

AHC System

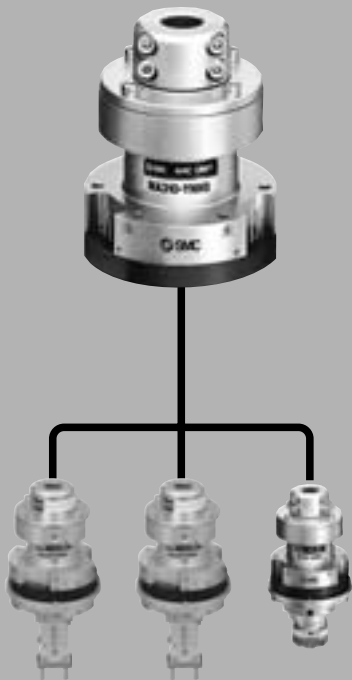
Series MA

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

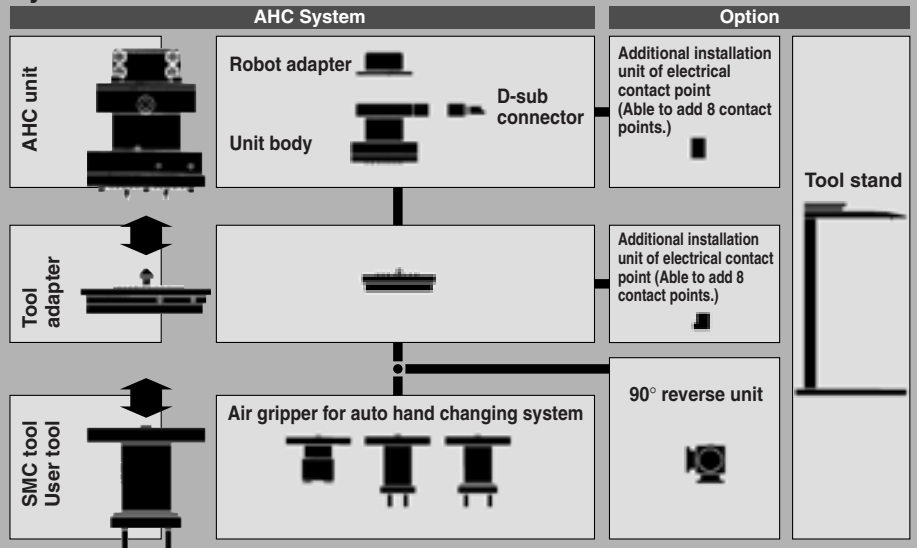
The robot hand tools change automatically to accommodate workpieces of different shapes, thus making it possible to adopt the FMS (flexible manufacturing system) in the assembly line.

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.

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□

Auto AHC and 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.

Failsafe mechanism

Prevents tools from dropping due to reductions in air pressure

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)

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

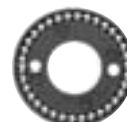
Max. transportable mass:

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

Repeatable high-precision

±0.01 mm

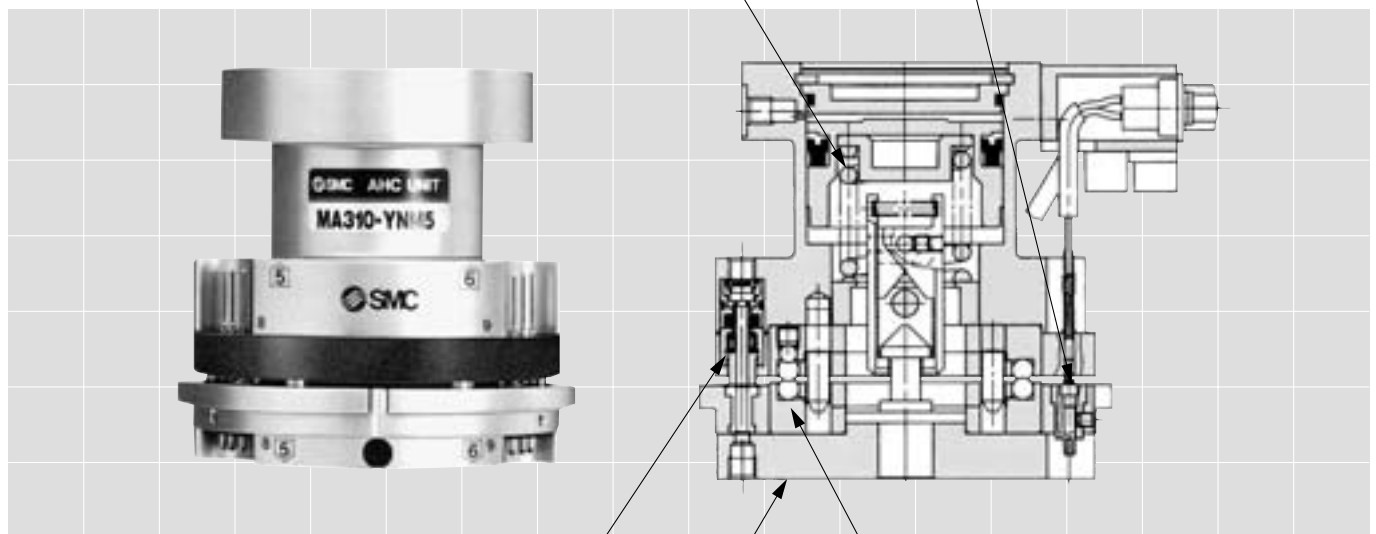
Series MA210
Series MA31□
Ball coupling



Series MA32□
Curved coupling



(For high torque resistance)



AHC System/Model/Specifications

		MA210	MA31 ⁰ ₁				MA32 ⁰ ₁			
AHC unit	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
		Robot adapter Applicable shaft diameter	Nil	●	●	●	●	●	●	●
ø8	●		—	—	—	—	—	—	—	—
ø10	●		●	●	●	●	●	●	●	●
ø11	●		●	●	●	●	●	●	●	●
ø14	●		●	●	●	●	●	●	●	●
ø15	●		●	●	●	●	●	●	●	●
ø20	●		●	●	●	●	●	●	●	●
ø24	—		●	●	●	●	●	●	●	●
Tool adapter	Port	M3	●	●			●			
		M5	—	●			●			

		MA210	MA31 ⁰ ₁				MA32 ⁰ ₁			
Parallel opening and closing for air gripper	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
		MHR2 Cylinder bore	ø10	●	●			●		
ø15	●		●			●				
ø10	●		—			—				
MHZ2 Cylinder bore	ø16	●	●			●				
	ø20	—	●			●				
	90° reverse unit	—	●			●				
Tool stand	●	●			●					
Additional installation unit	For Y	—	●			●				
	For A	—	●			●				

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

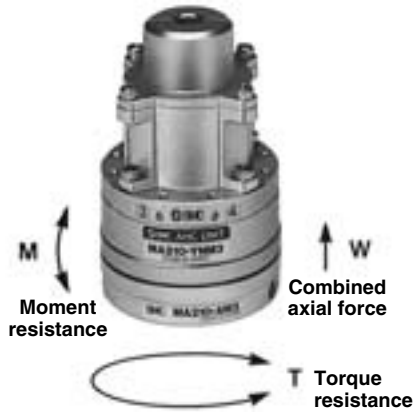
MRHQ

MA

D-□

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

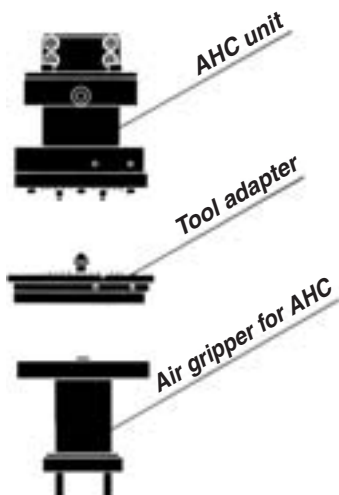
* Values given on the table for combined axial force, moment resistance, and torque resistance are the values for when the AHC unit and tool adapter begin to separate. During use, make sure the axial force, moment and torque from load are 1/2 or less than those shown above, for safety reasons.

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

Auto hand changer

Transportable mass

2	Transportable mass 3 kg
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AHC unit

Electric specifications

N	None
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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

Air connection size

M3	M3 x 0.5
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Tool adapter

Transportable mass

2	Transportable mass 3 kg
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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

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
Y69B	D-Y69B (2-wire)	Lead wire length: 0.5 m

Auto switch additional symbol

Nil	2 pcs.
S	1 pc.

