

# Low Profile Air Gripper/With One Finger Fixed

# MHF2-□F Series

∅8, ∅12, ∅16, ∅20

RoHS

## How to Order

**MHF2-12FD□R-M9BW□**

**Number of fingers**

2	2
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**Bore size [mm]**

8	8
12	12
16	16
20	20

**F** One finger fixed

**Action**

D	Double acting
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**Stroke**

Nil	Short stroke
1	Medium stroke
2	Long stroke

\* For details, refer to the "Model" chart on page 8.

**Number of auto switches**

Nil	2
S	1
n	n

**Auto switch**

Nil	Without auto switch (Built-in magnet)
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\* For applicable auto switches, refer to the table below.

**Piping position**

### Applicable Auto Switches/Refer to the Web Catalog or Best Pneumatics Catalog 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	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC	
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	M9BV	M9B	●	●	●	○	○					
	Diagnostic indication (2-color indicator)			3-wire (NPN)	5 V, 12 V	M9NWV	M9NW	●	●	●	○	○	○	○	IC circuit	
				3-wire (PNP)		M9PWV	M9PW	●	●	●	○	○	○	○	IC circuit	
				2-wire	M9B WV	M9B W	●	●	●	○	○	○	○	—		
				Water resistant (2-color indicator)	3-wire (NPN)	5 V, 12 V	M9NAV*1	M9NA*1	○	○	●	○	○	○	○	
	3-wire (PNP)				M9PAV*1		M9PA*1	○	○	●	○	○	○	○	—	
	2-wire				M9BAV*1	M9BA*1	○	○	●	○	○	○	○	—		

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

\* Solid state auto switches marked with "○" are produced upon receipt of order.

\* 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

\* When using the 2-color indicator type, please make the setting so that the indicator is lit in red to ensure the detection at the proper position of the air gripper.

## Specifications

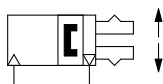


<b>Fluid</b>		Air
<b>Operating pressure</b>		0.2 to 0.7 MPa
<b>Ambient and fluid temperatures</b>		-10 to 60°C (No freezing)
<b>Max. operating frequency</b>	Short stroke	120 c.p.m.
	Medium stroke	120 c.p.m.
	Long stroke	60 c.p.m.
<b>Lubricant</b>		Non-lube
<b>Action</b>		Double acting
<b>Auto switch (Option)</b>		Solid state auto switch (3-wire, 2-wire)

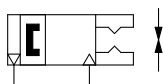
## Model

### Symbol

Double acting, Internal grip



Double acting, External grip



Refer to pages 22 to 24 for cylinders with auto switches.

- Auto Switch Installation Examples and Mounting Positions
- Auto Switch Hysteresis
- Auto Switch Mounting
- Protrusion of Auto Switch from Edge of Body

Action	Model	Bore size [mm]	Gripping force*1		Opening/Closing stroke (One side) [mm]	Stroke adjuster adjustment range [mm]	Weight*2 [g]	Volume [cm <sup>3</sup> ]	
			Effective gripping force per finger [N]					Finger open side	Finger close side
Double acting	MHF2-8FDR	8	19		4	2	55	0.3	0.3
	MHF2-8FD1R				8	4	70	0.5	0.5
	MHF2-8FD2R				16	8	95	0.9	0.9
	MHF2-12FDR	12	48		6	3	120	0.7	0.7
	MHF2-12FD1R				12	6	145	1.4	1.4
	MHF2-12FD2R				24	12	205	2.8	2.8
	MHF2-16FDR	16	90		8	4	275	1.7	1.7
	MHF2-16FD1R				16	8	345	3.3	3.3
	MHF2-16FD2R				32	16	490	6.5	6.5
	MHF2-20FDR	20	141		10	5	505	3.2	3.2
	MHF2-20FD1R				20	10	635	6.3	6.3
	MHF2-20FD2R				40	20	905	12.6	12.6

\*1 At the pressure of 0.5 MPa, when gripping point L is 20 mm

\*2 Excluding the auto switch weight

### Moisture Control Tube IDK Series

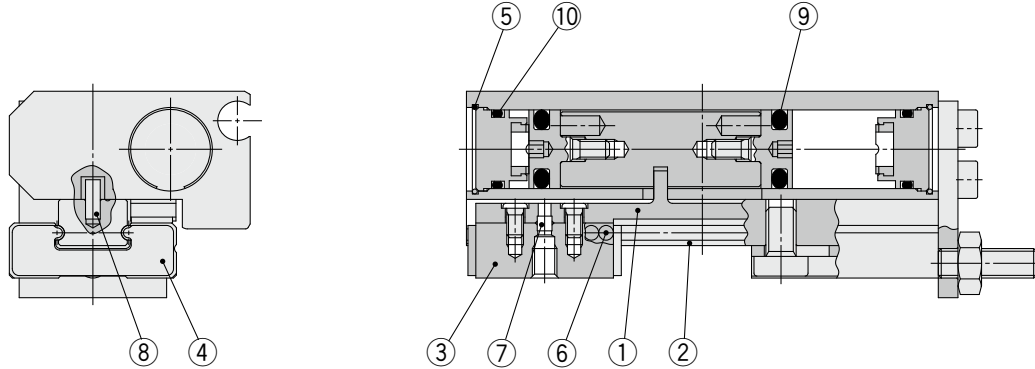


When operating an actuator with a small bore size and a short stroke at a high frequency, dew condensation (water droplets) may occur inside the piping depending on the conditions. Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **the IDK series in the Best Pneumatics No. 6 Catalog**.

