STM

Cylinder with Compact Guide

ø6, ø10

CONTENTS

Full of ease of use, super small

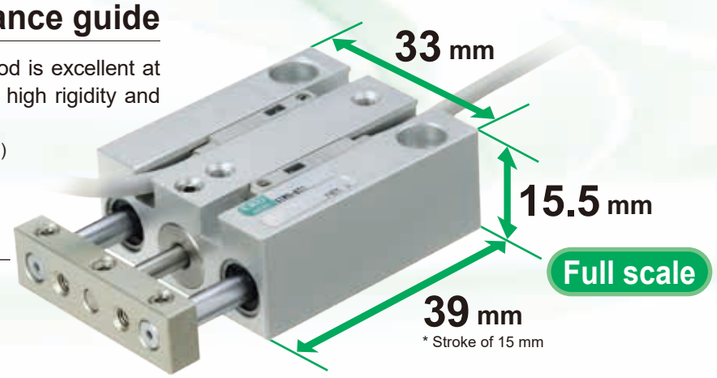
Super small size guided cylinder STM Series (ø6, ø10) with mounting flexibility, abundant variations, and consideration for ease of use and selection.

Rolling bearing type

With high-performance guide

The non-rotation accuracy of the rod is excellent at ±0.08*, and it has a structure with high rigidity and strong resistance to lateral loads.

* In the case of rolling bearing type (STM-B)



Super small size

The size of the smallest model is width 33 mm x height 15.5 mm. As a guided cylinder, it is an extremely small space-saving type.

For conveying small parts, etc.

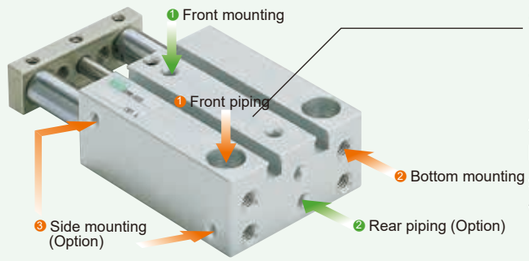
Ideal for small parts conveyance lines for precision equipment such as semiconductors, and can be used for a wide range of applications such as positioning, stoppers, clamps, press fitting, lifters, pushers, etc.

Application fields

Can be used in various manufacturing processes.

Rear piping possible / Side mounting also possible

The piping direction can be front or centralized piping from the rear. (Option) Mounting on the side of the cylinder is possible. Multiple units can be installed side by side even in narrow spaces. (Option)



2-color indicator type switch mountable

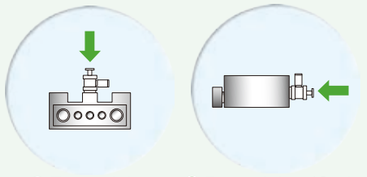
2-color indicator type solid state switch can be mounted on all models. The switch can be selected from two directions, horizontal and vertical, for the lead wire extraction direction.

* Regarding the photo, all options are shown for convenience of explanation. Actually, bottom mounting is not equipped when the side mounting option is selected. The same applies to piping options.

2 bearing types

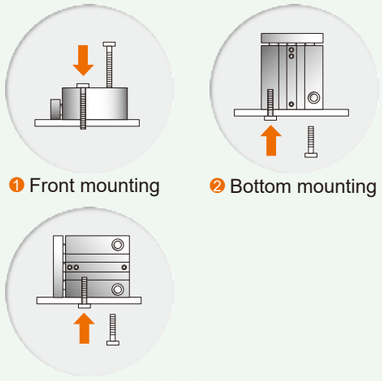
Two types, plain bearing and rolling bearing, are available according to the application.

Piping direction



1 Front piping　2 Rear piping (Option)

Mounting direction



1 Front mounting　2 Bottom mounting

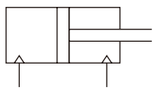
3 Side mounting (option)

STM Series product system

Model variations		Tube I.D.	Stroke (mm) 5	10	15	20	Option: Side mounting A	Rear piping R
Metal bush bearing	STM-M Series	ø6	●	●	●		●	●
		ø10	●	●	●	●	●	●
Ball bearing	STM-B Series	ø6	●	●	●		●	●
		ø10	●	●	●	●	●	●

Cylinder with Compact Guide
STM Series

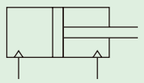
●: Standard, ◎: Option, : Not manufacturable

