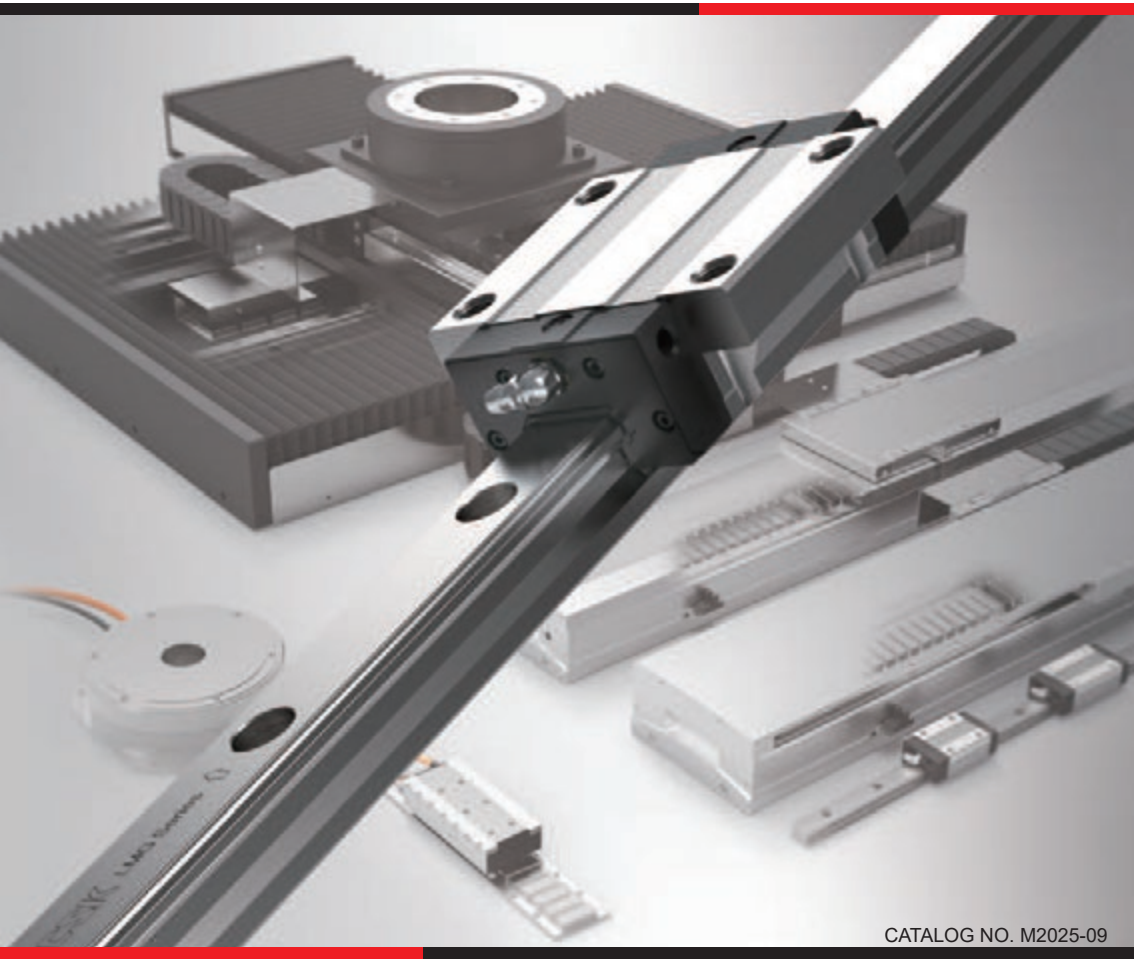
MELUCCI TECHNOLOGIES

CSK MOTION TECHNOLOGY

Products Information



CATALOG NO. M2025-09

CSK Motion Technology Co., Ltd.

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CSK Motion Technology

CSK Motion Technology Co., Ltd. was established in 2010. CSK is a company which is professionally manufacturing precision linear motion products. CSK possess a strong team which is expertized in aspects of R&D, manufacturing, and QA. CSK own superior and modernized precision facilities to mass-produce the linear guideway with accuracy as higher as UP grade(≦3μ).

Therefore, CSK is one of the few qualified manufacturers producing the super precision linear guideway in the world.

Recently, we are more active in the development of linear motor stage, module, direct drive rotary motor and other products, providing customized solutions in precision transmission system. CSK’ s objective is to provide world class quality products and service with favorable price and short delivery time to customers. Base on continuous improvement and innovation of linear motion technologies, CSK’ s vision is to become an eternal enterprise and by establishing the key core techniques to achieve the better welfare and environment for our global village.

Contents

Contents

Contents

Contents

Contents

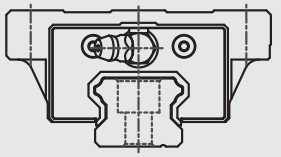
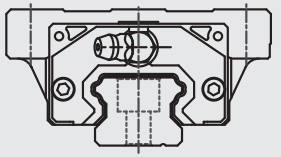
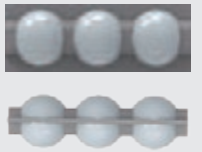
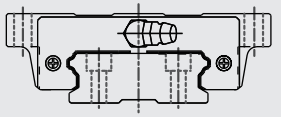
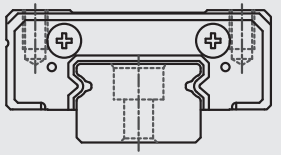
Contents

CSK CHINA

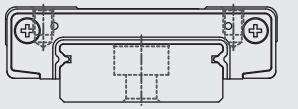
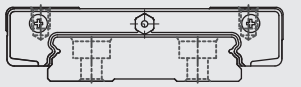
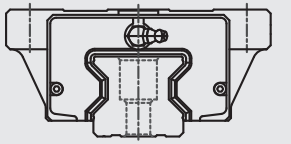
CSK Motion Technology Co., Ltd.
Industrial Zone, Madian Town, Jiaozhou,
Qingdao, China
E-mail info@cskmotions.com

www.cskmotions.com

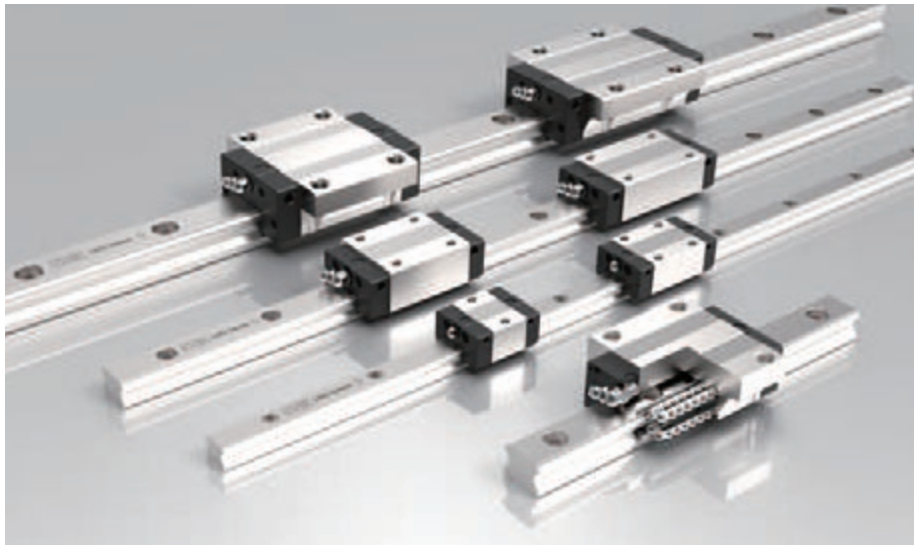
Guide Type

LMG series	Ball Type	Page
		A-17
LMGQ series	**Ball-Linkage**	**Page**
		A-30
LMGW series	**Ball Type**	**Page**
		B-01
LMN series	**Ball Type**	**Page**
		C-01

Guide Type

LMNW7/9/12 series	Ball Type	Page
		C-02
LMNW15 series	**Ball-Linkage**	**Page**
		C-02
LMR series	**Roller-Linkage**	**Page**
		D-01

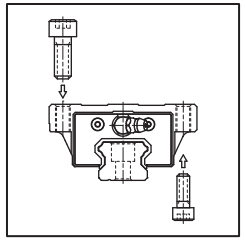
Linear Guide
LMG/GQ series



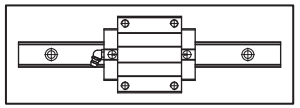
Carriage Type

Contour	Length	Spec. Code

Flange type

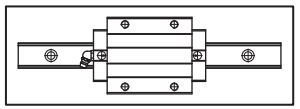


Heavy load



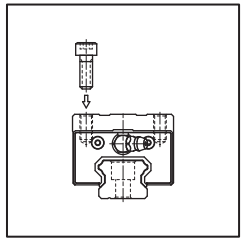
C/TC

Ultra heavy load

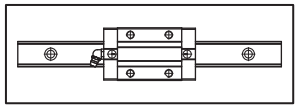


LC

Square high type

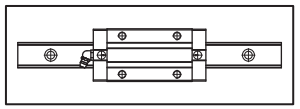


Heavy load



H

Ultra heavy load

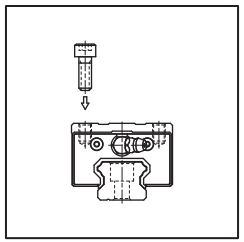


LH

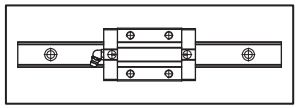
Carriage Type

Contour	Length	Spec. Code

Square medium type

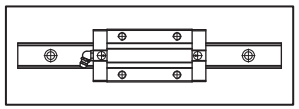


Heavy load



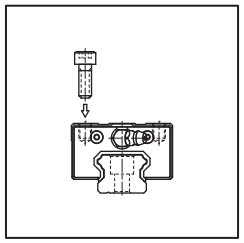
→ V

Ultra heavy load

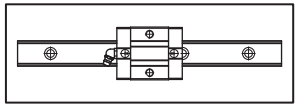


→ LV

Square compact type

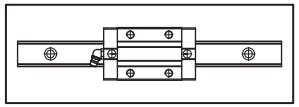


Medium load



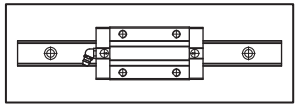
→ ST

Heavy load



→ T

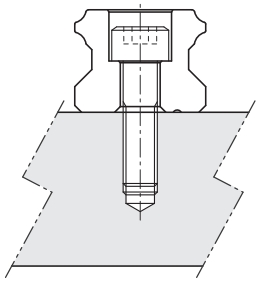
Ultra heavy load



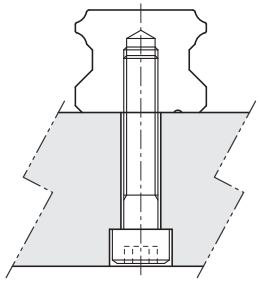
→ LT

Rail Type

Counter bore (R, U type)



Tapped hole (T type)



(1) For Butt-joint Rail

When applied length of rail longer than specified max. length, the rails can be connected to one another. For this situation, the joint marks indicate the matching position.
Accuracy may deviate at joints when carriages pass the joint simultaneously. Therefore, the joints should be interlaced for avoiding such accuracy problem.

Butt-Joint

- Dentification of butt-joint rail

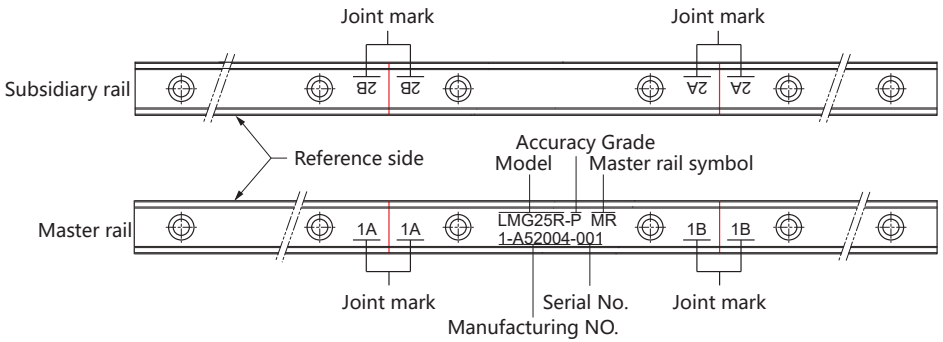


Fig. (A)

- Staggering the joint position

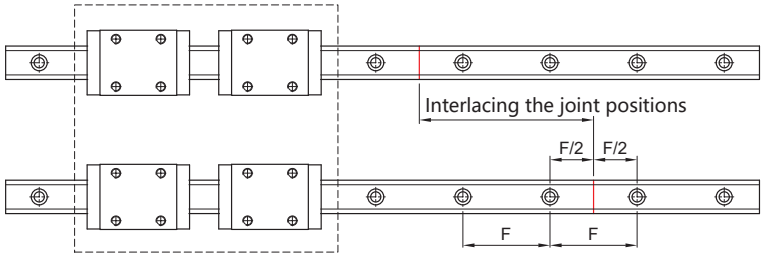


Fig. (B)

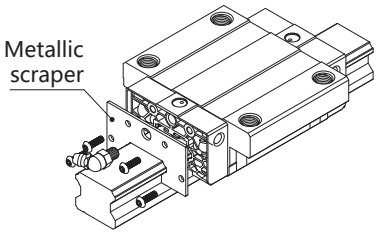
Dust Proof

(1) Code of contamination protection for carriage

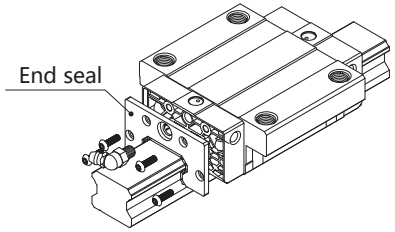
- Contamination protection

LMG series of linear guideway offers various kinds of dust protection accessory to keep the foreign matters from entering into the carriage.

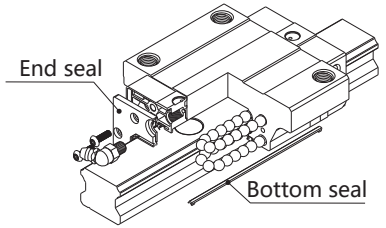
- No symbol Metallic scraper (both ends)



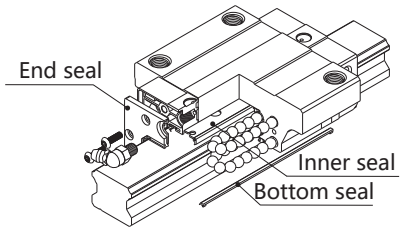
- UU Bidirectional end seal (both ends)



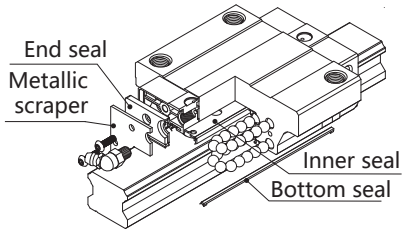
- SS Bidirectional end seal + Bottom seal



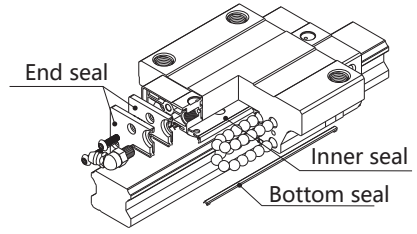
- VV Bidirectional end seal + Bottom seal + Inner seal



- ZZ SS + Metallic scraper

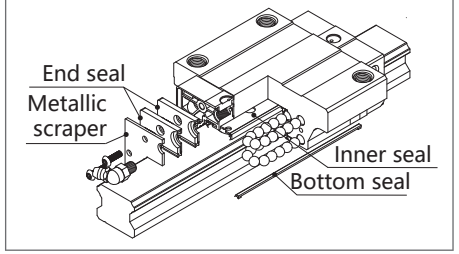


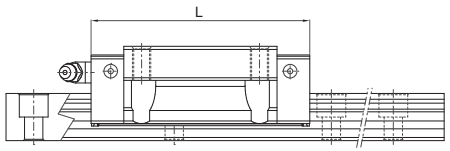
- DD Double bidirectional end seal+ Bottom seal + Inner seal



Dust Proof

● KK DD + Metallic scraper





● Types of dust proof accessories, and the increment to be added to the carriage overall length.The increment to be added to the length of carriage with different applications of dust protection accessory is shown below.

Model No.	No symbol	UU	SS	VV	ZZ	DD	KK
LMG 15	-	-	-	-	7	6	13
LMG 20	-	-	-	-	7	6	13
LMG 25	-	-	-	-	7	6	13
LMG 30	-	-	-	-	7	6	13
LMG 35	-	-	-	-	7	6	13
LMG 45	-	-	-	-	7	6	13
LMG 55	-	-	-	-	7	6	13

Dust Proof

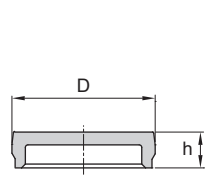
(2) Code of contamination protection for rail

● Caps for rail mounting hole

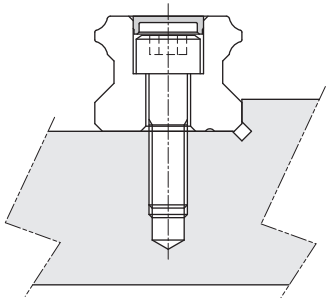
A special designed of cap is used to cover the bolt hole to prevent the foreign matters from entering the carriage.

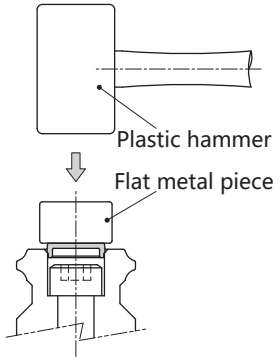
● Installation of plastic cap

Put the plate on the cap,then pound it into the bolt of rail with rubber hammer vertically. Continue pounding the cap until the cap is on the same plane with the top surface of rail.



plastic cap





● Plastic Cap

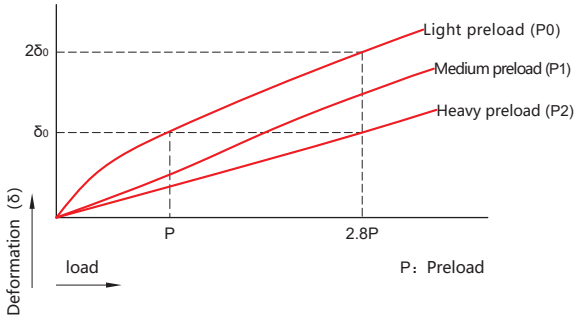
Code of Plastic Cap	Bolt Size	D (mm)	h (mm)	Rail Model
L3	M3	6.2	1.1	LMG/GQ 15U
L4	M4	7.5	1.1	LMG/GQ 15R
L5	M5	9.7	2.4	LMG/GQ 20R
L6	M6	11.2	2.8	LMG/GQ 25R，LMG 30U
L8	M8	14.2	3.3	LMG 30R，LMG 35R
L12	M12	20.2	4.5	LMG 45R
L14	M14	23.2	5.5	LMG 55R

Preload

Since the radial chearance of the linear guideway greatly affects the running accuracy,load carrying capacity and rigidity of the linear guideway, it is important to select an appropriate clearance according to the application. in general,selecting a negative clearance while taking into account possible vibrations and impact generated from reciprocating motion favorably affects the service life and the accuracy.

(1) Preload and Rigidity

Selecting appropriate preload to adapt the rigidity of machiney and equipment.
The rigidity of a linear guideway could be enhanced by increasing he preload. As shown as below figure, the load could be raised up to 2.8 times the preload applied.



(2) Preload and Service life

The preload is represented by negative clearance resulting from the increase of rolling element diameter. Therefore, the preload should be considered in calculation service life.

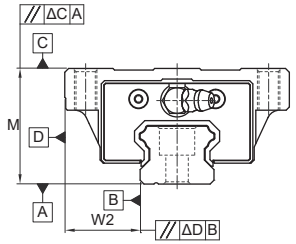
Preload Grade

Preload grade	Code	Preload	Operating Condition
Light preload	P0	0~0.02C	● The loading direction is fixed, vibration and impact are light, and two axes are applied in parallel. ● High precision is not required, and the low frictional resistance is needed.
Medium preload	P1	0.04~0.06C	● Overhang application with a moment load. ● Applied in one-axis configuration ● The need of light preload and high precision.
Heavy preload	P2	0.07~0.09C	● Machine is subjected to vibration and impact, and high rigidity required. ● Application of heavy load or heavy cutting.

Note: The preload is the percentage of basic dynamic load rating (C).

Non-Interchangeable Accuracy Grade

The accuracy of LMG/GQ series is divided into five classes, Normal grade (N), High accuracy grade (H), Precision grade (P), Super precision grade (SP) and Ultra precision grade (UP).

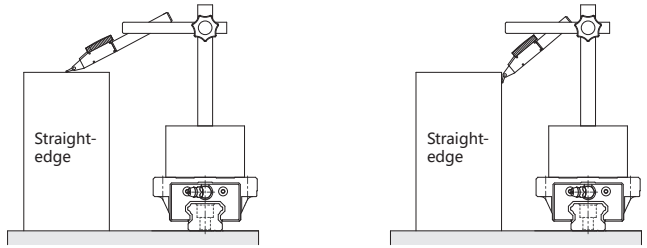


Unit (mm)

Model No.	Item	Accuracy Grade				
		Normal N	High H	Precision P	Super Precision SP	Ultra Precision UP
15 20	Tolerance for height M	±0.08	±0.03	0 -0.03	0 -0.015	0 -0.008
	Height difference ΔM	0.02	0.01	0.006	0.004	0.003
	Tolerance for distance W2	±0.08	±0.03	0 -0.03	0 -0.015	0 -0.008
	Difference in distance W2 (ΔW2)	0.02	0.01	0.006	0.004	0.003
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)				
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)				
25 30 35	Tolerance for height M	±0.08	±0.04	0 -0.04	0 -0.02	0 -0.01
	Height difference ΔM	0.02	0.015	0.007	0.005	0.003
	Tolerance for distance W2	±0.08	±0.04	0 -0.04	0 -0.02	0 -0.01
	Difference in distance W2 (ΔW2)	0.03	0.015	0.007	0.005	0.003
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)				
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)				
45 55	Tolerance for height M	±0.08	±0.05	0 -0.05	0 -0.03	0 -0.02
	Height difference ΔM	0.03	0.015	0.007	0.005	0.003
	Tolerance for distance W2	±0.08	±0.05	0 -0.05	0 -0.03	0 -0.02
	Difference in distance W2 (ΔW2)	0.03	0.02	0.01	0.007	0.005
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)				
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)				

Running Parallelism

The running accuracy is the deviation of parallelism between the reference surface of carriage and reference surface of rail when carriage moving over the entire length of rail.

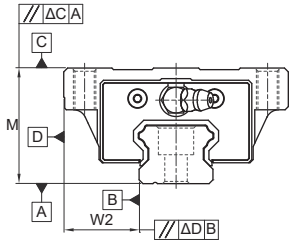


Measurement of running parallelism

Rail length (mm)		Running Parallelism Values (μm)				
Above	Or less (incl.)	Normal N	High H	Precision P	Super Precision SP	Ultra Precision UP
0	315	9	6	3	2	1.5
315	400	11	8	4	2	1.5
400	500	13	9	5	2	1.5
500	630	16	11	6	2.5	1.5
630	800	18	12	7	3	2
800	1000	20	14	8	4	2
1000	1250	22	16	10	5	2.5
1250	1600	25	18	11	6	3
1600	2000	28	20	13	7	3.5
2000	2500	30	22	15	8	4
2500	3000	32	24	16	9	4.5
3000	3500	33	25	17	11	5
3500	4000	34	26	18	12	6

Interchangeable Accuracy Grade

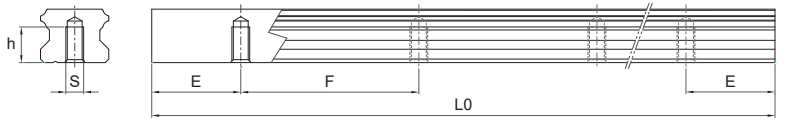
The accuracy of LMG/GQ series is divided into three classes, Normal grade (N), High accuracy grade (H), Precision grade (P).



Unit (mm)

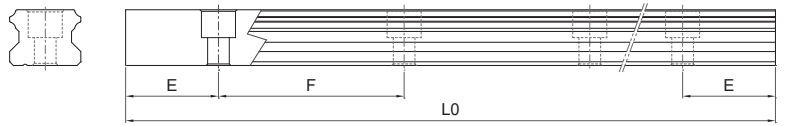
Model No.	Item		Accuracy Grade Normal N	High H	Precision P
15 20	Tolerance for height M		±0.080	±0.030	±0.015
	Height difference ΔM	Single axis with multiple sliders (1 set)	0.020	0.015	0.006
		Multiple axes with multiple sliders (multiple sets)	0.030	0.030	0.030
	Tolerance for distance W2		±0.080	±0.030	±0.015
	Difference in distance W2 (ΔW2)		0.025	0.020	0.006
	Running parallelism of surface C with surface A		ΔC (see Running parallelism of carriageA-13)		
	Running parallelism of surface D with surface B		ΔD (see Running parallelism of carriageA-13)		
25 30 35	Tolerance for height M		±0.080	±0.040	±0.020
	Height difference ΔM	Single axis with multiple sliders (1 set)	0.020	0.015	0.007
		Multiple axes with multiple sliders (multiple sets)	0.030	0.030	0.030
	Tolerance for distance W2		±0.080	±0.040	±0.015
	Difference in distance W2 (ΔW2)		0.030	0.020	0.007
	Running parallelism of surface C with surface A		ΔC (see Running parallelism of carriageA-13)		
	Running parallelism of surface D with surface B		ΔD (see Running parallelism of carriageA-13)		
45 55	Tolerance for height M		±0.080	±0.050	±0.025
	Height difference ΔM	Single axis with multiple sliders (1 set)	0.030	0.020	0.007
		Multiple axes with multiple sliders (multiple sets)	0.035	0.035	0.035
	Tolerance for distance W2		±0.080	±0.050	±0.020
	Difference in distance W2 (ΔW2)		0.030	0.020	0.010
	Running parallelism of surface C with surface A		ΔC (see Running parallelism of carriageA-13)		
	Running parallelism of surface D with surface B		ΔD (see Running parallelism of carriageA-13)		

Tapped Hole Rail Dimensions



Model	S	h (mm)
LMG/GQ 15T	M5	8
LMG/GQ 20T	M6	10
LMG/GQ 25T	M6	12
LMG 30T	M8	15
LMG 35T	M8	17
LMG 45T	M12	24
LMG 55T	M14	24

Rail Maximum Length and Standard



Unit (mm)

Size	LMG/GQ 15	LMG/GQ 20	LMG/GQ 25	LMG 30	LMG 35	LMG 45	LMG 55
Standard Pitch (F)	60	60	60	80	80	105	120
Standard (Estd.)	20	20	20	45	45	58	30
Minimum (Emin.)	5	6	7	8	8	11	13
Maximum Length (L0)	4000	4000	4000	4000	4000	4000	4000

Recommended Torque Value for Fastening Bolts on Linear Guideway

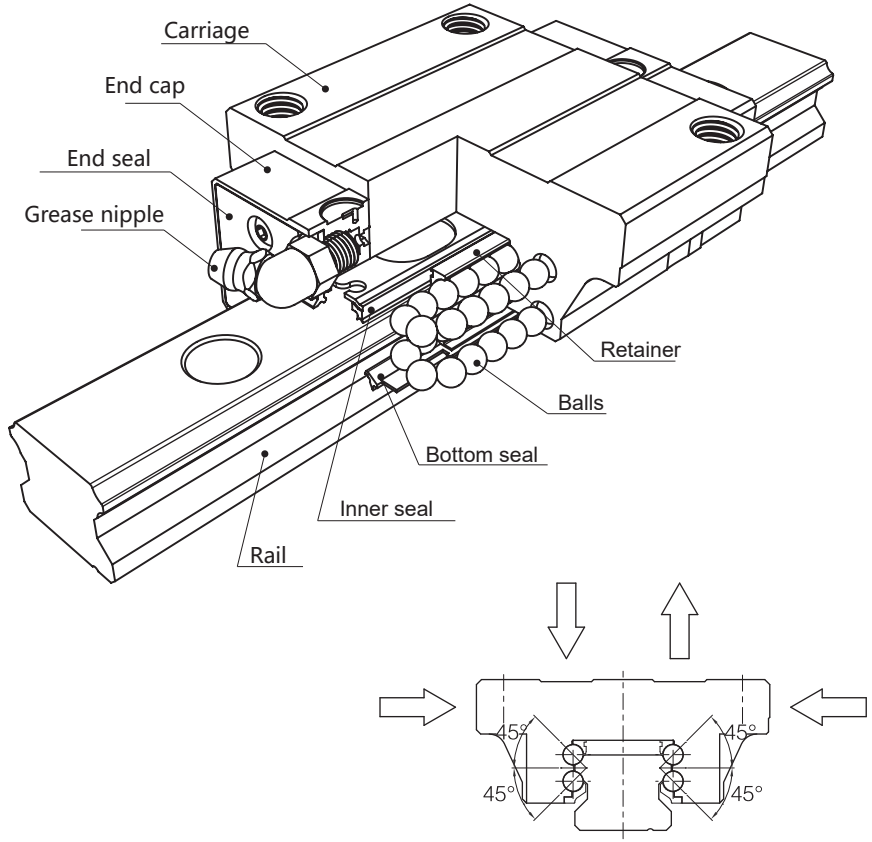
When installing linear guideway, the tightening force of assembly bolts significantly impacts overall assembly precision. Therefore, uniformity in the tightening force is crucial. It is recommended to use a torque wrench to tighten assembly bolts according to the torque values provided in the table below. Keep in mind that the torque values for bolts may vary based on the material of the mounting surface.

Unit (mm)

Nominal Size of Bolts	Tightening Torque Value		
	Iron components	Cast Components	Aluminum Alloy Components
M3×0.5P	2	1.3	1
M4×0.7P	4	2.7	2
M5×0.8P	8.8	5.9	4.4
M6×1P	13.7	9.2	6.8
M8×1.25P	30	20	15
M10×1.5P	68	45	33
M12×1.75P	120	78	58
M14×2P	157	105	78
M16×2P	196	131	98
M20×2.5P	382	255	191

*1 N-m = 0.738 lbf-ft

LMG series



Note: For reference only.

Characteristics

The four trains of balls are designed with a contact angle of 45° which enables it not only to bear load equally in radial, reversed radial and lateral directions but also can achieve high rigidity and high loading capacity. Therefore, it is suitable for all directional installation. Furthermore the unique self alignment function of LMG series can compensate the certain error while assembling, and which results in high precision and smooth motion.

- High rigidity
- Four-way equal load
- Self alignment capability
- Complete dust sealing system
- High positioning accuracy
- Smooth movement
- Low noise and high speed application
- Interchangeability
- Carriage common rail design
- International standard

Applications

Machine Tool (CNC、Lathe …)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Injection Molding Machine …)

Specifications

(1) Non-Interchangeable type

LMG 20 C M 2 SS P1 SR +R 1000-20 /20 P II

Series: LMG
Size: 15, 20, 25, 30, 35, 45, 55
Carriage type
(1) Heavy load
C: Flange type, mounting either from top or bottom
TC: Flange type, mounting either from top or bottom
H: Square high type
V: Square medium type
T: Square compact type
(2) Ultra heavy load
LC: Flange type, mounting either from top or bottom
LH: Square high type
LV: Square medium type
LT: Square compact type
(3) Medium load
ST: Square compact type
Accessories: No symbol, M (Metal End Cap), E (Electrolyte Resistant)
Number of carriages per rail: 1, 2, 3 ... ..
Dust protection option: No symbol, UU, SS, VV, ZZ, DD, KK
Preload: P0 (Light preload), P1 (Medium preload), P2 (Heavy preload)
Accessories: No symbol, SR (Self-Lubricating Module)
Code of special carriage: A, B ... (Standard rail is no symbol)
Rail type: R, U* (Counter-bore type), T (Tapped hole type)
Rail length (mm)
Rail hole pitch from start side (E1, Refer to FigureA-21)
Rail hole pitch to the end side (E2, Refer to FigureA-21)
Accuracy grade: N, H, P, SP, UP
Code of special rail: A, B ... (Standard rail is no symbol)
Number of rails per axis: No symbol, II, III, IV ...

*U type rail is only applicable for LMG15 and LMG30, detail information please see the specification table for the corresponding model number.

Specifications

(2) Interchangeable type

• Code of Carriage

LMG 20 C M SS P0 SR N

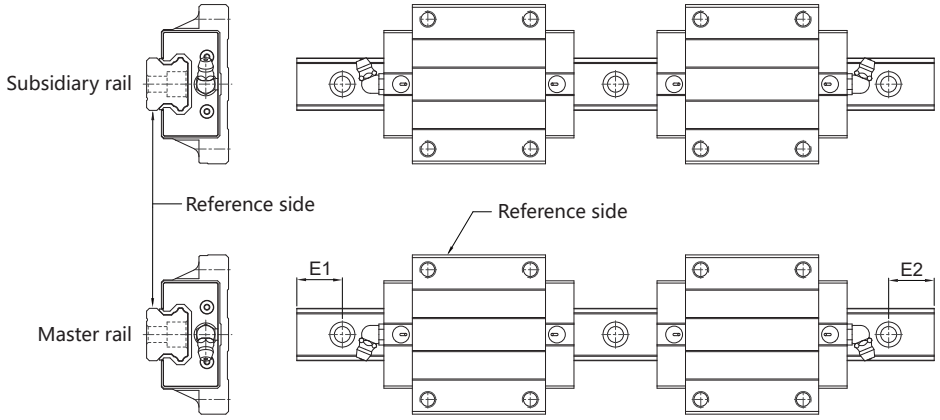
Series: LMG
Size: 15, 20, 25, 30, 35, 45, 55
Carriage type
(1) Heavy load
C: Flange type, mounting either from top or bottom
TC: Flange type
H: Square high type
V: Square medium type
T: Square compact type
(2) Ultra heavy load
LC: Flange type, mounting either from top or bottom
LH: Square high type
LV: Square medium type
LT: Square compact type
(3) Short type
ST: Square compact type
Accessories: No symbol, M (Metal End Cap), E (Electrolyte Resistant)
Dust protection option: No symbol, UU, SS, VV, ZZ, DD, KK
Preload: P0 (Light preload)
Accessories: No symbol, SR (Self-Lubricating Module)
Accuracy grade: N, H
Code of special carriage: A, B ... (Standard carriage is no symbol)

• Code of Rail

LMG 20 R 1000 -20 /20 N

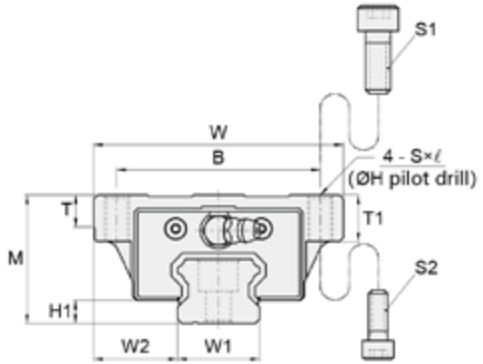
Series: LMG
Size: 15, 20, 25, 30, 35, 45, 55
Rail type: R, U* (Counter-bore type), T (Tapped hole type)
Rail length (mm)
Rail hole pitch from start side (E1, see Figure below)
Rail hole pitch to the end side (E2, see Figure below)
Accuracy grade: N, H
Code of special rail: A, B ... (Standard rail is no symbol)

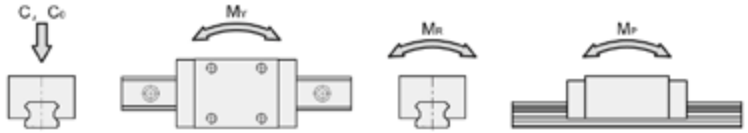
*U type rail is only applicable for LMG15 and LMG30, detail information please see the specification table for the corresponding model number.



Dimensions of LMG···C / LC

Model No.	Bolt Size		Pilot drill
	S1	S2	H
LMG15	M5	M4	4.4
LMG20	M6	M5	5.3
LMG25	M8	M6	6.9
LMG30	M10	M8	8.6
LMG35	M10	M8	8.6
LMG45	M12	M10	10.4
LMG55	M14	M12	12.5

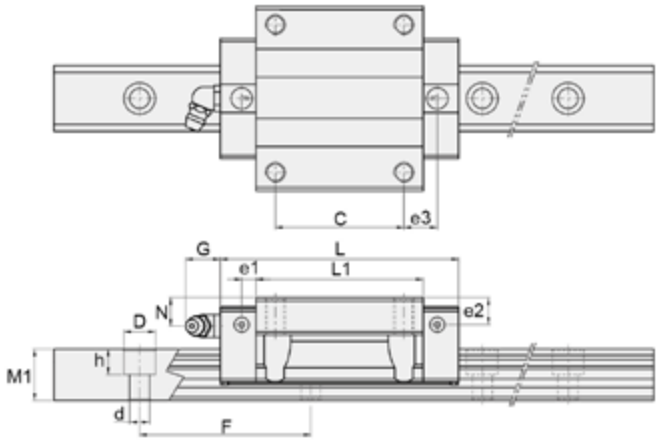




Unit (mm)

Model No.	External dimension			Carriage dimension												
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	T	T1	H1	N	e1	e2	e3	G	Grease nipple
	M	W	L													
LMG15 C	24	47	58.5	38	30	M5×8	39.5	5.5	8	4.5	5	3.3	4	8.6	5	M4×0.7
LMG20 C	30	63	75.2	53	40	M6×10	52.5	7	10	4.6	8.5	4.5	7	10.8	12	M6×0.75
LMG20 LC	30	63	87.6	53	40	M6×10	64.9	7	10	4.6	8.5	4.5	7	17	12	M6×0.75
LMG25 C	36	70	84	57	45	M8×13	58.8	9	13	6	10	5	9.5	11.8	12	M6×0.75
LMG25 LC	36	70	103	57	45	M8×13	77.8	9	13	6	10	5	9.5	21.3	12	M6×0.75
LMG30 C	42	90	98	72	52	M10×15	69.8	10	15	8	8	6	8	14	12	M6×0.75
LMG30 LC	42	90	120.2	72	52	M10×15	92	10	15	8	8	6	8	25.1	12	M6×0.75
LMG35 C	48	100	111.2	82	62	M10×15	80.2	10	15	9.5	8	7.5	8	15.6	12	M6×0.75
LMG35 LC	48	100	136.6	82	62	M10×15	105.6	10	15	9.5	8	7.5	8	28.3	12	M6×0.75
LMG45 C	60	120	138.2	100	80	M12×18	102.2	12	18	11	10	8.5	10	17.6	13.5	PT 1/8
LMG45 LC	60	120	169.9	100	80	M12×18	133.9	12	18	11	10	8.5	10	33.5	13.5	PT 1/8
LMG55 C	70	140	166	116	95	M14×25	126	15	25	13	12	9	10.5	33.5	13.5	PT 1/8
LMG55 LC	70	140	204	116	95	M14×25	164	15	25	13	12	9	10.5	42.5	13.5	PT 1/8

Dimensions of LMG···C / LC

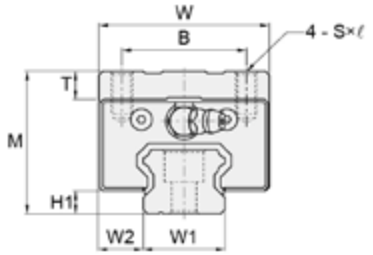


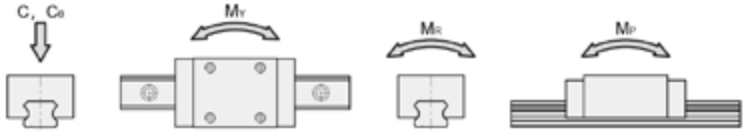
Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width	W2	Height	Pitch	Mounting bolt hole	Dynamic	Static	MP (KN·m)		MY (KN·m)		MR KN·m	Carriage Kg	Rail Kg/m
	W1		M1	F	D×h×d	C KN	C0 KN	Single Carriage	Double Carriages	Single Carriage	Double Carriages			
LMG15 C	15	16	13	60	7.5×5.3×4.5•	11.1	16.2	0.11	0.61	0.11	0.61	0.13	0.19	1.29
LMG20 C	20	21.5	15	60	9.5×8.5×6	18.9	27.4	0.23	1.29	0.23	1.29	0.28	0.42	1.92
LMG20 LC	20	21.5	15	60	9.5×8.5×6	22.4	33.7	0.35	1.84	0.35	1.84	0.35	0.53	1.92
LMG25 C	23	23.5	18	60	11×9×7	26.4	36.4	0.35	1.94	0.35	1.94	0.43	0.62	2.67
LMG25 LC	23	23.5	18	60	11×9×7	32.3	48.6	0.60	3.09	0.60	3.09	0.57	0.81	2.67
LMG30 C	28	31	23	80	14×12×9•	37.5	49.6	0.58	3.13	0.58	3.13	0.72	1.10	4.48
LMG30 LC	28	31	23	80	14×12×9•	45.9	66.1	0.98	4.96	0.98	4.96	0.96	1.43	4.48
LMG35 C	34	33	26	80	14×12×9	49.9	64.8	0.88	4.80	0.88	4.80	1.14	1.50	6.24
LMG35 LC	34	33	26	80	14×12×9	61.1	86.3	1.48	7.39	1.48	7.39	1.52	1.94	6.24
LMG45 C	45	37.5	32	105	20×17×14	80.4	101.0	1.77	9.17	1.77	9.17	2.35	2.83	10.25
LMG45 LC	45	37.5	32	105	20×17×14	98.3	135.0	2.97	14.54	2.97	14.54	3.13	3.68	10.25
LMG55 C	53	43.5	44	120	23×20×16	118.0	156.0	3.23	16.27	3.23	16.27	4.34	6.35	15.08
LMG55 LC	53	43.5	44	120	23×20×16	147.0	206.0	5.33	25.61	5.33	25.61	5.68	7.67	15.08

•1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.
2.Rail mounting hloes for M6 bolt (11×9×7) and M8 bolt (14×12×9) are available for LMG30 rail.
The codes of rail type are LMG30R for M8 bolt, and LMG30U for M6 bolt.

Dimensions of LMG···H / LH

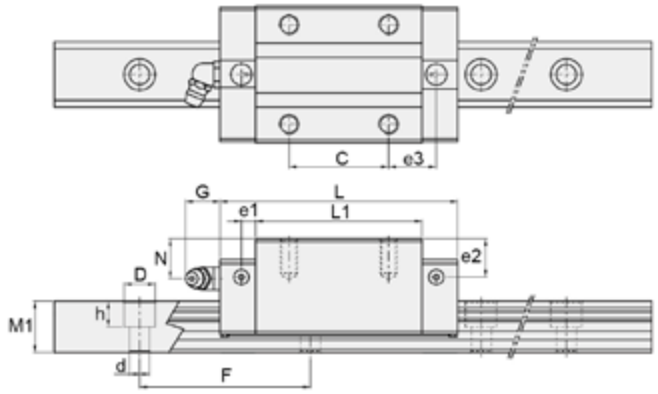




Unit (mm)

Model No.	External dimension			Carriage dimension												Grease nipple
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	T	H1	N	e1	e2	e3	G	
	M	W	L													
LMG15 H	28	34	58.5	26	26	M4×7	39.5	6	4.5	9	3.3	8	10.6	5	M4×0.7
LMG15 LH	28	34	72.6	26	34	M4×7	53.6	6	4.5	9	3.3	8	13.7	5	M4×0.7
LMG20 H	30	44	75.2	32	36	M5×8	52.5	6	4.6	8.5	4.5	7	12.8	12	M6×0.75
LMG20 LH	30	44	87.6	32	50	M5×8	64.9	6	4.6	8.5	4.5	7	12	12	M6×0.75
LMG25 H	40	48	84	35	35	M6×12	58.8	8	6	14	5	13.5	16.8	12	M6×0.75
LMG25 LH	40	48	103	35	50	M6×12	77.8	8	6	14	5	13.5	18.8	12	M6×0.75
LMG30 H	45	60	98	40	40	M8×12	69.8	8	8	11	6	11	20	12	M6×0.75
LMG30 LH	45	60	120.2	40	60	M8×12	92	8	8	11	6	11	21.1	12	M6×0.75
LMG35 H	55	70	111.2	50	50	M8×14	80.2	11	9.5	15	7.5	15	21.6	12	M6×0.75
LMG35 LH	55	70	136.6	50	72	M8×14	105.6	11	9.5	15	7.5	15	23.3	12	M6×0.75
LMG45 H	70	86	138.2	60	60	M10×20	102.2	16	11	20	8.5	20	27.6	13.5	PT 1/8
LMG45 LH	70	86	169.9	60	80	M10×20	133.9	16	11	20	8.5	20	33.5	13.5	PT 1/8
LMG55 H	80	100	166	75	75	M12×18	126	17	13	22	9	20.5	33.5	13.5	PT 1/8
LMG55 LH	80	100	204	75	95	M12×18	164	17	13	22	9	20.5	42.5	13.5	PT 1/8

Dimensions of LMG···H / LH

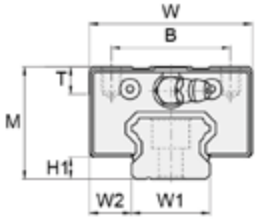


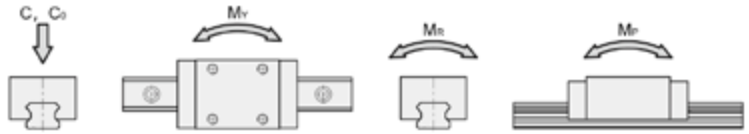
Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width		Height	Pitch	Mounting bolt hole	Dynamic	Static	MP (KN·m)		MY (KN·m)		MR KN·m	Carriage Kg	Rail Kg/m
	W1	W2	M1	F	D×h×d	C KN	C0 KN	Single Carriage	Double Carriages	Single Carriage	Double Carriages			
LMG15 H	15	9.5	13	60	7.5×5.3×4.5*	11.1	16.2	0.11	0.61	0.11	0.61	0.13	0.19	1.29
LMG15 LH	15	9.5	13	60	7.5×5.3×4.5*	13.9	21.6	0.19	1.00	0.19	1.00	0.17	0.27	1.29
LMG20 H	20	12	15	60	9.5×8.5×6	18.9	27.4	0.23	1.29	0.23	1.29	0.28	0.33	1.92
LMG20 LH	20	12	15	60	9.5×8.5×6	22.4	33.7	0.35	1.84	0.35	1.84	0.35	0.41	1.92
LMG25 H	23	12.5	18	60	11×9×7	26.4	36.4	0.35	1.94	0.35	1.94	0.43	0.55	2.67
LMG25 LH	23	12.5	18	60	11×9×7	32.3	48.6	0.60	3.09	0.60	3.09	0.57	0.72	2.67
LMG30 H	28	16	23	80	14×12×9*	37.5	49.6	0.58	3.13	0.58	3.13	0.72	0.87	4.48
LMG30 LH	28	16	23	80	14×12×9*	45.9	66.1	0.98	4.96	0.98	4.96	0.96	1.13	4.48
LMG35 H	34	18	26	80	14×12×9	49.9	64.8	0.88	4.80	0.88	4.80	1.14	1.44	6.24
LMG35 LH	34	18	26	80	14×12×9	61.1	86.3	1.48	7.39	1.48	7.39	1.52	1.88	6.24
LMG45 H	45	20.5	32	105	20×17×14	80.4	101.0	1.77	9.17	1.77	9.17	2.35	2.85	10.25
LMG45 LH	45	20.5	32	105	20×17×14	98.3	135.0	2.97	14.54	2.97	14.54	3.13	3.70	10.25
LMG55 H	53	23.5	44	120	23×20×16	118.0	156.0	3.23	16.27	3.23	16.27	4.34	6.18	15.08
LMG55 LH	53	23.5	44	120	23×20×16	147.0	206.0	5.33	25.61	5.33	25.61	5.68	7.45	15.08

*1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.
2.Rail mounting hloes for M6 bolt (11×9×7) and M8 bolt (14×12×9) are available for LMG30 rail.
The codes of rail type are LMG30R for M8 bolt, and LMG30U for M6 bolt.

Dimensions of LMG···ST / T / LT / V / LV

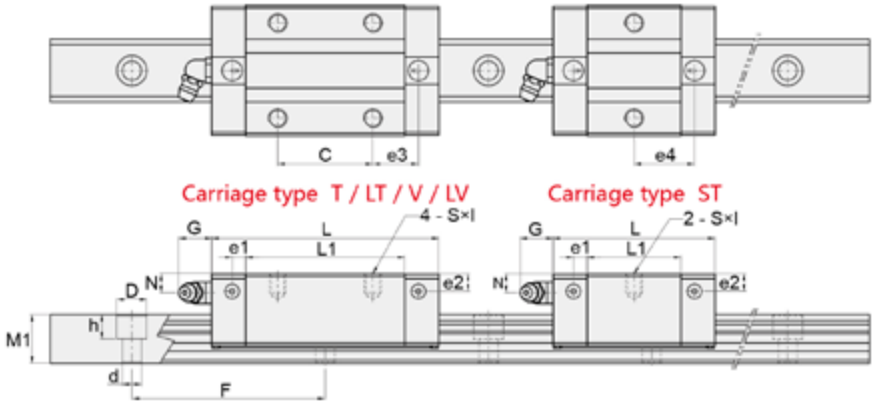




Unit (mm)

Model No.	External dimension			Carriage dimension												Grease nipple
	Height	Width	Length			Mounting hole										
	M	W	L	B	C	S×ℓ	L1	T	H1	N	e1	e2	e3	e4	G	
LMG15 ST	24	34	41	26	-	M4×5	22	6	4.5	5	3.3	4	14.9	14.8	5	M4×0.7
LMG15 T	24	34	58.5	26	26	M4×5	39.5	6	4.5	5	3.3	4	10.6	-	5	M4×0.7
LMG15 LT	24	34	72.6	26	34	M4×5	53.6	6	4.5	5	3.3	4	13.7	-	5	M4×0.7
LMG20 ST	28	42	47.6	32	-	M5×6	24.9	6	4.6	6.5	4.5	5	-	17	12	M6×0.75
LMG20 T	28	42	75.2	32	32	M5×6	52.5	6	4.6	6.5	4.5	5	14.8	-	12	M6×0.75
LMG25 ST	33	48	59.9	35	-	M6×7	34.5	8	6	7	5	6.5	22.2	22.3	12	M6×0.75
LMG25 T	33	48	84	35	35	M6×7	58.8	8	6	7	5	6.5	16.8	-	12	M6×0.75
LMG25 V	36	48	84	35	35	M6×9	58.8	8	6	10	5	9.5	16.8	-	12	M6×0.75
LMG25 LV	36	48	103	35	50	M6×9	77.8	8	6	10	5	9.5	16.8	-	12	M6×0.75
LMG30 T	42	60	98	40	40	M8×10	69.8	8	8	8	6	8	20	-	12	M6×0.75
LMG30 LT	42	60	120.2	40	60	M8×10	92	8	8	8	6	8	21.1	-	12	M6×0.75
LMG35 T	48	70	111.2	50	50	M8×12	80.2	10	9.5	8	7.5	8	21.6	-	12	M6×0.75
LMG35 LT	48	70	136.6	50	72	M8×12	105.6	10	9.5	8	7.5	8	23.3	-	12	M6×0.75
LMG45 T	60	86	138.2	60	60	M10×17	102.2	16	11	10	8.5	10	27.6	-	13.5	PT 1/8
LMG45 LT	60	86	169.9	60	80	M10×17	133.9	16	11	10	8.5	10	33.5	-	13.5	PT 1/8
LMG55 T	70	100	166	75	75	M12×18	126	17	13	12	9	10.5	33.5	-	13.5	PT 1/8
LMG55 LT	70	100	204	75	95	M12×18	164	17	13	12	9	10.5	42.5	-	13.5	PT 1/8

Dimensions of LMG···ST / T / LT / V / LV



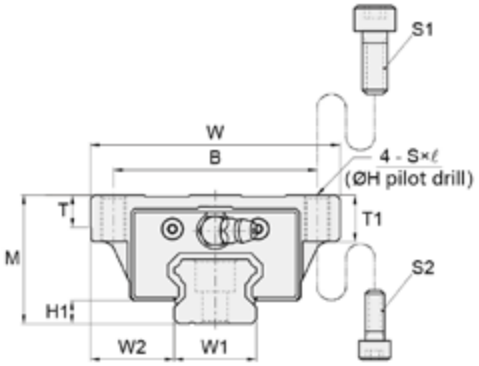
Unit (mm)

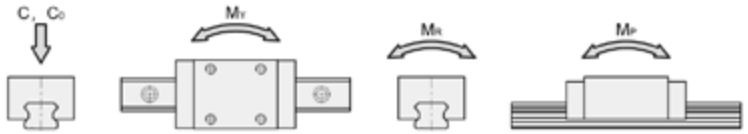
Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width		Height	Pitch	Mounting bolt hole	Dynamic	Static	MP (KN·m)		MY (KN·m)		MR KN·m	Carriage Kg	Rail Kg/m
	W1	W2	M1	F	D×h×d	C KN	C0 KN	Single Carriage	Double Carriages	Single Carriage	Double Carriages			
LMG15 ST	15	9.5	13	60	7.5×5.3×4.5•	6.7	8.1	0.04	0.25	0.04	0.25	0.06	0.09	1.29
LMG15 T	15	9.5	13	60	7.5×5.3×4.5•	11.1	16.2	0.11	0.61	0.11	0.61	0.13	0.15	1.29
LMG15 LT	15	9.5	13	60	7.5×5.3×4.5•	13.9	21.6	0.19	1.00	0.19	1.00	0.17	0.21	1.29
LMG20 ST	20	11	15	60	9.5×8.5×6	7.4	9.4	0.04	0.33	0.04	0.33	0.07	0.15	1.92
LMG20 T	20	11	15	60	9.5×8.5×6	18.9	27.4	0.23	1.29	0.23	1.29	0.28	0.28	1.92
LMG25 ST	23	12.5	18	60	11×9×7	13.1	16.9	0.11	0.71	0.11	0.71	0.18	0.26	2.67
LMG25 T	23	12.5	18	60	11×9×7	26.4	36.4	0.35	1.94	0.35	1.94	0.43	0.41	2.67
LMG25 V	23	12.5	18	60	11×9×7	26.4	36.4	0.35	1.94	0.35	1.94	0.43	0.47	2.67
LMG25 LV	23	12.5	18	60	11×9×7	32.3	48.6	0.60	3.09	0.60	3.09	0.57	0.61	2.67
LMG30 T	28	16	23	80	14×12×9•	37.5	49.6	0.58	3.13	0.58	3.13	0.72	0.79	4.48
LMG30 LT	28	16	23	80	14×12×9•	45.9	66.1	0.98	4.96	0.98	4.96	0.96	1.02	4.48
LMG35 T	34	18	26	80	14×12×9	49.9	64.8	0.88	4.80	0.88	4.80	1.14	1.14	6.24
LMG35 LT	34	18	26	80	14×12×9	61.1	86.3	1.48	7.39	1.48	7.39	1.52	1.47	6.24
LMG45 T	45	20.5	32	105	20×17×14	80.4	101.0	1.77	9.17	1.77	9.17	2.35	2.17	10.25
LMG45 LT	45	20.5	32	105	20×17×14	98.3	135.0	2.97	14.54	2.97	14.54	3.13	2.81	10.25
LMG55 T	53	23.5	44	120	23×20×16	118.0	156.0	3.23	16.27	3.23	16.27	4.34	5.20	15.08
LMG55 LT	53	23.5	44	120	23×20×16	147.0	206.0	5.33	25.61	5.33	25.61	5.68	6.17	15.08

•1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.
2.Rail mounting hloes for M6 bolt (11×9×7) and M8 bolt (14×12×9) are available for LMG30 rail.
The codes of rail type are LMG30R for M8 bolt, and LMG30U for M6 bolt.

Dimensions of LMG···TC

Model No.	Bolt Size		Pilot drill
	S1	S2	H
LMG15	M5	M4	4.4
LMG20	M6	M5	5.3
LMG25	M8	M6	6.9
LMG30	M10	M8	8.6
LMG35	M10	M8	8.6

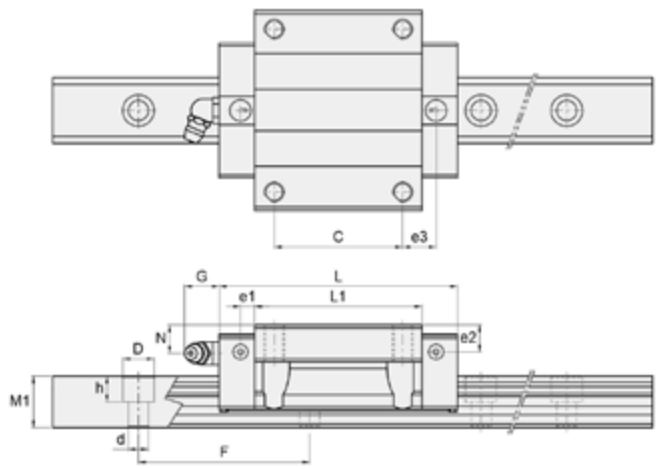




Unit (mm)

Model No.	External dimension			Carriage dimension												Grease nipple
	Height M	Width W	Length L	B	C	Mounting hole S×ℓ	L1	T	T1	H1	N	e1	e2	e3	G	
LMG15 TC	24	52	58.5	41	26	M5×7	39.5	5	7	4.5	5	3.3	4	10.6	5	M4×0.7
LMG20 TC	28	59	75.2	49	32	M6×9	52.5	5	9	4.6	6.5	4.5	5	14.8	12	M6×0.75
LMG25 TC	33	73	84	60	35	M8×10	58.8	6	10	6	7	5	6.5	16.8	12	M6×0.75
LMG30 TC	42	90	98	72	40	M10×15	69.8	12	15.2	8	8	6	8	20	12	M6×0.75
LMG35 TC	48	100	111.2	82	50	M10×15	80.2	10	15.3	9.5	8	7.5	8	21.6	12	M6×0.75

Dimensions of LMG···TC

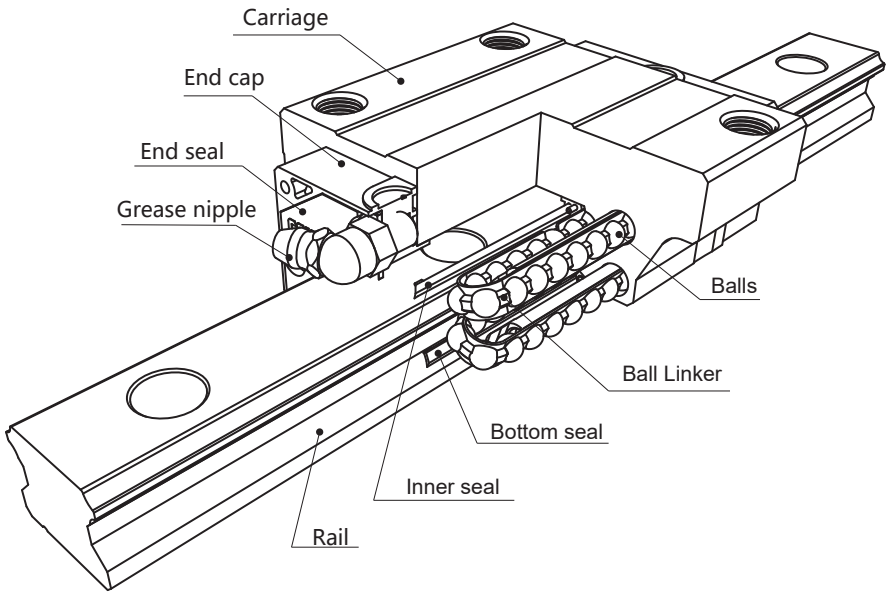


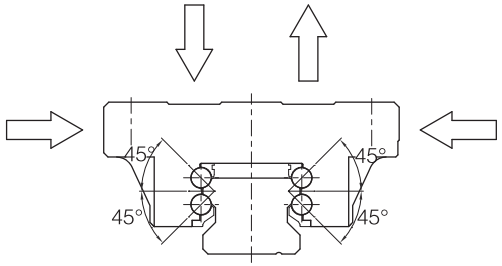
Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width W1	W2	Height M1	Pitch F	Mounting bolt hole D×h×d	Dynamic C KN	Static C0 KN	MP (KN·m) Single Carriage	MP (KN·m) Double Carriages	MY (KN·m) Single Carriage	MY (KN·m) Double Carriages	MR KN·m	Carriage Kg	Rail Kg/m
LMG15 TC	15	18.5	13	60	7.5×5.3×4.5*	11.1	16.2	0.11	0.61	0.11	0.61	0.13	0.20	1.29
LMG20 TC	20	19.5	15	60	9.5×8.5×6	18.9	27.4	0.23	1.29	0.23	1.29	0.28	0.36	1.92
LMG25 TC	23	25	18	60	11×9×7	26.4	36.4	0.35	1.94	0.35	1.94	0.43	0.58	2.67
LMG30 TC	28	31	23	80	14×12×9*	37.5	49.6	0.58	3.13	0.58	3.13	0.72	1.10	4.48
LMG35 TC	34	33	26	80	14×12×9	49.9	64.8	0.88	4.80	0.88	4.80	1.14	1.50	6.24

*1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.
2.Rail mounting hloes for M6 bolt (11×9×7) and M8 bolt (14×12×9) are available for LMG30 rail.
The codes of rail type are LMG30R for M8 bolt, and LMG30U for M6 bolt.

LMGQ series





Note: For reference only.

Characteristics

The four trains of balls are designed with a contact angle of 45° which enables it not only to bear load equally in radial, reversed radial and lateral directions but also can achieve high rigidity and high loading capacity. Therefore, it is suitable for all directional installation. Furthermore the unique self alignment function of LMG series can compensate the certain error while assembling, and which results in high precision and smooth motion.

- High rigidity
- Four-way equal load
- Self alignment capability
- Complete dust sealing system
- High positioning accuracy
- Low dust emission
- Smooth movement
- Low noise and high speed application
- Interchangeability
- Carriage common rail design
- International standard

Applications

Machine Tool (CNC、Lathe …)

Industrial Robot

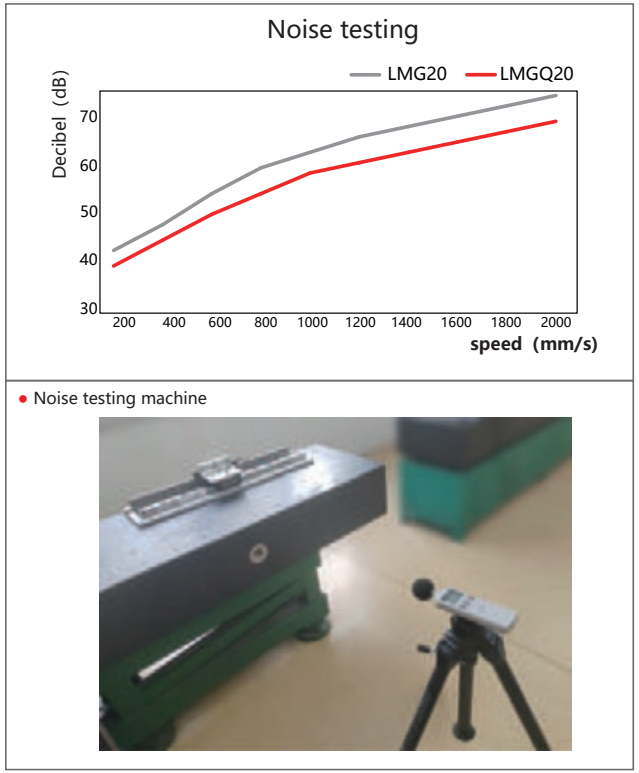
Semiconductor Manufacturing Equipment

Other (Injection Molding Machine …)

Characteristics

The LMGQ series uses a Ball Linker to eliminate the sharp sound (high audio sound) caused by the collision between the balls. Through experimental measurements, it has been found that under different speed conditions, the overall sound of the LMGQ series is effectively reduced by 5-7 decibels compared to the LMG series.

Model No.	Test conditions
Size	LMG/GQ20H1SSP0+R1200-30/30N
speed	200mm/s-2000mm/s
stroke	1000mm



Specifications

(1) Non-Interchangeable type

LMGQ 20 C 2 SS P1 +R 1000 -20 /20 P II

Series：LMGQ
Size：15，20，25
Carriage type
(1) Heavy load
C：Flange type, mounting either from top or bottom
H：Square high type
T：Square compact type
(2) Ultra heavy load
LC：Flange type, mounting either from top or bottom
LH：Square high type
(3) Medium load
ST：Square compact type
Number of carriages per rail：1，2，3 ...
Dust protection option：No symbol，UU，SS，VV，ZZ，DD，KK
Preload：P0（Light preload），P1（Medium preload），P2（Heavy preload）
Code of special carriage：A，B ...（Standard rail is no symbol）
Rail type：R，U*（Counter-bore type），T（Tapped hole type）
Rail length（mm）
Rail hole pitch from start side（E1, Refer to Figure A-35）
Rail hole pitch to the end side（E2, Refer to Figure A-35）
Accuracy grade：N，H，P，SP，UP
Code of special rail：A，B ...（Standard rail is no symbol）
Number of rails per axis：No symbol，II，III，IV ...

*U type rail is only applicable for LMGQ15, detail information please see the specification table for the corresponding model number.

Specifications

(2) Interchangeable type

- Code of Carriage

LMGQ 20 C SS P0 N

Series：LMGQ
Size：15，20，25
Carriage type
(1) Heavy load
C：Flange type, mounting either from top or bottom
H：Square high type
T：Square compact type
(2) Ultra heavy load
LC：Flange type, mounting either from top or bottom
LH：Square high type
(3) Medium load
ST：Square compact type
Dust protection option：No symbol，UU，SS，VV
Preload：P0（Light preload）
Accuracy grade：N，H
Code of special carriage：A，B ...（Standard carriage is no symbol）

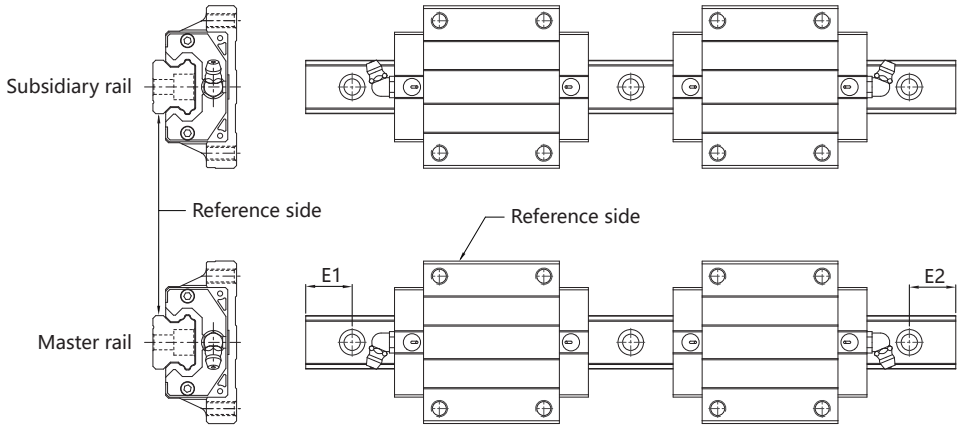
Specifications

- Code of Rail

LMG 20 R 1000 -20 /20 N

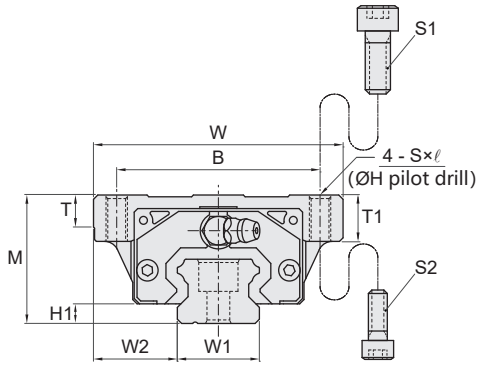
Series：LMG
Size：15，20，25
Rail type：R，U*（Counter-bore type），T（Tapped hole type）
Rail length（mm）
Rail hole pitch from start side（E1, see Figure below）
Rail hole pitch to the end side（E2, see Figure below）
Accuracy grade：N，H
Code of special rail：A，B ...（Standard rail is no symbol）

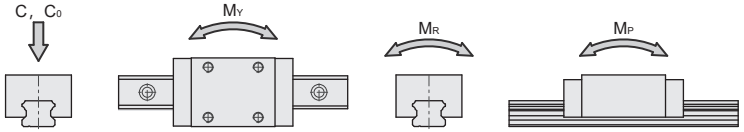
*U type rail is only applicable for LMG15, detail information please see the specification table for the corresponding model number.



Dimensions of LMGQ···C / LC

Model No.	Bolt Size		Pilot drill
	S1	S2	H
LMGQ15	M5	-	-
LMGQ20	M6	M5	5.3
LMGQ25	M8	M6	6.9





Unit (mm)

Model No.	External dimension			Carriage dimension												Grease nipple
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	T	T1	H1	N	e1	e2	e3	G	
	M	W	L													
LMGQ15 C	24	47	61.2	38	30	M5×8	43.8	5.5	8	4	5	3.3	4	10.9	5	M4×0.7
LMGQ20 C	30	63	76.1	53	40	M6×10	53.7	7	10.2	4.6	8.5	4.5	7	13.4	12	M6×0.75
LMGQ20 LC	30	63	91.1	53	40	M6×10	68.5	7	10.2	4.6	8.5	4.5	7	18.8	12	M6×0.75
LMGQ25 C	36	70	84.7	57	45	M8×13	62.7	9	13	5.5	10	5	9.5	13.9	12	M6×0.75
LMGQ25 LC	36	70	104.2	57	45	M8×13	83	9	13	5.5	10	5	9.5	23.7	12	M6×0.75

Linear Guide
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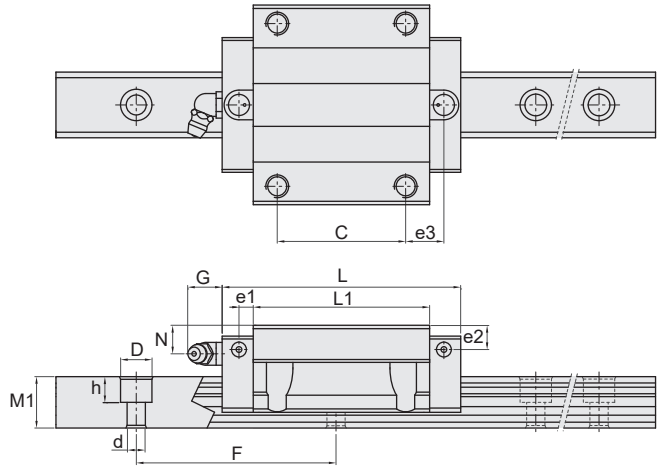
LMGQ

Dimensions of LMGQ···C / LC

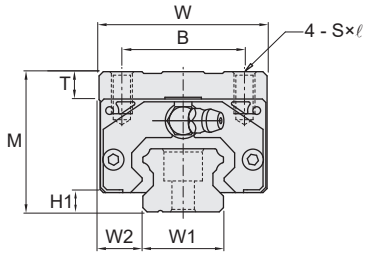


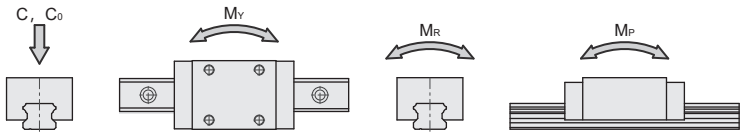
Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width	W2	Height	Pitch	Mounting bolt hole	Dynamic	Static	MP (KN·m)		MY (KN·m)		MR KN·m	Carriage Kg	Rail Kg/m
	W1		M1	F	D×h×d	C KN	C0 KN	Single Carriage	Double Carriages	Single Carriage	Double Carriages			
LMGQ15 C	15	16	13	60	7.5×5.3×4.5*	11.8	18.9	0.13	0.76	0.13	0.76	0.15	0.18	1.29
LMGQ20 C	20	21.5	15	60	9.5×8.5×6	20	32	0.30	1.68	0.30	1.68	0.33	0.40	1.92
LMGQ20 LC	20	21.5	15	60	9.5×8.5×6	23.2	39.3	0.44	2.36	0.44	2.36	0.41	0.51	1.92
LMGQ25 C	23	23.5	18	60	11×9×7	27.9	42.5	0.44	2.47	0.44	2.47	0.51	0.62	2.67
LMGQ25 LC	23	23.5	18	60	11×9×7	34.2	56.6	0.76	3.99	0.76	3.99	0.67	0.81	2.67

*1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.
2.Rail mounting holes for M6 bolt (11×9×7) and M8 bolt (14×12×9) are available for the LMG30 rail.
The codes of rail type are LMG30R for M8 bolt, and LMG30U for M6 bolt.
3.The LMGQ15C type slider does not provide a bottom-locking feature.

Dimensions of LMGQ···H / LH

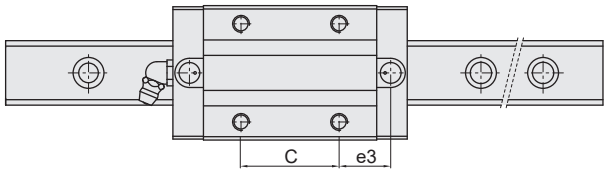


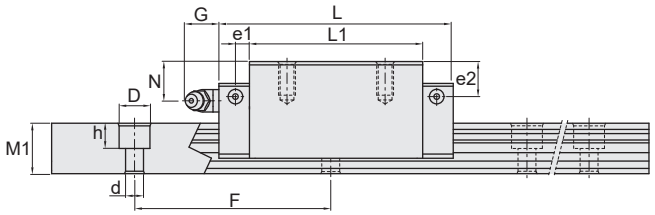


Unit (mm)

Model No.	External dimension			Carriage dimension											Grease nipple
	Height M	Width W	Length L	B	C	Mounting hole S×ℓ	L1	T	H1	N	e1	e2	e3	G	
LMGQ15 H	28	34	61.2	26	26	M4×7	43.8	6	4	9	3.3	8	12.9	5	M4×0.7
LMGQ20 H	30	44	76.1	32	36	M5×8	53.7	6	4.6	8.5	4.5	7	13.4	12	M6×0.75
LMGQ20 LH	30	44	91.1	32	50	M5×8	68.5	6	4.6	8.5	4.5	7	13.8	12	M6×0.75
LMGQ25 H	40	48	84.7	35	35	M6×12	62.7	8	5.5	14	5	13.5	18.9	12	M6×0.75
LMGQ25 LH	40	48	104.2	35	50	M6×12	83	8	5.5	14	5	13.5	21.5	12	M6×0.75

Dimensions of LMGQ···H/ LH



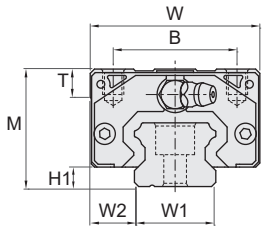


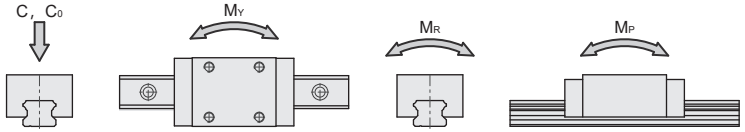
Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width W1	W2	Height M1	Pitch F	Mounting bolt hole D×h×d	Dynamic C KN	Static C0 KN	MP (KN·m) Single Carriage	MP (KN·m) Double Carriages	MY (KN·m) Single Carriage	MY (KN·m) Double Carriages	MR KN·m	Carriage Kg	Rail Kg/m
LMGQ15 H	15	9.5	13	60	7.5×5.3×4.5*	11.8	18.9	0.13	0.76	0.13	0.76	0.15	0.18	1.29
LMGQ20 H	20	12	15	60	9.5×8.5×6	20	32	0.30	1.68	0.30	1.68	0.33	0.31	1.92
LMGQ20 LH	20	12	15	60	9.5×8.5×6	23.2	39.3	0.44	2.36	0.44	2.36	0.41	0.39	1.92
LMGQ25 H	23	12.5	18	60	11×9×7	27.9	42.5	0.44	2.47	0.44	2.47	0.51	0.55	2.67
LMGQ25 LH	23	12.5	18	60	11×9×7	34.2	56.6	0.76	3.99	0.76	3.99	0.67	0.72	2.67

*1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail.
The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.

Dimensions of LMGQ···ST / T

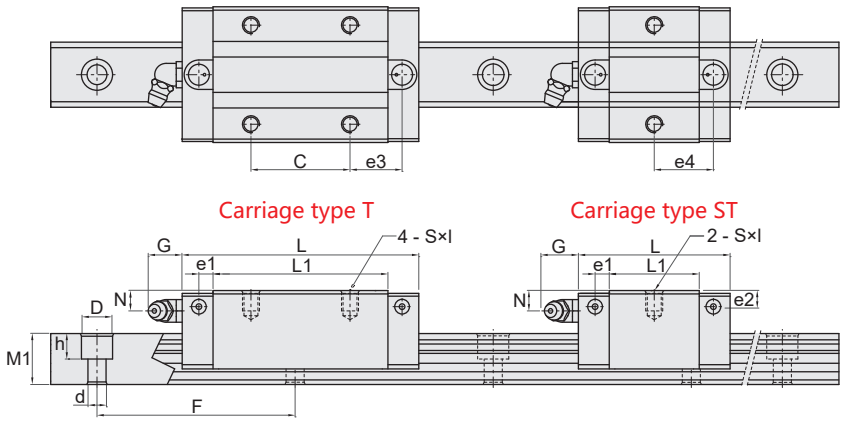




Unit (mm)

Model No.	External dimension			Carriage dimension												Grease nipple
	Height M	Width W	Length L	B	C	Mounting hole S×ℓ	L1	T	H1	N	e1	e2	e3	e4	G	
LMGQ15 T	24	34	61.2	26	26	M4×5	43.8	6	4	5	3.3	4	12.9	-	5	M4×0.7
LMGQ20 ST	28	42	50.9	32	-	M5×6	28.3	6	4.6	6.5	4.5	5	-	18.7	12	M6×0.75
LMGQ20 T	28	42	76.1	32	32	M5×6	53.7	6	4.6	6.5	4.5	5	15.4	-	12	M6×0.75
LMGQ25 T	33	48	84.7	35	35	M6×7	62.7	6	5.5	7	5	6.5	18.9	-	12	M6×0.75

Dimensions of LMGQ···ST / T



Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating					Weight	
	Width W1	W2	Height M1	Pitch F	Mounting bolt hole D×h×d	Dynamic C KN	Static C0 KN	MP (KN·m) Single Carriage	MP (KN·m) Double Carriages	MY (KN·m) Single Carriage	MY (KN·m) Double Carriages	MR KN·m	Carriage Kg	Rail Kg/m
LMGQ15 T	15	9.5	13	60	7.5×5.3×4.5*	11.8	18.9	0.13	0.76	0.13	0.76	0.15	0.14	1.29
LMGQ20 ST	20	11	15	60	9.5×8.5×6	11.7	14.8	0.07	0.52	0.07	0.52	0.15	0.13	1.92
LMGQ20 T	20	11	15	60	9.5×8.5×6	20	32	0.30	1.68	0.30	1.68	0.33	0.26	1.92
LMGQ25 T	23	12.5	18	60	11×9×7	27.9	42.5	0.44	2.47	0.44	2.47	0.51	0.41	2.67

*1.Rail mounting hloes for M3 bolt (6×4.5×3.5) and M4 bolt (7.5×5.3×4.5) are available for LMG15 rail. The codes of rail type are LMG15R for M4 bolt, and LMG15U for M3 bolt.

Lubrication

A well lubrication is important for maintaining the function of the linear guideway. If the lubrication is not sufficient, the frictional resistance at rolling area will increase and the service life will be shortened as a result of wear of rolling parts.
Two primary lubricants are both grease and oil used for the linear motion system, and the lubrication methods are categorized into manual and forced oiling. The selection of lubricant and its method should be based on the consideration of operating speed and environment requirement.

Grease lubrication

The grease feeding interval will be varied with different operating conditions and environments.Under normal operating condition, the grease should be replenished every 100km of travel.
The standard pre-filled grease is lithium-based grease No.2. Moving the carriage back and forth with minimum stroke length of three carriages after the carriages been greased. To assure the grease is evenly distributed inside of carriage, the mentioned process should be repeated twice at least.

Oil lubrication

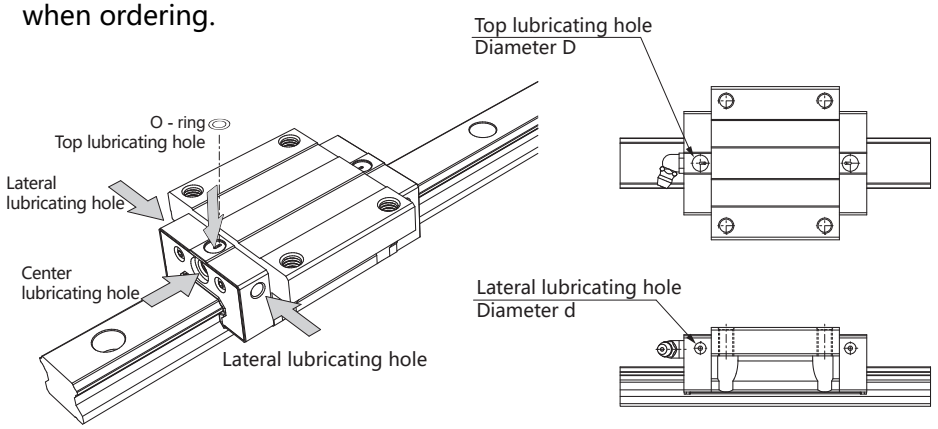
The recommended viscosity of oil is 30~150 cst, and the recommended feeding rate per hour. The nstallation other than horizontal may caused the oil unable to reach raceway area, so please specify the installed direction of your linear guideway applied.

Note:
When the operating stroke length less than the sum of length of two carriages, the lubrication fitting should be applied on both ends of carriage for adequacy. Moreover, if the stroke length less than a half of the length of a carriage, the carriage should be moved back and forth up to the length of two carriages while lubricating.

Lubrication

Lubrication position

The standard lubricating position of carriage is at the center of both ends, as shown below. As for lateral and top application, please specify when ordering.



Unit (mm)

Model No.	Center Lubricating	Lateral Lubricating			Top Lubricating		
	Grease Nipple	Diameter d	Grease Nipple	Drilling size	Diameter D	O - ring	Drilling size
LMG/GQ 15	M4×0.7P	3.3	M4×0.7P	1.5	5.8	P2	1
LMG/GQ 20	M6×0.75P	5.2	M6×0.75P	2	7.4	P4	
LMG/GQ 25							
LMG 30							
LMG 35							
LMG 45	PT1/8				10.2	P7	
LMG 55							1.5

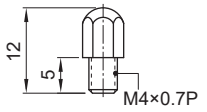
*In cases where the travel distance is less than the total length of two sliders, grease fittings or oil pipe connectors must be installed at both ends of the sliders, and regular lubrication is required. If the travel distance is less than half the total length of a slider, in addition to the aforementioned method, the slider must be moved back and forth over a lubrication distance of at least two slider lengths during lubrication.

Lubrication

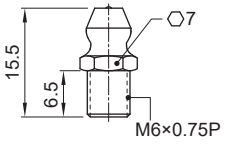
Grease nipples and oil piping joint

(1) Grease nipples

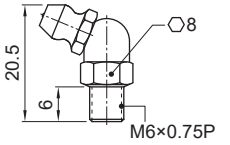
GS - M4



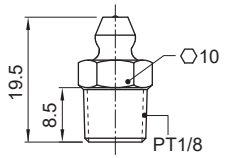
GS - M6



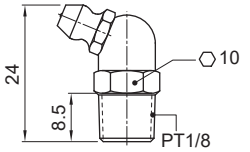
GC - M6



GS - 7



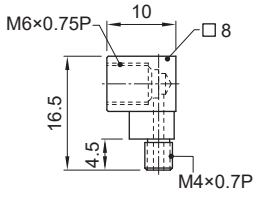
GC - 7



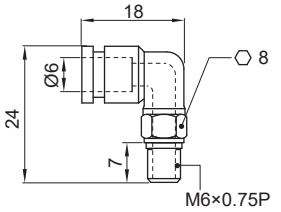
(2) Oil piping joint

● OC Type

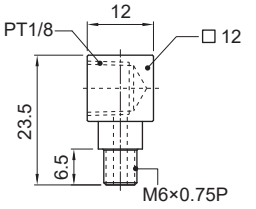
OC - 46



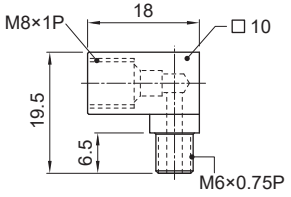
OC - 66



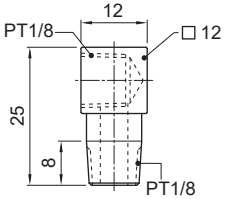
OC - 67



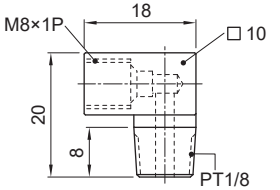
OC - 68



OC - 77



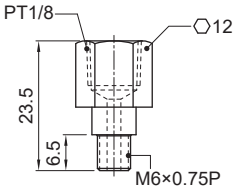
OC - 78



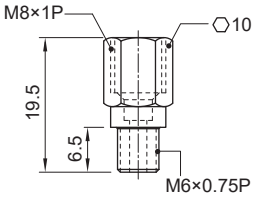
Lubrication

● OS Type

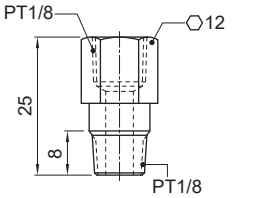
OS - 67



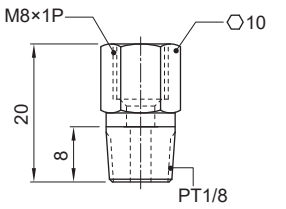
OS - 68



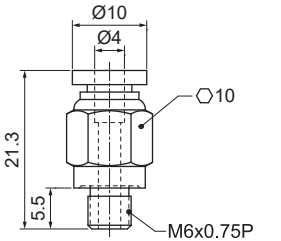
OS - 77



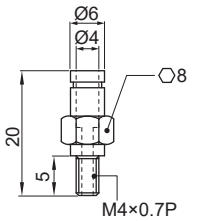
OS - 78



OS - 64 (Fast joint)



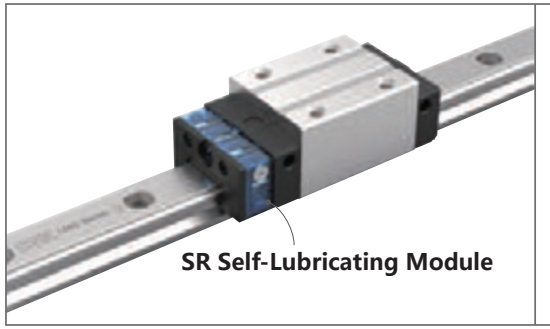
OS - 44 (Fast joint)



Model No.	Grease Nipples		Oil Piping Joint
	Standard	Option	Option
LMG/GQ 15	GS - M4	-	OC - 46、OS - 44
LMG/GQ 20	GC - M6	GS - M6	OC - 66、OC - 67、OC - 68、OS - 67、OS - 68、OS - 64
LMG/GQ 25			
LMG 30			
LMG 35			
LMG 45	GC - 7	GS - 7	OC - 77、OC - 78、OS - 77、OS - 78
LMG 55			

*When using different dust-proof configurations, it may be necessary to extend the grease fittings. Please contact CSK for consultation.

Self-Lubricating Module - SR series



- SR Self-Lubricating Module

Characteristics

- Can be used with grease
- Wide use of ambient temperature range
- Extend the maintenance cycle and reduce the maintenance cost
- Low consumption and environmentally friendly
- Oil supplement design, low cost
- Improve the service life of guide rail

Applications

Automation equipment
Electronic machinery
Industrial machinery
Other

Specifications

(1) Non-Interchangeable type

LMG/GQ20C2SSP1**SR**+R1000-20/20PII

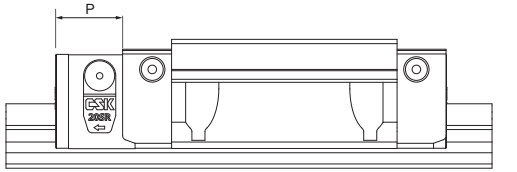
Self-Lubricating Module: SR

(2) Interchangeable type

LMG/GQ20CSSP0**SR**N

Self-Lubricating Module: SR

Dimension parameters



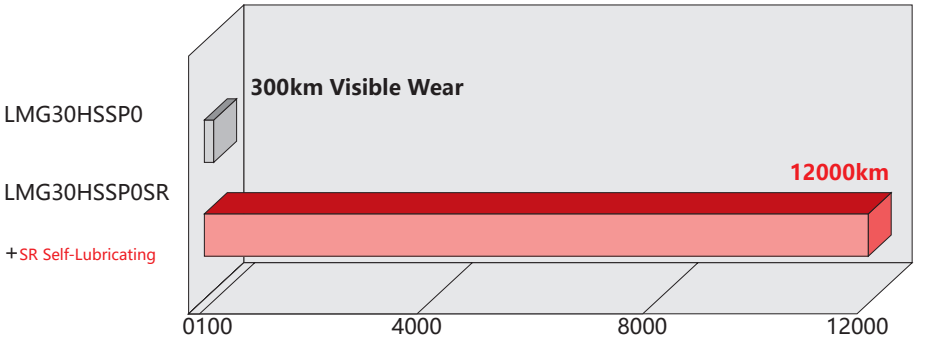
Extended size of Carriage

Model No.	P	Oil replenishment volume(ml)
LMG 15	12.6	1.3
LMG 20	15.6	2.8
LMG 25	15.6	4
LMG 30	15.6	5.9
LMGQ 15	15.6	1.3
LMGQ 20	18.6	2.8
LMGQ 25	18.6	4

Test conditions

Model No.	Test conditions
Size	LMG30H2SSP0SR+R1200-40/40NII
Speed	60m/min
stroke	1000mm
Payload	300kgf

Test conditions

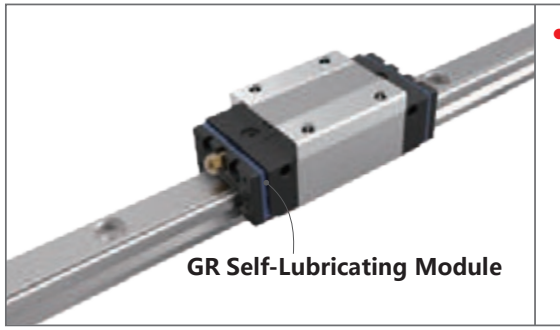


Normal exercise mileage (km)

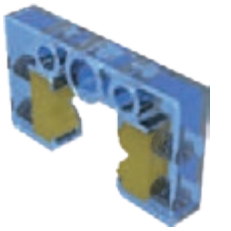
Model No.	Need to replenish lubricating oil (km)
LMG/GQ 15 SR	4000
LMG/GQ 20 SR	6000
LMG/GQ 25 SR	9000
LMG 30 SR	12000

*When installing self-lubricating modules, grease fittings are not included as standard.
If required, please contact CSK.
*The self-lubricating modules are pre-filled with specialized lubricant upon shipment.
If the lubricant level in the module is insufficient, please consult CSK.
*Due to factors such as the operating environment and conditions of the self-lubricating modules, the lubrication replenishment interval should be adjusted based on the actual situation.

