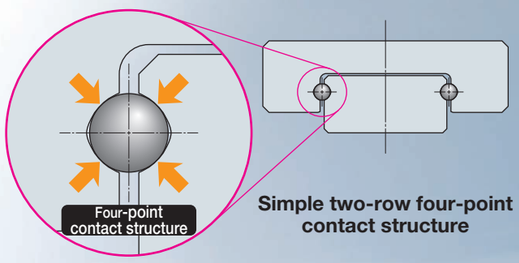
IKO Features of Linear Way Series

IKO's excellent features realized by contact in two-row raceways a simple structure by four-points

Two-row four-point contact type simple structure

IKO adopts two-row four-point contact type for every Linear Way series. Thanks to our design know how and production technologies having been fostered for long time, high accuracy and smooth motion are realized in the micro series.
In addition, load in every direction can be received evenly and therefore stable high accuracy and rigidity can be achieved even in applications where load has variable direction and size or complex load is applied.



Simple two-row four-point contact structure

Essential for micro sizing!

Micro Linear Way L realized by simple structure

Micro Linear Way L for further needs of miniaturization produced by original small sizing technology.
Wide variety of track rail width from 1 mm to 6 mm is available and high accuracy of micro positioning mechanism is realized.

IKO Micro Linear Way L

LWL1

World's smallest size!

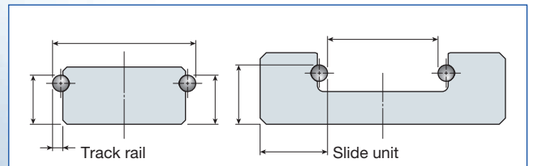
- High accuracy even with the smallest size of 1 mm*!
  *Track rail width of 1 mm
- Even the smallest size of 1 mm can be securely mounted and fixed**!
  **Tapped rail specification
- Even the smallest size of 1 mm can ensure stable operation!

LWL1 can be used for further super miniaturization of machines and devices with free-minded thinking.

Interchangeable

The simple structure of four-contact in two-row raceway yields small manufacturing errors or accuracy measurement errors, allowing the maintenance of each raceway in the high dimensions accuracy.

This technology realizes interchangeable specification and high interchangeable system in every series!



Measurement of way accuracy

As the ball is stabilized during track groove measurement, measurement of high accuracy and precise preload management are possible.

Variety of models and size variations

A wide variety of models and sizes, such as super miniature size of only 1 mm track rail width, is provided for your selection to meet each requirement.

Series		Model	Size	Track rail width Min	Max
C-Lube Linear Way ML	ML	20 models	15 sizes	3 ~	42 mm
Linear Way L	LWL	22 models	19 sizes	1 ~	42 mm
C-Lube Linear Way MLV	MLV	1 model	3 sizes	7 ~	12 mm
C-Lube Linear Way MV	MV	1 model	3 sizes	20 ~	30 mm
C-Lube Linear Way ME	ME	18 models	6 sizes	15 ~	45 mm
Linear Way E	LWE	21 models	6 sizes	15 ~	45 mm
C-Lube Linear Way MH	MH	17 models	9 sizes	8 ~	45 mm
Linear Way H	LWH	19 models	11 sizes	8 ~	65 mm
Linear Way F	LWF	4 models	7 sizes	33 ~	90 mm
C-Lube Linear Way MUL	MUL	1 model	2 sizes	25 ~	30 mm
Linear Way U	LWU	1 model	4 sizes	40 ~	86 mm

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

C-Lube Linear Way ML

ML

C-Lube Maintenance-free

long term maintenance free supported!

Linear Way L

LWL

Points

Extremely small size realized by simple structure

For details P.I-19

1 Super small-size linear motion rolling guide produced by two-row four-point contact simple structure and original small sizing technology. The track rail width of LWL1, the smallest size, is only 1mm.

Wide range of variations for your needs

For details P.I-25

2 The slide unit shape can be selected from two types, the standard type and the wide type suited for single-row track rail uses, and there are four types with different lengths of slide unit with same section. Furthermore, the track rail has the variation of standard type and tapped rail type with the screw thread implanted, allowing you to select an optimal product for the specifications of your machine and device.

Ball retained type for easy operation

3 The slide unit of ball retained type incorporates the ball retaining band, which prevents the ball from dropping down when the slide unit is removed from the track rail. This safety structure brings you an easy operation to the machines / equipment.

Stainless steel selections for excellent corrosion resistance

For details P.I-41

4 Stainless steel highly corrosion-resistant is used as the basic specification, so that the products are suitable for applications where rust prevention oil is not preferred, such as in cleanroom environment. High carbon steel products suited to general purposes are also provided.

Widely supports special environment uses

For details P.I-33

5 C-Lube Linear Way ML for special environment uses are provided as a series. Increasingly varied special environment uses are supported, such as by high-speed / low-noise specifications by combining silicon nitride ceramics and low dust-generation specifications.

Identification Number and Specification

Example of an identification number

The specifications of ML(F) and LWL(F) 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	4	5	6	3	7	8	9	10	11
Non-interchangeable specification											
Assembled set	ML	C	12	C1	R200			T_1	P		/U
Interchangeable specification											
Single slide unit	ML	C	12	C1				T_1	P	S1	/U
Single track rail (1)	LWL		12		R200	B			P	S1	
Assembled set	ML	C	12	C1	R200			T_1	P	S1	/U

1 Model
2 Length of slide unit
3 Structure
→ Model code Page Ⅱ－7

4 Size
→ Dimensions Page Ⅱ－7

5 Number of slide units
6 Length of track rail
→ Part code Page Ⅱ－7

7 Material type
→ Material code Page Ⅱ－7

8 Preload amount
→ Preload symbol Page Ⅱ－13

9 Accuracy class
→ Classification symbol Page Ⅱ－14

10 Interchangeable
→ Interchangeable code Page Ⅱ－15

11 Special specification
→ Supplemental code Page Ⅱ－15

Note (1) Indicate "LWL…B" or "LWLF…B" for the model code of the single track rail regardless of the series and the combination of slide unit models.