Variation	Model No. Circuit Diagram Symbol	Bore size (mm)	Stroke (mm) 5	10	15	20		Maximum stroke (mm)	Bearing type: Plain bearing M	Bearing type: Rolling bearing B	Option: Side Mount Type A	Option: Rear piping type R	Switch	Page
Double Acting/ Single Rod Type	STM-M/B 	ø6	●	●	●			15	●	●	●	●	◎	350
		ø10	●	●	●	●		20	●	●	●	●	◎	

Compact guided cylinder Double acting, Single rod type

STM-$^{M}_{B}$ Series

● Bore size: ø6, ø10

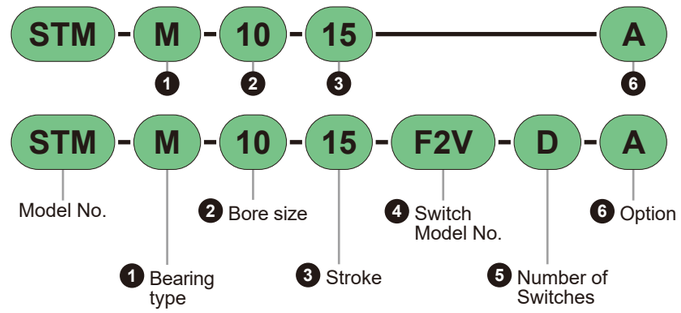
Circuit Diagram Symbol 

RoHS

Model No. Notation Method

Without Switch
(Built-in magnet for switch)

With Switch
(Built-in magnet for switch)



1 Bearing type

Code	Content
M	Plain bearing
B	Rolling bearing

2 Bore Size (mm)

Code	Content
6	ø6
10	ø10

3 Stroke (mm)

Code	Content
5	5
10	10
15	15
20	20 (ø10 only)

4 Switch Model No.

For switch details, please refer to P. 753.
Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V) AC	Load Voltage (V) DC	Load Current (mA) AC	Load Current (mA) DC	Lead wire *1 Straight	Lead wire *1 L-shape	
Solid State	1-Color	2-wire	-	10 to 30	-	5 to 20	-	F2S□	
		3-wire (NPN)	-	30 or less	-	50 or less	-	F3S□	
		2-wire	-	10 to 30	-	5 to 20 *2	F2H□	F2V□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3H□	F3V□	
		3-wire (PNP)	-	30 or less	-	50 or less	F3PH□	F3PV□	
	2-Color	2-wire	-	24±10%	-	5 to 20	F2YH□	F2YV□	
		3-wire (NPN)	-	30 or less	-	50 or less	F3YH□	F3YV□	

*1: For "□" in the switch model No., enter the code selected from the "*Lead wire length" table.
*2: The maximum load current value above, 20 mA, is at 25°C. If the switch operating ambient temperature is higher than 25°C, it will be lower than 20 mA. (At 60°C, it will be 5 to 10 mA.)
*3: When using a solid state 2-color indicator switch with STM-B-6, do not attach it to magnetic materials such as iron plates. This will cause switch detection failure.
*4: Switches other than the model No.s listed above are also available. (Custom order) For details, refer to P. 753.

* Lead wire length

Code	Content
Blank	1 m (Standard)
3	3 m (Option)

Example) Lead wire length
1 m F2S
3 m F2S 3

5 Number of Switches

Code	Content
R	With 1 on Rod Side
H	With 1 on Head Side
D	With 2 pcs

6 Option

Code	Content	
A	Side Mount Type	
R	Rear piping type	

Clean Specification (Catalog No. CB-033SAA)

● Dust prevention structure usable in cleanrooms

STM-B-·····-P7□

STM-B-·····-P5□

High durability equipment HP series (Catalog No. CC-1421AA)

● Long-life actuator that contributes to productivity improvement with stable operation

STM-$^{M}_{B}$-·····-HP□

Switch Single Unit Model No. Notation Method

SW - F2V

4 Switch Model No.

Specifications

Item		STM-M/B	
Bore Size	mm	ø6	ø10
Actuation method		Double Acting Type	
Operating Fluid		Compressed Air	
Max. Working Pressure	MPa	0.7	
Min. Operating Pressure	MPa	0.15	
Proof Pressure	MPa	1.05	
Ambient Temperature	°C	-10 to 60 (However, no freezing)	
Port Size		M3	
Stroke tolerance	mm	+1.5 0	
Operating Piston Speed	mm/s	50 to 500	
Cushion		With Rubber Cushion	
Lubrication		Not required (When lubricating, use turbine oil Class 1 ISO VG32)	
Allowable absorption energy	J	0.008	0.054

Stroke

Bore Size	Standard Stroke (mm)	Maximum Stroke (mm)	Min. Stroke	Minimum Stroke with Switch
ø6	5, 10, 15	15	5	5
ø10	5, 10, 15, 20	20		

Note) Strokes other than standard strokes are custom products.

