

Gripping at a long point is available by the use of the linear guide.



Excellent **CENTERING** Accuracy

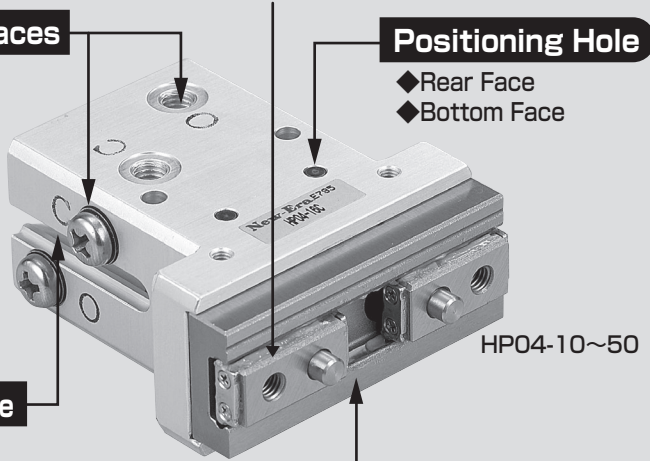
◆ ±0.07mm or less

Piping Port on 2 faces

◆ Excluding φ8mm

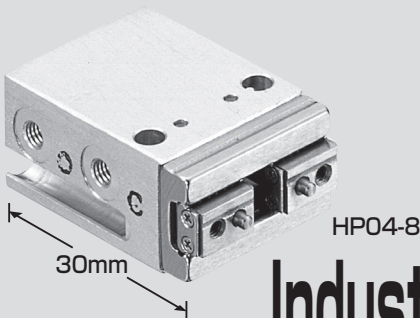
Positioning Hole

- ◆ Rear Face
- ◆ Bottom Face



HP04-10~50

Sensor Switch Groove



HP04-8

Use of **LINEAR GUIDE**

- ◆ Withstand load, withstand moment (high rigidity)
- ◆ High accuracy (repeat accuracy: ±0.01 mm or less)
- ◆ Gripping at a long point and overhang gripping are available.

Industry's smallest

◆ Gripper with sensor

HP04 Series

Parallel Linear Gripper (Standard Type)

Model Code No.

HP04 - 10 C * HAE - ZE135 A 2

Series Name

Number of Switches

1:1 Switch
2:2 Switches

Bore Size

8: 8mm
10: 10mm
16: 16mm
20: 20mm
32: 32mm
50: 50mm

Action Type

A : Single Acting Normally Open
C : Double Acting
Only Double Acting Type
for $\phi 32$ and $\phi 50$

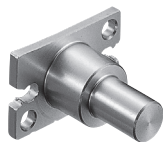
Switch Lead Wire Length

A: 1m
B: 3m

● Gripper Adaptor Type
No Code: No Gripper Adaptor

HAE (excluding $\phi 32$ and $\phi 50$)

HFE (excluding $\phi 8$, $\phi 32$ and $\phi 50$)
HFE-L : Large Diameter Type
($\phi 16$ only)



