

## C-Lube Linear Way MUL Linear Way U



# C-Lube Linear Way MUL

# MUL



long term maintenance free supported!

The aquamarine end plate is the symbol of maintenance free.

Track rail

Slide unit

Casing

C-Lube

Ball

End plate

Ball retaining band

End seal

Oil hole

Linear Way U  
**LWU**

## Points

### 1 Original U-shaped track rail

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.

### 2 Expanded freedom of design for use as a structure beam

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.

### 3 Additional machining available for corresponding to needs

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.

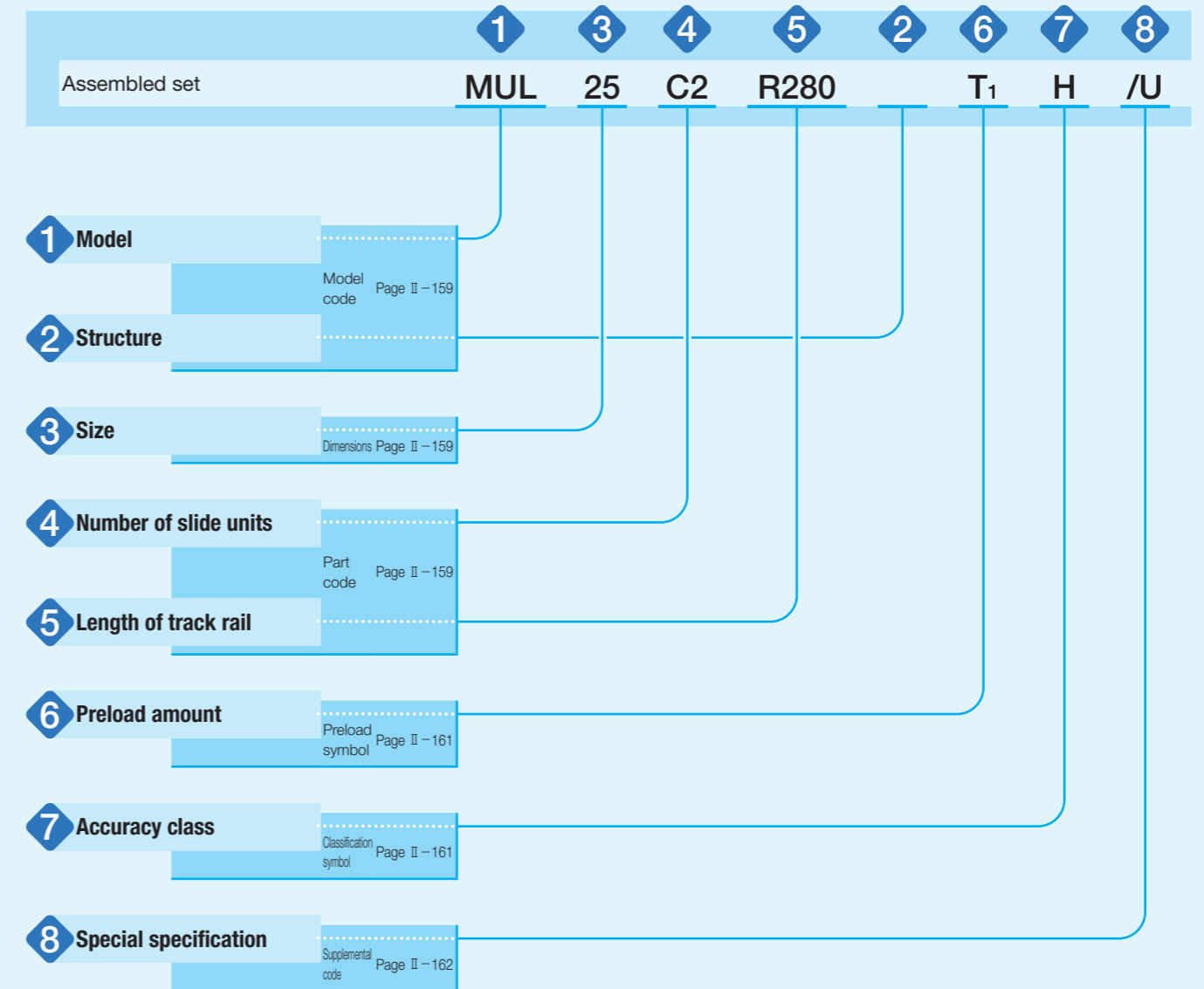
### 4 Stainless steel selections superior in corrosion resistance are listed on lineup. For details P.I-41

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.

