

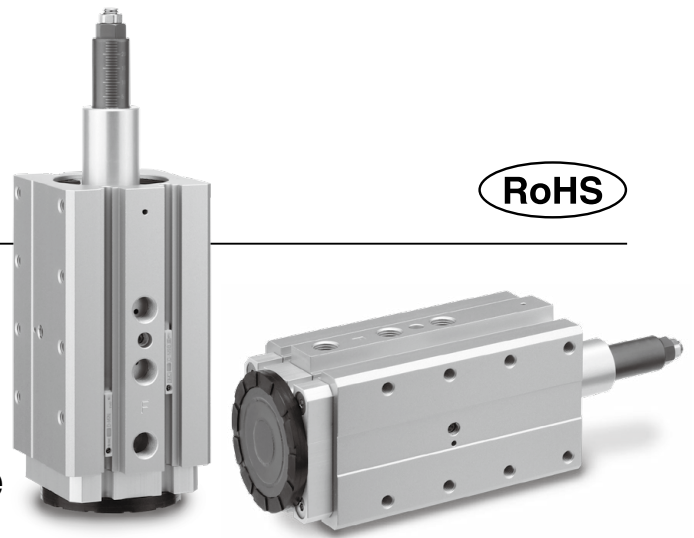
Magnet Gripper/ 3-Position Type

RoHS

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Allows for high-speed transfer

Prevents the accidental attraction of a second workpiece and allows for high-speed transfer. Improved cycle time



1 Workpiece attraction

Holding force: Small (Adjusted)

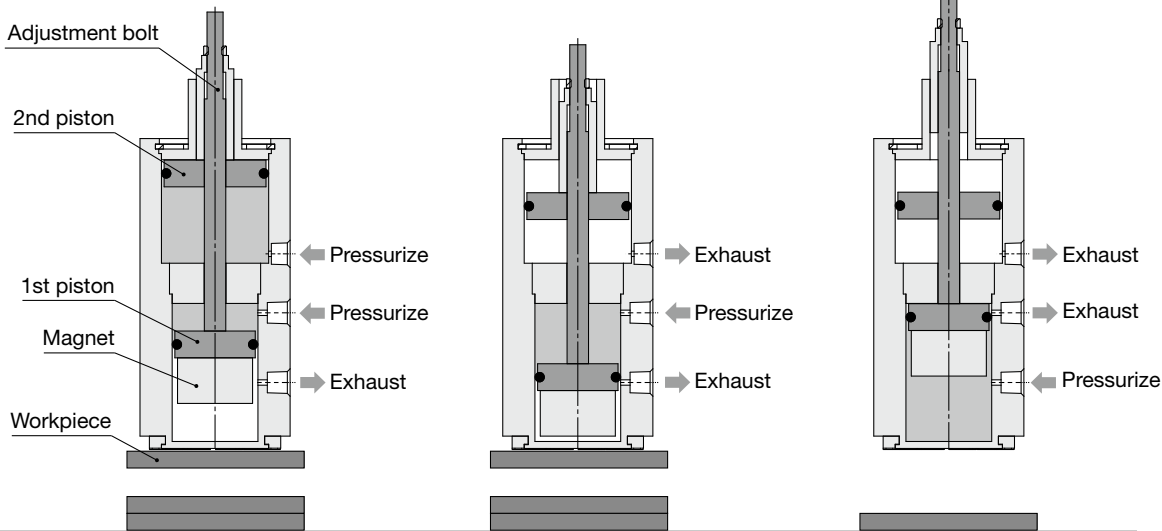
Prevents accidental attraction of a second piece

2 During transfer

Holding force: Max.

