

# Rotary Actuated Air Gripper

## MHR2, MDHR2/MHR3, MDHR3

2-finger type

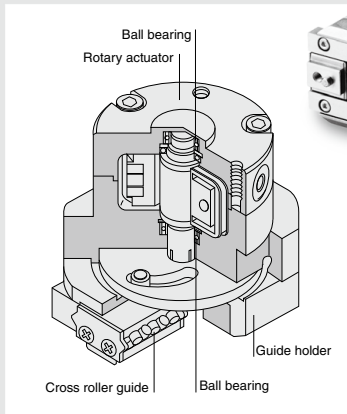
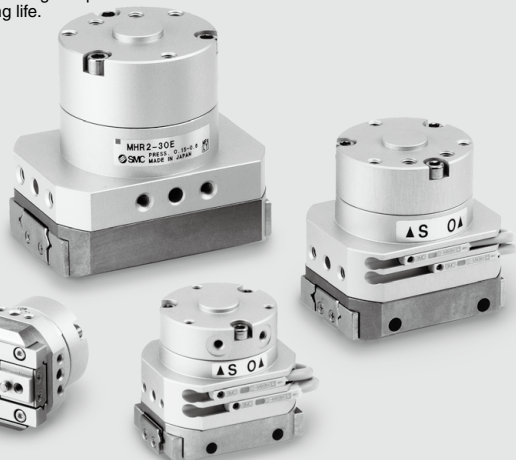
3-finger type

### High Precision - Repeatability $\pm 0.01$ mm

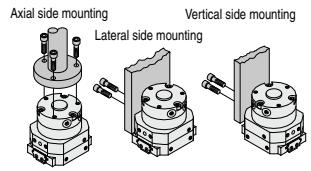
Parallel opening and closing mechanism utilizing a cross roller guide produces smooth operation without play, with high precision and long life.

### Low Profile

Using rotary actuators in the part of actuating portion enables a design compact.



### Universal mounting



**MDHR2**

**MDHR3**



■ Possible to mount solid state switch with indicator light D-M9. Easy to locate switch to optimum set point.

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

## High rigidity

Fingers operate smoothly as the holder maintains the guide from the outside and prevents finger displacement.

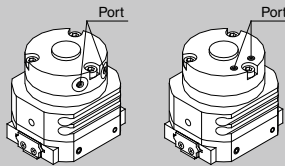


## Applicable for Clean Series.

Refer to "Pneumatic Clean Series" catalog for details.

## Internal/External gripping capability

## Connection port on 2 sides



## Series Variations

		(Nominal size)				Auto switch	
		10	15	20	30		
Rotary actuated air gripper	2-finger type	MHR2	●	●	●	●	P. 535 to P. 547
		MDHR2	●	●	●	●	
	3-finger type	MHR3	●	●	●	●	P. 548 to P. 555
		MDHR3	●	●	●	●	
Clean Series Rotary actuated air gripper	2-finger type	11-22-MHR2	●	●	●	●	Refer to the "Pneumatic Clean Series" catalog.
		11-22-MDHR2	●	●	●	●	
	3-finger type	11-22-MHR3	●	●	●	●	
		11-22-MDHR3	●	●	●	●	

# Rotary Actuated Air Gripper/2-Finger Type

## Series *MHR2/MDHR2*

Size: 10, 15, 20, 30

### How to Order

Without auto switch

MHR 2 - 10 R - [ ]

With auto switch  
(Built-in magnet)

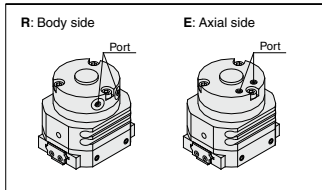
MDHR 2 - 10 R - M9N S - [ ]

With magnet  
(For auto switch)

Number of fingers  
2 2 fingers

Nominal size  
10  
15  
20  
30

Connecting port



Made to Order  
Refer to page 536 for details.

Number of auto switches

NII	2 pcs.
S	1 pc.

Applicable Auto Switches Refer to pages 807 to 856 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) <sup>2</sup>					Pre-wired connector	Applicable load
					DC	AC	Electrical entry direction		0.5 (NII)	1 (M)	3 (L)	5 (Z)			
							Perpendicular	In-line							
Solid state auto switch	-	Grommet	Yes	3-wire (NPN)	5V, 12V	-	M9NV	M9N	●	●	●	○	○	Relay, PLC	
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○		IC circuit
				2-wire	M9BV	M9B	●	●	●	○	○	—			
				3-wire (NPN)	M9NWV	M9NW	●	●	●	○	○	IC circuit			
	Diagnosis (2-color indication)			3-wire (PNP)	M9PWV	M9PW	●	●	●	○	○	○	—		
				2-wire	M9B WV	M9B W	●	●	●	○	○	—			
	Water resistant (2-color indicator)			3-wire (NPN)	M9NA**	M9NA**	○	○	○	●	○	○	IC circuit		
				3-wire (PNP)	M9PA**	M9PA**	○	○	○	●	○	○	circuit		
				2-wire	M9BAV**	M9BA**	○	○	●	○	○	—			
				2-wire	M9BAV**	M9BA**	○	○	●	○	○	—			

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

<sup>2</sup> Lead wire length symbols: 0.5 m ..... NII (Example) M9N  
1 m ..... M (Example) M9NM  
3 m ..... L (Example) M9NL  
5 m ..... Z (Example) M9NZ

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

Note) 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.

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

# Series MHR2/MDHR2

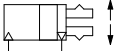


## Model/Specifications

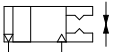
Nominal size		10	15	20	30
Action		Double acting			
Gripping force (N) <sup>(1)</sup> (Effective value) at 0.5 MPa	External grip	12	24	33	58
	Internal grip	12	25	34	59
Opening/ Closing stroke (Both sides)	Finger closing width (mm)	10	14	16	19
	Finger opening width (mm)	16	22	28	37
	Stroke (mm)	6	8	12	18
Weight (g) <sup>(2)</sup>		100 (95)	180 (175)	390 (380)	760 (740)
Connection port		M3 X 0.5		M5 X 0.8	
Repeatability		±0.01mm			
Fluid		Air			
Operating pressure		0.2 to 0.6 MPa		0.15 to 0.6 MPa	
Ambient and fluid temperature		0 to 60°C			
Max. operating frequency		180 c.p.m			
Lubrication		Non-lube			

### Symbol

Without auto switch/  
Double acting

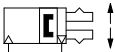


Internal grip

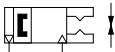


External grip

With auto switch/  
Double acting



Internal grip



External grip

Note 1) Refer to page 538 "Effective Gripping Force" for details of Gripping force at each gripping point.  
Value of effective gripping force is measured at the middle of opening/closing stroke.  
Note 2) ( ) Value shows MDHR weight, but it does not include auto switch weight.

When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.



**Made to Order**

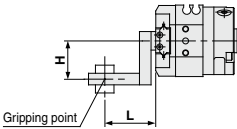
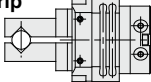
(Refer to pages 727 to 759 for details.)

Symbol	Specifications/Description
-X32	Grease change for rotary actuated part
-X63	Fluorine grease

## Gripping Point

- Workpiece gripping point should be within the gripping point range: The range shown for each operating pressure given in the graphs to the right.
- When the gripping point distance becomes large, the finger attachment applies an excessively large load to the finger sliding section, causing excessive play of the fingers and possibly leading to premature failure.

