class	Preload setting	Suitable applications
Linear recirculating roller bearing and guideway assemblies RUE...-D, RUE...-E (-L-KT) ²⁾		
V3	$0,1 \cdot C$	☐ High alternating load ☐ Particularly high rigidity ☐ Moment load
Linear recirculating ball bearing and guideway assemblies KUSE		
V1	$0,04 \cdot C_{II}^{1)}$	☐ High rigidity ☐ Moment load
V2	$0,13 \cdot C_{II}^{1)}$	☐ Alternating load ☐ Particularly high rigidity ☐ Moment load
Linear recirculating ball bearing and guideway assemblies KUBE...-B (-KT) ²⁾		
V1	$0,04 \cdot C$	☐ High rigidity ☐ Moment load
V2	$0,1 \cdot C$	☐ Alternating load ☐ Particularly high rigidity ☐ Moment load
Linear recirculating ball bearing and guideway assemblies KUE		
V0	Very small clearance to clearance-free	☐ Smooth-running ☐ Moment load
V1	Clearance-free	☐ High rigidity ☐ Moment load

¹⁾ Basic dynamic load rating C_{II} in tensile direction.

²⁾ Other preload classes available by agreement.



Friction

Influencing factors

Linear guidance systems have a low, uniform resistance to displacement.

The factors influencing friction are:

- the load
- the preload
- the traverse velocity
- the lubricant (viscosity and quantity)
- the temperature
- any misalignment
- the degree of sliding behaviour in the seals.

Influence of grease on friction

At initial operation and relubrication, the coefficient of friction increases temporarily due to the fresh grease. After a short running-in period, however, the coefficient of friction returns to its original lower value.

The friction behaviour is determined significantly by the characteristics of the grease used. The consistency and base oil viscosity serve as approximate guide values.

Attention!

Systems have an increased resistance to displacement after initial greasing.

Influence of seals on friction

Contact seals increase the total friction of the linear guidance system.

The seal friction is at its highest in new guidance systems. It decreases after the running-in period.

Attention!

Additional wiper variants (accessories) increase the friction to differing extents depending on the seal design.

Friction values are available by agreement.

Lubrication

Oil or grease lubrication

Monorail guidance systems must be lubricated. Technical, economic and ecological factors will determine whether oil or grease should be used and which lubrication method should be applied.

A significant factor in selecting the type of lubrication is the environmental conditions (contamination, etc.) acting on the guidance system. If extreme conditions are anticipated, it is recommended that Schaeffler Group External Sales is consulted in the design phase.

Delivered condition, suitable lubricants

RUE...-E (-L-KT), KUSE, KUVS, KUE are supplied with a preservative. The preservative is compatible with oils and greases having a mineral oil base.

Series KUVS...-B (-KT) is supplied with initial grease lubrication.

Monorail guidance systems run exclusively under mixed friction conditions. Doped lubricants should therefore be used in preference (type P to DIN 51 502).

Overview of lubricating oils

Linear guidance system	Oil to ISO-VG			
	68	100	150	220
Linear recirculating roller bearing and guideway assemblies				
RUE...-E (-L-KT)	●	●	●	●
Minimal lubricant quantity metering unit				
KIT.RWU...-510 (-H-510)	●	●	●	●
KIT.RWU...-511 (-H-511)	●	●	●	●
Linear recirculating ball bearing and guideway assemblies				
KUSE	●	●	●	●
KUVS...-B (-KT)	●	●	●	●
KUE	●	●	●	●

● Suitable.

Overview of lubricating greases

Linear guidance system	Grease and flowable grease										
	NLGI grade (consistency)						Base oil ISO-VG				
	000	00	0	1	2	3	68	100	150	220	
Linear recirculating roller bearing and guideway assemblies											
RUE...-E (-L-KT)	●	●	●	●	●	●	—	—	●	●	
Minimal lubricant quantity metering unit											
KIT.RWU...-510 (-H-510)	●	●	—	—	—	—	—	—	●	●	
KIT.RWU...-511 (-H-511)	●	●	—	—	—	—	—	—	●	●	
Linear recirculating ball bearing and guideway assemblies											
KUSE	●	●	●	●	●	●	●	●	●	—	
KUVS...-B (-KT)	●	●	●	●	●	●	●	●	●	—	
KUE	●	●	●	●	●	●	●	●	●	—	

● Suitable.



Used lubricants

Attention!

Used lubricants should be disposed of by environmentally-friendly methods. The use of lubricants is governed by national regulations for environmental protection and occupational safety as well as guidance from the lubricant manufacturers. These specifications must be observed.

Oil lubrication

The advantage of oil lubrication is the flushing effect.

Preference should be given to the use of oils CLP or CGLP to DIN 51 517 and HLP to DIN 51 524.

At operating temperatures between +10 °C and +70 °C, the viscosity should lie between ISO-VG 68 and ISO-VG 220, see table, page 38.

For low temperatures, oils with lower viscosity must be used.

For highly dynamic applications, oils to ISO-VG 100 are recommended.

Compatibility

If it is possible to draw upon practical experience or guidelines from the oil manufacturer, oils must not be used until their behaviour in relation to plastics, elastomers and non-ferrous metals has been tested.

Attention!

The compatibility of oils must always be checked.

This must always be checked under dynamic conditions and at operating temperature.

In case of doubt, the lubricant manufacturer must be consulted.

Miscibility

Lubricant oils with a mineral oil base of the same classification are miscible with each other. However, the viscosities should be within one ISO-VG class of each other.

Attention!

The miscibility of synthetic oils must always be checked.

In case of doubt, the lubricant manufacturer must be consulted.

Compatibility with process materials (e.g. cooling lubricants) must be checked.

Lubrication

Lubricant quantities

The values in the tables, page 41 to page 44, are guide values.

They are valid for the following conditions:

- operating duration 100%
- $C_0/P = 8$
- $v = 0,8 \text{ m/s}$
- stroke 500 mm to 1000 mm
- independent of mounting positions, 0° to 90° .

Precise values can only be determined in practice. Adequate provision of lubricant is indicated by a visible, unbroken oil film at the profile of the wipers.

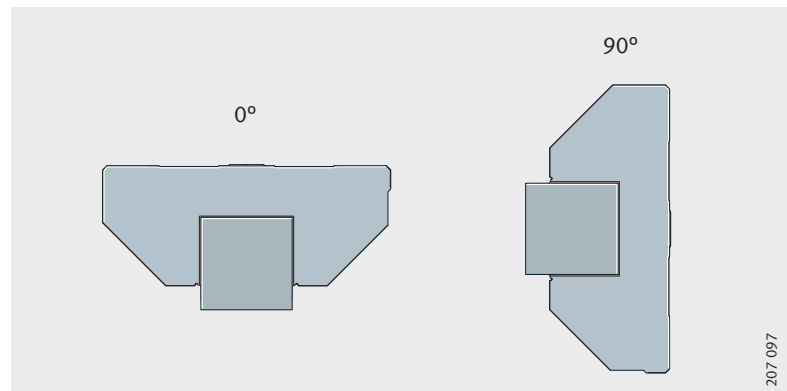


Figure 1
Mounting position

Minimum oil quantity $Q_{\min}$

The minimum oil quantity $Q_{\min}$ is valid for initial operation or for resumed operation after machine standstill of more than 8 hours; for values see tables, page 41 to page 44.

For initial operation, it is measured such that the oil ducts, rolling elements and raceways will be adequately provided with lubricant.



Oil impulse quantity Q_{imp}

The oil impulse quantity Q_{imp} is valid if the linear guidance system is connected to a central lubrication system and the stroke ratio is less than 200; for stroke ratio see page 50, for oil impulse quantity values see tables, page 41 to page 44.

Attention!

Carriages with a minimal lubricant quantity metering unit (KIT.RWU..-510, KIT.RWU..-511, KIT.RWU..-H-510 and KIT.RWU..-H-511) have integrated piston distributors. These supply a metered quantity of 0,12 cm³ per lubrication impulse to the carriages RWU. A separate piston distributor cannot be used with these guidance systems.

The lubricant quantities are valid for all mounting positions.

If heavy contamination is present, it may be necessary to increase the oil relubrication quantity.

The oil quantity for the damping carriage RUDS is dependent on the size of the recirculating roller guidance system RUE..-E (-L-KT).

Oil quantities for RUE and RUDS

Designation ¹⁾	Quantity for in-ital operation Minimum oil quantity Q_{min} cm ³	Relubrication quantities			
		Number of im- pulses	Oil im- pulse quan- tity Q_{imp} cm ³	Relubri- cation interval in h	Con- sump- tion cm ³ /h
RUE25-D-OE (-H, -L, -HL)	0,8	1	0,2	3	0,06
RUE35-E (-H, -L, -HL)	1,3	2	0,6	12	0,1
RUE35-E-L-KT (-HL)	1,3	2	0,6	12	0,1
RUE45-E (-H)	1,6	3	0,6	7	0,25
RUE45-E-L (-HL)	2,1	3	0,6	7	0,25
RUE45-E-L-KT (-HL)	2,1	3	0,6	7	0,25
RUE55-E (-H)	2,8	3	0,6	9	0,2
RUE55-E-L (-HL)	3,2	3	0,6	9	0,2
RUE55-E-L-KT (-HL)	3,2	3	0,6	9	0,2
RUE65-E (-H)	5,2	4	0,6	2	1,2
RUE65-E-L (-HL)	5,8	4	0,6	2	1,2
RUE65-E-L-KT (-HL)	5,8	4	0,6	2	1,2
RUE100-E-L	17,6	4	0,6	1	2,4

¹⁾ The oil quantity for the damping carriage RUDS is dependent on the size of the recirculating roller guidance system RUE.

Lubrication

Oil quantities for RUE...-E with minimal lubricant quantity metering unit

Designation	Number of im- pulses	Relubri- cation interval in h	Con- sump- tion cm ³ /h
RUE35-E (-E-H, -E-L, -E-HL, -E-L-KT, -E-HL-KT)	1	2,4	0,05
RUE45-E (-E-H)	1	1,5	0,08
RUE45-E-L (-E-HL, -E-L-KT, -E-HL-KT)	1	1,2	0,1
RUE55-E (-E-H)	1	0,9	0,13
RUE55-E-L (-E-HL, -E-L-KT, -E-HL-KT)	1	0,8	0,15
RUE65-E (-E-H)	1	0,5	0,25
RUE65-E-L (-E-HL, -E-L-KT, -E-HL-KT)	1	0,4	0,28

Attention!

RUE...-E (-L-KT) with a minimal lubricant quantity metering unit has integral piston distributors. A separate piston distributor cannot be used with this combination.

Oil quantities for KUSE

Designation	Minimum oil quantity for initial operation Q _{min} cm ³	Oil impulse quantity Q _{imp} cm ³ /h
KUSE20 (-H)	1,2	0,03
KUSE20-L (-HL)	1,6	0,04
KUSE25 (-H)	1,2	0,03
KUSE25-L (-HL)	2	0,05
KUSE30 (-H)	1,6	0,04
KUSE30-L (-HL)	2,8	0,07
KUSE35 (-H)	2,2	0,04
KUSE35-L (-HL)	3,2	0,08
KUSE45 (-H)	2,8	0,07
KUSE45-L (-HL)	5,2	0,12
KUSE55 (-H)	3,8	0,09
KUSE55-L (-HL)	6,8	0,14



Oil quantities for KUVE

Designation	Minimum oil quantity for initial operation $Q_{\min}$ cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUVE15-B (-S, -H)	0,6	0,02
KUVE15-B-EC (-ESC)	0,6	0,02
KUVE15-B-KT (-S, -H)	0,6	0,02
KUVE15-B-KT-L (-H, -HL, -SL)	0,6	0,02
KUVE20-B (-S, -H, -SN, -N)	0,9	0,03
KUVE20-B-L (-SL, -SNL, -NL)	0,9	0,03
KUVE20-B-EC (-ESC)	0,6	0,02
KUVE20-B-KT (-S)	0,9	0,03
KUVE20-B-KT-L (-SL)	0,9	0,03
KUVE25-B (-S, -H, -SN, -N)	0,9	0,03
KUVE25-B-L (-SL, -HL, -SNL, -NL)	1,2	0,04
KUVE25-B-EC (-ESC)	0,9	0,02
KUVE25-B-KT (-S, -H, -W)	0,9	0,03
KUVE25-B-KT-L (-SL, -HL, -WL)	1,2	0,04
KUVE30-B (-S, -H, -SN, -N)	0,9	0,03
KUVE30-B-L (-SL, -HL, -SNL, -NL)	1,5	0,05
KUVE30-B-EC (-ESC)	0,9	0,02
KUVE30-B-KT (-S, -H)	0,9	0,03
KUVE30-B-KT-L (-SL, -HL)	1,5	0,05
KUVE35-B (-S, -H, -SN, -N)	1,4	0,04
KUVE35-B-L (-SL, -HL, -SNL, -NL)	1,8	0,06
KUVE35-B-EC (-ESC)	0,9	0,02
KUVE35-B-KT (-S, -H)	1,4	0,04
KUVE35-B-KT-L (-SL, -HL)	1,8	0,06
KUVE45-B (-S, -H, -SN, -N)	2,2	0,05
KUVE45-B-L (-SL, -HL, -SNL, -NL)	3	0,09
KUVE45-B-EC (-ESC)	1,4	0,03
KUVE45-B-KT (-S, -H)	2,2	0,05
KUVE45-B-KT-L (-SL, -HL)	3	0,09
KUVE55-B (-S)	3	0,09
KUVE55-B-L (-SL)	4,2	0,12
KUVE55-B-KT (-S)	3	0,09
KUVE55-B-KT-L (-SL)	4,2	0,12

Lubrication

Oil quantities for KUE

Designation	Minimum oil quantity for initial operation $Q_{\min}$ cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUE15 (-H)	0,6	0,3
KUE20 (-H)	0,6	0,3
KUE25 (-H)	0,6	0,3
KUE30 (-H)	0,9	0,5
KUE35 (-H)	1,2	0,6

Oil quantities for KUVS

Designation	Minimum oil quantity for initial operation $Q_{\min}$ cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUVS32	0,5 to 0,6	0,3
KUVS42	0,5 to 0,6	0,3
KUVS69	0,8 to 0,9	0,5

Grease lubrication

The advantages of grease lubrication are as follows:

- little requirement for design work; it may be possible to dispense with a central lubrication system
- the possibility of long term lubrication
- the use of reservoir lubrication.

Flowable grease lubrication

For flowable greases of classes NLGI 00 and NLGI 000, the guide values for oil lubrication according to tables, page 41 to page 44, are valid.

For flowable greases of class NLGI 0, the data for the lubricant quantity and relubrication interval in the section apply.

In clean environmental conditions, the impulse quantity can in certain circumstances be reduced to approximately 20% of the oil impulse quantity given in the tables. If lubrication is carried out using flowable grease for linear recirculating roller bearing and guideway assembly RUE25-D, the design RUE25-D-FE must be selected.



Minimal lubricant quantity metering unit

For the minimal lubricant quantity metering unit, only flowable greases of classes NLGI 00 and NLGI 000 are permissible.
It is recommended that lithium soap or lithium complex soap greases with a mineral oil base and EP additives are used.
The base oil viscosity is shown in the table.

Base oil viscosity

Guidance system	Base oil viscosity
KUSE ¹⁾ KUE...-B (-KT) ¹⁾ KUE ¹⁾	ISO-VG 68 to ISO-VG 100
RUE...-D, RUE...-E (-L-KT) ²⁾	ISO-VG 150 to ISO-VG 220

¹⁾ For initial greasing with grease KP2P–30 to DIN 51825.

²⁾ For initial greasing with grease KP2P–20 to DIN 51825.

Grease lubrication

It is recommended that lithium soap or lithium complex soap greases with a mineral oil base are used.
The base oil viscosity is shown in the table.

Base oil viscosity

Guidance system	Base oil viscosity
KUSE KUE...-B (-KT) KUE	ISO-VG 68 to ISO-VG 100
RUE...-D, RUE...-E (-L-KT)	ISO-VG 150 to ISO-VG 220

Attention!

For high loads, greases doped with EP additives are absolutely necessary.

Miscibility

Greases may be mixed if:

- they have the same base oil type
- they have matching thickener types
- they have similar base oil viscosities:
the difference must be no more than one ISO-VG class
- they have the same consistency (NLGI class).

In case of doubt, please contact us.

Lubrication

Storage life

Experience shows that INA linear guidance systems lubricated with greases having a mineral oil base can be stored for up to 3 years.

The following preconditions apply:

- closed storage room
- storage temperature between 0 °C and +40 °C
- relative humidity <65%
- protection against chemical agents (vapours, gases, fluids).

It is the user's responsibility to follow the advice given by the lubricant manufacturer.

Initial grease quantity

Attention!

If the linear guidance system is not lubricated by means of a central lubrication system, the carriage (KUVE-B (-KT) with initial greasing as standard) must be greased with the initial grease quantity before fitting – for guide values see tables, page 46 and page 47.

Initial grease quantities for RUE

Designation	Initial grease quantity ≈g
RUE25-D-FE (-H)	2
RUE25-D-L-FE (-HL)	3
RUE35-E (-H)	6
RUE35-E-L (-KT, -HL, -HL-KT)	7
RUE45-E (-H)	10
RUE45-E-L (-KT, -HL, -HL-KT)	14
RUE55-E (-H)	18
RUE55-E-L (-KT, -HL, -HL-KT)	22
RUE65-E (-H)	20
RUE65-E-L (-KT, -HL, -HL-KT)	25
RUE100-E-L	80

Initial grease quantities for KUSE

Designation	Initial grease quantity ≈g
KUSE20-H	3
KUSE20-L (-HL)	3,8
KUSE25-H	4
KUSE25-L (-HL)	5,5
KUSE30-H	7
KUSE30-L (-HL)	9
KUSE35-H	11
KUSE35-L (-HL)	15
KUSE45-H	18
KUSE45-L (-HL)	23
KUSE55-H	26
KUSE55-L (-HL)	33



Initial grease quantities for KUV

Designation	Initial grease quantity ≈g
KUVE15-B (-S, -H)	0,6
KUVE15-B-EC (-ESC)	0,4
KUVE15-B-KT (-S, -H)	0,6
KUVE15-B-KT-L (-H, -HL, -SL)	0,8
KUVE20-B (-S, -H, -SN, -N)	1,1
KUVE20-B-L (-SL, -SNL, -NL)	1,4
KUVE20-B-EC (-ESC)	0,8
KUVE20-B-KT (-S)	1,1
KUVE20-B-KT-L (-SL)	1,4
KUVE25-B (-S, -H, -SN, -N)	1,5
KUVE25-B-L (-SL, -HL, -SNL, -NL)	2,3
KUVE25-B-EC (-ESC)	1,1
KUVE25-B-KT (-S, -H, -W)	1,5
KUVE25-B-KT-L (-SL, -HL, -WL)	2,3
KUVE30-B (-S, -H, -SN, -N)	3
KUVE30-B-L (-SL, -HL, -SNL, -NL)	3,8
KUVE30-B-EC (-ESC)	1,9
KUVE30-B-KT (-S, -H)	3
KUVE30-B-KT-L (-SL, -HL)	3,8
KUVE35-B (-S, -H, -SN, -N)	4,5
KUVE35-B-L (-SL, -HL, -SNL, -NL)	6
KUVE35-B-EC (-ESC)	3
KUVE35-B-KT (-S, -H)	4,5
KUVE35-B-KT-L (-SL, -HL)	6
KUVE45-B (-S, -H, -SN, -N)	9
KUVE45-B-L (-SL, -HL, -SNL, -NL)	10,5
KUVE45-B-EC (-ESC)	6
KUVE45-B-KT (-S, -H)	9
KUVE45-B-KT-L (-SL, -HL)	10,5
KUVE55-B (-S)	10,9
KUVE55-B-L (-SL)	14,3
KUVE55-B-KT (-S)	10,9
KUVE55-B-KT-L (-SL)	14,3

Initial grease quantities for KUE

Designation	Initial grease quantity ≈g
KUE15-H	1
KUE20-H	1,4
KUE25-H	2
KUE30-H	4
KUE35-H	5

Initial grease quantities for KUVS

Designation	Initial grease quantity ≈g
KUVS32	0,2 to 0,3
KUVS42	0,8 to 1
KUVS69	2 to 2,5

Lubrication

Calculation of lubrication interval

Grease operating life

Since it is not possible to calculate all the influencing factors, the precise grease operating life can only be determined under actual operating conditions. The approximation formula below, however, can be used to determine a guide value for many applications:

$$t_{fG} = t_f \cdot K_P \cdot K_W \cdot K_U$$

t_{fG} Guide value for grease operating life in operating hours

t_f Factor for basic lubrication interval in operating hours, *Figure 2*

K_P, K_W, K_U Correction factors for load, stroke and environment, page 49 and page 50.

Attention!

The grease operating life is restricted to a maximum of three years due to the ageing resistance of the grease.

Basic lubrication interval

The basic lubrication interval t_f is valid under the following conditions, *Figure 2*:

- a bearing temperature of $< +70\text{ °C}$
- a load ratio $C_0/P = 20$
- no disruptive environmental influences
- a stroke ratio between 10 and 50, page 50.

Speed parameter

The speed parameter is defined as follows:

$$GKW = \frac{60}{\bar{v}} \cdot K_{LF}$$

GKW Speed parameter, *Figure 2*

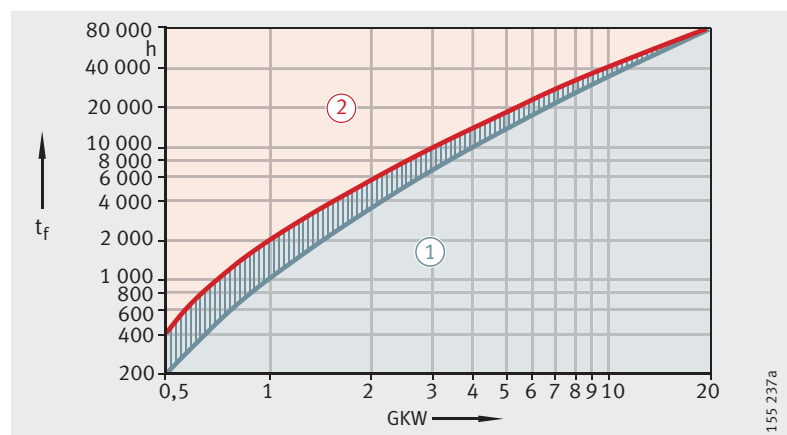
$\bar{v}$ Mean travel velocity

K_{LF} Bearing factor, see table, page 49.

t_f = basic lubrication interval
GKW = speed parameter

- ① Relubrication possible
- ② Regreasing required

Figure 2
Determination
of the basic lubrication interval





Bearing factor K_{LF} for delivered condition

Linear guidance system	Bearing factor K_{LF}		
	Carriage preserved	Carriage pregreased	Long term lubrication unit KIT ¹⁾
RUE25-D RUE...-E (-L-KT)	0,8	1,2	2,5
KUSE	2,5	4,5	—
KUVE...-B (-KT)	2,5	4,5	5,5
KUE	1,5	4,5	—

¹⁾ Valid only with long term lubrication unit KIT fitted on both sides of carriage.

Correction factor for load K_P

Attention!

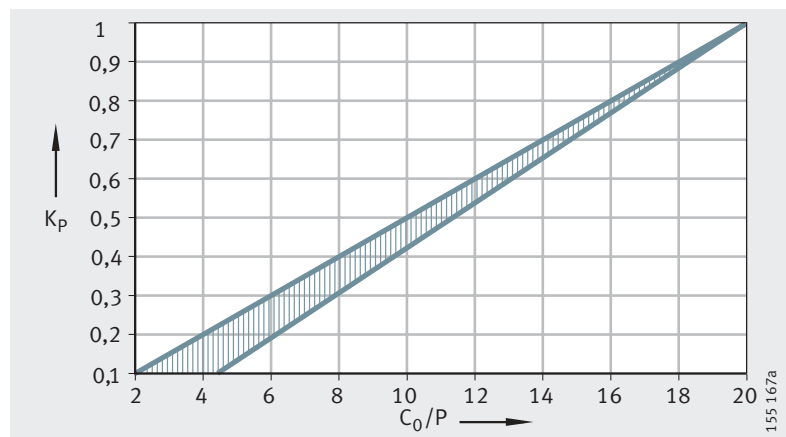
The correction factor K_P takes account of the strain on the grease at a load ratio of $C_0/P < 20$, *Figure 3*.

The factors are only valid for high quality lithium soap greases.

K_P = load correction factor
 C_0/P = load ratio

Figure 3

Correction factor
for load



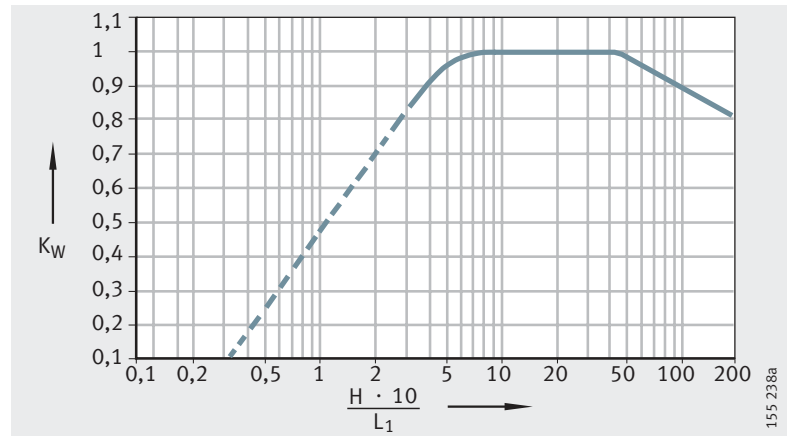
Lubrication

Correction factor for stroke K_W

The correction factor K_W takes account of the displacement distance to be lubricated, *Figure 4*. It is dependent on the stroke ratio.

$$K_W = \text{stroke correction factor} \\ \frac{H \cdot 10}{L_1} = \text{stroke ratio}$$

Figure 4
Correction factor for stroke



Stroke ratio

If the stroke ratio is < 10 or > 50 , the grease operating life is reduced due to the risk of fretting corrosion or the loss of grease.

The stroke ratio is calculated as follows:

$$\text{Stroke ratio} = \frac{H \cdot 10}{L_1}$$

L_1 mm
Effective saddle plate length according to dimension tables
 H mm
Stroke length.

If the stroke is very short, the grease operating life may be shorter than the calculated value. In this case, special greases are recommended – please contact us.

Correction factor for environment K_U

Attention!

The correction factor K_U takes account of shaking forces, vibrations (a cause of fretting corrosion) and shocks, see table.

These influences place an additional strain on the grease.

If cooling lubricant or moisture come into contact with the rolling element system, calculation is not possible.

Environmental influence and correction factor

Environmental influence	Correction factor K_U
Slight	1
Moderate	0,8
Heavy	0,5



Relubrication interval	If the guide value for the grease operating life t_{fG} is less than the required operating duration of the linear unit, relubrication must be carried out. Relubrication must be carried out at a time when the old grease can still be forced out of the carriage by the new grease. A guide value for the relubrication interval for most applications is: $t_{fR} = 0,5 \cdot t_{fG}; \quad t_{fG} < t_{fE}$
	t_{fR} h Guide value for relubrication interval in operating hours t_{fG} h Guide value for grease operating life in operating hours t_{fE} h Required operating duration in hours.
Relubrication of the guidance system Grease	The grease used for relubrication should be the same as that used for initial greasing; if different greases are to be used, the miscibility and compatibility of the greases must first be checked, see Miscibility, page 45.
Relubrication quantity	The relubrication quantity is approximately 50% of the initial grease quantity. Relubrication should preferably be carried out with several partial quantities instead of the complete quantity at a single point in time.
Relubrication procedure	Relubrication should be carried out with the carriage still warm from operation and the carriage should be moved during relubrication. The minimum stroke is four times the saddle plate length for saddle plate length, see dimension tables (L_1).
Attention!	If lubrication is carried out by hand, the grease gun, lubrication nipple and the environment of the lubrication nipple must first be cleaned thoroughly. If long term lubrication units KIT.RWU..-E-410, KIT.RWU..-E-430, KIT.KWVE..-B-400 and KIT.KWVE..-B-430 are to be used, please contact us.
Influence of grease on friction behaviour	At initial operation and relubrication, the coefficient of friction increases temporarily due to the fresh grease. After a short running-in period, however, the coefficient of friction returns to its original lower value. The friction behaviour is determined significantly by the characteristics of the grease used. The consistency and base oil viscosity serve as approximate guide values.

Special coatings

In order that standard components can function for long periods, without maintenance and reliably even under extreme operating conditions, the Schaeffler Group has developed several coatings for such requirements.

These coatings increase the corrosion resistance and/or wear resistance of the surface.

The selection of the coating is always dependent on the area of operation and the application.

Types of coatings

Components at risk of corrosion are protected by:

- Corrotect® special coating, page 53
- Protect A thin film chromium plating, page 55
- Protect B thin film chromium plating, page 57.

Advantages of thin film chromium plating

The high hardness of the thin film chromium plating and the special surface structure give an anti-wear effect. The columnar structure has a certain capacity for storage of lubricant. This ensures adequate lubricant in the rolling element contact zone even under extreme environmental and operating conditions.

A particularly high level of wear resistance together with a very high anti-corrosion effect is achieved by the coating Protect B, which has an additional layer of chromium mixed oxide. Due to its surface quality, this ensures separation of the contact between the rolling element and hard chromium layer and thus gives emergency running characteristics and reduction of wear under extreme operating conditions. Even under highly unfavourable environmental conditions, this coating still acts in a supportive capacity to the lubricant. Since the coating increases the wear resistance of the base material, the preload is maintained over an extended period.

Attention!

For use in the food industry, compliance with exacting environmental and health conditions must be achieved. The coating Protect A is free from Cr(VI) and can therefore be used in this sector.



Corrotect® special coating

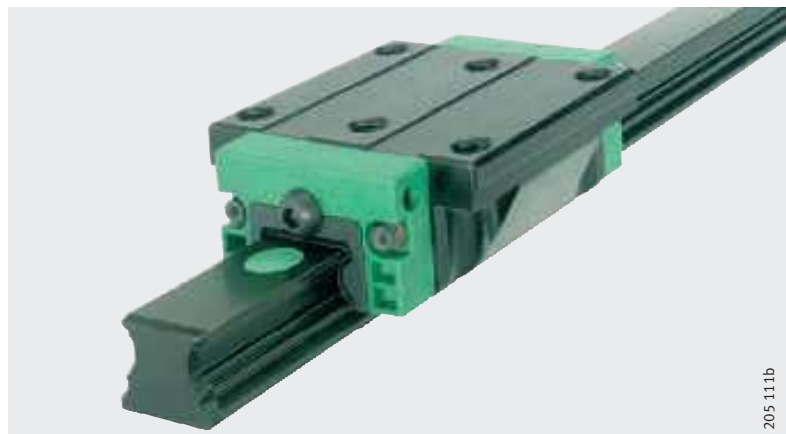
Anti-corrosion protection

Corrotect® is a surface coating applied by electroplating, *Figure 1*. It is an extremely thin anti-corrosion coating with cathodic protection and black chromate passivation. Under load, it is compacted into the surface roughness profile and partially worn away.

In parts coated with Corrotect®, running-in occurs in the area of the seal and an optically bright area develops as a result. Due to the remote cathodic protection mechanism, formation of rust in this area can also be prevented.

KUVE...-B-RRF

Figure 1
Special coating Corrotect®



Advantages

The special coating Corrotect®:

- is resistant to moisture, salt spray mist, contaminated water and weak alkaline or weak acidic cleaning agents
- does not impair the load carrying capacity, in contrast to the use of corrosion-resistant steels
- is extremely resistant to corrosion
- offers protection against rust on all surfaces
- ensures rust protection of smaller bright spots due to its cathodic protection effect
- gives protection against EP additives
- has good thermal conductivity
- is available as Corrotect® free from Cr(VI) by agreement.

Special coatings

Applications

Components coated with Corrotect[®] are particularly suitable where corrosion resistance is the most important factor.

The coating is also used very successfully to prevent adhesion of weld spray.

Available products

The following products in the field of linear motion are available with the Corrotect[®] coating:

- linear recirculating roller bearing and guideway assemblies RUE...-E (-L-KT)
- linear recirculating ball bearing and guideway assemblies KUBE...-B (-KT)
- shafts W
- hollow shafts WH
- guideways LFSR
- profiled track rollers LFR
- linear ball bearings KB, KS, KH.

Suffix

Components coated with Corrotect[®] have the suffix RRF; see Ordering designation.

Ordering designation

The ordering designation for a Corrotect[®]-coated recirculating ball guidance system KUBE25-B with two carriages, accuracy G3 and preload class V1 is:

- KUBE25-B-W2-G3-V1-RRF/

Technical/physical data for Corrotect[®]

The table shows technical/physical data for the special coating Corrotect[®].

Corrotect[®] data

	Data
Suffix	RRF
Colour	Black
Thickness ¹⁾	0,5 µm – 3 µm
Number of layers	1
Composition	Zinc alloyed with iron and cobalt
Hardness	300 HV
Anti-corrosion protection ²⁾	96 h
Anti-wear protection	–
Maximum single-piece length	3 500 mm
Free from Cr(VI) ³⁾	No Yes, by agreement only

¹⁾ Thickness in functional area.

²⁾ Salt spray test to DIN 50 021.

³⁾ Parts containing Cr(VI) are not suitable for the food industry.



Protect A

Anti-wear and anti-corrosion protection

Protect A is a pure chromium layer with a columnar surface structure, *Figure 2*.

The coating is applied by electroplating. The parts to be coated are heated to approx. +50 °C. Since no structural changes occur, the parts retain full dimensional stability.

The matt grey chromium layer retains a certain amount of lubricant between the pearls. As a result, effective anti-wear protection is achieved even under mixed friction or slippage conditions.

Operating temperature

The temperature range of the guidance system is between –10 °C and +100 °C.

KUVE...-B-KD

Figure 2
Thin film chromium plating
Protect A



Advantages

The coating:

- is resistant to various chlorides, various oils, sulphur compounds, chlorine compounds and weak acidic media
- does not influence the load carrying capacity and operating life of the coated products
- has higher wear resistance due to its high hardness
- ensures effective anti-wear protection even under mixed friction conditions
- offers good protection against EP additives
- has good thermal conductivity
- is moderately resistant to corrosion
- prevents false brinelling under vibration while stationary
- is free from Cr(VI).

Special coatings

Applications

Protect A does not contain Cr(VI). Components with this coating are therefore particularly suitable for use in the food industry, medical equipment and similar areas.

The coating is recommended for use under particularly small stroke lengths and vibration while stationary.

Available products

The following products in the field of linear motion are available coated with Protect A:

- linear recirculating roller bearing and guideway assemblies RUE...-E (-L-KT)
- linear recirculating ball bearing and guideway assemblies KUBE...-B (-KT).

Other products in the shaft and track roller range are available by agreement with the Protect A coating.

Suffix

Components coated with Protect A have the suffix KD; see Ordering designation.

Ordering designation

The ordering designation for a Protect A-coated recirculating ball guidance system KUBE25-B with two carriages, accuracy G3 and preload class V1 is:

- KUBE25-B-W2-G3-V1-KD/

Technical/physical data for Protect A

The table shows technical/physical data for the special coating Protect A.

Protect A data

	Data
Suffix	KD
Colour	Matt grey
Thickness ¹⁾	0,5 µm – 4 µm
Number of layers	1
Composition	Pure chromium layer with pearly surface
Hardness	900 HV – 1 300 HV
Anti-corrosion protection ²⁾	8 h
Anti-wear protection	Under mixed friction
Maximum single-piece length	4 000 mm
Free from Cr(VI) ³⁾	Yes

¹⁾ Thickness in functional area.

²⁾ Salt spray test to DIN 50 021.

³⁾ Parts free from Cr(VI) are suitable for the food industry.

Attention!

When using Protect A, coated carriages and coated guideways must always be combined. If coated carriages are used with uncoated guideways, for example, this will lead to a reduction in preload.



Protect B

High anti-corrosion and anti-wear protection

Protect B comprises two layers: a thin film chromium plating (Protect A) is covered by chromium mixed oxide, *Figure 3*.

The corrosion resistance is provided by the chromium mixed oxide layer. This layer acts in a supportive capacity to the lubricant when used in aggressive atmospheres and at high temperatures.

The temperature range of the guidance system is between -10°C and $+100^{\circ}\text{C}$.

KUVE...-B-KDC

Figure 3
Thin film chromium plating
Protect B



Advantages

The coating:

- is resistant to various chlorides, various oils, sulphur compounds, chlorine compounds and weak acidic media
- does not influence the load carrying capacity and operating life of the coated products
- improves the running-in behaviour
- offers effective anti-wear protection under inadequate lubrication
- offers good protection against EP additives
- acts in a supportive capacity to the lubricant by mean of the second layer in aggressive atmospheres and at high temperatures
- has good thermal conductivity
- offers high anti-wear protection together with high anti-corrosion protection
- prevents false brinelling under vibration while stationary.

Special coatings

Applications	Where high requirements for anti-corrosion protection are present and continuous lubrication cannot be ensured, Protect B is the suitable coating.
Available products	The following products in the field of linear motion are available coated with Protect B: ■ linear recirculating roller bearing and guideway assemblies RUE...-E (-L-KT) ■ linear recirculating ball bearing and guideway assemblies KUBE...-B (-KT). Other products in the shaft and track roller range are available by agreement.
Suffix	Components coated with Protect B have the suffix KDC; see Ordering designation.
Ordering designation	The ordering designation for a Protect B-coated recirculating ball guidance system KUBE25-B with two carriages, accuracy G3 and preload class V1 is: ■ KUBE25-B-W2-G3-V1-KDC/
Technical/physical data for Protect B	The table shows technical/physical data for the special coating Protect B.

Protect B data

	Data
Suffix	KDC
Colour	Black
Thickness ¹⁾	0,5 µm – 5 µm
Number of layers	2
Composition	Thin film chromium plating (Protect A) with coating of chromium mixed oxide
Hardness	950 HV
Anti-corrosion protection ²⁾	96 h
Anti-wear protection	Under inadequate lubrication
Maximum single-piece length	4 000 mm
Free from Cr(VI) ³⁾	No

1) Thickness in functional area.

2) Salt spray test to DIN 50 021.

3) Parts containing Cr(VI) are not suitable for the food industry.

Attention!

When using Protect B, coated carriages and coated guideways must always be combined. If coated carriages are used with uncoated guideways, for example, this will lead to a reduction in preload.



Special materials

Materials for KUV

For four-row linear recirculating ball bearing and guideway assemblies KUV, there are not only special coatings but also special materials:

- corrosion-resistant steel
- amagnetic steel
- end pieces made from metal
- ceramic rolling elements.

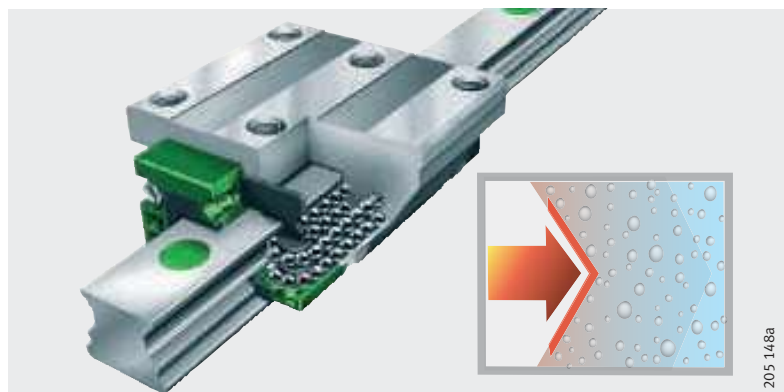
Corrosion-resistant steel

All metal parts in KUV..-B-RB are made from corrosion-resistant martensitic steel, *Figure 1*. Due to the special quench and tempering process as well as surface treatment, this material has high corrosion resistance. It is therefore also suitable for use in aqueous media, heavily diluted acids, alkalines or salt solutions.

KUV..-B-RB

Figure 1

Corrosion-resistant steel



Advantages

These guidance systems have the following advantages:

- they achieve basic load ratings equivalent to 70% of the standard values
- they are available in all accuracy and preload classes
- corrosion-resistant carriages can be used in any combination with the standard guideways, allowing replacement without any restrictions
- the existing range of accessories can be used to its full extent
- the complete sealing arrangement is already integrated.

Applications

The guidance systems are suitable for clean rooms and applications in electronic component manufacture as well as in the pharmaceutical and food industries.

Suffix

The suffix is RB; see Ordering designation.

Ordering designation

The ordering designation for the guidance system KUV25-B with two carriages, accuracy G3, preload class V1 and guideway length 1 300 mm is:

- KUV25-B-W2-G3-V1-RB/1 300

Available sizes

KUV15-B and KUV25-B; other sizes available by agreement.

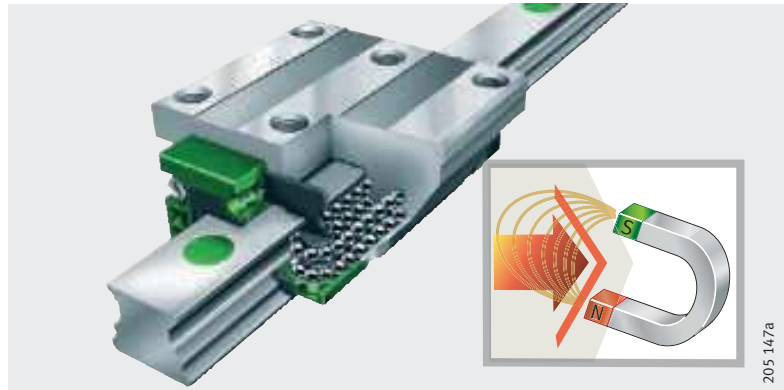
Special materials

Amagnetic steel

KUVE..-B-AM is made from corrosion-resistant amagnetic steel, *Figure 2*. Due to the special hardening process, the material achieves a hardness suitable for use in rolling bearings without developing a material structure that creates magnetic properties.

KUVE..-B-AM

Figure 2
Amagnetic steel



Advantages

Amagnetic guidance systems have the following advantages:

- all metal parts are made from corrosion-resistant steel
- they achieve basic load ratings equivalent to 60% of the values for the standard guidance system
- the magnetic permeability is very low ($\mu_r < 1,02$)
- they are available in all accuracy and preload classes
- they can be used in any combination with the standard guideways, allowing replacement without any restrictions (standard guideway, corrosion-resistant or amagnetic guideway)
- the existing range of accessories can be used to its full extent
- the complete sealing arrangement is already integrated.

Applications

Since no additional anti-corrosion coating is necessary, the guidance systems are highly suitable for use in clean rooms and the manufacture of electronic components, medical equipment and the food industry.

Suffix

The suffix is AM; see Ordering designation.

Ordering designation

The ordering designation for the amagnetic guidance system KUVE25-B with two carriages, accuracy G3, preload class V1 and guideway length 500 mm is:

- KUVE25-B-W2-G3-V1-AM/500

The maximum single-piece length of the guideways is 750 mm.

Amagnetic guidance systems are available by agreement.



Metal end piece

KUVE...-B-MKS has an end piece made from corrosion-resistant steel, *Figure 3*.

KUVE...-B-MKS

Figure 3

End pieces made from metal



Advantages

The metal end pieces:

- can be combined with amagnetic guidance systems
- can be used, due to their high strength compared to plastic designs, in applications where a particularly robust construction is required
- are resistant to gamma radiation
- are resistant to temperatures up to +150 °C
- are suitable for use in vacuum and clean rooms
- are available for all accuracy and preload classes
- are unsealed in the standard design
- are supplied as part of a guidance system with preservative only. Special lubricants can be used by agreement
- can be used with an integrated complete sealing arrangement and the range of accessories depending on the operating conditions (for example, temperature).

Applications

Due to the increased strength of the end piece, the guidance system is particularly suitable for extreme applications, for example at high temperatures or under radiation.

Suffix

The suffix is MKS; see Ordering designation.

Ordering designation

The ordering designation for the guidance system KUVE25-B with metal end piece, one carriage, accuracy G2, preload class V1 and guideway length 1500 mm is:

- KUVE25-B-W1-G2-V1-MKS/1 500

Available sizes

KUVE15-B and KUVE25-B; other sizes available by agreement.

Special materials

Ceramic rolling elements

In combination with coatings or special materials, ceramic rolling elements can be used in hybrid bearings.

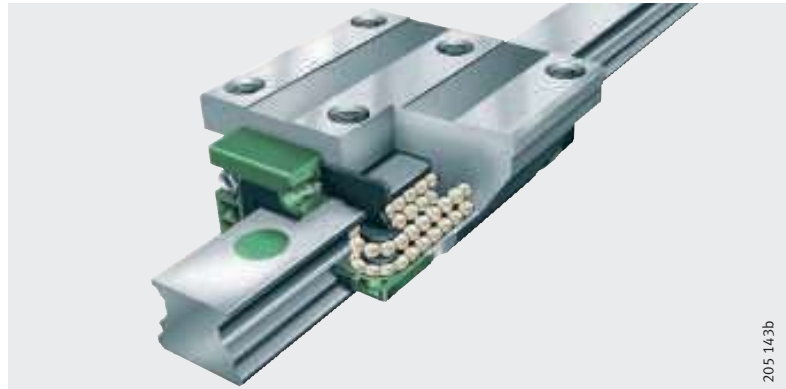
Ceramic is light, has a long operating life and offers significant advantages in many applications. Ceramic balls are characterised by their high hardness, rust resistance and electrical insulation.

KUVE..-B-HCB has ceramic rolling elements, *Figure 4*.

KUVE..-B-HCB

Figure 4

Ceramic rolling elements



Advantages

The guidance systems with ceramic rolling elements:

- have a longer rating life, depending on the application
- achieve basic load ratings equivalent to 70% of the standard values
- have lower bearing temperatures
- require less lubricant
- can be used to achieve corrosion-resistant guidance systems in combination with corrosion-resistant or coated saddle plates and guideways
- do not induce any magnetism between the rolling elements
- do not conduct electrical current
- allow higher speeds when used in combination with appropriate guidance system components
- can be fitted with the existing accessories and are interchangeable with the standard range.

Applications

Due to their amagnetic characteristics, linear recirculating ball bearing and guideway assemblies with ceramic rolling elements are used in many applications in medical equipment, laboratories and clean rooms as well as in the manufacture of electronic components.

Suffix

The suffix is HCB; see Ordering designation.

Ordering designation

The ordering designation for the guidance system KUVE25-B with two carriages, accuracy G3, preload class V1 and guideway length 250 mm is:

- KUVE25-B-W2-G3-V1-HCB/250



Fitting variants

Fitting work – influencing factors and assessment

The fitting work is essentially determined by:

- the arrangement of the screw mounting and locating surfaces for the guideways and carriages
- the accessibility of the fixing screws.

The fitting work can be evaluated according to the scheme, *Figure 1*.

The structure is ascending and describes the work according to the following criteria:

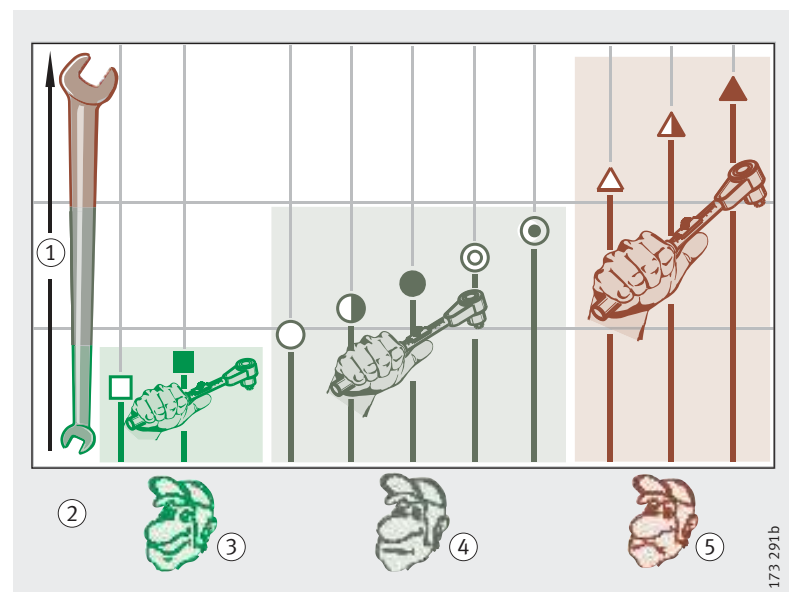
- simple fitting without fitting aids ③
- simple fitting with fitting aids ④
- demanding, time-consuming fitting with fitting aids ⑤.

For reasons of time and cost (reduced fitting work) only variants corresponding to ③ and ④ should be selected.

For assessment of fitting work see table, page 64.

- ① Fitting work
- ② Fitting variant
- ③ Simple fitting without aids
- ④ Simple fitting with aids
- ⑤ Demanding, time-consuming fitting with aids

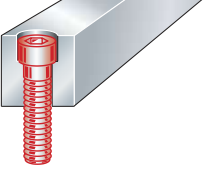
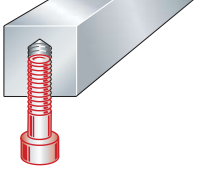
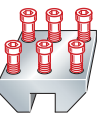
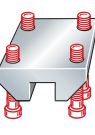
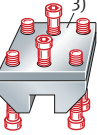
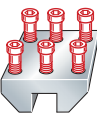
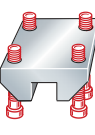
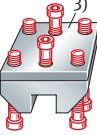
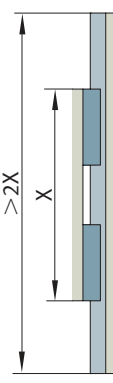
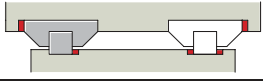
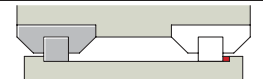
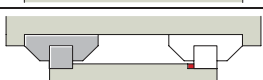
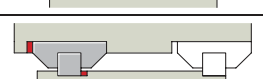
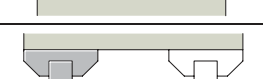
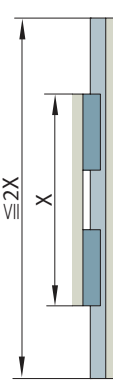
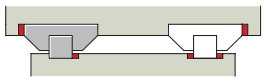
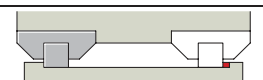
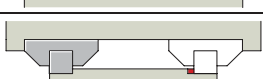
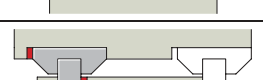
Figure 1
Relationship between
fitting work
and fitting variant



Fitting variants

Fitting work

The following table shows the fitting work as a function of the adjacent construction.

Ratio of table length to guide-way length	Design of adjacent construction ¹⁾		Location of guideway and carriage ²⁾							
										
$L > 2X$ or $L \leq X$	Datum side	Adjustment side								
										
										
										
										
										
										
										
										
										
										

1) For other designs of adjacent construction, please contact us.

2) In series KUE, the carriage do not have central fixing holes.

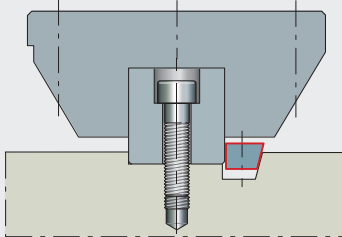
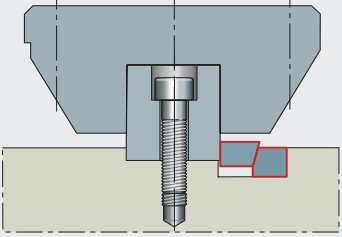
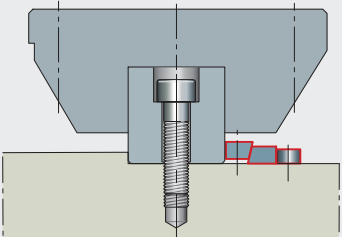
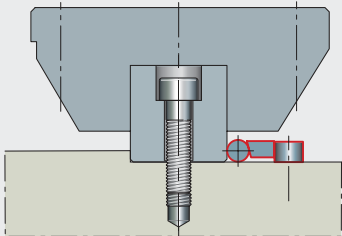
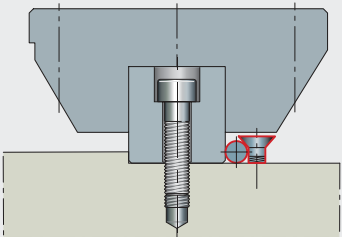
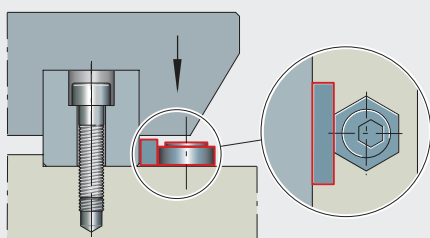
3) The intermediate plate can be used for any fitting variant.



Alignment elements

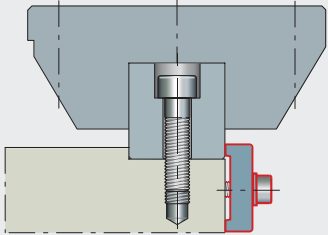
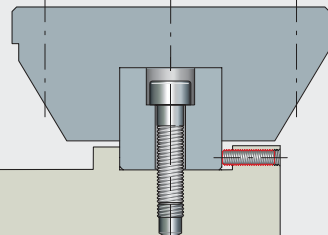
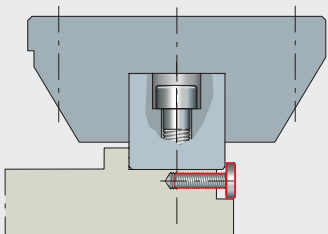
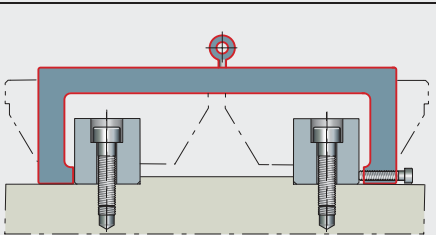
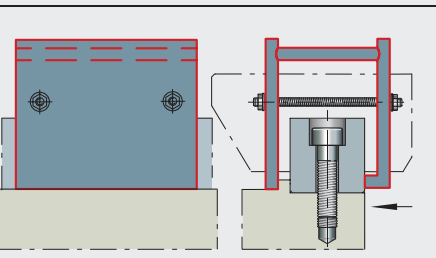
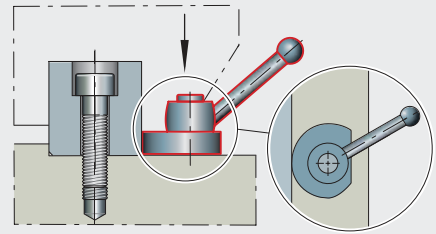
The tables show different alignment methods for guideways.

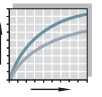
Alignment method

Element	
Vee ledge, integrated in a slot in the machine bed	 173 279a
Double vee ledge, in a slot in the machine bed	 173 280a
Double vee ledge screw mounted to the machine bed	 173 281a
Vee ledge with integral shaft, screw mounted to the machine bed	 173 282a
Shaft, screw mounted to the machine bed	 173 283a
Square section rail, adjusted using eccentric screw	 173 284a

Fitting variants

Alignment methods continued

Element	
Clamping strip	 173 285a
Adjusting screws	 173 286a
Locking screws	 173 287a
Fixing bracket with adjusting screws	 173 288a
Fixing bracket with threaded rod	 173 289a
Eccentric hand lever	 173 290a



Suspended arrangement of guidance system

Attention!

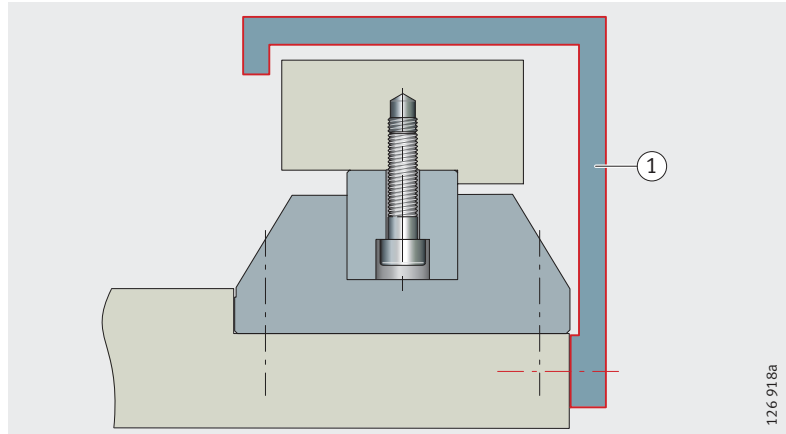
If the guidance system is in a suspended arrangement,
a drop guard ① is recommended, *Figure 2*.

Mounting position of the
guidance system 180°

① Drop guard

Figure 2

Suspended monorail guidance
system with drop guard



Fitting

Fixing screws for carriages and guideways

Monorail guidance systems must only be located using the specified screws.

It is vital to follow the information:

- in this catalogue
- in the technical proposal letter
- in the assembly drawing – if contained therein.

Attention!

The screw specifications and tightening torques must be observed.

Any deviations will influence the performance of the screw connections as well as the function and operating life of the guidance systems.

Only screws of the specified grades must be used.

If there is a possibility of settling, the fixing screws should be secured against rotation.

It must be ensured that the adjacent construction has adequate strength.

The technical performance capability can only be achieved if:

- all the threaded fixing holes are used
- the specified screw grades are used
- the specified screw tightening torques are observed.



Fitting of monorail guidance systems

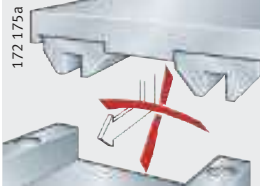
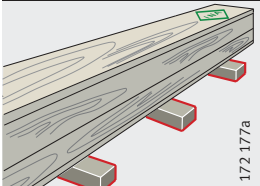
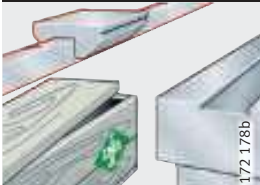
They can only achieve their optimum function and maximum operating life if they are correctly fitted and maintained. Examples of fitting methods are shown on page 84 to page 87.

Guidelines

Attention!

The specifications and regulations in the table must be observed.

Guidelines

	Guideline
	General Use only the appropriate tools and fitting aids. Always carry out the operations in the specified sequence.
	Do not carry out “prestrung mounting” – do not slide carriages already fitted to the machine table onto guideways that are also already fitted.
	Hands should be kept clean and dry, wear cotton gloves if necessary. Perspiration can lead to corrosion of monorail guidance systems with a dry preservative.
	Transport, storage and fitting area Monorail guidance systems should only be transported and stored in their original packaging. Guideways longer than 1,5 m must be supported at a minimum of 3 points during storage.
	Monorail guidance systems should only be removed from their original packaging once they are at the assembly area and immediately before fitting is carried out.
	Monorail guidance systems should not be fitted in the vicinity of machines or equipment that generate swarf or dust.
	Do not transmit electrical currents, for example during welding, through the monorail guidance systems.

Fitting

Delivered condition

Monorail guidance systems are supplied with a preservative or initial greasing, see table.

The preservative is compatible with oils and greases having a mineral oil base.

Delivered condition

Linear recirculating roller bearing and guideway assembly RUE...-D, RUE...-E (-L-KT)	Linear recirculating ball bearing and guideway assemblies	
	KUE, KUSE	KUVE...-B (-KT)
- Coated with preservative - Preassembled Carriage mounted on guideway	- Coated with preservative - Preassembled Carriage mounted on guideway if ordered as a unit - Carriage and guideway packed separately if carriage and guideway ordered individually	- With initial greasing - Preassembled Carriage mounted on guideway if ordered as a unit - Carriage and guideway packed separately if carriage and guideway ordered individually

Protection of wipers

The sharp-edged counterbores of the holes in the guideways are covered by an adhesive strip, *Figure 1*.

Avoid damage to the seal lips on the wipers of the carriages.

Attention!

The adhesive strip protects the seal lips on the wipers of the carriages. The adhesive strip should not be removed until immediately before the guidance system is fitted.

The counterbores may cause injury.

RUE...-E

① Adhesive strip

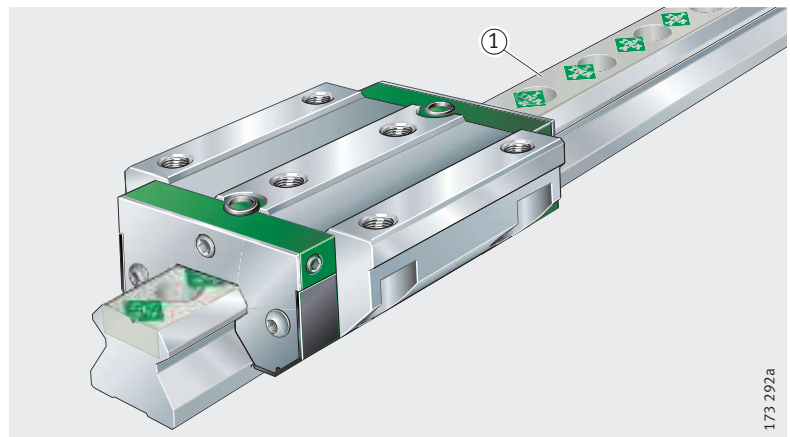


Figure 1

Holes covered by adhesive strip

173 292a

Dismantling and fitting of carriages

Attention!

Note the mounting position of the carriages – unmarked locating face.

Carriages should only be removed from the guideway or slid onto the guideways if necessary.

Removing the carriage

Locate the dummy guideway ① on one end face of the guideway ② and slide the carriage ③ carefully onto the dummy guideway ①, *Figure 2*.

Attention!

Do not remove the dummy guideway from the carriage.
Protect the rolling element set against contamination and damage.

Fitting the carriage

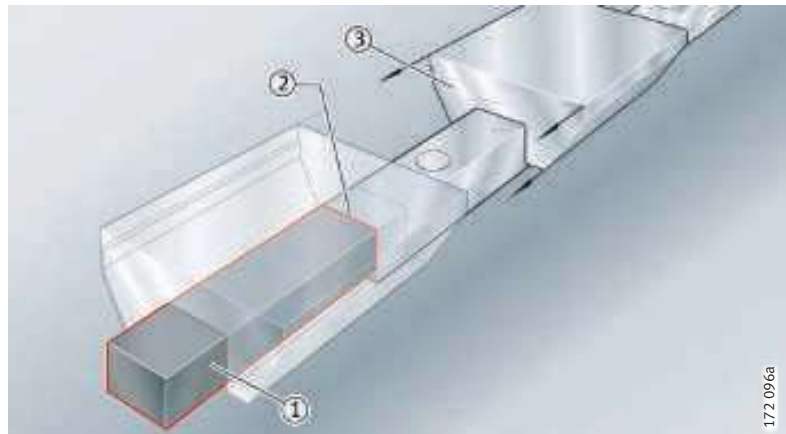
Locate the dummy guideway ① with the carriage ③ on one end face of the guideway ②, *Figure 2*.

Slide the carriage ③ carefully onto the guideway, taking care not to damage the seal lips.

- ① Dummy guideway
② End face of guideway
③ Carriage

Figure 2

Dismantling and fitting of carriages



Location of carriages

Attention!

The tightening torques M_A in the dimension tables are valid for screws coated with preservative. If there is a possibility of settling, the fixing screws should be secured against rotation.

Observe the tightening torques M_A for the fixing screws.

If the carriages are not connected to a central lubrication system, grease the carriages using the initial grease quantity – for grease quantities see tables, page 46 and page 47.

The guideways and carriages must be protected before and during fitting against solid and fluid contaminants.

Series RUE and KUSE

Attention!

Before the carriages are screw mounted to the adjacent construction, remove the adhesive strip covering the O rings. Check the seating of the O rings.

Fitting

Location of guideways

Attention!

The sharp-edged counterbores for the fixing screws may cause injury.

The tightening torques M_A in the dimension tables are valid for screws coated with preservative. For high accuracy requirements, the screws can be lubricated with grease containing MoS_2 . Since the coefficient of friction may be up to 50% lower in this case, the tightening torques should be reduced accordingly.

Tightening scheme

- Tighten the screws consecutively; in the first step to $0,5 \times M_A$, in the second step to $1 \times M_A$, *Figure 3*.

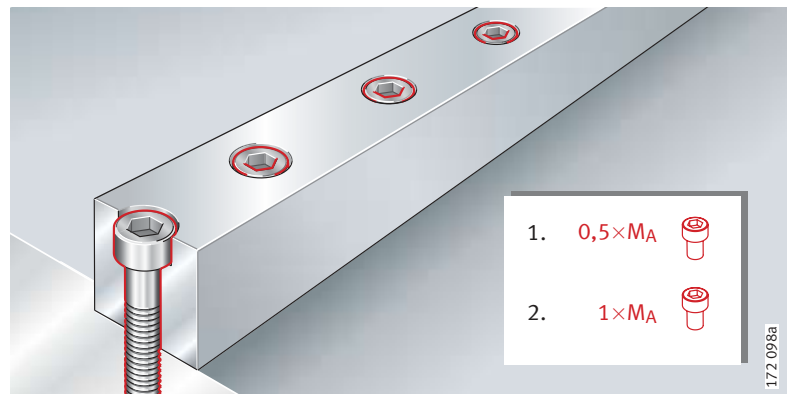


Figure 3
Tightening scheme
for guideways

Multi-piece guideways

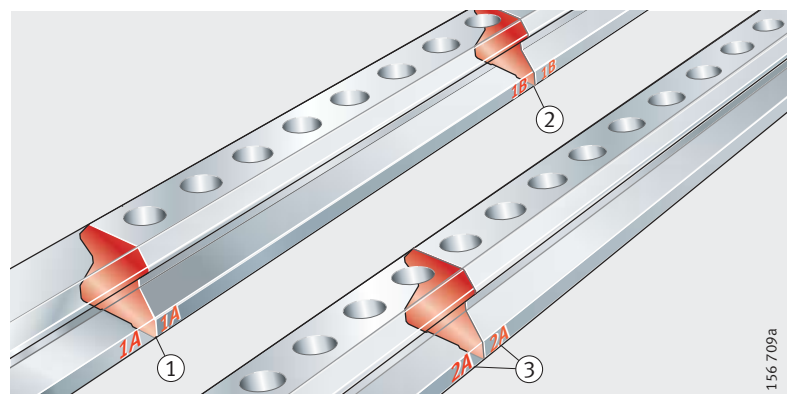
The end faces of the guideways are abutted against each other and the carriages are moved over the joint – this has the effect of aligning the guideways.

Screw mount the guideways according to the tightening scheme, *Figure 3*. Leave the carriages located at the joint.

Attention!

The individual guideway sections are marked with numbers and letters, *Figure 4*.

During fitting, the numbers and letters of the ends at each joint must match.



- Joints:
- ① 1A – 1A
 - ② 1B – 1B
 - ③ 2A – 2A

Figure 4
Joints on multi-piece guideways

Fitting of closing plugs

Attention!

Before fitting, guideways must be located using the tightening torque M_A according to the dimension tables.

Do not move carriages over counterbores of the fixing holes that have not been closed off. Ensure that the seal lips of the wipers are protected if carriages are moved.

Depending on the environment and operating conditions, the counterbores are closed off using plastic or brass closing plugs. For fitting using a fitting device, see page 74.

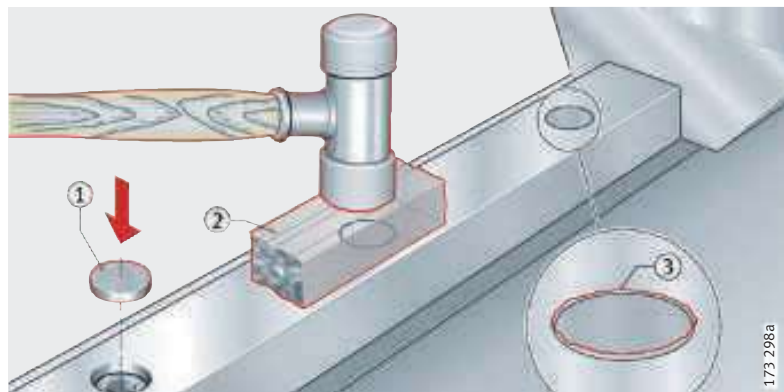
Knocking in of closing plugs, *Figure 5*:

- Insert the closing plugs ① in the correct position in the counterbore.
- Place the press-in block ② vertically on the closing plugs.
- Knock in the closing plugs by means of concentric impacts.
- Remove the ring-shaped burr from the closing plugs ③.

- ① Closing plug
- ② Press-in block
- ③ Ring-shaped burr

Figure 5

Knocking in of closing plugs



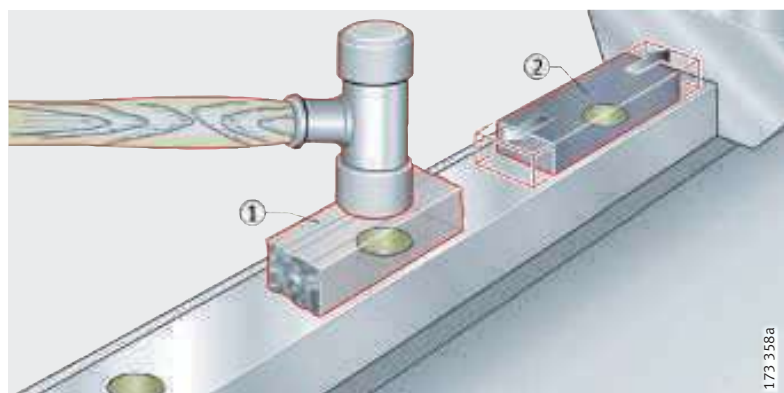
Final fitting of closing plugs, *Figure 6*:

- Knock the closing plugs in flush with the surface of the guideway ① by means of a second impact.
- Smooth off the top surface of brass closing plugs flat using an oilstone ②.
- Clean the guideway using a lint-free clean cloth and check that the closing plugs are fitted flush by means of a “finger tip test”.

- ① Press-in block
- ② Oil stone

Figure 6

Final fitting of closing plugs



Fitting

Fitting of brass closing plugs using fitting device

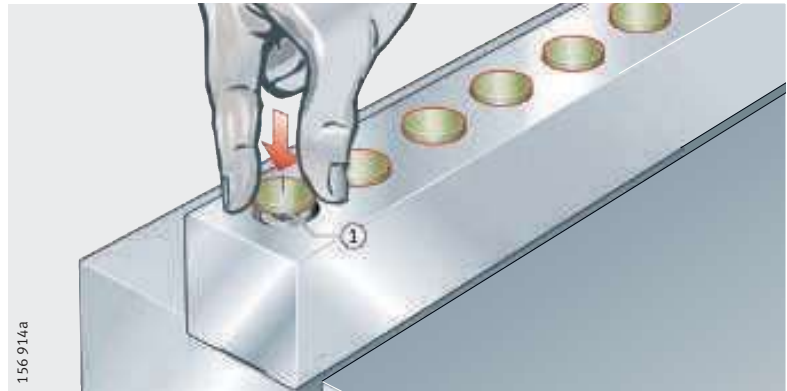
Insert the closing plugs in the counterbore, *Figure 7*:

- Insert the closing plug ① in the correct position in the counterbore.

① Closing plug

Figure 7

Inserting the closing plugs
in the counterbore



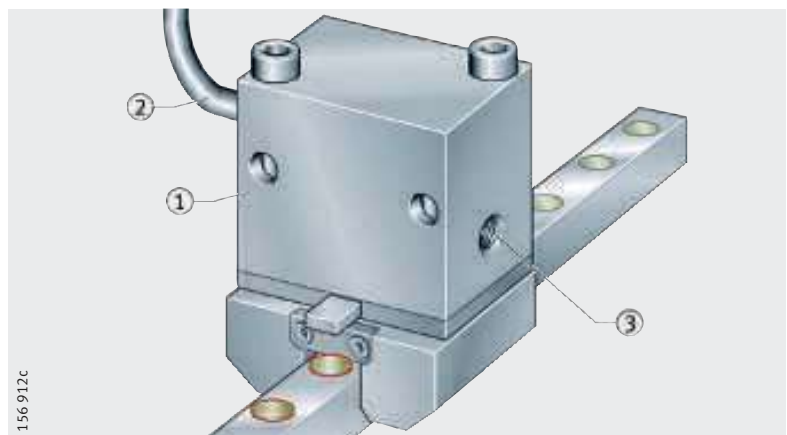
Fit the fitting device, *Figure 8*:

- Locate the fitting device MVH ① on the guideway.
- Connect the fitting device to the hydraulic source ② and ensure that the bleed ③ is activated.

① Fitting device MVH
② Hydraulic connector
③ Bleed

Figure 8

Fitting the fitting device





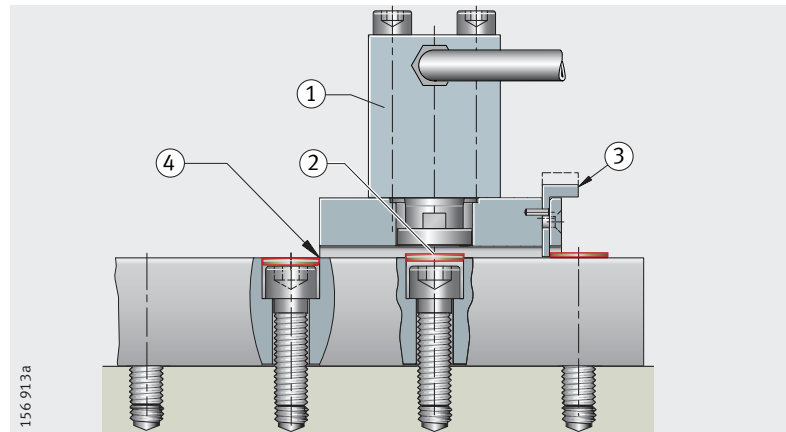
Press in the closing plugs, *Figure 9*:

- Position the fitting device ① over the closing plug ② until the pawl ③ contacts the next closing plug that has not yet been pressed in; for the last closing plug, carry out this alignment visually ④.
- Press in the closing plug using a maximum of 300 bar.

- ① Fitting device MVH
- ② Closing plug
- ③ Pawl
- ④ Visual check

Figure 9

Pressing in the closing plugs



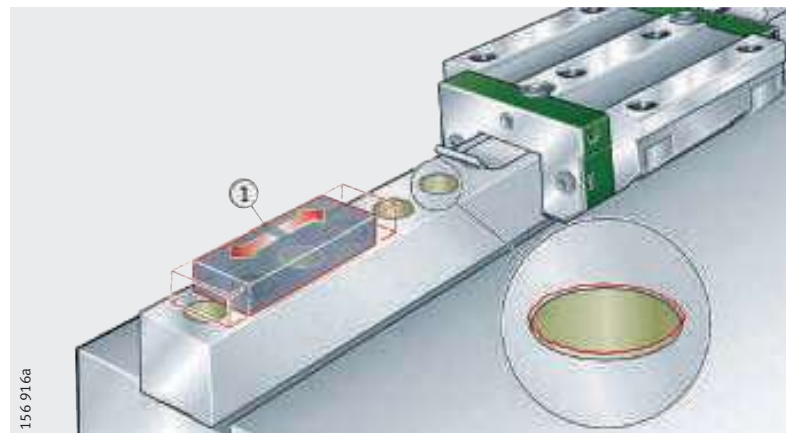
Smooth off the closing plugs flat, *Figure 10*:

- Smooth off the top surface of brass closing plugs flat using an oilstone ①.
- Then clean the guideway using a lint-free clean cloth.

- ① Oil stone

Figure 10

Smoothing off the closing plugs flat



Fitting

Fitting of two-piece plastic closing plugs

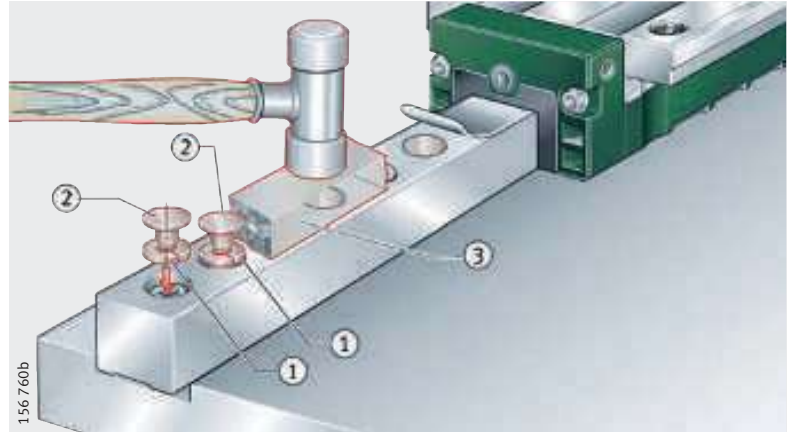
Press in the closing plugs, *Figure 11*:

- Insert the plastic clinch rings ① in the holes.
- Press the closing plugs ② in flush using a press-in block ③.

- ① Plastic clinch ring
- ② Closing plug
- ③ Press-in block

Figure 11

Pressing in the closing plugs



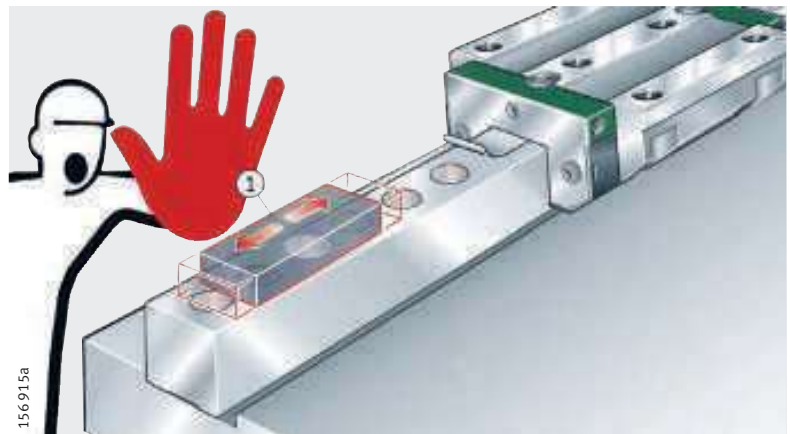
Attention!

Do not work the plastic closing plugs using an oil stone ① or similar, *Figure 12*.

- ① Oil stone

Figure 12

Do not work using an oil stone





Fitting of adhesive bonded covering strip

Attention!

Do not use the covering strip ADB with RUDS.

Only fit the covering strip to guideways that have been fitted in place.

The surface for adhesive fitting – the slot in the guideway – must be clean, free of grease and dry.

Avoid damaging the seal lip on the carriage.

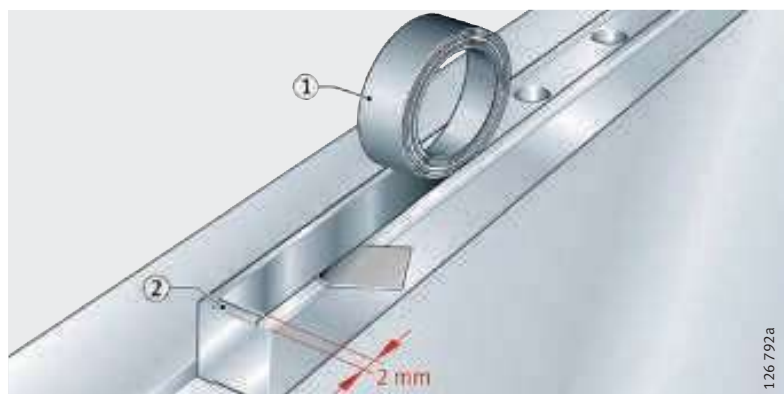
Place the covering strip in the slot, *Figure 13*:

- Unroll a portion of the covering strip ① and place with the adhesive film side face down in the slot ② – the covering strip should finish approx. 2 mm from the end of the guideway.

- ① Covering strip
- ② Slot

Figure 13

Placing the covering strip in the slot



Stick down the covering strip, *Figure 14*:

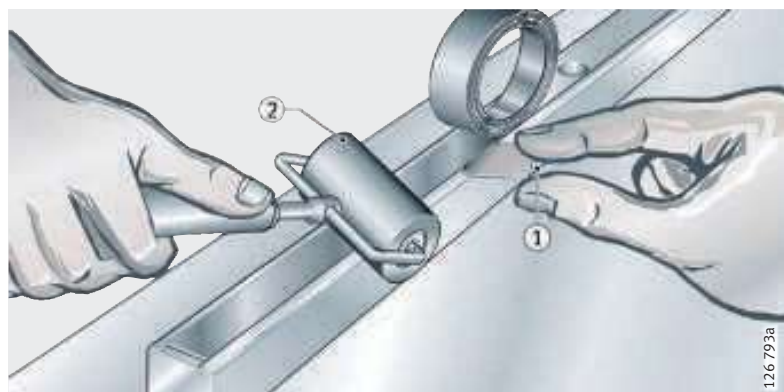
- Peel off the protective film ① approx. 30 mm and fold it out at an angle to one side.
- Align the covering strip in the slot and stick it down by applying pressure – for example by means of a pressure roller ②.
- The strength of the bond will depend on the pressure used.
- Remove the protective film ① and finish fitting the covering strip.

The final adhesive force is achieved at room temperature after approx. 72 hours.

- ① Protective film
- ② Pressure roller

Figure 14

Sticking down the covering strip



Fitting

Fitting of clip fit covering strip

Attention!

The covering strip ADB-K is a precision product and must be handled with great care.

Before fitting the covering strip, check that the clamping lugs are undamaged and that there are no creases.

Place the covering strip in the slot, *Figure 15*:

- Clean the covering strip ADB-K and the slot in the guideway surface using a cleaning cloth.
- Place the side of the strip with the larger radius in the slot; note the direction of curvature in the figure – sabre shape and the direction of the arrow; the other side of the strip must remain on the guideway surface.

① Covering strip

Figure 15
Pressing direction

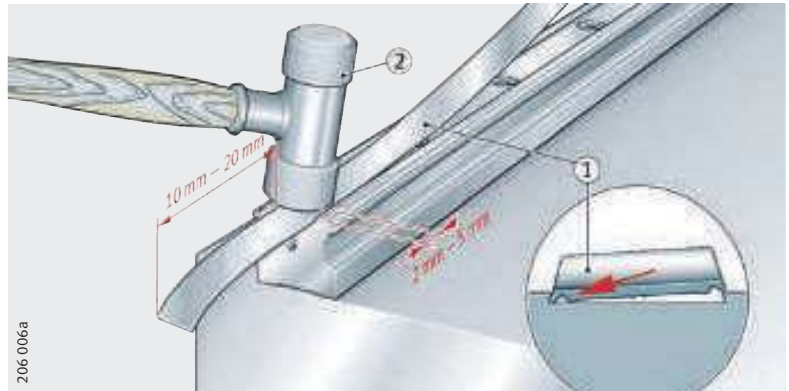


Locate the covering strip, *Figure 16*:

- The covering strip protrudes 10 mm to 20 mm above the guideway.
- Locate the covering strip over 2 mm to 5 mm in the slot using a rubber hammer (2).

① Covering strip
② Rubber hammer

Figure 16
Locating the covering strip





Attention!

Locate the fitting device so that the pressure roller ③ faces outwards, *Figure 17*. At the overhang of the covering strip, bend it slightly downwards as shown by the arrow.

Press the covering strip obliquely into the slot in front of the fitting device. Ensure that pressing is carried out in the correct direction.

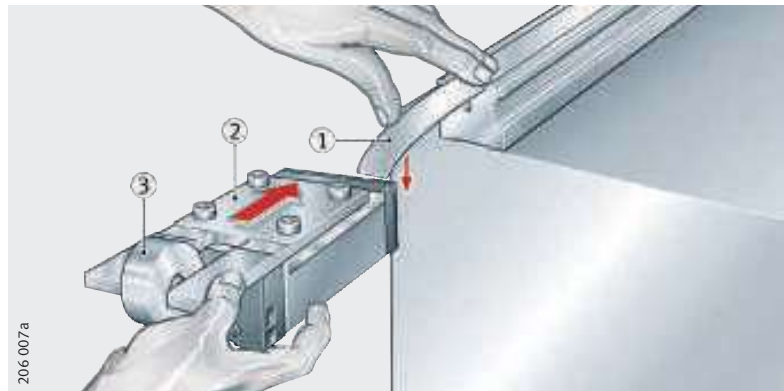
Fit the covering strip using the fitting device, *Figure 17*:

- Press the covering strip ① on the locating side obliquely into the slot with the fingers and slide on the fitting device ②. Ensure that pressing is carried out in the correct direction.
- Slide the fitting device 300 mm onto the guideway.

- ① Covering strip
- ② Fitting device
- ③ Pressure roller

Figure 17

Sliding on the fitting device



Attention!

Press the covering strip obliquely into the slot in front of the fitting device. Ensure that pressing is carried out in the correct direction.

We recommend that the covering strip should not be fitted more than once.

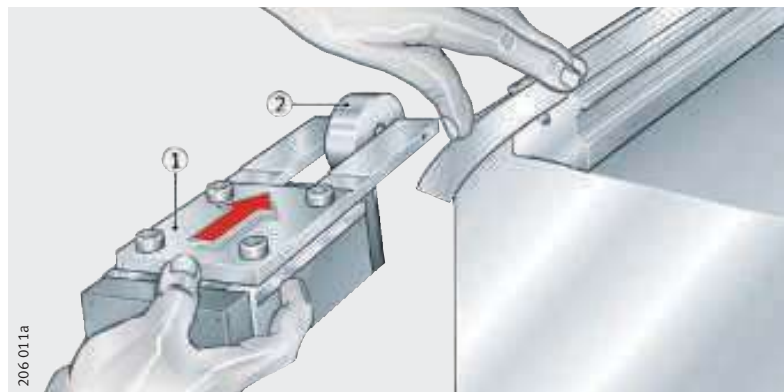
Fit the covering strip using the fitting device, *Figure 18*:

- Remove the fitting device ① from the guideway, turn it through 180° and slide it back onto the guideway. The pressure roller ② should now face towards the guideway.
- Cut the protruding end to length using snips.
- Fit the retainer.
- Check that the covering strip is correctly seated. The guideway must have a smooth surface; if necessary, smooth off using an oilstone.

- ① Fitting device
- ② Pressure roller

Figure 18

Sliding on the fitting device



Fitting

Fitting of clamping element

Attention!

The clamping element RUKS should only be located once the guideways and carriages have been fitted.

