

# MICRO TABLE

FMT Series

Registration of a Design



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# MICRO TABLE

FMT Series

## Compact, Lightweight, High Accuracy Actuator

Running Parallelism **0.05mm**

Linear Guide



IKO Co., Ltd BSP

### High Accuracy Linear Guide is built-in.

MICRO TABLE

#### Two Mounting Surfaces

Threaded holes for mounting provided in each of the front and top sides of the flat table improve the degree of freedom of mounting.

#### Linear Guide

Miniature Linear Guide integrated  
Small size and high accuracy (running parallelism: 0.05 mm) achieved.  
The trouble of designing the guide mechanism is eliminated.

#### Rear Side Piping

Piping ports are gathered on the rear side, saving the space for mounting in the radial direction.

#### Lightweight Body

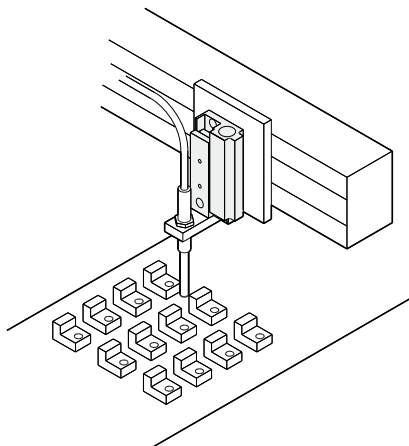
Lightweight product line including the 48 g model (FMT-SD6-10).

## Summary of The MICRO TABLE

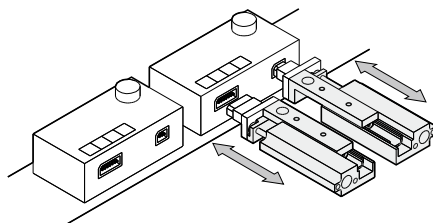
With the high accuracy, lightweight and compactness given the highest priority, the actuator integrates an air cylinder, linear guide and table.  
The flat shape of the unit has allowed reduction of the height up to the table.

### Application Examples : MICRO TABLE

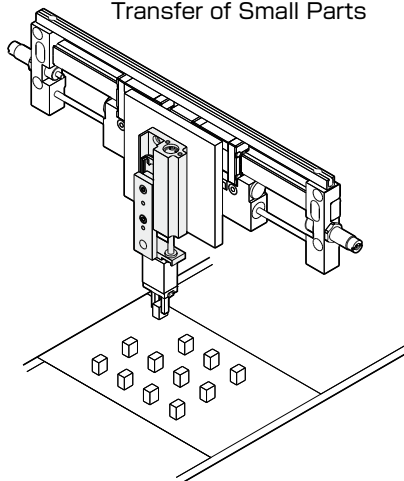
Drive of Small Sensors



Conductivity Test with Connectors



Transfer of Small Parts



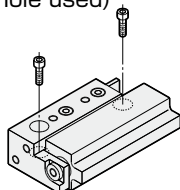
### MAIN BODY INSTALLATION

(Bolt as shown in the figure are not supplied with products)

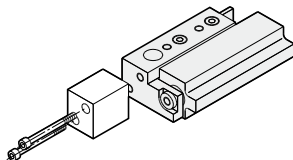
### MOUNTING

(Bolt as shown in the figure are not supplied with products)

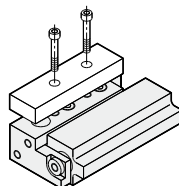
Top Mounting  
(Thru Hole used)



Top Mounting



Side Mounting



Model Code Example

# FMTS-SD10-10-RA12 LA

Series Name ●

Magnet ●

No Code	None
S	With Magnet

The magnet will become necessary when you install the switch

Bore Size ●

6	φ6
10	φ10

Cable Length ●

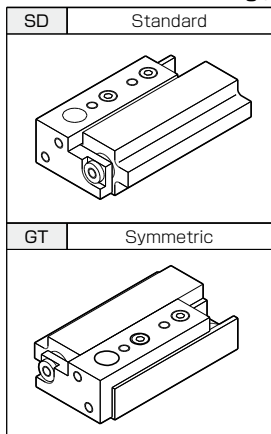
No Code	1m
LA	3m

5m for RA1 LA Switch

Number of Switches ●

1	1
2	2

Mounting ●



Switch ●

No Code	None		
RA1	Straight	DC24V 2 Wires Reed Switch	With Indicator Light
RB4	Straight	DC12~24V 2 Wires Solid State Switch	
RC4	Angle	DC5~24V 3 Wires Solid State Switch	With Indicator Light
RB5	Straight	DC5~24V 3 Wires Solid State Switch	With Indicator Light
RC5	Angle	DC5~24V 3 Wires Solid State Switch	With Indicator Light

