

AHC System Auto Hand Changing System

MA Series

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

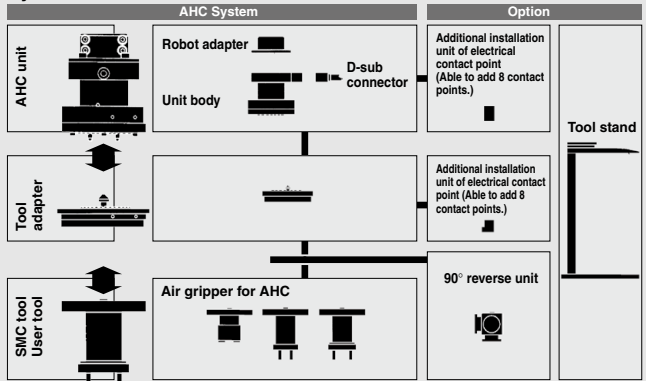
The robot hand tools change automatically to accommodate workpieces of different shapes, thus making it possible to adopt the FMS (flexible manufacturing system) in the assembly line.

Specifications

Series	MA210	MA310	MA311	MA320	MA321
Positioning	Ball coupling			Curved coupling	
Max. work load	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

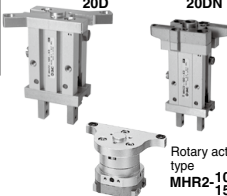
Adapter for assembling robot
MA2 Series
 ø8, ø10, ø11, ø14, ø15, ø20
MA3 Series
 ø10, ø11, ø14, ø15, ø20, ø24, ø25



Air grippers for AHC (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

(MA3 series 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.



(MA3 series only)

Tool stand



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

Auto AHC and Changing System

MA210 Series (Compact type)

Max. work load: 3 kg
Compact/Lightweight
O.D.: 52 mm, Weight: 360 g



MA3□1 Series (Double acting type)

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

Failsafe mechanism

Prevents tools from dropping due to reductions in air pressure

Electric interface

MA2 Series: 8 power systems

(Contact points: gold plated)

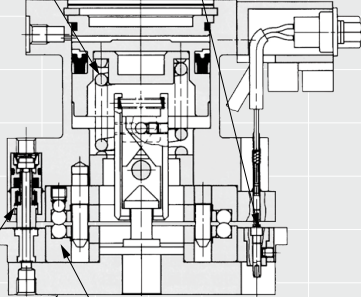
MA3 Series: 12 power systems

(Contact points: gold plated)

Additional installation unit, 8 power

systems (option)

D-sub connector, with robot cable (option)



Air interface

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

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

Max. work load:

MA2 Series: 3 kg

MA3 Series: 5 kg

Repeatable high-precision

±0.01 mm

MA210 Series

MA31□ Series

Ball coupling

MA32□ Series

Curved coupling



(For high torque resistance)

AHC System/Model/Specifications

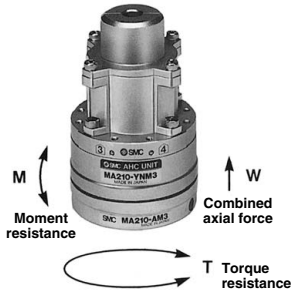
Series			MA2 Series	MA3 Series				
			MA210	MA310	MA311	MA320	MA321	
Positioning			Ball coupling	Ball coupling		Curved coupling		
Handling			Single acting	Single acting	Double acting	Single acting	Double acting	
AHC unit	Electric specifications	Soldering	●	●	●	●	●	
		D-sub connector	—	●	●	●	●	
		D-sub connector (With socket side connector)	—	●	●	●	●	
		D-sub connector (With socket side connector with 3 m cable)	—	●	●	●	●	
	Robot adapter Applicable shaft diameter	Nil	●	●	●	●	●	
		ø8	●	—	—	—	—	
		ø10	●	●	●	●	●	
		ø11	●	●	●	●	●	
		ø14	●	●	●	●	●	
		ø15	●	●	●	●	●	
		ø20	●	●	●	●	●	
		ø24	—	●	●	●	●	
	Tool adapter	Air pressure port	M3	●		●		●
			M5	—		●		●
Air gripper for AHC ^{*1}	MHR2	ø10	●		●		●	
		ø12	●		●		●	
	MHZ2	ø10	●		—		—	
		ø16	●		●		●	
		ø20	—		●		●	
90° reverse unit			—		●		●	
Tool stand			●		●		●	
Additional installation unit of electrical contact point	For AHC unit		—		●		●	
	For tool adapter		—		●		●	

*1) This air gripper for AHC is prepared as an optional air gripper that provides the air passage in the attachment to eliminate the fittings piping when mounting. As the mounting attachment and air piping are prepared, there is no problem even when other air gripper or vacuum pad is mounted. However, make sure that the axial force, moment, and torque due to a load are 1/2 or less of their allowable values. (For details about allowable values, refer to the specifications.)

AHC System

Auto Hand Changing System

MA2 Series



Specifications

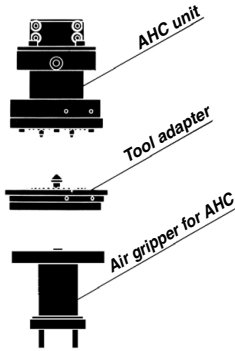
Series		MA210	
Positioning		Ball coupling	
Max. work load		3 kg	
Handling		Single acting/Air supply at disconnection	
Handling air pressure		0.4 to 0.7 MPa	
Proof pressure		1.05 MPa	
Ambient and fluid temperature		0 to 60°C	
Positioning repeatability		±0.01 mm	
Combined axial force W*		150 N	
Moment 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
	Electricity	Number of circuits	4
		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

Auto hand changer

Work load

2	Work load 3 kg
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AHC unit

Electric specifications

N	Soldering
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Air connection size

M3	M3 x 0.5
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Robot adapter

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

Tool adapter

MA 210-A M3

Auto hand changer

Work load

2	Work load 3 kg
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Tool adapter

Air connection size

M3	M3 x 0.5
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Air gripper for AHC

<ø10/ø15>

MHR2-10-A210

Cylinder bore

10	10 mm
15	15 mm

For MA2 With adapter

<ø10/ø16>

MHZ2-16 D N-A210-Y69A

Cylinder bore

10	10 mm
16	16 mm

Finger position

Nil	Standard
N	Narrow type

For MA2 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.

