

# AHC System

## MA Series

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

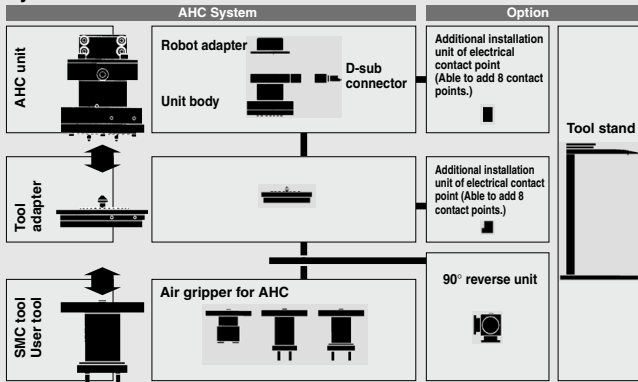
The robot hand tools change automatically to accommodate workpieces of different shapes, thus making it possible to adopt the FMS (flexible manufacturing system) in the assembly line.

#### 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

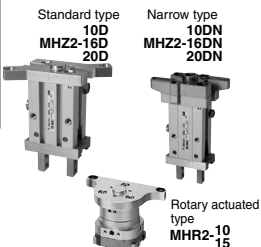


#### Variations

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)



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

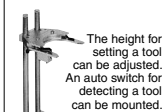
Added to the standard AHC unit  
Added to the standard tool adapter  
(MA3 series only)

**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.

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□

# Auto H and C hanging 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)

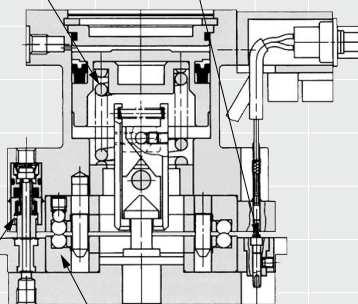
**MA3 Series: 12 power systems**

(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	—	●	●	●	●
	ø25	—	●	●	●	●	
Tool adapter	Air pressure port	M3	●	●		●	
		M5	—	●		●	
Air gripper for AHC <sup>*1</sup>	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.)

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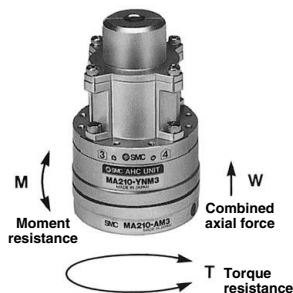
MRHQ

MA

D-□

# 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
		Number of circuits	4
	Electricity	Contact point capacity	2 A/interface
		Number of contact points	8

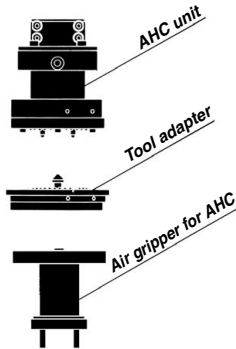
\* Values given on the table for combined axial force, moment resistance, and torque resistance are the values for when the AHC unit and tool adapter begin to separate. During use, make sure the axial force, moment and torque from load are 1/2 or less than those shown above, for safety reasons.

### 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**

Auto hand changer

Work load  
2 Work load 3 kg

AHC unit

Electric specifications  
N Soldering

### Robot adapter

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

Air connection size

M3 M3 x 0.5

### Tool adapter

**MA 210-A M3**

Auto hand changer

Air connection size

M3 M3 x 0.5

Tool adapter

Work load  
2 Work load 3 kg

### 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

For MA2  
With adapter

Finger position  
Nil Standard  
N Narrow type

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 With 3 m lead wire
L		

MHZ

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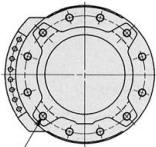
D-□

# MA2 Series

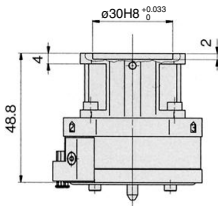


## AHC Unit and Tool Adapter

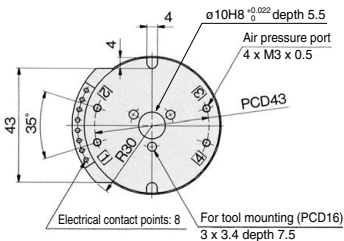
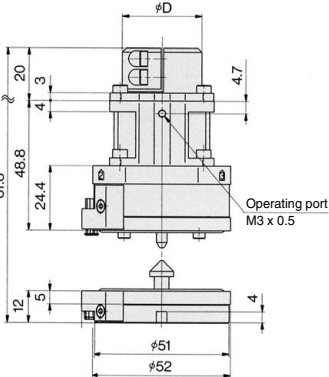
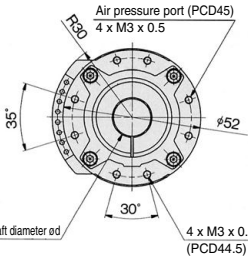
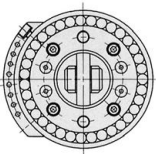
AHC Unit/MA210-YNM3 (Without robot adapter)  
AHC Unit/MA210-YNM3-□ (With robot adapter)  
Tool adapter/MA210-AM3



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



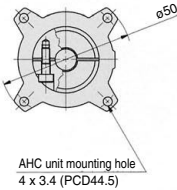
### AHC unit junction



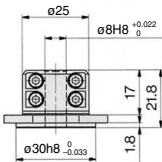
Model		Applicable shaft diameter ød	øD	Weight (g)
AHC unit	MA210-YNM3	—	—	260
	MA210-YNM3-S1	8	25	300
	MA210-YNM3-R1	10	30	
	MA210-YNM3-R2	11		
	MA210-YNM3-R3	14		
	MA210-YNM3-R4	15		
	MA210-YNM3-R5	20	35	
Tool adapter	MA210-AM3	—	—	100