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

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

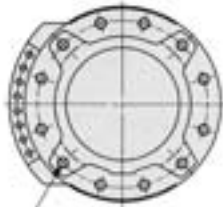
Nil	Grommet	With 0.5 m lead wire
L		With 3 m lead wire

Series MA2

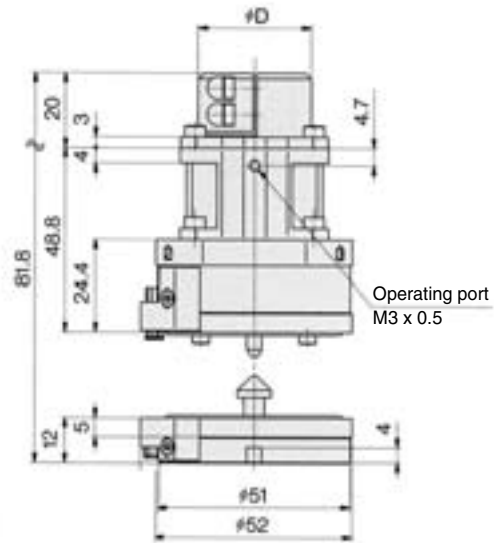
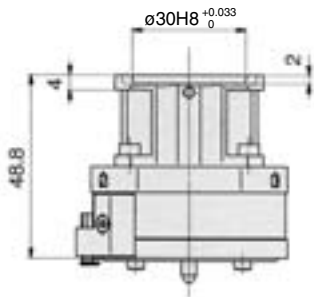
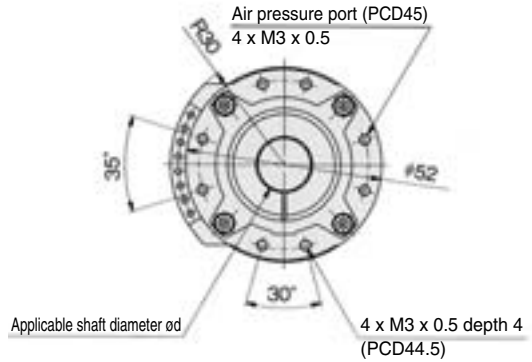


AHC Unit and Tool Adapter

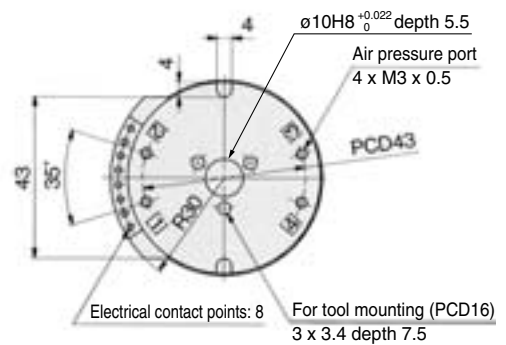
AHC Unit/MA210-YNM3 (Without robot adapter)
 AHC Unit/MA210-YNM3-□ (With robot adapter)
 Tool adapter/MA210-AM3



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



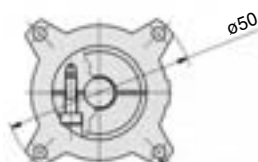
AHC unit junction



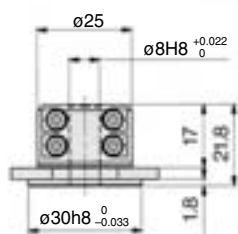
	Model	Applicable shaft diameter ød	øD	Mass (g)
AHC unit	MA210-YNM3	—	—	260
	MA210-YNM3-S1	8	25	300
	MA210-YNM3-R1	10	30	
	MA210-YNM3-R2	11		
	MA210-YNM3-R3	14		
	MA210-YNM3-R4	15		
	MA210-YNM3-R5	20		
Tool adapter	MA210-AM3	—	—	100

Robot adapter
MA210-C□□

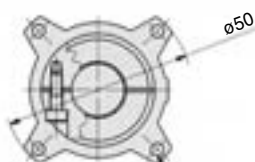
MA210-CS1



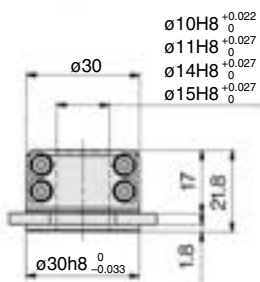
AHC unit mounting hole
4 x 3.4 (PCD44.5)



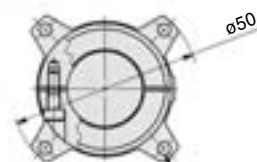
MA210-CR1, 2, 3, 4



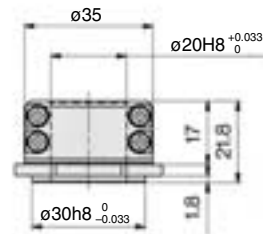
AHC unit mounting hole
4 x 3.4 (PCD44.5)



MA210-CR5



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



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

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□

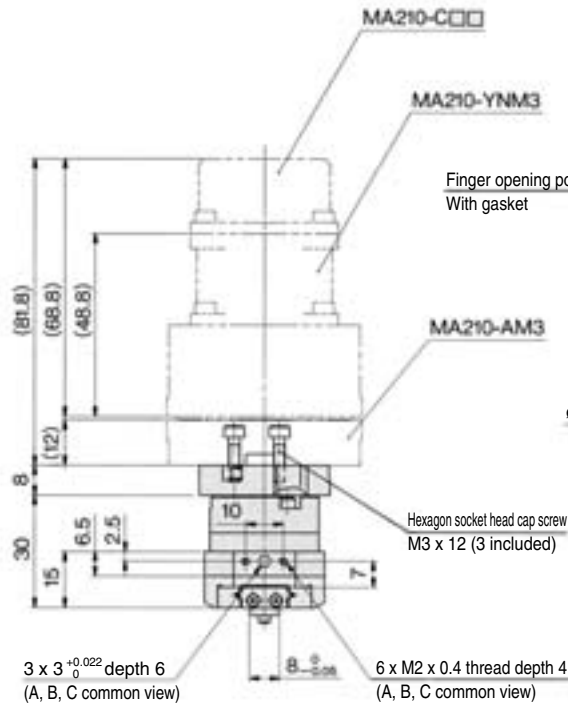
Series MA2



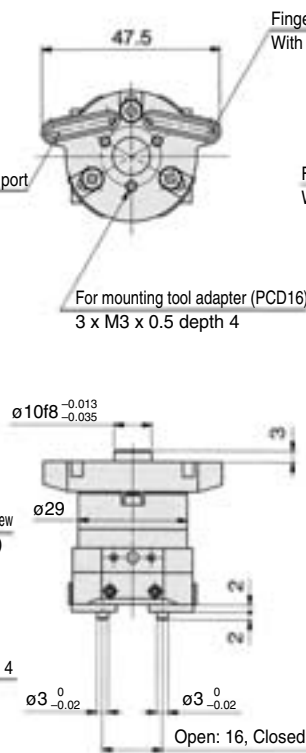
ø10/ø15 Air Gripper: Rotary Actuated Type

ø10/ø15: MHR2- $\frac{10}{15}$ -A210

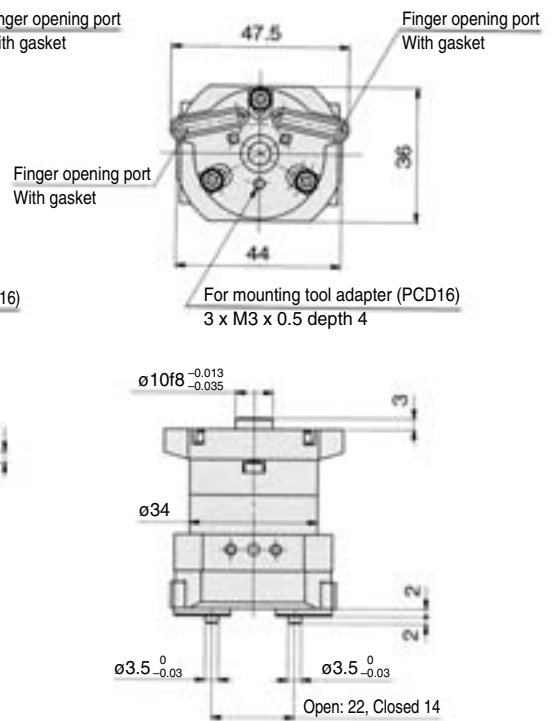
ø10 MHR2-10-A210



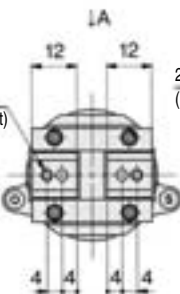
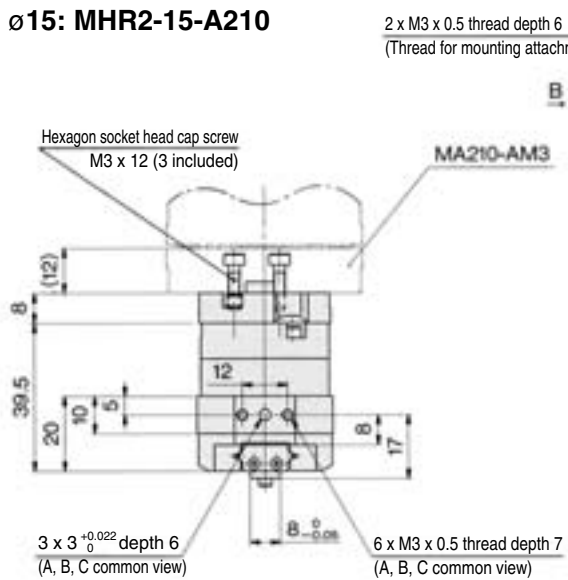
ø10 MHR2-10-A210



