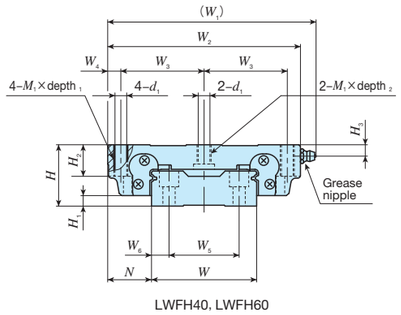
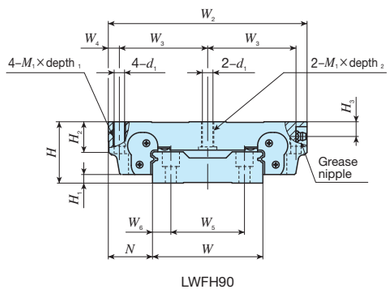
Flange type mounting from top / bottom

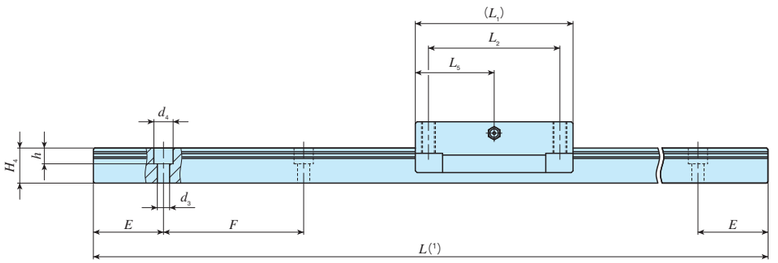
Shape	LWFH		
Size	40	60	90



LWFH40, LWFH60

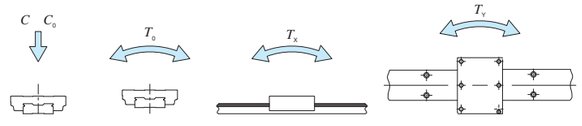


LWFH90



Identification number	Interchangeable	Mass(Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm												Dimensions of track rail mm									Appended mounting bolt for track rail (2) mm	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
LWF series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_5	d_1	M_1×depth 1	depth 2	H_2	H_3	W	H_4	W_5	W_6	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
LWFH 40	○	0.58	4.60	27	5	21	91	82	37	4	70	60	27.5	4.3	M 5×14	8	14	6.5	40	16	24	8	4.5	7.2	6	30	60	M4×16	12 600	16 600	280	108 612	99.3 563
LWFH 60	○	1.29	8.60	35	6	25	119	110	47.5	7.5	90	75	45	6.7	M 8×18	11	18	6.5	60	20	40	10	7	11	9	40	80	M6×22	16 100	23 500	600	210 1 090	193 998
LWFH 90	○	4.06	16.5	50	7	36	–	162	72	9	120	100	60	8.6	M10×20	20.5	26	12	90	25.5	60	15	9	14	12	40	80	M8×28	31 600	43 300	1 650	513 2 680	470 2 460

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−138.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. For size 40, small-head bolts are appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
Remark: The specifications of grease nipple are shown in Table 15 on page Ⅱ−146.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
LWFH	60	C2	R800	T1	P		/U
①	②	③	④	⑤	⑥	⑦	⑧

① Model

LWFH	Flange type mounting from top / bottom

② Size

40, 60, 90

③ Number of slide unit (2)

④ Length of track rail (800 mm)

⑤ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload

⑥ Accuracy class

H	High
P	Precision
SP	Super precision

⑦ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

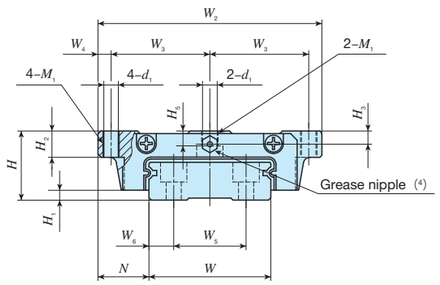
⑧ Special specification

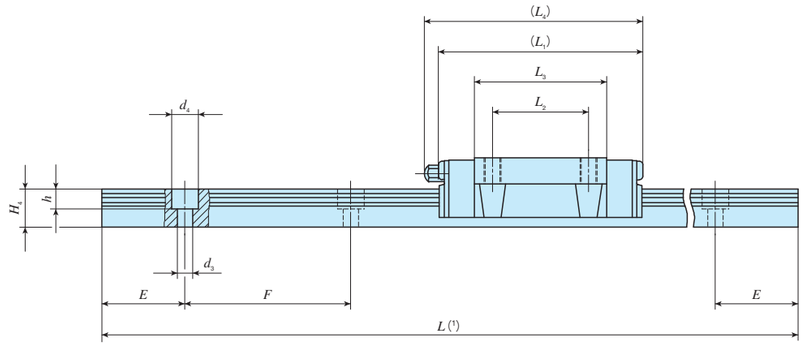
A, C, D, E, F, Ⅰ, J, L, LF
MN, N, Q, U, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Flange type mounting from top / bottom

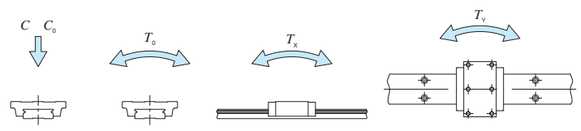
Shape	LWFF
Size	33 / 37 / 42 / 69





Identification number	Interchangeable	Mass(Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm												Dimensions of track rail mm									Appended mounting bolt for track rail (2) mm	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
LWF series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	d_1	M_1	H_2	H_3	H_5	W	H_4	W_5	W_6	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
LWFF 33	○	0.14	2.41	17	2.5	13.5	60	26.5	3.5	54	26	35.3	56	3.3	M4	6	3.2	3.7	33	10	18	7.5	4.6	8	6	20	40	M4×10	6 530	8 610	146	49.0 292	49.0 292
LWFF 37	○	0.23	3.05	21	3	15.5	68	30	4	62	29	40	66	4.4	M5	8	4	4.5	37	11.5	22	7.5	4.6	8	6	25	50	M4×12	9 840	12 200	235	80.0 480	80.0 480
LWFF 42	○	0.49	4.30	27	3	19	80	35	5	75	40	52.2	86	5.3	M6	10	6	7	42	14	24	9	4.6	8	6	30	60	M4×16	15 500	19 400	424	165 904	165 904
LWFF 69	○	1.40	9.51	35	4	25.5	120	53.5	6.5	109	60	79.5	120	7	M8	14	8	8	69	19.5	40	14.5	7	11	9	40	80	M6×22	34 900	44 100	1 560	581 2 940	488 2 460

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−138.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−146.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
LWFF	37	C2	R800	T1	P		/U
①	②	③	④	⑤	⑥	⑦	⑧

① Model

LWFF	Flange type mounting from top / bottom

② Size: 33, 37, 42, 69

③ Number of slide unit (2)

④ Length of track rail (800 mm)

⑤ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload

⑥ Accuracy class

H	High
P	Precision
SP	Super precision

⑦ Interchangeable

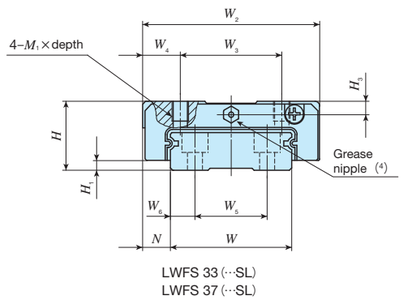
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑧ Special specification: A, D, E, F, Ⅰ, J, L, LF, MN, N, Q, U, V, W, Y, Z

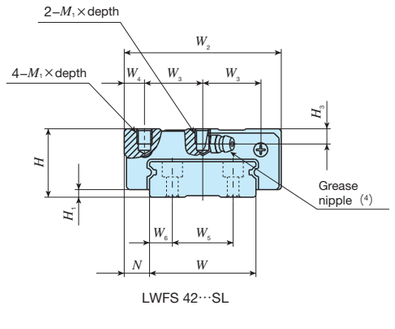
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Block type mounting from top

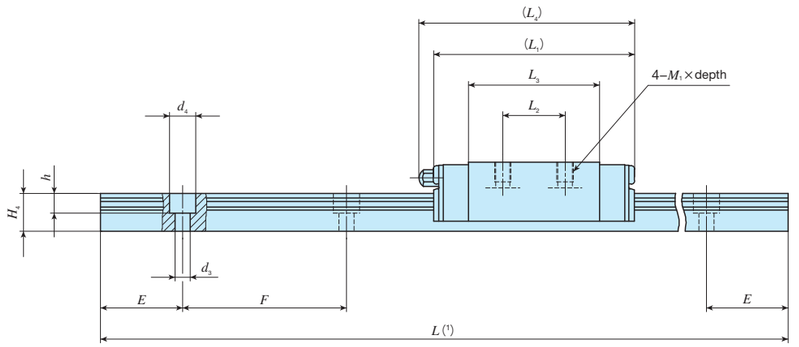
Shape	LWFS		
Size	33	37	42



LWFS 33 (···SL)
LWFS 37 (···SL)

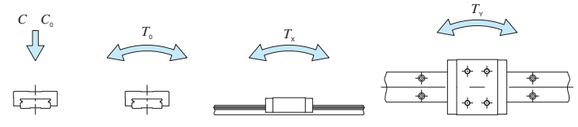


LWFS 42···SL



Identification number	Interchangeable	Mass(Ref.)		Dimensions of assembly			Dimensions of slide unit									Dimensions of track rail									Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
				mm			mm									mm									mm					
LWF series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	M_1×depth	H_3		W	H_4	W_5	W_6	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
LWFS 33	○	0.13	2.41	17	2.5	8.5	50	29	10.5	54	15	35.3	56	M4×5	3.2		33	10	18	7.5	4.6	8	6	20	40	M4×10	6 530	8 610	146	49.0 292	49.0 292
LWFS 33···SL	○																													
LWFS 37	○	0.20	3.05	21	3	8.5	54	31	11.5	62	19	40	66	M5×6	4		37	11.5	22	7.5	4.6	8	6	25	50	M4×12	9 840	12 200	235	80.0 480	80.0 480
LWFS 37···SL	○																													
LWFS 42···SL	○	0.40	4.30	27	3	10	62	23	8	75	32	52.2	86	M6×6	6		42	14	24	9	4.6	8	6	30	60	M4×16	15 500	19 400	424	165 904	165 904

Notes (1) Track rail lengths L are shown in Tables 2.1 and 2.2 on page Ⅱ−138.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. For stainless steel model, stainless steel bolts are appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−146.



Example of identification number of assembled set

Model code	Dimensions	Part code		Material code	Preload symbol	Classification symbol	Interchangeable code	Supplemental code
LWFS	37	C2	R800		T1	P		/U
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

LWFS	Block type mounting from top

② Size: 33, 37, 42

③ Number of slide unit (2)

④ Length of track rail (800 mm)

⑤ Material type

No symbol	High carbon steel made
SL	Stainless steel made

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑨ Special specification: A, D, E, F, Ⅰ, J, L, LF, MN, N, Q, U, V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

C-Lube Linear Way MUL
Linear Way U



C-Lube Linear Way MUL

MUL

C-Lube Maintenance-free

long term maintenance free supported!



Points

Original U-shaped track rail

1

MUL and LWU series are the linear motion rolling guides adopting the U-shaped track rail to greatly increase rigidity of track rail under moment load and torsion.

Expanded freedom of design for use as a structure beam

2

Because of the high rigidity of the track rail, the track rail can be used as a structure beam, such as a cantilever or both-end support in the machine and equipment. Therefore, freedom of design is expanded for user.

Additional machining available for corresponding to needs

3

High carbon steel track rail can be machined additionally to fix mechanical components such as a driving mechanism on the track rail directly at user.

Stainless steel selections superior in corrosion resistance are listed on lineup.

For details P.I-43

4

The main metal components made of corrosion-resistant stainless steel are available for small size of 25 mm and 30 mm of track rail width. They are suitable for applications where rust prevention oil is not preferred, such as in a cleanroom environment.

Identification Number and Specification

Example of an identification number

The specifications of MUL and LWU series are indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a part code, a preload symbol, a classification symbol, and any supplemental codes for each specification to apply.

	1	2	3	4	1	5	6	7
Assembled set	MUL	25	C2	R280		T1	H	/U

1 **Model** — Model code Page Ⅱ－159

2 **Size** — Dimensions Page Ⅱ－159

3 **Number of slide units**

Part code Page Ⅱ－159

4 **Length of track rail**

5 **Preload amount** — Preload symbol Page Ⅱ－161

6 **Accuracy class** — Classification symbol Page Ⅱ－161

7 **Special specification** — Supplemental code Page Ⅱ－162

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Identification Number and Specification –Model · Structure · Size · Number of Slide unit ·

1 Model

C-Lube Linear Way MUL (MUL series)	Small type	: MUL
Linear Way U (1) (LWU series)	Standard type	: LWU

For applicable models and sizes, see Table 1.

Note (1) This model has no built-in C-Lube.

2 Size

25,30,40,50,60,86 — For applicable models and sizes, see Table 1.

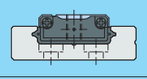
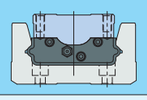
3 Number of slide units

: C○ — Indicates the number of slide units assembled on a track rail.

4 Length of track rail

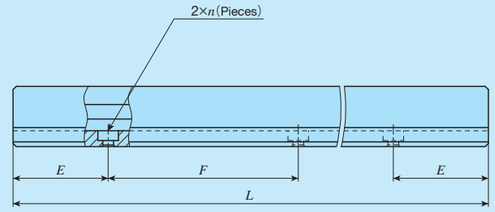
: R○ — Indicate the length of track rail in mm. For standard and maximum lengths, see Table 2.

Table 1 Models and sizes of MUL and LWU series

Shape	Material	Model	Size					
			25	30	40	50	60	86
Small type 	Stainless steel made	MUL	○	○	–	–	–	–
Standard type 	High carbon steel made	LWU···B	–	–	○	○	○	○

Length of Track Rail –

Table 2 Standard and maximum lengths of track rail



unit: mm

Item \ Identification number	MUL25	MUL30	LWU40···B	LWU50···B
Standard length L (n)	105 (3) 140 (4) 175 (5) 210 (6) 245 (7) 280 (8)	120 (3) 160 (4) 200 (5) 240 (6) 280 (7) 320 (8)	180 (3) 240 (4) 300 (5) 360 (6) 420 (7) 480 (8)	240 (3) 320 (4) 400 (5) 480 (6) 560 (7) 640 (8)
Pitch of mounting holes F	35	40	60	80
E	17.5	20	30	40
Standard E dimensions: or higher	4.5	4.5	–	–
Standard E dimensions: below	22	24.5	–	–
Maximum length (1)	420 (840)	480 (960)	720	800

Item \ Identification number	LWU60···B	LWU86···B
Standard length L (n)	300 (3) 400 (4) 500 (5) 600 (6) 700 (7) 800 (8)	300 (3) 400 (4) 500 (5) 600 (6) 700 (7) 800 (8)
Pitch of mounting holes F	100	100
E	50	50
Maximum length (1)	1 000	1 200

Note (1) Length up to the value in ( ) can be produced. If needed, please contact IKO.

Remarks 1. If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ－30.

MUL • LWU

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

5 Preload amount

Standard : No symbol
Light preload : T_1

For details of the preload amount, see Table 3.

Table 3 Preload amount

Item / Preload type	Preload symbol	Preload amount N	Operational conditions
Standard	(No symbol)	0 (1)	· Light and precise motion
Light preload	T_1	$0.02C_0$	· Almost no vibrations · Load is evenly balanced · Light and precise motion

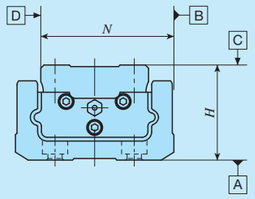
Note (1) Indicates zero or minimal amount of preload.
Remark: C_0 indicates the basic static load rating.

6 Accuracy class

Ordinary : No symbol
High : H

For details of accuracy class, see Table 4.

Table 4 Tolerance and allowance



unit: mm

Item \ Class (classification symbol)	Ordinary (No symbol)	High (H)
Dim. H tolerance	±0.100	±0.050
Dim. N tolerance	±0.100	±0.050
Dim. variation of H (1)	0.050	0.040
Dim. variation of N (1)	0.050	0.040
Parallelism in operation of the slide unit C surface to A surface	See Fig. 1	
Parallelism in operation of the slide unit D surface to B surface	See Fig. 1	

Note (1) It means the size variation between slide units mounted on the same track rail.

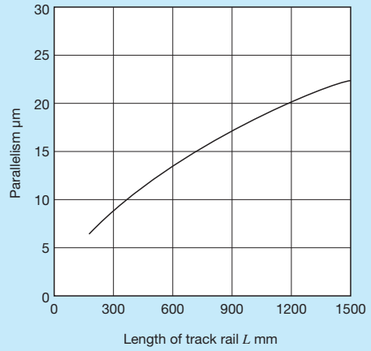


Fig. 1 Parallelism in operation

7 Special specification

/E, /L○, /MA, /Q, /U○, /W○

For applicable special specifications, see Table 5.
For combination of multiple special specifications, see Table 6.
For details of special specifications, see page Ⅲ—29.

Table 5 Application of special specifications

Special specification	Supplemental code	Size					
		25	30	40	50	60	86
Specified rail mounting hole positions	/E	○	○	×	×	×	×
Black chrome surface treatment	/L○	○(1)	○(1)	○	○	○	○
With track rail mounting bolt	/MA	○	○	○	○	○	○
With C-Lube plate	/Q	×	×	○	○	○	○
Upper seal	/U	○	○	×	×	×	×
A group of multiple assembled sets	/W○	○	○	○	○	○	○

Notes (1) Applicable only to "/LR".

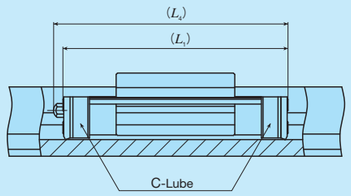
Table 6 Combination of supplemental codes

L	○				
MA	○	○			
Q	—	○	○		
U	○	○	○	—	
W	—	○	○	○	○
	E	L	MA	Q	U

Remarks 1. The combination of "—" shown in the table is not available.
2. When using multiple types for combination, please indicate by arranging the symbols in alphabetical order.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 7 Dimension of slide unit with C-Lube plate (Supplemental code /Q)

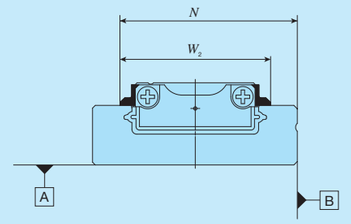


unit: mm

Size	L_1	L_4
40	67	68
50	82	83
60	95	100
86	142	146

Remark: The dimensions of the slide unit with C-Lube at both ends are indicated.

Table 8 Dimension of slide unit with upper seal (Supplemental code /U)



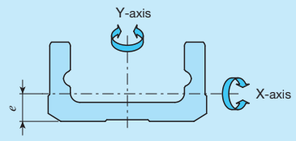
unit: mm

Size	N	W_2
25	21.4	18
30	25.9	22

Moment of Inertia of Sectional Area

High rigidity design of C-Lube Linear Way MUL and LWU are achieved by adopting a U-shaped track rail. The moment of inertia of sectional area of track rails are shown in Table 9.

Table 9 Moment of inertia of sectional area of track rails

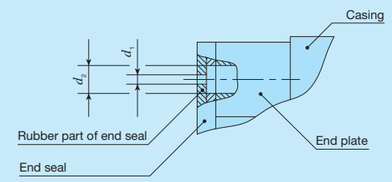


Identification number		Moment of inertia of sectional area mm⁴		Center of gravity e mm
		I_X	I_Y	
MUL	25	3.7×10^2	7.5×10^3	2.6
MUL	30	9.3×10^2	1.7×10^4	3.3
LWU	40···B	1.0×10^4	6.8×10^4	6.6
LWU	50···B	2.8×10^4	1.7×10^5	8.7
LWU	60···B	6.3×10^4	3.9×10^5	10.7 10.8
LWU	86···B	2.4×10^5	1.6×10^6	14.6

Lubrication

In the MUL series, lithium soap base grease (MULTEMP PS No.2, KYODO YUSHI) is prepacked, and in the LWU···B series, lithium soap base grease with extreme-pressure additive (Alvania EP grease 2 [Shell Lubricants Japan K.K.]) is prepacked. Additionally, MUL series has C-Lube placed in the recirculation part of balls, so that the interval for reapplicating lubricant can be extended and maintenance works such as grease job can be reduced significantly.
MUL series and LWU series have grease nipple or oil hole as indicated in Table 11. Supply nozzles fit to each shapes of grease nipple and dedicated supplying equipment (miniature greasers) fit to oil holes are also available. For order of these parts for lubrication, see Table 13 and Table 14.1 on page Ⅲ−23, and Table 15 on page Ⅲ−24.

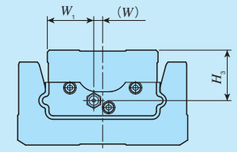
Table 10 Oil hole specifications



unit: mm

Size	d_1	d_2
25	0.5	1.2
30		1.5

Table 11 Lubrication parts and position of grease nipple



Size	Grease nipple type (1)	Applicable supply nozzle type	Bolt size of female threads for piping	Grease nipple position mm		
				W_1	W	H_3
25	Oil hole	Miniature greaser MG10B/MT2	–	7	0	2.9
30				9	0	3.75
40	A-M4	A-5120V A-5240V B-5120V B-5240V	M4	13	0	10.5
50				17	0	13.5
60	JIS type 1	Grease gun available on the market	M6	19	0	14.5
86				23.5	4.5	25.5

Note (1) For grease nipple specification, see Tables 14.1 and 14.2 on page Ⅲ−23.
Remark: Stainless steel grease nipple is also available. If needed, please contact IKO.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Dust Protection

The slide units of MUL series and LWU series are equiped with end seals and upper seals as standard for dust protection. However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the track rail, it is recommended to attach a protective cover to the linear motion mechanism.

Precaution for Use

❶ Mounting surface, reference mounting surface and typical mounting structure

When mounting the MUL series and LWU series, properly align the reference mounting surfaces B and D of the track rail and slide unit with the reference mounting surface of the table and bed and fix them. (See Fig. 2)

The reference mounting surfaces B and D and mounting surfaces A and C are precisely ground. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable linear motion with high accuracy.

Reference mounting surfaces of slide unit and track rail of the MUL series and LWU series are the opposite side of the IKO mark. (See Fig. 3)

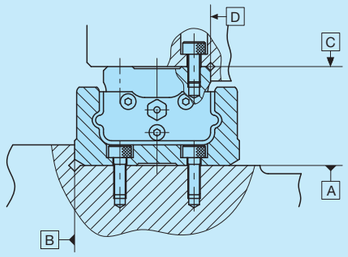


Fig. 2 Reference mounting surface and typical mounting structure

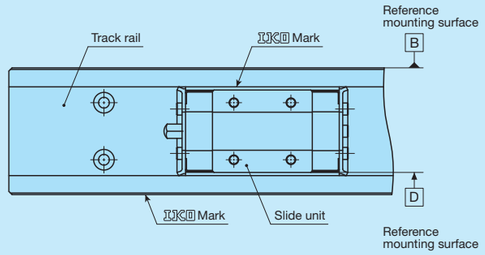


Fig. 3 Reference mounting surface

❷ Shoulder height and corner radius of the reference mounting surface

For the opposite corner of the mating reference mounting, it is recommended to have relieved fillet as indicated in Fig. 4. Recommended value for the shoulder height and corner radius on the mating side is indicated in Table 13.

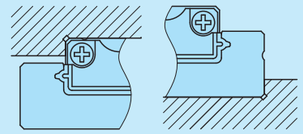


Fig. 4 Corner of the mating reference mounting

❸ Tightening torque for fixing screw

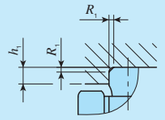
Typical tightening torque for mounting of the MUL series and LWU series to the steel mating member material is indicated in Table 12. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated in the table as necessary. If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.

Table 12 Tightening torque for fixing screw

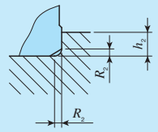
Bolt size	Tightening torque N · m	
	Stainless steel-made screw	High carbon steel-made screw
M 2.5×0.45	0.62	–
M 3 ×0.5	1.1	1.8
M 4 ×0.7	2.5	4.1
M 5 ×0.8	–	8.0
M 6 ×1	–	13.6

Remarks 1. The tightening torque is calculated based on strength division 12.9 and property division A2-70.
2. For the tightening torque of cross-recessed pan head screws for precision equipment, see Table 22 on page III-38.

Table 13 Shoulder height and corner radius of the reference mounting surface



Mounting part of slide unit



Mounting part of track rail

unit: mm

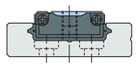
Size	Mounting part of slide unit		Mounting part of track rail	
	Shoulder height h_1	Corner radius R_1 (Maximum)	Shoulder height h_2	Corner radius R_2 (Maximum) (1)
25	1.5	0.2	2.5	–
30	2.5	0.2	3	–
40	3	0.5	5	1
50	3	0.5	7	2
60	3	0.5	9	2
86	4	0.5	11	2

Note (1) In sizes 25 and 30, provide a relieved fillet as shown in Fig. 4.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Small type

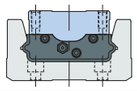
Shape: MUL



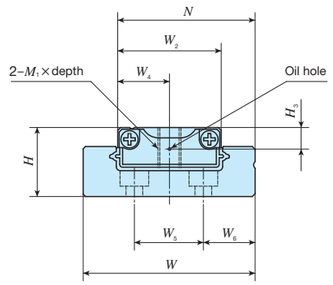
Size: 25 | 30

Standard type

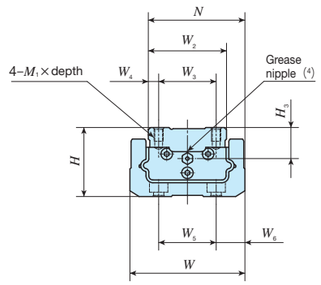
Shape: LWU...B



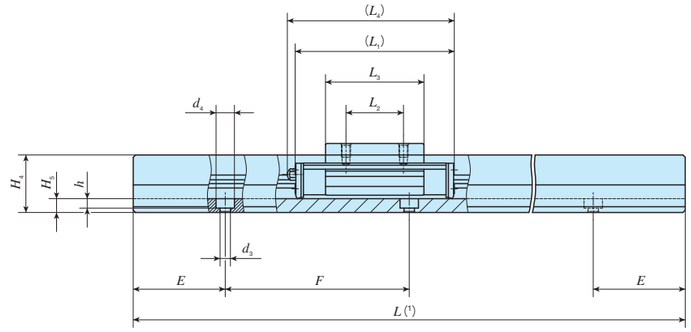
Size: 40 | 50 | 60 | 86



MUL

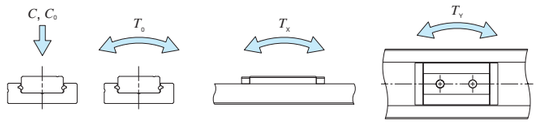


LWU...B



Identification number		Interchangeable	Mass(Ref.)		Dimensions of assembly mm		Dimensions of slide unit mm									Dimensions of track rail mm									Appended mounting bolt for track rail (2) mm	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MUL series	LWU series (No C-Lube)		Slide unit kg	Track rail kg/m	H	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	$M_1\times$ depth	H_3	W		H_4	H_5	W_5	W_6	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MUL 25	–	–	0.013	0.87	9	19.4	14	–	7	31	12	22	–	M 3× 5	2.9	24.9		6.7	3.2	9	8	2.9	4.8	1.6	17.5	35	Cross-recessed pan head screw for precision equipment (Class 3) M 2.5 × 6	1 770	2 840	20.3	10.1 53.7	8.4 45.0
MUL 30	–	–	0.028	1.39	12	23.9	18	–	9	38	14	28.6	–	M 4× 7	3.75	29.9		8.7	4.5	12	9	2.9	5	2.7	20	40	M 2.5× 6	2 280	3 810	34.9	16.9 87.5	14.2 73.4
–	LWU 40···B	–	0.12	2.65	24	33	26	18	4	55	18	31.5	59	M 3× 5	10.5	40		19	5	18	11	3.4	6.5	3.1	30	60	M 3 × 8 (Not appended)	8 410	9 780	134	53.0 351	53.0 351
–	LWU 50···B	–	0.27	4.06	30	42	34	25	4.5	70	25	42.8	73	M 4× 6	13.5	50		25	6	25	12.5	4.5	8	4.1	40	80	M 4 ×10 (Not appended)	13 500	15 800	280	114 711	114 711
–	LWU 60···B	–	0.40	6.66	35	49	38	28	5	83	28	52.4	88	M 5× 8	14.5	60		30	8	28	16	5.5	9.5	5.4	50	100	M 5 ×12 (Not appended)	18 800	21 600	425	181 1 150	181 1 150
–	LWU 86···B	–	1.32	14.1	48	71	56	46	5	130	46	93	134	M 6×12	25.5	86		42	13	46	20	7	11	7	50	100	M 6 ×16 (Not appended)	41 400	51 500	1 470	764 4 120	764 4 120

Notes (1) Track rail lengths L are shown in Table 2 on page Ⅱ−160.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176 or cross-recessed pan head screw for precision equipment. For the size 25 and 30 series, stainless steel bolts are appended.
Track rail mounting bolts are not appended for MUL series.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 11 on page Ⅱ−164.
Remark: The specification of oil hole is shown in Table 10 on page Ⅱ−164.



Example of identification number of assembled set

Model code	Dimensions	Part code		Model code	Preload symbol	Classification symbol	Supplemental code
MUL	25	C2	R280		T1	H	/LR
①	②	③	④	①	⑤	⑥	⑦

① Model

MUL	Small type
LWU…B	Standard type

② Size: 25, 30, 40, 50, 60, 86

③ Number of slide unit (2)

④ Length of track rail (280 mm)

⑤ Preload amount

No symbol	Standard
T1	Light preload

⑥ Accuracy class

No symbol	Ordinary
H	High

⑦ Special specification: E, LR, MA, Q, U, W

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

C-Lube Linear Roller Way Super MX
Linear Roller Way Super X



C-Lube Linear Roller Way Super MX

MX

C-Lube Maintenance-free

long term maintenance free supported!



Points

1 Roller type linear motion rolling guides having the highest level of rolling guide performance

For details P.I-21

Linear motion rolling guide that has achieved the highest level of performance in all characteristics, including load capacity, rigidity, friction characteristics and accuracy, brought about by utilizing the roller's excellent characteristic.

2 Wide range of variations for your needs

For details P.I-28

A wide variety of products, including five types of different slide unit shape such as the flange type, low profile flange type and low profile block type with low cross sectional height, etc., and four types of different slide unit length with varying lengths with same section are available. You can select an optimal product for the specifications of your machine and device.

3 Extra long unit

For details P.I-29

Extra long slide unit series having the length 1.4 to 1.5 times of standard type is now available. With more rollers built into the slide units, the new series not only have the enhanced load capacity and rigidity but also exhibit super accuracy running performance.

4 Stainless steels selections superior in corrosion resistance are listed on lineup.

For details P.I-43

A series of stainless steel products is available from the miniature size of track rail width 10 mm. They are highly corrosion-resistant and suitable for applications where rust prevention oil is not preferred, such as in cleanroom environment.

5 Easy replacement from ball type

For details P.I-24

Mounting dimensions are compatible with MH / LWH series of ball type. Therefore, replacement to roller type is possible without major design changes of machine and device.

Identification Number and Specification

Example of an identification number

The specifications of MX and LRX series are indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a part code, a material code, a preload symbol, a classification symbol, an interchangeable code, and any supplemental codes for each specification to apply.

	1	2	3	4	5	6	7	8	9	10
Non-interchangeable specification										
Assembled set	MX	G	15	C2	R240		T_1	P		/Z
Interchangeable specification										
Single slide unit	MX	G	15	C1			T_1	P	S1	/Z
Single track rail (1)	LRX		15		R240			P	S1	
Assembled set	MX	G	15	C2	R240		T_1	P	S1	/Z

1 **Model** — Model code Page Ⅱ－173

2 **Length of slide unit** — Model code Page Ⅱ－173

3 **Size** — Dimensions Page Ⅱ－173

4 **Number of slide units** — Part code Page Ⅱ－174

5 **Length of track rail** — Part code Page Ⅱ－174

6 **Material type** — Material code Page Ⅱ－174

7 **Preload amount** — Preload symbol Page Ⅱ－177

8 **Accuracy class** — Classification symbol Page Ⅱ－178

9 **Interchangeable** — Interchangeable code Page Ⅱ－179

10 **Special specification** — Supplemental code Page Ⅱ－179

Note (1) Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit model.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Identification Number and Specification —Model · Length of Slide Unit · Size—

1 Model

C-Lube Linear Roller Way Super MX (MX series)	Flange type mounting from top / bottom	: MX (2)
	Block type mounting from top	: MXD
	Compact block type mounting from top	: MXS
	Low profile flange type mounting from top	: MXN
	Low profile block type mounting from top	: MXNS
Linear Roller Way Super X (1) (LRX series)	Flange type mounting from top / bottom	: LRX (2)
	Block type mounting from top	: LRXD
	Compact block type mounting from top	: LRXS

For applicable models and sizes, see Table 1.1 and Table 1.2.
Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit models.

Notes (1) This model has no built-in C-Lube.
(2) Series of size 20 can only be mounted by the bolts from top. The models with the same dimensions allowing mounting from bottom are "MXH" and "LRXH."

2 Length of slide unit

Short	: C	For applicable models and sizes, see Table 1.1 and Table 1.2.
Standard	: No symbol	
Long	: G	
Extra long	: L	

3 Size

10, 12, 15, 20, 25, 30, 35, 45, 55, 65, 85, 100 — For applicable models and sizes, see Table 1.1 and Table 1.2.

Table 1.1 Models and sizes of MX and LRX series

Material	Shape	Slide unit Length	Model	Size 10	12	15	20	25	30	35	45	55	65	85	100
High carbon steel made	Flange type mounting from top / bottom	Short	MXC	–	○	○	○(1)	○	○	○	○	○	○	–	–
			LRXC	–	○	○	○(1)	○	○	○	○	○	○	–	–
		Standard	MX	–	○	○	○(1)	○	○	○	○	○	○	–	–
			LRX	–	○	○	○(1)	○	○	○	○	○	○	○	–
		Long	MXG	–	○	○	○(1)	○	○	○	○	○	○	–	–
			LRXG	–	○	○	○(1)	○	○	○	○	○	○	○	○
		Extra long	MXL	–	–	–	○(1)	○	○	○	○	○	○	–	–
			LRXL	–	–	–	–	–	–	–	–	–	–	○	–
	Block type mounting from top	Short	MXDC	–	○	○	○	○	○	○	○	○	○	–	–
			LRXDC	–	○	○	○	○	○	○	○	○	○	–	–
		Standard	MXD	–	○	○	○	○	○	○	○	○	○	–	–
			LRXD	–	○	○	○	○	○	○	○	○	○	○	–
		Long	MXDG	–	○	○	○	○	○	○	○	○	○	–	–
			LRXDG	–	○	○	○	○	○	○	○	○	○	○	–
		Extra long	MXDL	–	–	–	○	○	○	○	○	○	○	–	–
			LRXDL	–	–	–	–	–	–	–	–	–	–	○	–

Note (1) MXC20, MX20, MXG20, MXL20, LRXC20, LRX20 and LRXG20 can only be mounted by the bolts from top.
The models with the same dimensions allowing mounting from bottom are MXHC20, MXH20, MXHG20, MXHL20, LRXHC20, LRXH20 and LRXHG20.
Remark: For the models indicated in ▭, the interchangeable specification is available.

—Number of Slide Unit · Length of Track Rail · Material Type—

4 Number of slide units

: C○ — For an assembled set, indicates the number of slide units assembled on a track rail. For a single slide unit, only "C1" is specified.

5 Length of track rail

: R○ — Indicate the length of track rail in mm.
For the standard and maximum lengths, see Table 2.1, Table 2.2, Table 2.3 and Table 2.4.

6 Material type

High carbon steel made	: No symbol	For applicable models and sizes, see Table 1.1 and Table 1.2.
Stainless steel made (1)	: SL	

Note (1) Mount a standard grease nipple (brass) on the stainless steel type, too.
Stainless steel grease nipple is also available. If needed, please contact IKO.

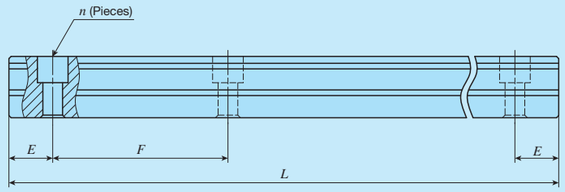
Table 1.2 Models and sizes of MX and LRX series

Material	Shape	Slide unit Length	Model	Size 10	12	15	20	25	30	35	45	55	65	85	100
High carbon steel made	Compact block type mounting from top	Short	MXSC	–	–	○	○	○	○	–	–	–	–	–	–
			LRXSC	–	–	○	○	○	○	–	–	–	–	–	–
		Standard	MXS	–	–	○	○	○	○	○	○	○	–	–	–
			LRXS	–	–	○	○	○	○	–	–	–	–	–	–
		Long	MXSG	–	–	○	○	○	○	○	○	○	–	–	–
			LRXSG	–	–	○	○	○	○	–	–	–	–	–	–
		Extra long	MXSL	–	–	–	○	○	○	–	–	–	–	–	–
	Low profile flange type mounting from top	Standard	MXN	–	–	–	–	–	○	○	○	○	–	–	–
		Long	MXNG	–	–	–	–	–	○	○	○	○	–	–	–
		Extra long	MXNL	–	–	–	–	–	○	○	○	○	–	–	–
	Low profile block type mounting from top	Standard	MXNS	–	–	–	–	–	○	○	○	○	–	–	–
		Long	MXNSG	–	–	–	–	–	○	○	○	○	–	–	–
		Extra long	MXNSL	–	–	–	–	–	○	○	○	○	–	–	–
Stainless steel made	Block type mounting from top	Short	LRXDC···SL	–	○	○	○	○	○	–	–	–	–	–	–
		Standard	MXD···SL	○	○	○	○	○	○	–	–	–	–	–	–
			LRXD···SL	○	○	○	○	○	○	–	–	–	–	–	–
		Long	LRXDG···SL	–	○	○	○	○	○	–	–	–	–	–	–

Remark: For the models indicated in ▭, the interchangeable specification is available.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 2.1 Standard and maximum length of high carbon steel track rail



unit: mm

Item \ Identification number	MX 12 LRX12	MX 15 LRX15	MX 20 LRX20	MX 25 LRX25	MX 30 LRX30	MX 35 LRX35
Standard length L (n)	80 (2) 160 (4) 240 (6) 320 (8) 400 (10) 480 (12) 560 (14) 640 (16) 720 (18)	180 (3) 240 (4) 360 (6) 480 (8) 660 (11)	240 (4) 480 (8) 660 (11) 840 (14) 1 020 (17) 1 200 (20) 1 500 (25)	240 (4) 480 (8) 660 (11) 840 (14) 1 020 (17) 1 200 (20) 1 500 (25)	480 (6) 640 (8) 800 (10) 1 040 (13) 1 200 (15) 1 520 (19)	480 (6) 640 (8) 800 (10) 1 040 (13) 1 200 (15) 1 520 (19)
Pitch of mounting holes F	40	60	60	60	80	80
E	20	30	30	30	40	40
Standard E dimensions (1) or higher	5.5	7	8	9	10	10
Standard E dimensions (1) below	25.5	37	38	39	50	50
Maximum length (2)	1 480	1 500 (1 980)	1 980 (3 000)	3 000 (3 960)	2 960 (4 000)	2 960 (4 000)

Item \ Identification number	MX 45 LRX45	MX 55 LRX55	MX 65 LRX65	LRX85	LRXG100
Standard length L (n)	840 (8) 1 050 (10) 1 260 (12) 1 470 (14) 1 995 (19)	840 (7) 1 200 (10) 1 560 (13) 1 920 (16) 3 000 (25)	1 500 (10) 1 950 (13) 3 000 (20)	1 620 (9) 1 980 (11) 2 340 (13) 2 700 (15)	1 500 (10) 1 950 (13) 3 000 (20)
Pitch of mounting holes F	105	120	150	180	150
E	52.5	60	75	90	75
Standard E dimensions (1) or higher	12.5	15	17	23	29
Standard E dimensions (1) below	65	75	92	113	104
Maximum length (2)	2 940 (3 990)	3 000 (3 960)	3 000 (3 900)	2 880	3 000

Notes (1) This does not apply to female threads for bellows (Supplemental code "/J").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit models.
3. In the case where track rail mounting hole is half pitch specification (Supplemental code "/HP"), see Table 2.3.
4. If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.

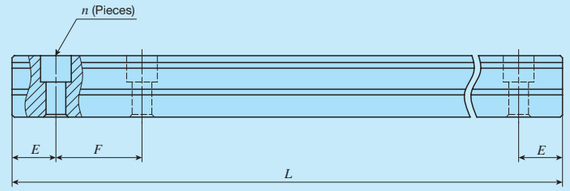
Table 2.2 Standard and maximum length of stainless steel track rail

unit: mm

Item \ Identification number	MXD 10···SL LRXD10···SL	MX 12···SL LRX12···SL	MX 15···SL LRX15···SL	MX 20···SL LRX20···SL	MX 25···SL LRX25···SL	MX 30···SL LRX30···SL
Standard length L (n)	50 (2) 100 (4) 150 (6) 200 (8) 250 (10) 300 (12) 350 (14) 400 (16) 450 (18) 500 (20)	80 (2) 160 (4) 240 (6) 320 (8) 400 (10) 480 (12) 560 (14) 640 (16) 720 (18)	180 (3) 240 (4) 360 (6) 480 (8) 660 (11)	240 (4) 480 (8) 660 (11) 840 (14)	240 (4) 480 (8) 660 (11) 840 (14)	480 (6) 640 (8) 800 (10) 1 040 (13)
Pitch of mounting holes F	25	40	60	60	60	80
E	12.5	20	30	30	30	40
Standard E dimensions (1) or higher	5	5.5	7	8	9	10
Standard E dimensions (1) below	17.5	25.5	37	38	39	50
Maximum length (2)	850 (1 000)	1 000 (1 480)	1 200 (1 980)	1 200 (1 980)	1 200 (1 980)	1 200 (2 000)

Notes (1) This does not apply to female threads for bellows (Supplemental code "/J").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit models.
3. In the case where track rail mounting hole is half pitch specification (Supplemental code "/HP"), see Table 2.4.
4. If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.

Table 2.3 Standard and maximum length of high carbon steel track rail (Half pitch mounting holes specification supplemental code /HP)



unit: mm

Item \ Identification number	MX 12···/HP LRX12···/HP	MX 15···/HP LRX15···/HP	MX 20···/HP LRX20···/HP	MX 25···/HP LRX25···/HP	MX 30···/HP LRX30···/HP	MX 35···/HP LRX35···/HP
Standard length L (n)	80 (4) 160 (8) 240 (12) 320 (16) 400 (20) 480 (24) 560 (28) 640 (32) 720 (36)	180 (6) 240 (8) 360 (12) 480 (16) 660 (22)	240 (8) 480 (16) 660 (22) 840 (28) 1 020 (34) 1 200 (40) 1 500 (50)	480 (16) 660 (22) 840 (28) 1 020 (34) 1 200 (40) 1 500 (50)	480 (12) 640 (16) 800 (20) 1 040 (26) 1 200 (30) 1 520 (38)	480 (12) 640 (16) 800 (20) 1 040 (26) 1 200 (30) 1 520 (38)
Pitch of mounting holes F	20	30	30	30	40	40
E	10	15	15	15	20	20
Standard E dimensions (1) or higher	5.5	7	8	9	10	10
Standard E dimensions (1) below	15.5	22	23	24	30	30
Maximum length (2)	1 480	1 500 (1 980)	1 980 (3 000)	3 000 (3 960)	2 960 (4 000)	2 960 (4 000)

Item \ Identification number	MX 45···/HP LRX45···/HP	MX 55···/HP LRX55···/HP	MX 65···/HP LRX65···/HP	LRX85···/HP
Standard length L (n)	840 (16) 1 050 (20) 1 260 (24) 1 470 (28) 1 995 (38)	840 (14) 1 200 (20) 1 560 (26) 1 920 (32) 3 000 (50)	1 500 (20) 1 950 (26) 3 000 (40)	1 620 (18) 1 980 (22) 2 340 (26) 2 700 (30)
Pitch of mounting holes F	52.5	60	75	90
E	26.25	30	37.5	45
Standard E dimensions (1) or higher	12.5	15	17	23
Standard E dimensions (1) below	38.75	45	54.5	68
Maximum length (2)	2 940 (3 990)	3 000 (3 960)	3 000 (3 900)	2 970

Notes (1) This does not apply to female threads for bellows (Supplemental code "/J").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit models.
3. If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.

Table 2.4 Standard and maximum length of stainless steel track rail (Half pitch mounting holes specification supplemental code /HP)

unit: mm

Item \ Identification number	MX 12···SL/HP LRX12···SL/HP	MX 15···SL/HP LRX15···SL/HP	MX 20···SL/HP LRX20···SL/HP	MX 25···SL/HP LRX25···SL/HP	MX 30···SL/HP LRX30···SL/HP
Standard length L (n)	80 (4) 160 (8) 240 (12) 320 (16) 400 (20) 480 (24) 560 (28) 640 (32) 720 (36)	180 (6) 240 (8) 360 (12) 480 (16) 660 (22)	240 (8) 480 (16) 660 (22) 840 (28)	480 (16) 660 (22) 840 (28)	480 (12) 640 (16) 800 (20) 1 040 (26)
Pitch of mounting holes F	20	30	30	30	40
E	10	15	15	15	20
Standard E dimensions (1) or higher	5.5	7	8	9	10
Standard E dimensions (1) below	15.5	22	23	24	30
Maximum length (2)	1 000 (1 480)	1 200 (1 980)	1 200 (1 980)	1 200 (1 980)	1 200 (2 000)

Notes (1) This does not apply to female threads for bellows (Supplemental code "/J").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LRX" for the model code of the single track rail regardless of the series and the combination of slide unit models.
3. If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

—Preload Amount—

7 Preload amount

Standard	: No symbol	Specify this item for an assembled set or a single slide unit.
Light preload	: T_1	For details of the preload amount, see Table 3.
Medium preload	: T_2	For applicable preload types, see Table 4.
Heavy preload	: T_3	

Table 3 Preload amount

Item / Preload type	Preload symbol	Preload amount N	Operational conditions
Standard	(No symbol)	0(1)	· Light and precise motion
Light preload	T_1	0.02 C_0	· Almost no vibrations · Load is evenly balanced · Light and precise motion
Medium preload	T_2	0.05 C_0	· Medium vibration · Medium overhung load
Heavy preload	T_3	0.08 C_0	· Operation with vibration and/or shock · Overhanging load applied · Heavy cutting

Note (1) Indicates zero or minimal amount of preload.
Remark: C_0 indicates the basic static load rating.

Table 4 Application of preload

Size	Preload type (preload symbol)			
	Standard (No symbol)	Light preload (T_1)	Medium preload (T_2)	Heavy preload (T_3)
10	○	○	–	–
12	○	○	○	○
15	○	○	○	○
20	○	○	○	○
25	○	○	○	○
30	○	○	○	○
35	○	○	○	○
45	○	○	○	○
55	○	○	○	○
65	○	○	○	○
85	○	○	○	○
100	○	○	○	○

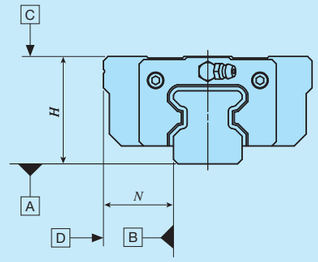
Remark: The mark ▭ indicates that interchangeable specification products are available.