The counterbores of the fixing holes must be closed off first.

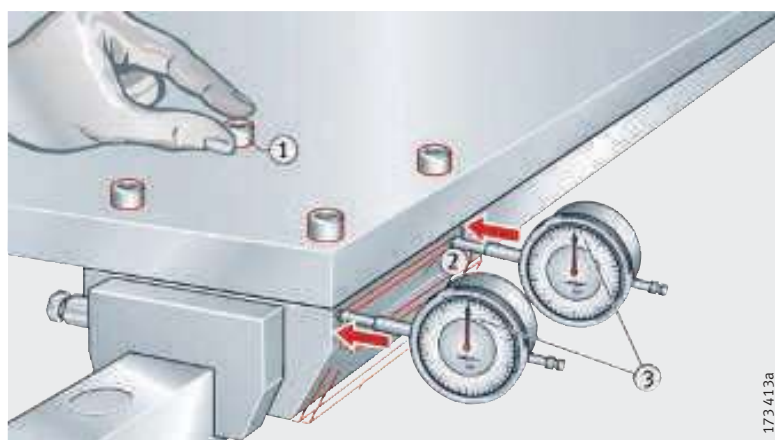
Align the clamping element, *Figure 19*:

- Tighten the fixing screws ① in the clamping element finger tight. Use all the threaded holes.
- Place one dial gauge ③ at each corner of one longitudinal side ② of the clamping element.
- Press one longitudinal side of the clamping element against the guideway (in the direction of the arrows) and set the dial gauges to "0" ③.

- ① Fixing screws
- ② Longitudinal side of the clamping element
- ③ Dial gauges

Figure 19

Aligning the clamping element



Attention!

Do not exceed the maximum oil pressure of 350 bar. Pay attention to pressure spikes.



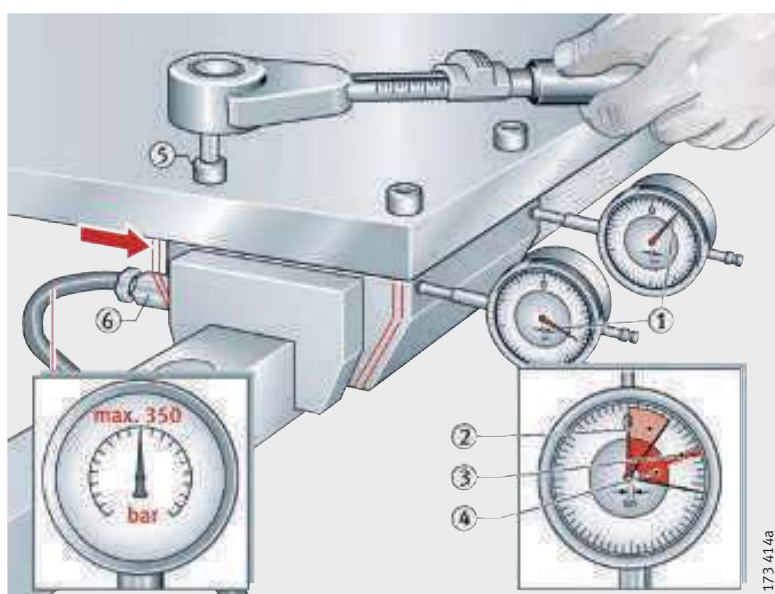
Finish fitting the clamping element, *Figure 20*:

- Press the opposing longitudinal side of the clamping element against the guideway (in the direction of the arrow).
- Read off and record the measured values on both dial gauges ①.
- Calculate the mean value of the measured values ③.
- Set the RUKS to half the mean value.
- Tighten the fixing screws ⑤ in accordance with the table.
- Fit the hydraulic connector ⑥ to the clamping element.
- Apply oil pressure and increase slowly to the maximum operating pressure.
- Check the clamping element for seal integrity, reduce the oil pressure.

- ① Measured values
- ② Measured value 1
- ③ Mean value of measured values
- ④ Measured value 2
- ⑤ Fixing screws
- ⑥ Hydraulic connector

Figure 20

Final fitting of the clamping element



Tightening torques for fixing screws

Fixing screws			
Size	DIN ISO 4 762	DIN 6 912 DIN 7 984	
	Grade 12.9	Grade 12.9	
		Blind hole	Through hole
		Tightening torque M _A Nm	
M8	41	–	41
M10	41	41	83
M12	83	83	140
M14	140	140	–

Fitting

Fitting of damping carriage

Attention!

The damping carriage RUDS should only be located once the guideways and carriages have been fitted.

Before fitting, the counterbores of the fixing holes in the guideways must be closed off.

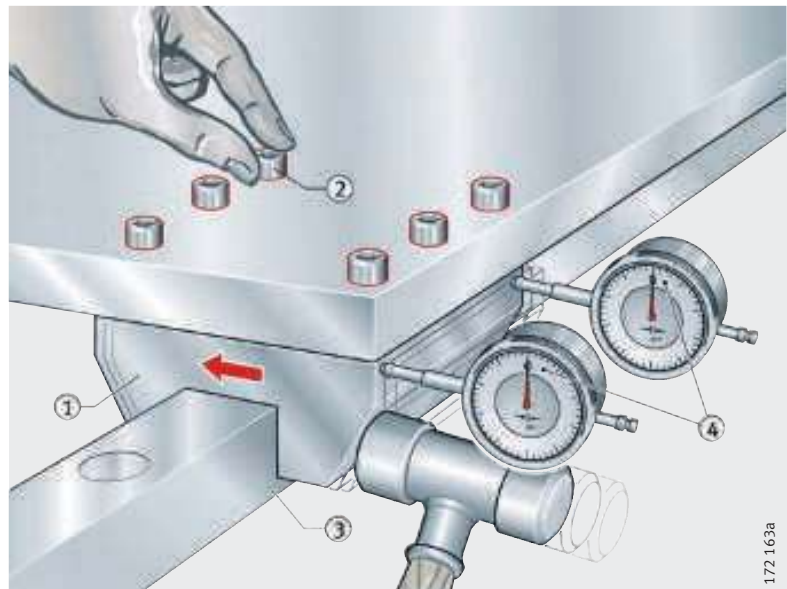
Keep the guideways free from oil.

Align the damping carriage, *Figure 21*:

- Insert the fixing screws ② in the damping carriage ① and tighten finger tight.
- Place one dial gauge ④ at each corner of one longitudinal side of the damping carriage.
- Press one longitudinal side of the damping carriage against the guideway (in the direction of the arrow) ③ and set the dial gauges to "0" ④.

- ① Damping carriage
- ② Fixing screws
- ③ Longitudinal side of the guideway
- ④ Dial gauges

Figure 21
Aligning the damping carriage





Finish fitting the damping carriage, *Figure 22*:

- Press the opposing longitudinal side of the damping carriage ① against the guideway (in the direction of the arrow).
- Read off and record the measured values on both dial gauges ②.
- Calculate the mean value ④ of the measured values.
- Set the damping carriage to half the value.
- Tighten the fixing screws ⑥.
- Fit the lubricant connector and charge the system with oil.

- ① Damping carriage
- ② Dial gauges
- ③ Measured value 1
- ④ Mean value of measured values
- ⑤ Measured value 2
- ⑥ Fixing screws

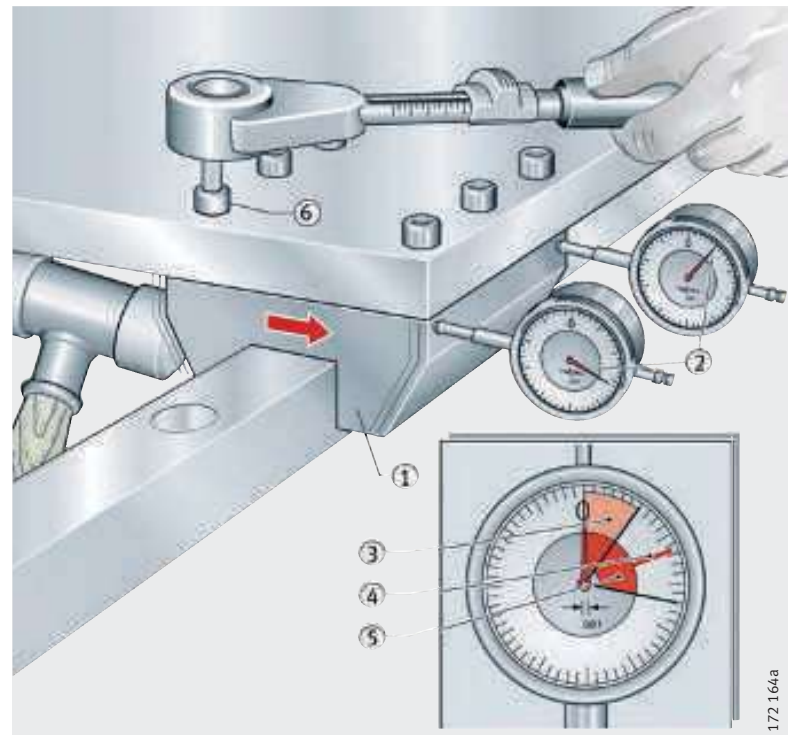


Figure 22

Final fitting of the damping carriage

Fitting

Fitting example for a linear guidance system

As an example, a fitting variant from *Figure 1*, page 63 ③, has been selected.

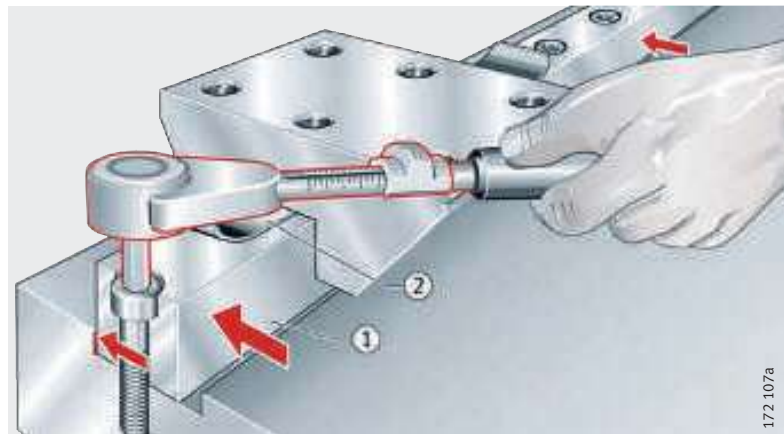
Screw mount the datum side, *Figure 23*:

- Press the guideway on the datum side ① against the locating face (in the direction of the arrows) and screw mount; observe the tightening torque M_A in the dimension tables.

- ① Datum side
- ② Spring steel strip

Figure 23

Screw mounting of the datum side



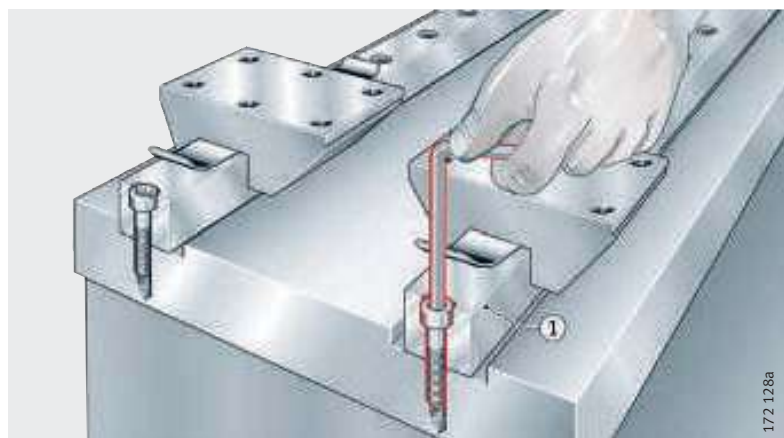
Screw mount the adjustment side, *Figure 24*:

- Screw mount the guideway on the adjustment side ① finger tight.

- ① Adjustment side

Figure 24

Screw mounting of the adjustment side



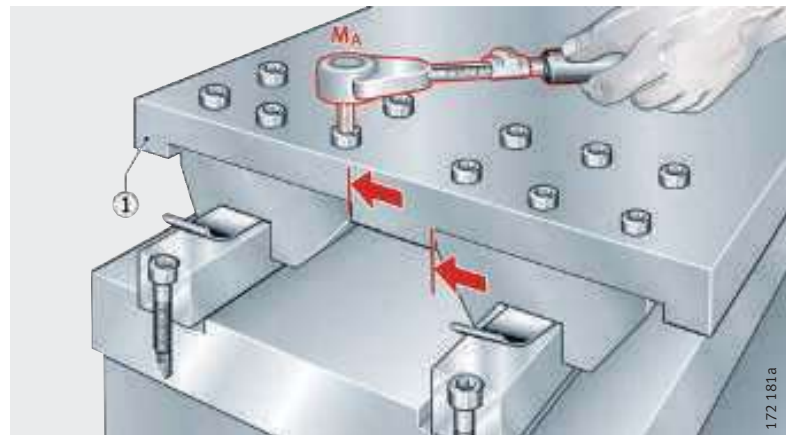
Screw mount the table, *Figure 25*:

- Locate the table ① gently on the carriages.
- Screw mount the carriages on the datum and adjustment sides to the table; observe the tightening torque M_A in the dimension tables.

① Table

Figure 25

Screw mounting of the table
to the carriages



Screw mount the adjustment side, *Figure 26*:

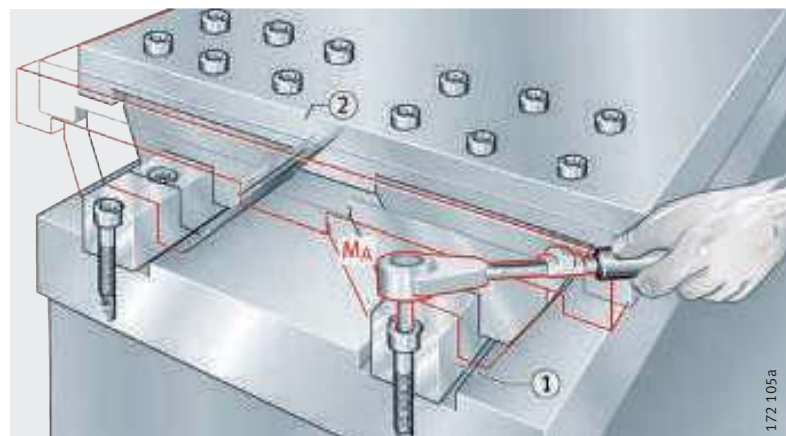
- Align the guideway on the adjustment side ① with the carriage ② and screw mount; observe the tightening torque M_A in the dimension tables.

① Adjustment side

② Table

Figure 26

Screw mounting of the
adjustment side



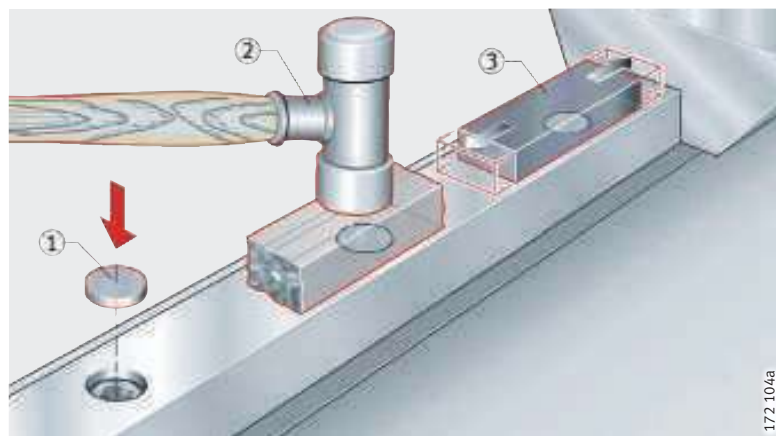
Fitting

Fit the closing plugs, *Figure 27*:

- Fit the closing plugs flush with the guideway surface ①, ②; see also page 73 to page 76.
- Clean the surface ③.

- ① Closing plugs
- ② Rubber hammer
- ③ Oil stone

Figure 27
Fitting of the closing plugs

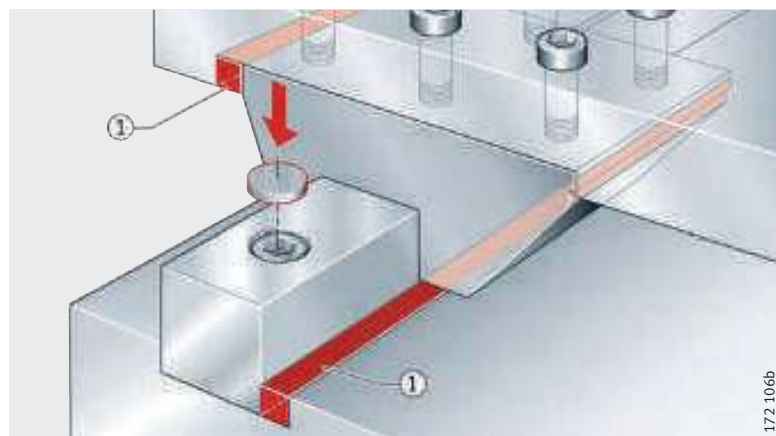


Secure the position, *Figure 28*:

- If necessary, secure the position ① of the guideways and carriages on the datum and adjustment sides.

- ① Position secured

Figure 28
Securing the position





Putting the guidance system into operation

Oil lubrication

Attention!

Ensure that the guideways show a visible oil film.

Supply the guidance system with oil:

- In order to ensure cleanliness and prevent corrosion, flush and fill all lubrication point supply pipes and lubrication holes immediately after connection.
- When putting monorail guidance systems into operation, supply the minimum oil quantity $Q_{\min}$, while moving the carriage four times its length; for oil quantities, see tables page 41 to page 44.

Damping carriage

The damping carriage RUDS should be connected to the lubricant supply system of the linear recirculating roller bearing and guideway assembly RUE...-E (-L-KT) or RUE25-D.

Grease lubrication

Attention!

Ensure that the guideways show a visible grease film.

KUVE...-B and KUVE...-B-KT have an initial grease quantity.

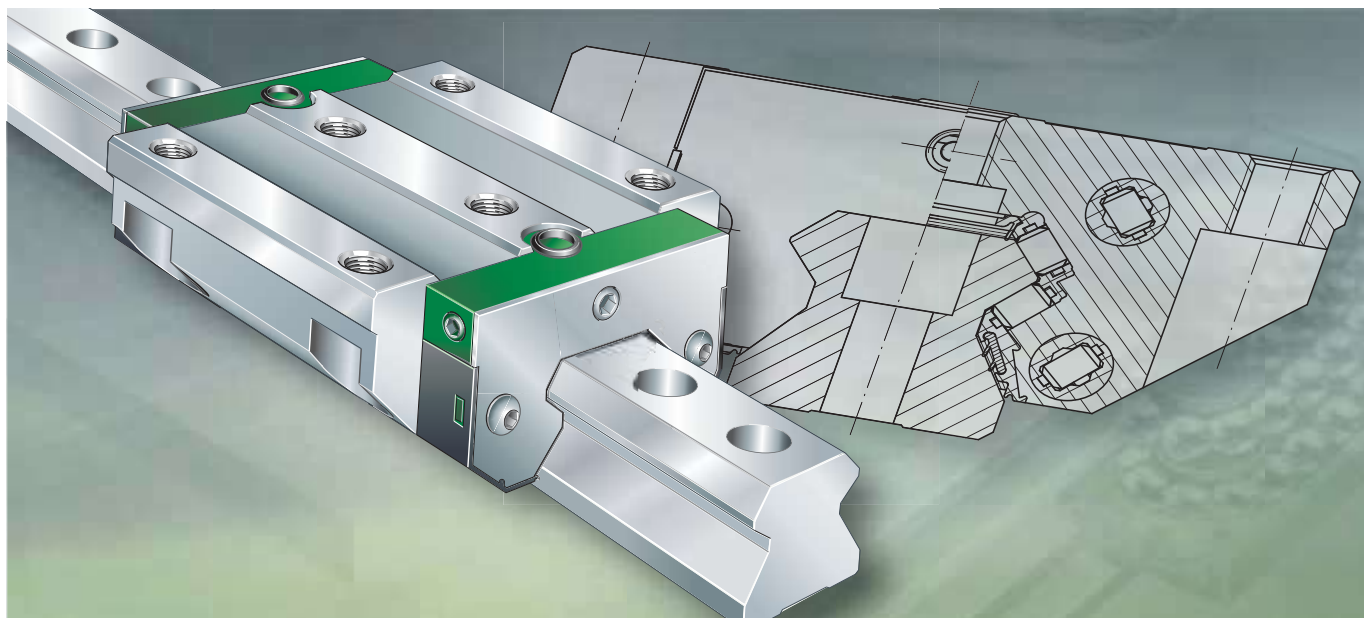
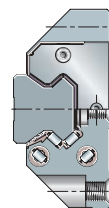
Supply the guidance system with grease:

- Fill a clean grease gun or other lubrication device with fresh grease.
- Clean the lubrication nipple and its immediate environment.
- Lightly grease the cleaned guideways.
- While the carriage is being filled by hand with the initial grease quantity, move the carriage four times its length; for grease quantities, see tables page 46 and page 47.
- If connected lubrication devices are being used, relubrication should be carried out until fresh grease emerges from the carriage – move the carriage over the guideway length several times without load.

Influence of grease

At initial operation and relubrication, the coefficient of friction increases temporarily due to the fresh grease. After a short running-in period, however, the coefficient of friction returns to its original lower value.

The friction behaviour is determined significantly by the characteristics of the grease used. The consistency and base oil viscosity serve as approximate guide values.

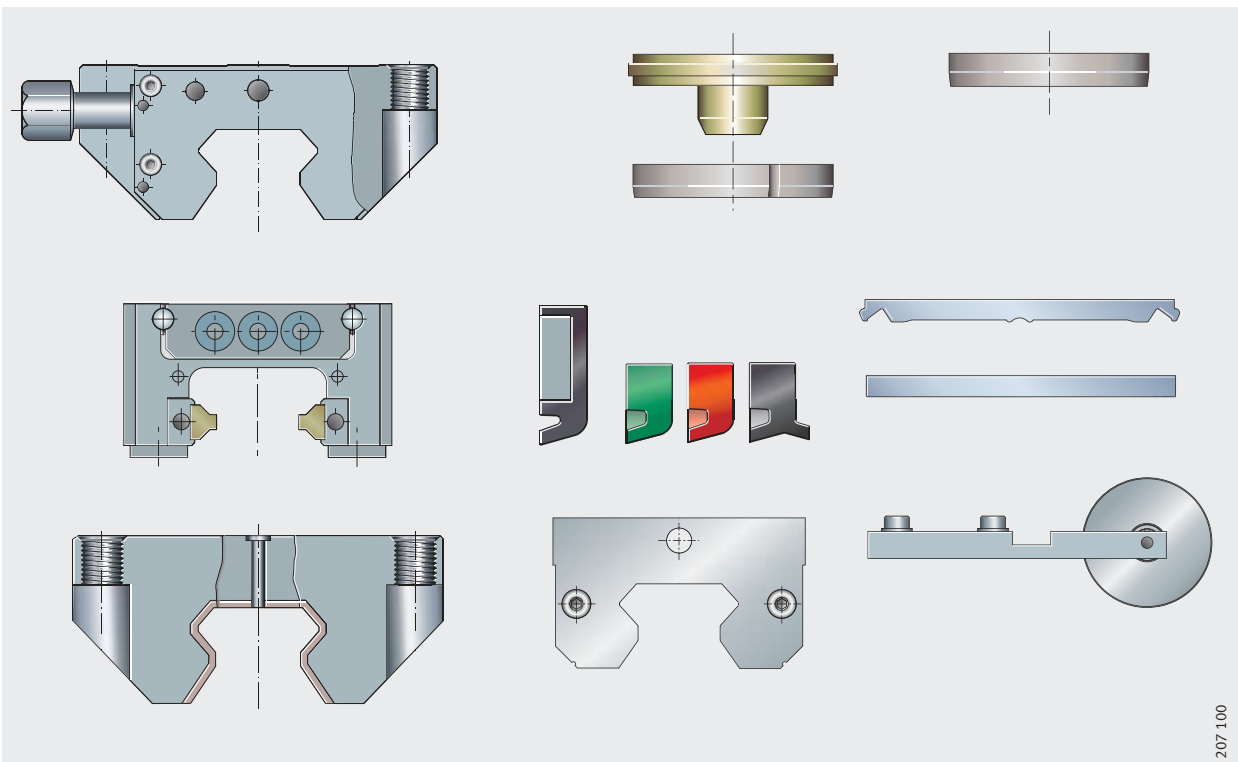
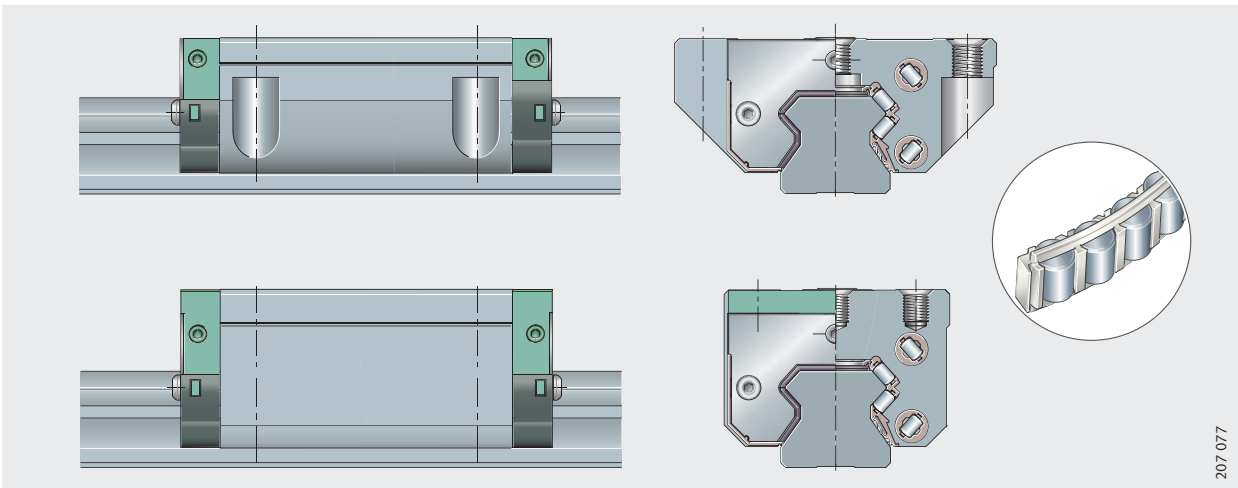
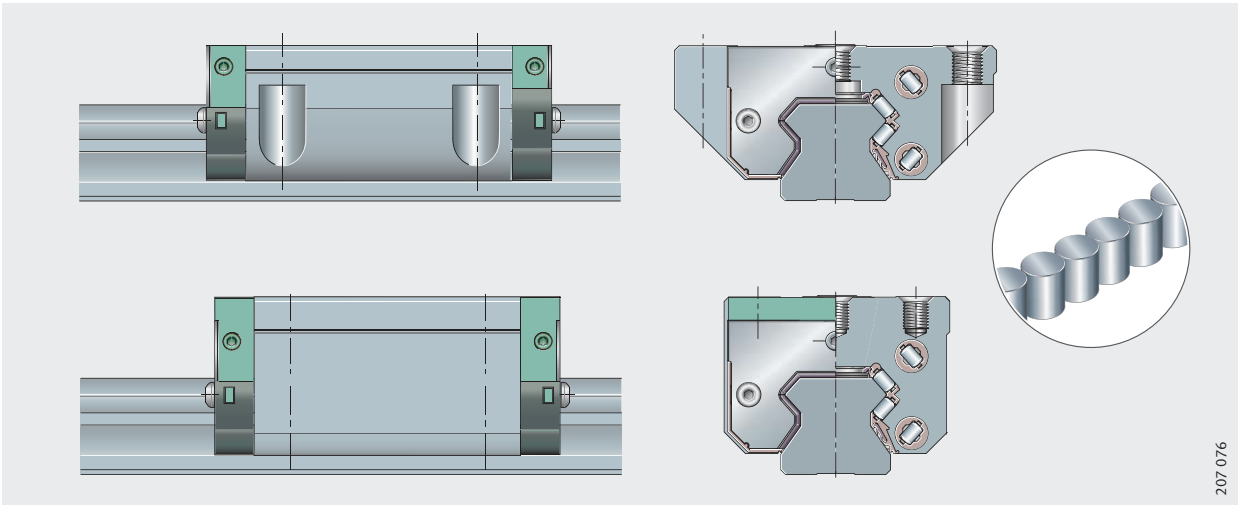
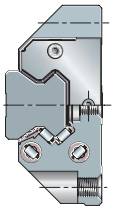


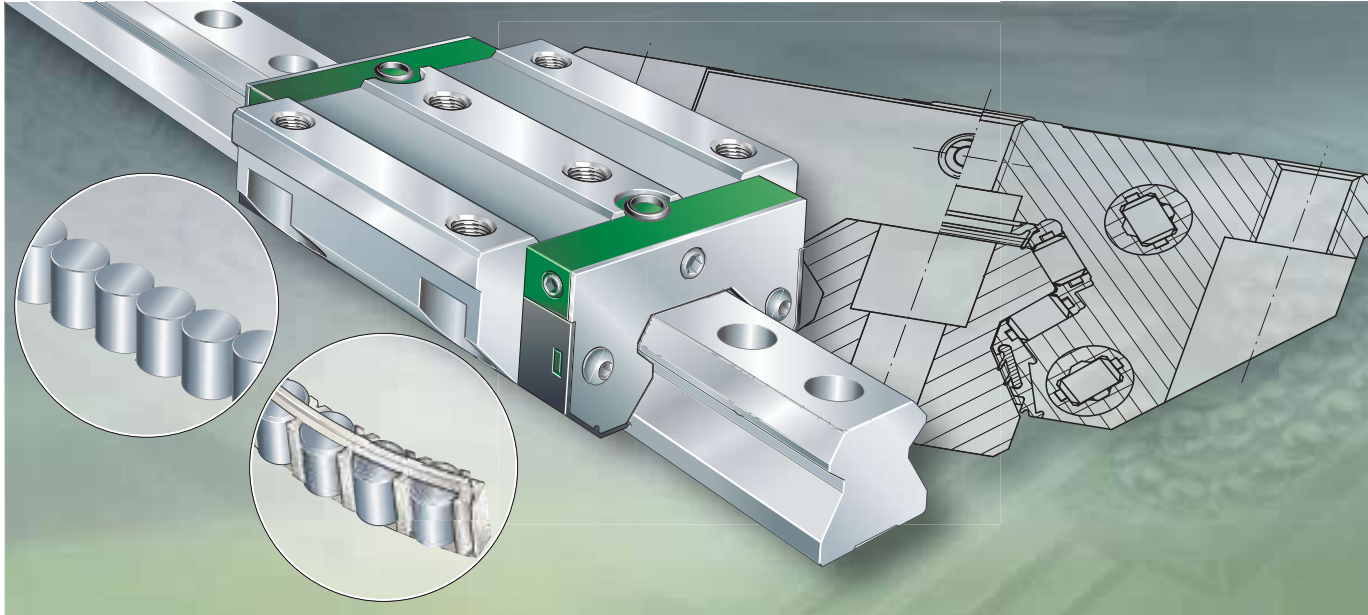
Linear recirculating roller bearing and guideway assemblies

Full complement
With chain guide
Accessories

Linear recirculating roller bearing and guideway assemblies

X-life Full complement	 92
The full complement linear recirculating roller bearing and guideway assemblies are the heavy duty designs in the range of INA monorail guidance systems. They are used wherever linear guidance systems must support extremely heavy loads, where particularly high rigidity is required and where very precise travel is also necessary.	
X-life With chain guide	 92
This series corresponds to the full complement design except that the rolling elements are guided by a rolling element chain. Solutions with a rolling element chain run with less noise than full complement guidance systems. Due to the chain, there are fewer load-bearing rolling elements in the load zone. Since a long saddle plate is used, however, the basic load ratings and rigidity values are similar to those of the full complement standard version.	
Accessories	 128
There is a comprehensive range of accessories for the linear recirculating roller bearing and guideway assemblies. This includes closing plugs and covering strips for the guideways as well as suitable fitting tools (hydraulic fitting device and rolling-in device). For lubrication and sealing, there is a comprehensive lubrication and sealing KIT. Clamping elements can be used to increase the rigidity of adjacent constructions and prevent micromovements under oscillating load. The braking and clamping element is a mechanical retaining system, for example where additional braking and clamping functions are required. Where vibrations are to be damped, damping carriages placed between the carriages provide an effective solution.	





Linear recirculating roller bearing and guideway assemblies

Full complement
With chain guide

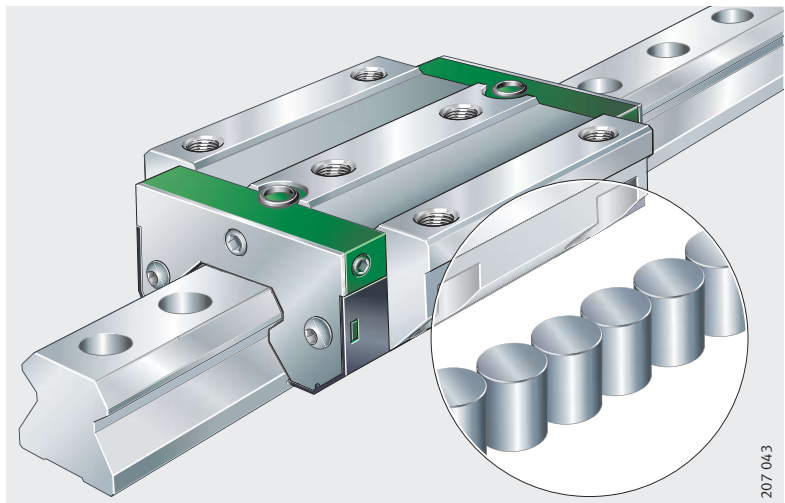
Product overview

Linear recirculating roller bearing and guideway assemblies

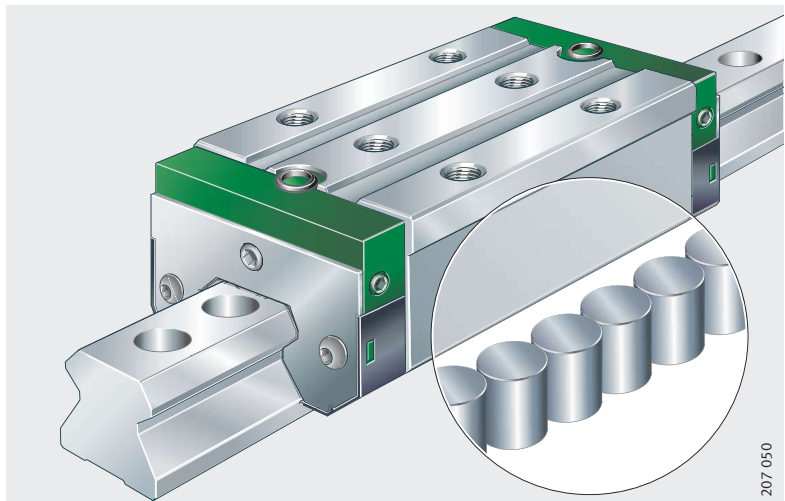
Full complement

For oil and grease lubrication

RUE..-E, RUE..-E-L

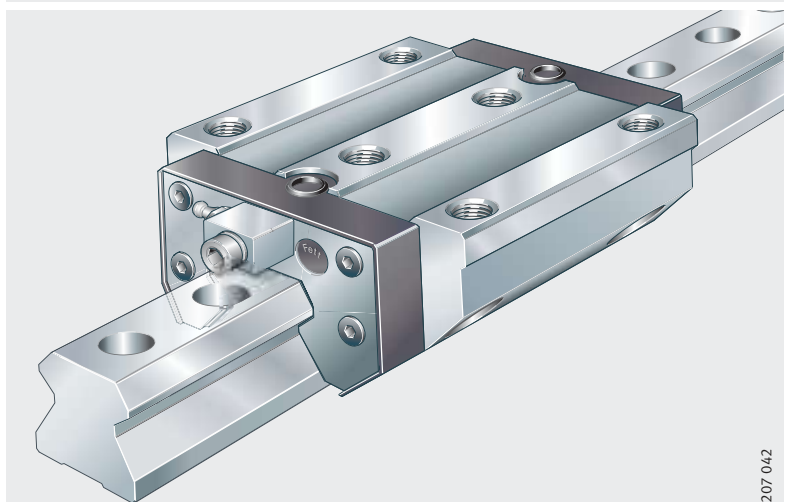


RUE..-E-H, RUE..-E-HL



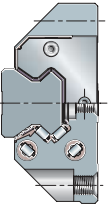
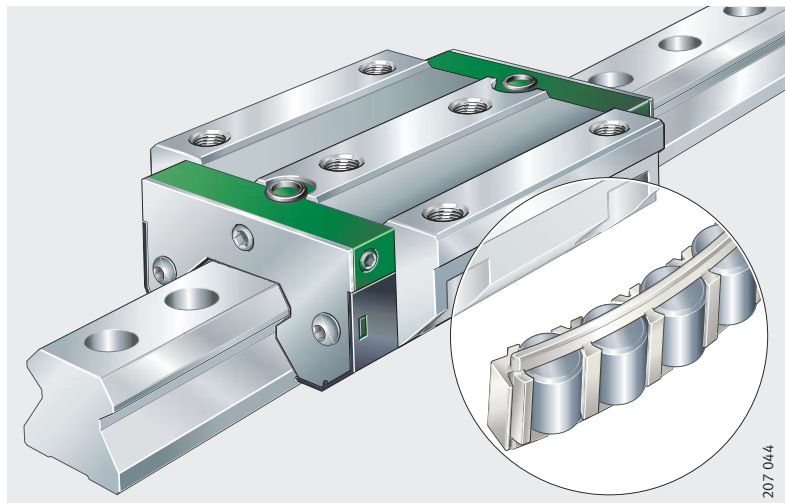
For oil or grease lubrication

RUE25-D-FE (-L, -H, -HL), RUE25-D-OE (-L, -H, -HL)

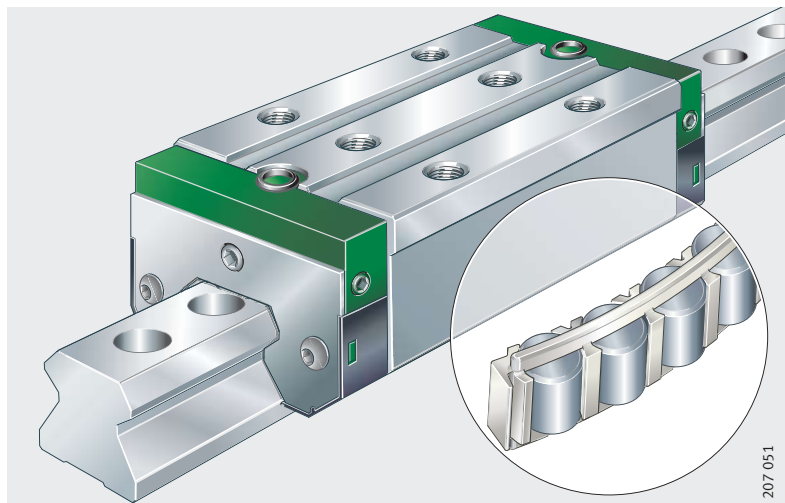


With chain guide
For oil and grease lubrication

RUE..-E-KT-L



RUE..-E-KT-HL



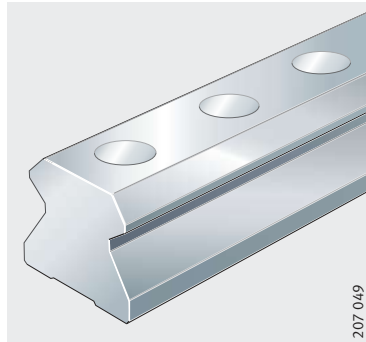
Product overview

Linear recirculating roller bearing and guideway assemblies

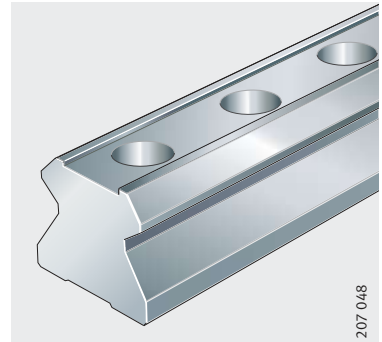
Guideways

Standard
or
with slot for covering strip

TSX...-E

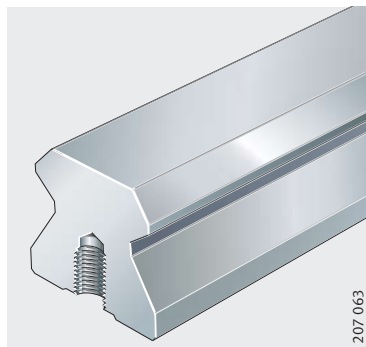


TSX...-E-ADB, TSX...-E-ADB+K



For screw mounting from below

TSX...-E-U



Standard accessories

Plastic closing plugs
Dummy guideway

KA...-TN



MSX...-E

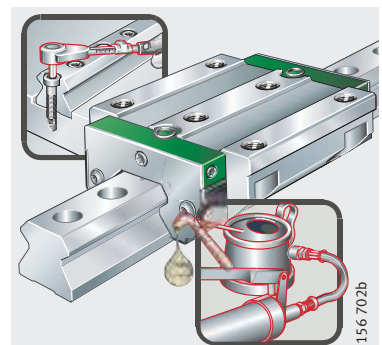


Fitting set
Fitting manual

M-Satz



MON 30



Linear recirculating roller bearing and guideway assemblies

Features

Linear recirculating roller bearing and guideway assemblies are used wherever linear guidance systems must support extremely heavy loads, where particularly high rigidity is required and where very precise travel is also necessary.

These preloaded units for long, unlimited stroke lengths are particularly suitable for use in machine tools.

Linear recirculating roller bearing and guideway assemblies are available in full complement design and with a chain guide.

A guidance system comprises at least one carriage with rollers, a guideway and plastic closing plugs.

X-life

Linear recirculating roller bearing and guideway assemblies are linear guidance systems of X-life quality. They are characterised by improved technological characteristics, increased robustness and a longer operating life.

Full complement

Series RUE..-E has a full complement of rollers as rolling elements.

Since they have the maximum possible number of rollers, full complement guidance systems have extremely high load carrying capacity and particularly high rigidity.

With chain guide

Series RUE..-E-KT corresponds to the full complement design except that the rollers are guided by a rolling element chain.

Solutions with a rolling element chain run with less noise than full complement guidance systems.

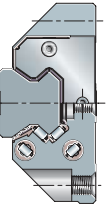
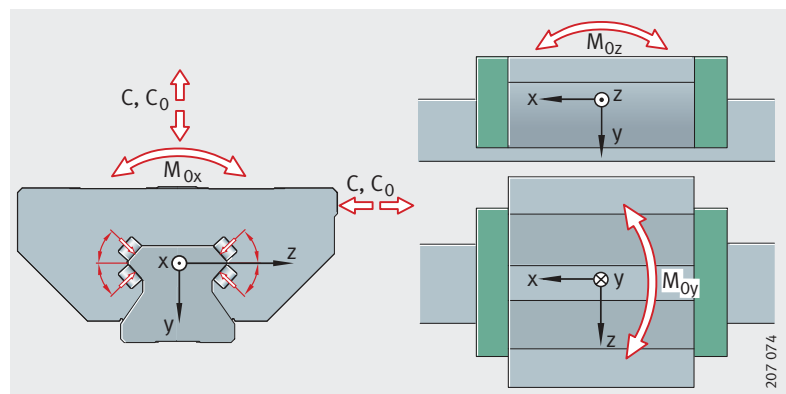
Due to the rolling element chain, there are fewer load-bearing rolling elements in the load zone. Since the longer saddle plate variant is used in the chain version, however, the basic load ratings and rigidity values are similar to those of the full complement standard version.

Load carrying capacity

The cylindrical rollers are in an X arrangement on the raceways.

The units can support forces from all directions – except in the direction of motion – and moments about all axes, *Figure 1*.

Figure 1
Load carrying capacity and contact angle



Linear recirculating roller bearing and guideway assemblies

Acceleration and speed

The dynamic values are shown in the table.

Operating limits

Designation	Acceleration up to m/s^2	Speed up to m/s
RUE35-E (-KT)	100	4
RUE45-E (-KT)	100	3,5
RUE55-E (-KT)	100	3
RUE65-E (-KT)	50	2,5
RUE100-E-L	5	1,5

Carriages

The carriages have saddle plates made from hardened steel and the rolling element raceways are precision ground. The cylindrical rollers are recirculated in enclosed channels with plastic return elements.

Roller guidance

Due to the patented injection moulding technology used, linear recirculating roller bearing and guideway assemblies have fewer joints and transitions, while the precise rib guidance of the rolling elements ensures very high running quality and a roller retention system allows easy fitting of the carriages.

Guideways

The guideways are made from hardened steel and are ground on all faces, the rolling element raceways are precision ground.

Located from above or below

Guideways TSX..-E (-ADB, -ADB+K) are located from above, guideway TSX..-E-U is located from below. All through holes have counterbores for the fixing screws or threaded blind holes.

Slot for covering strip

On guideways TSX..-E-ADB there is a slot for an adhesive bonded steel covering strip (ADB) and on guideways TSX..-ADB+K there is a slot with an undercut for a clip fit steel covering strip (ADB+K).

Multi-piece guideways

If the required guideway length $l_{\max}$ is greater than the value in the dimension tables, the guideways are supplied in several pieces; see page 106.

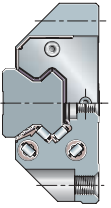
Sealing

The carriage is sealed on all sides by means of wipers, gap seals and upper and twin lower sealing strips, *Figure 2*. These sealing elements protect the rolling element system from contamination even under demanding environmental conditions.

The double lip end wipers on both sides retain the lubricant in the system.

Attention!

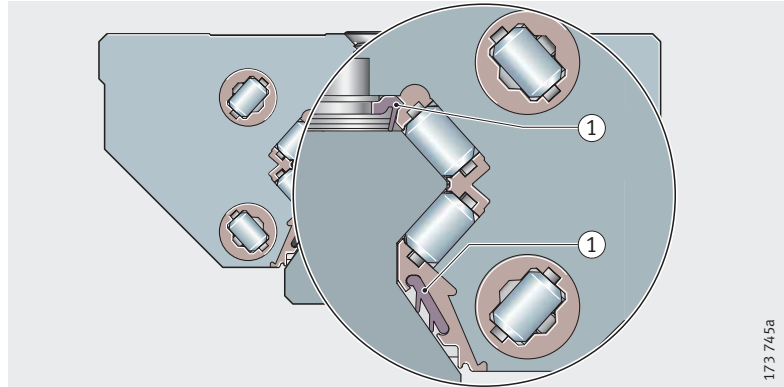
If the contamination conditions are exceptionally severe, please contact us.



① Standard sealing strips

Figure 2

Upper and lower sealing strips



Lubrication

Linear recirculating roller bearing and guideway assemblies RUE..-E (-KT) are suitable for oil and grease lubrication. A lubrication nipple and oil connector are supplied, see Standard accessories page 96 and page 99.

The lubrication nipple can be screwed into the right face, left face or end face of the end piece; before it is screwed in, the grub screw must be removed.

RUE25-D

Linear recirculating roller bearing and guideway assemblies RUE25-D are available for oil lubrication or grease lubrication; suffix OE or FE.

Attention!

If lubrication nipples and oil connectors are fitted in the end face, the maximum permissible screw depth of 6 mm must be observed, see dimension tables.

Operating temperature

Linear recirculating roller bearing and guideway assemblies can be used at operating temperatures from $-10\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$.

Standard accessories

Plastic dummy guideway

The dummy guideway prevents damage to the rolling element set if the carriage is removed from the guideway.

Carriages are always pushed directly from the guideway onto the dummy guideway and must remain there until they are reassembled.

Plastic closing plugs

The plugs close off the counterbores of the guideway holes flush with the surface of the guideway.

Optionally, two-piece closing plugs or brass closing plugs are also available; see Accessories, page 133.

Linear recirculating roller bearing and guideway assemblies

Lubrication connectors and O rings

The delivery of RUE...-E (-KT) includes:

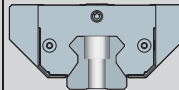
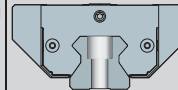
- a connector with a union nut for oil impulse or flowable grease lubrication (for pipe diameter 4 mm)
- a lubrication nipple for grease lubrication
- O rings for sealing purposes if relubrication is carried out from above via the adjacent construction
- grub screws for closing off the relubrication hole from above.

In RUE25-D-FE (-OE) the lubrication connectors are already fitted. O rings for sealing purposes if relubrication is carried out from above are included.

Corrosion-resistant designs

Linear recirculating roller bearing and guideway assemblies RUE are also available in corrosion-resistant designs with the special coatings Corrotect[®], Protect A and Protect B; for a description of the coatings, see page 52 to page 58.

Suffixes for Corrotect[®]-coated parts

With Corrotect [®] coating	Preassembled unit, guideway only coated	Carriage and guideway separate Carriage or guideway coated	Preassembled unit, carriage and guideway coated
			
	207 081	207 080	207 081
Suffix	RRFT	RRF	RRF

For applications with Corrotect[®], please contact us.

Attention!

Guideways coated with Corrotect[®] must not be used together with clamping elements RUKS...-D. If such use is planned, please contact us.

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description
–	Standard carriage
L	Long carriage
H	High carriage
HL	High, long carriage
FE	Grease lubrication for RUE25-D
OE	Oil lubrication for RUE25-D

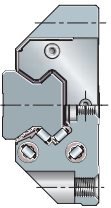
Design and safety guidelines

Preload

Linear recirculating roller bearing and guideway assemblies are available in preload class V3, see table.

Optimum rigidity of the elements is achieved with the smallest possible deviation in the preload force. Linear recirculating roller bearing and guideway assemblies are therefore supplied as preassembled units; this means that the elements are sorted and matched to each other.

It may be possible, after consultation, to use carriages and guideways in different combinations.



Preload class

Preload class ¹⁾	Preload setting	Suitable for
V3	$0,1 \cdot C$	■ High alternating load ■ Particularly high rigidity requirements ■ Moment load

¹⁾ Other preload classes available by agreement.

Influence of preload on the linear guidance system

Increasing the preload increases the rigidity.

However, preload also influences the displacement resistance and operating life of the linear guidance system.

Friction

The coefficient of friction is dependent on the ratio C/P , see table.

Coefficient of friction

Load C/P	Coefficient of friction μ_{RUE}
4 to 20	0,002 to 0,004

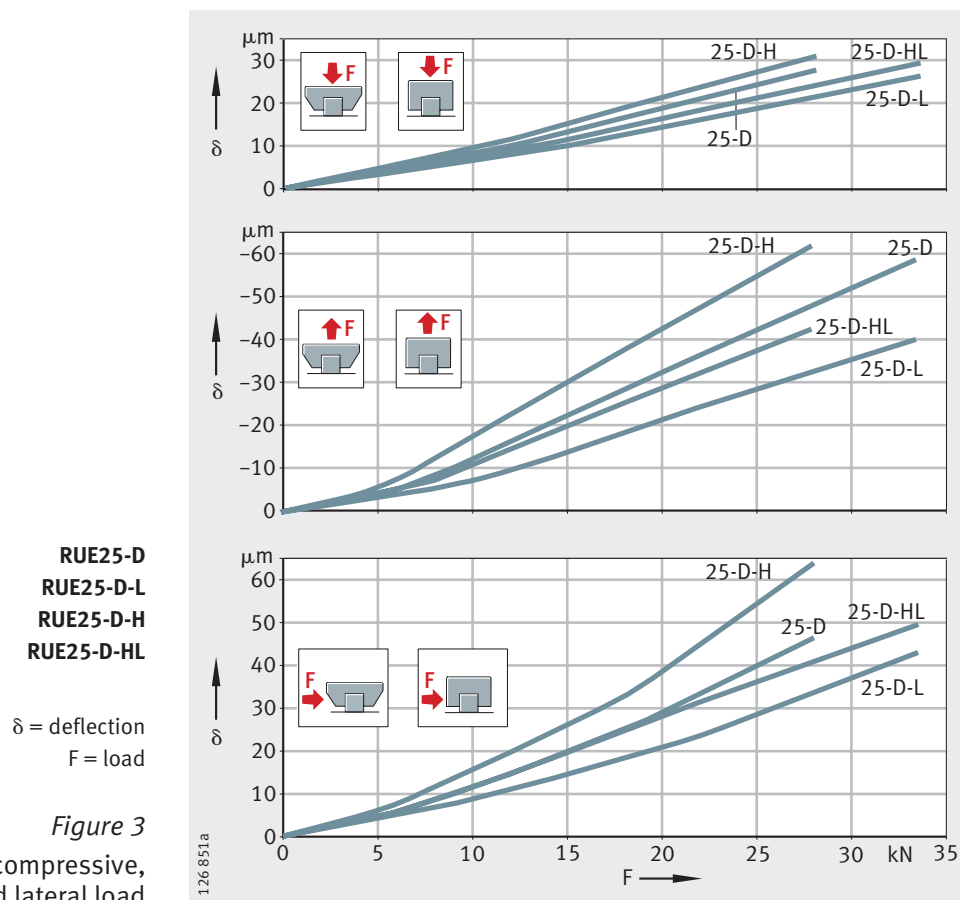
Rigidity

The spring curves show the deformation of linear recirculating roller bearing and guideway assemblies including the deformation of the screw connections to the adjacent construction, *Figure 3*, page 102 to *Figure 7*, page 104.

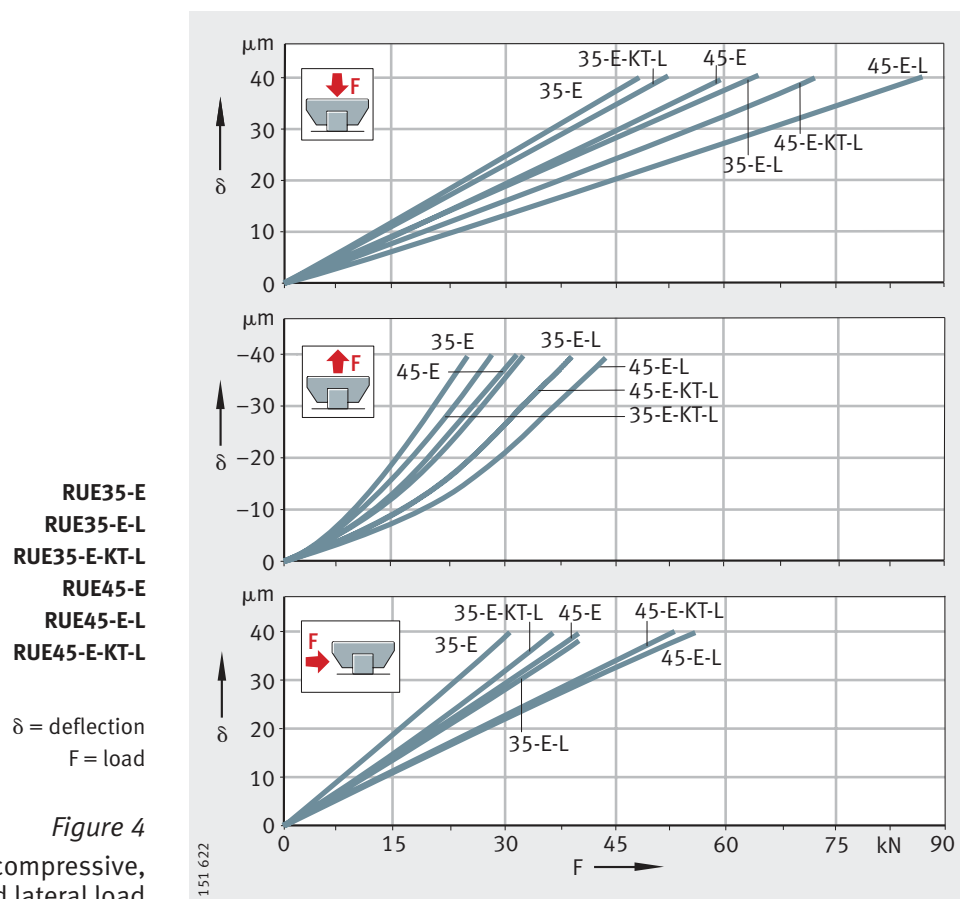
Attention!

The rigidity curves are valid only for mounting using six screws and the standard preload $0,1 \cdot C$.

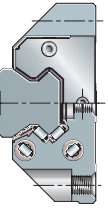
Linear recirculating roller bearing and guideway assemblies



Spring curves for compressive, tensile and lateral load



Spring curves for compressive, tensile and lateral load

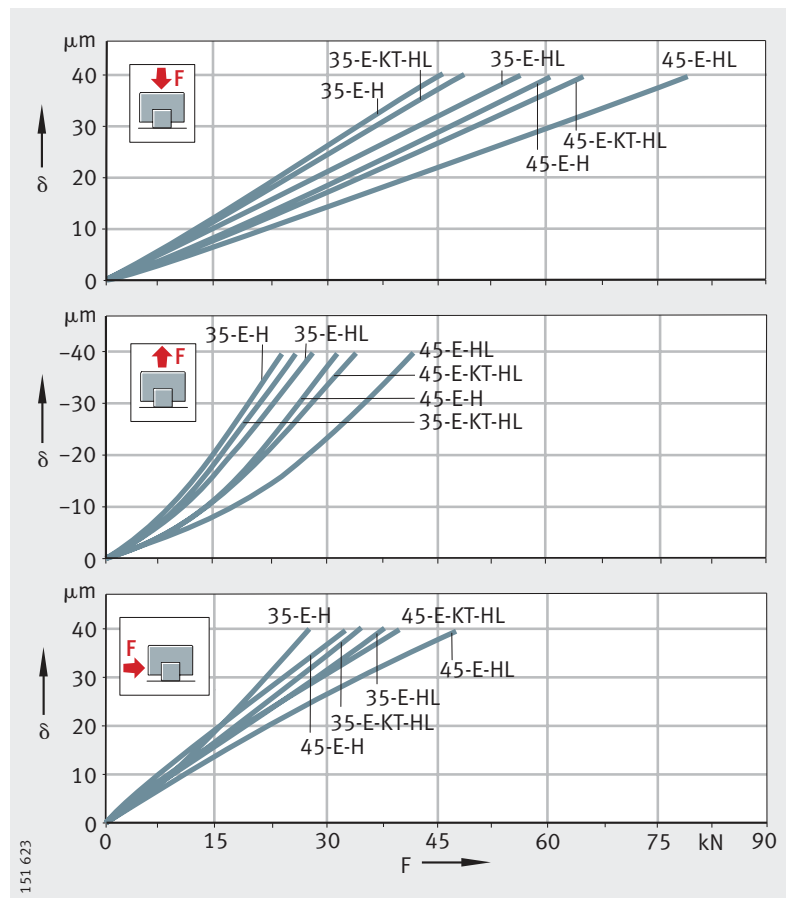


RUE35-E-H
RUE35-E-HL
RUE35-E-KT-HL
RUE45-E-H
RUE45-E-HL
RUE45-E-KT-HL

δ = deflection
F = load

Figure 5

Spring curves for compressive, tensile and lateral load

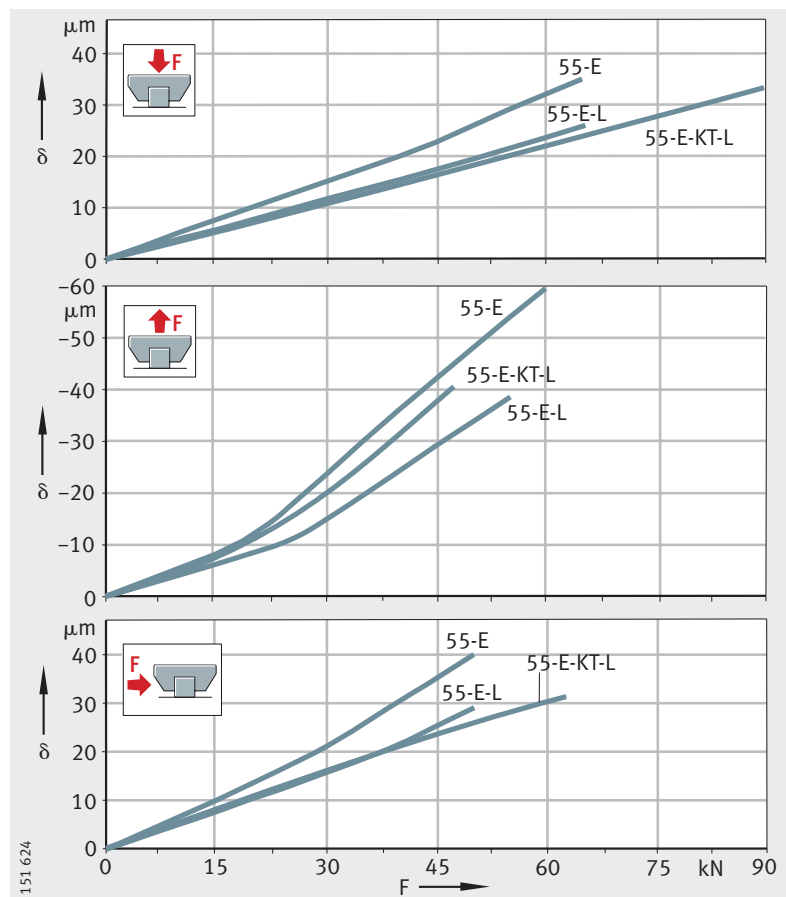


RUE55-E
RUE55-E-L
RUE55-E-KT-L

δ = deflection
F = load

Figure 6

Spring curves for compressive, tensile and lateral load



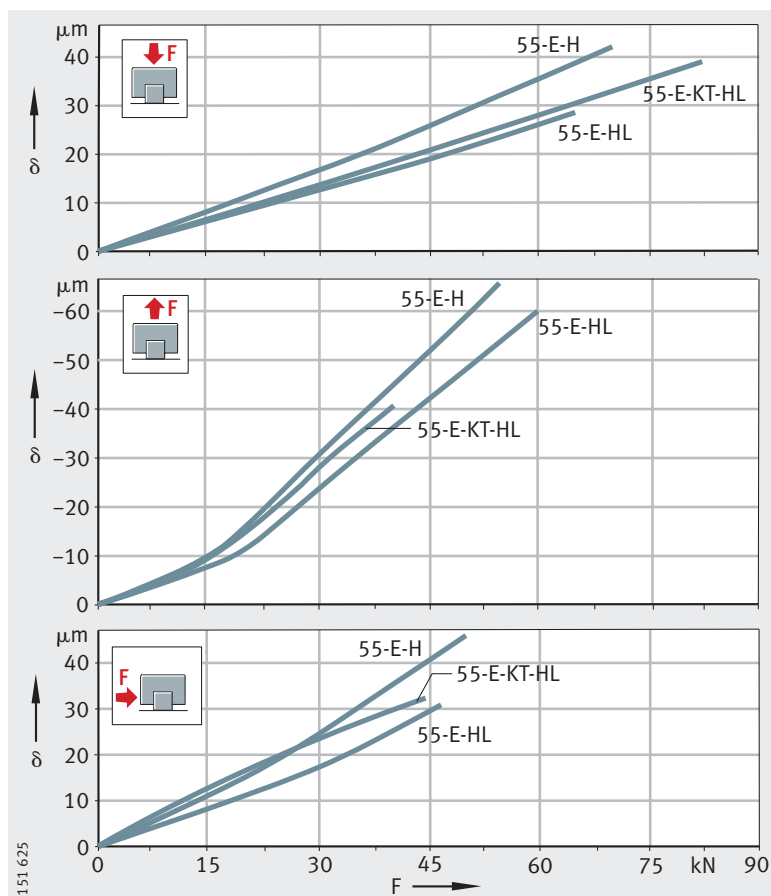
Linear recirculating roller bearing and guideway assemblies

RUE55-E-H
RUE55-E-HL
RUE55-E-KT-HL

δ = deflection
F = load

Figure 7

Spring curves for compressive, tensile and lateral load

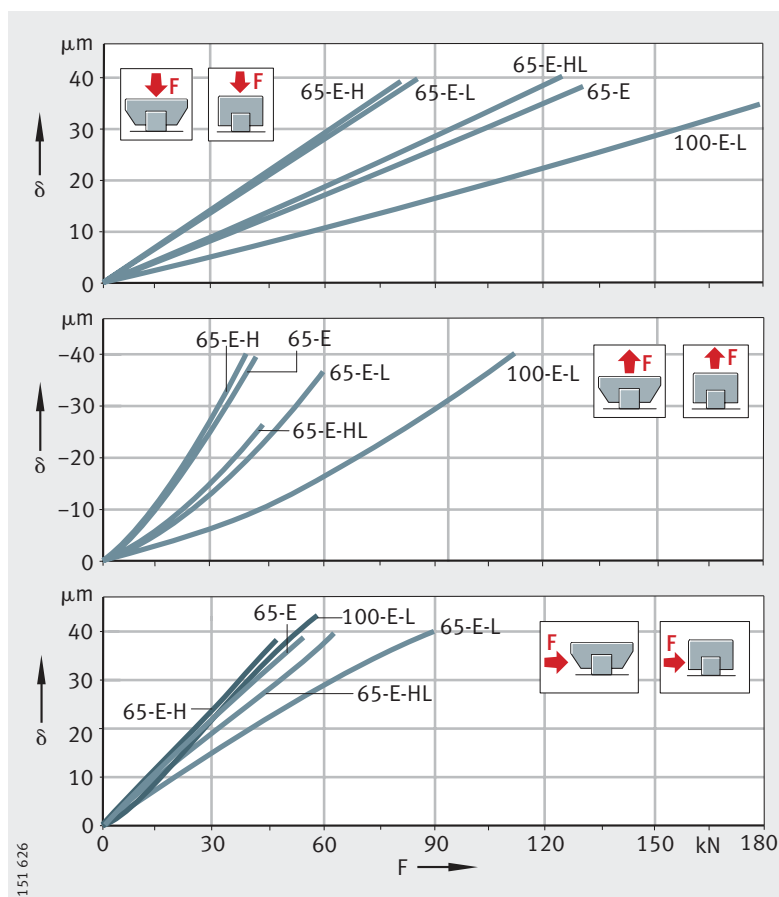


RUE65-E
RUE65-E-L
RUE65-E-H
RUE65-E-HL
RUE100-E-L

δ = deflection
F = load

Figure 8

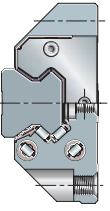
Spring curves for compressive, tensile and lateral load



Guideway hole patterns

Unless specified otherwise, the guideways have a symmetrical hole pattern, *Figure 9*.

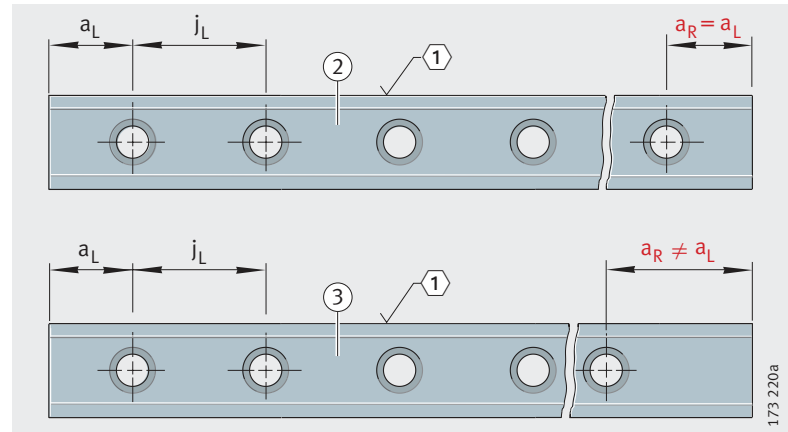
An asymmetrical hole pattern may be available at customer request. In this case, $a_L \geq a_{L \min}$ and $a_R \geq a_{R \min}$, *Figure 9*.



- ① Locating face
- ② Symmetrical hole pattern
- ③ Asymmetrical hole pattern

Figure 9

Hole patterns of guideways with one row of holes



Maximum number of pitches between holes

The number of pitches between holes is the rounded whole number equivalent to:

$$n = \frac{l - 2 \cdot a_{L \min}}{j_L}$$

The distances a_L and a_R are generally determined by:

$$a_L + a_R = l - n \cdot j_L$$

For guideways with a symmetrical hole pattern:

$$a_L = a_R = \frac{1}{2} \cdot (l - n \cdot j_L)$$

Number of holes:

$$x = n + 1$$

a_L, a_R mm
Distance between start or end of guideway and nearest hole

$a_{L \min}, a_{R \min}$ mm
Minimum values for a_L, a_R according to dimension tables

l mm
Guideway length

n —
Maximum possible number of hole pitches

j_L mm
Distance between holes

x —
Number of holes.

Attention!

If the minimum values for a_L and a_R are not observed, the counterbores of the holes may be intersected.

Linear recirculating roller bearing and guideway assemblies

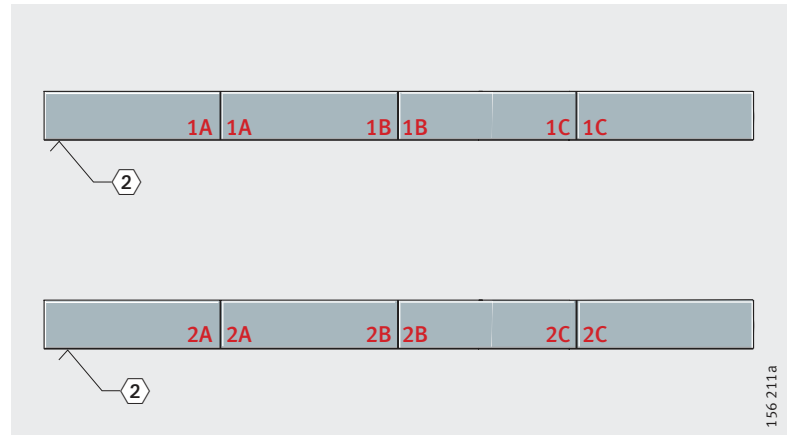
Multi-piece guideways

If the guideway length required is greater than $l_{\max}$ according to the dimension tables, these guideways are made up from individual pieces that together comprise the total required length. The individual pieces are matched to each other and marked, *Figure 10*.

② Marking
Guideway pieces:
1A, 1A
1B, 1B
1C, 1C
2A, 2A
2B, 2B
2C, 2C

Figure 10

Marking of multi-piece guideways



Demands on the adjacent construction

The running accuracy is essentially dependent on the straightness, accuracy and rigidity of the fit and mounting surfaces.

The straightness of the system is only achieved when the guideway is pressed against the datum surface.

If high demands are to be made on the running accuracy and/or if soft substructures and/or movable guideways are used, please contact us.

Geometrical and positional accuracy of the mounting surfaces

Attention!

The higher the requirements for accuracy and smooth running of the guidance system, the more attention must be paid to the geometrical and positional accuracy of the mounting surfaces.

The tolerances according to *Figure 11*, page 107 and table Values for parallelism tolerances t , page 108 must be observed.

Surfaces should be ground or precision milled – with the aim of achieving a mean roughness value $R_a 1,6$.

Any deviations from the stated tolerances will impair the overall accuracy, alter the preload and reduce the operating life of the guidance system.

Height difference ΔH

For ΔH , permissible values are in accordance with the following formula. If larger deviations are present, please contact us.

$$\Delta H = a \cdot b$$

ΔH μm

Maximum permissible deviation from the theoretically precise position, *Figure 11*, page 107

a –

Factor dependent on preload class, in this case: 0,075

b mm

Centre distance between guidance elements.

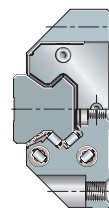


Figure 11
Tolerances of mounting surfaces
and parallelism
of mounted guideways

Linear recirculating roller bearing and guideway assemblies

Parallelism of mounted guideways

For guideways arranged in parallel, the parallelism t should be in accordance with *Figure 11*, page 107 and table. If the maximum values are used, the displacement resistance may increase. If larger tolerances are present, please contact us.

Values for parallelism tolerances t

Guideway Designation	Preload class V3 Parallelism tolerance t μm
TSX25-D (-U)	7
TSX35-E (-U)	10
TSX45-E (-U)	10
TSX55-E (-U)	10
TSX65-E (-U)	10
TSX100-E	10

Locating heights and corner radii

The locating heights and corner radii should be designed in accordance with table and *Figure 12*.

Locating heights and corner radii

Linear recirculating roller bearing and guideway assembly Designation	Locating heights		Corner radii	
	h_1 mm	h_2 mm max.	r_1 mm max.	r_2 mm max.
RUE25-D (-L, -H, -HL)	7,5	4,5	0,8	0,3
RUE35-E (-L, -H, -HL)	8	6	1	0,8
RUE35-E-KT-L (-HL)	8	6	1	0,8
RUE45-E (-L, -H, -HL)	10	8	1	0,8
RUE45-E-KT-L (-HL)	10	8	1	0,8
RUE55-E (-L, -H, -HL)	12	9,5	1	0,8
RUE55-E-KT-L (-HL)	12	9,5	1	0,8
RUE65-E (-L, -H, -HL)	15	10,5	1	0,8
RUE65-E-KT-L (-HL)	15	10,5	1	0,8
RUE100-E-L	25	13	1	0,8

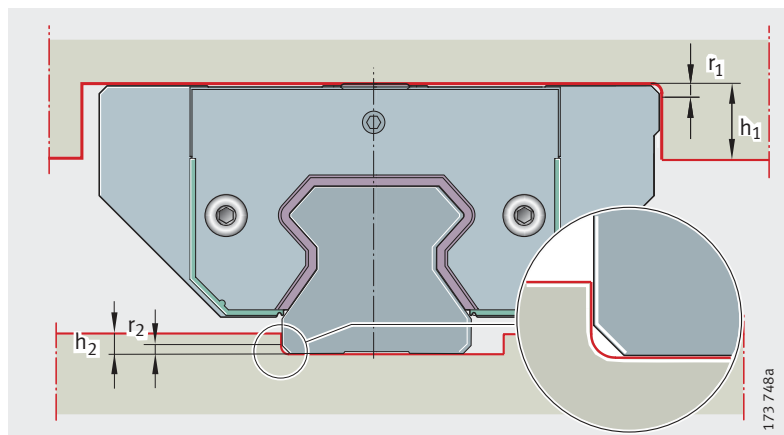


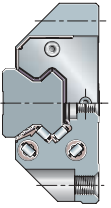
Figure 12

Locating heights and corner radii

Accuracy

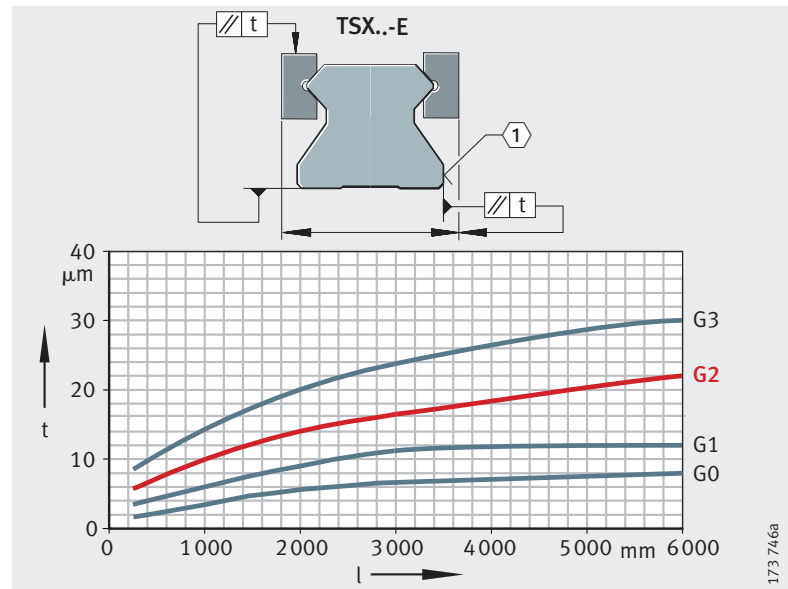
Accuracy classes

Linear recirculating roller bearing and guideway assemblies are available in accuracy classes G0 to G3, *Figure 13*. The standard is class G2.



t = parallelism tolerance
with differential measurement
l = total guideway length
① Locating face

Figure 13
Accuracy classes
and parallelism tolerances
of guideways



Parallelism of raceways to locating surfaces

The parallelism tolerances of guideways are shown in *Figure 13*. In systems with Corrotect® coating, there may be deviations in tolerances compared with uncoated units.

Tolerances

Tolerances: see table Tolerances of accuracy classes and *Figure 14*, page 110.

The tolerances are arithmetic mean values. They relate to the centre point of the screw mounting or locating surfaces of the carriage.

The dimensions H and A₁ (table Tolerances of accuracy classes) should always remain within the tolerance irrespective of the position of the carriage on the guideway.

Tolerances of accuracy classes

Tolerance		Accuracy			
		G0 μm	G1 μm	G2 ¹⁾ μm	G3 μm
Tolerance for height	H	±5	±10	±20	±25
Height difference ²⁾	ΔH	3	5	10	15
Tolerance for spacing	A ₁	±5	±10	±15	±20
Spacing difference ²⁾	ΔA ₁	3	7	15	22

¹⁾ Standard accuracy class.

²⁾ Difference between several carriages on one guideway, measured at the same point on the guideway.

Linear recirculating roller bearing and guideway assemblies

Units with Corrotect® coating

For these units, the values for the appropriate accuracy class must be increased by the values for RRF or RRFT; for values, see table.

Tolerances for coated parts

Tolerance		With Corrotect® coating		With Protect A coating	With Protect B coating
		RRF ¹⁾ μm	RRFT ²⁾ μm	KD μm	KDC μm
Tolerance for height	H	+6	+3	+6	+6
Height difference ³⁾	ΔH	+3	0	+3	+3
Tolerance for spacing	A ₁	+3	+3	+3	+3
Spacing difference ³⁾	ΔA ₁	+3	0	+3	+3

1) Displacement in tolerance zone (guideway and carriage coated).

2) Displacement in tolerance zone (guideway only coated).

3) Difference between several carriages on one guideway, measured at the same point on the guideway.

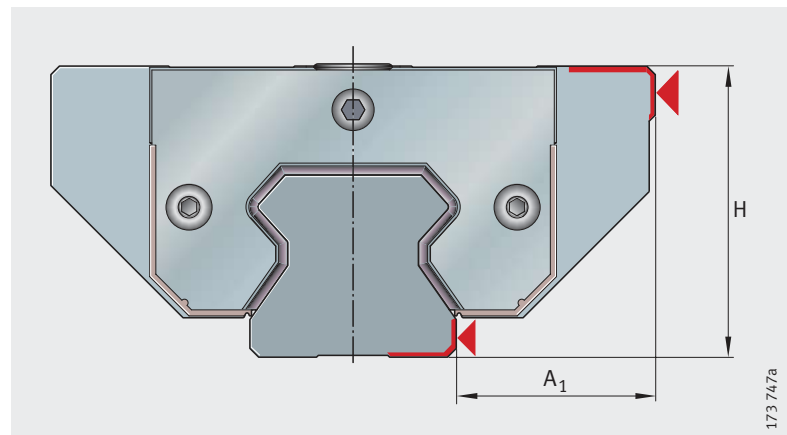


Figure 14

Datum dimensions for accuracy

Height sorting 2S

Where guidance systems are subject to particularly high accuracy requirements, it is possible to restrict the height tolerance by specific sorting.

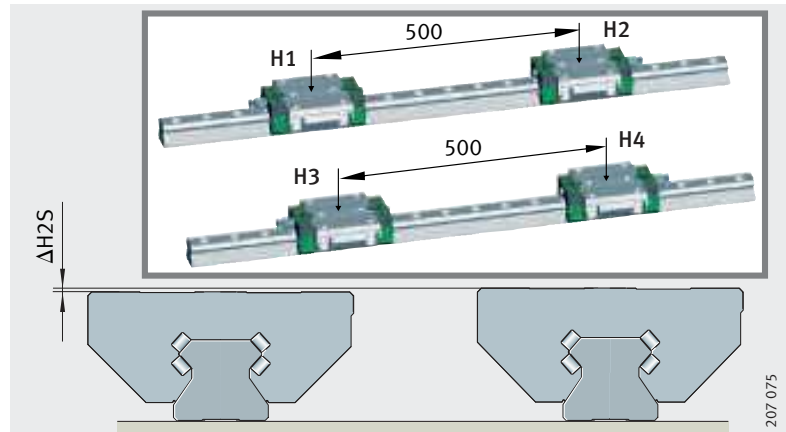


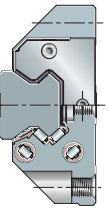
Figure 15
Height sorting 2S

Height difference in 2S

Roller system		2S-G0	2S-G1	2S-G2	2S-G3
		μm	μm	μm	μm
Height difference	$\Delta H_{2S}^{1)}$	6	8	15	20

¹⁾ Measured at the centre of the guideway.

The height tolerance of the carriages in sorting by sets comprises the height difference ΔH or ΔH_{2S} and the parallelism deviation of the raceways as a function of length.



Linear recirculating roller bearing and guideway assemblies

Positional and length tolerances of guideways

The positional and length tolerances are shown in *Figure 16* and table Length tolerances of guideways.
The hole pattern corresponds to DIN ISO 1101.

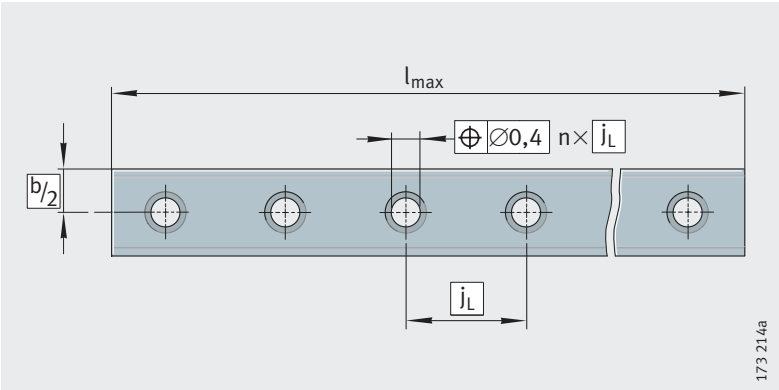


Figure 16
Positional and length tolerances of guideways

Length tolerances of guideways

Tolerances			
of guideways, as a function of length $l_{max}^{1)}$			on multi-piece guideways
Guideway length mm			mm
≤ 1000	> 1000 < 3000	> 3000	
-1	-1,5	$\pm 0,1\%$ of guideway length	± 3 over total length

1) Length l_{max} : see dimension tables.

Pieces of joined guideways

Guideway length ¹⁾ mm	Maximum permissible number of pieces
< 3 000	2
3 000 – 4 000	3
4 000 – 6 000	4
> 6 000	4 + 1 piece per 1 500 mm

1) Minimum length of one piece = 600 mm.

**Ordering example,
ordering designation
Unit, guideway with
asymmetrical hole pattern**

Linear roller bearing
and guideway assembly

Size

RUE-E

Carriage type

45

Number of carriages per unit

L

Accuracy class

W2

Preload

G2

Guideway length

V3

a_L

1540 mm

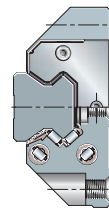
a_R

20 mm

50 mm

Ordering designation

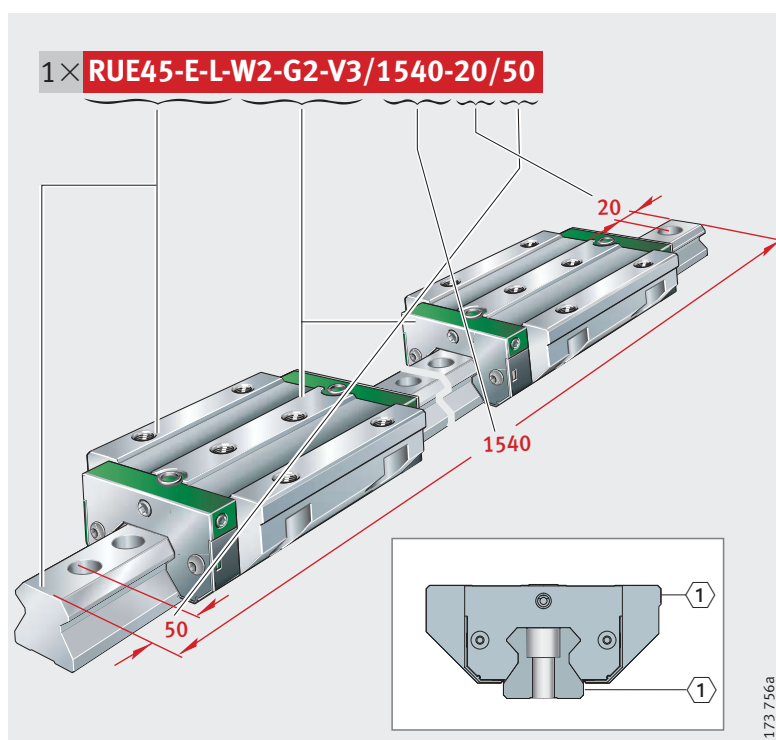
1×RUE45-E-L-W2-G2-V3/1540-20/50, Figure 17



① Locating face

Figure 17

Ordering example,
ordering designation



Linear recirculating roller bearing and guideway assemblies

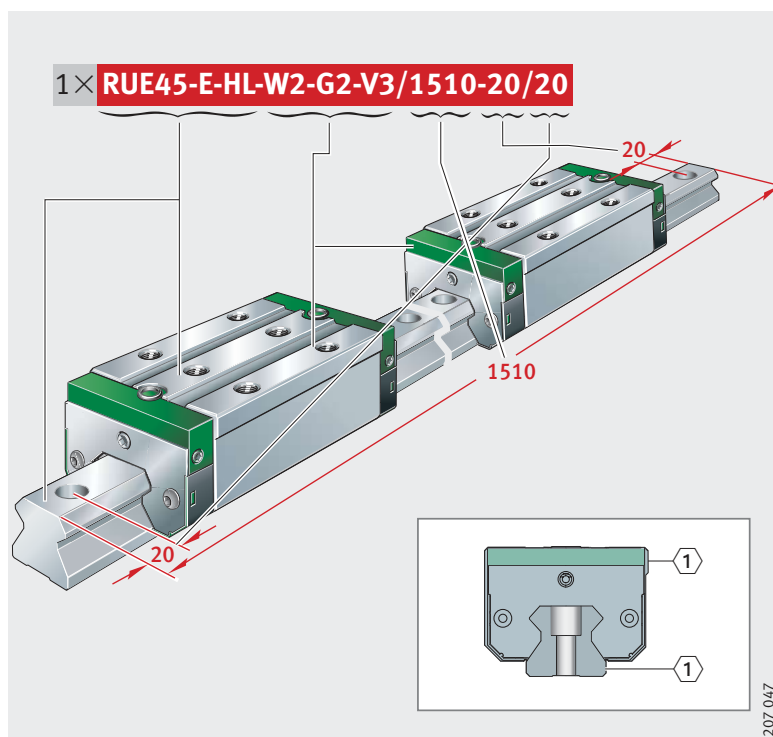
Unit, guideway with symmetrical hole pattern

Linear roller bearing and guideway assembly	RUE-E
Size	45
Carriage type	HL
Number of carriages per unit	W2
Accuracy class	G2
Preload	V3
Guideway length	1510 mm
a_L	20 mm
a_R	20 mm

Ordering designation 1×RUE45-E-HL-W2-G2-V3/1510-20/20, Figure 18

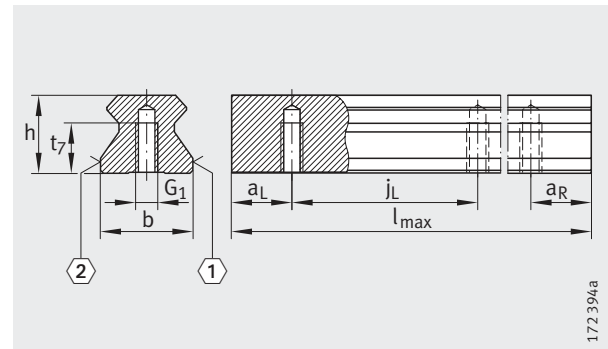
① Locating face

Figure 18
Ordering example,
ordering designation



Linear recirculating roller bearing and guideway assemblies

Full complement
Standard and L carriages



TSX...-E
①, ② ⑥

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions								
	l _{max} ¹⁾	H	B	L ²⁾	A ₁	J _B	b −0,005 −0,035	L ₁	J _L	J _{LZ}	j _L	a _L , a _R ³⁾	
												min.	max.
RUE25-D-FE ⁴⁾	1 980	36	70	91	23,5	57	23	65,6	45	40	30	20	23
RUE25-D-OE ⁵⁾													
RUE25-D-L-FE ⁴⁾				107				82,2					
RUE25-D-L-OE ⁵⁾													
RUE35-E	2 960	48	100	122,9	33	82	34	85,2	62	52	40	20	31
RUE35-E-L				148,7				111					
RUE45-E	2 940	60	120	145,9	37,5	100	45	104,2	80	60	52,5	20	41
RUE45-E-L				178,3				136,6					
RUE55-E	2 520	70	140	172,7	43,5	116	53	127	95	70	60	20	47
RUE55-E-L				210,7				165					
RUE65-E	2 520	90	170	195,5	53,5	142	63	141,2	110	82	75	20	61
RUE65-E-L				261,9				207,6					
RUE100-E-L	2 730	120	250	372,2	75	200	100	306,5	230	–	105	20	83

For further table values, see page 118 and page 119.

1) Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 112.

Maximum single-piece guideway length of 6 m available by agreement.

2) Minimum covered length for sealing the lubrication connectors.

3) a_L and a_R are dependent on the guideway length.

4) Grease lubrication.

5) Oil lubrication.

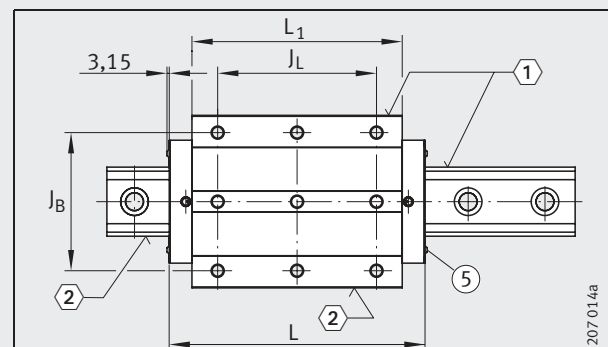
6) ① Locating face

② Marking

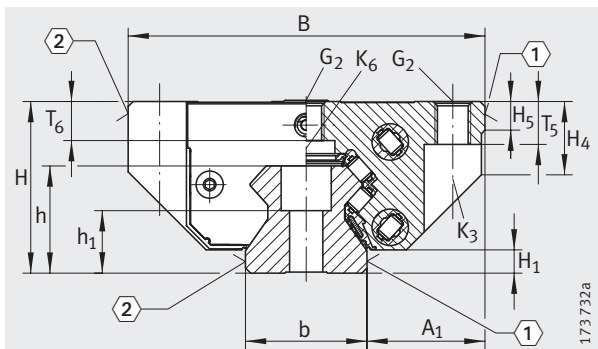
③ Screw plug, $M_A = 2,5 \text{ Nm}$

④ Fixing screw, $M_A = 2,5 \text{ Nm}$

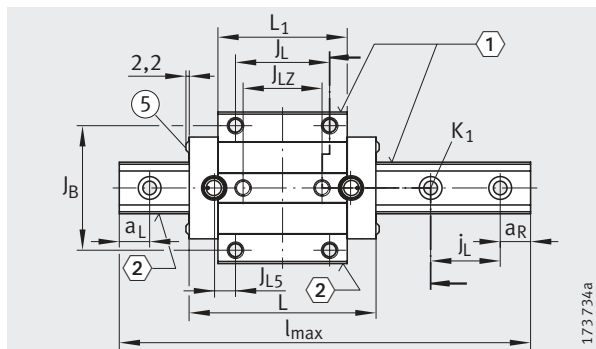
⑤ Fixing screw



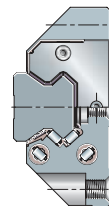
RUE100-E-L
①, ②, ⑤ ⑥



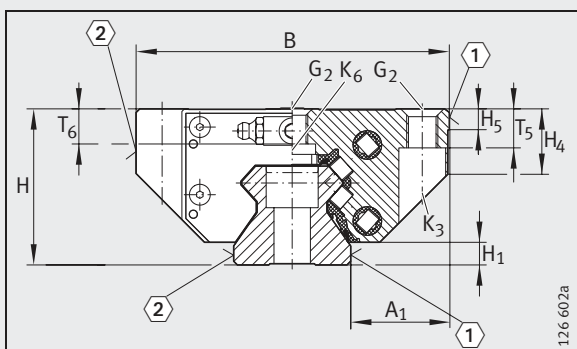
RUE...-E (-L)
①, ② ⑥



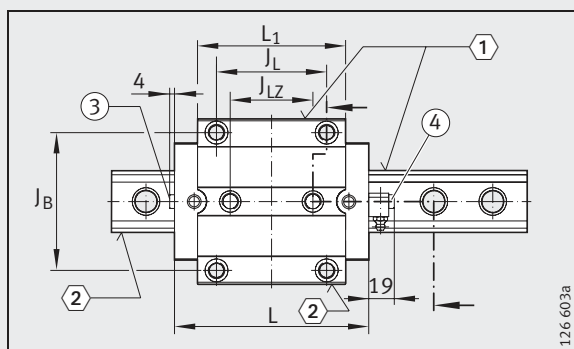
RUE...-E (-L) · View rotated 90°
①, ②, ⑤ ⑥



								Fixing screws									
H ₁	H ₅	H ₄	T ₅	T ₆	t ₇	h	h ₁	DIN ISO 4 762-12.9									
								G ₁		G ₂		K ₁		K ₃		K ₆	
									M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm
6,5	7,5	17,5	10	8,65	12,5	22,3	14,3	M6	17	M8	24	M6	17	M6	17	M6	10
6,5	8	20,5	12	10,9	15	30	17,5	M8	41	M10	41	M8	41	M8	41	M8	24
8,5	8	26	15	13,2	20	38	19,5	M12	140	M12	83	M12	140	M10	83	M10	48
11	12	32	18	14,8	22	45	22,5	M14	220	M14	140	M14	220	M12	140	M12	83
11,5	15	39,2	23,3	23,3	25	53,8	28,8	M16	340	M16	220	M16	340	M14	220	M14	130
15	25	51,3	29	26,6	–	80	48	–	–	M20	470	M24	1100	M16	340	M16	220



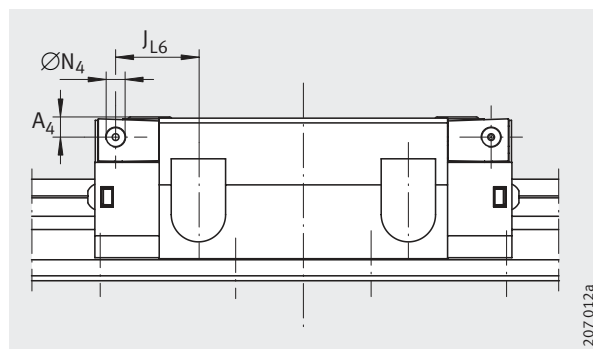
RUE25-D (-L)
①, ② ⑥



RUE25-D (-L) · View rotated 90°
①, ②, ③, ④ ⑥

Linear recirculating roller bearing and guideway assemblies

Full complement
Standard and L carriages



Lubrication connector on lateral face

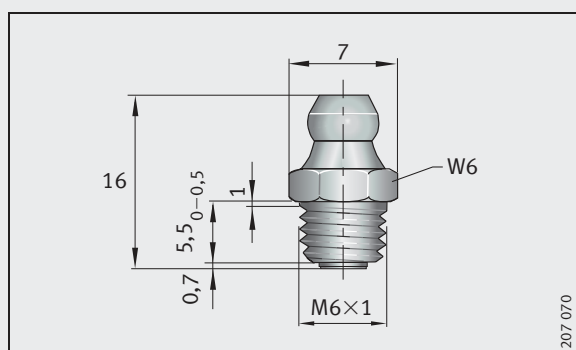
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway					Dimensioning of lubrication connectors		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug	Covering strip		A ₃	N ₃ ³⁾	A ₄
						Adhesive bonded	Clip fit			
RUE25-D-FE	RWU25-D-FE	0,7	TSX25-D(-U)	3,3	KA11-TN	ADB13	ADB13-K	7,5	M6	–
RUE25-D-OE	RWU25-D-OE									
RUE25-D-L-FE	RWU25-D-L-FE									
RUE25-D-L-OE	RWU25-D-L-OE	0,9								
RUE35-E	RWU35-E	1,75	TSX35-E(-U)	5,9	KA15-TN	ADB18	ADB18-K	6,6	M6	5,6
RUE35-E-L	RWU35-E-L	2,29								
RUE45-E	RWU45-E	3,07	TSX45-E(-U)	9,4	KA20-TN	ADB23	ADB23-K	6,6	M6	6,6
RUE45-E-L	RWU45-E-L	4,05								
RUE55-E	RWU55-E	5,24	TSX55-E(-U)	13,1	KA24-TN	ADB27	ADB27-K	8,1	M6	8,1
RUE55-E-L	RWU55-E-L	6,83								
RUE65-E	RWU65-E	9,32	TSX65-E(-U)	21,5	KA26-TN	ADB29	ADB29-K	19,6	M6	19,6
RUE65-E-L	RWU65-E-L	13,8								
RUE100-E-L	RWU100-E-L	36,4	TSX100-E	45,3	KA40-M	–	–	10,6	M6	10,6

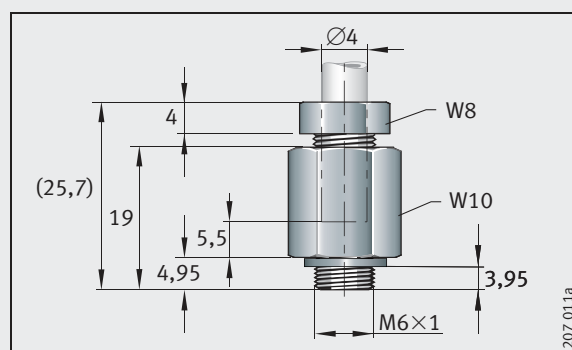
¹⁾ Maximum diameter of lubrication hole in adjacent construction.

²⁾ Position of lubrication hole in adjacent construction.

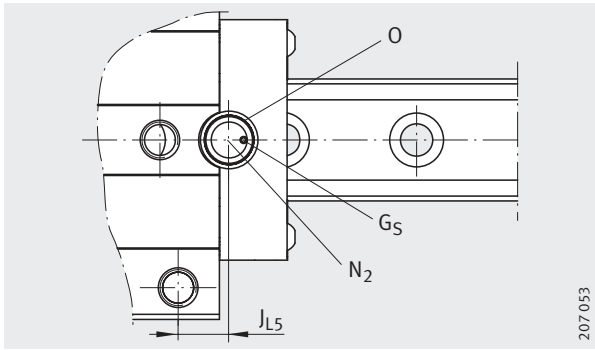
³⁾ Maximum screw depth 6 mm.



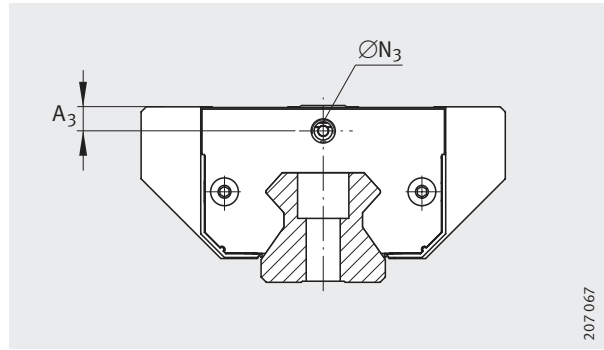
Lubrication nipple according to DIN 71412-A-M6,
Width across flats W = 6 mm



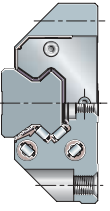
Connector with union nut,
width across flats W1 = 8 mm, W2 = 10 mm



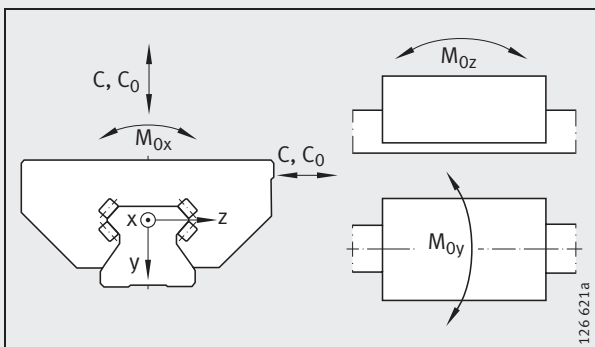
Lubrication connector in top face



Dimensioning of lubrication connector in end face



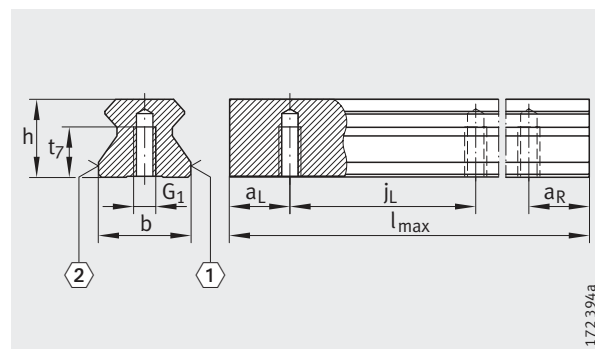
							Load carrying capacity				
N ₄	J _{L6}	N ₂ ¹⁾	J _{L5} ²⁾	G _S		O	Basic load ratings		Moment ratings		
				DIN EN ISO 4 026	DIN EN ISO 4 027		DIN 3 771	C	C ₀	M _{0x}	M _{0y}
			N	N	Nm	Nm	Nm				
–	–	3	14,5	–	–	10X1,5	28 000	65 000	350	760	680
			23				33 500	82 000	440	1 200	1 080
M6	24,4	6	14,3	M2,5X3	–	10X1,5	59 000	140 000	1 200	2 150	1 950
	37,4		27,2				70 000	175 000	1 500	3 350	3 000
M6	27	6	15,7	M2,5X3	–	10X1,5	92 000	215 000	1 899	4 255	3 821
	43,2		31,9				114 000	285 000	2 503	7 263	6 536
M6	32,9	6	21,6	–	M4X4	10X1,5	136 000	320 000	3 287	7 404	6 667
	51,9		40,6				167 000	415 000	4 226	12 214	11 010
M6	34,8	6	15,6	–	M4X4	18X1,5	200 000	435 000	5 450	12 100	10 900
	68,1		48,8				270 000	640 000	7 600	24 000	21 500
Ø5,6	65,1	6	47,15	–	M4X4	10X1,5	630 000	1 490 000	33 780	80 250	72 280



Load directions

Linear recirculating roller bearing and guideway assemblies

Full complement
H and HL carriages



TSX..-E-U

①, ② ⑥

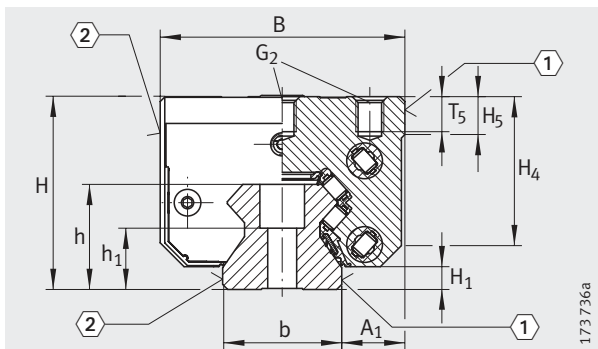
172394a

Dimension table · Dimensions in mm

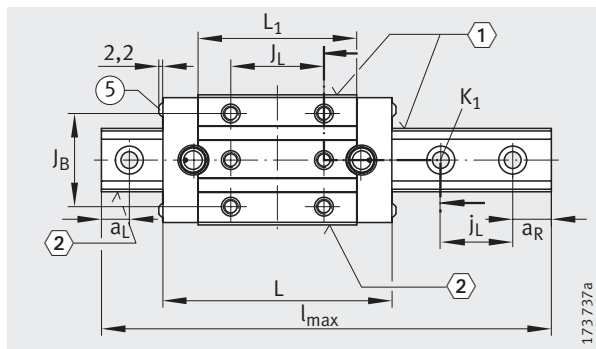
Designation	Dimensions				Mounting dimensions							
	$l_{max}^{1)}$	H	B	$L^{2)}$	A_1	J_B	b	L_1	J_L	j_L	$a_L, a_R^{3)}$	
							$-0,005$ $-0,035$				min.	max.
RUE25-D-H-FE⁴⁾	1 980	40	48	90,6	12,5	35	23	65,6	35	30	20	23
RUE25-D-H-OE⁵⁾												
RUE25-D-HL-FE⁴⁾				107				82,2	50			
RUE25-D-HL-OE⁵⁾												
RUE35-E-H	2 960	55	70	122,9	18	50	34	85,2	50	40	20	31
RUE35-E-HL				148,7				111	72			
RUE45-E-H	2 940	70	86	145,9	20,5	60	45	104,2	60	52,5	20	41
RUE45-E-HL				178,3				136,6	80			
RUE55-E-H	2 520	80	100	172,7	23,5	75	53	127	75	60	20	47
RUE55-E-HL				210,7				165	95			
RUE65-E-H	2 520	100	126	195,5	31,5	76	63	141,2	70	75	20	61
RUE65-E-HL				261,9				207,6	120			

For further table values, see page 122 and page 123.

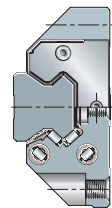
- 1) Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 112.
Maximum single-piece guideway length of 6 mm available by agreement.
- 2) Minimum covered length for sealing the lubrication connectors.
- 3) a_L and a_R are dependent on the guideway length.
- 4) Grease lubrication.
- 5) Oil lubrication.
- 6) ① Locating face
② Marking
③ Screw plug, $M_A = 2,5$ Nm
④ Fixing screw, $M_A = 2,5$ Nm
⑤ Fixing screw



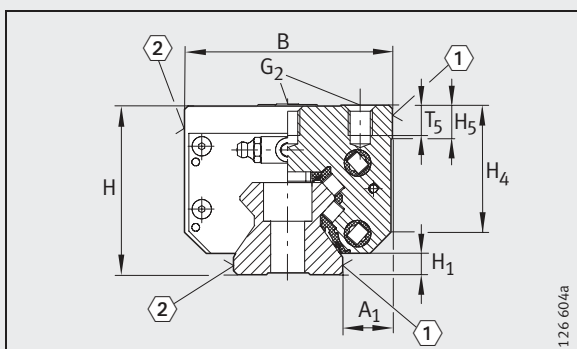
RUE..-E-H (-HL)
①, ② ⑥



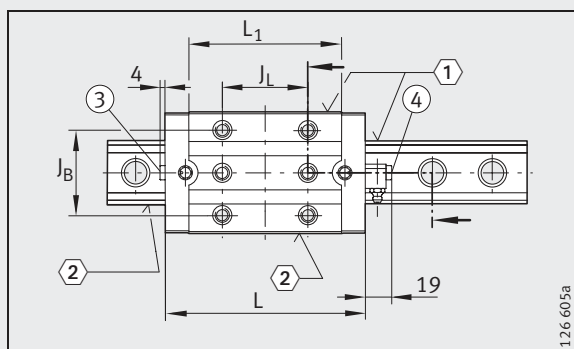
RUE..-E-H (-HL) · View rotated 90°
①, ②, ⑤ ⑥



							Fixing screws					
H ₁	H ₅	H ₄	T ₅	t ₇	h	h ₁	DIN ISO 4 762-12.9					
							G ₁		G ₂		K ₁	
								M _A Nm		M _A Nm		M _A Nm
6,5	7,5	32,5	7,5	12,5	22,3	11,8	M6	17	M6	17	M6	17
6,5	10,8	41,9	10	15	30	17,5	M8	41	M8	41	M8	41
8,5	13,7	52,4	12,5	20	38	19,5	M12	140	M10	83	M12	140
11	16	61,4	15	22	45	22,5	M14	220	M12	140	M14	220
11,5	15	71,2	20	25	53,8	28,8	M16	340	M14	220	M16	340



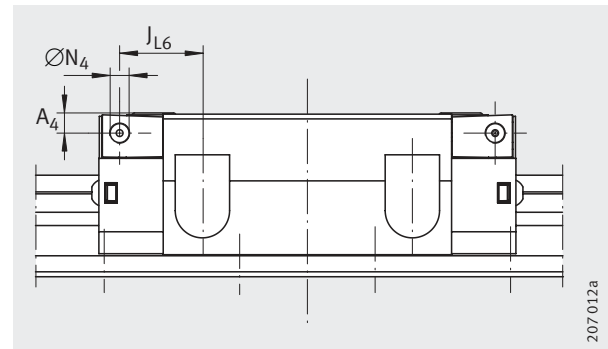
RUE25-D-H (-HL)
①, ② ⑥



RUE25-D-H (-HL) · View rotated 90°
①, ②, ③, ④ ⑥

Linear recirculating roller bearing and guideway assemblies

Full complement
H and HL carriages



Lubrication connector on lateral face

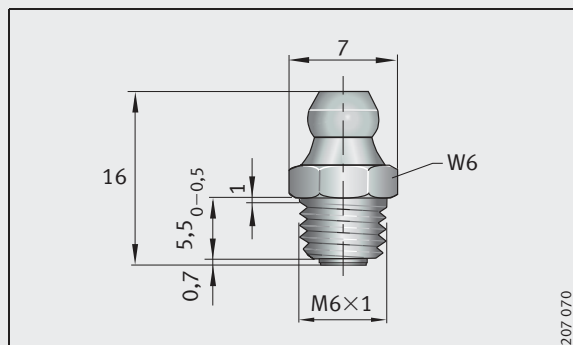
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway					Dimensioning of lubrication connectors		
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m	Closing plug	Covering strip		A ₃	N ₃ ³⁾	A ₄
						Adhesive bonded	Clip fit			
RUE25-D-H-FE	RWU25-D-H	0,6	TSX25-D(-U)	3,3	KA11-TN	ADB13	ADB13-K	11,5	M6	—
RUE25-D-H-OE										
RUE25-D-HL-FE	RWU25-D-HL	0,8								
RUE25-D-HL-OE										
RUE35-E-H	RWU35-E-H	1,67	TSX35-E(-U)	5,9	KA15-TN	ADB18	ADB18-K	13,6	M6	12,6
RUE35-E-HL	RWU35-E-HL	2,14								
RUE45-E-H	RWU45-E-H	3,05	TSX45-E(-U)	9,4	KA20-TN	ADB23	ADB23-K	16,6	M6	16,6
RUE45-E-HL	RWU45-E-HL	3,95								
RUE55-E-H	RWU55-E-H	4,94	TSX55-E(-U)	13,1	KA24-TN	ADB27	ADB27-K	18,1	M6	18,1
RUE55-E-HL	RWU55-E-HL	6,34								
RUE65-E-H	RWU65-E-H	8,9	TSX65-E(-U)	21,5	KA26-TN	ADB29	ADB29-K	29,6	M6	29,6
RUE65-E-HL	RWU65-E-HL	12,89								

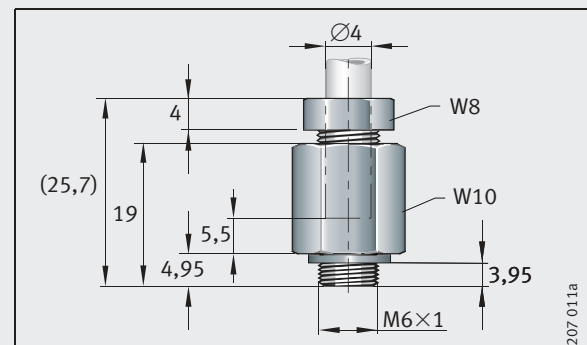
1) Maximum diameter of lubrication hole in adjacent construction.

2) Position of lubrication hole in adjacent construction.

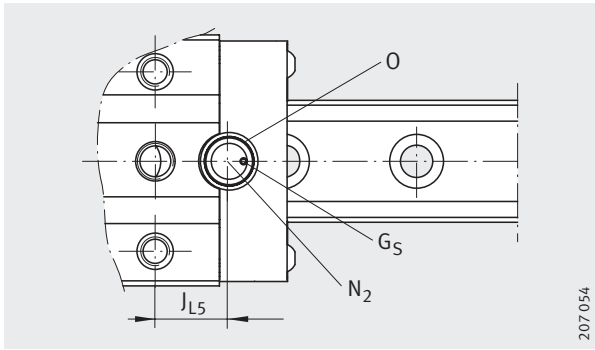
3) Maximum screw depth 6 mm.



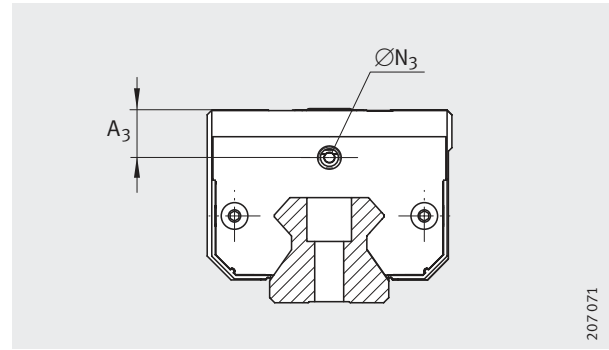
Lubrication nipple according to DIN 71412-A-M6,
Width across flats W = 6 mm



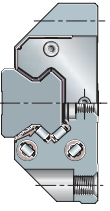
Connector with union nut,
width across flats W1 = 8 mm, W2 = 10 mm



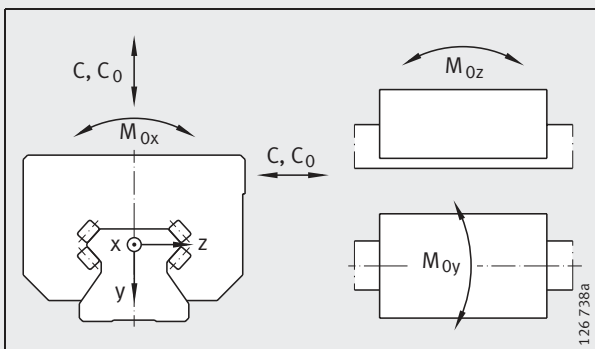
Lubrication connector in top face



Dimensioning of lubrication connector in end face



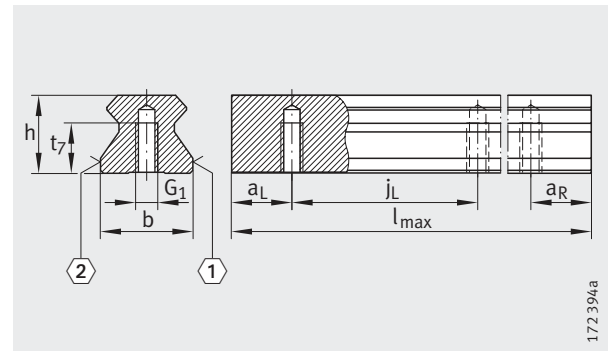
							Load carrying capacity				
N ₄	J _{L6}	N ₂ ¹⁾	J _{L5} ²⁾	G _S		O	Basic load ratings		Moment ratings		
				DIN EN ISO 4 026	DIN EN ISO 4 027	DIN 3 771	C	C ₀	M _{0x}	M _{0y}	M _{0z}
			N	N	Nm	Nm	Nm				
–	–	3	19,5	–	–	10X1,5	28 000	65 000	350	760	680
			20,3				3 500	82 000	440	1 200	1 080
M6	30,4	6	20,3	M2,5X3	–	10X1,5	59 000	140 000	1 200	2 150	1 950
	32,4		22,2				70 000	175 000	1 500	3 350	3 000
M6	37	6	25,7	M2,5X3	–	10X1,5	92 000	215 000	1899	4 255	3 821
	43,2		31,9				114 000	285 000	2503	7 263	6 536
M6	42,9	6	31,6	–	M4X4	10X1,5	136 000	320 000	3 287	7 404	6 667
	51,9		40,6				167 000	415 000	4 226	12 214	11 010
M6	54,8	6	35,6	–	M4X4	18X1,5	200 000	435 000	5 450	12 100	10 900
	63,1		43,8				270 000	640 000	7 600	24 000	21 500



Load directions

Linear recirculating roller bearing and guideway assemblies

With chain guide
L and HL carriages



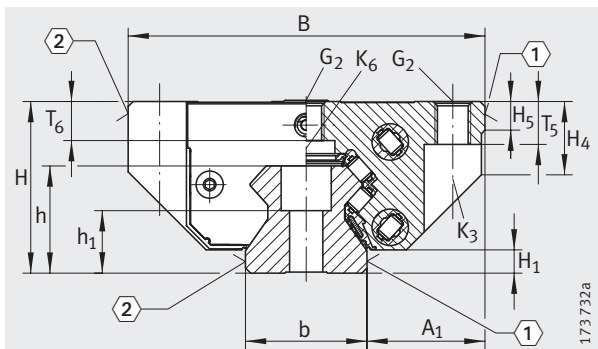
TSX..-E-U
①, ②⁴⁾

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions								
	$l_{\max}^{1)}$	H	B	$L^{2)}$	A_1	J_B	b -0,005 -0,035	L_1	J_L	J_{LZ}	j_L	$a_L, a_R^{3)}$	
												min.	max.
RUE35-E-KT-L	2 960	48	100	148,7	33	82	34	111	62	52	40	20	31
RUE35-E-KT-HL		55	70		18	50			72	—			
RUE45-E-KT-L	2 940	60	120	178,3	37,5	100	45	136,6	80	60	52,5	20	41
RUE45-E-KT-HL		70	86		20,5	60			—	—			
RUE55-E-KT-L	2 520	70	140	210,7	43,5	116	53	165	95	70	60	20	47
RUE55-E-KT-HL		80	100		23,5	75			—	—			

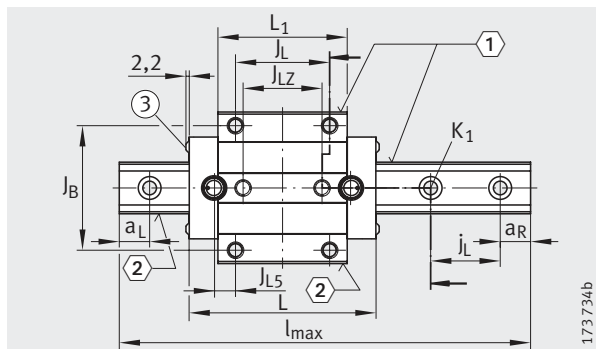
For further table values, see page 126 and page 127.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 112.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ Minimum covered length for sealing the lubrication connectors.
- ³⁾ a_L and a_R are dependent on the guideway length.
- ⁴⁾ ① Locating face
② Marking
③ Fixing screw



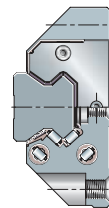
RUE...-E-KT-L

①, ②⁴⁾

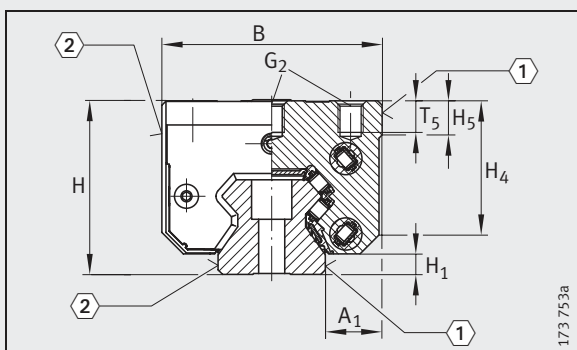


RUE...-E-KT-L · View rotated 90°

①, ②, ③⁴⁾

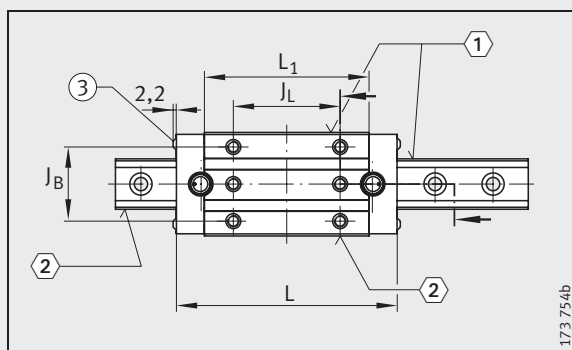


								Fixing screws															
H ₁	H ₅	H ₄	T ₅	T ₆	t ₇	h	h ₁	G1		G2		K1		K3		K6							
								DIN ISO 4 762-12.9								DIN 7 984-8.8							
									M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm				
6,5	8	20,5	12	10,9	15	30	17,5	M8	41	M10	41	M8	41	M8	41	M8	24						
	10,8	41,9	10	–						M8				–	–	–	–						
8,5	8	26	15	13,2	20	38	19,5	M12	140	M12	83	M12	140	M10	83	M10	48						
	13,7	52,4	12,5	–						M10				–	–	–	–						
11	12	32	18	14,8	22	45	22,5	M14	220	M14	140	M14	220	M12	140	M12	83						
	16	61,4	15	–						M12				–	–	–	–						



RUE...-E-KT-HL

①, ②⁴⁾

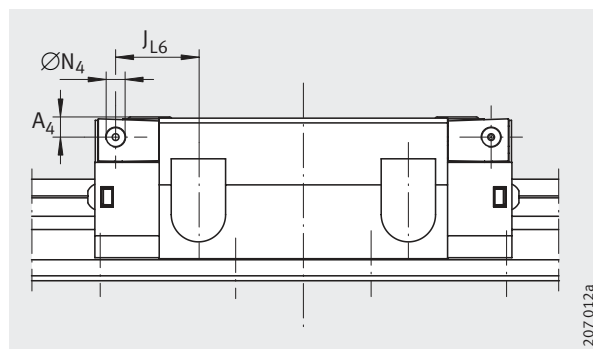


RUE...-E-KT-HL · View rotated 90°

①, ②, ③⁴⁾

Linear recirculating roller bearing and guideway assemblies

With chain guide
L and HL carriages



Lubrication connector on lateral face

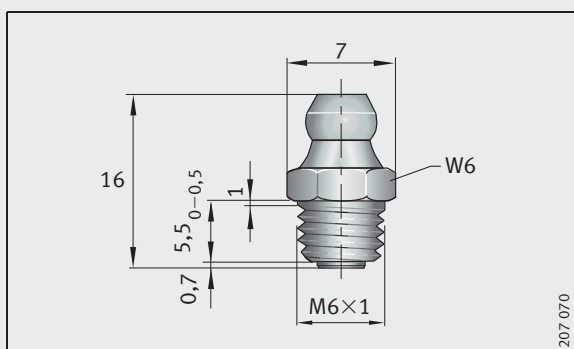
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway					Dimensioning of lubrication connectors		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug	Covering strip		A ₃	N ₃ ³⁾	A ₄
						Adhesive bonded	Clip fit			
RUE35-E-KT-L	RWU35-E-KT-L	2,28	TSX35-E(-U)	5,9	KA15-TN	ADB18	ADB18-K	6,6	M6	5,6
RUE35-E-KT-HL	RWU35-E-KT-HL	2,14						13,6		12,6
RUE45-E-KT-L	RWU45-E-KT-L	3,97	TSX45-E(-U)	9,4	KA20-TN	ADB23	ADB23-K	6,6	M6	6,6
RUE45-E-KT-HL	RWU45-E-KT-HL	3,99						16,6		16,6
RUE55-E-KT-L	RWU55-E-KT-L	6,72	TSX55-E(-U)	13,1	KA24-TN	ADB27	ADB27-K	8,1	M6	8,1
RUE55-E-KT-HL	RWU55-E-KT-HL	6,23						18,1		18,1

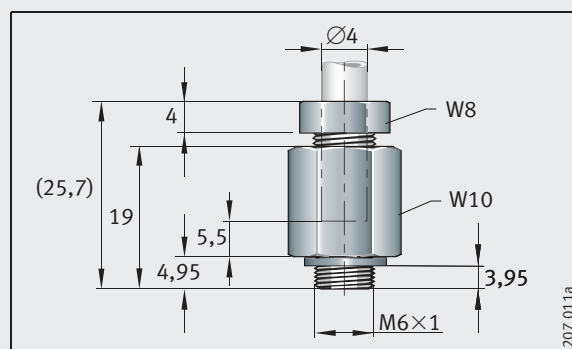
1) Maximum diameter of lubrication hole in adjacent construction.

2) Position of lubrication hole in adjacent construction.

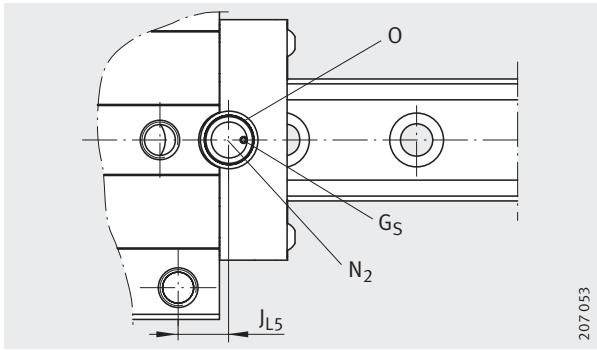
3) Maximum screw depth 6 mm.



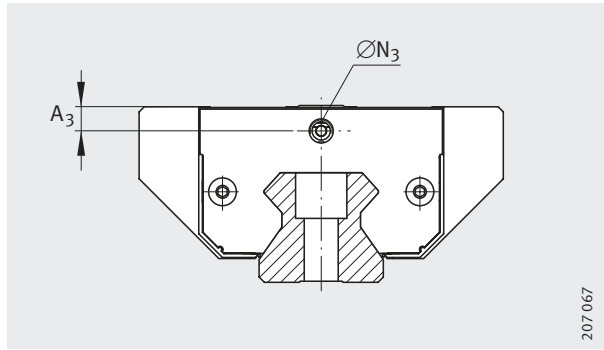
Lubrication nipple according to DIN 71412-A-M6,
Width across flats W = 6 mm



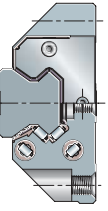
Connector with union nut,
width across flats W1 = 8 mm, W2 = 10 mm



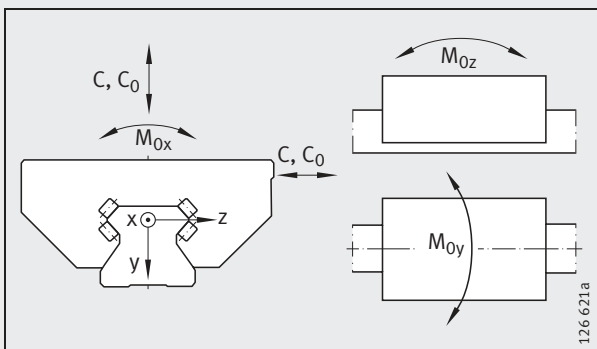
Lubrication connector in top face



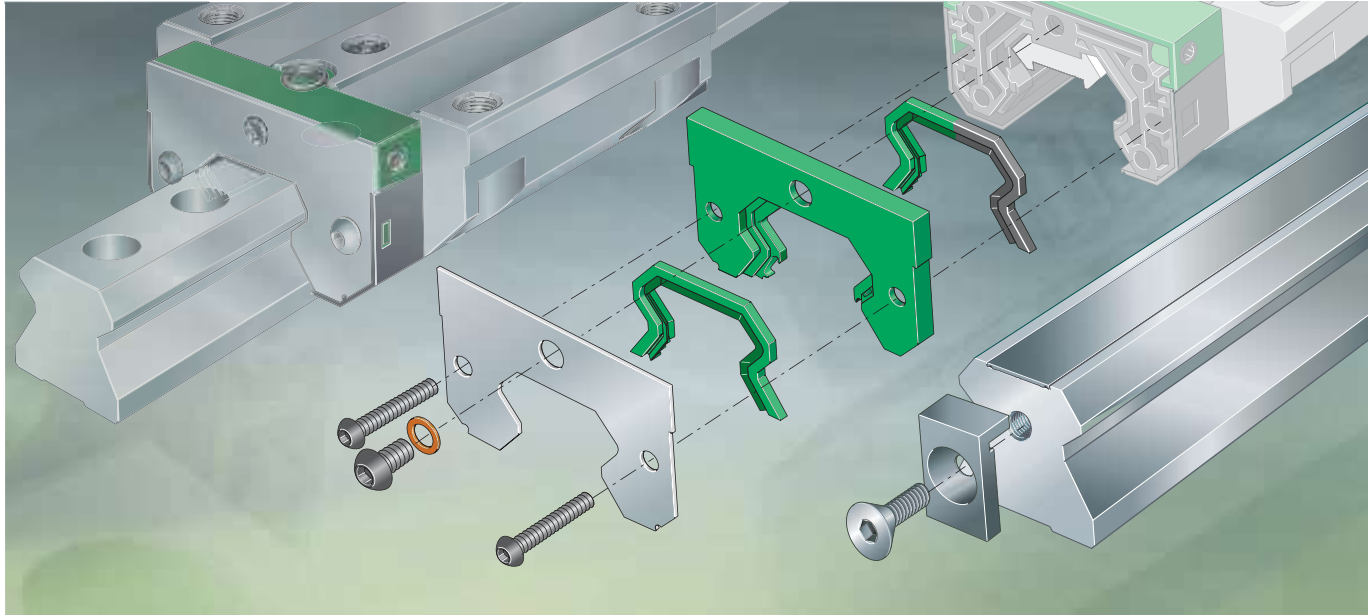
Dimensioning of lubrication connector in end face



							Load carrying capacity					
N ₄	J _{L6}	N ₂ ¹⁾	J _{L5} ²⁾	G _S		O	Basic load ratings		Moment ratings			
				DIN EN ISO 4 026	DIN EN ISO 4 027		DIN 3 771	C	C ₀	M _{0x}	M _{0y}	M _{0z}
M6	37,4	6	27,2	M2,5X3	–	10X1,5	54 000	126 000	1 100	2 500	2 250	
	32,4		22,2									
M6	43,2	6	31,9	M2,5X3	–	10X1,5	92 000	214 000	1 833	4 528	4 077	
	43,2											
M6	51,9	6	40,6	–	M4X4	10X1,5	138 000	325 000	3 279	9 447	8 497	
	51,9											



Load directions



Accessories

Closing plugs

Hydraulic fitting device for closing plugs

Guideway covering strips

Rolling-in device for covering strip

Clamping element

Braking and clamping element

Damping carriage

Sealing and lubrication elements – system KIT

Product overview Accessories

Closing plugs

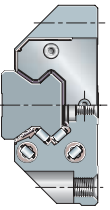
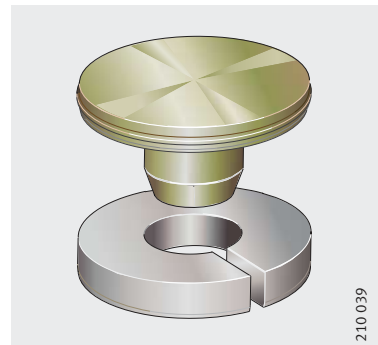
Brass closing plug

Brass closing plug with clinch ring

KA...-M



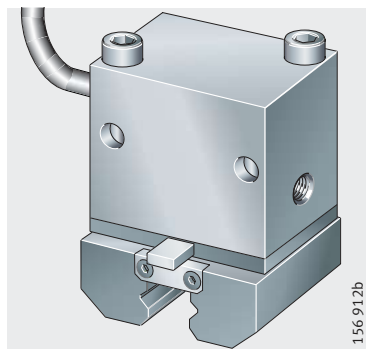
KA...-MSA



Hydraulic fitting device

For brass closing plugs

MVH.TSX...-D-A

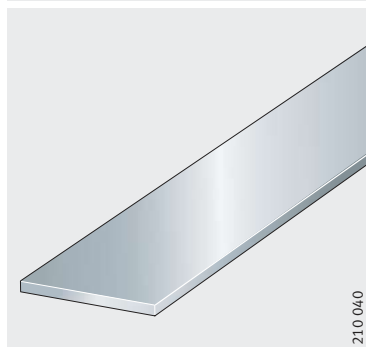


Guideway covering strips

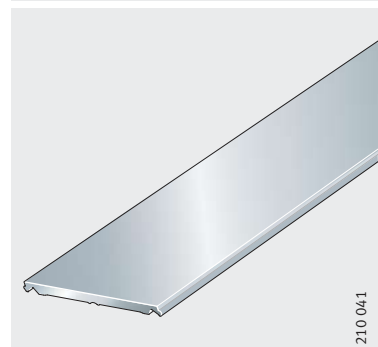
Adhesive bonded

Clip fit

ADB



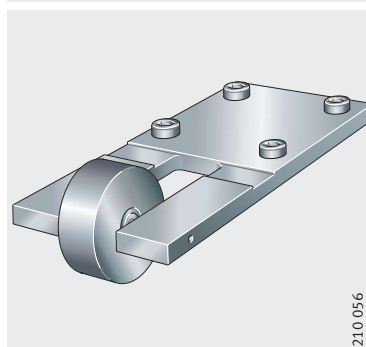
ADB...-K



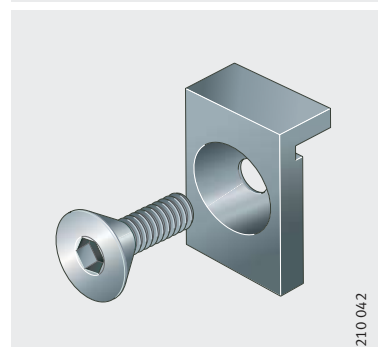
Rolling-in device and retaining plate

For covering strips

ERVU



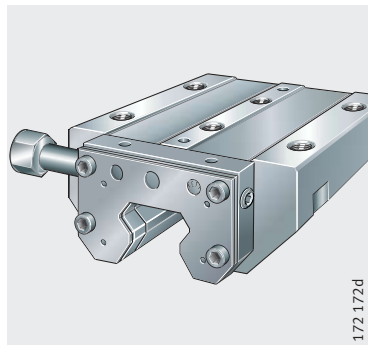
HPL.ADB



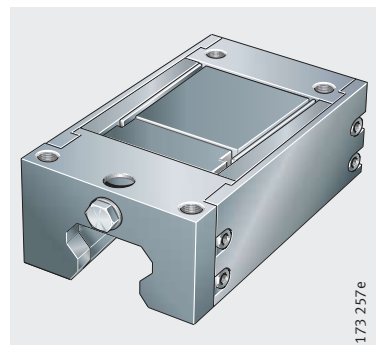
Product overview Accessories

Clamping element Braking and clamping element

RUKS...D-A

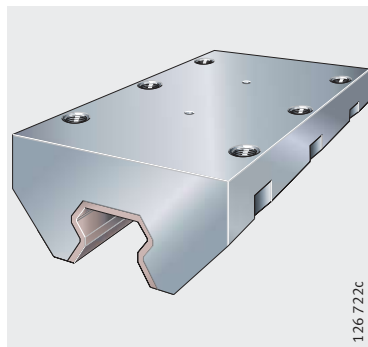


BKE.TSX



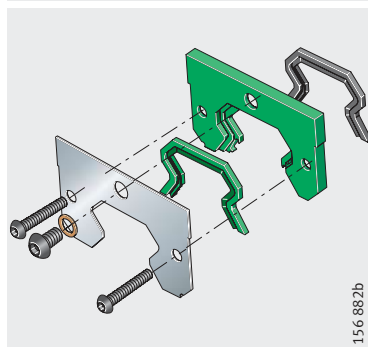
Damping carriage

RUDS...D



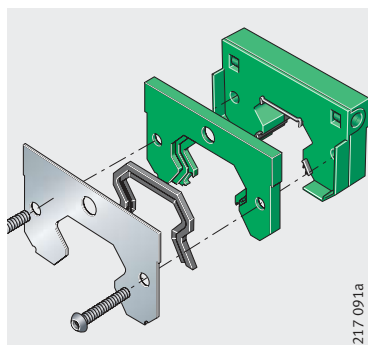
Sealing elements – system KIT End plate with end wiper – example KIT

KIT



Lubrication elements – system KIT Long term lubrication unit – example KIT

KIT

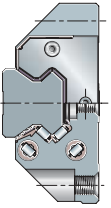


Accessories

Closing plugs

Closing plugs are used to close off the counterbores for the fixing screws in the guideways. As a result, the surface of the guideway is completely flush.

In addition to the standard plastic closing plugs, brass closing plugs and closing plugs with clinch ring are also available.



Brass closing plugs

Closing plugs KA..-M are particularly suitable for conditions involving hot swarf, aggressive media, vibrations and in machine tools, *Figure 1*.

Closing plugs can be fitted using the hydraulic fitting device MVH..-D-A; for a description see page 134.

KA..-M

Figure 1

Brass closing plug



With clinch ring

Brass closing plugs of type KA..-MSA comprise a brass plug with a plastic clinch ring, *Figure 2*.

The clinch ring ensures secure seating of the closing plug in the counterbore.

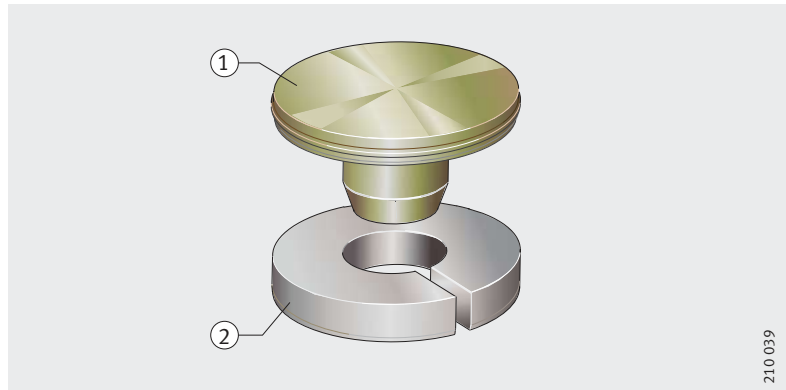
KA..-MSA

① Brass plug

② Plastic clinch ring

Figure 2

Closing plug with clinch ring



Steel closing plugs

Closing plugs made from steel are available by agreement to close off the guideway surface.

Accessories

Hydraulic fitting device

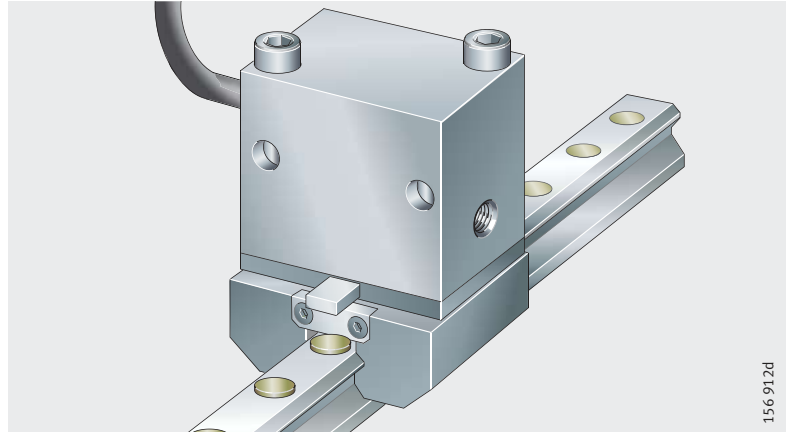
The hydraulic fitting device MVH...-D-A is used to press in the closing plugs KA...-M made from brass flush with the surface of the guideway.

The device is available for all RUE series.

Fitting of closing plugs using the fitting device is described on pages 73 to 76.

MVH.TSX...-D-A

Figure 3
Hydraulic fitting device



156 912d

Ordering example, ordering designation

A hydraulic fitting device for fitting the closing plug KA...-M for the linear recirculating roller bearing and guideway assembly RUE35-E is to be ordered.

Ordering designation

1×**MVH.TSX35-D-A**

Guideway covering strips

Adhesive bonded or clip fit

Attention!

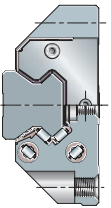
Covering strips are an alternative to closing plugs. They completely cover the counterbores for the fixing holes in the guideways and close these off flush with the guideway surface.

Covering strips are available in two designs. The covering strip ADB is adhesive bonded in the slot in the guideway, the covering strip ADB-K is clipped into the slot, *Figure 4*.

The clip fit covering strip must be fitted using the rolling-in device ERVU, see page 136.

For fitting of covering strips see pages 77 to 79.

Where applications using the covering strip are planned, please contact us.



ADB-K
ADB

- ① Clip fit
- ② Adhesive bonded

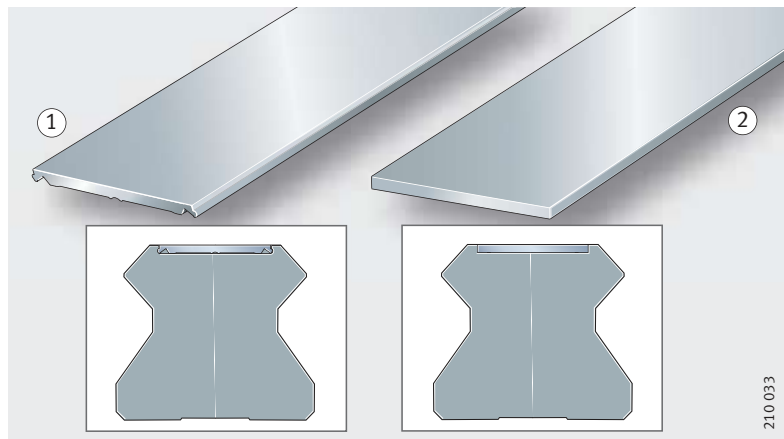


Figure 4
Guideway covering strip

Retaining plate

The retaining plate HPL.ADB fixes the covering strip ADB-K to the end of the guideway, *Figure 5*. It is included in the delivery.

HPL.ADB

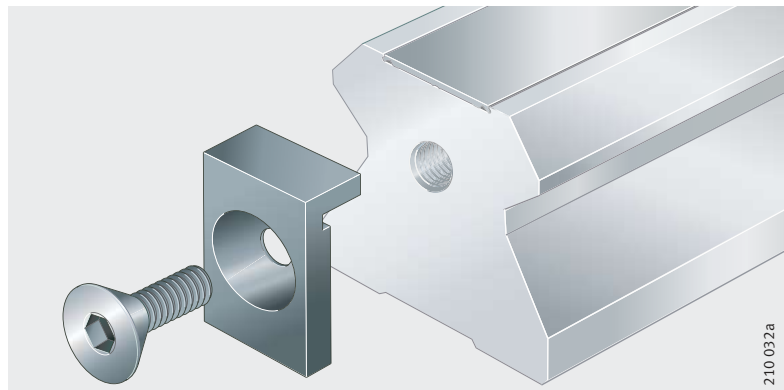


Figure 5
Retaining plate for covering strip

Accessories

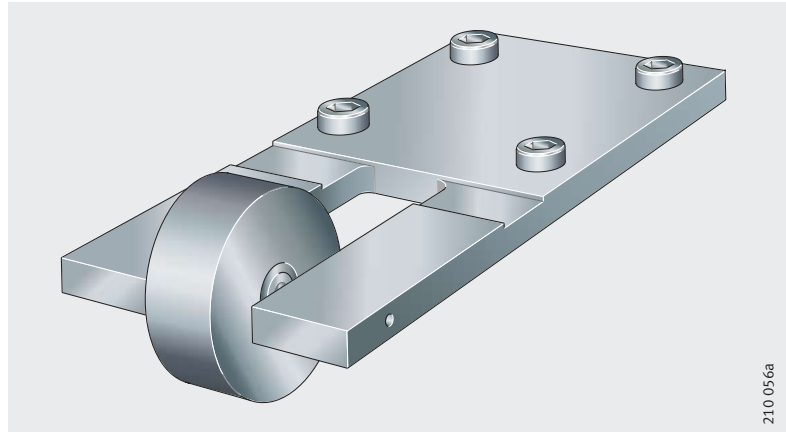
Rolling-in device

The clip fit covering strip ADB..-K is fitted using the fitting device ERVU so that it is securely fixed in the guideway, *Figure 6*. The rolling-in device must be ordered separately. When ordering, the size of the linear recirculating roller bearing and guideway assembly must be stated; see Ordering example.

ERVU

Figure 6

Rolling-in device for covering strip



**Ordering example,
ordering designation**
Ordering designation

Rolling-in device for covering strip ADB18-K for RUE35-E.

1×ERVU35

Clamping element

The clamping element RUKS...D-A operates by hydraulic means and prevents micromovements under oscillating load, *Figure 7*.

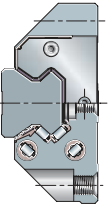
It is screw mounted to the adjacent construction and increases the rigidity, particularly in the direction of travel. This gives a significant improvement in the machining result – for example in machine tools.

Wipers and sealing strips protect the contact surfaces between the guideway and clamping element against contamination.

Elements are available for the series RUE...E(-KT). The dimension table for the clamping element is on pages 146 and 147.

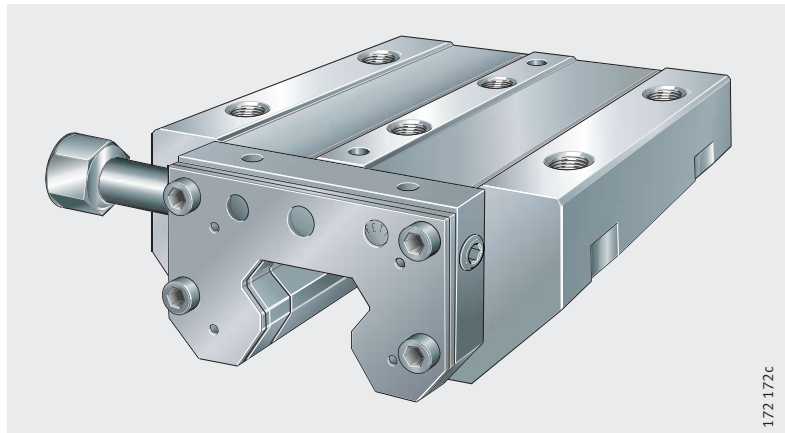
Attention!

If clamping elements are to be used for braking or damping in the direction of travel, please contact us.



RUKS...D-A-SR

Figure 7
Clamping element



172.172c

Accessories

Breakaway force

Attention!

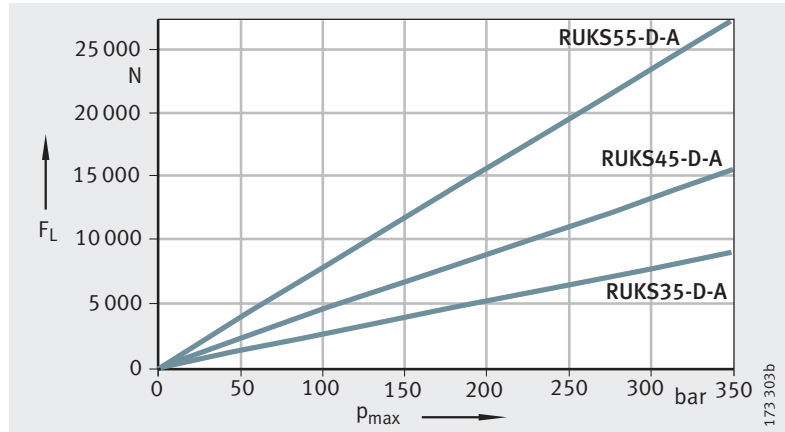
The breakaway forces are dependent on the size, *Figure 8*.

Clamping forces may vary depending on the condition of the guideway (quantity of lubricant).

F_L = breakaway force
 p_{max} = pressure

Figure 8

Breakaway forces



Fitting

Attention!

The clamping element must be aligned to the guideway.

For guidelines on fitting, see page 80 and page 81.

Clamping elements do not have locating surfaces.

The elements should never be laterally abutted.

The maximum pressure is 350 bar. Pay attention to pressure spikes.

Where pressure is applied with high frequency, please contact us.

Hydraulic oil feed from the side

In clamping elements RUKS..-D-A-SR and RUKS..-D-A-H-SR the hydraulic oil is fed from the side. Diminishing pipes with a thread M12×1,5 for Ermeto connectors are included in the delivery.

Hydraulic oil feed from above

In clamping elements RUKS..-D-A-SO and RUKS..-D-A-H-SO the hydraulic oil is fed from above via the adjacent construction.

Ordering example, ordering designation

Ordering designation

A clamping element for RUE35-E is to be ordered.

Hydraulic oil is to be fed from above via the adjacent construction.

1×**RUKS35-D-A-SO**

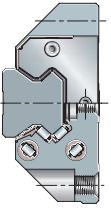
Braking and clamping element

The braking and clamping element BKE.TSX is used, for example, as a positionally independent safety system for linear drives where the drive cannot fully provide the braking and clamping function, *Figure 9*.

The compact construction and the arrangement of the elements saves space and no special devices are required.

If particularly high braking forces are required, several braking and clamping elements can be fitted.

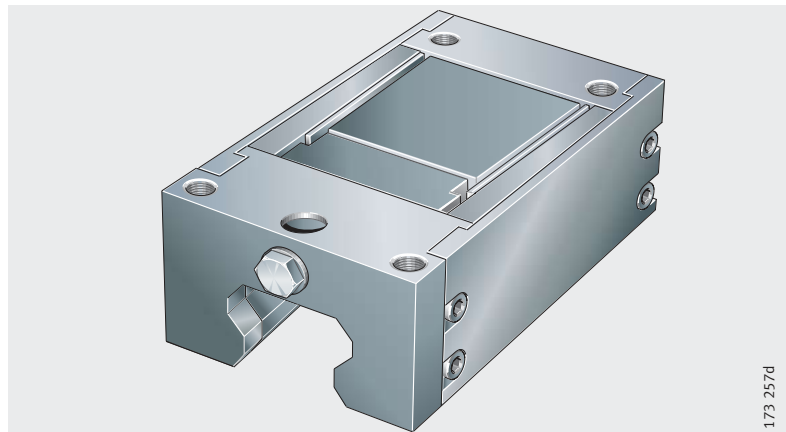
The system automatically compensates any clearance occurring up to the wear limit of the brake shoes, see Automatic clearance compensation, page 141. The elements are thus maintenance-free.



BKE.TSX

Figure 9

Braking and clamping element



173 257d

Mechanical braking and clamping forces

The elements operate by purely mechanical means, they therefore function even if a power failure occurs and are reliable in any mounting position; for a description of their function, see page 140. This eliminates safety problems resulting from power failure – a possibility with electronically braked systems.

The system carries out braking only when no pressure is present. This allows safety-focussed control even in emergencies.

The hydraulic brake opens under a pressure of approx. 55 bar.

If appropriate control is provided, even vertical axes can be rapidly braked to a stationary position. In a suspended arrangement, however, the entire guidance unit should be secured by a drop guard, for an example see page 67.

When the brake is locked, an axial clearance of up to 0,25 mm can occur. This must be noted if the elements are used for locating.

Accessories

Short reaction time

The clearance-free adjustment of the brake shoes ensures a short, consistent reaction time (in size 35 for example <30 m/s).

In order to ensure the shortest reaction times, the Schaeffler Group has worked with a manufacturer of fluid power devices to develop a hydraulic unit with a special valve.

The unit can be purchased directly from the manufacturer.

Attention!

Braking and clamping elements are one part of the emergency braking system. Their reliable operation also depends on the hydraulic components and the control system.

If the system is activated frequently, contact us.

Function

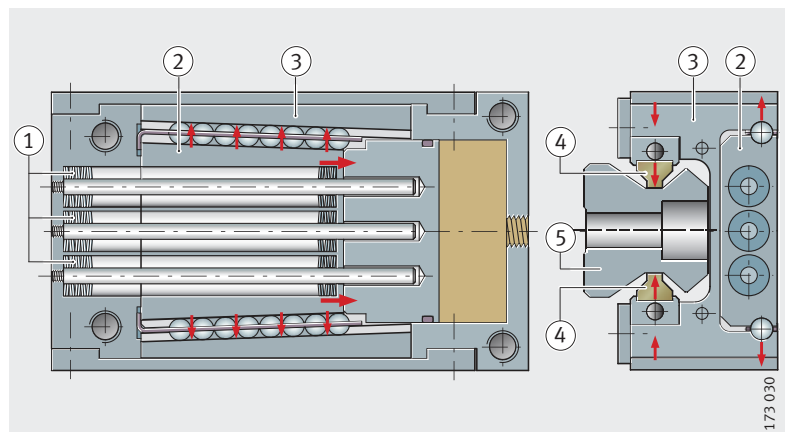
Three disc spring columns generate the braking and clamping force, *Figure 10*. Thanks to this mechanical spring energy store, the system operates extremely reliably without external energy.

The force is transmitted to the brake shoes by mechanical means. If the braking or clamping function is activated, the spring columns push a wedge-shaped slider between the upper legs of the H-shaped saddle plate. This presses the upper legs outwards and the lower ones inwards. The brake shoes clamp against the guideway, but not on the raceways.

- ① Disc spring columns
- ② Wedge-shaped slider
- ③ H-shaped saddle plate
- ④ Brake shoes
- ⑤ Guideway

Figure 10

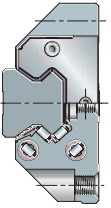
Functional components



Automatic clearance compensation

Wear of brake shoes

As the system clamps not only stationary guidance systems, but also moving ones, the brake shoes are subject to wear resulting from abrasion. However, clearance between the brake shoes and brake contact surfaces increases the system reaction time.



Wear compensation

In order to ensure consistent clearance-free contact of the brake shoes against the contact surfaces, wear of the linings is automatically compensated by mechanical means up to the wear limit. Compression springs slide a wedge between the brake shoes and the saddle plate, *Figure 11*. This ensures that the element always operates without clearance. The wear compensation mechanism is designed such that, in the opened condition, the brake shoes are adjacent to but not in contact with the guideway surface. This ensures that there is no wear or displacement resistance during movement of the guidance system.

Adapter plate

For the H variant of the carriages, an adapter plate is necessary, *Figure 11*. The adapter plate is included in the delivery.

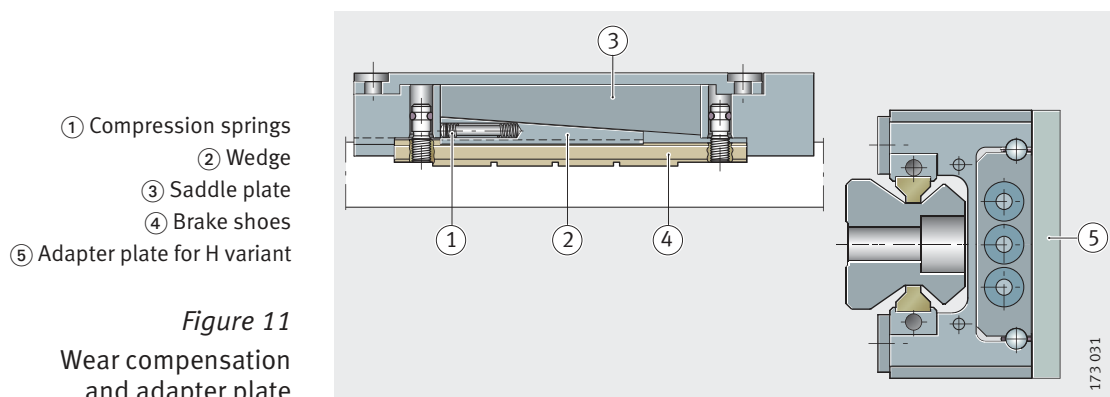


Figure 11

Wear compensation and adapter plate

Easy to fit

Braking and clamping elements are particularly easy to fit. They are simply slid onto the guideway and screw mounted to the adjacent construction.

Attention!

Due to the automatic wear compensation system, braking and clamping elements must be slid directly from the dummy guideway onto the guideway.

The element must never be separated from the guideway without using a dummy guideway and the dummy guideway must never be removed from the element.

Accessories

Suitable for ...

The elements give high braking and clamping forces within a very small design envelope. Their dimensions are matched to the INA standard and H carriages, can be used for the RUE guideways and can be easily integrated in existing applications based on INA linear guidance systems. The dimension table for the braking and clamping element is on page 148.

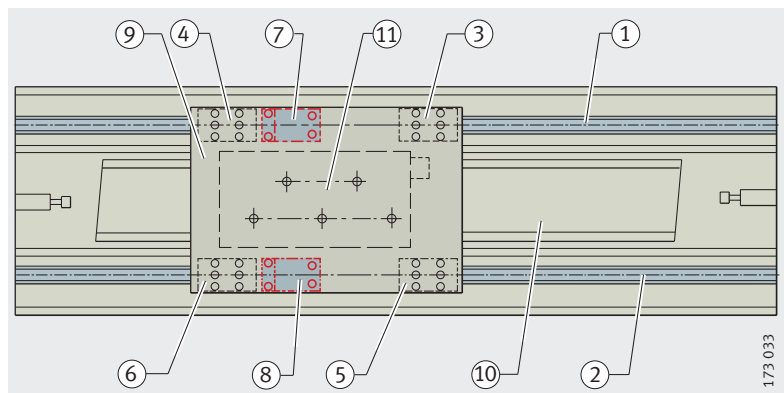
The compact construction and the arrangement of the elements directly on the guideway saves space and thus allows complete constructions with a reduced number of components.

They can also be used in applications without recirculating roller systems. In this case, the guideway is used only as a braking or clamping rail.

A typical arrangement as an emergency brake in an application with a linear motor is shown in *Figure 12*.

- ①, ② Guideways
- ③, ④, ⑤, ⑥ Carriages
- ⑦, ⑧ Emergency brakes
- ⑨ Table
- ⑩ Motor primary part
- ⑪ Motor secondary part

Figure 12
Typical application



Delivered condition

The elements are premounted on a separate rail and clamped in place by means of a fitting screw. The screw is used to loosen and then move the fixed element. The fitting screw is later replaced by the hydraulic connector.

Ordering example, ordering designation

Ordering designation

A braking and clamping element for RUE35-E with a hydraulic connector on the end face is to be ordered.

1×**BKE.TSX35-D**

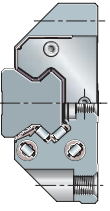
Damping carriage

Damping carriages RUDS...-D reduce vibrations acting on the guidance system. They improve operating results, extend the service life of the tools under vibration and increase the crash safety of the guidance system.

The damping carriage is arranged on the guideway in addition to the carriages and is screw mounted to the adjacent construction, *Figure 13* and *Figure 14*.

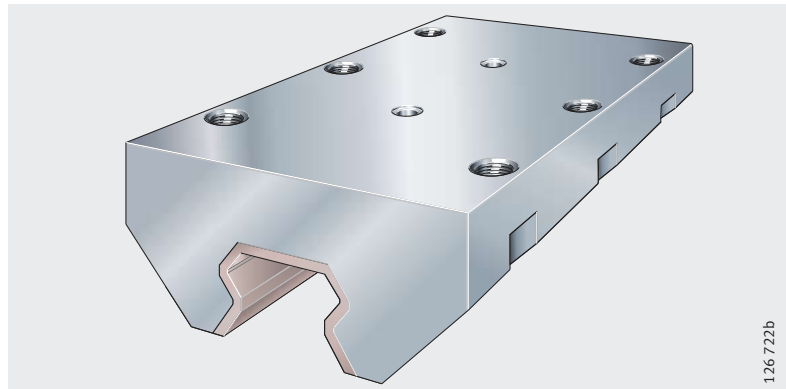
The additional damping element does not influence the special characteristics of the rolling element guidance system, such as low displacement resistance and high running accuracy.

The damping carriage is available for RUE...-D and RUE...-E. It must always be ordered together with a monorail guidance system, see also Ordering example page 144. The dimension table for the damping carriage is on page 149.



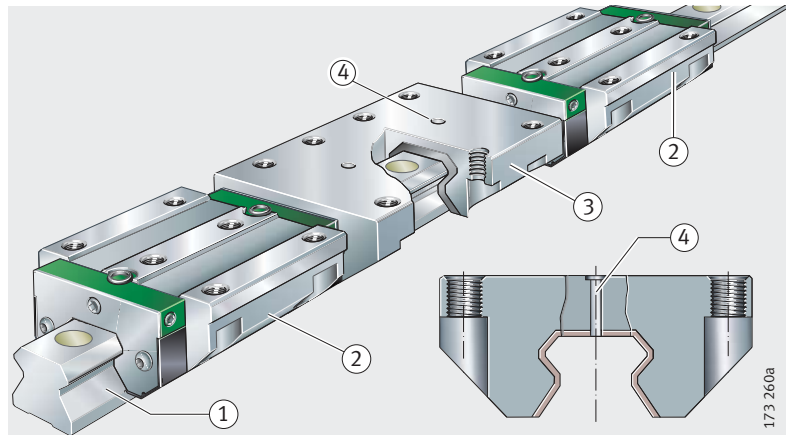
RUDS...-D

Figure 13
Damping carriage



- ① Guideway TSX...-E
- ② Carriage RWU...-E
- ③ Damping carriage RUDS...-D
- ④ Hole for oil feed

Figure 14
Linear recirculating roller bearing
and guideway assembly with
damping carriage



Accessories

Damping by oil film

The carriage damps vibrations acting on the guidance system by means of an oil film (squeeze film effect) between the damping carriage and the guideway, *Figure 15*. The damping effect increases with the size of the damping surface and the width of the gap. During operation, the guideway and damping carriage are not in contact with each other. The oil reaches the damping surface via lubrication holes in the back of the element.

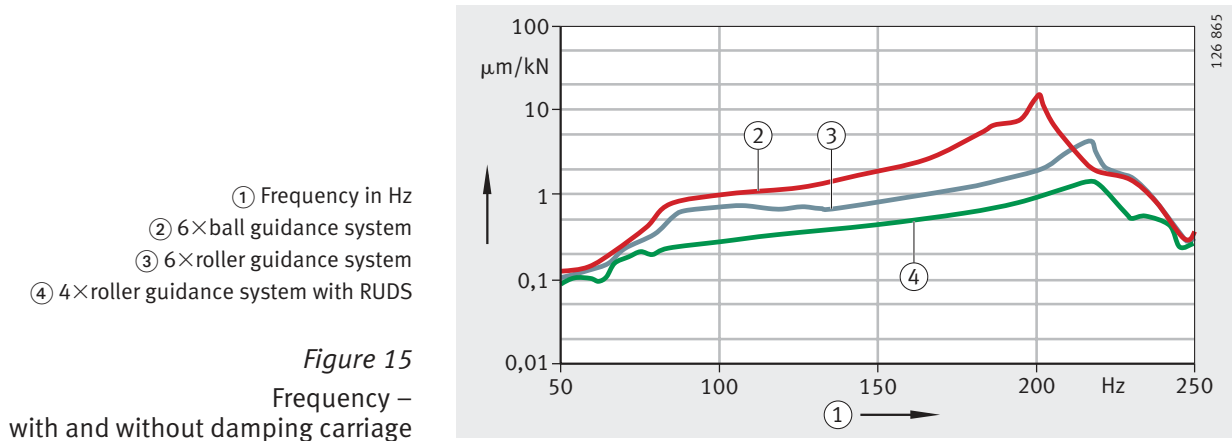


Figure 15
Frequency –
with and without damping carriage

Attention!

Damping carriages do not have locating surfaces. The elements should never be laterally abutted.

Counterbores in the guideways should only be closed off using brass closing plugs KA..-M.

Covering strips ADB and ADB-K must not be used.

Ordering example, ordering designation

Ordering designation

Option for damping carriage

Ordering designation

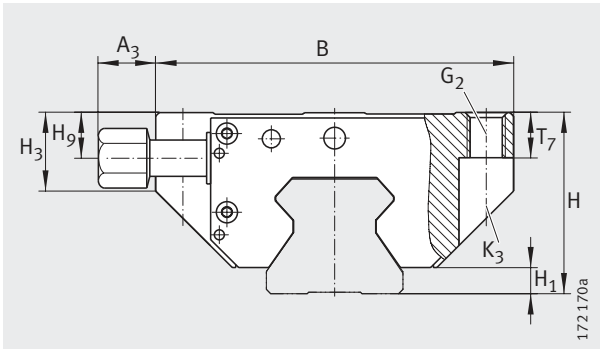
A damping carriage for a RUE35-E is required. The length of the carriage is 150 mm.

1×**RUDS35-D-150**

If the option of fitting a damping carriage is to be maintained, a damping carriage with a length of 0 mm should be ordered, see Ordering example. The guideway is then supplied with a closer height tolerance.

1×**RUDS35-D-0**
(option for use of damping carriage)

Clamping element



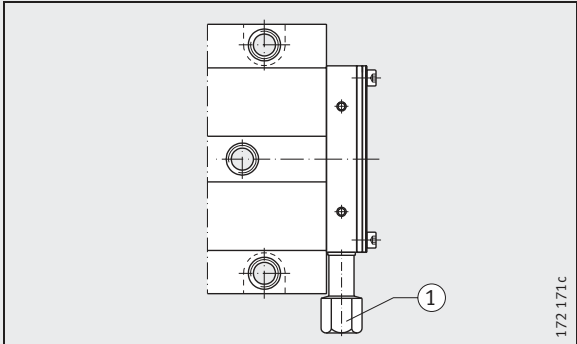
RUKS..-D-A

Dimension table · Dimensions in mm										
Designation	Mass	Dimensions			Mounting dimensions					
	m	B	H	L	J _B	A ₃	L ₁	J _{L1}	J _{L2}	J _{L5}
	≈kg									
RUKS35-D-A-SR ¹⁾	2,8	98	48	133,7	82	24,5	113	62	52	32
RUKS35-D-A-SO ²⁾						–				
RUKS35-D-A-H-SR ¹⁾		68	55		50	39,5		50	–	38
RUKS35-D-A-H-SO ²⁾						–				
RUKS45-D-A-SR ¹⁾	4,5	118	60	156	100	22	134	80	60	33,5
RUKS45-D-A-SO ²⁾						–				
RUKS45-D-A-H-SR ¹⁾		84	70		60	39		60	–	43,5
RUKS45-D-A-H-SO ²⁾						–				
RUKS55-D-A-SR ¹⁾	7,6	138	70	186	116	18,5	163	95	70	40,5
RUKS55-D-A-SO ²⁾						–				
RUKS55-D-A-H-SR ¹⁾		98	80		75	38,5		75	–	50,5
RUKS55-D-A-H-SO ²⁾						–				

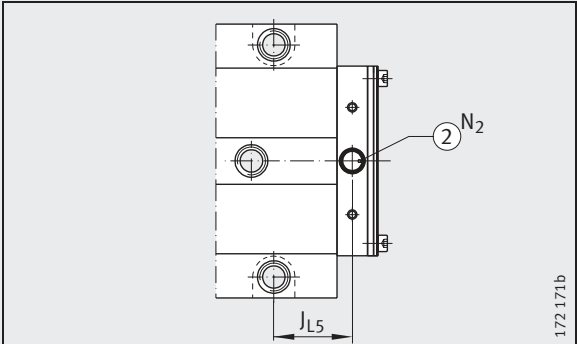
RUKS65-D-A available by agreement.

- 1) Oil connector on side: suffix SR.
2) Oil feed from above: suffix SO.
3)

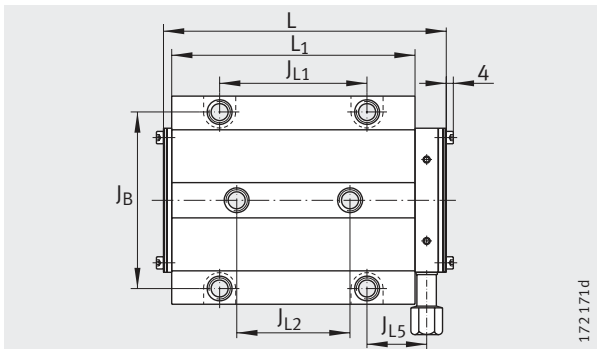
1 Oil connector on side
2 Oil feed from above



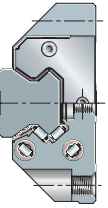
RUKS..-D-A-SR
1 3)



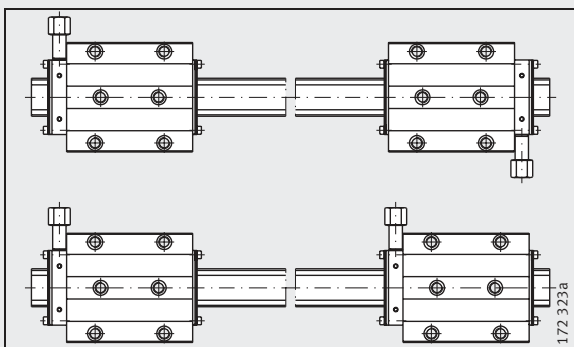
RUKS..-D-A-SO
2 3)



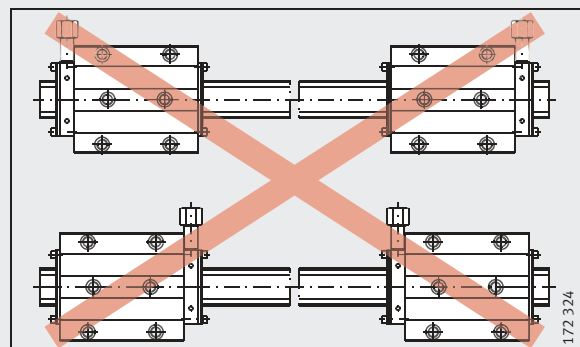
RUKS..-D-A · View rotated 90°



					Suitable for guideway	Fixing screws			
						G2		K3	
						DIN ISO 4 762-12.9			
N ₂	H ₁	H ₃	T ₇	H ₉			M _A Nm		M _A Nm
max.									
6	6,8	21	12	13,2	TSX35-E	M10	41	M8	41
				–					
		42	10	20,2		M8		–	–
				–					
6	8,7	27	15	15,6	TSX45-E	M12	83	M10	83
				–					
		58,3	12,5	25,6		M10		–	–
				–					
6	11	32	18	18,8	TSX55-E	M14	140	M12	140
				–					
		62	15	28,8		M12		–	–
				–					

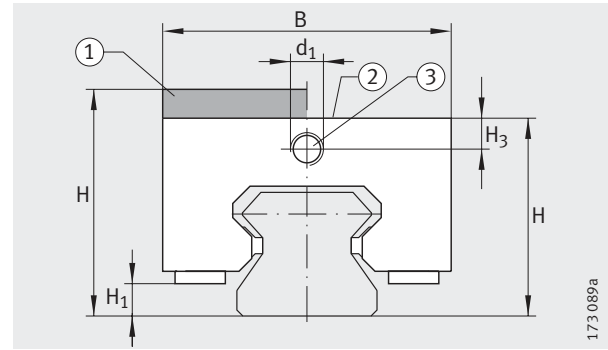


Position of pressure oil connector,
possible combinations



Position of pressure oil connector,
impossible combinations

Braking and clamping element



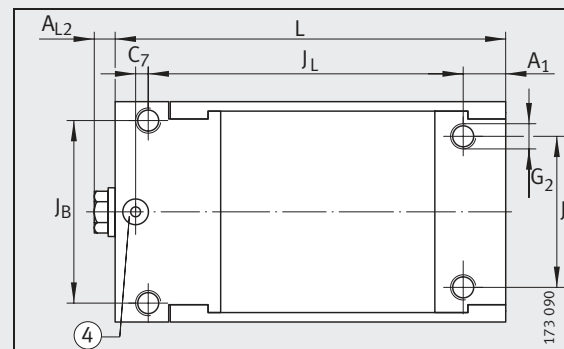
BKE.TSX...-D
①, ②, ③²⁾

Dimension table · Dimensions in mm

Designation	Clamp- ing force N	Dimensions													
		H		B	L	J _B	J _C	A ₁	J _L	C ₇	H ₁	H ₃	A _{L2}	d ₁	G ₂
		Without adapter plate	With adapter plate												
BKE.TSX25-D	1 000	36	–	47	91	38	34	10	75	–	6,5	6	5	M6X1	M6
BKE.TSX25-D-SO										0					
BKE.TSX25-D-H										–					
BKE.TSX25-D-H-SO		–	40							0					
BKE.TSX35-D	2 800	48	–	69	120	58	48	13,5	100	–	7,9	8,1	5	M8X1	M8
BKE.TSX35-D-SO										0					
BKE.TSX35-D-H										–					
BKE.TSX35-D-H-SO		–	55							0					
BKE.TSX45-D	4 300	60	–	85	141	70	60	15	113	–	13	10	5	M8X1	M10
BKE.TSX45-D-SO										5					
BKE.TSX45-D-H										–					
BKE.TSX45-D-H-SO		–	70							5					
BKE.TSX55-D	5 100	70	–	99	170	80	72	18	138	–	17,3	11,75	6	M10X1	M12
BKE.TSX55-D-SO										6					
BKE.TSX55-D-H										–					
BKE.TSX55-D-H-SO		–	80							6					
BKE.TSX65-D	11 000	90	–	125	186	96	96	22	150	–	20	17,5	7,5	M16X1,5	M14
BKE.TSX65-D-SO										0					
BKE.TSX65-D-H										–					
BKE.TSX65-D-H-SO		–	100							0					

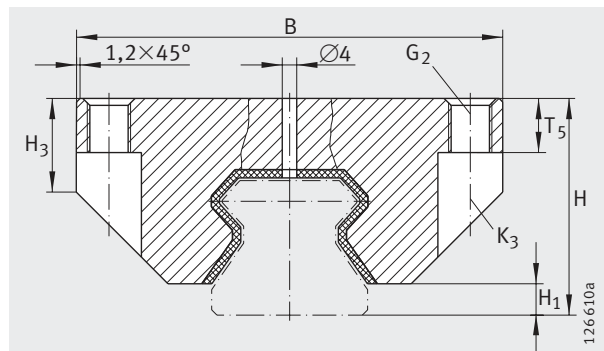
1) The maximum diameter of the oil feed hole is:
for sizes 25 to 55 = 6 mm
for size 65 = 15 mm.

