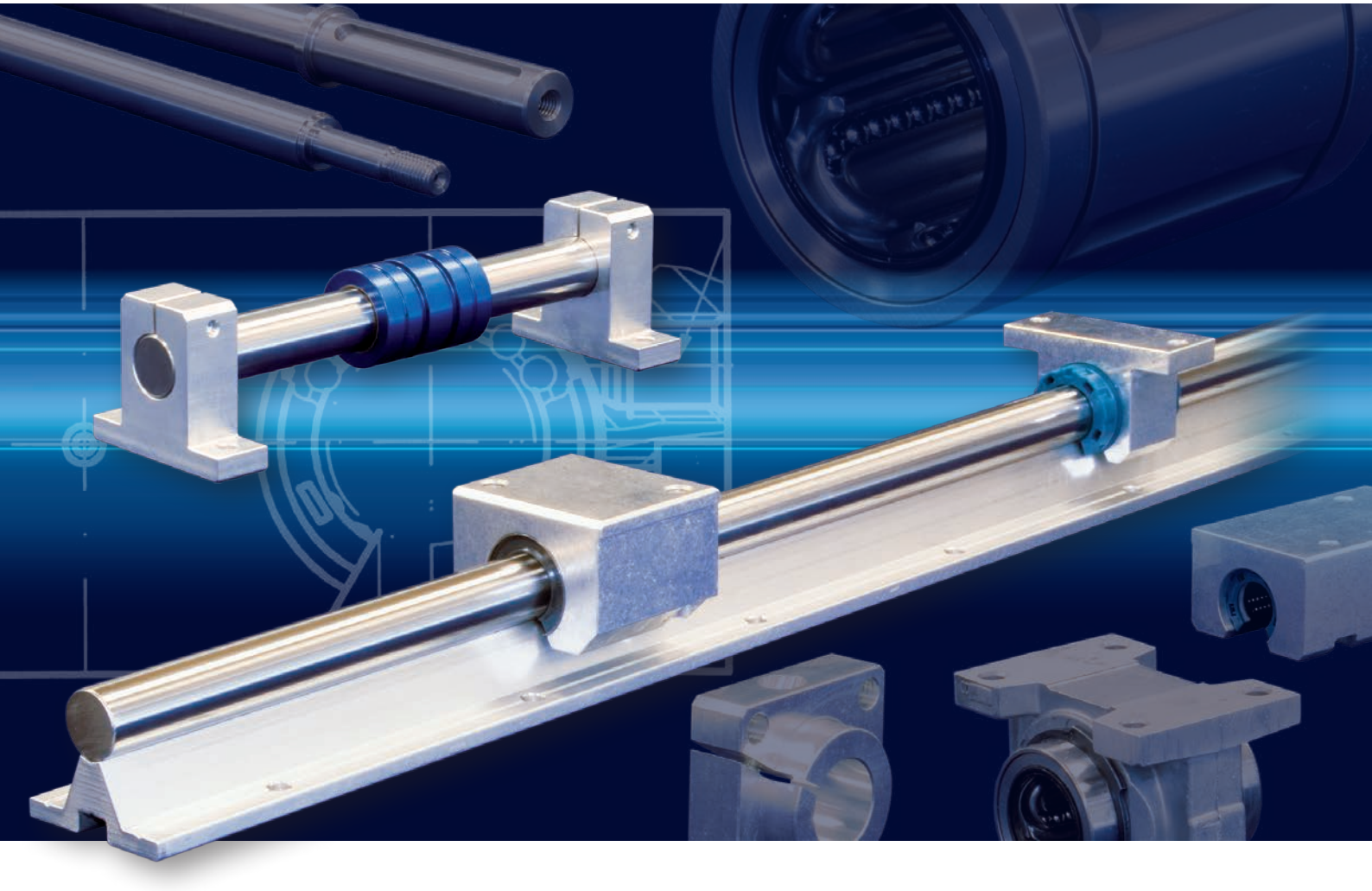


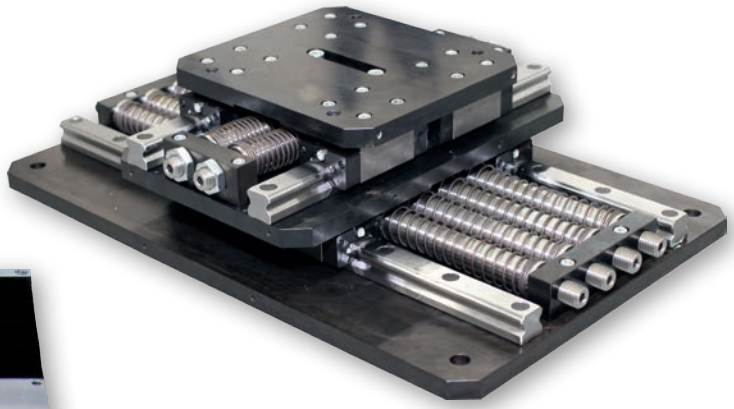
Linear-Technology

RODRIGUEZ®
Precision in Motion®

www.rodriguez.de

Applications for Linear-Roundrail-Technology-Products:

- food industry
- printing machines
- packaging machines
- medical industry
- optical scanner
- robots
- textile industry
- semiconductor industry
- woodworking machines
- handling systems



Linearguidings are used to solve linearmovement-requirements in various fields of engineering and machine building. As they contribute significantly in designing a machine technically and commercially, linearguidings gained in importance these days.

This catalogue introduces powerful linear-roundrail-components, mainly precision shafts, linear ballbushings, linear slidebushings, linear housing units and construction components, in 5 chapters.

Besides the mentioned standard-components, also special designs are available. These will be manufactured following a customer-drawing or will be designed based on given technical parameters.

We will be pleased to support you with our knowhow and experience.

Contents

Linear Technology

Chapter 1 - Linear Ball Bushings

Chapter 2 - Linear Bearing Housings, aluminium profile

Chapter 3 - Linear Bearing Housings graphite/aluminium mouldings

Chapter 4 - Linear Construction Components Shaft supports, end-blocks etc.

Chapter 5 - Precision Guide Shafts

Temperature and Friction

The temperature range, these linear ball bearings are suitable for applications between -20 and +80°C.
For higher temperatures we recommend all-steel bearings with special lubricants.

The coefficient of friction depends on the quality of the seals as well as on pressure and lubrication. The linear bearings have a Coefficient of Friction of 0.001 to 0.005.

Construction, Design and Materials

Linear housings - aluminium extruded section
Housing units can be fitted with all the linear bearings contained in this catalogue.
Aluminium housings are made of alloy EN AW-6060 or EN AW-6082.

Linear-housings - graphite pellet / aluminium injection mouldings
These housing units consist of standard or linear ball bearings with angle error compensation, slide bushings and cast iron- or aluminium injection moulding housings.

The bores for accepting linear ball bearings are generally H7.
Further tolerance information is given elsewhere in this catalogue.

Assembly Notes

The linear ball bearings mentioned in this catalogue are designed for bores to tolerance H7. They can be retained by retaining rings or clips. Open bearings are held in the radial-axial fixing bore by means of screws, dowels or lubricating slotted screws (page 11).
Standard linear ball bearings can also be pre-loaded with JS6 to M6 tolerances.

For safety and economic reasons however we strongly recommend the use of preassembled housing units.

Speed and Acceleration

Version	Max. Acceleration	Max. Speed
KH	50 m/s^2	2 m/s
LME	50 m/s^2	3 m/s
SDE	N.A.	N.A.
SPM	150 m/s^2	3 m/s
SSE	150 m/s^2	3 m/s
FMT	N.A.	4 m/s (with intermittent motion)
FM	N.A.	4 m/s (with intermittent motion)

Operating Life and Working Load for Linear Ball Bearings

Working Load
The load conditions listed in the tables apply to the linear ball bearings described in this catalogue in combination with precision steel shafts.

1. The load is applied at 90° to the horizontal plane

2. The surface hardness is HRC 62±2.

The following formula applies to configurations other than those given:

$$W_R = \frac{P}{K_\theta \times K_S \times K_L}$$

W_R = required dynamic load (N)
P = resultant of externally applied loads (N)
K_S = hardeness factor of shaft
K_θ = factor for direction of resultant load
K_L = factor for operating life

Direction of Load
For load correction factor K applicable to any linear ball bearing or linear housing, please enquire.

Shaft Surface Hardness
If a shaft does not conform to the HRC 62±2 criteria, a surface hardness correction factor KS applies.

Operating Life
The correction factor KL for operating life expectancy can be obtained from fig. 2.

Figure 1

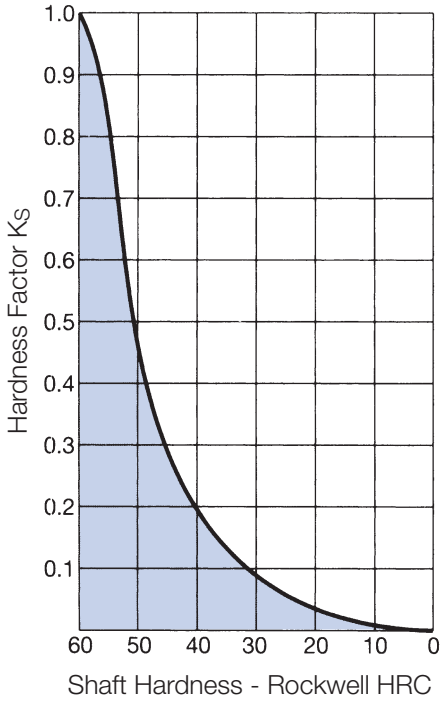
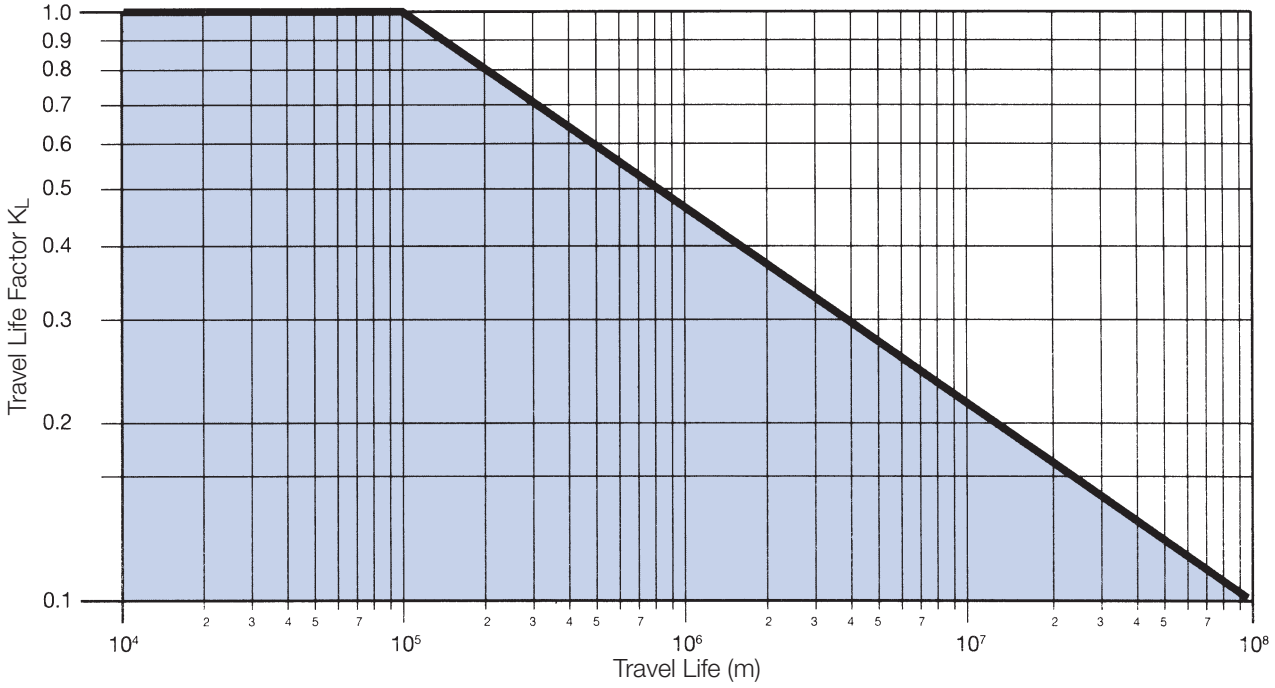


Figure 2



Load Limit

The load limit is the maximum load which may be applied to the bearing. Any application must be analysed in advance in order to ensure that maximum and / or shock laods will not exceed the load limits.

Dynamic Load Conditions

The dynamic load condition refers to the maximum continuos load which may be applied to a bearing, with a 90 % propability that a working life of 100 km can be achieved under normal operating conditions.
However, it must be considered that extremly short strokes, and the direction of load application, are also deciding factors.
The working life can be estimated by the use of the following formula:

$$L_m = \left(\frac{W}{P} * K_\theta * K_S\right)^3 * 10^5 \text{ m}$$

where:

L_m = working life in meters

W = dynamic load condition according to the tables, in N

P = result of the externally applied load, in N

K_θ = direction factor for the resulting load

K_S = shaft hardness factor

Sample Calculations

This shows how to calculate the correct size of ball bushing for a given application. in this example the “bearing shaft system” is subjected to a load of 2300N, acting at right angles to the direction of motion. The load is uniformly distributed among four closed Super-Smart Linear Ball Bearings™. The carriage moves over a stroke of 0.3 m at a frequency of 100 complete cycles per minute. An operating life of at least 3500 hours is required. A precision shaft will be used.
First, the average load acting on each of the Super-Smart bearings must be determined.

$$P = \frac{2300}{4} = 575 \text{ N}$$

From this the working life in m can be found:

$L_m = 2 * s * f * L_h * 60$
where: s = stroke in m

$L_m = 2 * 0{,}3 * 100 * 3500 * 60$
where: f = frequency in cycles per min

$L_m = 1{,}26 * 10^7 \text{m}$
where: L_h = required life in hours

From fig. 2 (graph) the working life factor (KL) 0.2.

From fig. 1 (graph) the shaft hardness factor (KS) 1.

For closed Super-Smart Linear Ball Bearings™ the minimum value of K_θ is 1, which is the value used for this calculation.

The necessary dynamic load is determined from the following formula:

$$WR = \frac{P}{K_L * K_S * K_\theta} \qquad WR = \frac{575}{0.2 * 1 * 1} = 2875 \text{ N}$$

From the appropriate sections giving technical product data and dimensions in this catalogue, it can be seen that the linear bearing with the next higher load capacity is the Super-Smart Linear Ball Bearing™ with a dynamic load capacity of 4000 N.

Determination of Working Life

The expected life of the Super-Smart Linear Ball Bearing™ “SMTE” under the conditions of this example is as follows:

W = 4000 N is the stated dynamic load

P = 575 N is resultant external load

K_θ = 1 is the orientation factor

K_S = 1 is the shaft hardness factor

Die oben genannten Werte werden in die folgende Formel eingebracht:

$$L_m = \left(\frac{W}{P} * K_\theta * K_S\right)^3 * 10^5 \text{ m} = 2.93 * 10^7 \text{ m}$$

The above values are substituted in the following expression:

$$L_h = \left(\frac{L_m}{2 * 60 * s * f}\right) = 8139 \text{ Hours}$$

Load Calculation

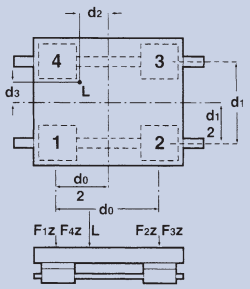
When designing a linear motion system, the way in which operating variables will influence performance must be considered. The following examples show how the position of the load and the load center can influence selection of the product. When considering an application, every force acting on the system must be evaluated in order to enable the most suitable product to be selected.

$$F_{1Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{2Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{3Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{4Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$



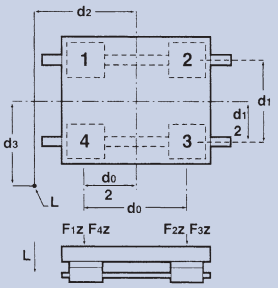
Horizontal Application I
At the time of movement with uniform velocity or at the time of stop.

$$F_{1Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{2Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{3Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{4Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0} - \frac{L}{2} \cdot \frac{d_3}{d_1}$$

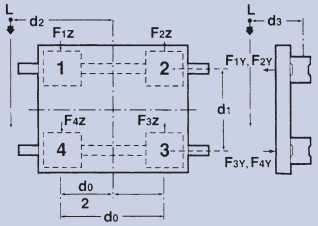


Horizontal Application II
At the time of movement with uniform velocity or at the time of stop.

$$F_{1Y} \sim F_{4Y} = \frac{L}{2} \cdot \frac{d_3}{d_1}$$

$$F_{1Z} = F_{4Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0}$$

$$F_{2Z} = F_{3Z} = \frac{L}{4} + \frac{L}{2} \cdot \frac{d_2}{d_0}$$



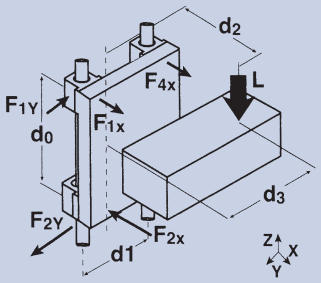
Side Mounted Application
At the time of movement with uniform velocity or at the time of stop.

$$F_{1X} \sim F_{4X} = \frac{L}{2} \cdot \frac{d_2}{d_0}$$

$$F_{1Y} \sim F_{4Y} = \frac{L}{2} \cdot \frac{d_3}{d_0}$$

$$F_{1X} + F_{4X} \sim F_{2X} + F_{3X}$$

$$F_{1Y} + F_{4Y} \sim F_{2Y} + F_{3Y}$$



Vertical Application
At the time of movement with uniform velocity or at the time of stop. At the time of start and stop, the load varies because of inertia.

Terms:

d_0 = distance between centerlines of the bearing housings
d_1 = distance between centerlines of shafts
d_2 = distance between centerlines of carriage and center of gravity
d_3 = distance between centerline of carriage and center of gravity
L = Load (N)
F_{NX} = Force in direction of X-axis (N)
F_{NY} = Force in direction of Y-axis (N)
F_{NZ} = Force in direction of Z-axis (N)

Shaft Deflection

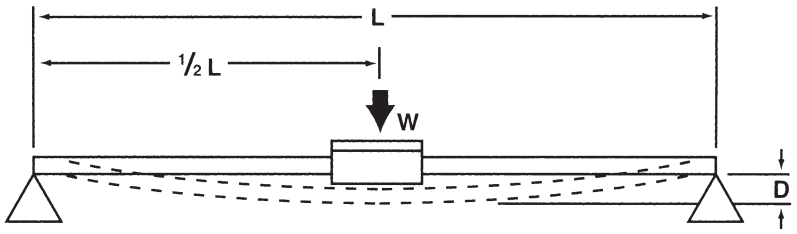
When using hardened precision steel shafts with end supports, care must be taken to ensure that the shaft deflection within the bearing travel does not exceed the bearing performance criteria.

The following tables give the shaft deflection at the center of a shaft with end supports. Systems using fully supported shafts are not subjected to these deflections.

Values of EI for Hardened and Ground Shafts

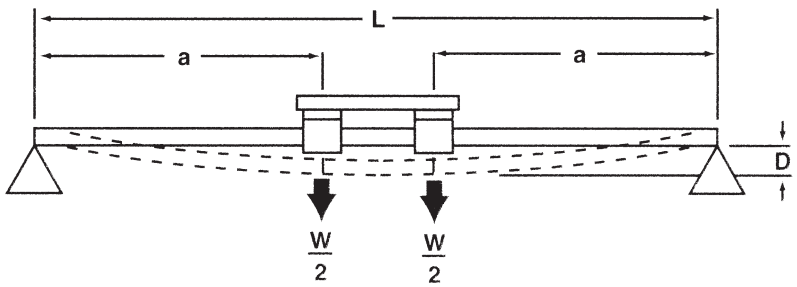
Shaft ∅ (mm)	EI (Nm^2)
5	5,838
8	38,26
10	93,41
12	193,7
16	612,2
20	1.495
25	3.649
30	7.566
40	$2{,}391 \cdot 10^4$
50	$5{,}838 \cdot 10^4$
60	$1{,}211 \cdot 10^5$
80	$3{,}826 \cdot 10^5$

Simply Supported Shaft with Single Block



Deflection at center (D) $D = \frac{WL^3}{48\,EI}$

Simply Supported Shaft with 2 Single Blocks



Deflection at center (D) $D = \frac{Wa\,(3L^3 - 4a^2)}{48\,EI}$

D = mm
W = N
L = mm
a = mm

Lubrication

All Linear Guiding Systems must be lubricated to ensure their function. The volume and the way of lubrication depends on the product. The definition of the re-lubrication, in terms of volume and cycles, are depending on the applications and can be calculated by our technical department. The information about grease- and oil-lubrication refer to standard industrial applications and are not obligatory. Especially in special cases, i.e. food-industry, high temperature- or high speed- applications or short-stroke-applications, an investigation of the application is necessary as well.

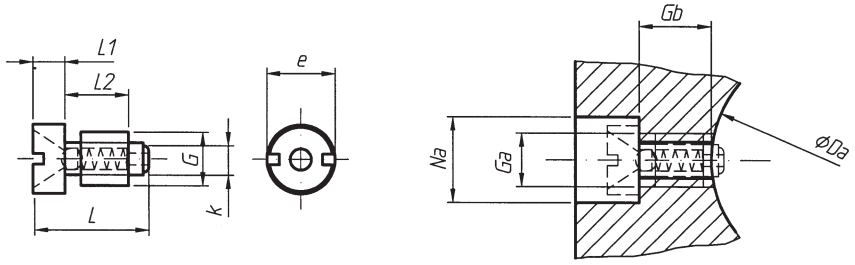
Delivery condition: All Linear ball bushings are shipped with rust preservative, that protects from corrosion and other influences during transport and storage.

Grease-lubrication: Common. Because of the trend to minimum-volumes and extended lubrication intervals, grease lubrication is useful for linear ball bushings. We recommend Klüber Isoflex NCA15.

Oil-lubrication: Possible. Useful when a central lubrication system with oil is already installed. Our recommendation is Klüberoil GEM 1-68 N.

Else: When lubricating a system initially, the lubricant has to be filled in with the shaft assembled until the lubricant is pushed out of the bushing. The lubrication cycle should be maximum 12 months or 100km, depending on what occurs first, but it may be less due to application-specifics. Relubrication of linear ball bushings is made through a lubrication nipple (see below). If no lubrication hole and no wipers are available the lubrication can be made through the shaft. It must be ensured that all balls obtain enough lubrication.

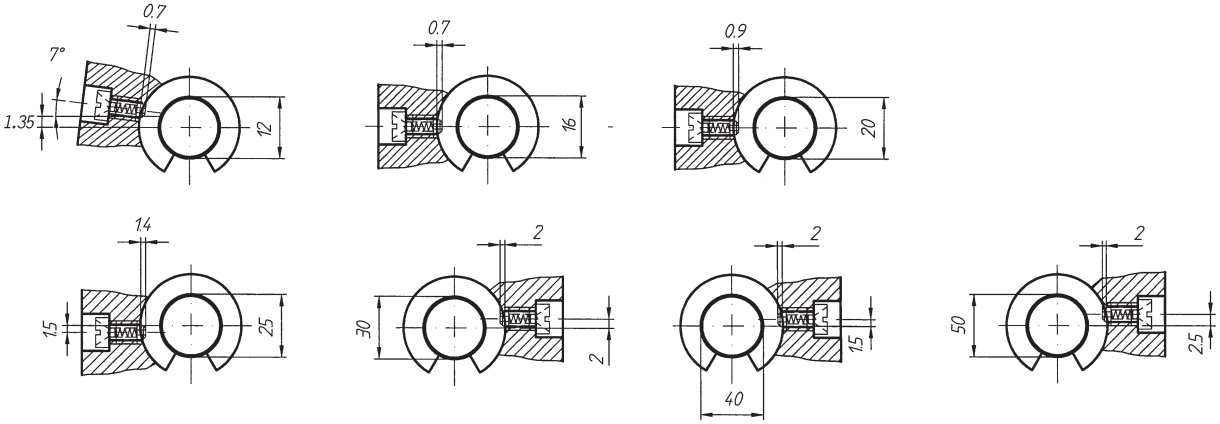
Lubrication nipple - slotted screw



Dimensions in mm

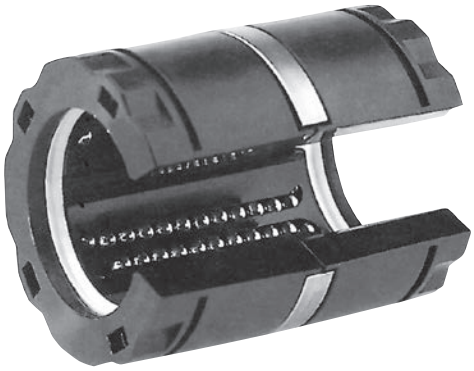
shaft-∅	G	L	L1	L2	k	∅ e	∅ Da	Ga	Gb$^{\pm 0,2}$	∅ Na$^{\pm 0,4}$
12	M5	10,9	3	6	3	6,45	22	M5	7,2	8
16	M5	10,9	3	6	3	6,45	26	M5	7,2	8
20	M5	10,9	3	6	3	6,45	32	M5	7	8
25	M5	10,9	3	6	3	6,45	40	M5	6,5	8
30	M5	10,9	3	6	3	6,45	47	M5	6,2	8
40	M5	10,9	3	6	3	6,45	62	M5	6,2	8
50	M5	10,9	3	6	3	6,45	75	M5	6,2	8

Position of radial - axial fixings



Super-Smart Linear Ball Bearings™

The SSE Super-Smart Linear Ball Bearings™ represent a significant, world-wide advance in linear guide technology. Super-Smart Linear Ball Bearings™ provide double the capacity and 8 times the working life, compared with Super-Smart Linear Ball Bearings used in industry.



Technologically advanced design
With Super-Smart Linear Ball Bearings™, four hardened steel elements carry the bearing forces, (see figs. 1 and 2).

The first element is the steel outer shell, which ensures diameter consistency of the bearing, even for slightly out-of-round housings. The unique design of this ring permits the adjustment of the bearing and provides compensation for diameter variations.

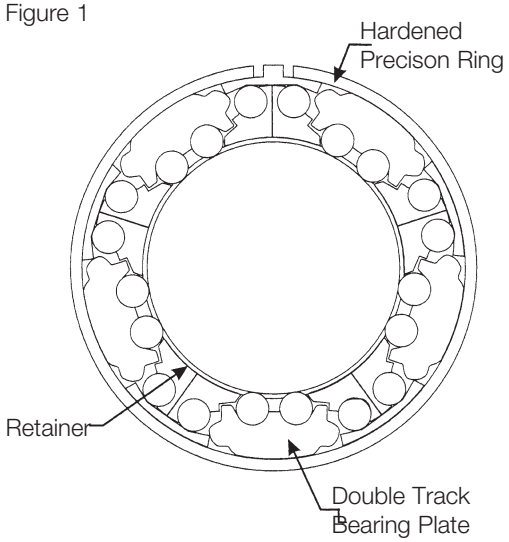
The second element is the high-precision double-track bearing plate, which doubles the load capacity and is self-adjusting.

The third element is the rolling components. The Super-Smart Linear Ball Bearings™ are provided with precision-ground balls with roundness and spherical geometry conforming to the highest quality standards. This results in maximal load capacity, working life and efficiency.

The PowerRail Advantage
The PowerRail Advantage is the ability of a Super-Smart Linear Ball Bearing™ to compensate torsional alignment errors due to carrier unevenness, machining inaccuracies or machine distortions, without unduly stressing the bearing. Assembly times and costs are reduced to a minimum whilst the efficiency of the bearing is maximised.

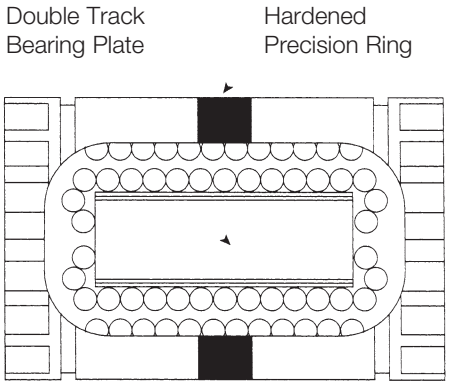
Super-Smart Linear Ball Bearings have 3 times the load capacity and 27 times the working life of conventional linear guides.

Figure 1



Cross-section of Super-Smart Ball Bushing Bearing™

Figure 2



Assembly notice: When sliding the ball bushing on the shaft, the shaft must not twist or be misaligned. Further no improper force may apply to the ball bushing. The assembly sleeve should only be removed during the assembly process.

Universal Self-Alignment
The bearing plate of the Super-Smart Linear Ball Bearing™ embodies many unique and technically advanced features. The universal self-alignment features are responsible for the fact that the Super-Smart Linear Ball Bearing™ achieves optimum performance with regard to load bearing capacity, working life, smooth operation and low coefficient of friction. The self-adjustment process has three features: tilt, roll and rotation.

Tilt
The design of the bearing plate permits it to tilt 0.5° inside the hardened outer shell, (see figs. 3 & 4). This enables a Super-Smart Linear Ball Bearing™ to compensate alignment errors due to housing bores or shaft distortions. This tilting ability also facilitates the smooth entry and exit of the precision balls into and out of the load zone, which results in a constant , low friction coefficient. Whilst compensating alignment errors, each load-bearing ball in the laod zone is equally stressed, which results in maximum load capacity.

