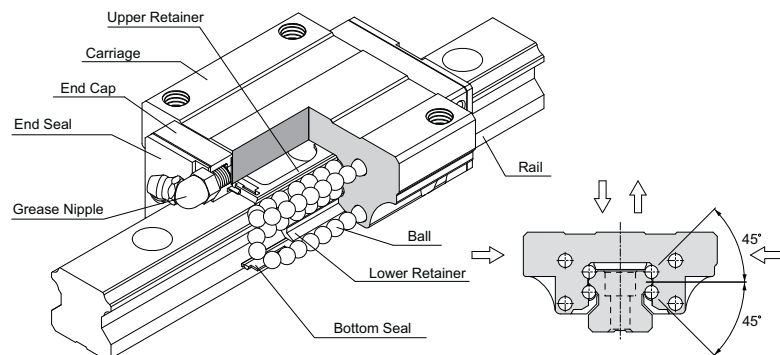


12 Introduction of Each Series

12.1 Heavy Load Type, MSA Series

A. Construction



B. Characteristics

The trains of balls are designed to a contact angle of 45° which enables it to bear an equal load in radial, reversed radial and lateral directions. Therefore, it can be applied in any installation direction. Furthermore, MSA series can achieve a well balanced preload for increasing rigidity in four directions while keeping a low frictional resistance. This is especially suit to high precision and high rigidity required motion.

The patent design of lubrication route makes the lubricant evenly distribute in each circulation loop. Therefore, the optimum lubrication can be achieved in any installation direction, and this promotes the performance in running accuracy, service life, and reliability.

High Rigidity, Four-way Equal Load

The four trains of balls are allocated to a circular contact angle at 45°, thus each train of balls can take up an equal rated load in all four directions. Moreover, a sufficient preload can be achieved to increase rigidity, and this makes it suitable for any kind of installation.

Smooth Movement with Low Noise

The simplified design of circulating system with strengthened synthetic resin accessories makes the movement smooth and quiet.

Self Alignment Capability

The self adjustment is performed spontaneously as the design of face-to-face (DF) circular arc groove. Therefore, the installation error could be compensated even under a preload, and which results in precise and smooth linear motion.

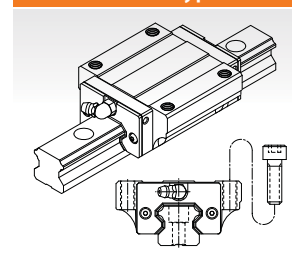
Interchangeability

For interchangeable type of linear guideway, the dimensional tolerances are strictly maintained within a reasonable range, and this has made the random matching of the same size of rails and carriages possible. Therefore, the similar preload and accuracy can be obtained even under the random matching condition. As a result of this advantage, the linear guideway can be stocked as standard parts, the installation and maintenance become more convenient. Moreover, this is also beneficial for shortening the delivery time.

C. Carriage Type

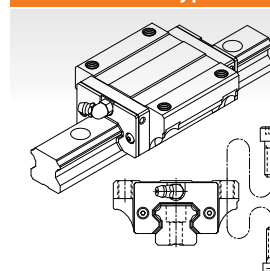
Heavy Load

MSA-A Type



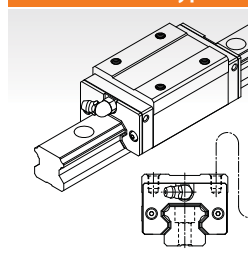
Installed from top side of carriage with the thread length longer than MSA-E type.

MSA-E Type



This type offers the installation either from top or bottom side of carriage.

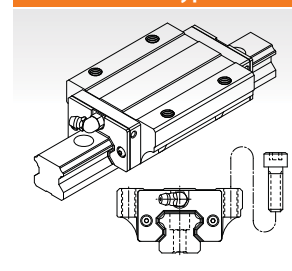
MSA-S Type



Square type with smaller width and can be installed from top side of carriage.

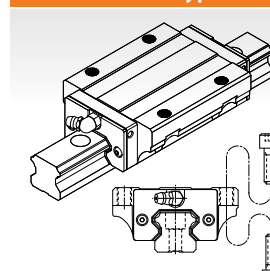
Ultra Heavy Load

MSA-LA Type



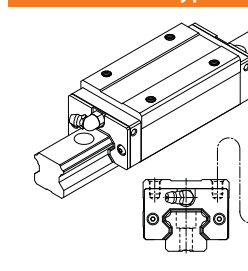
All dimensions are same as MSA-A except the length is longer, which makes it more rigid.

