

Radial Needle Roller and Cage Assemblies

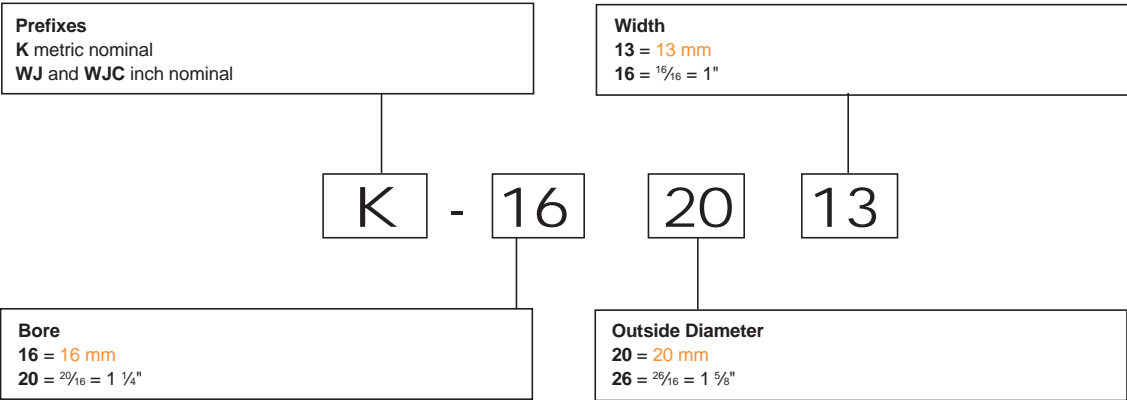
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TABLES OF DIMENSIONS

$\frac{3}{8}$ " O.D. (9.52 mm) to 5" O.D. (127.00 mm)

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Radial Needle Roller and Cage Assemblies





INTRODUCTION

Before selecting specific radial needle roller and cage assemblies, the general Engineering section of this catalog should be reviewed for detailed information concerning:

- bearing type selection
- bearing life and reliability
- definition of load ratings
- life and load relationships
- effect of raceway hardness
- example of life calculation
- lubrication
- limiting speeds
- shaft design
- housing design

In addition to these general considerations, review the material which follows when selecting radial needle roller and cage assemblies.

IDENTIFICATION

The prefix letters in the assembly designation denote whether the Torrington needle roller and cage assemblies are made to inch or metric nominal dimensions.

For example, an assembly with metric nominal dimensions is indicated by the code letter **K** in the prefix. Absence of the letter **K** in the prefix indicates an assembly with inch nominal dimensions.

There are two primary constructions of needle roller and cage assemblies, each of which is made to inch or metric nominal dimensions. The **WJ** (inch) and the **K** (metric) assemblies generally employ larger roller diameters. The **WJC** (inch) assemblies normally employ smaller roller diameters. Also listed are metric needle roller and cage assemblies using molded, one piece reinforced engineered polymer cages with suffix letters **TN**.

Radial Needle Roller and Cage Assemblies
Types K, WJ and WJC



CONSTRUCTION

Torrington needle roller and cage assemblies have a steel cage which provides both inward and outward retention of the needle rollers. The designs provide maximum cage strength consistent with the inherent high load ratings of needle roller bearings.

Torrington also has available one-piece reinforced engineered polymer cages for use where operating conditions permit. Before applying assemblies with engineered polymer cages, please consult Torrington sales engineers.

The controlled contour needle rollers used in these assemblies are made of high carbon chrome steel, through hardened, ground and lapped to close tolerances for diameter and roundness. See the Engineering section of this catalog for further discussion of controlled contour rollers.

DIMENSIONAL ACCURACY

The nominal inch assemblies, **WJ** and **WJC**, contain needle rollers manufactured to only one diameter grade. Any one assembly has needle rollers with a total diameter tolerance of 0.0001 inch (0,0025 mm).

Metric needle roller and cage assemblies, **K** are supplied with needle roller complements subdivided into groups shown in Table 1, the groups being at Torrington's option if nothing to the contrary is agreed upon at the time of ordering.

The limit to precision of the radial clearance of mounted needle roller and cage assemblies is the capability of the user to hold close tolerances on the inner and outer raceways.

The tolerance of the over-all width of these assemblies is given on the tabular pages of this section.

Table 1
Needle Roller Group Limits (Grade G2)

μm		inches		identifying color on package
0	-2	0	-0.00008	red
-1	-3	-0.00004	-0.00012	
-2	-4	-0.00008	-0.00016	blue
-3	-5	-0.00012	-0.00020	
-4	-6	-0.00016	-0.00024	gray
-5	-7	-0.00020	-0.00028	



MOUNTING DIMENSIONS

The cage and needle roller assembly normally uses the shaft and housing as the inner and outer raceways, respectively. In order to realize full bearing load rating and life, the shaft and housing must have the correct geometric and metallurgical characteristics.

The tables of dimensions for these assemblies list the recommended diameters for the shaft when used as the inner raceway. Additional design details for shafts used as inner raceways can be found in the general Engineering section of this catalog.

Since the housing normally serves as the outer raceway, it should be of sufficient cross section to maintain adequate roundness and running clearance under load. The tables of dimensions also list the recommended diameters for the housings when used as outer raceways. Additional design details for housings used as outer raceways can be found in the general Engineering section of this catalog.

The recommended mounting diameters for both nominal inch and nominal metric needle roller and cage assemblies will provide correct running clearance for most applications.

The needle roller and cage assembly must be axially located by shoulders or other suitable means. End locating surfaces should be hardened to minimize wear. For satisfactory operation, minimum axial clearance should be 0.008 inch (0.2 mm). When using types **WJ** assemblies adjacent fillets must not exceed 0.03 inch (0.8 mm) radius. When it is necessary to use fillets adjacent to **WJC** and **K** assemblies, please consult the Torrington Engineering Sales Office for recommendations.

LUBRICATION

Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces, such as in epicyclic gearing, or inertial forces as in the small end of a connecting rod, the contact pressure between the cage and the raceway guiding surface becomes critical. The allowable contact pressure depends on a combination of the induced force and the rubbing velocity between the cage and raceway and the rate of lubricant flow. Consult the Torrington Engineering Sales Office when cages will be subjected to high induced forces.

SPECIAL DESIGNS

Needle roller and cage assemblies made to special dimensions or configurations, such as those which are split to assemble around a one-piece crankshaft, can be made available upon special order where quantities permit. Special plated or coated cages to enhance life under conditions of high induced forces can also be made available.

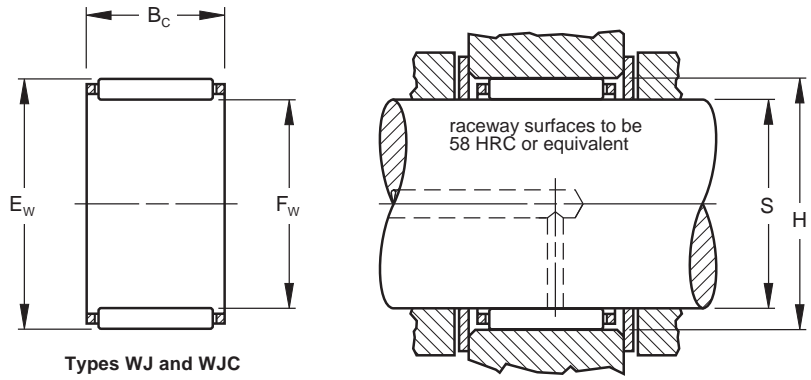


Type WJC

Check for availability.

Inch - metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.