Roll
The second significant design characteristic of the Super-Smart Linear Ball Bearing™ is the ability to roll. The outer radius of the cage is slightly smaller than the inner radius of the precision outer ring, (see fig. 5). The cage can compensate torsional inaccuracies and distributes the load equally between its two tracks. This roll function provides maximum load capacity and long working life.

Rotation
The ability to tilt and roll enables the cages of the Super-Smart Linear Ball Bearing™ to turn over their center axis, (see fig. 6). This enables the Super-Smart Linear Ball Bearing™ to compensate misalignments, resulting in a constantly low friction coefficient and maximum load capacity.

Figure 3

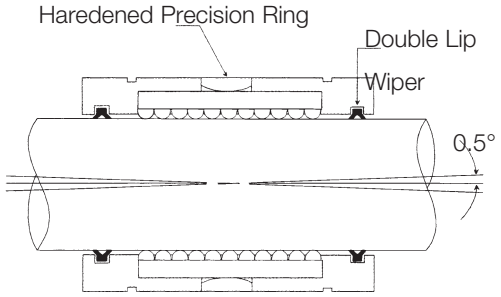
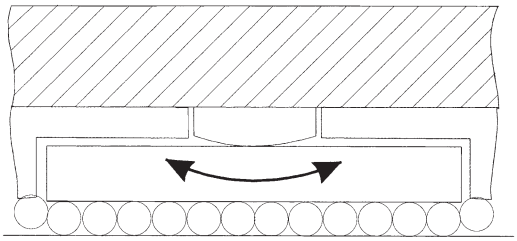
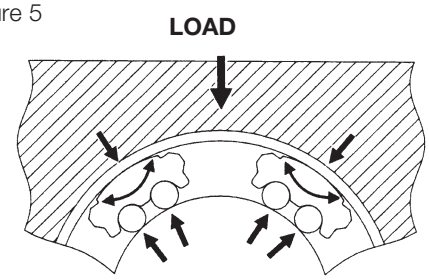


Figure 4



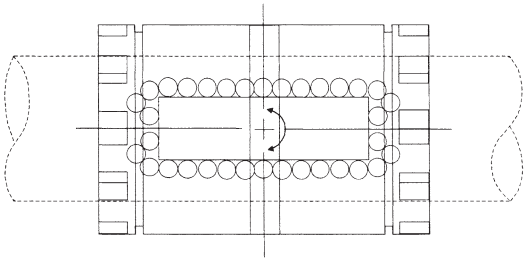
Close-up of hardened precision ring, showing how the bearing plate self-aligns (rocks) about the curved surface of the ring.

Figure 5



Close-up of double track bearing plates showing how they self-align (roll) to evenly distribute the load on each of their two ball tracks

Figure 6



Bearing plates rotate about their centre to prevent skewing relative to the center Linear Race.

Precision slide bushings made of Frelon

Frelon® is a composition of Teflon® and additional materials and was developed to create superiour performance. Its intention is to ensure less friction, self lubrication, high rigidity and reduced abrasion

Chemical resistance
Frelon® as a material is almost completely inactive. Only melted Natrium and Fluor under higher temperature effect the material.

Aluminium, anodisation and hardcoating
Precision slide bushings are made from aluminium AlMg1 SiCu. Sulfunic bath anodizing with a nickel acetate seal ensures best corrosion protection, that can be achieved with anodised coatings. Supposed the coating is correct, it is chemically inactive with a ph-value of 5 – 8 in most fluids. Hardcoating offers the same chemical resistance, but will be manufactured with a thickness of 50 µm, which improves the resistance of the surface.

Temperature
recision slide bushings work in a wide temperature range: -240°C up to +260°C.

- Linear slide bushings are developed to be implemented into most industrial applications.
- We recommend the standard range (FM-series) for temperature ranges lower than -18°C, whereas FMC-series is recommended in high temperature applications.

In order ensure the correct clearance, it is necessary to check the "real dimensions" when extreme temperatures apply

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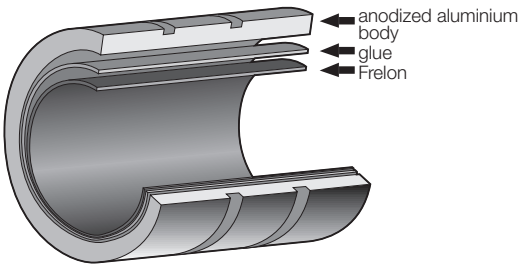
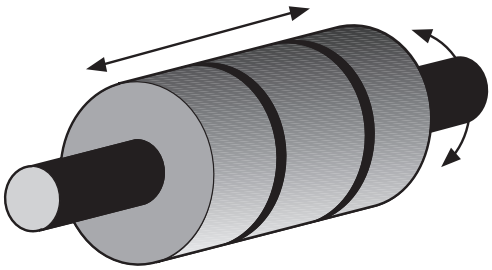
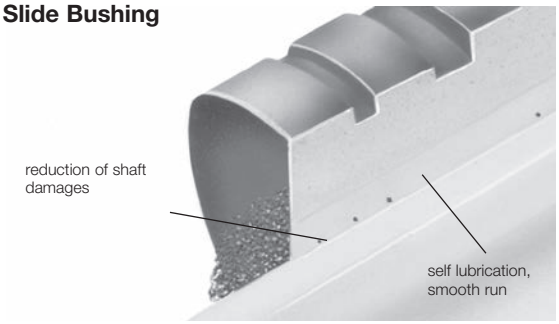
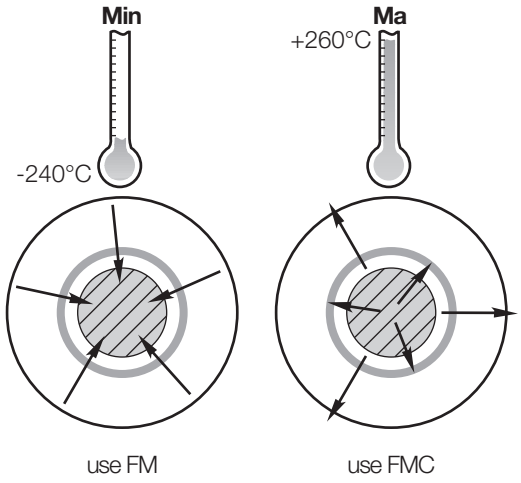




Slide Bushing

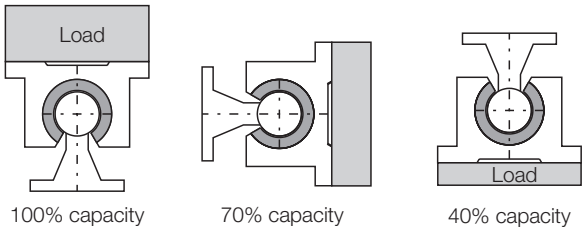


Temperature ranges



Load

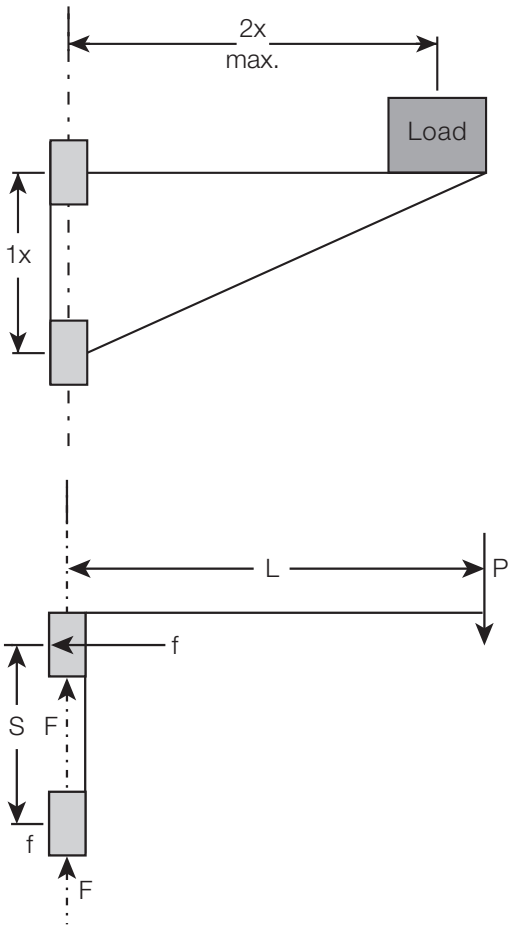
Open bushings
Precision slide bushings can be installed in any situation.
- The load capacity varies depending on the system configuration.



Indication

not supported loads
- Max. lever arm ratio 2:1. The max. distance between shaft and load may not be higher than the double of the middle distance between the bearings.

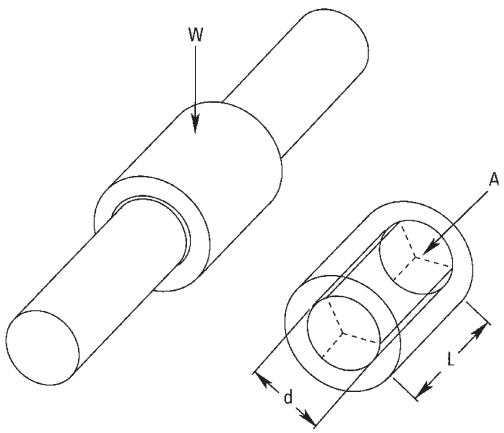
Important: Exceeding of the ratio 2:1 may cause clamping!
- The principle is not load dependent! It is also not depending on edgeload or the applied force.



P = load
L = distance shaft - load
s = middle distance of bearings
f = load on the bearings
F = friction force for each bearing
11 = coefficient of friction force (ca. 0,25 at pause)

Balance of moments:
$f \cdot s = L \cdot P$ $L/s = f/P$

calculation of friction force: $F = f \cdot \mu$
Remark: The total applied friction force is 2 F.
To block the bearing, the total friction force must be equal (or higher than) P .
$P = 2\,F = 2\,f \cdot \mu$



PV-values

Evaluation of Slide Bushings
The capability of a Slide Bushing is given as “PV”-Value
“P” = pressure
“V” = speed or Circumferential
“PV” = P x V

Max. parameters for linear slide bushings
“P” = 1034 N/cm^2
“V” = 43 m/min (dry)
“PV” = 2150 N/cm^2 x m/min

To secure performance, all 3 parameters may not be exceeded.

formulars
A = L x d (cm^2)
P = WA (N/cm^2)
PV = P x V (N/cm^2 x m/min)

The linear ball bearings are manufactured to very tight tolerances and result in smooth, almost frictionless movement. This excellent performance will be achieved only if the bearings are carefully assembled.

The alignment of the bearing and the parallelism of the shaft are the most important factors. To achieve smooth movement, two linear bearings per shaft are normally used. The housings should be carefully aligned as described below. When using tandem bearing housings, such alignment becomes superfluous.

In addition, make sure that the height of the mounting plate surface to the shaft is constant within limits of 0.025 mm. Depending on the accuracy of the mounting surface, it may be necessary to use shims.

The housings can be fitted to the mounting plate as follows:

a. Mount two housings, align them, and tighten the fixing screws. (Fig.1)

b. Mount the second pair of housings on the opposite side of the carriage and screw the fixing screws finger tight.

c. Push a sample shaft of the correct diameter and tolerance (h6) through this pair of housings in order to align them. (Fig. 2)

d. After correct alignment of the second pair of housings tighten the fixing screws.

Figure1

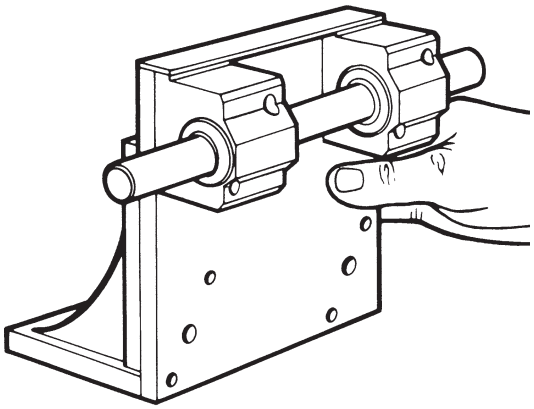


Figure 2

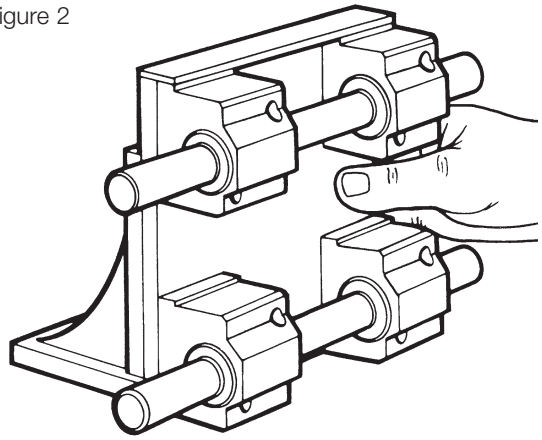


Figure 3

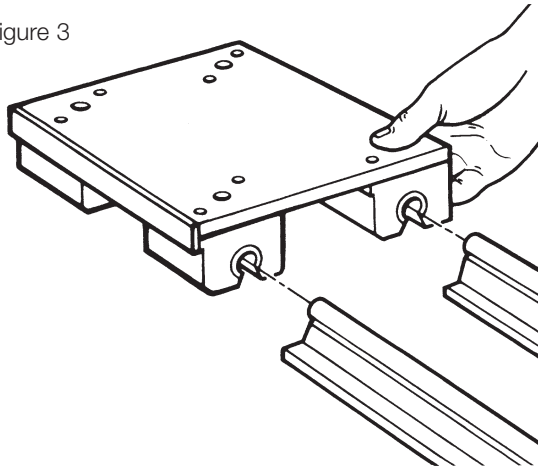


Figure 4

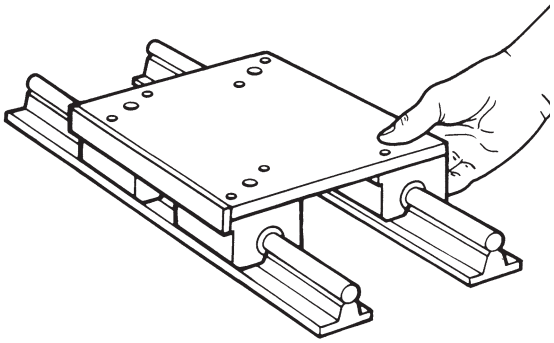


Figure 5

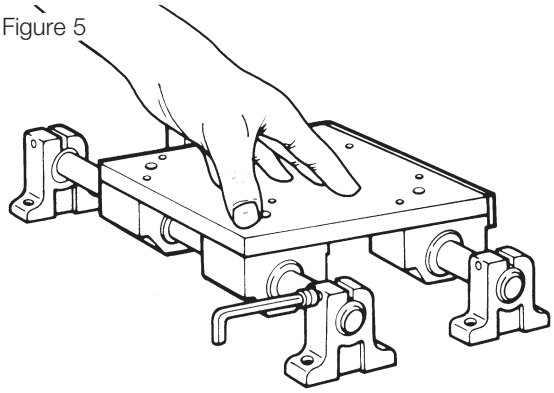
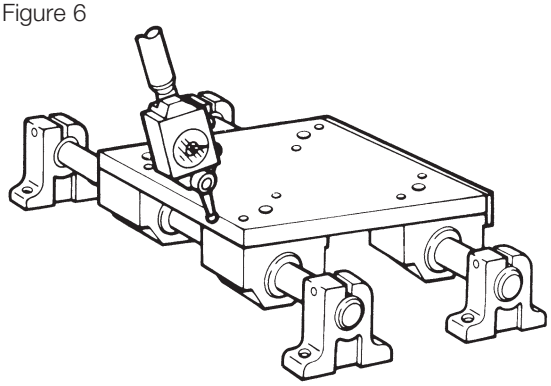


Figure 6



After properly preparing the carriage, the shafts need to be fixed on the mounting plate. To provide smooth running, the shafts must be parallel, with a tolerance of not more than 0.025 mm over the entire length of travel. To achieve this, proceed as follows:

a. Mount one shaft, either supported at the ends or over the whole length, finger tight on the mounting plate.

b. Using an optical align and fix screws.

c. When the first shaft is fixed correctly, mount the second shaft, align, and screw finger tight.

d. Now assemble the carriage. Moving it along will pull the second shaft into alignment with the first one. (Fig. 3 & 4)

e. When the second shaft is fixed the process is complete. Note however that, when using continuous shaft supports, the fixing screws should be tightened when the carriage is in the vicinity. Shafts with end supports should be tightened when the carriage is at the end being fixed. (Fig. 5)

f. At this point another check can be carried out to ensure that the carriage is tracking as it should, i.e. that the edge of the carriage is moving parallel with the shaft. This can be done by means of a dial indicator, mounted on the edge of the carriage. When moving the carriage the indicated value should be within the stated tolerance. (Fig. 6)

Ordering Code for Linear Housings:

Ordering example: AG-OP-20-S-V-X

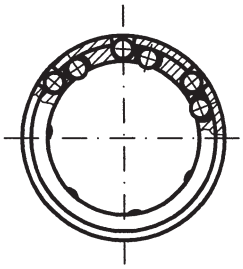
AG- AL - Extruded Profile		OP- Version		20- Shaft diameter
AGC	closed compact	no code	closed	∅ 8 to ∅ 80
TAGC	closed compact, tandem	AJ	radial adjustment	
ALGS	pillow block	OP	open	
AG	standard	OPAJ	open, radial adjustable	
AGS	open on side			
TAG	tandem			
QAG	quadruple			
FAG	flanged			
FTAG	flanged, tandem			
AL - Casting				
MAG	closed			
Graphite Moulding				
GG	closed			
FGG	flanged housing			

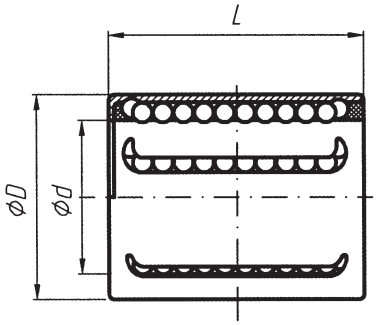
S- Linear bearing		V- Seal		X Specials to customers specification	
C	compact linear ball bearing	no code	seals at both ends	X	drawing number
K	standard linear ball bearing	V	external seals, both ends		
V	all steel linear ball bearing				
KS	standard linear ball bearing, self-aligning				
S	heavy duty linear ball bearing, self-aligning				
SCR	corrosion resistant, heavy duty, self-aligning				
L	ceramic linear slide bearing				
FM	linear slide bushing, self-lubricating				
FMA	linear slide bushing, self-lubricating, self-aligning				
FMT	linear slide bushing, self-lubricating, compact				

It is responisbility of the user to ascertain the suitability of the items listed in this catalogue for any specific application.
Faulty products will be replaced free of charge, if returned to us immediately. No further warranty will apply after such an exchange.
We reserve the right, to provide our linear units with equivalent linear bearings instead of the linear bearings shown in this catalog.

Linear Ball Bushing

The outer shell is made of steel, the cage is plastic. Balls are Grade 10. Bushings are available with seals at one or both ends.





Dimensions in mm

Part-No.	∅ d	∅ D	L	load capacity (N) dyn	stat.	weight (g)
KH-0622	6	12	22	400	239	7
KH-0824	8	15	24	435	280	12
KH-1026	10	17	26	500	370	14,5
KH-1228	12	19	28	620	510	18,5
KH-1428	14	21	28	620	520	20,5
KH-1630	16	24	30	800	620	27,5
KH-2030	20	28	30	950	790	32,5
KH-2540	25	35	40	1.990	1.670	66
KH-3050	30	40	50	2.800	2.700	95
KH-4060	40	52	60	4.400	4.450	182
KH-5070	50	62	70	5.500	6.300	252

Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5

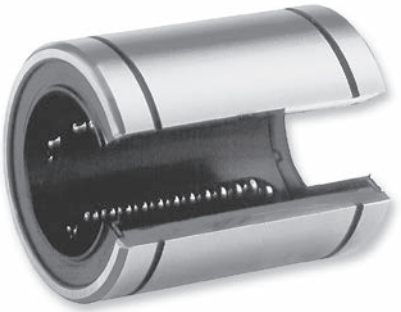
Ordering code

KH-	∅-	PP	
standard linear ball bushing	shaft diameter	P	seal one end
		PP	seal both ends

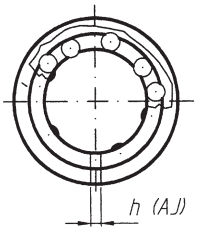
Standard Linear Ball Bushing

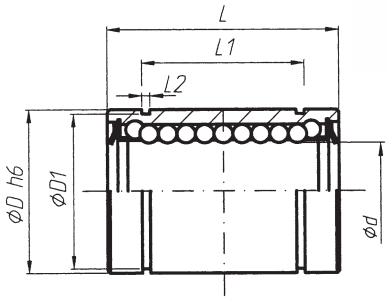
The outer shell is made of steel, the cage is plastic. Balls are Grade 10. The wipers are vulcanised onto the endring. Standard linear ball bushings are available in the following versions:

- closed
- closed, radial adjustable
- open

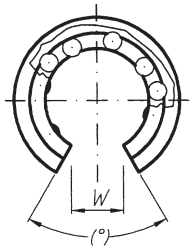


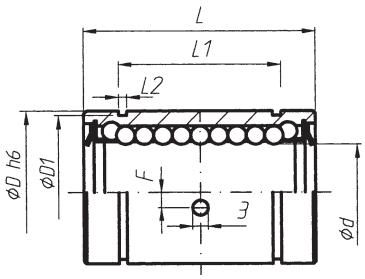
LME (LME-AJ)





LME-OP





Dimensions in mm

Part-No	∅ d	∅ D [3]	L	L1	L2	∅ D1	h	W	(°)	F	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
LME-05	5	12	$22^{-0,2}$	$14,5^{-0,2}$	1,1	11,5	1,0	–	–	–	200	260	0,01
LME-08	8	16	$25^{-0,2}$	$16,5^{-0,2}$	1,1	15,2	1,0				260	400	0,02
LME-12	12	22	$32^{-0,2}$	$22,9^{-0,2}$	1,3	21,0	1,5	–	–	–	410	590	0,04
LME-16	16	26	$36^{-0,2}$	$24,9^{-0,2}$	1,3	24,9	1,5	10,0	78	0	770	1.170	0,06
LME-20	20	32	$45^{-0,2}$	$31,5^{-0,2}$	1,6	30,3	2,0	10,0	60	0	860	1.370	0,09
LME-25	25	40	$58^{-0,3}$	$44,1^{-0,3}$	1,85	37,5	2,0	12,5	60	1,5[1]	980	1.560	0,21
LME-30	30	47	$68^{-0,3}$	$52,1^{-0,3}$	1,85	44,5	2,0	12,5	50	2,0	1.560	2.740	0,32
LME-40	40	62	$80^{-0,3}$	$60,6^{-0,3}$	2,15	59,0	3,0	16,8	50	1,5	2.150	4.010	0,70
LME-50	50	75	$100^{-0,3}$	$77,6^{-0,3}$	2,65	72,0	3,0	21,0	50	2,5	3.820	7.930	1,13
LME-60	60	90	$125^{-0,4}$	$101,7^{-0,4}$	3,15	86,5	3,0	27,2	54	0[2]	4.700	9.990	2,05

[1] Fixing hole ∅ 3mm. The hole for radial and axial adjustment is below the center (refer to page 11).
[2] Fixing hole ∅ 5mm.
[3] Tolerance for ballbushing without slot.
The Ball Bushings are also available in metric-japanese dimensions.
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

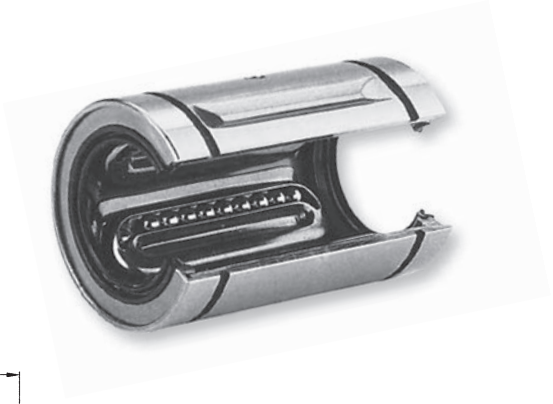
Ordering code

LME-	∅-	OP-		UU-		FX
standard ball bushing	shaft diameter	OP	open from ∅ 16	U	seal one	radial-axial fixing hole
		AJ	adial adjustable from ∅ 12	UU	seal both ends	

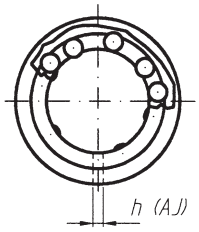
Linear Ball Bushing, all steel

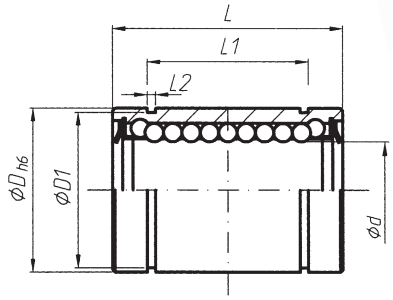
The outer shell and the cage are made of steel. Balls are Grade 10. The wipers are vulcanised onto the endring. All steel linear ball bushings are available in the following versions:

- closed
- closed, radial adjustable
- open

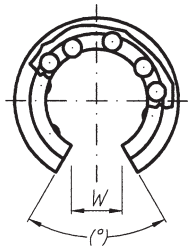


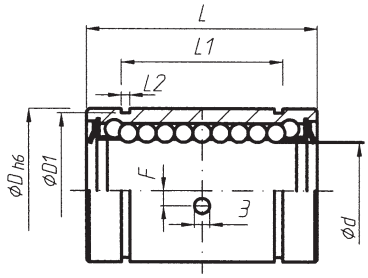
SDE (SDE-AJ)





SDE-OP





Dimensions in mm

Part-No.	∅ d	∅ D (3)	L	L1	L2	D1	h	W	(°)	F	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
SDE-05	5	12	$22^{-0,2}$	$14,5^{-0,2}$	1,1	11,5	1,0	–	–	–	108	183	0,02
SDE-08	8	16	$25^{-0,2}$	$16,5^{-0,2}$	1,1	15,2	1,0	–	–	–	122	223	0,03
SDE-12	12	22	$32^{-0,2}$	$22,9^{-0,2}$	1,3	21	1,5	7,5	78	1,35	289	503	0,04
SDE-16	16	26	$36^{-0,2}$	$24,9^{-0,2}$	1,3	24,9	1,5	10,0	78	0	319	587	0,05
SDE-20	20	32	$45^{-0,2}$	$31,5^{-0,2}$	1,6	30,3	2,0	10,0	60	0	590	1.010	0,09
SDE-25	25	40	$58^{-0,3}$	$44,1^{-0,3}$	1,85	37,5	2,0	12,5	60	1,5(1)	1.130	2.030	0,19
SDE-30	30	47	$68^{-0,3}$	$52,1^{-0,3}$	1,85	44,5	2,0	12,5	50	2,0	1.470	2.770	0,34
SDE-40	40	62	$80^{-0,3}$	$60,6^{-0,3}$	2,15	59,0	3,0	16,8	50	1,5	2.180	4.010	0,71
SDE-50	50	75	$100^{-0,3}$	$77,6^{-0,3}$	2,65	72,0	3,0	21,0	50	2,5	4.020	7.110	1,05
SDE-60	60	90	$125^{-0,4}$	$101,7^{-0,4}$	3,15	86,5	3,0	27,2	50	–	6.470	11.100	1,90
SDE-80	80	120	$165^{-0,4}$	$133,3^{-0,4}$	4,15	116	3,0	36,3	50	–	8.890	14.500	4,80
SDM-100	100	150	$175^{-0,4}$	$125,0^{-0,4}$	4,15	145	3,0	50	50	–	12.300	19.700	8,20
SDM-120	120	180	$200^{-0,4}$	$158,6^{-0,4}$	4,15	175	4,0	85	80	–	22.300	39.100	15,50

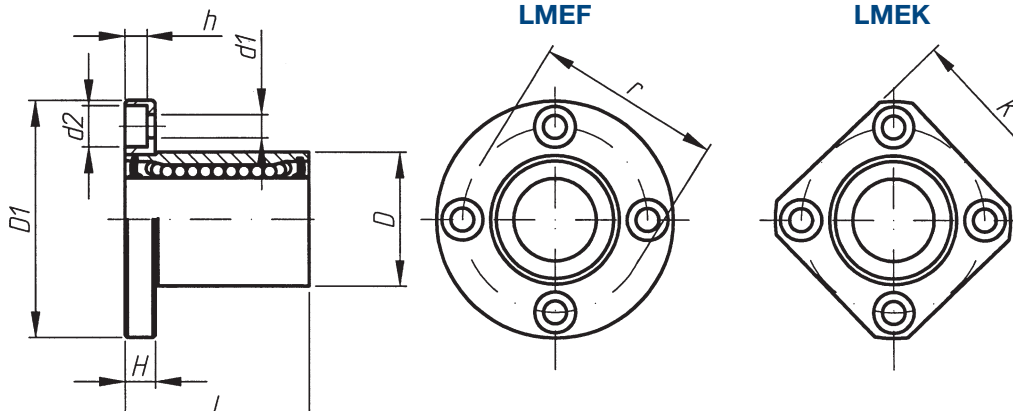
(1) Fixing hole ∅ 3mm. The hole for radial and axial adjustment is below the center (refer to page 11).
(2) Fixing hole ∅ 5mm.
(3) Tolerance for ballbushing without slot.
The Ball Bushings are also available in metric-japanese dimensions.
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

Ordering Code

SDE-	∅-	OP-		UU-		FX
standard ball bushing	shaft diameter	OP	open	U	seal one end	radial-axial fixing hole
		AJ	radial adjustable from ∅ 12	UU	seal both ends	

Linear Ball Bushing, Flange

The outer shell is made of steel, the cage is plastic. Balls are Grade 10. The wipers are vulcanised onto the endring.



