

L1870

BEARING MOUNTS

Material

Stainless steel (AISI 304), with smooth surfaces. Bearing stainless steel (440C) with 2RS seals, lubricated with food grade grease (USDA approved).

Technical Notes

Self-aligning bearing units.
Temperature range for bearings: -15°C to

+120°C.

Resistant to a moisture and a wide range of aggressive chemicals.

For optional shaft end caps add suffixes:

-C0 for two open protective caps (with seals) for through shafts.

-CC for one open and one closed protective caps for shaft ends.

Tips

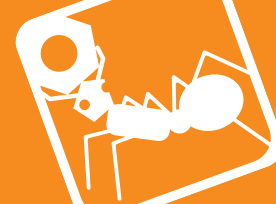
Shaft retention with two set screws (at 120° offset).

Used with h6 tolerance shafts (see our part no.s L1770-L1776).

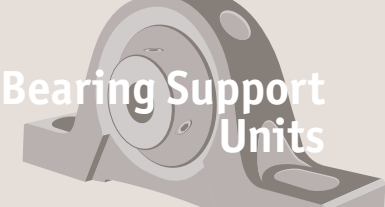
Maximum housing loads measured @ 20°C.

Order No.	d ₁ for h6	l ₁	d ₂	d ₃	d ₄	h ₁	h ₂ +0 -0.8	h ₃	l ₂	w ₁	w ₂	w ₃	w ₄	Weight kg
L1870.012	12	126	54	13	19	33.3	65	15	95	31.0	38	12.7	45.6	0.83
L1870.015	15	126	54	13	19	33.3	63	15	95	31.0	38	12.7	45.6	0.80
L1870.017	17	126	54	13	19	33.3	65	15	95	31.0	38	12.7	45.6	0.84
L1870.020	20	126	54	13	19	33.3	65	15	95	31.0	38	12.7	45.6	0.82
L1870.025	25	140	60	13	19	36.5	70	16	105	34.1	38	14.3	47.8	0.95
L1870.030	30	165	70	17	21	42.9	83	18	121	38.1	48	15.9	52.8	1.58
L1870.035	35	167	80	17	21	47.6	94	19	127	42.9	48	17.5	57.4	1.95
L1870.040	40	184	88	17	23	49.2	100	19	136	49.2	54	19.0	66.8	2.39
L1870.045	45	190	95	17	23	54.0	109	20	146	49.2	54	19.0	67.8	2.72
L1870.050	50	206	100	20	25	57.2	114	22	159	51.6	60	19.0	75.6	3.28
L1870.055	55	219	110	20	25	63.5	126	23	171	55.6	60	22.2	75.2	4.12
L1870.060	60	241	120	20	25	69.8	138	25	184	65.1	70	25.4	87.8	5.71

Order No.	Speed rpm max.	Dyn. load C kN max.	Static bearing load C ₀ kN max.	Housing load F ₁ kN max.	Housing load F ₆ kN max.	Housing load F ₂ kN max.	Housing load F ₃ kN max.	Torque screw to Nm	Housing load F ₄ kN max.	Housing load F ₅ kN max.	Set screw size
L1870.012	4800	10.1	6.8	160	34	66	110	8.5	50	160	M 6x1
L1870.015	4800	10.1	6.8	160	34	66	110	8.5	50	160	M 6x1
L1870.017	4800	10.1	6.8	160	34	66	110	8.5	50	160	M 6x1
L1870.020	4800	10.1	6.8	160	34	66	110	8.5	50	160	M 6x1
L1870.025	4000	11.0	8.0	180	36	74	120	8.5	56	180	M 6x1
L1870.030	3400	15.3	11.5	240	44	100	180	8.5	70	240	M 6x1



