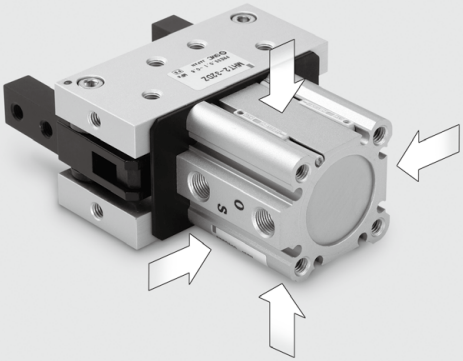
Toggle Type Air Gripper

MHT2 Series

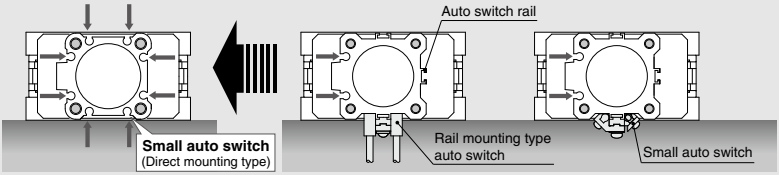
ø32, ø40, ø50, ø63

RoHS

New cylinder body allows small auto switches to be mounted on 4 surfaces.



Auto switch mounting rail removed.
A round slot for mounting small auto switches is provided on 4 surfaces.

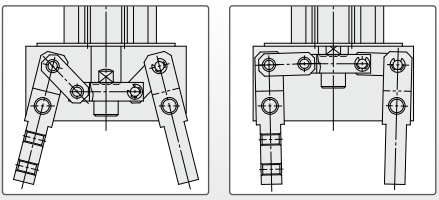


Strong and stable gripping force

can be obtained through the toggle mechanism.

Gripping moment (0.5 MPa)

Bore size (mm)	32	40	50	63
Gripping moment (Effective value) N·m	12.4	36.0	63.0	106

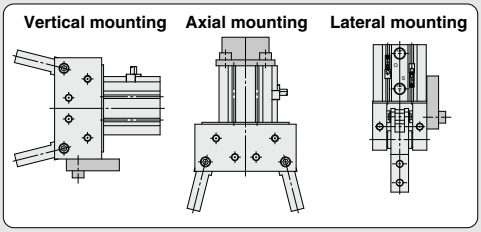


Holds workpiece even when the air is shut down. (Safety measures)

○Workpiece holding status is maintained even when the air is shut down by the toggle mechanism during close operation.

A high degree of freedom for mounting

A variety of mounting screws are available, such as screws for air gripper mounting,brackets to prevent workpiece deflection and etc.



Toggle Type Air Gripper
MHT2 Series
ø32, ø40, ø50, ø63

RoHS

How to Order

MHT 2 – 32 □ DZ – M9BW □ – □

- **Toggle type air gripper**
- **Number of fingers**

2	2 fingers

- **Bore size**

32	32 mm
40	40 mm
50	50 mm
63	63 mm

- **Port thread type**

Symbol	Type
Nil	Rc
TN	NPT
TF	G

- **Action**

D	Double acting

- **Auto switch**

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.

- **Number of auto switches**

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

- **Made to Order** (Refer to page 687 for details.)

Applicable Auto Switches/Refer to pages 797 to 850 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Electrical entry direction: Perpendicular	Auto switch model: Electrical entry direction: In-line	Lead wire length (m)∗: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	—	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	—	○	—	
	Diagnosis (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	—	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	—	○	—	
	Water resistant (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	—	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	○	○	●	○	—	○		
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	—	○	—	
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	—	Relay, PLC
						5 V, 12 V	100 V or less	**A90V**	**A90**	●	—	●	—	—	—	IC circuit	

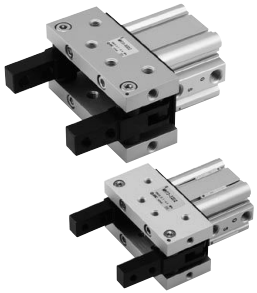
∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ "○" marked solid state auto switches are produced upon receipt of order.