Solid Self-lubricating Module - GR series



- GR Self-Lubricating Module



Characteristics

- Can be used in combination with other lubrication solutions.
- Wide range of applicable environmental temperatures.
- No flowing oil, protecting the equipment environment.
- Can be used simultaneously with lubricating grease; only a small amount of oil is required to achieve lubrication, making it environmentally friendly.
- Effectively extends maintenance cycles, reduces maintenance costs, and comprehensively extends the service life of guide rails.

Applications

Automation equipment
Electronic machinery
Industrial machinery
Other

Specifications

(1) Non-Interchangeable type

LMG/GQ20C2SSP1**GR**+R1000-20/20PII

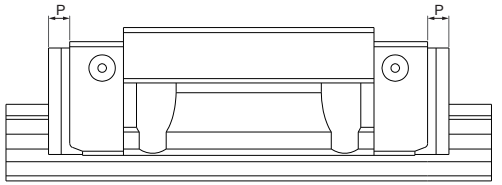
Self-Lubricating Module: GR

(2) Interchangeable type

LMG/GQ20CSSP0**GR**N

Self-Lubricating Module: GR

Dimension parameters

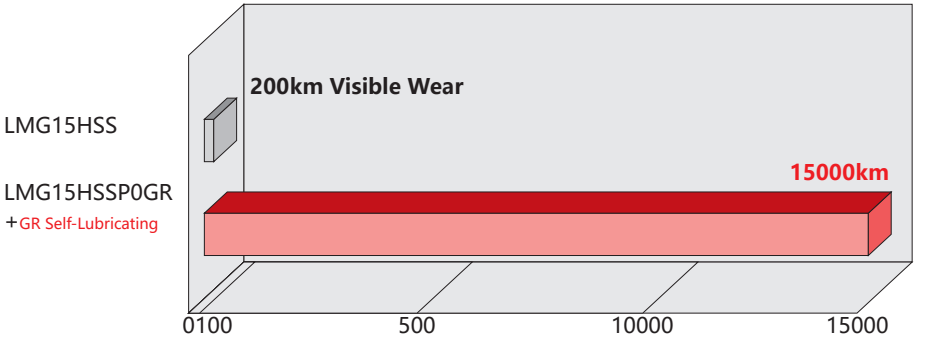


Extended size of Carriage

Model No.	P×2
LMG15/GQ15	10
LMG20/GQ20	10
LMG25/GQ25	10
LMG30	18
LMG35	18
LMG45	18
LMG55	18

Test conditions

Model No.	Test conditions
Size	LMG15H2SSP0GR+R1200-30/30
Speed	150m/min
stroke	1000mm
Payload	145kgf



*When installing self-lubricating modules, grease fittings are not included as standard.
If required, please contact CSK.

Grease for high speed - GS2

Properties

- **NLGI-grade**：2
- **Dropping point**：>180℃
- **Worked penetration(Pw 60)**：265~295 (1/10mm)
- **Temperature range**：-40℃~140℃
- **Net.**80g

Description

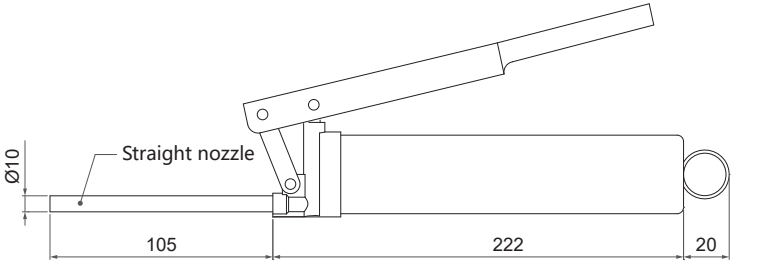
GS2 is an adhesive, lithium soap based lubricating grease designed for long-term application.
Suitable for high speed operation.

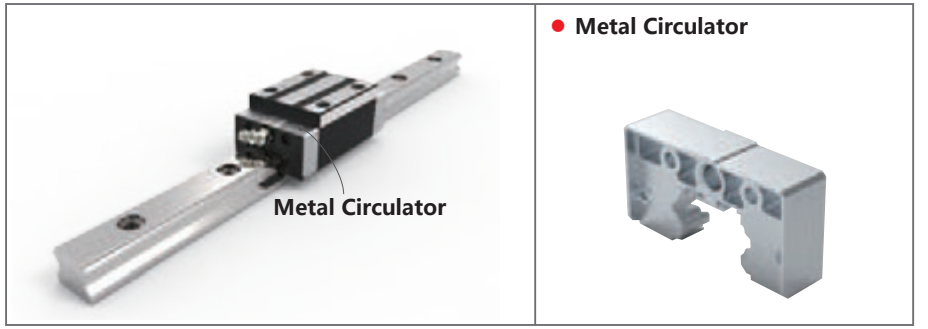
Advantages

- Suitable for life-time lubricatio
- Water resistant
- Work stable
- Protects from corrosion,even in the presence of salt water
- Suitable for high thermal loads
- Good adhesiveness
- Suitable for low temperatures
- Mechanically high loadable

Grease gun LG80

LG80 ： Grease gun for GS2.

Model No.	
Dimension	
Specifications	1.Discharge pressure：300kg/cm² 2.Weight (excluding the grease) ：0.5kg 3.Grease：80g in a bellows tube



Specifications

LMG 20 C **M** 2 SS P1 +R 1000 -20 /20 P II

Series：15, 20, 25, 30, 35, 45, 55

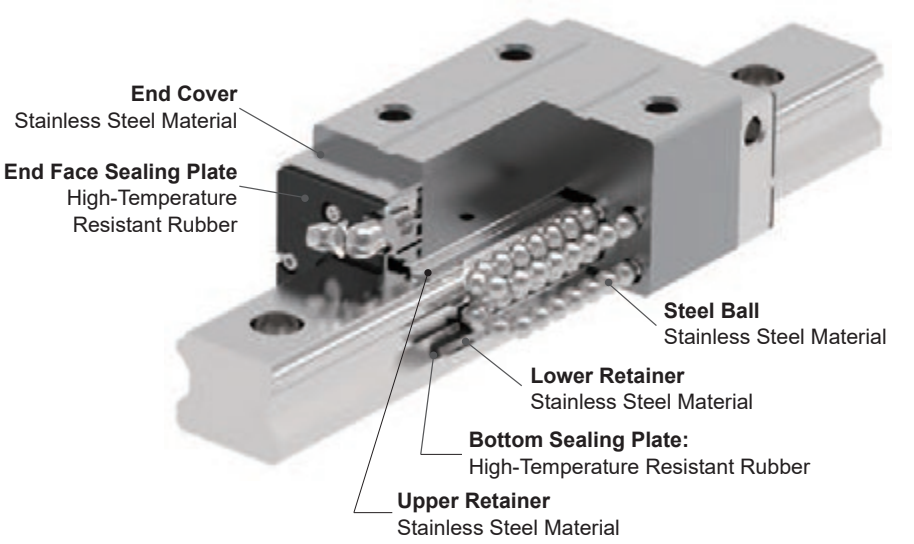
Metal Circulator：**M**

Characteristics

- Enhanced the strength of the Metal Circulator
- Higher acceleration and deceleration capacity
- Superior impact resistance performance
- Suitable for use in high temperature environment
- Significantly reducing the destructive intrusion of foreign matters arising
- Does not change the total length of the standard block

Applications

Heat treatment equipment
Automation equipment in high temperature environment
Equipment with low dust emission requirements
Other



Specifications

LMG 20 C **MG** 2 SS P1 +R 1000 -20 /20 P II

Series：15, 20, 25, 30, 35, 45

Full Metal Circulator：**MG**

Characteristics

● Suitable for High-Temperature Environments
The end covers and retainers are made of stainless steel, while the end face and bottom sealing plates are made of high-temperature resistant rubber, enabling the slider to operate continuously in environments with a maximum working temperature of 150°C.

● Higher Overall Strength and Impact Resistance
The use of stainless steel for the end covers and retainers significantly enhances the wear resistance and impact resistance of the slider's circulating components compared to standard plastic parts.

● High Corrosion Resistance
The end covers, retainers, and steel balls are all made of stainless steel. Combined with the surface-coated slider and rail, the overall corrosion resistance of the linear guide is greatly improved, making it suitable for harsh working environments such as outdoors, high temperatures, and high humidity.

● Suitable for Vacuum Environments
The use of stainless steel for the end covers and retainers eliminates the impact of vacuum environments on the components. When paired with vacuum-specific grease, the slider can operate stably and continuously in vacuum conditions.

Applications

Heat Treatment Equipment

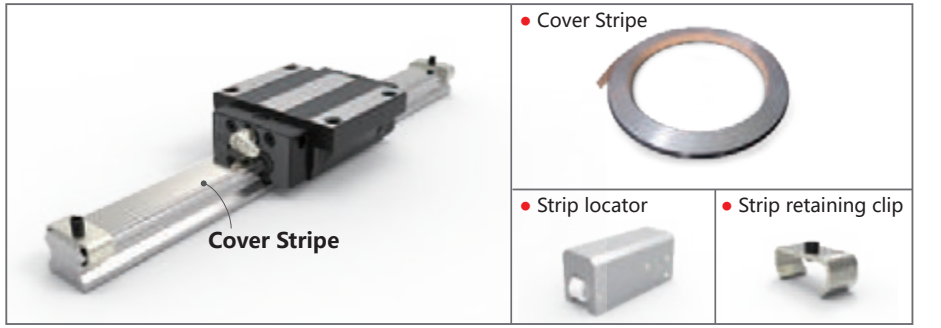
Automated Equipment in High-Temperature Environments

Woodworking Industry Equipment

Fields Requiring Chemical Corrosion Resistance (Please inform us of the operating environment before purchasing)

Harsh Environment Applications

Vacuum Environment Applications



Advantages

- **Simple installation and disassembly**
- **Prevent the intrusion of foreign matters**
- **No need to do special processing or individually customized rail**

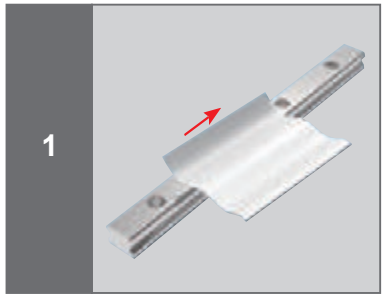
Specifications

LMG/GQ 20 CS 50

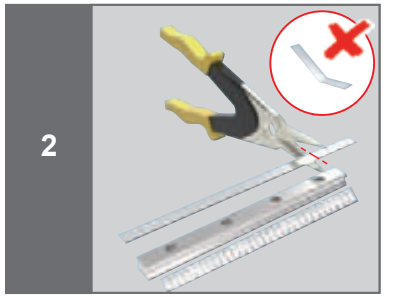
Series：LMG/GQ
Size：20，25
Components
CS ：Cover Stripe
CSL ：Strip locator
CSRC：Strip retaining clip
The quantity ordered
Cover Stripe：m
Strip locator/Strip retaining clip：pcs

Precautions for use：
- The cover stripe cannot be bent.
- Clean rail surface before installation.
- When installing, please wear gloves to prevent scratches.
- Cut off position, please chamfer processing.
- When cutting， make the cover stripe1~3mm shorter than the guide rail.

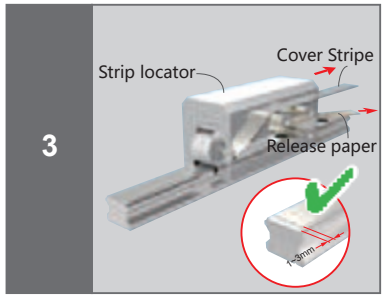
Installation



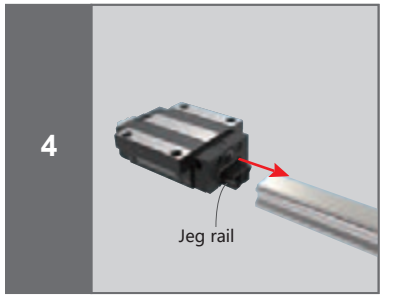
Clean rail surface before installation.



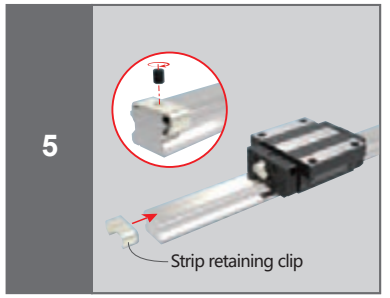
When cutting，make the cover stripe1~3mm shorter than the guide rail.
⚠ The cover stripe cannot be bent.



Use the strip locator to install the cover stripe.
⚠ The cover stripe cannot be bent.



Use Jeg rail mounting.



Insert strip retaining clip into the guide rail and bolt it tight.

Complete

Industrial black chrome coating	Manganese phosphate coating	Primary Chrome Coating
		

Advantages

- **Improved corrosion resistance ● Accuracy is not affected**
- **Change the appearance**

Applications

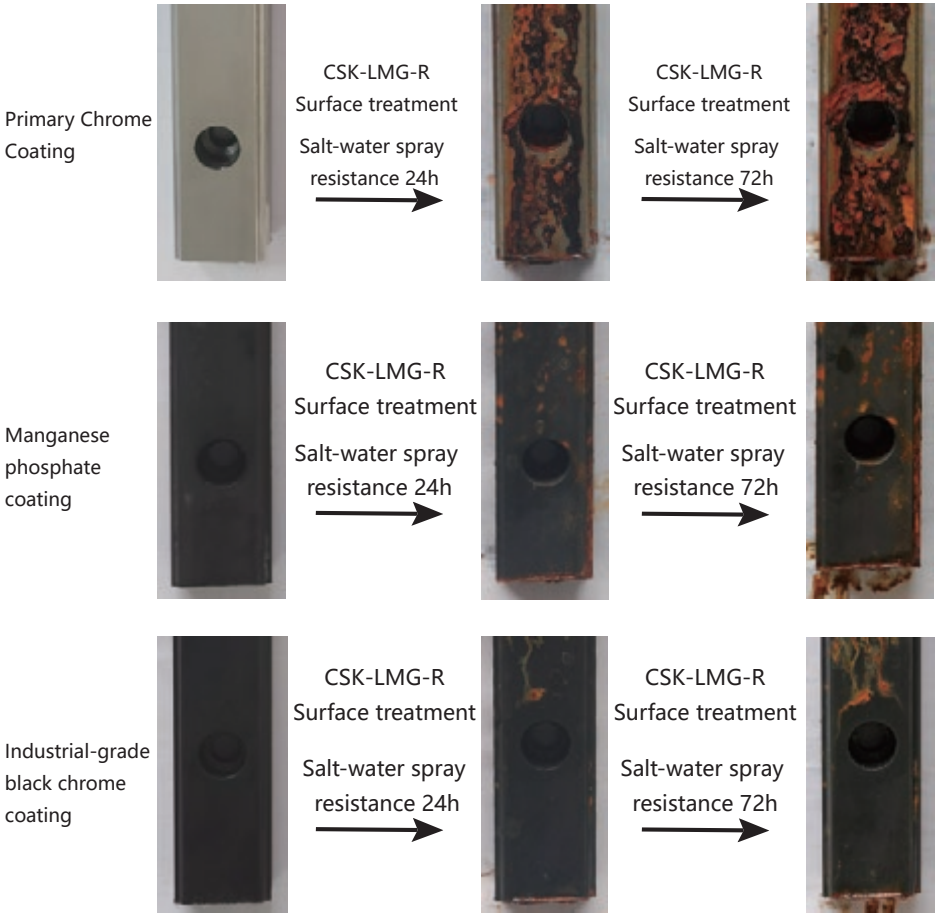
- **Chemical industry ● Automation ● Experimental environment**
- **Humid environment**

Specifications

LMG/GQ 20 C 2 SS P1 **B** +R 1000 -20 /20 P **B** II

Carriage surface treatment：B
Rail surface treatment：B
The inside of the hole is not guaranteed to be completely treated.

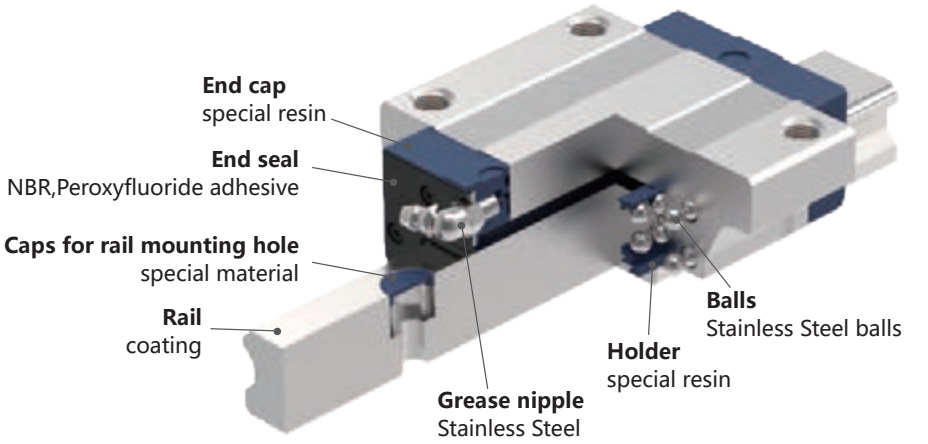
Test conditions



Item	Spray liquid	PH	Temperature	Humidity	Smoke collection volume
Description	5%NaCl solution	6.9	35°	85%RH	1.5ml(80cm²/H)

*Industrial grade low-temperature black chromium surface treatment, commonly known as cold electroplating.

Anti electrolyte Corrosion



Specifications

LMG 20 C **E** 2 SS P1 +R 1000 -20 /20 P II

Size：15，20，25，30

Anti electrolyte Corrosion：E

Characteristics

- For the lithium battery industry, this product does not contain copper, zinc, or nickel elements.
- Plastic accessories are made of special materials that can resist the corrosiveness of battery electrolytes.
- The lubricating oil nozzle is made of stainless steel material to prevent the generation of hazardous elements during the battery manufacturing process.
- Replacing steel balls with stainless steel balls enhances the corrosion resistance of their battery electrolyte.

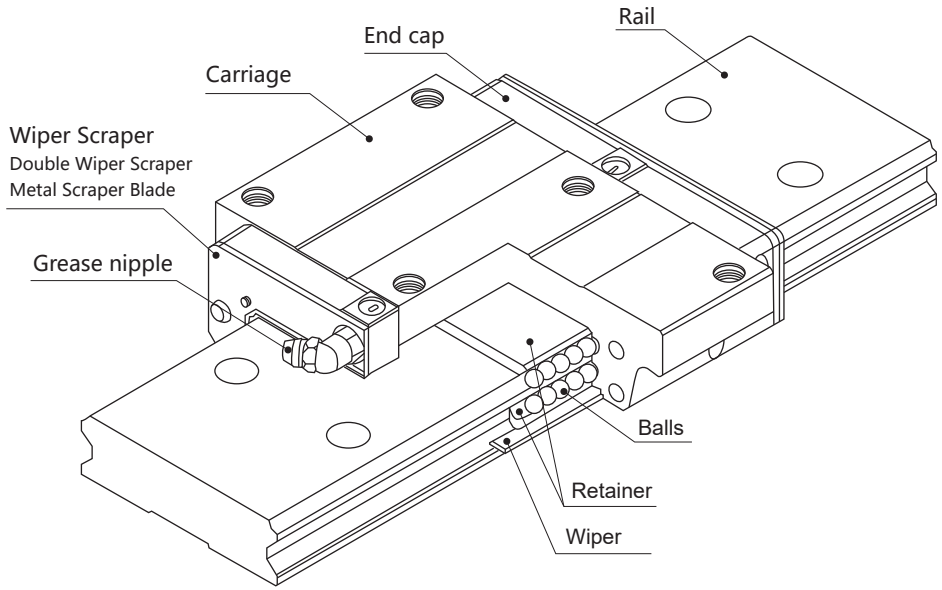
Test conditions

	Standard Part	Anti Corrosion Part
Before testing		
Battery electrolyte immersion After 24 hours		

MOTION TECHNOLOGY

Four-row wide Linear Guide
LMGW series

LMGW



Note: For reference only.

Characteristics

With its 45-degree contact angle design, this system offers equal load capacity in all four directions and self-aligning capability, effectively compensating for assembly inaccuracies on mounting surfaces to meet high-precision requirements. Moreover, the increased rail width and reduced overall height provide extremely high resistance to torsion. In applications where space is limited or high torque loads are involved, a single rail configuration can be adopted.

- High rigidity
- Four-way equal load
- Self alignment capability
- High positioning accuracy
- Running Smoothness
- Low noise and high speed application
- Long Service Life
- International standard

Applications

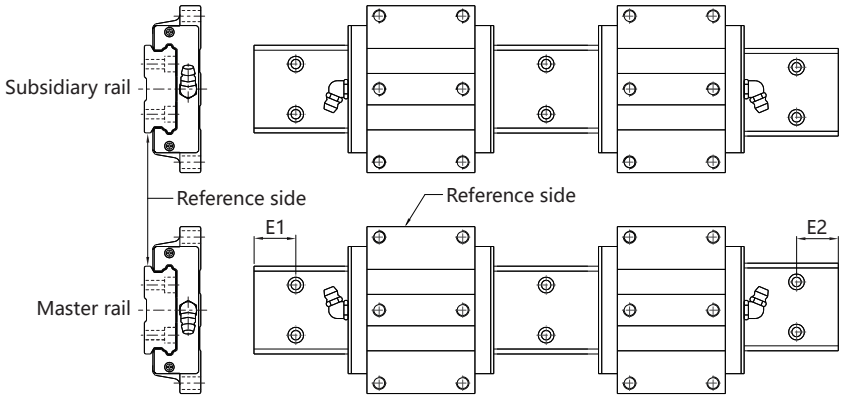
Conductor Manufacturing Equipment
Printing and Packaging Machinery
CNC Machine Tools
Industrial Robots
Medical Equipment
New Energy and Heavy Machiner

Specifications

(1) Non-Interchangeable type

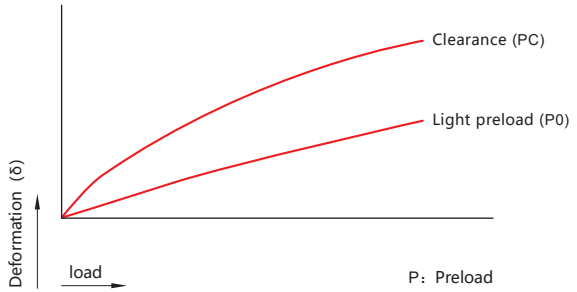
LMGW 17 T 1 UU P0 +R 300 -10 /10 N II

Series: LMGW
Size: 12, 14, 17, 21, 27
Carriage type
T: Standard Type
LT: Extended Type
C: Flange Type
Number of carriages per rail: 1, 2, 3 ...
Dust protection option: UU
Preload: PC (Clearance), P0 (Light preload),
P1 (Medium preload)
Rail type: R, T
Rail length (mm)
Rail hole pitch from start side (E1, see Figure below)
Rail hole pitch to the end side (E2, see Figure below)
Accuracy grade: N, H, P, SP, UP
Number of rails per axis: No symbol, II, III, IV ...



Preload Grade

Preload refers to the pre-applied force on the steel balls, achieved by increasing the ball diameter to create a negative clearance between the balls and the raceway. This enhances the rigidity of the linear guide and eliminates clearance. As shown in the figure, increasing the preload can improve the rigidity of the linear guide. However, for smaller specifications, it is recommended to use light preload or lower to avoid reducing service life due to excessive preload.

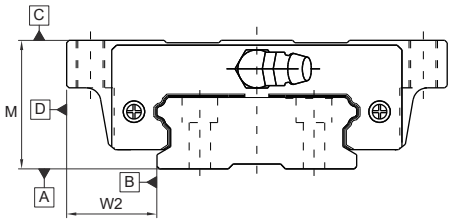


Preload grade	Code	Preload (μm)	Operating Condition
Clearance	PC	0~0.02C	● Load direction is fixed with minimal impact ● Low precision requirements
Light preload	P0	0.03~0.05C	● Light load with high precision requirements
Medium preload	P1	0.06~0.08C	● High rigidity requirements ● Operating environment with vibration and impact

*The "C" in the preload column represents the basic dynamic load rating.

Non-Interchangeable Accuracy Grade

The accuracy of LMGW series is divided into five classes, Normal grade (N), High accuracy grade (H), Precision grade (P), Super precision grade (SP) and Ultra precision grade (UP).

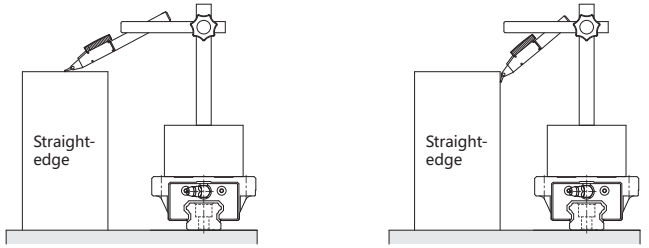


Unit (mm)

Model No.	Item	Accuracy Grade				
		Normal N	High H	Precision P	Super Precision SP	Ultra Precision UP
12 14 17 21	Tolerance for height M	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
	Height difference ΔM	0.02	0.01	0.006	0.004	0.003
	Tolerance for distance W2	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
	Difference in distance W2 (ΔW2)	0.02	0.01	0.006	0.004	0.003
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)				
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)				
27	Tolerance for height M	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
	Height difference ΔM	0.02	0.015	0.007	0.005	0.003
	Tolerance for distance W2	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
	Difference in distance W2 (ΔW2)	0.03	0.015	0.007	0.005	0.003
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)				
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)				

Running Parallelism

The running accuracy is the deviation of parallelism between the reference surface of carriage and reference surface of rail when carriage moving over the entire length of rail.

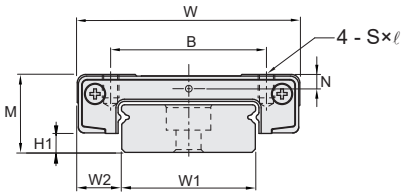


Measurement of running parallelism

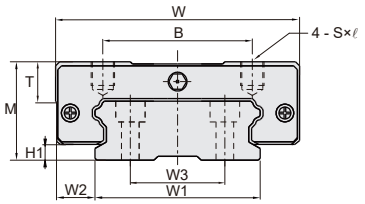
Rail length (mm)		Running Parallelism Values (μm)				
Above	Or less (incl.)	Normal N	High H	Precision P	Super Precision SP	Ultra Precision UP
0	100	12	7	3	2	2
100	200	14	9	4	2	2
200	300	15	10	5	3	2
300	500	17	12	6	3	2
500	700	20	13	7	4	2
700	900	22	15	8	5	3
900	1100	24	16	9	6	3
1100	1500	26	18	11	7	4
1500	1900	28	20	13	8	4
1900	2000	31	22	15	10	5

Dimensions of LMGW···T/LT

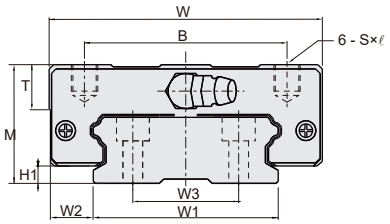
LMGW12/14T
LMGW12LT

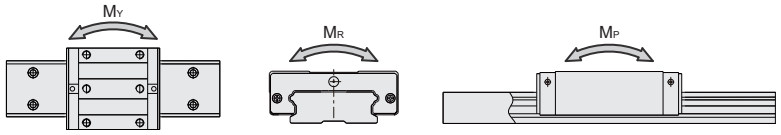


LMGW17T



LMGW21/27T

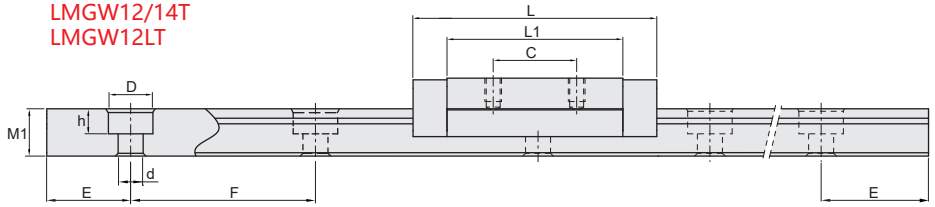




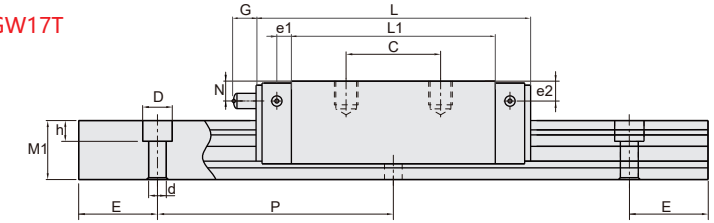
Model No.	External dimension			Carriage dimension										Grease nipple
	Height M	Width W	Length L	B	C	Mounting hole S×ℓ	L1	T	H1	N	e1	e2	G	
LMGW12T	12	30	39.3	21	12	M3×3	27.5	-	2.9	2.4	-	-	-	-
LMGW12LT	12	30	50.7	21	24	M3×3	38.5	-	2.9	2.4	-	-	-	-
LMGW14T	14	40	45.5	28	15	M3×3.6	31.5	-	3.4	2.8	-	-	-	-
LMGW17T	17	50	50.6	29	15	M4×5	35	6	2.5	4	3.1	3	4	M3×0.5
LMGW21T	21	54	59	31	19	M5×6	41.7	8	3	4.5	3.65	4.2	12	M6×1.0
LMGW27T	27	62	72.8	46	32	M6×6	51.8	10	4	6	3.5	5	12	M6×1.0

Dimensions of LMGW···T/LT

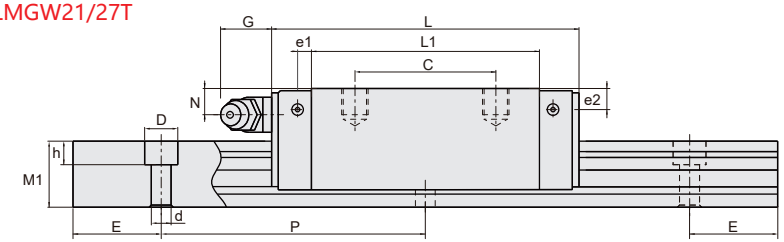
LMGW12/14T
LMGW12LT



LMGW17T



LMGW21/27T

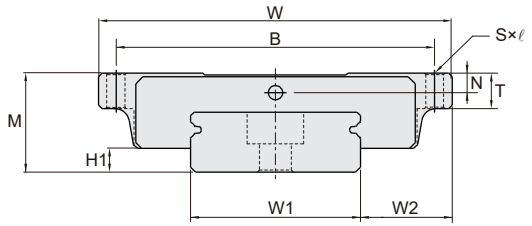


Unit (mm)

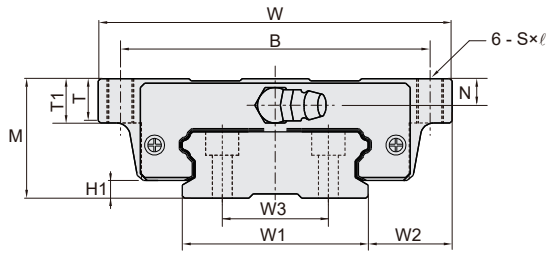
Model No.	Rail dimension							Basic load rating		Static moment rating			Weight	
	Width W1	W2	W3	Height M1	Pitch F	End E	Mounting bolt hole D×h×d	Dynamic C KN	Static C_0 KN	M_P KN·m	M_Y KN·m	M_R KN·m	Carriage Kg	Rail Kg/m
LMGW12T	18	6	-	7	40	15	7.5×5.3×4.5	2.75	4.12	18.96	18.96	40.12	0.04	0.91
LMGW12LT	18	6	-	7	40	15	7.5×5.3×4.5	3.43	5.89	34.00	34.00	54.54	0.057	0.91
LMGW14T	24	8	-	8.5	40	15	8×4.5×4.5	3.92	5.59	27.80	27.80	70.34	0.071	1.49
LMGW17T	33	8.5	18	9.3	40	15	7.5×5.3×4.5	5.23	9.64	0.062	0.062	0.15	0.12	2.2
LMGW21T	37	8.5	22	11	50	15	7.5×5.3×4.5	7.21	13.7	0.10	0.10	0.23	0.20	3.0
LMGW27T	42	10	24	15	60	20	7.5×5.3×4.5	12.4	21.6	0.17	0.17	0.42	0.35	4.7

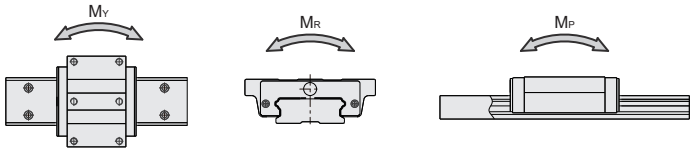
Dimensions of LMGW···C

LMGW12/14C



LMGW17/21/27C

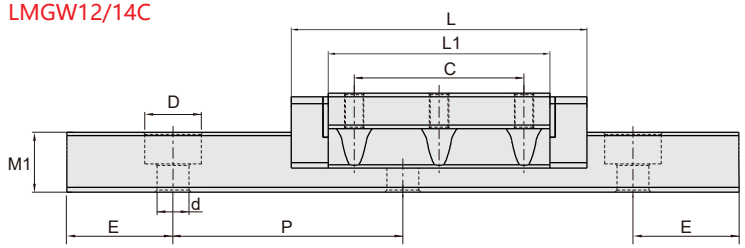




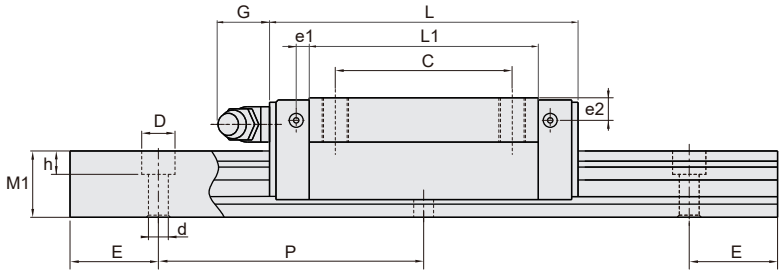
Model No.	External dimension			Carriage dimension											Grease nipple
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	T	T1	H1	N	e1	e2	G	
	M	W	L												
LMGW12C	12	40	37	35	18	M3	26.2	4	-	2.9	2.4	-	-	-	-
LMGW14C	14	50	45.5	45	24	M3	31.3	5	-	3.4	2.8	-	-	-	-
LMGW17C	17	60	50.6	53	26	M4	35	5.3	6	2.5	4	3.1	3	4	M3×0.5
LMGW21C	21	68	59	60	29	M5	41.7	7.3	8	3	4.5	3.65	4.2	12	M6×1.0
LMGW27C	27	80	72.8	70	40	M6	51.8	8	10	4	6	3.5	5	12	M6×1.0

Dimensions of LMGW···C

LMGW12/14C



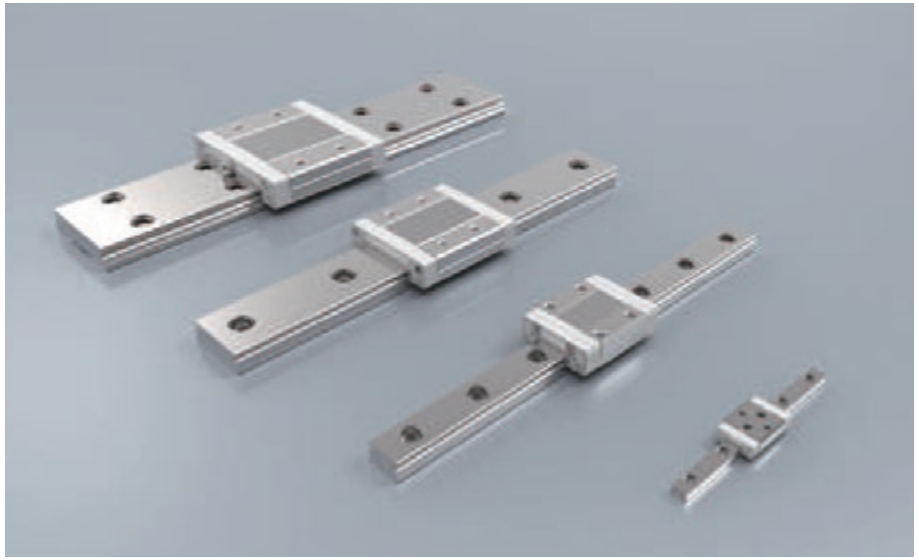
LMGW17/21/27C



Unit (mm)

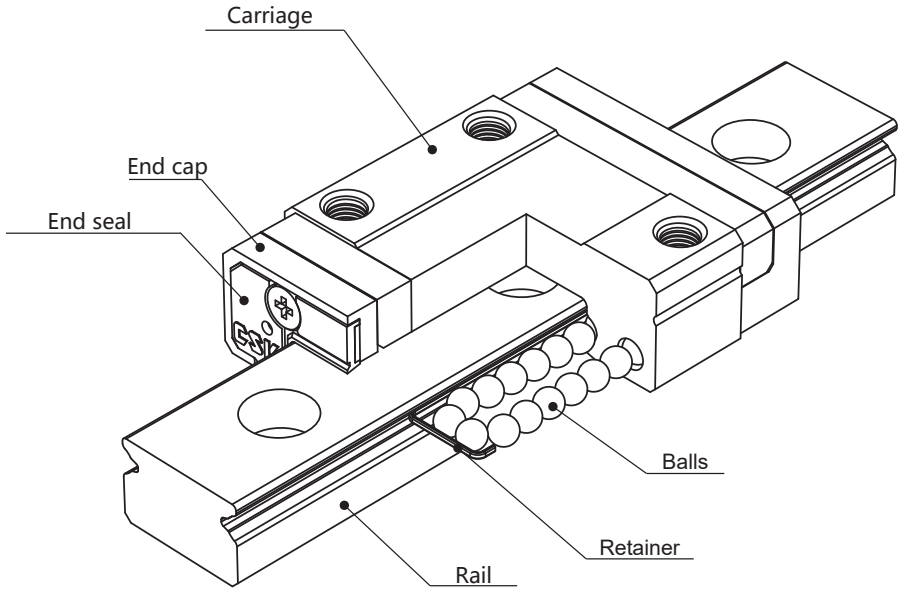
Model No.	Rail dimension							Basic load rating		Static moment rating			Weight	
	Width			Height	Pitch	End	Mounting bolt hole	Dynamic	Static					
	W1	W2	W3	M1	F	E	D×h×d	C KN	C_0 KN	M_P KN·m	M_Y KN·m	M_R KN·m	Carriage Kg	Rail Kg/m
LMGW12C	18	11	-	7	40	15	7.5×5.3×4.5	2.75	4.12	18.96	18.96	40.12	0.050	0.91
LMGW14C	24	13	-	8.5	40	15	8×4.5×4.5	3.92	5.59	27.80	27.80	70.34	0.100	1.49
LMGW17C	33	13.5	18	9.3	40	15	7.5×5.3×4.5	5.23	9.64	0.062	0.062	0.15	0.13	2.2
LMGW21C	37	15	22	11	50	15	7.5×5.3×4.5	7.21	13.7	0.10	0.10	0.23	0.23	3.0
LMGW27C	42	19	24	15	60	20	7.5×5.3×4.5	12.4	21.6	0.17	0.17	0.42	0.43	4.7

Miniature Linear Guide
LMN/NW series

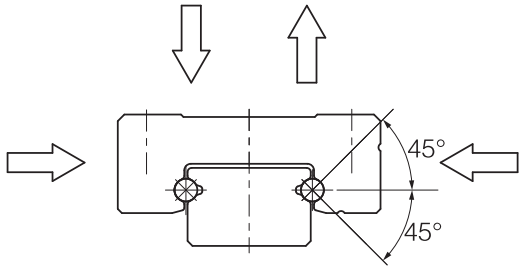


LMN

LMN

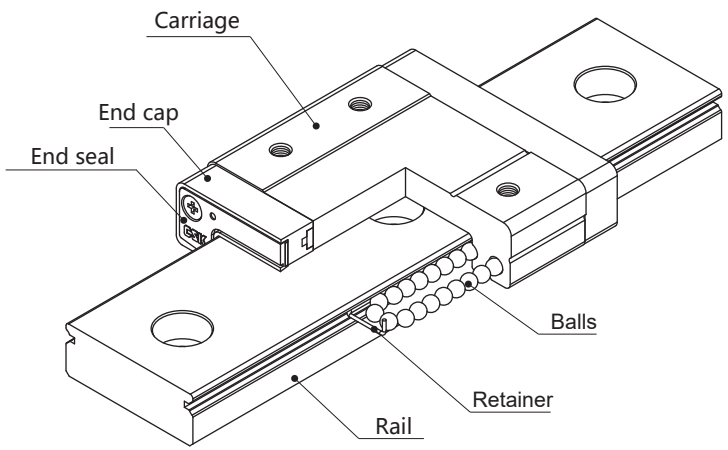


LMN5/7/9/12/15-T/LT

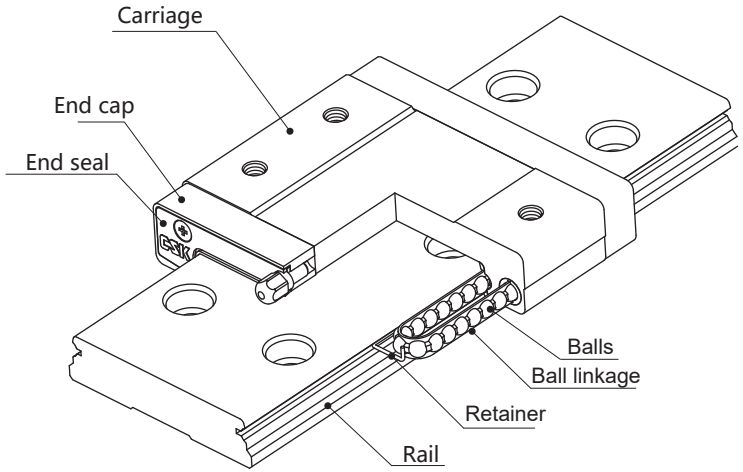


Note: For reference only.

LMNW



LMNW7/9/12-T/LT



LMNW15-T/LT

Characteristics

LMN/LMNW The linear guide rail adopts two rows of steel balls and a Gothic four point contact design, which can bear loads in all directions, making it highly efficientCharacteristics such as rigidity and high precision. Micro linear guide rails are suitable for spaces or parts that require small volume and light weight, especially for small self Dynamic equipment; The micro wide linear guide rail adopts a widened design and is suitable for equipment that carries loads from all directions and is used on a single axis. Designed steel ball protection.
The holder can be interchangeable with precision.

- High rigidity,High positioning repeatability
- Low friction, smooth walking
- High positioning repeatability and good reproducibility
- Small size, Light weight
- Interchangeability
- International standard

Applications

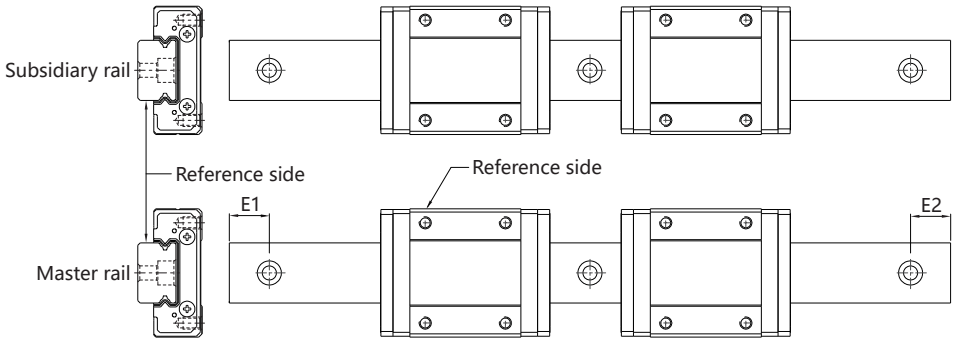
Semiconductor manufacturing devices, Industrial robots, Medical equipment, Precision testing instruments, Office automation equipment, Other small linear motion devices.

Specifications

(1) Non-Interchangeable type

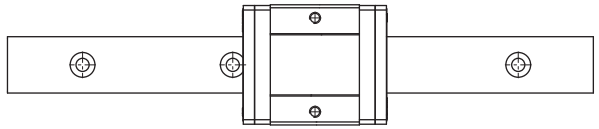
LMN 5 T 2 UU P0 +R 100 -5 /5 N M II

Series: LMN/LMNW
Size: 5, 7, 9, 12, 15
Carriage type
ST: Short Type
T: Standard Type
LT: Extended Type
Number of carriages per rail: 1, 2, 3 ...
Dust protection option: UU
Preload: PC (Clearance) , P0 (Light preload) ,
P1 (Medium preload)
Code of special carriage: A, B ...
(Standard rail is no symbol)
Rail type: R
Rail length (mm)
Rail hole pitch from start side (E1, see Figure below)
Rail hole pitch to the end side (E2, see Figure below)
Accuracy grade: N, H, P
Material quality: no symbol , M (stainless steel)
Code of special rail: A, B ... (Standard rail is no symbol)
Number of rails per axis: No symbol, II, III, IV ...



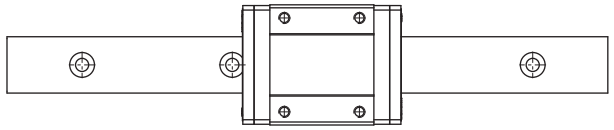
Specifications

Square compact type



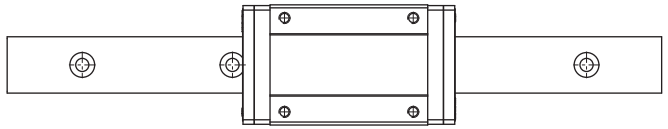
LMN/LMNW ··· ST

Heavy load



LMN/LMNW ··· T

Ultra heavy load



LMN/LMNW ··· LT

Specifications

(2) Interchangeable type

- Code of Carriage

LMN 5 T UU P0 N M

Series: LMN/LMNW
Size: 5, 7, 9, 12, 15
Carriage type
ST: Short Type
T: Standard Type
LT: Extended Type
Dust protection option: UU
Preload: P0 (Light preload)
Accuracy grade: N, H
Material quality: M (stainless steel)
Code of special carriage: A, B ... (Standard rail is no symbol)

- Code of Rail

LMN 5 R 100 -5 /5 N M

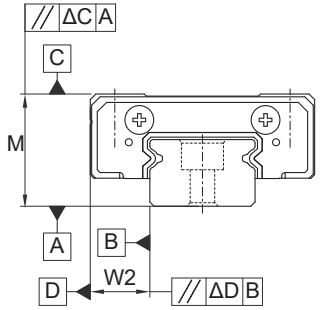
Series: LMN/LMNW
Size: 5, 7, 9, 12, 15
Rail type: R
Rail length (mm)
Rail hole pitch from start side (E1, Refer to Figure C-04)
Rail hole pitch to the end side (E2, Refer to Figure C-04)
Accuracy grade: N, H
Material quality: no symbol , M (stainless steel)
Code of special rail: A, B ... (Standard rail is no symbol)

Preload Grade

Preload grade	Code	Preload (μm)	Operating Condition
Clearance	PC	+3 ~ +8 (Preload 0)	• Starting frictional resistance is required. • Installation errors to be absorbed.
Light preload	P0	+0 ~ +2 (Preload 0)	• Minute vibration is applied. • Accurate motion is required. • Micromoment is applied.
Medium preload	P1	Preload 0.02C	• Light vibration is applied. • High precision motion is required. • Moment is applied.

Accuracy Grade

The accuracy of LMN/LMNW series is divided into three classes, Normal grade (N), High accuracy grade (H), Precision grade (P).

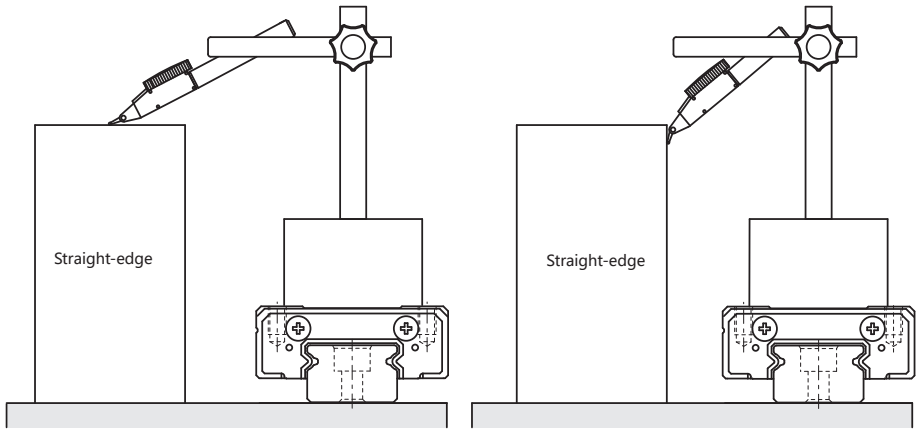


Unit (mm)

Model No.	Item	Accuracy Grade		
		Normal N	High H	Precision P
LMN 5 LMN/NW 7 LMN/NW 9 LMN/NW 12 LMN/NW 15	Tolerance for height M	±0.04	±0.02	±0.01
	Height difference (ΔM)	0.03	0.015	0.007
	Tolerance for distance W2	±0.04	±0.025	±0.015
	Difference in distance W2 (ΔW2)	0.03	0.02	0.01
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)		
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)		

Running Parallelism

The running accuracy is the deviation of parallelism between the reference surface of carriage and reference surface of rail when carriage moving over the entire length of rail.

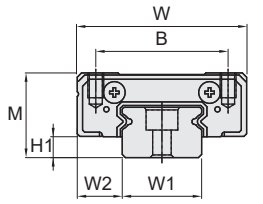


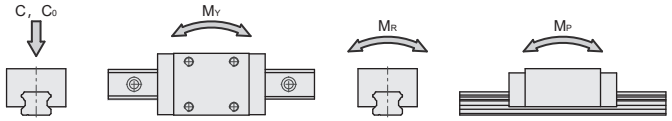
Measurement of running parallelism

Running Parallelism

Rail length (mm)		Running Parallelism Values (μm)		
Above	Or less (incl.)	Normal N	High H	Precision P
0	50	12	6	2
50	80	13	7	3
80	125	14	8	3.5
125	200	15	9	4
200	250	16	10	5
250	315	17	11	5
315	400	18	11	6
400	500	19	12	6
500	630	20	13	7
630	800	22	14	8
800	1000	23	16	9
1000	1200	25	18	11
1200	1300	26	19	12
1300	1400	27	19	12
1400	1500	28	20	13
1500	1600	29	20	14
1600	1700	30	21	14
1700	1800	30	21	15
1800	1900	31	22	15
1900	2000	31	22	16

Dimensions of LMN···T / LT

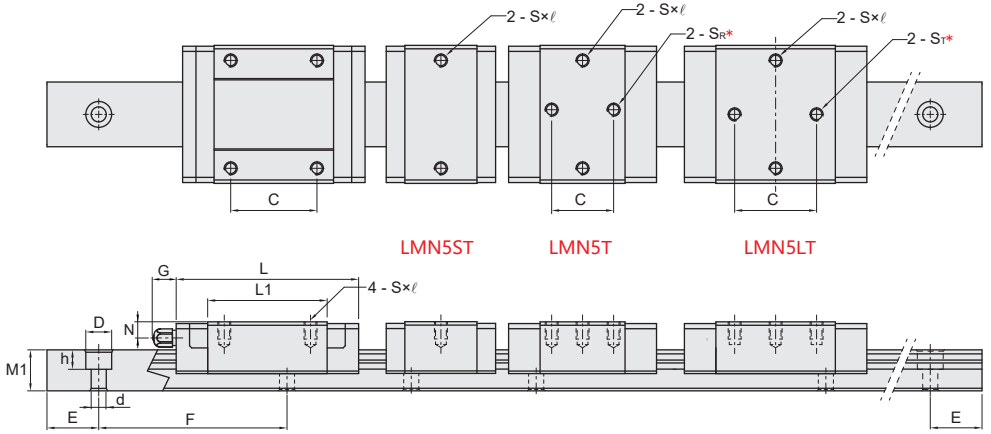




Unit (mm)

Model No.	External dimension			Carriage dimension						
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	H1	G	N
	M	W	L							
LMN5 ST	6	12	11.8	8	-	M2×1.5	6.7	1.2	-	-
LMN5 T	6	12	16.3	8	6	M2×1.5	9.7	1.2	-	-
LMN5 LT	6	12	19.3	8	7	M2×1.5	12.7	1.2	-	-
LMN7 T	8	17	23.4	12	8	M2×2.5	13.7	1.5	-	-
LMN7 LT	8	17	29.7	12	13	M2×2.5	20	1.5	-	-
LMN9 ST	10	20	21.9	15	-	M3×3.5	10.6	2	-	-
LMN9 T	10	20	29.9	15	10	M3×3.5	18.6	2	-	-
LMN9 LT	10	20	41	15	16	M3×3.5	29.7	2	-	-
LMN12T	13	27	34.4	20	15	M3×3.5	21.2	3	-	-
LMN12 LT	13	27	46.3	20	20	M3×3.5	33.1	3	-	-
LMN15T	16	32	42.3	25	20	M3×4	27.7	4	5.6	3.4
LMN15 LT	16	32	55.8	25	25	M3×4	41.2	4	5.6	3.4

Dimensions of LMN···T / LT



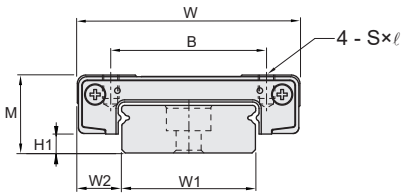
Unit (mm)

Model No.	Rail dimension						Basic load rating		Static moment rating			Weight	
	Width		Height	Pitch	End	Mounting bolt hole	Dynamic	Static	MP	MY	MR	Carriage	Rail
	W1	W2	M1	F	E	D×h×d	C KN	C0 KN	N·m	N·m	N·m	g	g/100mm
LMN5 ST	5	3.5	3.6	15	5	3.6×0.8×2.4	0.38	0.5	0.6	0.6	0.8	2.5	13
LMN5 T	5	3.5	3.6	15	5	3.6×0.8×2.4	0.48	0.71	1.1	1.1	1.8	3	13
LMN5 LT	5	3.5	3.6	15	5	3.6×0.8×2.4	0.58	0.93	1.8	1.8	2.4	4	13
LMN7 T	7	5	4.7	15	7.5	4.2×2.3×2.4	1.21	1.62	3.5	3.5	6	10	21
LMN7 LT	7	5	4.7	15	7.5	4.2×2.3×2.4	1.56	2.34	7	7	8.6	13	21
LMN9 ST	9	5.5	5.5	20	15	6×3.5×3.5	1.21	1.62	3.5	3.5	6	10	**21**
LMN9 T	9	5.5	5.5	20	15	6×3.5×3.5	1.85	2.38	6.7	6.7	11.2	20	31
LMN9 LT	9	5.5	5.5	**20**	15	6×3.5×3.5	2.52	**3.7**	15.3	15.3	17.4	28	31
LMN12T	12	7.5	7.5	25	15	6×4.5×3.5	3.12	4.05	13.1	13.1	26.3	37	61
LMN12 LT	12	7.5	7.5	25	15	6×4.5×3.5	4.25	6.3	26.1	26.1	38	53	61
LMN15T	15	8.5	9.5	40	20	6×4.5×3.5	4.67	6.13	25.3	25.3	49.5	66	102
LMN15 LT	15	8.5	9.5	40	20	6×4.5×3.5	6.2	9.19	54.2	54.2	74.2	94	102

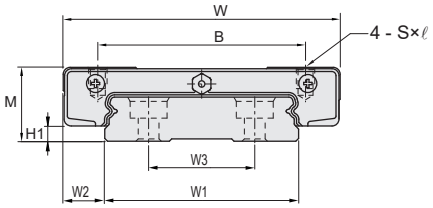
*ST： M2.6 THRU.
*SR： M2.0 THRU.

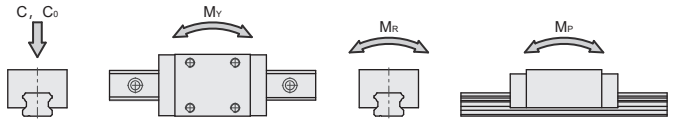
Dimensions of LMNW···T / LT

LMNW7/9/12-T/LT



LMNW15T/LT



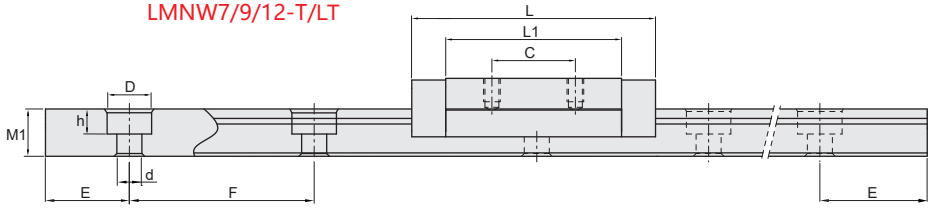


Unit (mm)

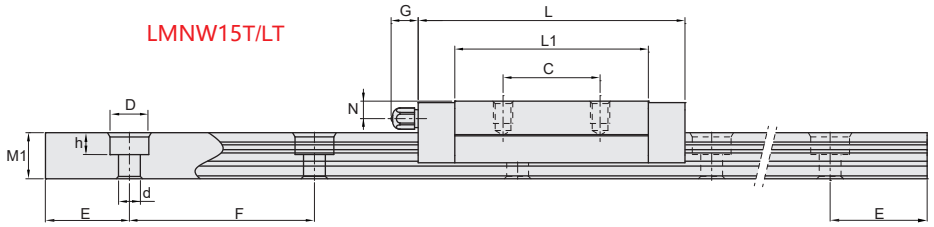
Model No.	External dimension			Carriage dimension						
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	H1	G	N
	M	W	L							
LMNW7 T	9	25	31.2	19	10	M3×3	21.5	2	-	-
LMNW7 LT	9	25	40.8	19	19	M3×3	31.1	2	-	-
LMNW9 T	12	30	38.5	21	12	M3×3	27.4	3	-	-
LMNW9 LT	12	30	50.4	23	24	M3×3	39.3	3	-	-
LMNW12T	14	40	43.8	28	15	M3×3.8	31.6	3.5	-	-
LMNW12 LT	14	40	58.1	28	28	M3×3.8	45.9	3.5	-	-
LMNW15T	16	60	55	45	20	M4×4.5	39.9	3.3	5.6	3.6
LMNW15 LT	16	60	72.6	45	35	M4×4.5	57.5	3.3	5.6	3.6

Dimensions of LMNW···T / LT

LMNW7/9/12-T/LT



LMNW15T/LT



Unit (mm)

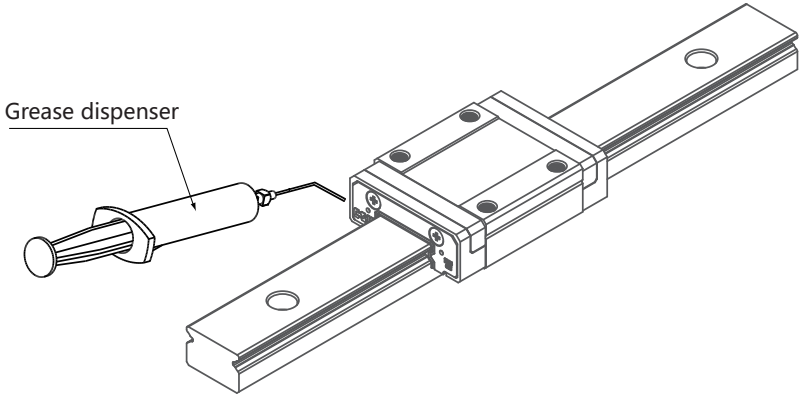
Model No.	Rail dimension							Basic load rating		Static moment rating			Weight	
	Width			Height	Pitch	End	Mounting bolt hole	Dynamic	Static					
	W1	W2	W3	M1	F	E	D×h×d	C KN	C0 KN	MP N·m	MY N·m	MR N·m	Carriage g	Rail g/100mm
LMNW7 T	14	5.5	-	5.2	30	10	6×3.2×3.5	1.61	2.3	6.9	6.9	15.4	20	51
LMNW7 LT	14	5.5	-	5.2	30	10	6×3.2×3.5	2.14	3.56	14.7	14.7	25.4	29	51
LMNW9 T	18	6	-	7	30	10	6×4.5×3.5	2.52	3.7	15.3	15.3	33.4	40	91
LMNW9 LT	18	6	-	7	30	10	6×4.5×3.5	3.23	5.28	30.3	30.3	47.7	57	91
LMNW12T	24	8	-	8.5	40	20	8×4.5×4.5	4.04	5.85	26.1	26.1	75.8	71	149
LMNW12 LT	24	8	-	8.5	40	20	8×4.5×4.5	5.27	8.55	53.9	53.9	110.8	103	149
LMNW15T	42	9	23	9.5	40	20	8×4.5×4.5	6.95	9.37	55.4	46.6	192.2	143	286
LMNW15 LT	42	9	23	9.5	40	20	8×4.5×4.5	9.15	13.7	120.3	120.3	293.5	215	286

Lubrication

Lubrication position

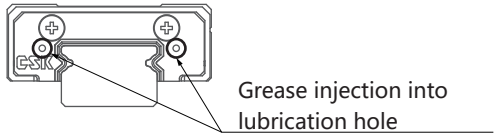
A high grade lithium soap based grease is applied to the CSK carriages prior to shipment for immediate use. Relubricate timely according to the use.
A special syringe lubricant dispenser is available from CSK as an option.

- Special syringe lubricant dispenser
- Scientific greasing method and position
- For technical support,please contact CSK.

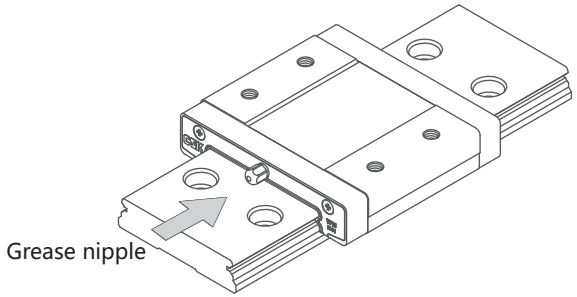


Lubrication

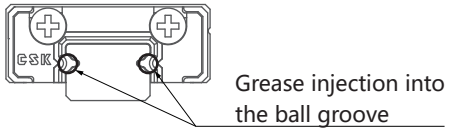
LMN12 LMNW9 LMNW12

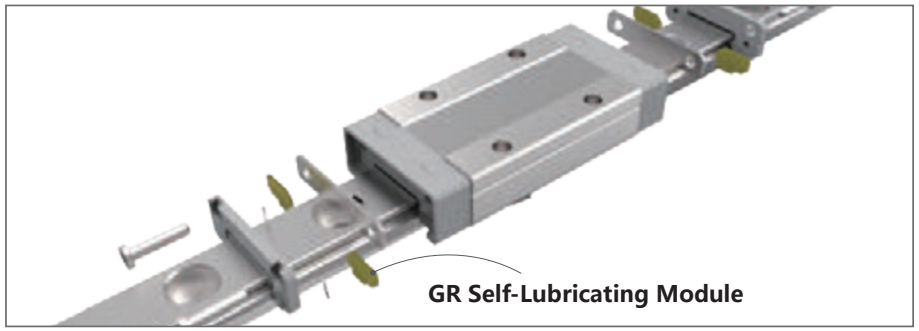


LMN15 LMNW15



LMN5 LMN7 LMN9 LMNW7





Characteristics

- Can be used simultaneously with lubricating grease
- Wide range of applicable environmental temperatures
- Effectively extends maintenance cycles and reduces maintenance costs
- Only a small amount of oil is required to achieve lubrication, making it environmentally friendly.
- Designed for easy oil replenishment, resulting in low operating costs.
- Comprehensively extends the service life of guide rails.

Applications

Automation equipment
Electronic machinery
Industrial machinery
Other

Specifications

(1) Non-Interchangeable type

LMN9T2UUP0**GR**+R1000-10/10NII

Self-Lubricating Module: GR

(2) Interchangeable type

LMN9TUUP0**GR**N

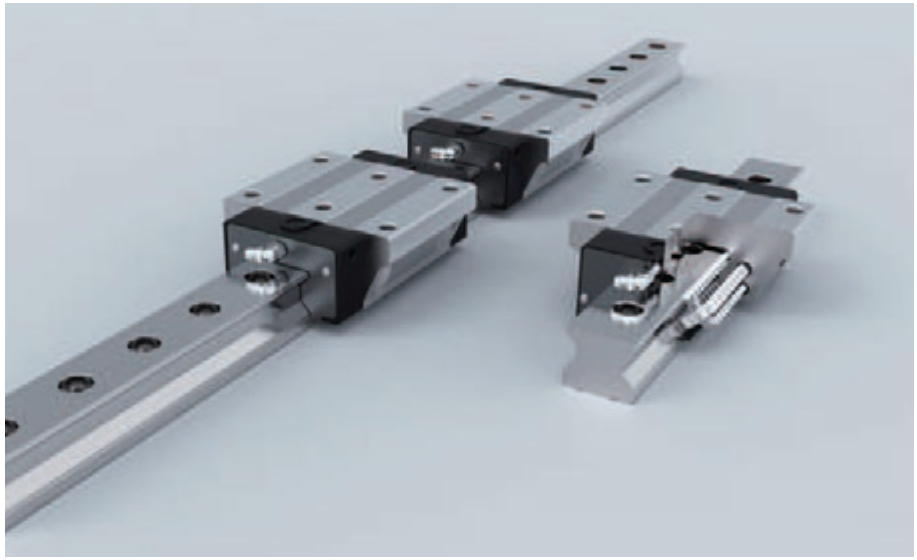
Self-Lubricating Module: GR

Dimension parameters

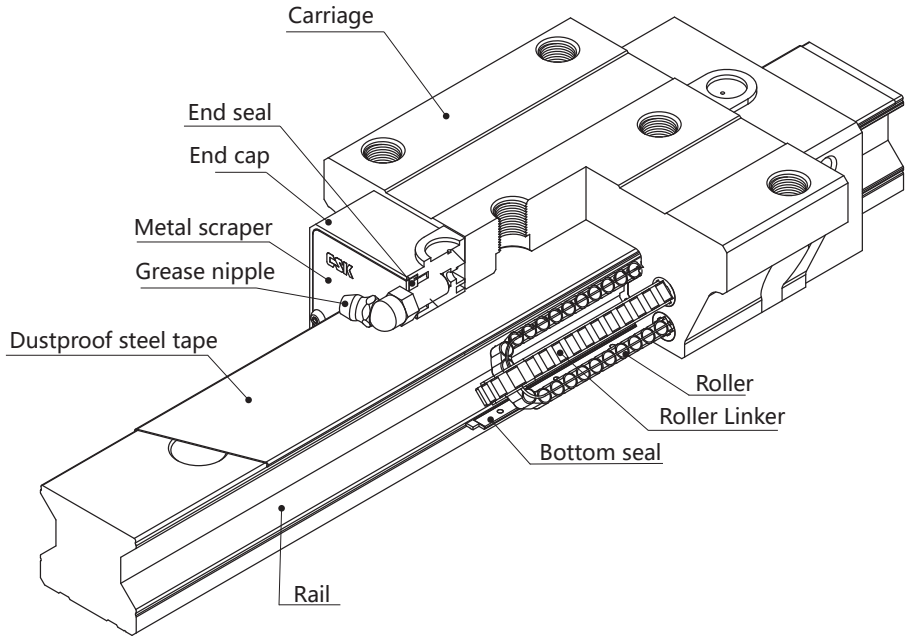
Slider Total Length

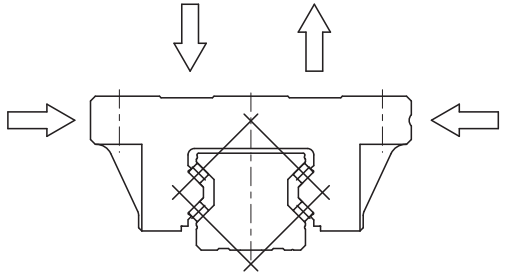
Model No.	L
LMN7T	25.4
LMN7LT	31.7
LMN9ST	23.9
LMN9T	31.9
LMN9LT	43
LMN12T	36.4
LMN12LT	48.3
LMN15T	46.3
LMN15LT	59.8

Roller-type Linear Guide
LMR series



Roller LMR series





Note: For reference only.

Characteristics

The LMR series linear guides utilize cylindrical rolling elements to replace traditional steel ball rolling elements. The transition from point contact to line contact significantly enhances load capacity. When subjected to high loads, the cylindrical rolling elements exhibit minimal elastic deformation. Additionally, the use of a 45° contact angle DB design across four rolling element rows ensures high rigidity and load-bearing performance. These guides can withstand radial, reverse radial, and lateral loads in all four directions. Furthermore, they feature a specially designed rolling element synchronizer internally, which eliminates gear effects caused by mutual friction during rolling. This greatly reduces travel resistance, improves operational smoothness, and lowers noise levels. Years of validated preload settings have achieved a perfect balance between travel resistance, rigidity, and lifespan. The LMR series fully meets the requirements of high-end precision equipment for high precision, high load capacity, high reliability, low noise, and smooth and stable linear motion.

- Ultra-High Rigidity and Heavy Load Capacity
- DB Design Across Four Rolling Element
- Ultra-High Precision with Optional Grades
- Smooth Travel
- High Speed and Low Noise
- Interchangeable Blocks
- Comprehensive Lubrication Design
- Sealed and Configurable
- Dust-Resistant Steel Belt Design
- Manufactured to International Standards

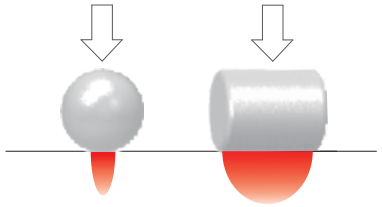
Applications

Machine Tool (Machine canter, Large gantry, Precision Lathe)
Industrial Automation (Heavy gantry robot, Cantilever cartesian robot, Robot ground track)

Characteristics

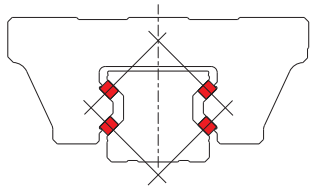
Heavy Load Capacity

The LMR series linear guides utilize cylindrical rolling elements to replace traditional steel ball rolling elements. The transition from point contact to line contact significantly enhances load capacity.



Ultra-High Rigidity

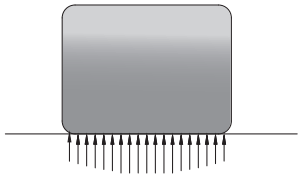
By utilizing modern digital technology, we analyze and optimize the contact position of the rolling column to maximize its resistance torque load capacity.



High Rigidity DB·Contact

Motion Accuracy

Smooth and precise walking accuracy achieved through exclusive fine control specifically developed for the rolling contact surface of the cylindrical component.



Stress distribution

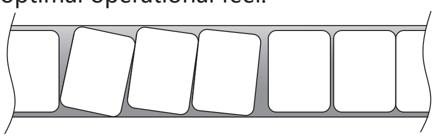
Creative Lubrication

The block features a built-in self-lubri cating module that guides lubricating oil to the surface of the linear guide using engineered fibers. The rolling friction guide requires only an extremely thin oil film for effective lubrication. By incorporating an internally self-built self-lubricating module, the lubrication cycle can be extended to some extent, thereby prolonging the service life.

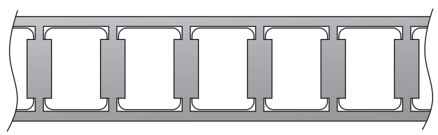
Characteristics

Smooth Motion

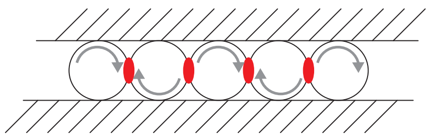
Optimization extends to each component, achieving uniform arrangement of cylindrical rolling elements through a rolling element synchronizer. This addresses the inherent rolling tilt issue and eliminates gear effects within the rolling elements, significantly reducing rolling resistance. The result is an optimal operational feel.



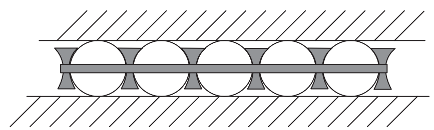
Cylindrical Rolling Element Tilt Illustration



Linker Array of Rolling Elements

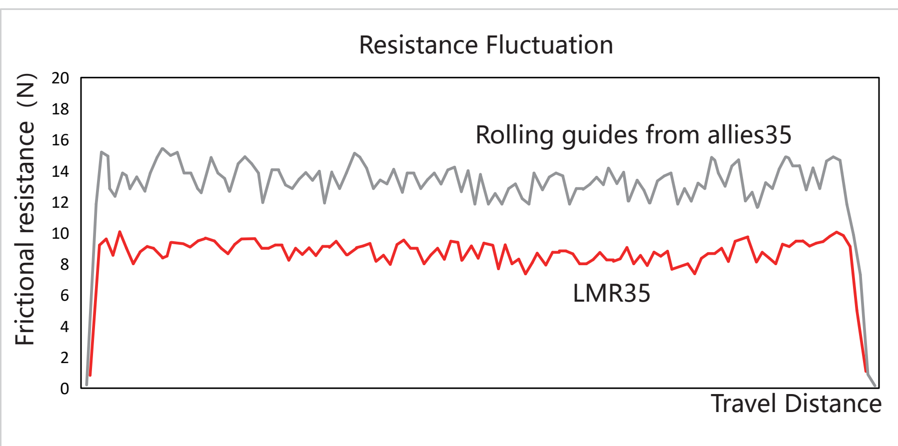


Gear Friction Effect Illustration



Linker Structure Illustration

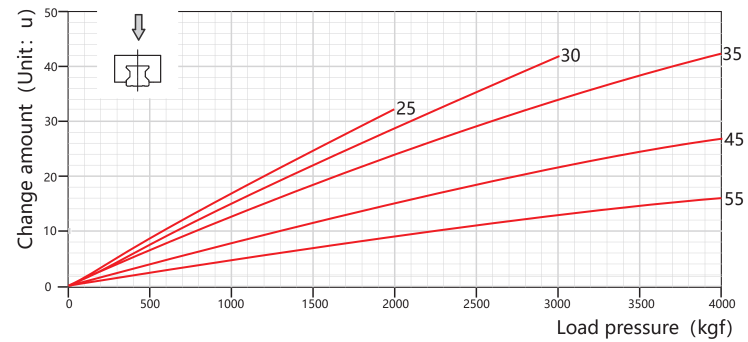
Resistance Fluctuation Test Report

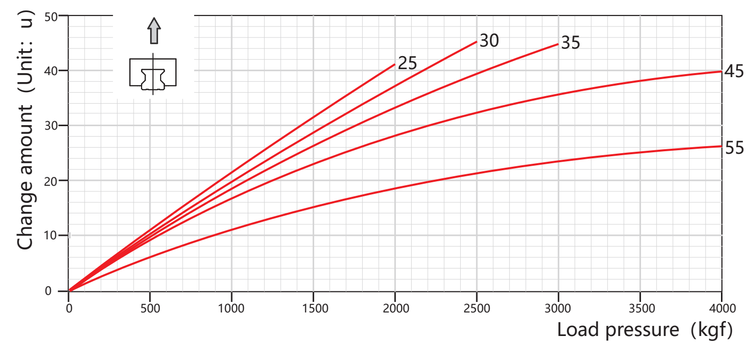


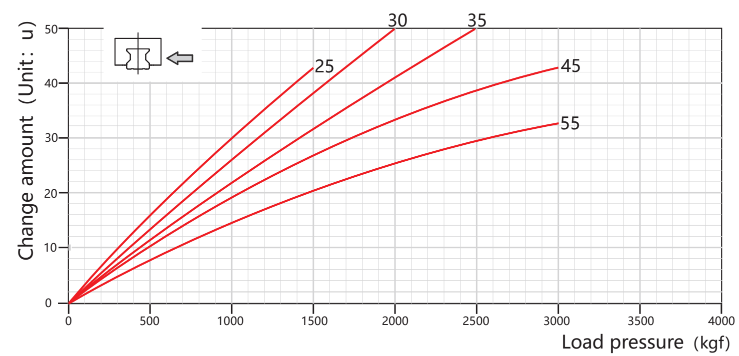
Characteristics

Rigidity

When the preload is P1, Roller guide rail rigidity.







Characteristics

Heavy Load Capacity

In harsh environments, metal scrapers serve as the first layer of protection, effectively protecting the sealing plate from the risk of being damaged by metal debris.
The slide rail is equipped with steel strips for overall rail protection, which not only improves assembly efficiency but also avoids the problem of foreign object intrusion caused by traditional bolt cover wear.

Dust test

Model No.	Test conditions
specifications	LMR30H1ZZP1+R1000-20/20H
speed	1m/s
Stroke	800mm
Environment	Aluminum chip covering

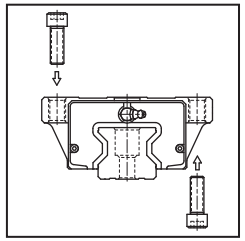
Dust testing machine	Using bolt caps	Dustproof steel tape
		
		

Dust prevention method for guide rails	Operating mileage	Test result
Bolt cover	10000km	There are aluminum chips inside the slider
Dustproof steel tape	10000km	There is no abnormal inside the slider

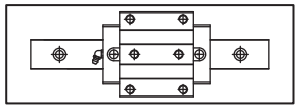
Carriage Type

Contour	Length	Spec Code

Flange type

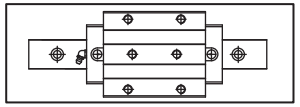


Standard type



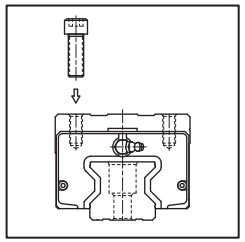
→ C

Extended

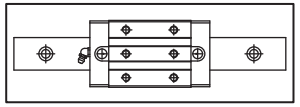


→ LC

Square high type

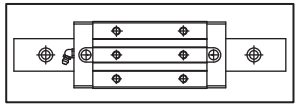


Standard type



→ H

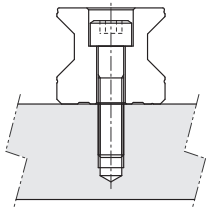
Extended



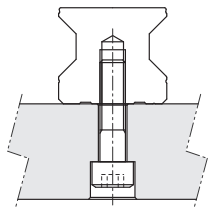
→ LH

Rail Type

Counter bore (R type)



Tapped hole (T type)



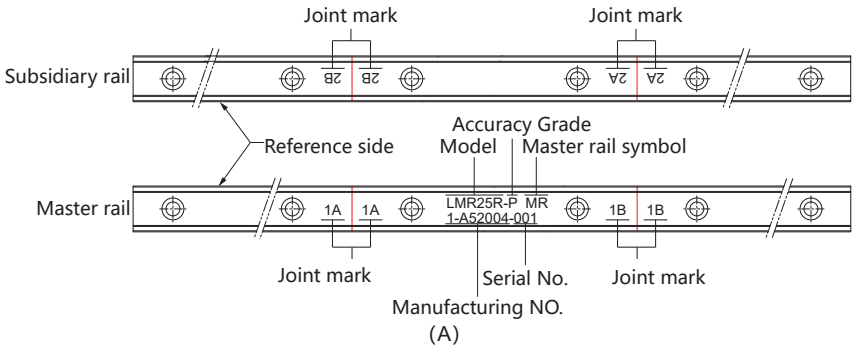
Butt-Joint

(1) For Butt-joint Rail

When applied length of rail longer than specified max. length, the rails can be connected to one another. For this situation, the joint marks indicate the matching position.

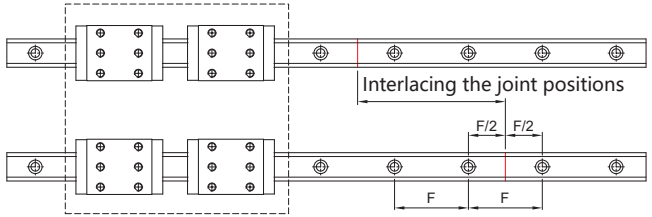
Accuracy may deviate at joints when carriages pass the joint simultaneously. Therefore, the joints should be interlaced for avoiding such accuracy problem.

- Dentification of butt-joint rail



(A)

- Staggering the joint position



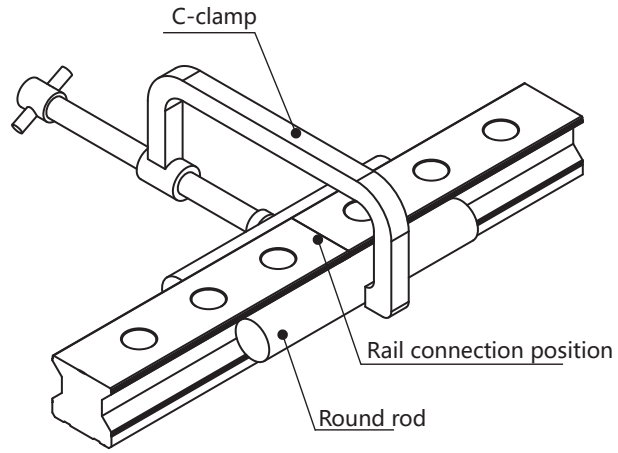
(B)

Rail Type

- Method of continuous installation

As shown in the schematic diagram, connect the two ends of the guide rail to be spliced together, take two standard round rods and press them against the groove of the guide rail, and use C-clamp.

Model No.	Standard round bar size
LMR 25	Ø15
LMR 30	Ø20
LMR 35	Ø22
LMR 45	Ø25
LMR 55	Ø28



Guide rail connection installation diagram

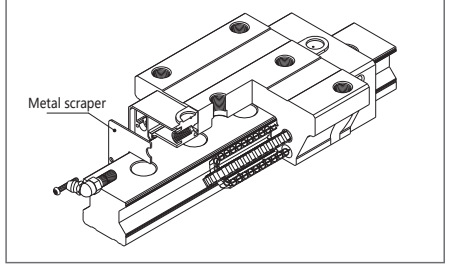
Dust Proof

(1) Code of contamination protection for carriage

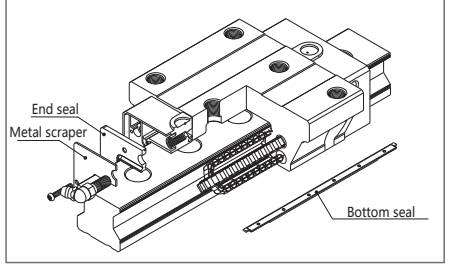
- Contamination protection

  LMR series of linear guideway offers various kinds of dust proof accessory to keep the foreign matters from entering into the carriage.

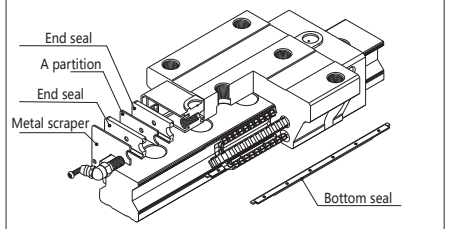
- No symbol Metal scrapers



- ZZ End seals + Bottom seals + metal scrapers

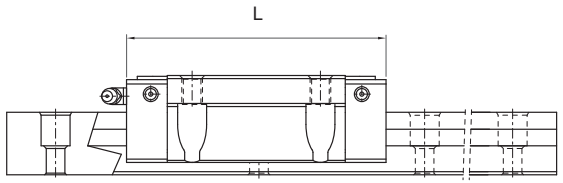


- KK Double End seals + Bottom seals + metal scrapers



- Types of dust proof accessories, and the increment to be added to the carriage overall length The increment to be added to the length of carriage with different applications of dust proof accessory is shown below.

Model No.	No symbol	ZZ	KK
LMR 25	-	-	6
LMR 30	-	-	6
LMR 35	-	-	8
LMR 45	-	-	6
LMR 55	-	-	6



Dust Proof

(2) Code of contamination protection for rail

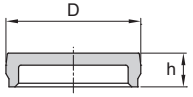
- Caps for rail mounting hole

  A special designed of cap is used to cover the bolt hole to prevent the foreign matters from entering the carriage.

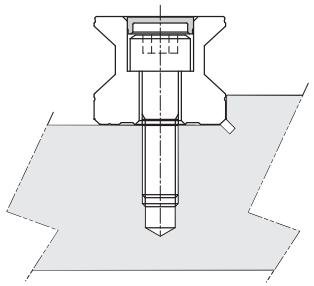
- Installation of plastic cap

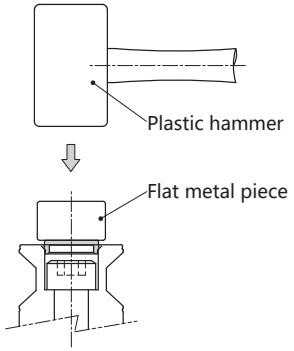
  Put the plate on the cap,then pound it into the bolt of rail with rubber hammer vertically.

  Continue pounding the cap until the cap is on the same plane with the top surface of rail.



plastic cap





- Plastic Cap

Code of Plastic Cap	Bolt Size	D (mm)	h (mm)	Rail Model
L6	M6	11.2	2.8	LMR25R
L8	M8	14.2	3.3	LMR30R, LMR35R
L12	M12	20.2	4.5	LMR45R
L14	M14	23.2	5.5	LMR55R

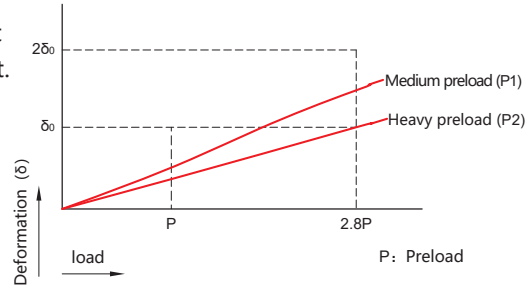
* For details on the dust-proof steel strip, please refer to the details page-C26

Preload

Since the radial chearance of the linear guideway greatly affects the running accuracy, load carrying capacity and rigidity of the linear guideway,it is important to select an appropriate clearance according to the application. in general,selecting a negative clearance while taking into account possible vibrations and impact generated from reciprocating motion favorably affects the service life and the accuracy.

Preload and Rigidity

Selecting appropriate preload to adapt the rigidity of machiney and equipment. The rigidity of a linear guideway could be enhanced by increasing the preload. As shown as below figure, the load could be raised up to 2.8 times the preload applied.



Preload and Service life

The preload is represented by negative clearance resulting from the increase of rolling element diameter. Therefore, the preload should be considered in calculation service life.

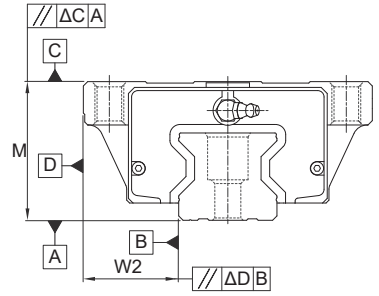
Preload Grade

Preload grade	Code	Preload	Operating Condition
Medium preload	P1	0.07~0.09C	• Overhang application with a moment load. • Applied in one-axis configuration • The need of light preload and high precision.
Heavy preload	P2	0.12~0.14C	• Machine is subjected to vibration and impact, and high rigidity required. • Application of heavy load or heavy cutting.

Note: The preload is the percentage of basic dynamic load rating (C).

Accuracy Grade

The accuracy of LMR series is divided into five classes, High accuracy grade (H), Precision grade (P), Super precision grade (SP) and Ultra precision grade (UP).

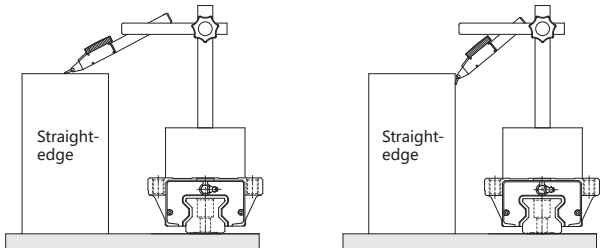


Unit (mm)

Model No.	Item	Accuracy Grade			
		High H	Precision P	Super Precision SP	Ultra Precision UP
LMR 25 LMR 30 LMR 35	Tolerance for height M	±0.04	0 -0.04	0 -0.02	0 -0.01
	Height difference ΔM	0.015	0.007	0.005	0.003
	Tolerance for distance W2	±0.04	0 -0.04	0 -0.02	0 -0.01
	Difference in distance W2 (ΔW2)	0.015	0.007	0.005	0.003
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)			
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)			
LMR 45 LMR 55	Tolerance for height M	±0.05	0 -0.05	0 -0.03	0 -0.02
	Height difference ΔM	0.015	0.007	0.005	0.003
	Tolerance for distance W2	±0.05	0 -0.05	0 -0.03	0 -0.02
	Difference in distance W2 (ΔW2)	0.02	0.01	0.007	0.005
	Running parallelism of surface C with surface A	ΔC (see Running parallelism of carriage)			
	Running parallelism of surface D with surface B	ΔD (see Running parallelism of carriage)			

Running Parallelism

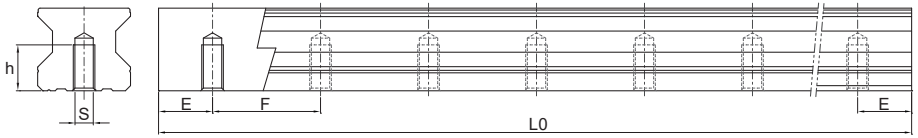
The running accuracy is the deviation of parallelism between the reference surface of carriage and reference surface of rail when carriage moving over the entire length of rail.



