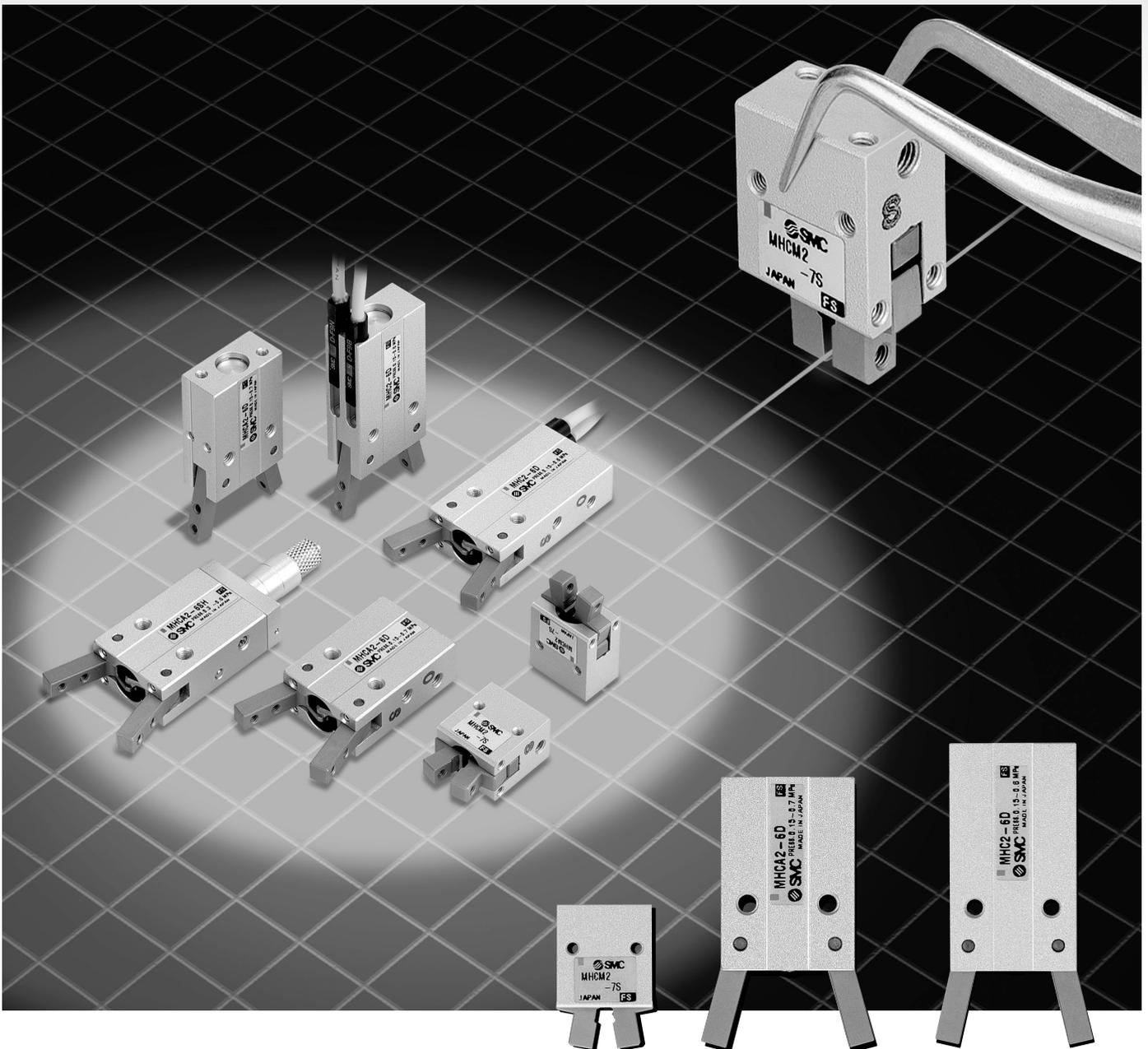


Angular Air Gripper



Angular style air gripper **Series MHC** now also available in $\phi 6$ size.
Series MHCM2 now available for further miniaturisation.

Series MHCA2/MHCA2/MHCM2

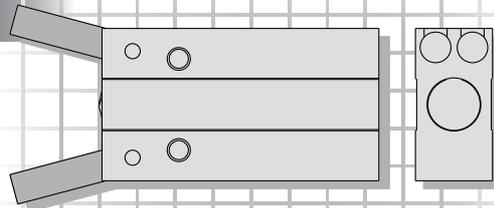
Angular air gripper

Series MHC2/MHCA2/MHCM2

MHC2-6 □

Auto switch is attachable.

48mm x 20mm x 10mm 22g

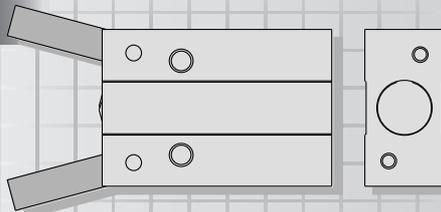


(Full size)

MHCA2-6 □

Short body.

41mm x 20mm x 10mm 19g

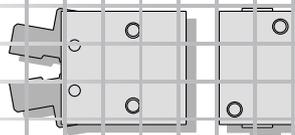


(Full size)

MHCM2-7S

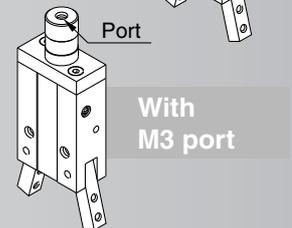
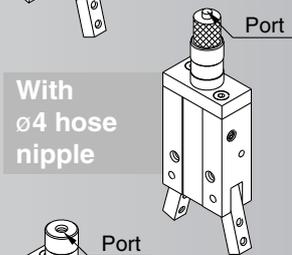
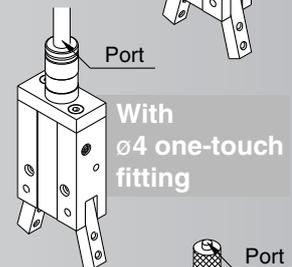
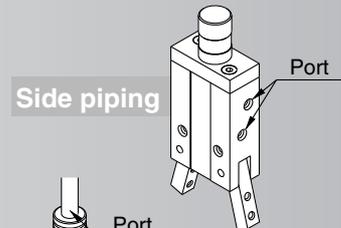
Smallest size and lightest weight in MHC series.

23mm x 15mm x 10mm 9.5g



(Full size)

Body option (Only for MHCA2-6)



Variations



Model	MHC2-6 □	MHCA2-6 □	MHCM2-7S
Cylinder bore	ø6	ø6	ø7
Action	Double acting Single acting (normally open)		Single acting (normally open)
Opening / Closing angle (both sides)	30° to -10°		20° to -7°
Holding moment (at 0.5 MPa)	0.038N·m (double acting) 0.024N·m (single acting)		0.017N·m
Repeatability	±0.02mm		
Maximum operating frequency	180c.p.m		
Weight	22g <small>Note)</small>	19g	9.5g
Auto switch	Solid state switch (2-wire, 3-wire)	—	—
Body option	—	End boss type	—

Note) Not including auto switch weight.

Series MHC2/MHCA2/MHCM2 Model Selection

Model Selection

Selection procedure

Step 1 Confirm gripping force

Step 2 Confirmation of inertial moment of attachment

Step 1 Confirmation of gripping force

Confirmation of conditions

Calculation of required gripping force

Model selection from gripping force graph

Example Work piece weight: **0.01kg**

Gripping method: External gripping

Model selection criteria with respect to work piece weight

- Although differences will exist depending on factors such as shape and the coefficient of friction between the attachments and work pieces, select a model which will provide a gripping force 10 to 20 times (Note 1) the weight of the work piece.

(Note 1) Refer to the model selection illustration for more information.

- Furthermore, in cases with high acceleration or impact, etc., it is necessary to allow an even greater margin of safety.

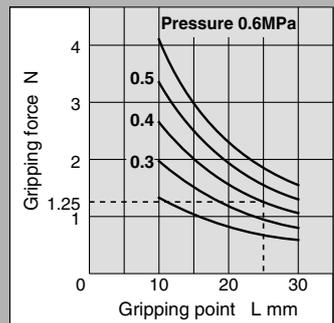
Example: When it is desired to set the gripping force at 10 times or more the work piece weight.

$$\begin{aligned} \text{Required gripping force} &= 0.01\text{kg} \times 10 \times 9.8\text{m/s}^2 \\ &= \text{Approx. } 0.98\text{N or more} \end{aligned}$$

Length of gripping point: **25mm**

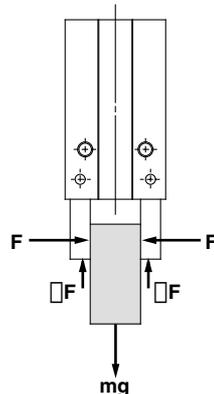
Operating pressure: **0.4MPa**

MHC2-6D/MHCA2-6D



- Selecting the MHC2-6D. The gripping force of 1.25N is obtained from the intersection point of gripping point distance $L = 25\text{mm}$ and pressure of 0.4MPa.
- The gripping force is 12.7 times greater than the work piece weight, and therefore satisfies a gripping force setting value of 10 times or more.

Model selection illustration



When gripping a work piece as in the figure to the left and with the following definitions,

F: Gripping force (N)

μ : Coefficient of friction between attachments and work piece

m: Work piece mass (kg)

g: Gravitational acceleration (= 9.8m/s²)

mg: Work piece weight (N)

the conditions under which the work piece will not drop are

$$2 \times \mu \times F > mg$$

Number of fingers

and therefore,

$$F > \frac{mg}{2 \times \mu}$$

With "a" as the safety margin, F is determined as follows:

$$F = \frac{mg}{2 \times \mu} \times a$$

Gripping force at least 10 to 20 times the work piece weight

The "10 to 20 times or more of the work piece weight" recommended by SMC is calculated with the safety margin of $a = 4$, which allows for impacts that occur during normal transportation, etc.