Order No.	Speed rpm max.	Dyn. load C kN max.	Static bearing load C ₀ kN max.	Housing load F ₁ kN max.	Housing load F ₆ kN max.	Housing load F ₂ kN max.	Housing load F ₃ kN max.	Torque screw to Nm	Housing load F ₄ kN max.	Housing load F ₅ kN max.	Set screw size
L1870.035	3000	20.1	15.6	320	48	120	200	20	88	320	M 8x1
L1870.040	2600	22.8	18.2	360	50	130	220	20	90	360	M 8x1
L1870.045	2400	25.7	20.8	380	52	140	240	40	98	380	M 10x1,25
L1870.050	2200	27.5	23.7	380	64	150	280	40	110	380	M 10x1,25
L1870.055	1800	34.0	25.5	475	80	191	350	40	262	475	M 10x1,25
L1870.060	1600	41.0	31.5	587	99	236	433	40	324	587	M 10x1,25



Housing material options



Cast iron housing

Standard version, passivated and painted $\varnothing 12-120\text{mm}$.

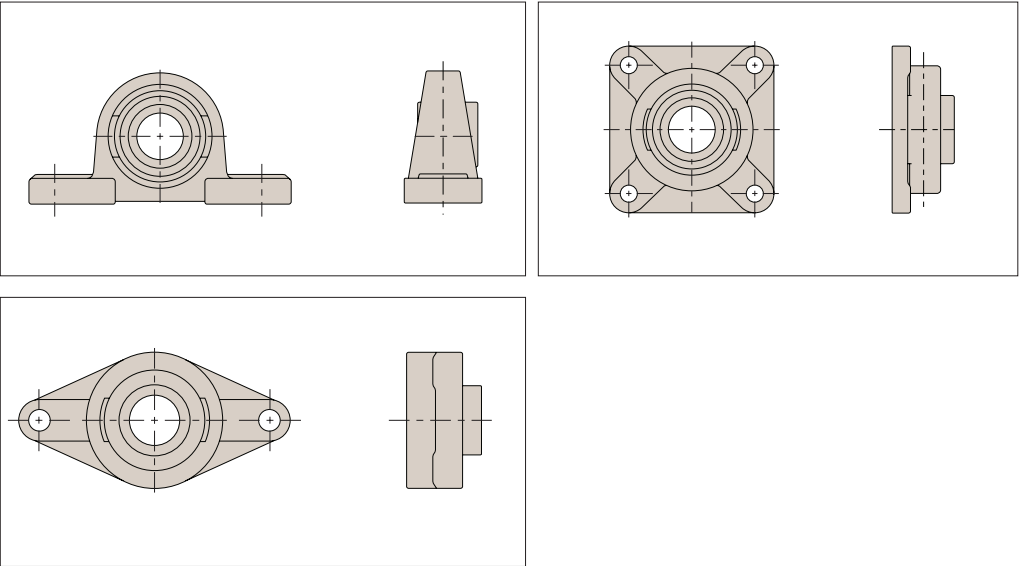
Stainless steel housing

Stainless AISI 304, $\varnothing 12-60\text{mm}$.

Thermoplastic housing

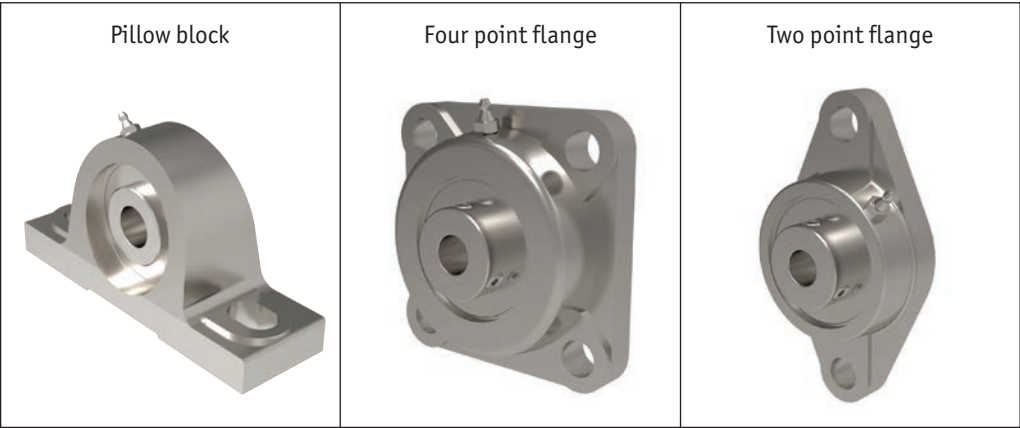
Food grade applications, smooth PBT resin material, $\varnothing 20-40\text{mm}$.