Measurement of running parallelism

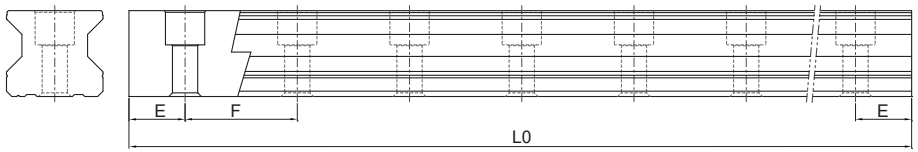
Rail length (mm)		Running Parallelism Values (μm)			
Above	Or less (incl.)	High H	Precision P	Super Precision SP	Ultra Precision UP
0	315	6	3	2	1.5
315	400	8	4	2	1.5
400	500	9	5	2	1.5
500	630	11	6	2.5	1.5
630	800	12	7	3	2
800	1000	14	8	4	2
1000	1250	16	10	5	2.5
1250	1600	18	11	6	3
1600	2000	20	13	7	3.5
2000	2500	22	15	8	4
2500	3000	24	16	9	4.5
3000	3500	25	17	11	5
3500	4000	26	18	12	6

Tapped Hole Rail Dimensions



Model	S	h (mm)
LMR 25T	M6	12
LMR 30T	M8	15
LMR 35T	M8	17
LMR 45T	M12	24
LMR 55T	M14	24

Rail Maximum Length and Standard



Unit (mm)

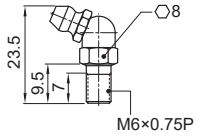
Size	LMR 25	LMR 30	LMR 35	LMR 45	LMR 55
Standard Pitch (F)	30	40	40	52.5	60
Standard (Estd.)	20	40	40	40	30
Minimum (Emin.)	7	8	8	11	12.5
Maximum Length (L0)	4000	4000	4000	4000	4000

Lubrication

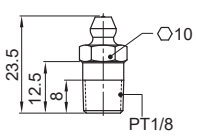
Grease nipples and oil piping joint

(1) Grease nipples

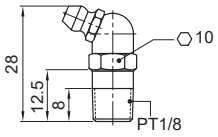
GC - M6M



GS - 7M



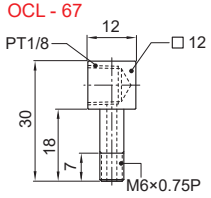
GC - 7M



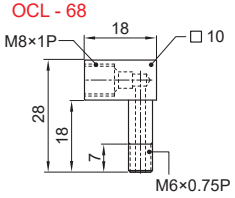
(2) Oil piping joint

● OC

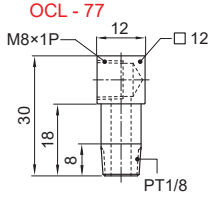
OCL - 67



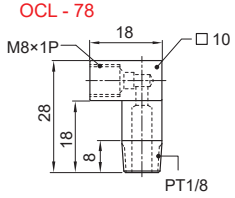
OCL - 68



OCL - 77

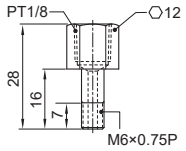


OCL - 78

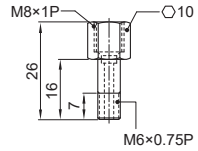


● OS

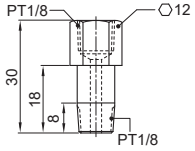
OSL - 67



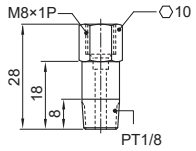
OSL - 68



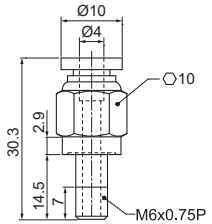
OSL- 77



OSL - 78



OSL - 64 (Fast joint)



Model No.	Grease Nipples		Oil Piping Joint
	Standard	Option	Option
LMR 25	GC - M6M	GS - M6M	OCL - 67、OCL - 68、OSL - 67、OSL- 68、OSL - 64
LMR 30			
LMR 35			
LMR 45	GC - 7M	GS - 7M	OCL - 77、OCL - 78、OSL - 77、OSL - 78
LMR 55			

Lubrication

A well lubrication is important for maintaining the function of the linear guideway. If the lubrication is not sufficient, the frictional resistance at rolling area will increase and the service life will be shortened as a result of wear of rolling parts.
Two primary lubricants are both grease and oil used for the linear motion system, and the lubrication methods are categorized into manual and forced oiling. The selection of lubricant and its method should be based on the consideration of operating speed and environment requirement.

Grease lubrication

The grease feeding interval will be varied with different operating conditions and environments.Under normal operating condition, the grease should be replenished every 100km of travel.
The standard pre-filled grease is lithium-based grease No.2. Moving the carriage back and forth with minimum stroke length of three carriages after the carriages been greased. To assure the grease is evenly distributed inside of carriage, the mentioned process should be repeated twice at least.

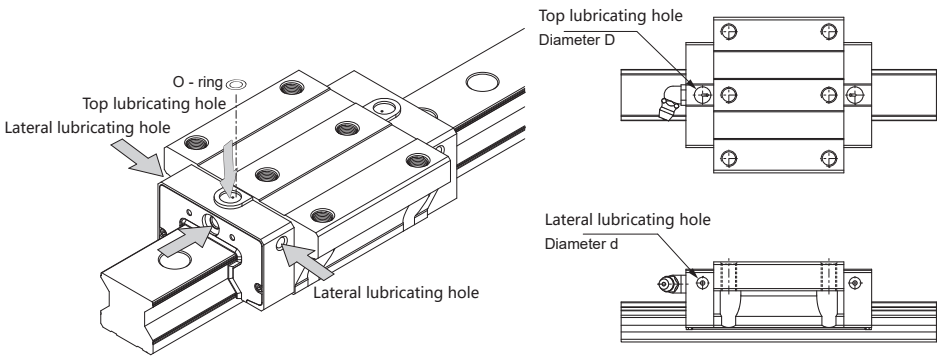
Oil lubrication

The recommended viscosity of oil is 30~150 cst, and the recommended feeding rate per hour. The nstallation other than horizontal may caused the oil unable to reach raceway area, so please specify the installed direction of your linear guideway applied.

Lubrication

Lubrication position

The standard lubricating position of carriage is at the center of both ends, as shown below.
As for lateral and top application, please specify when ordering.



Unit (mm)

Model No.	Center Lubricating	Lateral Lubricating			Top Lubricating		
	Grease Nipple	Diameter d	Grease Nipple	Drilling size	Diameter D	O - ring	Drilling size
LMR 25	M6×0.75P	5.2	M6×0.75P	2	7.4	P4	1
LMR 30				2.5			1.5
LMR 35				2			1
LMR 45	PT1/8			2.5	10.2	P7	2
LMR 55				2			

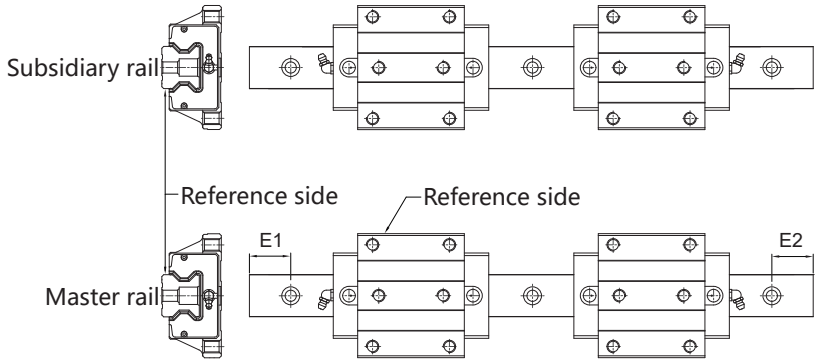
* When the travel distance is less than the total length of two sliders, grease fittings or oil pipe connectors must be installed at both ends of the sliders, and regular lubrication is required. If the travel distance is less than half the total length of a slider, in addition to the aforementioned method, the slider must be moved back and forth over a lubrication distance of at least two slider lengths during lubrication.

Specifications

(1) Non-Interchangeable type

LMR 25 C 2 ZZ P1 +R C 1000 -20 /20 P II

Series：LMR
Size：25，30，35，45，55
Carriage type
(1) Heavy load
C：Flange type, mounting either from top or bottom
H：Square high type
(2) Ultra heavy load
LC：Flange type, mounting either from top or bottom
LH：Square high type
Number of carriages per rail：1，2，3 ...
Dust protection option：No symbol，ZZ，KK
Preload：P1 (Medium preload) , P2 (Heavy preload)
Code of special carriage：A，B ... (Standard rail is no symbol)
Rail type：R，T (Tapped hole type)
Dustproof steel tape：No symbol，C
Rail length (mm)
Rail hole pitch from start side (E1, see Figure below)
Rail hole pitch to the end side (E2, see Figure below)
Accuracy grade：H，P，SP，UP
Code of special rail：A，B ... (Standard rail is no symbol)
Number of rails per axis：No symbol，II，III，IV ...



Specifications

(2) Interchangeable type

- Code of Carriage

LMR 25 C ZZ P1 H

Series：LMR
Size：25，30，35，45，55
Carriage type
(1) Heavy load
C： Flange type, mounting either from top or bottom
H： Square high type
(2) Ultra heavy load
LC：Flange type, mounting either from top or bottom
LH：Square high type
Dust protection option：No symbol，ZZ，KK
Preload：P1 (Medium preload) , P2 (Heavy preload)
Accuracy grade：H
Code of special carriage：A，B ... (Standard carriage is no symbol)

Specifications

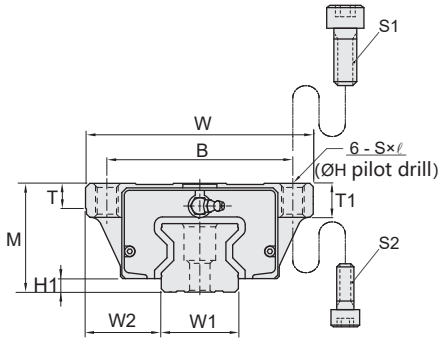
- Code of Rail

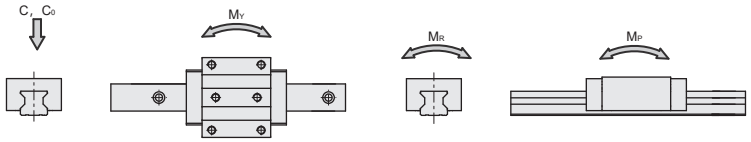
LMR 25 R 1000 -20 /20 H

Series：LMR
Size：25，30，35，45，55
Rail type：R，T (Tapped hole type)
Rail length (mm)
Rail hole pitch from start side (E1, Refer to Figure D-19)
Rail hole pitch to the end side (E2, Refer to Figure D-19)
Accuracy grade：H
Code of special rail：A，B ... (Standard rail is no symbol)

Dimensions of LMR···C / LC

Model No.	Bolt Size		Pilot drill
	S1	S2	H
LMR25	M8	M6	6.9
LMR30	M10	M8	8.6
LMR35	M10	M8	8.6
LMR45	M12	M10	10.4
LMR55	M14	M12	12.5





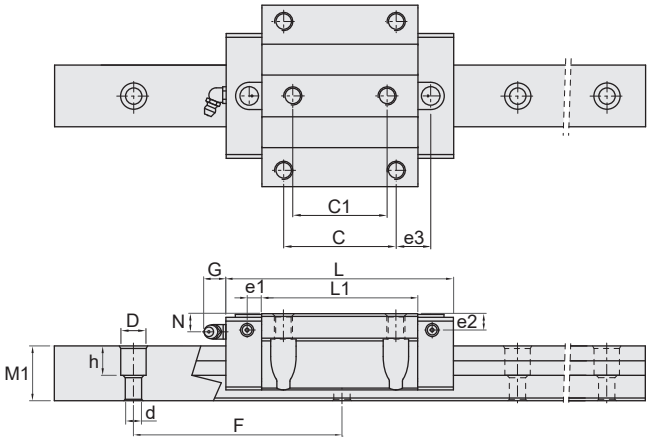
Unit (mm)

Model No.	External dimension			Carriage dimension													Grease nipple
	Height	Width	Length	B	C	C1	Mounting hole S×ℓ	L1	T	T1	H1	N	e1	e2	e3	G	
	M	W	L														
LMR25C	36	70	101.2	57	45	40	M8×10	65.2	9	13	5	6.6	7.5	6.5	17.1	15	M6×0.75
LMR25LC	36	70	117.2	57	45	40	M8×10	81.2	9	13	5	6.6	7.5	6.5	25.1	15	M6×0.75
LMR30 C	42	90	113.1	72	52	44	M10×10	71.5	8	13	5.8	7.2	7.5	7	16.7	15	M6×0.75
LMR30LC	42	90	135.6	72	52	44	M10×10	94	8	13	5.8	7.2	7.5	7	28	15	M6×0.75
LMR35 C	48	100	129	82	62	52	M10×13	86	10	13.5	6.5	9.5	8	9	19	15	M6×0.75
LMR35 LC	48	100	158.4	82	62	52	M10×13	111.8	10	13.5	6.5	9.5	8	9	31.9	15	M6×0.75
LMR45 C	60	120	153	100	80	60	M12×15	107	12	15	7.8	10	8.5	10	20.5	16.5	PT 1/8
LMR45 LC	60	120	184.2	100	80	60	M12×15	138.2	12	15	7.8	10	8.5	10	36.1	16.5	PT 1/8
LMR55 C	70	140	182	116	95	70	M14×18	126.4	12	18	10	12	9	10	22.7	16.5	PT 1/8
LMR55 LC	70	140	231.6	116	95	70	M14×18	176	12	18	10	12	9	10	47.5	16.5	PT 1/8

Linear Guide

LMR

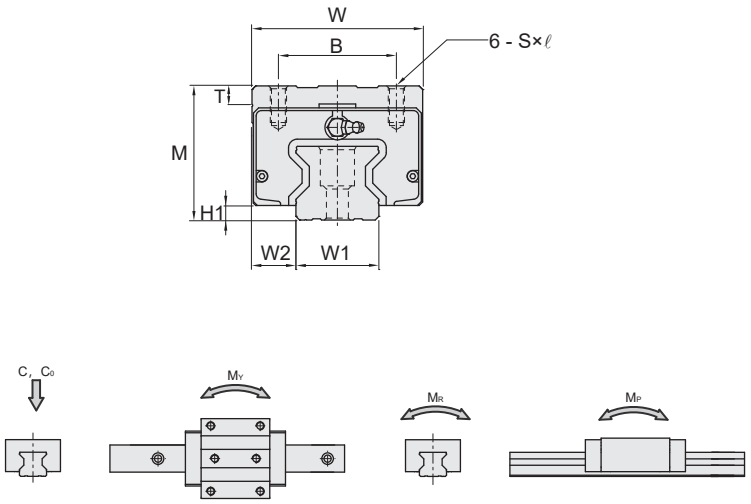
Dimensions of LMR···C / LC



Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating			Weight	
	Width	W2	Height	Pitch	Mounting bolt hole	Dynamic	Static	MP (KN·m)	MY (KN·m)	MR (KN·m)	Carriage Kg	Rail Kg/m
	W1		M1	F	D×h×d	C KN	C0 KN					
LMR25C	23	23.5	23.6	30	11×9×7	26.6	51.5	0.59	0.59	0.74	0.68	3.16
LMR25LC	23	23.5	23.6	30	11×9×7	30.9	62.3	0.85	0.85	0.90	0.85	3.16
LMR30 C	28	31	28	40	14×12×9	39.6	70.1	0.85	0.85	1.26	1.19	4.4
LMR30LC	28	31	28	40	14×12×9	51.3	98.2	1.64	1.64	1.76	1.45	4.4
LMR35 C	34	33	30.7	40	14×12×9	49.4	93.5	1.49	1.49	2.01	1.61	6.23
LMR35 LC	34	33	30.7	40	14×12×9	58.8	116.9	2.30	2.30	2.51	2.13	6.23
LMR45 C	45	37.5	38	52.5	20×17×14	88.3	181.5	3.56	3.56	5.00	3.04	10.23
LMR45 LC	45	37.5	38	52.5	20×17×14	109.4	239.2	6.12	6.12	6.59	3.85	10.23
LMR55 C	53	43.5	44	60	23×20×16	120.0	254.9	5.80	5.80	8.25	4.62	14.45
LMR55 LC	53	43.5	44	60	23×20×16	154.6	352.2	10.82	10.82	11.42	6.43	14.45

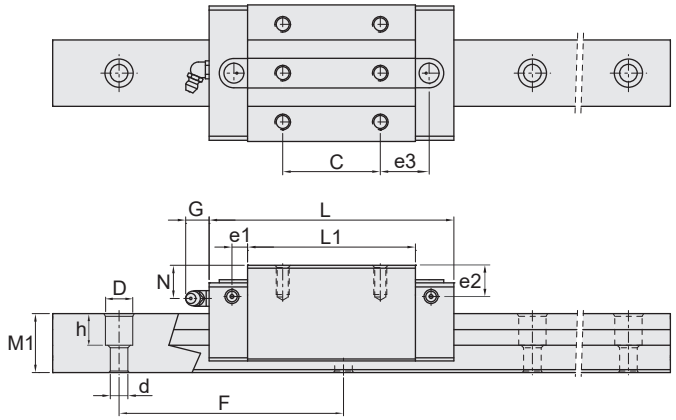
Dimensions of LMR···H / LH



Unit (mm)

Model No.	External dimension			Carriage dimension											Grease nipple
	Height	Width	Length	B	C	Mounting hole S×ℓ	L1	T	H1	N	e1	e2	e3	G	
	M	W	L												
LMR25H	40	48	101.2	35	35	M6×8	65.2	8	5	10.6	7.5	10.5	22.1	15	M6×0.75
LMR25LH	40	48	117.2	35	50	M6×8	81.2	8	5	10.6	7.5	10.5	22.6	15	M6×0.75
LMR30 H	45	60	113.1	40	40	M8×10	71.5	9	5.8	10.2	7.5	10.3	22.7	15	M6×0.75
LMR30LH	45	60	135.6	40	60	M8×10	94	9	5.8	10.2	7.5	10.3	24	15	M6×0.75
LMR35 H	55	70	129	50	50	M8×12	86	15	6.5	16.5	8	16	25	15	M6×0.75
LMR35 LH	55	70	158.4	50	72	M8×12	111.8	15	6.5	16.5	8	16	26.9	15	M6×0.75
LMR45 H	70	86	153	60	60	M10×17	107	12	7.8	20	8.5	20	30.5	16.5	PT 1/8
LMR45 LH	70	86	184.2	60	80	M10×17	138.2	12	7.8	20	8.5	20	36.1	16.5	PT 1/8
LMR55 H	80	100	182	75	75	M12×18	126.4	17	10	22	9	20	32.7	16.5	PT 1/8
LMR55 LH	80	100	231.6	75	95	M12×18	176	17	10	22	9	20	47.5	16.5	PT 1/8

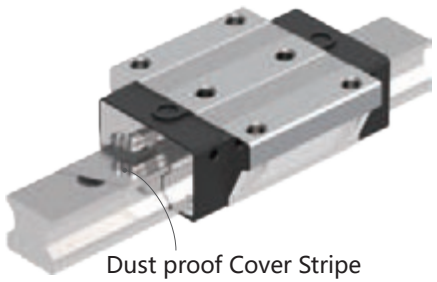
Dimensions of LMR···H / LH



Unit (mm)

Model No.	Rail dimension					Basic load rating		Static moment rating			Weight	
	Width		Height	Pitch	Mounting bolt hole	Dynamic	Static					
	W1	W2	M1	F	D×h×d	C KN	C0 KN	MP (KN·m)	MY (KN·m)	MR (KN·m)	Carriage Kg	Rail Kg/m
LMR25H	23	12.5	23.6	30	11×9×7	26.6	51.5	0.59	0.59	0.74	0.61	3.16
LMR25LH	23	12.5	23.6	30	11×9×7	30.9	62.3	0.85	0.85	0.90	0.76	3.16
LMR30 H	28	16	28	40	14×12×9	39.6	70.1	0.85	0.85	1.26	0.94	4.4
LMR30LH	28	16	28	40	14×12×9	51.3	98.2	1.64	1.64	1.76	1.15	4.4
LMR35 H	34	18	30.7	40	14×12×9	49.4	93.5	1.49	1.49	2.01	1.55	6.23
LMR35 LH	34	18	30.7	40	14×12×9	58.8	116.9	2.30	2.30	2.51	2.07	6.23
LMR45 H	45	20.5	38	52.5	20×17×14	88.3	181.5	3.56	3.56	5.00	3.07	10.23
LMR45 LH	45	20.5	38	52.5	20×17×14	109.4	239.2	6.12	6.12	6.59	3.87	10.23
LMR55 H	53	23.5	44	60	23×20×16	120.0	254.9	5.80	5.80	8.25	4.27	14.45
LMR55 LH	53	23.5	44	60	23×20×16	154.6	352.2	10.82	10.82	11.42	5.94	14.45

Roller Linear Guide - Options
Dust proof Cover Stripe C



Product characteristics

- **Easy to install and disassemble**
  Quick installation during installation, simple and fast disassembly of the entire strip during disassembly.
- **Prevent foreign object intrusion**
  Effectively prevent the chip or foreign matter damage the bolt hole special cover and then invade the inside of the slider, affecting the life of the linear guide.
- **Strong versatility**
  There is no need for special processing or individual customization of the slide, which greatly saves costs.

Specifications

LMR 25 C 2 ZZ P1 +R C 1000 -20 /20 P

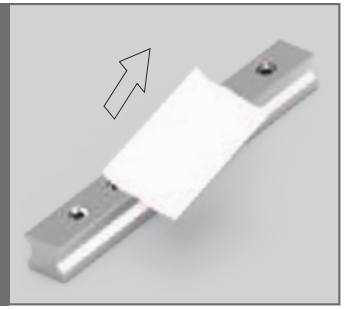
Series：LMR
Size：25，30，35，45，55
Dust proof Cover Stripe

Note:

- Dust proof steel belt can not be bent.
- Before installing the dust-proof steel belt, clean the upper surface of the guide rail.
- The edge and both ends of the dust-proof steel belt are sharp. To prevent scratches, please wear gloves when installing.
- Make chamfering at the cut off of the dust-proof steel belt to avoid scratches during installation.
- When cutting the dust-proof steel strip, it is recommended that the length of the steel strip on each side be 1~2mm shorter than the rail.

Installation

1

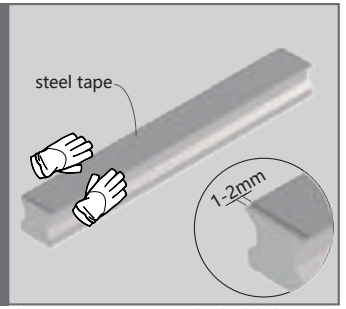


Clean rail surface before installation.

2

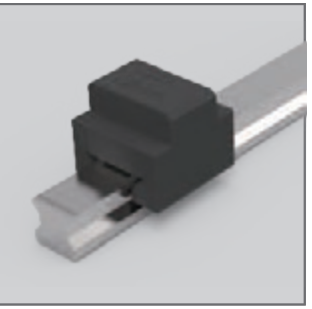
When cutting，make the cover stripe1~2mm shorter than the guideway.
⚠ The cover stripe cannot be bent.

3



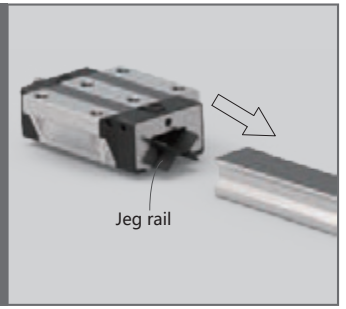
Place the cover stripe neatly, hold down the edge of the cover stripe, and press down to make sure that the end of the cover stripe is closely connected with the end of the guideway.
⚠ The cover stripe cannot be bent.

4



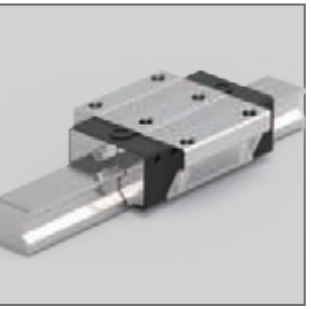
Align the cover stripe with the guideway and push it downward to check whether the cover stripe is in place. Repeat Step 4 until the cover stripe is in place.

5



After the Jeg rail is aligned with the guideway, push the slide block into the guideway. Take out the slide block, use the Jeg rail.

6



Complete

Description of slider back hole cove

Characteristics

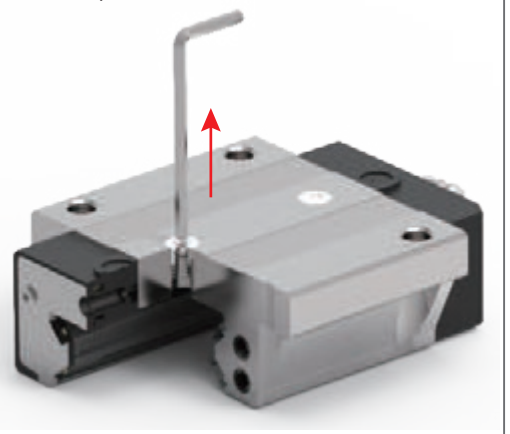
When the LMR series C-type slider is locked down，Prevent foreign objects from entering the interior of the slider through the back hole of the slider，Affects the service life of linear guides.

Disassembly method

When using the middle two holes, remove the dust plug from the back hole of the slider as follows.

1.Insert the ball head of the M4 Allen wrench into the center slot of the dustproof back hole cover. Lift out the dust proof back hole cover with vertical upward force.

Xmm Hex wrench with ball head



Linear Guide Basic knowledge

Linear Guide Service Life

When a linear guide rail operates under load, its rolling surfaces and rolling elements are continuously subjected to repetitive stress from rolling contact. When the fatigue limit is reached, the rolling surfaces can crack due to stress fatigue, leading to flaking that resembles scales on the metal surface. The service life of a linear guide rail is defined as the total operational distance until the onset of surface flaking on the rolling surfaces or rolling elements. This flaking phenomenon is a result of rolling fatigue in the material of the rolling surfaces or rolling elements.

Linear Guide Rated Life

Even when linear guide rails are manufactured under the same conditions and operated under the same conditions, there can be variations in their actual service life. Therefore, for the purpose of calculating the service life of linear guide rails, the rated life is defined as follows: The rated life refers to the total operational distance achieved by a batch of identical linear guide rails running under the same conditions, until 90% or more of the products do not exhibit surface flaking.

Basic Load Rating

Linear guide rails have two types of basic load ratings: the Basic Dynamic Load Rating (C) , which is used for calculating the service life, and the Basic Static Load Rating (C_0), which defines the limit of the static permissible load.

Basic Dynamic Load Rating

The term "Basic Dynamic Load Rating (C)" refers to a consis tent load condition in terms of direction and magnitude, under which a batch of identical linear guide rails, when operated under the same conditions, will have a rated life (L) of (L = 50) km for those using steel balls.

This load condition is known as the Basic Dynamic Load Rating (C). It is used to calculate the service life of linear guide rails when they are under load, and its value is recorded in the dimension tables for each model.

Basic Static Load Rating

When a linear guide rail is station ary or in motion, if it is subjected to an excessive load or a large impact load, local permanent deformation will occur at the contact area between the rolling surface and the rolling elements. Once this perma nent deformation exceeds a certain limit, it will interfere with the smooth operation of the linear guide rail.

Basic Static Load Rating (C_0) refers to a constant static load, both in direction and magnitude, that causes the total permanent defor mation of the rolling elements and the rolling surface at the maximum stress contact area to reach 0.0001 times the diameter of the rolling elements.

The Basic Static Load Rating (C_0) of linear guide rails is defined in terms of radial load. It is used to calculate the static safety factor relative to the applied load, and its values are listed in the dimension tables for each model.

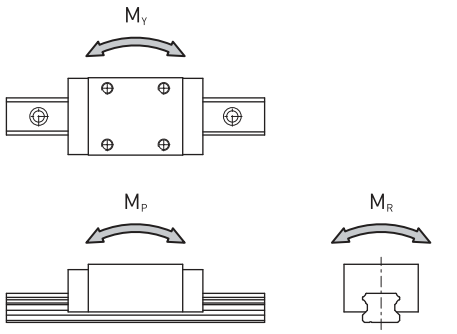
Permissible Static Moment Mo

When a linear guide rail is subjected to torque, the stress distribution on the rolling elements within the guide rail is uneven, resulting in the rolling elements at both ends bearing the maximum stress.

The Permissible Static Moment (Mo) refers to a fixed static moment, both in magnitude and direction, that results in the total permanent deformation of the rolling elements and the rolling surface at the contact area under maximum stress reaching 0.0001 times the diameter of the rolling elements.

The permissible static moments for linear guide rails are defined in three directions: M_P, M_R, and M_Y, and their values are listed in the dimension tables for each model.

Moment in various ditections



Static Safety Factor fs

When linear guide rails are stationary or in operation, they may be subjected to unexpected external forces due to vibration, impact, or the inertial forces generated by starting and stopping. For such load conditions, it is necessary to consider the static safety factor (fs). The static safety factor (fs) is represented by the number of times the actual load applied to the linear guide rail is of the basic static load rating (C_0).

$$f_s = \frac{f_C \times C_0}{P} \quad 或 \quad f_s = \frac{f_C \times M_0}{M}$$

f_S	Static safety factor
f_C	Contact Coefficient
C_0	Static load rating
M_0	Permissible static moments (M_P, M_R, and M_Y)
P	Load calculation value
M	Torque calculation value

Please refer to the safety factor shown in the table below as the reference value for the lower limit of operating conditions.

Reference of Static Safety Factor

Industry	Load conditions	Lower limit of fs
General Industry	With vibration and shock	1.0 ~ 3.5
	Without vibration and shock	2.0 ~ 5.0
Machine Tool Industry	With vibration and shock	1.0 ~ 4.0
	Without vibration and shock	2.5 ~ 7.0

Service Life Calculation Formula

The rated life (L) of a linear guide rail can be calculated based on the Basic Dynamic Load Rating (C) and the applied load (P).

In practical use, linear guide rails often operate with vibrations and impacts, resulting in constantly changing applied loads. Additionally, the hardness of the rolling surfaces and the temperature of the operat ing environment greatly affect the service life.

Taking these factors into account, the actual service life calculation for linear guide rails using steel balls is as follows:

Ball screw

$$L = \left| \frac{f_H \times f_T \times f_C}{f_w} \times \frac{C}{P} \right|^{3} \times 50$$

Rolling

$$L = \left| \frac{f_H \times f_T \times f_C}{f_w} \times \frac{C}{P} \right|^{\frac{10}{3}} \times 100$$

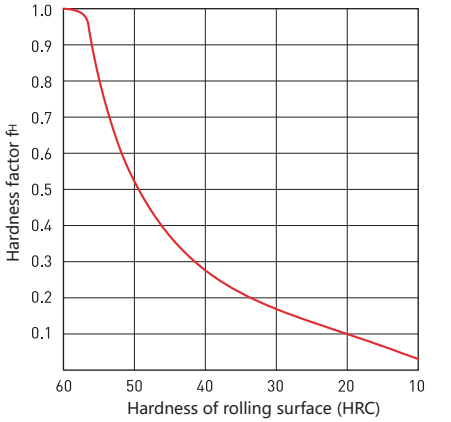
L	Rated life (km)
C	Basic dynamic load rating(N)
P	Load bearing
f_H	Hardness factor
f_T	Temperatre factor
f_C	Contact coefficient
f_W	Load Coefficient

Hardness Factor f_H

To fully utilize the load capacity of linear guideways, the hardness of the rolling surfaces should be between HRC 58 and 64. If the hardness falls below this range, the load capacity of the linear guideways will be reduced. In such cases, the basic dynamic rated load and basic static rate d load should be multiplied by the corre sponding hardness factor (f_H).

(Note) The hardness requirement for the rolling surface of CSK linear guideways is above HRC 58, therefore the hardness factor (f_H)=1.

■ Hardness Factor f_H

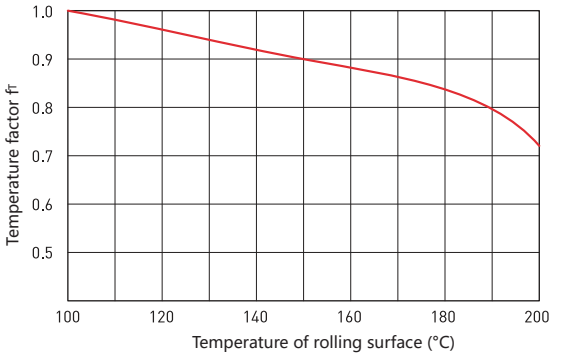


Temperature Factor f_T

When the operating environ ment of linear guideways exceeds 100°C, it is necessary to consider the adverse effects of high temperatures and multiply by the corresponding temperature coefficient from the list below.

(Note)The seal and end cap materials used in CSK linear guideway standard products are recommended for operating environ-ments with temperatures below 90°C.

■ Temperature Factor f_T



Contact Factor fc

When using multiple linear guideway sliders in close contact, the load distribu tion is difficult to even out due to the effects of torque load and installation precision. In such cases, when the sliders are positioned closely together, it is necessary to multiply the basic dynamic rated load (C) and the basic static rated load (C0) by the corresponding contact factor from the list provid ed.

■ Contact Factor fc

Number of sliders in close contact	Contact Factor
2	0.81
3	0.72
4	0.66
5	0.61
6 or more	0.6
Genaral use case	1

Load Factor fw

Machinery that typically performs reciprocating motion often experiences vibration or shock during operation. It is particularly challenging to accurately calculate the vibrations produced at high speeds and the impact of frequent starts and stops. At moments when the effects of speed and vibration are significant, please divide the basic dynamic rated load (C) by the load coefficient obtained from experience, as listed in the table below.

■ Load Factor fw

Operating conditions	Speed	fw
Without vibration and shock	V ≦ 15 m/min	1.0~1.2
Light vibration and shock	15 < V ≦ 60 m/min	1.2~1.5
Medium vibration and shock	60 < V ≦ 120 m/min	1.5~2.0
High vibration and shock	V ≧ 120 m/min	2.0~3.5

Calculation of Life Span

When the stroke length and the number of reciprocations for the use of linear guideways are fixed, the relative lifespan (Lh) can be calculated from the rated life (L) obtained from the aforementioned formula. This conversion allows for the determination of the lifespan in hours based on the specific operational parameters.

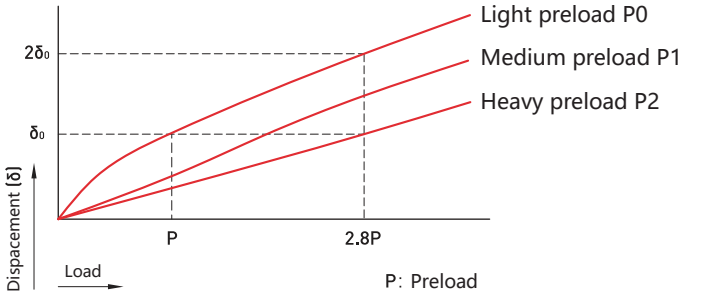
Linear motion of steel balls

$$L_h = \frac{L \times 10^3}{2 \times l_S \times n_1 \times 60}$$

- L_h Lifespan (hr)
- L Rated Life Calculation value (km)
- l_S Stroke Length (m)
- n_1 Counts Per Minute (min^{-1})

Rigidity and Preoad

When selecting linear guideways, it is essential to choose the appropriate preload that meets the operating conditions to achieve the required rigidity for the machinery and equipment. By applying a preload (i.e., preloading), the rigidity of the linear guideways can be increased up to 2.8 times the preload force. This results in a smaller displacement under the same load compared to a non-preloaded condition, significantly enhancing rigidity. The preload in linear guideways is achieved by increasing the diameter of the steel balls, creat ing a negative clearance between the balls and the rolling surface, thus apply ing an internal load. Therefore, this preload force must be taken into account when calculating the lifespan.



Friction Factor

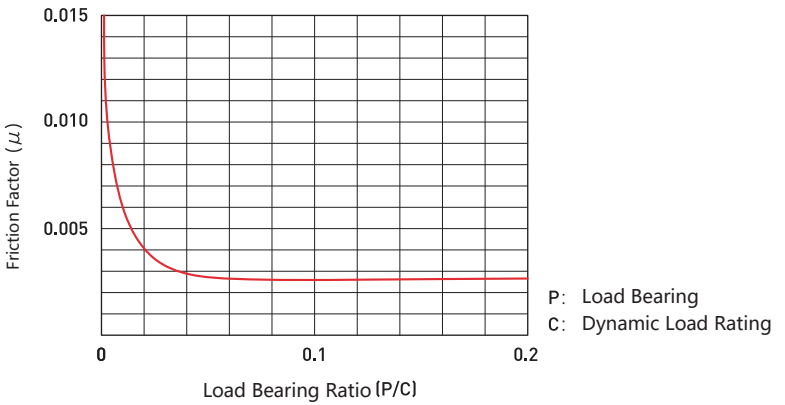
Linear guideways operate by rolling elements moving between rolling surfac es, which results in their frictional resistance being 1/20 to 1/40 of that of sliding guideways. Notably, their static friction is very low, almost identical to dynamic friction, preventing stick-slip motion during operation and enabling feed distances below the micron level. The frictional resistance of linear guide ways varies with their type, preload, the viscosity resistance of the lubricant, and the load applied to the guideways. Particularly, when torque is applied or preload is used to increase rigidity, the frictional resistance will rise accordingly. The frictional resistance (thrust value) of linear guideways can be calculated using the following formula, taking into account the load they bear and the resistance of the seals.

Note: Friction factor of LMG series linear guides is 0.002~0.003.

$$F=\mu \times P+f$$

F Friction Resistance (kgf)
μ Dynamic Frictional Resistance Factor
P Load Bearing (kgf)
f Seal Resistance

■ Load Bearing and Friction Factor Relationship



Features of CSK Linear Guide

High positioning accuracy

Linear guide facilitate movement through rolling elements between rolling surfaces, resulting in frictional resistance that is 1/20 to 1/40 of that of sliding guideways. Particularly noteworthy is the very low static friction, which is nearly identical to dynamic friction, thus eliminating the occurrence of stick-slip during micro-feed operations. This ensures excellent precision resolution and reproducibility, achieving positioning accuracy at the sub-micron level.

Minimal wear allows for long-term maintenance of precision

Traditional sliding guideways, due to the adverse effects of oil film backflow during movement, can lead to poor motion accuracy. Additionally, their challenging lubrication can result in significant wear on the contact surfaces of the guideway, severely affecting precision. In contrast, linear guideways with a rolling motion system have a simple lubrication structure, making lubrication easy and effective. This minimizes wear on the friction contact surfaces, there by maintaining the machine’ s travel accuracy over a long period.

Capable of high load in all four directions

The geometric design of linear guideways enables them to simultaneously withstand loads in radial, reverse radial, and lateral directions while maintaining their travel accuracy. Additionally, rigidity and load capacity can be enhanced by applying preload and increasing the number of sliders.

Suitable for applications requiring high-speed motion

The characteristic of low rolling friction resistance in linear guideways means that they require less power for mechanical equipment, thus saving on electricity consumption. Additionally, their low wear during movement and minimal frictional heat generation allow for the miniaturization of machinery and support the need for high-speed motion.

Easy to assemble and features interchangeability

The installation of linear guideways is straightforward: by following the recom mended assembly steps on a milled or ground mounting surface, the high precision achieved during the manufacturing of the guideways can be replicated. This process reduces the time and cost associated with traditional scraping methods required for the mounting surface. Additionally, the interchangeability feature of the guideways allows for the separate replacement of sliders or rails, or even the entire set of linear guideways, enabling the machinery to regain high-precision guidance. This makes machine assembly the easiest and maintenance the most convenient.

Key Points for Selecting CSK Linear Guide

Selecting Steps for CSK Linear Guide

1. Setting service conditions → Set necessary condition of load design *Note 1
- · Mounting operation
- · Symbol for number of axes

Change span, number of blocks and number of rails.

Change tyoe and size.

2. Selecting a type → Select a tye that meets the service condition and temporarily decide a rough size.

3. Calculating the applied load → Calculate the applied load on the block
- · Rated load of the block in all direction
- · Calculating the applied load

4. Calculating the equivalent load → Convert the load applied on each block in each direction into an quivalent load.

5. Calculating safety factor → Obtain the value of static safety factor from the basic satatic load rating and maximum applid load

Estimating rigidity
- · Selecting preload
- · Service life with preload considered
- · Design guide struture

Dtermining accuracy
- · Selection of accuracy grade
- · Accuracy of mounting surface

Judgement on the static safety factor

NO

YES

6. Calculating the average load → Average the applied load fluctuating during operation to convert the value to an average load.

7. Calculating the rated life → Calculate the distance traveledbased on the rated life eaution.

Compared with required service life

NO

YES

Selecting of Lucrication and Dustproof
- · Type of lubricant
- · lubrication method
- · Dust prevention

Completed

*Note 1 The necessary conditions for load design :
- · Space in the guide section
- · Dimensions (span, number of blocks, number of rails, thrust)
- · Mounting operation (horizontal, vertical, slant mount, wall mount, suspended)
- · Magnitude, direction and position of working load
- · Operation frequency (duty cycle)
- · Stroke length
- · Speed and acceleration
- · Required life
- · Dynamic accuracy
- · Service environment

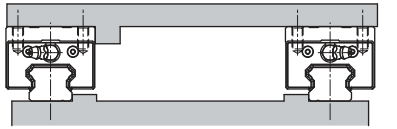
Setting Service Conditions

Mounting Operation

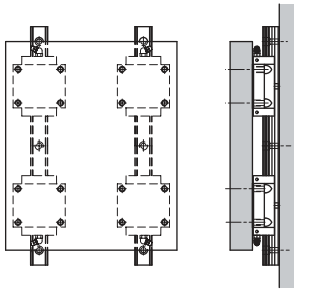
CSK Linear guides can be mounted in following six orientations. If oil is to be used as lubricant, in cases where the installation method is other than horizontal use, there may be difficulties in delivering lubricating oil to the rolling surface. When placing an order, please specify the mounting orientation and the location of the oil nozzle and oil pipe joint on the block.

■ Mounting Orientation

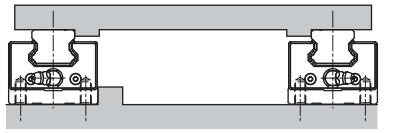
Horizontal (symbol:H)



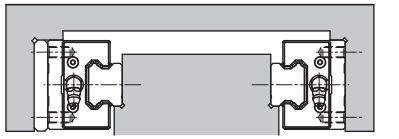
Vertical (symnol:V)



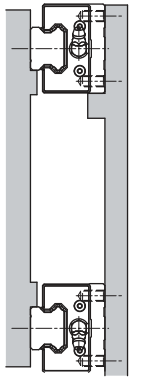
Inverted (symbol:R)



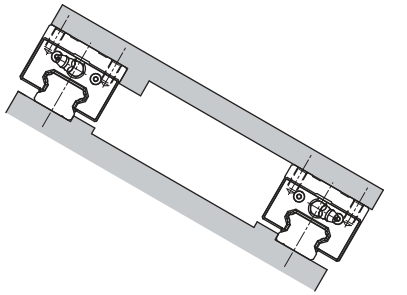
Relative (symbol:F)



Wall mount (symbol:K)



Slant mount (symbol:T)



Symbol for Number of Axes

When use two or more units of a model of precision or higher accuracy grades,please specify the number of CSK rails (symbol for number of axes) in advance.

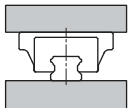
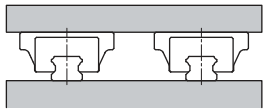
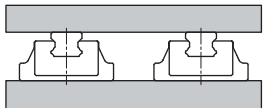
■ Example of model

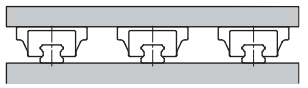
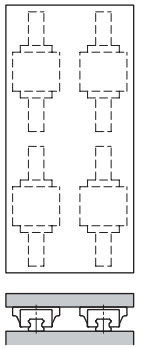
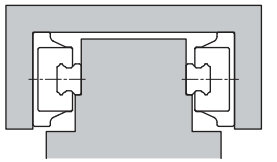
LMG20C2SSP1+R1000-20/20P II

Model number

Symbol for number of axes
("II" indicates 2 axes. no symbol for a single axis)

■ Symbol for number of axes

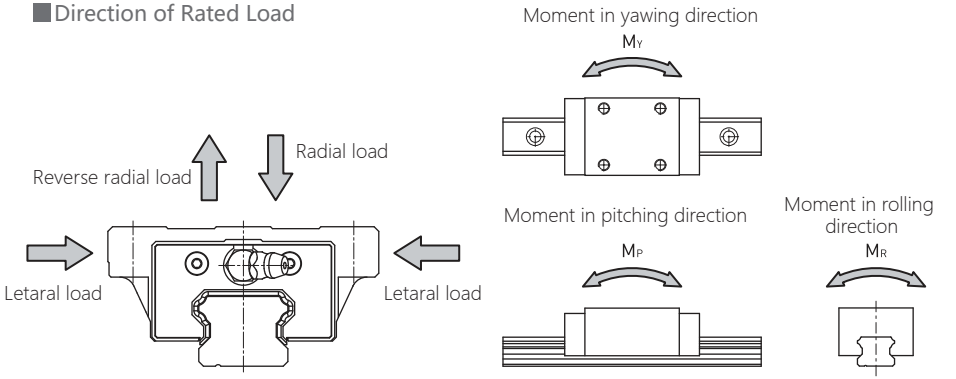
Symbol for number of axes: none	Symbol for number of axes: II	Symbol for number of axes: II
Required number of axes: 1	Required number of axes: 2	Required number of axes: 2
		

Symbol for number of axes: III	Symbol for number of axes: IV	Other
Required number of axes: 3	Required number of axes: 4	Required number of axes: 2
		

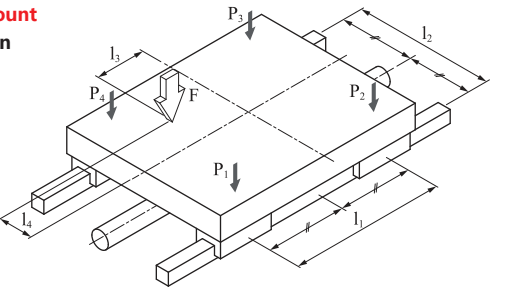
Calculate Applied Load

Linear guideway can withstand loads or torques in all directions due to installa tion methods, configurations, the center of gravity of moving objects, thrust positions, acceleration, and cutting resistance. When selecting linear guides, it is essential to consider various usage conditions to calculate the correct load-bearing capacity

■ Direction of Rated Load



■ Apllied Load Equation

Type	Service Conditions	Applied load equation
Horizontal mount **Uniform motion or stationary**		$P_1 = \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_1} - \frac{F \cdot l_4}{2 \cdot l_2}$ $P_2 = \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_1} - \frac{F \cdot l_4}{2 \cdot l_2}$ $P_3 = \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_1} + \frac{F \cdot l_4}{2 \cdot l_2}$ $P_4 = \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_1} + \frac{F \cdot l_4}{2 \cdot l_2}$

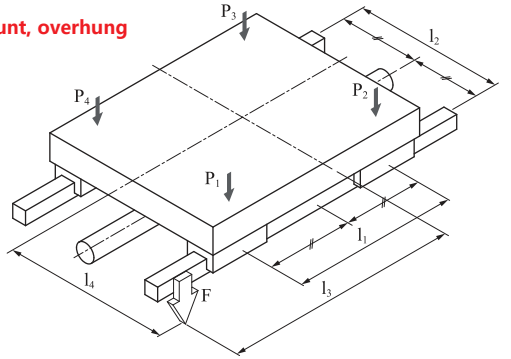
Calculate Applied Load

■ Apllied Load Equation

Type	Service Conditions	Applied load equation

Horizontal mount, overhung

Uniform motion or stationary



$$P_1 = \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_1} + \frac{F \cdot l_4}{2 \cdot l_2}$$

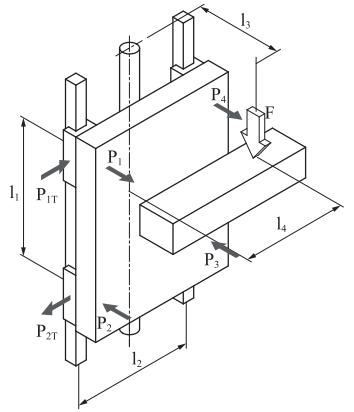
$$P_2 = \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_1} + \frac{F \cdot l_4}{2 \cdot l_2}$$

$$P_3 = \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_1} - \frac{F \cdot l_4}{2 \cdot l_2}$$

$$P_4 = \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_1} - \frac{F \cdot l_4}{2 \cdot l_2}$$

Vertical mount

Uniform motion or stationary



$$P_1 = P_2 = P_3 = P_4 = \frac{F \cdot l_3}{2 \cdot l_1}$$

$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{F \cdot l_4}{2 \cdot l_1}$$

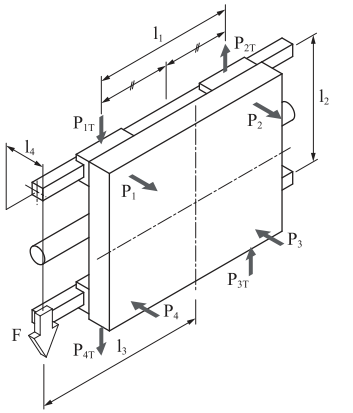
Calculate Applied Load

■ Apllied Load Equation

Type	Service Conditions	Applied load equation

Wall mount

Uniform motion or stationary

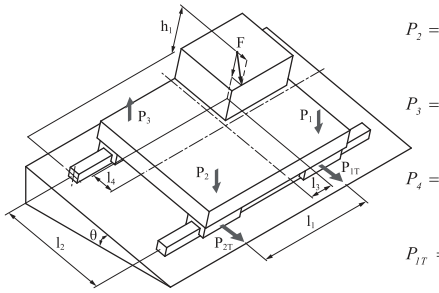


$$P_1 = P_2 = P_3 = P_4 = \frac{F \cdot l_4}{2 \cdot l_2}$$

$$P_{1T} = P_{4T} = \frac{F}{4} + \frac{F \cdot l_3}{2 \cdot l_1}$$

$$P_{2T} = P_{3T} = \frac{F}{4} - \frac{F \cdot l_3}{2 \cdot l_1}$$

Laterally tilt mount



$$P_1 = \frac{F \cdot \cos\theta}{4} + \frac{F \cdot \cos\theta \cdot l_3}{2 \cdot l_1} - \frac{F \cdot \cos\theta \cdot l_4}{2 \cdot l_2} + \frac{F \cdot \sin\theta \cdot h_1}{2 \cdot l_2}$$

$$P_2 = \frac{F \cdot \cos\theta}{4} - \frac{F \cdot \cos\theta \cdot l_3}{2 \cdot l_1} - \frac{F \cdot \cos\theta \cdot l_4}{2 \cdot l_2} + \frac{F \cdot \sin\theta \cdot h_1}{2 \cdot l_2}$$

$$P_3 = \frac{F \cdot \cos\theta}{4} - \frac{F \cdot \cos\theta \cdot l_3}{2 \cdot l_1} + \frac{F \cdot \cos\theta \cdot l_4}{2 \cdot l_2} - \frac{F \cdot \sin\theta \cdot h_1}{2 \cdot l_2}$$

$$P_4 = \frac{F \cdot \cos\theta}{4} + \frac{F \cdot \cos\theta \cdot l_3}{2 \cdot l_1} + \frac{F \cdot \cos\theta \cdot l_4}{2 \cdot l_2} - \frac{F \cdot \sin\theta \cdot h_1}{2 \cdot l_2}$$

$$P_{1T} = P_{4T} = \frac{F \cdot \sin\theta}{4} + \frac{F \cdot \sin\theta \cdot l_3}{2 \cdot l_1}$$

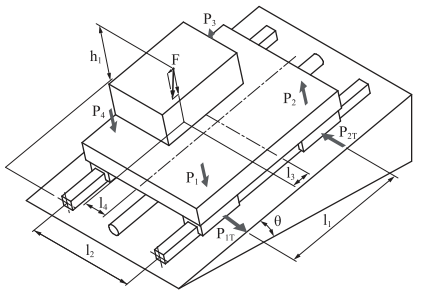
$$P_{2T} = P_{3T} = \frac{F \cdot \sin\theta}{4} - \frac{F \cdot \sin\theta \cdot l_3}{2 \cdot l_1}$$

Calculate Applied Load

■Apllied Load Equation

Type	Service Conditions	Applied load equation

Longitudinally tilt mount



$$P_1 = \frac{F\cdot\cos\theta}{4} + \frac{F\cdot\cos\theta\cdot l_3}{2\cdot l_1} - \frac{F\cdot\cos\theta\cdot l_4}{2\cdot l_2} + \frac{F\cdot\sin\theta\cdot h_1}{2\cdot l_1}$$

$$P_2 = \frac{F\cdot\cos\theta}{4} - \frac{F\cdot\cos\theta\cdot l_3}{2\cdot l_1} - \frac{F\cdot\cos\theta\cdot l_4}{2\cdot l_2} - \frac{F\cdot\sin\theta\cdot h_1}{2\cdot l_1}$$

$$P_3 = \frac{F\cdot\cos\theta}{4} - \frac{F\cdot\cos\theta\cdot l_3}{2\cdot l_1} + \frac{F\cdot\cos\theta\cdot l_4}{2\cdot l_2} - \frac{F\cdot\sin\theta\cdot h_1}{2\cdot l_1}$$

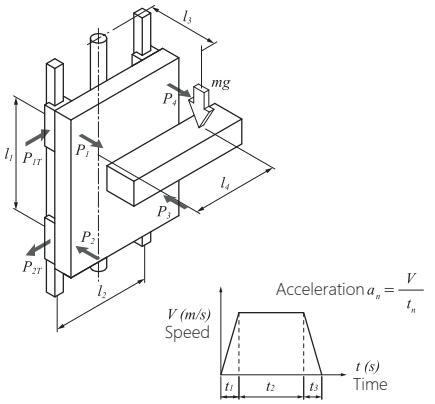
$$P_4 = \frac{F\cdot\cos\theta}{4} + \frac{F\cdot\cos\theta\cdot l_3}{2\cdot l_1} + \frac{F\cdot\cos\theta\cdot l_4}{2\cdot l_2} + \frac{F\cdot\sin\theta\cdot h_1}{2\cdot l_1}$$

$$P_{1T} = P_{4T} = \frac{F\cdot\sin\theta\cdot l_4}{2\cdot l_1}$$

$$P_{2T} = P_{3T} = -\frac{F\cdot\sin\theta\cdot l_4}{2\cdot l_1}$$

Vertical mount

with intertia



■ Speed diagram

During acceleration

$$P_1 = P_2 = P_3 = P_4 = \frac{m\cdot(g+a_1)\cdot l_3}{2\cdot l_1}$$

$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{m\cdot(g+a_1)\cdot l_4}{2\cdot l_1}$$

During uniform motion

$$P_1 = P_2 = P_3 = P_4 = \frac{m\cdot g\cdot l_3}{2\cdot l_1}$$

$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{m\cdot g\cdot l_4}{2\cdot l_1}$$

During deceleration

$$P_1 = P_2 = P_3 = P_4 = \frac{m\cdot(g-a_3)\cdot l_3}{2\cdot l_1}$$

$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{m\cdot(g-a_3)\cdot l_4}{2\cdot l_1}$$

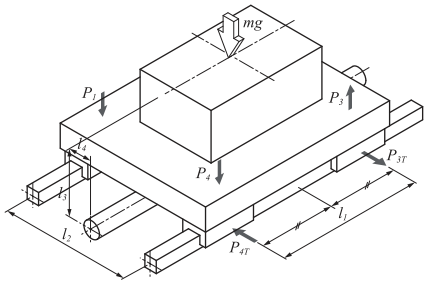
Calculate Applied Load

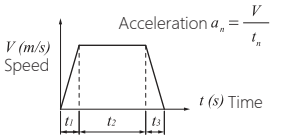
■Apllied Load Equation

Type	Service Conditions	Applied load equation

Horizontal mount

with intertia





■ Speed diagram

During acceleration

$$P_1 = P_4 = \frac{mg}{4} - \frac{m\cdot a_1\cdot l_3}{2\cdot l_1}$$

$$P_2 = P_3 = \frac{mg}{4} + \frac{m\cdot a_1\cdot l_3}{2\cdot l_1}$$

$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{m\cdot a_1\cdot l_4}{2\cdot l_1}$$

During uniform motion

$$P_1 = P_2 = P_3 = P_4 = \frac{mg}{4}$$

During deceleration

$$P_1 = P_4 = \frac{mg}{4} + \frac{m\cdot a_3\cdot l_3}{2\cdot l_1}$$

$$P_2 = P_3 = \frac{mg}{4} - \frac{m\cdot a_3\cdot l_3}{2\cdot l_1}$$

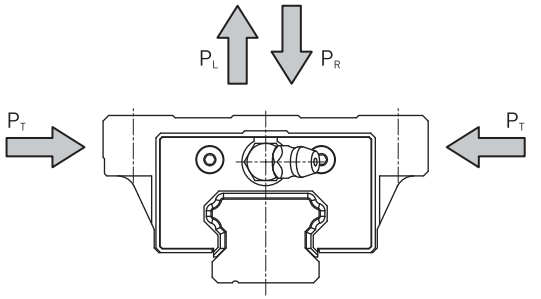
$$P_{1T} = P_{2T} = P_{3T} = P_{4T} = \frac{m\cdot a_3\cdot l_4}{2\cdot l_1}$$

Calculate Equivalent Load

The slider of a linear guide can simultaneously withstand loads and torques in various directions, including radial, anti-radial, and lateral forces. When multiple loads act in different directions, it is possible to convert all these loads into equiv alent radial or lateral loads for calculating the service life or static safety factor.
The LMG series linear guides are designed to handle equal loads in four direc tions. For cases where two or more (including two) guide rails are used, the calculation of equivalent load is as follows.

$$P_E = |P_{R(L)}| + |P_T|$$

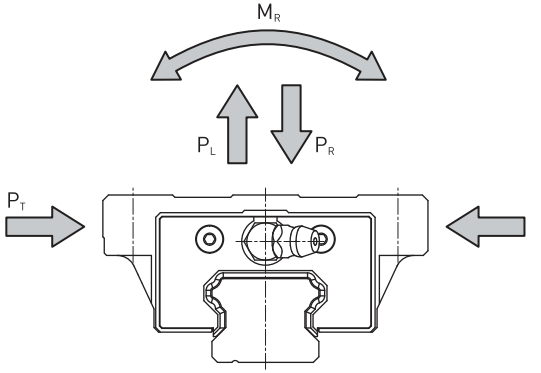
P_E Equivalent load (N)
P_R Radial load (N)
P_L Reverse-radial load (N)
P_T Lateral load (N)



In the case of using a single linear guide, the equivalent load must take into account the torque effect. The calculation formula for this is as follows.

$$P_E = |P_{R(L)}| + |P_T| + C_0 \times \frac{|M|}{M_R}$$

P_E Equivalent load (N)
P_R Radial load (N)
P_L Reverse-radial load (N)
P_T Lateral load (N)
C_0 Basic static load rating(N)
M Torque calculation value
M_R Permissible static moments



Calculate Static Safety Factor

When calculating the load applied to a linear guide, it is essential to determine both the average load required for calculating the service life and the maximum load needed for calculating the static safety factor. Particularly in cases of rapid starts and stops, or when cutting loads are involved, as well as situations where cantilever loads cause significant torque, unexpected high loads may impact the linear guide. When selecting a model, ensure that its maximum load capaci ty is suitable. For calculating the static safety factor, please refer to page D-02.

Calculate Average Load

In case where the load applied to each block fluctuates under different conditons, such as industrial robot' s arm that grasps a moving workpiece during forward motion and experiences only the arm' s own weight during backward motion, or when a machine tool' s slider encounters changing loads due to various conditions, it is essential to comprehensively consider these dynamic load conditions for service life calculations.
The average load (Pm) refers to a certain load size during slider operation that has the same service life as under these varying load conditions.
The basic formula for calculating the average load is as follows:

$$P_m = \sqrt[i]{\frac{1}{L} \cdot \sum_{n=1}^{n} (P_n^i \cdot L_n)}$$

P_m Average load (N)
P_n Varying load (N)
L Total distance traveled (mm)
L_n Distance traveled under load Pn (mm)
i Constant determined by the rolling elements (when rolling element is steel balls, i=3)

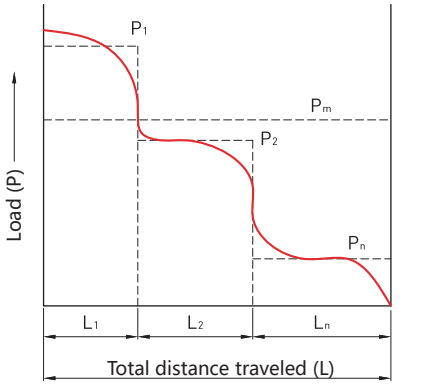
Examples of varying load

1. When the load varies in steps

Rolling element is steel balls, i=3

$$P_m = \sqrt[3]{\frac{1}{L}(P_1^3 \cdot L_1 + P_2^3 \cdot L_2 \cdots + P_n^3 \cdot L_n)}$$

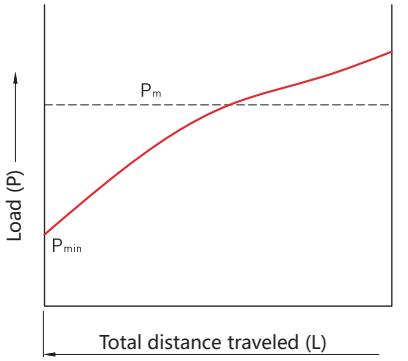
P_m Average load (N)
P_n Varying load (N)
L Total distance traveled (mm)
L_n Distance traveled under load Pn (mm)



2. When the load varies monotonously

$$P_m \cong \frac{1}{3}(P_{min} + 2 \cdot P_{max})$$

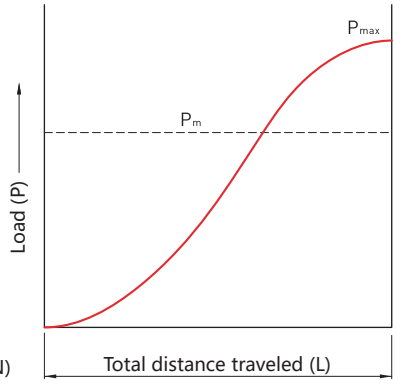
P_m Average load (N)
P_{min} Minimum load (N)
P_{max} Maximum load (N)



3. When the load varies sinusoidally

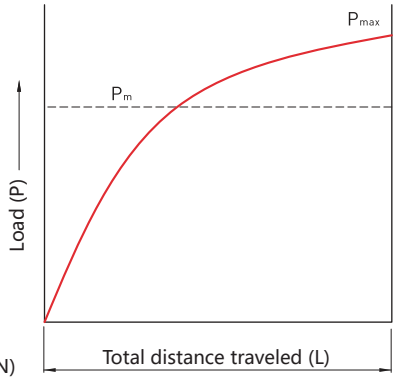
$$P_m \cong 0.65P_{max}$$

P_m Average load (N)
P_{max} Maximum load (N)



$$P_m \cong 0.75P_{max}$$

P_m Average load (N)
P_{max} Maximum load (N)



Calculate Rated Life

The service life of the linear guide is subject to variations even under the same operational conditions. Therefore, it is necessary to use the rated life as a reference value when estimating the service life of linear guides. For the calculation of rated life, please refer page E-03.

Estimate the Rigidity

Select the preload

Preload significantly affects the walking precision, load-bearing capacity, and rigidity of linear guides. In general, applying preload is beneficial for improving the service life and accuracy, especially in cases involving reciprocating motion that may cause vibration and impact.

The following are the reference criteria for preload selection:

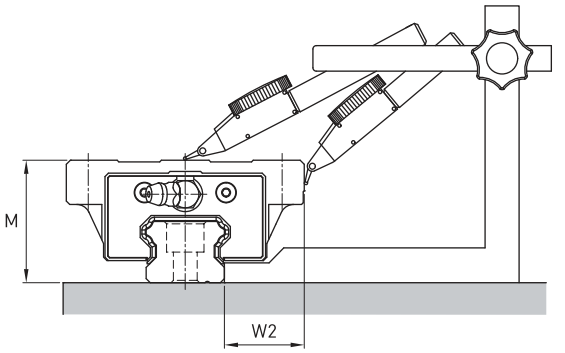
Preload	Service conditions	Sample applications
Light preload (P0)	• Fixed load direction, minimal vibration and impact, and 2 rails are installed in parallel. • Very high precision is not required, and the sliding resisitance must be as low as possible	Beam-welding machine, book-binding machine, automatic packaging machines, general industrial machinery XY axes, automatic sashing-manufacturing machines, flame cutting machine, and tool chanding machine
Medium preload (P1)	• Overhang or moment load is applied • Single axes configuration • Light weight and high accuracy are required	Grinding machine table feed axis, automatic painting machines, industrial robots, high speed machine feeder, grinding machine worktable feed axes, NC lathes, electrical discharge machining machines, measuring instruments, and precision alignment platforms
Heavey preload (P2)	• High rigidity is required and vibrations and impact are applied • Heavy-cutting machine tool	Machine center, NC lathe, grinding wheel feed axes in grinders, milling machine, centers, NC lathes, vertical or horizontal boring machines, and tool guide sections

When considering preload, it is essential to take into account the service life.
When use with medium or heavy preload, it is necessary to calculate the service life based on the preload load.

Determine the accuracy

Accuracy standard

Accuracy is specified in terms of parallelism, dimensional tolerance for height M and width W2, and height and with difference between a pair when 2 or more blocks are used on on rail or when 2 or more rails are mounted on the same plane.



■ Running parallelism

■ Running parallelism

It refers to a parallelism error between the block and rail datum plane when the blovk travels the whole length of the rail with rail secured on the reference datum plane using bolts.

■ Differences in height M (ΔM)

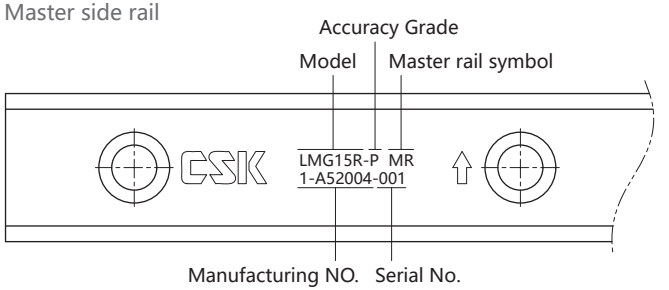
Indicates a difference between the minimum maximum values of height (M) of each of the blocks used on the same plane in combination.

■ Differences in width W2 (ΔW2)

Indicates a difference between the minimum maximum values of width (W2) of each of the blocks, mounted on one rail in combination, and the rail.

Notes:
1. When 2 or more rails are used on the same plane in parallel, only the width (W2) tolerance and the difference on the master rail apply. The master rail is imprinted with "MR" (except for normal grade of accuracy) in the end.
2. Accuracy measurements each represent the average value of the central point or the central area of the block.

■ Master side rail



Guidelines for accuracy grades

Guidelines for selecting an accuracy grades of Guides Lines according to the machine type.

Type of machine		Acurracy grade				
		Normal N	High H	Precision P	Super Precision SP	Ultra Precision UP
Machine Tool	Machine center			●	●	
	Lathe			●	●	
	Milling machine			●	●	
	Drilling machine			●	●	
	Jig borer				●	●
	Grinder machine				●	●
	Elecric discharge machine			●	●	●
	Punching press		●	●		
	Laser beam machine		●	●	●	
	Woodwoking machine	●	●	●		
	NC drilling machine		●	●		
	Tapping center		●	●		
	Pallet changer	●				
	ATC	●				
	Wire cutting machine			●	●	
	Dressing machine				●	●
Idustrial robot	Cartesian coordinate	●	●	●		
	Cylindrical coordinate	●	●			
Semiconductor manufacturing machine	Wire bonding machine			●	●	
	Prober				●	●
	Electronic component inserter		●	●		
	Printed circuit board drilling machine		●	●	●	
Others	Inject molding machine	●	●			
	3D measuring instrument				●	●
	Office equipment	●	●			
	Conveyance system	●	●			
	XY table		●	●	●	
	Coating machine	●	●			
	Welding machine	●	●			
	Medical equipment	●	●			
	Digitizer		●	●	●	
	Inspection machine			●	●	●

Design Reference Elements

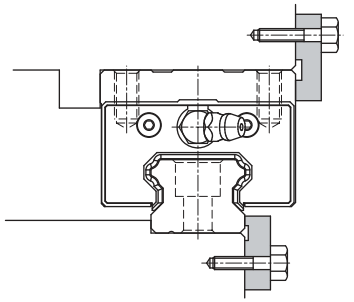
Design of Structure

Linear Guide Installation Method

When there are vibrations or impacts in the machinery, the linear guide and block may deviate from their original fixed positions, affecting operational precision and lifespan. To prevent this situation, it is recommended to secure the linear guide and slider using the following methods.

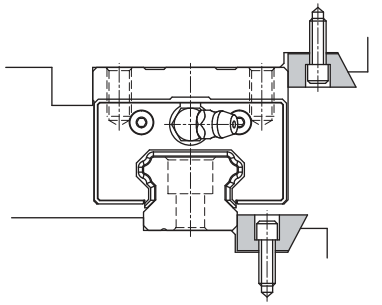
Pressure Plate Fixation Method

Ensure that the side surfaces of the guide and slider slightly protrude from the edges of the bed or worktable. The pressure plate should be machined with grooves to avoid interference with the corners of the guide or slider during installation.



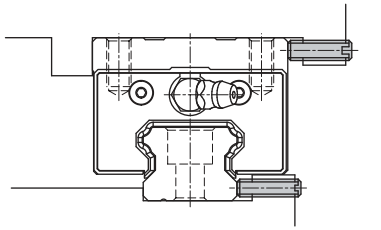
Tapered Wedge Fixation Method

Apply pressure to the tapered wedge for secure fixation. Be cautious not to apply excessive force, as it may cause bending of the guide or deformation of the outer shoulder. Proper attention to the tightening force is essential during installation.



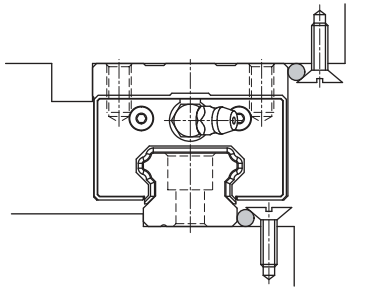
Positioning Bolt Fixation Method

Due to space limitations, avoid using excessively large bolts.



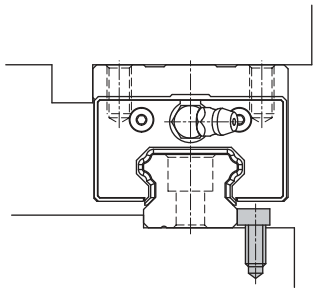
Roller Fixation Method

Use inclined surfaces on the bolt heads to press the rollers. Pay special attention to the position of the bolt heads.



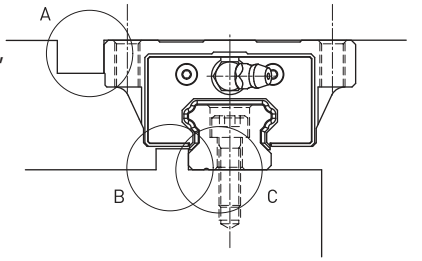
Clamping Bolt with Eccentric Head Fixation Method

After fixing the clamping bolt with eccentric head, apply pressure to the eccentric head of the clamping for secure fixation. When tightened, the eccentric head of the bolt exerts strong clamping force by utilizing the wedge effect, allowing significant clamping force with a small tightening torque.



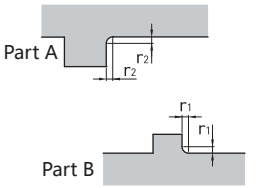
Design of Mounting Surface

When installing linear guide rails, espe cially in equipment requiring high precision, it is necessary to install the linear tracks with high accuracy. At this time, please pay attention to the following points to design the mounting surface.



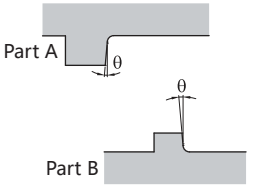
Angle Shape

Refers to the shape of the corner on the mounting surface of linear guide rails or blocks. If it is machined with an R shape larger than the chamfer size of the linear guide rail or block, it may not correctly contact reference surface. Therefore, when designing the mounting surface, pay attention to the "angle shape" specified in each item.



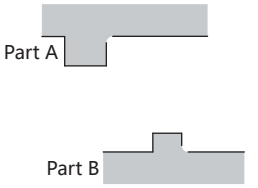
Perpendicularity of Reference Surface

If the perpendicularity accuracy between the mounting surface of linear guide rails or blocks and reference surface cannot be guaranteed, it may not correctly align with reference surface. Therefore, during design, be mindful of the angular deviation between the mounting surface and the reference surface.



Dimension of Reference Surface

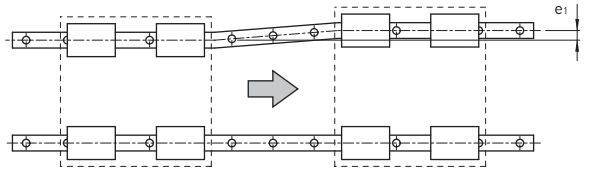
When designing the datum surface for linear guides, consider the height and thickness of reference surface. If it is too high, there is a risk of interference; conversely, if it is too low, it may not properly align due to the chamfer of linear guide rails or blocks. Additionally, if the thickness of the linear guide is too low, it may lack of rigidity when subjected to lateral loads or when using lateral thrust bolts for positioning, leading to poor accuracy. Pay close attention to these factors.



Tolerance of Mounting Surface

The linear guide series with self-aligning properties can achieve smooth linear motion even when the mounting surface has slight machining errors. Below are the allowable surface deviation values when there is no impact on rolling resistance or lifespan.

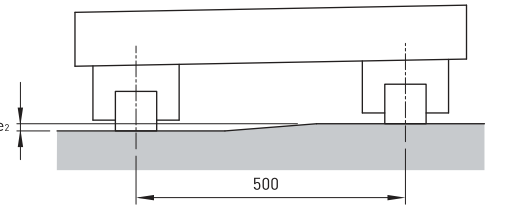
■ Parallelism error (e1)



Unit: μm

Model	Preload		
	P0	P1	P2
LMG 15	25	18	-
LMG 20	25	20	18
LMG 25	30	22	20
LMG 30	40	30	27
LMG 35	50	35	30
LMG 45	60	40	35

■ Horizontal error (e2)



Unit: μm

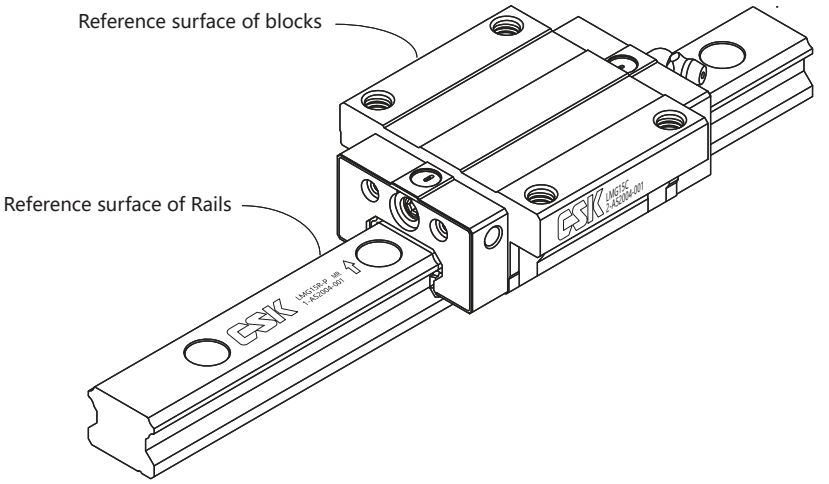
Model	Preload		
	P0	P1	P2
LMG 15	130	85	-
LMG 20	130	85	50
LMG 25	130	85	70
LMG 30	170	110	90
LMG 35	210	150	120
LMG 45	250	170	140

Note: The values in the table represent the permissible limits when the axis spacing is 500 mm, and these limits are proportional to the axis spacing.

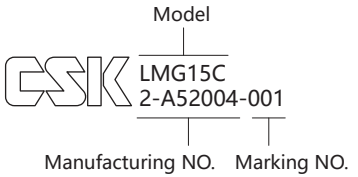
Marking on the Master Guide and Combined Use

Marking on the Reference Surface

On the guide rail, the reference surface direction is indicated by the arrow pointing toward the model and manufacturing number mark. However, on the block, it is on the opposite side of the model and manufacturing number mark, as shown as below.



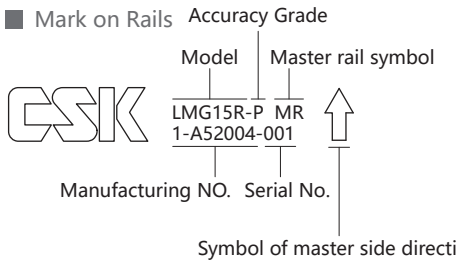
■ Mark on blocks



■ Production Code Information

2	A	52	004
Document Type	Year	Week	Production Code No.

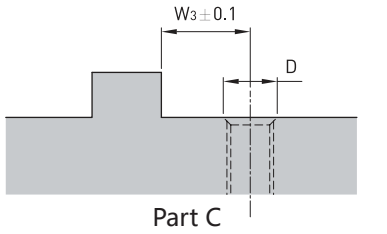
■ Mark on Rails



Note: The slider code of the assembly component corresponds to its mating guide rail code.

Tolerance of the Datum hole size

The size tolerance from the reference surface of the guide rail or block to the mounting hole should not be too large, as it may prevent correct positioning during installation. Typically, depend ing on the model, the tolerance should be set within ±0.1 mm.



Chamfering of threaded holes

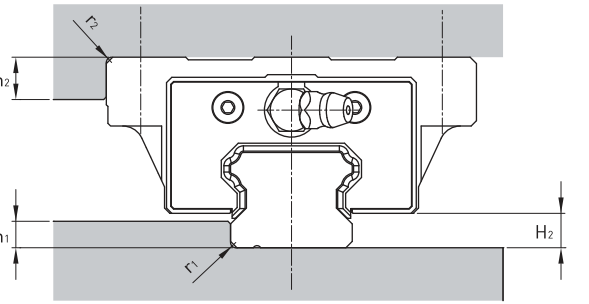
The chamfering of threaded holes during installation is essential for accurate positioning of guide rails. If the chamfer is too large or too small, it can adversely affect precision.

■ Chamfer dimensions

Chamfer inner diameter(D) = bolt nominal dameter + pitch
Eg: M6 (pitch is 1)
Chamfer inner diameter(D) = 6+1=7

Shoulder Height and Coners' Shape of Mounting Surface

Usually, mounting surface of rails and blocks has a reference surface on their side. This is for ease of assembly and precise positioning. The height of this reference surface shoulder varies depending on the model. Additionally, the corner of the installation shoulder should be machined with a recessed section or a radius smaller than the corner angle to prevent interference with the chamfer of the rail or block.



The radius of the corner (denoted as 'r') varies depending on the model.
Please refer to the table below.

Unit: mm

Model	r1 max.	r2 max.	h1	h2	H2
LMG 15	0.5	0.5	3	4	4.5
LMG 20	0.5	0.5	3.5	5	5
LMG 25	1	1	5	5	6.5
LMG 30	1	1	5	5	8.5
LMG 35	1	1	6	6	9.5
LMG 45	1	1	8	8	11

Marking on the Master Rail

All LM rails mounted on the same plane are marked with the same serial number. The rail marked with "MR" after the serial number is the master rail. The block on the master rail has its reference surface finished to a designated precision, allowing it to serve as the positioning reference for tables. Normal grade linear guides are not marked with "MR." Therefore, any one of the LM rails having the same model number can be used as the master rail.

■ Mark on mater rail

Use of Rails and Carriage

The rail and block(s) used in combination must have the same model number. When removing a block from the rail and reinstalling the block, make sure that they have the same model number and the numbers are oriented in the same direction.

Use of Jointed Rails

When a long LM rail is ordered, two or more rails will be jointed together to the desired length.
When jointing rails, make sure that the joint match marks shown in Fig.(A) are correctly positioned.
When jointing two rails, it is recommended to stagger the joint positions to avoid recision variations when the blocks passes through the joint. Please refer to Fig.(B) for illustration.

- Use of joint match mark

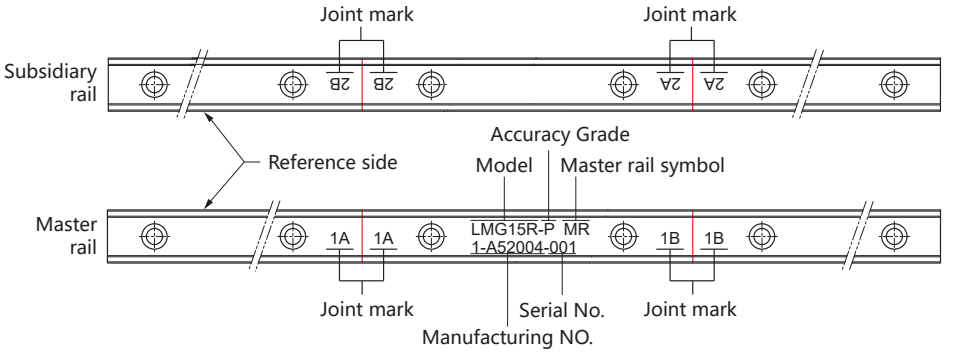


Fig. (A)

- Stagger the joint position

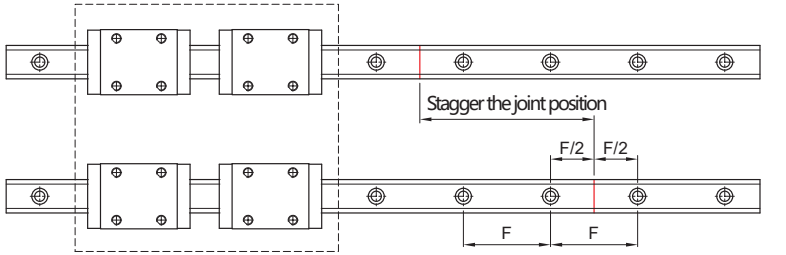
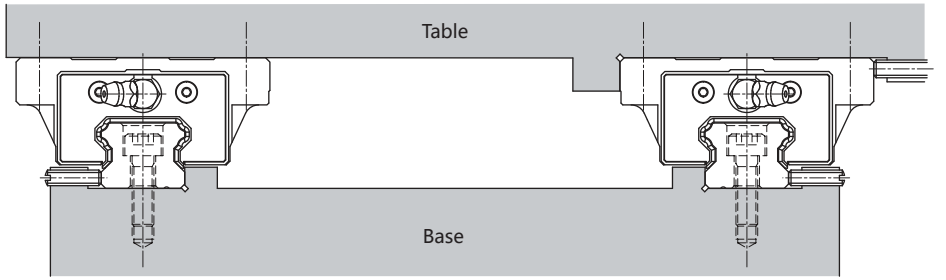


Fig. (B)

Mounting of Linear Guide

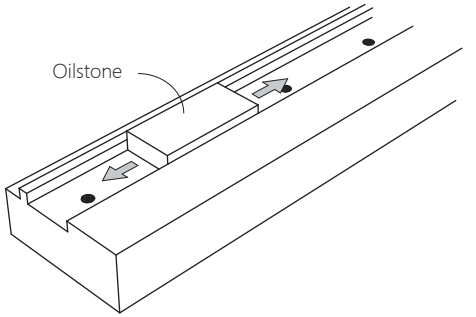
Mounting Procedure

- When installing in a mechanical system with vibration and impact effects, and when high rigidity and high precision are required.

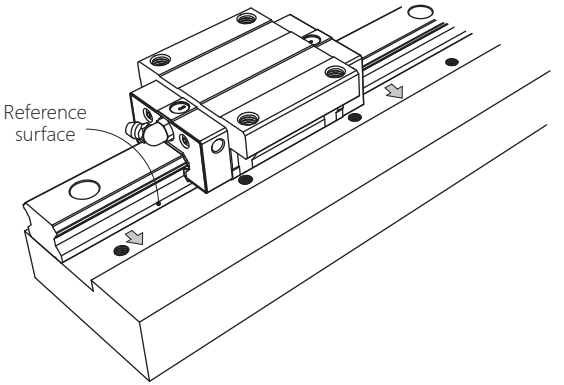


(1) Mounting the Rails

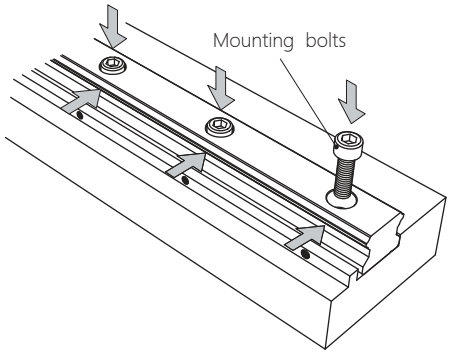
1. Before installation, ensure that any burrs and dusts are removed from the machining surface of the machine bed.



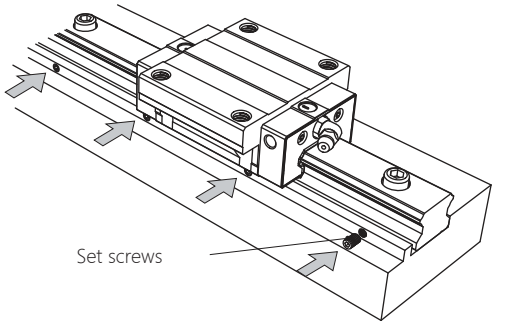
2. Gently place the linear guide on the base , aligning the reference surface of the guide with the lateral mounting surface of the bed. Note that both sides of the guide slider can serve as reference faces.



3. Secure the mounting bolts without fully tightening them. Ensure that the reference face of the linear guide aligns closely with the lateral mounting surface of the machine bed. Before installation, verify that the bolt holes match the assembly bolts.

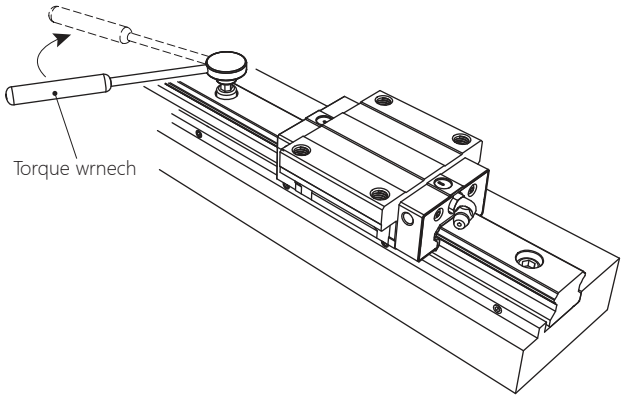


4. Gradually tighten the Set screws to ensure a snug fit between the linear guide and the machine bed' s lateral mounting surface.



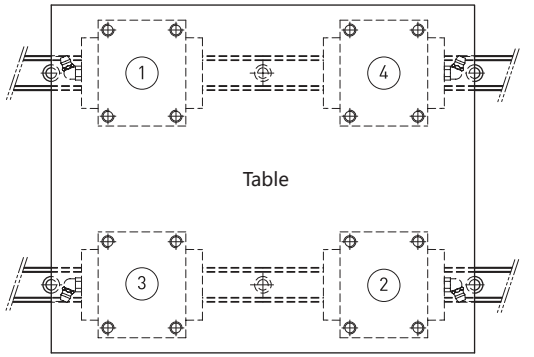
5. Use a torque wrench to tighten the assembly bolts to the specified torque value. Follow a sequence from the center of the guide towards both ends for consistent precision.

6. Install the remaining paired guides following steps 1 to 5.

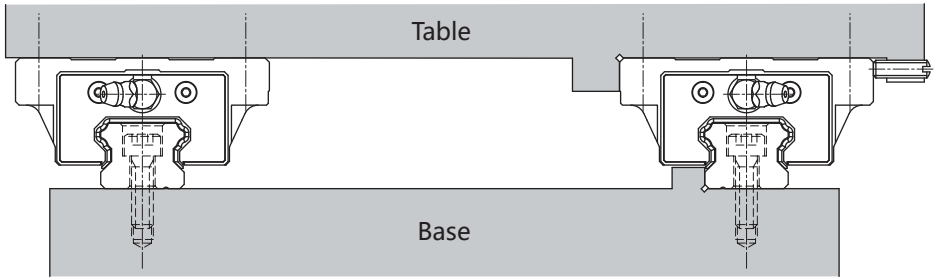


(2) Mounting the blocks

1. Gently place the table on the blocks and temperarily fasten the mounting bolts.
2. Press the master side blocks to the side reference surface of the table using se screws and position the table.
3. Fully fasten the mounting bolts on the master side and subsidiary side to complete the installation.

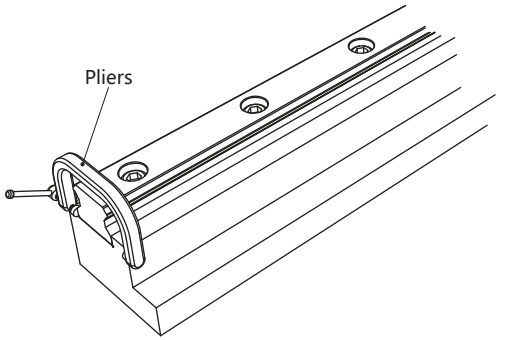


■ Mounting the guide when the master rail is not provided with set screws



(1) Mounting the Master Rail

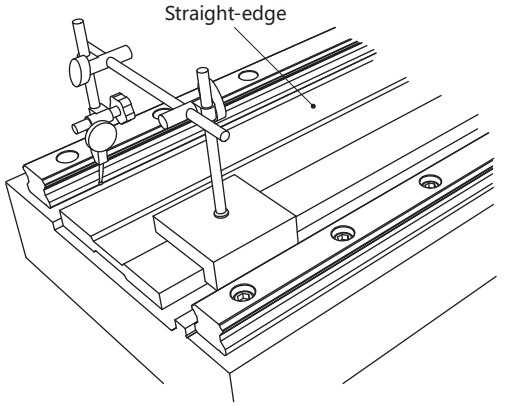
After temporarily fastening the mounting bolts, firmly press the rail to the side reference surface at the position of each mouting bolt using a small vice and fully fasten the bolts.Perform this in order from either rail end to the other.



