



## TM Miniature Linear Guide



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## 2-3 TM Miniature Linear Guide

### ■ 2-3-1 The Characteristics of TM Series

#### Dust-Proof Design

The stainless bottom seal is the innovative new design of TM series. It prevents effectively the abnormal chips getting into the ball track from the bottom side of the block and keep the good running performance and extend the service life of the slider because the friction is low by keeping some small backlash between the slider and rail.

Standard end seals provide extreme protection from dust, metal scrapers to maintain long service life and shorten maintenance period. Unique low friction seal lips provide best smoothness and lower friction.

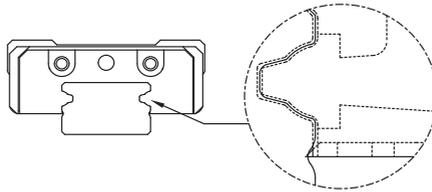


Fig 2.3.1

#### High Tensile Performance Stainless Steel Reinforcement Plate

Dual fully covered stainless steel plates design delivers the best coverage for plastic on each ends. Stainless steel screws are used to strength the rigidity, protection with end cap in order to sustain higher operational speed  $V_{max} = 5 \text{ m/s}$ ,  $\alpha_{max} = 300 \text{ m/s}$ . When reinforcement plates and dust-proof seal is equipped to a Linear Block, they can function as a scraper.

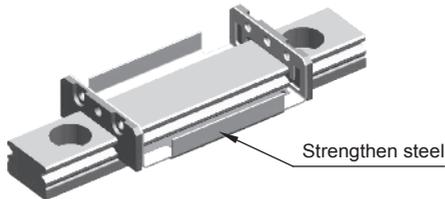


Fig 2.3.2

#### High Loading and Moment Capacity Performance

TM Miniature Linear Guide series uses two row circulation with Gothic  $45^\circ$  contact angle on the rail groove to achieve equal load capacity in four directions. Larger steel balls are used to enhance the loading and torsion resistance performance in limited space.

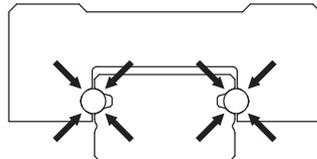


Fig 2.3.3 The Gothic  $45^\circ$  four-direction load structure

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### 2-3-2 The Structure of TM-series

Recirculation system : End cap + Recirculation tube + Ball retainer

Sealing system : Side + Bottom system

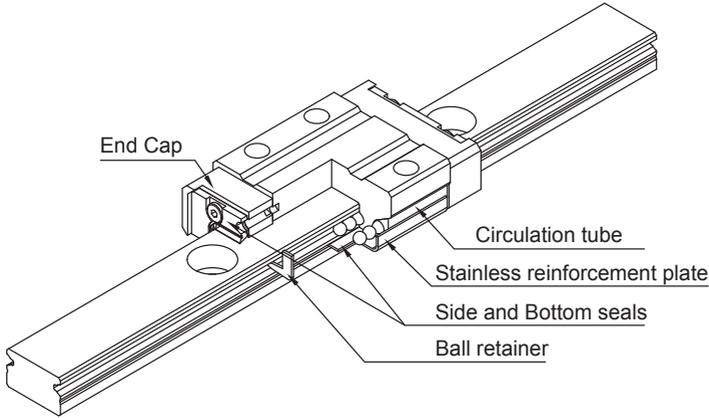
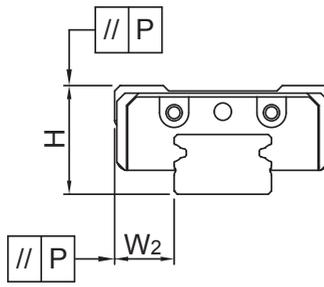


Fig 2.3.4

### 2-3-3 Accuracy

Miniature Linear Guide TM-series provides P, H, N three accuracy grades for customer to choose.

Table 2.3.1

	Accuracy ( $\mu\text{m}$ )		Precision P	High H	Normal N
	Tolerance of Height H	H		$\pm 10$	$\pm 20$
Variation of height with different block on same spot of the rail	$\Delta H$		7	15	25
Tolerance of width W2	W2		$\pm 15$	$\pm 25$	$\pm 40$
Variation with width on different block on same spot of the rail	$\Delta W2$		10	20	30

## Speed

The maximum acceleration of TM-series can reach  $V_{max} > 5 \text{ m/s}$ ,  $a_{max} = 300 \text{ m/s}^2$  (60 m/s without preload).

