

Rotary Actuated

Air Gripper

(2 Finger)

(3 Finger)

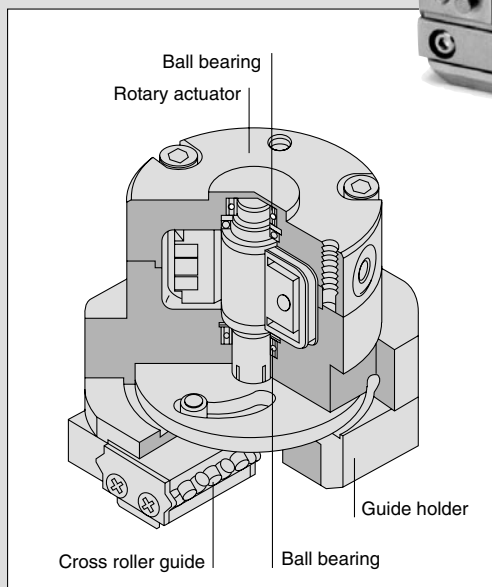
MHR2/MDHR2, MHR3/MDHR3

High Precision - Repeatability ± 0.01 mm

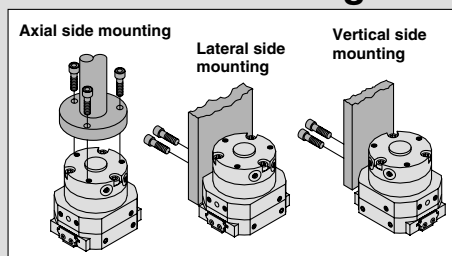
Parallel opening and closing mechanism utilizing a cross roller guide produces smooth operation without play, with high precision and long life.

Applicable for Clean Room Class 10

Cross roller movement has minimal friction and prevents dust generation. Stainless steel used for finger, guide and cross roller section inhibits rust. Vacuum at the relief port will remove interior dust for clean room applications.



■ Universal Mounting



MDHR2

MDHR3



■ Possible to mount solid state switch with indicator light D-F9. Easy to locate switch to optimum set point.

High Rigidity

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

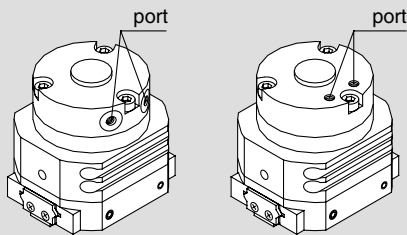


Low Profile

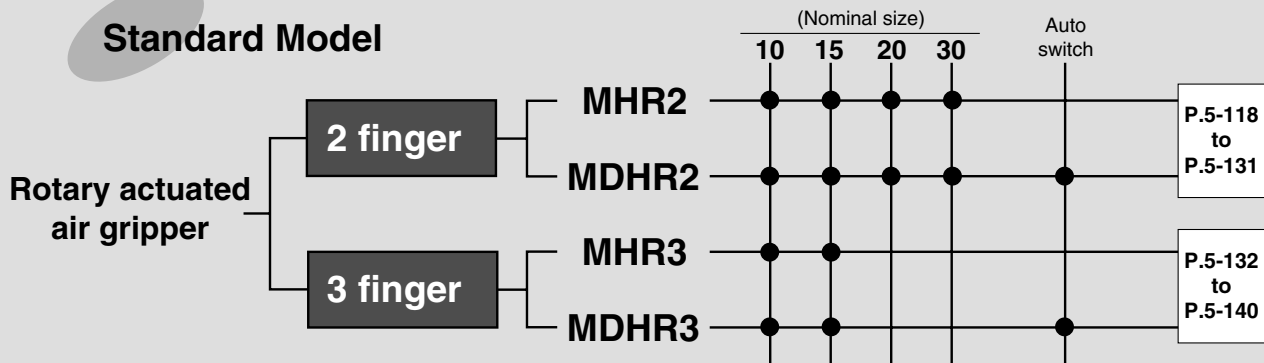
Compact design even during actuation.

Internal/External Holding Capability

Connection Port on 2 Sides



Standard Model



Rotary Actuated Air Gripper

Series *MHR2/MDHR2*

2 Finger/ø10, ø15, ø20, ø30

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
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Nominal size

10
15
20
30

Connection port

R: Body side

E: Axial side

Number of auto switches

-	2
S	1

Type of auto switch

-	Without auto switch
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Auto switch specifications

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model no.		Lead wire length (m)*		Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (-)	3 (L)		
Solid state switch	-	Grommet		3-Wire (NPN)	24V	5V 12V	-	M9NV	M9N	●	●	IC Relay, PLC
				3-Wire (PNP)				M9PV	M9P	●	●	
				2-Wire				M9BV	M9B	●	●	

* Lead wire length: 0.5m..... (Example) M9BV
 3m.....L (Example) M9BVL
 * Refer to p.6-15 for auto switch specifications.

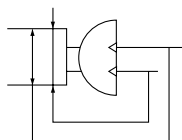
2 Finger Air Gripper Series *MHR2/MDHR2*



Model/Specifications

Nominal size		10	15	20	30
Action		Double acting			
Holding force (N) (Effective value) ⁽¹⁾ at 0.5MPa	External hold	12	24	33	58
	Internal hold	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		M5	
Repeatability		±0.01mm			
Fluid		Air			
Operating pressure		0.2 to 0.6MPa	0.15 to 0.6MPa		
Ambient and fluid temperature		0 to 60°C			
Max. operating frequency		180c.p.m			
Lubrication		Non-lube			

Symbol



Note 1) Refer to p.5-121 [Effective Holding Force] for details of holding force at each holding point.
Value of effective holding force is measured at the middle of opening/closing stroke.

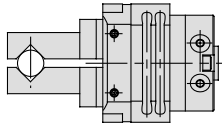
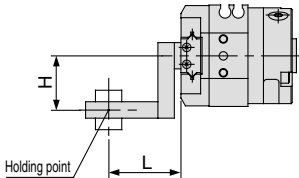
Note 2) () Value shows MDHR weight, but it does not include auto switch weight.

Series MHR2/MDHR2

Holding Point

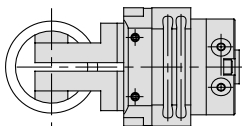
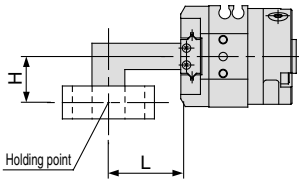
- Proper holding points should be selected in accordance with the operating pressure. The distance to the holding point L and the overhang distance H should be within the limit range shown in the graph on the right.
- When the work holding point is out of the limit range, the unbalanced load applied to the finger and the guide section may cause excessive play in fingers and have an adverse effect on the gripper life.

External hold



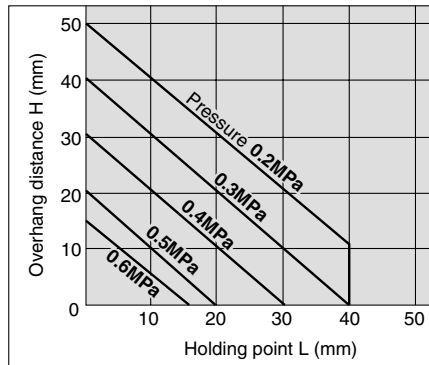
L: Distance to the holding point
H: Overhang distance

Internal hold

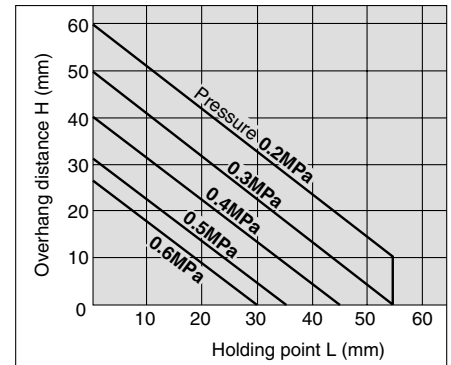


Limitation of holding point: External hold/Internal hold

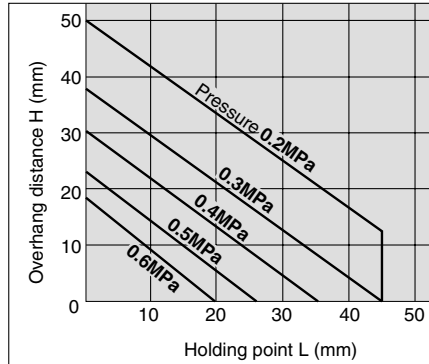
MHR2-10/MDHR2-10



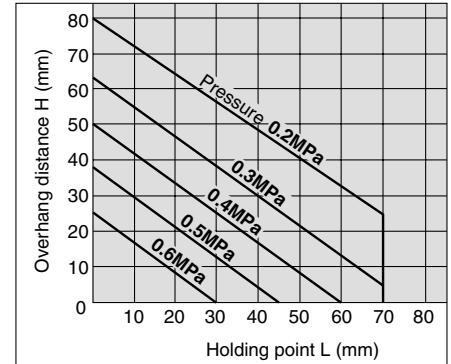
MHR2-20/MDHR2-20



MHR2-15/MDHR2-15



MHR2-30/MDHR2-30



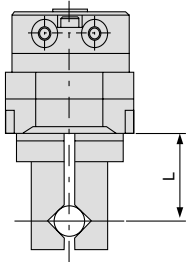
2 Finger Air Gripper Series *MHR2/MDHR2*

Effective Holding Force

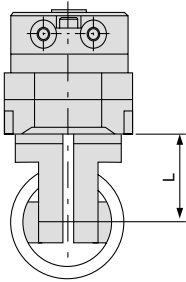
Guidelines for the selection of the gripper with respect to component weight

- Selection of the correct model depends upon the component weight, the coefficient of friction between the finger attachment and the component, and their respective configurations. A model should be selected with a holding force of 10 to 20 times that of the component weight.
- If high acceleration, deceleration or impact forces are encountered during motion a further margin of safety should be considered.

