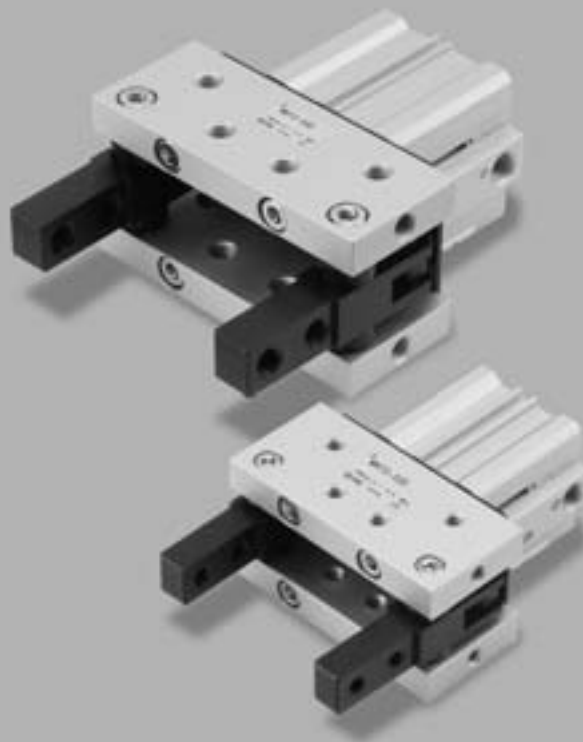


# Toggle Type Air Gripper

Series *MHT2*

ø32, ø40, ø50, ø63

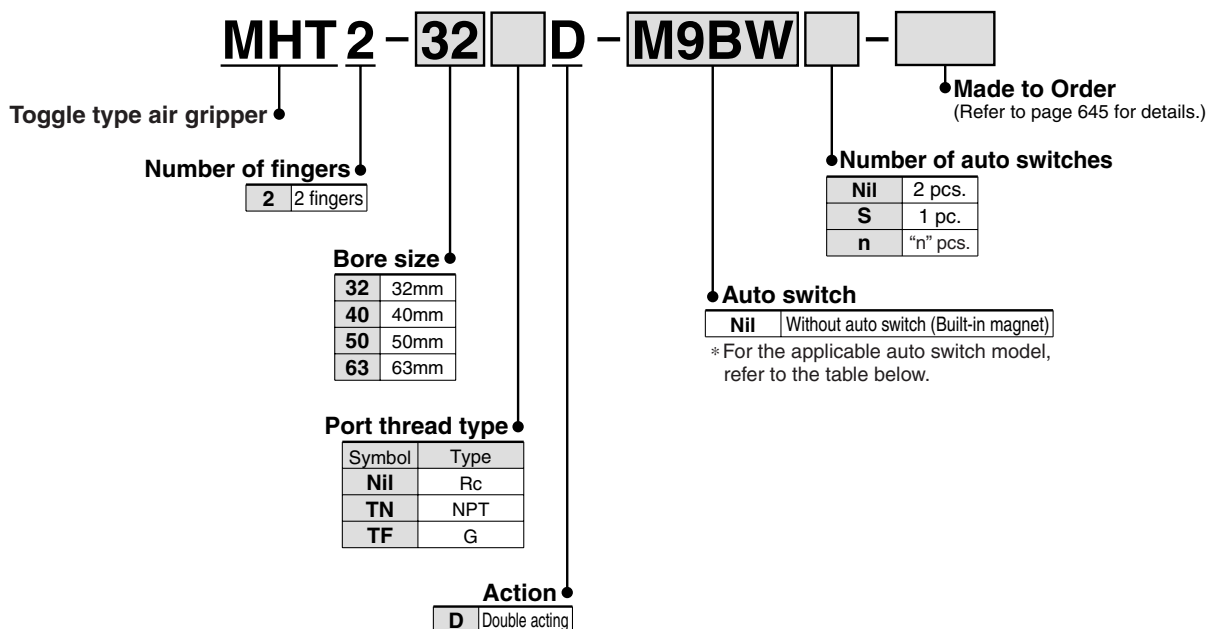


# Toggle Type Air Gripper

## Series MHT2

Size: 32, 40, 50, 63

### How to Order



### Applicable Auto Switch/Refer to pages 761 to 809 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)		IC circuit	Relay, PLC
							Perpendicular	In-line								
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
		3-wire (PNP)		●					●	●	○	—	○			
	Diagnosis (2-color indication)	Grommet		2-wire	12 V		M9BV	M9B	●	●	●	○	—	○	—	
				3-wire (NPN)					5 V, 12 V	M9NWV	M9NW	●	●	●	○	
	3-wire (PNP)	12 V		M9PWV	M9PW		●	●				●	○	—	○	
	Water resistant (2-color indication)						Grommet	2-wire	5 V, 12 V	M9BHV	M9BH	●	●	●	○	
		3-wire (NPN)		12 V	M9NAV			M9NA				○	○	●	○	
	With diagnosis output (2-color indication)	Grommet					3-wire (PNP)		5 V, 12 V	M9PAV	M9PA	○	○	●	○	
				2-wire	12 V		M9BAV	M9BA				○	○	●	○	
	4-wire	5 V, 12 V		—					F79F	●	—	●	○	—	○	
Reed switch	—	Grommet	Yes	3-wire (NPN)	—	5 V	—	A96V	A96	●	—	●	—	—	—	—
				2-wire	—	200 V	A72	A72H	●	—	●	—	—	—	—	
					12 V	100 V	A93V	A93	●	—	●	—	—	—	—	
		Connector		No	5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit	
					12 V	—	A73C	—	●	—	●	●	●	—	—	
		Grommet		Yes	5 V, 12 V	24 V or less	A80C	—	●	—	●	●	●	—	IC circuit	
					—	—	A79W	—	●	—	●	—	—	—	—	

\* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW  
 1 m..... M (Example) M9NWM  
 3 m..... L (Example) M9NWL  
 5 m..... Z (Example) M9NWX  
 None ..... N (Example) J79CN

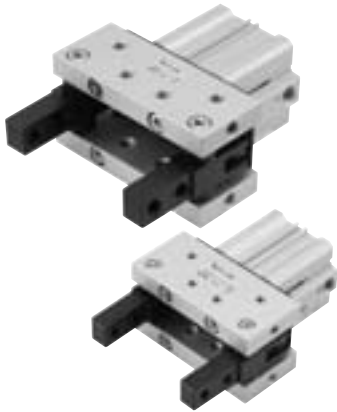
\* "O" marked solid state auto switches are produced upon receipt of order.

