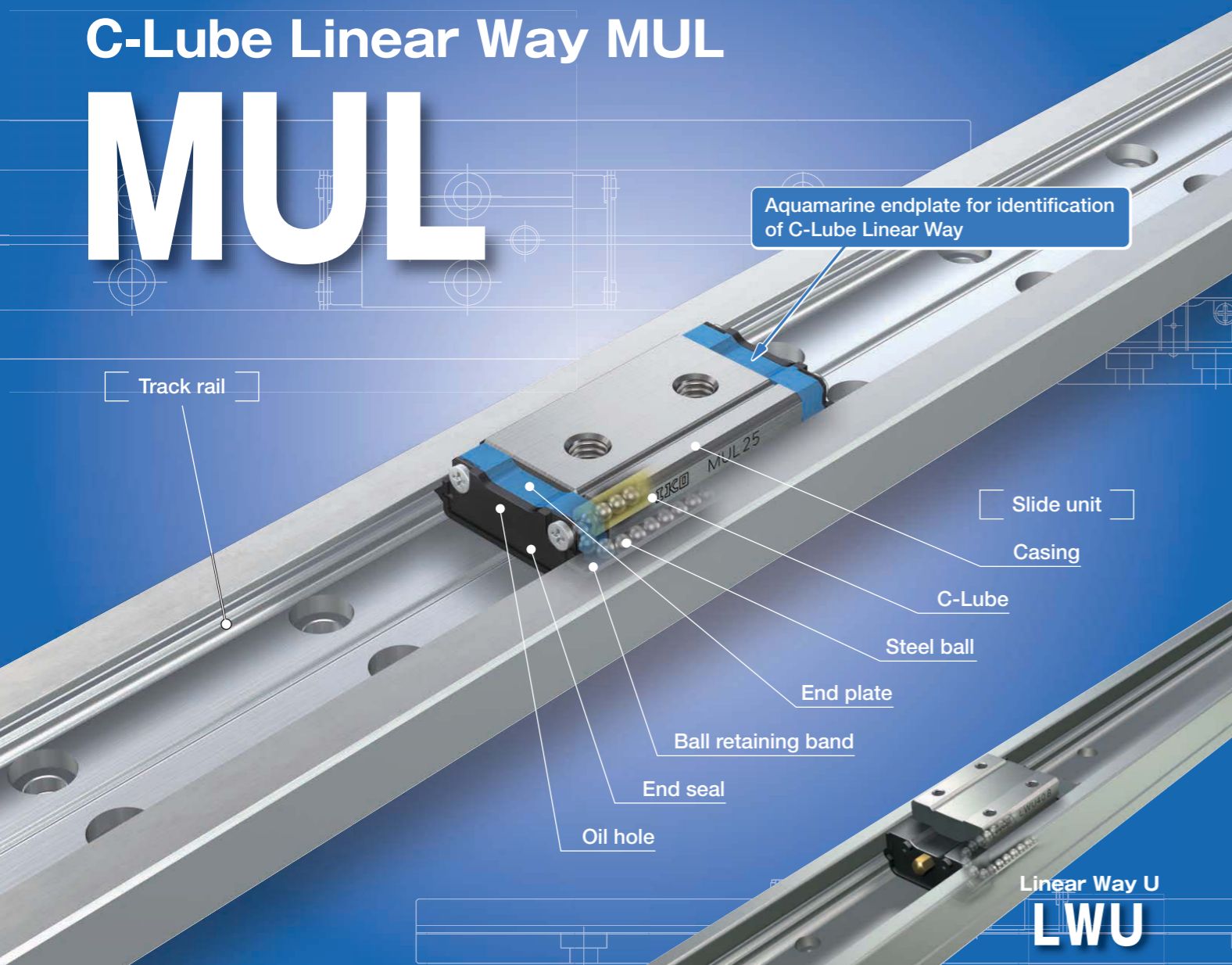


# **C-Lube Linear Way MUL Linear Way U**

# C-Lube Linear Way MUL

# MUL



## Features

### Long-term maintenance free

The lubricant in the C-Lube keeps the lubrication performance for a long period of time and achieves long-term maintenance free operations. (5 years and 20,000km)  
So man-hours for troublesome lubrication control can be reduced.