When $\mu = 0.2$	When $\mu = 0.1$
$F = \frac{mg}{2 \times 0.2} \times 4$	$F = \frac{mg}{2 \times 0.1} \times 4$
$= 10 \times mg$	$= 20 \times mg$

10 x work piece weight

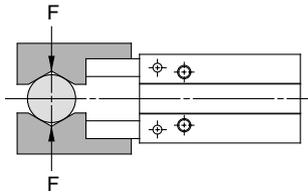
20 x work piece weight

(Note) · Even in cases where the coefficient of friction is greater than $\mu = 0.2$, for safety reasons, SMC recommends selecting a gripping force which is at least 10 to 20 times the work piece weight.
· It is necessary to allow a greater safety margin for high accelerations and strong impacts, etc.

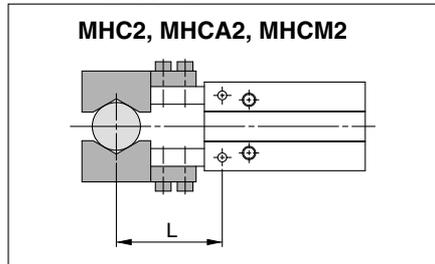
Step 1 Effective gripping force: Series MHC□2 External gripping force

●Expressing the effective gripping force

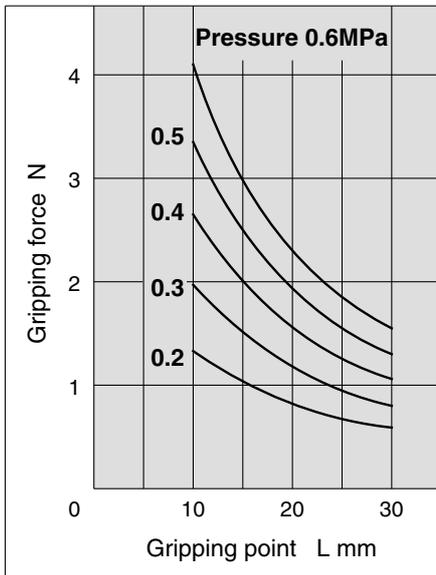
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger when both fingers and attachments are in full contact with the work piece as shown in the figure below.



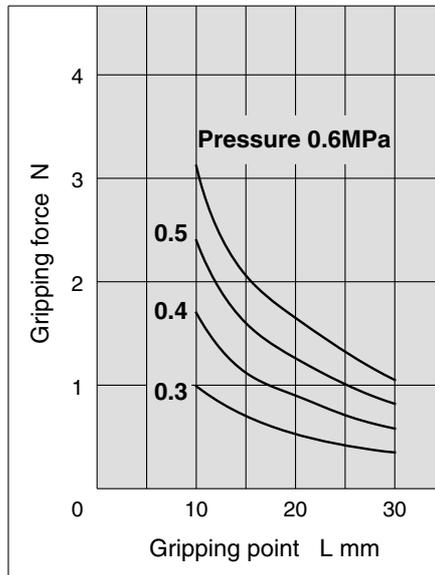
External gripping



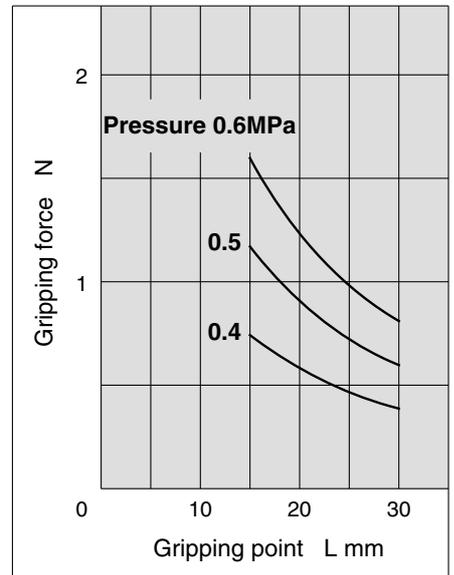
MHC2-6D/MHCA2-6D



MHC2-6S/MHCA2-6S

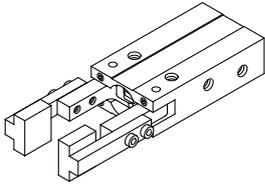


MHCM2-7S

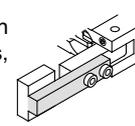


Series MHC2/MHCA2/MHCM2

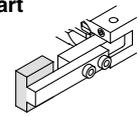
Step 2 Confirmation of inertial moment of attachment



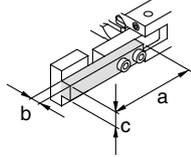
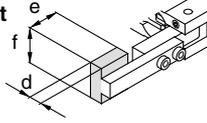
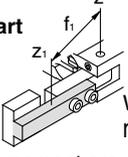
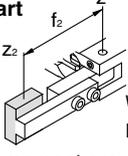
Confirm the inertial moment of one of the two attachments.
For example, in calculating the inertial moment of an attachment in the picture on the right, divide it into 2 rectangular parallelepipeds, A part and B part.



A part



B part

Procedure	Formula	Example						
<p>1. Calculate the operating conditions and attachment dimensions.</p>	<p>A part</p>  <p>B part</p> 	<p>Operating equipment: MHC2-6D a = 20 (mm) b = 3 (mm) c = 4 (mm) d = 4 (mm) e = 5 (mm) f = 6 (mm)</p>						
<p>2. Calculate the inertial moment of the attachment.</p>	<p>A part</p>  <p>Weight calculation $m_1 = a \times b \times c \times \text{Relative density}$</p> <p>Inertial moment around Z1 axis $I_{Z1} = \{m_1 (a^2 + b^2) / 12\} \times 10^{-6}$</p> <p>Inertial moment around Z axis $I_A = I_{Z1} + m_1 r_1^2 \times 10^{-6}$</p> <p>B part</p>  <p>Weight calculation $m_2 = d \times e \times f \times \text{Relative density}$</p> <p>Inertial moment around Z2 axis $I_{Z2} = \{m_2 (d^2 + e^2) / 12\} \times 10^{-6}$</p> <p>Inertial moment around Z axis $I_B = I_{Z2} \times m_2 r_2^2 \times 10^{-6}$</p> <p>Thus, the total inertial moment is $I = I_A + I_B$ (□: Unit conversion constant)</p>	<p>Assuming the attachment material is aluminium alloy (relative density=2.7), $r_1 = 16.4$ (mm).</p> <p>$m_1 = 20 \times 3 \times 4 \times 2.7 \times 10^{-6}$ $= 6.48 \times 10^{-4}$ (kg)</p> <p>$I_{Z1} = \{6.48 \times 10^{-4} \times (20^2 + 3^2) / 12\} \times 10^{-6}$ $= 2.21 \times 10^{-8}$ (kg·m²)</p> <p>$I_A = 2.21 \times 10^{-8} + 6.48 \times 10^{-4} \times 16.4^2 \times 10^{-6}$ $= 0.20 \times 10^{-6}$ (kg·m²)</p> <p>$r_2 = 23.5$(mm)</p> <p>$m_2 = 4 \times 5 \times 6 \times 2.7 \times 10^{-6}$ $= 3.24 \times 10^{-4}$ (kg)</p> <p>$I_{Z2} = \{3.24 \times 10^{-4} \times (4^2 + 5^2) / 12\} \times 10^{-6}$ $= 1.11 \times 10^{-9}$ (kg·m²)</p> <p>$I_B = 1.11 \times 10^{-9} + 3.24 \times 10^{-4} \times 23.5^2 \times 10^{-6}$ $= 0.18 \times 10^{-6}$ (kg·m²)</p> <p>$I = 0.20 \times 10^{-6} + 0.18 \times 10^{-6}$ $= 0.38 \times 10^{-6}$ (kg·m²)</p>						
<p>3. Confirm from the table that the inertial moment of one attachment is within the allowable range.</p>	<p>MHC2-6D/MHCA2-6D</p> <table border="1" data-bbox="542 1590 965 1825"> <tr> <td>Finger opening and closing speed</td> <td>Allowable inertial moment of attachment</td> </tr> <tr> <td>Without speed controller</td> <td>0.5 x 10⁻⁶ Kg□m²</td> </tr> <tr> <td>With speed controller 3/4 to 1 and 1/2 reverse rotation from fully close state</td> <td>1.5 x 10⁻⁶ Kg□m²</td> </tr> </table> <p>Attachment inertial moment > Allowable inertial moment</p>	Finger opening and closing speed	Allowable inertial moment of attachment	Without speed controller	0.5 x 10 ⁻⁶ Kg□m ²	With speed controller 3/4 to 1 and 1/2 reverse rotation from fully close state	1.5 x 10 ⁻⁶ Kg□m ²	<p>Attachment inertial moment 0.38 x 10⁻⁶ (kg·m²) < Allowable inertial moment without speed controller 0.5 x 10⁻⁶ (kg·m²)</p> <p>Therefore, the attachment can be used without a speed controller.</p>
Finger opening and closing speed	Allowable inertial moment of attachment							
Without speed controller	0.5 x 10 ⁻⁶ Kg□m ²							
With speed controller 3/4 to 1 and 1/2 reverse rotation from fully close state	1.5 x 10 ⁻⁶ Kg□m ²							

Symbol

Symbol	Definition	Unit
Z	Central axis of finger rotation	—
Z1	Axis which contains center of gravity of attachment A part and is parallel to Z	—
Z2	Axis which contains center of gravity of attachment B part and is parallel to Z	—
I	Total inertial moment of attachment	kg□m ²
Iz1	Inertial moment around Z1 axis of attachment A part	kg□m ²
Iz2	Inertial moment around Z2 axis of attachment B part	kg□m ²
IA	Inertial moment around Z axis of attachment A part	kg□m ²
IB	Inertial moment around Z axis of attachment B part	kg□m ²
m1	Weight of attachment A part	kg
m2	Weight of attachment B part	kg
r1	Distance between axes Z and Z1	mm
r2	Distance between axes Z and Z2	mm

