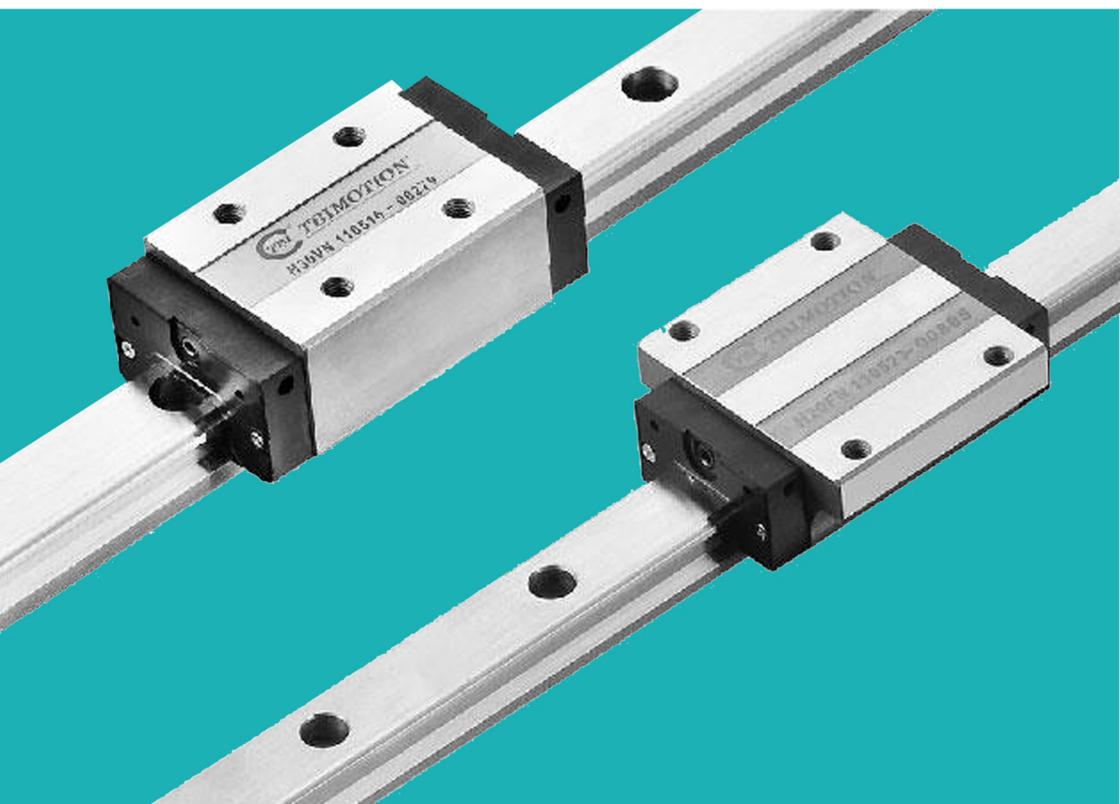




TR Self Lubricating Series



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TBI MOTION LINEAR GUIDE

2-2 TRH / TRS / TRC International Standard Linear Guide

■ 2-2-12 J-Flow System

When the linear guide sets up on the side mount as the (Fig 2.2.8) shows. It is hard to equally distribute the lubrication on the race groove due to gravity. The common way to solve this is to grease from the side of the block; however, such method is almost impossible when the application is already space limited. TBI Motion provides a unique solution to overcome the dilemma by implementing the J-Flow System. The J-Flow System is equipped with two optional screw-tightening lubrication spot on both ends of linear block with the special internal lubricating path which allows the lubrication to travel in both direction by simply tightening or loosening the lubrication screw.

A

Linear Guide

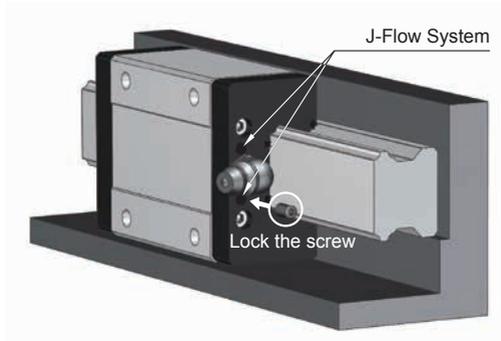


Fig 2.2.8 J-Flow System

The oil flows upward

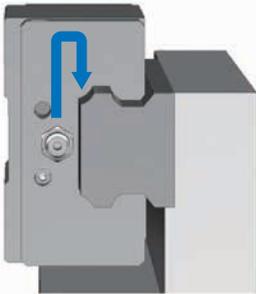


Fig 2.2.9 The oil sail against the gravity to lubricate the circulation path

When stop, slowly shed

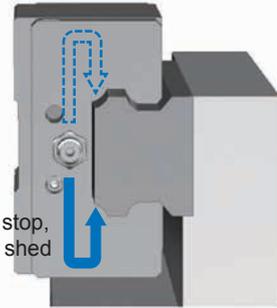


Fig 2.2.10 The oil flows downward through optional screw in spot when the feeding stops

