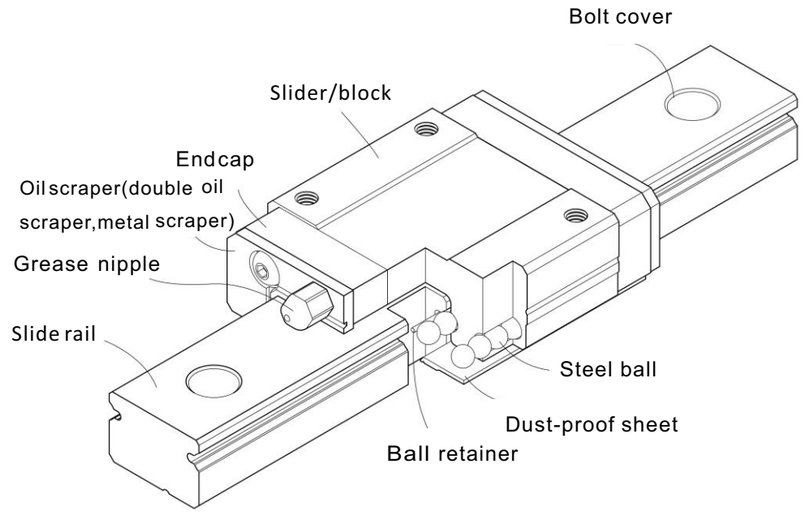
MINIATURE LINEAR GUIDE CATALOG

5.TG Series - Miniature Linear Guideway

5. 1 The Features of the TGN Series Linear

1.Small size and light weight, especially suitable for use in miniaturized equipment.
2.Stainless steel linear slides, including sliders, slides and other metal fittings such as steel balls, retainers, etc., all made of stainless steel and have rust-proof properties.
3.Adopting Gothic four-point contact design, it can withstand loads in all directions, with strong rigidity and high precision.
4.There is a ball retainer design, which is interchangeable with precision.

5. 1. 1 TGN Body Structure

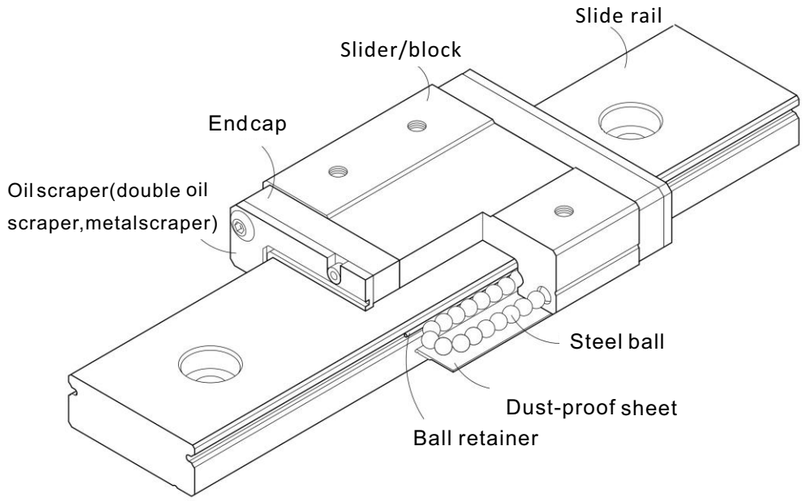


- Rolling circulation system: slider/block, slide rail, end cap, steel ball, ball retainer.
- Lubrication system: TGN15 has a nozzle on the end cover side to provide customers with oil filling, while TGN7, 9 and 12 reserve oil filling holes on the end cover side, which can be used to lubricate oil or grease into the inside of the slider.
- Dust Protection system: oil scraper, dust-proof sheet(optional for size 9,12,15), bolt cover(optional for size 12,15).

5. 2 The Features of the TGW Series of Linear Guide

1.The design of the widened slide rail greatly improves the torque load capacity and can be used for single shaft.
2.Gothic four-point contact design, can withstand loads in all directions and has high rigidity.
3.The slider is equipped with a micro-small retaining wire, and the slider steel ball will not fall off.
4.The slide rails, sliders and all metal fittings are made of stainless steel and are corrosion resistant.

