




Order example

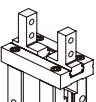
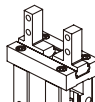
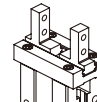
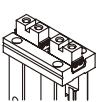
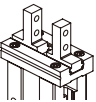
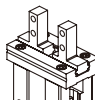
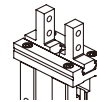
MCHC □ - 20 - □ N

Model	Tube ID.	Style (*1)	Type (*2)
MCHC (Standard stroke)	6	Blank: Double acting	Blank: Standard 1: Standard (Side tapped) 2: Standard (Through hole)
	10 16 20 25	Blank: Double acting S: Single acting / Normally open C: Single acting / Normally closed	Blank: Standard 1: Standard (Side tapped) 2: Standard (Through hole) 3: Flat N: Narrow N1: Narrow (Side tapped) N2: Narrow (Through hole)
	32 40	Blank: Double acting	Blank: Standard 1: Standard (Side tapped) 2: Standard (Through hole) 3: Flat
MCHCL (Long stroke)	10 16 20 25	Blank: Double acting	Blank: Standard 1: Standard (Side tapped) 2: Standard (Through hole)

*1. STYLE

Blank: Double acting	S: Single acting / Normally open	C: Single acting / Normally closed
		

*2. TYPE

Blank: Standard	1: Standard (Side tapped)	2: Standard (Through hole)	3: Flat
			
N: Narrow	N1: Narrow (Side tapped)	N2: Narrow (Through hole)	
			

Features

- Integral linear guide used for high rigidity and high precision.
- The material of finger is martensitic stainless steel.
- Body thickness tolerance $\pm 0.05\text{mm}$.
- Bottom pin holes for accurate re-locating.
- Grooves on the body for sensor switch to be inserted into.
- The gripping stroke of long-stroke type is approximately double compare with standard type.
- Magnetic as standard.

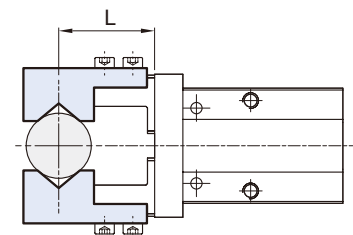
Specification

Model	MCHC								
Acting type	Double acting / Single acting								
Tube I.D. (mm)	6	10	16	20	25	32	40		
Opening / Closing stroke (mm)*1	4	4(8)	6(12)	10(18)	14(22)	22	30		
Port size	M3×0.5		M5×0.8						
Medium	Air								
Operating pressure range (MPa)	Double acting	0.15~0.7	0.2~0.7	0.1~0.7					
	Single acting	—	0.35~0.7	0.25~0.7		—			
Ambient temperature	-10~+60°C (No freezing)								
Repeatability (mm)	± 0.01					± 0.02			
Max. operating frequency (c.p.m)	180 (120)					60			
Lubricator	Not required								
Sensor switch (*2)	RDFE(V)	RDE, RDE-D: Non-contact	RDE(-D), RDFE(V)						
Weight (g)	Double acting	Standard	27	55	124	250	461	732	1298
		Long stroke	—	56	125	252	463	—	—
	Single acting	Flat type	—	53	124	244	450	760	1344
		Standard	—	70	145	270	490	—	—

*1. () value for long stroke.

2. RDE, RDFE(V) specification, please refer to page 5-6, 11.

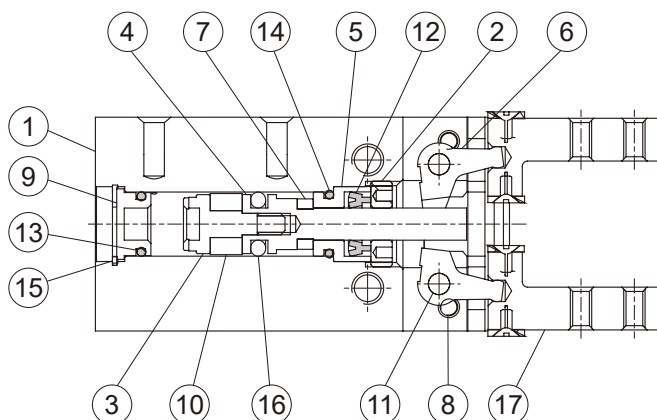
Gripping force



Tube I.D.		6	10	16	20	25	32	40
Double acting	External	3.3(0.3)	11(1.1)	34(3.5)	42(4.3)	65(6.6)	158(15.8)	254(25.4)
	Internal	6.1(0.6)	17(1.7)	45(4.6)	66(6.7)	104(10.6)	193(19.3)	318(31.8)
Single acting / Normally open	External	—	7.1(0.7)	27(2.8)	33(3.4)	45(4.6)	—	—
	Internal	—	13(1.3)	38(3.9)	57(5.8)	83(8.5)	—	—

* Operation pressure 0.5 MPa, gripping length 20mm, the effective gripping force for each finger is *** N(kgf).

Double acting



Material

No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Front cap	Stainless steel	1	
3	Magnet holder	Stainless steel	1	
4	Piston rod	Stainless steel	1	
5	Rod cover	Stainless steel	1	
6	Lever	Stainless steel	2	
7	Cushion pad	PU	1	●
8	Screw	Stainless steel	4	
9	End cover	Aluminum alloy	1	
10	Magnet ring	Magnet material	1	
11	Pin	Bearing steel	2	
12	Rod packing	NBR	1	●
13	O-ring	NBR	1	
14	O-ring	NBR	1	
15	Snap ring	Carbon steel	1	●
16	Piston packing	NBR	1	●
17	Gripping set	Stainless steel (*)	1	

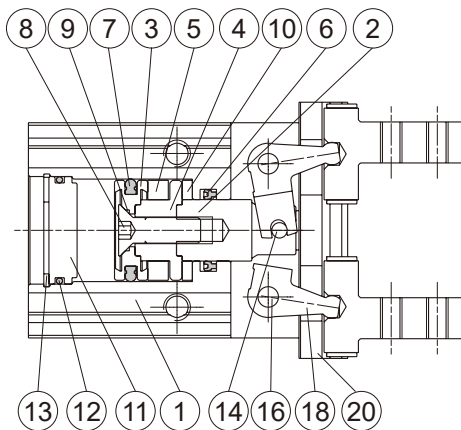
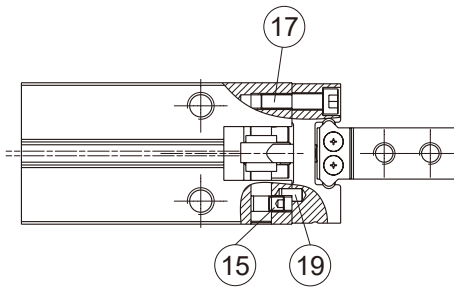
* Bearing steel balls as standard.

Order example of repair kits

Tube I.D.	Repair kits
$\varnothing 6$	PS-MCHC-6

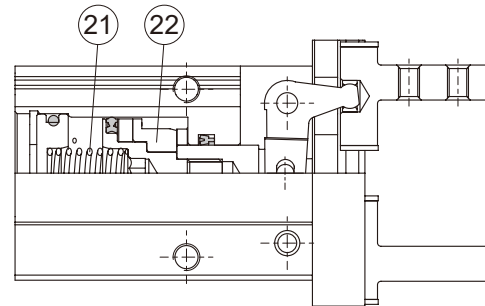
PARALLEL GRIPPER (2-Finger)

Double acting



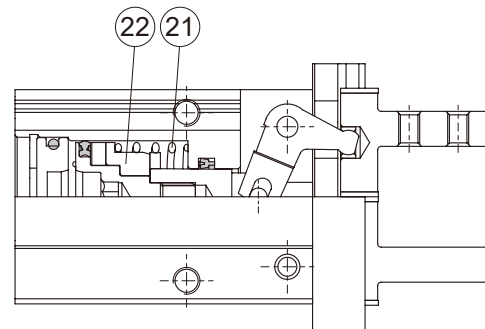
Single acting

Normally open



Single acting

Normally closed



Material

No.	Tube I.D. Part name	10	16	20	25	32	40	Q'y	Repair kits (inclusion)		
									Double	Single	
1	Body	Aluminum alloy						1			
2	Piston rod	Stainless steel						1			
3	Piston	Aluminum alloy *1						1			
4	Magnet holder	*2	Aluminum alloy						1		
5	Magnet ring	Magnet material						1			
6	Rod packing	NBR						1	●	●	
7	Piston packing	NBR						1	●	●	
8	Screw	—	Stainless steel						1		
9	O-ring	—	NBR						1	●	
10	Cushion pad	PU						1	●	●	
11	End cover	Aluminum alloy						1			
12	Cover ring	NBR						1	●	●	
13	Snap ring	*3	Stainless steel						1		
14	Spindle river	Carbon steel						1			
15	Screw	*2	Alloy steel						4		
16	Grip rivet	Bearing steel						2			
17	Bolt	Stainless steel						4			
18	Lever	Stainless steel						2			