MSA-LE Type



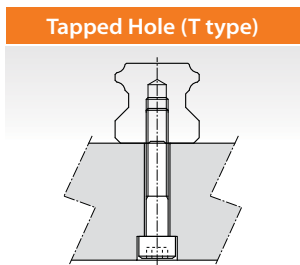
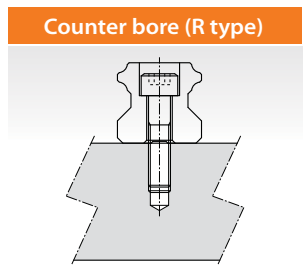
All dimensions are same as MSA-E except the length is longer, which makes it more rigid.

MSA-LS Type



All dimensions are same as MSA-S except the length is longer, which makes it more rigid.

D. Rail Type



E. Description of Specification

(1) Non-Interchangeable Type

	MSA	25	A	2	SS	F0	+R	1200	-20	/40	P	II
Series : MSA												
Size : 15, 20, 25, 30, 35, 45, 55, 65												
Carriage type : (1) Heavy load												
A : Flange type, mounting from top												
E : Flange type, mounting either from top or bottom												
S : Square type												
(2) Ultra heavy load												
LA : Flange type, mounting from top												
LE : Flange type, mounting either from top or bottom												
LS : Square type												
Number of carriages per rail : 1, 2, 3 ...												
Dust protection option of carriage :												
No symbol, UU, SS, ZZ, DD, KK, LL, RR (see page B85)												
Preload : FC (Light preload), F0 (Medium preload), F1 (Heavy preload) (see page B27)												
Code of special carriage : No symbol, A, B ...												
Rail type : R (Counter-bore type), T (Tapped hole type)												
Rail length (mm)												
Rail hole pitch from start side (E1, see Fig.12.1)												
Rail hole pitch to the end side (E2, see Fig.12.1)												
Accuracy grade : N, H, P, SP, UP												
Code of special rail : No symbol, A, B ...												
Dust protection option of rail : No symbol, /CC, /MC (see page B85)												
Number of rails per axis : No symbol, II, III, IV ...												

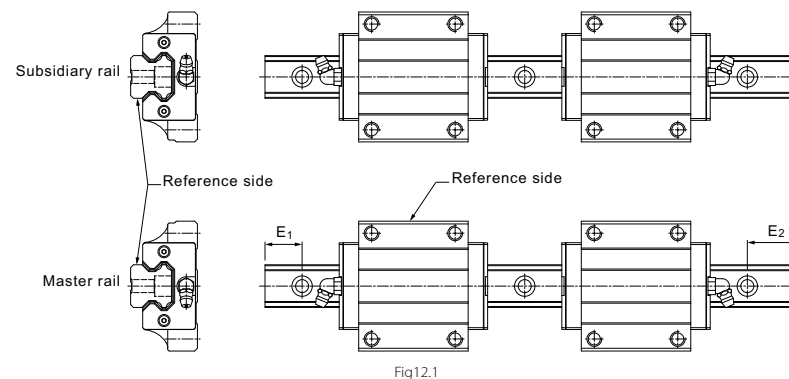


Fig12.1

(2) Interchangeable Type

	MSA	25	A	SS	FC	N
Code of Carriage						
Series : MSA						
Size : 15, 20, 25, 30, 35, 45, 55, 65						
Carriage type : (1) Heavy load						
A : Flange type, mounting from top						
E : Flange type, mounting either from top or bottom						
S : Square type						
(2) Ultra heavy load						
LA : Flange type, mounting from top						
LE : Flange type, mounting either from top or bottom						
LS : Square type						
Dust protection option of carriage : No symbol, UU, SS, ZZ, DD, KK, LL, RR (see page B85)						
Preload : FC (Light preload) (see page B27)						
Accuracy grade : N, H						
Code of special carriage : No symbol, A, B ...						
Code of Rail						
Series : MSA						
Size : 15, 20, 25, 30, 35, 45, 55, 65						
Rail type : R (Counter-bore type), T (Tapped hole type)						
Rail length (mm)						
Rail hole pitch from start side (E1, see Fig.12.1)						
Rail hole pitch to the end side (E2, see Fig.12.1)						
Accuracy grade : N, H						
Code of special rail : No symbol, A, B ...						
Dust protection option of rail : No symbol, /CC, /MC (see page B85)						