(2) Mounting the Subsidiary Rail

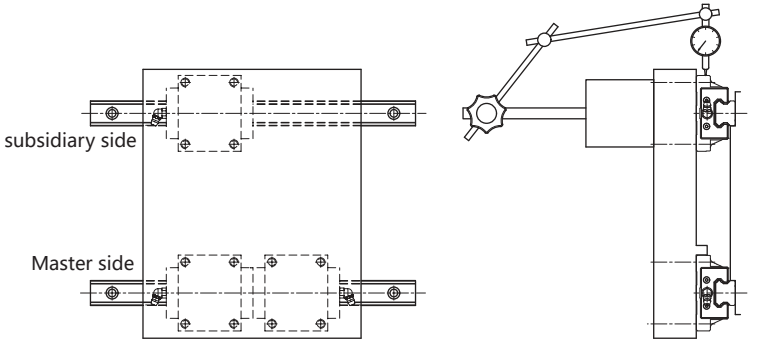
■ Using a Straight-edge

Place straight-edges between two rails, and arrange the straight-edge in parallel with the side reference of the master rail using a dial gauge. Then, secure the mounting bolts in order while achieving straightness of the subsidary rail with the straight-edge as the reference by using the dia gauge.



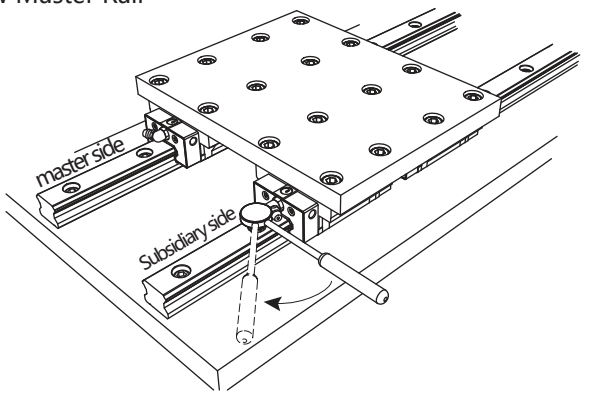
■ Moving Worktable

Secure the two LM blocks on the master rail with the table (or a temporary table for measurement), and temporarily fasten the rail and the block on the subsidiary rail with the table. Place a dial gauge to the side face of the block on the subsidiary rail from the dial stand fixed on the table top, then fasten the bolts in order while achieving parallelism of the subsidiary rail by moving the table from the rail end.



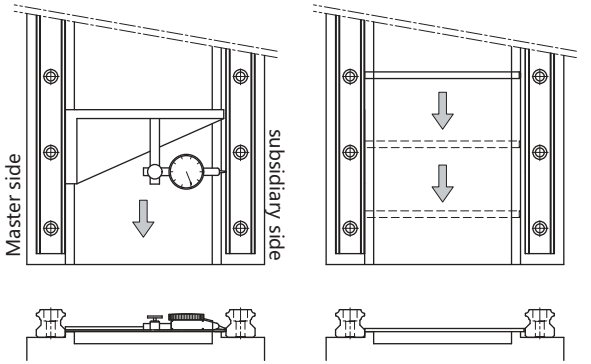
■ Having Subsidiary Rail Follow Master Rail

Place the table on the blocks of the correctly mounted master rail and the temporarily fastened subsidiary rail, and fully fasten the two blocks on the master rail and one of the two blocks on the subsidiary rail with bolts. Fully tighten the mounting bolts on the subsidiary rail in order while temporarily fastening the remaining block on the subsidiary rail.

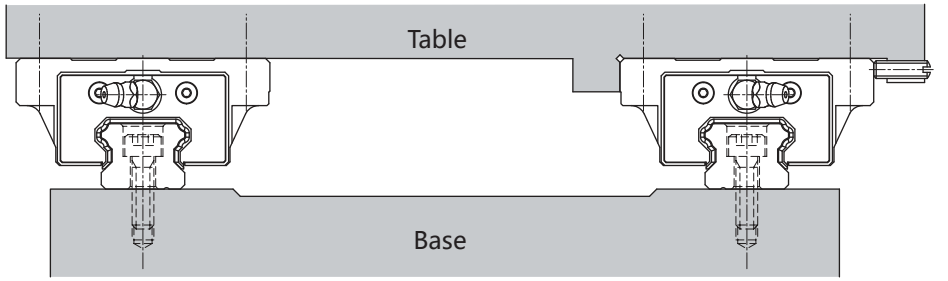


■ Using a Jig

Use a jig to achieve parallelism of the reference surface on the subsidiary side against the side reference surface of the master side from one end of the rail by the mounting pitch, and at the same time, fully fasten the mounting bolts in order.



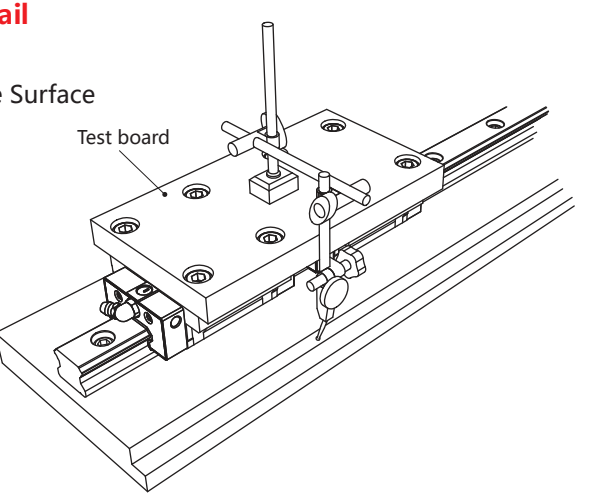
■ Mounting the guide when the master rail does not have a reference surface



(1) Mounting the Master Rail

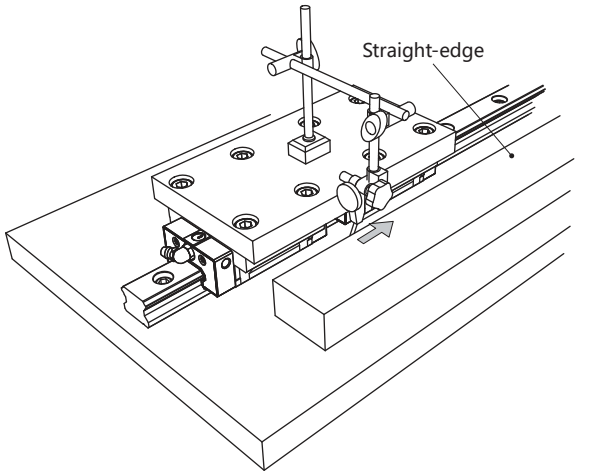
■ Using a Temporary Reference Surface

Temporarily set a reference surface near the rail mounting position on the base to achieve straightness of the rail from the rail end. In this method, two blocks must be joined together and attached to a measurement plate.



■ Using a Straight-edge

After temporarily fastening the mounting bolts, use a dial gauge to check the straightness of the side reference surface of the LM rail from the rail end, and at the same time, fully fasten the mounting bolts.

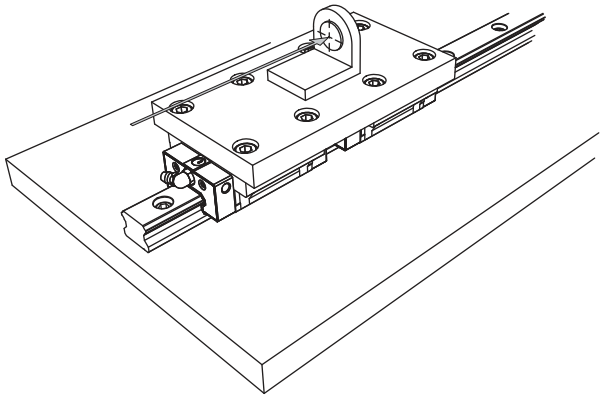


(2) Procedure of Mounting Subsidiary Rail and Block Follows the same specifications as mentioned earlier.

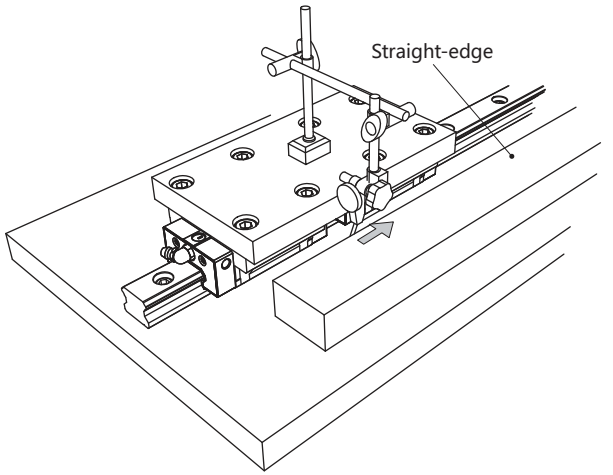
Method for Measuring Accuracy after Installation

When measuring running accuracy of the block, stable accuracy can be obtained by securing two blocks on an inspection plate. When using a dial gauge, we recommend placing the straight-edge as close as possible to the block in order to perform accurate measurement.

■ Measurement method using an auto-collomator



■ Measurement method using a dial gauge



Linear Guide precautions for use

Operation

1. After tilting, the slider and guide may slide due to their own weight. Please be vigilant.
2. Do not drop or strike the linear guide, as it may cause scratches or damage. Even if no visible damage is apparent, impact can still impair functionality.
3. Refrain from disassembling the slider on your own, as it could introduce foreign particles or negatively affect assembly precision.
4. Be mindful of preventing foreign objects from entering the slider. Damage to the steel ball circulation components may compromise functionality.
5. Avoid using the linear guide in environments exceeding 80°C (176°F). Instantaneous temperatures should not exceed 100°C (212°F).
6. When disassembling or replacing the slider from the guide, use rail clamps for assistance. Only detach the slider from the guide when necessary.
7. If operating in environments with frequent vibration, high dust, extreme temperatures (hot or cold), or other challenging conditions, please consult CSK.

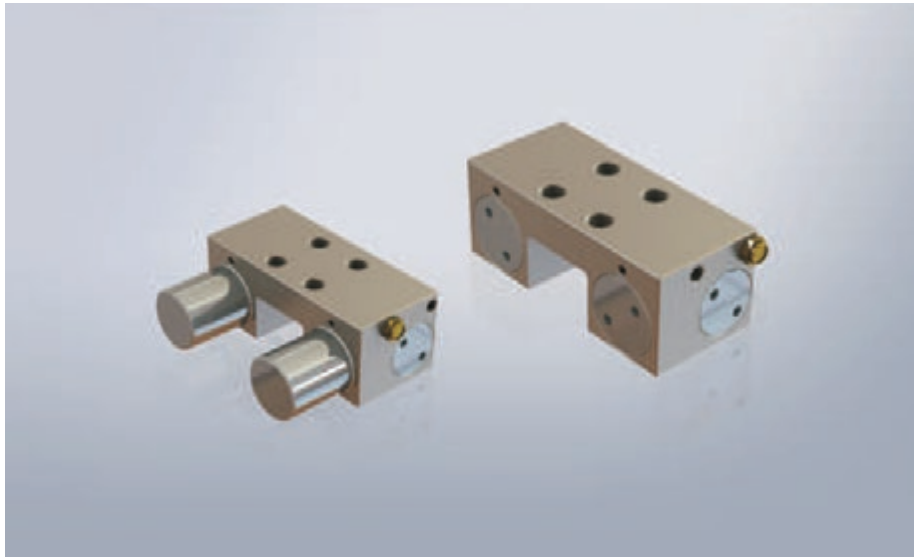
Lubrication

1. Thoroughly remove anti-corrosion oil and feed lubricant before using the product.
2. Refrain from combining lubricants with different properties.
3. When using oil lubricants, be aware that due to installation orientations, lubricating oil maynot reach all internal areas of the blocks, please contact CSK for details.
4. Please apply grease every 100km of travel for reference.

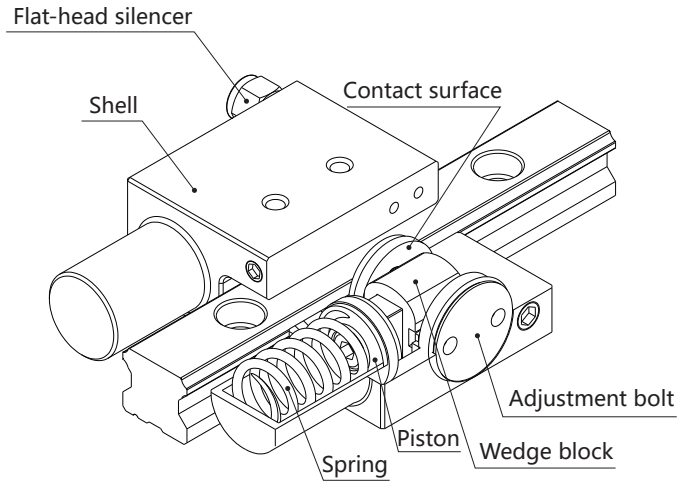
Storage

When storing linear guide rails, make sure to apply rust-proof oil and seal them in the specified cover. Place them horizontally and avoid environments with high or low temperatures and excessive humidity. The recommended operating temperature should not exceed 80°C, and avoid sudden temperatures exceeding 100°C.

Clamp
LK series



Construction



Characteristics

A rolling linear guide clamp consists of a clamp body, an actuating element, a clamping element, and a contact element. It is a high-performance functional component designed for use with rolling linear guides.

- Fixed worktable
- Vibration prevention
- Precision positioning
- Rigidity enhancement

Term Explanation

Normally Open Clamp
A clamp that remains released when no air supply is provided.

Brake-Equipped Clamp
A clamp with brake pads as the contact element.

Normally Closed Clamp
A clamp that remains clamped when no air supply is provided.

Mounting Pad
A shim plate used to align the clamp height with the linear guide height.

Minimum Operating Pressure
The lowest pressure required for normal operation of the clamp.

Maximum Operating Pressure
The highest pressure allowed for normal operation of the clamp.

Reaction Time
- **Normally Open Clamp Reaction Time**

The time interval between the system issuing a signal to start air supply and the actual commencement of air supply to the clamp.

- **Normally Closed Clamp Reaction Time**

The time interval between the system issuing a signal to stop the air supply and the actual cessation of air supply to the clamp.

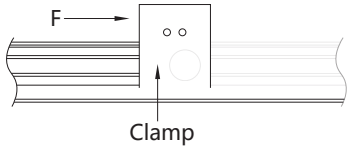
Response Time
- **Normally Open Clamp Reaction Time**

The time interval from the commencement of air supply to the clamp until it clamps the linear guide.

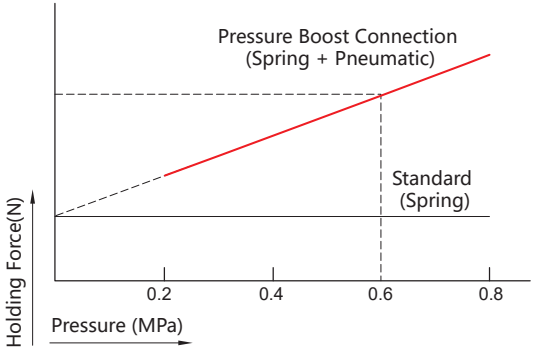
- **Normally Closed Clamp Reaction Time**

The time interval from the cessation of air supply to the clamp until it clamps the linear guide.

Holding Force
The force that resists the axial movement of the slider. The holding force varies depending on the static friction coefficient between the guide rail and the clamping mechanism. (The rated holding force in the catalog is calculated based on a static friction coefficient of 0.1.)



Pressure Boost Connection
A connection method that increases the holding force by applying air pressure in addition to the spring-based holding force, thereby enhancing the overall clamping capability.



Air Consumption
The volume of air required for one complete operating cycle of the clamp.

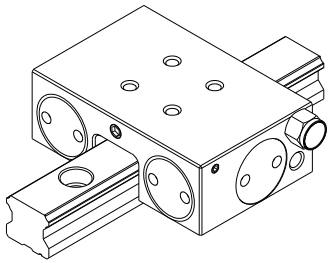
Specifications

LK G 30 C M No A

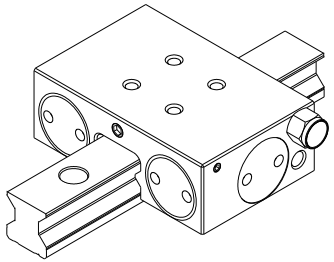
- Clamp
- G-Compatible with LMG ball-type guides
- R-Compatible with LMR roller-type guides
- LMG15-55
- LMR25-55
- C-Flange type
- H-Square high type
- T -Square compact type
- M: Manual
- R: Pneumatic
- F: Hydraulic
- NO: Normally Open
- NC: Normally Closed
- Special Mark

No Pneumatic Normally Open Series

Construction



LKG-RNo ball-type



LKR-RNo roller-type

Characteristics

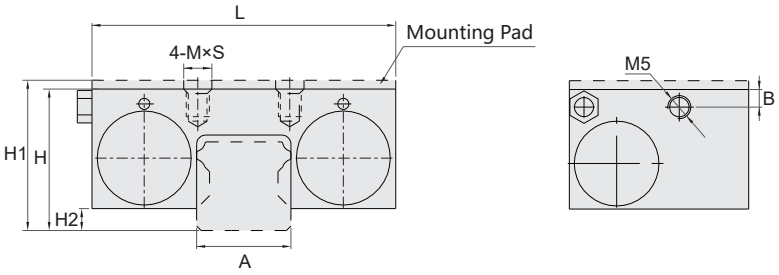
Utilizing the wedge amplification principle, clamping is achieved through pneumatic pressure. Its compact structure and innovative design prevent rigid impacts during clamping. Direct connection to the worktable requires no modifications to the table dimensions. Suitable for pneumatic clamping in motion axes.

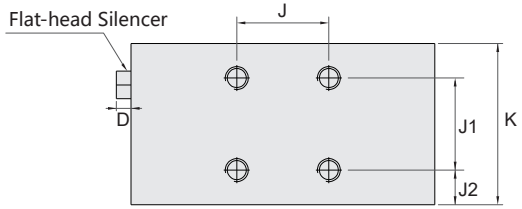
- High Holding Force
- Easy Installation
- Precision Positioning
- Optimized Design

	Response Time	Pressure	Temperature
Pneumatic Normally Open Type	≤0.06s	0.2~0.8MPa	0℃~70℃

*The holding force in the table corresponds to an air pressure of 0.6 MPa; the holding force is proportional to the pressure within the operating pressure range.

Dimensions of LKG-RNo



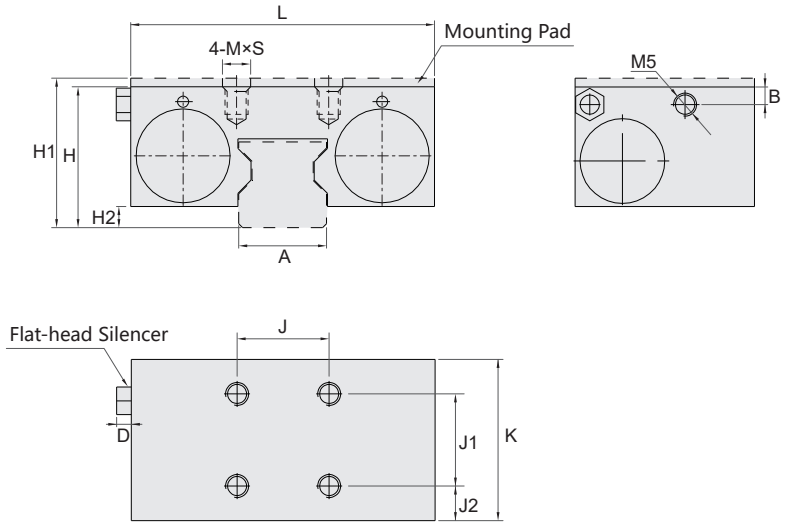


Unit (mm)

Model No.	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	Rated Holding Force N	Air Consumption l/cycle
LKG15RNo	24	28	2.5	60	M4	5	15	4	4.5	15	15	16.5	42	650	0.011
LKG20RNo	30	-	4	67	M5	5	20	4.55	4.5	20	20	8	39	1000	0.019
LKG25RNo	36	40	6	74	M6	7	23	4	4.5	20	20	10	37	1200	0.021
LKG30RNo	42	45	7	90	M8	10	28	5.5	4.5	22	22	8	41	1750	0.031
LKG35RNo	48	55	7	100	M8	12	34	7.5	4.5	24	24	8.5	41	2000	0.031
LKG45RNo	60	70	13	120	M8	12	45	12	4.5	26	26	11	49	2250	0.041
LKG55RNo	70	80	18.5	128	M10	15	53	15.5	4.5	30	30	9.5	49	2250	0.041

*H1 refers to the height of the clamp after installing the mounting pad when used with a square slider.

Dimensions of LKR-RNo



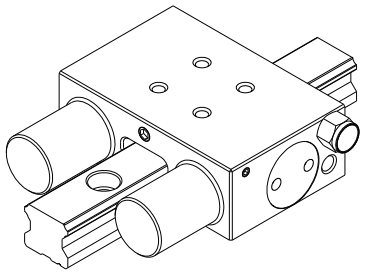
Unit（mm）

Model No.	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	Rated Holding Force N	Air Consumption l/cycle
LKR25RNo	36	40	4.5	74	M6	7	23	6.5	4.5	20	20	7	37	1200	0.02
LKR30RNo	42	45	5	90	M8	9	28	7.25	4.5	22	22	10	41	1750	0.028
LKR35RNo	48	55	5	100	M8	11	34	10	4.5	24	24	8.5	41	2000	0.03
LKR45RNo	60	70	8	120	M8	12	45	16	4.5	26	26	11	49	2250	0.04
LKR55RNo	70	80	10	128	M10	12	53	19	4.5	30	30	9.5	49	2250	0.04

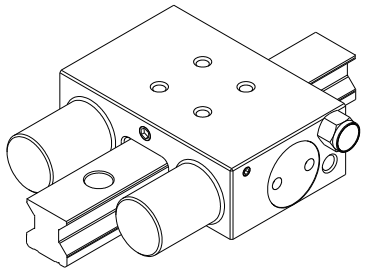
*H1 refers to the height of the clamp after installing the mounting pad when used with a square slider.

Nc Pneumatic Normally Closed Series

Construction



LKG-RNc ball-type



LKR-RNc roller-type

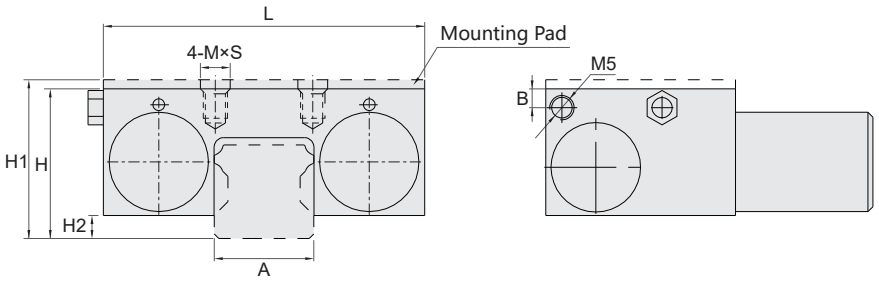
Characteristics

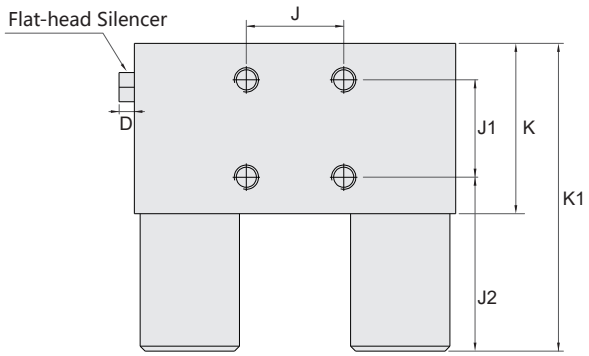
Clamping is achieved through spring energy acting on the wedge block. The clamp is released by pneumatic pressure (divided into standard series and low-pressure series based on the required release pressure). It connects directly to the worktable without requiring modifications to the table dimensions. Suitable for fixing machining center worktables.

- High Reliability
- Stable and Easy to Use
- High Positioning Accuracy
- Energy Efficient

	Release Pressure	Pressure Boost Connection	Response Time	Temperature
Pneumatic Normally Closed Type	0.55~0.8MPa	0.2~0.8MPa	≤0.06s	0℃~70℃

Dimensions of LKG-RNc



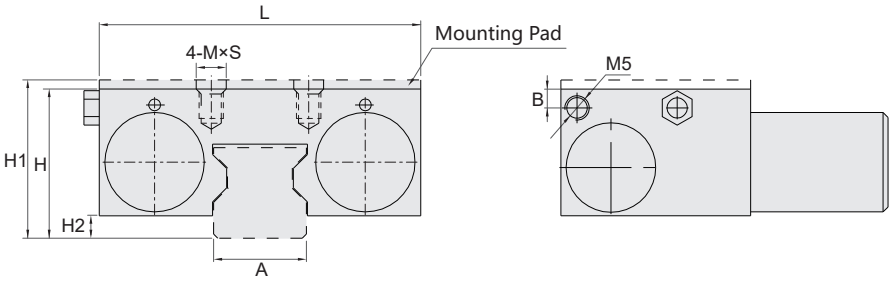


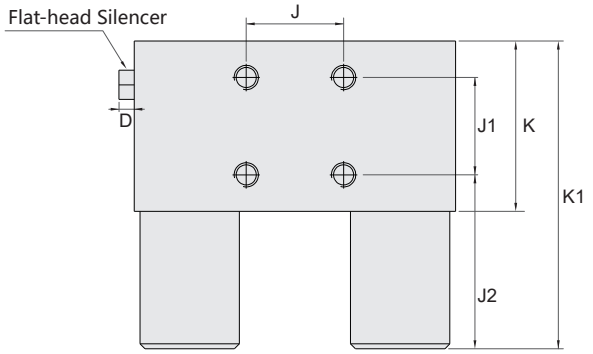
Unit (mm)

Model No.	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	K1	Rated Holding Force N	Air Consumption l/cycle
LKG15RNc	24	28	2.5	60	M4	5	15	12.5	4.5	15	15	37.5	42	63	400	0.011
LKG20RNc	30	-	4	67	M5	5	20	4.55	4.5	20	20	30	39	61	600	0.019
LKG25RNc	36	40	6	74	M6	7	23	7	4.5	20	20	32	37	59	750	0.021
LKG30RNc	42	45	7	90	M8	10	28	5.5	4.5	22	22	36	41	69	1050	0.031
LKG35RNc	48	55	7	100	M8	12	34	9.5	4.5	24	24	36.5	41	69	1250	0.031
LKG45RNc	60	70	13	120	M8	12	45	14.5	4.5	26	26	44	49	82	1450	0.041
LKG55RNc	70	80	18.5	128	M10	15	53	18.5	4.5	30	30	42.5	49	82	1450	0.041

*H1 refers to the height of the clamp after installing the mounting pad when used with a square slider.

Dimensions of LKR-RNc





Unit (mm)

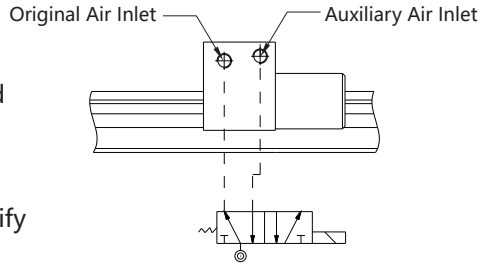
Model No.	H	H1	H2	L	M	S	A	B	D	J	J1	J2	K	K1	Rated Holding Force N	Air Consumption l/cycle
LKR25RNc	36	40	4.5	74	M6	7	23	6	4.5	20	20	29	37	59	750	0.021
LKR30RNc	42	45	5	90	M8	9	28	6	4.5	22	22	38	41	69	1050	0.031
LKR35RNc	48	55	5	100	M8	11	34	13.2	4.5	24	24	36.5	41	69	1250	0.031
LKR45RNc	60	70	8	120	M8	12	45	16	4.5	26	26	44	49	82	1450	0.041
LKR55RNc	70	80	10	128	M10	12	53	19	5.5	30	30	42.5	49	82	1450	0.041

*H1 refers to the height of the clamp after installing the mounting pad when used with a square slider.

Pressure Boost Connection

Connection Method

1. Remove the silencer.
2. Install the tube fitting, air tube, and solenoid valve.
3. Begin air supply.
4. Activate the solenoid valve and verify the clamp's open/close status.

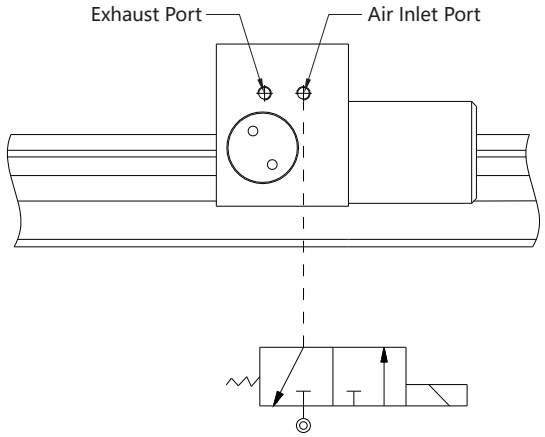


Installation

1. Install the clamp after the guide rail and slider are mounted. It is recommended to position it between two sliders.
2. Mount the clamp on the linear guide rail in the released state, ensuring that the clamp can move freely without contact between the clamping mechanism and the rail.
3. Hand-tighten the hex socket screws to temporarily pre-secure the clamp to the sliding table.
4. Perform clamping actions on the guide rail, repeating the clamping and releasing cycles more than 10 times.
5. While the clamp is engaged with the rail, use a torque wrench to tighten the bolts to the specified torque. Then release the clamp and verify that the clamping mechanism does not contact the rail (push the sliding table back and forth; if the friction increases compared to before securing the clamp, loosen the bolts and readjust the clamp).
6. Finally, check for air leaks at the tubing connections.

Precautions

1. Normally closed clamps are equipped with spacers between clamping mechanisms ex-factory. Do not remove the spacers except during installation.
2. To avoid partial loading, clamps must be installed on all guide rails.
3. Install an air filter with a filtration rating of 25μm or finer.
4. Use air tubes with an outer diameter of Φ6mm or larger. Smaller diameters may increase response time.
5. Minimize air tube length. Longer tubes may extend response time.
6. Mounting through-holes connecting the clamp to the worktable should have a tolerance of +0.5mm, with a C0.3 chamfer at the clamp contact surface.
7. It is recommended to use normally closed solenoid valves with short response times for the clamps. Refer to the figure below for connection methods.



Ball Screws

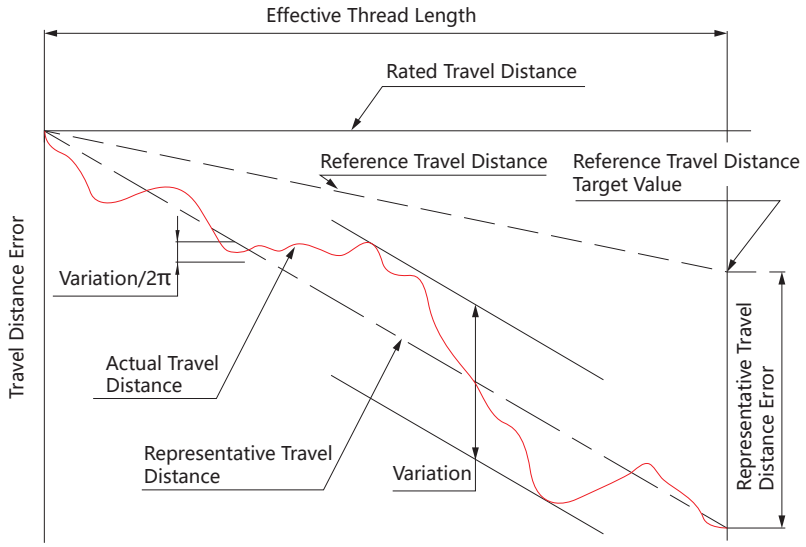
SFD/DFD series

BAIISCREWS

Accuracy

Lead Accuracy

The lead accuracy of ball screws is managed in accordance with the JIS B1192-1997 standard. The accuracy grades C0 to C5 are indicated by linearity and directionality, whereas grades C7 to C10 are denoted by the running distance error over a thread length of 300mm.



Lead Accuracy Terminology

Actual Travel
The measured travel error during actual testing of ball screws.

Reference Travel
Generally equivalent to the rated travel distance. However, depending on application requirements, it may be adjusted from the rated value.

Reference Travel Target Value
To compensate for lead screw deflection under tension, or account for thermal expansion/
contraction due to external loads and temperature variations, the reference travel may be preset to either negative or positive values. In such cases, the target value of reference travel must be specified.

Representative Travel
A least-squares fitted line representing the trend of actual travel measurements, derived from the actual travel curve.

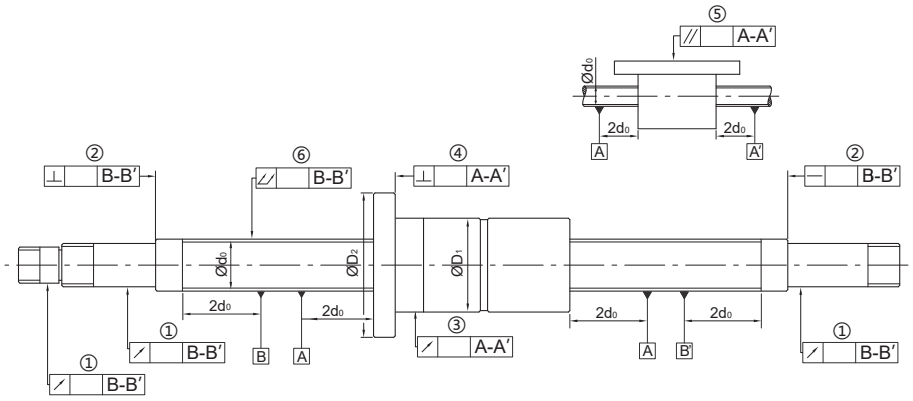
Representative Travel Error
The deviation (± value) between representative travel and reference travel.

Variation
The maximum amplitude between two parallel lines enclosing the actual travel data, drawn parallel to the representative travel line.

Variation/300
Variation measured over any 300mm section within the total thread length.

Variation/2π
Variation occurring within one revolution of the screw shaft.

Geometric Tolerance Notation for Ball Screws



⊥ Perpendicularity ⟋ Runout // Parallelism A Datum Plane

Geometric Tolerance Inspection of Ball Screws

①The radial circular runout value of the screw support relative to axis B of the thread groove surface is measured at the shoulder.

②The perpendicularity of the end face of the screw support relative to axis B of the thread groove surface is measured at the shoulder.

③The radial circular runout value of the nut mounting part relative to axis A of the thread groove surface is measured.

④The perpendicularity of the end face of the nut flange relative to axis A of the thread groove surface is measured.

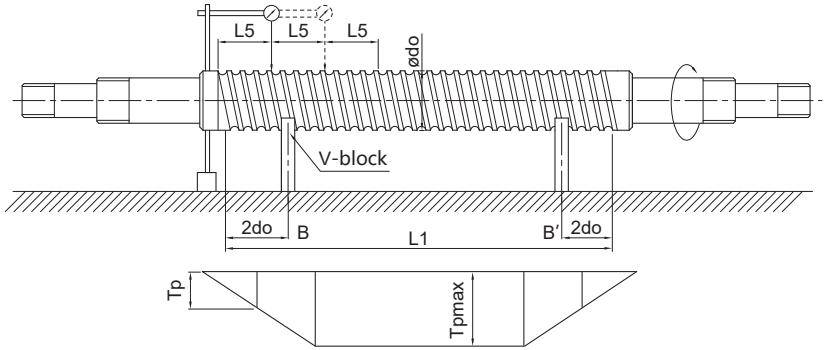
⑤The parallelism of the flat mounting surface of the nut relative to axis A of the thread groove surface is measured.

⑥The total radial runout value of the screw axis is measured.

Note: The geometric tolerance inspection items described herein are based on JIS B 1192-1997.

Accuracy Verification Standard

(1) Measure the total runout of the lead screw.

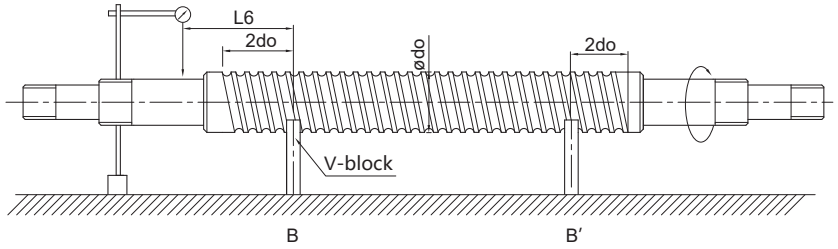


Unit (μm)

Nominal Outer Diameter do(mm)		Reference Length For Measurement L_5	Accuracy Grade Tpmax						
Exceed	Below(inclusive)	-	C0	C1	C2	C3	C5	C7	C10
6	12	80	20	20	20	23	28	40	80
12	25	160							
25	50	315							
50	100	630							
100	200	1250							

Slenderness ratio L_1/do(mm)		Accuracy Grade (L1≥4L5)						
Exceed	Below(inclusive)	C0	C1	C2	C3	C5	C7	C10
-	40	40	40	40	45	60	80	160
40	60	60	60	60	70	85	120	240
60	80	100	100	100	115	140	200	400
80	100	160	160	160	180	220	320	640

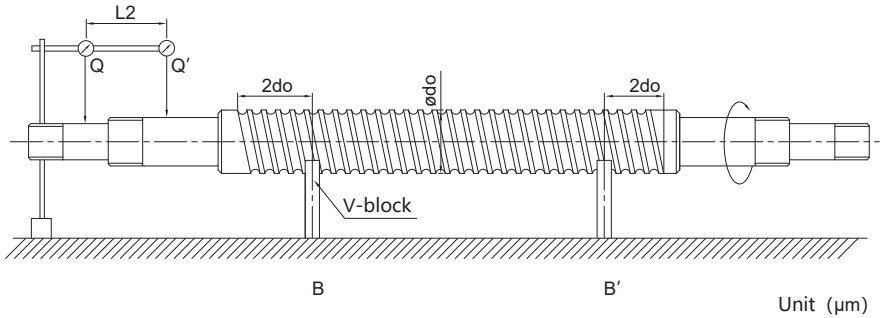
(2) Measure the runout of the bearing side relative to the lead screw BB'



Unit (μm)

Nominal Outer Diameter do(mm)		Reference Length For Measurement L_r	Accuracy Grade (L6≤L_r)						
Exceed	Below(inclusive)	-	C0	C1	C2	C3	C5	C7	C10
6	20	80	6	8	10	11	16	40	63
20	50	125	8	10	12	14	20	50	80
50	125	200	10	12	16	18	26	63	100
125	200	315	-	-	-	20	32	80	125

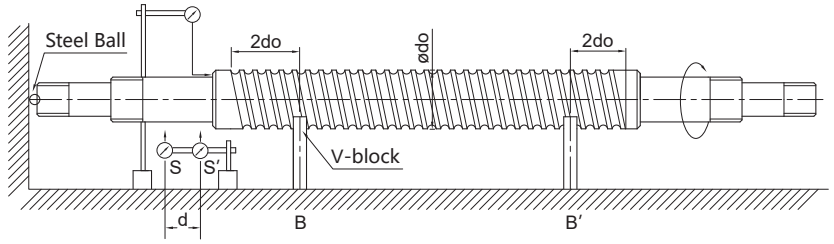
(3) Concentricity of the lead screw drive end relative to the bearing side (maximum difference between Q and Q')



Unit (μm)

Nominal Outer Diameter do(mm)		Reference Length For Measurement Lr	Accuracy Grade (L_2≤L_r)						
Exceed	Below(inclusive)	-	C0	C1	C2	C3	C5	C7	C10
6	20	80	4	5	5	6	7	12	16
20	50	125	5	6	6	7	9	16	20
50	125	200	6	7	8	9	11	20	25
125	200	315	-	-	-	10	14	25	32

(4) Perpendicularity of the lead screw drive end relative to the bearing side

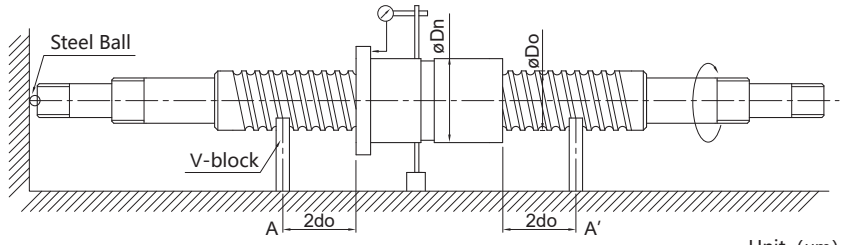


The runout value R on the side is the difference between the runout values S and S' at the two support ends.

Unit (μm)

Nominal Outer Diameter do(mm)		Accuracy Grade						
Exceed	Below(inclusive)	C0	C1	C2	C3	C5	C7	C10
6	63	3	3	3	4	5	6	10
63	125	3	4	4	5	6	8	12
125	200	-	-	-	6	8	10	16

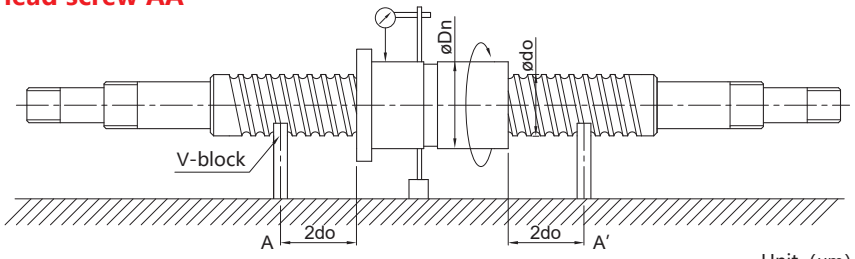
(5) Measure the perpendicularity of the nut flange mounting surface relative to the lead screw AA'



Unit (μm)

Nut Outer Diameter Dn		Accuracy Grade						
Exceed	Below(inclusive)	C0	C1	C2	C3	C5	C7	C10
-	20	5	6	7	8	10	14	-
20	32	5	6	7	8	10	14	-
32	50	6	7	8	8	11	18	-
50	80	7	8	9	10	13	18	-
80	125	7	9	10	12	15	20	-
125	160	8	10	11	13	17	20	-
160	200	-	11	12	14	18	25	-
200	250	-	12	14	15	20	30	-

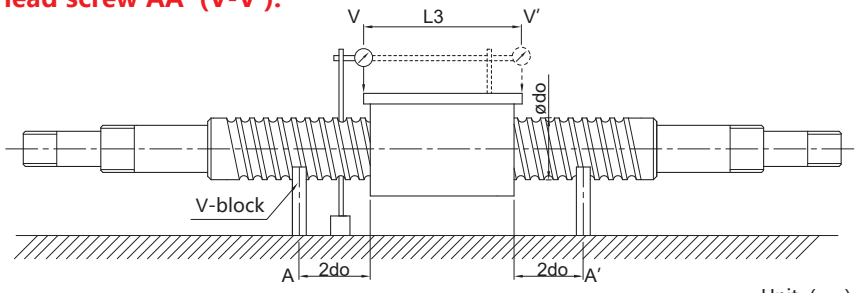
(6) Measure the runout of the nut outer diameter relative to the lead screw AA'



Unit (μm)

Nut Outer Diameter Dn		Accuracy Grade						
Exceed	Below(inclusive)	C0	C1	C2	C3	C5	C7	C10
-	20	5	6	7	9	12	20	-
20	32	6	7	8	10	12	20	-
32	50	7	8	10	12	15	25	-
50	80	8	10	12	15	19	30	-
80	125	9	12	16	20	22	40	-
125	160	10	13	17	22	28	40	-
160	200	-	16	20	22	28	40	-
200	250	-	17	20	22	28	40	-

(7) Measure the runout of the nut outer diameter relative to the lead screw AA' (V-V').



Unit (μm)

Reference plane length of the nut L3		Accuracy Grade						
Exceed	Below(inclusive)	C0	C1	C2	C3	C5	C7	C10
-	50	5	6	7	8	10	17	-
50	100	6	7	8	10	12	17	-
100	200	-	10	11	13	17	30	-

Positioning Accuracy

Factors Affecting Feed Accuracy Errors

Among the factors affecting feed accuracy errors, lead accuracy and the rigidity of the feed system are the primary focus of research. Other factors, such as thermal deformation caused by temperature rise and the assembly accuracy of guiding surfaces, also need to be considered.

Selection of Lead Accuracy

The cumulative reference lead is the same as the nominal lead. However, to compensate for the elongation of the screw due to temperature rise during operation or the expansion/contraction caused by external loads, the reference lead of the screw shaft is adjusted in the reciprocating or positive direction. As a countermeasure to compensate for shaft elongation, a pre-tension force can be applied to the screw shaft during installation. Typically, a pre-tension force equivalent to the load capacity of the support bearings plus an additional 2–3°C temperature rise is applied.

Countermeasures for Thermal Deformation

Thermal elongation and deformation of the screw shaft due to heat can lead to a decline in positioning accuracy. The magnitude of thermal deformation can be calculated using a formula.

$$\Delta L_\theta = \rho \cdot \theta \cdot L$$

ΔL_θ	Thermal Deformation Amount [μm]
ρ	Coefficient of Thermal Expansion [12μm/m°C]
θ	Average Temperature Rise of the Screw Shaft [°C]
L	Total Length of the Ball Screw [mm]

The above formula can be interpreted as follows: for a screw with a length of 1000 mm, every 1°C increase in temperature will result in an elongation of 12 μm. Therefore, even if the lead of the ball screw is manufactured with high precision, the deformation caused by temperature rise can still prevent it from meeting high-precision positioning requirements. Additionally, as the operating speed of the ball screw increases, the average temperature rise also increases, leading to greater thermal deformation. How can the adverse effects of temperature rise be mitigated? The following three methods are proposed:

1.Control Heat Generation

- Select an appropriate preload.
- Choose the correct and suitable lubricant.

2.Increase the Lead of the Ball Screw and Reduce Rotational Speed

- Hollow out the screw shaft and pass coolant through it to carry away heat.
- Cool the outer surface of the screw shaft using lubricating oil or air.
- Implement a nut cooling system by circulating coolant through the nut to remove heat.

3.Mitigate the Effects of Temperature Rise

- Determine the target value for cumulative lead error and apply negative compensation.
- Warm up the machine by running it at high speed until the temperature stabilizes before use.
- Apply a preload to the screw shaft during installation.
- Use a closed-loop system for positioning.

Service Life

Even when used under correct conditions, ball screws will eventually deteriorate over time and become unusable. The period from the start of use until the point when they can no longer be used is referred to as the service life of ball screws, which is generally categorized into two types:

1.Fatigue Life

- Caused by the occurrence of flaking or spalling.

2.Accuracy Life

- Deterioration in precision due to wear.

The fatigue life of a ball screw, similar to that of rolling bearings, can be calculated using the basic dynamic load rating.

Basic Dynamic Load Rating (Ca)

The dynamic load refers to the axial load under which a batch of ball screws of the same specifications, operating under identical conditions for 10^6 revolutions, will have 90% of the screws not experience flaking due to fatigue. This axial load is defined as the dynamic load rating (Ca).

Life Calculation

- There are three methods for calculating fatigue life.

1.Total Number of Revolutions $L = \left(\frac{Ca}{Fa \times fw}\right)^3 \times 10^6$

2.Total Operating Time $L_t = \frac{L}{60 \times n}$

3.Total Travel Distance $L_s = \frac{L \times l}{10^6}$

L	Fatigue life expressed in total number of revolutions [rev]
Lt	Fatigue life expressed in total operating time [hr]
Ls	Fatigue life expressed in total travel distance [km]
Ca	Basic dynamic load rating [kgf]
Fa	Axial load [kgf]
n	Motor speed [rpm]
l	Lead [mm]
fw	Load factor [as shown in the table below]

Vibration and Impact	Speed (V)	fw
Light	V < 15 (m/min)	1.0~1.2
Medium	15 < V < 60 (m/min)	1.2~1.5
Heavy	V > 60 (m/min)	1.5~3.0

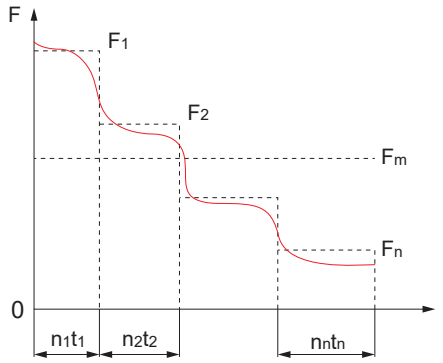
When selecting a ball screw, neither too short nor too long a service life is suitable. An excessively long service life may result in the selection of an oversized ball screw, leading to uneconomical outcomes. Therefore, the table below provides reference target values for the fatigue life of ball screws in various applications.

Machine Tools	Industrial Machinery	Automatic Control Equipment	Measuring Instruments
20,000hr	10,000hr	15,000hr	15,000hr

- Average Load

When the axial load is continuously changing, to determine the fatigue life, it is necessary to first calculate the average axial load (Fm).By plotting the axial load (Fa) on the Y-axis and the number of revolutions (n·t) on the X-axis, three types of curves can be obtained. The analysis is as follows:

■It forms a stepwise curve, as shown in the figure below:



The average axial load can be calculated using the following formula:

$$Fm = \left(\frac{F_1^3 \cdot n_1 \cdot t_1 + F_2^3 \cdot n_2 \cdot t_2 + \cdots + F_n^3 \cdot n_n \cdot t_n}{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots + n_n \cdot t_n} \right)^{\frac{1}{3}}$$

The average rotational speed can be calculated using the following formula:

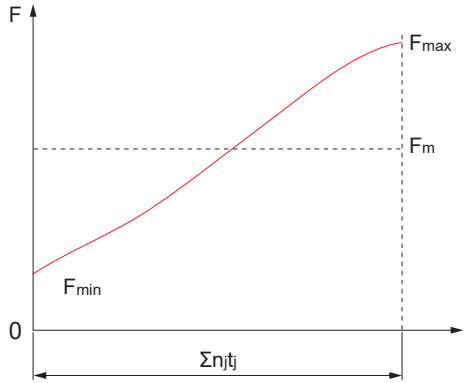
$$Nm = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots + n_n \cdot t_n}{t_1 + t_2 + \cdots + t_n}$$

Axial Load (kgf)	Rotational Speed (rpm)	使用时间 (Sec or %)
F_1	n_1	t_1
F_2	n_2	t_2
.	.	.
.	.	.
.	.	.
Fn	n_n	t_n

■When it is approximately a straight line, as shown in the figure below:

When the variation curve of the average axial load is as shown in the figure below, an approximate value can be calculated using the formula:

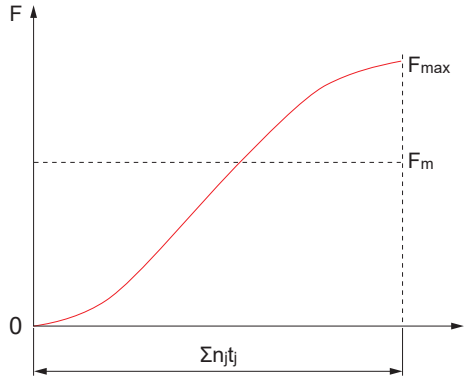
$Fm = 1/3(Fmin+2Fmax)$



■When presenting a sinusoidal curve, there are the following two scenarios:

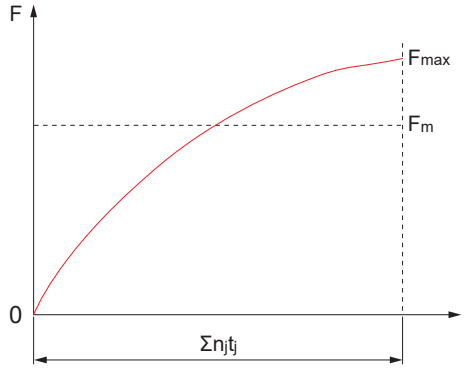
1.When the fluctuation curve of the average axial load is as illustrated in the figure below, an approximation can be derived using the formula:

$Fm = 0.65Fmax$



2.When the variation curve of the average axial load is as depicted in the following diagram, an approximate value can be obtained by applying the formula:

$Fm = 0.75Fmax$



The Impact of Installation Errors

When an eccentric load (torsional load and radial load) is applied to a ball screw, not only the operability but also the fatigue life can be adversely affected. Therefore, during the initial design of the machine, the rigidity of the installation structure parts (screw shaft, support bearings, and guide surfaces) should be increased, and great attention must be paid during assembly to reduce the impact of installation errors. The figure shows the reference calculation ratio for a ball screw under torsional load.

- Type of nut: R40-10K5-SFDA

■Specifications

Shaft diameter: 40mm

Ball diameter: 6.35 mm

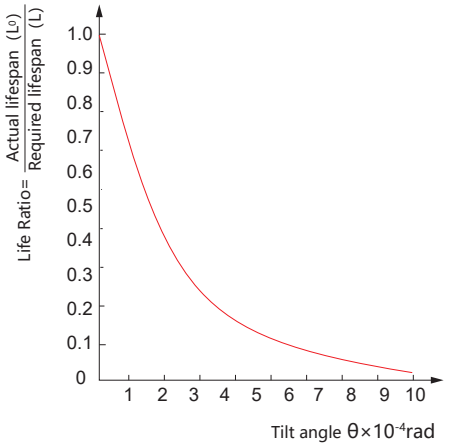
Number of circulation turns: 5 turns

Clearance: 50 μm

■Conditions

Axial thrust Fa = 300 kgf

Radial displacement: 0



The impact of skew installation errors

Allowable Axial Load

Buckling load

Due to the self-weight of the worktable, workpiece, and other components, a compressive load is generated on the lead screw. Therefore, it is necessary to verify the safety of the lead screw against buckling. This is shown as follows:

$$P = \alpha\frac{\pi^2 NEI}{L^2} = m\frac{dr^4}{L^2} \times 10^3 \text{ (kgf)}$$

- α Safety factor [α = 0.5]
- E Young's modulus [E = 2.1 × 10^4 kgf/mm^2]
- I Minimum second moment of area of the screw shaft [I = πdr^4/64 mm^4]
- dr Root diameter of the screw shaft [dr = pitch diameter of the screw - ball diameter (mm)]
- L Installation span [mm] (distance between the two installation points of the screw)
- m、N Coefficient determined by the installation method of the ball screw
  - Supported-Supported: m = 5.1 [N = 1]
  - Fixed-Supported: m = 10.2 [N = 2]
  - Fixed-Fixed: m = 20.3 [N = 4]
  - Fixed-Free: m = 1.3 [N = 1/4]

Allowable tensile and compressive load

When the installation distance is relatively short, the differences in installation methods have a smaller impact. In such cases, verification must be performed using the following two additional methods:

- Allowable tensile and compressive load based on the yield stress of the screw shaft.

$$P = \sigma \cdot A = \sigma \cdot \pi \cdot dr^2 / 4$$

- σ Allowable tensile and compressive stress [147 MPa]
- A Cross-sectional area of the screw shaft root diameter [mm^2]
- dr Root diameter of the screw shaft [mm]

Allowable Rotational Speed

Critical speed

The speed at which resonance occurs is called the critical speed. Resonance can lead to poor machining quality and even damage to the machine, so it is essential to avoid the motor speed coinciding with the natural frequency of the ball screw. Our company sets the allowable rotational speed at 80% or less of the critical speed. This is shown as follows:

$$n = \alpha \times \frac{60\lambda^2}{2\pi L^2}\sqrt{\frac{EIg}{\gamma A}} = f\frac{dr}{L^2} \times 10^7 \text{ (rpm)}$$

- n Allowable rotational speed [rpm]
- α Safety factor [α = 0.8]
- E Young's modulus [$E = 2.1 \times 10^4$ kgf/mm²]
- I Minimum second moment of area of the screw shaft [$I = \pi dr^4/64$ mm⁴]
- dr Root diameter of the screw shaft [mm]
- A Cross-sectional area of the screw shaft [$A = \pi dr^2/4$ mm²]
- L Installation span [mm] (distance between the two installation points of the screw)
- g Gravitational acceleration [$g = 9.8 \times 10^3$ mm/s²]
- γ Specific weight of the material [$\gamma = 7.8 \times 10^{-6}$ kgf/mm³]
- f、λ Coefficient determined by the installation method of the ball screw
  - Supported-Supported: f = 9.7 [$\lambda = \pi$]
  - Fixed-Supported: f = 15.1 [λ = 3.927]
  - Fixed-Fixed: f = 21.9 [λ = 4.730]
  - Fixed-Free: f = 3.4 [λ = 1.875]

Note: If the calculated allowable rotational speed does not meet CSK's design requirements, a support mechanism can be added in the middle to increase the allowable rotational speed.

The dm•n value of the ball screw

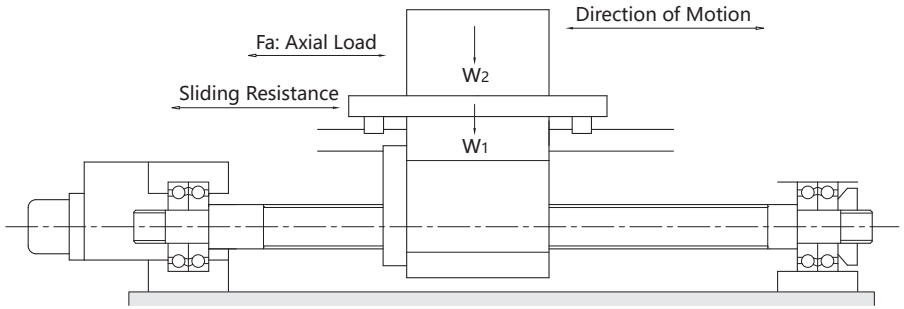
dm represents the pitch diameter of the screw, and n represents the maximum rotational speed of the ball screw. Therefore, the dm·n value indicates the orbital speed of the balls. It is the most significant factor affecting the noise, operating temperature, lifespan, and circulation system of the ball screw. Generally, the limits for the dm·n value of a ball screw are as follows:

Product		Allowable dm.n value		Maximum rotational speed (standard)min⁻¹
		Standard lead	High lead	
Precision ball screw	End-cap type	≤220000		3000

Note:
- Under normal conditions, the dm·n value can reach 130,000. In special cases, such as when both ends of the screw are fixed, the dm·n value can reach 140,000.
- For leads of 10mm, 12mm, 14mm, and 16mm, the dm·n value ≤ 120,000. For leads of 20mm and 25mm, the dm·n value ≤ 160,000.
- These limits on the dm·n value are for general reference only. In fact, for screws with the same root diameter, the allowable value varies depending on the installation method and the installation span between the two ends.
- If there is a need for a higher dm·n value, please contact CSK sales personnel. However, with advancements in manufacturing technology, the dm·n value is no longer strictly limited by these constraints. Ball screws with values exceeding 100,000 are now available.

Calculation of Axial Load

Horizontal reciprocating motion mechanism



For general conveying devices, where the nut performs horizontal reciprocating motion, the axial load analysis is as follows:

Uniform acceleration to the left	$Fa_1=\mu\times mg+f+ma$
Uniform velocity to the left	$Fa_2=\mu\times mg+f$
Uniform deceleration to the left	$Fa_3=\mu\times mg+f-ma$
Uniform acceleration to the right	$Fa_4=-\mu\times mg-f-ma$
Uniform velocity to the right	$Fa_5=-\mu\times mg-f$
Uniform deceleration to the right	$Fa_6=-\mu\times mg-f+ma$

a Acceleration

$$a=\frac{Vmax}{ta}$$

Vmax Maximum speed

ta Acceleration time

m Total mass: the weight of the platform plus the weight of the transported object

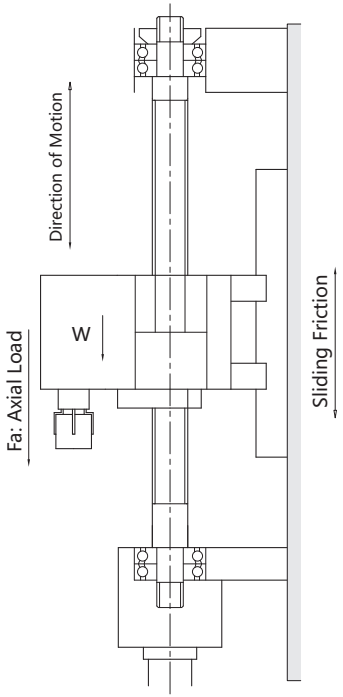
μ Friction coefficient

f Resistance when unloaded

Vertical reciprocating motion mechanism

For general conveying devices, where the nut performs vertical reciprocating motion, the axial load analysis is as follows:

Uniform acceleration ascent	$Fa_1=mg+f+ma$
Uniform velocity ascent	$Fa_2=mg+f$
Uniform deceleration ascent	$Fa_3=mg+f-ma$
Uniform acceleration descent	$Fa_4=mg-f-ma$
Uniform velocity descent	$Fa_5=mg-f$
Uniform deceleration descent	$Fa_6=mg-f+ma$



a Acceleration

$$a=\frac{Vmax}{ta}$$

Vmax Maximum speed

ta Acceleration time

m Total mass: the weight of the platform plus the weight of the transported object

μ Friction coefficient

f Resistance when unloaded

Rigidity of the Lead Screw Drive System

The insufficient rigidity of the peripheral structure of the lead screw is one of the main causes of lost motion. Therefore, in precision machinery such as machining centers, to achieve good positioning accuracy, the design must consider the balance of axial rigidity and torsional rigidity of each component of the lead screw drive system.

The axial rigidity of a lead screw drive system

The calculation of axial elastic deformation and rigidity of a lead screw is as follows:

$$\delta=\frac{Fa}{Kr}$$

$$\frac{1}{K_T}=\frac{1}{K_S}+\frac{1}{K_N}+\frac{1}{K_B}+\frac{1}{K_H}$$

δ Axial elastic deformation of the lead screw system [μm]

Fa Axial load borne by the lead screw system [kgf]

K_T Axial rigidity of the lead screw system [kgf/μm]

K_S Axial rigidity of the lead screw shaft [kgf/μm]

K_N Axial rigidity of the nut [kgf/μm]

K_B Axial rigidity of the support bearings [kgf/μm]

K_H Axial rigidity of the nut and bearing mounting sections [kgf/μm]

- Axial rigidity of the lead screw shaft: K_S

Depending on the installation method, the following analysis is performed:

■Fixed-Free (Axial Direction)

$$K_S=\frac{A\times E}{x}\times 10^{-3}$$

K_S Axial rigidity of the ball screw shaft [kgf/μm]

A Cross-sectional area of the ball screw shaft [$A=\pi\cdot dr/4$ mm²]

dr Root diameter of the ball screw shaft [dr = pitch diameter of the screw - ball diameter mm]

E Longitudinal elastic modulus [$E=2.1\times10^4$ kgf/mm²]

x Distance between load application points [mm]

■Fixed-Fixed (Axial Direction)

$$K_S=\frac{A\times E\times L}{x(L-x)}\times 10^{-3}$$

K_S Axial rigidity of the ball screw shaft [kgf/μm]

L Distance between installation points [mm]

Note: The maximum axial deformation occurs at the position where x = L/2

- Axial rigidity of the nut: K_N

The relationship between axial load Fa and axial elastic deformation δa is as follows:

$$\delta a = \frac{C}{\sin\alpha}\left[\frac{Q^2}{D_w}\right]^{1/3} \times \xi \ (\mu m)$$

C	Constant determined by material, shape, and dimensions [Ref: C≒2.4]
a	Contact angle between ball and raceway
D_w	Ball diameter [mm]
Q	Load per ball [Q = Fa/Z·sin α kgf]
Z	Number of balls
ξ	Accuracy, internal structural coefficient

■Rigidity of non-preloaded nut

When a 30% of the basic dynamic load rating is applied as the axial load on the ball screw, the theoretical rigidity value K can be obtained by means of the elastic deformation generated between the raceway and the ball (for details, refer to each screw size table in this catalog). When taking the nut into account, it is appropriate to use 80% of the value in the size table as the rigidity value K.

When the axial load Fa is not based on 30% of the basic dynamic load rating Ca, the rigidity value KN can be calculated with the following formula:

$$K_N = 0.8 \times K\left[\frac{Fa}{0.3Ca}\right]^{1/3}$$

K	Size table rigidity value [kgf/μm]
Fa	Axial load [kgf]
Ca	Basic dynamic load rating [kgf]

■Rigidity of preloaded nut

Apply a preload force equivalent to 10% of the basic dynamic load rating (5% in the case of oversize preload method) to the ball screw. The theoretical rigidity value K can be calculated by the elastic deformation generated between the screw raceway and balls under the action of axial load (refer to each screw size table in this catalog). When considering the nut body together, it is appropriate to take 80% of the value listed in the size table as the rigidity value K. When the preload force Fao is not based on 10% of the basic dynamic load rating Ca, the rigidity value K_N can be calculated using the following formula:

$$K_N = 0.8 \times K\left[\frac{Fao}{\varepsilon \times Ca}\right]^{1/3}$$

K	Rigidity value of the dimension table [kgf/μm]
Fao	Preload [kgf]
ε	Rigidity calculation reference coefficient ε=0.10 [Preload of preload piece and lead preload deviation] ε=0.05 [Oversize preload]
Ca	Basic dynamic rated load [kgf]

- The rigidity of the support bearing: K_B

The rigidity of the combined thrust angular contact ball bearing, which is used as a support bearing for ball screws and widely applied in precision machinery, can be calculated using the following formula:

$$K_B = \frac{3Fao}{\delta ao}$$

δao	The axial elastic deformation under applied preload.

$$\delta ao = \frac{0.44}{\sin\alpha}\left[\frac{Q^2}{D_w}\right]^{1/3}$$

$$Q = \frac{Fao}{Z \times \sin\alpha}$$

Fao	Preload [kgf]
a	Contact angle of the support bearing [°]
D_w	Ball diameter [mm]
Q	Load per ball
Z	Number of balls

- Rigidity at the nut and bearing mounting locations: K_H

At the initial stage of mechanical design, it is essential to focus on enhancing the rigidity of these mounting locations.

Torsional rigidity of the drive screw system

Factors contributing to positioning accuracy errors due to torsional deformation in the rotational structure include:

- Torsional deformation of the screw shaft
- Torsional deformation at the coupling section
- Torsional deformation of the motor

However, in the case of general machine tools (excluding high-speed machines), the aforementioned deformation amounts are relatively small compared to axial deformation and are therefore omitted from consideration.

Preload and Its Effects in the Drive Screw System

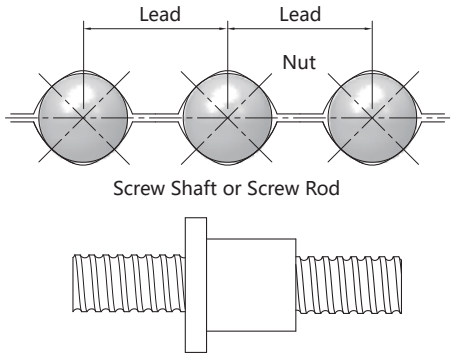
To achieve high positioning accuracy, common methods include eliminating the backlash of the ball screw to zero and increasing rigidity to reduce elastic deformation under axial loads. Both methods can be accomplished by applying preload to the ball screw.

- Methods of Applying Preload

■Methods of Applying Preload to Single-Nut Ball Screws

As shown in the figure below, a preload method is applied by inserting steel balls with a diameter slightly larger than the groove space into the ball grooves. This creates four-point contact between the balls and the grooves, making it suitable for light preload applications.

Four-point contact preload

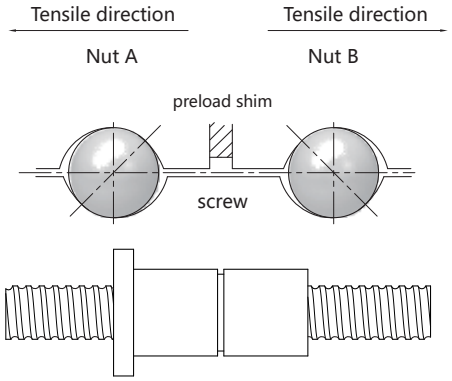


■Methods of Applying Preload to Double-Nut Ball Screws

A preload is applied by placing a preload spacer between the two nuts, which can be divided into the following two methods:

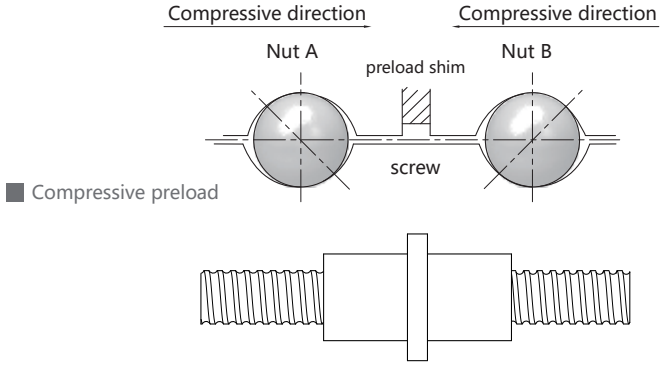
1. As shown in the figure below, a preload spacer of appropriate thickness is selected based on the required preload force and inserted between the nuts. This creates a preload force, and since nuts A and B are subjected to tensile loads, this method is referred to as "tensile preload."

Tensile preload



2. As shown in the figure below, a preload spacer of relatively thin thickness is selected based on the required preload force and inserted between the nuts. This creates a preload force, and since nuts A and B are subjected to compressive loads, this method is referred to as "compressive preload."

Compressive preload



■The relationship between preload and elastic deformation

As shown in the figure below, nuts A and B are combined with a preload Fao , resulting in an elastic deformation of δao in each nut. When an external load Fa is applied to nut A in this state, the elastic deformations of nuts A and B are as follows:

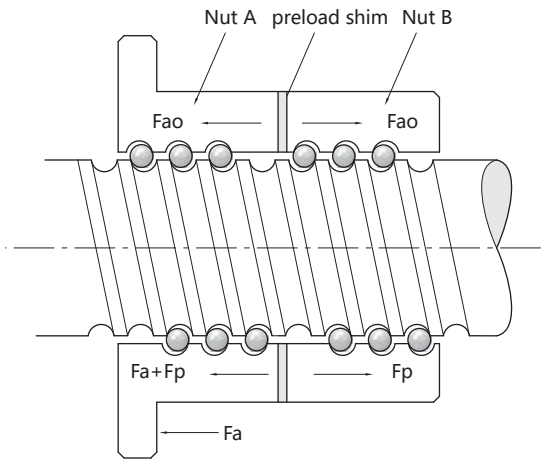
$$\delta_A = \delta_{a0} + \delta_{a1}$$
$$\delta_B = \delta_{a0} - \delta_{a1}$$

The difference in the load applied to nuts A and B is:

$$F_A = F_{ao} + F_a - F_a' = F_a + F_p$$
$$F_B = F_{ao} - F_a' = F_p$$

Note: F_A and F_B are in opposite directions.

■ Positioning Preload of Double Nuts



Allowable Load of Ball Groove

Factors Affecting Feed Accuracy Errors

Even if the ball screw is used infrequently and at low speeds, it is essential to select a value where the maximum load is significantly less than the basic static rated load of the ball screw.

Basic Static Rated Load Ca

A certain axial static load, under which the sum of the permanent deformation at the contact point between the groove bearing the maximum stress and the steel ball (including the nut and the screw shaft) and the permanent deformation of the steel ball itself reaches 0.01% of the diameter of the steel ball, is defined as the basic static rated load.

Calculation of the Maximum Allowable Load

$$F_{max} = C_0/f_s$$

f_s Static Allowable Load Factor

Under normal operation	1.2~2
Under operation with vibration	1.5~3

Ball Screw Torque

Forward Operation

The conversion of rotary motion into linear motion is referred to as forward operation. The torque required for this operation can be calculated using the following formula:

$$T_a = \frac{F_a \times l}{2\pi \times \eta_1}$$

T_a	Forward Operation Torque
F_a	Axial Load
l	Lead
η_1	Forward Efficiency

Reverse Operation

The conversion of linear motion into rotary motion is referred to as reverse operation. The torque required for this operation can be calculated using the following formula:

$$T_b = \frac{Fa \times l \times \eta_2}{2\pi}$$

T_b Reverse Operation Torque
η_2 Reverse Efficiency

Friction Torque of Preloaded Nut

The friction torque generated due to preload can be calculated using the following formula:

$$T_p = k \times \frac{Fao \times l}{2\pi}$$

T_p Reference Torque
Fao Preload
k Preload Torque Coefficient of Ball Screw
$k = 0.05 \times (\tan\beta)^{-0.5}$

Motor Drive Torque

Drive Torque at Constant Speed

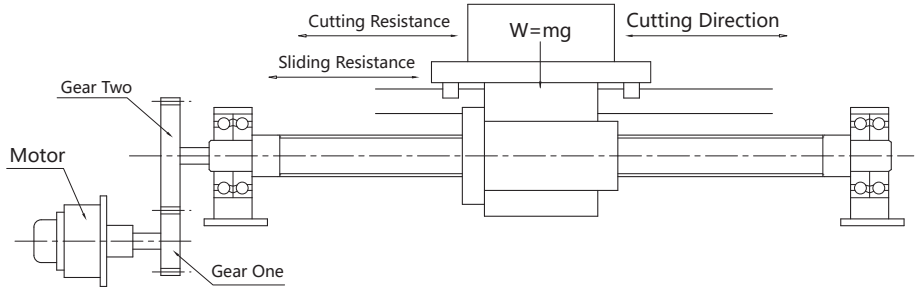
The torque required to counteract external loads and maintain constant speed operation of the ball screw is known as the drive torque at constant speed. This torque is equal to the preload torque + friction torque generated by axial force + friction torque of the support bearings. It can be calculated using the following formula:

$$T_1 = \left(k \times \frac{Fao \cdot l}{2\pi} + \frac{Fa \cdot l}{2\pi \times \eta} + T_B \right) \times \frac{N_1}{N_2}$$

T_1 Drive Torque at Constant Speed
Fao Preload
Fa Axial Load [Fa = F + μ·W]
F Cutting Force in the Screw Axial Direction
μ Friction Coefficient of the Guide Surface
W Total Weight of Moving Objects [Table Weight + Workpiece Weight]
T_B Friction Torque of Support Bearings
N_1 Number of Teeth on Gear One
N_2 Number of Teeth on Gear Two

There are many types of motors, and generally, the drive torque at constant speed should not exceed 30% of the motor's rated torque as a usage standard.

■ Schematic Diagram of Worktable Force



- Drive Torque During Acceleration

The maximum torque required to counteract external loads and achieve uniformly accelerated motion of the ball screw is known as the drive torque during acceleration. This torque can be calculated using the following formula:

$$T_2 = T_1 + J \cdot \dot{\omega}$$

$$J = J_M + J_{G1} + \left(\frac{N_1}{N_2} \right)^2 \times [J_{G2} + J_{SH} + J_W + J_C]$$

$$J_W = \frac{m}{g} \left(\frac{l}{2\pi} \right)^2$$

T_2 Maximum Drive Torque During Acceleration
$\dot{\omega}$ Angular Acceleration of the Motor
J Total Moment of Inertia Loaded on the Motor
J_M Moment of Inertia of the Motor
J_{G1} Moment of Inertia of Gear One
J_{G2} Moment of Inertia of Gear Two
J_{SH} Moment of Inertia of the Screw Shaft
J_W Moment of Inertia of the Moving Parts (Nut, Worktable)
J_C Moment of Inertia of the Coupling
m Total Mass (Mass of Worktable plus Workpiece)
l Lead
g Gravitational Acceleration

- Moment of Inertia Calculation Formula for Cylinders (Ball Screws, Gears, etc.).

$$J = \frac{1}{32}\rho\pi D^4 L\ [kg \cdot m^2]$$

$$= \frac{\pi\gamma}{32g} D^4 L\ [kg \cdot m^2]$$

$$= \frac{mD^2}{8}\ [kg \cdot m^2]$$

ρ	Material Density
γ	Material Specific Weight
D	Cylinder Diameter
L	Cylinder Length
m	Cylinder Mass

Material and Hardness

Standard Materials and Hardness for Ball Screws

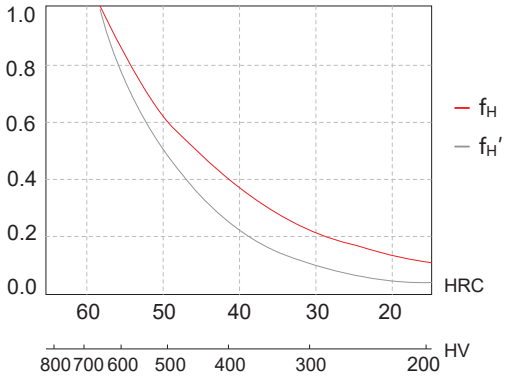
Part Name	Material	Heat Treatment Method	Hardness (HRC)
Precision Screw	50CrMo4 QT/Equivalent	Medium Frequency Heat Treatment	58~62
Rolled Screw	S55C/Equivalent	Medium Frequency Heat Treatment	58~62
Nut	SCM420H/Equivalent	Carburizing Heat Treatment	58~62

Hardness Factor

As shown in the figure below, if materials other than the standard materials are used and the surface hardness of these materials does not reach HRC 58, it is necessary to correct the basic dynamic rated load Ca and the basic static rated load Co. The values of Ca and Co shown in the dimension table can be corrected as follows.

$$Ca' = f_H \times Ca \quad Co' = f_H' \times Co$$

f_H	Hardness Factor
f_H'	Static Hardness Factor



Lubrication

The lubricants and greases used for ball screws are lithium soap-based lubricants with a viscosity of 30~140 cst (40°C). The lubricating oil used is ISO grade 32~100.

- Selection Criteria

1.For high-speed or low-temperature applications, use a lubricant with a low base oil viscosity.
2.For high-temperature, high-load, or oscillating, low-speed applications, use a lubricant with a higher base oil viscosity.

The table below shows general guidelines for the inspection and replenishment intervals of lubricants. When replenishing, wipe off the old lubricant attached to the screw shaft before applying new lubricant.

■Inspection and Replenishment Intervals for Lubricants

Lubrication Method	Inspection Interval	Inspection Items	Replenishment or Replacement Interval
Automatic Interval Oiling	Every week	Oil quantity, contamination	Replenish during each inspection, but adjust based on oil reservoir capacity
Grease	Initial 2~3 months of operation	Presence of foreign matter	Typically replenish every year, but adjust based on inspection results
Oil Bath	Before daily operation	Oil level management	Replenish appropriately based on consumption

■Oil Injection Quantity Calculation

Lubrication Method	Inspection and Replenishment Guidelines
Oil	Inspect every week and replenish during each inspection, adjusting appropriately based on the oil reservoir capacity. If the lubricating grease is dirty, please replace the lubricating oil. • Oil Injection Quantity Calculation The oil injection quantity every 10 minutes is $Q = \frac{\text{Screw Outer Diameter (mm)}}{90}$ c.c.

■Grease Injection Quantity Calculation

Lubrication Method	Inspection and Replenishment Guidelines
Grease	Inspect during the initial 2~3 months of operation to check for the presence of foreign matter. If the grease is dirty, please replace it. Depending on the usage conditions and operating environment, replenish the grease appropriately, with an injection amount of 50% of the internal volume of the nut. The formula below shows the required amount of lubricating grease to be injected. Avoid mixing different brands of grease whenever possible.

Ball Diameter d	Ø1.588	Ø2.0	Ø2.381	Ø2.778	Ø3.175	Ø3.969	Ø4.762
G	0.8	1.0	1.0	1.5	1.2	1.3	2.0

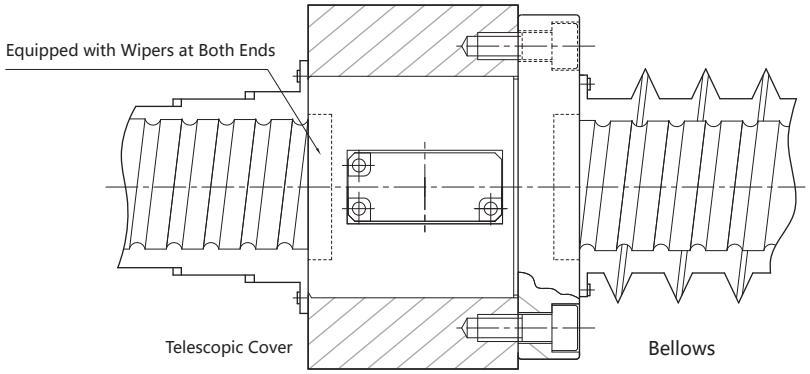
Ball Diameter d	Ø6.350	Ø7.144	Ø7.938	Ø9.525	Ø12.7	Ø15.875	Ø19.05
G	3.0	3.5	3.9	5.0	6.0	9.6	12

$$Q = \left[\left(\sqrt{(\pi \times dm)^2 + Ld^2} \times \pi d^2 \times \text{Circulation Loop}\right) \times \frac{1}{1000} + \left(\frac{\pi L \times (2DG + G^2)}{4}\right)\right] \times \frac{1}{1100}$$

Q	Lubricating Grease Injection Amount [cm³]
D	Screw Outer Diameter [mm]
d	Ball Diameter [mm]
dm	Pitch Circle Diameter [mm]
G	Ball Size Coefficient
Ld	Lead [mm]
L	Nut Length [mm]

Dust Proof

Ball screws, like rolling bearings, experience accelerated wear when foreign particles or moisture are introduced, which can lead to severe damage or failure. To address this, our company's ball screw nuts are equipped with wipers at both ends. To prevent the ingress of external contaminants, please use bellows or telescopic covers as shown in the figure below to ensure complete sealing, providing superior dust protection. For detailed requirements, please contact CSK.



Installation

The installation method is an important consideration when selecting the specifications of a ball screw. As shown in Fig.(A) to (C), three of the most commonly used installation methods are illustrated. The differences in installation methods are explained in detail with relevant formulas in the 'Allowable Axial Load' section on page E-15.

- Fixed-Fixed

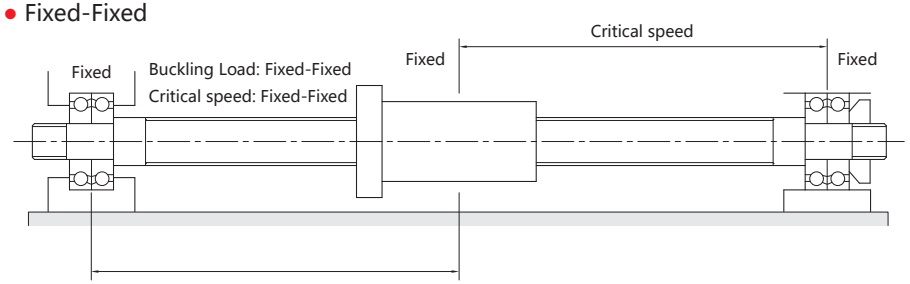


Fig.(A)

- Fixed-Supported

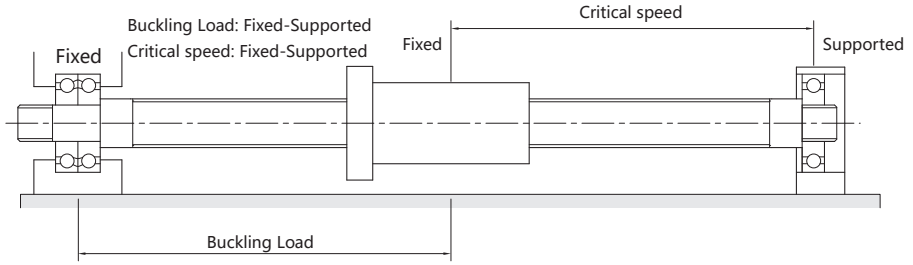


Fig.(B)

- Fixed-Free

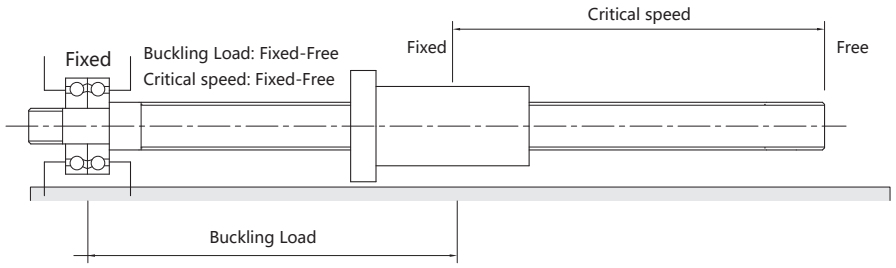
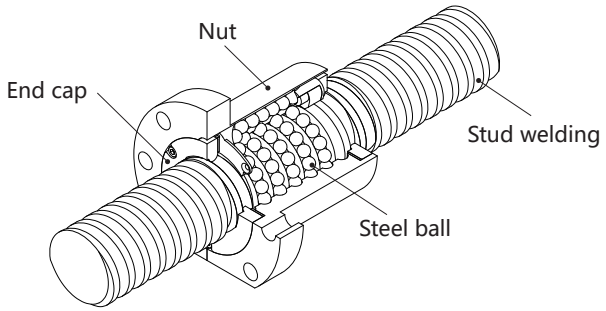


Fig.(C)

Ground Ball Screws

Construction



Note: Certain components are neither displayed nor elucidated; the definitive structure is contingent upon the tangible product, with the provided illustrations intended solely for referential purposes.

Characteristics

The ball screw, as a highly efficient transmission component, boasts high transmission efficiency, significantly reducing energy loss. It operates smoothly with low noise, and its power transmission is both rapid and stable, thereby accelerating equipment operation processes. With high reverse transmission accuracy, it enables precise positioning and control. Its excellent wear resistance extends the service life and lowers maintenance costs. Possessing good rigidity, it can withstand substantial loads and is widely used in high-precision fields such as CNC machine tools and automated equipment. Its installation is straightforward, and maintenance costs are minimal.

- High-efficiency Transmission
- Precise Operation
- Durable and Load-resistant
- High Rigidity
- Simple Installation
- Optimized Design

Applications

Precision CNC Machine Tools	Industrial Robots	Semiconductor Manufacturing Equipment
Medical Devices	Aerospace	Automated Equipment

Specifications

1 R 50 - 10 K5 - 1 S F D B - 800 - 1200 - C3 -H

- Number of threads
  - L: Left-hand thread
  - R: Right-hand thread
- Nominal diameter
  - (Refer to page G-37 for details)
- Lead
  - (Refer to page G-37 for details)
- Number of ball circuits
- Number of nut assemblies
  - S: Single nut
  - D: Double nut
- F: With flange
  - R: Without flange
- D: End cap type
  - F: External recirculation (tube projection type)
  - E: External recirculation (circumferential type)
- No marking: Standard nut
  - B: Surface treatment
  - U: Self-lubricating nut
  - C: Cooling nut
- Thread length
- Total length
- Accuracy grade
- No marking: Standard
  - B: Surface treatment
  - H: Hollow screw

Lead Accuracy (Tolerance)

Unit (μm)

Accuracy Grade		C0		C1		C2		C3		C5	
Effective Thread Length(mm)		Repre-sentative Travel Error	Varia-tion	Repre-sentative Travel Error	Varia-tion	Repre-sentative Travel Error	Varia-tion	Repre-sentative Travel Error	Varia-tion	Repre-sentative Travel Error	Varia-tion
Above	Below										
-	100	3	3	3.5	5	5	7	8	8	18	18
100	200	3.5	3	4.5	5	7	7	10	8	20	18
200	315	4	3.5	6	5	8	7	12	8	23	18
315	400	5	3.5	7	5	9	7	13	10	25	20
400	500	6	4	8	5	10	7	15	10	27	20
500	630	6	4	9	6	11	8	16	12	30	23
630	800	7	5	10	7	13	9	18	13	35	25
800	1000	8	6	11	8	15	10	21	15	40	27
1000	1250	9	6	13	9	18	11	24	16	46	30
1250	1600	11	7	15	10	21	13	29	18	54	35
1600	2000	-	-	18	11	25	15	35	21	65	40
2000	2500	-	-	22	13	30	18	41	24	77	46
2500	3150	-	-	26	15	36	21	50	29	93	54
3150	4000	-	-	30	18	44	25	60	35	115	65
4000	5000	-	-	-	-	52	30	72	41	140	77
5000	6300	-	-	-	-	65	36	90	50	170	93
6300	8000	-	-	-	-	-	-	110	60	210	115
8000	10000	-	-	-	-	-	-	-	-	260	140

Note: The unit of the effective thread length is millimeter.

Variation over 300mm Thread Length and per Revolution (Tolerance)

Unit (μm)

Accuracy Grade	C0	C1	C2	C3	C5
CSK(Variation/300)	3.5	5	7	8	18
JIS(Variation/300)	3.5	5	-	8	18
ISO(Variation/300)	3.5	6	-	12	23
DIN(Variation/300)	3.5	6	-	12	23
CSK(Variation/2π)	3	4	5	6	8
JIS(Variation/2π)	3	4	-	6	8
ISO(Variation/2π)	3	4	-	6	8
DIN(Variation/2π)	-	4	-	6	8

Screw Diameter and Lead Comparison Table

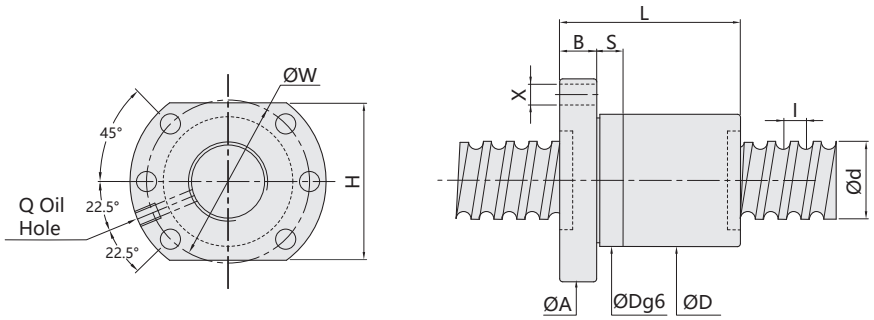
Ground ball screws are available in diversified specifications and various lead accuracies offered for selection. Please refer to the table below.