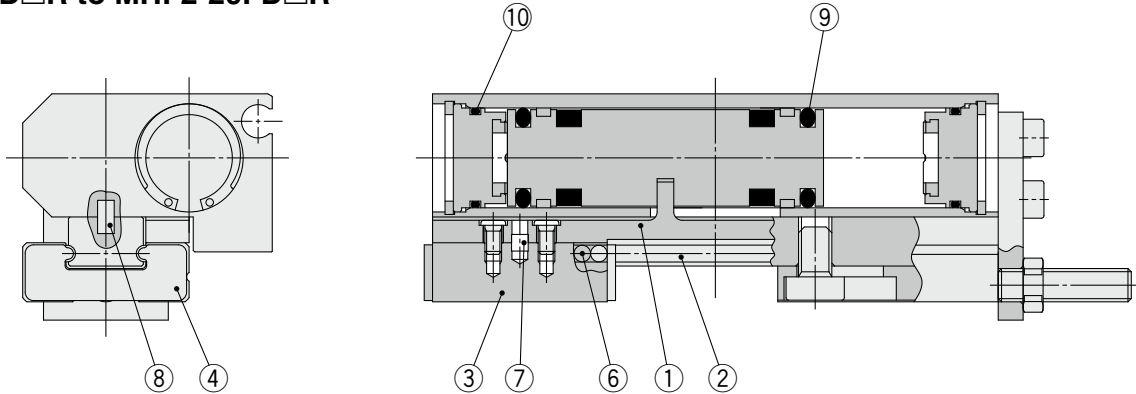
# MHF2-□F Series

## Replacement Parts

### MHF2-8FD□R



### MHF2-12FD□R to MHF2-20FD□R



### Component Parts

No.	Description
1	Joint
2	Guide rail
3	Finger
4	Roller stopper
5	Clip
6	Steel ball
7	Roller (ø8, ø12) Parallel pin (ø16, ø20)
8	Parallel pin
9	Piston seal
10	Gasket

### Seal Kit

Model	Kit no.	Contents
MHF2-8FDR	MHF8F-PS	⑤ ⑨ ⑩
MHF2-8FD1R		
MHF2-8FD2R		
MHF2-12FDR	MHF12F-PS	⑨ ⑩
MHF2-12FD1R		
MHF2-12FD2R		
MHF2-16FDR	MHF16F-PS	⑨ ⑩
MHF2-16FD1R		
MHF2-16FD2R		
MHF2-20FDR	MHF20F-PS	⑨ ⑩
MHF2-20FD1R		
MHF2-20FD2R		

### Finger Assembly

Model	Kit no.	Contents
MHF2-8FDR	MHF-AA0802F	① ② ③ ④ ⑥ ⑦ ⑧ Guide rail mounting screw
MHF2-8FD1R	MHF-AA0802F-1	
MHF2-8FD2R	MHF-AA0802F-2	
MHF2-12FDR	MHF-AA1202F	① ② ③ ④ ⑥ ⑦ ⑧ Guide rail mounting screw
MHF2-12FD1R	MHF-AA1202F-1	
MHF2-12FD2R	MHF-AA1202F-2	
MHF2-16FDR	MHF-AA1602F	① ② ③ ④ ⑥ ⑦ ⑧ Guide rail mounting screw
MHF2-16FD1R	MHF-AA1602F-1	
MHF2-16FD2R	MHF-AA1602F-2	
MHF2-20FDR	MHF-AA2002F	① ② ③ ④ ⑥ ⑦ ⑧ Guide rail mounting screw
MHF2-20FD1R	MHF-AA2002F-1	
MHF2-20FD2R	MHF-AA2002F-2	

### Grease Pack

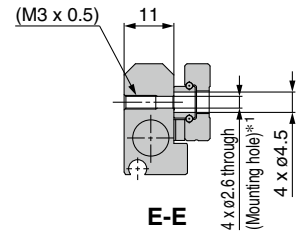
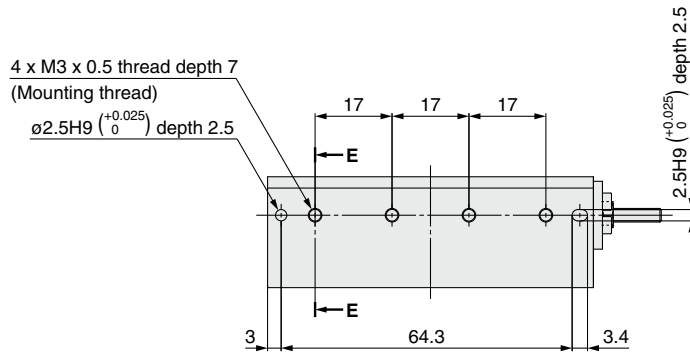
\* The seal kit does not include a grease pack. Order it separately.  
 Guide unit: GR-S-010 (10 g)  
 Cylinder unit: GR-L-005 (5 g)