### Lightweight and compact

The C-Lube is incorporated in the lightweight and compact slide unit of miniature type Linear Way LWLU series without changing the external dimensions of the slide unit.

### Smooth and light motion

As the C-Lube is not in contact with the track rail, frictional resistance does not increase. A smooth and light motion is ensured.

### Stainless Steel

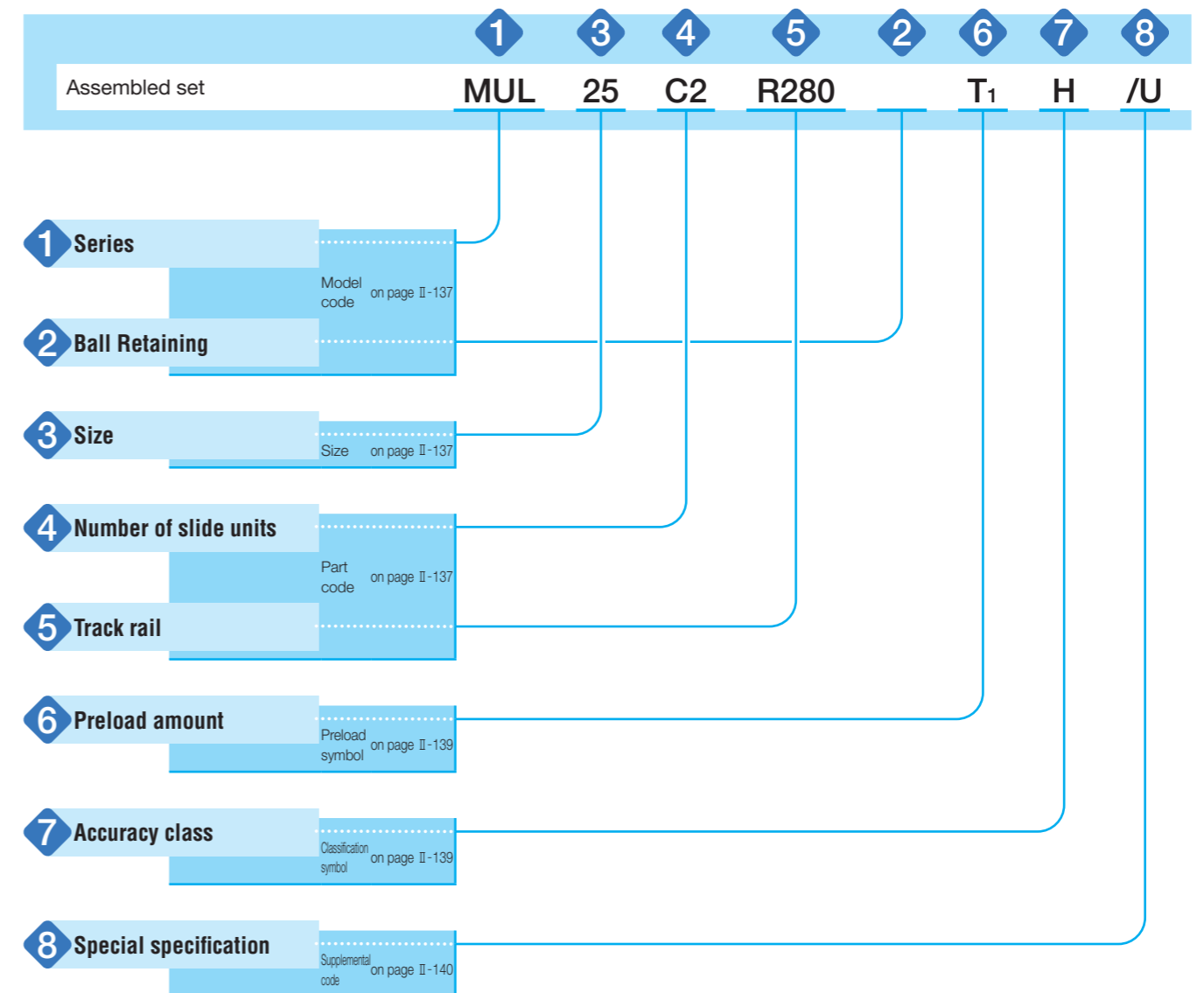
The metal components are manufactured from corrosion resistant stainless steel. So this series is most suitable for use in clean rooms and also for applications where the use of lubricants and rust preventive oil should be avoided or kept to a minimum.