External hold



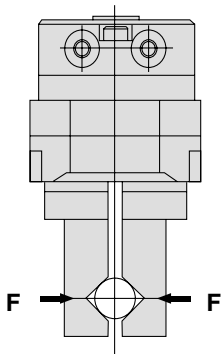
Internal hold



L: Holding point length mm

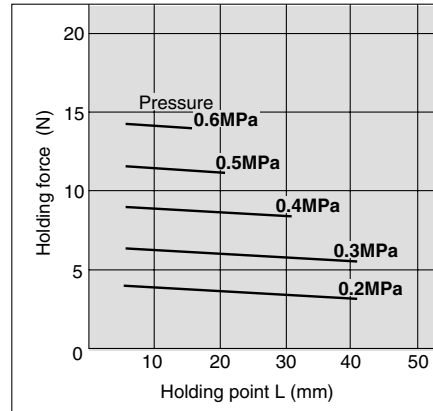
• Indication of effective holding force

The holding force shown in the tables represents the holding force of one finger when all fingers and attachments are in contact with the work. (F: Thrust of one finger)



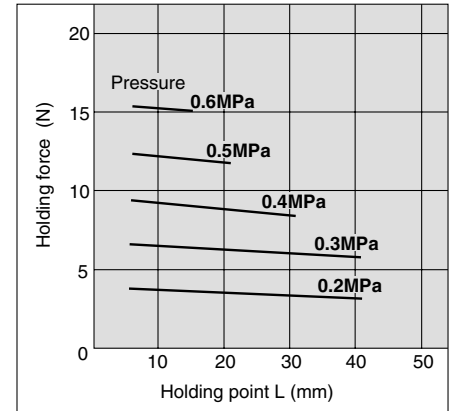
External hold

MHR2-10/MDHR2-10

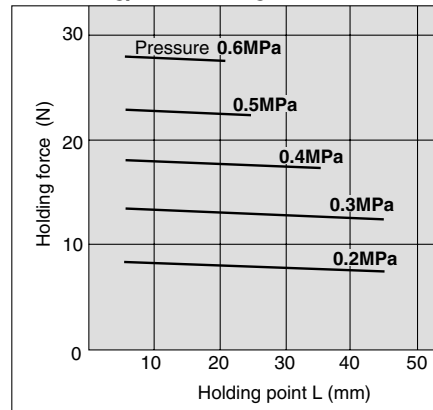


Internal hold

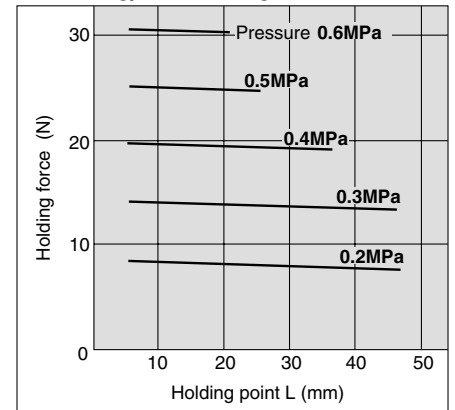
MHR2-10/MDHR2-10



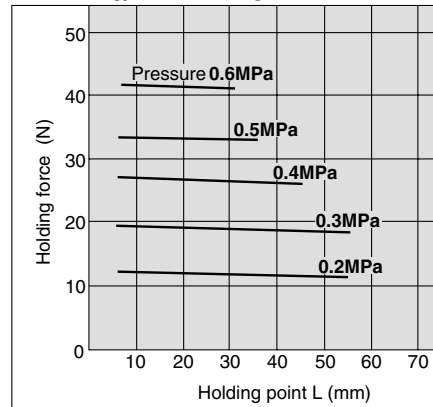
MHR2-15/MDHR2-15



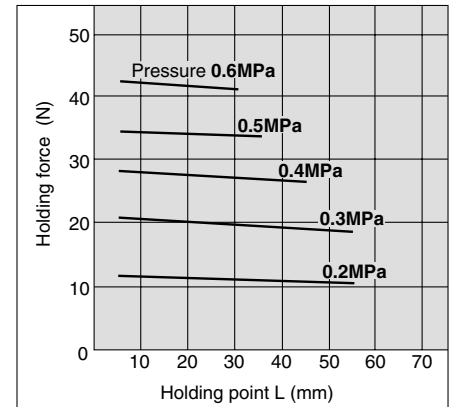
MHR2-15/MDHR2-15



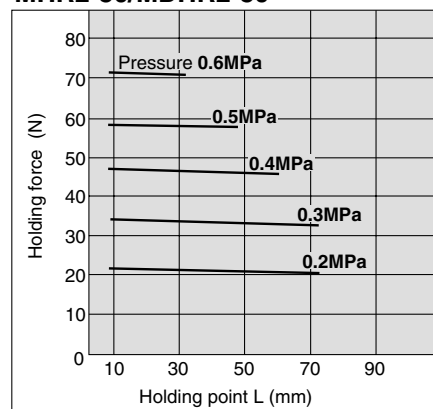
MHR2-20/MDHR2-20



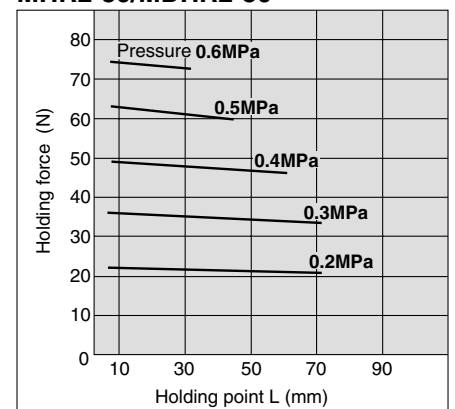
MHR2-20/MDHR2-20



MHR2-30/MDHR2-30



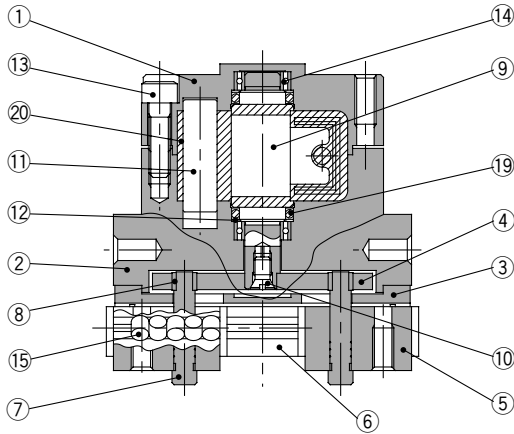
MHR2-30/MDHR2-30



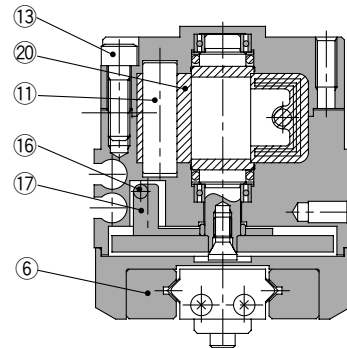
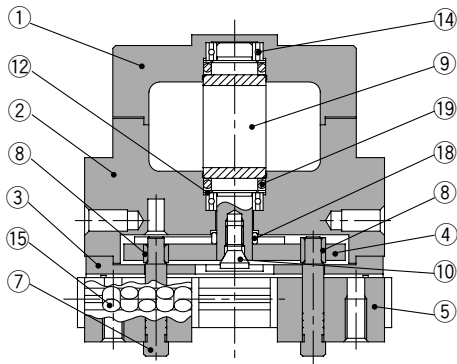
Series MHR2/MDHR2

Construction

MHR2



MDHR2



Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Anodized
②	Adaptor Body	Aluminum alloy	Anodized
③	Guide holder	Stainless steel	
④	Cam	Cold rolled steel	Nitriding
⑤	Finger ass'y	Stainless steel	Heat treatment
⑥	Guide	Stainless steel	Heat treatment
⑦	Pin	Carbon steel	Heat treatment Electroless nickel plated
⑧	Pin roller	Stainless steel	Nitriding
⑨	Vane shaft	Stainless steel	M□HR2-30 is carbon steel
⑩	Shaft bolt	Chrome molybdenum steel	Zinc chrome

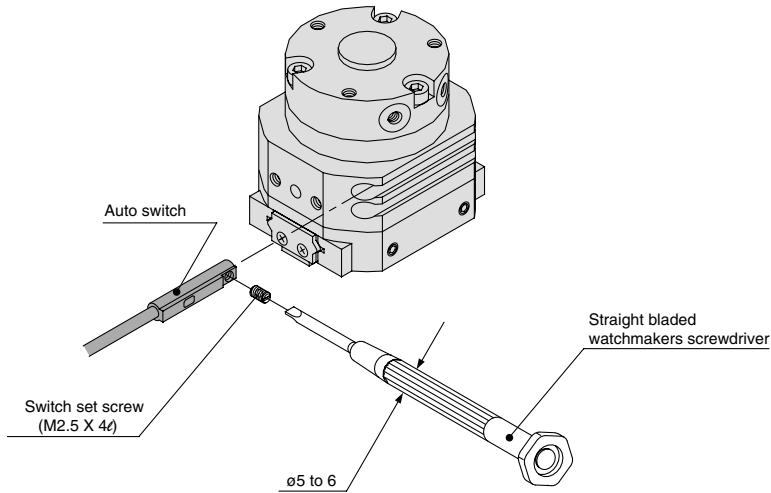
Component Parts

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 steel	
⑮	Cylindrical roller	Stainless steel	
⑯	Magnet	Magnetic material	
⑰	Magnet holder	Aluminum alloy	Anodized
⑱	Roller	Stainless steel	Nitriding
⑲	O ring	NBR	
⑳	Stopper packing	NBR	

2 Finger Air Gripper Series *MHR2/MDHR2*

Method for Setting Auto Switch

To set the auto switch, insert the auto switch into the switch groove of the air gripper from the direction indicated in the following drawing. After setting the position, tighten the attached switch mounting set screw with a straight bladed watchmakers screwdriver.



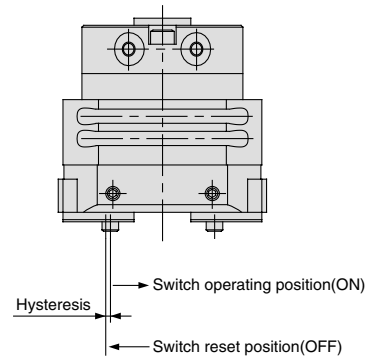
Note) Use a watchmakers screwdriver with a grip diameter of 5 to 6mm to tighten the auto switch set screw. Use a tightening torque of 0.05 to 0.1N·m. As a rough guide, tighten the screw an additional 90° after feeling a tight resistance.

Auto Switch Hysteresis

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

Model	Hysteresis(Max.value)mm
MDHR2-10	0.6
MDHR2-15	
MDHR2-20	
MDHR2-30	0.9

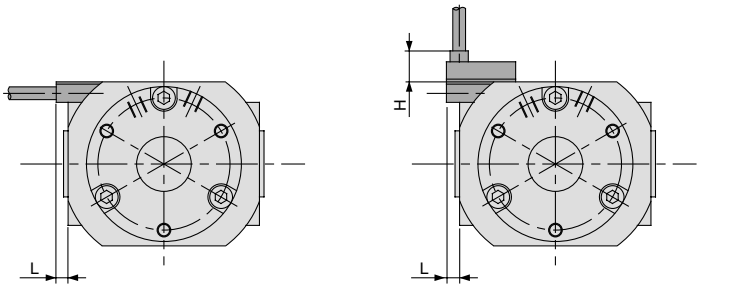
MDHR2



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.

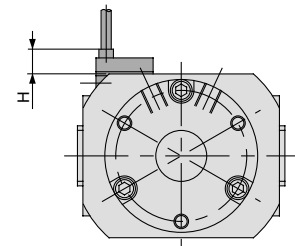
MDHR2-10, 15



When auto switch D-M9N, D-M9P, D-M9B is used.

When auto switch D-M9NV, D-M9PV, D-M9BV is used.

MDHR2-20, 30



When auto switch D-M9NV, D-M9PV, D-M99BV is used.