- 2) ① With adapter plate
② Without adapter plate
③ Hydraulic connector
④ Hydraulic connector in top face (suffix SO)¹⁾

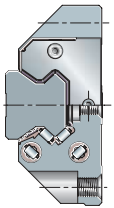


Top view¹⁾
④²⁾

Damping carriage



RUDS...-D



Dimension table · Dimensions in mm

Designation	Mass m ≈kg/ 100 mm	Dimensions ¹⁾		Mounting dimensions								Suitable for linear recirculating roller bearing and guideway assembly	
		B	H	H ₁	T ₅	H ₃	J _B	A ₁	A ₂ , J _L	G ₂ ²⁾	K ₃ ³⁾		
RUDS25-D	1,1	68	36	7,2	10	18	57	37,5	75	M8	M6	RUE25-D	RUE25-D-L
RUDS25-D-H	1	47	40		9	29,5	35			M6	–	RUE25-D-H	RUE25-D-LH
RUDS35-D	2,1	98	48	6,8	12	20	82	37,5	75	M10	M8	RUE35-E	RUE35-E-L (-KT)
RUDS35-D-H	1,8	68	55			41	50			M8	–	RUE35-E-H	RUE35-E-HL (-KT)
RUDS45-D	3,6	118	60	8,7	15	26	100	37,5	75	M12	M10	RUE45-E	RUE45-E-L (-KT)
RUDS45-D-H	3	84	70		12	53	60			M10	–	RUE45-E-H	RUE45-E-HL (-KT)
RUDS55-D	4,4	138	70	11	18	31	116	37,5	75	M14	M12	RUE55-E	RUE55-E-L (-KT)
RUDS55-D-H	3,7	98	80			61	75			M12	–	RUE55-E-H	RUE55-E-HL (-KT)
RUDS65-D	5	168	90	11,5	23	39	142	37,5	75	M16	M14	RUE65-E	RUE65-E-L
RUDS65-D-H	4,6	124	100			71	76			M14	–	RUE65-E-H	RUE65-E-HL (-KT)

1) Standard lengths:

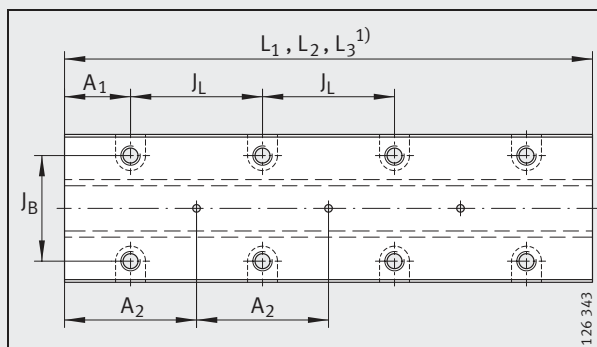
L₁ = 150 mm, not for RUDS65-D

L₂ = 225 mm, not for RUDS65-D

L₃ = 300 mm, not for RUDS25-D.

2) For screws DIN ISO 4 762-12.9. Thread length for RUDS...D-H at least 1,25 · G₂

3) G₂ as through hole for screws DIN ISO 4 762-12.9.



RUDS...-D · View rotated 90°

Accessories

Sealing and lubrication elements – system KIT

With their comprehensive range of standard accessories, linear guidance systems can be easily used in numerous areas. Since the guidance systems are used in an extremely wide variety of applications, however, additional requirements are often placed on the lubrication and sealing components.

Application-oriented complete package

If the standard components are not adequate for reliable operation and a long operating life, it is possible to draw on a finely graduated system of lubrication and sealing elements. These special accessories protect the rolling element system of the guidance systems against contamination and ensure lubrication appropriate to requirements with long relubrication intervals even under the most demanding operating conditions.

Structured as a KIT

The elements are configured as the system KIT and are designed for various application conditions.

Starting from the degree of contamination, the best combination in each case can be quickly and easily compiled, see Degree of contamination. Which combinations are possible and advisable is shown in the table on page 164.

The sealing elements are described on pages 151 to 154, for table see page 160.

The description of the lubrication elements is on pages 155 to 158, for table see page 162.

Attention!

Only a proportion of the KITs can be retrofitted. Parts that cannot be retrofitted must be ordered together with the linear recirculating roller bearing and guideway assembly and are supplied already fitted.

Degree of contamination

Attention!

The degree of contamination will vary depending on the market sector, the application and the environmental conditions. The definitions according to the table are therefore only an initial aid in the selection of KITs.

By agreement, we will be pleased to assemble complete packages for specific applications.

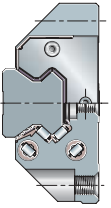
Definition of the degree of contamination

Degree of contamination			
Very slight	Slight	Moderate	Heavy
Clean environment	- Coarse (large) metal swarf - Clean environment - No cooling lubricants	- Coarse (large) metal swarf - Slight exposure to, for example, cooling lubricants	- Hot swarf (metal, aluminium) of widely varying size and shape, including very small swarf from HSC machining - Aggressive media and dust as well as cooling lubricants

Sealing elements

The following additional sealing components are available:

- end plates, page 151
- end wipers, page 151
- end wipers with carrier plate, page 152
- additional wipers, page 153
- sealing strips, page 154.



End plates

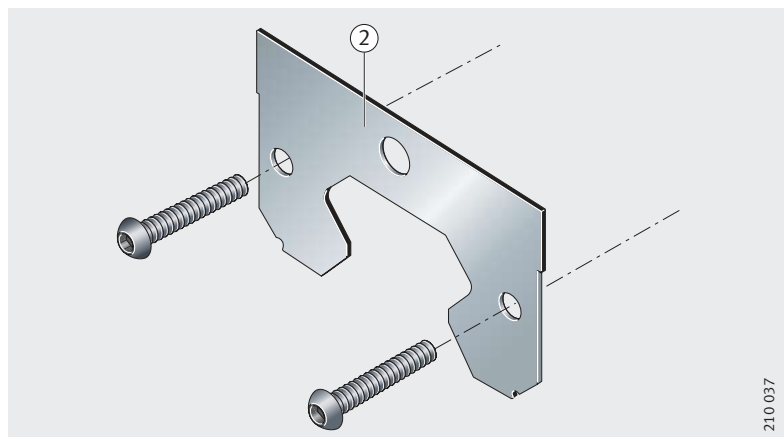
End plates are corrosion-resistant, non-contact components, *Figure 1*. They protect the end wipers located behind them against, for example, coarse contaminants and hot swarf.

There is a narrow gap between the guideway and the wiper.

A KIT.RWU...-E always contains an end plate.

② End plates,
non-contact

Figure 1
End plate



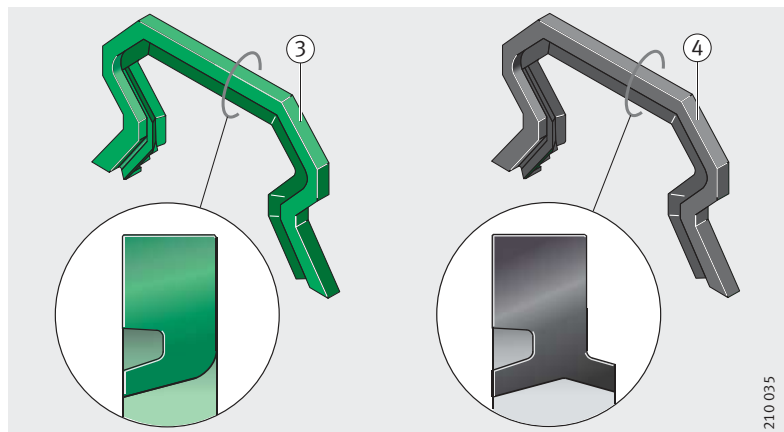
End wipers

End wipers are contact seals that are fixed to the end faces of the carriage.

They are available in single lip (standard) and double lip designs and are made from special high performance material, *Figure 2*.

③ End wiper,
single lip, green
④ End wiper,
double lip, black

Figure 2
End wipers



Accessories

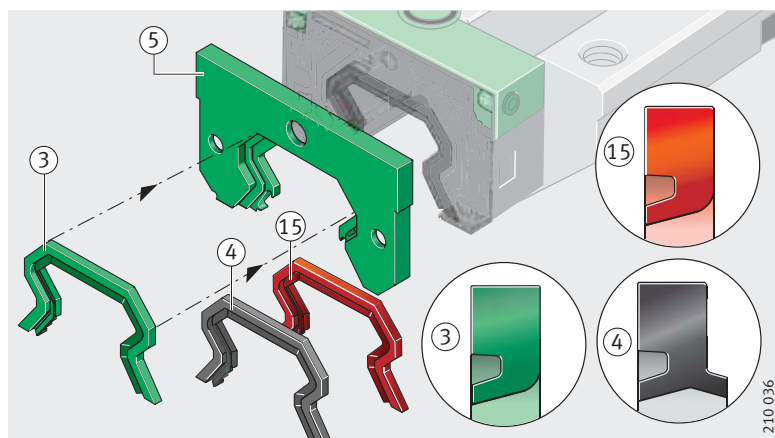
End wipers with carrier plate

In addition to the standard seal, other end wipers may be used behind each other (cascading arrangement). These are screw mounted with a carrier plate in front of the first wiper on the carriage, *Figure 3*.

The end wipers are of a single or double lip design and are made from special high performance seal material. For protection against aggressive media (for example acids, alkalis), special end wipers made from FPM are available, *Figure 3*.

- ③ End wiper, single lip, green
- ④ End wiper, double lip, black
- ⑤ Carrier plate for end wiper
- ⑮ End wiper, single lip, red (FPM)

Figure 3
End wipers

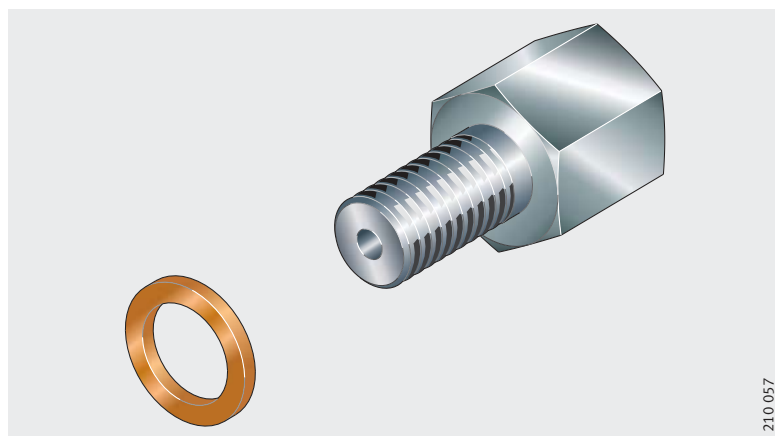


Lubrication adapters

If relubrication is carried out from the end while using an end wiper with a carrier plate or additional wipers, a lubrication adapter with a longer thread S31 must be used.

The lubrication adapter S31 must be ordered separately.

Figure 4
Lubrication adapter with longer thread



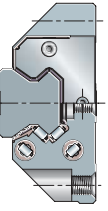
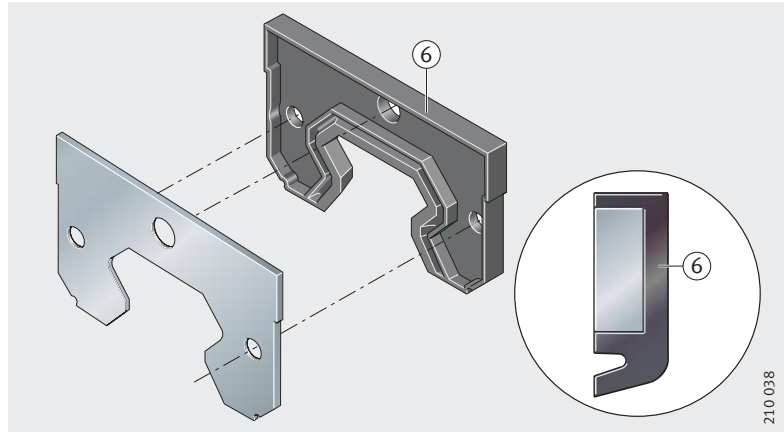
Additional wipers

Additional wipers for heavy contamination such as dust or liquids are used in combination with further wipers.

They are of a single lip design and are made from NBR, *Figure 5*.

⑥ Additional wiper,
single lip

Figure 5
Additional wiper



Accessories

Sealing strips

Sealing strips are contact components that are fitted to the upper and lower longitudinal sides of the carriage, *Figure 6*. They protect the rolling element system against contamination and loss of lubricant.

Single lip and double lip

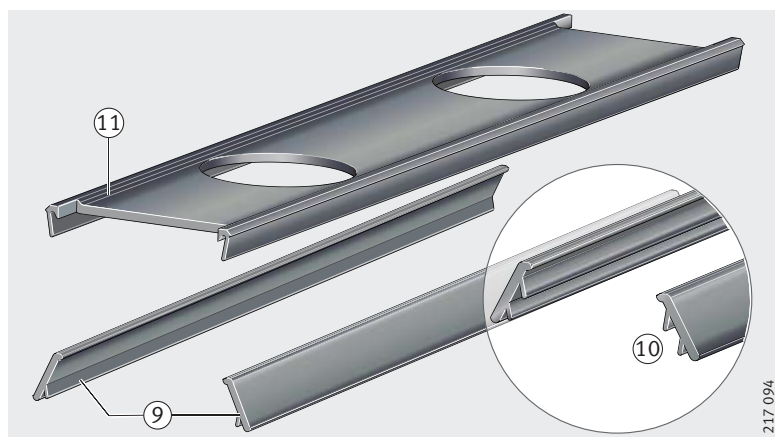
The linear recirculating roller bearing and guideway assembly is supplied with a single lip upper sealing strip as well as a double lip lower sealing strip.

Attention!

Sealing strips should be used in addition to end wipers especially in applications where lubrication is critical, such as those involving fine dust or aggressive coolants.

- ⑨ Lower sealing strip, single lip
- ⑩ Double lower sealing strip, double lip
- ⑪ Upper sealing strip

Figure 6
Sealing strips



217 094

Lubrication elements

The following components are available:

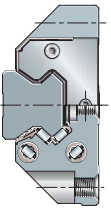
- end piece without upper lubrication hole, page 155
- long term lubrication unit, page 156
- minimal lubricant quantity metering unit, page 158.

End piece without upper relubrication hole

Attention!

For KITS of sealing and long term lubrication units, the end piece of the carriage can also be supplied without the upper relubrication hole, *Figure 7*.

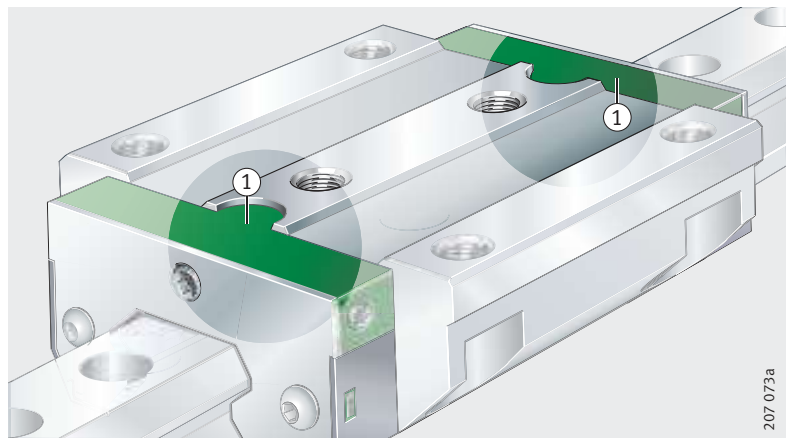
KITs for minimal lubricant quantity metering units do not have an upper lubrication hole and cannot be retrofitted. At the time of ordering, it should be determined which KITs are required.



① End piece without upper lubrication hole

Figure 7

End piece without upper lubrication hole



207 073a

Accessories

Long term lubrication unit

Operating life of the linear guidance system

The operating life is defined as the life actually achieved by a linear guidance system. This may deviate significantly, however, from the basic rating life.

A sufficiently long operating life is only achieved, assuming the bearing arrangement is correctly designed, through optimum lubrication and sealing.

Grease operating life and relubrication interval

If guidance systems cannot be relubricated, the grease operating life becomes the decisive factor. This indicates the length of time for which a grease can be used without its function being impaired. For calculation of the grease operating life, see page 48.

As the load increases, the grease is subjected to increasing strain. As a result, it ages more quickly. Premature destruction of the grease structure has an adverse effect on the performance characteristics of the grease. The grease operating life declines and relubrication must be carried out earlier.

If the shortened relubrication intervals are not observed, the guidance system will fail before the end of the expected operating life. With decreasing grease operating life, the operating life of the linear guidance system is thus reduced.

**Longer operating life
by means of a long term
lubrication unit**

The volume of lubricating grease in the carriage is increased by the lubrication pockets in the saddle plate.

If a long term lubrication unit KIT.RWU...-E-4 is also fitted, this gives an additional improvement in the lubricant balance, *Figure 8*. The lubricant is stored in a high capacity reservoir and continuously released to the raceways via a transfer medium. Depending on the operating and environmental conditions, long relubrication intervals or even complete freedom from maintenance are possible as a result.

Long term lubrication units are particularly suitable in applications where lubrication is of critical importance. They are screw mounted between the end piece and the wiper and function with equal reliability in either a horizontal or vertical mounting position.

With initial greasing and refillable

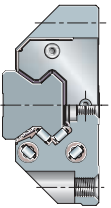
Due to their initial greasing, long term lubrication units are ready for immediate operation. If they are ordered together with an RUE, both the RUE and long term lubrication unit have an initial greasing. If necessary, the reservoir can be refilled through lateral holes.

Attention!

If the long term lubrication unit is retrofitted, it is absolutely essential that the carriage is pregreased. The long term lubrication unit must always be used on both sides of the carriage.

Double lip end seal

Integrated double lip end seals give protection against grease loss and contamination.



- ① Fixing screws
- ② End plate
- ④ End wiper
- ⑤ Carrier plate
- ⑫ Long term lubrication unit

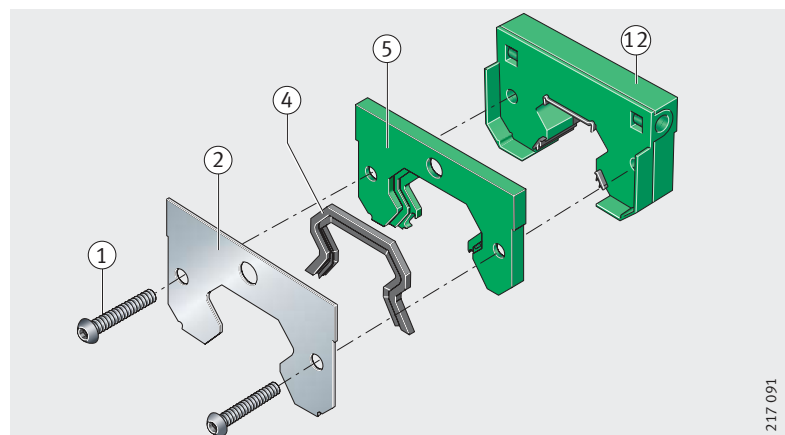


Figure 8
Long term lubrication unit

217 091

Accessories

Minimal lubricant quantity metering unit

The lubricant metering device is screw mounted to the end face of the carriage and can be connected to all conventional central lubrication systems, *Figure 9*.

The piston distributors in the aluminium body lubricate all four raceways evenly, irrespective of position, economically and with the smallest possible quantities of precisely metered lubricant.

The lubrication is fed in from the side via only one connecting pipe:

- for oil lubrication at $P_{\min} = 25$ bar,
- for flowable grease lubrication at $P_{\min} = 38$ bar.

Coupling piece

The coupling piece for connection to the central lubrication system has a union nut similar to DIN 3 871-A, is fitted on the left or right side of the metering unit and is suitable for connecting pipes with an outside diameter of 4 mm. The dimension table for the metering unit is on pages 170 and 166.

Attention!

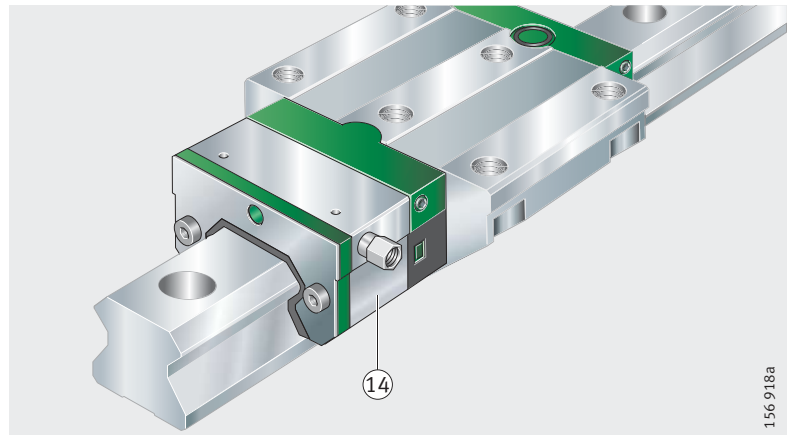
In the case of RUE..-E-H and RUE..-E-HL the lubrication connector protrudes laterally approx. 9 mm from the carriage.

KIT.RWU..-E-5

⑭ Minimal lubricant quantity metering unit

Figure 9

Minimal lubricant quantity metering unit



Lubricant and metering quantities

The lubricant quantity is determined by the number of lubrication impulses. The metering unit is supplied with metering quantities of $0,12 \text{ cm}^3$ per impulse and metering element.

Suitable lubricants

Oils CLP to DIN 51 517 and HLP to DIN 51 524 should be used in preference.

At operating temperatures from 0°C to $+70^\circ\text{C}$, the viscosity should be between ISO-VG 32 and ISO-VG 68.

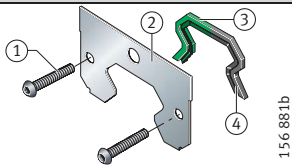
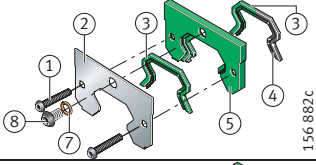
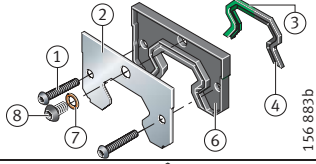
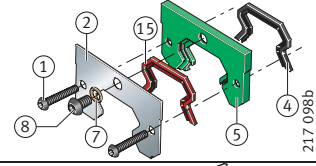
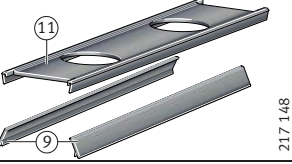
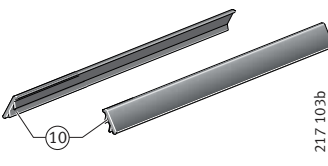
In the low temperature field, oils to ISO-VG 10 or ISO-VG 22 should be used.

Slideway oils CGLP can be used up to ISO-VG 220.

A $25 \mu\text{m}$ oil filter is recommended.

Flowable greases of NLGI class 00 and NLGI class 000 can also be used.

Accessories

Sealing elements KIT ¹⁾			① Fixing screws K ₁ (2 pieces)	② End plate, non-contact	End wipers, contact		
KIT	Description	Designation and KIT end number KIT.RWU...-E ¹⁰⁾			③ Single lip, green	④ Double lip, black	⑤ Single lip, red
 156 881b	① Fixing screws K ₁	100 ¹⁰⁾	1	1	1	–	–
	② End plate, non-contact	103 ¹⁰⁾			–	1	
	③ End wiper, single lip, green	120 ⁷⁾			–	–	
	④ End wiper, double lip, black	123 ⁹⁾			–	–	
 156 882c	⑤ Carrier plate for end wiper	130 ⁸⁾⁹⁾	1	1	1	1	–
	⑥ Additional wiper, single lip	133 ⁸⁾⁹⁾			–	–	
	⑦ Sealing ring	140 ⁸⁾⁹⁾			2	–	
	⑧ Screw plug K ₂	143 ⁸⁾⁹⁾			–	–	
 156 883b	⑨ Lower sealing strips, single lip	300 ⁸⁾⁹⁾	1	1	1	–	–
	⑩ Lower sealing strips, double lip	303 ⁸⁾⁹⁾			–	1	
	⑪ Upper sealing strips, single lip	340 ⁸⁾			–	–	
	⑫ End wiper, single lip, red	343 ⁸⁾			–	–	
 217 098b	⑬ Upper sealing strips, single lip	350 ⁸⁾	1	1	–	1	1 ⁶⁾
	⑭ End wiper, single lip, red	353 ⁸⁾			–	–	
 217 148	⑮ Upper sealing strips, single lip	900	–	–	–	–	–
	⑯ End wiper, single lip, red	910			–	–	
 217 103b	⑰ Upper sealing strips, single lip	920 ⁷⁾	–	–	–	–	–
	⑱ End wiper, single lip, red	930			–	–	

Attention! The table is only a guide.

The specific application conditions must be taken into consideration when selecting the elements.

The sealing elements can be used in various combinations.

However, not every combination is possible or advisable.

For recommended and possible combinations, see page 164.

¹⁾The KITs are available for the series RUE...-E (-KT).

²⁾Ordering example for KIT100 for RUE35-E: KIT.RWU35-E-OS-100.

³⁾See figure bottom right.

⁴⁾For definition see page 150.

⁵⁾Material NBR.

⁶⁾Material FPM, for protection against aggressive media (for example acids, alkalis).

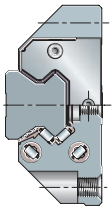
⁷⁾Standard for RUE-E and RUE-E-KT.

⁸⁾If relubrication is carried out from the end face a lubrication adapter S31 is required, see page 152.

⁹⁾Not available for size 65.

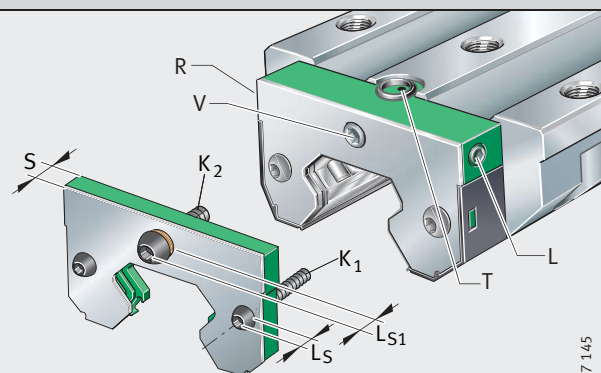
¹⁰⁾Available by agreement for size RUE25-D.

⑤ Carrier plate	⑥ Additional wiper, single lip	⑦ Sealing ring	⑧ Screw plug K ₂	Sealing strips			Relubrication facility ³⁾	Fitting of KIT		Width S in mm ³⁾	Contamination ⁴⁾					
				Lower		Upper ⑪		Retrofittable ²⁾	Factory fit		Very slight	Slight	Moderate	Heavy		
				⑨ Single lip	⑩ Double lip											
-	-	-	-	-	-	-	L, R, T, V	■	■	-	■	■	-	-		
							L, R, V	-	■							
							L, R, T, V	■	■		■	■				
							L/R/V	-	■							
1	-	1	1	-	-	-	L, R, T, V	■	■	5,8	-	■	■	-		
							L, R, V	-	■							
							L, R, T, V	■	■							
							L, R, V	-	■							
-	1 ⁵⁾	1	1	-	-	-	L, R, T, V	■	■	5,4	-	-	■	■		
							L, R, V	-	■							
							L, R, T, V	■	■							
							L, R, V	-	■							
1	-	1	1	-	-	-	L, R, T, V	■	■	5,8	-	-	■	■		
							L, R, V	-	■							
-	-	-	-	1	-	-	-	-	■	-	■	-	-	-		
				-	1						-	■				
-	-	-	-	1	-	1	-	-	■	-	-	■	-	-		
				-	1	-						-	■	■		



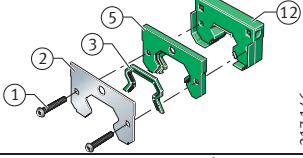
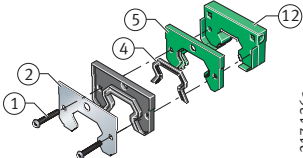
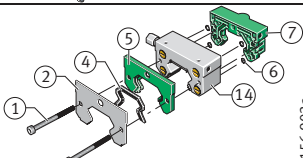
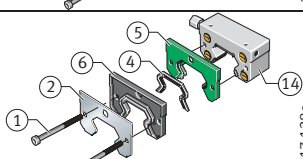
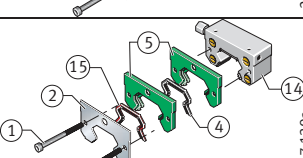
Fixing screws and screw plugs K₁, K₂, width S, relubrication facility L, R, T, V

RUE size	KIT end number	Fixing screw K ₁		Screw plug K ₂	
			L _s mm		L _{s1} mm
35 45	120	M4	2,2	-	-
	130, 140, 300, 340, 350		2,2	M6	4,3
55 65	120	M5	2,75	-	-
	130, 140, 300, 340, 350			M6	4,3



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Accessories

Lubrication elements KIT ¹⁾			① Fixing screws K ₁ (2 pieces)	② End plate, non-contact	End wipers, contact		
KIT	Description	Designation and KIT end number			③ Single lip, green	④ Double lip, black	⑤ Single lip, red
 217 146	① Fixing screws K ₁ ② End plate ③ End wiper, single lip, green ④ End wiper, double lip, black ⑤ Carrier plate ⑥ Additional wiper ⑫ Long term lubrication unit ⑭ Minimal lubricant quantity-metering unit	410 ⁷⁾	1	1	-	1	-
		413 ⁷⁾⁸⁾					
 217 136a	⑤ Carrier plate ⑥ Additional wiper ⑫ Long term lubrication unit ⑭ Minimal lubricant quantity-metering unit	420 ⁷⁾	1	1	-	1	-
		423 ⁷⁾⁸⁾					
 156 903a	⑫ Long term lubrication unit ⑭ Minimal lubricant quantity-metering unit ⑮ End wiper, single lip, red	510	1	1	-	1	-
		511					
 217 138a	⑫ Long term lubrication unit ⑭ Minimal lubricant quantity-metering unit	530	1	1	-	1	-
		531					
 217 139a	⑫ Long term lubrication unit ⑭ Minimal lubricant quantity-metering unit	550	1	1	-	-	1 ⁶⁾
		551					
		560 ¹²⁾	1	1	-	1	-
		561 ¹²⁾					

Attention! The table is only a guide.

The specific application conditions must be taken into consideration when selecting the elements.

The lubrication elements can be used in various combinations.

However, not every combination is possible or advisable.

For recommended and possible combinations, see page 164.

¹⁾The KITS are available for the series RUE-E (-KT) .

²⁾Ordering example for KIT410 for RUE35-E: KIT.RWU35-E-OS-410.

³⁾See figure bottom right.

⁴⁾For definition see page 150.

⁵⁾Material NBR.

⁶⁾Material FPM, for protection against aggressive media (for example acids, alkalis).

⁷⁾KIT.RWU...-E-4 must always be fitted to both sides of the carriage.

⁸⁾In the case of KIT.RWU...-413 (-423) the upper relubrication hole is additionally closed off.

⁹⁾Valid for sizes 35 to 45.

¹⁰⁾Valid for size 55.

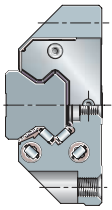
¹¹⁾Valid for size 65.

¹²⁾Not available for size 65.

¹³⁾Available by agreement for size RUE25-D.

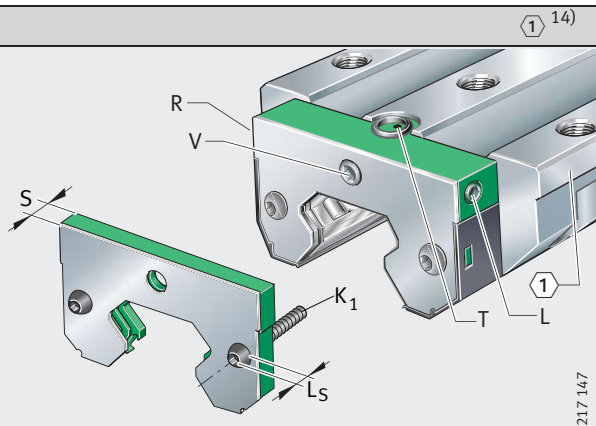
¹⁴⁾ Locating face

⑤ Carrier plate	⑥ Additional wiper, contact, single lip, black	⑫ Long term lubrication unit	Minimal lubricant quantity metering unit Connector ⑭		Relubrication facility ³⁾	Fitting of KIT		Width S in mm ³⁾	Contamination ⁴⁾			
			On right side	On left side		Retrofittable ²⁾	Factory fit		Very slight	Slight	Moderate	Heavy
1	-	1	-	-	L, R	■ -	■ ■	17,5 ⁹⁾ 22,5 ¹⁰⁾ 23,4 ¹¹⁾	-	■	■	-
1	1 ⁵⁾	1	-	-	L, R	■ -	■ ■	22,5 ⁹⁾ 23,2 ⁹⁾ 23,4 ¹⁰⁾	-	-	■	■
1	-	-	■	-	R	-	■	31,8	-	■	■	-
			-	■	L							
1	1 ⁵⁾	-	■	-	R	-	■	36,8	-	-	■	■
			-	■	L							
2	-	-	■	-	R	-	■	37,2	-	-	■	■
			-	■	L							
2	-	-	■	-	R							
			-	■	L							



Fixing screws K₁, width S and relubrication facility L, R, T, V

RUE size	KIT end number	Fixing screw K ₁	
			L _s mm
35	410, 420	M4	2,8
45	510, 530, 550, 560		4
55	400, 430	M5	2,7
65	510, 530, 550, 560		5



217 147

Accessories

Recommended and possible combinations																	
Designation and KIT end numbers KIT.RWU...-E-	100, 103	120, 123	130, 133	140, 143	300, 303	340, 343	350, 353	410, 413	420, 423	510	511	530	531	550	551	560	561
100, 103	●	○	○	●	○	○	○										
120, 123	○	●	●	○	○	○	○			●	●	○	○	○	○	○	○
130, 133	○	●	●	○	○	○	○			●	●	○	○	○	○	○	○
140, 143	●	○	○	●	○	○	○										
300, 303	○	○	○	○	●	○	○			○	○	●	●	○	○	○	○
340, 343	○	○	○	○	○	●	●			○	○	●	●	○	○	○	○
350, 353	○	○	○	○	○	○	●			○	○	○	○	●	●	○	○
410, 413								●	○								
420, 423								○	●								
510		●	●			○	○										
511		●	●			○	○										
530		○	○			●											
531		○	○			●											
550		○	○			○	●										
551		○	○			○	●										
560		○	●			○	○										
561		○	●			○	○										
900	●	○	○	●	○	○	○										
910	●	○	○	●	○	○	○										
920	○	●	●	○	○	○	○										
930	○	●	●	○	●	●	●			●	●	●	●	●	●	●	●

- Recommended combinations.
- Possible combinations.

Accessories

Configuration of KIT.RWU

Attention!

The description shows how an ordering designation is constructed for factory fitted KITS.

Always pay attention to the position of the locating faces of the carriage and guideway.

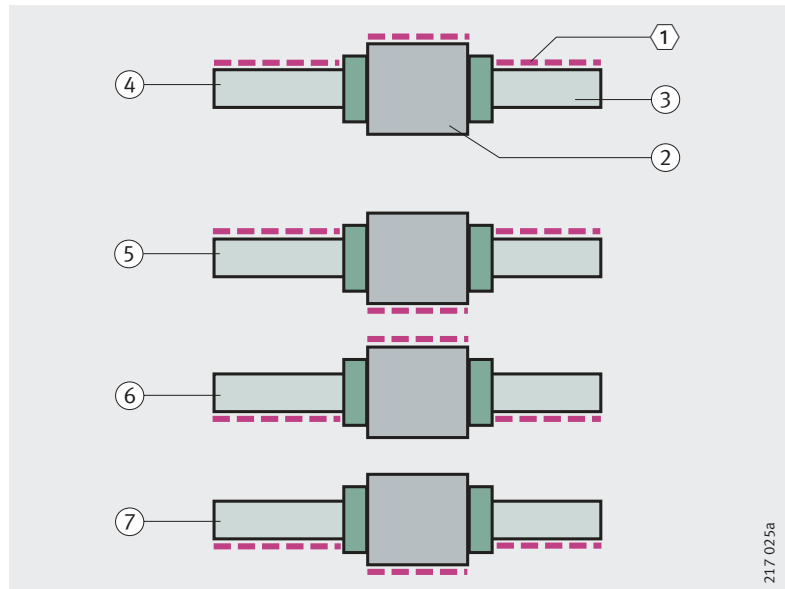
Definition of locating faces

Possible locating faces for guideways and carriages are shown in *Figure 10*. The locating faces are indicated by the broken lines.

- ① Locating face
- ② Carriage
- ③ Guideway
- ④ Standard RUE...-E
- ⑤ RUE...-E-OU
- ⑥ RUE...-E-UO
- ⑦ RUE...-E-UU

Figure 10

Locating faces on guideways and carriages



217 025a

Definition of KIT position on the carriage

KIT components can be fitted on the left, centre or right of the carriage, *Figure 11*.

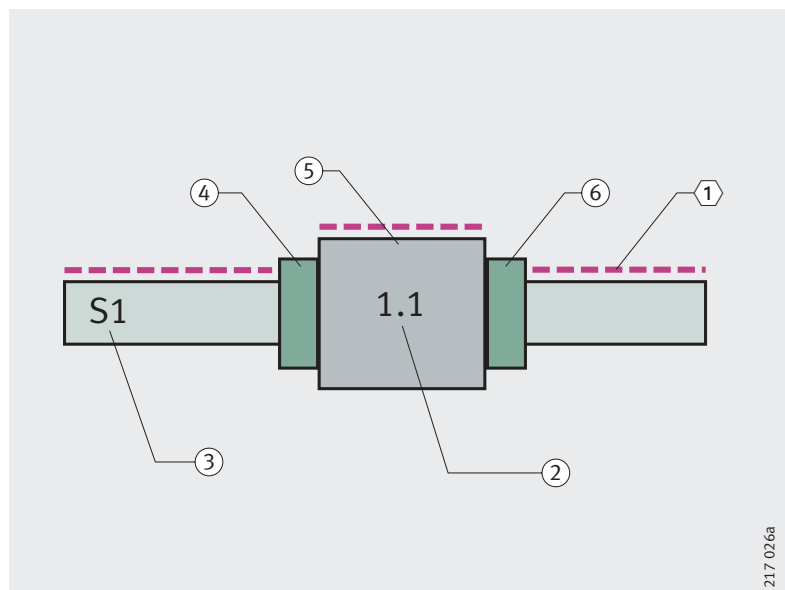
Attention!

In order to clearly define the KIT components, the carriage is always shown viewed with the locating face upwards.

- ① Locating face
- ② Carriage number (W) for each guideway set (W1.1, W1.n, W2.n)
W1.1 indicates:
1 = number of guideway
.1 = number of carriage
- ③ Guideway set (S1, S2, Sn)
- ④ KIT.RWU on left of carriage
- ⑤ KIT.RWU on centre of carriage
- ⑥ KIT.RWU on right of carriage

Figure 11

KIT position on carriage
Position of locating face
for guideways and carriages



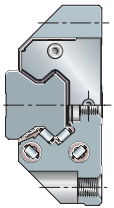
217 026a

Ordering example,
ordering designation
Unit
with one guideway set

Attention!

In order to clearly define the KIT components, the carriage is always shown viewed with the locating face upwards.

The KIT structure is always described from left to right.



Linear recirculating roller bearing
and guideway assembly RUE..-E
with KIT components

Linear roller bearing and guideway assembly	RUE
Size	35
Full complement	E
High carriage	H
Number of guideway sets	1
Number of carriages per unit	W1
Accuracy class	G2
Preload	V3
Guideway length	800 mm
a_L	20 mm
a_R	20 mm

Additional wiper, single lip (NBR)
and end wiper, double lip
without relubrication from above, left KIT.RWU35-E-343

Upper sealing strip, single lip,
and lower, double lip, centre KIT.RWU35-E-930

Additional wiper, single lip (NBR)
and end wiper, double lip,
without relubrication from above, right KIT.RWU35-E-343

Designation of KIT components: see *Figure 12*.

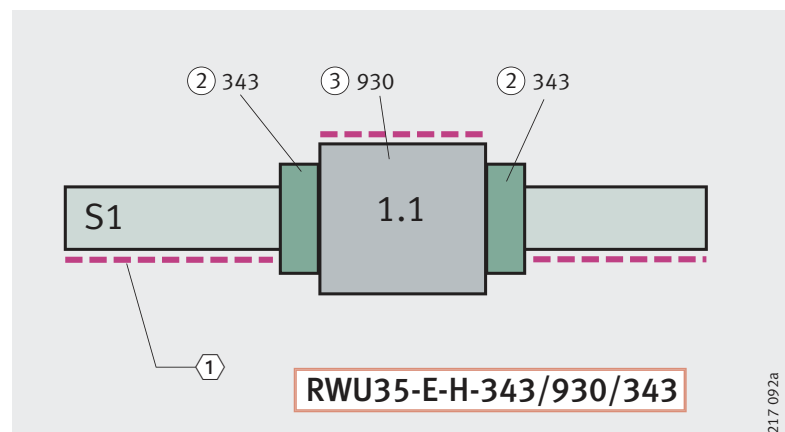
Ordering designation

System		RUE35-E-H
Guideway set	S1	RUE35-E-H-UO-W1-G2-V3/800-20/20
Carriage	W1.1	RWU35-E-H-343/930/343-G2-V3

- ① Locating face
- ② Long term lubrication unit KIT.RWU35-E-343
- ③ Sealing strips KIT.RWU35-E-930

Figure 12

Ordering example,
ordering designation



Accessories

Unit with two guideway sets

Attention!

In order to clearly define the KIT components, the carriage is always shown viewed with the locating face upwards.

In the example, the guideway set 2 is thus rotated for definition by 180°.

The KIT structure is always described from left to right.

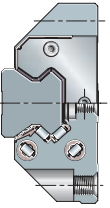
Linear recirculating roller bearing and guideway assembly RUE..-E with KIT components

Linear roller bearing and guideway assembly	RUE
Size	45
Full complement	E
Guideway for screw mounting from below	U
Number of guideway sets	2
Number of carriages per unit	W2
Accuracy class	G2
Preload	V3
Guideway length	2 600 mm
a _L	40 mm
a _R	40 mm
Additional wiper, single lip (NBR) and end wiper, single lip	KIT.RWU45-E-300
Sealing strips, upper and lower, double lip	KIT.RWU45-E-930
Minimal lubricant quantity metering unit, additional wiper, single lip (NBR) and end wiper, double lip, connector on right	KIT.RWU45-E-530

Designation of KIT components: see *Figure 13*.

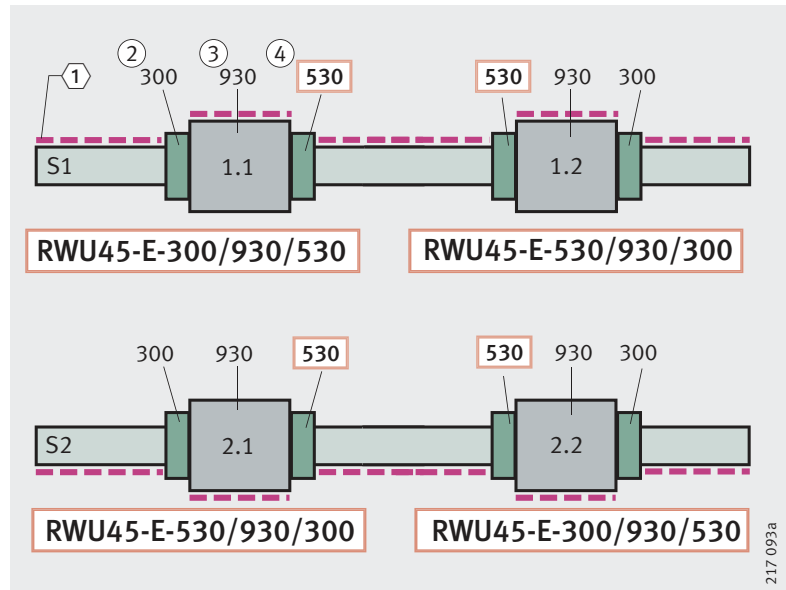
Ordering designation

System		RUE45-E
Guideway set	S1	RUE45-E-U-W2-G2-V3/2 600-40/40
Carriage	W1.1	RWU45-E-300/930/530-G2-V3
	W1.2	RWU45-E-530/930/300-G2-V3
Guideway set	S2	RUE45-E-U-UU-W2-G2-V3/2 600-40/40
Carriage	W2.1	RWU45-E-530/930/300-G2-V3
	W2.2	RWU45-E-300/930/530-G2-V3

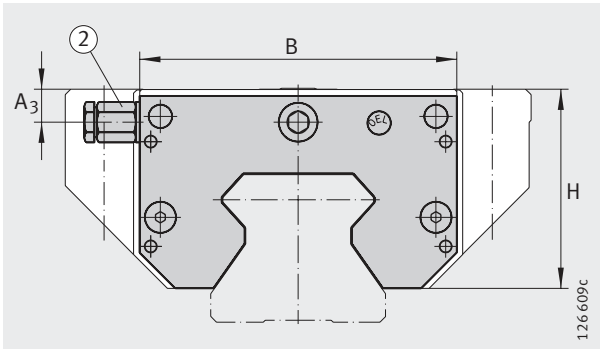


- ① Locating face
- ② Additional and end wipers KIT.RWU45-E-300
- ③ Sealing strips KIT.RWU45-E-930
- ④ Minimal lubricant quantity metering unit KIT.RWU45-E-530

Figure 13
Ordering example,
ordering designation



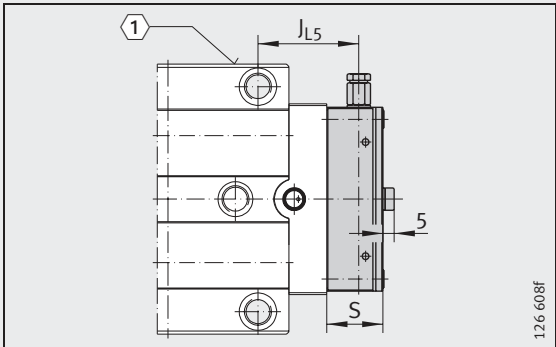
Minimal lubricant quantity metering unit



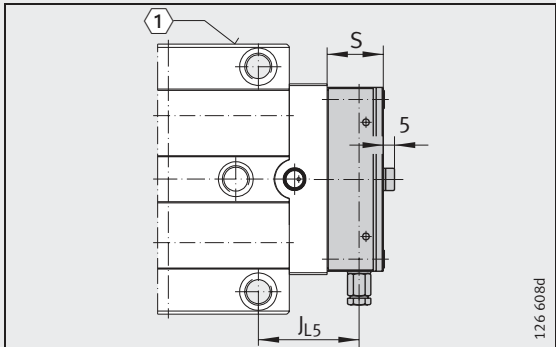
KIT.RWU...-E-510
② 1)

Dimension table · Dimensions in mm							
Designation	Mass m ≈g	Dimensions					
		B	A ₃	H	J _{L5}		S
					with RUE...-E (-H)	with RUE...-E-L (-HL)	
KIT.RWU35-E-510 (-511)	170	66,9	6,6	41,2	44	55,5	31,8
KIT.RWU35-E-530 (-531)							36,8
KIT.RWU35-E-550 (-551)							37,2
KIT.RWU35-E-560 (-561)							
KIT.RWU45-E-510 (-511)	200	81,7	8,5	51,3	44,8	61,8	31,8
KIT.RWU45-E-530 (-531)							36,8
KIT.RWU45-E-550 (-551)							37,2
KIT.RWU45-E-560 (-561)							
KIT.RWU55-E-510 (-511)	240	95	10	59	51,5	71,5	31,8
KIT.RWU55-E-530 (-531)							36,8
KIT.RWU55-E-550 (-551)							37,2
KIT.RWU55-E-560 (-561)							
KIT.RWU65-E-510 (-511)	500	121	10,2	78,5	–	85	31,8
KIT.RWU65-E-530 (-531)							36,8
KIT.RWU65-E-550 (-551)							37,2

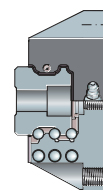
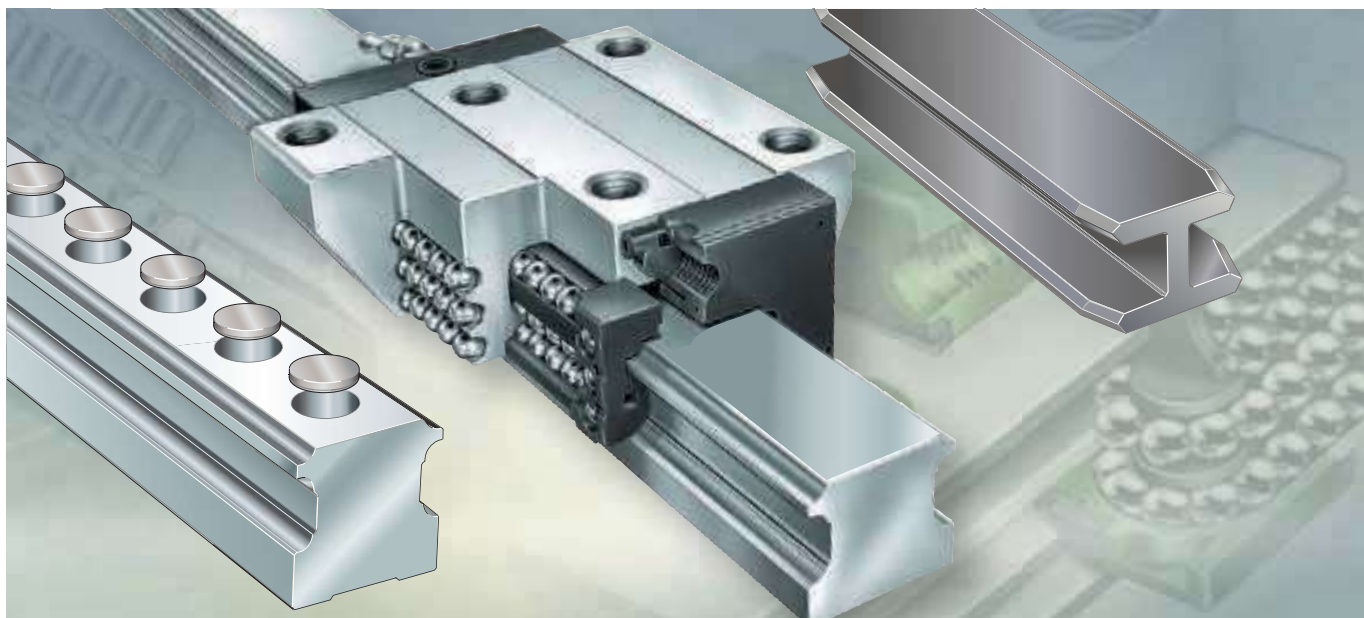
- 1) ① Locating face
② Lubrication connector



KIT.RWU..-E-511 (-531, -551, -561)
Relubrication from left side
① 1)

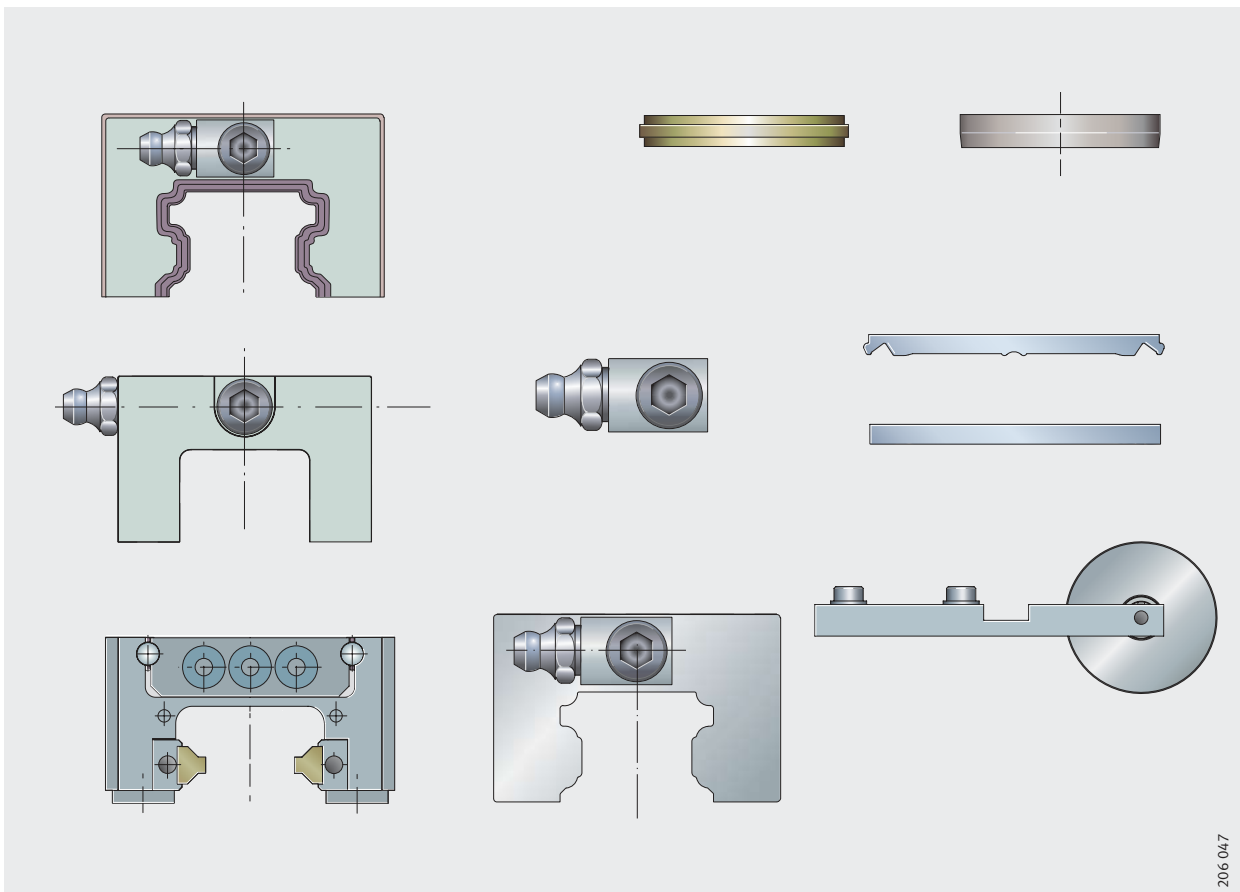
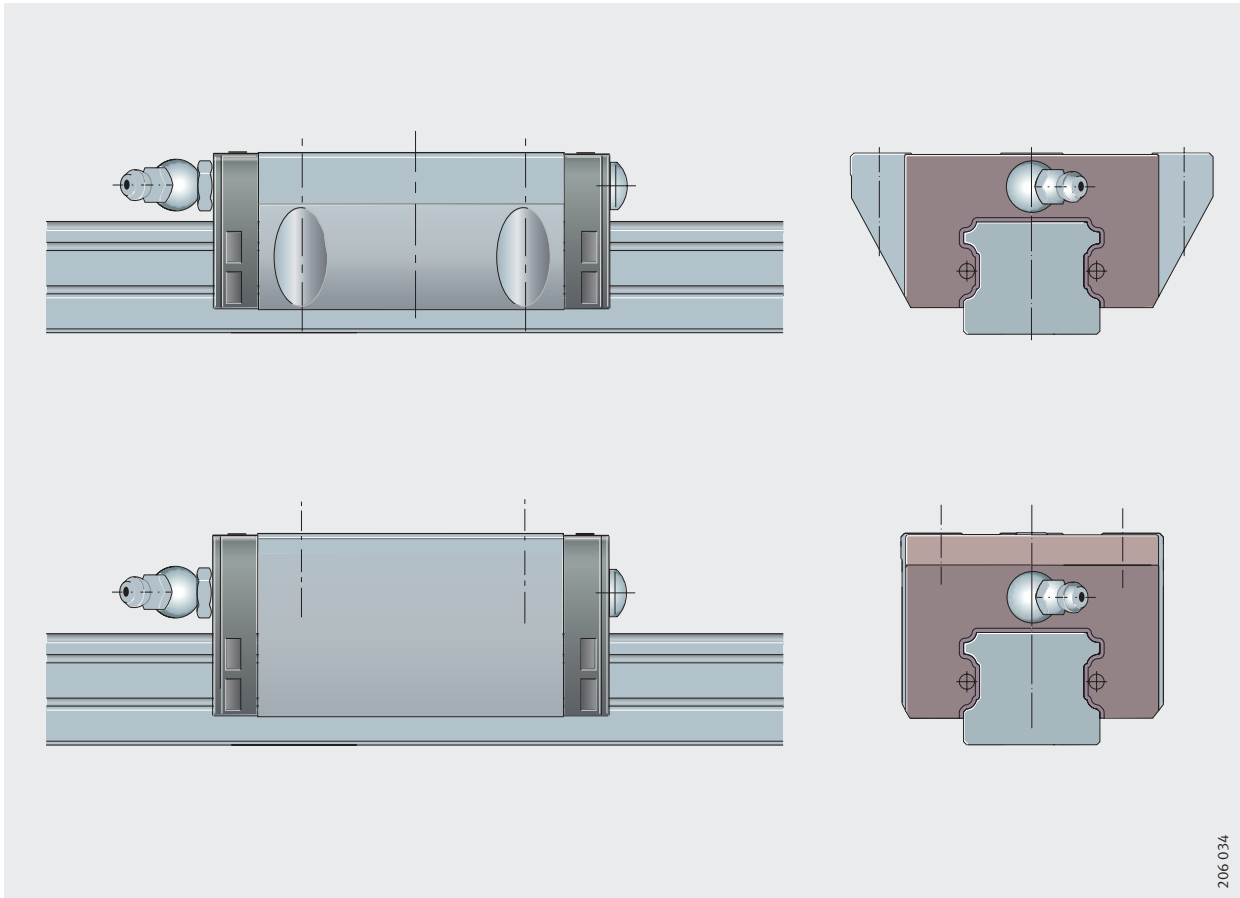


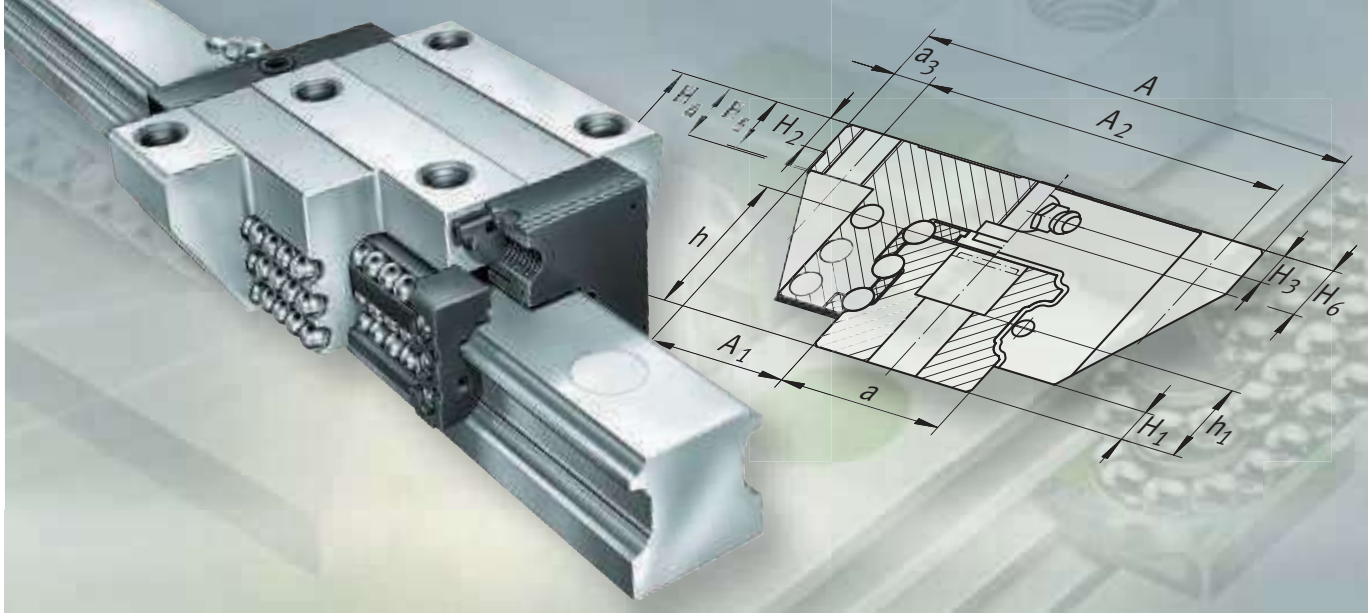
KIT.RWU..-E-510 (-530, -550, -560)
Relubrication from right side
① 1)



Six-row linear recirculating ball bearing and guideway assemblies

Full complement
Accessories



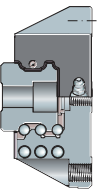


Six-row linear recirculating ball bearing and guideway assemblies

Full complement

Six-row linear recirculating ball bearing and guideway assemblies

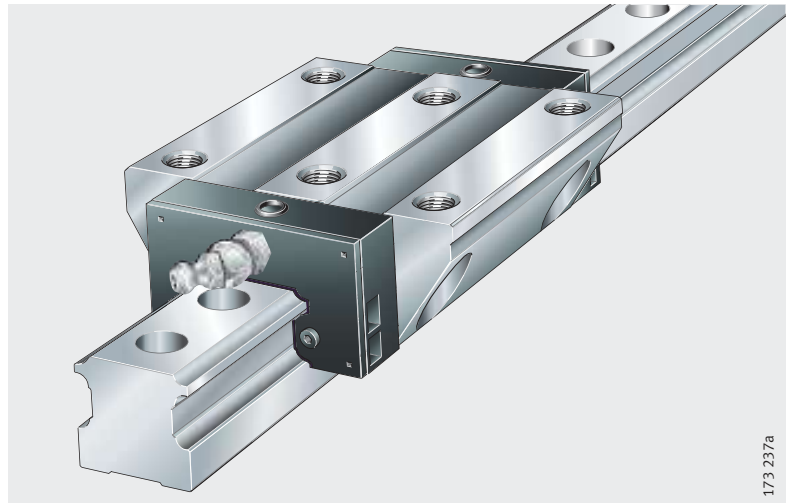
	Page
Product overview	Six-row linear recirculating ball bearing and guideway assemblies 178
Features	Load carrying capacity 180 Acceleration and speed 180 Carriages 181 Guideways 181 Sealing 181 Lubrication 181 Operating temperature 182 Standard accessories 182 Corrosion-resistant designs 182 Suffixes 182
Design and safety guidelines	Preload 183 Friction 183 Rigidity 183 Guideway hole patterns 186 Demands on the adjacent construction 187
Accuracy	Accuracy classes 190 Parallelism of raceways to locating surfaces 190 Positional and length tolerances of guideways 192
Ordering example, ordering designation	Carriage and guideway separate, guideway with symmetrical hole pattern 193 Unit, guideway with asymmetrical hole pattern 194
Dimension tables	Six-row linear recirculating ball bearing and guideway assemblies, standard and L carriages 196 Six-row linear recirculating ball bearing and guideway assemblies, H and HL carriages 200



Full complement

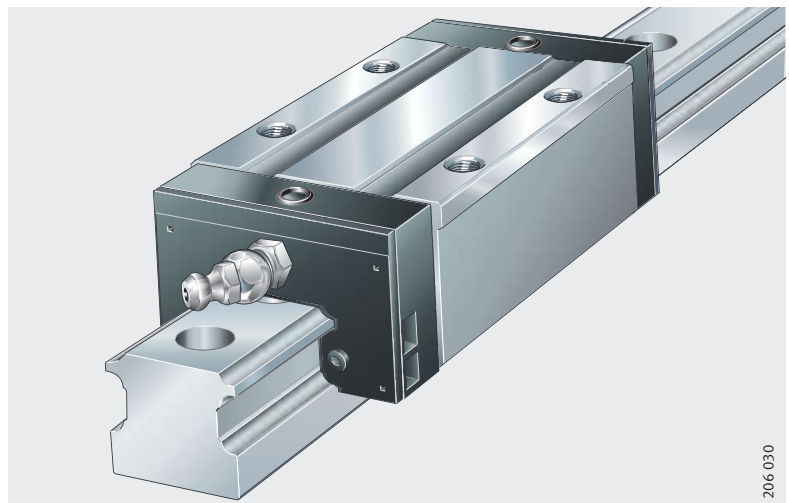
For oil and grease lubrication

KUSE, KUSE..-L



173 237a

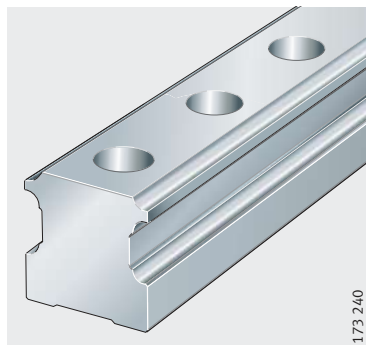
KUSE..-H, KUSE..-HL



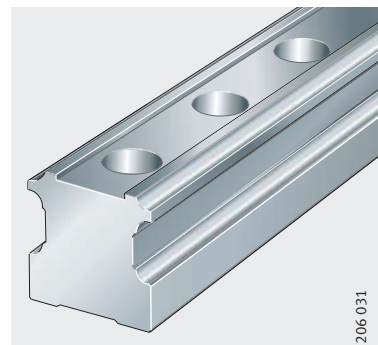
206 030

Guideways
Standard
or
with slot for covering strip

TKSD

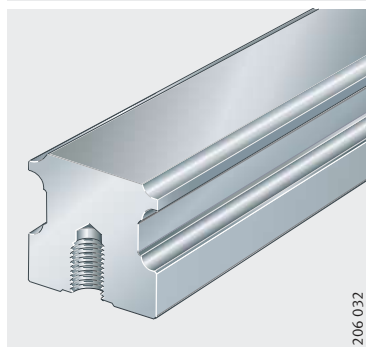


TKSD...-ADB, TKSD...-ADB+K



For screw mounting from below

TKSD...-U

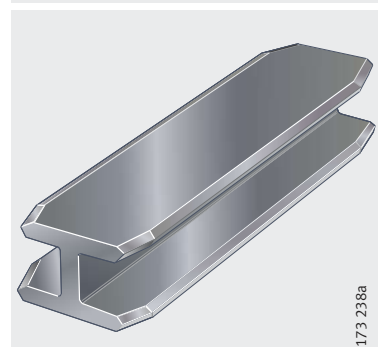


Standard accessories
Plastic closing plugs
Dummy guideway

KA...-TN

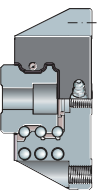
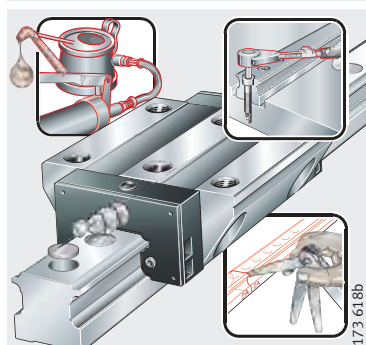


MKSD



Fitting manual

MON22



Six-row linear recirculating ball bearing and guideway assemblies

Features

Linear recirculating ball bearing and guideway assemblies KUSE are full complement systems and are preloaded. They are used in applications with long unrestricted strokes, high and very high loads and high to very high rigidity.

A guidance system comprises at least one carriage with a full complement ball system, a guideway and plastic closing plugs.

The units can be ordered separately as carriage KWSE and guideway TKSD or as a unit KUSE. In a unit, one or more carriages are mounted on a guideway.

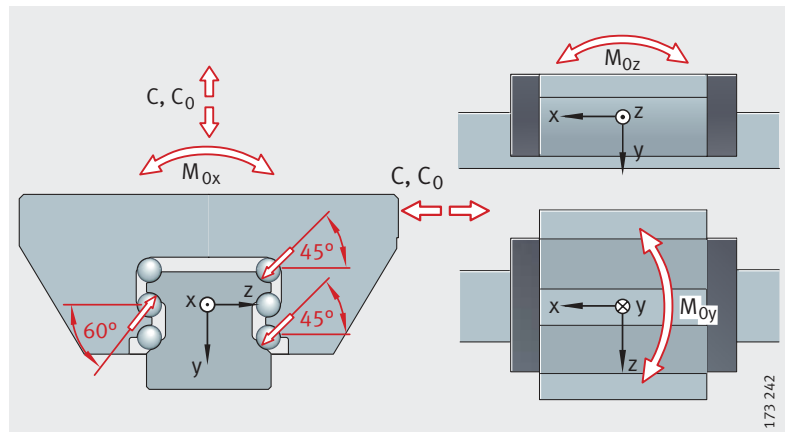
Load carrying capacity

The linear recirculating ball bearing and guideway assemblies have six rows of balls. The four outer rows have a contact angle of 45° and the two inner rows have a contact angle of 60° to the raceways, *Figure 1*.

Four rows of balls support compressive loads while two rows of balls support tensile loads and all six rows support lateral loads.

The units can support loads from all directions – except for the direction of travel – and moments about all axes, *Figure 1*.

Figure 1
Load carrying capacity
and contact angle



Acceleration and speed Operating limits

The dynamic values are shown in the table.

Designation	Acceleration up to m/s^2	Speed up to m/min
KUSE	150	300

Carriages

The carriages have saddle plates made from hardened steel and the rolling element raceways are precision ground. The balls are recirculated in enclosed channels with plastic return elements.

In order to increase the grease volume, the carriages have lubricant reservoirs, see Lubrication.

Guideways

The guideways are made from hardened steel and are ground on all faces, the rolling element raceways are precision ground.

Located from above or below

Guideways TKSD (-ADB, -ADB+K) are located from above, guideways TKSD..-U are located from below. All through holes have counterbores for the fixing screws or threaded blind holes.

Slot for covering strip

Guideways TKSD..-ADB have a slot for the adhesive bonded steel covering strip (ADB) and guideways TKSD..-ADB+K have a slot with undercut for a clip fit steel covering strip (ADB+K).

Multi-piece guideways

If the required guideway length $l_{\max}$ is greater than the value in the dimension tables, the guideways are supplied in several pieces, see page 187.

Sealing

Standard sealing strips and elastic wipers ensure effective sealing, *Figure 2*. These sealing elements protect the rolling element system from contamination even under demanding environmental conditions.

For additional sealing variants see Accessories, page 215.

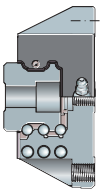
Attention!

If the contamination conditions are exceptionally severe, please contact us.

Lubrication

The linear recirculating ball bearing and guideway assemblies are suitable for oil and grease lubrication. If grease lubrication is used, they are maintenance-free for most applications due to the lubricant reservoir, *Figure 2*.

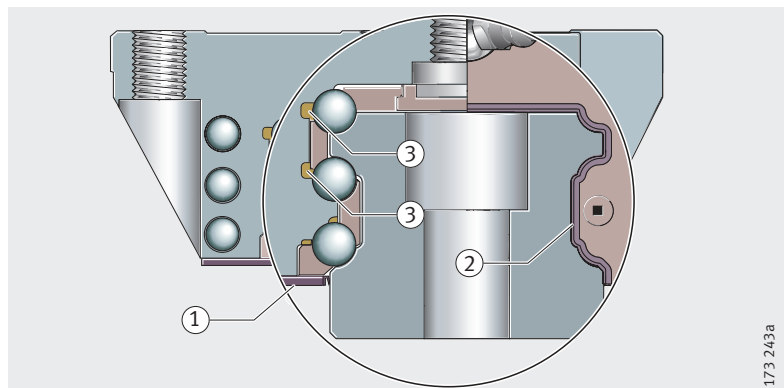
Lubrication is carried out via lubrication nipples in the end face of the end piece or from above via the adjacent construction and the lubrication holes in the end pieces.



- ① Standard sealing strips
- ② Elastic wiper
- ③ Lubricant pockets and grease reservoir

Figure 2

Sealing strips, wipers,
lubricant reservoir



Six-row linear recirculating ball bearing and guideway assemblies

Operating temperature

KUSE units can be used at operating temperatures from –10 °C to +100 °C.

Standard accessories

Plastic dummy guideway

The dummy guideway prevents damage to the rolling element set if the carriage is removed from the guideway.

Carriages are always pushed directly from the guideway onto the dummy guideway and must remain there until they are reassembled.

Plastic closing plugs

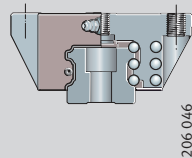
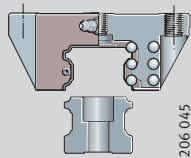
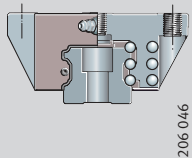
The plugs close off the counterbores of the guideway holes flush with the surface of the guideway.

Optionally, brass closing plugs are also available, see page 208.

Corrosion-resistant designs

Six-row linear recirculating ball bearing and guideway assemblies KUSE are also available in corrosion-resistant designs with the special coatings Corrotect[®], Protect A and Protect B.

Suffixes for Corrotect[®]-coated parts

With Corrotect [®] coating	Preassembled unit Guideway only coated	Carriage and guideway separate Carriage or guideway coated	Preassembled unit Carriage and guideway coated
			
Suffix	RRFT	RRF	RRF

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description
–	Standard carriage
L	Long carriage
H	High carriage
HL	High, long carriage

Design and safety guidelines

Preload

Linear recirculating ball bearing and guideway assemblies KUSE are available in preload classes V1 and V2, see table.

Preload classes

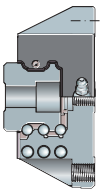
Preload class	Preload setting	Suitable for
V1	$0,04 \cdot C_{II}^{1)}$	- Moderate load - Particularly high rigidity requirements - Moment load
V2	$0,13 \cdot C_{II}^{1)}$	- High alternating load - Particularly high rigidity requirements - Moment load

¹⁾ Basic dynamic load rating of the central rows of balls.

Influence of preload on the linear guidance system

Increasing the preload increases the rigidity.

However, preload also influences the displacement resistance and operating life of the linear guidance system.



Friction

The coefficient of friction is dependent on the ratio C/P, see table.

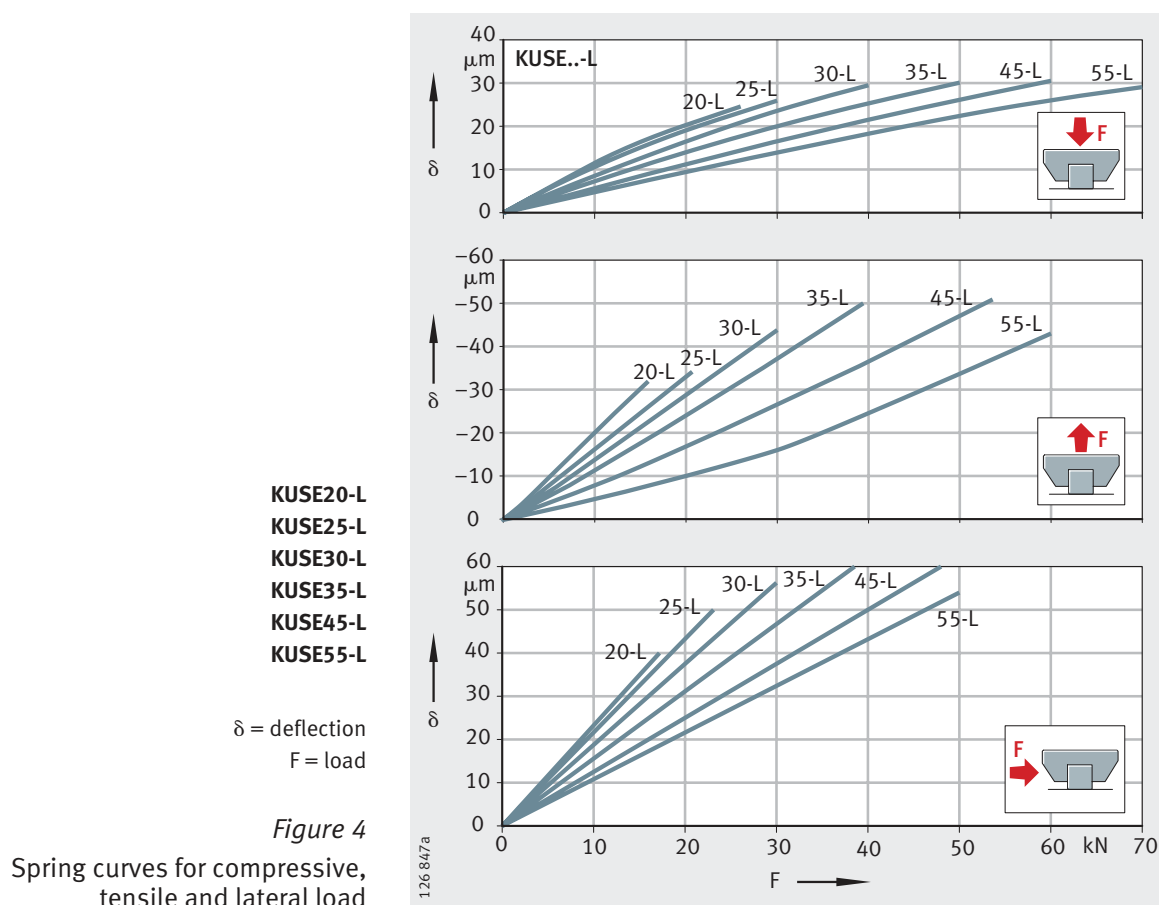
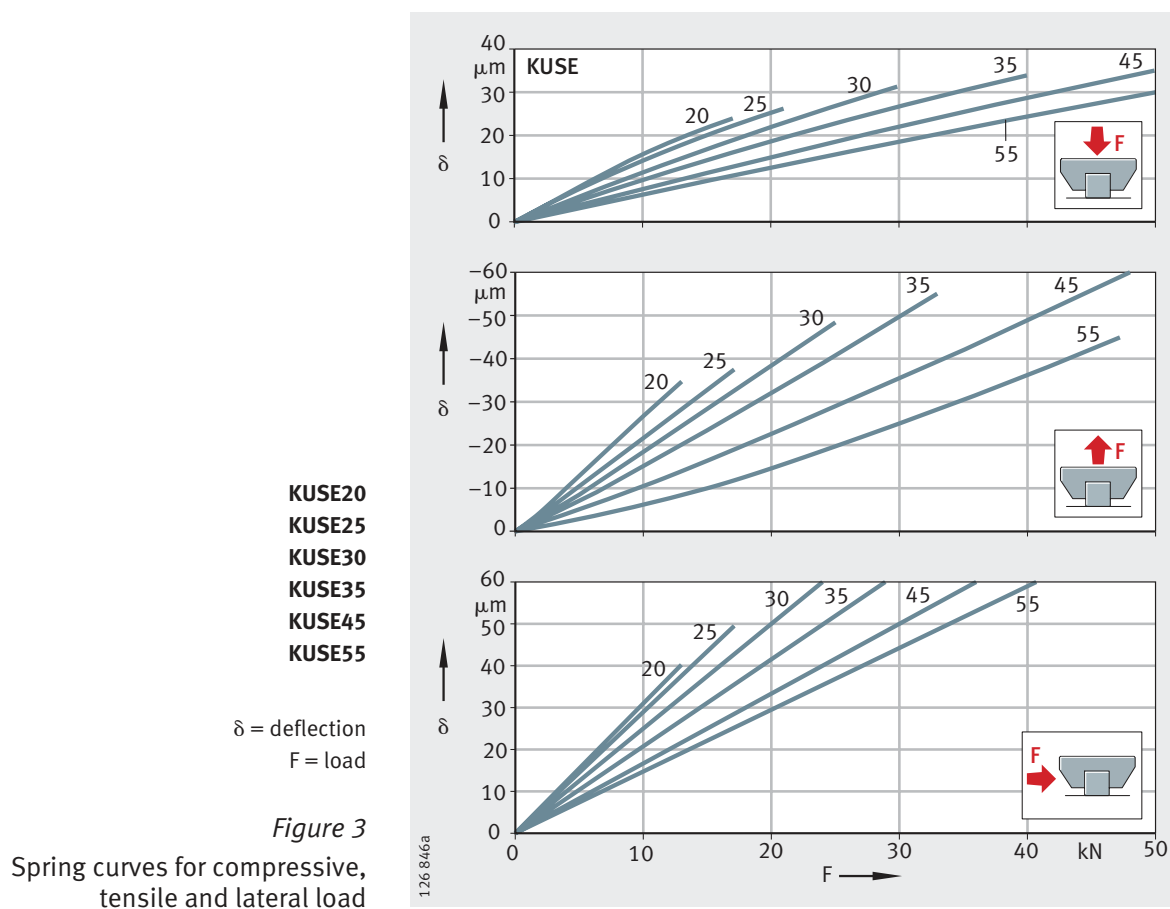
Coefficient of friction

Load C/P	Coefficient of friction μ_{KUSE}
4 to 20	0,001 to 0,002

Rigidity

The spring curves show the deformation of linear recirculating ball bearing and guideway assemblies KUSE including the deformation of the screw connections to the adjacent construction, *Figure 3*, page 184 to *Figure 6*, page 185.

Six-row linear recirculating ball bearing and guideway assemblies

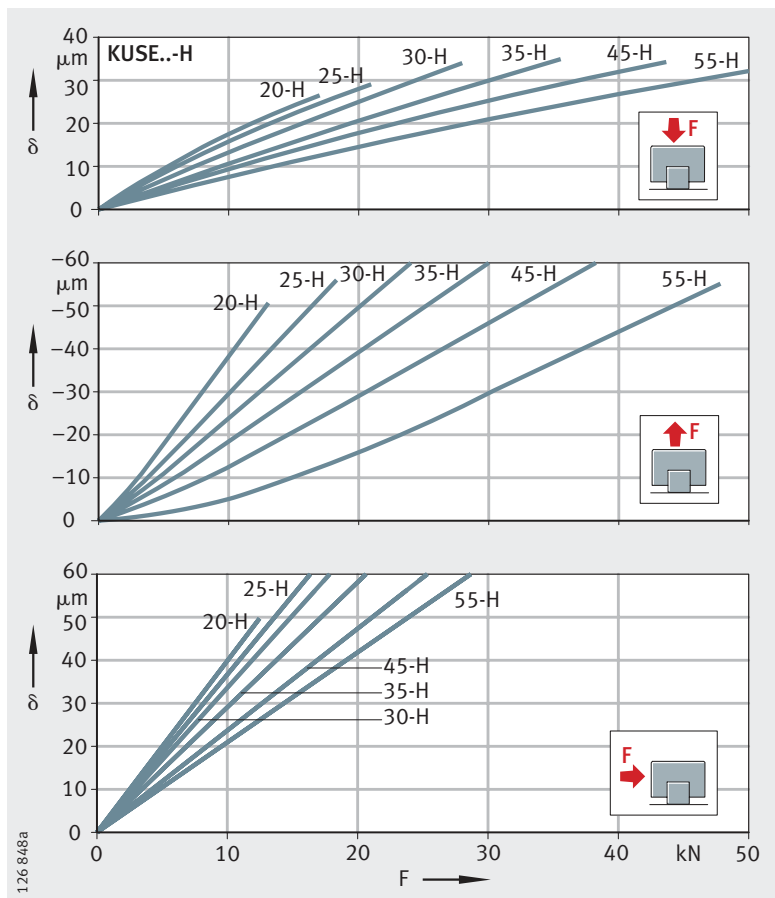


KUSE20-H
KUSE25-H
KUSE30-H
KUSE35-H
KUSE45-H
KUSE55-H

δ = deflection
 F = load

Figure 5

Spring curves for compressive, tensile and lateral load

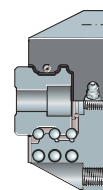
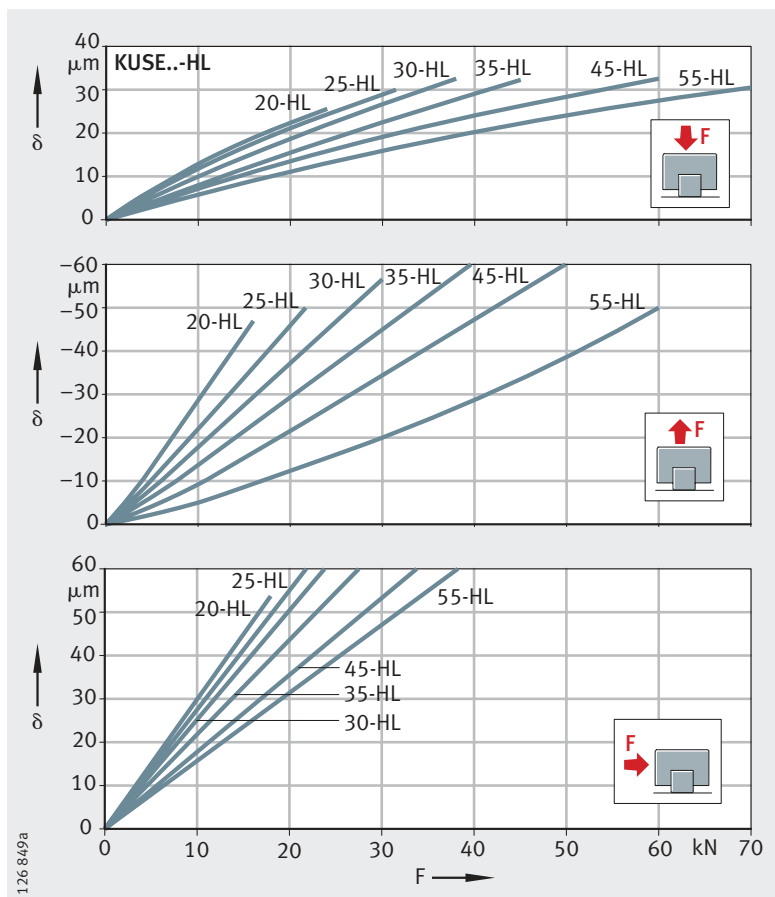


KUSE20-HL
KUSE25-HL
KUSE30-HL
KUSE35-HL
KUSE45-HL
KUSE55-HL

δ = deflection
 F = load

Figure 6

Spring curves for compressive, tensile and lateral load



Six-row linear recirculating ball bearing and guideway assemblies

Guideway hole patterns

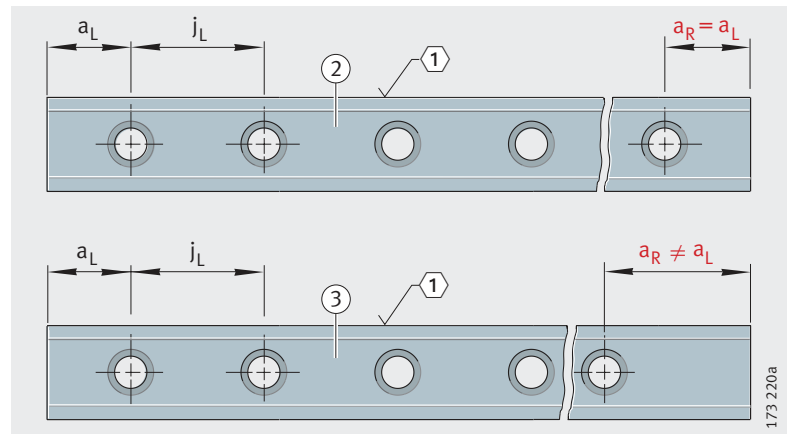
Unless specified otherwise, the guideways have a symmetrical hole pattern, *Figure 7*.