Dimensions in mm

Part-No.	∅ d	∅ D	L	D1	H	h	d1	d2	r	K	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
LME(F/K)-08	8	16	25	32	5	3,1	3,4	6	24	25	265	402	0,04
LME(F/K)-12	12	22	32	42	6	4,1	4,5	7,5	32	32	510	784	0,09
LME(F/K)-16	16	26	36	46	6	4,1	4,5	7,5	36	35	578	892	0,12
LME(F/K)-20	20	32	45	54	8	5,1	5,5	9	43	42	862	1.370	0,19
LME(F/K)-25	25	40	58	62	8	5,1	5,5	9	51	50	980	1.570	0,34
LME(F/K)-30	30	47	68	76	10	6,1	6,6	11	62	60	1.570	2.740	0,55
LME(F/K)-40	40	62	80	98	13	8,1	9	14	80	75	2.160	4.020	1,21
LME(F/K)-50	50	75	100	112	13	8,1	9	14	94	88	3.820	7.940	1,76
LME(F/K)-60	60	90	125	134	18	10,1	11	17	112	106	4.700	9.800	3,24

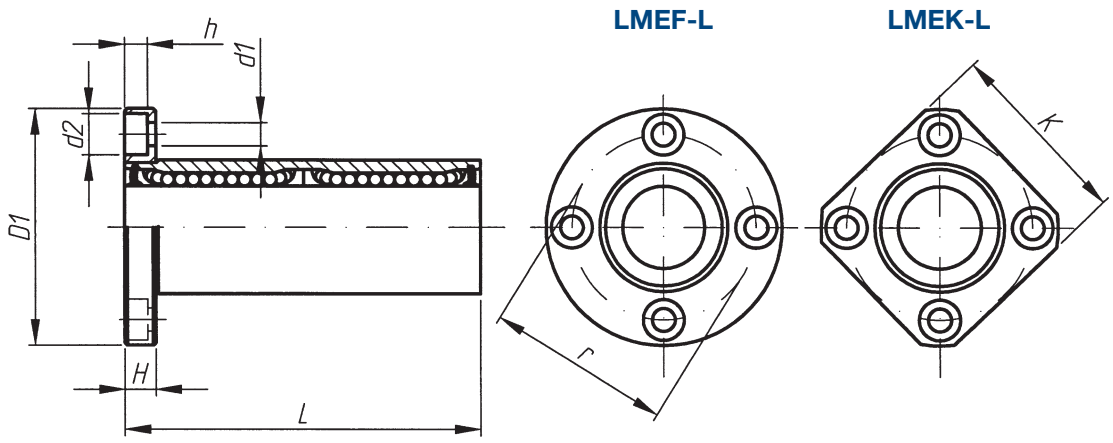
The Ball Bushings are also available in metric-japanese dimensions.
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

Ordering code

LMEF-	∅-	UU-
linear ball bushing	shaft diameter	**U** seal one end,
LMEF round flange		**UU** seal both ends
LMEK square flange		

Linear Ball Bushing, Flange, Long

The outer shell is made of steel, the cage is plastic. Balls are Grade 10. The wipers are vulcanised onto the endring.



Dimensions in mm

Part-No.	∅ d	∅ D	L	D1	H	h	d1	d2	r	K	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
LME(F/K)-08-L	8	16	45/46*	32	5	3,1	3,4	6	24	25	421	804	0,05
LME(F/K)-12-L	12	22	57/61*	42	6	4,1	4,5	7,5	32	32	813	1.570	0,10
LME(F/K)-16-L	16	26	70/68*	46	6	4,1	4,5	7,5	36	35	921	1.780	0,19
LME(F/K)-20-L	20	32	80	54	8	5,1	5,5	9	43	42	1.370	2.740	0,26
LME(F/K)-25-L	25	40	112	62	8	5,1	5,5	9	51	50	1.570	3.140	0,52
LME(F/K)-30-L	30	47	123	76	10	6,1	6,6	11	62	60	2.500	5.490	0,67
LME(F/K)-40-L	40	62	151	98	13	8,1	9	14	80	75	3.430	8.040	1,59
LME(F/K)-50-L	50	75	192	112	13	8,1	9	14	94	88	6.080	15.900	3,57
LME(F/K)-60-L	60	90	209	134	18	10,1	11	17	112	106	7.550	20.000	4,59

*Change of specification, length-adjustment acc. development of stock, if this is critical, please contact us.
The Ball Bushings are also available in metric-japanese dimensions.
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

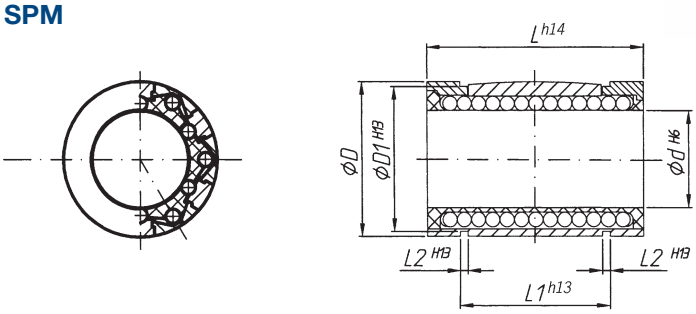
Ordering code

LMEF-	∅-L	UU-	
linear ball bushing	shaft diameter, long version	**U**	seal one end
LMEF round flange		**UU**	seal both ends
LMEK square flange			

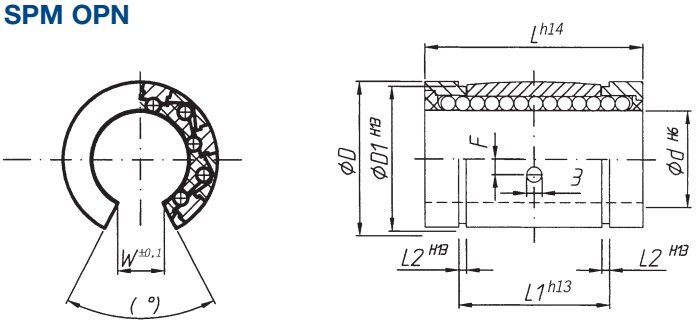
Linear Ball Bushing, selfaligning

These bushings consist of a very precise injection-moulded plastic carrier with clipped-in runner plates. The plastic carrier also acts as a return track and for seal fixing. The seal is made of a special polyamide material with a low coefficient of friction. The twin-lip seal is clipped into the bushing.

SPM



SPM OPN



Dimensions in mm

Part-No.	∅ d	∅ D	L	L1	L2	D1	W	(°)	F	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
SPM-08	8	16	25	16,2	1,1	11,5	–	–	–	310	340	0,02
SPM-12	12	22	32	22,6	1,3	21,0	7,0	70	1,35	830	910	0,02
SPM-16	16	26	36	24,6	1,3	24,9	9,8	70	0	1.020	1.120	0,03
SPM-20	20	32	45	31,2	1,6	30,3	10,5	58	0	2.020	2.220	0,06
SPM-25	25	40	58	43,7	1,85	37,5	13,0	60	1,5(1)	3.950	4.350	0,13
SPM-30	30	47	68	51,7	1,85	44,5	15,3	60	0	4.800	5.280	0,19
SPM-40	40	62	80	60,3	2,15	59,0	21,4	58	0	8.240	9.060	0,36
SPM-50	50	75	100	77,3	2,65	72,0	24,0	55	0	12.060	13.270	0,66

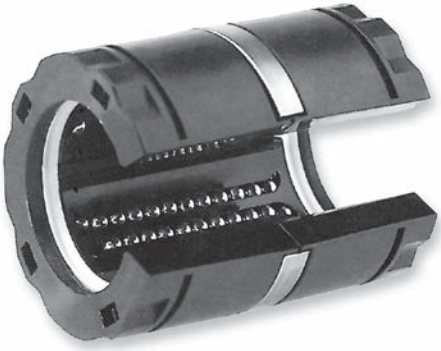
(1))The hole for radial and axial adjustment is below the center (refer to page 11).
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

Ordering code

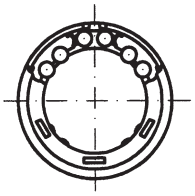
SPM-	∅-	OPN-	WW
linear ball bushing, self-aligning	shaft diameter	OPN open from ∅ 12	W seal one end WW seal both ends

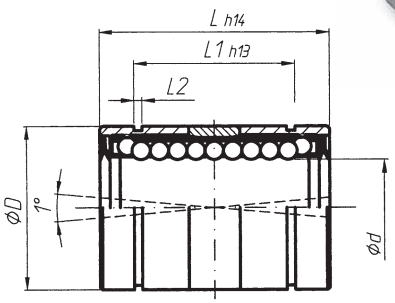
Linear Ball Bushing, selfaligning, high load capacity

You will find detailed technical information on pages 12+13.

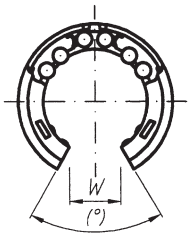


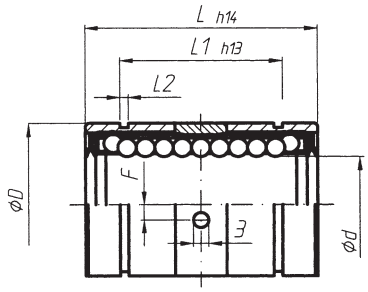
SSE





SSE-OPN





Dimensions in mm

Part-No.	∅ d	∅ D	L	L1	$L2_{min}$	W	F	(°)	load capacity (N) dyn	load capacity (N) stat.	weight (kg)
SSE-M16	16	26	36	24,6	1,3	9,4	0	70	2.200	2.400	0,03
SSE-M20	20	32	45	31,2	1,6	10,2	0	60	4.000	4.400	0,066
SSE-M25	25	40	58	43,7	1,85	14,4	1,5[1]	60	6.700	7.300	0,133
SSE-M30	30	47	68	51,7	1,85	13,9	2,0	55	8.300	9.100	0,202
SSE-M40	40	62	80	60,3	2,15	18,2	1,5	60	13.700	15.000	0,392

[1] The hole for radial and axial adjustment is below the center (refer to page 11).
Load ratings only apply in connection with hardened and ground shafts, please refer to chapter 5.

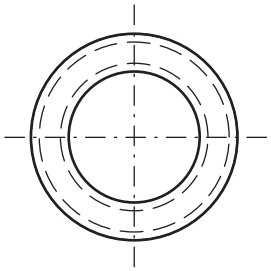
Ordering code

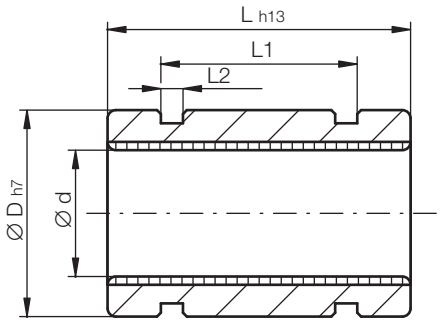
SSE-	∅-	OPN-	WW-	CR
Super-Smart-Linear Ball Bushing™	shaft diameter	OPN open from ∅ 12	W seal one end WW seal both ends	corrosion resistant

Compact Linear Slide Bushing

Frelon®, selflubricating
You will find detailed technical information on pages 14+15

FMT





Dimensions in mm

Part-No.	∅ d	tolerances +µ	* +µ	∅ D^{h7}	L^{h13}	L1	L2	weight (kg)
FMT-06	6	10-28	60-78	12	22			0,006
FMT-08	8	13-35	63-85	15	24	14	2	0,007
FMT-10	10	13-35	63-85	17	26	16	2	0,009
FMT-12	12	16-43	66-93	19	28	18	2	0,011
FMT-14	14	16-43	66-93	21	28	18	2	0,013
FMT-16	16	16-43	66-93	24	30	18	2	0,018
FMT-20	20	20-53	96-129	28	30	18	2	0,023
FMT-25	25	20-53	96-129	35	40	28.4	3,2	0,044
FMT-30	30	20-53	90-129	40	50	36.4	3,2	0,065
FMT-40	40	25-64	127-166	52	60	48.2	4,1	0,123
FMT-50	50		127-166	62	70	58,2	4,1	0,177

* FMTC

calculation of load capacity

stat: max. surface pressure 1050 N/cm^2
dyn: max. surface pressure 2150 N/cm^2 x m/min

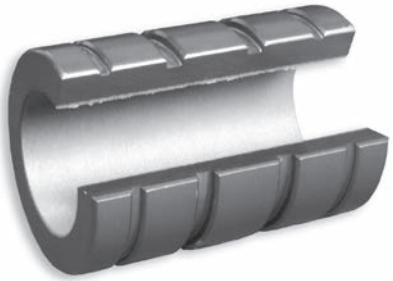
Ordering code

FMT-	C-	∅
linear slide bushing	precision class	shaft diameter

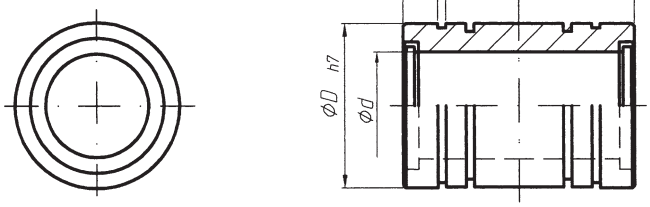
Linear Slide Bushing

Frelon®, selflubricating

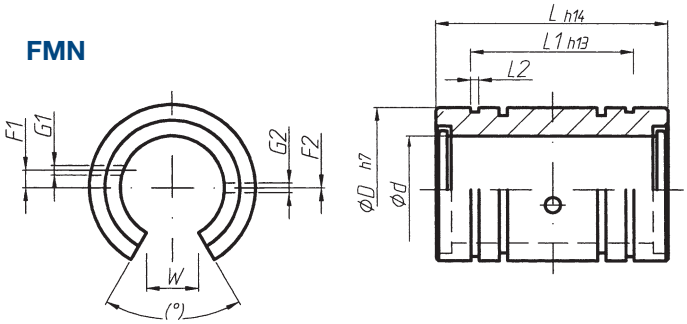
You will find detailed technical information on pages 14+15



FM



FMN



Dimensions in mm

		tolerances												weight
Part-No.	∅ d	+µ	* +µ	∅ D	L	L1	$L2_{min}$	W	G1	G2	(°)	F1	F2	(kg)
FM(N)-05	5	10-28	60-78	12	22	14,28	1,14	3,2	0	2,2	60	–	0	0,004
FM(N)-08	8	13-35	63-85	16	25	16,28	1,14	5,1	0	3	60	–	0	0,009
FM(N)-10	10	13-35	63-85	19	29	22,04	1,32	6,4	0	3	60	–	0	0,014
FM(N)-12	12	16-43	66-93	22	32	22,64	1,32	7,6	3	3	78	7	1,35	0,017
FM(N)-16	16	16-43	66-93	26	36	24,64	1,32	10,4	3	2,2	78	0	0	0,028
FM(N)-20	20	20-53	96-129	32	45	31,26	1,63	10,8	3	2,2	60	0	0	0,054
FM(N)-25	25	20-53	96-129	40	58	43,8	1,90	13,2	3	3	60	-1,51	0	0,109
FM(N)-30	30	20-53	96-129	47	68	51,8	1,90	14,2	3	3	72	2	0	0,176
FM(N)-40	40	25-64	127-166	62	80	60,4	2,20	19,5	3	3	72	1,5	0	0,356
FM(N)-50	50	25-64	127-166	75	100	77,4	2,70	24,0	5	3	72	2,5	0	0,628
FM(N)-60	60	30-76	182-228	90	125	101,4	3,20	29,6	6	0	72	0	–	1,117
FM(N)-80	80	30-76	182-228	120	165	133,34	4,17	39	8	0	72	0	–	2,679

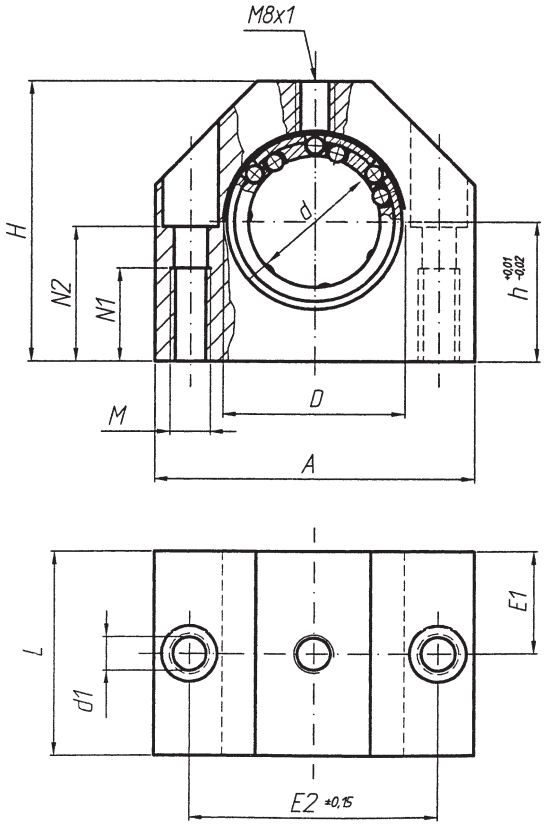
* FMC (N)

calculation of load capacity

stat: max. surface pressure 1050 N/cm²
dyn: max. surface pressure 2150 N/cm² x m/min
(1) The hole for radial and axial adjustment is below the center (refer to page 11).
** not available in self-aligning

Ordering code

FMT-	C/A-	N-	∅
linear slide bushing	**C** precision class **A** self-aligning	**N** open**	shaft diameter



single closed
compact version
lubrication hole M8 x 1

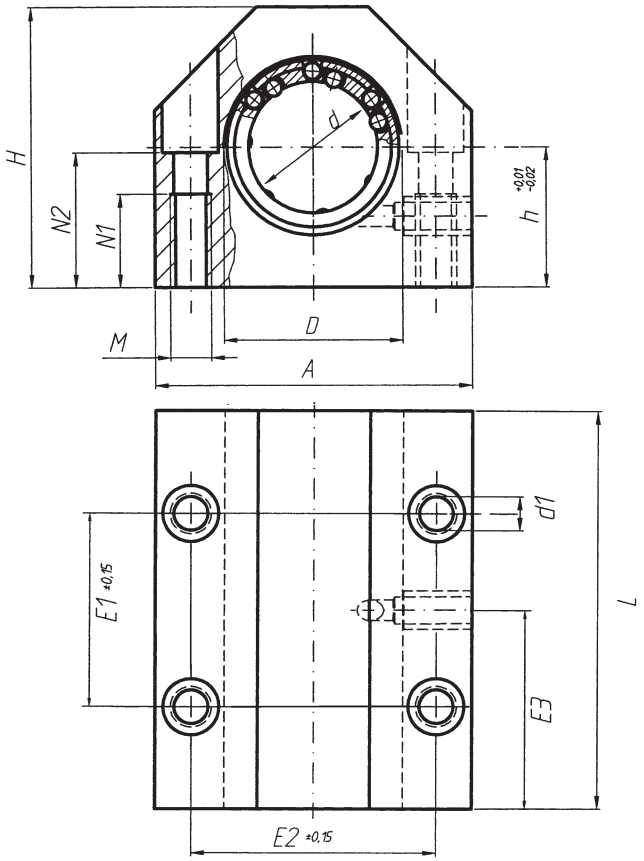
Dimensions in mm

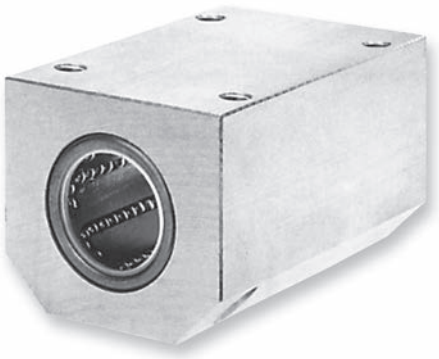
Part-No.	∅ d	∅ D	A	H	h	L	E1	E2	∅ d1	N1	N2	M	weight (kg)
AGC-08	8	15	32	27	14	24	12	23	3,4	9	13	M4	0,04
AGC-10	10	17	40	33	16	26	13	29	4,3	11	16	M5	0,10
AGC-12	12	19	40	33	17	28	14	29	4,3	11	16	M5	0,18
AGC-16	16	24	45	38	19	30	15	34	4,3	11	18	M5	0,27
AGC-20	20	28	53	45	23	30	15	40	5,3	13	22	M6	0,32
AGC-25	25	35	62	54	27	40	20	48	6,6	18	26	M8	0,66
AGC-30	30	40	67	60	30	50	25	53	6,6	18	29	M8	0,95
AGC-40	40	52	87	76	39	60	30	69	8,4	22	38	M10	1,82
AGC-50	50	62	103	92	47	70	35	82	10,5	26	46	M12	2,52

- Load ratings according to the specification of the bearing
- fixing screws DIN 912-8.8, circlip DIN 7980
- weight value considering the ball bushing

Ordering code

AGC-	∅-	C	
linear housing, closed, compact	shaft diameter	C	linear ball bushing (refer to page 19)
		FMT	linear slide bushing (refer to page 26)





tandem closed
compact
lubrication hole M8 x 1

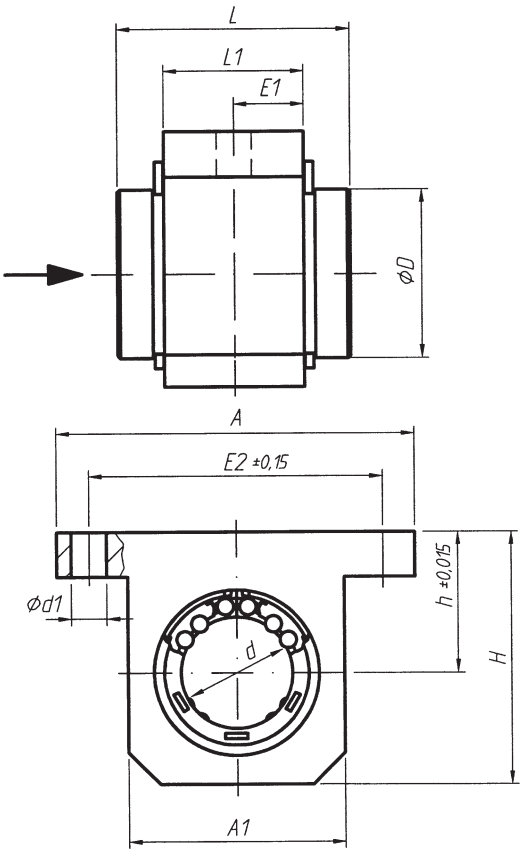
Dimensions in mm

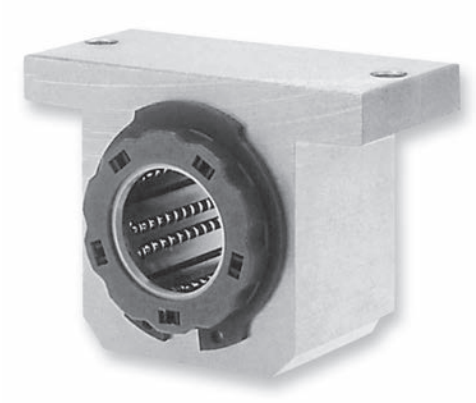
Part-No.	∅ d	∅ D	A	H	h	L	E1	E2	E3	d1	N1	N2	M	weight (kg)
TAGC-12	12	19	40	33	17	60	35	29	30,0	4,3	11	16	M5	0,18
TAGC-16	16	24	45	38	19	65	40	34	32,5	4,3	11	18	M5	0,27
TAGC-20	20	28	53	45	23	65	45	40	32,5	5,3	13	22	M6	0,32
TAGC-25	25	35	62	54	27	85	55	48	42,5	6,6	18	26	M8	0,66
TAGC-30	30	40	67	60	30	105	70	53	52,5	6,6	18	29	M8	0,95
TAGC-40	40	52	87	76	39	125	85	69	62,5	8,4	22	38	M10	1,82
TAGC-50	50	62	103	92	47	145	100	82	72,5	10,5	26	46	M12	2,52

- Load ratings according to the specification of the bearing (x2)
- fixing screws DIN 912-8.8, circlip DIN 7980
- weight value considering the ball bushing

Ordering code

TAGC-	∅-	C-	
tandem housing, closed, compact	shaft diameter	C	linear ball bushing (refer to page 19)
		FMT	linear slide bushing (refer to page 26)





standard closed
integrated wipers on both ends

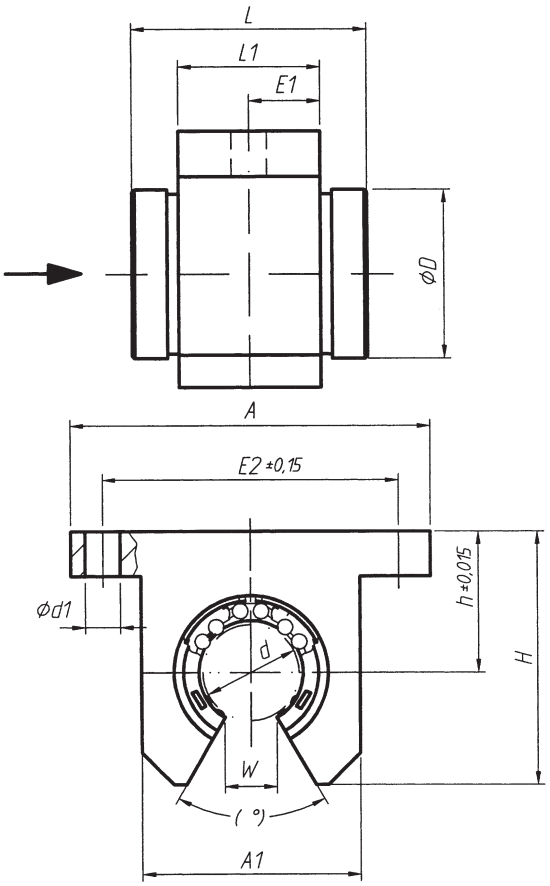
Dimensions in mm

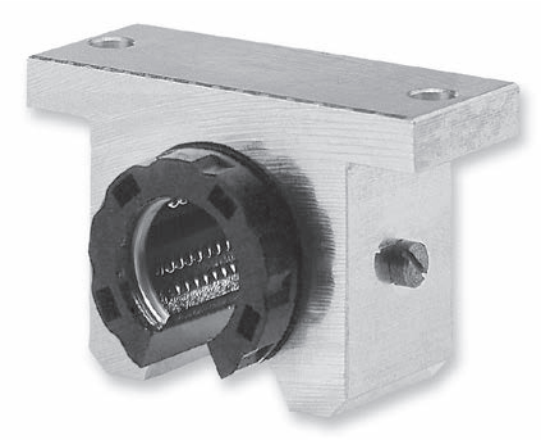
Part-No.	∅ d	∅ D	h	H	A	A1	E1	E2	L	L1	∅ d1	weight (kg)
ALGS-12	12	22	18	35	52	30	10	42	32	20	5,3	0,09
ALGS-16	16	26	22	40,5	56	34	11	46	36	22	5,3	0,12
ALGS-20	20	32	25	48,0	70	40	14	58	45	28	6,4	0,25
ALGS-25	25	40	30	58,0	80	50	20	68	58	40	6,4	0,49
ALGS-30	30	47	35	67,0	88	58	24	76	68	48	6,4	0,78
ALGS-40	40	62	45	85,0	108	74	28	94	80	56	8,4	1,28
ALGS-50	50	75	50	100	135	96	36	116	100	72	10,5	1,70

- Load ratings according to the specification of the bearing
- weight value considering the standard ball bushing
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

ALGS-	∅-	S	
linear housing, closed	shaft diameter	S	linear ball bushingself-aligning/ high load capacity (refer to page 25)
		K	linear ball bushing standard (refer to page 20)
		V	linear ball bushing all-steel (refer to page 21)
		KS	linear ball bushing standard self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic





standard open
lubrication and fixing by lubricating-/fixing screw

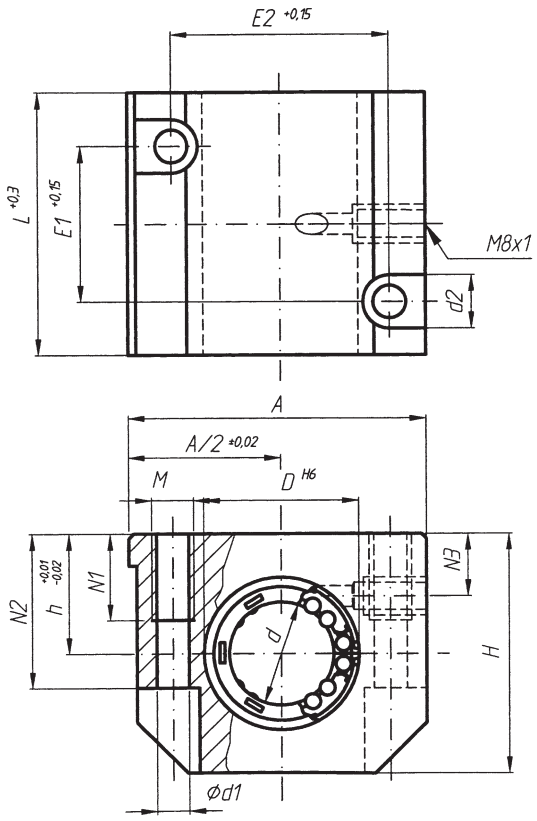
Dimensions in mm

Part-No.	∅ d	∅ D	h	H	A	A1	E1	E2	L	L1	W (min.)	S	(°)	weight (kg)
ALGS-OP-12	12	22	18	28	52	30	10	42	32	20	7	5,3	60	0,09
ALGS-OP-16	16	26	22	33,5	56	34	11	46	36	22	9,4	5,3	60	0,12
ALGS-OP-20	20	32	25	42	70	40	14	58	45	28	10	6,4	60	0,25
ALGS-OP-25	25	40	30	51	80	50	20	68	58	40	12,5	6,4	60	0,49
ALGS-OP-30	30	47	35	60	88	58	24	76	68	48	12,5	6,4	60	0,78
ALGS-OP-40	40	62	45	77	108	74	28	94	80	56	16,8	8,4	60	1,28
ALGS-OP-50	50	75	50	93	135	96	36	116	100	72	21	10,5	60	1,70

