

Rotary Actuated Air Gripper

MHR2, MDHR2/MHR3, MDHR3

2-finger type

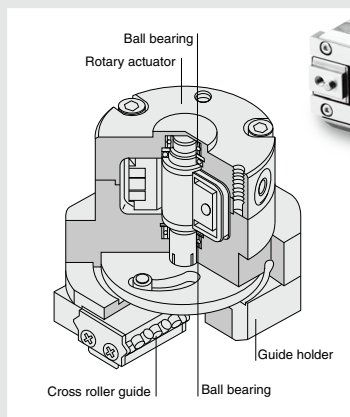
3-finger type

High Precision - Repeatability ± 0.01 mm

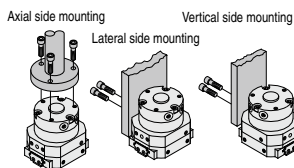
Parallel opening and closing mechanism utilizing a cross roller guide produces smooth operation without play, with high precision and long life.

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

MHR

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.

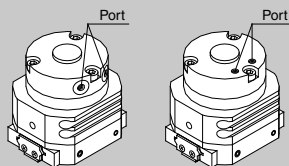


Applicable for Clean Series.

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)

Made to Order
Refer to page 536 for details.

Number of fingers
2 2 fingers

Number of auto switches

Nil	2 pcs.
S	1 pc.

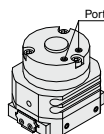
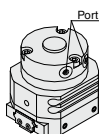
Nominal size

10
15
20
30

Connecting port

R: Body side

E: Axial side



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)*				Pre-wired connector	Applicable load			
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)		12V	M9PV	M9P	●	●	●	○	○				
				2-wire		5V, 12V	M9BV	M9B	●	●	●	○	○				
				3-wire (NPN)		12V	M9NVV	M9NW	●	●	●	○	○				
	Diagnosis (2-color indication)			3-wire (PNP)	24V	5V, 12V	M9PWV	M9PW	●	●	●	○	○	IC circuit			
				2-wire		12V	M9BWW	M9BW	●	●	●	○	○				
	Water resistant (2-color indicator)			3-wire (NPN)	24V	5V, 12V	M9NAV**	M9NA**	○	○	●	○	○	IC circuit			
				3-wire (PNP)		12V	M9PAV**	M9PA**	○	○	●	○	○				
				—		2-wire	24V	5V, 12V	M9RAV**	M9RA**	○	○	●			○	—
						3-wire (PNP)		12V	M9NAV**	M9NA**	○	○	●			○	

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

¹⁾ 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.

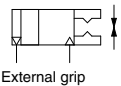
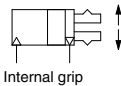
Note) When using the 2-color indicator type, please make the setting so that the indicator is lit in red to ensure the detection at the proper position of the air gripper.

Series **MHR2/MDHR2**

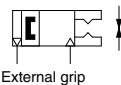
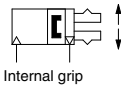


Symbol

Without auto switch/
Double acting



With auto switch/
Double acting



Made to Order: Individual Specifications
(For details, refer to page 561-1.)

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



Made to Order
(Refer to pages 727 to 759 for details.)

Symbol	Specifications/Description
-X63	Fluorine grease

Model/Specifications

Nominal size		10	15	20	30
Action		Double acting			
Gripping force (N) ⁽¹⁾ (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) ⁽²⁾		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			

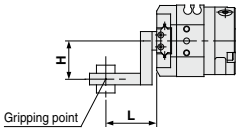
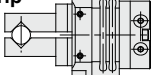
Note 1) Refer to page 538 "Effective Gripping Force" for details of Gripping force at each gripping point.
Value of effective gripping force is measured at the middle of opening/closing stroke.
Note 2) () Value shows MDHR weight, but it does not include auto switch weight.

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.

Gripping Point

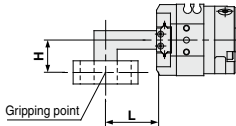
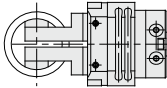
- Workpiece gripping point should be within the gripping point range: The range shown for each operating pressure given in the graphs to the right.
- When the gripping point distance becomes large, the finger attachment applies an excessively large load to the finger sliding section, causing excessive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

External grip



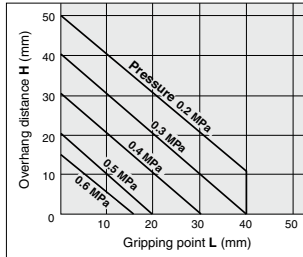
L: Distance to the gripping point
H: Overhang distance

Internal grip

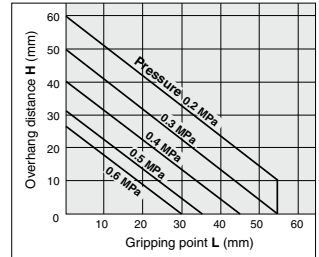


Limitation of Gripping: External Grip/Internal Grip

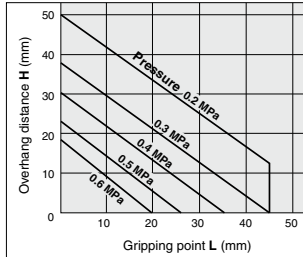
MHR2-10/MDHR2-10



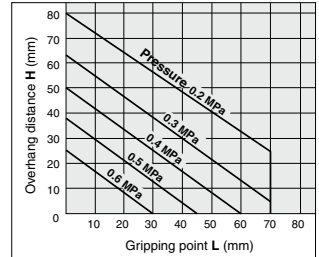
MHR2-20/MDHR2-20



MHR2-15/MDHR2-15



MHR2-30/MDHR2-30



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X ☐

MRHQ

MA

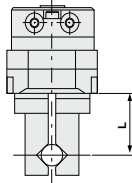
D- ☐

Effective Gripping Force

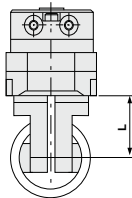
Guidelines for the selection of the gripper with respect to workpiece mass

- 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



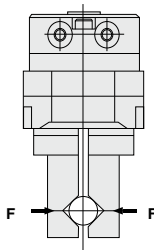
Internal grip



L: Gripping point length (mm)

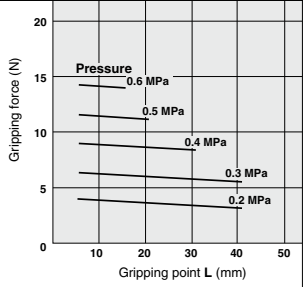
• Indication of effective gripping force

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.