Direction of Cable Outlet

RA, RB.....

Straight Outlet Cable

RC.....

Angle Outlet Cable



For details  Page 1066, 1067

Stroke ●

Bore Size	Standard Stroke (mm)		
	10	20	30
φ 6	●	●	●
φ 10	●	●	●

### Intermediate Stroke

1mm step intermediate strokes can be set by installing spacers in the cylinder for standard strokes. The total length of the cylinder is the same as that of the longer stroke cylinder for standard strokes.
















## SPECIFICATIONS

Bore Size	$\phi 6\text{mm}$	$\phi 10\text{mm}$
Rod Diameter	$\phi 3\text{mm}$	$\phi 4$
Maximum Load Mass	0.1 kg	0.2kg
Piping Diameter	M3×0.5	
Guide Mechanism	Miniature Linear Guide	
Type of Operation	Double Acting	
Fluid	Air	
Maximum Operating Pressure	0.7 MPa	
Minimum Operating Pressure	0.15MPa	
Pressure	1.05MPa	
Operating Temperature	5~60°C	
Operating Speed	100~500mm/s	
Lubrication	Not required	
Cushioning	None	

## THE TYPE OF LINEAR GUIDE

Model	Stroke	Type
FMT6	10	IKO BSP1025SL
	20	IKO BSP1035SL
	30	IKO BSP1045SL
FMT10	10	IKO BSP1540SL
	20	
	30	IKO BSP1550SL

## OPTIONAL PARTS CODES

Name	Reed Switch	Solid State Switch(2 Wires, with Indicator Light)		Solid State Switch(3 Wires, with Indicator Light)																																					
		Straight Outlet Cable	Angle Outlet Cable	Straight Outlet Cable	Angle Outlet Cable																																				
<table border="1"> <tr> <td>PARTS CODE</td> <td>Note</td> </tr> <tr> <td>PARTS CODE</td> <td>Note</td> </tr> <tr> <td>Content</td> <td></td> </tr> </table>	PARTS CODE	Note	PARTS CODE	Note	Content		<table border="1"> <tr> <td>RA 1 (FMT)</td> <td>Cable Length: 1m</td> </tr> <tr> <td>RA 1 LA (FMT)</td> <td>Cable Length: 5m</td> </tr> <tr> <td></td> <td>with fixture</td> </tr> </table>	RA 1 (FMT)	Cable Length: 1m	RA 1 LA (FMT)	Cable Length: 5m		with fixture	<table border="1"> <tr> <td>RB4 (FMT)</td> <td>Cable Length: 1m</td> </tr> <tr> <td>RB4LA (FMT)</td> <td>Cable Length: 3m</td> </tr> <tr> <td></td> <td>with fixture</td> </tr> </table>	RB4 (FMT)	Cable Length: 1m	RB4LA (FMT)	Cable Length: 3m		with fixture	<table border="1"> <tr> <td>RC4 (FMT)</td> <td>Cable Length: 1m</td> </tr> <tr> <td>RC4LA (FMT)</td> <td>Cable Length: 3m</td> </tr> <tr> <td></td> <td>with fixture</td> </tr> </table>	RC4 (FMT)	Cable Length: 1m	RC4LA (FMT)	Cable Length: 3m		with fixture	<table border="1"> <tr> <td>RB5 (FMT)</td> <td>Cable Length: 1m</td> </tr> <tr> <td>RB5LA (FMT)</td> <td>Cable Length: 3m</td> </tr> <tr> <td></td> <td>with fixture</td> </tr> </table>	RB5 (FMT)	Cable Length: 1m	RB5LA (FMT)	Cable Length: 3m		with fixture	<table border="1"> <tr> <td>RC5 (FMT)</td> <td>Cable Length: 1m</td> </tr> <tr> <td>RC5LA (FMT)</td> <td>Cable Length: 3m</td> </tr> <tr> <td></td> <td>with fixture</td> </tr> </table>	RC5 (FMT)	Cable Length: 1m	RC5LA (FMT)	Cable Length: 3m		with fixture
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### RA Switch Fixture