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

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

1 Model

C-Lube Linear Way ML (ML(F) series)
Standard type : ML
Wide type : MLF

Linear way L (1) (LWL (F) series)
Standard type : LWL
Wide type : LWLF

For applicable models and sizes, see Table 2.1 and Table 2.2.
Indicate "LWL···B" or "LWLF···B" for the model code of the single track rail regardless of the series and the combination of slide unit models.

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

2 Length of slide unit

Short : C
Standard : No symbol
Long : G
Extra long : L

For applicable models and sizes, see Table 2.1 and Table 2.2.

3 Structure

Table 1.1 Structure of ML and LWL

Model	Types and sizes of track rails			Structure	
ML	Standard rail specification		Size: 5~25	Ball retained type	: No symbol
	Tapped rail specification		Size: 3	Ball non-retained type	: No symbol
			Size: 5, 7, 9	Ball retained type	: N
LWL	Standard rail specification			Ball retained type	: B
	Tapped rail specification	Mounting from bottom	Size: 2, 3	Ball non-retained type	: No symbol
			Size: 5, 7, 9	Ball retained type	: N
		Mounting from lateral	Size: 1	Ball non-retained type	: Y
	Solid rail specification		Size: 1	Ball non-retained type	: No symbol

Table 1.2 Structure of MLF and LWLF

Model	Types of track rails		Structure	
MLF	Standard rail specification	Size: 6	Ball non-retained type	: No symbol
		Size: 10~42	Ball retained type	
	Tapped rail specification	Size: 6	Ball non-retained type	: N
		Size: 10~18	Ball retained type	
LWLF	Standard rail specification	Size: 4, 6	Ball non-retained type	: No symbol
		Size: 10~42	Ball retained type	: B
	Tapped rail specification	Size: 2	Ball non-retained type	: No symbol
		Size: 6	Ball non-retained type	: N
		Size: 10~18	Ball retained type	

For applicable models and sizes, see Table 2.1 and Table 2.2.

4 Size

Standard type 1, 2, 3, 5, 7, 9, 12, 15, 20, 25
Wide type 2, 4, 6, 10, 14, 18, 24, 30, 42

For applicable models and sizes, see Table 2.1 and Table 2.2.

5 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.

6 Length of track rail

: R○

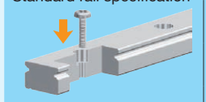
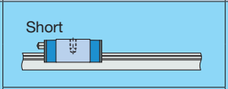
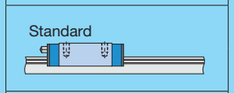
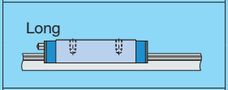
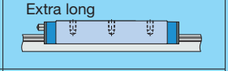
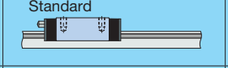
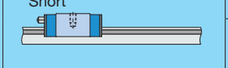
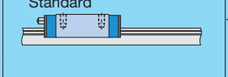
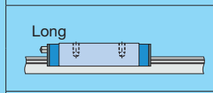
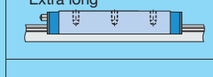
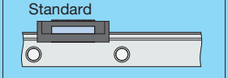
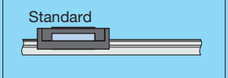
Indicate the length of track rail in mm.
For standard and maximum lengths, see Table 3.1, Table 3.2, and Table 3.3.

7 Material type

Stainless steel made : No symbol
High carbon steel made : CS

For applicable models and sizes, see Table 2.1 and Table 2.2.

Table 2.1 Models and sizes of standard type ML(F) and LWL(F) series

Types of track rails	Material type	Length of slide unit	Structure	Model	Size 1	2	3	5	7	9	12	15	20	25
Standard rail specification 	Stainless steel made	Short 	Ball retained type	MLC	–	–	–	○	○	○	○	○	○	○
				LWLC···B	–	–	–	○	○	○	○	○	○	○
		Standard 		ML	–	–	–	○	○	○	○	○	○	○
				LWL···B	–	–	–	○	○	○	○	○	○	○
		Long 		MLG	–	–	–	–	○	○	○	○	○	○
				LWLG···B	–	–	–	–	○	○	○	○	○	○
		Extra long 		MLL	–	–	–	–	–	○	○	○	–	–
	High carbon steel made	Standard 		LWL···BCS	–	–	–	–	–	○	○	○	○	–
Tapped rail specification Mounting from bottom 	Stainless steel made	Short 	Ball non-retained type	MLC	–	–	○	–	–	–	–	–	–	–
				LWLC	–	–	○	–	–	–	–	–	–	–
			Ball retained type	MLC···N	–	–	–	○	○	○	–	–	–	–
				LWLC···N	–	–	–	○	○	○	–	–	–	–
		Standard 	Ball non-retained type	ML	–	–	○	–	–	–	–	–	–	–
				LWL	–	○	○	–	–	–	–	–	–	–
			Ball retained type	ML···N	–	–	–	○	○	○	–	–	–	–
				LWL···N	–	–	–	○	○	○	–	–	–	–
		Long 	Ball retained type	MLG···N	–	–	–	–	○	○	–	–	–	–
				LWLG···N	–	–	–	–	○	○	–	–	–	–
		Extra long 	Ball retained type	MLL···N	–	–	–	–	–	○	–	–	–	–
Tapped rail specification Mounting from lateral 		Standard 	Ball non-retained type	LWL···Y	○	–	–	–	–	–	–	–	–	–
Solid rail specification 		Standard 	Ball non-retained type	LWL	○	–	–	–	–	–	–	–	–	–