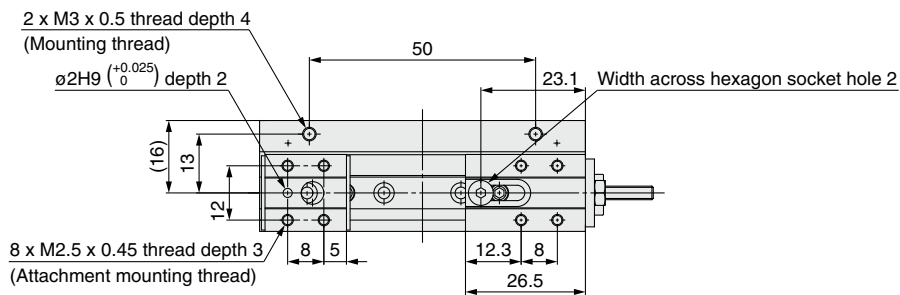
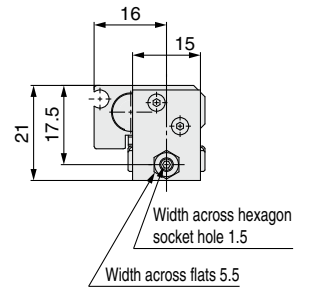
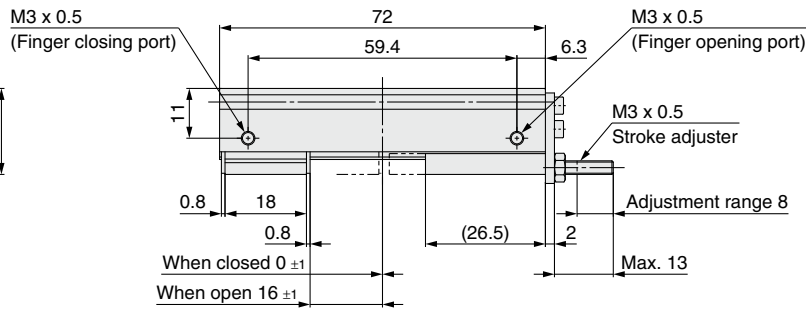
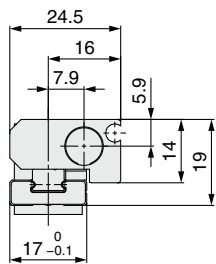


## Dimensions

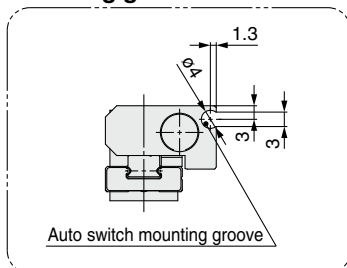
### MHF2-8FD2R



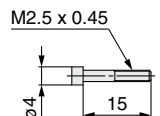
\*1 Use the attached hexagon socket head cap screws for body through-hole mounting.



### Dimensions of auto switch mounting groove



**Accessory:**  
Hexagon socket head cap screw  
for body through-hole mounting  
(4 special screws are included.)



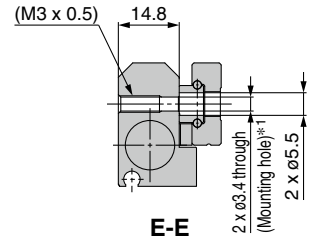
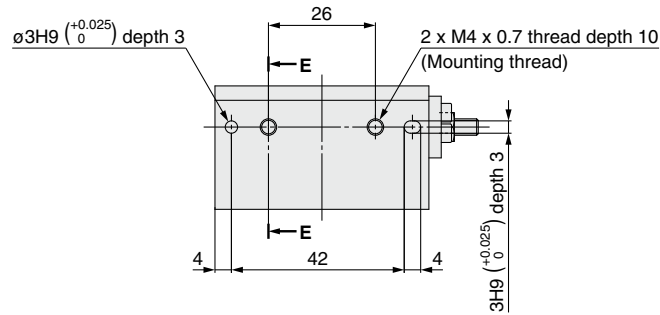
\* Special screws for body through-hole mounting are attached to the product. They are also provided at an order of 1 piece or more with the part number shown below.