BD (FMT)	Switch Fixture, Screw
	

### RB, RC Switch Fixture

BE (FMT)	Switch Fixture, Screw
	

### ●RB, RC Switch

Conventional RG1, RG2 switch can be replaced to RB, RC switch.

## MASS

Unit: g

Model	Mass
FMT -SD 6-10	48
FMT -SD 6-20	58
FMT -SD 6-30	60
FMT -SD10-10	68
FMT -SD10-20	97
FMT -SD10-30	108
FMTS-SD 6-10	50
FMTS-SD 6-20	60
FMTS-SD 6-30	62
FMTS-SD10-10	71
FMTS-SD10-20	100
FMTS-SD10-30	111

NOTE: SD, GT are both the same mass.

Unit: g

Switch Type	Mass
RA1	10
RB4	15
RC4	
RB5	
RC5	30
RA1LA	
RB4LA	
RC4LA	35
RB5LA	
RC5LA	

## THEORETICAL THRUST

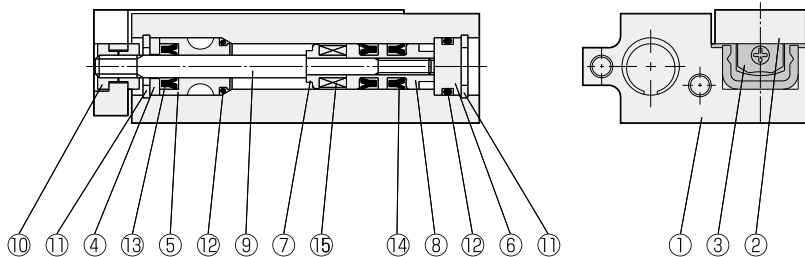
Unit: N

Bore Size (mm)	Working Direction	Operating Pressure MPa					
		0.2	0.3	0.4	0.5	0.6	0.7
φ6	Push	5.7	8.5	11	14	17	20
	Pull	4.2	6.4	8.5	11	13	15
φ10	Push	16	24	31	39	47	55
	Pull	13	20	26	33	40	46

 $1\text{MPa}=10.2\text{kgf}/\text{cm}^2$   
 $1\text{N}=0.102\text{kgf}$

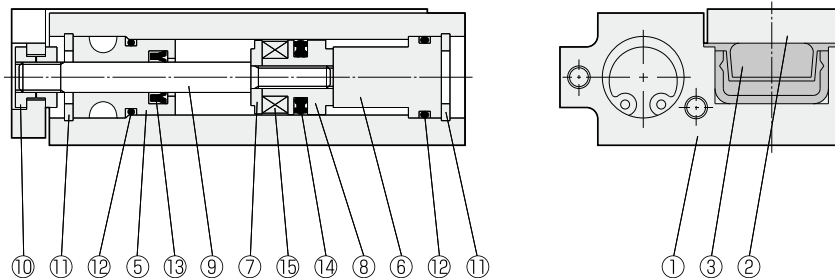
# STRUCTURE AND PRINCIPAL COMPONENTS

## FMT6



These components cannot be disassembled.

## FMT10



These components cannot be disassembled.

**⚠ Caution**

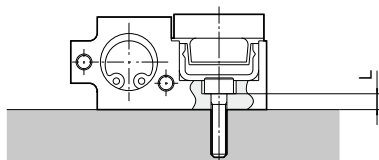
Conventional function will be lost if disassembled.