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

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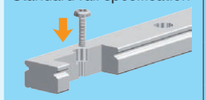
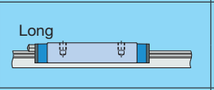
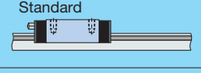
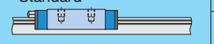
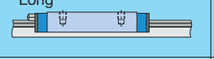
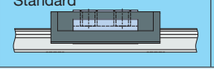
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

— Model · Length of Slide Unit · Structure · Size · Material Type —

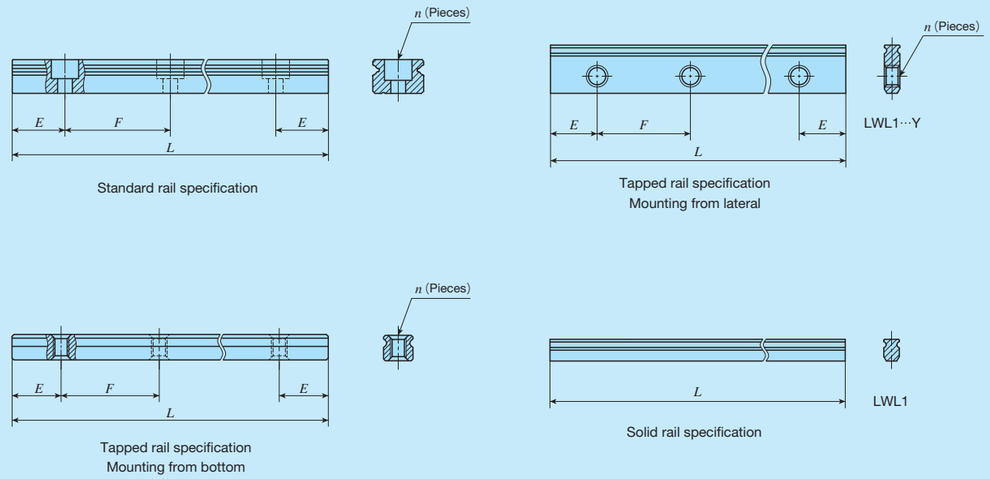
Table 2.2 Models and sizes of wide type ML(F) and LWL(F) series

Types of track rails	Material type	Length of slide unit	Structure	Model	Size 2	4	6	10	14	18	24	30	42
Standard rail specification 	Stainless steel made	Short 	Ball retained type	MLFC	–	–	–	○	○	○	○	○	○
				LWLFC···B	–	–	–	○	○	○	○	○	○
			Ball non-retained type	MLFC	–	–	○	–	–	–	–	–	–
				LWLFC	–	–	○	–	–	–	–	–	–
		Standard 	Ball retained type	MLF	–	–	–	○	○	○	○	○	○
				LWLF···B	–	–	–	○	○	○	○	○	○
			Ball non-retained type	MLF	–	–	○	–	–	–	–	–	–
				LWLF	–	○	○	–	–	–	–	–	–
		Long 	Ball retained type	MLFG	–	–	–	–	○	○	○	○	○
				LWLFG···B	–	–	–	–	○	○	○	○	○
	High carbon steel made	Standard 	Ball retained type	LWLF···BCS	–	–	–	–	–	○	○	○	○
Tapped rail specification Mounting from bottom 	Stainless steel made	Short	Ball retained type	MLFC···N	–	–	–	○	○	○	–	–	–
				LWLFC···N	–	–	–	○	○	○	–	–	–
			Ball non-retained type	MLFC···N	–	–	○	–	–	–	–	–	–
				LWLFC···N	–	–	○	–	–	–	–	–	–
		Standard 	Ball retained type	MLF···N	–	–	–	○	○	○	–	–	–
				LWLF···N	–	–	–	○	○	○	–	–	–
			Ball non-retained type	MLF···N	–	–	○	–	–	–	–	–	–
				LWLF···N	–	–	○	–	–	–	–	–	–
		Long 	Ball retained type	MLFG···N	–	–	–	–	○	○	–	–	–
				LWLFG···N	–	–	–	–	○	○	–	–	–
		Standard 	Ball non-retained type	LWLF	○	–	–	–	–	–	–	–	–

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

— Length of Track Rail —

Table 3.1 Standard and maximum length of stainless steel track rail (Standard type)



unit: mm

Item \ Identification number	LWL1···Y	LWL1	LWL2	ML 3 LWL3	ML 5 LWL5···B	ML 7 LWL7···B
Standard length L (n)	18 (3) 30 (5) 42 (7)	18 (–) 30 (–) 42 (–)	32 (4) 40 (5) 56 (7) 80 (10)	30 (3) 40 (4) 60 (6) 80 (8) 100 (10)	60 (4) 90 (6) 105 (7) 120 (8) 150 (10)	60 (4) 90 (6) 120 (8) 150 (10) 180 (12) 240 (16)
Pitch of mounting holes F	6	–	8	10	15	15
E	3	–	4	5	7.5	7.5
Standard E dimensions (1) or higher	2.5	–	2.5	3	4	4.5
Standard E dimensions (1) below	5.5	–	6.5	8	11.5	12
Maximum length (2)	102	102	104 (200)	150 (300)	210 (510)	300 (990)
Maximum number of butt-jointing track rail (3)	–	–	–	–	5	7
Maximum length of butt-jointing track rail (3)	–	–	–	–	915	1 905