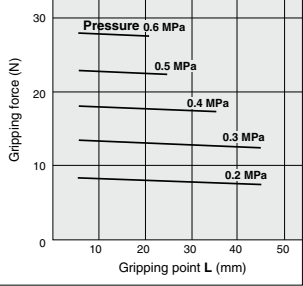


External Grip

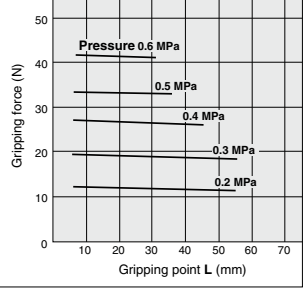
MHR2-10/MDHR2-10



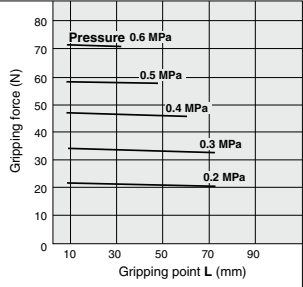
MHR2-15/MDHR2-15



MHR2-20/MDHR2-20

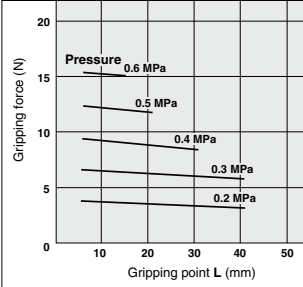


MHR2-30/MDHR2-30

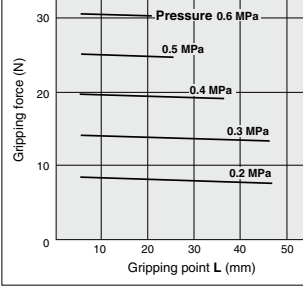


Internal Grip

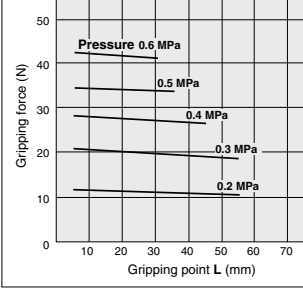
MHR2-10/MDHR2-10



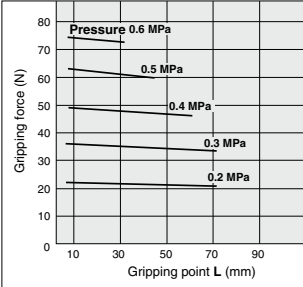
MHR2-15/MDHR2-15



MHR2-20/MDHR2-20

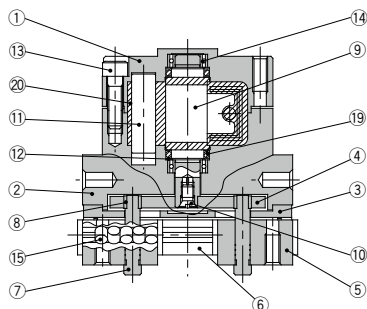


MHR2-30/MDHR2-30

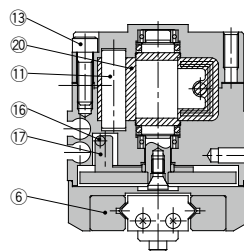
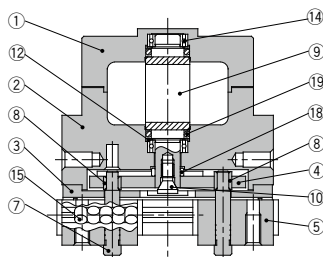


Construction

MHR2



MDHR2



Component Parts

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

Component Parts

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

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT
-Z

MHY

MHW

-X□

MRHQ

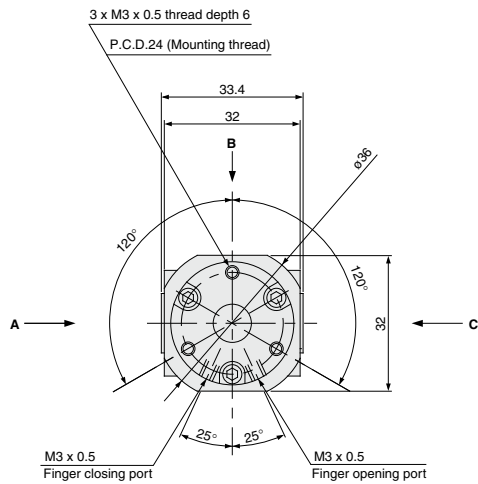
MA

D-□

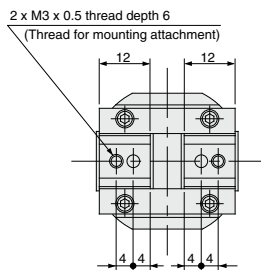
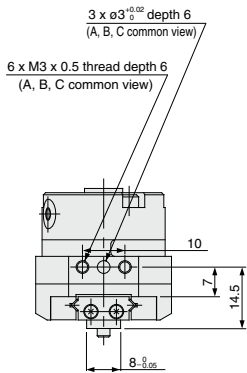
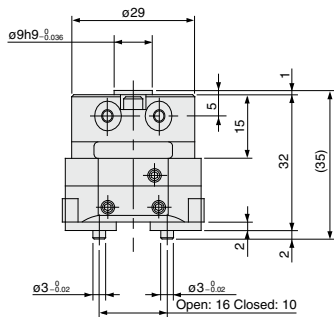
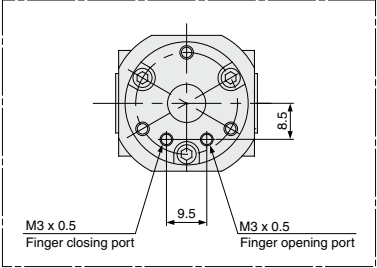
Series **MHR2/MDHR2**

Nominal Size 10

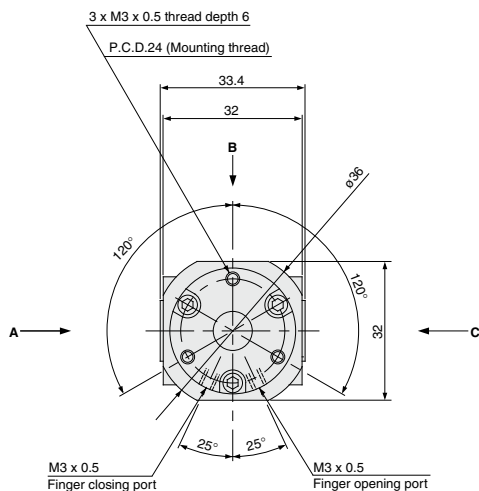
Without auto switch: **MHR2-10R**



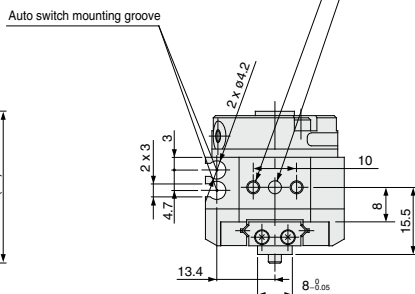
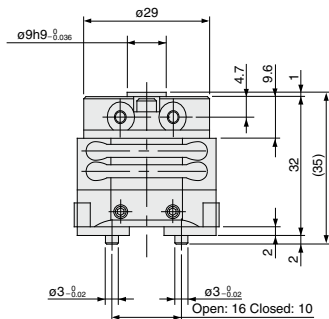
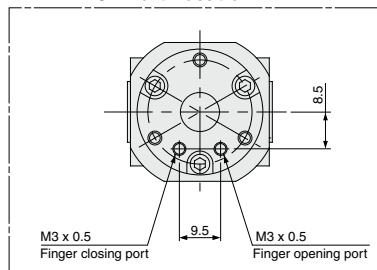
MHR2-10E Port Location



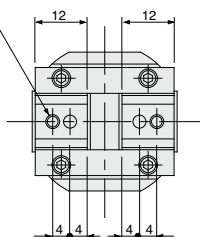
With auto switch (Built-in magnet): MDHR2-10R



MDHR2-10E Port Location

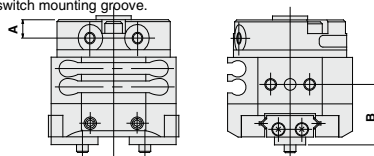


2 x M3 x 0.5 thread depth 6
(Thread for mounting attachment)