No.	Tube I.D. Part name	10	16	20	25	32	40	Q'y	Repair kits (inclusion)	
									Double	Single
19	Pin	Bearing steel						2		
20	Gripping set	Stainless steel *4						1		
21	Spring	Stainless steel						1		
22	Spring holder	Stainless steel						1		

*1. Single acting: Stainless steel

*2. Stainless steel

*3. Carbon steel

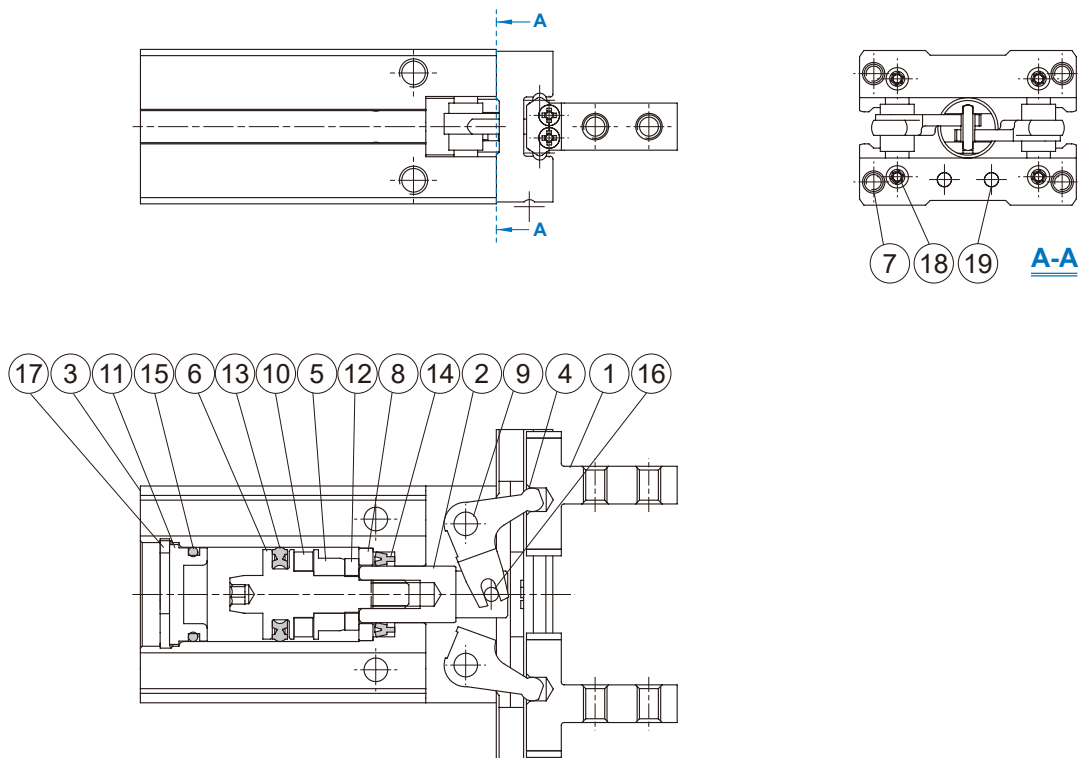
*4. Bearing steel balls as standard.

Order example of repair kits

Tube I.D.	Repair kits	
	Double acting	Single acting N.O. / N.C.
$\varnothing 10$	PS-MCHC-10	PS-MCHC-10-S
$\varnothing 16$	PS-MCHC-16	PS-MCHC-16-S
$\varnothing 20$	PS-MCHC-20	PS-MCHC-20-S
$\varnothing 25$	PS-MCHC-25	PS-MCHC-25-S
$\varnothing 32$	PS-MCHC-32	—
$\varnothing 40$	PS-MCHC-40	—

PARALLEL GRIPPER

Double acting



Material

No.	Tube I.D. Part name	10	16	20	25	Q'y	Repair kits (inclusion)
1	Gripping set	Stainless steel *1				1	
2	Piston rod	Stainless steel				1	
3	Body	Aluminum alloy				1	
4	Lever	Stainless steel				2	
5	Spring holder	Stainless steel				1	
6	Piston	Stainless steel				1	
7	Bolt	Stainless steel				4	
8	Stop ring	*2		-		1	
9	Grip rivet	Carbon steel				2	
10	Magnet ring	Magnet material				1	
11	End cover	Aluminum alloy				1	
12	Gasket	NBR				1	●
13	Piston packing	NBR				1	●
14	Rod packing	NBR				1	●
15	O-ring	NBR				1	●
16	Spindle river	Carbon steel				1	
17	Snap ring	*3	Stainless steel			1	
18	Hexagon screw	*2		Alloy steel		4	
19	Pin	Carbon steel				2	

*1. Bearing steel balls as standard.

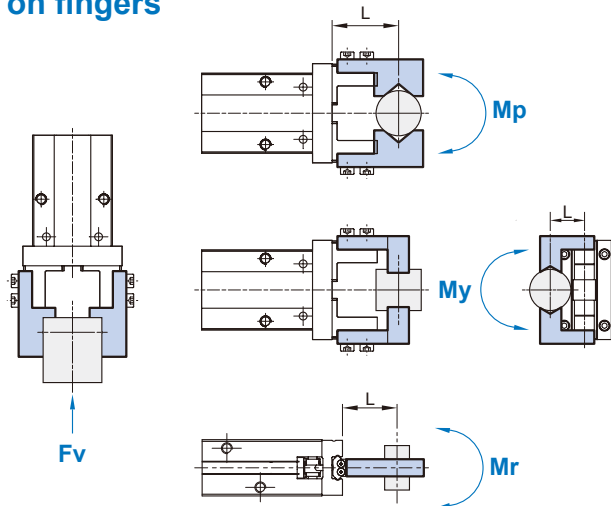
2. Stainless steel 3. Carbon steel

Order example of repair kits

* $\phi 10$ use the same repair kits with standard stroke single acting type.

Tube I.D.	Repair kits
$\phi 10$	PS-MCHC-10-S
$\phi 16$	PS-MCHCL-16
$\phi 20$	PS-MCHCL-20
$\phi 25$	PS-MCHCL-25

Confirmation of external force on fingers

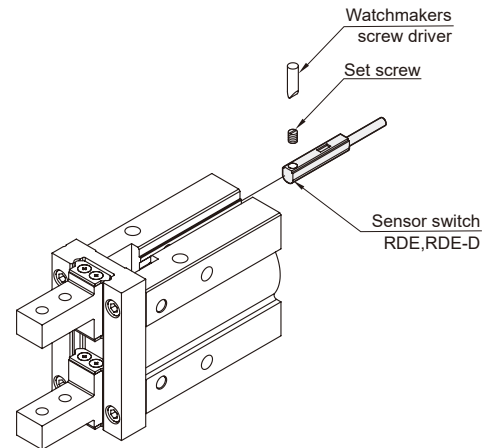


L: distance to the point at which the load is applied (mm)

Tube I.D. (mm)	Allowable vertical load Fv (N)	Maximum allowable moment		
		Pitch moment Mp (N-m)	Yaw moment My (N-m)	Roll moment Mr (N-m)
6	10	0.04	0.04	0.08
10	58	0.26	0.26	0.53
16	98	0.68	0.68	1.36
20	147	1.32	1.32	2.65
25	255	1.94	1.94	3.88
32	343	3	3	6
40	490	4.5	4.5	9

* Values for load and moment in the table indicate static values.