High-speed transfer

3 Workpiece release

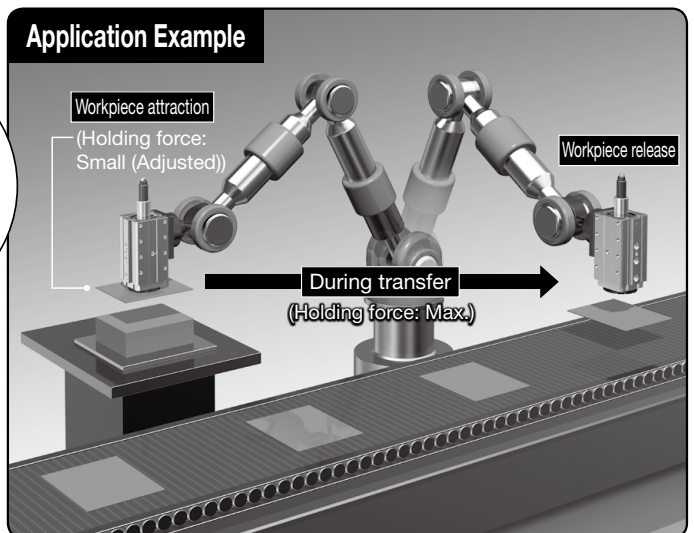
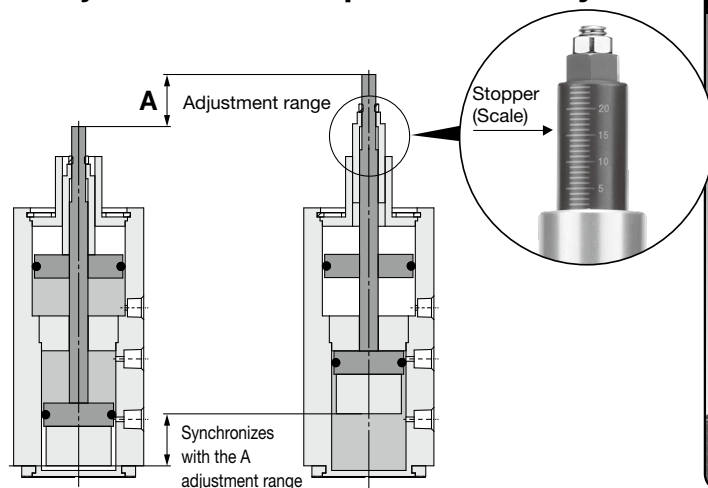


Reliable attraction of a single workpiece with a small holding force

High-speed transfer with a large holding force

Gripper mountable on 3 surfaces (Excludes the port side)

Stopper (scale) allows for holding force adjustment and improved visibility



MHM-X7776



23-E796

Magnet Gripper/3-Position Type

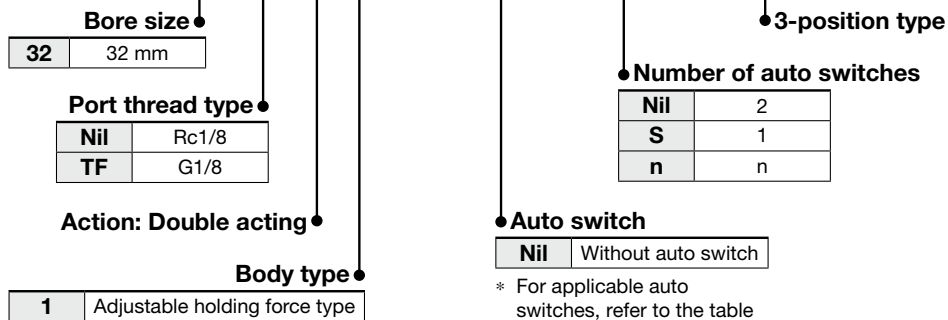
MHM-X7776

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How to Order

MHM-32 **D1** - **M9BW** - **X7776**



* For applicable auto switches, refer to the table below.

Applicable Auto Switches / Refer to the **Web Catalog** for further information on auto switches.

Small 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	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○				
				2-wire	M9BV		M9B	●	●	●	○	○					
				3-wire (NPN)	M9NWV		M9NW	●	●	●	○	○					
	Diagnostic indication (2-color indicator)			3-wire (PNP)	5 V, 12 V		M9PWV	M9PW	●	●	●	○	○	○		○	IC circuit
				2-wire			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	○	○	●	○	○	○		○	—
				2-wire													

*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC for water-resistant products.

* 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

* Solid state auto switches marked with a "○" are produced upon receipt of order.
 * Auto switches are shipped together with the product but do not come assembled.