Item \ Identification number	ML 9 LWL9···B	ML 12 LWL12···B	ML 15 LWL15···B	ML 20 LWL20···B	ML 25 LWL25···B
Standard length L (n)	60 (3) 80 (4) 120 (6) 160 (8) 220 (11) 280 (14)	100 (4) 150 (6) 200 (8) 275 (11) 350 (14) 475 (19)	160 (4) 240 (6) 320 (8) 440 (11) 560 (14) 680 (17)	180 (3) 240 (4) 360 (6) 480 (8) 660 (11) 840 (14)	240 (4) 300 (5) 360 (6) 480 (8) 660 (11) 900 (15)
Pitch of mounting holes F	20	25	40	60	60
E	10	12.5	20	30	30
Standard E dimensions (1) or higher	4.5	5	5.5	8	9
Standard E dimensions (1) below	14.5	17.5	25.5	38	39
Maximum length (2)	860 (1 200)	1 000 (1 450)	1 000 (1 480)	960 (1 800)	960 (1 800)
Maximum number of butt-jointing track rail (3)	2	2	2	2	2
Maximum length of butt-jointing track rail (3)	1 660	1 925	1 880	1 740	1 740

Notes (1) Not applicable to track rail with stopper pins (supplemental code "/S").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
(3) Not applicable to interchangeable specifications or tapped rail specifications.

Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LWL···B" 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.

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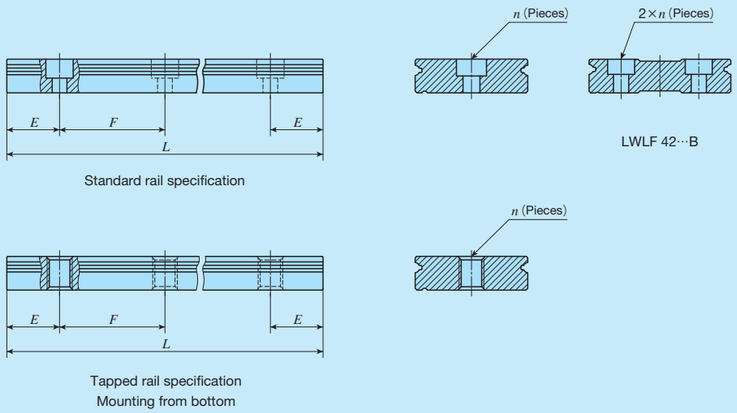
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 3.2 Standard and maximum length of stainless steel track rail (Wide type)



unit: mm

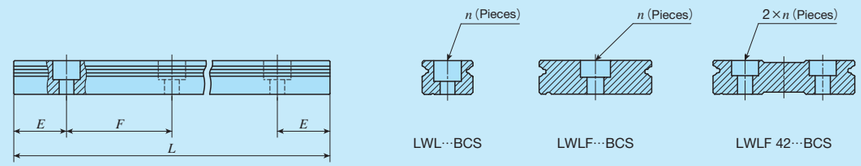
Item \ Identification number	LWLF2	LWLF4	MLF 6 LWLF6	MLF 10 LWLF10···B	MLF 14 LWLF14···B
Standard length L (n)	18 (3) 30 (5) 42 (7) 54 (9)	40 (4) 60 (6) 70 (7) 80 (8) 100 (10)	60 (4) 90 (6) 105 (7) 120 (8) 150 (10)	60 (3) 80 (4) 120 (6) 160 (8) 220 (11) 280 (14)	90 (3) 120 (4) 150 (5) 180 (6) 240 (8) 300 (10)
Pitch of mounting holes F	6	10	15	20	30
E	3	5	7.5	10	15
Standard E dimensions (1) or higher	2.5	3.5	4.5	4.5	5.5
Standard E dimensions (1) below	5.5	8.5	12	14.5	20.5
Maximum length (2)	102	180 (300)	240 (300)	300 (500)	300 (990)
Maximum number of butt-jointing track rail (3)	–	–	–	7	8
Maximum length of butt-jointing track rail (3)	–	–	–	1 840	1 950

Item \ Identification number	MLF 18 LWLF18···B	MLF 24 LWLF24···B	MLF 30 LWLF30···B	MLF 42 LWLF42···B
Standard length L (n)	90 (3) 120 (4) 150 (5) 180 (6) 240 (8) 300 (10)	120 (3) 160 (4) 240 (6) 320 (8) 400 (10) 480 (12)	160 (4) 240 (6) 320 (8) 440 (11) 560 (14) 680 (17)	160 (4) 240 (6) 320 (8) 440 (11) 560 (14) 680 (17)
Pitch of mounting holes F	30	40	40	40
E	15	20	20	20
Standard E dimensions (1) or higher	5.5	6.5	6.5	6.5
Standard E dimensions (1) below	20.5	26.5	26.5	26.5
Maximum length (2)	690 (1 860)	680 (1 960)	680 (2 000)	680 (2 000)
Maximum number of butt-jointing track rail (3)	3	3	3	3
Maximum length of butt-jointing track rail (3)	1 920	1 840	1 840	1 840

Notes (1) Not applicable to track rail with stopper pins (supplemental code "/S").
(2) Length up to the value in ( ) can be produced. If needed, please contact IKO.
(3) Not applicable to interchangeable specifications or tapped rail specifications.
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
2. Indicate "LWLF···B" 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.