Installation of sensor switch



Allowable load calculation

$$\text{Allowable load } F(N) = \frac{M(\text{maximum allowable moment})(N \cdot m)}{L(m)}$$

Example

When a static load of $f=20\text{N}$ is operating, which applies pitch moment to point $L=25\text{mm}$ from the **MCHC-16** guide.

$$\begin{aligned} \text{Allowable load } F(N) &= \frac{0.68 (N \cdot m)}{25 \times 10^{-3} (m)} \\ &= 27.2 (N) \end{aligned}$$

Load $f=20 (N) < 27.2 (N)$, so can be used.

Model selection suggestions

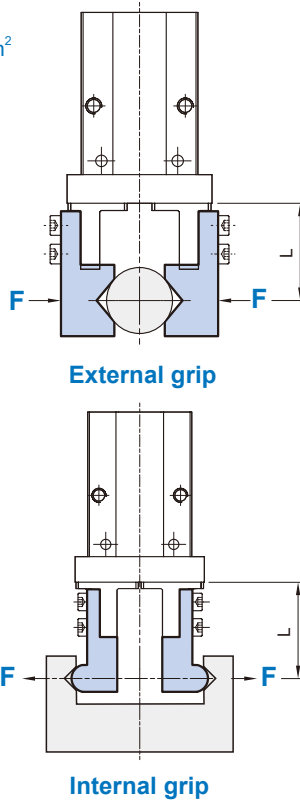
1. For normal gripping and carrying usage, the recommended safe factor (a) is 4.
2. The value of gripping force of single finger can be found at the gripping force table.
3. The safe factor (a) have to be higher if the gripper is using with a great accelerated velocity or impaction condition.

Effective gripping force (Double acting)

Indication of effective force.

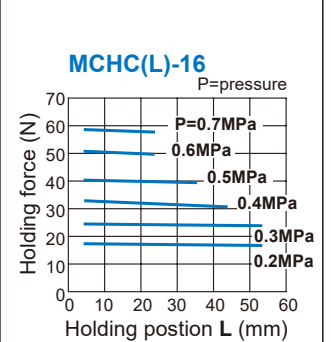
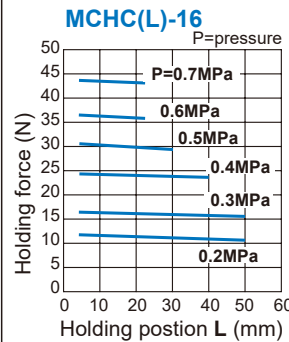
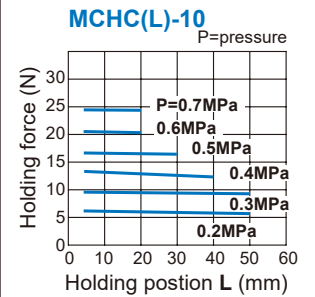
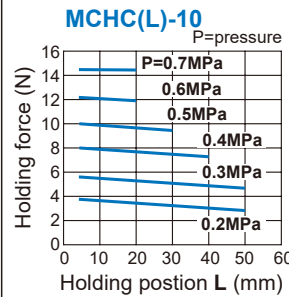
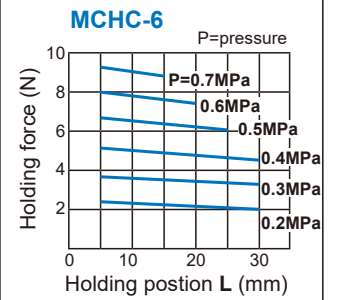
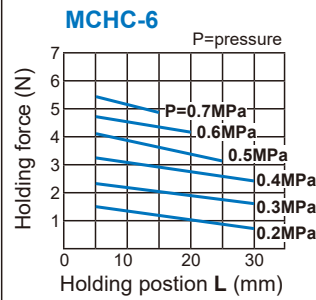
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

1N=0.102 kgf
1MPa=10.2 kgf/cm²



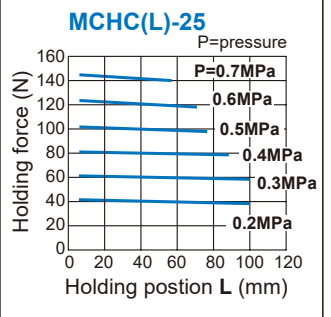
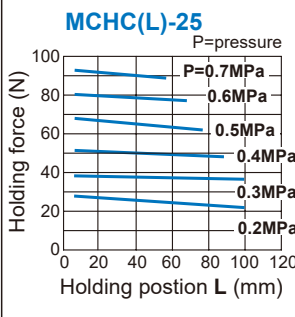
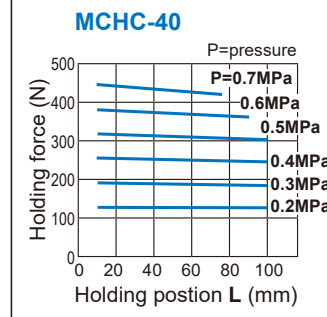
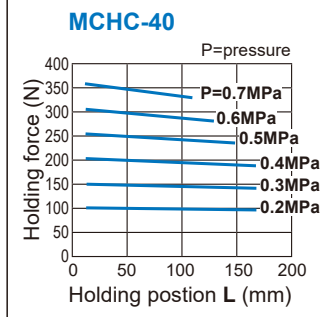
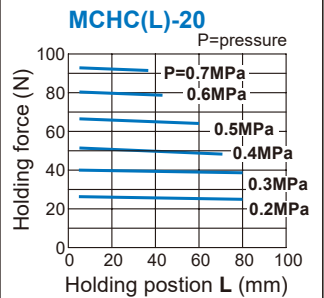
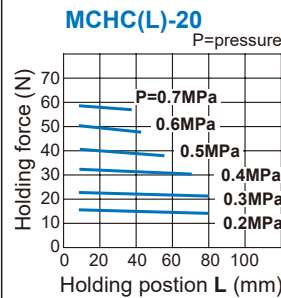
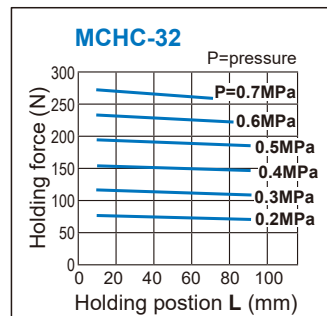
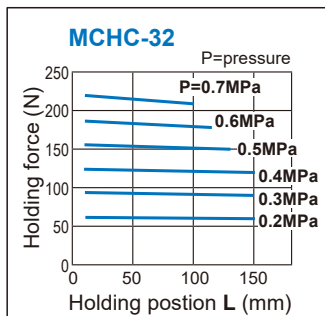
External gripping force

Internal gripping force



External gripping force

Internal gripping force

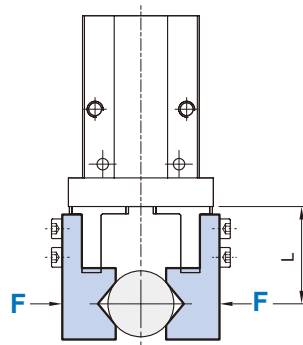


Effective gripping force (Single acting)

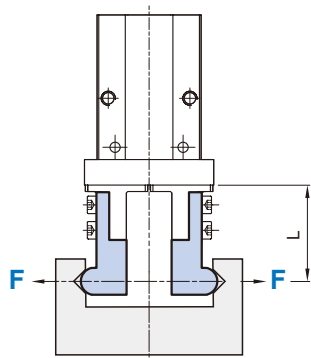
Indication of effective force.

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 workpiece as shown in the figure below.