5. 2. 1 TGW Body Structure



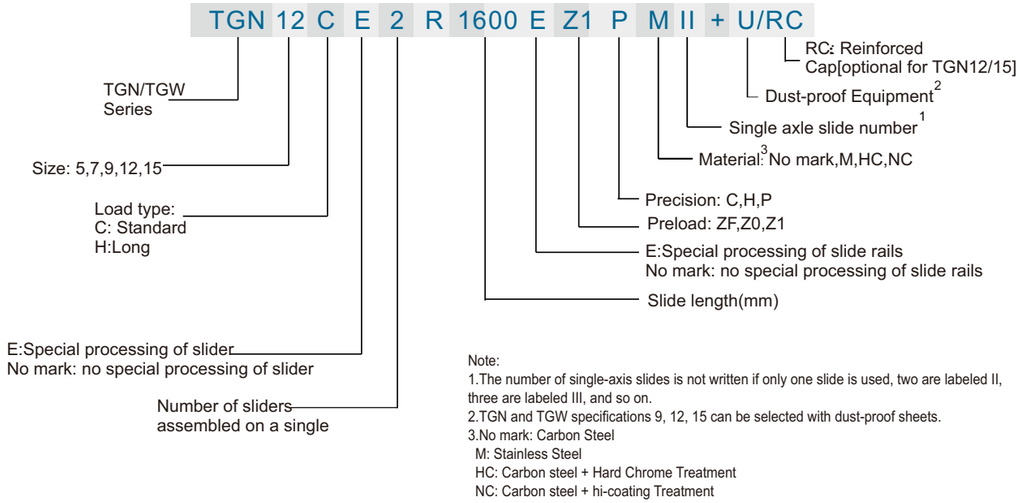
5.2.2 Application range

The TGN/TGW range of applications includes: semiconductor manufacturing equipment, printed circuit board IC assembly equipment, medical equipment, robotic arms, precision measuring instruments, office automation equipment, and other small linear slides.

5.2.3 Product number

Non-interchangeable and interchangeable linear slides, the same size and size, the main difference is that the interchangeable sliders and slides can be used interchangeably, which is convenient, but the combination accuracy It is impossible to achieve ultra-high precision of non-interchangeable type. However, due to the good dimensional control and strict quality requirements of IMTEK, the combination accuracy of interchangeable type has reached a certain level, and it is not necessary to install linear sliding. For rail customers, it is a good choice. The product model mainly indicates the series, size, type, accuracy grade, preloading and other specifications to facilitate the confirmation of the product by both parties when ordering.

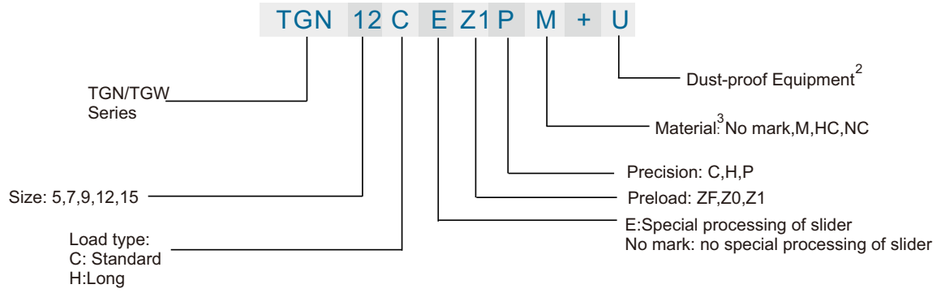
(1) **Non-interchangeable linear slide product model**



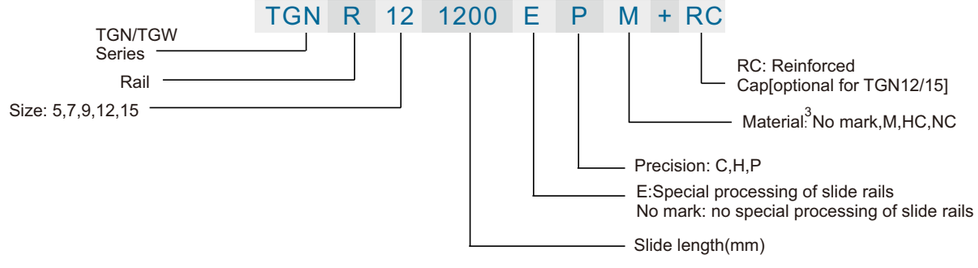
Note:
1.The number of single-axis slides is not written if only one slide is used, two are labeled II, three are labeled III, and so on.
2.TGN and TGW specifications 9, 12, 15 can be selected with dust-proof sheets.
3.No mark: Carbon Steel
M: Stainless Steel
HC: Carbon steel + Hard Chrome Treatment
NC: Carbon steel + hi-coating Treatment