Magnetic Field Resistant Auto Switches

Type	Auto switch model	Applicable magnetic field	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire length	Applicable load
Solid state auto switch	P3DWA	AC magnetic field (Single-phase AC welding magnetic field)	Grommet	2-color	2-wire	24 VDC	0.5 m	Relay, PLC
	P3DWAL						3 m	
	P3DWAZ						5 m	
	P3DWASC						0.3 m	
	P3DWASE		Pre-wired connector		2-wire (3-4)			
				2-wire (1-4)				

Specifications



Bore size [mm]		32
Pilot port		Rc1/8, G1/8
Fluid		Air
Action		3-position
Operating pressure		0.35 to 0.6 MPa
Proof pressure		0.9 MPa
Ambient and fluid temperatures		-10 to 60°C (No freezing)
Holding force*1	Workpiece thickness: 2 mm	250 N
	Workpiece thickness: 6 mm	500 N
Residual holding force		0.3 N or less
Adjustment amount		0 to 24 mm
Lubrication		Non-lube
Weight		985 g

*1 The theoretical holding force (reference value) when the entire attraction surface of a low carbon steel plate is covered

Replacement Parts

Pad

Part no.
MHM-A3213



Model Selection / Selection Procedure

1 Calculate the required holding force.

$$W = S \frac{mg}{n}$$

W: Required holding force

n: Number of magnet grippers [pcs.]

m: Workpiece mass [kg]

g: Gravitational acceleration [= 9.8 m/s²]

S: Safety factor Horizontal lifting: 4 or more

Ensure there is sufficient holding force when adjusting the holding force so that the workpiece does not fall or slide sideways.

Selection example

Workpiece mass: **m** = 1 kg

Number of magnet grippers: **n** = 1 pc.

Attraction surface faces downward (**S** = 4)

Required holding force: **W** = $4 \times \frac{1 \times 9.8}{1} = 39.2 \text{ N}$

Workpiece plate thickness: **t** = 1 mm (assuming flat plate without holes)

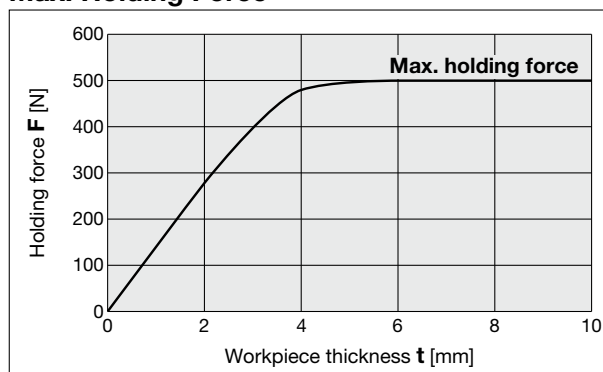
Holding is possible, as **F** > **W** according to the holding force graph.

2 Model selection

Referring to the theoretical holding force graph, select the models where **F** is larger than **W**.

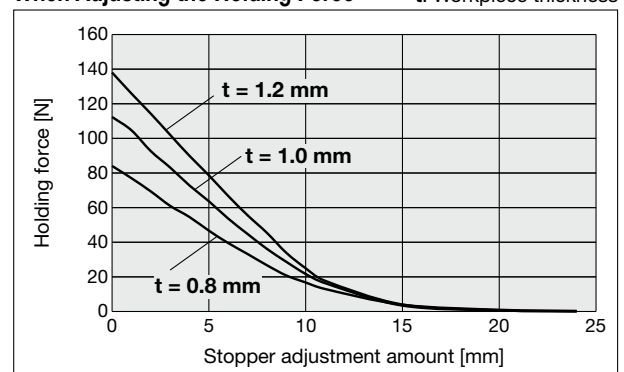
The holding force graph shows the theoretical value for low carbon steel plate. Holding forces vary depending on the material and shape of the workpiece. Please perform a holding test referring to the value selected based on the graph.

