

Link-Belt® Spherical Roller Bearing



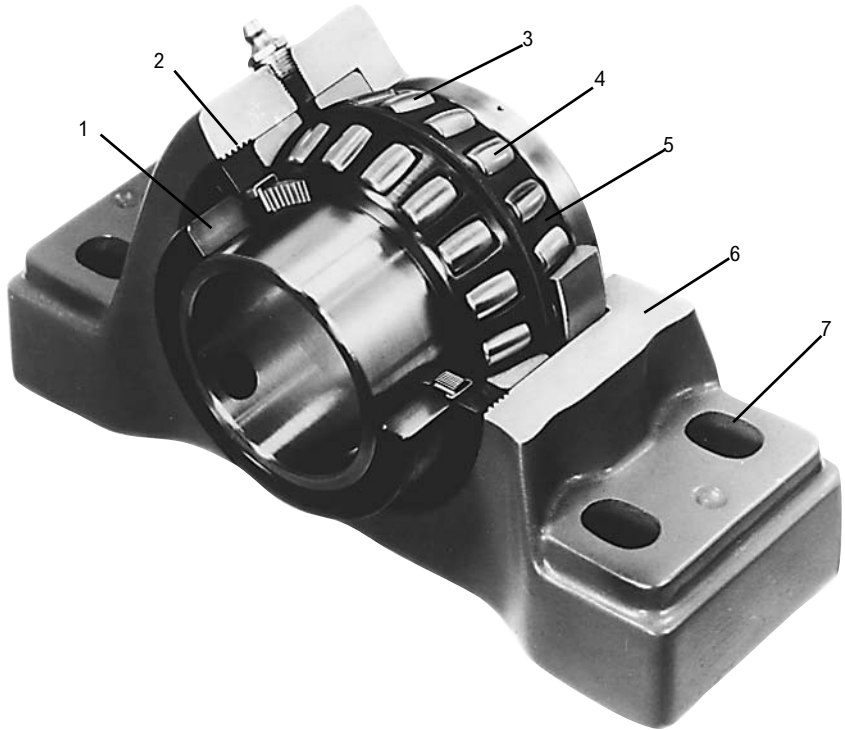
Easy to mount,
sealed, pre-lubricated
and do not require
bearing adjustment
during mounting.

Series B22400, B22500 & B22600 Spherical Roller Bearing Units and Takeups – Features and Benefits

Series B22400 are single collar mounted spherical roller bearing units. Series B22500 are double collar mounted spherical roller bearing units. Series B22600 are adapter mounted spherical roller bearing units. These units provide economic

and versatile arrangements for supporting shafts carrying substantial radial or combination radial and thrust loads. These units are especially adaptable for conveyors, elevators, general industrial machinery, heavier duty fans and blowers, power transmission

applications, ditchers, trenchers, pavers and other such applications. These series of bearings are easy to mount, sealed, pre-lubricated and do not require bearing adjustment during mounting.



1. Mounting Feature
 - B22400 Series – Spring locking collar locks inner ring securely to shaft.
 - B22500 Series – Two spring locking collars lock inner ring securely to shaft.
 - B22600 Series – Tapered adapter mounting system.
2. Choice of three seals, floating labyrinth Type H, spring-loaded lip Type E, and triple lip Type E7.
3. Long inner ring for high stability and load support.
4. Self-aligning double row spherical roller bearing adjusts $\pm 2^\circ$ to allow for alignment variations between shaft and supporting structure.
5. Double contoured retainer pockets assure accurate roller control.
6. Sturdy, compact one-piece cast iron or cast steel housing.
7. Slotted bolt holes in pillow block bases facilitate mouting; bottom of base is machined.

Spherical Roller Bearings

Self-aligning double row spherical roller bearings have high LDN values and are designed to distribute the load over the symmetrical rollers, assuring positive tracking and smooth operation. The large roller complement provides high capacity for radial or combined radial-thrust loads.

Osculation clearance at the ends of the rollers compensates for shock loads and prevents destructive edge loading. These precision bearings with double contoured retainer pockets are designed to meet a broad range of application requirements.



Spring Locking Collar (s) - B22400 & B22500 Series

The spring locking collar(s) design provides a secure grip of the wide inner ring bearing to the shaft. The set screws extend through the inner ring of the bearing and lock firmly onto the shaft. Installation is fast and simple. Correctly tightening

the set screws produces elastic strain in the spring locking collar resulting in a continuous pressure on the set screw threads and providing a positive lock.