—Accuracy Class—

8 Accuracy class

High	: H	For interchangeable specification products, assemble a slide unit and a track rail of the same accuracy class.
Precision	: P	For details of accuracy class, see Table 5.
Super precision	: SP	For applicable accuracy class, see Table 6.
Ultra precision	: UP	

Table 5 Tolerance and allowance



unit: mm

Item / Class (classification symbol)	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
Dim. H tolerance	±0.040	±0.020	±0.010	±0.008
Dim. N tolerance	±0.050	±0.025	±0.015	±0.010
Dim. variation of H (1)	0.015	0.007	0.005	0.003
Dim. variation of N (1)	0.020	0.010	0.007	0.003
Dim. variation of H for multiple assembled sets (2)	0.035	0.025	–	–
Parallelism in operation of the slide unit C surface to A surface	See Fig. 1			
Parallelism in operation of the slide unit D surface to B surface	See Fig. 1			

Notes (1) It means the size variation between slide units mounted on the same track rail.
(2) Applicable to the interchangeable specification.

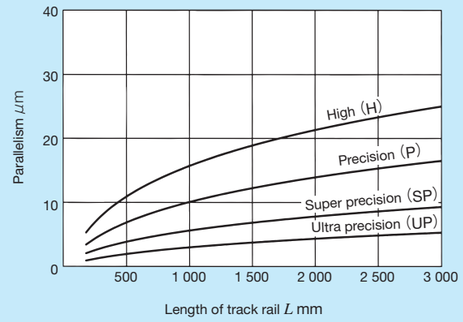


Fig. 1 Parallelism in operation

Table 6 Application of accuracy class

Size	Class (classification symbol)			
	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
10	○	○	○	○
12	○	○	○	○
15	○	○	○	○
20	○	○	○	○
25	○	○	○	○
30	○	○	○	○
35	○	○	○	○
45	○	○	○	○
55	○	○	○	○
65	○	○	○	○
85	○	○	○	○
100	○	○	○	○

Remark: The mark ▭ indicates that interchangeable specification products are available.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

9 Interchangeable

S1 specification	: S1	This is specified for the interchangeable specifications. Assemble a track rail and a slide unit with the same interchangeable code. When using in combination with different interchangeable codes, please contact IKO. Note that the combination of interchangeable codes will not have any effect on accuracy. For applicable models and sizes, see Table 1.1 and Table 1.2. "No symbol" is indicated for non-interchangeable specification.
S2 specification	: S2	
Non-interchangeable specification	: No symbol	

10 Special specification

/A, /D, /E, /F, /GE, /HP, /I, /J○, /L○, /LF○, /MA, /MN, /N, /PS, /Q, /RC○, /T, /UR, /V○, /W○, /Y○, /Z○

For applicable special specifications, see Tables 7.1, 7.2, 7.3, and 7.4. For combination of multiple special specifications, see Table 8. For details of special specifications, see page Ⅲ—29.

Table 7.1 Application of special specifications (Interchangeable specification, single slide unit)

Special specification	Supplemental code	Size											
		10	12	15	20	25	30	35	45	55	65	85	100
Changed pitch of slide unit middle mounting holes (1)	/GE	—	×	○	○	○	○	○	○	○	○	—	—
Female threads for bellows (2)	/J○	—	×	○	○	○	○	○	○	○	○	—	—
No end seal (3)	/N	—	○	○	○	○	○	○	○	×	×	—	—
With C-Lube plate (4)	/Q	—	○	○	○	○	○	○	○	○	○	—	—
Double end seals	/V○	—	○	○	○	○	○	○	○	○	○	—	—
Scrapers	/Z○	—	○	○	○	○	○	○	○	○	○	—	—

Notes (1) Applicable to flange type (MX, MXG, MXH20, MXHG20, LRX, LRXG, LRXH20, LRXHG20).
(2) Not applicable to stainless steel made products.
(3) Not applicable to low profile flange type (MXN, MXNG, MXNL) and low profile block type (MXNS, MXNSG, MXNSL).
(4) Applicable to LRX series.

Table 7.2 Application of special specifications (Interchangeable specification, single track rail)

Special specification	Supplemental code	Size											
		10	12	15	20	25	30	35	45	55	65	85	100
Specified rail mounting hole positions	/E	—	○	○	○	○	○	○	○	○	○	—	—
Caps for rail mounting holes	/F	—	○	○	○	○	○	○	○	○	○	—	—
Half pitch mounting holes for track rail	/HP	—	○	○	○	○	○	○	○	○	○	—	—
Female threads for bellows (1)	/J	—	×	○	○	○	○	○	○	○	○	—	—
Black chrome surface treatment	/LR	—	○	○	○	○	○	○	○	○	○	—	—
Without track rail mounting bolt	/MN	—	○	○	○	○	○	○	○	○	○	—	—
Butt-jointing track rails	/T	—	○	○	○	○	○	○	○	○	○	—	—

Note (1) Not applicable to stainless steel made products.

Table 7.3 Application of special specifications (Interchangeable specification, assembled set)

Special specification	Supplemental code	Size											
		10	12	15	20	25	30	35	45	55	65	85	100
Opposite reference surfaces arrangement	/D	—	○	○	○	○	○	○	○	○	○	—	—
Specified rail mounting hole positions	/E	—	○	○	○	○	○	○	○	○	○	—	—
Caps for rail mounting holes	/F	—	○	○	○	○	○	○	○	○	○	—	—
Changed pitch of slide unit middle mounting holes (1)	/GE	—	×	○	○	○	○	○	○	○	○	—	—
Half pitch mounting holes for track rail	/HP	—	○	○	○	○	○	○	○	○	○	—	—
Female threads for bellows (2)	/J○	—	×	○	○	○	○	○	○	○	○	—	—
Black chrome surface treatment	/L○	—	○	○	○	○	○	○	○	○	○	—	—
Fluorine black chrome surface treatment	/LF○	—	○	○	○	○	○	○	○	○	○	—	—
With track rail mounting bolt (3)	/MA	—	○	○	○	○	○	○	○	○	○	—	—
Without track rail mounting bolt (4)	/MN	—	○	○	○	○	○	○	○	○	○	—	—
No end seal (5)	/N	—	○	○	○	○	○	○	○	×	×	—	—
With C-Lube plate (4)	/Q	—	○	○	○	○	○	○	○	○	○	—	—
Butt-jointing track rails	/T	—	○	○	○	○	○	○	○	○	○	—	—
Double end seals	/V○	—	○	○	○	○	○	○	○	○	○	—	—
Specified grease (6)	/Y○	—	○	○	○	○	○	○	○	○	○	—	—
Scrapers	/Z○	—	○	○	○	○	○	○	○	○	○	—	—

Notes (1) Applicable to flange type (MX, MXG, MXH20, MXHG20, LRX, LRXG, LRXH20, LRXHG20).
(2) Not applicable to stainless steel made products.
(3) Applicable to MX series.
(4) Applicable to LRX series.
(5) Not applicable to low profile flange type (MXN, MXNG, MXNL) and low profile block type (MXNS, MXNSG, MXNSL).
(6) MX series is applicable only to /YCG.

Table 7.4 Application of special specifications (Non-interchangeable specification)

Special specification	Supplemental code	Size											
		10	12	15	20	25	30	35	45	55	65	85	100
Butt-jointing track rails	/A	○	○	○	○	○	○	○	○	○	○	○	○
Opposite reference surfaces arrangement	/D	○	○	○	○	○	○	○	○	○	○	○	○
Specified rail mounting hole positions	/E	○	○	○	○	○	○	○	○	○	○	○	○
Caps for rail mounting holes	/F	×	○	○	○	○	○	○	○	○	○	○	○
Changed pitch of slide unit middle mounting holes (1)	/GE	×	×	○	○	○	○	○	○	○	○	×	○
Half pitch mounting holes for track rail	/HP	×	○	○	○	○	○	○	○	○	○	○	×
Inspection sheet	/I	○	○	○	○	○	○	○	○	○	○	○	○
Female threads for bellows	/J○	×	×	○	○	○	○	○	○	○	○	○	×
Black chrome surface treatment	/L○	×	○	○	○	○	○	○	○	○	○	×	×
Fluorine black chrome surface treatment	/LF○	×	○	○	○	○	○	○	○	○	○	×	×
With track rail mounting bolt (2)	/MA	○	○	○	○	○	○	○	○	○	○	×	×
Without track rail mounting bolt (3)	/MN	○	○	○	○	○	○	○	○	○	○	○	○
No end seal (4)	/N	○	○	○	○	○	○	○	○	×	×	×	×
Rail cover plate for track rail (3)	/PS	×	×	×	×	×	×	○	○	○	×	×	×
With C-Lube plate (3)	/Q	○	○	○	○	○	○	○	○	○	○	○	×
C-Wiper (2) (5)	/RC○	×	×	×	○	○	○	○	○	○	○	×	×
Inner seal (2)	/UR	×	×	×	○	○	○	○	○	○	○	×	×
Double end seals	/V○	×	○	○	○	○	○	○	○	○	○	○	○
A group of multiple assembled sets (6)	/W○	○	○	○	○	○	○	○	○	○	○	○	×
Specified grease (7)	/Y○	○	○	○	○	○	○	○	○	○	○	○	○
Scrapers	/Z○	×	○	○	○	○	○	○	○	○	○	○	○

Notes (1) Applicable to flange type (MX, MXG, MXH20, MXHG20, LRX, LRXG, LRXH20, LRXHG20).
(2) Applicable to MX series.
(3) Applicable to LRX series.
(4) Not applicable to low profile flange type (MXN, MXNG, MXNL) and low profile block type (MXNS, MXNSG, MXNSL).
(5) Since inner seal and scraper are mounted simultaneously, indication of "/UR" or "/Z" is not necessary.
(6) LRX85, LRXG85, LRXL85, LRXD85, LRXDG85, LRXDL85 are applicable only to High (H) and Precision (P).
(7) MX series is applicable only to /YCG.

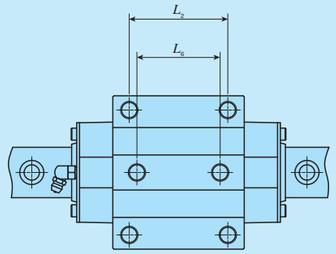
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 8 Combination of supplemental codes

	A	D	E	F	GE	HP	I	J	L	LF	MA	MN	N	PS	Q	RC	T	UR	V	W	Y
D	○																				
E	–	–																			
F	○	○	○																		
GE	○	○	○	○																	
HP	–	○	–	○	○																
I	○	○	○	○	○	○															
J	○	○	○	○	○	–	○														
L	○	○	○	○	○	○	○	○													
LF	○	○	○	○	○	○	○	○	–												
MA	○	○	○	○	○	○	○	○	○	○											
MN	○	○	○	○	○	○	○	○	○	○	–										
N	○	○	○	–	○	○	○	–	○	○	○	○									
PS	–	○	○	–	○	○	○	○	–	–	–	○	–								
Q	○	○	○	○	○	○	○	–	○	○	–	○	○	○							
RC	–	○	○	○	○	○	○	–	○	○	○	–	–	–	–						
T	–	○	○	○	○	○	–	–	○	○	○	○	○	–	○	–					
UR	–	○	○	○	○	○	○	○	○	○	○	–	–	–	–	–	–				
V	○	○	○	○	○	○	○	●	○	○	○	○	–	○	–	○	○	○			
W	○	○	–	○	○	○	○	○	○	○	○	○	○	○	○	○	–	○	○		
Y	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	○	–	○	○	
Z	○	○	○	○	○	○	○	●	○	○	○	○	–	–	–	–	○	○	●	○	○

Remarks 1. The combination of "—" shown in the table is not available.
2. Contact IKO for the combination of the interchangeable specification marked with ●.
3. When using multiple types for combination, please indicate by arranging the symbols in alphabetical order.

Table 9 Pitch of slide unit middle mounting holes (Supplemental code /GE)

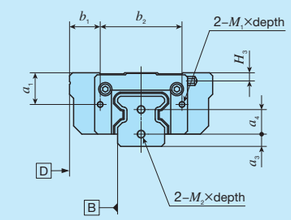


unit: mm

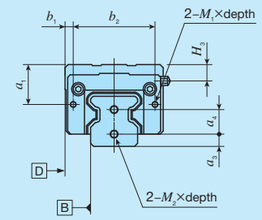
Size	L_2	L_6
15	30	26
20	40	35
25	45	40
30	52	44
35	62	52
45	80	60
55	95	70
65	110	82
100	200	150

Table 10.1 Dimension of female threads for bellows (Supplemental code Single unit: /J Assembled set: /J /JJ)

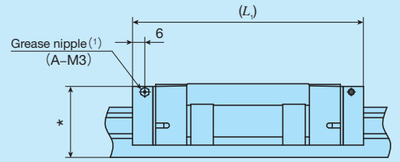
Size 15, 20, 25 and 30



Flange type



Block type
Compact block type



unit: mm

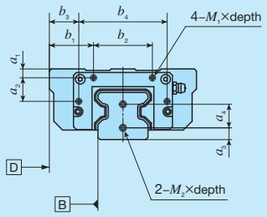
Identification number		Slide unit						Track rail		
		a_1	b_1	b_2	M_1×depth	L_1 (2)	H_3	a_3	a_4	M_2×depth
MXC 15	LRXC 15	10.5	10.5	26	M3×6	67	1	4	8	M3×6
MX 15	LRX 15					83				
MXG 15	LRXG 15					99				
MXDC 15	LRXDC 15	14.5	4			67	5			
MXD 15	LRXD 15					83				
MXDG 15	LRXDG 15					99				
MXSC 15	LRXSC 15	10.5				67	1			
MXS 15	LRXS 15					83				
MXSG 15	LRXSG 15					99				
MXC 20 (3)	LRXC 20 (3)	12	13.5	36	M3×6	81	2	5	10	M4×8
MX 20 (3)	LRX 20 (3)					101				
MXG 20 (3)	LRXG 20 (3)					121				
MXL 20 (3)	–					143				
MXDC 20	LRXDC 20	16	4			81	6			
MXD 20	LRXD 20					101				
MXDG 20	LRXDG 20					121				
MXDL 20	–					143				
MXSC 20	LRXSC 20	12				81	2			
MXS 20	LRXS 20					101				
MXSG 20	LRXSG 20					121				
MXSL 20	–					143				
MXC 25	LRXC 25	15.5	15	40	M3×6	89	4	6	12	M4×8
MX 25	LRX 25					113				
MXG 25	LRXG 25					128				
MXL 25	–					152				
MXDC 25	LRXDC 25	19.5	4			89	8			
MXD 25	LRXD 25					113				
MXDG 25	LRXDG 25					128				
MXDL 25	–					152				
MXSC 25	LRXSC 25	15.5				89	4			
MXS 25	LRXS 25					113				
MXSG 25	LRXSG 25					128				
MXSL 25	–					152				
MXC 30	LRXC 30	18.5	20	50	M3×6	100	4.8	7	14	M4×8
MX 30	LRX 30					128				
MXG 30	LRXG 30					149				
MXL 30	–					177				
MXDC 30	LRXDC 30	21.5	5			100	7.8			
MXD 30	LRXD 30					128				
MXDG 30	LRXDG 30					149				
MXDL 30	–					177				
MXSC 30	LRXSC 30	18.5				100	4.8			
MXS 30	LRXS 30					128				
MXSG 30	LRXSG 30					149				
MXSL 30	–					177				

Notes (1) The specification and mounting positions of grease nipple are different from those of the standard specification product. Note that grease nipple for size 30 models is A-M4 type. For grease nipple specification, see Table 14.1 on page Ⅲ—23.
(2) Dimensions of the specification that female threads for bellows are fitted to both ends of the slide unit are indicated.
(3) This is also applicable to the models allowing mounting from bottom (MXHC20, MXH20, MXHG20, MXHL20, LRXHC20, LRXH20 and LRXHG20).

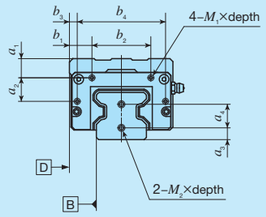
Remarks 1. Size 15 and 20 series of flange type and compact block type will have the dimension with * mark higher than the dimensions of assembly H. For details of dimensions, contact IKO.
2. This is also applicable to stainless steel type models of the same size.

Table 10.2 Dimension of female threads for bellows (Supplemental code Single unit: /J Assembled set: /J /JJ)

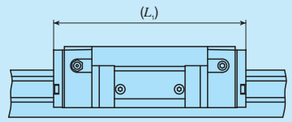
Size 35, 45, 55, 65 and 85



Flange type



Block type
Compact block type

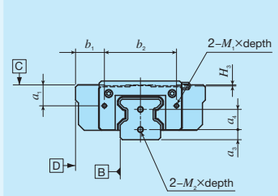


unit: mm

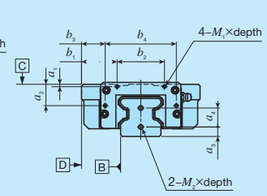
Identification number		Slide unit								Track rail		
		a_1	a_2	b_1	b_2	b_3	b_4	M_1×depth	L_1(1)	a_3	a_4	M_2×depth
MXC 35	LRXC 35	6	16	30	40	20	60	M3× 6	99	8	16	M4× 8
MX 35	LRX 35								131			
MXG 35	LRXG 35								159			
MXL 35	–								191			
MXDC 35	LRXDC 35	13		15		5			99			
MXD 35	LRXD 35								131			
MXDG 35	LRXDG 35								159			
MXDL 35	–								191			
MXS 35	–	6							131			
MXSG 35	–								159			
MXC 45	LRXC 45	7	21	35	50	23	74	M4× 8	123	10	19	M5×10
MX 45	LRX 45								163			
MXG 45	LRXG 45								203			
MXL 45	–								243			
MXDC 45	LRXDC 45	17		18		6			123			
MXD 45	LRXD 45								163			
MXDG 45	LRXDG 45								203			
MXDL 45	–								243			
MXS 45	–	7							163			
MXSG 45	–								203			
MXC 55	LRXC 55	7	27	40	60	26	88	M4× 8	145	10	24	M5×10
MX 55	LRX 55								193			
MXG 55	LRXG 55								247			
MXL 55	–								301			
MXDC 55	LRXDC 55	17		20		6			145			
MXD 55	LRXD 55								193			
MXDG 55	LRXDG 55								247			
MXDL 55	–								301			
MXS 55	–	7							193			
MXSG 55	–								247			
MXC 65	–	8.7	37	47.5	75	31	108	M5×10	191	14	28	M6×12
–	LRXC 65								192			
MX 65	–								255			
–	LRX 65								256			
MXG 65	–								319			
–	LRXG 65								320			
MXL 65	–								391			
MXDC 65	–			25.5		9			191			
–	LRXDC 65								192			
MXD 65	–								255			
–	LRXD 65								256			
MXDG 65	–								319			
–	LRXDG 65								320			
MXDL 65	–								391			
–	LRX 85	15	45	62.5	90	37.5	140	M6×10	334	14.5	38	M6×12
–	LRXG 85								406			
–	LRXL 85								505			
–	LRXD 85	15	45	38	90	13	140	M6×10	334	14.5	38	M6×12
–	LRXDG 85								406			
–	LRXDL 85								505			

Note (1) Dimensions of the specification that female threads for bellows are fitted to both ends of the slide unit are indicated.

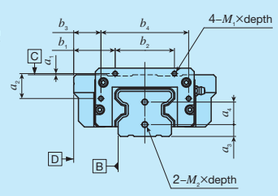
Table 10.3 Dimension of female threads for bellows (Supplemental code Single unit: /J Assembled set: /J /JJ)



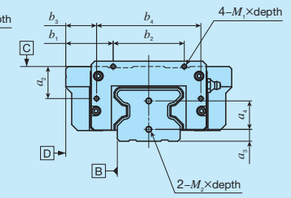
Size 30



Size 35

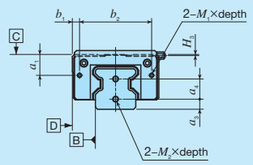


Size 45

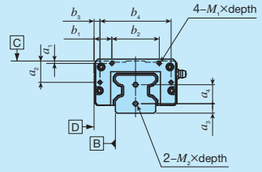


Size 55

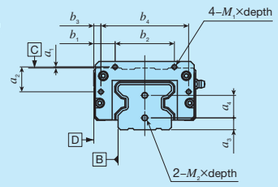
Low profile flange type



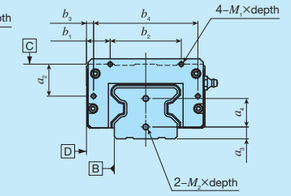
Size 30



Size 35

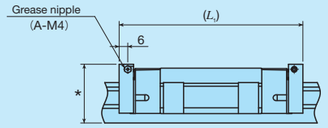


Size 45

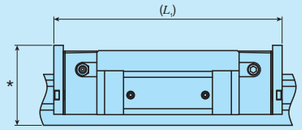


Size 55

Low profile block type



Size 30



Size 35, 45, 55

unit: mm

Identification number	Slide unit									Track rail		
	a_1(1)	a_2	b_1	b_2	b_3	b_4	M_1×depth	L_1(2)	H_3	a_3	a_4	M_2×depth
MXN 30	14.5	–	20	50	–	–	M3×6	128	0.8	7	14	M4× 8
MXNG 30								149				
MXNL 30								177				
MXNS 30			5					128				
MXNSG 30								149				
MXNSL 30								177				
MXN 35	2	16	30	40	20	60	M3×6	131	–	8	16	M4× 8
MXNG 35								159				
MXNL 35								191				
MXNS 35			15		5			131				
MXNSG 35								159				
MXNSL 35								191				
MXN 45	1	21	35	50	23	74	M4×8	163	–	10	19	M5×10
MXNG 45								203				
MXNL 45								243				
MXNS 45			18		6			163				
MXNSG 45								203				
MXNSL 45								243				
MXN 55	0	27	40	60	26	88	M4×8	193	–	10	24	M5×10
MXNG 55								247				
MXNL 55								301				
MXNS 55			20		6			193				
MXNSG 55								247				
MXNSL 55								301				

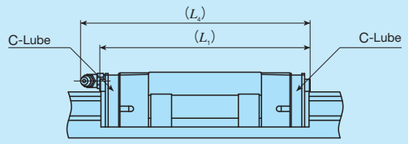
Notes (1) a_1 shows the dimension between mounting surface C and upper female thread.
(2) Dimensions of the specification that female threads for bellows are fitted to both ends of the slide unit are indicated.
Remark: The dimension of * is higher than the dimensions of assembly H. For details of dimensions, contact IKO.

MX • LRX

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 11.1 Dimension of slide unit with C-Lube plate (Supplemental code /Q)

Size: 10, 12, 15, 20, 25, 30



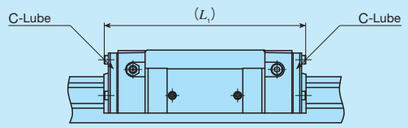
unit: mm

Identification number	L_1	L_4
LRXD 10···SL	44	–
LRXC 12	47	50
LRX 12	57	60
LRXG 12	68	71
LRXC 15	63	64
LRX 15	79	80
LRXG 15	95	96
LRXC 20	76	84
LRX 20	96	104
LRXG 20	116	124
LRXC 25	85	93
LRX 25	109	117
LRXG 25	124	132
LRXC 30	96	107
LRX 30	124	135
LRXG 30	145	156

Remarks 1. The dimensions of the slide unit with C-Lube at both ends are indicated.
2. A typical identification number is indicated, but is applied to all LRX series models of the same type.

Table 11.2 Dimension of slide unit with C-Lube plate (Supplemental code /Q)

Size: 35, 45, 55, 65, 85



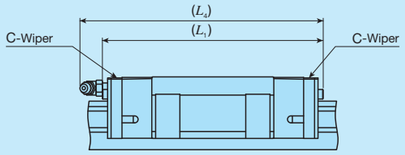
unit: mm

Identification number	L_1
LRXC 35	103
LRX 35	135
LRXG 35	163
LRXC 45	127
LRX 45	167
LRXG 45	207
LRXC 55	149
LRX 55	197
LRXG 55	251
LRXC 65	198
LRX 65	262
LRXG 65	326
LRX 85	341
LRXG 85	413
LRXL 85	512

Remarks 1. The dimensions of the slide unit with C-Lube at both ends are indicated.
2. A typical identification number is indicated, but is applied to all LRX series models of the same type.

Table 12.1 Dimension of slide unit with C-Wiper (Supplemental code Assembled set: /RC /RCC)

Size: 20, 25, 30



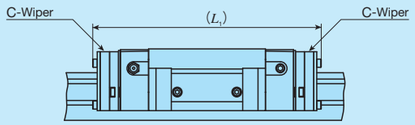
unit: mm

Identification number	L_1	L_4
MXC 20	80	90
MX 20	100	110
MXG 20	120	130
MXL 20	142	153
MXC 25	89	99
MX 25	113	123
MXG 25	128	138
MXL 25	152	162
MXC 30	100	113
MX 30	128	141
MXN 30		138
MXG 30	149	162
MXNG 30		159
MXL 30	177	190
MXNL 30		187

Remarks 1. The dimensions of the slide unit with C-Wiper at both ends are indicated.
2. A typical identification number is indicated, but is applied to all MX series models of the same size.

Table 12.2 Dimension of slide unit with C-Wiper (Supplemental code Assembled set: /RC /RCC)

Size: 35, 45, 55, 65



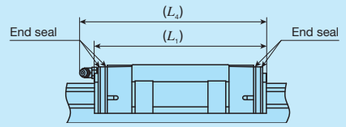
unit: mm

Identification number	L_1
MXC 35	123
MX 35	155
MXG 35	183
MXL 35	215
MXC 45	149
MX 45	189
MXG 45	229
MXL 45	269
MXC 55	172
MX 55	220
MXG 55	274
MXL 55	328
MXC 65	223
MX 65	287
MXG 65	351
MXL 65	423

Remarks 1. The dimensions of the slide unit with C-Wiper at both ends are indicated.
2. A typical identification number is indicated, but is applied to all MX series models of the same size.

Table 13.1 Dimension of slide unit with double end seals (Supplemental code Single unit: /V Assembled set: /V /VV)

Size: 12, 15, 20, 25, 30



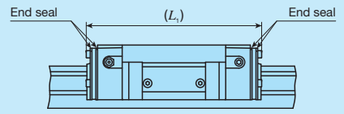
unit: mm

Identification number		L_1	L_4
MXC 12	–	49	52
–	LRXC 12	44	46
MX 12	–	58	61
–	LRX 12	54	57
MXG 12	–	70	72
–	LRXG 12	65	67
MXC 15	LRXC 15	58	59
MX 15	LRX 15	74	75
MXG 15	LRXG 15	90	91
MXC 20	LRXC 20	73	83
MX 20	LRX 20	93	103
MXG 20	LRXG 20	113	123
MXL 20	–	135	145
MXC 25	LRXC 25	83	92
MX 25	LRX 25	107	116
MXG 25	LRXG 25	122	131
MXL 25	–	146	155
MXC 30	LRXC 30	93	106
MX 30	LRX 30	121	134
MXN 30	–		131
MXG 30	LRXG 30	142	155
MXNG 30	–		152
MXL 30	–	170	183
MXNL 30	–		180

Remarks 1. The dimensions of the slide unit with double end seals at both ends are indicated.
2. A typical identification number is indicated, but is applied to all models of the same size.

Table 13.2 Dimension of slide unit with double end seals (Supplemental code Single unit: /V Assembled set: /V /VV)

Size: 35, 45, 55, 65, 85, 100



unit: mm

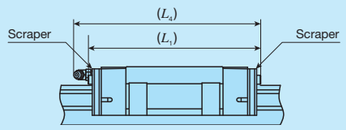
Identification number		L_1
MXC 35	LRXC 35	101
MX 35	LRX 35	133
MXG 35	LRXG 35	161
MXL 35	–	193
MXC 45	LRXC 45	127
MX 45	LRX 45	167
MXG 45	LRXG 45	207
MXL 45	–	247
MXC 55	LRXC 55	149
MX 55	LRX 55	197
MXG 55	LRXG 55	251
MXL 55	–	305
MXC 65	–	192
–	LRXC 65	193
MX 65	–	256
–	LRX 65	257
MXG 65	–	320
–	LRXG 65	321
MXL 65	–	392
–	LRX 85	338
–	LRXG 85	410
–	LRXL 85	509
–	LRXG 100	376

Remarks 1. The dimensions of the slide unit with double end seals at both ends are indicated.
2. A typical identification number is indicated, but is applied to all models of the same size.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 14.1 Dimension of slide unit with scrapers (Supplemental code Single unit: /Z Assembled set: /Z /ZZ)

Size: 12, 15, 20, 25, 30



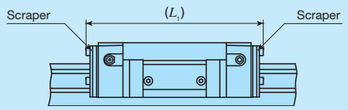
unit: mm

Identification number		L_1	L_4
MXC 12	–	50	53
–	LRXC 12	45	48
MX 12	–	60	63
–	LRX 12	56	58
MXG 12	–	71	74
–	LRXG 12	66	69
MXC 15	LRXC 15	60	61
MX 15	LRX 15	76	77
MXG 15	LRXG 15	92	93
MXC 20	LRXC 20	74	83
MX 20	LRX 20	94	103
MXG 20	LRXG 20	114	123
MXL 20	–	137	146
MXC 25	LRXC 25	85	93
MX 25	LRX 25	109	117
MXG 25	LRXG 25	124	132
MXL 25	–	148	156
MXC 30	LRXC 30	96	107
MX 30	LRX 30	124	135
MXN 30	–		132
MXG 30	LRXG 30	145	156
MXNG 30	–		153
MXL 30	–	173	184
MXNL 30	–		181

Remarks 1. The dimensions of the slide unit with scraper at both ends are indicated.
2. A typical identification number is indicated, but is applied to all models of the same size.

Table 14.2 Dimension of slide unit with scrapers (Supplemental code Single unit: /Z Assembled set: /Z /ZZ)

Size: 35, 45, 55, 65, 85, 100



unit: mm

Identification number		L_1
MXC 35	LRXC 35	103
MX 35	LRX 35	135
MXG 35	LRXG 35	163
MXL 35	–	195
MXC 45	LRXC 45	129
MX 45	LRX 45	169
MXG 45	LRXG 45	209
MXL 45	–	249
MXC 55	LRXC 55	151
MX 55	LRX 55	199
MXG 55	LRXG 55	253
MXL 55	–	307
MXC 65	LRXC 65	194
MX 65	LRX 65	258
MXG 65	LRXG 65	322
MXL 65	–	394
–	LRX 85	339
–	LRXG 85	411
–	LRXL 85	510
–	LRXG 100	378

Remarks 1. The dimensions of the slide unit with scraper at both ends are indicated.
2. A typical identification number is indicated, but is applied to all models of the same size.

Lubrication

Lithium-soap base grease with extreme-pressure additive (Alvania EP grease 2 [Shell Lubricants Japan K.K.]) is pre-packed in MX series and LRX series. Additionally, MX series has C-Lube placed in the recirculation part of cylindrical roller, so that the interval for reapplicating lubricant can be extended and maintenance works such as grease job can be reduced significantly.
MX series and LRX series have grease nipple or oil hole as indicated in Table 15. Supply nozzles fit to each shapes of grease nipple and dedicated supplying equipment (miniature greasers) fit to oil holes are also available. For order of these parts for lubrication, see Table 13 and Table 14.1 on Page Ⅲ—23, and Table 15 on page Ⅲ—24.

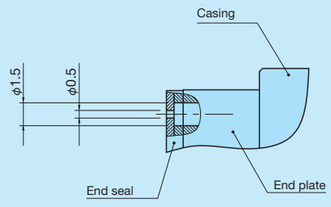


Fig. 2 Oil hole specification of MXD10···SL and LRXD10···SL

Table 15 Parts for lubrication

Size	Grease nipple type (1)	Applicable supply nozzle type	Nominal size of female threads for grease nipple (or piping) mounting
10	Oil hole	Miniature greaser MG2.5B/EP2	–
12	A-M3	A-5120V A-5240V B-5120V B-5240V	M3(7)
15(2) (8)	A-M4		M4
20(2)	B-M4	A-8120V B-8120V	
25(2)			
30(3) (4)	B-M6	Grease gun available on the market	M6
35(5)	JIS1 type		
45(6)	JIS2 type		PT1/8
55			
65			
85			
100	A-PT1/4		PT1/4

Notes (1) For grease nipple specification, see Table 14.1 and Table 14.2 in page Ⅲ—23.
(2) The grease nipple when female threads for bellows (supplemental code "/J") is specified is A-M3.
(3) The grease nipple when female threads for bellows (supplemental code "/J") is specified is A-M4.
(4) The grease nipple for MXN30 is B-M4. The grease nipple when female threads for bellows (supplemental code "/J") is specified is A-M4.
(5) The size of the grease nipple mounting thread hole for MXN35 in the slide unit travelling direction is smaller than that of the crosswise direction. When the grease nipple is mounted along the travelling direction, contact IKO.
(6) The grease nipple for MXN45 is JIS type1.
(7) M3 size is available only for grease nipple. Piping joints must be prepared separately by the customer.
(8) For the LRX and MX series, the grease nipple attached to the slide unit is a special specification when attaching double-end seals (supplemental code "/VR", "/VL") or scraper (supplemental code "/ZR", "/ZL") on one side. If you wish to mount a size-15 grease nipple on the opposite side of the double-end seal side or the scraper side, please contact IKO.
Remark: Stainless steel grease nipple is also available. If needed, please contact IKO.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Dust Protection

The slide units of MX series and LRX series are equipped with end seals and under seals as standard for dust protection. However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the track rail, it is recommended to cover the whole unit with bellows or telescope type shield, etc.
MX series and LRX series are provided with specific bellows. The bellows are easy to mount and provide excellent dust protection. If needed, please refer to Ⅲ−26 for ordering.
Also the rail cover sheet to cover the mounting hole of track rail (Fig. 3) and track rail mounting from bottom with no mounting hole on the upper surface (Fig. 4) are available. If needed, please contact IKO.

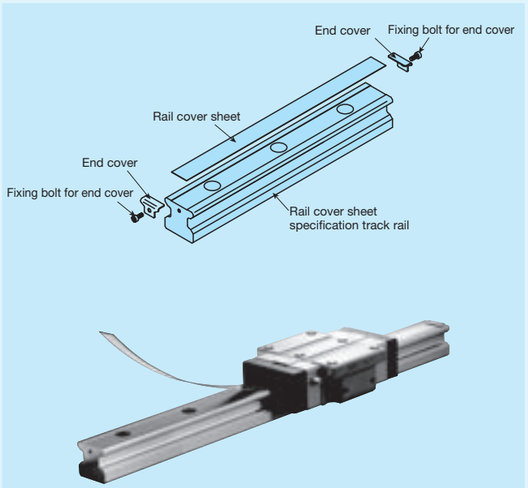


Fig. 3 Rail cover sheet

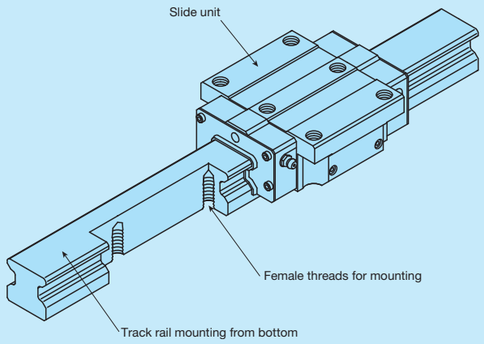


Fig. 4 Track rail mounting from bottom specification

Precaution for Use

❶ Mounting surface, reference mounting surface and typical mounting structure

When mounting the MX series and LRX series, properly align the reference mounting surfaces B and D of the track rail and slide unit with the reference mounting surface of the table anend bed and fix them. (See Fig. 5.)
The reference mounting surfaces B and D and mounting surfaces A and C are precisely ground. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable liar motion with high accuracy.
Reference mounting surface of the slide unit is the opposite side of the IKO mark. The track rail reference mounting surface is identified by locating the IKO mark on the top surface of the track rail. It is the side surface above the mark (in the direction of the arrow). (See Fig. 6.)

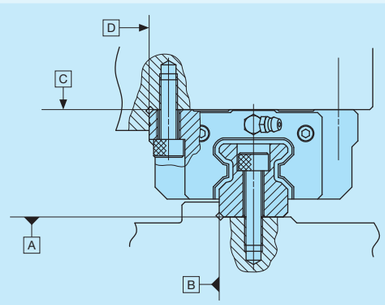


Fig. 5 Reference mounting surface and typical mounting structure

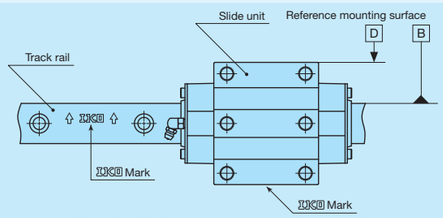


Fig. 6 Reference mounting surface

❷ Fixing the slide unit

Slide unit is also provided with mounting holes in the middle of width direction (see Fig. 7) and some products have the arrangement to receive the applied load in a good balance. When designing machines or equipment, consider the arrangement so that the mounting holes in the middle of slide unit can also be used to fix the units, to use the highest performance out of the product.
To fix the slide unit of compact block type or low profile block type, we recommend to secure the fixing thread depth of Table 16.1and Table 16.2. Also, with the low profile flange type and low profile block type, make sure that the fixing thread depth for the mounting screw in the middle of slide unit width direction should be less than the maximum fixing thread depth of the dimension table.

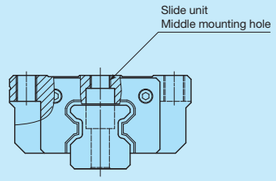


Fig. 7 Slide unit middle mounting hole

Table 16.1 Fixing thread depth for slide unit mounting hole of compact block type unit: mm

Identification number		Recommended minimum fixing thread depth
MXS 15	LRXS 15	4.5
MXS 20	LRXS 20	5.5
MXS 25	LRXS 25	7
MXS 30	LRXS 30	9

Remark: A typical identification number is indicated, but is applied to all compact block types of the same size.

Table 16.2 Fixing thread depth for slide unit mounting hole of low profile block type unit: mm

Identification number	Recommended minimum fixing thread depth
MXNS 30	8
MXNS 35	8.5
MXNS 45	10.5
MXNS 55	14

Remark: A typical identification number is indicated, but is applied to all low profile block types of the same size.

❸ Shoulder height and corner radius of the reference mounting surface

For the opposite corner of the mating reference mounting, it is recommended to have relieved fillet as indicated in Fig. 8, but you may also use it with providing corner radius R as shown in Table 17. Recommended value for the shoulder height and corner radius on the mating side is indicated in Table 17.

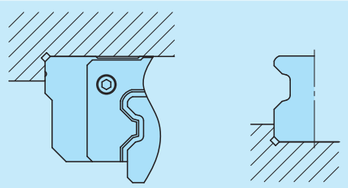
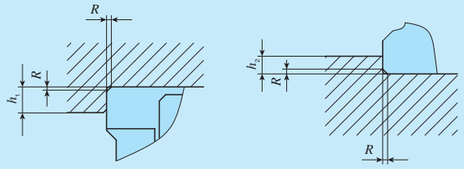


Fig. 8 Corner of the mating reference mounting

Table 17 Shoulder height and corner radius of the reference mounting surface



Mounting part of slide unit　　Mounting part of track rail

unit: mm

Size	Shoulder height of slide unit mounting part h_1	Shoulder height of track rail mounting part h_2	Corner radius R (Maximum)
10	4	1	0.3
12	4	2	0.5
15	4	3	0.5
20	5	4	0.5
25	6	5	1
30	8	5.5	1
35	8	5.5	1
45	8	7	1.5
55	10	8	1.5
65	10	10	1.5
85	14	14	2.5 (Slide unit) 1.5 (Track rail)
100	14	13	2.5

❹ Tightening torque for fixing screw

Typical tightening torque for mounting of the MX series and LRX series to the steel mating member material is indicated in Table 18. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated in the table as necessary. If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.

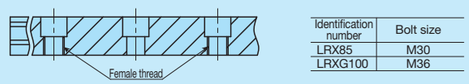
Table 18 Tightening torque for fixing screw

Bolt size	Tightening torque N・m		
	High carbon steel-made screw		Stainless steel-made screw
	Size 12 to 65	Size 85 and 100	
M 2.6×0.45	–	–	0.70
M 3 ×0.5	1.8	–	1.1
M 4 ×0.7	4.1	–	2.5
M 5 ×0.8	8.0	–	5.0
M 6 ×1	13.6	–	8.5
M 8 ×1.25	32.7	–	20.4
M10 ×1.5	63.9	–	–
M12 ×1.75	110	–	–
M14 ×2	175	–	–
M16 ×2	268	–	–
M20 ×2.5	522	–	–
M24 ×3	–	749	–
M30 ×3.5	–	1 490	–

Remarks 1. The tightening torque is calculated based on strength division 12.9 for product size 12 to 65, strength division 10.9 for product sizes 85 and 100, and property division A2-70 for stainless steel bolts.
2. It is recommended that the tightening torque of slide unit middle mounting holes for size 15, 20, 25, 30, 35 of flange type (MXC, MX, MXG, MXL, LRXC, LRX, LRXG) is to be 70 to 80% of the values in the table.

❺ Remarks

- As LRX(D)(G,L)85 and LRXG100 are heavyweight products, we recommend the use of eyebolts for transport and assembly. For eyebolt mounting, use the slide unit mounting holes and the track rail female threads for eyebolts (Fig. 9). For the LRXG100 track rail, also use the LRXG100 track rail dedicated eyebolt adapter (Fig. 10).
- LRX(D)(G,L)85 slide unit eyebolts (JIS B1168 M20) and LRX85 track rail dedicated eyebolts (Fig. 11) are not appended. If needed, please contact IKO.



Identification number	Bolt size
LRX85	M30
LRXG100	M36

Track rails of length 1000 mm or more have the female threads at two or more mounting hole positions.

Fig. 9 Track rail female threads for eyebolts

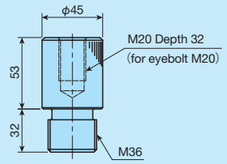


Fig. 10 LRXG100 track rail dedicated eyebolt adapter

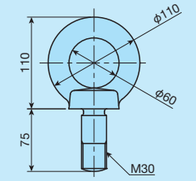


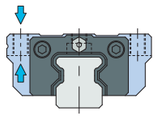
Fig. 11 LRX85 track rail dedicated eyebolt

MX・LRX

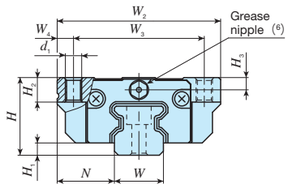
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Flange type mounting from top / bottom

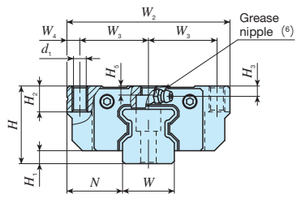
Shape: MX • LRX

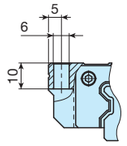


Size						
12	15	20	25	30		
35	45	55	65	85	100	

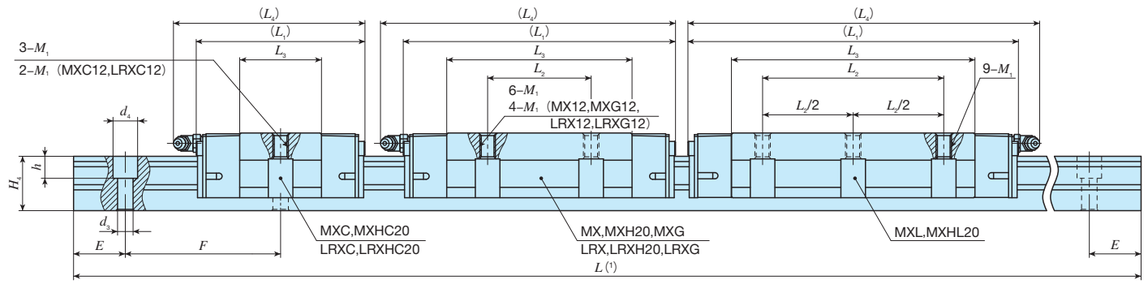


MXC12,LRXC12
MX 12,LRX 12
MXG12,LRXG12



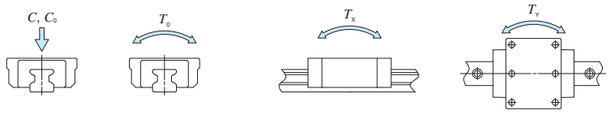


MXHC 20,LRXHC 20
MXH 20,LRXH 20
MXHG 20,LRXHG 20
MXHL 20
Mounting from bottom only (3)



Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm																						Dimensions of track rail mm								Appended mounting bolt for track rail (4)	Basic dynamic load rating (5)	Basic static load rating (5)	Static moment rating (5)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	d_1	M_1		H_2	H_3	H_5	W	H_4	d_3	d_4	h	E	F	Bolt size × ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXC 12		○	0.058	0.92	19	3	14	40	32	4	40	–	15.8	44	3.4	M4		6	3	–	12	12	3.5	6	4.5	20	40	M3×12	4 250	6 500	49.4	18.6 196	18.6 196
	LRXC 12	○									37		14.8	40															3 900	6 090	46.3	16.3 170	16.3 170
MX 12		○	0.092								50	15	25.4	53															6 120	10 400	79.1	45.8 371	45.8 371
	LRX 12	○									47		25.3	50															5 890		78.7	45.2 343	45.2 343
MXG 12		○	0.13								61		36.6	64															8 120	15 000	114	92.7 628	92.7 628
	LRXG 12	○									58		35.8	61															7 710	14 600	111	88.6 581	88.6 581
MXC 15	LRXC 15	○	0.13	1.65	24	4	16	47	19	4.5	52	–	24	55	4.4	M5		7	3.5	3	15	16.5	4.5	8	6	30	60	M4×16	7 730	12 000	113	50.6 457	50.6 457
MX 15	LRX 15	○	0.20								68	30	40	71															11 500	20 000	188	136 942	136 942
MXG 15	LRXG 15	○	0.28								84		56	87															14 900	28 000	263	262 1 590	262 1 590
MXC 20 (2)	LRXC 20 (2)	○	0.29	2.73	30	5	21.5	63	26.5	5	66	–	31.6	74	– (2)	M6 (2)		10	4	3.5	20	21	6	9.5	8.5	30	60	M5×20	16 100	26 400	341	150 1 260	150 1 260
MX 20 (2)	LRX 20 (2)	○	0.44								86	40	51.6	94															23 400	42 700	550	379 2 520	379 2 520
MXG 20 (2)	LRXG 20 (2)	○	0.61								106		71.6	114															30 100	58 900	760	713 4 200	713 4 200
MXL 20 (2)	–	–	0.80								128	70	94.1	137															37 200	77 200	996	1 210 6 560	1 210 6 560
MXHC 20 (3)	LRXHC 20 (3)	○	0.29								66	–	31.6	74	–	–													16 100	26 400	341	150 1 260	150 1 260
MXH 20 (3)	LRXH 20 (3)	○	0.44								86	40	51.6	94															23 400	42 700	550	379 2 520	379 2 520
MXHG 20 (3)	LRXHG 20 (3)	○	0.61								106		71.6	114															30 100	58 900	760	713 4 200	713 4 200
MXHL 20 (3)	–	–	0.80								128	70	94.1	137															37 200	77 200	996	1 210 6 560	1 210 6 560

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The mounting bolt can be mounted only in downward direction.
(3) The mounting bolt can be mounted only in upward direction.
(4) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(5) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(6) The shape of the grease nipple varies depending on the size and the applicable supplemental code. For details of the specifications, see Table 15 on page Ⅱ-188.
Remark: A grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code			Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MX	G	15	C2	R360	T1	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MX	Flange type mounting from top / bottom
LRX	
MXH	Flange type mounting from bottom
LRXH	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 12, 15, 20

④ Number of slide unit (2)

⑤ Length of track rail (360 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

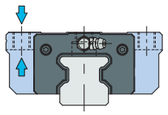
⑨ Special specification: A, D, E, F, GE, HP, I , J, L LF, MA, MN, N, Q, RC, T UR, V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

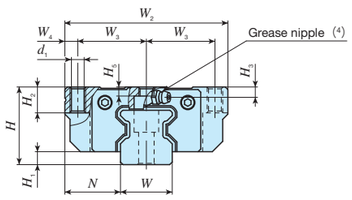
IKO C-Lube Linear Roller Way Super MX

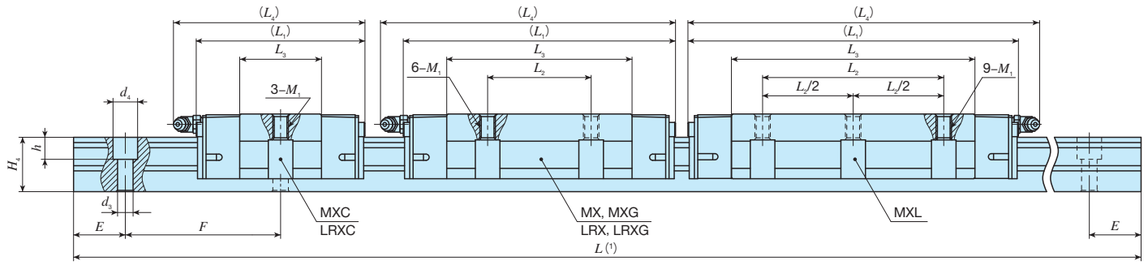
Flange type mounting from top / bottom

Shape: **MX • LRX**



Size: 12 15 20 25 30 35 45 55 65 85 100

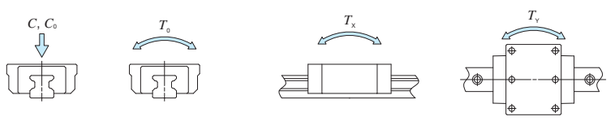




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm												Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	d_1	M_1		H_2	H_3	H_5	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXC 25	LRXC 25	○	0.44	3.59	36	6	23.5	70	28.5	6.5	74	–	36	83	7	M 8		10	5	5	23	24.5	7	11	9	30	60	M6×25	21 600	33 800	500	213 1 810	213 1 810
MX 25	LRX 25	○	0.67								98	45	60	107															32 100	56 300	833	573 3 800	573 3 800
MXG 25	LRXG 25	○	0.84								113		75	122															38 200	70 300	1 040	885 5 380	885 5 380
MXL 25	–	–	1.08								137	70	99	146															47 400	92 800	1 370	1 530 8 480	1 530 8 480
MXC 30	LRXC 30	○	0.78	5.01	42	6.5	31	90	36	9	85	–	42.4	95	8.5	M10		10	6.5	5.5	28	28	9	14	12	40	80	M8×28	29 200	44 600	808	329 2 740	329 2 740
MX 30	LRX 30	○	1.20								113	52	70.4	123															43 400	74 400	1 350	883 5 780	883 5 780
MXG 30	LRXG 30	○	1.58								134		91.4	144															53 200	96 700	1 750	1 470 8 740	1 470 8 740
MXL 30	–	–	2.03								162	80	119.4	172															65 600	126 000	2 290	2 500 13 600	2 500 13 600

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.