Limiting range of attachment inertial moment

MHC2-6D/MHCA2-6D

Finger opening and closing speed	Allowable inertial moment of attachment	Weight (Guide)
Without speed controller ^{Note)}	0.5 x 10 ⁻⁶ kg□m ²	2g or less
With speed controller 3/4 to 1 and 1/2 reverse rotation from fully close state	1.5 x 10 ⁻⁶ kg□m ²	3.5g or less

MHC2-6S/MHCA2-6S

Finger opening and closing speed	Allowable inertial moment of attachment	Weight (Guide)
Without speed controller ^{Note)}	0.5 x 10 ⁻⁶ kg□m ²	2g or less
With speed controller 3/4 to 2 reverse rotation from fully close state	1.5 x 10 ⁻⁶ kg□m ²	3.5g or less

MHCM2-7S

Finger opening and closing speed	Allowable inertial moment of attachment	Weight (Guide)
Without speed controller ^{Note)}	0.3 x 10 ⁻⁶ kg□m ²	2g or less
With speed controller 1/2 to 1 3/4 reverse rotation from fully close state	1.0 x 10 ⁻⁶ kg□m ²	3.3g or less

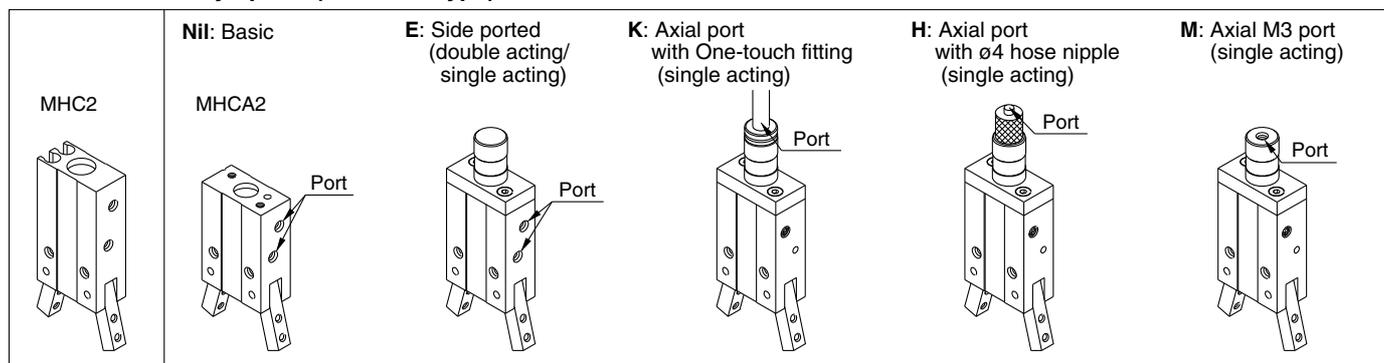
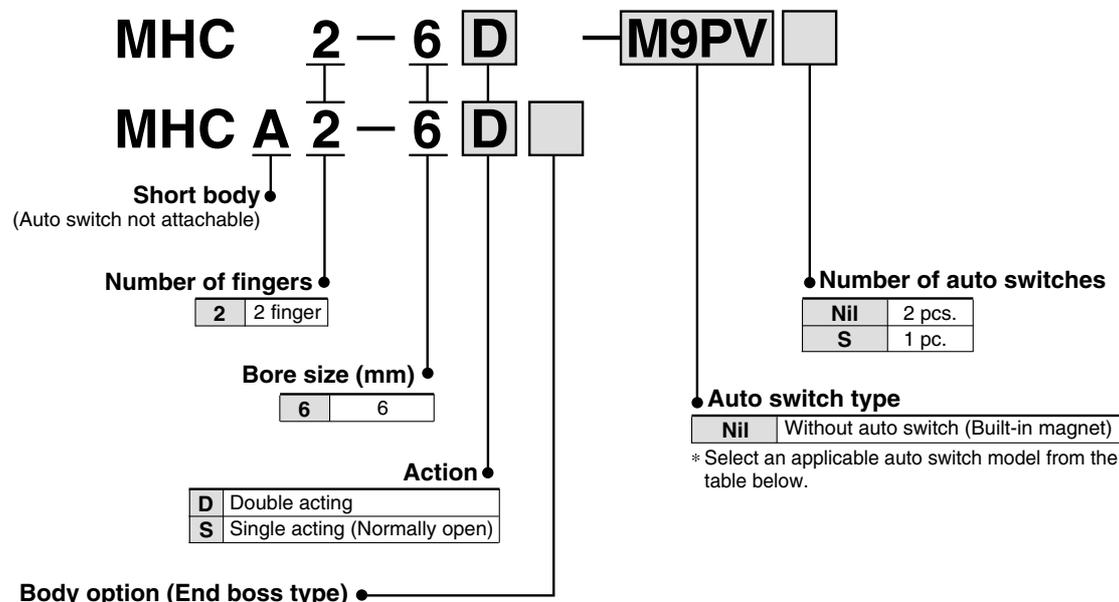
□Applicable speed controller ——— Air gripper direct connection type AS1211F-M3
 Use a meter-in type.
 Note) In case of MHCM2-7S, provide a run off space because the speed controller protrudes from the body top surface by 0.6 mm.

Note) Sometimes the work piece may not be gripped precisely because of excessive speed in finger opening and closing. Therefore, use a meter-in type speed controller to adjust the finger opening and closing speed.

Angular Air Gripper

Series MHC2-6/MHCA2-6

How to Order



Applicable auto switches

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch type		Lead wire length (m)*			Note 1) Flexible lead wire (-61)	Applicable loads	
					DC	AC		Electrical entry direction	In-line	0.5 (Nil)	3 (L)	5 (Z)			
Solid state switch	-	Grommet	Yes	3-wire (NPN)	24V	12V	-	Perpendicular	M9NV	M9N	●	●	○	-	Relay PLC
				3-wire (PNP)				M9PV	M9P	●	●	○			
				2-wire				M9BV	M9B	●	●	○			

*Lead wire length symbol: 0.5m..... Nil (Example) M9N
3m..... L (Example) M9NL
5m..... Z (Example) M9NZ

*Auto switches marked "O" are produced upon receipt of order.
Note 1) For the flexible wire specification, enter -61 after the part number.

(Example) When ordering with air gripper

MHC2-6D-M9NVS-61

●Flexible wire

When ordering only auto switch

D-M9PL-61

●Flexible wire

Angular Air Gripper *Series MHC2-6/MHCA2-6*



Specifications

Fluid		Air
Operating pressure	Double acting	0.15 to 0.6MPa
	Single acting: Normally open	0.3 to 0.6MPa
Ambient and fluid temperature		-10 to 60°C
Repeatability		±0.02mm
Maximum operating frequency		180c.p.m
Lubrication		Non-lube
Action		Double acting, Single acting (Normally open)
Auto switch (Optional) ^{Note)}		Solid state switch (3-wire, 2-wire)

Note) Refer to page 6-15 for auto switch specifications.

Model

Action	Model	Cylinder bore (mm)	Holding moment ^{Note)} (Effective value) N□m	Opening/Closing angle (Both sides)	Weight ^{Note 2)} g
Double acting	MHC2-6D	6	0.038	30° to -10°	22
	MHCA2-6D	6			19
Single acting (Normally open)	MHC2-6S	6	0.024	30° to -10°	22
	MHCA2-6S	6			19

Note 1) At the pressure of 0.5MPa

Note 2) Excluding the auto switch weight.

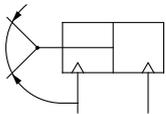
Option

●Body option/End boss type

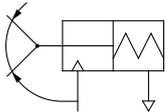
Symbol	Piping position	Piping port type	Applicable model	
		MHCA2-6	Double acting	Single acting
Nil	Standard	M3	●	●
E	Side ported	M3	●	●
K	Axial port	With ø4 one-touch fitting	—	●
H		With ø4 hose nipple	—	●
M		M3	—	●

Symbol

Double acting



Single acting

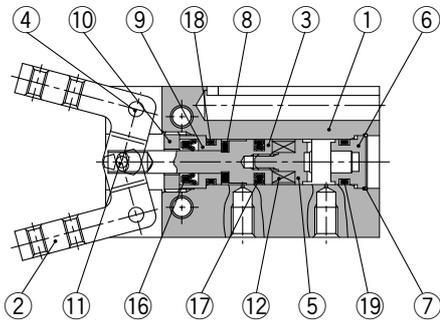


Series MHC2-6/MHCA2-6

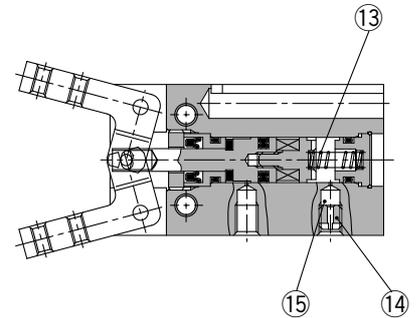
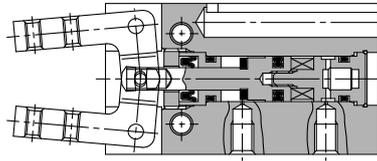
Construction

MHC2-6

Double acting/with fingers open



Double acting/with fingers closed Single acting



Parts list

No.	Description	Material	Note
1	Body	Aluminium alloy	Hard anodized
2	Finger	Stainless steel	Heat treatment
3	Piston	Stainless steel	
4	Lever shaft	Stainless steel	Nitriding
5	Magnet holder	Stainless steel	
6	Cap	Aluminium alloy	Hard anodized
7	Clip	Stainless steel	
8	Bumper	Urethane rubber	
9	Holder	Brass	Electroless nickel plated
10	Holder lock	Stainless steel	