Max. Holding Force



When Adjusting the Holding Force

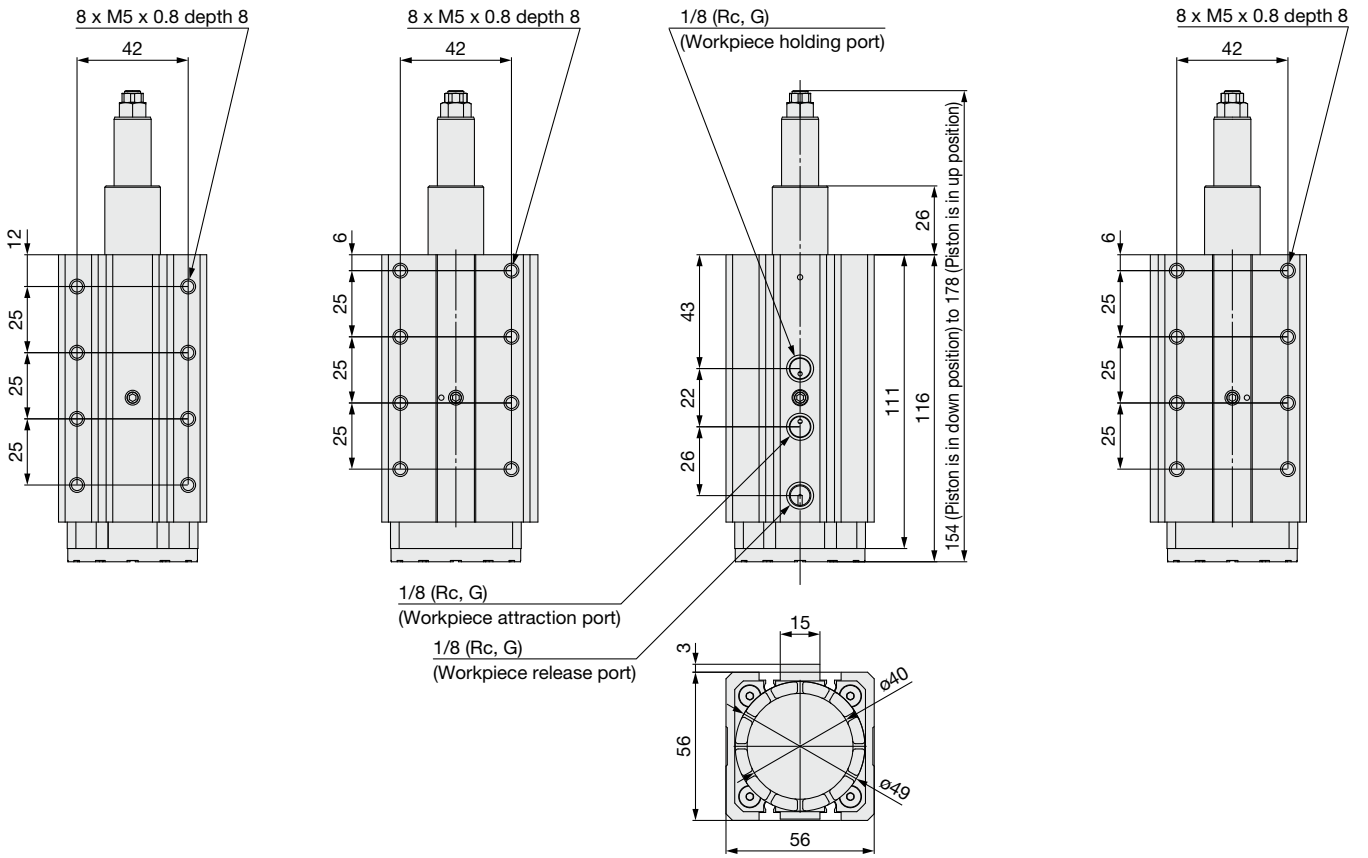
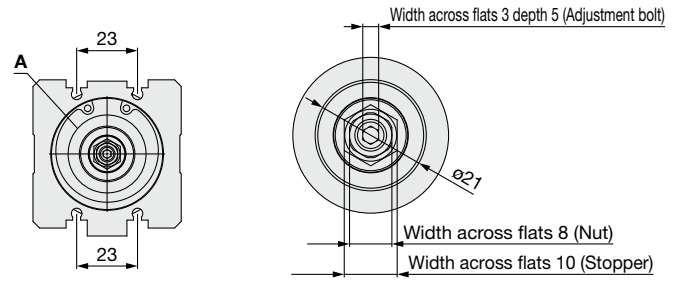
t: Workpiece thickness



The model selection holding conditions, auto switch mounting position and mounting method, and specific product precautions are the same as those of the MHM series magnet gripper. Refer to the **Web Catalog**.