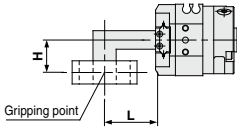
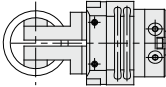
### External grip



Gripping point

L: Distance to the gripping point  
H: Overhang distance

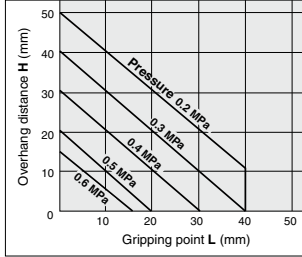
### Internal grip



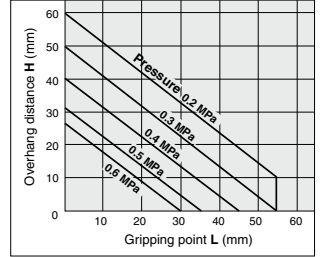
Gripping point

## Limitation of Gripping: External Grip/Internal Grip

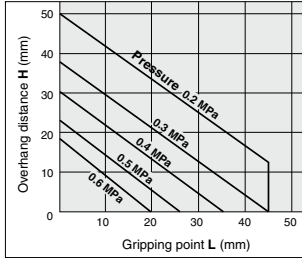
MHR2-10/MDHR2-10



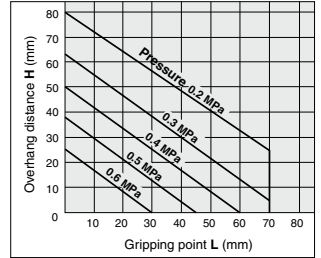
MHR2-20/MDHR2-20



MHR2-15/MDHR2-15



MHR2-30/MDHR2-30



MHZ

MHF

MHL

**MHR**

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X

MRHQ

MA

D-

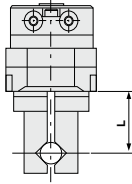
# Series MHR2/MDHR2

## Effective Gripping Force

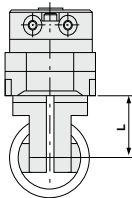
### Guidelines for the selection of the gripper with respect to workpiece mass

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.
- If high acceleration, deceleration or impact forces are encountered during motion a further margin of safety should be considered.

### External grip



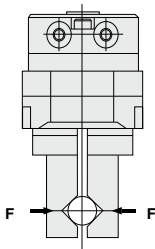
### Internal grip



L: Gripping point length (mm)

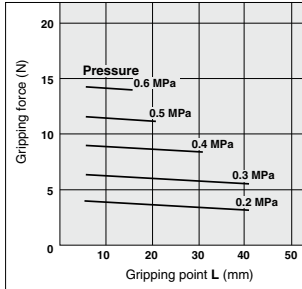
### • Indication of effective gripping force

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.

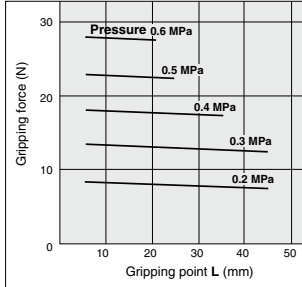


### External Grip

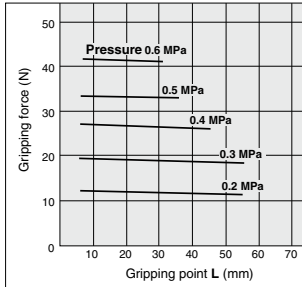
#### MHR2-10/MDHR2-10



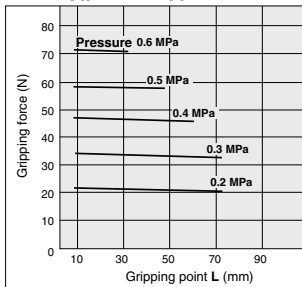
#### MHR2-15/MDHR2-15



#### MHR2-20/MDHR2-20

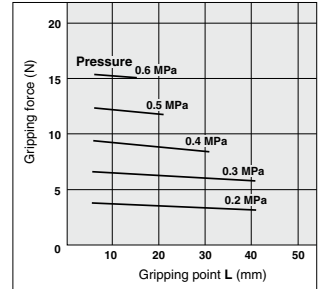


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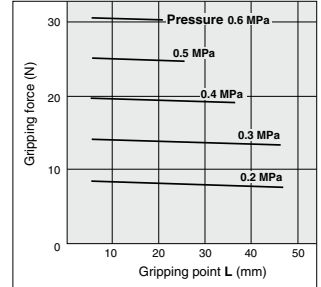


### Internal Grip

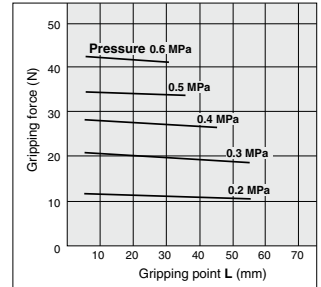
#### MHR2-10/MDHR2-10



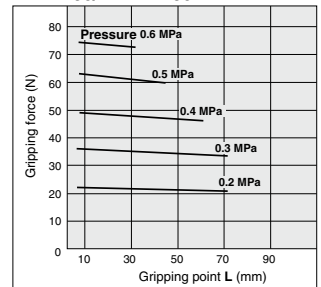
#### MHR2-15/MDHR2-15



#### MHR2-20/MDHR2-20

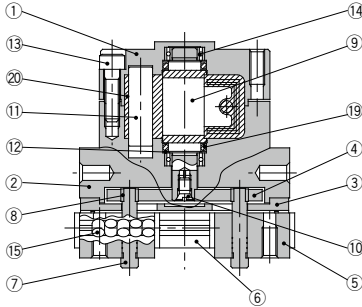


#### MHR2-30/MDHR2-30

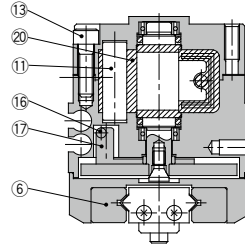
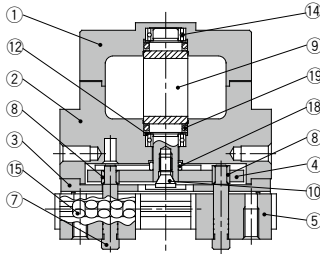


## Construction

### MHR2



### MDHR2



### Component Parts

No.	Description	Material	Note
1	<b>Body</b>	Aluminum alloy	Hard anodized
2	<b>Adaptor body</b>	Aluminum alloy	Hard anodized
3	<b>Guide holder</b>	Stainless steel	
4	<b>Cam</b>	Cold rolled steel	Nitriding
5	<b>Finger assembly</b>	Stainless steel	Heat treated
6	<b>Guide</b>	Stainless steel	Heat treated
7	<b>Pin</b>	Carbon steel	Heat treated Electroless nickel plated
8	<b>Pin roller</b>	Stainless steel	Nitriding
9	<b>Vane shaft</b>	Stainless steel, NBR	MCHR2-30 is carbon steel NBR
10	<b>Joint bolt</b>	Chrome molybdenum steel	Zinc chromated

### Component Parts

No.	Description	Material	Note
11	<b>Stopper</b>	Resin	
12	<b>Back-up ring</b>	Stainless steel plate	
13	<b>Hexagon socket head bolt</b>	Stainless steel	
14	<b>Bearing</b>	High carbon chrome bearing steel	
15	<b>Cylindrical roller</b>	—	
16	<b>Magnet</b>	Stainless steel	
17	<b>Magnet holder</b>	Aluminum alloy	Hard anodized
18	<b>Roller</b>	Stainless steel	
19	<b>O-ring</b>	NBR	
20	<b>Stopper seal</b>	NBR	