Max. protrusion of auto switch from edge of body: L, H

Unit: mm

Auto switch model no.		D-M9N	D-M9P, D-M9B	D-M9NV, D-M9PV, D-M9BV
Air gripper model no.				
MDHR2-10	L	2.6	7.1	0.6
	H	-	-	6.8
MDHR2-15	L	-	2.6	-
	H	-	-	6.8

Max. protrusion of auto switch from edge of body: H

MDHR2-20	6.8
MDHR2-30	6.8

Unit: mm

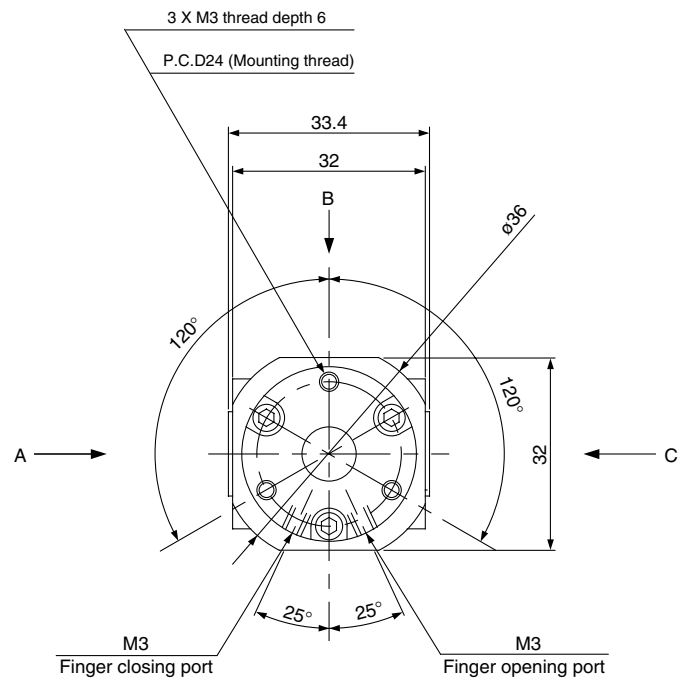
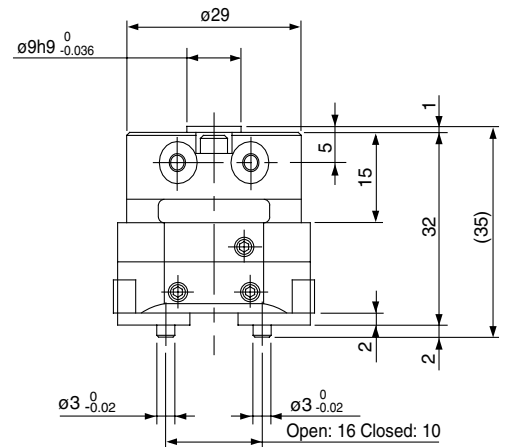
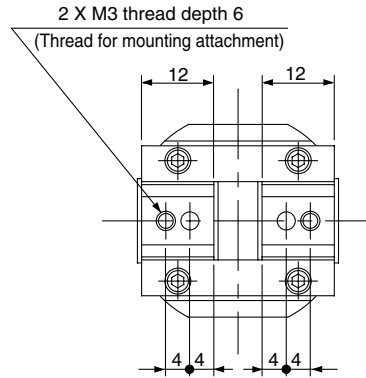
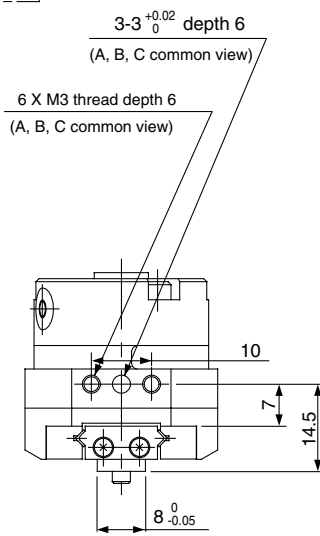
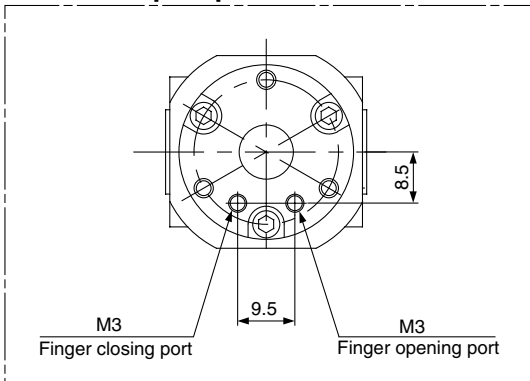
The auto switch will not protrude in the case of D-M9N, D-M9P, D-M9B.

Series MHR2/MDHR2

ø10

Without Auto Switch: MHR2-10R

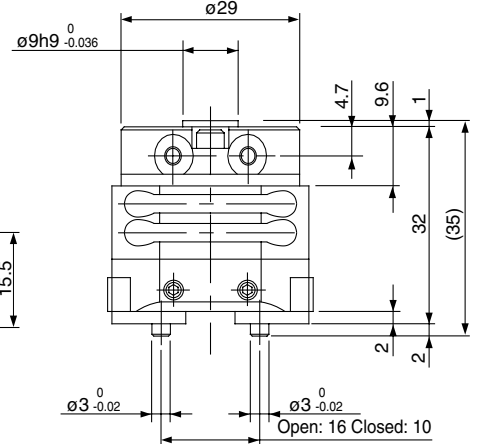
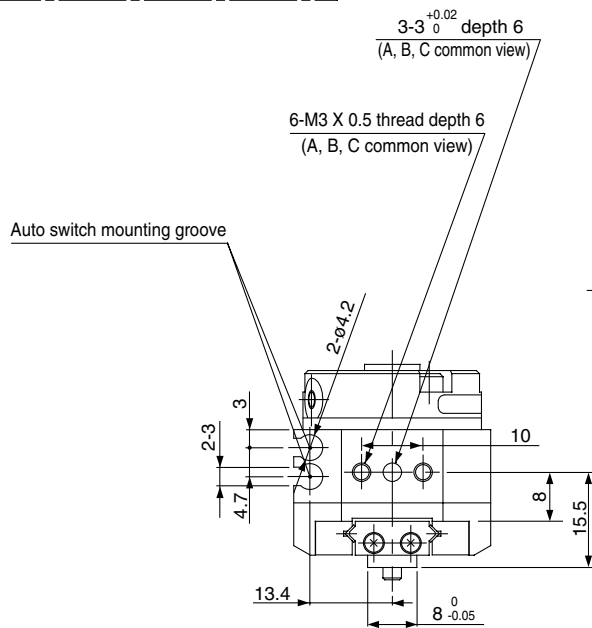
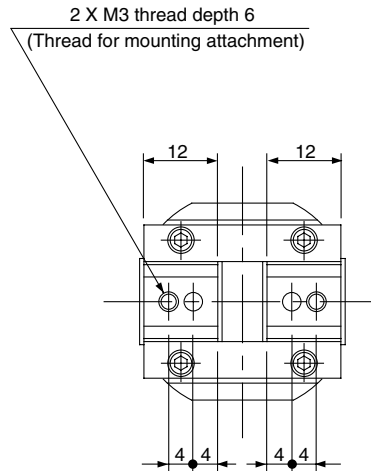
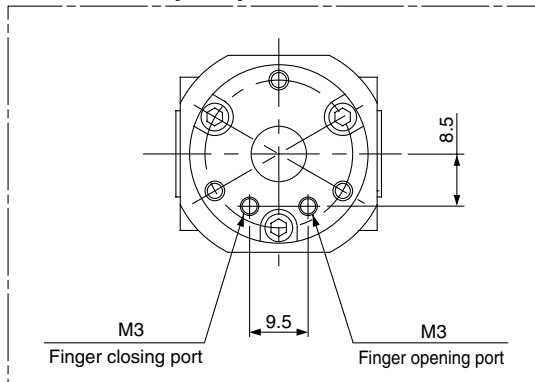
MHR2-10E port position



2 Finger Air Gripper Series *MHR2/MDHR2*

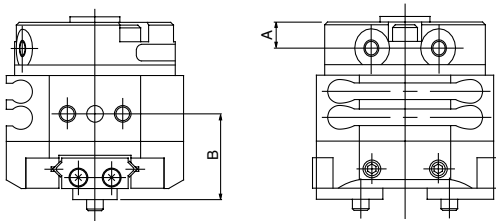
With Auto Switch (Built-in magnet): MDHR2-10R

MDHR2-10E port position

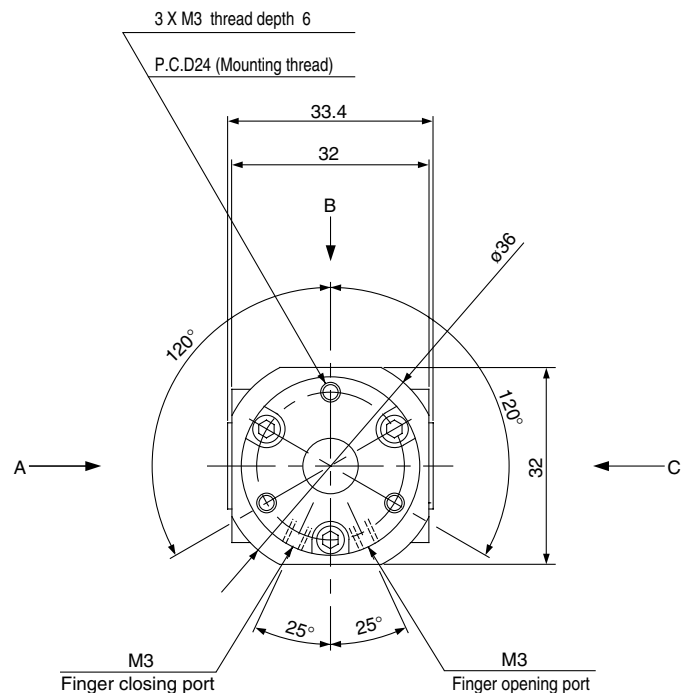


Dimensional differences between MHR and MDHR

Regardless of auto switch installation, some body dimensions are different.



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

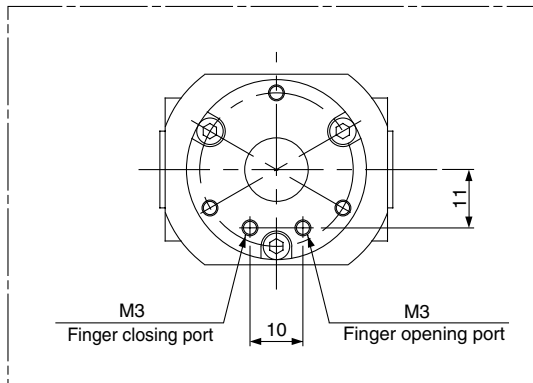


Series MHR2/MDHR2

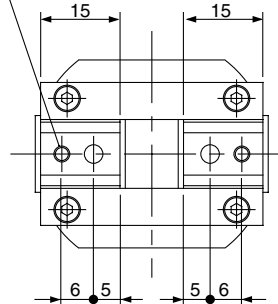
ø15

Without Auto Switch: MHR2-15R

MHR2-15E port position

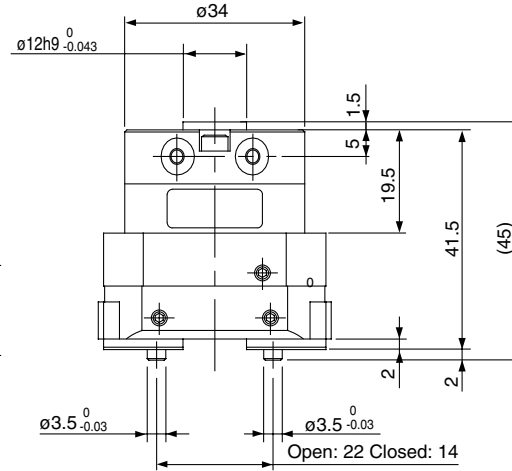
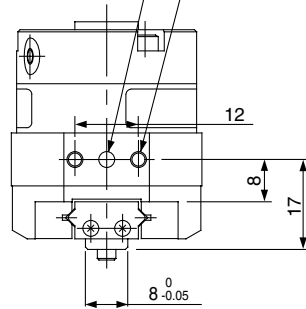