Tool stand

MA210-S1-Y59A

Tool stand

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

MA2 Series

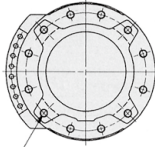


AHC Unit and Tool Adapter

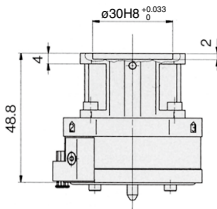
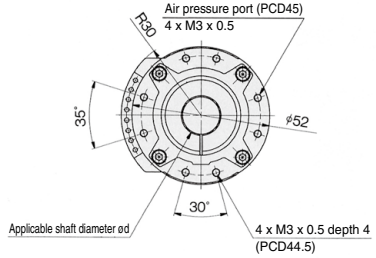
AHC Unit/MA210-YNM3 (Without robot adapter)

AHC Unit/MA210-YNM3-□ (With robot adapter)

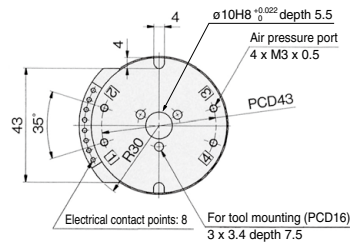
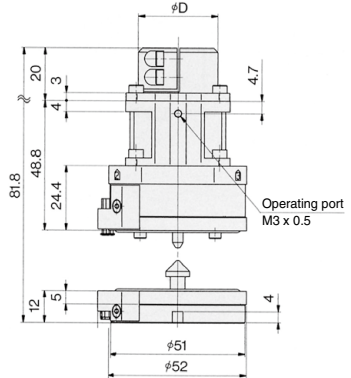
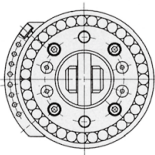
Tool adapter/MA210-AM3



For mounting robot adapter (PCD44.5)
4 x M3 x 0.5 through



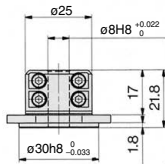
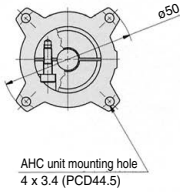
AHC unit junction



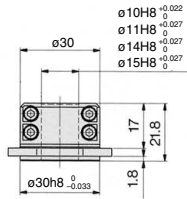
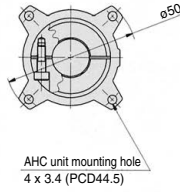
	Model	Applicable shaft diameter ød	øD	Weight (g)
AHC unit	MA210-YNM3	—	—	260
	MA210-YNM3-S1	8	25	300
	MA210-YNM3-R1	10	30	
	MA210-YNM3-R2	11		
	MA210-YNM3-R3	14		
	MA210-YNM3-R4	15		
MA210-YNM3-R5	20	35		
Tool adapter	MA210-AM3	—	—	100

**Robot adapter
MA210-C□□**

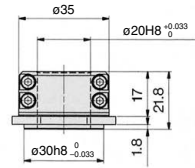
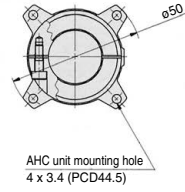
MA210-CS1



MA210-CR1, 2, 3, 4



MA210-CR5



Part no.	Applicable shaft diameter	Weight (g)
MA210-CS1	$\phi 8$	40
MA210-CR1	$\phi 10$	
MA210-CR2	$\phi 11$	
MA210-CR3	$\phi 14$	
MA210-CR4	$\phi 15$	
MA210-CR5	$\phi 20$	

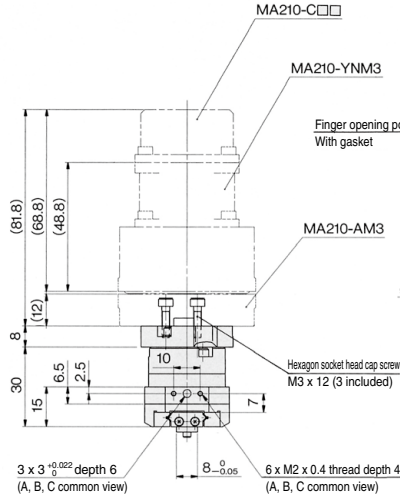
MA2 Series



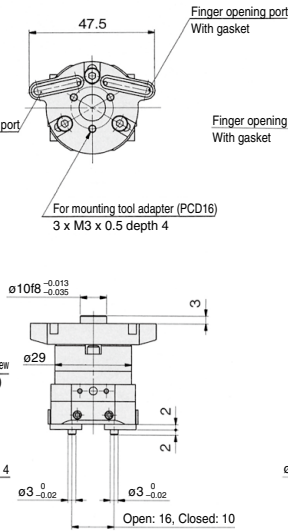
ø10/ø15 Air Gripper: Rotary Actuated Type

ø10/ø15: MHR2- $\frac{10}{15}$ -A210

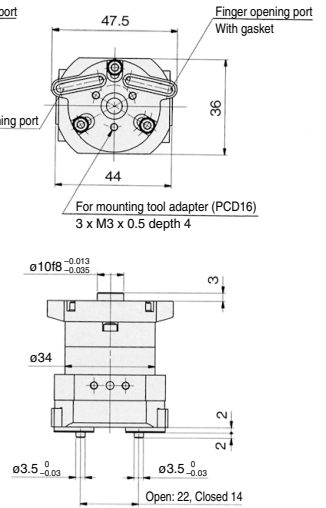
ø10 MHR2-10-A210



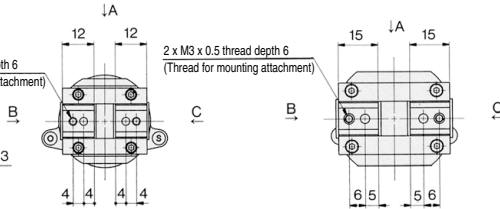
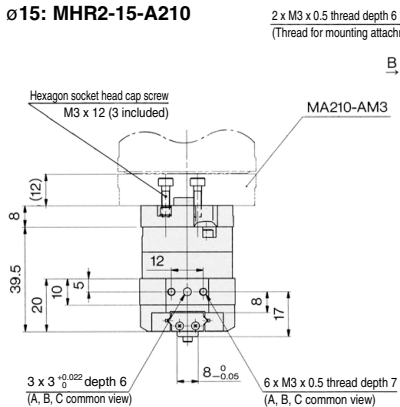
ø10 MHR2-10-A210