Parts list

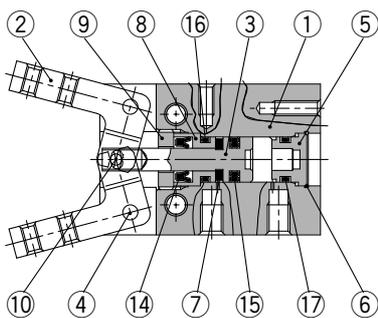
No.	Description	Material	Note
11	Needle roller	High carbon chromium bearing steel	
12	Magnet	Rare earth magnet	Nickel plated
13	NO spring	Piano wire	Zinc chromated
14	Exhaust plug	Brass	Electroless nickel plated
15	Exhaust filter	Resin	
16	Rod seal	NBR	
17	Piston seal	NBR	
18	Gasket	NBR	
19	Gasket	NBR	

Replacement parts

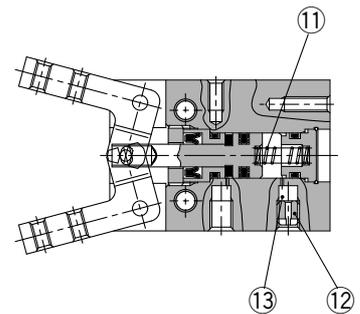
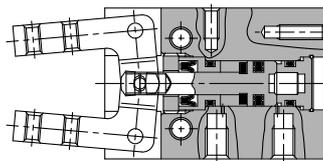
Description	Kit no.	Main parts	Note
Seal kit	MHC6-PS	16, 17, 18, 19	

MHCA2-6 (Short body)

Double acting/with fingers open



Double acting/with fingers closed Single acting



Parts list

No.	Description	Material	Note
1	Body	Aluminium alloy	Hard anodized
2	Finger	Stainless steel	Heat treatment
3	Piston	Stainless steel	
4	Lever shaft	Stainless steel	Nitriding
5	Cap	Aluminium alloy	Hard anodized
6	Clip	Stainless steel	
7	Bumper	Urethane rubber	
8	Holder	Brass	Electroless nickel plated
9	Holder lock	Stainless steel	

Parts list

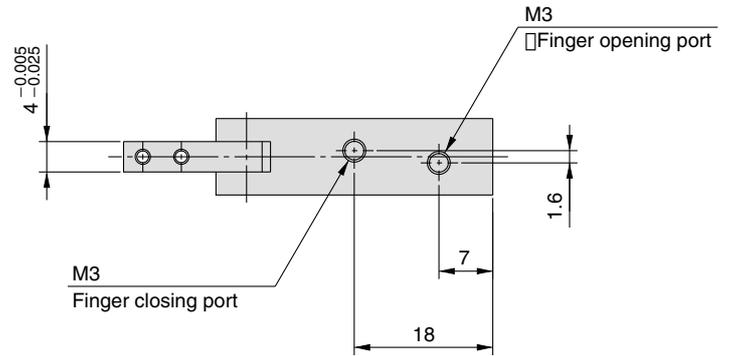
No.	Description	Material	Note
10	Needle roller	High carbon chromium bearing steel	
11	NO spring	Piano wire	Zinc chromated
12	Exhaust plug	Brass	Electroless nickel plated
13	Exhaust filter	Resin	
14	Rod seal	NBR	
15	Piston seal	NBR	
16	Gasket	NBR	
17	Gasket	NBR	

Replacement parts

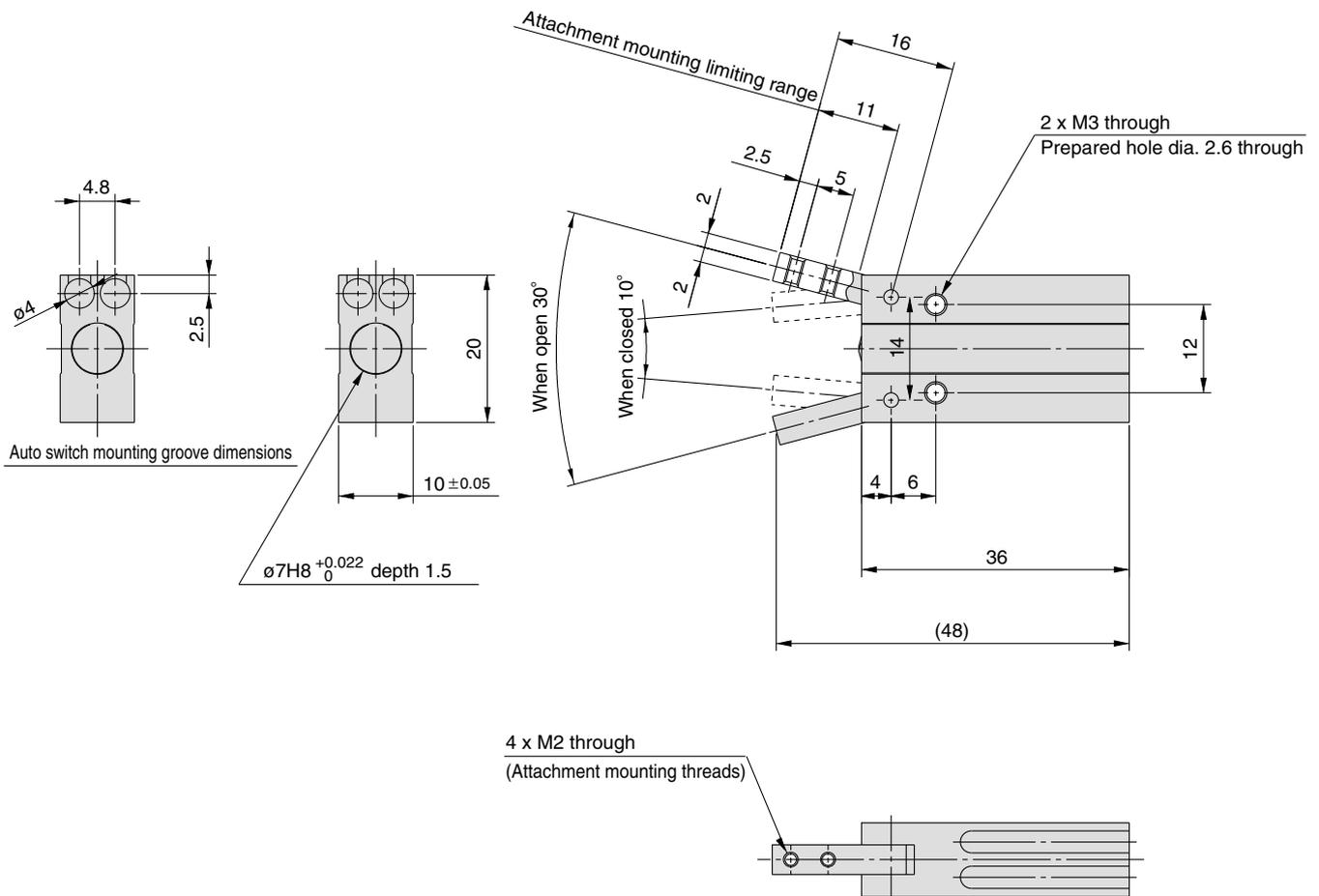
Description	Kit no.	Main parts	Note
Seal kit	MHCA6-PS	14, 15, 16, 17	

Dimensions

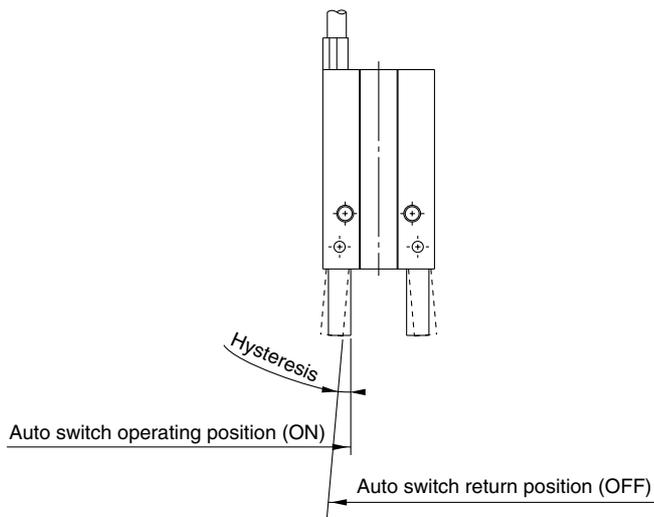
MHC2-6□



□ In the case of MHC2-6S, finger opening port is a breathing hole.



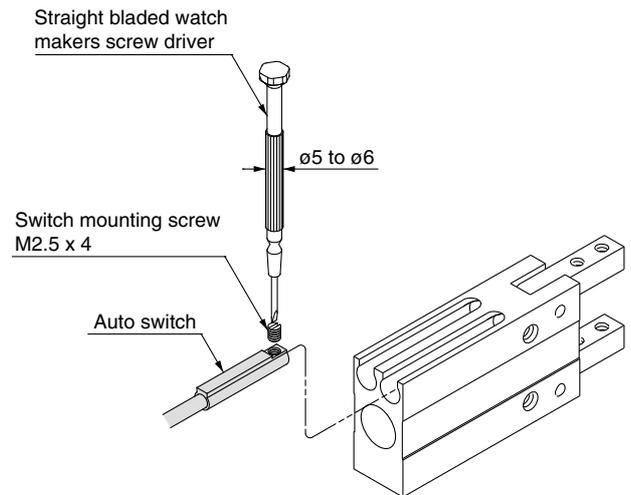
Auto Switch Hysteresis



Hysteresis

Model	D-M9□(V)
MHC2-6□	4°

Auto Switch Mounting



Note) Use a screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.1N·m. When you begin to feel that the screw is being tightened, turn it further by 90°.

Auto Switch Protrusion from the Body End Surface

- The amount of auto switch protrusion from the body end surface is shown in the table below.
- Use this as a standard when mounting, etc.