— Length of Track Rail —

Table 3.3 Standard and maximum length of high carbon steel track rail (Standard type, Wide type)



unit: mm

Item \ Identification number	LWL 9···BCS	LWL12···BCS	LWL15···BCS	LWL20···BCS
Standard length L (n)	80 (4) 160 (8) 220 (11) 280 (14) 380 (19) 500 (25) 600 (30)	100 (4) 200 (8) 275 (11) 350 (14) 475 (19) 600 (24) 700 (28)	160 (4) 320 (8) 440 (11) 560 (14) 680 (17) 800 (20) 920 (23)	180 (3) 240 (4) 360 (6) 480 (8) 660 (11) 900 (15) 1 020 (17)
Pitch of mounting holes F	20	25	40	60
E	10	12.5	20	30
Standard E dimensions (1) or higher	4.5	5	5.5	8
Standard E dimensions (1) below	14.5	17.5	25.5	38
Maximum length	1 000	1 500	1 520	1 560

Item \ Identification number	LWLF18···BCS	LWLF24···BCS	LWLF30···BCS	LWLF42···BCS
Standard length L (n)	90 (3) 180 (6) 240 (8) 300 (10) 420 (14) 510 (17) 600 (20)	120 (3) 240 (6) 320 (8) 400 (10) 600 (15) 720 (18) 800 (20)	160 (4) 320 (8) 440 (11) 560 (14) 680 (17) 800 (20) 920 (23)	160 (4) 320 (8) 440 (11) 560 (14) 680 (17) 800 (20) 920 (23)
Pitch of mounting holes F	30	40	40	40
E	15	20	20	20
Standard E dimensions (1) or higher	5.5	6.5	6.5	6.5
Standard E dimensions (1) below	20.5	26.5	26.5	26.5
Maximum length	1 500	1 520	1 600	1 600

Note (1) Not applicable to track rail with stopper pins (supplemental code "/S").
Remarks 1. A typical identification number is indicated, but is applied to all models of the same size.
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.

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

— Preload Amount —

8 Preload amount

Clearance	: T_0	Specify this item for an assembled set or a single slide unit.
Standard	: No symbol	For details of the preload amount, see Table 4.
Light preload	: T_1	For applicable preload types, see Table 5.1 and Table 5.2.

Table 4 Preload amount

Item / Preload type	Preload symbol	Preload amount N	Operational conditions
Clearance	T_0	0 (1)	· Very light motion
Standard	(No symbol)	0 (2)	· Light and precise motion
Light preload	T_1	0.02 C_0	· Almost no vibrations · Load is evenly balanced · Light and precise motion

Notes (1) There is zero or subtle clearance.
(2) Indicates zero or minimal amount of preload.
Remark: C_0 indicates the basic static load rating.

Table 5.1 Application of preload (Standard type)

Size	Preload type (preload symbol)		
	Clearance (T_0)	Standard (No symbol)	Light preload (T_1)
1	○	–	–
2	○	–	–
3	○	–	–
5	○	○	–
7	○(1)	○	○(1)
9	○(1)	○	○(1)
12	○(1)	○	○(1)
15	○(1)	○	○(1)
20	○	○	○
25	○	○	○

Note (1) Not applicable when /HB is specified.
Remark: The mark ▭ indicates that interchangeable specification products are available.

Table 5.2 Application of preload (Wide type)

Size	Preload type (preload symbol)		
	Clearance (T_0)	Standard (No symbol)	Light preload (T_1)
2	○	–	–
4	○	–	–
6	○	–	–
10	○	○	–
14	○	○	○
18	○	○	○
24	○	○	○
30	○	○	○
42	○	○	○

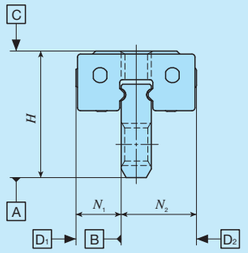
Remark: The mark ▭ indicates that interchangeable specification products are available.

— Accuracy class —

9 Accuracy class

High	: H	For interchangeable specification products, assemble a slide unit and a track rail of the same accuracy class.
Precision	: P	Size 1 series have "No symbols."
		For the details of accuracy class, see Table 6.1 and 6.2.

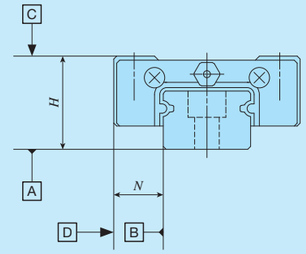
Table 6.1 Tolerance and allowable values (Series of size 1)



unit: mm

Item	Tolerance
Dim. H tolerance	±0.020
Dim. N_1 and Dim. N_2 tolerance	±0.025

Table 6.2 Tolerance and allowance (Series of size 2 or larger excluding LWLF2)



unit: mm

Item / Class (classification symbol)	High (H)	Precision (P)
Dim. H tolerance	±0.020	±0.010
Dim. N tolerance	±0.025	±0.015
Dim. variation of H (1)	0.015	0.007
Dim. variation of N (1)	0.020	0.010
Dim. variation of H for multiple assembled sets (2)	0.030	0.020
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.

Table 6.3 Tolerance and allowance (LWLF 2)

unit: mm

Item / Class (classification symbol)	High (H)	Precision (P)
Dim. H tolerance	±0.020	±0.010
Dim. N_1 and Dim. N_2 tolerance	±0.025	±0.015
Dim. variation of H (1)	0.015	0.007
Dim. variation of N (1)	0.020	0.010
Parallelism in operation of the slide unit C surface to A surface	See Fig. 1 (If the track rail length is less than 60mm, the value will be the same as 60mm.)	
Parallelism in operation of the slide unit D surface to B surface	See Fig. 1 (If the track rail length is less than 60mm, the value will be the same as 60mm.)	

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

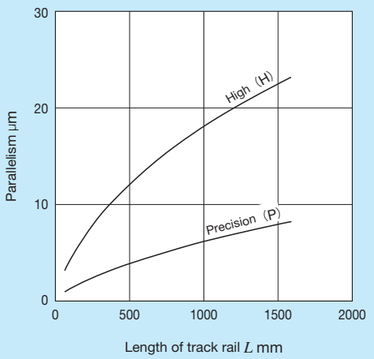


Fig. 1 Parallelism in operation (Series of size 2 or higher)

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

— Interchangeable Specification · Special Specification —

10 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 2.1 and Table 2.2. "No symbol" is indicated for non-interchangeable specification.
S2 specification	: S2	
Non-interchangeable specification	: No symbol	

11 Special specification

/A, /BS, /D, /E, /HB, /I, /LR, /MN, /N, /Q, /RE, /S, /U, /W○, /Y○

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 specification, see page Ⅲ−29.