- Specification

Nominal Diameter ø	Lead					
	5	8	10	12	16	20
25	●	●	●		●	●
32	●	●	●	●	●	●
40	●	●	●	●	●	●
50		●	●	●	●	●

Note: The length and accuracy of ground ball screws are subject to limitations. For other requirements, please consult our company.

SFD



Unit (mm)

Model	Screw Shaft Outer Diameter d	Lead l	Ball Diameter mm	Number of Circulation Loops	Basic Rated Load Ca Kgf	Basic Rated Load C0a Kgf	Rigidity K Kgf/μm
SFD 2505	25	5	3.175	4	1426	3821	50
SFD 2510		10		3	1089	2796	38
SFD 2520		20		2	743	1831	26
SFD 2508		8	4.762	4	2851	6856	55
SFD 2510		10		4	2851	6836	55
SFD 2516		16		4	2802	6756	55
SFD 2520		20		2	1455	3164	29
SFD 3205	32	5	3.175	4	1594	4945	61
SFD 3208		8	4.762	5	3861	10875	80
SFD 3210		10		5	3851	10855	80
SFD 3212		12		5	3851	10836	80
SFD 3220		20		2	1683	4209	34
SFD 3210		10	6.35	5	5663	14418	85
SFD 3212		12		5	5653	14398	85
SFD 3216		16		4	4475	11045	69
SFD 3220		20		3	3495	8298	54
SFD 4005	40	5	3.175	4	1742	6229	71
SFD 4008		8	4.762	4	3574	11204	77
SFD 4010		10	6.35	5	6277	18348	101
SFD 4012		12		5	6356	18318	101
SFD 4016		16		5	6326	18238	101
SFD 4020		20		4	5138	14378	82
SFD 5008	50	8	4.762	5	4732	17462	109
SFD 5010		10	6.35	5	7088	23203	119
SFD 5012		12		5	7079	23184	119
SFD 5016		16		5	7049	23134	119
SFD 5020		20		3	4415	13452	74

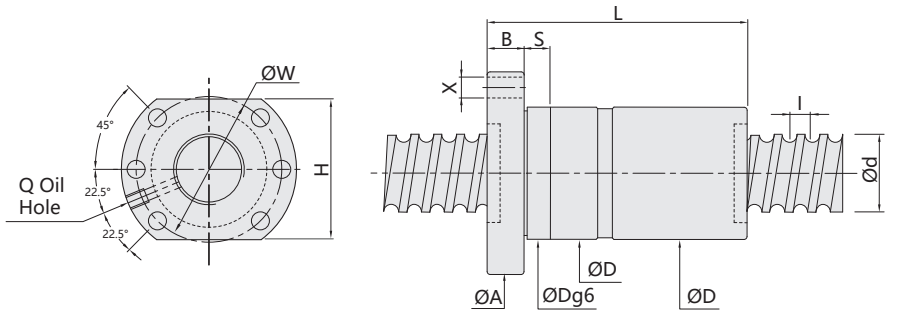
SFD

Unit (mm)

型号	螺帽尺寸 D	A	B	L	W	H	X	Q	S
SFD 2505	40	62	12	41	51	48	6.6	M6X1P	15
SFD 2510	40	62	12	50	51	48	6.6	M6X1P	15
SFD 2520	40	62	12	60	51	48	6.6	M6X1P	15
SFD 2508	45	65	15	55	54	51	6.6	M6X1P	15
SFD 2510	45	65	15	63	54	51	6.6	M6X1P	15
SFD 2516	45	65	15	85	54	51	6.6	M6X1P	15
SFD 2520	45	65	15	61	54	51	6.6	M6X1P	15
SFD 3205	50	87	16	41	72	69	9	M8X1P	15
SFD 3208	53	87	16	67	72	69	9	M8X1P	15
SFD 3210	53	87	16	77	72	69	9	M8X1P	15
SFD 3212	53	87	16	87	72	69	9	M8X1P	15
SFD 3220	53	87	16	70	72	69	9	M8X1P	15
SFD 3210	57	87	16	78	72	69	9	M8X1P	15
SFD 3212	57	87	16	88	72	69	9	M8X1P	15
SFD 3216	57	87	16	92	72	69	9	M8X1P	15
SFD 3220	57	87	16	88	72	68	9	M8X1P	15
SFD 4005	58	91	18	42	76	68	9	M8X1P	15
SFD 4008	60	91	18	56	76	72	9	M8X1P	15
SFD 4010	65	95	18	78	80	72	9	M8X1P	20
SFD 4012	65	95	18	88	80	72	9	M8X1P	20
SFD 4016	65	95	18	108	80	72	9	M8X1P	20
SFD 4020	65	95	18	110	80	72	9	M8X1P	20
SFD 5008	70	105	18	64	88	80	11	M8X1P	20
SFD 5010	75	118	18	78	100	92	11	M8X1P	20
SFD 5012	75	118	18	90	100	92	11	M8X1P	20
SFD 5016	75	118	18	109	100	92	11	M8X1P	20
SFD 5020	75	118	18	95	100	92	11	M8X1P	25

Note: CSK continuously conducts research and improvement work, and therefore reserves the right to change design specifications at any time without prior notice.

DFD



Unit (mm)

Model	Screw Shaft Outer Diameter d	Lead l	Ball Diameter mm	Number of Circulation Loops	Basic Rated Load Ca Kgf	Basic Rated Load C_{0a} Kgf	Rigidity K Kgf/μm
DFD 2505	25	5	3.175	4	1426	3821	77
DFD 2510		10		3	1089	2796	58
DFD 2520		20		2	743	1831	39
DFD 2508		8	4.762	4	2851	6856	83
DFD 2510		10		4	2851	6836	83
DFD 2516		16		4	2802	6756	83
DFD 2520		20		2	1455	3164	42
DFD 3205	32	5	3.175	4	1594	4945	93
DFD 3208		8	4.762	5	3861	10875	124
DFD 3210		10		5	3851	10855	124
DFD 3212		12		5	3851	10836	124
DFD 3220		20		2	1683	4209	51
DFD 3210		10	6.35	5	5663	14418	131
DFD 3212		12		5	5653	14398	131
DFD 3216		16		4	4475	11045	105
DFD 3220		20		3	3495	8298	80
DFD 4005	40	5	3.175	4	1742	6229	111
DFD 4008		8	4.762	4	3574	11204	118
DFD 4010		10	6.35	5	6277	18348	155
DFD 4012		12		5	6356	18318	155
DFD 4016		16		5	6326	18238	155
DFD 4020		20		4	5138	14378	125
DFD 5008	50	8	4.762	5	4732	17462	169
DFD 5010		10	6.35	5	7088	23203	185
DFD 5012		12		5	7049	23184	185
DFD 5016		16		5	7049	23134	185
DFD 5020		20		3	4415	13452	112

DFD

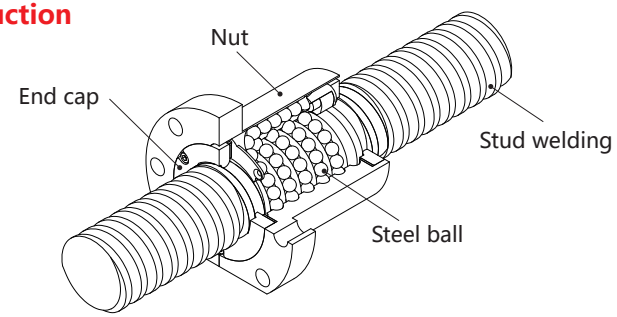
Unit (mm)

型号	螺帽尺寸 D	A	B	L	W	H	X	Q	S
DFD 2505	40	62	12	81	51	48	6.6	M6X1P	15
DFD 2510	40	62	12	100	51	48	6.6	M6X1P	15
DFD 2520	40	62	12	120	51	48	6.6	M6X1P	15
DFD 2508	45	65	15	111	54	51	6.6	M6X1P	15
DFD 2510	45	65	15	128	54	51	6.6	M6X1P	15
DFD 2516	45	65	15	173	54	51	6.6	M6X1P	15
DFD 2520	45	65	15	122	54	51	6.6	M6X1P	15
DFD 3205	50	87	16	81	72	69	9	M8X1P	15
DFD 3208	53	87	16	132	72	69	9	M8X1P	15
DFD 3210	53	87	16	147	72	69	9	M8X1P	15
DFD 3212	53	87	16	171	72	69	9	M8X1P	15
DFD 3220	53	87	16	140	72	69	9	M8X1P	15
DFD 3210	57	87	16	153	72	69	9	M8X1P	15
DFD 3212	57	87	16	172	72	69	9	M8X1P	15
DFD 3216	57	87	16	180	72	69	9	M8X1P	15
DFD 3220	57	87	16	178	72	69	9	M8X1P	15
DFD 4005	58	91	18	87	76	68	9	M8X1P	15
DFD 4008	60	91	18	118	76	68	9	M8X1P	15
DFD 4010	65	95	18	158	80	72	9	M8X1P	20
DFD 4012	65	95	18	172	80	72	9	M8X1P	20
DFD 4016	65	95	18	212	80	72	9	M8X1P	20
DFD 4020	65	95	18	220	80	72	9	M8X1P	20
DFD 5008	70	105	18	128	88	80	11	M8X1P	20
DFD 5010	75	118	18	158	100	92	11	M8X1P	20
DFD 5012	75	118	18	174	100	92	11	M8X1P	20
DFD 5016	75	118	18	215	100	92	11	M8X1P	20
DFD 5020	75	118	18	185	100	92	11	M8X1P	25

Note: CSK continuously conducts research and improvement work, and therefore reserves the right to change design specifications at any time without prior notice.

Rolled Ball Screws

Construction



Note: Certain components are neither displayed nor elucidated; the definitive structure is contingent upon the tangible product, with the provided illustrations intended solely for referential purposes.

Characteristics

The company employs advanced rolling technology. From the selection of screw material, rotational speed processing, intermediate wave surface heat treatment, to post-manufacturing processes, we implement strict quality control to ensure the best product quality that meets customer requirements. The rolled ball screws, combined with precision-ground nuts, replace traditional Acme lead screws and trapezoidal lead screws in transmission systems. This design enhances operational smoothness, reduces friction and axial backlash, and offers the advantages of rapid delivery and cost-effectiveness.

- High-precision Nut
- Highly Interchangeable Nut
- Durable and Load-resistant
- Superior Drive Performance
- Decrease Frictional Resistance
- Cost-effective

Applications

General-purpose Machine Tools
Automated Equipment
Medical Devices
Packaging Machinery
Printing Machinery
Construction Machinery

Specifications

1 R 25 - 05 K4 - 1 S F S B - 800 - 1000 - C7R - B

- Number of threads
- L: Left-hand thread
- R: Right-hand thread
- Nominal diameter
- (Refer to page G-44 for details)
- Lead
- (Refer to page G-44 for details)
- Number of bead rolls
- Number of cap assemblies
- S: Single nut
- D: Double nut
- F: With flange
- R: Without flange
- S: Square nut (DIN Standard)
- U: Internal recirculation (DIN Standard)
- K: Mini type
- Nut:
- Unmarked:
- Standard size nut. Custom sizing is generally not accepted.
- B: Surface treatment
- Thread length
- Total length
- Accuracy grade, "R" is the dedicated code for rolled-grade lead screws.
- Lead screw:
- Unmarked: Standard
- B: Surface treatment

Lead Accuracy (e)

According to ISO 3408-3, the lead accuracy of rolled ball screws is defined as the cumulative lead error over any travel length within the effective thread length, refer to the table on the right.
If higher precision is required, it is recommended to use ground ball screws.

Unit (μm)

e Grade / Measured Length	C7
0~100	44
101~200	48
201~315	50

· e(Allowable cumulative lead error over any length in the effective thread range.)

Screw Diameter and Lead Comparison Table

Rolled ball screws are available in diversified specifications and various lead accuracies, with the maximum rolling length offered for selection. Please refer to the table below.

● Specification

Nominal Diameter ø	Lead													Maximum Length of Rolled Screw
	1	2	2.5	4	5	10	16	20	25	30	32	40	50	
6	●													1000
8	●	●	●											1000
10		●		●										3000
12		●		●/○	●	●		●						3000
14		●		●										3000
16					●/○	●/○	●	●						3000
20					●/○	●		●				●		3000
25					●/○	●/○			●					6000
32					●/○	●/○		●			●			6000
40					●/○	●/○		●				●		6000
50					●	●/○		●					●	6000
63						●		●						7000
80						●		●						7000

● : Right-hand Thread ○ : Left-hand Thread

Note: The length and accuracy of rolled ball screws are subject to limitations. For other requirements, please consult our company.

● Lead Accuracy Specification by Rolling Length

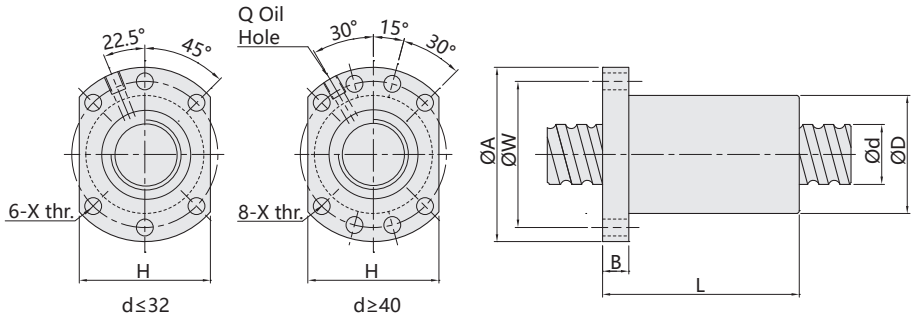
Nominal Diameter ø		6	8	10	12	14	16	20	25	32	40	50	63	80
Lead Accuracy Grade (e) Maximum Rolling Length (mm)	C7	1000		3000					6000				7000	

Axial Backlash

Under normal conditions without preload, the maximum axial backlash is shown in the table below.

Ball Diameter ød (mm)	0.8~1.2	1.588~2.381	2.778~4.762	6.35~7.938
Maximum Axial Backlash (mm)	< 0.01	< 0.02	< 0.04	< 0.07

SFS



Unit (mm)

Model	Screw Shaft Outer Diameter d	Lead l	Ball Diameter mm	Number of Circulation Loops	Basic Rated Load Ca Kgf	Basic Rated Load C0a Kgf	Rigidity K Kgf/μm
SFS 1205	12	5	2.5	3	666	1321	19
SFS 1210		10	2.5	3	647	1292	19
SFS 1220		20	2.5	2	390	684	17
SFS 1605	15	5	2.778	4	1118	2513	30
SFS 1610		10	2.778	3	845	1827	23
SFS 1616		16	2.778	2	558	1143	14
SFS 1616		16	2.778	3	814	1775	22
SFS 1620		20	2.778	2	560	1176	14
SFS 2005	20	5	3.175	4	1490	3687	37
SFS 2010		10	3.175	4	1522	3839	40
SFS 2020		20	3.175	2	770	1764	19
SFS 2020		20	3.175	3	1124	2740	29
SFS 2040		40	3.175	2	687	1293	24
SFS 2505	25	5	3.175	4	1656	4664	43
SFS 2525		25	3.175	2	850	2206	22
SFS 2525		25	3.175	3	1239	3428	34
SFS 3220	31	20	3.969	3	1915	5490	43
SFS 3232		32	3.969	2	1265	3434	27
SFS 3232		32	3.969	3	1846	5337	42
SFS 4020	38	20	6.350	3	3967	10723	54
SFS 4040		40	6.350	2	2593	6656	34
SFS 4040		40	6.350	3	3788	10349	52
SFS 5005	50	5	3.175	4	2215	9550	68
SFS 5020	48	20	6.350	4	5757	18493	87
SFS 5050		50	6.350	2	2954	8757	42
SFS 5050		50	6.350	3	4316	13618	65

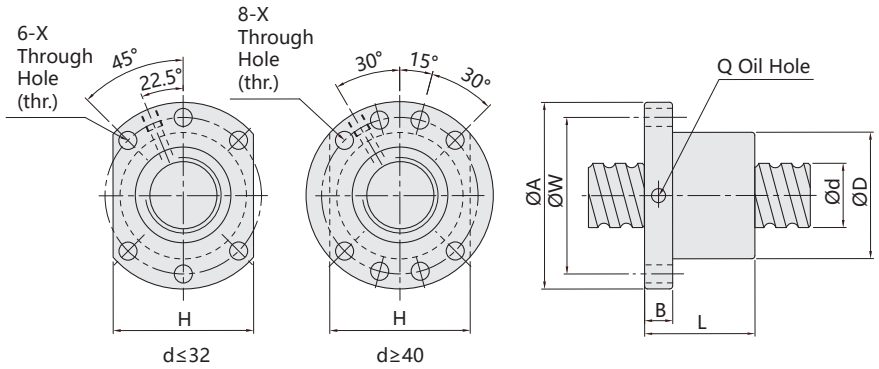
SFS

Unit (mm)

Model	Nut Dimensions D	A	B	L	W	H	X	Q
SFS 1205	24	40	10	30	32	30	4.5	M6
SFS 1210	24	40	10	45	32	30	4.5	M6
SFS 1220	24	40	10	54.5	32	30	4.5	M6
SFS 1605	28	48	10	37	38	40	5.5	M6
SFS 1610	28	48	10	47	38	40	5.5	M6
SFS 1616	28	48	10	45	38	40	5.5	M6
SFS 1616	28	48	10	61	38	40	5.5	M6
SFS 1620	28	48	10	57	38	40	5.5	M6
SFS 2005	36	58	10	37	47	44	6.6	M6
SFS 2010	36	58	10	57	47	44	6.6	M6
SFS 2020	36	58	10	54	47	44	6.6	M6
SFS 2020	36	58	10	74	47	44	6.6	M6
SFS 2040	36	58	10	90	47	44	6.6	M6
SFS 2505	40	62	10	37	51	48	6.6	M6
SFS 2525	40	62	12	65	51	48	6.6	M6
SFS 2525	40	62	12	90	51	48	6.6	M6
SFS 3220	50	80	12	80	65	62	9	M6
SFS 3232	50	80	12	82	65	62	9	M6
SFS 3232	50	80	12	114	65	62	9	M6
SFS 4020	63	93	14	86	78	70	9	M8
SFS 4040	63	93	15	104.5	78	70	9	M8
SFS 4040	63	93	15	144.5	78	70	9	M8
SFS 5005	75	110	15	37	93	85	11	M8
SFS 5020	75	110	18	108	93	85	11	M8
SFS 5050	75	110	18	125	93	85	11	M8
SFS 5050	75	110	18	175	93	85	11	M8

Note: For more specifications of DIN standards, refer to the SFU.

SFU



Unit (mm)

Model	Screw Shaft Outer Diameter d	Lead l	Ball Diameter mm	Number of Circulation Loops	Basic Rated Load		Rigidity K Kgf/μm
					Ca Kgf	C0a Kgf	
• SFU 2510	25	10	4.762	4	2961	7302	50
• SFU 3205	32	5	3.175	4	1930	6351	54
• SFU 3210		10	6.350	4	4813	12216	61
• SFU 4005	40	5	3.175	4	2118	7996	63
• SFU 4010		10	6.350	4	5407	15508	73
• SFU 5010	50	10	6.350	4	6012	19622	94
SFU 6310	63	10	6.350	4	6728	25367	135
SFU 6320		20	9.525	4	11453	36662	109
SFU 8010	80	10	6.350	4	7356	31963	153
SFU 8020		20	9.525	4	12921	47757	138

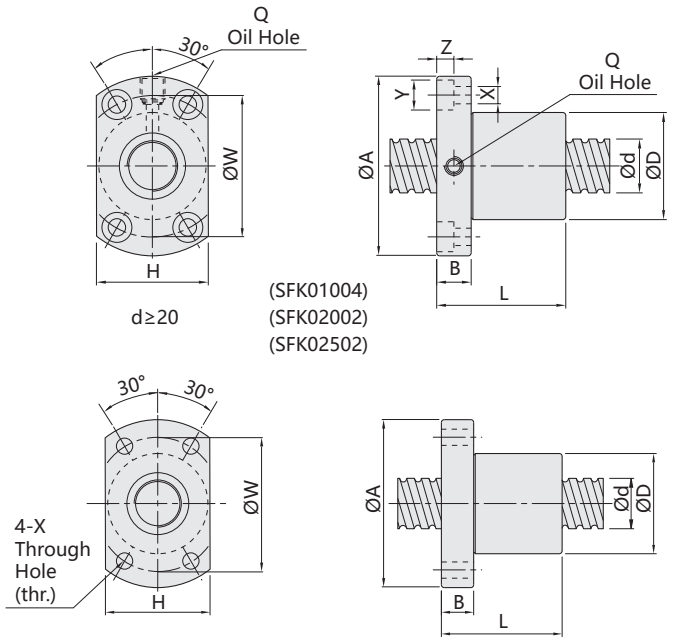
SFU

Unit (mm)

Model	Nut Dimensions							
	D	A	B	L	W	H	X	Q
• SFU 2510	40	62	12	85	51	48	6.6	M6
• SFU 3205	50	80	12	52	65	62	9	M6
• SFU 3210	50	80	12	90	65	62	9	M6
• SFU 4005	63	93	14	55	78	70	9	M8
• SFU 4010	63	93	14	93	78	70	9	M8
• SFU 5010	75	110	16	93	93	85	11	M8
SFU 6310	90	125	18	98	108	(95)	11	M8
SFU 6320	95	135	20	149	115	(100)	13.5	M8
SFU 8010	105	145	20	98	125	(110)	13.5	M8
SFU 8020	125	165	25	154	145	(130)	13.5	M8

Note: 1. Can produce left-hand threads as marked • .
2. For standard stock nuts above size 63 with full round flange, trimming according to drawing dimensions is available.
3. For more specifications of DIN standards, refer to the SFS.

SFK



Unit (mm)

Model	Screw Shaft Outer Diameter d	Lead l	Ball Diameter mm	Number of Circulation Loops	Basic Rated Load		Rigidity K Kgf/μm
					Ca Kgf	Coa Kgf	
SFK 0601	6	1	0.8	3	116	229	9
SFK 0801	8	1	0.8	4	166	408	14
SFK 0802		2	1.2	3	227	463	13
SFK 0802.5		2.5	1.2	3	226	462	13
SFK 1002	10	2	1.2	3	248	574	15
SFK 1004		4	2	3	473	910	17
SFK 1202	12	2	1.2	4	339	911	22
• SFK 1204		4	2.5	3	709	1276	26
SFK 1402	14	2	1.2	4	359	1058	30
SFK 1404		4	2.5	4	866	1935	30

SFK

Unit (mm)

Model	Nut Dimensions									
	D	A	B	L	W	H	X	Y	Z	Q
SFK 0601	12	24	3.5	15	18	16	3.4	-	-	-
SFK 0801	14	27	4	16	21	18	3.4	-	-	-
SFK 0802	14	27	4	16	21	18	3.4	-	-	-
SFK 0802.5	16	29	4	26	23	20	3.4	-	-	-
SFK 1002	18	35	5	28	27	22	4.5	-	-	-
SFK 1004	26	46	10	34	36	28	4.5	8	4.5	M6
SFK 1202	20	37	5	28	29	24	4.5	-	-	-
• SFK 1204	24	40	6	33	32	25	3.5	-	-	-
SFK 1402	21	40	6	23	31	26	5.5	-	-	-
SFK 1404	26	46	10	45	36	28	4.5	8	4.5	M6

Note: 1. Can produce left-hand threads as marked • .

2. CSK continuously conducts research and improvement work, and therefore reserves the right to change design specifications at any time without prior notice.

Comparison of Ground vs. Rolled Ball Screws

Comparison Item	Ground	Rolled
Manufacturing Process	Completed through grinding, usually after heat treatment. High machining accuracy and good surface finish.	Cold rolling process, where round bar material is extruded through rotating dies to form threads without cutting. High processing efficiency.
Accuracy	C0-C5 grade, with minimal lead error, suitable for high-precision requirements.	C7grade
Operation Quality	Very smooth surface, low friction, and quiet operation.	Polished surface, smooth operation.
Mechanical Properties	High concentricity between threads and axis, small return clearance or can be eliminated by preloading, suitable for high repeatability and positioning accuracy requirements.	Rolling process creates plastic deformation, resulting in higher surface hardness and strength, with better fatigue resistance than ground grade.
Delivery Time	Customized production, longer delivery cycle.	Standardized production, shorter delivery cycle.
Application Scenarios	High-precision CNC machines, semiconductor equipment, aerospace, medical devices, and other applications requiring high positioning accuracy and repeatability.	Industrial automation, logistics equipment, industrial machinery, etc.

Unit

Standard Load Series: AK/AF/BK/BF/EK/EF/FK/FF
High Load Series: WBK-DF/DFD

Type

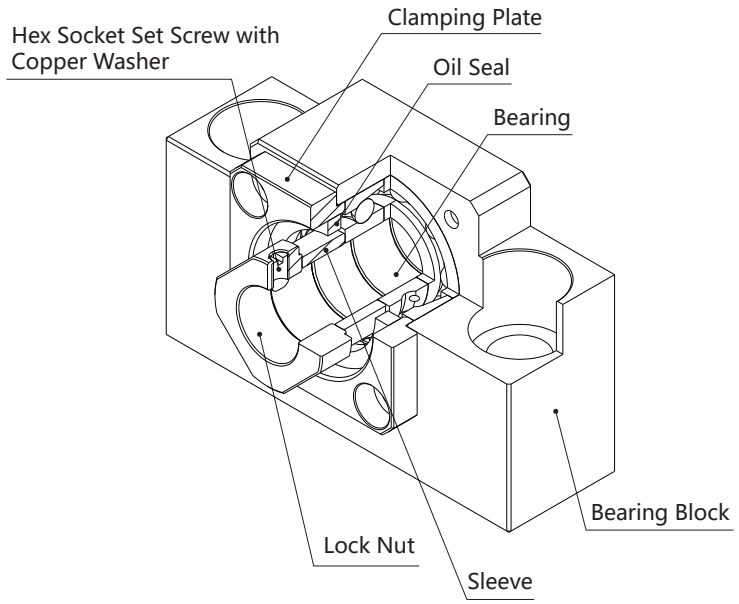
BF series(Square Support Side)		Page
 BF Blackened	 BF-B Nickel Plating	H-10
EK series(Male Fixed Side)		**Page**
 EK Blackened	 EK-B Nickel Plating	H-12
EF series(Male Support Side)		**Page**
 EF Blackened	 EF-B Nickel Plating	H-14

FK series(Flanged Fixed Side)		Page
 FK Blackened	 FK-B Nickel Plating	H-16
FF series(Flanged Support Side)		**Page**
 FF Blackened	 FF-B Nickel Plating	H-18
WBK-DF/DFD(High-Load Support Base)		**Page**
 WBK-DF/DFD Blackened	 WBK-DF/DFD-N Nickel Plating	H-20

* CSK support brackets are nickel-plated using an electroless nickel plating process. This method does not require an external power source but instead relies on a chemical reaction to deposit a nickel coating onto the surface of the workpiece.

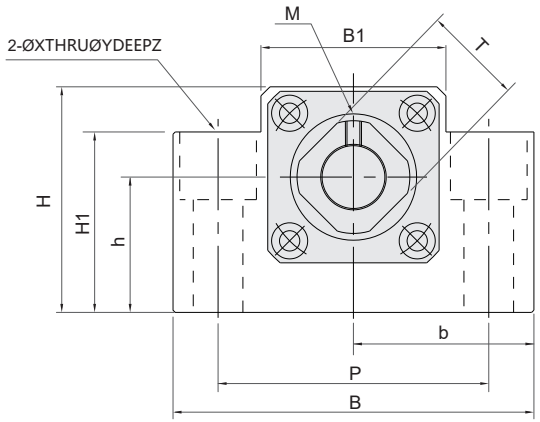
AK series (Square Fixed Side)

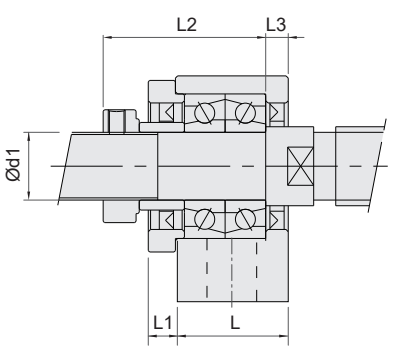
Construction



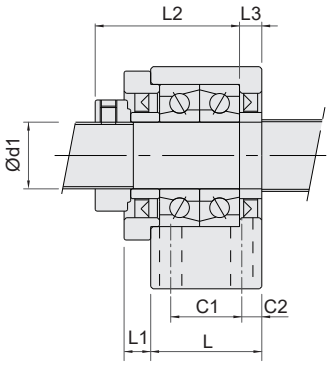
Unit (mm)

Model	Shaft Diameter d1	L	L1	L2	L3	B	H	b ±0.02	h ±0.02
AK10	10	24	6	31.5	6	70	43	35	25
AK12	12	24	6	31.5	6	70	43	35	25
AK15	15	25	6	36	5	80	49	40	30
AK20	20	42	10	50	10	95	58	47.5	30
AK25	25	48	14	60	14	105	68	52.5	35





AK10-AK15



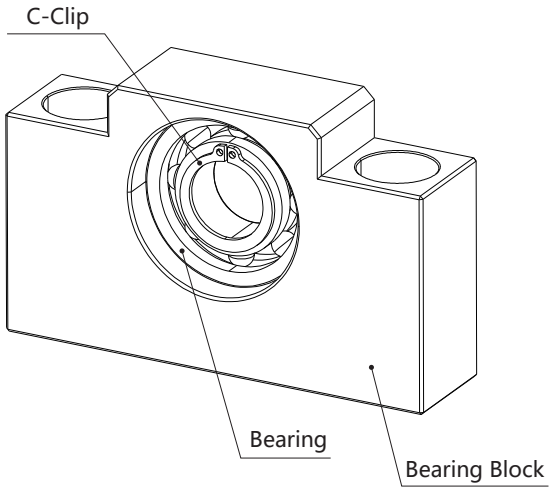
AK20-AK25

Unit (mm)

Model	B1	H1	P	X	Y	Z	M	T	C1	C2
AK10	36	35	52	9	14	11	M4	16	-	-
AK12	36	35	52	9	14	11	M4	19	-	-
AK15	41	40	60	11	17	15	M4	22	-	-
AK20	56	45	75	11	17	15	M4	30	22	10
AK25	66	25	85	11	-	-	M5	35	30	9

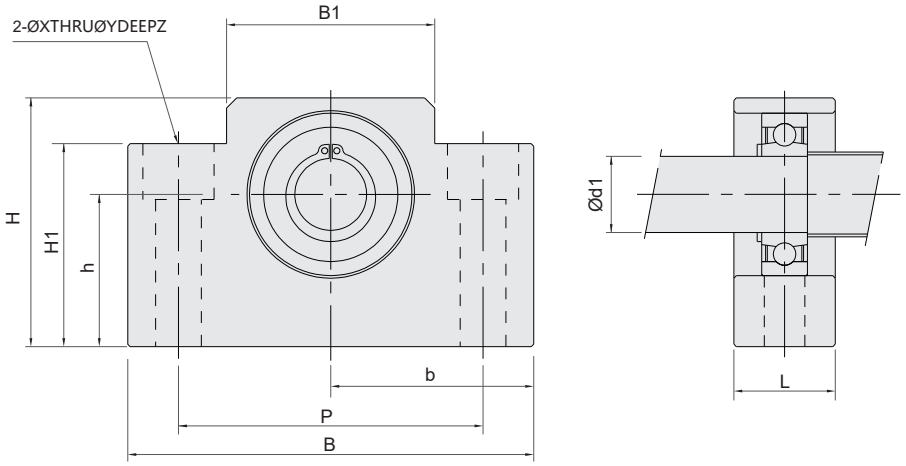
AF series (Square Support Side)

Construction



Unit (mm)

Model	Shaft Diameter d1	L	B	H	b ±0.02	h ±0.02	B1
AF10	8	20	70	43	35	25	36
AF12	10	20	70	43	35	25	36
AF15	15	20	80	49	40	30	41
AF20	20	26	95	58	47.5	30	56
AF25	25	30	105	68	52.5	35	66

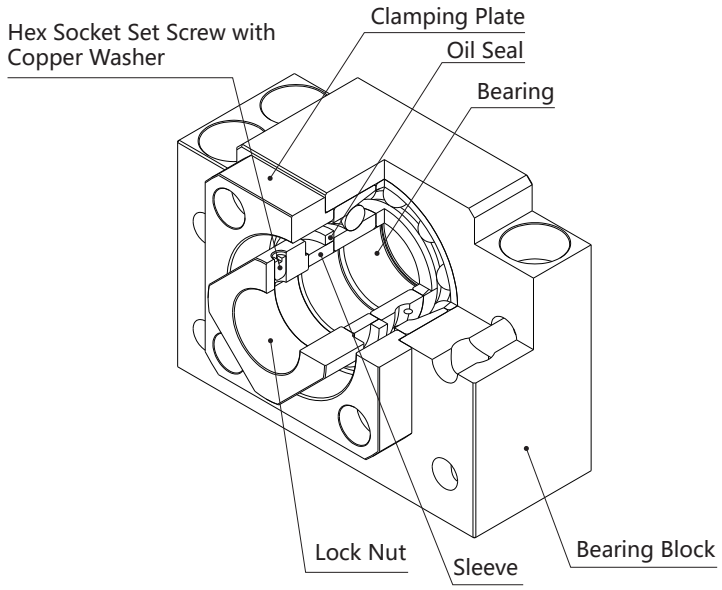


Unit (mm)

Model	H1	P	X	Y	Z	Use bearings	Use a C-Clip
AF10	35	52	9	14	11	608ZZ	S8
AF12	35	52	9	14	11	6000ZZ	S10
AF15	40	60	9	14	11	6002ZZ	S15
AF20	45	75	11	17	15	6204ZZ	S20
AF25	25	85	11	-	-	6205ZZ	S25

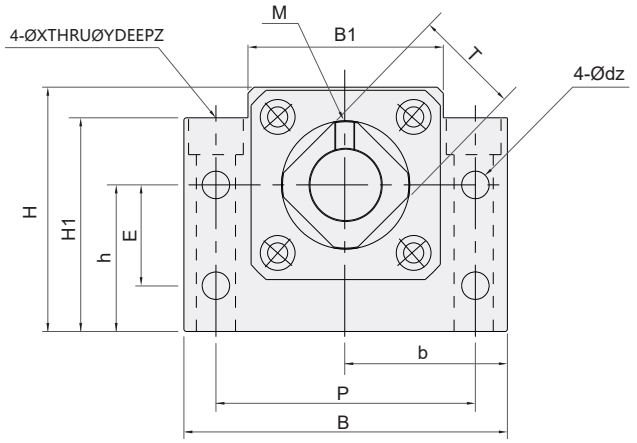
BK series(Square Fixed Side)

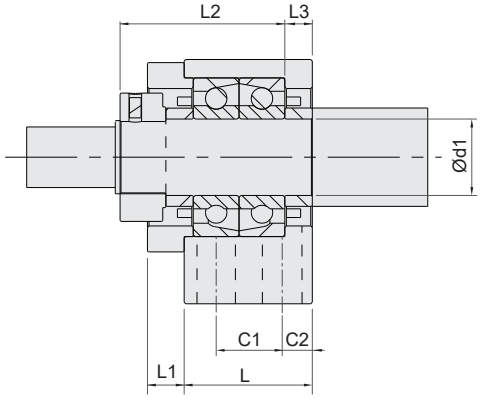
Construction



Unit (mm)

Model	Shaft Diameter d1	L	L1	L2	L3	B	H	b ±0.02	h ±0.02	B1
BK10	10	25	5	31.5	5	60	39	30	22	34
BK12	12	25	5	31.5	5	60	43	30	25	34
BK15	15	27	6	34	6	70	48	35	28	40
BK17	17	35	9	44	7	86	64	43	39	50
BK20	20	35	8	43	8	88	60	44	34	52
BK25	25	42	12	54	9	106	80	53	48	64
BK30	30	45	14	61	9	128	89	64	51	76
BK35	35	50	14	67	12	140	96	70	52	88
BK40	40	61	18	76	15	160	110	80	60	100



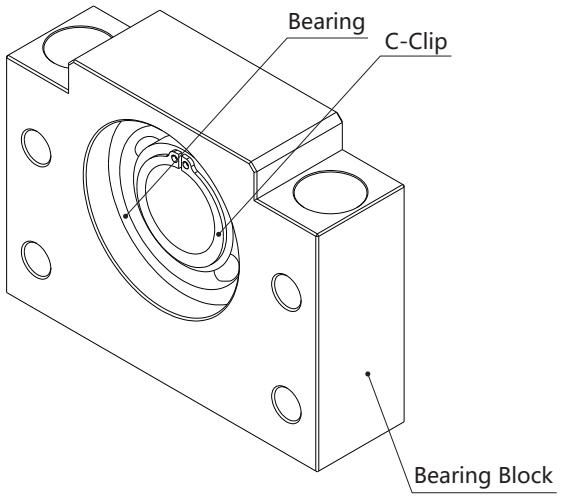


Unit (mm)

Model	H1	P	C1	C2	X	Y	Z	M	T	E	dz
BK10	32.5	46	13	6	6.6	11	5	M4	16	15	5.5
BK12	32.5	46	13	6	6.6	11	1.5	M4	19	18	5.5
BK15	38	54	15	6	6.6	11	6.5	M4	22	18	5.5
BK17	55	68	19	8	9	14	8.5	M4	24	28	6.6
BK20	50	70	19	8	9	14	8.5	M4	30	22	6.6
BK25	70	85	22	10	11	17.5	11	M5	35	33	9
BK30	78	102	23	11	14	20	13	M6	40	33	11
BK35	79	114	26	11	14	20	13	M8	50	35	11
BK40	90	130	33	14	18	26	17	M8	50	37	14

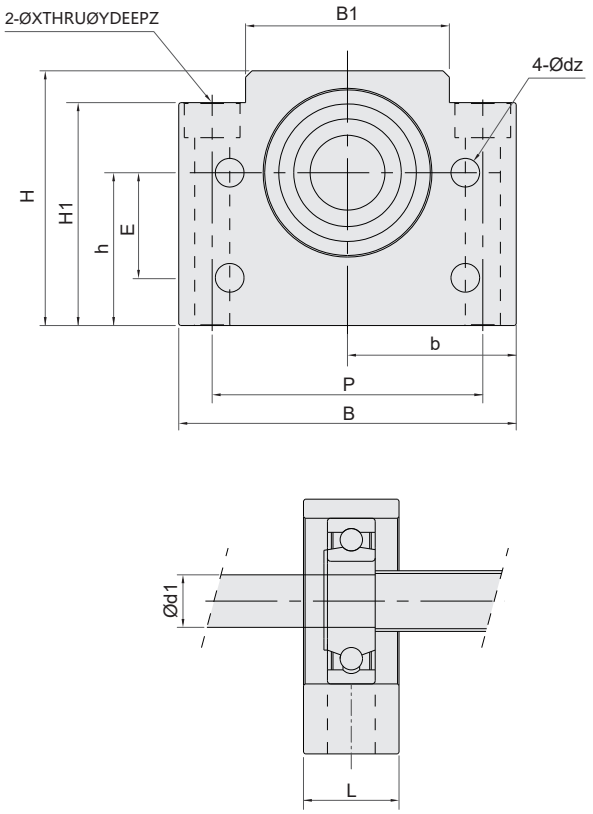
BF series(Square Support Side)

Construction



Unit (mm)

Model	Shaft Diameter d1	L	B	H	b ±0.02	h ±0.02	B1	H1
BF10	8	20	60	39	30	22	34	32.5
BF12	10	20	60	43	30	25	34	32.5
BF15	15	20	70	48	35	28	40	38
BF17	17	23	86	64	43	39	50	55
BF20	20	26	88	60	44	34	52	50
BF25	25	30	106	80	53	48	64	70
BF30	30	32	128	89	64	51	76	78
BF35	35	32	140	96	70	52	88	79
BF40	40	37	160	110	80	60	100	90



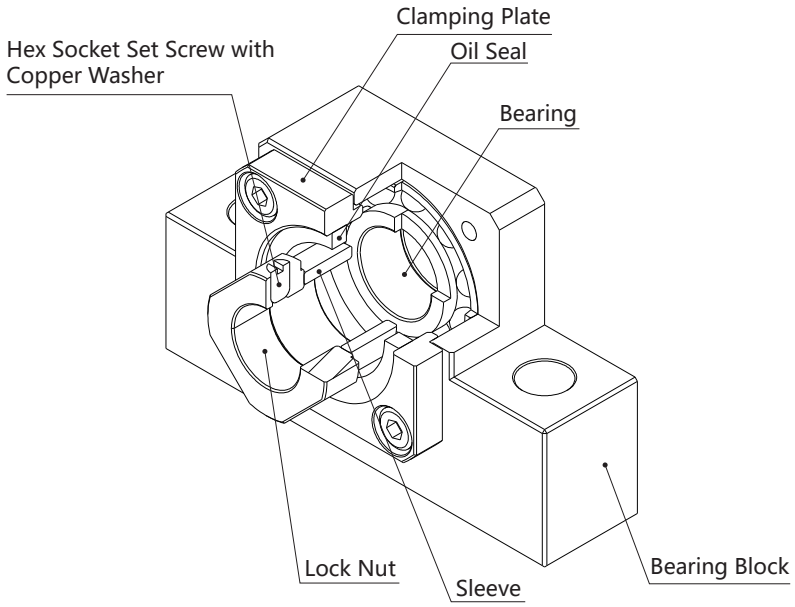
Unit (mm)

Model	P	X	Y	Z	E	dz	Use bearings	Use a C-Clip
BF10	46	6.6	11	5	15	5.5	608ZZ	S8
BF12	46	6.6	11	1.5	18	5.5	6000ZZ	S10
BF15	54	6.6	11	6.5	18	5.5	6002ZZ	S15
BF17	68	9	14	8.5	28	6.6	6203ZZ	S17
BF20	70	9	14	8.5	22	6.6	6004ZZ	S20
BF25	85	11	17.5	11	33	9	6205ZZ	S25
BF30	102	14	20	13	33	11	6206ZZ	S30
BF35	114	14	20	13	35	11	6207ZZ	S35
BF40	130	18	26	17.5	37	14	6208ZZ	S40

UNIT

EK series(Male Fixed Side)

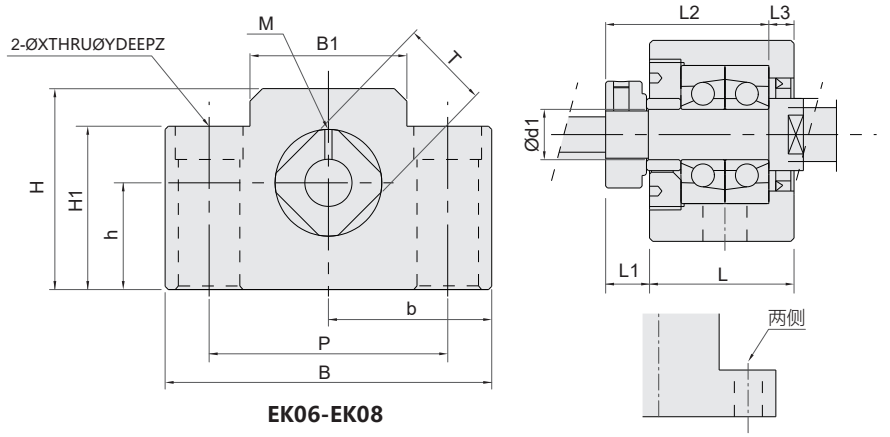
Construction



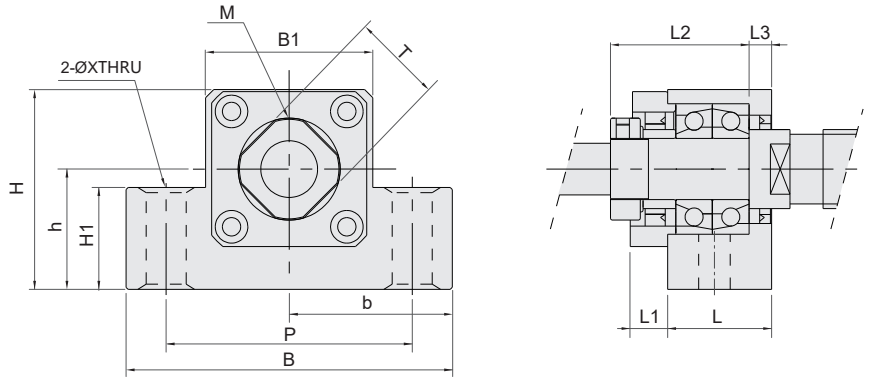
Unit (mm)

Model	Shaft Diameter d1	L	L1	L2	L3	B	H	b	h
								±0.02	±0.02
EK06	6	20	5.5	22	3.5	42	25	21	13
EK08	8	23	7	26	4	52	32	26	17
EK10	10	24	6	31.5	6	70	43	35	25
EK12	12	24	6	31.5	6	70	43	35	25
EK15	15	25	6	36	5	80	49	40	30
EK20	20	42	10	50	10	95	58	47.5	30

UNIT



EK06-EK08



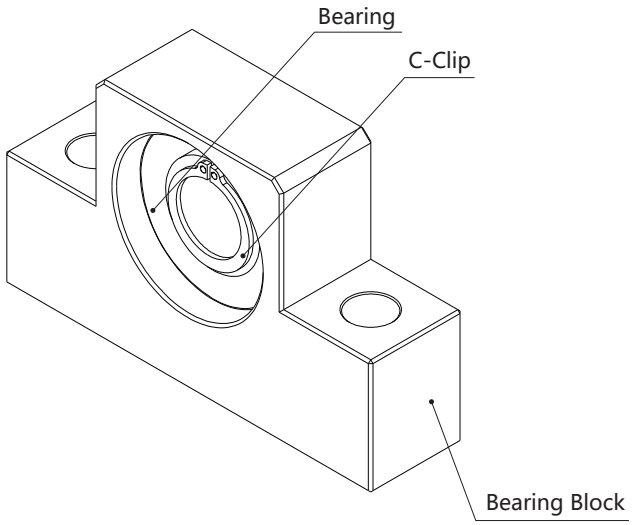
EK10-EK20

Unit (mm)

Model	B1	H1	P	X	Y	Z	M	T	C1	C2
EK06	18	20	30	5.5	9.5	11	M3	12	-	-
EK08	25	26	38	6.6	11	12	M3	14	-	-
EK10	36	24	52	9	-	-	M4	16	-	-
EK12	36	24	52	9	-	-	M4	19	-	-
EK15	41	25	60	11	-	-	M4	22	-	-
EK20	56	25	75	11	-	-	M4	30	-	-

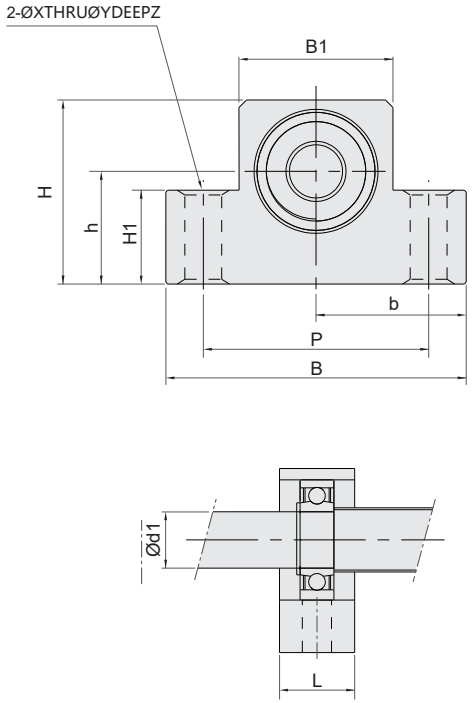
EF series(Male Support Side)

Construction



Unit (mm)

Model	Shaft Diameter d1	L	B	H	b	h	B1
					±0.02	±0.02	
EF06	6	12	42	25	21	13	18
EF08	6	14	52	32	26	17	25
EF10	8	20	70	43	35	25	36
EF12	10	20	70	43	35	25	36
EF15	15	20	80	49	40	30	41
EF20	20	26	95	58	47.5	30	56



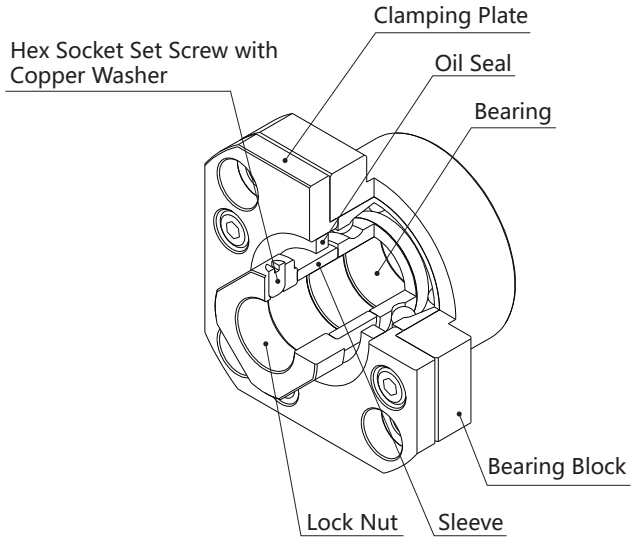
Unit (mm)

Model	H1	P	X	Y	Z	Use bearings	Use a C-Clip
EF06	20	30	5.5	9.5	11	606ZZ	S6
EF08	26	38	6.6	11	12	606ZZ	S6
EF10	24	52	9	-	-	608ZZ	S8
EF12	24	52	9	-	-	6000ZZ	S10
EF15	25	60	9	-	-	6002ZZ	S15
EF20	25	75	11	-	-	6204ZZ	S20

UNIT

FK series(Flanged Fixed Side)

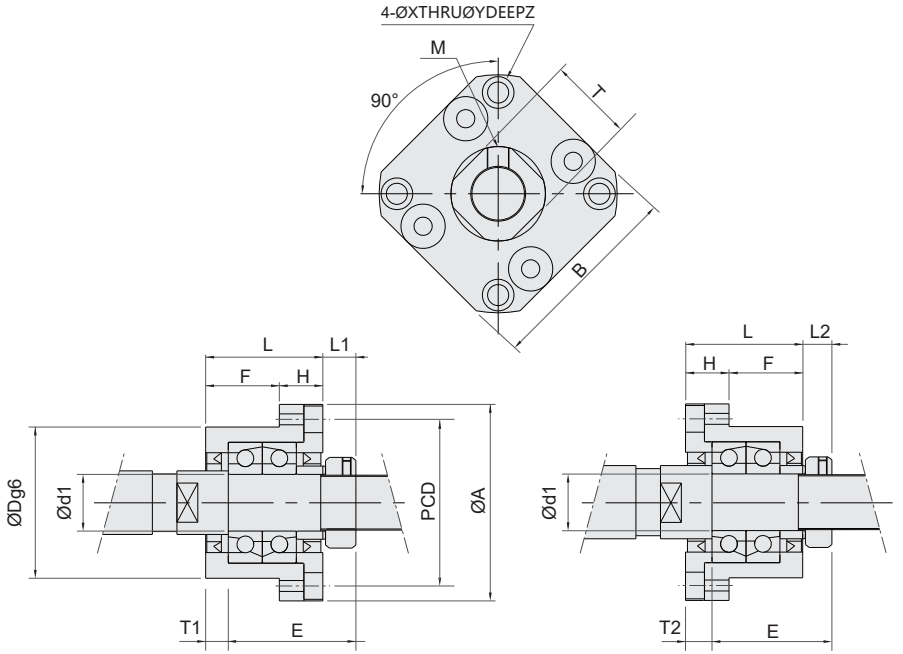
Construction



Unit (mm)

Model	Shaft Diameter d1	L	H	F	E	Dg6		A	PCD	B
FK06	6	20	7	13	22	22	-0.007 -0.02	35	28	28
FK08	8	23	9	14	26	28	-0.007 -0.02	43	35	35
FK10	10	27	10	17	29.5	34	-0.009 -0.025	52	42	42
FK12	12	27	10	17	29.5	36	-0.009 -0.025	54	44	44
FK15	15	32	15	17	36	40	-0.009 -0.025	63	50	52
FK17	17	45	22	23	47	50	-0.009 -0.025	77	62	61
FK20	20	52	22	30	50	57	-0.010 -0.029	85	70	68
FK25	25	57	27	30	60	63	-0.010 -0.029	98	80	79
FK30	30	62	30	32	61	75	-0.010 -0.029	117	95	93

UNIT



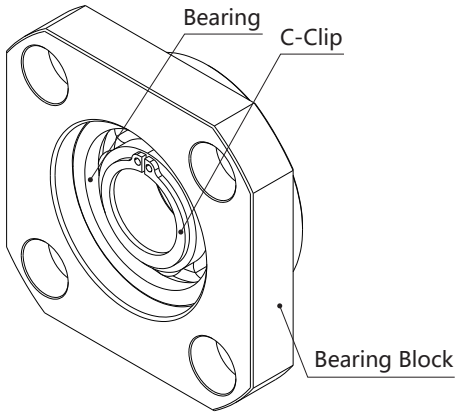
Mounting Method A **Mounting Method B**

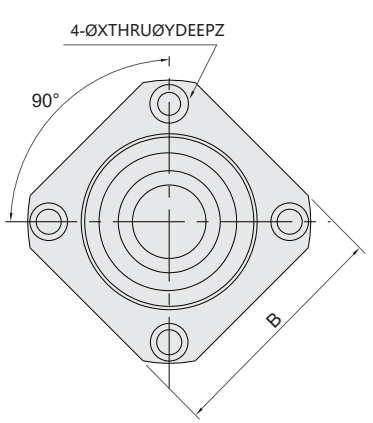
Unit (mm)

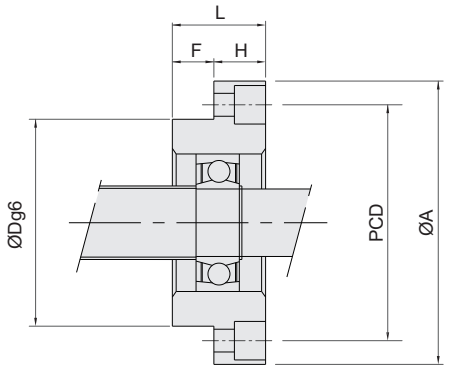
Model	Mounting Method A		Mounting Method B		X	Y	Z	M	T
	L1	T1	L2	T2					
FK06	5.5	3.5	6.5	4.5	3.4	6	3	M3	12
FK08	7	4	8	5	3.4	6	4	M3	14
FK10	7.5	5	8.5	6	4.5	8	4	M4	16
FK12	7.5	5	8.5	6	4.5	8	4	M4	19
FK15	10	6	12	8	5.5	9.5	6	M4	22
FK17	11	9	14	12	6.6	11	10	M4	24
FK20	8	10	12	14	6.6	11	10	M4	30
FK25	13	10	20	17	9	14	13	M5	35
FK30	11	12	17	18	11	17	15	M6	40

FF series (Flanged Support Side)

Construction







Unit (mm)

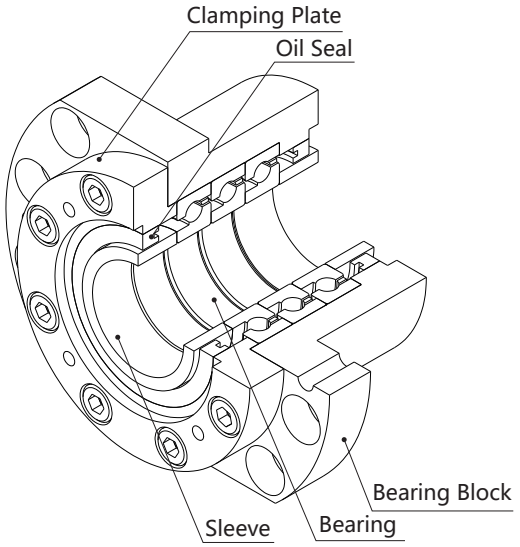
Model	Shaft Diameter d1	L	H	F	Dg6		A
FF06	6	10	6	4	22	-0.007 -0.02	36
FF10	8	12	7	5	28	-0.007 -0.02	43
FF12	10	15	7	8	34	-0.009 -0.025	52
FF15	15	17	9	8	40	-0.009 -0.025	63
FF17	17	20	11	9	50	-0.009 -0.025	77
FF20	20	20	11	9	57	-0.010 -0.029	85
FF25	25	24	14	10	63	-0.010 -0.029	98
FF30	30	27	18	9	75	-0.010 -0.029	117

Unit (mm)

Model	PCD	B	X	Y	Z	Use bearings	Use a C-Clip
FF06	28	28	3.4	6	4	606ZZ	S6
FF10	35	35	3.4	6	4	608ZZ	S8
FF12	42	42	4.5	8	4	6000ZZ	S10
FF15	50	52	5.5	9.5	5.5	6002ZZ	S15
FF17	62	61	6.6	11	6.5	6203ZZ	S17
FF20	70	68	6.6	11	6.5	6204ZZ	S20
FF25	80	79	9	14	8.5	6205ZZ	S25
FF30	95	93	11	17.5	11	6206ZZ	S30

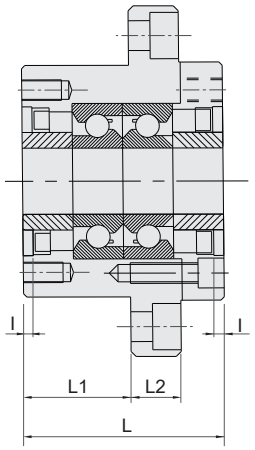
WBK-DF/DFD (High-Load Support Base)

Construction

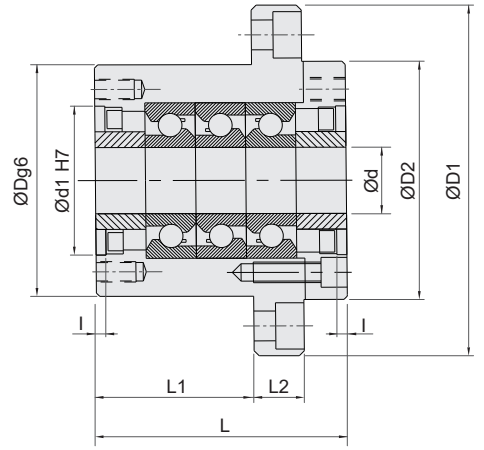


Unit (mm)

Model	d	D	D1	D2	L	L1	L2	A	W	X	Y	Z	d1	I	V	P	Q
WBK20DF	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK25DF	25	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK25DFD	25	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DF	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DFD	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK35DF	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK35DFD	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DF	40	95	142	102	66	33	18	106	121	11	17.5	11	68	4	80	M6	12
WBK40DFD	40	95	142	102	81	48	18	106	121	11	17.5	11	68	4	80	M6	12



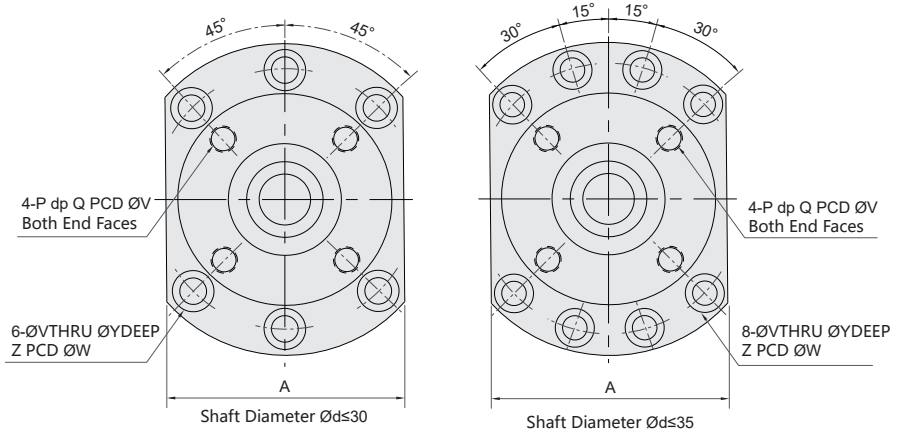
DF Assembly

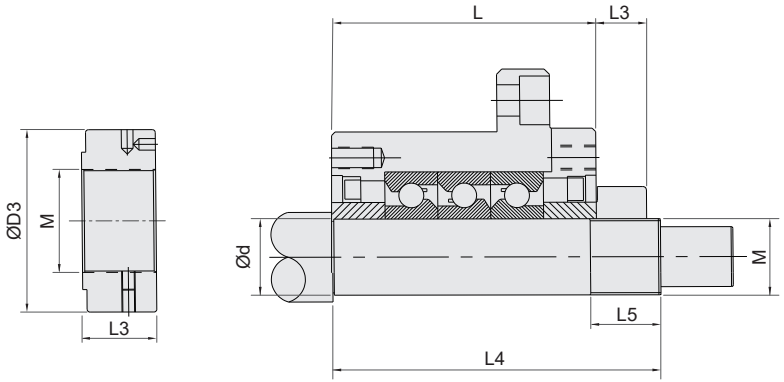


DFD Assembly

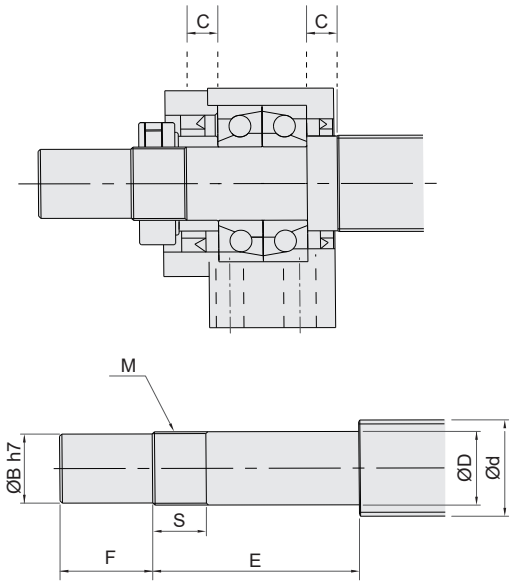
Unit (mm)

Model	Basic dynamic load rating	Limit Load	Preload	Axial rigidity	Starting torque	Lock Nut			Weight	Shaft End Dimension		
						M	D3	L3		d	L4	L5
WBK20DF	21900	26600	2150	750	14.0	M20×1	40	18	1.9	20	81	23
WBK25DF	28500	40500	3150	1000	23.0	M25×1.5	45	20	3.1	25	89	26
WBK25DFD	46500	81500	4300	1470	31.0	M25×1.5	45	20	3.4	25	104	26
WBK30DF	29200	43000	3350	1030	24.0	M30×1.5	50	20	3.0	30	89	26
WBK30DFD	47500	86000	4500	1520	33.0	M30×1.5	50	20	3.3	30	104	26
WBK35DF	31000	50000	3800	1180	28.0	M35×1.5	55	22	3.4	35	92	30
WBK35DFD	50500	100000	5200	1710	37.0	M35×1.5	55	22	4.3	35	107	30
WBK40DF	31500	52000	3900	1230	28.0	M40×1.5	60	22	3.6	40	92	30
WBK40DFD	51500	104000	5300	1810	38.0	M40×1.5	60	22	4.2	40	107	30





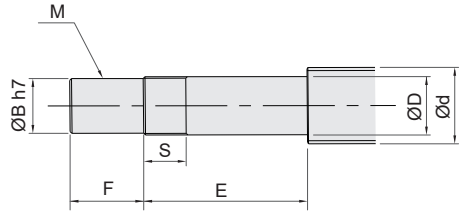
Shaft End Machining Dimensions (Fixed Side) BK

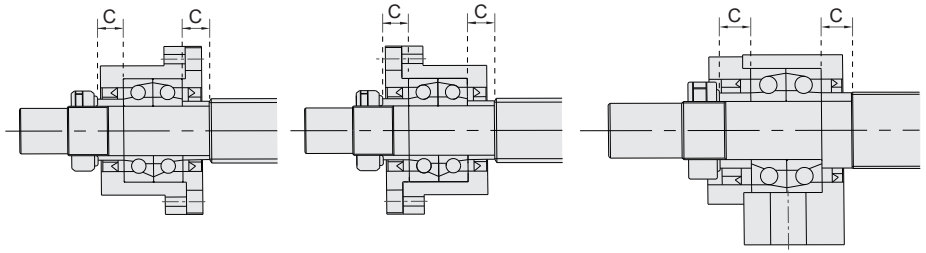


Unit (mm)

Model	Ball Screw Shaft Outer Diameter	Nominal Thread Diameter					Nominal Thread		Sleeve Length
BK	d	D		B	E	F	M	S	C
BK10	12/14/15	10	-0.005 -0.012	8	36	15	M10×1	16	5.5
BK12	14/15/16	12	-0.005 -0.012	10	36	15	M12×1	14	5.5
BK15	18/20	15	-0.005 -0.012	12	40	20	M15×1	12	6
BK17	20/25	17	-0.005 -0.014	15	53	23	M17×1	17	7
BK20	25/28	20	-0.005 -0.014	17	53	25	M20×1	15	8
BK25	32/36	25	-0.005 -0.014	20	65	30	M25×1.5	18	9
BK30	36/40	30	-0.005 -0.015	25	72	38	M30×1.5	25	9
BK35	45	35	-0.005 -0.015	30	81	45	M35×1.5	28	12
BK40	50	40	-0.005 -0.015	35	93	50	M40×1.5	35	15

Machining Dimensions of Shaft End (Fixed Side) FK,EK,AK



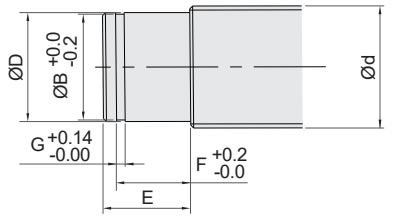


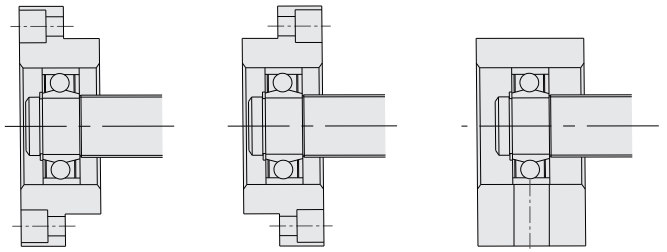
FK **FK** **EK,AK**

Unit (mm)

Model			Ball Screw Shaft Outer Diameter	Nominal Thread Diameter					Nominal Thread		Sleeve Length
FK	EK	AK	d	D		B	E	F	M	S	C
FK06	EK06	-	8	6	-0.005 -0.012	4	28	8	M6×0.75	8	5
FK08	EK08	-	10/12	8	-0.005 -0.012	6	32	9	M8×1	10	5.5
FK10	EK10	AK10	12/14/15	10	-0.005 -0.012	8	36	15	M10×1	11	5.5
FK12	EK12	AK12	14/15/16	12	-0.005 -0.014	10	36	15	M12×1	11	5.5
FK15	EK15	AK15	18/20	15	-0.005 -0.014	12	47	20	M15×1	13	10
FK17	-	-	20/25	17	-0.005 -0.014	15	58	23	M17×1	15	10
FK20	EK20	AK20	25/28/30	20	-0.005 -0.014	17	62	25	M20×1	17	11
FK25	-	AK25	30/32/36	25	-0.005 -0.014	20	76	30	M25×1.5	20	15
FK30	-	-	36/40	30	-0.005 -0.015	25	72	38	M30×1.5	25	9

Machining Dimensions of Shaft End (Fixed Side) FF,EF,BF,AF





FF **FF** **EF,BF,AF**

Unit (mm)

Model				Ball Screw Shaft Outer Diameter	Nominal Thread Diameter					
FF	EF	BF	AF	d	D		E	B	F	G
FF06	EF06	-	-	8	6	-0.005 -0.012	9	5.7	6.8	0.8
-	EF08	-	-	10	6	-0.005 -0.012	9	5.7	6.8	0.8
FF10	EF10	BF10	AF10	12/14/15	8	-0.005 -0.012	10	7.6	7.9	0.9
FF12	EF12	BF12	AF12	14/15/16	10	-0.005 -0.012	11	9.6	9.15	1.15
FF15	EF15	BF15	AF15	18/20	15	-0.005 -0.014	13	14.3	10.15	1.15
FF17	-	BF17	-	20/25	17	-0.005 -0.014	16	16.2	13.15	1.15
FF20	EF20	(BF20) Note	AF20	25/28/30	20	-0.005 -0.014	19(16)	19	15.35(13.35)	1.35
FF25	-	BF25	AF25	30/32/36	25	-0.005 -0.014	20	23.9	16.35	1.35
FF30	-	BF30	-	36/40	30	-0.005 -0.015	21	28.6	17.75	1.75
-	-	BF35	-	40/45	35	-0.005 -0.015	22	33	18.75	1.75
-	-	BF40	-	50	40	-0.005 -0.015	23	38	19.75	1.95

Reference Table for Axial Load on Support Base Fixed End

Model		Bearing	Static Load	Axial Load	Limiting Speed
FK06	EK06	706C	93	74	-
FK08	EK08	708A	129	103	-
BK10 FK10	AK10 EK10	7000A	239	195	27105
BK12 FK12	AK12 EK12	7001A	276	217	24375
BK15 FK15	AK15 EK15	7002A	321	240	20800
BK17	FK17	7203A	556	413	17160
		7203B	523	490	11798
BK20		7004A	622	428	15730
	AK20	7204A	770	587	14560
FK20	EK20	7204B	710	691	10625
BK25	AK25	7205A	964	709	12675
FK25		7205B	881	820	8980
BK30	FK30	7206A	1388	939	10660
		7206B	1268	1082	7570
BK35		7207B	1714	1466	6400
BK40		7208B	2145	1834	5700

Lock Nut Model Reference

code	Model	Surface Treatment	Tightening Torque	Prevailing Torque
RK06	M6×P0.75	Blackened	25	6(M3)
RK06-B		Nickel Plating		
RK08	M8×P1.0	Blackened	50	6(M3)
RK08-B		Nickel Plating		
RK10	M10×P1.0	Blackened	95	6(M4)
RK10-B		Nickel Plating		
RK12	M12×P1.0	Blackened	140	15(M4)
RK12-B		Nickel Plating		
RK15	M15×P1.0	Blackened	240	15(M4)
RK15-B		Nickel Plating		
RK17	M17×P1.0	Blackened	315	15(M4)
RK17-B		Nickel Plating		
RK20	M20×P1.0	Blackened	480	15(M4)
RK20-B		Nickel Plating		
RK25	M25×P1.5	Blackened	860	50(M6)
RK25-B		Nickel Plating		
RK30	M30×P1.5	Blackened	1280	50(M6)
RK30-B		Nickel Plating		
RK40	M40×P1.5	Blackened	3000	50(M6)
RK40-B		Nickel Plating		

Installation

(1) Assemble the fixed-end support unit with the ball screw.

■Do not disassemble the support unit.

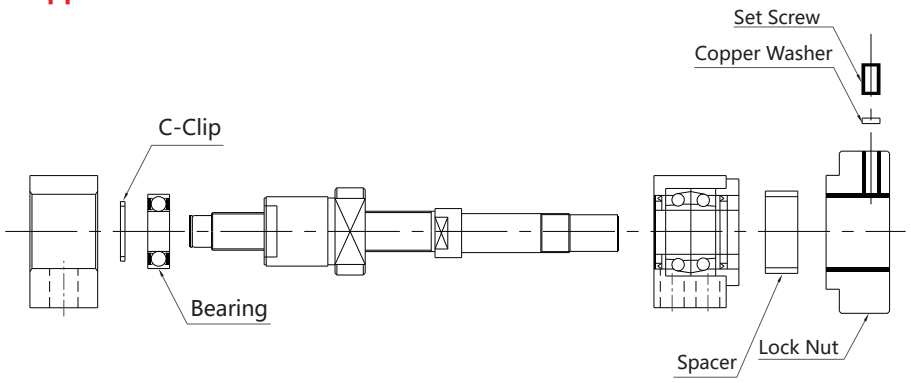
■Avoid scratching the shaft seal during screw insertion.

(2) After inserting the screw into the fixed-end support unit, ensure the copper washer of the lock nut is properly placed and secure it with a hex socket set screw.

■Place the copper washer into the lock nut before fixation, and use thread-locking adhesive to prevent loosening.

■If used in special environments, please contact us.

(3) Assemble the support-end bearing with the screw shaft end, secure it with a circlip, and then install the assembly into the support-end support unit.



Support End **Fixed End**

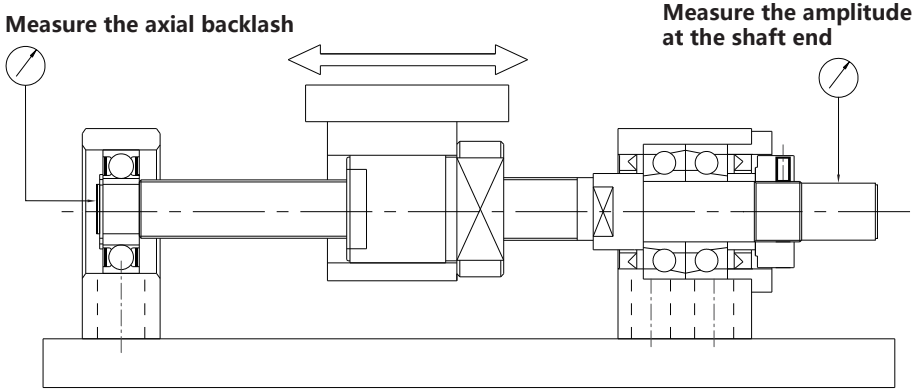
Accuracy

(1) Measure the rotational accuracy of the ball screw's fixed end shaft.

■Amplitude of the ball screw shaft end.

(2) Measure the axial backlash of the support end shaft.

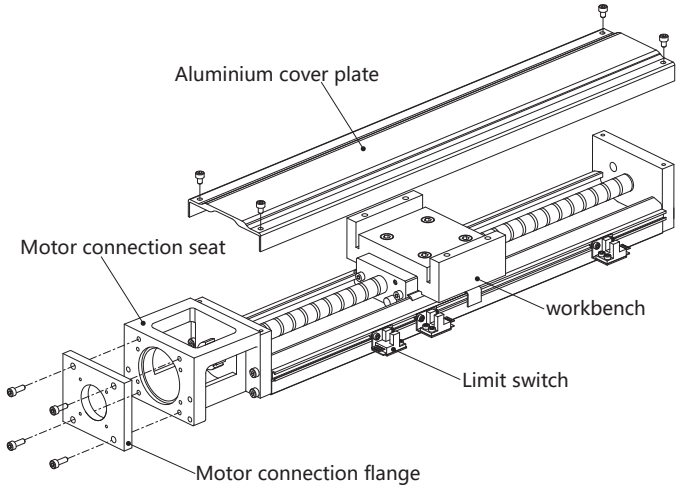
■Axial backlash.



Single Axis Module
LMK series

LMK

Construction



Note: For reference only.

Characteristics

The LMK single-axis robot is a versatile series of products driven by the motor, integrating ball screws and U-shaped rails,which can provide high positioning accuracy, with fast selection, fast installation, compact volume, high rigidity and other features.

- Easy to design and install
- Small size and light weight
- High precision
- High rigidity
- Fully equipped
- Optimal design

Applications

Precision CNC machine tools, semiconductor manufacturing equipment, automatic loading and unloading equipment, automatic welding machine, dispensing machine, assembling machine, packaging equipment

LMK

Specifications

LMK 60D 10 P E -300 E A 1 E-F0 C S1 M

LMK: Single-axis robot

Size: 40, 50, 60D, 86D, 100

Ball screw lead
LMK40: 2
LMK50: 2
LMK60: 5, 10
LMK86: 10, 20
LMK100: 20

Accuracy grade
P: Precision grade
N: Normal Grade

Special processing of ball screw
E: Special processing of ball screw
No symbol: Ball screw standard type

Rail length
LMK40: 100, 150, 200
LMK50: 150, 200, 250, 300
LMK60: 150, 200, 300, 400, 500, 600
LMK86: 340, 440, 540, 640, 740, 940
LMK100: 980, 1080, 1180, 1280, 1380

special processing of rail
E: special processing of rail
No symbol: Rail standard type

special processing of rail
A: standard type
S: Light load type

Number of slides
1, 2

Special processing of sliding
E: Special processing of sliding No symbol: slide standard type

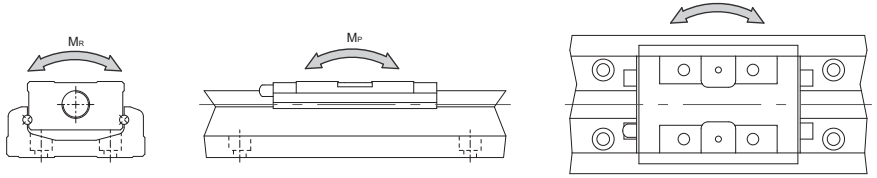
Motor connection flange specifications
FE: Special processing (refer to E15-18)

Dust protection option
C: Aluminium cover plate
B: Telescopic sheath
No symbol: No cover plate

Limit switch
S0 : Only limiting orbits
S1 : Three limit switches BS5-L1M (refer to E18)
S2 : Three limit switches BS5-Y1M (refer toE18)
SE:Customer specified limit switches or quantities

No symbol
Motor specification
M:Attached motor (motor connection holes refer to page I-15~I-18)

Load specification



Unit (mm)

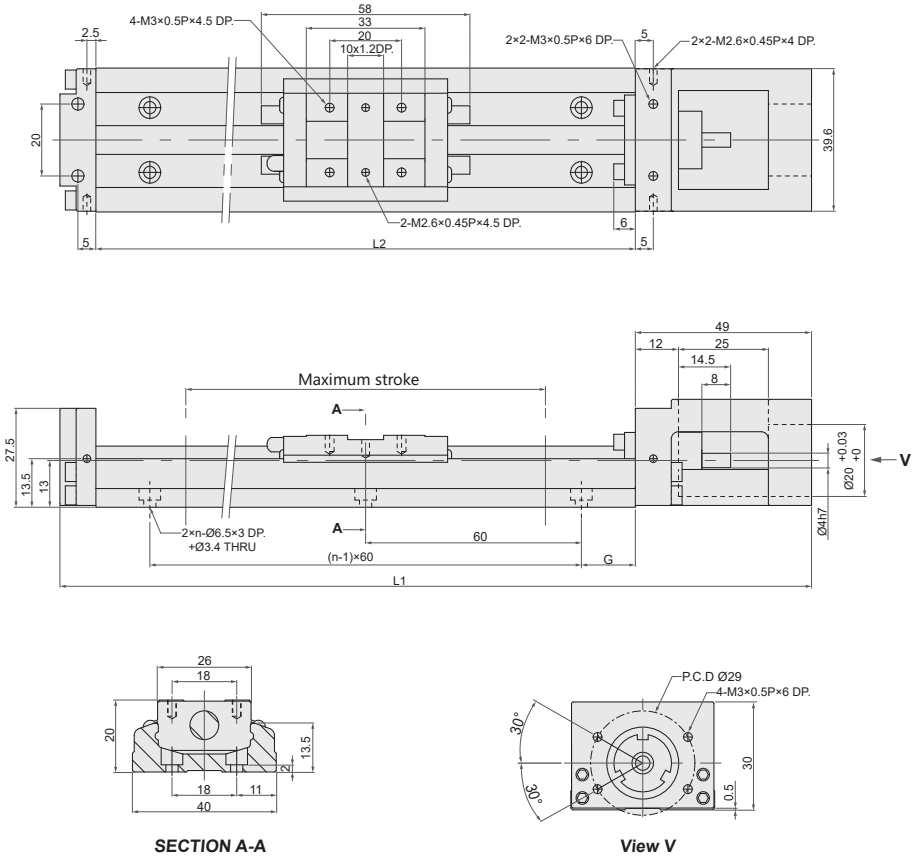
Model No.		Effective stroke	ball screw				Linear Guideway							
			Diameter (mm)	lead (mm)	Dynamic (N)	Static (N)	Dynamic (N)	Static (N)	Static moment rating Mp (N-m)		My (N-m)		Mr (N-m)	
							sliderA	sliderA	sliderA1	sliderA2	sliderA1	sliderA2	sliderA1	sliderA2
LMK4002	Precision grade	8	8	2	735	1538	3920	6468	33	182	33	182	81	162
	Normal Grade				676	1284								
LMK5002	Precision grade	8	8	2	2136	3468	8007	12916	116	545	116	545	222	444
	Normal Grade				1813	2910								
LMK6005	Precision grade	12	12	5	3744	6243	13230	21464	152	348	152	348	419	838
	Normal Grade				3377	5625								
LMK6010	Precision grade	12	12	10	2410	3743	13230	21464	152	348	152	348	419	838
	Normal Grade				2107	3234								
LMK8610	Precision grade	15	15	10	7144	12644	31548	50674	622	3050	622	3050	1507	3014
	Normal Grade				6429	11387								
LMK8620	Precision grade	15	15	20	4645	7655	31548	50674	622	3050	622	3050	1507	3014
	Normal Grade				4175	6889								
LMK10020	Precision grade	20	20	20	7046	12544	39200	63406	960	4763	960	4763	2205	4410
	Normal Grade				4782	9163								

Accuracy Grade

Unit (mm)

Model No.	Rail length	Location reproducibility		Accuracy		Running Parallelism		Maximum rotational torque(N-cm)	
		Precision	Normal Grade	Precision	Normal Grade	Precision	Normal Grade	Precision	Normal Grade
LMK40	100	±0.003	±0.005	0.020	-	0.010	-	1.2	0.8
	150								
	200								
LMK50	150	±0.003	±0.005	0.020	-	0.010	-	4	2
	200								
	250								
	300								
LMK60	150	±0.003	±0.005	0.025	-	0.010	-	15	7
	200								
	300								
	400								
	500	±0.003	±0.005	0.025	-	0.015	-	15	7
	600								
LMK86	340	±0.003	±0.005	0.030	-	0.015	-	15	10
	440								
	540								
	640								
	740	±0.003	±0.005	0.040	-	0.020	-	17	10
	940	±0.003	±0.005	0.035	-	0.030	-	25	10
LMK100	980	±0.005	±0.01	0.035	-	0.025	-	17	12
	1080								
	1180	±0.005	±0.01	0.04	-	0.03	-	20	12
	1280	±0.005	±0.01	0.045	-	0.035	-	23	15
	1380			0.05	-	0.04	-	25	

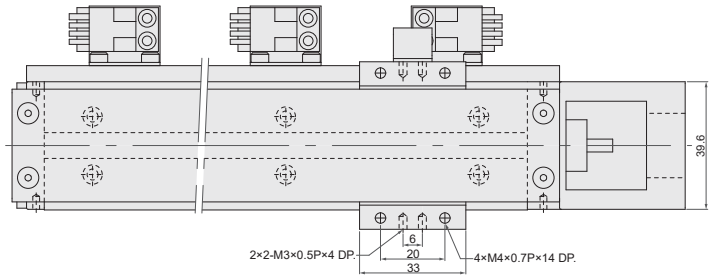
LMK40

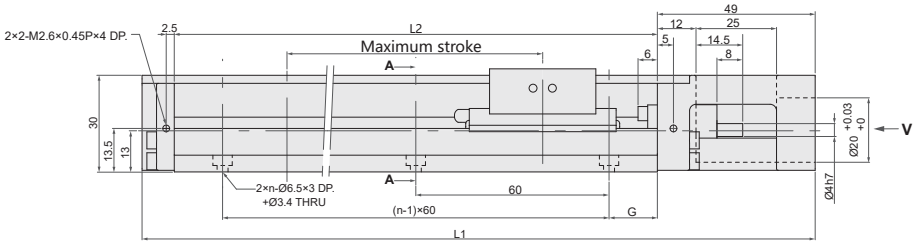


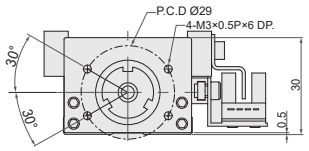
Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	n	Weight (kg)	
		A1slider	A2 slider			A1slider	A2 slider
100	159	36	-	20	2	0.48	-
150	209	86	34	15	3	0.6	0.67
200	259	136	84	40	3	0.72	0.79

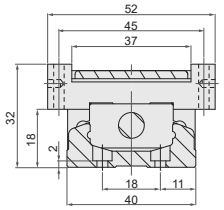
LMK40







View V

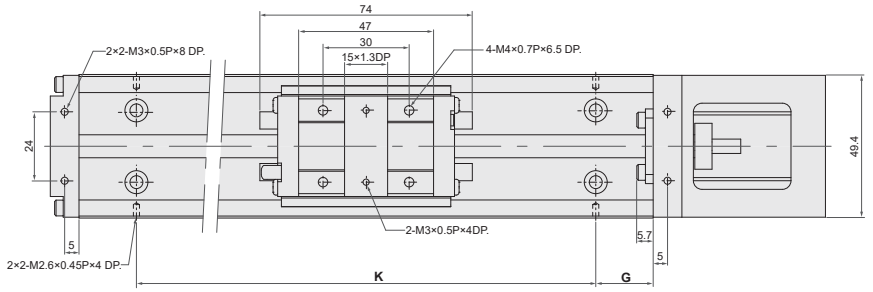


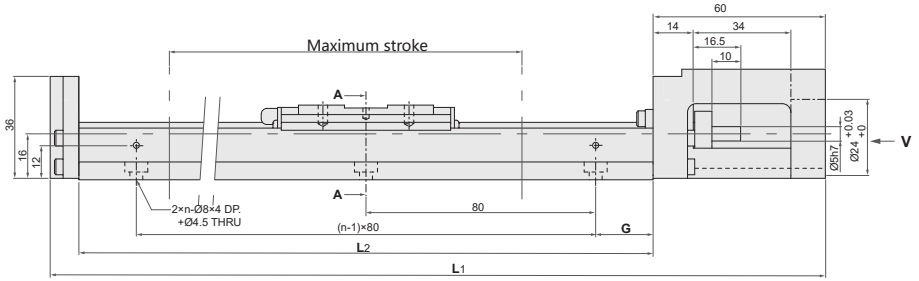
SECTION A-A

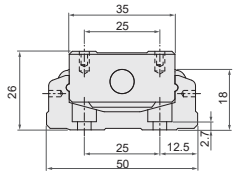
Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	n	Weight (kg)	
		A1 slider	A2 slider			A1 slider	A2 slider
100	159	36	-	20	2	0.55	-
150	209	86	34	15	3	0.68	0.76
200	259	136	84	40	3	0.82	0.89

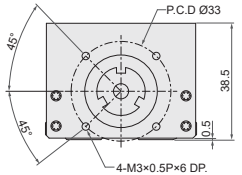
LMK50







SECTION A-A

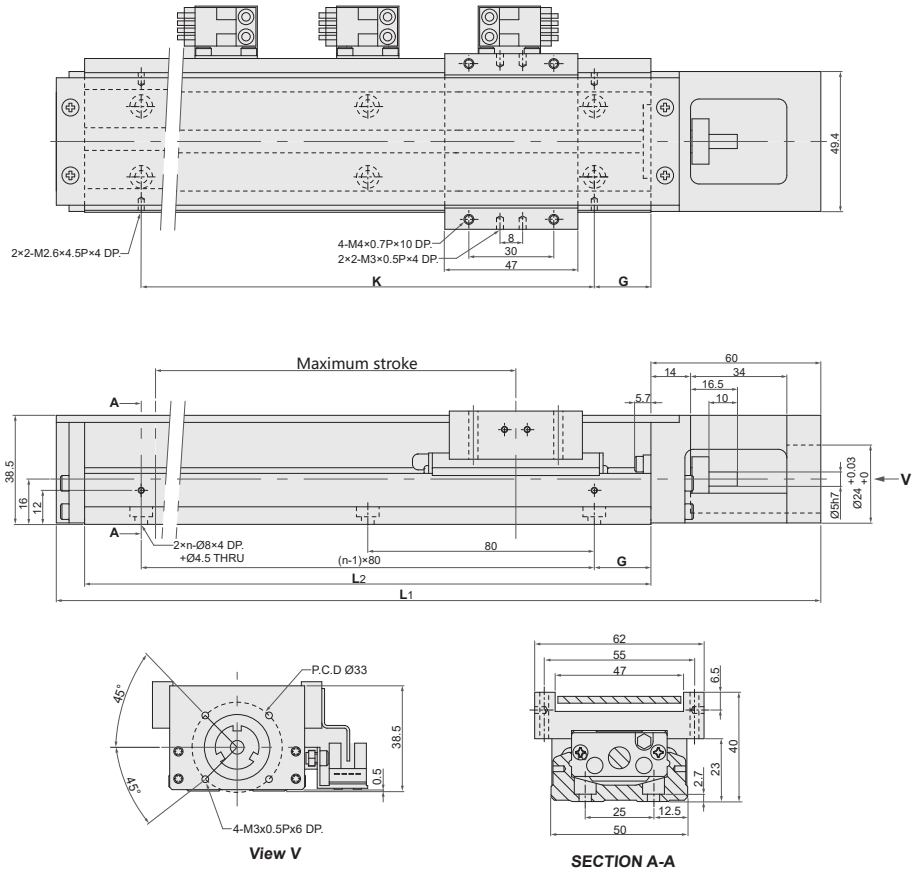


View V

Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	K (mm)	n	Weight (kg)	
		A1 slider	A2 slider				A1 slider	A2 slider
150	220	70	-	35	80	2	1	-
200	270	120	55	20	160	3	1.2	1.4
250	320	170	105	45	160	3	1.4	1.6
300	370	220	155	30	240	4	1.6	1.8