● Detailed specifications → P.12~13

● Switch Type No Code: No Switch

ZE135 ES13

2 Wire System Solid State Switch, Straight Type

ZE235 ES23

2 Wire System Solid State Switch, L-shaped

ZE155 ES(P)15

3 Wire System Solid State Switch, Straight Type

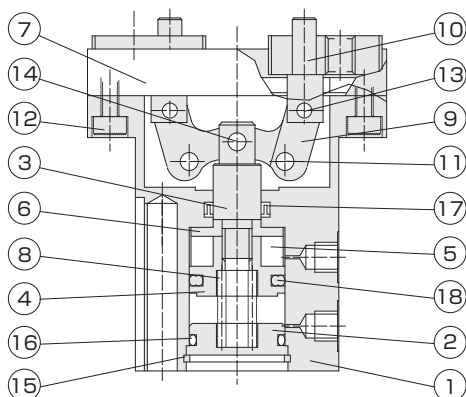
ZE255 ES(P)25

3 Wire System Solid State Switch, L-shaped



● Switch details → P.521~528

Internal Structure Diagram



Parts List

NO	Name	Material
1	Main Body	Aluminum Alloy
2	Head Cover	Aluminum Alloy
3	Piston Rod	Stainless Steel
4	Piston	Aluminum Alloy
5	Magnet	Resin
6	Pressure Cover	Aluminum Alloy
7	Linear Guide	Bearing Steel
8	Spring	Plano Wire (Single Acting only)
9	Action Lever	Carbon Steel
10	Knuckle	Stainless Steel
11	Fulcrum Pin	Carbon Tool Steel
12	Hexagon Socket Head Bolt	Stainless Steel (Chrome Molybdenum Steel: $\phi 50$ only)
13	Press Fit Pin	Carbon Tool Steel
14	Press Fit Pin	Carbon Tool Steel
15	Hole Locating Snap Ring	Carbon Tool Steel
16	O Ring	NBR
17	Rod Packing	NBR
18	Piston Packing	NBR

Specifications

Fluid	Air
Maximum Operating Pressure [MPa]	0.7
Proof Pressure [MPa]	1.05
Operating Temperature [°C]	0~60 (No Freezing)
Lubrication	Not Required (Required for sliding parts of the machine) Only $\phi 8$ required
Pipe Bore	M3×0.5 (HP04-8, HP04-10) M5×0.8 (HP04-16, HP04-20, HP04-32) Rc 1/8 (HP04-50)
Maximum Operating Cycle [Cycle/min]	120
Centering Accuracy [mm]	±0.07
Repeat Accuracy [mm]	±0.01
Applicable Switch	ZE, ES Type (Solid State Switch)

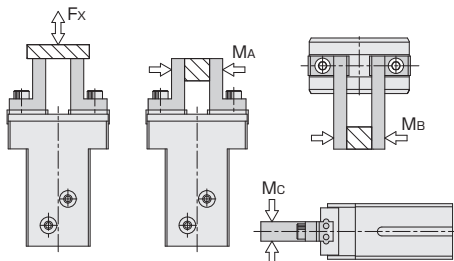
Action Type	Model	Bore Size [mm]	Minimum Operating Pressure [MPa]	Opening/Closing Stroke [mm]	Gripping Force [N]		Outside Dimensions (T x W x L) [mm]	Product Mass [g]
					Close	Open		
Double Acting	HP04-8C	8	0.22	4	5.8	9.9	13×20×30	22
	HP04-10C	10	0.2	6.5	10	15.6	20×36×49	80
	HP04-16C	16	0.12	10	26	39	25×50×56	159
	HP04-20C	20	0.1	14	45	60	32×62×67	329
	HP04-32C	32	0.1	22	157	176	40×85×83	664
	HP04-50C	50	0.1	36	370	410	60×119×110	1850
Single Acting Normally Open	HP04-8A	8	0.4	4	4.1	1.3	13×20×30	23
	HP04-10A	10	0.35	6.5	6.8	2.4	20×36×49	81
	HP04-16A	16	0.25	10	20	5.4	25×50×56	160
	HP04-20A	20	0.25	14	34	7.3	32×62×67	330

Note) The grip force is measured at the intermediate position of the opening/closing stroke. It is an effective value when the grip point L is 30 mm and the pressure is 0.5 MPa.

The opening force of the single acting type indicates the spring force.

When this product is used with an extremely short stroke, it may work badly because of the lack of oil of the guide.