∗ Refer to page 694 for details, because there are other auto switches available than above models.
∗ Refer to pages 837 and 838 for the details of the auto switches with a pre-wired connector.

- **Ideal for gripping heavy workpiece.**
- **The toggle mechanism holds workpiece even when pressure drops.**
- **Auto switch is attachable.**



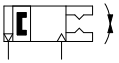
Model/Specifications

Model	MHT2-32DZ	MHT2-40DZ	MHT2-50DZ	MHT2-63DZ
Bore size (mm)	32	40	50	63
Action	Double acting			
Fluid	Air			
Operating pressure	0.1 to 0.6 MPa			
Ambient and fluid temperature	5 to 60°C			
Lubrication	Not required			
Finger opening angle (Total)	–3° to 28°	–3° to 27°	–2° to 23°	–2° to 23°
Weight (g)	790	1070	1890	2720
Gripping moment Note) **(Effective value) (N·m)**	12.4	36.0	63.0	106

Note) At the pressure of 0.5 MPa

Symbol

Double acting/External grip



Made to Order Individual Specifications
(Refer to page 695 for details.)

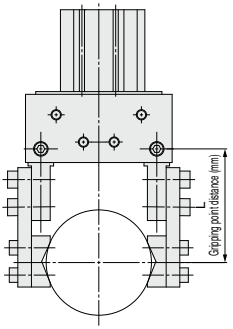
Symbol	Specifications/Description
-X5060	Double rod cylinder
-X5070	With boss in head side

Made to Order
(Refer to pages 725 to 748 for details.)

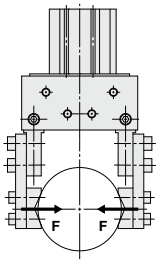
Symbol	Specifications/Description
-X4	Heat resistance (100°C)
-X5	Fluororubber seal
-X63	Fluorine grease

Effective Gripping Force

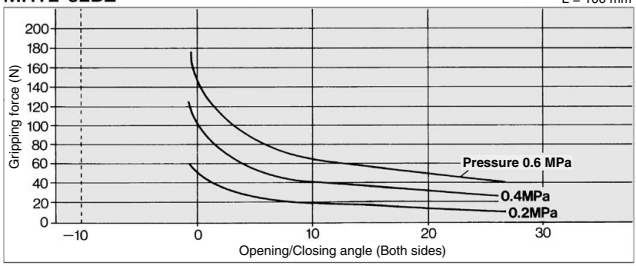
- Workpiece gripping point should be within the range indicated in the graph.
- If there is an overhang, please consult with SMC.



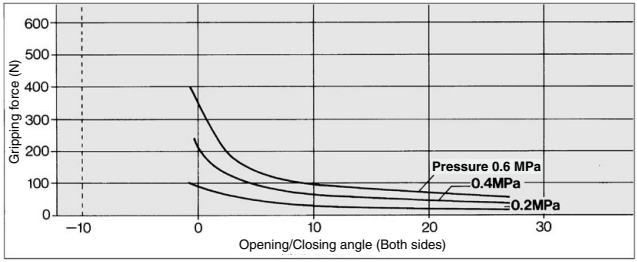
- **Indication of effective gripping force**
  The effective gripping force shown in the graphs to the right is expressed as **F**, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



