

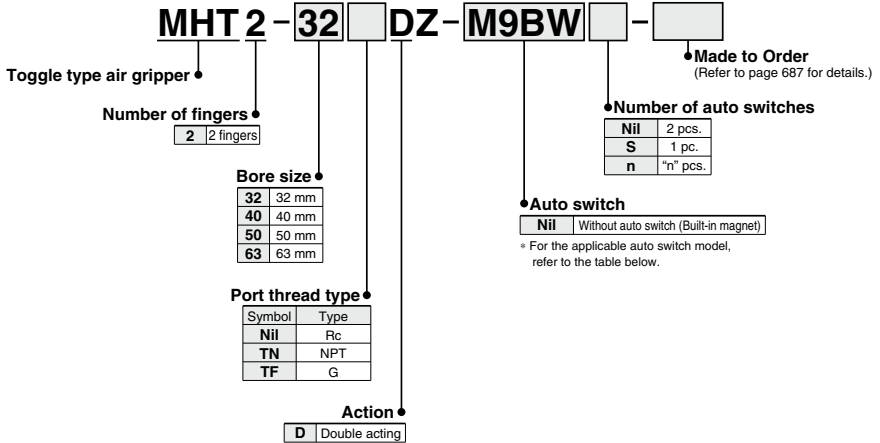
# Toggle Type Air Gripper

# MHT2 Series

ø32, ø40, ø50, ø63



## How to Order



### 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		Auto switch model		Lead wire length (m)*					Pre-wired connector	Applicable load
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		
							Perpendicular	In-line							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V,	—	M9NV	M9N	●	●	○	○	○	IC circuit	Relay, PLC
				3-wire (PNP)	12 V		M9PV	M9P	●	●	○	○			
				2-wire	12 V		M9BV	M9B	●	●	○	○			
				3-wire (NPN)	5 V,		M9NWV	M9NW	●	●	○	○			
	3-wire (PNP)			12 V	M9PWV		M9PW	●	●	○	○				
	2-wire			12 V	M9B WV		M9B	●	●	○	○				
	3-wire (NPN)			5 V,	M9NAV*1		M9NA*1	○	○	●	○				
	3-wire (PNP)			12 V	M9PAV*1		M9PA*1	○	○	●	○				
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	A96V	A96	●	—	●	—	—	IC circuit	—
				2-wire	12 V	100 V	A93V*2	A93	●	●	●	—	—	—	Relay, PLC
					24 V	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.

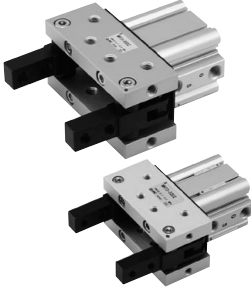
\* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW  
 1 m..... M (Example) M9NWM  
 3 m..... L (Example) M9NWL  
 5 m..... Z (Example) M9NWZ

\* \*○\* 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.



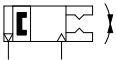
## Model/Specifications

Model	MHT2-32□□DZ	MHT2-40□□DZ	MHT2-50□□DZ	MHT2-63□□DZ
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 <sup>Note)</sup> (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

[Click here for details](#)

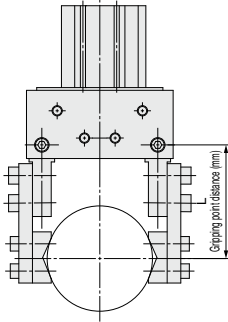
Symbol	Specifications/Description
-X4	Heat resistance (100°C)
-X5	Fluororubber seal
-X50	Without magnet
-X63	Fluorine grease

MHZ
MHF
MHL
MHR
MHK
MHS
MHC
MHT
MHY
MHW
-X□
MRHQ
MA
D-□

# MHT2 Series

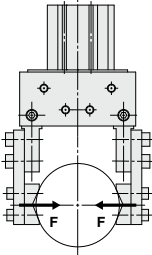
## Effective Gripping Force

- 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.