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
	-10E	14.5
MDHR2	-10R	4.7
	-10E	15.5

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

-Z

MHY

MHW

-X

MRHQ

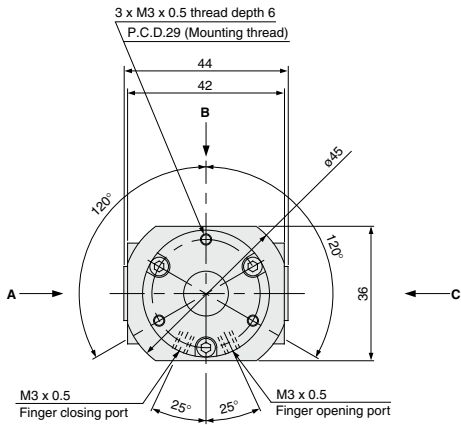
MA

D-

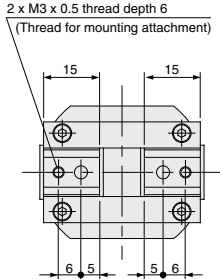
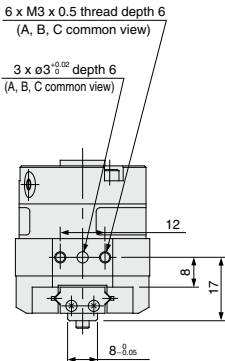
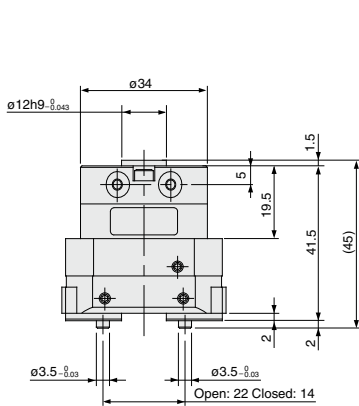
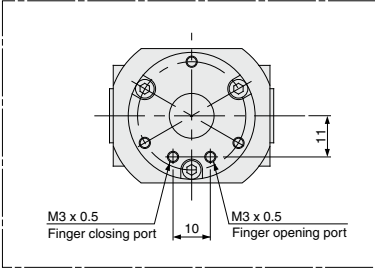
Series **MHR2/MDHR2**

Nominal Size 15

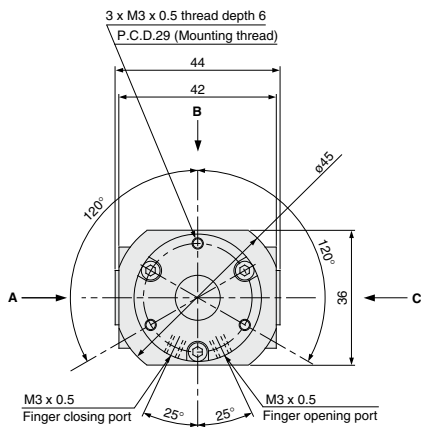
Without auto switch: **MHR2-15R**



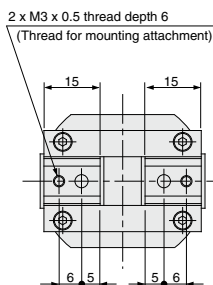
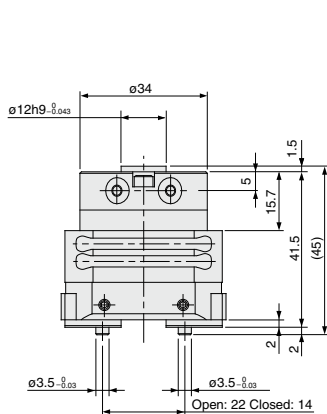
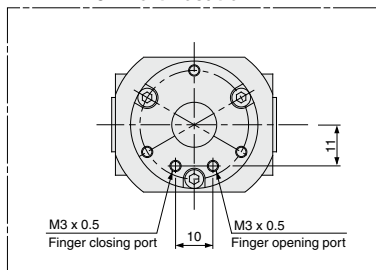
MHR2-15E Port Location



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

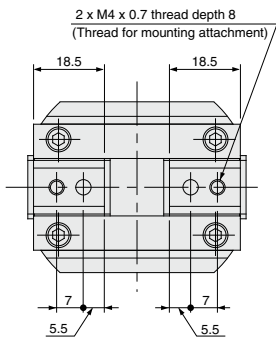
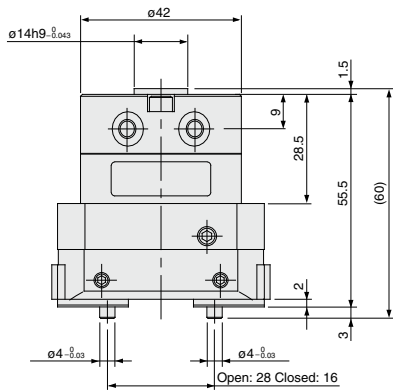
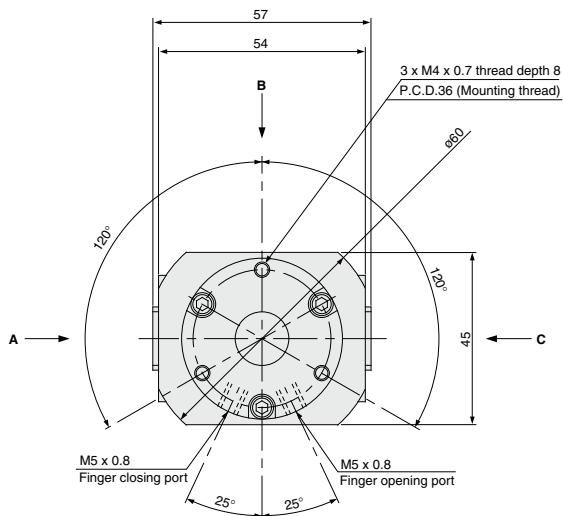
MA

D- ☐

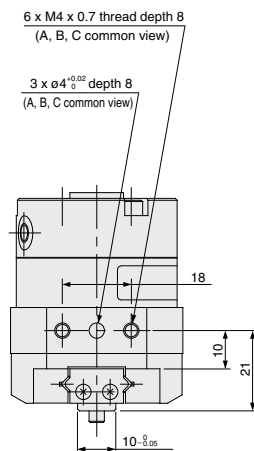
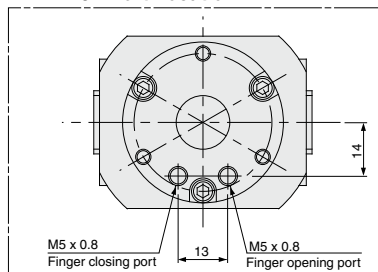
Series *MHR2/MDHR2*