■ 2-2-13 Strong Dust-proof/Self-Lubricating Linear Guide Series Accessory

TBI MOTION Linear Guide with Double-lip End Seal

Characteristics of **TBI MOTION** Dust-proof End Seal

1. Seal Function : Seal design from single-lip to double-lip is to prevent more dust from going into the block.
2. Hardness : Heat treatment harden the end seal to absorb impact while operating.
3. Environment : Better solution for dust-proof when using double seals in environment with high contamination.
4. Lifetime Extension : Double-lip seal prevents dust go into the block and provides a solution for block damage due to dust issue.

Characteristics of **TBI MOTION** Metal Scraper

The scraper decreases the possibility of high temperature iron chip or dust entering the block.

Characteristics of **TBI MOTION** Self-Lubricating Linear Guide Series

There is a Felt accessory between end cap and seals. Felt with oil lubricates the rail when operating and grease nipple is not needed. The design is shown below. (Fig 2.2.11)

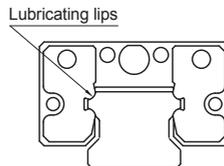


Fig 2.2.11

Example

WZ (Top Seal+Bottom Seal+Two Double-lip end seals+Felt)

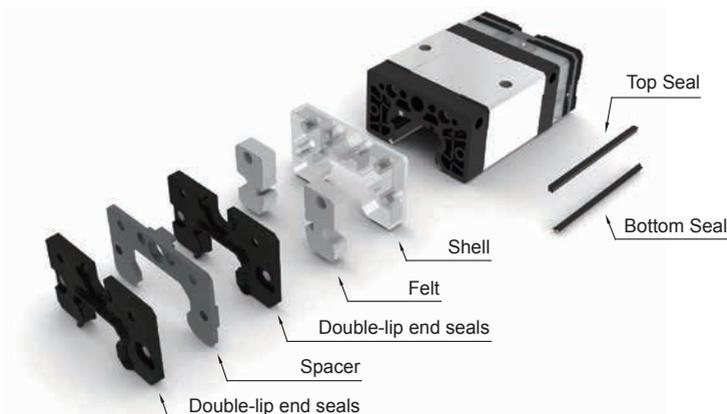


Fig 2.2.12

TBI MOTION LINEAR GUIDE

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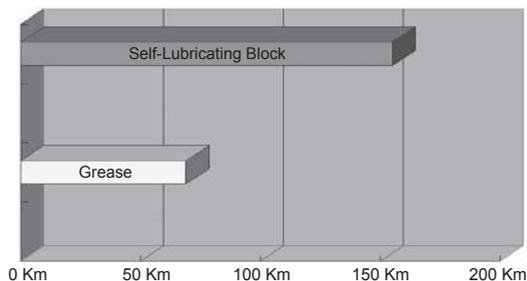
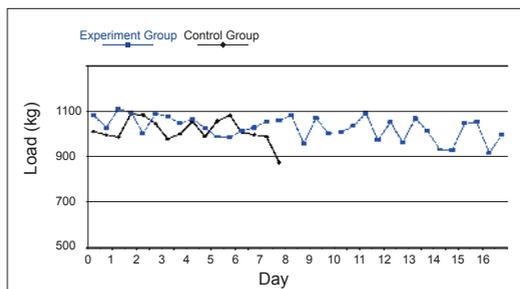
Life Comparison

As shown in the chart, the lifetime of self-lubricating blocks is twice as long as standard series blocks.

Table 2.2.15 Test

	Control Group	Experiment Group
Test Environment	Standard	Self-Lubricating
Model No.	TRH20VN	TRH20VN
Load Rating	1000 kg	1000 kg
Speed	6 m/min	6 m/min
Travel Length	600 mm	600 mm

※ No extra grease is added during the test for both standard series and self-lubricating series.