## ⚠️ 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.

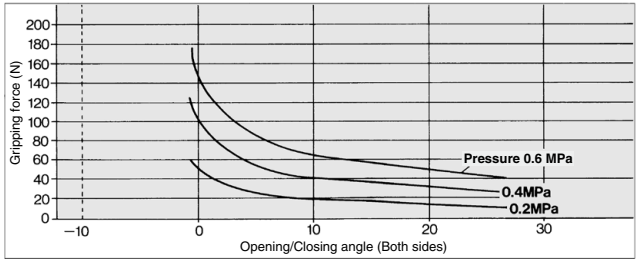
If the workpiece is not gripped in a stable manner, it could shift or drop and create a dangerous situation.

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.

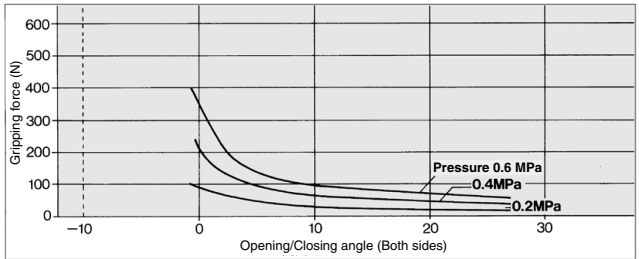
### MHT2-32DZ

L = 100 mm



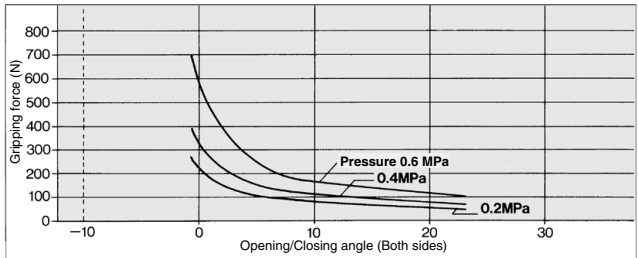
### MHT2-40DZ

L = 120 mm



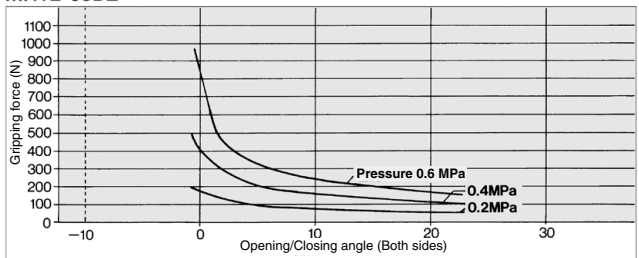
### MHT2-50DZ

L = 150 mm

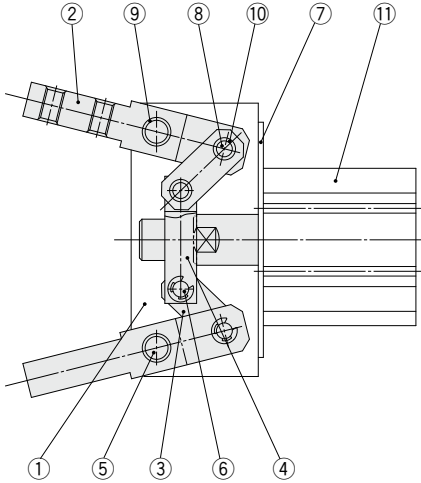


### MHT2-63DZ

L = 180 mm



## 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 impilled acetal resin bearing
10	Bearing		Steel lined oil impilled acetal resin bearing
11	Cylinder		Compact cylinder

## Replacement Parts

Description	MHT2-32□□DZ	MHT2-40□□DZ	MHT2-50□□DZ	MHT2-63□□DZ	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/MHT2-□□DZ
	CDQ2A32TN-15DZ	CDQ2A40TN-15DZ	CDQ2A50TN-20DZ	CDQ2A63TN-20DZ	⑪/MHT2-□□NDZ
	CDQ2A32TF-15DZ	CDQ2A40TF-15DZ	CDQ2A50TF-20DZ	CDQ2A63TF-20DZ	⑪/MHT2-□□TFDZ

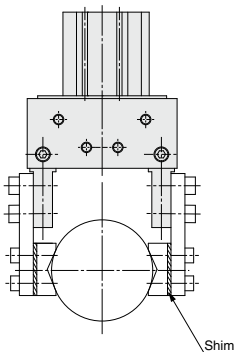
\* For finger assembly, lever assembly, order 2 pieces per one unit.