Cylinder Weight

Unit: g

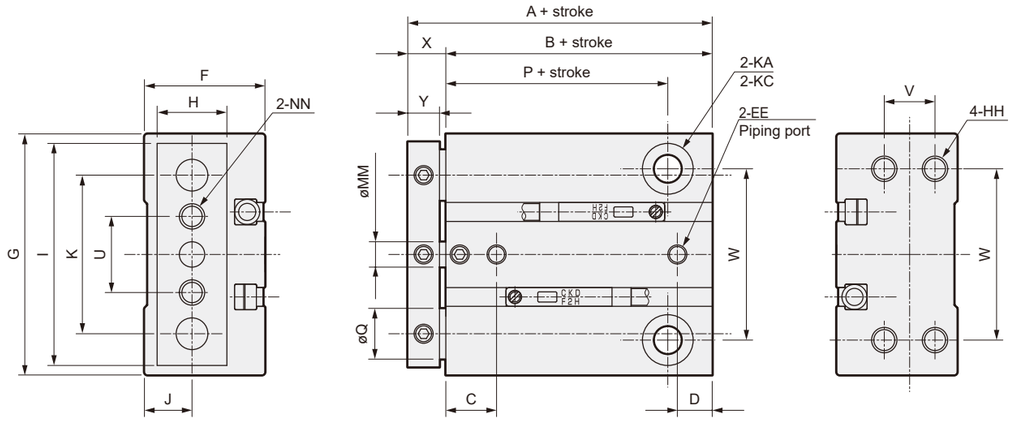
Model No.	Stroke (mm) / Bore Size (mm)	5	10	15	20	Switch weight
STM-M	ø6	45.1	52.5	59.9	-	Refer to the mass described in the switch specifications on P. 753
	ø10	73.7	84.6	95.4	106.3	
STM-B	ø6	41.9	48.1	54.3	-	
	ø10	67.1	75.5	84.0	92.5	

Theoretical Thrust Table

Unit: N

Bore Size (mm)	Operating Direction	Operating pressure (MPa)						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø6	Push	4.24	5.65	8.48	11.3	14.1	17.0	19.8
	Pull	3.18	4.24	6.36	8.48	10.6	12.7	14.8
ø10	Push	11.8	15.7	23.6	31.4	39.3	47.1	55.0
	Pull	9.90	13.2	19.8	26.4	33.0	39.6	46.2

Outline Dimension Drawing



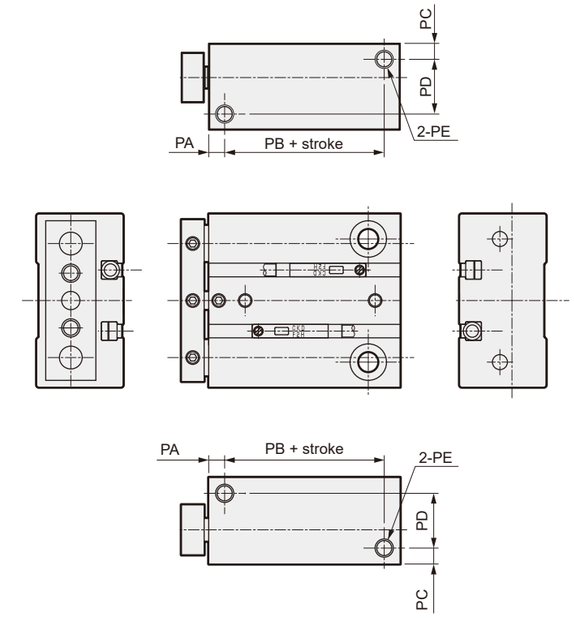
Code / Bore size (mm)	Standard Stroke (mm)	A	B	C	D	EE	F	G	H	HH	I	J	K	KA
6	5, 10, 15	30	24	7.5	5	M3	15.5	33	9	M3 Depth 5	31	6	23	3.4 Through
10	5, 10, 15, 20	34	28	8.5	7	M3	19	38	11	M4 Depth 5	35	7.5	25	4.3 Through