ø15 MHR2-15-A210



ø15: MHR2-15-A210



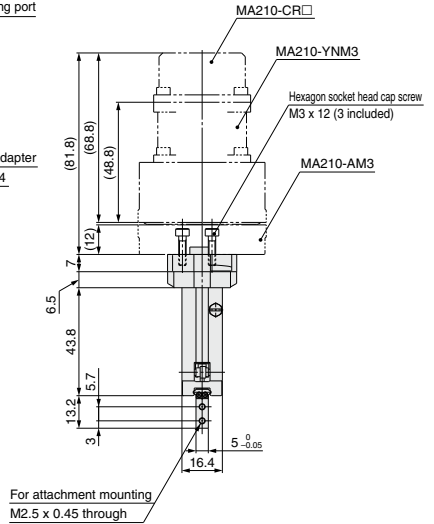
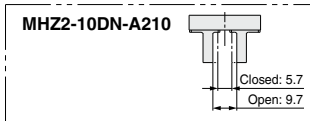
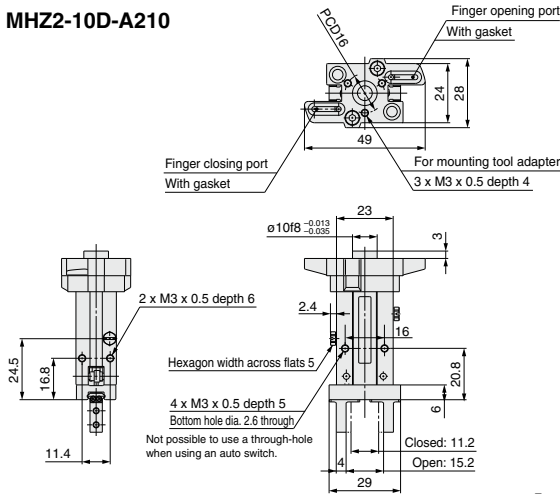
Weight: 130 g

Weight: 210 g

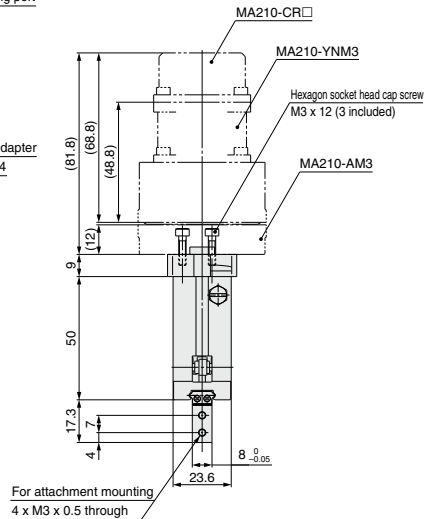
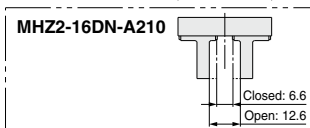
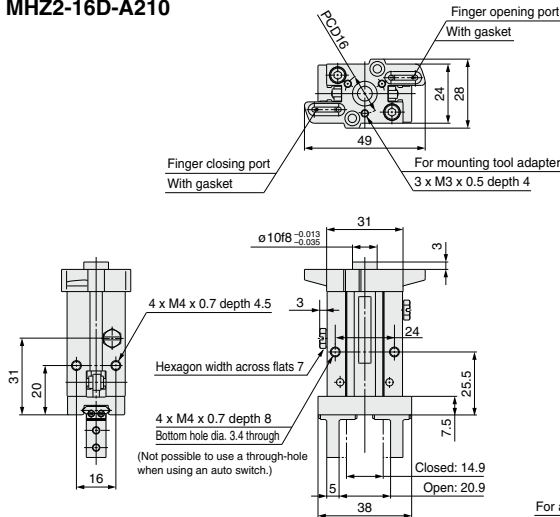
(Note) Refer to Series MHR2 (page 644) for the detailed specifications of air grippers.

ø10/ø16 Air Gripper: Standard Type

MHZ2-10D-A210



MHZ2-16D-A210



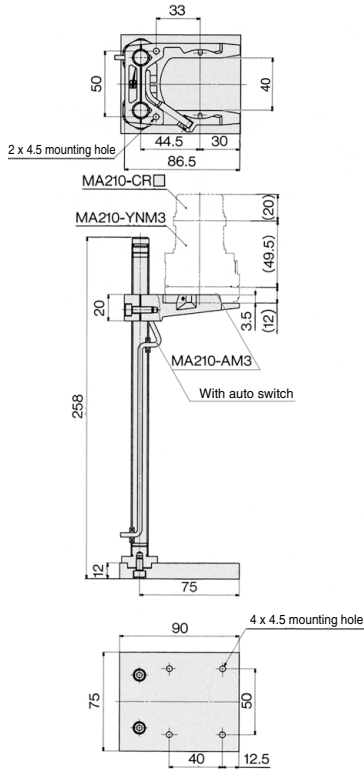
Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to MHZ2 series (page 499) for the detailed specifications of air grippers.

MA2 Series



Tool Stand

MA210-S1-□

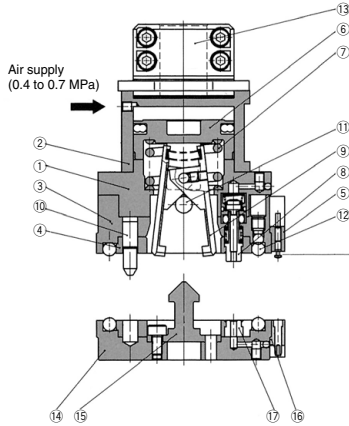


Weight: 520 g

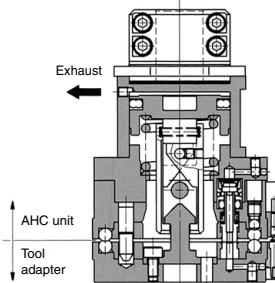
Construction: Component Parts

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	Electroless nickel plating
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

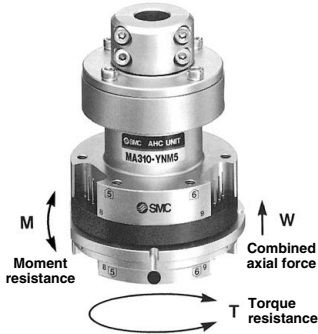
Component Parts

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

MA3 Series



Specifications

Series		MA310	MA311	MA320	MA321
Positioning		Ball coupling		Curved coupling	
Max. work load		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 W*		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	
	Electricity	Number of circuits		6	
		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.