(2) **Interchangeable linear slide product model**

- Interchangeable Block



- Interchangeable Rail

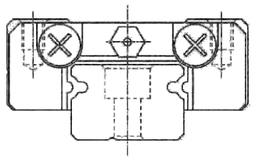
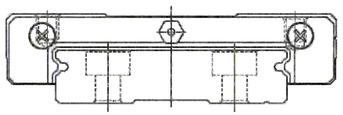


5. 3 TG Series Types

(1)Block Types

TG Series offers offers two types of linear guideway, flange and square.

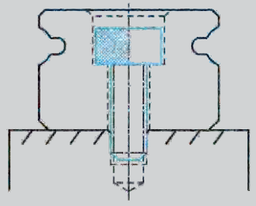
Table 2.94 Block Type

Type	Spec.	Shape	Height (mm)	Length (mm)	Application
Square	TGN-C TGN-H		8 ↓ 16	100 ↓ 2000	○ Printer ○ Robotics ○ Precision Measure equipment ○ Semiconductor equipment
Flange	TGW-C TGW-H		9 ↓ 16	100 ↓ 2000	

(2) Mounting Type

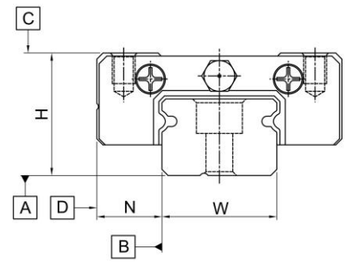
TG Series offers top mounting type.

Table 2.95 mounting type

Mounting from Top


5. 4 Accuracy Class

The accuracy of TGN and TGW series small slide rails is divided into three levels: ordinary, high and precision. Customers can choose the appropriate precision according to the precision requirements of the equipment.



(1) Non-interchangeable linear slide accuracy

The combined height H measurement is based on the center position of the upper reference plane of the slider, and the combined width N is measured based on the center position of the reference side of the slider.

Table 2.96 Accuracy Standard of Non-interchangeable type

Unit：mm

Accuracy Class	Normal（C）	High(H)	Precision(P)
Dimension Tolerance of height H	±0.04	±0.02	±0.01
Dimension Tolerance of width N	±0.04	±0.025	±0.015
Pair Variation of height H	0.03	0.015	0.007
Pair Variation of width N(reference rail)	0.03	0.02	0.01
Running parallelism of block surface C to surface A	Running parallelism[See table 2.98]		
Running parallelism of block surface D to surface B	Running parallelism[See table 2.98]		

(2) Accuracy of interchangeable linear guide way

Interchangeable linear slide accuracy is the accuracy of paired height and width of the slider assembled on a single slide rail, and the accuracy of the non-interchangeable linear slide rail. However, if it is assembled on different support rails, due to the height error of the slide rail, Its paired height and width accuracy is slightly inferior to non-interchangeable linear slides, while the parallelism accuracy of walking is the same as that of non-interchangeable linear slides.

Table 2.97 Accuracy Standard of interchangeable type

Unit: mm

Accuracy Class		Normal（C）	High(H)	Precision(P)
Dimension Tolerance of height H	Dimension Tolerance of height H	±0.04	±0.02	±0.01
Dimension Tolerance of width N	Dimension Tolerance of width N	±0.04	±0.025	±0.015
One Set	Pair Variation of height H	0.03	0.015	0.007
	Pair Variation of width N	0.03	0.02	0.01
Pair Variation of width N(Reference rail)		0.07	0.04	0.02
Running parallelism of block surface C to surface A		Running parallelism[See table 2.98]		
Running parallelism of block surface D to surface B		Running parallelism[See table 2.98]		