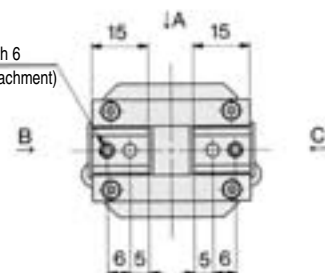
ø15 MHR2-15-A210



ø15: MHR2-15-A210



Mass: 130 g

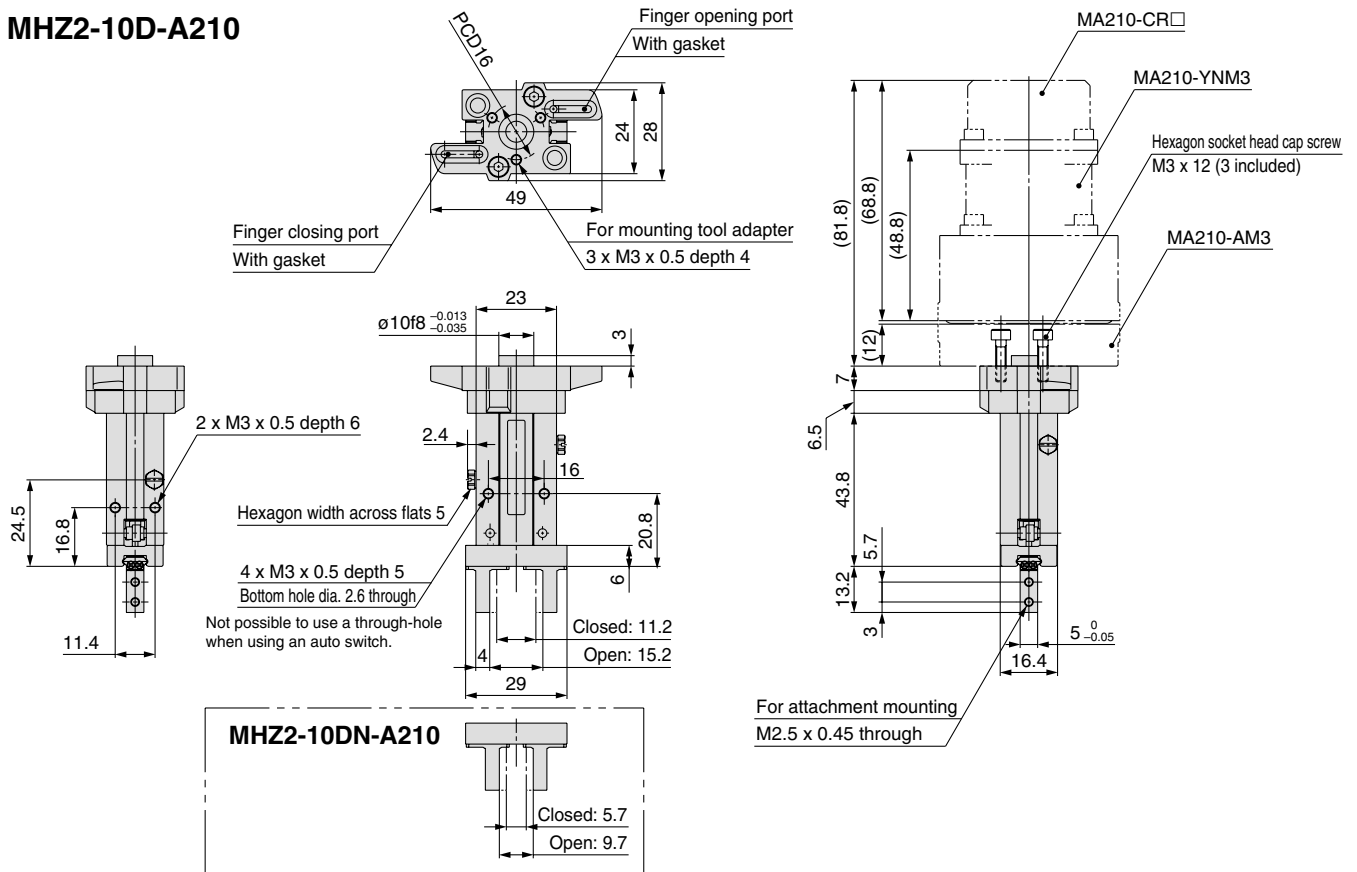


Mass: 210 g

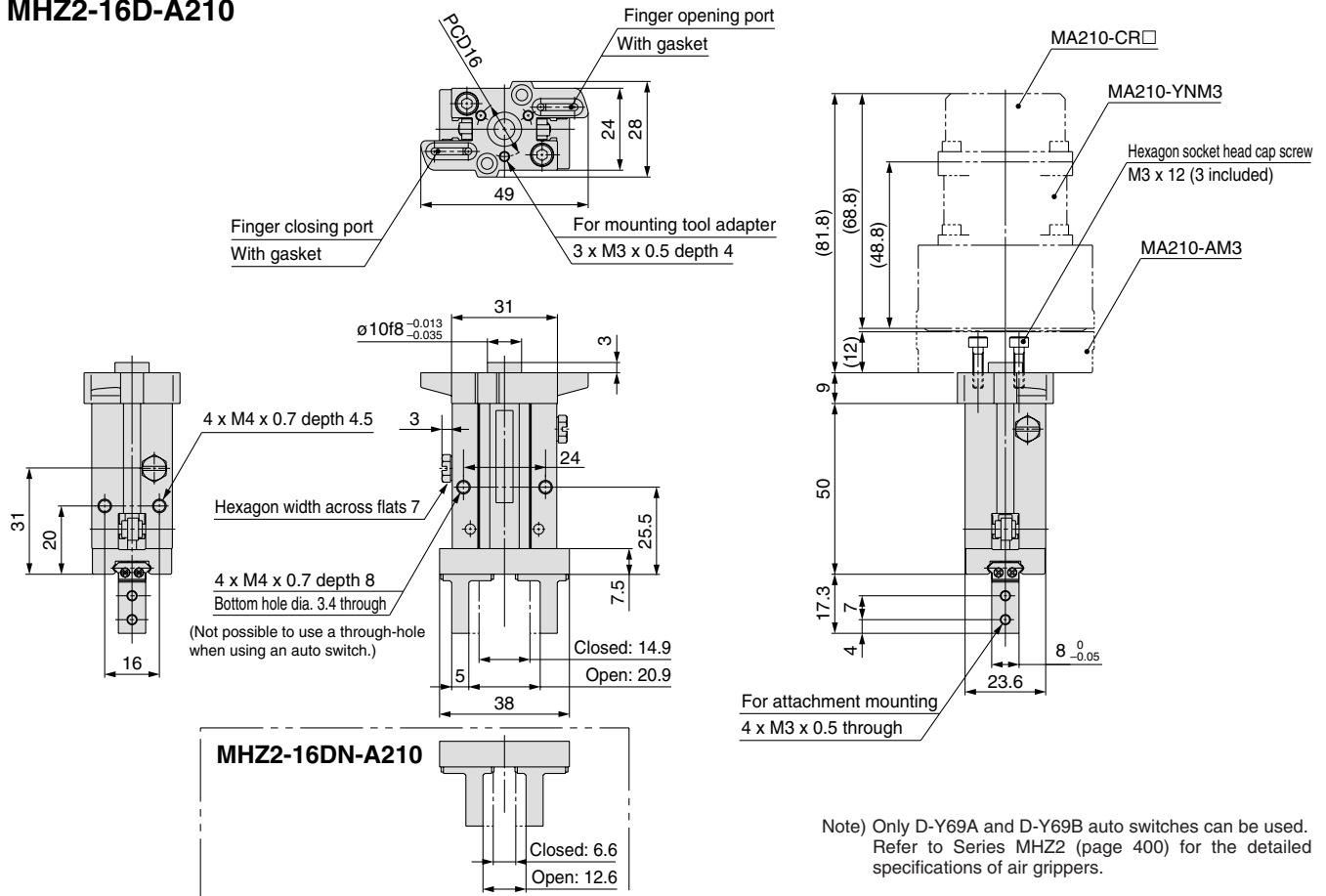
Note) Refer to Series MHR2 (page 492) for the detailed specifications of air grippers.

ø10/ø16 Air Gripper: Standard Type

MHZ2-10D-A210



MHZ2-16D-A210



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

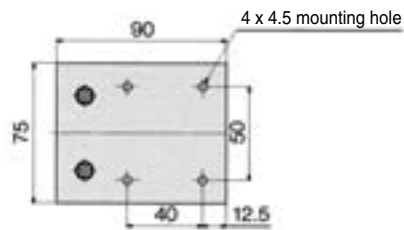
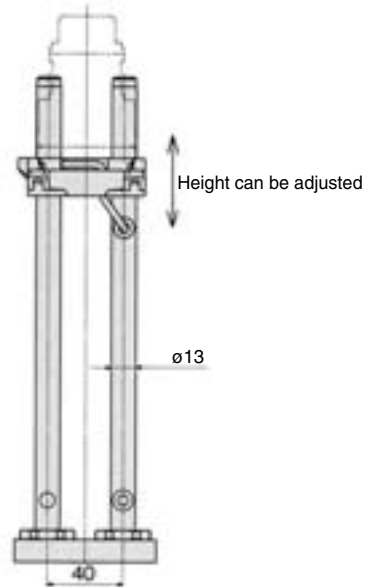
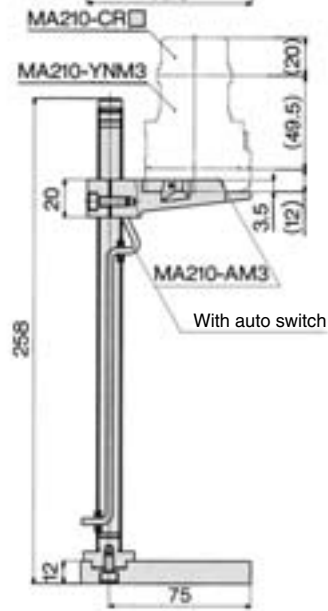
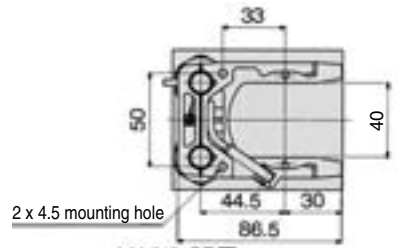
Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to Series MHZ2 (page 400) for the detailed specifications of air grippers.