- Load ratings according to the specification of the bearing
- weight value considering the standard ball bushing
- the bushings are secured in the housings by fixing screws
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

ALGS-OP-	∅-	S	
linear housing, open	shaft diameter	**S**	linear ball bushing self-aligning/ high load capacity (refer to page 25)
		K	linear ball bushing standard (refer to page 20)
		V	linear ball bushing all-steel (refer to page 21)
		KS	linear ball bushing standard self-aligning (refer to page 24))
		FM	inear slide bushing, self-lubricating (ref. to p. 27))
		L	linear slide bushing, ceramic



single
integrated wipers on both ends
lubrication hole M8 x1

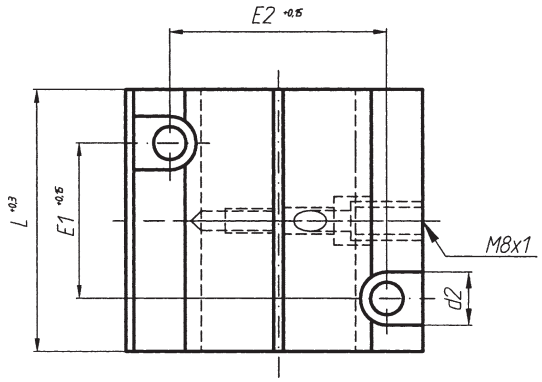
Dimensions in mm

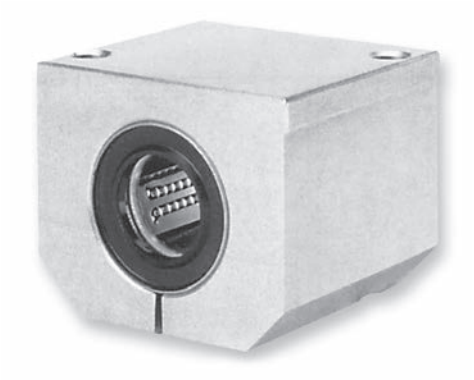
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	E1	E2	∅ d1	d2	M	weight (kg)
AG-08	8	16	35	28	13	32	10	14	8	20	25	3,3	6	M4	0,07
AG-12	12	22	43	35	18	39	13	25	10	23	32	4,2	8	M5	0,13
AG-16	16	26	53	42	22	43	13	30	12	26	40	5,2	10	M6	0,20
AG-20	20	32	60	50	25	54	18	34	13	32	45	6,8	11	M8	0,34
AG-25	25	40	78	60	30	67	22	40	15	40	60	8,6	15	M10	0,65
AG-30	30	47	87	70	35	79	22	48	16	45	68	8,6	15	M10	0,97
AG-40	40	62	108	90	45	91	26	60	20	58	86	10,3	18	M12	1,80
AG-50	50	75	132	105	50	113	34	49	20	50	108	14,25	20	M16	3,00
AG-60	60	90	178	128	69	142	40	100	–	90	130	17,5	26	M20	
AG-80	80	120	232	186	93	185	48	136	–	110	170	22	33	M24	

- Load ratings according to the specification of the bearing
- weight value considering the standard ball bushing
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

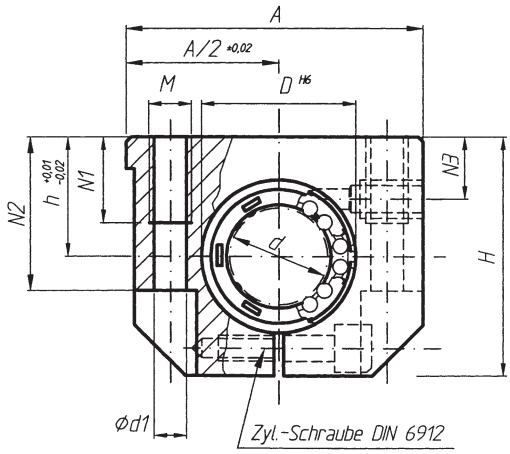
Ordering code

AG-	∅-	S-		V
single linear housing unit, single, closed	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





single
radial adjustment
integrated wipers on both ends
lubrication hole M8 x1



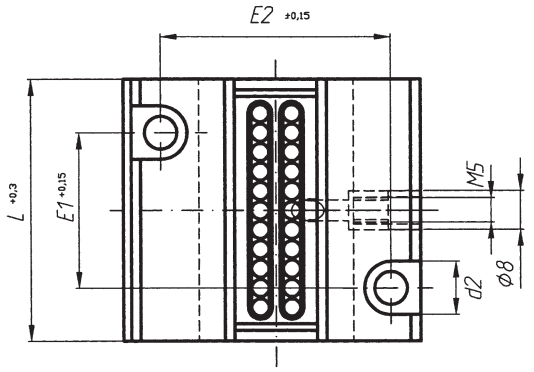
Dimensions in mm

Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	E1	E2	∅ d1	d2	M	weight (kg)
AG-AJ-08	8	16	35	28	13	32	10	14	8	20	25	3,3	6	M4	0,07
AG-AJ-12	12	22	43	35	18	39	11	25	10	23	32	4,2	8	M5	0,13
AG-AJ-16	16	26	53	42	22	43	13	30	12	26	40	5,2	10	M6	0,20
AG-AJ-20	20	32	60	50	25	54	18	34	13	32	45	6,8	11	M8	0,34
AG-AJ-25	25	40	78	60	30	67	22	40	15	40	60	8,6	15	M10	0,65
AG-AJ-30	30	47	87	70	35	79	22	48	16	45	68	8,6	15	M10	0,97
AG-AJ-40	40	62	108	90	45	91	26	60	20	58	86	10,3	18	M12	1,80
AG-AJ-50	50	75	132	105	50	113	34	49	20	50	108	14,25	20	M16	3,00
AG-AJ-60	60	90	178	128	69	142	40	100	–	90	130	17,5	26	M20	
AG-AJ-80	80	120	232	186	93	185	48	136	–	110	170	22	33	M24	

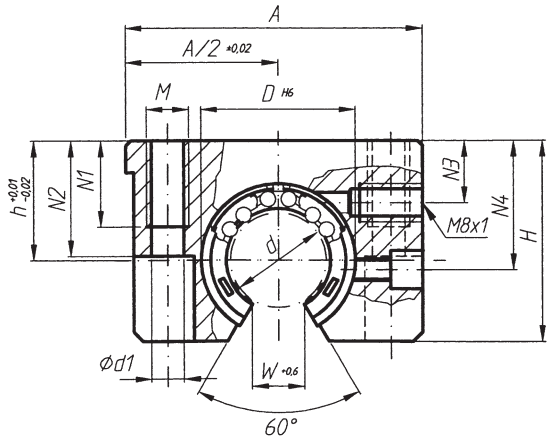
- Load ratings according to the specification of the bearing
- weight value considering the standard ball bushing
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

AG-AJ-	∅-	S-		V
linear housing, single, closed, radial adjustment	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	



single open
integrated wipers on both ends
lubrication hole M8 x1



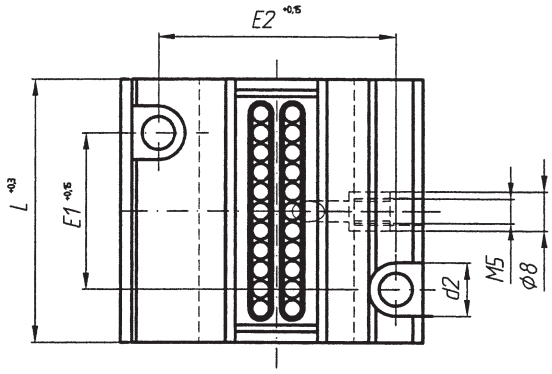
Dimensions in mm

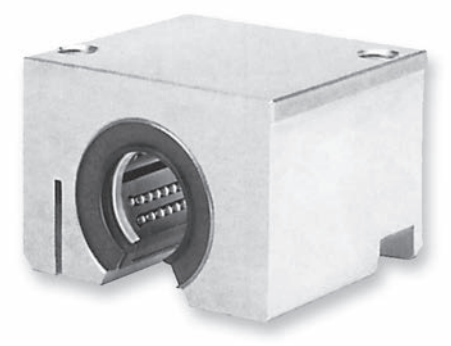
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	N4	E1	E2	∅ d1	d2	M	W (min.)	weight (kg)
AG-OP-12	12	22	43	28	18	39	11	23,5	8	16,65	23	32	4,2	8	M5	7	0,11
AG-OP-16	16	26	53	35	22	43	13	30	12	22,00	26	40	5,2	10	M6	9,4	0,17
AG-OP-20	20	32	60	42	25	54	18	34	13	25,00	32	45	6,8	11	M8	10	0,30
AG-OP-25	25	40	78	51	30	67	22	40	15	31,50	40	60	8,6	15	M10	12,5	0,57
AG-OP-30	30	47	87	60	35	79	22	48	16	33,00	45	68	8,6	15	M10	12,5	0,86
AG-OP-40	40	62	108	77	45	91	26	60	20	43,50	58	86	10,3	18	M12	16,8	1,60
AG-OP-50	50	75	132	88	50	113	34	49	20	47,5	50	108	14,25	20	M16	21	2,60
AG-OP-60	60	90	178	118	69	142	40	100	–	–	90	130	17,5	26	M20	27,2	7,15
AG-OP-80	80	120	232	158	93	185	48	136	–	–	110	170	22	33	M24	36,3	17

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

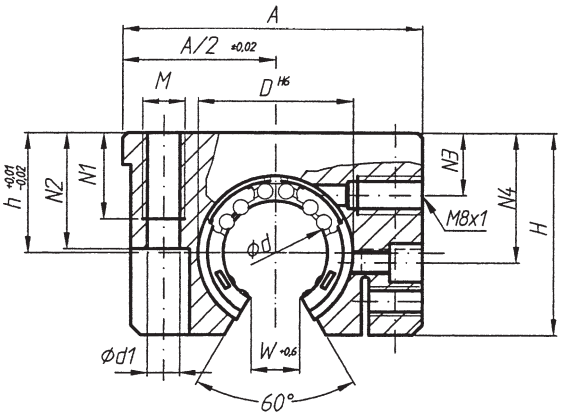
Ordering code

AG-OP-	∅-	S-		V
linear housing, single, open	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





single open
radial adjustment
integrated wipers on both ends
lubrication hole M8 x1



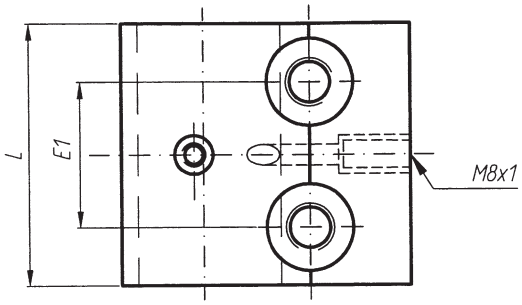
Dimensions in mm

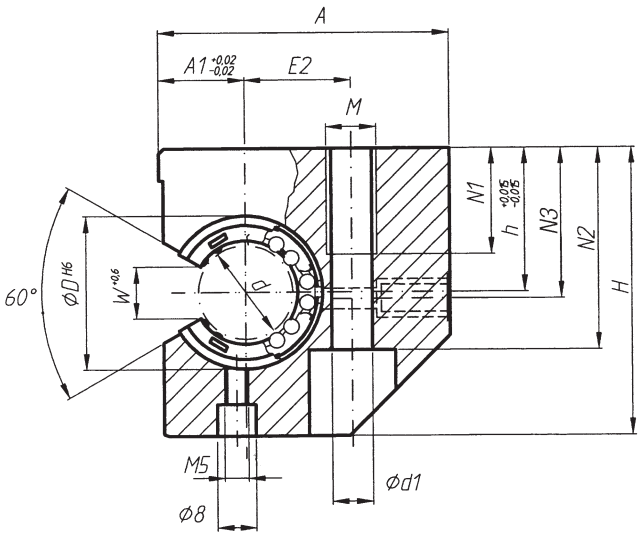
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	N4	E1	E2	∅ d1	d2	M	W (min.)	weight (kg)
AG-OPAJ-12	12	22	43	28	18	39	11	23,5	8	16,65	23	32	4,2	8	M5	7	0,11
AG-OPAJ-16	16	26	53	35	22	43	13	30	12	22,00	26	40	5,2	10	M6	9,4	0,17
AG-OPAJ-20	20	32	60	42	25	54	18	34	13	25,00	32	45	6,8	11	M8	10	0,30
AG-OPAJ-25	25	40	78	51	30	67	22	40	15	31,50	40	60	8,6	15	M10	12,5	0,57
AG-OPAJ-30	30	47	87	60	35	79	22	48	16	33,00	45	68	8,6	15	M10	12,5	0,86
AG-OPAJ-40	40	62	108	77	45	91	26	60	20	43,50	58	86	10,3	18	M12	16,8	1,60
AG-OPAJ-50	50	75	132	50	88	113	34	49	20	47,5	50	108	14,25	20	M16	21	2,60
AG-OPAJ-60	60	90	178	118	69	142	40	100	–	–	90	130	17,5	26	M20	27,2	7,15
AG-OPAJ-80	80	120	232	158	93	185	48	136	–	–	110	170	22	33	M24	36,3	17

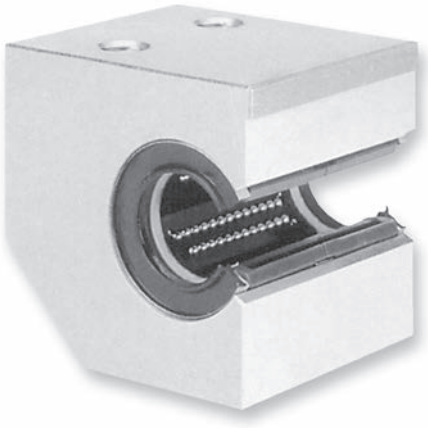
- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

AG-OPAJ-	∅-	S-		V
linear housing, single, open, radial adjustment	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	







open on side
integrated wipers on both ends

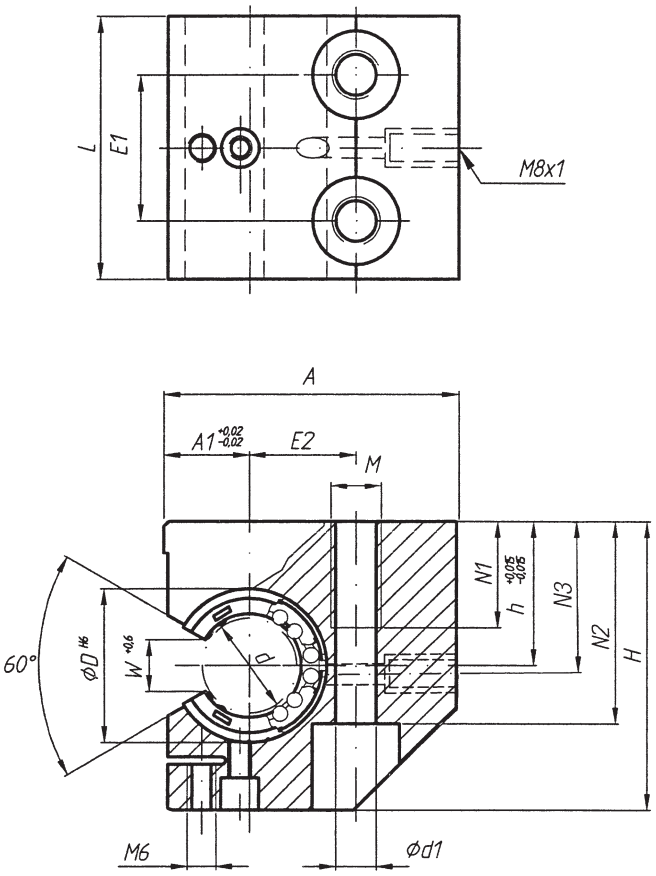
Dimensions in mm

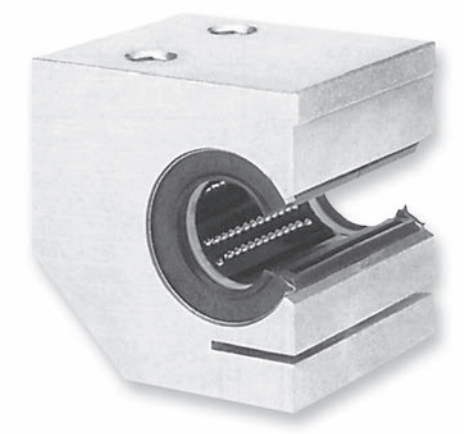
Part-No.	∅ d	∅ D	A	A1	H -1	h	E1	E2	L	∅ d1	M	N1	N2	N3	W (min.)	weight (kg)
AGS-20	20	32	60	17	60	30	30	22	54	8,6	M10	22	42	32	10	0,42
AGS-25	25	40	75	21	72	35	36	28	67	10,3	M12	26	50	38	12,5	0,80
AGS-30	30	47	86	25	82	40	42	34	79	13,5	M16	34	55	44	12,5	1,20
AGS-40	40	62	110	32	100	45	48	43	91	17,5	M20	43	67	50	16,8	2,00

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

AGS-	∅-	S-		V
linear housing, open on side	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





open on side
radial adjustment
integrated wipers on both ends

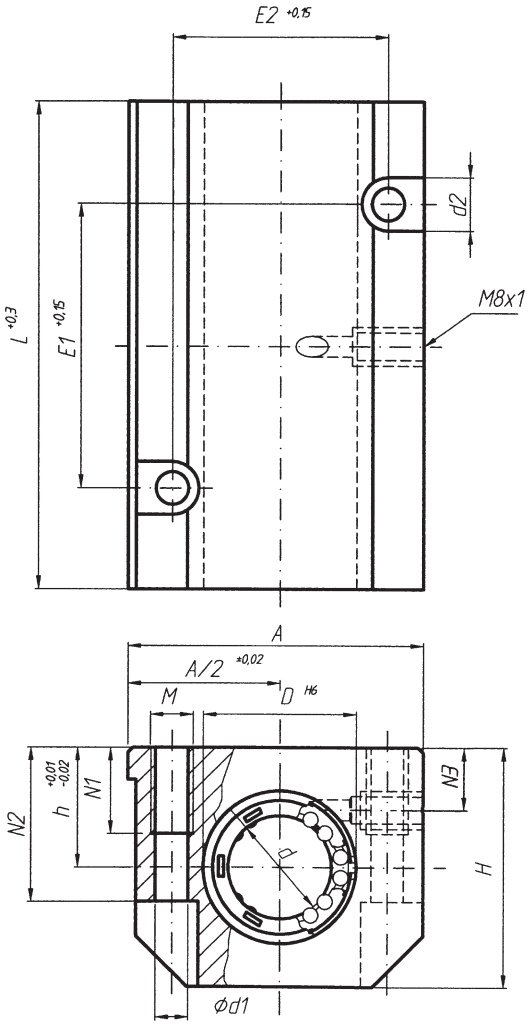
Dimensions in mm

Part-No.	∅ d	∅ D	A	A1	H	h	E1	E2	L	∅ d1	M	N1	N2	N3	W (min.)	weight (kg)
AGS-AJ-20	20	32	60	17	60	30	30	22	54	8,6	M10	22	42	32	10	0,42
AGS-AJ-25	25	40	75	21	72	35	36	28	67	10,3	M12	26	50	38	12,5	0,80
AGS-AJ-30	30	47	86	25	82	40	42	34	79	13,5	M16	34	55	44	12,5	1,20
AGS-AJ-40	40	62	110	32	100	45	48	43	91	17,5	M20	43	67	50	16,8	2,00

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

AGS-AJ-	∅-	S-		V
linear housing, open on side, radial adjustment	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	



tandem closed
integrated wipers on both ends
lubrication hole M8 x1

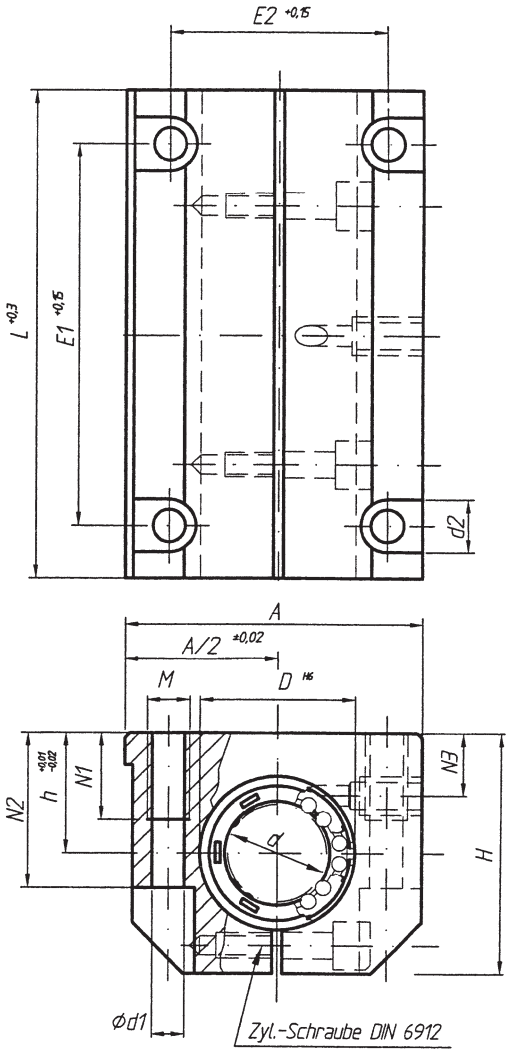
Dimensions in mm

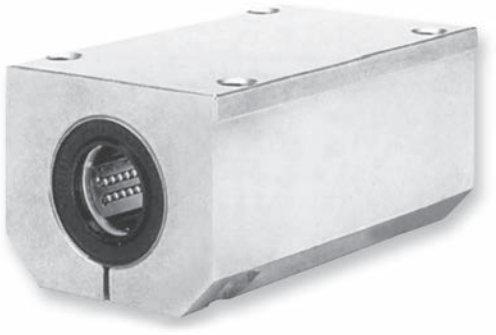
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	E1	E2	∅ d1	d2	M	weight (kg)
TAG-08	8	16	35	28	13	62	13	14	8	35	25	4,2	8	M5	0,15
TAG-12	12	22	43	35	18	76	13	25	10	40	30	5,2	10	M6	0,27
TAG-16	16	26	53	42	22	84	13	30	12	45	36	5,2	10	M6	0,41
TAG-20	20	32	60	50	25	104	18	34	13	55	45	6,8	11	M8	0,72
TAG-25	25	40	78	60	30	130	22	40	15	70	54	8,6	15	M10	1,35
TAG-30	30	47	87	70	35	152	26	48	16	85	62	10,3	18	M12	2,01
TAG-40	40	62	108	90	45	176	34	60	20	100	80	14,25	20	M16	3,67
TAG-50	50	75	132	105	50	224	35	49	–	125	100	–	–	M16	6,30
TAG-60	60	90	178	128	69	278	40	100	–	90	130	17,5	26	M20	
TAG-80	80	120	232	186	93	364	48	136	–	110	170	22	33	M24	

- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAG-	∅-	S-		V
linear housing, tandem, closed	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





tandem closed
radial adjustment
integrated wipers on both ends
lubrication hole M8 x1

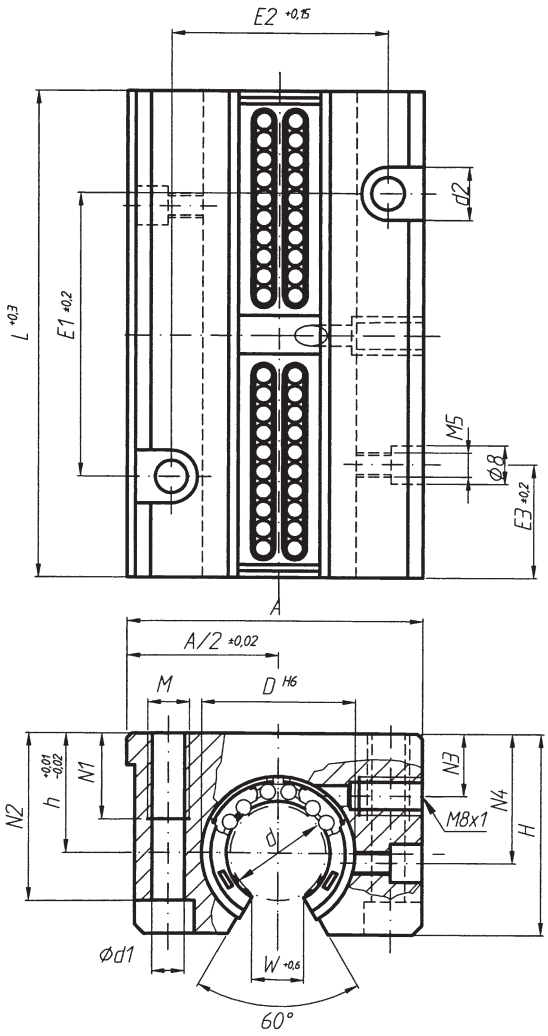
Dimensions in mm

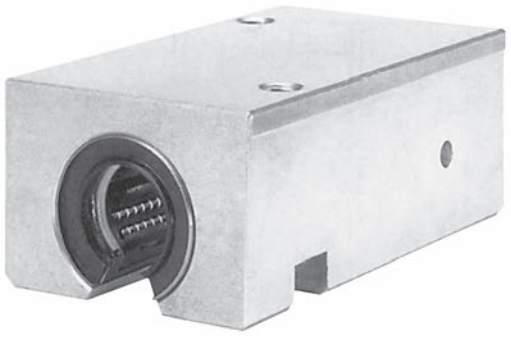
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	E1	E2	∅ d1	d2	M	weight (kg)
TAG-AJ-08	8	16	35	28	13	62	11	14	8	50	25	4,2	8	M5	0,15
TAG-AJ-12	12	22	43	35	18	76	11	25	10	56	32	4,2	8	M5	0,27
TAG-AJ-16	16	26	53	42	22	84	13	30	12	64	40	5,2	10	M6	0,41
TAG-AJ-20	20	32	60	50	25	104	18	34	13	76	45	6,8	11	M8	0,72
TAG-AJ-25	25	40	78	60	30	130	22	40	15	94	60	8,6	15	M10	1,35
TAG-AJ-30	30	47	87	70	35	152	22	48	16	106	68	8,6	15	M10	2,01
TAG-AJ-40	40	62	108	90	45	176	26	60	20	124	86	10,3	18	M12	3,67
TAG-AJ-50	50	75	132	105	50	224	35	49	–	125	100	–	–	M16	6,30
TAG-AJ-60	60	90	178	118	69	278	40	100	–	90	130	17,5	26	M20	
TAG-AJ-80	80	120	232	158	93	364	48	136	–	110	170	22	33	M24	

- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAG-AJ-	∅-	S-		V
linear housing, tandem, closed, radial adjustment	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





tandem open
integrated wipers on both ends
lubrication hole M8 x1

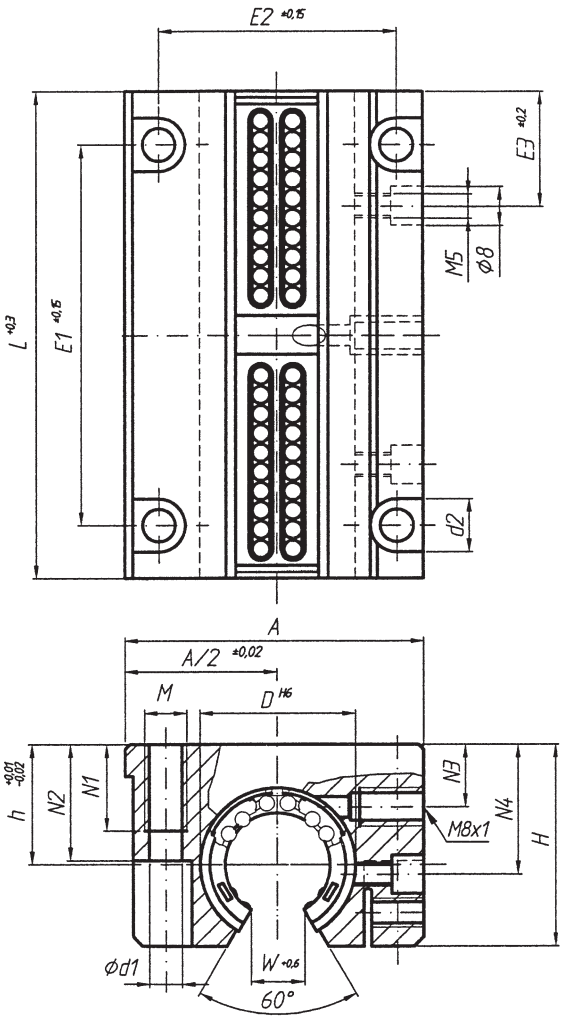
Dimensions in mm

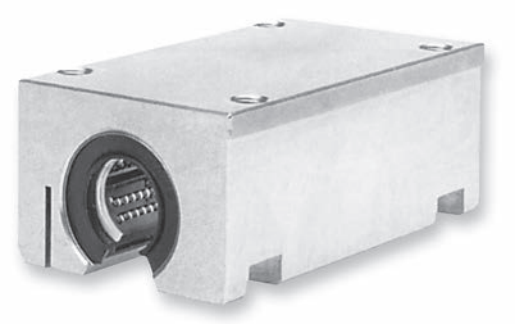
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	N4	E1	E2	E3	∅ d1	d2	M	W (min.)	weight (kg)
TAG-OP-12	12	22	43	30	18	76	13	25	10	16,65	40	30	19,5	5,2	10	M6	7	0,22
TAG-OP-16	16	26	53	35	22	84	13	30	12	22,00	45	36	21,5	5,2	10	M6	9,4	0,34
TAG-OP-20	20	32	60	42	25	104	18	34	13	25,00	55	45	27,0	6,8	11	M8	10	0,62
TAG-OP-25	25	40	78	51	30	130	22	40	15	31,50	70	54	33,5	8,6	15	M10	12,5	1,17
TAG-OP-30	30	47	87	60	35	152	26	48	16	33,00	85	62	39,5	10,3	18	M12	12,5	1,68
TAG-OP-40	40	62	108	77	45	176	34	60	20	43,50	100	80	45	14,25	20	M16	16,8	3,15
TAG-OP-50	50	75	132	88	50	224	35	49	–	–	125	100	–	13,5	–	M16	21	5,5
TAG-OP-60	60	90	178	118	69	278	40	100	–	–	90	130	–	17,5	26	M20	27,2	5,2
TAG-OP-80	80	120	232	158	93	364	48	136	–	–	110	170	–	22	33	M24	36,3	11,5

- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAG-OP-	∅-	S-		V
linear housing, tandem, open	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





tandem open
radial adjustment
integrated wipers on both ends
lubrication hole M8 x1

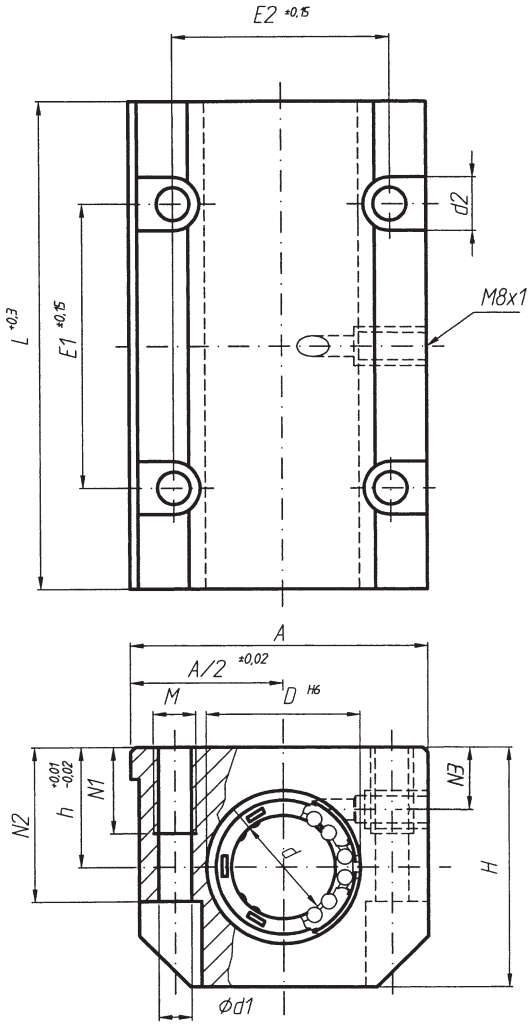
Dimensions in mm

Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	N4	E1	E2	E3	∅ d1	d2	M	W (min.)	weight (kg)
TAG-OPAJ-12	12	22	43	30	18	76	11	25	10	16,65	56	32	19,5	4,2	8	M5	7	0,22
TAG-OPAJ-16	16	26	53	35	22	84	13	30	12	22,00	64	40	21,5	5,2	10	M6	9,4	0,34
TAG-OPAJ-20	20	32	60	42	25	104	18	34	13	25,00	76	45	27,0	6,8	11	M8	10	0,62
TAG-OPAJ-25	25	40	78	51	30	130	22	40	15	31,50	94	60	33,5	8,6	15	M10	12,5	1,17
TAG-OPAJ-30	30	47	87	60	35	152	22	48	16	33,00	106	68	39,5	8,6	15	M10	12,5	1,68
TAG-OPAJ-40	40	62	108	77	45	176	26	60	20	43,50	124	86	45,5	10,3	18	M12	16,8	3,15
TAG-OPAJ-50	50	75	132	88	50	224	35	49	–	–	125	100	–	13,5	–	M16	21	5,5
TAG-OPAJ-60	60	90	178	118	69	278	40	100	–	–	90	130	–	17,5	26	M20	27,2	5,2
TAG-OPAJ-80	80	120	232	158	93	364	48	136	–	–	110	170	–	22	33	M24	36,3	11,5

- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAG-OPAJ-	∅-	S-		V
linear housing, tandem, open, radial adjustment	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	



tandem closed
4 mounting holes
integrated wipers on both ends
lubrication holes M8 x1

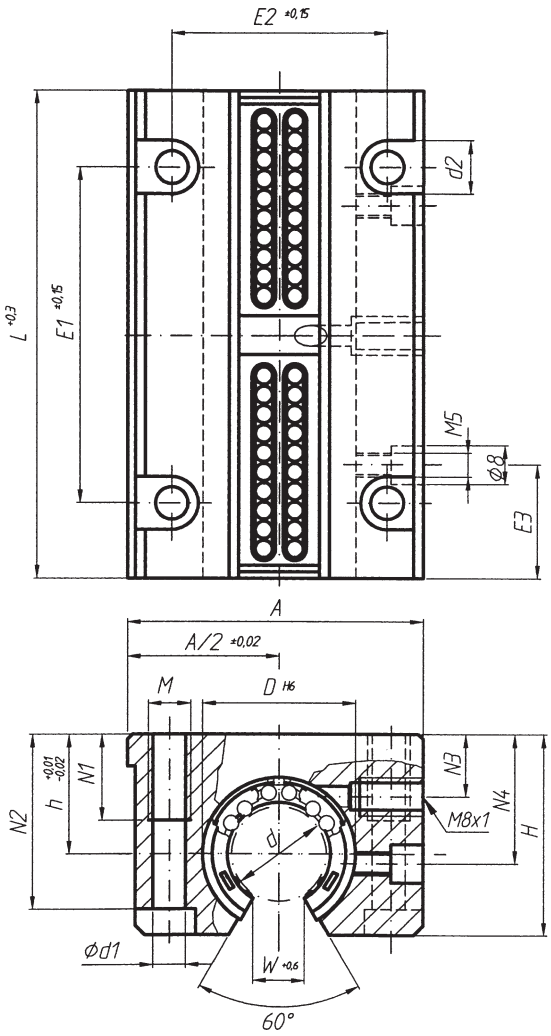
Dimensions in mm

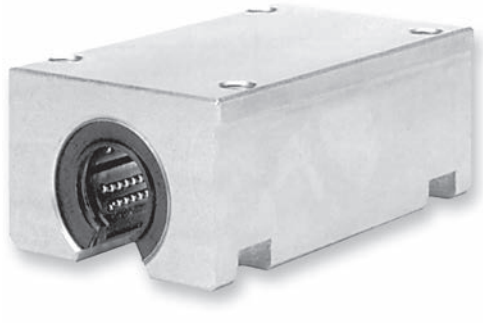
Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	E1	E2	∅ d1	d2	M	weight (kg)
TAGI-08	8	16	35	28	13	62	11	14	8	50	25	4,2	8	M5	0,15
TAGI-12	12	22	43	35	18	76	11	25	10	56	32	4,2	8	M5	0,27
TAGI-16	16	26	53	42	22	84	13	30	12	64	40	5,2	10	M6	0,41
TAGI-20	20	32	60	50	25	104	18	34	13	76	45	6,8	11	M8	0,72
TAGI-25	25	40	78	60	30	130	22	40	15	94	60	8,6	15	M10	1,35
TAGI-30	30	47	87	70	35	152	22	48	16	106	68	8,6	15	M10	2,01
TAGI-40	40	62	108	90	45	176	26	60	20	124	86	10,3	18	M12	3,67

- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAGI-	∅-	S-		V
linear housing, tandem, closed, 4 mounting holes	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	





tandem open
4 mounting holes
integrated wipers on both ends
lubrication hole M8 x1

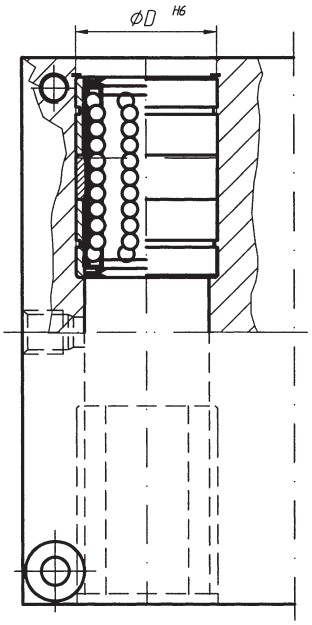
Dimensions in mm

Part-No.	∅ d	∅ D	A	H	h	L	N1	N2	N3	N4	E1	E2	E3	∅ d1	d2	M	W (min.)	weight (kg)
TAGI-OP-12	12	22	43	28	18	76	11	23,5	10	16,65	56	32	19,5	4,2	8	M5	7	0,22
TAGI-OP-16	16	26	53	35	22	84	13	30	12	22,00	64	40	21,5	5,2	10	M6	9,4	0,34
TAGI-OP-20	20	32	60	42	25	104	18	34	13	25,00	76	45	27,0	6,8	11	M8	10	0,62
TAGI-OP-25	25	40	78	51	30	130	22	40	15	31,50	94	60	33,5	86	15	M10	12,5	1,17
TAGI-OP-30	30	47	87	60	35	152	22	48	16	33,00	106	68	39,5	8,6	15	M10	12,5	1,68
TAGI-OP-40	40	62	108	77	45	176	26	60	20	43,50	124	86	45,5	10,3	18	M12	16,8	3,15

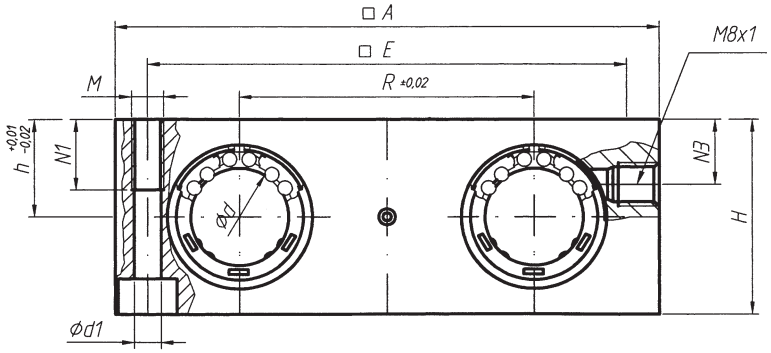
- load ratings according to the specification of the bearing (x 2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

TAGI-OP-	∅-	S-		V
linear housing, tandem, open, 4 mounting holes	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	



quadro closed
integrated wipers on both ends
lubrication hole M8 x1
specials to be inquired



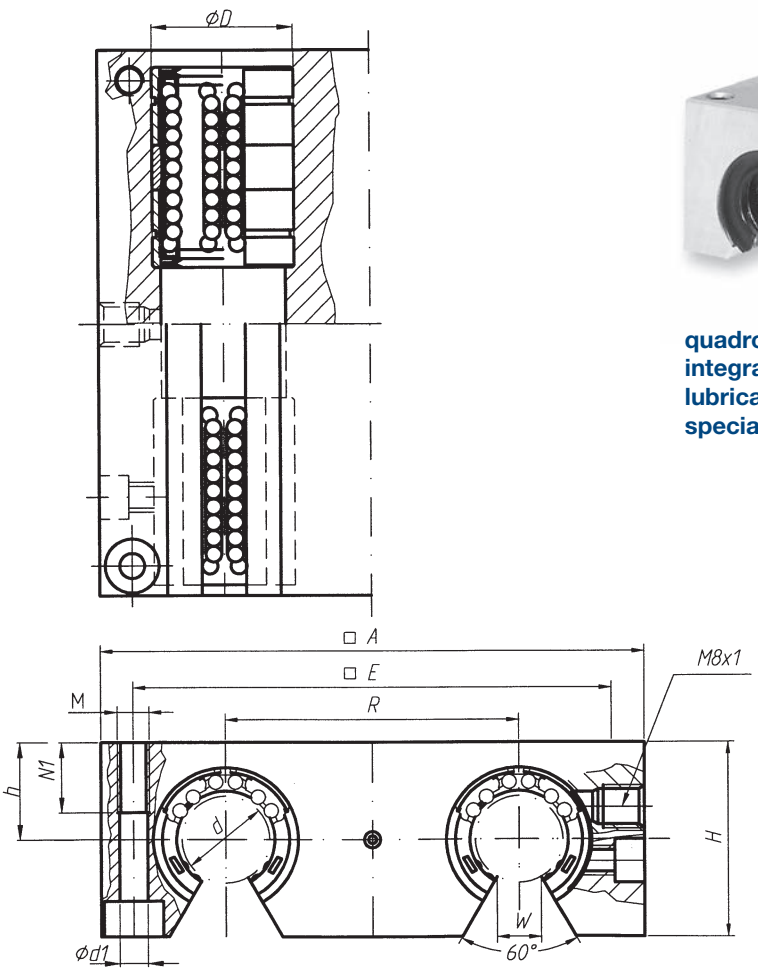
Dimensions in mm

Part-No.	∅ d	∅ D	A	H	h	E	N1	N3	R	∅ d1	M	weight (kg)
QAG-08	8	16	65	23	11,5	55	11	8	32	4,3	M5	0,23
QAG-12	12	22	85	32	16	73	13	13	42	5,3	M6	0,52
QAG-16	16	26	100	36	18	88	13	15	54	5,3	M6	0,78
QAG-20	20	32	130	46	23	115	18	19	72	6,8	M8	1,74
QAG-25	25	40	160	56	28	140	22	24	88	9	M10	3,13
QAG-30	30	47	180	64	32	158	26	27	96	10,5	M12	4,43
QAG-40	40	62	230	80	40	202	34	35	122	13,5	M16	8,70

- load ratings according to the specification of the bearing (x4)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 472
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

QAG-	∅-	S-		V
linear housing, quadro, closed	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	



quadro open
integrated wipers on both ends
lubrication hole M8 x1
specials to be inquired

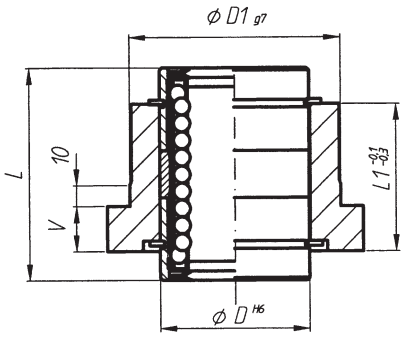
Dimensions in mm

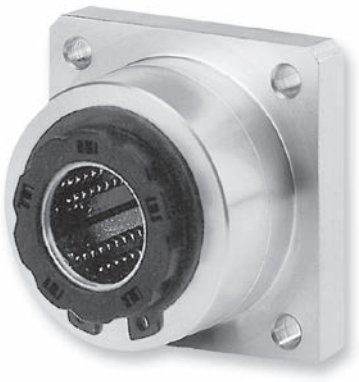
Part-No.	∅ d	∅ D	A	H	h	E	N1	R	W (min.)	∅ d1	M	weight (kg)
QAG-OP-12	12	22	85	30	18	73	13	42	7	5,3	M6	0,45
QAG-OP-16	16	26	100	35	22	88	13	54	9,4	5,3	M6	0,73
QAG-OP-20	20	32	130	42	25	115	18	72	10	6,8	M8	1,48
QAG-OP-25	25	40	160	51	30	140	22	88	12,5	9	M10	2,68
QAG-OP-30	30	47	180	60	35	158	26	96	12,5	10,5	M12	3,95
QAG-OP-40	40	62	230	77	45	202	34	122	16,8	13,5	M16	8,12

- load ratings according to the specification of the bearing (x4)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

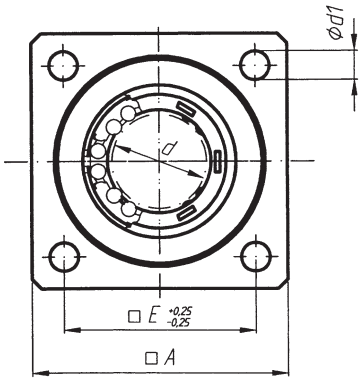
Ordering code

QAG-OP-	∅-	S-		V
linear housing, quadro, open	shaft diameter	S	Winkelfehlerausgleich/hohe load capacity (s. S. 25)	external front seal
		K	Linearkugellager Standard (s. S. 20)	
		V	Linearkugellager Vollstahl (s. S. 21)	
		KS	Linearkugellager Standard mit Winkelfehlerausgleich (s. S. 24)	
		FM	Lineargleitlager selbstschmierend (s. S. 27)	
		L	Lineargleitlager Keramik	





single flange
integrated wipers on both ends



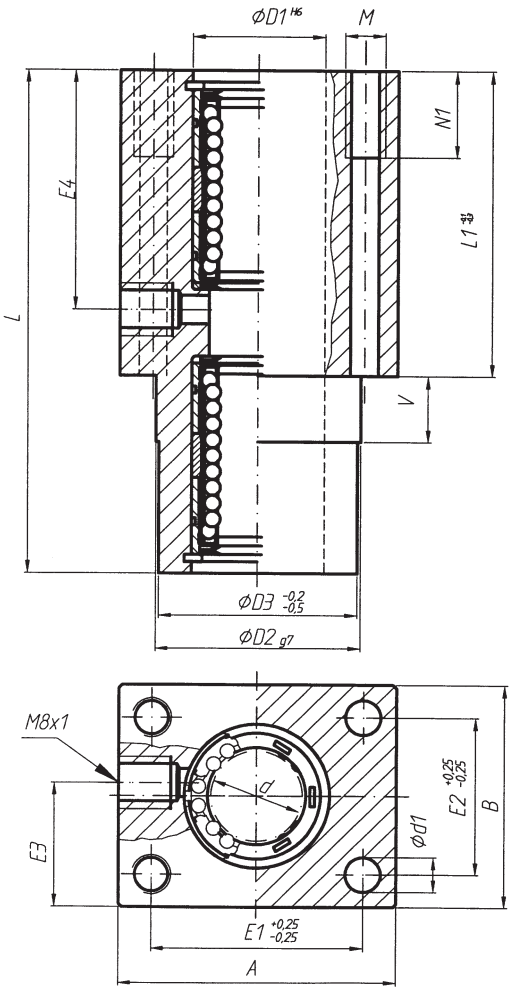
Dimensions in mm

Part-No.	∅ d	∅ D	∅ D1	A	L	L1	V	E	∅ d1	weight (kg)
FAG-12	12	22	32	40	32	22	6	30	5,5	0,12
FAG-16	16	26	38	50	36	24	8	35	5,5	0,17
FAG-20	20	32	46	60	45	30	10	42	6,6	0,33
FAG-25	25	40	58	70	58	42	12	54	6,6	0,68
FAG-30	30	47	66	80	68	50	14	60	9,0	1,03
FAG-40	40	62	90	100	80	59	16	78	11,0	2,00

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

FAG-	∅-	S	
linear housing, single, flange	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic



tandem flange
integrated wipers on both ends
lubrication hole M8 x1

Dimensions in mm

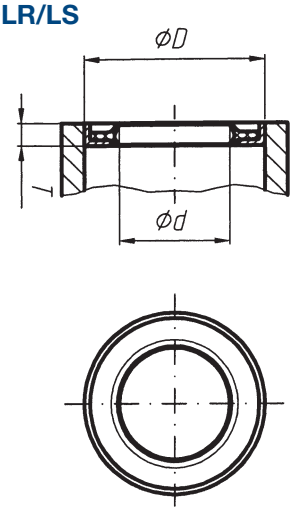
Part-No.	∅ d	∅ D1	∅ D2	D3	A	B	E1	E2	E3	E4	L	L1	∅ d1	M	N1	V	weight (kg)
FTAG-12	12	22	30	30	42	34	32	24	19	38	76	46	5,3	M6	13	10	0,20
FTAG-16	16	26	35	35	50	40	38	28	22	42	84	50	6,6	M8	18	10	0,32
FTAG-20	20	32	42	42	60	50	45	35	27	52	104	60	8,4	M10	22	10	0,55
FTAG-25	25	40	52	52	74	60	56	42	32	65	130	73	10,5	M12	26	10	1,17
FTAG-30	30	47	61	61	84	70	64	50	37	76	152	82	13,5	M16	34	10	1,50

- load ratings according to the specification of the bearing (x2)
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

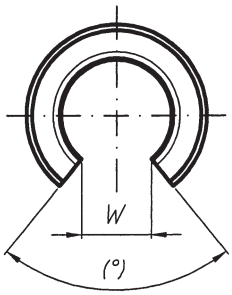
Ordering code

FTAG-	∅-	S-		V
linear housing, tandem, flange	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)	external front seal
		K	linear ball bushing, standard (refer to p. 20)	
		V	linear ball bushing, all-steel (refer to page 21)	
		KS	linear ball bushing, standard, self-aligning (refer to page 24)	
		FM	linear slide bushing, self-lubricating (ref. to p. 27)	
		L	linear slide bushing, ceramic	

DLR/LS



DLR OP/LXS



double lip seal

external front seals for linear ball bushing and linear slide bushing

Dimensions in mm

Part-No.	∅ d	∅ D [1]	T	h	W	(°)
DLR-12	12	22	3,0	1,5	7,5	78
DLR-16	16	26	3,0	1,5	10,0	78
DLR-20	20	32	4,0	2,0	10,0	60
DLR-25	25	40	4,0	2,0	12,5	60
DLR-30	30	47	5,0	2,0	12,5	50
DLR-40	40	62	5,0	3,0	16,8	50

[1] The metal-rings of the seals are manufactured with a plus-tolerance.

Ordering code

DLR-	∅-	OP
double lip seal	shaft diameter	open

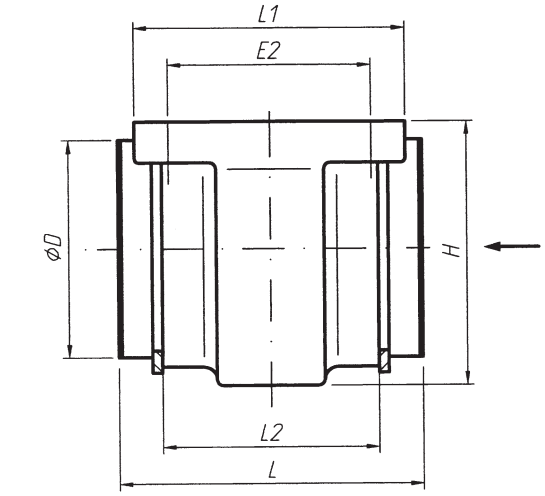
suitable external and internal retaining rings DIN 471/472 available from stock

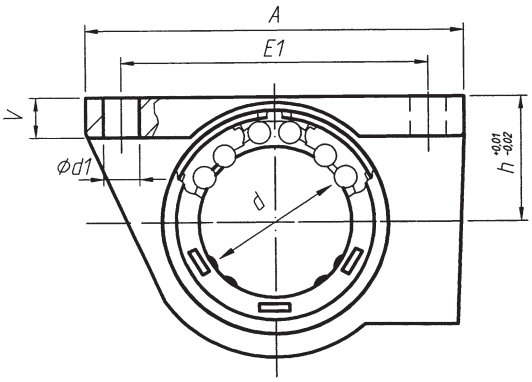
integrated seals for linear slide bushing, ceramic

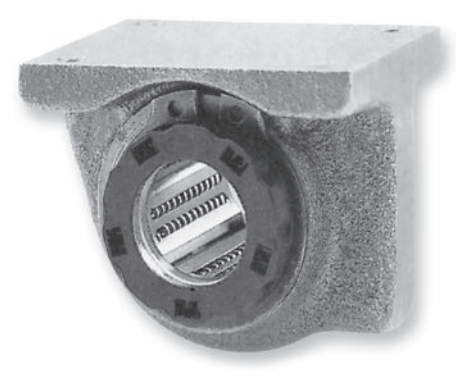
Dimensions in mm

Part-No.	∅ d	∅ D	T	W	(°)
LS/LXS-12	12	20	4,2	7,5	78
LS/LXS-16	16	23	4,4	11,0	78
LS/LXS-20	20	29	5,2	12,1	60
LS/LXS-25	25	35	6,1	14,2	60
LS/LXS-30	30	41,5	7,0	17,5	50
LS/LXS-40	40	56,5	7,9	21,4	50

LS = closed version
LXS = open version







graphite moulding closed
integrated wipers on both ends

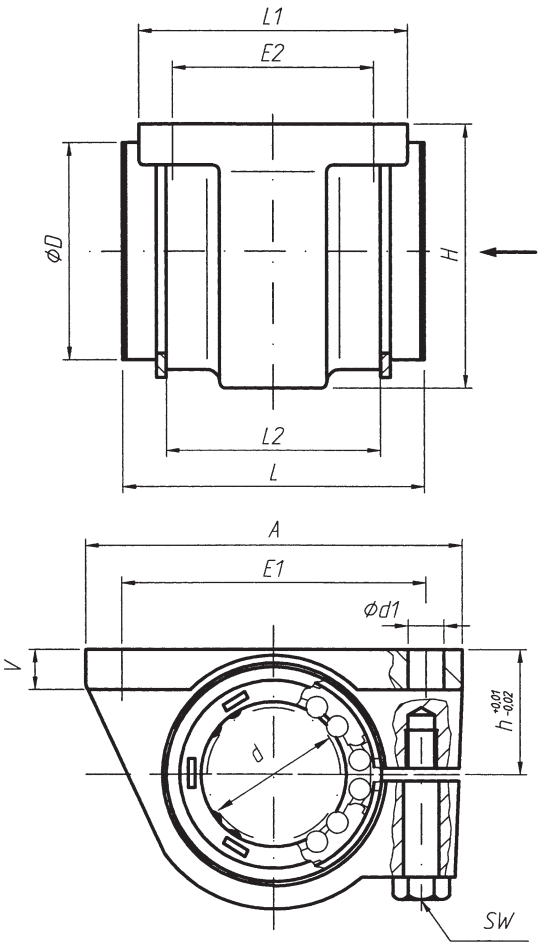
Dimensions in mm

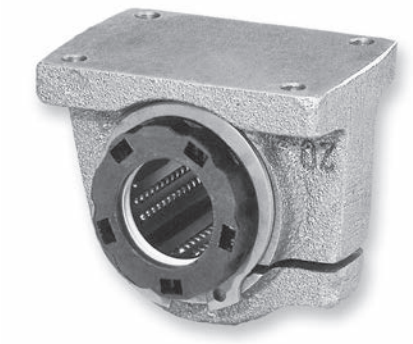
Part-No.	∅ d	∅ D	A	H	h	L	L1	L2	E1	E2	∅ d1	V	weight (kg)
GG-08	8	16	32 -2mm	28	15	25	28 -2mm	14	25 ±0,15	20 ±0,15	3,3	5,0	0,10
GG-12	12	22	42	35	18	32	32	20	32 ±0,15	23 ±0,15	4,3	5,5	0,12
GG-16	16	26	50	42	22	36	35	22	40 ±0,15	26 ±0,15	4,3	6,5	0,19
GG-20	20	32	60	50	25	45	42	28	45 ±0,15	32 ±0,15	4,3	8,0	0,38
GG-25	25	40	74	60	30	58	54	40	60 ±0,15	40 ±0,15	5,3	9,0	0,70
GG-30	30	47	84	70	35	68	60	48	68 ±0,20	45 ±0,20	6,4	10,0	1,10
GG-40	40	62	108	90	45	80	78	56	86 ±0,20	58 ±0,20	8,4	12,0	2,30
GG-50	50	75	130	105	50	100	70	72	108 ±0,20	50 ±0,20	8,4	14,0	3,45
GG-60	60	90	160	125	60	125	92	95	132 ±0,25	65 ±0,25	10,5	15,0	6,77
GG-80	80	120	200	170	80	165	122	125	170 ±0,50	90 ±0,50	13,0	22,0	15,50