Adapter Mount – B22600 Series

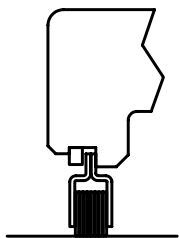
The adapter mounting provides better concentricity and shaft control, increasing service life. Where Turned, Ground and Polished shafting is the norm on collar-mounted units, the maximized mounting power of the B22600 allows for Commercial Grade Shafting compatibility (a commonly used grade of shafting due to its price and availability). Shaft damage from set screws is eliminated with the B22600's improved mounting design. Shaft damage

from the bearing inner ring fretting to the shaft (the result of a clearance or loose fit) is also eliminated. These improvements facilitate easier bearing removal, replacement bearing installation and longer shaft service life.

Interchangeable Seals-Seal Types

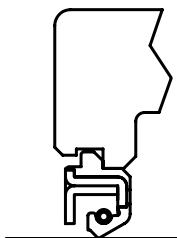
Three standard sealing systems are available each offering maximum protection for the bearing. These seals are interchangeable and are designed for grease lubrication.

Type H Seal



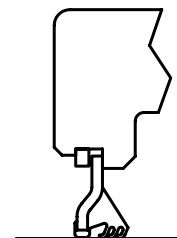
Type H floating labyrinth seals have multiple self-centering rings held securely in a steel carrier. Type H seals are normally furnished.

Type E Seal



Type E spring loaded lip seals utilize a spring to provide uniform pressure for keeping the sealing lip in contact with the inner ring. Type E seals are normally used for liquid splash environments.

Type E7 Seal



Type E7 triple lip seal with metal outboard guard is designed for the most severe of applications. The outboard metal guard protects the inner seal lips from abrasion and damage. The three molded, heavy contact lips provide excellent protection from abrasive media, dust and moisture.

One-Piece Cast Iron or Cast Steel Housings

Compact one-piece housings provide for strength and load support. Scientifically contoured housing design provides superior rigidity. Cast iron or cast steel pillow blocks have two or four slotted bolt holes with ample space

provided for drilling dowel pin holes. Flanged and flanged cartridge units have drilled mounting holes and machined mounting surfaces for maximum stability. Cartridge units have cast iron or steel housings and are finished

to precision tolerances. Takeup units have machined slots for smooth, precise operation. Pillow blocks, flanged, and cartridge units are available for fixed or expansion operation.



Nomenclature

Symbol	Description	P	E	-B22	4	39	F	H	C	17H
C	Cartridge unit	}	}	}	}	}	}	}	}	}
CSE	Cartridge unit; steel housing									
EF	Flanged unit; 4-bolt square									
EP	Pillow block; cast iron									
F	Flanged unit; 3- and 4-bolt									
FB	Flanged bracket unit									
FC	Flanged cartridge unit; 4-bolt round									
P	Pillow block									
PK	Pillow block; cast steel housing									
T	Takeup unit, slotted guides									
DS	Takeup, conveyor, hinged top, welded steel frame	}	}	}	}	}	}	}	}	
DSH	Takeup, conveyor, extra strength, welded steel frame									
R	Collar opposite cover (B22400 only)									
E	Expansion unit (not used with CSE symbol)									
B22	Spherical roller bearing; extended inner ring separable outer rings									
4	400 series designation (one locking collar)	}	}	}	}	}	}	}	}	}
5	500 series designation (two locking collars)									
6	600 series designation (adapter mounted)									
B	Inner ring bore equal to a bore of preceding smaller bearing group									
39	Shaft diameter in 16ths of an inch	}	}	}	}	}	}	}	}	}
M55	Metric series, bore in mm									
F	Four bolt base pillow block									
H	Floating labyrinth seal	}	}	}	}	}	}	}	}	}
E	Spring-loaded lip seal									
E7	Triple lip seal									
C	Closed end unit									
18	Takeup adjustment, inches									
17H	Grease designation									
4	Clearance other than standard									

Series B22400, B22500 & B22600 Spherical Roller Bearing

To select a bearing, determine the applied radial load, the applied thrust load, the desired Rating Life, and applicable operating conditions. The procedure shown here will aid in selecting a bearing to meet an L10 design life. The formulas for calculating life expectancy should be used to determine the Rating Life L10 for the bearing selected.

