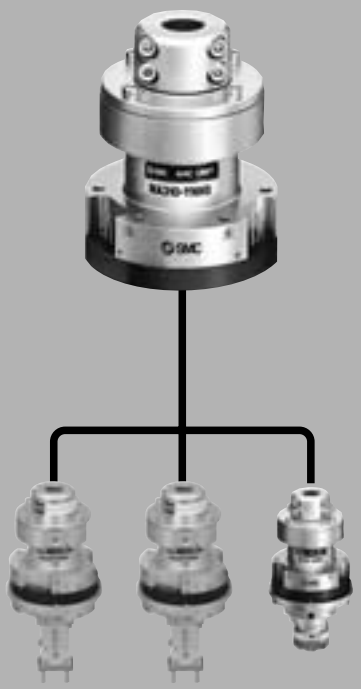
AHC System

Series MA

Automatic exchange of robot hand tools, FMS (flexible manufacturing system) implemented for assembly lines.

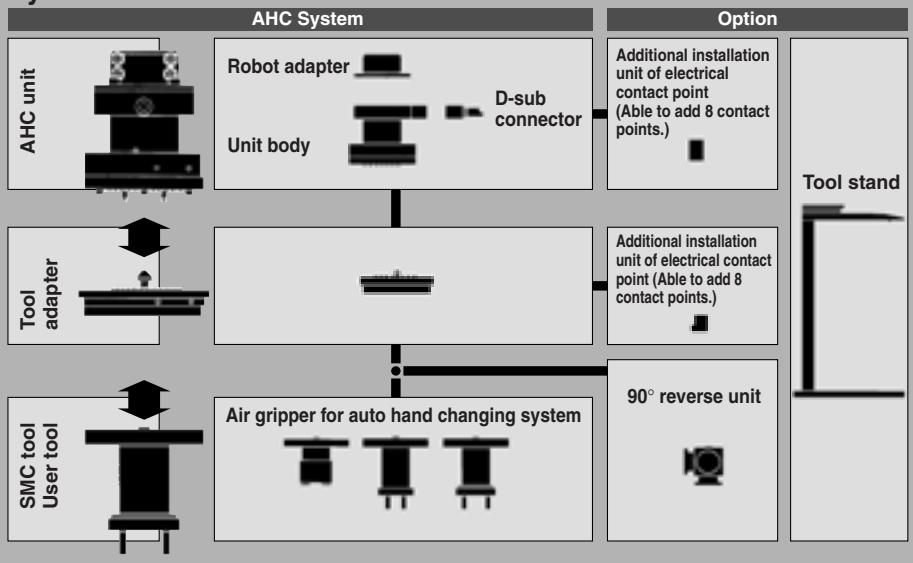
The robot hand tools change automatically to accommodate workpieces of different shapes, thus making it possible to adopt the FMS (flexible manufacturing system) in the assembly line.



Specifications

Series	MA210	MA310	MA311	MA320	MA321
Positioning	Ball coupling			Curved coupling	
Max. transportable mass	3 kg	5 kg			
Handling	Single acting/Air supply at separation		Double acting	Single acting/ Air supply at separation	Double acting
Handling air pressure	0.4 to 0.7 MPa				
Proof pressure	1.05 MPa				
Ambient and fluid temperature	0 to 60°C				
Positioning repeatability	±0.01 mm				

System Construction



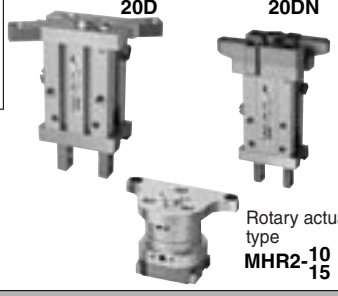
Variations

Adapter for assembling robot
Series MA2
ø8, ø10, ø11, ø14, ø15, ø20
Series MA3
ø10, ø11, ø14, ø15, ø20, ø24, ø25

Air grippers for auto hand changing system
(ø10 to ø20)

Standard type
10D
MHZ2-16D
20D

Narrow type
10DN
MHZ2-16DN
20DN



Rotary actuated type
MHR2-$^{10}_{15}$

Additional installation unit of electrical contact point
(Able to add 8 contact points)

Added to the standard AHC unit

Added to the standard tool adapter

(Series MA3 only)

90° reverse unit

By attaching 2 tools, a single robot can perform 2 types of tasks.
An auto switch for detecting the location can be mounted.

(Series MA3 only)

Tool stand

The height for setting a tool can be adjusted.
An auto switch for detecting a tool can be mounted.

Auto Hand Changing System

Series MA210 (Compact type)

Max. transportable mass: 3 kg
Compact/Lightweight
O.D.: 52 mm, Mass: 360 g

Series MA3□1 (Double acting type)

Ideal for carrying heavy loads.
2.5 times the moment resistance and torque resistance of the conventional series.

No adjustment or teaching necessary when replacing tools

All attachment and removal during tool replacement is carried out automatically, allowing for elimination of the onerous labor of the replacement process, and a major reduction of time needed for changing setups.

Quicker launch of assembly lines

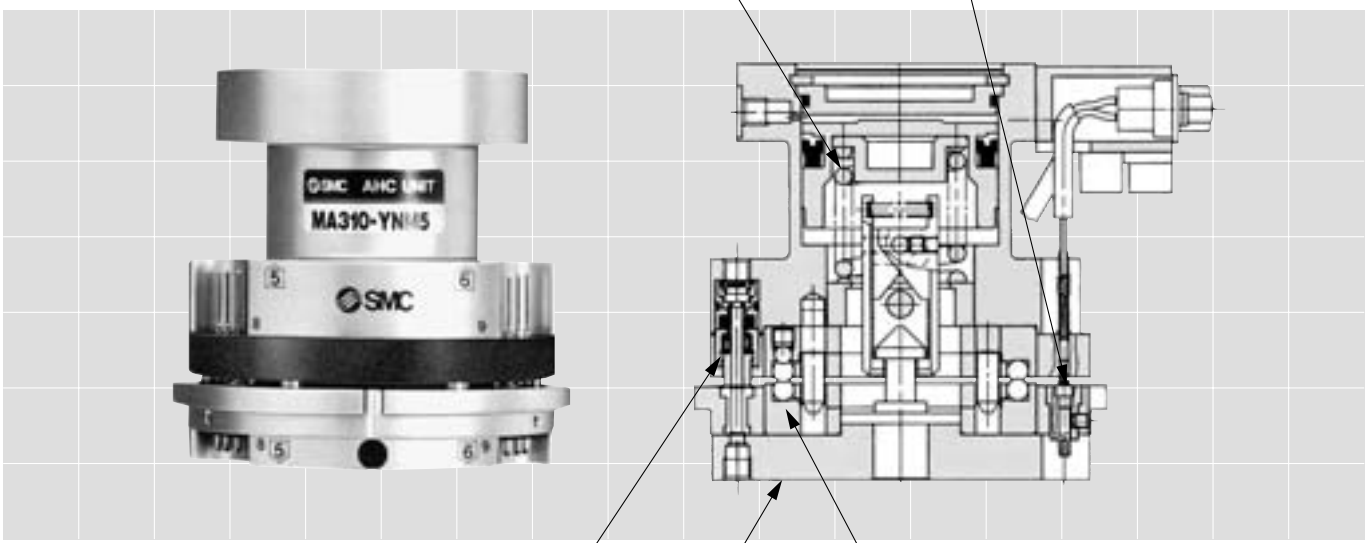
Use of the AHC system makes it possible to design the equipment layout more quickly, and reduces the time required for manufacturing.

Electric interface

Series MA2: 8 power systems
(Contact points: gold plated)
Series MA3: 12 power systems
(Contact points: gold plated)
Additional installation unit, 8 power systems (option)
D-sub connector, with robot cable (option)

Failsafe mechanism

Prevents tools from dropping due to reductions in air pressure



Air interface

Series MA2: 4 power systems, self-seal mechanism, built-in check valve
Series MA3: 6 power systems, self-seal mechanism, built-in check valve

Repeatable high-precision ±0.01 mm

Series MA210
Series MA31□
Ball coupling

Series MA32□
Curved coupling

(For high torque resistance)

Max. transportable mass:

Series MA2: **3 kg**
Series MA3: **5 kg**

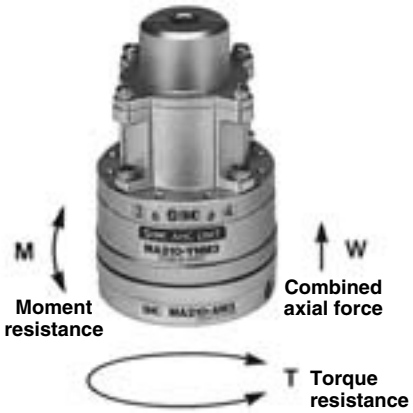
AHC System/Model/Specifications

			MA210	MA31$^{0}_{1}$				MA32$^{0}_{1}$			
	Electric specifications		Without D-sub connector	Without D-sub connector	D-sub connector entry	With D-sub connector	With robot cable	Without D-sub connector	D-sub connector entry	With D-sub connector	With robot cable
AHC unit	Robot adapter Applicable shaft diameter	**Nil**	●	●	●	●	●	●	●	●	●
		ø8	●	—	—	—	—	—	—	—	—
		ø10	●	●	●	●	●	●	●	●	●
		ø11	●	●	●	●	●	●	●	●	●
		ø14	●	●	●	●	●	●	●	●	●
		ø15	●	●	●	●	●	●	●	●	●
		ø20	●	●	●	●	●	●	●	●	●
		ø24	—	●	●	●	●	●	●	●	●
		ø25	—	●	●	●	●	●	●	●	●
Tool adapter	Port	**M3**	●	●				●			
		M5	—	●				●			

			MA210	MA31$^{0}_{1}$				MA32$^{0}_{1}$			
	Electric specifications		Without D-sub connector	Without D-sub connector	D-sub connector entry	With D-sub connector	With robot cable	Without D-sub connector	D-sub connector entry	With D-sub connector	With robot cable
Parallel opening and closing for air gripper	**MHR2** Cylinder bore	**ø10**	●	●				●			
		ø15	●	●				●			
	MHZ2 Cylinder bore	**ø10**	●	—				—			
		ø16	●	●				●			
		ø20	—	●				●			
90° reverse unit			—	●				●			
Tool stand			●	●				●			
Additional installation unit		For Y	—	●				●			
		For A	—	●				●			

AHC System/Auto Hand Changing System

Series MA2



Specifications

Series			MA210
Positioning			Ball coupling
Max. transportable mass			3 kg
Handling			Single acting/Air supply at disconnection
Handling air pressure			0.4 to 0.7 MPa
Proof pressure			1.05 MPa
Ambient and fluid temperature			0 to 60°C
Positioning repeatability			±0.01 mm
Combined axial force*			150 N
Moment resistance M*			2 N·m
Torque resistance T*			2 N·m
Interface	**Air**	**Max. operating pressure**	0.7 MPa
		Operating vacuum pressure	–100 kPa or more (10 Torr or more)
		Cv value	0.056
		Number of circuits	4
	Electricity	**Contact point capacity**	2 A/interface
		Number of contact points	8

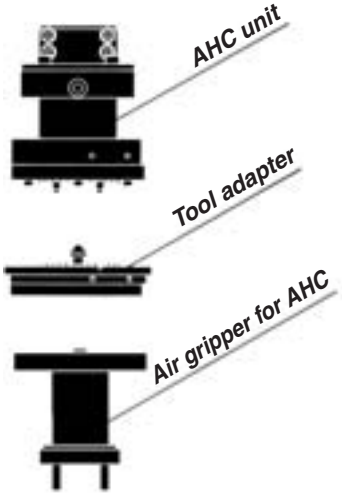
* Values given on the table for combined axial force, moment resistance, and torque resistance are the values for when the AHC unit and tool adapter begin to separate. During use, make sure the axial force, moment and torque from load are 1/2 or less than those shown above, for safety reasons.

Option Part No.

Robot adapter

Part no.	Applicable shaft diameter	Note
MA210-CS1	ø8	Hexagon socket head cap screw M3 x 8 (4 pcs.) M3 x 10 (4 pcs.)
MA210-CR1	ø10	
MA210-CR2	ø11	
MA210-CR3	ø14	
MA210-CR4	ø15	
MA210-CR5	ø20	

How to Order



AHC unit

MA 210 – Y N M3 – R3

- **MA**: Auto hand changer
- **210**: Transportable mass

2	Transportable mass 3 kg

- **Y**: AHC unit
- **N**: Electric specifications

N	None

- **M3**: Air connection size

M3	M3 x 0.5

- **R3**: Robot adapter

Nil	Without robot adapter	
S1	ø8	Applicable shaft diameter
R1	ø10	
R2	ø11	
R3	ø14	
R4	ø15	
R5	ø20	

Tool adapter

MA 210 – A M3

- **MA**: Auto hand changer
- **210**: Transportable mass

2	Transportable mass 3 kg

- **A**: Tool adapter
- **M3**: Air connection size

M3	M3 x 0.5

Air gripper for AHC

<ø10/ø15>

MHR2 – 10 – A210

- **10**: Cylinder bore

10	10 mm
15	15 mm

- **A210**: For MA2 With adapter

<ø10/ø16>

MHZ2 – 16 D N – A210 – Y69A

- **16**: Cylinder bore

10	10 mm
16	16 mm

- **D**: Double acting
- **N**: Finger position

Nil	Standard
N	Narrow type

- **A210**: For MA2 With adapter
- **Y69A**: Auto switch type

Nil	Without auto switch	
Y69A	D-Y69A (3-wire)	Solid state auto switch Lead wire: Right angle entry Lead wire length: 0.5 m
Y69B	D-Y69B (2-wire)	

- Auto switch additional symbol

Nil	2 pcs.
S	1 pc.