Allowable Load and Allowable Moment

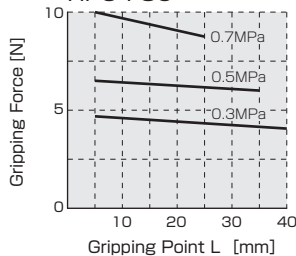


Load and Moment	Fx [N]	MA [N·m]	MB [N·m]	MC [N·m]
Model				
HP04-8	12	0.04	0.04	0.08
HP04-10	50	0.4	0.4	0.8
HP04-16	120	1	1	2
HP04-20	200	1.5	1.5	3
HP04-32	350	3	3	6
HP04-50	600	5.5	6	10

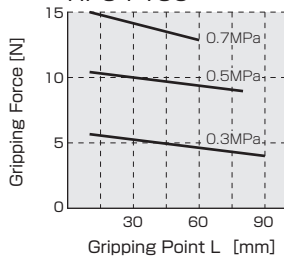
Effective Gripping Force

Closing Force (Double Acting Type)

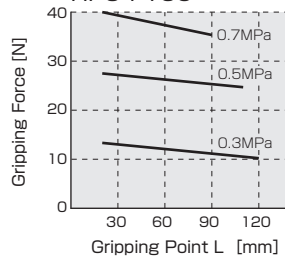
HP04-8C



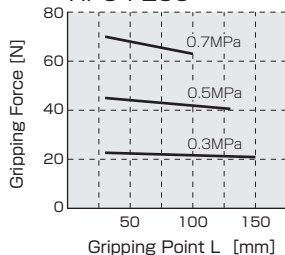
HP04-10C



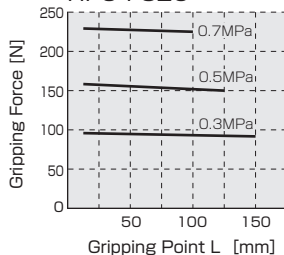
HP04-16C



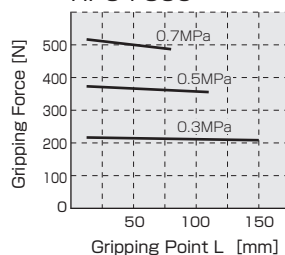
HP04-20C



HP04-32C

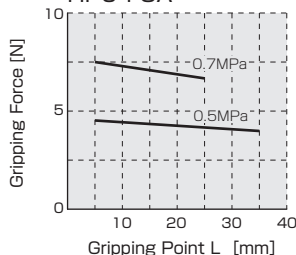


HP04-50C

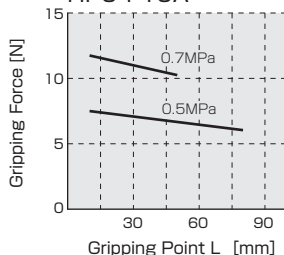


Closing Force (Single Acting Type)

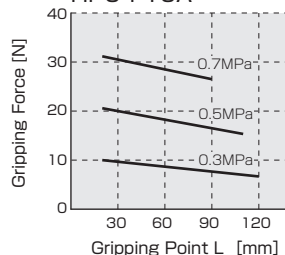
HP04-8A



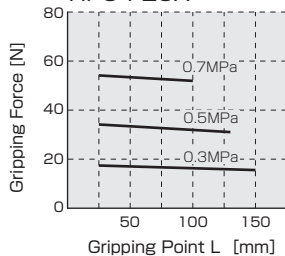
HP04-10A



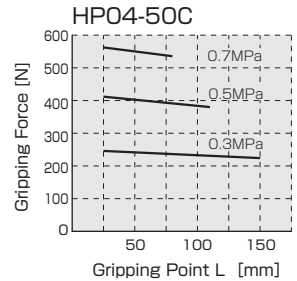
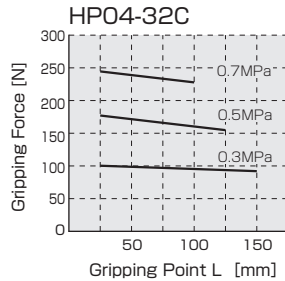
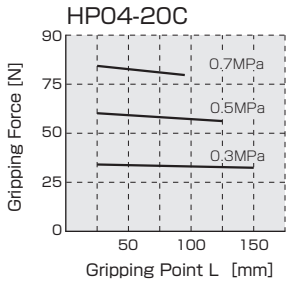
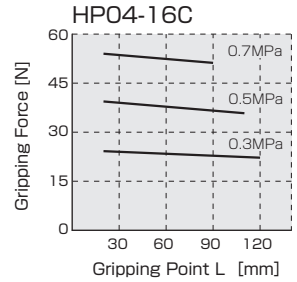
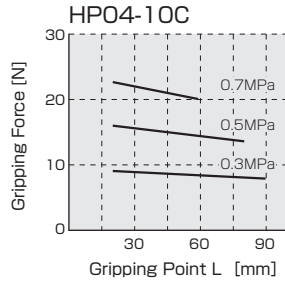
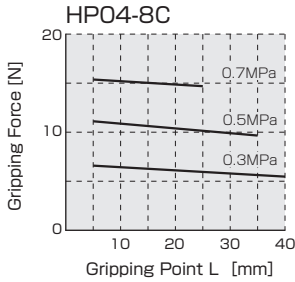
HP04-16A