1N=0.102 kgf
1MPa=10.2 kgf/cm²

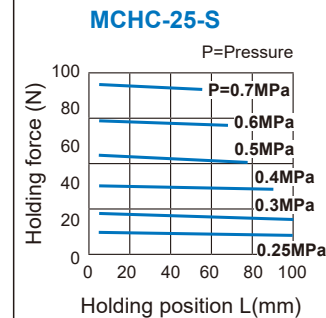
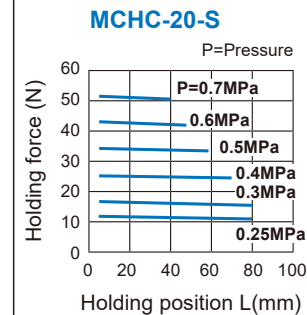
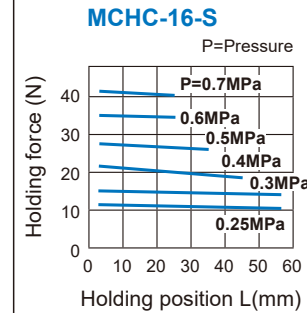
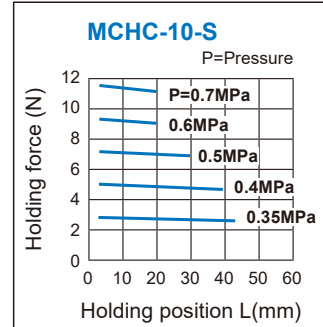


External grip
(Single acting / Normally open)

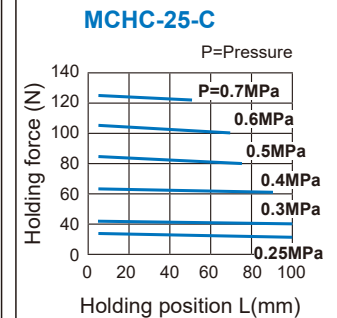
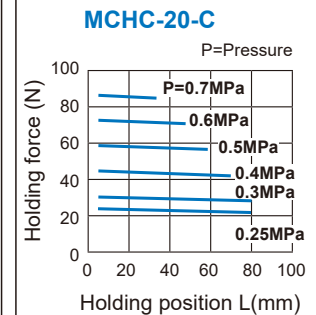
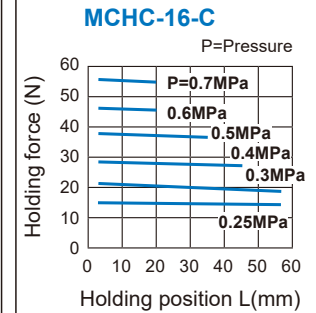
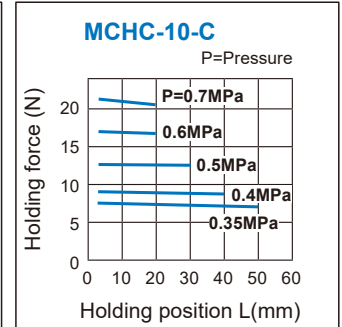


Internal grip
(Single acting / Normally closed)

External gripping force Single acting / N.O.

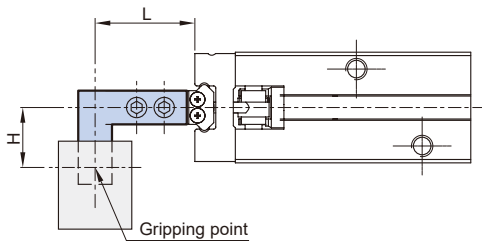
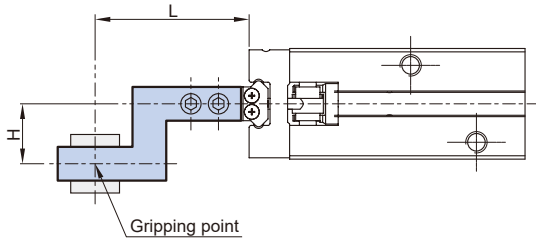


Internal gripping force Single acting / N.C.

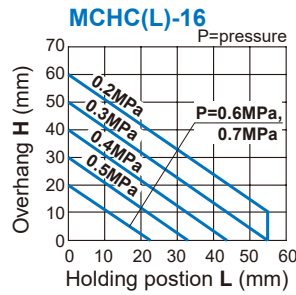
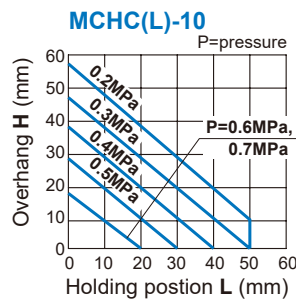
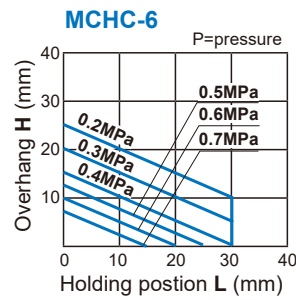


Confirmation of gripping point

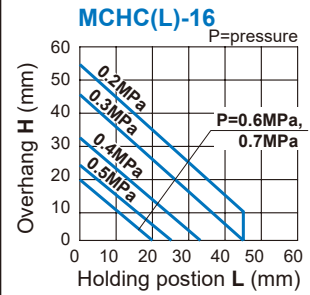
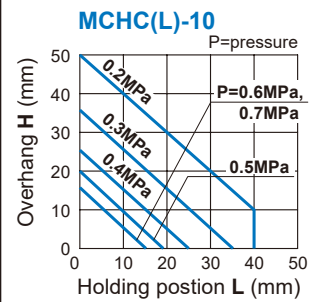
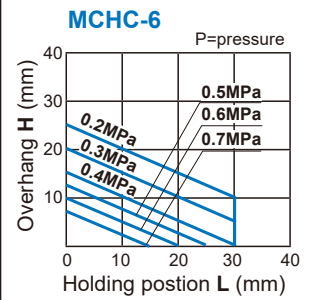
- The air gripper should be operated so that the workpiece gripping point "L" and the amount of overhang "H" stay within the range shown for each operating pressure given in the graphs to the right.
- If the workpiece gripping point goes beyond the range limits, this will have an adverse effect on the life the air gripper.



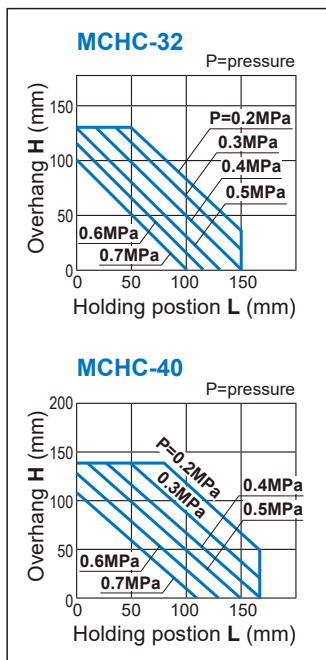
External gripping



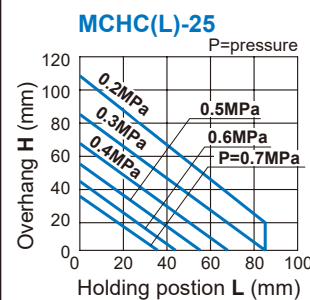
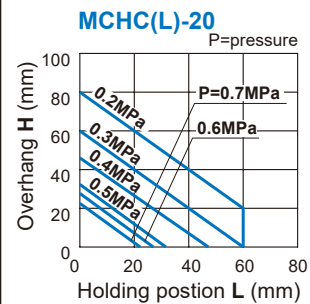
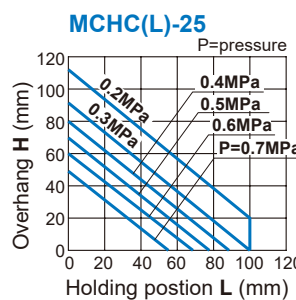
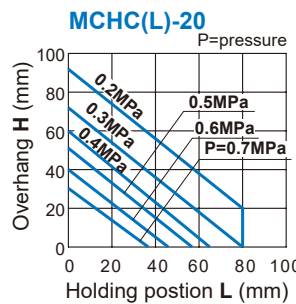
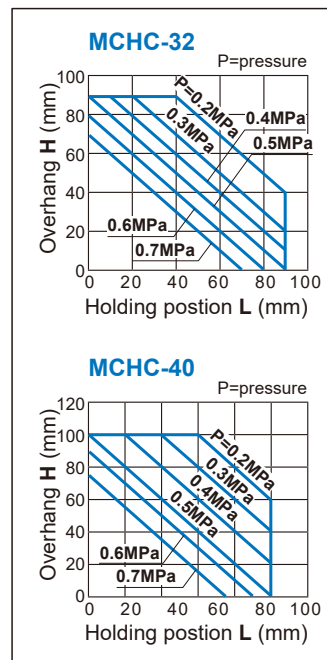
Internal gripping