### PRINCIPAL COMPONENTS

No.	Name	Material	Remarks	No.	Name	Material	Remarks
1	Body	Aluminum Alloy	White Alumite	9	Rod	Stainless Steel	
2	Table	Aluminum Alloy	White Alumite	10	Connecting Nut	Stainless Steel	
3	Miniature Linear Guide	Stainless, Resin		11	Circlip	Steel	Nickel Plating
4	Rod Seal Holder	Aluminum Alloy	Only FMT6	12	O-ring	NBR	
5	Rod Cover	Aluminum Alloy		13	Rod Seal	NBR	
6	End Cover	Aluminum Alloy	White Alumite	14	Piston Seal	NBR	
7	Piston A	Stainless Steel	FMT 6	15	Magnet	Magnetic Material	
		Rolled Steel	FMT10				
8	Piston B	Aluminum Alloy					

## BODY INSTALLATION

### Top Mounting(Thru Hole used)

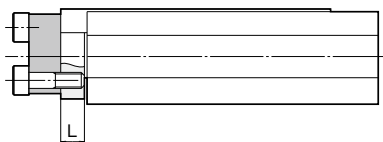


Model	Bolt Size	Thru Hole Length L(mm)	Fastening Torque N·m
FMT 6	M3	2.5	1.1
FMT10	M3	3	1.1

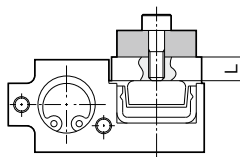
FMT

## MOUNTING ON TABLE

### Front Mounting



### Top Mounting



Model	Bolt Size	Screw Depth L(mm)	Fastening Torque N·m
FMT 6	M3×0.5	4.0	1.1 <sup>Note</sup>
FMT10	M3×0.5	4.0	1.1 <sup>Note</sup>

Model	Bolt Size	Screw Depth L(mm)	Fastening Torque N·m
FMT 6	M3×0.5	4.0	1.1 <sup>Note</sup>
FMT10	M3×0.5	4.0	1.1 <sup>Note</sup>

### ⚠ Caution

A miniature linear guide is employed. Accordingly, when tightening a bolt, hold the table with the hand, etc. so that the tightening torque is not applied to the table.

Excessive torque or impact applied may cause failure.

Ensure that the tightening torque is 0.23 N·m when holding the table is not possible.

If there is any possibility that the bolts are loosened, take loosening prevention measures such as use of an adhesive.



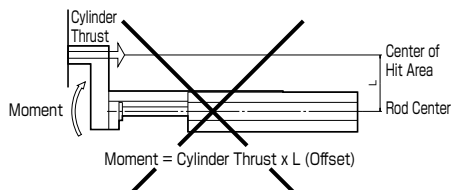
## PRECAUTIONS FOR DESIGN AND USE

### ⚠ Caution

#### Moment due to Cylinder Thrust in Offset Pushing

A miniature linear guide is used and applications in which the mounted load or workpiece is pushed with its center offset are not permitted because the moment due to the thrust of the cylinder itself exceeds the allowable moment value of the linear guide.

Ensure that the center of the hit area coincides with the rod center or use PICO TABLE (PPT) or PICO UNIT (PPU).



#### Accuracy of Assembly Dimensions

When high accuracy of assembly dimensions of the product is required, use the following products.

PICO TABLE (PPT)  39 page

PICO UNIT (PPU)  313 page

#### External Force

This product is designed for low load applications. If large external force is applied, use PICO TABLE (PPT) or PICO UNIT (PPU).

#### Linear Guide Lubrication

Lubricant is enclosed in the linear guide in advance but the performance will be deteriorated by a long operating time, operating conditions, environment, etc. Regular lubrication is necessary.

Using without lubrication may accelerate wear of the rolling part or cause earlier end of the service life.

The timing of regreasing depends on the operating conditions and environment. As a rule, regrease at intervals of travel of 100 km or one month.

After wiping the old grease off, supply lithium soap-based grease to the linear guide.

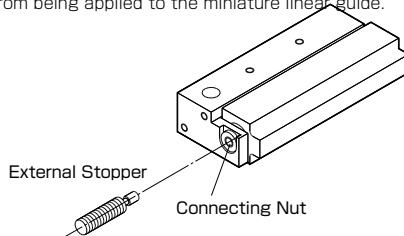
Supplying a different type of grease may cause malfunction or failure due to lubrication performance degradation or chemical change.