Nominal Size 20

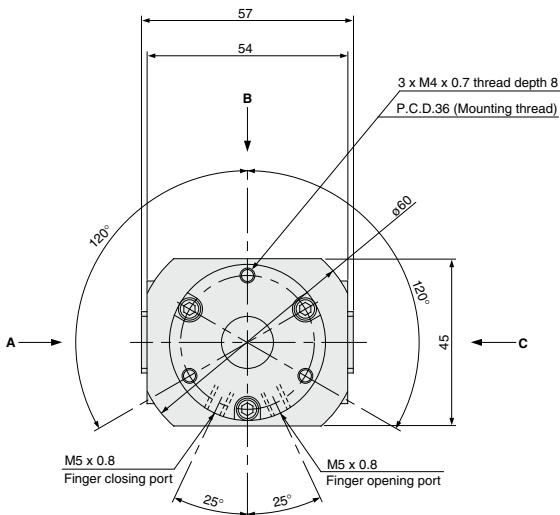
Without auto switch: MHR2-20R



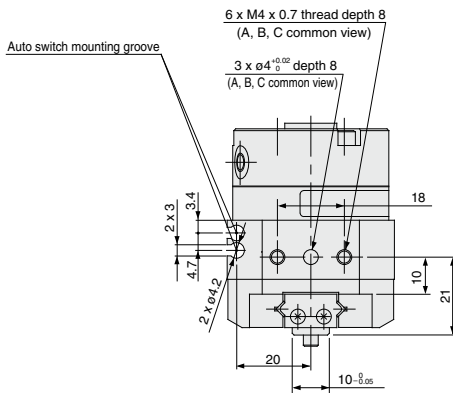
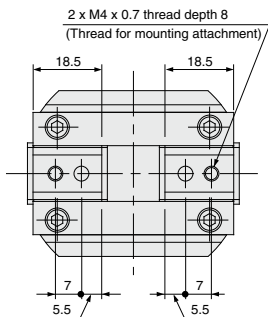
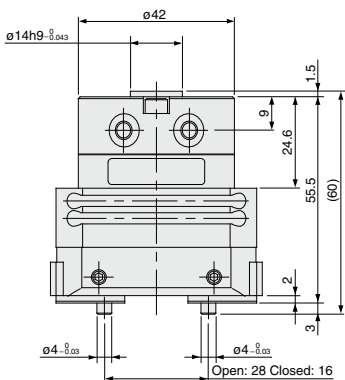
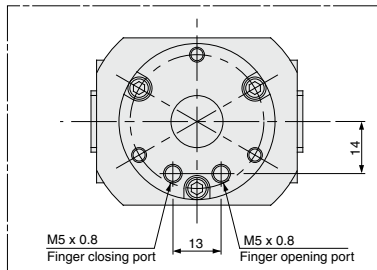
MHR2-20E Port Location