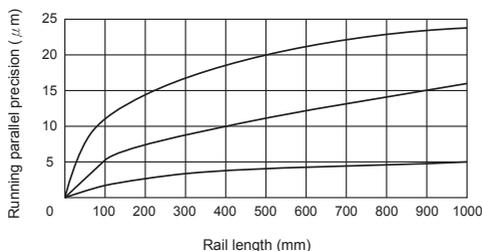


Fig 2.3.5 Running parallel precision slide relative to the rails datum

## ■ 2-3-4 Preload

### Preload Value

Miniature Linear Guide TM-series offers three preloading level, ZF, Z0, Z1. A proper preload enhances performance on rigidity, precision, and torsion resistance; However, an improper preload shorten service life and increase friction.

Table 2.3.2 Table

Preload Grade	Pressure	Preload(μm)				Applications
		7	9	12	15	
ZF	Slight Clearance	+4~0	+4~0	+5~0	+6~0	Running smoothly
Z0	Zero Preload	+2~0	+2~0	+2~0	+3~0	Precision applications, Running smoothly
Z1	Light Preload	0~3	0~4	0~5	0~6	High steel, Precision applications, Running smoothly

### Permissible Operational Temperature

The Miniature Linear Guide TM-series is sufficient to operate between  $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$ . For sudden temperature rise the temperature can reach up to  $+100^{\circ}\text{C}$ .

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### 2-3-5 Types of Lubrication

Grease

When a linear guide is well lubricated, the contact point between rail and rolling steel balls will be separated by 1 micro meter. Therefore, a good lubrication increases the service life of linear guide.

Clean room Lubrication

Suitable for low contamination environment.

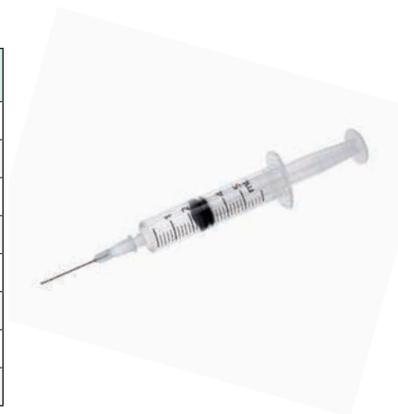
Lubrication

General usage, ISO V32~68.

※If Special oil is required please contact *TBI MOTION*.

Table 2.3.3

Model	Lubrication amount (cc)	Model	Lubrication amount (cc)
TM07NN	0.3		
TM07NL	0.4		
TM09NN	0.4	TM09WN	0.4
TM09NL	0.6	TM09WL	0.6
TM012NN	0.9	TM012WN	0.9
TM012NL	1.3	TM012WL	1.3
TM015NN	1.4	TM015WN	1.4
TM015NL	2.0	TM015WL	2.0



### 2-3-6 Order Information

Customized Requirement :

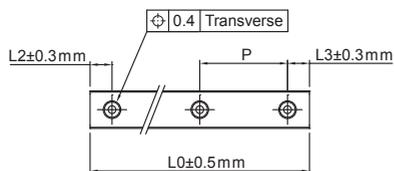


Table 2.3.4

Rail Length	Dimension			
	TM7	TM9	TM12	TM15
Pitch(mm)	15	20	25	40
Wide Pitch(mm)	—	30	40	40
L2, L3 min	3	4	4	4
L2, L3 max	10	20	20	35
Lmax	1300	1300	1300	1300

※If special dimension is required please contact *TBI MOTION*.

## Height of Shoulder on Mounting Surface and Chamfer

Height of shoulder should be taken into consideration when installing a Linear Guide, if the block or rail is over-chamfered, the tip part has the possibility to effect the accuracy of Linear Guide, or if the height of shoulder is to high, it interferes the operation of block. Install the Linear Guide as suggested, the accuracy of Linear Guide can be maintained.