Tool stand

MA210 – S1 – Y59A

- **S1**: Tool stand
- **Y59A**: Auto switch type

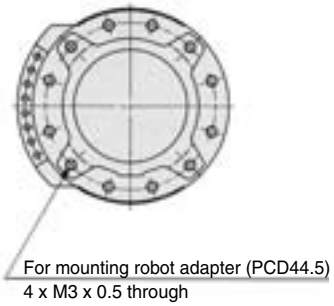
Nil	Without auto switch	
Y59A	D-Y59A (3-wire)	Solid state auto switch Lead wire: Axial direction entry
Y59B	D-Y59B (2-wire)	

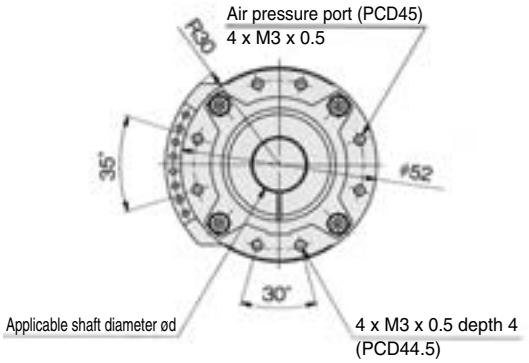
- Lead wire length

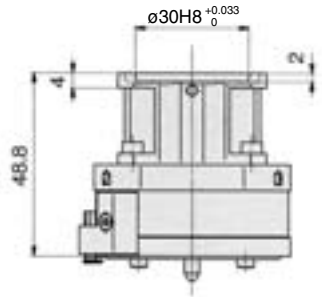
Nil	Grommet	With 0.5 m lead wire
L		With 3 m lead wire

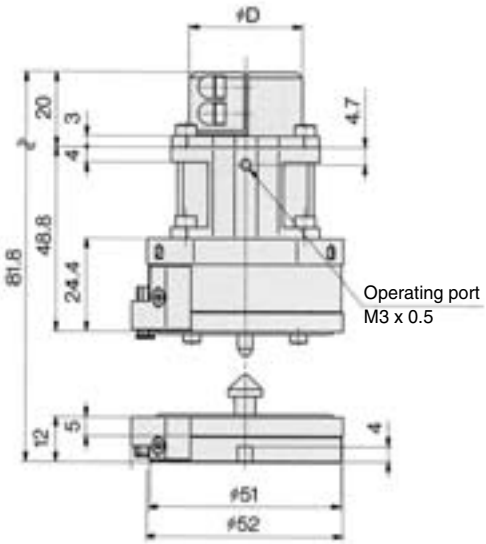
AHC Unit and Tool Adapter

AHC Unit/MA210-YNM3 (Without robot adapter)
AHC Unit/MA210-YNM3-□ (With robot adapter)
Tool adapter/MA210-AM3

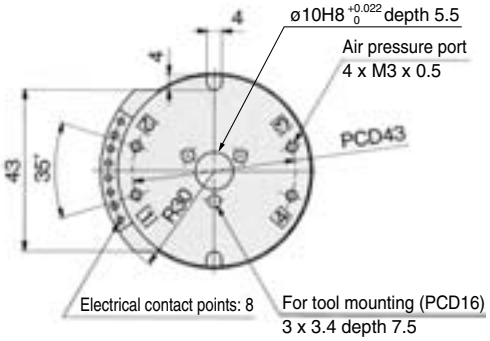








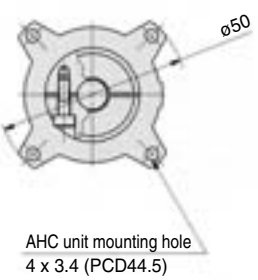
AHC unit junction

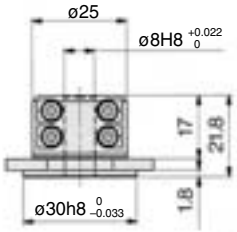


Model		Applicable shaft diameter ø**d**	ø**D**	Mass (g)
AHC unit	**MA210-YNM3**	—	—	260
	MA210-YNM3-S1	8	25	300
	MA210-YNM3-R1	10	30	
	MA210-YNM3-R2	11		
	MA210-YNM3-R3	14		
	MA210-YNM3-R4	15		
	MA210-YNM3-R5	20	35	
Tool adapter	**MA210-AM3**	—	—	100

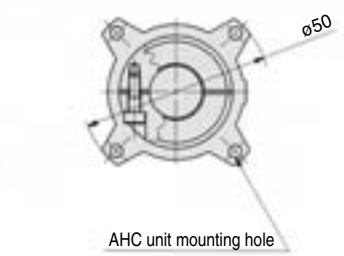
Robot adapter
MA210-C□□

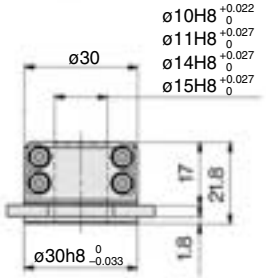
MA210-CS1



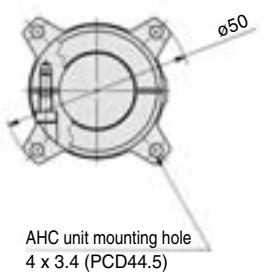


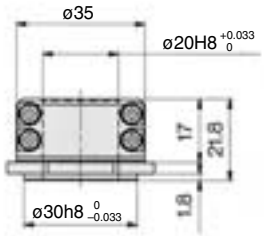
MA210-CR1, 2, 3, 4





MA210-CR5



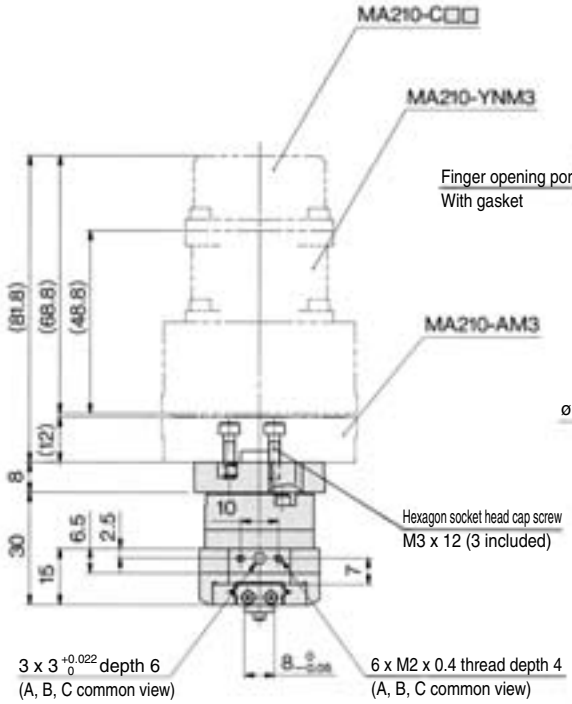


Part no.	Applicable shaft diameter	Mass (g)
MA210-CS1	ø8	40
MA210-CR1	ø10	
MA210-CR2	ø11	
MA210-CR3	ø14	
MA210-CR4	ø15	
MA210-CR5	ø20	

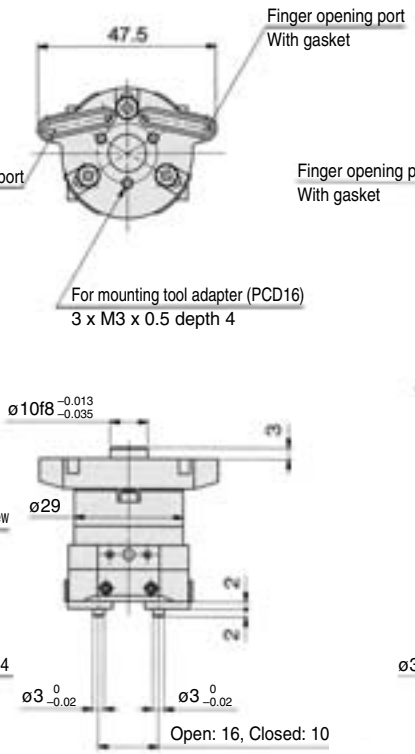
ø10/ø15 Air Gripper: Rotary Actuated Type