### U-shaped track rail

Rigidity of track rail under moment and torsion is very much increased by adopting the U-shaped design. The track rail can, therefore, be mounted on machines and equipment as structural members, either in a cantilever position or supported at both ends, so they can be combined an assembled freely.

## Identification number and specification


The specification of C-Lube Linear Way MUL is indicated by the identification number, consisting of a model code, a size, a part code, a preload symbol, a classification symbol and any supplemental codes.



# Identification number and specification —Series · Ball Retaining · Size · Number of slide unit—

<b>1 Series</b>	C-Lube Linear Way UL (MUL Series)	Miniature type	: MUL
	Linear Way U <sup>(1)</sup> (LWU Series)	Miniature type Standard type	: LWUL : LWU
Applicable size and shape of slide unit are shown in Table 1.			
Note <sup>(1)</sup> : Linear Way without C-Lube.			
<b>2 Ball Retaining</b>	Ball retained type	: B	For available models and size, see Table 1.
	Ball non-retained type	: No symbol	
<b>3 Size</b>	25, 30, 40, 50, 60, 86, 100, 130	For available models and size, see Table 1.	
<b>4 Number of slide units</b>		: ○	For an assembled set, indicate the number of slide units assembled on one 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.

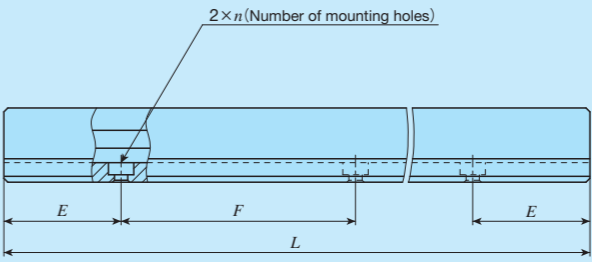
Table 1 Type and Size

Shape	Material	Model code	Size							
			25	30	40	50	60	86	100	130
Miniature 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 rails

unit : mm



Model number	MUL25 LWUL25...B	MUL30 LWUL30...B	LWU40...B LWU40	LWU50...B LWU50
Item				
Standard length $L(n)$	105 (3)	120 (3)	180 (3)	240 (3)
	140 (4)	160 (4)	240 (4)	320 (4)
	175 (5)	200 (5)	300 (5)	400 (5)
	210 (6)	240 (6)	360 (6)	480 (6)
	245 (7)	280 (7)	420 (7)	560 (7)
	280 (8)	320 (8)	480 (8)	640 (8)
Pitch of mounting holes $F$	35	40	60	80
$E$	17.5	20	30	40
Standard range of $E$	incl.	4.5	4.5	-
	under	22	24.5	-
Maximum length <sup>(1)</sup>	420 (840)	480 (960)	720	800
Model number	LWU60...B LWU60	LWU86...B LWU86	LWU100	LWU130
Item				
Standard length $L(n)$	300 (3)	300 (3)	450 (3)	450 (3)
	400 (4)	400 (4)	600 (4)	600 (4)
	500 (5)	500 (5)	750 (5)	750 (5)
	600 (6)	600 (6)	900 (6)	900 (6)
	700 (7)	700 (7)	1 050 (7)	1 050 (7)
	800 (8)	800 (8)	1 200 (8)	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> : Track rails with the maximum lengths shown in parentheses can also be manufactured. Consult **IKO** for further information.  
 Remark : 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.