Series MA2



Tool Stand

MA210-S1-□



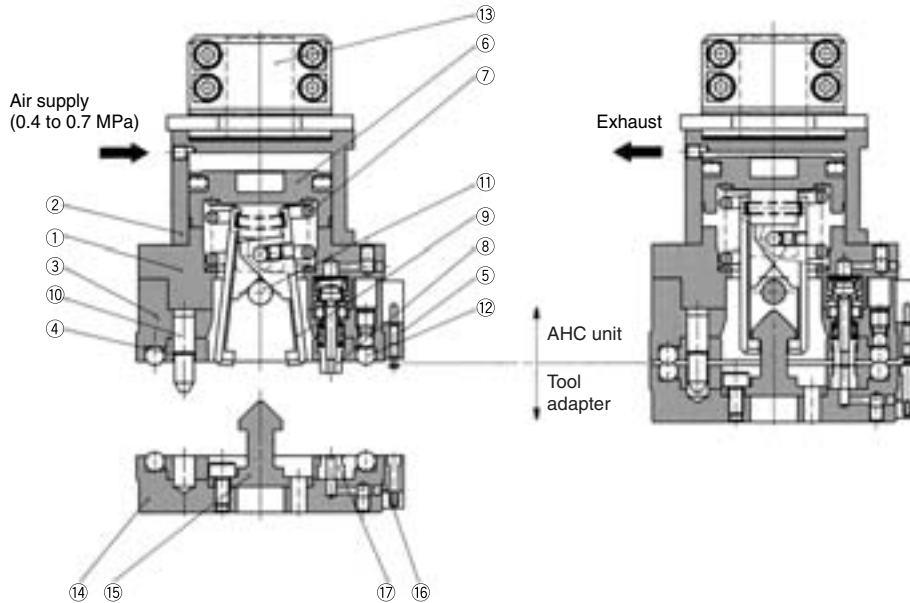
Mass: 520 g

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	

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

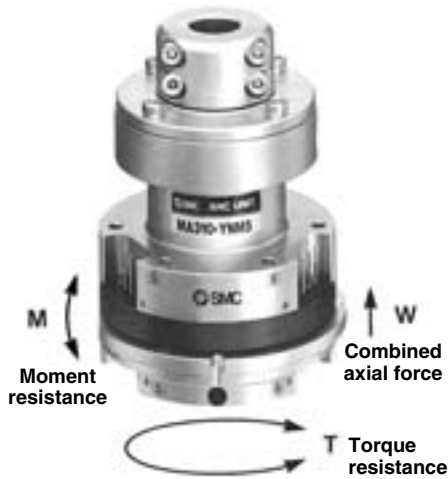
-X□

MRHQ

MA

D-□

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		
	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.

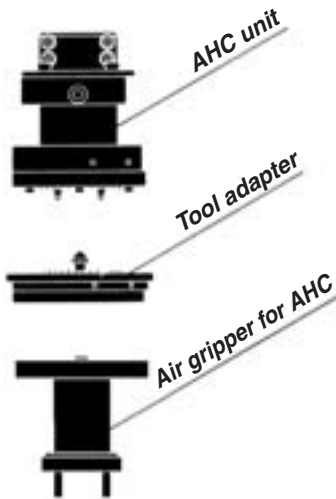
Robot adapter

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

Transportable mass
3 Transportable mass 5 kg

Positioning

1 Ball coupling
2 Curved coupling

Operation

0 Single acting
1 Double acting

AHC unit

Robot adapter

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

Air connection size

M5 M5 x 0.8

Electric specifications

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

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

Transportable mass

3 Transportable mass 5 kg

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

Nil Standard
N Narrow type

Auto switch type

Auto switch type	Without auto switch	
Nil	—	
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 MA3₂0-AM3

90° reverse unit

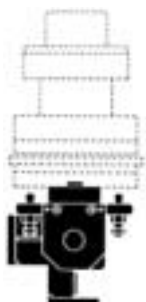
MA310-R1-90A

90° reverse unit

Auto switch type

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

Auto switch type	Without auto switch	
Nil	—	
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.



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□

Series MA3



AHC Unit and Tool Adapter/Single Acting Type

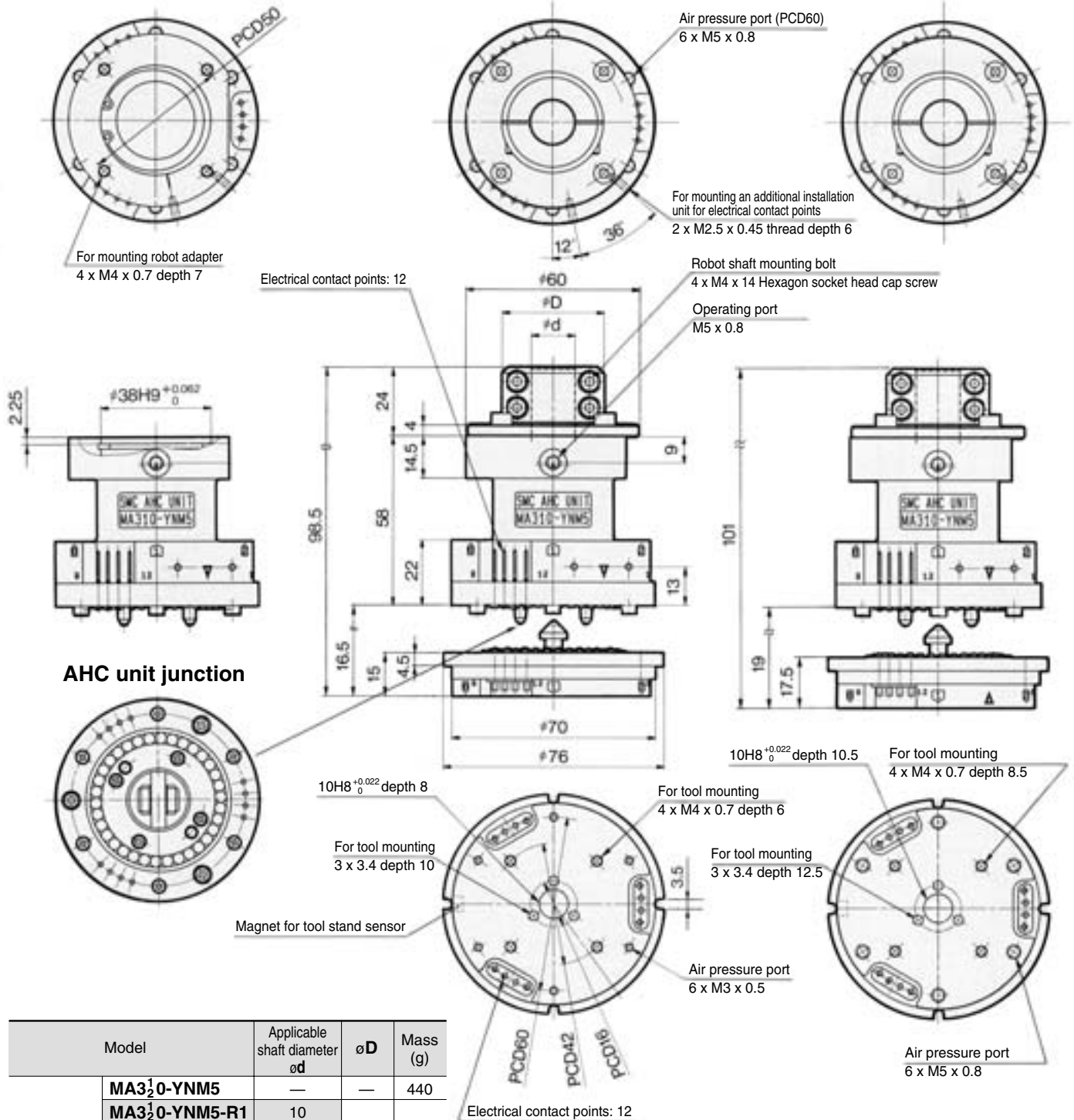
AHC Unit/MA3 $\frac{1}{2}$ 0-YNM5 (Without robot adapter)

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	Mass (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

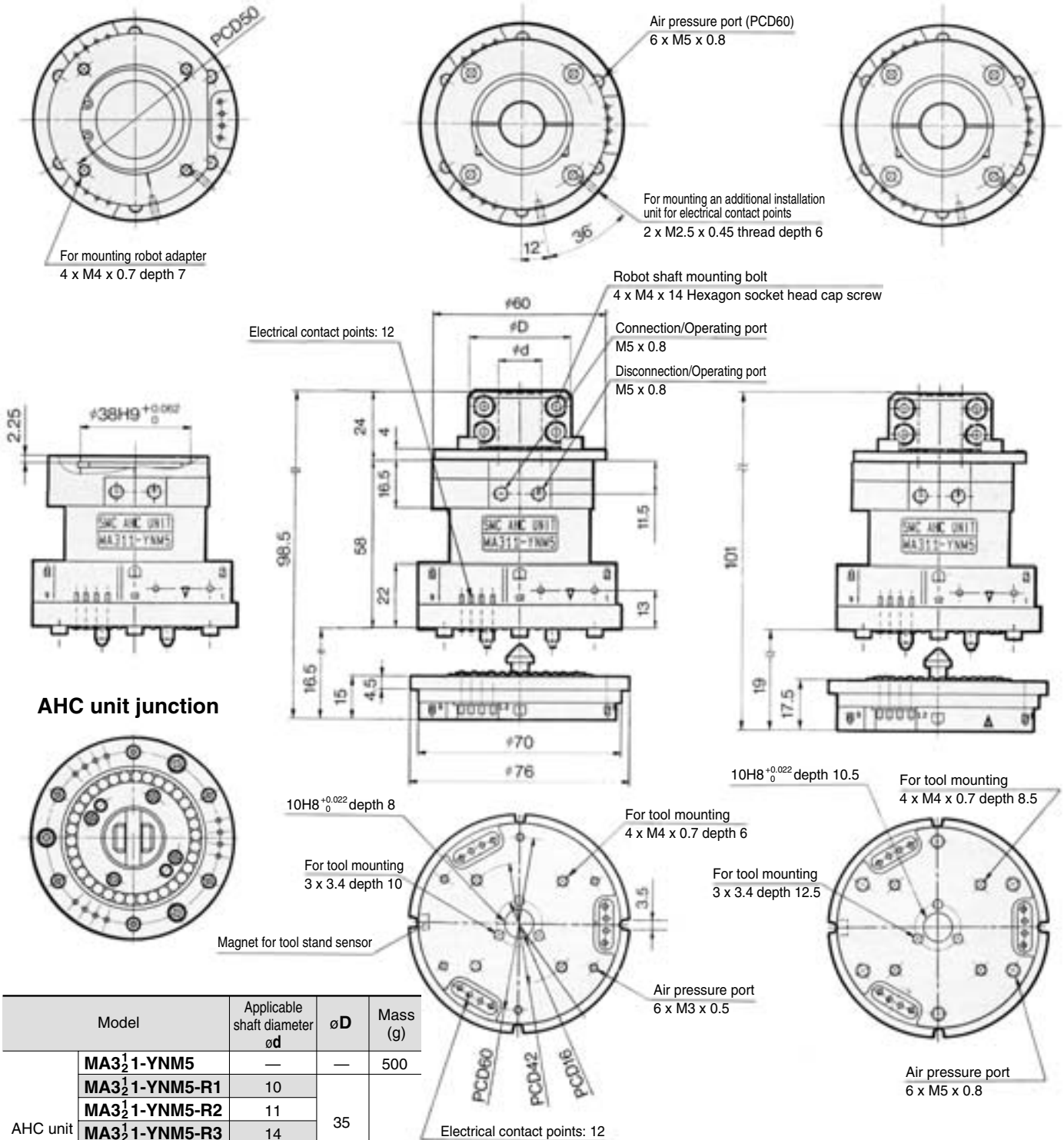
AHC Unit/MA3¹/₂1-YNM5 (Without robot adapter)