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



MDHR2-20E Port Location

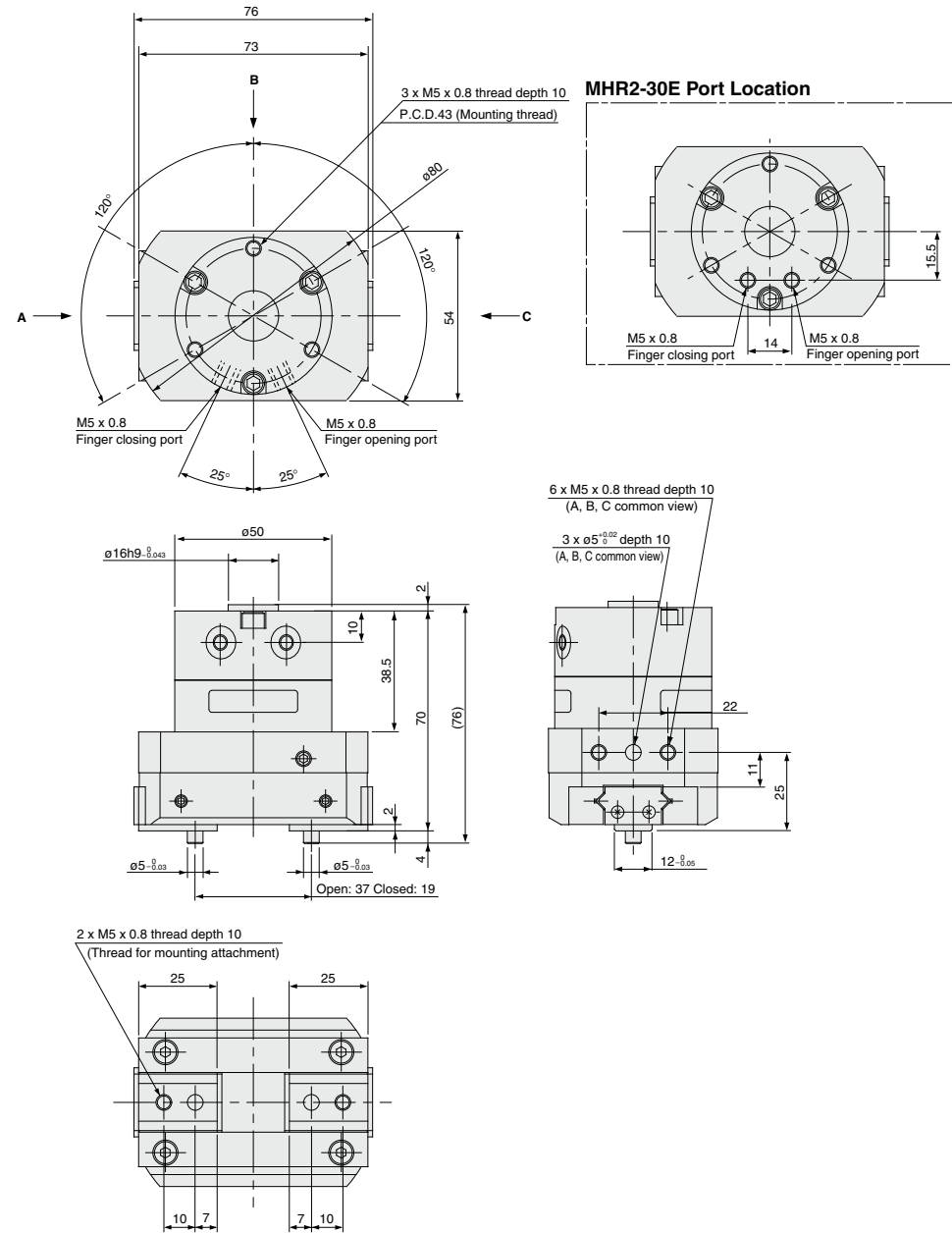


- ☐ MHZ
- ☐ MHF
- ☐ MHL
- ☒ MHR
- ☐ MHK
- ☐ MHS
- ☐ MHC
- ☐ MHT-Z
- ☐ MHY
- ☐ MHW
- ☐ -X ☐
- ☐ MRHQ
- ☐ MA
- ☐ D- ☐

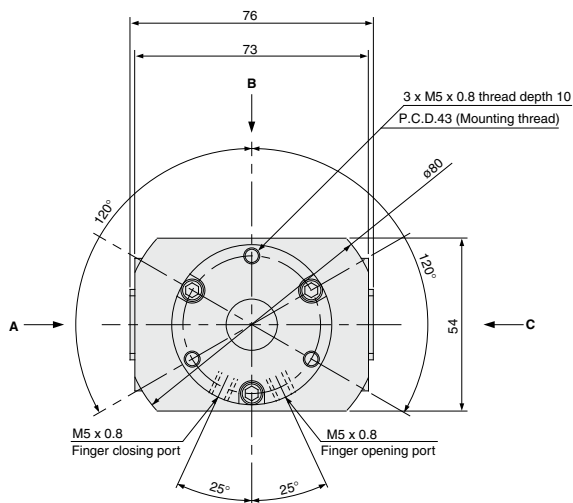
Series **MHR2/MDHR2**

Nominal Size 30

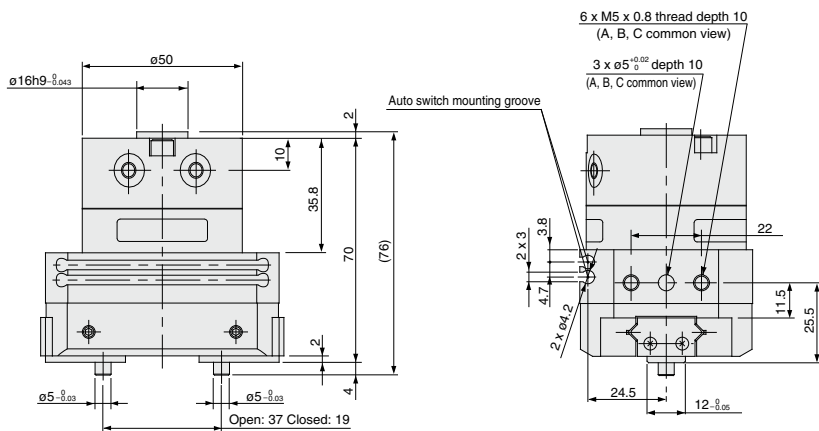
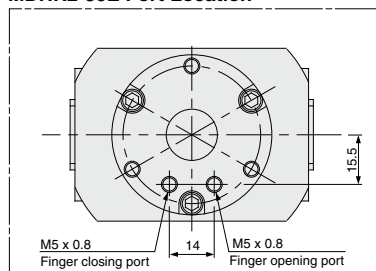
Without auto switch: MHR2-30R



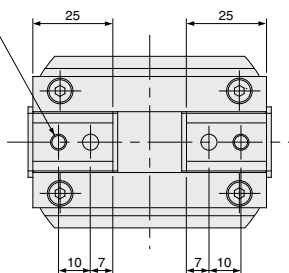
With auto switch (Built-in magnet): MDHR2-30R



MDHR2-30E Port Location

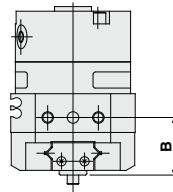


2 x M5 x 0.8 thread depth 10
(Thread for mounting attachment)



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)

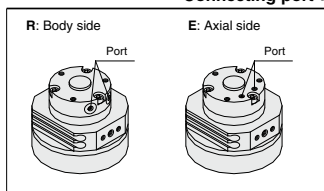
Number of fingers

3 3 fingers

Nominal size

10
15

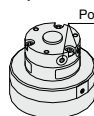
Connecting port



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) [*]				Pre-wired connector	Applicable load			
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5V, 12V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)	12V		M9PV	M9P	●	●	●	○	○				
				2-wire	5V, 12V		M9BV	M9B	●	●	●	○	○	—			
				3-wire (NPN)	5V, 12V		M9NVW	M9NW	●	●	●	○	○				
	Diagnosis (2-color indication)			3-wire (PNP)	12V		M9PWV	M9PW	●	●	●	○	○	IC circuit			
				2-wire	5V, 12V		M9BWV	M9BW	●	●	●	○	○			—	
				Water resistant (2-color indicator)	3-wire (NPN)		5V, 12V	M9NAV**	M9NA**	○	○	●	○	○			IC circuit
					3-wire (PNP)		12V	M9PAV**	M9PA**	○	○	●	○	○			
						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.

* 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
Action		Double acting	
Holding force (N) (Effective value) ⁽¹⁾ at 0.5 MPa	External grip	7	13
	Internal grip	6.5	12
Opening/Closing stroke (Diameter)	Finger closing width (mm)	16	19
	Finger opening width (mm)	22	27
	Stroke (mm)	6	8
Weight (g) ⁽²⁾		120 (125)	225 (230)
Connection port		M3 x 0.5	
Repeatability		±0.01 mm	
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	

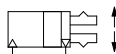
Note 1) Refer to page 550 "Effective Gripping Force" for details of gripping force at each gripping point.
Valve of effective gripping force is measured at the middle of opening/closing stroke.

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

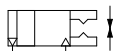
When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.

Symbol

Without auto switch/
Double acting

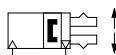


Internal grip

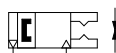


External grip

With auto switch/
Double acting



Internal grip



External grip



Made to Order: Individual Specifications
(For details, refer to page 561-1.)

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



Made to Order
(Refer to pages 727 to 759 for details.)

Symbol	Specifications/Description
-X63	Fluorine grease

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT
-Z

MHY

MHW

-X□

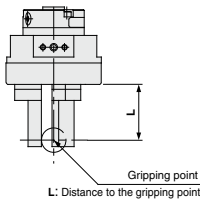
MRHQ

MA

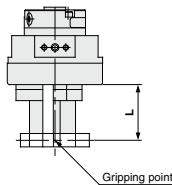
D-□

Gripping Point

External grip



Internal grip

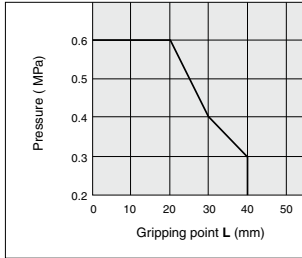


Limitation of Gripping: External Grip/Internal Grip

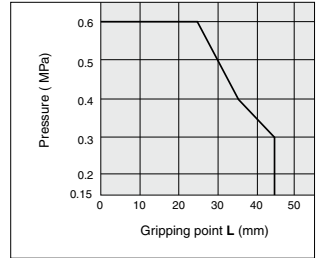
- Workpiece gripping point should be within the gripping point range: L shown below, by operating pressure.

- 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□

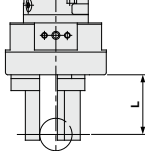


Effective Gripping Force

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

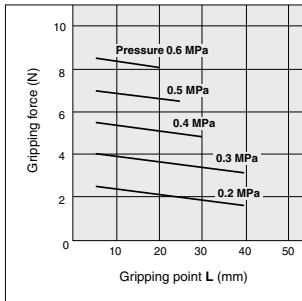
- Selection of the correct model depends upon the workpiece mass, the coefficient of friction between the finger attachment and the component, and their respective configurations. A model should be selected with a gripping force of 7 to 14 times that of the workpiece mass.
- If high acceleration, deceleration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

