C-Lube Linear Way MUL
Linear Way U

C-Lube Linear Way MUL

MUL

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-39

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		T_1	H	/U

1 **Model** — Model code Page Ⅱ－159

2 **Size** — Dimensions Page Ⅱ－159

3 **Number of slide units**

4 **Length of track rail**

Part code Page Ⅱ－159

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.

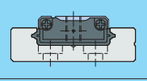
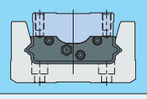
3 Number of slide units

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

4 Length of track rail

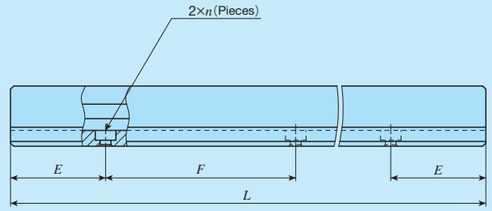
: R○ — Indicate the length of track rail in mm. For standard and maximum lengths, see Table 2.

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.

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

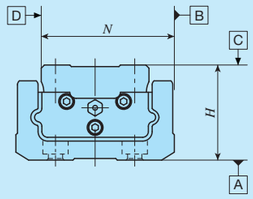
Note (1) Indicates zero or minimal amount of preload.
Remark: C_0 indicates the basic static load rating.

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.

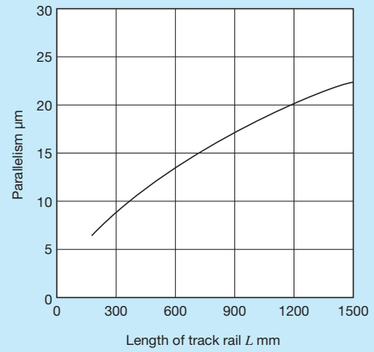


Fig. 1 Parallelism in operation

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".

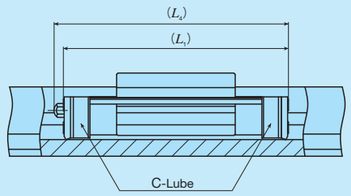
Table 6 Combination of supplemental codes

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)

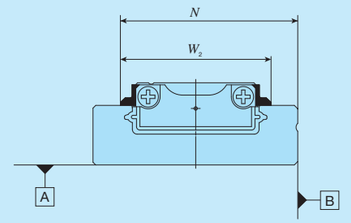


unit: mm

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)



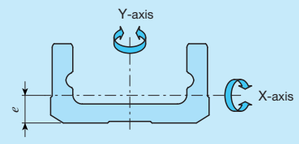
unit: mm

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

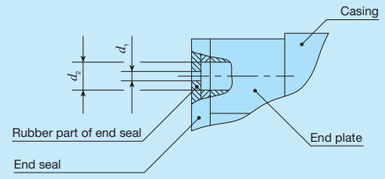


Identification number		Moment of inertia of sectional area mm⁴		Center of gravity e mm
		I_X	I_Y	
MUL	25	3.7×10^2	7.5×10^3	2.6
MUL	30	9.3×10^2	1.7×10^4	3.3
LWU	40···B	1.0×10^4	6.8×10^4	6.6
			6.9×10^4	
LWU	50···B	2.8×10^4	1.7×10^5	8.7
LWU	60···B	6.3×10^4	3.9×10^5	10.7
				10.8
LWU	86···B	2.4×10^5	1.6×10^6	14.6

Lubrication

In the series of size 25 and 30 of MUL series, lithium-soap base grease (MULTEMP PS No.2, KYODO YUSHI) is pre-packed, and in the LWU series of size 40 to 86, lithium-soap base grease with extreme-pressure additive (Alvania EP grease 2 [SHOWA SHELL SEKIYU K. K.]) is pre-packed. 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.