AHC Unit/MA3¹/₂1-YNM5-□ (With robot adapter)

Tool adapter/MA3¹/₂1-A□

When mounting MA3¹/₂1-AM3

When mounting MA3¹/₂1-AM5



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

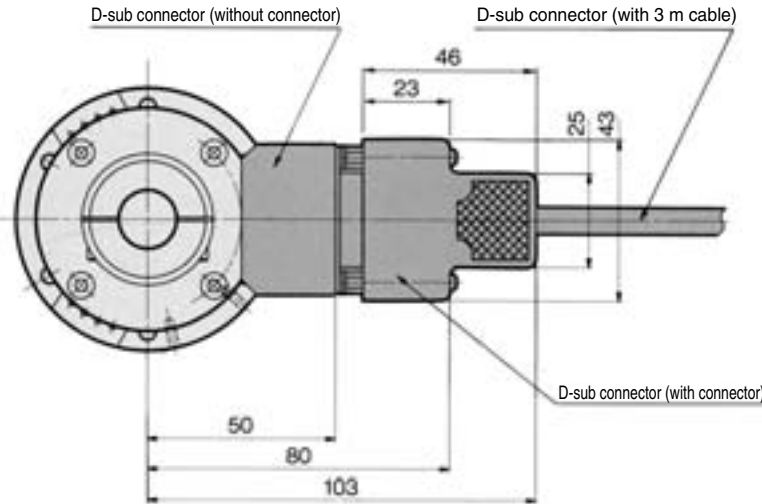
	Model	Applicable shaft diameter ϕd	ϕD	Mass (g)
AHC unit (Double Acting)	MA3 ¹ / ₂ 1-YNM5	—	—	500
	MA3 ¹ / ₂ 1-YNM5-R1	10	35	580
	MA3 ¹ / ₂ 1-YNM5-R2	11		
	MA3 ¹ / ₂ 1-YNM5-R3	14		
	MA3 ¹ / ₂ 1-YNM5-R4	15	41	
	MA3 ¹ / ₂ 1-YNM5-R5	20		
	MA3 ¹ / ₂ 1-YNM5-S6	24		
MA3 ¹ / ₂ 1-YNM5-R6	25			
Tool adapter	MA3 ¹ / ₂ 0-AM3	—	—	250
	MA3 ¹ / ₂ 0-AM5	—	—	270

Series MA3

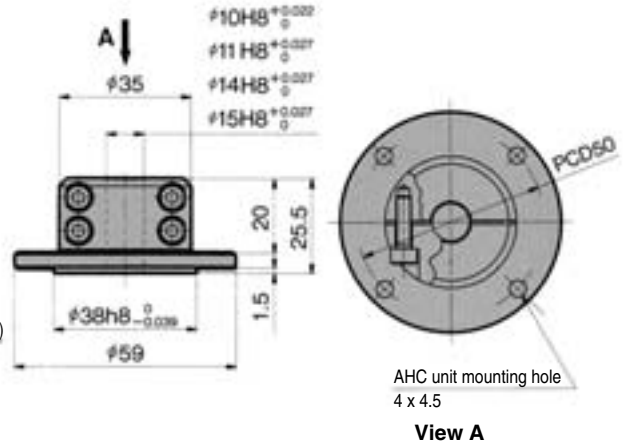


With D-sub connector
MA3□□-Y□M5-□□

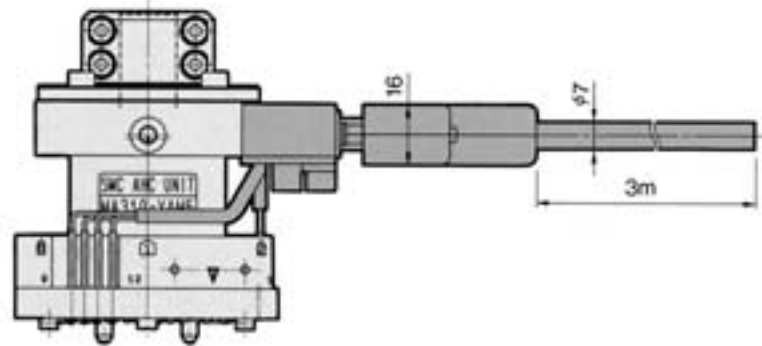
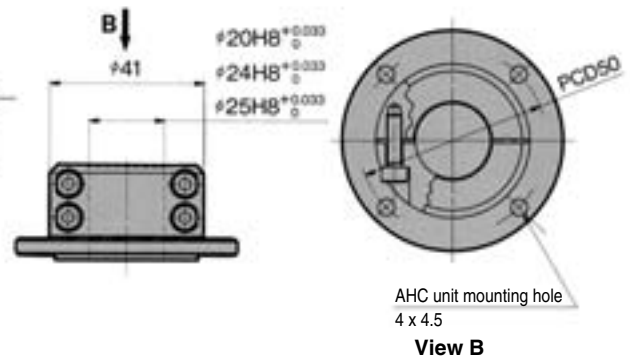
Robot adapter
MA310-C□□



MA310-CR1, 2, 3, 4



MA310-CR5, 6, CS6



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 mm ²
	No. of cores	—	12

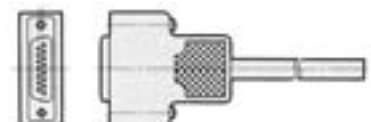
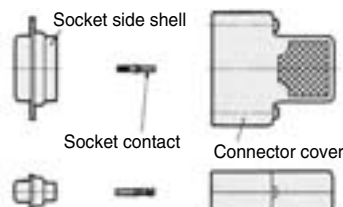
MA3□□-YAM5-□□ with a D-sub connector
Since the AHC unit main body is compatible with a pin contact, prepare a socket contact.

MA3□□-YBM5-□□ with a 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





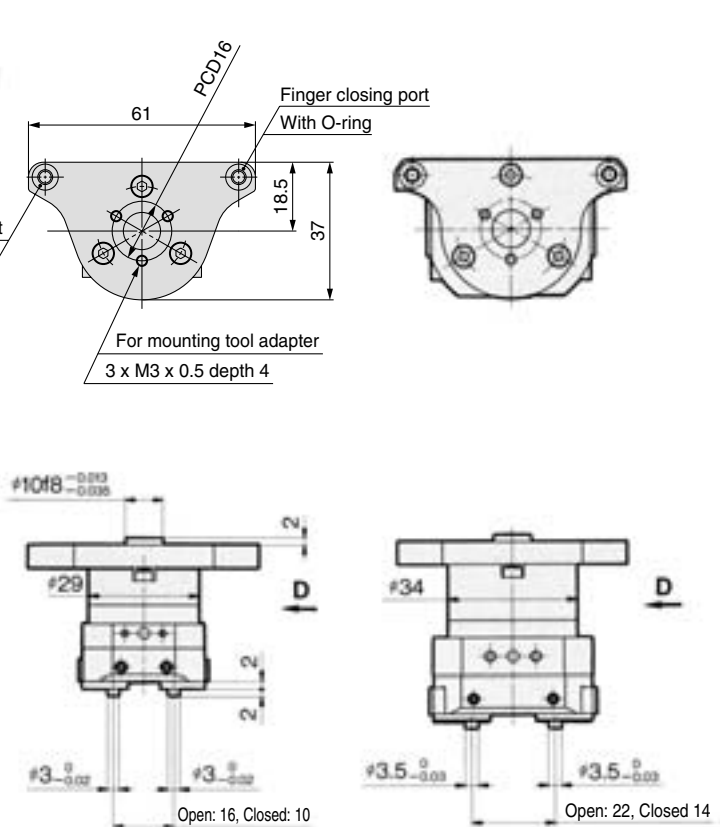
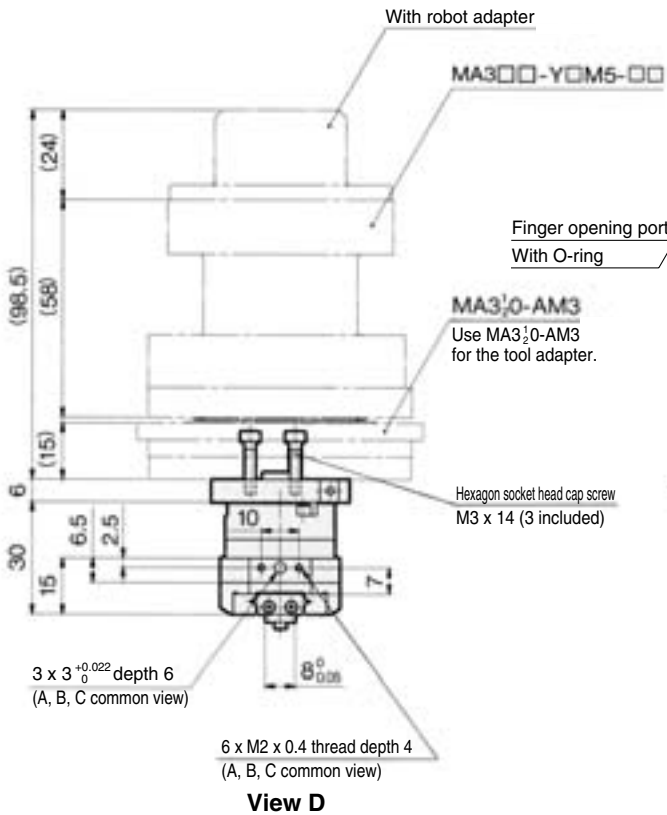
∅10/∅15 Air Gripper: Rotary Actuated Type