Remark: A grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code		Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MX	G	25	C2	R840	T1	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MX	Flange type mounting from top / bottom
LRX	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 25, 30

④ Number of slide unit (2)

⑤ Length of track rail (840 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

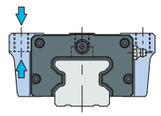
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

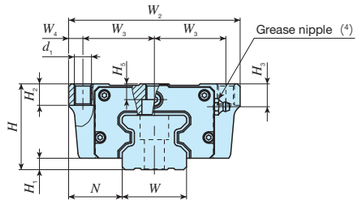
⑨ Special specification: A, D, E, F, GE, HP, Ⅰ, J, L, LF, MA, MN, N, Q, RC, T, UR, V, W, Y, Z

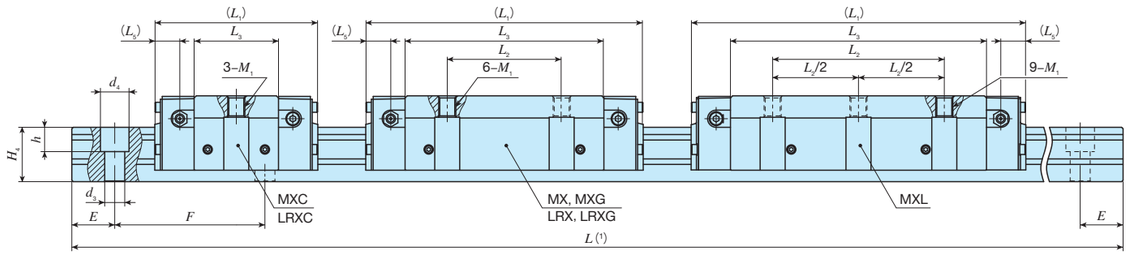
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

IKO C-Lube Linear Roller Way Super MX

Flange type mounting from top / bottom

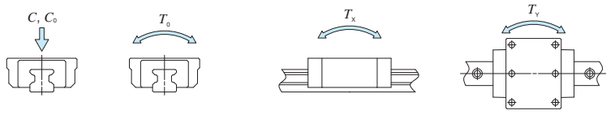
Shape	MX • LRX 
Size	12 15 20 25 30 35 45 55 65 85 100





Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm																							Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_5	d_1	M_1		H_2	H_3	H_5	W	H_4	d_3	d_4	h	E	F	Bolt size × ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXC 35		○	1.13	6.88	48	6.5	33	100	41	9	92	–	46.6	12.7	8.5	M10		13	13	7	34	32	9	14	12	40	80	M 8×35	39 500	60 000	1 300	506 3 950	506 3 950
	LRXC 35	○												12.5																											
MX 35		○	1.76								124	62	78.6	12.7															58 700	100 000	2 170	1 360 8 470	1 360 8 470
	LRX 35	○												12.5																											
MXG 35		○	2.41								152		106.6	12.7															74 200	135 000	2 930	2 440 13 800	2 440 13 800
	LRXG 35	○												12.5																											
MXL 35	–	–	3.00								184	100	138.6	12.7															90 800	175 000	3 800	4 060 21 300	4 060 21 300
MXC 45	LRXC 45	○	2.11	10.8	60	8	37.5	120	50	10	114	–	59	17.5	10.5	M12		15	16	11	45	38	14	20	17	52.5	105	M12×40	64 100	95 600	2 660	1 010 7 800	1 010 7 800
MX 45	LRX 45	○	3.26								154	80	99																95 400	159 000	4 430	2 700 16 800	2 700 16 800
MXG 45	LRXG 45	○	4.60								194		139																124 000	223 000	6 200	5 220 29 000	5 220 29 000
MXL 45	–	–	5.66								234	120	179																151 000	287 000	7 980	8 560 44 400	8 560 44 400

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.
Remark: Three grease nipple mounting thread holes are provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code			Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MX	G	35	C2	R1200	T2	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MX	Flange type mounting from top / bottom
LRX	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 35, 45

④ Number of slide unit (2)

⑤ Length of track rail (1,200 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

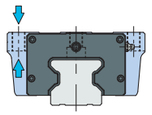
⑨ Special specification: A, D, E, F, GE, HP, I , J, L, LF, MA, MN, N, PS, Q, RC, T, UR, V, W, Y, Z

MX • LRX

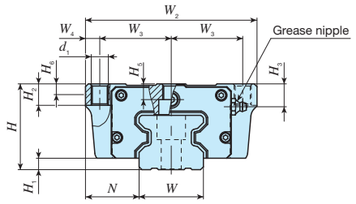
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

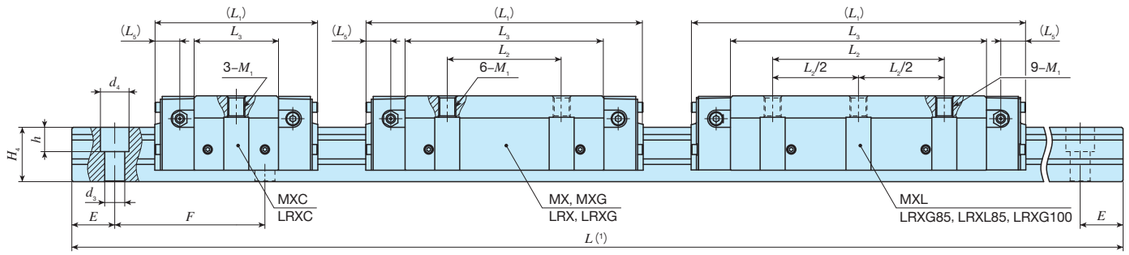
Flange type mounting from top / bottom

Shape: MX • LRX



Size: 12 15 20 25 30 35 45 55 65 85 100





Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm																				Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_5	d_1	M_1		H_2	H_3	H_5	H_6	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXC 55	LRXC 55	○	3.49	14.1	70	9	43.5	140	58	12	136	–	72	20	12.5	M14		17	16	14	–	53	43	16	23	20	60	120	M14×45	99 700	149 000	4 830	1 880 14 400	1 880 14 400
MX 55	LRX 55	○	5.42								184	95	120																148 000	248 000	8 040	5 040 31 100	5 040 31 100
MXG 55	LRXG 55	○	7.93								238		174																198 000	359 000	11 700	10 400 57 000	10 400 57 000
MXL 55	–	–	10.1								292	150	228																244 000	470 000	15 300	17 700 90 700	17 700 90 700
MXC 65		○	7.18	22.6	90	12	53.5	170	71	14	180	–	95	26.3	14.5	M16		23	18	18.5	–	63	56	18	26	22	75	150	M16×60	174 000	249 000	9 790	4 200 32 000	4 200 32 000
	LRXC 65	○									181			26.6																		4 200 32 200	4 200 32 200
MX 65		○	11.5								244	110	159	26.3															260 000	415 000	16 300	11 300 69 000	11 300 69 000
	LRX 65	○									245			26.6																		11 300 69 300	11 300 69 300
MXG 65		○	16.0								308		223	26.3															337 000	581 000	22 800	21 800 120 000	21 800 120 000
	LRXG 65	○									309			26.6																				
MXL 65	–	–	20.8								380	200	295	26.3															419 000	768 000	30 200	37 600 193 000	37 600 193 000
–	LRX 85	–	25.4	36.7	110	16	65	215	92.5	15	323	140	232	27.5	17.8	M20		35	22	25.5	20	85	67	26.5	39	30	90	180	M24×70	440 000	753 000	38 900	29 500 163 000	29 500 163 000
–	LRXG 85	–	32.7								395	200	304																542 000	985 000	50 800	50 000 257 000	50 000 257 000
–	LRXL 85	–	44.0								494	280	403																674 000	1 300 000	67 300	87 000 422 000	87 000 422 000
–	LRXG 100*	–	43.0	43.2	120	15	75	250	110	15	362	200	262	29.7	17.8	M20		35	30	30.5	–	100	70	33	48	36	75	150	M30×80	498 000	821 000	49 700	35 800 199 000	35 800 199 000

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .

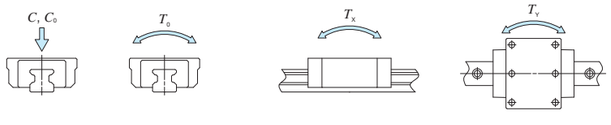
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.

(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.

Remarks 1. The specifications of grease nipple are shown in Table 15 on page Ⅱ−188.

2. Three grease nipple mounting thread holes are provided on the right and left end plates respectively.

3. The identification numbers with * are our semi-standard items.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MX	G	55	C2	R3000	T2	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MX	Flange type mounting from top / bottom
LRX	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 55, 65, 85, 100

④ Number of slide unit (2)

⑤ Length of track rail (3,000 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

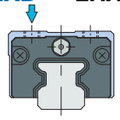
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑨ Special specification: A, D, E, F, GE, HP, I , J, L LF, MA, MN, PS, Q, RC T, UR, V, W, Y, Z

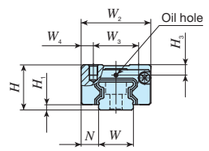
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Block type mounting from top

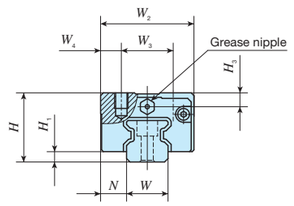
Shape: **MXD • LRXD**



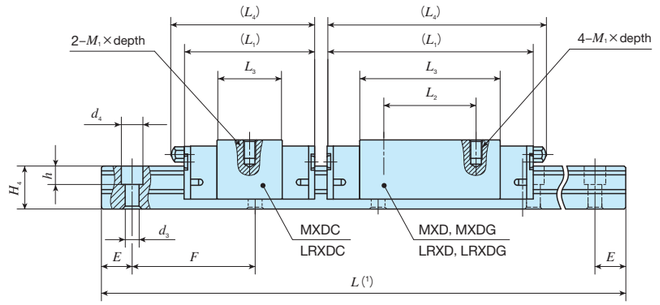
Size: **10** **12** 15 20 25 30 / 35 45 55 65 85



MXD 10
LRXD10



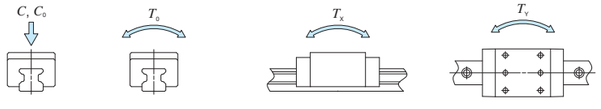
MXDC12, LRXDC12
MXD 12, LRXD 12
MXDG12, LRXDG12



Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm									Dimensions of track rail mm								Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	M_1×depth		H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXD 10···SL		–	0.028	0.48	13	1.5	5	20	13	3.5	36	12	20.8	–	M2.6×3		3	10	8	3.5	6	3.5	12.5	25	M3×10	3 200	5 880	37.9	20.9 147	20.9 147
	LRXD 10···SL	–									35																		20.9 142	20.9 142
MXDC 12		○	0.045	0.92	20	3	7.5	27	15	6	40	–	15.8	44	M4 ×4.5		4	12	12	3.5	6	4.5	20	40	M3×12	4 250	10 400	49.4	18.6 196	18.6 196
	LRXDC 12	○									37		14.8	40												3 900	6 090	46.3	16.3 170	16.3 170
–	LRXDC 12···SL	○																												
MXD 12		○									50		25.4	53												6 120		79.1	45.8 371	45.8 371
	LRXD 12	○									47		25.3	50												5 890		78.7	45.2 343	45.2 343
MXD 12···SL		○	0.072								50		25.4	53												6 120		79.1	45.8 371	45.8 371
	LRXD 12···SL	○									47	15	25.3	50												5 890		78.7	45.2 343	45.2 343
MXDG 12		○	0.097								61		36.6	64												8 120	15 000	114	92.7 628	92.7 628
	LRXDG 12	○																								7 710	14 600	111	88.6 581	88.6 581
–	LRXDG 12···SL	○									58		35.8	61																

Notes (1) Track rail lengths L are shown in Tables 2.1 and 2.2 on page Ⅱ−175 and Tables 2.3 and 2.4 on page Ⅱ−176.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. For stainless steel model, stainless steel bolts are appended.
In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.

Remarks 1. The specification of oil hole is shown in Fig. 2 on page Ⅱ−188.
2. The specifications of grease nipple are shown in Table 15 on page Ⅱ−188.
3. For size 12 series, a grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code			Material code	Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXD	G	12	C2	R560	—	T1	P	—	/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Model
MXD	Block type mounting from top
LRXD	

② Length of slide unit
C	Short
No symbol	Standard
G	Long

③ Size
10, 12

④ Number of slide unit (2)

⑤ Length of track rail (560 mm)

⑥ Material type
No symbol	High carbon steel made
SL	Stainless steel made

⑦ Preload amount
No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑧ Accuracy class
H	High
P	Precision
SP	Super precision
UP	Ultra precision

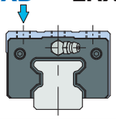
⑨ Interchangeable
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑩ Special specification
A, D, E, F, HP, Ⅰ, L, LF
MA, MN, N, Q, T, V, W
Y, Z

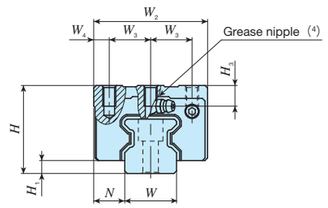
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

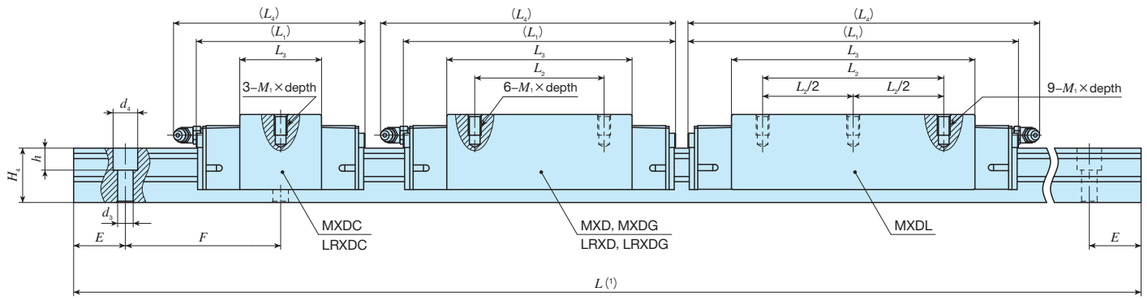
Block type mounting from top

Shape: **MXD • LRXD**



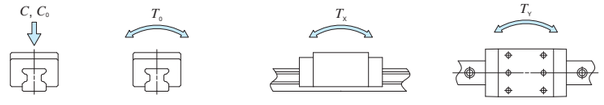
Size						
10	12	15	20	25	30
35	45	55	65	85	





Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm								Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	M_1×depth	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXDC 15	LRXDC 15	○	0.13	1.65	28	4	9.5	34	13	4	52	–	24	55	M4×8	7.5	15	16.5	4.5	8	6	30	60	M4×16	7 730	12 000	113	50.6 457	50.6 457
–	LRXDC 15···SL	○																											
MXD 15	LRXD 15	○	0.19								68	26	40	71											11 500	20 000	188	136 942	136 942
MXD 15···SL	LRXD 15···SL	○																											
MXDG 15	LRXDG 15	○	0.26								84		56	87											14 900	28 000	263	262 1 590	262 1 590
–	LRXDG 15···SL	○																											
MXDC 20	LRXDC 20	○	0.25	2.73	34	5	12	44	16	6	66	–	31.6	74	M5×8	8	20	21	6	9.5	8.5	30	60	M5×20	16 100	26 400	341	150 1 260	150 1 260
–	LRXDC 20···SL	○																											
MXD 20	LRXD 20	○	0.38								86	36	51.6	94											23 400	42 700	550	379 2 520	379 2 520
MXD 20···SL	LRXD 20···SL	○																											
MXDG 20	LRXDG 20	○	0.52								106	50	71.6	114											30 100	58 900	760	713 4 200	713 4 200
–	LRXDG 20···SL	○																											
MXDL 20	–	–	0.67								128	70	94.1	137											37 200	77 200	996	1 210 6 560	1 210 6 560

Notes (1) Track rail lengths L are shown in Tables 2.1 and 2.2 on page Ⅱ－175 and Tables 2.3 and 2.4 on page Ⅱ－176.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. For stainless steel model, stainless steel bolts are appended.
In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shape of the grease nipple varies depending on the size and the applicable supplemental code. For details of the specifications, see Table 15 on page Ⅱ-188.
Remark: A grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code			Material code	Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXD	G	20	C2	R840	—	T1	P	—	/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Model	
MXD	Block type mounting from top
LRXD	

② Length of slide unit	
C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size
15, 20

④ Number of slide unit (2)

⑤ Length of track rail (840 mm)

⑥ Material type	
No symbol	High carbon steel made
SL	Stainless steel made

⑦ Preload amount	
No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑧ Accuracy class	
H	High
P	Precision
SP	Super precision
UP	Ultra precision

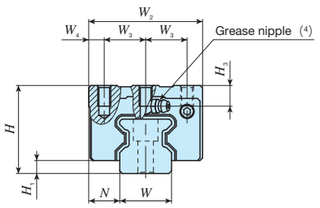
⑨ Interchangeable	
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

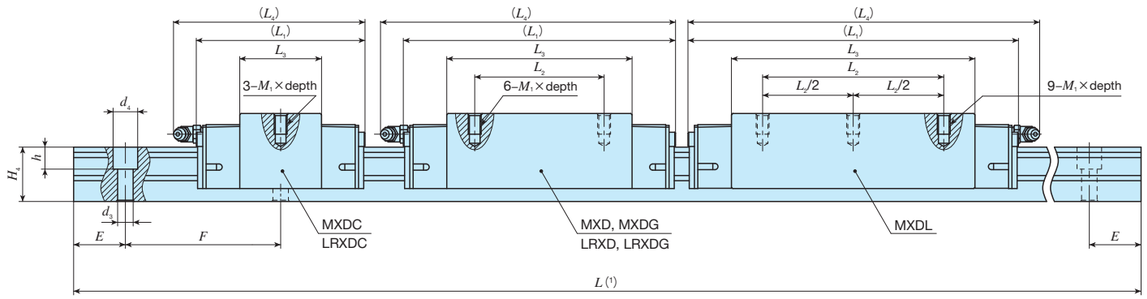
⑩ Special specification
A, D, E, F, HP, Ⅰ, J, L, LF MA, MN, N, Q, RC, T, UR V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Block type mounting from top

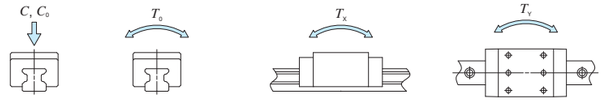
Shape	MXD • LRXD
Size	10 12 15 20 25 30 35 45 55 65 85





Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm								Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	M_1×depth	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXDC 25	LRXDC 25	○	0.36	3.59	40	6	12.5	48	17.5	6.5	74	–	36	83	M6×12	9	23	24.5	7	11	9	30	60	M6×25	21 600	33 800	500	213 1 810	213 1 810
–	LRXDC 25···SL	○																											
MXD 25	LRXD 25	○	0.55								98	35	60	107											32 100	56 300	833	573 3 800	573 3 800
MXD 25···SL	LRXD 25···SL	○																											
MXDG 25	LRXDG 25	○	0.68								113	50	75	122											38 200	70 300	1 040	885 5 380	885 5 380
–	LRXDG 25···SL	○																											
MXDL 25	–	–	0.88								137	70	99	146											47 400	92 800	1 370	1 530 8 480	1 530 8 480
MXDC 30	LRXDC 30	○	0.60	5.01	45	6.5	16	60	20	10	85	–	42.4	95	M8×12	9.5	28	28	9	14	12	40	80	M8×28	29 200	44 600	808	329 2 740	329 2 740
–	LRXDC 30···SL	○																											
MXD 30	LRXD 30	○	0.92								113	40	70.4	123											43 400	74 400	1 350	883 5 780	883 5 780
MXD 30···SL	LRXD 30···SL	○																											
MXDG 30	LRXDG 30	○	1.18								134	60	91.4	144											53 200	96 700	1 750	1 470 8 740	1 470 8 740
–	LRXDG 30···SL	○																											
MXDL 30	–	–	1.52								162	80	119.4	172											65 600	126 000	2 290	2 500 13 600	2 500 13 600

Notes (1) Track rail lengths L are shown in Tables 2.1 and 2.2 on page Ⅱ－175 and Tables 2.3 and 2.4 on page Ⅱ－176.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. For stainless steel model, stainless steel bolts are appended.
In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ－188.
Remark: A grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code		Material code	Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXD	G	25	C2	R840	—	T1	P	—	/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Model

MXD	Block type mounting from top
LRXD	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 25, 30

④ Number of slide unit (2)

⑤ Length of track rail (840 mm)

⑥ Material type

No symbol	High carbon steel made
SL	Stainless steel made

⑦ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑧ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑨ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

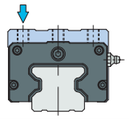
⑩ Special specification: A, D, E, F, HP, Ⅰ, J, L, LF MA, MN, N, Q, RC, T, UR V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

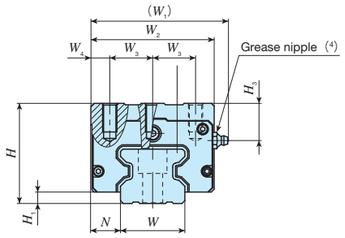
IKO C-Lube Linear Roller Way Super MX

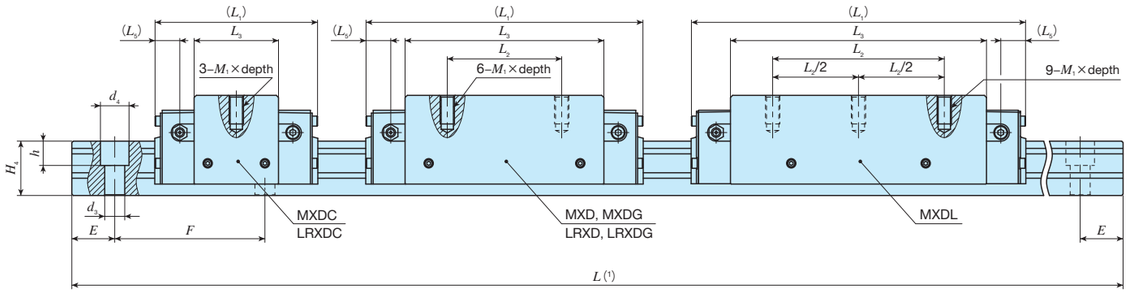
Block type mounting from top

Shape: **MXD • LRXD**



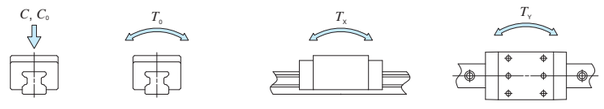
Size: 10 | 12 | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | 85





Identification number: MX series	Identification number: LRX series (No C-Lube)	Interchangeable	Mass (Ref.): Slide unit kg	Mass (Ref.): Track rail kg/m	Dimensions of assembly mm: H	H_1	N	Dimensions of slide unit mm: W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_5	M_1×depth	H_3	Dimensions of track rail mm: W	H_4	d_3	d_4	h	E	F	Appended mounting bolt for track rail (2): Bolt size× ℓ	Basic dynamic load rating (3): C N	Basic static load rating (3): C_0 N	Static moment rating (3): T_0 N·m	T_X N·m	T_Y N·m
MXDC 35		○	0.97	6.88	55	6.5	18	78	70	25	10	92	–	46.6	12.7	M 8×16	20	34	32	9	14	12	40	80	M 8×35	39 500	60 000	1 300	506 3 950	506 3 950
	LRXDC 35	○													12.5															
MXD 35		○	1.52									124	50	78.6	12.7											58 700	100 000	2 170	1 360 8 470	1 360 8 470
	LRXD 35	○													12.5															
MXDG 35		○	2.02									152	72	106.6	12.7											74 200	135 000	2 930	2 440 13 800	2 440 13 800
	LRXDG 35	○													12.5															
MXDL 35	–	–	2.55									184	100	138.6	12.7											90 800	175 000	3 800	4 060 21 300	4 060 21 300
MXDC 45	LRXDC 45	○	2.01	10.8	70	8	20.5	96	86	30	13	114	–	59	17.5	M10×20	26	45	38	14	20	17	52.5	105	M12×40	64 100	95 600	2 660	1 010 7 800	1 010 7 800
MXD 45	LRXD 45	○	3.13									154	60	99												95 400	159 000	4 430	2 700 16 800	2 700 16 800
MXDG 45	LRXDG 45	○	4.29									194	80	139												124 000	223 000	6 200	5 220 29 000	5 220 29 000
MXDL 45	–	–	5.36									234	120	179												151 000	287 000	7 980	8 560 44 400	8 560 44 400

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.
Remark: Three grease nipple mounting thread holes are provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code			Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXD	G	35	C2	R1200	T2	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXD	Block type mounting from top
LRXD	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 35, 45

④ Number of slide unit (2)

⑤ Length of track rail (1,200 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

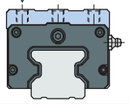
⑨ Special specification: A, D, E, F, HP, I , J, L, LF, MA, MN, N, PS, Q, RC, T, UR, V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

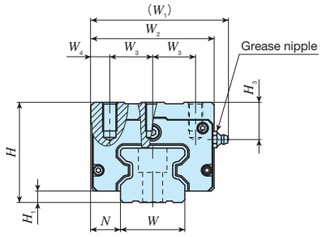
IKO C-Lube Linear Roller Way Super MX

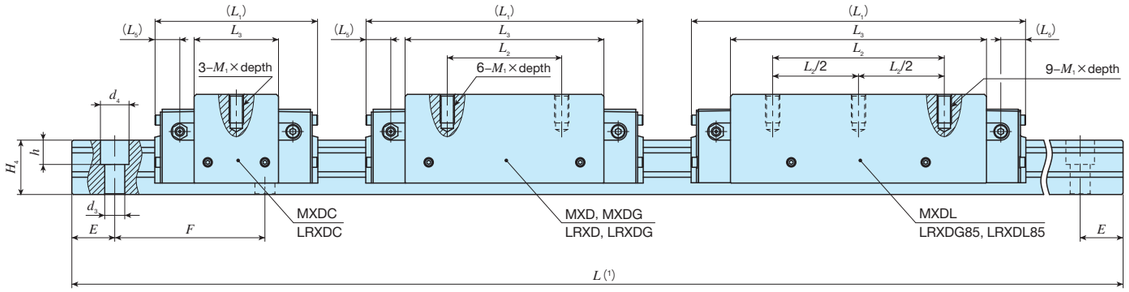
Block type mounting from top

Shape: **MXD • LRXD**



Size						
10	12	15	20	25	30	
35	45	55	65	85		

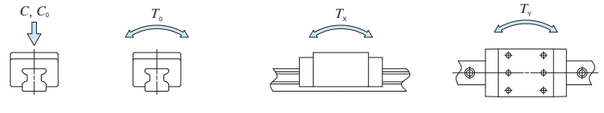




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm									Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_5	M_1×depth	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXDC 55	LRXDC 55	○	3.17	14.1	80	9	23.5	110	100	37.5	12.5	136	–	72	20	M12×25	26	53	43	16	23	20	60	120	M14×45	99 700	149 000	4 830	1 880 14 400	1 880 14 400
MXD 55	LRXD 55	○	4.97									184	75	120												148 000	248 000	8 040	5 040 31 100	5 040 31 100
MXDG 55	LRXDG 55	○	7.06									238	95	174												198 000	359 000	11 700	10 400 57 000	10 400 57 000
MXDL 55	–	–	9.08									292	150	228												244 000	470 000	15 300	17 700 90 700	17 700 90 700
MXDC 65		○	5.52	22.6	90	12	31.5	135	126	38	25	180	–	95	26.3	M16×25	18	63	56	18	26	22	75	150	M16×60	174 000	249 000	9 790	4 200 32 000	4 200 32 000
	LRXDC 65	○										181			26.6													4 200 32 200	4 200 32 200
MXD 65		○	8.70									244	70	159	26.3											260 000	415 000	16 300	11 300 69 000	11 300 69 000
	LRXD 65	○										245			26.6													11 300 69 300	11 300 69 300
MXDG 65		○	12.1									308	120	223	26.3											337 000	581 000	22 800	21 800 120 000	21 800 120 000
	LRXDG 65	○										309			26.6														
MXDL 65	–	–	15.5									380	200	295	26.3											419 000	768 000	30 200	37 600 193 000	37 600 193 000
	LRXD 85	–	19.9	36.7	110	16	40.5	175	166	60	23	323	140	232	27.5	M20×30	22	85	67	26.5	39	30	90	180	M24×70	440 000	753 000	38 900	29 500 163 000	29 500 163 000
	LRXDG 85	–	25.5									395	200	304												542 000	985 000	50 800	50 000 257 000	50 000 257 000
	LRXDL 85	–	34.1									494	280	403												674 000	1 300 000	67 300	87 000 422 000	87 000 422 000

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.

Remarks 1. The specifications of grease nipple are shown in Table 15 on page Ⅱ−188.
2. Three grease nipple mounting thread holes are provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code	Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXD	G	55	C2	R3000	T2	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXD	Block type mounting from top
LRXD	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 55, 65, 85

④ Number of slide unit (2)

⑤ Length of track rail (3,000 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑨ Special specification: A, D, E, F, HP, Ⅰ, J, L, LF, MA, MN, PS, Q, RC, T, UR, V, W, Y, Z

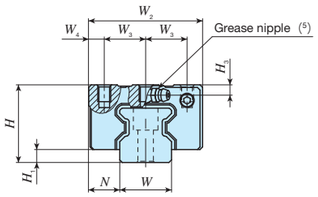
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

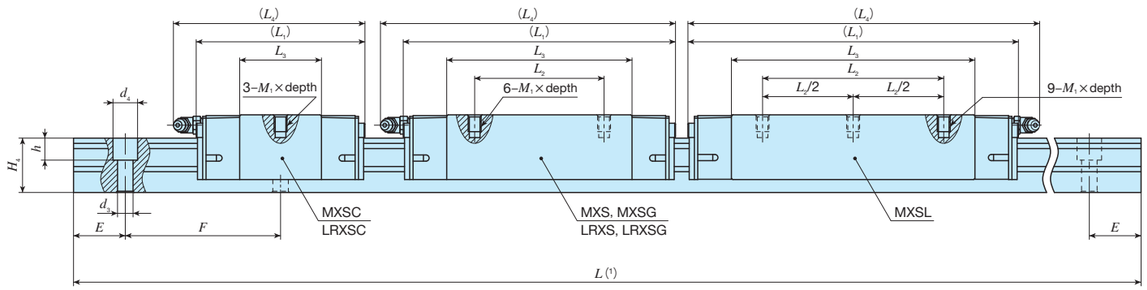
IKO C-Lube Linear Roller Way Super MX

Compact block type mounting from top

Shape	MXS • LRXS

Size	15	20	25	30
	35	45	55	

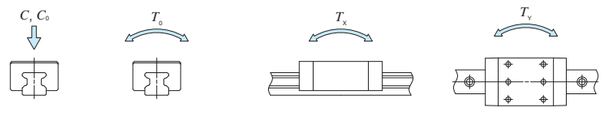




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm									Dimensions of track rail mm							Appended mounting bolt for track rail (3)	Basic dynamic load rating (4)	Basic static load rating (4)	Static moment rating (4)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	M_1×depth (2)	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXSC 15	LRXSC 15	○	0.099	1.65	24	4	9.5	34	13	4	52	–	24	55	M4× 5.5	3.5	15	16.5	4.5	8	6	30	60	M4×16	7 730	12 000	113	50.6 457	50.6 457
MXS 15	LRXS 15	○	0.15								68	26	40	71											11 500	20 000	188	136 942	136 942
MXSG 15	LRXSG 15	○	0.21								84		56	87											14 900	28 000	263	262 1 590	262 1 590
MXSC 20	LRXSC 20	○	0.21	2.73	30	5	12	44	16	6	66	–	31.6	74	M5× 6.5	4	20	21	6	9.5	8.5	30	60	M5×20	16 100	26 400	341	150 1 260	150 1 260
MXS 20	LRXS 20	○	0.31								86	36	51.6	94											23 400	42 700	550	379 2 520	379 2 520
MXSG 20	LRXSG 20	○	0.42								106	50	71.6	114											30 100	58 900	760	713 4 200	713 4 200
MXSL 20	–	–	0.55								128	70	94.1	137											37 200	77 200	996	1 210 6 560	1 210 6 560
MXSC 25	LRXSC 25	○	0.30	3.59	36	6	12.5	48	17.5	6.5	74	–	36	83	M6× 9	5	23	24.5	7	11	9	30	60	M6×25	21 600	33 800	500	213 1 810	213 1 810
MXS 25	LRXS 25	○	0.47								98	35	60	107											32 100	56 300	833	573 3 800	573 3 800
MXSG 25	LRXSG 25	○	0.57								113	50	75	122											38 200	70 300	1 040	885 5 380	885 5 380
MXSL 25	–	–	0.74								137	70	99	146											47 400	92 800	1 370	1 530 8 480	1 530 8 480
MXSC 30	LRXSC 30	○	0.54	5.01	42	6.5	16	60	20	10	85	–	42.4	95	M8×11	6.5	28	28	9	14	12	40	80	M8×28	29 200	44 600	808	329 2 740	329 2 740
MXS 30	LRXS 30	○	0.83								113	40	70.4	123											43 400	74 400	1 350	883 5 780	883 5 780
MXSG 30	LRXSG 30	○	1.05								134	60	91.4	144											53 200	96 700	1 750	1 470 8 740	1 470 8 740
MXSL 30	–	–	1.37								162	80	119.4	172											65 600	126 000	2 290	2 500 13 600	2 500 13 600

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) For the fixing thread depth of the slide unit mounting hole, the value indicated in Table 16.1 on page Ⅱ−190 is recommended.
(3) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176. In an assembled set of MX series, track rail mounting bolts are not appended.
(4) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(5) The shape of the grease nipple varies depending on the size and the applicable supplemental code. For details of the specifications, see Table 15 on page Ⅱ-188.

Remark: A grease nipple mounting thread hole is provided on the right and left end plates respectively.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXS	G	25	C2	R840	T1	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXS	Compact block type mounting from top
LRXS	

② Length of slide unit

C	Short
No symbol	Standard
G	Long
L	Extra long

③ Size: 15, 20, 25, 30

④ Number of slide unit (2)

⑤ Length of track rail (840 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

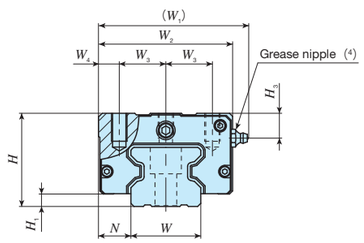
⑨ Special specification: A, D, E, F, HP, I , J, L, LF MA, MN, N, Q, RC, T, UR V, W, Y, Z

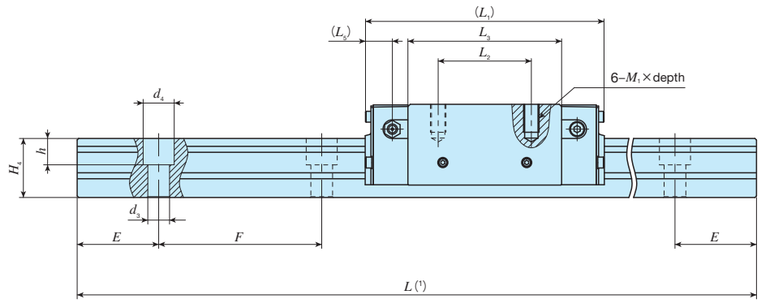
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

IKO C-Lube Linear Roller Way Super MX

Compact block type mounting from top

Shape	MXS
Size	15 · 20 · 25 · 30 · **35** · **45** · **55**

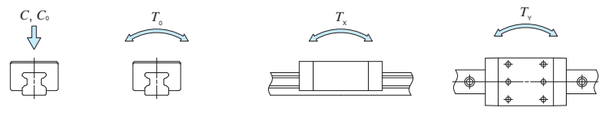




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm										Dimensions of track rail mm								Mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_5	$M_1\times$ depth		H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXS 35	–	○	1.22	6.88	48	6.5	18	78	70	25	10	124	50	78.6	12.7	M 8×12		13	34	32	9	14	12	40	80	M 8×35	58 700	100 000	2 170	1 360 8 470	1 360 8 470
MXSG 35	–	○	1.61									152	72	106.6													74 200	135 000	2 930	2 440 13 800	2 440 13 800
MXS 45	–	○	2.37	10.8	60	8	20.5	96	86	30	13	154	60	99	17.5	M10×18		16	45	38	14	20	17	52.5	105	M12×40	95 400	159 000	4 430	2 700 16 800	2 700 16 800
MXSG 45	–	○	3.27									194	80	139													124 000	223 000	6 200	5 220 29 000	5 220 29 000
MXS 55	–	○	3.96	14.1	70	9	23.5	110	100	37.5	12.5	184	75	120	20	M12×20		16	53	43	16	23	20	60	120	M14×45	148 000	248 000	8 040	5 040 31 100	5 040 31 100
MXSG 55	–	○	5.63									238	95	174													198 000	359 000	11 700	10 400 57 000	10 400 57 000

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) Track rail mounting bolts are not appended.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.

Remark: Three grease nipple mounting thread holes are provided on the right and left end plates respectively.



MX • LRX

Example of identification number of assembled set

Model code		Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXS	G	45	C2	R1470	T1	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXS	Compact block type mounting from top

② Length of slide unit

No symbol	Standard
G	Long

③ Size: 35, 45, 55

④ Number of slide unit (2)

⑤ Length of track rail (1,470 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

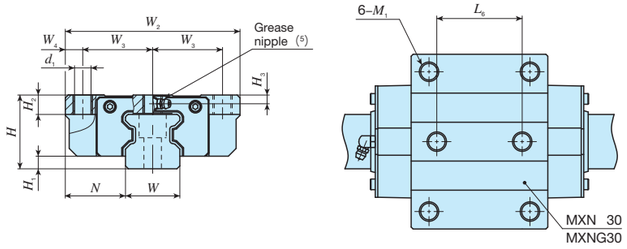
⑨ Special specification: A, D, E, F, HP, I , J, L, LF MA, N, RC, T, UR, V, W, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

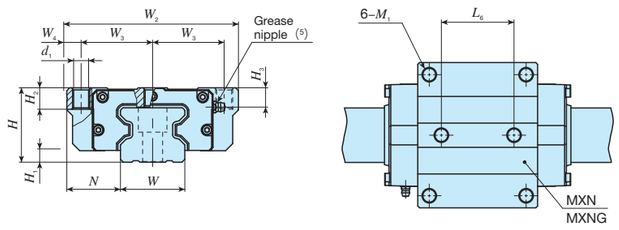
Low profile flange type mounting from top

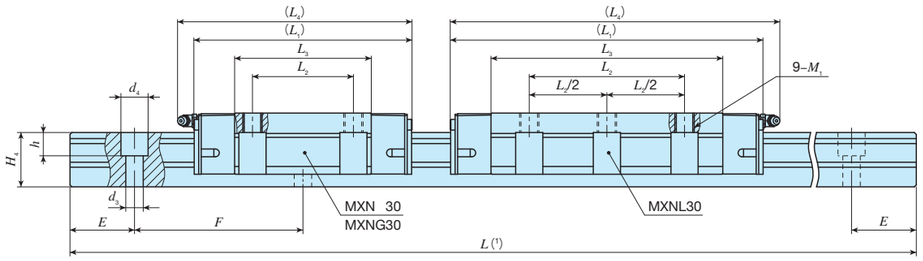
Shape	MXN			
Size	30	35	45	55

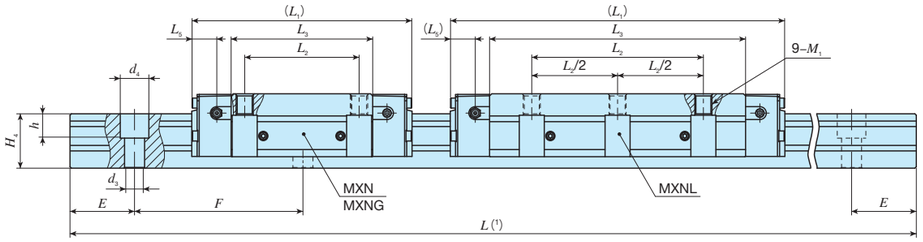
MXN 30
MXNG 30
MXNL 30



MXN
MXNG
MXNL



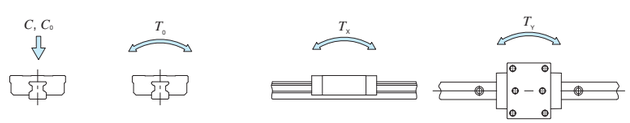




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm												Dimensions of track rail mm								Mounting bolt for track rail (3)	Basic dynamic load rating (4)	Basic static load rating (4)	Static moment rating (4)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_2	W_3	W_4	L_1	L_2	L_3	L_4	L_5	L_6	d_1	M_1	Maximum fixing thread depth (2)	H_2	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size × ℓ	C N	C_0 N	T_0 N·m	T_x N·m	T_y N·m
MXN 30	–	○	1.05	5.01	38	6.5	31	90	36	9	113	52	70.4	121	–	44	8.5	M10	9	10	4.5	28	28	9	14	12	40	80	M 8×28	43 400	74 400	1 350	883 5 780	883 5 780
MXNG 30	–	○	1.38								134		91.4	142															53 200	96 700	1 750	1 470 8 740	1 470 8 740
MXNL 30	–	–	1.75								162	80	119.4	170		80													65 600	126 000	2 290	2 500 13 600	2 500 13 600
MXN 35	–	○	1.55	6.88	44	6.5	33	100	41	9	124	62	78.6	–	12.7	52	8.5	M10	11	13	11	34	32	9	14	12	40	80	M 8×35	58 700	100 000	2 170	1 360 8 470	1 360 8 470
MXNG 35	–	○	2.13								152		106.6																74 200	135 000	2 930	2 440 13 800	2 440 13 800
MXNL 35	–	–	2.71								184	100	138.6			100													90 800	175 000	3 800	4 060 21 300	4 060 21 300
MXN 45	–	○	2.58	10.8	52	8	37.5	120	50	10	154	80	99	–	17.5	60	10.5	M12	13	15	13.5	45	38	14	20	17	52.5	105	M12×40	95 400	159 000	4 430	2 700 16 800	2 700 16 800
MXNG 45	–	○	3.73								194		139																124 000	223 000	6 200	5 220 29 000	5 220 29 000
MXNL 45	–	–	4.72								234	120	179			120													151 000	287 000	7 980	8 560 44 400	8 560 44 400
MXN 55	–	○	4.61	14.1	63	9	43.5	140	58	12	184	95	120	–	20	70	12.5	M14	19	17	16	53	43	16	23	20	60	120	M14×45	148 000	248 000	8 040	5 040 31 100	5 040 31 100
MXNG 55	–	○	6.94								238		174																198 000	359 000	11 700	10 400 57 000	10 400 57 000
MXNL 55	–	–	8.87								292	150	228			150													244 000	470 000	15 300	17 700 90 700	17 700 90 700

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) The fixing thread depth of mounting screw in the middle of the way in the slide unit width direction should be less than the maximum fixing thread depth.
(3) Track rail mounting bolts are not appended.
(4) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_x, T_y) are shown in the sketches below. The upper values of T_x and T_y are for one slide unit and the lower values are for two slide units in close contact.
(5) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.

Remarks 1. For size 30 series, a grease nipple mounting thread hole is provided on the right and left end plates respectively.
2. For size 35, 45, and 55 series, three grease nipple mounting thread holes are provided on the right and left end plates respectively. However, the size of thread hole for size 35 in the slide unit travelling direction is smaller than that of the crosswise direction. When the grease nipple is mounted along the travelling direction, contact IKO.