Turbine oil can be applied or drop-fed for use.

Do not use spindle oil or machine oil because they adversely affect the packing.

#### External Stopper

When an external stopper is provided, be sure to mount it so that the hitting point is the center of the connecting nut on the rod axis as shown in the figure in order to prevent the moment due to cylinder thrust from being applied to the miniature linear guide.



#### Mounting Surface Accuracy

Ensure that the mating mounting surface of a machine, equipment, jig, etc. is a flat surface machined to high precision without unevenness or projections and mounting is correct in order to achieve stable, high-accuracy linear motion.

Low mounting surface accuracy or incorrect mounting may cause looseness, increase the rolling resistance or adversely affect the service life.

#### Rolling Feel in Linear Guide

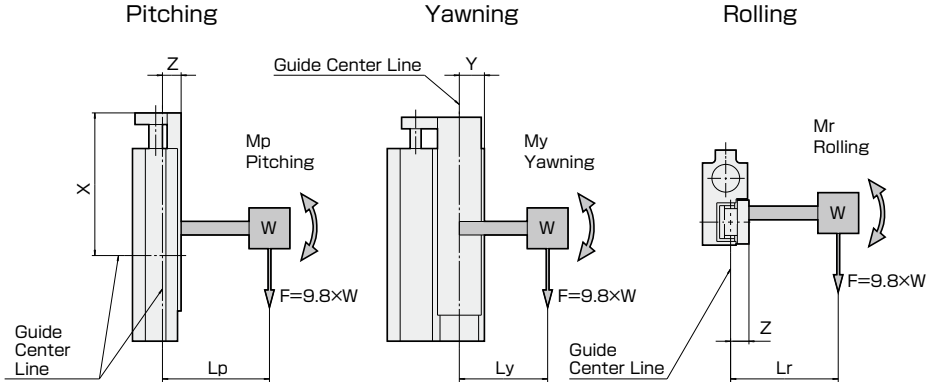
When the table is moved by hand, rolling of balls inside the linear guide may cause slight feel of operation discontinuity or difference in the rolling resistance between products. This is due to preload of the linear guide and does not affect the performance.

# ALLOWABLE LOAD AND ALLOWABLE MOMENT

## ⚠ Cation

### ■ Moment Direction and the Position of Guide Center Line

The moment directions are classified into three types in accordance with the mounting condition of a load to the actuator.



Guide Center Positions

Unit: m

Model	Stroke (mm)	Guide Center Line Positions			
		X'	X''	Y	Z
FMT6	10	0.0265	0.0315	0.0065	0.0063
	20	0.0335	0.0435		
	30	0.0405	0.0555		
FMT10	10	0.0335	0.0385	0.0090	0.0075
	20	0.0365	0.0465		
	30	0.0445	0.0595		

W(kg):mass of a loaded work

F(N):gravitation acting on a loaded work

Lp,Ly,Lr(m):distance between the center line of the guide and that of a loaded work

X' :at pull end

X'' :at push end

### ■ allowable Mass and Allowable Moment in case of a Loaded Work

Confirm that the following two values are respectively within the allowable range.

#### ① Allowable Load Mass

Unit: kg

Model	FMT6	FMT10
Allowable Load Mass	0.1	0.2

#### ② Allowable Loaded Work Moment

The moment in each direction generated by the gravity acting on a loaded work is calculated by the formulas below. These calculated values shall not exceed the allowable loaded work moment.

(Load moment)=(Gravity acting on a load: F) x (Distance between guide center line and center of gravity of a loaded work:L)  
 $=9.8 \times (\text{Load mass:}W) \times (\text{Distance between guide center line and center of gravity of a loaded work:L})$   
 (Gravity acting on a load:F)  $=9.8 \times (\text{Load mass:}W)$