HP04-20A



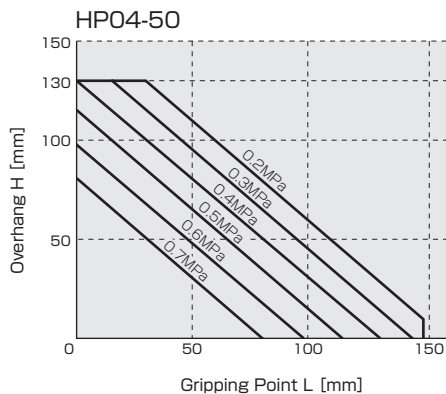
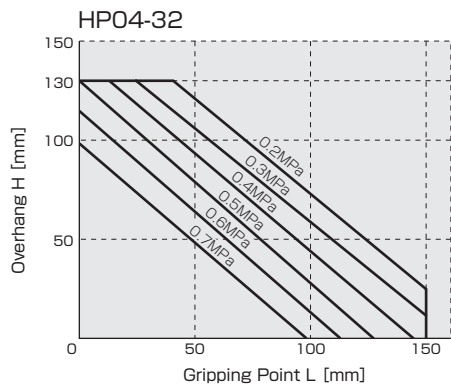
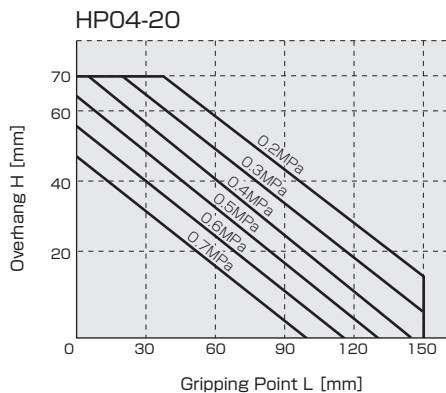
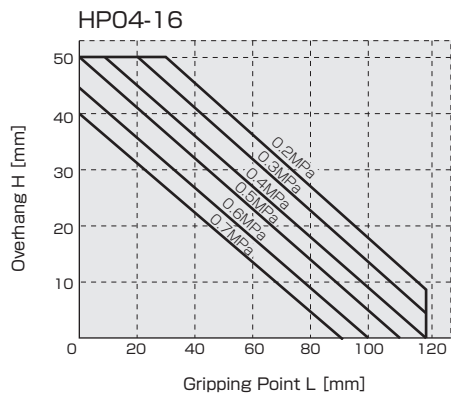
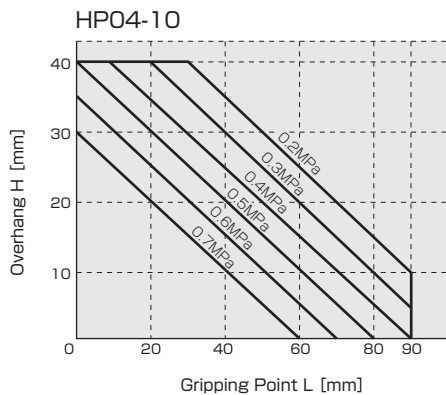
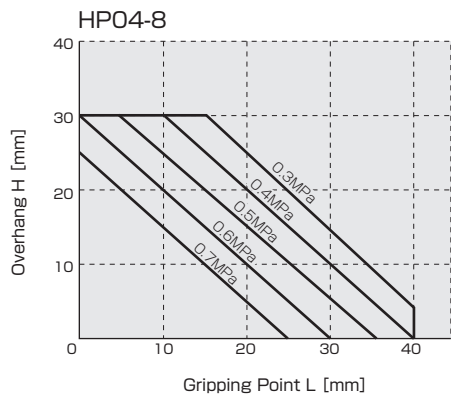
Opening Force (Double Acting Type)