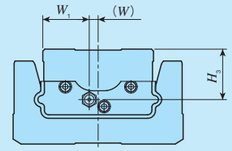
Table 10 Oil hole specifications



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	–	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)

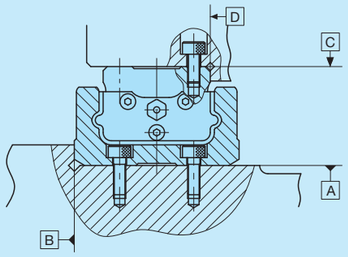


Fig. 2 Reference mounting surface and typical mounting structure

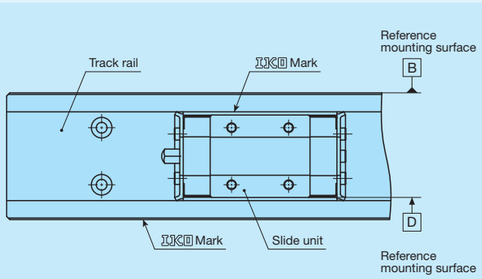


Fig. 3 Reference mounting surface

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.

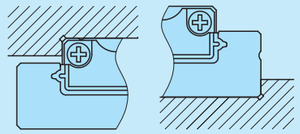


Fig. 4 Corner of the mating reference mounting

❸ Tightening torque for fixing screw

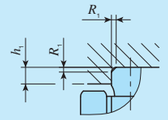
Typical tightening torque for mounting of the MUL series and LWU series to the steel mating member material is indicated in Table 12. When vibration and shock of the machine or device are large, fluctuating load is large, or moment load is applied, fix it by using the torque 1.2 to 1.5 times larger than 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

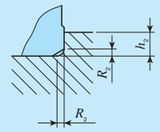
Bolt size	Tightening torque N・m	
	Stainless steel-made screw	High carbon steel-made screw
M 2.5×0.45	0.62	–
M 3 ×0.5	–	1.8
M 4 ×0.7	–	4.1
M 5 ×0.8	–	8.0
M 6 ×1	–	13.6

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

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



Mounting part of slide unit



Mounting part of track rail

unit: mm

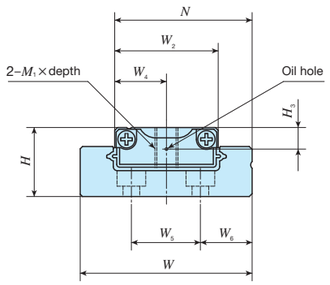
Size	Mounting part of slide unit		Mounting part of track rail	
	Shoulder height h_1	Corner radius R_1 (Maximum)	Shoulder height h_2	Corner radius R_2 (Maximum) (1)
25	1.5	0.2	2.5	–
30	2.5	0.2	3	–
40	3	0.5	5	1
50	3	0.5	7	2
60	3	0.5	9	2
86	4	0.5	11	2

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

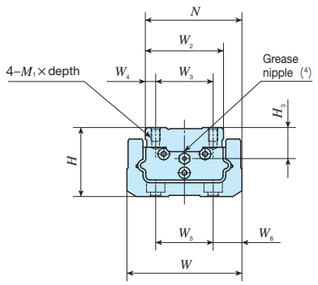
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Small type		
Shape	MUL	
Size	25	30

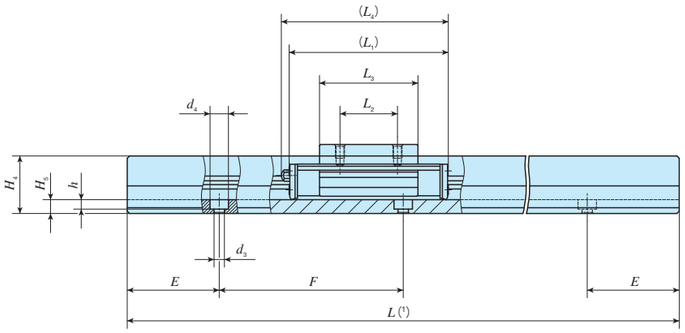
Standard type				
Shape	LWU...B			
Size	40	50	60	86



MUL

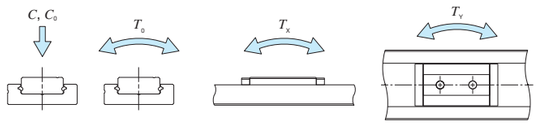


LWU…B



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 M 2.5 × 6	1 770	2 840	20.3	10.1 53.7	8.4 45.0
MUL 30	–	– –	0.028 0.029	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 2.66	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 4.08	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 6.69	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 JCIS10-70 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	/Q
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