Replacement part/Grease pack part no.

For finger part: MH-G01 (30 g)

For cylinder part: GR-S-010 (10 g)

## Attachment Design



- ① Design the attachment so that both fingers grip the workpiece when they are in parallel with each other.
- ② Take considerations so that the fine adjustment of the attachment can be made by putting the adjustment shim.
- ③ When 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.
- ④ The 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.

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

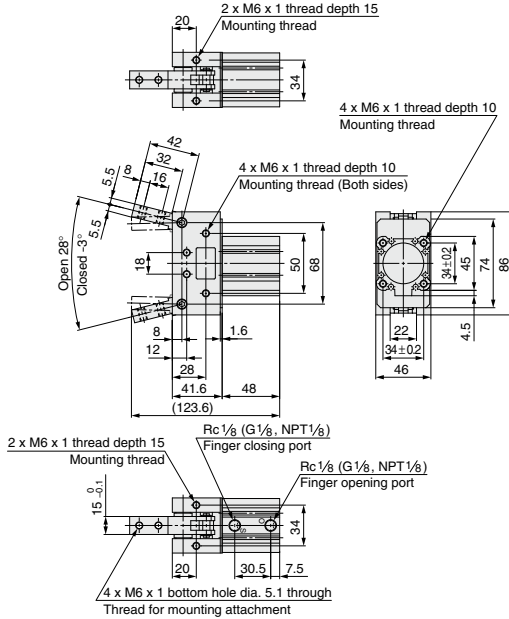
D-□

# MHT2 Series

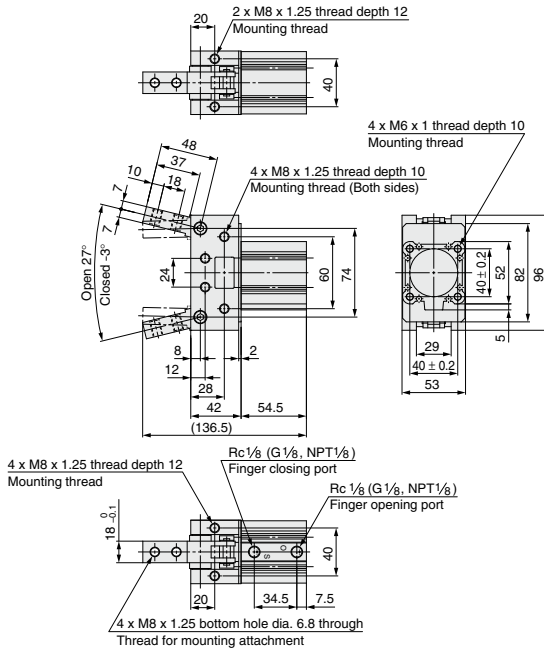


## Dimensions

### MHT2-32DZ

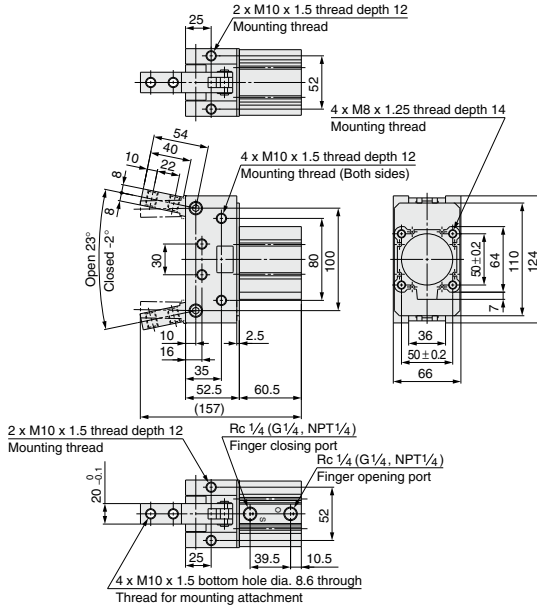


### MHT2-40DZ

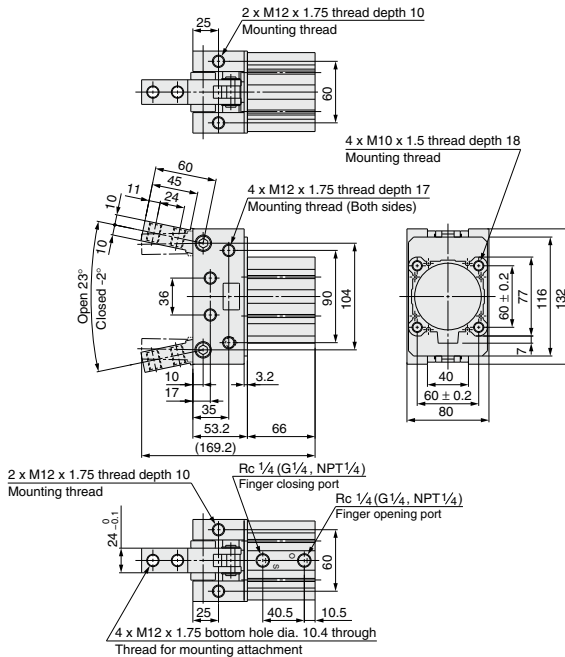


## Dimensions

### MHT2-50DZ



### MHT2-63DZ



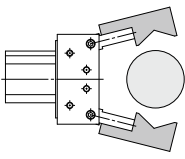
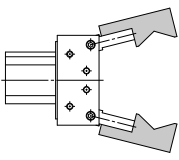
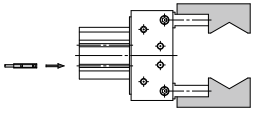
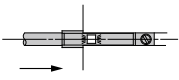
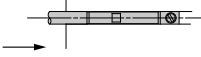
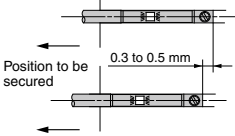