Order no.	No. of screws
MHF-B08	4 pcs./unit

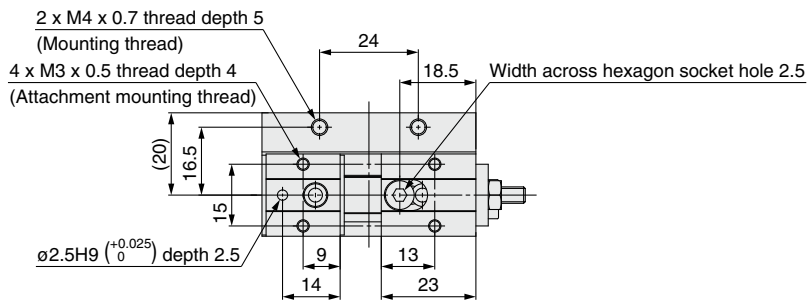
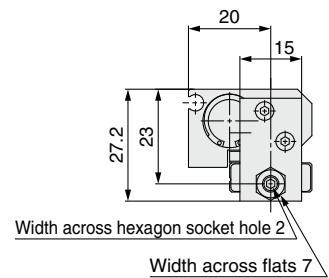
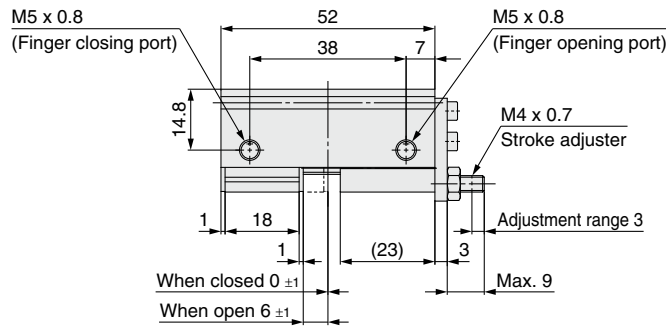
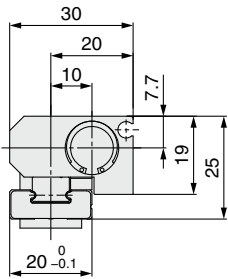
# MHF2-□F Series

## Dimensions

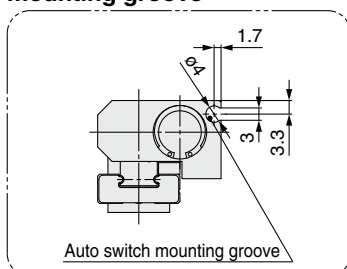
### MHF2-12FDR



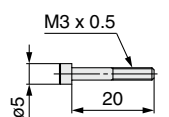
\*1 Use the attached hexagon socket head cap screws for body through-hole mounting.



### Dimensions of auto switch mounting groove



**Accessory:**  
Hexagon socket head cap screw  
for body through-hole mounting  
(2 special screws are included.)

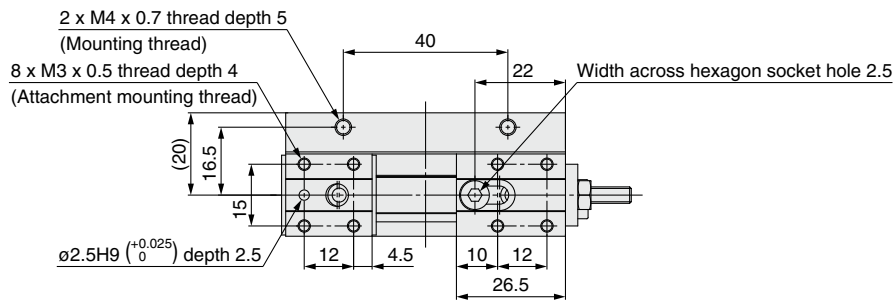
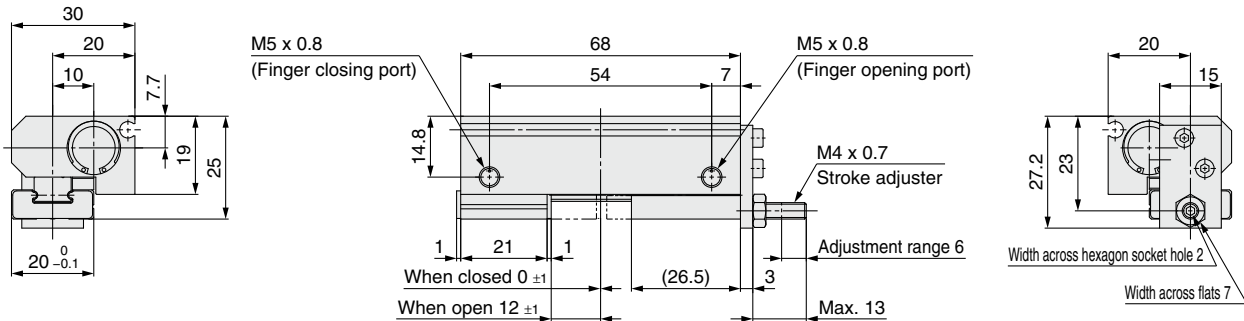
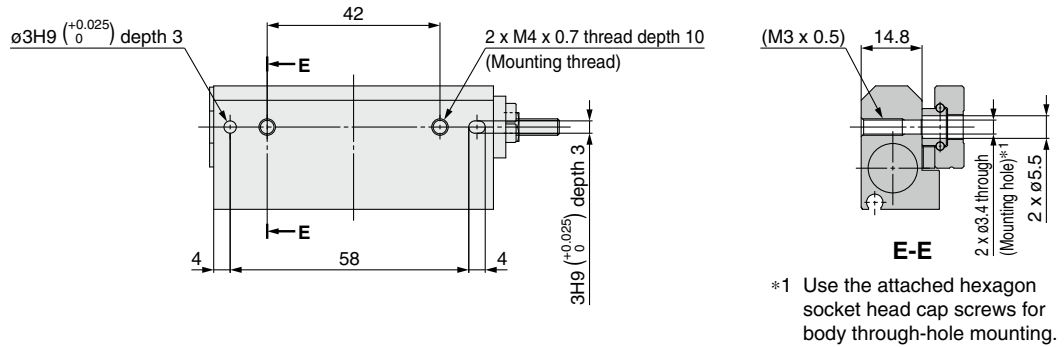