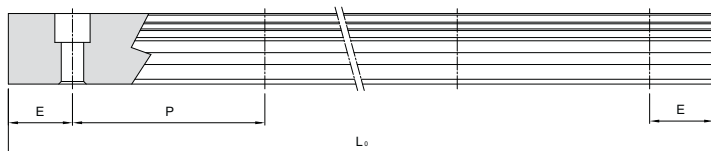
F. Accuracy Grade | For details, see page B24

G. Preload Grade | For details, see page B27

H. The Shoulder Height and Corner Radius for Installation | For details, see page B73

I. Dimensional Tolerance of Mounting Surface | For details, see page B75

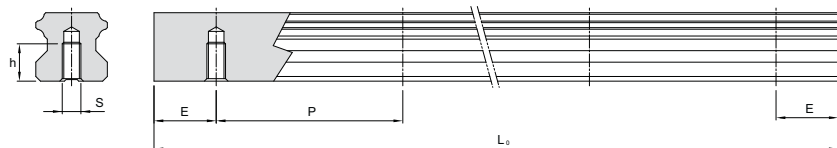
J. Rail Maximum Length and Standrad



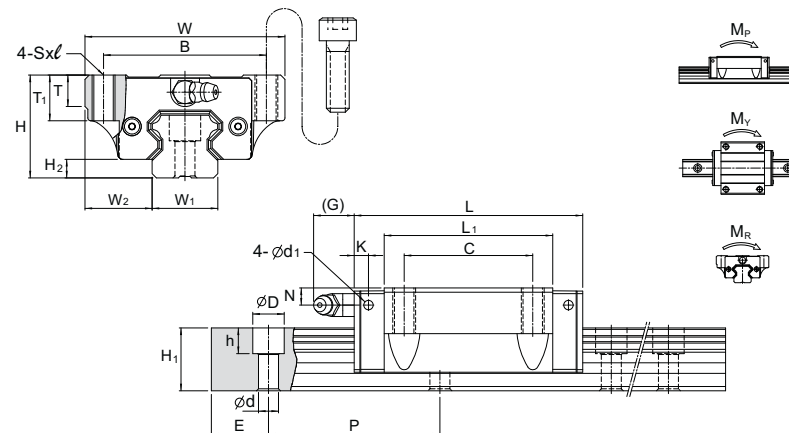
Unit: mm

Model No.	MSA 15	MSA 20	MSA 25	MSA 30	MSA 35	MSA 45	MSA 55	MSA 65
Standard Pitch (P)	60	60	60	80	80	105	120	150
Standard (E_{std.})	20	20	20	20	20	22.5	30	35
Minimum (E_{min.})	5	6	7	8	8	11	13	14
Max (L₀ max.)	2000	4000	4000	4000	4000	4000	4000	4000

K. Tapped-hole Rail Dimensions



Rail Model	S	h(mm)
MSA 15 T	M5	8
MSA 20 T	M6	10
MSA 25 T	M6	12
MSA 30 T	M8	15
MSA 35 T	M8	17
MSA 45 T	M12	24
MSA 55 T	M14	24
MSA 65 T	M20	30



Unit: mm

Model No.	External dimension				Carriage dimension												
	Height H	Width W	Length L	W ₂	H ₂	B	C	S × ℓ	L ₁	T	T ₁	N	G	K	d ₁	Grease Nipple	
MSA 15 A	24	47	56.3	16	4.2	38	30	M5×11	39.3	7	11	4.3	7	3.2	3.3	G-M4	
MSA 20 A MSA 20 LA	30	63	72.9 88.8	21.5	5	53	40	M6×10	51.3 67.2	7	10	5	12	5.8	3.3	G-M6	
MSA 25 A MSA 25 LA	36	70	81.6 100.6	23.5	6.5	57	45	M8×16	59 78	11	16	6	12	5.8	3.3	G-M6	
MSA 30 A MSA 30 LA	42	90	97 119.2	31	8	72	52	M10×18	71.4 93.6	11	18	7	12	6.5	3.3	G-M6	
MSA 35 A MSA 35 LA	48	100	111.2 136.6	33	9.5	82	62	M10×21	81 106.4	13	21	8	11.5	8.6	3.3	G-M6	
MSA 45 A MSA 45 LA	60	120	137.7 169.5	37.5	10	100	80	M12×25	102.5 134.3	13	25	10	13.5	10.6	3.3	G-PT1/8	