ø10/ø15: MHR2-$^{10}_{15}$-A210

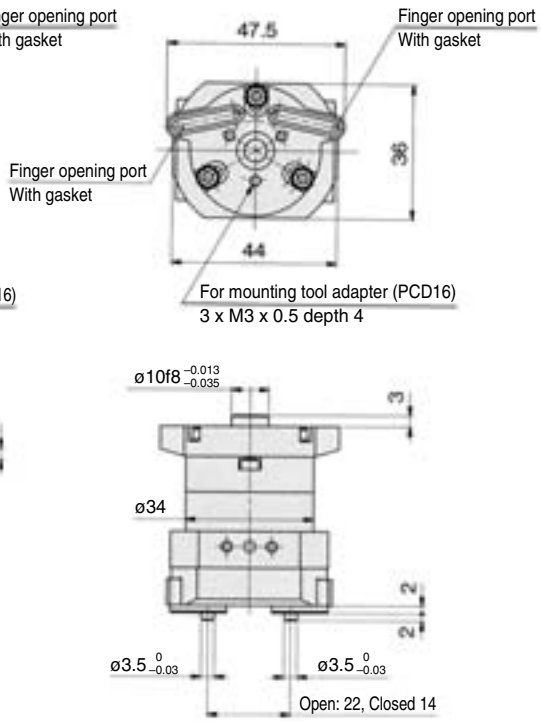
ø10
MHR2-10-A210



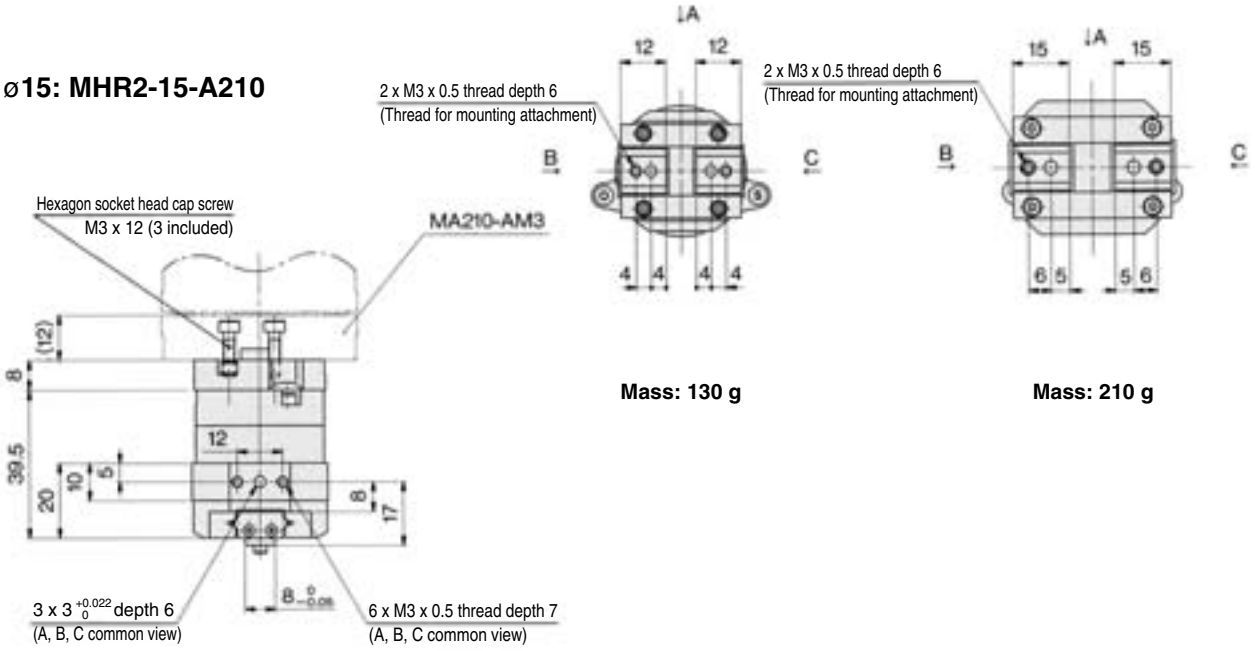
ø10
MHR2-10-A210



ø15
MHR2-15-A210



ø15: MHR2-15-A210



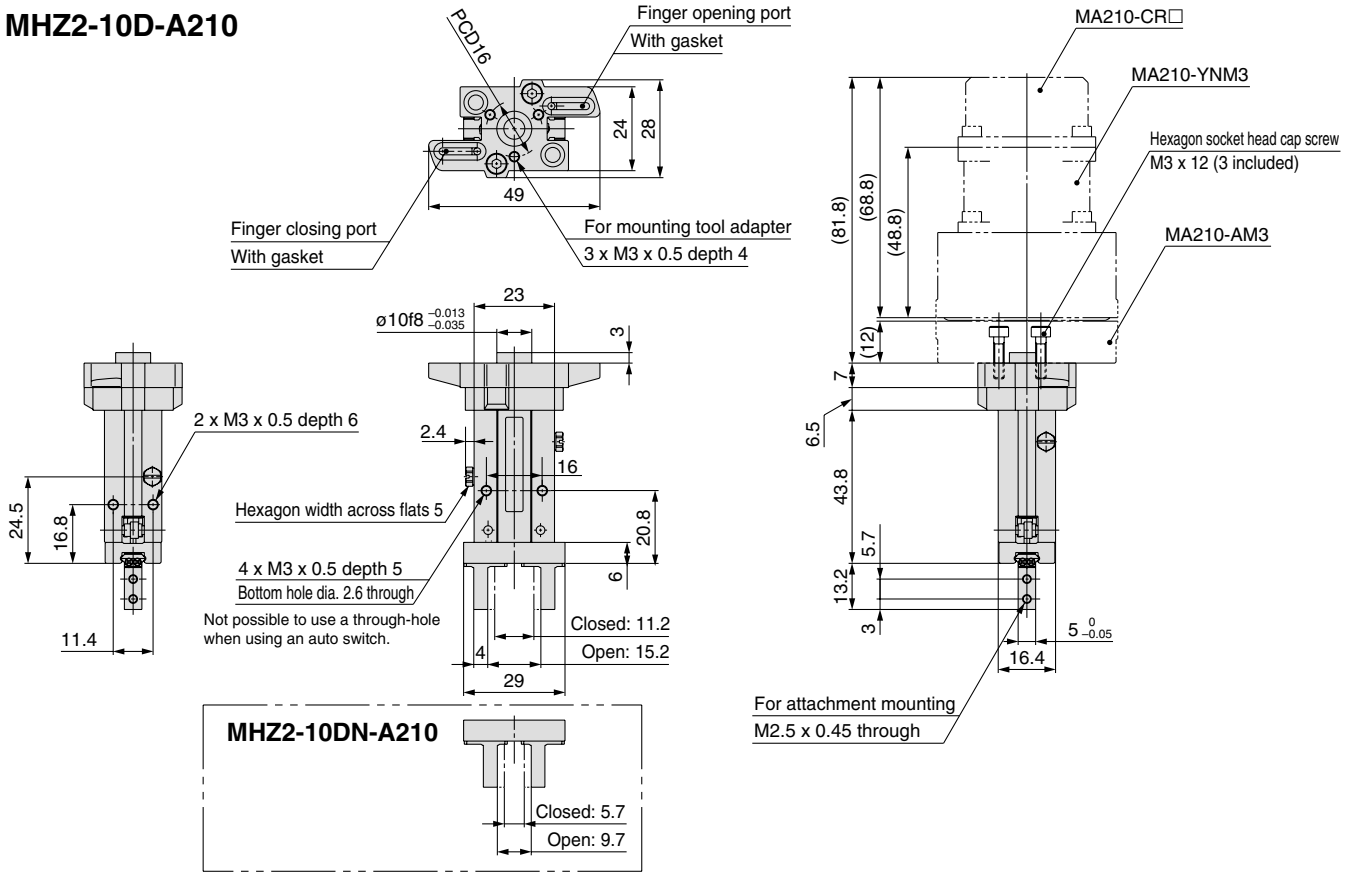
Mass: 130 g

Mass: 210 g

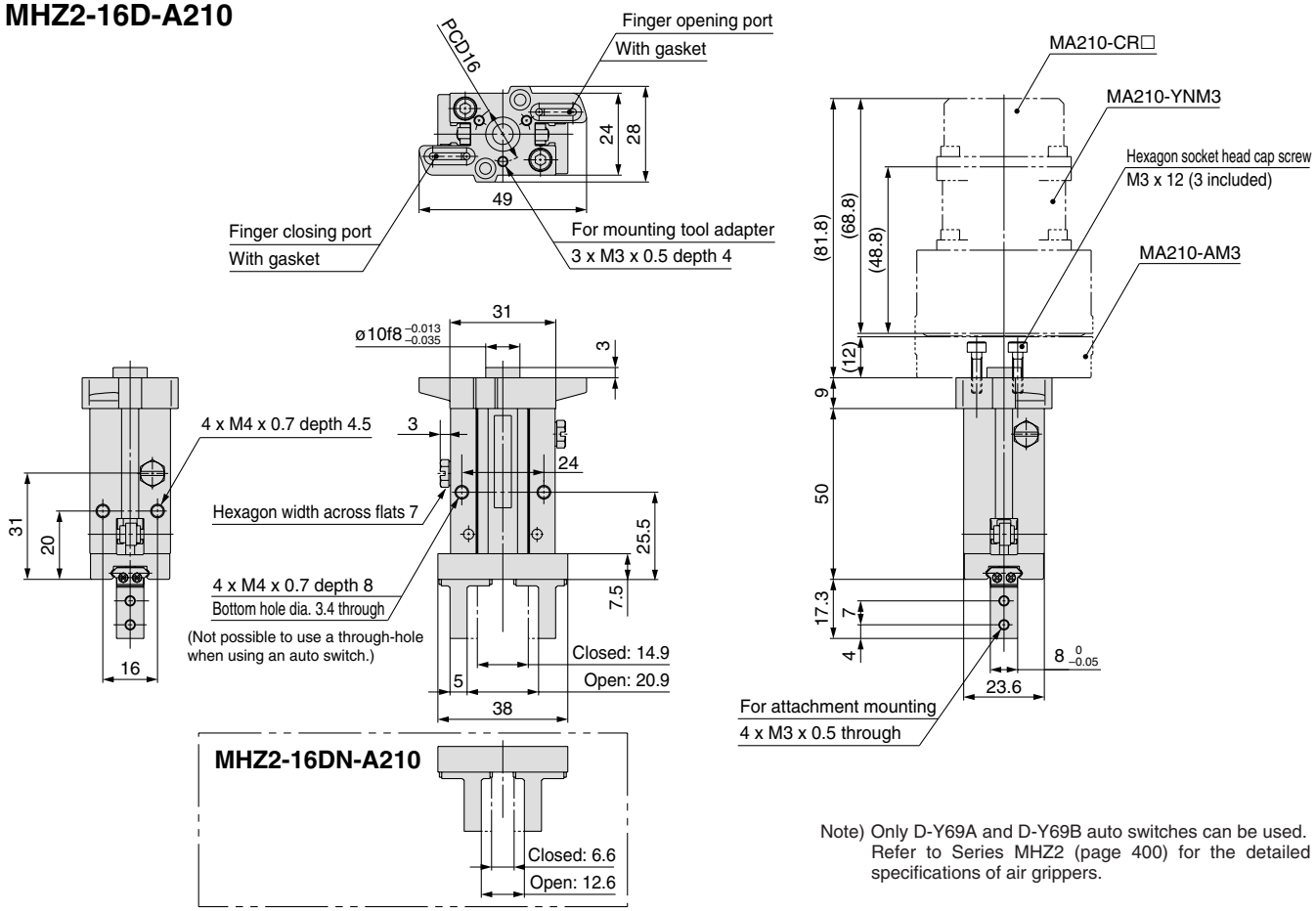
Note) Refer to Series MHR2 (page 492) for the detailed specifications of air grippers.

ø10/ø16 Air Gripper: Standard Type

MHZ2-10D-A210



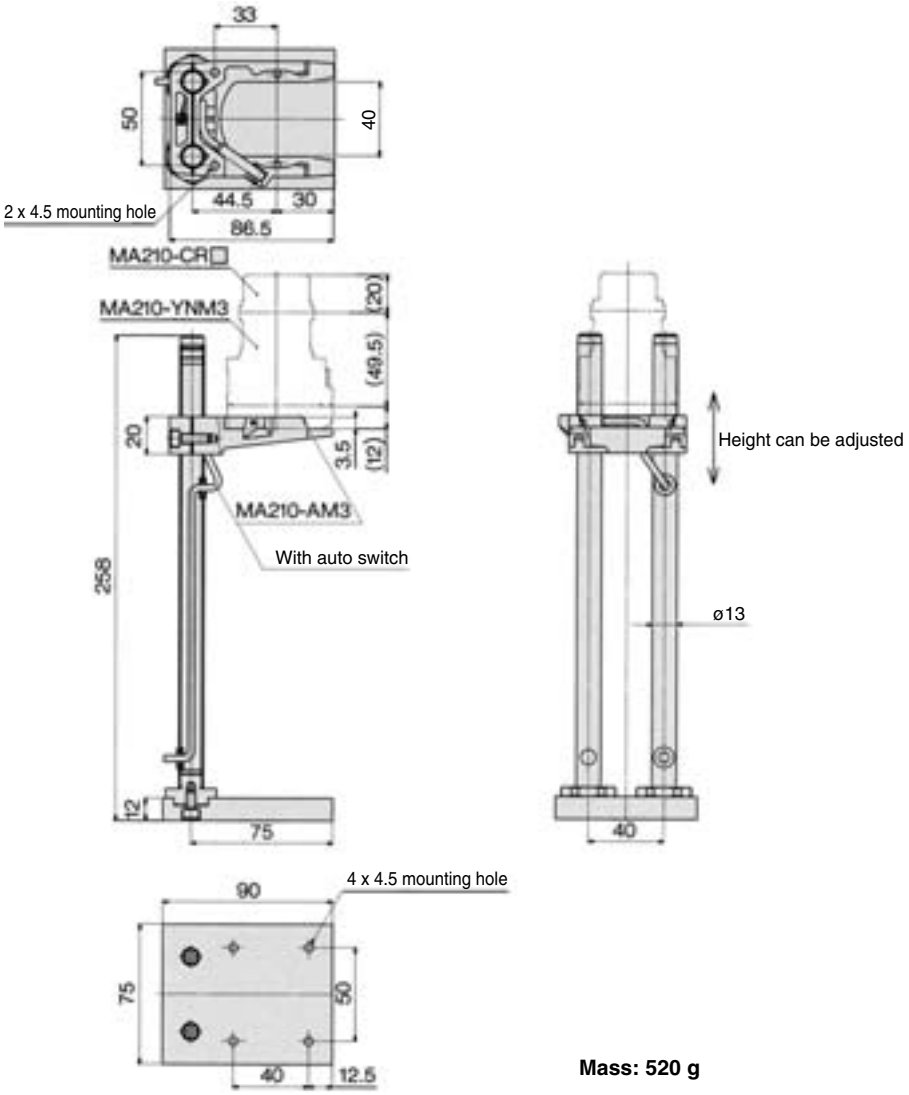
MHZ2-16D-A210



Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to Series MHZ2 (page 400) for the detailed specifications of air grippers.

Tool Stand

MA210-S1-□

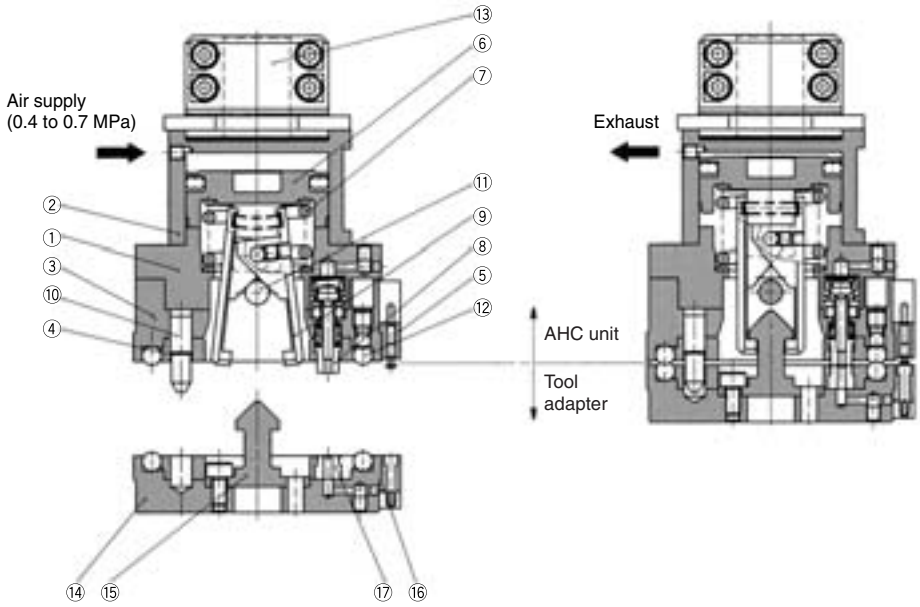


Mass: 520 g

Construction: Component Parts

Single acting type

When disconnected **When connected**



Component Parts

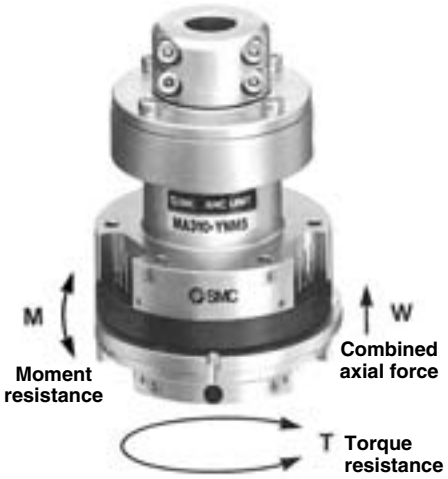
No.	Description	Material	Note
1	**Unit body**	Aluminum alloy	Hard anodized
2	**Head cap**	Aluminum alloy	Hard anodized
3	**Ball base**	Aluminum alloy	Hard anodized
4	**Ball cover**	Carbon steel	
5	**Contact probe assembly**		
6	**Piston**	Stainless steel	
7	**Clamp spring**	Steel wire	Zinc chromated
8	**Check valve assembly**		
9	**Lever**	Carbon steel	Special black thin membrane anti-corrosive treated
10	**Pilot pin**	Carbon steel	Special black thin membrane anti-corrosive treated