Instructions of Self-Lubricating Block Felt

The felt has already filled in with lubricant. It is suggested to soak the whole felt in the oil tank for more than 8 hours before using. Felt can be refilled with any approved lubricant depending on the requirement (ISOVG 32~68).

Characteristics of Suggested Oil :

- (1) Form a strong oil film.
- (2) Reduce wear as much as possible.
- (3) Have high wear resistance.
- (4) Have high thermal stability.
- (5) Be noncorrosive.
- (6) Be highly rust-preventive.
- (7) Be free from dust and some moisture.

Characteristics of Block Felt

- (1) Easy Assembly and Removal - Only screws are needed when assembling and disassembling the accessory.
- (2) Environmental Friendly - No need of grease nipple and other equipment to save energy.
- (3) Low Maintenance - Prevents oil leaking, making it a ideal solution for clean working environments.
- (4) Strong Dust-Proof - With dust-proof accessory, service life is extended.

The Suggested Operating Temperature

The suggested operating temperature is between -10°C to 60°C. If operating temperature is over suggested criteria, please contact TBI MOTION.

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Self-Lubricating Linear Guide Oil Cassette Units

Self lubrication system is designed with lubrication mechanism between end cap and wiper. The structure units are shown as follow. The Cassette unit is comprised with fluid channel which is soaked with oil and act to release the lubricants thoroughly during operation. With this smart and simple design, the linear guide can be lubricated without extra oil feeding units thus minimize unnecessary parts and waste which triggers higher cost and higher risk in mounting error.

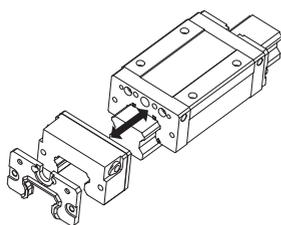


Fig 2.2.13 Installation Method

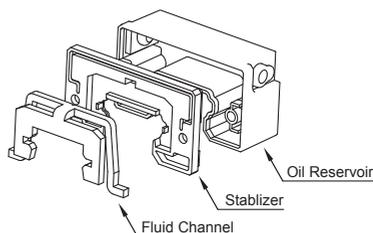


Fig 2.2.14 Cassette Unit

Characteristics of Self-Lubricating Units

- (1) No extra oil feeding unit is required.
- (2) Applicable in highly required clean environment.
- (3) May maintain lubrication for a period of time.
- (4) Lubricates thoroughly in any operating positions.
- (5) Interchangeable to any grease/oil.
- (6) Improves dust-proof efficiency when assembled to the block.

Applications

- (1) Machine Tool
- (2) Industrial Automation : Plastic and rubber manufacturers, Typography, Paper, Textiles, Food.
- (3) Electronic and Component manufacturing : Semiconductor, X-Y Platform, Measurement, Equipment
- (4) Others : Medical Equipment, Conveyers

Characteristics of Lubrication Oil

The Self lubrication cassette is filled in with Synthetic Hydro Carbon oil (SHC). The performance of the oil is list as follows :

- (1) Solvent refined oil without wax and impurity.
- (2) High grade of consistency in extreme temperature.
- (3) Corrosion free to metal and high polymer.
- (4) Unique woven texture provides oil film on the contact point to prevent wear.
- (5) High chemical stability and durability.

Table 2.2.16

Character	Color		Clear Yellow
Ratio	15/4°C		0.860
Viscosity	100°C	c S t	137.47
	40°C		1570.68
Viscosity Index	—		120
Fluid	°C		-30
Flash Point	°C		243
Evaporation Rate	100°C · 24 hr		<0.15%
Copper Corrosion Test	100°C · 24 hr		Pass
Resin Test	80°C · 24 hr Polystyrene		Pass
Operation Temperature (°C)			-30~160

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■ 2-2-14 Dust-proof/Accessory

If the following accessories are needed, please add the code followed by the model number.

Special Option : Steel end seal, Steel end cap, Cover Strip, please contact TBI Motion.

Standard Accessories :

End seal and Bottom seal

To prevent life reduction caused by iron chips or dust entering the block.

Other Accessories :

Top Seal

Efficiently prevents dust from the surface of rail or tapping hole getting inside the block.

Double end seal

Enhances the wiping effect, foreign matter can be completely wiped off.

Double-lip end seals

Double-lip end seal is suitable for environment with high contamination.

Characteristics of *TBI MOTION* Metal Scraper

The scraper decreases the possibility of high temperature iron chip or dust entering the block.