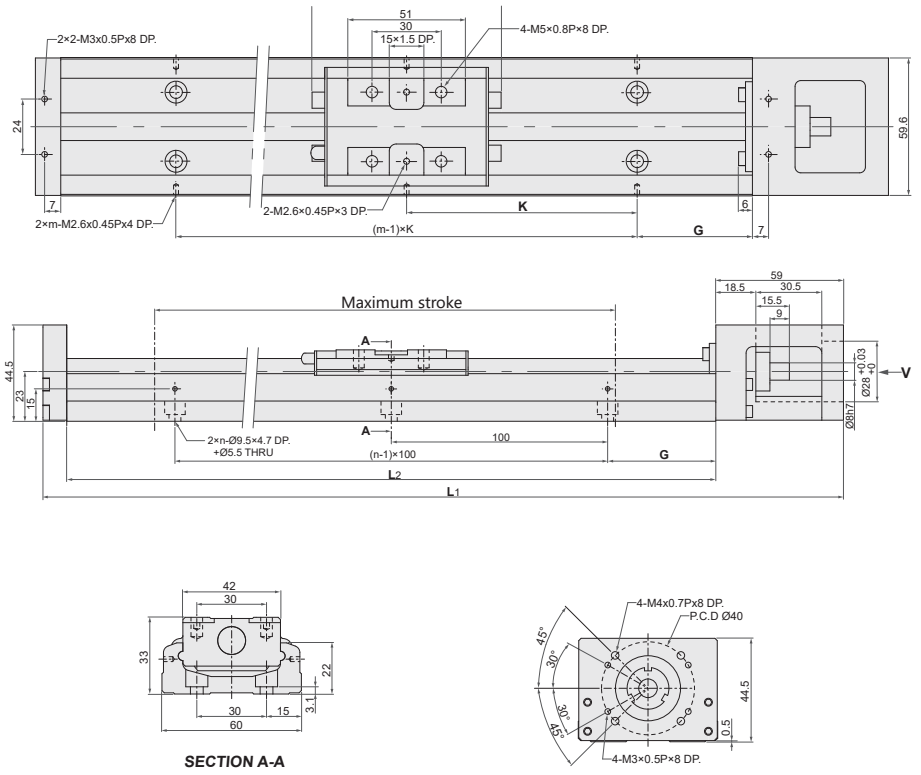
LMK50



Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	K (mm)	n	Weight (kg)	
		A1 slider	A2 slider				A1 slider	A2 slider
150	220	70	-	35	80	2	1.1	-
200	270	120	55	20	160	3	1.3	1.5
250	320	170	105	45	160	3	1.6	1.8
300	370	220	155	30	240	4	1.8	2.0

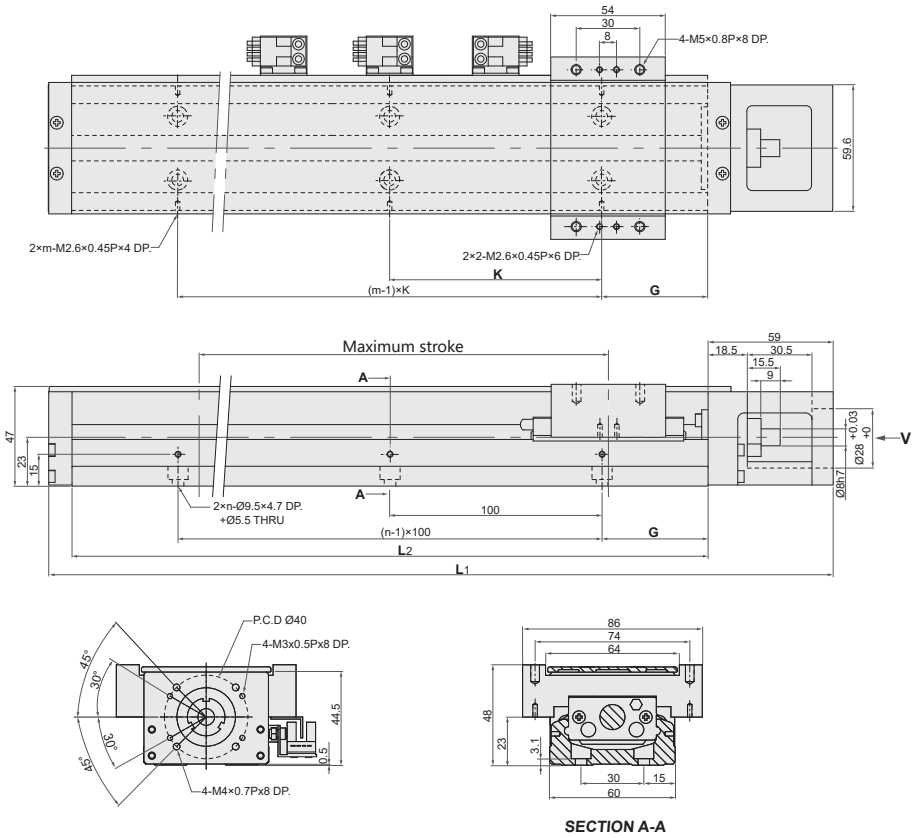
LMK60(D)



Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	K (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider					A1 slider	A2 slider
150	220	60	-	25	100	2	2	1.5	-
200	270	110	-	50	100	2	2	1.8	-
300	370	210	135	50	200	3	2	2.4	2.7
400	470	310	235	50	100	4	4	3	3.3
500	570	410	335	50	200	5	3	3.6	3.9
600	670	510	435	50	100	6	6	4.2	4.6

LMK60(D)

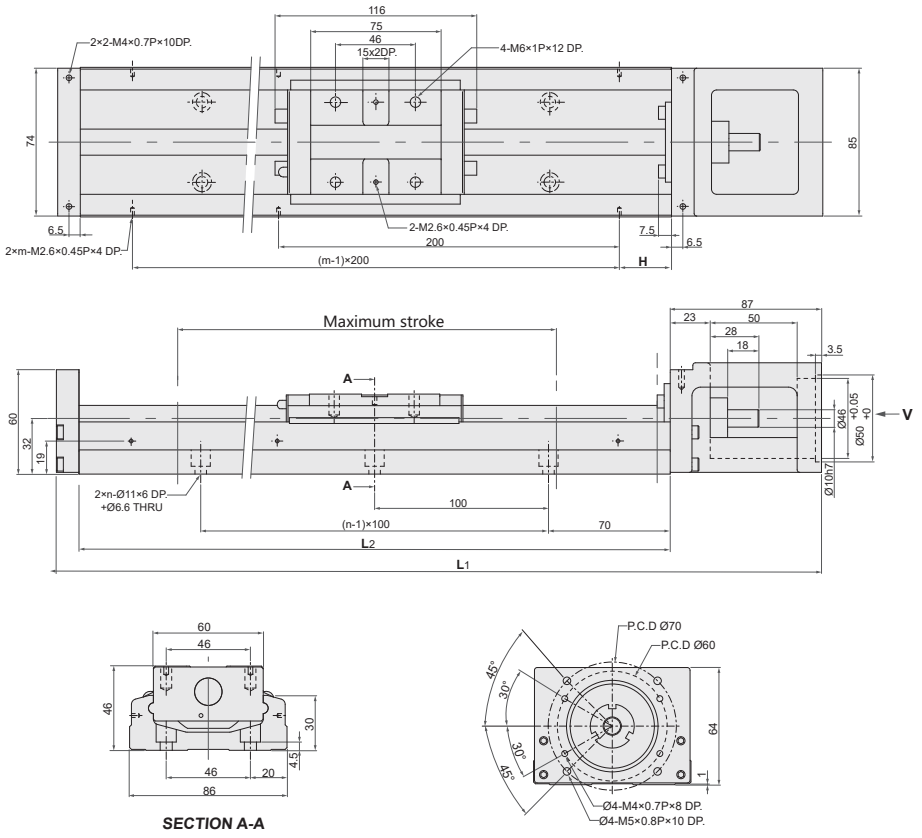


SECTION A-A

Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	K (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider					A1 slider	A2 slider
150	220	60	-	25	100	2	2	1.7	-
200	270	110	-	50	100	2	2	2.1	-
300	370	210	135	50	200	3	2	2.7	3
400	470	310	235	50	100	4	4	3.3	3.6
500	570	410	335	50	200	5	3	3.9	4.2
600	670	510	435	50	100	6	6	4.6	5

LMK86(D)

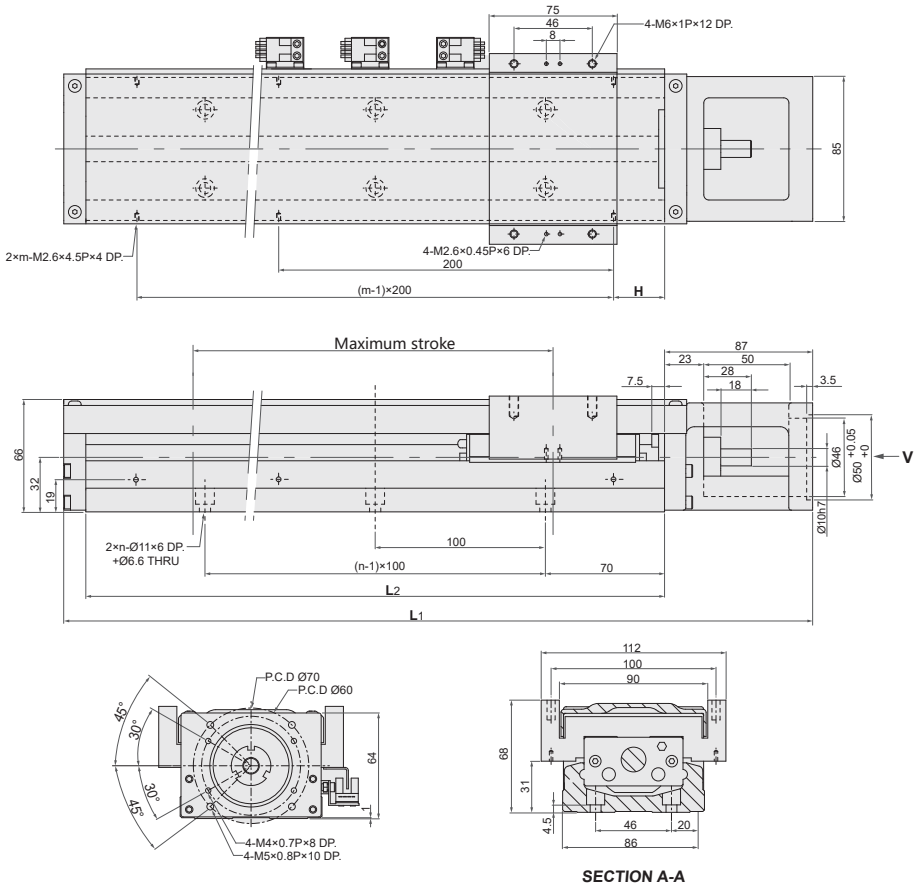


SECTION A-A

Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		H (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider				A1 slider	A2 slider
340	440	216.5	108.5	70	3	2	5.7	6.5
440	540	316.5	208.5	20	4	3	6.9	7.7
540	640	416.5	308.5	70	5	3	8	8.8
640	740	516.5	408.5	20	6	4	9.2	10
740	840	616.5	508.5	70	7	4	10.4	11.2
940	1040	816.5	708.5	70	9	5	11.6	12.4

LMK86(D)

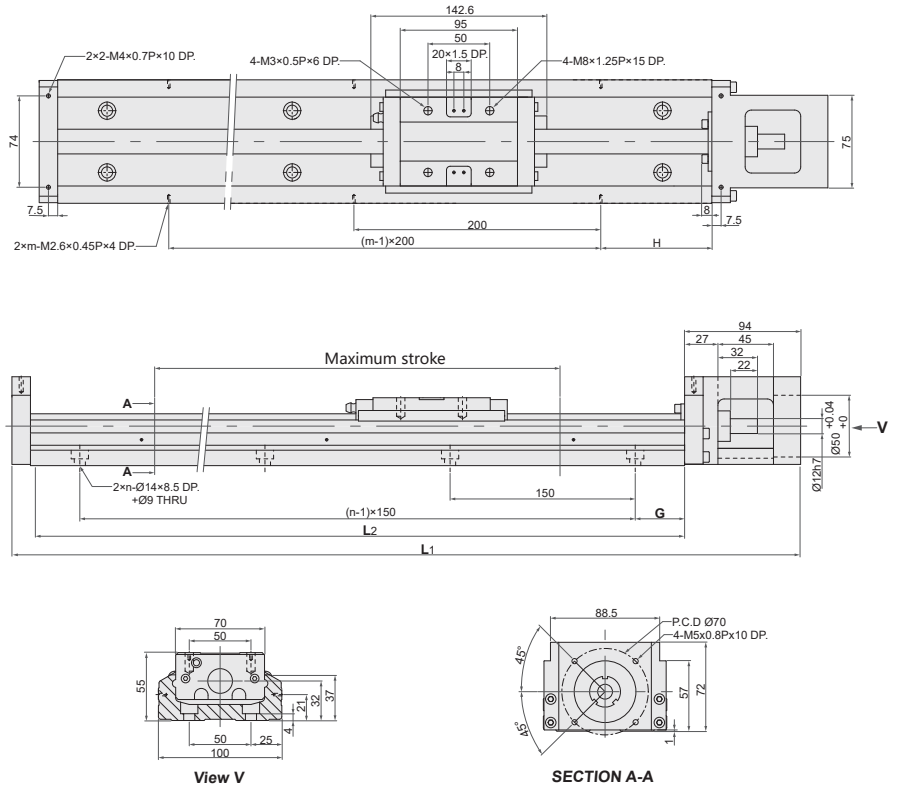


SECTION A-A

Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		H (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider				A1 slider	A2 slider
340	440	216.5	108.5	70	3	2	6.5	7.3
440	540	316.5	208.5	20	4	3	7.8	8.6
540	640	416.5	308.5	70	5	3	9	9.8
640	740	516.5	408.5	20	6	4	10.3	11.3
740	840	616.5	508.5	70	7	4	11.6	12.4
940	1040	816.5	708.5	70	9	5	13	13.8

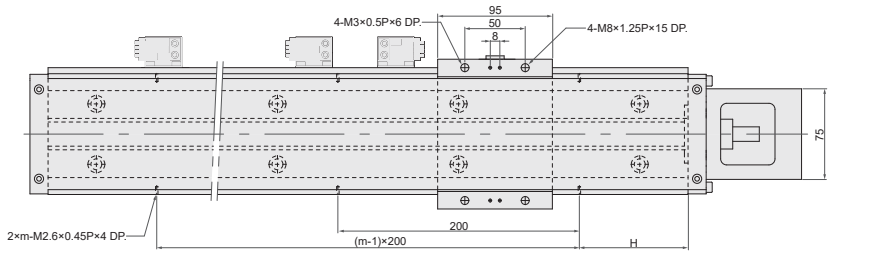
LMK100

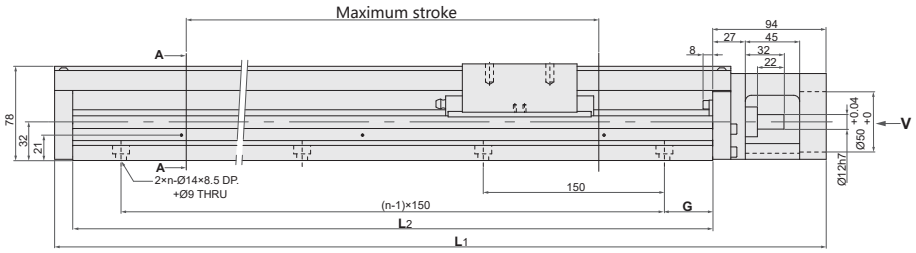


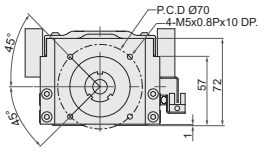
Unit (mm)

Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	H (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider					A1 slider	A2 slider
980	1089	828	700	40	90	7	5	18.6	20.3
1080	1189	928	800	15	40	8	6	20.3	22
1180	1289	1028	900	65	90	8	6	22	23.7
1280	1389	1128	1000	40	40	9	7	23.6	25.3
1380	1489	1228	1100	15	90	10	7	25.3	27

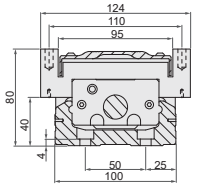
LMK100







View V



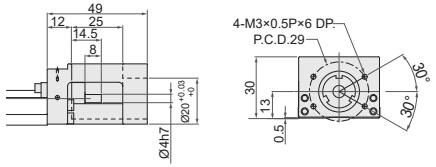
SECTION A-A

Unit (mm)

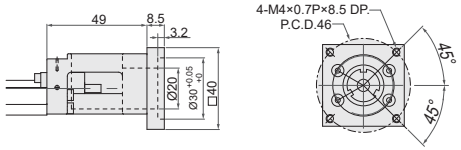
Rail lengthL2 (mm)	lengthL1 (mm)	Maximum stroke (mm)		G (mm)	H (mm)	n	m	Weight (kg)	
		A1 slider	A2 slider					A1 slider	A2 slider
980	1089	828	700	40	90	7	5	20.4	22.1
1080	1189	928	800	15	40	8	6	22.2	23.9
1180	1289	1028	900	65	90	8	6	24	25.7
1280	1389	1128	1000	40	40	9	7	25.7	27.4
1380	1489	1228	1100	15	90	10	7	27.5	29.2

LMK40 Connection flange

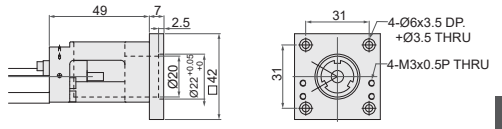
Motor connection seat F0



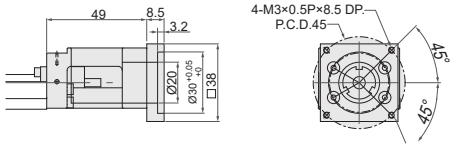
Motor connection flange F1



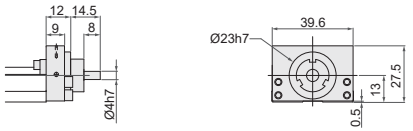
Motor connection flange F3



Motor connection flange F2

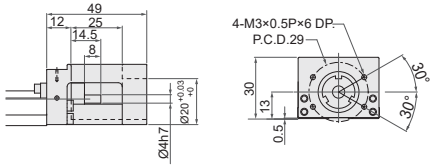


Transfer fixed seat H0

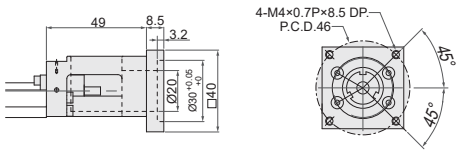


LMK50 Connection flange

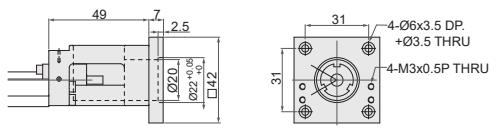
Motor connection seat F0



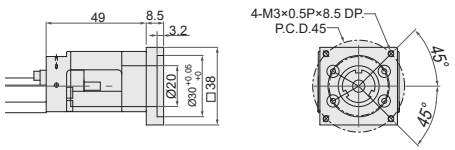
Motor connection flange F1



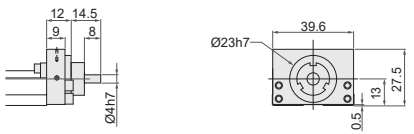
Motor connection flange F3



Motor connection flange F2

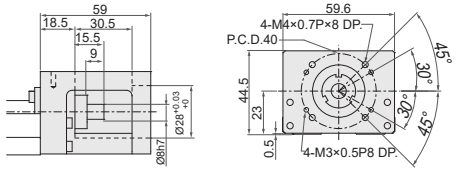


Transfer fixed seat H0

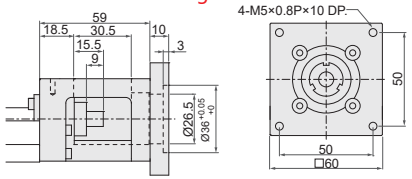


LMK60 Connection flange

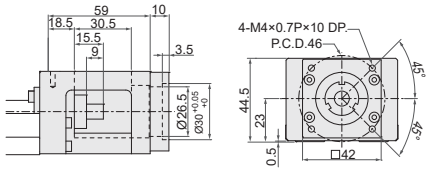
Motor connection seat F0



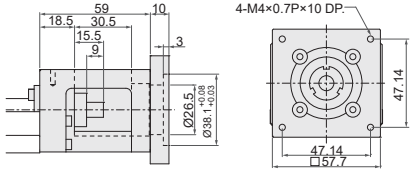
Motor connection flange F3



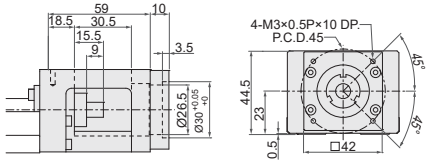
Motor connection flange F1



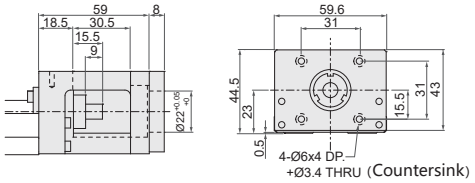
Motor connection flange F4



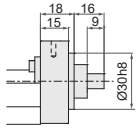
Motor connection flange F2

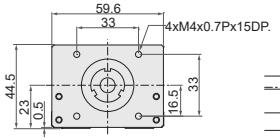


Motor connection flange F5

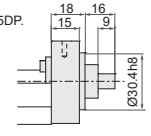


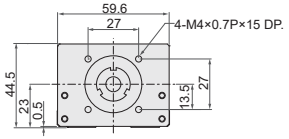
Transfer fixed seat H0





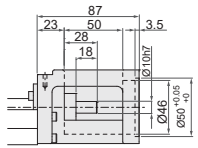
Transfer fixed seat H1

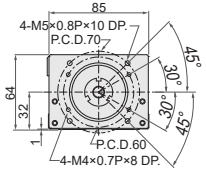




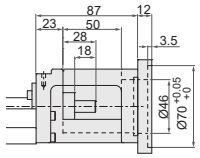
LMK86 Connection flange

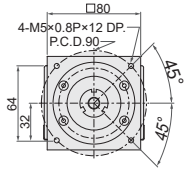
Motor connection seat F0



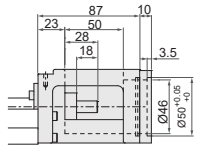


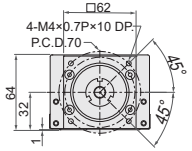
Motor connection flange F4



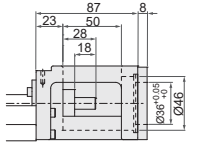


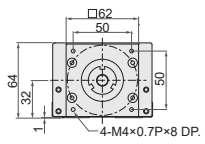
Motor connection flange F1



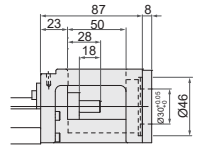


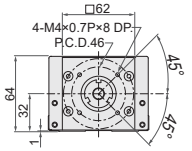
Motor connection flange F5



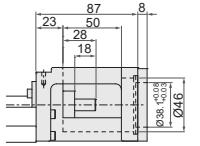


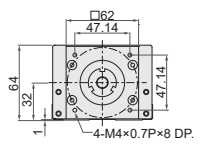
Motor connection flange F2



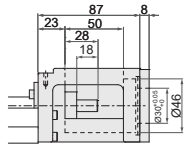


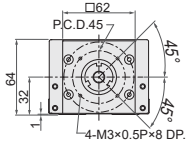
Motor connection flange F6



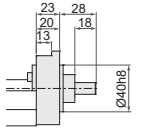


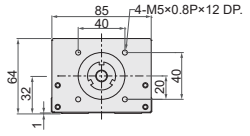
Motor connection flange F3





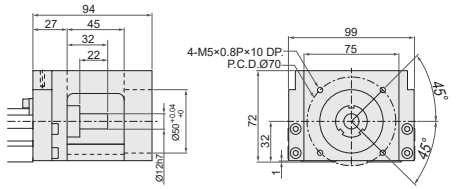
Transfer fixed seat H0



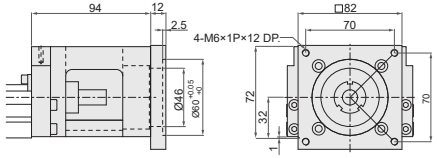


LMK100 Connection flange

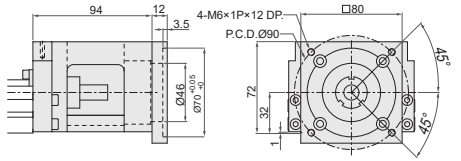
Motor connection seat F0



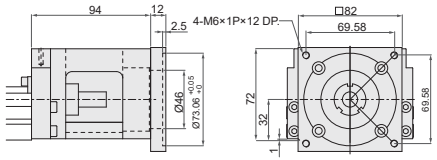
Motor connection flange F3



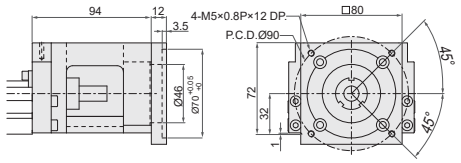
Motor connection flange F1



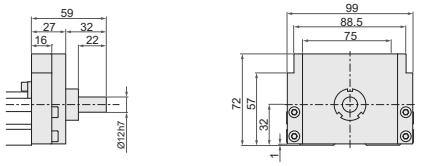
Motor connection flange F4



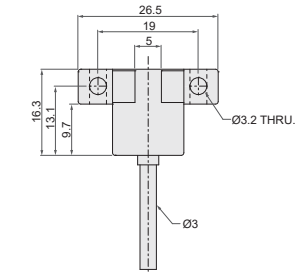
Motor connection flange F2



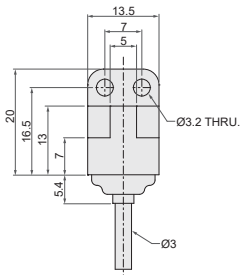
Transfer fixed seat H0



Limit switch



BS5-L1M



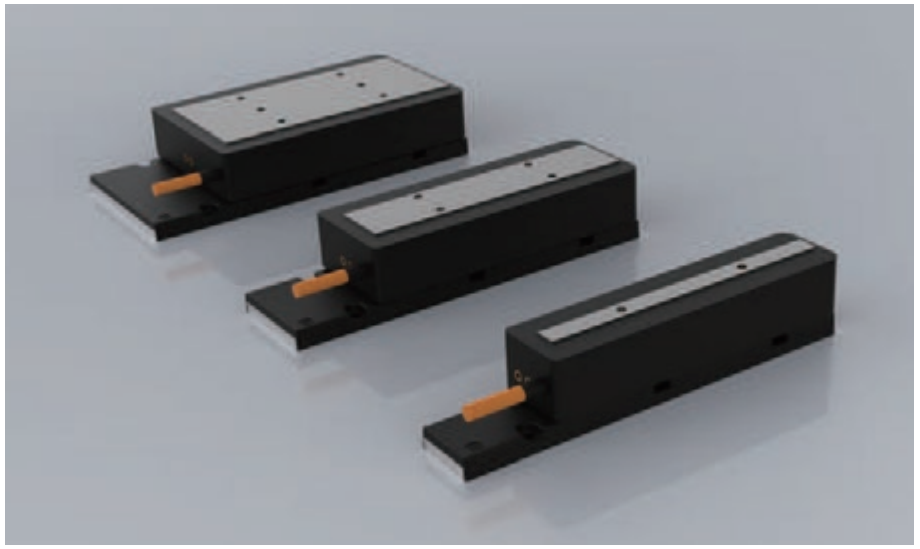
BS5-Y1M

MOTION TECHNOLOGY

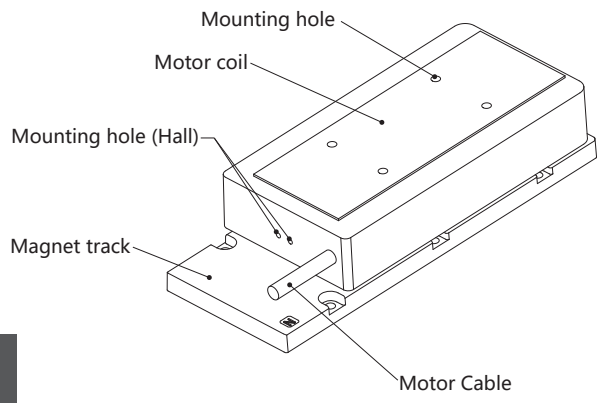
MELUCCI TECHNOLOGIES

Iron Core Linear Motor

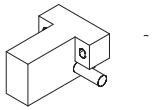
DPG series



Construction



Hall (optional)



Note: For reference only.

Characteristics

The DPG series belongs to the high-speed, high-thrust linear motors with high magnetic density. The magnetic tracks are integrally encapsulated, which prevents the magnets from performance degradation due to long-term temperature effects and also protects against the dangers of electrostatic sparks, making it more durable and safer.

- High speed up to 5m/s
- High force density
- Low speed fluctuation
- Smooth operation, no obvious frustration
- Provide accurate magnetic attraction
- Peak force: 87.7N~2000N
- Continuous thrust:25.3N~691.6N
- Itinerary be extended indefinitely
- Parameters are accurate and reliable
- Hall sensor is available

Applications

Machine Rools (CNC, etc.)
Industrial Robots
Semiconductor Manufacturing Equipment
Gantry dual drive system

Specifications

(1) Motor coil

DPG 35 C1

Series
DPG
Size
35, 45, 55, 65 , 75 , 95
Number of motor coils
C1, C2, C3, C4
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

(2) Magnet track

DPG 35 M128

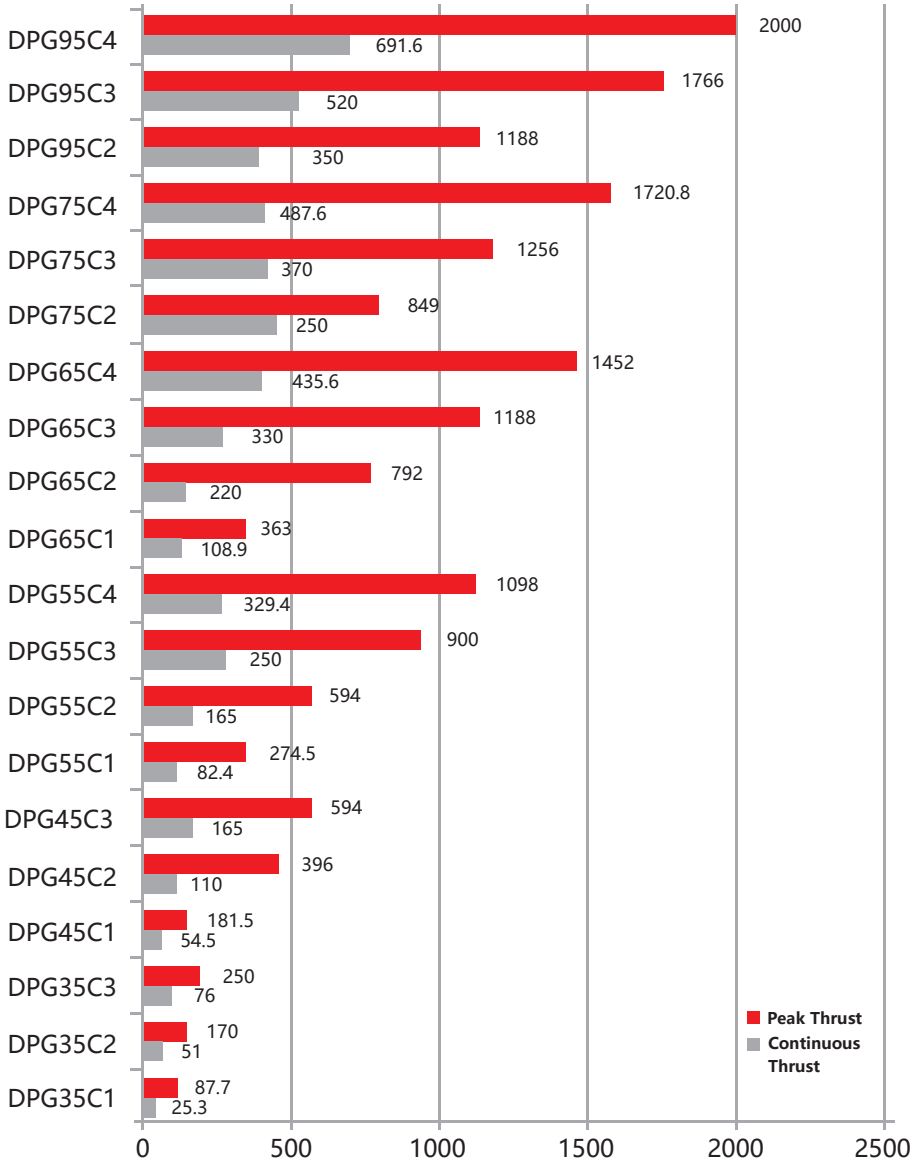
Series
DPG
Size
35, 45, 55, 65 , 75 , 95
Magnet track length
M128
M192
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

(3) Hall sensor

HA D PG

Series
HA: Code of hall
Motor type code
D: Direct drive motor
.....
Matching code
PG: DPG series
.....

Thrust



DPG Technical parameters

Performance	Unit	DPG35C1	DPG35C2	DPG35C3	DPG45C1	DPG45C2	DPG45C3	DPG55C1	DPG55C2	DPG55C3	DPG55C4
Peak Force(1 sec.)	N	87.7	170	250	181.5	396	594	274.5	594	900	1098
Continuous Force	N	25.3	51	76	54.5	110	165	82.4	165	250	329.4
Peak Power @25°C (1s)	W	751	1793	2252	935	1870	2805	1202	2283	3424	4566
Continuous Power @25°C	W	62	124	188	84	168	252	108	205	308	411
Electrical											
Peak Current (rms) (1s)	A	10	10	10	15	18	18	18	18	18	18
Continuous Current (rms)	A	3	3	3	5.5	5.5	5.5	5.8	5.8	5.8	5.8
Force Constant	N/A	8.4	17.0	25.0	12.1	22.0	33.0	16.5	33.0	50.0	65.9
Back EMF Constant (L-L)	V_{pk}/(m/s)	4.5	12.5	22.1	8.7	19.6	31.4	14.1	24.6	42.4	59.5
Resistance @25°C ((L-L)	Ohm	1.2	2.3	3.5	1.5	3	4.4	1.9	3.7	5.5	7.3
Inductance @1kHz ((L-L)	mH	4.7	11.2	16.5	5.2	15	24.7	10.6	22.2	32	42.6
Electrical Time Constant	ms	3.9	4.9	4.7	3.6	5.1	5.6	5.6	6.0	5.8	5.8
Max. DC BUS	V_{DC}	330									
Thermal											
Max. Coil Temperature	°C	120									
Thernal Resistance @105°C	°C/W	1.90	2.30	1.58	1.40	1.10	0.73	1.11	0.73	0.34	0.29
Mechanical											
Electrical Cycle Length	mm	32									
Coil Weight	kg	0.3	0.5	0.8	0.4	0.8	1.1	0.6	1.1	1.6	2
Attraction Force	kN	0.2	0.3	0.4	0.3	0.5	0.7	0.5	0.8	1.1	1.4
Track Weight	kg/m	1.6			2.2			2.9			
Cooling Type		Natural ail-cooling									

DPG Technical parameters

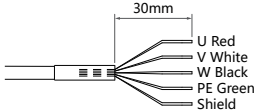
Performance	Unit	DPG65C1	DPG65C2	DPG65C3	DPG65C4	DPG75C2	DPG75C3	DPG75C4	DPG95C2	DPG95C3	DPG95C4
Peak Force(1 sec.)	N	363	792	1188	1452	849	1256	1720.8	1188	1766	2000
Continuous Force	N	108.9	220	330	435.6	250	370	487.6	350	520	691.6
Peak Power @25°C (1s)	W	1445	2600	4765	5200	3188	4782	6376	4038	6058	8077
Continuous Power @25°C	W	130	234	351	468	256	384	512	324	486	648
Electrical											
Peak Current (rms) (1s)	A	18	18	18	18	18	18	18	18	18	18
Continuous Current (rms)	A	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Force Constant	N/A	21.8	44.0	66	87	47	69.8	95.6	66	98	130.5
Back EMF Constant (L-L)	V_{pk}/(m/s)	15.4	35.8	51.9	78.5	41.2	68.5	97.2	48	72	98
Resistance @25°C ((L-L)	Ohm	2.3	4.6	6.4	8.7	4.9	7.6	9.8	6.4	8.9	12.8
Inductance @1kHz ((L-L)	mH	12.7	27.7	41.3	54	31.5	47.5	62.8	42.9	63.8	80.9
Electrical Time Constant	ms	5.6	6.1	6.4	6.2	6.5	6.2	6.4	6.7	7.2	6.3
Max. DC BUS	V_{DC}	330									
Thermal											
Max. Coil Temperature	°C	120									
Thernal Resistance @105°C	°C/W	0.92	0.55	0.3	0.26	0.41	0.27	0.23	0.32	0.22	0.19
Mechanical											
Electrical Cycle Length	mm	32									
Coil Weight	kg	0.7	1.4	1.9	2.5	1.6	2.3	3	2.1	3.1	4
Attraction Force	kN	0.6	1	1.4	1.8	1.3	1.8	2.3	1.8	2.5	3.2
Track Weight	kg/m	3.5			4.2			5.6			
Cooling Type		Natural ail-cooling									

*1.Please refer to the installation manual for the moving and stationary stators when installing the iron-core moving and stationary stators.

2.The default motor cable length is 0.5m unless otherwise specified.

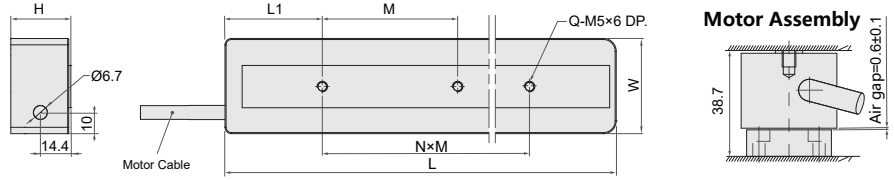
3.Do not pull or tug the motor cables.

4.The wire terminal treatment is as shown in the figure on the right. For special requirements, please contact CSK.



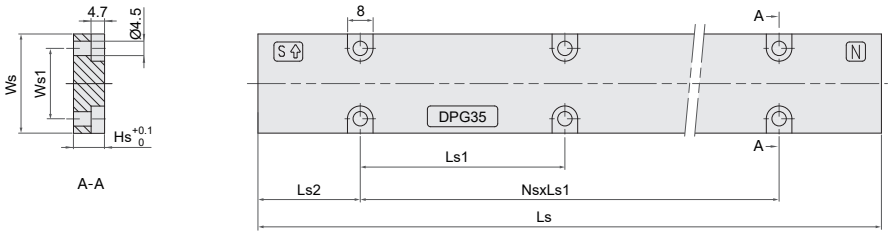
Dimensions of DPG35

(1) Dimensions of Motor Coil



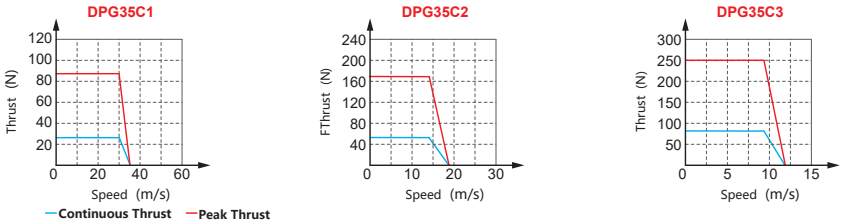
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG35C1	87	24.7	42.7	1	2	35	10	28.4
DPG35C2	151	46	64	1	2	35	10	28.4
DPG35C3	215	46	64	2	3	35	10	28.4

(2) Dimensions of Magnet Track



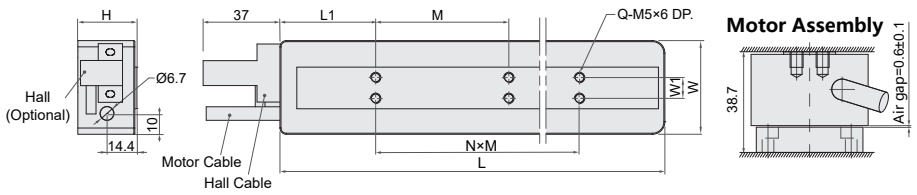
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG35M128	128	64	32	1	4	31	22	9.7
DPG35M192	192	64	32	2	6	31	32	9.7

(3) Thrust and speed



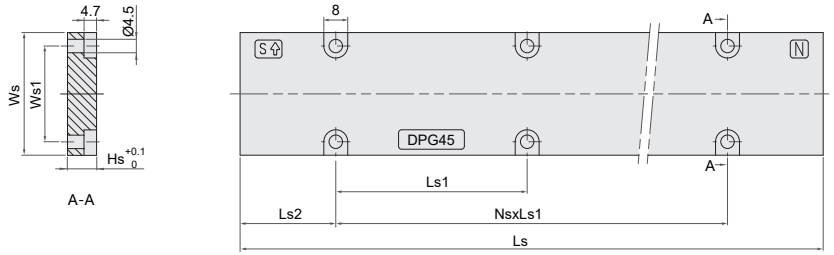
Dimensions of DPG45

(1) Dimensions of Motor Coil



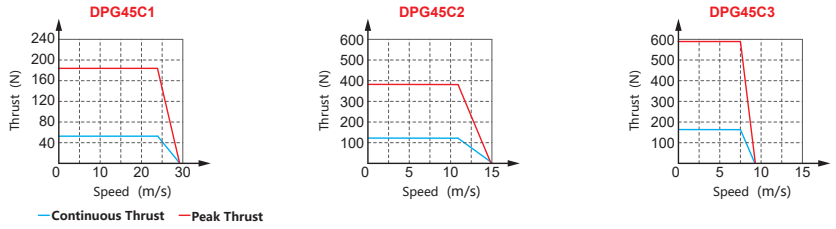
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG45C1	87	24.7	42.7	1	4	45	10	28.4
DPG45C2	151	46	64	1	4	45	10	28.4
DPG45C3	215	46	64	2	6	45	10	28.4

(2) Dimensions of Magnet Track



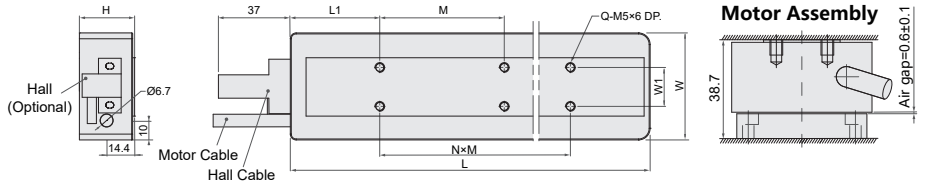
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG45M128	128	64	32	1	4	41	32	9.7
DPG45M192	192	64	32	2	6	41	32	9.7

(3) Thrust and speed



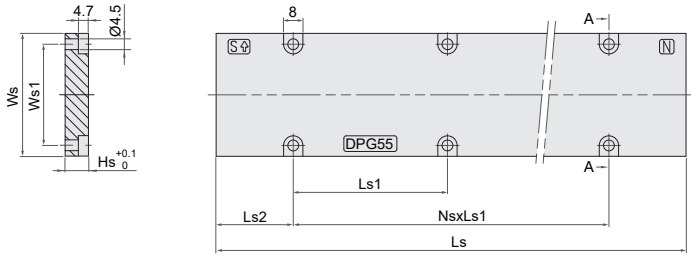
Dimensions of DPG55

(1) Dimensions of Motor Coil



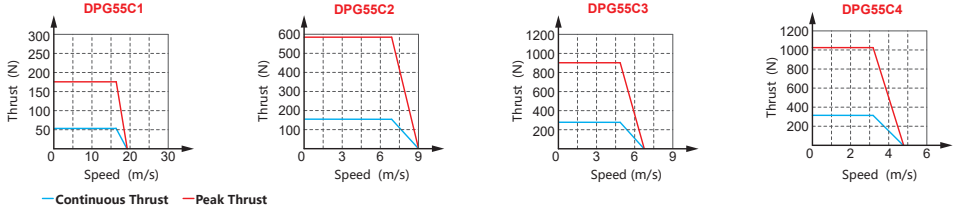
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG55C1	87	24.7	42.7	1	4	55	20	28.4
DPG55C2	151	46	64	1	4	55	20	28.4
DPG55C3	215	46	64	2	6	55	20	28.4
DPG55C4	279	46	64	3	8	55	20	28.4

(2) Dimensions of Magnet Track



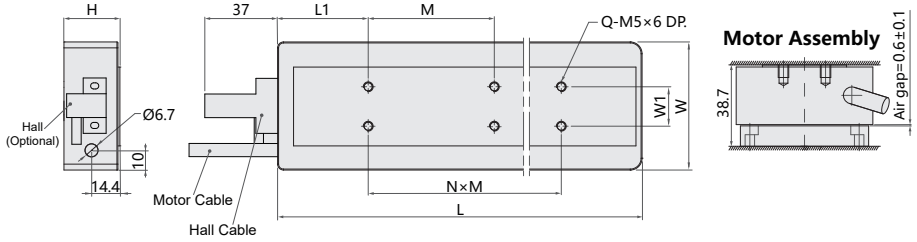
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG55M128	128	64	32	1	4	51	42	9.7
DPG55M192	192	64	32	2	6	51	42	9.7

(3) Thrust and speed



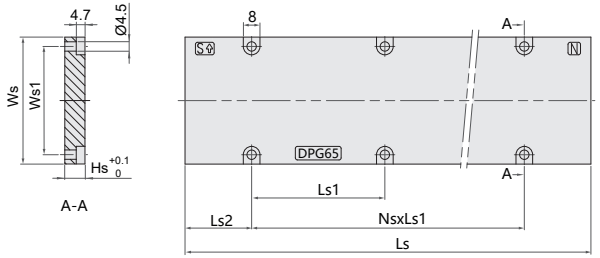
Dimensions of DPG65

(1) Dimensions of Motor Coil



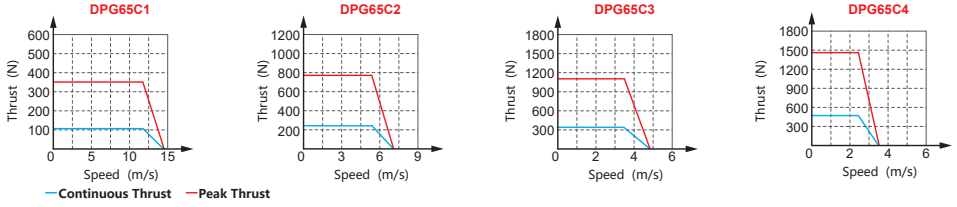
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG65C1	87	24.7	42.7	1	4	65	20	28.4
DPG65C2	151	46	64	1	4	65	20	28.4
DPG65C3	215	46	64	2	6	65	20	28.4
DPG65C4	279	46	64	3	8	65	20	28.4

(2) Dimensions of Magnet Track



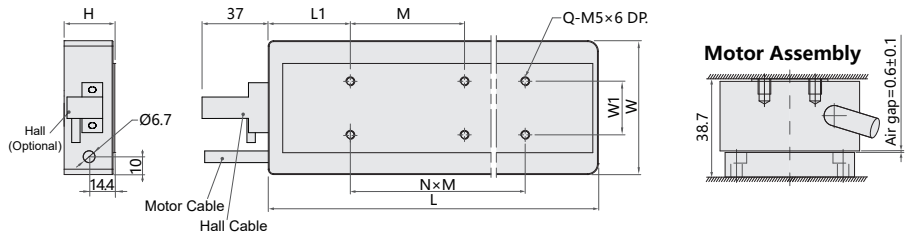
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG65M128	128	64	32	1	4	61	52	9.7
DPG65M192	192	64	32	2	6	61	52	9.7

(3) Thrust and speed



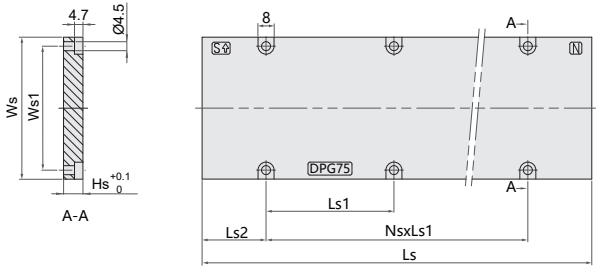
Dimensions of DPG75

(1) Dimensions of Motor Coil



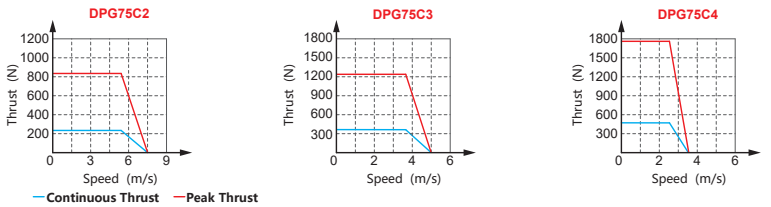
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG75C2	151	46	64	1	4	75	30	28.4
DPG75C3	215	46	64	2	6	75	30	28.4
DPG75C4	279	46	64	3	8	75	30	28.4

(2) Dimensions of Magnet Track



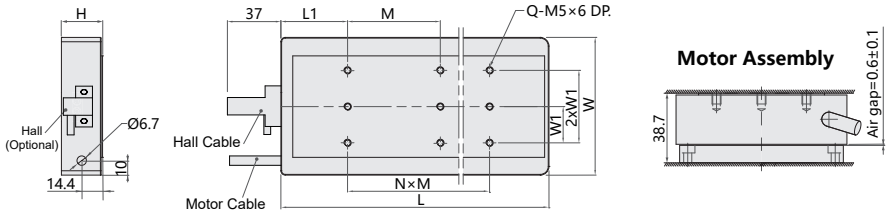
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG75M128	128	64	32	1	4	71	62	9.7
DPG75M192	192	64	32	2	6	71	62	9.7

(3) Thrust and speed



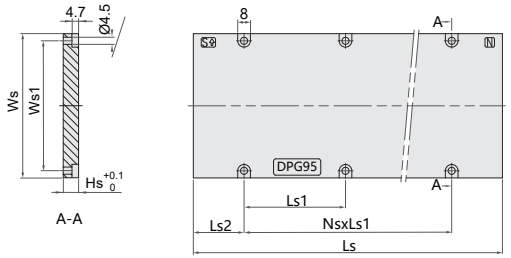
Dimensions of DPG95

(1) Dimensions of Motor Coil



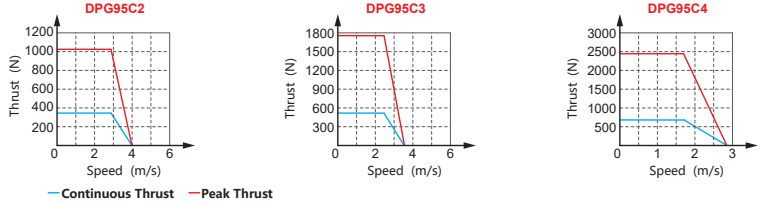
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPG95C2	151	46	64	1	4	95	25	28.4
DPG95C3	215	46	64	2	6	95	25	28.4
DPG95C4	279	46	64	3	8	95	25	28.4

(2) Dimensions of Magnet Track



Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPG95M128	128	64	32	1	4	91	82	9.7
DPG95M192	192	64	32	2	6	91	82	9.7

(3) Thrust and speed

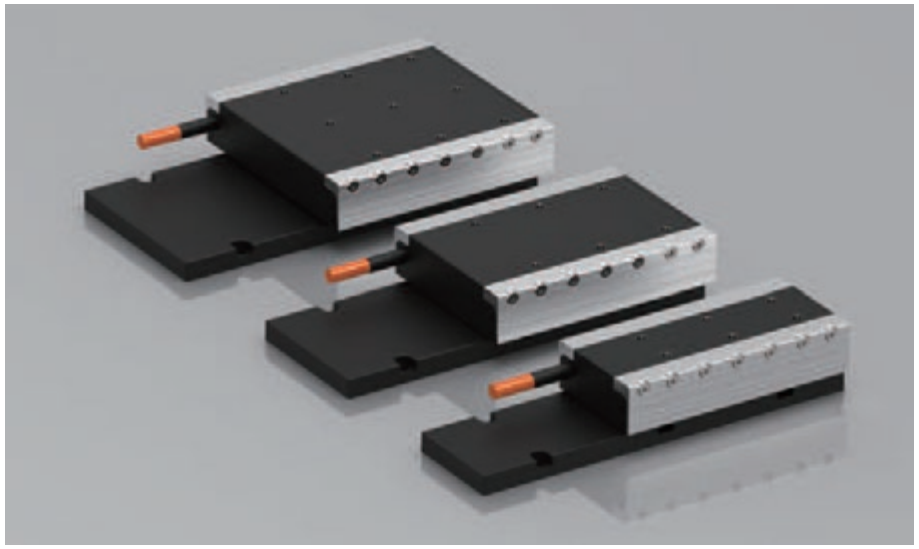


MOTION TECHNOLOGY

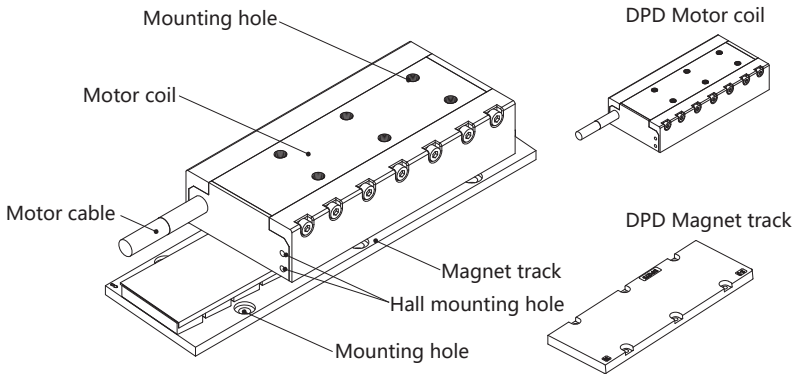
MELUCCI TECHNOLOGIES

Iron Core Linear Motor

DPD series (Standard)



Construction



Note: For reference only.

Characteristics

DPD series motors are ultra-thin linear motors with high force density and low cogging force. The linear motor of this series consists of motor coil and magnetic track. The motor coil can be combined to form a new ultra-thin high force motor. The length of magnetic track can be customized and the stroke can be selected.

- Ultra-thin
- High response
- Small end effects
- Low cogging force
- Precise magnetic attraction
- Peak force: 285N~2496N
- Continuous force: 95N~832N
- Maximum speed up to 8m/s
- Customization
- Hall sensor optional

Applications

Machine Tool (CNC, Lathe ···)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Injection Molding Machine ···)

Specifications

(1) Motor coil

DPD 56 C2 _

Series
DPD: Standard
Size
56, 86, 116
Number of motor coils
C2, C4, C6
Special symbol
No symbol: Standard
Special: No symbol, A, B... (For other requirements, please consult CSK)

(2) Magnet track

DPD 56 M120 _

Series
DPD: Standard
Size
56, 86, 116
Magnet track length
M120, M180, M300
Special symbol
No symbol: Standard
Special: No symbol, A, B... (For other requirements, please consult CSK)

(3) Hall sensor

HA D PD

Series
HA: Code of hall
Motor type code
D: Direct drive motor
.....
Matching code
PD: DPD series
.....

DPD Technical parameters

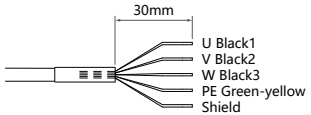
Performance	Unit	DPD56C2	DPD56C4	DPD56C6	DPD86C2	DPD86C4	DPD86C6	DPD116C2	DPD116C4	DPD116C6
Peak Force(1 sec.)	N	285	576	858	588	1092	1677	690	1620	2496
Continuous Force	N	95	192	286	196	364	559	230	540	832
Peak Power @25°C (1s)	W	285	576	858	588	1092	1677	690	1620	2496
Continuous Power @25°C	W	95	192	286	196	364	559	230	540	832
Electrical										
Peak Current (rms) (1s)	A	6.6	12.6	18.9	6.6	12.2	19.2	6.6	12.1	19.2
Continuous Current (rms)	A	2.2	4.2	6.3	2.2	4	6.4	2.2	4	6.4
Force Constant	N/A	43.2	45.7	45.4	89.1	91	87.3	104.5	135	130
Back EMF Constant (L-L)	V_{pk}/(m/s)	38.6	38.3	36.9	74.8	74.1	71.4	113.6	106.2	105.9
Resistance @25°C ((L-L)	Ohm	4.53	2.6	1.7	7.86	4.08	3.2	10.5	5.7	3.5
Inductance @1kHz ((L-L)	mH	21	11.46	7.4	41	20.1	13.5	65.46	29	21.87
Electrical Time Constant	ms	4.64	4.41	4.35	5.22	4.93	4.22	6.23	5.09	6.25
Max. DC BUS	V_{DC}	330								
Thermal										
Max. Coil Temperature	°C	120								
Thernal Resistance @105°C	°C/W	1.3	0.6	0.4	0.6	0.3	0.2	0.5	0.2	0.1
Mechanical										
Electrical Cycle Length	mm	30								
Coil Weight	kg	0.82	1.44	2.1	1.18	2.4	3.51	1.79	3.35	4.92
Attraction Force	kN	0.75	1.47	2.17	1.45	2.85	4.19	2.15	4.2	6.28
Track Weight	kg/m	3			5.3			9.5		
Cooling Type		Natural ail-cooling								

*1.Please refer to the installation manual for the moving and stationary stators when installing the iron-core moving and stationary stators.

2.The default motor cable length is 0.5m unless otherwise specified.

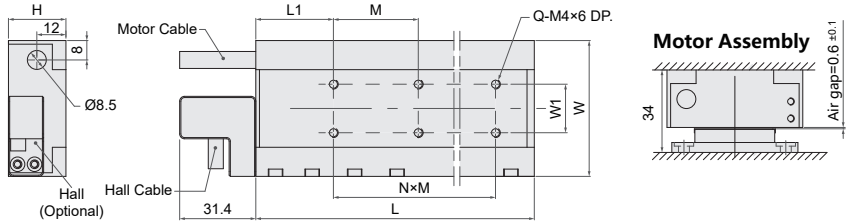
3.Do not pull or tug the motor cables.

4.The wire terminal treatment is as shown in the figure on the right. For special requirements, please contact CSK.



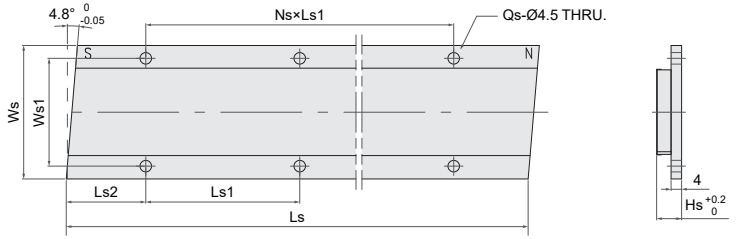
Dimensions of DPD56

(1) Dimensions of Motor Coil



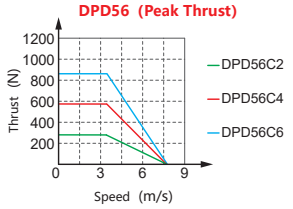
Coil SPC.	L	L1	M	N	Q	W	W1	H
DPD56C2	118	32	35	2	6	56	20	23.7
DPD56C4	223	32	35	5	12	56	20	23.7
DPD56C6	328	32	35	8	18	56	20	23.7

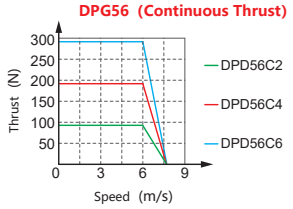
(2) Dimensions of Magnet Track



Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPD56M120	120	60	31	1	4	52	42	9.6
DPD56M180	180	60	31	2	6	52	42	9.6
DPD56M300	300	60	31	4	10	52	42	9.6

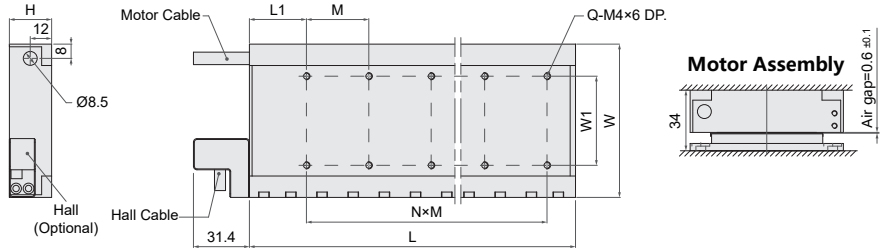
(3) Thrust and speed





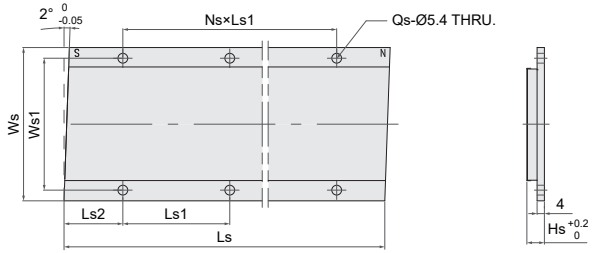
Dimensions of DPD86

(1) Dimensions of Motor Coil



Coil SPC.	L	L1	M	N	Q	W	W1	H
DPD86C2	118	32	35	2	6	86	50	23.7
DPD86C4	223	32	35	5	12	86	50	23.7
DPD86C6	328	32	35	8	18	86	50	23.7

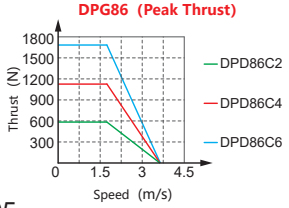
(2) Dimensions of Magnet Track



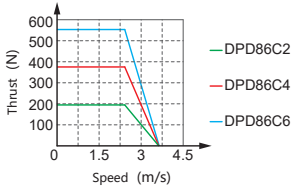
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPD86M120	120	60	31	1	4	86	74	9.6
DPD86M180	180	60	31	2	6	86	74	9.6
DPD86M300	300	60	31	4	10	86	74	9.6

(3) Thrust and speed

DPG86 (Peak Thrust)

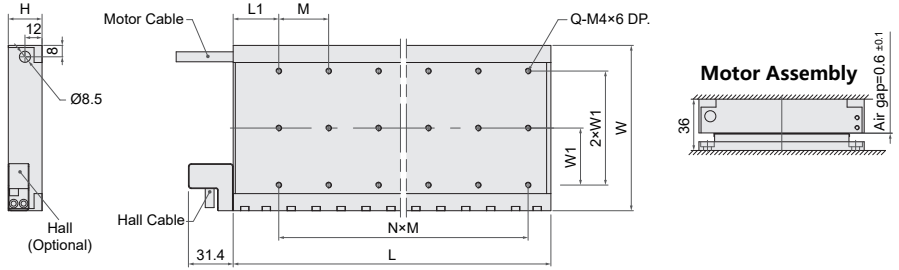


DPG86 (Continuous Thrust)



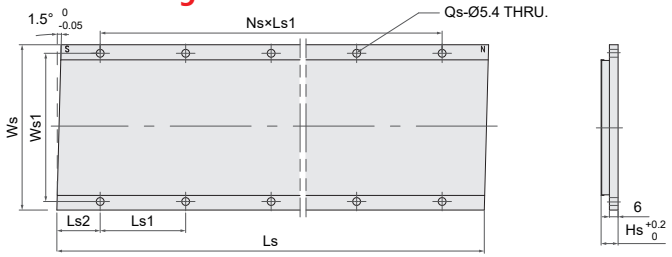
Dimensions of DPD116

(1) Dimensions of Motor Coil



Coil SPC.	L	L1	M	N	Q	W	W1	H
DPD116C2	118	32	35	2	9	116	40	23.7
DPD116C4	223	32	35	5	18	116	40	23.7
DPD116C6	328	32	35	8	27	116	40	23.7

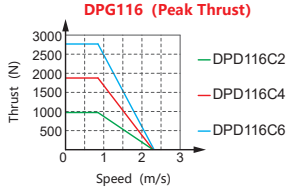
(2) Dimensions of Magnet Track



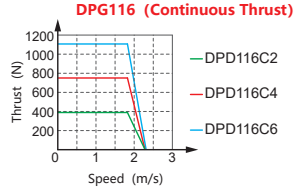
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs
DPD116M120	120	60	30.4	1	4	116	104	11.6
DPD116M180	180	60	30.4	2	6	116	104	11.6
DPD116M300	300	60	30.4	4	10	116	104	11.6

(3) Thrust and speed

DPG116 (Peak Thrust)

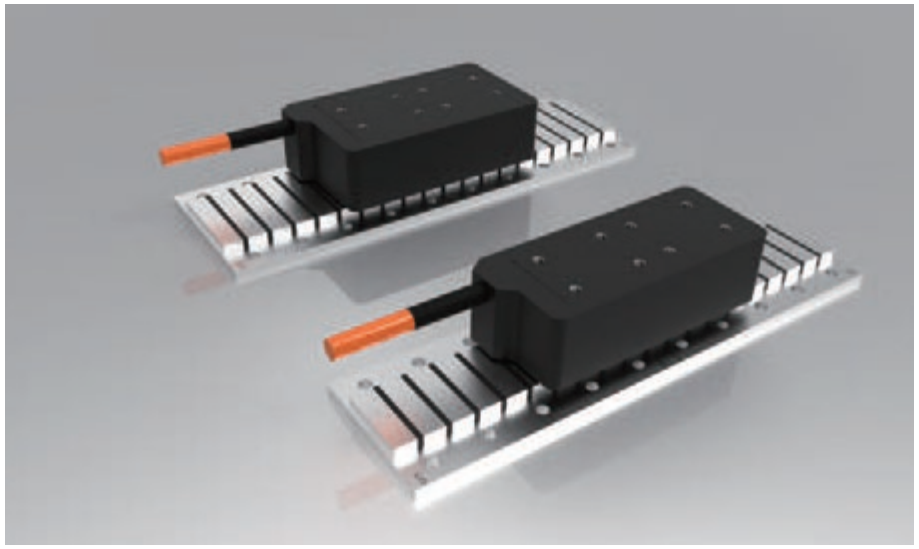


DPG116 (Continuous Thrust)

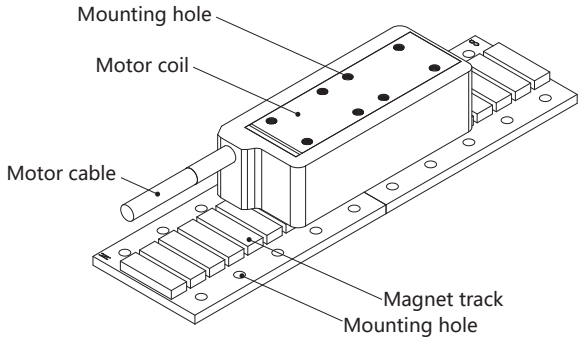


Iron Core Linear Motor

DPN series (Small size)



Construction



Note: For reference only.

Characteristics

DPN series motors are small linear motors with small size, high force and small magnetic attraction. The linear motor of this series consists of motor coil and magnetic track. The moving part can be a motor coil or a magnetic track, suitable for short stroke. These motors have the characteristics of high acceleration and high speed, which are suitable for testing industry.

- Small size
- High response
- Small end effects
- Low cogging force
- Precise magnetic attraction
- Peak force: 75N~240N
- Continuous force: 25N~80N
- Maximum speed up to 8m/s
- Customization
- Hall sensor optional

Applications

Machine Tool (CNC, Lathe ···)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Injection Molding Machine ···)

DPN

Specifications

(1) Motor coil

DPN 30 C2 _

Series
DPN: Small size
Size
30, 40
Number of motor coils
C2, C4
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

(2) Magnet track

DPN 30 M120 _

Series
DPN: Small size
Size
30, 40
Magnet track length
M120, M180, M300
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

DPN Technical parameters

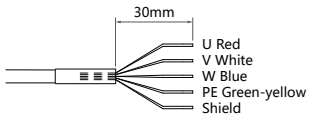
Performance	Unit	DPN30C2	DPN30C4	DPN40C2	DPN40C4
Peak Force (1s)	N	75	150	120	240
Continuous Force	N	25	50	40	80
Peak Power @25°C (1s)	W	56.3	112.5	90	180
Continuous Power @25°C	W	18.8	37.5	30	60
Electrical					
Peak Current (rms) (1s)	A	4.5	4.5	4.5	4.5
Continuous Current (rms)	A	1.5	1.5	1.5	1.5
Force Constant	N/A	16.67	33.33	26.67	53.33
Back EMF Constant (L-L)	V_{pk}/(m/s)	29.13	58.26	43.5	86.8
Resistance @25°C (L-L)	Ohm	14.71	29.41	20.5	36
Inductance @1kHz (L-L)	mH	22.06	60.47	47.9	86.8
Electrical Time Constant	ms	1.5	2.06	2.34	2.41
Max. DC BUS	V_{DC}	300			
Thermal					
Max. Coil Temperature	°C	120			
Thernal Resistance @105°C	°C/W	6.4	3.2	4	2
Mechanical					
Electrical Cycle Length	mm	15			
Coil Weight	kg	0.09	0.18	0.12	0.24
Attraction Force	kN	0.2	0.4	0.3	0.56
Track Weight	kg/m	1.35		1.68	
Cooling Type		Natural ail-cooling			

*1.Please refer to the installation manual for the moving and stationary stators when installing the iron-core moving and stationary stators.

2.The default motor cable length is 0.5m unless otherwise specified.

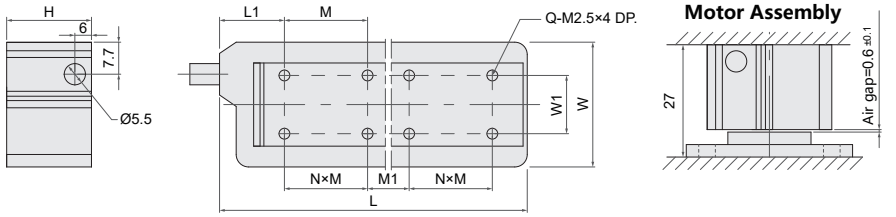
3.Do not pull or tug the motor cables.

4.The wire terminal treatment is as shown in the figure on the right. For special requirements, please contact CSK.



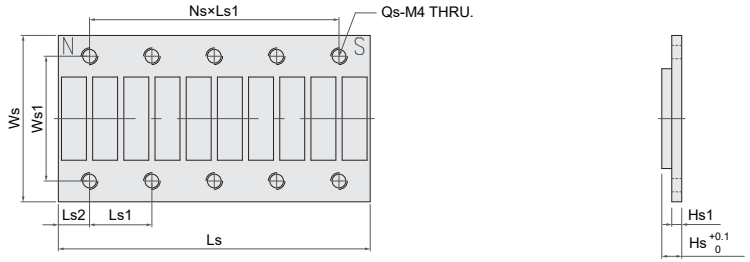
Dimensions of DPN30

(1) Dimensions of Motor Coil



Coil SPC.	L	L1	M	M1	N	Q	W	W1	H
DPN30C2	74	15.6	20	10	1	8	30	14	20.4
DPN30C4	134	15.6	20	30	2	12	30	14	20.4

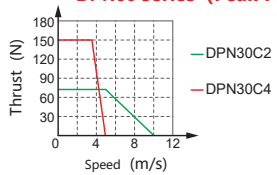
(2) Dimensions of Magnet Track



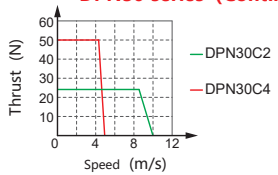
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs	Hs1
DPN30M120	120	15	7.5	7	16	40	30	6	3
DPN30M180	180	15	7.5	11	24	40	30	6	3
DPN30M300	300	15	7.5	19	40	40	30	6	3

(3) Thrust and speed

DPN30 series (Peak Force)

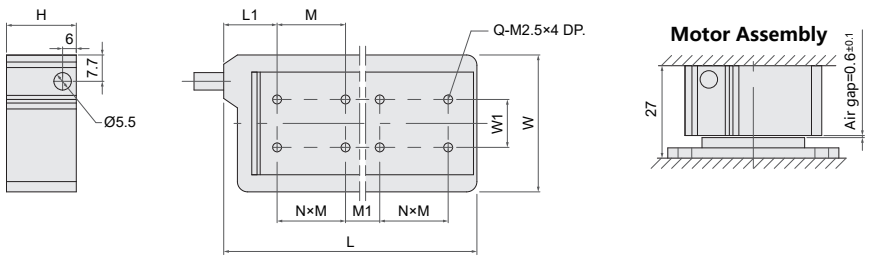


DPN30 series (Continuous Thrust)



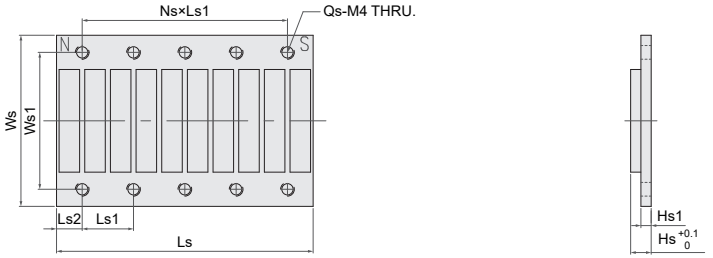
Dimensions of DPN40

(1) Dimensions of Motor Coil



Coil SPC.	L	L1	M	M1	N	Q	W	W1	H
DPN40C2	74	15.6	20	10	1	8	40	14	20.4
DPN40C4	134	15.6	20	30	2	12	40	14	20.4

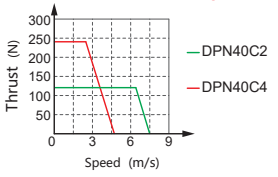
(2) Dimensions of Magnet Track



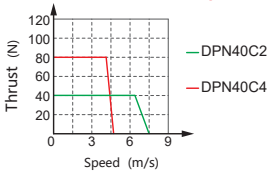
Magnet Track SPC.	Ls	Ls1	Ls2	Ns	Qs	Ws	Ws1	Hs	Hs1
DPN40M120	120	15	7.5	7	16	50	40	6	3
DPN40M180	180	15	7.5	11	24	50	40	6	3
DPN40M300	300	15	7.5	19	40	50	40	6	3

(3) Thrust and speed

DPN40 series (Peak Thrust)

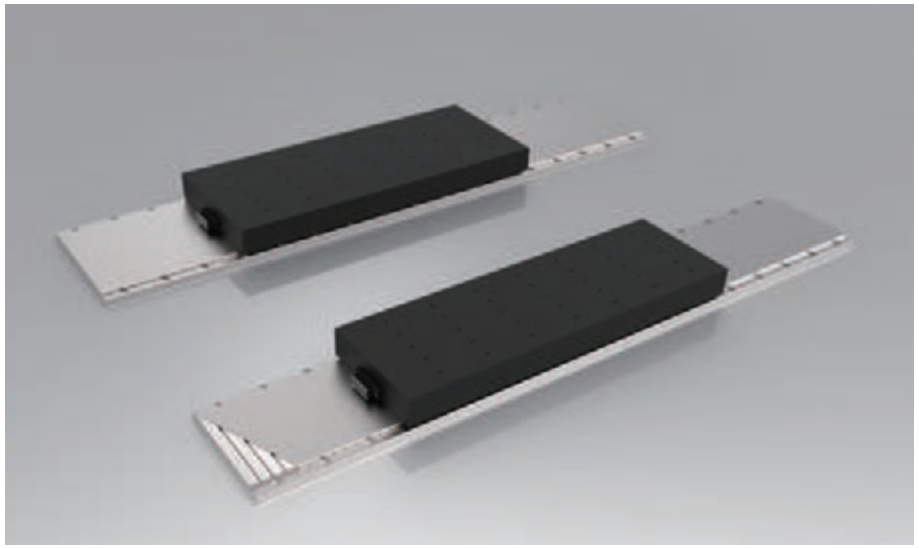


DPN40 series (Continuous Thrust)

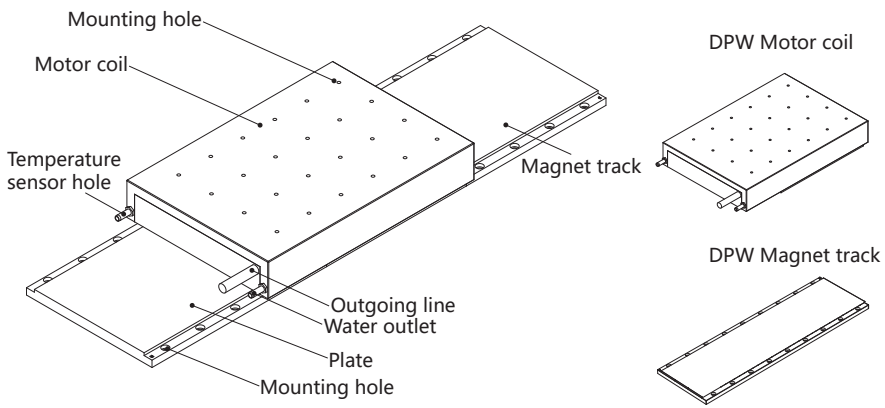


Iron Core Linear Motor

DPW-F series (Heavy load water cooling)



Construction



Note: For reference only.

Characteristics

DPWF series motors are high force flat plate linear motors with high load, more than 1KN of force. The linear motor of this series consists of motor coil and magnetic track. These motors have the characteristics of low speed, high force and high load, which are suitable for large equipment and high load conditions.

- The force is more than 1KN
- High load capacity
- Suitable for low speed operation
- Peak force: 1960.4N~7861N
- Continuous force: 1023.6N~3931.2N
- Customization

Applications

Machine Tool (CNC, EDM ···)
Laser industry
Logistics handling
Other (Gantry double drive system ···)

DPW

Specifications

(1) Motor coil

DPW 180 C4 F

Series
DPW: High force
Size
180, 230
Number of motor coils
C4, C8, C12, C16
water cooling
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

(2) Magnet track

DPW 180 M256

Series
DPW: High force
Size
180, 230
Magnet track length
M256, M320
Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

DPW Technical parameters

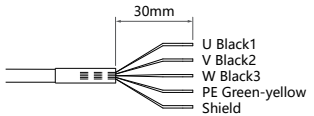
Performance	Unit	DPW180C4F	DPW180C8F	DPW180C12F	DPW180C16F	DPW230C4F	DPW230C8F	DPW230C12F	DPW230C16F
Peak Force(1 sec.)	N	3040	5416	6912	9031	4121	7250	8743	10621
Continuous Force	N	1580	2844	3595	4511	2060	3816	4670	5556
Electrical									
Peak Current (rms) (1s)	A	16	32	48	64	16	32	48	64
Continuous Current (rms)	A	8	16	24	32	8	16	24	32
Force Constant	N/A	197.5	177.8	149.8	141	257.5	238.5	194.6	173.6
Back EMF Constant (L-L)	V_{pk}/(m/s)	190	120.2	153.5	122	251.1	160.7	203	162.7
Resistance @25°C (L-L)	Ohm	7.78	3.89	2.9	1	10.1	5.04	3.36	2.52
Inductance @1kHz (L-L)	mH	100.5	51.25	33.1	15.3	134	68.4	50.2	29.8
Electrical Time Constant	ms	12.9	13.2	11.4	15.3	13.3	13.6	14.9	11.8
Max. DC BUS	V_{DC}	330							
Thermal									
Max. Coil Temperature	°C	120							
Thernal Resistance @105°C	°C/W	0.11	0.04	0.04	0.03	0.1	0.04	0.03	0.02
Mechanical									
Electrical Cycle Length	mm	32							
Coil Weight	kg	6.8	13.5	20.2	27	8.5	16.9	25.3	33.7
Attraction Force	kN	4.93	9.98	14.97	19.9	6.5	13.3	19.95	26.5
Track Weight	kg/m	20.9				26.3			
Cooling Type		Natural ail-cooling							

*1.Please refer to the installation manual for the moving and stationary stators when installing the iron-core moving and stationary stators.

2.The default motor cable length is 0.5m unless otherwise specified.

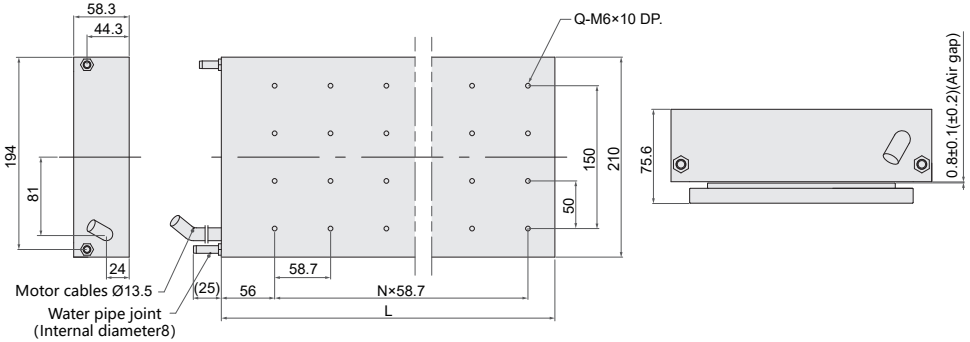
3.Do not pull or tug the motor cables.

4.The wire terminal treatment is as shown in the figure on the right. For special requirements, please contact CSK.

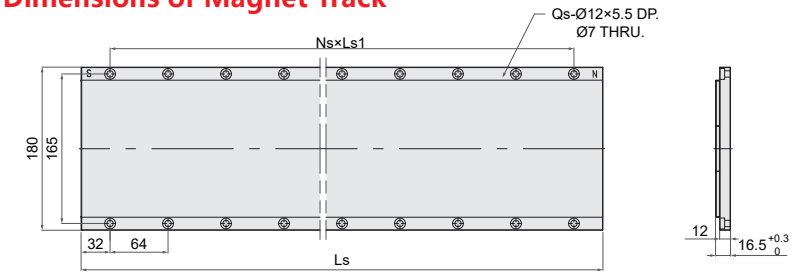


Dimensions of DPW180

(1) Dimensions of Motor Coil



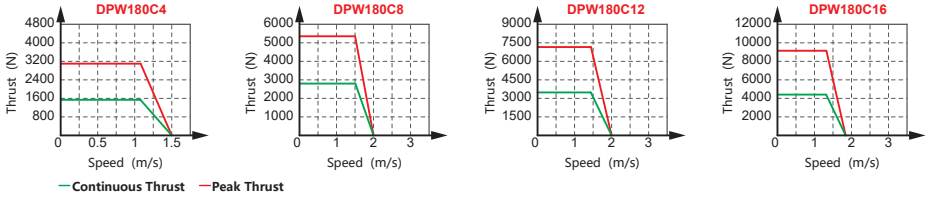
(2) Dimensions of Magnet Track



Coil SPC.	L	N	Q
DPW180C4F	202	2	12
DPW180C8F	378	5	24
DPW180C12F	554	8	36
DPW180C16F	730	11	48

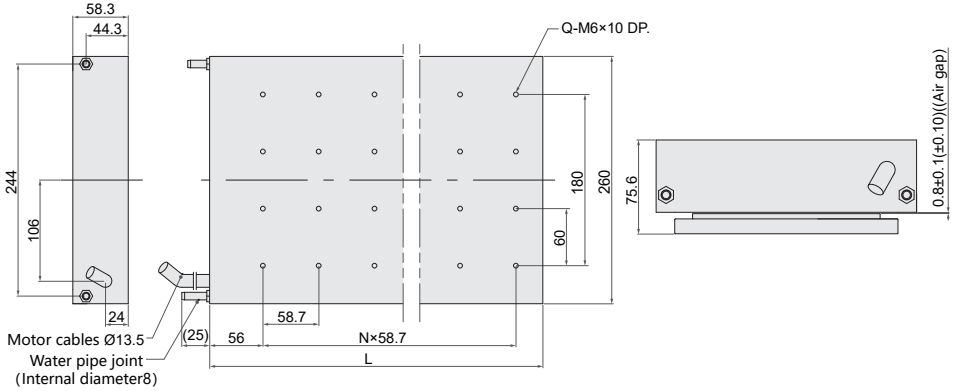
Magnet Track SPC.	Ls	Ns	Qs
DPW180M256	256	3	8
DPW180M320	320	4	10

(3) Thrust and speed

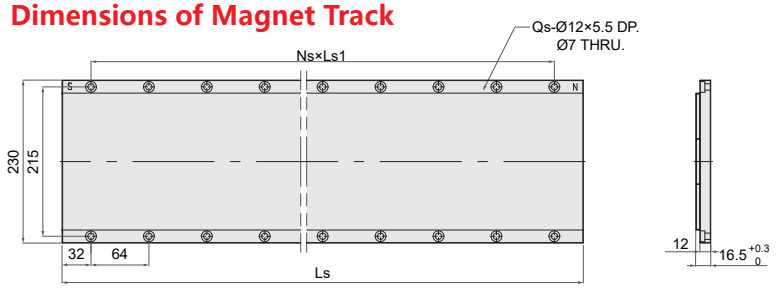


Dimensions of DPW230

(1) Dimensions of Motor Coil



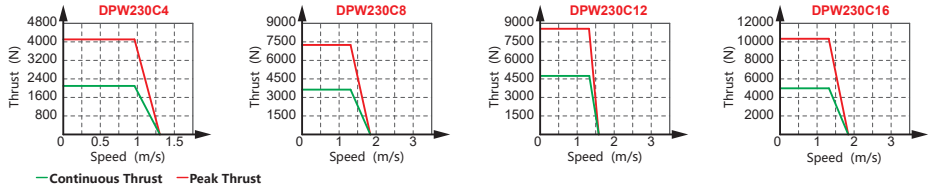
(2) Dimensions of Magnet Track



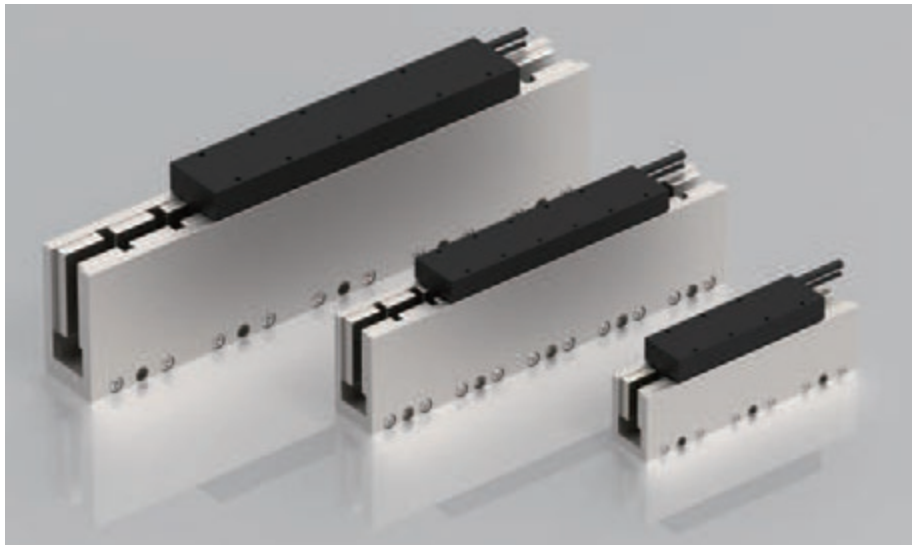
Coil SPC.	L	N	Q
DPW230C4F	202	2	12
DPW230C8F	378	5	24
DPW230C12F	554	8	36
DPW230C16F	730	11	48

Magnet Track SPC.	Ls	Ns	Qs
DPW230M256	256	3	8
DPW230M320	320	4	10

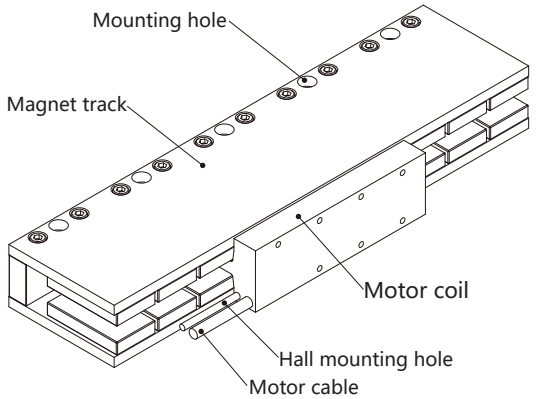
(3) Thrust and speed



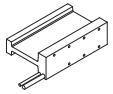
Ironless Linear Motor
DUF series



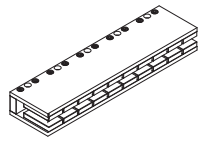
Construction



DUF Motor coil



DUF Magnet track



Note: For reference only.

Characteristics

DUF series motors are ironless linear motors with no cogging force and low speed fluctuation .The linear motor of this series consists of motor coil and magnetic track. There is no attractive force between motor coil and magnet track during assembly. Without cogging force, they have excellent dynamic performance and can meet the demand of low speed fluctuation.