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X

MRHQ

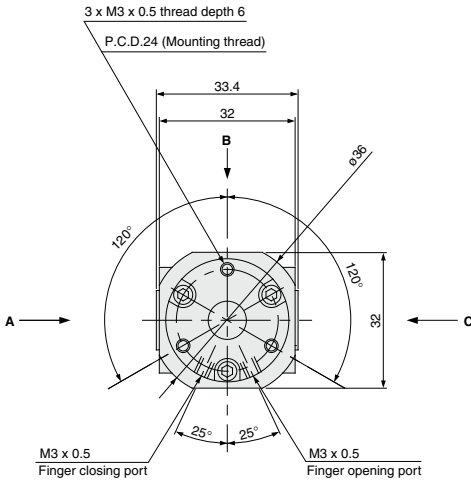
MA

D-

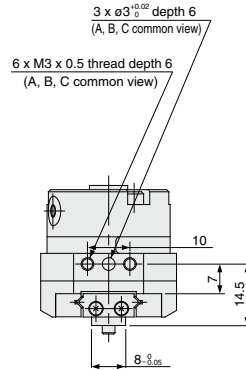
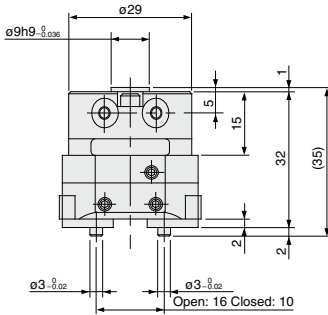
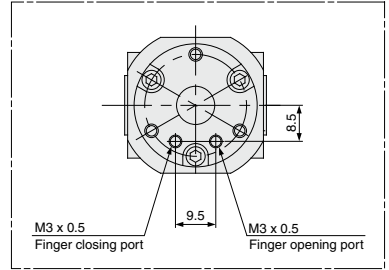
# Series MHR2/MDHR2

## Nominal Size 10

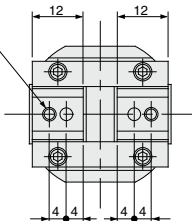
Without auto switch: MHR2-10R



MHR2-10E Port Location

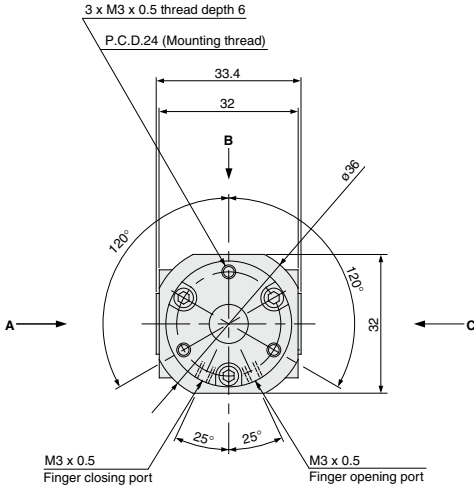


2 x M3 x 0.5 thread depth 6  
(Thread for mounting attachment)

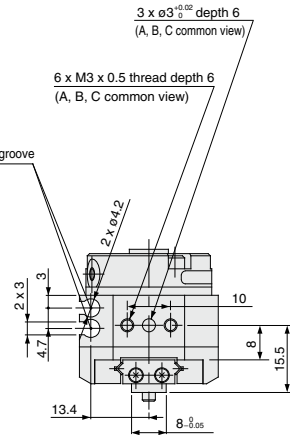
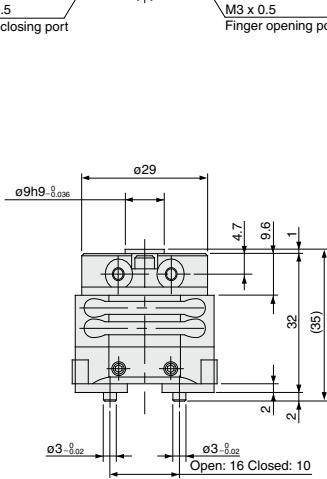
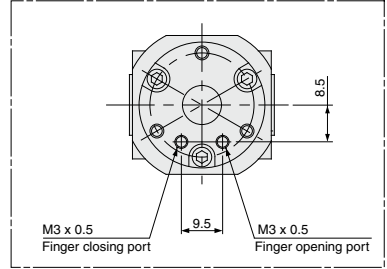




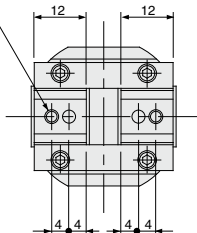
With auto switch (Built-in magnet): MDHR2-10R



MDHR2-10E Port Location

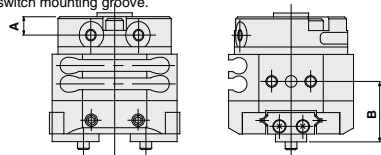


2 x M3 x 0.5 thread depth 6  
(Thread for mounting attachment)



Dimensional Differences between MHR and MDHR

The following dimensions are different between series MHR and MDHR. And also, body shapes are different depending on auto switch mounting groove.



Model	A	B
MHR2	-10R 5	14.5
	-10E —	14.5
MDHR2	-10R 4.7	15.5
	-10E —	15.5

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X

MRHQ

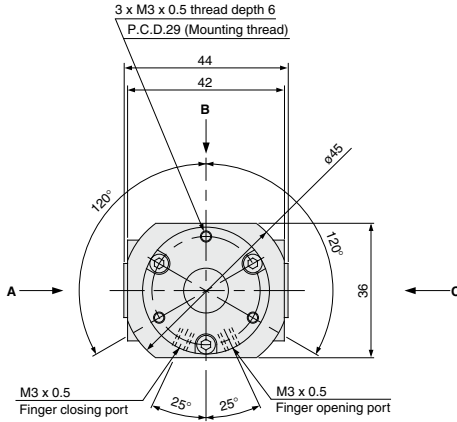
MA

D-

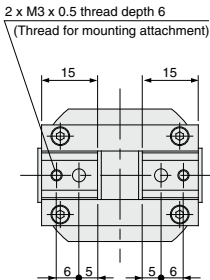
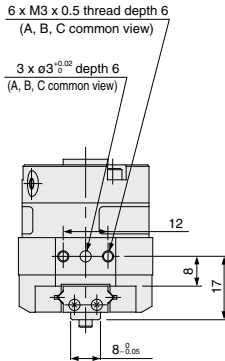
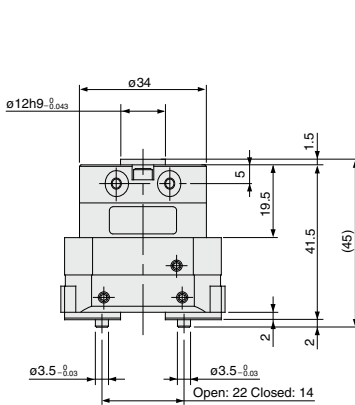
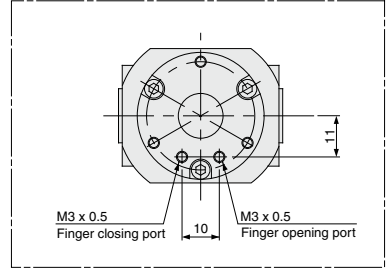
# Series MHR2/MDHR2