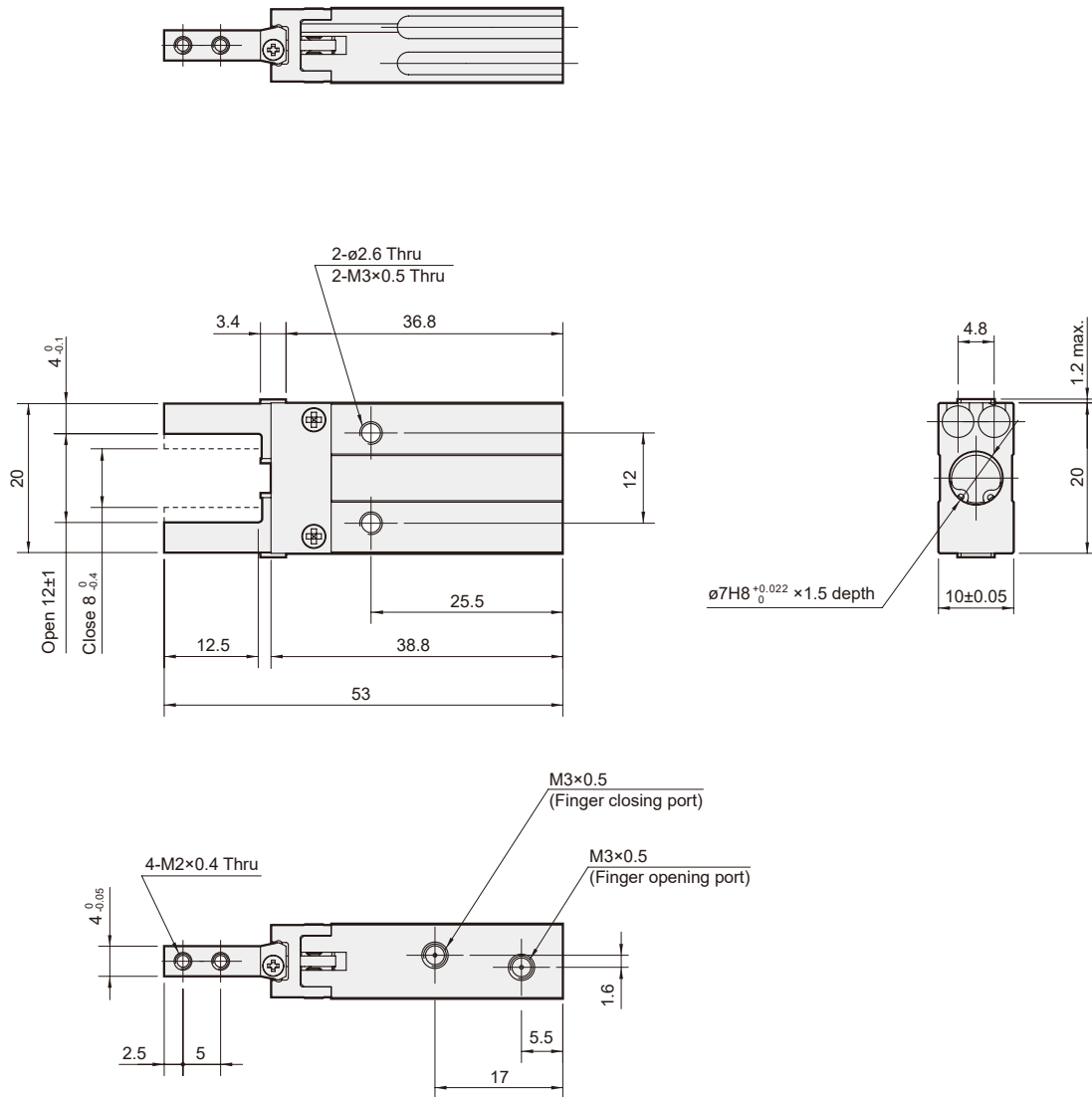


External gripping

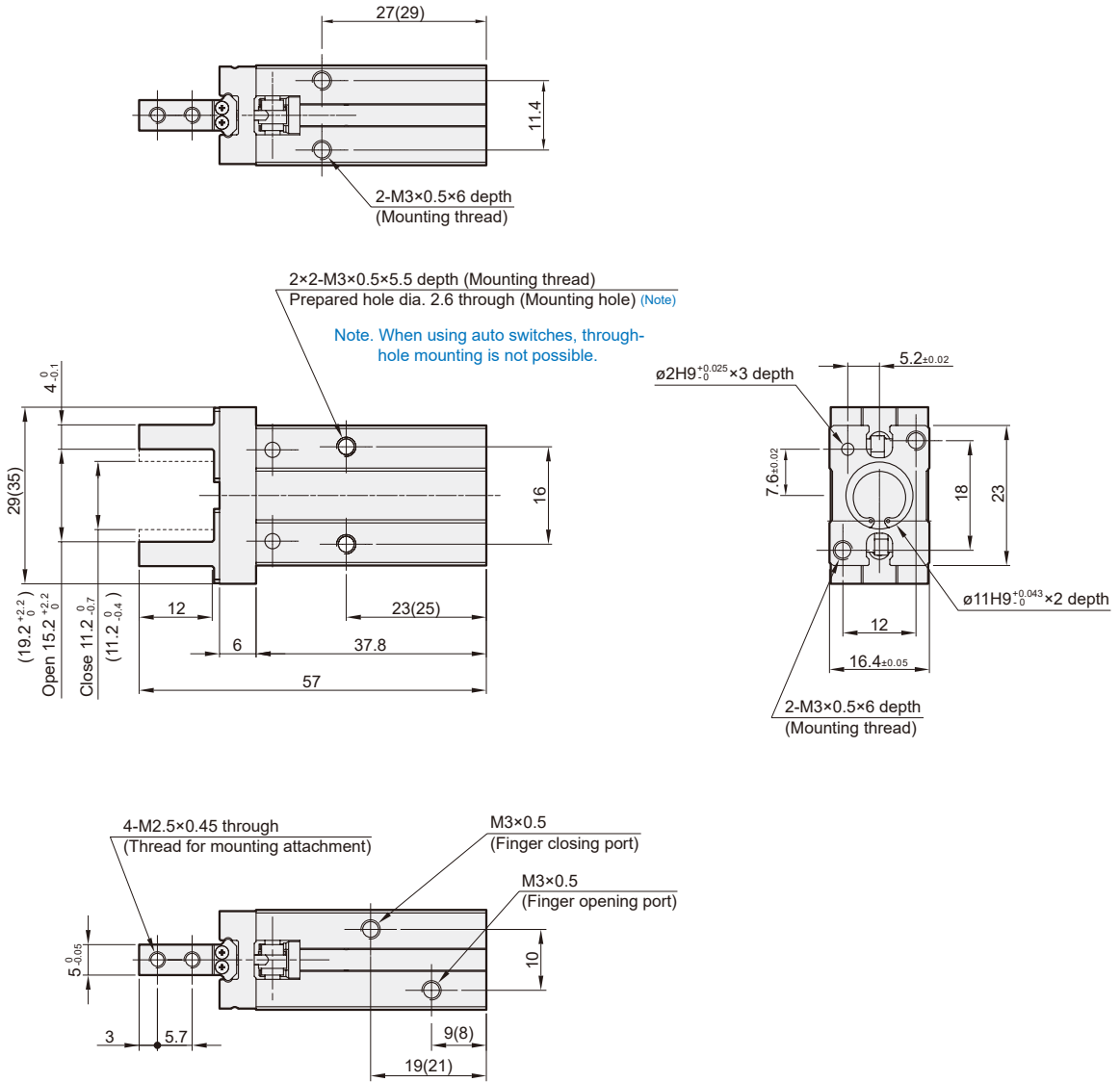


Internal gripping



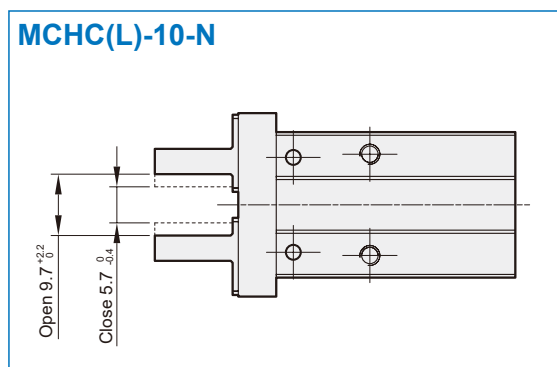


PARALLEL GRIPPER (2-Finger)