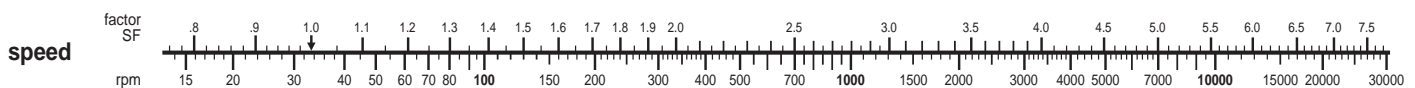


DIMENSIONS AND LOAD RATINGS – INCH SERIES										BEARING MOUNTING				
F _w Bore		E _w Outside Diameter		Assembly Designation	B _c Width		Load Ratings			Limiting Speed	Inch Mounting			
							Basic Dynamic C _r	Basic Static C ₀	Limiting Speed		S Shaft Raceway		H Housing Bore	
(nom.)		(nom.)					Ⓓ	ISO 281		ISO 76		Diameter inches		inches
inch	mm	inch	mm		inch	mm	lbf	lbf	lbf	rpm	max.	min.	min.	max.
0.16	4	0.28	7	—	—	—	—	—	—	—	0.1575	0.1573	0.2758	0.2761
0.2	5	0.31	8	—	—	—	—	—	—	—	0.1969	0.1967	0.3152	0.3155
0.2	5	0.31	8	—	—	—	—	—	—	—	0.1969	0.1967	0.3152	0.3155
0.2	5	0.35	9	—	—	—	—	—	—	—	0.1969	0.1967	0.3545	0.3549
0.24	6	0.35	9	—	—	—	—	—	—	—	0.2362	0.236	0.3545	0.3549
0.28	7	0.39	10	—	—	—	—	—	—	—	0.2756	0.2754	0.3939	0.3943
0.31	8	0.43	11	—	—	—	—	—	—	—	0.315	0.3147	0.4333	0.4337
0.35	9	0.47	12	—	—	—	—	—	—	—	0.3543	0.3541	0.4727	0.4731
0.35	9	0.47	12	—	—	—	—	—	—	—	0.3543	0.3541	0.4727	0.4731
3/8	9.52	1/2	12.70	WJC-060806	0.375	9.52	616	826	840	48 000	0.3750	0.3748	0.5002	0.5006
0.39	10	0.51	13	—	—	—	—	—	—	—	0.3937	0.3935	0.512	0.5125
0.39	10	0.55	14	—	—	—	—	—	—	—	0.3937	0.3935	0.5514	0.5519
0.39	10	0.63	16	—	—	—	—	—	—	—	0.3937	0.3935	0.6302	0.6306
0.43	11	0.55	14	—	—	—	—	—	—	—	0.4331	0.4328	0.5514	0.5519
0.47	12	0.59	15	—	—	—	—	—	—	—	0.4724	0.4721	0.5908	0.5912
0.47	12	0.59	15	—	—	—	—	—	—	—	0.4724	0.4721	0.5908	0.5912
0.47	12	0.59	15	—	—	—	—	—	—	—	0.4724	0.4721	0.5908	0.5912
0.47	12	0.63	16	—	—	—	—	—	—	—	0.4724	0.4721	0.6302	0.6306
1/2	12.70	3/8	15.88	WJC-081008	0.500	12.70	1 020	1 370	1 740	35 000	0.5000	0.4997	0.6252	0.6256
0.51	13	0.67	17	—	—	—	—	—	—	—	0.5118	0.5115	0.6302	0.6306
0.55	14	0.71	18	—	—	—	—	—	—	—	0.5512	0.5509	0.7089	0.7093
0.55	14	0.71	18	—	—	—	—	—	—	—	0.5512	0.5509	0.7089	0.7093
0.55	14	0.75	19	—	—	—	—	—	—	—	0.5512	0.5509	0.7483	0.7488
0.55	14	0.79	20	—	—	—	—	—	—	—	0.5512	0.5509	0.7877	0.7882
5/8	14.29	11/16	17.46	WJC-091108	0.500	12.70	1 110	1 490	2 020	31 000	0.5625	0.5622	0.6877	0.6881
0.59	15	0.71	18	—	—	—	—	—	—	—	0.5906	0.5902	0.7089	0.7093
0.59	15	0.71	18	—	—	—	—	—	—	—	0.5906	0.5902	0.7089	0.7093
0.59	15	0.75	19	—	—	—	—	—	—	—	0.5906	0.5902	0.7483	0.7488
0.59	15	0.75	19	—	—	—	—	—	—	—	0.5906	0.5902	0.7483	0.7488
0.59	15	0.75	19	—	—	—	—	—	—	—	0.5906	0.5902	0.7483	0.7488
0.59	15	0.75	19	—	—	—	—	—	—	—	0.5906	0.5902	0.7483	0.7488
0.59	15	0.83	21	—	—	—	—	—	—	—	0.5906	0.5902	0.827	0.8276

Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N
 Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).
 Limiting speeds listed on this page are based on adequate oil lubrication.
 Ⓓ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to the Torrington Engineering Sales Office before a final selection is made.
 Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0.2 mm.



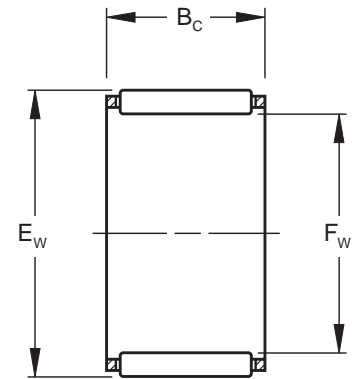


Type K

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



Types K

BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore	Basic Dynamic C _r	Basic Static C ₀				Limiting Speed			
millimeters	millimeters							ISO 281	ISO 76	
max.	min.	min.	max.		inch	mm	lbf	lbf	lbf	
4,000	3,995	7,005	7,014	K4x7x7TN	0.276	7	306	411	298	75 000
5,000	4,995	8,005	8,014	K5x8x8TN	0.315	8	366	491	384	75 000
5,000	4,995	8,005	8,014	K5x8x10TN	0.394	10	510	684	591	75 000
5,000	4,995	9,005	9,014	K5x9x13TN	0.512	13	720	965	797	75 000
6,000	5,995	9,005	9,014	K6x9x8	0.315	8	535	718	652	75 000
7,000	6,994	10,005	10,014	K7x10x8TN	0.315	8	459	616	547	67 000
8,000	7,994	11,006	11,017	K8x11x10	0.394	10	766	1 030	1 100	58 000
9,000	8,994	12,006	12,017	K9x12x10	0.394	10	716	961	1 040	51 000
9,000	8,994	12,006	12,017	K9x12x13	0.512	13	933	1 250	1 460	51 000
9,525	9,520	12,705	12,715	—	—	—	—	—	—	—
10,000	9,994	13,006	13,017	K10x13x10TN	0.394	10	719	965	1 070	45 000
10,000	9,994	14,006	14,017	K10x14x10	0.394	10	1 030	1 380	1 420	47 000
10,000	9,994	16,006	16,017	K10x16x12	0.472	12	1 430	1 920	1 720	49 000
11,000	10,992	14,006	14,017	K11x14x10	0.394	10	798	1 070	1 260	41 000
12,000	11,992	15,006	15,017	K12x15x9	0.354	9	800	1 070	1 290	37 000
12,000	11,992	15,006	15,017	K12x15x10	0.394	10	981	1 320	1 690	37 000
12,000	11,992	15,006	15,017	K12x15x13	0.512	13	1 140	1 530	2 030	37 000
12,000	11,992	16,006	16,017	K12x16x13	0.512	13	1 260	1 680	1 910	38 000
12,700	12,692	15,880	15,890	—	—	—	—	—	—	—
13,000	12,992	17,006	17,017	K13x17x10	0.394	10	1 210	1 620	1 870	35 000
14,000	13,992	18,006	18,017	K14x18x8	0.315	8	903	1 210	1 310	32 000
14,000	13,992	18,006	18,017	K14x18x10	0.394	10	1 200	1 610	1 890	32 000
14,000	13,992	19,007	19,020	K14x19x13	0.512	13	1 730	2 320	2 620	33 000
14,000	13,992	20,007	20,020	K14x20x12	0.472	12	1 790	2 400	2 450	34 000
14,288	14,280	17,468	17,478	—	—	—	—	—	—	—
15,000	14,992	18,006	18,017	K15x18x14TN	0.551	14	1 330	1 780	2 670	29 000
15,000	14,992	18,006	18,017	K15x18x17	0.669	17	1 350	1 820	2 710	29 000
15,000	14,992	19,007	19,020	K15x19x10	0.394	10	1 320	1 770	2 180	30 000
15,000	14,992	19,007	19,020	K15x19x13	0.512	13	1 620	2 170	2 830	30 000
15,000	14,992	19,007	19,020	K15x19x17	0.669	17	2 070	2 780	3 880	30 000
15,000	14,992	21,007	21,020	K15x21x21	0.827	21	3 050	4 090	4 920	31 000

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0.2 mm.