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

Special specification	Supplemental code	Size									
		1	2	3	5	7	9	12	15	20	25
		–	4	6	10	14	18	24	30	42	–
No end seal	/N	–	–	–	○	○	○	○	○	○	○
With C-Lube plate (1)	/Q	–	–	–	○	○	○	○	○	○	○
Under seal	/U	–	–	–	×	×	○	○	○	○	○

Note (1) Applicable to LWL(F) series.

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

Special specification	Supplemental code	Size									
		1	2	3	5	7	9	12	15	20	25
		–	4	6	10	14	18	24	30	42	–
Specified rail mounting hole positions	/E	–	–	–	○	○	○	○	○	○	○
Without track rail mounting bolt	/MN	–	–	–	○	○	○	○	○	○	○

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

Special specification	Supplemental code	Size									
		1	2	3	5	7	9	12	15	20	25
		–	4	6	10	14	18	24	30	42	–
Opposite reference surfaces arrangement	/D	–	–	–	○	○	○	○	○	○	○
Specified rail mounting hole positions	/E	–	–	–	○	○	○	○	○	○	○
Without track rail mounting bolt (1)	/MN	–	–	–	○	○	○	○	○	○	○
No end seal	/N	–	–	–	○	○	○	○	○	○	○
With C-Lube plate (2)	/Q	–	–	–	○	○	○	○	○	○	○
Under seal	/U	–	–	–	×	×	○	○	○	○	○

Notes (1) Not applicable to tapped rail specification.
(2) Applicable to LWL(F) series.

— Special Specification —

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

Special specification	Supplemental code	Size									
		1	2	3	5	7	9	12	15	20	25
Butt-jointing track rails (1) (2)	/A	×	×	×	○	○	○	○	○	○	○
Stainless steel end plate (3)	/BS	×	○	○	○	○	○	○	○	○	×
Opposite reference surfaces arrangement	/D	×	○	○	○	○	○	○	○	○	○
Specified rail mounting hole positions	/E	×	○	○	○	○	○	○	○	○	○
Hybrid C-Lube Linear Way	/HB	×	×	×	×	○	○	○	○	×	×
Inspection sheet	/I	×	○	○	○	○	○	○	○	○	○
Black chrome surface treatment (track rail) (2)	/LR	×	×	×	×	○	○	○	○	○	○
Without track rail mounting bolt (2)	/MN	×	×	×	○	○	○	○	○	○	○
No end seal	/N	×	×	×	○	○	○	○	○	○	○
With C-Lube plate (3)	/Q	×	×	×	○	○	○	○	○	○	○
Special environment seal (3)	/RE	×	×	×	○	○	○	○	○	○	×
Track rail with stopper pins	/S	×	×	×	○	○	○	○	○	○	○
Under seal	/U	×	×	×	×	×	○	○	○	○	○
A group of multiple assembled sets	/W○	×	○	○	○	○	○	○	○	○	○
Specified grease (4)	/Y○	×	○(5)	○	○	○	○	○	○	○	○

Notes (1) Not applicable to high carbon steel made products.
(2) Not applicable to tapped rail specification.
(3) Applicable to LWL series.
(4) ML series is applicable only to /YCG.
(5) Applicable only to /YNG.

Table 7.5 Application of special specifications (Non-interchangeable specification, wide type)

Special specification	Supplemental code	Size								
		2	4	6	10	14	18	24	30	42
Butt-jointing track rails (1) (2)	/A	×	×	×	○	○	○	○	○	○
Stainless steel end plate (3)	/BS	×	×	×	○	○	○	○	○	○
Opposite reference surfaces arrangement	/D	×	○	○	○	○	○	○	○	○
Specified rail mounting hole positions	/E	○	○	○	○	○	○	○	○	○
Inspection sheet	/I	○	○	○	○	○	○	○	○	○
Black chrome surface treatment (track rail) (2)	/LR	×	×	×	×	○	○	○	○	○
Without track rail mounting bolt (2)	/MN	×	○	○	○	○	○	○	○	○
No end seal	/N	×	×	×	○	○	○	○	○	○
With C-Lube plate (3)	/Q	×	×	×	○	○	○	○	○	○
Special environment seal (3)	/RE	×	×	×	○	○	○	○	○	○
Track rail with stopper pins	/S	×	×	×	○	○	○	○	○	○
Under seal	/U	×	×	×	×	×	○	○	○	○
A group of multiple assembled sets	/W○	○	○	○	○	○	○	○	○	○
Specified grease (4)	/Y○	×	○(5)	○	○	○	○	○	○	○

Notes (1) Not applicable to high carbon steel made products.
(2) Not applicable to tapped rail specification.
(3) Applicable to LWLF series.
(4) MLF series is applicable only to /YCG.
(5) Applicable only to /YNG.

Table 8 Combination of supplemental codes

	A	BS	D	E	HB	I	LR	MN	N	Q	RE	S	U	W
BS	○													
D	○	○												
E	–	○	–											
HB	○	–	○	○										
I	○	○	○	○	○									
LR	–	○	○	○	○	○								
MN	○	○	○	○	○	○	○							
N	○	○	○	○	○	○	○	○						
Q	○	○	○	○	–	○	○	○	○					
RE	○	○	○	○	–	○	○	○	–	○				
S	○	○	○	○	○	○	○	○	○	○	○			
U	○	○	○	○	○	○	○	○	–	○	–	○		
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.