Component Parts

No.	Description	Material	Note
11	**Parallel pin**	Stainless steel	
12	**Steel ball**	Stainless steel	
13	**Robot adapter**	Aluminum alloy	Hard anodized
14	**Tool adapter**	Aluminum alloy	Hard anodized
15	**Hook**	Carbon steel	Special black thin membrane anti-corrosive treated
16	**Contact block assembly**		Contact point gold plated
17	**Passage seal**	Synthetic rubber	

AHC System/Auto Hand Changing System

Series MA3



Specifications

Series			MA310	MA311	MA320	MA321
Positioning			Ball coupling		Curved coupling	
Max. transportable mass			5 kg			
Handling			Single acting/ Air supply at disconnection	Double acting	Single acting/ Air supply at disconnection	Double acting
Handling air pressure			0.4 to 0.7 MPa			
Proof pressure			1.05 MPa			
Ambient and fluid temperature			0 to 60°C			
Positioning repeatability			±0.01 mm			
Combined axial force *			200 N	500 N (0.5 MPa)	200 N	500 N (0.5 MPa)
Moment resistance M *			3 N·m	7.5 N·m (0.5 MPa)	3 N·m	7.5 N·m (0.5 MPa)
Torque resistance T *			3 N·m	7.5 N·m (0.5 MPa)	12 N·m	30 N·m (0.5 MPa)
Interface	**Air**	**Max. operating pressure**	0.7 MPa			
		Operating vacuum pressure	–100 kPa or more (10 Torr or more)			
		Cv value	0.072			
		Number of circuits	6			
	Electricity	**Contact point capacity**	2 A/interface			
		Number of contact points	12			

* Values given on the table for combined axial force, moment resistance, and torque resistance are the values for when the AHC unit and tool adapter begin to separate. During use, make sure the axial force, moment and torque from load are 1/2 or less than those shown above, for safety reasons.

Option Part No.

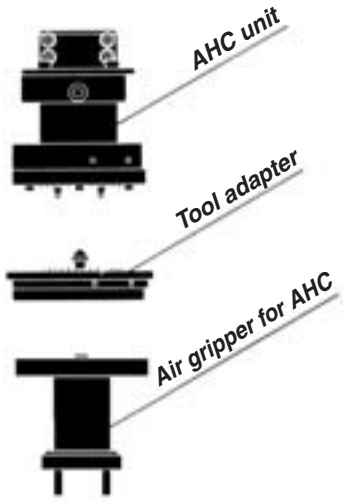
Robot adapter

Part no.	Applicable shaft diameter	Note
MA310-CR1	ø10	Hexagon socket head cap screw M4 x 10 (4 pcs.) M4 x 14 (4 pcs.)
MA310-CR2	ø11	
MA310-CR3	ø14	
MA310-CR4	ø15	
MA310-CR5	ø20	
MA310-CS6	ø24	
MA310-CR6	ø25	

Additional Installation Unit of Electrical Contact Point

Part no.	Additional installation unit	Application	Note
MA310-EY1	8 contact points	AHC unit	Hexagon socket head cap screw M2.5 x 10 (2 pcs.)
MA310-EA1		Tool adapter	

How to Order



MA 3 1 0 – Y A M5 – R3

Auto hand changer

Transportable mass

3	Transportable mass 5 kg

Positioning

1	Ball coupling
2	Curved coupling

Operation

0	Single acting
1	Double acting

AHC unit

Electric specifications

Symbol	No electric specifications	D-sub connector
N	●	—
A	—	● (Without connector)
B	—	● (With connector)
C	—	● (With 3 m cable)

Air connection size

M5	M5 x 0.8

Robot adapter

Nil	Without robot adapter	
R1	ø10	Applicable shaft diameter
R2	ø11	
R3	ø14	
R4	ø15	
R5	ø20	
S6	ø24	
R6	ø25	

Tool adapter

MA 3 10 – A M5

Auto hand changer

Transportable mass

3	Transportable mass 5 kg

Series

10	Ball coupling
20	Curved coupling

Tool adapter

Air connection size

M3	M3 x 0.5
M5	M5 x 0.8

Air gripper for AHC

<ø10/ø15>

MHR2 – 10 – A310

Cylinder bore

10	10 mm
15	15 mm

For MA3 With adapter

<ø16/ø20>

MHZ2 – 16 D N – A310 – Y69A

Cylinder bore

16	16 mm
20	20 mm

Finger position

Nil	Standard
N	Narrow type

For MA3 With adapter

Auto switch type

Nil	Without auto switch	
Y69A	D-Y69A (3-wire)	Solid state auto switch Lead wire: Right angle entry Lead wire length: 0.5 m
Y69B	D-Y69B (2-wire)	

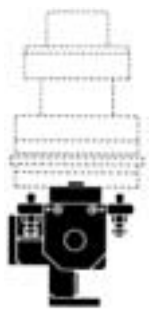
Auto switch additional symbol

Nil	2 pcs.
S	1 pc.

∗ When using an air gripper for AHC, use tool adapter MA3$^{1}_{2}$0-AM3

90° reverse unit

MA310 – R1 – 90A



90° reverse unit

Auto switch type

Nil	Without auto switch	—		
90	D-90 (2 pcs.)	Reed auto switch		Lead wire length: 0.5 m
90A	D-90A (2 pcs.)			
S99	D-S991, D-S992 (1 pc. each)	Solid state auto switch	3-wire	
T99	D-T991, D-T992 (1 pc. each)		2-wire	

∗ Can also be used for Series MA320.

Tool stand

MA310 – S1 – Y59A

Tool stand

Lead wire length

Nil	Grommet	With 0.5 m lead wire
L		With 3 m lead wire

Auto switch type

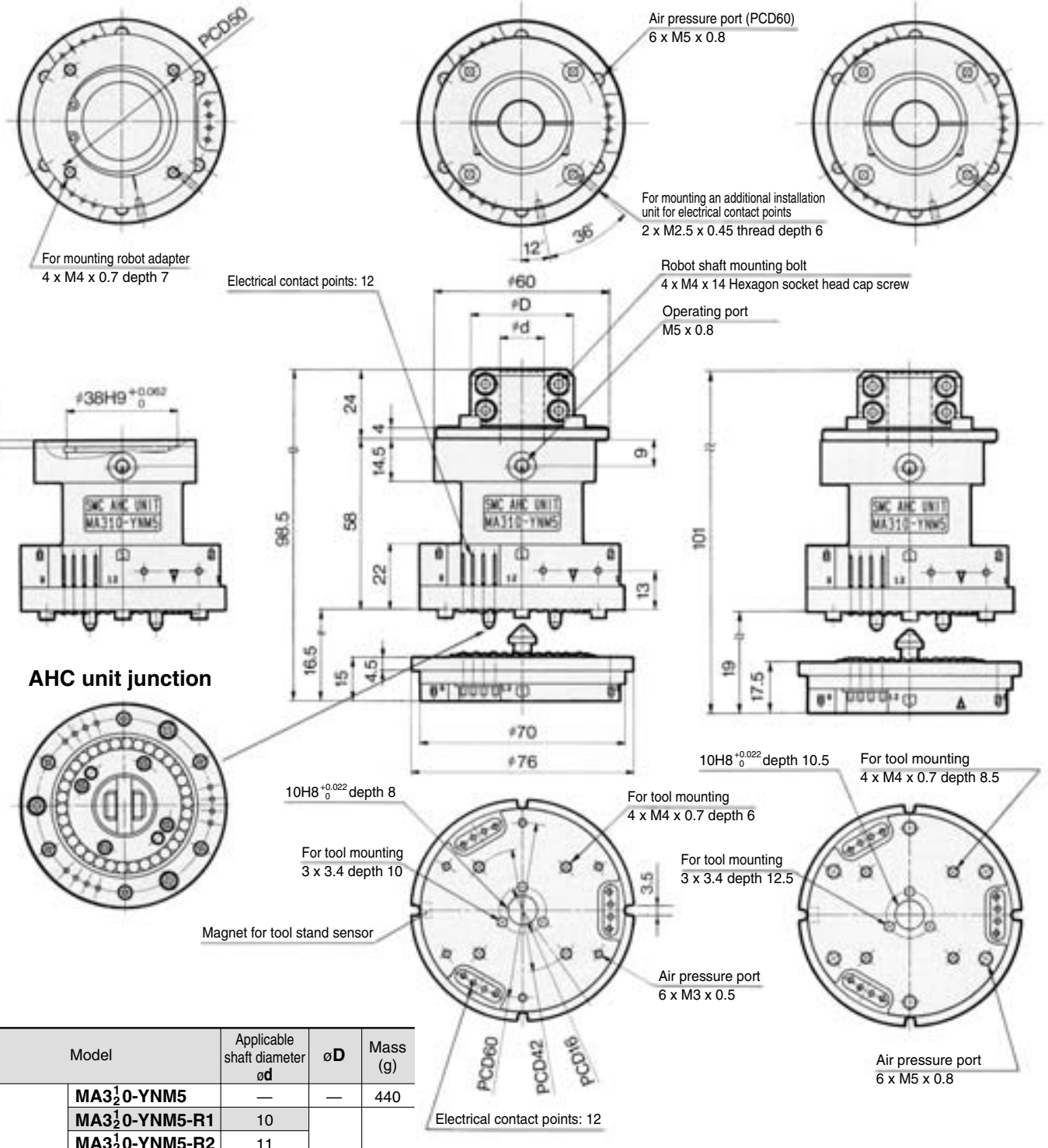
Nil	Without auto switch	
Y59A	D-Y59A (3-wire)	Solid state auto switch Lead wire: Axial direction entry
Y59B	D-Y59B (2-wire)	

∗ Can also be used for Series MA320.

AHC Unit and Tool Adapter/Single Acting Type

AHC Unit/MA3$_2^1$0-YNM5 (Without robot adapter)
AHC Unit/MA3$_2^1$0-YNM5-□ (With robot adapter)
Tool adapter/MA3$_2^1$0-A□