Robot adapter  
MA210-C□□

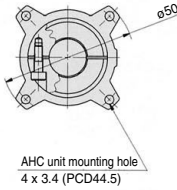
MA210-CS1



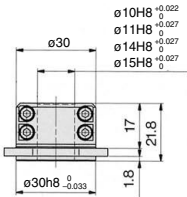
AHC unit mounting hole  
4 x 3.4 (PCD44.5)



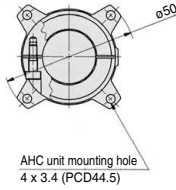
MA210-CR1, 2, 3, 4



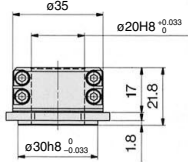
AHC unit mounting hole  
4 x 3.4 (PCD44.5)



MA210-CR5



AHC unit mounting hole  
4 x 3.4 (PCD44.5)



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

MHZ

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MHC

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MA

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A detailed view of a hydraulic cylinder, showing its various components and the 'MAGNET' label.

**Ø10/Ø15: MHR2-<sup>10</sup>/<sub>15</sub>-A210**

Technical drawing of the MA210-AM3 assembly, showing dimensions and components. The drawing includes a side view and a cross-sectional view.

**Dimensions:**

- Overall height: 81.8
- Height to top of MA210-YNM3: 68.8
- Height to top of MA210-AM3: 48.8
- Height of MA210-AM3: 12
- Height of base: 8
- Height of base to center of MA210-AM3: 30
- Height of base to center of MA210-AM3 (A, B, C common view): 15
- Height of base to center of MA210-AM3 (A, B, C common view): 6.5
- Height of base to center of MA210-AM3 (A, B, C common view): 2.5
- Height of base to center of MA210-AM3 (A, B, C common view): 8
- Height of base to center of MA210-AM3 (A, B, C common view): 8.0<sub>-0.05</sub>

**Components:**

- MA210-C□□
- MA210-YNM3
- Finger opening part With gasket
- MA210-AM3
- Hexagon socket head cap screw M3 x 12 (3 included)
- 3 x 3  $\phi 0.002$  depth 6 (A, B, C common view)
- 6 x M2 x 0.4 thread depth 4 (A, B, C common view)

47.5

Finger opening port  
With gasket

port

Finger opening  
With gasket

For mounting tool adapter (PCD16)  
3 x M3 x 0.5 depth 4

$\varnothing 10.18^{+0.013}_{-0.035}$

$\varnothing 29$

4

$\varnothing 3^{+0.02}_{-0.02}$

$\varnothing 3^{+0}_{-0.02}$

Open: 16, Closed: 10

Technical drawing of the PCD16 mounting tool adapter, showing top and side views with dimensions and labels.

**Top View Dimensions:**

- Outer diameter: 47.5
- Inner diameter (mounting holes): 44
- Thickness: 36
- Mounting holes: 3 x M3 x 0.5 depth 4
- Central hole: 44

**Side View Dimensions:**

- Total height: 63
- Mounting holes: 3 x M3 x 0.5 depth 4
- Central section diameter: 34
- Base diameter: 3.5 (tolerance 0/-0.03)

**Labels:**

- Finger opening port With gasket
- ng port
- For mounting tool adapter (PCD16)
- 3 x M3 x 0.5 depth 4
- Open: 22, Closed 14

**Ø15: MHR2-15-A210**

2 x M3 x 0.5 thread depth 6  
(Thread for mounting attach

B

Hexagon socket head cap screw  
M3 x 12 (3 included)

MA210-AM3

39.5  
8  
(12)  
20  
10  
5  
12  
8  
17  
8  
0<sup>+0.06</sup>  
3 x 3 x 0.022 depth 6  
(A, B, C common view)  
6 x M3 x 0.5 thread depth 7  
(A, B, C common view)

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

C →      ← B

**Weight: 210 g**

Courtesy of Steven Engineering, Inc - (800) 258-9200 - [sales@steveneng.com](mailto:sales@steveneng.com) - [www.stevenengineering.com](http://www.stevenengineering.com)