2 X M3 thread depth 6
(Thread for mounting attachment)

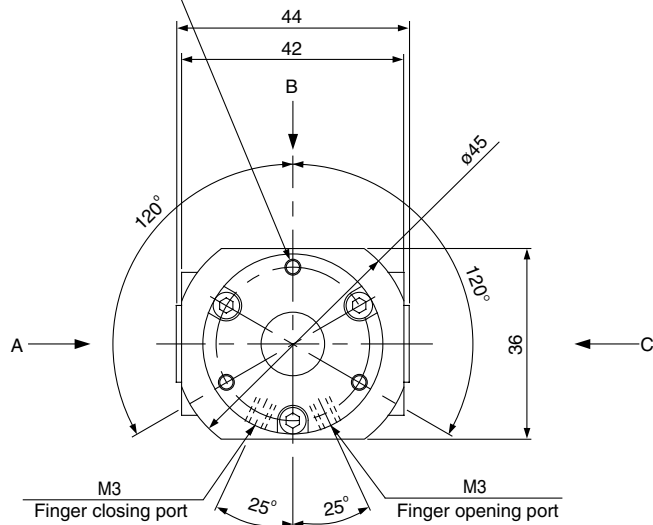


6 X M3 thread depth 6
(A, B, C common view)

3-3 $\begin{smallmatrix} +0.02 \\ 0 \end{smallmatrix}$ depth 6
(A, B, C common view)



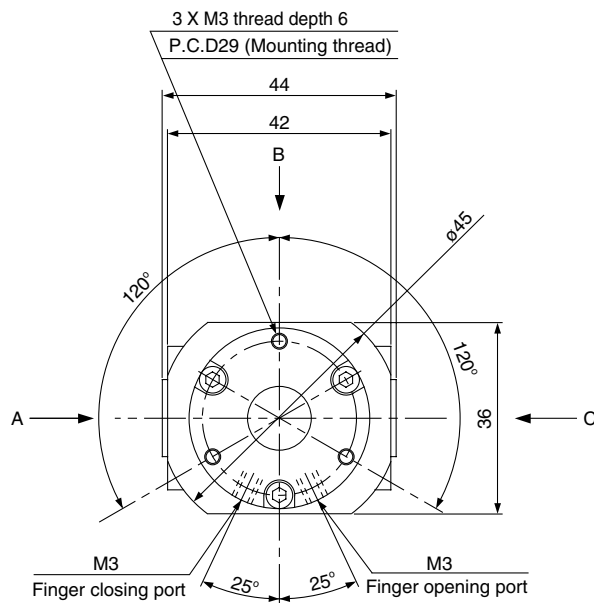
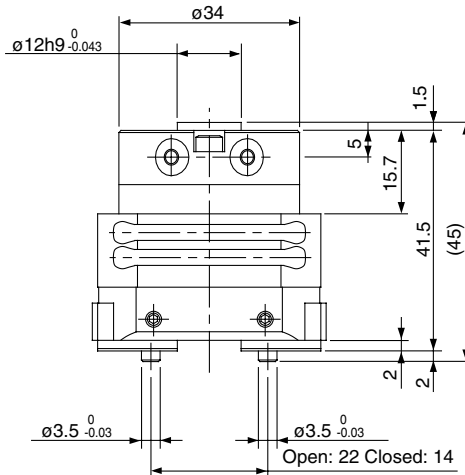
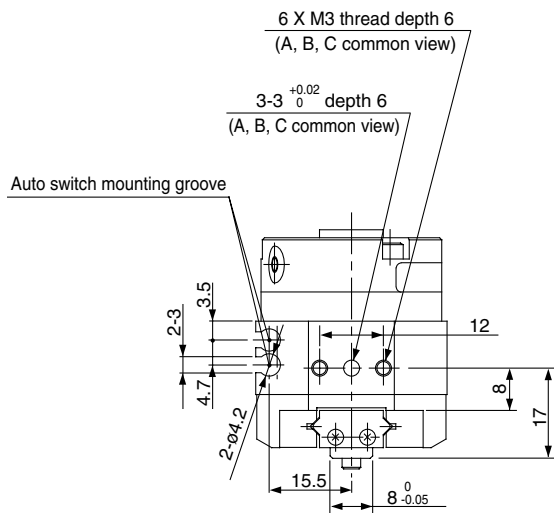
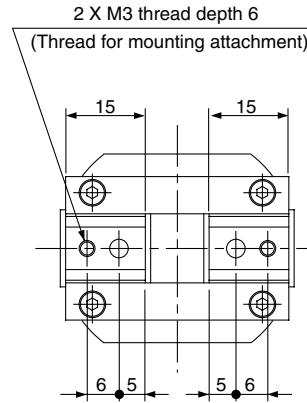
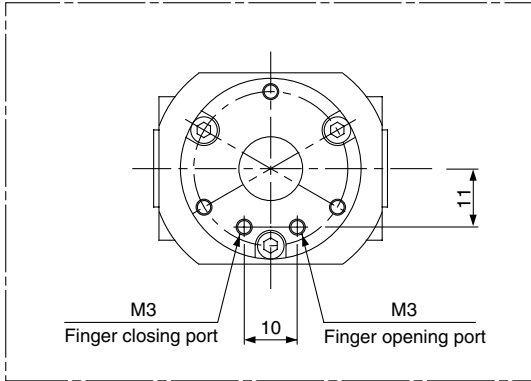
3 X M3 thread depth 6
P.C.D29 (Mounting thread)



2 Finger Air Gripper Series *MHR2/MDHR2*

With Auto Switch (Built-in magnet): MDHR2-15R

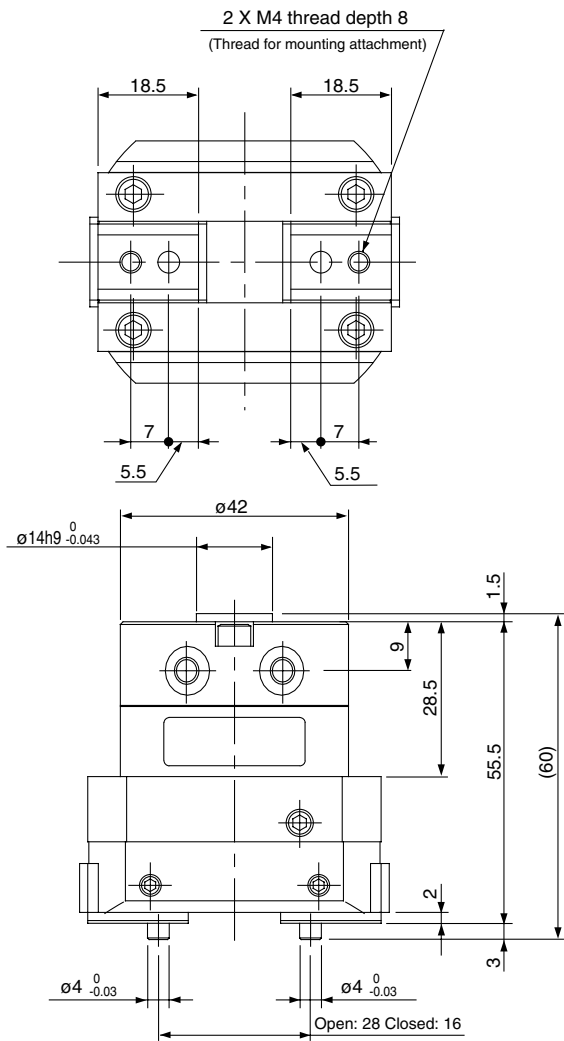
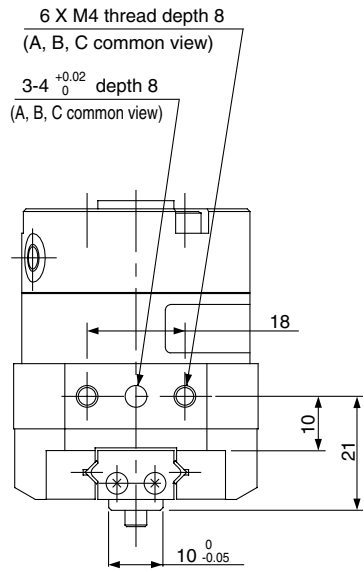
MDHR2-15E port position



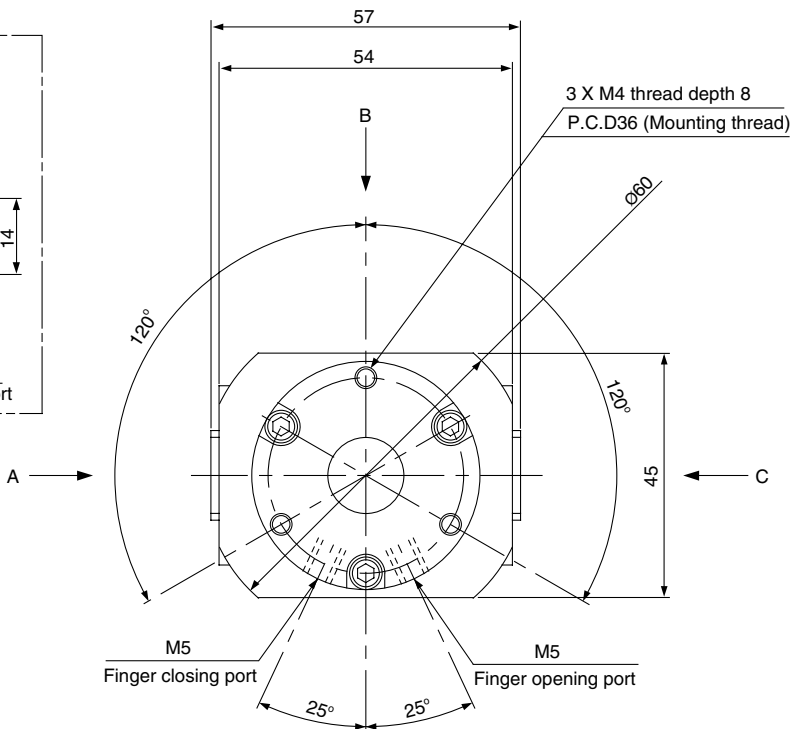
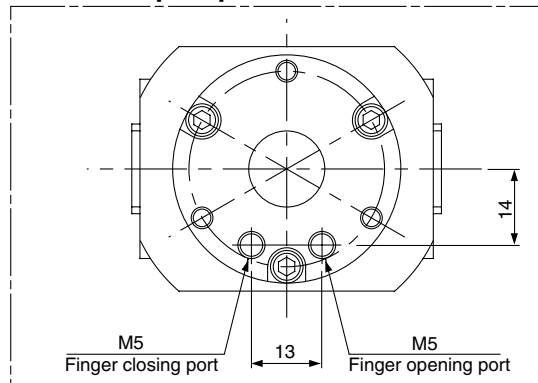
Series MHR2/MDHR2