Code / Bore size (mm)	KC	MM	NN	P	Q		U	V	W	X	Y
					STM-M	STM-B					
6	6.1 Counterbore depth 3.3	3	M3 Through	17	6	4	12	6	25	6	5
10	8 Counterbore depth 4.4	4	M4 Through	20.5	8	5	12	8	27	6	5

Note) For dimensions with each switch, refer to P. 357.

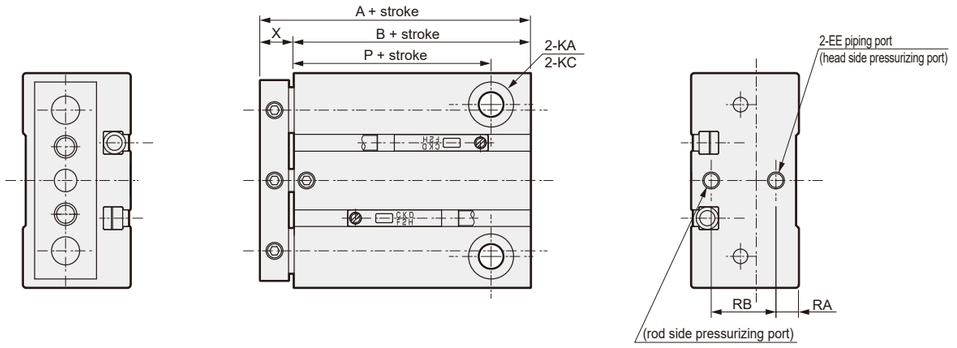
Outer Dimensions Diagram with Option

● Side mounting type (A)



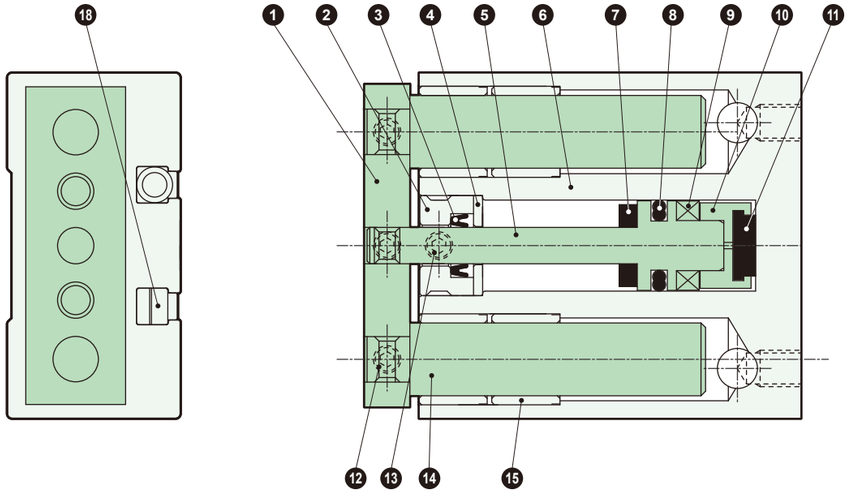
Code / Bore size (mm)	Standard Stroke (mm)	PA	PB	PC	PD	PE
6	5, 10, 15	3	18	3	10	M3 Depth 5
10	5, 10, 15, 20	4	21	4	12	M4 Depth 5

● Rear piping type (R)

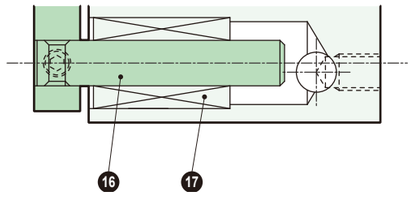


Code / Bore size (mm)	Standard Stroke (mm)	A	B	EE	KA	KC	P	RA	RB
6	5, 10, 15	32	26	M3	3.4 Through	6.1 Counterbore depth 3.3	17	4	8
10	5, 10, 15, 20	34	28	M3	4.3 Through	8 Counterbore depth 4.4	20.5	4	12