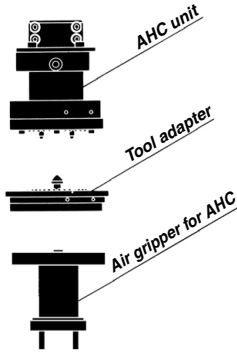
Robot adapter

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**
- Work load**
3 Work load 5 kg
- Positioning**
1 Ball coupling
2 Curved coupling
- Operation**
0 Single acting
1 Double acting
- AHC unit**
- Air connection size**
M5 M5 x 0.8
- Robot adapter**

Robot adapter	Without robot adapter
R1	ø10
R2	ø11
R3	ø14
R4	ø15
R5	ø20
R6	ø24
	ø25

Applicable shaft diameter

Symbol	Soldering	D-sub connector
N	●	—
A	—	●
B	—	● (With socket side connector)
C	—	● (With socket side connector with 3 m cable)

Electric specifications

* Refer to page 920 "D-sub connectors" for details.

Tool adapter

MA 3 10 - A M5

- Auto hand changer**
- Air connection size**
M3 M3 x 0.5
M5 M5 x 0.8
- Tool adapter**
- Series**
10 Ball coupling
20 Curved coupling
- Work load**
3 Work load 5 kg

Air gripper for AHC

MHR2-10-A310

<ø10/ø15>

- Cylinder bore**
10 10 mm
15 15 mm
- For MA3 With adapter**

MHZ2-16DN-A310-Y69A

<ø16/ø20>

- Cylinder bore**
16 16 mm
20 20 mm
- For MA3 With adapter**

Finger position

Nil	Standard
N	Narrow type

Auto switch type

Symbol	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) Solid state auto switch Lead wire: Right angle entry Lead wire length: 0.5 m

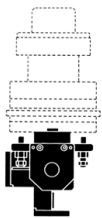
Auto switch additional symbol

* When using an air gripper for AHC, use tool adapter MA3₁0-AM3

Nil	2 pcs.
S	1 pc.

90° reverse unit

MA310-R1-90A



90° reverse unit

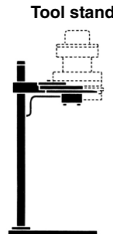
Auto switch type

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

* Can also be used for MA320 series.

Tool stand

MA310-S1-Y59A



Lead wire length

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

Auto switch type

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

* Can also be used for MA320 series.

MA3 Series



AHC Unit and Tool Adapter/Single Acting Type

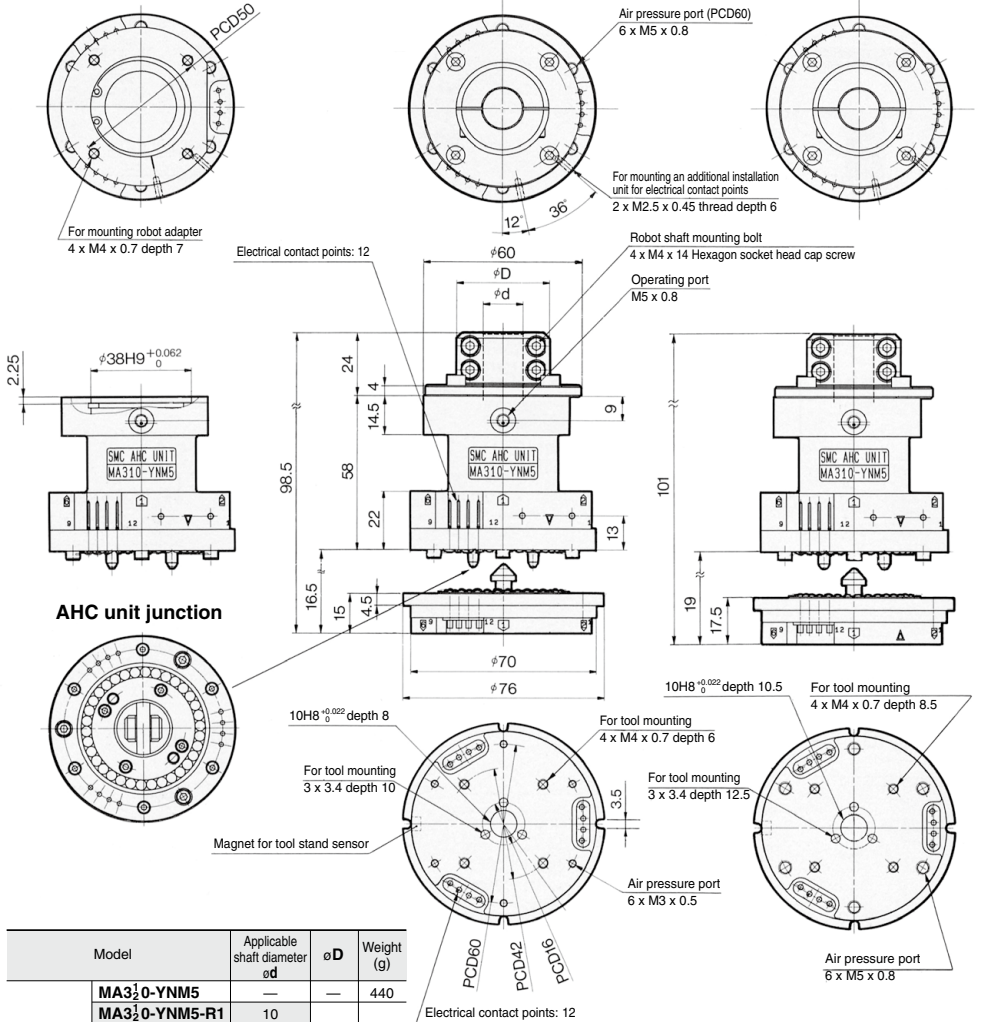
AHC Unit/MA3 $\frac{1}{2}$ 0-YNM5 (Without robot adapter)

AHC Unit/MA3 $\frac{1}{2}$ 0-YNM5-□ (With robot adapter)