Example of identification number of assembled set

Model code		Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXN	G	55	C2	R3000	T2	P		/F
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXN	Low profile flange type mounting from top

② Length of slide unit

No symbol	Standard
G	Long
L	Extra long

③ Size: 30, 35, 45, 55

④ Number of slide unit (2)

⑤ Length of track rail (3,000 mm)

⑥ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑧ Interchangeable

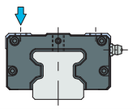
No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑨ Special specification: A, D, E, F, HP, I, J, L, LF MA, RC, T, UR, V, W, Z

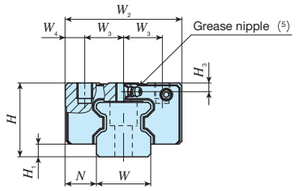
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Low profile block type mounting from top

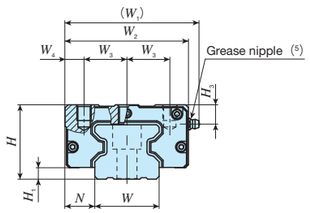
Shape	MXNS
Size	30 / 35 / 45 / 55

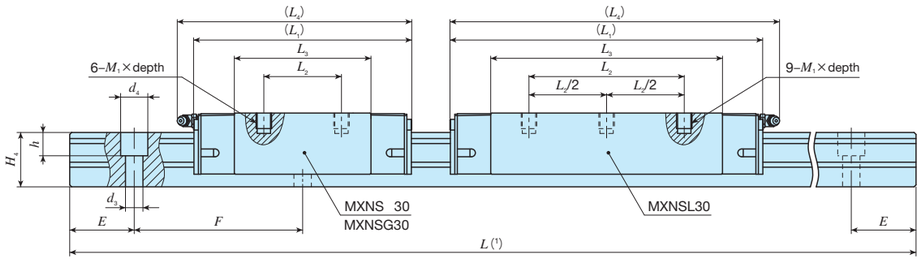


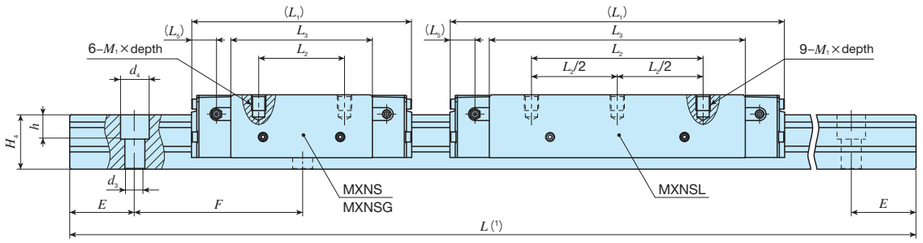
MXNS 30
MXNSG 30
MXNSL 30



MXNS
MXNSG
MXNSL



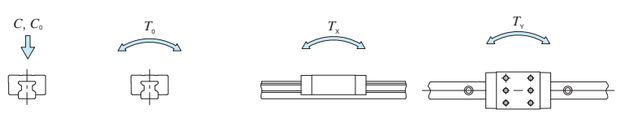




Identification number		Interchangeable	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm											Dimensions of track rail mm							Mounting bolt for track rail (3)	Basic dynamic load rating (4)	Basic static load rating (4)	Static moment rating (4)		
MX series	LRX series (No C-Lube)		Slide unit kg	Track rail kg/m	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_4	L_5	M_1×depth (2)	Maximum fixing thread depth (2)	H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N	T_0 N·m	T_X N·m	T_Y N·m
MXNS 30	–	○	0.70									113	40	70.4	121													43 400	74 400	1 350	883 5 780	883 5 780
MXNSG 30	–	○	0.90	5.01	38	6.5	16	–	60	20	10	134	60	91.4	142	–	M 8× 8	9	4.5	28	28	9	14	12	40	80	M 8×28	53 200	96 700	1 750	1 470 8 740	1 470 8 740
MXNSL 30	–	–	1.14									162	80	119.4	170													65 600	126 000	2 290	2 500 13 600	2 500 136 000
MXNS 35	–	○	1.08									124	50	78.6														58 700	100 000	2 170	1 360 8 470	1 360 8 470
MXNSG 35	–	○	1.42	6.88	44	6.5	18	78	70	25	10	152	72	106.6	–	12.7	M 8× 9	11	11	34	32	9	14	12	40	80	M 8×35	74 200	135 000	2 930	2 440 13 800	2 440 13 800
MXNSL 35	–	–	1.81									184	100	138.6														90 800	175 000	3 800	4 060 21 300	4 060 21 300
MXNS 45	–	○	1.84									154	60	99														95 400	159 000	4 430	2 700 16 800	2 700 16 800
MXNSG 45	–	○	2.58	10.8	52	8	20.5	94	86	30	13	194	80	139	–	17.5	M10×11	13	13.5	45	38	14	20	17	52.5	105	M12×40	124 000	223 000	6 200	5 220 29 000	5 220 29 000
MXNSL 45	–	–	3.29									234	120	179														151 000	287 000	7 980	8 560 44 400	8 560 44 400
MXNS 55	–	○	3.31									184	75	120														148 000	248 000	8 040	5 040 31 100	5 040 31 100
MXNSG 55	–	○	4.83	14.1	63	9	23.5	110	100	37.5	12.5	238	95	174	–	20	M12×15	19	16	53	43	16	23	20	60	120	M14×45	198 000	359 000	11 700	10 400 57 000	10 400 57 000
MXNSL 55	–	–	6.28									292	150	228														244 000	470 000	15 300	17 700 90 700	17 700 90 700

Notes (1) Track rail lengths L are shown in Table 2.1 on page Ⅱ−175 and Table 2.3 on page Ⅱ−176 .
(2) For the fixing thread depth of the slide unit mounting hole, the value indicated in Table 16.2 on page Ⅱ−190 is recommended. The fixing thread depth of mounting screw in the middle of the way in the slide unit width direction should be less than the maximum fixing thread depth.
(3) Track rail mounting bolts are not appended.
(4) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(5) The shapes of grease nipple vary by size. The specifications are shown in Table 15 on page Ⅱ−188.

Remarks 1. For size 30 series, a grease nipple mounting thread hole is provided on the right and left end plates respectively.
2. For size 35, 45, and 55 series, three grease nipple mounting thread holes are provided on the right and left end plates respectively. However, the size of thread hole for size 35 in the slide unit travelling direction is smaller than that of the crosswise direction. When the grease nipple is mounted along the travelling direction, contact IKO.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Interchangeable code	Supplemental code
MXNS G	55	C2	R3000	T_2	P		/F
① ②	③	④	⑤	⑥	⑦	⑧	⑨

① Model

MXNS	Low profile block type mounting from top

② Length of slide unit

No symbol	Standard
G	Long
L	Extra long

③ Size: 30, 35, 45, 55

④ Number of slide unit (2)

⑤ Length of track rail (3,000 mm)

⑥ Preload amount

No symbol	Standard
T_1	Light preload
T_2	Medium preload
T_3	Heavy preload

⑦ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

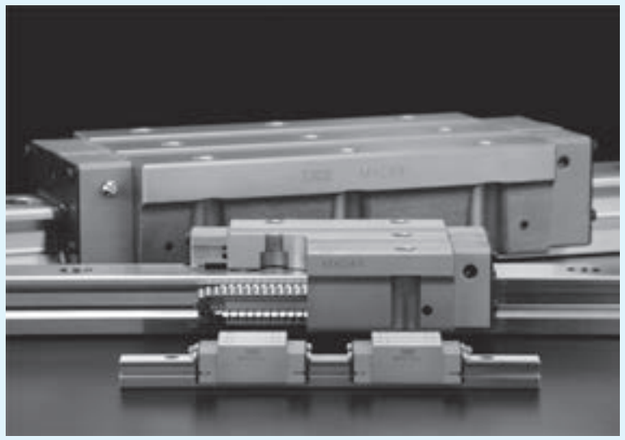
⑧ Interchangeable

No symbol	Non-interchangeable specification
S1	S1 specification
S2	S2 specification

⑨ Special specification: A, D, E, F, HP, I , J, L, LF MA, RC, T, UR, V, W, Z

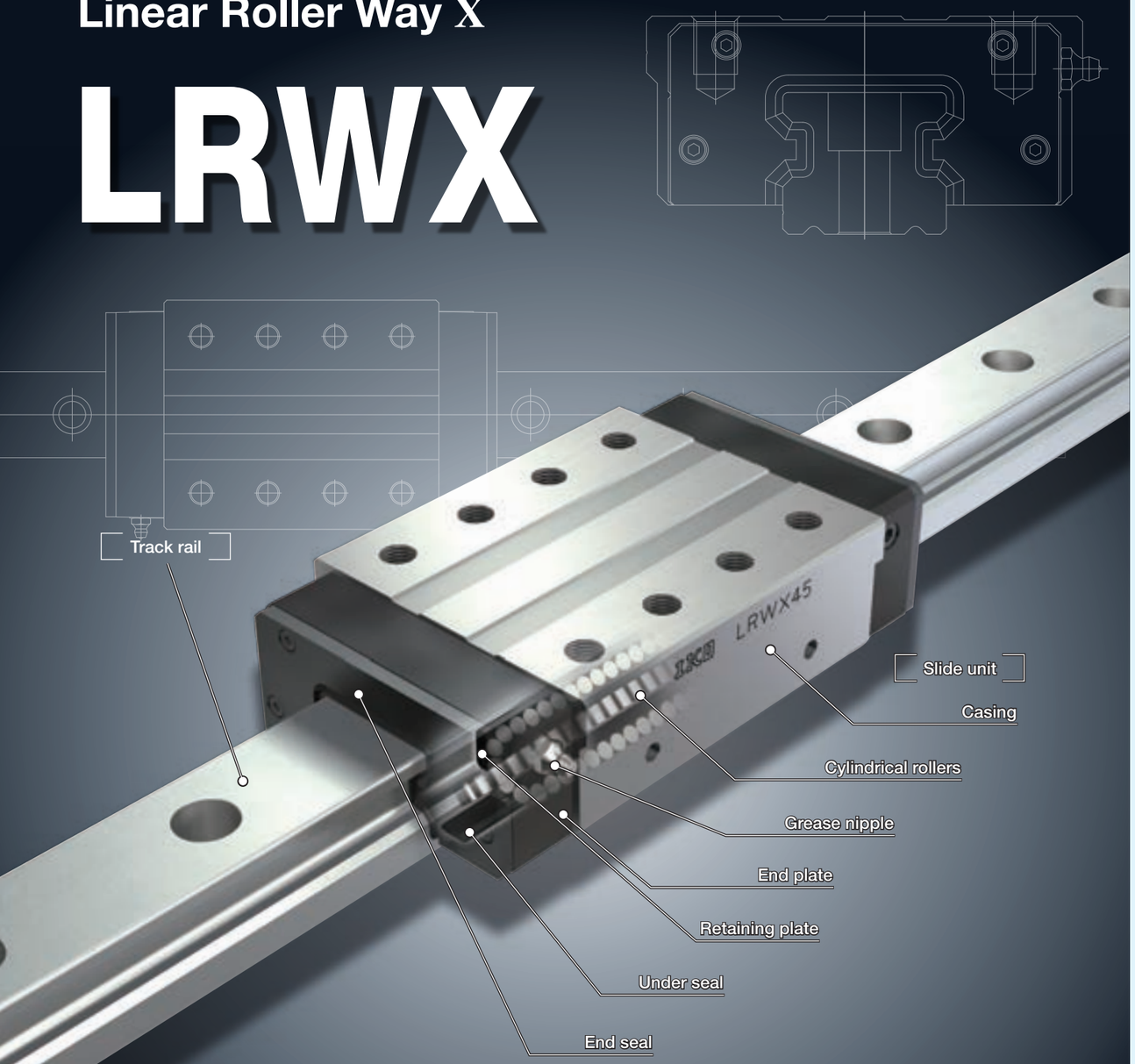
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Linear Roller Way X



Linear Roller Way X

LRWX



Roller type linear motion rolling guide with cylindrical rollers in four-rows!

Well-balanced roller arrangement enabling equal resistance to all direction loads!

Slide unit shape block type and flange type are available and can be selected according to the application!

Identification Number and Specification

Example of an identification number

The specification of LRWX series is indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a part code, a preload symbol, a classification symbol, and any supplemental codes for each specification to apply.

	1	2	3	4	1	5	6	7
Assembled set	LRWX	35	C2	R660	B	T_2	SP	/Z

1 **Model** — Model code — Page Ⅱ－221

2 **Size** — Dimensions — Page Ⅱ－221

3 **Number of slide units**

4 **Length of track rail**

Part code — Page Ⅱ－221

5 **Preload amount** — Preload symbol — Page Ⅱ－222

6 **Accuracy class** — Classification symbol — Page Ⅱ－222

7 **Special specification** — Supplemental code — Page Ⅱ－223

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Identification Number and Specification —Model · Size · Number of Slide Unit · Length of Track Rail—

1 Model

Linear Roller Way X (1) (LRWX series)

Block type mounting from top : LRWX···B
Flange type mounting from bottom : LRWXH

For applicable models and sizes, see Table 1.

Note (1) This model has no built-in C-Lube.

2 Size

25,35,45,55,75

For applicable models and sizes, see Table 1.

3 Number of slide units

: C○

Indicates the number of slide units assembled on a track rail.

4 Length of track rail

: R○

Indicate the length of track rail in mm.
For standard and maximum lengths, see Table 2.

Table 1 Models and sizes of LRWX series

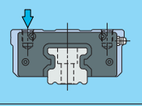
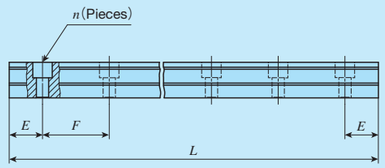
Shape	Model	Size				
		25	35	45	55	75
Block type mounting from top 	LRWX···B	○	○	○	○	○
Flange type mounting from bottom	LRWXH	–	○	○	○	○

Table 2 Standard and maximum lengths of track rail



unit: mm

Item \ Identification number	LRWX25···B	LRWX25···B/HP(3)	LRWX 35···B LRWXH35	LRWX 45···B LRWXH45	LRWX 55···B LRWXH55	LRWX 75···B LRWXH75
Standard length L (n)	480 (8) 660 (11) 840 (14) 1 020 (17) 1 200 (20) 1 500 (25)	480 (16) 660 (22) 840 (28) 1 020 (34) 1 200 (40) 1 500 (50)	480 (8) 660 (11) 840 (14) 1 020 (17) 1 200 (20) 1 500 (25)	800 (10) 1 040 (13) 1 200 (15) 1 520 (19) 1 920 (24)	800 (8) 1 000 (10) 1 200 (12) 1 500 (15) 2 000 (20) 3 000 (30)	840 (7) 1 200 (10) 1 560 (13) 1 920 (16) 3 000 (25)
Pitch of mounting holes F	60	30	60	80	100	120
E	30	15	30	40	50	60
Standard E dimensions (1) or higher	9	9	12	15	18	23
Standard E dimensions (1) below	39	24	42	55	68	83
Maximum length (2)	1 980 (3 000)	1 980 (3 000)	3 000 (3 960)	2 960 (4 000)	3 000 (4 000)	3 000 (3 960)

Notes (1) Not applicable to female threads for bellows (supplemental code "/J").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
(3) This indicates the dimension for the half pitch mounting holes specification of track rail.
Remark: If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ−30.

—Preload Amount · Accuracy Class—

5 Preload amount

Standard : No symbol
Light preload : T_1
Medium preload : T_2
Heavy preload : T_3

For details of the preload amount, see Table 3.

6 Accuracy class

High : H
Precision : P
Super precision : SP
Ultra precision : UP

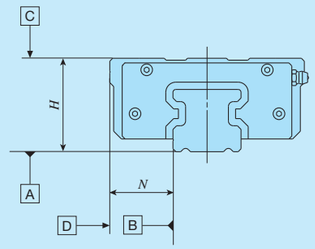
For details of accuracy class, see Table 4.

Table 3 Preload amount

Item \ Preload type	Preload symbol	Preload amount N	Operational conditions
Standard	(No symbol)	0(1)	· Light and precise motion
Light preload	T_1	0.02 C_0	· Almost no vibrations · Load is evenly balanced · Light and precise motion
Medium preload	T_2	0.05 C_0	· Medium vibration · Medium overhung load
Heavy preload	T_3	0.08 C_0	· Operation with vibration and / or shock · Overhanging load applied · Heavy cutting

Note (1) Indicates zero or minimal amount of preload.
Remark: C_0 indicates the basic static load rating.

Table 4 Tolerance and allowance



unit: mm

Item \ Class (classification symbol)	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
Dim. H tolerance	±0.040	±0.020	±0.010	±0.008
Dim. N tolerance	±0.050	±0.025	±0.015	±0.010
Dim. variation of H(1)	0.015	0.007	0.005	0.003
Dim. variation of N(1)	0.020	0.010	0.007	0.003
Parallelism in operation of the slide unit C surface to A surface	See Fig. 1			
Parallelism in operation of the slide unit D surface to B surface	See Fig. 1			

Note (1) It means the size variation between slide units mounted on the same track rail.

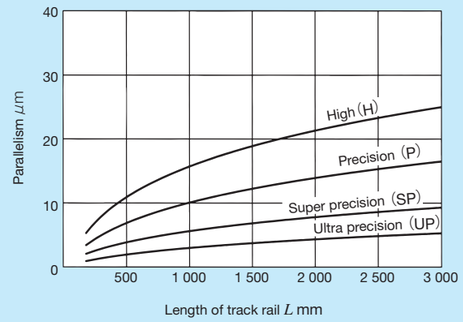


Fig. 1 Parallelism in operation

LRWX

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

7 Special specification

/A, /D, /E, /F, /HP, /I,
/J○, /L○, /LF○, /Q,
/V○, /W○, /Y○, /Z○

For applicable special specifications, see Table 5.
For combination of multiple special specifications, see Table 6.
For details of special specifications, see page Ⅲ－29.

Table 5 Application of special specifications

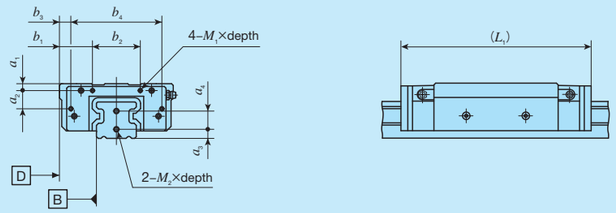
Special specification	Supplemental code	Size				
		25	35	45	55	75
Butt-jointing track rails	/A	○	○	○	○	○
Opposite reference surfaces arrangement	/D	○	○	○	○	○
Specified rail mounting hole positions	/E	○	○	○	○	○
Caps for rail mounting holes	/F	○	○	○	○	○
Half pitch mounting holes for track rail	/HP	○	×	×	×	×
Inspection sheet	/I	○	○	○	○	○
Female threads for bellows	/J○	○	○	○	○	○
Black chrome surface treatment	/L○	○	○	○	○	○
Fluorine black chrome surface treatment	/LF○	○	○	○	○	○
With C-Lube plate	/Q	○	○	○	○	○
Double seals	/V○	○	×	×	×	×
A group of multiple assembled sets	/W○	○	○	○	○	○
Specified grease	/Y○	○	○	○	○	○
Scrapers	/Z○	○	○	○	○	○

Table 6 Combination of supplemental codes

	A	D	E	F	HP	I	J	L	LF	Q	V	W	Y
D	○												
E	–	–											
F	○	○	○										
HP	–	○	–	○									
I	○	○	○	○	○								
J	○	○	○	○	–	○							
L	○	○	○	○	○	○	○						
LF	○	○	○	○	○	○	○	–					
Q	○	○	○	○	○	○	–	○	○				
V	○	○	○	○	○	○	○	○	○	–			
W	○	○	–	○	○	○	○	○	○	○	○		
Y	○	○	○	○	○	○	○	○	○	–	○	○	
Z	○	○	○	○	○	○	–	○	○	–	○	○	○

Remarks 1. The combination of "－" shown in the table is not available.
2. When using multiple types for combination, please indicate by arranging the symbols in alphabetical order.

Table 7 Dimension of female threads for bellows (Supplemental code: /J /JJ)

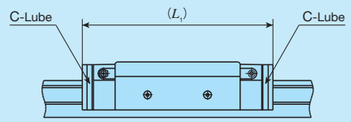


unit: mm

Identification number	Slide unit								Track rail		
	a_1	a_2	b_1	b_2	b_3	b_4	M_1×depth	L_1(1)	a_3	a_4	M_2×depth
LRWX 25···B	5	12	15	33	7	49	M3× 6	116	7	12	M4× 8
LRWX 35···B	6	16	29	42	10	80	M3× 6	166	8	16	M4× 8
LRWXH 35			31		12						
LRWX 45···B	8	20	34	52	12	96	M4× 8	221	10	19	M5×10
LRWXH 45			38		16						
LRWX 55···B	9	24	36	68	15	110	M5×10	282	12	23	M6×12
LRWXH 55			43		22						
LRWX 75···B	10	35	35	110	15.5	149	M5×10	366	15	30	M6×12
LRWXH 75			42		22.5						

Note (1) Dimensions of the specification that female threads for bellows are fitted to both ends of the slide unit are indicated.

Table 8 Dimension of slide unit with C-Lube plate (Supplemental code /Q)

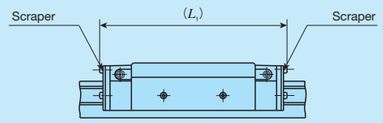


unit: mm

Size	L_1
25	120
35	166
45	218
55	275
75	364

Remark: The dimensions of the slide unit with C-Lube at both ends are indicated.

Table 9 Dimension of slide unit with scrapers (Supplemental code: /Z /ZZ)



unit: mm

Size	L_1
25	120
35	164
45	217
55	275
75	361

Remark: The dimensions of the slide unit with scraper at both ends are indicated.

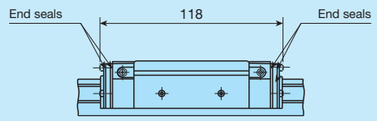


Fig. 2 Dimensions of slide unit with double seals (Size 25) (Supplemental code: /V /VV)

Remark: The dimensions of the slide unit with double end seals at both ends are indicated.

LRWX

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Lubrication

Lithium-soap base grease with extreme-pressure additive (Alvania EP Grease 2 [Shell Lubricants Japan K.K.]) is pre-packed in LRWX series.

LRWX series has grease nipple as indicated in Table 10.

Table 10 Parts for lubrication

Size	Grease nipple type (1)	Applicable supply nozzle type	Bolt size of female threads for piping
25	JIS type 1	Grease gun available on the market	M6
35			
45	JIS type 2		PT1/8
55			
75			

Note (1) For grease nipple specification, see Table 14.2 on page Ⅲ−23.
Remark: Stainless steel grease nipple is also available. If needed, please contact IKO.

Dust Protection

The slide units of LRWX series are equipped with end seals and under seals as standard for dust protection. However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the track rail, it is recommended to cover the whole unit with bellows or telescope type shield, etc.
LRWX series is provided with specific bellows. The bellows are easy to mount and provide excellent dust protection. If needed, please refer to Ⅲ−26 for ordering.

Precaution for Use

❶Mounting surface, reference mounting surface and typical mounting structure

When mounting the LRWX series, properly align the reference mounting surfaces B and D of the track rail and slide unit with the reference mounting surface of the table and bed and fix them. (See Fig. 3)
Reference mounting surfaces B and D and mounting surfaces A and C are ground precisely. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable linear motion with high accuracy.
Reference mounting surface of the slide unit is the opposite side of the IKO mark. The track rail reference mounting surface is identified by locating the IKO mark on the top surface of the track rail. It is the side surface above the mark (in the direction of the arrow). (See Fig. 4)

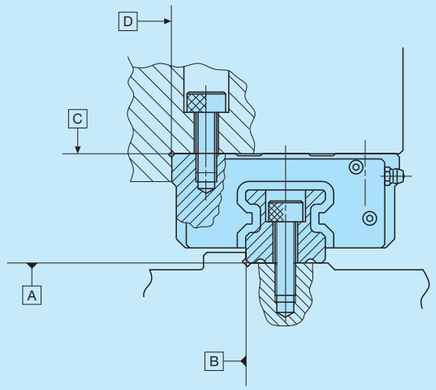


Fig. 3 Reference mounting surface and typical mounting structure

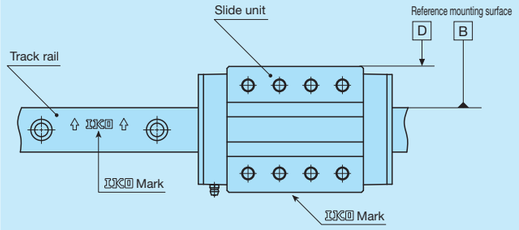


Fig. 4 Reference mounting surface

❷Fixing the slide unit

Slide unit of LRWX25··· B and LRWXH is also provided with mounting holes in the middle of width direction (see Fig. 5) and has the arrangement to receive the applied load in a good balance. When designing machines or equipment, consider the arrangement so that the mounting holes in the middle of slide unit can also be used to fix the units, to use the highest performance out of the product.

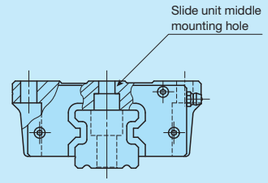


Fig. 5 Slide unit middle mounting hole

❸Shoulder height and corner radius of the reference mounting surface

For the opposite corner of the mating reference mounting, it is recommended to have relieved fillet as indicated in Fig. 6, but you may also use it with providing corner radius R as shown in Table 11. Recommended value for the shoulder height and corner radius on the mating side is indicated in Table 11.

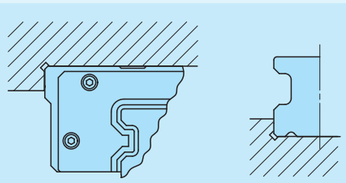
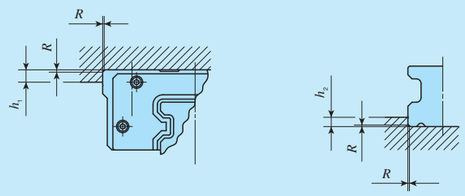


Fig. 6 Corner of the mating reference mounting

Table 11 Shoulder height and corner radius of the reference mounting surface



unit: mm

Size	Shoulder height of slide unit mounting part h_1	Shoulder height of track rail mounting part h_2	Corner radius R (Maximum)
25	6	4	1
35	8	5.5	1
45	8	6	1
55	10	8	1.5
75	10	8	1.5

❹Tightening torque for fixing screw

Typical tightening torque for mounting of the LRWX series to the steel mating member material is indicated in Table 12. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated in the table as necessary. If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.

Table 12 Tightening torque for fixing screw

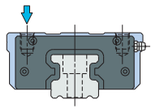
Bolt size	Tightening torque N · m
	High carbon steel-made screw
M 6×1	13.6
M 8×1.25	32.7
M10×1.5	63.9
M12×1.75	110
M16×2	268
M24×3	749

Remark: The tightening torque is calculated based on strength division 12.9 for product size up to 55, and strength division 10.9 for product size 75.

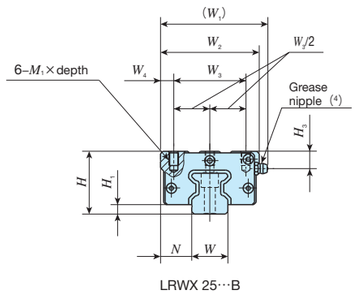
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Block type mounting from top

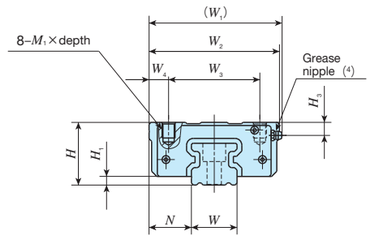
Shape: LRWX···B

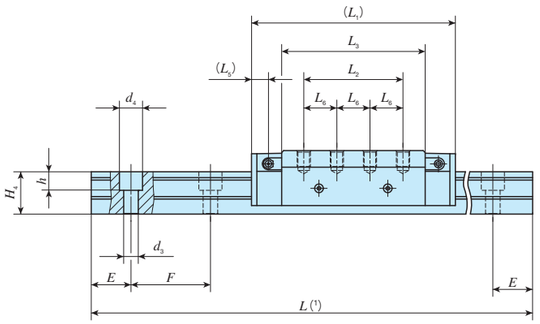


Size: 25 | 35 | 45 | 55 | 75



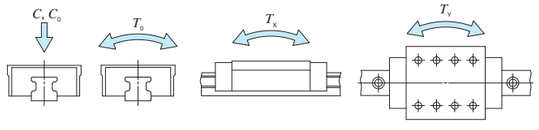
LRWX 25···B





Identification number	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm										Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
LRWX series (No C-Lube)	Slide unit	Track rail	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_5	L_6	$M_1\times$ depth		H_3	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C	C_0	T_0	T_X	T_Y
	kg	kg/m																								N	N	N · m	N · m	N · m
LRWX 25···B	0.93	3.70	40	6	20	69	63	46	8.5	109	45	74.4	11	–	M 6× 9		11	23	26	7	11	9	30	60	M 6×28	32 700	70 300	1 110	885 5 170	885 5 170
LRWX 35···B	2.65	6.66	48	6.5	32.5	103	100	70	15	154	75	108.4	12.8	25	M10×12		10	35	32	11	17.5	14	30	60	M10×35	49 900	91 100	2 150	1 660 9 450	1 660 9 450
LRWX 45···B	5.32	10.3	60	8	37.5	125	120	82	19	205	105	144	18.5	35	M12×16		14.5	45	39	14	20	16	40	80	M12×40	93 300	167 000	5 000	4 030 23 000	4 030 23 000
LRWX 55···B	9.09	15.3	70	9	42.5	142	140	95	22.5	262	135	189	24.5	45	M12×18		16	55	47	18	26	21	50	100	M16×50	186 000	330 000	12 200	10 700 57 900	10 700 57 900
LRWX 75···B	19.0	25.1	90	10	52.5	190	180	123	28.5	346	180	240	45	60	M16×25		20	75	57	26	39	30	60	120	M24×60	298 000	518 000	25 200	20 900 121 000	20 900 121 000

Notes (1) Track rail lengths L are shown in Table 2 on page Ⅱ−221.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 10 on page Ⅱ−225.



Example of identification number of assembled set

Model code	Dimensions	Part code		Model code	Preload symbol	Classification symbol	Supplemental code
LRWX	35	C2	R840	B	T1	P	/W2
①	②	③	④	①	⑤	⑥	⑦

① Model
LRWX···B | Block type mounting from top

② Size
25, 35, 45, 55, 75

③ Number of slide unit (2)

④ Length of track rail (840 mm)

⑤ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

⑥ Accuracy class

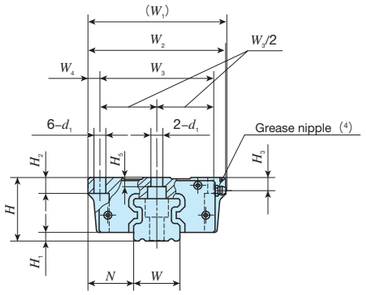
H	High
P	Precision
SP	Super precision
UP	Ultra precision

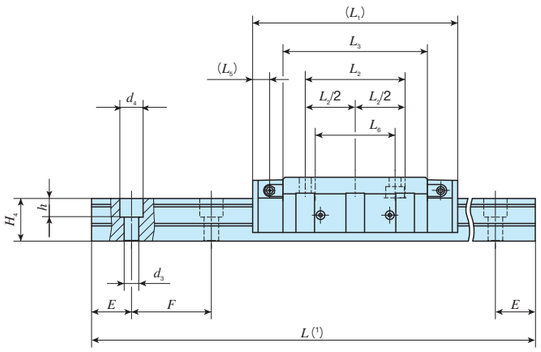
⑦ Special specification
A, D, E, F, HP, Ⅰ, J
L, LF, Q, V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Flange type mounting from bottom

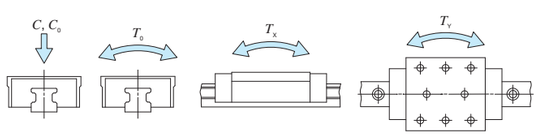
Shape	LRWXH			
Size	35	45	55	75





Identification number	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide unit mm												Dimensions of track rail mm							Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)	Static moment rating (3)		
LRWX series (No C-Lube)	Slide unit	Track rail	H	H_1	N	W_1	W_2	W_3	W_4	L_1	L_2	L_3	L_5	L_6	d_1	H_2	H_3	H_5	W	H_4	d_3	d_4	h	E	F	Bolt size× ℓ	C	C_0	T_0	T_X	T_Y
	kg	kg/m																									N	N	N · m	N · m	N · m
LRWXH 35	2.51	6.66	48	6.5	34.5	105	104	86	9	154	75	108.4	12.8	60	9	12	10	7	35	32	11	17.5	14	30	60	M10×35	49 900	91 100	2 150	1 660 9 450	1 660 9 450
LRWXH 45	5.18	10.3	60	8	41.5	129	128	108	10	205	105	144	18.5	80	11	15	14.5	10	45	39	14	20	16	40	80	M12×40	93 300	167 000	5 000	4 030 23 000	4 030 23 000
LRWXH 55	9.08	15.3	70	9	49.5	–	154	130	12	262	135	189	24.5	106	14	18	16	10	55	47	18	26	21	50	100	M16×50	186 000	330 000	12 200	10 700 57 900	10 700 57 900
LRWXH 75	19.7	25.1	90	10	59.5	197	194	164	15	346	180	240	45	134	18	24	20	16	75	57	26	39	30	60	120	M24×60	298 000	518 000	25 200	20 900 121 000	20 900 121 000

Notes (1) Track rail lengths L are shown in Table 2 on page Ⅱ−221.
(2) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating (C), basic static load rating (C_0), and static moment rating (T_0, T_X, T_Y) are shown in the sketches below. The upper values of T_X and T_Y are for one slide unit and the lower values are for two slide units in close contact.
(4) The shapes of grease nipple vary by size. The specifications are shown in Table 10 on page Ⅱ−225.



Example of identification number of assembled set

Model code	Dimensions	Part code		Preload symbol	Classification symbol	Supplemental code
LRWXH	35	C2	R840	T1	P	/W2
①	②	③	④	⑤	⑥	⑦

① Model

LRWXH	Flange type mounting from bottom

② Size: 35, 45, 55, 75

③ Number of slide unit (2)

④ Length of track rail (840 mm)

⑤ Preload amount

No symbol	Standard
T1	Light preload
T2	Medium preload
T3	Heavy preload

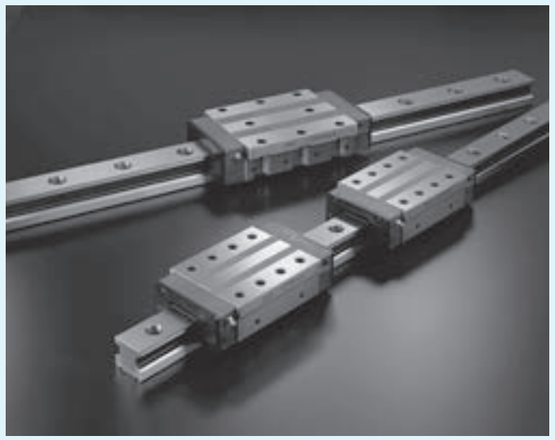
⑥ Accuracy class

H	High
P	Precision
SP	Super precision
UP	Ultra precision

⑦ Special specification: A, D, E, F, HP, Ⅰ, J, L, LF, Q, V, W, Y, Z

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Linear Way Module



Linear Way Module

LWLM



LRWM

Points

● Compact module type

1 Compact linear motion rolling guides consisting of a set of track rail and slide member which forms the smallest unit of linear motion mechanism.

● Available Models

2 Two models are available: LWLM which uses balls for the rolling elements; and LRWM which uses rollers.

● Stainless steel selections for excellent corrosion resistance

3 LWLM is made of stainless steel of excellent corrosion resistance. They are suitable for applications where rust prevention oil is not preferred, such as in cleanroom environment.

Identification Number and Specification

Example of an identification number

The specification of Linear Way Module series is indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a part code, a classification symbol, and any supplemental codes for each specification to apply.

	1	2	3	4	5	6
Assembled set	LRWM	3	M2	R660	SP	/W2

- 1 **Model** — Model code Page Ⅱ－235
- 2 **Size** — Dimensions Page Ⅱ－235
- 3 **Number of slide members** — Part code Page Ⅱ－235 Page Ⅱ－236
- 4 **Length of track rail** — Part code Page Ⅱ－235 Page Ⅱ－236
- 5 **Accuracy class** — Classification symbol Page Ⅱ－237
- 6 **Special specification** — Supplemental Code Page Ⅱ－238

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Identification Number and Specification —Model · Size · Number of Slide Member—

1 Model

Linear Way Module	Linear Way LM (1)	: LWLM
	Linear Roller Way M (1)	: LRWM

For applicable models and sizes, see Table 1.1 and 1.2.

Note (1) This model has no built-in C-Lube.

2 Size

7, 9, 11
2, 3, 4, 5, 6

For applicable models and sizes, see Table 1.1 and 1.2.

3 Number of slide members

: M○

Indicates the number of slide members assembled on a track rail.

Table 1.1 Model and sizes of LWLM series

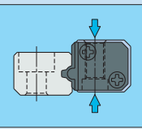
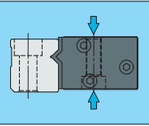
Shape	Model	Size		
		7	9	11
	LWLM	○	○	○

Table 1.2 Model and sizes of LRWM series

Shape	Model	Size				
		2	3	4	5	6
	LRWM	○	○	○	○	○

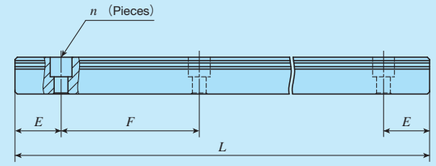
—Length of Track Rail—

4 Length of track rail

: R○

Indicate the length of track rail in mm.
For standard and maximum lengths, see Table 2.

Table 2 Standard and maximum lengths of track rail



unit: mm

Item \ Identification number		LWLM7	LWLM9	LWLM11
Standard length L (n)		60 (3) 80 (4) 120 (6) 160 (8)	100 (4) 150 (6) 200 (8) 275 (11)	160 (4) 240 (6) 320 (8) 440 (11)
Pitch of mounting holes F		20	25	40
E		10	12.5	20
Standard E dimensions	or higher	4.5	5	5.5
	below	14.5	17.5	25.5
Maximum length (1)		240 (500)	350 (900)	520 (1 000)

Item \ Identification number		LRWM2	LRWM3	LRWM4	LRWM5	LRWM6
Standard length L (n)		480 (8) 660 (11) 840 (14)	480 (8) 660 (11) 840 (14)	800 (10) 1 040 (13) 1 200 (15)	800 (8) 1 200 (12) 1 500 (15)	1 200 (10)
Pitch of mounting holes F		60	60	80	100	120
E		30	30	40	50	60
Standard E dimensions	or higher	8	9	10	12	13
	below	38	39	50	62	73
Maximum length		1 800	1 860	1 920	1 600	1 200

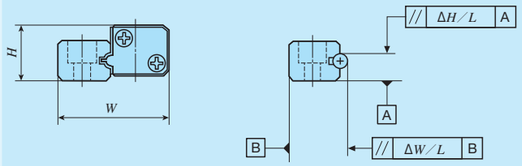
Note (1) Length up to the value in ( ) can be produced. If needed, please contact IKO.
Remark: If not directed, E dimensions for both ends will be the same within the range of standard E dimensions. To change the dimensions, indicate the specified rail mounting hole positions "/E" of special specification. For more information, see page Ⅲ－30.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

5 Accuracy class

High	: H	For details of accuracy class, see Table 3.
Precision	: P	
Super precision	: SP	

Table 3 Tolerance and allowance



unit: mm

Item \ Class (classification symbol)	High (H)	Precision (P)	Super precision (SP)
Dim. H tolerance	±0.040	±0.020	±0.010
Dim. W tolerance	±0.050	±0.025	±0.015
Dim. variation of H(1)	0.015	0.007	0.005
Dim. variation of W(1)	0.020	0.010	0.007
Track rail parallelism ΔH	See Fig. 1.1 and Fig. 1.2		
Track rail parallelism ΔW	See Fig. 1.1 and Fig. 1.2		

Note (1) It means the size variation between slide members mounted on the same track rail.

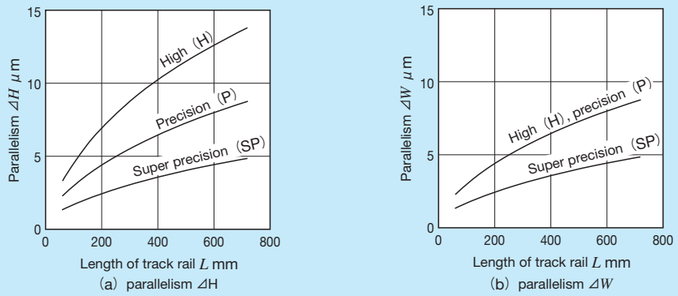


Fig.1.1 Track rail parallelism for LWLM

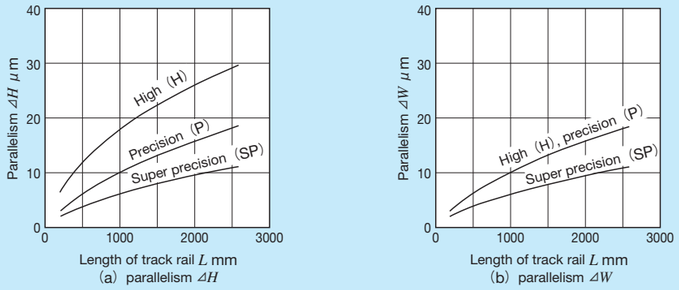


Fig.1.2 Track rail parallelism for LRWM

6 Special specification

/A, /E, /F, /I, /L○, /LF○, /MN, /W○, /Y○

For applicable special specifications, see Table 4.
For combination of multiple special specifications, see Table 5.
For details of special specifications, see page Ⅲ－29.

Table 4 Application of special specifications

Special specification	Supplemental code	Model and size							
		LWLM			LRWM				
		7	9	11	2	3	4	5	6
Butt-jointing track rails	/A	×	×	×	○	○	○	○	○
Specified rail mounting hole positions	/E	○	○	○	○	○	○	○	○
Caps for rail mounting holes	/F	×	×	×	○	○	○	○	○
Inspection sheet	/I	○	○	○	○	○	○	○	○
Black chrome surface treatment	/L○	×	×	×	○	○	○	○	○
Fluorine black chrome surface treatment	/LF○	×	×	×	○	○	○	○	○
Without track rail mounting bolt	/MN	○	○	○	○(1)	○(1)	○(1)	○(1)	○(1)
A group of multiple assembled sets	/W○	○	○	○	○	○	○	○	○
Specified grease	/Y○	○	○	○	○	○	○	○	○

Note (1) None of mounting bolts for slide member and track rail are appended.

Table 5 Combination of supplemental codes

	A	E	F	I	L	LF	MN	W
E	–							
F	○	○						
I	○	○	○					
L	○	○	○	○				
LF	○	○	○	○	–			
MN	○	○	○	○	○	○		
W	○	–	○	○	○	○	○	
Y	○	○	○	○	○	○	○	○

Remarks 1. The combination of "－" shown in the table is not available.
2. When using multiple types for combination, please indicate by arranging the symbols in alphabetical order.

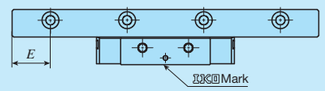


Fig.2 Specified rail mounting hole positions (Supplemental code /E)

Remark: For details of specified rail mounting hole positions (supplemental code /E), see page Ⅲ－30.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Lubrication

Lithium-soap base grease with extreme-pressure additive (Alvania EP Grease 2 [Shell Lubricants Japan K.K.]) is pre-packed in Linear Way Module series.
Though grease nipples are not appended to Linear Way Module series, oil holes are provided to slide member so that the grease or lubrication oil supplied from machines / devices is directly guided to the rolling elements recirculation route. Lubrication is easily conducted by providing the supply route in the machines / devices as shown in Fig. 3.

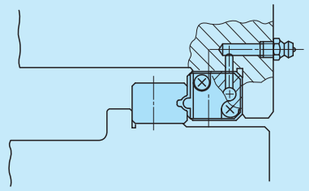


Fig. 3 Example of lubrication method

Dust Protection

The slide members of Linear Way Module series are equipped with end seals as standard for dust protection. However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the track rail, it is recommended to cover the whole unit with bellows or telescope type shield, etc.

Precaution for Use

❶ Mounting surface, reference mounting surface and typical mounting structure

When mounting the Linear Way Module series, properly align the reference mounting surfaces B and D of the track rail and slide member with the reference mounting surface of the table and bed and fix them. (See Fig. 4)
The reference mounting surfaces B and D and mounting surfaces A and C are precisely ground. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable linear motion with high accuracy.

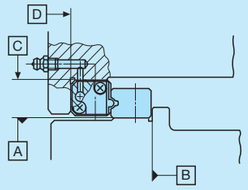


Fig. 4 Reference mounting surface and typical mounting structure

❷ Fixing the slide member

Typical mounting structure of Linear Way Module series is shown in Fig. 5. As a convenient means to eliminate play or to give preload in linear motion rolling mechanism, preload adjusting screws are often used.
Set the preload adjusting screws at the positions of fixing bolts of slide member and in the middle of the height of slide member, and then press the slide member by tightening the screw.
For mounting the slide member of Linear Way Module LWLM, it is recommended to fix the slide member from the table side, because the allowance for the preload adjustment in the bolt hole of slide member is small. In this case, the bolt hole and the counterbore in the table should be made larger to give the adjustment allowance.

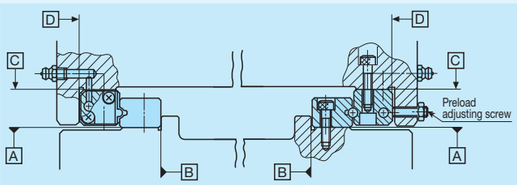


Fig.5 Mounting by preload adjusting screws

Preload amount varies depending on operational conditions of your machine and device. However, as excessive preload may lead to short life and damage on the raceway, it is typically ideal to adjust to zero clearance or slight preload state.

❸ Shoulder height and corner radius of the reference mounting surface

For the opposite corner of the mating reference mounting, it is recommended to have relieved fillet as indicated in Fig. 6. Recommended value for the shoulder height and corner radius on the mating side is indicated in Table 7.1, Table 7.2 and Table 7.3.

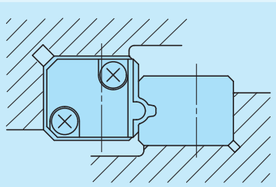


Fig. 6 Corner of the mating reference mounting

❹ Tightening torque for fixing screw

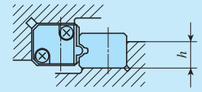
Typical tightening torque for mounting of Linear Way Module series to the steel mating member material is indicated in Table 6. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated in the table as necessary. If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.

Table 6 Tightening torque for fixing screw

Bolt size	Tightening torque N · m	
	High carbon steel-made screw	Stainless steel-made screw
M 2.6×0.45	–	0.7
M 3 ×0.5	1.8	1.1
M 4 ×0.7	4.1	–
M 5 ×0.8	8.0	–
M 6 ×1	13.6	–
M 8 ×1.25	32.7	–
M10 ×1.5	63.9	–
M12 ×1.75	110	–

Remark: The tightening torque is calculated based on strength division 12.9 and property division A2-70.

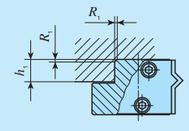
Table 7.1 Shoulder height of the reference mounting surface for LWLM



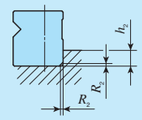
unit: mm

Size	Mounting part of track rail shoulder height h
7	4
9	5
11	6

Table 7.2 Shoulder height and corner radius of the reference mounting surface for LRWM



Mounting part of slide member



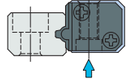
Mounting part of track rail

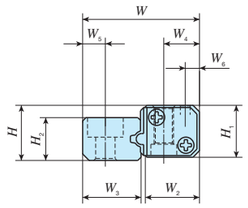
unit: mm

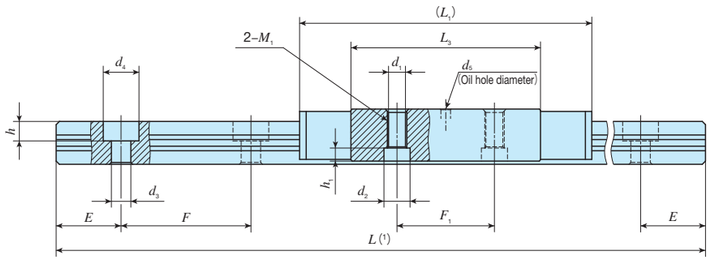
Size	Mounting part of slide member		Mounting part of track rail	
	Shoulder height h_1	Corner radius R_1 (Maximum)	Shoulder height h_2	Corner radius R_2 (Maximum)
2	7	1	5	1
3	8.5	1	6	1
4	10.5	1.5	6	1
5	12.5	1.5	8	1
6	14.5	2	8	1.5

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Linear Way LM			
Shape	LWLM		
Size	7	9	11



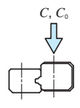




Identification number	Mass (Ref.)		Dimensions of assembly mm		Dimensions of slide member mm													Dimensions of track rail mm								Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)
Linear Way Module series (No C-Lube)	Slide member g	Track rail g/m	H	W	H_1	W_2	W_4	W_6	L_1	L_3	F_1	d_1	d_2		h_1	M_1	d_5	H_2	W_3	W_5	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N
LWLM 7*	10	210	7	15	6.6	7.8	5	2.5	38	24	12	–	–		–	M2.6	1	4.8	6.8	3.3	3 (4)	– (4)	– (4)	10	20	M2.6×8 (4)	1 730	2 020
LWLM 9*	16	390	8.5	18	8	8.6	5.5	2.2	45	29.2	15	–	–		–	M3	1.5	6.6	9	3.5	3	5.5	3	12.5	25	M2.6×8	2 780	3 150
LWLM 11*	32	590	11	23	10	11.8	7	3	52	32.8	15	2.55	5		3	M3	2	8	10.8	5	3.5	6	4.5	20	40	M3×8	4 080	4 240

Notes (1) Track rail lengths L are shown in Table 2 on page Ⅱ−236.
(2) The appended mounting bolts are stainless steel hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating (C) and basic static load rating (C_0) are shown in the sketch below.
(4) Track rail mounting holes have no counterbore.
When the appended track rail mounting bolts are used, the height from track rail bottom surface to bolt head is 7.4 mm.