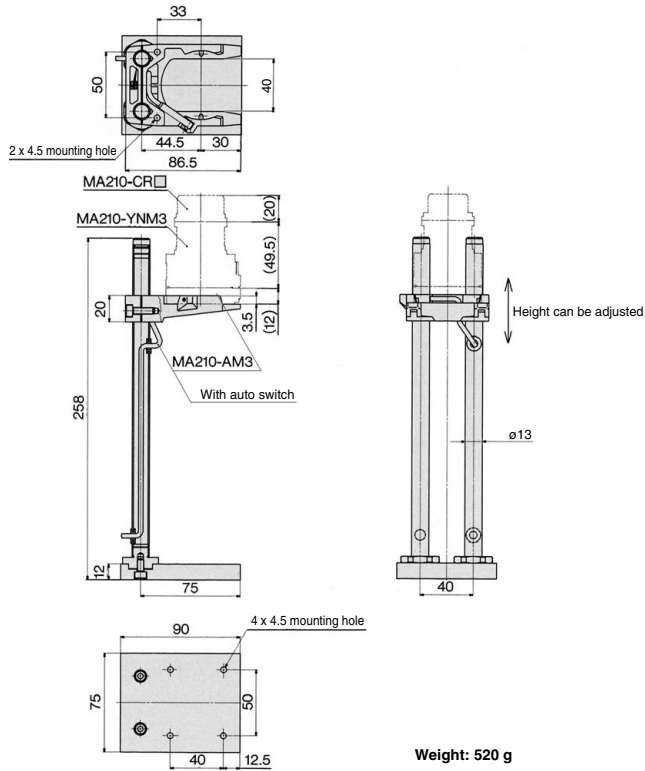


# MA2 Series



## Tool Stand

MA210-S1-□

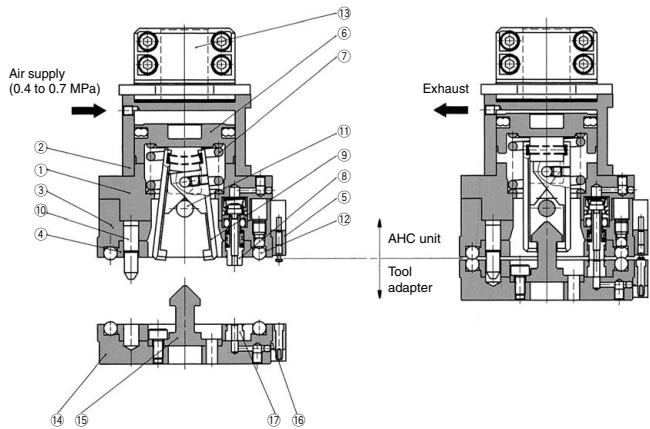


**Construction: Component Parts**

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	

MHZ

MHF

MHL

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MHC

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MA

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# 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.

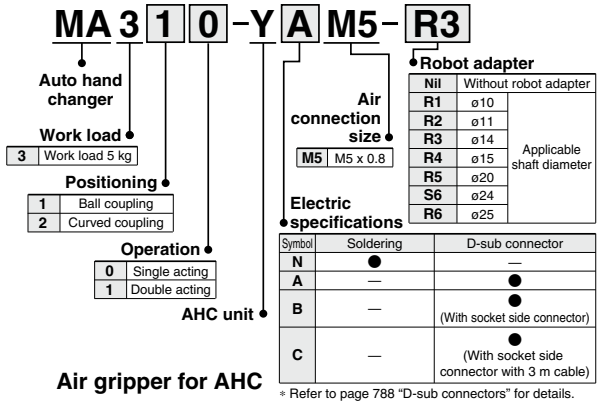
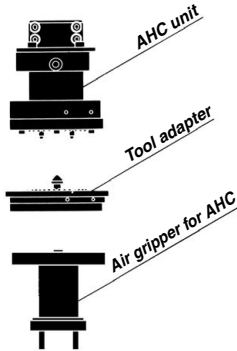
#### Robot adapter

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



## Tool adapter

## 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

For MA3  
With adapter

**Finger position**

NII	Standard
N	Narrow type

## Auto switch type

	Without auto switch	
NII	—	
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)	

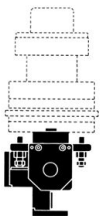
## Auto switch additional symbol

\* When using an air gripper for AHC, use tool adapter MA3<sub>1</sub>0-AM3

NII	2 pcs.
S	1 pc.

## 90° reverse unit

**MA310-R1-90A**



## 90° reverse unit

## Auto switch type

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

\* Can also be used for MA320 series.

## Tool stand

**MA310-S1-Y59A**



## Tool stand

## Lead wire length

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

## Auto switch type

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

\* Can also be used for MA320 series.

MHZ

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# MA3 Series



## AHC Unit and Tool Adapter/Single Acting Type

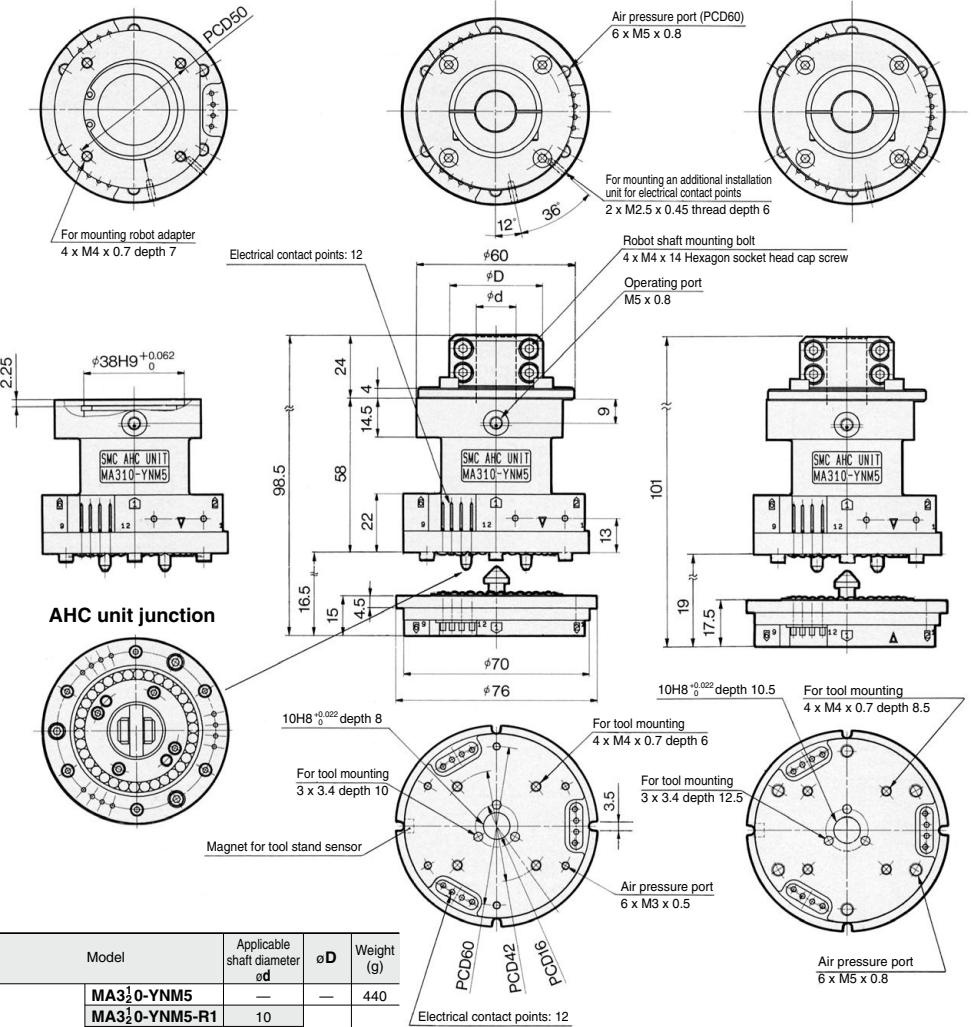
AHC Unit/MA3 $\frac{1}{2}$ 0-YNM5 (Without robot adapter)