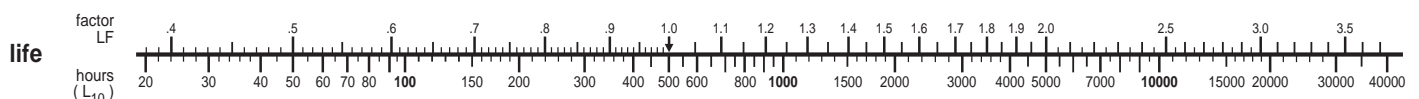
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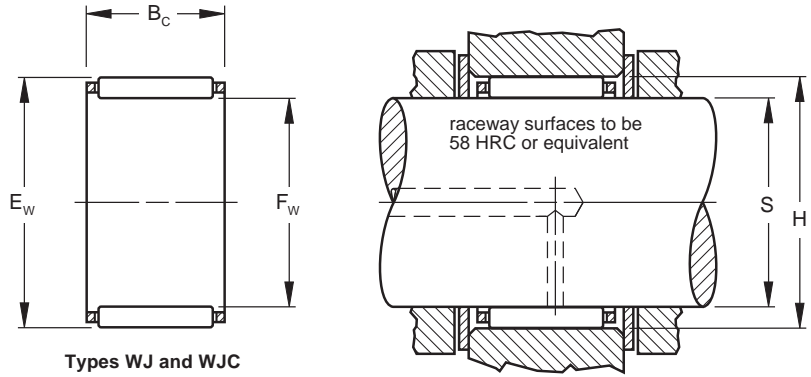


Types WJ and WJC

Check for availability.

Inch - metric conversions given are for the convenience of the user.

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Types WJ and WJC

DIMENSIONS AND LOAD RATINGS – INCH SERIES

BEARING MOUNTING

F _w Bore (nom.)	E _w Outside Diameter (nom.)		Assembly Designation	B _c Width +0.000 -0.015 +0.00 -0.38		Load Ratings			Limiting Speed rpm	Inch Mounting				
						Basic Dynamic C _r Ⓣ	Basic Static C ₀			S Shaft Raceway Diameter inches		H Housing Bore inches		
							ISO 281	ISO 76		max.	min.	min.	max.	
5/16	15.88	3/4	19.05	WJ-101208	0.500	12.70	1 150	1 540	2 170	27 000	0.6250	0.6247	0.7503	0.7508
5/16	15.88	7/8	22.22	WJ-101410	0.625	15.88	2 530	3 400	3 830	29 400	0.6250	0.6247	0.8753	0.8758
5/16	15.88	7/8	22.22	WJ-101414	0.875	22.22	3 490	4 680	5 780	29 400	0.6250	0.6247	0.8753	0.8758
0.63	16.00	0.79	20.00	—	—	—	—	—	—	—	0.6299	0.6296	0.7877	0.7882
0.63	16.00	0.79	20.00	—	—	—	—	—	—	—	0.6299	0.6296	0.7877	0.7882
0.63	16.00	0.79	20.00	—	—	—	—	—	—	—	0.6299	0.6296	0.7877	0.7882
0.63	16.00	0.79	20.00	—	—	—	—	—	—	—	0.6299	0.6296	0.7877	0.7882
0.63	16.00	0.79	20.00	—	—	—	—	—	—	—	0.6299	0.6296	0.7877	0.7882
0.63	16.00	0.94	24.00	—	—	—	—	—	—	—	0.6299	0.6296	0.9452	0.9457
0.67	17.00	0.83	21.00	—	—	—	—	—	—	—	0.6693	0.669	0.827	0.8276
0.67	17.00	0.83	21.00	—	—	—	—	—	—	—	0.6693	0.669	0.827	0.8276
0.67	17.00	0.87	22.00	—	—	—	—	—	—	—	0.6693	0.669	0.8664	0.8669
0.71	18.00	0.87	22.00	—	—	—	—	—	—	—	0.7087	0.7083	0.8664	0.8669
0.71	18.00	0.87	22.00	—	—	—	—	—	—	—	0.7087	0.7083	0.8664	0.8669
0.71	18.00	0.94	24.00	—	—	—	—	—	—	—	0.7087	0.7083	0.9452	0.9457
0.71	18.00	0.98	25.00	—	—	—	—	—	—	—	0.7087	0.7083	0.9845	0.985
0.75	19.00	0.94	24.00	—	—	—	—	—	—	—	0.748	0.7477	0.9452	0.9457
3/4	19.05	1	25.40	WJ-121616	1.000	25.40	4 410	5 920	8 180	24 000	0.7500	0.7496	1.0003	1.0008
0.79	20.00	0.94	24.00	—	—	—	—	—	—	—	0.7874	0.787	0.9452	0.9457
0.79	20.00	0.94	24.00	—	—	—	—	—	—	—	0.7874	0.787	0.9452	0.9457
0.79	20.00	1.02	26.00	—	—	—	—	—	—	—	0.7874	0.787	1.0239	1.0244
0.79	20.00	1.02	26.00	—	—	—	—	—	—	—	0.7874	0.787	1.0239	1.0244
0.79	20.00	1.02	26.00	—	—	—	—	—	—	—	0.7874	0.787	1.0239	1.0244
0.79	20.00	1.1	28.00	—	—	—	—	—	—	—	0.7874	0.787	1.1026	1.1031
0.87	22.00	1.02	26.00	—	—	—	—	—	—	—	0.8661	0.8658	1.0239	1.0244
0.87	22.00	1.02	26.00	—	—	—	—	—	—	—	0.8661	0.8658	1.0239	1.0244
0.87	22.00	1.18	30.00	—	—	—	—	—	—	—	0.8661	0.8658	1.1814	1.1819
0.87	22.00	1.26	32.00	—	—	—	—	—	—	—	0.8661	0.8658	1.2602	1.2608
7/8	22.22	1 1/8	28.58	WJ-141816	1.000	25.40	4 810	6 450	9 540	20 200	0.8750	0.8746	1.1253	1.1258

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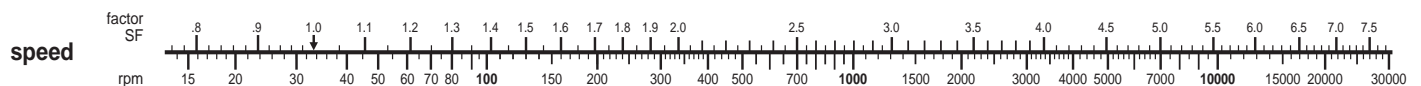
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Minimum axial clearance should be .008 inches or 0.2 mm.