\* Refer to page 652 for details, because there are other auto switches available than above models.

\* Refer to pages 796 and 797 for the details of the auto switches with a pre-wired connector.


\* When D-A9□ and M9□ (ø32 to ø50) are mounted on a place other than the port surface, please order auto switch mounting brackets separately. Refer to page 653 for details.

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



## Model/Specifications

Model	MHT2-32D	MHT2-40D	MHT2-50D	MHT2-63D
Bore size (mm)	32	40	50	63
Action	Double acting			
Fluid	Air			
Operating pressure	0.1 to 0.6MPa			
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°
Mass (kg)	0.80	1.09	1.93	2.8
Gripping moment <sup>Note)</sup> (Effective value) (N·m)	12.4	36.0	63.0	106

 Note) At the pressure of 0.5 MPa



### Made to Order

(Refer to pages 683 to 713 for details.)

Symbol	Specifications/Description
-X4	Heat resistance (100°C)
-X5	Fluororubber seal
-X63	Fluorine grease
-X5060	Double rod cylinder
-X5070	With boss in head side

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

**MHT**

MHY

MHW

-X□

MRHQ

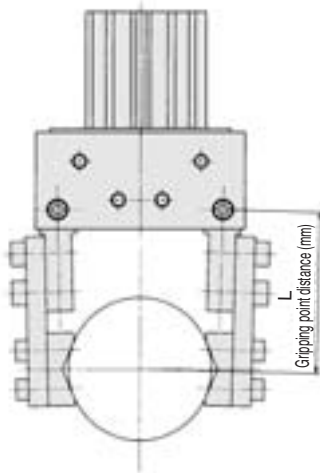
MA

D-□

# Series MHT2

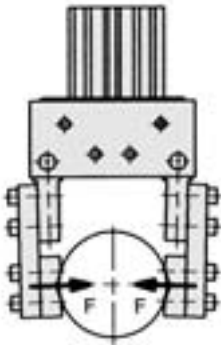
## Effective Gripping Force

- Workpiece gripping point should be within the range indicated in the graph.



### • 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 before handling. Refer to front matters 38 and 39 for Safety Instructions and pages 358 to 365 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.

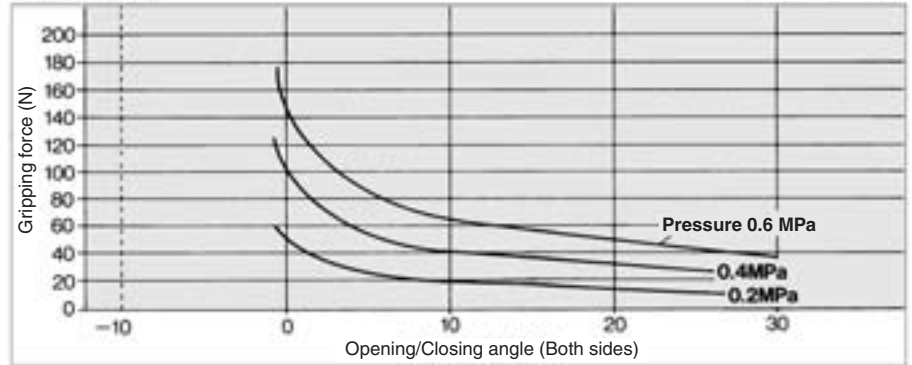
If the workpiece is not gripped in a stable manner, it could shift or drop and create a dangerous situation.