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 øD	øD	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	41	
	MA3 $\frac{1}{2}$ 0-YNM5-S6	24		
	MA3 $\frac{1}{2}$ 0-YNM5-R6	25		
Tool adapter	MA3 $\frac{1}{2}$ 0-AM3	—	—	250
	MA3 $\frac{1}{2}$ 0-AM5			270



## AHC Unit and Tool Adapter/Double Acting Type

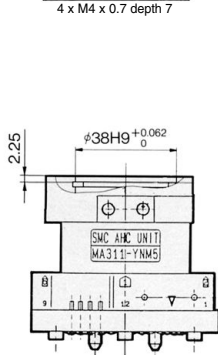
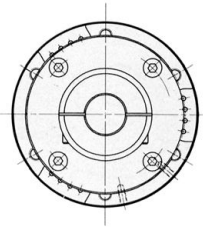
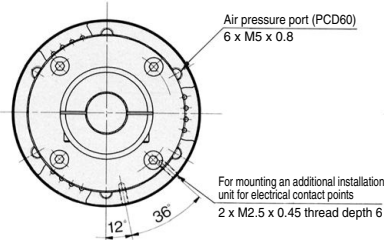
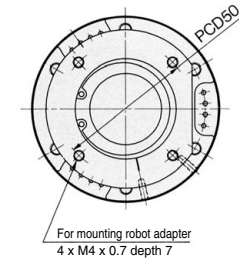
AHC Unit/MA3  $\frac{1}{2}$  1-YNM5 (Without robot adapter)

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

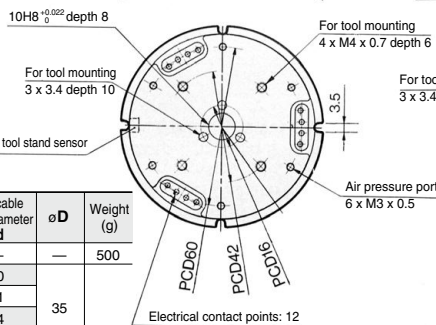
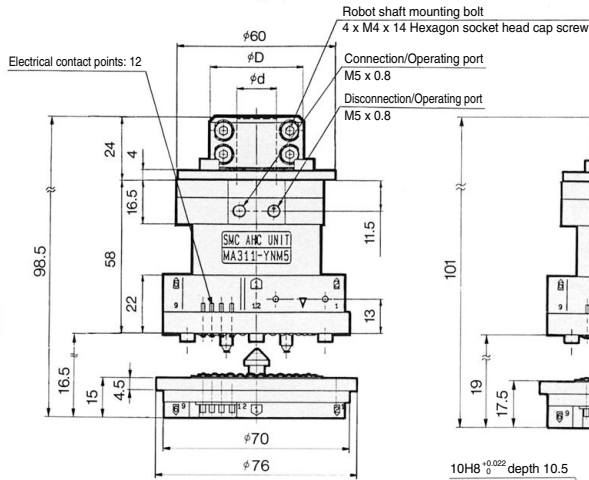
Tool adapter/MA3  $\frac{1}{2}$  0-A□

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

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



AHC unit junction



Model	Applicable shaft diameter ød	øD	Weight (g)
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	580
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
Tool adapter MA3 $\frac{1}{2}$ 0-AM5	—	—	270

AHC unit  
(Double Acting)

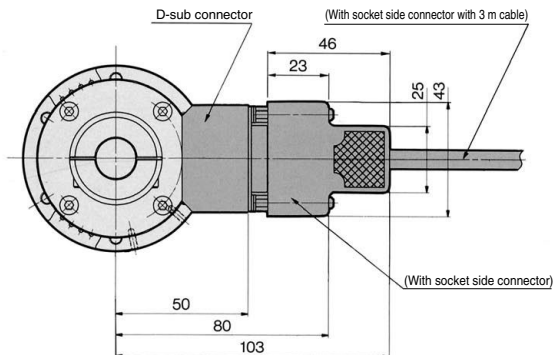
MHZ  
MHF  
MHL  
MHR  
MHK  
MHS  
MHC  
MHT  
MHY  
MHW  
-X□  
MRHQ  
MA  
D-□

# MA3 Series

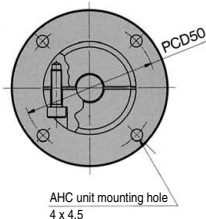
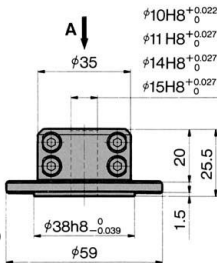


With D-sub connector  
MA3□□-Y□M5-□□

Robot adapter  
MA310-C□□

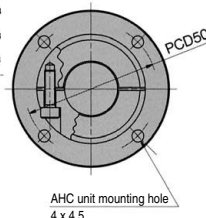
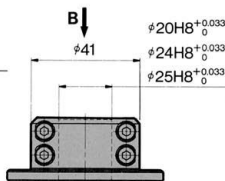