ø20

Without Auto Switch: MHR2-20R



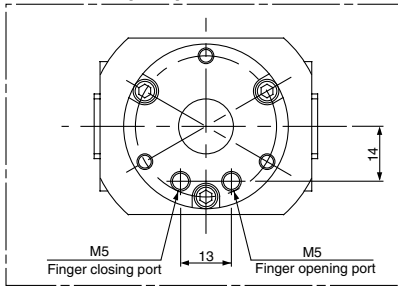
MHR2-20E port position



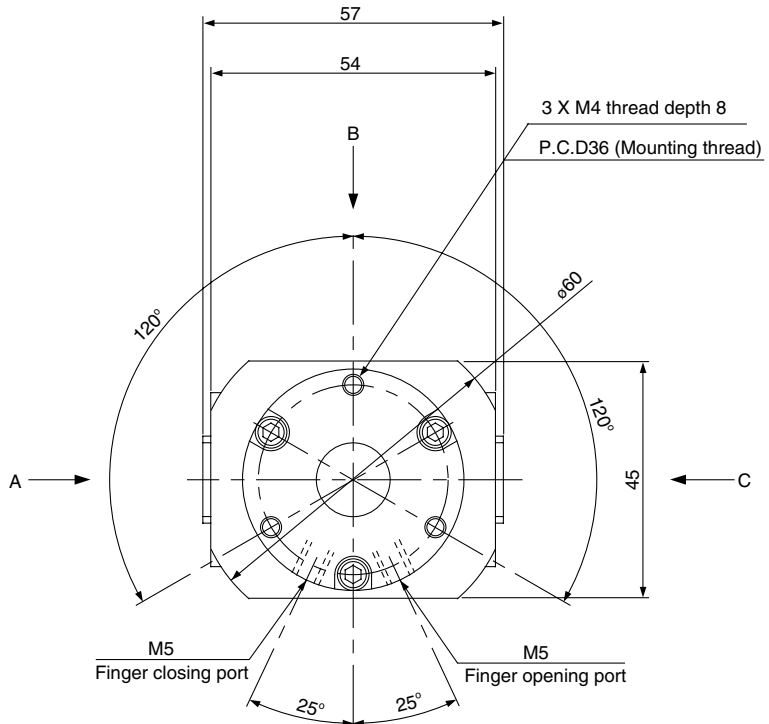
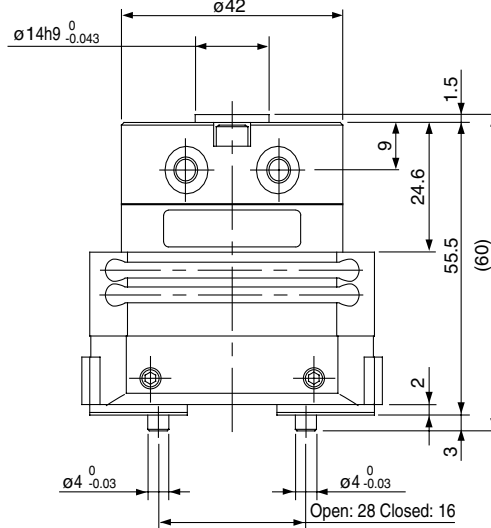
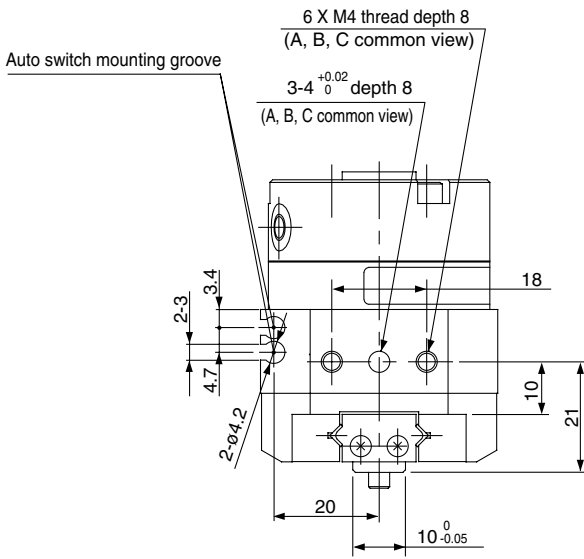
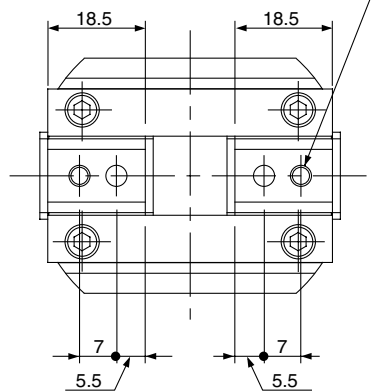
2 Finger Air Gripper Series *MHR2/MDHR2*

With Auto Switch (Built-in magnet): MDHR2-20R

MDHR2-20E port position



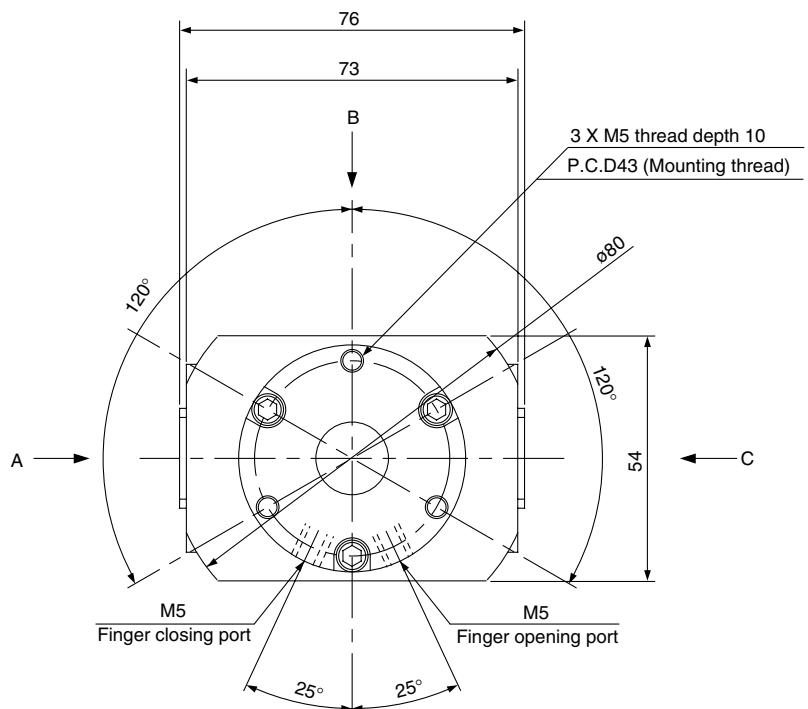
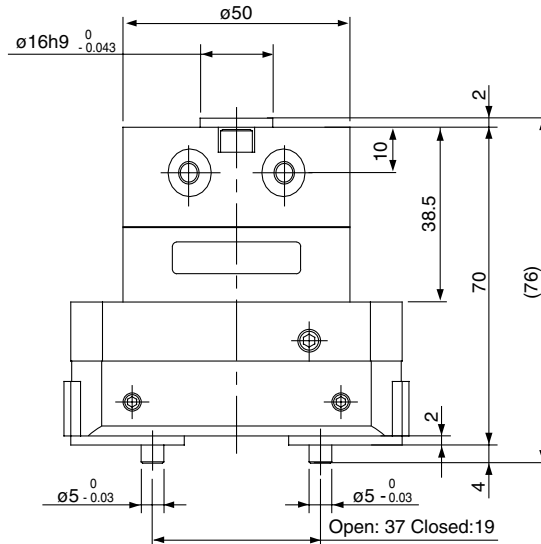
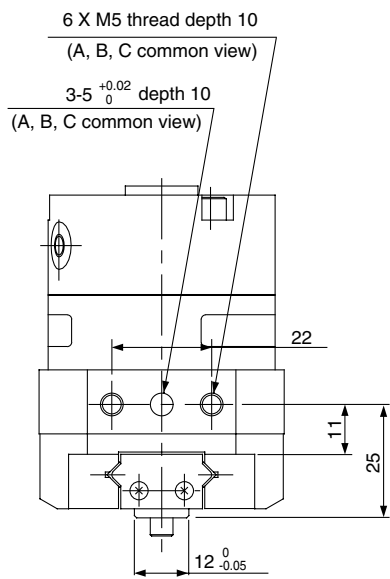
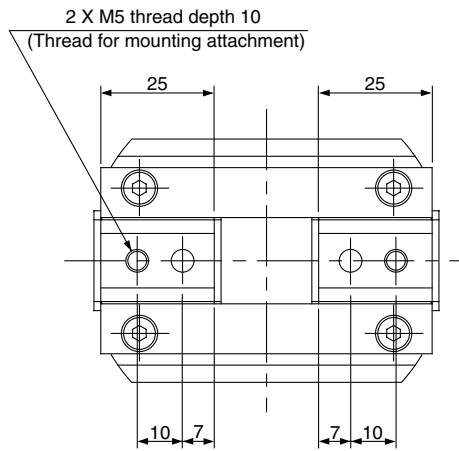
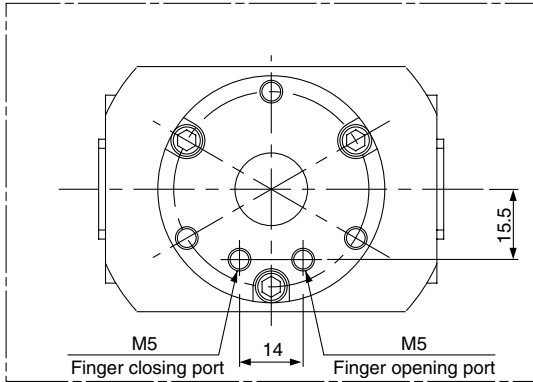
2 X M4 thread depth 8
(Thread for mounting attachment)



Series MHR2/MDHR2

∅30

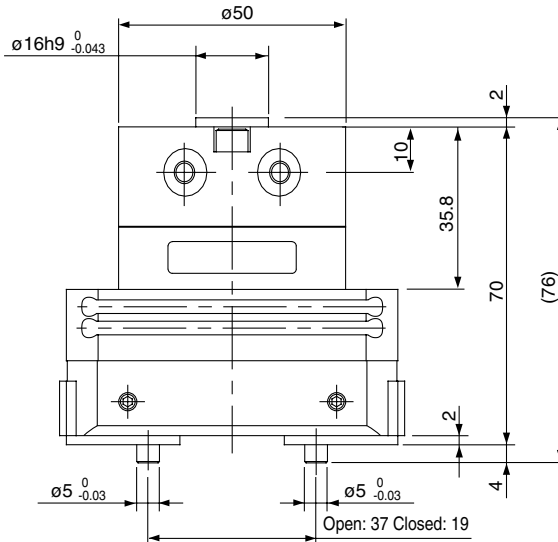
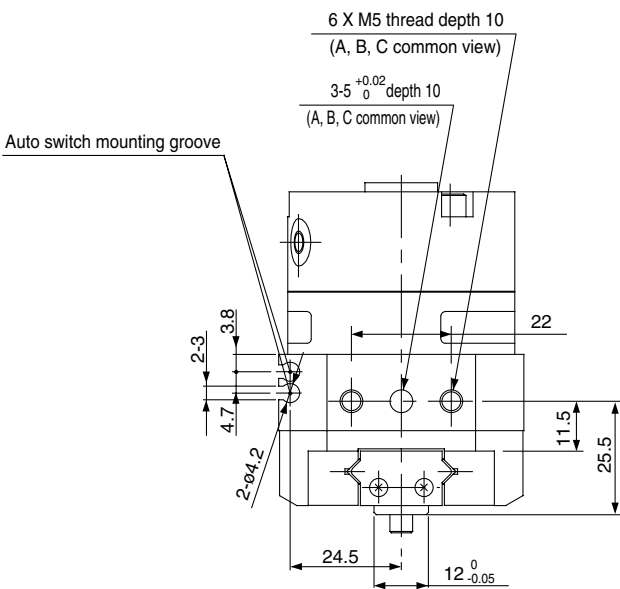
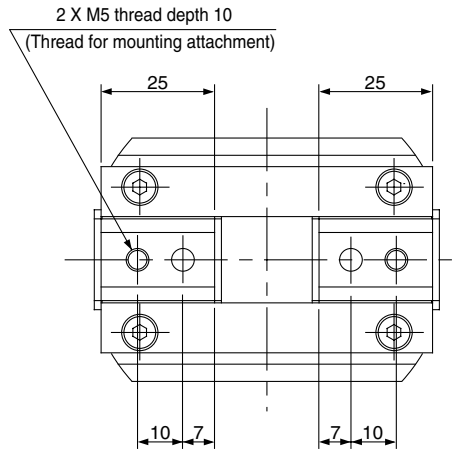
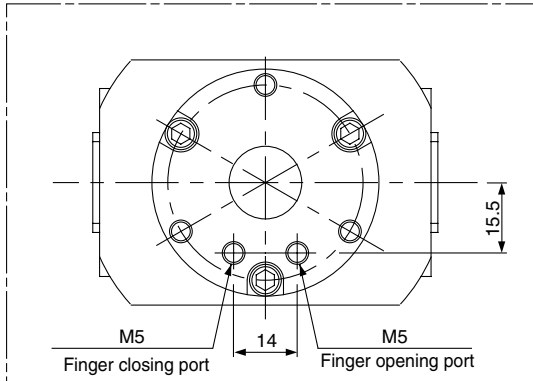
Without Auto Switch: MHR2-30R
MHR2-30E port position