Remarks 1. Slide member mounting bolts are not appended.
2. The identification numbers with * are our semi-standard items.



Example of identification number of assembled set

Model code	Dimensions	Part code		Classification symbol	Supplemental code
LWLM	9	M2	R200	P	/W2
①	②	③	④	⑤	⑥

① Model
LWLM Linear Way LM

② Size
7, 9, 11

③ Number of slide member (2)

④ Length of track rail (200 mm)

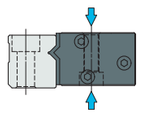
⑤ Accuracy class

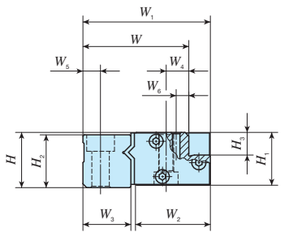
H	High
P	Precision
SP	Super precision

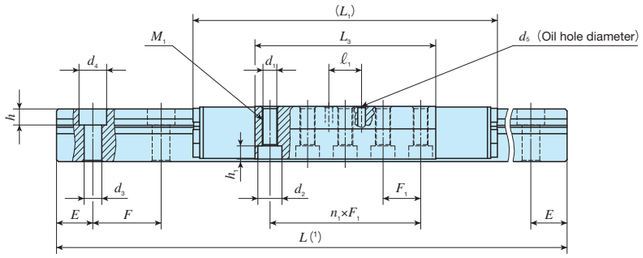
⑥ Special specification
E, Ⅰ, MN, W, Y

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Linear Roller Way M

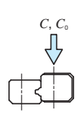
Shape	LRWM 
Size	2 3 4 5 6





Identification number	Mass (Ref.)		Dimensions of assembly mm			Dimensions of slide member mm															Appended mounting bolt for slide member (2)	Dimensions of track rail mm								Appended mounting bolt for track rail (2)	Basic dynamic load rating (3)	Basic static load rating (3)
Linear Way Module series (No C-Lube)	Slide member kg	Track rail kg/m	H	W	W_1	H_1	H_3	W_2	W_4	L_1	L_3	$n_1\times F_1$	M_1	d_1	d_2	h_1		W_6	ℓ_1	d_5	Bolt size× ℓ	H_2	W_3	W_5	d_3	d_4	h	E	F	Bolt size× ℓ	C N	C_0 N
LRWM 2*	0.26	1.98	19	33	39.6	18	7.5	22.9	8	105	63	4×12	M 5	4.4	8	4.1		4	10	3	M4×20	18	15	6	6	9.5	5.4	30	60	M 5×20	9 700	10 800
LRWM 3*	0.46	2.92	22	42	50.6	21	9	29.8	9	122	72	4×15	M 6	5.4	9.5	5.2		5	13	3	M5×25	21	19	7	7	11	6.5	30	60	M 6×25	18 500	20 300
LRWM 4*	0.98	4.64	28	56	65.6	27	11	39.4	13	157	96	5×16	M 8	6.8	11	6.2		6	–	3	M6×32	27	24	9	9	14	8.6	40	80	M 8×32	36 500	39 800
LRWM 5*	2.03	6.85	33	70	81.6	32	13	49.1	16	212	140	5×24	M10	8.6	14	8.2		7	–	3	M8×35	32	30	12	11	17.5	10.8	50	100	M10×35	67 900	75 500
LRWM 6*	3.42	9.25	38	83	96.6	37	15	58.6	21	256	168	6×25	M10	8.6	14	8.2		8	28	3	M8×40	37	35	14	14	20	13	60	120	M12×40	99 800	109 000

Notes (1) Track rail lengths L are shown in Table 2 on page Ⅱ−236.
(2) The appended mounting bolts are hexagon socket head bolts equivalent to JIS B 1176.
(3) The direction of basic dynamic load rating (C) and basic static load rating (C_0) are shown in the sketch below.
Remark: The identification numbers with * are our semi-standard items.



Example of identification number of assembled set

Model code	Dimensions	Part code		Classification symbol	Supplemental code
LRWM	3	M2	R660	P	/W2
①	②	③	④	⑤	⑥

① Model
LRWM — Linear Roller Way M

② Size
2, 3, 4, 5, 6

③ Number of slide member (2)

④ Length of track rail (660 mm)

⑤ Accuracy class

H	High
P	Precision
SP	Super precision

⑥ Special specification
A, E, F, Ⅰ, L, LF
MN, W, Y

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

General Explanation



Selection Procedure

Selection of Linear Way and Linear Roller Way should be considered from the most important required matter to details in order.
Typical procedure is shown below.

Example of Linear Way and Linear Roller Way selection procedure

Check for use condition

- Machines and locations in use
- Confirm requirements, performance, and special environments of Linear Way and Linear Roller Way.

↓

Selection of Linear Way and Linear Roller Way model

- Select a suitable Linear Way and Linear Roller Way model for usage conditions in consideration of an applied load, a load direction, rigidity, friction, ease of mounting, etc.

→ See pages Ⅰ−7 to Ⅰ−8 and descriptions of each series.

↓

Selection of interchangeable or non-interchangeable specification

- Take maintainability and ease of assembly into account.

→ See pages Ⅰ−15 to Ⅰ−18 and descriptions of each series.

↓

Selection of accuracy class

- Select based on required traveling accuracy. Select a higher accuracy class especially when traveling accuracy is important.

→ See descriptions of each series.

↓

Temporary specification of size and numbers of sets and slide units

- Take a balance of machines / equipment and past experience into account.

↓

Calculation of applied load

- Calculate an applied load on each slide unit of Linear Way and Linear Roller Way.
- Consider loads and fluctuating loads by acceleration and deceleration.

→ See pages Ⅲ−9 to Ⅲ−18.

↓

Calculation of static safety factor

- Calculate a static safety factor to confirm suitability for usage conditions.

→ See page Ⅲ−6.

↓

Calculation of life

- Calculate rating life to confirm suitability for use conditions.

→ See page Ⅲ−6.

↓

Consideration of preload amount or clearance

- Select a suitable preload amount or clearance for use conditions.

→ See page Ⅲ−20 and descriptions of each series.

↓

Determination of size, numbers of sets and slide units, and preload

↓

Selection of lubrication and dust protection

- Select oil lubrication or grease lubrication.
- Select dust protection such as seals and bellows according to environmental conditions.

→ See pages Ⅲ−21 to Ⅲ−27 and descriptions of each series.

↓

Consideration of surroundings

- Consider a mounting method and related dimensions.

→ See page Ⅲ−36 and descriptions of each series.

↓

Final specification determination of Linear Way, Linear Roller Way and their surroundings

Load Rating and Life

Life of linear motion rolling guides

Even in normal operational status, a linear motion rolling guide will reach the end of its life after a certain period of operations. As repeated load is constantly applied onto a raceway and rolling elements of the linear motion rolling guide, this leads to leprous damage (scale-like wear fragments) called fatigue flaking due to rolling contact fatigue of materials, it will be unusable at the end. Total traveling distance before occurrence of this fatigue flaking on a raceway or rolling elements is called the life of linear motion rolling guide.
As the life of linear motion rolling guide may vary depending on material fatigue phenomenon, rating life based on statistic calculation is used.

Rating life

Rating life of linear motion rolling guide refers to the total traveling distance 90% of a group of the same linear motion rolling guide can operate without linear motion rolling guide material damages due to rolling contact fatigue when they are operated individually under the same conditions.

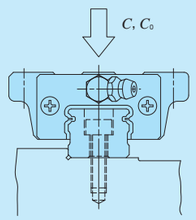


Fig. 1 Direction of load rating

Basic dynamic load rating C

Complying with ISO 14728-1

Basic dynamic load rating refers to load with certain direction and size that is logically endurable for rating life of 50×10^3 m when a group of the same linear motion rolling guides is operated individually under the same conditions.

Basic static load rating C_0

Complying with ISO 14728-2

Basic static load rating refers to static load generating a certain contact stress at the center of contact part of the rolling elements and a raceway under maximum load, which is the load at the allowable limit for normal rolling motion. Generally, it is used considering static safety factor.

Static moment rating T_0, T_X, T_Y

Static moment rating refers to static moment load generating a certain contact stress at the center of contact parts of rolling elements and a raceway under the maximum load when the moment load shown in Fig. 2 is loaded, which is the moment load at the allowable limit for normal rolling motion. Generally, it is used considering static safety factor.

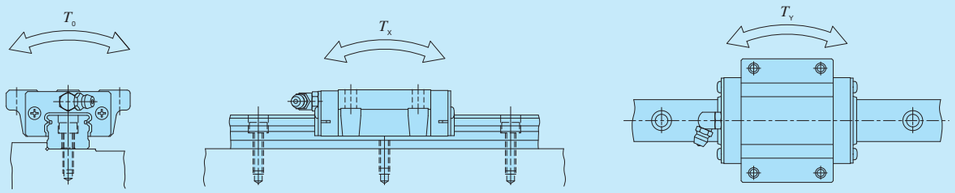


Fig. 2 Direction of static moment rating

Calculating formula of life

The rating life calculation formulas are shown below.

Linear Way

$$L=50\left(\frac{C}{P}\right)^3 \cdots\cdots(1)$$

Linear Roller Way

$$L=50\left(\frac{C}{P}\right)^{10/3} \cdots\cdots(2)$$

where, L: Rating life, 10^3 m
C: Basic dynamic load rating, N
P: Dynamic equivalent load, N

Life time can be calculated by applying a stroke length and a number of strokes per minute to the formula below.

$$L_h=\frac{10^6 L}{2Sn_1\times60} \cdots\cdots(3)$$

where, L_h : Rating life in hours, h
S : Stroke length, mm
n_1 : Number of strokes per minute, min^{-1}

Load factor

Load applied to a linear motion rolling guide can be larger than theoretical load due to machine vibration or shock. Generally, the applied load is obtained by multiplying it by the load factor indicated in Table 1.

Table 1 Load factor

Operating conditions	f_W
Smooth operation free from shock	1 ～1.2
Normal operation	1.2 ～1.5
Operation with shock load	1.5 ～3

Static safety factor

Generally, basic static load rating and static moment rating is considered as load at the allowable limit for normal rolling motion. However, static safety factor must be considered according to operating conditions and required performance of the linear motion rolling guide.
Static safety factor can be obtained by the following equation and typical values are indicated in Tables 2.1 and 2.2.
Equation (5) is a representative equation for a moment load. Moment load and static moment rating in each direction is applied for the calculation.

$$f_S=\frac{C_0}{P_0} \cdots\cdots(4)$$

$$f_S=\frac{T_0}{M_0} \cdots\cdots(5)$$

where, f_S : Static safety factor
C_0 : Basic static load rating, N
P_0 : Static equivalent load, N
T_0 : Static moment rating, N・m
M_0 : Moment load in each direction, N・m
(maximum moment load)

Table 2.1 Static safety factor for Linear Way

Operational conditions	f_s
Operation with vibration and / or shock	3 ～5
High operating performance	2 ～4
Normal operating conditions	1 ～3

Table 2.2 Static safety factor for Linear Roller Way

Operational conditions	f_s
Operation with vibration and / or shock	4 ～6
High operating performance	3 ～5
Normal operating conditions	2.5 ～3

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Dynamic equivalent load

When a load is applied in a direction other than that of the basic dynamic load rating or a complex load is applied, the dynamic equivalent load must be calculated to obtain the basic rating life.

Obtain the downward and lateral conversion loads from the loads and moments in various directions.

$$F_{re}=k_r|F_r|+\frac{C_0}{T_0}|M_0|+\frac{C_0}{T_X}|M_X| \cdots\cdots(6)$$

$$F_{ae}=k_a|F_a|+\frac{C_0}{T_Y}|M_Y| \cdots\cdots(7)$$

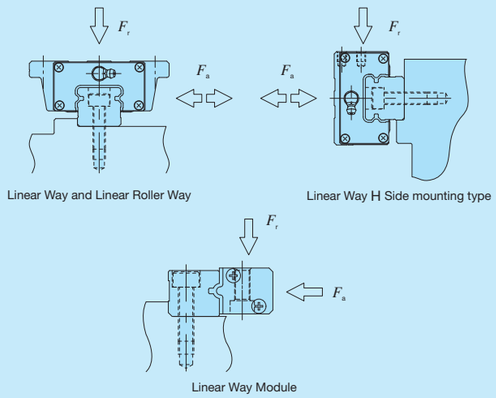
[For Linear Way H Side mounting type (LWHY)]

$$F_{ae}=k_a|F_a|+\frac{C_0}{T_0}|M_0|+\frac{C_0}{T_X}|M_x| \cdots\cdots(8)$$

$$F_{re}=k_r|F_r|+\frac{C_0}{T_Y}|M_Y| \cdots\cdots(9)$$

where, F_{re} : Downward conversion load, N
F_{ae} : Lateral conversion load, N
F_r : Downward load, N
F_a : Lateral load, N
M_0 : Moment load in the T_0 direction, N · m
M_X : Moment load in the T_X direction, N · m
M_Y : Moment load in the T_Y direction, N · m
k_r, k_a : Conversion factors for load direction (See Table 3)
C_0 : Basic static load rating, N
T_0 : Static moment rating in the T_0 direction, N · m
T_X : Static moment rating in the T_X direction, N · m
T_Y : Static moment rating in the T_Y direction, N · m

Table 3 Conversion factor for load direction



Series name and size		Conversion factor k_r $F_r \geqq 0$	Conversion factor k_r $F_r < 0$	Conversion factor k_a
C-Lube Linear Way ML Linear Way L	Ball retained type	1	1	1.19
	Ball non-retained type	1	1	0.84
C-Lube Linear Way MLV		1	1	1.19
C-Lube Linear Way MV		1	1.23	1.35
C-Lube Linear Way ME Linear Way E	15～30	1	1	1
	35～45	1	1.19	1.28
Low Decibel Linear Way E		1	1	1
C-Lube Linear Way MH Linear Way H	8～12	1	1	1.19
	15～30	1	1	1
	35～65	1	1.19	1.28
Linear Way H	15～30	1	1	1
Linear Way H Horizontal mounting type	35～45 (1)	1	1	0.84 0.95
Linear Way F	33～42	1	1	1
	69	1	1	1.19
	LWFH	1	1.19	1.28
C-Lube Linear Way MUL Linear Way U	25, 30	1	1	1.19
	40～86	1	1	1
C-Lube Linear Roller Way Super MX Linear Roller Way Super X		1	1	1
Linear Roller Way X		1	1	1
Linear Way Module	LWLM	1	1	0.73
	LRWM	1	1	0.58

Note (1) The upper value of k_a columns represents the right direction and the lower value represents the left direction.

Obtain the dynamic equivalent load from the downward and lateral conversion loads.

$$P=XF_{re}+YF_{ae} \cdots\cdots(10)$$

where, P : Dynamic equivalent load, N
X, Y : Dynamic equivalent load factor (See Table 4)
F_{re} : Downward conversion load, N
F_{ae} : Lateral conversion load, N

Table 4 Dynamic equivalent load factor

Class	X	Y
$\|F_{re}\| \geqq \|F_{ae}\|$	1	0.6
$\|F_{re}\| < \|F_{ae}\|$	0.6	1

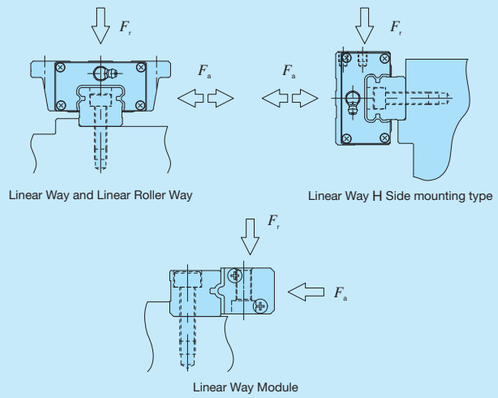
Static equivalent load

When a load is applied in a direction other than that of the basic static load rating or a complex load is applied, the static equivalent load must be calculated to obtain the static safety factor.

$$P_0=k_{0r}|F_r|+k_{0a}|F_a|+\frac{C_0}{T_0}|M_0|+\frac{C_0}{T_X}|M_X|+\frac{C_0}{T_Y}|M_Y| \cdots\cdots(11)$$

where, P_0 : Static equivalent load, N
F_r : Downward load, N
F_a : Lateral load, N
M_0 : Moment load in the T_0 direction, N · m
M_X : Moment load in the T_X direction, N · m
M_Y : Moment load in the T_Y direction, N · m
k_{0r}, k_{0a} : Conversion factors for load direction (See Table 5)
C_0 : Basic static load rating, N
T_0 : Static moment rating in the T_0 direction, N · m
T_X : Static moment rating in the T_X direction, N · m
T_Y : Static moment rating in the T_Y direction, N · m

Table 5 Conversion factor for load direction



Series name and size		Conversion factor k_{0r} $F_r \geqq 0$	Conversion factor k_{0r} $F_r < 0$	Conversion factor k_{0a}
C-Lube Linear Way ML Linear Way L	Ball retained type	1	1	1.19
	Ball non-retained type	1	1	0.84
C-Lube Linear Way MLV		1	1	1.19
C-Lube Linear Way MV		1	1.88	2.08
C-Lube Linear Way ME Linear Way E	15～30	1	1	1
	35～45	1	1.19	1.28
Low Decibel Linear Way E		1	1	1
C-Lube Linear Way MH Linear Way H	8～12	1	1	1.19
	15～30	1	1	1
	35～65	1	1.19	1.28
Linear Way H	15～30	1	1	1
Linear Way H Horizontal mounting type	35～45 (1)	1	1	0.78 0.93
Linear Way F	33～42	1	1	1
	69	1	1	1.19
	LWFH	1	1.19	1.28
C-Lube Linear Way MUL Linear Way U	25, 30	1	1	1.19
	40～86	1	1	1
C-Lube Linear Roller Way Super MX Linear Roller Way Super X		1	1	1
Linear Roller Way X		1	1	1
Linear Way Module	LWLM	1	1	0.60
	LRWM	1	1	0.50

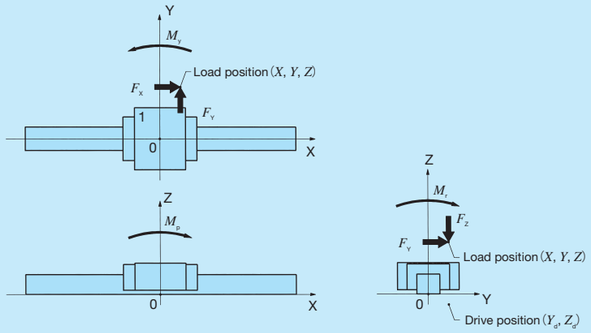
Note (1) The upper value of k_{0a} columns represents the right direction and the lower value represents the left direction.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Calculated Load

Examples of calculation for the loads applied to Linear Way and Linear Roller Way that is incorporated in machine / equipment is shown in Table 6.1 to Table 6.6.

Table 6.1 One track rail and one slide unit

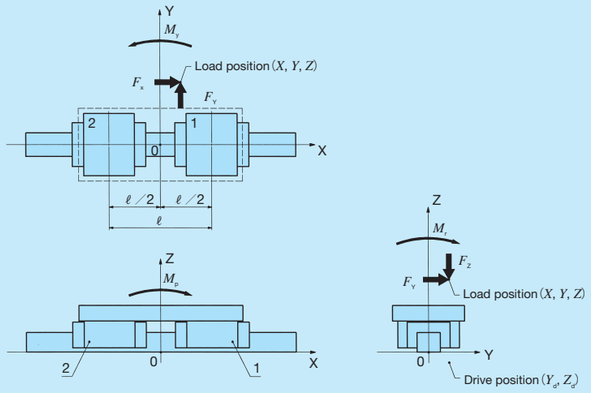


Slide unit No.	Load applied on the slide unit				
	Downward load F_r	Lateral load F_a	Moment load in the T_0 direction M_0	Moment load in the T_X direction M_X	Moment load in the T_Y direction M_Y
1	F_Z	F_Y	M_r	M_p	M_y

Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

$$M_r = F_Y Z + F_Z Y$$
$$M_p = F_X\ (Z - Z_d) + F_Z X$$
$$M_y = -F_X\ (Y - Y_d) + F_Y X$$

Table 6.2 One track rail and two slide units

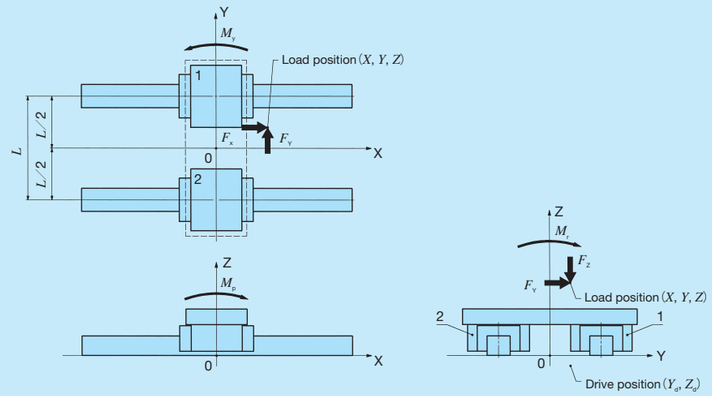


Slide unit No.	Load applied on the slide unit		
	Downward load F_r	Lateral load F_a	Moment load in the T_0 direction M_0
1	$\frac{F_Z}{2} + \frac{M_p}{\ell}$	$\frac{F_Y}{2} + \frac{M_y}{\ell}$	$\frac{M_r}{2}$
2	$\frac{F_Z}{2} - \frac{M_p}{\ell}$	$\frac{F_Y}{2} - \frac{M_y}{\ell}$	$\frac{M_r}{2}$

Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

$$M_r = F_Y Z + F_Z Y$$
$$M_p = F_X\ (Z - Z_d) + F_Z X$$
$$M_y = -F_X\ (Y - Y_d) + F_Y X$$

Table 6.3 Two track rails and one slide unit



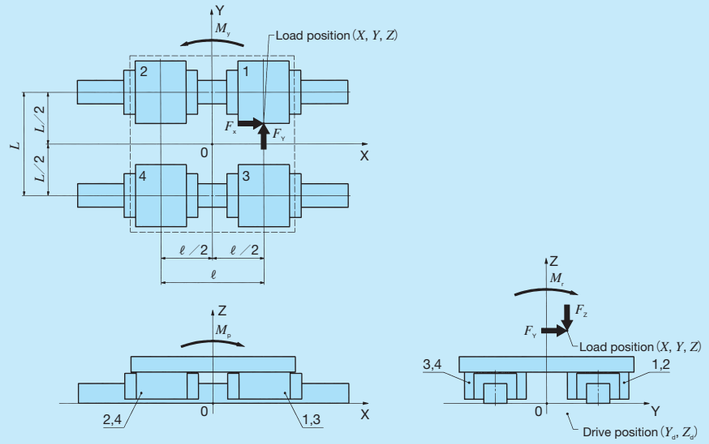
Slide unit No.	Load applied on the slide unit			
	Downward load F_r	Lateral load F_a	Moment load in the T_X direction M_X	Moment load in the T_Y direction M_Y
1	$\frac{F_Z}{2} + \frac{M_r}{L}$	$\frac{F_Y}{2}$	$\frac{M_p}{2}$	$\frac{M_y}{2}$
2	$\frac{F_Z}{2} - \frac{M_r}{L}$	$\frac{F_Y}{2}$	$\frac{M_p}{2}$	$\frac{M_y}{2}$

Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

$$M_r = F_Y Z + F_Z Y$$
$$M_p = F_X\ (Z - Z_d) + F_Z X$$
$$M_y = -F_X\ (Y - Y_d) + F_Y X$$

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 6.4 Two track rails and two slide units



Slide unit No.	Load applied on the slide unit	
	Downward load F_r	Lateral load F_a
1	$\frac{F_z}{4}+\frac{M_r}{2L}+\frac{M_p}{2\ell}$	$\frac{F_Y}{4}+\frac{M_y}{2\ell}$
2	$\frac{F_z}{4}+\frac{M_r}{2L}-\frac{M_p}{2\ell}$	$\frac{F_Y}{4}-\frac{M_y}{2\ell}$
3	$\frac{F_z}{4}-\frac{M_r}{2L}+\frac{M_p}{2\ell}$	$\frac{F_Y}{4}+\frac{M_y}{2\ell}$
4	$\frac{F_z}{4}-\frac{M_r}{2L}-\frac{M_p}{2\ell}$	$\frac{F_Y}{4}-\frac{M_y}{2\ell}$

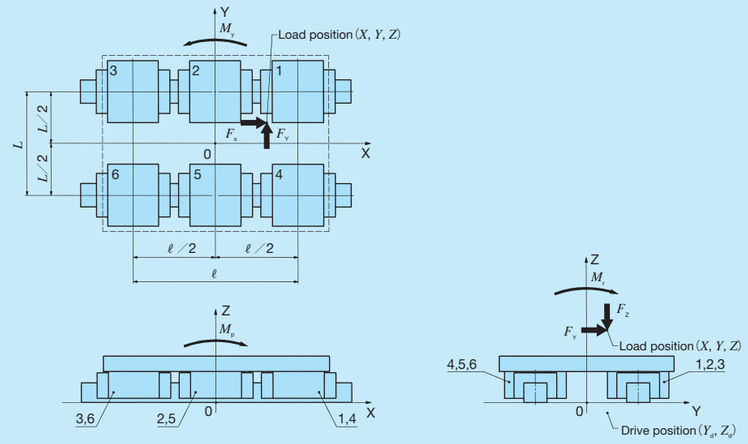
Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

$M_r=F_Y Z+F_Z Y$

$M_p=F_X\ (Z-Z_d)+F_Z X$

$M_y=-F_X\ (Y-Y_d)+F_Y X$

Table 6.5 Two track rails and three slide units



Slide unit No.	Load applied on the slide unit	
	Downward load F_r	Lateral load F_a
1	$\frac{F_z}{6}+\frac{M_r}{3L}+\frac{M_p}{2\ell}$	$\frac{F_Y}{6}+\frac{M_y}{2\ell}$
2	$\frac{F_z}{6}+\frac{M_r}{3L}$	$\frac{F_Y}{6}$
3	$\frac{F_z}{6}+\frac{M_r}{3L}-\frac{M_p}{2\ell}$	$\frac{F_Y}{6}-\frac{M_y}{2\ell}$
4	$\frac{F_z}{6}-\frac{M_r}{3L}+\frac{M_p}{2\ell}$	$\frac{F_Y}{6}+\frac{M_y}{2\ell}$
5	$\frac{F_z}{6}-\frac{M_r}{3L}$	$\frac{F_Y}{6}$
6	$\frac{F_z}{6}-\frac{M_r}{3L}-\frac{M_p}{2\ell}$	$\frac{F_Y}{6}-\frac{M_y}{2\ell}$

Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

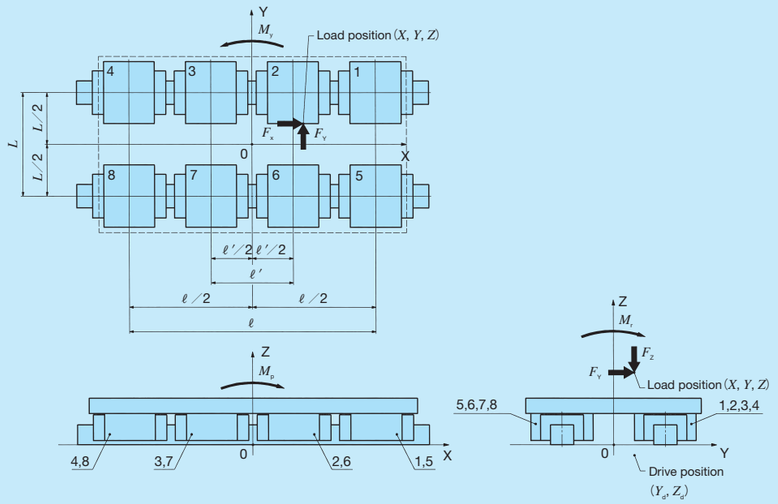
$M_r=F_Y Z+F_Z Y$

$M_p=F_X\ (Z-Z_d)+F_Z X$

$M_y=-F_X\ (Y-Y_d)+F_Y X$

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 6.6 Two track rails and four slide units



Slide unit No.	Load applied on the slide unit	
	Downward load F_r	Lateral load F_a
1	$\frac{F_z}{8}+\frac{M_r}{4L}+\frac{M_p}{2}\frac{\ell}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}+\frac{M_y}{2}\frac{\ell}{\ell^2+\ell'^2}$
2	$\frac{F_z}{8}+\frac{M_r}{4L}+\frac{M_p}{2}\frac{\ell'}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}+\frac{M_y}{2}\frac{\ell'}{\ell^2+\ell'^2}$
3	$\frac{F_z}{8}+\frac{M_r}{4L}-\frac{M_p}{2}\frac{\ell'}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}-\frac{M_y}{2}\frac{\ell'}{\ell^2+\ell'^2}$
4	$\frac{F_z}{8}+\frac{M_r}{4L}-\frac{M_p}{2}\frac{\ell}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}-\frac{M_y}{2}\frac{\ell}{\ell^2+\ell'^2}$
5	$\frac{F_z}{8}-\frac{M_r}{4L}+\frac{M_p}{2}\frac{\ell}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}+\frac{M_y}{2}\frac{\ell}{\ell^2+\ell'^2}$
6	$\frac{F_z}{8}-\frac{M_r}{4L}+\frac{M_p}{2}\frac{\ell'}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}+\frac{M_y}{2}\frac{\ell'}{\ell^2+\ell'^2}$
7	$\frac{F_z}{8}-\frac{M_r}{4L}-\frac{M_p}{2}\frac{\ell'}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}-\frac{M_y}{2}\frac{\ell'}{\ell^2+\ell'^2}$
8	$\frac{F_z}{8}-\frac{M_r}{4L}-\frac{M_p}{2}\frac{\ell}{\ell^2+\ell'^2}$	$\frac{F_Y}{8}-\frac{M_y}{2}\frac{\ell}{\ell^2+\ell'^2}$

Remark: The moment loads in each direction M_r, M_p, M_y can be obtained by the following equation.

$M_r=F_Y Z+F_Z Y$

$M_p=F_X\ (Z-Z_d)+F_Z X$

$M_y=-F_X\ (Y-Y_d)+F_Y X$

Mean Equivalent Load for Fluctuating Load

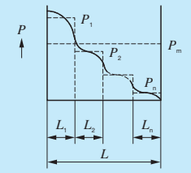
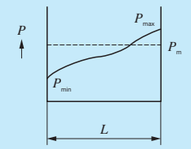
When the load on the Linear Way and Linear Roller Way varies, instead of dynamic equivalent load P, the mean equivalent load P_m is used for calculating formula of life.
The mean equivalent load is a load converted to give life equal to that for fluctuating load. It is obtained by the following formula:

$$P_m=\sqrt[p]{\frac{1}{L}\int_0^L P_n^{\,p}\,dL} \quad \cdots\cdots (12)$$

where, P_m : Mean equivalent load, N
L : Total traveling distance, m
P_n : Fluctuating load, N
p : Exponent (ball type: 3, roller type: 10/3)

Table 7 gives calculation examples of the mean equivalent load for typical fluctuating loads.

Table 7 Mean equivalent load for fluctuating load

Example		Mean equivalent load
① Stepwise changing load		$P_m=\sqrt[p]{\frac{1}{L}(P_1^{\,p}L_1+P_2^{\,p}L_2+\ldots+P_n^{\,p}L_n)}$ where, L_1 : Total traveling distance receiving the load P_1, m L_2 : Total traveling distance receiving the load P_2, m L_n : Total traveling distance receiving the load P_n, m
② Monotonously changing load		$P_m \fallingdotseq \frac{1}{3}(2P_{max}+P_{min})$ where, P_{max} : Maximum value of fluctuating load, N P_{min} : Minimum value of fluctuating load, N

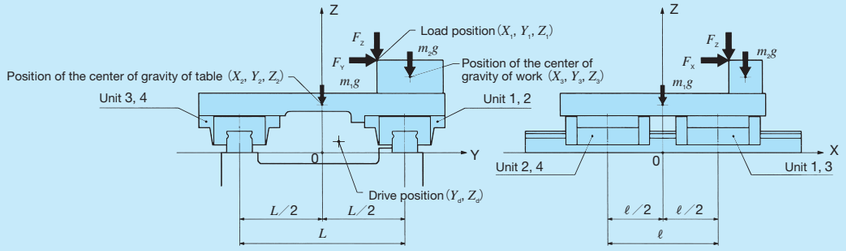
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Examples of Load and Life Calculation

Example 1

Linear Way Model·····ME 25 C2 R640 H
Basic dynamic load rating····· C = 18100 N
Basic static load rating····· C_0 = 21100 N
Applied load····· F_{X1} = 1000 N
····· F_{Y1} = 2000 N
····· F_{Z1} = 1000 N
Load position····· X_1 = 60 mm
····· Y_1 = 50 mm
····· Z_1 = 83 mm
Table mass····· m_1 = 10 kg
Position of the center of gravity of table····· X_2 = 0 mm
····· Y_2 = 0 mm
····· Z_2 = 43 mm

Work mass····· m_2 = 10 kg
Position of center of gravity of work····· X_3 = 75 mm
····· Y_3 = 80 mm
····· Z_3 = 68 mm
Number of strokes per minute····· n_1 = 5 min^{-1}
Stroke length····· S = 100 mm
Distance between slide units····· ℓ = 100 mm
Distance between the track rails····· L = 150 mm
Drive position····· Y_d = 150 mm
····· Z_d = 10 mm



The life and static safety factor in the case of Example 1 is calculated. Load factor f_W is assumed to be 1.5.

❶Calculation of load on the slide unit

Due to the applied load and the table mass, moment load occurs around each coordinate axis of the Linear Way as shown below.

$$M_r = \Sigma (F_Y Z) + \Sigma (F_Z Y) = F_{Y1} Z_1 + F_{Z1} Y_1 + m_1 g Y_2 + m_2 g Y_3$$
$$= 2000 \times 83 + 1000 \times 50 + 10 \times 9.8 \times 0 + 10 \times 9.8 \times 80$$
$$\fallingdotseq 224000$$

$$M_p = \Sigma \{F_X (Z - Z_d)\} + \Sigma (F_Z X) = F_{X1} (Z_1 - Z_d) + F_{Z1} X_1 + m_1 g X_2 + m_2 g X_3$$
$$= 1000 \times (83 - 10) + 1000 \times 60 + 10 \times 9.8 \times 0 + 10 \times 9.8 \times 75 \fallingdotseq 140000$$

$$M_y = -\Sigma \{F_X (Y - Y_d)\} + \Sigma (F_Y X) = -F_{X1} (Y_1 - Y_d) + F_{Y1} X_1$$
$$= -1000 \times (50 - 150) + 2000 \times 60 = 220000$$

where, M_r: Moment load in the rolling direction, N · mm
M_p: Moment load in the pitching direction, N · mm
M_y: Moment load in the yawing direction, N · mm

The loads applied on each slide unit are calculated according to Table 6.4 on page Ⅲ−11.

$$F_{r1} = \frac{\Sigma F_z}{4} + \frac{M_r}{2L} + \frac{M_p}{2\ell} = \frac{F_{Z1} + m_1 g + m_2 g}{4} + \frac{M_r}{2L} + \frac{M_p}{2\ell}$$
$$= \frac{1000 + 10 \times 9.8 + 10 \times 9.8}{4} + \frac{224000}{2 \times 150} + \frac{140000}{2 \times 100}$$
$$\fallingdotseq 1750$$

$$F_{r2} = \frac{\Sigma F_z}{4} + \frac{M_r}{2L} - \frac{M_p}{2\ell} = \frac{F_{Z1} + m_1 g + m_2 g}{4} + \frac{M_r}{2L} - \frac{M_p}{2\ell} \fallingdotseq 346$$

$$F_{r3} = \frac{\Sigma F_z}{4} - \frac{M_r}{2L} + \frac{M_p}{2\ell} = \frac{F_{Z1} + m_1 g + m_2 g}{4} - \frac{M_r}{2L} + \frac{M_p}{2\ell} \fallingdotseq 252$$

$$F_{r4} = \frac{\Sigma F_z}{4} - \frac{M_r}{2L} - \frac{M_p}{2\ell} = \frac{F_{Z1} + m_1 g + m_2 g}{4} - \frac{M_r}{2L} - \frac{M_p}{2\ell}$$
$$\fallingdotseq -1150$$

$$F_{a1} = F_{a3} = \frac{\Sigma F_Y}{4} + \frac{M_y}{2\ell} = \frac{F_{Y1}}{4} + \frac{M_y}{2\ell}$$
$$= \frac{2000}{4} + \frac{220000}{2 \times 100} = 1600$$

$$F_{a2} = F_{a4} = \frac{\Sigma F_Y}{4} - \frac{M_y}{2\ell} = \frac{F_{Y1}}{4} - \frac{M_y}{2\ell} = -600$$

❷Calculating of rating life

The upward / downward load and lateral load are converted by formula (6) and (7) on page Ⅲ−7.

$$F_{re1} = k_r \,|\, F_{r1} \,| = 1 \times 1750 = 1750$$
$$F_{re2} = k_r \,|\, F_{r2} \,| = 1 \times 346 = 346$$
$$F_{re3} = k_r \,|\, F_{r3} \,| = 1 \times 252 = 252$$
$$F_{re4} = k_r \,|\, F_{r4} \,| = 1 \times 1150 = 1150$$
$$F_{ae1} = k_a \,|\, F_{a1} \,| = 1 \times 1600 = 1600$$
$$F_{ae2} = k_a \,|\, F_{a2} \,| = 1 \times 600 = 600$$
$$F_{ae3} = k_a \,|\, F_{a3} \,| = 1 \times 1600 = 1600$$
$$F_{ae4} = k_a \,|\, F_{a4} \,| = 1 \times 600 = 600$$

where, k_r, k_a: Conversion factors for load direction (See Table 3 on page Ⅲ−7.)

The dynamic equivalent load is calculated by formula (10) on page Ⅲ−7.

$$P_1 = X \,|\, F_{re1} \,| + Y \,|\, F_{ae1} \,| = 1 \times 1750 + 0.6 \times 1600 = 2710$$
$$P_2 = X \,|\, F_{re2} \,| + Y \,|\, F_{ae2} \,| = 0.6 \times 346 + 1 \times 600 \fallingdotseq 808$$
$$P_3 = X \,|\, F_{re3} \,| + Y \,|\, F_{ae3} \,| = 0.6 \times 252 + 1 \times 1600 \fallingdotseq 1750$$
$$P_4 = X \,|\, F_{re4} \,| + Y \,|\, F_{ae4} \,| = 1 \times 1150 + 0.6 \times 600 = 1510$$

The basic rating life of slide unit 1 receiving the largest dynamic equivalent load is calculated. The basic rating life is obtained by the formula (1) given on the page Ⅲ−6 considering the load factor f_w (see Table 1 on page Ⅲ−6).

$$L_1 = 50 \left(\frac{C}{f_W P_1}\right)^3 = 50 \times \left(\frac{18100}{1.5 \times 2710}\right)^3 \fallingdotseq 4410$$

$$L_{h1} = \frac{10^6 L_1}{2 S n_1 \times 60} = \frac{10^6 \times 4410}{2 \times 100 \times 5 \times 60} \fallingdotseq 73500$$

As the result of calculation above, the basic rating life is about 73,500 hours.

❸Calculating of static safety factor

The static equivalent load is calculated from the upward / downward load and lateral load by formula (11) on page Ⅲ−8.

$$P_{01} = k_{0r} \,|\, F_{r1} \,| + k_{0a} \,|\, F_{a1} \,| = 1 \times 1750 + 1 \times 1600 = 3350$$
$$P_{02} = k_{0r} \,|\, F_{r2} \,| + k_{0a} \,|\, F_{a2} \,| = 1 \times 346 + 1 \times 600 = 946$$
$$P_{03} = k_{0r} \,|\, F_{r3} \,| + k_{0a} \,|\, F_{a3} \,| = 1 \times 252 + 1 \times 1600 = 1852$$
$$P_{04} = k_{0r} \,|\, F_{r4} \,| + k_{0a} \,|\, F_{a4} \,| = 1 \times 1150 + 1 \times 600 = 1750$$

where, k_{0r}, k_{0a}: Conversion factors for load direction (See Table 5 on page Ⅲ−8.)

The static safety factor of slide unit 1 receiving the largest static equivalent load is calculated. The static safety factor is calculated by formula (4) on page Ⅲ−6.

$$f_{s1} = \frac{C_0}{P_{01}} = \frac{21100}{3350} \fallingdotseq 6.3$$

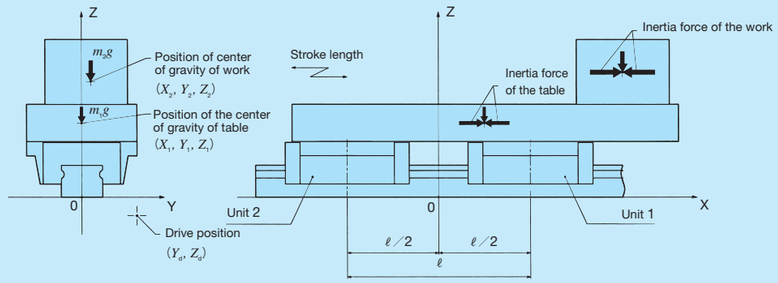
As the result of calculation above, the static safety factor is about 6.3.

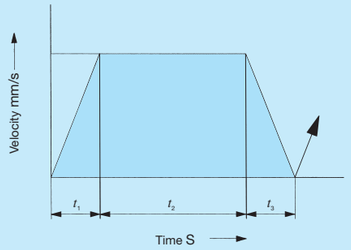
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Example 2

Linear Way Model·····MH 45 C2 R1050 H
Basic dynamic load rating····· C = 74600 N
Basic static load rating····· C_0 = 80200 N
Static moment rating in the T_0 direction···· T_0 = 1610 N · m
Table mass····· m_1 = 100 kg
Position of the center of gravity of table··· X_1 = 50 mm
··· Y_1 = 0 mm
··· Z_1 = 80 mm
Work mass····· m_2 = 1000 kg
Position of center of gravity of work···· X_2 = 200 mm
···· Y_2 = 10 mm
···· Z_2 = 130 mm

Distance between slide units··· ℓ = 200 mm
Stroke length····· S = 500 mm
Number of strokes per minute··· n_1 = 6 min^{-1}
Maximum traveling velocity···· V = 100 mm/s
Time spent for acceleration ··· t_1 = 0.1 s
Time spent during constant speed motion··· t_2 = 4.9 s
Time spent for deceleration···· t_3 = 0.1 s
Drive position····· Y_d = 60 mm
····· Z_d = −20 mm





The life and static safety factor in the case of Example 2 is calculated. Load factor f_w is assumed to be 1.5.

❶Calculation of load on the slide unit

Due to the applied load and the table mass and inertia force, moment load occurs around each coordinate axis of the Linear Way as shown below.

〔During acceleration at the start of motion〕

$$M_r = \Sigma\ (F_Y Z) + \Sigma\ (F_Z Y) = m_1 g Y_1 + m_2 g Y_2 = 100\times 9.8\times 0 + 1000\times 9.8\times 10 \fallingdotseq 98000$$

$$M_p = \Sigma\ \{F_X\ (Z - Z_d)\} + \Sigma\ (F_Z X) = m_1 \frac{V_{max}}{1000\times t_1}\ (Z_1 - Z_d) + m_2 \frac{V_{max}}{1000\times t_1}\ (Z_2 - Z_d) + m_1 g X_1 + m_2 g X_2 = 100\times \frac{100}{1000\times 0.1}\times\ (80+20) + 1000\times \frac{100}{1000\times 0.1} \times\ (130+20) + 100\times 9.8\times 50 + 1000\times 9.8\times 200 \fallingdotseq 2169000$$

$$M_y = -\Sigma\ \{F_X\ (Y - Y_d)\} + \Sigma\ (F_Y X) = -m_1 \frac{V_{max}}{1000\times t_1}\ (Y_1 - Y_d) - m_2 \frac{V_{max}}{1000\times t_1}\ (Y_2 - Y_d) = -100\times \frac{100}{1000\times 0.1}\times\ (0-60) - 1000\times \frac{100}{1000\times 0.1} \times\ (10-60) \fallingdotseq 56000$$

〔During constant speed motion〕

$$M_r = m_1 g Y_1 + m_2 g Y_2 \fallingdotseq 98000$$

$$M_p = m_1 g X_1 + m_2 g X_2 \fallingdotseq 2010000$$

$$M_y = 0$$

〔During deceleration at the end of motion〕

$$M_r = m_1 g Y_1 + m_2 g Y_2 \fallingdotseq 98000$$

$$M_p = -m_1 \frac{V_{max}}{1000\times t_3}(Z_1 - Z_d) - m_2 \frac{V_{max}}{1000\times t_3}(Z_2 - Z_d) + m_1 g X_1 + m_2 g X_2 \fallingdotseq 1850000$$

$$M_y = m_1 \frac{V_{max}}{1000\times t_3}(Y_1 - Y_d) + m_2 \frac{V_{max}}{1000\times t_3}(Y_2 - Y_d) \fallingdotseq -56000$$

where, M_r: Moment load in the rolling direction, N · mm
M_p: Moment load in the pitching direction, N · mm
M_y: Moment load in the yawing direction, N · mm

The loads applied on each slide unit are calculated according to Table 6.2 on page Ⅲ−9.

〔During acceleration at the start of motion〕

$$F_{r1} = \frac{\Sigma F_Z}{2} + \frac{M_p}{\ell} = \frac{m_1 g + m_2 g}{2} + \frac{M_p}{\ell} = \frac{100\times 9.8 + 1000\times 9.8}{2} + \frac{2169000}{200} \fallingdotseq 16200$$

$$F_{r2} = \frac{\Sigma F_Z}{2} + \frac{M_p}{\ell} = \frac{m_1 g + m_2 g}{2} - \frac{M_p}{\ell} \fallingdotseq -5460$$

$$F_{a1} = \frac{\Sigma F_Y}{2} + \frac{M_y}{\ell} = 280$$

$$F_{a2} = \frac{\Sigma F_Y}{2} - \frac{M_y}{\ell} = -280$$

$$M_{01} = M_{02} = \frac{M_r}{2} = 49000$$

〔During constant speed motion〕

$$F_{r1} = \frac{100\times 9.8 + 1000\times 9.8}{2} + \frac{2010000}{200} \fallingdotseq 15400$$

$$F_{r2} \fallingdotseq -4660$$

$$F_{a1} = F_{a2} = 0$$

$$M_{01} = M_{02} = 49000$$

〔During deceleration at the end of motion〕

$$F_{r1} = \frac{100\times 9.8 + 1000\times 9.8}{2} + \frac{1850000}{200} \fallingdotseq 14600$$

$$F_{r2} \fallingdotseq -3860$$

$$F_{a1} \fallingdotseq -280$$

$$F_{a2} \fallingdotseq 280$$

$$M_{01} = M_{02} = 49000$$

❷Calculating of rating life

The upward / downward load, lateral load and the moment load along T_0 direction are calculated by the formula (6) and (7) on page Ⅲ−7, and the dynamic equivalent load is calculated by formula (10).