MA310-CR1, 2, 3, 4

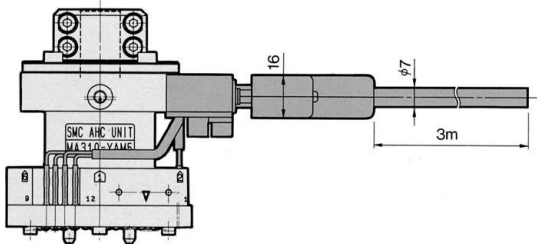


View A

MA310-CR5, 6, CS6



View B



AHC unit with D-sub connector	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

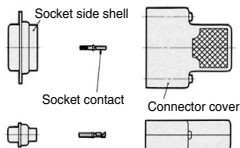
Model	Applicable shaft diameter	Weight (g)
MA310-CR1	$\phi 10$	80
MA310-CR2	$\phi 11$	
MA310-CR3	$\phi 14$	
MA310-CR4	$\phi 15$	
MA310-CR5	$\phi 20$	
MA310-CS6	$\phi 24$	
MA310-CR6	$\phi 25$	

## D-sub connectors

D-sub connector specifications		AHC unit main body 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 mm <sup>2</sup>
	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.

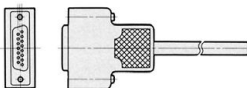
MA3□□-YBM5-□□ with a socket side connector  
A pin contact is comprised of 12 crimping connection type pins as standard.  
For a crimping tool, we recommend the CT150-2-D-C made by Japan Aviation Electronics Industry, Inc.



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



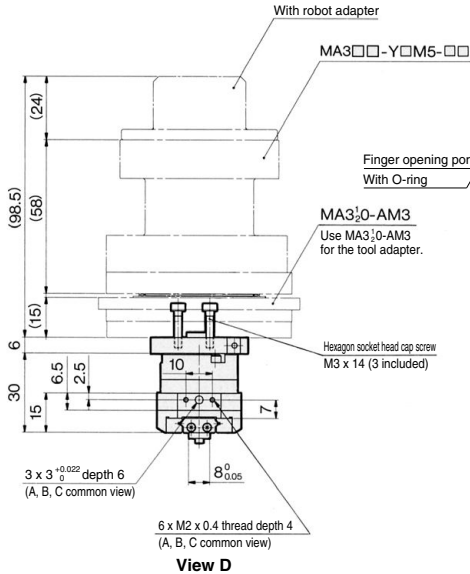




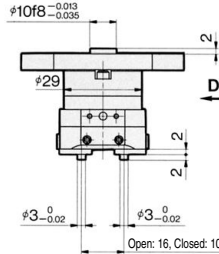
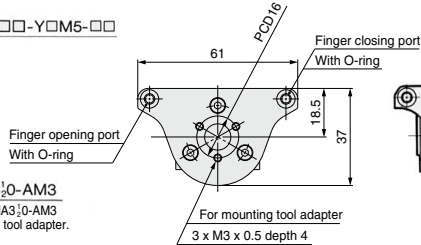
# $\varnothing 10/\varnothing 15$ Air Gripper: Rotary Actuated Type

$\varnothing 10/\varnothing 15$ : MHR2- $\frac{10}{15}$ -A310

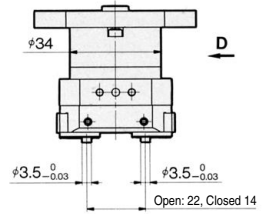
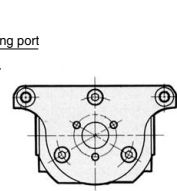
## $\varnothing 10$ MHR2-10-A310



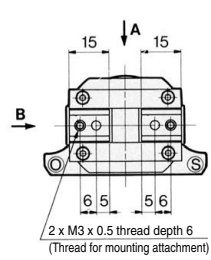
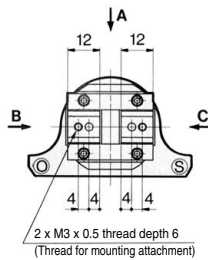
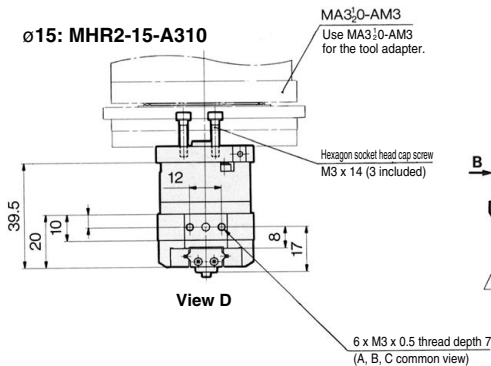
## $\varnothing 10$ MHR2-10-A310



## $\varnothing 15$ MHR2-15-A310



## $\varnothing 15$ : MHR2-15-A310



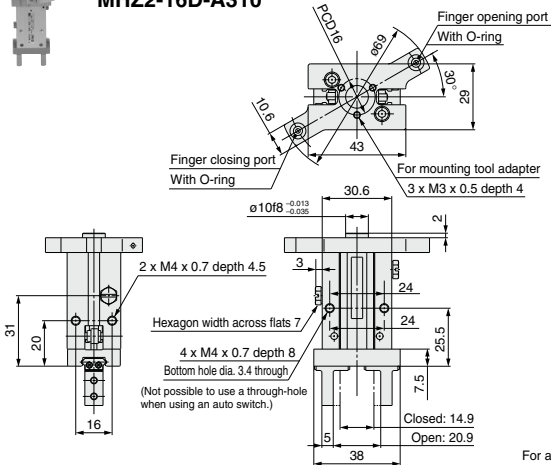
(Note) Refer to MHR2 series (page 518) for the detailed specifications of air grippers.

