L1708

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 TA is better than 15μ.

For part numbers with $^{-1}$ shaft tolerance required is g6. Temperature range: -20°C to +80°C.
Steel ball retainers can be supplied for higher temperatures applications up to 120°C - with no end seals. Please advise at time of ordering if this is required.

Tips
d_2 is the dimension before the bush has

been slotted. Superball linear bearings are also available (3 x load rating of standard bushings and 27 x travel life see part nos. L1740 and L1742.)
Nickel plated version with stainless steel balls (for corrosion resistance) on request - or stainless steel version no. L1711.

Order No.	d_1 tol. h6	d_2 tol. h6	l_1	d_3	l_2	l_3	w_1	No. of ball circuits	Dyn. load C N max.	Static load C_0 N max.	Weight g
L1708.005	5	12	22	11.5	14.5	1.10	1.0	4	200	260	12
L1708.006-1	6	12	19	11.5	13.5	1.10	1.0	4	200	260	8
L1708.008	8	16	25	15.2	16.5	1.10	1.0	4	260	400	20
L1708.010-1	10	19	29	18.0	22.0	1.30	1.0	4	370	540	30
L1708.012	12	22	32	21.0	22.9	1.30	1.5	4	410	590	41
L1708.016	16	26	36	24.9	24.9	1.30	1.5	5	770	1170	57
L1708.020	20	32	45	30.3	31.5	1.60	2.0	5	860	1370	91
L1708.025	25	40	58	37.5	44.1	1.85	2.0	6	980	1560	215
L1708.030	30	47	68	44.5	52.1	1.85	2.0	6	1560	2740	325
L1708.040	40	62	80	59.0	60.6	2.15	3.0	6	2150	4010	705
L1708.050	50	75	100	72.0	77.6	2.65	3.0	6	3820	7930	1130
L1708.060	60	90	125	86.0	101.7	3.15	3.0	6	4700	9990	2220

Linear ball bushings
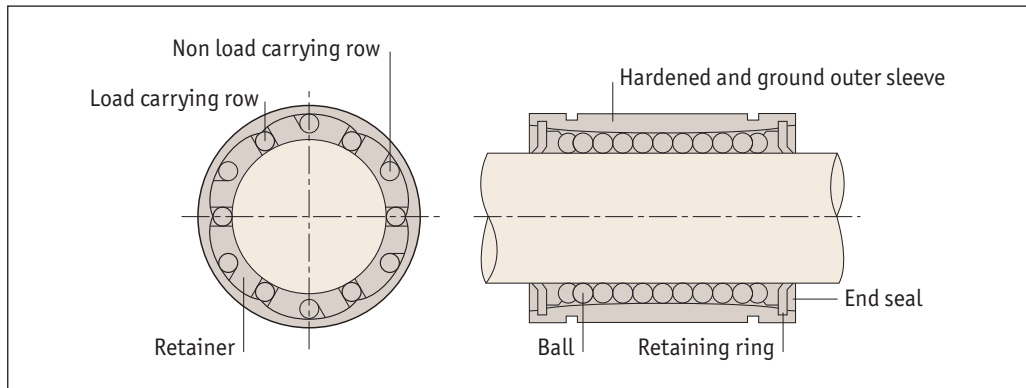
Applications

- 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	
Part no.	Normal fit	Pressed fit
L1706 to L1733	H7	K6, J6
L1706...$^{-1}$ to L1733...$^{-1}$	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	
Part no.	Normal fit	Tight fit
L1706 to L1733	h6	k6
L1706...$^{-1}$ to L1733...$^{-1}$	f6, g6	h6

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_0

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.

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

Load ratings and orientation of balls.

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.
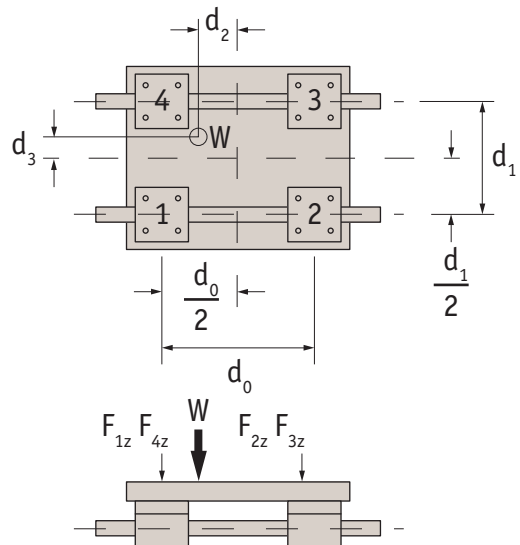
Horizontal application

For uniform speed or when stopped.

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

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

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

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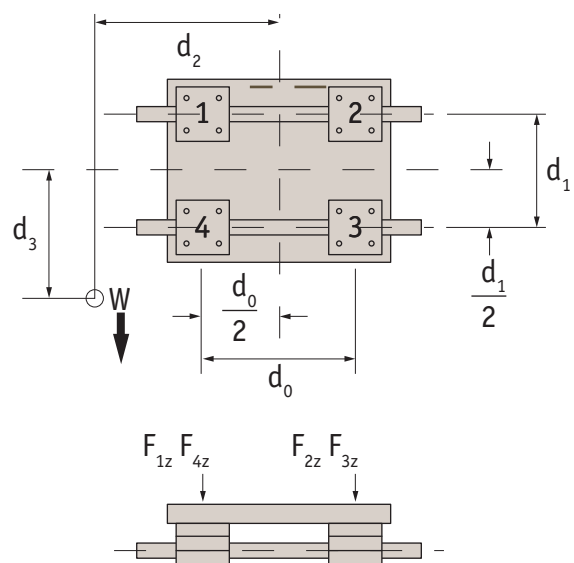
Horizontal application

For uniform speed or when stopped.

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

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

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

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

Side mounted application

For uniform speed or when stopped.

$$F_{1Y} \sim F_{4Y} = \left(\frac{W}{2} \cdot \frac{d_3}{d_0} \right) \qquad F_{1Z} = F_{4Z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$

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

Vertical application

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

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

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

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

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

LINEAR BEARINGS