(3) Accuracy of Running Parallelism

Table 2.98 Accuracy of Running Parallelism

Rail Length（mm）	Accuracy（μm）			Rail Length（mm）	Accuracy（μm）		
	（C）	（H）	（P）		（C）	（H）	（P）
0	12	6	2	1000-1200	25	18	11
50-80	13	7	3	1200-1300	25	18	11
80-125	14	8	3.5	1300-1400	26	19	12
125-200	15	9	4	1400-1500	27	19	12
200-250	16	10	5	1500-1600	28	20	13
250-315	17	11	5	1600-1700	29	20	14
315-400	18	11	6	1700-1800	30	21	14
400-500	19	12	6	1800-1900	30	21	15
500-630	20	13	7	1900-2000	31	22	15
630-800	22	14	8	2000-	31	22	16
800-1000	23	16	9				

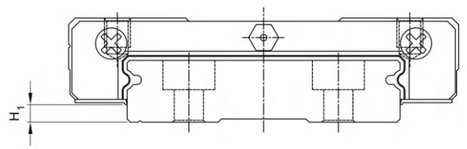
5.5 Preload

TGN/TGW series offers three pre-pressures: normal clearance, no preload, and light preload.

Table 2.99 Preload Classes

Class	Code	Preload	Accuracy
Light Clearance	ZF	Clearance 4-10μm	C
Very Light Preload	Z0	0	C-P
Light Preload	Z1	0.02C	C-P

Note: "C" in column preload means basic dynamic load rating.



5.6 Dust-proof Equipment

The standard dust-proof device is equipped with scraper blades at both ends of the slider to block dust or impurities from entering the inside of the slider, which affects the life and accuracy of the linear slide. The dust-proof piece is installed at the bottom of the slider to prevent dust or impurities from entering the inside of the slider from the bottom of the slider. If the customer wants to use the dust-proof piece, add +U code to the back of the model. Specifications 7 The gap between the slider and the bottom bearing surface (H1) is very small, and no dust-proof piece is provided. However, specifications 9, 12 and 15 are available for dust-proof sheets. When selecting the dust-proof piece, the customer should pay attention to the smaller slider clearance (H1). When using the side bearing surface, the height of the side bearing surface should not be greater than the clearance value (H1) to avoid the slider. Interference with the side bearing surface during operation.

Table 3.00 Mounting surface clearance H1 with dust guard slider

Size	Bottom Seal	H1mm	Size	Bottom Seal	H1mm
TGN7	-	-	TGW7	-	-
TGN9	*	1	TGW9	*	1.9
TGN12	*	2	TGW12	*	2.4
TGN15	*	3	TGW15	*	2.4
TGN5-0	-	-	TGW5-0	-	-
TGN7-0	-	-	TGW7-0	-	-
TGN9-0	*	1.2	TGW9-0	*	1.95
TGN12-0	*	2	TGW12-0	*	2.45
TGN15-0	*	3	TGW15-0	*	2.45

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5.7 Mounting Surface Accuracy Tolerance

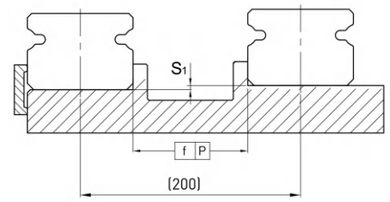


Table 3.01 Max. Parallelism Tolerance（P）

Unit: μm

Size	Preload		
	ZF Preload	Z0 Preload	Z1 Preload
TG5	2	2	2
TG7	3	3	3
TG9	4	4	3
TG12	9	9	5
TG15	10	10	6

Table 3.02 Max. Tolerance of reference Surface Height（S1）

Unit: μm

Spec.	Preload		
	ZF Preload	Z0 Preload	Z1 Preload
TG5	20	20	2
TG7	25	25	3
TG9	35	35	6
TG12	50	50	12
TG15	60	60	20

Note: The allowable value is proportional to the distance between axes

Table 3.02 Flatness of Mounting surface

Spec.	Flatness of the Mounting surface
TG5	0.015/200
TG7	0.025/200
TG9	0.035/200
TG12	0.050/200
TG15	0.060/200

Note: The values above are suitable for ZF/Z0. For preload Z1 or using two(or more) rails on the same plane, 50% or less of the values above are recommended.