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.

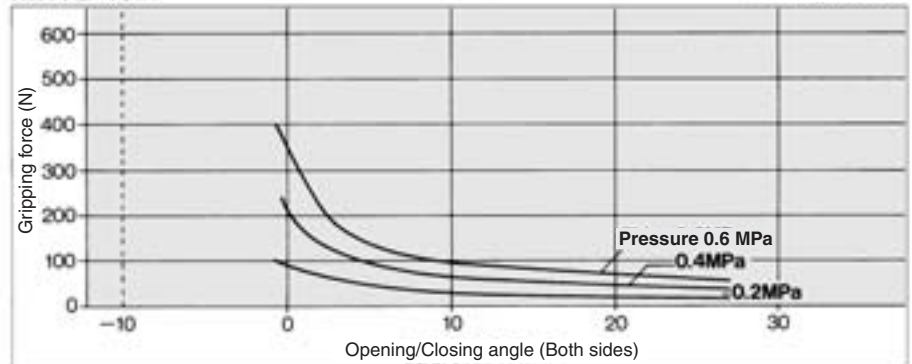
MHT2-32D

L = 100 mm



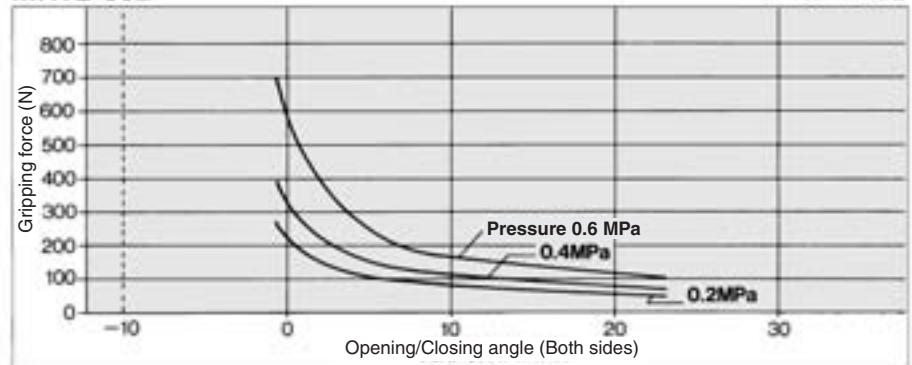
MHT2-40D

L = 120 mm



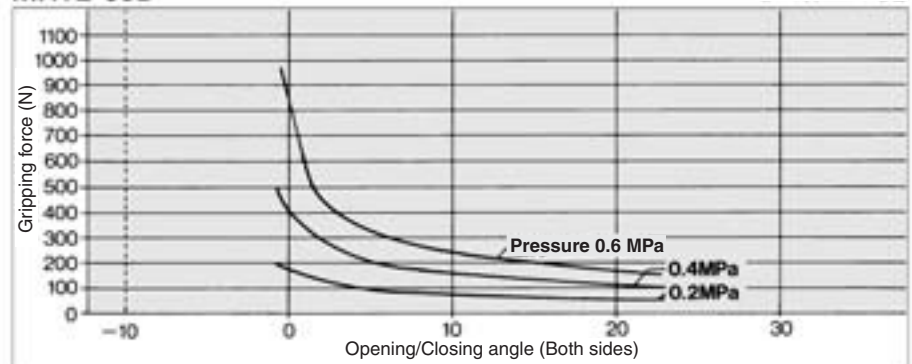
MHT2-50D

L = 150 mm

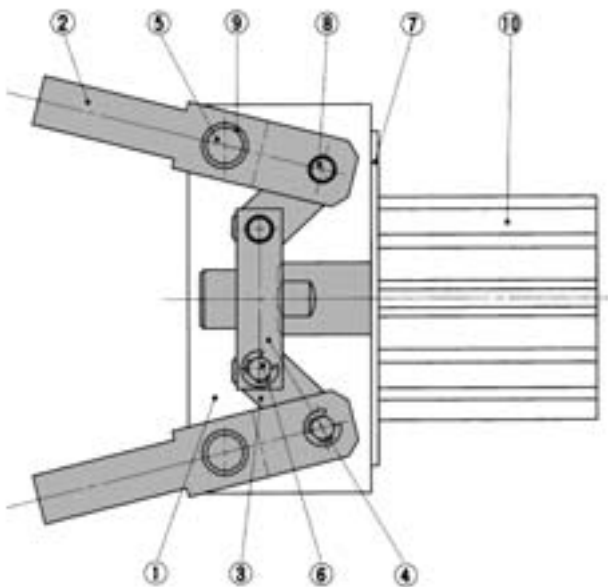


MHT2-63D

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 imfilled acetal resin bearing
10	Cylinder		Compact cylinder