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

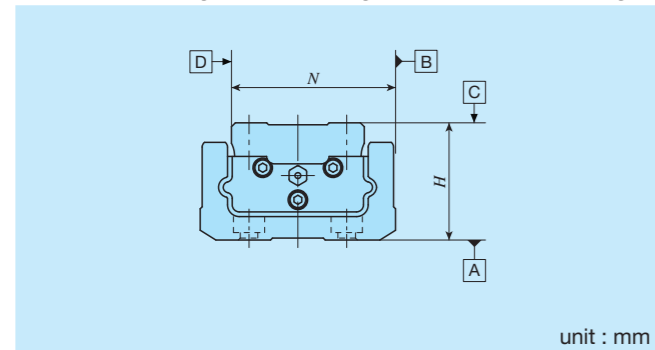
**Table 3 Preload amount**

Item	Symbol	Preload amount N	Application
Standard	(No symbol)	0 <sup>(1)</sup>	· Smooth and precise motion
Light preload	T <sub>1</sub>	0.02C <sub>0</sub>	· Minimum vibration · Load is evenly balanced · Smooth and precise motion

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

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

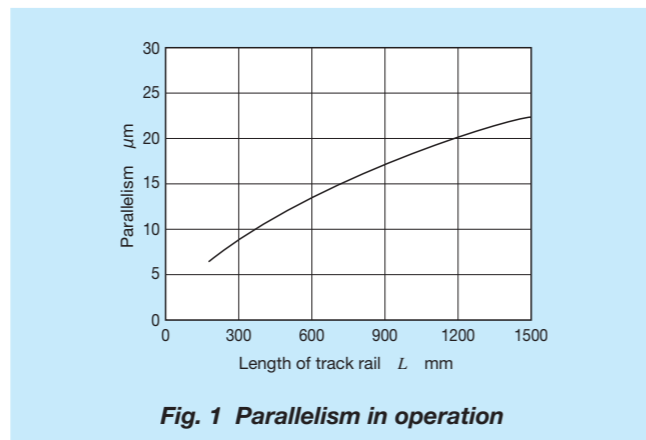
**Table 4 Accuracy of Linear Way and Linear Roller Way**



unit : mm

Item	Standard(No 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 C to A		See Fig. 1	
Parallelism in operation of D to B		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**

<b>8 Special specification</b>	/E, /L○, /MA, /MN, /Q, /U○, /W○	Applicable special specifications are shown in Table 5. When a combination of several special specifications is required, please refer Table 6 and arrange their supplemental codes in alphabetical order. For detail of specifications, see page III-17.
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**Table 5 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	/L○	○ <sup>(1)</sup>	○ <sup>(1)</sup>	○	○	○	○	○	○
Supplied with track rail mounting bolt	/MA	○ <sup>(2)</sup>	○ <sup>(2)</sup>	○	○	○	○	○	○
Supplied without track rail mounting bolt <sup>(3)</sup>	/MN	○	○	—	—	—	—	—	—
C-Lube plates <sup>(3)</sup>	/Q	—	—	○	○	○	○	○	○
Upper seals	/U	○	○	—	—	—	—	—	—
Matched sets to be used as an assembled group	/W○	○	○	○	○	○	○	○	○

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

**Table 6 Combination of special specifications**

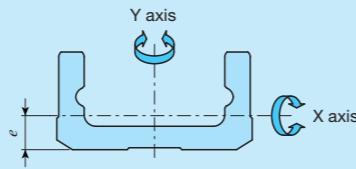
L	○					
MA	○	○				
MN	○	○	—			
Q	—	○	○	○		
U	○	○	○	○	—	
W	—	○	○	○	○	○
	E	L	MA	MN	Q	U

Remark : When several special specifications are required, arrange the supplemental codes alphabetically.

## Geometrical moment of inertia

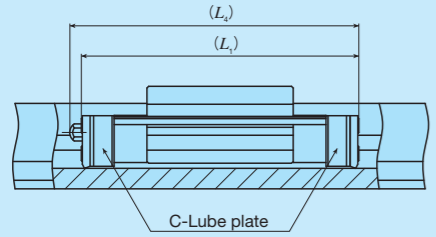
High rigidity design of C-Lube Linear Way MUL and LWU are achieved by adopting a U-shaped track rail. Table 7 shows the moment of inertia of sectional area of track rails.