5.8 Installation Precautions

- Mounting surface shoulder height and fillets

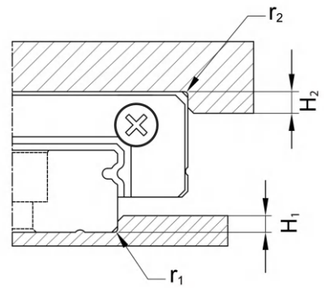


Table 3.03 Shoulder Heights and fillets

Spec.	Max. Radius of fillets r1(mm)	Max. Radius of fillets r2(mm)	Shoulder Height H1(mm)	Shoulder Height H2(mm)
TGN5	0.1	0.2	1.2	2
TGN7	0.2	0.2	1.2	3
TGN9	0.2	0.3	1.7	3
TGN12	0.3	0.4	1.7	4
TGN15	0.5	0.5	2.5	5
TGW5	0.1	0.2	1.2	2
TGW7	0.2	0.2	1.7	3
TGW9	0.3	0.3	2.5	3
TGW12	0.4	0.4	3	4
TGW15	0.4	0.8	3	5

- Tightening Torque of bolts for installation

Improper tightening of rail mounting bolts will seriously affect the accuracy of the linear guideway. The following table lists the recommended tightening torque for the specific bolt sizes.

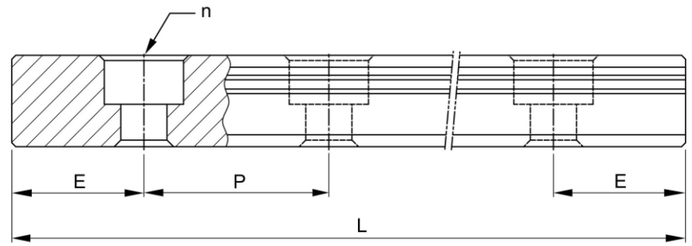
Table 3.04 Tightening Torque

Spec	Bolt Size	Torque N-cm(kgf-cm)		
		Iron	Casting	Aluminum
TGN5	M2×0.4P×6L	57(5.9)	39.2（4）	29.4（3）
TGN7	M2×0.4P×6L	57(5.9)	39.2（4）	29.4（3）
TGN9	M3×0.5P×8L	186（19）	127（13）	98（10）
TGN12	M3×0.5P×8L	186（19）	127（13）	98（10）
TGN15	M3×0.5P×10L	186（19）	127（13）	98（10）
TGW5	M2.5×0.45P×7L	118（12）	78.4（8）	58.8（6）
TGW7	M3×0.5P×6L	186（19）	127（13）	98（10）
TGW9	M3×0.5P×8L	186（19）	127（13）	98（10）
TGW12	M4×0.7P×8L	392（40）	274（28）	206（21）
TGW15	M4×0.7P×10L	392（40）	274（28）	206（21）

Note：1Kgf=9.81N

5.9 Standard and maximum lengths of Rails

IMTEK offers standard lengths of rail for instant requirements. For Non-standard rail lengths, it's recommended that the E value is no greater thatn1/2 of the pitch(P) to prevent instability at the end of the rail, and the E value should be no less than Emin to avoid a broken mounting hole.



L=(n-1)xP + 2xE

L: Total length of rails (mm)
n: Number of bolt holes
P: Distance between bolt holes (mm)
E: Bolt hole to end distance (mm)