### Replacement Parts

Description	MHT2-32D	MHT2-40D	MHT2-50D	MHT2-63D	Main parts
Finger assembly	MH-TA3201	MH-TA4001	MH-TA5001	MH-TA6301	②⑨
Lever assembly	MH-TA3202	MH-TA4002	MH-TA5002	MH-TA6302	③
Link parts assembly	MH-TA3203	MH-TA4003	MH-TA5003	MH-TA6303	<ø32, ø40> ②③④⑥⑧⑨ <ø50, ø63> ②③④⑧⑨
Compact cylinder	CDQ2A32-15D	CDQ2A40-15D	CDQ2A50-20D	CDQ2A63-20D	⑩

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

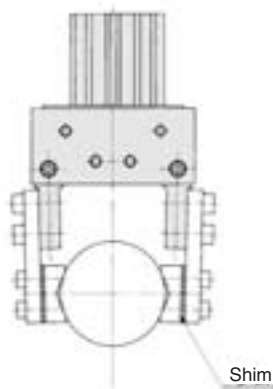
Replacement part/Grease pack part no.

For finger part: MH-G01 (30 g)

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

### Attachment Design

Use shims for fine adjustment of the attachment.



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

**MHT**

MHY

MHW

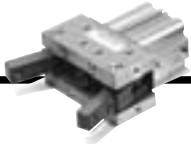
-X□

MRHQ

MA

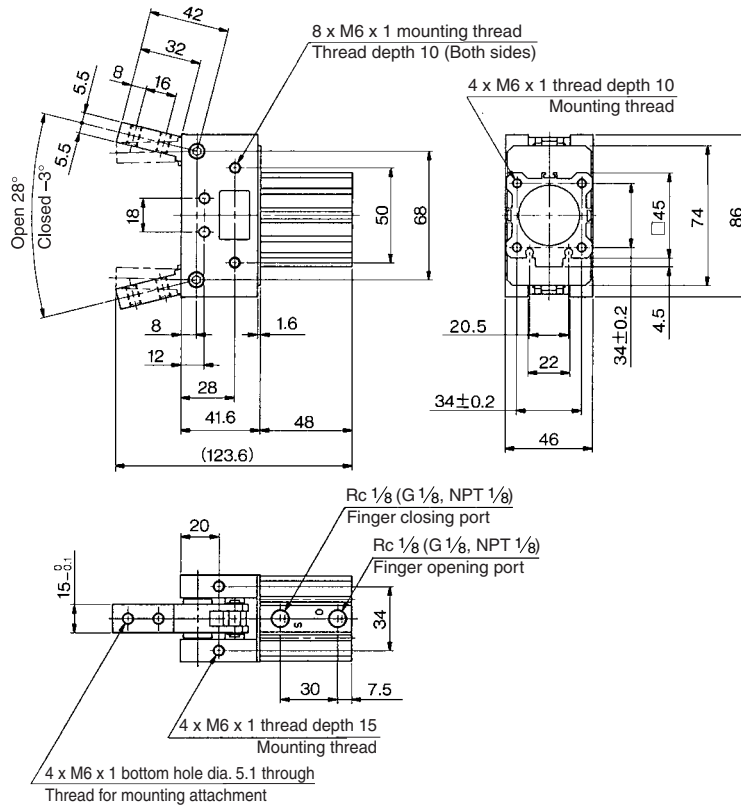