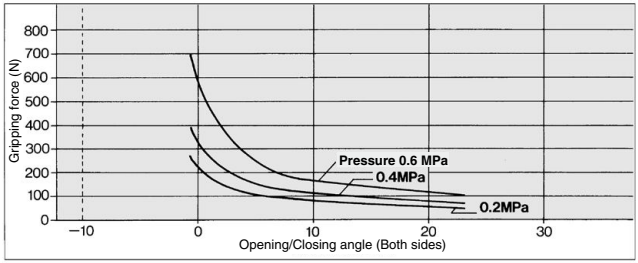
MHT2-32DZ L = 100 mm



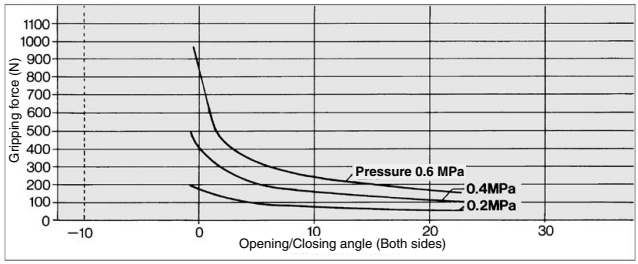
MHT2-40DZ L = 120 mm



MHT2-50DZ L = 150 mm



MHT2-63DZ L = 180 mm



⚠ Precautions

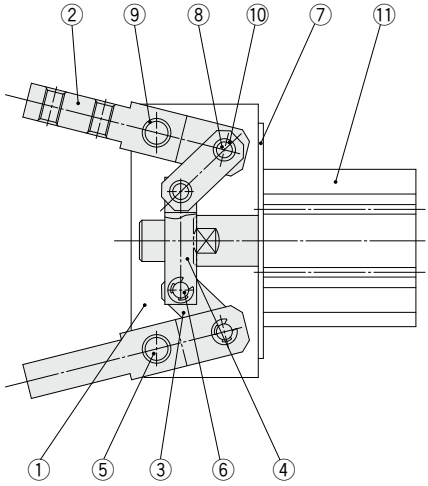
Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 366 to 374 for Air Gripper and Auto Switch Precautions.

⚠ Warning

Maintenance

If a workpiece is to be gripped by using the toggle, make sure to periodically check that the workpiece has not shifted during the acceleration of the movement.
If the workpiece is not gripped in a stable manner, it could shift or drop and create a dangerous situation.
If the workpiece is not gripped in a stable manner, use shims on the attachment to adjust the gripped.
To verify the gripping condition or to make any adjustments, make sure to do so in an area where the air gripper or the workpiece will not fall.

Construction



Component Parts

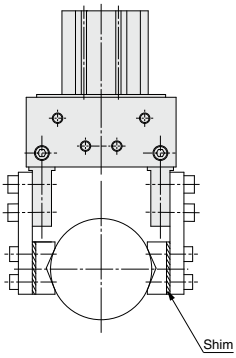
No.	Description	Material	Note
1	**Side plate**	Aluminum alloy	Hard anodized
2	**Finger**	Carbon steel	Black zinc chromated
3	**Lever**	Carbon steel	Black zinc chromated
4	**Joint**	Carbon steel	Black zinc chromated
5	**Shaft**	Stainless steel	
6	**Joint pin**	Stainless steel	
7	**Cylinder plate**	Soft steel	Black zinc chromated
8	**Lever pin**	Stainless steel	
9	**Bearing**		Steel lined oil imfilled acetal resin bearing
10	**Bearing**		Steel lined oil imfilled acetal resin bearing
11	**Cylinder**		Compact cylinder

Replacement Parts

Description	MHT2-32DZ	MHT2-40DZ	MHT2-50DZ	MHT2-63DZ	Main parts
Finger assembly	MH-TA3201	MH-TA4001	MH-TA5001	MH-TA6301	②⑨
Lever assembly	MH-TA3202	MH-TA4002	MH-TA5002	MH-TA6302	③⑩
Link parts assembly	MH-TA3203	MH-TA4003	MH-TA5003	MH-TA6303	<ø32, ø50>②③④⑥⑧⑨⑩ <ø40, ø63>②③④⑧⑨⑩
Compact cylinder	CDQ2A32-15DZ	CDQ2A40-15DZ	CDQ2A50-20DZ	CDQ2A63-20DZ	⑪

∗ For finger assembly, lever assembly, order 2 pieces per one unit.
Replacement part/Grease pack part no.
For finger part: MH-G01 (30 g)
For cylinder part: GR-S-010 (10 g)

Attachment Design



①Design the attachment so that both fingers grip the workpiece when they are in parallel with each other.