Table 3.05 Track Length

Item	TGNR5	TGNR7	TGNR9	TGNR12	TGNR15	TGWR5	TGWR7	TGWR9	TGWR12	TGWR15
Standard length(n)	40（3）	40（3）	55（3）	70（3）	70（2）	50（3）	80（3）	80（3）	110（3）	110（3）
	55（4）	55（4）	75（4）	95（4）	110（3）	70（4）	110（4）	110（4）	150（4）	150（4）
	70（5）	70（5）	95（5）	120（5）	150（4）	90（5）	140（5）	140（5）	190（5）	190（5）
	100（7）	85（6）	115（6）	145（6）	190（5）	110（6）	170（6）	170（6）	230（6）	230（6）
	130（9）	100（7）	135（7）	170（7）	230（6）	130（7）	200（7）	200（7）	270（7）	270（7）
	160（11）	130（9）	155（8）	195（8）	270（7）	150（8）	260（9）	230（8）	310（8）	310（8）
			175（9）	220（9）	310（8）	170（9）		260（9）	350（9）	350（9）
			195（10）	245（10）	250（9）			290（10）	390（10）	390（10）
			275（14）	270（11）	390（10）			350（14）	430（11）	430（11）
			375（19）	320（13）	430（11）			500（19）	510（13）	510（13）
				370（15）	470（12）			710（24）	590（15）	590（15）
				470（19）	550（14）			860（29）	750（19）	750（19）
				570（23）	670（17）				910（23）	910（23）
				695（28）	870（22）				1070（27）	1070（27）
Spacing (P)	15	15	20	25	40	20	30	30	40	40
Standard end distance (Es)	5	5	7.5	10	15	5	10	10	15	15
Standard end distance maximum length	250（17）	595（40）	1195（60）	1995（80）	1990（50）	250（13）	590（20）	1970（66）	1990（50）	1990（50）
maximum length	2504	600	12005	2000	2000	2504	6006	2000	2000	2000

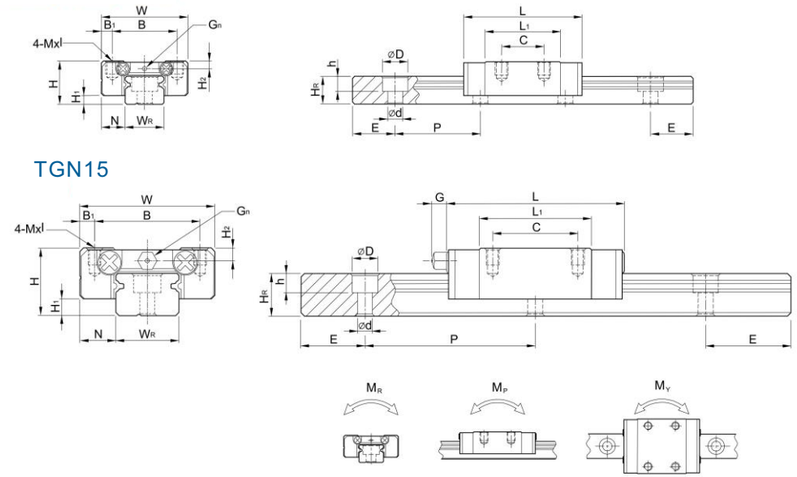
Note:

1. The general rail E dimension tolerance is 0.5 ~ -0.5mm, and the rail joint end distance E dimension tolerance is strictly 0 ~ -0.3mm.
2. The maximum length of the standard end distance means that the left and right end distances are the maximum length of the standard end distance.
3. The "M" meter in the specification is made of stainless steel (SUS), and there is no "M" marked alloy steel.
4. The maximum length in the table is the length within the specification. If customers have special needs, please contact IMTEK.
5. If the customer needs a different E value, please contact IMTEK.