〔During acceleration at the start of motion〕

$$F_{re1} = k_r\,|\,F_{r1}\,| + \frac{C_0}{T_0}|M_{01}\,| = 1\times 16200 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 18600$$

$$F_{re2} = 1.19\times 5460 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 8940$$

$$F_{ae1} = k_a\,|\,F_{a1}\,| = 1.28\times 280 \fallingdotseq 358$$

$$F_{ae2} = 1.28\times 280 \fallingdotseq 358$$

$$P_{1a} = X F_{re1} + Y F_{ae1} = 1\times 18600 + 0.6\times 358 \fallingdotseq 18800$$

$$P_{2a} = X F_{re2} + Y F_{ae2} = 1\times 8940 + 0.6\times 358 \fallingdotseq 9150$$

〔During constant speed motion〕

$$F_{re1} = 1\times 15400 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 17800$$

$$F_{re2} = 1.19\times 4660 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 7990$$

$$F_{ae1} = 0$$

$$F_{ae2} = 0$$

$$P_{1b} = 17800$$

$$P_{2b} = 7990$$

〔During deceleration at the end of motion〕

$$F_{re1} = 1\times 14600 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 17000$$

$$F_{re2} = 1.19\times 3860 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 7030$$

$$F_{ae1} = 1.28\times 280 \fallingdotseq 358$$

$$F_{ae2} = 1.28\times 280 \fallingdotseq 358$$

$$P_{1c} = 1\times 17000 + 0.6\times 358 \fallingdotseq 17200$$

$$P_{2c} = 1\times 7030 + 0.6\times 358 \fallingdotseq 7240$$

Because the dynamic equivalent load changes stepwise along the traveling distance, the mean equivalent load is calculated from ① in Table 7 on page Ⅲ−14.

$$P_{m1} = \sqrt[3]{\frac{1}{S}\left(P_{1a}{}^3\frac{V_{max}\,t_1}{2} + P_{1b}{}^3 V_{max} t_2 + P_{1c}{}^3\frac{V_{max}\,t_3}{2}\right)} = \left\{\frac{1}{500}\times\left(18800^3\times\frac{100\times 0.1}{2} + 17800^3\times 100\times 4.9 + 17200^3\times\frac{100\times 0.1}{2}\right)\right\}^{1/3} \fallingdotseq 17800$$

$$P_{m2} = \left\{\frac{1}{500}\times\left(9150^3\times\frac{100\times 0.1}{2} + 7990^3\times 100\times 4.9 + 7240^3\times\frac{100\times 0.1}{2}\right)\right\}^{1/3} \fallingdotseq 8000$$

The basic rating life of slide unit 1 receiving the largest dynamic equivalent load is calculated. The basic rating life is obtained by the formula (1) given on the page Ⅲ−6 considering the load factor f_w (see Table 1 on page Ⅲ−6).

$$L_1 = 50\left(\frac{C}{f_W P_{m1}}\right)^3 = 50\left(\frac{74600}{1.5\times 17800}\right)^3 \fallingdotseq 1090$$

$$L_{h1} = \frac{10^6 L_1}{2 S n_1\times 60} = \frac{10^6\times 1090}{2\times 500\times 6\times 60} \fallingdotseq 3030$$

As the result of calculation above, the basic rating life is about 3,030 hours.

❸Calculating of static safety factor

The static equivalent load is calculated from the upward / downward load and lateral load by formula (11) on page Ⅲ−8.

〔During acceleration at the start of motion〕

$$P_{01a} = k_{0r}\,|\,F_{r1}\,| + k_{0a}\,|\,F_{a1}\,| + \frac{C_0}{T_0}|M_{01}\,| = 1\times 16200 + 1.28\times 280 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 19000$$

$$P_{02a} = k_{0r}\,|\,F_{r2}\,| + k_{0a}\,|\,F_{a2}\,| + \frac{C_0}{T_0}|M_{02}\,| = 1.19\times 5460 + 1.28\times 280 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 9300$$

〔During constant speed motion〕

$$P_{01b} = 1\times 15400 + 1.28\times 0 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 19000$$

$$P_{02b} = 1.19\times 4660 + 1.28\times 0 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 7990$$

〔During deceleration at the end of motion〕

$$P_{01c} = 1\times 14600 + 1.28\times 280 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 17400$$

$$P_{02c} = 1.19\times 3860 + 1.28\times 280 + \frac{80200}{1610}\times\frac{49000}{1000} \fallingdotseq 7390$$

The static safety factor of slide unit 1 during acceleration at the start of motion receiving the largest static equivalent load is calculated. The static safety factor is calculated by formula (4) on page Ⅲ−6.

$$f_s = \frac{C_0}{P_{01a}} = \frac{80200}{19000} \fallingdotseq 4.2$$

As the result of calculation above, the static safety factor is about 4.2.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Accuracy

Five classes of accuracy, ordinary, high, precision, super precision, and ultra precision are specified for Linear Way and Linear Roller Way.

The outline of applicable accuracy classes is shown in Table 8. For details, see an explanation of each series.

Table 8 Accuracy classes and series

Series name \ Class (classification symbol)	Ordinary (No symbol)	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
C-Lube Linear Way ML Linear Way L	–	○	○	–	–
C-Lube Linear Way MLV	–	○	–	–	–
C-Lube Linear Way MV	○	○	○	○	–
C-Lube Linear Way ME Linear Way E	○	○	○	○	–
C-Lube Linear Way MH Linear Way H	–	○	○	○	–
Linear Way F	–	○	○	○	–
C-Lube Linear Way MUL Linear Way U	○	○	–	–	–
C-Lube Linear Roller Way Super MX Linear Roller Way Super X	–	○	○	○	○
Linear Roller Way X	–	○	○	○	○
Linear Way Module	–	○	○	○	–

Preload

Objectives of preload

In some cases, the linear motion rolling guide is used with clearance given to the linear motion rolling guide when light motion with small load is required. However, for some applications, it may be used with play in the guiding mechanism removed or with preload to increase rigidity.

Preload is applied to the contact parts of a raceway and rolling elements with internal stress generated in advance. When a external load is applied on the preloaded linear motion rolling guide, shock absorbing with this internal stress makes elastic deformation smaller, and its rigidity is increased. (See Fig. 3)

Preload setting

Preload amount is determined by considering the characteristics of the machines or equipments on which the linear motion rolling guide is mounted and the nature of load acting on the linear motion rolling guide. The standard amount of preload for linear motion rolling guides is, in general, approx. 1/3 of load when the rolling elements are balls (steel balls) and approx. 1/2 of load when they are rollers (cylindrical rollers). If the linear motion rolling guides are required to have very high rigidity to withstand vibration or fluctuating load, a larger preload may be applied.

For applicable preload amount, see Table 9. For details, see an explanation of each series.

Precaution for preload selection

Even when high rigidity must be required, excessive preload should be avoided, because it will produce an excessive stress between rolling elements and raceways, and eventually result in short life of linear motion rolling guides. It is important to apply a proper amount of preload, considering the operational conditions. When using with a large preload, contact IKO.

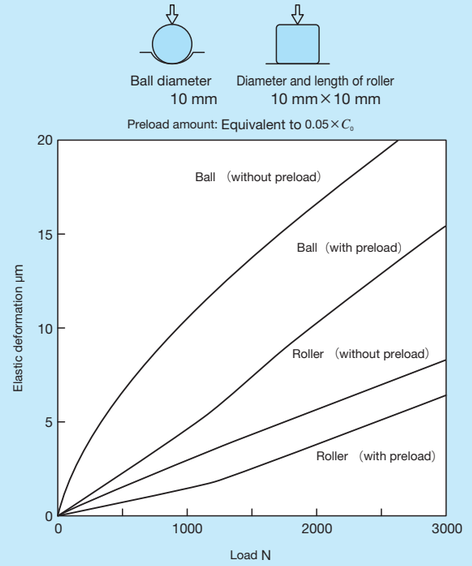


Fig. 3 Preload and elastic deformation behavior

Table 9 Series and preload amount

Series name \ Preload (preload symbol)	Clearance (T_C)	Clearance (T_0)	Standard (No symbol)	Light preload (T_1)	Medium preload (T_2)	Heavy preload (T_3)
C-Lube Linear Way ML Linear Way L	–	○	○	○	–	–
C-Lube Linear Way MLV(1)	–	–	–	–	–	–
C-Lube Linear Way MV	○	–	○	○	–	–
C-Lube Linear Way ME Linear Way E	○	–	○	○	○	–
C-Lube Linear Way MH Linear Way H	–	○	○	○	○	○
Linear Way F	–	–	○	○	○	–
C-Lube Linear Way MUL Linear Way U	–	–	○	○	–	–
C-Lube Linear Roller Way Super MX Linear Roller Way Super X	–	–	○	○	○	○
Linear Roller Way X	–	–	○	○	○	○

Note (1) Preload is adjusted to have subtle clearance or minimal amount of preload.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Friction

Friction of linear motion rolling guide

The static friction (start-up friction) of linear motion rolling guides is much lower than that of conventional plain guides. Also, the difference between static friction and dynamic friction is small, and frictional resistance varies little when velocity changes. These are excellent features of linear motion rolling guides, and account for their ability to reduce power consumption, suppress operating temperature rise, and increase traveling speed.
Since frictional resistance and variation are small, high-speed response characteristics to motion commands and high accuracy positioning can be achieved.

Friction coefficient

The frictional resistance of linear motion rolling guides varies with their model, applied load, velocity and characteristics of lubricant. Generally, lubricant or seals are major factors in determining the frictional resistance in light load or high-speed operation, while the amount of load is the major factor in heavy load or low speed operation. The frictional resistance of linear motion rolling guides depends on various factors, but generally the following formula is used.

$$F=\mu P \cdots\cdots (13)$$

where, F : Frictional resistance, N
μ : Dynamic friction coefficient
P : Applied load, N

For sealed guides, seal resistance is added to the above value, but this resistance varies greatly depending on the interference amount of seal lip and lubrication conditions.
Where the lubrication and mounting condition are correct and the load is moderate, the friction coefficients of Linear Way and Linear Roller Way in operation are within the range shown in Table 10. Generally, friction coefficient is large under small load.

Table 10 Friction coefficient

Series name	Dynamic friction coefficient μ (1)
Linear Way	0.0040～0.0060
Linear Roller Way	0.0020～0.0040

Note (1) These friction coefficients do not include seal.

Lubrication

Objectives of lubrication

The objectives of applying lubricant for linear motion rolling guides is to keep raceways, rolling elements, etc. in a linear motion rolling guide from metal contact, and thereby reduce friction and wear preventing heat generation and seizure. When an adequate oil film is formed at the rolling contact area between the raceways and rolling elements, the contact stress due to load can be reduced. To manage the formation of adequate oil film is important for ensuring the reliability of linear motion rolling mechanism.

Selection of lubricant

To obtain the full performance of linear motion rolling guides, it is necessary to select an appropriate lubricant and lubrication method by considering the model, load and velocity of each linear motion rolling guide. However, as compared with plain guides, lubrication of linear motion rolling guides is much simpler. Only a small amount of lubrication oil is needed and replenishment interval is longer, so maintenance can be greatly reduced. Grease and oil are the two most commonly used lubricants for linear motion rolling guides.

Grease lubrication

For linear motion rolling guides, lithium-soap base grease (Consistency No.2 of JIS) is commonly used. For rolling guides operating under heavy load conditions, grease containing extreme pressure additives is recommended.
In clean and high-vacuum environments, where low dust generating performance and low vaporization characteristics are required, greases containing a synthetic-base oil or a soap other than the lithium-soap base are used. For applications in these environments, due consideration is necessary to select a grease that is suitable for the operating conditions of linear motion rolling guide and achieves satisfactory lubrication performance at the same time.

Table 11 Pre-packed grease list

Series name	Pre-packed grease
C-Lube Linear Way ML Linear Way L	MULTEMP PS No.2 [KYODO YUSHI CO., LTD.]
C-Lube Linear Way MLV	
C-Lube Linear Way MV	Alvania EP Grease 2 [Shell Lubricants Japan K.K.]
C-Lube Linear Way ME Linear Way E	
C-Lube Linear Way MH (1) Linear Way H (1)	
Linear Way F	
C-Lube Linear Way MUL Linear Way U (2)	MULTEMP PS No.2 [KYODO YUSHI CO., LTD.]
C-Lube Linear Roller Way Super MX Linear Roller Way Super X	Alvania EP Grease 2 [Shell Lubricants Japan K.K.]
Linear Roller Way X	
Linear Way Module	

Notes (1) MULTEMP PS No.2 is pre-packed in size 8 to 12 series.
(2) Alvania EP Grease 2 is pre-packed in size 40 to 86 series.

Grease replenishment interval

The quality of any grease will gradually deteriorate as operating time passes. Therefore, periodic replenishment is necessary. Grease replenishment interval varies depending on the operating conditions. A six month interval is generally recommended, and if the machine operation consists of reciprocating motions with many cycles and long strokes, replenishment every three month is recommended.
In addition, linear motion rolling guides in which the lubrication part "C-Lube" is built deliver long-term maintenance free performance. This eliminates the need for lubrication mechanism and workload which used to be necessary for linear motion rolling guides and significantly reduces maintenance cost.

Grease replenishment method

New grease must be supplied through a grease feed device such as a grease nipple until old grease is discharged. After grease is replenished, running-in is performed and excess grease will be discharged to outside of the linear motion rolling guide. Discharged grease must then be removed before starting the operation.
The amount of grease required for standard replenishment is about 1/3 to 1/2 of the free space inside the linear motion rolling guide. When grease is supplied from a grease nipple for the first time, there will be grease lost in the replenishment path. The amount lost should be taken into consideration.
Generally, immediately after grease is replenished, frictional resistance tends to increase. If additional running-in is performed for 10 to 20 reciprocating cycles after excess grease is discharged, frictional resistance becomes small and stable.
For applications where low frictional resistance is required, the replenishment amount of grease may be reduced, but it must be kept to an appropriate level so as not to give a bad influence on the lubrication performance.

Mixing of different type of grease

Mixing different types of grease may result in changing the properties of base oil, soap base, or additives used, and, in some cases, severely deteriorate the lubrication performance or cause trouble due to chemical changes of additives. Old grease should therefore be removed thoroughly before filling with new grease.

Lubrication part "C-Lube"

C-Lube is a porous resin with molding formed fine resin powder. It is a lubrication part impregnated with a large amount of lubrication oil in its open pores by capillary inside.
Lubrication oil is supplied directly to balls (steel balls) or rollers (cylindrical rollers), not to the track rail. When the balls or rollers have contact with C-Lube built in the slide unit, lubrication oil is supplied to the surface of the balls or rollers. As the balls or rollers circulate, the lubricant is distributed to the loading area along the track rail. This results in adequate lubrication oil being properly maintained in the loading area and lubrication performance will last for a long time.
The surface of C-Lube is always covered with the lubrication oil. Lubrication oil is continuously supplied to the surface of balls or rollers by surface tension in the contact of C-Lube surface and balls or rollers.

Oil lubrication

For oil lubrication, heavy load requires high oil viscosity and high velocity requires low oil viscosity. Generally, for linear motion rolling guides operating under heavy load, lubrication oil with a viscosity of about 68 mm^2/s is used. For linear motion rolling guides under light load at high-speed operation, lubrication oil with a viscosity of about 13 mm^2/s is used.

Table 12 Grease brands used in linear motion rolling guide

Brand		Base oil	Thickener	Consistency	Range of operating temperature (2) ℃	Usage
Alvania EP Grease 2	[Shell Lubricants Japan K.K.]	Mineral oil	Lithium	284	-20～110	General application with extreme-pressure additive
Alvania Grease S2	[Shell Lubricants Japan K.K.]	Mineral oil	Lithium	283	-25～120	General application
MULTEMP PS No.2	[KYODO YUSHI CO., LTD.]	Synthetic oil, Mineral oil	Lithium	275	-50～130	General application
IKO Low Dust-Generation Grease for Clean Environment CG2	[NIPPON THOMPSON CO., LTD.]	Synthetic oil	Urea	280	-40～200	For clean environment Long life
IKO Low Dust-Generation Grease for Clean Environment CGL	[NIPPON THOMPSON CO., LTD.]	Synthetic oil, Mineral oil	Lithium / Calcium	225	-30～120	For clean environment Low sliding
Klüberalfa GR Y-VAC3 (1)	[NOK KLUEBER]	Synthetic oil	Ethylene tetra-fluoride	No.3	-20～250	For vacuum
IKO Anti-Fretting Corrosion Grease AF2	[NIPPON THOMPSON CO., LTD.]	Synthetic oil	Urea	285	-50～170	Fretting-proof
6459 Grease N	[Shell Lubricants Japan K.K.]	Mineral oil	Poly-urea	305	–	Fretting-proof

Notes (1) Set replenishment intervals to short.
(2) The ranges of operating temperature are quoted from the grease manufacturer's cataloged values, but do not guarantee regular use under high temperature environment.
Remarks Check with the chosen grease manufacturer's catalog before use.
For grease for applications other than those listed, please contact IKO.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Miniature greaser

The miniature greaser is specially prepared for grease replenishment for Linear Way and Linear Roller Way with an oil hole. Table 13 shows types of grease and specifications of miniature greasers.



Table 13 Grease type and miniature greaser

Identification number	Grease name	Amount	Outer diameter of grease feed needle
MG10B/MT2	Lithium-Based Grease MT2	10 ml	ϕ1 mm
MG10B/CG2	IKO Low Dust-Generation Grease for Clean Environment CG2		
MG2.5B/EP2	Lithium-Based Grease EP2	2.5 ml	
MG2.5B/CG2	IKO Low Dust-Generation Grease for Clean Environment CG2		
MG2.5B/CGL	IKO Low Dust-Generation Grease for Clean Environment CGL		
MG2.5B/AF2	IKO Anti-Fretting Corrosion Grease AF2		

Grease nipple and supply nozzle

Tables 14.1 and 14.2 show the specifications of grease nipples and applicable types of supply nozzles, and Table 15 shows the specifications of supply nozzles.

Table 14.1 Grease nipple and applicable supply nozzle type

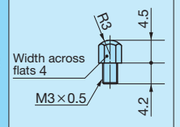
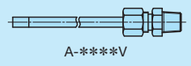
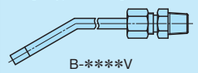
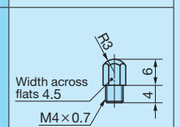
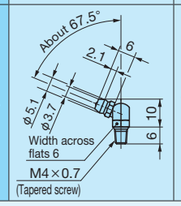
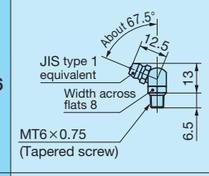
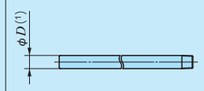
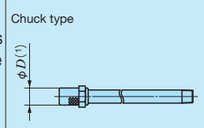
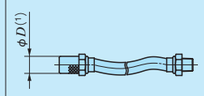
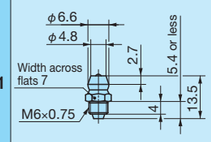
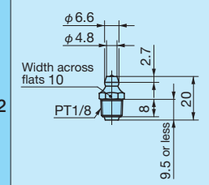
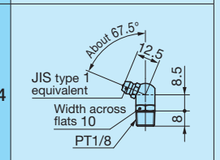
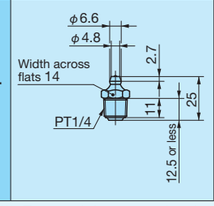
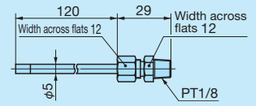
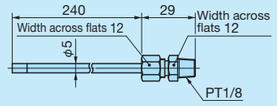
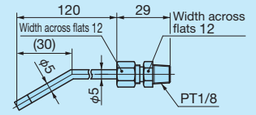
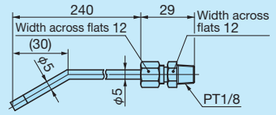
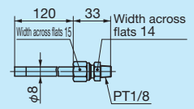
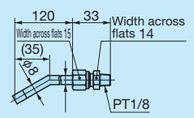
Grease nipple		Applicable supply nozzle type	
Type	Dimensions and shape	Type	Shape
A-M3		A-5120V A-5240V B-5120V B-5240V	Straight type  A-****V Straight type with angle  B-****V
A-M4			
B-M4		A-8120V B-8120V	

Table 14.2 Grease nipple and applicable supply nozzle type

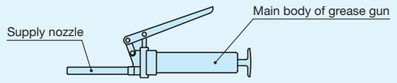
Grease nipple		Applicable supply nozzle type	
Type	Dimensions and shape	Type	Shape
B-M6		Products available on the market	Straight type  Chuck type  Hose type 
JIS type 1			
JIS type 2			
JIS type 4			
A-PT 1/4			

Note (1) For straight type, chuck type and hose type supply nozzles available on the market, it is recommended to use one with an outer diameter D of 13 mm or less.

Table 15 Types and dimensions of supply nozzle

Type	Dimensions and shape
A-5120V	
A-5240V	
B-5120V	
B-5240V	
A-8120V	
B-8120V	

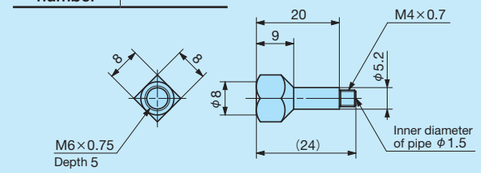
Remark: The supply nozzles shown in the table can be mounted on the main body of a common grease gun available on the market shown below. If needed, specify the supply nozzle type and place an order to IKO.



Piping joint

When applying centralized grease or oil lubrication, detach the grease nipple or plug from the slide unit, and replace them with piping joints, which are prepared for various female threads for piping. Use them after confirming the dimensions of the piping joints and H_3 dimensions in the dimensions table of each models, because the top face of some piping joints is at the same or higher level than the top face of slide unit. Fig. 4.1 and 4.2 and Tables 16.1, 16.2, 16.3, and 16.4 show identification number and dimensions of piping joints. Note that some of them are not applicable for the slide units of special specifications. Piping joints can be mounted on Linear Way and Linear Roller Way prior to delivery upon request. If needed, please contact IKO.

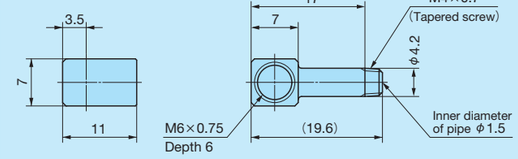
Identification number	SC4-20S



Remark: Not applicable to MX, LRX series.

Fig. 4.1 Piping joint for M4×0.7 (Straight type)

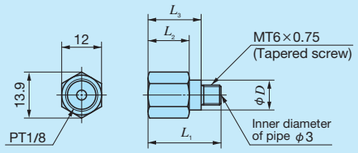
Identification number	LC4-17



Remark: It is recommended to mount the straight type piping joint in Table 16.1 for female threads (M6×0.75).

Fig. 4.2 Piping joint for M4×0.7 (L type)

Table 16.1 Piping joint for M6×0.75 (Straight type)

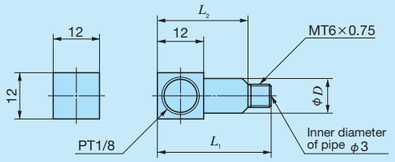


unit: mm

Identification number	L_1	L_2	L_3	D
SC6-16	22	12.4	16	9
SC6-22S	28	12	22	6
SC6-25S	31	12	25	6

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

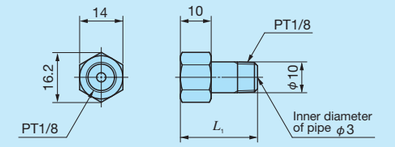
Table 16.2 Piping joint for M6×0.75 (L type)



unit: mm

Identification number	L_1	L_2	D
LC6-18	25	18	9
LC6-22S	28	–	6
LC6-24	30.5	23.5	9
LC6-25S	31	–	6

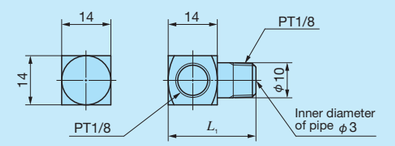
Table 16.3 Piping joint for PT1/8 (Straight type)



unit: mm

Identification number	L_1
SC1/8-19S	25
SC1/8-34S	40

Table 16.4 Piping joint for PT1/8 (L type)



unit: mm

Identification number	L_1
LC1/8-19S	25
LC1/8-34S	40

Dust Protection

Purpose of dust protection

To obtain the full performance of linear motion rolling guides, it is important to protect them from the intrusion of dust and other harmful foreign substances. Select an effective sealing or dust-protection device to withstand any operating conditions that might be imposed.

Method of dust protection

Linear Way and Linear Roller Way have end seals as a standard specification. In addition, double seals or scrapers are provided as special specifications for improvement in dust protection performance. Also caps and a rail cover sheet to cover the mounting hole of track rail (Fig. 5) and track rail mounting from bottom with no mounting hole on the upper surface (Fig. 6) will further increase the reliability of dust protection.
However, if large amount of contaminant or dust are floating, or if large particles of foreign substances such as chips or sand may adhere to the raceway, complete dust protection becomes difficult. In this case, it is recommended to cover the whole unit with bellows (Fig. 7), telescope type shield, etc.
When rail cover sheet or track rails mounting from bottom specification is needed, please contact IKO.

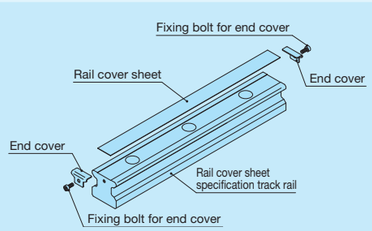


Fig. 5 Rail cover sheet

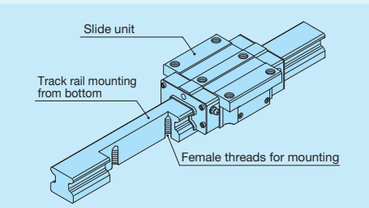


Fig. 6 Track rail mounting from bottom

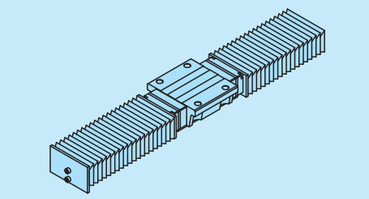


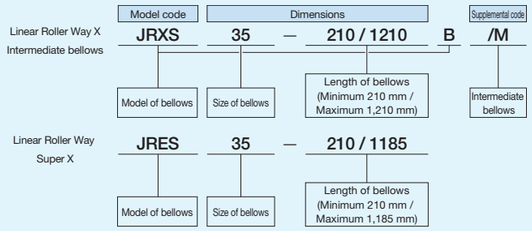
Fig. 7 Bellows

Specific bellows

The specific bellows are manufactured to match the dimensions of Linear Way and Linear Roller Way for easy mounting and excellent dust protection.
If special bellows to be used in an upside-down position or those made of heat-resistant material are needed, please contact IKO.

Identification number of bellows

The identification number of bellows consists of a model code, dimensions, and any supplemental codes. Its standard arrangement is shown below.



Calculation of minimum length of bellows

The minimum necessary length of specific bellows is determined, by first calculating the necessary number of accordion pleats as follows.

$$ns=\frac{S}{\ell s_{max}-\ell s_{min}}$$

where, ns : Number of pleats (Raise decimal fractions)
S : Stroke length, mm
ℓs_{max} : Maximum length of one pleat (See Tables 18.1 and 18.2)
ℓs_{min} : Minimum length of one pleat (See Tables 18.1 and 18.2)

$$L_{min}=ns\times \ell s_{min}+m\times 5+10$$
$$L_{max}=S+L_{min}$$

where, L_{min} : Minimum length of bellows, mm
L_{max} : Maximum length of bellows, mm
m : Number of internal guide plates (See Table 17)

Table 17 Number of internal guide plates for bellows

Model	P dimensions of specific bellows (1) mm Above	Below	Number of internal guide plates m
JEF JRES	—	35	$m=\frac{ns}{7}-1$
JES JHS JFS JRXS···B JFFS	—	22	$m=\frac{ns}{16}$ when $ns\leqq 20$, then $m=0$
	22	25	$m=\frac{ns}{12}$ when $ns\leqq 18$, then $m=0$
	25	35	$m=\frac{ns}{8}$

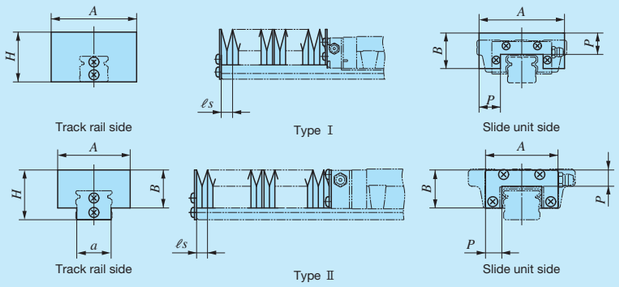
Note (1) For P dimensions, see Table 18.1 and Table 18.2.
Remark: In calculating the number of internal guide plates m, raise the decimal fractions for JEF and JRES and omit the decimal fractions for others.

Intermediate bellows

Since different type of mounting plate is used for mounting bellows between slide units. add supplemental code "/M" onto the identification number when ordering.
Reinforced bellows are also available, which are specially designed for use on long track rails or for lateral mounting. The width A of reinforced bellows is greater than that of standard type bellows. If needed, please contact IKO.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 18.1 Dimensions of bellows and applicable models

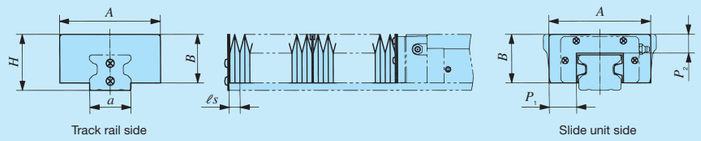


unit: mm

Series name	Size	Bellows model code	Type	H	A	a	B	P	ℓs_{min}	ℓs_{max}
C-Lube Linear Way ME Linear Way E	15	JEF 15	Ⅱ	23.5	34	14	17	8	2	9
	20	JEF 20		27.5	40	19	21	9	2	10
	25	JEF 25		32	46	22	24	10	2	11
	30	JES 30		42	70	27	35	15	2	14
	35	JES 35		48	85	33	40	18	2	18.5
	45	JES 45		60	105	44	50	22	2	23.5
C-Lube Linear Way MH Linear Way H(1)	15	JHS 15	Ⅰ	31(2)	55	–	19.5	15	2	14
	20	JHS 20		35(2)	60	–	25	15	2	14
	25	JHS 25		39(2)	64	–	29.5	15	2	14
	30	JHS 30		42	70	–	35	15	2	14
	35	JHS 35		48	85	–	40	18	2	18.5
	45	JHS 45		60	105	–	50	22	2	23.5
	55	JHS 55		70	120	–	57	25	2	28
	65	JHS 65		90	158	–	76	35	2	42
Linear Way F	33	JFFS 33	Ⅱ	26(2)	66(3)	–	23	15	2	15
	37	JFFS 37	Ⅱ	27.5(2)	70(3)	–	24	15	2	15
	40	JFS 40	Ⅰ	32(2)	80	–	27	15	2	14
	42	JFFS 42	Ⅱ	30.5(2)	76(3)	–	27.5	15	2	15
	60	JFS 60	Ⅰ	36(2)	100	–	30	15	2	14
	69	JFFS 69	Ⅱ	36(2)	106	–	31.5	15	2	15
	90	JFS 90	Ⅰ	50	150	–	43	22	2	23.5

Notes (1) Not applicable to horizontal mounting type LWHY.
(2) The height of bellows may become higher than the height H of dimensions of assembly of slide units. Check H dimensions of each series in dimension table.
(3) The width of bellows may become larger than the W_2 dimensions of slide units. Check with W_2 dimensions of each series in dimension table.

Table 18.2 Dimensions of bellows and applicable models



unit: mm

Series name	Size	Bellows model code	H	A	a	B	P_1	P_2	ℓs_{min}	ℓs_{max}
C-Lube Linear Roller Way Super MX Linear Roller Way Super X	15	JRES 15	34(1)	55(2)	14	30	17.5	15	2	15
	20	JRES 20	39(1)	60(2)	19	34	15	15	2	15
	25	JRES 25	42(1)	65(2)	22	36	16.5	15	2	15
	30	JRES 30	46(1)	70(2)	27	39.5	15	15	2	15
	35	JRES 35	48	88(2)	33	41.5	24	15	2	15
	45	JRES 45	60	108(2)	44	52	29	20	2	21
	55	JRES 55	70	122(2)	52	61	31	22	2	23.5
	65	JRES 65	88	140(2)	61	76	25	25	2	30
	85	JRES 85	107	180	82	89	30	30	2	36
Linear Roller Way X	25	JRXS 25···B	40	60	22	34	15	12	2	10
	35	JRXS 35···B	48	88	34	41.5	24	15	2	14
	45	JRXS 45···B	60	108	44	52	29	20	2	21
	55	JRXS 55···B	70	122	54	61	31	22	2	23.5
	75	JRXS 75···B	90	160	74	80	40	30	2	36

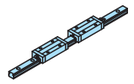
Notes (1) The height of bellows may become higher than the height H of dimensions of assembly of slide units. Check H dimensions of each series in dimension table.
(2) The width of bellows may become larger than the W_2 dimensions of slide units. Check W_2 dimensions of each series in dimension table.

Identification number and quantity for ordering

To order a set of Linear Way and Linear Roller Way, please specify the number of sets based on the number of track rails. For slide units of the interchangeable specification or single track rails, please specify the number of units.

Non-interchangeable specification

Assembled set



(When 1 set is needed)

Example of identification number indication

LWESG 25 C2 R640 SL T1 P /FU

Order quantity
1 set

Interchangeable specification

Single slide unit



(When 2 pieces are needed)

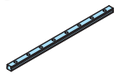
Example of identification number indication

LWESG 25 C1 SL T1 P SO /U

Only C1 is specified. Please specify S1 or S2.

Order quantity
2 pieces

Single track rail



(When 1 unit is needed)

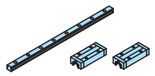
Example of identification number indication

LWE 25 R640 SL P SO /F

Please specify S1 or S2.

Order quantity
1 unit

Assembled set



(When 1 set is needed)

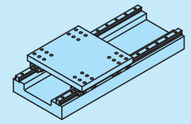
Example of identification number indication

LWESG 25 C2 R640 SL T1 P SO /FU

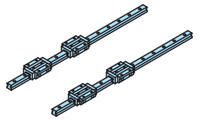
Please specify S1 or S2.

Order quantity
1 set

Specification with 1 multiple assembled sets as 1 assembled group (Special specification /W)



Linear Way and Linear Roller Way



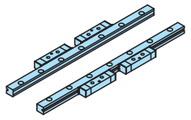
(When 2 sets as 1 assembled group is needed)

Example of identification number indication

LRX 45 C2 R1260 T3 SP /W2

Order quantity
2 sets

Linear Way Module



(When 2 sets as 1 assembled group is needed)

Example of identification number indication

LWLM 9 M2 R360 P /W2

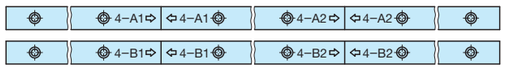
Order quantity
2 set

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Special Specification

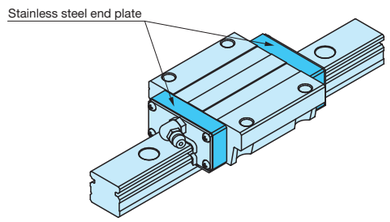
For Linear Way and Linear Roller Way, special specification described in pages Ⅲ−29 through Ⅲ−35 is available. There is limitation on applicable special specification. For details, see an explanation of each series.

Butt-jointing track rails /A



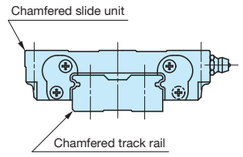
When the track rail of non-interchangeable specification is longer than the maximum length, two or more track rails should be butted in a linear motion direction. For length and number of track rails to butt, please contact IKO.

Stainless steel end plate /BS



The standard synthetic resin end plates are replaced with stainless steel end plates. The total length of the slide unit remains unchanged.
In addition, for improvement of heat resistance, it is recommended to use "No end seal (supplemental code /N)" together.

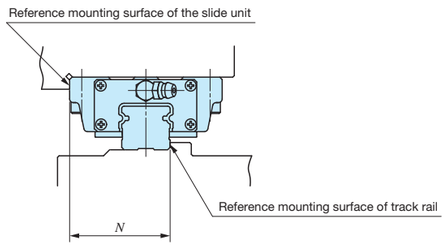
Chamfered reference surface /C /CC



Add chamfer to the reference mounting surface of the slide unit and track rail.

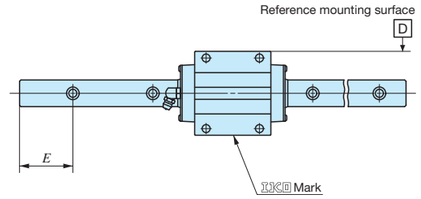
① /C Add chamfer to the reference mounting surface of the track rail.
② /CC Add chamfer to the reference mounting surface of the slide unit and track rail.

Opposite reference surfaces arrangement /D



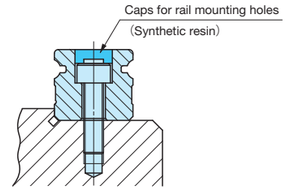
Reference mounting surface of the track rail should be the opposite of the standard position. Accuracy of N dimensions and parallelism during operation remain unchanged.

Specified rail mounting hole positions /E



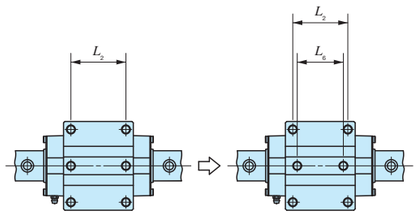
By specifying E dimensions from the mounting hole at the track rail left end to the left end surface when seen from IKO mark of the slide unit, specify the position of track rail mounting hole.
Specify the dimensions (in mm) after "/E".
In addition, E dimension range is limited. For details, please contact IKO.
For Linear Way H horizontal mounting type and Linear Way Module series, see an explanation of each series.

Caps for rail mounting holes /F



Dedicated caps for rail mounting holes are included. They close track rail mounting holes to improve sealing property in a motion direction. Contact IKO for aluminum alloy caps for rail mounting holes.

Changed pitch of slide unit middle mounting holes /GE

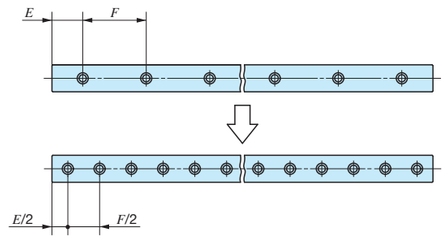


Change the dimension between mounting holes at the slide unit center.

Hybrid C-Lube Linear Way /HB

Change the material of rolling elements built into the slide unit to silicon nitride ceramics.

Half pitch mounting holes for track rail /HP



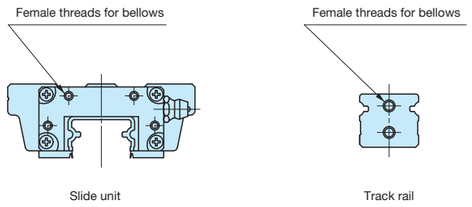
Set the pitch of track rail mounting holes to a half of the standard F dimension. The specification with bolts for track rail mounting holes are supplied with the required number of bolts.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Inspection sheet / I

Inspection sheet of H dimension, N dimension and parallelism during slide unit operation are appended in each set.

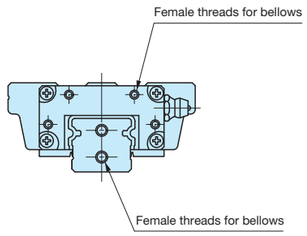
Female threads for bellows (Single unit) /J /JR /JL



For single slide unit or single track rail of the interchangeable specification, fit female threads for bellows.

① /J Fit female threads to both ends of the slide unit or track rail.
② /JR Fit female threads to a right end surface of the slide unit seen from IKO mark of the slide unit.
③ /JL Fit female threads to a left end surface of the slide unit seen from IKO mark of the slide unit.

Female threads for bellows (Assembled set) /J /JJ /JR /JS /JJS



For assembled set of the interchangeable specification or a non-interchangeable specification product, fit female threads for bellows to the slide unit and track rail.

① /J Fit female threads to both ends of the track rail and to slide unit end nearest to both ends of the track rail. (When only one slide unit is used, fit them to both ends of the track rail)
② /JJ When two or more slide units are used, fit female threads to both ends of the track rail and to both ends of each slide unit. (When only one slide unit is used, specify "/J")
③ /JR Fit female threads to both ends of the track rail.
④ /JS Fit female threads to slide unit end nearest to both ends of the track rail. (When only one slide unit is used, they are fitted to both ends of the track rail)
⑤ /JJS When two or more slide units are used, fit female threads to both ends of each slide unit. (When only one slide unit is used, specify "/JS")

Black chrome surface treatment /LC /LR /LCR

Acrylate resin coating is applied to improve the rust prevention property after black impregnated chrome surface treatment.

① /LC Perform casing treatment.
② /LR Perform track rail treatment.
③ /LCR Perform casing and track rail treatment.

Fluorine black chrome surface treatment /LFC /LFR /LFCR

Fluorinated resin coating is applied to improve the rust prevention property after black impregnated chrome surface treatment. In addition, this prevent foreign substances from sticking to the surface.

① /LFC Perform casing treatment.
② /LFR Perform track rail treatment.
③ /LFCR Perform casing and track rail treatment.

With track rail mounting bolt /MA

Recommended track rail mounting bolt is included. For bolt size, see the dimension table.

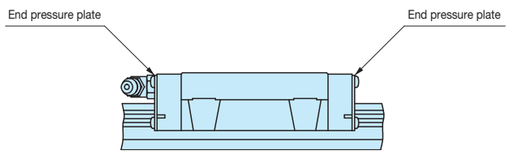
Without track rail mounting bolt /MN

Track rail mounting bolt is not included.

Changed size of mounting holes /M4

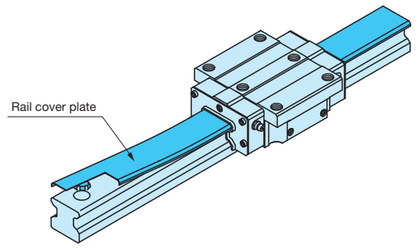
Set the M3 track rail mounting hole for ME15 to M4 track rail mounting holes. For combination with track rail mounting bolt (supplemental code "/MA"), specify "/MA4".

No end seal /N



End seals at both ends of the slide unit can be replaced with end pressure plates, which do not come in contact with the track rail, to reduce frictional resistance. No under seal is attached.
This specification is not effective for dust protection.

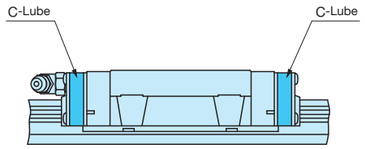
Rail cover plate for track rail /PS



Deliver with the track rail cover plate mounted. Covering the upper surface with U-shape stainless steel thin plate after assembly of the track rail improves the sealing property further. Change the end seal to dedicated one.
In addition, see the supplied rail cover plate instruction manual for mounting of rail cover plate.

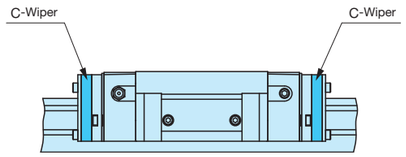
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

With C-Lube plate /Q



The C-Lube impregnated with lubricant is attached inside the end seal of the slide unit, so that the interval for reapplicating lubricant can be extended.

C-Wiper /RC /RCC



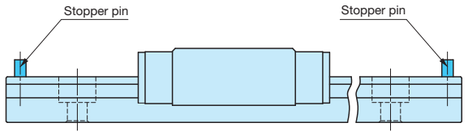
C-Wiper is mounted on the slide unit end to improve dust protection property.
In addition, the slide unit with C-Wiper is equipped with inner seal (/UR) and scraper (/Z) together.

① /RC Fit C-Wiper to slide unit end nearest to both ends of the track rail. When only one slide unit is used, fit them to both ends of the track rail.
② /RCC When two or more slide units are used, fit C-Wiper to both ends of each slide unit.

Special environment seal /RE

The standard end seal and under seal are replaced with seals for special environment that can be used at high temperatures.

Track rail with stopper pins /S

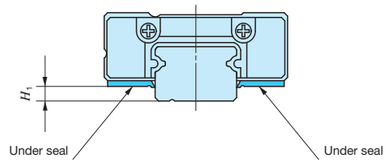


Mount stopper pins to both ends of the track rail as slide unit retainers.

Butt-jointing track rails (Interchangeable specification) /T

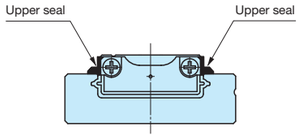
Finish the butted parts at both ends so as to set the interchangeable specification track rail in a linear motion direction. Butt the same interchangeable code for track rails. For non-interchangeable specification, specify butt-jointing track rails "/A".

Under seal (1) /U

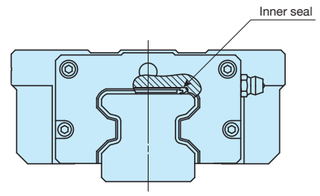


The seal is attached to the bottom of the slide unit to prevent foreign substances from entering from underneath.

Note (1) For C-Lube Linear Way MUL and Linear Way U, attach "upper seal".
The seal is attached to the upper end of the slide unit to prevent foreign substances from entering from above.

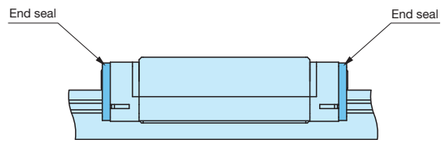


Inner seal /UR



Attach the inner seal to the inside of the slide unit.
Inner seal improves dust protection property of the cylindrical roller circulation part against foreign substances from the upper surface of the track rail.

End seal /US



Attach end seals instead of scrapers on both sides of the slide unit in order to improve the dust protection performance.

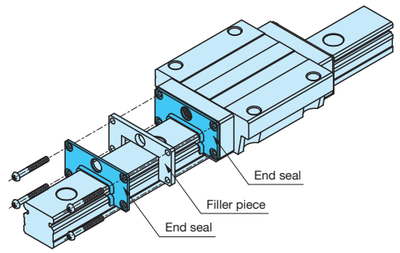
Double seals (Single unit) /V /VR /VL

Double end seals are mounted to the interchangeable specification slide unit to improve the dust protection property.

① /V Apply double seals to both ends of the slide unit.
② /VR Apply double seals to a right end surface of the slide unit seen from the IKO mark of the slide unit.
③ /VL Apply double seals to a left end surface of the slide unit seen from the IKO mark of the slide unit.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

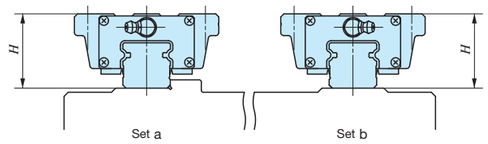
Double seals (Assembled set) /V /VV



Double end seals are mounted to the interchangeable specification assembled set or non-interchangeable specification product's slide unit to improve the dust protection property.

① /V Apply double seals to slide unit end nearest to both ends of the track rail. When only one slide unit is used, fit them to both ends of the track rail.
② /VV When two or more slide units are used, apply double seals to both ends of each slide unit.

A group of multiple assembled sets /W



Set the variation of H dimensions of the Linear Way and Linear Roller Way of multiple assembled sets on the same flat surface in the standard range.
The variation of H dimensions of the multiple assembled sets is the same as the accuracy of one set.
Indicate the number of sets after "/W" based on the number of units when specify.

Specified grease /YCG /YCL /YAF /YBR /YNG

The type of pre-packed grease can be changed by the supplemental code.

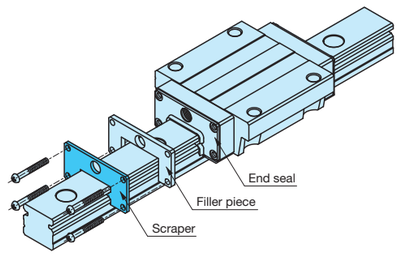
① /YCG Low Dust-Generation Grease for Clean Environment CG2 is pre-packed.
② /YCL Low Dust-Generation Grease for Clean Environment CGL is pre-packed.
③ /YAF Anti-Fretting Corrosion Grease AF2 is pre-packed.
④ /YBR MOLYCOTE BR2- Plus Grease [Dow Corning] is pre-packed.
⑤ /YNG No grease is pre-packed.

Scraper (Single unit) /Z /ZR /ZL

Mount a metal scraper to the interchangeable specification slide unit.
The scraper is non-contact type and effectively eliminate large foreign substances adhering to the track rail.

① /Z Mount scrapers to both ends of the slide unit.
② /ZR Fit a scraper to a right end surface of the slide unit seen from IKO mark of the slide unit.
③ /ZL Fit a scraper to a left end surface of the slide unit seen from IKO mark of the slide unit.

Scraper (Assembled set) /Z /ZZ



Mount a metal scraper to the interchangeable specification assembled set or non-interchangeable specification product's slide unit.
The scraper is non-contact type and effectively eliminate large foreign substances adhering to the track rail.

① /Z Fit a scraper to slide unit end nearest to both ends of the track rail. When only one slide unit is used, fit them to both ends of the track rail.
② /ZZ When two or more slide units are used, fit scrapers to both ends of each slide unit.