\* Special screws for body through-hole mounting are attached to the product. They are also provided at an order of 1 piece or more with the part number shown below.

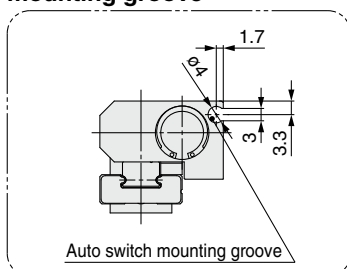
Order no.	No. of screws
MHF-B12	2 pcs./unit

## Dimensions

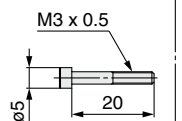
### MHF2-12FD1R



### Dimensions of auto switch mounting groove



**Accessory:**  
Hexagon socket head cap screw for body through-hole mounting (2 special screws are included.)



\* Special screws for body through-hole mounting are attached to the product. They are also provided at an order of 1 piece or more with the part number shown below.

Order no.	No. of screws
MHF-B12	2 pcs./unit







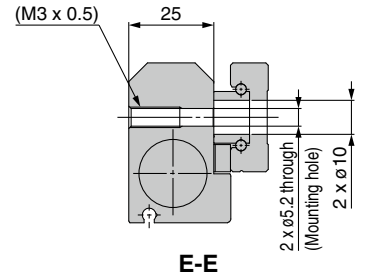
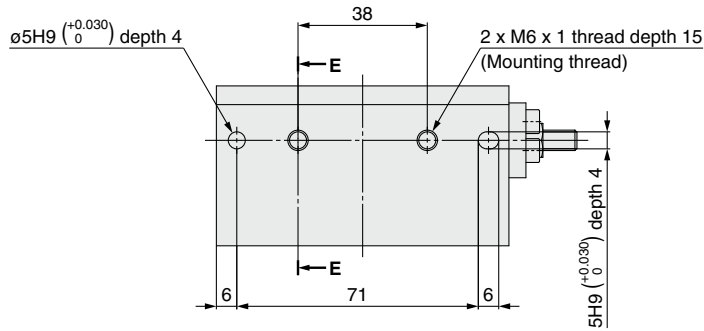




# MHF2-□F Series

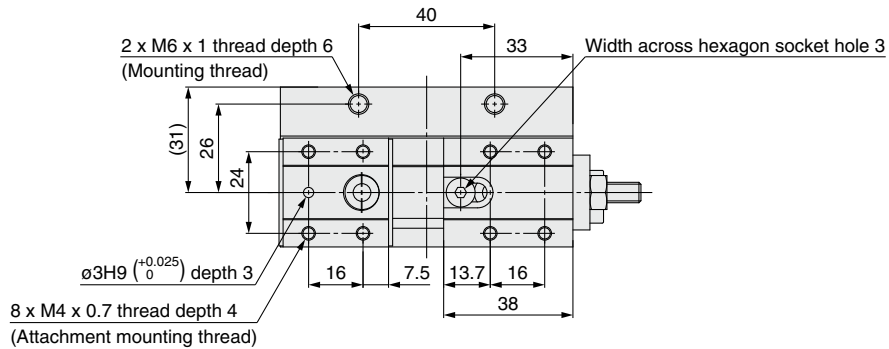
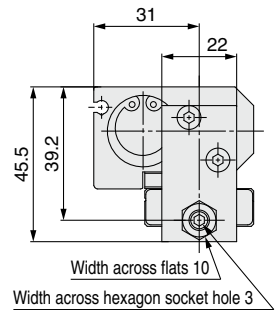
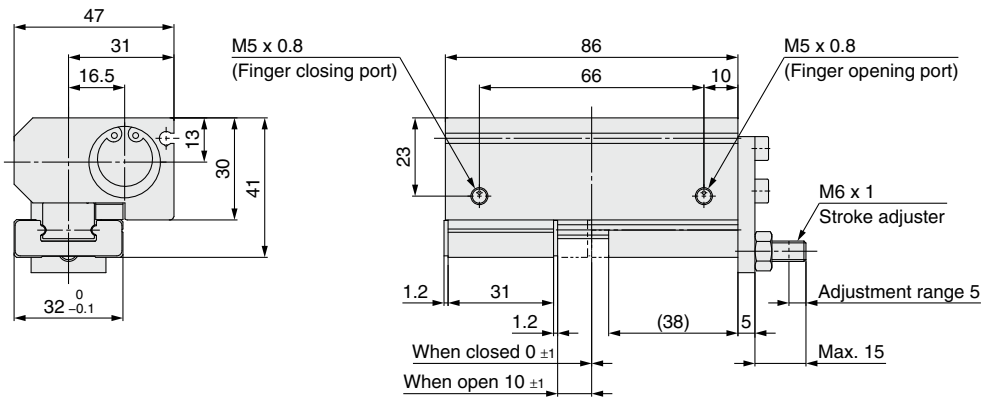
## Dimensions