Model No.	Rail dimension					Basic load rating		Static moment rating				Weight		
	Width W ₁	Height H ₁	Pitch P	E std.	D × h × d	Dynamic C kN	Static C ₀ kN	M _p kN-m		M _v kN-m		M _r kN-m	Carriage kg	Rail kg/m
								Single*	Double*	Single*	Double*			
MSA 15 A	15	15	60	20	7.5×5.3×4.5	11.8	18.9	0.12	0.68	0.12	0.68	0.14	0.18	1.5
MSA 20 A MSA 20 LA	20	18	60	20	9.5×8.5×6	19.2 23.3	29.5 39.3	0.23 0.39	1.42 2.23	0.23 0.39	1.42 2.23	0.29 0.38	0.4 0.52	2.4
MSA 25 A MSA 25 LA	23	22	60	20	11×9×7	28.1 34.4	42.4 56.6	0.39 0.67	2.20 3.52	0.39 0.67	2.20 3.52	0.48 0.63	0.62 0.82	3.4
MSA 30 A MSA 30 LA	28	26	80	20	14×12×9	39.2 47.9	57.8 77.0	0.62 1.07	3.67 5.81	0.62 1.07	3.67 5.81	0.79 1.05	1.09 1.43	4.8
MSA 35 A MSA 35 LA	34	29	80	20	14×12×9	52.0 63.6	75.5 100.6	0.93 1.60	5.47 8.67	0.93 1.60	5.47 8.67	1.25 1.67	1.61 2.11	6.6
MSA 45 A MSA 45 LA	45	38	105	22.5	20×17×14	83.8 102.4	117.9 157.3	1.81 3.13	10.67 16.95	1.81 3.13	10.67 16.95	2.57 3.43	2.98 3.9	11.5

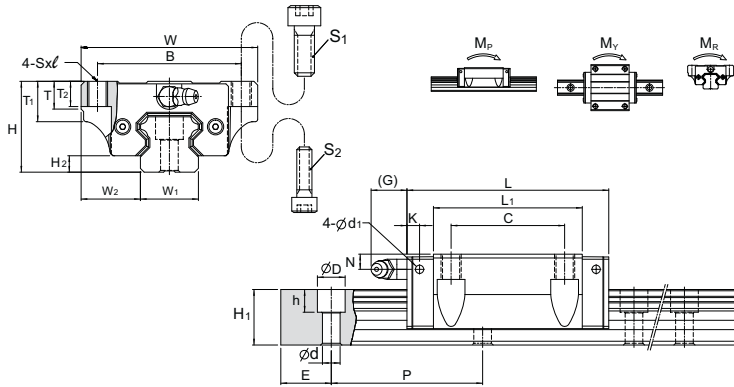
Note: Request for size 55 and 65 MSA-A / MSA-LA carriage, please refer to MSA-E / MSA-LE carriage type.

Note: The basic dynamic load rating C of ball type is based on the 50 km for nominal life. The conversion between C for 50 km and C₁₀₀ for 100 km is C=1.26 × C₁₀₀.

Note*: Single: Single carriage/ Double: Double carriages closely contacting with each other.

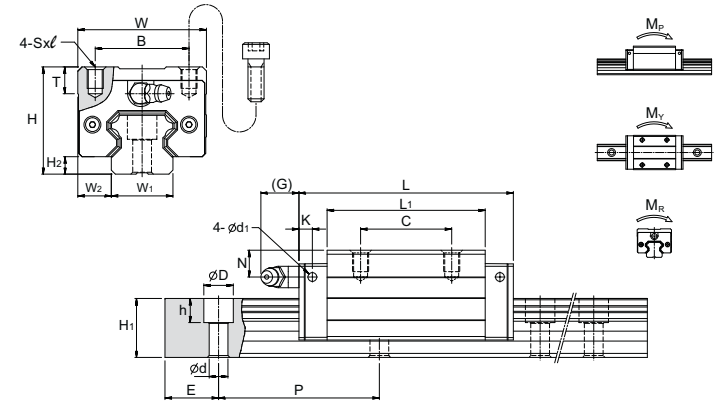
Dimensions of MSA-E / MSA-LE

Dimensions of MSA-S / MSA-LS



Model No.	Bolt Size	
	S ₁	S ₂
MSA 15	M5	M4
MSA 20	M6	M5
MSA 25	M8	M6
MSA 30	M10	M8
MSA 35	M10	M8
MSA 45	M12	M10
MSA 55	M14	M12
MSA 65	M16	M14