An asymmetrical hole pattern may be available at customer request. In this case, $a_L \geq a_{L \min}$ and $a_R \geq a_{R \min}$, *Figure 7*.

- ① Locating face
- ② Symmetrical hole pattern
- ③ Asymmetrical hole pattern

Figure 7

Hole patterns of guideways with one row of holes



Maximum number of pitches between holes

The number of pitches between holes is the rounded whole number equivalent to:

$$n = \frac{l - 2 \cdot a_{L \min}}{j_L}$$

The distances a_L and a_R are generally determined by:

$$a_L + a_R = l - n \cdot j_L$$

For guideways with a symmetrical hole pattern:

$$a_L = a_R = \frac{1}{2} \cdot (l - n \cdot j_L)$$

Number of holes:

$$x = n + 1$$

a_L, a_R mm
Distance between start or end of guideway and nearest hole

$a_{L \min}, a_{R \min}$ mm
Minimum values for a_L, a_R according to dimension tables

l mm
Guideway length

n —
Maximum possible number of hole pitches

j_L mm
Distance between holes

x —
Number of holes.

Attention!

If the minimum values for a_L and a_R are not observed, the counterbores of the holes may be intersected.

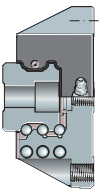
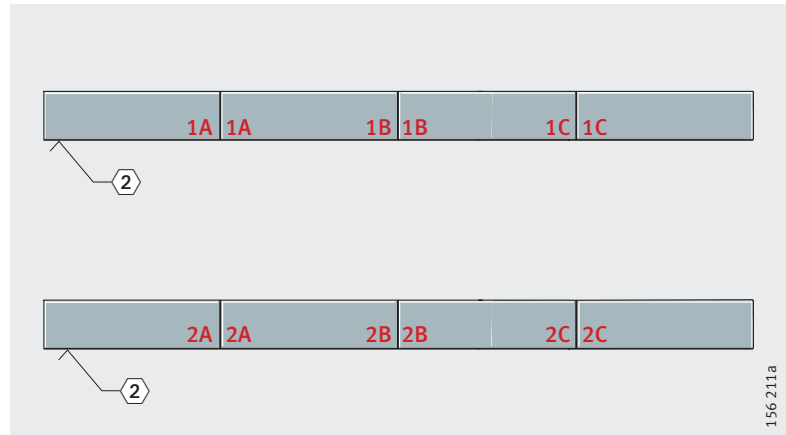
Multi-piece guideways

If the guideway length required is greater than $l_{\max}$ according to the dimension tables, these guideways are made up from individual pieces that together comprise the total required length. The individual pieces are matched to each other and marked, *Figure 8*.

② Marking
Guideway pieces:
1A, 1A
1B, 1B
1C, 1C
2A, 2A
2B, 2B
2C, 2C

Figure 8

Marking of multi-piece guideways



Demands on the adjacent construction

The running accuracy is essentially dependent on the straightness, accuracy and rigidity of the fit and mounting surfaces.

The straightness of the system is only achieved when the guideway is pressed against the datum surface.

If high demands are to be made on the running accuracy and/or if soft substructures and/or movable guideways are used, please contact us.

Geometrical and positional accuracy of the mounting surfaces

Attention!

The higher the requirements for accuracy and smooth running of the guidance system, the more attention must be paid to the geometrical and positional accuracy of the mounting surfaces.

The tolerances according to *Figure 9*, page 188 and table Values for parallelism tolerances t , page 189 must be observed.

Surfaces should be ground or precision milled – with the aim of achieving a mean roughness value $R_a 1,6$.

Any deviations from the stated tolerances will impair the overall accuracy, alter the preload and reduce the operating life of the guidance system.

Height difference ΔH

For ΔH , permissible values are in accordance with the following formula. If larger deviations are present, please contact us.

$$\Delta H = a \cdot b$$

ΔH μm

Maximum permissible deviation from the theoretically precise position, *Figure 9*, page 188

a –

Factor dependent on the preload class according to table

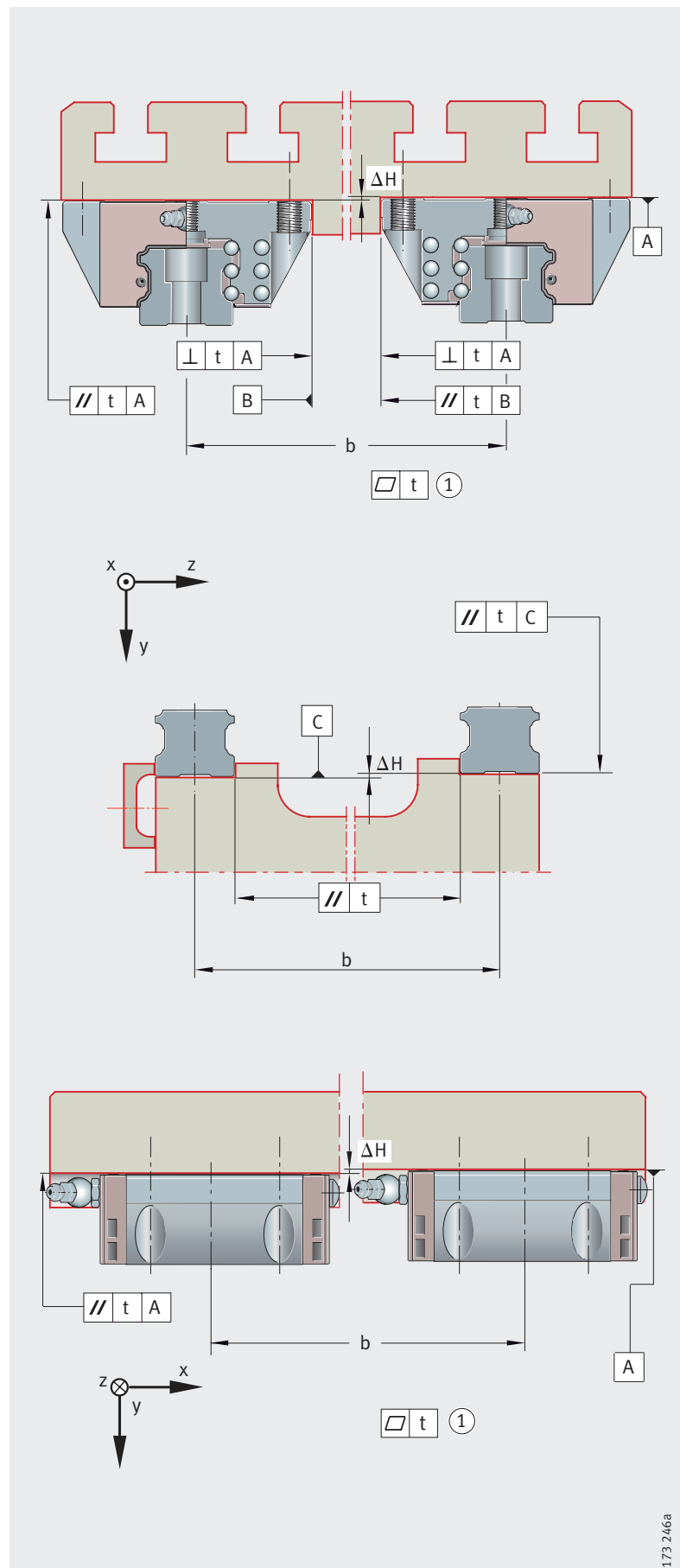
b mm

Centre distance between guidance elements.

Factor a

Preload class	Factor a
V1	0,2
V2	0,1

Six-row linear recirculating ball bearing and guideway assemblies

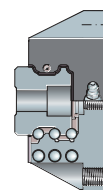


Parallelism of mounted guideways

For guideways arranged in parallel, the parallelism t should be in accordance with *Figure 9*, page 188 and table. If the maximum values are used, the displacement resistance may increase. If larger tolerances are present, please contact us.

Values for parallelism tolerances t

Guideway Designation	Preload class	
	V1	V2
	Parallelism tolerance	
	t μm	t μm
TKSD20 (-U)	9	6
TKSD25 (-U)	11	7
TKSD30 (-U)	13	8
TKSD35 (-U)	15	10
TKSD45 (-U)	17	12
TKSD55 (-U)	20	14



Locating heights and corner radii

The locating heights and corner radii should be designed in accordance with table and *Figure 10*.

Locating heights and corner radii

Six-row linear recirculating ball bearing and guideway assembly Designation	Locating heights		Corner radii	
	h_1 mm	h_2 mm max.	r_1 mm max.	r_2 mm max.
KUSE20 (-L, -H, -HL)	5	4	1	0,5
KUSE25 (-L, -H, -HL)	5	4,5	1	0,8
KUSE30 (-L, -H, -HL)	6	5	1	0,8
KUSE35 (-L, -H, -HL)	6,5	6	1	0,8
KUSE45 (-L, -H, -HL)	9	8	1	1
KUSE55 (-L, -H, -HL)	12	10	1	1,5

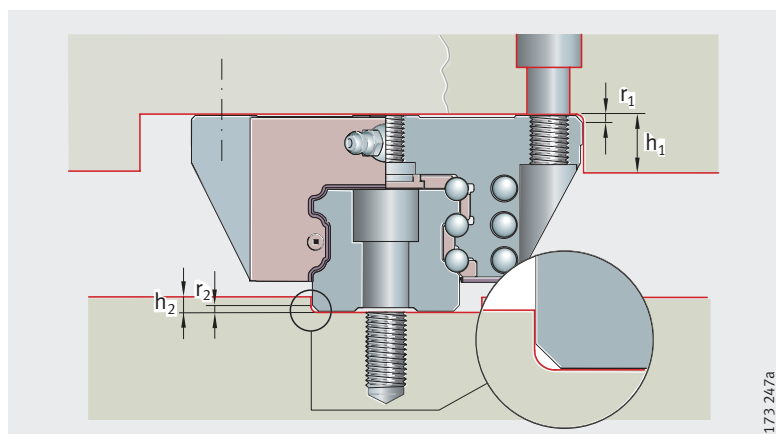


Figure 10

Locating heights and corner radii

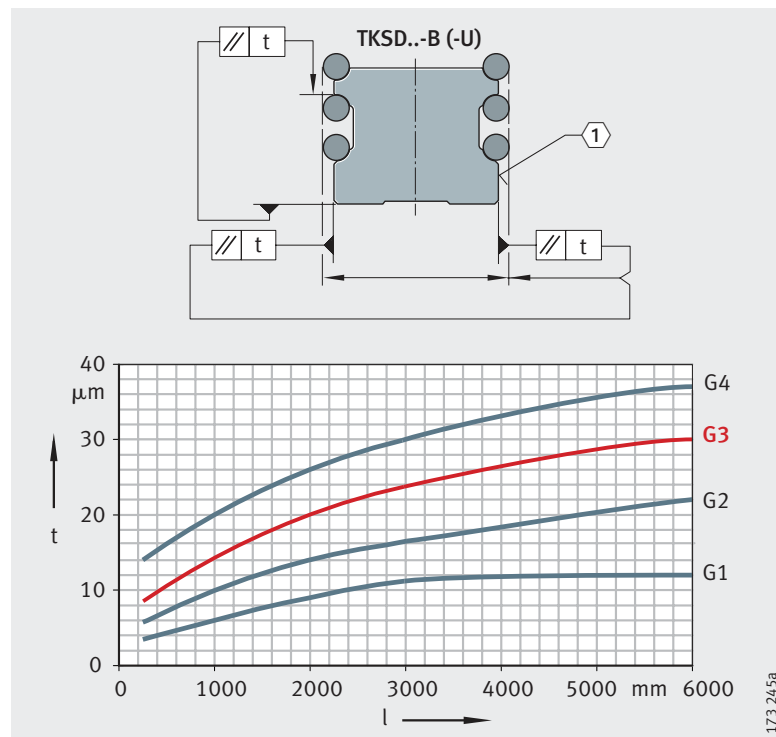
Six-row linear recirculating ball bearing and guideway assemblies

Accuracy Accuracy classes

Six-row linear recirculating ball bearing and guideway assemblies are available in accuracy classes G1 to G4, *Figure 11*. The standard is class G3.

t = parallelism tolerance
with differential measurement
l = total guideway length
① Locating face

Figure 11
Accuracy classes
and parallelism tolerances
of guideways



Parallelism of raceways to locating surfaces

The parallelism tolerances of guideways are shown in *Figure 11*. In systems with Corrotect® coating, there may be deviations in tolerances compared with uncoated units.

Tolerances

Tolerances: see table Tolerances of accuracy classes and reference dimensions for accuracy: see *Figure 12*.

The tolerances are arithmetic mean values. They relate to the centre point of the screw mounting or locating surfaces of the carriage.

The dimensions H and A₁ (table Tolerances of accuracy classes) should always remain within the tolerance irrespective of the position of the carriage on the guideway.

Tolerances of accuracy classes

Tolerance		Accuracy			
		G1 μm	G2 μm	G3 ¹⁾ μm	G4 μm
Tolerance for height	H	± 10	± 20	± 25	± 80
Height difference ²⁾	ΔH	5	10	15	20
Tolerance for spacing	A ₁	± 10	± 15	± 20	± 80
Spacing difference ²⁾	ΔA_1	7	15	22	30

1) Standard accuracy class.

2) Difference between several carriages on one guideway, measured at the same point on the guideway.

Units with Corrotect® coating

For these units, the values for the appropriate accuracy class must be increased by the values for RRF or RRFT; for values, see table.

Tolerances for coated parts

Tolerance		With Corrotect® coating		With Protect A coating	With Protect B coating
		RRF ¹⁾ μm	RRFT ²⁾ μm	KD μm	KDC μm
Tolerance for height	H	+6	+3	+6	+6
Height difference ³⁾	ΔH	+3	0	+3	+3
Tolerance for spacing	A ₁	+3	+3	+3	+3
Distance difference ³⁾	ΔA_1	+3	0	+3	+3

1) Displacement in tolerance zone (guideway and carriage coated).

2) Displacement in tolerance zone (guideway only coated).

3) Difference between several carriages on one guideway, measured at the same point on the guideway.

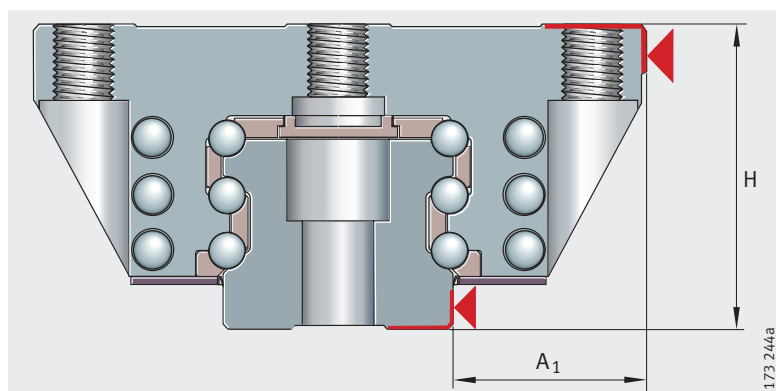
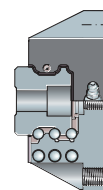


Figure 12

Datum dimensions for accuracy

Six-row linear recirculating ball bearing and guideway assemblies

Positional and length tolerances of guideways

The positional and length tolerances are shown in *Figure 13* and table Length tolerances of guideways.
The hole pattern corresponds to DIN ISO 1101.

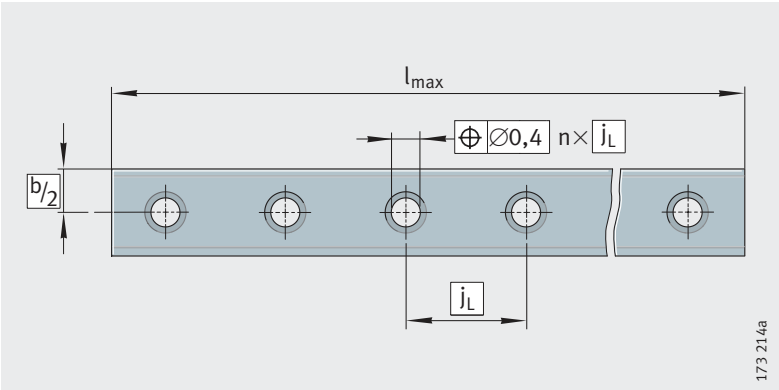


Figure 13
Positional and length tolerances of guideways

Length tolerances of guideways

Tolerances			
of guideways, as a function of length $l_{max}^{1)}$			on multi-piece guideways
Guideway length mm			mm
≤ 1000	> 1000 < 3000	> 3000	
-1	-1,5	$\pm 0,1\%$ of guideway length	± 3 over total length

1) Length l_{max} : see dimension tables.

Pieces of joined guideways

Guideway length ¹⁾ mm	Maximum permissible number of pieces
< 3 000	2
3 000 – 4 000	3
4 000 – 6 000	4
> 6 000	4 + 1 piece per 1 500 mm

1) Minimum length of one piece = 600 mm.

Ordering example,
ordering designation
Carriage
and guideway separate,
guideway with symmetrical
hole pattern
Carriage

Two carriages
for six-row linear ball bearing
and guideway assembly
Size
Accuracy class
Carriage preload

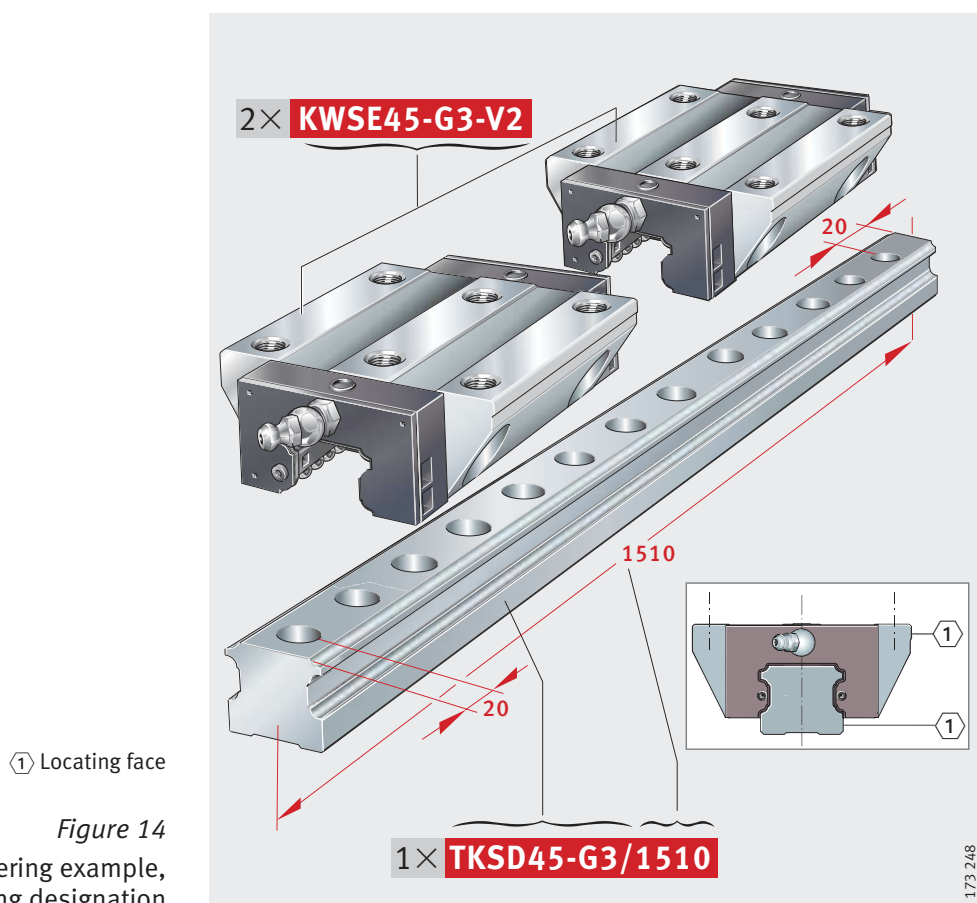
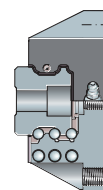
KWSE
45
G3
V2

Ordering designation 2×KWSE45-G3-V2, Figure 14

Guideway
Guideway for carriage
Size
Accuracy class
Guideway length
 a_L
 a_R

TKSD
45
G3
1510 mm
20 mm
20 mm

Ordering designation 1×TKSD45-G3/1510, Figure 14



Six-row linear recirculating ball bearing and guideway assemblies

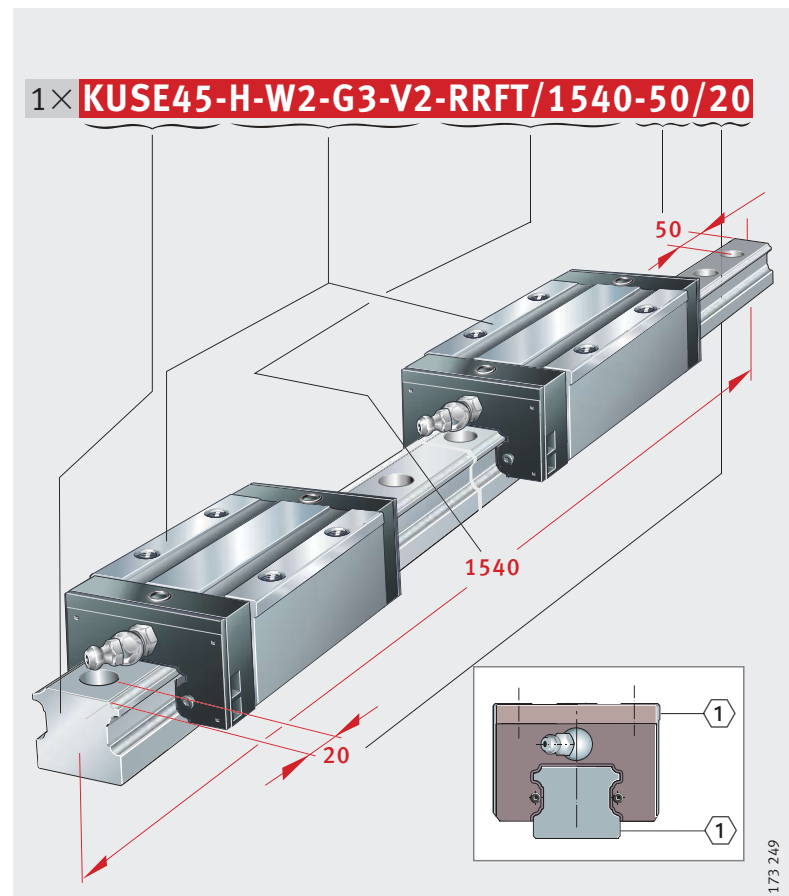
Unit, guideway with asymmetrical hole pattern

Linear ball bearing and guideway assembly with two carriages per guideway	KUSE
Size	45
Carriage type	H
Number of carriages per unit	W2
Accuracy class	G3
Preload class	V2
Guideway with Corrotect® coating	RRFT
Guideway length	1540 mm
a_L	50 mm
a_R	20 mm

Ordering designation 1×KUSE45-H-W2-G3-V2-RRFT/1540-50/20, Figure 15

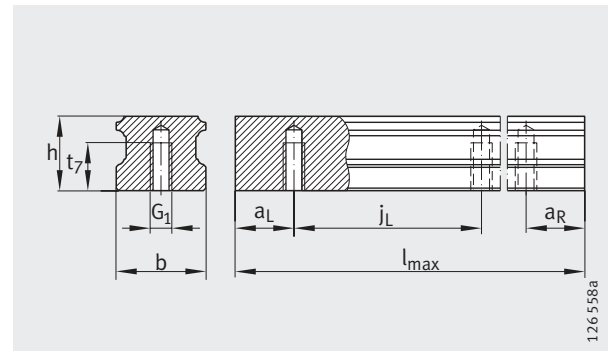
① Locating face

Figure 15
Ordering example,
ordering designation



Six-row linear recirculating ball bearing and guideway assemblies

Standard and L carriages



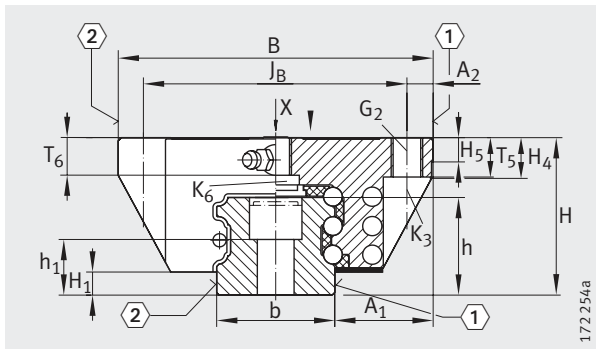
TKSD..-U

Dimension table · Dimensions in mm

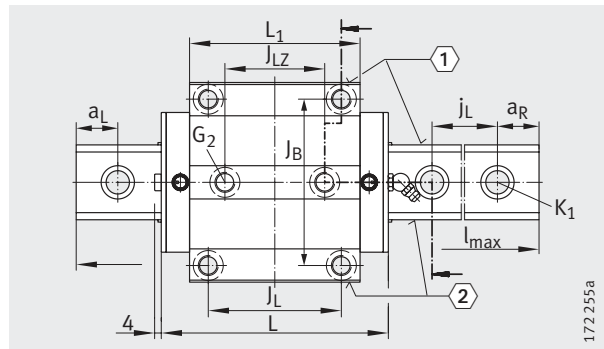
Designation	Dimensions				Mounting dimensions									
	$l_{\max}^{1)}$	H	B	$L^{2)}$	A_1	J_B	b	A_2	L_1	J_L	J_{LZ}	j_L	$a_L, a_R^{3)}$	
							$^{+0,00}_{-0,03}$						min.	max.
KUSE20	1 980	30	63	70,9	21,5	53	20	5	51,9	40	35	60	20	53
KUSE20-L				91,6					72,2					
KUSE25	1 980	36	70	81,8	23,5	57	23	6,5	60,4	45	40	60	20	53
KUSE25-L				104,3					82,9					
KUSE30	2 000	42	90	91,4	31	72	28	9	67	52	44	80	20	71
KUSE30-L				119,1					94,7					
KUSE35	2 960	48	100	107,1	33	82	34	9	77,7	62	52	80	20	71
KUSE35-L				138,1					119,1					
KUSE45	2 940	60	120	136,7	37,5	100	45	10	102,3	80	60	105	20	94
KUSE45-L				172,3					137,9					
KUSE55	2 520	70	140	156,5	43,5	116	53	12	117,1	95	70	120	20	107
KUSE55-L				196,7					157,3					

For further table values, see page 198 and page 199.

- 1) Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 192.
Maximum single-piece guideway length of 6 m available by agreement.
- 2) Minimum covered length for sealing the lubrication connectors N_2 .
- 3) a_L and a_R are dependent on the guideway length.
- 4) For location from above:
the maximum screw depth for two central threaded holes is $T_6 + 3$ mm.
- 5) 1 Locating face
2 Marking

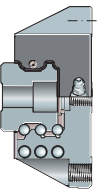


KUSE (-L)
①, ② 5)



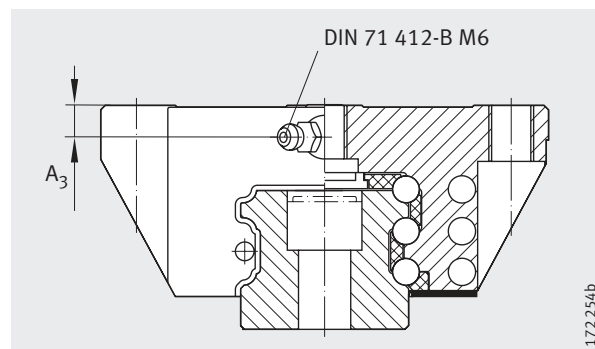
KUSE (-L) · View rotated 90°
①, ② 5)

								Fixing screws															
H ₁	H ₅	H ₄	T ₅	T ₆ ⁴⁾	t ₇	h	h ₁	G ₁		G ₂		K ₁		K ₃		K ₆							
								DIN ISO 4 762-12.9								DIN 7 984-8.8							
									M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm				
4,6	5	10,6	10	7,2	10	18	10	M6	17	M6	10	M5	10	M5	10	M5	5,8						
								M5	10														
5,2	5	9,8	10	9,5	12	21,7	11,7	M6	17	M8	24	M6	17	M6	17	M6	10						
5,4	6	13,2	12	10	15	25	13	M8	41	M10	41	M8	41	M8	41	M8	24						
6,6	6,5	13,3	13	12	15	29,7	17,7	M8	41	M10	41	M8	41	M8	41	M8	24						
8,6	9	17,7	15	15	20	37,2	19,2	M12	140	M12	83	M12	140	M10	83	M10	48						
10,8	11,75	20,1	18	17	22	44	22	M14	220	M14	140	M14	220	M12	140	M12	83						



Six-row linear recirculating ball bearing and guideway assemblies

Standard and L carriages



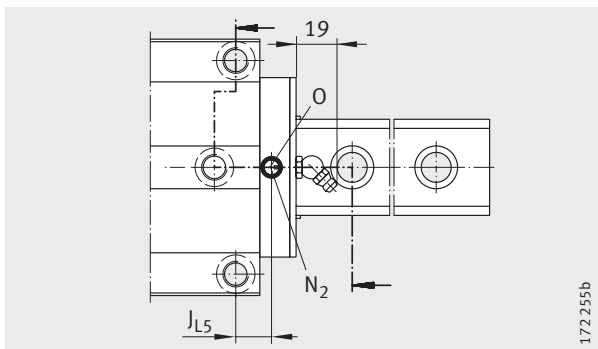
Lubrication connector on end face

Dimension table (continued) · Dimensions in mm

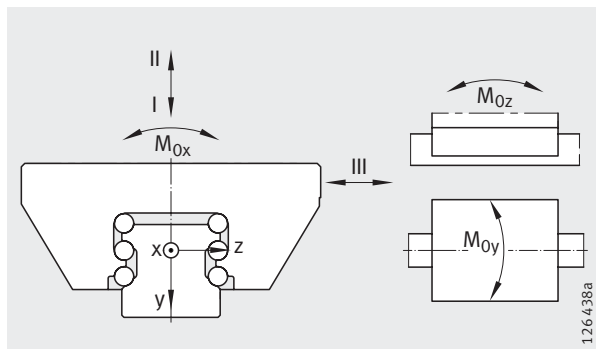
Designation	Carriage		Guideway					Dimensioning of lubrication connectors			
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m	Closing plug	Covering strip		N ₂ ¹⁾ max.	J _{L5} ²⁾	A ₃	O DIN 3 771
						Adhesive bonded	Clip fit				
KUSE20	KWSE20	0,43	TKSD20(-U)	2,3	KA10-TN	ADB13	ADB13-K	3	9,7	5,8	3X1,5
KUSE20-L	KWSE20-L	0,6							19,85		
KUSE25	KWSE25	0,6	TKSD25(-U)	3,1	KA11-TN	ADB13	ADB13-K	3	12,7	6	3X1,5
KUSE25-L	KWSE25-L	0,82							23,95		
KUSE30	KWSE30	1,2	TKSD30(-U)	4,4	KA15-TN	ADB18	ADB18-K	4,5	12,5	6,5	4,5X1,5
KUSE30-L	KWSE30-L	1,6							26,35		
KUSE35	KWSE35	1,5	TKSD35(-U)	6,5	KA15-TN	ADB18	ADB18-K	4,5	11,65	7,2	4,5X1,5
KUSE35-L	KWSE35-L	2,1							27,35		
KUSE45	KWSE45	3,15	TKSD45(-U)	11,3	KA20-TN	ADB23	ADB23-K	6	15,65	8,5	7X1,5
KUSE45-L	KWSE45-L	4,2							33,45		
KUSE55	KWSE55	4,9	TKSD55(-U)	15,7	KA24-TN	ADB27	ADB27-K	6	18,9	10	7X1,5
KUSE55-L	KWSE55-L	6,6							39		

¹⁾ Maximum diameter of lubrication hole in adjacent construction.

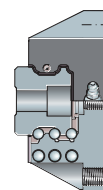
²⁾ Position of lubrication hole in adjacent construction.



Lubrication connector in top face



Load directions



Basic load ratings

Moment ratings

Load direction I Compressive load

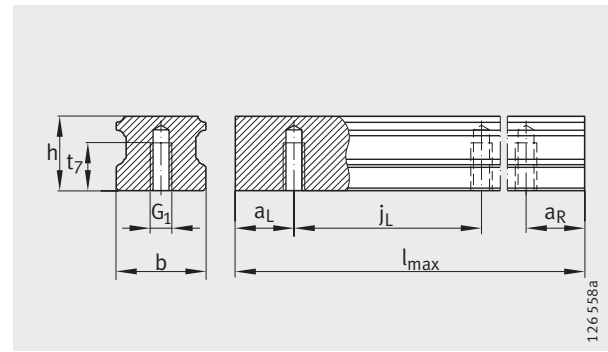
Load direction II Tensile load

Load direction III lateral load

C N	C ₀ N	C N	C ₀ N	C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
22 000	52 000	17 500	33 500	16 300	36 000	358	333	303
28 000	72 000	22 200	46 500	18 900	50 000	494	619	564
28 000	67 000	22 900	43 000	21 300	46 000	535	486	442
35 300	93 700	28 900	59 800	24 700	64 000	736	903	823
40 000	80 000	33 000	60 000	30 500	64 000	896	762	694
51 000	113 000	42 400	84 300	36 500	90 000	1 265	1 478	1 346
55 000	102 000	45 000	79 000	42 000	85 000	1 454	1 173	1 069
70 000	145 000	57 300	112 400	49 500	120 000	2 054	2 275	2 072
80 000	174 000	65 000	117 000	59 000	126 000	2 794	2 237	2 037
98 000	236 000	79 300	159 000	69 000	170 000	3 792	4 011	3 654
102 000	230 000	81 000	147 000	75 000	157 000	4 114	3 141	2 861
125 400	312 000	100 600	199 400	87 000	214 000	5 584	5 633	5 132

Six-row linear recirculating ball bearing and guideway assemblies

H and HL carriages



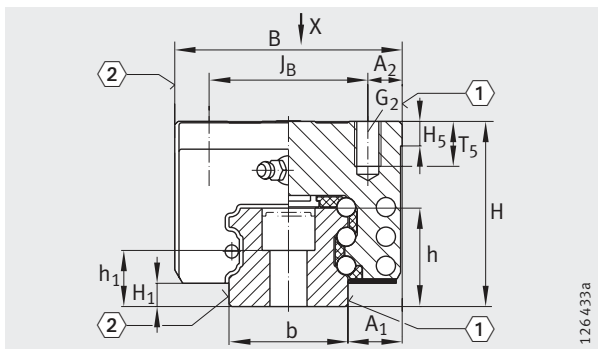
TKSD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions								
	$l_{\max}^{1)}$	H	B	$L^{2)}$	A_1	J_B	b	A_2	L_1	J_L	j_L	$a_L, a_R^{3)}$	
							$-0,005$ $-0,03$					min.	max.
KUSE20-H	1 980	30	44	70,9	12	32	20	6	51,9	36	60	20	53
KUSE20-HL				91,6					72,2	50			
KUSE25-H	1 980	40	48	81,8	12,5	35	23	6,5	60,4	35	60	20	53
KUSE25-HL				104,3					82,9	50			
KUSE30-H	2 000	45	60	91,4	16	40	28	10	67	40	80	20	71
KUSE30-HL				119,1					94,7	60			
KUSE35-H	2 960	55	70	107,1	18	50	34	10	77,7	50	80	20	71
KUSE35-HL				138,1					109,1	72			
KUSE45-H	2 940	70	86	136,7	20,5	60	45	13	102,3	60	105	20	94
KUSE45-HL				172,3					137,9	80			
KUSE55-H	2 520	80	100	156,5	23,5	75	53	12,5	117,1	75	120	20	107
KUSE55-HL				196,7					157,3	95			

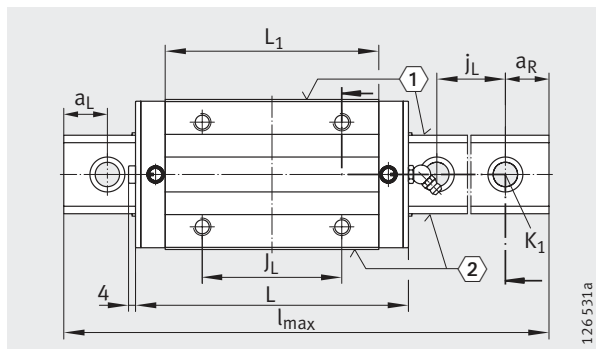
For further table values, see page 202 and page 203.

- 1) Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 192.
Maximum single-piece guideway length of 6 m available by agreement.
- 2) Minimum covered length for sealing the lubrication connectors N_2 .
- 3) a_L and a_R are dependent on the guideway length.
- 4) ① Locating face
② Marking



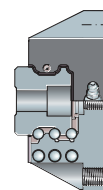
KUSE...-H (-HL)
①, ② ④

126 433a



KUSE-H (-HL) · View rotated 90°
①, ② ④

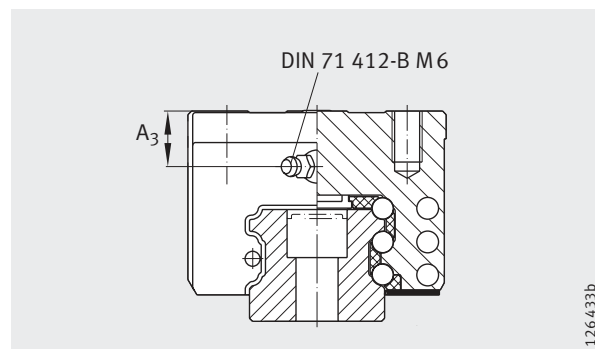
126 531a



							Fixing screws					
H ₁	H ₅	A ₃	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁	
							DIN ISO 4 762-12.9					
								M _A Nm		M _A Nm		M _A Nm
4,6	5	5,8	6	10	18	10	M6	17	M5	10	M5	10
			6,25									
5,2	5	10	10	12	21,7	11,7	M6	17	M6	17	M6	17
5,4	6	9,5	11	15	25	13	M8	41	M8	41	M8	41
6,6	6,5	14,2	14	15	29,7	17,7	M8	41	M8	41	M8	41
8,6	9	18,5	17	20	37,2	19,2	M12	140	M10	83	M12	140
10,8	11,75	20	19	22	44	22	M14	220	M12	140	M14	220

Six-row linear recirculating ball bearing and guideway assemblies

H and HL carriages



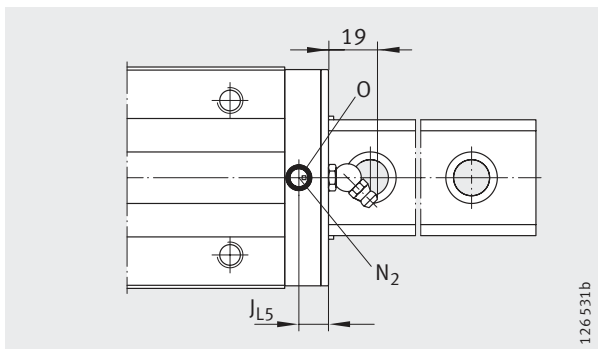
Lubrication connector on end face

Dimension table (continued) · Dimensions in mm

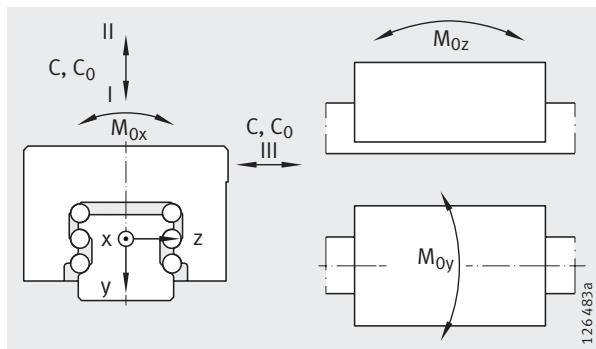
Designation	Carriage		Guideway					Dimensioning of lubrication connectors			
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m	Closing plug	Covering strip		N ₂ ¹⁾ max.	J _{L5} ²⁾	A ₃	O DIN 3 771
						Adhesive bonded	Clip fit				
KUSE20-H	KWSE20-H	0,32	TKSD20(-U)	2,3	KA10-TN	ADB13	ADB13-K	3	11,7	5,8	3X1,5
KUSE20-HL	KWSE20-HL	0,44							14,85		
KUSE25-H	KWSE25-H	0,5	TKSD25(-U)	3,1	KA11-TN	ADB13	ADB13-K		17,2	10	3X1,5
KUSE25-HL	KWSE25-HL	0,7		3,15					21,45		
KUSE30-H	KWSE30-H	0,9	TKSD30(-U)	4,4	KA15-TN	ADB18	ADB18-K	4,5	18,5	9,5	4,5X1,5
KUSE30-HL	KWSE30-HL	1,2							22,35		
KUSE35-H	KWSE35-H	1,3	TKSD35(-U)	6,5	KA15-TN	ADB18	ADB18-K	4,5	17,65	14,2	4,5X1,5
KUSE35-HL	KWSE35-HL	1,8							22,35		
KUSE45-H	KWSE45-H	2,75	TKSD45(-U)	11,3	KA20-TN	ADB23	ADB23-K	6	25,65	18,5	7X1,5
KUSE45-HL	KWSE45-HL	3,7							33,45		
KUSE55-H	KWSE55-H	4,5	TKSD55(-U)	15,7	KA24-TN	ADB27	ADB27-K	6	28,9	20	7X1,5
KUSE55-HL	KWSE55-HL	5,9							39		

¹⁾ Maximum diameter of lubrication hole in adjacent construction.

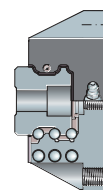
²⁾ Position of lubrication hole in adjacent construction.



Lubrication connector in top face



Load directions



Basic load ratings

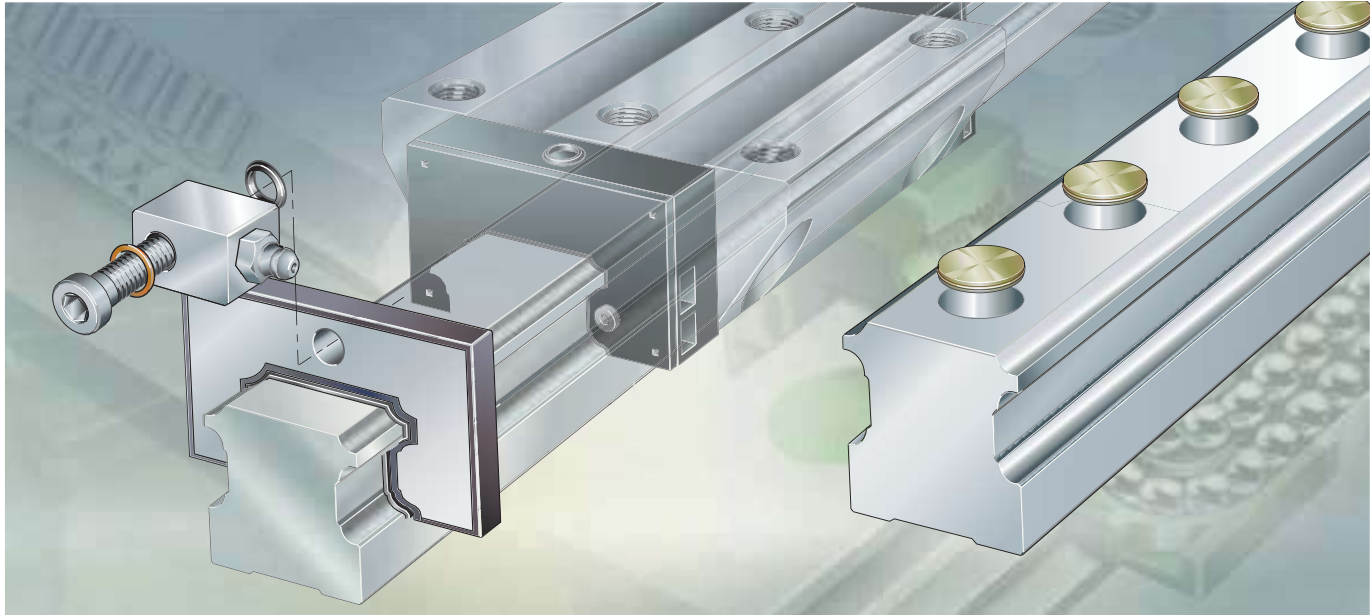
Moment ratings

Load direction I Compressive load

Load direction II Tensile load

Load direction III lateral load

C N	C ₀ N	C N	C ₀ N	C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
22 000	52 000	17 500	33 500	16 300	36 000	358	333	303
28 000	72 000	22 200	46 500	18 900	50 000	494	619	564
28 000	67 000	22 900	43 000	21 300	46 000	535	486	442
35 300	93 700	28 900	59 800	24 700	64 000	736	903	823
40 000	80 000	33 000	60 000	30 500	64 000	896	762	694
51 000	113 000	42 400	84 300	36 500	90 000	1 265	1 478	1 346
55 000	102 000	45 000	79 000	42 000	85 000	1 454	1 173	1 069
70 000	145 000	57 300	112 400	49 500	120 000	2 054	2 275	2 072
80 000	174 000	65 000	117 000	59 000	126 000	2 794	2 237	2 037
98 000	236 000	79 300	159 000	69 000	170 000	3 792	4 011	3 654
102 000	230 000	81 000	147 000	75 000	157 000	4 114	3 141	2 861
125 400	312 000	100 600	199 400	87 000	214 000	5 584	5 633	5 132



Accessories

Closing plugs
Guideway covering strips
Rolling-in device for covering strip
Braking and clamping element
Sealing and lubrication elements

Product overview Accessories

Brass closing plug

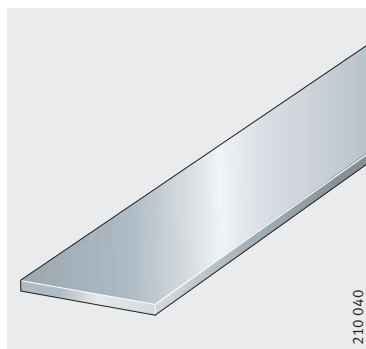
KA..-M



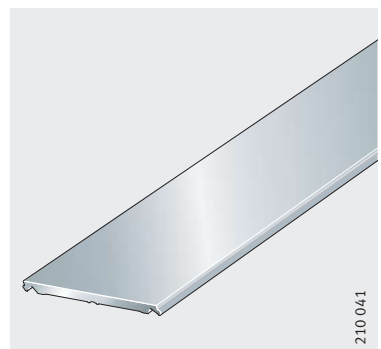
Guideway covering strips

Adhesive bonded
Clip fit

ADB



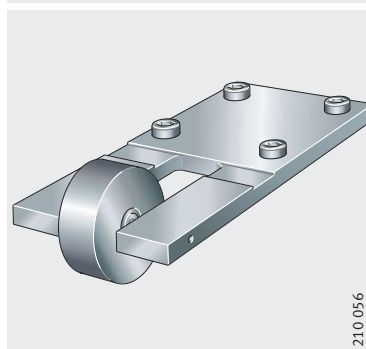
ADB..-K



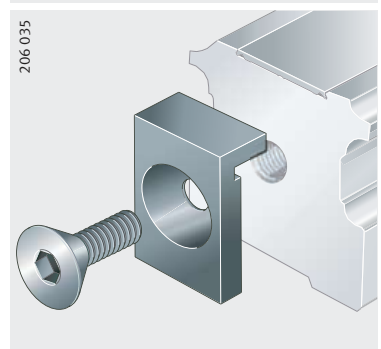
Rolling-in device and retaining plate

For covering strips

ERVS

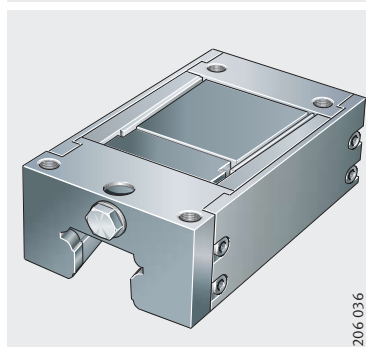


HPL.ADB



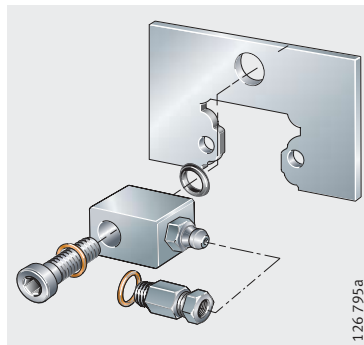
Braking and clamping element

BKE.TKSD



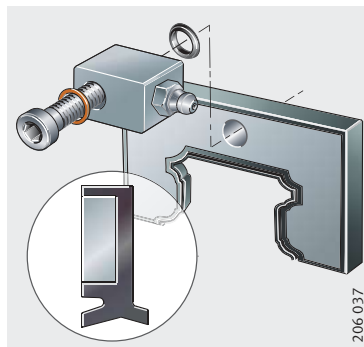
Sheet steel wipers

APLSE

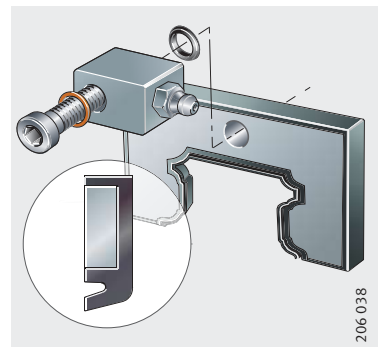


End wipers With double lip seal With single lip seal

ABE-P2

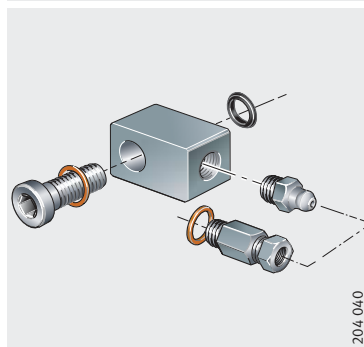


ABE



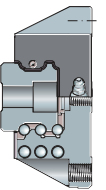
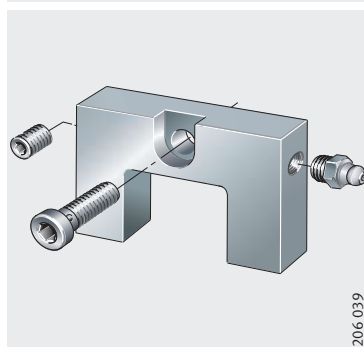
Lubrication adapters For oil and grease lubrication

SMAD.KOE, SMAD.KFE



Lubrication adapter plate

BPLSE



Accessories

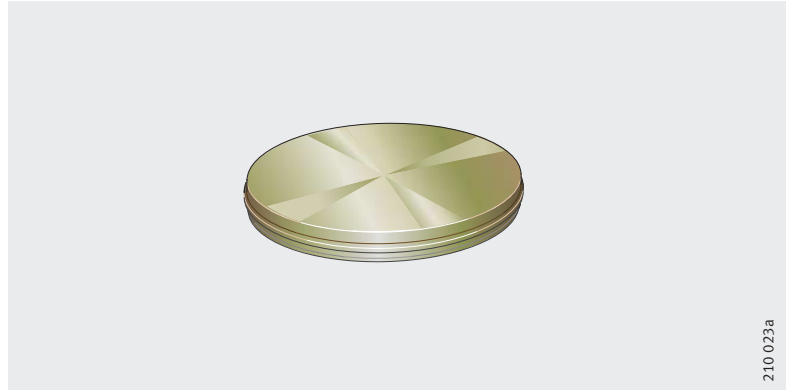
Brass closing plugs

Closing plugs are used to close off the counterbores for the fixing screws in the guideways. As a result, the surface of the guideway is completely flush.

Closing plugs KA..-M are particularly suitable for conditions involving hot swarf, aggressive media, vibrations and in machine tools, *Figure 1*.

KA..-M

Figure 1
Brass closing plug



Guideway covering strips

Covering strips are an alternative to closing plugs. They completely cover the counterbores for the fixing holes in the guideways and close these off flush with the guideway surface.

Adhesive bonded or clip fit

Attention!

Covering strips are available in two designs. The covering strip ADB is adhesive bonded in the slot in the guideway, the covering strip ADB-K is clipped into the slot, *Figure 2*.

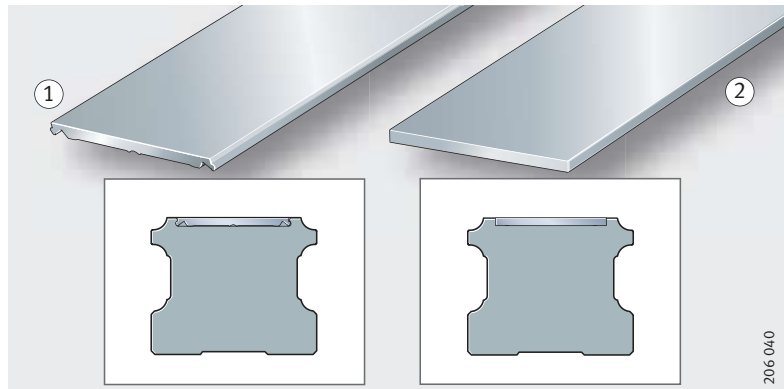
The clip fit covering strip must be fitted using the rolling-in device ERVS, see page 210.

For fitting of covering strips see page 77 to page 79.

Where applications using the covering strip are planned, please contact us.

- ADB-K
ADB
- ① Clip fit
② Adhesive bonded

Figure 2
Guideway covering strip

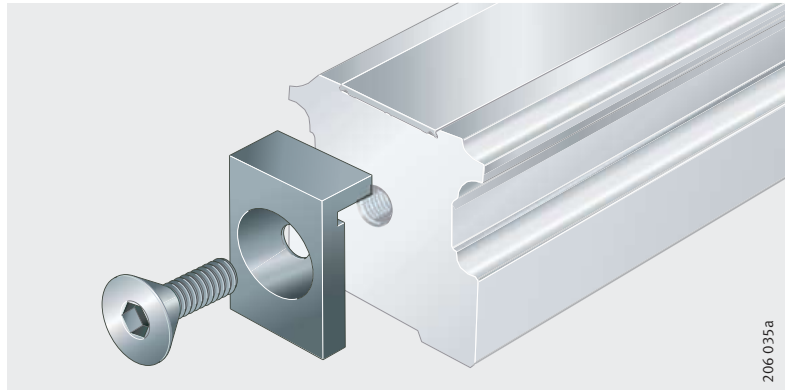


Retaining plate

The retaining plate HPL.ADB fixes the covering strip ADB-K to the end of the guideway, *Figure 3*. It is included in the delivery.

HPL.ADB

Figure 3
Retaining plate for covering strip



Accessories

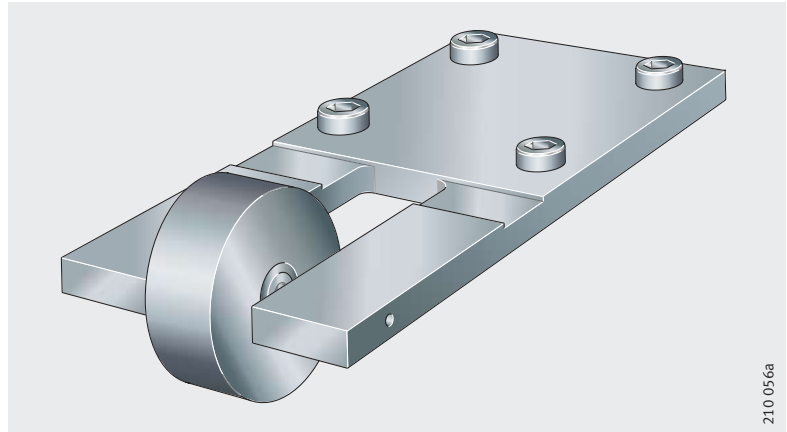
Rolling-in device

The clip fit covering strip ADB..-K is fitted using the fitting device ERVS so that it is securely fixed in the guideway, *Figure 4*. The rolling-in device must be ordered separately. When ordering, the size of the linear recirculating ball bearing and guideway assembly must be stated; see Ordering example.

ERVS

Figure 4

Rolling-in device for covering strip



**Ordering example,
ordering designation**
Ordering designation

Rolling-in device for covering strip ADB18-K for KUSE35.

1×**ERVS35**

Braking and clamping element

The braking and clamping element BKE.TKSD is used, for example, as a positionally independent safety system for linear drives where the drive cannot fully provide the braking and clamping function, *Figure 5*.

The compact construction and the arrangement of the elements saves space and no special devices are required.

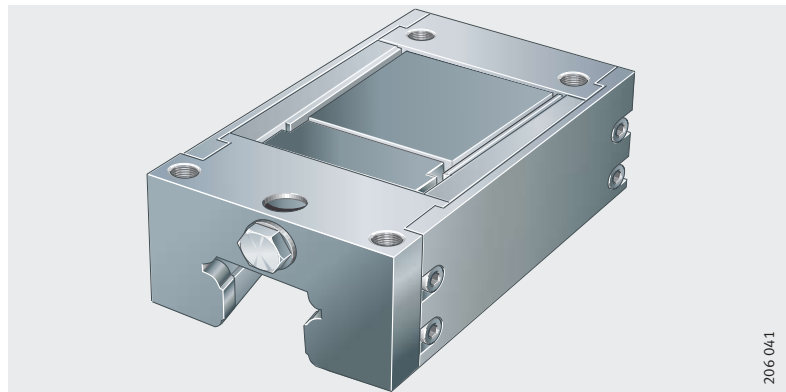
If particularly high braking forces are required, several braking and clamping elements can be fitted.

The system automatically compensates any clearance occurring up to the wear limit of the brake shoes, see Automatic clearance compensation, page 213. The elements are thus maintenance-free.

BKE.TKSD

Figure 5

Braking and clamping element



Mechanical braking and clamping forces

The elements operate by purely mechanical means, they therefore function even if a power failure occurs and are reliable in any mounting position; for a description of their function, see page 212. This eliminates safety problems resulting from power failure – a possibility with electronically braked systems.

The system carries out braking only when no pressure is present. This allows safety-focussed control even in emergencies.

The hydraulic brake opens under a pressure of approx. 55 bar.

If appropriate control is provided, even vertical axes can be rapidly braked to a stationary position. In a suspended arrangement, however, the entire guidance unit should be secured by a drop guard, for an example see page 67.

When the brake is locked, an axial clearance of up to 0,25 mm can occur. This must be noted if the elements are used for locating.

Accessories

Short reaction time

The clearance-free adjustment of the brake shoes ensures a short, consistent reaction time (in size 35 for example <30 m/s).

In order to ensure the shortest reaction times, the Schaeffler Group has worked with a manufacturer of fluid power devices to develop a hydraulic unit with a special valve. The unit can be purchased directly from the manufacturer.

Attention!

Braking and clamping elements are one part of the emergency braking system. Their reliable operation also depends on the hydraulic components and the control system.

If the system is activated frequently, contact us.

Function

Three disc spring columns generate the braking and clamping force, *Figure 6*. Thanks to this mechanical spring energy store, the system operates extremely reliably without external energy.

The force is transmitted to the brake shoes by mechanical means. If the braking or clamping function is activated, the spring columns push a wedge-shaped slider between the upper legs of the H-shaped saddle plate. This presses the upper legs outwards and the lower ones inwards. The brake shoes clamp against the guideway, but not on the raceways.

- ① Disc spring columns
- ② Wedge-shaped slider
- ③ H-shaped saddle plate
- ④ Brake shoes
- ⑤ Guideway

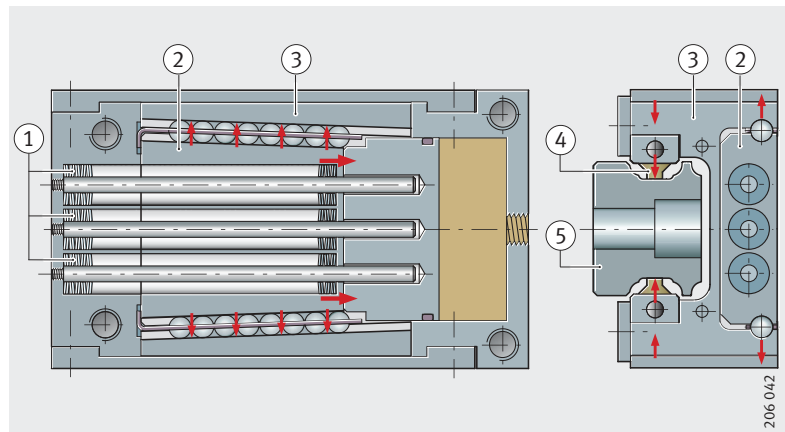


Figure 6

Functional components

Automatic clearance compensation

Wear of brake shoes

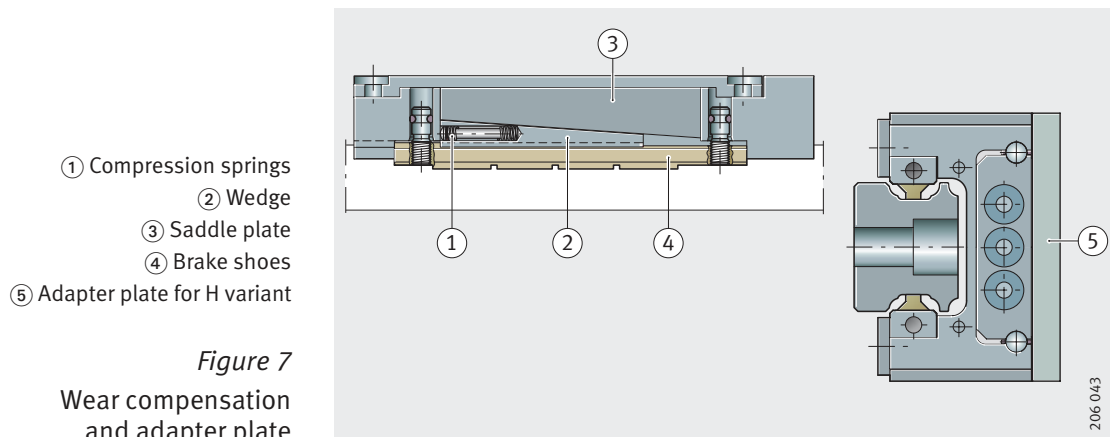
As the system clamps not only stationary guidance systems, but also moving ones, the brake shoes are subject to wear resulting from abrasion. However, clearance between the brake shoes and brake contact surfaces increases the system reaction time.

Wear compensation

In order to ensure consistent clearance-free contact of the brake shoes against the contact surfaces, wear of the linings is automatically compensated by mechanical means up to the wear limit. Compression springs slide a wedge between the brake shoes and the saddle plate, *Figure 7*. This ensures that the element always operates without clearance. The wear compensation mechanism is designed such that, in the opened condition, the brake shoes are adjacent to but not in contact with the guideway surface. This ensures that there is no wear or displacement resistance during movement of the guidance system.

Adapter plate

For the H variant of the carriages, an adapter plate is necessary, *Figure 7*. The adapter plate is included in the delivery.



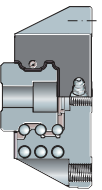
Easy to fit

Braking and clamping elements are particularly easy to fit. They are simply slid onto the guideway and screw mounted to the adjacent construction.

Attention!

Due to the automatic wear compensation system, braking and clamping elements must be slid directly from the dummy guideway onto the guideway.

The element must never be separated from the guideway without using a dummy guideway and the dummy guideway must never be removed from the element.



Accessories

Suitable for ...

The elements give high braking and clamping forces but have only a very small design envelope. Their dimensions are matched to the INA standard and H carriages, can be used for the KUSE guideways and can be easily integrated in existing applications based on INA linear guidance systems. The dimension table for the braking and clamping element is on page 220.

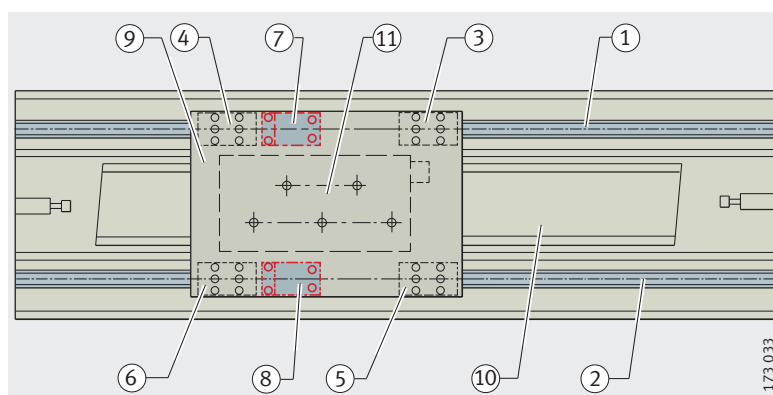
The compact construction and the arrangement of the elements directly on the guideway saves space and thus allows complete constructions with a reduced number of components.

They can also be used in applications without recirculating ball systems. In this case, the guideway is used only as a braking or clamping rail.

A typical arrangement as an emergency brake in an application with a linear motor is shown in *Figure 8*.

- ①, ② Guideways
- ③, ④, ⑤, ⑥ Carriages
- ⑦, ⑧ Emergency brakes
- ⑨ Table
- ⑩ Motor primary part
- ⑪ Motor secondary part

Figure 8
Typical application



Delivered condition

The elements are premounted on a separate rail and clamped in place by means of a fitting screw. The screw is used to loosen and then move the fixed element. The fitting screw is later replaced by the hydraulic connector.

Ordering example, ordering designation

Ordering designation

One braking and clamping element for KUSE35 with hydraulic connector on the end face.

1×**BKE.TKSD35**

Sheet steel wipers

Sheet steel wipers APLSE are screw mounted to the end faces of the carriage, *Figure 9*.

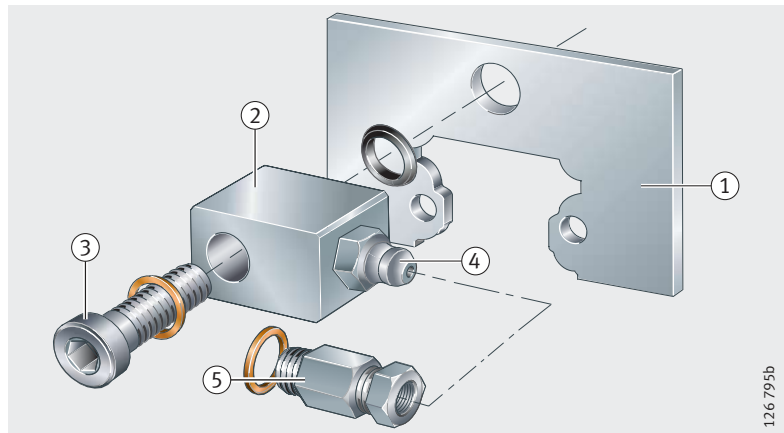
They protect the seal lips of the standard wipers against coarse contaminants and hot swarf. There is a narrow gap between the guideway and the wiper.

APLSE

- ① Sheet steel wiper
- ② Lubrication adapter
- ③ Fixing screw
- ④ Lubrication nipple
- ⑤ Central lubrication connector

Figure 9

Sheet steel wiper



Complete fitting set

The wipers are supplied with the lubrication adapter SMAD.KFE and the fixing screw. The lubrication adapter can be replaced by the lubrication adapter SMAD.KOE; lubrication adapters: see page 218.

Instead of the lubrication nipple, the adapter can be fitted with a central lubrication connector – with a thread DIN 13 M8×1.

Ordering example, ordering designation

Ordering designation

Two sheet steel wipers for a KUSE25 are required.

2×**APLSE25-FE**

Accessories

End wipers

The end wipers are available with double and single lip seals; single lip seals: see page 217. They are screw mounted to the end faces of the carriage and protect the components behind them as well as the rolling element system, *Figure 10* and *Figure 11*. It is thus possible in many cases to dispense with costly sealing measures on the adjacent construction.

The seal carrier is an aluminium plate. The seal material is wear-resistant NBR plastic (nitrile rubber). In the single lip design, a seal lip variant with FPM (fluoro rubber) is also possible, see page 217.

Wipers with double lip seals

These wipers are particularly suitable for applications involving a high level of contamination and extend the operating life of the guidance system compared with the standard version even in heavily contaminated environments.

They are suitable for fine dusts and most cooling lubricants. Furthermore, they can also be used for the design of maintenance-free bearing arrangements even in contaminated environments, since the double lip concept minimises the loss of lubricant.

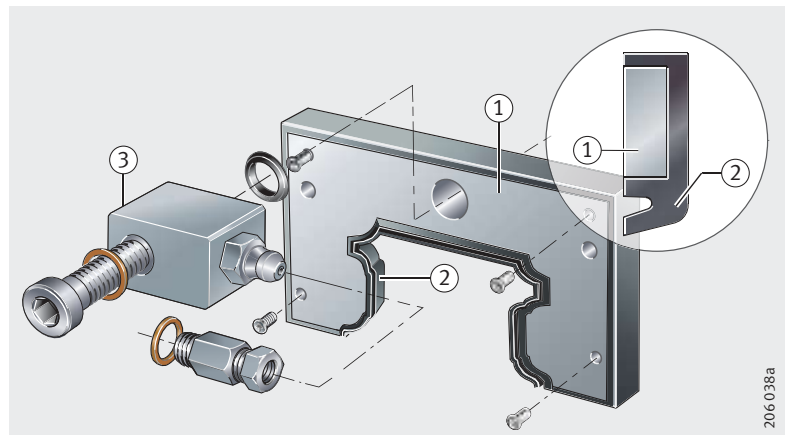
With lubrication adapter

A lubrication adapter for grease (SMAD.KFE) or oil (SMAD.KOE) is supplied in accordance with the ordering data.

- ① End wiper
- ② Double lip seal ABE...-P2-NBR
- ③ Lubrication adapter

Figure 10

End wiper with double lip seal



Ordering example, ordering designation

Ordering designation

Two end wipers with double lip seals for a KUSE35 with a central lubrication connector for oil.

2×ABE.KWSE35-P2-NBR-OE

Wipers with single lip seals

These wipers are available with the seal materials NBR for fine dust and most cooling lubricants and with FPM for particularly aggressive cooling lubricants or alkalis, *Figure 11*.

They are suitable for applications involving a high level of contamination and extend the operating life of the guidance system compared with the standard version even in contaminated environments.

The wipers are available from size KUSE25.

With lubrication adapter

A lubrication adapter for grease (SMAD.KFE) or Öl (SMAD.KOE) is supplied in accordance with the ordering data.

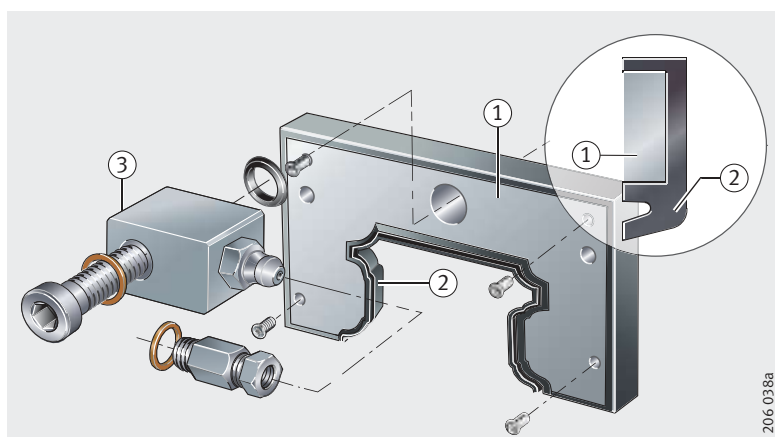
Attention!

If wipers are to be retrofitted, please contact us first.

- ① End wiper
- ② Single lip seal ABE...-NBR or ABE...-FPM
- ③ Lubrication adapter

Figure 11

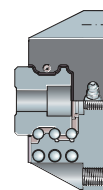
End wiper with single lip seal



Ordering example, ordering designation Ordering designation

Two end wipers with NBR single lip seals for a KUSE35 with a lubrication nipple for grease.

2×ABE.KWSE35-NBR-FE



Accessories

Lubrication adapters

Lubrication adapters SMAD.KFE or SMAD.KOE are available for grease or oil lubrication, see table. They are screwed into the end piece of the carriage instead of the lubrication nipple NIP-KG-M6, *Figure 12*.

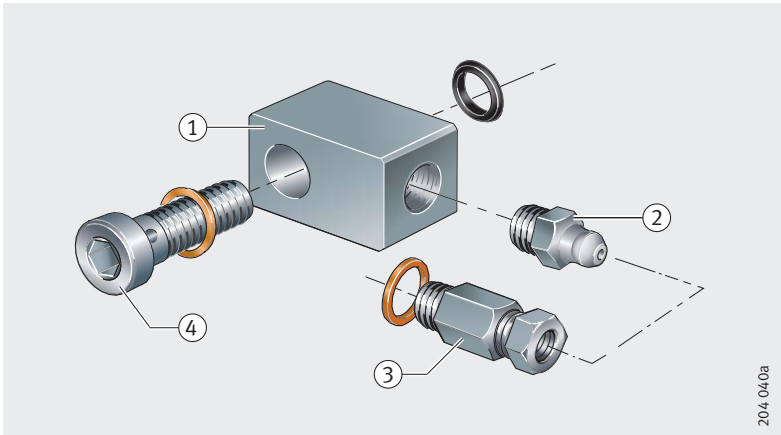
- SMAD.KFE
SMAD.KOE
- ① Adapter

② Lubrication nipple

③ Central lubrication connector

④ Fixing screw

Figure 12
Lubrication adapter



Design of the adapter

Design of the adapter

The design depends on the lubrication method, see table.

Adapter Designation	Lubrication method	Design of the adapter
SMAD.KFE	Grease lubrication	With lubrication nipple
SMAD.KOE	Oil lubrication	With central lubrication connector

Fitting

Attention!

The maximum tightening torque M_A for the fixing screw is 1,5 Nm. Lubrication adapters must not be subjected to moment loads.

Ordering example, ordering designation

Ordering designation

One lubrication adapter for a KU5E20 for oil lubrication.

1×SMAD.KW5E20-OE

Lubrication adapter plate

Lubrication adapter plates BPLSE are screw mounted to the end piece of the carriage. They move the lubrication connector to the outer side of the carriage.

The adapter plates each comprise an aluminium body, a screw plug, a fixing screw with a sealing ring, a lubrication nipple to DIN 71 412-A M8×1 or a central lubrication connector with a sealing ring and thread to DIN 13 M8×1.

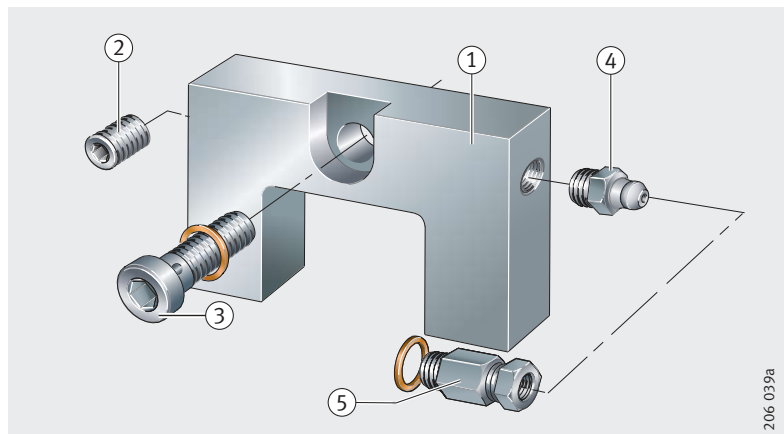
Attention!

The unused hole in the adapter plate must be closed off using the screw plug.

In the case of all narrow carriages (-H and -HL) the lubrication nipple protrudes laterally 9 mm from the carriage.

- BPLSE**
- ① Aluminium body
 - ② Screw plug
 - ③ Fixing screw with sealing ring
 - ④ Lubrication nipple
 - ⑤ Central lubrication connector

Figure 13
Lubrication adapter plate

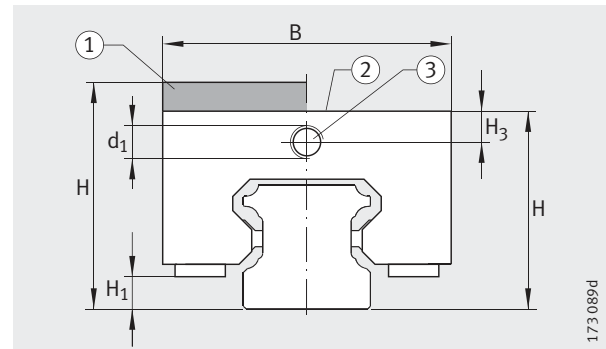


**Ordering example,
ordering designation**
Ordering designation

A lubrication adapter plate for a KUSE35 with a central lubrication connector is required.

1×**BPLSE35-OE**

Braking and clamping element



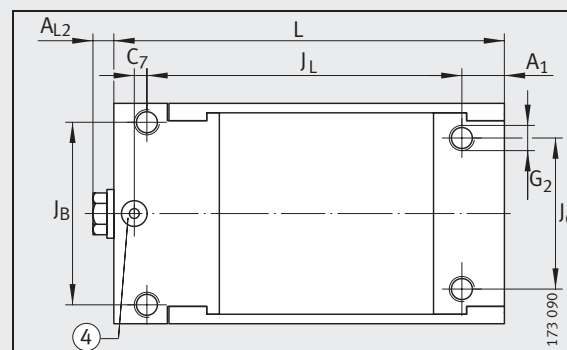
BKE.TKSD
①, ②, ③ ²⁾

Dimension table · Dimensions in mm

Designation	Clamp- ing force kN	Dimensions													
		H		B	L	J _B	J _C	A ₁	J _L	C ₇	H ₁	H ₃	A _{L2}	d ₁	G ₂
		Without adapter plate	With adapter plate												
BKE.TKSD25	1	36	—	47	91	38	34	10	75	—	6,5	6	5	M6X1	M6
BKE.TKSD25-O		—	—							0					
BKE.TKSD25-H		—	40							—					
BKE.TKSD25-H-SO		—	—							0					
BKE.TKSD35	2,8	48	—	69	120	58	48	13,5	100	—	7,9	8,1	5	M8X1	M8
BKE.TKSD35-O		—	—							0					
BKE.TKSD35-H		—	55							—					
BKE.TKSD35-H-SO		—	—							0					
BKE.TKSD45	4,3	60	—	85	141	70	60	15	113	—	13	10	5	M8X1	M10
BKE.TKSD45-O		—	—							5					
BKE.TKSD45-H		—	70							—					
BKE.TKSD45-H-SO		—	—							5					
BKE.TKSD55	5,1	70	—	99	170	80	72	18	138	—	17,3	11,75	6	M10X1	M12
BKE.TKSD55-O		—	—							6					
BKE.TKSD55-H		—	80							—					
BKE.TKSD55-H-SO		—	—							6					

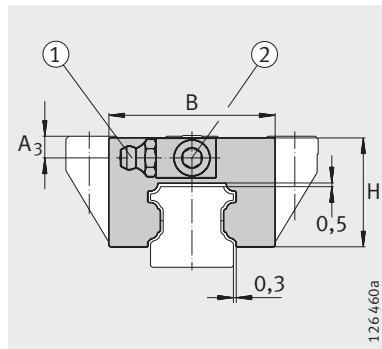
¹⁾ The maximum diameter of the oil feed hole is 6 mm.

- ²⁾ ① With adapter plate
 ② Without adapter plate
 ③ Hydraulic connector
 ④ Hydraulic connector in top face (suffix O, SO)¹⁾

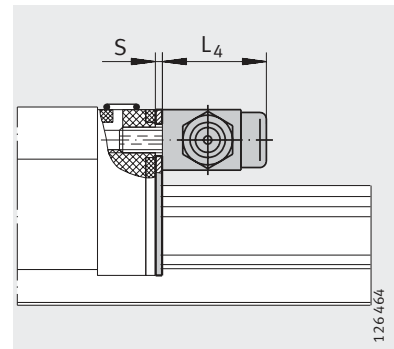


Top view¹⁾
 ④ ²⁾

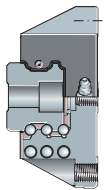
Sheet steel wipers



APLSE
①, ②²⁾



APLSE



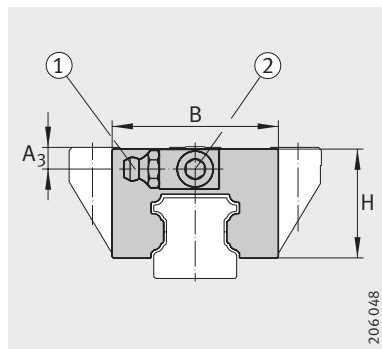
Dimension table · Dimensions in mm								
Designation ¹⁾		Mass m ≈g	Dimensions					Suitable for linear recirculating ball bearing and guideway assembly
With grease lubrication	With oil lubrication		B	H	S	A ₃	L ₄	
APLSE20-FE	APLSE20-OE	26	42,8	24,9	0,8	5,8	19,5	KUSE20 (-L) KUSE20-H (-HL)
APLSE25-FE	APLSE25-OE	27	46	29,8	0,8	6 10	19,5	KUSE25 (-L) KUSE25-H (-HL)
APLSE30-FE	APLSE30-OE	31	58	35,8	0,8	6,5 9,5	19,5	KUSE30 (-L) KUSE30-H (-HL)
APLSE35-FE	APLSE35-OE	34	68	40,7	0,8	7,2 14,2	19,5	KUSE35 (-L) KUSE35-H (-HL)
APLSE45-FE	APLSE45-OE	40	84	50,7	0,8	8,5 18,5	19,5	KUSE40 (-L) KUSE40-H (-HL)
APLSE55-FE	APLSE55-OE	46	96,4	58,5	0,8	10 20	19,5	KUSE45 (-L) KUSE45-H (-HL)

Attention!

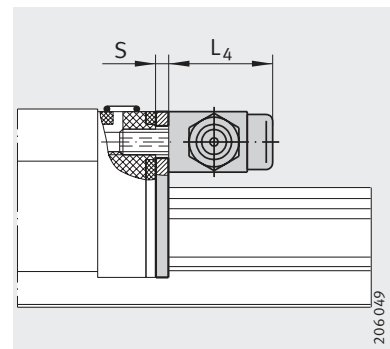
During fitting, it must be ensured that there is a uniform gap between the guideway and the wiper.

- 1) APLSE...-FE has a lubrication nipple.
APLSE...-OE has an oil connector (similar to DIN 3871-A).
- 2) ① Lubrication nipple
② Maximum tightening torque M_A of fixing screw = 1,5 Nm

Wipers



ABE.KWSE
①, ②²⁾



ABE.KWSE

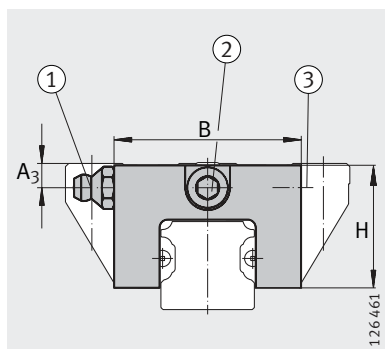
Dimension table · Dimensions in mm

Designation ¹⁾		Mass m ≈ g	Dimensions					Suitable for linear recirculating ball bearing and guideway assembly
With grease lubrication	With oil lubrication		B	H	S	A ₃	L ₄	
ABE.KWSE20-FE-NBR	ABE.KWSE20-OE-NBR	39	42,8	24,3	4,5	5,8	19,5	KUSE20 (-L)
ABE.KWSE20-FE-FPM	ABE.KWSE20-OE-FPM					5,8		KUSE20-H (-HL)
ABE.KWSE25-FE-NBR	ABE.KWSE25-OE-NBR	41	46	29,5	4,5	6	19,5	KUSE25 (-L)
ABE.KWSE25-FE-FPM	ABE.KWSE25-OE-FPM					10		KUSE25-H (-HL)
ABE.KWSE30-FE-NBR	ABE.KWSE30-OE-NBR	42	57,4	35,7	4,5	6,5	19,5	KUSE30 (-L)
ABE.KWSE30-FE-FPM	ABE.KWSE30-OE-FPM					9,5		KUSE30-H (-HL)
ABE.KWSE35-FE-NBR	ABE.KWSE35-OE-NBR	46	67,4	40,5	4,9	7,2	19,5	KUSE35 (-L)
ABE.KWSE35-FE-FPM	ABE.KWSE35-OE-FPM					14,2		KUSE35-H (-HL)
ABE.KWSE45-FE-NBR	ABE.KWSE45-OE-NBR	60	83,4	50,1	5,5	8,5	19,5	KUSE45 (-L)
ABE.KWSE45-FE-FPM	ABE.KWSE45-OE-FPM					18,5		KUSE45-H (-HL)
ABE.KWSE55-FE-NBR	ABE.KWSE55-OE-NBR	72	95,8	57,9	5,5	10	19,5	KUSE55 (-L)
ABE.KWSE55-FE-FPM	ABE.KWSE55-OE-FPM					20		KUSE55-H (-HL)

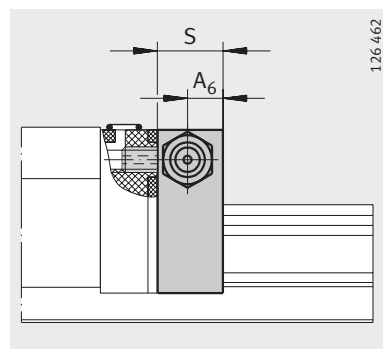
¹⁾ ABE.KWSE...FE has a lubrication nipple.
ABE.KWSE...OE has an oil connector (similar to DIN 3871-A).