2 Finger Air Gripper Series *MHR2/MDHR2*

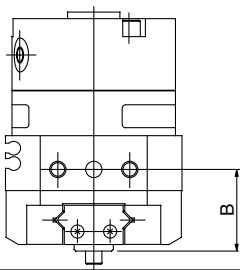
With Auto Switch (Built-in magnet): MDHR2-30R

MDHR2-30E port position

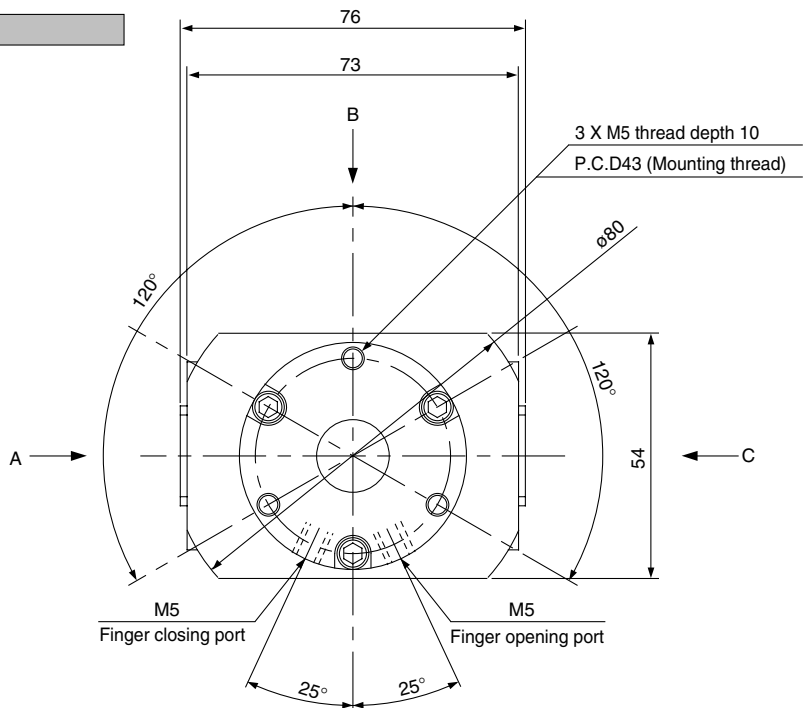


Dimensional differences between MHR and MDHR

Regardless of auto switch installation, some body dimensions are different.



Model	B
MHR2-30□	25
MDHR2-30□	25.5



Rotary Actuated Air Gripper

Series *MHR3/MDHR3*

3 Finger/ø10, ø15

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

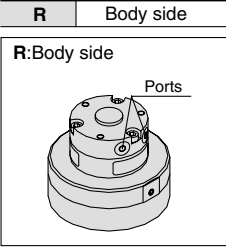
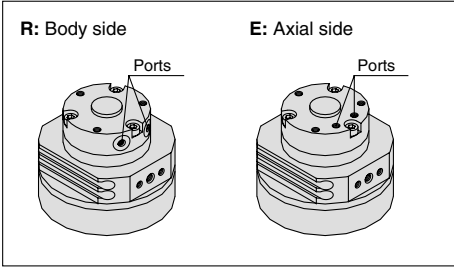
R	Body side
---	-----------

Number of auto switches

-	2
S	1

Type of auto switch

-	Without auto switch
---	---------------------

Auto switch specifications

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model no.		Lead wire length (m)*		Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (-)	3 (L)	IC	Relay, PLC	
Solid state switch	-	Grommet	With	3-wire (NPN)	24V	5V 12V	-	M9NV	M9N	●			●
				3-wire (NPN)				M9PV	M9P	●	●		
				2-wire				M9BV	M9B	●	●		

*Lead wire length: 0.5m..... (Example) M9BV
3m.....L (Example) M9BVL

*Refer to p.6-15 for auto switch specifications.

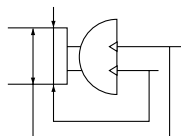
3 Finger Air Gripper Series *MHR3/MDHR3*



Model/Specifications

Nominal size		10	15
Action		Double acting	
Holding force (N) (Effective value) ⁽¹⁾ at 0.5MPa	External hold	7	13
	Internal hold	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	
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		180c.p.m	
Lubrication		Non-lube	

Symbol

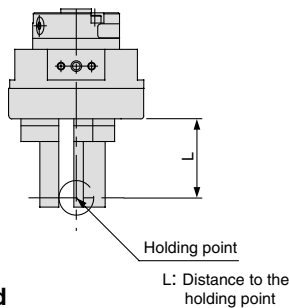


Note 1) Refer to p.5-134 [Effective Holding Force] for details of holding force at each holding point.
 Valve of effective holding force is measured at the middle of opening/closing stroke.
 Note 2) () Value shows MDHR weight, but it does not include auto switch weight.

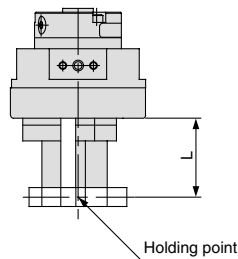
Series MHR3/MDHR3

Holding Point

External hold



Internal hold

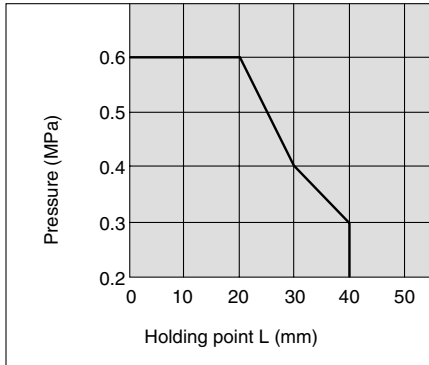


Limitation of holding: External hold/Internal hold

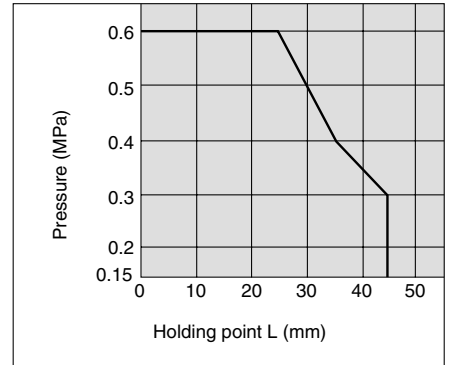
● Work holding point should be within the holding point range: L shown below, by operating pressure.

● When the work holding point is out of the limiting range, the unbalanced load applied to the finger and the guide section may cause excessive play in fingers and have an adverse effect on the gripper life.

MHR3-10R/MDHR3-10□



MHR3-15R/MDHR3-15□

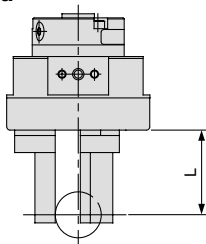


Effective Holding Force

Guidelines for the selection of the gripper with respect to component weight

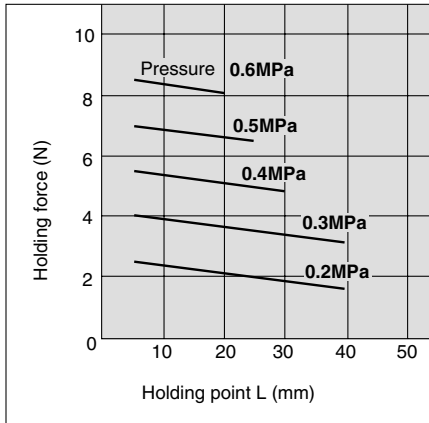
- Selection of the correct model depends upon the component weight, the coefficient of friction between the finger attachment and the component, and their respective configurations.
- A model should be selected with a holding force of 7 to 14 times that of the component weight. If high acceleration,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

External hold



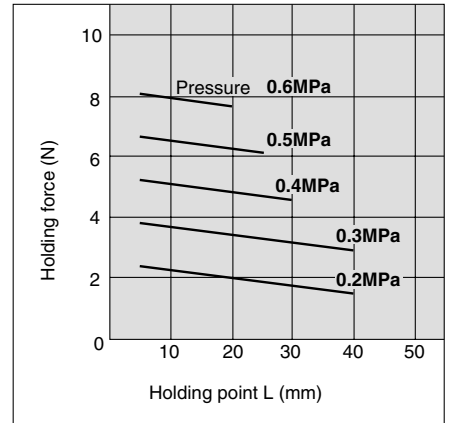
External hold

MHR3-10R/MDHR3-10□

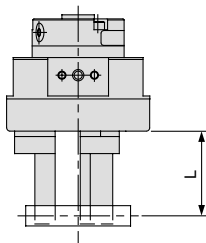


Internal hold

MHR3-10R/MDHR3-10□

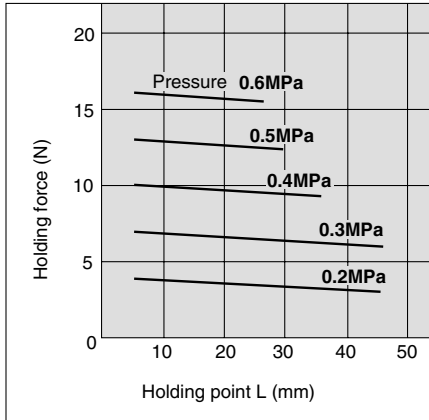


Internal hold

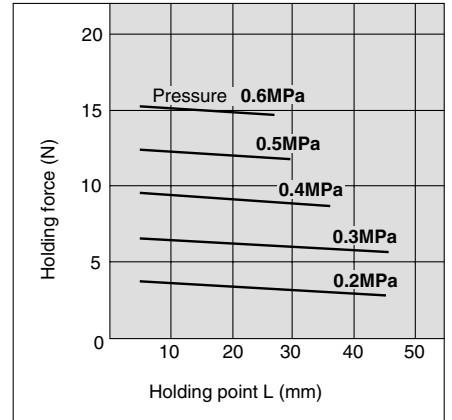


L: Holding point length mm

MHR3-15R/MDHR3-15□

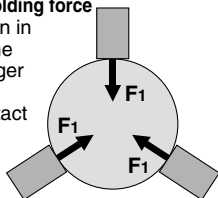


MHR3-15R/MDHR3-15□



Indication of effective holding force

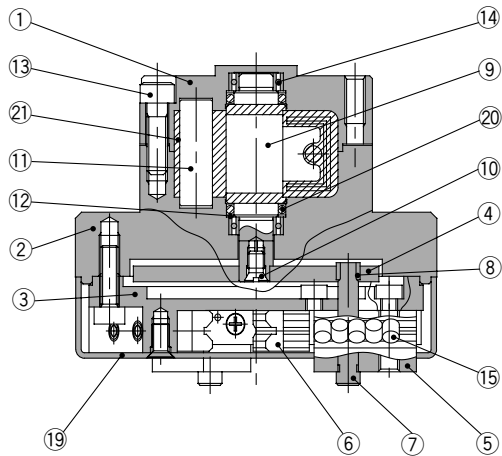
The holding force shown in the tables represents the holding force of one finger when all fingers and attachments are in contact with the work.