D-□

# Series MHT2

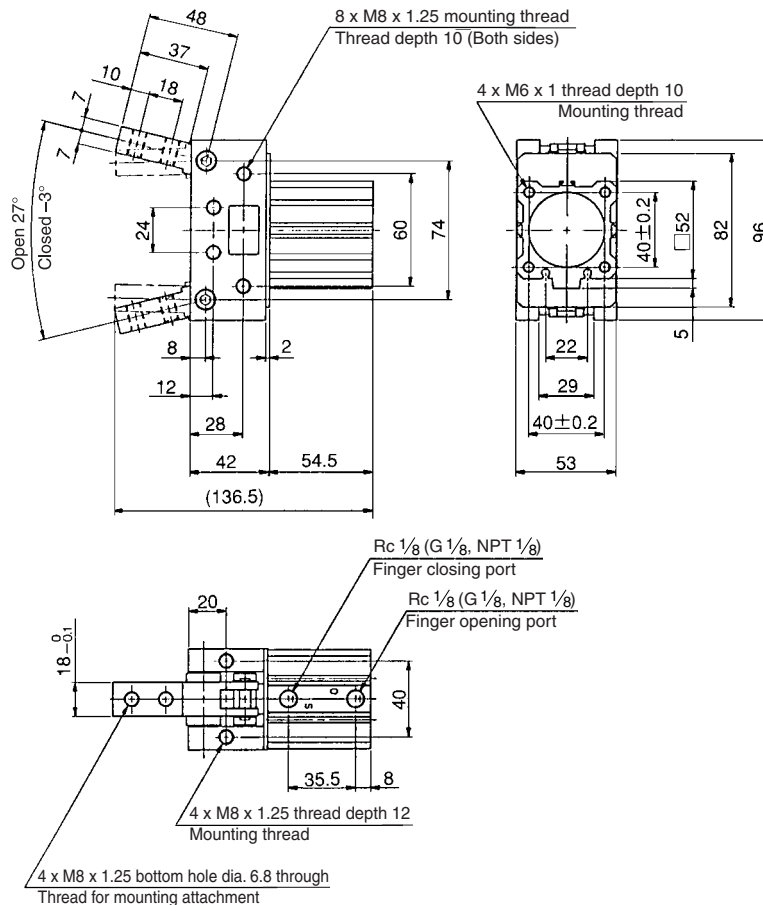


## Dimensions

MHT2-32D

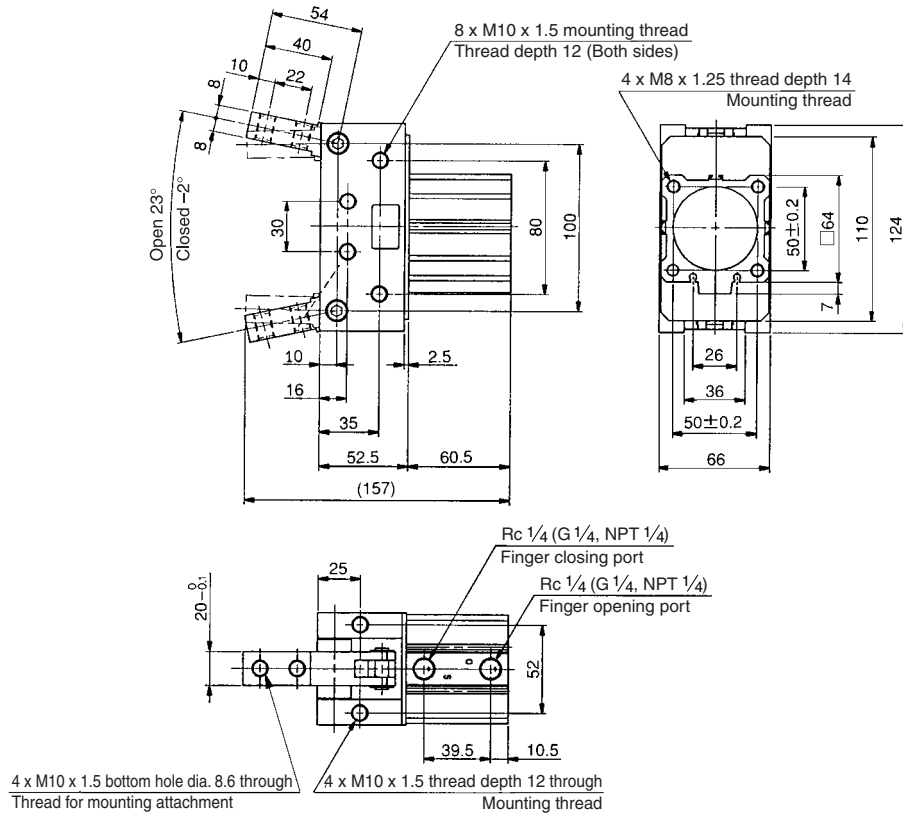


MHT2-40D

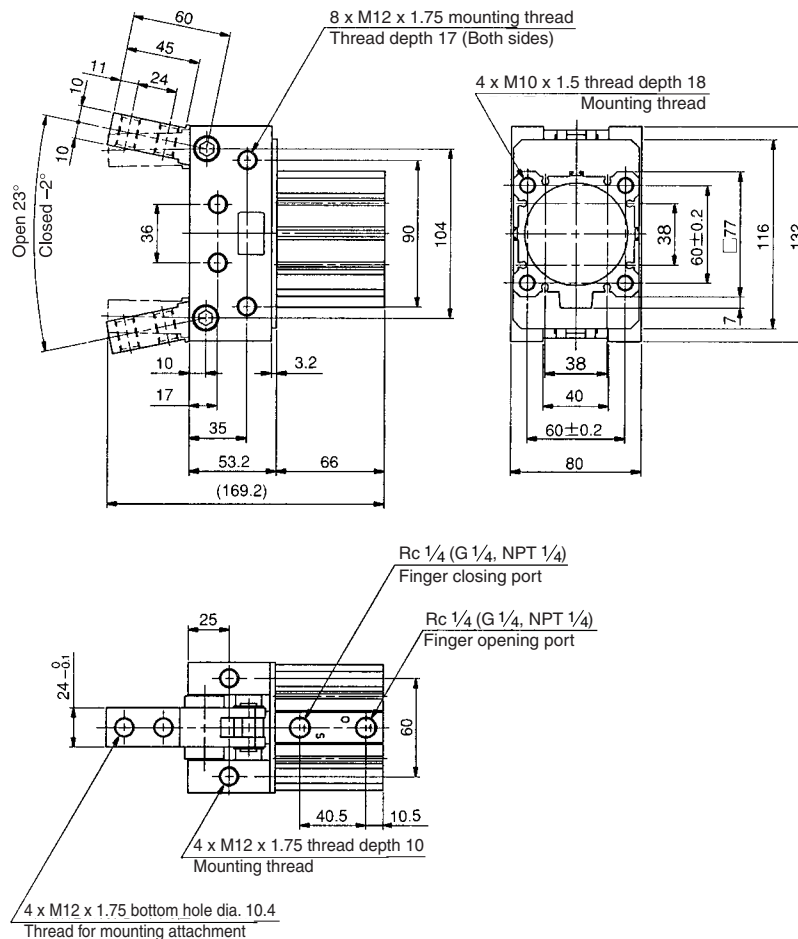


## Dimensions

### MHT2-50D



### MHT2-63D



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

## Auto Switch Installation Examples and Mounting Positions

Various auto switch applications are possible 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	3. Confirmation of workpiece released	
Position to be detected		Position of fingers fully opened	Position when gripping a workpiece	Position of fingers fully closed	
Operation of auto switch		Auto switch turned ON when fingers return. (Light ON)	Auto switch turned ON when gripping a workpiece. (Light ON)	When a workpiece is held (Normal operation): Auto switch to turn OFF (Light not illuminating) When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light illuminating)	