- No attractive force
- No cogging force
- Low speed fluctuation
- High response
- Small end effects
- Peak force: 226.4N~10510N
- Continuous force: 41.2N~1501N
- Customization

Applications

Machine Tool (CNC, Lathe ···)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Injection Molding Machine ···)

DUF

Specifications

(1) Motor coil

DUF 3 C2 P

Series
DUF: Ironless Linear Motor
Size
3, 4, 5, 6
Number of motor coils
C1, C2, C3, C4, C5
Special symbol
No symbol: series
P: parallel
Special: No symbol, A, B ... (For other requirements, please consult CSK)

(2) Magnet track

DUF 3 M120

Series
DUF: Ironless Linear Motor
Size
3, 4, 5, 6
Magnet track length
M120, M180·····
Special symbol
No symbol: CSK Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

Technical parameters

Performance	Unit	DUF3C1	DUF3C2	DUF3C3	DUF4C1	DUF4C2	DUF4C3	DUF4C4	DUF4C4P	DUF4C5	DUF4C5P	DUF4C6P
Peak Force(1 sec.)	N	226.4	452.8	679	333.2	666.4	999.6	1332.8	1332.8	1666	1666	1999
Continuous Force	N	41.2	82.3	123.5	66.6	133.3	199.9	266.6	266.6	333.2	333.2	399.8
Electrical												
Peak Current (rms) (1s)	A	11.55	11.55	11.55	14	14	14	14	28	14	28	28
Continuous Current (rms)	A	2.1	2.1	2.1	2.8	2.8	2.8	2.8	5.6	2.8	5.6	5.6
Force Constant	N/A	19.6	39.2	58.8	23.8	47.6	71.4	95.2	47.6	119	59.5	71.4
Back EMF Constant (L-L)	V_{pk}/(m/s)	15.99	31.99	47.98	19.42	38.84	58.26	77.68	38.84	97.1	48.55	58.26
Resistance @25°C ((L-L)	Ohm	3.7	7.4	11.1	5.03	10.07	15.1	20.13	5.03	25.17	6.04	7.55
Inductance @1kHz ((L-L)	mH	2.3	4.6	6.9	5.18	10.37	15.55	20.74	4.93	25.92	5.92	7.78
Electrical Time Constant	ms	0.62	0.62	0.62	1.03	1.03	1.03	1.03	0.98	1.03	0.98	1.03
Max. DC BUS	V_{DC}	330										
Thermal												
Max. Coil Temperature	°C	100										
Thernal Resistance @105°C	°C/W	2.37	1.18	0.79	0.98	0.49	0.33	0.24	0.24	0.2	0.2	0.16
Mechanical												
Electrical Cycle Length	mm	60										
Coil Weight	kg	0.34	0.45	0.68	0.34	0.65	0.95	1.3	1.3	1.58	1.58	1.75
Attraction Force	kN	0										
Track Weight	kg/m	8.75			14.72							
Cooling Type		Natural ail-cooling										

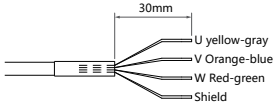
Technical parameters

Performance	Unit	DUF5C2	DUF5C2P	DUF5C3	DUF5C3P	DUF5C4	DUF5C4P	DUF5C5	DUF5C5P	DUF6C4	DUF6C8
Peak Force(1 sec.)	N	1825.2	1825.2	2737.8	2737.8	3650.4	3650.4	4563	4563	5040	10510
Continuous Force	N	280.8	280.8	421.2	421.2	561.6	561.6	702	702	720	1501
Electrical											
Peak Current (rms) (1s)	A	19.5	39	19.5	39	19.5	39	19.5	39	72.8	72.8
Continuous Current (rms)	A	3	6	3	6	3	6	3	6	10.4	10.4
Force Constant	N/A	93.6	46.8	140.4	70.2	187.2	93.6	234	117	69.3	144.38
Back EMF Constant (L-L)	V_{pk}/(m/s)	76.38	38.17	114.57	57.28	152.76	76.38	190.94	97.47	56.55	117.81
Resistance @25°C ((L-L)	Ohm	7.4	2	11.1	3	14.8	4	18.5	5	1.08	2.3
Inductance @1kHz ((L-L)	mH	15.4	3.76	23.1	5.64	30.78	7.51	38.5	9.39	1.38	5
Electrical Time Constant	ms	2.08	1.88	2.08	1.88	2.08	1.88	2.08	1.88	1.53	2.17
Max. DC BUS	V_{DC}	330									
Thermal											
Max. Coil Temperature	°C	100									
Thernal Resistance @105°C	°C/W	0.58	0.54	0.39	0.36	0.48	0.53	0.48	0.53	1.4	2.98
Mechanical											
Electrical Cycle Length	mm	84									
Coil Weight	kg	0.8	0.8	1.6	2.4	3.2	3.2	4	4	4.25	9.5
Attraction Force	kN	0									
Track Weight	kg/m	25.08								66.7	
Cooling Type		Natural ail-cooling									

*1The default motor cable length is 0.5m unless otherwise specified.

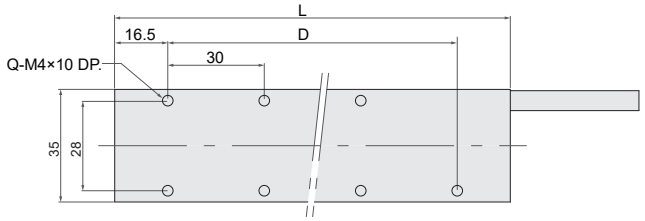
2.Do not pull or tug the motor cables.

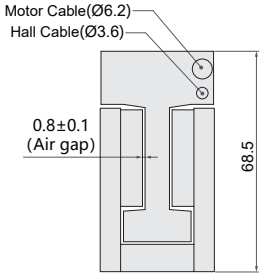
3.The wire terminal treatment is as shown in the figure on the right. For special requirements, please contact CSK.



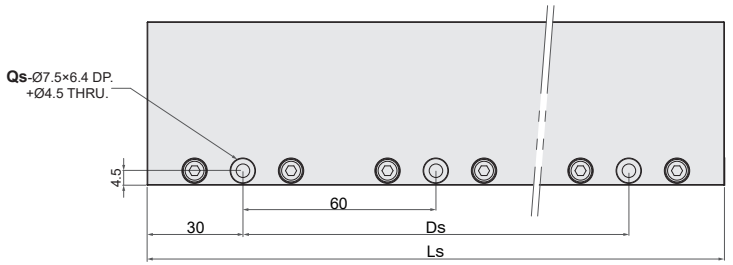
Dimensions of DUF3

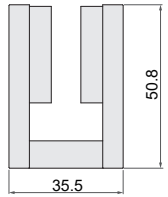
(1) Dimensions of Motor Coil

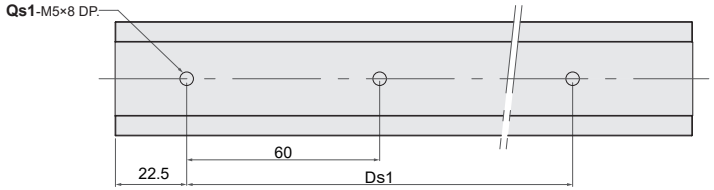




(2) Dimensions of Magnet Track





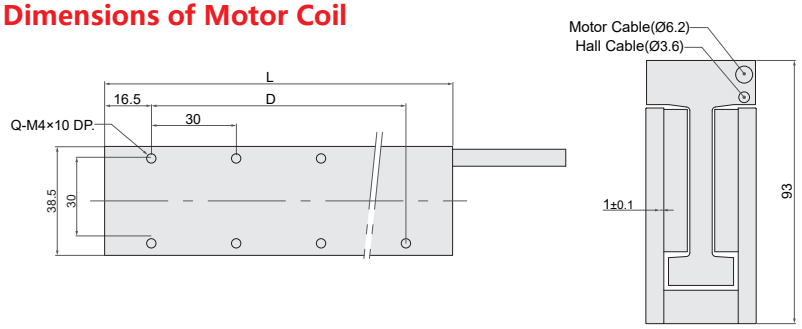


Coil SPC.	L	D	Q
DUF3C1	63	30	3
DUF3C2	123	90	7
DUF3C3	183	150	11

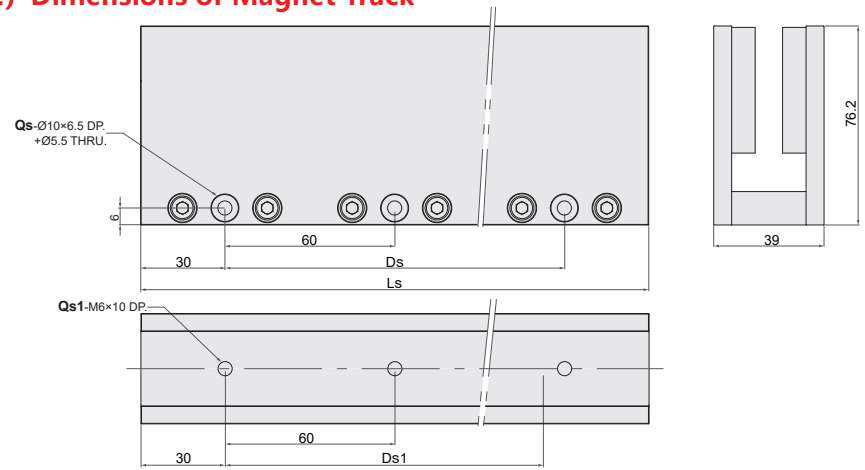
Magnet Track SPC.	Ls	Ds	Qs	Ds1	Qs1
DUF3M120	120	60	2	60	2
DUF3M180	180	120	3	120	3
DUF3M300	300	180	4	180	4

Dimensions of DUF4

(1) Dimensions of Motor Coil



(2) Dimensions of Magnet Track

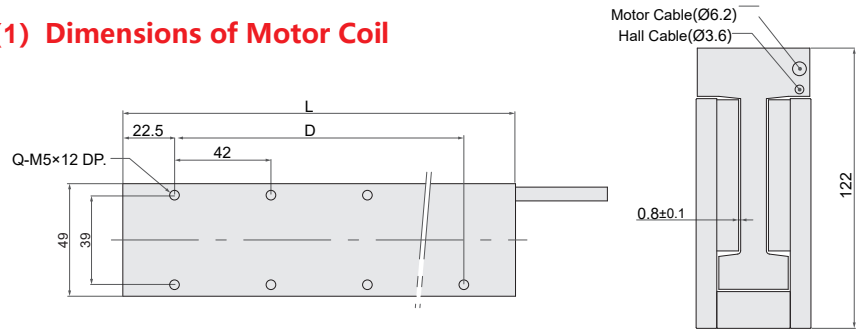


Coil SPC.	L	D	Q
DUF4C1	63	30	3
DUF4C2	123	90	7
DUF4C3	183	150	11
DUF4C4	243	210	15
DUF4C5	303	270	19
DUF4C6	363	330	23

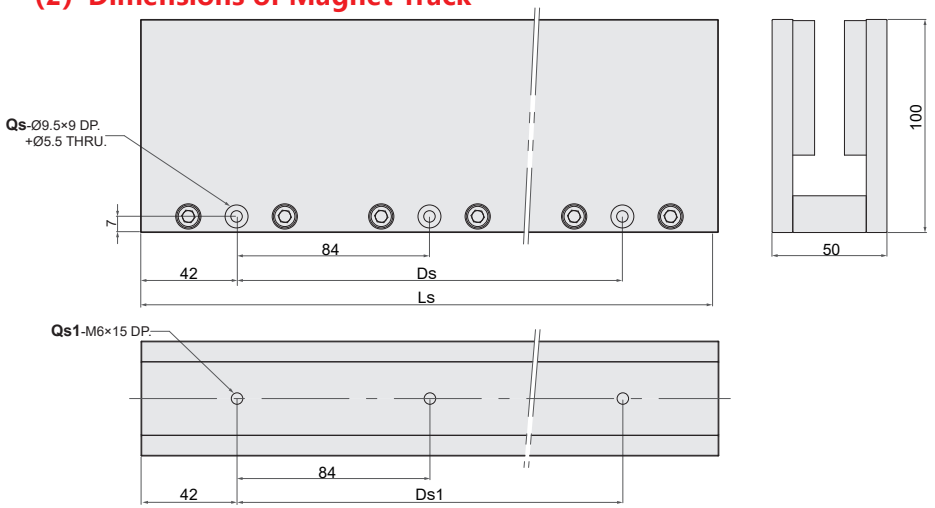
Magnet Track SPC.	Ls	Ds	Qs	Ds1	Qs1
DUF4M120	120	60	2	60	2
DUF4M180	180	120	3	120	3
DUF4M240	240	180	4	180	4

Dimensions of DUF5

(1) Dimensions of Motor Coil



(2) Dimensions of Magnet Track

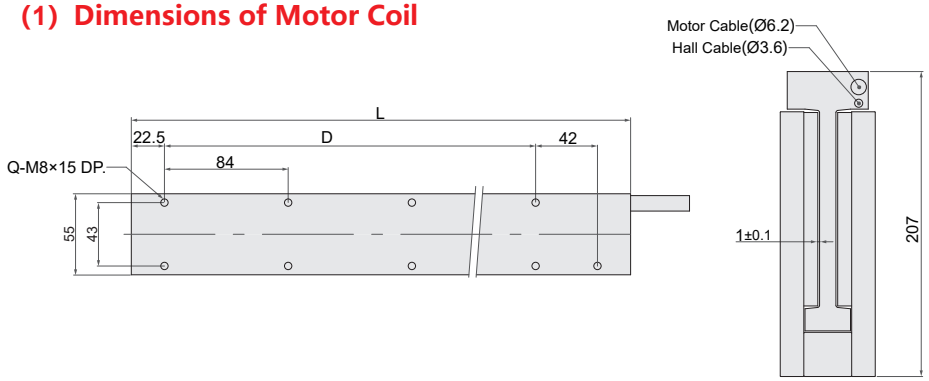


Coil SPC.	L	D	Q
DUF5C2	171	126	7
DUF5C3	255	150	11
DUF5C4	339	294	15
DUF5C5	423	378	19

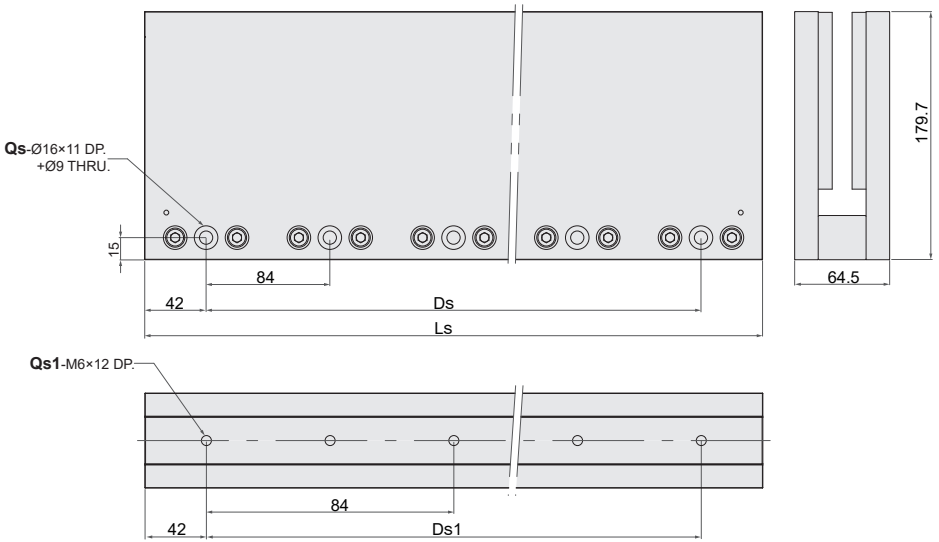
Magnet Track SPC.	Ls	Ds	Qs	Ds1	Qs1
DUF5M168	168	84	2	84	2
DUF5M252	252	168	3	168	3
DUF5M420	420	336	5	336	5

Dimensions of DUF6

(1) Dimensions of Motor Coil



(2) Dimensions of Magnet Track



Coil SPC.	L	D	Q
DUF6C4	339	252	9
DUF6C8	675	588	17

Magnet Track SPC.	Ls	Ds	Qs	Ds1	Qs1
DUF6M168	168	84	2	84	2
DUF6M252	252	168	3	168	3
DUF6M420	420	336	5	336	5

Direct Drive Precautions for use

1. Precautions before purchase

1.1 When purchasing, please check the scope of the use environment with our sales staff. Please do not use in the corrosive environment such as sulfur and sulphide gas, which may lead to line breakage or poor contact.

1.2 When selecting the model, please check the use requirements and motor parameters with our sales staff to ensure the scientific use.

2. Matters needing attention in operation

2.1 This product is manufactured as a precision mechanical part and is widely used in the mechanical industry. Technical personnel with professional knowledge and experience are required to operate it.

2.2 When operating, please be sure to use according to the operating specifications of the product.

2.3 In the application, if you have special requirements on the use environment of cable and motor installation, please contact our sales staff for confirmation to prevent accidents.

2.4 All terminals of the equipment are not allowed to be plugged and unplugged with live power to prevent damage to the motor and driver.

2.5 The ground wire of the motor must be grounded.

2.6 Do not place the control signal line and power line (main power line, motor power line, etc.) of the equipment in the same line tube or wrap them into a bundle.

2.7 During motor operation, do not touch the moving parts of the motor.

3. Matters needing attention for follow-up maintenance

3.1 Precautions for storage equipment: temperature shall be controlled within -20℃ to +60℃. Humidity: less than 85%, placed in a dust-free, clean, non-corrosive gas, no grinding fluid, no metal powder, no oil environment.

3.2 In the case of movement, wiring, maintenance and inspection, please cut off the power for more than 3 minutes before operating. Cut off the power for about 2~3 minutes, the power line still has voltage residue, do not touch the equipment carelessly.

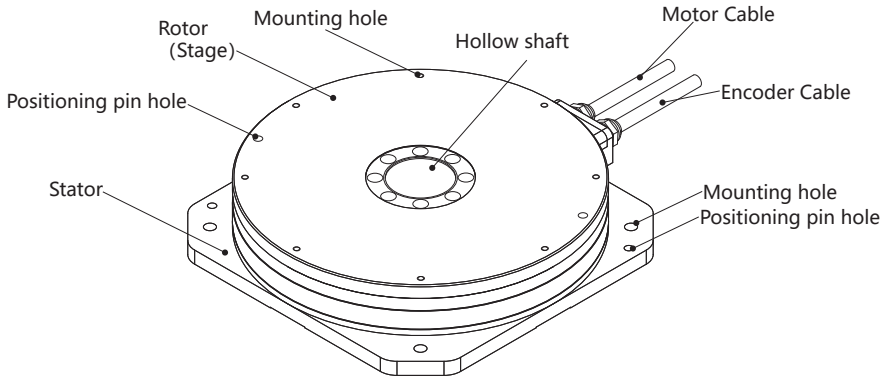
3.3 Frequent power on or off will lead to deterioration of main circuit components. After power off, please wait for more than 1 minute to power on again. The frequency of power on and off is limited to less than 2 times every 3 minutes.

Direct Drive Torque Motor

RMB series

RMB

Construction



Note: For reference only.

Characteristics

RMB series is an ultra-thin direct drive torque motor, which has the characteristics of large torque, low height, light weight, large hollow shaft and so on. This series is equipped with high resolution optical encoder, so that it has the advantages of high precision, high response, accurate positioning, etc., which is widely used in detection, machine tool and other industries.

- High resolution optical encoder
- Hollow shaft
- Ultra thin structure, low combination height
- Compact structure
- High precision
- Peak torque: 1.9~42N·m
- Continuous torque: 0.6~14N·m
- Low run-out, less than 10μm (optional)
- Repeatability: ±2.5arc-sec
- No hall sensor

Applications

Machine Tool (CNC …)
Industrial Robot
Clean room environment
Semiconductor Manufacturing Equipment
Other (Laser manufacturing equipment …)

RMB

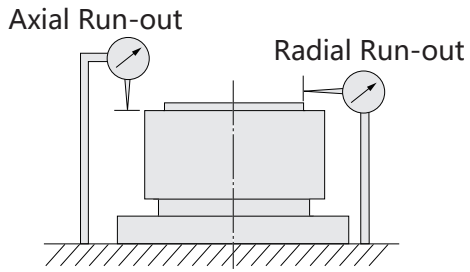
Specifications

RMB 80 - 1 IE - N

Series
RMB
Size
80，110，180，240
Height code
1（Please refer to the corresponding form for details)
Encoder
AE：Absolute Encoder
I E：Incremental Encoder
Accuracy grade
N：High accuracy grade
P：Precision grade
Special symbol
No symbol：CSK Standard
Special：No symbol，A，B ... (For other requirements, please consult CSK)

Notice：
1.The length of motor cable and encoder cable is 0.4 meters, and the length of extension cable needs to be confirmed by customers.
2.This series supports customization.

Run-out measurement



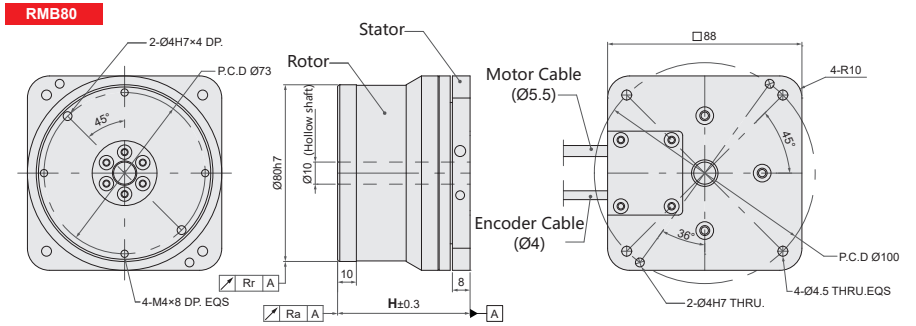
Technical parameters

Performance	Unit	RMB80-1	RMB110-1	RMB110-2	RMB180-1	RMB240-1
Peak Torque(1 sec.)	N·m	1.9	3.3	7.2	11.1	42
Continuous Torque	N·m	0.6	1.1	2.4	3.7	14
Max.Speed	rpm	1000	1000	500	600	400
Electrical						
Peak Current (rms)(1s)	A	3.6	3.8	4.2	10.2	10.2
Continuous Current (rms)	A	1.2	1.2	1.4	3.4	3.4
Torque Constant	N·m/A	0.5	0.92	2	1.1	5.2
Back EMF Constant (L-L)	V/rpm	0.043	0.09	0.173	0.105	0.51
Resistance @25℃ (L-L)	Ohm	7.8	10	13.8	3.1	5.1
Inductance @1kHz (L-L)	mH	5.1	15	26.5	5.7	24.6
Electrical Time Constant	ms	0.65	1.5	1.9	1.8	4.9
Max. DC BUS	V_{DC}	330				
Thermal						
	℃	120				
Mechanical						
Number of Poles		10	10	10	16	22
Rotor Inertia	kg·m²	0.00098	0.0016	0.003	0.01	0.034
Weight	kg	1.6	2.8	4	6.4	13.8
Max. Axial Load	N	500	500	500	2090	2430
Encoder Type		Incremental optical encoder			Absolute optical encoder	
Resolution	p/rev	10240000*	14745600*		16777216*	
Repeatability	arc-sec	±2				
Accuracy	arc-sec	±30			±10*	
Cooling Type		Natural ail-cooling				

*Resolution：The display value is the highest value and the parameter changes with the setting of the drive.
Accuracy：After the compensation.
Due to different working conditions, some performance parameters are different. Please consult CSK.

Dimensions of RMB

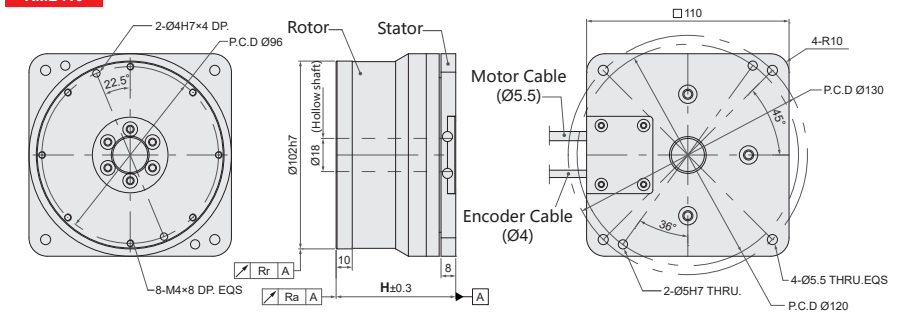
RMB80



Height (mm)	RMB80-1
H	60

Accuracy grade / Run-out(mm)	High accuracy grade	Precision grade
Ra	0.015	0.005
Rr	0.015	0.005

RMB110

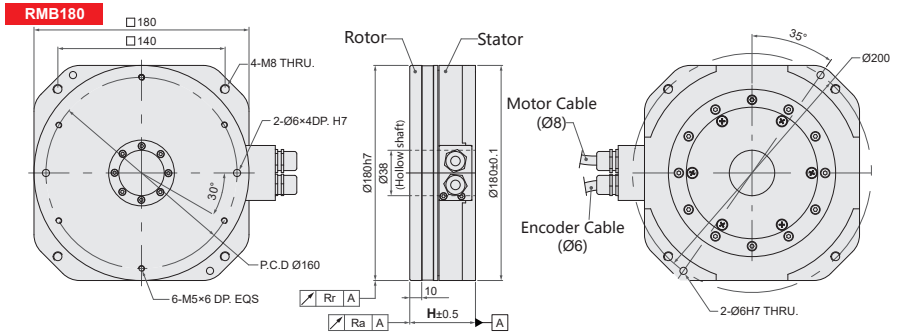


Height (mm)	RMB110-1	RMB110-2
H	65	80

Accuracy grade / Run-out(mm)	High accuracy grade	Precision grade
Ra	0.015	0.005
Rr	0.015	0.005

Dimensions of RMB

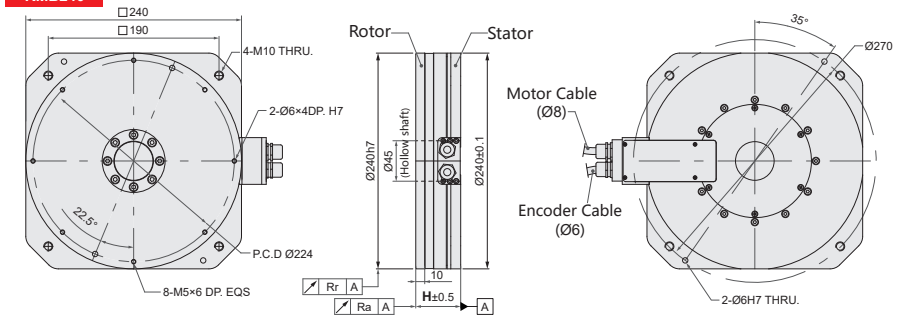
RMB180



Height (mm)	RMB180-1
H	55

Accuracy grade / Run-out(mm)	High accuracy grade	Precision grade
Ra	0.015	0.008
Rr	0.015	0.008

RMB240

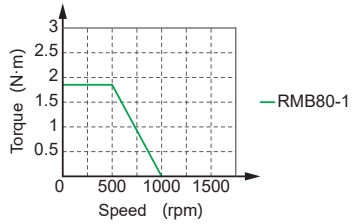


Height (mm)	RMB240-1
H	50

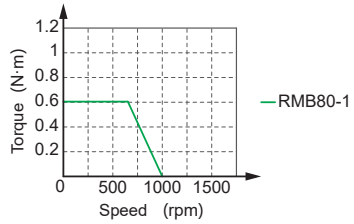
Accuracy grade / Run-out(mm)	High accuracy grade	Precision grade
Ra	0.015	0.008
Rr	0.015	0.008

RMB Torque and Speed

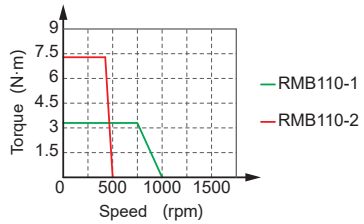
RMB80 series (Peak Torque)



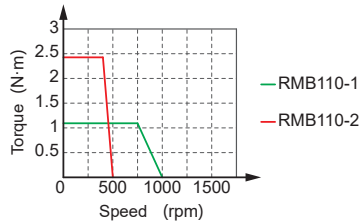
RMB80 series (Continuous Torque)



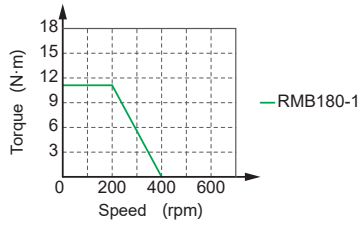
RMB110 series (Peak Torque)



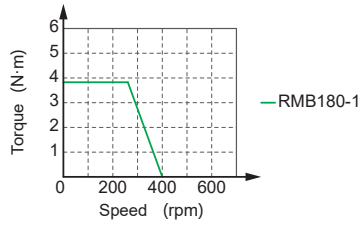
RMB110 series (Continuous Torque)



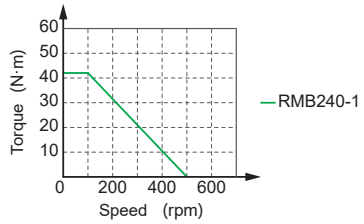
RMB180 series (Peak Torque)



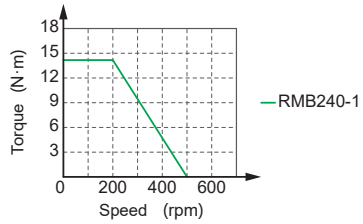
RMB180 series (Continuous Torque)



RMB240 series (Peak Torque)



RMB240 series (Continuous Torque)

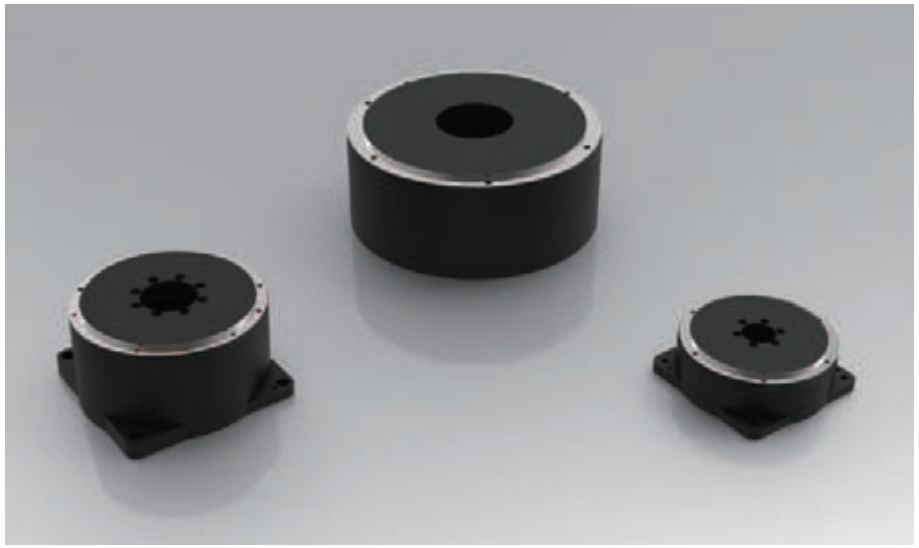


RMB

MOTION TECHNOLOGY

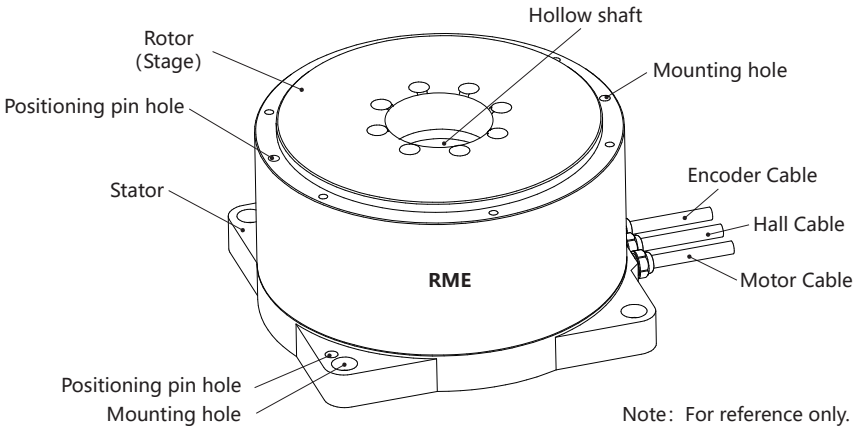
Direct Drive Torque Motor

RME series



RME

Construction



Note: For reference only.

Characteristics

RME series torque motors are directly connected to the load, saving the connection mechanism such as reducer, gearbox and so on. This series is equipped with high resolution optical encoder, so that it has the advantages of high precision, high response, accurate positioning, etc., which is widely used in detection, machine tool and other industries.

- High resolution optical encoder
- Hollow shaft
- Stable structure, High load capacity
- Compact structure
- High precision
- Peak torque: 16.2~496N.m
- Continuous torque: 2.6~252N.m
- Low torque fluctuation, less than 0.2%
- Repeatability: ±1.5arc-sec
- Hall sensor optional

Applications

Machine Tool (CNC ···)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Laser manufacturing equipment ···)

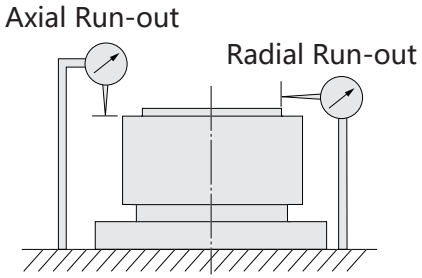
Specifications

RME 140 - 1 H - IE -

Series
RME
Size
140, 170, 263
Height code
1, 2, 3 (Please refer to the corresponding form for details)
Hall sensor
H: With Hall sensor
No symbol: Without Hall sensor
Encoder
AE: Absolute Encoder
IE: Incremental Encoder (Standard)
Special symbol
No symbol: CSK Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

Notice:
The length of motor cable is 0.3 meters., and the length of extension cable needs to be confirmed by customers.

Run-out measurement



Technical parameters

Performance	Unit	RME140-1	RME140-2	RME170-1	RME170-2	RME170-3
Peak Torque(1 sec.)	N·m	15.7	27.6	72.8	125.6	178.7
Continuous Torque	N·m	5.8	10.8	24	42	59.7
Max.Speed	rpm	600	350	190	150	120
Electrical						
Peak Current (rms)(1s)	A	7	7	7.5	7.5	7.5
Continuous Current (rms)	A	2.5	2.5	2.5	2.5	2.5
Torque Constant	N·m/A	2.4	4.2	9.5	16.7	23.8
Back EMF Constant (L-L)	V/rpm	2	3.4	7.8	13.6	19.4
Resistance @25℃ (L-L)	Ohm	3.7	5.9	9.4	14.4	20
Inductance @1kHz (L-L)	mH	3.8	6	17.4	34.7	45
Electrical Time Constant	ms	1.02	1.01	1.8	2.4	2.2
Max. DC BUS	V_{DC}	330				
Thermal						
Max. Coil Temperature	°C	120				
Mechanical						
Number of Poles		28		30		
Rotor Inertia	kg·m²	0.0045	0.0076	0.023	0.032	0.041
Weight	kg	3.5	5.5	10	14	18
Max. Axial Load	N	2500		15000		
Resolution	p/rev	819200		1174000		
Repeatability	arc-sec	±1.5				
Accuracy	arc-sec	±20				
Cooling Type		Natural ail-cooling				

Due to different working conditions, some performance parameters are different. Please consult CSK.

RME

Direct Drive Torque Motor

Technical parameters

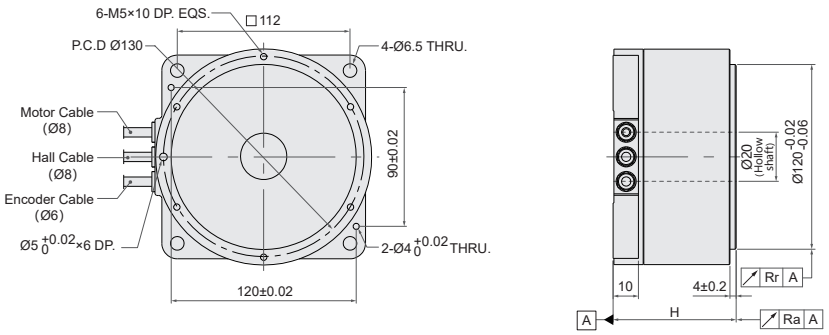
Performance	Unit	RME263-1	RME263-2	RME263-3	RME263-4
Peak Torque(1 sec.)	N·m	134.7	188.6	298.5	502
Continuous Torque	N·m	45.6	94.8	148.9	248.8
Max.Speed	rpm	200	150	120	100
Electrical					
Peak Current (rms)(1s)	A	21.3	14.2	14.2	14.2
Continuous Current (rms)	A	7.1	7.1	7.1	7.1
Torque Constant	N·m/A	6.3	13.4	21.9	35.2
Back EMF Constant (L-L)	V/rpm	5.2	10.9	17.9	28.7
Resistance @25℃ (L-L)	Ohm	1.7	2.7	3.9	6.7
Inductance @1kHz (L-L)	mH	5	8.3	13.4	22.8
Electrical Time Constant	ms	2.9	3	3.4	3.4
Max. DC BUS	V_{DC}	330			
Thermal					
Max. Coil Temperature	°C	120			
Mechanical					
Number of Poles		40	40	40	40
Rotor Inertia	kg·m²	0.076	0.1	0.15	0.21
Weight	kg	18.5	24.4	35	47.5
Max. Axial Load	N	40000	40000	40000	40000
Resolution	p/rev	1638400			
Repeatability	arc-sec	±1.5			
Accuracy	arc-sec	±20			
Axial Run-out(Ra)	μm	5			
Radial Run-out(Rr)	μm	5			
Cooling Type		Natural ail-cooling			

Due to different working conditions, some performance parameters are different. Please consult CSK.

RME

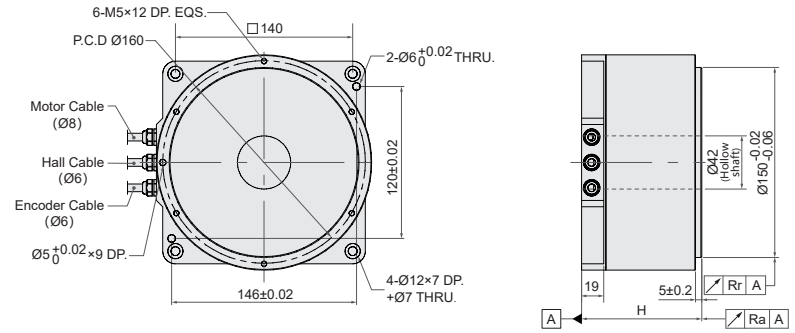
Dimensions of RME

RME140



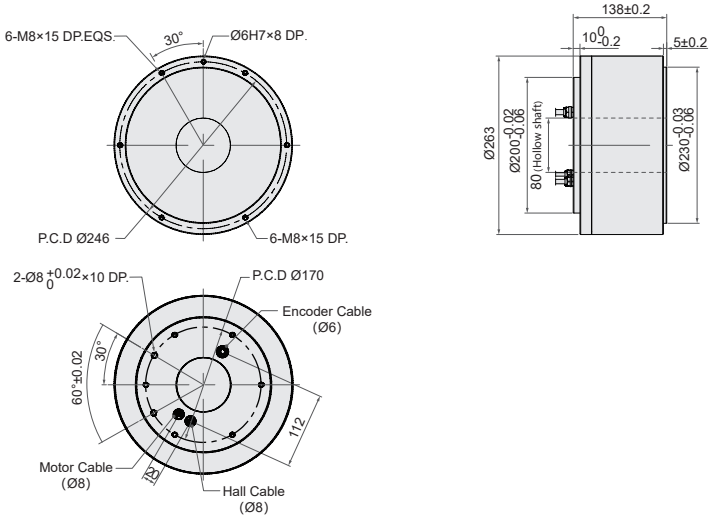
Parameters \ Model	RME140-1	RME140-2
Height H (mm)	50	80

RME170



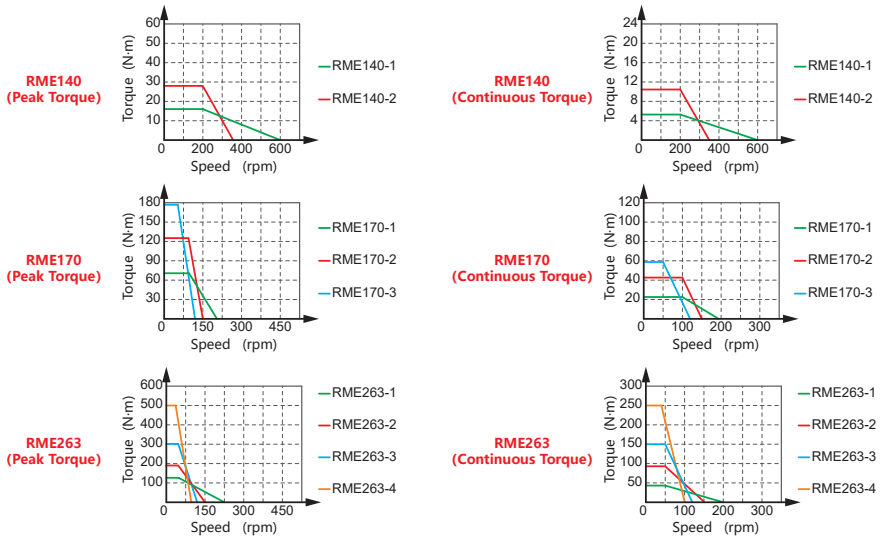
Parameters \ Model	RME170-1	RME170-2	RME170-3
Height H (mm)	95	125	155

RME263



Parameters \ Model	RME263-1	RME263-2	RME263-3	RME263-4
Height H (mm)	95	113	138	188

RME Torque and Speed



Precautions for use

1. Precautions before purchase
1.1 When purchasing, please check the scope of the use environment with our sales staff. Please do not use in the corrosive environment such as sulfur and sulphide gas, which may lead to line breakage or poor contact.
1.2 When selecting the model, please check the use requirements and motor parameters with our sales staff to ensure the scientific use.

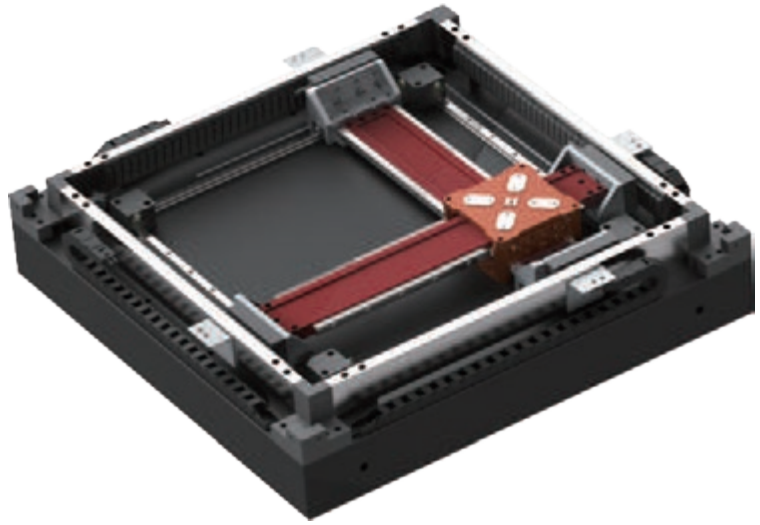
2. Matters needing attention in operation
2.1 This product is manufactured as a precision mechanical part and is widely used in the mechanical industry. Technical personnel with professional knowledge and experience are required to operate it.
2.2 When operating, please be sure to use according to the operating specifications of the product.
2.3 In the application, if you have special requirements on the use environment of cable and motor installation, please contact our sales staff for confirmation to prevent accidents.
2.4 All terminals of the equipment are not allowed to be plugged and unplugged with live power to prevent damage to the motor and driver.
2.5 The ground wire of the motor must be grounded.
2.6 Do not place the control signal line and power line (main power line, motor power line, etc.) of the equipment in the same line tube or wrap them into a bundle.
2.7 During motor operation, do not touch the moving parts of the motor.
2.8 The rotor is constructed from permanent magnets, which generate a significant magnetic force. Therefore, prior to installation, please consult our sales representatives to obtain detailed installation instructions. During assembly, strictly adhere to the standardized installation procedures.

3. Matters needing attention for follow-up maintenance
3.1 Precautions for storage equipment: temperature shall be controlled within -20℃ to +60℃. Humidity: less than 85%, placed in a dust-free, clean, non-corrosive gas, no grinding fluid, no metal powder, no oil environment.
3.2 In the case of movement, wiring, maintenance and inspection, please cut off the power for more than 3 minutes before operating. Cut off the power for about 2~3 minutes, the power line still has voltage residue, do not touch the equipment carelessly.
3.3 Frequent power on or off will lead to deterioration of main circuit components. After power off, please wait for more than 1 minute to power on again. The frequency of power on and off is limited to less than 2 times every 3 minutes.

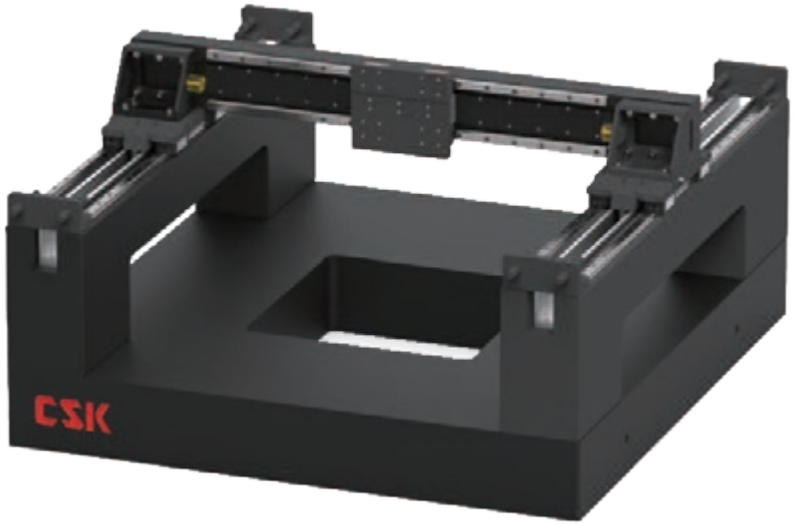
MOTION TECHNOLOGY

MELUCCI TECHNOLOGIES

Linear Motor Stage
LMA series



Construction

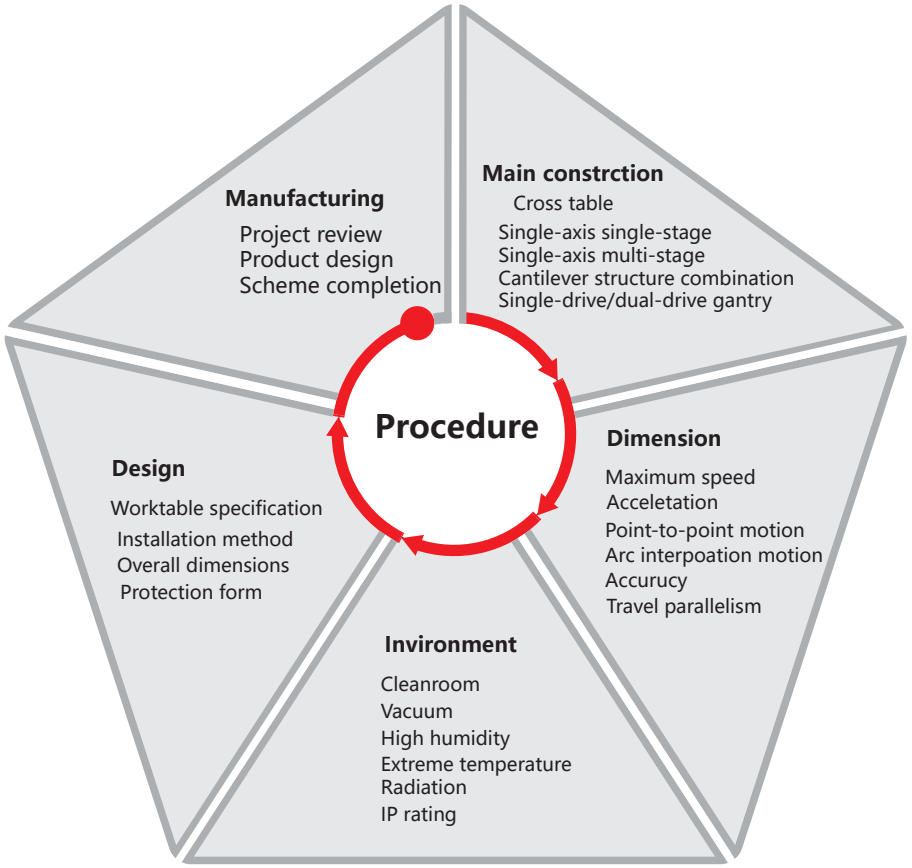


Characteristics

LMA series is a customized series, the main body of this stage is the linear motor stage. In order to ensure the quality of products, components are well-known brand products. In addition, the products have been designed and tested by a team of professional designers. Single product manufacturing and batch manufacturing are allowed.

- Customization
- Multiple structural types
- Multiple motor types
- Multiple dustproof configurations
- Multiple accuracy grades
- Multiple control modes
- Multiple product combinations
- Multiple appearance treatments
- Original design
- Cooperation

Procedures for Constructing Motor Stage



Customized and Original

CSK specializes in providing professional products and services in the field of linear motors. Contact our research and development team during the initial design phase to discuss your requirements. We will assist you in finding the right solutions and shorten your design and product cycles.

Specifications

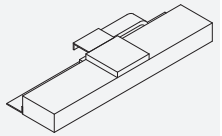
(1) Motor coil

LMA 2 L 2R - 200 × 200 × 200 A

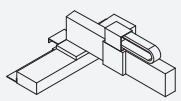
Series
LMA: Linear Motor Stage
Number of straight axes
2: 2 straight axes
Structure type
S: Single axis with single slider D: Single axis with multiple sliders
C: Cantilever type L : Cross type
G: Gantry type (contains the coaxial dual drive)
Number of rotation axes
2R: 2 rotation axes
No symbol : There is no axis of rotation
Stroke (mm)
Special symbol
No symbol: CSK Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

Structure type

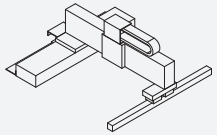
S type



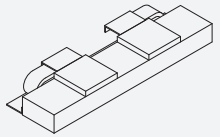
C type



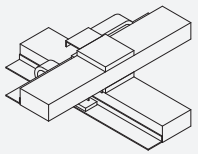
G type (Single drive)



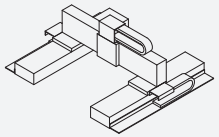
D type



L type



G type (Double drive)



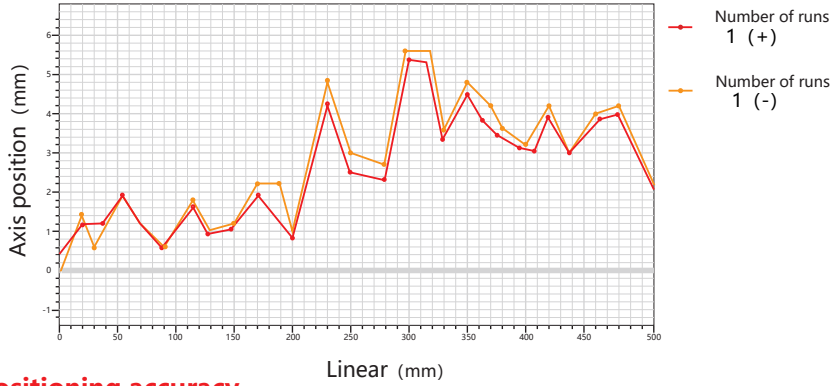
LMA

Accuracy

The precision of the module varies depending on the model (according to measurement method using Renishaw XL80 laser interferometer), and it an be tested under equivalent conditions according to customer requirements. Please consult CSK.

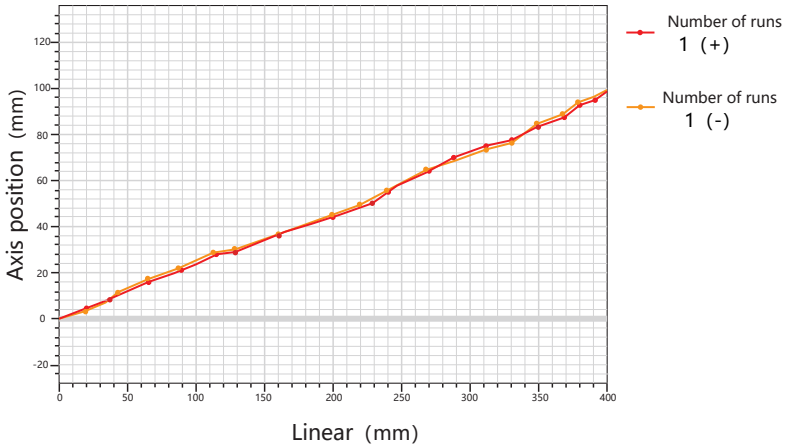
(1) Repetition accuracy

Repeat positioning from the same direction to any point 7 times and determine the maximum deviation.



(2) Positioning accuracy

From the reference position, sequentially position to specific points in a certain direction. Measure the difference between the actual displacement and the desired displacement at each position.
Express the maximum deviation within each stroke length in absolute value.



LMA

Accuracy

Pitch

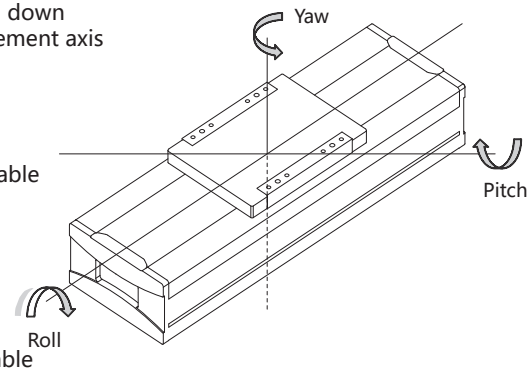
The angle change in the up and down direction of the worktable movement axis

Roll

Changes in axial angle of worktable movement axis

Yaw

The angle change of the worktable movement axis in the left and right directions



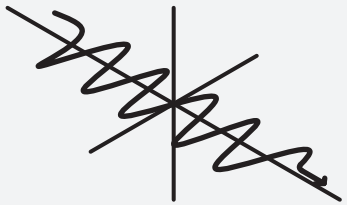
Running Parallelism

Deviation from the baseline

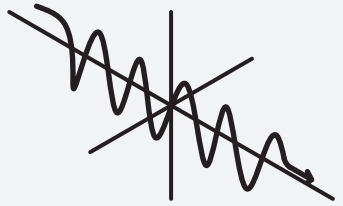
The movement along the horizontal axis

The movement along the vertical axis

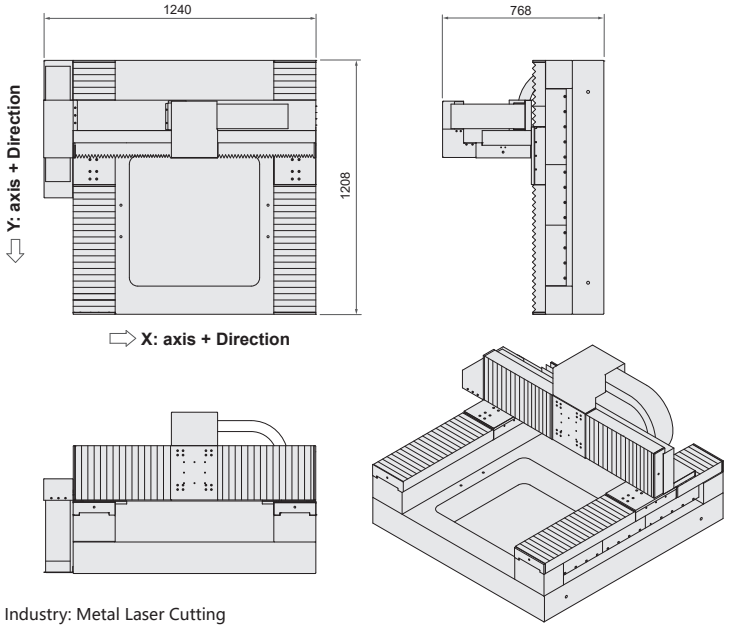
Horizontal straightness



Vertical straightness



LMA3G-600×600A (G) DA0000572A



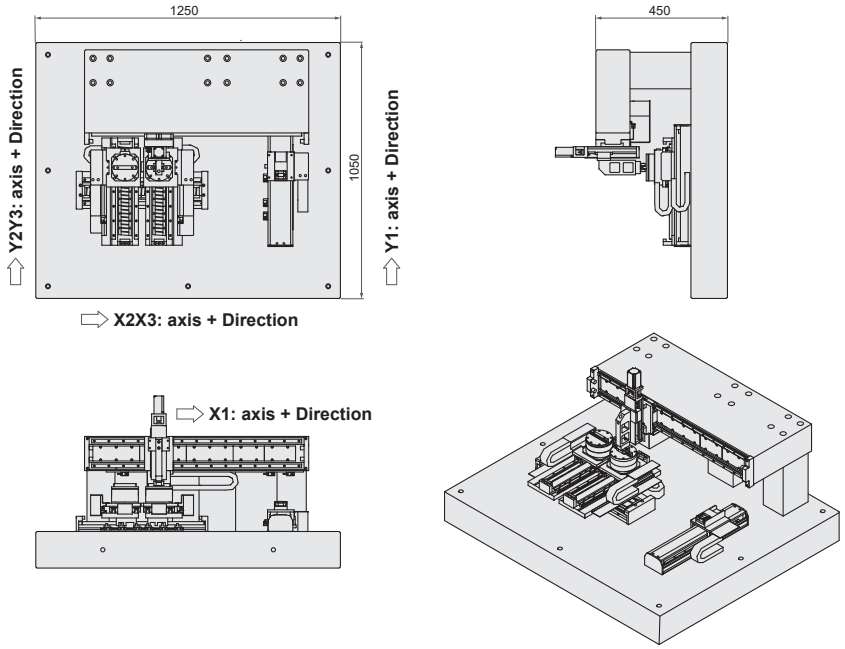
Application Industry: Metal Laser Cutting

- Equipped with dust-proof cover, granite base, and high-rigidity aluminum alloy structure.
- Integrated with high-precision linear encoders to enhance repeatability and positioning accuracy.
- Paired with coreless linear motors to meet circular interpolation requirements, suitable for high acceleration and deceleration movements.

LMA3G-600×600A			
Peak force (N)	X：486；Y：1015	**Limit switch**	BS5-Y1M
Continuous force (N)	X：143；Y：290	**Appearance**	Black/Silvery
Effective stroke (mm)	X：600；Y：600	**Base material**	Granite
Payload (kg)	10	**Placement method**	Horizontal
Maximum speed (m/s)	0.5 (Rated load)	**Lubrication**	Lithium base grease
Max.acceleration (m/s^2)	9.8 (Rated load)		
Encoder (Magnetic/Optical)	Optical 0.5um		
Repeatability (μm)	X/Y：±1 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±3 (compensatory)		

LMA7L2R-A

DA0000914A



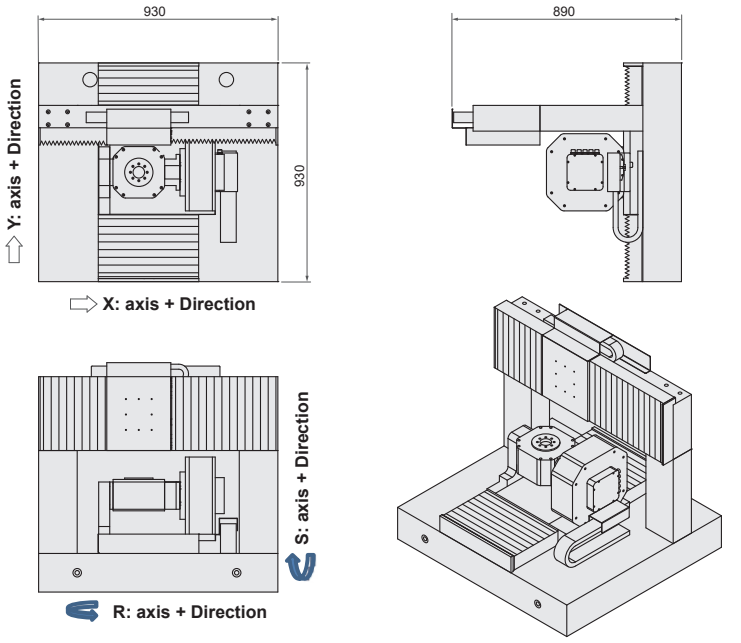
Application Industry: Semiconductor Industry

- Equipped with high-precision granite base.
- Integrated with linear motors, DD (Direct Drive), and single-axis robots, enabling seven-axis linkage with high precision and stability.

LMA7L2R-A			
Peak force (N)	X1: 363 X2X3: 360 Y1: 240 Y2Y3: 540	**Max.acceleration**(m/s^2)	9.8 (Rated load)
Continuous force (N)	X1: 108 X2X3: 120 Y1: 80 Y2Y3: 180	**Encoder (Magnetic/Optical)**	Optical 0.5um
Peak Torque (N.m)	A: 3.9	**Limit switch**	BS5-Y1M
Continuous Torque (N.m)	R: 1.3	**Appearance**	Black/Silvery
Effective stroke (mm)	X1: 550 X2X3: 210 Y1: 200 Y2Y3: 40	**Base material**	Granite
Payload (kg)	5	**Placement method**	Horizontal
Maximum speed (m/s)	X1: 1.3 X2X3: 1 Y1: 1 Y2Y3: 1	**Lubrication**	Lithium base grease
Repeatability (μm)	X/Y:±1 (RenishawXL80 measurement method)	**Z-axis**	Single Axis Module LMK60
Accuracy (μm)	X/Y:±3 (compensatory)		

LMA2L2R-PP-300×300A (L)

DA0000683A

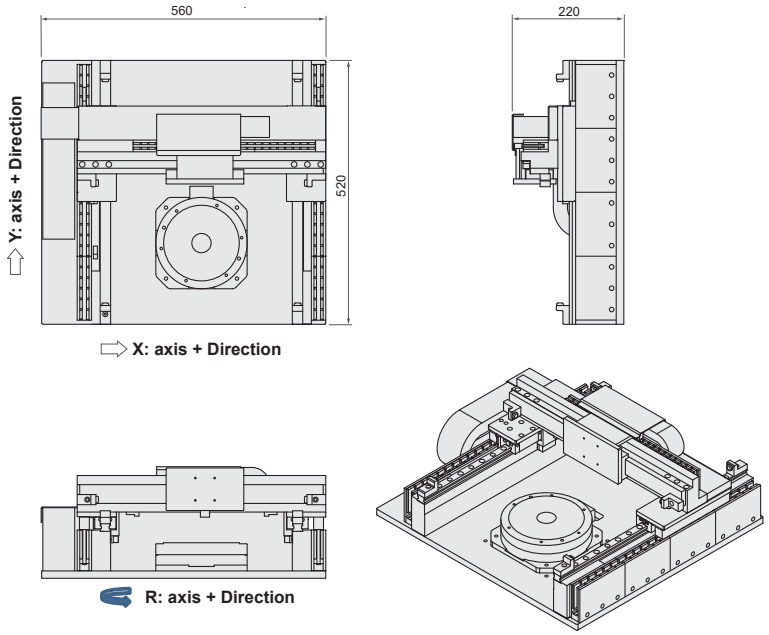


Application Industry: Mobile Phone Case Cutting

- Compatible with screw-driven Z-axis for five-axis simultaneous machining.
- Equipped with dust-proof cover and integral marble structure.
- R/S axis utilizes direct-drive torque motors, offering high precision and high responsiveness.

LMA2L2R-PP-300×300A			
Peak force (N)	X: 486 Y: 1108	**Max. acceleration (m/s2)**	9.8 (Rated load)
Continuous force (N)	X: 143.5 Y: 277	**Encoder (Magnetic/Optical)**	Optical 0.1um
Peak Torque (N.m)	R: 11.1	**Limit switch**	Y1M-BS5
Continuous Torque (N.m)	R: 3.7	**Appearance**	Black
Effective stroke (mm)	X/Y: 300	**Placement method**	Horizontal
Payload (kg)	X: 15 R: 10	**Lubrication**	Lithium base grease
Maximum speed (m/s)	0.5 (Rated load)		
Repeatability (μm)	X/Y: ±2; R/S: ±2arc-sec (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y: ±5; R/S: ±30arc-sec (compensatory)		

LMA3G1R-240×240 (G) DA0000588A

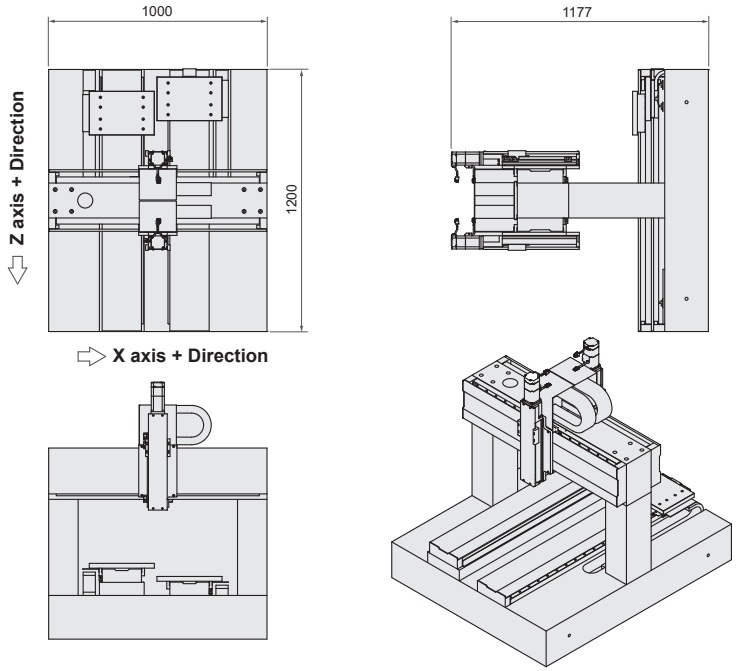


Application Industry: Electronic Component Pin Insertion

- Equipped with RMB series ultra-thin direct-drive torque motors.
- Equipped with DUD series coreless linear motors, no cogging force, speed fluctuation <1%.
- The overall structure is made of high-strength aluminum profiles, offering high precision, high responsiveness, and accurate positioning.

LMA3G1R-240X240			
Peak force (N)	X: 198 Y: 486	**Max. acceleration** (m/s^2)	9.8 (Rated load)
Continuous force (N)	X: 54.5 Y: 143.5	**Encoder (Magnetic/Optical)**	Optical 0.5um
Peak Torque (N.m)	R: 42	**Limit switch**	Y1M-BS5
Peak Torque (N.m)	R: 14	**Appearance**	Silvery
Effective stroke (mm)	X/Y: 240	**Placement method**	Horizontal
Payload (kg)	X: 3 R: 10	**Lubrication**	Lithium base grease
Maximum speed (m/s)	0.8 (Rated load)		
Repeatability (μm)	X/Y: ±2; R/S: ±2arc-sec (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y: ±5; R/S: ±30arc-sec (compensatory)		

LMA6G-700×900×200A (G) DA0000466A

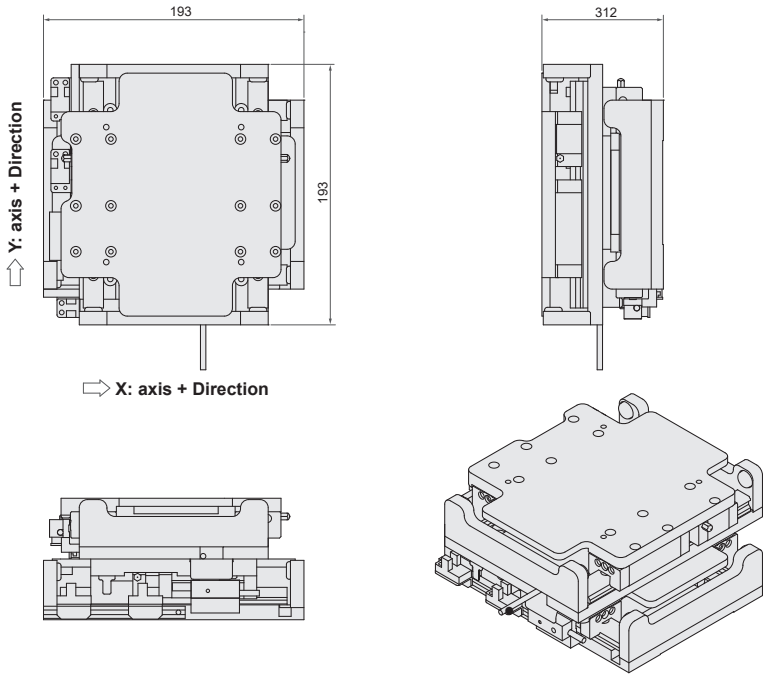


Application Industry: Optical Lens Assembly

- Granite base and beam structure.
- Multi-axis synchronous motion application, significantly improving efficiency.
- Excellent stability even at low speeds.

LMA6G-700×900×200A			
Peak force (N)	X: 588; Y: 285	**Limit switch**	BS5-Y1M
Continuous force (N)	X: 196; Y: 95	**Appearance**	Black
Effective stroke (mm)	X: 700; Y: 900; Z: 200	**Base material**	Granite
Payload (kg)	Z: 25; Y: 10	**Placement method**	Horizontal
Maximum speed (m/s)	0.1 (Rated load)	**Lubrication**	Lithium base grease
Max.acceleration (m/s^2)	-		
Encoder (Magnetic/Optical)	Optical 0.5um		
Repeatability (μm)	X/Y: ±1.5; Z: ±3 (RenishawXL80)		
Accuracy (μm)	X/Y: ±5; Z: 25 (compensatory)		

LMA2L-40×40 (L) DA0000600A

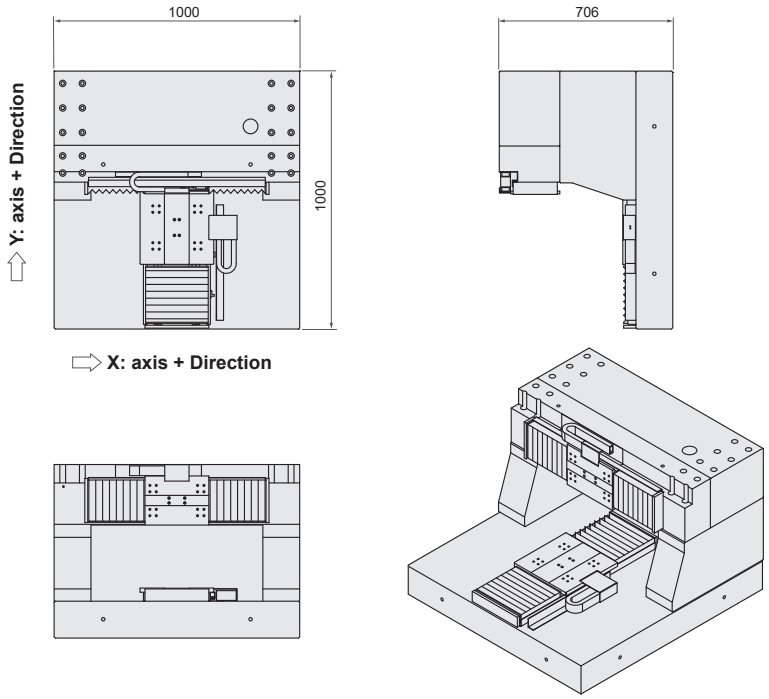


Application Industry: 3D Printing

- Compact XY configuration, lightweight and space-saving.
- High-strength steel base, high rigidity, suitable for inverted use.
- Equipped with CSK ultra-precision grade guide rails, high walking parallelism.

LMA2L-40×40			
Peak force (N)	X/Y：588	**Limit switch**	Y1M-BS5
Continuous force (N)	X/Y：196	**Appearance**	Silvery
Effective stroke (mm)	X/Y：40	**Placement method**	Hanging upside down
Payload (kg)	15	**Lubrication**	Lithium base grease
Maximum speed (m/s)	0.2 (Rated load)		
Max.acceleration (m/s^2)	6 (Rated load)		
Encoder (Magnetic/Optical)	Optical 0.5um		
Repeatability (μm)	X/Y：±2 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±2 (compensatory)		

LMA2G-300×300A (G) DA0000185H



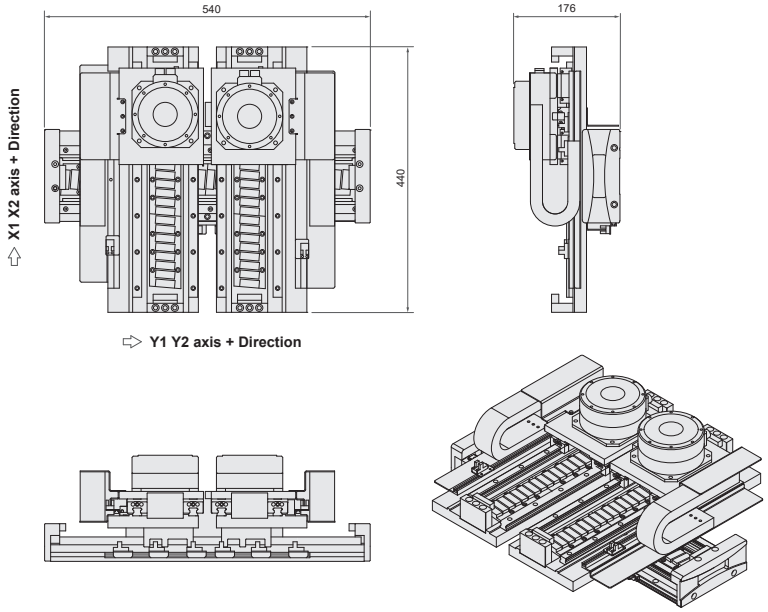
Application Industry: Lens Assembly

- Granite gantry structure.
- Capable of achieving high walking parallelism and high acceleration/deceleration motion.

LMA2G-300×300A			
Peak force (N)	X：360 Y：540	**Limit switch**	EE-SX674
Continuous force (N)	X：120 Y：180	**Appearance**	Silvery
Effective stroke (mm)	X/Y：300	**Placement method**	Horizontal
Payload (kg)	X：10 Y：15	**Lubrication**	Lithium base grease
Maximum speed (m/s)	1 (Rated load)		
Max.acceleration (m/s^2)	9.8 (Rated load)		
Encoder (Magnetic/Optical)	Optical 0.5um		
Repeatability (μm)	X/Y：±2 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±5 (compensatory)		

LMA4L2R-210×40A (L)

DA0000310H



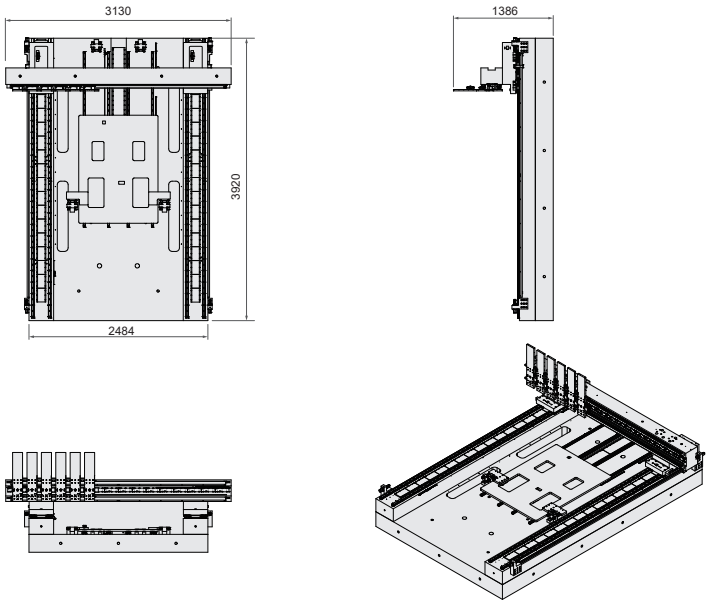
Application Industry: Wafer Cutting and Handling

- Integrated high-precision torque motors, multi-mover synchronization, XY positioning with high-precision angle compensation.
- CSK standard aluminum extrusion base design, offering excellent cost-performance ratio and high repeatability, up to ±1μm.

LMA4L2R-210×40A			
Peak force (N)	X：360；Y：540	**Encoder (Magnetic/Optical)**	Optical 0.5um
Continuous force (N)	X：120；Y：180	**Repeatability** (μm)	X/Y：±1 (RenishawXL80 measurement method)
Peak Torque (N·m)	A：3.9	**Repeatability** (arc-sec)	A：±3
Continuous Torque (N·m)	A：1.3	**Limit switch**	EE-SX674
Effective stroke (mm)	X：210；Y：40；A：360°	**Appearance**	Silvery
Payload (kg)	A：5	**Base material**	aluminium alloy
Maximum speed (m/s)	1 (Rated load)	**Placement method**	Horizontal
Max.acceleration (m/s^2)	-	**Lubrication**	Lithium base grease
No-load speed (rpm)	300		

LMA4G-1720x3100x920A (G)

DA0001038A

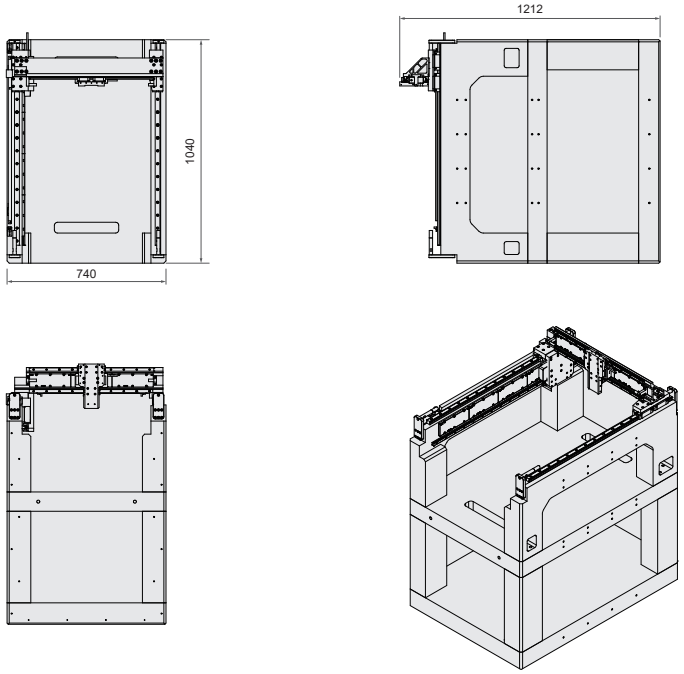


Application Industry: LCD Panel

- Equipped with Grade 00 high-precision granite base and beam
- Fitted with three sets of high-precision silent linear guides
- Equipped with DPG and DPW series iron-core motors, enabling dual-drive functionality with high synchronization, high load capacity, high precision, and strong motion stability.

LMA4G-1720x3100x920A			
Peak force (N)	X：594 Y1：3760 Y2：3429	**Limit switch**	BS5-Y1M
Continuous force (N)	X：165 Y1：1403 Y2：1834	**Appearance**	Black
Effective stroke (mm)	X：1720 Y1：3100 Y2：920	**Base material**	Granite
Payload (kg)	25	**Placement method**	Horizontal
Maximum speed (m/s)	X：0.5 Y1：0.5 Y2：0.3	**Lubrication**	Lithium base grease
Max.acceleration(m/s^2)	X：5 Y1：3.8 Y2：2.5		
Encoder (Magnetic/Optical)	Optical 0.5um		
Repeatability (μm)	X：±2 Y1：±2.5 Y2：±2 (RenishawXL80)		
Accuracy (μm)	X：±6 Y1：±7 Y2：±6 (compensatory)		

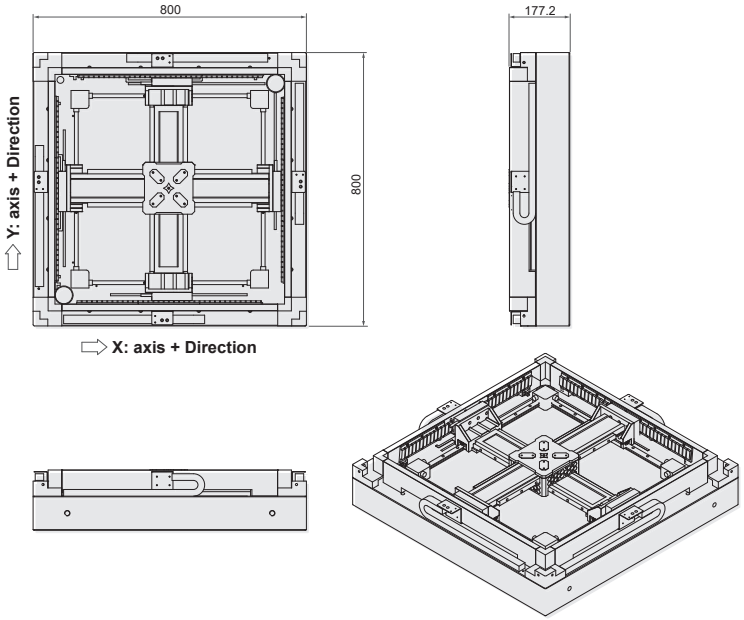
LMA3G-400X620A (G) DA0001023B



Application Industry: Dispensing Machine
- Features a single-drive gantry structure
- Equipped with a granite base
- Utilizes DPG series iron-core motors, enabling single-axis drive for the gantry axis, suitable for light-load applications.

LMA3G-400X620A			
Peak force (N)	X：660 Y：740	**Limit switch**	PM-L25
Continuous force (N)	X：220 Y：370	**Appearance**	Black
Effective stroke (mm)	X：400 Y：620	**Base material**	Granite
Payload (kg)	18	**Placement method**	Horizontal
Maximum speed (m/s)	X/Y：1.5	**Lubrication**	Lithium base grease
Max.acceleration(m/s^2)	X/Y：13		
Encoder (Magnetic/Optical)	Optical 1um		
Repeatability (μm)	X/Y：±5 (RenishawXL80)		
Accuracy (μm)	X/Y：±15 (compensatory)		

LMA2L-300×300A (L) DA0000680A

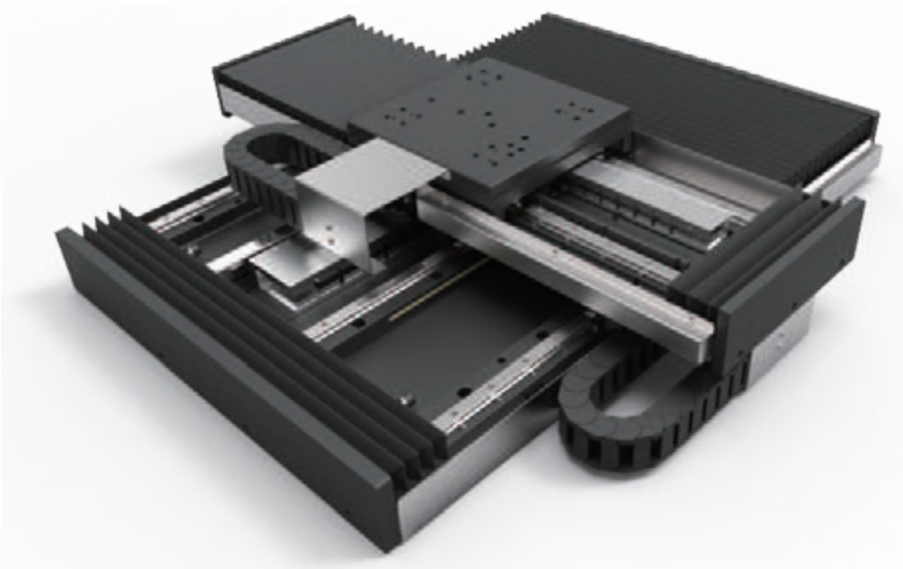


Application Industry: Semiconductor Industry
- Equipped with a high-precision granite base
- Fitted with eight sets of precision-grade linear guides
- Utilizes DPD series iron-core linear motors, enabling four-axis synchronous motion with high acceleration, high speed, and exceptional stability.

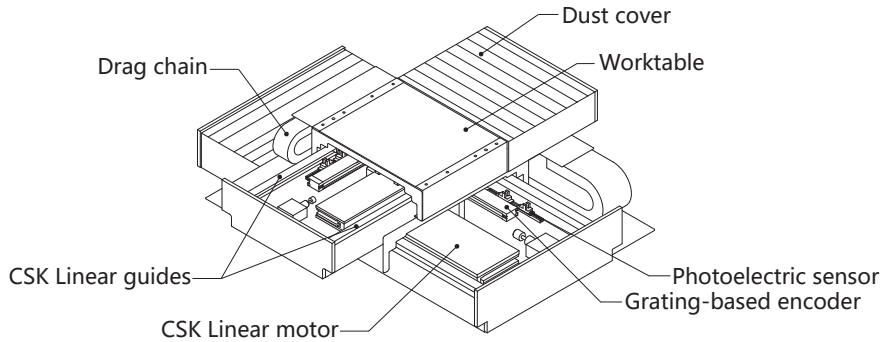
LMA2L-300×300A			
Peak force (N)	X/Y：285	**Limit switch**	BS5-Y1M
Continuous force (N)	X/Y：95	**Appearance**	Black/Silvery
Effective stroke (mm)	X/Y：300	**Base material**	Granite
Payload (kg)	10	**Placement method**	Horizontal
Maximum speed (m/s)	1.5 (Rated load)	**Lubrication**	Lithium base grease
Max.acceleration(m/s^2)	2.8 (Rated load)		
Encoder (Magnetic/Optical)	Optical 0.1um		
Repeatability (μm)	X/Y：±1 (RenishawXL80)		
Accuracy (μm)	X/Y：±3 (compensatory)		

Linear Motor Stage

LMA-CS series



Construction



Note: Only for reference

Characteristics

LMA-CS series is designed and developed to meet the high-precision requirements of the motion platform market. Notably, this series features full linear motor drive and is constructed with an industrial-grade marble theme. All components are sourced from internationally renowned brands, ensuring product excellence. Leveraging years of experience in motion platform manufacturing, the overall architecture has been reanalyzed to achieve optimal balance design. Rigorous data validation using professional instruments ensures the scientific and rational performance of the motion platform, all while maintaining cost-effectiveness. The LMA-CS series offers both personalized single-unit production and batch supply options.