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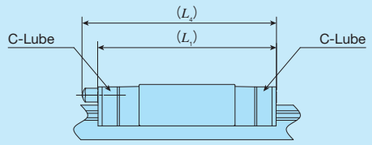
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

— Special Specification —

Table 9 Dimension of slide unit with C-Lube plate (Supplemental code /Q)



unit: mm

Identification number	L_1	L_4	Identification number	L_1	L_4
LWLC 5···B	22	–	LWLFC 10···B	26.5	–
LWL 5···B	25	–	LWLF 10···B	30.5	–
LWLC 7···B	27	–	LWLFC 14···B	30.5	–
LWL 7···B	31.5	–	LWLF 14···B	39.5	–
LWLG 7···B	39	–	LWLFG 14···B	50	–
LWLC 9···B	30	–	LWLFC 18···B	34.5	–
LWL 9···B	39	–	LWLF 18···B	46.5	–
LWLG 9···B	49	–	LWLFG 18···B	58.5	–
LWLC 12···B	33	–	LWLFC 24···B	38.5	–
LWL 12···B	42	–	LWLF 24···B	52	–
LWLG 12···B	52	–	LWLFG 24···B	67	–
LWLC 15···B	42	47	LWLFC 30···B	45.5	50
LWL 15···B	52	57	LWLF 30···B	59.5	64
LWLG 15···B	67	72	LWLFG 30···B	78.5	83
LWLC 20···B	48	53	LWLFC 42···B	51.5	56
LWL 20···B	60	65	LWLF 42···B	65	70
LWLG 20···B	78	83	LWLFG 42···B	84.5	89
LWLC 25···B	63.5	74			
LWL 25···B	87.5	98			
LWLG 25···B	107.5	117			

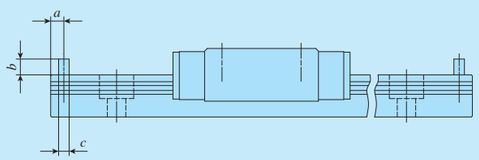
Remarks 1. The dimensions of the slide unit with C-Lube at both ends are indicated.
2. A typical identification number is indicated, but is applied to all LWL(F) series models of the same size.

Table 10 Load rating / static moment rating of Hybrid C-Lube Linear Way (Supplemental code /HB)

Identification number	C N	C_0 N	T_0 N·m	T_x(1) N·m	T_Y(1) N·m
MLC 7···/HB	937	965	3.5	1.6 12.6	1.3 10.6
ML 7···/HB	1 330	1 610	5.9	4.0 23.9	3.3 20.1
MLG 7···/HB	1 690	2 250	8.2	7.5 43.1	6.3 36.2
MLC 9···/HB	1 180	1 260	5.9	2.4 18.2	2.1 15.3
ML 9···/HB	1 810	2 340	10.9	7.7 43.4	6.5 36.4
MLG 9···/HB	2 370	3 420	15.9	15.9 83.6	13.4 70.1
MLL 9···/HB	2 870	4 500	20.9	27.1 134	22.7 112
MLC 12···/HB	2 210	2 030	12.6	4.5 35.5	3.8 29.8
ML 12···/HB	3 330	3 650	22.6	13.1 79.2	11.0 66.4
MLG 12···/HB	4 310	5 270	32.7	26.0 143	21.9 120
MLL 12···/HB	5 820	8 110	50.3	59.3 288	49.8 242
MLC 15···/HB	3 490	3 310	25.5	9.9 71.8	8.3 60.3
ML 15···/HB	4 980	5 520	42.5	25.3 146	21.2 122
MLG 15···/HB	6 620	8 280	63.7	54.3 288	45.5 241
MLL 15···/HB	8 370	11 600	89.2	104 497	86.9 417

Note (1) 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.

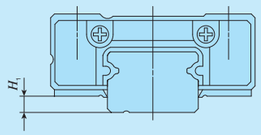
Table 11 Dimension of track rail with stopper pins (Supplemental code /S)



unit: mm

Size		a	b	c
5	–	2	2	1.6
7	–	2.5	2.5	2
9	–		3	
–	10		2	1.6
12	–		3	2
–	14			
15	–		4	
–	18		3	
20	–		5	
–	24		3	
25	–	3.5	5	
–	30	2.5	4	
–	42		5	

Table 12 H_1 dimension with under seal (Supplemental code /U)



unit: mm

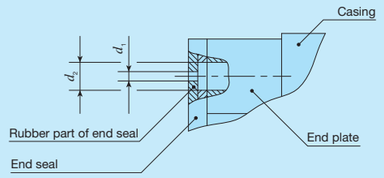
Size		H_1
9	–	1
12	–	2
15	–	3
–	18	2
20	–	4
–	24	2
25	–	5(1)
–	30	2
–	42	3

Note (1) The dimensions are the same as those before mounting of under seal.

Lubrication

Lithium-soap base grease (MULTEMP PS No.2 [KYODO YUSHI CO., LTD.]) is pre-packed in ML(F) and LWL(F) series. Additionally, ML(F) 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.
ML(F) series and LWL(F) series have grease nipple or oil hole as indicated in Table 14. Since the Size 1, 2, 3, 4 and 6 series do not have an oil hole, apply grease directly to the raceway part of the track rail for re-greasing. 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 13 Oil hole specifications



unit: mm

Size		d_1	d_2
5	10	0.5	1.1
7	14		1.2
9	18		1.5
12	24		2

Dust Protection

The slide units of ML(F) series and LWL(F) 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 attach a protective cover to the linear motion mechanism.
No end seal is provided for size 1, 2, 3, 4 or 6 series. For applications in the environment not clean enough, cover the entire unit with a protective case, etc. to prevent harmful foreign substances such as dust and particles from outside to enter.