Detection combinations	One auto switch	●	●	●	
	Two auto switches	●——●	●——●	●——●	
		●——●	●——●	●——●	
How to determine auto switch installation position		Step 1) Fully open the fingers.	Step 1) Position fingers for gripping a workpiece.	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.	Position where light turns ON	
		Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.	0.3 to 0.5 mm		
		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 to be secured		
		Position where light turns ON		0.3 to 0.5 mm	
Position to be secured		0.3 to 0.5 mm			

Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.

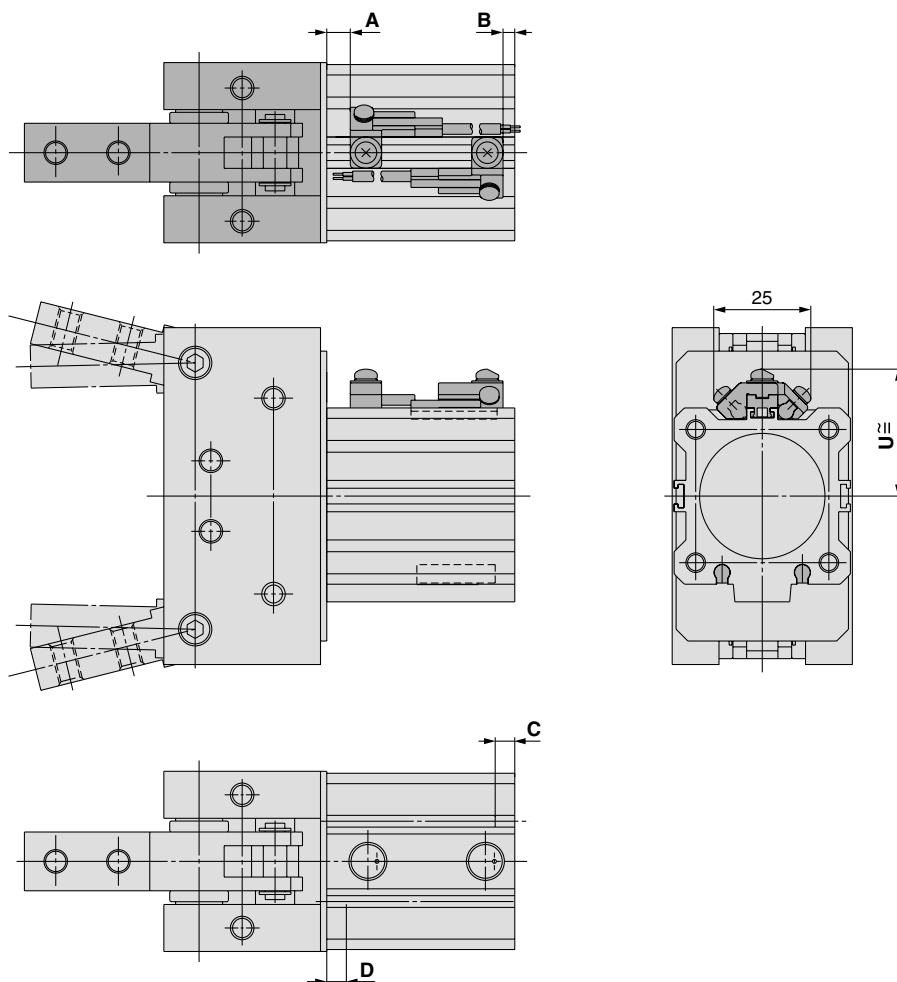
Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.