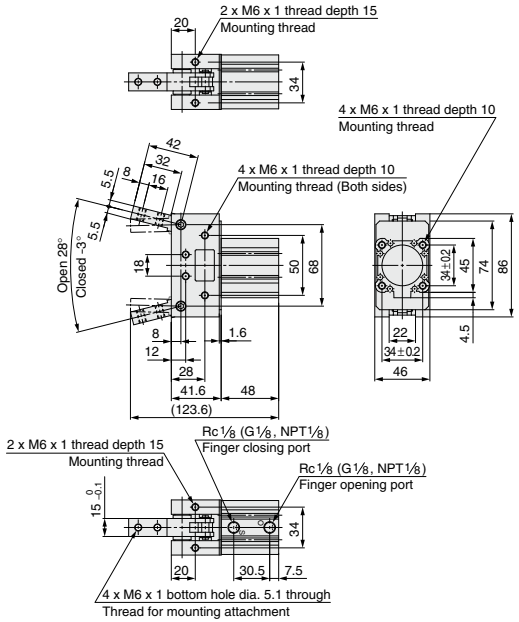
②Take considerations so that the fine adjustment of the attachment can be made by putting the adjustment shim.

③When the shim is thin, the gripping force becomes insufficient and the workpiece may become unstable. Conversely, when the shim is thick, the toggle mechanism is difficult to activate and a large impulsive sound may sometimes be produced. Carefully check this point.

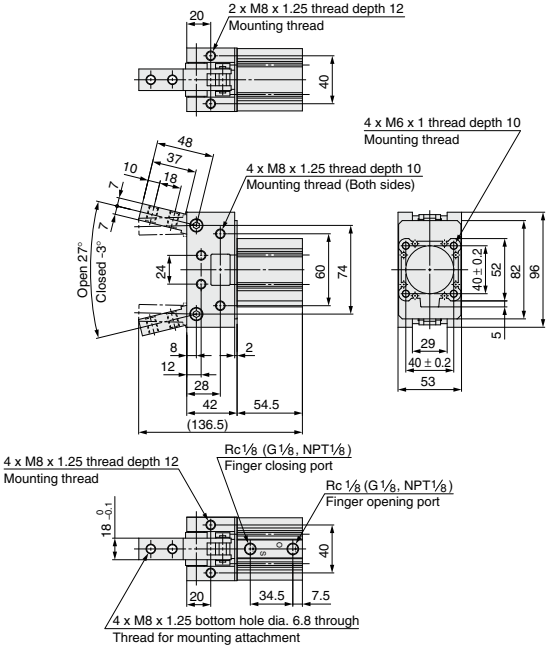
④The gripping status may become unstable due to continual wear of the bearing or shaft during operation. If this happens, make the adjustment, such as use of thicker shim according to the conditions.