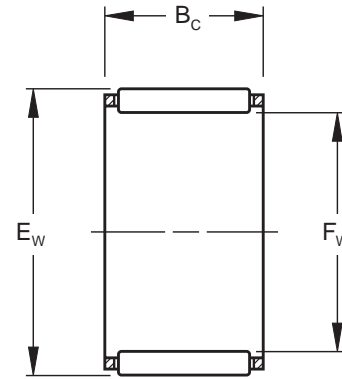


Type K (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



Types K

BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore	Basic Dynamic C _r	Basic Static C ₀				Limiting Speed			
millimeters	millimeters							ISO 281	ISO 76	
max.	min.	min.	max.		inch	mm	lbf	lbf	lbf	rpm
15,875	15,867	19,058	19,071	—	—	—	—	—	—	—
15,875	15,867	22,233	22,246	—	—	—	—	—	—	—
15,875	15,867	22,233	22,246	—	—	—	—	—	—	—
16,000	15,992	20,007	20,020	K16x20x10	0.394	10	1 310	1 760	2 200	28 000
16,000	15,992	20,007	20,020	K16x20x13	0.512	13	1 690	2 260	3 040	28 000
16,000	15,992	20,007	20,020	K16x20x14	0.551	14	1 810	2 430	3 320	28 000
16,000	15,992	20,007	20,020	K16x20x17	0.669	17	2 000	2 680	3 770	28 000
16,000	15,992	20,007	20,020	K16x20x20	0.787	20	2 250	3 020	4 380	28 000
16,000	15,992	24,007	24,020	K16x24x20	0.787	20	3 410	4 580	4 880	30 000
17,000	16,992	21,007	21,020	K17x21x10	0.394	10	1 360	1 830	2 350	26 000
17,000	16,992	21,007	21,020	K17x21x13	0.512	13	1 750	2 350	3 250	26 000
17,000	16,992	22,007	22,020	K17x22x20	0.787	20	2 880	3 860	5 300	27 000
18,000	17,992	22,007	22,020	K18x22x10	0.394	10	1 410	1 890	2 500	24 000
18,000	17,992	22,007	22,020	K18x22x14	0.551	14	1 950	2 610	3 780	24 000
18,000	17,992	24,007	24,020	K18x24x12	0.472	12	2 010	2 690	3 010	25 000
18,000	17,992	25,007	25,020	K18x25x22	0.866	22	3 940	5 280	6 500	26 000
19,000	18,991	24,007	24,020	K19x24x17	0.669	17	2 820	3 790	5 350	24 000
19,050	19,040	25,408	25,421	—	—	—	—	—	—	—
20,000	19,991	24,007	24,020	K20x24x10	0.394	10	1 500	2 020	2 810	22 000
20,000	19,991	24,007	24,020	K20x24x14	0.551	14	2 070	2 780	4 250	22 000
20,000	19,991	26,007	26,020	K20x26x12	0.472	12	2 220	2 970	3 520	23 000
20,000	19,991	26,007	26,020	K20x26x17	0.669	17	3 330	4 460	5 950	23 000
20,000	19,991	26,007	26,020	K20x26x20	0.787	20	3 440	4 610	6 180	23 000
20,000	19,991	28,007	28,020	K20x28x20	0.787	20	4 170	5 590	6 610	23 000
22,000	21,991	26,007	26,020	K22x26x10	0.394	10	1 640	2 210	3 250	20 000
22,000	21,991	26,007	26,020	K22x26x13	0.512	13	1 980	2 650	4 110	20 000
22,000	21,991	30,007	30,020	K22x30x20	0.787	20	4 140	5 550	6 700	21 000
22,000	21,991	32,009	32,025	K22x32x30	1.181	30	7 050	9 460	11 600	22 000
22,225	22,215	28,583	28,596	—	—	—	—	—	—	—

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0,2 mm.

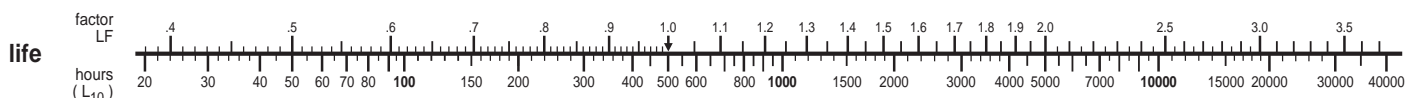
Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

Limiting speeds listed on this page are based on adequate oil lubrication.

Ⓣ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to the Torrington Engineering Sales Office before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.



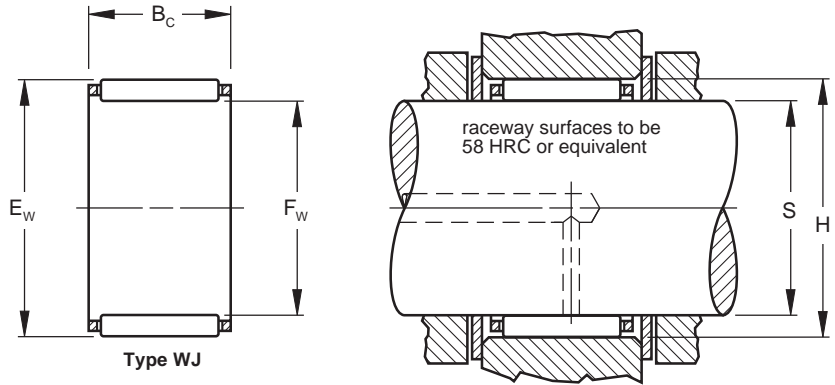


Type WJ

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



DIMENSIONS AND LOAD RATINGS – INCH SERIES										BEARING MOUNTING				
F _w Bore (nom.)	E _w Outside Diameter (nom.)		Assembly Designation	B _c Width		Load Ratings			Limiting Speed	Inch Mounting				
	inch	mm		inch	mm	Basic Dynamic C _r	Basic Static C ₀			S Shaft Raceway Diameter		H Housing Bore		
				+0.000 -0.015	+0,00 -0,38	Ⓣ	ISO 281	ISO 76		max.	min.	min.	max.	
				inch	mm	lbf	lbf	lbf	rpm					
0.94	24	1.10	28	—	—	—	—	—	—	0.9449	0.9445	1.1026	1.1031	
0.94	24	1.10	28	—	—	—	—	—	—	0.9449	0.9445	1.1026	1.1031	
0.98	25	1.14	29	—	—	—	—	—	—	0.9843	0.9839	1.142	1.1425	
0.98	25	1.18	30	—	—	—	—	—	—	0.9843	0.9839	1.1814	1.1819	
0.98	25	1.18	30	—	—	—	—	—	—	0.9843	0.9839	1.1814	1.1819	
0.98	25	1.18	30	—	—	—	—	—	—	0.9843	0.9839	1.1814	1.1819	
0.98	25	1.18	30	—	—	—	—	—	—	0.9843	0.9839	1.1814	1.1819	
0.98	25	1.22	31	—	—	—	—	—	—	0.9843	0.9839	1.2208	1.2215	
0.98	25	1.26	32	—	—	—	—	—	—	0.9843	0.9839	1.2602	1.2608	
0.98	25	1.30	33	—	—	—	—	—	—	0.9843	0.9839	1.2996	1.3002	
0.98	25	1.30	33	—	—	—	—	—	—	0.9843	0.9839	1.2996	1.3002	
0.98	25	1.38	35	—	—	—	—	—	—	0.9843	0.9839	1.3783	1.3789	
0.98	25	1.38	35	—	—	—	—	—	—	0.9843	0.9839	1.3783	1.3789	
1	25,40	1 1/8	33,34	WJ-162112	0.750	19,05	4 590	6 150	8 060	18 000	1.0000	0.9996	1.3129	1.3135
1	25,40	1 1/8	33,34	WJ-162116	1.000	25,40	6 050	8 110	11 500	18 000	1.0000	0.9996	1.3129	1.3135
1	25,40	1 1/8	33,34	WJ-162120	1.250	31,75	7 390	9 910	14 900	18 000	1.0000	0.9996	1.3129	1.3135
1.02	26	1.18	30	—	—	—	—	—	—	1.0236	1.0233	1.1814	1.1819	
1 1/8	28,58	1 1/2	38,10	WJ-182416	1.000	25,40	6 970	9 350	12 600	16 000	1.1250	1.1246	1.5004	1.5010
1 1/8	28,58	1 1/2	38,10	WJ-182420	1.250	31,75	8 580	11 500	16 500	16 000	1.1250	1.1246	1.5004	1.5010

Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

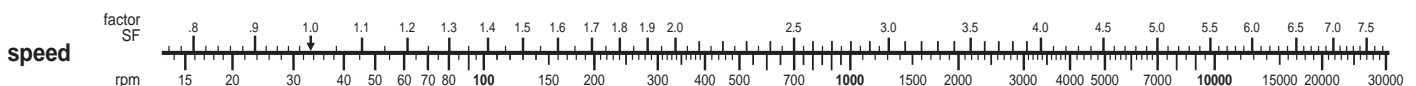
Limiting speeds listed on this page are based on adequate oil lubrication.

Ⓣ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to our engineering department before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0,2 mm.