∅10/∅15: MHR2-10-A310

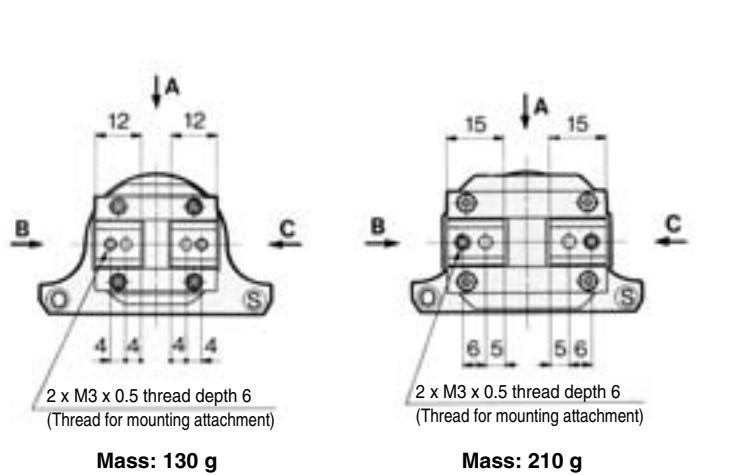
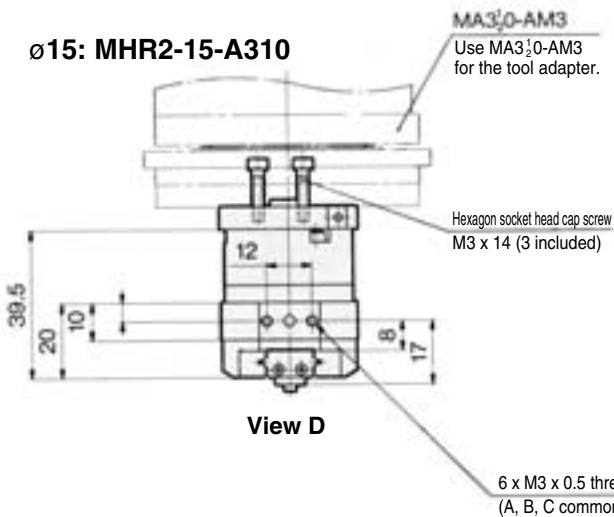
∅10
MHR2-10-A310

∅10
MHR2-10-A310

∅15
MHR2-15-A310



∅15: MHR2-15-A310



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

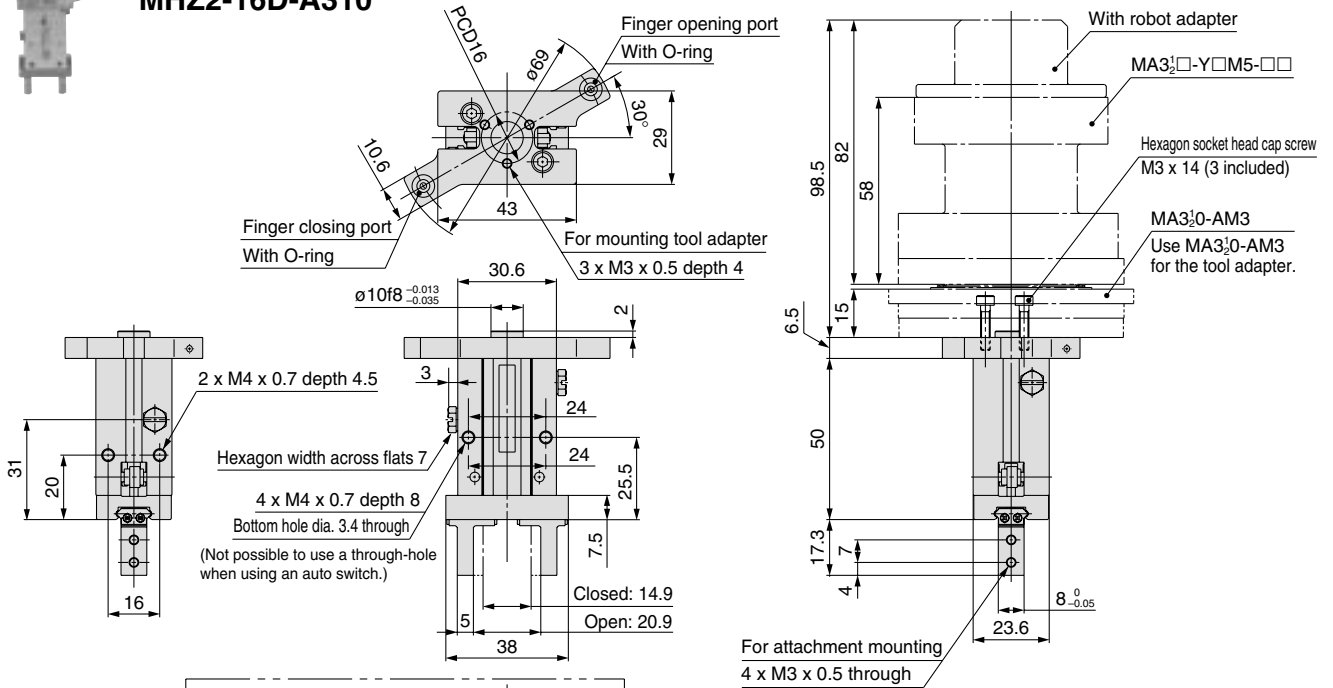
Note) Refer to Series MHR2 (page 492) for the detailed specifications of air grippers.

Series MA3

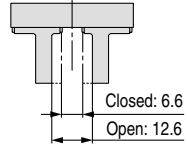


Ø16/Ø20 Air Gripper: Standard Type

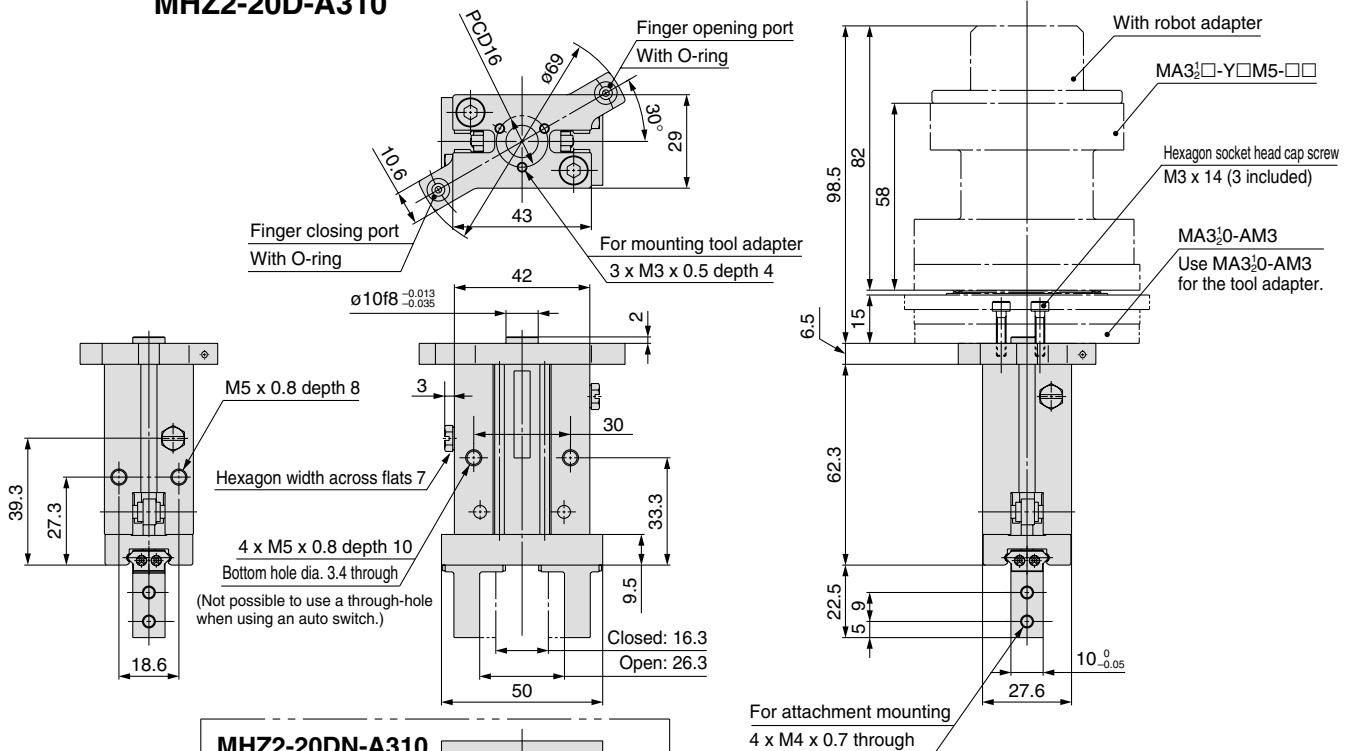
MHZ2-16D-A310



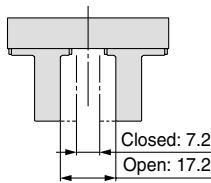
MHZ2-16DN-A310



MHZ2-20D-A310



MHZ2-20DN-A310

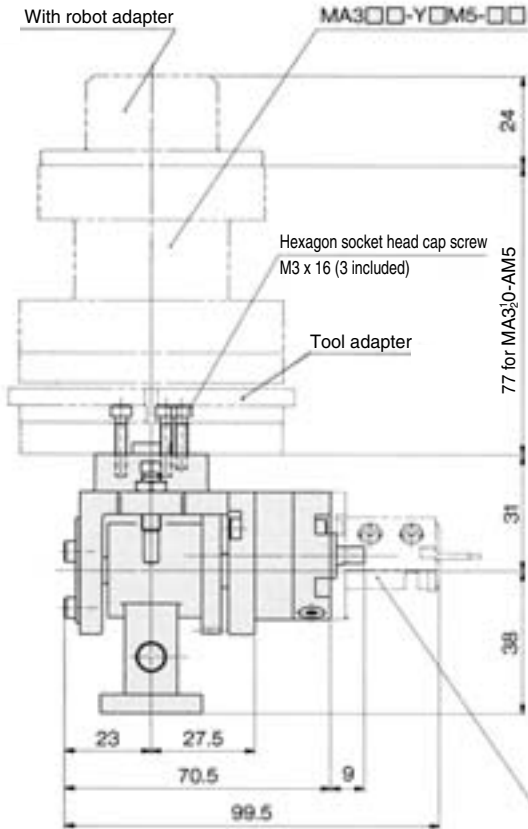


Note) Only D-Y69A and D-Y69B auto switches can be used. Refer to Series MHZ2 (page 400) for the detailed specifications of air grippers.