MHM-X7776

Dimensions

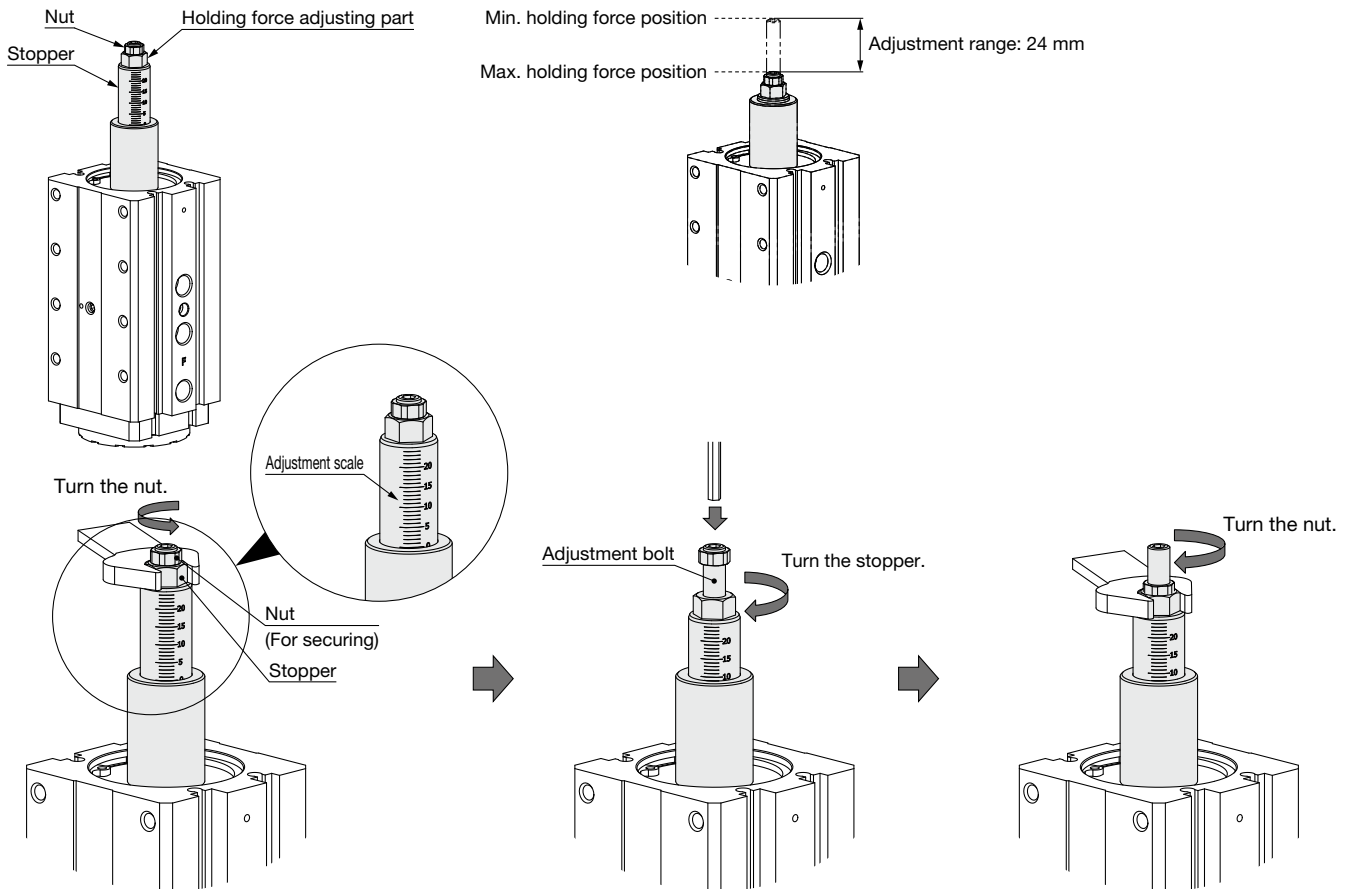


* Refer to page 4 for the holding force adjustment method.