Pitching :Mp(N-m)  $=9.8 \times W(\text{kg}) \times Lp(\text{m})$

Yawing :My(N-m)  $=9.8 \times W(\text{kg}) \times Ly(\text{m})$

Rolling :Mr(N-m)  $=9.8 \times W(\text{kg}) \times Lr(\text{m})$

#### Allowable Loaded Work Moment

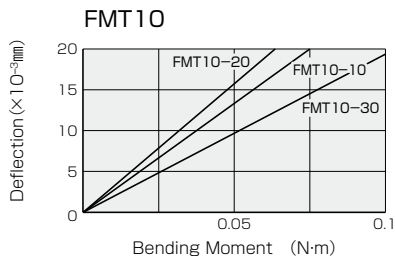
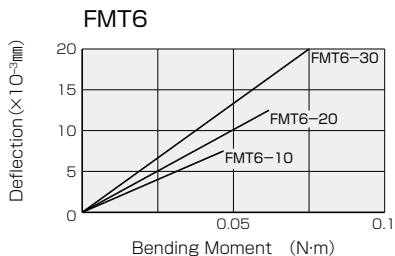
Unit: N·m

Model	Stroke (mm)	Allowable Loaded Work Moment		
		Mp	My	Mr
FMT6	10	0.046	0.040	0.049
	20	0.061	0.053	0.062
	30	0.076	0.067	0.074
FMT10	10	0.079	0.069	0.169
	20	0.079	0.069	0.169
	30	0.103	0.089	0.213

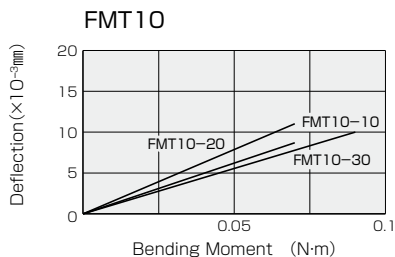
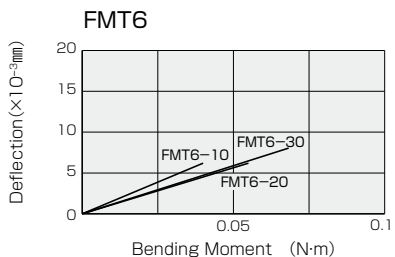
1N·m=0.102kgf·m

# DEFLECTION AT THE TABLE END BY BENDING MOMENT

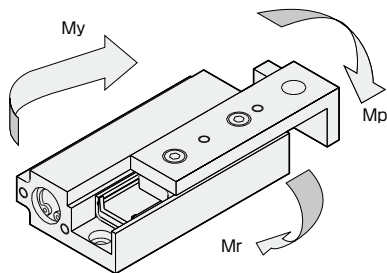
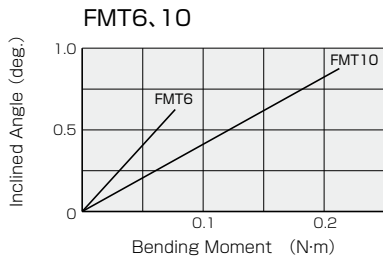
## ■Pitching( $M_p$ )



## ■Yawning( $M_y$ )

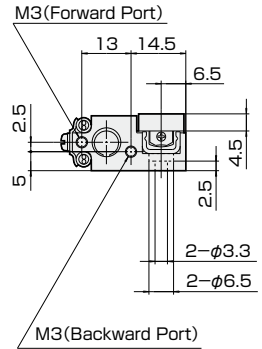
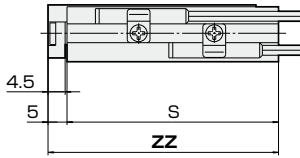
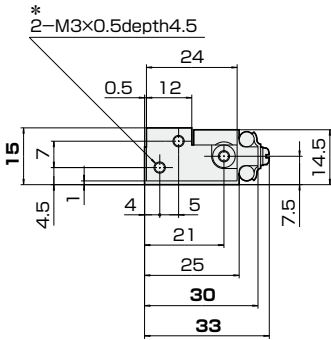
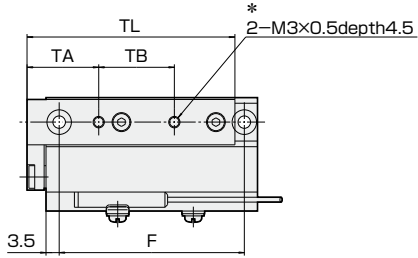