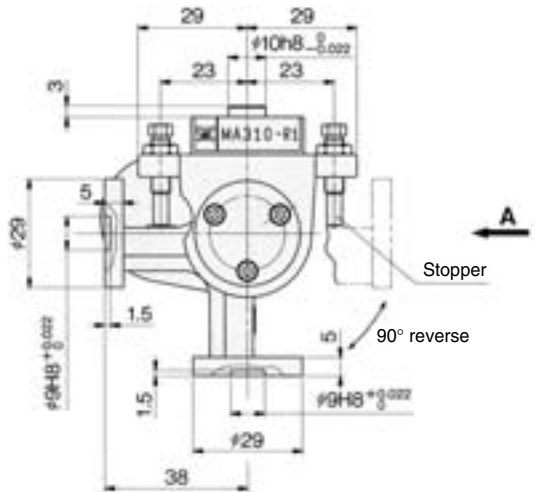
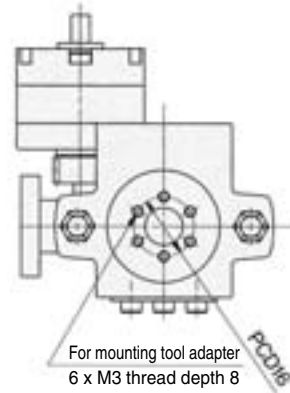


90° Reverse Unit

MA310-R1-□



View A



MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

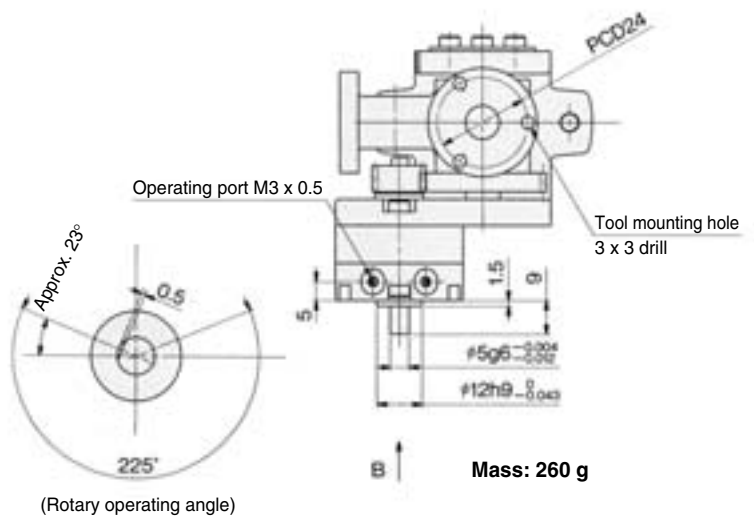
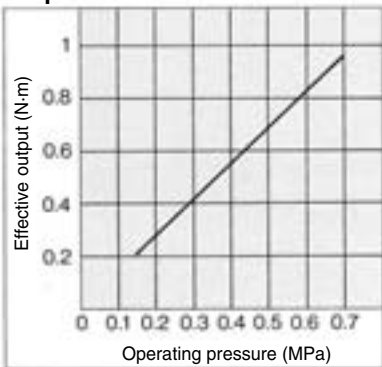
-X□

MRHQ

MA

D-□

Output Table



(Rotary operating angle)

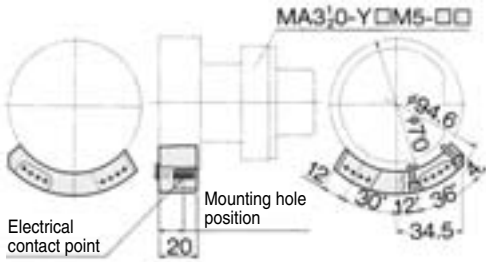
View B

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

Series MA3

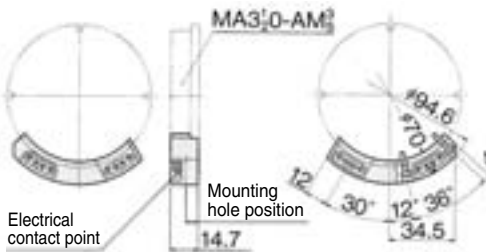


MA310-EY1: For AHC unit



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

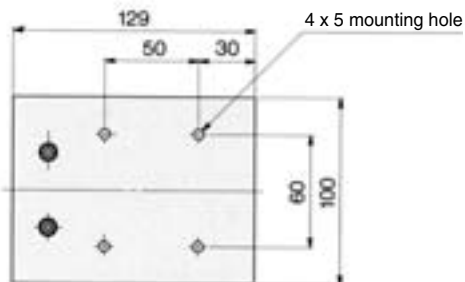
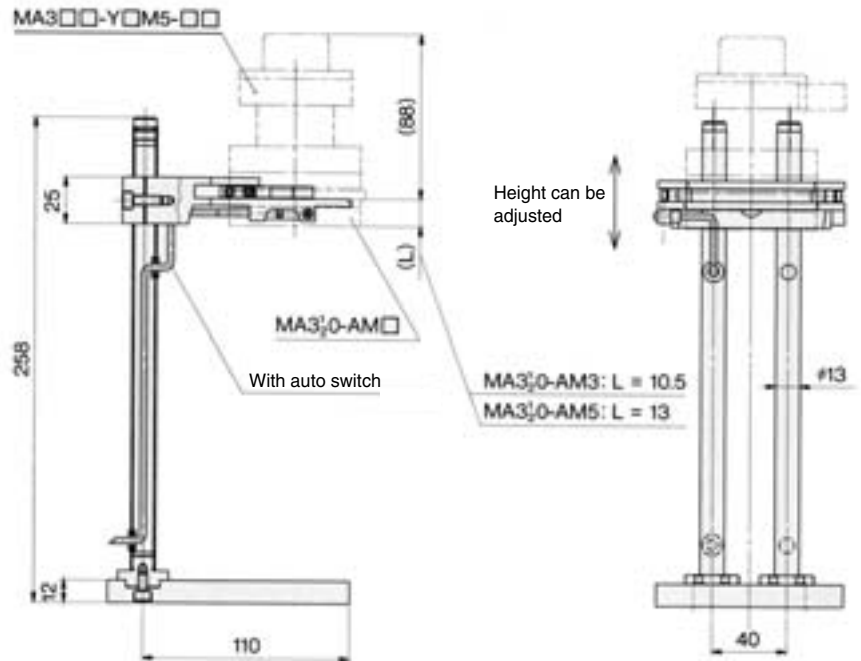
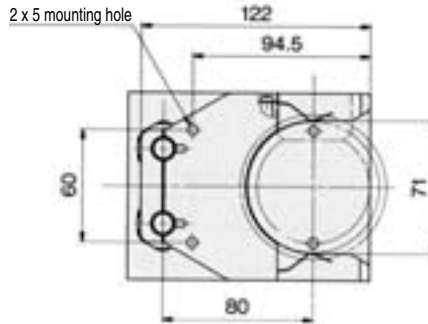
MA310-EA1: For tool adapter