Lead wire type		In-line entry	Perpendicular entry
Model	Illustration		
		D-M9	D-M9□V
MHC2-6□	Open	6.5	4.5
	Close	9	7

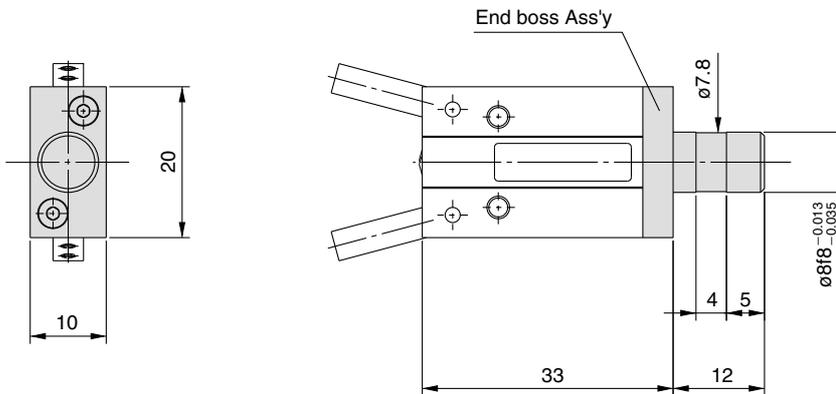
Body Option: End Boss Type

Applicable Model

Symbol	Piping position	Piping port type	Applicable model	
			Double acting	Single acting
E	Side ported	M3	●	●
H	Axial port	With ø4 hose nipple	—	●
K		With ø4 one-touch fitting	—	●
M		M3	—	●

Side Ported [E]

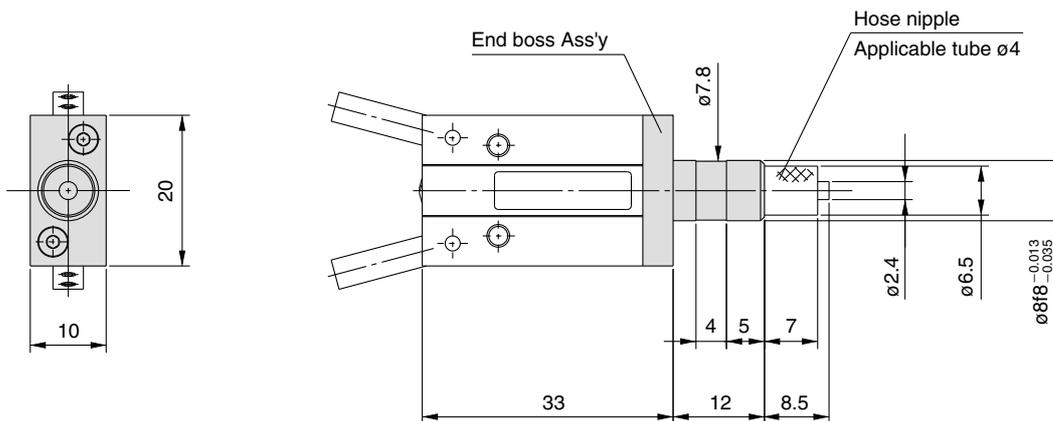
MHCA2-6□E



□The specifications and dimensions not given above are identical with those of the standard type.

Axial Port (with hose nipple) [H]

MHCA2-6SH



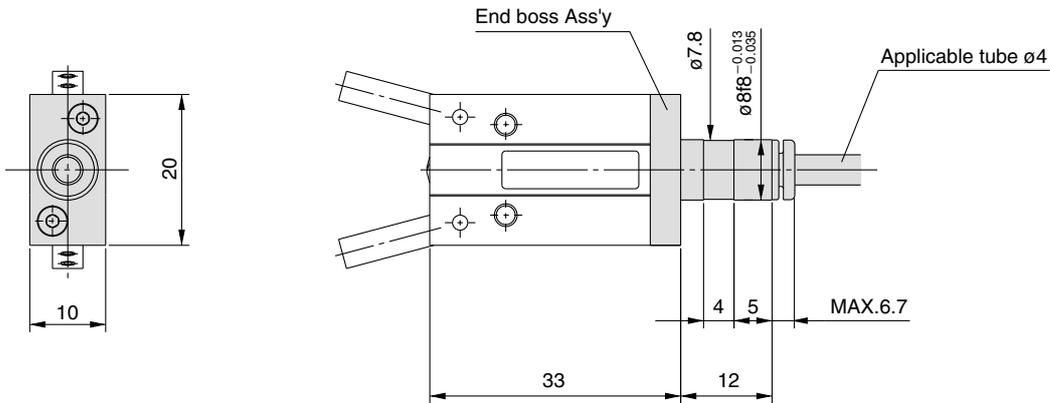
□The specifications and dimensions not given above are identical with those of the standard type.

Applicable tube

Description/Model	Nylon tube	Soft nylon tube	Polyurethane tube	Polyurethane coil tube
Specifications	T0425	TS0425	TU0425	TCU0425B-1
Outside diameter mm	4	4	4	4
Max. operating pressure MPa	1.0	0.8	0.5	0.5
Min. bending radius mm	13	12	10	—
Operating temperature °C	-20 to 60	-20 to 60	-20 to 60	-20 to 60
Material	Nylon 12	Nylon 12	Polyurethane	Polyurethane

Axial Port (with One touch fitting) [K]

MHCA2-6SK



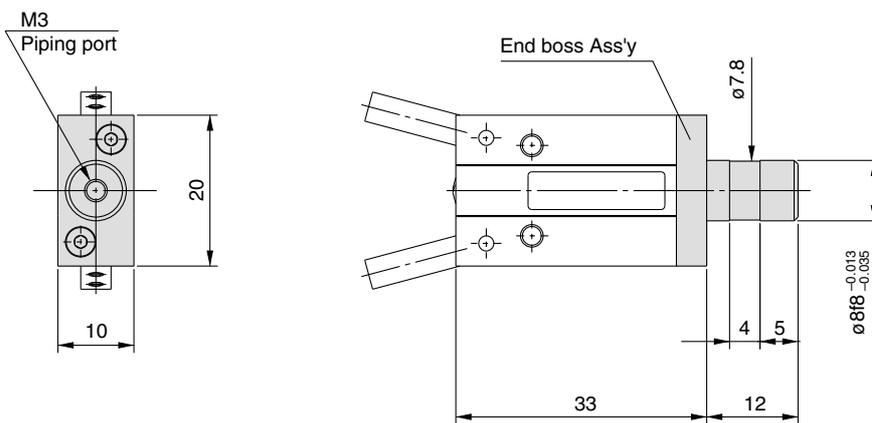
□The specifications and dimensions not given above are identical with those of the standard type.

Applicable tube

Description, model	Nylon tube	Soft nylon tube	Polyurethane tube	Polyurethane coil tube
Specifications	T0425	TS0425	TU0425	TCU0425B-1
Outside diameter mm	4	4	4	4
Max. operating pressure MPa	1.0	0.8	0.5	0.5
Min. bending radius mm	13	12	10	—
Operating temperature °C	-20 to 60	-20 to 60	-20 to 60	-20 to 60
Material	Nylon12	Nylon12	Polyurethane	Polyurethane

Axial Port (with M3 port) [M]

MHCA2-6SM



□The specifications and dimensions not given above are identical with those of the standard type.

Weights

Unit: g

Model	End boss type (symbol)			
	E	H	K	M
MHCA2-6□□□	23	23	23	23

Compact Type *MHCM2-7S*

How to Order



MHC M 2 - 7 S

Compact type

Number of fingers

2 2 finger

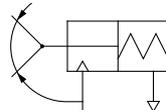
Action

S Single acting (Normally open)

Bore size (mm)

7 7

Symbol



Specifications

Fluid	Air
Operating pressure	0.4 to 0.6MPa
Ambient and fluid temperature	-10 to 60°C
Repeatability	±0.02mm
Maximum operating frequency	180c.p.m.
Lubrication	Non-lube
Action	Single acting (Normally open)

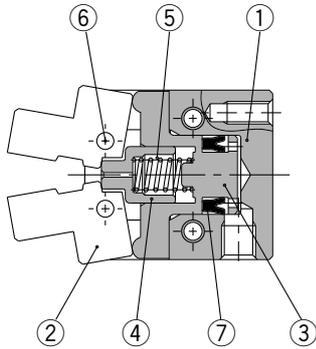
Model

Action	Model	Cylinder bore (mm)	Holding moment ^(Note) (Effective value) N□m	Opening/Closing angle (Both sides)	Weight g
Single acting (Normally open)	MHCM2-7S	7	0.017	20° to -7°	9.5

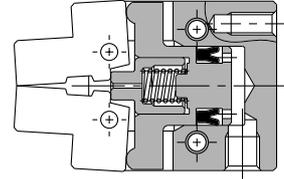
Note) At the pressure of 0.5MPa

Construction/MHCM2-7S (Compact type)