### MHF2-20FDR

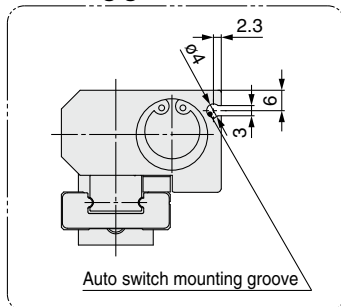


E-E

\* Use the commercially available hexagon socket head cap screws for body through-hole mounting.



### Dimensions of auto switch mounting groove

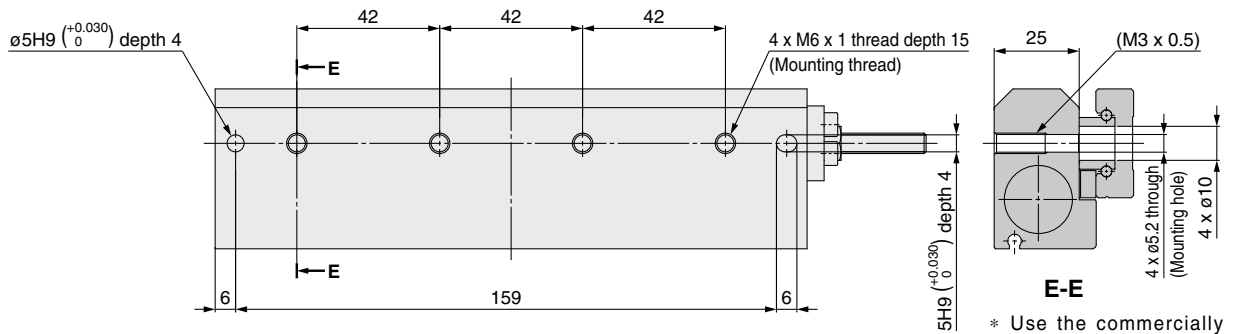




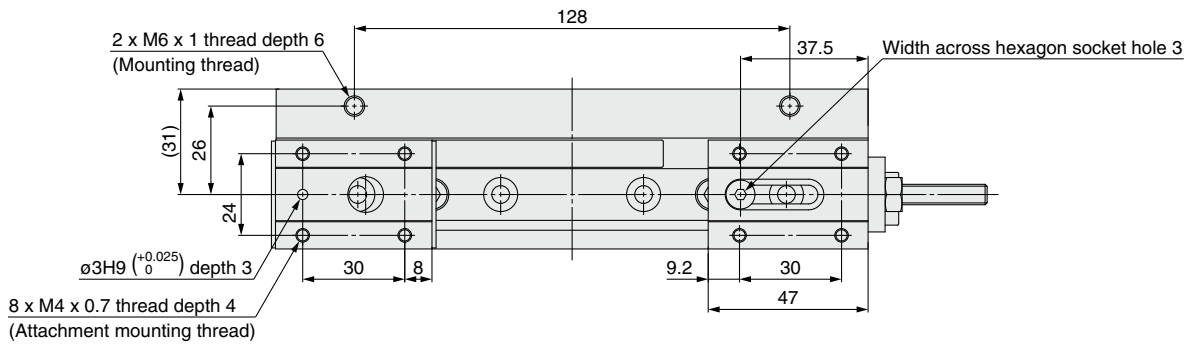
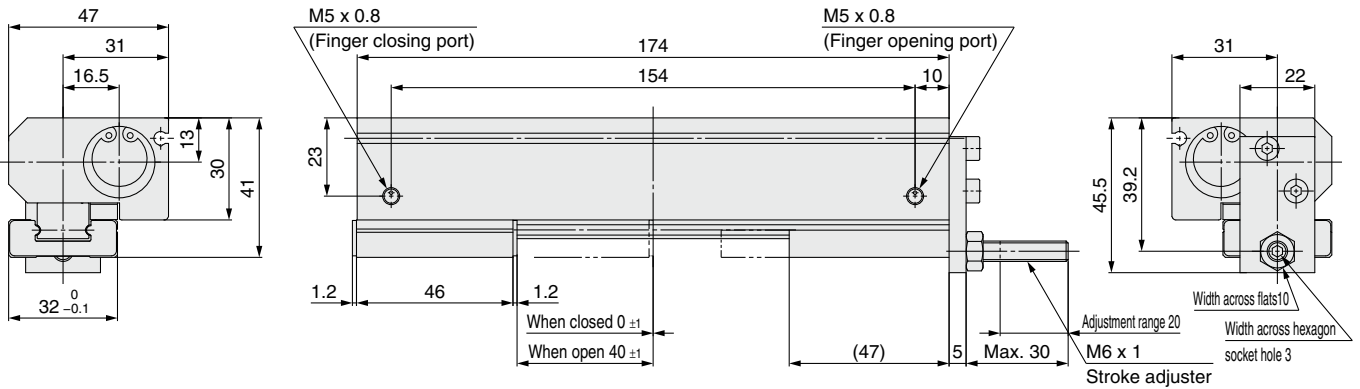
# MHF2-□F Series