Unit: mm



Unit: mm

Model No.	External dimension				Carriage dimension												Grease Nipple
	Height H	Width W	Length L	W ₂	H ₂	B	C	S x ℓ	L ₁	T	T ₁	T ₂	N	G	K	d ₁	
MSA 15 E	24	47	56.3	16	4.2	38	30	M5x7	39.3	7	11	7	4.3	7	3.2	3.3	G-M4
MSA 20 E MSA 20 LE	30	63	72.9 88.8	21.5	5	53	40	M6x10	51.3 67.2	7	10	10	5	12	5.8	3.3	G-M6
MSA 25 E MSA 25 LE	36	70	81.6 100.6	23.5	6.5	57	45	M8x10	59 78	11	16	10	6	12	5.8	3.3	G-M6
MSA 30 E MSA 30 LE	42	90	97 119.2	31	8	72	52	M10x10	71.4 93.6	11	18	10	7	12	6.5	3.3	G-M6
MSA 35 E MSA 35 LE	48	100	111.2 136.6	33	9.5	82	62	M10x13	81 106.4	13	21	13	8	11.5	8.6	3.3	G-M6
MSA 45 E MSA 45 LE	60	120	137.7 169.5	37.5	10	100	80	M12x15	102.5 134.3	13	25	15	10	13.5	10.6	3.3	G-PT 1/8
MSA 55 E MSA 55 LE	70	140	161.5 199.5	43.5	13	116	95	M14x17	119.5 157.5	19	32	17	11	13.5	8.6	3.3	G-PT 1/8
MSA 65 E MSA 65 LE	90	170	199 253	53.5	15	142	110	M16x23	149 203	21.5	37	23	19	13.5	8.6	3.3	G-PT 1/8

Model No.	Rail dimension				Basic load rating		Static moment rating				Weight			
	Width W ₁	Height H ₁	Pitch P	E std.	D x h x d	Dynamic C kN	Static C ₀ kN	M _p kN-m		M _v kN-m		M _R kN-m	Carriage kg	Rail kg/m
								Single*	Double*	Single*	Double*			
MSA 15 E	15	15	60	20	7.5x5.3x4.5	11.8	18.9	0.12	0.68	0.12	0.68	0.14	0.18	1.5
MSA 20 E MSA 20 LE	20	18	60	20	9.5x8.5x6	19.2 23.3	29.5 39.3	0.23 0.39	1.42 2.23	0.23 0.39	1.42 2.23	0.29 0.38	0.4 0.52	2.4
MSA 25 E MSA 25 LE	23	22	60	20	11x9x7	28.1 34.4	42.4 56.6	0.39 0.67	2.20 3.52	0.39 0.67	2.20 3.52	0.48 0.63	0.62 0.82	3.4
MSA 30 E MSA 30 LE	28	26	80	20	14x12x9	39.2 47.9	57.8 77.0	0.62 1.07	3.67 5.81	0.62 1.07	3.67 5.81	0.79 1.05	1.09 1.43	4.8
MSA 35 E MSA 35 LE	34	29	80	20	14x12x9	52.0 63.6	75.5 100.6	0.93 1.60	5.47 8.67	0.93 1.60	5.47 8.67	1.25 1.67	1.61 2.11	6.6
MSA 45 E MSA 45 LE	45	38	105	22.5	20x17x14	83.8 102.4	117.9 157.3	1.81 3.13	10.67 16.95	1.81 3.13	10.67 16.95	2.57 3.43	2.98 3.9	11.5
MSA 55 E MSA 55 LE	53	44	120	30	23x20x16	123.6 151.1	169.8 226.4	3.13 5.40	17.57 28.11	3.13 5.40	17.57 28.11	4.50 6.00	4.17 5.49	15.5
MSA 65 E MSA 65 LE	63	53	150	35	26x22x18	198.8 253.5	265.3 375.9	6.11 11.84	33.71 57.32	6.11 11.84	33.71 57.32	8.36 11.84	8.73 11.89	21.9