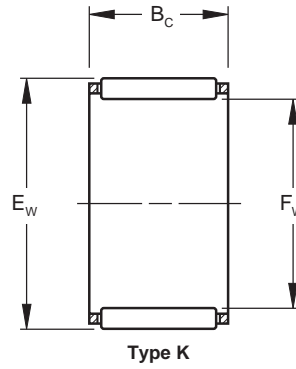


Type K (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore						Basic Dynamic C _r	Basic Static C ₀	Limiting Speed	
	millimeters	millimeters								
max.	min.	min.	max.	inch	mm	lbf	lbf	lbf	rpm	
24,000	23,991	28,007	28,020	K24x28x10	0.394	10	1 620	2 180	3 280	18 000
24,000	23,991	28,007	28,020	K24x28x13	0.512	13	2 090	2 800	4 540	18 000
25,000	24,991	29,007	29,020	K25x29x13	0.512	13	2 140	2 870	4 750	17 000
25,000	24,991	30,007	30,020	K25x30x13	0.512	13	2 480	3 320	4 910	17 000
25,000	24,991	30,007	30,020	K25x30x18	0.709	18	3 480	4 670	7 620	17 000
25,000	24,991	30,007	30,020	K25x30x20	0.787	20	3 700	4 960	8 220	17 000
25,000	24,991	30,007	30,020	K25x30x24	0.945	24	4 190	5 620	9 620	17 000
25,000	24,991	31,009	31,025	K25x31x17	0.669	17	3 340	4 480	6 350	18 000
25,000	24,991	32,009	32,025	K25x32x16	0.630	16	3 370	4 520	5 790	18 000
25,000	24,991	33,009	33,025	K25x33x20	0.787	20	4 750	6 380	9 290	18 000
25,000	24,991	33,009	33,025	K25x33x25	0.984	25	5 570	7 470	10 100	18 000
25,000	24,991	35,009	35,025	K25x35x25	0.984	25	6 380	8 550	10 500	19 000
25,000	24,991	35,009	35,025	K25x35x30	1.181	30	7 520	10 100	13 000	19 000
25,400	25,390	33,348	33,363	—	—	—	—	—	—	—
25,400	25,390	33,348	33,363	—	—	—	—	—	—	—
25,400	25,390	33,348	33,363	—	—	—	—	—	—	—
26,000	25,991	30,007	30,020	K26x30x13	0.512	13	2 070	2 770	4 590	16 000
28,575	28,565	38,110	38,125	—	—	—	—	—	—	—
28,575	28,565	38,110	38,125	—	—	—	—	—	—	—

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0,2 mm.

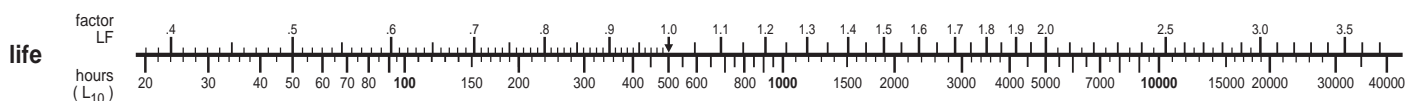
Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

Limiting speeds listed on this page are based on adequate oil lubrication.

Ⓣ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to the Torrington Engineering Sales Office before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.



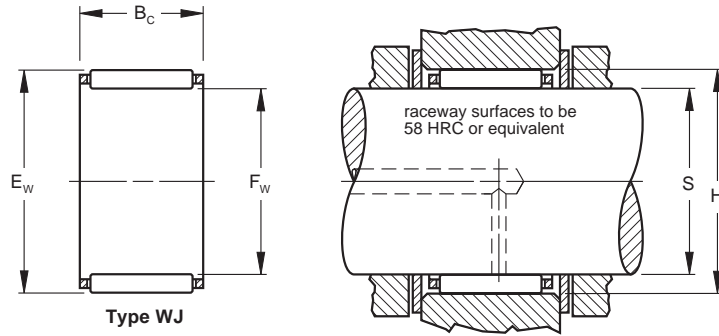


Type WJ (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



DIMENSIONS AND LOAD RATINGS – INCH SERIES

F _w Bore (nom.)	E _w Outside Diameter (nom.)		Assembly Designation	B _c Width		Load Ratings			Limiting Speed	BEARING MOUNTING				
						Basic Dynamic C _r	Basic Static C ₀			Inch Mounting		H Housing Bore		
							ISO 281	ISO 76		S Shaft Raceway Diameter	H Housing Bore			
				+0.000 -0.015	+0.00 -0.38	Ⓣ	lbf	lbf	lbf	rpm	inches		inches	
inch	mm	inch	mm	inch	mm						max.	min.	min.	max.
1.18	30	1.38	35	—	—	—	—	—	—	—	1.1811	1.1807	1.3783	1.3789
1.18	30	1.38	35	—	—	—	—	—	—	—	1.1811	1.1807	1.3783	1.3789
1.18	30	1.38	35	—	—	—	—	—	—	—	1.1811	1.1807	1.3783	1.3789
1.18	30	1.57	40	—	—	—	—	—	—	—	1.1811	1.1807	1.5752	1.5758
1.18	30	1.65	42	—	—	—	—	—	—	—	1.1811	1.1807	1.6539	1.6545
1 ¼	31.75	1 ½	41.28	WJ-202612	0.750	19.05	5 460	7 320	9 490	14 000	1.2500	1.2496	1.6254	1.6260
1 ¼	31.75	1 ½	41.28	WJ-202616	1.000	25.40	7 250	9 730	13 700	14 000	1.2500	1.2496	1.6254	1.6260
1 ¼	31.75	1 ½	41.28	WJ-202620	1.250	31.75	8 930	12 000	17 900	14 000	1.2500	1.2496	1.6254	1.6260
1 ¼	31.75	1 ½	41.28	WJ-202624	1.500	38.10	10 500	14 100	22 100	14 000	1.2500	1.2496	1.6254	1.6260
1.26	32	1.42	36	—	—	—	—	—	—	—	1.2598	1.2594	1.4177	1.4183
1.26	32	1.46	37	—	—	—	—	—	—	—	1.2598	1.2594	1.457	1.4577
1.26	32	1.46	37	—	—	—	—	—	—	—	1.2598	1.2594	1.457	1.4577
1.26	32	1.50	38	—	—	—	—	—	—	—	1.2598	1.2594	1.4964	1.497
1.26	32	1.54	39	—	—	—	—	—	—	—	1.2598	1.2594	1.5358	1.5364
1.26	32	1.54	39	—	—	—	—	—	—	—	1.2598	1.2594	1.5358	1.5364
1 ¾	34.92	1 ¾	44.45	WJ-222816	1.000	25.40	7 520	10 100	14 700	13 000	1.3750	1.3746	1.7504	1.7510
1 ¾	34.92	1 ¾	44.45	WJ-222820	1.250	31.75	9 260	12 400	19 200	13 000	1.3750	1.3746	1.7504	1.7510
1.38	35	1.57	40	—	—	—	—	—	—	—	1.378	1.3775	1.5752	1.5758
1.38	35	1.65	42	—	—	—	—	—	—	—	1.378	1.3775	1.6539	1.6545
1.38	35	1.65	42	—	—	—	—	—	—	—	1.378	1.3775	1.6539	1.6545
1.38	35	1.65	42	—	—	—	—	—	—	—	1.378	1.3775	1.6539	1.6545
1.46	37	1.65	42	—	—	—	—	—	—	—	1.4567	1.4563	1.6539	1.6545
1.50	38	1.81	46	—	—	—	—	—	—	—	1.4961	1.4956	1.8114	1.812
1.50	38	1.97	50	—	—	—	—	—	—	—	1.4961	1.4956	1.9689	1.9695
1 ½	38.10	1 ¾	47.62	WJ-243016	1.000	25.40	7 700	10 400	15 700	12 000	1.5000	1.4996	1.8754	1.8760
1 ½	38.10	1 ¾	47.62	WJ-243020	1.250	31.75	9 570	12 800	20 600	12 000	1.5000	1.4996	1.8754	1.8760
1 ½	38.10	1 ¾	47.62	WJ-243024	1.500	38.10	11 300	15 100	25 400	12 000	1.5000	1.4996	1.8754	1.8760

Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

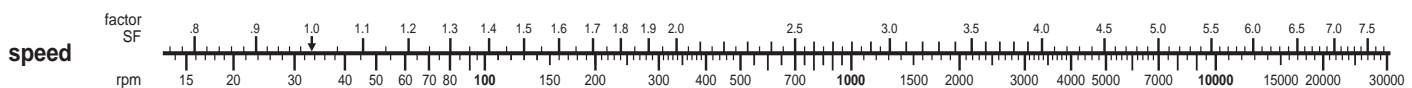
Limiting speeds listed on this page are based on adequate oil lubrication.