Precaution for Use

Operating temperature

The maximum operating temperature for linear motion rolling guide with integrated C-Lube is 80℃. The maximum operating temperature for linear motion rolling guide without integrated C-Lube is 120℃ and temperature up to 100℃ is allowed for continuous operation. When the temperature exceeds 100℃, please contact IKO.
When specifying special specification with C-Lube plate (supplemental code "/Q"), utilize it below 80℃.

Multiple slide units used in close proximity

When using multiple slide units in close proximity, greater load may be applied than the calculated value depending on the deviation of slide unit mounting accuracy for the machine or device. In such cases, allowance for greater applied load than the calculated value should be made.

Lateral or upside-down mounting

For lateral or upside-down mounting of the Linear Way E and Linear Way F, specify the special specification (supplemental code "/U") with under seal as necessary to prevent foreign substances from entering into the slide unit.

Operation velocity

Operation velocity limit value of the Linear Way and Linear Roller Way depends on operation conditions such as motion characteristics, applied load, lubrication status, mounting accuracy and environment temperature.
Reference values based on actual performance and experienced values as a reference of maximum velocity under typical operating conditions are indicated in Table 19.
IKO also offers products which can be operated beyond the maximum speeds in Table 19. For more information, please see the high-speed specification Linear Way on page I-41.

Table 19 Reference maximum velocity

Size	Maximum velocity m/min
35	180
45	120
55	100
65	75

Cleaning and removing fat

Never clean a linear motion rolling guide that has integrated C-lube with organic solvents or white kerosene with fat removing properties.

Lubrication oil supply point for oil lubrication

If the lubrication oil is supplied by a gravity drip system, enough lubrication oil may not be supplied to ways above the supply point, so lubrication path and supply point must be considered. For such applications, please contact IKO.

Precautions regarding oil components

Rust prevention oil or grease is used for the linear motion rolling guide. Therefore, oil may drip or spatter depending on the operating conditions. Consider installing a shielding plate if necessary.

Storage

Store the Linear Way/Linear Roller Way horizontally indoors in the IKO packing and packaging provided. Avoid high temperature, low temperature and high humidity. Lubricant will deteriorate over time in products stored for a long time. Be sure to reapply lubricant prior to use.

Handling

Do not disassemble the linear motion rolling guide. Also, do not apply excessive force or impact beyond intended use. It may lead to intrusion of foreign substances, or deterioration of accuracy and performance.

Precaution for Mounting

When mounting multiple assembled sets at the same time

● Interchangeable specification products
For interchangeable specification products, assemble a slide unit and a track rail with the same interchangeable code ("S1" or "S2").
● Non-interchangeable specification products
Do not change the combination of delivered slide unit and track rail.
● Product including multiple assembled sets
For special specification (supplemental code "/W") products with multiple assembled sets, the delivered combination is managed as a group for variation. So do not mix with different group for mounting.

Assembling of slide unit and track rail

When assembling the slide unit on the track rail, correctly fit the grooves of the slide unit and the track rail and move the slide unit softly in parallel direction. Rough handling may result in damaging of seals or dropping of steel balls and cylindrical roller.
For product including a dummy rail as a standard accessory, operation of the slide unit to the track rail can be made easier by using the dummy rail.
Though the dummy rail is included as an accessory of products indicated in Table 21.1 and Table 21.2, it is also available for other products. If these parts are necessary, please contact IKO.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Mounting accuracy

Deviation of accuracy of Linear Way and Linear Roller Way mounting surface or deviation of accuracy in mounting may generate large load over the calculated value. Note that such load could affect the life adversely. It enhances the reliability of Linear Way and Linear Roller Way to ensure high machining accuracy and assembly accuracy depending on operational conditions of the track rail and slide unit such as required motion accuracy and rigidity and to consider mounting structure that can maintain the accuracy and performance.
Typical reference values for mounting parallelism between multiple assembled sets used are shown in Table 20.

Table 20 Parallelism between two mounting surfaces unit: μm

Classification	Ordinary (No symbol)	High (H)	Precision (P)	Super precision (SP)	Ultra precision (UP)
Parallelism	30		20	10	6

Shoulder height and corner radius of the reference mounting surface

For the shape of opposite corner of the reference surface, it is recommended to have relieved fillet as indicated in Fig. 8, but you may also use it with providing radius at the corner. For recommended values for the shoulder height and corner radius of the reference mounting surface, see an explanation of each series.

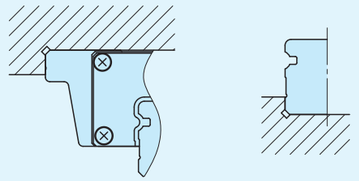


Fig. 8 Corner of the mating reference mounting

Table 21.1 Products appended with dummy rail ○: Appended

Series name and size		Interchangeable		Non-interchangeable specification
		Single unit	Assembled set	Assembled set
C-Lube Linear Way ML Linear Way L		○	See Table 21.2	See Table 21.2
C-Lube Linear Way MLV		–	–	
C-Lube Linear Way MV		–	–	–
C-Lube Linear Way ME Linear Way E		○	–	–
C-Lube Linear Way MH	8~12	○	○	○
Linear Way H	15~65	○	–	–
Linear Way F		○	–	–
C-Lube Linear Way MUL	25, 30	–	–	○
Linear Way U	40~86	–	–	–
C-Lube Linear Roller Way Super MX	10~30	○	○	○
	35~65	○	–	–
Linear Roller Way Super X	Extra long	○	○	○
	85, 100	–	–	–
Linear Roller Way X		–	–	–

Table 21.2 Appended dummy rail model number for C-Lube Linear Way ML, C-Lube Linear Way MLV and Linear Way L

C-Lube Linear Way ML		C-Lube Linear Way MLV	Linear Way L	
Standard type	Wide type	Standard type	Standard type	Wide type
–	–	–	–	LWLF 2
–	–	–	LWL 2	LWLF 4
MLC 3	MLFC 6	–	LWLC 3	LWLFC 6
ML 3	MLF 6	–	LWL 3	LWLF 6
MLC 5	MLFC 10	–	LWLC 5···B	LWLFC 10···B
ML 5	MLF 10	–	LWL 5···B	LWLF 10···B
MLC 7	MLFC 14	MLV 7	LWLC 7···B	LWLFC 14···B
ML 7	MLF 14	–	LWL 7···B	LWLF 14···B
MLG 7	MLFG 14	–	LWLG 7···B	LWLFG 14···B
MLC 9	MLFC 18	MLV 9	LWLC 9···B	LWLFC 18···B
ML 9	MLF 18	–	LWL 9···B	LWLF 18···B
MLG 9	MLFG 18	–	LWLG 9···B	LWLFG 18···B
MLL 9	–	–	–	–
MLG 12	MLFG 24	–	LWLG 12···B	LWLFG 24···B
MLL 12	–	–	–	–
MLG 15	MLFG 30	–	LWLG 15···B	LWLFG 30···B
MLL 15	–	–	–	–
MLG 20	MLFG 42	–	LWLG 20···B	LWLFG 42···B
MLG 25	–	–	LWLG 25···B	–

Cleanup of mounting surface

Remove burrs and blemishes by using oil-stone, etc. and wipe off rust prevention oil and dust with clean cloth from mounting surface and reference mounting surface of the machine or device to which the Linear Way or Linear Roller Way are mounted.

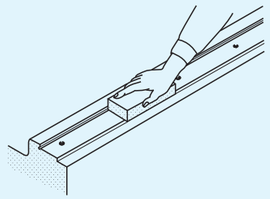


Fig. 9 Cleanup of mounting surface

Tightening torque for fixing screw

Typical fixing screw tightening torque to mount the Linear Way and Linear Roller Way is indicated in Table 22. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than the value indicated as necessary.
If the mating member material is cast iron or aluminum alloy, reduce the tightening torque depending on the strength characteristics of the mating member material.
For details, see an explanation of each series.
Though the track rail mounting bolts are appended as an accessory of products indicated in Table 23, it is also available for other products. If these parts are necessary, please contact IKO.

Mounting of caps for rail mounting holes

When mounting the special specification caps for rail mounting holes (supplemental code "/F") on the track rail, use a flat applicator and stamp it by bits until it becomes plane with the track rail upper surface.

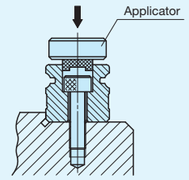


Fig. 10 Mounting of caps for rail mounting holes

Table 22 Tightening torque for fixing screw

Bolt size	Tightening torque [N · m]				Tightening torque [N · cm]
	High carbon steel-made screw (Strength division 8.8)	High carbon steel-made screw (Strength division 10.9)	High carbon steel-made screw (Strength division 12.9)	Stainless steel-made screw (Property division A2-70)	Cross-recessed pan head screw for precision equipment (1)
M 1 ×0.25	–	–	–	0.04	0.8
M 1.4×0.3	–	–	–	0.10	2.6
M 1.6×0.35	–	–	–	0.15	3.8
M 2 ×0.4	–	–	–	0.31	7.8
M 2.3×0.4	–	–	–	0.49	–
M 2.5×0.45	–	–	–	0.62	15.8
M 2.6×0.45	–	–	–	0.70	–
M 3 ×0.5	1.3	–	1.8	1.1	–
M 4 ×0.7	2.9	–	4.1	2.5	–
M 5 ×0.8	5.7	–	8.0	5.0	–
M 6 ×1	–	–	13.6	8.5	–
M 8 ×1.25	–	–	32.7	20.4	–
M10 ×1.5	–	–	63.9	–	–
M12 ×1.75	–	–	110	–	–
M14 ×2	–	–	175	–	–
M16 ×2	–	–	268	–	–
M20 ×2.5	–	–	522	–	–
M24 ×3	–	749	–	–	–
M30 ×3.5	–	1 490	–	–	–

Note (1) The tightening torque of the cross-recessed pan head screw for precision equipment is for reference only. In actual use, the customer should set according to the operating conditions.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 23 Specifications of appended track rail mounting bolts

Series	Size	Material type	Specifications of appended bolts: Type	Material	Class
C-Lube Linear Way ML Standard type(1)	1～ 3(2)	Stainless steel made	Cross-recessed pan head screw for precision equipment	Stainless steel made	–
Linear Way L Standard type(1)	5	Stainless steel made	Cross-recessed pan head screw for precision equipment	Stainless steel made	–
	7～ 25	Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
	9～ 20	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 8.8
C-Lube Linear Way ML Wide type(1)	4～ 10	Stainless steel made	Cross-recessed pan head screw for precision equipment	Stainless steel made	–
Linear Way L Wide type(1)	14～ 42	Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
	18～ 42	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 8.8
C-Lube Linear Way MLV		Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
C-Lube Linear Way MV(3)		High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
C-Lube Linear Way ME(3)		Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
Linear Way E(3)		High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
C-Lube Linear Way MH(4)	8～ 30	Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
Linear Way H(5)	12	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 8.8
	15～ 65	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
Linear Way F		Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
		High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
C-Lube Linear Way MUL(3)	25	Stainless steel made	Cross-recessed pan head screw for precision equipment	Stainless steel made	–
	30	Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
Linear Way U(3)	40～ 86	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
C-Lube Linear Roller Way Super MX(4)	10～ 65	Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
Linear Roller Way Super X		High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
	85～100	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 10.9
Linear Roller Way X	25～ 55	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9
	75	High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 10.9
Linear Way LM(6)		Stainless steel made	JIS B 1176 Hexagon socket head bolt	Stainless steel made	Property division A2-70
Linear Roller Way M(7)		High carbon steel made	JIS B 1176 Hexagon socket head bolt	High carbon steel made	Strength division 12.9

Notes (1) The bolts are not appended for tapped rail specification.
(2) The bolts are not appended. Specifications in the table are the ones prepared by IKO.
(3) The bolts are not appended. Specifications in the table are the ones when special specification "/MA" (with track rail mounting bolts) is specified.
(4) The bolts are not appended in an assembled set. Specifications in the table are the ones when special specification "/MA" (with track rail mounting bolts) is specified.
(5) The bolts are not appended in LWH···MU.
(6) Slide member mounting bolts are not appended.
(7) Slide member mounting bolts are also appended.

Mounting surface, reference mounting surface and typical mounting structure

When mounting Linear Way and Linear Roller Way, properly align the reference mounting surface B and D of the track rail and slide unit with the reference mounting surface of the table and bed and fix them. (See Fig. 11)
The reference mounting surfaces B and D and mounting surfaces A and C are precisely ground. Machining the mounting surface of the table and bed, such as machine or device, to high accuracy and mounting them properly will ensure stable linear motion with high accuracy.

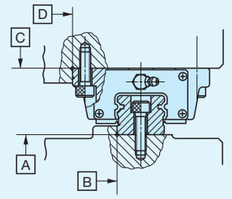


Fig. 11 Reference mounting surface and typical mounting structure of Linear Way and Linear Roller Way

Reference mounting surface of the slide unit is the opposite side of the IKO mark. The track rail reference mounting surface is identified by locating the IKO mark on the top surface of the track rail. It is the side surface above the mark (in the direction of the arrow). (See Fig. 12.)

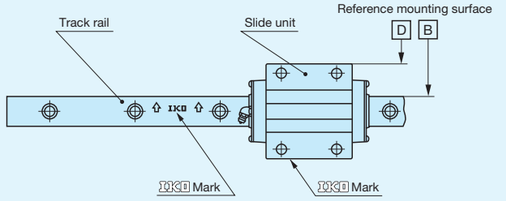


Fig. 12 Position of reference mounting surface of Linear Way and Linear Roller Way (Representative example)

Load direction and mounting structure

When lateral load, alternate load, or fluctuating load is applied onto the Linear Way or Linear Roller Way, securely fix the ends of slide unit and track rail as indicated in the Fig. 13 and Fig. 14.
When the load is small or operational conditions are not harsh, mounting methods indicated in Fig. 15 and Fig. 16 may be used.

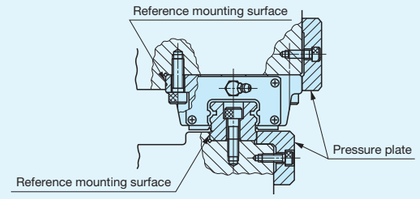


Fig. 13 Mounting example with pressure plate

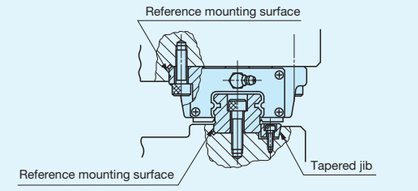


Fig. 14 Mounting example with tapered jib

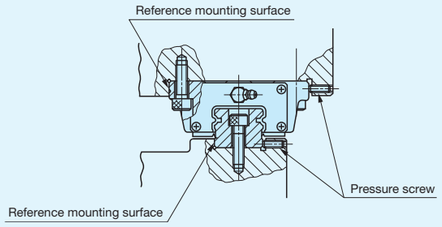


Fig. 15 Mounting example with pressure screw

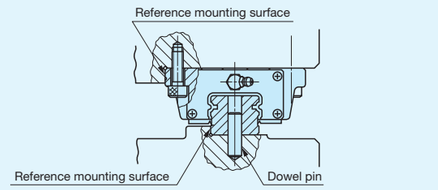


Fig. 16 Mounting example with dowel pin

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Mounting Examples

Typical procedures to mount Linear Way and Linear Roller Way are described in Examples 1 to 4 using a Linear Way as a representative case.

Example 1. Typical operation

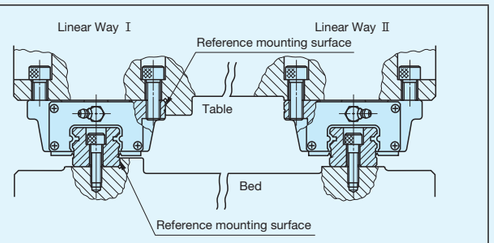


Fig. 17 Mounting example 1

For typical application without shock, reference mounting surface is prepared on each bed and table on the reference side. The mounting procedures are as follows. (See Fig. 17)

❶ Cleanup of mounting surface and reference mounting surface

- Remove burrs and blemishes by using oil-stone, etc. from reference mounting surface and mounting surface of the machine or the device to which Linear Way is mounted and wipe off with clean cloth. (see Fig. 18)
- Wipe off rust prevention oil and dust on the reference mounting surface and the mounting surface of the Linear Way with clean cloth.

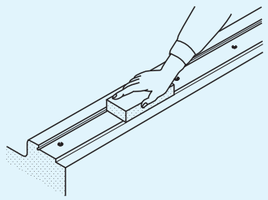


Fig. 18 Cleanup of mounting surface

❷ Temporary fixing of Linear Way Ⅰ and Ⅱ track rails

- Align and temporarily fix them with reference mounting surface of each Linear Way track rail. (See Fig. 19)
  At this point, ensure that the fixing bolt does not interfere with the mounting hole.
- Fix the Linear Way Ⅱ track rail to the bed.

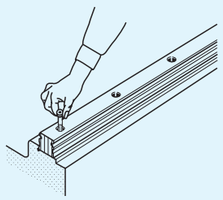


Fig. 19 Temporary fixing of track rail

❸ Fixing of Linear Way Ⅰ track rail

- Use small type vise or the like to stick track rail reference mounting surface to the reference mounting surface of the bed and tighten the fixing bolt at the same position. Repeat this method from one end to fix the track rail in order. (See Fig. 20)
- Linear Way Ⅱ track rail should be left temporarily fixed.

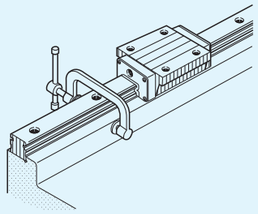


Fig. 20 Fixing of reference side track rail

❹ Temporary fixing of Linear Way Ⅰ and Ⅱ slide units

- Align the Linear Way with the mounting position of the table and load the table gently.
- Temporarily fix the Linear Way Ⅰ and Ⅱ slide units to the table.

❺ Fixing of Linear Way Ⅰ slide unit

- Align the reference mounting surface of the Linear Way Ⅰ slide unit with the reference mounting surface of the table correctly and fix them.

❻ Fixing of Linear Way Ⅱ slide unit

- Fix one of the Linear Way Ⅱ slide units in a motion direction correctly and leave the other slide units temporarily fixed. (See Fig. 21)

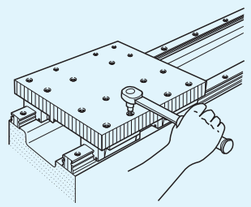


Fig. 21 Fixing of slide unit

❼ Fixing of Linear Way Ⅱ track rail

- Move the table and fix the Linear Way Ⅱ track rail ensuring smooth motion status. At this point, tighten each fixing bolt immediately after the fixed slide unit of the Linear Way Ⅱ passes on each of it. Repeat this method from one end to fix the track rail in order. (See Fig. 22)

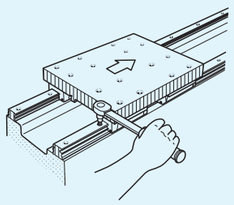


Fig. 22 Fixing of driven side track rail

❽ Fixing of Linear Way Ⅱ slide unit

- Fix the rest of the Linear Way II slide units.

Example 2. Operation for linear motion with accuracy and rigidity

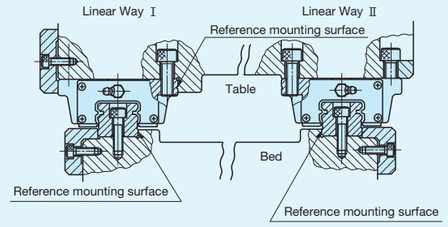


Fig. 23 Mounting example 2

If accuracy and rigidity of linear motion are required, prepare two reference mounting surfaces on the bed and one reference mounting surface on the table. The mounting procedures are as follows. (See Fig. 23)

❶ Cleanup of mounting surface and reference mounting surface

- Remove burrs and blemishes by using oil-stone, etc. from reference mounting surface and mounting surface of the machine or the device to which Linear Way is mounted and wipe off with clean cloth. (see Fig. 24)
- Wipe off rust prevention oil and dust on the reference mounting surface and the mounting surface of the Linear Way with clean cloth.

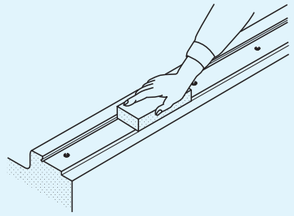


Fig. 24 Cleanup of mounting surface

❷ Temporary fixing of Linear Way Ⅰ and Ⅱ track rails

- Align and temporarily fix them with reference mounting surface of each Linear Way track rail. (See Fig. 25)
  At this point, ensure that the fixing bolt does not interfere with the mounting hole.

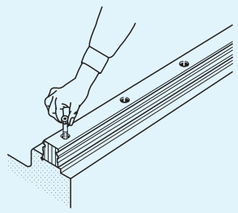


Fig. 25 Temporary fixing of track rail

❸ Fixing of Linear Way Ⅰ and Ⅱ track rails

- Stick the track rail reference mounting surface of the Linear Way Ⅰ to the reference mounting surface of the bed with pressure plate or pressure screws and tighten the track rail fixing bolt at the same position. Repeat this method from one end to fix the track rail in order. (See Fig. 26)

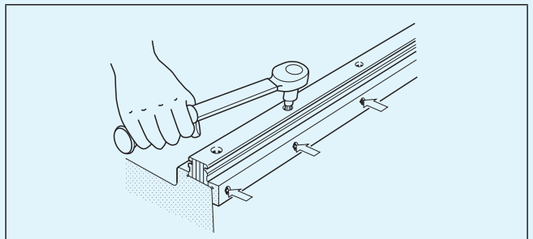


Fig. 26 Fixing of track rail

❹ Temporary fixing of Linear Way Ⅰ and Ⅱ slide units

- Align the slide unit with the mounting position of the table and load the table gently. Temporarily fix the Linear Way Ⅰ and Ⅱ slide units to the table.

❺ Fixing of Linear Way Ⅰ slide unit

- Align the reference mounting surface of the Linear Way Ⅰ slide unit with the reference mounting surface of the table correctly and fix them with pressure plate or pressure screws.

❻ Fixing of Linear Way Ⅱ slide unit

- Move the table ensuring smooth motion status, and fix the Linear Way Ⅱ slide unit. (See Fig. 27)

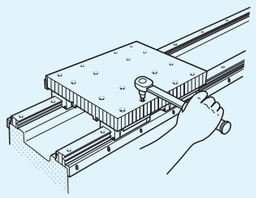


Fig. 27 Fixing of slide unit

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Example 3 Operation in case the slide unit is fixed separated from the track rail

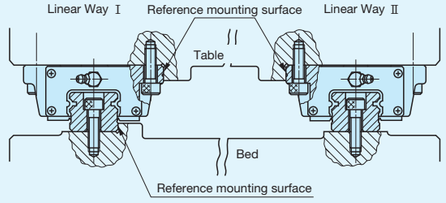


Fig. 28 Mounting example 3

If it cannot be fixed securely with the table loaded, prepare one reference mounting surface on the bed and two reference mounting surfaces on the table. The mounting procedures are as follows. (See Fig. 28)

❶ Cleanup of mounting surface and reference mounting surface

- Remove burrs and blemishes by using oil-stone, etc. from reference mounting surface and mounting surface of the machine or the device to which Linear Way is mounted and wipe off with clean cloth. (see Fig. 29)
- Wipe off rust prevention oil and dust on the reference mounting surface and the mounting surface of the Linear Way with clean cloth.

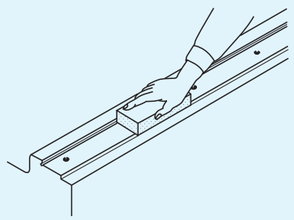


Fig. 29 Cleanup of mounting surface

❷ Temporary fixing of Linear Way Ⅰ and Ⅱ track rails

- Align and temporarily fix them with reference mounting surface of each Linear Way track rail. (See Fig. 30)
  At this point, ensure that the fixing bolt does not interfere with the mounting hole.

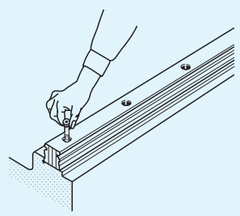


Fig. 30 Temporary fixing of track rail

❸ Fixing of Linear Way Ⅰ track rail

- Use small type vise or the like to stick track rail reference mounting surface to the reference mounting surface of the bed and tighten the fixing bolt at the same position. Repeat this method from one end to fix the track rail in order. (See Fig. 31)
- Linear Way Ⅱ track rail should be left temporarily fixed.

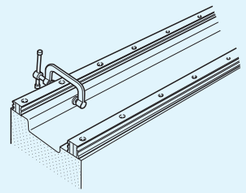


Fig. 31 Fixing of track rail

❹ Separation of track rail and slide unit

- After checking the combination and positions of Linear Way Ⅰ and Ⅱ track rails and slide units, separate each slide unit from the track rail.

❺ Fixing of Linear Way Ⅰ and Ⅱ slide units

- Align with the reference mounting surface of the Linear Way Ⅰ and Ⅱ slide units correctly, and fix them. (See Fig. 32)

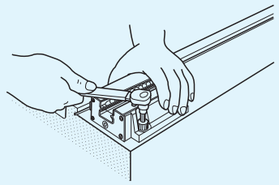


Fig. 32 Fixing of slide unit

❻ Setting of track rail and slide unit

- Insert and assemble the slide unit fixed to the table slowly with care while aligning it with the track rail fixed and temporarily fixed to the bed to maintain parallelism.

❼ Fixing of Linear Way Ⅱ track rail

- Move the table and fix the Linear Way Ⅱ track rail ensuring smooth motion status. At this point, tighten each fixing bolt immediately after the fixed slide unit of the Linear Way Ⅱ passes on each of it. Repeat this method from one end to fix the track rail in order.

Example 4. Operation of Linear Way Module

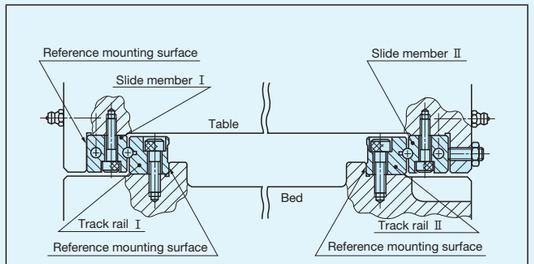


Fig. 33 Mounting example 4

For the Linear Way Module, normally 2 sets are used in parallel as indicated in Fig. 33. For the mounting, typically follow the procedure below (see Fig. 33).

❶ Cleanup of mounting surface and reference mounting surface

- Remove burrs and blemishes by using oil-stone, etc. from reference mounting surface and mounting surface of the machine or the device to which Linear Way Module is mounted and wipe off with clean cloth (see Fig. 34).
- Wipe off rust prevention oil and dust on the reference mounting surface and the mounting surface of the Linear Way Module with clean cloth.

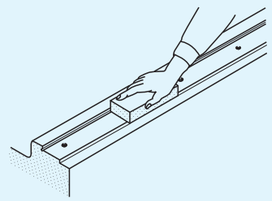


Fig. 34 Cleanup of mounting surface

❷ Fixing of track rail

- Align the reference mounting surfaces of track rails Ⅰ and Ⅱ with the reference mounting surfaces of the bed correctly, stick them by using small type vise, and tighten the fixing bolts at the same position (see Fig. 35).

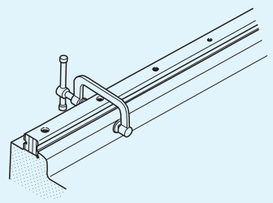


Fig. 35 Fixing of track rail

❸ Fixing the slide member

- Align the reference mounting surface of the slide member Ⅰ with the reference mounting surface of the table correctly, tighten the fixing bolt to fix them, and temporarily fix the slide member Ⅱ (see Fig. 36).

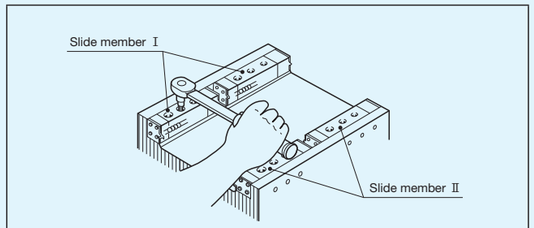


Fig. 36 Fixing of slide member

❹ Setting of table and bed

- Insert and assemble the slide member fixed to the table slowly with care while aligning it with the track rail fixed to the bed to maintain parallelism.

❺ Fixing the slide member Ⅱ

- As indicated in Fig. 37, tighten the preload adjusting screw at the center first and then all the rest preload adjusting screws in order while measuring the clearance by using the dial gauge.
- The position where the dial gauge deflection stops after moving the table to right and left indicates zero preload or slight preload state.
- After preload adjustment, tighten the fixing bolt to fix them.

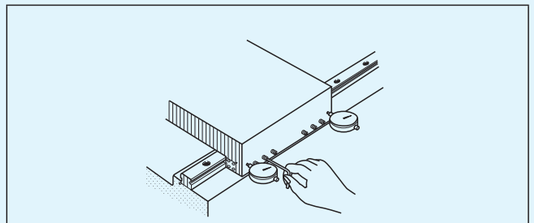


Fig. 37 Preload adjustment

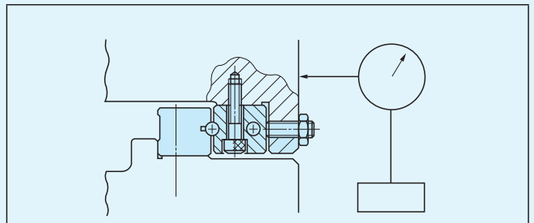


Fig. 38 Example of preload adjustment check method

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Mounting of reference side track rail

Mounting methods of reference side track rail are indicated below. Select a method suitable for the specifications of your machine or device.

❶ Method to use reference mounting surface

・Stick track rail reference mounting surface to the reference mounting surface of the bed by using a pressure plate or small type vise, and tighten the fixing bolt at the same position. Repeat this method from one end to fix the track rail in order.

❷ Method to use temporary reference surface

・Prepare temporary reference surface around the mounting surface of the bed, temporarily fix the track rail, fix the measurement stand on the upper surface of the slide unit as indicated in Fig. 39, place an indicator onto the temporary reference surface, and fix them from one end of the track rail in order while maintaining straightness.

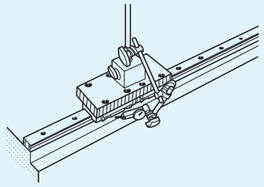


Fig. 39 Method to use temporary reference surface

❸ Method with straight-edge

・After temporary fixing of the track rail, apply an indicator to the reference mounting surface of the track rail as indicated in Fig. 40 and fix them from one end of the track rail in order referring to the straight-edge while maintaining straightness.

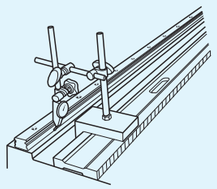


Fig. 40 Method with straight-edge

Mounting of driven side track rail

Mounting methods of driven side track rail are indicated below. Select a method suitable for the specifications of your machine or device.

❶ Method to use reference mounting surface

・Stick track rail reference mounting surface to the reference mounting surface of the bed by using a pressure plate or small type vise, and tighten the fixing bolt at the same position. Repeat this method from one end to fix the track rail in order.

❷ Method to follow the reference side track rail

・Correctly mount the reference side track rail and one of the driven slide units in motion direction, temporarily fix the rest of slide units and track rails, and fix them from one end of the driven side track rail in order ensuring smooth motion status.

❸ Method with straight-edge

・After temporary fixing of the track rail, apply an indicator to the reference mounting surface of the track rail as indicated in Fig. 40 and fix them from one end of the track rail in order referring to the straight-edge while maintaining straightness.

❹ Method to use reference side Linear Way

・Fix a measurement stand onto the upper surface of the reference side slide unit as indicated in Fig. 41, place an indicator onto the reference mounting surface of the driven side track rail, and fix them from one end in order while maintaining parallelism.

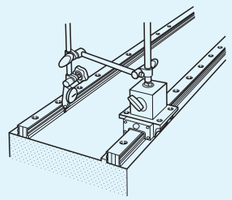


Fig. 41 Method to use reference side Linear Way

Mounting procedures when track rails are butt-jointed

When multiple track rails are butt-jointed, it is necessary to specify special specification butted track rails (non-interchangeable specification, supplemental code "/A") or butt-jointing track rails (interchangeable specification, supplemental code "/T").
Butt-jointing track rails have a butt-jointing mark on the track rail end surface as indicated in Fig. 42. Typical method to butt-joint the track rails is as follows.

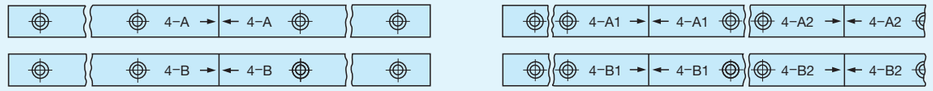


Fig. 42 Butt-jointing mark

❶ Align the butt-jointing mark on the track rail end surface and temporarily fix it. Since butt-jointing track rails are interchangeable, no butt-jointing position is specified.

❷ Correctly align the reference mounting surface of the track rail with that of the bed in order. At this point, use a small type vise or the like to stick the reference mounting surfaces of the bed and track rail together so as to eliminate any step at the joint part of the track rail. (See Fig. 43)

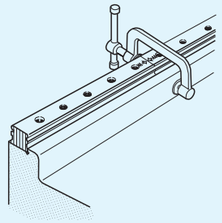
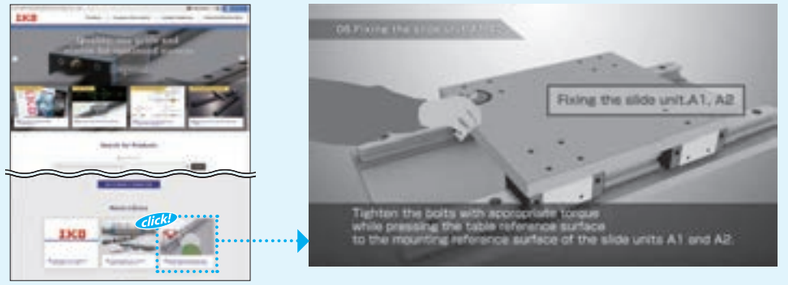


Fig. 43 Method to butt-joint track rails

Guide to Mounting Videos

Instructional videos about the mounting methods for linear motion rolling guides are available on the IKO website. Please utilize them when necessary.

https://www.ikont.co.jp/eg/



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Reference tables

Statements

● Unit Conversion Rate Table

SI, CGS series and gravity system unit cross-reference table

Amount / Unit system	Length	Mass	Time	Acceleration	Force	Stress and pressure
SI	m	kg	s	m/s^2	N	Pa
CGS series	cm	g	s	Gal	dyn	dyn/cm^2
Gravity system	m	$kgf·s^2/m$	s	m/s^2	kgf	kgf/m^2

Energy	Power	Temperature	Viscosity	Kinetic viscosity	Flux	Flux density	Magnetic field intensity
J	W	K	Pa·s	m^2/s	Wb	T	A/m
erg	erg/s	℃	P	St	Mx	Gs	Oe
kgf·m	kgf·m/s	℃	$kgf·s/m^2$	m^2/s	—	—	—

SI unit conversion

Amount	Unit name	Code	SI conversion rate	SI unit name	Code
Angle	D Min Sec	° ′ ″	π/180 π/10 800 π/648 000	Radian	rad
Length	Meter Micron Angstrom X ray unit Nautical mile	m μ Å n mile	1 10^{-6} 10^{-10} $\approx 1.002\ 08\times10^{-13}$ 1852	Meter	m
Area	Square meter Are Hectare	m^2 a ha	1 10^2 10^4	Square meter	m^2
Volume	Cubic meter Liter	m^3 l, L	1 10^{-3}	Cubic meter	m^3
Mass	Kilogram Ton Atomic mass unit	kg t u	1 10^3 $\approx 1.660\ 57\times10^{-27}$	Kilogram	kg
Time	Sec Min Hr Day	s min h d	1 60 3 600 86 400	Sec	s
Velocity	Meter per second Knot	m/s kn	1 1 852/3 600	Meter per second	m/s
Frequency and vibration	Number of cycle	s^{-1}	1	Hertz	Hz
Number of rotations	Rotation per minute	min^{-1}	1/60	Per second	s^{-1}
Angular velocity	Radian per second	rad/s	1	Radian per second	rad/s
Acceleration	Meter per second G	m/s^2 G	1 9.806 65	Meter per second	m/s^2
Force	Weight in kg Weight in ton Dyne	kgf tf dyn	9.806 65 9 806.65 10^{-5}	Newton	N
Force moment load	Weight in kg meter	kgf·m	9.806 65	Newton meter	N · m
Stress and pressure	Weight in kg per square meter Weight in kg per square cm Weight in kg per square mm	kgf/m^2 kgf/cm^2 kgf/mm^2	9.806 65 $9.806\ 65\times10^4$ $9.806\ 65\times10^6$	Pascal	Pa

Amount	Unit name	Code	SI conversion rate	SI unit name	Code
Pressure	Meter water column millimeter of mercury column Torr Air pressure Bar	mH_2O mmHg Torr atm bar	9 806.65 101 325/760 101 325/760 101 325 10^5	Pascal	Pa
Energy	Erg IT calorie Weight in kg meter Kilowatt per hour French horse-power per hour Electron volt	erg cal_{IT} kgf·m kW·h PS·h eV	10^{-7} 4.186 8 9.806 65 3.600×10^6 $\approx 2.647\ 79\times10^6$ $\approx 1.602\ 19\times10^{-19}$	Joule	J
Power and motivity	Watt French horse-power Weight in kg meter per second	W PS kgf·m/s	1 ≈735.5 9.806 65	Watt	W
Viscosity	Poise Centipoise Weight in kg second per square meter	P cP $kgf·s/m^2$	10^{-1} 10^{-3} 9.806 65	Pascal second	Pa·s
Kinetic viscosity	Stokes Centistokes	St cSt	10^{-4} 10^{-6}	Square meter per second	m^2/s
Temperature	D	℃	+273.15	Kelvin	K
Radioactivity	Curie	Ci	3.7×10^{10}	Becquerel	Bq
Exposure radiation dose	Roentgen	R	2.58×10^{-4}	Coulomb per kg	C/kg
Absorbed dose	Rad	rad	10^{-2}	Gray	Gy
Dose equivalent	Rem	rem	10^{-2}	Sievert	Sv
Flux	Maxwell	Mx	10^{-8}	Weber	Wb
Flux density	Gamma Gauss	γ Gs	10^{-9} 10^{-4}	Tesla	T
Magnetic field intensity	Oersted	Oe	$10^3/4\pi$	Ampere per meter	A/m
Electric charge	Coulomb	C	1	Coulomb	C
Electric potential difference	Volt	V	1	Volt	V
Capacitance	Farad	F	1	Farad	F
(Electric) Resistance	Ohm	Ω	1	Ohm	Ω
(Electric) Conductance	Siemens	S	1	Siemens	S
Inductance	Henry	H	1	Henry	H
Current	Ampere	A	1	Ampere	A

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

● Inch-mm Conversion Table

1 inch=25.4mm

inch		0″	1″	2″	3″	4″	5″	6″	7″	8″
Fractional number	Decimal number									
	0		25.400	50.800	76.200	101.600	127.000	152.400	177.800	203.200
1 / 64″	0.015625	0.397	25.797	51.197	76.597	101.997	127.397	152.797	178.197	203.597
1 / 32″	0.031250	0.794	26.194	51.594	76.994	102.394	127.794	153.194	178.594	203.994
3 / 64″	0.046875	1.191	26.591	51.991	77.391	102.791	128.191	153.591	178.991	204.391
1 / 16″	0.062500	1.588	26.988	52.388	77.788	103.188	128.588	153.988	179.388	204.788
5 / 64″	0.078125	1.984	27.384	52.784	78.184	103.584	128.984	154.384	179.784	205.184
3 / 32″	0.093750	2.381	27.781	53.181	78.581	103.981	129.381	154.781	180.181	205.581
7 / 64″	0.109375	2.778	28.178	53.578	78.978	104.378	129.778	155.178	180.578	205.978
1 / 8″	0.125000	3.175	28.575	53.975	79.375	104.775	130.175	155.575	180.975	206.375
9 / 64″	0.140625	3.572	28.972	54.372	79.772	105.172	130.572	155.972	181.372	206.772
5 / 32″	0.156250	3.969	29.369	54.769	80.169	105.569	130.969	156.369	181.769	207.169
11 / 64″	0.171875	4.366	29.766	55.166	80.566	105.966	131.366	156.766	182.166	207.566
3 / 16″	0.187500	4.762	30.162	55.562	80.962	106.362	131.762	157.162	182.562	207.962
13 / 64″	0.203125	5.159	30.559	55.959	81.359	106.759	132.159	157.559	182.959	208.359
7 / 32″	0.218750	5.556	30.956	56.356	81.756	107.156	132.556	157.956	183.356	208.756
15 / 64″	0.234375	5.953	31.353	56.753	82.153	107.553	132.953	158.353	183.753	209.153
1 / 4″	0.250000	6.350	31.750	57.150	82.550	107.950	133.350	158.750	184.150	209.550
17 / 64″	0.265625	6.747	32.147	57.547	82.947	108.347	133.747	159.147	184.547	209.947
9 / 32″	0.281250	7.144	32.544	57.944	83.344	108.744	134.144	159.544	184.944	210.344
19 / 64″	0.296875	7.541	32.941	58.341	83.741	109.141	134.541	159.941	185.341	210.741
5 / 16″	0.312500	7.938	33.338	58.738	84.138	109.538	134.938	160.338	185.738	211.138
21 / 64″	0.328125	8.334	33.734	59.134	84.534	109.934	135.334	160.734	186.134	211.534
11 / 32″	0.343750	8.731	34.131	59.531	84.931	110.331	135.731	161.131	186.531	211.931
23 / 64″	0.359375	9.128	34.528	59.928	85.328	110.728	136.128	161.528	186.928	212.328
3 / 8″	0.375000	9.525	34.925	60.325	85.725	111.125	136.525	161.925	187.325	212.725
25 / 64″	0.390625	9.922	35.322	60.722	86.122	111.522	136.922	162.322	187.722	213.122
13 / 32″	0.406250	10.319	35.719	61.119	86.519	111.919	137.319	162.719	188.119	213.519
27 / 64″	0.421875	10.716	36.116	61.516	86.916	112.316	137.716	163.116	188.516	213.916
7 / 16″	0.437500	11.112	36.512	61.912	87.312	112.712	138.112	163.512	188.912	214.312
29 / 64″	0.453125	11.509	36.909	62.309	87.709	113.109	138.509	163.909	189.309	214.709
15 / 32″	0.468750	11.906	37.306	62.706	88.106	113.506	138.906	164.306	189.706	215.106
31 / 64″	0.484375	12.303	37.703	63.103	88.503	113.903	139.303	164.703	190.103	215.503
1 / 2″	0.500000	12.700	38.100	63.500	88.900	114.300	139.700	165.100	190.500	215.900

1 inch=25.4mm

inch		0″	1″	2″	3″	4″	5″	6″	7″	8″
Fractional number	Decimal number									
33 / 64″	0.515625	13.097	38.497	63.897	89.297	114.697	140.097	165.497	190.897	216.297
17 / 32″	0.531250	13.494	38.894	64.294	89.694	115.094	140.494	165.894	191.294	216.694
35 / 64″	0.546875	13.891	39.291	64.691	90.091	115.491	140.891	166.291	191.691	217.091
9 / 16″	0.562500	14.288	39.688	65.088	90.488	115.888	141.288	166.688	192.088	217.488
37 / 64″	0.578125	14.684	40.084	65.484	90.884	116.284	141.684	167.084	192.484	217.884
19 / 32″	0.593750	15.081	40.481	65.881	91.281	116.681	142.081	167.481	192.881	218.281
39 / 64″	0.609375	15.478	40.878	66.278	91.678	117.078	142.478	167.878	193.278	218.678
5 / 8″	0.625000	15.875	41.275	66.675	92.075	117.475	142.875	168.275	193.675	219.075
41 / 64″	0.640625	16.272	41.672	67.072	92.472	117.872	143.272	168.672	194.072	219.472
21 / 32″	0.656250	16.669	42.069	67.469	92.869	118.269	143.669	169.069	194.469	219.869
43 / 64″	0.671875	17.066	42.466	67.866	93.266	118.666	144.066	169.466	194.866	220.266
11 / 16″	0.687500	17.462	42.862	68.262	93.662	119.062	144.462	169.862	195.262	220.662
45 / 64″	0.703125	17.859	43.259	68.659	94.059	119.459	144.859	170.259	195.659	221.059
23 / 32″	0.718750	18.256	43.656	69.056	94.456	119.856	145.256	170.656	196.056	221.456
47 / 64″	0.734375	18.653	44.053	69.453	94.853	120.253	145.653	171.053	196.453	221.853
3 / 4″	0.750000	19.050	44.450	69.850	95.250	120.650	146.050	171.450	196.850	222.250
49 / 64″	0.765625	19.447	44.847	70.247	95.647	121.047	146.447	171.847	197.247	222.647
25 / 32″	0.781250	19.844	45.244	70.644	96.044	121.444	146.844	172.244	197.644	223.044
51 / 64″	0.796875	20.241	45.641	71.041	96.441	121.841	147.241	172.641	198.041	223.441
13 / 16″	0.812500	20.638	46.038	71.438	96.838	122.238	147.638	173.038	198.438	223.838
53 / 64″	0.828125	21.034	46.434	71.834	97.234	122.634	148.034	173.434	198.834	224.234
27 / 32″	0.843750	21.431	46.831	72.231	97.631	123.031	148.431	173.831	199.231	224.631
55 / 64″	0.859375	21.828	47.228	72.628	98.028	123.428	148.828	174.228	199.628	225.028
7 / 8″	0.875000	22.225	47.625	73.025	98.425	123.825	149.225	174.625	200.025	225.425
57 / 64″	0.890625	22.622	48.022	73.422	98.822	124.222	149.622	175.022	200.422	225.822
29 / 32″	0.906250	23.019	48.419	73.819	99.219	124.619	150.019	175.419	200.819	226.219
59 / 64″	0.921875	23.416	48.816	74.216	99.616	125.016	150.416	175.816	201.216	226.616
15 / 16″	0.937500	23.812	49.212	74.612	100.012	125.412	150.812	176.212	201.612	227.012
61 / 64″	0.953125	24.209	49.609	75.009	100.409	125.809	151.209	176.609	202.009	227.409
31 / 32″	0.968750	24.606	50.006	75.406	100.806	126.206	151.606	177.006	202.406	227.806
63 / 64″	0.984375	25.003	50.403	75.803	101.203	126.603	152.003	177.403	202.803	228.203

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

● Hardness Conversion Table (Reference)

Rockwell C scale hardness Load 1471N HRC	Vickers hardness HV	Brinell hardness Standard ball	Brinell hardness Tungsten Carbide ball	Rockwell hardness A scale Load 588.4N Diamond circular cone	Rockwell hardness B scale Load 980.7N Diameter 1/16in ball	Shore hardness HS
68	940	—	—	85.6	—	97
67	900	—	—	85.0	—	95
66	865	—	—	84.5	—	92
65	832	—	(739)	83.9	—	91
64	800	—	(722)	83.4	—	88
63	772	—	(705)	82.8	—	87
62	746	—	(688)	82.3	—	85
61	720	—	(670)	81.8	—	83
60	697	—	(654)	81.2	—	81
59	674	—	(634)	80.7	—	80
58	653	—	615	80.1	—	78
57	633	—	595	79.6	—	76
56	613	—	577	79.0	—	75
55	595	—	560	78.5	—	74
54	577	—	543	78.0	—	72
53	560	—	525	77.4	—	71
52	544	(500)	512	76.8	—	69
51	528	(487)	496	76.3	—	68
50	513	(475)	481	75.9	—	67
49	498	(464)	469	75.2	—	66
48	484	451	455	74.7	—	64
47	471	442	443	74.1	—	63
46	458	432	432	73.6	—	62
45	446	421	421	73.1	—	60
44	434	409	409	72.5	—	58
43	423	400	400	72.0	—	57
42	412	390	390	71.5	—	56
41	402	381	381	70.9	—	55
40	392	371	371	70.4	—	54
39	382	362	362	69.9	—	52