The selection procedures and rating formulas shown here are in agreement with The American Bearing Manufacturers Association Standards and ANSI/ABMA Standards STD 11-1990. Ratings are based on fatigue life. The Rating Life L10 or fatigue life at 90% reliability is the usual basis for bearing selection. For radial load applications only,

Table 4, can be used to select a bearing or to determine L10 life expectancy.

To assure a satisfactory bearing application, fitting practice, mounting, lubrication, sealing, static rating, housing strength, operating conditions and maintenance must be considered.

Selection

Step 1

Determine an appropriate L10 design life.

Type of service	Operating time, hours per year	Design life, years	L10 design life, hours
Light seasonal usage	500 to 750	3-5	3,000
Heavy seasonal usage	1,400 to 1,600	4-6	8,000
Industrial—8 hour shift	2,000	10	20,000
Industrial—16 hour shift	4,000	10	40,000
Industrial—continuous	8,700	10	80,000 to 100,000

Step 2

Determine a required $\left(\frac{C}{P}\right)$ from Table 1.

Step 3

Calculate the required C and select a roller bearing.

a For radial load only:

$$P = F_r$$

$$\text{required } C = \left(\frac{C}{P}\right)P \text{ using } \left(\frac{C}{P}\right) \text{ from Step 2}$$

Select a roller bearing from Table 2 with a basic load rating C equal to or greater than the required C.

Step 3 (continued)

b For combined radial and thrust loads:

Select a trial roller bearing of the desired shaft size from Table 2.

Calculate the ratio of thrust load F_a to the radial load F_r .

$$\frac{F_a}{F_r}$$

Calculate the equivalent radial load P

$$P = X F_r + Y F_a$$

If $\frac{F_a}{F_r}$ is equal to or less than e, then $P = X_1 F_r + Y_1 F_a$

If $\frac{F_a}{F_r}$ is greater than e, then $P = X_2 F_r + Y_2 F_a$

For values of e, X_1 , Y_1 , X_2 , and Y_2 , see Table 2.

Calculate the required C

$$\text{required } C = \left(\frac{C}{P}\right)P \text{ using } \left(\frac{C}{P}\right) \text{ from Step 2.}$$

Consult Table 2, basic load rating. If a smaller bearing meets, or nearly meets, the required C, its life expectancy can be calculated.

Note: If the load P is greater than .25C, consult Rexnord Bearing Division.

Selection

Symbols for formulas:
 C = basic load rating, pounds (or newtons)
 Co = static load rating, pounds (or newtons)
 e = a reference value
 Fa = thrust load, pounds (or newtons)
 Fr = radial load, pounds (or newtons)
 L10 = rating life, hours

n = speed, revolutions per minute
 P = equivalent radial load, pounds (or newtons)
 X = radial factor
 Y = thrust factor

Basic Formula

$$\left(\frac{C}{P}\right) = \left(\frac{L_{10} \times n \times 60}{1,000,000}\right)^{3/10}$$

$$L_{10} = \frac{\left(\frac{C}{P}\right)^{10/3} \times 1,000,000}{n \times 60}$$

Life Expectancy

To calculate the Rating Life L10 of any selected or trial bearing:

Step 1

Determine the equivalent radial load P.

a For radial load only:

$$P = Fr$$

b For combined radial and thrust load:

$$P = XFr + YFa$$

if $\frac{Fa}{Fr}$ is equal to or less than e, then
 $P = X1Fr + Y1Fa$

if $\frac{Fa}{Fr}$ is greater than e, then
 $P = X2Fr + Y2Fa$

For values of e, X1, Y1, X2, and Y2, consult the appropriate bearing rating Table 2.

Step 2

Calculate the ratio of the basic load rating C to the equivalent radial load.

$$\left(\frac{C}{P}\right)$$

Step 3

Approximate the bearing life from Table 1.

Life Adjustment

The Rating Life, L10, may be modified for some applications in accordance with the formula

$$Ln = a1a2a3L10$$

where Ln = Adjusted life for (100-n) % reliability,

a1 = Life adjustment factor for reliability

a2 = Life adjustment factor

for material and processing

a3 = Life adjustment factor for operating conditions.

For most normal applications, all factors will be taken as 1, and the Rating Life used as the selection basis or life estimate. In addition, as long as standard catalog bearings are used, a2 will be normally set equal to one.

The factor a3 covers such things as lubrication, misalignment, and temperature. Some conditions that could yield as significantly different than unity include speeds less than 20000 DN or greater than 200000 DN, temperatures below -40°F (-40°C) or above 275°F (135°C). For other possible conditions, as well as additional information on life adjustment factors, consult Rexnord Bearing Division.