**Table 9 Moment of inertia of sectional area of track rails**



Model number	Moment of inertia of sectional area mm <sup>4</sup>		Center of gravity <i>e</i> mm	
	<i>I<sub>x</sub></i>	<i>I<sub>y</sub></i>		
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			
—	LWU 60··B	$6.3 \times 10^4$	$3.9 \times 10^5$	10.7
—	LWU 60			
—	LWU 86··B	$2.4 \times 10^5$	$1.6 \times 10^6$	14.6
—	LWU 86			
—	LWU 100	$5.9 \times 10^5$	$3.3 \times 10^6$	18.8
—	LWU 130	$1.4 \times 10^6$	$8.8 \times 10^6$	23.0

**Table 7 Slide unit with C-Lube plates (Supplemental code /Q)**

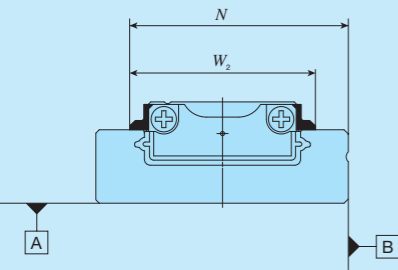


unit : mm

Size	<i>L<sub>1</sub></i>	<i>L<sub>4</sub></i>
40	67	68
50	82	83
60	95	102
86	142	148
100	166	172
130	190	196

Remark : The values are for total length of slide unit with C-Lube plates at both ends.

**Table 8 Slide unit with upper seals (Supplemental code /U)**



unit : mm

Size	<i>N</i>	<i>W<sub>2</sub></i>
25	21.4	18
30	25.9	22

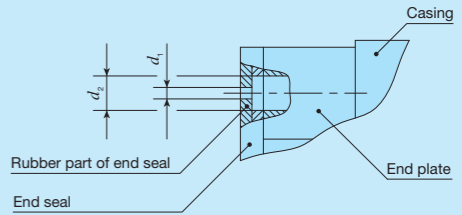
## Lubrication

Lithium-soap base grease (MULTEMP PS No.2 : KYODO YUSHI) is pre-packed in MUL and LWU series slide units of Size 25 and Size 30 and lithium-soap base grease containing extreme pressure additive (ALVANIA grease EP 2 : SHELL) is pre-packed in series of Size 40 to Size 130. Additionally, C-Lube (Capillary sleeve) a component part is placed in the ball recirculation path, thereby extending the re-lubrication (greasing) interval time and maintenance work for a long period. MUL and LWU series are provided with an oil hole and with grease nipple shown in Table 11.

Supply nozzles matching the size of grease nipple and dedicated grease fillers (mini grease injectors) matching the oil holes are also available.

For these parts for lubrication, consult **IKO** for further information.

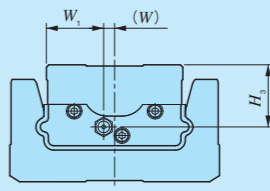
**Table 10 Oil hole**



unit : mm

Size	<i>d<sub>1</sub></i>	<i>d<sub>2</sub></i>
25	0.5	1.2
30		1.5

**Table 11 Parts for lubrication**



Size	Grease nipple <sup>(1)</sup>	Applicable supply nozzle	Nominal size of female threads for piping	Location of grease nipple mm		
				<i>W<sub>1</sub></i>	<i>W</i>	<i>H<sub>3</sub></i>
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 1形	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> : In grease nipple specification please see Table 13.1 and 13.2 on page III-10.

# Dust Protection

The MUL and LWU series of slide units are equipped with double end seals and upper seals as standard for protection against dust. If the slide unit will be used in a working environment that contains lots of dust, contaminants, or comparatively large particles such as chips and sands that may cover its track rail, **IKO** recommend protecting the linear motion parts against them with a protective cover or the like.