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



## ø16/ø20 Air Gripper: Standard Type

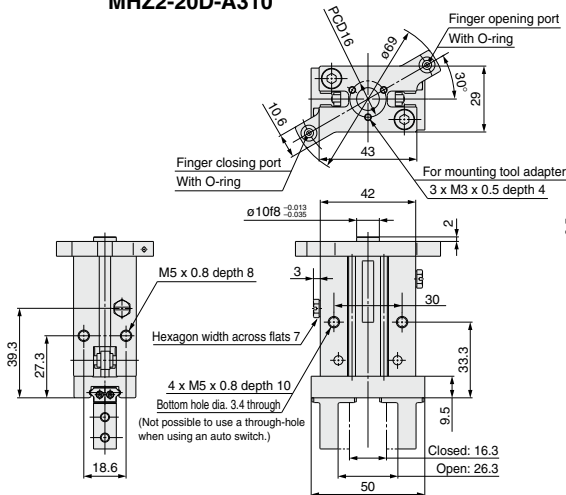
### MHZ2-16D-A310



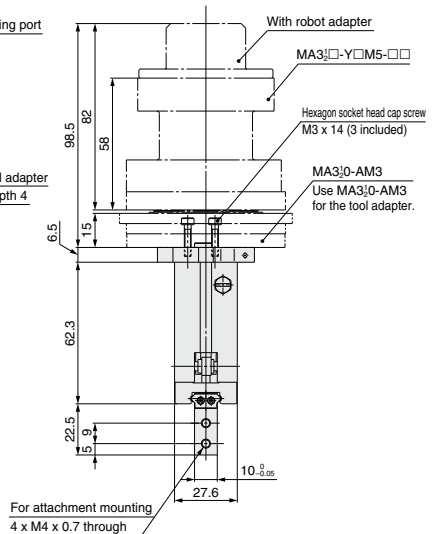
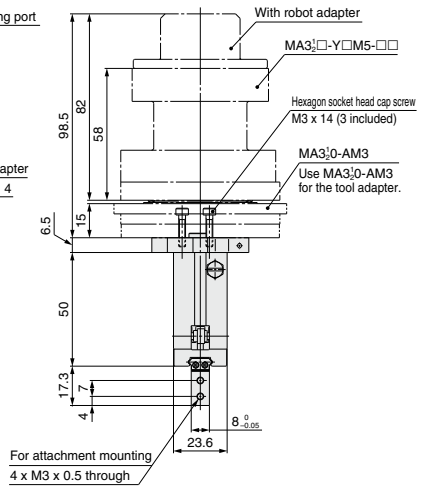
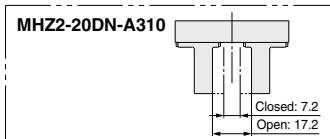
### MHZ2-16DN-A310



### MHZ2-20D-A310



### MHZ2-20DN-A310

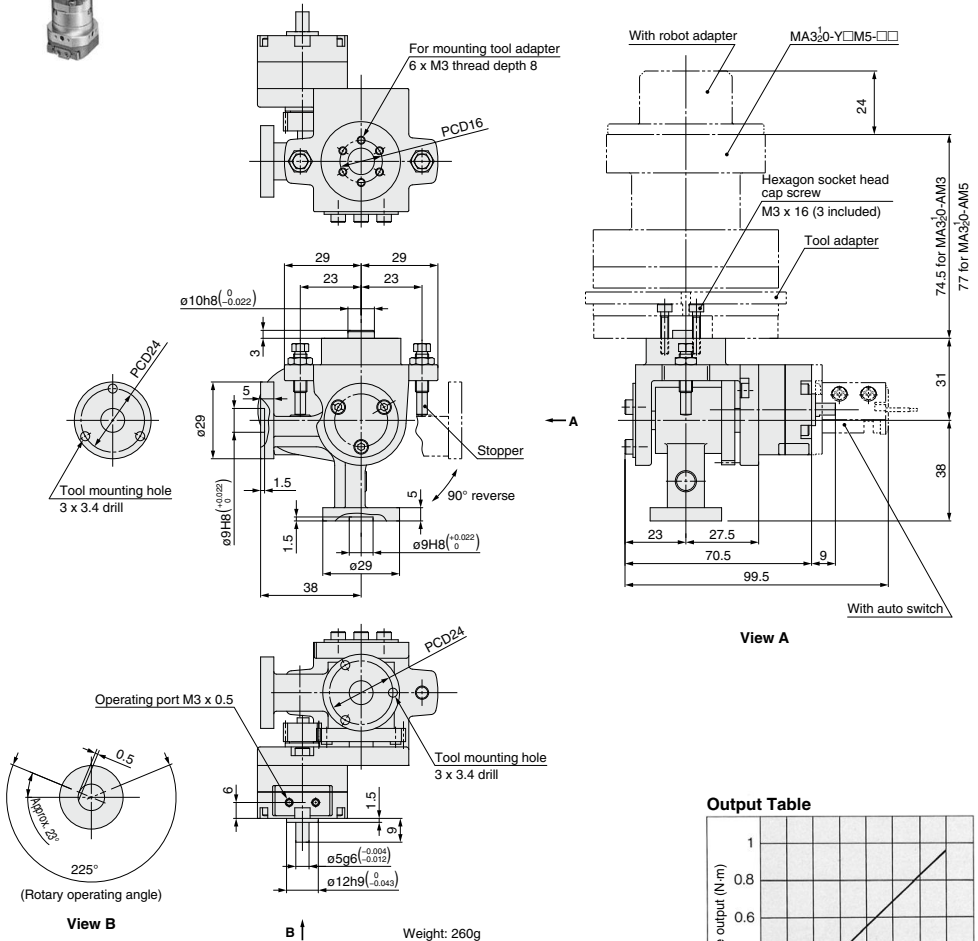


Note) Only D-Y69A and D-Y69B auto switches can be used.  
Refer to MHZ2 series (page 411) for the detailed specifications of air grippers.