## Dimensions

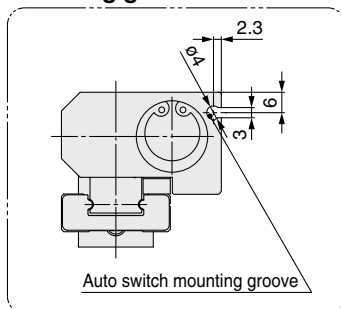
### MHF2-20FD2R



**E-E**  
 \* Use the commercially available hexagon socket head cap screws for body through-hole mounting.



### Dimensions of auto switch mounting groove

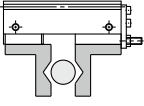
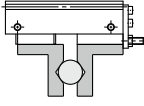
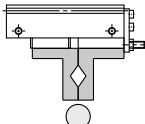
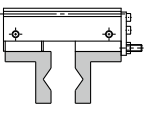
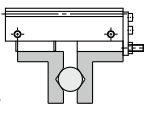
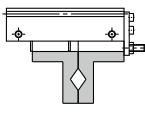
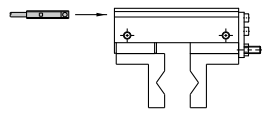
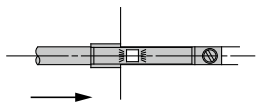
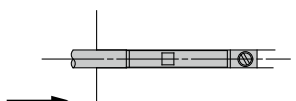
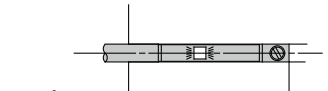
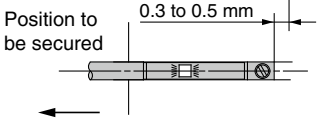
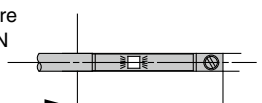
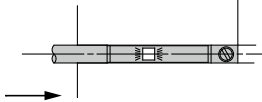


# MHF2-□F Series

## Auto Switch Installation Examples and Mounting Positions

Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

### 1) External Gripping

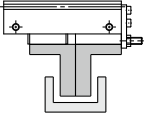
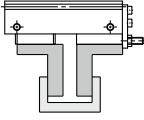
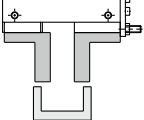
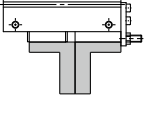
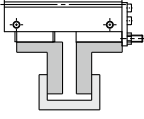
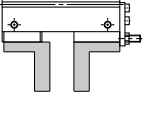
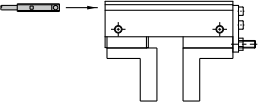
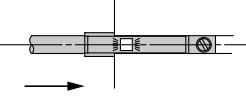
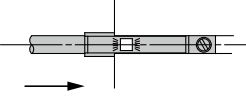
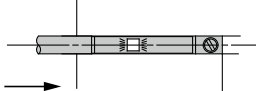
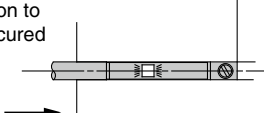
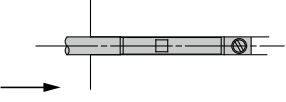
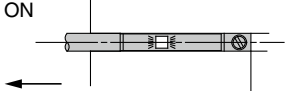
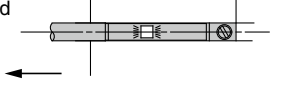
Detection example		① Confirmation of fingers in reset position	② Confirmation of a workpiece held	③ Confirmation of a workpiece released
Position to be detected		Position of fingers fully open 	Position when gripping a workpiece 	Position of fingers fully closed 
Operation of auto switches		When fingers return: Auto switch to turn ON (Light ON)	When gripping a workpiece: Auto switch to turn ON (Light ON)	When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)
Detection combinations	One auto switch * One position, any of ①, ② and ③ can be detected.	●	●	●
	Two auto switches * Two positions of ①, ② and ③ can be detected.	●	●	—
		—	●	●
Pattern	A	●	●	—
	B	—	●	●
	C	●	—	●
How to determine auto switch installation position		Step 1) Fully open the fingers. 	Step 1) Position fingers for gripping a workpiece. 	Step 1) Fully close the fingers. 
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 mounting groove in the direction as shown in the illustration to the right. 		
		<p>Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.</p>  <p>Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.</p>  <p>Step 5) Slide 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.</p> <p>Position where light turns ON</p>  <p>Position to be secured</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 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates.</p> <p>Position where light turns ON</p>  <p>0.3 to 0.5 mm</p> <p>Position to be secured</p> 	

\* It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.