## ■Rolling ( $M_r$ )



# DIMENSIONS(mm) FMT6 BASIC

FMT(S)-SD6-(Stroke)



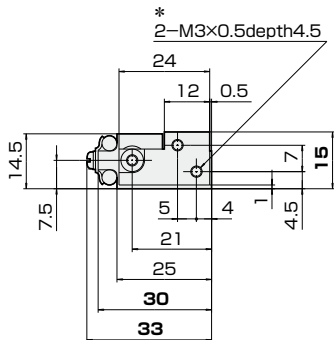
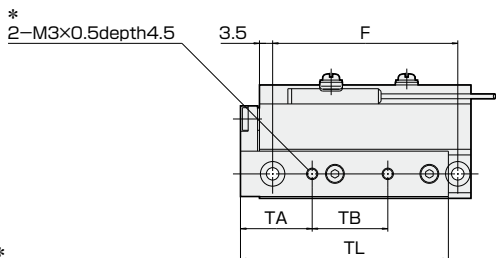
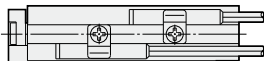
\*Ensure that the protrusion of the bolts fixing the loaded work is within 4mm.

Model	F	S	TA	TB	TL	ZZ
FMT(S)-SD6-10	39	46	15	15	41	51
FMT(S)-SD6-20	49	56	19	20	55	61
FMT(S)-SD6-30	59	66	23	25	69	71

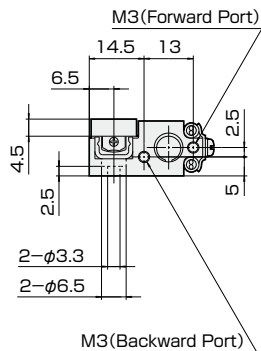
MICRO TABLE

# DIMENSIONS(mm) FMT6 SYMMETRIC

FMT(S)-GT6-(Stroke)



\* 2-M3x0.5 depth 4.5

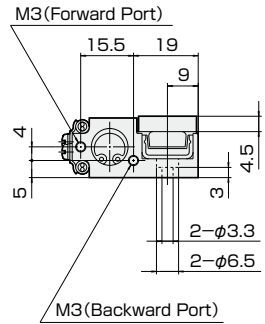
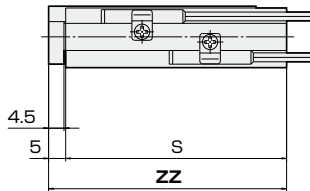
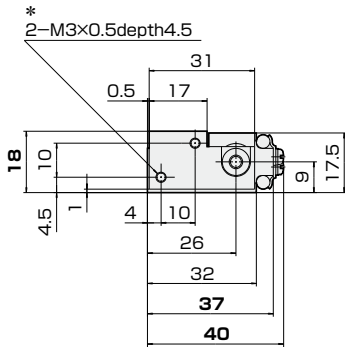
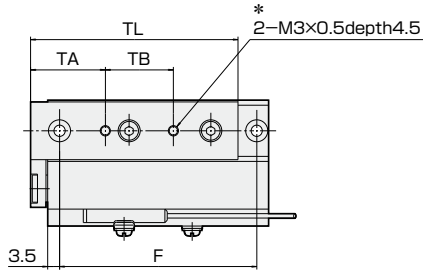
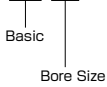


\*Ensure that the protrusion of the bolts fixing the loaded work is within 4mm.

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FMT(S)-GT6-20	49	56	19	20	55	61
FMT(S)-GT6-30	59	66	23	25	69	71

# DIMENSIONS(mm) FMT10 BASIC

FMT(S)-SD10-(Stroke)



\*Ensure that the protrusion of the bolts fixing the loaded work is within 4mm.