External grip



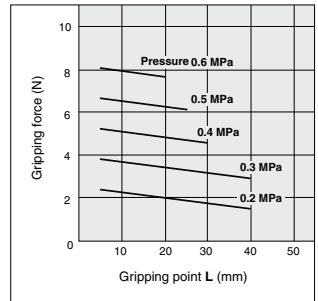
External Grip

MHR3-10R/MDHR3-10□

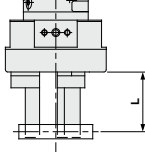


Internal Grip

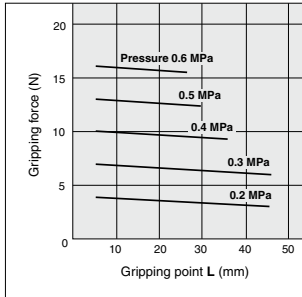
MHR3-10R/MDHR3-10□



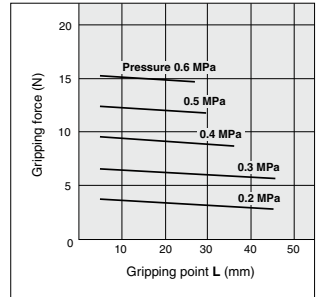
Internal grip



MHR3-15R/MDHR3-15□

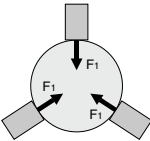


MHR3-15R/MDHR3-15□

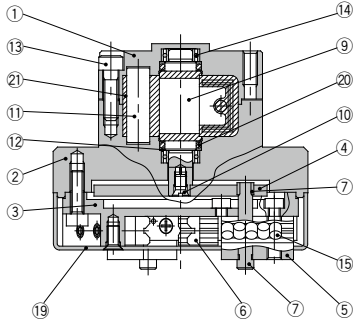


Indication of effective gripping force

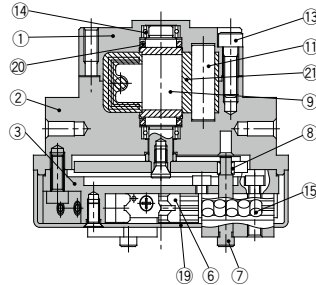
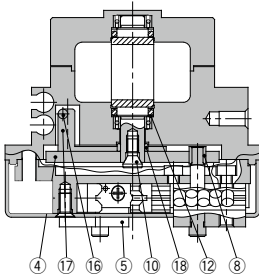
The effective gripping force shown in the graphs to the right is expressed as F_1 , which is the thrust of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure to the right.



Construction



MDHR3



Component Parts

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

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

Replacement Parts

Description	M□HR3-10□	M□HR3-15□	Main parts
Cover	P3313128	P3313228	(19)

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT
-Z

MHY

MHW

-X□

MRHQ

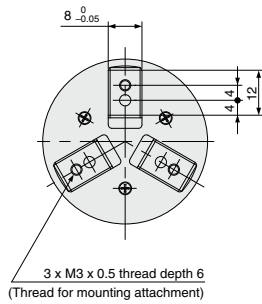
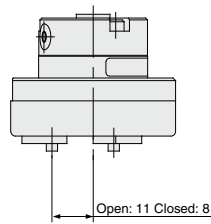
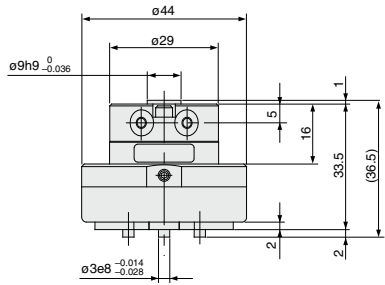
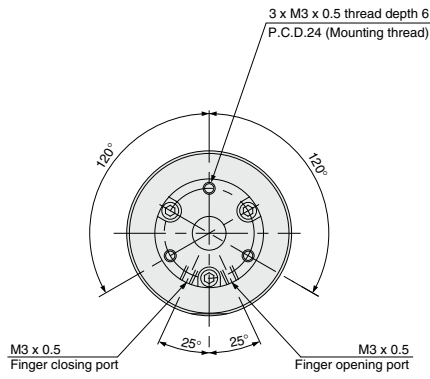
MA

D-□

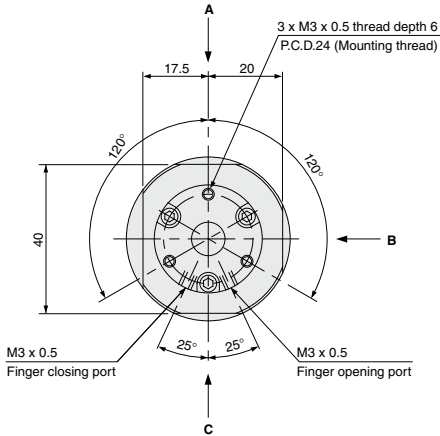
Series **MHR3/MDHR3**

Nominal Size 10

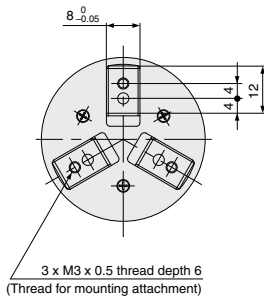
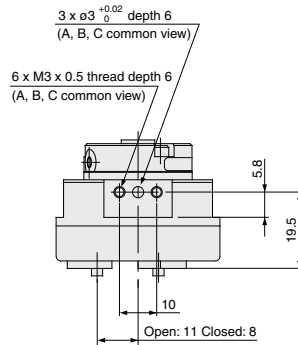
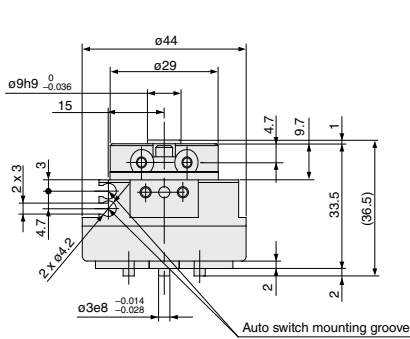
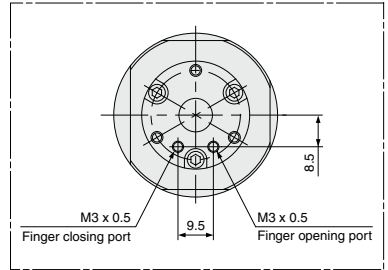
Without auto switch: MHR3-10R



With auto switch (Built-in magnet): MDHR3-10R

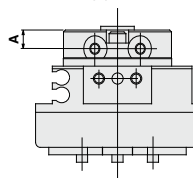


MDHR3-10E Port Location



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.