²⁾ ① Lubrication nipple
② Maximum tightening torque M_A of fixing screw = 1,5 Nm

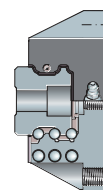
Lubrication adapter plate



BPLSE
①, ②, ③ ²⁾



BPLSE

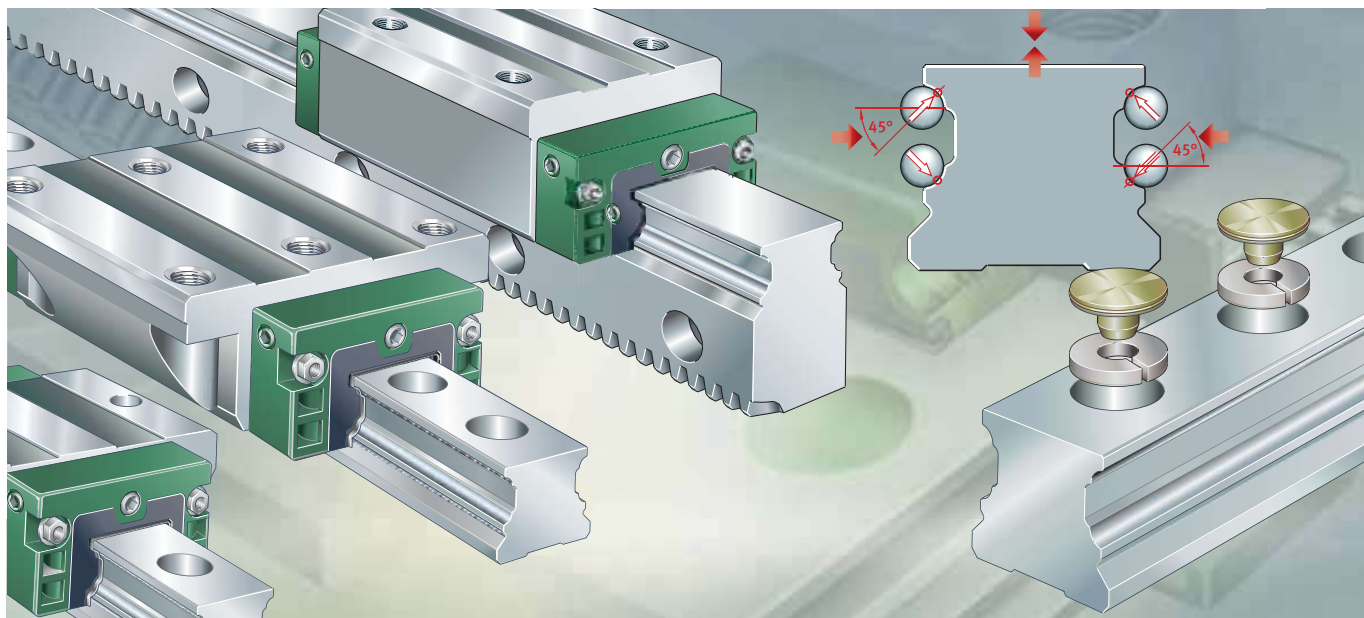


Dimension table · Dimensions in mm								
Designation ¹⁾		Mass m ≈g	Dimensions					Suitable for linear recirculating ball bearing and guideway assembly
With grease lubrication	With oil lubrication		B	H	S	A ₆	A ₃	
BPLSE20-FE	BPLSE20-OE	29	42,8	24,9	12	6,5	5,8	KUSE20 (-L) KUSE20-H (-HL)
							6	KUSE25 (-L)
BPLSE25-FE	BPLSE25-OE	35	46	30,1	12	6,5	10	KUSE25-H (-HL)
							6,5	KUSE30 (-L)
BPLSE30-FE	BPLSE30-OE	52	58	35,8	12	6,5	9,5	KUSE30-H (-HL)
							7,2	KUSE35 (-L)
BPLSE35-FE	BPLSE35-OE	67	68	40,7	12	6,5	14,2	KUSE35-H (-HL)
							8,5	KUSE40 (-L)
BPLSE45-FE	BPLSE45-OE	98	84	50,7	12	6,5	18,5	KUSE40-H (-HL)
							10	KUSE45 (-L)
BPLSE55-FE	BPLSE55-OE	128	96,4	58,5	12	6,5	20	KUSE45-H (-HL)

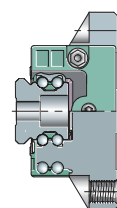
Attention!

In the case of series KUSE..-H (-HL) the lubrication nipple or oil connector protrudes laterally approx. 9 mm from the carriage. The lubrication nipple and screw plug can be interchanged.

- ¹⁾ BPLSE...-FE has a lubrication nipple.
BPLSE...-OE has an oil connector (similar to DIN 3871-A).
- ²⁾ ① Lubrication nipple
② Maximum tightening torque M_A of fixing screw = 1,5 Nm
③ Screw plug M8×1



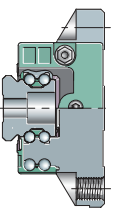
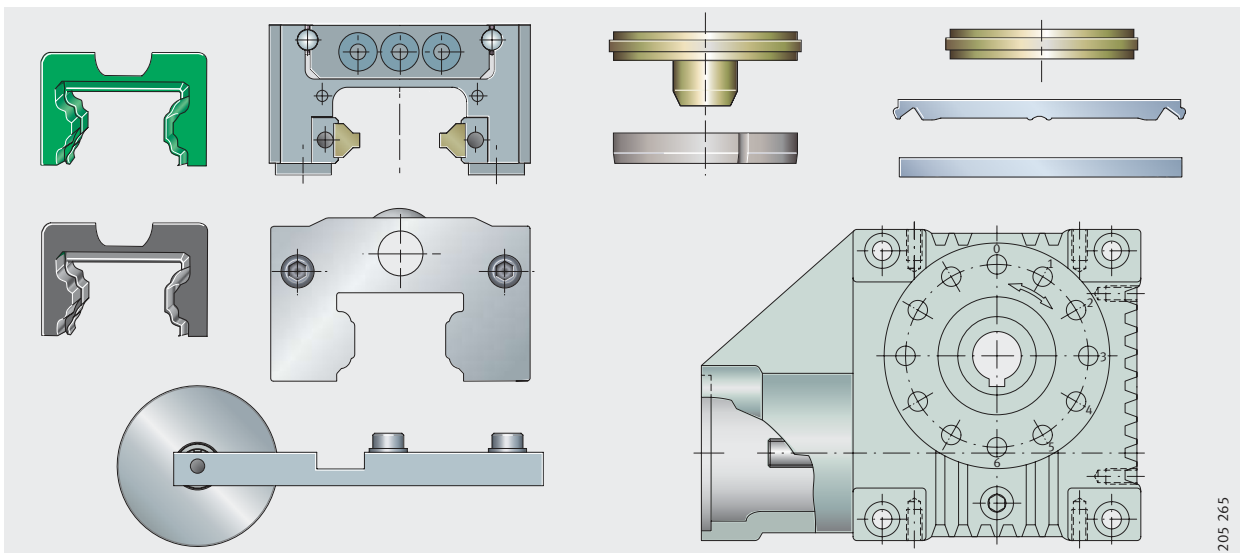
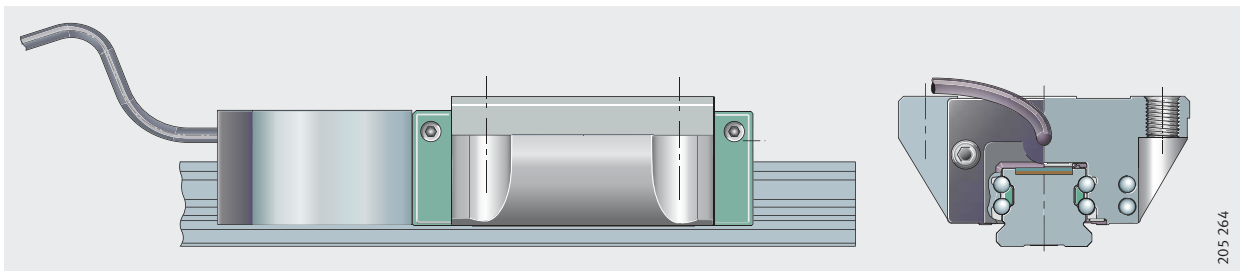
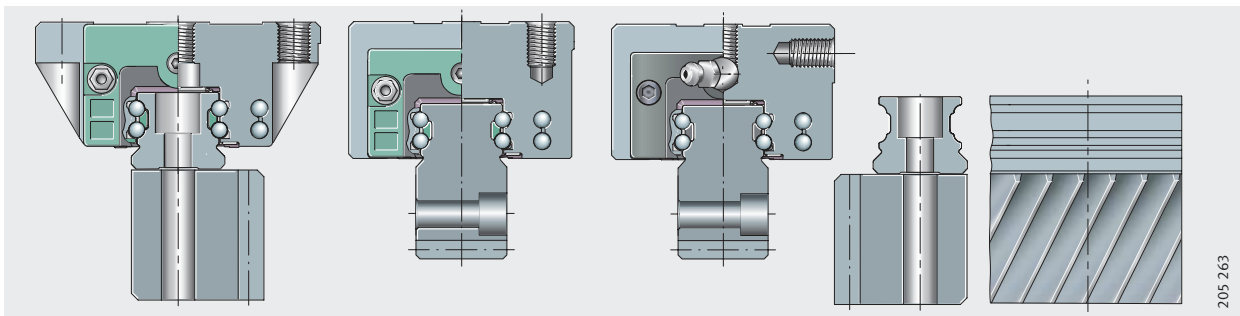
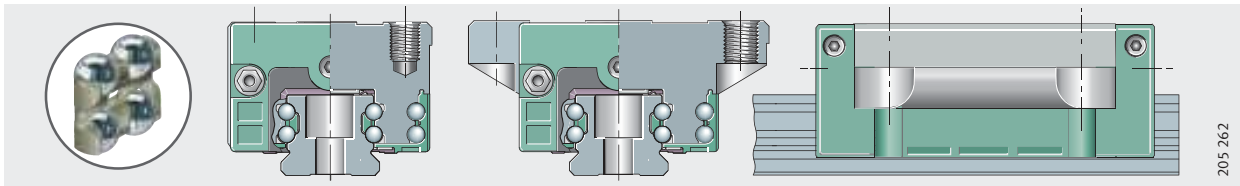
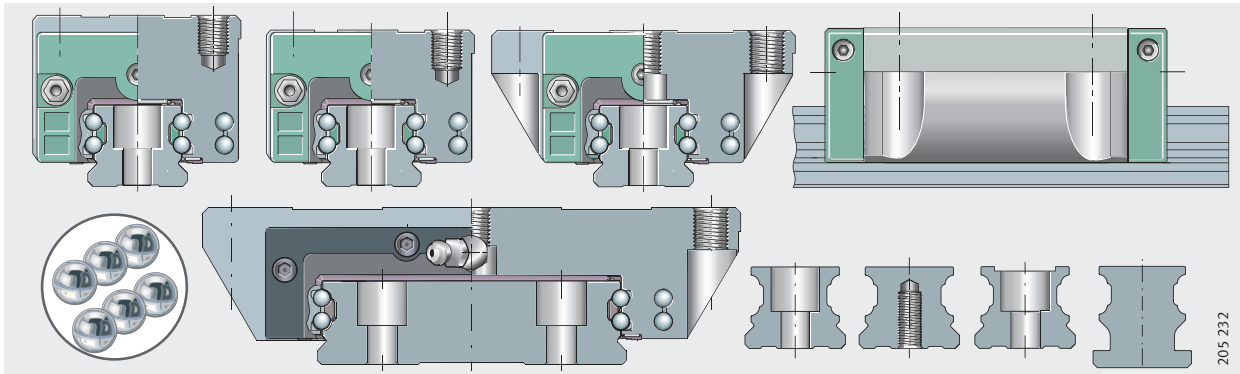
Four-row linear recirculating ball bearing and guideway assemblies

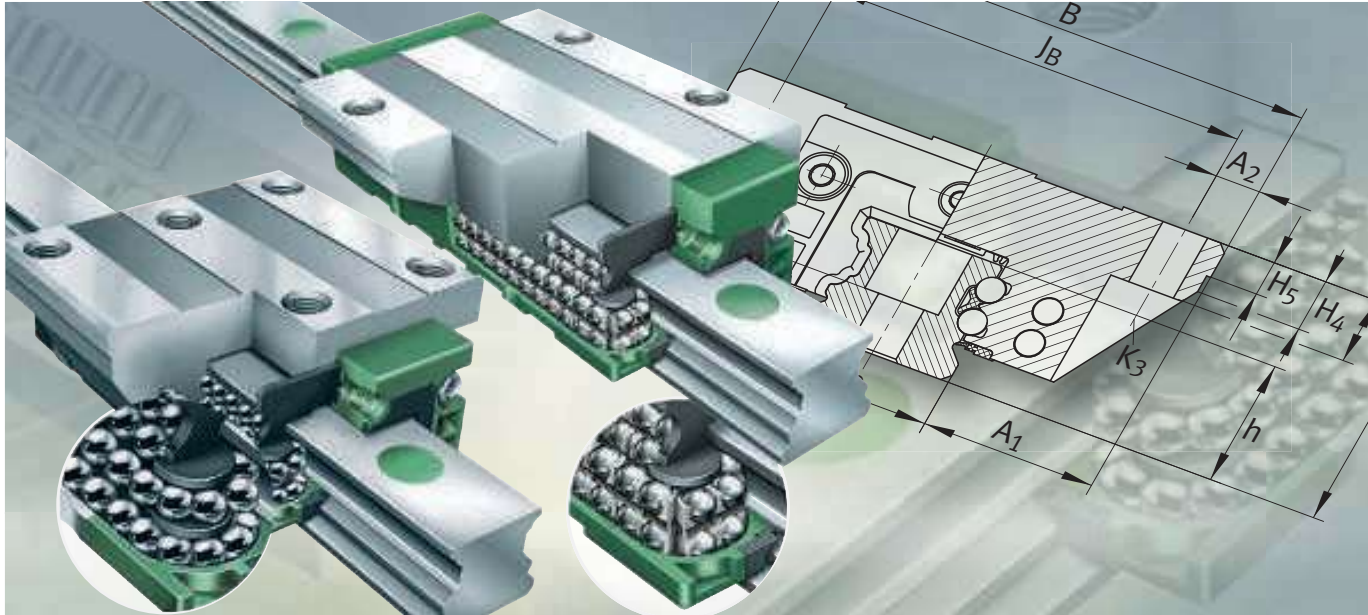


Full complement
With Quad-Spacers
With toothed guideway
With integral measuring system
Accessories

Four-row linear recirculating ball bearing and guideway assemblies

X-life Full complement	 228
	KUVE..-B is of a full complement design and therefore has a high load carrying capacity. It is used where the emphasis is on dynamic characteristics as well as maximum load carrying capacity and rigidity.
X-life With Quad-Spacers	 228
	Linear recirculating ball bearing and guideway assemblies KUVE..-B-KT have Quad-Spacers. These plastic spacers ensure that the rolling elements do not come into contact with each other. Since this prevents collision noises, the units run more quietly.
Toothed guideways Teeth on underside or toothed rack with lateral teeth	 296
	For driven guideways, it is possible to use the units KUVE..-B-ZHP with a toothed guideway and right hand helical teeth on the underside or a combination of the toothed rack ZHST..-SVS + guideway TKVD with lateral helical teeth. In comparison with units without teeth, these designs are more precise, allow significantly simpler adjacent constructions and give additional freedom in the design of bearing arrangements.
With integral electronic-magnetic measuring system	 322
	The combination of the proven linear recirculating ball bearing and guideway assemblies with an electronic-magnetic measuring system gives a very compact, cost-effective solution for applications that require particularly precise travel distances. Measurement is carried out by means of absolute digital or incremental length measurement.
Accessories	 336
	There is a comprehensive range of accessories for the KUVE units. This includes closing plugs and covering strips for the guideways as well as suitable fitting tools. For lubrication and sealing, it includes lubrication and sealing KITS, such as the long term lubrication unit, end plates, end wipers and sealing strips. For toothed units, it includes gearboxes, motors and drive shafts.





Four-row linear recirculating ball bearing and guideway assemblies

Full complement
With Quad-Spacers

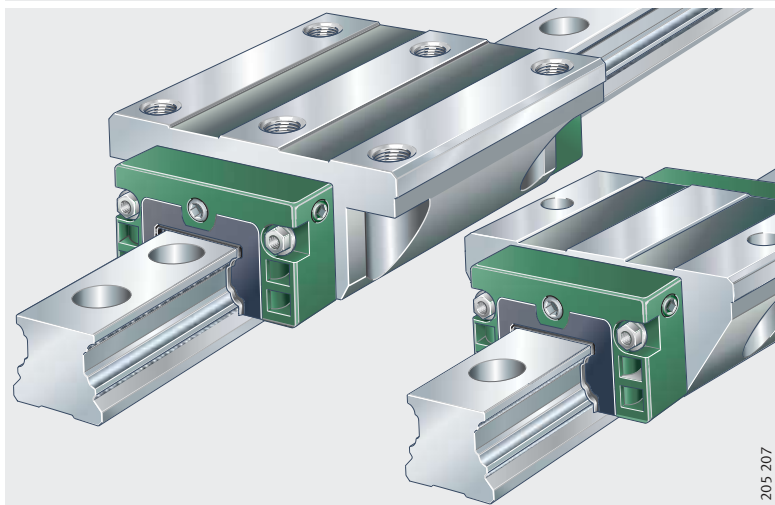
Product overview

Four-row linear recirculating ball bearing and guideway assemblies

Full complement

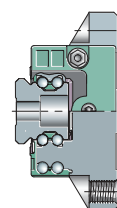
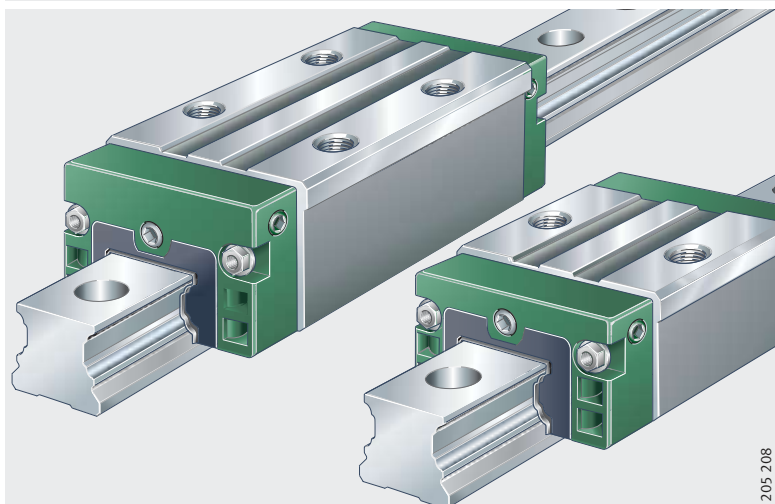
Standard, long, low,
high or short carriage

KUVE...-B, KUVE...-B-L,
KUVE...-B-N, KUVE...-B-NL, KUVE...-B-EC



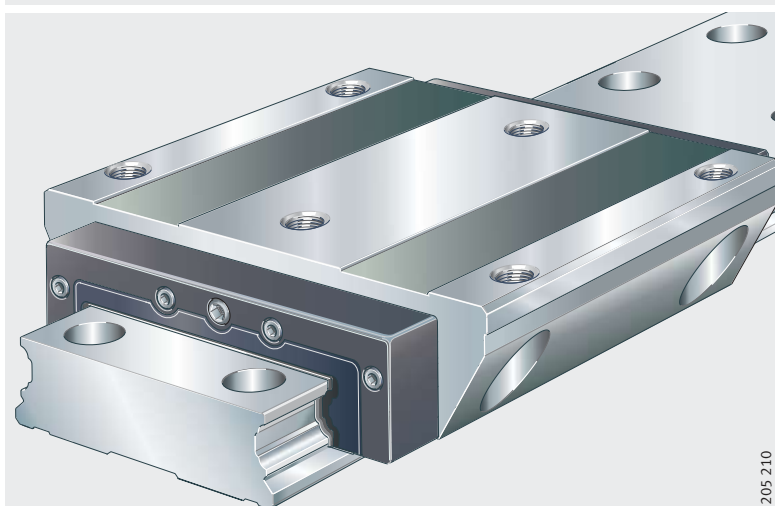
High, narrow or short carriage

KUVE...-B-H, KUVE...-B-HL, KUVE...-B-S, KUVE...-B-SL,
KUVE...-B-SN, KUVE...-B-SNL, KUVE...-B-ESC



Wide guideway

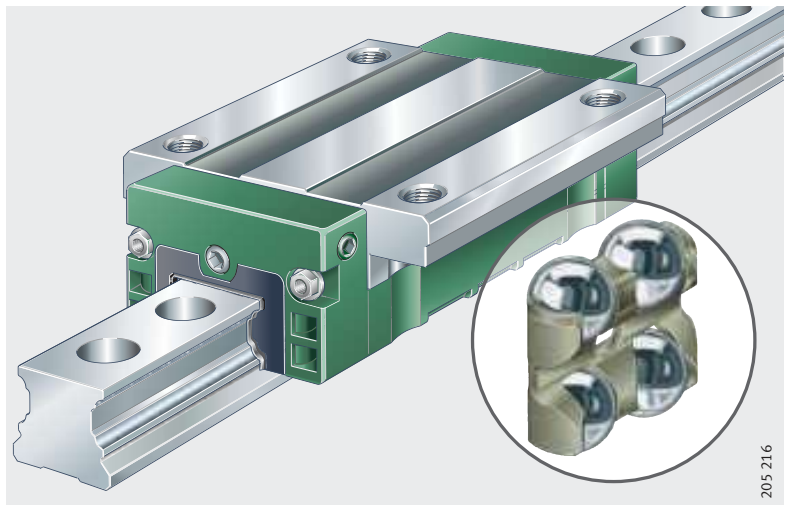
KUVE...-W, KUVE...-WL



Product overview **Four-row linear recirculating ball bearing and guideway assemblies**

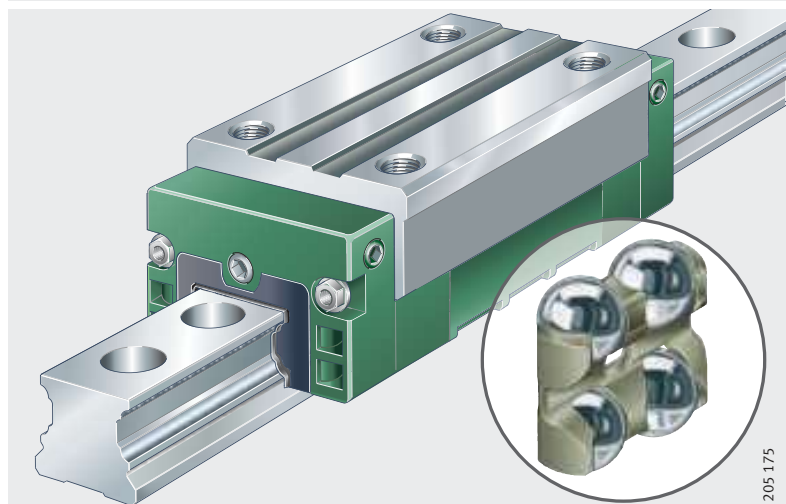
With Quad-Spacers

KUVE...-B-KT, KUVE...-B-KT-L



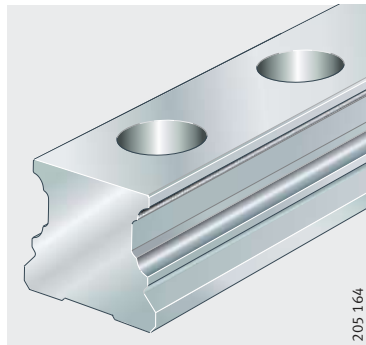
High or narrow carriage

KUVE...-B-KT-H, KUVE...-B-KT-HL, KUVE...-B-KT-S, KUVE...-B-KT-SL

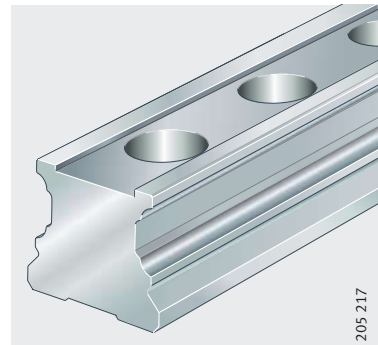


Guideways
Standard
or
with slot for covering strip

TKVD

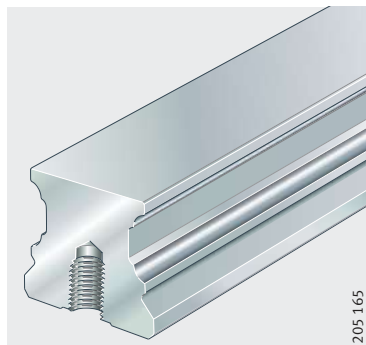


TKVD...-ADB, TKVD...-ADB+K

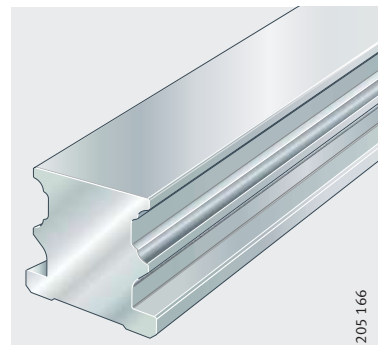


For screw mounting from below
With slots for clamping lugs

TKVD...-U

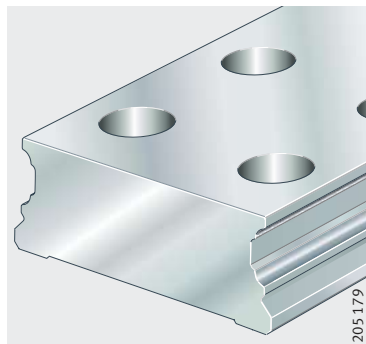


TKVD...-K



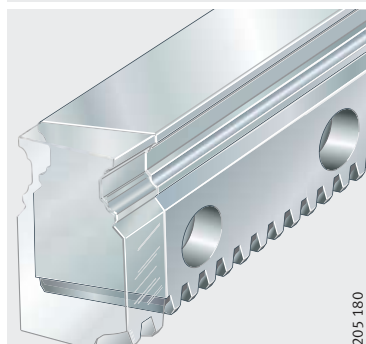
Wide guideway

TKVD...-W

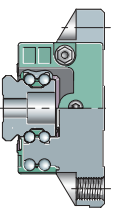
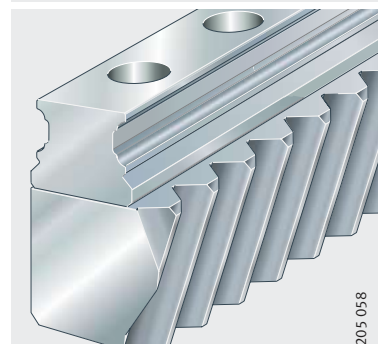


With helical teeth

TKVD...-ZHP



TKVD...-ZHST+SVS



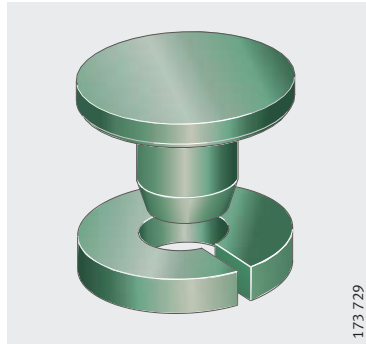
Product overview **Four-row linear recirculating ball bearing and guideway assemblies**

Standard accessories

Plastic closing plugs

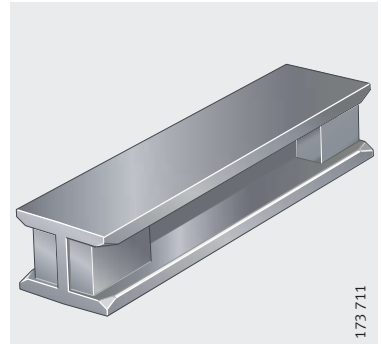
Dummy guideway

KA...-TN/A



173 729

MKVD

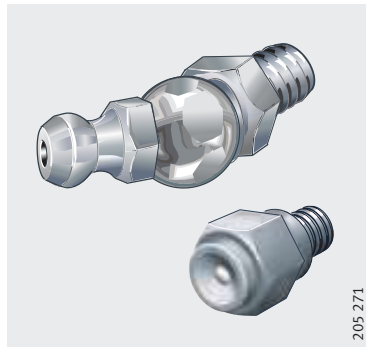


173 711

Lubrication nipple

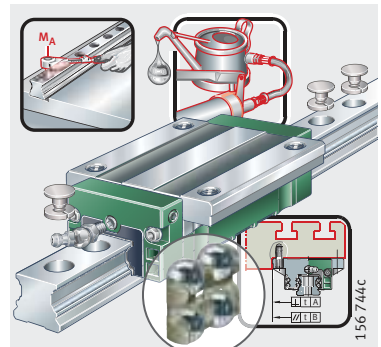
Fitting manual

DIN 71412-B, NIP S M3



205 271

MON 38



156 744c

Four-row linear recirculating ball bearing and guideway assemblies

Features

Four-row linear recirculating ball bearing and guideway assemblies represent the most extensive and complex group within the range of monorail guidance systems. They are used where linear guidance systems with high load carrying capacity and rigidity must move heavy loads with high running and positional accuracy as well as low friction. The guidance systems are preloaded and are suitable for long, unlimited stroke lengths.

Depending on the operating conditions, accelerations up to 150 m/s^2 and speeds up to 360 m/min are possible. Where designs are planned with extensive use of accessories and travel speeds $>180 \text{ m/min}$, please contact us.

The units are available in full complement design and with Quad-Spacers. A guidance system comprises at least one carriage with rolling elements, a guideway and two-piece plastic closing plugs. The four-row linear recirculating ball bearing and guideway assemblies are supplied with initial greasing as standard.

X-life

Four-row linear recirculating ball bearing and guideway assemblies are linear guidance systems of X-life quality. They are characterised by improved technological characteristics, increased robustness and a longer operating life.

Full complement

Series KUVB..-B has a full complement of balls as rolling elements. Since they have the maximum possible number of rolling elements, full complement guidance systems have extremely high load carrying capacity and particularly high rigidity.

With Quad-Spacers

Series KUVB..-B-KT corresponds to the full complement design. In order to prevent noise from recirculation, however, the rolling elements are guided by plastic spacers – known as Quad-Spacers. As a result, these guidance systems run with less noise than full complement variants.

One Quad-Spacer accommodates two rolling elements each from the compressive and tensile raceway. Since the Quad-Spacers are not connected chain elements, bending and tensile stresses are eliminated, particularly in the return area.

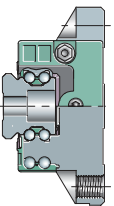
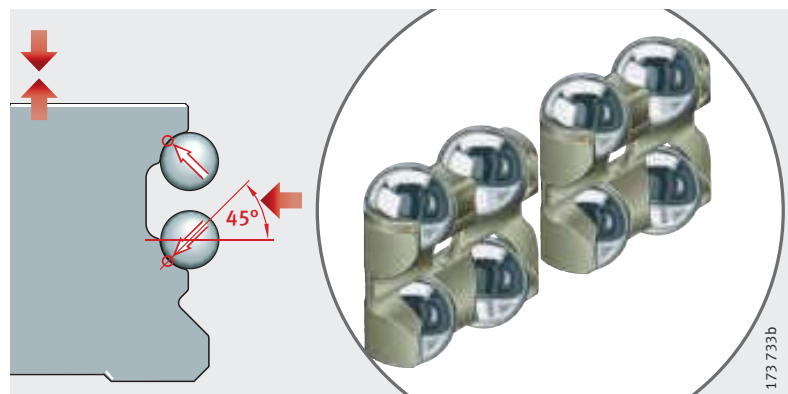


Figure 1
Quad-Spacers



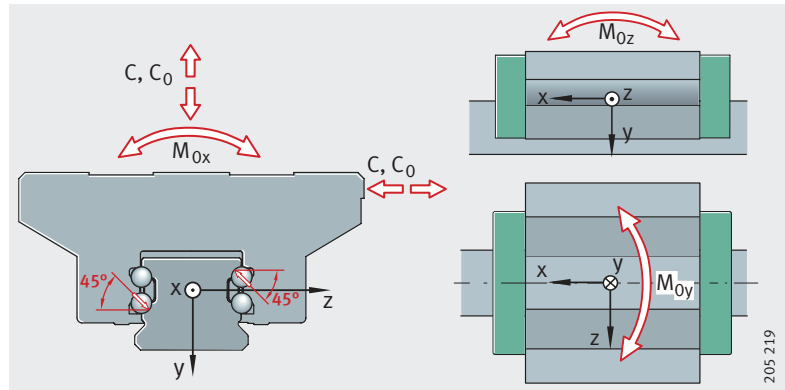
Four-row linear recirculating ball bearing and guideway assemblies

Load carrying capacity

The rows of balls are in two point contact, in an O arrangement and at a contact angle of 45° in relation to the raceways.

The units can support forces from all directions – except in the direction of motion – and moments about all axes, *Figure 2*.

Figure 2
Load carrying capacity
and contact angle



Carriages

The carriages are supplied in numerous variants. They have saddle plates with hardened and precision ground rolling element raceways, in which the balls are recirculated by means of enclosed channels and plastic return elements.

A generous grease reservoir is provided by means of favourably positioned lubricant pockets in the carriage; see Lubrication, page 237.

Guideways

The guideways are made from hardened steel and are ground on all faces, the rolling element raceways are precision ground.

Located from above or below

Guideways TKVD.. (-ADB, -ADB+K) and TKVD..-W are located from above. The through holes have counterbores for the fixing screws. Guideways TKVD..-U are located from below by means of threaded blind holes.

Clamping lugs and clamping strips are used for the location of guideways TKVD..-K.

With helical teeth

Guideways TKVD..-ZHP have right hand helical teeth on the underside and are located from the lateral side.

In the variant TKVD..-ZHST+SVS, the standard guideway is combined with a toothed rack. In this case, the helical teeth are arranged on the lateral face.

Slot for covering strip

Guideways TKVD..-ADB have a slot for an adhesive bonded steel covering strip (ADB) and guideways TKVD..-ADB+K have a slot with undercut for a clip fit steel covering strip (ADB+K).

Multi-piece guideways

If the required guideway length $l_{\max}$ is greater than the value in the dimension tables, the guideways are supplied in several pieces; see page 252.

Sealing

Elastic end wipers are fitted to the end pieces of the carriages on both sides to retain the lubricant within the system.

Standard sealing strips as well as additional optional upper sealing strips ensure reliable sealing and protect the rolling element system against contamination, even in demanding environmental conditions, *Figure 3*.

Attention!

If the contamination conditions are exceptionally severe, please contact us.

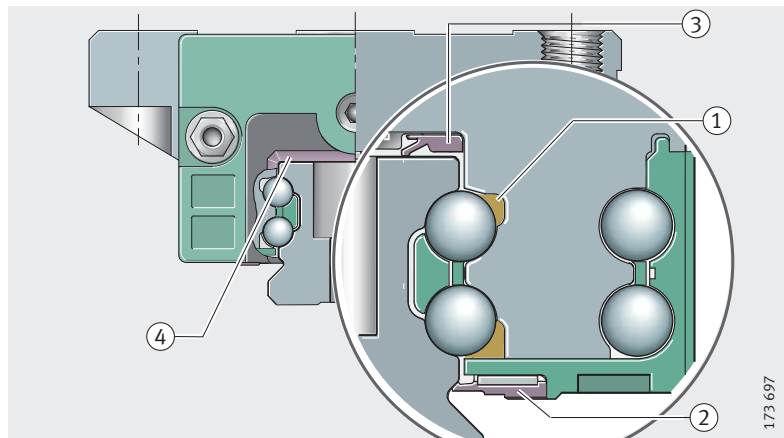
Lubrication

Linear recirculating ball bearing and guideway assemblies KUV...-B and KUV...-B-KT are suitable for oil and grease lubrication and the systems are supplied with initial greasing. They are lubricated via the lubrication nipple in the end piece (on the end face or from the side). The end face lubrication nipple is included in the delivery. Lubrication nipples for relubrication from the side are available by agreement.

Due to the integral lubricant reservoir in the carriages, the units have extended relubrication intervals, *Figure 3*. Depending on the application, they may also give maintenance-free operation.

- ① Integral lubricant pockets with grease reservoir
- ② Standard sealing strip
- ③ Optional sealing strip
- ④ Elastic wipers on end faces

Figure 3
Lubricant reservoir
and sealing



Operating temperature

Four-row linear recirculating ball bearing and guideway assemblies can be used at operating temperatures from -10 °C to $+100\text{ °C}$.

Four-row linear recirculating ball bearing and guideway assemblies

Standard accessories

Plastic dummy guideway

The dummy guideway prevents damage to the rolling element set if the carriage is removed from the guideway.

Carriages are always pushed directly from the guideway onto the dummy guideway and must remain there until they are reassembled.

Plastic closing plugs

The plugs close off the counterbores of the guideway holes flush with the surface of the guideway.

Optionally, brass closing plugs are also available, see Accessories, page 344.

Lubrication connectors

One lubrication nipple is included loose in the delivery.

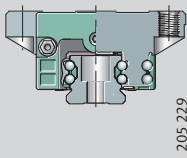
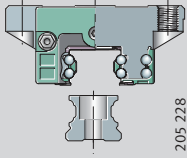
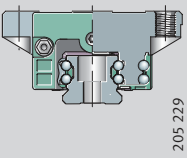
The lateral relubrication holes are open. Once the lubrication nipple provided for this purpose is screwed in, the guidance systems can be supplied with lubricant. For protection, the holes are closed off by means of a grub screw.

Corrosion-resistant designs

Four-row linear recirculating ball bearing and guideway assemblies KUBE are also available in corrosion-resistant designs with the special coatings Corrotect[®], Protect A and Protect B; for a description of the coatings, see page 53 to page 58.

For applications with Corrotect[®], please contact us.

Suffixes for Corrotect[®]-coated parts

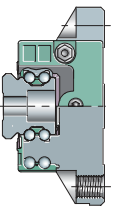
With Corrotect [®] coating	Preassembled unit Guideway only coated	Carriage and guideway separate Carriage or guideway coated	Preassembled unit Carriage and guideway coated
			
Suffix	RRFT	RRF	RRF

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description
–	Standard carriage
EC	Short carriage
ESC	Short, narrow carriage
H	High carriage
HL	High, long carriage
L	Long carriage
N	Low carriage
NL	Low, long carriage
S	Narrow carriage
SL	Narrow, long carriage
SN	Narrow, low carriage
SNL	Narrow, low, long carriage
W	Wide carriage
WL	Wide, long carriage
SB	High carriage with lateral threaded fixing holes



Four-row linear recirculating ball bearing and guideway assemblies

Design and safety guidelines

Preload

Four-row linear recirculating ball bearing and guideway assemblies are available in preload classes V1 and V2, see table.

Preload classes

Preload class ¹⁾	Preload setting	Suitable for
V1 ²⁾	$0,04 \cdot C$	- Moderate load - High rigidity requirements - Moment load
V2	$0,1 \cdot C$	- High alternating load - Particularly high rigidity requirements - Moment load

1) Other preload classes available by agreement.

2) Standard preload class.

Influence of preload on the linear guidance system

Increasing the preload increases the rigidity. However, preload also influences the displacement resistance and operating life of linear guidance systems.

Friction

Coefficient of friction

The coefficient of friction is dependent on the ratio C/P , see table.

Load C/P	Coefficient of friction μ_{KUVE}
4 to 20	0,0007 to 0,0015

Rigidity

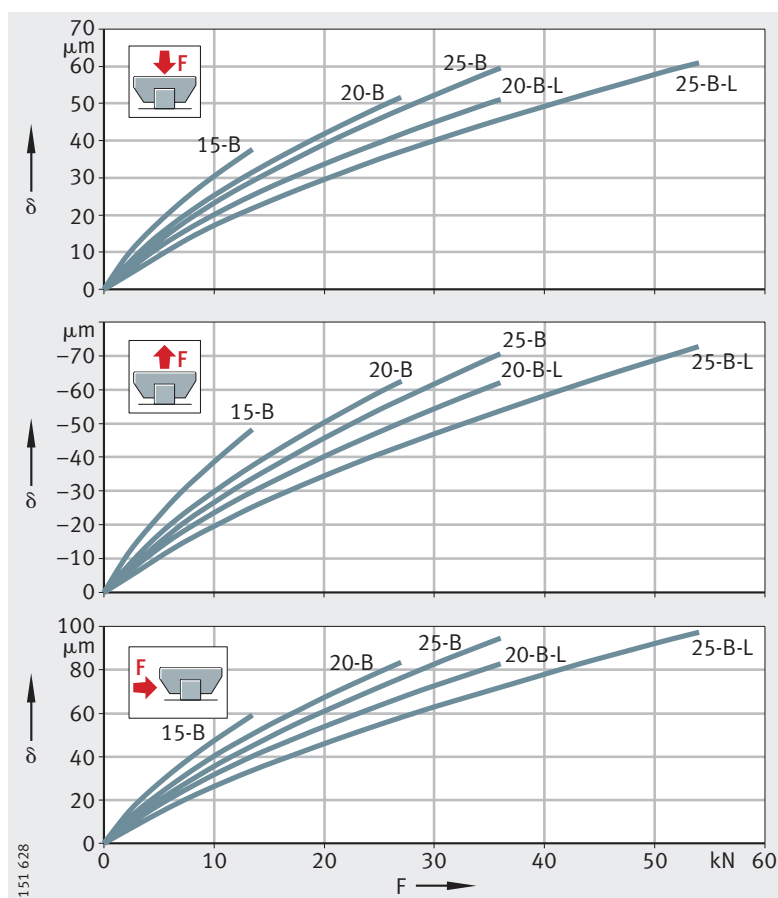
The spring curves show the deformation of linear recirculating ball bearing and guideway assemblies including the deformation of the screw connections to the adjacent construction, *Figure 4*, page 241 to *Figure 21*, page 249.

KUVE15-B
KUVE20-B
KUVE20-B-L
KUVE25-B
KUVE25-B-L

δ = deflection
 F = load

Figure 4

Spring curves for compressive, tensile and lateral load

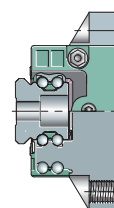
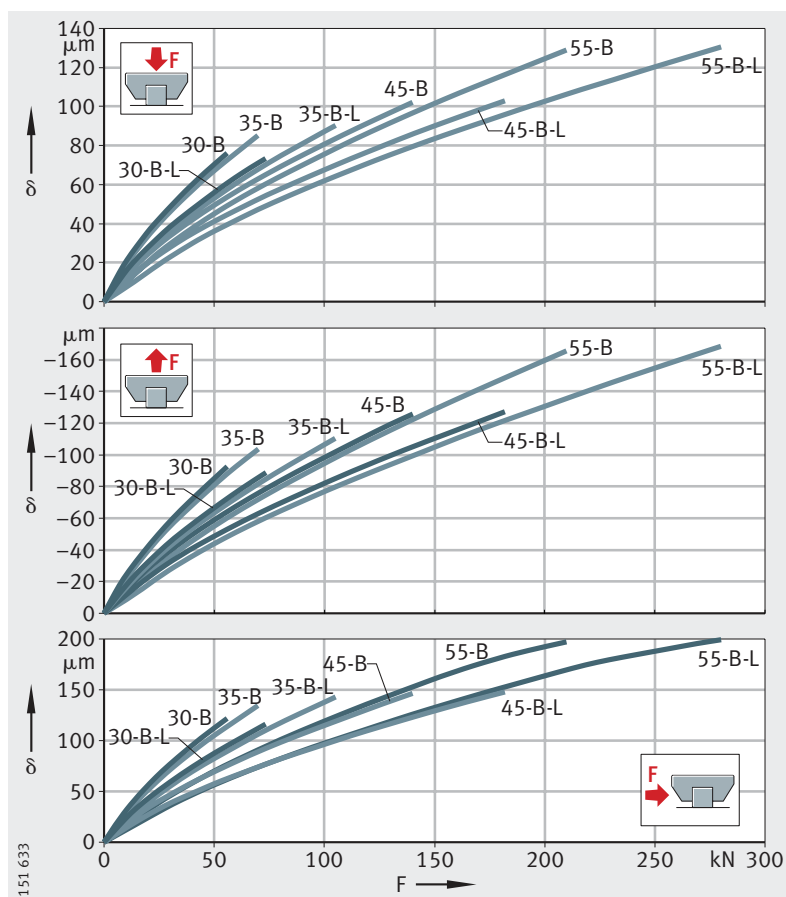


KUVE30-B
KUVE30-B-L
KUVE35-B
KUVE35-B-L
KUVE45-B
KUVE45-B-L
KUVE55-B
KUVE55-B-L

δ = deflection
 F = load

Figure 5

Spring curves for compressive, tensile and lateral load



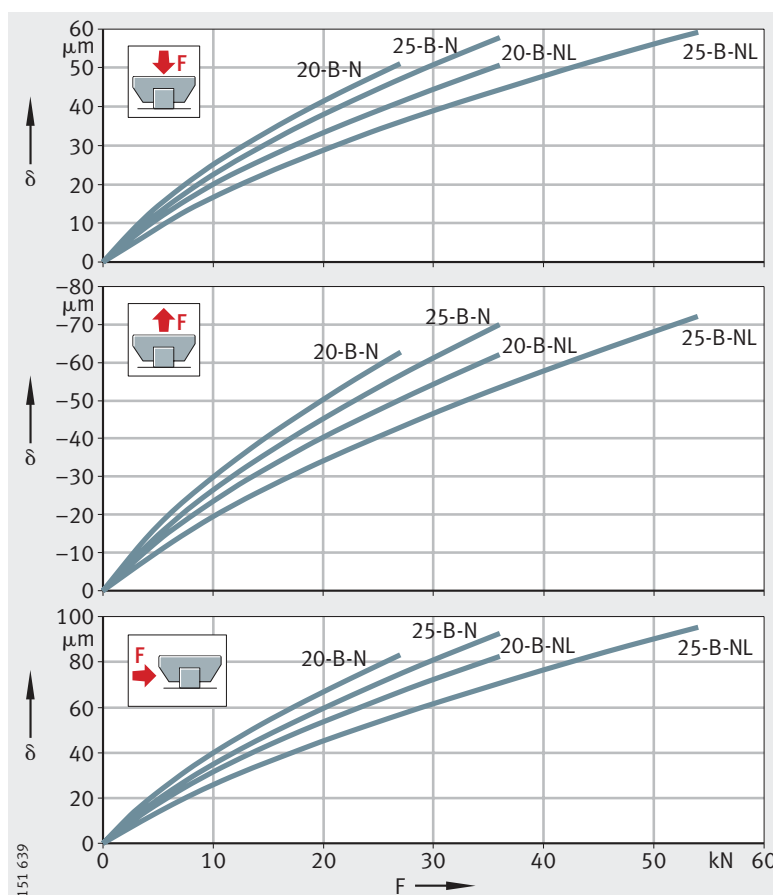
Four-row linear recirculating ball bearing and guideway assemblies

KUVE20-B-N
KUVE20-B-NL
KUVE25-B-N
KUVE25-B-NL

δ = deflection
F = load

Figure 6

Spring curves for compressive, tensile and lateral load

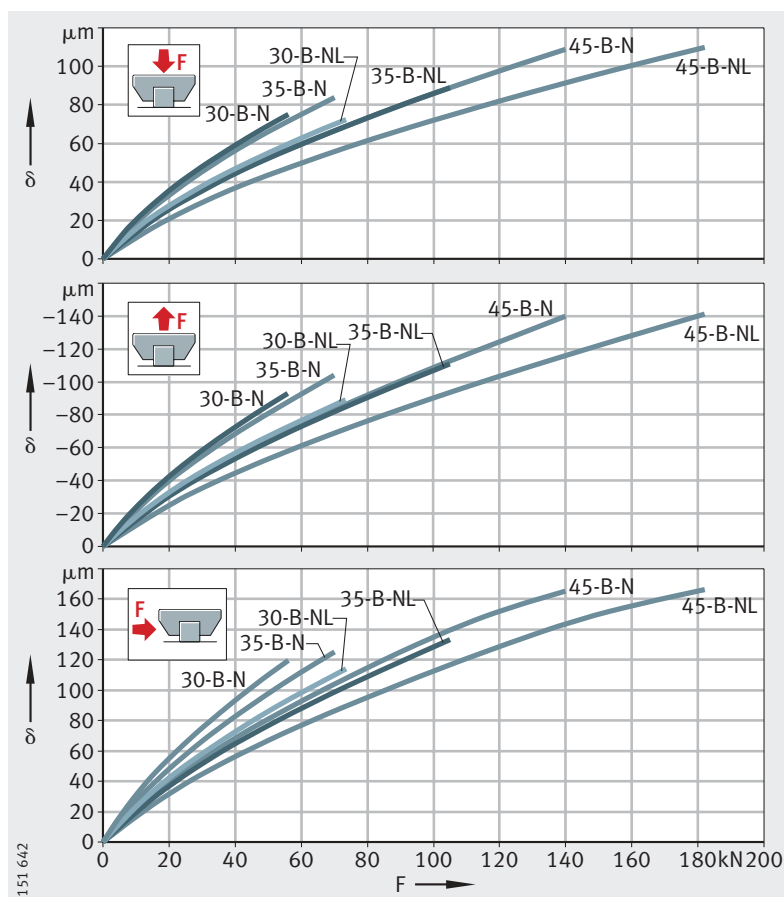


KUVE30-B-N
KUVE30-B-NL
KUVE35-B-N
KUVE35-B-NL
KUVE45-B-N
KUVE45-B-NL

δ = deflection
F = load

Figure 7

Spring curves for compressive, tensile and lateral load

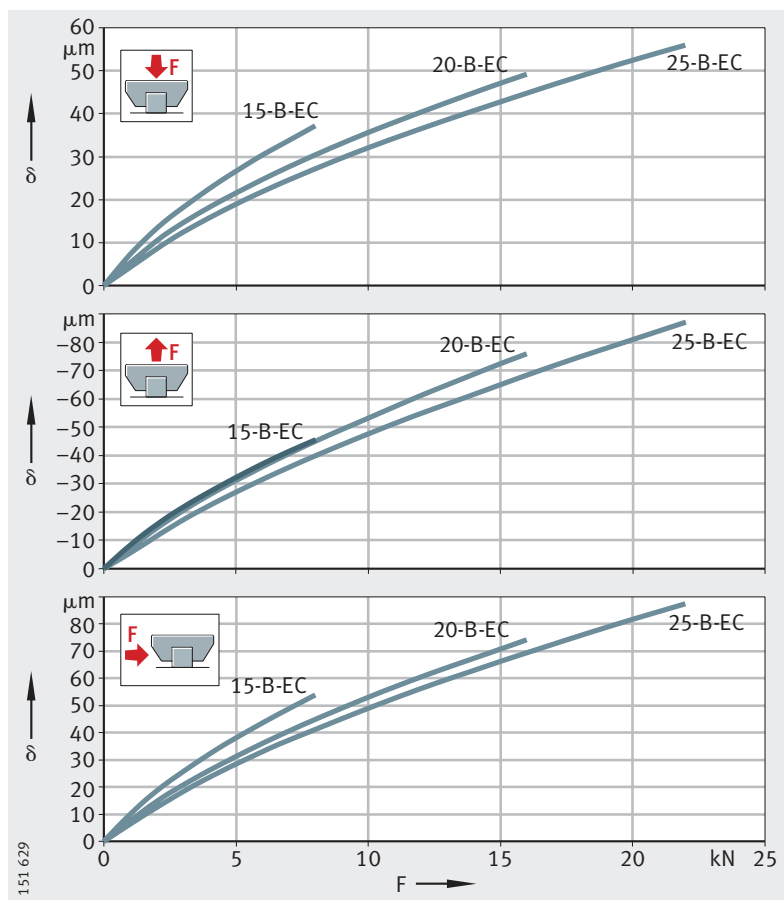


KUVE15-B-EC
KUVE20-B-EC
KUVE25-B-EC

δ = deflection
 F = load

Figure 8

Spring curves for compressive,
 tensile and lateral load

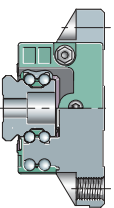
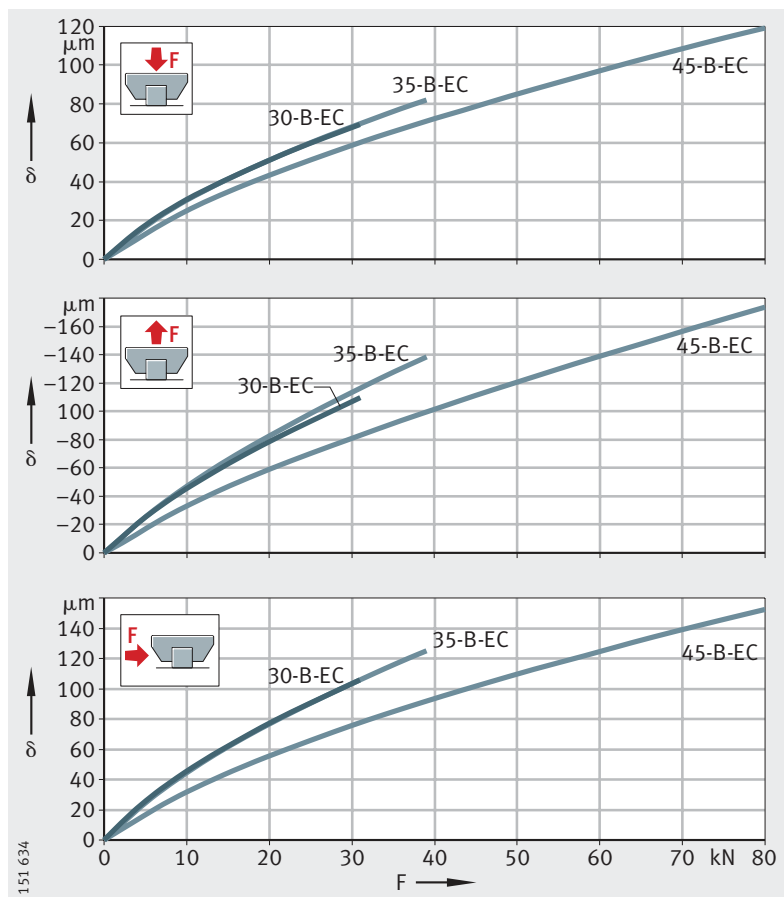


KUVE30-B-EC
KUVE35-B-EC
KUVE45-B-EC

δ = deflection
 F = load

Figure 9

Spring curves for compressive,
 tensile and lateral load



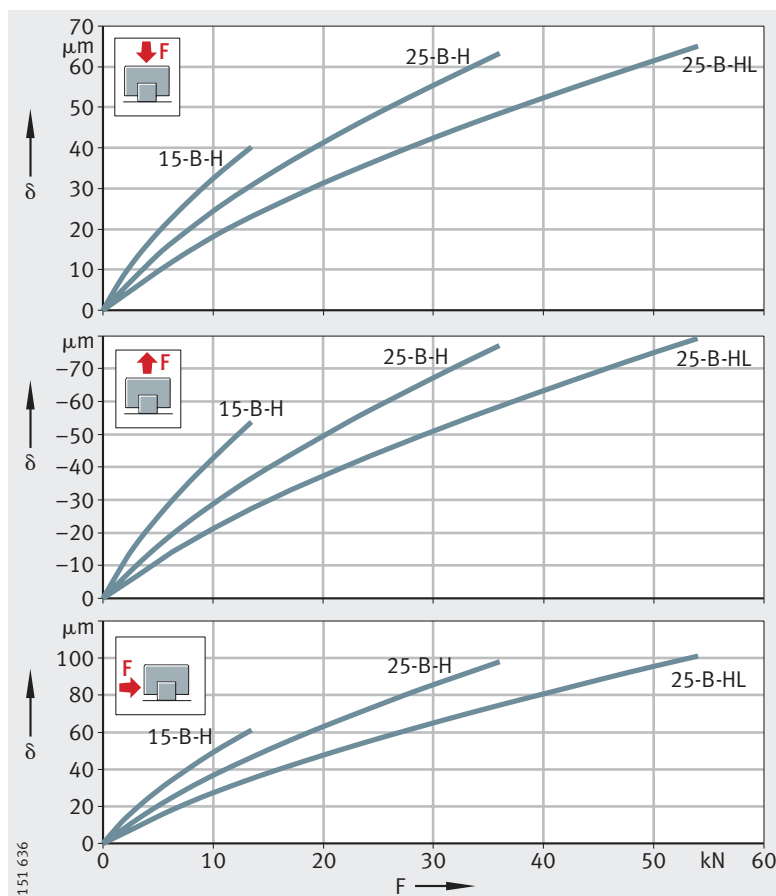
Four-row linear recirculating ball bearing and guideway assemblies

KUVE15-B-H
KUVE25-B-H
KUVE25-B-HL

δ = deflection
F = load

Figure 10

Spring curves for compressive, tensile and lateral load

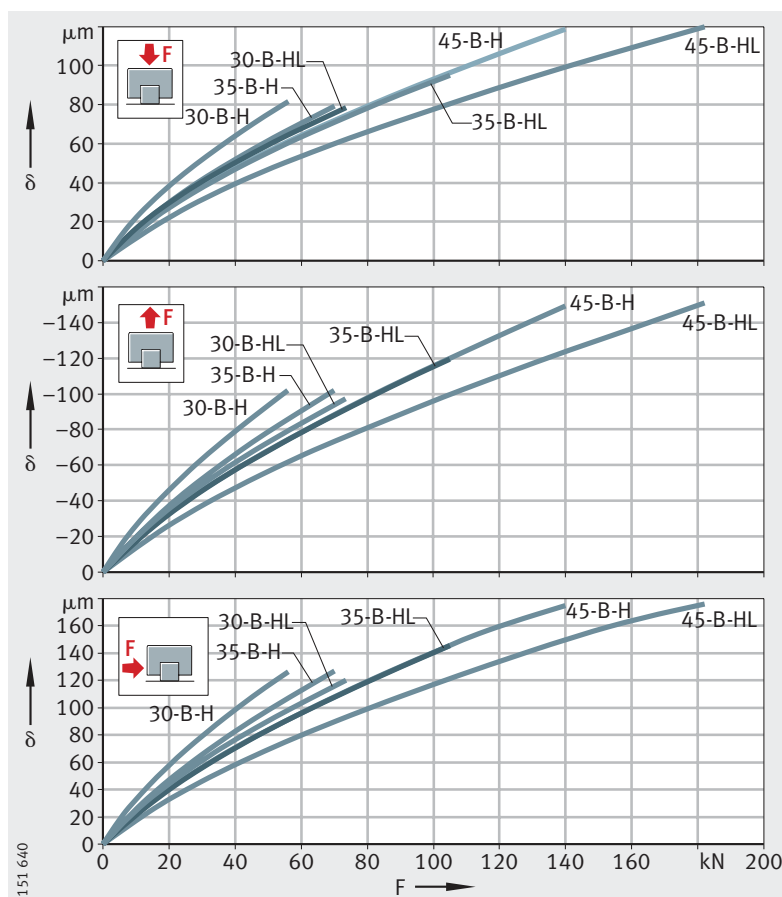


KUVE30-B-H
KUVE30-B-HL
KUVE35-B-H
KUVE35-B-HL
KUVE45-B-H
KUVE45-B-HL

δ = deflection
F = load

Figure 11

Spring curves for compressive, tensile and lateral load

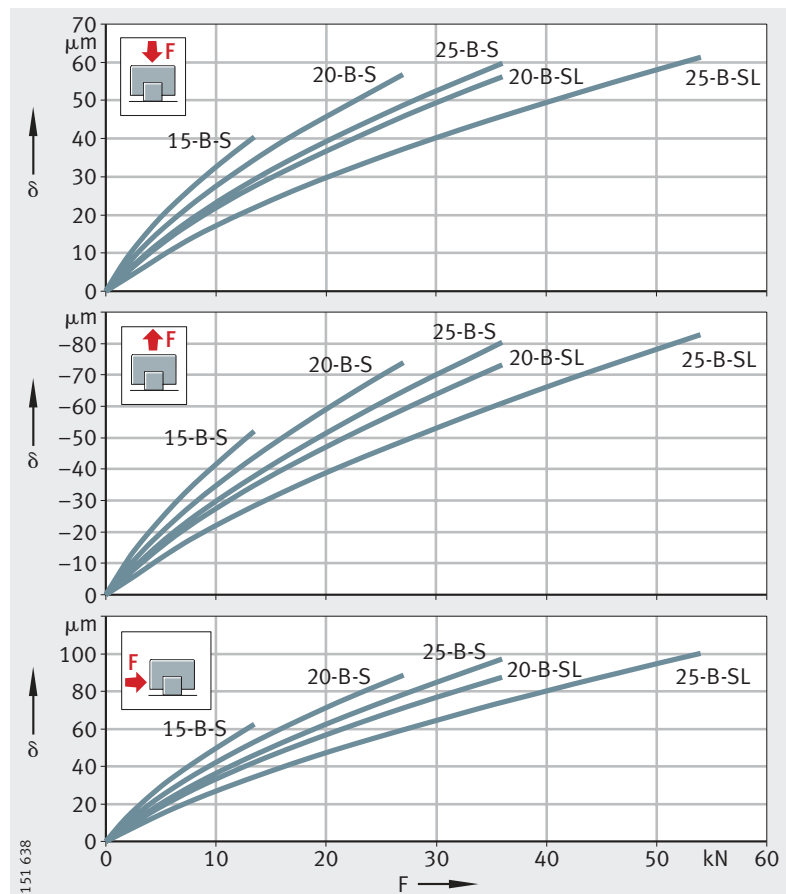


KUVE15-B-S
KUVE20-B-S
KUVE20-B-SL
KUVE25-B-S
KUVE25-B-SL

δ = deflection
F = load

Figure 12

Spring curves for compressive, tensile and lateral load

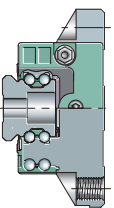
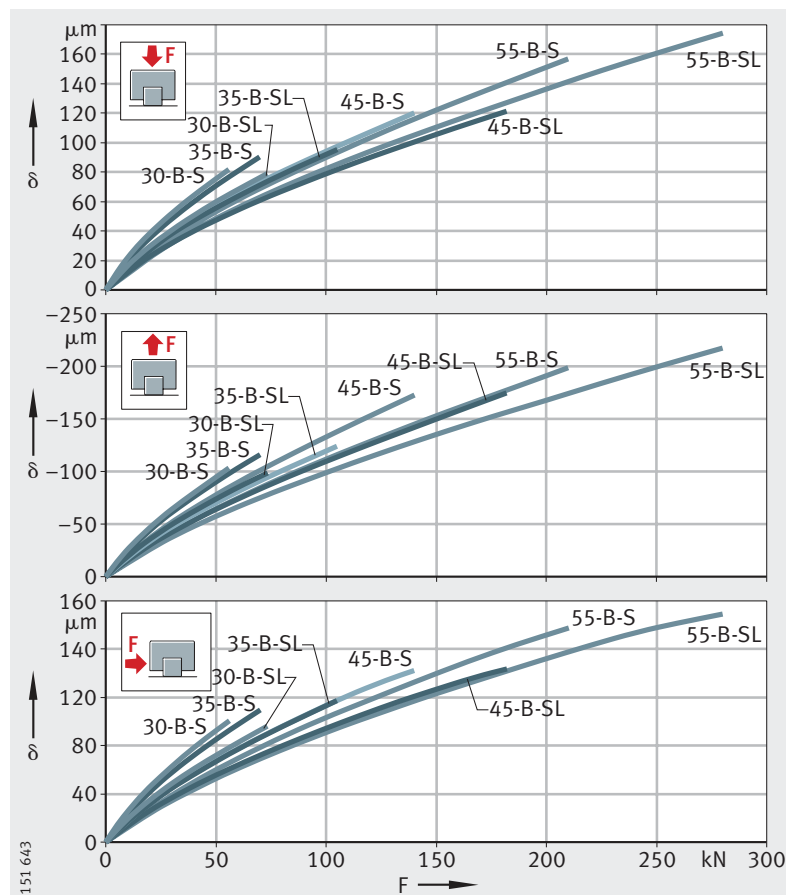


KUVE30-B-S
KUVE30-B-SL
KUVE35-B-S
KUVE35-B-SL
KUVE45-B-S
KUVE45-B-SL
KUVE55-B-S
KUVE55-B-SL

δ = deflection
F = load

Figure 13

Spring curves for compressive, tensile and lateral load



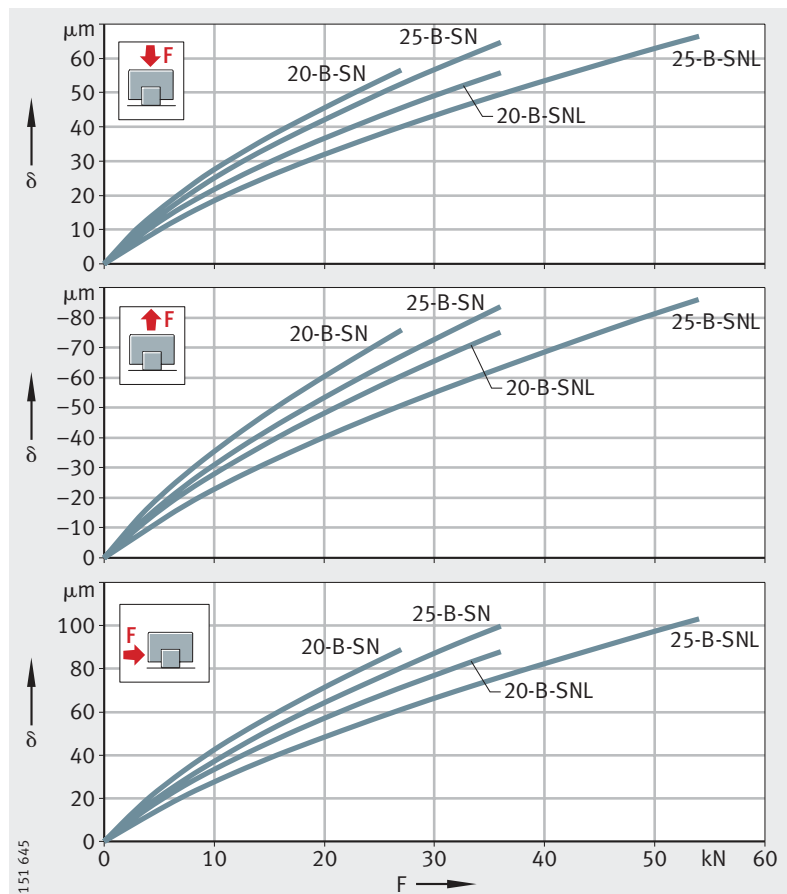
Four-row linear recirculating ball bearing and guideway assemblies

KUVE20-B-SN
KUVE20-B-SNL
KUVE25-B-SN
KUVE25-B-SNL

δ = deflection
F = load

Figure 14

Spring curves for compressive, tensile and lateral load

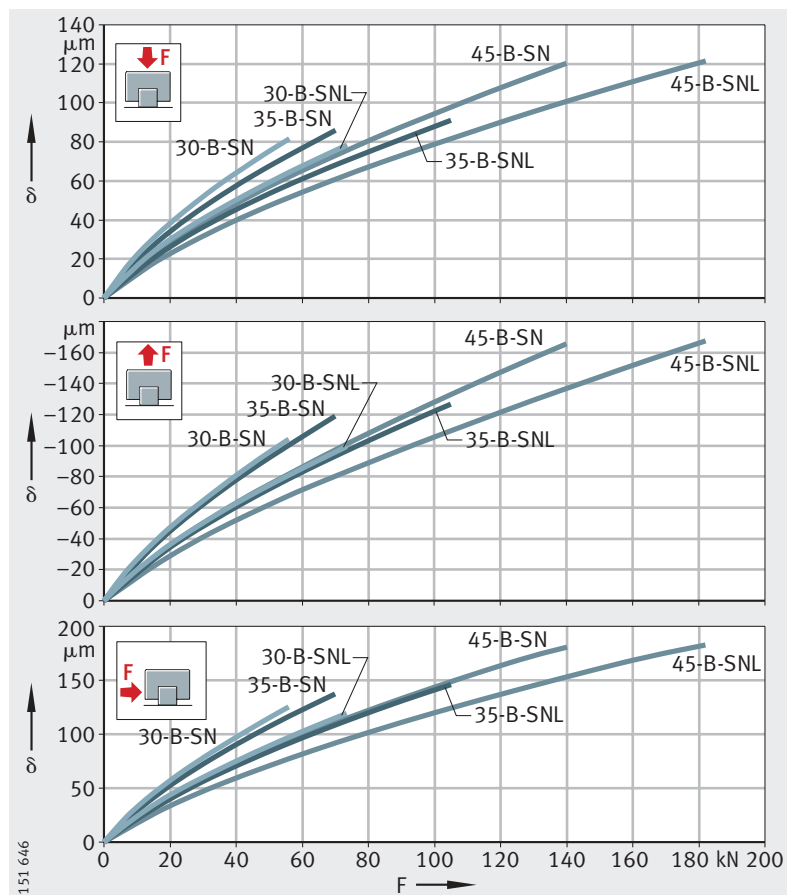


KUVE30-B-SN
KUVE30-B-SNL
KUVE35-B-SN
KUVE35-B-SNL
KUVE45-B-SN
KUVE45-B-SNL

δ = deflection
F = load

Figure 15

Spring curves for compressive, tensile and lateral load

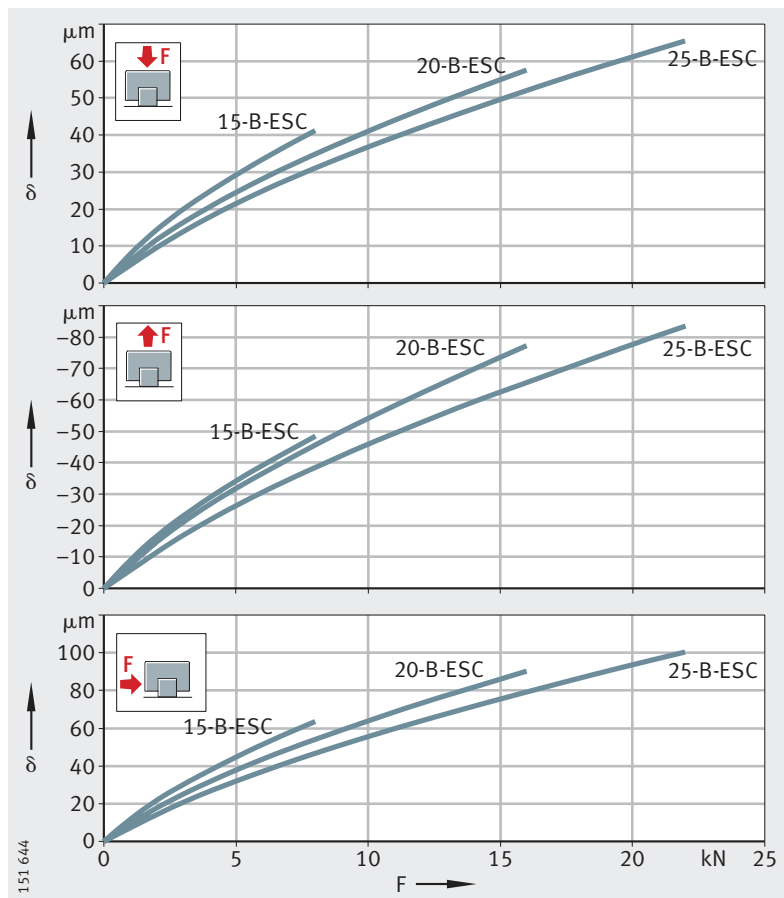


KUVE15-B-ESC
KUVE20-B-ESC
KUVE55-B-ESC

δ = deflection
 F = load

Figure 16

Spring curves for compressive,
 tensile and lateral load

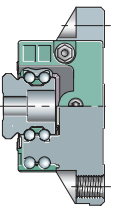
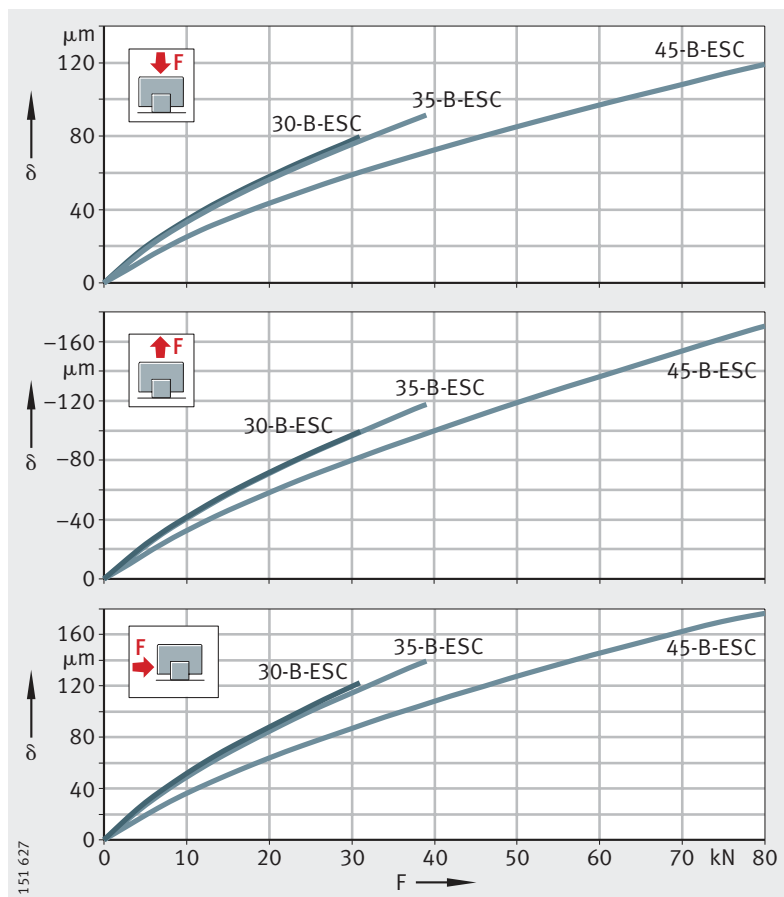


KUVE30-B-ESC
KUVE35-B-ESC
KUVE45-B-ESC

δ = deflection
 F = load

Figure 17

Spring curves for compressive,
 tensile and lateral load



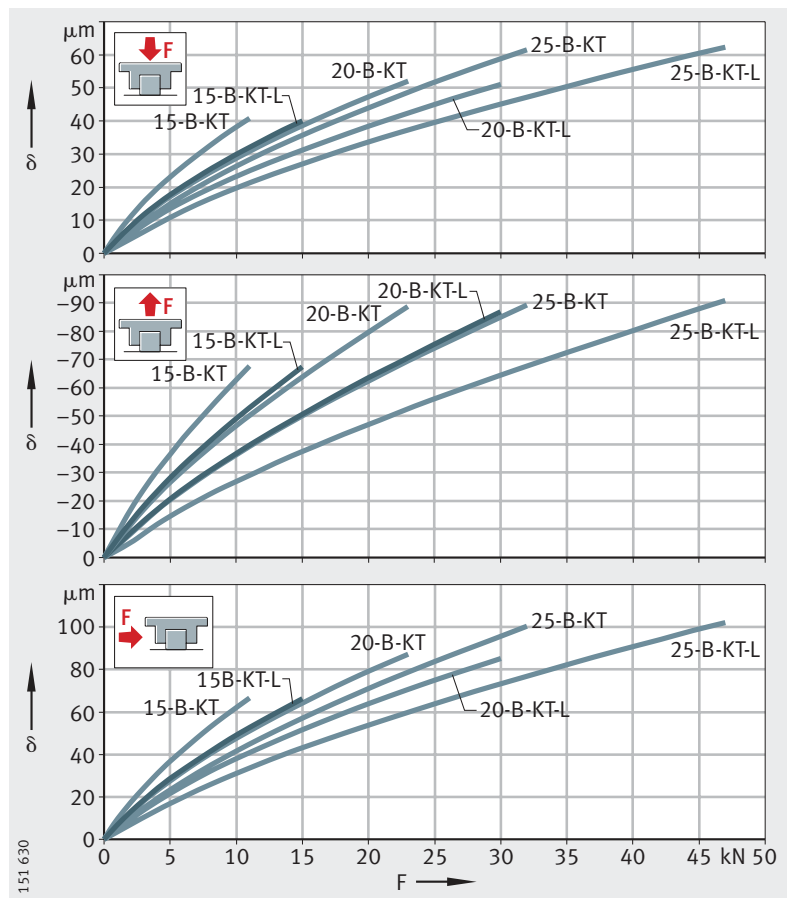
Four-row linear recirculating ball bearing and guideway assemblies

KUVE15-B-KT
KUVE15-B-KT-L
KUVE20-B-KT
KUVE20-B-KT-L
KUVE25-B-KT
KUVE25-B-KT-L

δ = deflection
F = load

Figure 18

Spring curves for compressive, tensile and lateral load

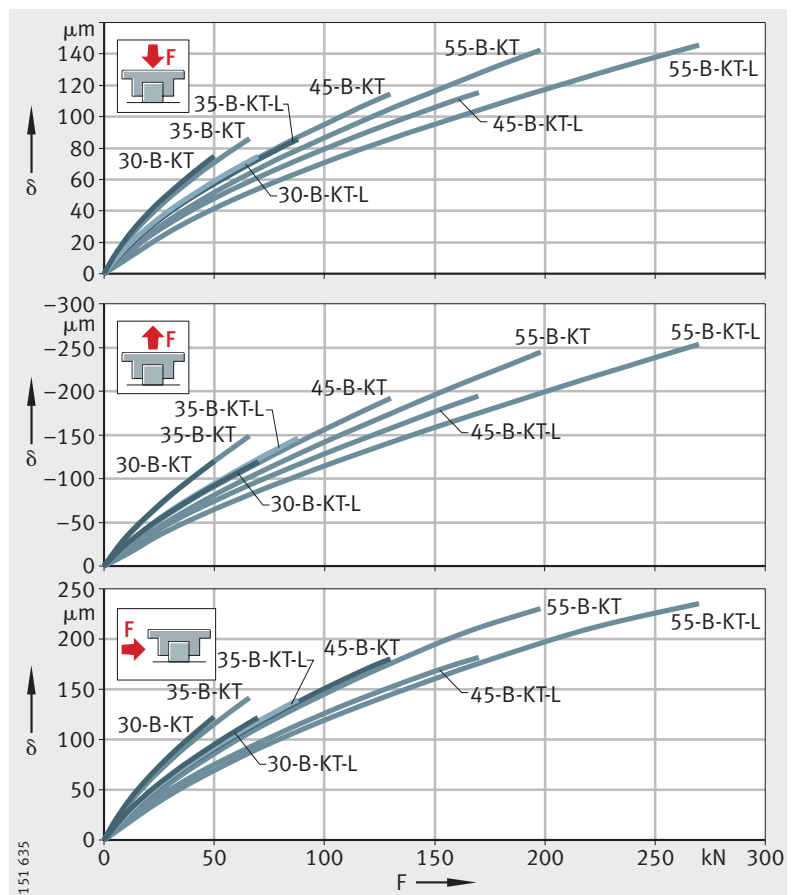


KUVE30-B-KT
KUVE30-B-KT-L
KUVE35-B-KT
KUVE35-B-KT-L
KUVE45-B-KT
KUVE45-B-KT-L
KUVE55-B-KT
KUVE55-B-KT-L

δ = deflection
F = load

Figure 19

Spring curves for compressive, tensile and lateral load

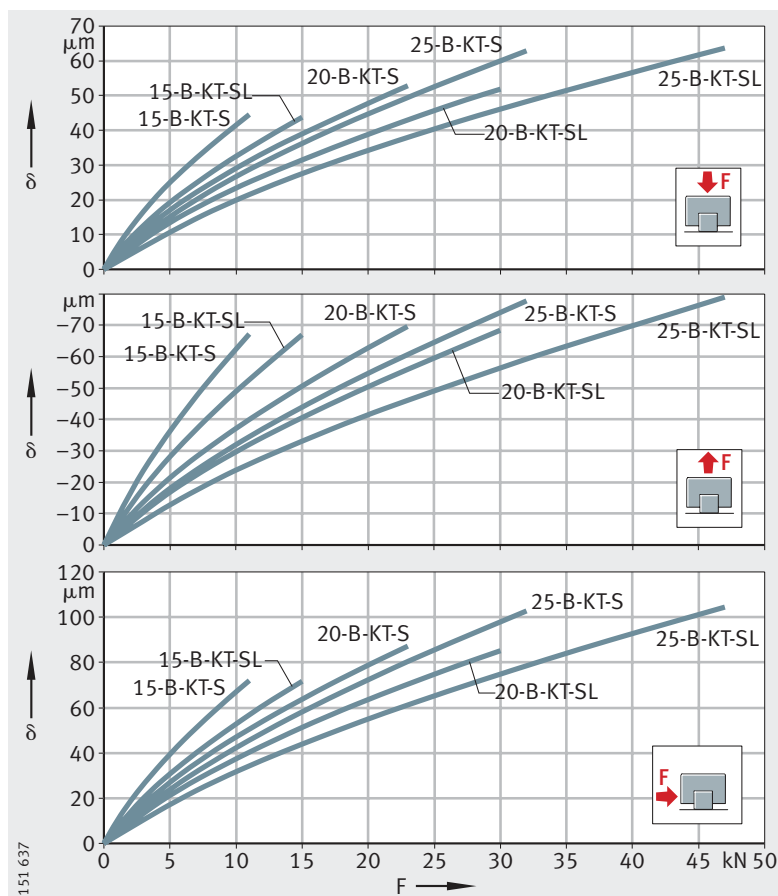


KUVE15-B-KT-S
KUVE15-B-KT-SL
KUVE20-B-KT-S
KUVE20-B-KT-SL
KUVE25-B-KT-S
KUVE25-B-KT-SL

δ = deflection
 F = load

Figure 20

Spring curves for compressive, tensile and lateral load

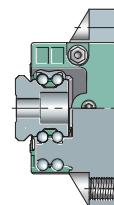
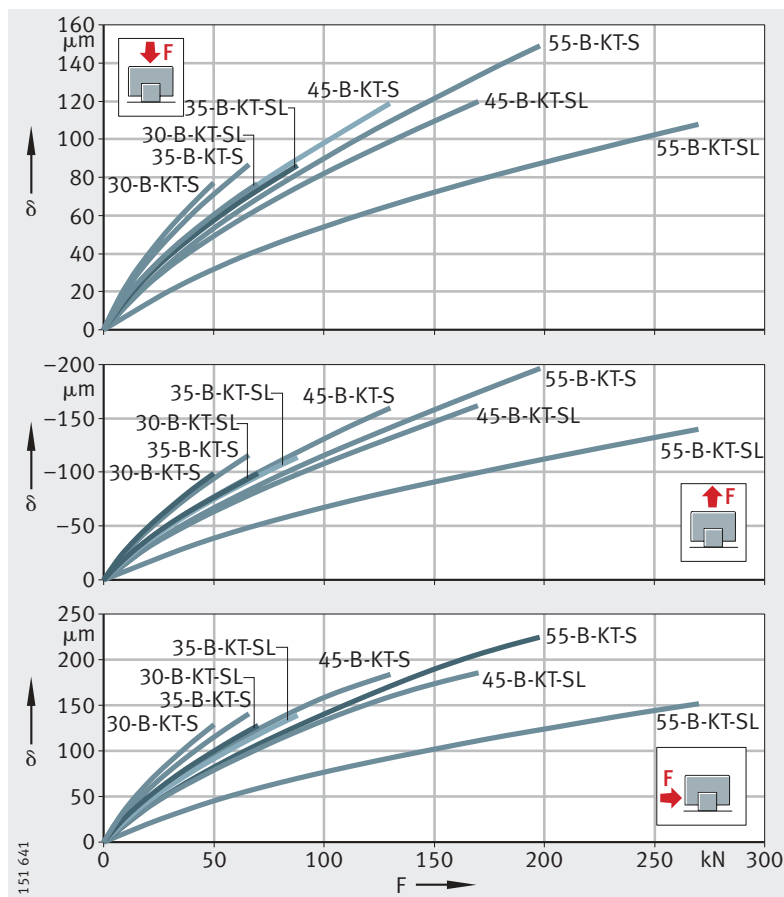


KUVE30-B-KT-S
KUVE30-B-KT-SL
KUVE35-B-KT-S
KUVE35-B-KT-SL
KUVE45-B-KT-S
KUVE45-B-KT-SL
KUVE55-B-KT-S
KUVE55-B-KT-SL

δ = deflection
 F = load

Figure 21

Spring curves for compressive, tensile and lateral load



Four-row linear recirculating ball bearing and guideway assemblies

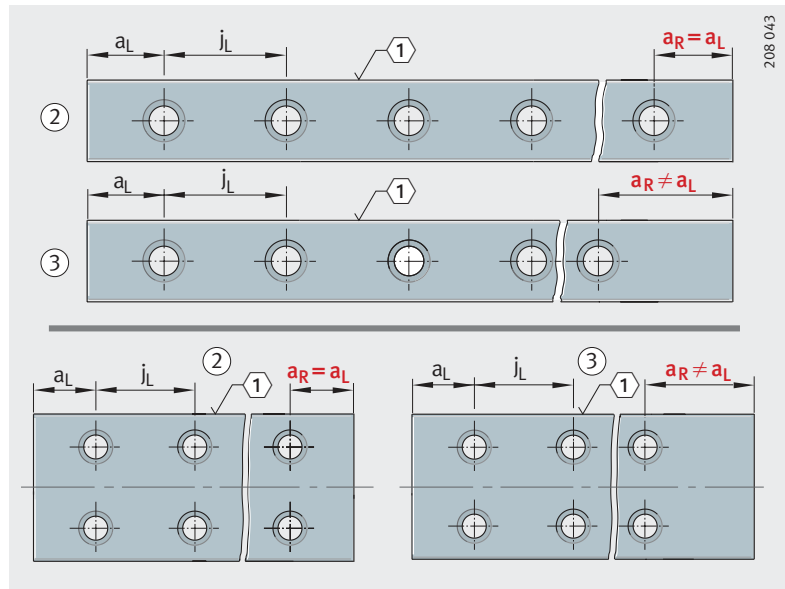
Guideway hole patterns

Unless specified otherwise, the guideways have a symmetrical hole pattern, *Figure 22*.