Internal Structure Diagram / Material



Plain bearing (M)

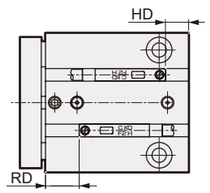
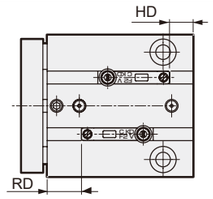
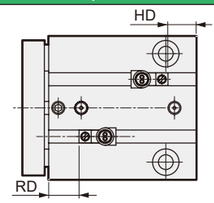
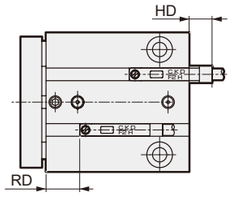
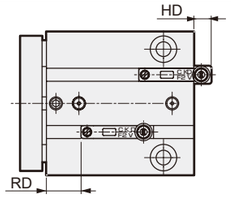
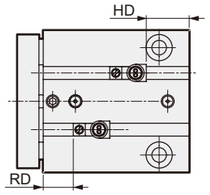


Rolling bearing (B)

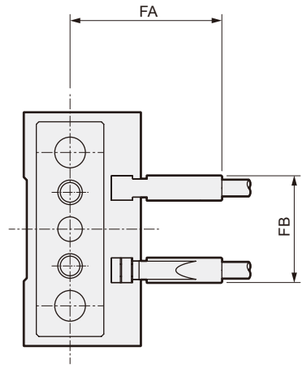
Do not disassemble

Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	End plate	Aluminum Alloy	Alumite	10	Adapter	Aluminum Alloy	Chromate
2	Rod Metal	Stainless Steel		11	Cushion rubber H	Urethane Rubber	
3	Rod Packing	Nitrile Rubber		12	Hexagon socket head set screw	Stainless Steel	
4	Spacer	Aluminum alloy	Chromate	13	Hexagon socket head set screw	Stainless Steel	
5	Piston	Stainless Steel		14	Guide rod	Stainless Steel	ø10: Industrial chromium plating
6	Cylinder Body	Aluminum Alloy	Hard Anodized	15	Bushing	Oil-Impregnated Bearing Alloy	
7	Cushion rubber R	Urethane Rubber		16	Guide rod	Alloy Steel	Industrial Hard Chrome Plating
8	Piston Packing	Nitrile Rubber		17	Ball bearing		
9	Magnet	Plastic	ø10: Painted	With Switch			
				18	Switch		

STM Series Switch External Dimensions Diagram

	F2H, F3H, F2YH, F3YH, F3PH	F2V, F3V, F2YV, F3YV, F3PV	F2S, F3S
Mounting A			
Mounting B *1			

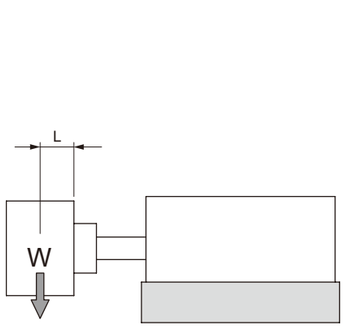
● Protrusion dimension when mounting cylinder switch F2S, F3S (*4)

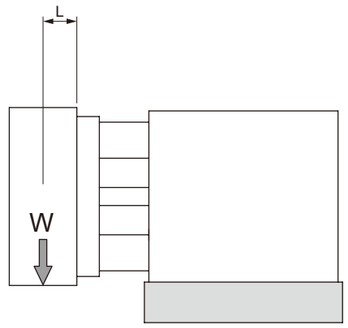


Mounting method	Bore	F2H, F3H		F2V, F3V		F2YH, F3YH, F3PH		F2YV, F3YV, F3PV		F2S, F3S			
		RD	HD (*3)	RD	HD (*3)	RD	HD (*3)	RD	HD (*3)	FA (*4)	FB (*4)	RD	HD
Mounting A	ø6	8	5.5 (7.5)	8	5.5 (7.5)	8	5.5 (7.5)	8	5.5 (7.5)	22.8	17.2	7	4.5
	ø10	10	7.5	10	7.5	10	7.5	10	7.5	24.8	17.4	9	6.5
Mounting B	ø6	8	– 4.5 (– 6.5)	8	1.5 (3.5)	8	– 9 (– 11)	8	– 6 (– 8)	22.8	17.2	7	8
	ø10	10	–3.5	10	0.5	10	8	10	–4	24.8	17.4	9	10