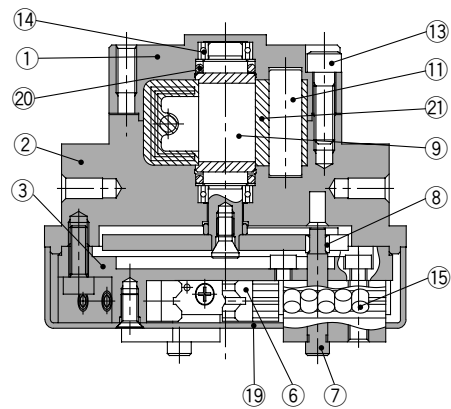
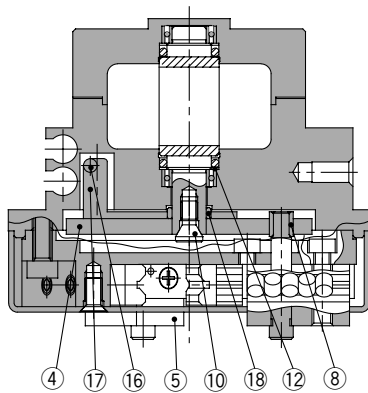
3 Finger Air Gripper Series *MHR3/MDHR3*

Construction

MHR3



MDHR3



Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Anodized
②	Adaptor body	Aluminum alloy	Anodized
③	Guide holder	Stainless steel	
④	Cam	Cold rolled steel	Nitriding
⑤	Finger ass'y	Stainless steel	Heat treatment
⑥	Guide	Stainless steel	Heat treatment
⑦	Pin	Carbon steel	Heat treatment Electroless nickel plated
⑧	Pin roller	Stainless steel	Nitriding
⑨	Vane shaft	Stainless steel	
⑩	Joint bolt	Chrome molybdenum steel	Zinc chrome
⑪	Stopper	Resin	

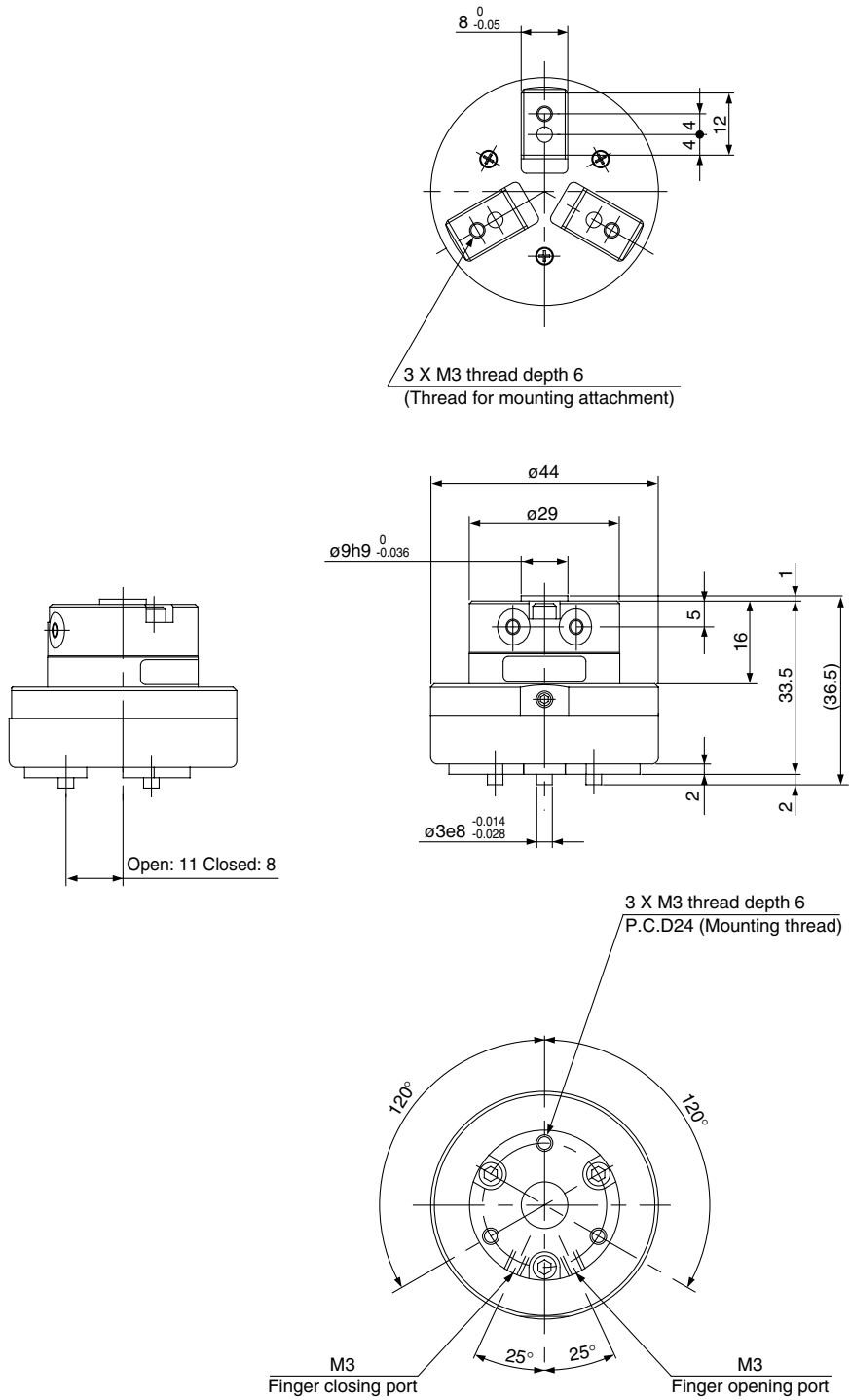
Component Parts

No.	Description	Material	Note
⑫	Back-up ring	Stainless steel plate	
⑬	Hexagon socket head bolt	Stainless steel	
⑭	Bearing	High carbon chrome steel	
⑮	Cylindrical roller	Stainless steel	
⑯	Magnet	Magnetic material	
⑰	Magnet Holder	Aluminum alloy	Anodized
⑱	Roller	Stainless steel	Nitriding
⑲	Cover	Aluminum alloy	Anodized
⑳	O ring	NBR	
㉑	Stopper packing	NBR	

Series MHR3/MDHR3

ø10

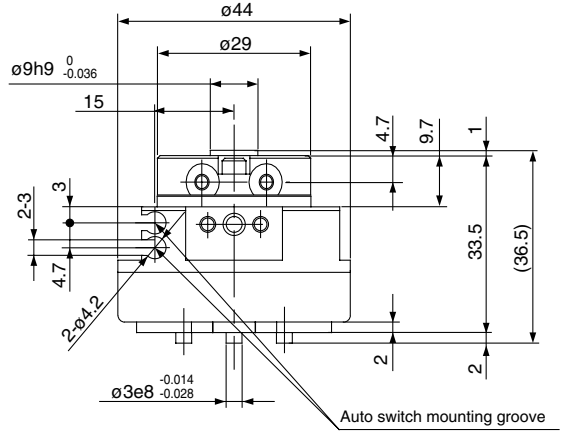
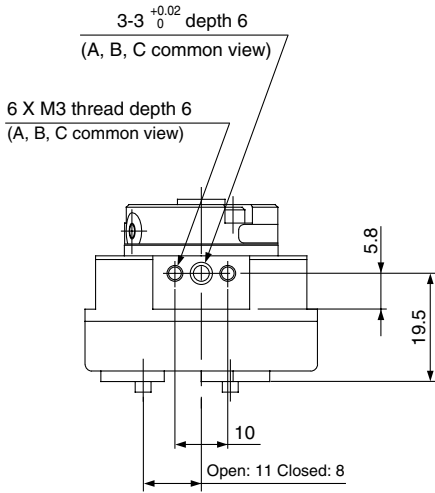
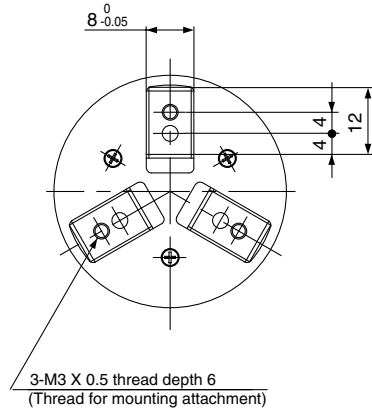
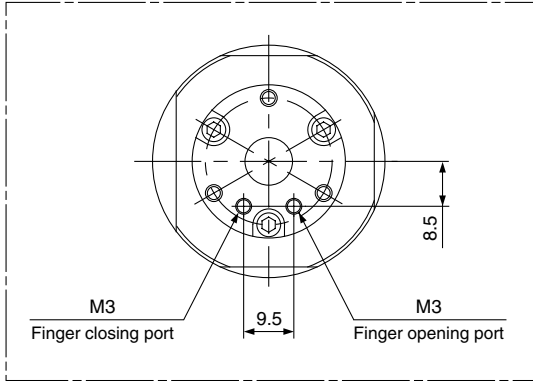
Without Auto Switch: MHR3-10R



3 Finger Air Gripper Series *MHR3/MDHR3*

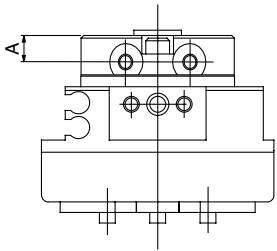
With Auto Switch (Built-in magnet): MDHR3-10R

MDHR3-10E port position

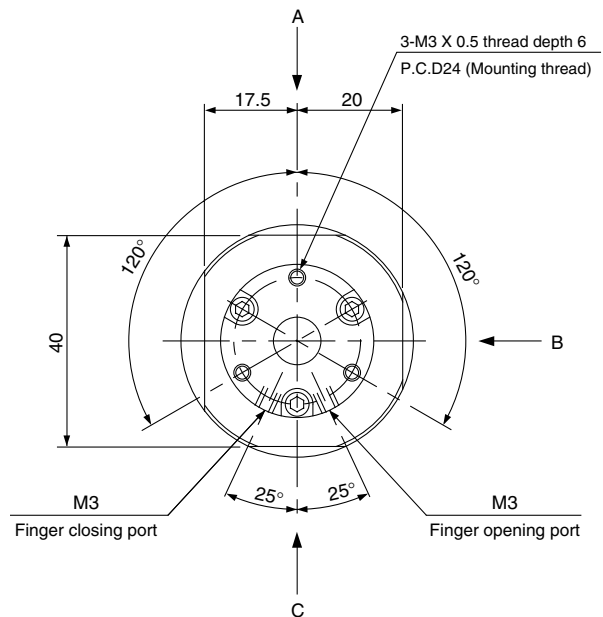


Dimensional differences between MHR and MDHR

Regardless of auto switch installation, some body dimensions are different.