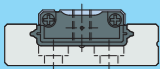



MUL · LWU

# Identification Number and Specification — Model · Structure · Size · Number of Slide unit ·

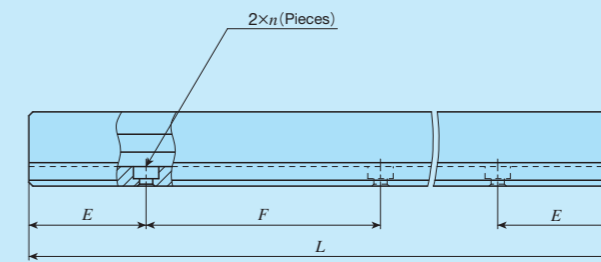
<b>1 Model</b>	C-Lube Linear Way MUL (MUL series)	Small type	: MUL
	Linear Way U <sup>(1)</sup> (LWU series)	Small type Standard type	: LWUL : LWU
For applicable models and sizes, see Table 1.			
Note <sup>(1)</sup> This model has no built-in C-Lube.			
<b>2 Structure</b>	Ball retained type	: B	For applicable models and sizes, see Table 1.
	Ball non-retained type	: No symbol	
<b>3 Size</b>	25,30,40,50,60,86,100,130	For applicable models and sizes, see Table 1.	
<b>4 Number of slide units</b>	: C○	Indicates the number of slide units assembled on a track rail.	
<b>5 Length of track rail</b>	: 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	100	130
Small type 	Stainless steel made	MUL	○	○	—	—	—	—	—	—
		LWUL...B	○	○	—	—	—	—	—	—
Standard type 	High carbon steel made	LWU...B	—	—	○	○	○	○	—	—
		LWU	—	—	○	○	○	○	○	○

# Length of Track Rail —

Table 2 Standard and maximum lengths of track rail



unit: mm

Item	MUL25 LWUL25...B	MUL30 LWUL30...B	LWU40...B LWU40	LWU50...B LWU50
	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)
Pitch of mounting holes $F$	35	40	60	80
$E$	17.5	20	30	40
Standard $E$ dimensions or higher below	4.5 22	4.5 24.5	— —	— —
Maximum length <sup>(1)</sup>	420 (840)	480 (960)	720	800
Item	LWU60...B LWU60	LWU86...B LWU86	LWU100	LWU130
	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)	450 (3) 600 (4) 750 (5) 900 (6) 1 050 (7) 1 200 (8)
Pitch of mounting holes $F$	100	100	150	150
$E$	50	50	75	75
Maximum length <sup>(1)</sup>	1 000	1 200	1 500	1 500

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

Remarks 1. M8 female threads for hanging bolt are provided on the track rail of size 100 model. And M10 female threads for hanging bolt are provided on the track rail of size 130 model.

2. 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 —

<b>6</b> Preload amount	Standard	: No symbol	For details of the preload amount, see Table 3.
	Light preload	: T <sub>1</sub>	