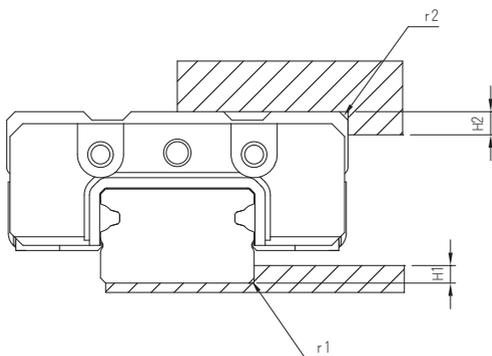


Table 2.3.5 Height of shoulder a chamfer

Model No.	Corner Radius of Mounting Surface r1	Corner Radius of Mounting Surface r2	Shoulder height on rail side H1	Shoulder height on rail side H2
TM07N	0.3	0.2	1	3
TM09N	0.3	0.3	1.7	3
TM12N	0.5	0.4	2.5	4
TM15N	0.5	0.5	2.5	5
TW09W	0.3	0.3	2.5	3
TW12W	0.5	0.5	3	4
TW15W	0.5	0.5	3	5

Table 2.3.6 Condition with Hexagonal Head Bolt

Model No.	Screw No.	Fasten Torque		
		Steel	Casting	Aluminum Alloy
TM07N	M2	57	39.2	29.4
TM09N	M3	186	127	98
TM12N	M3	186	127	98
TM15N	M3	186	127	98
TW09W	M3	186	127	98
TW12W	M4	392	274	206
TW15W	M4	392	274	206

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### ■ 2-3-7 Nominal Model Code of TM Type

Length of Block

Perform joint treatment when required lengths exceed 1300. Please contact TBI MOTION for detailed information.

**T M 07 W L A - 2 - 1000 - N A - Z0 - II - K**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭

①	②	③	④
Nominal Model	Block Type	Dimension	Width of Rail
T	M : Mini X : Special	07, 09, 12, 15	N : Standard W : Wide

(Drawing will be provided for special item in order to distinguish the height of the rail.)

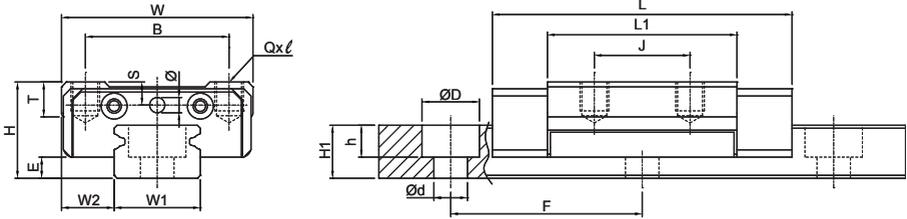
⑤	⑥	⑦
Length of Block	Material of Block	Quantity of Block
N : Standard L : Long	S : Stainless steel A : Alloy steel	( Mark 1 when there is only 1 runner block )

⑧	⑨	⑩	⑪
Accessory Code	Length of Rail	Accuracy Grade	Material of Rail
□ : Standard ( End seal + Side seal )	Unit : mm	N : Normal H : High P : Precision	S : Stainless steel A : High Carbon steel

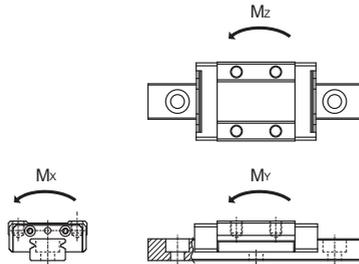
⑫	⑬	⑭
Preload	Two Sets per Axis	Rail Special Machining
ZF : Slight Clearance Z0 : No Preload Z1 : Light Preload	( No need to be marked when there is only one rail ) II	K : Tapped-Hole Rail X : Rail with Special Machining

※ No symbol required when no plating is need.

## TM-N Series Specifications



Model No.	Assembly (mm)			Rail(mm)							Block(mm)						
	H	W2	E	W	B	J	T	L	L1	Qxℓ	Ø	W1	H1	ØD	h	Ød	F
TM07NN	8	5	1.2	17	12	8	2.25	22.8	12.3	M2x2	1.3	7	4.7	4.2	2.3	2.4	15
TM07NL	8	5	1.2	17	12	13	2.25	30.8	20.3	M2x2	1.3	7	4.7	4.2	2.3	2.4	15
TM09NN	10	5.5	1.9	20	15	10	3.62	30.4	19.8	M3x3	1.3	9	5.5	6	3.3	3.5	20
TM09NL	10	5.5	1.9	20	15	16	3.62	40.7	30.1	M3x3	1.3	9	5.5	6	3.3	3.5	20
TM12NN	13	7.5	2.7	27	20	15	4.54	34.4	20.6	M3x3.5	1.3	12	7.5	6	4.5	3.5	25
TM12NL	13	7.5	2.7	27	20	20	4.54	46.9	33.1	M3x3.5	1.3	12	7.5	6	4.5	3.5	25
TM15NN	16	8.5	3.7	32	25	20	5.86	42.4	27	M3x5	1.3	15	9.5	6	4.5	3.5	40
TM15NL	16	8.5	3.7	32	25	25	5.86	59.4	44	M3x5	1.3	15	9.5	6	4.5	3.5	40