Tool adapter/MA3 $\frac{1}{2}$ 0-A□

When mounting MA3 $\frac{1}{2}$ 0-AM3

When mounting MA3 $\frac{1}{2}$ 0-AM5



	Model	Applicable shaft diameter ϕd	ϕD	Weight (g)
AHC unit	MA3 $\frac{1}{2}$ 0-YNM5	—	—	440
	MA3 $\frac{1}{2}$ 0-YNM5-R1	10	35	520
	MA3 $\frac{1}{2}$ 0-YNM5-R2	11		
	MA3 $\frac{1}{2}$ 0-YNM5-R3	14		
	MA3 $\frac{1}{2}$ 0-YNM5-R4	15		
	MA3 $\frac{1}{2}$ 0-YNM5-R5	20		
	MA3 $\frac{1}{2}$ 0-YNM5-S6	24		
	MA3 $\frac{1}{2}$ 0-YNM5-R6	25	41	
Tool adapter	MA3 $\frac{1}{2}$ 0-AM3	—	—	250
	MA3 $\frac{1}{2}$ 0-AM5	—	—	270



AHC Unit and Tool Adapter/Double Acting Type

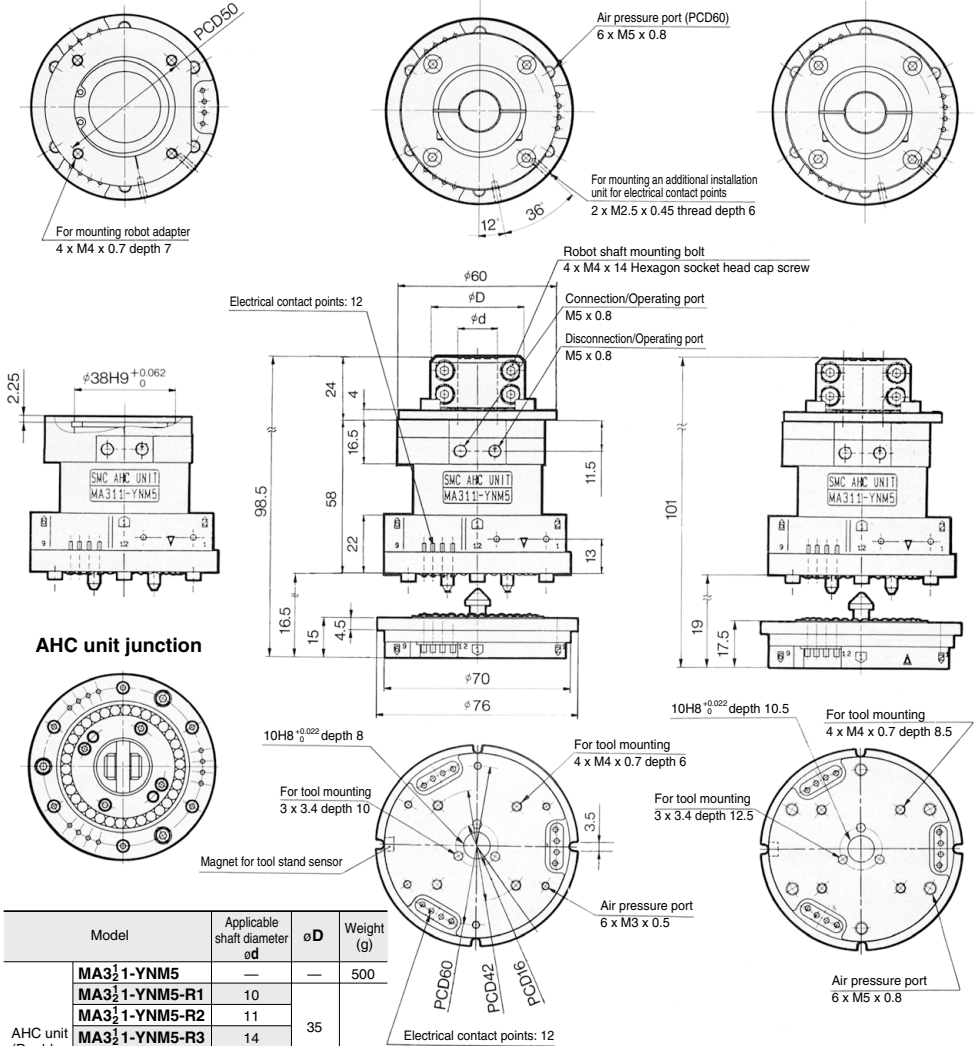
AHC Unit/MA3 $\frac{1}{2}$ 1-YNM5 (Without robot adapter)

AHC Unit/MA3 $\frac{1}{2}$ 1-YNM5-□ (With robot adapter)

Tool adapter/MA3 $\frac{1}{2}$ 0-A□

When mounting MA3 $\frac{1}{2}$ 0-AM3

When mounting MA3 $\frac{1}{2}$ 0-AM5



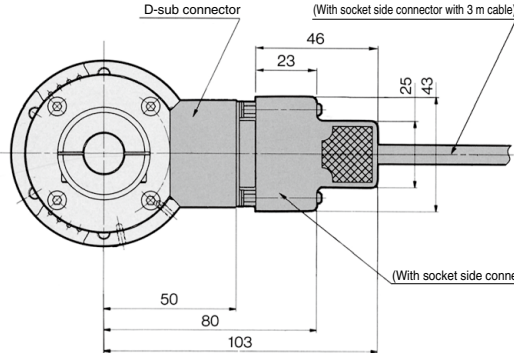
	Model	Applicable shaft diameter ϕd	ϕD	Weight (g)
AHC unit (Double Acting)	MA3 $\frac{1}{2}$ 1-YNM5	—	—	500
	MA3 $\frac{1}{2}$ 1-YNM5-R1	10	35	580
	MA3 $\frac{1}{2}$ 1-YNM5-R2	11		
	MA3 $\frac{1}{2}$ 1-YNM5-R3	14		
	MA3 $\frac{1}{2}$ 1-YNM5-R4	15	41	
	MA3 $\frac{1}{2}$ 1-YNM5-R5	20		
	MA3 $\frac{1}{2}$ 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

MA3 Series

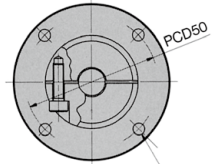
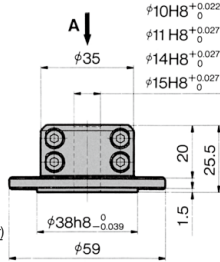


With D-sub connector
MA3□□-Y□M5-□□

Robot adapter
MA310-C□□



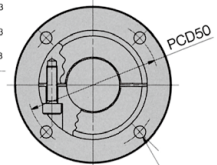
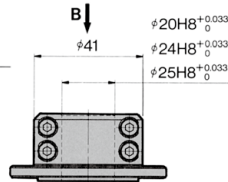
MA310-CR1, 2, 3, 4