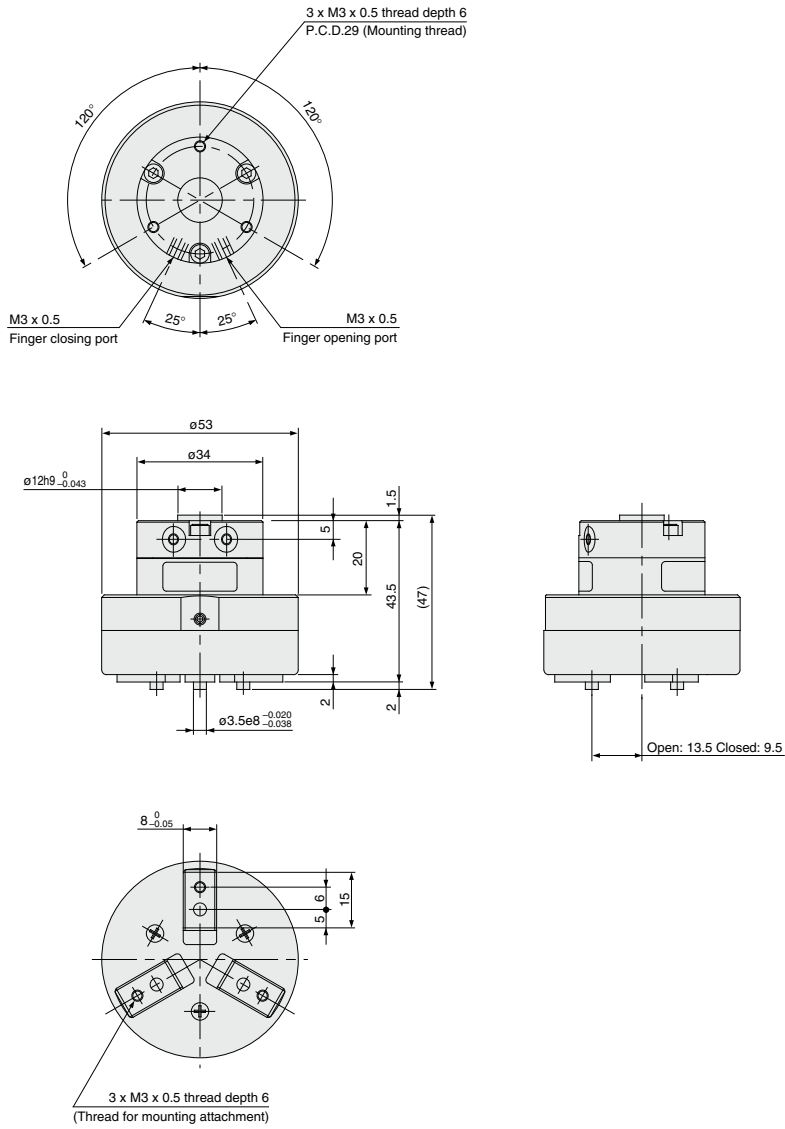
Model	A
MHR3-10R	5
MDHR3-10R	4.7

MHZ
MHF
MHL
MHR
MHK
MHS
MHC
MHT -Z
MHY
MHW
-X <input type="checkbox"/>
MRHQ
MA
D- <input type="checkbox"/>

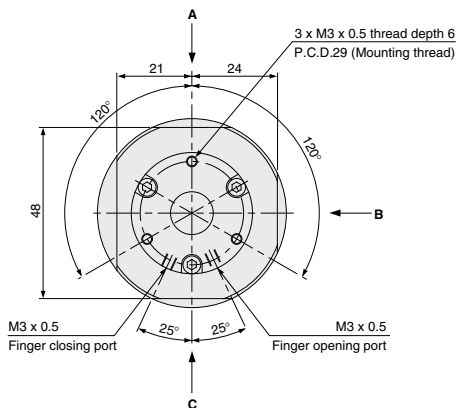
Series **MHR3/MDHR3**

Nominal Size 15

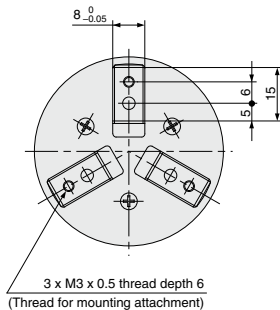
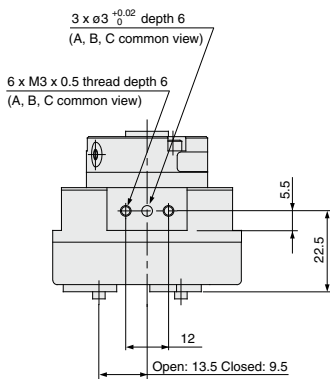
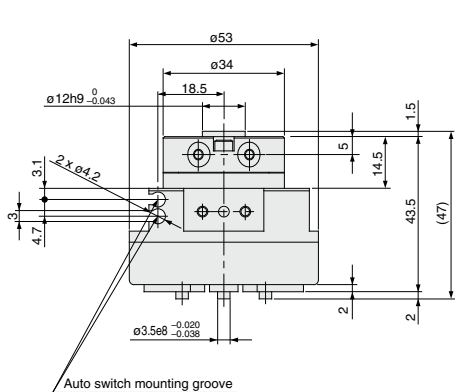
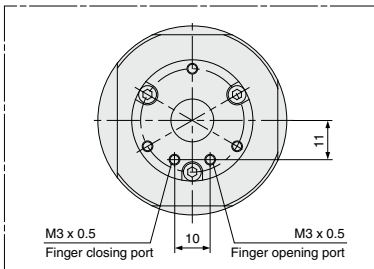
Without auto switch: MHR3-15R



With auto switch (Built-in magnet): MDHR3-15R



MDHR3-15E Port Location



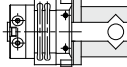
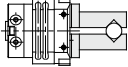
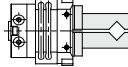
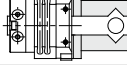
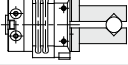
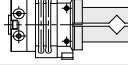
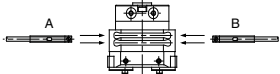
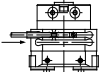
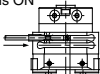
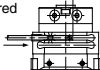
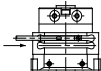
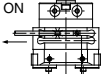
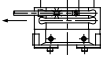
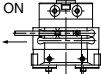
- ☐ MHZ
- ☐ MHF
- ☐ MHL
- ☒ MHR
- ☐ MHK
- ☐ MHS
- ☐ MHC
- ☐ MHT-Z
- ☐ MHY
- ☐ MHW
- ☐ -X ☐
- ☐ MRHQ
- ☐ MA
- ☐ D- ☐

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.

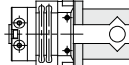
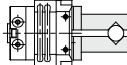
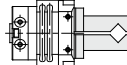
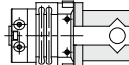
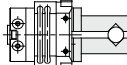
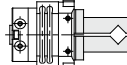
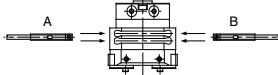

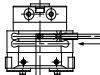

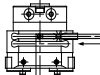

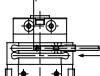



1) Detection when Gripping Exterior of Workpiece/Auto Switch Mounted from Direction A

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.		In the case of mounting auto switch from A direction 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. 		
Position where light turns ON  0.3 to 0.5 mm Position to be secured 		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. 		

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	●	—
		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.		In the case of mounting auto switch from B direction 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 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 		Position where light turns ON 
		Step 5) Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5 mm beyond the position where the indicator light illuminates. 		Position to be secured 
		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.

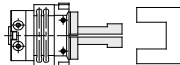
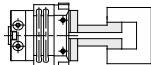
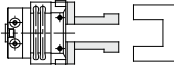
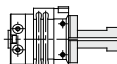
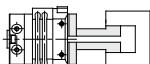
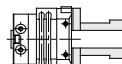
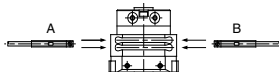






Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.

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.

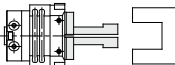
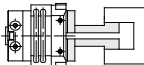
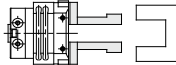
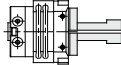
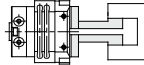
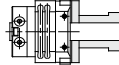
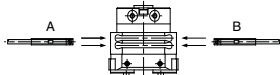
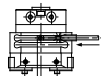
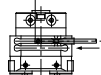


3) Detection when Gripping Interior of Workpiece/Auto Switch Mounted from Direction A

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.		In the case of mounting auto switch from A direction 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			
	Pattern			
	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.		In the case of mounting auto switch from B direction 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. <div>Position where light turns ON </div> <div>Position to be secured </div> <div>0.3 to 0.5 mm</div>	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. 

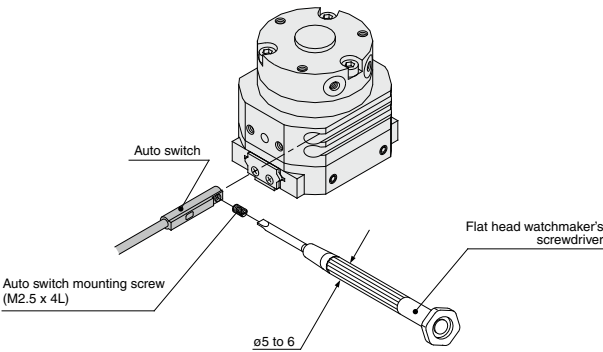
Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.