Pillow Bearings



Use with Automation linear shafts L1770-L1774

Options





For cast iron housings

- Single row radial contact self-aligning bearings (steel 100Cr6).
- Re-lubricatable.
- Fixing to shaft via set screw.
- Operating temperature range -20° to $+100^{\circ}$.

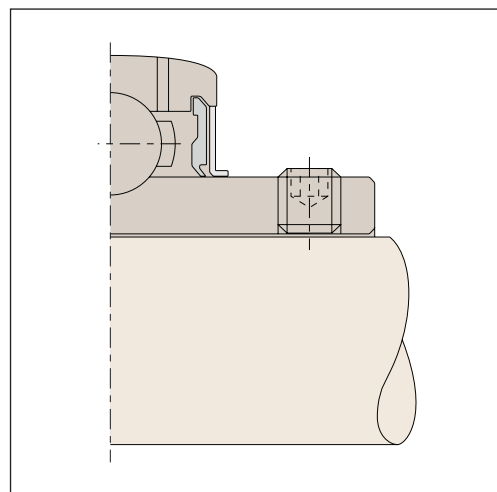
For stainless & thermoplastic housings

- Single row radial contact self-aligning bearings (stainless steel AISI 440C), stainless steel cage.
- Lubricated with food grade grease.
- Fixing to shaft via set screw.

Shaft fixing set screw

2 set screws at 120° with hexagon socket and knurled cup point, recommended shaft tolerance h6/h7.

Set screw	Max. tightening torque (Nm)	Hexagon socket A/F
M5 x 0,8	3,5	2,5
M6 x 1	5,5	3,0
M8 x 1	11,5	4,0
M10 x 1,25	22,0	5,0
M12 x 1,25	33,0	6,0
M14 x 1,5	42,0	7,0
M16 x 1,5	64,0	8,0
M18 x 1,5	75,0	9,0
M20 x 1,5	120,0	10,0

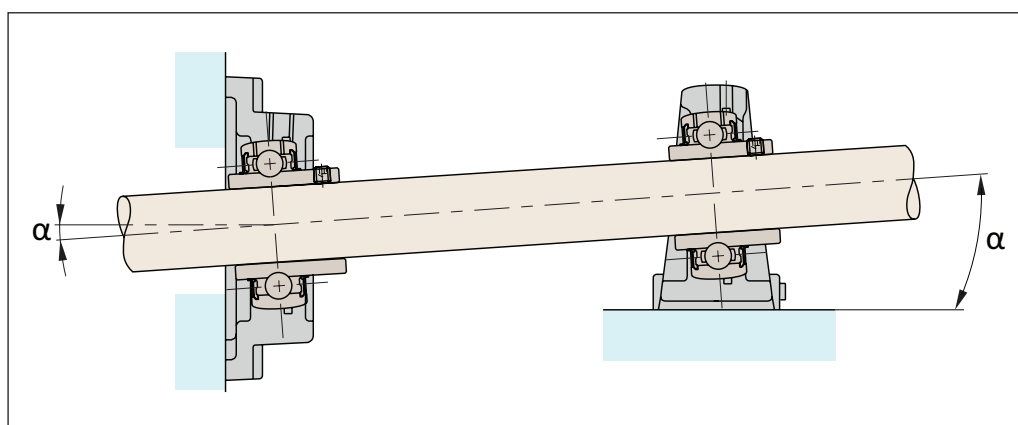


Lubrication

Our units are lubricated for life. If re-lubrication is necessary (because of severe operating conditions), use a lithium soap base with a viscosity of $100\text{mm}^2/\text{s}$ at 40°C .