Rockwell C scale hardness Load 1471N HRC	Vickers hardness HV	Brinell hardness Standard ball	Brinell hardness Tungsten Carbide ball	Rockwell hardness A scale Load 588.4N Diamond circular cone	Rockwell hardness B scale Load 980.7N Diameter 1/16in ball	Shore hardness HS
38	372	353	353	69.4	—	51
37	363	344	344	68.9	—	50
36	354	336	336	68.4	(109.0)	49
35	345	327	327	67.9	(108.5)	48
34	336	319	319	67.4	(108.0)	47
33	327	311	311	66.8	(107.5)	46
32	318	301	301	66.3	(107.0)	44
31	310	294	294	65.8	(106.0)	43
30	302	286	286	65.3	(105.5)	42
29	294	279	279	64.7	(104.5)	41
28	286	271	271	64.3	(104.0)	41
27	279	264	264	63.8	(103.0)	40
26	272	258	258	63.3	(102.5)	38
25	266	253	253	62.8	(101.5)	38
24	260	247	247	62.4	(101.0)	37
23	254	243	243	62.0	100.0	36
22	248	237	237	61.5	99.0	35
21	243	231	231	61.0	98.5	35
20	238	226	226	60.5	97.8	34
(18)	230	219	219	—	96.7	33
(16)	222	212	212	—	95.5	32
(14)	213	203	203	—	93.9	31
(12)	204	194	194	—	92.3	29
(10)	196	187	187	—	90.7	28
(8)	188	179	179	—	89.5	27
(6)	180	171	171	—	87.1	26
(4)	173	165	165	—	85.5	25
(2)	166	158	158	—	83.5	24
(0)	160	152	152	—	81.7	24

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

● Tolerances of Shaft Dimensions

unit: μm

Classification of diameter mm		b12		c12		d6		e6		e12		f5		f6		g5	
Above	Below	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
—	3	−140	− 240	− 60	− 160	− 20	− 26	− 14	− 20	− 14	−114	− 6	−10	− 6	− 12	− 2	− 6
3	6	−140	− 260	− 70	− 190	− 30	− 38	− 20	− 28	− 20	−140	−10	−15	−10	− 18	− 4	− 9
6	10	−150	− 300	− 80	− 230	− 40	− 49	− 25	− 34	− 25	−175	−13	−19	−13	− 22	− 5	−11
10	18	−150	− 330	− 95	− 275	− 50	− 61	− 32	− 43	− 32	−212	−16	−24	−16	− 27	− 6	−14
18	30	−160	− 370	−110	− 320	− 65	− 78	− 40	− 53	− 40	−250	−20	−29	−20	− 33	− 7	−16
30	40	−170	− 420	−120	− 370	− 80	− 96	− 50	− 66	− 50	−300	−25	−36	−25	− 41	− 9	−20
40	50	−180	− 430	−130	− 380												
50	65	−190	− 490	−140	− 440	−100	−119	− 60	− 79	− 60	−360	−30	−43	−30	− 49	−10	−23
65	80	−200	− 500	−150	− 450												
80	100	−220	− 570	−170	− 520	−120	−142	− 72	− 94	− 72	−422	−36	−51	−36	− 58	−12	−27
100	120	−240	− 590	−180	− 530												
120	140	−260	− 660	−200	− 600	−145	−170	− 85	−110	− 85	−485	−43	−61	−43	− 68	−14	−32
140	160	−280	− 680	−210	− 610												
160	180	−310	− 710	−230	− 630												
180	200	−340	− 800	−240	− 700	−170	−199	−100	−129	−100	−560	−50	−70	−50	− 79	−15	−35
200	225	−380	− 840	−260	− 720												
225	250	−420	− 880	−280	− 740												
250	280	−480	−1000	−300	− 820	−190	−222	−110	−142	−110	−630	−56	−79	−56	− 88	−17	−40
280	315	−540	−1060	−330	− 850												
315	355	−600	−1170	−360	− 930	−210	−246	−125	−161	−125	−695	−62	−87	−62	− 98	−18	−43
355	400	−680	−1250	−400	− 970												
400	450	−760	−1390	−440	−1070	−230	−270	−135	−175	−135	−765	−68	−95	−68	−108	−20	−47
450	500	−840	−1470	−480	−1110												

g6		h5		h6		h7		h8		h9		h10		h11		Classification of diameter mm	
H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	Above	Below
− 2	− 8	0	− 4	0	− 6	0	−10	0	−14	0	− 25	0	− 40	0	− 60	—	3
− 4	−12	0	− 5	0	− 8	0	−12	0	−18	0	− 30	0	− 48	0	− 75	3	6
− 5	−14	0	− 6	0	− 9	0	−15	0	−22	0	− 36	0	− 58	0	− 90	6	10
− 6	−17	0	− 8	0	−11	0	−18	0	−27	0	− 43	0	− 70	0	−110	10	18
− 7	−20	0	− 9	0	−13	0	−21	0	−33	0	− 52	0	− 84	0	−130	18	30
− 9	−25	0	−11	0	−16	0	−25	0	−39	0	− 62	0	−100	0	−160	30	40
																40	50
−10	−29	0	−13	0	−19	0	−30	0	−46	0	− 74	0	−120	0	−190	50	65
																65	80
−12	−34	0	−15	0	−22	0	−35	0	−54	0	− 87	0	−140	0	−220	80	100
																100	120
−14	−39	0	−18	0	−25	0	−40	0	−63	0	−100	0	−160	0	−250	120	140
																140	160
																160	180
−15	−44	0	−20	0	−29	0	−46	0	−72	0	−115	0	−185	0	−290	180	200
																200	225
																225	250
−17	−49	0	−23	0	−32	0	−52	0	−81	0	−130	0	−210	0	−320	250	280
																280	315
−18	−54	0	−25	0	−36	0	−57	0	−89	0	−140	0	−230	0	−360	315	355
																355	400
−20	−60	0	−27	0	−40	0	−63	0	−97	0	−155	0	−250	0	−400	400	450
																450	500

unit: μm

Classification of diameter mm		h12		js5		j5		js6		j6		j7		k5		k6	
Above	Below	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
—	3	0	−100	+ 2	− 2	+2	− 2	+ 3	− 3	+ 4	− 2	+ 6	− 4	+ 4	0	+ 6	0
3	6	0	−120	+ 2.5	− 2.5	+3	− 2	+ 4	− 4	+ 6	− 2	+ 8	− 4	+ 6	+1	+ 9	+1
6	10	0	−150	+ 3	− 3	+4	− 2	+ 4.5	− 4.5	+ 7	− 2	+10	− 5	+ 7	+1	+10	+1
10	18	0	−180	+ 4	− 4	+5	− 3	+ 5.5	− 5.5	+ 8	− 3	+12	− 6	+ 9	+1	+12	+1
18	30	0	−210	+ 4.5	− 4.5	+5	− 4	+ 6.5	− 6.5	+ 9	− 4	+13	− 8	+11	+2	+15	+2
30	40	0	−250	+ 5.5	− 5.5	+6	− 5	+ 8	− 8	+11	− 5	+15	−10	+13	+2	+18	+2
40	50																
50	65	0	−300	+ 6.5	− 6.5	+6	− 7	+ 9.5	− 9.5	+12	− 7	+18	−12	+15	+2	+21	+2
65	80																
80	100	0	−350	+ 7.5	− 7.5	+6	− 9	+11	−11	+13	− 9	+20	−15	+18	+3	+25	+3
100	120																
120	140	0	−400	+ 9	− 9	+7	−11	+12.5	−12.5	+14	−11	+22	−18	+21	+3	+28	+3
140	160																
160	180																
180	200	0	−460	+10	−10	+7	−13	+14.5	−14.5	+16	−13	+25	−21	+24	+4	+33	+4
200	225																
225	250																
250	280	0	−520	+11.5	−11.5	+7	−16	+16	−16	+16	−16	+26	−26	+27	+4	+36	+4
280	315																
315	355	0	−570	+12.5	−12.5	+7	−18	+18	−18	+18	−18	+29	−28	+29	+4	+40	+4
355	400																
400	450	0	−630	+13.5	−13.5	+7	−20	+20	−20	+20	−20	+31	−32	+32	+5	+45	+5
450	500																

m5		m6		n5		n6		p6		Classification of diameter mm	
H	L	H	L	H	L	H	L	H	L	Above	Below
+ 6	+ 2	+ 8	+ 2	+ 8	+ 4	+10	+ 4	+ 12	+ 6	—	3
+ 9	+ 4	+12	+ 4	+13	+ 8	+16	+ 8	+ 20	+12	3	6
+12	+ 6	+15	+ 6	+16	+10	+19	+10	+ 24	+15	6	10
+15	+ 7	+18	+ 7	+20	+12	+23	+12	+ 29	+18	10	18
+17	+ 8	+21	+ 8	+24	+15	+28	+15	+ 35	+22	18	30
+20	+ 9	+25	+ 9	+28	+17	+33	+17	+ 42	+26	30	40
										40	50
+24	+11	+30	+11	+33	+20	+39	+20	+ 51	+32	50	65
										65	80
+28	+13	+35	+13	+38	+23	+45	+23	+ 59	+37	80	100
										100	120
+33	+15	+40	+15	+45	+27	+52	+27	+ 68	+43	120	140
										140	160
										160	180
+37	+17	+46	+17	+51	+31	+60	+31	+ 79	+50	180	200
										200	225
										225	250
+43	+20	+52	+20	+57	+34	+66	+34	+ 88	+56	250	280
										280	315
+46	+21	+57	+21	+62	+37	+73	+37	+ 98	+62	315	355
										355	400
+50	+23	+63	+23	+67	+40	+80	+40	+108	+68	400	450
										450	500

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

● Tolerances of Housing Hole Dimensions

unit: μm

Classification of diameter mm		B12		E7		E11		E12		F6		F7		G6		G7	
Above	Below	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
—	3	+ 240	+140	+ 24	+ 14	+ 74	+ 14	+114	+ 14	+ 12	+ 6	+ 16	+ 6	+ 8	+ 2	+12	+ 2
3	6	+ 260	+140	+ 32	+ 20	+ 95	+ 20	+140	+ 20	+ 18	+10	+ 22	+10	+12	+ 4	+16	+ 4
6	10	+ 300	+150	+ 40	+ 25	+115	+ 25	+175	+ 25	+ 22	+13	+ 28	+13	+14	+ 5	+20	+ 5
10	18	+ 330	+150	+ 50	+ 32	+142	+ 32	+212	+ 32	+ 27	+16	+ 34	+16	+17	+ 6	+24	+ 6
18	30	+ 370	+160	+ 61	+ 40	+170	+ 40	+250	+ 40	+ 33	+20	+ 41	+20	+20	+ 7	+28	+ 7
30	40	+ 420	+170	+ 75	+ 50	+210	+ 50	+300	+ 50	+ 41	+25	+ 50	+25	+25	+ 9	+34	+ 9
40	50	+ 430	+180														
50	65	+ 490	+190	+ 90	+ 60	+250	+ 60	+360	+ 60	+ 49	+30	+ 60	+30	+29	+10	+40	+10
65	80	+ 500	+200														
80	100	+ 570	+220	+107	+ 72	+292	+ 72	+422	+ 72	+ 58	+36	+ 71	+36	+34	+12	+47	+12
100	120	+ 590	+240														
120	140	+ 660	+260	+125	+ 85	+335	+ 85	+485	+ 85	+ 68	+43	+ 83	+43	+39	+14	+54	+14
140	160	+ 680	+280														
160	180	+ 710	+310														
180	200	+ 800	+340	+146	+100	+390	+100	+560	+100	+ 79	+50	+ 96	+50	+44	+15	+61	+15
200	225	+ 840	+380														
225	250	+ 880	+420														
250	280	+1000	+480	+162	+110	+430	+110	+630	+110	+ 88	+56	+108	+56	+49	+17	+69	+17
280	315	+1060	+540														
315	355	+1170	+600	+182	+125	+485	+125	+695	+125	+ 98	+62	+119	+62	+54	+18	+75	+18
355	400	+1250	+680														
400	450	+1390	+760	+198	+135	+535	+135	+765	+135	+108	+68	+131	+68	+60	+20	+83	+20
450	500	+1470	+840														

H6		H7		H8		H9		H10		H11		JS6		J6		Classification of diameter mm	
H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	Above	Below
+ 6	0	+10	0	+14	0	+ 25	0	+ 40	0	+ 60	0	+ 3	− 3	+ 2	−4	—	3
+ 8	0	+12	0	+18	0	+ 30	0	+ 48	0	+ 75	0	+ 4	− 4	+ 5	−3	3	6
+ 9	0	+15	0	+22	0	+ 36	0	+ 58	0	+ 90	0	+ 4.5	− 4.5	+ 5	−4	6	10
+11	0	+18	0	+27	0	+ 43	0	+ 70	0	+110	0	+ 5.5	− 5.5	+ 6	−5	10	18
+13	0	+21	0	+33	0	+ 52	0	+ 84	0	+130	0	+ 6.5	− 6.5	+ 8	−5	18	30
+16	0	+25	0	+39	0	+ 62	0	+100	0	+160	0	+ 8	− 8	+10	−6	30	40
																40	50
+19	0	+30	0	+46	0	+ 74	0	+120	0	+190	0	+ 9.5	− 9.5	+13	−6	50	65
																65	80
+22	0	+35	0	+54	0	+ 87	0	+140	0	+220	0	+11	−11	+16	−6	80	100
																100	120
+25	0	+40	0	+63	0	+100	0	+160	0	+250	0	+12.5	−12.5	+18	−7	120	140
																140	160
																160	180
+29	0	+46	0	+72	0	+115	0	+185	0	+290	0	+14.5	−14.5	+22	−7	180	200
																200	225
																225	250
+32	0	+52	0	+81	0	+130	0	+210	0	+320	0	+16	−16	+25	−7	250	280
																280	315
+36	0	+57	0	+89	0	+140	0	+230	0	+360	0	+18	−18	+29	−7	315	355
																355	400
+40	0	+63	0	+97	0	+155	0	+250	0	+400	0	+20	−20	+33	−7	400	450
																450	500

unit: μm

Classification of diameter mm		JS7		J7		K5		K6		K7		M6		M7		N6	
Above	Below	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
—	3	+ 5	− 5	+ 4	− 6	0	− 4	0	− 6	0	−10	− 2	− 8	−2	−12	− 4	−10
3	6	+ 6	− 6	+ 6	− 6	0	− 5	+2	− 6	+ 3	− 9	− 1	− 9	0	−12	− 5	−13
6	10	+ 7	− 7	+ 8	− 7	+1	− 5	+2	− 7	+ 5	−10	− 3	−12	0	−15	− 7	−16
10	18	+ 9	− 9	+10	− 8	+2	− 6	+2	− 9	+ 6	−12	− 4	−15	0	−18	− 9	−20
18	30	+10	−10	+12	− 9	+1	− 8	+2	−11	+ 6	−15	− 4	−17	0	−21	−11	−24
30	40	+12	−12	+14	−11	+2	− 9	+3	−13	+ 7	−18	− 4	−20	0	−25	−12	−28
40	50																
50	65	+15	−15	+18	−12	+3	−10	+4	−15	+ 9	−21	− 5	−24	0	−30	−14	−33
65	80																
80	100	+17	−17	+22	−13	+2	−13	+4	−18	+10	−25	− 6	−28	0	−35	−16	−38
100	120																
120	140	+20	−20	+26	−14	+3	−15	+4	−21	+12	−28	− 8	−33	0	−40	−20	−45
140	160																
160	180																
180	200	+23	−23	+30	−16	+2	−18	+5	−24	+13	−33	− 8	−37	0	−46	−22	−51
200	225																
225	250																
250	280	+26	−26	+36	−16	+3	−20	+5	−27	+16	−36	− 9	−41	0	−52	−25	−57
280	315																
315	355	+28	−28	+39	−18	+3	−22	+7	−29	+17	−40	−10	−46	0	−57	−26	−62
355	400																
400	450	+31	−31	+43	−20	+2	−25	+8	−32	+18	−45	−10	−50	0	−63	−27	−67
450	500																

N7		P6		P7		R7		S7		Classification of diameter mm	
H	L	H	L	H	L	H	L	H	L	Above	Below
− 4	−14	− 6	−12	− 6	− 16	− 10	− 20	− 14	− 24	—	3
− 4	−16	− 9	−17	− 8	− 20	− 11	− 23	− 15	− 27	3	6
− 4	−19	−12	−21	− 9	− 24	− 13	− 28	− 17	− 32	6	10
− 5	−23	−15	−26	−11	− 29	− 16	− 34	− 21	− 39	10	18
− 7	−28	−18	−31	−14	− 35	− 20	− 41	− 27	− 48	18	30
− 8	−33	−21	−37	−17	− 42	− 25	− 50	− 34	− 59	30	40
										40	50
− 9	−39	−26	−45	−21	− 51	− 30	− 60	− 42	− 72	50	65
						− 32	− 62	− 48	− 78	65	80
−10	−45	−30	−52	−24	− 59	− 38	− 73	− 58	− 93	80	100
						− 41	− 76	− 66	− 101	100	120
−12	−52	−36	−61	−28	− 68	− 48	− 88	− 77	−117	120	140
						− 50	− 90	− 85	−125	140	160
						− 53	− 93	− 93	−133	160	180
−14	−60	−41	−70	−33	− 79	− 60	−106	−105	−151	180	200
						− 63	−109	−113	−159	200	225
						− 67	−113	−123	−169	225	250
−14	−66	−47	−79	−36	− 88	− 74	−126	−138	−190	250	280
						− 78	−130	−150	−202	280	315
−16	−73	−51	−87	−41	− 98	− 87	−144	−169	−226	315	355
						− 93	−150	−187	−244	355	400
−17	−80	−55	−95	−45	−108	−103	−166	−209	−272	400	450
						−109	−172	−229	−292	450	500

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Model code	Series name	Catalog name	Page
B			
BG	Stroke Rotary Cage	RED	Ⅱ-192
BK···A	Miniature Stroke Rotary Bushing	RED	Ⅱ-187
BSP···SL	Precision Linear Slide Unit	RED	Ⅱ- 89
BSPG···SL	Precision Linear Slide Unit	RED	Ⅱ- 91
BSR···SL	Precision Linear Slide Unit	RED	Ⅱ- 93
BSU···A	Linear Slide Unit	RED	Ⅱ- 99
BWU	High Rigidity Precision Linear Slide Unit	RED	Ⅱ- 81
C			
CRW	Crossed Roller Way	RED	Ⅱ- 33
CRW···SL	Crossed Roller Way	RED	Ⅱ- 33
CRWG	Anti-Creep Cage Crossed Roller Way	RED	Ⅱ- 27
CRWG···H	Anti-Creep Cage Crossed Roller Way H	RED	Ⅱ- 31
CRWM	Crossed Roller Way	RED	Ⅱ- 49
CRWU	Crossed Roller Way Unit	RED	Ⅱ- 63
CRWU···R	Crossed Roller Way Unit	RED	Ⅱ- 67
CRWU···RS	Crossed Roller Way Unit	RED	Ⅱ- 71
CRWUG	Anti-Creep Cage Crossed Roller Way Unit	RED	Ⅱ- 61
F			
FT	Flat Roller Cage	RED	Ⅱ-211
FT···N	Flat Roller Cage	RED	Ⅱ-211
FT···V	Flat Roller Cage	RED	Ⅱ-211
FTW···A	Flat Roller Cage	RED	Ⅱ-212
FTW···VA	Flat Roller Cage	RED	Ⅱ-212
G			
GSN	Roller Way	RED	Ⅱ-204
L			
LM	Linear Bushing	RED	Ⅱ-147
LM···AJ	Linear Bushing	RED	Ⅱ-147
LM···F	Linear Bushing	RED	Ⅱ-161
LM···F AJ	Linear Bushing	RED	Ⅱ-161
LM···F OP	Linear Bushing	RED	Ⅱ-161
LM···F UU	Linear Bushing	RED	Ⅱ-163
LM···F UU AJ	Linear Bushing	RED	Ⅱ-163
LM···F UU OP	Linear Bushing	RED	Ⅱ-163
LM···N	Linear Bushing	RED	Ⅱ-147
LM···N AJ	Linear Bushing	RED	Ⅱ-147
LM···N F	Linear Bushing	RED	Ⅱ-161
LM···N F AJ	Linear Bushing	RED	Ⅱ-161
LM···N F OP	Linear Bushing	RED	Ⅱ-161
LM···N F UU	Linear Bushing	RED	Ⅱ-163
LM···N F UU AJ	Linear Bushing	RED	Ⅱ-163
LM···N F UU OP	Linear Bushing	RED	Ⅱ-163
LM···N OP	Linear Bushing	RED	Ⅱ-147
LM···N UU	Linear Bushing	RED	Ⅱ-151
LM···N UU AJ	Linear Bushing	RED	Ⅱ-151
LM···N UU OP	Linear Bushing	RED	Ⅱ-151
LM···OP	Linear Bushing	RED	Ⅱ-147
LM···UU	Linear Bushing	RED	Ⅱ-151
LM···UU AJ	Linear Bushing	RED	Ⅱ-151
LM···UU OP	Linear Bushing	RED	Ⅱ-151
LMB	Linear Bushing	RED	Ⅱ-159
LMB···AJ	Linear Bushing	RED	Ⅱ-159
LMB···N	Linear Bushing	RED	Ⅱ-159
LMB···N AJ	Linear Bushing	RED	Ⅱ-159
LMB···N OP	Linear Bushing	RED	Ⅱ-159
LMB···OP	Linear Bushing	RED	Ⅱ-159
LME	Linear Bushing	RED	Ⅱ-155
LME···AJ	Linear Bushing	RED	Ⅱ-155
LME···F	Linear Bushing	RED	Ⅱ-165
LME···F AJ	Linear Bushing	RED	Ⅱ-165
LME···F OP	Linear Bushing	RED	Ⅱ-165
LME···F UU	Linear Bushing	RED	Ⅱ-167
LME···F UU AJ	Linear Bushing	RED	Ⅱ-167
LME···F UU OP	Linear Bushing	RED	Ⅱ-167
LME···N	Linear Bushing	RED	Ⅱ-155
LME···N AJ	Linear Bushing	RED	Ⅱ-155
LME···N F	Linear Bushing	RED	Ⅱ-165
LME···N F AJ	Linear Bushing	RED	Ⅱ-165
LME···N F OP	Linear Bushing	RED	Ⅱ-165
LME···N F UU	Linear Bushing	RED	Ⅱ-167
LME···N F UU OP	Linear Bushing	RED	Ⅱ-167
LME···N OP	Linear Bushing	RED	Ⅱ-155
LME···N UU	Linear Bushing	RED	Ⅱ-157
LME···N UU AJ	Linear Bushing	RED	Ⅱ-157
LME···N UU OP	Linear Bushing	RED	Ⅱ-157
LME···OP	Linear Bushing	RED	Ⅱ-155
LME···UU	Linear Bushing	RED	Ⅱ-157
LME···UU AJ	Linear Bushing	RED	Ⅱ-157
LME···UU OP	Linear Bushing	RED	Ⅱ-157
LMG	Linear Bushing G	RED	Ⅱ-139
LMGT	Linear Bushing G	RED	Ⅱ-139
LMS	Miniature Linear Bushing	RED	Ⅱ-172
LMS···F	Miniature Linear Bushing	RED	Ⅱ-172
LMS···F UU	Miniature Linear Bushing	RED	Ⅱ-172
LMS···UU	Miniature Linear Bushing	RED	Ⅱ-172
LMSL	Miniature Linear Bushing	RED	Ⅱ-172
LMSL···F	Miniature Linear Bushing	RED	Ⅱ-172
LMSL···F UU	Miniature Linear Bushing	RED	Ⅱ-172
LMSL···UU	Miniature Linear Bushing	RED	Ⅱ-172
LRWM	Linear Way Module	BLUE	Ⅱ-243
LRWX···B	Linear Roller Way X	BLUE	Ⅱ-227
LRWXH	Linear Roller Way X	BLUE	Ⅱ-229
LRX	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXC	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXD	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXD···SL	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXDC	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXDC···SL	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXDG	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXDG···SL	Linear Roller Way Super X	BLUE	Ⅱ-199
LRXDL	Linear Roller Way Super X	BLUE	Ⅱ-207
LRXG	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXH	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXHC	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXHG	Linear Roller Way Super X	BLUE	Ⅱ-191
LRXL	Linear Roller Way Super X	BLUE	Ⅱ-197
LRXS	Linear Roller Way Super X	BLUE	Ⅱ-209
LRXSC	Linear Roller Way Super X	BLUE	Ⅱ-209
LRXSG	Linear Roller Way Super X	BLUE	Ⅱ-209
LSAG	Linear Ball Spline G	RED	Ⅱ-123
LSAGF	Linear Ball Spline G	RED	Ⅱ-127
LSAGFL	Linear Ball Spline G	RED	Ⅱ-127
LSAGFLT	Linear Ball Spline G	RED	Ⅱ-127
LSAGFT	Linear Ball Spline G	RED	Ⅱ-127
LSAGL	Linear Ball Spline G	RED	Ⅱ-123
LSAGLT	Linear Ball Spline G	RED	Ⅱ-123
LSAGT	Linear Ball Spline G	RED	Ⅱ-123
LWE	Linear Way E	BLUE	Ⅱ- 75
LWE···Q	Low Decibel Linear Way E	BLUE	Ⅱ- 75
LWE···SL	Linear Way E	BLUE	Ⅱ- 75
LWEC	Linear Way E	BLUE	Ⅱ- 75
LWEC···SL	Linear Way E	BLUE	Ⅱ- 75
LWEG	Linear Way E	BLUE	Ⅱ- 75
LWEG···SL	Linear Way E	BLUE	Ⅱ- 75
LWES	Linear Way E	BLUE	Ⅱ- 83
LWES···Q	Low Decibel Linear Way E	BLUE	Ⅱ- 83
LWES···SL	Linear Way E	BLUE	Ⅱ- 83
LWESC	Linear Way E	BLUE	Ⅱ- 83
LWESC···SL	Linear Way E	BLUE	Ⅱ- 83
LWESG	Linear Way E	BLUE	Ⅱ- 83
LWESG···SL	Linear Way E	BLUE	Ⅱ- 83
LWET	Linear Way E	BLUE	Ⅱ- 79
LWET···Q	Low Decibel Linear Way E	BLUE	Ⅱ- 79
LWET···SL	Linear Way E	BLUE	Ⅱ- 79
LWETC	Linear Way E	BLUE	Ⅱ- 79
LWETC···SL	Linear Way E	BLUE	Ⅱ- 79
LWETG	Linear Way E	BLUE	Ⅱ- 79
LWETG···SL	Linear Way E	BLUE	Ⅱ- 79
LWFF	Linear Way F	BLUE	Ⅱ-151
LWFH	Linear Way F	BLUE	Ⅱ-149
LWFS	Linear Way F	BLUE	Ⅱ-153
LWFS···SL	Linear Way F	BLUE	Ⅱ-153
LWH···B	Linear Way H	BLUE	Ⅱ-107
LWH···M	Linear Way H	BLUE	Ⅱ-107
LWH···MU	Linear Way H	BLUE	Ⅱ-107

Note: BLUE denotes CAT-1604E, while RED denotes CAT-1605E

Model Code Index

Note: BLUE denotes CAT-1604E, while RED denotes CAT-1605E

Model code	Series name	Catalog name	Page
L			
LWH···SL	Linear Way H	BLUE	Ⅱ-107
LWHD	Linear Way H	BLUE	Ⅱ-121
LWHD···B	Linear Way H	BLUE	Ⅱ-123
LWHD···M	Linear Way H	BLUE	Ⅱ-123
LWHD···MU	Linear Way H	BLUE	Ⅱ-123
LWHD···SL	Linear Way H	BLUE	Ⅱ-121
LWHDC···SL	Linear Way H	BLUE	Ⅱ-121
LWHDG	Linear Way H	BLUE	Ⅱ-123
LWHDG···SL	Linear Way H	BLUE	Ⅱ-121
LWHG	Linear Way H	BLUE	Ⅱ-107
LWHS···B	Linear Way H	BLUE	Ⅱ-127
LWHS···M	Linear Way H	BLUE	Ⅱ-127
LWHS···MU	Linear Way H	BLUE	Ⅱ-127
LWHS···SL	Linear Way H	BLUE	Ⅱ-127
LWHSG	Linear Way H	BLUE	Ⅱ-127
LWHT	Linear Way H	BLUE	Ⅱ-113
LWHT···B	Linear Way H	BLUE	Ⅱ-113
LWHT···M	Linear Way H	BLUE	Ⅱ-113
LWHT···MU	Linear Way H	BLUE	Ⅱ-113
LWHT···SL	Linear Way H	BLUE	Ⅱ-113
LWHTG	Linear Way H	BLUE	Ⅱ-115
LWHY	Linear Way H	BLUE	Ⅱ-131
LWL	Linear Way L	BLUE	Ⅱ- 23
LWL···B	Linear Way L	BLUE	Ⅱ- 25
LWL···B CS	Linear Way L	BLUE	Ⅱ- 27
LWL···N	Linear Way L	BLUE	Ⅱ- 25
LWL···Y	Linear Way L	BLUE	Ⅱ- 23
LWLC	Linear Way L	BLUE	Ⅱ- 23
LWLC···B	Linear Way L	BLUE	Ⅱ- 25
LWLC···N	Linear Way L	BLUE	Ⅱ- 25
LWLF	Linear Way L	BLUE	Ⅱ- 31
LWLF···B	Linear Way L	BLUE	Ⅱ- 31
LWLF···BCS	Linear Way L	BLUE	Ⅱ- 35
LWLF···N	Linear Way L	BLUE	Ⅱ- 31
LWLFC	Linear Way L	BLUE	Ⅱ- 31
LWLFC···B	Linear Way L	BLUE	Ⅱ- 31
LWLFC···N	Linear Way L	BLUE	Ⅱ- 31
LWLFG···B	Linear Way L	BLUE	Ⅱ- 33
LWLFG···N	Linear Way L	BLUE	Ⅱ- 33
LWLG···B	Linear Way L	BLUE	Ⅱ- 25
LWLG···N	Linear Way L	BLUE	Ⅱ- 25
LWLM	Linear Way Module	BLUE	Ⅱ-241
LWU···B	Linear Way U	BLUE	Ⅱ-167
M			
MAG	C-Lube Linear Ball Spline MAG	RED	Ⅱ-123
MAGF	C-Lube Linear Ball Spline MAG	RED	Ⅱ-127
MAGFT	C-Lube Linear Ball Spline MAG	RED	Ⅱ-127
MAGL	C-Lube Linear Ball Spline MAG	RED	Ⅱ-123
MAGLT	C-Lube Linear Ball Spline MAG	RED	Ⅱ-123
MAGT	C-Lube Linear Ball Spline MAG	RED	Ⅱ-123
ME	C-Lube Linear Way ME	BLUE	Ⅱ- 75
ME···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 75
MEC	C-Lube Linear Way ME	BLUE	Ⅱ- 75
MEC···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 75
MEG	C-Lube Linear Way ME	BLUE	Ⅱ- 75
MEG···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 75
MES	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MES···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MESC	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MESC···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MESG	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MESG···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 83
MET	C-Lube Linear Way ME	BLUE	Ⅱ- 79
MET···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 79
METC	C-Lube Linear Way ME	BLUE	Ⅱ- 79
METC···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 79
METG	C-Lube Linear Way ME	BLUE	Ⅱ- 79
METG···SL	C-Lube Linear Way ME	BLUE	Ⅱ- 79
MH	C-Lube Linear Way MH	BLUE	Ⅱ-107
MH···M	C-Lube Linear Way MH	BLUE	Ⅱ-107
MH···MU	C-Lube Linear Way MH	BLUE	Ⅱ-107
MHD	C-Lube Linear Way MH	BLUE	Ⅱ-121
MHD···M	C-Lube Linear Way MH	BLUE	Ⅱ-123
MHD···MU	C-Lube Linear Way MH	BLUE	Ⅱ-123
MHD···SL	C-Lube Linear Way MH	BLUE	Ⅱ-121
MHDC···SL	C-Lube Linear Way MH	BLUE	Ⅱ-121
MHDG	C-Lube Linear Way MH	BLUE	Ⅱ-123
MHDG···SL	C-Lube Linear Way MH	BLUE	Ⅱ-121
MHG	C-Lube Linear Way MH	BLUE	Ⅱ-107
MHS	C-Lube Linear Way MH	BLUE	Ⅱ-127
MHS···M	C-Lube Linear Way MH	BLUE	Ⅱ-129
MHS···MU	C-Lube Linear Way MH	BLUE	Ⅱ-129
MHS···SL	C-Lube Linear Way MH	BLUE	Ⅱ-127
MHSG	C-Lube Linear Way MH	BLUE	Ⅱ-127
MHT	C-Lube Linear Way MH	BLUE	Ⅱ-113
MHT···M	C-Lube Linear Way MH	BLUE	Ⅱ-115
MHT···MU	C-Lube Linear Way MH	BLUE	Ⅱ-115
MHT···SL	C-Lube Linear Way MH	BLUE	Ⅱ-113
MHTG	C-Lube Linear Way MH	BLUE	Ⅱ-113
ML	C-Lube Linear Way ML	BLUE	Ⅱ- 23
MLC	C-Lube Linear Way ML	BLUE	Ⅱ- 23
MLF	C-Lube Linear Way ML	BLUE	Ⅱ- 31
MLFC	C-Lube Linear Way ML	BLUE	Ⅱ- 31
MLFG	C-Lube Linear Way ML	BLUE	Ⅱ- 33
MLG	C-Lube Linear Way ML	BLUE	Ⅱ- 25
MLL	C-Lube Linear Way ML	BLUE	Ⅱ- 27
MLV	C-Lube Linear Way MLV	BLUE	Ⅱ- 47
MUL	C-Lube Linear Way MUL	BLUE	Ⅱ-167
MV	C-Lube Linear Way MV	BLUE	Ⅱ- 59
MX	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXC	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXD	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-199
MXD···SL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-199
MXDC	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-199
MXDG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-199
MXDL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-201
MXG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXH	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXHC	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXHG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXHL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-191
MXN	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-213
MXNG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-213
MXNL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-213
MXNS	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-215
MXNSG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-215
MXNSL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-215
MXS	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-209
MXSC	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-209
MXSG	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-209
MXSL	C-Lube Linear Roller Way Super MX	BLUE	Ⅱ-209
O			
OR···A	Miniature Stroke Rotary Bushing	RED	Ⅱ-187
R			
RW	Roller Way	RED	Ⅱ-201
RWB	Roller Way	RED	Ⅱ-202
S			
SF···A	Miniature Stroke Rotary Bushing	RED	Ⅱ-187
SR	Roller Way	RED	Ⅱ-203
ST	Stroke Rotary Bushing	RED	Ⅱ-179
ST···B	Stroke Rotary Bushing	RED	Ⅱ-179
ST···UU	Stroke Rotary Bushing	RED	Ⅱ-181
ST···UU B	Stroke Rotary Bushing	RED	Ⅱ-181
STS	Miniature Stroke Rotary Bushing	RED	Ⅱ-187
STSI	Miniature Stroke Rotary Bushing	RED	Ⅱ-187

Note: BLUE denotes CAT-1604E, while RED denotes CAT-1605E

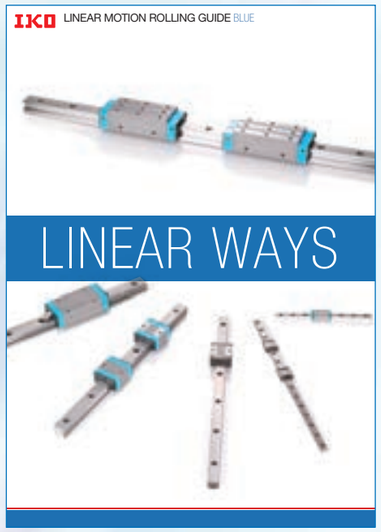
Model Code Index

Note: BLUE denotes CAT-1604E, while RED denotes CAT-1605E

IKO Linear Motion Rolling Guide Series, Configuration of General Catalog

IKO Linear Motion Rolling Guide Series General Catalog Consists of **BLUE** (CAT-1604E) and **RED** (CAT-1605E), the two volumes.

BLUE



CAT-1604E

【Models】

- Rail Guide Type
  - Endless Linear Motion Type

RED



CAT-1605E

【Models】

- Rail Guide Type
  - Limited Linear Motion Type
- Shaft Guide Type
  - Endless Linear Motion Type
  - Limited Linear Motion Type + Rolling Motion Type
- Flat Guide Type
  - Endless Linear Motion Type
  - Limited Linear Motion Type

C-Lube Linear Way ML
Linear Way L
ML・LWL



C-Lube Linear Way MLV
MLV



C-Lube Linear Way MV
MV



C-Lube Linear Way ME
Linear Way E
ME・LWE



C-Lube Linear Way MH
Linear Way H
MH・LWH



Linear Way F
LWF



C-Lube Linear Way MUL
Linear Way U
MUL・LWU



C-Lube
Linear Roller Way Super MX
Linear Roller Way Super X
MX・LRX



Linear Roller Way X
LRWX



Linear Way Module
LWLM・LRWM



Rail Guide Type
Crossed Roller Way
CRW(G)(…H)
CRWU(G)



Rail Guide Type
Linear Slide Unit
BWU・BSP(G)
BSU…A



Shaft Guide Type
Linear Ball Spline
MAG・LSAG



Shaft Guide Type
Linear Bushing
LMG・LM・LMS



Shaft Guide Type
Stroke Rotary Bushing
ST・STSI・BG



Flat Guide Type
Roller Way & Flat Roller Cage
RW・SR・GSN
FT・FTW…A



IKO Introduction of Technical Service Site

"IKO Technical Service Site" can be accessed from our home page. The site provides various tools for selecting Linear Ways and Linear Roller Ways. Please utilize these tools for assistance when selecting products. Additionally the site also provides CAD data and product catalogs for the Needle Series, Linear Motion Rolling Guide Series, and Mechatronics Series for download. Please utilize them to improve your design efficiency.

https://www.ikont.co.jp/eg/



1. Technical calculations

For Linear Way/Linear Roller Way load and life calculation, you can obtain the calculated load and the rating life by entering the operating conditions.
Also you can derive the motor torque required for operation and the effective propulsion force during operation in the sections of motor torque calculation and calculation of effective propulsion force of linear motor tables respectively, and output the calculation results in PDF format, as well as save the histories.



2. Selection of Identification Number

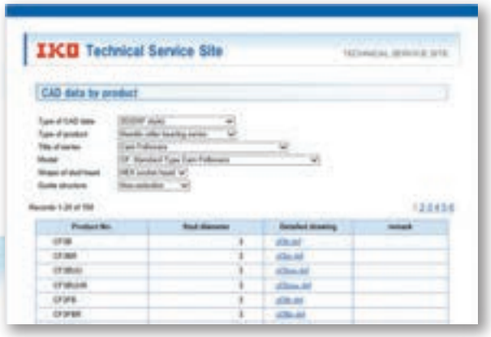
By selecting such specification as model code, dimensions, part code, material code, preload symbol, classification symbol, interchangeable code and supplemental code of Linear ways/Linear roller ways, you can easily specify the identification number used for ordering.
Also you can browse the CAD data of the selected products, calculate the load, and output the selection results in PDF format, as well as save the histories.



3. Downloading CAD data

2-dimensional CAD data (DXF file)

There are two types of figures, brief figure and detailed figure. The brief figure shows only the external view lines, and the detailed figure shows the detailed lines. The drawing consists of three drawings: front view, side view and plain view. The scale shows only the original size (1:1), and it does not show dimension lines.



3-dimensional CAD data

It is linked to the mechanical parts CAD library "PART community". Entering the rail dimension and option contents to the detail, you can view the 2D/3D CAD data suitable for the specification for free of charge.



4. Downloading Catalog and Operation Manual

You can download product catalogs of needle series, linear motion rolling guide series and mechatronics series, operation manuals of precision positioning tables and various electrical components in PDF format, as well as support software for precision positioning tables. If you would like a copy of our catalog, please visit the IKO official website and apply for the catalog, or contact our regional office or sales office nearby.

Oil Minimum

IKO Gentle to The Earth

Nippon Thompson Co., Ltd. is working to develop global environment-friendly products.
It is committed to developing products that make its customers' machinery and equipment more reliable, thereby contributing to preserving the global environment.
This development stance manifests well in the keyword "**Oil Minimum**."
Our pursuit of Oil Minimum has led to the creation of IKO's proprietary family of lubricating parts as "C-Lube."

- IKO Linear Motion Rolling Guides are manufactured through a control system that alleviates their impact on the global environment to meet the quality requirements of ISO 14001 in compliance with the quality requirements level of ISO 9001 for quality improvement.
- The standard products listed in this catalog comply with the specifications of the ten hazardous materials cited in the European RoHS Directive.

NIPPON THOMPSON CO., LTD. (JAPAN)

Head Office : 19-19, Takanawa 2-chome, Minato-ku, Tokyo, 108-8586, Japan
Phone : +81 (0)3-3448-5850
Fax : +81 (0)3-3447-7637
E-mail : ntt@ikonet.co.jp
URL : https://www.ikont.co.jp/eg/
Plant : Gifu, Kamakura

IKO INTERNATIONAL, INC. (U.S.A.)

East Coast Operation (Sales Head Office)
91 Walsh Drive,
Parsippany, NJ, 07054,
U.S.A.
Phone : +1-973-402-0254
Toll Free : +1-800-922-0337
Fax : +1-973-402-0441
E-mail : eco@ikonet.co.jp

Midwest Operation
101 Mark Street, Unit-G,
Wood Dale, IL, 60191,
U.S.A.
Phone : +1-630-766-6464
Toll Free : +1-800-323-6694
Fax : +1-630-766-6869
E-mail : mwo@ikonet.co.jp

West Coast Operation
9830 Norwalk Boulevard, Suite 198,
Santa Fe Springs, CA, 90670,
U.S.A.
Phone : +1-562-941-1019
Toll Free : +1-800-252-3665
Fax : +1-562-941-4027
E-mail : wco@ikonet.co.jp

Silicon Valley Sales Office
1500 Wyatt Drive, Suite 10,
Santa Clara, CA, 95054,
U.S.A.
Phone : +1-408-492-0240
Toll Free : +1-800-252-3665
Fax : +1-408-492-0245
E-mail : wco@ikonet.co.jp

Southeast Operation
3235 Satellite Boulevard Building 400, Suite 230,
Duluth, GA, 30096,
U.S.A.
Phone : +1-770-418-1904
Toll Free : +1-800-874-6445
Fax : +1-770-418-9403
E-mail : seo@ikonet.co.jp

Southwest Operation
6191 N STATE HIGHWAY 161, STE 440,
IRVING, TX 75038-2264,
U.S.A.
Phone : +1-972-925-0444
Toll Free : +1-800-295-7886
Fax : +1-972-707-0385
E-mail : swo@ikonet.co.jp

IKO THOMPSON BEARINGS CANADA, INC.(CANADA)

Suite 700 - 6733 Mississauga Road, Mississauga,
Ontario, L5N 6J5, Canada
Phone : +1-647-931-3933
E-mail : itc@ikonet.co.jp

IKO BRASIL SERVIÇOS EMPRESARIAIS LTDA. (BRAZIL)

Rua Frei Caneca 1407,
Condominio Edificio Barão de Monte Cedro,
Cjs. 801/802, Consolação, São Paulo- SP
Cep: 01307-909
Phone : +55 (0)11-2366-3033
E-mail : itb@ikonet.co.jp

NIPPON THOMPSON EUROPE B.V. (EUROPE)

The Netherlands (Sales Head Office)
Keersopstraat 35,
3044 EX, Rotterdam,
The Netherlands
Phone : +31 (0)10-462 68 68
E-mail : nte@ikonet.co.jp

Germany Branch
Mündelheimer Weg 54,
40472 Düsseldorf,
Germany
Phone : +49 (0)211-41 40 61
Fax : +49 (0)211-42 76 93
E-mail : ntd@ikonet.co.jp

Regensburg Sales Office
Im Gewerbepark D 04,
93059 Regensburg,
Germany
Phone : +49 (0)941-20 60 70
Fax : +49 (0)941-20 60 719
E-mail : ntdr@iko-nt.de

U.K. Branch
2 Vincent Avenue, Crownhill,
Milton Keynes, Bucks, MK8 0AB,
United Kingdom
Phone : +44 (0)1908-566144
E-mail : sales@iko.co.uk

Spain Branch
Autovia Madrid-Barcelona, Km. 43,700
Polig. Ind. AIDA - Nove A-8, Ofic. 2-1ª
19200-Azuqueca de Henares,
(Guadalajara) Spain
Phone : +34 949-26 33 90
Fax : +34 949-26 31 13
E-mail : nts@ikonet.co.jp

France Branch
Bâtiment le Raphaël-Paris, Nord 2,
22 avenue des Nations
BP54394 Villepinte
95943 ROISSY C.D.G Cedex
France
Phone : +33 (0)1-48 16 57 39
Fax : +33 (0)1-48 16 57 46
E-mail : ntf@ikont.eu

IKO THOMPSON ASIA CO., LTD. (THAILAND)

Unit 305,3rd Fl., Zuellig house, 1-7 Silom Rd.,
Silom Bangrak, Bangkok 10500, Thailand
Phone : +66 (0)2637-5115
Fax : +66 (0)2637-5116
E-mail : ita@ikonet.co.jp

See you again at
IKO Website
https://www.ikont.co.jp/eg/

IKO THOMPSON KOREA CO.,LTD. (KOREA)

201, Worldvision Bldg., 77-1, Yeouinaru-ro,
Yeongdeungpo-gu, Seoul, Korea
Phone : +82 (0)2-6337-5851
Fax : +82 (0)2-6337-5852
E-mail : itk@ikonet.co.jp

IKO-THOMPSON (SHANGHAI) LTD. (CHINA)

Shanghai (Sales Head Office)
2301-02, 2310, MetroPlaza No.555,
LouShanGuan Road, ChangNing District,
Shanghai, People's Republic of China, 200051
Phone : +86 (0)21-3250-5525
Fax : +86 (0)21-3250-5526
E-mail : ntc@ikonet.co.jp

Beijing Branch
Room 1909, Tower C Oriental Media Center,
Guanghua Road No. 4 Chaoyang District, Beijing,
People's Republic of China, 100026
Phone : +86 (0)10-6515-7681
Fax : +86 (0)10-6515-7689
E-mail : ntc@ikonet.co.jp

Guangzhou Branch
Room 834, Garden Tower, Garden Hotel
368 Huanshi East Road, Yuexiu District, Guangzhou,
Guangdong
People's Republic of China, 510064
Phone : +86 (0)20-8384-0797
Fax : +86 (0)20-8381-2863
E-mail : ntc@ikonet.co.jp

Wuhan Branch
Room 2300, Truroll Plaza No.72, Wusheng Road,
Qiao kou District, Wuhan, Hubei,
People's Republic of China, 430033
Phone : +86 (0)27-8556-1610
Fax : +86 (0)27-8556-1630
E-mail : ntc@ikonet.co.jp

Shenzhen Branch
Room1808, KEENSTAR Building 18,
Chuangye 2nd Rd 248, Bao'an, Shenzhen, Guangdong,
People's Republic of China, 518081
Phone : +86 (0)755-2265-0553
Fax : +86 (0)755-2298-0665
E-mail : ntc@ikonet.co.jp

Xian Branch
Room 2010, Block B, Chaoyang International Plaza,
No. 166,
Changle West Road, Xincheng District Xi'an, Shanxi,
People's Republic of China, 710032
Phone : +86 (0)29-8323-5915
E-mail : ntc@ikonet.co.jp

Qingdao Branch
Room 608, Building 47, Huarun City,
No. 101 Shenzhen Road, Laoshan District,
Qingdao City, Shandong
People's Republic of China, 266100
Phone : +86 (0)532-8670-2246
Fax : +86 (0)532-8670-2242
E-mail : ntc@ikonet.co.jp

Shenyang Branch
2-1203 Tower I. City Plaza Shenyang NO.206,
Nanjing North Street, Heping District,
Shenyang, Liaoning
People's Republic of China, 110001
Phone : +86 (0)24-2334-2662
Fax : +86 (0)24-2334-2442
E-mail : ntc@ikonet.co.jp

Ningbo Office
Room 3406, Zhongnongxin Building, No.181,
Zhongshan East Road, Haishu District,
Ningbo, Zhejiang
People's Republic of China, 315000
Phone : +86 (0)574-8718-9535
Fax : +86 (0)574-8718-9533
E-mail : ntc@ikonet.co.jp