# Precautions for Use

## ① Mounting surface, reference mounting surface, and general mounting structure

To mount C-Lube linear MUL and LWU, correctly fit the reference mounting surfaces **B** and **D** of the slide unit and track rail to the reference mounting surfaces of the table and the bed, and then fix them tightly. (See Fig.2)

The reference mounting surfaces **B** and **D** and mounting surfaces A and C of Linear Way or Linear Roller Way are accurately finished by grinding. Stable and high accuracy linear motion can be obtained by finishing the mating mounting surfaces of machines or equipment with high accuracy and correctly mounting the guide on these surfaces.

The reference mounting surfaces are the opposite surfaces of each **IKO** marks. (See Fig. 3)

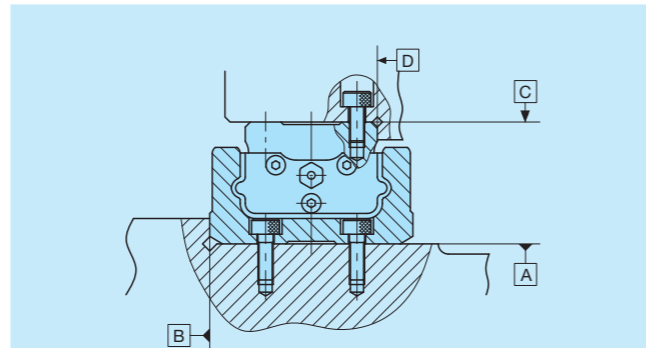


Fig. 2 Reference mounting surfaces and general mounting structure of Linear Way and Linear Roller Way

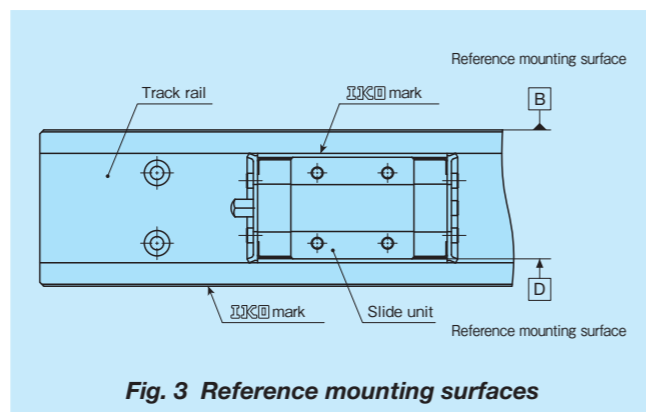


Fig. 3 Reference mounting surfaces

## ② Corner radius and shoulder height of reference mounting surfaces

It is recommended to make a relieved fillet at the corner of the mating reference mounting surfaces as shown in Fig. 4. Table 13 show recommended shoulder heights and corner radii of the mating reference mounting surfaces.

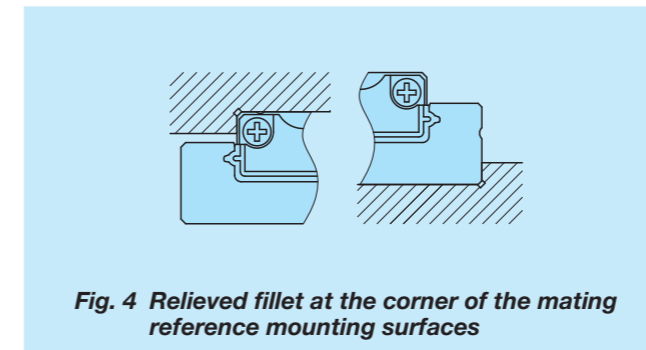


Fig. 4 Relieved fillet at the corner of the mating reference mounting surfaces

## ③ Tightening torque of mounting bolts

The standard torque values for Linear Way mounting bolts are shown in Table 12. When machines or equipment are subjected to severe vibration, shock, large fluctuating load, or moment load, the bolts should be tightened with a torque 1.2 to 1.5 times higher than the standard torque values shown.