## 90° Reverse Unit

MA310-R1-□



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□

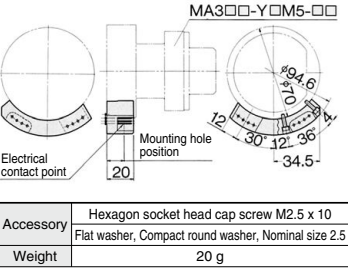
Please consult SMC regarding operating conditions (load, speed, etc.) before using.

# MA3 Series

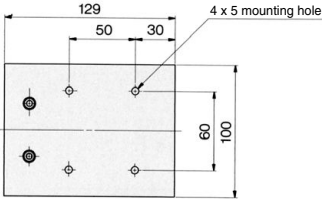
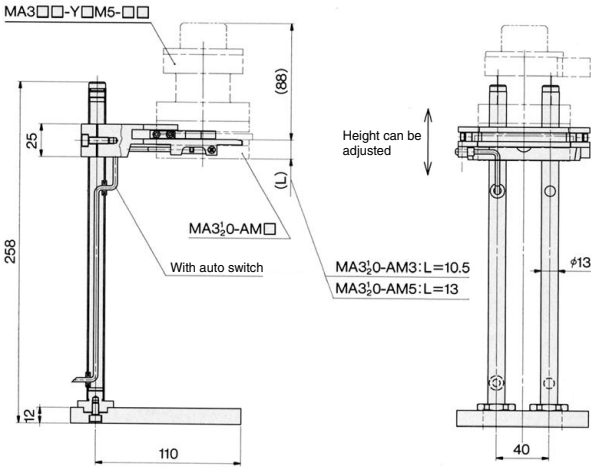
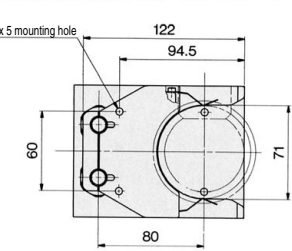
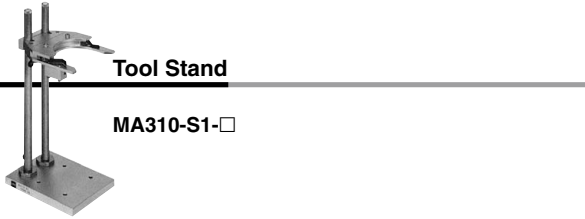
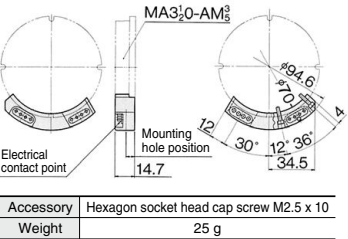


Additional Installation  
Unit of Electrical  
Contact Point

## MA310-EY1: For AHC unit



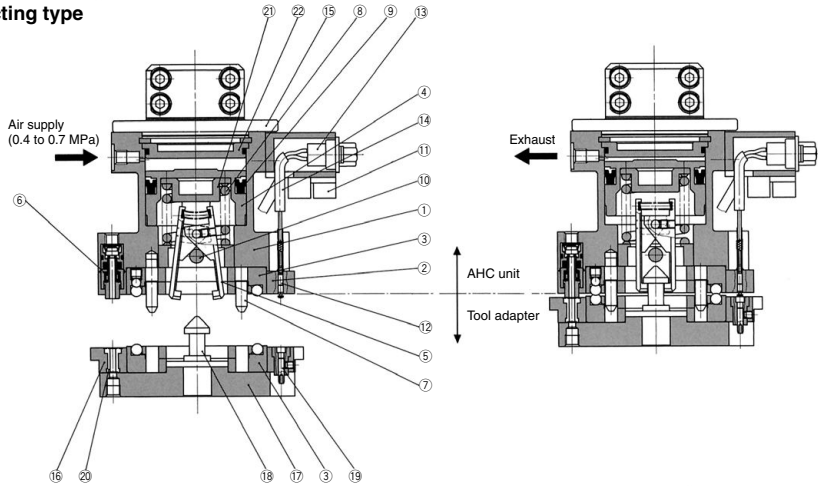
## MA310-EA1: For tool adapter



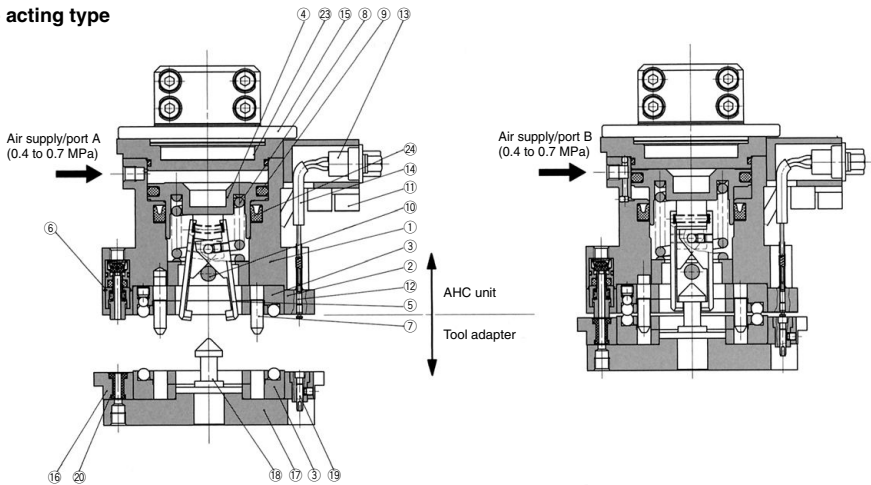
Weight: 950 g

## Construction: Component Parts

### Single acting type



### Double acting type



### Component Parts

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

### Component Parts

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

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□



# MA Series

## Specific Product Precautions 1

Be sure to read this before handling the products.