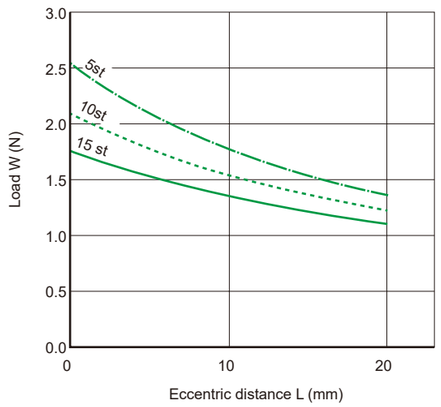
*1: If the switch is mounted as shown in mounting B, the switch may protrude from the main body. If the switch protrudes from the main body and the product is assembled to the device with head-side mounting, the switch will interfere with the device, so please be careful.
*2: A negative dimension indicates the protrusion dimension from the end face of the main body.
*3: Dimensions in ( ) are for the rear piping type.
*4: For FA and FB dimensions, please refer to "Protrusion dimension when mounting cylinder switch F2S, F3S".

Allowable Lateral Load

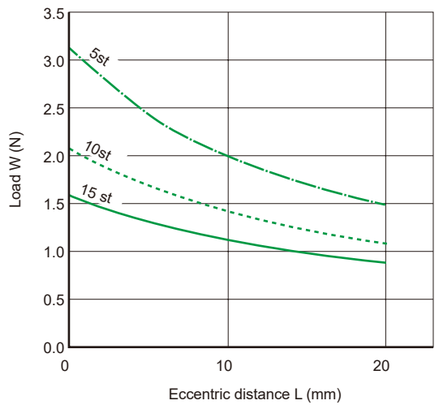




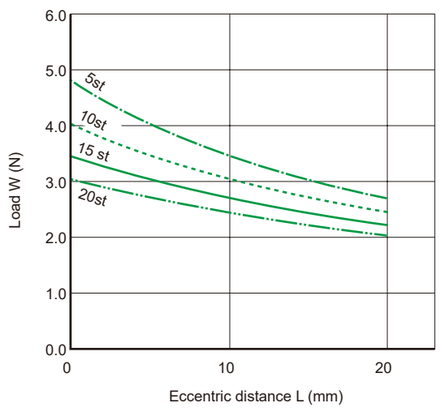
● STM-M-6



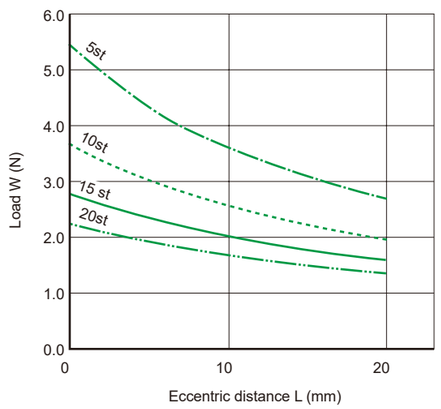
● STM-B-6



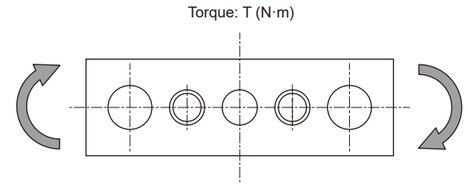
● STM-M-10



● STM-B-10



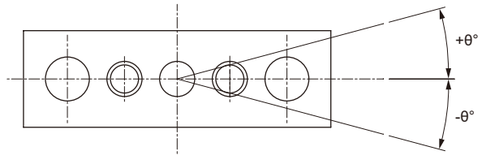
Allowable rotational torque



Unit: N·m

Bore Size (mm)	Model No.	Bearing type	Stroke (mm)			
			5	10	15	20
ø6	STM-M-6	Plain bearing	0.015	0.012	0.010	-
	STM-B-6	Rolling bearing	0.018	0.012	0.009	-
ø10	STM-M-10	Plain bearing	0.030	0.025	0.022	0.019
	STM-B-10	Rolling bearing	0.034	0.023	0.018	0.014

Non-rotation accuracy (Reference value)