Single acting/with open



With closed

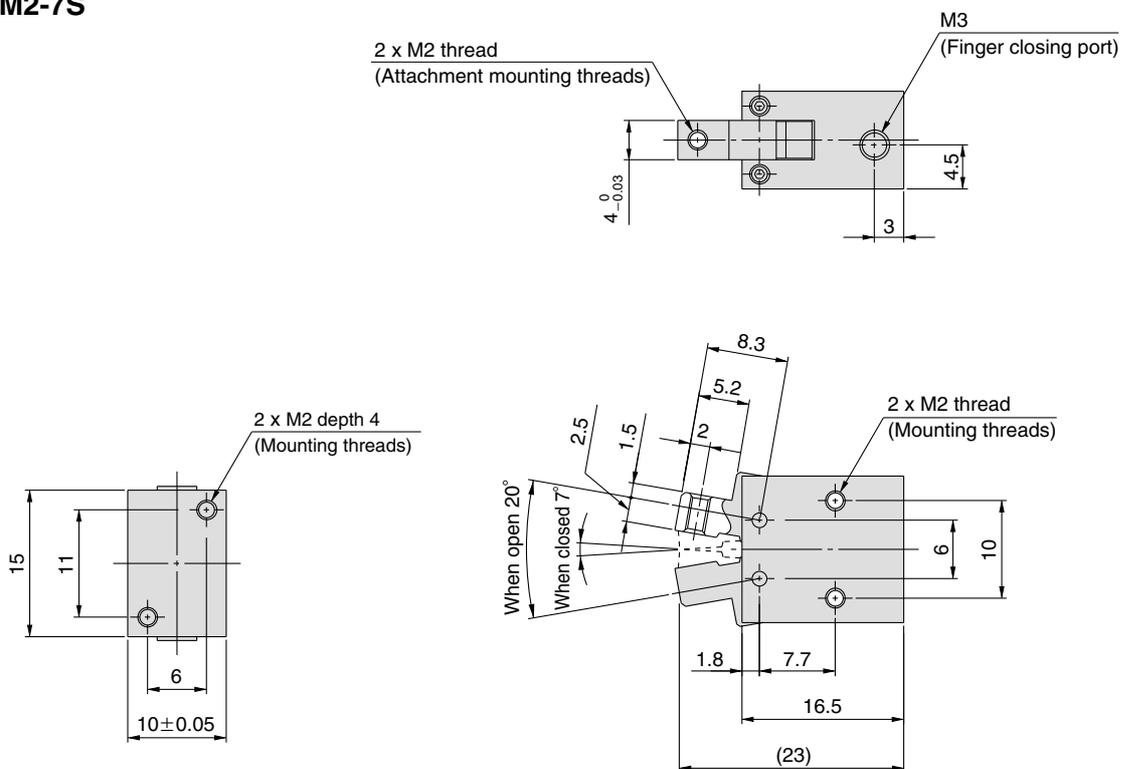


Parts list

No.	Description	Material	Note	Replacement parts order no.
1	Body	Aluminium alloy	Hard anodized	
2	Finger	Stainless steel	Heat treatment	
3	Piston	Stainless steel	Heat treatment	
4	Pusher	Stainless steel		
5	Spring	Piano wire	Zinc chromated	
6	Needle roller	High carbon chromium bearing steel		
7	Piston seal	NBR		MYN-4

Dimensions

MHCM2-7S



Series MHC2 Auto Switch Common Specifications

Auto Switch Common Specifications

Type	Solid state switch
Operating time	1ms or less
Shock resistance	1000m/s ²
Insulation resistance	50MΩ or more at 500VDC (Between lead wire and case)
Withstand voltage	1000VAC for 1min. (Between lead wire and case)
Ambient temperature	-10 to 60°C
Enclosure	IEC529 standard IP67, JISC0920 watertight construction

Lead Wire Length

Lead wire length indication

(Example)

D-M9P **L**

●Lead wire length

Nil	0.5m
L	3m
Z	5m

Note 1) Lead wire length Z: 5m applicable auto switch
Solid state switch: All models are produced upon receipt of order
(as standard).

Note 2) For the flexible wire specification, enter -61 after the part number.

(Example) D-M9PL-**61**

●Flexible wire specifications

Lead Wire Colour Changes

The lead wire colors of SMC auto switches have been changed as shown below to satisfy IEC947-5-2 standards for production beginning September, 1996 and thereafter.

Take special care regarding wire polarity during the time that old colors still coexist with the new colours.

2-wire

	Old	New
Output (+)	Red	Brown
Output (-)	Black	Blue

3-wire

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black

**Angular Style Air Gripper
Standard Type**

Series MHC2

Angular Style Air Gripper

Series MHC2

Standard

- A large amount of gripping force is provided through the use of a double piston mechanism, while maintaining a compact design.
- Built-in variable throttle.
- A solid state auto switch with an indicator light can be mounted.



Specifications

Fluid		Air
Operating pressure	Double acting	0.1 to 0.6MPa
	Single acting	0.25 to 0.6MPa
Ambient and fluid temperature		-10 to 60°C
Repeatability		±0.01mm
Max. operating frequency		180c.p.m
Lubrication		Not required
Action		Double acting, Single acting
Auto switch (Option) ^{Note)}		Solid state switch (3 wire, 2 wire)

Note) Refer to Auto Switch Guide for further specifications of auto switch.

Model

Action	Model	Bore size mm	Holding moment (effective value) ⁽¹⁾	Opening/closing angle (both sides)	Weight ⁽²⁾ g
Double acting	MHC2-10D	10	0.10	30° to -10°	39
	MHC2-16D	16	0.39		91
	MHC2-20D	20	0.70		180
	MHC2-25D	25	1.36		311
Single acting	MHC2-10S	10	0.070	30° to -10°	39
	MHC2-16S	16	0.31		92
	MHC2-20S	20	0.54		183
	MHC2-25S	25	1.08		316

Note1) At pressure 0.5MPa.
Note2) Weight except auto switch.

How to Order

MHC2-20-D-M9BW-S

Angular style air gripper

Bore size

10	10mm
16	16mm
20	20mm
25	25mm

Action

D	Double acting
S	Single acting

Number of auto switches

-	2
S	1

Auto switch

-	Without auto switch (Built-in)
---	--------------------------------

Applicable Auto Switches

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*					Pre-wired connector	Applicable load	
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	IC circuit		PLC	
							Perpendicular	In-line								
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	M9NV	M9N	●	●	○	○	○	○	—	—
				3-wire (PNP)					●	●	○	○				
				2-wire					●	●	○	○				
				3-wire (NPN)					●	●	○	○				
				3-wire (PNP)					●	●	○	○				
				2-wire					●	●	○	○				
	Diagnosis (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	M9NVV	M9NW	●	●	○	○	○	○	—	—
				3-wire (PNP)					●	●	○	○				
				2-wire					●	●	○	○				
				3-wire (NPN)					●	●	○	○				
				3-wire (PNP)					●	●	○	○				
				2-wire					●	●	○	○				
Water resistant (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	M9NAV**	M9NA**	○	○	○	○	○	○	—	—	
			3-wire (PNP)					○	○	○	○					
			2-wire					○	○	○	○					
			3-wire (NPN)					○	○	○	○					
			3-wire (PNP)					○	○	○	○					
			2-wire					○	○	○	○					

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
1 m M (Example) M9NVV
3 m L (Example) M9NVL
5 m Z (Example) M9NVZ

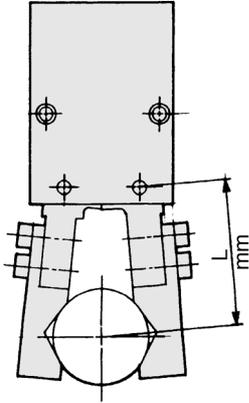
* Solid state auto switches marked with a "O" symbol are produced upon receipt of order.

Note 1) When using the 2-colour indicator type, please make the setting so that the indicator is lit in red to ensure the detection at the proper position of the air gripper.

Note 2) When ordering the air gripper with auto switch, auto switch mounting brackets are supplied with the air gripper. When ordering the auto switch separately, auto switch mounting brackets (BMG2-012) are required.

Holding Point

● Work holding point should be within the range indicated in the graph.



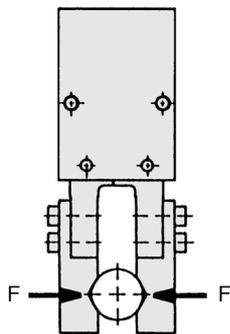
Guidelines for the selection of the gripper with respect to component weight

● Selection of the correct model depends upon the component weight, the coefficient of friction between the finger attachment and the component, and their respective configurations. A model should be selected with a holding force of 10 to 20 times that of the component weight.

● If high acceleration, deceleration or impact forces are encountered during component transfer a further margin of safety should be considered.

● Effective holding force

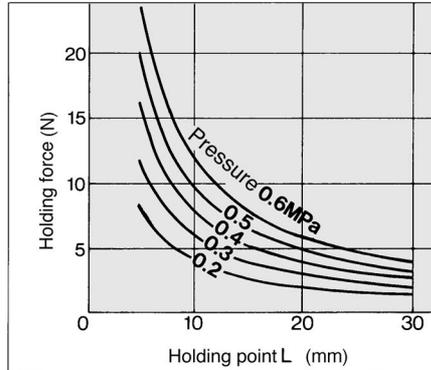
The holding force shown in the tables represents the holding force of one finger when all fingers and attachment are in contact with the work. F = One finger thrust.