Table 1 • Relation of L10 life and speed to $\left(\frac{C}{P}\right)$

Bearing Life Hours L10	Speed, n									
	50	100	200	300	400	500	600	700	800	
3000	1.93	2.38	2.93	3.31	3.61	3.86	4.07	4.27	4.44	
4000	2.11	2.59	3.19	3.61	3.93	4.20	4.44	4.65	4.84	
5000	2.25	2.77	3.42	3.86	4.20	4.50	4.75	4.97	5.18	
6000	2.38	2.93	3.61	4.07	4.44	4.75	5.02	5.25	5.47	
8000	2.59	3.19	3.93	4.44	4.84	5.18	5.47	5.73	5.96	
10000	2.77	3.42	4.20	4.75	5.18	5.54	5.85	6.12	6.37	
12000	2.93	3.61	4.44	5.02	5.47	5.85	6.18	6.47	6.73	
14000	3.07	3.78	4.65	5.25	5.73	6.12	6.47	6.77	7.05	
16000	3.19	3.93	4.84	5.47	5.96	6.37	6.73	7.05	7.34	
18000	3.31	4.07	5.02	5.66	6.18	6.60	6.97	7.30	7.60	
20000	3.42	4.20	5.18	5.85	6.37	6.81	7.20	7.54	7.85	
25000	3.65	4.50	5.54	6.25	6.81	7.29	7.70	8.06	8.39	
30000	3.86	4.75	5.85	6.60	7.20	7.70	8.13	8.51	8.86	
35000	4.04	4.97	6.12	6.92	7.54	8.06	8.51	8.92	9.28	
40000	4.20	5.18	6.37	7.20	7.85	8.39	8.86	9.28	9.66	
45000	4.36	5.36	6.60	7.46	8.13	8.69	9.18	9.61	10.00	
50000	4.50	5.54	6.81	7.70	8.39	8.97	9.48	9.92	10.30	
60000	4.75	5.85	7.20	8.13	8.86	9.48	10.00	10.50	10.90	
70000	4.97	6.12	7.54	8.51	9.28	9.92	10.50	11.00	11.40	
80000	5.18	6.37	7.85	8.86	9.66	10.30	10.90	11.40	11.90	
90000	5.36	6.60	8.13	9.18	10.00	10.70	11.30	11.80	12.30	
100000	5.54	6.81	8.39	9.48	10.30	11.00	11.70	12.20	12.70	
150000	6.25	7.70	9.48	10.70	11.70	12.50	13.20	13.80	14.40	
200000	6.81	8.39	10.30	11.70	12.70	13.60	14.40	15.00	15.70	
	Speed, n									
	900	1000	1200	1500	1800	2400	3000	3600	6000	
3000	4.60	4.75	5.02	5.36	5.66	6.18	6.60	6.97	8.13	
4000	5.02	5.18	5.47	5.85	6.18	6.73	7.20	7.60	8.86	
5000	5.36	5.54	5.85	6.25	6.60	7.20	7.70	8.13	9.48	
6000	5.66	5.85	6.18	6.60	6.97	7.60	8.13	8.59	10.00	
8000	6.18	6.37	6.73	7.20	7.60	8.29	8.86	9.36	10.90	
10000	6.60	6.81	7.20	7.70	8.13	8.86	9.48	10.00	11.70	
12000	6.97	7.20	7.60	8.13	8.59	9.36	10.00	10.60	12.30	
14000	7.30	7.54	7.96	8.51	8.99	9.80	10.50	11.10	12.90	
16000	7.60	7.85	8.29	8.86	9.36	10.20	10.90	11.50	13.40	
18000	7.88	8.13	8.59	9.18	9.70	10.60	11.30	11.90	13.90	
20000	8.13	8.39	8.86	9.48	10.00	10.90	11.70	12.30	14.40	
25000	8.69	8.97	9.48	10.10	10.70	11.70	12.50	13.20	15.40	
30000	9.18	9.48	10.00	10.70	11.30	12.30	13.20	13.90	16.20	
35000	9.61	9.92	10.50	11.20	11.80	12.90	13.80	14.60	17.00	
40000	10.00	10.30	10.90	11.70	12.30	13.40	14.40	15.20	17.70	
45000	10.40	10.70	11.30	12.10	12.80	13.90	14.90	15.70	18.30	
50000	10.70	11.00	11.70	12.50	13.20	14.40	15.40	16.20	18.90	
60000	11.30	11.70	12.30	13.20	13.90	15.20	16.20	17.10	20.00	
70000	11.80	12.20	12.90	13.80	14.60	15.90	17.00	17.90	20.90	
80000	12.30	12.70	13.40	14.40	15.20	16.50	17.70	18.70	21.80	
90000	12.80	13.20	13.90	14.90	15.70	17.10	18.30	19.40	22.60	
100000	13.20	13.60	14.40	15.40	16.20	17.70	18.90	20.00	23.30	
150000	14.90	15.40	16.20	17.30	18.30	20.00	21.40	22.60	26.30	
200000	16.20	16.70	17.70	18.90	20.00	21.80	23.30	24.60	28.70	