MHZ
MHF
MHL
MHR
MHK
MHS
MHC
<b>MHT</b>
MHY
MHW
-X□
MRHQ
MA
D-□

# 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.

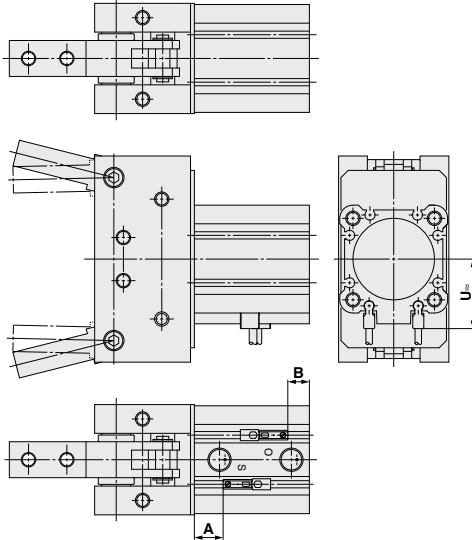
### Detection when Gripping Exterior of Workpiece

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.	●	●
	Two auto switches * Two positions ① and ② can be detected.	●	●
How to determine auto switch installation position	Step 1) Fully open the fingers.		Step 1) Position fingers for gripping a workpiece.
At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.	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 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.
	Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.		Position where light turns ON
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

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)

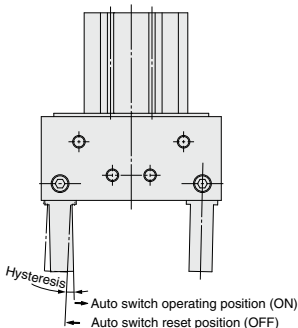
Auto switch model \ Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V	
	A	B	A	B
32	12	9	8	5
40	16	11.5	12	7.5
50	14	14.5	10	10.5
63	16.5	17.5	12.5	13.5