Dimensions

MHT2-32DZ

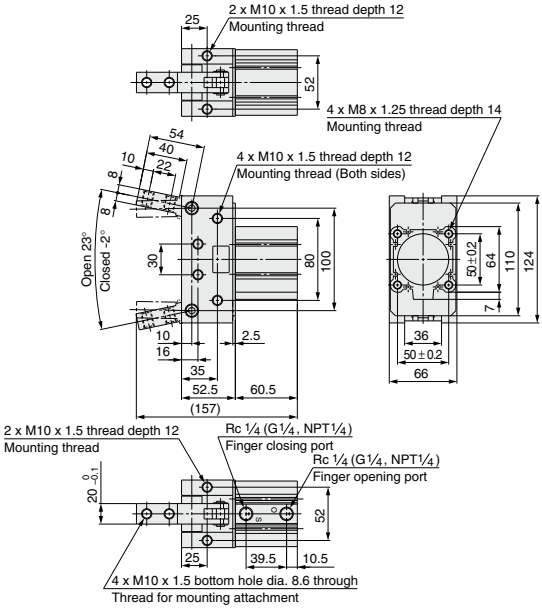


MHT2-40DZ

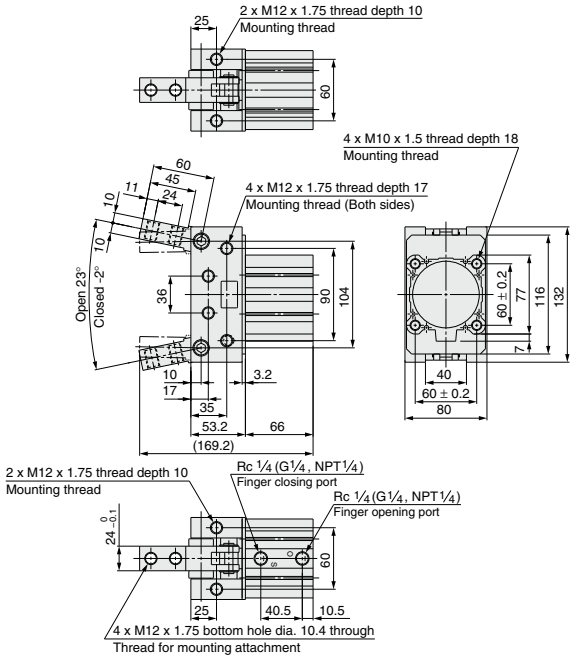


Dimensions

MHT2-50DZ



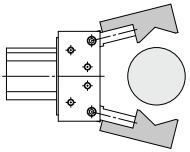
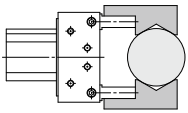
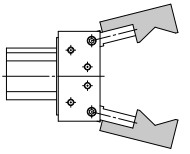
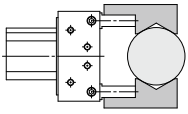
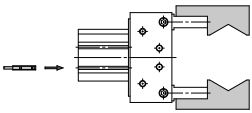
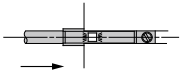
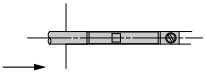
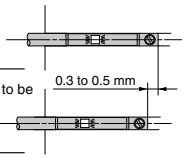
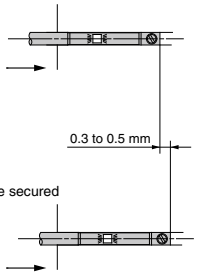
MHT2-63DZ



MHT2 Series
Auto Switch Installation Examples and Mounting Positions

The auto switch can check the finger return and workpiece gripping through different combinations of auto switch quantities and detecting positions.

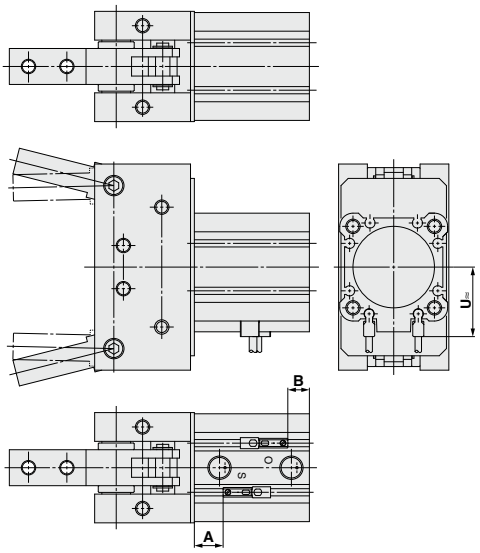
Detection when Gripping Exterior of Workpiece