5.10 Dimensions for TGN/TGW Series

(1) TGN-C/TGN-H

TGN7,TGN9,TGN12



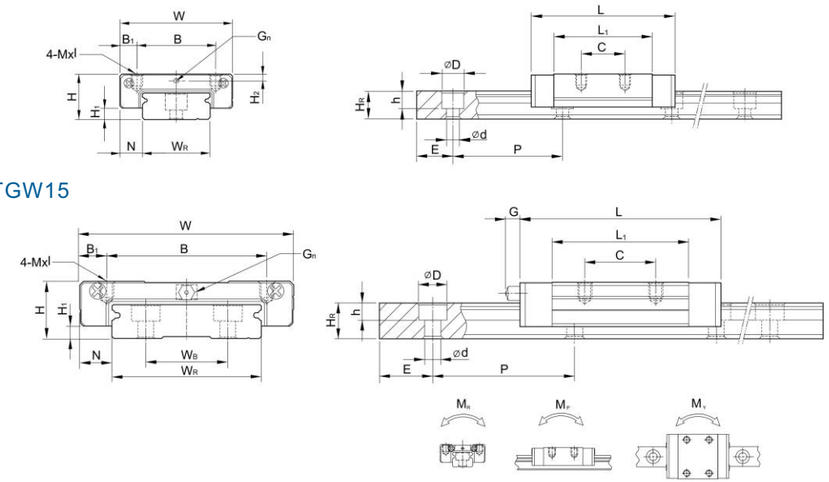
TGN15

Spec.	Dimension of Assembly (mm)			Dimension of Block (mm)										Dimension of Rail (mm)								Mounting Bolt for rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	HI	N	W	B	BI	C	LI	L	G	Gn	MxI	H2	W_R	H_R	D	h	d	P	E				M_R N-m	M_P N-m	M_Y N-m	Block Kg	Rail Kg/m
TGN7C	8	1.5	5	17	12	2.5	8	13.5	22.5	-	f 1.2	M2×2.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2×6	0.98	1.24	4.70	2.84	2.84	0.010	0.22
TGN7H							13	21.8	30.8													1.37	1.96	7.64	4.80	4.80	0.015	
TGN9C	10	2	5.5	20	15	2.5	10	18.9	28.9	-	f 1.4	M3×3	1.8	9	6.5	6	3.5	3.5	20	7.5	M3×8	1.86	2.55	11.76	7.35	7.35	0.016	0.38
TGN9H							16	29.9	39.9													2.55	4.02	19.60	18.62	18.62	0.026	
TGN12C	13	3	7.5	27	20	3.5	15	21.7	34.7	-	f 2	M3×3.5	2.5	12	8	6	4.5	3.5	25	10	M3×8	2.84	3.92	25.48	13.72	13.72	0.034	0.65
TGN12H							20	32.4	45.4													3.72	5.88	38.22	36.26	36.26	0.054	
TGN15C	16	4	8.5	32	25	3.5	20	26.7	42.1	4.5	M3	M3×4	3	15	10	6	4.5	3.5	40	15	M3×10	4.61	5.59	45.08	21.56	21.56	0.059	1.06
TGN15H							25	43.4	58.8													6.37	9.11	73.50	57.82	57.82	0.092	

Note:1Kgf=9.81N

(2) TGW-C/TGW-H

TGW7,TGW9,TGW12



TGW15

Spec.	Dimension of Assembly (mm)			Dimension of Block (mm)										Dimension of Rail (mm)								Mounting Bolt for rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	HI	N	W	B	BI	C	LI	L	G	Gn	MxI	H2	W_R	W_B	H_R	D	h	d	P	E				M_R N-m	M_P N-m	M_Y N-m	Block Kg	Rail Kg/m
TGW7C	9	1.9	5.5	25	19	3	10	21	31.2	-	f 1.2	M3×3	1.85	14	-	5.2	6	3.2	3.5	30	10	M3×6	1.37	2.06	15.70	7.14	7.14	0.020	0.51
TGW7H							19	30.8	41														1.77	3.14	23.45	15.53	15.53	0.029	
TGW9C	12	2.9	6	30	21	4.5	12	27.5	39.3	-	f 1.2	M3×3	2.4	18	-	7	6	4.5	3.5	30	10	M3×8	2.75	4.12	40.12	18.96	18.96	0.040	0.91
TGW9H					23	3.5	24	38.5	50.7														3.43	5.89	54.54	34.00	34.00	0.057	
TGW12C	14	3.4	8	40	28	6	15	31.3	46.1	-	f 1.2	M3×3.6	2.8	24	-	8.5	8	4.5	4.5	40	15	M4×8	3.92	5.59	70.34	27.80	27.80	0.071	1.49
TGW12H							28	45.6	60.4														5.10	8.24	102.70	57.37	57.37	0.103	
TGW15C	16	3.4	9	60	45	7.5	20	38	54.8	5.2	M3	M4×4.2	3.2	42	23	9.5	8	4.5	4.5	40	15	M4×10	6.77	9.22	199.34	56.66	56.66	0.143	2.86
TGW15H							35	57	73.8														8.93	13.38	299.01	122.60	122.60	0.215	

Note:1Kgf=9.81N