Installation

Shaft misalignment is compensated to a certain degree by the shaft-aligning bearings.



If re-lubrication required

$$\alpha = \pm 2^{\circ}$$

If no re-lubrication

$$\alpha = \pm 5^{\circ}$$

When using protective end caps

$$\alpha = \pm 5^{\circ}$$



Cast Iron Bearing Units

Equivalent load ratings

Bearing Support Units



The radial loads of the cast iron bearing supports are limited by the bearings themselves – the housings can withstand the maximum loads.

Please see the part numbers for dynamic and static radial loads. The maximum axial loads are 50% of the maximum static radial loads. The standard bearing have a C3 clearance.

Bore nominal size (mm)		Radial bearing clearance (μ) C3	
Above	Up to	Min.	Max.
10	18	11	25
18	24	13	28
24	30	13	28
30	40	15	33
40	50	18	36
50	65	23	43
65	80	25	51
80	100	30	58
100	120	36	66
120	140	41	81

When choosing a suitable bearing size – this depends on the load and speed required.

If the load acts mainly whilst the bearing rotates, then it is a dynamic load, if it acts mainly during no movement or low speeds, then it is a static load.

The maximum for both of these, for each bearing, is shown in the part tables.

Dynamic equivalent loads:

For some situations the bearing will have to withstand both radial and axial loads and we then need to calculate an equivalent dynamic load using the following equation:

$$L = X \cdot F_r + Y \cdot F_a \text{ (kN)}$$

- P = Dynamic equivalent load (kN)
- F_r = Actual radial load (kN)
- F_a = Actual axial load (kN)
- X = Radial factor
- Y = Axial factor

Load ratio table 1:

F_a C_{0r}	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0,014	0,19				2,30
0,028	0,22				1,99
0,056	0,26				1,71
0,084	0,28				1,55
0,110	0,30	1	0	0,56	1,45
0,170	0,34				1,31
0,280	0,38				1,15
0,420	0,42				1,04
0,560	0,44				1,00

e = Limiting value

C_{0r} = Radial static load rating (see dimension tables for ball bearing units)

Bearing Supports from Automotion Components



Static equivalent loads

For situations where there are radial and axial loads on the static or slow moving bearings:

$$P_0 = X_0 \bullet F_r + Y_0 \bullet F_a \text{ (kN)}$$

$$P_0 = F_r \quad \text{if} \quad \frac{F_a}{F_r} \leq 0.8$$

P_0 = Static equivalent load (kN) For all bearing inserts the following applies:

X_0 = Static radial factor $X_0 = 0.6$

Y_0 = Static axial factor $Y_0 = 0.5$

Using the ratio **fs**, it can be checked if sufficient static dimensioning for the insert has been ensured:

$$fs = \frac{C_{0r}}{P_0}$$

Some standard values are:

fs = 0.7 Minimal demands for running smoothness and rotating movement

fs = 1.0 occasional rotating bearing, normal demands for running

fs = 2.0 smoothness, high demands for running smoothness

It should be noted that this ratio does not provide any assurance against a break or similar, but instead it is assurance against excessive local deformation in the rolling contact (ball/raceway).

Calculating bearing life

When calculating bearing life for bearing units, the following applies:

$$L_{10} = \left(\frac{C_r}{P} \right)^3 \quad (10^6 \text{ revolutions})$$

If the bearing life should be specified in hours, the following applies:

$$L_{10h} = \left(\frac{C_r}{P} \right)^3 \bullet \frac{10^6}{60n} \quad (\text{h})$$

n = speed (min^{-1})