Ⓣ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to the Torrington Engineering Sales Office before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0.2 mm.



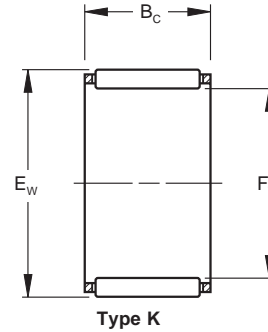


Type K (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore						Basic Dynamic C _r	Basic Static C ₀		
	millimeters							Ⓓ	ISO 281	
max.	min.	min.	max.	inch	mm	lbf	lbf	lbf	rpm	
30,000	29,991	35,009	35,025	K30x35x17	0.669	17	3 430	4 600	7 890	14 000
30,000	29,991	35,009	35,025	K30x35x20	0.787	20	3 970	5 330	9 530	14 000
30,000	29,991	35,009	35,025	K30x35x23	0.906	23	4 490	6 030	11 200	14 000
30,000	29,991	40,009	40,025	K30x40x30	1.181	30	8 290	11 100	15 400	15 000
30,000	29,991	42,009	42,025	K30x42x30	1.181	30	9 140	12 300	15 600	16 000
31,750	31,740	41,285	41,300	—	—	—	—	—	—	—
31,750	31,740	41,285	41,300	—	—	—	—	—	—	—
31,750	31,740	41,285	41,300	—	—	—	—	—	—	—
31,750	31,740	41,285	41,300	—	—	—	—	—	—	—
32,000	31,989	36,009	36,025	K32x36x15	0.591	15	1 950	2 620	4 550	13 000
32,000	31,989	37,009	37,025	K32x37x13	0.512	13	2 580	3 470	5 610	13 000
32,000	31,989	37,009	37,025	K32x37x17	0.669	17	3 390	4 550	7 930	13 000
32,000	31,989	38,009	38,025	K32x38x26	1.024	26	5 610	7 520	13 300	14 000
32,000	31,989	39,009	39,025	K32x39x16	0.630	16	3 900	5 240	7 530	14 000
32,000	31,989	39,009	39,025	K32x39x18	0.709	18	4 370	5 870	8 720	14 000
34,925	34,915	44,460	44,475	—	—	—	—	—	—	—
34,925	34,915	44,460	44,475	—	—	—	—	—	—	—
35,000	34,989	40,009	40,025	K35x40x13	0.512	13	2 750	3 690	6 240	12 000
35,000	34,989	42,009	42,025	K35x42x16	0.630	16	4 150	5 570	8 390	12 000
35,000	34,989	42,009	42,025	K35x42x18	0.709	18	4 650	6 240	9 720	12 000
35,000	34,989	42,009	42,025	K35x42x30	1.181	30	6 820	9 150	15 900	12 000
37,000	36,989	42,009	42,025	K37x42x13	0.512	13	2 880	3 860	6 750	11 000
38,000	37,989	46,009	46,025	K38x46x32	1.260	32	9 300	12 500	22 200	12 000
38,000	37,989	50,009	50,025	K38x50x33	1.299	33	11 500	15 400	22 200	12 000
38,100	38,090	47,635	47,650	—	—	—	—	—	—	—
38,100	38,090	47,635	47,650	—	—	—	—	—	—	—
38,100	38,090	47,635	47,650	—	—	—	—	—	—	—

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0.2 mm.

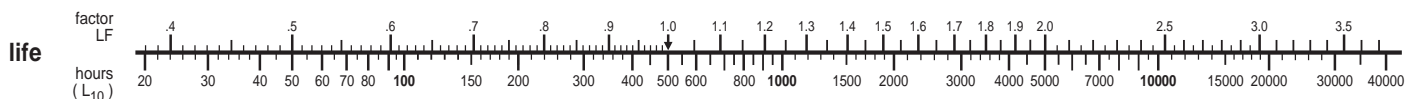
Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

Limiting speeds on this page are based on adequate oil lubrication.

Ⓓ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to our engineering department before a final selection is made.

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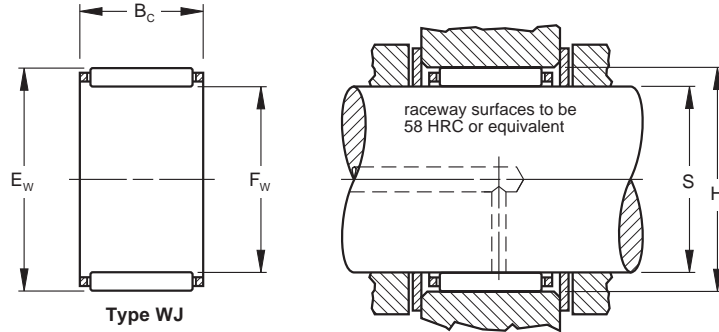


Type WJ (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



DIMENSIONS AND LOAD RATINGS – INCH SERIES										BEARING MOUNTING				
F _w Bore	E _w Outside Diameter		Assembly Designation	B _c Width		Load Ratings			Limiting Speed	Inch Mounting				
						Basic Dynamic C _r		Basic Static C ₀		S Shaft Raceway Diameter	H Housing Bore			
						ISO 281	ISO 76	inches					inches	
(nom.)	(nom.)		+0.000 -0.015	+0.00 -0.38	Ⓣ	lbf	lbf	lbf	rpm	max.	min.	min.	max.	
inch	mm	inch	mm	inch	mm	lbf	lbf	lbf	rpm	max.	min.	min.	max.	
1.57	40	1.77	45	—	—	—	—	—	—	1.5748	1.5744	1.7720	1.7726	
1.57	40	1.77	45	—	—	—	—	—	—	1.5748	1.5744	1.7720	1.7726	
1.57	40	1.85	47	—	—	—	—	—	—	1.5748	1.5744	1.8507	1.8513	
1.57	40	1.89	48	—	—	—	—	—	—	1.5748	1.5744	1.8901	1.8907	
1.57	40	1.89	48	—	—	—	—	—	—	1.5748	1.5744	1.8901	1.8907	
1.65	42	1.97	50	—	—	—	—	—	—	1.6535	1.6531	1.9689	1.9695	
1 3/4	44,45	2 1/8	53,98	WJ-283412	0.750	19,05	6 430	8 630	12 900	9 900	1.7500	1.7496	2.1254	2.1261
1 3/4	44,45	2 1/8	53,98	WJ-283416	1.000	25,40	8 550	11 500	18 700	9 900	1.7500	1.7496	2.1254	2.1261
1 3/4	44,45	2 1/8	53,98	WJ-283424	1.500	38,10	12 400	16 600	30 100	9 900	1.7500	1.7496	2.1254	2.1261
1.77	45	1.97	50	—	—	—	—	—	—	1.7717	1.7712	1.9689	1.9695	
1.77	45	2.09	53	—	—	—	—	—	—	1.7717	1.7712	2.087	2.0878	
1.77	45	2.36	60	—	—	—	—	—	—	1.7717	1.7712	2.3626	2.3633	
1.85	47	2.05	52	—	—	—	—	—	—	1.8504	1.85	2.0476	2.0484	
1.85	47	2.17	55	—	—	—	—	—	—	1.8504	1.85	2.1657	2.1665	
1.89	48	2.09	53	—	—	—	—	—	—	1.8898	1.8893	2.087	2.0878	
1.93	49	2.56	65	—	—	—	—	—	—	1.9291	1.9287	2.5594	2.5602	
1.97	50	2.17	55	—	—	—	—	—	—	1.9685	1.9681	2.1657	2.1665	
1.97	50	2.17	55	—	—	—	—	—	—	1.9685	1.9681	2.1657	2.1665	
1.97	50	2.20	56	—	—	—	—	—	—	1.9685	1.9681	2.2051	2.2059	
1.97	50	2.28	58	—	—	—	—	—	—	1.9685	1.9681	2.2839	2.2846	
1.97	50	2.28	58	—	—	—	—	—	—	1.9685	1.9681	2.2839	2.2846	
2	50,80	2 3/8	60,32	WJ-323812	0.750	19,05	6 970	9 350	15 000	8 600	2.0000	1.9995	2.3754	2.3761
2	50,80	2 3/8	60,32	WJ-323816	1.000	25,40	9 270	12 400	21 600	8 600	2.0000	1.9995	2.3754	2.3761
2	50,80	2 3/8	60,32	WJ-323820	1.250	31,75	11 400	15 300	28 200	8 600	2.0000	1.9995	2.3754	2.3761
2	50,80	2 3/8	60,32	WJ-323824	1.500	38,10	13 400	18 000	34 800	8 600	2.0000	1.9995	2.3754	2.3761
2.05	52	2.36	60	—	—	—	—	—	—	2.0472	2.0467	2.3626	2.3633	
2 1/16	52,39	2 7/16	61,91	WJ-333916	1.000	25,40	9 410	12 800	22 500	8 300	2.0625	2.0620	2.4379	2.4386
2 1/8	53,98	2 1/2	63,50	WJ-344016	1.000	25,40	8 400	11 600	20 100	8 000	2.1250	2.1245	2.5004	2.5011
2 1/8	53,98	2 1/2	63,50	WJ-344020	1.250	31,75	10 900	14 600	27 000	8 000	2.1250	2.1245	2.5004	2.5011
2 1/8	53,98	2 1/2	63,50	WJ-344024	1.500	38,10	13 000	17 400	34 000	8 000	2.1250	2.1245	2.5004	2.5011

Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

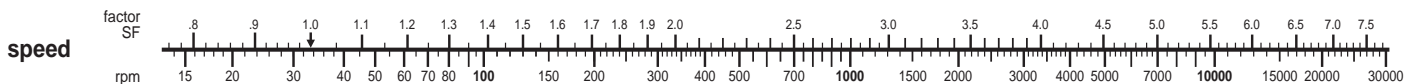
Limiting speeds listed on this page are based on adequate oil lubrication.

Ⓣ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to the Torrington Engineering Sales Office before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0,2 mm.



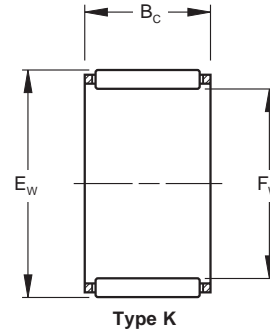


Type K (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore						Basic Dynamic C _r	Basic Static C ₀	Limiting Speed	
	millimeters	millimeters	millimeters							
max.	min.	min.	max.	inch	mm	lbf	lbf	lbf	rpm	
40,000	39,989	45,009	45,025	K40x45x17	0.669	17	4 040	5 420	10 700	11 000
40,000	39,989	45,009	45,025	K40x45x21	1.063	21	3 940	5 290	10 300	11 000
40,000	39,989	47,009	47,025	K40x47x18	0.709	18	4 750	6 370	10 400	11 000
40,000	39,989	48,009	48,025	K40x48x20	0.787	20	6 000	8 050	12 800	11 000
40,000	39,989	48,009	48,025	K40x48x35	1.378	35	9 650	12 900	23 600	11 000
42,000	41,989	50,009	50,025	K42x50x20	0.787	20	5 960	7 990	12 900	10 000
44,450	44,440	53,985	54,003	—	—	—	—	—	—	—
44,450	44,440	53,985	54,003	—	—	—	—	—	—	—
44,450	44,440	53,985	54,003	—	—	—	—	—	—	—
45,000	44,989	50,009	50,025	K45x50x17	0.669	17	4 230	5 670	11 800	9 400
45,000	44,989	53,010	53,029	K45x53x20	0.787	20	6 090	8 170	13 500	9 600
45,000	44,989	60,010	60,029	K45x60x45	1.772	45	18 200	24 400	36 200	10 000
47,000	46,989	52,010	52,029	K47x52x17	0.669	17	4 100	5 500	11 500	8 900
47,000	46,989	55,010	55,029	K47x55x28	1.102	28	8 260	11 100	20 300	9 200
48,000	47,989	53,010	53,029	K48x53x17	0.669	17	4 350	5 830	12 500	8 700
49,000	48,989	65,010	65,029	K49x65x38	1.496	38	16 900	22 600	32 200	9 300
50,000	49,989	55,010	55,029	K50x55x20	0.787	20	5 100	6 840	15 600	8 400
50,000	49,989	55,010	55,029	K50x55x30	1.181	30	6 430	8 630	20 900	8 400
50,000	49,989	56,010	56,029	K50x56x23	0.905	23	6 000	8 050	16 800	8 500
50,000	49,989	58,010	58,029	K50x58x20	0.787	20	6 560	8 800	15 400	8 600
50,000	49,989	58,010	58,029	K50x58x25	0.984	25	7 850	10 500	19 400	8 600
50,800	50,787	60,335	60,353	—	—	—	—	—	—	—
50,800	50,787	60,335	60,353	—	—	—	—	—	—	—
50,800	50,787	60,335	60,353	—	—	—	—	—	—	—
50,800	50,787	60,335	60,353	—	—	—	—	—	—	—
52,000	51,987	60,010	60,029	K52x60x24	0.945	24	7 960	10 700	20 000	8 200
52,388	52,375	61,923	61,941	—	—	—	—	—	—	—
53,975	53,962	63,510	63,528	—	—	—	—	—	—	—
53,975	53,962	63,510	63,528	—	—	—	—	—	—	—
53,975	53,962	63,510	63,528	—	—	—	—	—	—	—

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0.2 mm.

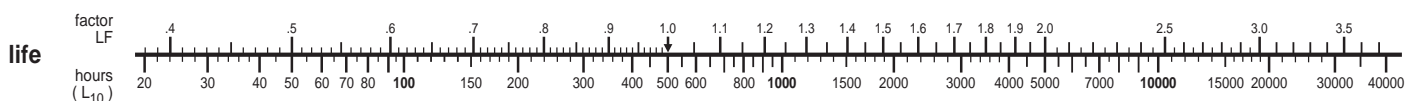
Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

Limiting speeds on this page are based on adequate oil lubrication.

Ⓓ Symbol denotes Torrington Basic Dynamic Load Rating to be used in load-life calculations taking into consideration the application guidelines and limitations given in this catalog. Applications involving loads approaching this rating should be referred to our engineering department before a final selection is made.

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.



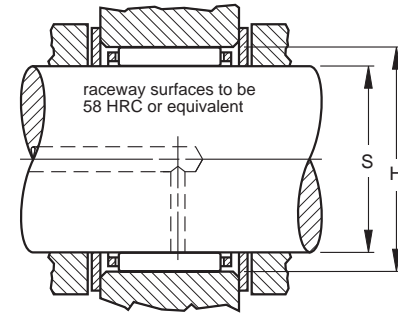
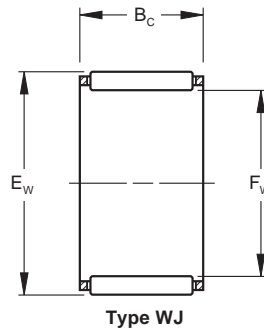