Table 2 • Load Ratings and Speed Limits

Size Code	Co Static load rating		C Basic load rating		Approximate speed limit RPM*			e	Fa/Fr ≤ e		Fa/Fr > e	
	newtons	pounds	newtons	pounds	H seal	E seal	E7 seal		X1	Y1	X2	Y2
B416	66100	14900	51200	11500	3500	3500	---	0.51	1.00	1.32	0.67	1.96
B420	80500	18100	60900	13700	3000	3000	1700	0.48	1.00	1.40	0.67	2.08
B424 B524 B624	93200	20900	64900	14600	2750	2750	1575	0.44	1.00	1.54	0.67	2.29
B428 B528	127700	28700	89800	20200	2350	2350	1325	0.45	1.00	1.51	0.67	2.25
B432 B531 B631	147700	33200	94300	21200	2150	2150	1225	0.40	1.00	1.68	0.67	2.50
B436 B536 B635	197500	44400	117400	26400	1950	1950	1075	0.40	1.00	1.68	0.67	2.50
B440 B540 B639	238000	53500	139700	31400	1750	1750	975	0.38	1.00	1.80	0.67	2.68
B448 B548 B647	318000	71500	185900	41800	1500	1500	850	0.38	1.00	1.79	0.67	2.67
B456 B556 B655	403400	90700	226800	51000	1250	1250	725	0.38	1.00	1.77	0.67	2.64
B464 B564 B663	609400	137000	351800	79100	1100	1100	625	0.36	1.00	1.88	0.67	2.79
B572 B671	790200	178000	419400	94300	1000	1000	550	0.38	1.00	1.80	0.67	2.68
B580 B679	944700	212000	520400	117000	900	900	525	0.37	1.00	1.83	0.67	2.72

If the load P is greater than .25C, consult Rexnord Bearing Division.

For vertical shift application, consult Rexnord Bearing Division.

* Based on grease lubrication and moderate load.

Table 3 • Size Code Interchange Table

	B22400 Series Single Set Collar	B22500 Series Double Set Collar	B22600 Series Tapered Adapter	Size Code
Shaft Size	Bearing Number	Bearing Number	Bearing Number	
1 25mm	B22416 B224M25			B416
1-3/16 1-1/4 30mm	B22419 B22420 B224M30			B420
1-7/16 1-1/2 35mm	B22423 B22424 B224M35	B22523	B22623	B424 B524 B624
1-1/2 1-5/8 1-11/16 1-3/4 40mm	B224B24 B22426 B22427 B22428 B224M40	B22527		B428 B528
1-3/4 1-15/16 2 45mm 50mm	B224B28 B22431 B22432 B224M45 B224M50	B22531	B22631	B432 B531 B631
2 2-3/16 2-1/4 55mm	B22435 B22436 B224M55	B22532 B22535	B22635	B436 B536 B635
2-1/4 2-7/16 2-1/2 60mm	B224B36 B22439 B22440 B224M60	B22539	B22639	B440 B540 B639
2-11/16 2-3/4 2-15/16 3 65mm 70mm 75mm	B22443 B22444 B22447 B22448 B224M65 B224M70 B224M75	B22543 B22547	B22643 B22647	B448 B548 B647
3-3/16 3-7/16 3-1/2 80mm 85mm	B22451 B22455 B22456 B224M80 B224M85	B22555	B22655	B456 B556 B655
3-11/16 3-15/16 4 90mm 100mm	B22459 B22463 B22464 B224M90 B224M100	B22563 B22564	B22663	B464 B564 B663
4-3/16 4-7/16 4-1/2 110mm 115mm		B22567 B22571 B22572 B225M110 B225M115	B22671	B572 B671
4-15/16 5 125mm		B22579 B22580 B225M125	B22679	B580 B679

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