## Nominal Size 15

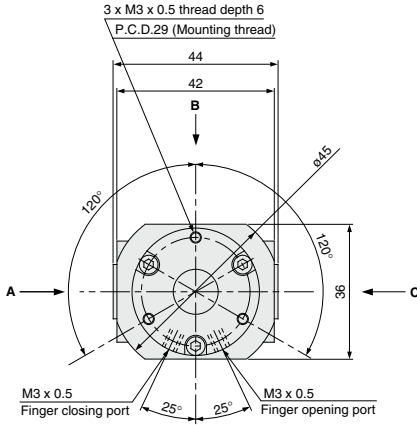
### Without auto switch: MHR2-15R



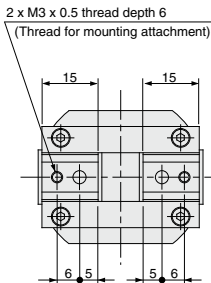
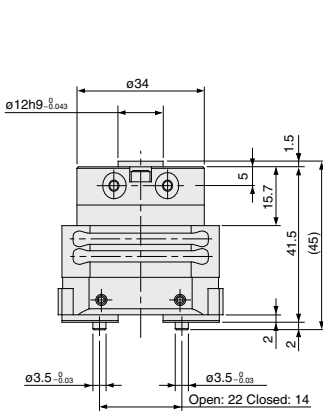
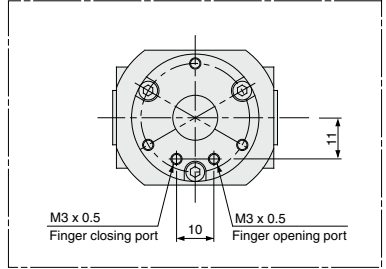
MHR2-15E Port Location



With auto switch (Built-in magnet): MDHR2-15R



MDHR2-15E Port Location



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X □

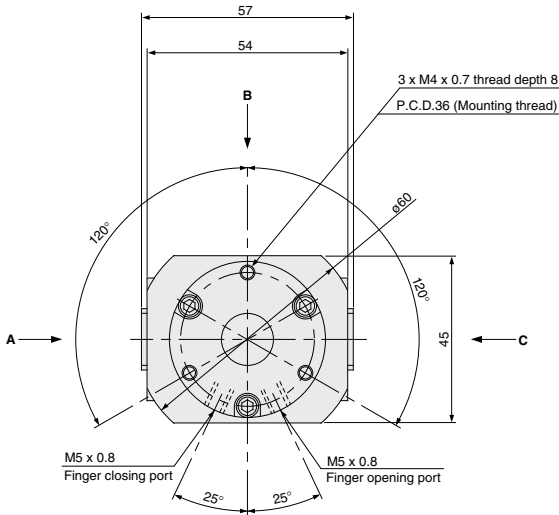
MRHQ

MA

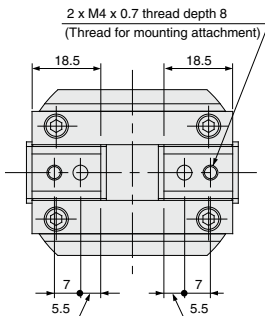
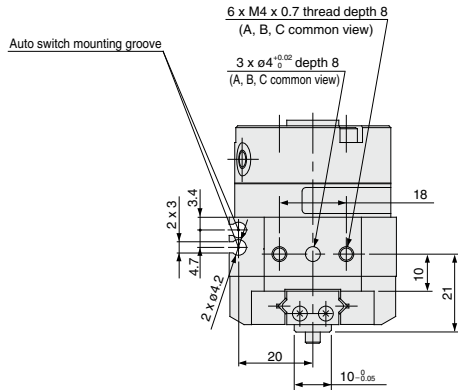
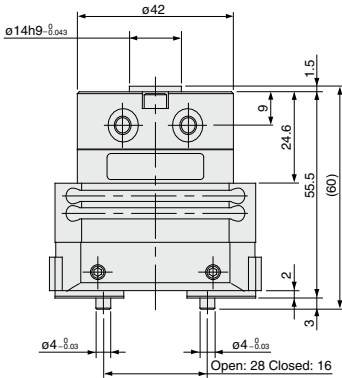
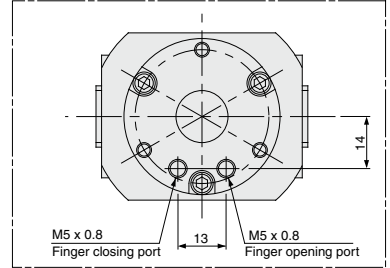
D-□



With auto switch (Built-in magnet): MDHR2-20R



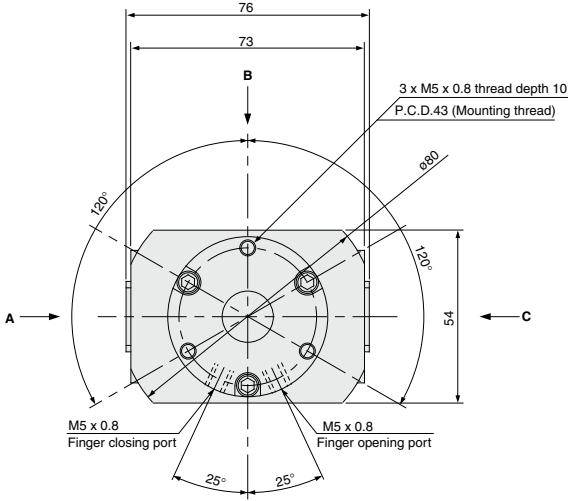
MDHR2-20E Port Location



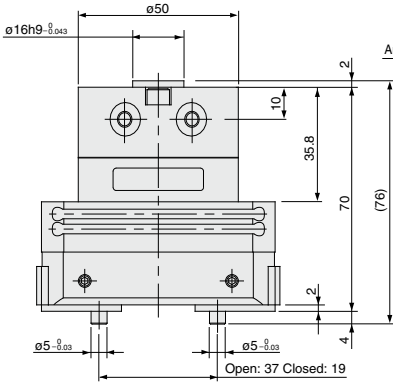
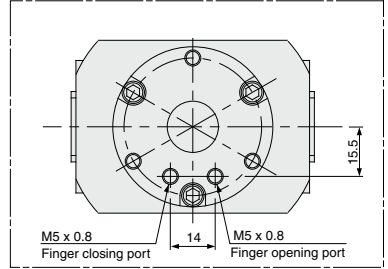
MHZ
MHF
MHL
<b>MHR</b>
MHK
MHS
MHC
MHT-Z
MHY
MHW
-X□
MRHQ
MA
D-□



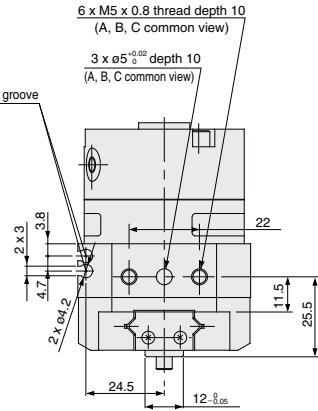
With auto switch (Built-in magnet): MDHR2-30R



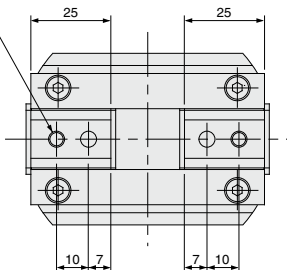
MDHR2-30E Port Location



Auto switch mounting groove

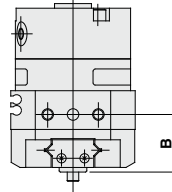


2 x M5 x 0.8 thread depth 10  
(Thread for mounting attachment)



**Dimensional Differences between MHR and MDHR**

The following dimensions are different between series MHR and MDHR. And also, body shapes are different depending on auto switch mounting groove.