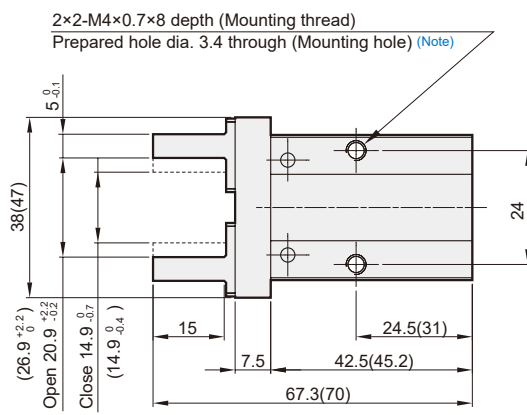
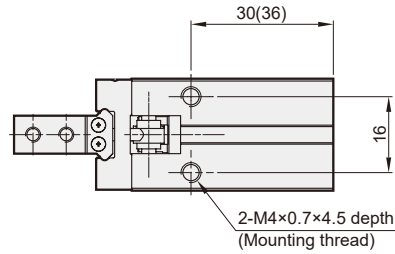


*() for long stroke value.

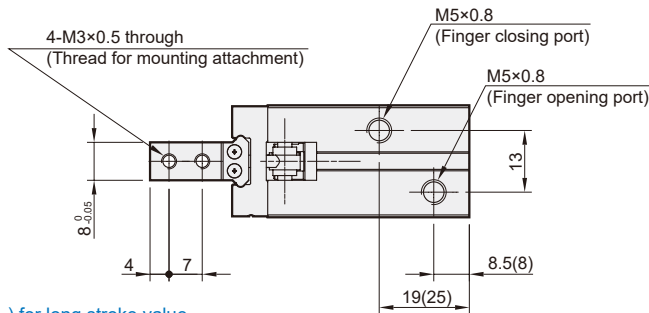
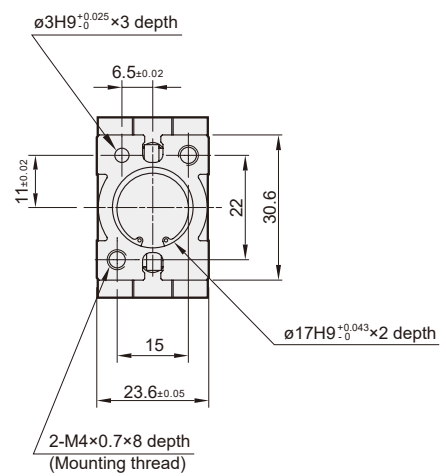
Finger position – Narrow



PARALLEL GRIPPER (2-Finger)

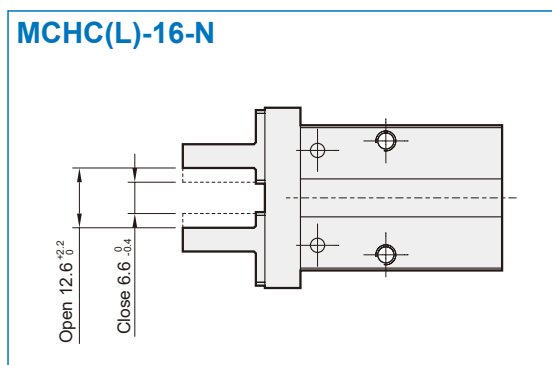


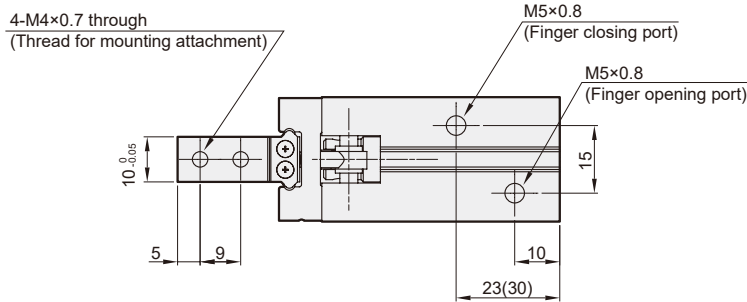
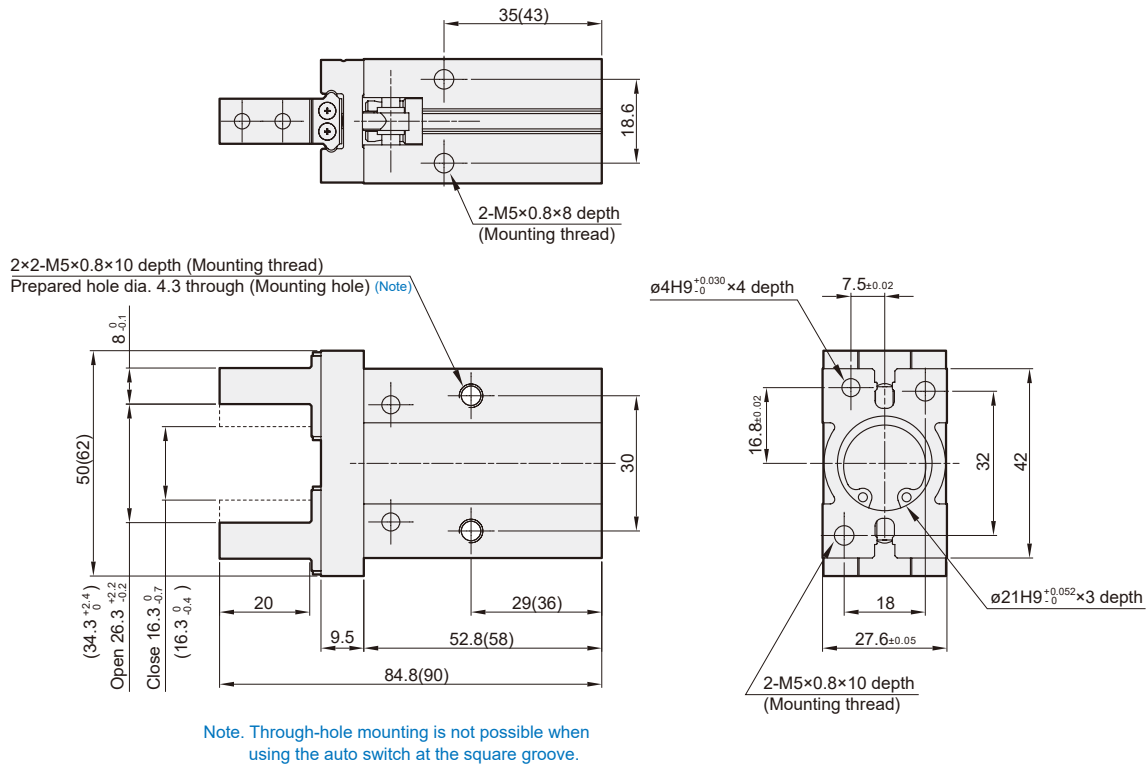
Note. Through-hole mounting is not possible when using the auto switch at the square groove.



*() for long stroke value.