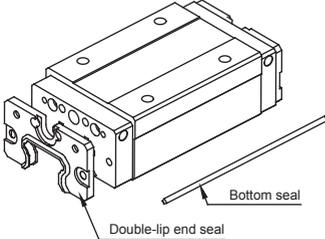
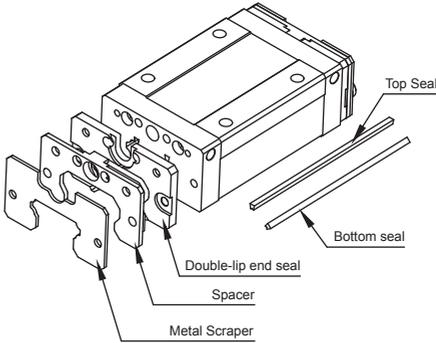
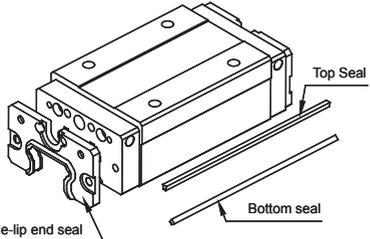
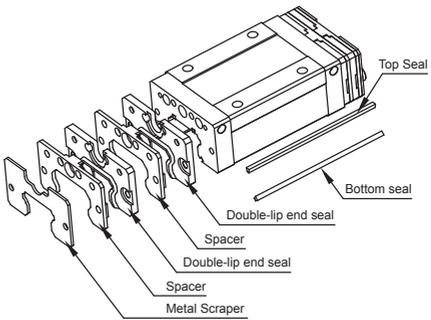
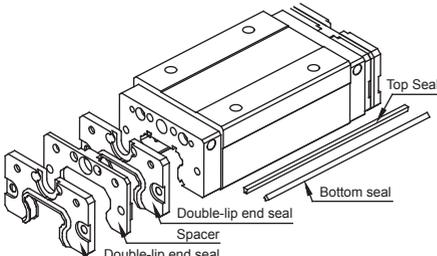
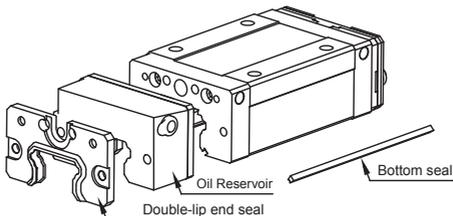
Felt

Double-lip end seal is suitable for environment with high contamination. Felt lubricates the ball track of the rail extending the lifetime. This accessory is suitable for light rating load environment.

Oil Reservoir

After installation, oil reservoir can extend lubricating effect.

Table 2.2.17 Codes of Accessories

<p>XN (Double-lip end seals+Bottom seals)</p>	<p>SU (Double-lip end seals+Bottom seals+Top seals+Metal Scraper)</p>
 <p>Bottom seal</p> <p>Double-lip end seal</p>	 <p>Top Seal</p> <p>Bottom seal</p> <p>Double-lip end seal</p> <p>Spacer</p> <p>Metal Scraper</p>
<p>UN (Double-lip end seals+Bottom seals+Top seals)</p>	<p>SZ (Two Double-lip end seals+Bottom seals+Top seals+Metal Scraper)</p>
 <p>Top Seal</p> <p>Bottom seal</p> <p>Double-lip end seal</p>	 <p>Top Seal</p> <p>Bottom seal</p> <p>Double-lip end seal</p> <p>Spacer</p> <p>Double-lip end seal</p> <p>Spacer</p> <p>Metal Scraper</p>
<p>ZN (Two Double-lip end seals+Bottom seals+Top seals)</p>	<p>BN (Double-lip end seals+Bottom seals+Oil Reservoir)</p>
 <p>Top Seal</p> <p>Bottom seal</p> <p>Double-lip end seal</p> <p>Spacer</p> <p>Double-lip end seal</p>	 <p>Oil Reservoir</p> <p>Double-lip end seal</p> <p>Bottom seal</p>

※ After selection of different accessories increase the overall length of the slider, see table 2.2.18.