Model	B
MHR2-30□	25
MDHR2-30□	25.5

MHZ

MHF

MHL

**MHR**

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X□

MRHQ

MA

D-□

# Rotary Actuated Air Gripper/3-Finger Type

# Series *MHR3/MDHR3*

## Size: 10, 15

### How to Order

Without auto switch

MHR 3 - 10 R - [ ]

With auto switch  
(Built-in magnet)

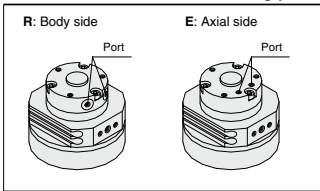
MDHR 3 - 10 R - M9N S - [ ]

With magnet  
(For auto switch)

Number of fingers  
3 3 fingers

Nominal size  
10  
15

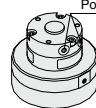
Connecting port



Connecting port

R Body side

R: Body side



Made to Order  
Refer to page 549 for details.

Number of auto switches

NIL	2 pcs.
S	1 pc.

Applicable Auto Switches/Refer to pages 807 to 856 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) <sup>*)</sup>				Pre-wired connector	Applicable load	
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC
							Perpendicular	In-line							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5V, 12V	—	M9NV	M9N	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○		
	Diagnosis (2-color indication)			2-wire	12V	—	M9BV	M9B	●	●	●	○	○	—	
				3-wire (NPN)	5V, 12V	—	M9NVW	M9NW	●	●	●	○	○	IC circuit	
	3-wire (PNP)			M9PVW			M9PW	●	●	●	○	○	—		
	Water resistant (2-color indicator)			2-wire	12V	—	M9BWV	M9BW	●	●	●	○	○	—	
				3-wire (NPN)	5V, 12V	—	M9NAV**	M9NA**	○	○	●	○	○	IC circuit	
				3-wire (PNP)			M9PAV**	M9PA**	○	○	●	○	○	—	
				2-wire	12V	—	M9BAV**	M9BA**	○	○	○	○	○	—	

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

\*) Lead wire length symbols: 0.5 m..... Nil (Example) M9N  
1 m..... M (Example) M9NM  
3 m..... L (Example) M9NL  
5 m..... Z (Example) M9NZ

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

Note) 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.



# Rotary Actuated Air Gripper 3-Finger Type *Series MHR3/MDHR3*

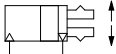


## Model/Specifications

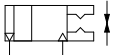
Nominal size		10	15
<b>Action</b>		Double acting	
<b>Holding force (N) (Effective value) <sup>(1)</sup> at 0.5 MPa</b>	<b>External grip</b>	7	13
	<b>Internal grip</b>	6.5	12
<b>Opening/Closing stroke (Diameter)</b>	<b>Finger closing width (mm)</b>	16	19
	<b>Finger opening width (mm)</b>	22	27
	<b>Stroke (mm)</b>	6	8
<b>Weight (g) <sup>(2)</sup></b>		120 (125)	225 (230)
<b>Connection port</b>		M3 x 0.5	
<b>Repeatability</b>		±0.01 mm	
<b>Fluid</b>		Air	
<b>Operating pressure</b>		0.2 to 0.6 MPa	0.15 to 0.6 MPa
<b>Ambient and fluid temperature</b>		0 to 60 °C	
<b>Max. operating frequency</b>		180 c.p.m	
<b>Lubrication</b>		Non-lube	

### Symbol

Without auto switch/  
Double acting

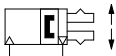


Internal grip

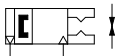


External grip

With auto switch/  
Double acting



Internal grip



External grip



**Made to Order**

(Refer to pages 727 to 759 for details.)

Symbol	Specifications/Description
-X32	Grease change for rotary actuated part
-X63	Fluorine grease

Note 1) Refer to page 550 "Effective Gripping Force" for details of gripping force at each gripping point.  
Valve of effective gripping force is measured at the middle of opening/closing stroke.

Note 2) ( ) Value shows MDHR weight, but it does not include auto switch weight.

When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X□

MRHQ

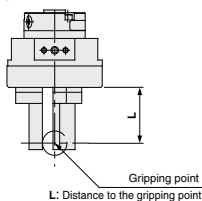
MA

D-□

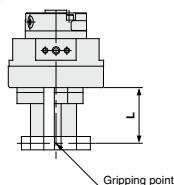
# Series MHR3/MDHR3

## Gripping Point

### External grip



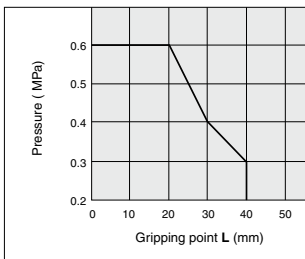
### Internal grip



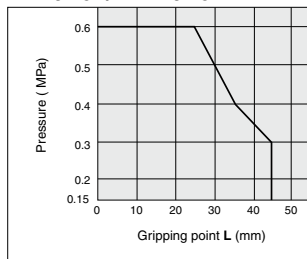
### Limitation of Gripping: External Grip/Internal Grip

- Workpiece gripping point should be within the gripping point range: L shown below, by operating pressure.
- When the gripping point distance becomes large, the finger attachment applies an excessively large load to the finger sliding section, causing excessive play of the fingers and possibly leading to premature failure.

#### MHR3-10R/MDHR3-10□



#### MHR3-15R/MDHR3-15□

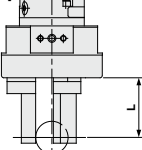


## Effective Gripping Force

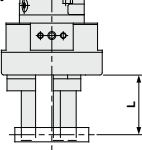
### Guidelines for the selection of the gripper with respect to workpiece mass

- Selection of the correct model depends upon the workpiece mass, the coefficient of friction between the finger attachment and the component, and their respective configurations. A model should be selected with a gripping force of 7 to 14 times that of the workpiece mass.
- If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.

### External grip

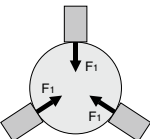


### Internal grip



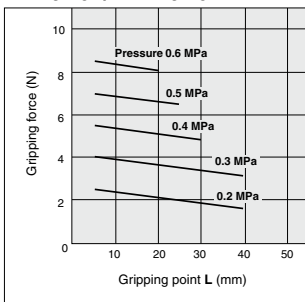
### •Indication of effective gripping force

The effective gripping force shown in the graphs to the right is expressed as  $F_1$ , which is the thrust of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure to the right.