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**

Auto Switch Mounting Surface	Auto Switch Mounting									
	<p>● Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw.</p>									
	<p><b>Tightening torque of auto switch mounting screw</b> (N·m)</p> <table border="1"> <thead> <tr> <th>Auto switch model</th> <th>Tightening torque</th> </tr> </thead> <tbody> <tr> <td>D-A9□(V)</td> <td>0.10 to 0.20</td> </tr> <tr> <td>D-M9□(V)</td> <td rowspan="2">0.05 to 0.15</td> </tr> <tr> <td>D-M9□W(V)</td> </tr> <tr> <td>D-M9□A(V)</td> <td>0.05 to 0.10</td> </tr> </tbody> </table>	Auto switch model	Tightening torque	D-A9□(V)	0.10 to 0.20	D-M9□(V)	0.05 to 0.15	D-M9□W(V)	D-M9□A(V)	0.05 to 0.10
Auto switch model	Tightening torque									
D-A9□(V)	0.10 to 0.20									
D-M9□(V)	0.05 to 0.15									
D-M9□W(V)										
D-M9□A(V)	0.05 to 0.10									

- MHZ
- MHF
- MHL
- MHR
- MHK
- MHS
- MHC
- MHT
- MHY
- MHW
- X□
- MRHQ
- MA
- D-□



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	Grommet (In-line)	Without indicator light		
	D-A72H		—		
	D-A73H, A76H		—		
D-A80H	Without indicator light				
Solid state auto switch	D-F7NV, F7PV, F7BV	Grommet (Perpendicular)	—	BQ5-032	ø32 to ø63
	D-F7NWV, F7BWW		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 indicator)		
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.



## 1 Double Rod Cylinder

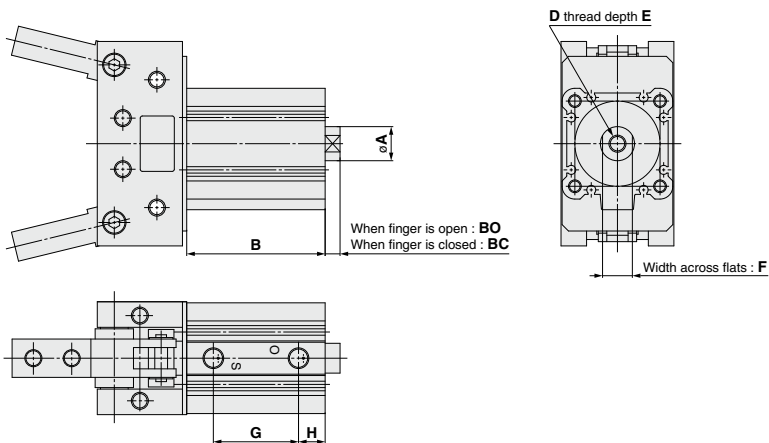
Symbol  
**-X5060**

### 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.)



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

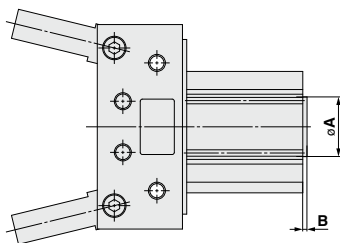
## 2 With Boss in Head Side

Symbol  
**-X5070**

### 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.)



Model	A	B	Weight (g)
MHT2-32DZ-X5070	21h9 <sup>0</sup> <sub>-0.062</sub>	2	795
MHT2-40DZ-X5070	28h9 <sup>0</sup> <sub>-0.062</sub>	2	1,080
MHT2-50DZ-X5070	35h9 <sup>0</sup> <sub>-0.062</sub>	2	1,905
MHT2-63DZ-X5070	35h9 <sup>0</sup> <sub>-0.062</sub>	2	2,745

- MHZ
- MHF
- MHL
- MHR
- MHK
- MHS
- MHC
- MHT
- MHY
- MHW
- X□
- MRHQ
- MA
- D-□