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.

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.



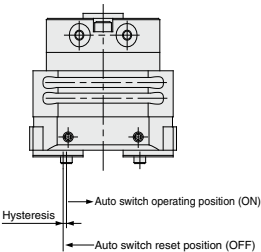
Note) Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.15 N·m.

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

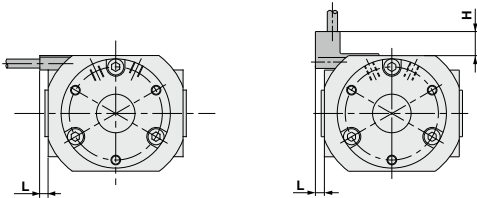
MDHR2



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

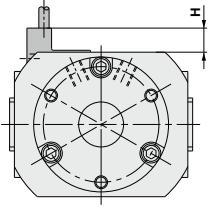


Auto switches of D-M9N, D-M9P, D-M9B, and D-M9□A are used. Auto switches of D-M9NV, D-M9PV, D-M9BV, and D-M9□AV are used.

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

Auto switch model		D-M9□ D-M9□W	D-M9□A	D-M9□V M9□WV	D-M9□AV
Air gripper model	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.

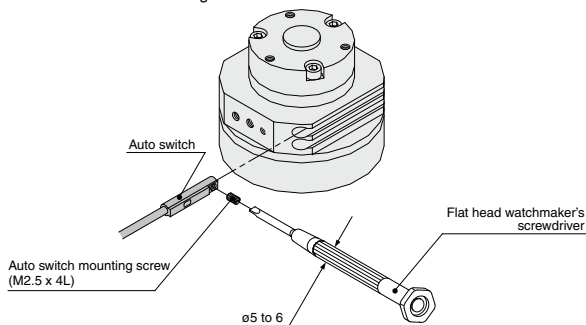
Max. Protrusion of Auto Switch from Edge of Body: H (mm)

Auto switch model		D-M9□V M9□WV	D-M9□AV
Air gripper model	H	7	6.8
	H	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.



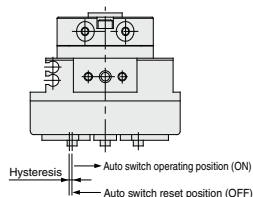
Note) Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.15 N·m.

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

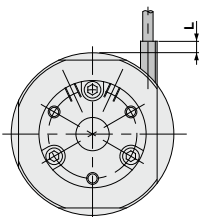
MDHR3



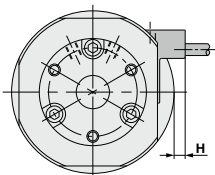
Protrusion of Auto Switch from Edge of Body

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□
D-M9□W are used.

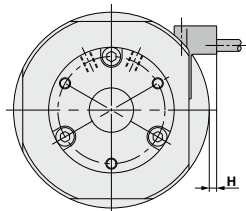


When auto switches of D-M9□V
D-M9□AV are used.

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

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

MDHR3-15



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

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

Auto switch model	D-M9□V M9□WV	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*

Made to Order: Individual Specifications



1 Grease Change for Rotary Actuated Part

Symbol

-X32

As a measure against condensation, grease used for the rotary actuated part has been changed to SMC-GF1.

How to Order

MHR2
MDHR2 — **Standard part number** — **X32**
MHR3
MDHR3

Grease Change for Rotary Actuated Part •

Specifications

Grease	Fluorine grease (SMC-GF1)
Specifications/dimensions other than the above	Same as the standard type

Note) Do not use for lubrication.



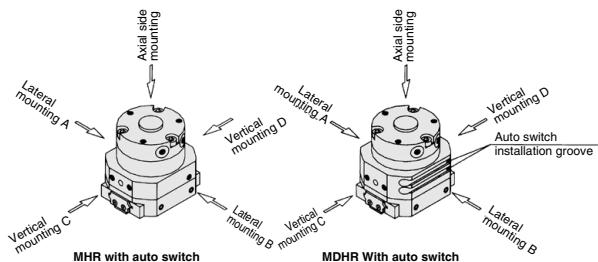
Series MHR2, MDHR2/MHR3, MDHR3 Specific Product Precautions

Be sure to read before handling.

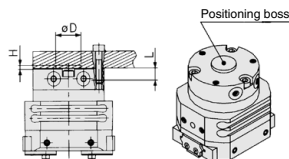
Mounting Air Grippers/MHR2/MHR3

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-□	●	●	●	—	●

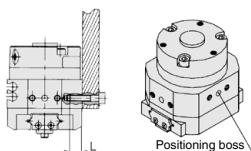


Axial side mounting



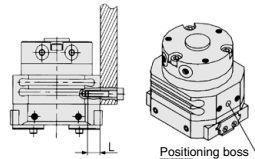
Model		Applicable bolt	Max. tightening torque N·m	Max. screw-in depth Lmm	Positioning boss		
					Dmm	Hmm	
MHR	2	-10	M3 x 0.5	0.88	6	9H9 ^{+0.038} _{-0.033}	1
		-15	M4 x 0.7	2.1	8	12H9 ^{+0.053} _{-0.043}	1.5
		-20	M5 x 0.8	4.3	10	14H9 ^{+0.063} _{-0.053}	2
MDHR	3	-10	M3 x 0.5	0.88	6	9H9 ^{+0.038} _{-0.033}	1
		-15	M4 x 0.7	2.1	8	12H9 ^{+0.053} _{-0.043}	1.5
		-20	M5 x 0.8	4.3	10	14H9 ^{+0.063} _{-0.053}	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	-10 M3 x 0.5	0.88	6	3 ^{+0.02 -0}	6
		-15 M4 x 0.7	2.1	8	4 ^{+0.02 -0}	8
		-20 M5 x 0.8	4.3	10	5 ^{+0.02 -0}	10
MDHR	3	-10 M3 x 0.5	0.88	6	3 ^{+0.02 -0}	6
		-15 M4 x 0.7	2.1	8	4 ^{+0.02 -0}	8
		-20 M5 x 0.8	4.3	10	5 ^{+0.02 -0}	10

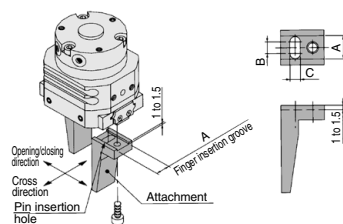
Vertical mounting



Model		Applicable bolt	Max. tightening torque N·m	Max. screw-in depth Lmm	Positioning boss	
					Bore Depth dmm	Bore Depth hmm
MHR	2	-10 M3 x 0.5	0.88	6	3 ^{+0.02} ₀	6
		-15 M4 x 0.7	2.1	8	4 ^{+0.02} ₀	8
		-20 M5 x 0.8	4.3	10	5 ^{+0.02} ₀	10
MDHR	3	-30 M3 x 0.5	0.88	6	3 ^{+0.02} ₀	6
		-15				

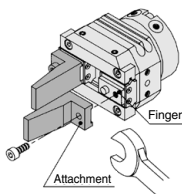
How to Locate Finger and Attachment

- 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
MHR	2	-10	M3 x 0.5
		-15	0.59
		-20	M4 x 0.7
MDHR	3	-30	M4 x 0.7
		-30	M5 x 0.8
		-30	2.8
	3	-10	M5 x 0.8
		-15	M3 x 0.5
			0.59

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.

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT-Z

MHY

MHW

-X□

MRHQ

MA

D-□