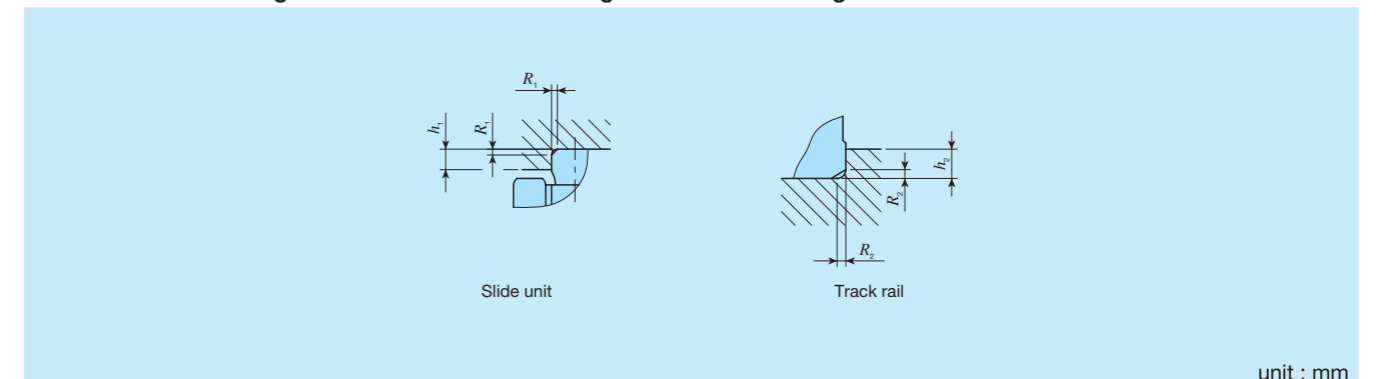
When the mating member material is cast iron or aluminum, tightening torque should be lowered in accordance with the strength characteristics of the material.

Table 12 Tightening torque of mounting bolts of Linear Way

Bolt size	Tightening torque N · m	
	Carbon steel bolt	Stainless steel bolt
M 2.5×0.45	0.62	—
M 3 ×0.5	1.1	1.7
M 4 ×0.7	2.5	4.0
M 5 ×0.8	—	7.9
M 6 ×1	—	13.3
M 8 ×1.25	—	32.0
M10 ×1.5	—	62.7

Note(1) : The values in ( ) show recommended tightening torque for strength division 12.9 (for carbon steel bolt) and property division A2-70 (for stainless steel bolt).

Table 13 Shoulder heights and corner of the mating reference mounting



unit : mm

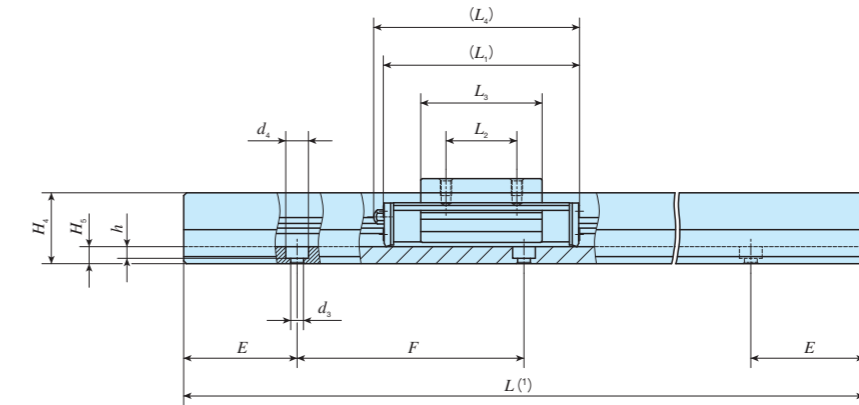
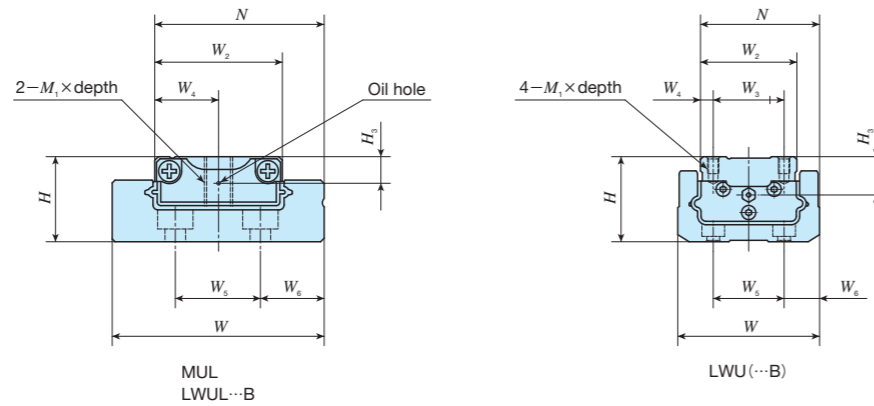
Size	Slide unit		Track rail	
	Shoulder height $h_1$	Corner radius $R_1$ (max.)	Shoulder height $h_2$	Corner radius $R_2$ (max.)
25	1.5	0.2	2.5	—
30	2.5	0.2	3	—
40	3	0.5	5	1
50	3	0.5	7	2
60	3	0.5	9	2
86	4	0.5	11	2
100	4	0.5	13	1
130	5	1	14	2