Series		MA3 <sub>2</sub> <sup>10</sup>	MA3 <sub>2</sub> <sup>11</sup>	MA210
Connection and disconnection procedures	Connection procedures	<ol style="list-style-type: none"> <li>Supply compressed air: 0.4 to 0.7 MPa to the operating port.</li> <li>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.</li> <li>Release the compressed air from the operating port.</li> </ol>	<ol style="list-style-type: none"> <li>Supply compressed air: 0.4 to 0.7 MPa to the disconnection port.</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>Supply compressed air: 0.4 to 0.7 MPa to the operating port.</li> <li>Release the compressed air from the operating port.</li> </ol>
	Disconnection procedures	<ol style="list-style-type: none"> <li>Supply compressed air: 0.4 to 0.7 MPa to the operating port.</li> <li>Pull up the AHC unit 12 mm or more.</li> </ol>	<ol style="list-style-type: none"> <li>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.</li> <li>Pull up the AHC unit 12 mm or more.</li> </ol>	<ol style="list-style-type: none"> <li>Supply compressed air: 0.4 to 0.7 MPa to the operating port.</li> <li>Pull up the AHC unit 12 mm or more.</li> </ol>

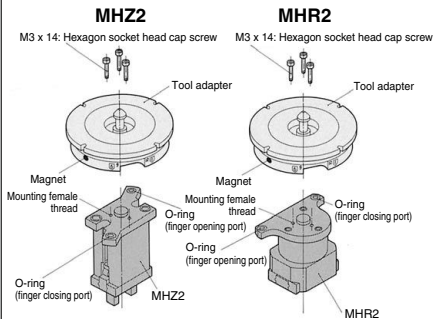
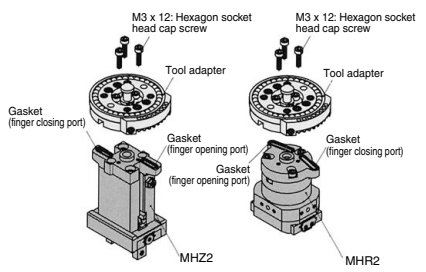
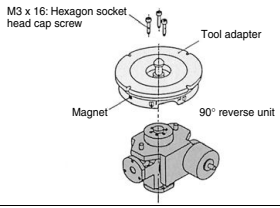
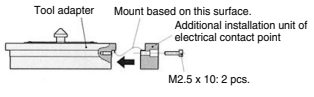
Robot Adapter Mounting	<p><b>[Mounting the robot adapter to the AHC unit]</b> Attach the robot adapter to the AHC unit by evenly tightening the 4 hexagon socket head cap screws with the maximum tightening torque mentioned in the figures below.</p> <p><b>[Mounting the robot adapter to an assembling robot]</b> 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</p>	



## MA Series

# Specific Product Precautions 2

Be sure to read this before handling the products.

Series		MA3□□	MA210
How to use dedicated air grippers	Mounting procedures	<ol style="list-style-type: none"><li>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.</li><li>Evenly tighten 3 hexagon socket head cap screws with a maximum tightening torque of 1.06 N-m.</li><li>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.</li></ol>	
			
	Piping and wiring procedures	<ol style="list-style-type: none"><li>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.<ul style="list-style-type: none"><li>Finger closing port: "S" mark</li><li>Finger opening port: "O" mark</li></ul></li><li>When using an auto switch, solder it to the terminal on the tool adapter.</li></ol>	
90° reverse unit	Mounting procedures	<ol style="list-style-type: none"><li>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.</li><li>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.</li></ol> 	
	Piping and wiring procedures	<ol style="list-style-type: none"><li>Pipe the driving air for tools or the rotary actuator to the air port of the tool adapter.</li><li>When wiring for use with an auto switch, etc., solder it to the terminal on the tool adapter.</li></ol>	
Additional installation unit of electrical contact point	Mounting procedures	<ol style="list-style-type: none"><li>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.</li></ol> 	

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□



## MA Series

# Specific Product Precautions 3

Be sure to read this before handling the products.

### 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.

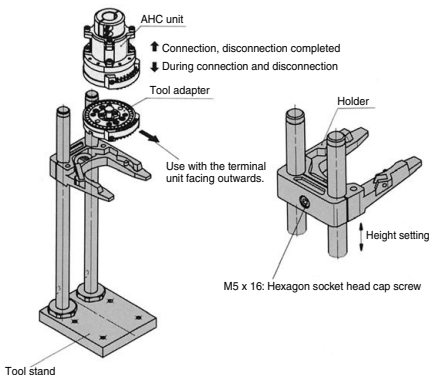
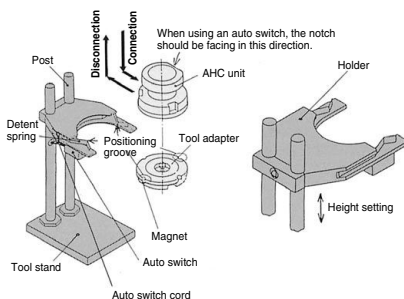
Tighten the auto switch mounting screws with a maximum tightening torque of 0.1 N·m.

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.