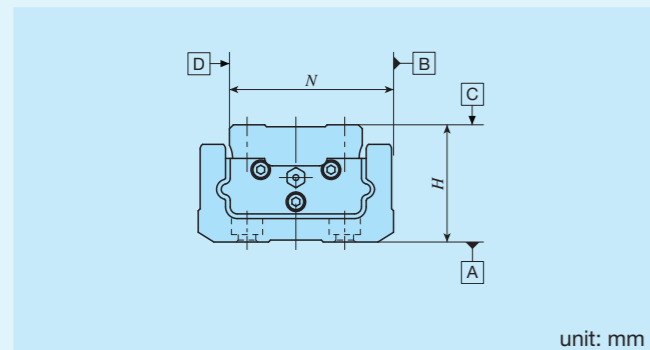
Table 3 Preload amount

Preload type	Item	Preload symbol	Preload amount N	Operational conditions
Standard	(No symbol)	0 <sup>(1)</sup>	· Light and precise motion	
Light preload	T <sub>1</sub>	0.02C <sub>0</sub>	· Almost no vibrations · Load is evenly balanced · Light and precise motion	

Note <sup>(1)</sup> Indicates zero or minimal amount of preload.  
Remark: C<sub>0</sub> indicates the basic static load rating.

<b>7</b> Accuracy class	Ordinary	: No symbol	For details of accuracy class, see Table 4.
	High	: H	

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 <sup>(1)</sup>	0.050	0.040
Dim. variation of N <sup>(1)</sup>	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 <sup>(1)</sup> It means the size variation between slide units mounted on the same track rail.

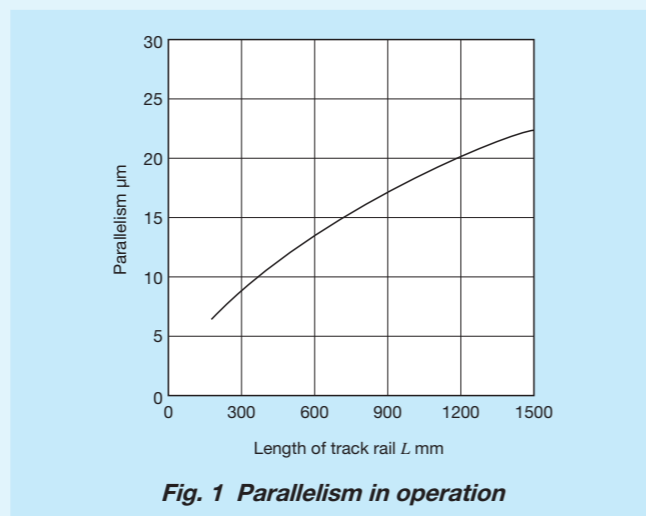


Fig. 1 Parallelism in operation

— Special Specification —

<b>8</b> Special specification	/E, /LO, /MA, /MN, /Q, /UO, /WO	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.
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Table 5 Application of special specifications

Special specification	Supplemental code	Size							
		25	30	40	50	60	86	100	130
Specified rail mounting hole positions	/E	○	○	×	×	×	×	×	×
Black chrome surface treatment	/LO	○ <sup>(1)</sup>	○ <sup>(1)</sup>	○	○	○	○	○	○
With track rail mounting bolt	/MA	○ <sup>(2)</sup>	○ <sup>(2)</sup>	○	○	○	○	○	○
Without track rail mounting bolt <sup>(3)</sup>	/MN	○	○	×	×	×	×	×	×
With C-Lube plate <sup>(3)</sup>	/Q	×	×	○	○	○	○	○	○
Upper seal	/U	○	○	×	×	×	×	×	×
A group of multiple assembled sets	/WO	○	○	○	○	○	○	○	○

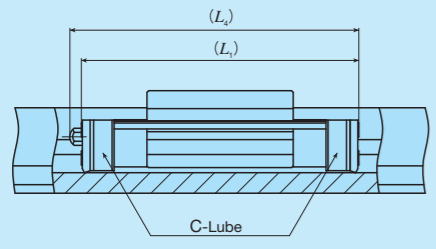
Notes <sup>(1)</sup> Applicable only to "/LR".  
<sup>(2)</sup> Applicable to MUL series.  
<sup>(3)</sup> Applicable to LWU series.