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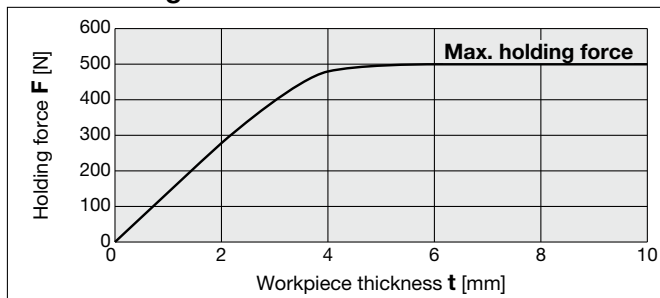
Holding Force Adjustment

Holding Force Adjustment



1. Secure the stopper with a wrench, etc., and rotate the nut to loosen it. (At the time of factory shipment, it is tightened to the specified torque of around adjustment scale 0 (max. holding force position).)
2. With the workpiece released, secure the adjustment bolt, rotate the stopper, and adjust the holding force.
3. Secure the stopper with a wrench, etc., rotate the nut, and tighten to the specified torque.

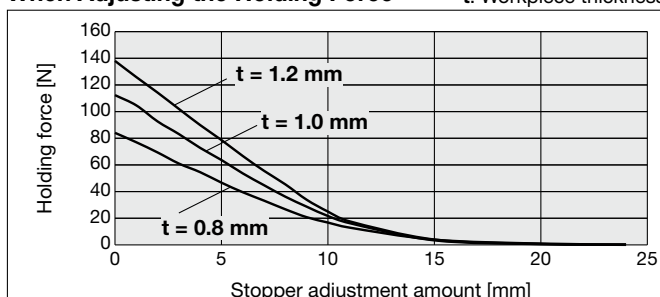
Max. Holding Force



Width across flats [mm]			Nut tightening torque [N·m]	Holding force adjustment range [mm]
Adjustment bolt	Stopper	Nut		
3	10	8	5.2	0 to 24

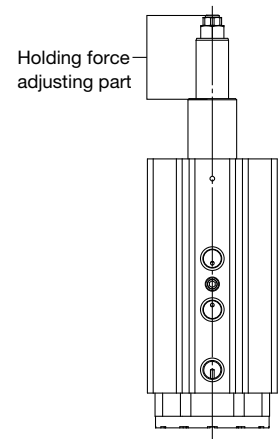
When Adjusting the Holding Force

t : Workpiece thickness



⚠ Caution

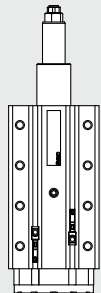
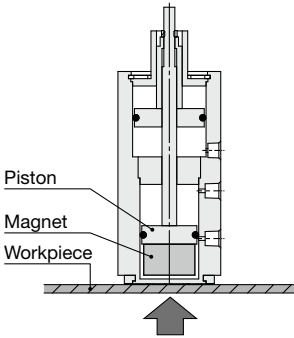
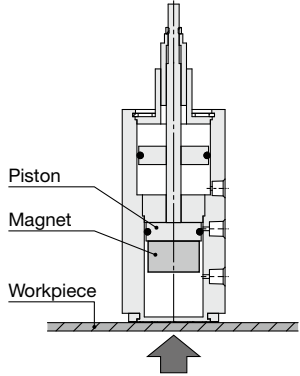
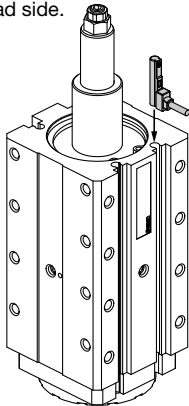
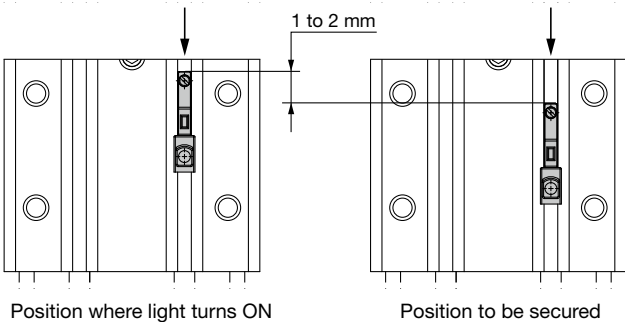
1. Do not apply external forces to the holding force adjusting part other than for the purpose of holding force adjustment. Do not fix the holding force adjusting part to the outside or attempt to rotate it.
2. Take safety measures during the adjustment of the holding force. The workpiece may drop.