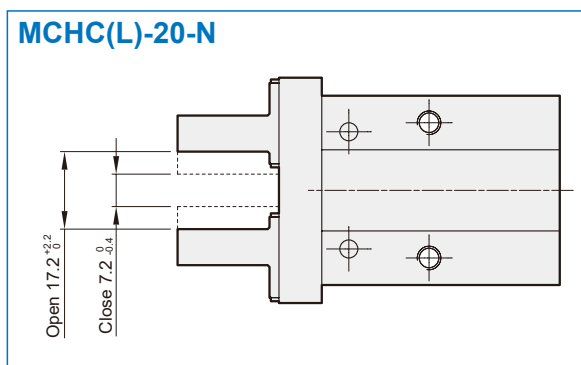
Finger position – Narrow

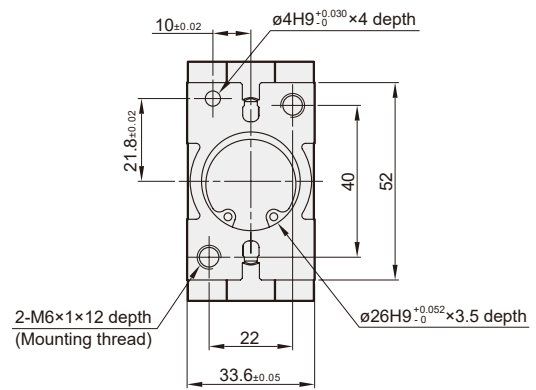
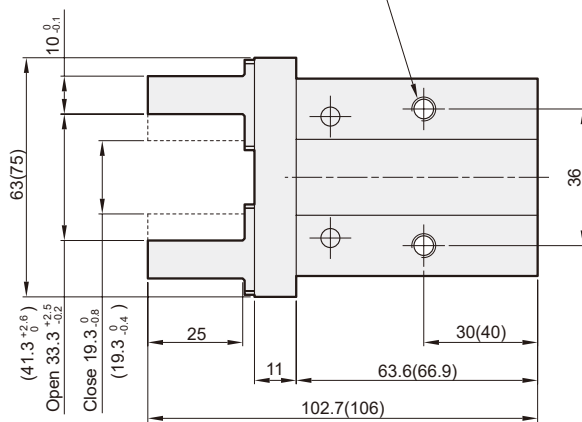
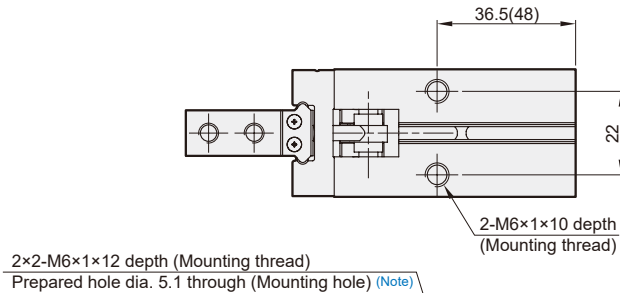




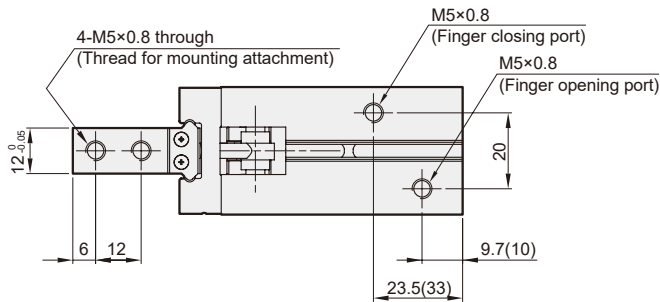
*() for long stroke value.

Finger position – Narrow



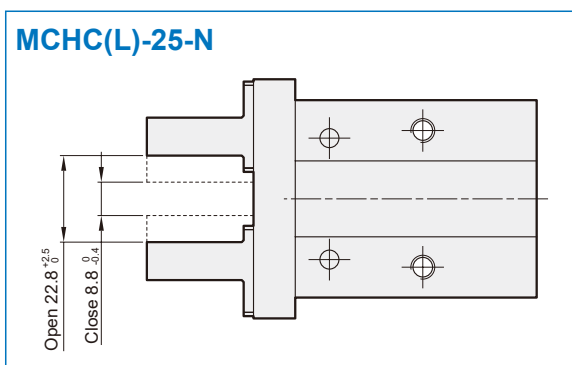


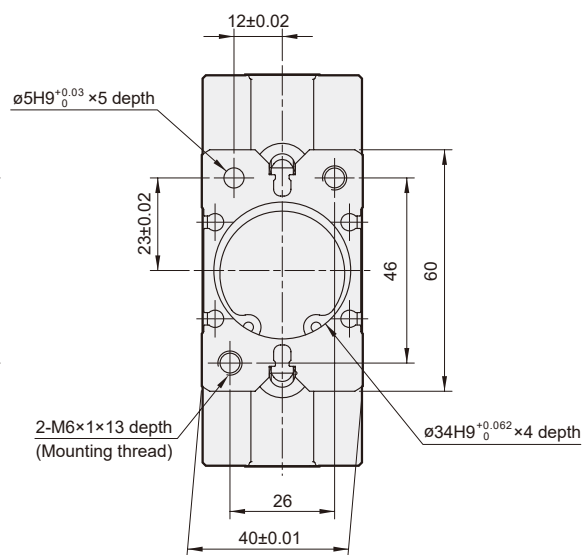
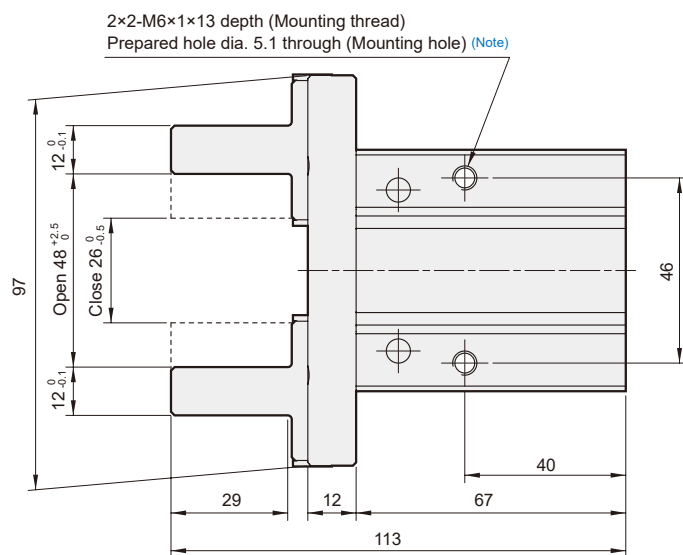
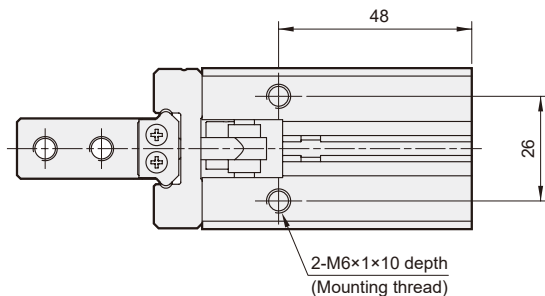
Note. Through-hole mounting is not possible when using the auto switch at the square groove.



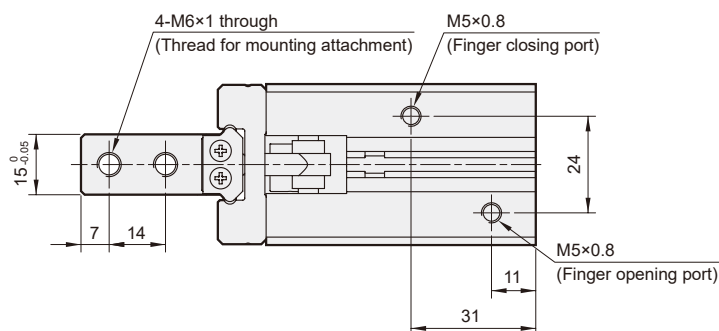
* () for long stroke value.