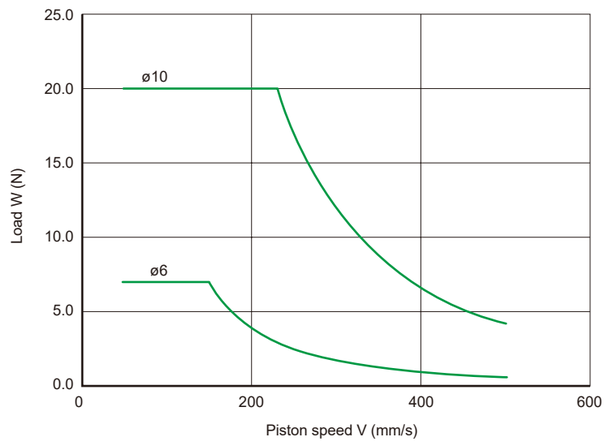


Bore Size (mm)	Non-rotation accuracy θ (degrees)	
	Plain bearing	Rolling bearing
ø6	±0.14	±0.08
ø10	±0.16	±0.08

Allowable absorption energy value

Use within the range to the lower left of the curve. If using in the upper right range, provide a separate external shock absorber.

Allowable absorption energy value



Pneumatic Equipment

To Use This Product Safely

Be sure to read this before use.

For general information on cylinders, please see Intro P. 41, and for cylinder switches, please see P. 808.

Individual Precautions: Compact guided cylinder STM series

During Design / Selection

1. Common

Caution

■ When using a solid state 2-color indicator switch with STM-B-6, do not attach it to magnetic materials such as iron plates. This will cause switch detection failure.

2. With switch

Caution

■ Install the switch while adhering to the tightening torque.
If tightened beyond the tightening torque range, mounting screws, mounting brackets, switches, etc. may be damaged. Also, if tightened below the tightening torque range, the switch mounting position may shift. Tightening torque: 0.03 to 7.0 N·m

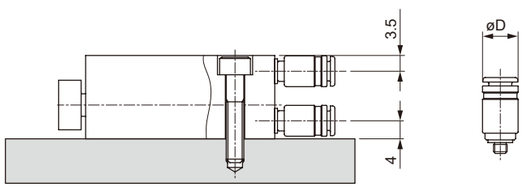
During Use

1. Common

Caution

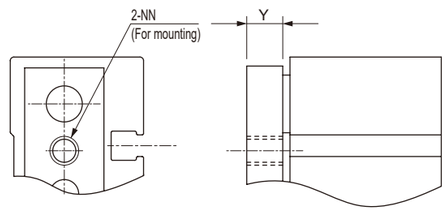
■ Be sure to use a speed controller when piping. Also, the usable fittings when mounting with through bolts for the rear piping type are as follows.

Bore Size	Port Size	Usable fittings / speed controllers	Fitting outer diameter D
ø6 ø10	M3	SC3W-M3-□ SC3U-M3-□	ø8
		FTS4-M3 FTL4-M3	
		GWS□-M3-S	
		PTN2-M3 PTNL-M3	



■ To prevent an increase in sliding resistance, do not make dents or scratches on the tube body mounting surface and end plate surface that may impair flatness. The flatness of the mating side to be included to the end plate should be 0.02 mm or less. If it is difficult to ensure the above flatness, insert shims (customer prepared), etc. between the end plate and the workpiece to adjust the gap. This may help prevent an increase in sliding resistance.

■ When attaching a jig, etc. to the end plate, ensure that the bolt screw-in length is equivalent to the Y dimension. This will cause damage to the end plate.



Bore Size (mm)	Y dimension
ø6	5
ø10	

■ A rubber cushion is incorporated as a cushion mechanism. The table below shows the kinetic energy that can be absorbed by the rubber cushion. If the energy exceeds this value, consider a separate shock absorber.

Bore Size (mm)	Allowable Absorption Energy (J)
ø6	0.008
ø10	0.054

■ When attaching a workpiece to the end plate, tighten with the tightening torque shown in the table below.

Bore Size (mm)	Thread Size	Tightening Torque (N·m)
ø6	M3	0.6
ø10	M4	1.6

■ This cylinder is a non-disassembly type. Do not forcibly disassemble.

For precautions regarding mounting, installation, adjustment, use, and maintenance, please see "Precautions for Use" in this catalog and the CKD Components Product website (https://www.ckd.co.jp/kiki/en/) → "Model No." → Instruction Manual