When mounting MA3$_2^1$0-AM3 **When mounting MA3$_2^1$0-AM5**

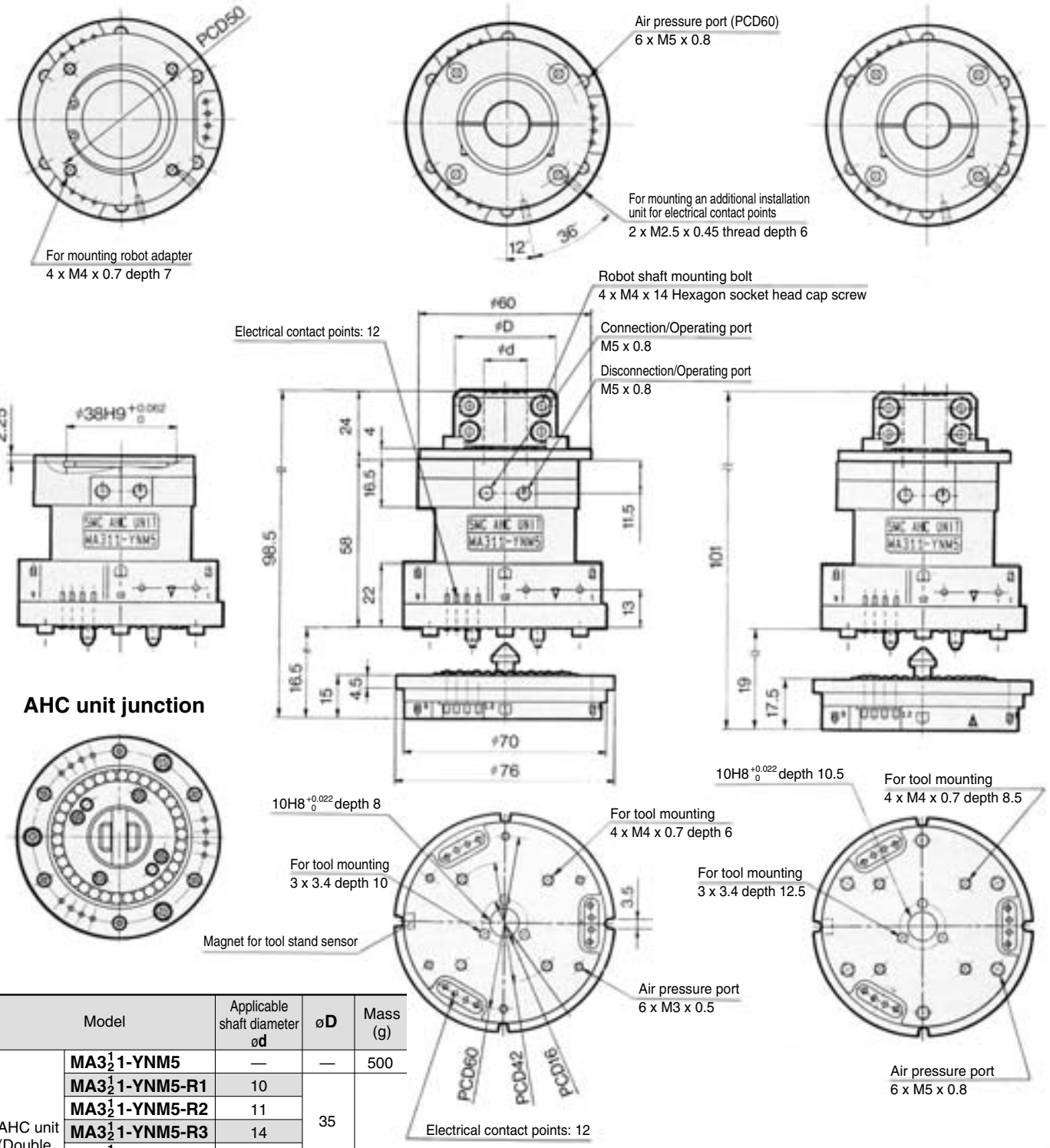


Model		Applicable shaft diameter ød	øD	Mass (g)
AHC unit	**MA3$_2^1$0-YNM5**	—	—	440
	MA3$_2^1$0-YNM5-R1	10	35	520
	MA3$_2^1$0-YNM5-R2	11		
	MA3$_2^1$0-YNM5-R3	14		
	MA3$_2^1$0-YNM5-R4	15		
	MA3$_2^1$0-YNM5-R5	20	41	
	MA3$_2^1$0-YNM5-S6	24		
	MA3$_2^1$0-YNM5-R6	25		
Tool adapter	**MA3$_2^1$0-AM3**	—	—	250
	MA3$_2^1$0-AM5			270

AHC Unit and Tool Adapter/Double Acting Type

AHC Unit/MA3$\frac{1}{2}$1-YNM5 (Without robot adapter)
AHC Unit/MA3$\frac{1}{2}$1-YNM5-□ (With robot adapter)
Tool adapter/MA3$\frac{1}{2}$1-A□

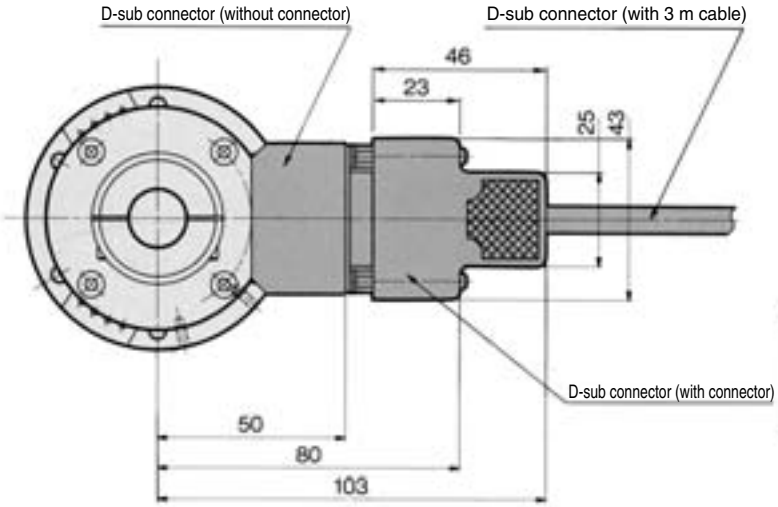
When mounting MA3$\frac{1}{2}$1-AM3 **When mounting MA3$\frac{1}{2}$1-AM5**



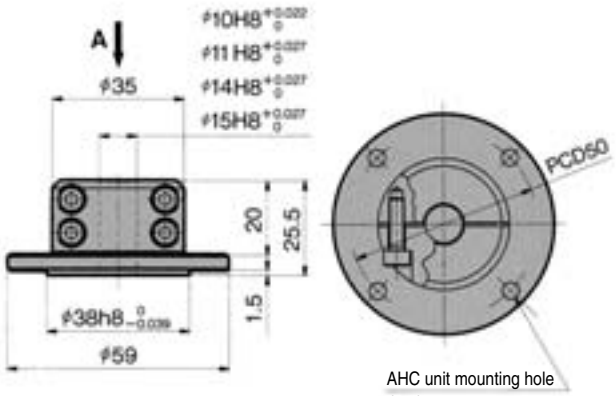
Model		Applicable shaft diameter ød	øD	Mass (g)
AHC unit (Double Acting)	**MA3$\frac{1}{2}$1-YNM5**	—	—	500
	MA3$\frac{1}{2}$1-YNM5-R1	10	35	580
	MA3$\frac{1}{2}$1-YNM5-R2	11		
	MA3$\frac{1}{2}$1-YNM5-R3	14		
	MA3$\frac{1}{2}$1-YNM5-R4	15		
	MA3$\frac{1}{2}$1-YNM5-R5	20	41	
	MA3$\frac{1}{2}$1-YNM5-S6	24		
	MA3$\frac{1}{2}$1-YNM5-R6	25		
Tool adapter	**MA3$\frac{1}{2}$0-AM3**	—	—	250
	MA3$\frac{1}{2}$0-AM5			270

With D-sub connector
MA3□□-Y□M5-□□

Robot adapter
MA310-C□□

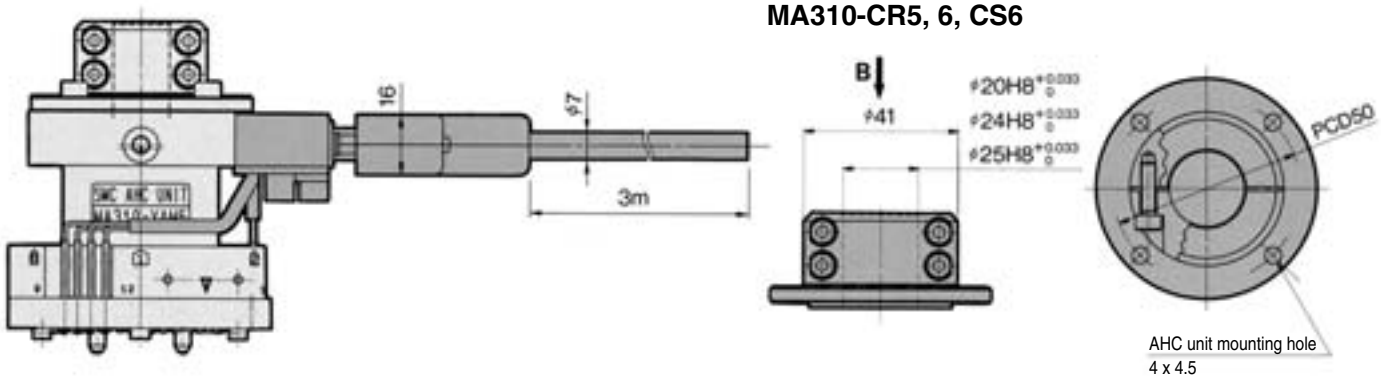


MA310-CR1, 2, 3, 4



View A

MA310-CR5, 6, CS6



View B

AHC unit with D-sub connector	Mass (g)
MA3$\frac{1}{2}$0-YAM5-□□	600
MA3$\frac{1}{2}$0-YBM5-□□	620
MA3$\frac{1}{2}$0-YCM5-□□	890
MA3$\frac{1}{2}$1-YAM5-□□	660
MA3$\frac{1}{2}$1-YBM5-□□	680
MA3$\frac{1}{2}$1-YCM5-□□	950

Model	Applicable shaft diameter	Mass (g)
MA310-CR1	ø10	80
MA310-CR2	ø11	
MA310-CR3	ø14	
MA310-CR4	ø15	
MA310-CR5	ø20	
MA310-CS6	ø24	
MA310-CR6	ø25	

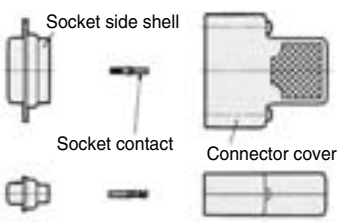
D-sub connectors

D-sub connector specifications

		AHC unit main body side	Robot cable side
D-sub connector	**Contact classification**	Pin	Socket
	Shell size	A	
	No. of cores	15	
	Connector type	Crimping connection type	
Robot cable	**Effective area**	—	0.2 mm²
	No. of cores	—	12

MA3□□-YAM5-□□ with a D-sub connector
Since the AHC unit main body is compatible with a pin contact, prepare a socket contact.

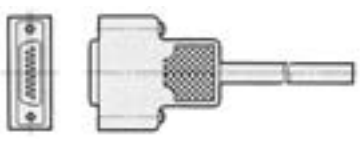
MA3□□-YBM5-□□ with a D-sub connector
A pin contact is comprised of 12 crimping connection type pins as standard.
For a crimping tool, we recommend the CT150-2-D*C made by Japan Aviation Electronics Industry, Inc.



MA3□□-YCM5-□□ with a robot cable
The combination of the electric contact point number and cables of the AHC unit is shown in the table below.

Electrical Contact Point No./Cable Wiring

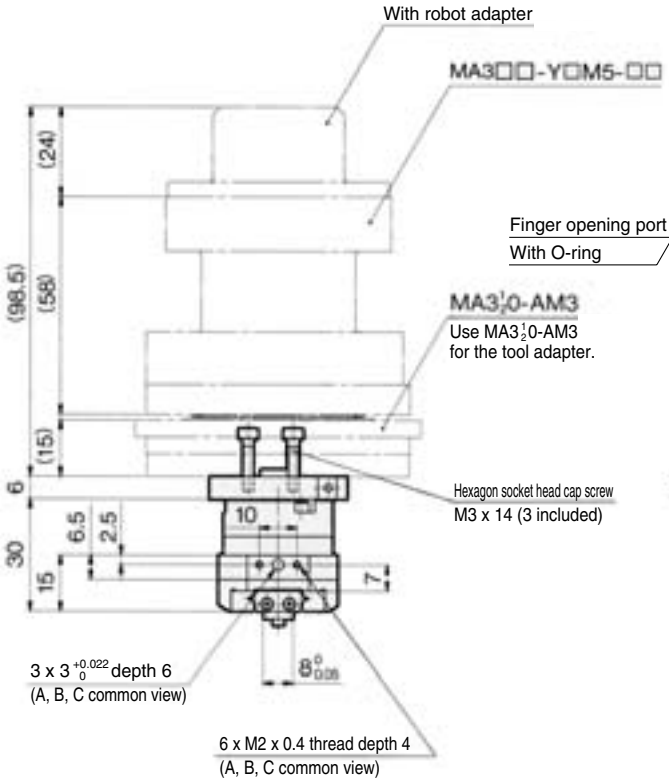
Electrical contact point no.	1	2	3	4	5	6	7	8	9	10	11	12
Insulation color	Red	White	Black	Pink	Light blue	Purple	Gray	Orange	Green	Yellow	Brown	Blue