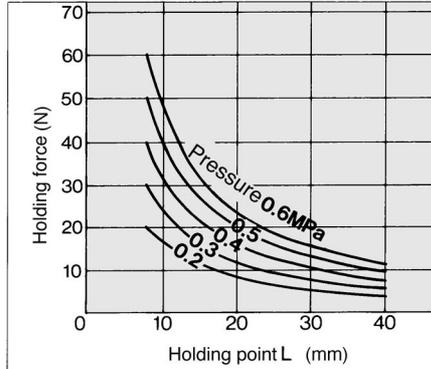
Effective Holding Force

Double acting

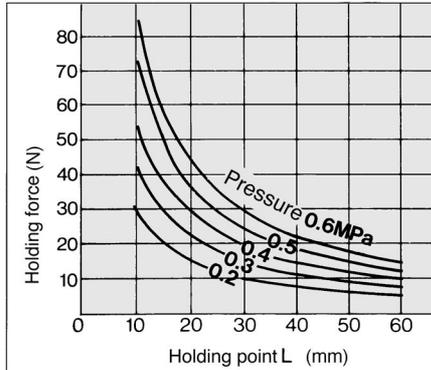
MHC2-10D



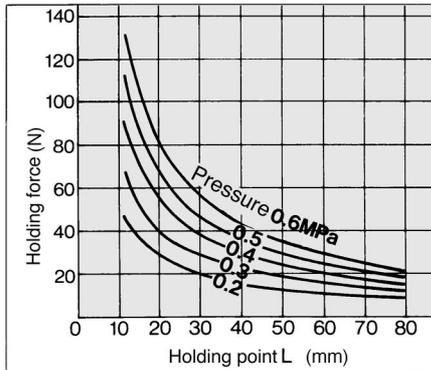
MHC2-16D



MHC2-20D

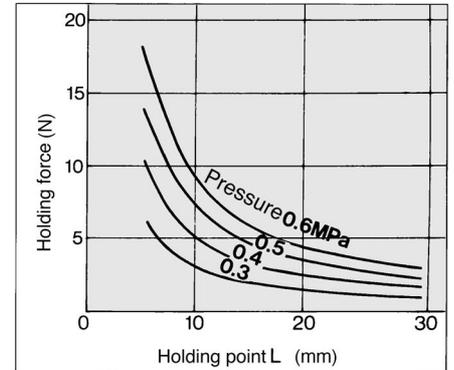


MHC2-25D

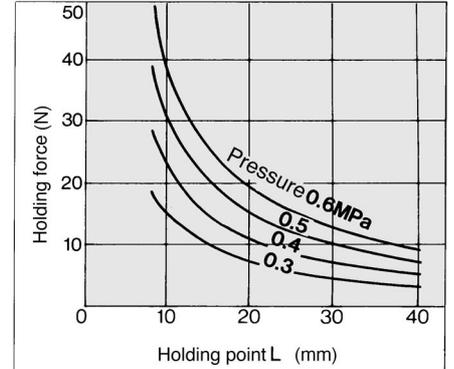


Single acting

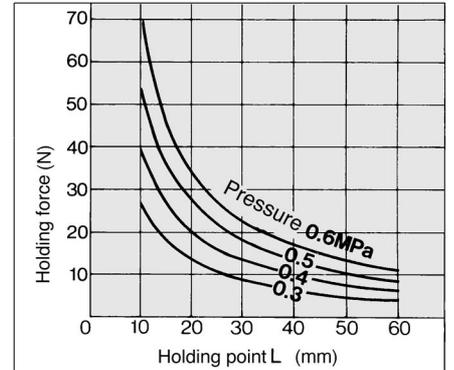
MHC2-10S



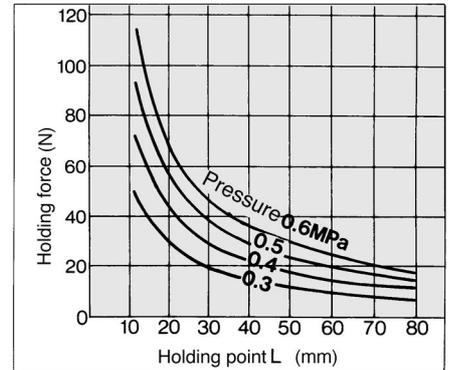
MHC2-16S



MHC2-20S



MHC2-25S

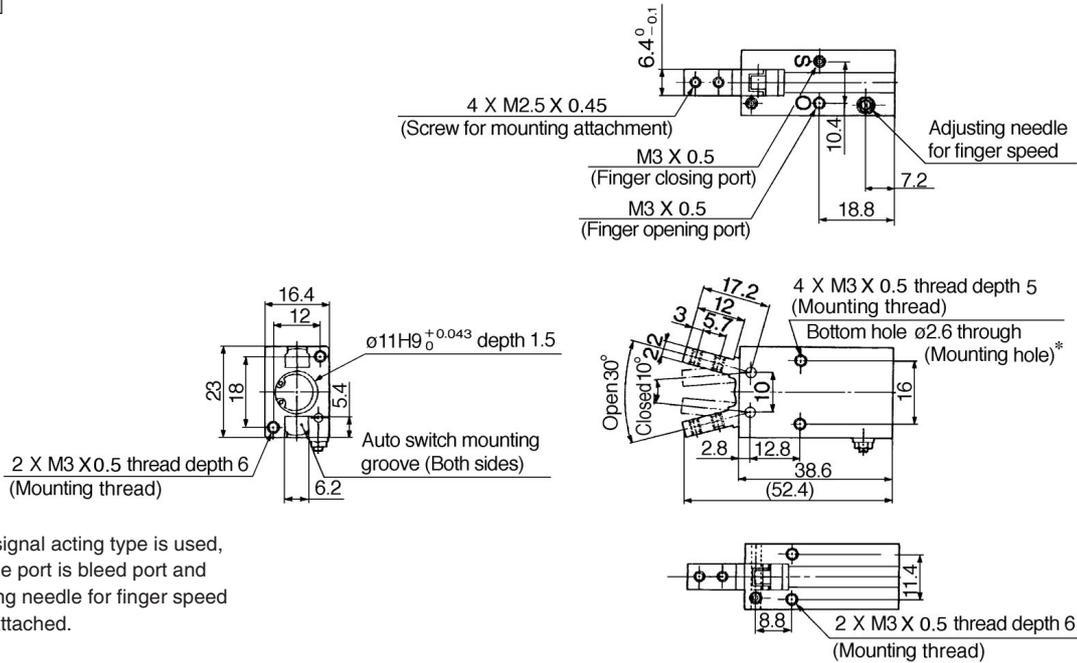


Series MHC2



Double Acting $\phi 10, \phi 16$,

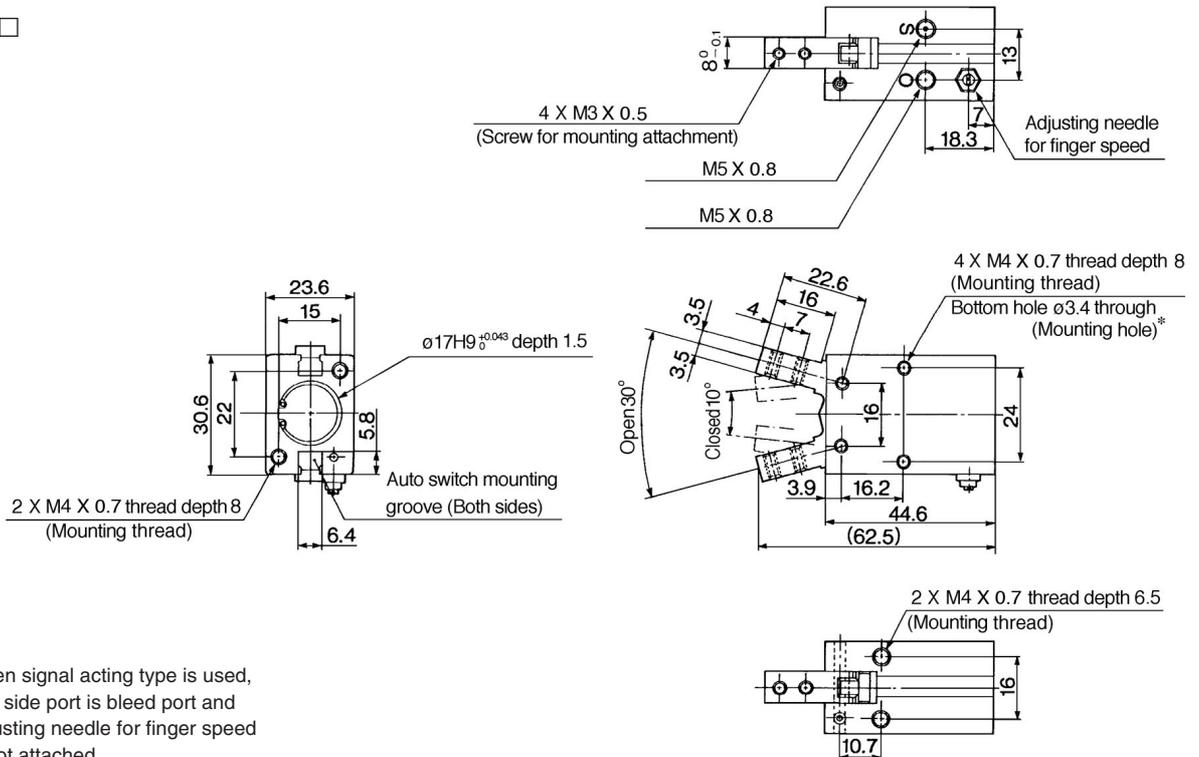
MHC2-10□



Note) When signal acting type is used, one side port is bleed port and adjusting needle for finger speed is not attached.

* When auto switch is used, through hole mounting type is not available.

MHC2-16□



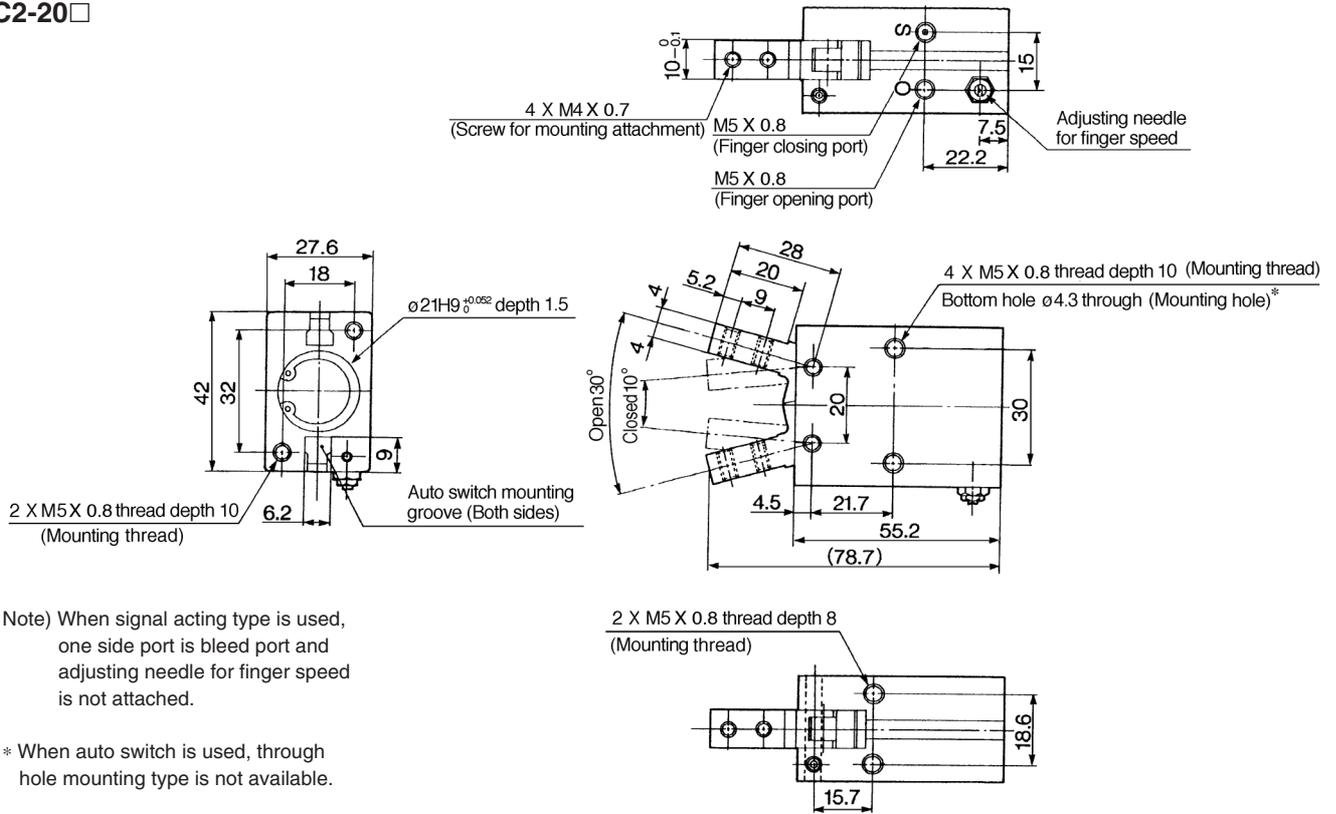
Note) When signal acting type is used, one side port is bleed port and adjusting needle for finger speed is not attached.