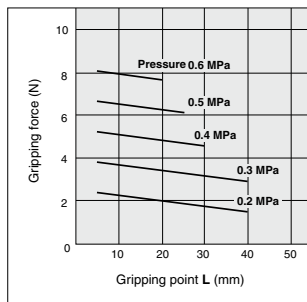
### External Grip

#### MHR3-10R/MDHR3-10□

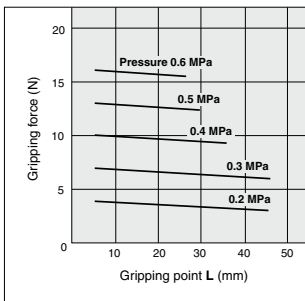


### Internal Grip

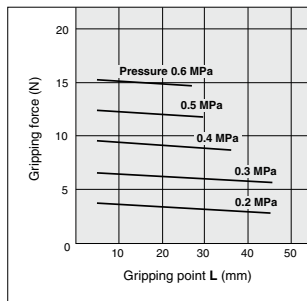
#### MHR3-10R/MDHR3-10□



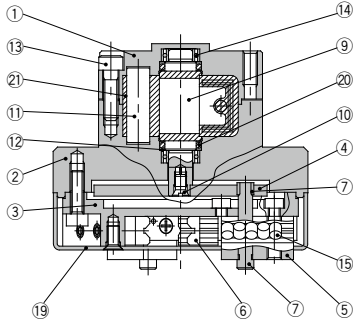
#### MHR3-15R/MDHR3-15□



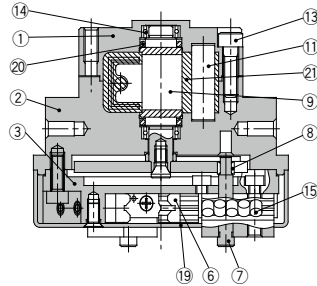
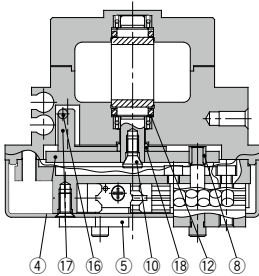
#### MHR3-15R/MDHR3-15□



## Construction



### MDHR3



## Component Parts

No.	Description	Material	Note
1	<b>Body</b>	Aluminum alloy	Hard anodized
2	<b>Adaptor body</b>	Aluminum alloy	Hard anodized
3	<b>Guide holder</b>	Stainless steel	
4	<b>Cam</b>	Cold rolled steel	Nitriding
5	<b>Finger assembly</b>	Stainless steel	Heat treated
6	<b>Guide</b>	Stainless steel	Heat treated
7	<b>Pin</b>	Carbon steel	Heat treated Electroless nickel plated
8	<b>Pin roller</b>	Stainless steel	Nitriding
9	<b>Vane shaft</b>	Stainless steel, NBR	
10	<b>Joint bolt</b>	Chrome molybdenum steel	Zinc chromated
11	<b>Stopper</b>	Resin	

No.	Description	Material	Note
12	<b>Back-up ring</b>	Stainless steel plate	
13	<b>Hexagon socket head bolt</b>	Stainless steel	
14	<b>Bearing</b>	High carbon chrome bearing steel	
15	<b>Cylindrical roller</b>	Stainless steel	
16	<b>Magnet</b>	—	
17	<b>Magnet holder</b>	Aluminum alloy	Hard anodized
18	<b>Roller</b>	Stainless steel	
19	<b>Cover</b>	Aluminum alloy	Hard anodized
20	<b>O-ring</b>	NBR	
21	<b>Stopper seal</b>	Chrome molybdenum steel	

## Replacement Parts

Description	M□HR3-10□	M□HR3-15□	Main parts
<b>Cover</b>	P3313128	P3313228	(19)

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X□

MRHQ

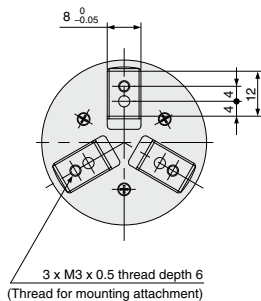
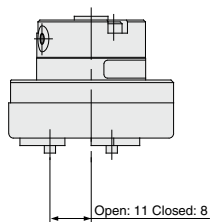
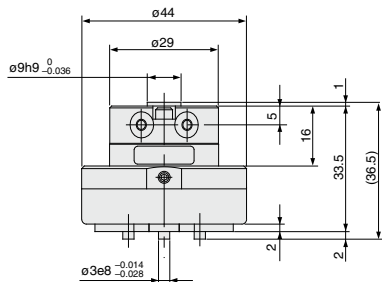
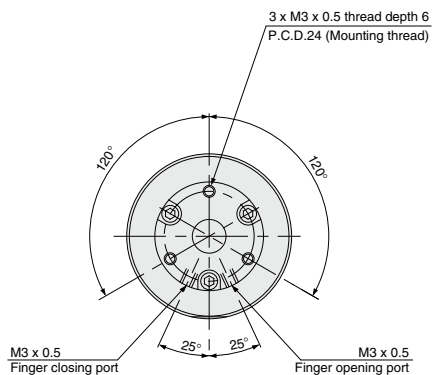
MA

D-□

# Series MHR3/MDHR3

## Nominal Size 10

Without auto switch: MHR3-10R

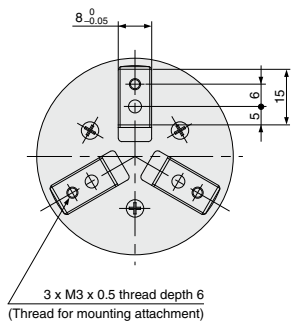
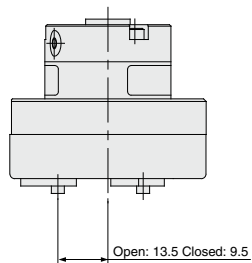
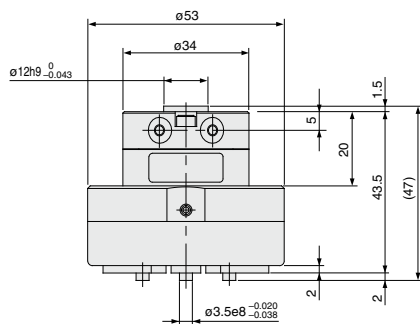
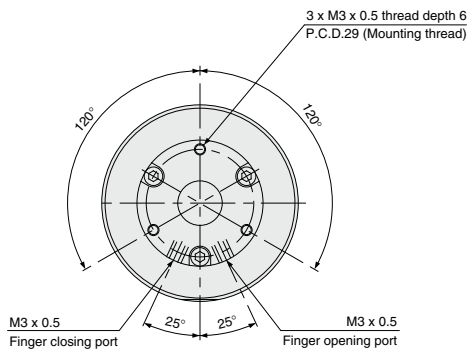




# Series MHR3/MDHR3

## Nominal Size 15

Without auto switch: MHR3-15R



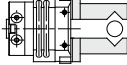
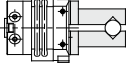
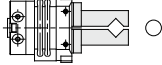
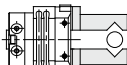
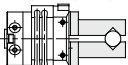
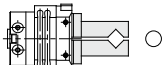
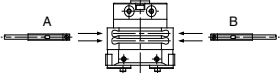
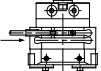
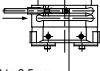
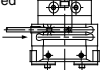
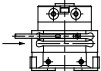
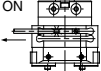
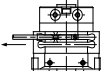


# Series MDHR2/MDHR3

## Auto Switch Installation Examples and Mounting Positions

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

### 1) Detection when Gripping Exterior of Workpiece/Auto Switch Mounted from Direction A

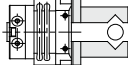
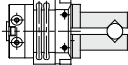
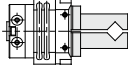
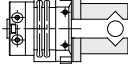
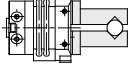
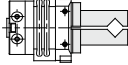
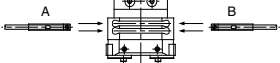
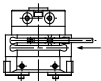
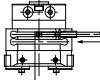
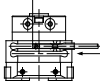
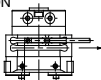
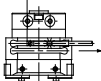
Detection example		1. Confirmation of fingers in reset position	2. Confirmation of workpiece held	3. Confirmation of workpiece released
Position to be detected		Position of fingers fully opened 	Position when gripping a workpiece 	Position of fingers fully closed 
Operation of auto switch		Auto switch turned ON when fingers return. (Light ON)	Auto switch turned ON when gripping a workpiece. (Light ON)	When a workpiece is 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.	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.		<b>In the case of mounting auto switch from A direction</b> Step 2) Insert the auto switch into the auto switch installation groove from direction A. 		
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 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates. 		
Position where light turns ON  0.3 to 0.5mm Position to be secured 		Step 4) Slide the auto switch 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 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 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.