AHC unit mounting hole
4 x 4.5

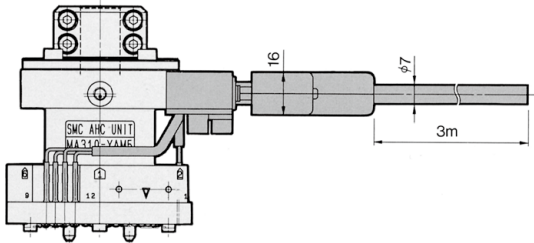
View A

MA310-CR5, 6, CS6



AHC unit mounting hole
4 x 4.5

View B



AHC unit with D-sub connector	Weight (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	Weight (g)
MA310-CR1	φ10	80
MA310-CR2	φ11	
MA310-CR3	φ14	
MA310-CR4	φ15	
MA310-CR5	φ20	
MA310-CS6	φ24	
MA310-CR6	φ25	

D-sub connectors

D-sub connector specifications

		AHC unit main body side		Cable side	
D-sub connector	Contact classification	Pin	Socket		
	Shell size	A			
	No. of cores	15			
Robot cable	Connector type	Crimping connection type			
Robot cable	Effective area	—	0.2 mm ²		
	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 socket side connector
A pin contact is comprised of 12 crimping connection type pins as standard.

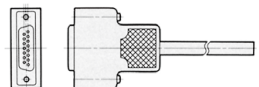
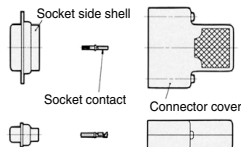
For a crimping tool, we recommend the CT150-2-D-C made by Japan Aviation Electronics Industry, Inc.

MA3□□-YCM5-□□ with a socket side connector with 3 m 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





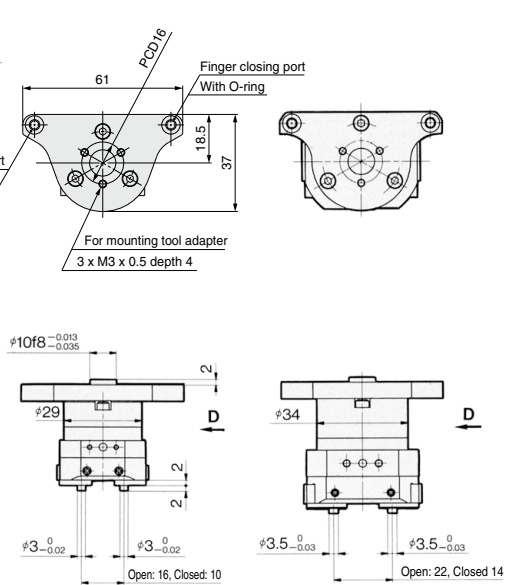
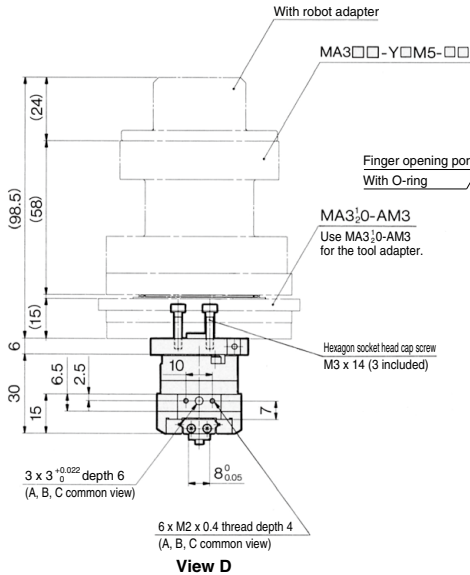
ø10/ø15 Air Gripper: Rotary Actuated Type

ø10/ø15: MHR2-¹⁰/₁₅-A310

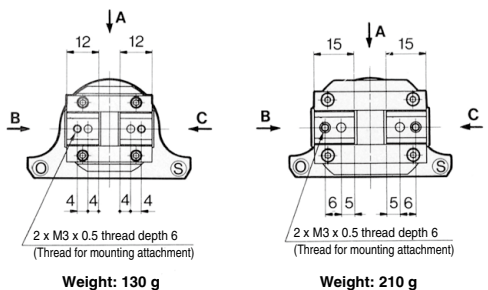
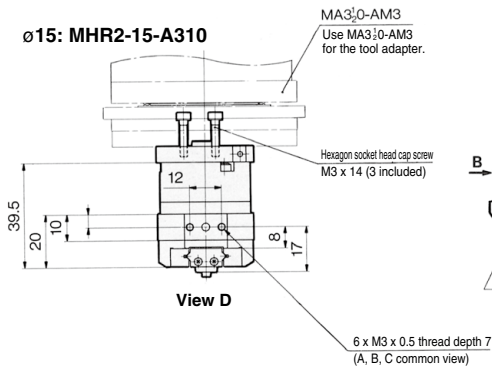
**ø10
MHR2-10-A310**

**ø10
MHR2-10-A310**

**ø15
MHR2-15-A310**



ø15: MHR2-15-A310



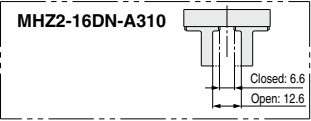
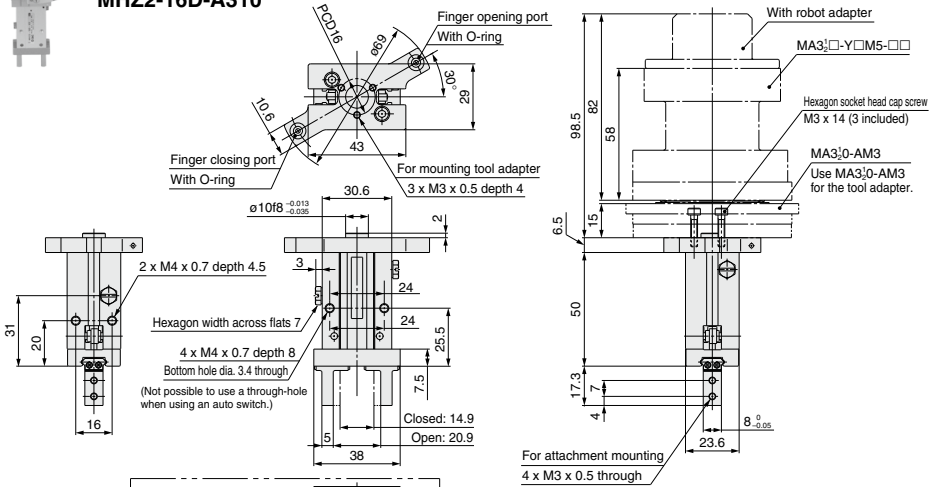
(Note) Refer to MHR2 series (page 644) for the detailed specifications of air grippers.