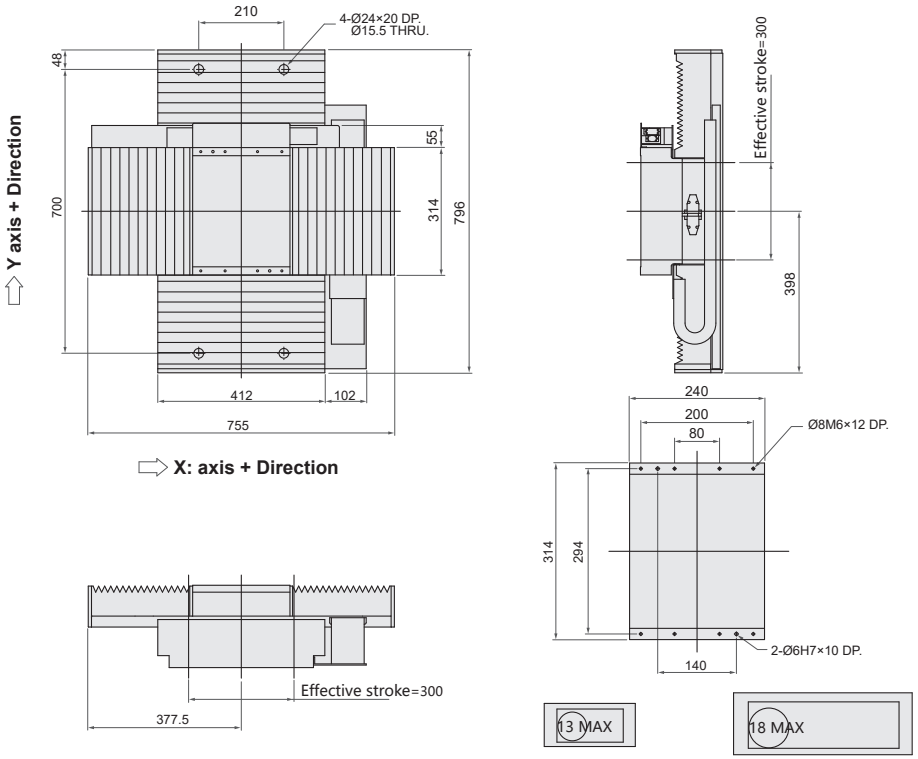
- High speed and accuracy
- Speed fluctuation < 0.1%
- Multiple precision options
- Labyrinth structure dust pretection
- No toothless force
- Axis orthogonality < 5μm
- Meet arc interpolation requirements

Specifications

LMA-CS - U - 300 × 300 A

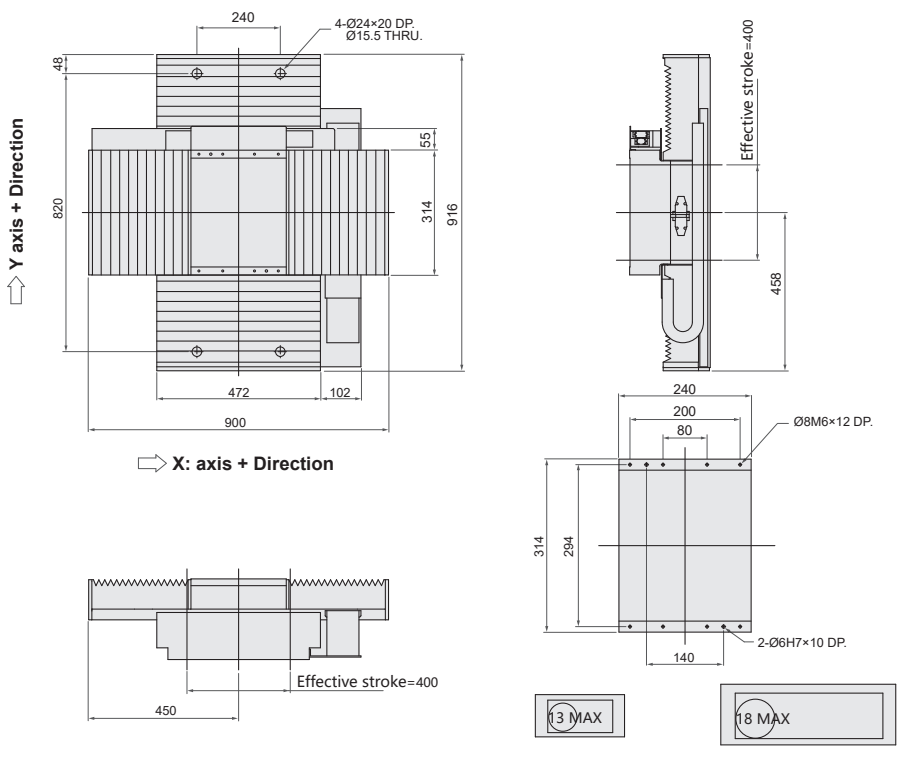
Series
LMA-CS: Linear Motor XY Stage
Motor
U: DUD Ironless Linear Motor(Standard)
P: DPD Iron Core Linear Motor
Effective stroke (mm)
Special symbol
No symbol: CSK Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

LMA-CS-U-300×300



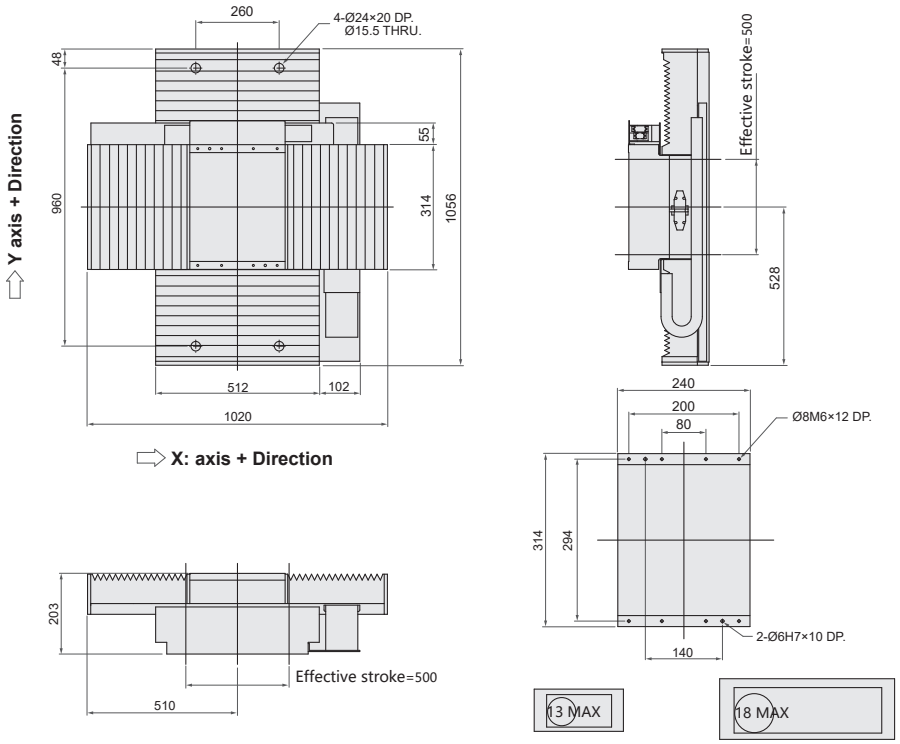
LMA-CS-U-300×300			
Peak force (N)	X：486 Y：870	**Limit switch**	Optional
Continuous force (N)	X：143.5 Y：290	**Appearance**	Black
Effective stroke (mm)	X/Y：300	**Placement method**	Horizontal
Payload (kg)	20	**Lubrication**	Lithium base grease
Maximum speed (m/s)	1 (no-load)		
Max.acceleration (m/s^2)	9.8 (no-load)		
Encoder (Magnetic/Optical)	Optional		
Repeatability (μm)	X/Y：±2 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±4 (compensatory)		

LMA-CS-U-400×400



LMA-CS-U-400×400			
Peak force (N)	X：486 Y：870	**Limit switch**	Optional
Continuous force (N)	X：143.5 Y：290	**Appearance**	Black
Effective stroke (mm)	X/Y：400	**Placement method**	Horizontal
Payload (kg)	20	**Lubrication**	Lithium base grease
Maximum speed (m/s)	1 (no-load)		
Max.acceleration (m/s^2)	9.8 (no-load)		
Encoder (Magnetic/Optical)	Optional		
Repeatability (μm)	X/Y：±2 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±4 (compensatory)		

LMA-CS-U-500×500



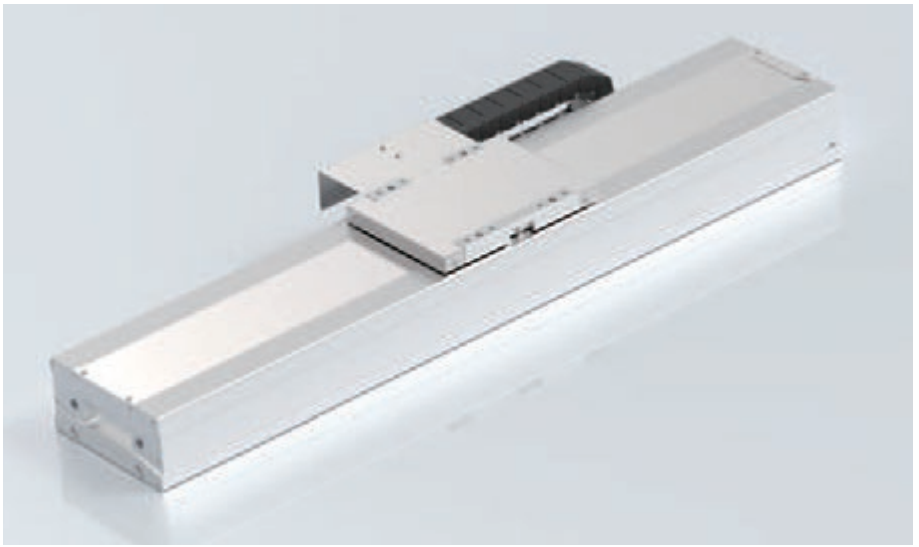
LMA-CS-U-500×500			
Peak force (N)	X：486　Y：870	**Limit switch**	Optional
Continuous force (N)	X：143.5　Y：290	**Appearance**	Black
Effective stroke (mm)	X/Y：500	**Placement method**	Horizontal
Payload (kg)	20	**Lubrication**	Lithium base grease
Maximum speed (m/s)	1 (no-load)		
Max.acceleration (m/s^2)	9.8 (no-load)		
Encoder (Magnetic/Optical)	Optional		
Repeatability (μm)	X/Y：±2 (RenishawXL80 measurement method)		
Accuracy (μm)	X/Y：±4 (compensatory)		

MOTION TECHNOLOGY

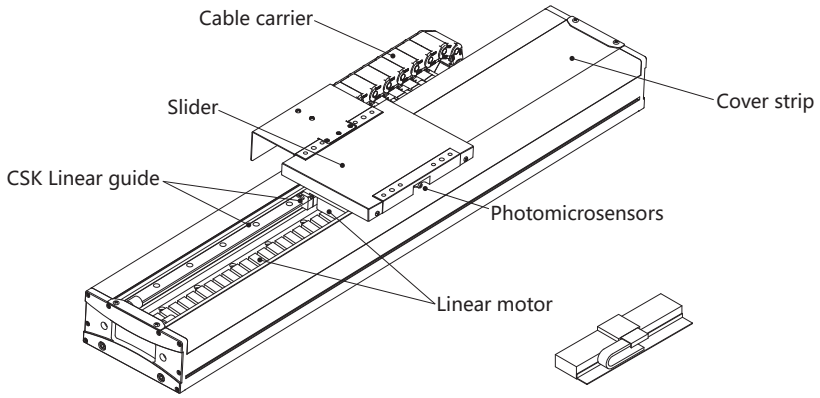
MELUCCI TECHNOLOGIES

Linear Motor Module

LMB series



Construction



Note: For reference only.

Characteristics

LMB series linear motor modules are specially designed for environments with high dust level and low dust emission. Completely dustpreventive structure is adopted to effectively prevent foreign bodies from invading the module body, so that it can withstand harsh environment . It can be connected with a special device to achieve low dust emission, can meet part of clean room use requirements.

- Completely dust preventive structure
- Low dust emission
- Rapid acceleration/deceleration
- Precision optional
- Multi-slider
- Long stroke
- Use precision linear guideway
- Modularization
- High quality appearance
- Customization

Applications

Machine Tool (CNC, Lathe ···)
Industrial Robot
Semiconductor Manufacturing Equipment
Other (Injection Molding Machine ···)

Specifications

LMB 150 F1 D2 - S700 LH P2 3K 3M

Series
LMB: Completely dust preventive structure series

Size
150, 180

Thrust specifications
F1: (Details are shown in the table.) F2

Number of slider
D1: 1 slider (Standard) D2: 2 sliders
Note: For multi-slide configurations, please consult CSK.

Effective stroke
S700: Each slider effective stroke is 700mm
200mm, 300mm, 400mm....., 2000mm
Note: Details provided in Technical Parameters.

Cable carrier entry location
RH : Horizontally, right LH : Horizontally, left (Standard)
RW: Wall hanging, right LW : Wall hanging, left
No symbol : There is no cable carrier

Resolution
P1: Magnetic encoders
P2: Optical encoders 1μm (Standard)
P3: Optical encoders 0.5μm
Note: For other requirements, please consult CSK.

Limit switch
3K: 3 Photomicrosensors (Optional)
N : There is no limit switch

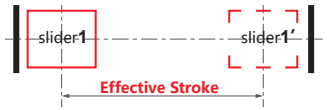
Motor/encoder extension cable
3M: 3 meters (Standard) , 5 meters, 10 meters

Special symbol
No symbol: Standard
Special: No symbol, A, B ... (For other requirements, please consult CSK)

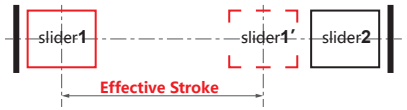
LMB series technical analysis

Effective stroke

■Single slider



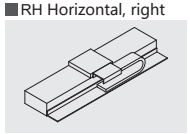
■Double slider



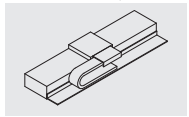
※Note：For other requirements,please consult CSK.

Cable carrier entry location

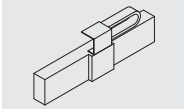
■RH Horizontal, right



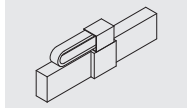
■LH Horizontal, left



■RW Wall mounted, right



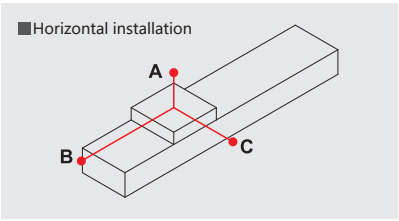
■LW Wall mounted, left



※Be sure to install in the direction as specified individually.
Installation in any other way will cause a failure.

Allowable overhang

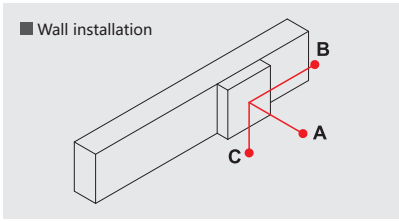
■Horizontal installation



Unit（mm）

Payload	A	B	C
10kg	2525	1397	956
15kg	2248	940	706
20kg	2143	712	573
25kg	1752	576	404
30kg	1464	484	296
35kg	1264	420	220
40kg	1112	372	180

■Wall installation



Unit（mm）

Payload	A	B	C
10kg	976	1056	2032
15kg	696	680	1760
20kg	536	488	1624
25kg	388	320	1024
30kg	224	260	840
35kg	212	216	712
40kg	188	184	612

LMB

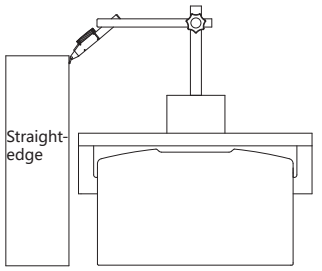
Technical Parameters

Model	LMB150		LMB180	
	LMB150F1	LMB150F2	LMB180F1	LMB180F2
Peak Force（N）	792	1188	849	1256
Continuous Force（N）	220	330	250	370
Effective stroke（mm）	100-4000 (The stroke increases in increments of 100 mm. For larger strokes, please contact CSK.)			
Encoder resolution	Optical：1、0.5、0.1μm ; 1vpp sincos/ Magnetic：1μm、0.2μm			
Repeatability（μm）	±2μm/±3μm			
Accuracy（μm）	±6μm/±9μm（compensatory）			
Horizontal straightness	±2.5μm/500mm			
Vertical straightness	±5μm/500mm			
Appearance	Colorless oxidation			
Maximum speed（m/s）	5	5	5	5
Max. acceleration（m/s²）	27.5	33.6	28.7	34.2
Workbench weight（kg）	4.5	6.3	5.2	7.3
Height（mm）	95			

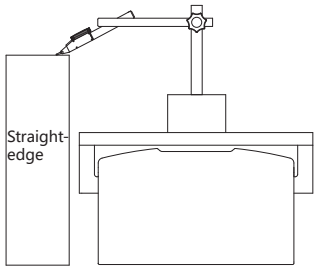
- When the effective travel exceeds two meters, no cover plate is added.
- The positioning accuracy after compensation is three times the repeat accuracy.
- The lubrication method employs lithium-based grease, with oiling required every 100 kilometers.

Running Parallelism

Vertical straightness



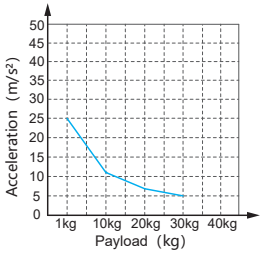
Horizontal straightness



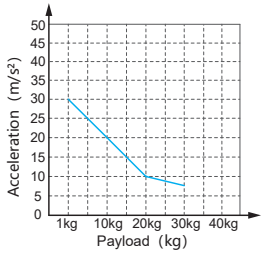
LMB

Selection auxiliary diagram(acceleration)

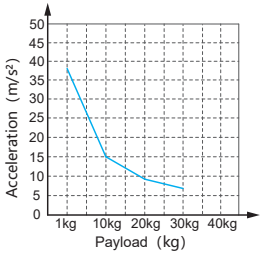
LMB150F1



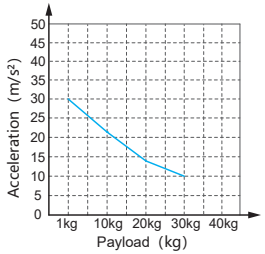
LMB150F2



LMB180F1

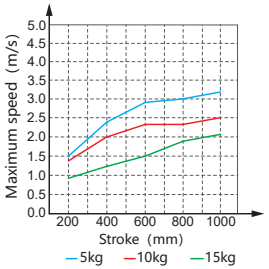


LMB180F2

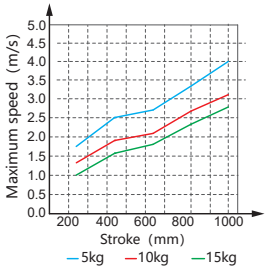


Selection auxiliary diagram (Maximum speed)

LMB150F1



LMB150F2



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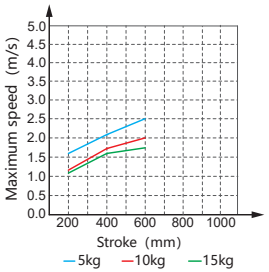

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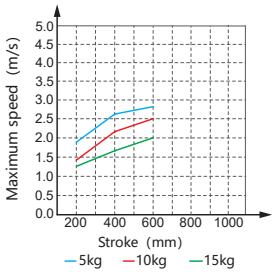
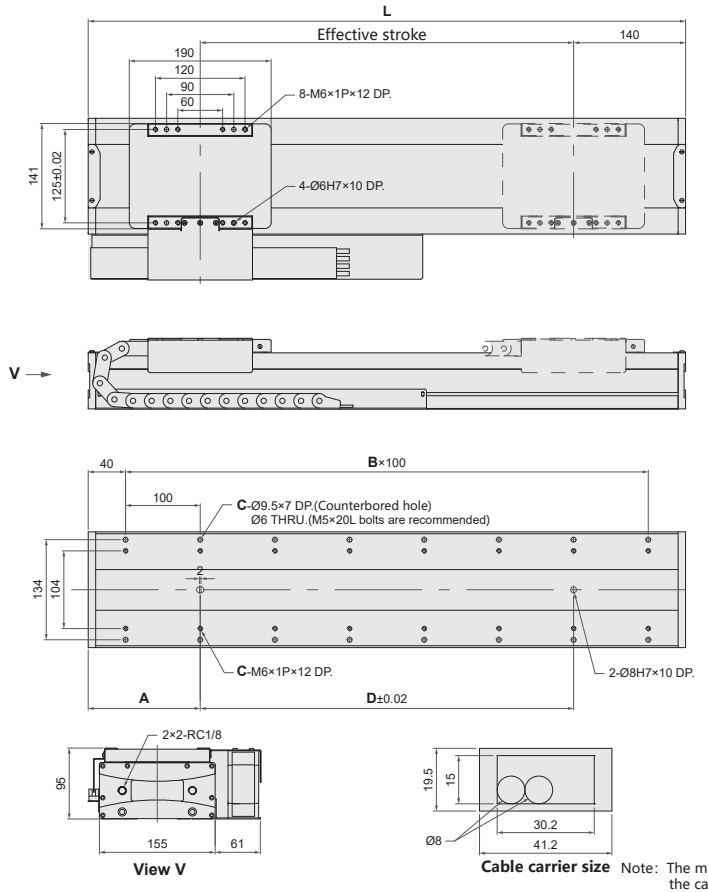


LMB150F1

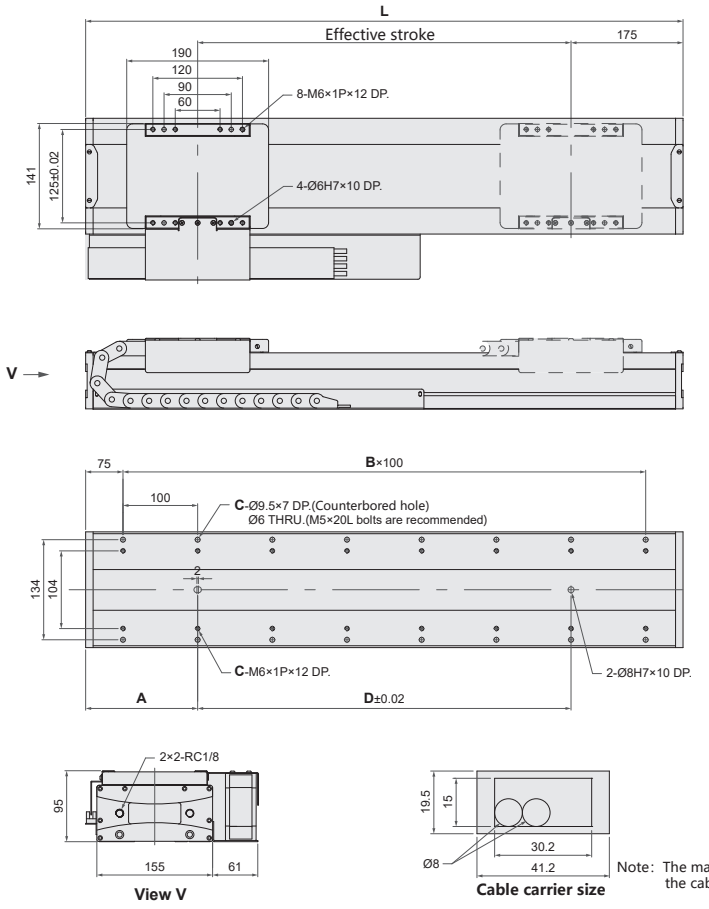


Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	480	580	680	780	880	980	1080	1280	1480	1680	1880	2080	2280
A	140								240	340	440	540	640
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	13	14.6	16.3	17.9	19.5	21.2	22.8	26.1	29.3	32.6	35.9	39.1	42.4

LMB150F2



View V

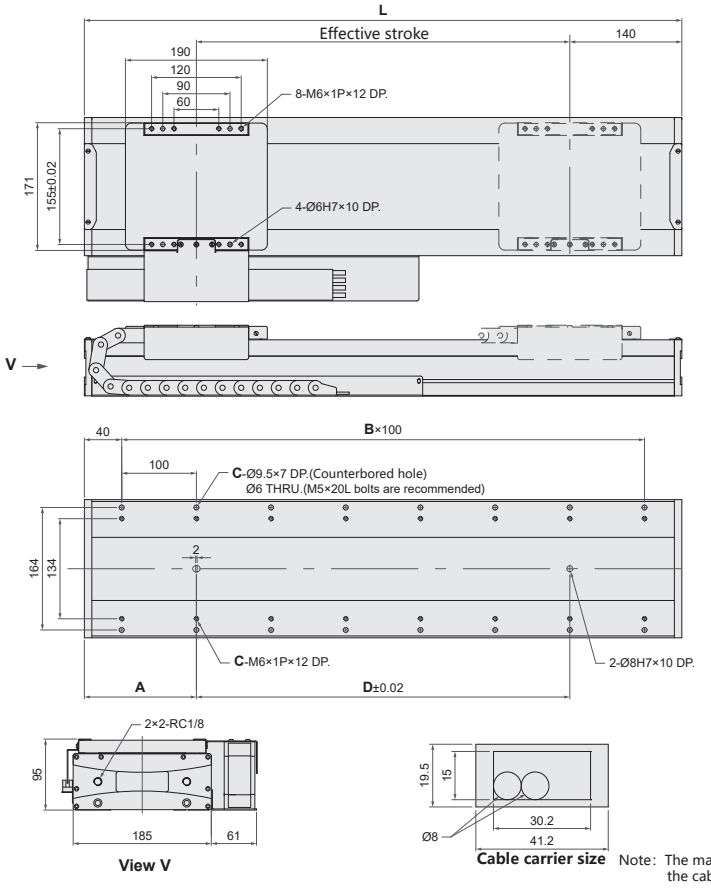
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	550	650	750	850	950	1050	1150	1350	1550	1750	1950	2150	2350
A	175								275	375	475	575	675
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	14	15.6	17.3	18.9	20.5	22.2	23.8	27.1	30.3	33.6	36.9	40.1	43.4

LMB180F1



View V

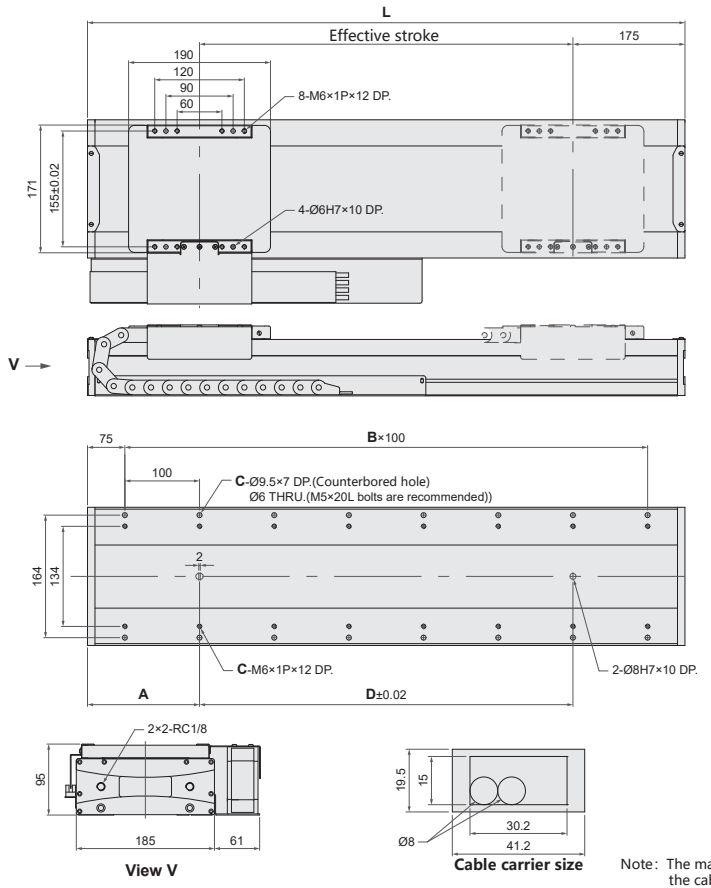
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	480	580	680	780	880	980	1080	1280	1480	1680	1880	2080	2280
A	140								240	340	440	540	640
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	13.9	15.8	17.7	19.6	21.5	23.4	25.2	29	32.8	36.5	40.3	44.1	47.8

LMB180F2



View V

Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

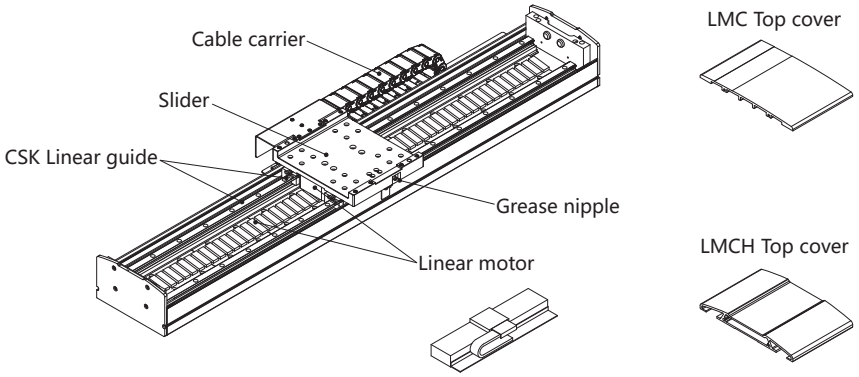
Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	550	650	750	850	950	1050	1150	1350	1550	1750	1950	2150	2350
A	175								275	375	475	575	675
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	15.1	17	18.9	20.8	22.7	24.6	26.4	30.2	34	37.7	41.5	45.3	49

Linear Motor Module

LMC (H) series

Construction



Note：For reference only.

Characteristics

LMC（H）series linear motor module is a universal series,suitable for automatic applications as moving or driving units. Modular design is economical and practical. Different structures can meet different stroke ,and can be used together when the accuracy is not high.The cover plate can be removed under special circumstance.

- Semi enclosed structure
- Efficient heat dissipation
- Rapid acceleration/deceleration
- Precision optional
- Multi-slider
- Long stroke
- Use precision linear guideway
- Modularization
- High quality appearance
- Customization

Applications

Machine Tool（CNC, Lathe …）
Industrial Robot
Semiconductor Manufacturing Equipment
Other（Injection Molding Machine …）

Specifications

LMC 100 F1 D2 - S700 LH P2 3K 3M

Series
LMC：Semi enclosed structure series
LMCH：Semi enclosed structure series（High type）

Size
100，135，150，180，220

Thrust specifications
F1：(Details are shown in the table.) F2

Number of slider
D1：1 slider（Standard） D2：2 sliders

Effective stroke
S700：Each slider effective stroke is 700mm
200mm，300mm，400mm……，2000mm
Note：Details provided in Technical Parameters.

Cable carrier entry location
RH：Horizontally, right LH：Horizontally, left（Standard）
RW：Wall hanging, right LW：Wall hanging, left
No symbol：There is no cable carrier

Resolution
P1：Magnetic encoders P2：Optical encoders 1μm（Standard）
P3：Optical encoders 0.5μm
Note：For other requirements, please consult CSK.

Limit switch
3K：3 Photomicrosensors（Optional） N：There is no limit switch

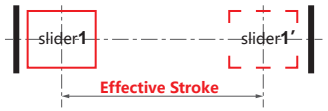
Motor/encoder extension cable
3M：3 meters（Standard）, 5 meters, 10 meters

Special symbol
No symbol：CSK Standard
Special：No symbol，A，B … (For other requirements, please consult CSK)

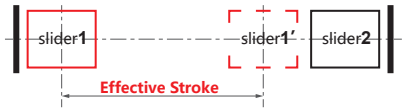
LMC series technical analysis

Effective stroke

■Single slider



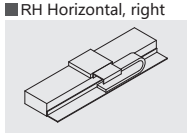
■Double slider



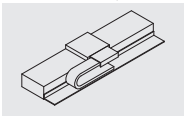
※Note：For other requirements,please consult CSK.

Cable carrier entry location

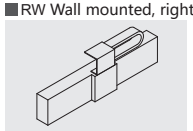
■RH Horizontal, right



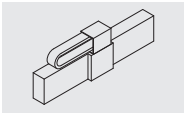
■LH Horizontal, left



■RW Wall mounted, right



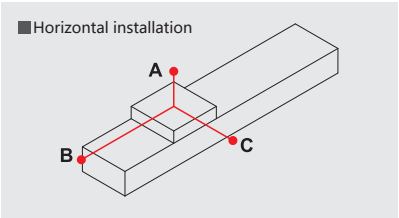
■LW Wall mounted, left



※Be sure to install in the direction as specified individually.
Installation in any other way will cause a failure.

Allowable overhang

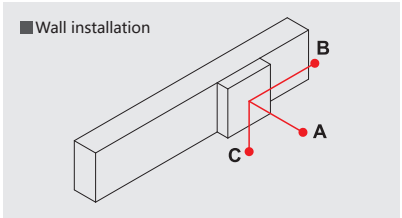
■Horizontal installation



Unit（mm）

Payload	A	B	C
10kg	2525	1397	956
15kg	2248	940	706
20kg	2143	712	573
25kg	1752	576	404
30kg	1464	484	296
35kg	1264	420	220
40kg	1112	372	180

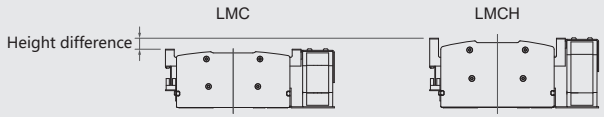
■Wall installation



Unit（mm）

Payload	A	B	C
10kg	976	1056	2032
15kg	696	680	1760
20kg	536	488	1624
25kg	388	320	1024
30kg	224	260	840
35kg	212	216	712
40kg	188	184	612

Height difference



LMC Characteristics：
After installation,the assembly height is low.

LMCH Characteristics：
After installation,long stroke can be realized.

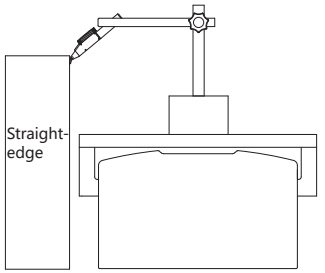
Technical Parameters

Model	LMC100		LMC135	LMC150/LMCH150		LMC180/LMCH180		LMC220	
	LMC100F1	LMC100F2	LMC135F1	LMC150F1	LMC150F2	LMC180F1	LMC180F2	LMC220F1	LMC220F2
Peak Force (N)	240	170	396	792	1188	849	1256	1766	2000
Continuous force (N)	80	51	110	220	330	250	370	520	691.6
Effective stroke (mm)	100-1000		100-4000 (The stroke increases in increments of 100 mm. For larger strokes, please contact CSK.)						
Encoder resolution			Optical：1、0.5、0.1μm ; 1vpp sincos/ Magnetic：1μm、0.2μm						
Repeatability (μm)			±2μm/±3μm						
Accuracy (μm)			±6μm/±9μm（compensatory）						
Horizontal straightnes			±2.5μm/500mm						
Vertical straightness			±5μm/500mm						
Appearance			Colorless oxidation						
Maximum speed (m/s)	5	5	5	5	5	5	5	5	5
Max. acceleration (m/s^2)	20	11	25	30	36	31	37	38	44
Workbench weight (kg)	1.5	1.8	2.6	3.7	5.5	4.4	6.5	6.9	8.1
Height (mm)	70		85	80/95				115	

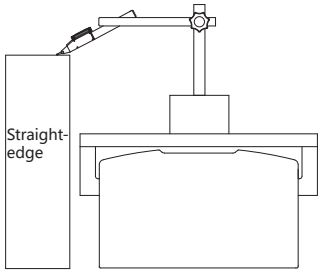
- When the effective travel exceeds two meters, no cover plate is added.
- The positioning accuracy after compensation is three times the repeat accuracy.
- The lubrication method employs lithium-based grease, with oiling required every 100 kilometers.

Running Parallelism

Vertical straightness

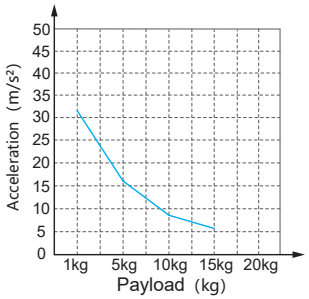


Horizontal straightness

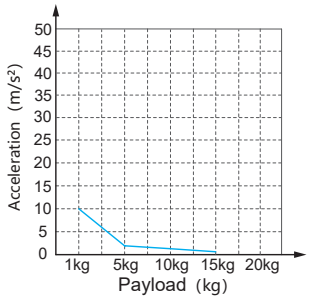


Selection auxiliary diagram(acceleration)

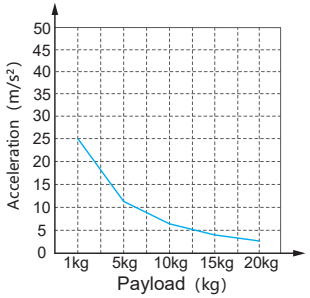
LMC100F1



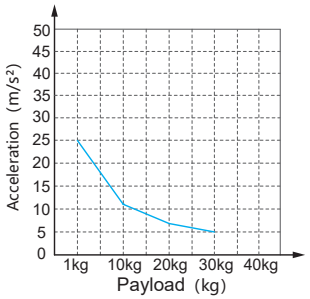
LMC100F2



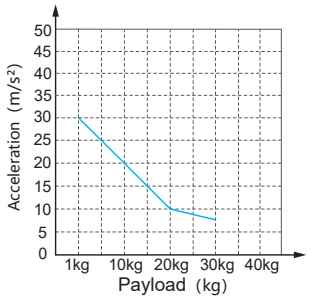
LMC135F1



LMC150F1

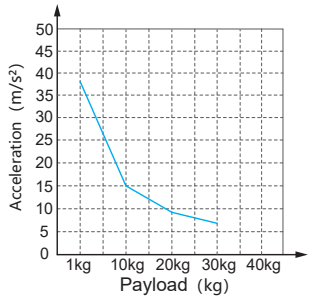


LMC150F2

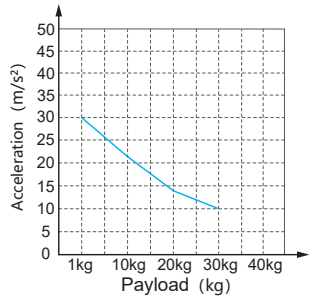


Selection auxiliary diagram(acceleration)

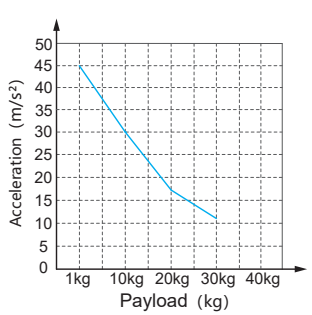
LMC180F1



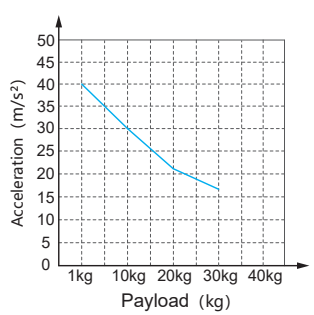
LMC180F2



LMC220F1

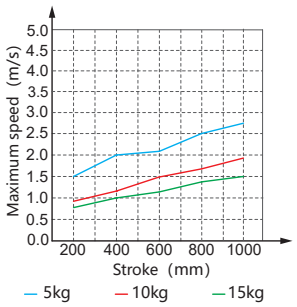


LMC220F2

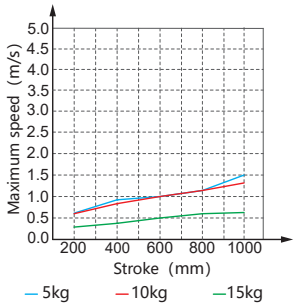


Selection auxiliary diagram (Maximum speed)

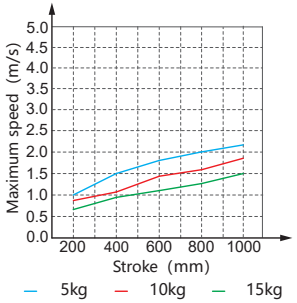
LMC100F1



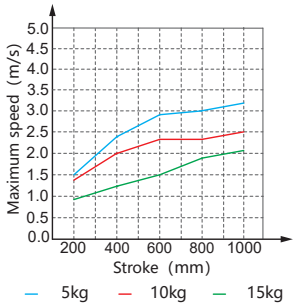
LMC100F2



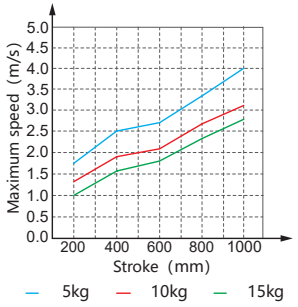
LMC135F1



LMC150F1

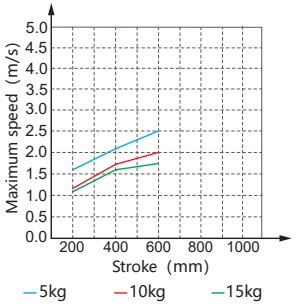


LMC150F2

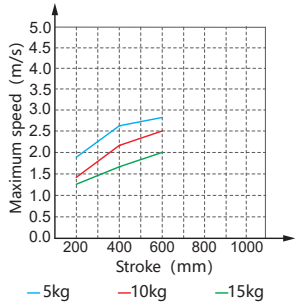


Selection auxiliary diagram (Maximum speed)

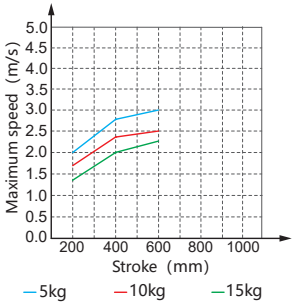
LMC180F1



LMC180F2



LMC220F1



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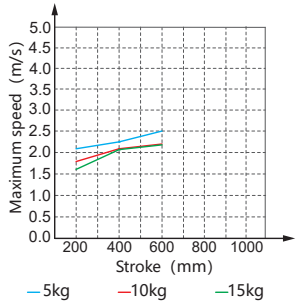
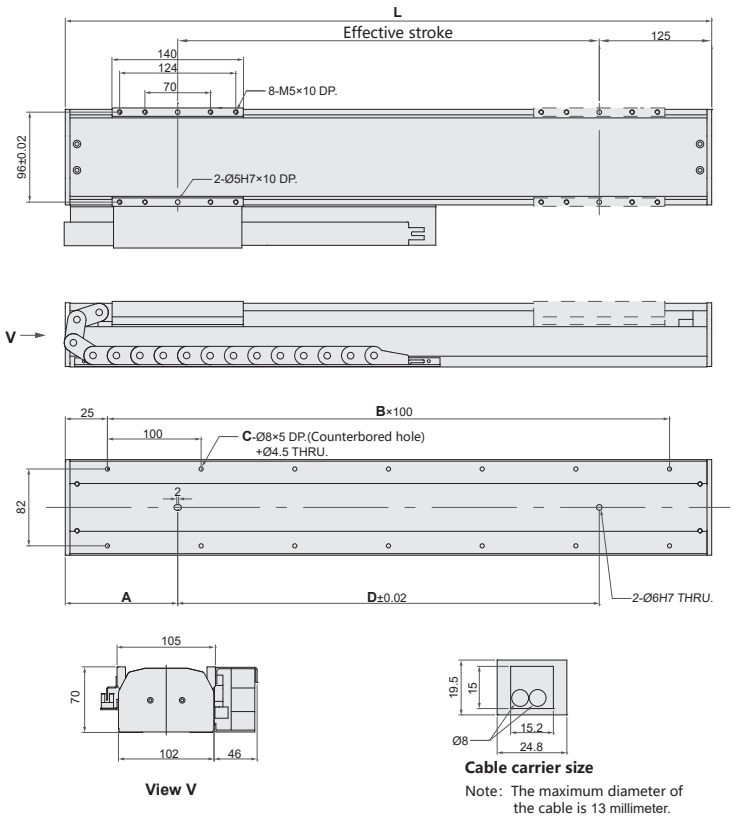


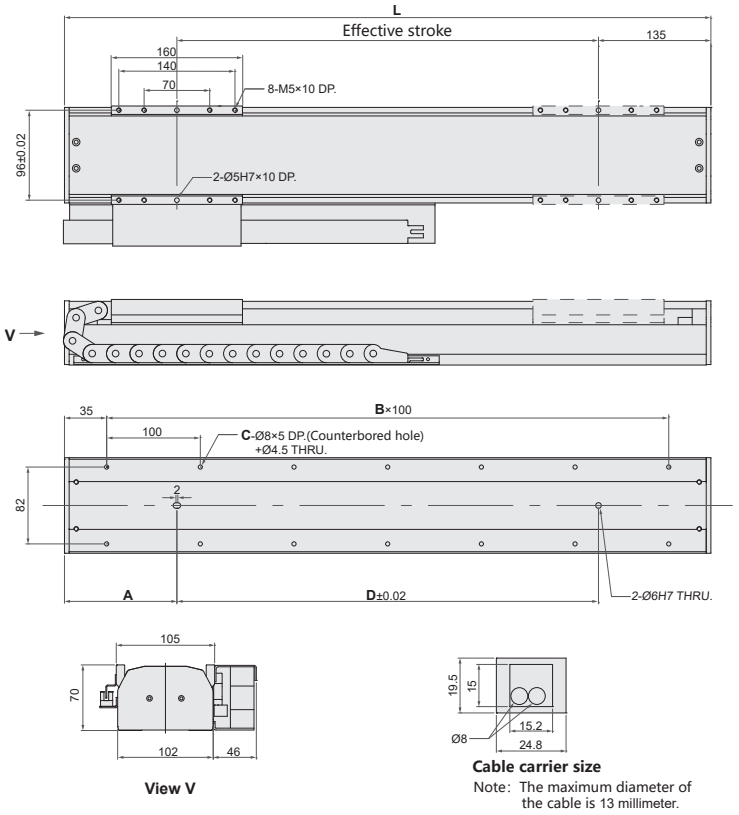
LMC100F1



Unit (mm)

Effective stroke	100	200	300	400	500	600	700	800	900	1000
L	350	450	550	650	750	850	950	1050	1150	1250
A	125									
B	3	4	5	6	7	8	9	10	11	12
C	8	10	12	14	16	18	20	22	24	26
D	100	200	300	400	500	600	700	800	900	1000
Weight (kg)	4.7	5.4	6	6.7	7.3	8	8.7	9.3	10	10.6

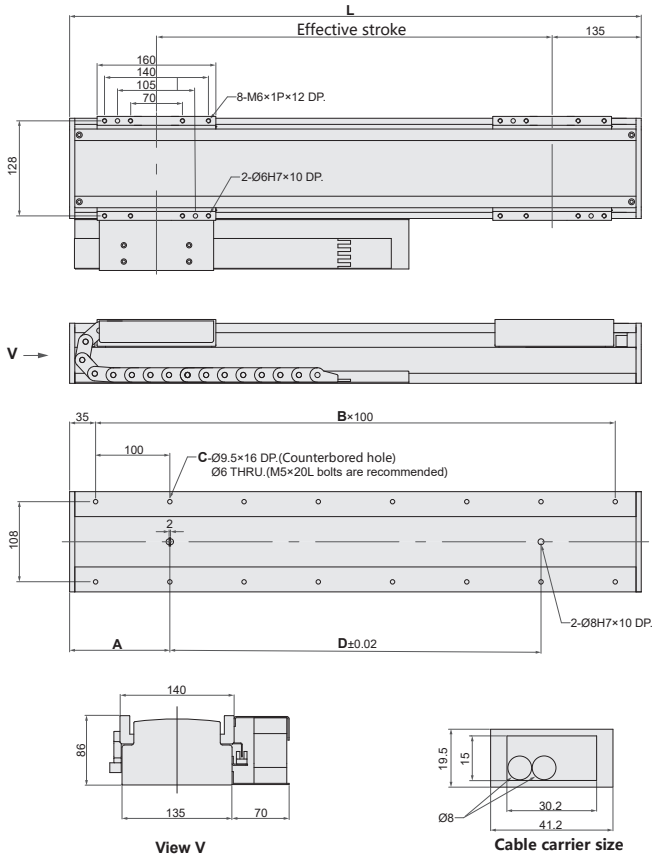
LMC100F2



Unit (mm)

Effective stroke	100	200	300	400	500	600	700	800	900	1000
L	370	470	570	670	770	870	970	1070	1170	1270
A	135									
B	3	4	5	6	7	8	9	10	11	12
C	8	10	12	14	16	18	20	22	24	26
D	100	200	300	400	500	600	700	800	900	1000
Weight (kg)	5.6	6.3	7	7.6	8.3	9	9.7	10.3	11	11.7

LMC135



View V

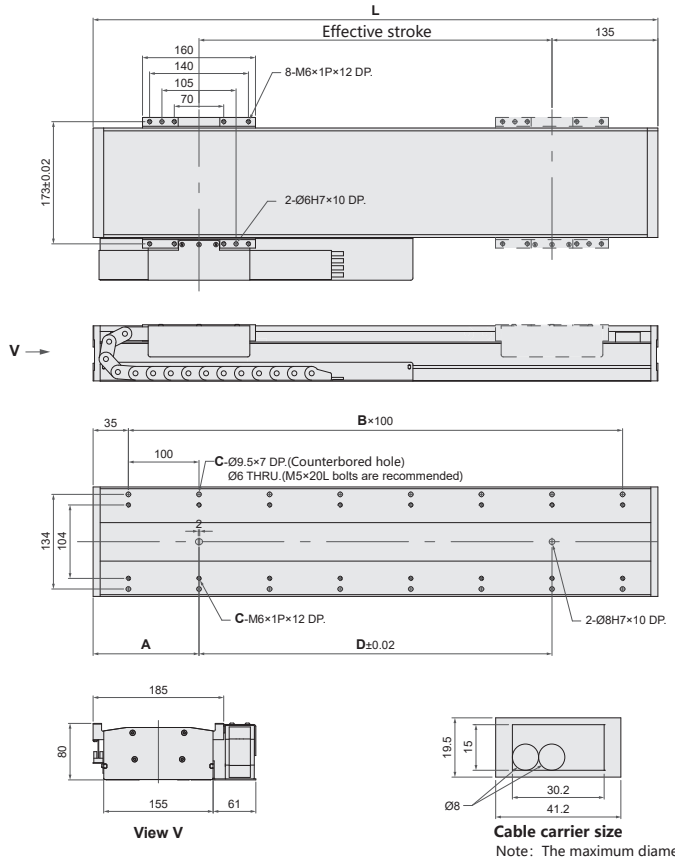
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	470	570	670	770	870	970	1070	1270	1470	1670	1870	2070	2270
A	135								235	335	435	535	635
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	8.9	10.1	11.3	12.6	13.8	15.1	16.3	18.8	21.2	23.7	26.2	28.7	31.2

LMC150F1



View V

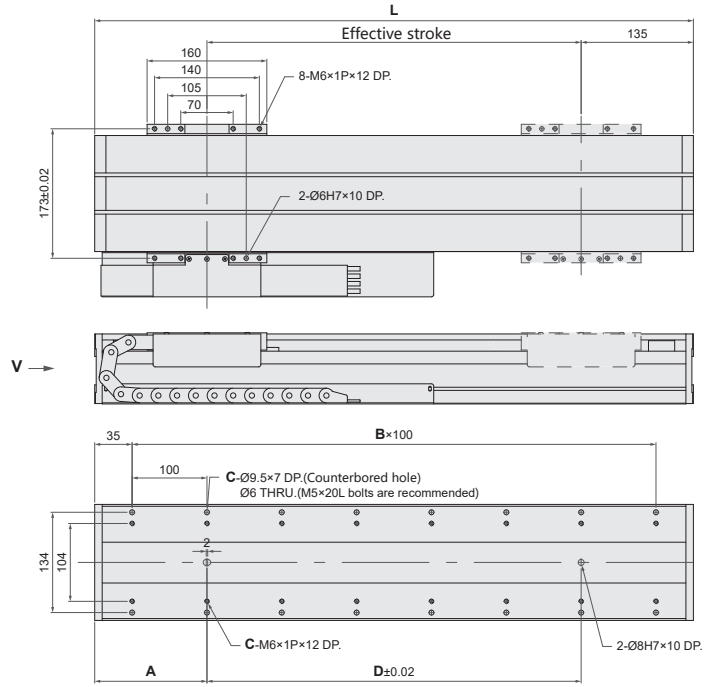
Cable carrier size

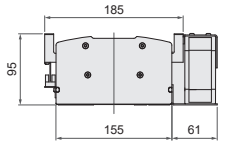
Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

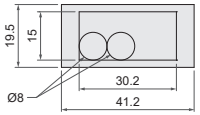
Effective stroke	200	300	400	500	600	700
L	470	570	670	770	870	970
A	135					
B	4	5	6	7	8	9
C	10	12	14	16	18	20
D	200	300	400	500	600	700
Weight (kg)	13.2	15	16.7	18.5	20.2	22

LMCH150F1





View V



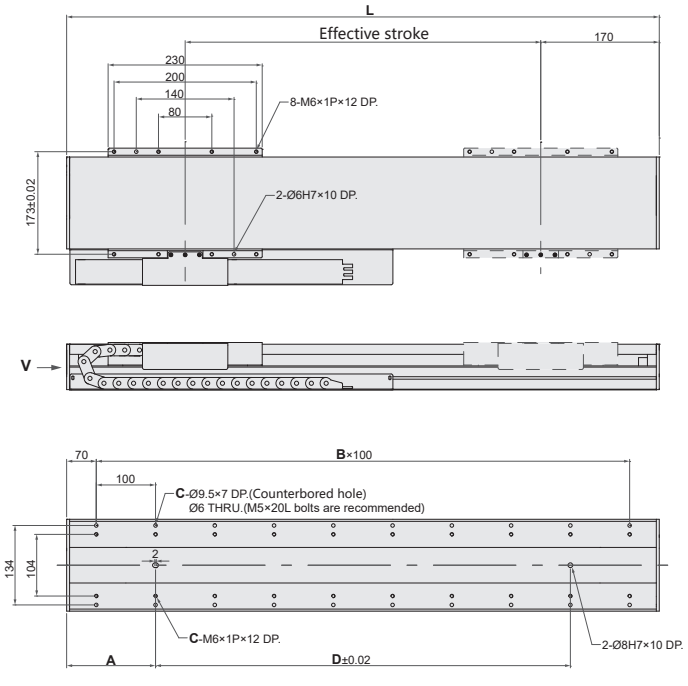
Cable carrier size

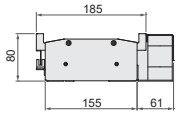
Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

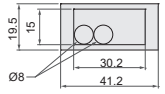
Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	470	570	670	770	870	970	1070	1270	1470	1670	1870	2070	2270
A	135								235	335	435	535	635
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	13.7	15.5	17.2	19	20.7	22.5	24.2	27.7	31.2	34.7	38.2	41.7	45.2

LMC150F2





View V



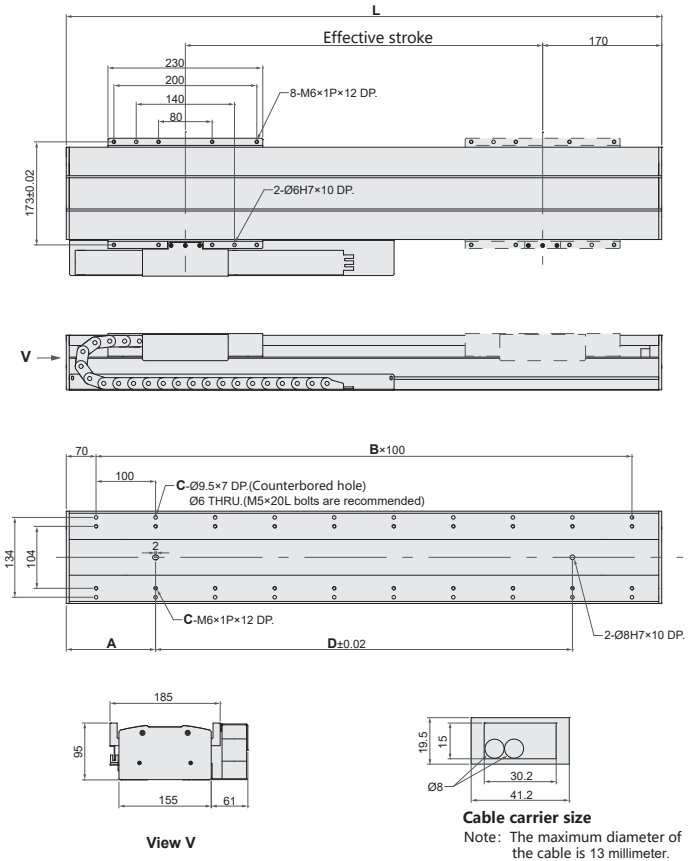
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700
L	540	640	740	840	940	1040
A	170					
B	4	5	6	7	8	9
C	10	12	14	16	18	20
D	200	300	400	500	600	700
Weight (kg)	15	16.8	18.5	20.3	22	23.8

LMCH150F2



View V

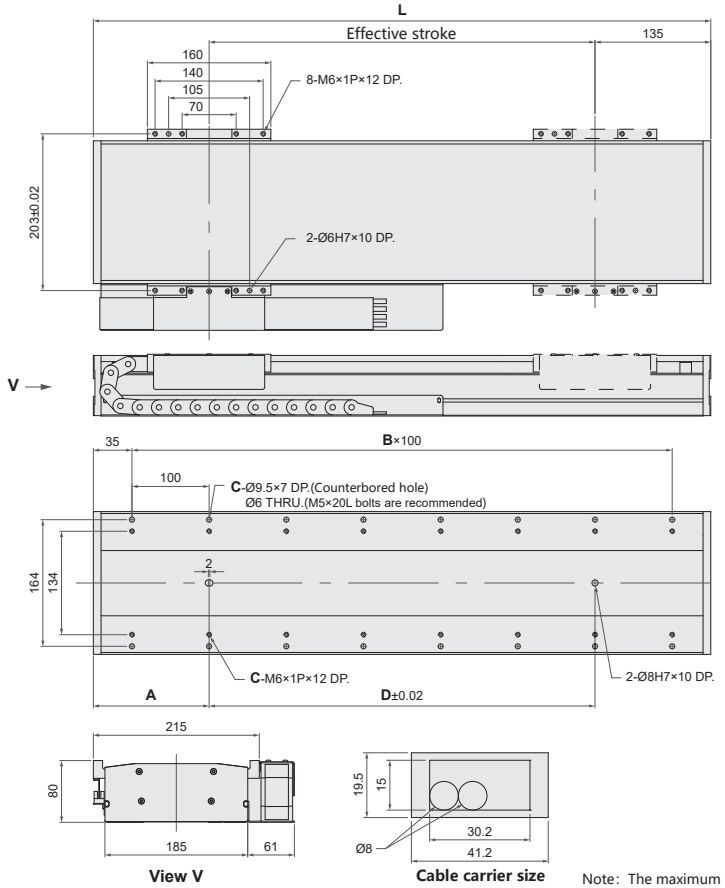
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	540	640	740	840	940	1040	1140	1340	1540	1740	1940	2140	2340
A	170								270	370	470	570	670
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	15.6	17.4	19.1	20.9	22.6	24.4	26.1	29.6	33.1	36.6	40.1	43.6	47.1

LMC180F1



View V

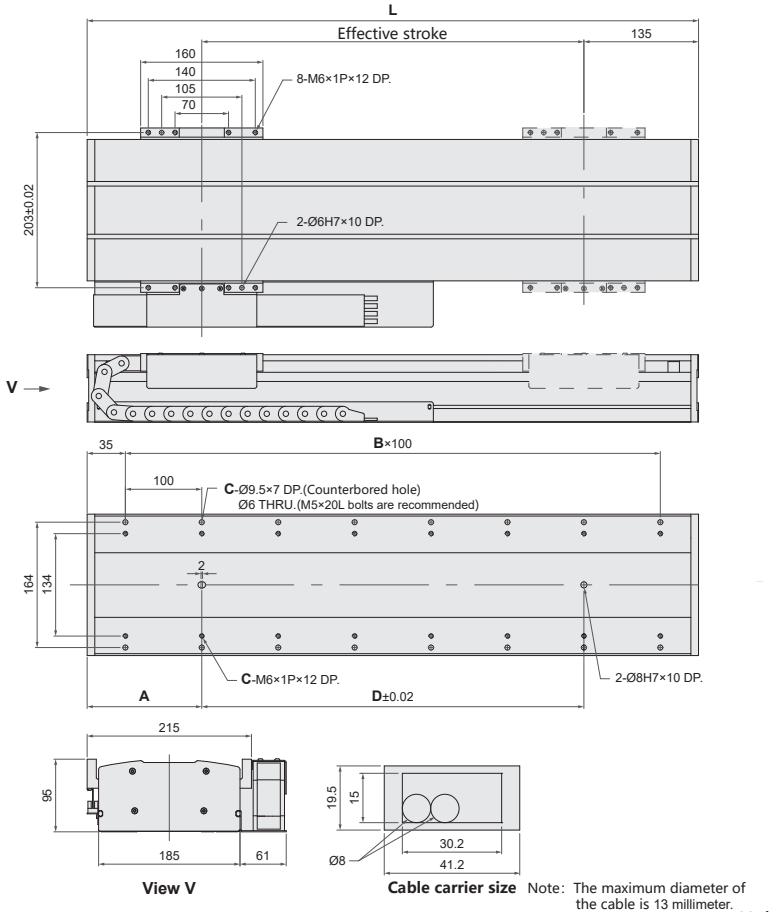
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700
L	470	570	670	770	870	970
A	135					
B	4	5	6	7	8	9
C	10	12	14	16	18	20
D	200	300	400	500	600	700
Weight (kg)	15.7	17.7	19.7	21.6	23.6	25.6

LMCH180F1



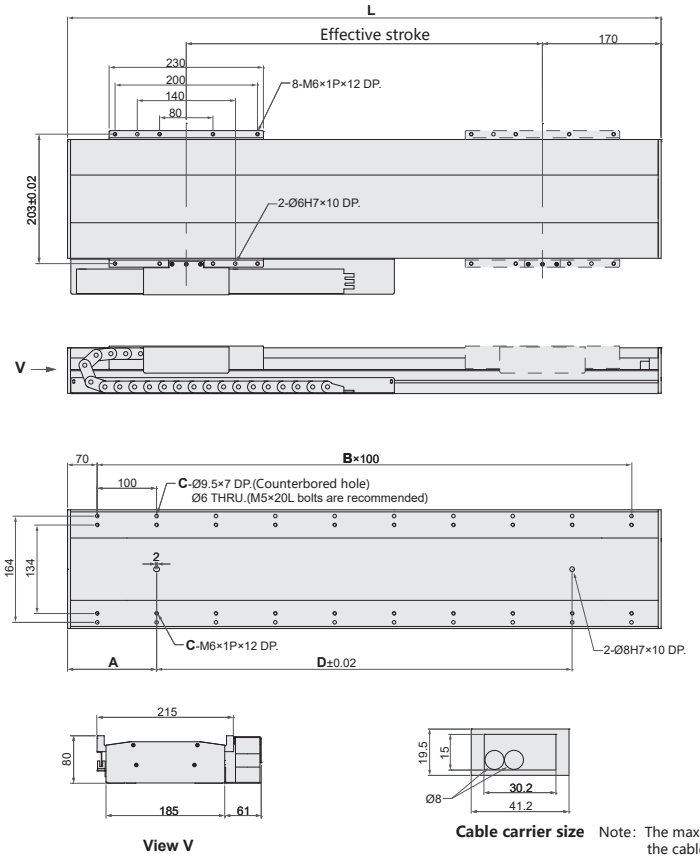
View V

Cable carrier size Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	470	570	670	770	870	970	1070	1270	1470	1670	1870	2070	2270
A	135								235	335	435	535	635
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	16.2	18.2	20.2	22.1	24.1	26.1	28.1	32	36	40	39.9	47.9	51.8

LMC180F2



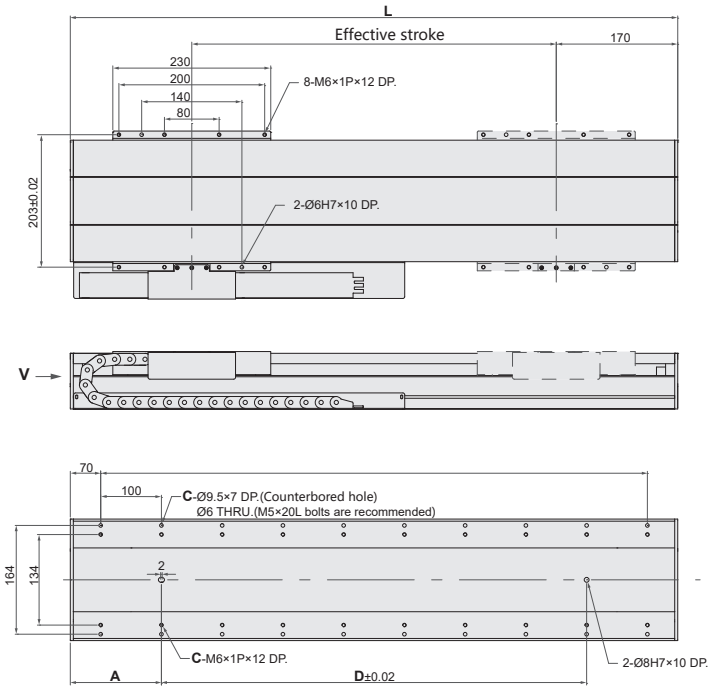
View V

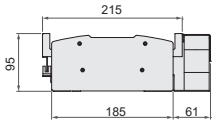
Cable carrier size Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

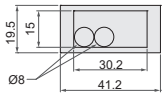
Effective stroke	200	300	400	500	600	700
L	540	640	740	840	940	1040
A	170					
B	4	5	6	7	8	9
C	10	12	14	16	18	20
D	200	300	400	500	600	700
Weight (kg)	17.8	19.8	21.8	23.7	25.7	27.7

LMCH180F2





View V



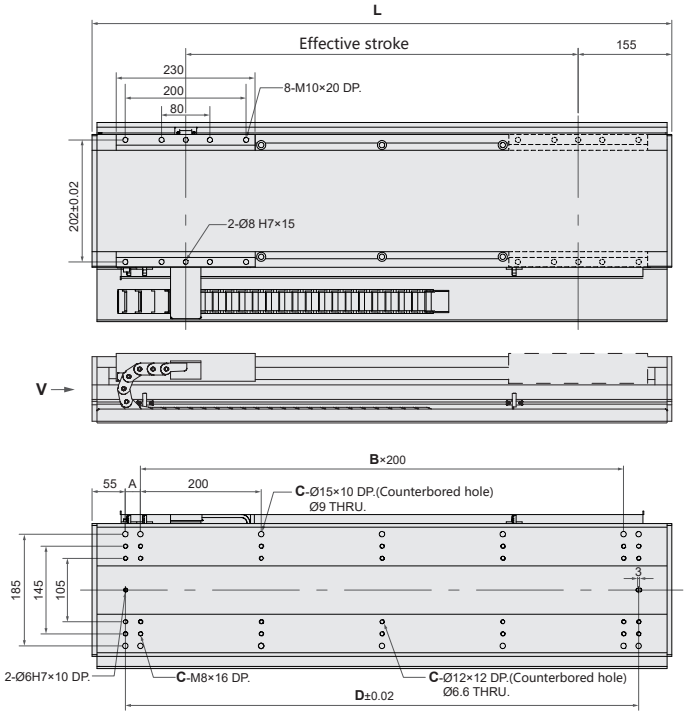
Cable carrier size

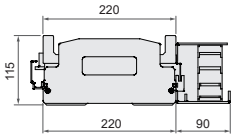
Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

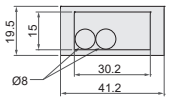
Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	540	640	740	840	940	1040	1140	1340	1540	1740	1940	2140	2340
A	170								270	370	470	570	670
B	4	5	6	7	8	9	10	12	14	16	18	20	22
C	10	12	14	16	18	20	22	26	30	34	38	42	46
D	200	300	400	500	600	700	800	1000					
Weight (kg)	18.5	20.5	22.5	24.4	26.4	28.4	30.4	34.3	38.3	42.3	46.2	50.2	54.1

LMC220F1





View V



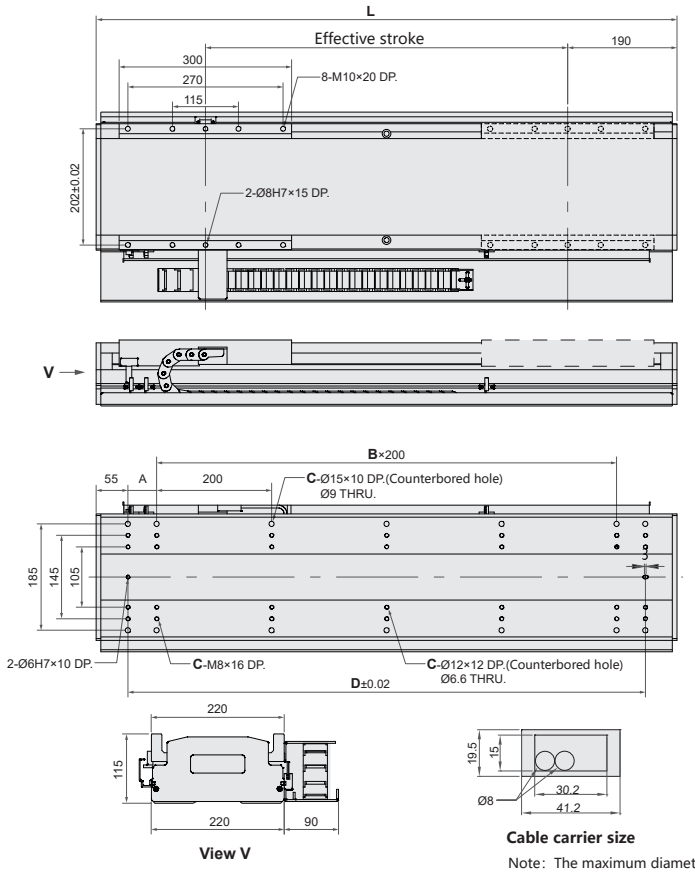
Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	560	660	760	860	960	1060	1160	1360	1560	1760	1960	2160	2360
A	25	75	125	175	25	75	125	25	125	25	125	25	125
B	2	2	2	2	4	4	4	6	6	8	8	10	10
C	10	10	10	10	14	14	14	18	18	22	22	26	26
D	450	550	650	750	850	950	1050	1250	1450	1650	1850	2050	2150
Weight (kg)	26.7	29.5	32.3	35.1	37.9	40.7	43.5	49.1	54.7	60.3	65.9	71.5	77.1

LMC220F2



View V

Cable carrier size

Note: The maximum diameter of the cable is 13 millimeter.

Unit (mm)

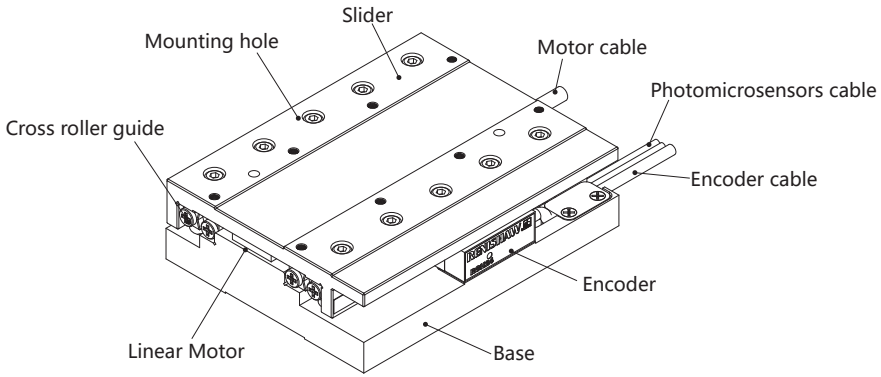
Effective stroke	200	300	400	500	600	700	800	1000	1200	1400	1600	1800	2000
L	610	710	810	910	1010	1110	1210	1410	1610	1810	2010	2210	2410
A	50	100	150	200	50	100	150	20	150	50	150	50	150
B	2	2	2	2	4	4	4	6	6	8	8	10	10
C	10	10	10	10	14	14	14	18	18	22	22	26	26
D	500	600	700	800	900	1000	1100	1300	1500	1700	1900	2100	2300
Weight (kg)	30.4	33.2	36	38.8	41.6	44.4	47.2	52.8	58.4	65.4	69.6	75.2	80.8

MOTION TECHNOLOGY

Mini Linear Motor Module

LMD series

Construction



Note：For reference only.

Characteristics

The concept of LMD series is to design a direct drive micro module with extremely low cross-section height, small volume and high force by matching with high-resolution linear encoder and using high-precision roller guide rail, it realizes high-precision and extremely low dust emission, which can be used in clean room environment.

- High positioning accuracy
- High acceleration，high response
- Compact structure and space saving
- Excellent stability
- Multiple configurations available
- Suitable for cleanroom environments

Applications

Semiconductor Manufacturing Equipment

Industrial Robot

Photovoltaic Field

Other（Injection Molding Machine …）

Specifications

LMD 120 - S60 H 2K 3M

Series

LMD：Micro Linear Motor Module series

Size

100，120

Effective stroke

40，60，80，100

Accuracy Grade

N：Normal H：High P：Precision

Limit switch

2K：2 Photomicrosensors（Standard） N ：There is no limit switch

Note：For other requirements, please consult CSK.

Motor/encoder extension cable

3M：3 meters（Standard），5 meters, 10 meters...

No symbol：Without Extension Cables

Special symbol

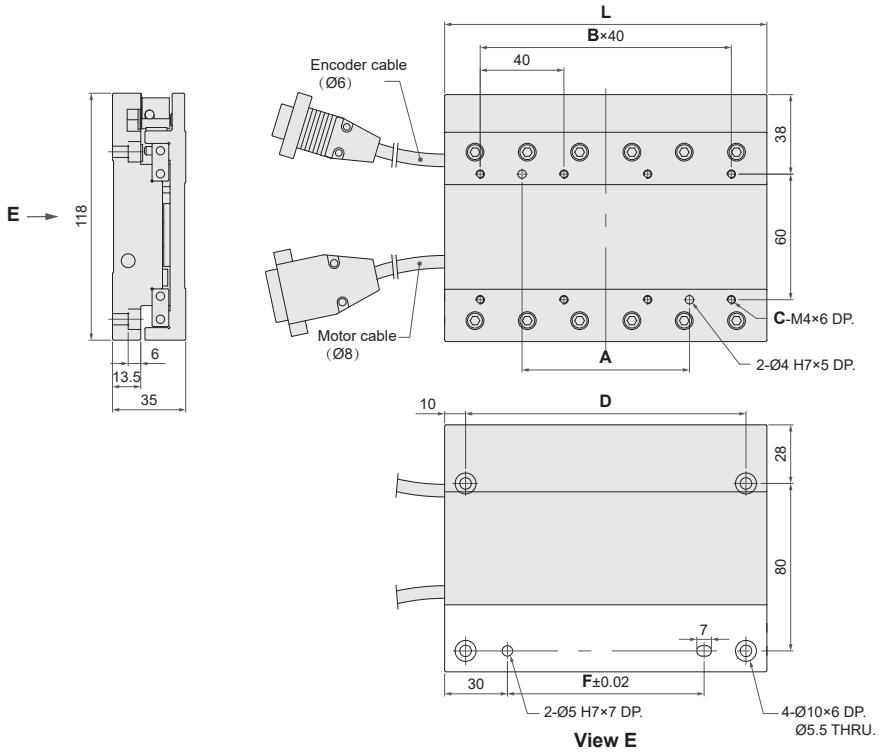
No symbol：CSK Standard

Special：No symbol，A，B ...（For other requirements, please consult CSK）

Technical parameters

Model	LMD100			LMD120		
Accuracy Grade	N	H	P	N	H	P
Peak force（N）	75			120		
Continuous force（N）	25			40		
Peak current（A）	4.5			4.5		
Continuous current（A）	1.5			1.5		
Effective stroke（mm）	40、60、80			40、60、80、100		
Encoder resolution（μm）	Magnetic: 1	Optical: 0.1	Optical: sin-cos	Magnetic: 1	Optical: 0.1	Optical: sin-cos
Repeatability（μm）	±1	±0.3	±0.1	±1	±0.3	±0.1
Accuracy(compensatory)(μm)	±2	±1	±0.5	±2	±1	±0.5
Horizontal straightness	10	6	4	10	6	4
Vertical straightness	10	6	4	10	6	4
Rated Load	3			5		
Max. acceleration(No-Load) (m/s^2)	4			4		
Appearance	Black					

Dimensions of LMD120



Unit (mm)

Effective stroke	L	A	B	C	D	F	Weight (kg)	
							LMD100	LMD120
40	129	80	3	8	109	69	2.1	2.7
60	154	80	3	8	134	94	3.2	3.8
80	179	120	4	10	159	119	4.3	4.9
100	204	120	4	10	184	144	5.4	6

Precautions for use

1. Precautions before purchase

1.1 When purchasing, please check the scope of the use environment with our sales staff. Please do not use in the corrosive environment such as sulfur and sulphide gas, which may lead to line breakage or poor contact.

1.2 When selecting the model, please check the use requirements and motor parameters with our sales staff to ensure the scientific use.

2. Matters needing attention in operation

2.1 This product is manufactured as a precision mechanical part and is widely used in the mechanical industry. Technical personnel with professional knowledge and experience are required to operate it.

2.2 When operating, please be sure to use according to the operating specifications of the product.

2.3 In the application, if you have special requirements on the use environment of cable and motor installation, please contact our sales staff for confirmation to prevent accidents.

2.4 All terminals of the equipment are not allowed to be plugged and unplugged with live power to prevent damage to the motor and driver.

2.5 The ground wire of the motor must be grounded.

2.6 Do not place the control signal line and power line (main power line, motor power line, etc.) of the equipment in the same line tube or wrap them into a bundle.

2.7 During motor operation, do not touch the moving parts of the motor.

3. Matters needing attention for follow-up maintenance

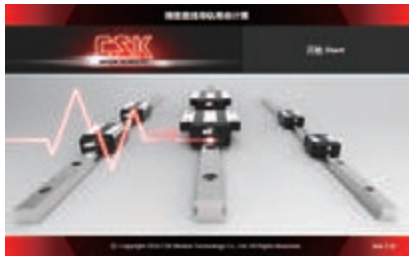
3.1 Precautions for storage equipment: temperature shall be controlled within -20℃ to +60℃. Humidity: less than 85%, placed in a dust-free, clean, non-corrosive gas, no grinding fluid, no metal powder, no oil environment.

3.2 In the case of movement, wiring, maintenance and inspection, please cut off the power for more than 3 minutes before operating. Cut off the power for about 2~3 minutes, the power line still has voltage residue, do not touch the equipment carelessly.

3.3 Frequent power on or off will lead to deterioration of main circuit components. After power off, please wait for more than 1 minute to power on again. The frequency of power on and off is limited to less than 2 times every 3 minutes.

3.4 When in use, please lubricate and maintain the linear guide rail regularly.

Theoretical Calculation Software



Precision Linear Guide Life Calculation Software

Applicable products: CSK LMG series linear guideway
In order to provide customers with scientific data reference, CSK specially produces this theoretical calculation software, which is convenient for users to select products and evaluate schemes.
The software is based on the theoretical calculation, and there is deviation between the calculation result and the actual value, which is only for reference.
The software copyright belongs to CSK Motion Technology Co., Ltd.
please consult CSK for more technical support.

Linear Motor Force Calculation Software

Applicable products: CSK Iron Core Linear Motor and Ironless Linear Motor
In order to provide customers with scientific data reference, CSK specially produces this theoretical calculation software, which is convenient for users to select products and evaluate schemes.
The software is based on the theoretical calculation, and there is deviation between the calculation result and the actual value, which is only for reference.
The software copyright belongs to CSK Motion Technology Co., Ltd.
please consult CSK for more technical support.

Direct Drive Torque Motor Torque Calculation Software

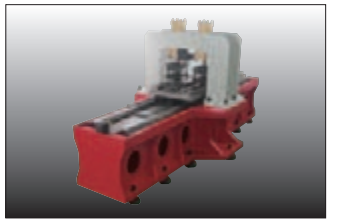
Applicable products: CSK Direct Drive Torque Motor
In order to provide customers with scientific data reference, CSK specially produces this theoretical calculation software, which is convenient for users to select products and evaluate schemes.
The software is based on the theoretical calculation, and there is deviation between the calculation result and the actual value, which is only for reference.
The software copyright belongs to CSK Motion Technology Co., Ltd.
please consult CSK for more technical support.

Notice：
CSK calculation software is a theoretical calculation software, which is only for reference. When using, please ask professional personnel to operate or operate under the guidance of professional personnel. If incorrect operation is used to output results, the consequences will be borne by the operator.

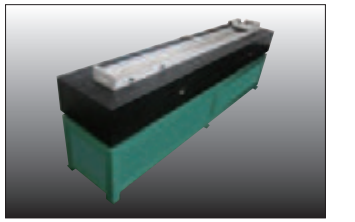
Product performance verification equipment

In CSK' s product development process, products are rigorously tested and strive to provide the best products to customers.

Guide life testing machine

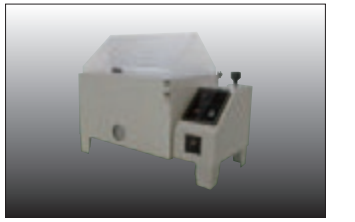


Guide high speed testing machine

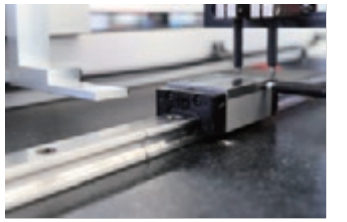


Guide dustproof testing machine

Salt spray testing machine

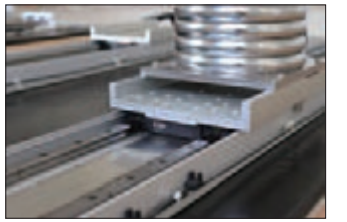


Linear guide accuracy detection

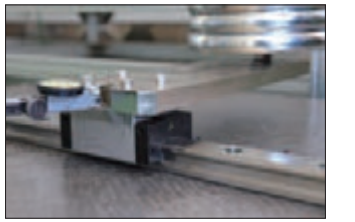


Linear guide thrust fluctuation test

Linear guide durability test



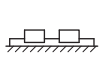
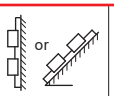
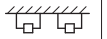
Linear guide torque test



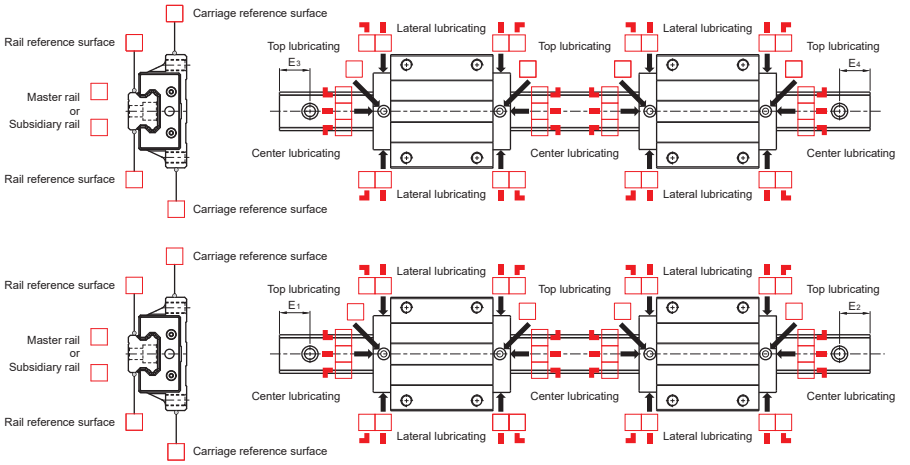
Linear Guideway Request Form

Date:

Customer Name:	Address:
TEL:	Model:
FAX:	Number:
Contact Person:	Application:

Installation Direction	 ☐ H type	 ☐ R type	 ☐ V type	 ☐ K type	 ☐ T type	 ☐ RV type	☐ Others
Carriage Type	☐ C ☐ LC ☐ H ☐ LH ☐ T ☐ ST						
Size	☐ 15 ☐ 20 ☐ 25 ☐ 30 ☐ 35 ☐ 45						
No. of Carriages	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ Others:						
Dust Protection	☐ 无 ☐ UU ☐ SS ☐ ZZ ☐ DD ☐ KK						
Preload Grade	☐ P0 ☐ P1 ☐ P2						
Rail Type	☐ Counter-bore (R Type) ☐ Tapped hole (T Type) ☐ Counter-bore (U Type)						
Rail Length & Pitch	L0: E1: E2: E3: E4:						
Accuracy Grade	☐ N ☐ H ☐ P ☐ SP ☐ UP						
Rail per Axis	☐ 1 ☐ 2 ☐ 3 ☐ Others:						
Lubrication Type	☐ Grease ☐ Oil						
Lubrication Fitting	☐ Grease nipple (Code:) ☐ Oil piping joint (Code:)						
Full Code of Spec.							
Required Quantity							

Reference surface, Lubricating location and direction



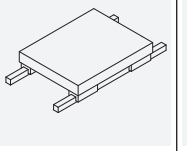
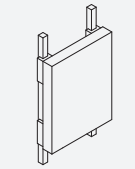
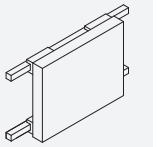
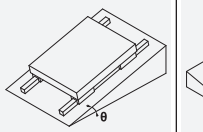
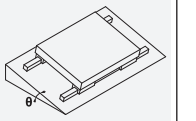
Note : Non-specified cases followed by CSK standards. For other special requirements, please contact us.

Linear Guideway Selection Request Form

Date:

Customer Name:	Address:
TEL:	Model:
FAX:	Number:
Contact Person:	Application:

Installation:

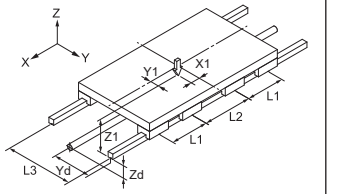
 ☐ Horizontal mount	 ☐ Vertical mount	 ☐ Wall mount	 ☐ Front tilt mount	 ☐ Laterally tilt mount

Note: please draw a schematic drawing for other requirements.

Parameters:

Preselection conditions			
Series		Preload	
Size		Accuracy grade	
Installation			
Speed conditions			
Max. speed	m/s	Stroke	mm
Acceleration time	sec	No. of reciprocations	1/min
Service conditions			
Driving original position		Carriage distance	
Yd	mm	L1	mm
Zd	mm	Middle distance	
Load	kg	L2	mm
Load position		Rail distance	
X1	mm	L3	mm
Y1	mm	Tilt angle	
Z1	mm	θ	°

Figure:



Schematic drawing:

Demand:

Note : Non-specified cases followed by CSK standards. For other special requirements, please contact us.

Ball Screw Selection Request Form

Date:

Customer Name:	Address:
TEL:	Model:
FAX:	Axis Type:
Contact Person:	Number:

Parameters:

Specification selection							
Thread Direction	☐ Left ☐ Right			Number of Threads	☐ 1 ☐ 2 ☐ 3 ☐ 4		
Screw Outer Diameter		Lead		Number of Ball Circuits		Accuracy Grade	
Thread Length				Total Screw Length			
Nut Type	☐ End Cap Type ☐ Other						
Load conditions							
Maximum Stroke	mm		Motor Maximum Speed	r.p.m	Motor Specification	kw	
Screw Mounting Direction	☐ Vertical ☐ Horizontal ☐ Inclined		Inclination Angle		Support Distance	mm	
Acceleration/ Deceleration Time	S		Acceleration	m/s^2	Maximum Feed Rate	m/min	
Required Life	×10^6revs		km		hr		
Axial Load	First Load	kgf	Rotation Speed	mm/min	Usage Time	Ratio(%)	
	Second Load	kgf	Rotation Speed	mm/min	Usage Time	Ratio(%)	
	Third Load	kgf	Rotation Speed	mm/min	Usage Time	Ratio(%)	
Maximum Axial Load	kgf	Table Weight	kg	Workpiece Weight	kg		
Guide Type	☐ Linear Ball Guide	☐ Ball Guide	☐ Hard Guide				
Support Method	☐ Fixed-Fixed	☐ Fixed-Supported	☐ Fixed-Free	☐ Supported-Supported			
	Lead Accuracy, Axial Backlash						
Cumulative Lead Target Value (T)	mm	Positioning Accuracy	mm(No Load)	Repeatability	mm(No Load)		
Preload	kgf	Preload Torque	kgf/cm				
Axial Backlash	mm(No Load)	Nut Rigidity	kgf/μm				
	Others						
Lubricant		Grease		Other			
Operating Temperature Range	☐ ℃ ☐ °F						

Demand:

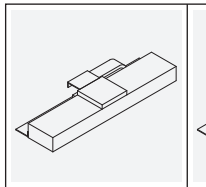
Note : Non-specified cases followed by CSK standards. For other special requirements, please contact us.

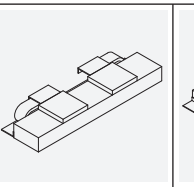
Linear Motor Module/Stage Selection Request Form

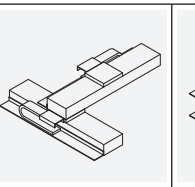
Date:

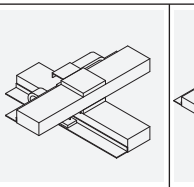
Customer Name:	Address:
TEL:	Model:
FAX:	Number:
Contact Person:	Application:

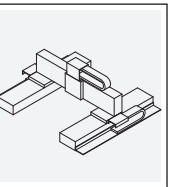
Structure Type:


☐ S type


☐ D type


☐ C type


☐ L type


☐ G type

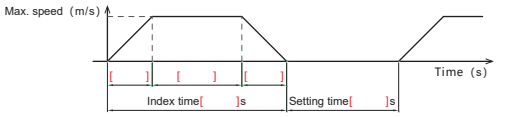
Note: please draw a schematic drawing for other requirements.

Parameters:

Single axis			
Stroke	mm	Load	kg
Max. speed	m/s	Accuracy	±μm
Acceleration	m/s^2	Repeatability	±μm
X axis			
Stroke	mm	Load	kg
Max. speed	m/s	Accuracy	±μm
Acceleration	m/s^2	Repeatability	±μm
Y axis			
Stroke	mm	Load	kg
Max. speed	m/s	Accuracy	±μm
Acceleration	m/s^2	Repeatability	±μm

Schematic drawing:

Cycle pattern



Installation

☐ Horizontal mount ☐ Wall mount

☐ Others [ ]

Dust Proof

Demand:

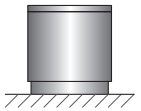
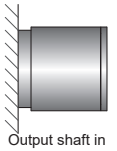
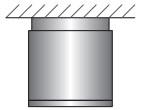
Note : Non-specified cases followed by CSK standards. For other special requirements, please contact us.

Direct Drive Torque Motor Selection Request Form

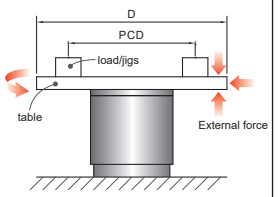
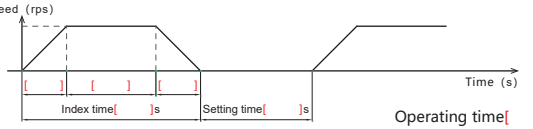
Date:

Customer Name:	Address:
TEL:	Model:
FAX:	Number:
Contact Person:	Application:

Installation:

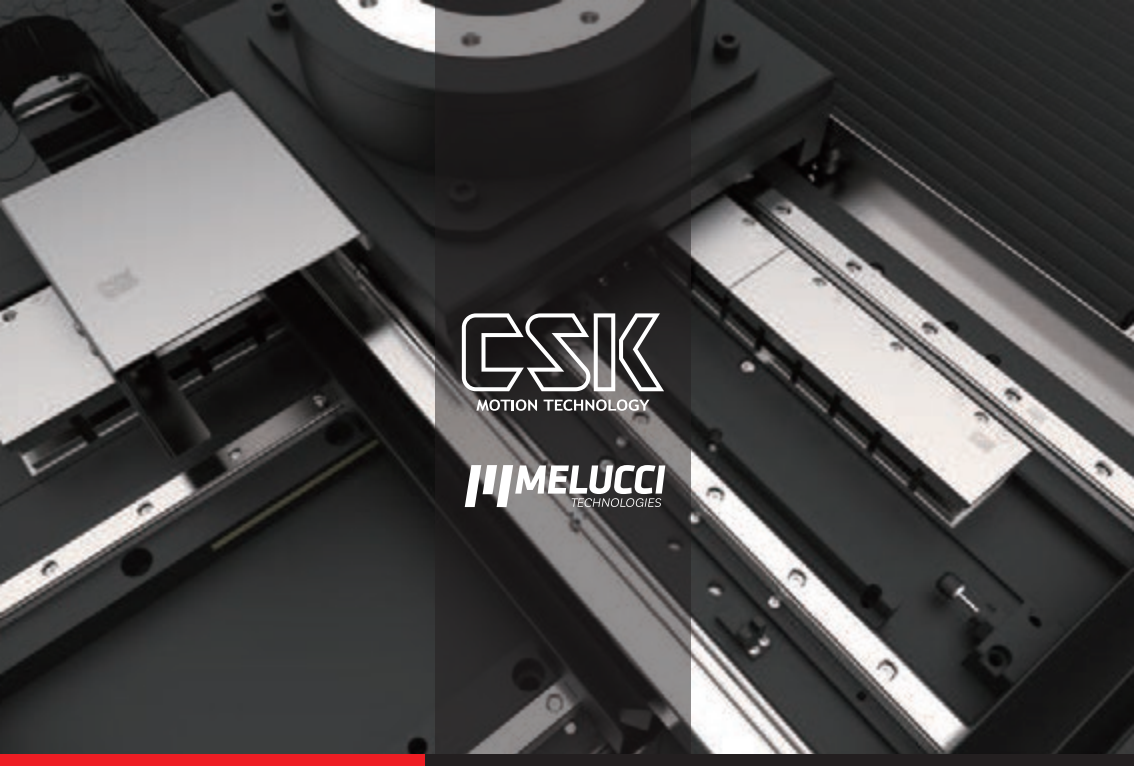
☐ Horizontal mount	☐ Wall mount	☐ Inverted mount	☐ Others
 Output shaft in a vertical direction	 Output shaft in a transverse direction	 Output shaft in a downward direction	

Parameters:

Load conditions		Figure	Schematic drawing
Shape of table			
Diameter of table(D)	mm		
Mass of table(m1)	kg		
Material of table			
Dimensions of load/jigs	mm		
Mass of load/jigs	kg		
Number of load/jigs	pcs		
PCD (distance between the load/jigs)	mm		
External force Way of external force	[ ]N / ☐ None ☐ At startup ☐ During rotating ☐ Rotational direction ☐ At settling (Clockwise is the direction of rotation)		
Position of external force Direction of external force			
Positioning command system	☐ Internal program system ☐ Pulse train input operation ☐ CANopen ☐ EtherCAT ☐ PROFINET		
Index angle/Number of points	Settle at[ ]°, Number of points[ ]		
Repeatability(±)	±[ ]arc-sec (±[ ]mm at[ ]mm from the motor center)		
Cycle pattern ●Index time ●Setting time	 Operating time[ ]hours/days		
Environmental conditions	Operating environment ☐ Clean ☐ General environment (IP30) ☐ Chips and dust ☐ Oil, water, and chemical		
Motor cable Length	Length: [ ]m		

Demand:

Note : Non-specified cases followed by CSK standards. For other special requirements, please contact us.



CSK CHINA

CSK Motion Technology Co., Ltd.

Industrial Zone, Madian Town, Jiaozhou,

Qingdao, China

E-mail info@cskmotions.com

www.cskmotions.com

MELUCCI
TECHNOLOGIES

www.melucci.it
vendite@melucci.it
Tel. 0541 775768
Via Emilia 78-80 - 47921 Rimini (RN)

Distributor