## Proper Auto Switch Mounting Position and Height

- D-A9□
- D-A9□V
- D-M9□
- D-M9□V
- D-M9□W
- D-M9□WV
- D-M9□AL
- D-M9□AVL



### Proper Auto Switch Mounting Position

(mm)

Auto switch model \ Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL				D-A9□ D-A9□V			
	A	B	C	D	A	B	C	D
32	10.5	7.5	12	9	6.5	3.5	8	5
40	14.5	10	16	11.5	10.5	6	12	7.5
50	12.5	13	14	14.5	8.5	9	10	10.5
63	15	16	16.5	17.5	11	12	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	U
D-A9□ D-A9□V D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL	
32	32.5
40	36
50	42
63	48.5

Note) Dimensions when mounted with an auto switch mounting bracket (BQ2-012).

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

**MHT**

MHY

MHW

-X□

MRHQ

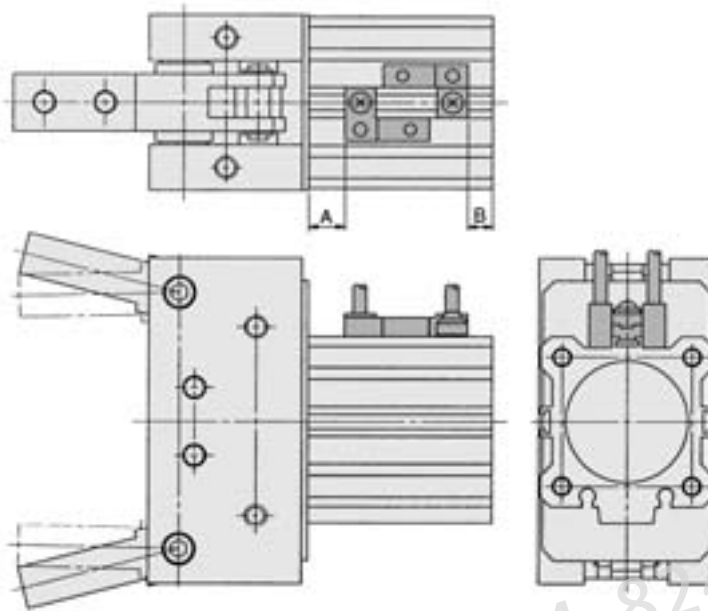
MA

D-□

# Series MHT2

## Proper Auto Switch Mounting Position

D-A7□  
 D-A80  
 D-A7□H  
 D-A80H  
 D-A73C  
 D-A80C  
 D-F7BAL  
 D-F7BAVL  
 D-F7□  
 D-J79  
 D-F7□V  
 D-J79C  
 D-F7□W  
 D-F79F  
 D-F7□WV  
 D-J79W  
 D-A79W

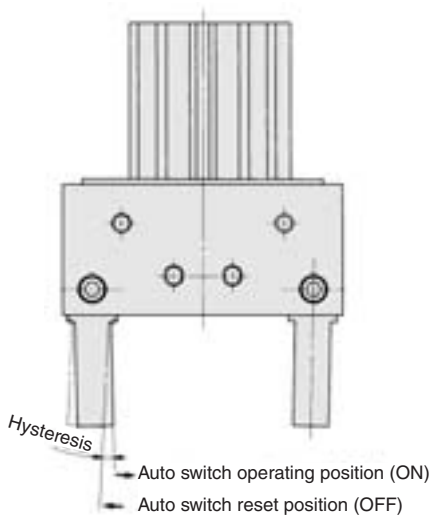


(mm)

Auto switch model	D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7BAL D-F7BAVL D-F7□/J79 D-F7□V/J79C D-F7□W/F79F D-F7□WV D-J79W		D-A79W	
	A	B	A	B	A	B
Bore size 32	9	6	9.5	6.5	6.5	3.5
40	13	8.5	13.5	9	10.5	6
50	11	11.5	11.5	12	8.5	9
63	13.5	14.5	14	15	11	12

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

## Auto Switch Hysteresis



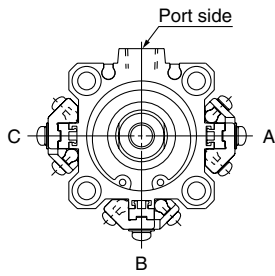
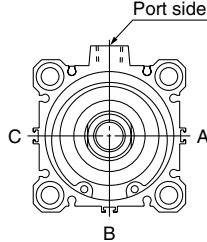
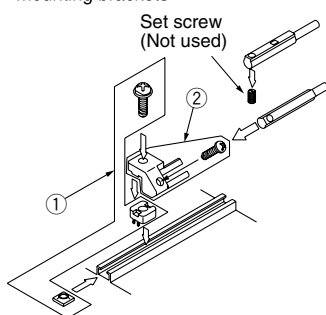
Air gripper model	Hysteresis degree (Max. value)
MHT2-32D	3
MHT2-40D	3
MHT2-50D	3
MHT2-63D	3

The auto switches below are also mountable in addition to the models in How to Order.