An asymmetrical hole pattern may be available at customer request. In this case, $a_L \geq a_{L \min}$ and $a_R \geq a_{R \min}$, *Figure 22*.

- ① Locating face
- ② Symmetrical hole pattern
- ③ Asymmetrical hole pattern

Figure 22
Hole patterns of guideways
with one or two rows of holes



**Maximum number of pitches
between holes**

The number of pitches between holes is the rounded whole number equivalent to:

$$n = \frac{l - 2 \cdot a_{L \min}}{j_L}$$

The distances a_L and a_R are generally determined by:

$$a_L + a_R = l - n \cdot j_L$$

For guideways with a symmetrical hole pattern:

$$a_L = a_R = \frac{1}{2} \cdot (l - n \cdot j_L)$$

Number of holes:

$$x = n + 1$$

a_L, a_R mm

Distance between start or end of guideway and nearest hole

$a_{L \min}, a_{R \min}$ mm

Minimum values for a_L, a_R according to dimension tables

l mm

Guideway length

n –

Maximum possible number of hole pitches

j_L mm

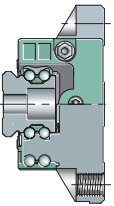
Distance between holes

x –

Number of holes.

Attention!

If the minimum values for a_L and a_R are not observed, the counterbores of the holes may be intersected.



Four-row linear recirculating ball bearing and guideway assemblies

Multi-piece guideways

If the guideway length required is greater than $l_{\max}$ according to the dimension tables, these guideways are made up from individual pieces that together comprise the total required length. The individual pieces are matched to each other and marked, *Figure 23*.

② Marking
Guideway pieces:
1A, 1A
1B, 1B
1C, 1C
2A, 2A
2B, 2B
2C, 2C

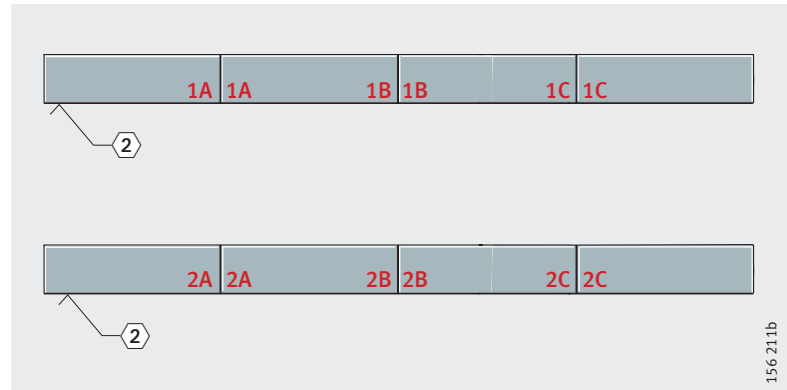


Figure 23

Marking of multi-piece guideways

Demands on the adjacent construction

The running accuracy is essentially dependent on the straightness, accuracy and rigidity of the fit and mounting surfaces.

The straightness of the system is only achieved when the guideway is pressed against the datum surface.

If high demands are to be made on the running accuracy and/or if soft substructures and/or movable guideways are used, please contact us.

Geometrical and positional accuracy of the mounting surfaces

Attention!

The higher the requirements for accuracy and smooth running of the guidance system, the more attention must be paid to the geometrical and positional accuracy of the mounting surfaces.

The tolerances according to *Figure 24*, page 253 and table Values for parallelism tolerances t , page 254 must be observed.

Surfaces should be ground or precision milled – with the aim of achieving a mean roughness value $R_a 1,6$.

Any deviations from the stated tolerances will impair the overall accuracy, alter the preload and reduce the operating life of the guidance system.

Height difference ΔH

For ΔH , permissible values are in accordance with the following formula. If larger deviations are present, please contact us.

$$\Delta H = a \cdot b$$

ΔH μm
Maximum permissible deviation from the theoretically precise position, *Figure 24*, page 253

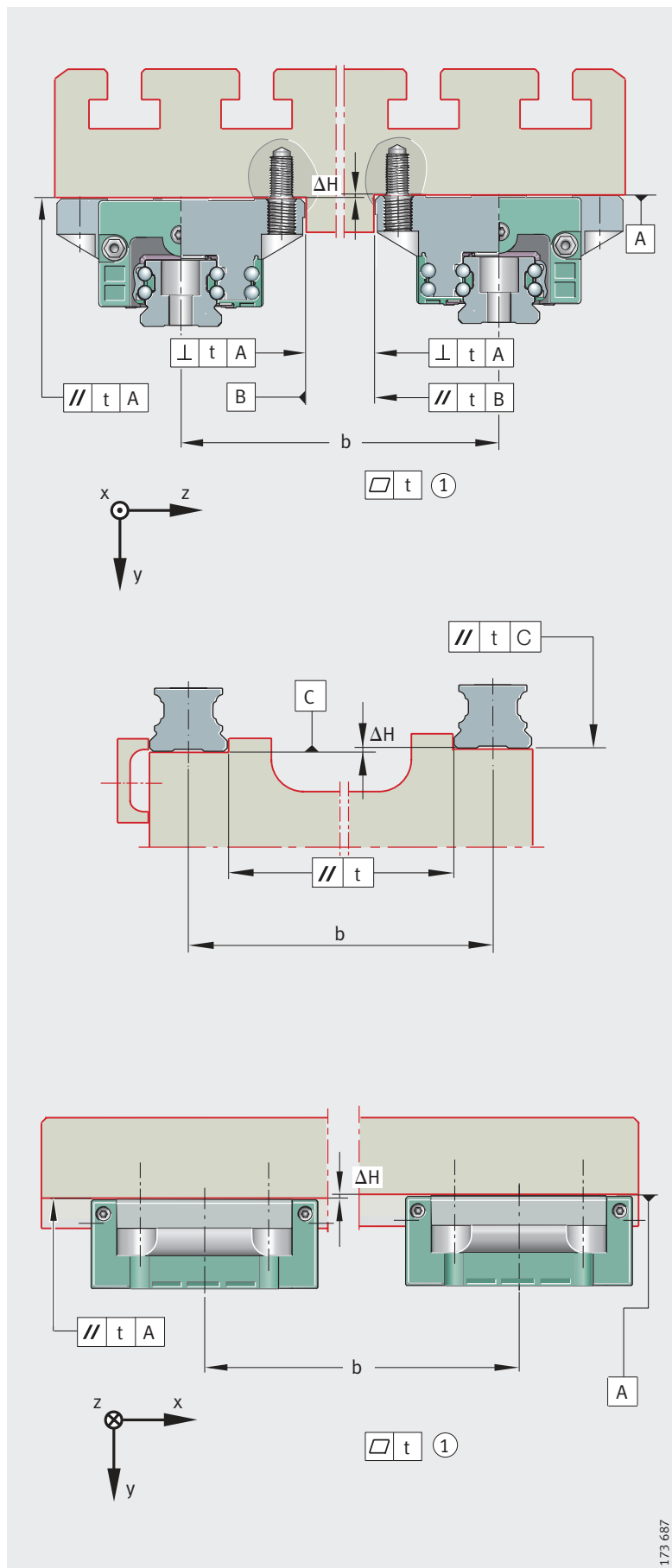
a –
Factor dependent on preload class, see table

b mm
Centre distance between guidance elements.

Factor a

Preload class	Factor a
V1 ¹⁾	0,2
V2	0,1

¹⁾ Standard preload class.



① Not convex
(for all machined surfaces)

Figure 24
Tolerances of mounting surfaces
and parallelism
of mounted guideways

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Four-row linear recirculating ball bearing and guideway assemblies

Parallelism of mounted guideways

For guideways arranged in parallel, the parallelism t should be in accordance with *Figure 24*, page 253 and table. If the maximum values are used, the displacement resistance may increase. If larger tolerances are present, please contact us.

Values for parallelism tolerances t

Guideway Designation	Preload class	
	V1	V2
	Parallelism tolerance t	
	μm	μm
TKVD15-B (-U)	8	5
TKVD20 (-U)	9	6
TKVD25 (-U)	11	7
TKVD30 (-U)	13	8
TKVD35 (-U)	15	10
TKVD45 (-U)	17	12
TKVD55-B (-U)	20	14

Locating heights and corner radii

The locating heights and corner radii should be designed in accordance with table and *Figure 25*.

Locating heights, corner radii

Four-row linear recirculating ball bearing and guideway assembly Designation	Locating heights		Corner radii	
	h_1 mm	h_2 mm max.	r_1 mm max.	r_2 mm max.
KUVE15-B (-H, -S, -EC, -ESC)	4,5	3,5	1	0,5
KUVE15-B-KT (-L, -H, -HL, -S, -SL)	4,5	3,5	1	0,5
KUVE20-B (-L, -H, -HL, -S, -SL, -SN, -SNL, -N, -NL, -EC, -ESC)	5	4	1	0,5
KUVE20-B-KT (-L, -H, -HL, -S, -SL)	5	4	1	0,5
KUVE25-B (-L, -H, -HL, -S, -SL, -SN, -SNL, -N, -NL, -EC, -ESC)	5	4,5	1	0,8
KUVE25-B-KT (-L, -H, -HL, -S, -SL, -W, -WL)	5	4,5	1	0,8
KUVE30-B (-L, -H, -HL, -S, -SL, -SN, -SNL, -N, -NL, -EC, -ESC)	6	5	1	0,8
KUVE30-B-KT (-L, -H, -HL, -S, -SL)	6	5	1	0,8
KUVE35-B (-L, -H, -HL, -S, -SL, -SN, -SNL, -N, -NL, -EC, -ESC)	6,5	6	1	0,8
KUVE35-B-KT (-L, -H, -HL, -S, -SL)	6,5	6	1	0,8
KUVE45-B (-L, -H, -HL, -S, -SL, -SN, -SNL, -N, -NL, -EC, -ESC)	9	8	1	1
KUVE45-B-KT (-L, -H, -HL, -S, -SL)	9	8	1	1
KUVE55-B (-L, -S, -SL)	12	10	1	1,5
KUVE55-B-KT (-L, -S, -SL)	12	10	1	1,5

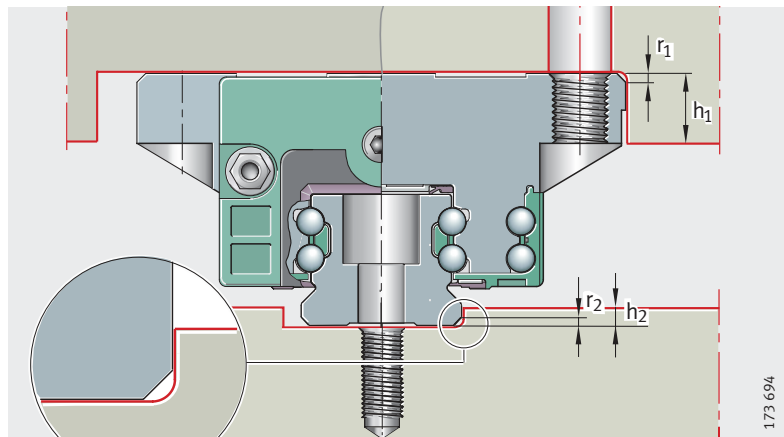


Figure 25

Locating heights and corner radii

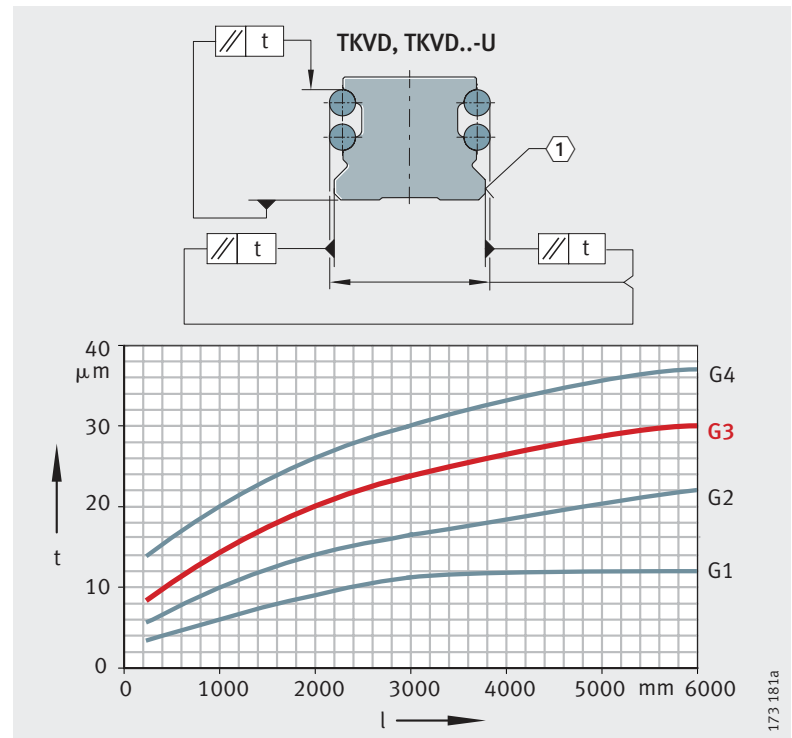
Four-row linear recirculating ball bearing and guideway assemblies

Accuracy Accuracy classes

Four-row linear recirculating ball bearing and guideway assemblies are available in accuracy classes G1 to G4, *Figure 26*. The standard is class G3.

t = parallelism tolerance
with differential measurement
l = total guideway length
① Locating face

Figure 26
Accuracy classes
and parallelism tolerances
of guideways



Parallelism of raceways to locating surfaces

The parallelism tolerances of guideways are shown in *Figure 26*. In systems with Corrotect® coating, there may be deviations in tolerances compared with uncoated units.

Tolerances

Tolerances: see table Accuracy class tolerances, reference dimensions for accuracy: see *Figure 27*.

The tolerances are arithmetic mean values. They relate to the centre point of the screw mounting or locating surfaces of the carriage.

The dimensions H and A₁ (table Accuracy class tolerances) should always remain within the tolerance irrespective of the position of the carriage on the guideway.

Accuracy class tolerances

Tolerance		Accuracy			
		G1 μm	G2 μm	G3 ¹⁾ μm	G4 μm
Tolerance for height	H	±10	±20	±25	±80
Height difference ²⁾	ΔH	5	10	15	20
Tolerance for spacing	A ₁	±10	±15	±20	±80
Spacing difference ²⁾	ΔA ₁	7	15	22	30

1) Standard accuracy class.

2) Difference between several carriages on one guideway, measured at the same point on the guideway.

Units with coating

For these units, the values for the appropriate accuracy class must be increased by the values (dependent on the coating); for values see table.

Tolerances for coated parts

Tolerance		With Corroprotect® coating		With Protect A coating	With Protect B coating
		RRF ¹⁾ μm	RRFT ²⁾ μm	KD μm	KDC μm
Tolerance for height	H	+6	+3	+6	+6
Height difference ³⁾	ΔH	+3	0	+3	+3
Tolerance for spacing	A ₁	+3	+3	+3	+3
Spacing difference ³⁾	ΔA ₁	+3	0	+3	+3

1) Displacement in tolerance zone (guideway and carriage coated).

2) Displacement in tolerance zone (guideway only coated).

3) Difference between several carriages on one guideway, measured at the same point on the guideway.

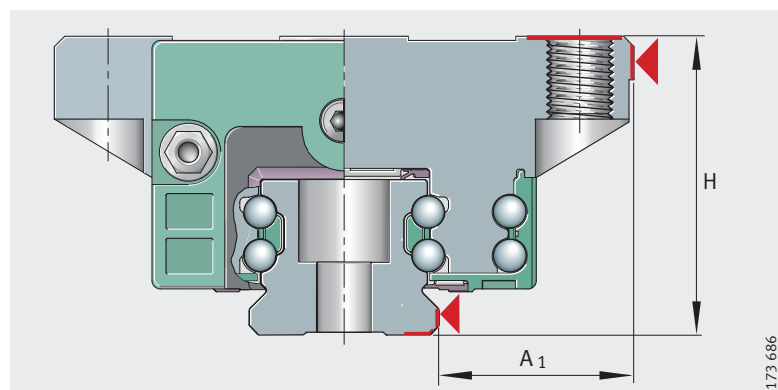
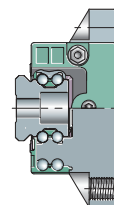


Figure 27
Datum dimensions for accuracy

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Four-row linear recirculating ball bearing and guideway assemblies

Height sorting 2S

Where guidance systems are subject to particularly high accuracy requirements, it is possible to restrict the height tolerance by specific sorting.

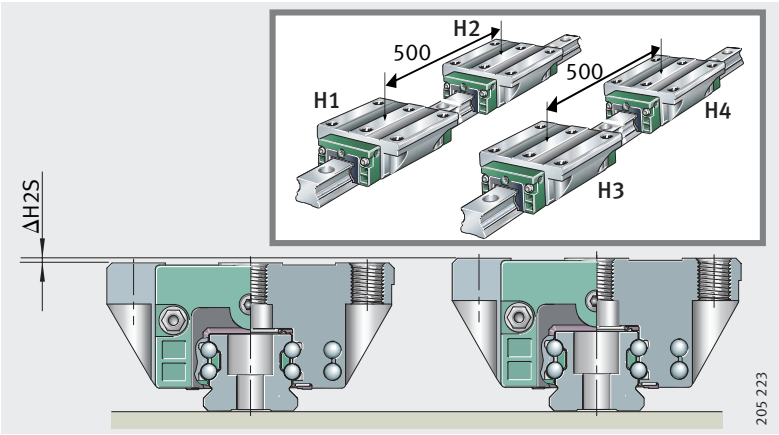


Figure 28
Height sorting 2S

Height difference in 2S

Accuracy		G1	G2	G3
		μm	μm	μm
Height difference	ΔH2S ¹⁾	10	20	25

1) Measured at the centre of the guideway.

The height tolerance of the carriages in sorting by sets comprises the height difference ΔH or ΔH2S and the parallelism deviation of the raceways as a function of length.

Positional and length tolerances of guideways

The positional and length tolerances are shown in *Figure 29*, *Figure 30* and table.
The hole pattern corresponds to DIN ISO 1101.

Figure 29
Positional and length tolerances of guideways with one row of holes

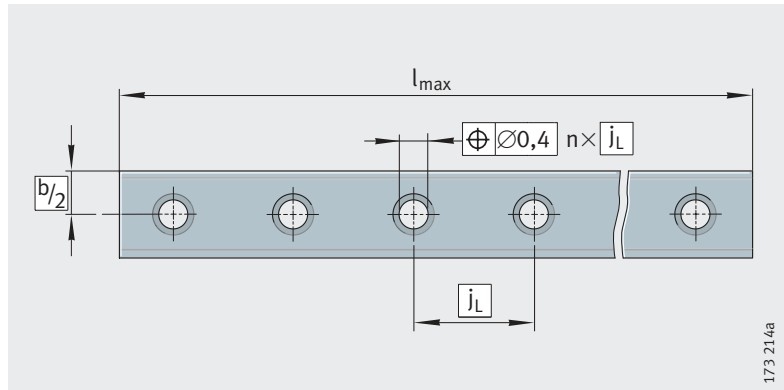
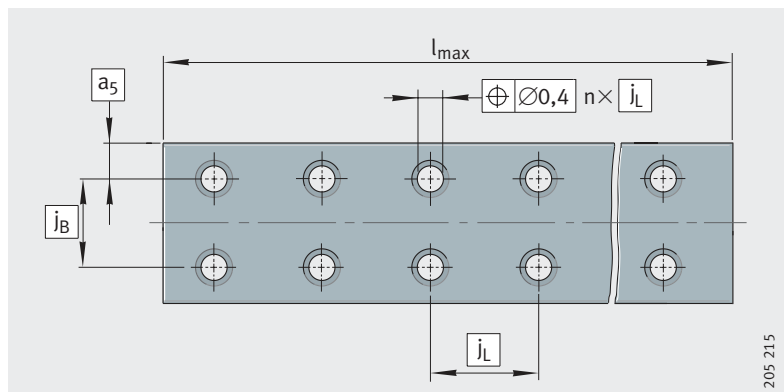


Figure 30
Positional and length tolerances of guideways with two rows of holes



Length tolerances of guideways

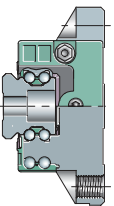
Tolerances			
of guideways, as a function of length $l_{\max}^{1)}$			on multi-piece guideways
Guideway length mm			mm
≤ 1000	> 1000 < 3000	> 3000	
-1	-1,5	$\pm 0,1\%$ of guideway length	± 3 over total length

¹⁾ Length $l_{\max}$: see dimension tables.

Pieces of joined guideways

Guideway length ¹⁾ mm	Maximum permissible number of pieces
$< 3\,000$	2
$3\,000 - 4\,000$	3
$4\,000 - 6\,000$	4
$> 6\,000$	$4 + 1$ piece per $1\,500$ mm

¹⁾ Minimum length of one piece = 600 mm.



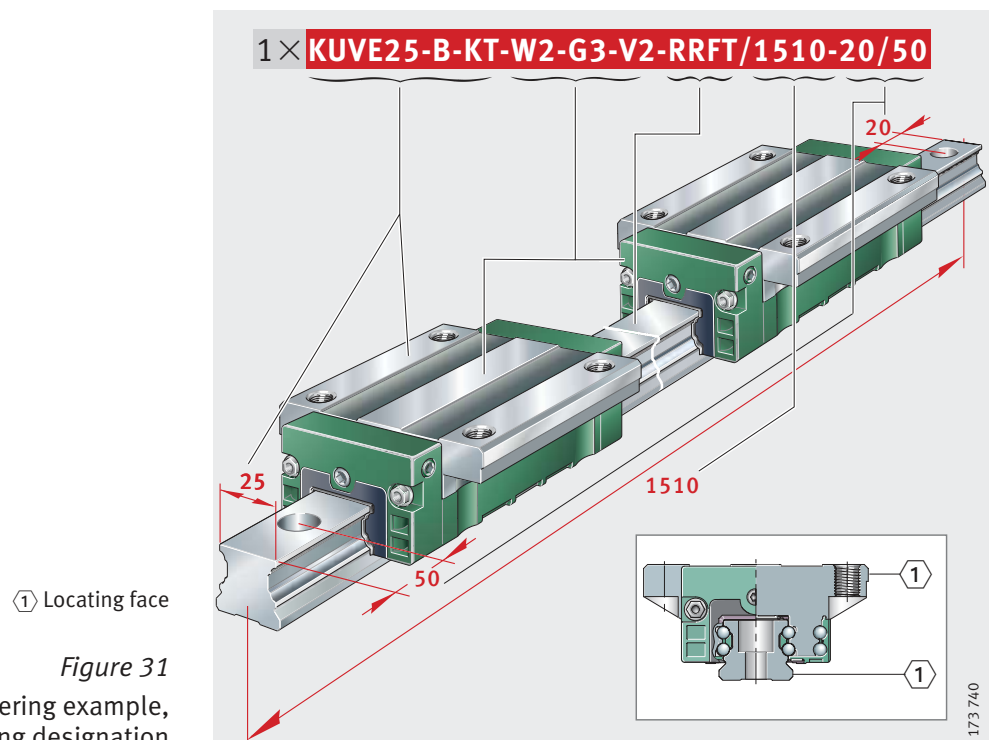
Four-row linear recirculating ball bearing and guideway assemblies

**Ordering example,
ordering designation
Unit, guideway with
asymmetrical hole pattern**

Linear ball bearing and guideway assembly
with two carriages per guideway

Size	KUVE
Carriage type, with Quad-Spacers	25
Number of carriages per unit	B-KT
Accuracy class	W2
Preload class	G3
Guideway with Corrotect® coating	V2
Guideway length	RRFT
a_L	1 510 mm
a_R	20 mm
	50 mm

Ordering designation 1×KUVE25-B-KT-W2-G3-V2-RRFT/1510-20/50, Figure 31

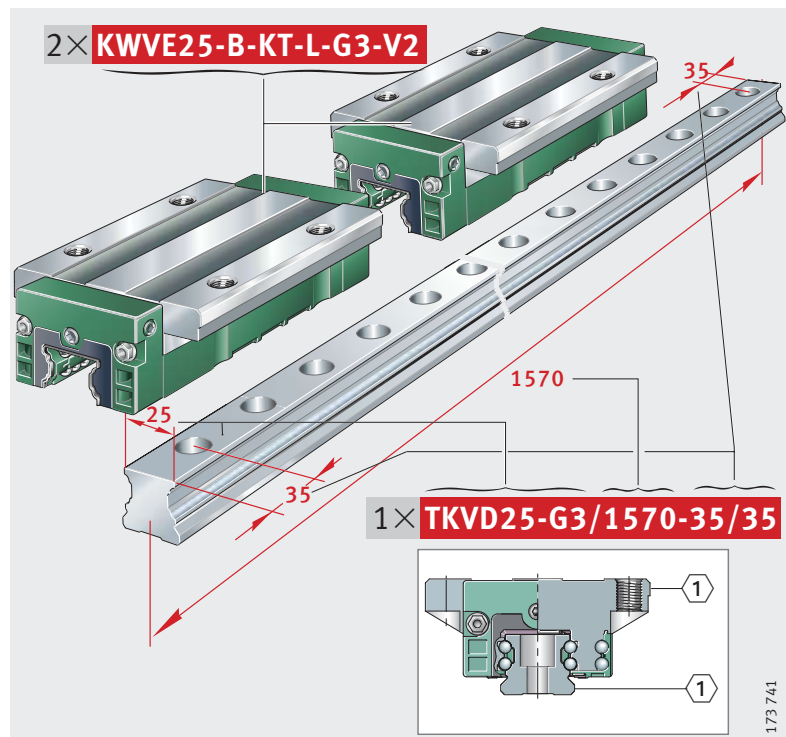


**Carriage and guideway
separate, guideway with
symmetrical hole pattern**

Carriage	Carriage for four-row linear ball bearing and guideway assembly	KWVE
	Size	25
	Carriage type, long carriage, with Quad-Spacers	B-KT-L
	Accuracy class	G3
	Preload class	V2
Ordering designation	2×KWVE25-B-KT-L-G3-V2, Figure 32	
Guideway	Guideway for carriage	TKVD
	Size	25
	Accuracy class	G3
	Guideway length	1 570 mm
	a_L	35 mm
	a_R	35 mm
Ordering designation	1×TKVD25-G3/1570-35/35, Figure 32	

① Locating face

Figure 32
Ordering example,
ordering designation



Four-row linear recirculating ball bearing and guideway assemblies

Unit, guideway with asymmetrical hole pattern

Linear ball bearing and guideway assembly with two carriages per guideway

Size

KUVE

Carriage type, full complement

25

B

Number of carriages per unit

W2

Accuracy class

G3

Preload class

V2

Guideway with Corrotect® coating

RRFT

Guideway length

1 510 mm

a_L

20 mm

a_R

50 mm

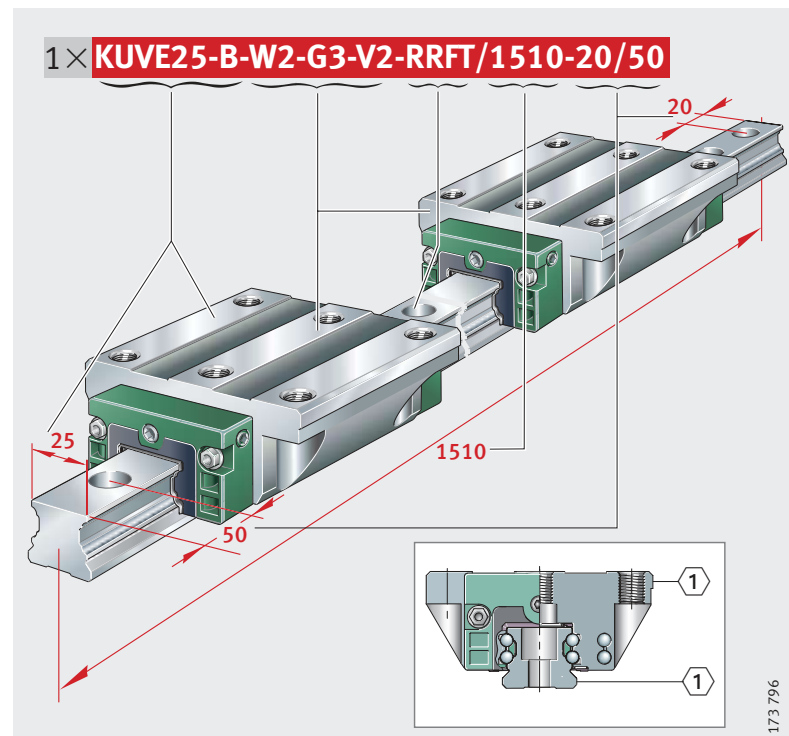
Ordering designation

1×KUVE25-B-W2-G3-V2-RRFT/1510-20/50, Figure 33

① Locating face

Figure 33

Ordering example,
ordering designation



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**Carriage and guideway
separate, guideway with
symmetrical hole pattern**

Carriage	Carriage for four-row linear ball bearing and guideway assembly	KWVE
	Size	25
	Type, long carriage	B-L
	Accuracy class	G3
	Preload class	V2
Ordering designation	2×KWVE25-B-L-G3-V2, Figure 34	
Guideway	Guideway for carriage	TKVD
	Size	25
	Accuracy class	G3
	Guideway length	1 570 mm
	a_L	35 mm
	a_R	35 mm
Ordering designation	1×TKVD25-G3/1570-35/35, Figure 34	

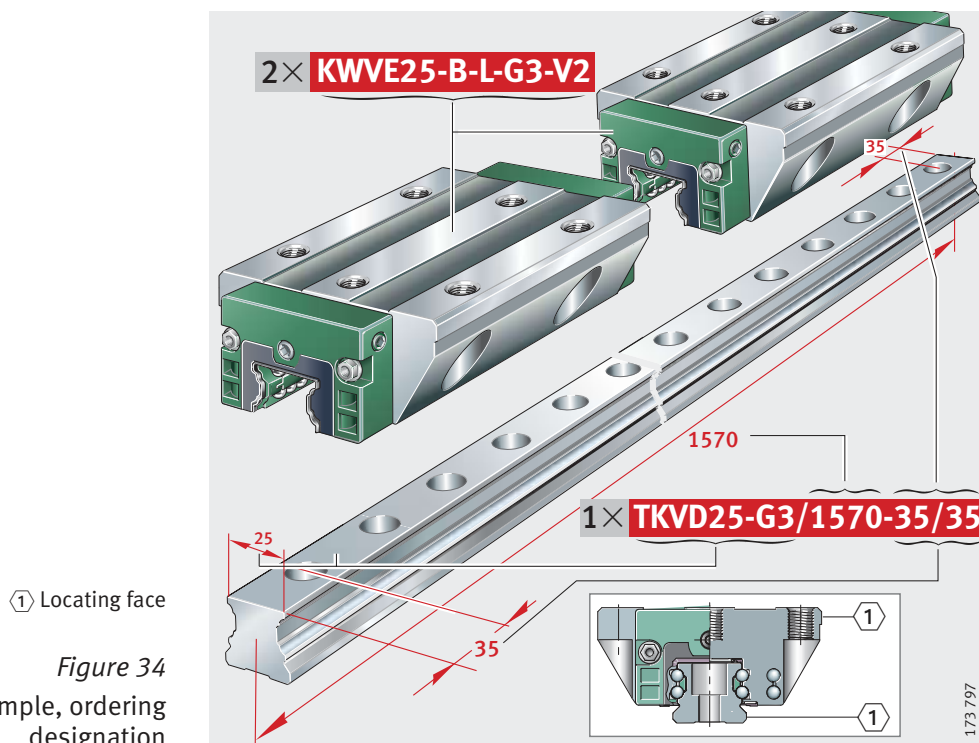
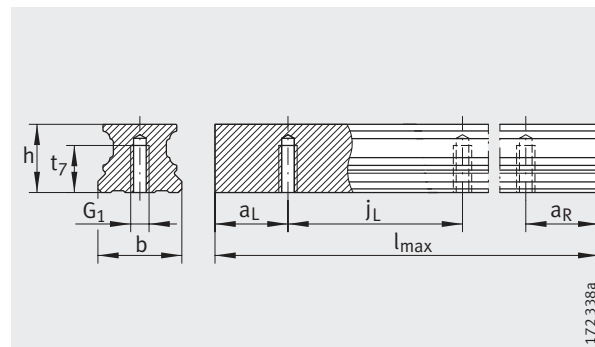


Figure 34
Ordering example, ordering
designation

Four-row linear recirculating ball bearing and guideway assemblies

Full complement

Standard, L, N and NL carriages



TKVD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions												
	l _{max} ¹⁾	H	B	L	A ₁	J _B	b -0,005 -0,03	A ₂	L ₁	J _L	J _{LZ}	J _L	a _L , a _R ²⁾		H ₁	H ₄	
													min.	max.			
KUVE15-B	1 200	24	47	59,6	16	38	15	4,5	39,8	30	26	60	20	53	4,3	7,6	
KUVE20-B	2 960	30	63	69,8	21,5	53	20	5	50,4	40	35	60	20	53	4,5	11	
KUVE20-B-L		87,3		67,9													
KUVE20-B-N		69,8		50,4													
KUVE20-B-NL		27		87,3					67,9								
KUVE25-B	2 960	36	70	81,7	23,5	57	23	6,5	60,7	45	40	60	20	53	5,1	10,9	
KUVE25-B-L		107,5		86,5													
KUVE25-B-N		81,7		60,7													
KUVE25-B-NL		31		107,5					86,5								
KUVE30-B	2 960	42	90	97,4	31	72	28	9	72	52	44	80	20	71	5,9	13,8	
KUVE30-B-L		125,4		100													
KUVE30-B-N		97,4		72													
KUVE30-B-NL		38		125,4					100								
KUVE35-B	2 960	48	100	110,4	33	82	34	9	80	62	52	80	20	71	6,7	14,3	
KUVE35-B-L		143,4		113													
KUVE35-B-N		110,4		80													
KUVE35-B-NL		44		143,4					113								
KUVE45-B	2 940	60	120	139	37,5	100	45	10	102,5	80	60	105	20	94	9,7	19,9	
KUVE45-B-L		171,1		134,6													
KUVE45-B-N		139		102,5													
KUVE45-B-NL		52		171,1					134,6								
KUVE55-B	2 520	70	140	172	43,5	116	53	12	132	95	70	120	20	107	13,5	22,7	
KUVE55-B-L				210					170								

For further table values, see page 266 and page 267.

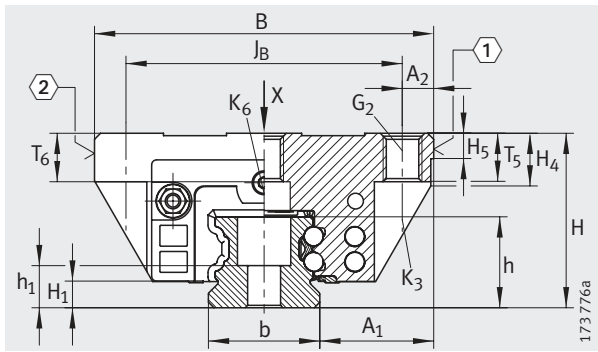
¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.

²⁾ a_L and a_R are dependent on the guideway length.

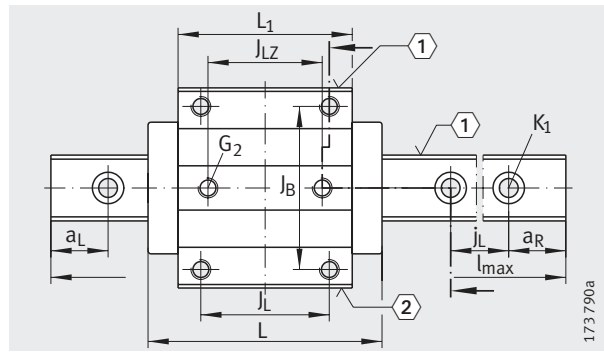
³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.

⁴⁾ ① Locating face

② Marking

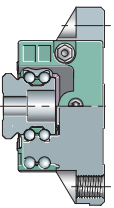


KUVE...-B (-L, -N, -NL)
①, ②⁴⁾



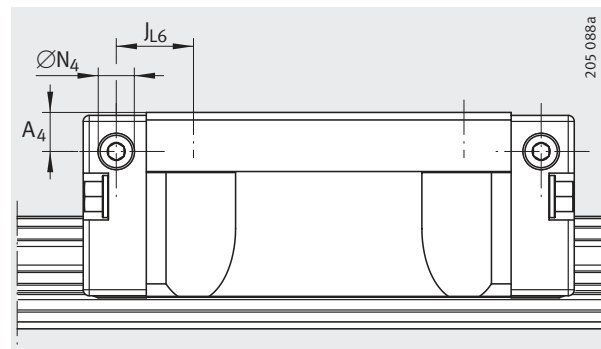
KUVE...-B (-L, -N, -NL) · View rotated 90°
①, ②⁴⁾

Fixing screws ³⁾																
H ₅	T ₅	T ₆	t ₇	h	h ₁	DIN ISO 4 762-12.9										
						G ₁		G ₂		K ₁		K ₃		K ₆		K ₆
							M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm	
4,75	7	5,8	8	15	8,15	M5	10	M5	5,8	M4	5	M4	5	–	–	M4
5,25	10	7,5	10	17	9,1	M6	17	M6	10	M5	10	M5	10	M5	10	–
	8	6										M5	10	–	–	M5
5,25	10	10	12	18,7	8,7	M6	17	M8	24	M6	17	M6	17	M6	17	–
		8												–	–	M6
6,25	12	11,5	15	23,5	11,5	M8	41	M10	41	M8	41	M8	41	M8	41	–
		9												–	–	M8
6,75	13	12,3	15	27	15	M8	41	M10	41	M8	41	M8	41	M8	41	–
		8,3												–	–	M8
9,25	15	15	20	34,2	16,2	M12	140	M12	83	M12	140	M10	83	M10	83	–
		11												–	–	M10
11,25	21	18	22	41,5	19,5	M14	220	M14	140	M14	220	M12	140	M12	140	–



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
Standard, L, N and NL carriages



Lubrication connector on lateral face

Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m	Closing plug K ₂
KUVE15-B	KWVE15-B	0,2	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE20-B	KWVE20-B	0,44	TKVD20 (-U)	2,2	KA10-TN/A
KUVE20-B-L	KWVE20-B-L	0,59			
KUVE20-B-N	KWVE20-B-N	0,37			
KUVE20-B-NL	KWVE20-B-NL	0,51			
KUVE25-B	KWVE25-B	0,68	TKVD25(-U)	2,7	KA11-TN/A
KUVE25-B-L	KWVE25-B-L	1			
KUVE25-B-N	KWVE25-B-N	0,56			
KUVE25-B-NL	KWVE25-B-NL	0,82			
KUVE30-B	KWVE30-B	1,2	TKVD30(-U)	4,3	KA15-TN/A
KUVE30-B-L	KWVE30-B-L	1,7			
KUVE30-B-N	KWVE30-B-N	1			
KUVE30-B-NL	KWVE30-B-NL	1,5			
KUVE35-B	KWVE35-B	1,75	TKVD35(-U)	5,7	KA15-TN/A
KUVE35-B-L	KWVE35-B-L	2,52			
KUVE35-B-N	KWVE35-B-N	1,56			
KUVE35-B-NL	KWVE35-B-NL	2,23			
KUVE45-B	KWVE45-B	3,3	TKVD45(-U)	9,2	KA20-TN/A
KUVE45-B-L	KWVE45-B-L	4,3			
KUVE45-B-N	KWVE45-B-N	2,72			
KUVE45-B-NL	KWVE45-B-NL	3,38			
KUVE55-B	KWVE55-B	5,5	TKVD55-B(-U)	14	KA24-TN/A
KUVE55-B-L	KWVE55-B-L	6,6			

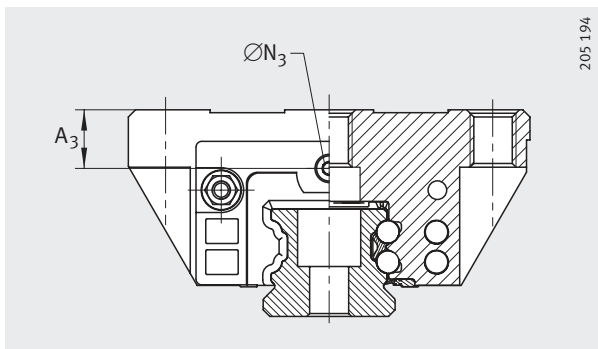
¹⁾ Calculation of basic load ratings in accordance with DIN 636.

Based on practical experience, it may be possible to increase the basic dynamic load rating.

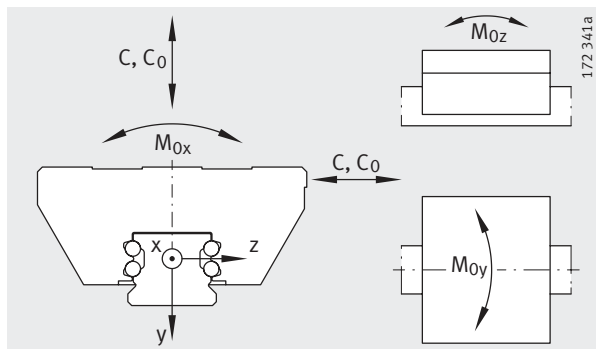
²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).

³⁾ Tapered head lubrication nipple to DIN 71 412-B M6, KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.

⁴⁾ Maximum permissible screw depth for lubrication connectors.

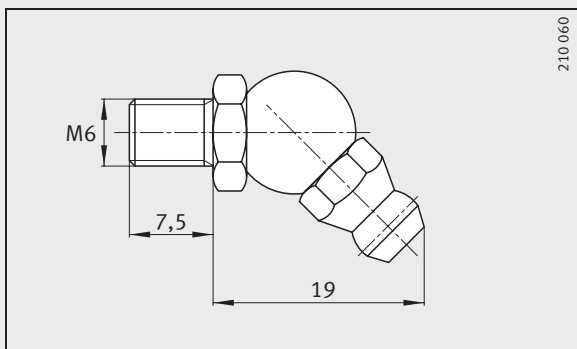
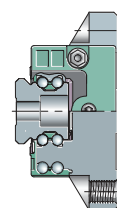


Lubrication connector on end face

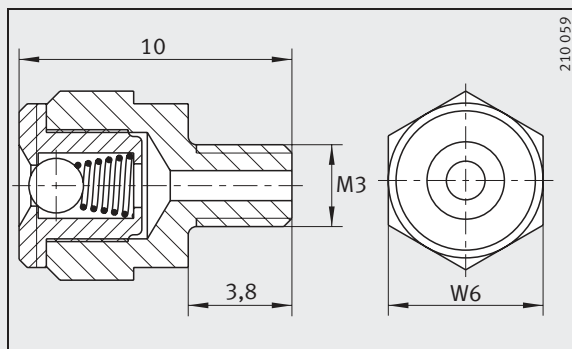


Load directions

Dimensioning of lubrication connectors							Load carrying capacity ¹⁾				
A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		4)			4)		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
4,3	2,57	5,5	3,2	2,57	5,5	9,1	7 200	14 500	150	100	100
7,7	4,5	7	4,6	4,5	5,5	9,4	13 100	27 000	332	240	240
						18,9	16 200	36 500	452	430	430
4,7			3,3	2,57		9,4	13 100	27 000	332	240	240
						18,9	16 200	36 500	452	430	430
11	5,5	7	6,5	5,6	7	12,85	17 900	37 000	510	395	395
						25,75	23 400	54 000	745	825	825
6			4	2,57	6	12,05	17 900	37 000	510	395	395
						24,95	23 400	54 000	745	825	825
11,5	5,5	7	7	5,5	7	15,5	27 500	55 000	970	660	660
						29,5	34 500	74 000	1 320	1 180	1 180
7,5			4,95	4,5		15,1	27 500	55 000	970	700	700
						29,1	34 500	74 000	1 310	1 240	1 240
12,3	5,5	7	11	5,5	7	16	38 000	72 000	1 465	1 020	1 020
						32,5	47 500	100 000	2 625	1 890	1 890
8,3			7			16	38 000	72 000	1 465	1 020	1 020
						32,5	47 500	100 000	2 025	1 890	1 890
16,5	5,5	7	16,5	5,5	7	19,25	69 000	141 000	3 610	2 485	2 485
						35,3	82 000	181 000	4 635	4 000	4 000
8,5			8,5			19,25	69 000	141 000	3 610	2 485	2 485
						35,5	82 000	181 000	5 635	4 000	4 000
15	5,5	7	15	5,5	7	30,5	104 000	213 000	5 600	2 730	2 730
						49,5	127 000	285 000	7 500	4 725	4 800



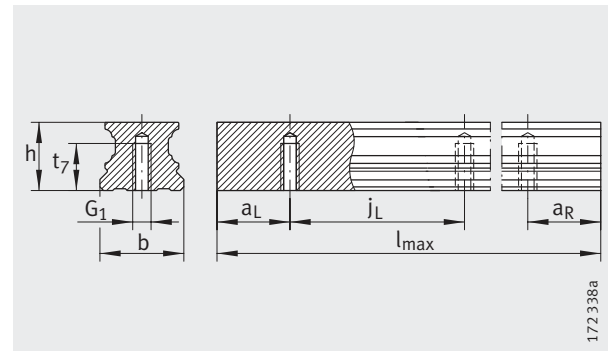
Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

Full complement
H, S, SN carriages



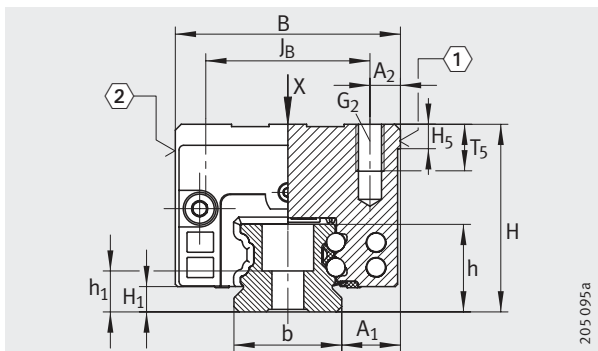
TKVD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions								
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	b $-0,005$ $-0,03$	A_2	L_1	J_L	j_L	$a_L, a_R^{2)}$	
												min.	max.
KUVE15-B-H	1 200	28	34	59,6	9,5	26	15	4	39,8	26	60	20	53
KUVE15-B-S		24											
KUVE20-B-H	2 960	30	44	69,8	12	32	20	6	50,4	36	60	20	53
KUVE20-B-S													
KUVE20-B-SN		27											
KUVE25-B-H	2 960	40	48	81,7	12,5	35	23	6,5	60,7	35	60	20	52
KUVE25-B-S		36											
KUVE25-B-SN		31											
KUVE30-B-H	2 960	45	60	97,4	16	40	28	10	72	40	80	20	71
KUVE30-B-S		42											
KUVE30-B-SN		38											
KUVE35-B-H	2 960	55	70	110,4	18	50	34	10	80	50	80	20	71
KUVE35-B-S		48											
KUVE35-B-SN		44											
KUVE45-B-H	2 940	70	86	139	20,5	60	45	13	102,5	60	105	20	94
KUVE45-B-S		60											
KUVE45-B-SN		52											
KUVE55-B-S	2 520	70	100	172	23,5	75	53	12,5	132	75	120	20	107

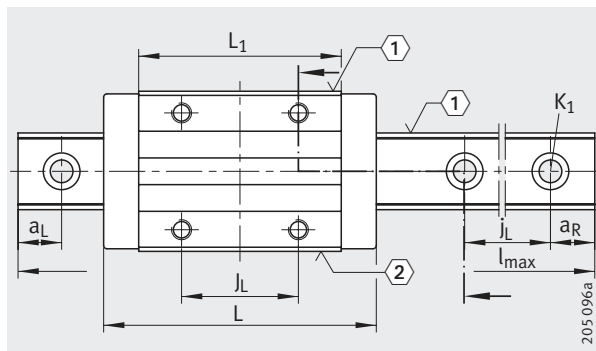
For further table values, see page 270 and page 271.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ a_L and a_R are dependent on the guideway length.
- ³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- ⁴⁾ ① Locating face
② Marking



KUVE...-B (-H, -S, -SN)

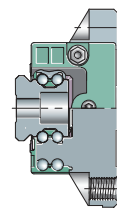
①, ②⁴⁾



KUVE...-B (-H, -S, -SN) · View rotated 90°

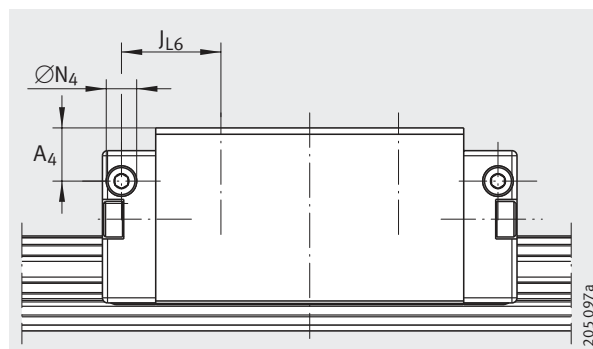
①, ②⁴⁾

						Fixing screws ³⁾					
H ₁	H ₅	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁	
						DIN ISO 4 762-12.9					
							M _A Nm		M _A Nm		M _A Nm
4,3	4,75	6	8	15	8,15	M5	10	M4	5	M4	5
4,5	5,25	7,5	10	17	9,1	M6	17	M5	10	M5	10
5,1	5,25	10	12	18,7	8,7	M6	17	M6	17	M6	17
		7,5									
5,9	6,25	13,5	15	23,5	11,5	M8	41	M8	41	M8	41
		11									
6,7	6,75	13,5	15	27	15	M8	41	M8	41	M8	41
9,7	9,25	23,5	20	34,2	16,2	M12	140	M10	83	M12	140
		17									
		16,5									
13,5	11,25	15	22	41,5	19,6	M14	220	M12	140	M14	220



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
H, S, SN carriages

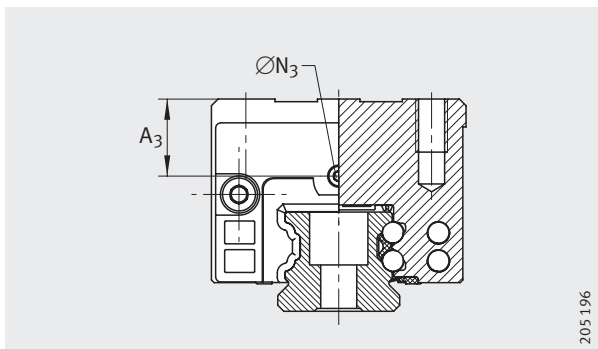


Lubrication connector on lateral face

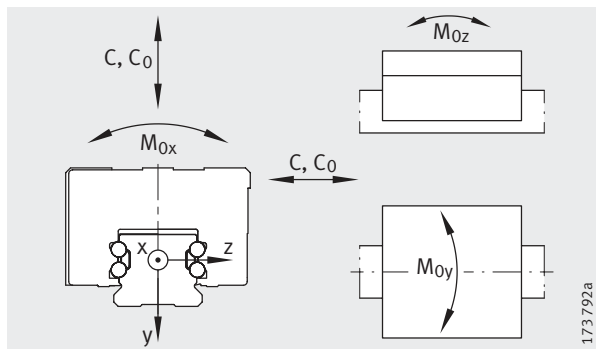
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE15-B-H	KWVE15-B-H	0,2	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE15-B-S	KWVE15-B-S	0,16			
KUVE20-B-H	KWVE20-B-H	0,34	TKVD20 (-U)	2,2	KA10-TN/A
KUVE20-B-S	KWVE20-B-S				
KUVE20-B-SN	KWVE20-B-SN	0,29			
KUVE25-B-H	KWVE25-B-H	0,65	TKVD25(-U)	2,7	KA11-TN/A
KUVE25-B-S	KWVE25-B-S	0,56			
KUVE25-B-SN	KWVE25-B-SN	0,45			
KUVE30-B-H	KWVE30-B-H	1,04	TKVD30(-U)	4,3	KA15-TN/A
KUVE30-B-S	KWVE30-B-S	0,94			
KUVE30-B-SN	KWVE30-B-SN	0,8			
KUVE35-B-H	KWVE35-B-H	1,71	TKVD35(-U)	5,7	KA15-TN/A
KUVE35-B-S	KWVE35-B-S	1,3			
KUVE35-B-SN	KWVE35-B-SN	1,24			
KUVE45-B-H	KWVE45-B-H	3,36	TKVD45(-U)	9,2	KA20-TN/A
KUVE45-B-S	KWVE45-B-S	2,67			
KUVE45-B-SN	KWVE45-B-SN	2,12			
KUVE55-B-S	KWVE55-B-S	4,35	TKVD55-B(-U)	14	KA24-TN/A

- ¹⁾ Calculation of basic load ratings in accordance with DIN 636.
Based on practical experience, it may be possible to increase the basic dynamic load rating.
- ²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).
- ³⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.
- ⁴⁾ Maximum permissible screw depth for lubrication connectors.

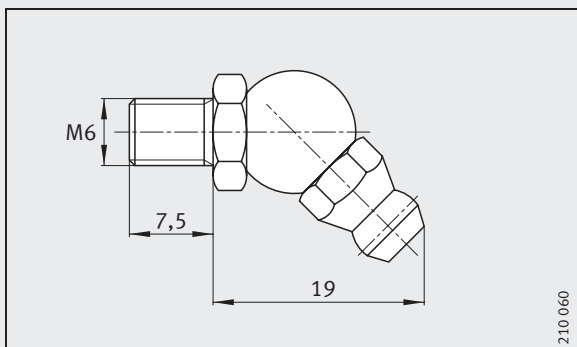
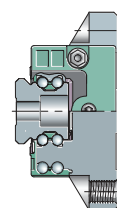


Lubrication connector on end face

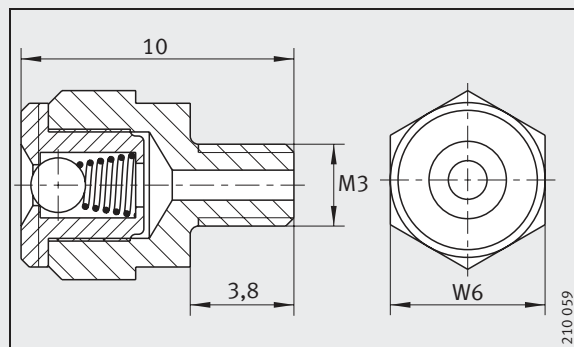


Load directions

Dimensioning of lubrication connectors							Load carrying capacity ¹⁾				
A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		⁴⁾			⁴⁾		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
8,3 4,3	2,57	5,5	7,2 3,2	2,57	5,5	11,1	7 200	14 500	150	100	100
8 4,7			4,6 3,3								
15 11 6	5,5	7	10,5 6,5 4	5,6 2,57	7 6	17,9	17 900	37 000	510	395	395
14,5 11,5 7,5			10 7 4,95	5,5 4,5	7						
19,3 12,3 8,3			18 11 7	5,5	7						
26,5 16,5 8,5	5,5	7	26,5 16,5 8,5	5,5	7	29,3	69 000	141 000	3 610	2 485	2 485
15			15	5,5	7						
	5,5	7	15	5,5	7	40,5	104 000	213 000	5 600	2 730	2 730



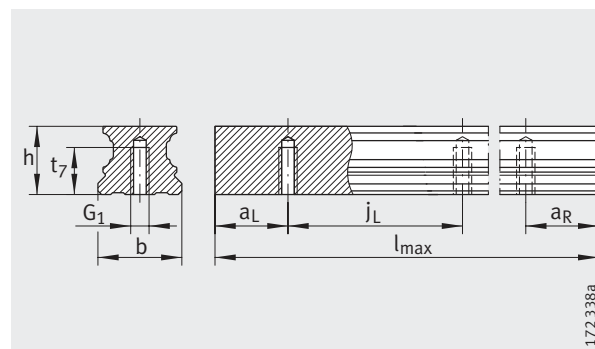
Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

Full complement
SL, HL, SNL carriages



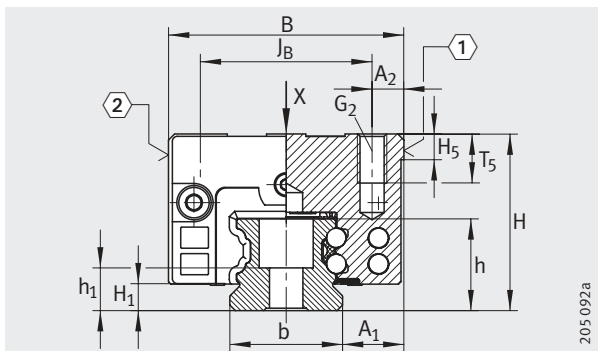
TKVD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Dimensions						
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	b -0,005 -0,03	A_2	L_1	J_L	j_L
KUVE20-B-SL	2 960	30	44	87,3	12	32	20	6	67,9	50	60
KUVE20-B-SNL		27									
KUVE25-B-HL	2 960	40	48	107,5	12,5	35	23	6,5	86,5	50	60
KUVE25-B-SL		36									
KUVE25-B-SNL		31									
KUVE30-B-HL	2 960	45	60	125,4	16	40	28	10	100	60	80
KUVE30-B-SL		42									
KUVE30-B-SNL		38									
KUVE35-B-HL	2 960	55	70	143,4	18	50	34	10	113	72	80
KUVE35-B-SL		48									
KUVE35-B-SNL		44									
KUVE45-B-HL	2 940	70	86	171,1	20,5	60	45	13	134,6	80	105
KUVE45-B-SL		60									
KUVE45-B-SNL		52									
KUVE55-B-SL	2 520	70	100	210	23,5	75	53	12,5	170	95	120

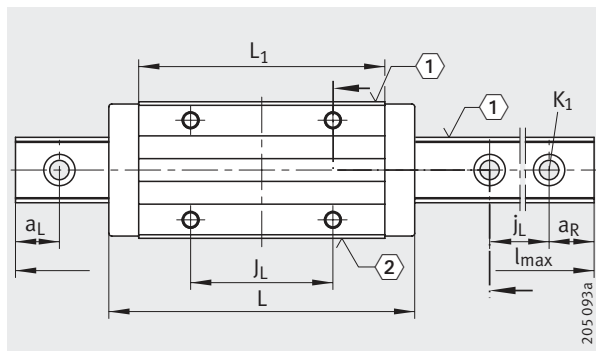
For further table values, see page 274 and page 275.

- 1) Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- 2) a_L and a_R are dependent on the guideway length.
- 3) If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- 4) ① Locating face
② Marking



KUVE...-B (-SL, -HL, -SNL)

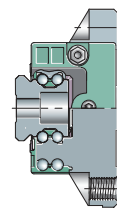
①, ②⁴⁾



KUVE...-B (-SL, -HL, -SNL) · View rotated 90°

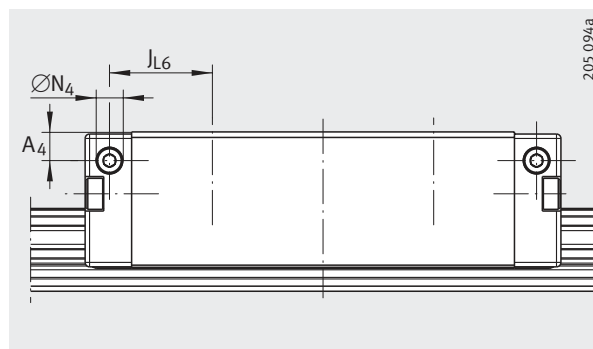
①, ②⁴⁾

								Fixing screws ³⁾					
a _L , a _R ²⁾		H ₁	H ₅	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁	
min.	max.							DIN ISO 4 762-12.9					
20	53	4,5	5,25	7,5	10	17	9,1	M6	17	M5	10	M5	10
20	53	5,1	5,25	10	12	18,7	8,7	M6	17	M6	17	M6	17
				7,5									
20	71	5,9	6,25	13,5	15	23,5	11,5	M8	41	M8	41	M8	41
				11									
20	71	6,7	6,75	13,5	15	27	15	M8	41	M8	41	M8	41
20	94	9,7	9,25	17	20	34,2	16,2	M12	140	M10	83	M12	140
				16,5									
20	107	13,5	11,25	15	22	41,5	19,5	M14	220	M12	140	M14	220



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
SL, HL, SNL carriages

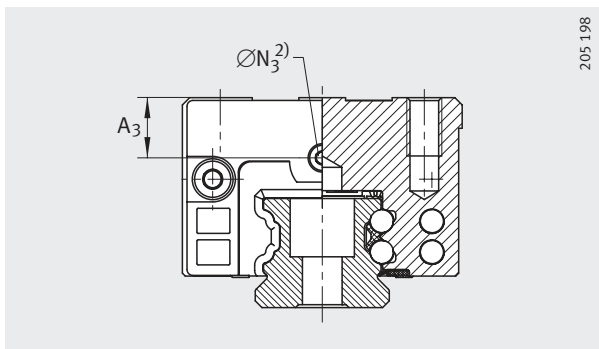


Lubrication connector on lateral face

Dimension table (continued) · Dimensions in mm

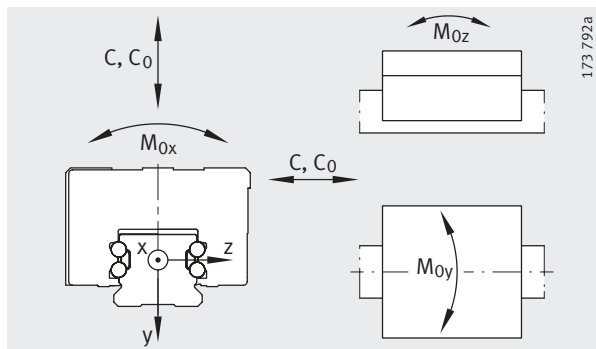
Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE20-B-SL	KWVE20-B-SL	0,46	TKVD20 (-U)	2,2	KA10-TN/A
KUVE20-B-SNL	KWVE20-B-SNL	0,38			
KUVE25-B-HL	KWVE25-B-HL	1	TKVD25(-U)	2,7	KA11-TN/A
KUVE25-B-SL	KWVE25-B-SL	1			
KUVE25-B-SNL	KWVE25-B-SNL	0,62			
KUVE30-B-HL	KWVE30-B-HL	1,43	TKVD30(-U)	4,3	KA15-TN/A
KUVE30-B-SL	KWVE30-B-SL	1,7			
KUVE30-B-SNL	KWVE30-B-SNL	1,1			
KUVE35-B-HL	KWVE35-B-HL	2,4	TKVD35(-U)	5,7	KA15-TN/A
KUVE35-B-SL	KWVE35-B-SL	1,81			
KUVE35-B-SNL	KWVE35-B-SNL	1,72			
KUVE45-B-HL	KWVE45-B-HL	4,27	TKVD45(-U)	9,2	KA20-TN/A
KUVE45-B-SL	KWVE45-B-SL	3,38			
KUVE45-B-SNL	KWVE45-B-SNL	2,68			
KUVE55-B-SL	KWVE55-B-SL	6,3	TKVD55(-U)	14	KA24-TN/A

- ¹⁾ Calculation of basic load ratings in accordance with DIN 636.
Based on practical experience, it may be possible to increase the basic dynamic load rating.
- ²⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.
- ³⁾ Maximum permissible screw depth for lubrication connectors.



205 198

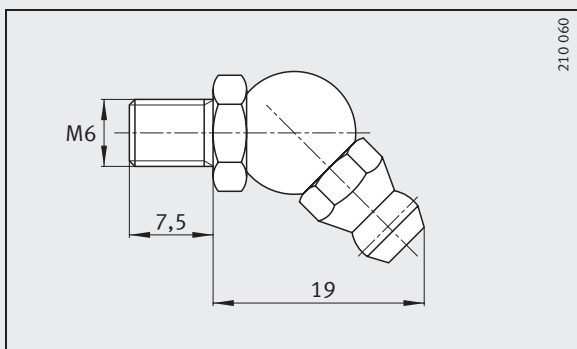
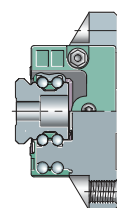
Lubrication connector on end face



173 792a

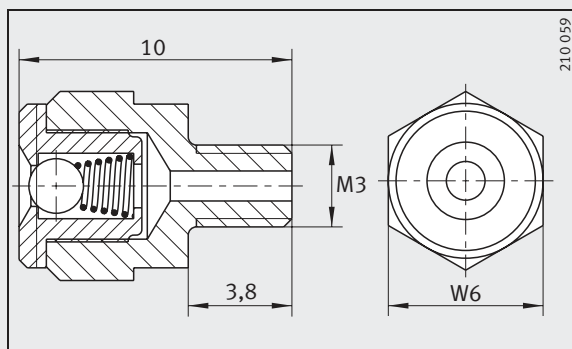
Load directions

Dimensioning of lubrication connectors							Load carrying capacity ¹⁾				
A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		³⁾			³⁾		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
7,7	4,5	7	4,6	4,5	5,5	13,2	16 200	36 500	452	430	430
4,7			3,3	2,57							
15	5,5	7	10,5	5,6	7	23,3	23 400	54 000	745	825	825
11			6,5								
6			4	2,57							
14,5	5,5	7	10	5,5	7	25,5	34 500	74 000	1 310	1 240	1 240
11,5			7								
7,5			4,95	4,5							
19,3	5,5	7	18	5,5	7	27,5	47 500	100 000	2 025	1 890	1 890
12,3			11								
8,3			7								
26,5	5,5	7	26,5	5,5	7	35,3	82 000	181 000	4 635	4 000	4 000
16,5			16,5								
8,5			8,5								
15	5,5	7	15	5,5	7	49,5	127 000	285 000	7 500	4 725	4 800



210 060

Lubrication nipple²⁾

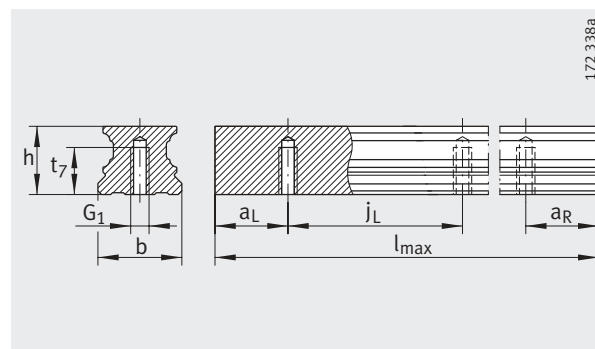


210 059

Lubrication nipple²⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

Full complement
EC carriages



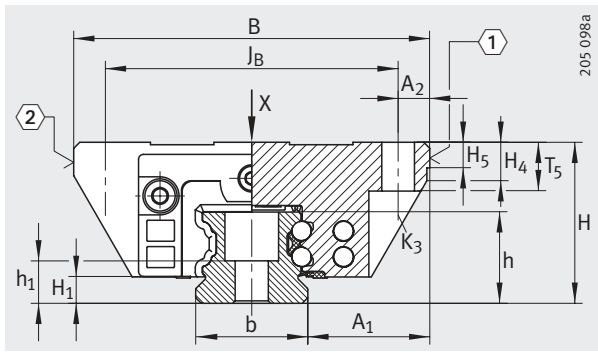
TKVD..-U

Dimension table · Dimensions in mm

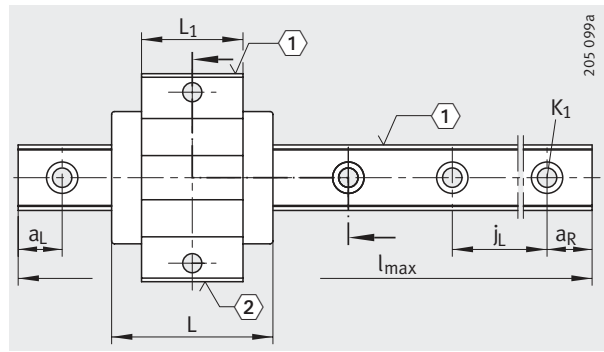
Designation	Dimensions				Mounting dimensions							
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	b -0,005 -0,03	A_2	L_1	J_L	$a_L, a_R^{2)}$	
											min.	max.
KUVE15-B-EC	1 200	24	52	42,9	18,5	41	15	5,5	23,1	60	20	53
KUVE20-B-EC	2 960	28	59	48,8	19,5	49	20	5	29,4	60	20	53
KUVE25-B-EC	2 960	33	73	56,6	25	60	23	6,5	35,6	60	20	53
KUVE30-B-EC	2 960	42	90	67,4	31	72	28	9	42	80	20	71
KUVE35-B-EC	2 960	48	100	74,6	33	82	34	9	44,2	80	20	71
KUVE45-B-EC	2 940	60	120	96,2	37,5	100	45	10	59,7	105	20	94

For further table values, see page 278 and page 279.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ a_L and a_R are dependent on the guideway length.
- ³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- ⁴⁾ ① Locating face
② Marking

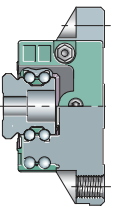


KUVE...-B-EC
①, ②⁴⁾



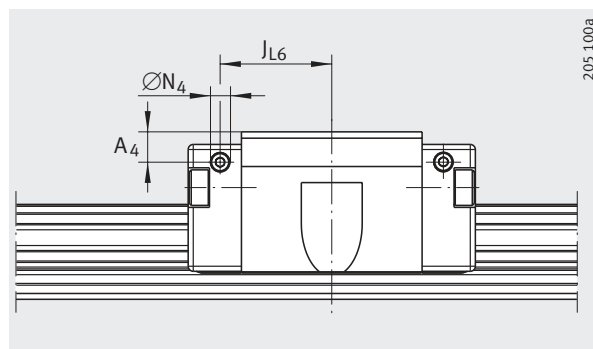
KUVE...-B-EC · View rotated 90°
①, ②⁴⁾

							Fixing screws ³⁾					
H ₁	H ₄	H ₅	T ₅	t ₇	h	h ₁	G ₁		K ₁		K ₃	
							DIN ISO 4 762-12.9					
								M _A Nm		M _A Nm		M _A Nm
4,3	6,1	4,75	7	8	15	8,15	M5	10	M4	5	M4	5
4,5	11,2	5,25	9	10	17	9,1	M6	17	M5	10	M5	10
5,1	7,85	5,25	10	12	18,7	8,7	M6	17	M6	17	M6	17
5,9	13,8	6,25	12	15	23,5	11,5	M8	41	M8	41	M8	41
6,7	14,3	6,75	13	15	27	15	M8	41	M8	41	M8	41
9,7	19,9	9,25	15	20	34,2	16,2	M12	140	M12	140	M10	83



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
EC carriages



Lubrication connector on lateral face

Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE15-B-EC	KWVE15-B-EC	0,13	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE20-B-EC	KWVE20-B-EC	0,23	TKVD20 (-U)	2,2	KA10-TN/A
KUVE25-B-EC	KWVE25-B-EC	0,4	TKVD25(-U)	2,7	KA11-TN/A
KUVE30-B-EC	KWVE30-B-EC	0,75	TKVD30(-U)	4,3	KA15-TN/A
KUVE35-B-EC	KWVE35-B-EC	1,04	TKVD35(-U)	5,7	KA15-TN/A
KUVE45-B-EC	KWVE45-B-EC	2,07	TKVD45(-U)	9,2	KA20-TN/A

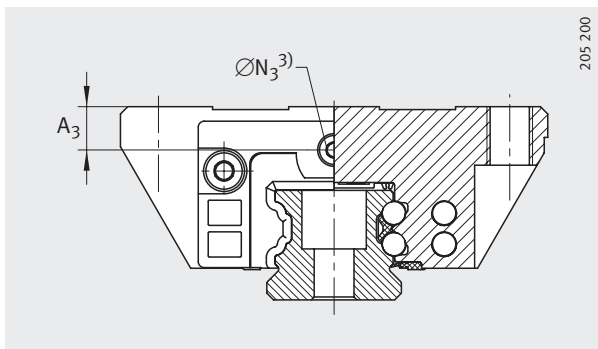
¹⁾ Calculation of basic load ratings in accordance with DIN 636.

Based on practical experience, it may be possible to increase the basic dynamic load rating.

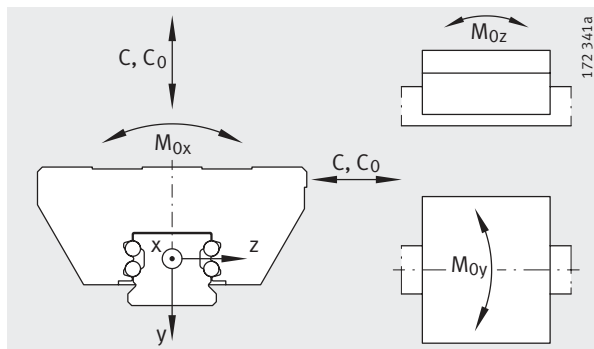
²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).

³⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.

⁴⁾ Maximum permissible screw depth for lubrication connectors.



Lubrication connector on end face

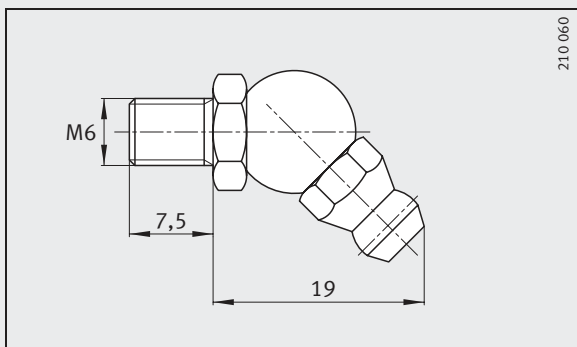
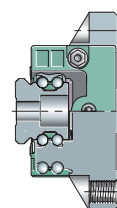


Load directions

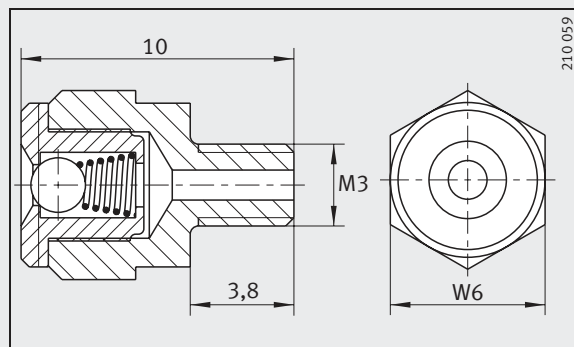
Dimensioning of lubrication connectors

Load carrying capacity¹⁾

A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		⁴⁾			⁴⁾		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
4,3	2,57	5,5	3,2	2,57	5,5	15,8	4 900	8 300	86	35	35
6	4,5	7	4,3	2,57	5,5	18,9	8 900	15 400	190	85	85
8	5,5	7	6	2,57	6	22	12 500	22 200	305	155	155
11,5	5,5	7	7	5,5	7	26,5	18 700	31 500	554	248	248
12,3	5,5	7	11	5,5	7	29,1	24 600	39 000	790	330	330
16,5	5,5	7	16,5	5,5	7	37,9	46 500	80 000	2 060	883	883



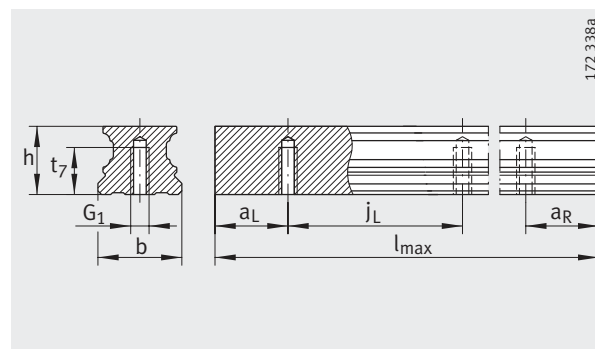
Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

Full complement
ESC carriages



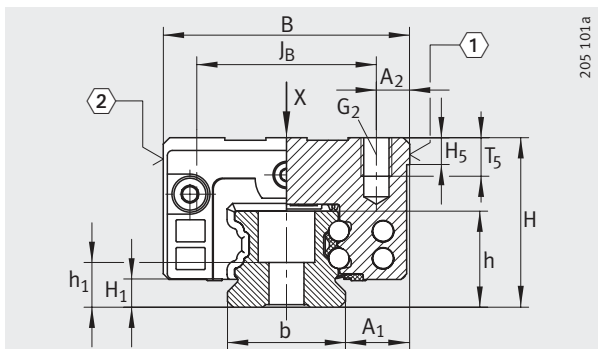
TKVD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions							
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	b -0,005 -0,03	A_2	L_1	J_L	$a_L, a_R^{2)}$	
											min.	max.
KUVE15-B-ESC	1 200	24	34	42,9	9,5	26	15	4	23,1	60	20	53
KUVE20-B-ESC	2 960	28	42	48,8	11	32	20	5	29,4	60	20	53
KUVE25-B-ESC	2 960	33	48	56,6	12,5	35	23	6,5	35,6	60	20	53
KUVE30-B-ESC	2 960	42	60	67,4	16	40	28	10	42	80	20	71
KUVE35-B-ESC	2 960	48	70	74,6	18	50	34	10	44,2	80	20	71
KUVE45-B-ESC	2 940	60	86	96,2	20,5	60	45	13	59,7	105	20	94

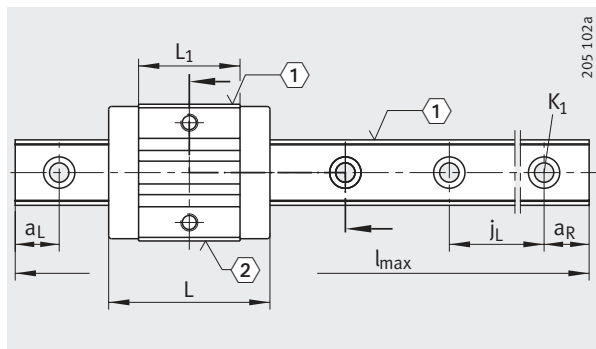
For further table values, see page 282 and page 283.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ a_L and a_R are dependent on the guideway length.
- ³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- ⁴⁾ ① Locating face
② Marking



KUV...-B-ESC

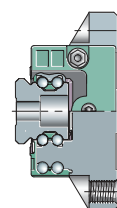
1, 2 4)



KUV...-B-ESC · View rotated 90°

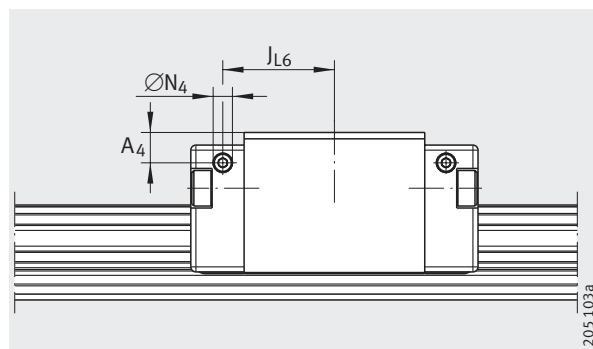
1, 2 4)

						Fixing screws ³⁾					
H ₁	H ₅	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁	
						DIN ISO 4 762-12.9					
							M _A Nm		M _A Nm		M _A Nm
4,3	4,75	6	8	15	8,15	M5	10	M4	5	M4	5
4,5	5,25	7,5	10	17	9,1	M6	17	M5	10	M5	10
5,1	5,25	10	12	18,7	8,7	M6	17	M6	17	M6	17
5,9	6,25	13,5	15	23,5	11,5	M8	41	M8	41	M8	41
6,7	6,75	13,5	15	27	15	M8	41	M8	41	M8	41
9,7	9,25	17	20	34,2	16,2	M12	140	M10	83	M12	140



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
ESC carriages



Lubrication connector on lateral face

Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE15-B-ESC	KWVE15-B-ESC	0,12	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE20-B-ESC	KWVE20-B-ESC	0,18	TKVD20 (-U)	2,2	KA10-TN/A
KUVE25-B-ESC	KWVE25-B-ESC	0,3	TKVD25(-U)	2,7	KA11-TN/A
KUVE30-B-ESC	KWVE30-B-ESC	0,57	TKVD30(-U)	4,3	KA15-TN/A
KUVE35-B-ESC	KWVE35-B-ESC	1,04	TKVD35(-U)	5,7	KA15-TN/A
KUVE45-B-ESC	KWVE45-B-ESC	1,8	TKVD45(-U)	9,2	KA20-TN/A

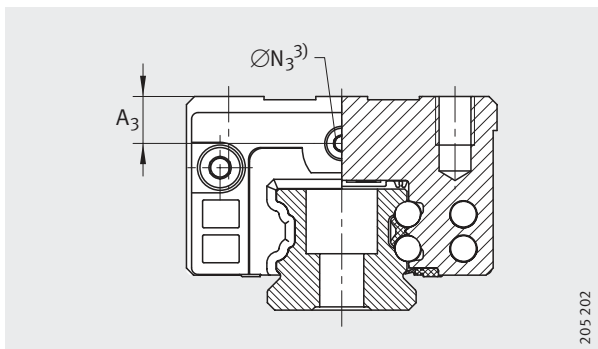
¹⁾ Calculation of basic load ratings in accordance with DIN 636.

Based on practical experience, it may be possible to increase the basic dynamic load rating.

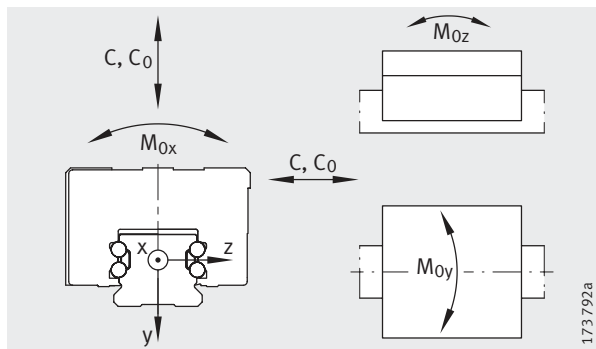
²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).

³⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.

⁴⁾ Maximum permissible screw depth for lubrication connectors.

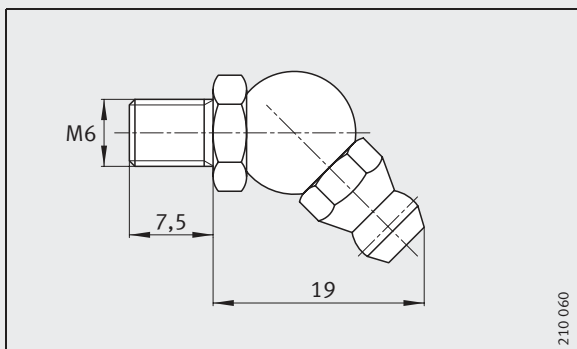
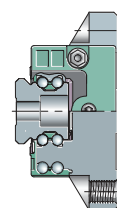


Lubrication connector on end face

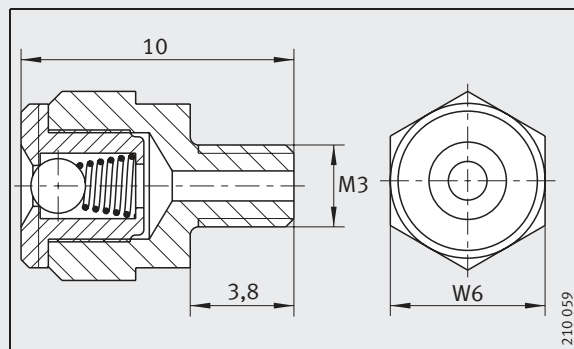


Load directions

Dimensioning of lubrication connectors							Load carrying capacity ¹⁾				
A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		⁴⁾			⁴⁾		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
4,3	2,57	5,5	3,2	2,57	5,5	15,8	4 900	8 300	86	35	35
6	4,5	7	4,3	2,57	5,5	18,9	8 900	15 400	190	85	85
8	5,5	7	6	2,57	6	22	12 500	22 200	305	155	155
11,5	5,5	7	7	5,5	7	26,5	18 700	31 500	554	248	248
12,3	5,5	7	11	5,5	7	29,1	24 600	39 000	790	330	330
16,5	5,5	7	16,5	5,5	7	37,9	46 500	80 000	2 060	883	883



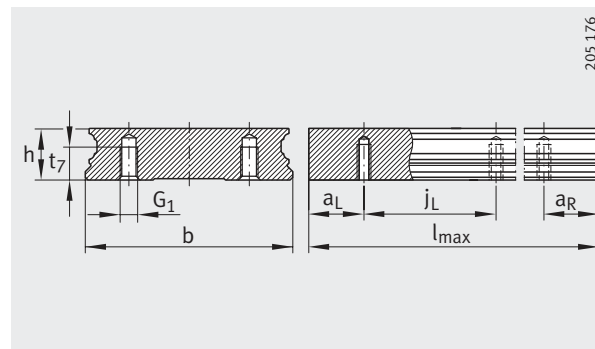
Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

Full complement
Wide guideway
W, WL carriages



TKVD..-W-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions												
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	j_B	a_5	b	A_2	L_1	J_L	j_L	$a_L, a_R^{2)}$		A_{L1}	H_1
														min.	max.		
KUVE15-W	1 200	21	68	55,6	15,5	60	22	7,5	$37_{-0,005}^{-0,03}$	4	39,8	29	50	10	44	1,5	4,3
KUVE20-W	1 980	27	80	69,8	19	70	24	9	42	5	50,4	40	60	20	53	19	4,6
KUVE25-WL	1 980	35	120	107,5	25,5	107	40	14,5	69	6,5	86,5	60	80	20	71	19	5,2
KUVE30-W	2 000	42	142	97,6	31	124	50	15	80	9	72	52	80	20	71	19	6
KUVE35-WL	2 960	50	162	140,2	36	144	60	15	90	9	109,8	80	80	20	71	19	6,8

¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.