ø10/ø15 Air Gripper: Rotary Actuated Type

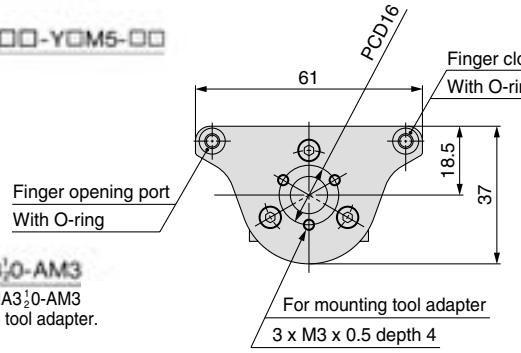
ø10/ø15: MHR2-$^{10}_{15}$-A310

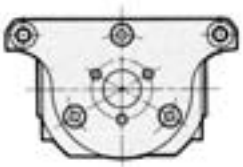
ø10
MHR2-10-A310

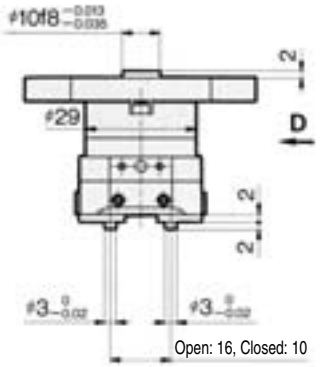


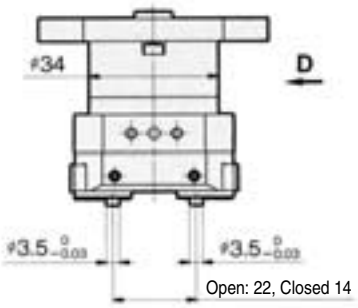
View D

ø10
MHR2-10-A310

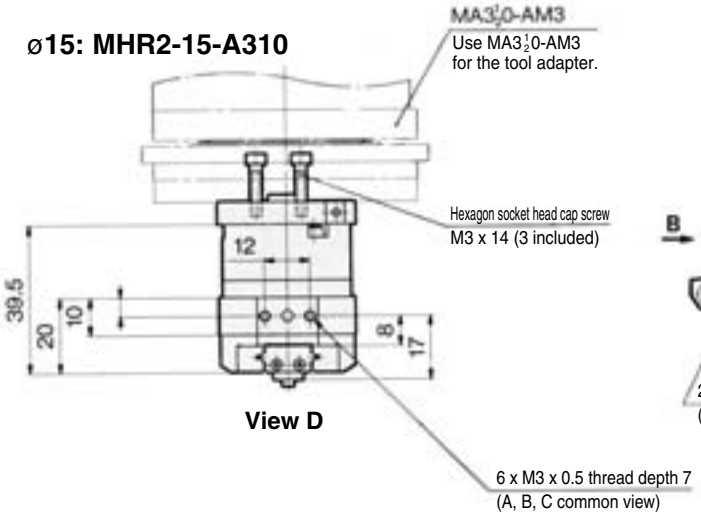




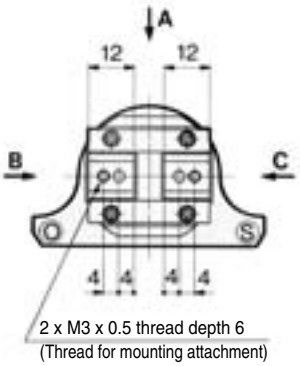




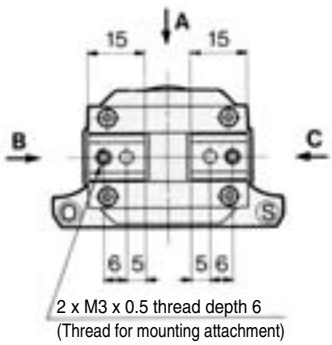
ø15: MHR2-15-A310



View D



Mass: 130 g

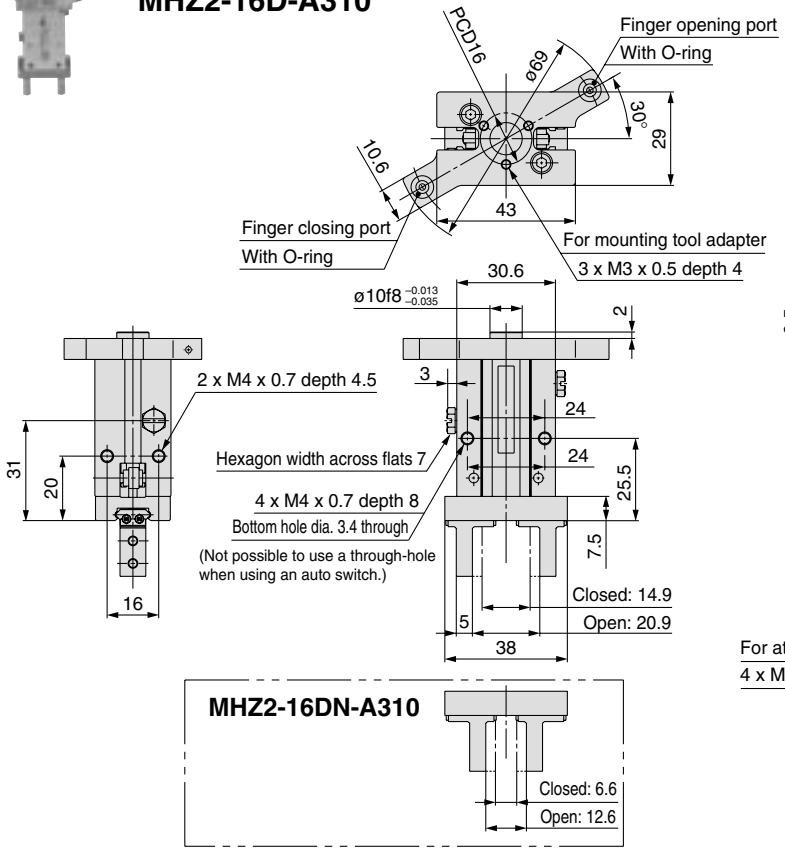


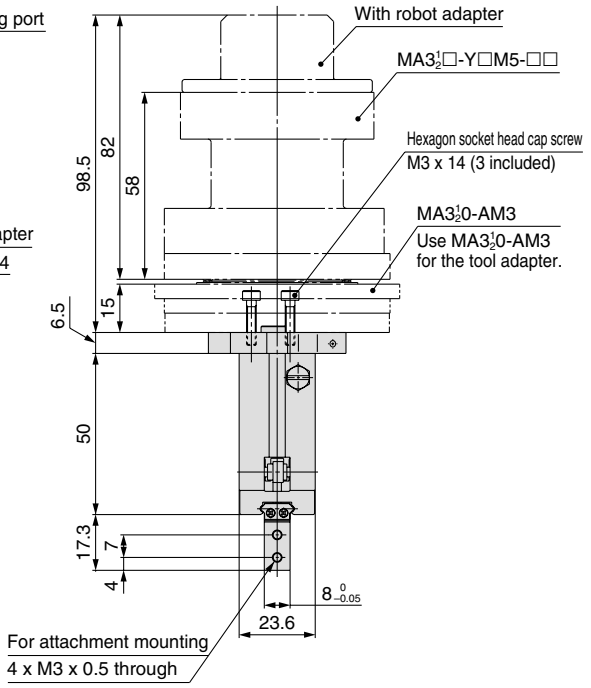
Mass: 210 g

Note) Refer to Series MHR2 (page 492) for the detailed specifications of air grippers.

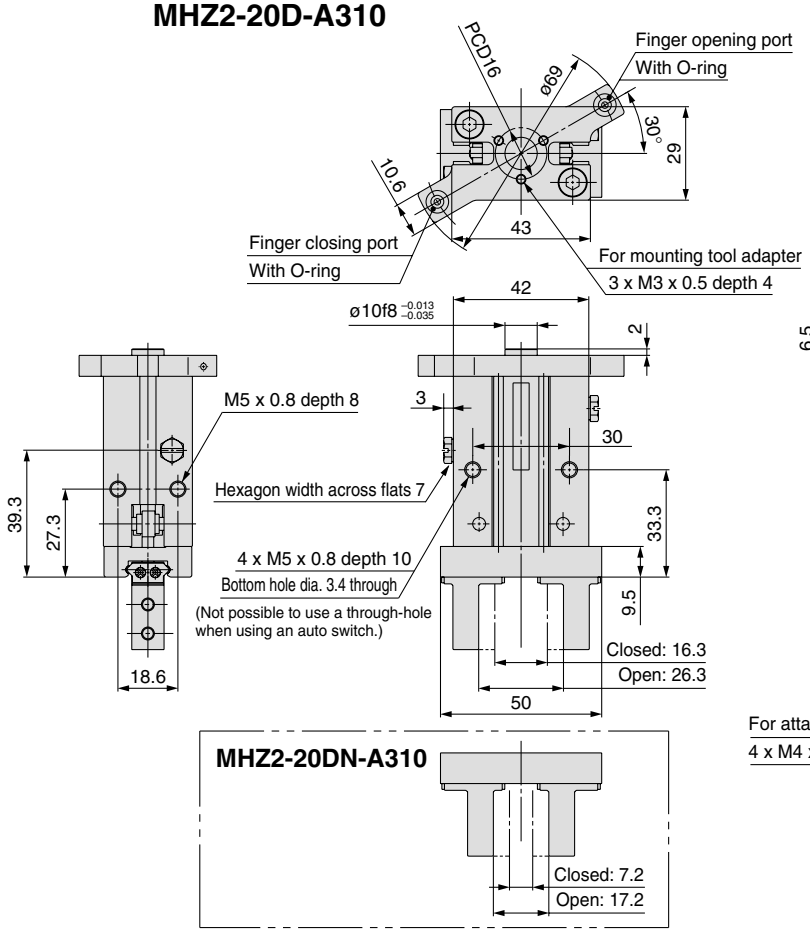
ø16/ø20 Air Gripper: Standard Type

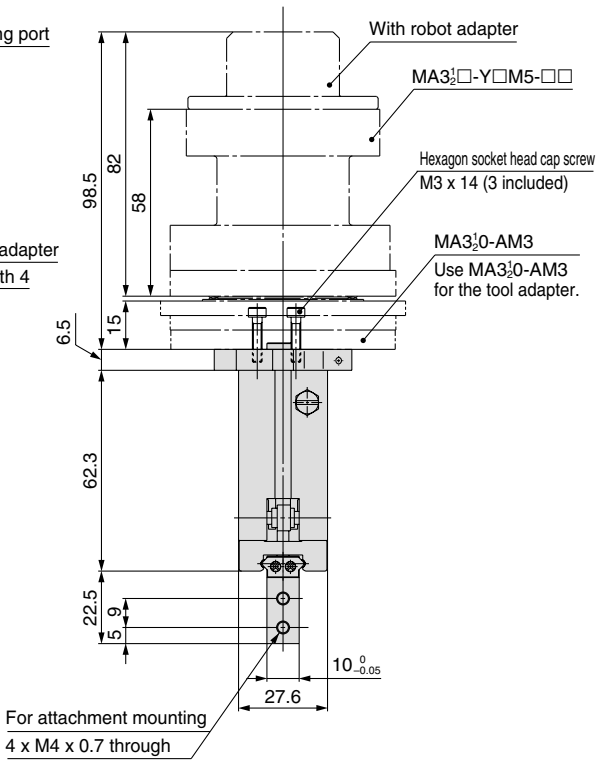
MHZ2-16D-A310





MHZ2-20D-A310

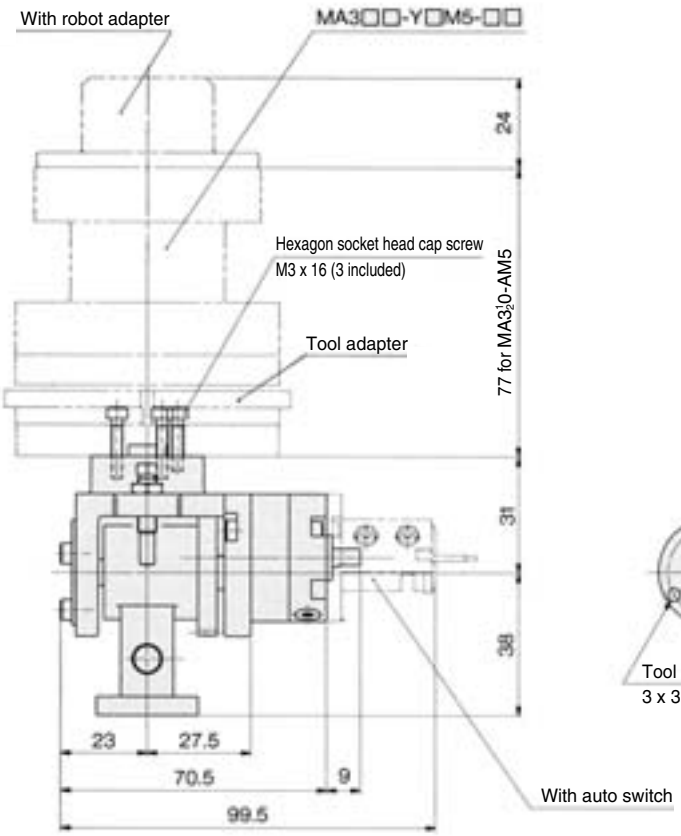




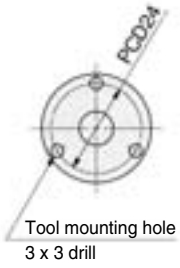
Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to Series MHZ2 (page 400) for the detailed specifications of air grippers.