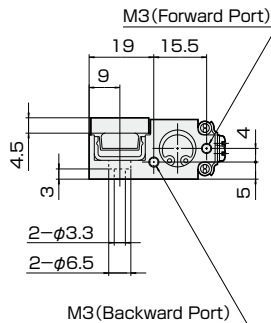
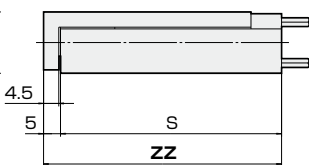
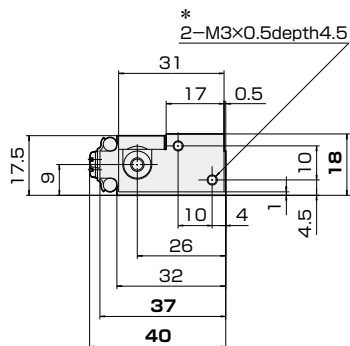
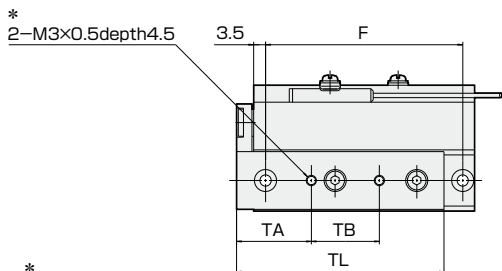
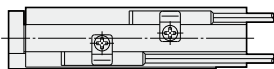
Model	F	S	TA	TB	TL	ZZ
FMT(S)-SD10-10	48	55	16	20	55	60
FMT(S)-SD10-20	58	65	22	20	61	70
FMT(S)-SD10-30	68	75	28	25	77	80

MICRO TABLE

# DIMENSIONS(mm) FMT10 SYMMETRIC

FMT(S)-GT10-(Stroke)

Symmetric  
Bore Size



\*Ensure that the protrusion of the bolts fixing the loaded work is within 4mm.

Model	F	S	TA	TB	TL	ZZ
FMT(S)-GT10-10	48	55	16	20	55	60
FMT(S)-GT10-20	58	65	22	20	61	70
FMT(S)-GT10-30	68	75	28	25	77	80

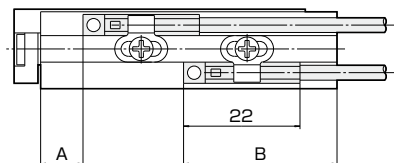
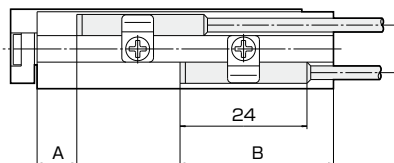
FMT

MICRO TABLE

# SWITCH SETTING POSITION

## Setting Position

Explanation of hysteresis and on hold distance. see Switch Catalogue



### RA1 Switch

Model	Switch Setting Position		On Hold Distance $l$	Hysteresis $c$
	A	B		
FMT 6	7.3	28.7	10	1
FMT10	10.5	34.5	10	1

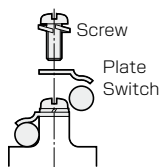
### RB, RC Switch

Model	Switch Setting Position		On Hold Distance $l$	Hysteresis $c$
	A	B		
FMT 6	6.6	29.4	3.5	0.5
FMT10	9.8	35.2	4	0.5

Explanation of hysteresis and on hold distance. see Switch Catalogue

## Switch Installation

Loosen the fixing screw to move the switch along the axis. Adjust the switch to the appropriate position while checking the switch operation using the indicator. Then tighten the screw with 0.3N·m of torque.





## Custom Made

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Contact us for how to order, time to delivery and detailed specification.

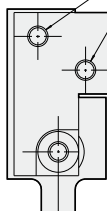
Threaded Hole with Helical Insert.....Model with the threaded holes for mounting a load in the table top side provided with helical inserts.

Note: It is not possible to add helical inserts to an already purchased product.

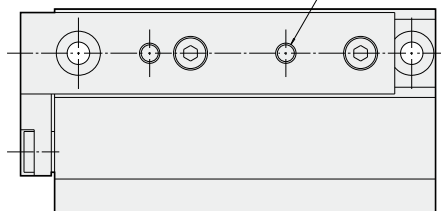
Helical Insert Material: Stainless Steel

Size of Threaded Hole with Helical Insert: M3 Screw depth3 or M4 Screw depth4

The screw can not be a helical insert.



Threaded Hole with Helical Insert



# ■ MEMO ■

# ■ MEMO ■

# ■ MEMO ■