²⁾ a_L and a_R are dependent on the guideway length.

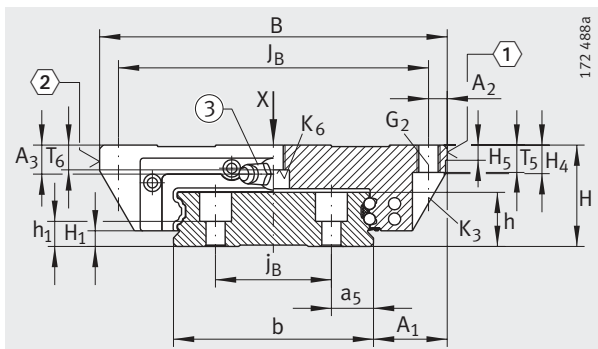
³⁾ For location from above: the maximum screw depth for the central threaded holes is $T_6 + 2,5$ mm.

⁴⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.

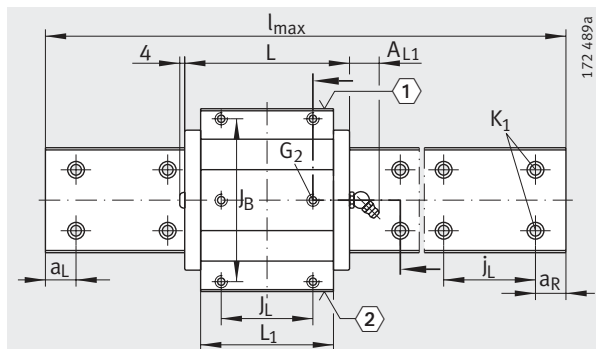
⁵⁾ ① Locating face

② Marking

③ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20 to DIN 71 412-B M5 and KUVE15 with drive fit lubrication nipple

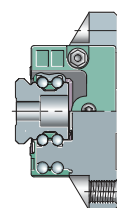


KUVE...-W (-WL)
①, ②, ③⁵⁾



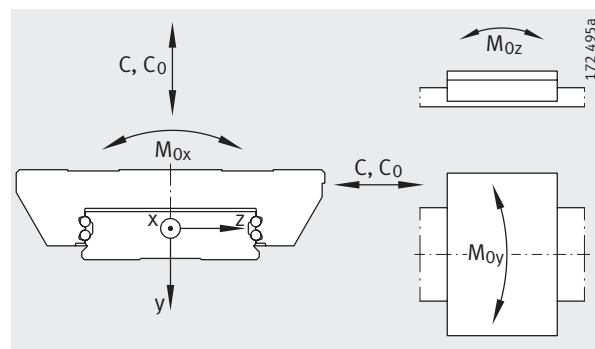
KUVE...-W (-WL) · View rotated 90°
①, ②⁵⁾

						Fixing screws ⁴⁾									
H ₅	H ₄	T ₅	T ₆ ³⁾	h	h ₁	G ₂	K ₁		K ₃		K ₆		K ₆		
						DIN ISO 4 762-12.9									
							M _A Nm		M _A Nm		M _A Nm		M _A Nm		M _A Nm
4,5	7,7	7	4,8	12,9	6	M5	5,8	M4	5	M4	5	–	–	M4	2
5	10,6	10	6	17	10	M6	10	M4	5	M5	10	–	–	M5	4
5	9,9	10	10	18,7	8,7	M8	41	M6	17	M6	17	M6	17	–	–
6	13,8	12	12	23,5	11,5	M10	41	M8	41	M8	41	–	–	M8	12
6,5	16,3	13	13	27	15	M10	41	M8	41	M8	41	M8	41	–	–



Four-row linear recirculating ball bearing and guideway assemblies

Full complement
Wide guideway
W, WL carriages



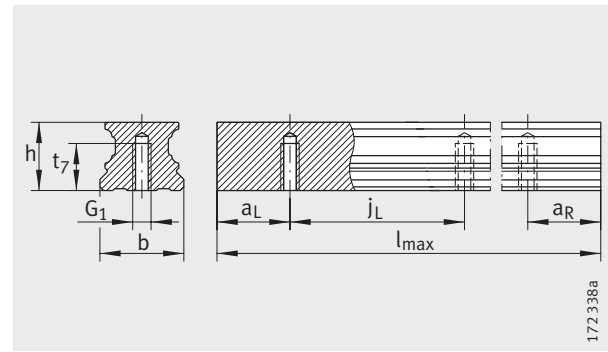
Load directions

Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway			Load carrying capacity				
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m	Closing plug K ₂	Basic load ratings		Moment ratings		
						C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
KUVE15-W	KWVE15-W	0,27	TKVD15-W	3,6	KA08-TN/A	7 200	14 500	332	100	100
KUVE20-W	KWVE20-W	0,5	TKVD20-W	5	KA08-TN/A	13 100	27 000	687	240	240
KUVE25-WL	KWVE25-WL	1,46	TKVD25-WL	9,4	KA11-TN/A	23 400	54 000	2 225	825	825
KUVE30-W	KWVE30-W	1,95	TKVD30-W	13,6	KA15-TN/A	27 500	55 000	2 660	700	700
KUVE35-WL	KWVE35-WL	4,11	TKVD35-W	17,4	KA15-TN/A	47 500	100 000	5 550	1 890	1 890

Four-row linear recirculating ball bearing and guideway assemblies

With Quad-Spacers
Standard, L carriages



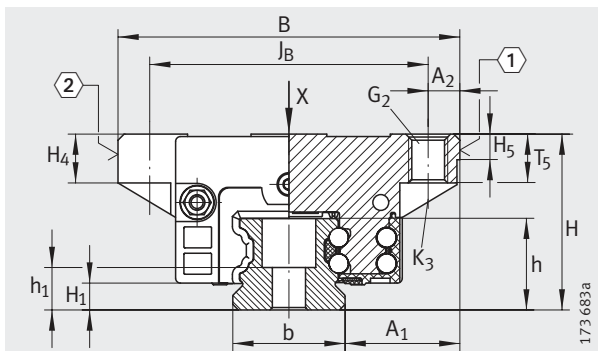
TKVD..-U

Dimension table · Dimensions in mm

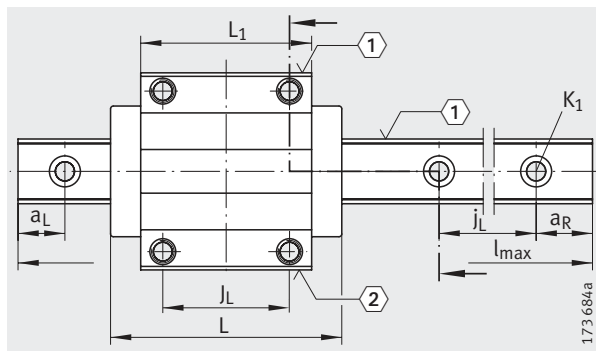
Designation	Dimensions				Mounting dimensions								
	$l_{\max}^{1)}$	H	B	L	A_1	J_B	b -0,005 -0,03	A_2	L_1	J_L	j_L	$a_L, a_R^{2)}$	
												min.	max.
KUVE15-B-KT	1200	24	47	59,6	16	38	15	4,5	39,8	30	60	20	53
KUVE15-B-KT-L				73					53,2				
KUVE20-B-KT	2960	30	63	69,8	21,5	53	20	5	50,4	40	60	20	53
KUVE20-B-KT-L				87,3					67,9				
KUVE25-B-KT	2960	36	70	82,1	23,5	57	23	6,5	60,7	45	60	20	53
KUVE25-B-KT-L				107,9					86,5				
KUVE30-B-KT	2960	42	90	97,4	31	72	28	9	72	52	80	20	71
KUVE30-B-KT-L				125,4					100				
KUVE35-B-KT	2960	48	100	110,4	33	82	34	9	80	62	80	20	71
KUVE35-B-KT-L				143,4					113				
KUVE45-B-KT	2940	60	120	139	37,5	100	45	10	102,5	80	105	20	94
KUVE45-B-KT-L				171,1					134,6				
KUVE55-B-KT	2520	70	140	172	43,5	116	53	12	132	95	120	20	107
KUVE55-B-KT-L				210					170				

For further table values, see page 290 and page 291.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ a_L and a_R are dependent on the guideway length.
- ³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- ⁴⁾ ① Locating face
② Marking

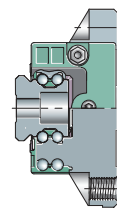


KUV...-B-KT (-L)
①, ②⁴⁾



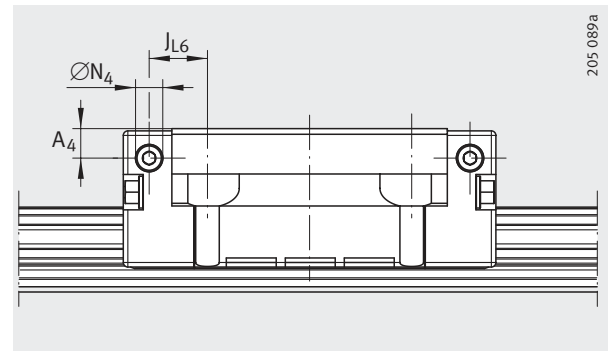
KUV...-B-KT (-L) · View rotated 90°
①, ②⁴⁾

							Fixing screws ³⁾							
H ₁	H ₄	H ₅	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁		K ₃	
							DIN ISO 4 762-12.9							
								M _A Nm		M _A Nm		M _A Nm		M _A Nm
4,3	7	4,75	7	8	15	8,15	M5	10	M5	5,8	M4	5	M4	5
4,5	10,2	5,25	7,5	10	17	9,1	M6	17	M6	10	M5	10	M5	10
5,1	10,4	5,25	10	12	18,7	8,7	M6	17	M8	24	M6	17	M6	17
5,9	13,2	6,25	12	15	23,5	11,5	M8	41	M10	41	M8	41	M8	41
6,7	13,3	6,75	13	15	27	15	M8	41	M10	41	M8	41	M8	41
9,7	19,1	9,25	15	20	34,2	16,2	M12	140	M12	83	M12	140	M10	83
13,5	21,6	11,25	21	22	41,5	19,5	M14	220	M14	140	M14	220	M12	140



Four-row linear recirculating ball bearing and guideway assemblies

With Quad-Spacers
Standard, L carriages

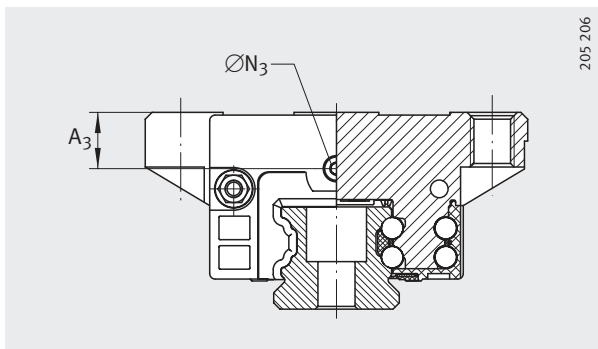


Lubrication connector on lateral face

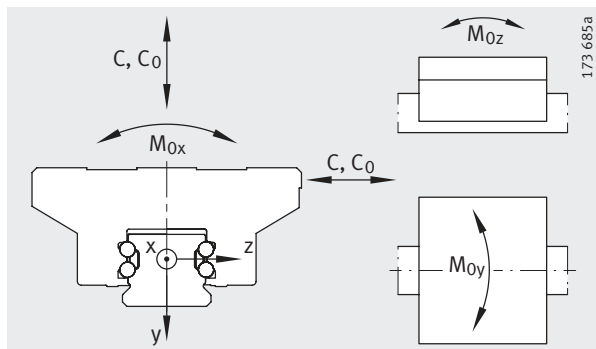
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE15-B-KT	KWVE15-B-KT	0,17	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE15-B-KT-L	KWVE15-B-KT-L	0,21			
KUVE20-B-KT	KWVE20-B-KT	0,37	TKVD20 (-U)	2,2	KA10-TN/A
KUVE20-B-KT-L	KWVE20-B-KT-L	0,5			
KUVE25-B-KT	KWVE25-B-KT	0,6	TKVD25(-U)	2,7	KA11-TN/A
KUVE25-B-KT-L	KWVE25-B-KT-L	0,9			
KUVE30-B-KT	KWVE30-B-KT	1	TKVD30(-U)	4,3	KA15-TN/A
KUVE30-B-KT-L	KWVE30-B-KT-L	1,5			
KUVE35-B-KT	KWVE35-B-KT	1,56	TKVD35(-U)	5,7	KA15-TN/A
KUVE35-B-KT-L	KWVE35-B-KT-L	2,16			
KUVE45-B-KT	KWVE45-B-KT	2,98	TKVD45(-U)	9,2	KA20-TN/A
KUVE45-B-KT-L	KWVE45-B-KT-L	4,3			
KUVE55-B-KT	KWVE55-B-KT	4	TKVD55-B(-U)	14	KA24-TN/A
KUVE55-B-KT-L	KWVE55-B-KT-L	6,18			

- ¹⁾ Calculation of basic load ratings in accordance with DIN 636.
Based on practical experience, it may be possible to increase the basic dynamic load rating.
- ²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).
- ³⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.
- ⁴⁾ Maximum permissible screw depth for lubrication connectors.

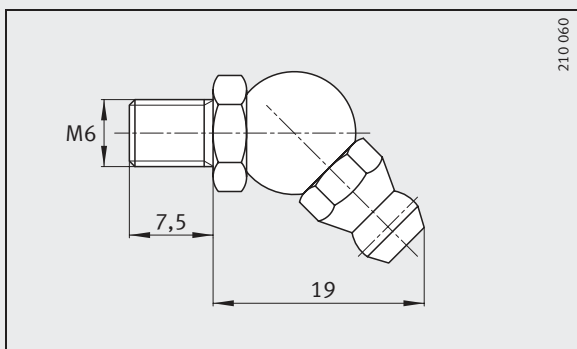
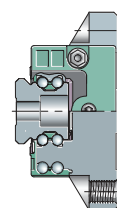


Lubrication connector on end face

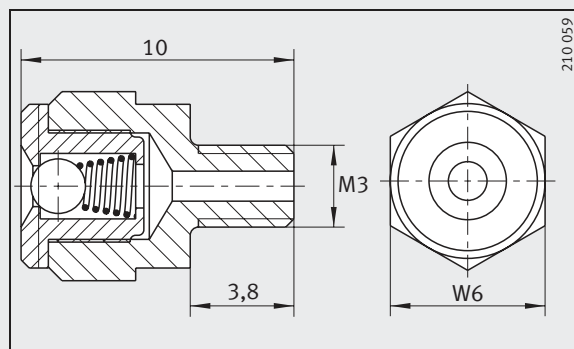


Load directions

Dimensioning of lubrication connectors						Load carrying capacity ¹⁾					
A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		⁴⁾			⁴⁾		C N	C ₀ N	M _{0x} Nm	M _{0y} Nm	M _{0z} Nm
4,3	2,57	5,5	3,2	2,57	5,5	9,1	6 100	11 400	105	74	74
						15,8	7 900	16 500	162	148	105
7,7	4,5	7	4,5	4,5	5,5	9,5	11 800	23 000	276	205	205
						18,3	14 400	30 500	368	345	345
11	5,5	7	6,5	5,5	7	12,9	16 200	32 000	430	330	335
						25,8	21 100	47 000	625	690	690
11,5	5,5	7	7	5,5	7	15	26 500	51 000	890	670	670
						29	33 000	71 000	1 230	1 230	1 245
12,3	5,5	7	11	5,5	7	16	36 000	67 000	1 340	995	995
						32,5	44 000	89 000	1 790	1 715	1 710
16,5	5,5	7	16,5	5,5	7	19,3	65 000	130 000	3 600	2 610	2 610
						35,3	79 000	171 000	4 715	4 335	4 330
15	5,5	7	15	5,5	7	30,5	99 000	199 000	6 730	4 750	4 750
						49,5	123 000	270 000	9 115	8 490	8 490



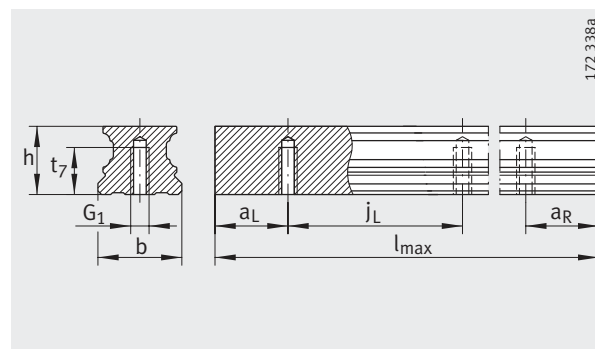
Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats W = 6 mm

Four-row linear recirculating ball bearing and guideway assemblies

With Quad-Spacers
S, SL, H, HL carriages



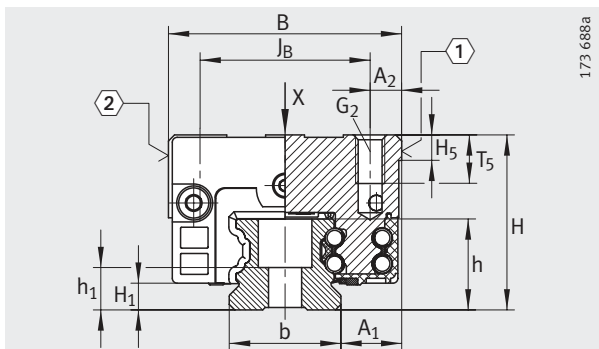
TKVD..-U

Dimension table · Dimensions in mm

Designation	Dimensions				Mounting dimensions								
	l _{max} ¹⁾	H	B	L	A ₁	J _B	b -0,005 -0,03	A ₂	L ₁	J _L	j _L	a _L , a _R ²⁾	
												min.	max.
KUVE15-B-KT-S	1 200	24	34	59,6	9,5	26	15	4	39,8	26	60	20	53
KUVE15-B-KT-H		28		73									
KUVE15-B-KT-SL		24											
KUVE15-B-KT-HL		28											
KUVE20-B-KT-S	2 960	30	44	69,8	12	32	20	6	50,4	36	60	20	53
KUVE20-B-KT-SL		87,3		67,9					50				
KUVE25-B-KT-S	2 960	36	48	82,1	12,5	35	23	6,5	60,7	35	60	20	53
KUVE25-B-KT-H		40		107,9									
KUVE25-B-KT-SL		36											
KUVE25-B-KT-HL		40											
KUVE30-B-KT-S	2 960	42	60	97,4	16	40	28	10	72	40	80	20	71
KUVE30-B-KT-H		45		125,4									
KUVE30-B-KT-SL		42											
KUVE30-B-KT-HL		45											
KUVE35-B-KT-S	2 960	48	70	110,4	18	50	34	10	80	50	80	20	71
KUVE35-B-KT-H		55		143,4									
KUVE35-B-KT-SL		48											
KUVE35-B-KT-HL		55											
KUVE45-B-KT-S	2 940	60	86	139	20,5	60	45	13	102,5	60	105	20	94
KUVE45-B-KT-H		70		171,1									
KUVE45-B-KT-SL		60											
KUVE45-B-KT-HL		70											
KUVE55-B-KT-S	2 520	70	100	172	23,5	75	53	12,5	132	75	120	20	107
KUVE55-B-KT-SL				210									

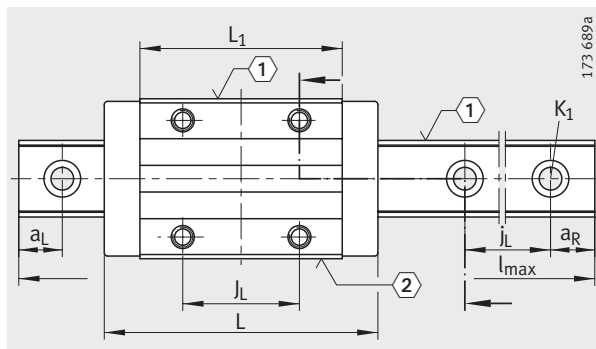
For further table values, see page 294 and page 295.

- ¹⁾ Maximum length of single-piece guideways. For permissible number of guideway pieces, see page 259.
Maximum single-piece guideway length of 6 m available by agreement.
- ²⁾ a_L and a_R are dependent on the guideway length.
- ³⁾ If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- ⁴⁾  Locating face
 Marking



KUVE...-B-KT (-S, -SL, -H, -HL)

①, ②⁴⁾

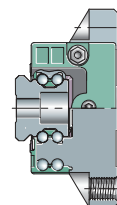


KUVE...-B-KT (-S, -SL, -H, -HL) ·

View rotated 90°

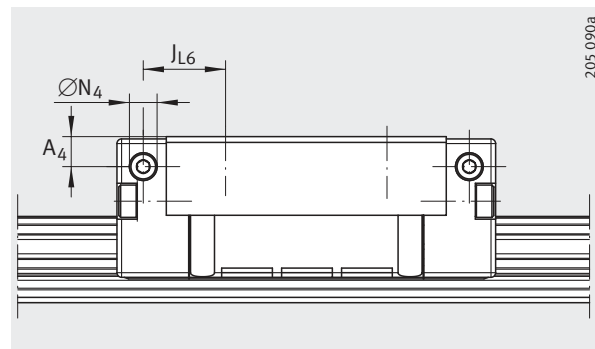
①, ②⁴⁾

						Fixing screws ³⁾					
H ₁	H ₅	T ₅	t ₇	h	h ₁	G ₁		G ₂		K ₁	
						DIN ISO 4 762-12.9					
							M _A Nm		M _A Nm		M _A Nm
4,3	4,75	6	8	15	8,15	M5	–	M4	5	M4	5
4,5	5,25	7,5	10	17	9,1	M6	17	M5	10	M5	10
5,1	5,25	10	12	18,7	8,7	M6	17	M6	17	M6	17
5,9	6,25	13,5	15	23,5	11,5	M8	41	M8	41	M8	41
6,7	6,75	13,5	15	27	15	M8	41	M8	41	M8	41
9,7	9,25	17	20	34,2	16,2	M12	140	M10	83	M12	140
13,5	11,25	15	22	41,5	19,5	M14	220	M12	140	M14	220



Four-row linear recirculating ball bearing and guideway assemblies

With Quad-Spacers
S, SL, H, HL carriages

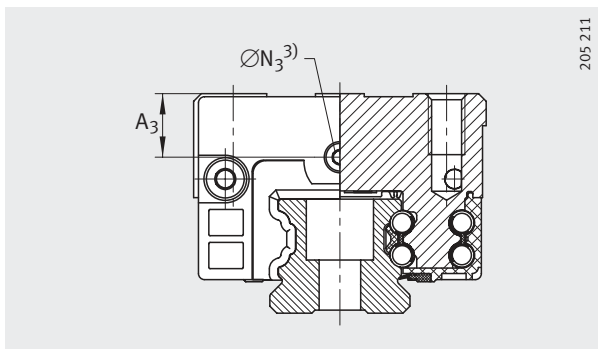


Lubrication connector on lateral face

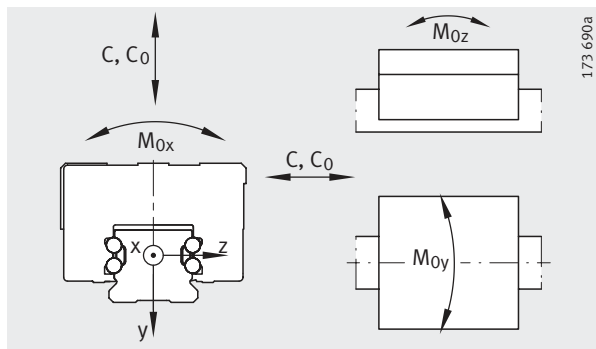
Dimension table (continued) · Dimensions in mm

Designation	Carriage		Guideway		
	Designation	Mass m ≈ kg	Designation	Mass m ≈ kg/m	Closing plug K ₂
KUVE15-B-KT-S	KWVE15-B-KT-S	0,14	TKVD15-B (-U) ²⁾	1,44	KA07-TN/A
KUVE15-B-KT-H	KWVE15-B-KT-H	0,18			
KUVE15-B-KT-SL	KWVE15-B-KT-SL	0,18			
KUVE15-B-KT-HL	KWVE15-B-KT-HL	0,23			
KUVE20-B-KT-S	KWVE20-B-KT-S	0,4	TKVD20 (-U)	2,2	KA10-TN/A
KUVE20-B-KT-SL	KWVE20-B-KT-SL	0,41			
KUVE25-B-KT-S	KWVE25-B-KT-S	0,56	TKVD25(-U)	2,7	KA11-TN/A
KUVE25-B-KT-H	KWVE25-B-KT-H	0,6			
KUVE25-B-KT-SL	KWVE25-B-KT-SL	0,73			
KUVE25-B-KT-HL	KWVE25-B-KT-HL	0,85			
KUVE30-B-KT-S	KWVE30-B-KT-S	0,85	TKVD30(-U)	4,3	KA15-TN/A
KUVE30-B-KT-H	KWVE30-B-KT-H	0,95			
KUVE30-B-KT-SL	KWVE30-B-KT-SL	1,1			
KUVE30-B-KT-HL	KWVE30-B-KT-HL	1,3			
KUVE35-B-KT-S	KWVE35-B-KT-S	1,3	TKVD35(-U)	5,7	KA15-TN/A
KUVE35-B-KT-H	KWVE35-B-KT-H	1,59			
KUVE35-B-KT-SL	KWVE35-B-KT-SL	1,79			
KUVE35-B-KT-HL	KWVE35-B-KT-HL	2,23			
KUVE45-B-KT-S	KWVE45-B-KT-S	2,45	TKVD45(-U)	9,2	KA20-TN/A
KUVE45-B-KT-H	KWVE45-B-KT-H	3,14			
KUVE45-B-KT-SL	KWVE45-B-KT-SL	3,2			
KUVE45-B-KT-HL	KWVE45-B-KT-HL	4,1			
KUVE55-B-KT-S	KWVE55-B-KT-S	3,95	TKVD55-B(-U)	14	KA24-TN/A
KUVE55-B-KT-SL	KWVE55-B-KT-SL	5,05			

- ¹⁾ Calculation of basic load ratings in accordance with DIN 636.
Based on practical experience, it may be possible to increase the basic dynamic load rating.
- ²⁾ The new carriages cannot be used on the previous guideways TKVD15(-U).
- ³⁾ Tapered head lubrication nipple to DIN 71 412-B M6,
KUVE20-B to DIN 71 412-B M5 and KUVE15-B to DIN 3 405-B M3, supplied loose with delivery.
- ⁴⁾ Maximum permissible screw depth for lubrication connectors.

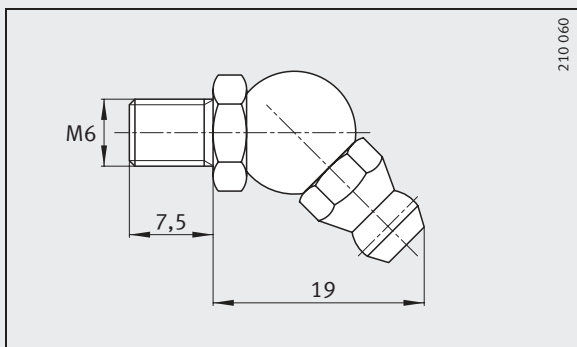
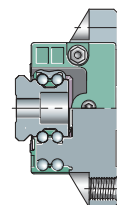


Lubrication connector on end face

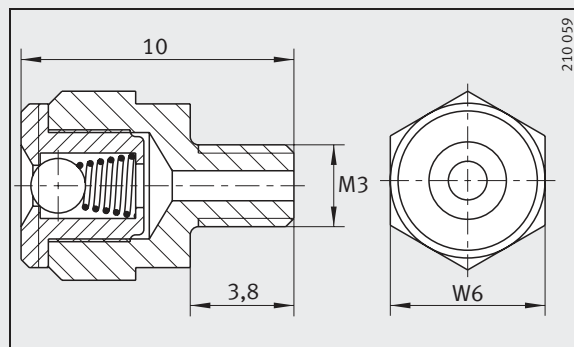


Load directions

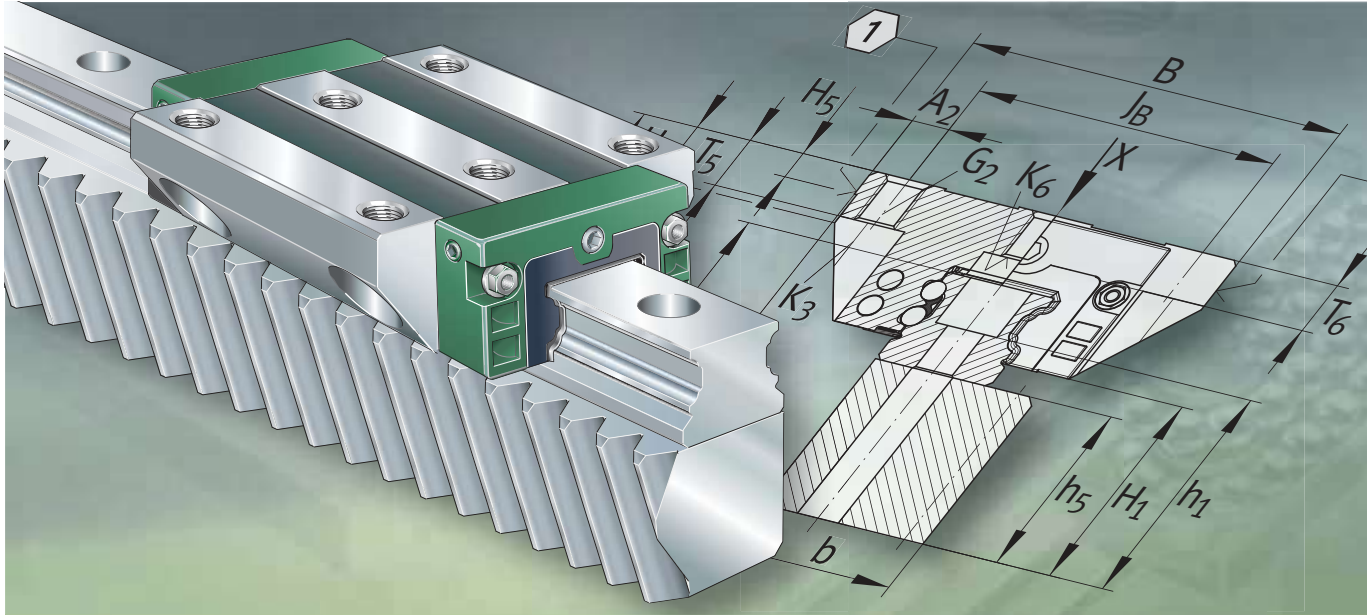
Dimensioning of lubrication connectors							Load carrying capacity ¹⁾				
A_3	$\varnothing N_3$		A_4	$\varnothing N_4$		J_{L6}	Basic load ratings		Moment ratings		
		⁴⁾			⁴⁾		C N	C_0 N	M_{0x} Nm	M_{0y} Nm	M_{0z} Nm
4,3	2,57	5,5	3,2	2,57	5,5	11,1	6 100	11 400	105	74	74
8,3			7,2								
4,3			3,2			17,8	7 900	16 500	162	148	105
8,3			7,2								
7,7	4,5	5,5	4,5	4,5	5,5	11,5	11 800	23 000	276	205	205
						13,3	14 400	30 500	368	345	345
11	5,5	7	6,5	5,5	7	17,9	16 200	32 000	430	330	335
15			10,5								
11			6,5			23,3	21 100	47 000	625	690	690
15			10,5								
11,5	5,5	7	7	5,5	7	21	26 500	51 000	890	670	670
14,5			10								
11,5			7			25	33 000	71 000	1 230	1 245	1 245
14,5			10								
12,3	5,5	7	11	5,5	7	22	36 000	67 000	1 340	995	995
19,3			18								
12,3			11			27,5	44 000	89 000	1 790	1 715	1 710
19,3			18								
16,5	5,5	7	16,5	5,5	7	29,3	65 000	130 000	3 600	2 610	2 610
26,5			26,5								
16,5			16,5			35,3	79 000	171 000	4 715	4 335	4 330
26,5			26,5								
15	5,5	7	15	5,5	7	40,5	99 000	199 000	5 230	2 530	2 560
						49,5	123 000	270 000	7 100	4 580	4 580



Lubrication nipple³⁾



Lubrication nipple³⁾,
width across flats $W = 6$ mm



Four-row linear recirculating ball bearing and guideway assemblies

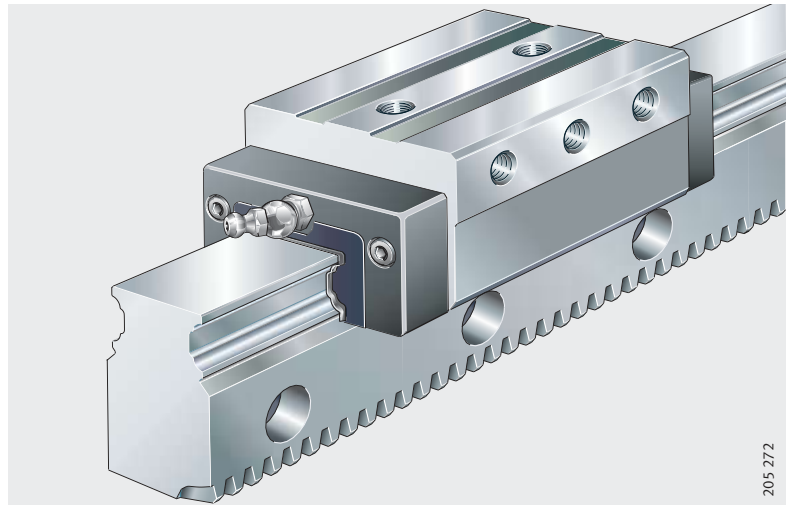
With toothed guideway

Product overview

Four-row linear recirculating ball bearing and guideway assemblies

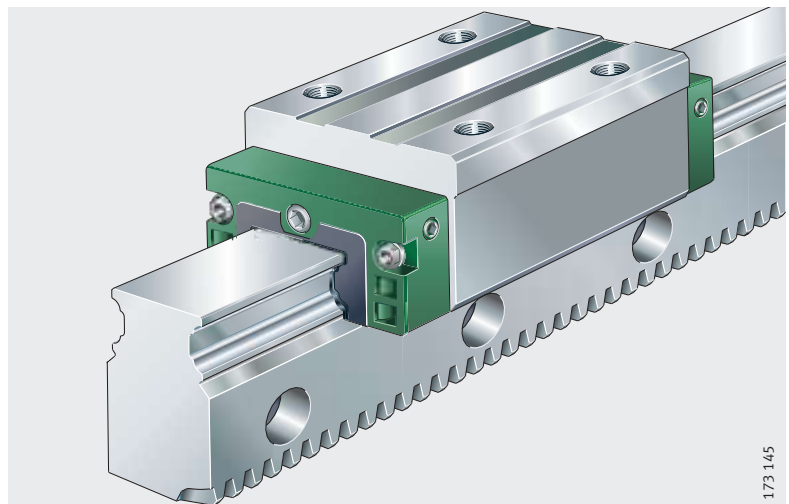
**Guideway with teeth
on underside**
Lateral fixing of carriage

KUVE...SB-ZHP



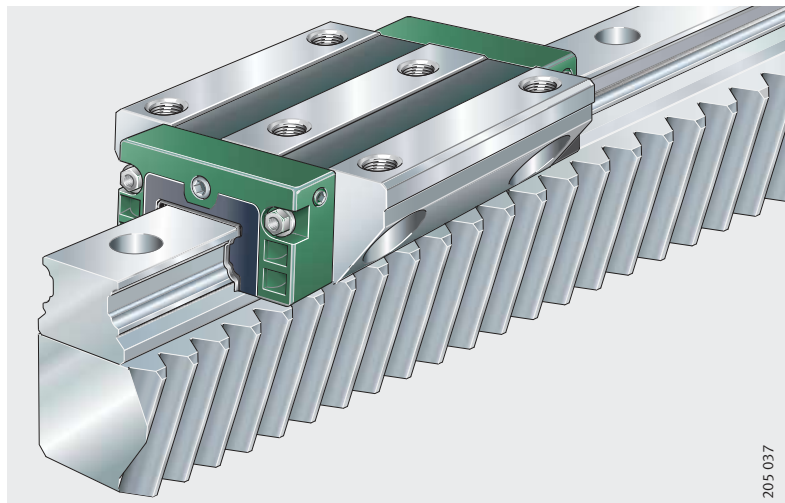
Fixing of carriage from above

KUVE...B-H-ZHP

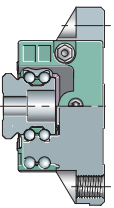
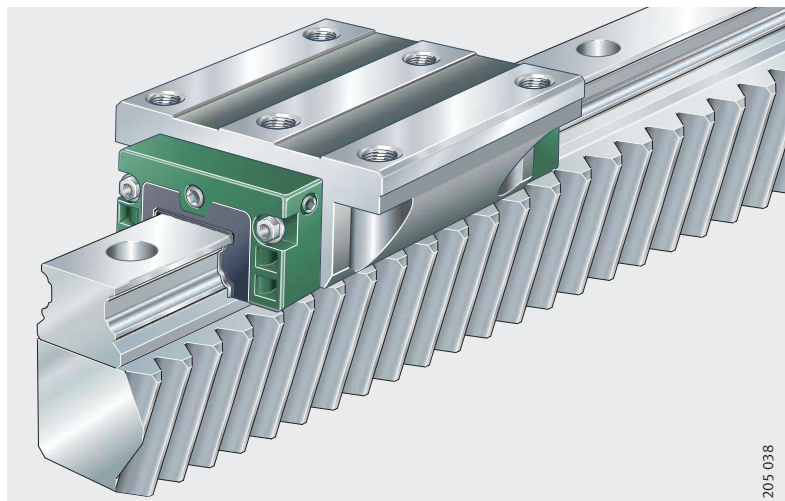


**Guideway with teeth
on lateral face**
Fixing of carriage from above

KUVE...B-N-ZHST+SVS



KUVE...B-ZHST+SVS



Four-row linear ball bearing and guideway assembly with toothed guideway

Features

Four-row linear recirculating ball bearing and guideway assemblies with toothed guideways build on the advantages of untoothed units through a considerable reduction in the fitting work required, higher accuracy, simpler design and machining of the adjacent construction and lower logistical outlay.

In order to give the widest possible coverage of different drive concepts and adjacent constructions, guideways are available in the following designs:

- TKVD...ZHP, guideway teeth on underside (monobloc)
- TKVD...ZHST+SVS, guideway TKVD, combined with a toothed rack, teeth on lateral face.

A guidance system comprises at least one carriage and a toothed guideway or a guideway combined with a toothed rack.

Guidance systems with lateral teeth – the guidance units TKVD...ZHST+SVS – are supplied as a preassembled unit.

Load carrying capacity

Four-row linear recirculating ball bearing and guideway assemblies with a toothed guideway correspond in their construction and load carrying capacity to the KUV range.

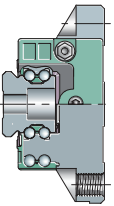
They can support forces from all directions and moments about all axes and are highly suitable for applications in the handling sector and in automation technology.

Carriages

Carriages are available in numerous variants, see page 231 and page 232.

The carriage KWVE...SB also has lateral fixing holes.

Guideways	Guideways and toothed racks are hardened, the raceways and teeth are ground. Toothed guideways TKVD..-ZHP und TKVD..-ZHST+SVS have helical teeth on the underside or lateral face. The teeth are right hand teeth with 19°31'42", mesh angle 20° and tooth grade 6.								
Other designs for TKVD..-ZHST+SVS	The combined design is available by agreement (teeth with or without heat treatment, helical or spur teeth, tooth grade 6 or 9 or tooth position on lateral face or on underside).								
Multi-piece guideways	For guideway lengths of more than 2 860 mm, the toothed guideways TKVD..-ZHST+SVS are supplied for handling reasons as units suitable for joining (guideway and toothed rack fitted). For fitting, the mating piece MSATZ-MZHP is required and can be supplied by agreement. These fitting aids have left hand teeth. By agreement, single-piece guideways are available up to a maximum of 5 740 mm.								
Lubrication									
Rolling element system	The units are suitable for oil and grease lubrication, see page 237. The rolling contact is lubricated via a lubrication connector in the end piece of the carriage.								
Teeth	The teeth must be lubricated separately, for example by means of a felted gear and an electronically controlled lubricant dispenser.								
Operating temperature	The units can be used at operating temperatures from –10 °C to +100 °C.								
Suffixes	Suffixes for available designs: see table.								
Available designs	<table> <tr> <th>Suffix</th><th>Description</th></tr> <tr> <td>SB</td><td>Carriage with lateral fixing holes</td></tr> <tr> <td>ZHP</td><td>Guideway with helical teeth on underside</td></tr> <tr> <td>ZHST+SVS</td><td>Toothed rack, helical teeth on lateral face</td></tr> </table>	Suffix	Description	SB	Carriage with lateral fixing holes	ZHP	Guideway with helical teeth on underside	ZHST+SVS	Toothed rack, helical teeth on lateral face
Suffix	Description								
SB	Carriage with lateral fixing holes								
ZHP	Guideway with helical teeth on underside								
ZHST+SVS	Toothed rack, helical teeth on lateral face								



Four-row linear ball bearing and guideway assembly with toothed guideway

Design and safety guidelines Safety specifications

Attention!

Always observe the design and safety guidelines starting on page 240.

The following protective measures must be observed in all cases:

- Avoid contact with any rotating parts – for example input and output shaft, spur gear, toothed rack. Provide covers as necessary.
- Do not undo the screw plugs on the gearbox.
- Avoid direct contact with lubricants.
- Pay attention to the datasheets from the lubricant and gearbox manufacturers.
- Risk of injury due to sharp edges.

On multi-piece guideways, the standard lengths should be used in preference, see dimension table, page 314.

Torque transmission ratings for teeth

For flank and tooth fracture loading, the torque values assuming good grease lubrication (use of electronic lubricant dispenser or adequate manual lubrication once per day) and $v = 1,5 \text{ m/s}$, safety factor $S_B = 1$ and a stable bearing arrangement on one side for the gear pinion shaft, are in accordance with the table Maximum torque.

If a feather key joint is used, this torque must if necessary be calculated separately or checked in accordance with DIN 6 885-1.

For permissible torques with a shrink fit washer, see table.

Maximum torque

Pinion hardened Number of teeth ¹⁾ z	Modulus m	Pitch circle diameter mm	Teeth hardened Max. torque	
			ZHP Nm	ZHST Nm
30	2	63,66	270	–
20	3	63,66	505	410
15	4	63,66	–	670

¹⁾ Other pinions available by agreement.

Fitting guidelines for toothed guideways TKVD...ZHP

Attention!

Guideways TKVD...ZHP are through hardened. This must be taken into consideration for any rework – for example at the customer.

With the exception of W and LMS versions, all carriage types can be fitted on ZHP guideways.

The guideways can be used in any combination without length restrictions. They are cut obliquely at the joints. This ensures a smooth transition across the teeth on multi-piece guideways.

Standard lengths

There are three standard lengths per size.

Example

Size 25 is available in the standard lengths 540 mm, 960 mm and 1500 mm.

Guideway ends on standard lengths

If a guideway of any length comprises standard lengths ($n \times \text{standard length}$), the pieces are cut obliquely at the start and end, *Figure 1*, ①. The joints between the pieces are oblique.

Example

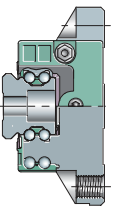
The total length $L = 3\,000\text{ mm}$.
The guideway for carriage size 25 comprises:
 $2 \times \text{TKVD25-ZHP/1500}$

Guideway ends on intermediate lengths

In this case, the guideways are cut straight at the start and end, *Figure 1*, ②. The joint remains oblique.

Example

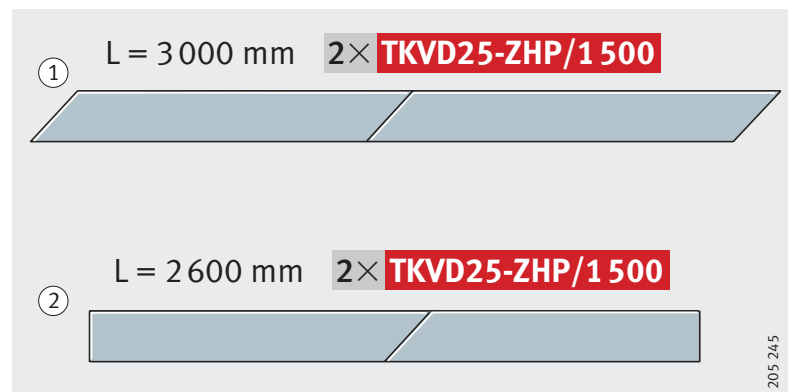
The total length $L = 2\,600\text{ mm}$. The guideway pieces each of 1300 mm length are produced from guideways of standard length 1500 mm which are each cut obliquely on one side. This length must also be stated when ordering.
The complete guideway for the carriage size 25 comprises:
 $2 \times \text{TKVD25-ZHP/1500}$



- ① Guideway ends cut obliquely
- ② Guideway ends cut straight

Figure 1

Start and end of guideway cut obliquely or straight



Four-row linear ball bearing and guideway assembly with toothed guideway

Guideway joint

Attention must be paid to the alignment of the teeth at the joint. In order that toothed guideways of any length can be fitted, the teeth are arranged such that they form a half tooth gap at the start and end in each case.

In contrast to standard guideways, there is a gap at the joint on toothed guideways. This is kept very small by means of narrow manufacturing tolerances but is nevertheless necessary for the optimum functioning of the toothed rack.

Fitting toothed rack

Due to the helical teeth, the fitting toothed rack MZHP is required for alignment of the guideway joint. This is dependent on the modulus and must be ordered separately, see Ordering designation.

The fitting toothed rack has teeth in the opposite direction and is pressed over the guideway joint during fitting. This ensures the transition at the guideway joint.

Ordering designation for fitting toothed racks

The fitting toothed racks are available as:

- MZHP02 for modulus 2
- MZHP03 for modulus 3
- MZHP04 for modulus 4.

Measuring the joint using the test roller

A further possibility for aligning and checking the guideway joint is measurement using a test roller. The total height of the toothed rack is measured using the test roller, *Figure 2*.

The height at the guideway joint may be influenced directly through the gap between the toothed racks 1 and 2. The pitch gap at the joint (H_3) is set such that the offset between height 1 (H_1) and height 2 (H_2) is as small as possible.

- ① Toothed rack 1
- ② Toothed rack 2
- ③ Test roller
- H_1 = height 1
- H_2 = height 2
- H_3 = height at the joint

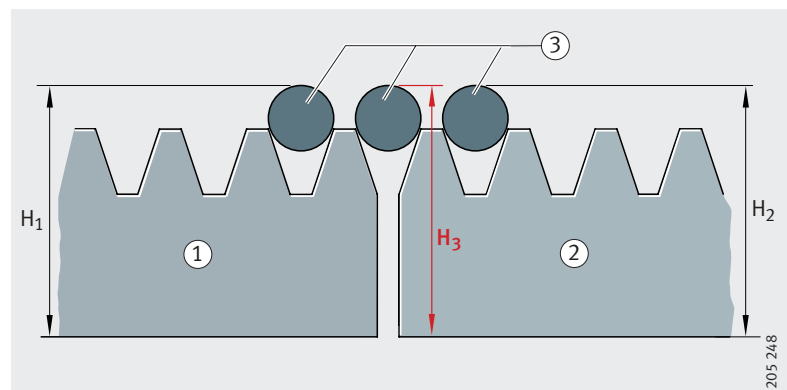


Figure 2
Measurement using test roller

Fitting guidelines for toothed guideways TKVD...ZHST+SVS

Single-piece guideway lengths

A toothed guideway TKVD...ZHST+SVS comprises at least one guideway TKVD...ZHST and a toothed rack ZHST+SVS.

The unit TKVD...ZHST+SVS is supplied preassembled. The toothed rack is aligned against the guideway, permanently screw mounted and must not be dismantled.

The maximum single-piece guideway length is 2 860 mm.

A single-piece unit of length 5 740 mm can also be supplied.

Toothed racks are also available as a single piece up to a maximum length of 960 mm.

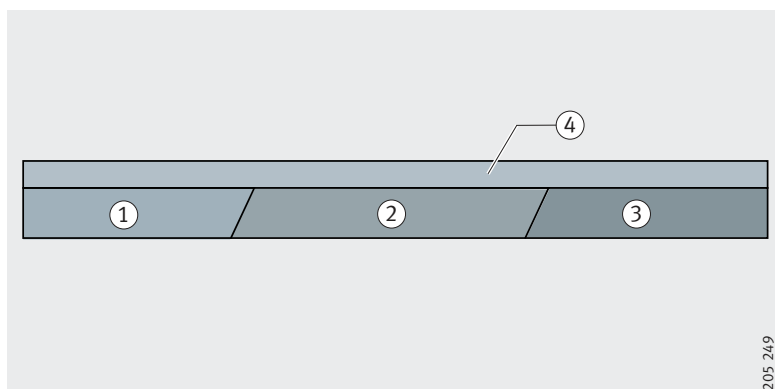
Guideway joint for standard length and length to customer requirements

The joint between the toothed racks is oblique, while the start and end of the unit are straight, *Figure 3*.

- ① Toothed rack 1
- ② Toothed rack 2
- ③ Toothed rack 3
- ④ Guideway

Figure 3

Guideway joint,
start and end of unit

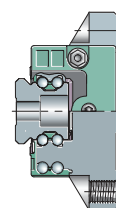
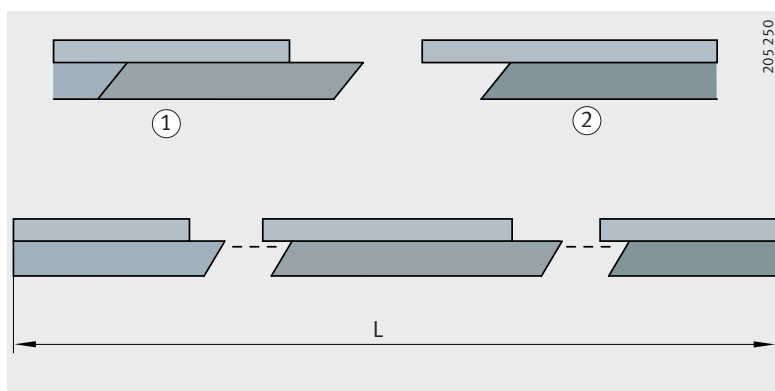


If the standard guideways are longer than 2 860 mm, the unit is supplied as several pieces. As a result, unit 1 and unit 2 overlap at the joint, *Figure 4*. The guidance unit can thus be easily used in applications with long, unlimited stroke lengths.

- ① Unit 1
 - ② Unit 2
- L = length according to customer requirements

Figure 4

Unit for length
according to customer requirements



Four-row linear ball bearing and guideway assembly with toothed guideway

Fitting set and fitting toothed rack

For fitting with a guideway joint, the fitting set MSATZ is required. This must be ordered separately.

The fitting set comprises a fitting ledge with a mating plate for correct alignment of the guideways at the joint, *Figure 5*.

As in the case of the ZHP guideways, the fitting toothed rack MZHP must be ordered at the same time.

- ① Fitting toothed rack
- ② Fitting ledge
- ③ Mating plate

Figure 5
Fitting tools

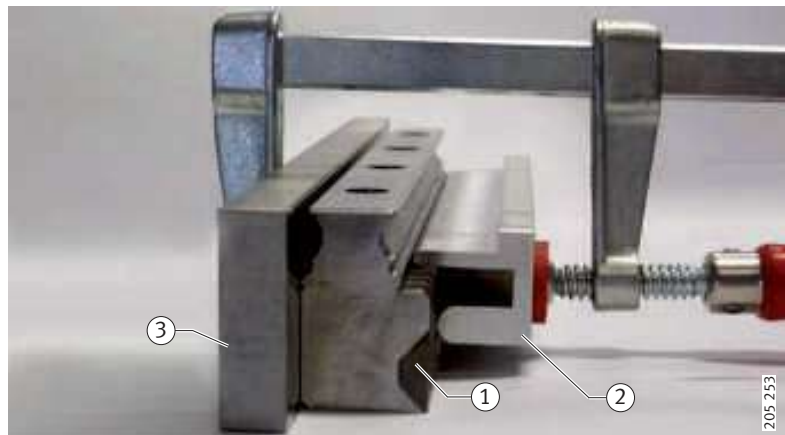


The fitting toothed rack MZHP is used as in the case of the ZHP guideway design, see page 304. In addition, the guideways must be aligned using the fitting ledge and the mating plate, *Figure 6*.

Once the guideways and toothed racks are aligned and screw mounted (if the application allows screw mounting), the unit is fixed to the adjacent construction in the same way as a standard guidance system.

- ① Fitting toothed rack
- ② Fitting ledge
- ③ Mating plate

Figure 6
Alignment of guideway and toothed rack



**Guideway
hole dimensions a_L , a_R**

For a_L und a_R , it must be noted that their definition is restricted in comparison with the standard guideway. This is due to the double hole pattern of guideway TKVD..-ZHST+SVS.

The range of a_L and a_R $53 \leq (a_L + a_R) \leq 63$ is not possible with TKVD..-ZHST+SVS.

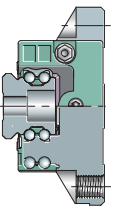
The guideway has a standard hole pattern for fixing the unit to the adjacent construction and fixing holes from below for fixing the toothed rack.

Accuracy

The guideway TKVD..-ZHST+SVS has the standard accuracy G3.

When the guideway and toothed rack are combined, an accuracy corresponding to “normal” in accordance with ISO/CD 12090-1 is ensured.

Higher accuracies are only available by agreement.



Four-row linear ball bearing and guideway assembly with toothed guideway

Ordering example, ordering designation

Guideway identical to standard production length

Standard production lengths: see dimension tables.

Start and end of guideway cut obliquely.

Four-row linear ball bearing and guideway assembly	KUVE
Size	25
Carriage type, for screw mounting from side	SB
Guideway with teeth on underside	ZHP
Number of carriages per unit	W2
Accuracy class	G3
Preload class	V2
Guideway length	1 500 mm

Ordering designation

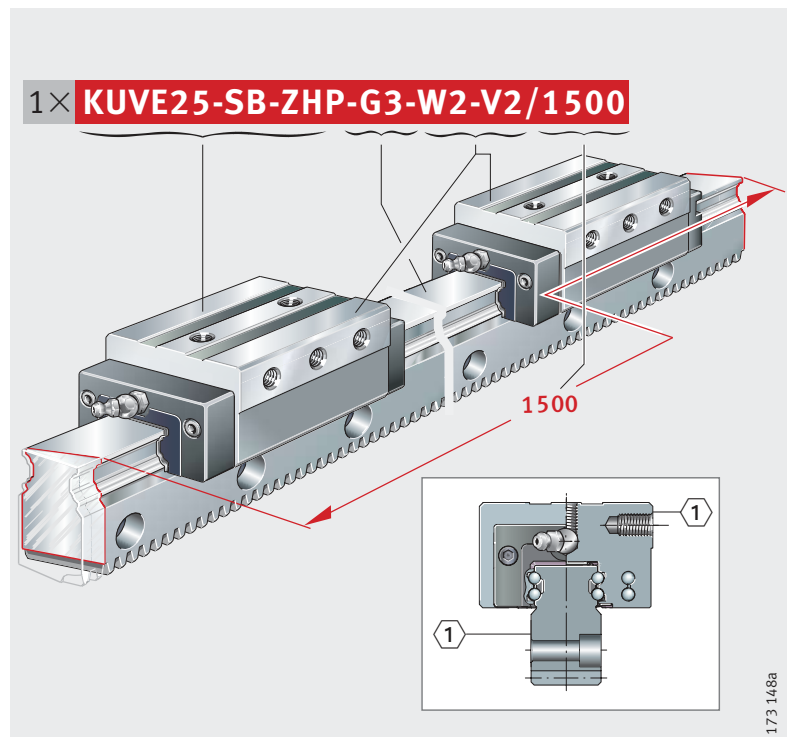
1×KUVE25-SB-ZHP-W2-G3-V2/1 500, Figure 7

Attention!

Even with $n \times l_{\max}$, the ends of the individual guideway pieces are cut obliquely.

① Locating face
Ends of guideways cut obliquely

Figure 7
Ordering example,
ordering designation



173 148a

Guideway smaller than standard production length

Start and end of guideway cut straight.

Four-row linear ball bearing and guideway assembly

KUVE

Size

35

Type, narrow carriage

B-S

Guideway with teeth on underside

ZHP

Number of carriages per unit

W1

Accuracy class

G3

Preload class

V1

Guideway length

1 400 mm

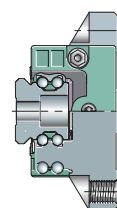
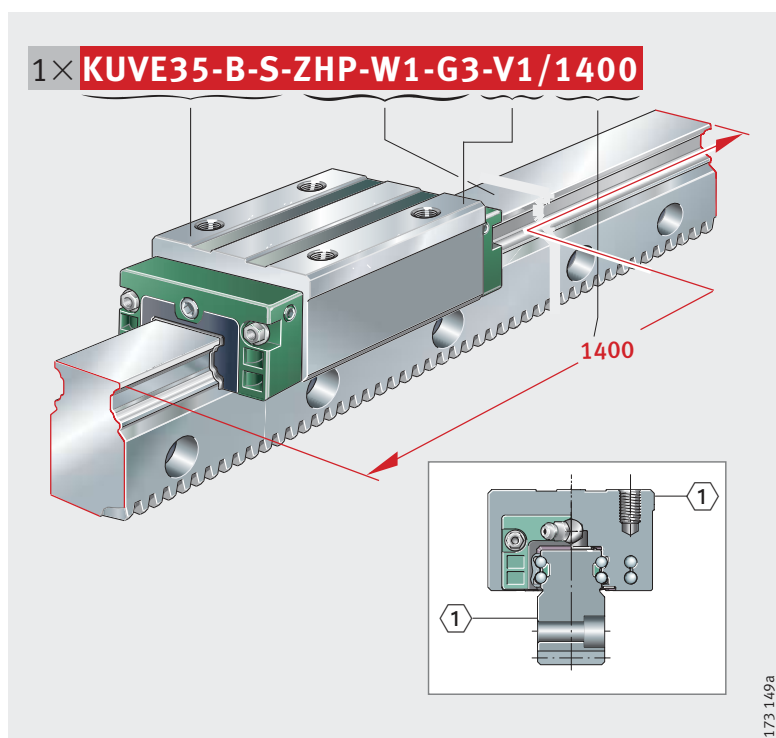
Ordering designation

1×KUVE35-B-S-ZHP-W1-G3-V1/1 400, Figure 8

① Locating face
Ends of guideways cut straight

Figure 8

Ordering example,
ordering designation



Four-row linear ball bearing and guideway assembly with toothed guideway

Guideway larger than standard production length

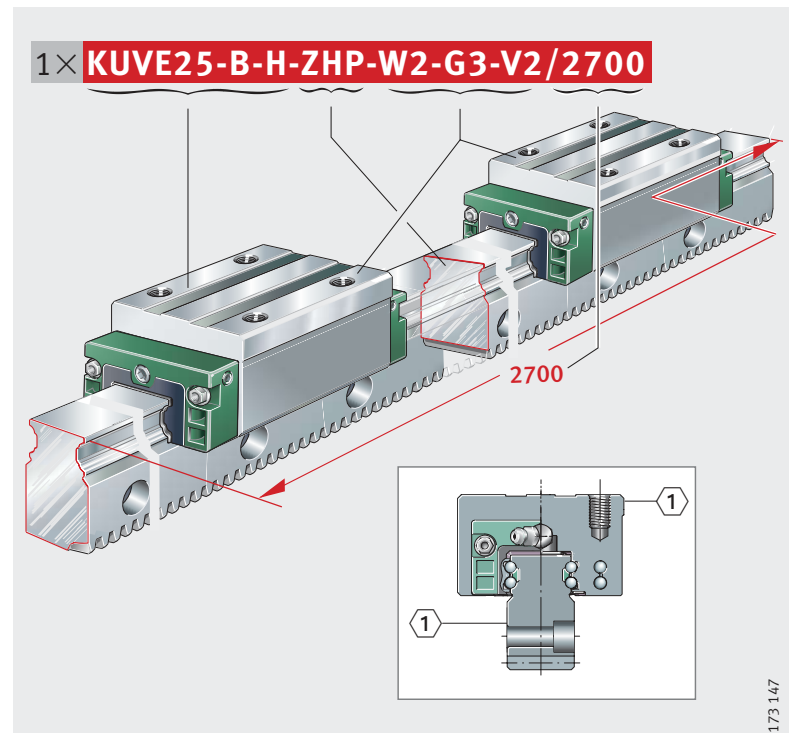
Start and end of guideway cut straight, guideway joint cut obliquely.

Four-row linear ball bearing and guideway assembly	KUVE
Size	25
Type, high carriage	B-H
Guideway with teeth on underside	ZHP
Number of carriages per unit	W2
Accuracy class	G3
Preload class	V2
Guideway length	2 700 mm

Ordering designation 1×KUVE25-B-H-ZHP-W2-G3-V2/2 700, Figure 9

① Locating face
Guideway joint cut obliquely,
ends cut straight

Figure 9
Ordering example,
ordering designation



**Unit with toothed guideway,
teeth on lateral face**

Four-row linear ball bearing
and guideway assembly

Size

KUVE

Carriage type

25

B

Guideway with toothed rack, lateral teeth

TKVD25-ZHST+SVS

Number of carriages per unit

W1

Accuracy class

G3

Preload class

V1

Guideway length

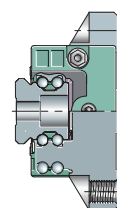
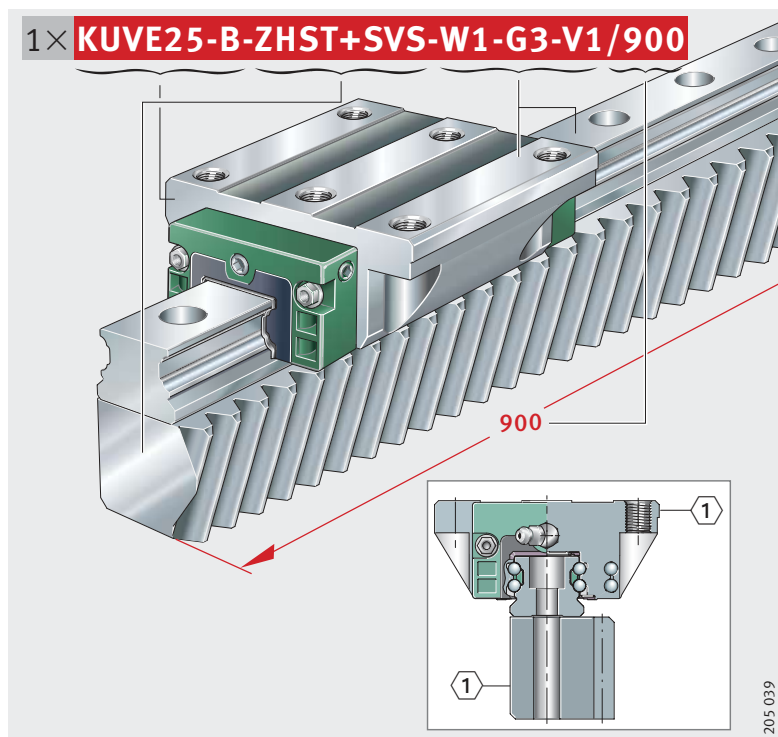
900 mm

Ordering designation

1×KUVE25-B-ZHST+SVS-W1-G3-V1/900, Figure 10

① Locating face
Unit

Figure 10
Ordering example,
ordering designation



Four-row linear ball bearing and guideway assembly with toothed guideway

Guideway with toothed rack, lateral teeth

Guideway of size 25 with toothed rack, lateral teeth
Guideway length

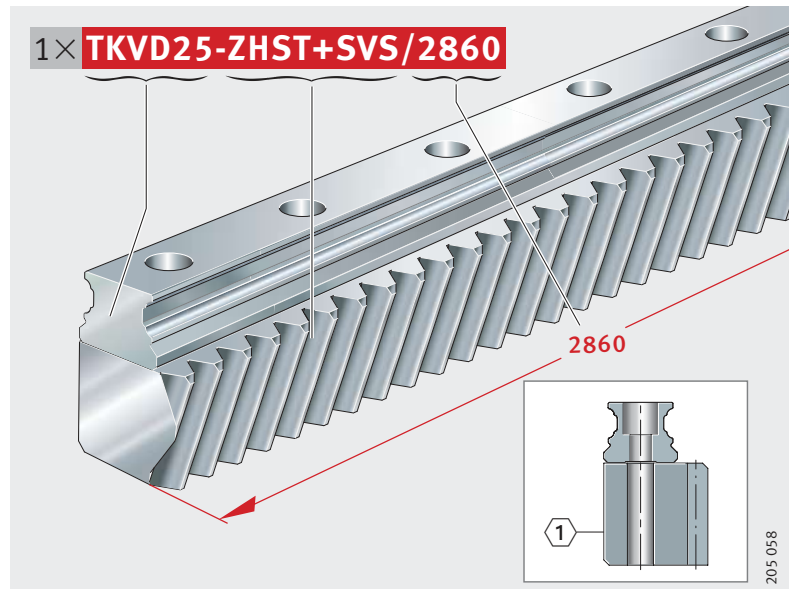
TKVD25-ZHST+SVS
2 860 mm

Ordering designation

1×TKVD25-ZHST+SVS/2860, Figure 11

① Locating face
Guideway with toothed rack

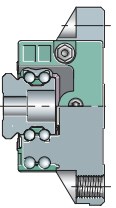
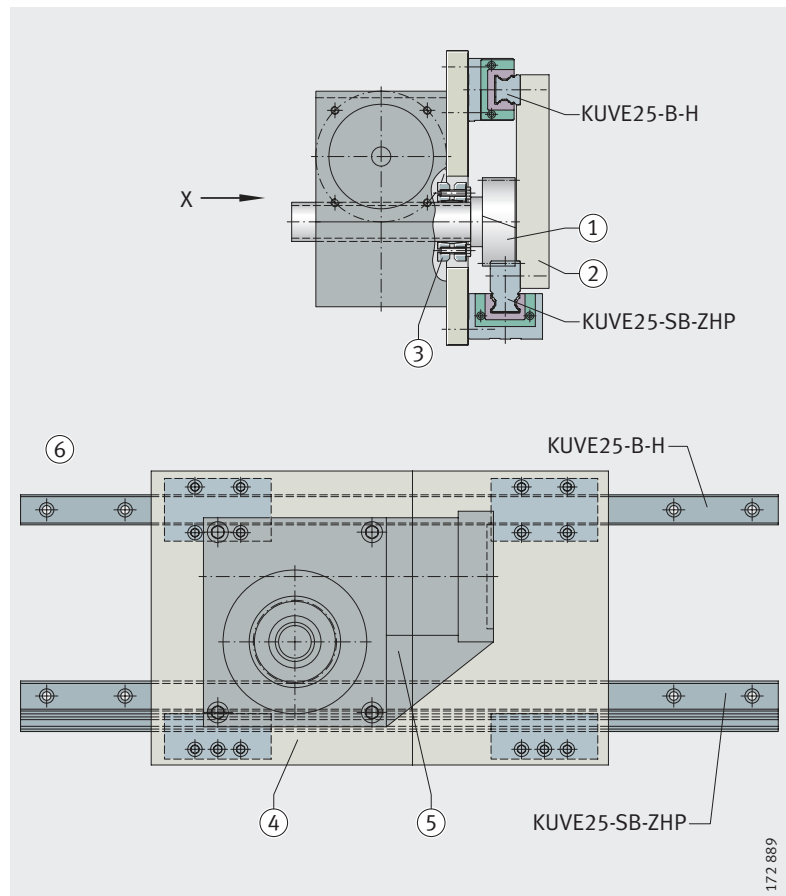
Figure 11
Ordering example,
ordering designation



Design example with toothed guideway

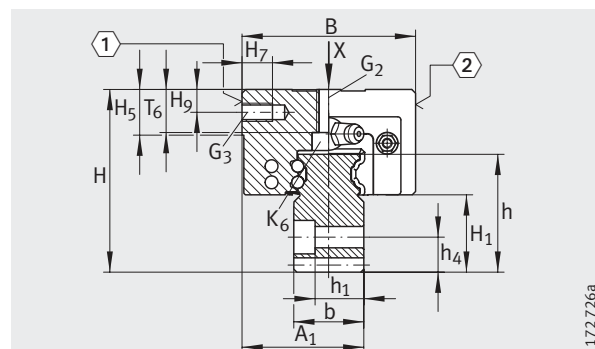
- ① Drive shaft
- ② Mounting plate
- ③ Shrink fit washer
- ④ Connecting plate
- ⑤ Gearbox with coupling
- ⑥ View X

Figure 12
Design example



Four-row linear recirculating ball bearing and guideway assemblies

Guideway with teeth on underside



KUVE...SB-ZHP

①, ②⁴⁾

Dimension table · Dimensions in mm

Designation	Dimensions						Mounting dimensions										
	l _{max} ¹⁾			H	B	L	A ₁	A ₃	b -0,005 -0,03	L ₁	J _{LZ}	J _{L1}	j _L	a _L , a _R ²⁾		H ₁	H ₅
														min.	max.		
KUVE25-SB-ZHP ³⁾	540	960	1 500	60	57	81,7	40	15	23	60,7	35	17,5	60	20	53	25,2	15
KUVE35-SB-ZHP ³⁾	560	1 120	1 680	85	76	110,4	55	19,3	34	80	50	25	80	20	71	36,8	22

For further table values, see page 316 and page 317.

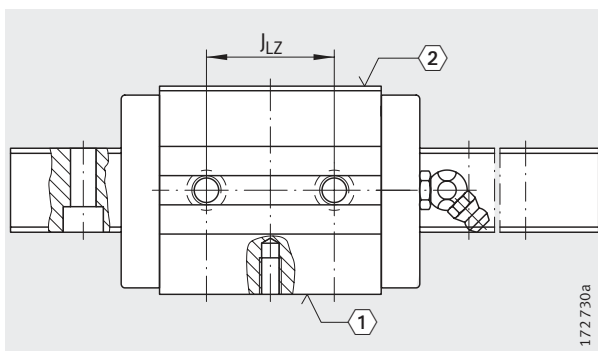
¹⁾ Standard lengths have obliquely cut ends and can be used for direct joining of guideways.

²⁾ a_L and a_R are dependent on the guideway length l .

³⁾ Teeth, centre distance and ratio in accordance with DIN 3 975 and DIN 3 976.

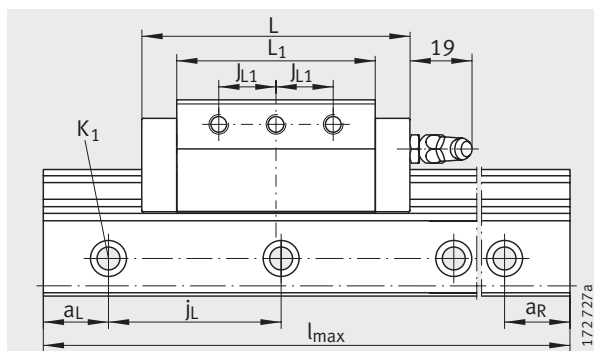
⁴⁾ ① Locating face

② Marking



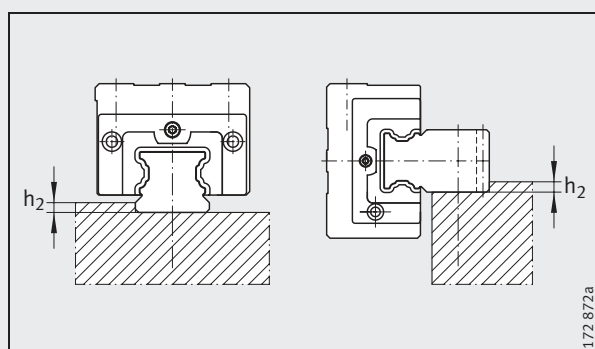
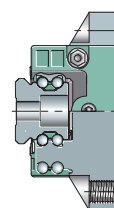
KUV...-SB-ZHP · View rotated 90°

1, 2 4)



KUV...-SB-ZHP

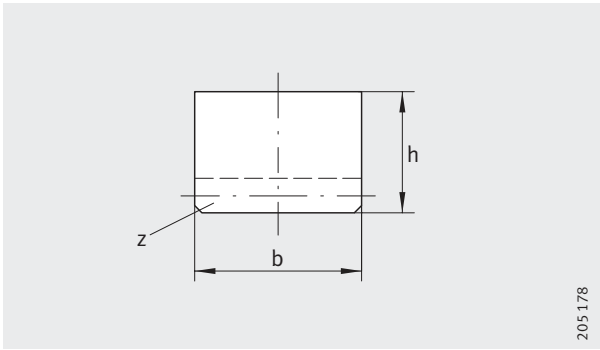
							Fixing screws								Modulus	
T ₆	H ₇	H ₉	h	h ₁	h ₂	h ₄	K ₁		G ₂		G ₃		K ₆		m	
	min.				max.		DIN ISO 4 762-12.9 ³⁾									DIN 7 984-8.8
								M _A Nm		M _A Nm		M _A Nm		M _A Nm		
14,8	10	7,5	38,7	13	3	11,5	M6	17	M8	24	M6	17	M6	17	2	
18,15	13	11	57	22	5	17	M8	41	M10	83	M8	41	M8	41	3	



KUV...-B-SB-ZHP

Four-row linear recirculating ball bearing and guideway assemblies

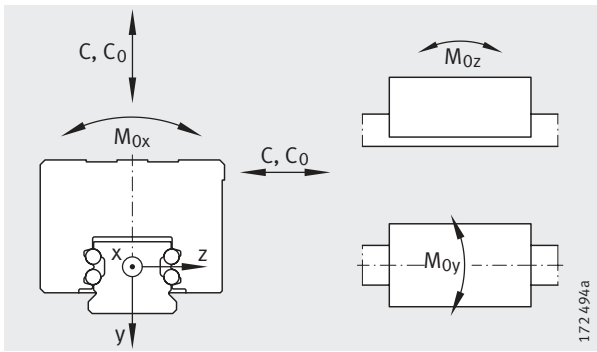
Guideway with teeth on underside



Fitting mating piece MZHP

Dimension table (continued) · Dimensions in mm								
Designation	Carriage		Guideway		Mating piece ¹⁾			
	Designation	Mass m	Designation	Mass m	Designation	Dimensions		
						Modulus	b	h Number of teeth z
		≈kg		≈kg/m				
KUVE25-SB-ZHP	KWVE25-B-SB	0,85	TKVD25-ZHP	6,3	MZHP02	2	24	24 30
KUVE35-SB-ZHP	KWVE35-B-SB	1,8	TKVD35-ZHP	14	MZHP03	3	29	29 20

¹⁾ Without fixing holes.



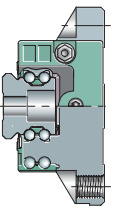
Load directions

Load carrying capacity

Basic load ratings

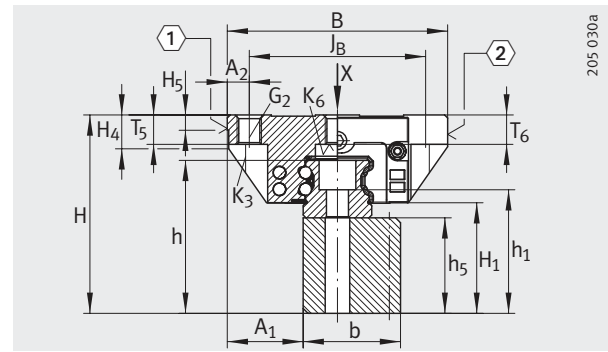
Moment ratings

C	C ₀	M _{0x}	M _{0y}	M _{0z}
N	N	Nm	Nm	Nm
17 900	37 000	510	395	395
38 000	72 000	1 465	1 020	1 020



Four-row linear recirculating ball bearing and guideway assemblies

Guideway with teeth on lateral face



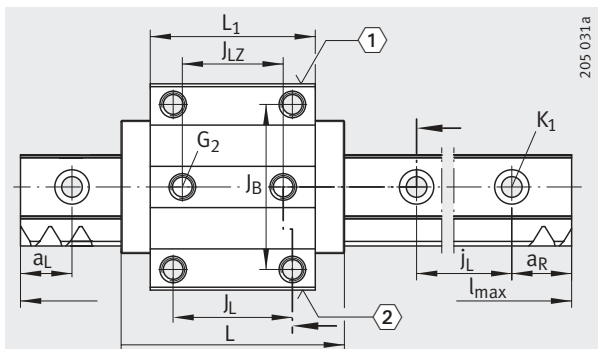
KUVE...-B-ZHST+SVS

①, ②⁵⁾

Dimension table · Dimensions in mm

Designation	Mass				Mounting dimensions							
	$l_{\max}^{1)}$	H	B	L	A ₁	b	h ₅	L ₁	J _B	J _L	J _{LZ}	j _L
KUVE25-B-ZHST+SVS³⁾	2 860	65	70	81,7	23,5	29,75	29	60,7	57	45	40	60
KUVE30-B-ZHST+SVS³⁾	2 860	81	90	97,6	31	39,75	39	72	72	52	44	80
KUVE35-B-ZHST+SVS³⁾	2 860	87	100	110	33	48,75	39	80	82	62	52	80

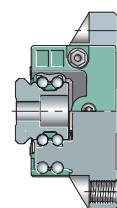
- 1) The maximum single-piece length of the toothed racks is 960 mm.
The maximum single-piece selling length of the unit is 2860 mm.
There is a possibility of obtaining by agreement a single-piece unit up to 5740 mm.
- 2) a_L and a_R are dependent on the length of the unit,
the holes may be intersected in certain cases.
- 3) Teeth, centre distance and ratio in accordance with DIN 3975 and DIN 3976.
- 4) If there is a possibility of preload loss due to settling, the fixing screws should be secured against rotation.
- 5) ① Locating face
② Marking



KUBE...-B-ZHST+SVS · View rotated 90°

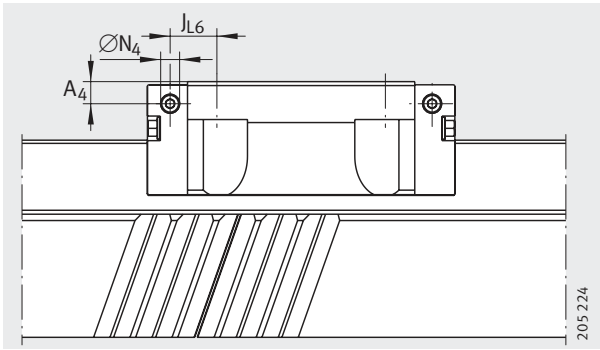
①, ② ⁵⁾

										Fixing screws ⁴⁾								Modulus
a _L , a _R ²⁾		A ₂	H ₁	H ₄	H ₅	T ₅	T ₆	h	h ₁	K ₁		G ₂		G ₃		K ₆		m
										DIN ISO 4 762-12.9								
min.	max.										M _A Nm		M _A Nm		M _A Nm		M _A Nm	
28	32	6,5	34,4	10,9	5	10	10	47,7	37,7	M6	17	M8	24	M6	17	M6	17	3
28	51	9	45	13,8	6	12	12	62,5	50,5	M8	41	M10	41	M8	41	M8	41	4
28	51	9	45,8	14,3	6,5	13	12	66	54	M8	41	M10	41	M8	41	M8	41	4



Four-row linear recirculating ball bearing and guideway assemblies

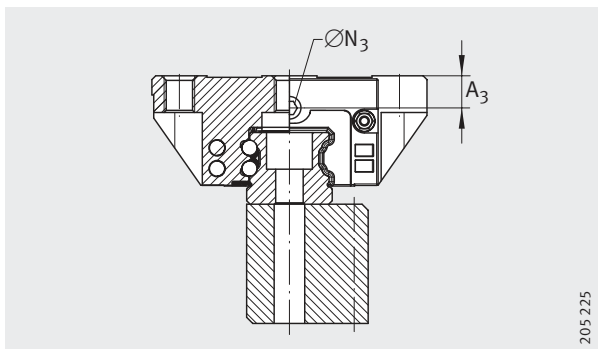
Guideway with teeth on lateral face



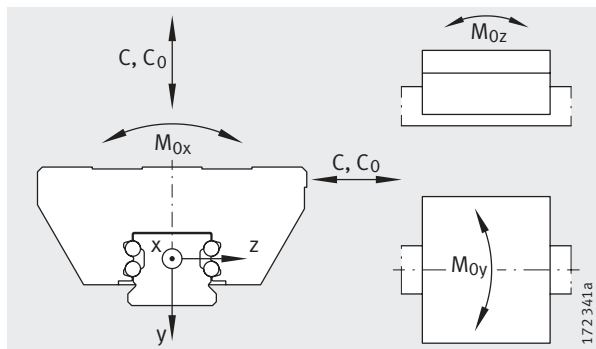
Lubrication connector on lateral face

Dimension table (continued) · Dimensions in mm				
Designation	Carriage ²⁾		Guideway	
	Designation	Mass m ≈kg	Designation	Mass m ≈kg/m
KUVE25-B-ZHST+SVS	KWVE25-B	0,71	TKVD25-ZHST+SVS	8,5
KUVE30-B-ZHST+SVS	KWVE30-B	1,4	TKVD30-ZHST+SVS	15
KUVE35-B-ZHST+SVS	KWVE35-B	2,02	TKVD35-ZHST+SVS	19,2

- ¹⁾ Calculation of basic load ratings in accordance with DIN 636.
Based on practical experience, it may be possible to increase the basic dynamic load rating.
- ²⁾ Lubrication nipple with tapered head to DIN 71 412-B M6 supplied loose.
- ³⁾ Maximum permissible screw depth for lubrication connectors.



Lubrication connector on end face

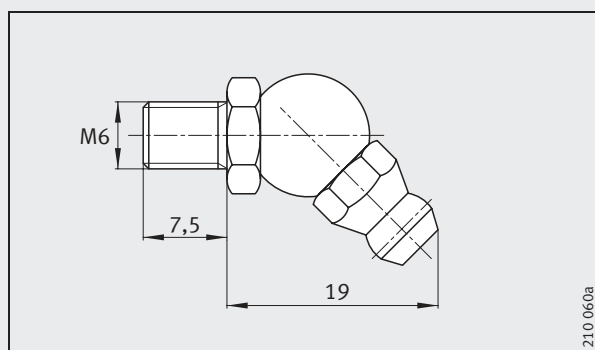
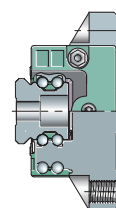


Load directions

Dimensioning of lubrication connectors

Load carrying capacity¹⁾

A ₃	ØN ₃		A ₄	ØN ₄		J _{L6}	Basic load ratings		Moment ratings		
		3)			3)		C	C ₀	M _{0x}	M _{0y}	M _{0z}
							kN	kN	Nm	Nm	Nm
11	5,5	7	6,5	5,5	7	12,85	17,9	37	510	395	395
11,5	5,5	7	7	5,5	7	15,5	27,5	55	970	700	700
12,3	5,5	7	11	5,5	7	16	38	72	1 465	1 020	1 020



Lubrication nipple²⁾



По вопросам продаж и поддержки обращайтесь:

Алматы (727)345-47-04 Ангарск (3955)60-70-56 Архангельск (8182)63-90-72 Астрахань (8512)99-46-04 Барнаул (3852)73-04-60 Белгород (4722)40-23-64 Благовещенск (4162)22-76-07 Брянск (4832)59-03-52 Владивосток (423)249-28-31 Владикавказ (8672)28-90-48 Владимир (4922)49-43-18 Волгоград (844)278-03-48 Вологда (8172)26-41-59 Воронеж (473)204-51-73 Екатеринбург (343)384-55-89	Иваново (4932)77-34-06 Ижевск (3412)26-03-58 Иркутск (395)279-98-46 Казань (843)206-01-48 Калининград (4012)72-03-81 Калуга (4842)92-23-67 Кемерово (3842)65-04-62 Киров (8332)68-02-04 Коломна (4966)23-41-49 Кострома (4942)77-07-48 Краснодар (861)203-40-90 Красноярск (391)204-63-61 Курск (4712)77-13-04 Курган (3522)50-90-47 Липецк (4742)52-20-81	Магнитогорск (3519)55-03-13 Москва (495)268-04-70 Мурманск (8152)59-64-93 Набережные Челны (8552)20-53-41 Нижний Новгород (831)429-08-12 Новокузнецк (3843)20-46-81 Ноябрьск (3496)41-32-12 Новосибирск (383)227-86-73 Омск (3812)21-46-40 Орел (4862)44-53-42 Оренбург (3532)37-68-04 Пенза (8412)22-31-16 Петрозаводск (8142)55-98-37 Псков (8112)59-10-37 Пермь (342)205-81-47	Ростов-на-Дону (863)308-18-15 Рязань (4912)46-61-64 Самара (846)206-03-16 Санкт-Петербург (812)309-46-40 Саратов (845)249-38-78 Севастополь (8692)22-31-93 Саранск (8342)22-96-24 Симферополь (3652)67-13-56 Смоленск (4812)29-41-54 Сочи (862)225-72-31 Ставрополь (8652)20-65-13 Сургут (3462)77-98-35 Сыктывкар (8212)25-95-17 Тамбов (4752)50-40-97 Тверь (4822)63-31-35	Тольятти (8482)63-91-07 Томск (3822)98-41-53 Тула (4872)33-79-87 Тюмень (3452)66-21-18 Ульяновск (8422)24-23-59 Улан-Удэ (3012)59-97-51 Уфа (347)229-48-12 Хабаровск (4212)92-98-04 Чебоксары (8352)28-53-07 Челябинск (351)202-03-61 Череповец (8202)49-02-64 Чита (3022)38-34-83 Якутск (4112)23-90-97 Ярославль (4852)69-52-93
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