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

GG-	∅-	S-	
linear housing, graphite	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic





graphite moulding closed
radial adjustment
integrated wipers on both ends

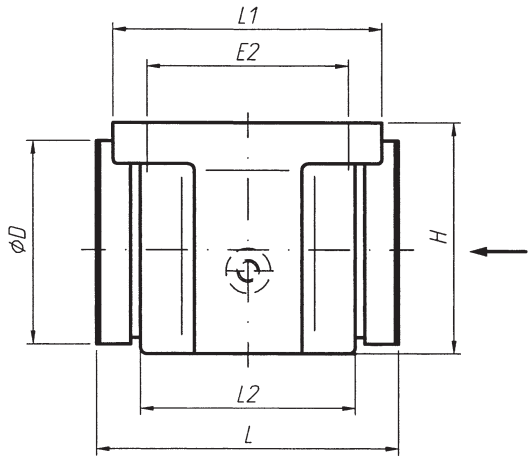
Dimensions in mm

Part-No.	∅ d	∅ D	A	h	H	L	L1	L2	E1	E2	∅ d1	V	SW	weight (kg)
GG-AJ-08	8	16	32	15	28	25	28	14	$25^{\pm0,15}$	$20^{\pm0,15}$	3,3	5,0	5,5	0,10
GG-AJ-12	12	22	42	18	35	32	32	20	$32^{\pm0,15}$	$23^{\pm0,15}$	4,3	5,5	7,0	0,12
GG-AJ-16	16	26	50	22	42	36	35	22	$40^{\pm0,15}$	$26^{\pm0,15}$	4,3	6,5	7,0	0,19
GG-AJ-20	20	32	60	25	50	45	42	28	$45^{\pm0,15}$	$32^{\pm0,15}$	4,3	8,0	7,0	0,38
GG-AJ-25	25	40	74	30	60	58	54	40	$60^{\pm0,15}$	$40^{\pm0,15}$	5,3	9,0	8,0	0,70
GG-AJ-30	30	47	84	35	70	68	60	48	$68^{\pm0,20}$	$45^{\pm0,20}$	6,4	10,0	10,0	1,10
GG-AJ-40	40	62	108	45	90	80	78	56	$86^{\pm0,20}$	$58^{\pm0,20}$	8,4	12,0	13,0	2,30
GG-AJ-50	50	75	130	50	105	100	70	72	$108^{\pm0,20}$	$50^{\pm0,20}$	8,4	14,0	13,0	3,45
GG-AJ-60	60	90	160	60	125	125	92	95	$132^{\pm0,25}$	$65^{\pm0,25}$	10,5	15,0	17,0	6,77
GG-AJ-80	80	120	200	80	170	165	122	125	$170^{\pm0,50}$	$90^{\pm0,50}$	13,0	22,0	19,0	15,50

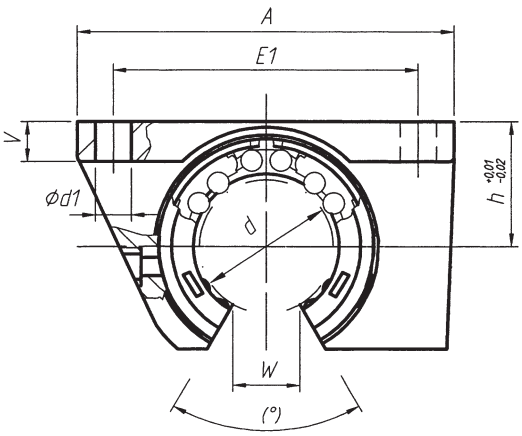
- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

GG-AJ-	∅-	S	
linear housing, closed, radial adjustment, graphite	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic



graphite moulding open
integrated wipers on both sides



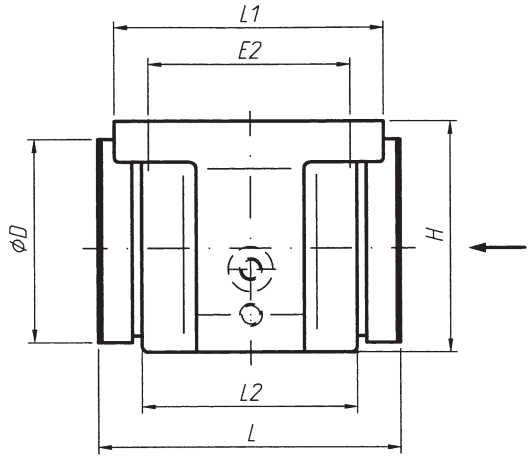
Dimensions in mm

Part-No.	∅ d	h	H	L	A	L1	L2	E1	E2	∅ d1	V	W (min.)	(°)	weight (kg)
GG-OP-12	12	18	28	32	42	32	20	$32^{\pm0,15}$	$23^{\pm0,15}$	4,3	5,5	7	60	0,10
GG-OP-16	16	22	35	36	50	35	22	$40^{\pm0,15}$	$26^{\pm0,15}$	4,3	6,5	9,4	60	0,18
GG-OP-20	20	25	42	45	60	42	28	$45^{\pm0,15}$	$32^{\pm0,15}$	4,3	8,0	10	60	0,32
GG-OP-25	25	30	51	58	74	54	40	$60^{\pm0,15}$	$40^{\pm0,15}$	5,3	9,0	12,5	60	0,63
GG-OP-30	30	35	60	68	84	60	48	$68^{\pm0,20}$	$45^{\pm0,20}$	6,4	10,0	12,5	55	0,90
GG-OP-40	40	45	77	80	108	78	56	$86^{\pm0,20}$	$58^{\pm0,20}$	8,4	12,0	16,8	60	2,10
GG-OP-50	50	50	88	100	130	70	72	$108^{\pm0,20}$	$50^{\pm0,20}$	8,4	14,0	21	50	3,10
GG-OP-60	60	60	105	125	160	92	95	$132^{\pm0,25}$	$65^{\pm0,25}$	10,5	15,0	27,2	50	5,78
GG-OP-80	80	80	140	165	200	122	125	$170^{\pm0,50}$	$90^{\pm0,50}$	13,0	22,0	36,3	50	12,80

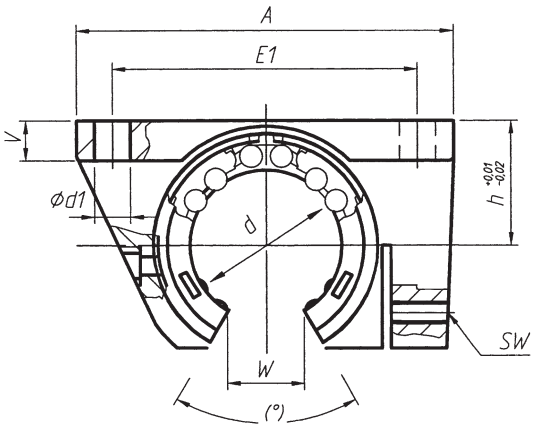
- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980
- opening angle may differ depending on production-lots

Ordering code

GG-OP-	∅-	S	
linear housing, open, graphite	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic



graphite moulding open
radial adjustment
integrated wipers on both ends



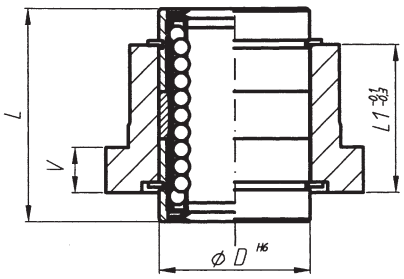
Dimensions in mm

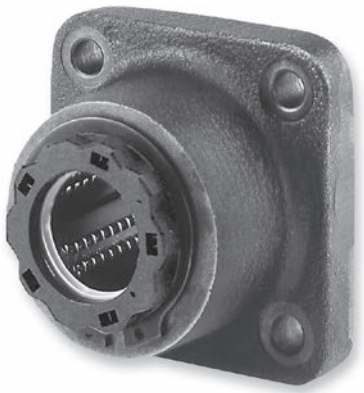
Part-No.	∅ d	h	H	L	A	L1	L2	E1	E2	∅ d1	V	W (min.)	SW	(°)	weight (kg)
GG-OPAJ-12	12	18	28	32	42	32	20	$32^{\pm0,15}$	$23^{\pm0,15}$	4,3	5,5	7	2,5	60	0,10
GG-OPAJ-16	16	22	35	36	50	35	22	$40^{\pm0,15}$	$26^{\pm0,15}$	4,3	6,5	9,4	2,5	60	0,18
GG-OPAJ-20	20	25	42	45	60	42	28	$45^{\pm0,15}$	$32^{\pm0,15}$	4,3	8,0	10	2,5	60	0,32
GG-OPAJ-25	25	30	51	58	74	54	40	$60^{\pm0,15}$	$40^{\pm0,15}$	5,3	9,0	12,5	3,0	60	0,63
GG-OPAJ-30	30	35	60	68	84	60	48	$68^{\pm0,20}$	$45^{\pm0,20}$	6,4	10,0	12,5	3,0	55	0,90
GG-OPAJ-40	40	45	77	80	108	78	56	$86^{\pm0,20}$	$58^{\pm0,20}$	8,4	12,0	16,8	4,0	60	2,10
GG-OPAJ-50	50	50	88	100	130	70	72	$108^{\pm0,20}$	$50^{\pm0,20}$	8,4	14,0	21	5,0	50	3,91
GG-OPAJ-60	60	60	105	125	160	92	95	$132^{\pm0,25}$	$65^{\pm0,25}$	10,5	15,0	27,2	5,0	50	7,79
GG-OPAJ-80	80	80	140	165	200	122	125	$170^{\pm0,50}$	$90^{\pm0,50}$	13,0	22,0	36,3	6,0	50	16,05

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980
- opening angle may differ depending on production-lots

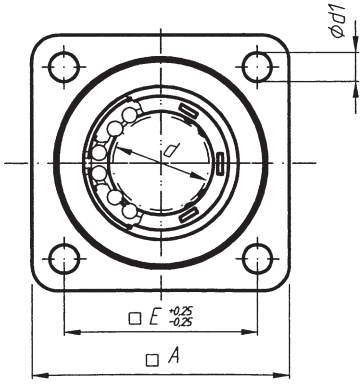
Ordering code

GG-OPAJ-	∅-	S	
linear housing, open, radial adjustment, graphite	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic





graphite moulding flange
integrated wipers on both ends



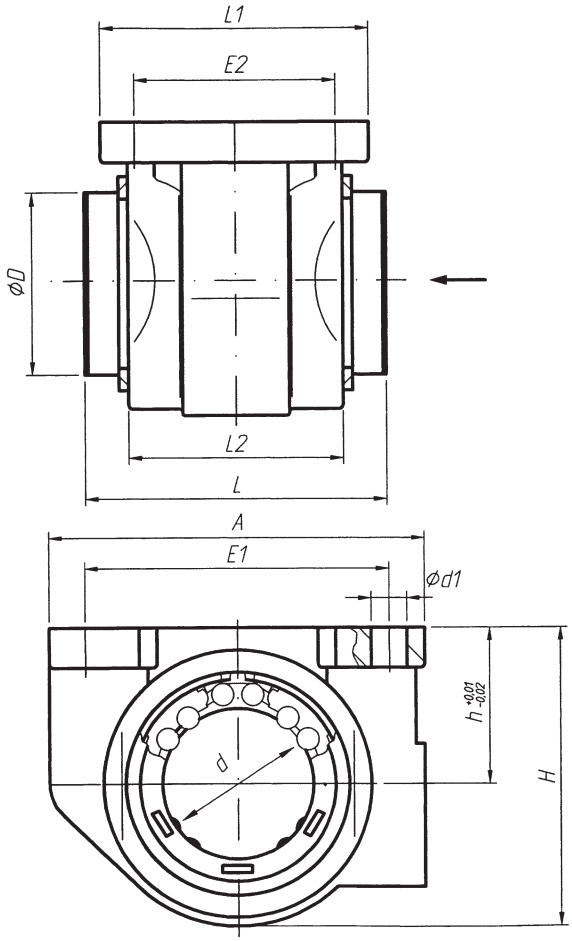
Dimensions in mm

Part-No.	∅ d	∅ D	A	L	L1	E	∅ d1	V	W	weight (kg)
FGG-12	12	22	42	32	22	$30^{\pm0,12}$	5,5	6	10,0	0,14
FGG-16	16	26	50	36	24	$35^{\pm0,12}$	5,5	8	10,5	0,23
FGG-20	20	32	60	45	30	$42^{\pm0,15}$	6,6	10	13,5	0,38
FGG-25	25	40	74	58	42	$54^{\pm0,15}$	6,6	12	17,5	0,78
FGG-30	30	47	84	68	50	$60^{\pm0,25}$	9,0	14	21,0	1,23
FGG-40	40	62	108	80	59	$78^{\pm0,25}$	11,0	16	22,0	2,31
FGG-50	50	75	130	100	75	$98^{\pm0,25}$	11,0	18	14,0	3,91
FGG-60	60	90	160	125	99	$120^{\pm0,50}$	14,0	22	15,0	7,79
FGG-80	80	120	200	165	130	$155^{\pm0,50}$	14,0	26	20,0	16,05

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

FGG-	∅-	S	
linear housing, flange, graphite	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic



aluminium moulding closed
integrated wipers on both ends

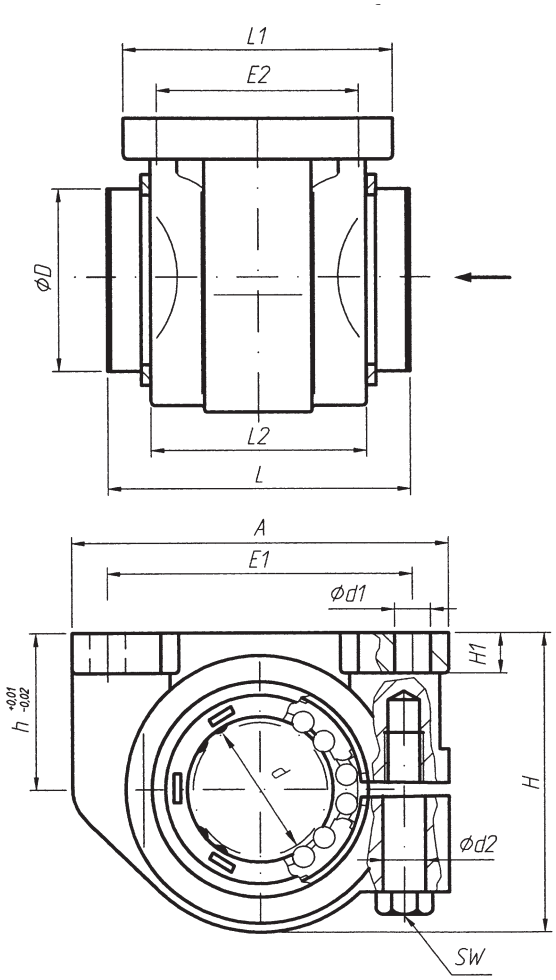
Dimensions in mm

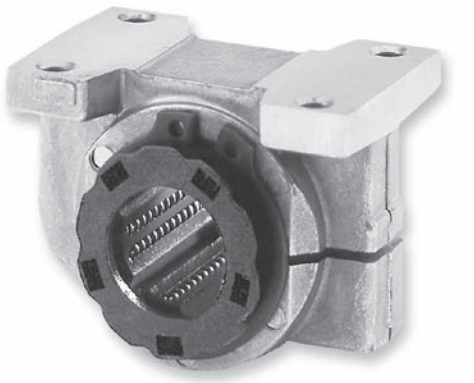
Part-No.	∅ d	∅ D	A	h	H	L	L1	L2	E1	E2	∅ d1	weight (kg)
MAG-12	12	22	42	18	34,0	32	32	20	$32^{\pm0,15}$	$23^{\pm0,15}$	4,5	0,06
MAG-16	16	26	50	22	41,0	36	35	22	$40^{\pm0,15}$	$26^{\pm0,15}$	4,5	0,08
MAG-20	20	32	60	25	47,5	45	42	28	$45^{\pm0,15}$	$32^{\pm0,15}$	4,5	0,16
MAG-25	25	40	74	30	60,0	58	54	40	$60^{\pm0,20}$	$40^{\pm0,20}$	5,5	0,31
MAG-30	30	47	84	35	67,0	68	60	48	$68^{\pm0,20}$	$45^{\pm0,20}$	6,6	0,45
MAG-40	40	62	108	45	87,0	80	78	56	$86^{\pm0,20}$	$58^{\pm0,20}$	9,0	0,81
MAG-50	50	75	130	50	98,0	100	70	72	$108^{\pm0,20}$	$50^{\pm0,20}$	9,0	1,65

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

MAG-	∅-	S	
linear housing, closed, AL-Casting	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic





aluminium moulding closed
radial adjustment
integrated wipers on both ends

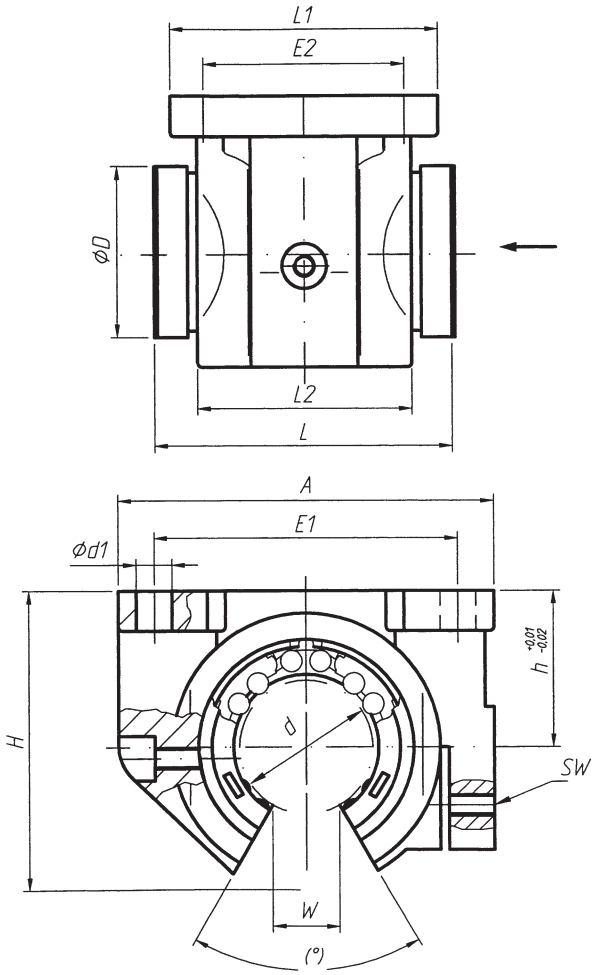
Dimensions in mm

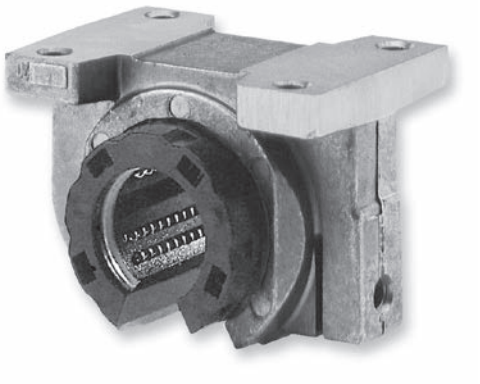
Part-No.	∅ d	∅ D	A	h	H	H1	L	L1	L2	E1	E2	∅ d1	∅ d2	SW	weight (kg)
MAG-AJ-12	12	22	42	18	34,0	4,8	32	32	20	$32^{\pm0,15}$	$23^{\pm0,15}$	4,5	4,5	7	0,06
MAG-AJ-16	16	26	50	22	41,0	5,5	36	35	22	$40^{\pm0,15}$	$26^{\pm0,15}$	4,5	4,5	7	0,08
MAG-AJ-20	20	32	60	25	47,5	7,0	45	42	28	$45^{\pm0,15}$	$32^{\pm0,15}$	4,5	4,5	7	0,16
MAG-AJ-25	25	40	74	30	60,0	8,0	58	54	40	$60^{\pm0,20}$	$40^{\pm0,20}$	5,5	5,5	8	0,31
MAG-AJ-30	30	47	84	35	67,0	9,0	68	60	48	$68^{\pm0,20}$	$45^{\pm0,20}$	6,6	7	10	0,45
MAG-AJ-40	40	62	108	45	87,0	11,0	80	78	56	$86^{\pm0,20}$	$58^{\pm0,20}$	9,0	9	13	0,81
MAG-AJ-50	50	75	130	50	98,0	12,5	100	70	72	$108^{\pm0,20}$	$50^{\pm0,20}$	9,0	9	13	1,65

- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by retaining rings DIN 471
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

MAG-AJ-	∅-	S	
linear housing, closed, radial adjustment, AL-casting	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic





aluminium moulding open
radial adjustment
integrated wipers on both ends

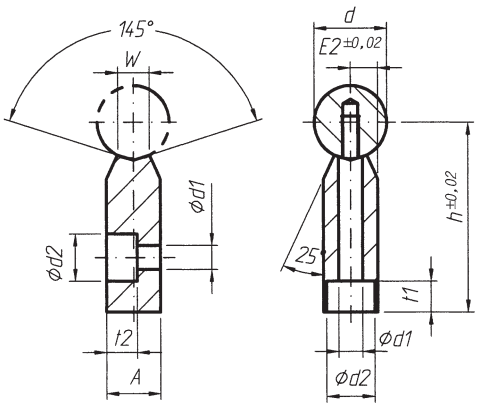
Dimensions in mm

Part-No.	∅ d	∅ D	A	h	H	E1	E2	L	L1	L2	SW	∅ d1	W (min.)	(°)	weight (kg)
MAG-OPAJ-12	12	22	42	18	34,0	$32^{\pm0,15}$	$23^{\pm0,15}$	32	32	20	2,0	4,5	7	70	0,06
MAG-OPAJ-16	16	26	50	22	41,0	$40^{\pm0,15}$	$26^{\pm0,15}$	36	35	22	2,5	4,5	9,4	70	0,08
MAG-OPAJ-20	20	32	60	25	47,5	$45^{\pm0,15}$	$32^{\pm0,15}$	45	42	28	2,5	4,5	10	60	0,16
MAG-OPAJ-25	25	40	74	30	60,0	$60^{\pm0,20}$	$40^{\pm0,20}$	58	54	40	3,0	5,5	12,5	60	0,31
MAG-OPAJ-30	30	47	84	35	67,0	$68^{\pm0,20}$	$45^{\pm0,20}$	68	60	48	3,0	6,6	12,5	55	0,45
MAG-OPAJ-40	40	62	108	45	87,0	$86^{\pm0,20}$	$58^{\pm0,20}$	80	78	56	4,0	9,0	16,8	60	0,81
MAG-OPAJ-50	50	75	130	50	98,0	$108^{\pm0,20}$	$50^{\pm0,20}$	100	70	72	4,0	9,0	21	50	1,65

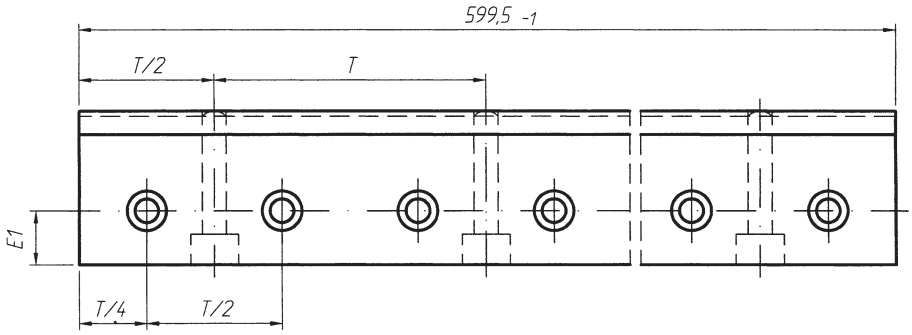
- load ratings according to the specification of the bearing
- weight value considering the linear ball bushing, standard
- the bushings are secured in the housings by radial-axial-fixing screw
- fixing screws DIN 912 - 8.8, circlip DIN 7980

Ordering code

MAG-OPAJ-	∅-	S	
linear housing, open, radial adjustment, AL-casting	shaft diameter	**S**	linear ball bushing, self-aligning, high load capacity (refer to page 25)
		K	linear ball bushing, standard (refer to p. 20)
		V	linear ball bushing, all-steel (refer to page 21)
		KS	linear ball bushing, standard, self-aligning (refer to page 24)
		FM	linear slide bushing, self-lubricating (ref. to p. 27)
		L	linear slide bushing, ceramic



flat
aluminium alloy
600 mm long
single row of fixing holes

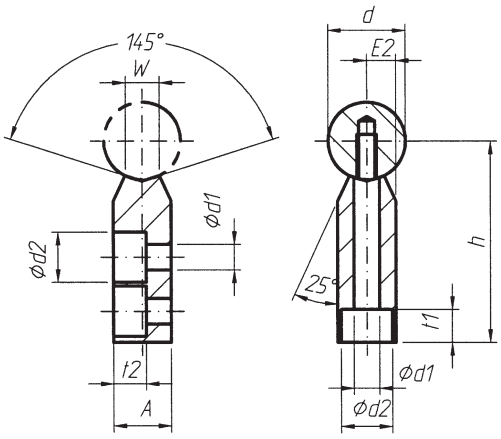


- also available with assembled shaft, refer to page 64

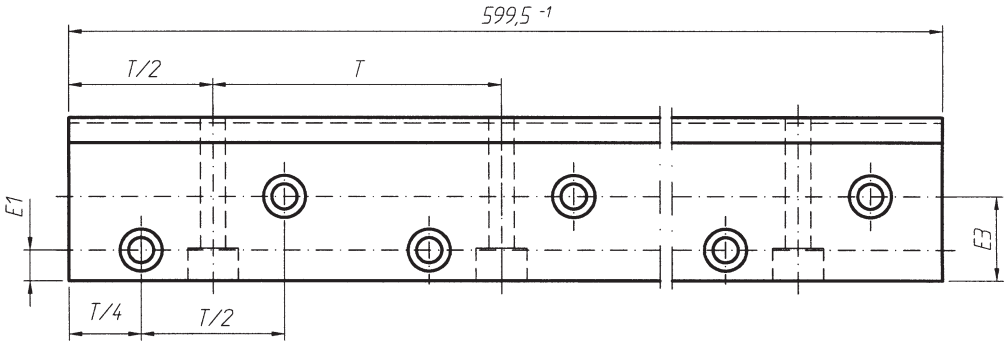
Dimensions in mm

Part-No.	∅ d	A	h	E1	E2	W	∅ d1	∅ d2	t1	t2	T	weight (kg)
WUF-20	20	15	52	15	7,5	8,3	6,6	11	8,5	8,5	100	1,10
WUF-25	25	20	62	18	10,0	10,8	9,0	15	15	11,0	120	1,50
WUF-30	30	25	72	21	12,5	11,0	11,0	18	15,3	13,5	150	2,10
WUF-40	40	30	88	25	15,0	15,0	14,0	20	19	16,0	200	3,00
WUF-50	50	35	105	30	17,5	19,0	16,0	24	21,5	18,5	200	4,20

- suitable precison steel shafts chapter 5
- Dimension T/2 equal both sides



flat
aluminium alloy
600 mm long
double row of fixing holes

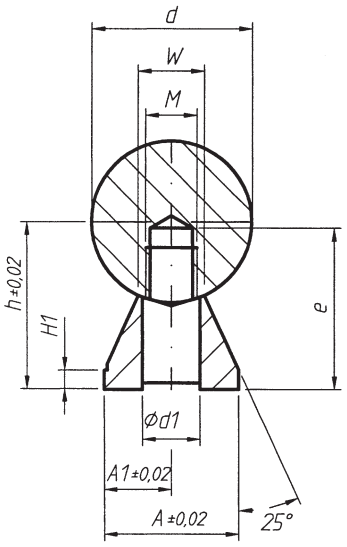


- also available with assembled shaft, refer to page 62

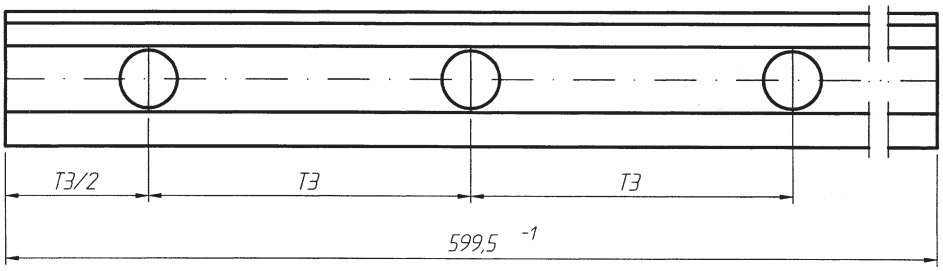
Dimensions in mm

Part-No.	∅ d	A	h	E1	E2	E3	W	∅ d1	∅ d2	t1	t2	T	weight (kg)
WUFD-20	20	15	52	8	7,5	22	8,3	6,6	11	8,5	8,5	75	1,00
WUFD-25	25	20	62	10	10,0	26	10,0	9,0	15	14,0	11,0	75	1,30
WUFD-30	30	25	72	12	12,5	30	11,0	11,0	18	15,3	13,5	100	1,90
WUFD-40	40	30	88	12	15,0	38	15,0	14,0	20	17,5	16,0	100	2,70
WUFD-50	50	35	105	15	17,5	45	19,0	15,5	24	21,5	18,5	100	3,70