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



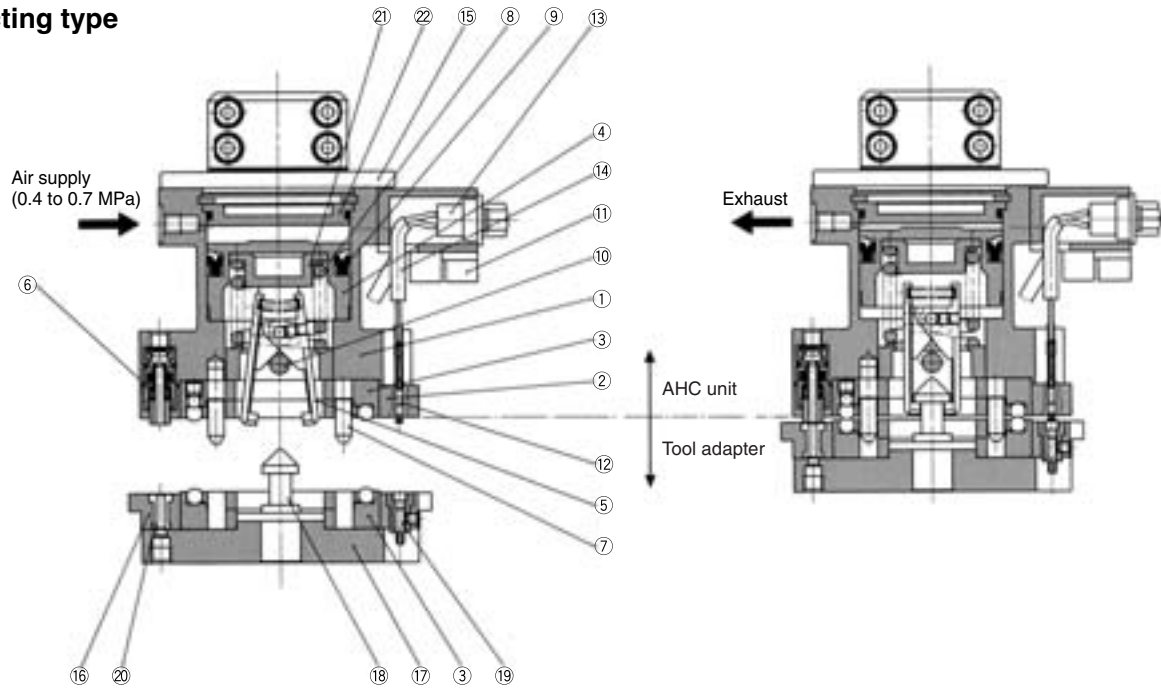
MA310-S1-□



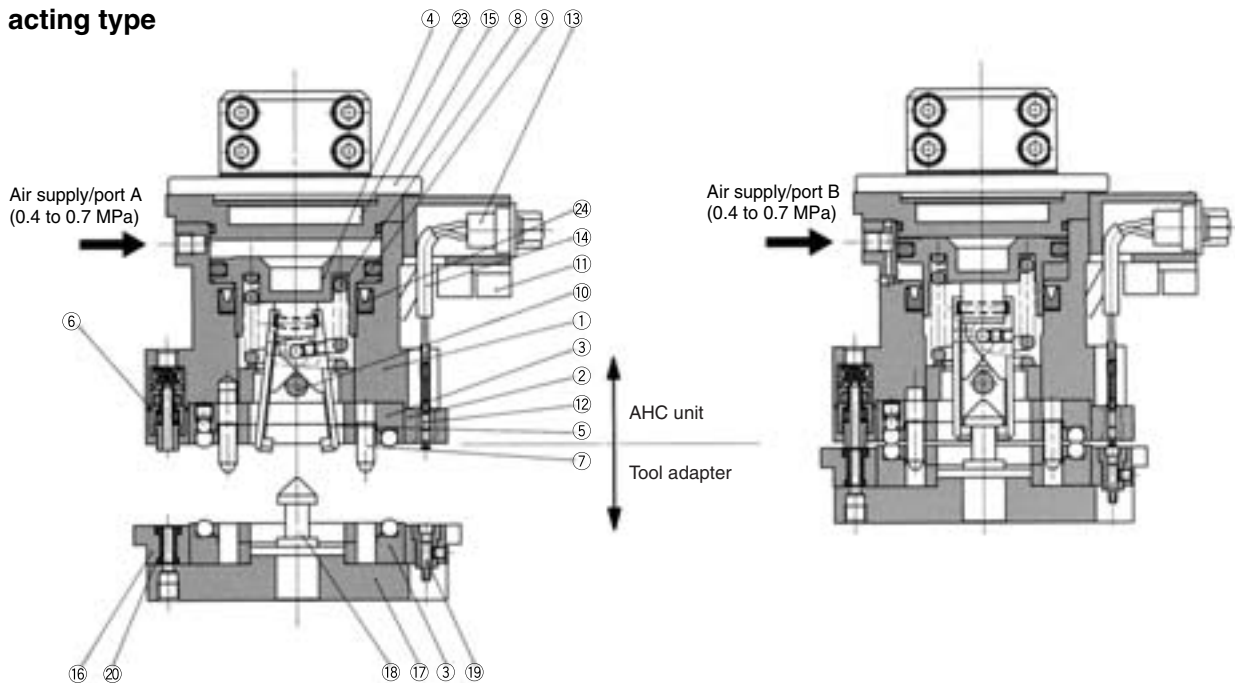
Mass: 950 g

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	

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

MA

D-□



Series MA Specific Product Precautions 1

Be sure to read before handling.

Series	MA3 ₂ ¹⁰	MA3 ₂ ¹¹	MA210
Connection and disconnection procedures	Connection procedures		
	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Supply compressed air: 0.4 to 0.7 MPa to the disconnection 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 disconnection port, and at the same time supply compressed air (0.4 to 0.7 MPa) to the connection port. 	<ol style="list-style-type: none"> 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.
Disconnection procedures	Disconnection procedures		
	<ol style="list-style-type: none"> 1. Supply compressed air: 0.4 to 0.7 MPa to the operating port. 2. Pull up the AHC unit 12 mm or more. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Supply compressed air: 0.4 to 0.7 MPa to the operating port. 2. Pull up the AHC unit 12 mm or more.
	<p style="text-align: center;">Disconnected state</p> <p>On the basis of the t dimension at the time of connection, move the AHC unit until the dimension becomes 0 to 2 mm larger.</p> <p style="text-align: center;">Connected state</p> <p>Air interface: Port number Electric interface: Contact point number</p>	<p style="text-align: center;">Disconnected state</p> <p>On the basis of the t dimension at the time of connection, move the AHC unit until the dimension becomes 0 to 2 mm larger.</p> <p style="text-align: center;">Connected state</p> <p>Electric interface: Port number Electric interface: Contact point number</p>	<p style="text-align: center;">Disconnected state</p> <p>On the basis of the t dimension at the time of connection, move the AHC unit until the dimension becomes 0 to 2 mm larger.</p> <p style="text-align: center;">Connected state</p>

Robot Adapter Mounting	<p>[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.</p> <p>[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</p>
	<p>Robot adapter AHC unit</p> <p>M4 x 10 Hexagon socket head cap screw Maximum tightening torque 2.5 N·m</p> <p>M4 x 14 Hexagon socket head cap screw Maximum tightening torque 2.5 N·m</p>



Series MA Specific Product Precautions 2

Be sure to read before handling.

Series		MA3□□	MA210
How to use dedicated air grippers	Mounting procedures	<ol style="list-style-type: none"> 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. Evenly tighten 3 hexagon socket head cap screws with a maximum tightening torque of 1.06 N·m. 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. 	<ol style="list-style-type: none"> Mount the tool adapter and the air gripper using the positioning shown in the figures below.
	Piping and wiring procedures		
90° reverse unit	Mounting procedures	<ol style="list-style-type: none"> 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. 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		
Additional installation unit of electrical contact point	Mounting procedures	<ol style="list-style-type: none"> 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. 	
	Piping and wiring procedures		

MHZ

MHF

MHL

MHR

MHK

MHS

MHC

MHT

MHY

MHW

-X□

MRHQ

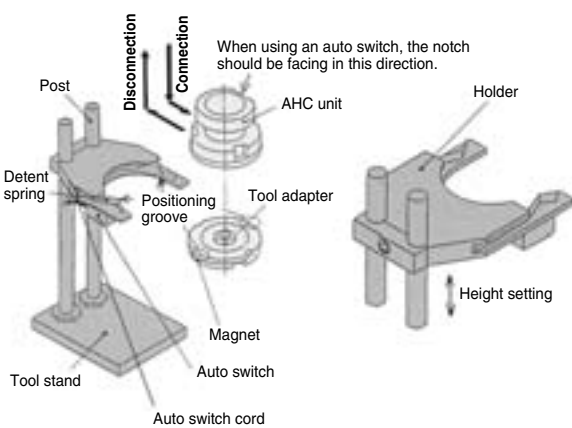
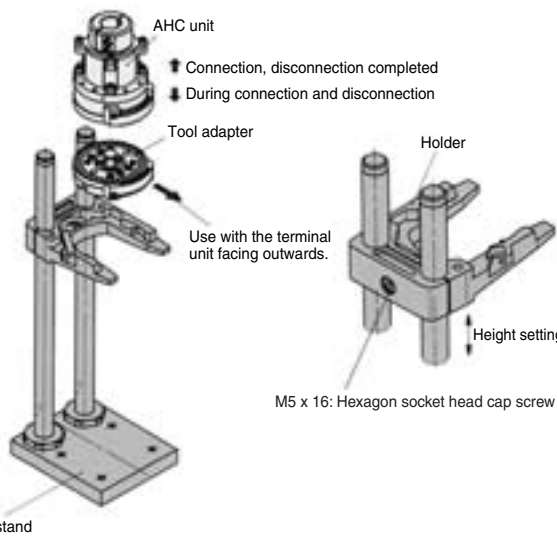
MA

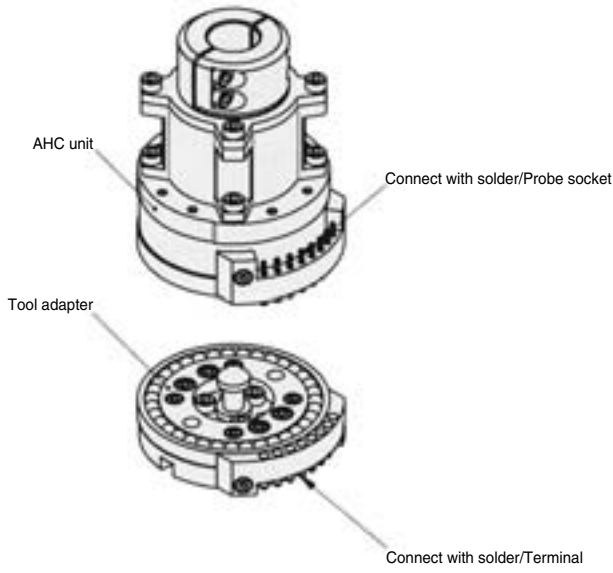
D-□



Series MA Specific Product Precautions 3

Be sure to read before handling.

Series	MA3□□	MA210
How to use the tool stand	<ol style="list-style-type: none"> 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. Connect or disconnect the AHC unit and tool adapter only after attaching the AHC unit in a horizontal direction. 	<ol style="list-style-type: none"> Use the tool adapter and tool stand based on the positioning shown in the figure below. Connect or disconnect the AHC unit and tool adapter in a direction perpendicular to the AHC unit.
	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. 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. During piping and wiring, be sure that there is no external forces such as pulling and twisting at work. 
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