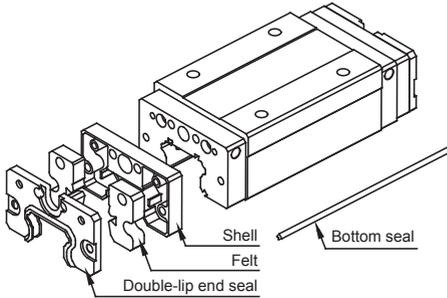
TBI MOTION LINEAR GUIDE

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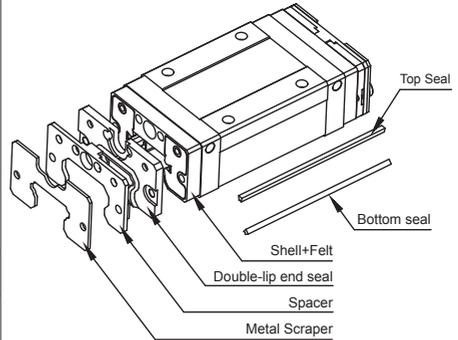
A

Linear Guide

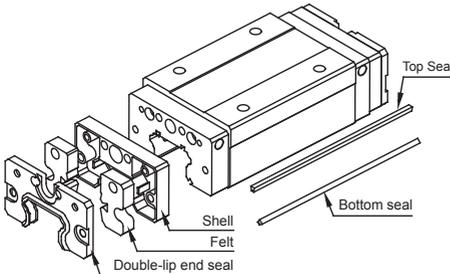
WW (Double-lip end seals+Bottom seals+Felts)



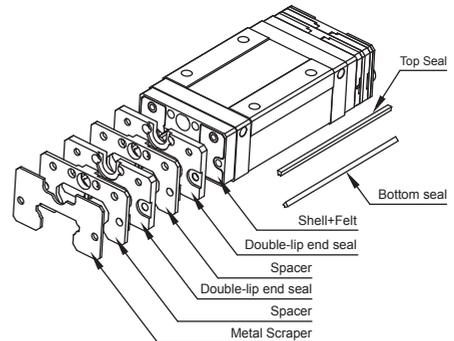
DU (Double-lip end seals+Bottom seals+Top seals+Felts+Metal Scraper)



WU (Double-lip end seals+Bottom seals+Top Seals+Felts)



DZ (Two Double-lip end seals+Bottom seals+Top seals+Felts+Metal Scraper)



WZ (Two Double-lip end seals+Bottom seals+Top Seals+Felts)

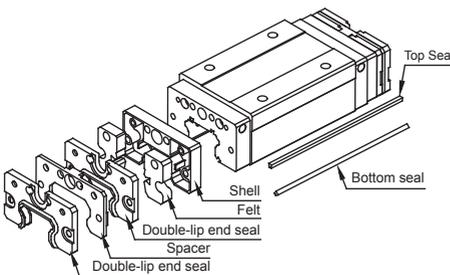


Table 2.2.18 TR Type Block Length of Accessories

Unit : mm

Two Double-lip end seals (ZN)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	47.9	58.4	65.6	76.4	84.7	-	-	-
N	64.5	TRS (77.3) TRH (84.6)	89.4	105.3	118	134.5	-	-
L	73	-	-	-	-	150	173	208
E	-	108.6	118.4	141	162	184	211.1	267.5

Double-lip end seals+Felt (WW, WU)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	51.8	60.9	68.7	78.9	87.2	-	-	-
N	68.4	TRS (79.8) TRH (87.1)	92.5	107.8	120.5	136	-	-
L	76.9	-	-	-	-	151.5	-	-
E	-	111.1	121.5	143.5	164.5	185.5	-	-

Two Double-lip end seals+Felt (WZ)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	59.4	69.9	77.1	87.9	96.2	-	-	-
N	76	TRS (88.8) TRH (96.1)	100.9	116.8	129.5	146	-	-
L	84.5	-	-	-	-	161.5	-	-
E	-	120.1	129.9	152.5	173.5	195.5	-	-

Double-lip end seals+Metal Scraper (SU)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	45.3	54.4	62.2	72.4	80.7	-	-	-
N	61.9	TRS (73.3) TRH (80.6)	86	101.3	114	129.5	-	-
L	70.4	-	-	-	-	145	167	202
E	-	104.6	115	137	158	179	205.1	261.5

TBI MOTION LINEAR GUIDE

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Table 2.2.18 TR Type Block Length of Accessories

Unit : mm

Two Double-lip end seals+Metal Scraper (SZ)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	52.9	63.4	70.6	81.4	89.7	-	-	-
N	69.5	TRS (82.3) TRH (89.6)	94.4	110.3	123	139.5	-	-
L	78	-	-	-	-	155	178	213
E	-	113.6	123.5	146	167	189	216.1	272.5