- suitable precison steel shafts chapter 5
- Dimension T/2 equal both sides



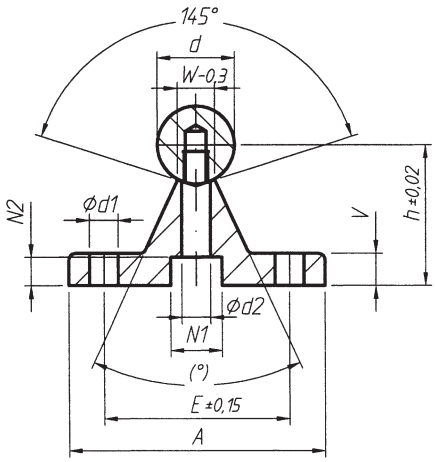
low shape
aluminium alloy
600 mm long



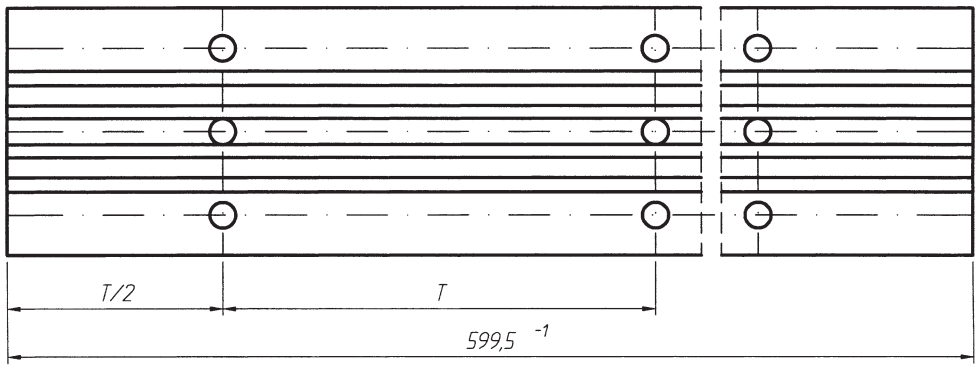
Dimensions in mm

Part-No.	∅ d	h	H1	A	A1	W	M	∅ d1	e	T3	weight (kg)
WUN-12	12	14,5	3	11	5,5	5,4	M4	4,5	16,5	75	0,44
WUN-16	16	18	3	14	7,0	7,0	M5	5,5	19,5	75	0,56
WUN-20	20	22	3	17	8,5	8,1	M6	6,6	25,0	75	0,81
WUN-25	25	26	3	21	10,5	10,3	M8	9,0	27,5	75	1,06
WUN-30	30	30	3	23	11,5	11,0	M10	11,0	33,0	100	1,25
WUN-40	40	39	4	30	15,0	15,0	M12	13,5	39,0	100	2,16
WUN-50	50	46	5	35	17,5	19,0	M14	15,5	44,0	100	2,94

- suitable precison steel shafts chapter 5
- Dimension T/2 equal both sides



medium height
aluminium alloy
600 mm long

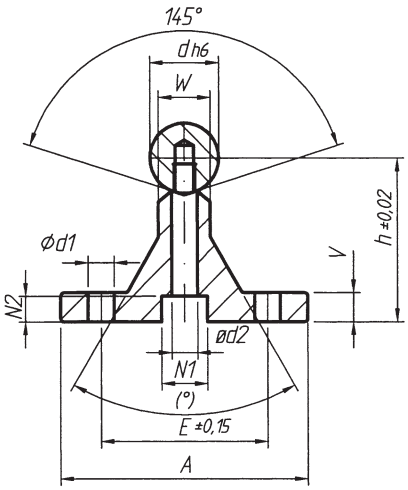


- also available with assembled shaft, refer to page 62

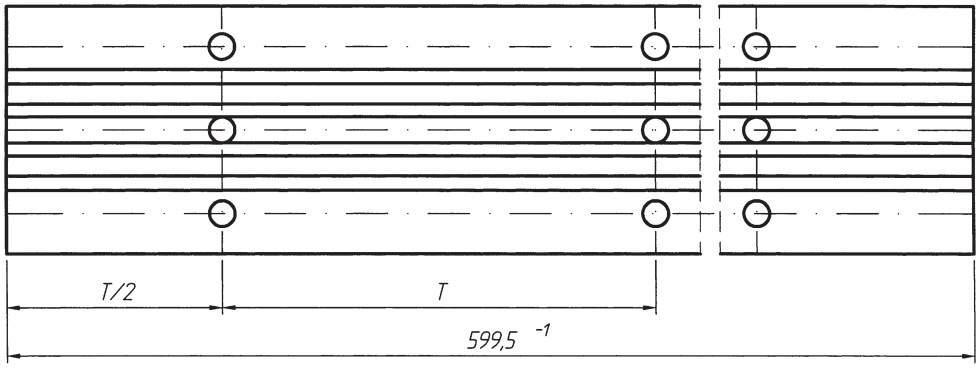
Dimensions in mm

Part-No.	∅ d	A	h	V	N1	N2	∅ d1	∅ d2	W	(°)	E	T1	T2	weight (kg)
WUM-12	12	40	22	5	8,0	5,0	4,5	4,5	5,8	50	29	75	120	0,52
WUM-16	16	45	26	5	9,5	6,0	5,5	5,5	7,0	50	33	100	150	0,64
WUM-20	20	52	32	6	11,0	6,5	6,6	6,6	8,3	50	37	100	150	0,90
WUM-25	25	57	36	6	14,0	8,5	6,6	9,0	10,8	50	42	120	200	1,08
WUM-30	30	69	42	7	17,0	10,5	9,0	11,0	11,0	50	51	150	200	1,43
WUM-40	40	73	50	8	17,0	10,5	9,0	11,0	15,0	50	55	200	300	1,81
WUM-50	50	84	60	9	19,0	12,5	11,0	13,0	19,0	46	63	200	300	2,45
WUM-60	60	94	$68^{\pm 0,01}$	10	22,0	12,5	11,0	15,5	25,0	46	72	300	–	3,16
WUM-80	80	116	$86^{\pm 0,01}$	12	–	12,5	13,0	17,5	34,0	46	92	300	–	4,86

- suitable precision steel shafts chapter 5
- Dimension T/2 equal both sides



high
aluminium alloy
600 mm long

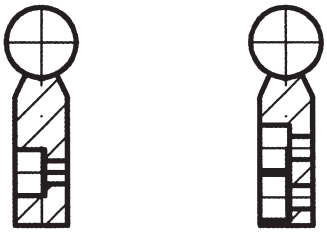


- also available with assembled shaft, refer to page 62

Dimensions in mm

Part-No.	∅ d	A	h	V	N1	N2	∅ d1	∅ d2	W	(°)	E	T1	T2	weight (kg)
WUH-12	12	43	28	5	8	5	4,5	4,5	9	60	29	75	120	0,64
WUH-16	16	48	30	5	10^{+1}	$6^{+1,5}$	5,5	5,5	10	60	33	100	150	0,74
WUH-20	20	56	38	6	12	9,5	66	6,6	11	60	37	100	150	1,00
WUH-25	25	60	42	6	15	11,5	6,6	9,0	14	60	42	120	200	1,20
WUH-30	30	74	53	8	17	11,5	9	11,0	14	60	51	150	200	1,80
WUH-40	40	78	60	8	19	13	9	11,0	18	60	55	200	300	2,10

- suitable precision steel shafts chapter 5
- Dimension T/2 equal both sides



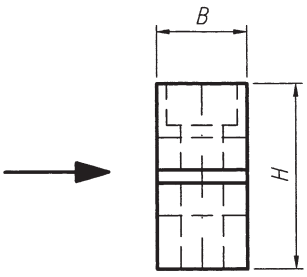
complete assembled
different shaft material

These support rails are supplied completely assembled.
For dimensions please see the page describing the appropriate shaft support.
Any length can be supplied. If required lengths exceeds the maximum manufactured length, rails will be supplied in sections to be assembled at the manufacturer.
The position of the first fixing hole can be selected by customer.
If no selection is made, the first hole will be at T/2.
Available support rails are tabulated below:

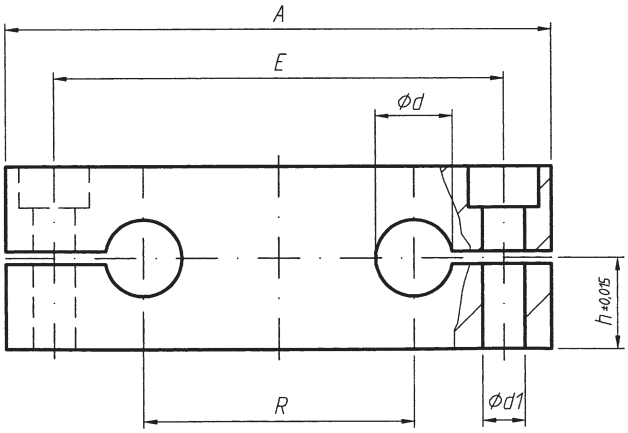
Shaft ∅	TSM with screw		TSH with screw		TSF with screw		TSFD with screw	
12	WUM	M4x17	WUH	M4x20	-	-	-	-
16	WUM	M5x20	WUH	M5x25	-	-	-	-
20	WUM	M6x25	WUH	M6x30	WUF	M6x45	WUFD	M6x45
25	WUM	M8x30	WUH	M8x35	WUF	M8x50	WUFD	M8x50
30	WUM	M10x35	WUH	M10x45	WUF	M10x60	WUFD	M10x60
40	WUM	M10x40	WUH	M10x50	WUF	M12x75	WUFD	M12x75
50	WUM	M12x45	WUH	M12x55	WUF	M14x90	WUFD	M14x90
60	WUM	M14x50	WUH	M14x55	-	-	-	-
80	WUM	M16x60	WUH	M16x65	-	-	-	-

Ordering code

TSM-	∅ 20-	2500-	T2-	Z-
specification TSF, TSFD, TSM, TSH, TSN	shaft diameter in mm	shaft length	T1 T1-hole pattern T2 T2-hole pattern	endmachining 1AX axial thread on one end 2AX axial thread on both end Z per drawing/other specification



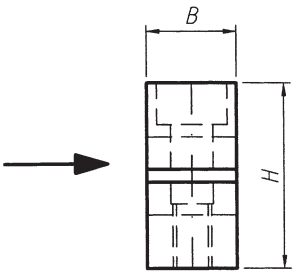
aluminium alloy
fixed twin shaft block

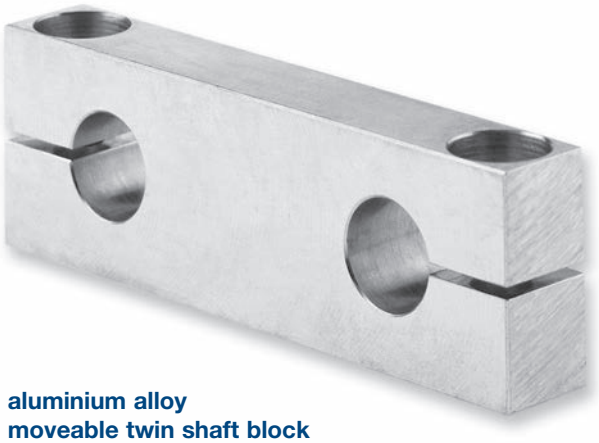


Dimensions in mm

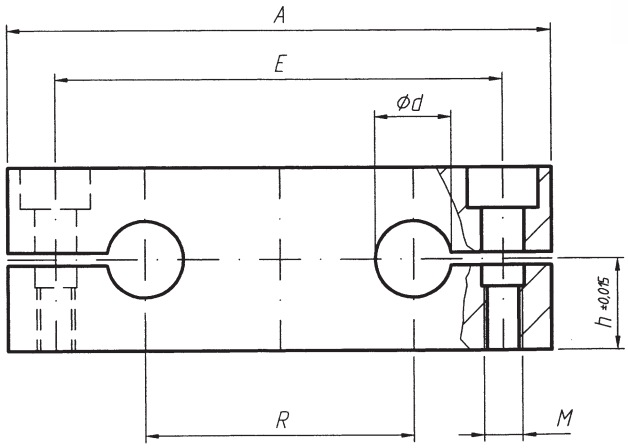
Part-No.	∅ d	A	B	H	h	E	∅ d1	R	weight (kg)
TAA-08	8	65	12	23	12,5	52	5,5	32	0,04
TAA-12	12	85	14	32	18,0	70	6,6	42	0,09
TAA-16	16	100	18	36	20,0	82	9,0	54	0,14
TAA-20	20	130	20	46	25,0	108	11,0	72	0,25
TAA-25	25	160	25	56	30,0	132	13,5	88	0,47
TAA-30	30	180	25	64	35,0	150	13,5	96	0,62
TAA-40	40	230	30	80	44,0	190	17,5	122	1,15

- distance between shaft centres equals dimension “R” for types QAG and QAG-OP, section III
- suitable precision steel shafts, see section V





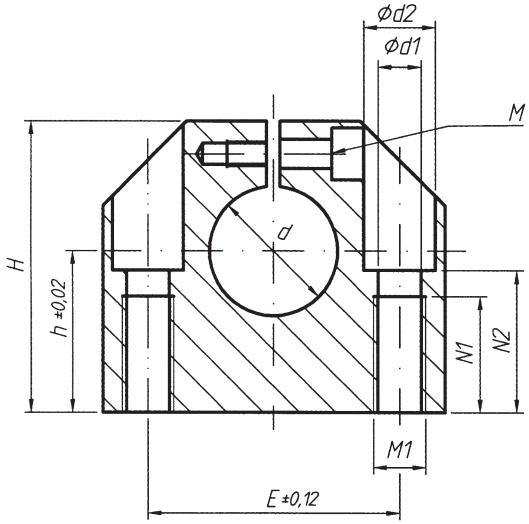
aluminium alloy
moveable twin shaft block



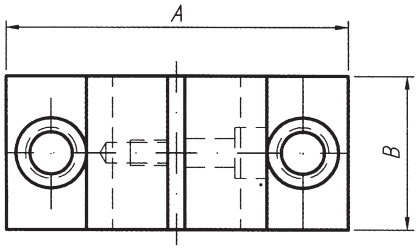
Dimensions in mm

Part-No.	∅ d	A	B	H	h	E	M	R	weight (kg)
TAB-08	8	65	12	22	11	52	M5	32	0,04
TAB-12	12	85	14	28	14	70	M6	42	0,07
TAB-16	16	100	18	32	16	82	M8	54	0,13
TAB-20	20	130	20	42	21	108	M10	72	0,22
TAB-25	25	160	25	52	26	132	M12	88	0,44
TAB-30	30	180	25	58	29	150	M12	96	0,56
TAB-40	40	230	30	72	36	190	M16	122	1,00

- distance between shaft centres equals dimension “R” for types QAG and QAG-OP, section III
- suitable precision steel shafts, see section V



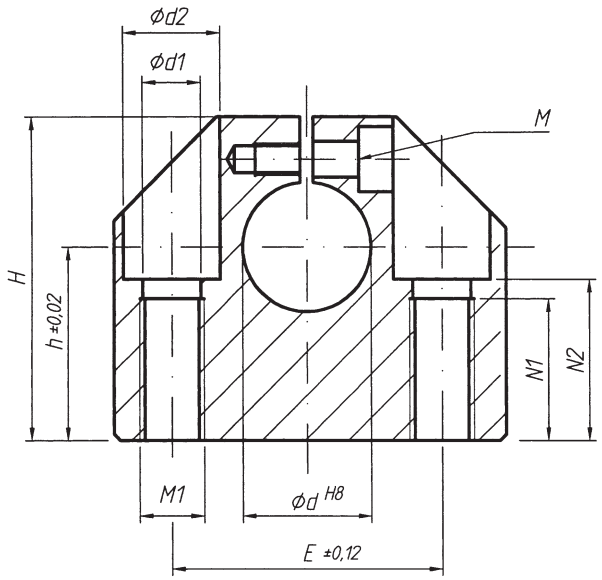
compact
aluminium alloy

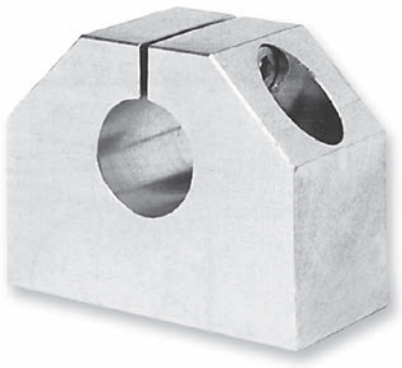


Dimensions in mm

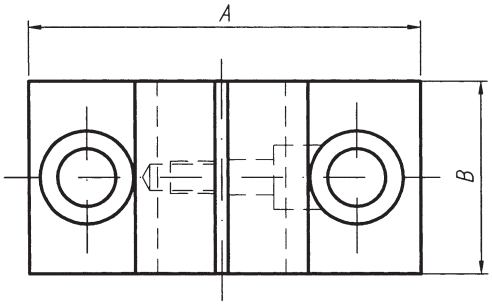
Part-No.	∅ d	A	B	H	h	E	∅ d1	∅ d2	M	M1	N1	N2	weight (kg)
WBC-08	8	32	16	27	16	22	4,2	8	M3	M5	11	13	0,03
WBC-10	10	40	18	33	18	27	5,2	10	M4	M6	13	16,5	0,05
WBC-12	12	40	18	33	19	27	5,2	10	M4	M6	13	16,5	0,05
WBC-16	16	45	20	38	22	32	5,2	10	M4	M6	13	18	0,07
WBC-20	20	53	24	45	25	39	6,8	11	M5	M8	18	21	0,12
WBC-25	25	62	28	54	31	44	8,6	15	M6	M10	22	25	0,17
WBC-30	30	67	30	60	34	49	8,6	15	M6	M10	22	29	0,22
WBC-40	40	87	40	76	42	66	10,3	18	M8	M12	26	37	0,48
WBC-50	50	103	50	92	50	80	14,25	20	M10	M16	34	44	0,82

- suitable precision steel shafts, see section V





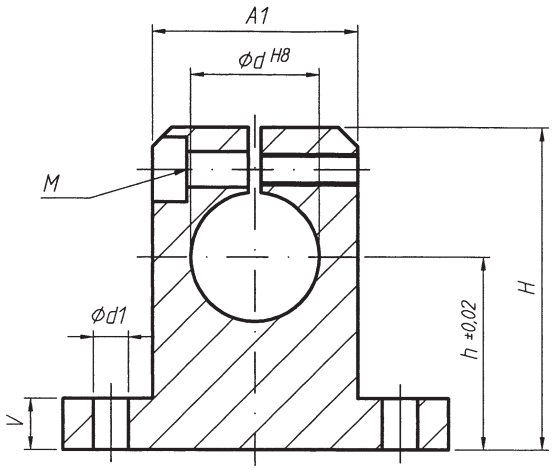
aluminium alloy



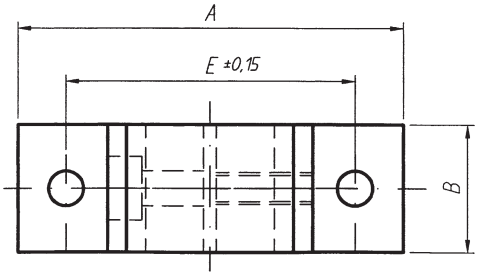
Dimensions in mm

Part-No.	∅ d	A	B	H	h	E	∅ d1	∅ d2	M	M1	N1	N2	weight (kg)
WBA-08	8	32	18	28	15	22	3,3	6	M3	M4	9	13,0	0,04
WBA-12	12	43	20	35	20	30	5,2	10	M4	M6	13	16,5	0,10
WBA-16	16	53	24	42	25	38	6,8	11	M5	M8	18	21,0	0,15
WBA-20	20	60	$30^{-0,6}$	$50^{-0,6}$	30	42	8,6	15	M6	M10	22	25,0	0,23
WBA-25	25	78	38	61	35	56	10,3	18	M8	M12	26	30,0	0,41
WBA-30	30	87	$40^{-1,0}$	$70^{-0,6}$	40	64	10,3	18	M8	M12	26	34,0	0,53
WBA-40	40	108	48	90	50	82	14,25	20	M10	M16	34	44,0	0,99
WBA-50	50	132	58	105	60	100	17,5	26	M10	M20	43	49,0	1,25

- suitable precision steel shafts, see section V
- Supportblocks will be produced with reference edge. Depending on manufacturing-lot the reference edge will be visual optically.



standard
aluminium alloy



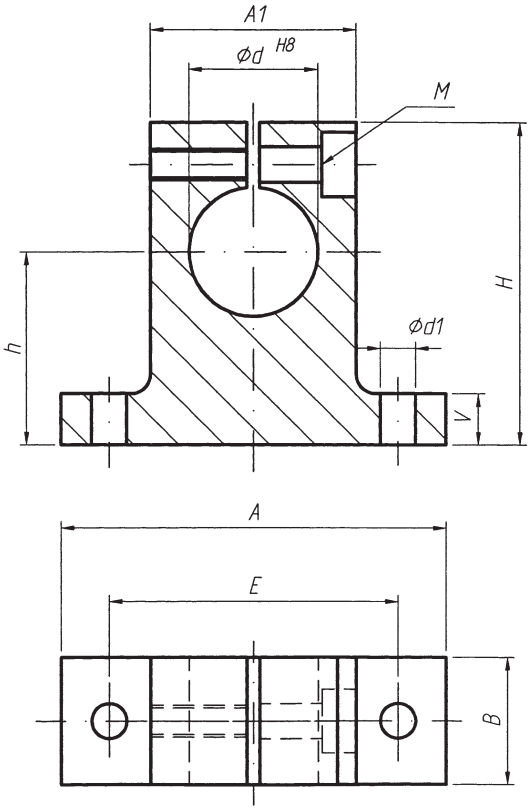
Dimensions in mm

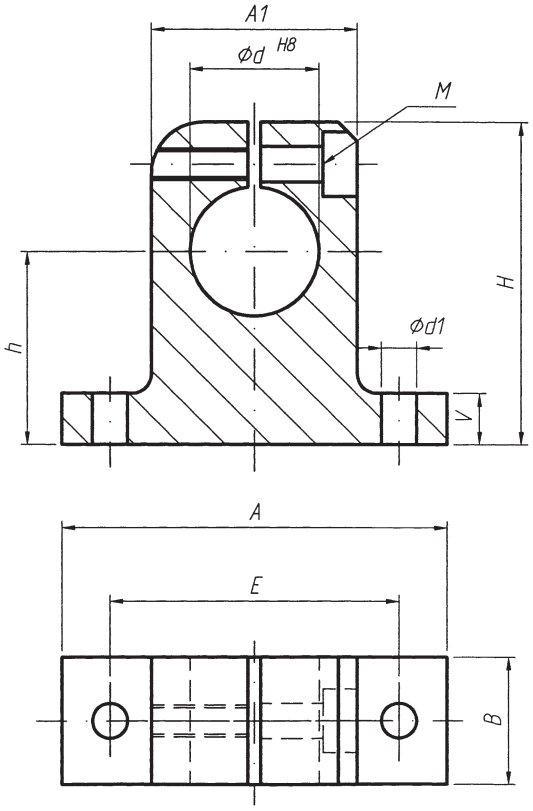
Part-No.	∅ d	H	h	A	A1	B	E	∅ d1	V	M	weight (kg)
WBAS-08	8	27	15	32	16	10	25	4,5	5,0	M3	0,01
WBAS-12	12	35	20	42	20	12	32	5,5	5,5	M4	0,02
WBAS-16	16	42	25	50	26	16	40	5,5	6,5	M4	0,03
WBAS-20	20	50	30	60	32	20	45	5,5	8,0	M4	0,07
WBAS-25	25	58	35	74	38	25	60	6,6	9,0	M5	0,14
WBAS-30	30	68	40	84	45	28	68	9,0	10,0	M6	0,20
WBAS-40	40	86	50	108	56	32	86	11,0	12,0	M8	0,48
WBAS-50	50	100	60	130	80	40	108	11,0	14,0	M8	1,90
WBAS-60	60	124	75	160	100	48	132	13,5	15,0	M10	3,60

- suitable precision steel shafts, see section V
- dimensions H1, A, A1, B, V tolerances to DIN 1686 - GTB 15

standard
steel
version WBS

standard
steel
version WBS-..-S

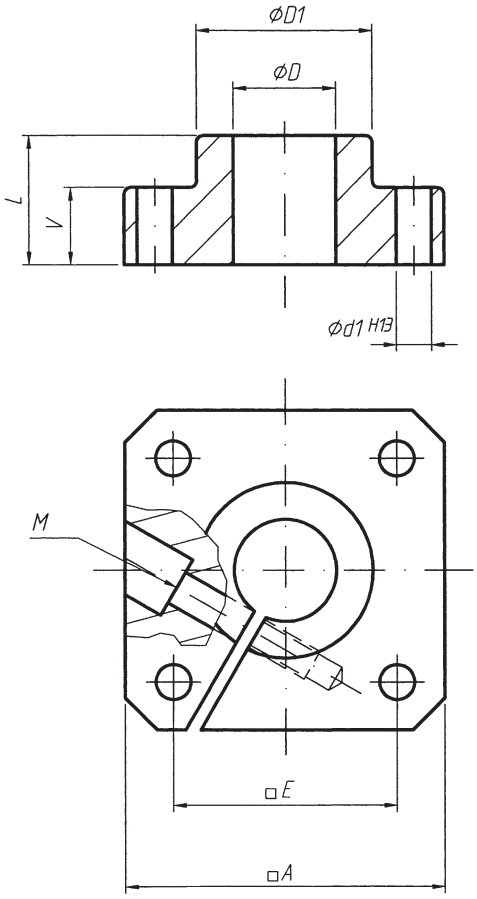


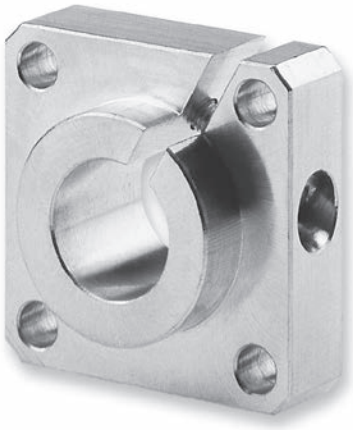


Dimensions in mm

Part-No.	∅ d	H	h	A	A1	B	E	∅ d1	V	M	weight (kg)
WBS-08	8	27	$15^{\pm 0,010}$	32	16	10	$25^{\pm 0,15}$	4,5	5,2	M2,5	0,03
WBS-12	12	35	$20^{\pm 0,010}$	42	20	12	$32^{\pm 0,15}$	5,5	5,5	M3	0,06
WBS-16	16	42	$25^{\pm 0,010}$	50	26	16	$40^{\pm 0,15}$	5,5	6,5	M3	0,11
WBS-20	20	50	$30^{\pm 0,010}$	60	32	20	$45^{\pm 0,15}$	5,5	8,0	M3	0,21
WBS-25	25	58	$35^{\pm 0,010}$	74	38	25	$60^{\pm 0,15}$	6,6	9,0	M4	0,35
WBS-30	30	68	$40^{\pm 0,010}$	84	45	28	$68^{\pm 0,20}$	9,0	10,0	M5	0,52
WBS-40	40	86	$50^{\pm 0,010}$	108	56	32	$86^{\pm 0,20}$	11,0	12,0	M6	0,92
WBS-50	50	100	$60^{\pm 0,015}$	130	80	40	$108^{\pm 0,20}$	11,0	14,0	M6	1,90
WBS-60	60	124	$75^{\pm 0,015}$	160	100	48	$132^{\pm 0,25}$	13,5	15,0	M8	3,60
WBS-80	80	160	$100^{\pm 0,015}$	200	130	60	$170^{\pm 0,50}$	17,5	22,0	M10	7,30

- suitable precision steel shafts, see section V
- dimensions H1, A, A1, B, V tolerances to DIN 1686 - GTB 15
- size WBS-40 will be delivered in version -S in standard



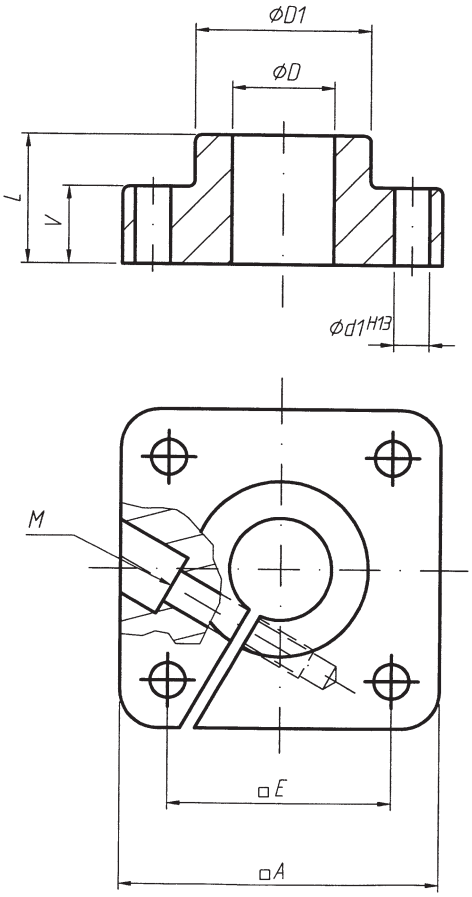


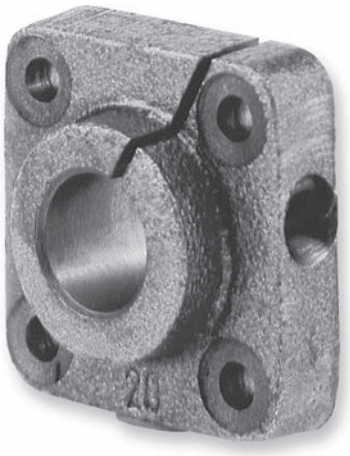
flange
aluminium alloy

Dimensions in mm

Part-No.	∅ d	A	L	∅ D1	E	∅ d1	V	M	weight (kg)
FWBA-12	12	40	20	23,5	$30^{\pm0,12}$	5,5	12	M4	0,06
FWBA-16	16	50	20	27,5	$35^{\pm0,12}$	5,5	12	M4	0,08
FWBA-20	20	50	23	33,5	$38^{\pm0,15}$	6,6	14	M5	0,10
FWBA-25	25	60	25	42,0	$42^{\pm0,15}$	6,6	16	M6	0,15
FWBA-30	30	70	30	49,5	$54^{\pm0,25}$	9,0	19	M8	0,30
FWBA-40	40	100	40^{-1}	65,0	$68^{\pm0,25}$	11,0	26	M10	0,70
FWBA-50	50	100	50^{-1}	75,0	$75^{\pm0,25}$	11,0	36	M10	1,20