## 2) Detection when Gripping Exterior of Workpiece/Auto Switch Mounted from Direction B

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 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.	A ●	● ●	—
	Pattern 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.		<p style="text-align: center;"><b>In the case of mounting auto switch from B direction</b></p> <p style="text-align: center;">Step 2) Insert the auto switch into the auto switch installation groove from direction B.</p> <div style="text-align: center;">  </div>		
Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.		<p style="text-align: center;">Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it.</p> <div style="text-align: center;">  </div>		
Step 4) Slide the auto switch in the direction of the arrow until the indicator light goes out		<p style="text-align: center;">Position where light turns ON</p> <div style="text-align: center;">  </div> <p style="text-align: center;">0.3 to 0.5 mm</p> <p style="text-align: center;">Position to be secured</p> <div style="text-align: center;">  </div>		
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.		<p style="text-align: center;">Position where light turns ON</p> <div style="text-align: center;">  </div> <p style="text-align: center;">0.3 to 0.5 mm</p> <p style="text-align: center;">Position to be secured</p> <div style="text-align: center;">  </div>		

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.

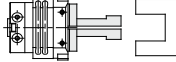
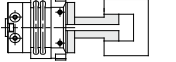

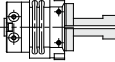
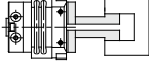
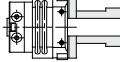
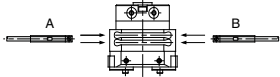



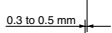

- MHZ
- MHF
- MHL
- MHR
- MHK
- MHS
- MHC
- MHT-Z
- MHY
- MHW
- X□
- MRHQ
- MA
- D-□

# Series MDHR2/MDHR3

## Auto Switch Installation Examples and Mounting Positions

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

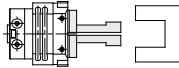
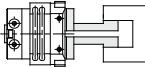
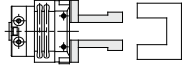
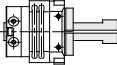
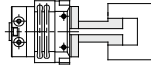
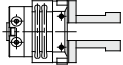
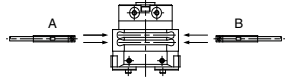
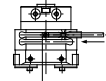
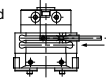




### 3) Detection when Gripping Interior of Workpiece/Auto Switch Mounted from Direction A

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 closed 	Position when gripping a workpiece 	Position of fingers fully opened 
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 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.	A	●	—
		B	—	●
C	●	—	●	
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.		<b>In the case of mounting auto switch from A direction</b> Step 2) Insert the auto switch into the auto switch installation groove from direction A. 		
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 indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it.		
Step 4) Slide the auto switch 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 where light turns ON 		
0.3 to 0.5 mm		0.3 to 0.5 mm 		
Position to be secured		Position to be secured 		

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.

## 4) Detection when Gripping Interior of Workpiece/Auto Switch Mounted from Direction B

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 closed 	Position when gripping a workpiece 	Position of fingers fully opened 
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 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.	A ●	●	—
	Pattern	B —	●	●
	C ●	—	—	●
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.	<b>In the case of mounting auto switch from B direction</b>			
	Step 2) Insert the auto switch into the auto switch installation groove from direction B. 			
	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   Position to be secured  0.3 to 0.5 mm	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.   Step 4) Slide the auto switch 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 in the direction of the arrow beyond the position where the indicator light illuminates.  Position where light turns ON   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.

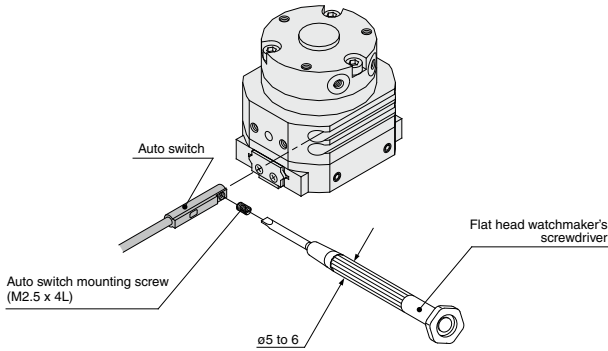
Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.

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

# Series MHR2/MDHR2

## Auto Switch Mounting

To set the auto switch, insert the auto switch into the installation groove of the gripper from the direction indicated in the following drawing. After setting the position, tighten the attached auto switch mounting set screw with a flat head watchmaker's screwdriver.



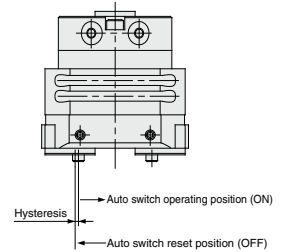
Note) Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.15 N·m.

## Auto Switch Hysteresis

Please refer to the table as a guide when setting auto switch positions.

Model	Hysteresis (Max. value) (mm)
MDHR2-10	0.3
MDHR2-15	0.2
MDHR2-20	0.6
MDHR2-30	0.3

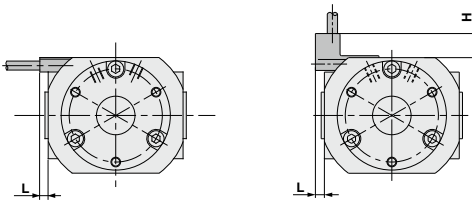
### MDHR2



## Protrusion of Auto Switch from Edge of Body

The maximum protrusion of an auto switch (when fingers are fully open) from the edge of the body is shown in the table below. Use the table as a guideline for mounting.

### MDHR2-10, 15



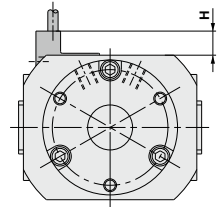
Auto switches of D-M9N, D-M9P, D-M9B, and D-M9□A are used.

Auto switches of D-M9NV, D-M9PV, D-M9BV, and D-M9□AV are used.

### Max. Protrusion of Auto Switch from Edge of Body: L, H (mm)

Auto switch model		Auto switch model			
		D-M9□ D-M9□W	D-M9□A	D-M9□V M9□WV	D-M9□AV
Air gripper model					
MDHR2-10	L	2.6	4.6	0.6	2.6
	H	—	—	7	6.8
MDHR2-15	L	—	—	—	—
	H	—	—	7	6.8

### MDHR2-20, 30



Auto switches of D-M9NV, D-M9PV, D-M9BV, and D-M9□AV are used.

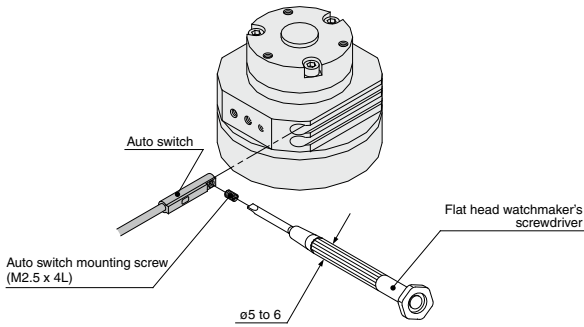
### Max. Protrusion of Auto Switch from Edge of Body: H (mm)

Auto switch model		Auto switch model	
		D-M9□V M9□WV	D-M9□AV
Air gripper model			
MDHR2-20		7	6.8
MDHR2-30		7	6.8

The auto switch will not protrude in the case of D-M9□.

