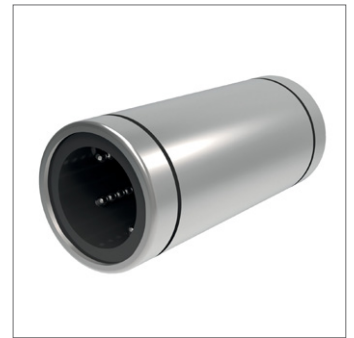
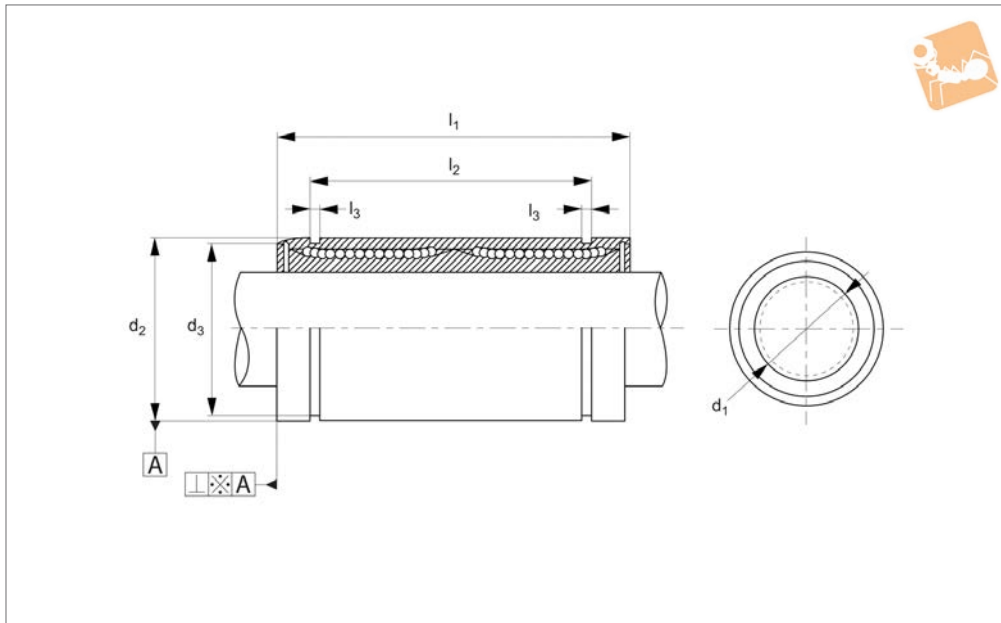




# Long Linear Ball Bushings

double length

# Linear Bearings



**L1712**

LINEAR BEARINGS

### Material

Hardened and ground body from bearing steel.

Single body resin retainer (POM).

Supplied with nitrile rubber (NBR) end-seals -UU as standard.

### Technical Notes

For use with hardened shafts only (see part

nos. L1770 - L1772) - tolerance h6.

Perpendicularity A is better than 15 $\mu$ .

Temperature range: -20°C to +80°C.

Steel ball retainers can be supplied for higher temperature applications up to +120°C - with no end seals. Please advise at time of ordering if this is required.

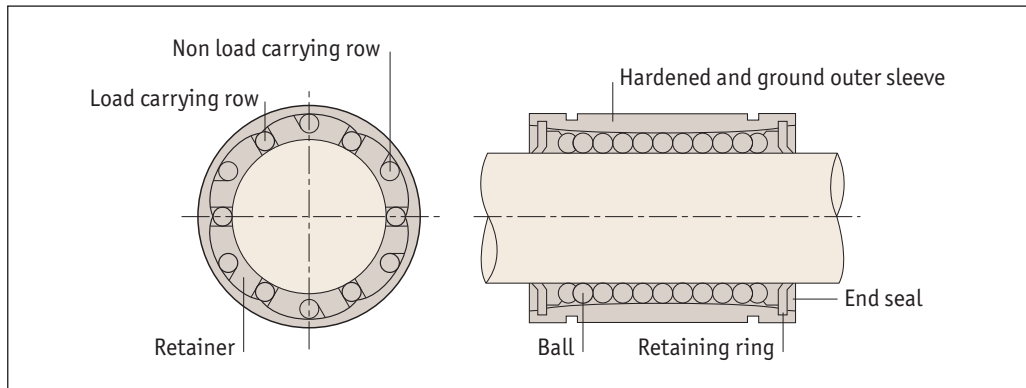
### Tips

Nickel plated version with stainless steel balls (for corrosion resistance) on request - or stainless steel version no. L1713.

Order No.	d <sub>1</sub> tol. h6	d <sub>2</sub> tol. h6	l <sub>1</sub>	d <sub>3</sub>	l <sub>2</sub>	l <sub>3</sub>	No. of ball circuits	Dyn. load C N max.	Static load C <sub>0</sub> N max.	Weight g
L1712.008	8	16	45	15.2	33.0	1.10	4	430	780	31
L1712.012	12	22	57	21.0	45.8	1.30	4	650	1200	80
L1712.012-1	12	22	61	21.0	45.8	1.30	4	830	1600	80
L1712.016	16	26	70	24.9	49.8	1.30	5	1230	2350	145
L1712.020	20	32	80	30.3	61.0	1.60	5	1400	2750	180
L1712.025	25	40	112	38.0	82.0	1.85	6	1560	3140	440
L1712.030	30	47	123	44.5	104.2	1.85	6	2490	5490	580
L1712.040	40	62	154	59.0	121.2	2.15	6	3430	8040	1170
L1712.050	50	75	192	72.0	155.2	2.65	6	6080	15900	3100
L1712.060	60	90	211	86.5	170.0	3.15	6	7650	20000	3500



### Linear ball bushings



#### Applications

- Computers and peripheral equipment.
- Recording equipment.
- Linear motion systems.
- Multi-axis drilling machine.
- Printing machines.
- Food packaging machines.
- Punching presses.
- Tool grinders.
- Assembly systems.
- Card selectors.