MA3 Series

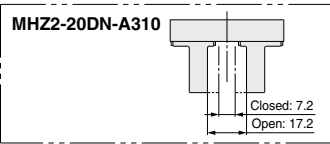
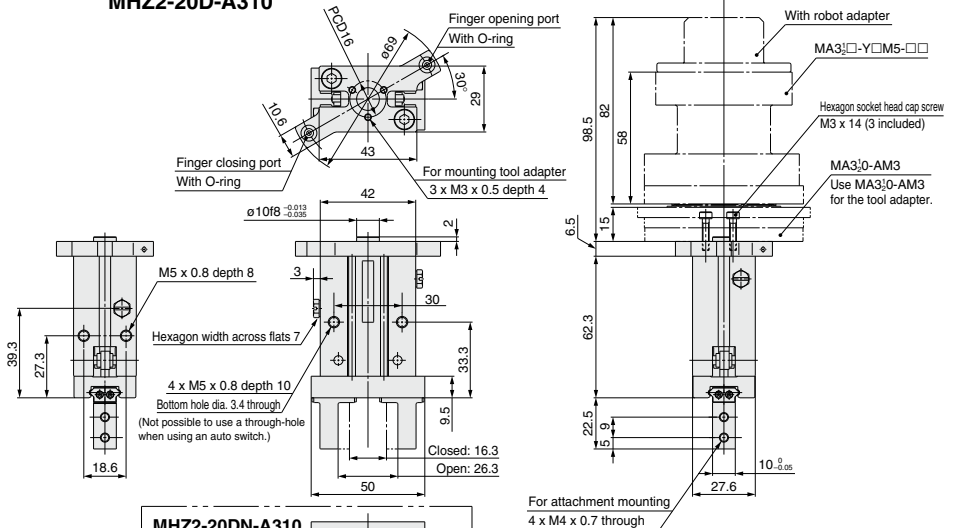


ø16/ø20 Air Gripper: Standard Type

MHZ2-16D-A310



MHZ2-20D-A310

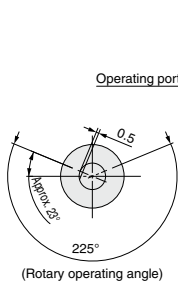
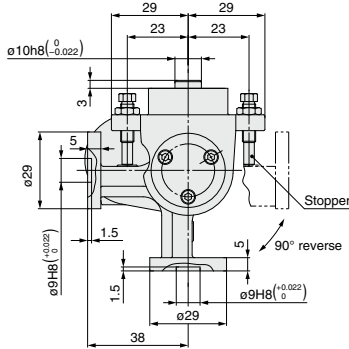
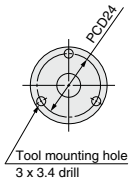
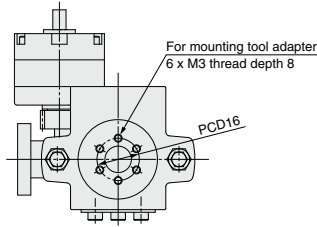


Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to MHZ2 series (page 499) for the detailed specifications of air grippers.

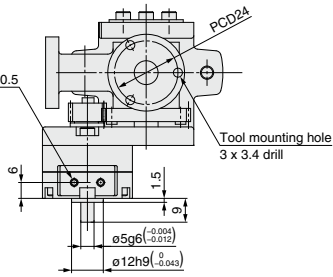


90° Reverse Unit

MA310-R1-□

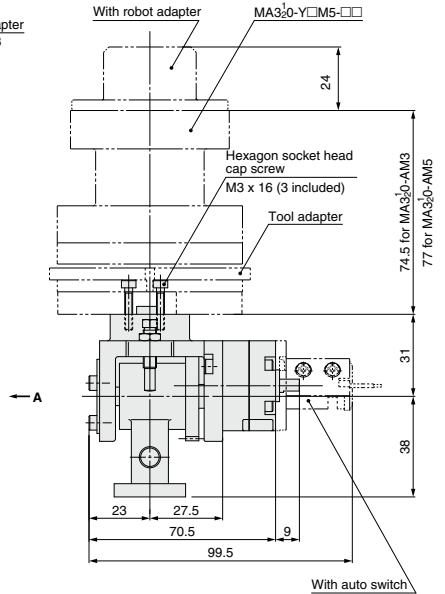


View B



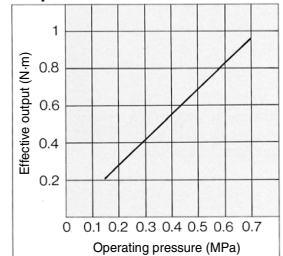
View A

Weight: 260g

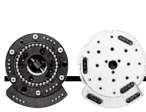


View A

Output Table

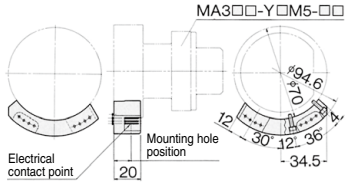


MA3 Series



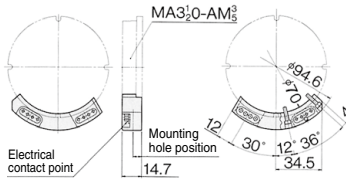
Additional Installation Unit of Electrical Contact Point