Detection example	1. Confirmation of fingers in reset position	2. Confirmation of workpiece held
Position to be detected	Position of fingers fully opened 	Position when gripping a workpiece 
Operation of auto switch	Auto switch turned ON when fingers return. (Light ON)	Auto switch turned ON when gripping a workpiece. (Light ON)
Detection combinations: One auto switch ∗ One position, either ① or ②, can be detected.	●	●
Detection combinations: Two auto switches ∗ Two positions ① and ② can be detected.	●	●
How to determine auto switch installation position At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.	Step 1) Fully open the fingers. 	Step 1) Position fingers for gripping a workpiece. 
	Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the following drawing. 	
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.  Step 5) Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5 mm beyond the position where the indicator light illuminates. Position where light turns ON Position to be secured 0.3 to 0.5 mm 	Step 3) Slide the auto switch in the direction of the arrow until the light illuminates and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. Position where light turns ON 0.3 to 0.5 mm Position to be secured 

Note) ●It is recommended to grip a workpiece when the fingers are in parallel with each other.

Proper Auto Switch Mounting Position and Height

D-M9□
D-M9□V
D-M9□W
D-M9□WV
D-M9□A
D-M9□AV
D-A9□
D-A9□V



Proper Auto Switch Mounting Position (mm)

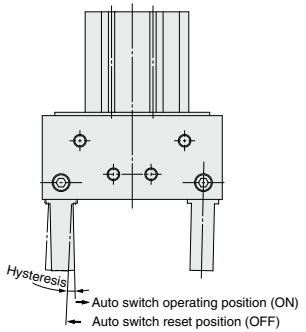
Auto switch model / Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V	
	A	B	A	B
32	12	9	8	5
40	16	11.5	12	7.5
50	14	14.5	10	10.5
63	16.5	17.5	12.5	13.5

Note) The actual mounting position should be adjusted after confirming the auto switch performance.

Auto Switch Mounting Height (mm)

Auto switch model / Bore size	D-M9□V	D-A9□V
	U	U
32	30	27.5
40	32	30
50	37.5	35
63	42.5	40.5

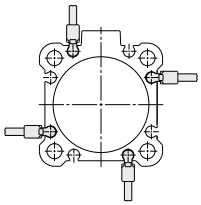
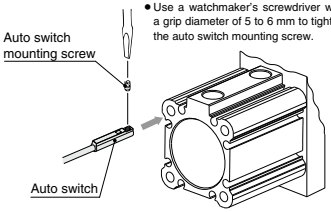
Auto Switch Hysteresis



Air gripper model	Hysteresis degree (Max. value)
MHT2-32D	3
MHT2-40D	3
MHT2-50D	3
MHT2-63D	3

Auto Switch Mounting

D-M9□ **D-M9□W** **D-M9□A** **D-A9□**
D-M9□V **D-M9□WV** **D-M9□AV** **D-A9□V**

Auto Switch Mounting Surface	Auto Switch Mounting
	

● Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw.

Tightening torque of auto switch mounting screw (N·m)

Auto switch model	Tightening torque
D-M9□(V) D-M9□W(V) D-M9□A(V)	0.05 to 0.15
D-A9□(V)	0.10 to 0.20

In addition to applicable auto switches described in How to Order, auto switches listed below can be mounted with using auto switch mounting brackets.
For auto switches listed below, please order auto switches and auto switch mounting brackets separately.
Refer to Best Pneumatics No.2-1 for the detailed specifications.

Type	Model	Electrical entry (Fetching direction)	Features	Auto switch mounting bracket part no.	Applicable bore size
Reed switch	D-A72	Grommet (Perpendicular)	—	BQ5-032	ø32 to ø63
	D-A73		—		
	D-A80		Without indicator light		
	D-A79W		Diagnosis (2-color indicator)		
	D-A73C	Connector (Perpendicular)	—		
	D-A80C		Without indicator light		
	D-A72H	Grommet (In-line)	—		
	D-A73H, A76H		—		
	D-A80H		Without indicator light		
Solid state auto switch	D-F7NV, F7PV, F7BV	Grommet (Perpendicular)	—		
	D-F7NWV, F7BWV		Diagnosis (2-color indicator)		
	D-F7BAVL		Water resistant (2-color indicator)		
	D-J79C	Connector (Perpendicular)	—		
	D-F79, F7P, J79	Grommet (In-line)	—		
	D-F79W, F7PW, J79W		Diagnosis (2-color indicator)		
	D-F7BAL		Water resistant (2-color indicator)		
	D-F79F		With diagnosis output (2-color indication)		
	D-F7NTL		With timer		

∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 837 and 838 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to Best Pneumatics No.2-1 for details.
∗ Trimmer auto switch (D-F7K) and heat-resistant solid state auto switch (D-F7NJL) are not applicable.

Made to Order Individual Specifications

Please contact SMC for detailed dimensions, specifications and lead times.

Made to Order

Symbol
-X5060

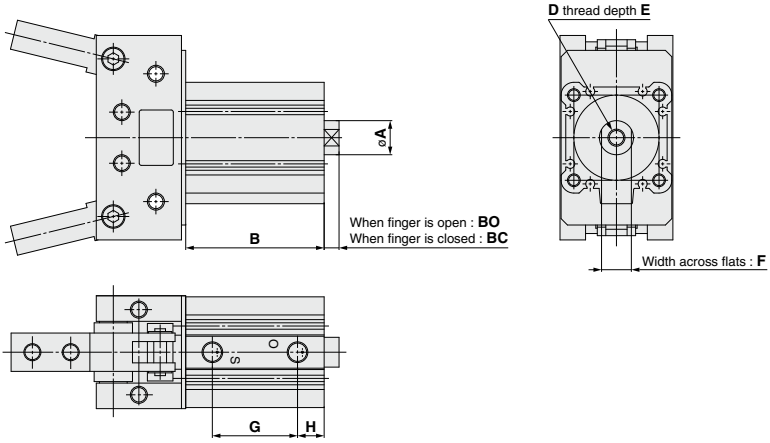
1 Double Rod Cylinder

MHT2 – Bore size DZ – X5060

Use a double rod cylinder where a standard single rod cylinder (CDQ2 series) is used.

Note) When the toggle is used to grip a workpiece, if the rod is pushed or a load is placed on it, the workpiece may be dropped since the toggle mechanism does not work.

Dimensions (Dimensions other than specified below are the same as the standard type.)



(mm)

Model	A	B	BO	BC	D	E	F	G	H	Weight (g)
MHT2-32DZ-X5060	16	55.5	7	22	M8 x 1.25	13	14	35.5	10	850
MHT2-40DZ-X5060	16	65	7	22	M8 x 1.25	13	14	40	12.5	1,170
MHT2-50DZ-X5060	20	70.5	8	28	M10 x 1.5	15	17	42.5	14	2,050
MHT2-63DZ-X5060	20	72	8	28	M10 x 1.5	15	17	41	15.5	2,900

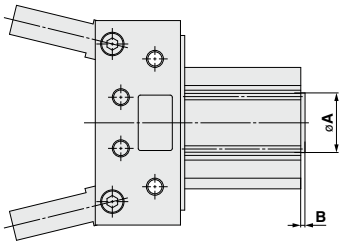
Symbol
-X5070

2 With Boss in Head Side

MHT2 – Bore size DZ – X5070

Use the cylinder CDQ2 series with boss in head side.

Dimensions (Dimensions other than specified below are the same as the standard type.)



(mm)

Model	A	B	Weight (g)
MHT2-32DZ-X5070	$21h9^{0}_{-0.052}$	2	795
MHT2-40DZ-X5070	$28h9^{0}_{-0.052}$	2	1,080
MHT2-50DZ-X5070	$35h9^{0}_{-0.062}$	2	1,905
MHT2-63DZ-X5070	$35h9^{0}_{-0.062}$	2	2,745