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



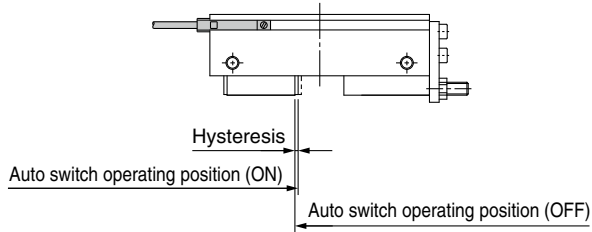
## 2) Internal Gripping

Detection example		① Confirmation of fingers in reset position	② Confirmation of a workpiece held	③ Confirmation of a workpiece released	
Position to be detected		Position of fingers fully closed 	Position when gripping a workpiece 	Position of fingers fully open 	
Operation of auto switches		When fingers return: Auto switch to turn ON (Light ON)	When gripping a workpiece: Auto switch to turn ON (Light ON)	When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)	
Detection combinations	One auto switch * One position, any of ①, ② and ③ can be detected.	●	●	●	
	Two auto switches * Two positions of ①, ② and ③ can be detected.	<b>A</b>	●	—	
		<b>B</b>	—	●	
		<b>C</b>	●	—	
How to determine auto switch installation position		Step 1) Fully close the fingers. 	Step 1) Position fingers for gripping a workpiece. 	Step 1) Fully open the fingers. 	
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 mounting groove in the direction as shown in the illustration to the right. 			
		Step 3) Slide the auto switch in the direction of the arrow until the indicator 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 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates. 		
		Position where light turns ON  0.3 to 0.5 mm Position to be secured 	Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out. 		
		Step 5) Slide 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  0.3 to 0.5 mm Position to be secured 			

- \* It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.
- \* When holding a workpiece close at the end of opening/closing stroke of fingers, detecting performance of the combinations listed in the table above may be limited, depending on the hysteresis of an auto switch, etc.

## Auto Switch Hysteresis

Auto switches have hysteresis similar to micro switches. Use the table below as a guide when adjusting auto switch positions, etc.

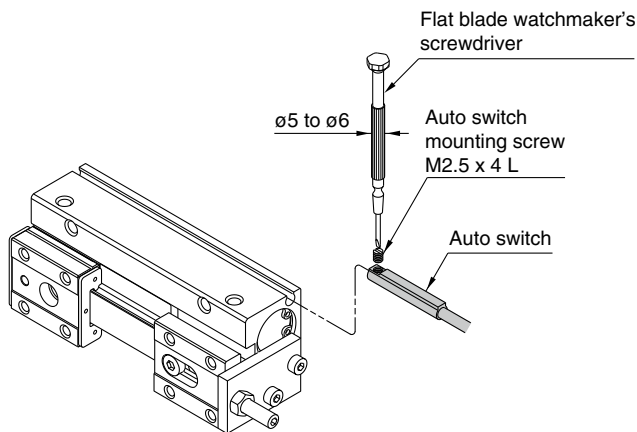


## Hysteresis

	D-M9□(V) D-M9□W(V) D-M9□A(V)
MHF2-8FD□	0.2
MHF2-12FD□	0.3
MHF2-16FD□	0.4
MHF2-20FD□	0.4

## Auto Switch Mounting

To set the auto switch, insert the auto switch into the auto switch installation groove of the gripper from the direction as shown in the illustration below. After setting the position, tighten the attached auto switch mounting screw with a flat blade watchmaker's screwdriver.



\* Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw.  
The tightening torque should be 0.05 to 0.15 N·m.

## Protrusion of Auto Switch from Edge of Body

- The amount of auto switch protrusion from the body end surface is shown in the table below.
- Use this as a standard when mounting, etc.

### Protrusion of Auto Switch

Lead wire type	In-line entry		Perpendicular entry		
	Illustration		Illustration		
Model					
		D-M9□ D-M9□W	D-M9□A	D-M9□V D-M9□WV	D-M9AV
MHF2-8FD	Open	6.5	8.5	4.5	6.5
	Closed	6.5	8.5	4.5	6.5
MHF2-8FD1	Open	6.5	8.5	4.5	6.5
	Closed	6.5	8.5	4.5	6.5
MHF2-8FD2	Open	4	6	2	4
	Closed	4	6	2	4
MHF2-12FD	Open	3.5	5.5	2	4
	Closed	3.5	5.5	2	4
MHF2-12FD1	Open	1.5	3.5	—	1.5
	Closed	1.5	3.5	—	1.5
MHF2-12FD2	Open	1.5	3.5	—	1.5
	Closed	1.5	3.5	—	1.5
MHF2-16FD	Open	—	1	—	—
	Closed	—	1	—	—
MHF2-16FD1	Open	—	1	—	—
	Closed	—	1	—	—
MHF2-16FD2	Open	—	1	—	—
	Closed	—	1	—	—
MHF2-20FD	Open	—	—	—	—
	Closed	—	—	—	—
MHF2-20FD1	Open	—	—	—	—
	Closed	—	—	—	—
MHF2-20FD2	Open	—	—	—	—
	Closed	—	—	—	—

\* There is no protrusion for sections of the table with no values entered.