Table 6 Combination of supplemental codes

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

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

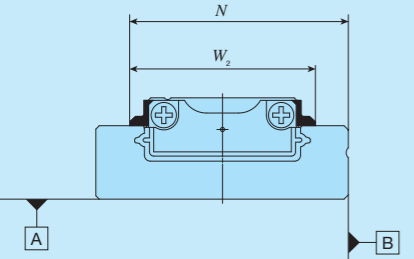


unit: mm

Size	$L_1$	$L_4$
40	67	68
50	82	83
60	95	100
86	142	146
100	166	170
130	190	194

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)**



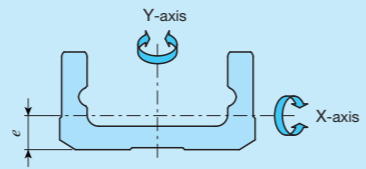
unit: mm

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**



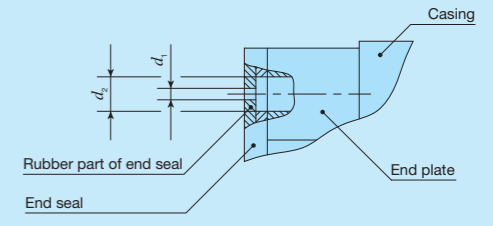
Identification number	Moment of inertia of sectional area $\text{mm}^4$		Center of gravity $e$ mm
	$I_x$	$I_y$	
MUL 25 LWUL 25...B	$3.7 \times 10^2$	$7.5 \times 10^3$	2.6
MUL 30 LWUL 30...B	$9.3 \times 10^2$	$1.7 \times 10^4$	3.3
— LWU 40...B	$1.0 \times 10^4$	$6.8 \times 10^4$	6.6
— LWU 40		$6.9 \times 10^4$	
— LWU 50...B	$2.8 \times 10^4$	$1.7 \times 10^5$	8.7
— LWU 50			10.7
— LWU 60...B	$6.3 \times 10^4$	$3.9 \times 10^5$	10.8
— LWU 60			14.6
— LWU 86...B	$2.4 \times 10^5$	$1.6 \times 10^6$	18.8
— LWU 86			23.0
— LWU 100	$5.9 \times 10^5$	$3.3 \times 10^6$	
— LWU 130	$1.4 \times 10^6$	$8.8 \times 10^6$	

## Lubrication

In the series of size 25 and 30 of MUL series and LWU series, lithium-soap base grease (MULTEMP PS No.2, KYODO YUSHI) is pre-packed, and in the series of size 40 to 130, 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 reapplying 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.

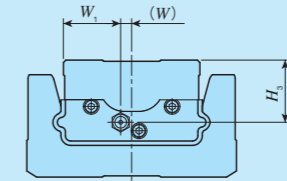
**Table 10 Oil hole specifications**



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 <sup>(1)</sup>	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	M4	13	0	10.5
50		B-5120V		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
100				28.5	4	29
130				44	0	35.5

Note <sup>(1)</sup> 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**.

# Dust Protection


The slide units of MUL series and LWU series are equipped 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