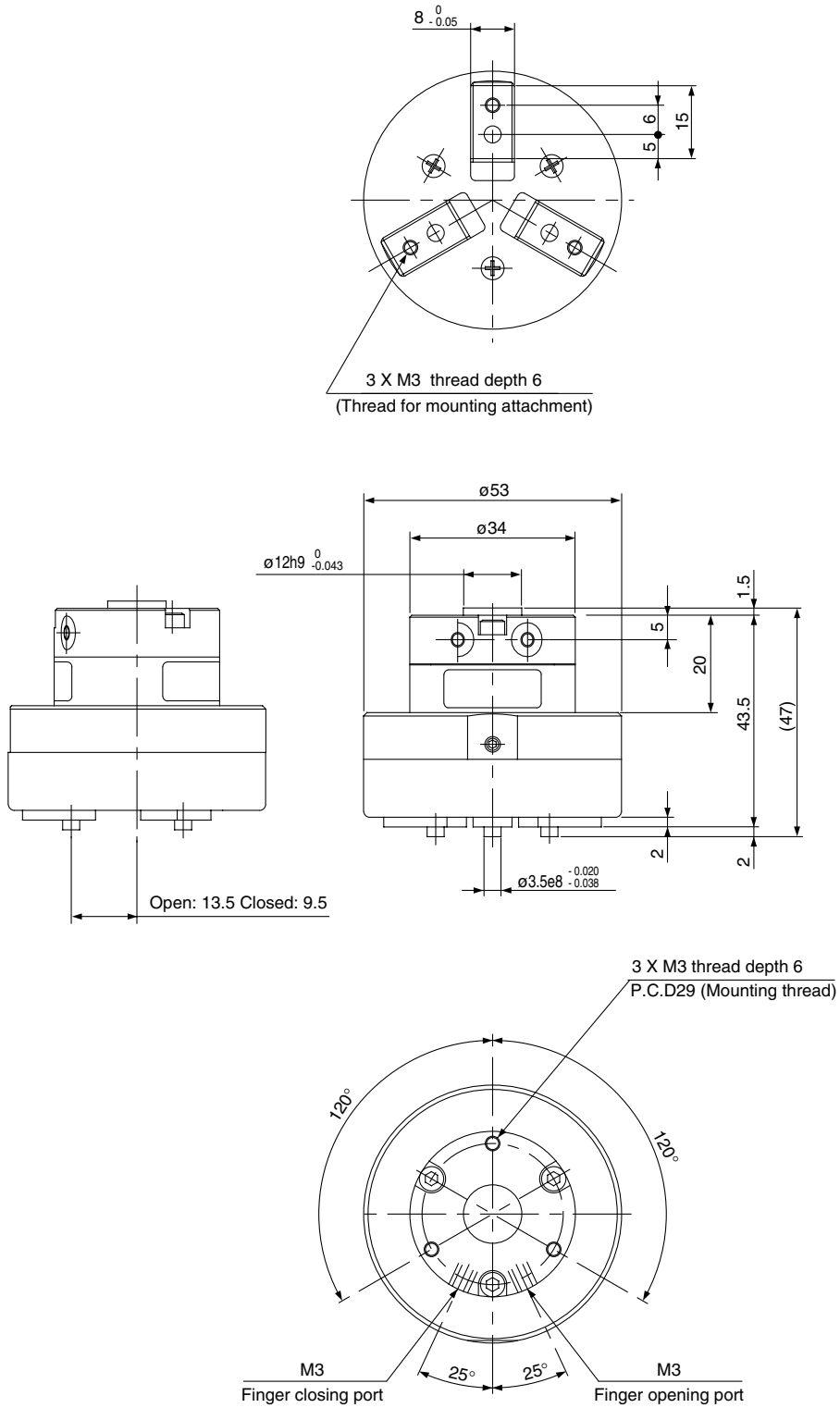
Model	A
MHR3-10R	5
MDHR3-10R	4.7



Series MHR3/MDHR3

ø15

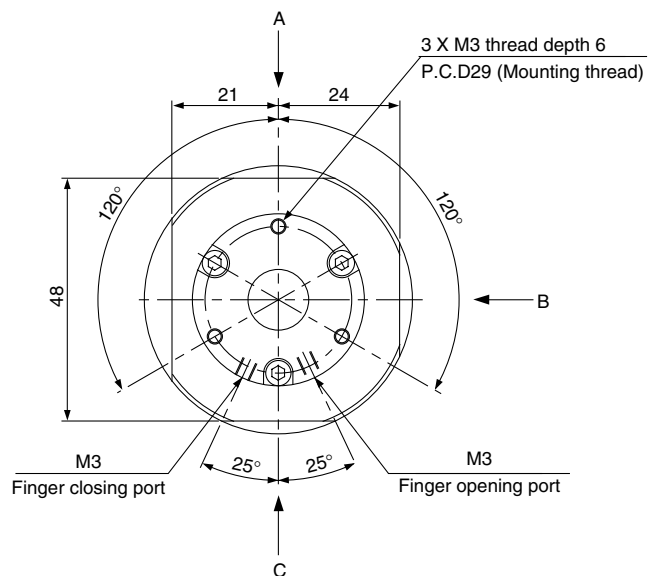
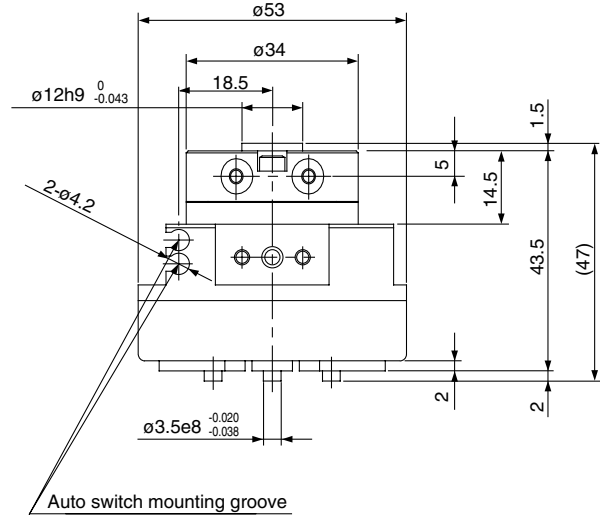
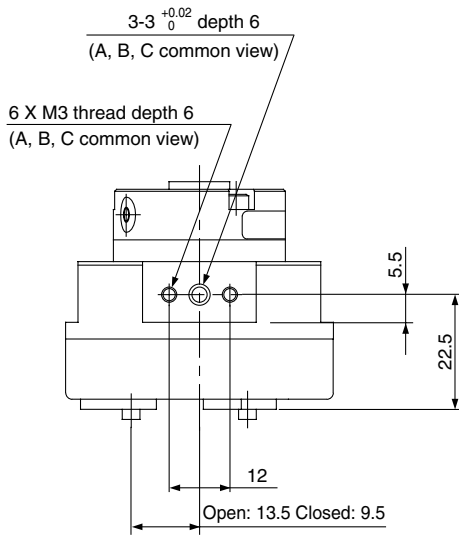
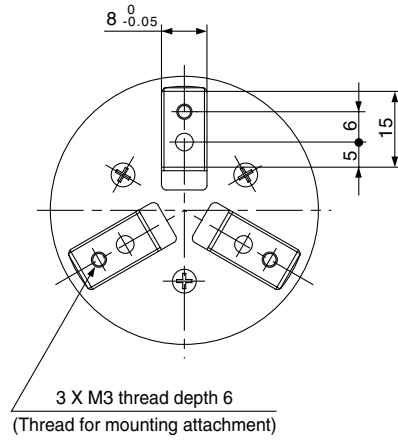
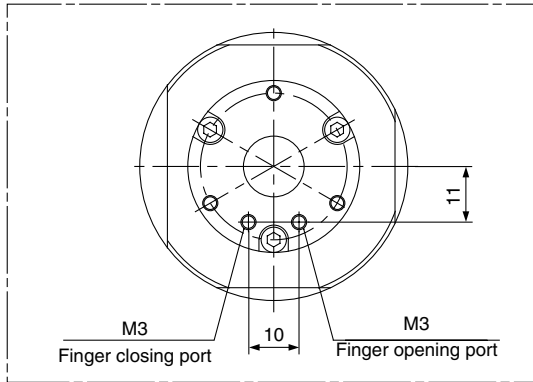
Without Auto Switch: MHR3-15R



3 Finger Air Gripper Series *MHR3/MDHR3*

With Auto Switch (Built-in magnet): MDHR3-15R

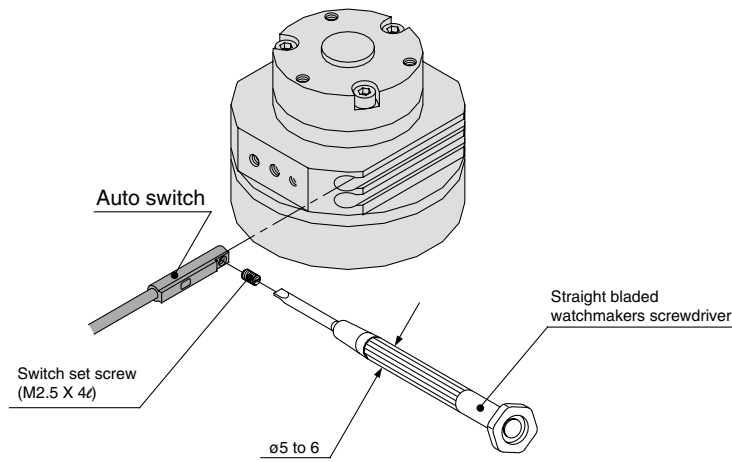
MDHR3-15E port position



Series MHR3/MDHR3

Method for Setting Auto Switch

To set the auto switch, insert the auto switch into the switch groove of the air gripper from the direction indicated in the following drawing. After setting the position, tighten the attached switch mounting set screw with a straight bladed watchmakers screwdriver.



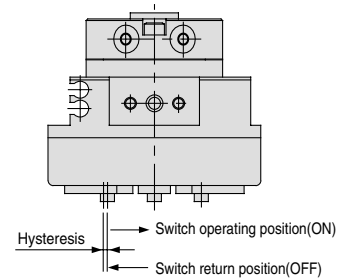
Note) Use a watchmakers screwdriver with a grip diameter of 5 to 6mm to tighten the auto switch set screw. Use a tightening torque of 0.05 to 0.1N·m. As a rough guide, tighten the screw an additional 90° after feeling a tight resistance.

Auto Switch Hysteresis

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

Model	Hysteresis (Max.value)mm
MDHR3-10	0.6
MDHR3-15	

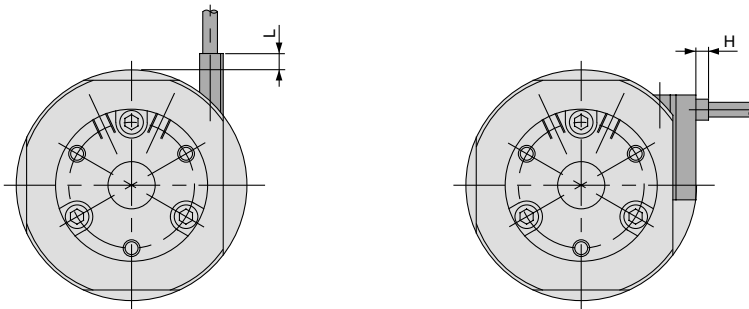
MDHR3



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.

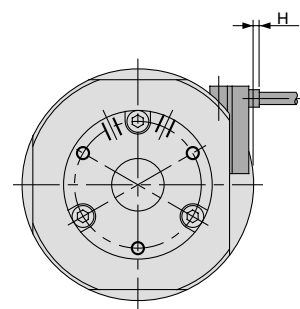
MDHR3-10



When auto switch D-M9N, D-M9P, D-M9B is used.

When auto switch D-M9NV, D-M9PV, D-M9BV is used.

MDHR3-15



When auto switch D-M9NV, D-M9PV, D-M9BV is used.

Max. protrusion of auto switch from edge of body: L, H

Auto switch model no.	D-M9N	D-M9P, D-M9B	D-M9NV, D-M9PV, D-M9BV	Unit: mm
L	-	3.1	-	
H	-	-	2.3	

Max. protrusion of auto switch from edge of body: H

MDHR3-15	1.3
	Unit: mm

The auto switch will not protrude in the case of D-M9N, D-M9P, D-M9B.