MA310-EY1: For AHC unit



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

MA310-EA1: For tool adapter

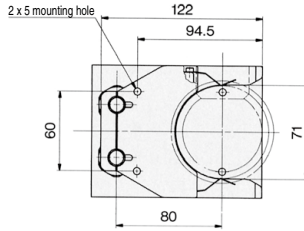


Accessory	Hexagon socket head cap screw M2.5 x 10
Weight	25 g

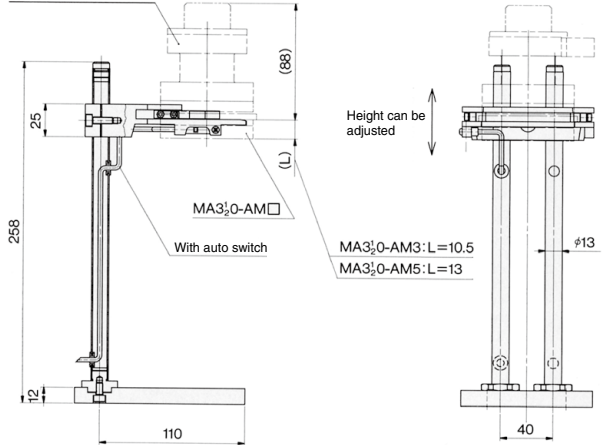


Tool Stand

MA310-S1-□



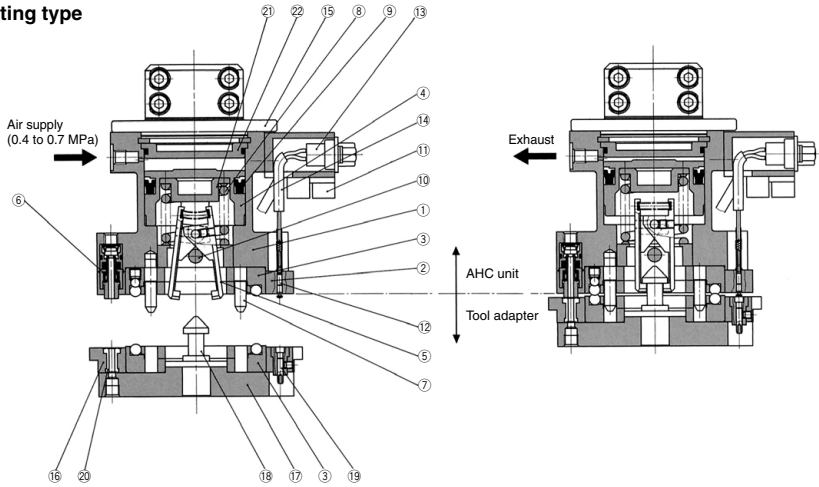
MA310-Y□M5-□□



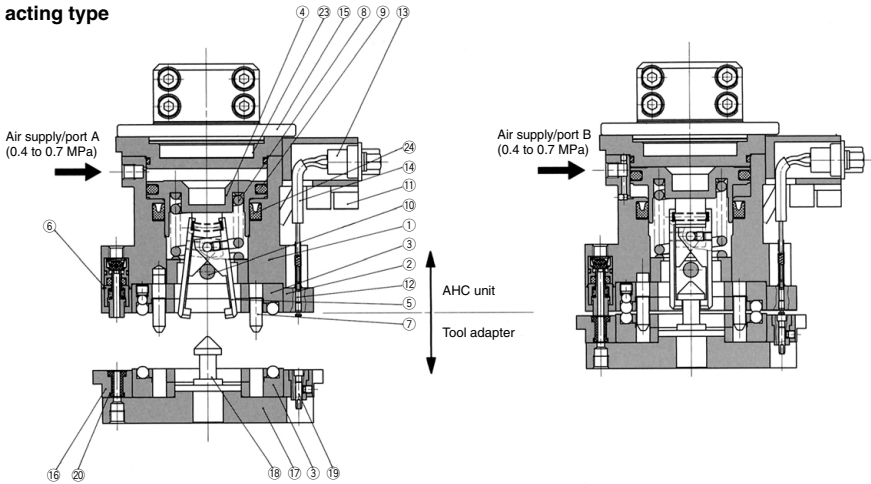
Weight: 950 g

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	Zinc chromated
9	Seal	Synthetic rubber	
10	Parallel pin	Stainless steel	
11	Multi-tube holder	Synthetic resin	Black
12	Contact probe		
13	D-sub connector assembly		

Component Parts

No.	Description	Material	Note
14	Cable		
15	Robot adapter	Aluminum alloy	Hard anodized
16	Connecting base	Aluminum alloy	Hard anodized
17	Tool 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	Hard anodized
24	Rod seal	Synthetic rubber	



MA Series Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 7 for safety instructions and pages 14 to 22 for air gripper and auto switch precautions.

Series	MA3 ₂ 1 ₀	MA3 ₂ 1 ₁	MA210
Connection and disconnection procedures	Connection procedures		
	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.	1. Supply compressed air: 0.4 to 0.7 MPa to the disconnection 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.	1. Supply compressed air: 0.4 to 0.7 MPa to the operating port. 3. Release the compressed air from the operating port.
Connection and disconnection procedures	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.

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



MA Series Specific Product Precautions 2

Be sure to read this before handling the products. Refer to page 7 for safety instructions and pages 14 to 22 for air gripper and auto switch precautions.

		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.	1. Mount the tool adapter and the air gripper using the positioning shown in the figures below.	
		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.		
	Piping and wiring procedures	<p>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 work, which can be referred to while work is taking place.</p> <ul style="list-style-type: none"> Finger closing port: "S" mark Finger opening port: "O" mark <p>2. When using an auto switch, solder it to the terminal on the tool adapter.</p>		
90° reverse unit	Mounting procedures	<p>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.</p> <p>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.</p>		
	Piping and wiring procedures	<p>1. Pipe the driving air for tools or the rotary actuator to the air port of the tool adapter.</p> <p>2. When wiring for use with an auto switch, etc., solder it to the terminal on the tool adapter.</p>		
Additional installation unit of electrical contact point	Mounting procedures	<p>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.</p>		



MA Series Specific Product Precautions 3

Be sure to read this before handling the products. Refer to page 7 for safety instructions and pages 14 to 22 for air gripper and auto switch precautions.

Series

MA3□□

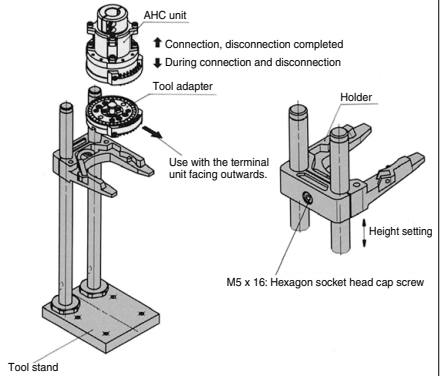
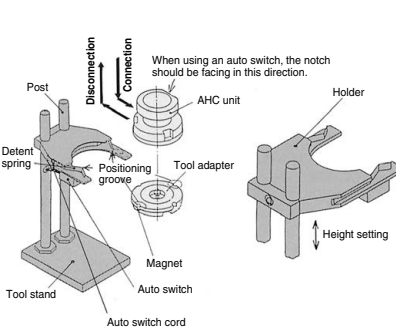
MA210

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.