## ① 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  mark. (See Fig. 3)

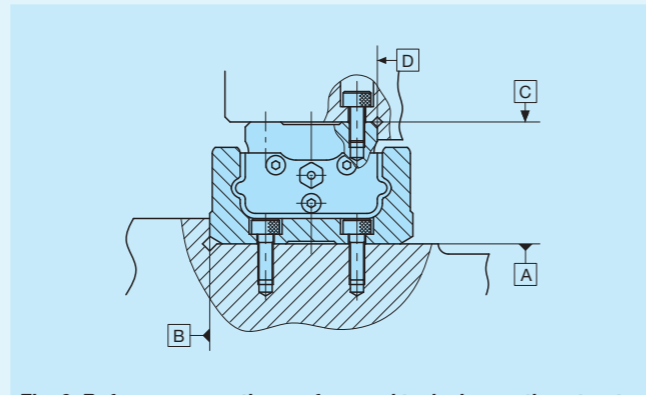


Fig. 2 Reference mounting surface and typical mounting structure

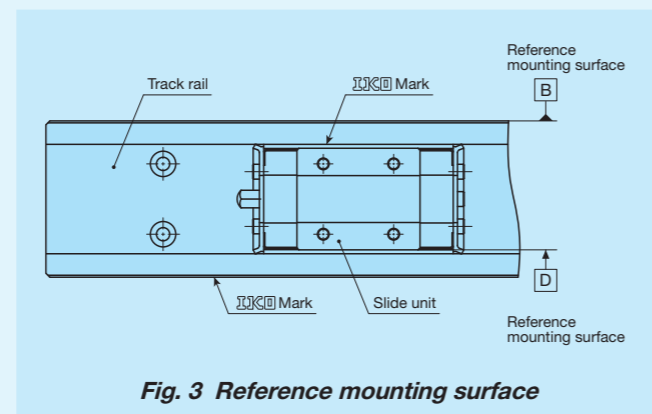


Fig. 3 Reference mounting surface

## ② 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.

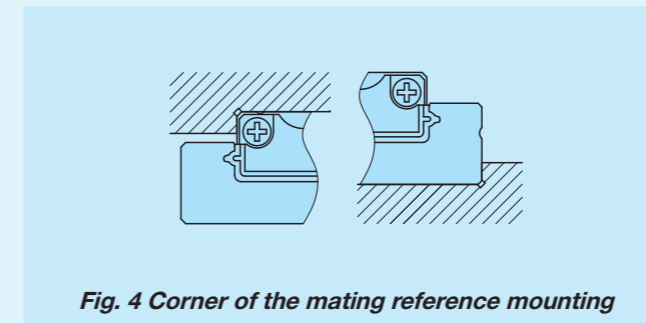


Fig. 4 Corner of the mating reference mounting

## ③ 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
M 8 ×1.25	—	32.7
M10 ×1.5	—	63.9

Note (1) 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

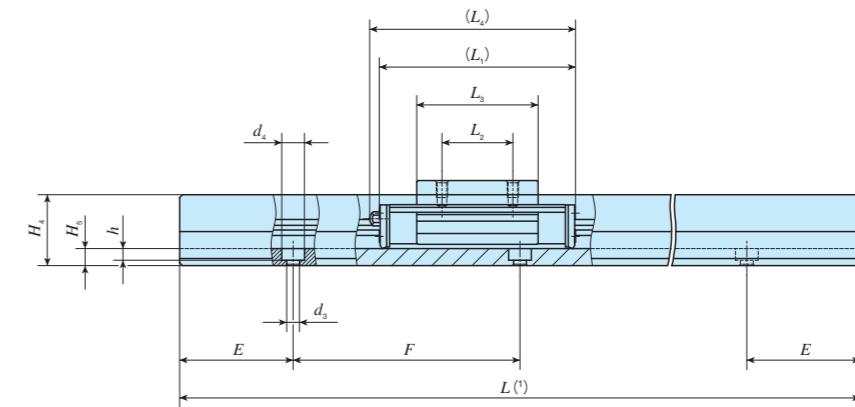
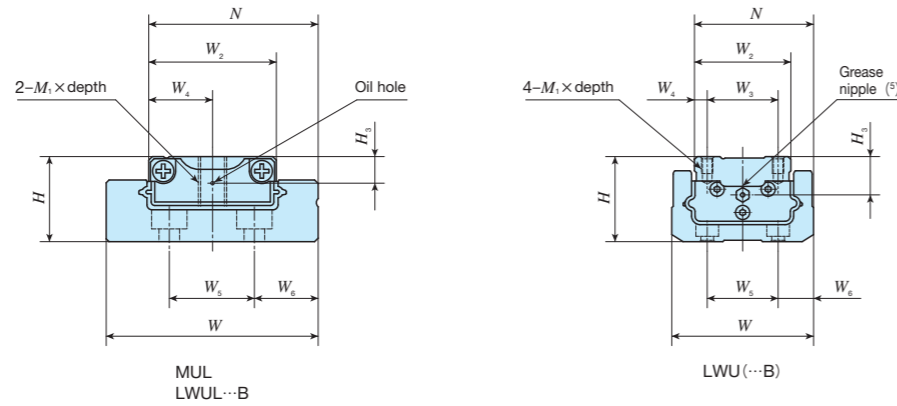
Size	Mounting part of slide unit		Mounting part of track rail	
	Shoulder height $h_1$	Corner radius $R_1$ (Maximum)	Shoulder height $h_2$	Corner radius $R_2$ (Maximum) (1)
25	1.5	0.2	2.5	—
30	2.5	0.2	3	—
40	3	0.5	5	1
50	3	0.5	7	2
60	3	0.5	9	2
86	4	0.5	11	2
100	4	0.5	13	1
130	5	1	14	2