#### Interchangeability

Our linear bushing systems are designed to have full interchangeability, with other manufacturers' parts. **For shafting see part numbers L1770 to L1785.**

#### High precision retainer

The single body retainer guides 4-6 ball circuits. It precisely guides the balls with a smooth motion.

#### Tolerance of housing bore

Normal fit is standard, pressed fit is for without clearance.

Type	Case	
	Normal fit	Pressed fit
Part no.		
L1706 to L1733	H7	K6, J6
L1706... <sup>-1</sup> to L1733... <sup>-1</sup>	H7	J7

#### Rigid outer sleeve

The hardened and precisely ground outer sleeve is made of bearing steel.

#### L1750 bushing carriages

Consists of light aluminium case and L1706 type linear bushing, so the installation can be finished simply by bolting. Longer life can be obtained by adjusting the orientation of the ball circuits in the linear carriage element against the direction of load.

#### Tolerance of shaft

Type	Shaft	
	Normal fit	Tight fit
Part no.		
L1706 to L1733	h6	k6
L1706... <sup>-1</sup> to L1733... <sup>-1</sup>	f6, g6	h6



# Technical Information

## Load rating important information



### Basic dynamic load rating C

The basic dynamic load rating is defined as the constant load both in direction and magnitude under which a group of identical linear bushings are individually operated. 90% of the units can travel 50KM without failing due to rolling contact fatigue.

### Basic static load rating C<sub>0</sub>

If a linear bushing is subject to an excessive load or impact, a permanent deformation occurs between the raceway and the rolling element. The basic static load rating is defined as the static load that gives a prescribed constant contact stress at the centre of the contact area between the rolling element and raceway receiving the maximum load.

### Relationships between load ratings and the position of ball circuits

Load ratings of linear bushing are affected by the position of the ball circuits as shown below.

Load ratings and orientation of balls.

No of ball rows	Orientation of balls	
	Maximum load rating	Minimum load rating
4		
	$F = 1.41 \times C$	$F = C$
5		
	$F = 1.46 \times C$	$F = C$
6		
	$F = 1.26 \times C$	$F = C$



When designing a linear motion system it is necessary to consider how the application will affect performance. The following examples demonstrate how the position of the load and the centre of gravity can influence product selection. When evaluating your application, review each of the forces acting on your system and determine the product that best suits your needs.

#### Horizontal application

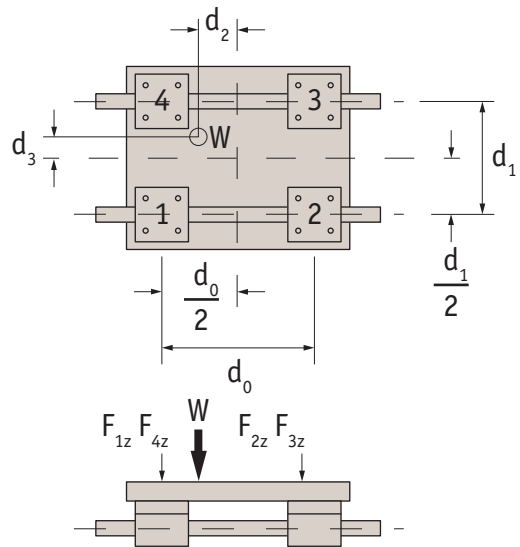
For uniform speed or when stopped.

$$F_{1z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{2z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{3z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{4z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$



#### Horizontal application

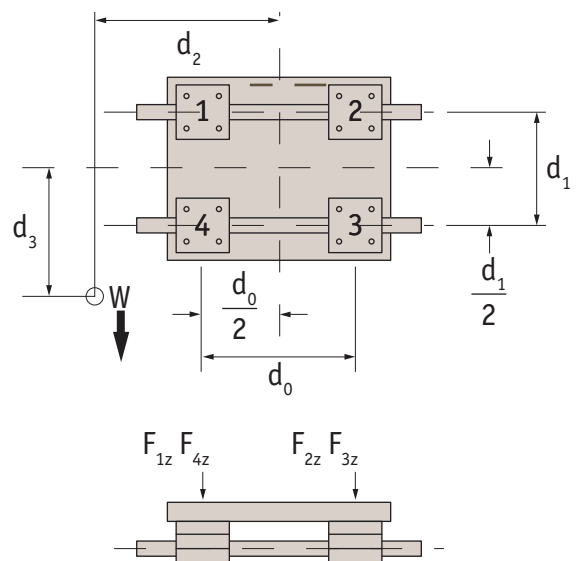
For uniform speed or when stopped.

$$F_{1z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{2z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{3z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{4z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$





$$F_{1Y} \sim F_{4Y} = \left( \frac{W}{2} \cdot \frac{d_3}{d_0} \right)$$

$$F_{1Z} = F_{4Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$

$$F_{2Z} = F_{3Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$

### Side mounted application

For uniform speed or when stopped.

$$F_{1X} \sim F_{4X} = \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$

$$F_{1Y} \sim F_{4Y} = \left( \frac{W}{2} \cdot \frac{d_3}{d_0} \right)$$

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

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

### Vertical application

For uniform speed or when stopped. On start up/stop the load varies due to inertia in the system.