* When auto switch is used, through hole mounting type is not available.

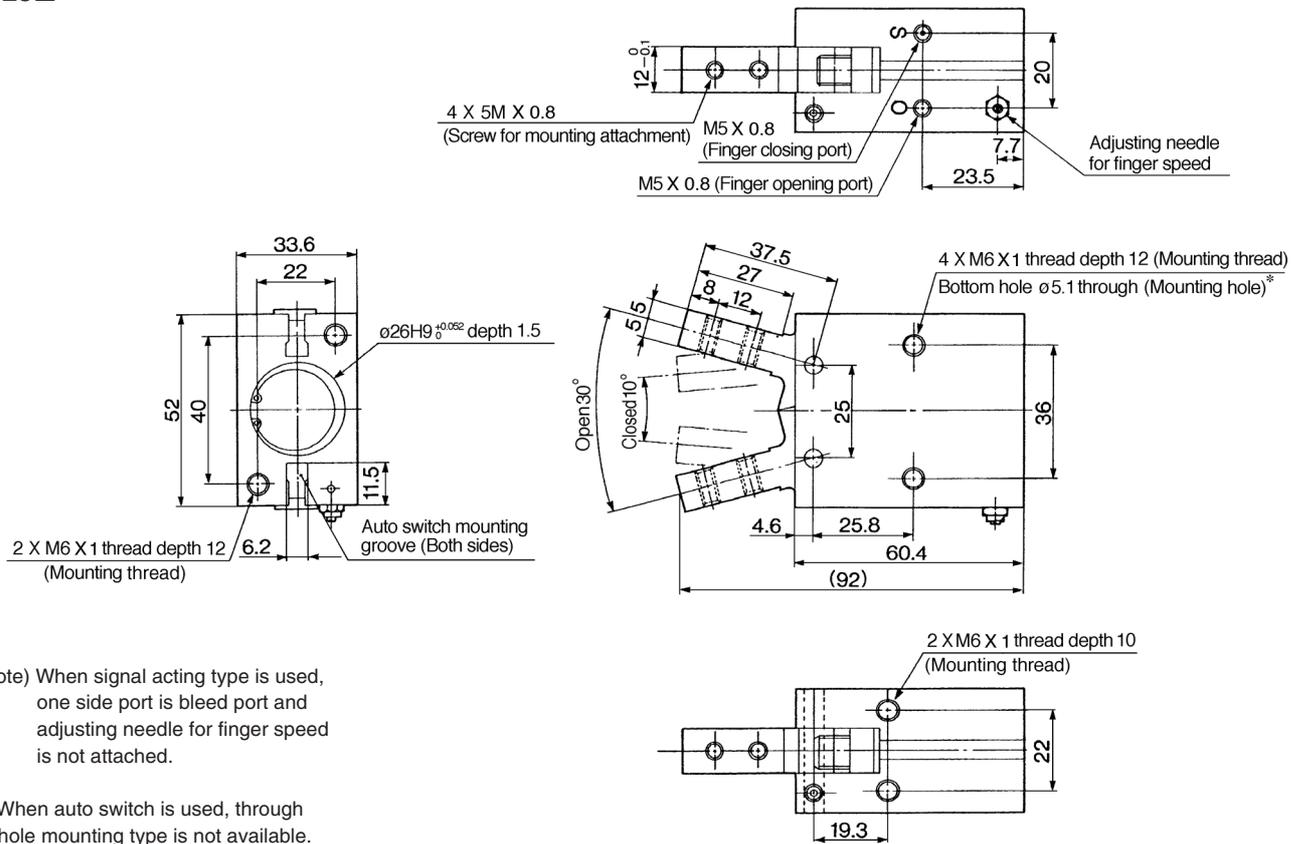
Angular Style Standard Series **MHC2**

Double Acting $\phi 20, \phi 25,$

MHC2-20□



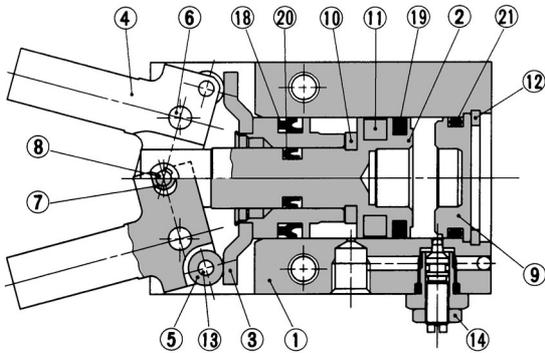
MHC2-25□



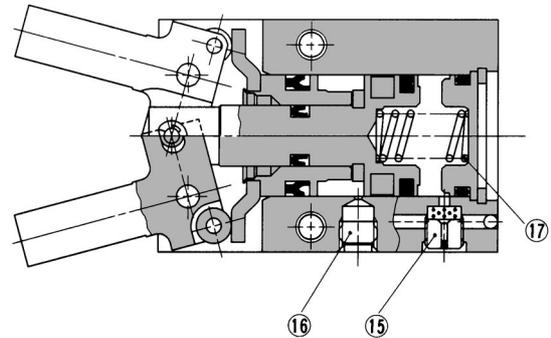
Series MHC2

Construction

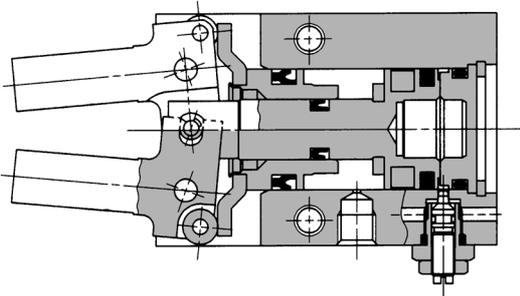
Double acting/Fingers open



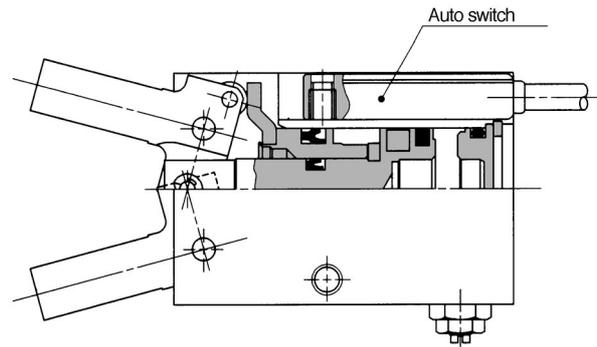
Single acting



Double acting/Fingers closed



With auto switch



Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Hard anodized
2	Piston A	Aluminum alloy	Hard anodized
3	Piston B assembly		
4	Finger	Carbon steel	Heat treated
5	Side roller	Carbon steel	Nitriding
6	Lever shaft	Stainless steel	Nitriding
7	Center roller	Carbon steel	Nitriding
8	Center pin	Carbon steel	Nitriding
9	Cap	Resin	
10	Bumper	Urethane rubber	
11	Rubber magnet	Synthetic rubber	

Component Parts

No.	Description	Material	Note
12	Type C retaining ring	Carbon steel	Phosphate coated
13	Needle roller	High carbon chrome bearing steel	
14	Needle assembly	Brass	Electroless nickel plated
15	Exhaust plug	Brass	Electroless nickel plated
16	Plug	Brass	Electroless nickel plated
17	Spring	Stainless steel spring wire	
18	Piston seal	NBR	
19	Piston seal	NBR	
20	Piston seal	NBR	
21	Gasket	NBR	

Replacement Parts

Description	MHC2-10□	MHC2-16□	MHC2-20□	MHC2-25□	Main parts
Seal kit	MHC10-PS	MHC16-PS	MHC20-PS	MHC25-PS	(18)(19)(20)(21)
Finger assembly	MHC-A1003	MHC-A1603	MHC-A2003	MHC-A2503	(4)(5)(6)(7)(8)(13)
Piston assembly set	MHC-A1002	MHC-A1602	MHC-A2002	MHC-A2502	(2)(3)(7)(8)(10)(11)(18)(19)(20)
Piston A assembly	MHC-A1001	MHC-A1601	MHC-A2001	MHC-A2501	(2)(10)(11)
Piston B assembly	P3311145B	P3311245B	P3311345B	P3311445C	(3)
Needle assembly	MH-A1006		MH-A1606		(14)

* Order 1 piece finger assembly per one unit.

Replacement part/Grease pack part no.: GR-S-010 (10 g)