Double-lip end seals+Felt+Metal Scraper (DU)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	56.8	65.9	73.7	83.9	92.2	-	-	-
N	73.4	TRS (84.8) TRH (92.1)	97.5	112.8	125.5	141	-	-
L	81.9	-	-	-	-	156.5	-	-
E	-	116.1	126.5	148.5	169.5	190.5	-	-

Two Double-lip end seals+Felt+Metal Scraper (DZ)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	64.4	74.9	82.1	92.9	101.2	-	-	-
N	81	TRS (93.8) TRH (101.1)	105.9	121.8	134.5	151	-	-
L	89.5	-	-	-	-	166.5	-	-
E	-	125.1	134.9	157.5	178.5	200.5	-	-

Double-lip end seals+Oil Reservoir (BN)								
Length of Block Code \ Type	TR15	TR20	TR25	TR30	TR35	TR45	TR55	TR65
S	55.8	66.4	73.2	83.4	91.7	-	-	-
N	72.4	TRS (85.3) TRH (92.6)	97	112.3	125	144	-	-
L	80.9	-	-	-	-	159.5	-	-
E	-	116.6	126	148	169	193.5	-	-

A

Linear Guide

Dust-proof Rails

Once the Linear Guide is operating in a cutting machine, dust and foreign matter that enter the Linear Guide may cause abnormal wear and shorten the service life.

Linear Guide rail mounting-hole cap

Chips and foreign matter clogging the mounting holes of a Linear Guide rail may enter the Linear Guide block. To prevent this situation, the mounting holes must be closed with dedicated caps, which must be installed to flush with the Linear Guide rail top surface. To insert a dedicated cap into a mounting hole, drive the cap in using a plastic hammer with a flat metal pad placed over the cap until it matches with the Linear Guide rail top surface. (Fig 2.2.15)

Rail with tapped holes

Fixing a rail with tapped hole is different from fixing a standard one. A major strength of it is the shape of the tapped hole ; dust and chippings would not enter. (Fig 2.2.15)

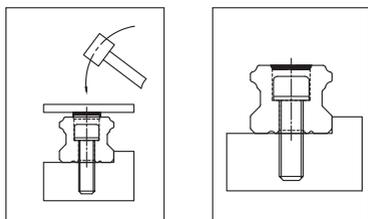


Fig 2.2.15 Dust-proof

■ 2-2-15 Friction

The figure showed in the chart is the maximum friction. (Table 2.2.20)

Table 2.2.20 End Cap friction rate

Unit : kgf

Model No.	End Cap friction rate (Max)
TR15	0.25
TR20	0.35
TR25	0.4
TR30	0.5
TR35	0.7
TR45	1.3
TR55	1.6
TR65	2

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■ 2-2-16 Mounting-Surface Dimensional Tolerance

TR series Linear Guide is a Four-Way Equal-Load design, a slight dimensional error in the mounting surface can be absorbed by the self-adjusting capability, thus ensuring smooth linear motion. In the table below are the dimensional tolerances for the mounting surface of TR Linear Guide.

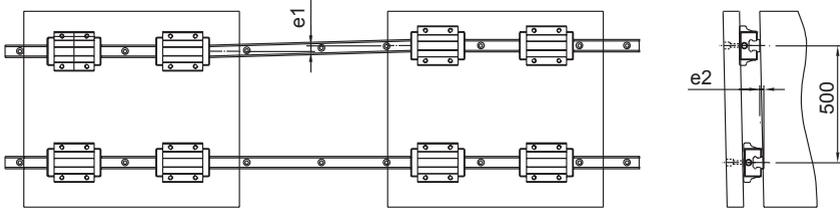


Fig 2.2.16

Table 2.2.21

Unit : μm

Model No.	Tolerance for Parallelism Between Two Axis(e1)					Tolerance for Parallelism Between Two Axis(e2)				
	Z3	Z2	Z1	Z0	ZF	Z3	Z2	Z1	Z0	ZF
TR15	-	-	18	25	35	-	-	85	130	190
TR20	-	18	20	25	35	-	50	85	130	190
TR25	15	20	22	30	42	60	70	85	130	195
TR30	20	27	30	40	55	80	90	110	170	250
TR35	22	30	35	50	68	100	120	150	210	290
TR45	25	35	40	60	85	110	140	170	250	350
TR55	34	45	50	70	98	130	170	210	300	410
TR65	42	55	60	80	105	150	200	250	350	460