Model No.	External dimension				Carriage dimension												Grease Nipple
	Height H	Width W	Length L	W ₂	H ₂	B	C	S x ℓ	L ₁	T	N	G	K	d ₁			
MSA 15 S	28	34	56.3	9.5	4.2	26	26	M4x5	39.3	7.2	8.3	7	3.2	3.3	G-M4		
MSA 20 S MSA 20 LS	30	44	72.9 88.8	12	5	32	50	M5x6	51.3 67.2	8	5	12	5.8	3.3	G-M6		
MSA 25 S MSA 25 LS	40	48	81.6 100.6	12.5	6.5	35	50	M6x8	59 78	10	10	12	5.8	3.3	G-M6		
MSA 30 S MSA 30 LS	45	60	97 119.2	16	8	40	60	M8x10	71.4 93.6	11.7	10	12	6.5	3.3	G-M6		
MSA 35 S MSA 35 LS	55	70	111.2 136.6	18	9.5	50	72	M8x12	81 106.4	12.7	15	12	11.5	8.6	3.3	G-M6	
MSA 45 S MSA 45 LS	70	86	137.7 169.5	20.5	10	60	80	M10x17	102.5 134.3	16	20	13.5	10.6	3.3	G-PT 1/8		
MSA 55 S MSA 55 LS	80	100	161.5 199.5	23.5	13	75	95	M12x18	119.5 157.5	18	21	13.5	8.6	3.3	G-PT 1/8		
MSA 65 S MSA 65 LS	90	126	199 253	31.5	15	76	120	M16x20	149 203	23	19	13.5	8.6	3.3	G-PT 1/8		

Model No.	Rail dimension				Basic load rating		Static moment rating				Weight			
	Width W ₁	Height H ₁	Pitch P	E std.	D x h x d	Dynamic C kN	Static C ₀ kN	M _p kN-m		M _v kN-m		M _R kN-m	Carriage kg	Rail kg/m
								Single*	Double*	Single*	Double*			
MSA 15 S	15	15	60	20	7.5x5.3x4.5	11.8	18.9	0.12	0.68	0.12	0.68	0.14	0.18	1.5
MSA 20 S MSA 20 LS	20	18	60	20	9.5x8.5x6	19.2 23.3	29.5 39.3	0.23 0.39	1.42 2.23	0.23 0.39	1.42 2.23	0.29 0.38	0.3 0.39	2.4
MSA 25 S MSA 25 LS	23	22	60	20	11x9x7	28.1 34.4	42.4 56.6	0.39 0.67	2.20 3.52	0.39 0.67	2.20 3.52	0.48 0.63	0.52 0.68	3.4
MSA 30 S MSA 30 LS	28	26	80	20	14x12x9	39.2 47.9	57.8 77.0	0.62 1.07	3.67 5.81	0.62 1.07	3.67 5.81	0.79 1.05	0.86 1.12	4.8
MSA 35 S MSA 35 LS	34	29	80	20	14x12x9	52.0 63.6	75.5 100.6	0.93 1.60	5.47 8.67	0.93 1.60	5.47 8.67	1.25 1.67	1.45 1.9	6.6
MSA 45 S MSA 45 LS	45	38	105	22.5	20x17x14	83.8 102.4	117.9 157.3	1.81 3.13	10.67 16.95	1.81 3.13	10.67 16.95	2.57 3.43	2.83 3.7	11.5
MSA 55 S MSA 55 LS	53	44	120	30	23x20x16	123.6 151.1	169.8 226.4	3.13 5.40	17.57 28.11	3.13 5.40	17.57 28.11	4.50 6.00	4.12 4.91	15.5
MSA 65 S MSA 65 LS	63	53	150	35	26x22x18	198.8 253.5	265.3 375.9	6.11 11.84	33.71 57.32	6.11 11.84	33.71 57.32	8.36 11.84	6.43 8.76	21.9

Note: The basic dynamic load rating C of ball type is based on the 50 km for nominal life. The conversion between C for 50 km and C₁₀₀ for 100 km is C=1.26 x C₁₀₀.

Note*: Single: Single carriage/ Double: Double carriages closely contacting with each other.

Note: The basic dynamic load rating C of ball type is based on the 50 km for nominal life. The conversion between C for 50 km and C₁₀₀ for 100 km is C=1.26 x C₁₀₀.

Note*: Single: Single carriage/ Double: Double carriages closely contacting with each other.