unit: mm

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

# IKO C-Lube Linear Way MUL

Small type	
Shape	MUL · LWUL
Size	25 30
Standard type	
Shape	LWU (...B)
Size	40 50 60 86 100 130



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) mm Bolt size × ℓ	Basic dynamic load rating (4) C N	Basic static load rating (4) C <sub>0</sub> N	Static moment rating (4)				
MUL series	LWU series (No C-Lube)		Slide unit kg	Track rail kg/m	H	N	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	M <sub>1</sub> × depth	H <sub>3</sub>	W	H <sub>4</sub>	H <sub>5</sub>	W <sub>5</sub>	W <sub>6</sub>	d <sub>3</sub>	d <sub>4</sub>	h				E	F	T <sub>0</sub> N · m	T <sub>x</sub> N · m	T <sub>y</sub> N · m
MUL 25	LWUL 25...B	-	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	LWUL 30...B	-	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 40(2)	-	0.12	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	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 50(2)	-	0.27	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	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 1150	181 1150
-	LWU 60(2)	-	0.40	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 1150	181 1150
-	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 4120	764 4120
-	LWU 86(2)	-	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 4120	764 4120
-	LWU 100(2)	-	2.20	21.5	58	82	65	50	7.5	154	50	111	158	M 8 × 15	29	99.5	52	17	50	24.5	9	14	9	75	150	M 8 × 20 (Not appended)	54 600	68 500	2 230	1 210 6 460	1 210 6 460
-	LWU 130(2)	-	4.49	33.0	72	109	88	70	9	178	70	132	182	M10 × 20	35.5	130	65	20	70	30	11	17.5	10.6	75	150	M10 × 25 (Not appended)	70 300	88 800	3 920	1 830 9 630	1 830 9 630

Notes (1) Track rail lengths L are shown in Table 2 on page II - 160.

(2) The balls are not retained.

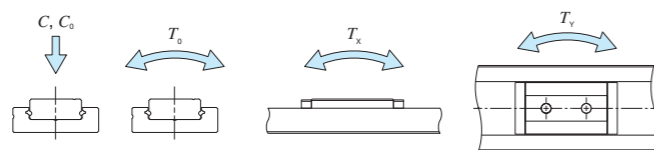
(3) The appended track rail mounting bolts are hexagon socket head bolts equivalent to JIS B 1176 or JCS10-70 cross-recessed pan head screw for precision equipment. For the size 25 and 30 series, stainless steel bolts are appended.

Track rail mounting bolts are not appended for MUL series.

(4) The direction of basic dynamic load rating (C), basic static load rating (C<sub>0</sub>), and static moment rating (T<sub>0</sub>, T<sub>x</sub>, T<sub>y</sub>) are shown in the sketches below. The upper values of T<sub>x</sub> and T<sub>y</sub> 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 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 ⑤ ⑥ ⑦ ⑧

① Model  
MUL  
LWUL...B  
LWU...B

② Size  
25, 30, 40, 50, 60, 86, 100, 130

③ Number of slide unit (2)  
④ Length of track rail (280 mm)

⑤ Structure  
B Ball retained type  
No symbol Ball non-retained type

⑥ Preload amount  
No symbol Standard  
T1 Light preload

⑦ Accuracy class  
No symbol Ordinary  
H High

⑧ Special specification  
E, LR, MA, MN, Q, U, W