Auto switch type	Model	Electrical entry (direction)	Characteristics
Solid state switch	D-F7NV, F7PV, F7BV	Grommet (Perpendicular)	—
	D-F7NWW, F7BWW		Diagnosis (2-color indication)
	D-F7BAVL		Water resistant (2-color indication)
	D-F79, F7P, J79	Grommet (In-line)	—
	D-F79W, F7PW, J79W		Diagnosis (2-color indication)
	D-F7BAL		Water resistant (2-color indication)
D-F7NTL		With timer	
Reed switch	D-A73	Grommet (Perpendicular)	—
	D-A80		Without indicator light
	D-A73H, A76H	Grommet (In-line)	—
	D-A80H		Without indicator light

\* Solid state auto switches are also available with a pre-wired connector. Refer to pages 796 and 797 for details.

## Auto Switch Mounting Bracket : Part. No

Auto switch mounting surface	Bore size (mm)	
	ø32, ø40, ø50	ø63
		
Auto switch model	Auto switch mounting surface Port side	Auto switch mounting surface A, B, C
<b>D-A9□</b> <b>D-A9□V</b> <b>D-M9□</b> <b>D-M9□V</b> <b>D-M9□W</b> <b>D-M9□WV</b> <b>D-M9□AL</b> <b>D-M9□AVL</b>	Auto switch mounting bracket not necessary.	①BQ-2 ②BQ2-012 Use a set of two-type auto switch mounting brackets. 
	Auto switch mounting surface Port, A, B, C sides	Auto switch mounting bracket not necessary.

Note 1) When a compact auto switch is mounted on the three sides other than the port side (A, B and C in the above figure), auto switch mounting brackets are necessary. Order them separately from the actuator.  
 (The above is applied when a compact auto switch is mounted on the auto switch mounting rail without using the ø63 compact auto switch mounting groove.)  
 MHT2-32D-M9BW 1  
 BQ-2..... 2 pcs.  
 BQ2-012..... 2 pcs.

Note 2) Auto switch mounting brackets and the auto switch are shipped together with the actuator.

Auto switch model	Bore size (mm)	
	ø12 to ø25	ø40 to ø100
<b>D-A7□/A80</b> <b>D-A73C/A80C</b> <b>D-A7□H/A80H</b> <b>D-A79W</b> <b>D-F7□/J79</b> <b>D-F7□V</b> <b>D-J79C</b> <b>D-F7□W/J79W</b> <b>D-F7□WV</b> <b>D-F7BAL/F7BAVL</b> <b>D-F79F/F7NTL</b>	BQ-1	BQ-2

Note 3) Auto switch mounting brackets and the auto switch are shipped together with the actuator.

### Auto switch mounting bracket mass

Mounting bracket part no.	Applicable cylinder bore size	Mass (g)
BQ-2	ø32 to ø63	1.5
BQP1-050	ø40 to ø63	16

### [Stainless steel mounting screw set]

Use the stainless steel mounting screw set below (including nuts) depending on the operating environment. (An auto switch spacer (for BQ-2) is not included. Please order it separately.)

BBA2: For types D-A7, A8, F7, and J7

The above stainless steel screws are used for types D-F7BAL and F7BAVL switches when they are shipped with mounted cylinders. Furthermore, BBA2 is included when an auto switch is shipped as a single unit.

Note 4) Refer to the table below for the details of BBA2.

Note 5) When type D-M9□A (V) L is added, please order separately the stainless steel

screw set BBA2 and BQ2-012S as a set.

### Details of stainless steel mounting screw set

Part no.	Content				Applicable auto switch mounting bracket part no.	Applicable auto switch	
	No.	Description	Size	Quantity			
BBA2	1	Auto switch mounting screw	M3 x 0.5 x 6L	1	BMU1-025	Type D-A7/A8 Type D-F7/J7	
			M3 x 0.5 x 8L	1			BQ-1
			M3 x 0.5 x 10L	1			BQ-2
	2	Auto switch mounting nut (Square nut)	M3 x 0.5	1	BQ-1		
3	Auto switch mounting nut (convex shape)	M3 x 0.5	1	BQ-2			

Note 1) A spacer for BQ-2 (Black resin) is not included.

Note 2) When types D-A9□(V), M9□(V), M9□W(V) and M9□A(V)L auto switches are used with BQ2-012S, use stainless steel screws equivalent to auto switch mounting brackets compatible with each cylinder series.

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