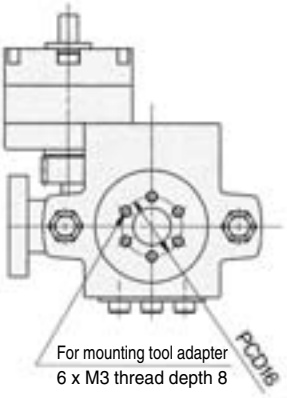
90° Reverse Unit

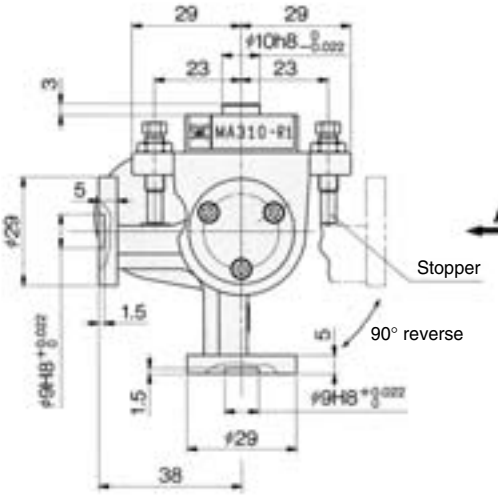
MA310-R1-□

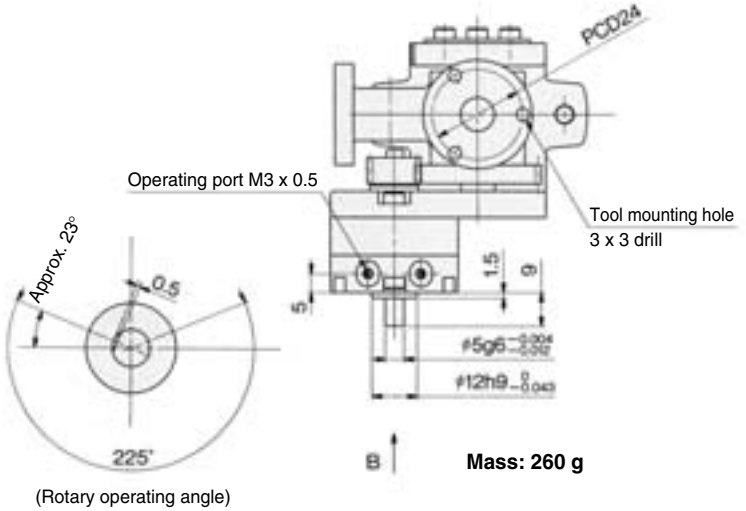


View A







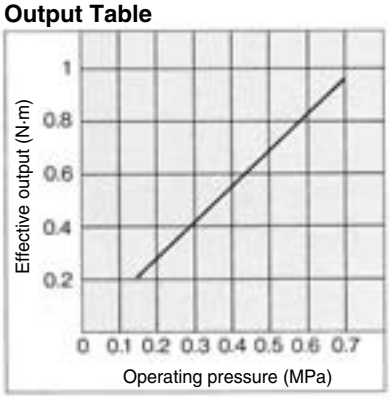


Mass: 260 g

(Rotary operating angle)

View B

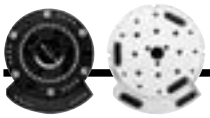
Output Table



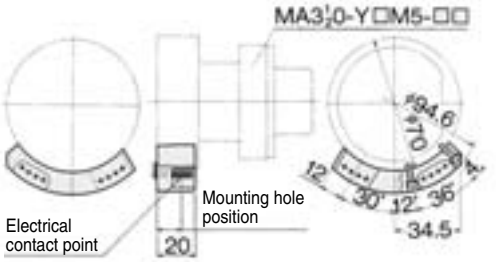
Please consult SMC regarding operating conditions (load, speed, etc.) before using.

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

Additional Installation Unit of Electrical Contact Point

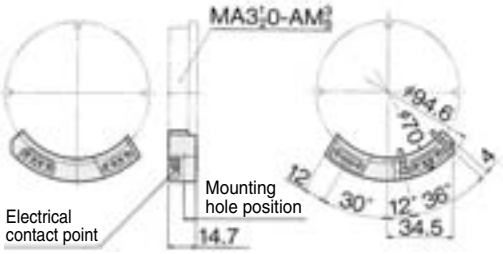


MA310-EY1: For AHC unit



Accessory	Hexagon socket head cap screw M2.5 x 10
	Flat washer, Compact round washer, Nominal size 2.5
Mass	20 g

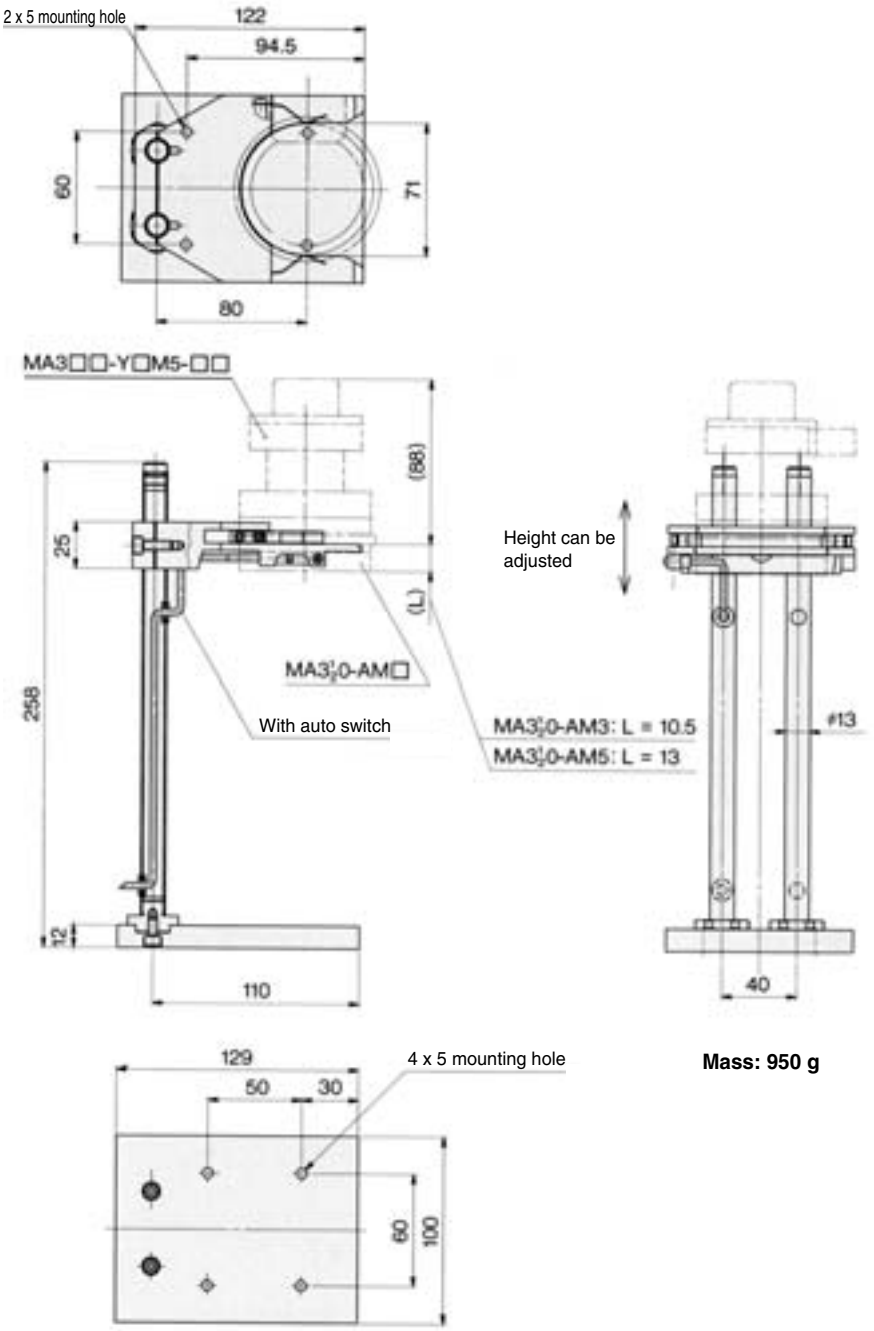
MA310-EA1: For tool adapter



Accessory	Hexagon socket head cap screw M2.5 x 10
Mass	25 g

Tool Stand

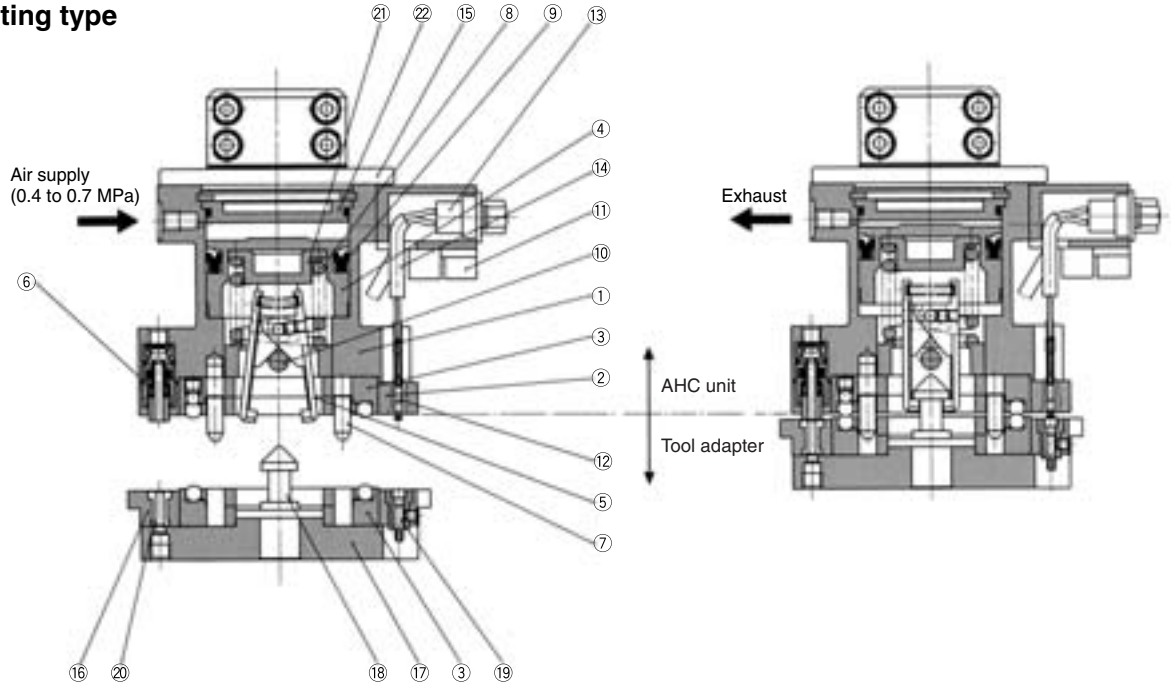
MA310-S1-□



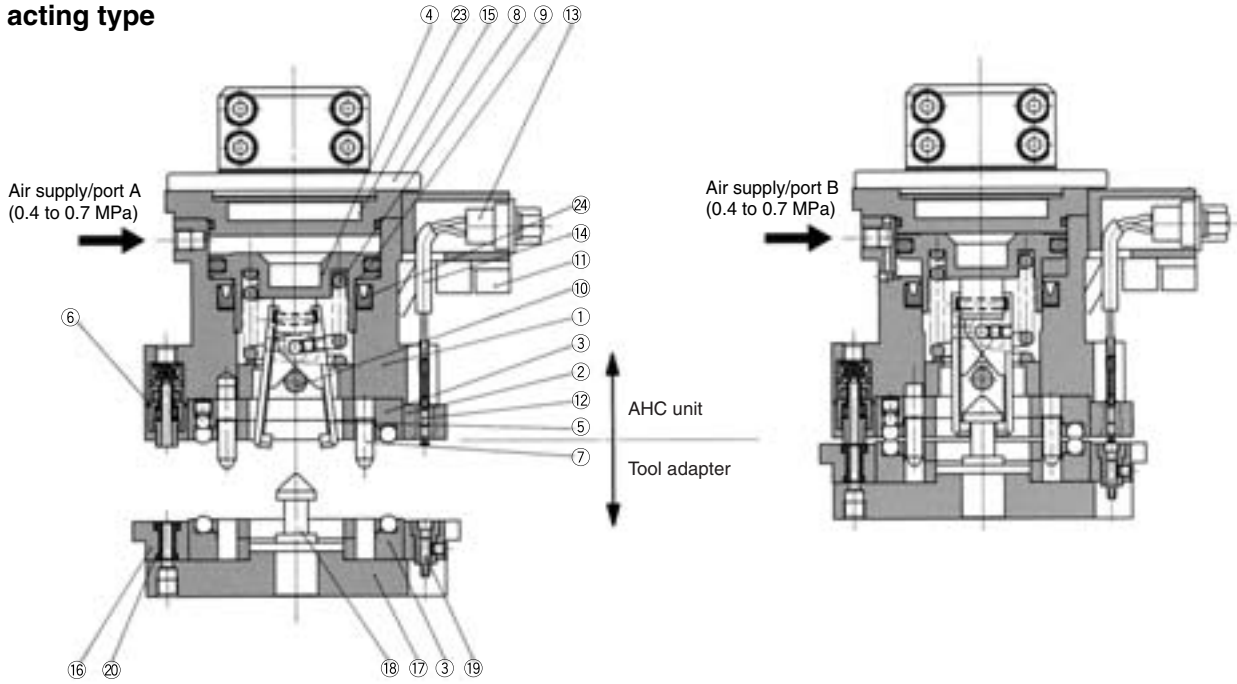
Mass: 950 g

Construction: Component Parts

Single acting type



Double acting type



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Insulation ring**	Synthetic resin	Black
3	**Coupling**	Carbon steel	Special black thin membrane anti-corrosive treated
4	**Piston**	Aluminum alloy	Chromated
5	**Lever**	Carbon steel	Special black thin membrane anti-corrosive treated
6	**Check valve assembly**	Brass, steel wire, synthetic rubber	
7	**Pilot pin**	Carbon steel	Special black thin membrane anti-corrosive treated
8	**Clamp spring**	Steel wire	
9	**Seal**	Synthetic rubber	
10	**Parallel pin**	Carbon steel	
11	**Multi-tube holder**	Synthetic resin	Black
12	**Contact probe**		
13	**D-sub connector assembly**		