Table 14 Parts for lubrication

Size		Grease nipple type (1)	Applicable supply nozzle type	Bolt size of female threads for piping
5, 7, 9, 12	10, 14, 18, 24	Oil hole	Miniature greaser MG10B/MT2	–
15, 20	30, 42	A-M3	A-5120V A-5240V B-5120V B-5240V	
25	–	B-M4	A-8120V B-8120V	M4

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

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

Precaution for Use

❶ Mounting surface, reference mounting surface and general mounting structure

When mounting the ML(F) series and LWL(F) series, properly align the reference mounting surfaces B and D (D1 or D2)of the track rail and slide unit with the reference mounting surface of the table and bed and fix them. (See Fig. 2)

Reference mounting surfaces B and D (D1 or D2) and mounting surfaces A and C are precisely ground. By machining the mounting surface of the mating member, such as machine or device, to high accuracy and mounting them properly, stable linear motion with high accuracy is obtained.

The LWL1···Y track rail has the mounting structure in the lateral direction. Two types of mounting structures are available (as shown in Fig. 3.1 and Fig. 3.2).

The reference mounting surfaces of the slide unit LWL1 (Y) and LWLF2 are located at both the left and right sides (D1 and D2). (See Fig. 5.1)

Excluding LWL1 (Y) and LWLF2, the reference mounting surface of the slide unit is on the opposite side of the IKO mark. (See Fig. 5.2)

The reference mounting surface of the track rail, with the exception of LWL1 (Y), 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. 5.1 and Fig. 5.2)

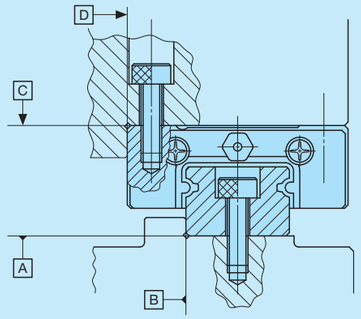

Fig. 2 Reference mounting surface and typical mounting structure

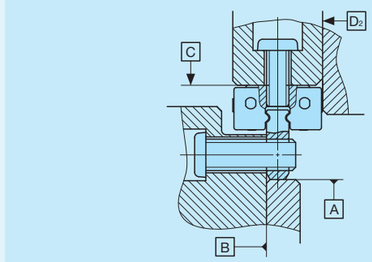

Fig. 3.1 Reference mounting surface of LWL1···Y and typical mounting structure ①

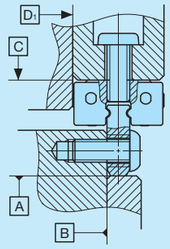

Fig. 3.2 Reference mounting surface of LWL1···Y and typical mounting structure ②

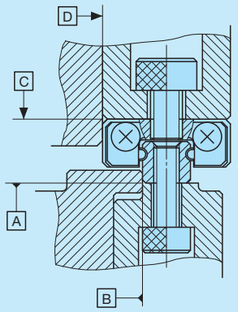

Fig. 4 Reference mounting surface of size 2, 3, 4 and 6 series and typical mounting structure

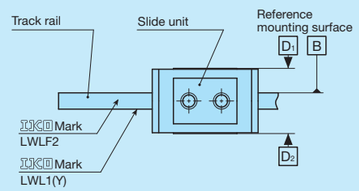

Fig. 5.1 Reference mounting surface of LWL1 (Y) and LWLF2

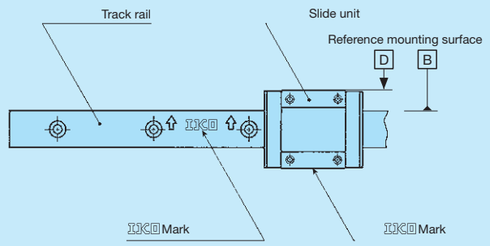

Fig. 5.2 Reference mounting surface of products other than LWL1 (Y) and LWLF2

❷ Mounting screws for slide unit

To mount a slide unit, tightly fasten the bolt against female thread of slide unit.

The female thread is created through holes of the slide unit for size 1 series, and also through holes for the slide unit and track rail for size 2, 3, 4 and 6 series. When the fixing thread depth of the mounting screw goes too deep, it can interfere with the track rail and impact the running accuracy or product life so that the fixing thread depth should be within the screwing depth specified in the dimension table.

Also prepare the small screws dedicated to precision devices (head diameter 1.8 mm or smaller) for the mounting bolt of slide unit of size 1 and LWLF2.

❸ Mounting screws for track rail

In the size 2 and 3 series and tapped rail specifications, track rail mounting bolts are not appended. Prepare mounting bolts whose fixing thread depth is less than H_4 in dimension table.

❹ 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 on the mating side is indicated in Table 16.

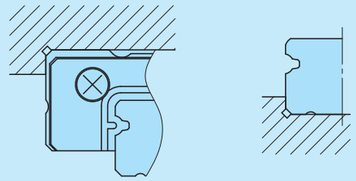

Fig. 6 Corner of the mating reference mounting

❺ Tightening torque for fixing screw

Typical tightening torque for mounting ML(F) series and LWL(F) series to the steel mating member material is indicated in Table 15. 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 15 Tightening torque for fixing screw

Bolt size	Tightening torque N · m	
	Stainless steel-made screw	High carbon steel-made screw
M1 ×0.25	0.04	–
M1.4×0.3	0.10	–
M1.6×0.35	0.15	–
M2 ×0.4	0.31	–
M2.5×0.45	0.62	–
M3 ×0.5	1.1	1.3
M4 ×0.7	2.5	2.9
M5 ×0.8	5.0	5.7
M6 ×1	8.5	–

Remarks 1. The tightening torque is calculated based on strength division 8.8 and property division A2-70.
2. It is recommended that the tightening torque of slide unit mounting holes for series size 1 is to be 70 to 80 % of the values in the table.

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