Finger position – Narrow

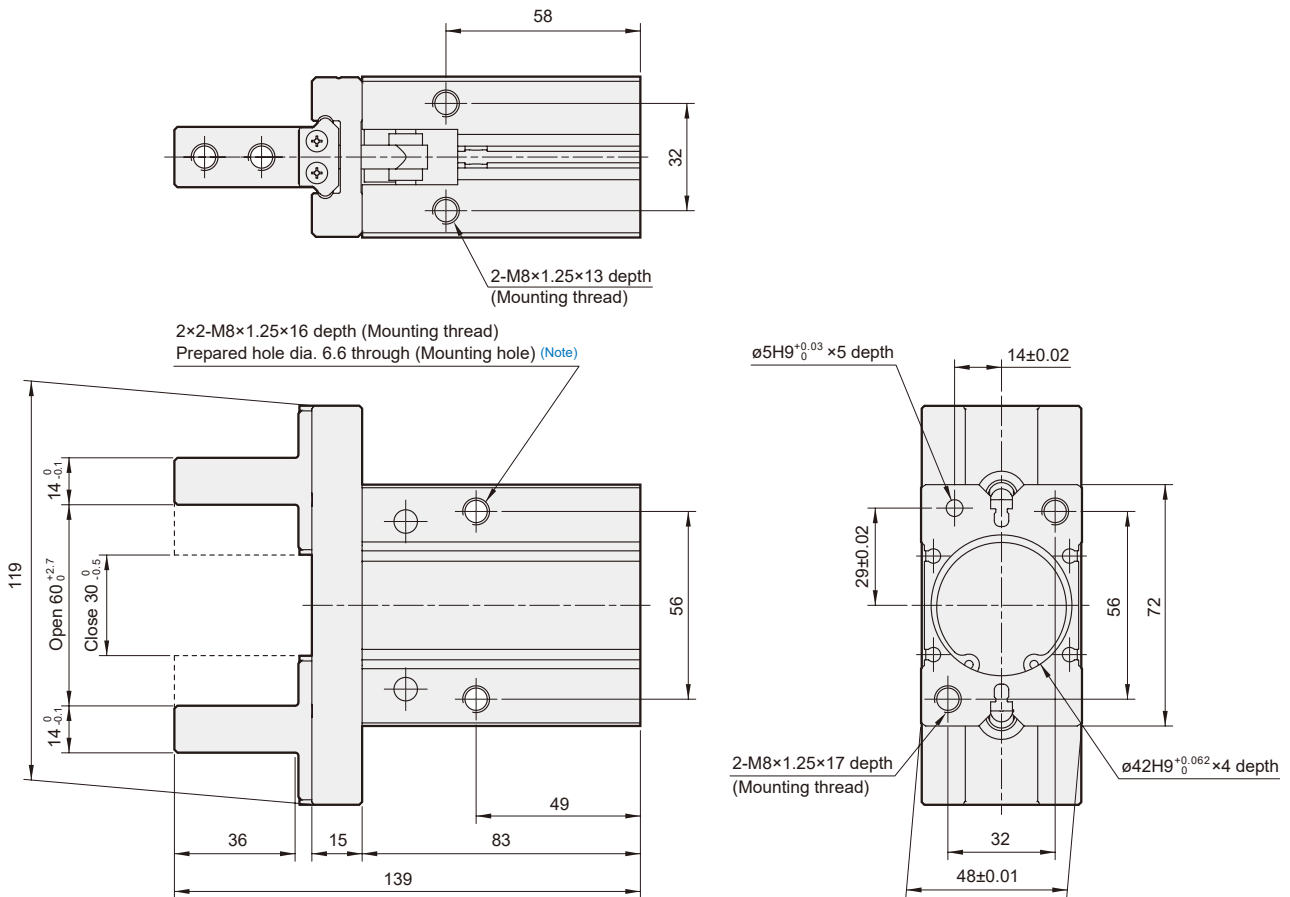




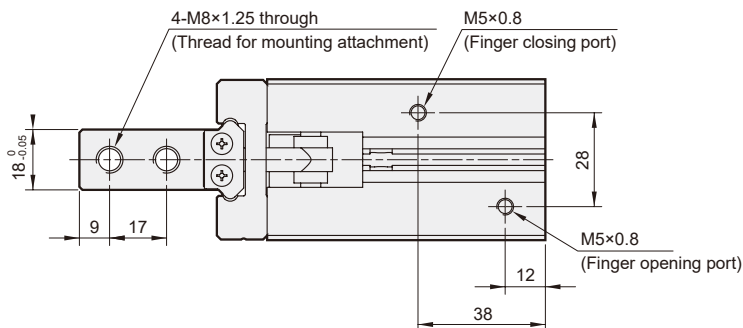
Note. Through-hole mounting is not possible when using the auto switch at the square groove.



PARALLEL GRIPPER (2-Finger)

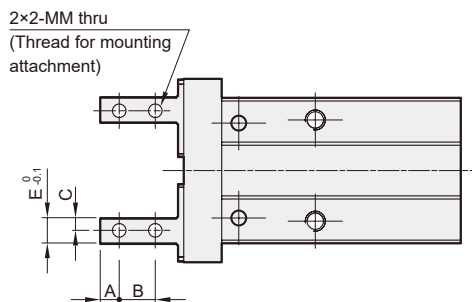


Note. Through-hole mounting is not possible when using the auto switch at the square groove.



MCHC*-1, N1

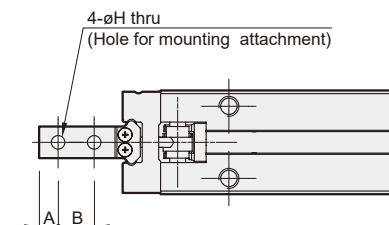
Side tapped



Code Tube I.D.	A	B	C	E	MM
6	2.5	5	2	4	M2×0.4
10	3	5.7	2	4	M2.5×0.45
16	4	7	2.5	5	M3×0.5
20	5	9	4	8	M4×0.7
25	6	12	5	10	M5×0.8
32	7	14	6	12	M6×1.0
40	9	17	7	14	M8×1.25

MCHC*-2, N2

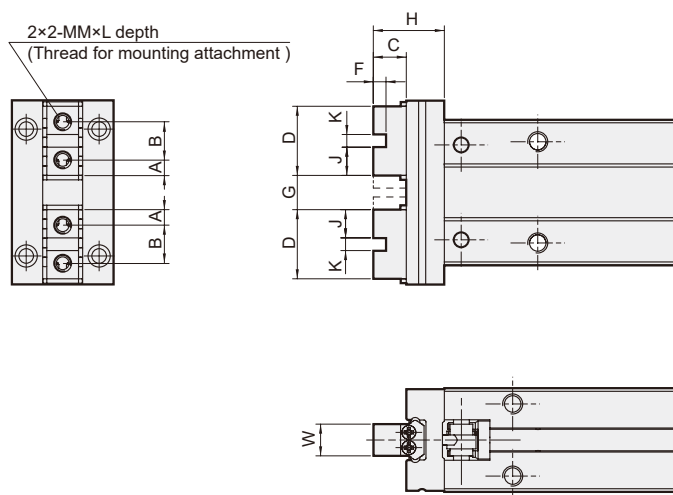
Through hole



Code Tube I.D.	A	B	H
6	2.5	5	$\phi 2.4$
10	3	5.7	$\phi 2.9$
16	4	7	$\phi 3.4$
20	5	9	$\phi 4.5$
25	6	12	$\phi 5.5$
32	7	14	$\phi 6.6$
40	9	17	$\phi 9$

MCHC*-3

Flat



Code Tube I.D.	A	B	C	D	F	G		H	J	K	MM	L	W
						Open	Closed						
10	2.45	6	5.2	10.9	2	5.4 ^{+2.2} ₀	1.4 ⁰ _{-0.2}	11.2	4.45	2H9 ^{+0.025} ₀	M2.5×0.45	5	5 ⁰ _{-0.05}
16	3.05	8	8.3	14.1	2.5	7.4 ^{+2.2} ₀	1.4 ⁰ _{-0.2}	15.8	5.8	2.5H9 ^{+0.025} ₀	M3×0.5	6	8 ⁰ _{-0.05}
20	3.95	10	10.5	17.9	3	11.6 ^{+2.3} ₀	1.6 ⁰ _{-0.2}	20	7.45	3H9 ^{+0.025} ₀	M4×0.7	8	10 ⁰ _{-0.05}
25	4.90	12	13.1	21.8	4	16 ^{+2.5} ₀	2 ⁰ _{-0.2}	24.1	8.9	4H9 ^{+0.03} ₀	M5×0.8	10	12 ⁰ _{-0.05}
32	7.30	20	18	34.6	5	25 ^{+2.7} ₀	3 ⁰ _{-0.2}	30	14.8	5H9 ^{+0.03} ₀	M6×1.0	12	15 ⁰ _{-0.05}
40	8.70	24	22	41.4	6	33 ^{+2.9} ₀	3 ⁰ _{-0.2}	37	17.7	6H9 ^{+0.03} ₀	M8×1.25	16	18 ⁰ _{-0.05}