- suitable precision steel shafts, see section V
- dimensions A, L, D, V tolerances to DIN 1686 - GTB 15





flange
graphite moulding

Dimensions in mm

Part-No.	∅ d	A	L	∅ D1	E	∅ d1	V	M	weight (kg)
FWBG-12	12	42	20	23,5	$30^{\pm 0,12}$	5,5	12	M4	0,15
FWBG-16	16	50	20	27,5	$35^{\pm 0,12}$	5,5	12	M4	0,21
FWBG-20	20	54	23	33,5	$38^{\pm 0,15}$	6,6	14	M5	0,28
FWBG-25	25	60	25	42,0	$42^{\pm 0,15}$	6,6	16	M6	0,41
FWBG-30	30	76	30	49,5	$54^{\pm 0,25}$	9,0	19	M8	0,75
FWBG-40	40	96	40	65,0	$68^{\pm 0,25}$	11,0	26	M10	1,65
FWBG-50	50	106	50	75,0	$75^{\pm 0,25}$	11,0	36	M10	2,60

- suitable precision steel shafts, see section V
- dimensions A, L, D, V tolerances to DIN 1686 - GTB 15

Tolerance zones for internal (hole) dimensions (H15 through H5)

Dimensions in mm

Basic Size		H15	H14	H13	H12	H11	H10	H9	H8	H7	H6	H5
Over	6	+0,580	+0,360	+0,220	+0,150	+0,090	+0,058	+0,036	+0,022	+0,015	+0,009	+0,006
To	10	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	10	+0,700	+0,430	+0,270	+0,180	+0,110	+0,070	+0,043	+0,027	+0,018	+0,011	+0,008
To	14	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	14	+0,700	+0,430	+0,270	+0,180	+0,110	+0,070	+0,043	+0,027	+0,018	+0,011	+0,008
To	18	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	18	+0,840	+0,520	+0,330	+0,210	+0,130	+0,084	+0,052	+0,033	+0,021	+0,013	+0,009
To	24	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	24	+0,840	+0,520	+0,330	+0,210	+0,130	+0,084	+0,052	+0,033	+0,021	+0,013	+0,009
To	30	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	30	+1,000	+0,620	+0,390	+0,250	+0,160	+0,100	+0,062	+0,039	+0,025	+0,016	+0,011
To	40	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	40	+1,000	+0,620	+0,390	+0,250	+0,160	+0,100	+0,062	+0,039	+0,025	+0,016	+0,011
To	50	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	50	+1,200	+0,740	+0,460	+0,300	+0,190	+0,120	+0,074	+0,046	+0,030	+0,019	+0,013
To	65	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	65	+1,200	+0,740	+0,460	+0,300	+0,190	+0,120	+0,074	+0,046	+0,030	+0,019	+0,013
To	80	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	80	+1,400	+0,870	+0,540	+0,350	+0,220	+0,140	+0,087	+0,054	+0,035	+0,022	+0,015
To	100	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	100	+1,400	+0,870	+0,540	+0,350	+0,220	+0,140	+0,087	+0,054	+0,035	+0,022	+0,015
To	120	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	120	+1,600	+1,000	+0,630	+0,400	+0,250	+0,160	+0,100	+0,063	+0,040	+0,025	+0,018
To	140	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	140	+1,600	+1,000	+0,630	+0,400	+0,250	+0,160	+0,100	+0,063	+0,040	+0,025	+0,018
To	160	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	160	+1,600	+1,000	+0,630	+0,400	+0,250	+0,160	+0,100	+0,063	+0,040	+0,025	+0,018
To	180	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Over	180	+1,850	+1,150	+0,720	+0,460	+0,290	+0,185	+0,115	+0,072	+0,046	+0,029	+0,020
To	200	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Tolerance zones for external (shaft) dimensions (h15 through h5)

Dimensions in mm

Basic Size		h15	h14	h13	h12	h11	h10	h9	h8	h7	h6	h5
Over	6	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	10	-0,580	-0,360	-0,220	-0,150	-0,090	-0,058	-0,036	-0,022	-0,015	-0,009	-0,006
Over	10	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	14	-0,700	-0,430	-0,270	-0,180	-0,110	-0,070	-0,043	-0,027	-0,018	-0,011	-0,008
Over	14	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	18	-0,700	-0,430	-0,270	-0,180	-0,110	-0,070	-0,043	-0,027	-0,018	-0,011	-0,008
Over	18	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	24	-0,840	-0,520	-0,330	-0,210	-0,130	-0,084	-0,052	-0,033	-0,021	-0,013	-0,009
Over	24	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	30	-0,840	-0,520	-0,330	-0,210	-0,130	-0,084	-0,052	-0,033	-0,021	-0,013	-0,009
Over	30	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	40	-1,000	-0,620	-0,390	-0,250	-0,160	-0,100	-0,062	-0,039	-0,025	-0,016	-0,011
Over	40	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	50	-1,000	-0,620	-0,390	-0,250	-0,160	-0,100	-0,062	-0,039	-0,025	-0,016	-0,011
Over	50	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	65	-1,200	-0,740	-0,460	-0,300	-0,190	-0,120	-0,074	-0,046	-0,030	-0,019	-0,013
Over	65	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	80	-1,200	-0,740	-0,460	-0,300	-0,190	-0,120	-0,074	-0,046	-0,030	-0,019	-0,013
Over	80	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	100	-1,400	-0,870	-0,540	-0,350	-0,220	-0,140	-0,087	-0,054	-0,035	-0,022	-0,015
Over	100	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	120	-1,400	-0,870	-0,540	-0,350	-0,220	-0,140	-0,087	-0,054	-0,035	-0,022	-0,015
Over	120	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	140	-1,600	-1,000	-0,630	-0,400	-0,250	-0,160	-0,100	-0,063	-0,040	-0,025	-0,018
Over	140	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	160	-1,600	-1,000	-0,630	-0,400	-0,250	-0,160	-0,100	-0,063	-0,040	-0,025	-0,018
Over	160	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	180	-1,600	-1,000	-0,630	-0,400	-0,250	-0,160	-0,100	-0,063	-0,040	-0,025	-0,018
Over	180	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
To	200	-1,850	-1,150	-0,720	-0,460	-0,290	-0,185	-0,115	-0,072	-0,046	-0,029	-0,020

An economic and proven solution to many linear bearing applications is the use of hardened and ground shafts (solid or tubular) offered in various materials and finishes, together with recirculating linear ball bushes, linear housings, shaft mounting blocks, continuous shaft supports. Our precision shafts are induction hardened. This ensures a constant degree of hardness along the ball-ways, as well as the rest of the shaft surface, in both the radial and axial direction. This induction process provides an effective hardened zone all over the shaft surface whilst leaving the core unhardened. This facilitates subsequent machining. The shafts are centerless ground and are then tested rigorously for straightness and roundness of the cylindrical form, as well as for surface finish. Please select the shaft-type best suited to your application.

Selection criteria for solid or tubular linear bearing shafts

your special requirements	our type	material + finish	surface hardness	tolerance of outer ∅	sizes avail. ∅	see page
- very high surface hardness - all machining examples on page 75 can be carried out - no special corrosion	**WV**	solid shafts induction-hardened + precision-ground Cf 53 (1.1213)	62 +/- 2 HRC	h6	3 - 120 mm ∅	73
- outside diameter hardened and approx. 10 µm hard-chrome plated - all machining examples on page 75 can be carried out - considerable corrosion resistance	**WV 1**	hard chrome plated solid shafts induction-hardened + precision-ground Cf 53 Cr (1.1213)	900-1100 HV	h7	3 - 120 mm ∅	73
- high surface hardness - all machining examples on page 75 can be carried out - considerable corrosion resistance	**WRS 1**	solid shafts induction-hardened + precision-ground X46Cr13 (1.4034)	rust-resistant 53 +/- 2 HRC	h6	5 - 60 mm ∅	74
- high surface hardness - all machining examples on page 75 can be carried out - considerable corrosion resistance	**WRS 2**	"stainless" steel" solid shafts induction-hardened + precision-ground X90CrMoV18 (1.4112)	54 +/- 2 HRC	h6	5 - 60 mm ∅	74
- very high surface hardness - all machining examples on page 75 can be carried out - low weight - cables and fluids can be fed through - no corrosion resistance	**WH**	hollow/tubular shafts, induction-hardened + precision-ground C60 (1.0601)	62 +/- 2 HRC	h6	12 - 100 mm ∅	74

	WV	WV1	WRS1	WRS2	WH
Roundness	1/2 tolerance of diameter				
Straightness per DIN ISO 13012	∅ 5 - 6 mm = 0,15/1000 mm · ∅ 8 - 10 mm = 0,12/1000 mm · from ∅ 12 mm = 0,10/1000 mm				
Surface	Ra ≤ 0,3 µm				

WV solid steel shafts, induction hardened to HRC 62±2, material spec. CF-53 (1.1213))
WV 1 solid shafts, hard-chrome plated approx. 10 µm thickness, hardness HV 900/1100, material spec. CF-53 (1.1213)

shaft diameter ∅	weight per meter	shaft material code	production length max.	hardness depth Rht (max.)**	standard tolerance ISO h6
mm	kg	WV	mm	mm	µm
5	0,154	**WV - 5**	3.900	0,4 - 0,8	0 - 8
6	0,222	**WV - 6**	6.000	0,4 - 0,8	0 - 8
8	0,395	**WV - 8**	6.200	0,4 - 1,0	0 - 9
10	0,617	**WV - 10**	6.200	0,4 - 1,0	0 - 9
12	0,888	**WV - 12**	6.200	0,6 - 1,0	0 - 11
14	1,208	**WV - 14**	6.200	0,6 - 1,3	0 - 11
15	1,387	**WV - 15**	6.100	0,6 - 1,3	0 - 11
16	1,578	**WV - 16**	7.200	0,6 - 1,5	0 - 11
18	1,998	**WV - 18**	6.200	0,6 - 1,5	0 - 11
20	2,466	**WV - 20**	7.200	0,9 - 1,5	0 - 13
22	2,984	**WV - 22**	4.200	0,9 - 1,5	0 - 13
24	3,551	**WV - 24**	6.000	0,9 - 1,5	0 - 13
25	3,853	**WV - 25**	7.800	0,9 - 1,7	0 - 13
30	5,549	**WV - 30**	7.800	0,9 - 1,7	0 - 13
32	6,313	**WV - 32**	7.800	1,5 - 2,0	0 - 16
35	7,553	**WV - 35**	7.800	1,5 - 2,0	0 - 16
36	7,99	**WV - 36**	7.800	1,5 - 2,0	0 - 16
40	9,865	**WV - 40**	7.800	1,5 - 2,0	0 - 16
45	12,48	**WV - 45**	7.800	1,5 - 2,6	0 - 16
50	15,41	**WV - 50**	7.800	1,5 - 2,6	0 - 16
60	22,2	**WV - 60**	7.800	2,2 - 3,0	0 - 19
70	30,21	**WV - 70**	7.800	2,2 - 3,0	0 - 19
80	39,46	**WV - 80**	7.800	2,2 - 3,0	0 - 19
100	61,65	**WV - 100**	7.800	3,0 - 3,6	0 - 22
		WV 1			**ISO h7**
5	0,154	**WV 1 - 5**	2.000	0,4 - 0,8	0 - 12
6	0,222	**WV 1 - 6**	3.900	0,4 - 0,8	0 - 15
8	0,395	**WV 1 - 8**	3.900	0,4 - 1,0	0 - 15
10	0,617	**WV 1 - 10**	6.200	0,4 - 1,0	0 - 18
12	0,888	**WV 1 - 12**	6.200	0,6 - 1,0	0 - 18
14	1,208	**WV 1 - 14**	6.200	0,6 - 1,3	0 - 18
15	1,387	**WV 1 - 15**	6.100	0,6 - 1,3	0 - 18
16	1,578	**WV 1 - 16**	7.200	0,6 - 1,5	0 - 18
20	2,466	**WV 1 - 20**	7.200	0,6 - 1,5	0 - 21
24	3,551	**WV 1 - 24**	6.000	0,9 - 1,5	0 - 21
25	3,853	**WV 1 - 25**	7.800	0,9 - 1,7	0 - 21
30	5,549	**WV 1 - 30**	7.800	0,9 - 1,7	0 - 21
32	6,313	**WV 1 - 32**	6.000	1,5 - 2,0	0 - 21
35	7,553	**WV 1 - 35**	6.000	1,5 - 2,0	0 - 25
40	9,865	**WV 1 - 40**	7.800	1,5 - 2,0	0 - 25
50	15,41	**WV 1 - 50**	7.800	1,5 - 2,6	0 - 25
60	22,2	**WV 1 - 60**	7.800	2,2- 3 ,0	0 - 25
80	39,46	**WV 1 - 80**	7.800	2,2- 3 ,0	0 - 30

- other diameters and materials to be inquired
- ** depending on lots. the precision shafts up to ∅10mm can be throughhardened.
- The Rht is defined by DIN ISO 13012. We will be pleased to provide details if required.
- The borderhardnessdepth is the depth, where the hardness is at least 80% of the surfacehardness.

WRS 1 rust and acid resistant, HRC 51-55, material spec. X46Cr13 (1.4034)
WRS 2 “stainless” st. acid resistant, HRC 52-56, material spec. X90CrMoV18 (1.4112)
WH hollow/tubular shafts, induction hardened HRC 62±2 , material spec. C60 (1.0601)

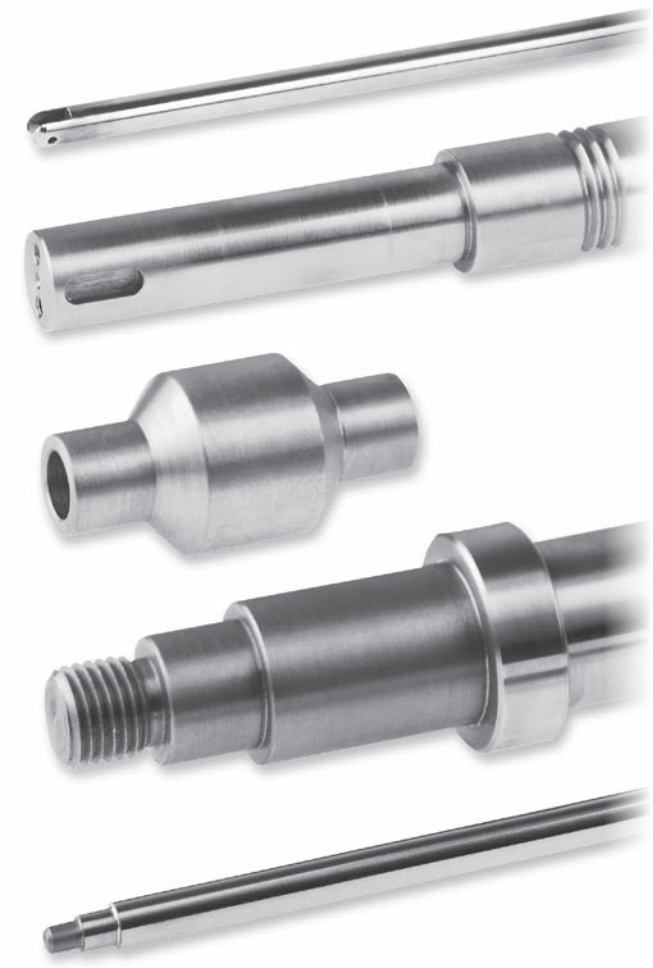
shaft diameter ∅	inside diameter*	weight per Meter	shaft material code	prduction length max.	hardness depth (max)**	standard tolerance ISO h6
mm	mm	kg	WRS 1	mm	mm	µm
5		0,154	**WRS 1 - 5**	1.000	0,4 - 0,8	0 - 8
6		0,222	**WRS 1 - 6**	3.900	0,4 - 0,8	0 - 8
8		0,395	**WRS 1 - 8**	3.900	0,4 - 1,0	0 - 9
10		0,617	**WRS 1 - 10**	3.900	0,4 - 1,0	0 - 9
12		0,888	**WRS 1 - 12**	4.900	0,6 - 1,0	0 - 11
14		1,208	**WRS 1 - 14**	4.900	0,6 - 1,3	0 - 11
15		1,387	**WRS 1 - 15**	4.900	0,6 - 1,3	0 - 11
16		1,578	**WRS 1 - 16**	4.900	0,6 - 1,5	0 - 11
20		2,466	**WRS 1 - 20**	4.900	0,9 - 1,5	0 - 13
25		3,853	**WRS 1 - 25**	4.900	0,9 - 1,7	0 - 13
30		5,549	**WRS 1 - 30**	4.900	0,9 - 1,7	0 - 13
40		9,865	**WRS 1 - 40**	4.900	1,5 - 2,0	0 - 16
50		15,41	**WRS 1 - 50**	4.900	1,5 - 2,6	0 - 16
60		22,2	**WRS 1 - 60**	4.900	2,2 - 3,0	0 - 19
			WRS 2			
3		0,055	**WRS 2 - 3**	200	through hardened	0 - 6
4		0,098	**WRS 2 - 4**	200	through hardened	0 - 8
5		0,154	**WRS 2 - 5**	3.800	0,4 - 0,8	0 - 8
6		0,222	**WRS 2 - 6**	3.800	0,4 - 0,8	0 - 8
8		0,395	**WRS 2 - 8**	3.800	0,4 - 1,0	0 - 9
10		0,617	**WRS 2 - 10**	3.800	0,4 - 1,0	0 - 9
12		0,888	**WRS 2 - 12**	7.800	0,6 - 1,0	0 - 11
14		1,208	**WRS 2 - 14**	7.800	0,6 - 1,3	0 - 11
15		1,387	**WRS 2 - 15**	7.800	0,6 - 1,3	0 - 11
16		1,578	**WRS 2 - 16**	7.800	0,6- 1,5	0 - 11
20		2,466	**WRS 2 - 20**	7.800	0,9 - 1,5	0 - 13
25		3,853	**WRS 2 - 25**	7.800	0,9 - 1,7	0 - 13
30		5,549	**WRS 2 - 30**	7.800	0,9 - 1,7	0 - 13
40		9,865	**WRS 2 - 40**	7.800	1,5 - 2,0	0 - 16
50		15,41	**WRS 2 - 50**	7.800	1,5 - 2,6	0 - 16
60		22,2	**WRS 2 - 60**	7.800	2,2 - 3,0	0 - 19
			WH			
12	4	0,79	**WH - 12**	6.000	0,6 - 1,0	0 - 11
16	7	1,28	**WH - 16**	6.000	0,6 - 1,5	0 - 11
20	14	1,25	**WH - 20**	6.000	0,9 - 1,5	0 - 13
25	15,6	2,35	**WH - 25**	6.000	0,9 - 1,7	0 - 13
30	18,3	3,5	**WH - 30**	6.000	0,9 - 1,7	0 - 13
40	28	4,99	**WH - 40**	6.000	1,5 - 2,0	0 - 16
50	29,7	9,91	**WH - 50**	6.000	1,5 - 2,6	0 - 16
60	36	14,2	**WH - 60**	6.000	2,2 - 3,0	0 - 19
80	57	19,43	**WH - 80**	6.000	2,2 - 3,0	0 - 19

- other diameters and materials to be inquired
- *standardvalue, we reserve the option to deliver other inner-diameters depending on raw-material lots.
- **depending on lots. the precision shafts up to ∅10mm can be throughhardened.
- The Rht is defined by DIN 50190. We will be pleased to provide details if required.
- The borderhardnessdepth is the depth, where the hardness is at least 80% of the surfacehardness.

Machined hardened and ground precision shafts

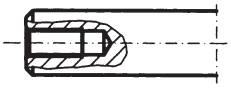
Please take advantage of our machining facilities, your overall costs will be lower if you use our "ready-to-install" precision shafts.

We specialise in machining induction hardened shafts. Using modern CNC machines we can supply finish-machined shaft units: eg: cyl. dias, chamfers, radial or axial drilled and tapped bores.

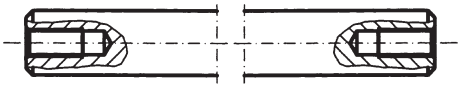


Machining examples

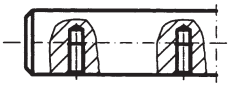
version 1AX – axial thread on one end



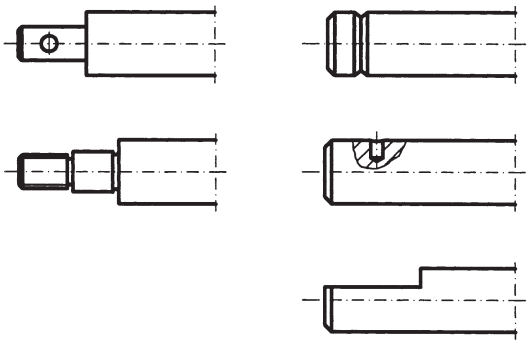
version 2AX – axial thread on both ends



version T1 or T2 – radial hole pattern T1 or T2



version Z – end machining per drawing



Shafts may be annealed depending on the hardnesszone and the required machining.

We will machine your shafts to your specification or drawing!

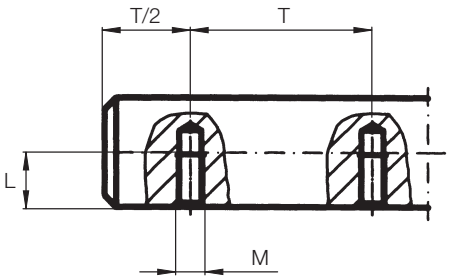
Standard machining options for Precision Shafts WV, WV1, WRS1, WRS2 + WH

Axial threads

option 1AX (axial thread on one end) / option 2AX (axial thread on both ends)

shaft-∅, mm	thread	deapth
8	M4	10 mm
10	M4	10 mm
12	M5	12 mm
14	M5	12 mm
16	M6	15 mm
20	M8	20 mm
25	M10	25 mm
30	M10	25 mm
40	M12	30 mm
50	M16	40 mm
60	M20	50 mm
80	M24	60 mm

For special threads, depth etc. please add the suffix “Z” instead of 1AX/ 2AX and indicate the specification.



Radial Hole Pattern

T1, T2, T3, Z (special, according to customer drawing)

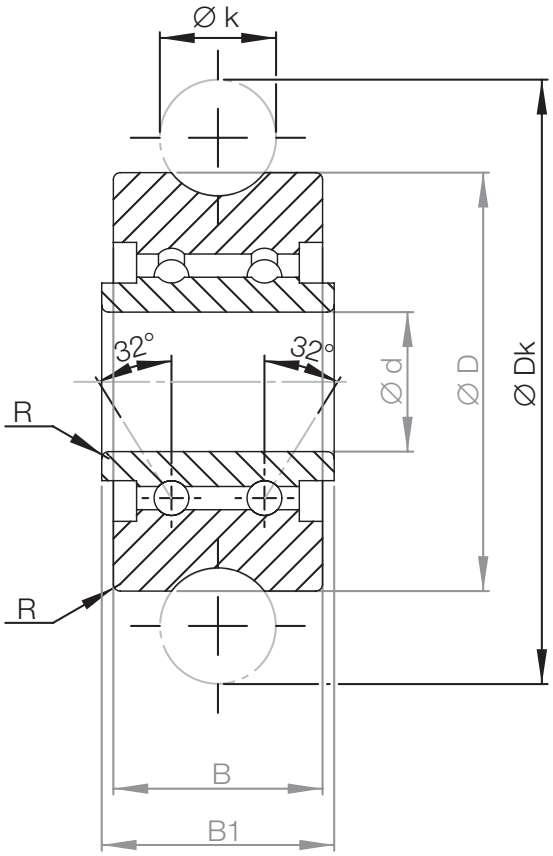
shaft-∅, mm	M	L	T1	T2	T3
12	M4	8	75 mm	120 mm	75 mm
16	M5	9,5	100 mm	150 mm	75 mm
20	M6	13	100 mm	150 mm	75 mm
25	M8	14	120 mm	200 mm	75 mm
30	M10	18	150 mm	200 mm	100 mm
40	M10	20	200 mm	300 mm	100 mm
50	M12	23	300 mm	-	-

For special threads or hole patterns etc. please add the suffix “Z” instead of T1/ T2/ T3 and indicate the specification.
Sinking of the thread depending on the hardnessdepth of the shaft.

Ordering code

WV–	∅ 20–	h6–	2500–	T2–	
material (WV, WV1, WRS1, WRS2, WH)	shaft diameter in mm	outside diameter tolerance please refer to page 76	shaft length	T1	T1-hole pattern
				T2	T2-hole pattern
				1AX	axial thread on one end
				2AX	axial thread on both ends
				Z	per drawing/other specification

If no further requirements are made, all shafts will be chamfered, ca. 1x45°.



RODRIGUEZ® Trackrollers of the R-series are an interesting and economical addition to known linear guides. They can especially be used, in simple movements, when radial and slight axial forces are applied. Further they offer low noise performance, high speeds and continuous and low start- and running torques. Integration into existing and new machines can be realised easily. Centrical and excentrical pins are available.

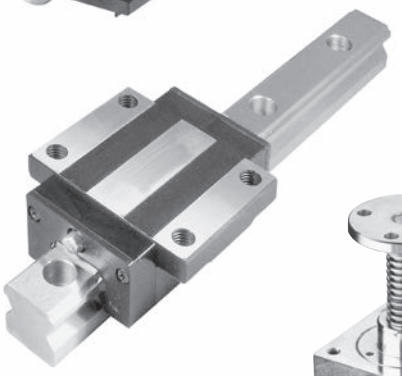
Dimensions in mm

							load capacity [N][1]		
Part-No.	k	d	D	Dk	B	B1	C dyn.	C0 stat.	weight [kg]
R50/5-6ZZ	6	5	17	27	7	8	890	1.610	0,01
R50/8-6ZZ	6	8	24	34	11	11	2.280	4.100	0,02
R5201-10ZZ	10	12	35	51,3	15,9	15,9	5.100	8.500	0,08
R5301-10ZZ	10	12	42	58	19	19	7.700	13.000	0,10
R5302-10ZZ	10	15	47	63,3	19	19	9.200	14.500	0,17
R5201-12ZZ	12	12	35	55,5	15,9	15,9	5.000	8.300	0,08
R5204-16ZZ	16	20	52	79	20,6	$22,6^{-2}$	9.500	14.600	0,23
R5206-20ZZ	20	25	72	102	23,8	$25,8^{-2}$	16.600	23.400	0,25
R5206-25ZZ	25	25	72	112	23,8	$25,8^{-2}$	16.400	23.100	0,25
R5207-30ZZ	30	30	80	132	27	29^{-2}	20.800	28.500	0,66
R5208-40ZZ	40	40	98	165	36	36^{-2}	29.000	38.500	1,36

[1] Load applies in radial direction
Version with seals 2RS to be inquired

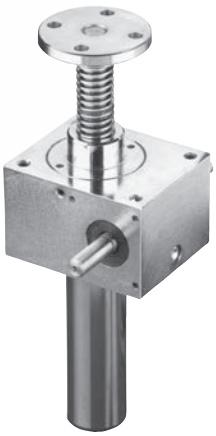
Linear Motors
with complete accessories

Linear Guideways



Roller-Guideways
for heavy-load applications

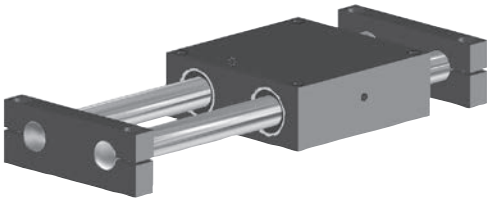
Worm Drives
2.5 KN - 500 KN load capacity



Ballscrews
rolled, ground or whirled,
individual nut specification

Trapezoidal screws
nuts from resin,
brass, steel

Linear Actuators
up to 1200 mm stroke



Roundrail - Inchrange includes all
standard linear ballbushings and
accessories in inch

Linear Systems, X-Y-Z
available with motor, controller etc.

For more than 65 years Rodriguez® with its knowledge and expertise has been one of the leading suppliers worldwide of thin-section bearings, linear technology, precision roller bearings, custom bearings and components for various industrial applications. As technology progresses, the demand for the highest quality construction is greater than ever, resulting in the need for the best component selection, application engineering and customer-specific roller bearing technology. Due to their ability to meet these requirements, Rodriguez® delivers to the most important industrial sections, among

Driving technology
Automation
Printing machinery
Electronic
Automotive
Precision mechanics
Semiconductor industry
Wood working machinery
Plastic technology
Food industry
Aircraft and aerospace
Mechanical engineering
Medical devices
Testing equipment
Assembly
Optics
Robotics
Packaging technology
Machine tools

RODRIGUEZ® has realised very quickly that automatic repetitive motions require for more and more precise components. Customer objective and subsequently the consulting, research, development and manufacturing is the key qualification. Our belief is that only those who know the details are able to produce complex construction solutions. Therefore we have theoretically and practically elaborated the preconditions for a successful engineer consulting for all matters of roller bearings together with our partners.

And: Practised customer proximity and high flexibility are of course of the same value to us as a perfect customer service.

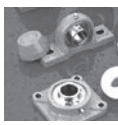
Reali Slim Bearings

Precision Bearings for Machine Tools and Indexing Tables

Linearcomponents/-systems/-motors

Special Bearings

Stainless Steel & Thermoplastic Bearing Housings



Ball Units

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Precision in Motion®

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