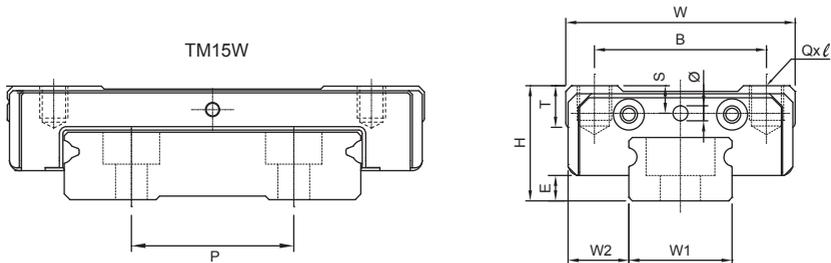


Model No.	Load Rating (kgf)		Static Permissible Moment					Weight	
			Mx(kgf-mm)	My(kgf-mm)		Mz(kgf-mm)		Rail (kg/m)	Rail (kg/m)
	C	Co		Single Block	Single Block	Double Block	Single Block		
TM07NN	144	204	745	232	3,234	232	3,234	0.005	0.21
TM07NL	220	374	1,367	849	7,261	849	7,261	0.009	
TM09NN	220	374	1,713	849	7,117	849	7,117	0.013	0.32
TM09NL	299	579	2,648	2,099	14,174	2,099	14,174	0.020	
TM12NN	381	536	3,269	1,094	12,391	1,094	12,391	0.024	0.61
TM12NL	555	919	5,604	3,437	26,857	3,437	26,857	0.039	
TM15NN	581	834	6,336	2,316	23,096	2,316	23,096	0.048	1
TM15NL	860	1,459	11,088	7,527	52,908	7,527	52,908	0.080	

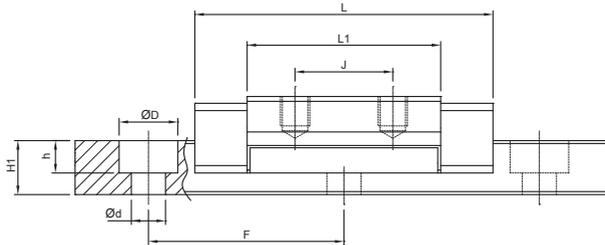
# TBI MOTION LINEAR GUIDE

## 2-1 The Types of TBI MOTION Linear Guide

TM-W Series Specifications



Model No.	Assembly (mm)			Rail(mm)							Block(mm)							
	H	W2	E	W	B	J	T	L	L1	Qxℓ	Ø	W1	H1	ØD	h	Ød	F	P
TM09WN	12	6	3	30	21	12	4	39.1	26.7	M3x3	1.3	18	7.3	6	4.5	3.5	30	
TM09WL	12	6	3	30	23	24	4	50.7	38.3	M3x3	1.3	18	7.3	6	4.5	3.5	30	
TM12WN	14	8	3.5	40	28	15	4.5	46.2	29	M3x3.5	1.3	24	8.5	8	4.5	4.5	40	
TM12WL	14	8	3.5	40	28	28	4.5	61.2	44	M3x3.5	1.3	24	8.5	8	4.5	4.5	40	
TM15WN	16	9	3.6	60	45	20	4.8	55.1	38.5	M4x4.5	1.3	42	9.5	8	4.5	4.5	40	23
TM15WL	16	9	3.6	60	45	35	4.8	74.2	57.6	M4x4.5	1.3	42	9.5	8	4.5	4.5	40	23



Model No.	Load Rating (kgf)		Static Permissible Moment					Weight	
			Mx(kgf-mm)	My(kgf-mm)		Mz(kgf-mm)		Rail (kg/m)	Rail (kg/m)
	C	Co		Single Block	Single Block	Double Block	Single Block		
TM09WN	208	368	4,645	1,621	12,205	1,621	12,205	0.03	0.97
TM09WL	260	509	7,123	3,905	23,411	3,905	23,411	0.043	
TM12WN	313	530	10,190	2,864	23,153	2,864	23,153	0.05	1.47
TM12WL	415	796	15,748	7,083	46,164	7,083	46,164	0.076	
TM15WN	517	856	26,387	5,459	42,543	5,459	42,543	0.116	2.85
TM15WL	686	1,283	41,779	14,144	87,256	14,144	87,256	0.175	