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

Remark : The above table shows representative model numbers but is applicable to all models.

# IKO C-Lube Linear Way MUL

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



Model number		Interchangeable	Mass (Reference)		Dimension of assembly mm		Dimension of slide unit mm										Dimension of track rail mm							Appended mounting bolt for track rail <sup>(3)</sup> mm	Basic dynamic load rating <sup>(4)</sup>	Basic static load rating <sup>(4)</sup>	Static moment rating <sup>(4)</sup>				
MUL	LWU (Non 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	Bolt size x length	C	C <sub>0</sub>	T <sub>0</sub>	T <sub>x</sub>	T <sub>y</sub>
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 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 <sup>(2)</sup>	-	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 <sup>(2)</sup>	-	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	90	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 <sup>(2)</sup>	-	0.40	6.69	35	49	38	28	5	83	28	52.4	90	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	136	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
-	LWU 86 <sup>(2)</sup>	-	1.32	14.1	48	71	56	46	5	130	46	93	136	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
-	LWU 100 <sup>(2)</sup>	-	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 <sup>(2)</sup>	-	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

Note<sup>(1)</sup> : Track rail lengths are shown in Table 2 on page II-138.

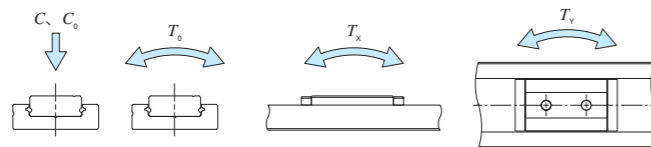
<sup>(2)</sup> : Steel balls are not retained.

<sup>(3)</sup> : The appended track rail mounting bolts are hexagon socket head bolts of JIS B 1176 or equivalent, or cross-recessed head screws for precision equipment. For stainless steel type Linear Way U, stainless steel bolts or screws are appended. In MUL, bolts are not appended.

<sup>(4)</sup> : The directions 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 in the T<sub>x</sub> and T<sub>y</sub> columns apply to one slide unit, and the lower values apply to two slide units in close contact.

Remark 1 : In sizes 25 and 30, oil holes are prepared. For specification, see Table 10 on page II-142.

2 : For grease nipple specifications, see Table 11 on page II-142.



**Example of identification number of assembled set**

Model code: MUL    Size: 25    Part code: C2    Model code: R280    Preload amount: T1    Class symbol: H    Supplemental code: /Q

① Model code: MUL (Miniature type), LWUL...B (Standard type)

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

③ Number of slide unit (two units)

④ Length of track rail (280mm)

⑤ Ball retaining: B (Ball retained type), No symbol (Ball non-retained type)

⑥ Preload symbol: No symbol (Standard), T1 (Light preload)

⑦ Accuracy class: No symbol (Ordinary), H (High)

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