Type WJ (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



DIMENSIONS AND LOAD RATINGS – INCH SERIES

BEARING MOUNTING

F _w Bore (nom.)	E _w Outside Diameter (nom.)		Assembly Designation	B _c Width		Load Ratings			Limiting Speed	Inch Mounting				
						Basic Dynamic C _r	Basic Static C ₀			S Shaft Raceway Diameter inches	H Housing Bore inches			
							ISO 281	ISO 76					max.	min.
inch	mm	inch	mm	inch	mm	lbf	lbf	lbf	rpm	max.	min.	min.	max.	
2.17	55	2.36	60	—	—	—	—	—	—	2.1654	2.1648	2.3626	2.3633	
2.17	55	2.36	60	—	—	—	—	—	—	2.1654	2.1648	2.3626	2.3633	
2 3/16	55,56	2 7/16	65,09	WJ-354116	1.000	25,40	9 700	13 000	23 600	7 800	2.1875	2.1870	2.5629	2.5636
2 1/4	57,15	2 3/8	66,68	WJ-364216	1.000	25,40	8 810	11 800	21 000	7 500	2.2500	2.2495	2.6254	2.6261
2 1/4	57,15	2 3/8	66,675	WJ-364220	1.250	31,75	11 100	14 900	28 400	7 500	2.2500	2.2495	2.6254	2.6261
2 1/4	57,15	2 3/8	66,675	WJ-364224	1.500	38,10	13 200	17 800	35 500	7 500	2.2500	2.2495	2.6254	2.6261
2.36	60	2.56	65	—	—	—	—	—	—	2.3622	2.3617	2.5594	2.5602	
2.36	60	2.68	68	—	—	—	—	—	—	2.3622	2.3617	2.6776	2.6783	
2.36	60	2.68	68	—	—	—	—	—	—	2.3622	2.3617	2.6776	2.6783	
2 3/8	60,32	2 3/4	69,85	WJ-384424	1.500	38,10	13 500	18 100	37 000	7 100	2.3750	2.3745	2.7504	2.7511
2 1/2	63,50	2 7/8	73,02	WJ-404616	1.000	25,40	9 150	12 300	22 800	6 700	2.5000	2.4995	2.8754	2.8761
2 1/2	63,50	2 7/8	73,03	WJ-404620	1.250	31,75	11 600	15 500	30 800	6 700	2.5000	2.4995	2.8754	2.8761
2 1/2	63,50	2 7/8	73,02	WJ-404624	1.500	38,10	13 800	18 500	38 500	6 700	2.5000	2.4995	2.8754	2.8761
2.56	65	2.76	70	—	—	—	—	—	—	2.5591	2.5585	2.7563	2.7570	
2.56	65	2.87	73	—	—	—	—	—	—	2.5591	2.5585	2.8744	2.8752	
2 3/4	69,85	3 1/8	79,38	WJ-445016	1.000	25,40	9 470	12 700	24 600	6 100	2.7500	2.7495	3.1254	3.1261
2.95	75	3.27	83	—	—	—	—	—	—	2.9528	2.9522	3.2682	3.2691	
3	76,20	3 3/8	85,72	WJ-485416	1.000	25,40	9 790	13 100	26 400	5 600	3.0000	2.9995	3.3755	3.3764
3	76,20	3 3/8	85,72	WJ-485424	1.500	38,10	14 100	19 000	42 300	5 600	3.0000	2.9995	3.3755	3.3764
3 1/4	82,55	3 5/8	92,08	WJ-525816	1.000	25,40	10 100	13 500	28 100	5 100	3.2500	3.2494	3.6255	3.6264
3 1/4	82,55	3 5/8	92,08	WJ-525824	1.500	38,10	14 600	19 600	45 200	5 100	3.2500	3.2494	3.6255	3.6264
3 1/2	88,90	3 7/8	98,42	WJ-566216	1.000	25,40	10 400	13 900	29 900	4 700	3.5000	3.4994	3.8755	3.8764
3 1/2	88,90	4	101,60	WJ-566416	1.000	25,40	13 100	17 500	32 900	4 800	3.5000	3.4994	4.0005	4.0014
3 1/2	88,90	4	101,60	WJ-566424	1.500	38,10	18 800	25 200	52 500	4 800	3.5000	3.4994	4.0005	4.0014
4	101,60	4 1/2	114,30	WJ-647216	1.000	25,40	13 700	18 400	36 400	4 200	4.0000	3.9994	4.5005	4.5014
4	101,60	4 1/2	114,30	WJ-647224	1.500	38,10	19 700	26 400	58 200	4 200	4.0000	3.9994	4.5005	4.5014

Load ratings are given in pounds-force: 1 lbf = 0.454 kgf = 4.448 N

Required Basic Dynamic Load Rating (C_r) = Applied Load • SF • LF • HF (see page E75).

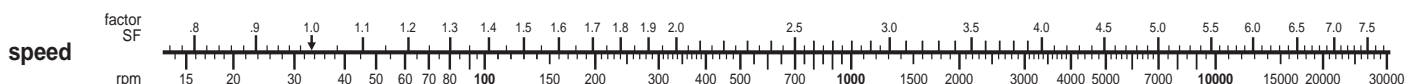
Limiting speeds listed on this page are based on adequate oil lubrication.

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Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

Minimum axial clearance should be .008 inches or 0,2 mm.



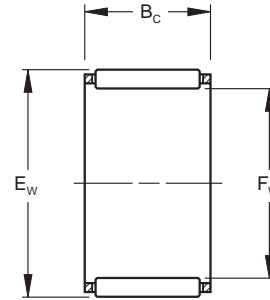


Type K (continued)

Check for availability.

Inch-metric conversions given are for the convenience of the user.

The controlling dimensions are in inches for nominal inch bearings and in millimeters for nominal metric bearings.



Type K

BEARING MOUNTING				DIMENSIONS AND LOAD RATINGS – METRIC SERIES						
Metric Mounting				Assembly Designation	B _c Width		Load Ratings			Limiting Speed
S Shaft Raceway Diameter	H Housing Bore						Basic Dynamic C _r	Basic Static C ₀		
	millimeters						Ⓓ	ISO 281	ISO 76	
max.	min.	min.	max.	inch	mm	lbf	lbf	lbf	rpm	
55,000	54,987	60,010	60,029	K55x60x17	0.669	17	4400	5910	13300	7600
55,000	54,987	60,010	60,029	K55x60x20	0.787	20	5200	6980	16500	7600
55,562	55,549	65,098	65,116	—	—	—	—	—	—	—
57,150	57,137	66,685	66,703	—	—	—	—	—	—	—
57,150	57,137	66,685	66,703	—	—	—	—	—	—	—
57,150	57,137	66,685	66,703	—	—	—	—	—	—	—
60,000	59,987	65,010	65,029	K60x65x20	0.787	20	5390	7230	17800	6900
60,000	59,987	68,010	68,029	K60x68x23	0.905	23	8270	11100	22100	7100
60,000	59,987	68,010	68,029	K60x68x25	0.984	25	8720	11700	23600	7100
60,325	60,312	69,860	69,878	—	—	—	—	—	—	—
63,500	63,487	73,035	73,053	—	—	—	—	—	—	—
63,500	63,487	73,035	73,053	—	—	—	—	—	—	—
63,500	63,487	73,035	73,053	—	—	—	—	—	—	—
65,000	64,987	70,010	70,029	K65x70x30	1.181	30	7490	10000	27800	6400
65,000	64,987	73,010	73,029	K65x73x30	1.181	30	10100	13600	29300	6500
69,850	69,837	79,385	79,404	—	—	—	—	—	—	—
75,000	74,987	83,012	83,034	K75x83x23	0.906	23	8870	11900	26000	5600
76,200	76,187	85,738	85,761	—	—	—	—	—	—	—
76,200	76,187	85,738	85,761	—	—	—	—	—	—	—
82,550	82,535	92,008	92,111	—	—	—	—	—	—	—
82,550	82,535	92,008	92,111	—	—	—	—	—	—	—
88,900	88,885	98,438	98,461	—	—	—	—	—	—	—
88,900	88,885	101,613	101,636	—	—	—	—	—	—	—
88,900	88,885	101,613	101,636	—	—	—	—	—	—	—
101,600	101,585	114,313	114,336	—	—	—	—	—	—	—
101,600	101,585	114,313	114,336	—	—	—	—	—	—	—

Mounting - The recommended shaft and housing bore diameters listed above are essential to the proper application of the needle roller and cage assemblies. Proper mounting requires that all surfaces adjacent to the assemblies must have a hardness equivalent to 58 HRC, minimum. The raceway with the lower hardness determines the ability of the assembly to carry the load.

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