MHM-X7776

Auto Switch Mounting

Auto Switch Mounting Position Setting

Detection example	① Detect the magnet position for workpiece holding.	② Detect the magnet position for workpiece release.
<p>Position to be detected</p> <p>Head side</p>  <p>Attraction side</p>	<p>Magnet attraction side</p> 	<p>Magnet attraction side</p> 
<p>How to determine auto switch installation position</p> <p>Connect the auto switch to a power supply and follow the directions.</p>	<p>Step 1) Hold the workpiece.</p>	<p>Step 1) Release the workpiece.</p>
	<p>Step 2) Insert the auto switch into the auto switch mounting groove from the head side.</p> 	
	<p>Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates and fasten it at a position 1 to 2 mm in the direction of the arrow beyond the position where the indicator light illuminates.</p> 	

Auto Switch Use

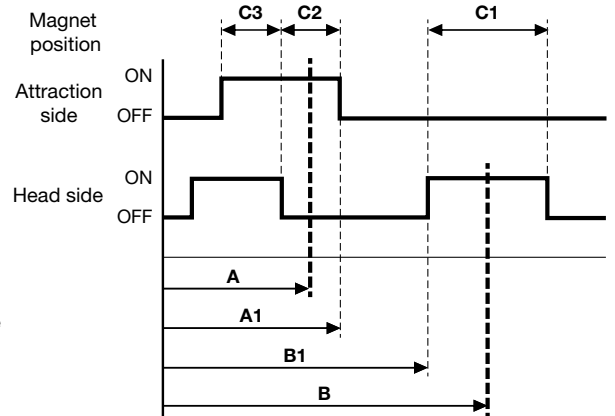
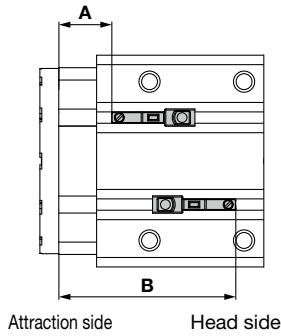
* The auto switch reacts at 2 places when the magnet is at the head side (workpiece release).
At C3 in the waveform chart, the magnet position cannot be detected.

C1: Detection area of the magnet position for workpiece release

C2: Detection area of the magnet position for workpiece holding

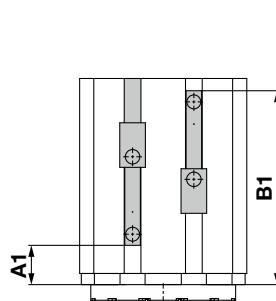
C3: Area where the magnet position cannot be detected

* In sections smaller than A1, the workpiece holding auto switch will respond.
In sections larger than B1, the workpiece release auto switch will respond.
Keep this in mind when detecting the magnet position at the holding force adjustment position.

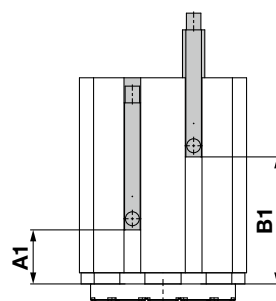


D-M9□V D-M9□WV D-M9□AV		D-M9□ D-M9□W D-M9□A		D-P3DWA□	
Perpendicular entry		In-line entry		In-line entry	
A1	B1	A1	B1	A1	B1
21	48	21	36	16.5	31.5

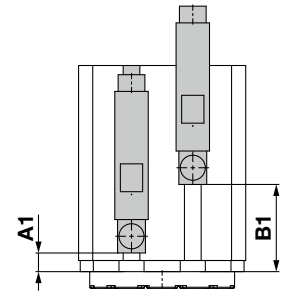
* Dimensions above are for reference.



**Small auto switch:
Perpendicular
electrical entry**

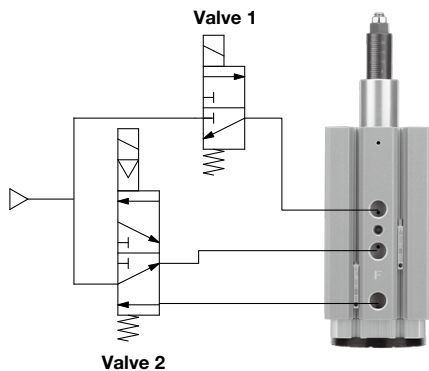


**Small auto switch:
In-line electrical
entry**




**Magnetic field resistant
auto switch**

Recommended circuit



	Workpiece release	Workpiece attraction	During transfer
Valve 1	OFF	ON	OFF
Valve 2	ON	OFF	OFF

 **Safety Instructions** | Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

SMC Corporation