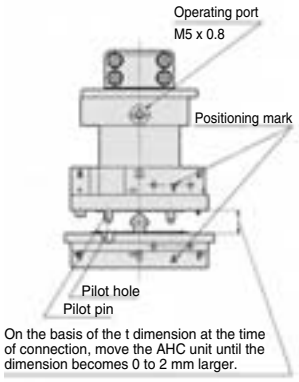
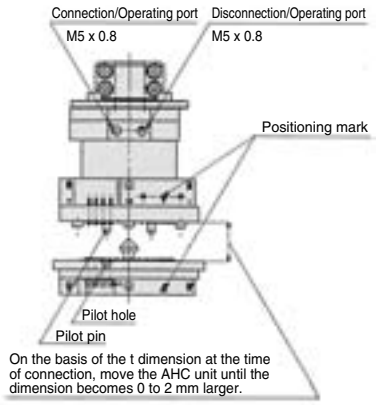
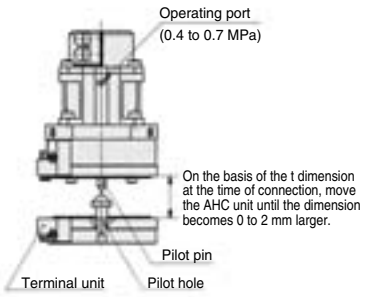
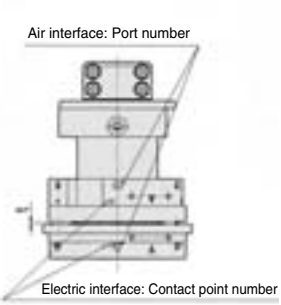
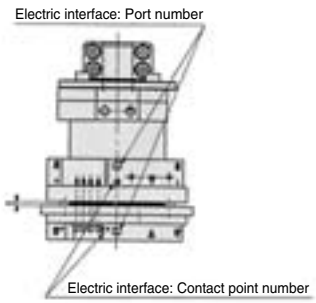
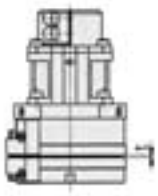
Component Parts

No.	Description	Material	Note
14	**Heath cable**		
15	**Robot adapter**	Aluminum alloy	Hard anodized
16	**Connecting base**	Aluminum alloy	Hard anodized
17	**Toe plate**	Aluminum alloy	Hard anodized
18	**Hook**	Carbon steel	Special black thin membrane anti-corrosive treated
19	**Contact block assembly**	Beryllium copper, synthetic resin	Contact point gold plated
20	**Passage seal**	Synthetic rubber	
Single acting type			
21	**Bearing**	Stainless steel	
22	**Cap**	Aluminum alloy	Chromated
Double acting type			
23	**Head cap**	Aluminum alloy	
24	**Rod seal**	Synthetic rubber	

Specific Product Precautions 1

Be sure to read before handling.

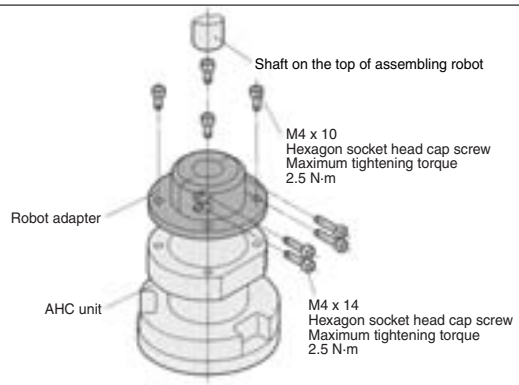
Connection and disconnection procedures

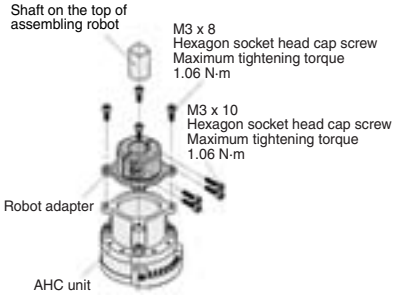
Series	MA3$^{1}_{2}$0	MA3$^{1}_{2}$1	MA210
Connection procedures	1. Supply compressed air: 0.4 to 0.7 MPa to the operating port.	1. Supply compressed air: 0.4 to 0.7 MPa to the disconnection port.	1. Supply compressed air: 0.4 to 0.7 MPa to the operating port.
	2. Align the positions of the AHC unit and tool adapter as shown below, move the AHC unit to within 0.5 mm of the tool adapter, with the centers aligned, and insert the pilot pin into the pilot hole on the tool adapter side. Move the AHC unit toward until the t dimension in the figure below attains 0 to 2 mm larger than the value at the time of connection.		
	3. Release the compressed air from the operating port.	3. Release the compressed air from the disconnection port, and at the same time supply compressed air (0.4 to 0.7 MPa) to the connection port.	3. Release the compressed air from the operating port.
Disconnection procedures	1. Supply compressed air: 0.4 to 0.7 MPa to the operating port. 2. Pull up the AHC unit 12 mm or more.	1. Release the compressed air from the connection port, and at the same time supply compressed air (0.4 to 0.7 MPa) to the disconnection port. 2. Pull up the AHC unit 12 mm or more.	1. Supply compressed air: 0.4 to 0.7 MPa to the operating port. 2. Pull up the AHC unit 12 mm or more.
	Disconnected state  	Disconnected state  	Disconnected state 
	Connected state  	Connected state  	Connected state 

Robot Adapter Mounting

[Mounting the robot adapter to the AHC unit]
Attach the robot adapter to the AHC unit by evenly tightening the 4 hexagon socket head cap screws with the maximum tightening torque mentioned in the figures below.

[Mounting the robot adapter to an assembling robot]
Mount the AHC unit to the shaft of the assembling robot by evenly tightening the 4 hexagon socket head cap screws with the maximum tightening torque mentioned in the figures below





Specific Product Precautions 2

Be sure to read before handling.

Series	MA3□□	MA210

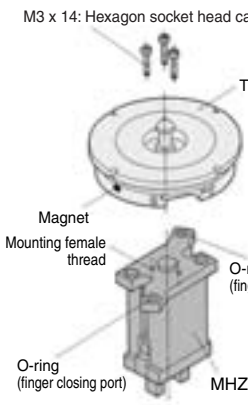
How to use dedicated air grippers

Mounting procedures

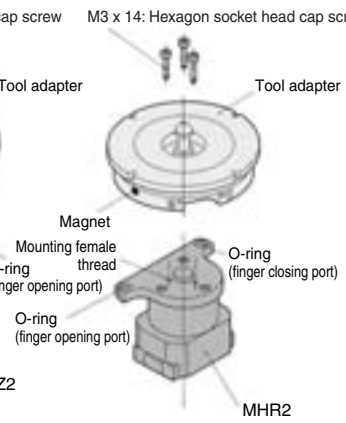
1. Based on the positioning of the tool adapter and the air gripper shown in the figures below, note that it is possible to rotate them every 120° and in three different directions. Mount them accordance with your operating conditions.

2. Evenly tighten 3 hexagon socket head cap screws with a maximum tightening torque of 1.06 N·m.
3. Before mounting, confirm that the O-ring or gasket of the air gripper is mounted properly, and make sure there is no dust or debris on the sheet surface of the tool adapter.

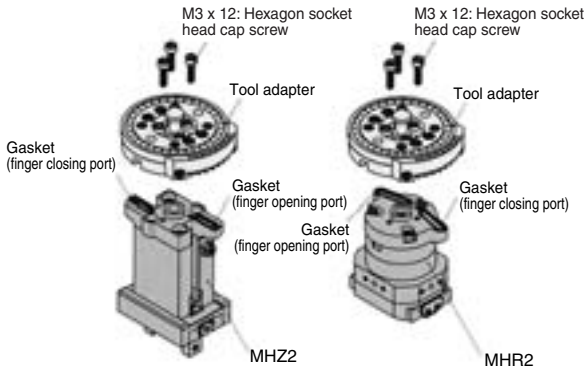
MHZ2



MHR2



1. Mount the tool adapter and the air gripper using the positioning shown in the figures below.



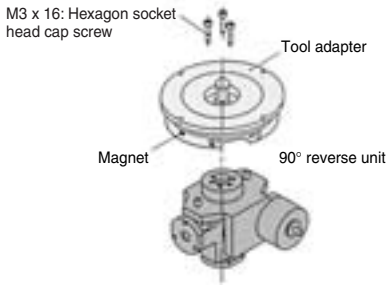
Piping and wiring procedures

1. The bracket is fitted with a fluid passage, so there is no need for piping except for on the AHC unit side. The bracket also has a mark for the position of the piping port, which can be referred to while work is taking place.
   • Finger closing port: “S” mark • Finger opening port: “O” mark
2. When using an auto switch, solder it to the terminal on the tool adapter.

90° reverse unit

Mounting procedures

1. Based on the positioning shown in the figure below, note that it is possible to rotate the tool adapter and the air gripper every 60° and in six different directions.
2. Mount the 90° reverse unit to the tool adapter, and evenly tighten the 3 hexagon socket head cap screws (M3 x 16) with a maximum tightening torque of 1.06 N·m.

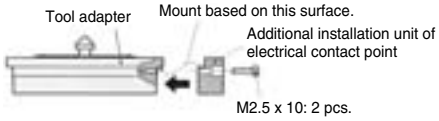


Piping and wiring procedures

1. Pipe the driving air for tools or the rotary actuator to the air port of the tool adapter.
2. When wiring for use with an auto switch, etc., solder it to the terminal on the tool adapter.

Additional installation unit of electrical contact point

1. As shown in the figure below, determine the position in accordance with the leveled part of the AHC unit and tool adapter, and evenly tighten the 2 hexagon socket head cap screws (M2.5 x 10) with a maximum tightening torque of 0.3 N·m.



Series MA
Specific Product Precautions 3
Be sure to read before handling.

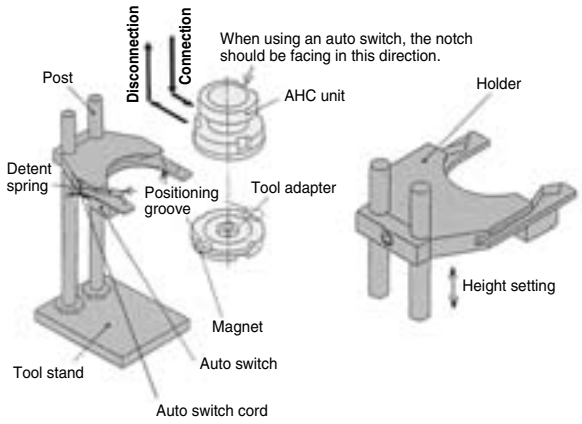
Series	MA3□□	MA210

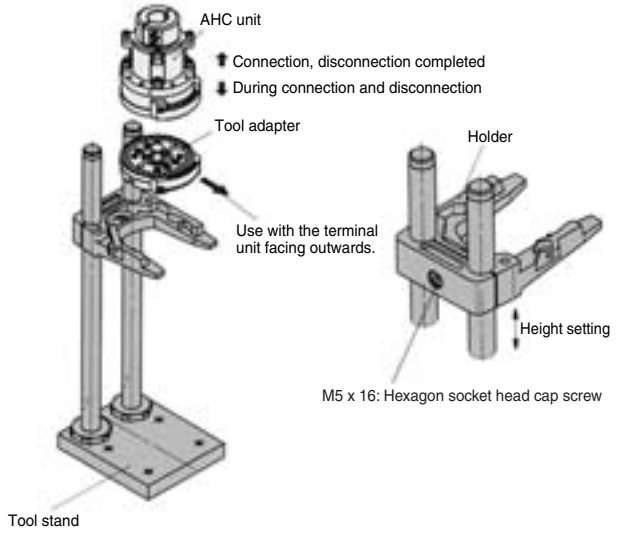
How to use the tool stand

1. Align the positions of the tool adapter positioning groove and the tool stand detent spring.
   When using an auto switch, position the auto switch in relation to the magnet fitted on the tool adapter in accordance with the figure below.
   By changing the auto switch mounting position to the right side, it is possible to use it by turning it around 180°. When doing so, be sure the auto switch cable is coming out of the post side.
   Tighten the auto switch mounting screws with a maximum tightening torque of 0.1 N·m.
2. Connect or disconnect the AHC unit and tool adapter only after attaching the AHC unit in a horizontal direction.

1. Use the tool adapter and tool stand based on the positioning shown in the figure below.
2. Connect or disconnect the AHC unit and tool adapter in a direction perpendicular to the AHC unit.

3. When positioning the holder, loosen the hexagon socket head cap screws shown in the figure below right, and set it at the desired height, then tighten with a maximum tightening torque of 5 N·m.





Piping and wiring precautions

1. Use SMC compact one-touch fittings, one-touch mini (M3, M5), or miniature fittings (M3, M5).
   Thoroughly flush out the connector piping and be sure that dirt and chips, etc., do not get inside the equipment.
2. When wiring, except for the D-sub connector entry, solder to the probe socket of the AHC unit, or the terminal of the tool adapter.
   We recommend insulating the connection points with heat shrinking tube, etc.
3. During piping and wiring, be sure that there is no external forces such as pulling and twisting at work.