## Auto Switch Mounting

To set the auto switch, insert the auto switch into the installation groove of the gripper from the direction indicated in the following drawing. After setting the position, tighten the attached auto switch mounting set screw with a flat head watchmaker's screwdriver.



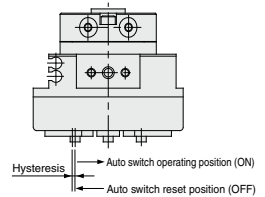
Note) Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.15 N·m.

## Auto Switch Hysteresis

Please refer to the table as a guide when setting auto switch positions.

Model	Hysteresis (Max.value) (mm)
MDHR3-10	0.2
MDHR3-15	0.5

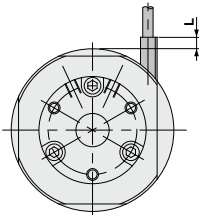
### MDHR3



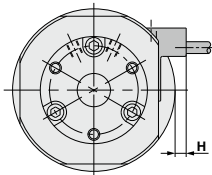
## Protrusion of Auto Switch from Edge of Body

The maximum protrusion of an auto switch (when fingers are fully open) from the edge of the body is shown in the table below. Use the table as a guideline for mounting.

### MDHR3-10



When auto switches of D-M9□ and D-M9□A are used.



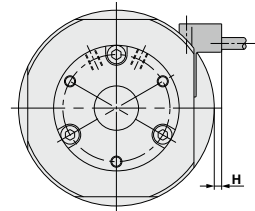
When auto switches of D-M9□V and D-M9□AV are used.

#### Max. Protrusion of Auto Switch from Edge of Body: L, H

(mm)

Auto switch model	D-M9□ D-M9□W	D-M9□A	D-M9□V M9□VW	D-M9□AV
L	—	—	—	—
H	—	—	2.5	2.3

### MDHR3-15



When auto switches of D-M9□V and D-M9□AV are used.

#### Max. Protrusion of Auto Switch from Edge of Body: H

(mm)

Auto switch model	D-M9□V M9□VW	D-M9□AV
H	1.5	1.3

The auto switch will not protrude in the case of D-M9□.

MHZ

MHF

MHL

**MHR**

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X□

MRHQ

MA

D-□

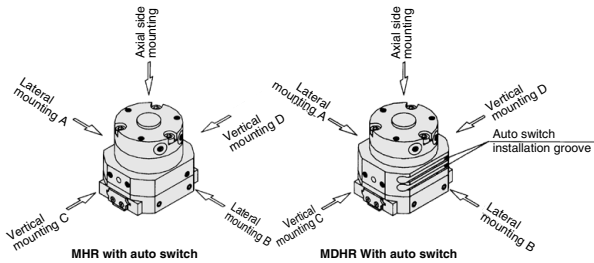


# Series MHR2, MDHR2/MHR3, MDHR3 Specific Product Precautions

Be sure to read before handling.

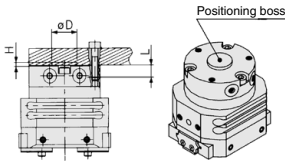
## Mounting Air Grippers/MHR2/MHR3

Mounting direction of each model is different. Refer to the table at right.



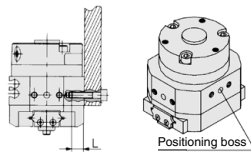
Model	Axial side mounting	Lateral mounting			Vertical mounting	
		A	B	C	D	
MHR2-□	●	—	—	—	—	●
MHR3-□	●	—	—	—	—	—
MDHR2-□	●	●	—	—	—	●
MDHR3-□	●	●	●	—	—	●

### Axial side mounting



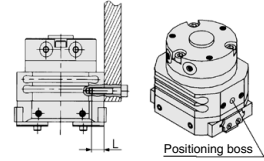
Model	Applicable bolt	Max. tightening torque N·m	Max. screw-in depth Lmm	Positioning boss		
				Dmm	Hmm	
MHR	2	M3 x 0.5	0.88	6	9H9 <sub>0</sub> <sup>+0.036</sup>	1
	12H9 <sub>0</sub> <sup>+0.043</sup>				1.5	
	3	M4 x 0.7	2.1	8	14H9 <sub>0</sub> <sup>+0.043</sup>	2
MDHR	2	M3 x 0.5	0.88	6	9H9 <sub>0</sub> <sup>+0.036</sup>	1
	12H9 <sub>0</sub> <sup>+0.043</sup>				1.5	
	3	M4 x 0.7	2.1	8	14H9 <sub>0</sub> <sup>+0.043</sup>	2

### Lateral mounting



Model	Applicable bolt	Max. tightening torque N·m	Max. screw-in depth Lmm	Positioning boss		
				Bore Depth dmm	Bore Depth hmm	
MHR	2	M3 x 0.5	0.88	6	3 <sup>+0.002</sup> <sub>0</sub>	6
	15				6	
	3	M4 x 0.7	2.1	8	4 <sup>+0.002</sup> <sub>0</sub>	8
MDHR	2	M3 x 0.5	0.88	6	3 <sup>+0.002</sup> <sub>0</sub>	6
	15				6	
	3	M4 x 0.7	2.1	8	4 <sup>+0.002</sup> <sub>0</sub>	8

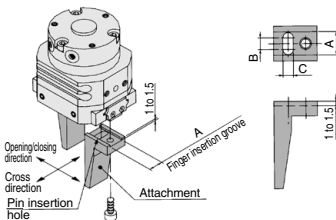
### Vertical mounting



Model	Applicable bolt	Max. tightening torque N·m	Max. screw-in depth Lmm	Positioning boss		
				Bore Depth dmm	Bore Depth hmm	
MHR	2	M3 x 0.5	0.88	6	3 <sup>+0.002</sup> <sub>0</sub>	6
	15				6	
	3	M4 x 0.7	2.1	8	4 <sup>+0.002</sup> <sub>0</sub>	8
MDHR	2	M3 x 0.5	0.88	6	3 <sup>+0.002</sup> <sub>0</sub>	6
	15				6	
	3	M4 x 0.7	2.1	8	4 <sup>+0.002</sup> <sub>0</sub>	8

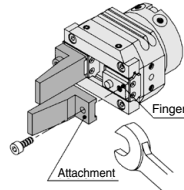
### How to Locate Finger and Attachment

- Positioning in the finger's open/close direction**  
Position the finger and the attachment by inserting the finger's pin into the attachment's pin insertion hole. Provide the following pin insertion hole dimensions: shaft-basis fitting dimension C for the open/close direction; slotted hole with relief B for the cross direction.
- Positioning in the finger's cross direction**  
Position the finger and the attachment by placing the finger's width into the attachment's finger insertion groove A.



### How to Mount the Attachment to the Finger

- To mount the attachment to the finger, make sure to use a wrench to support the attachment so as not to apply undue strain on the finger.
- Refer to the table below for the proper tightening torque on the bolt used for securing the attachment to the finger.



Model	Applicable bolt	Max. tightening torque N·m		
			2	-10
MHR	-15			
	-20	M4 x 0.7	1.4	
MDHR	-30	M5 x 0.8	2.8	
	3	-10	M3 x 0.5	0.59
	-15			

### Finger opening/closing speed: MHR2/MHR3

When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.