■ Gripping Point Limit Range

HP04 Series

Parallel Linear Gripper (Standard Type)

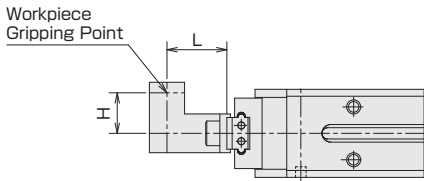


● **Mounting of the attachment**

L (distance gripping point) and H (overhang distance) of the attachment to be mounted to the lever shall be within the range specified in the previous page (Gripping point limit range). If they exceed the limit range, excess moment will be applied to the guide, causing troubles that have a bad influence on the life and accuracy (e.g. finger backlash). Even if they are within the limit range, the attachment shall be as small and light as possible.

● **Guide for selecting a model for the workpiece weight**

It shall be 5 to 10% of the effective gripping force or any value less than that although it differs depending on the coefficient of friction between the attachment and the workpiece and the shape. It shall be greater than that when great acceleration or impact is applied during workpiece transportation.

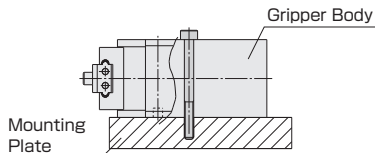


Main Body Mounting Method

Mounting Example

1 When the through-hole of the main body is used

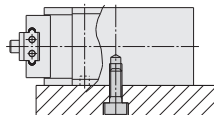
(Switch not mountable for $\phi 10$, $\phi 16$ and $\phi 20$)



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
$\phi 8$	M3×0.5	0.59
$\phi 10$	M3×0.5	0.59
$\phi 16$	M3×0.5	0.59
$\phi 20$	M4×0.7	1.37
$\phi 32$	M5×0.8	2.84
$\phi 50$	M6×1.0	4.92

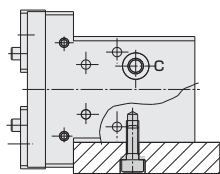
2 When the screw on the back face of the main body is used

(Excluding $\phi 8$)



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
$\phi 10$	M4×0.7	1.37
$\phi 16$	M4×0.7	1.37
$\phi 20$	M5×0.8	2.84
$\phi 32$	M6×1.0	4.92
$\phi 50$	M8×1.25	11.87

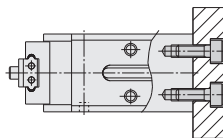
3 When the screw on the side of the main body is used



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
$\phi 8$	M3×0.5	0.59
$\phi 10$	M3×0.5	0.59
$\phi 16$	M4×0.7	1.37
$\phi 20$	M5×0.8	2.84
$\phi 32$	M6×1.0	4.92
$\phi 50$	M8×1.25	11.87

4 When the screw on the bottom face of the main body is used

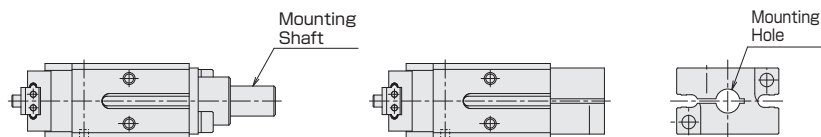
(Only $\phi 8$ requires a space such as a relief because the switch protrudes.)



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
$\phi 8$	M2.5×0.4	0.34
$\phi 10$	M3×0.5	0.59
$\phi 16$	M4×0.7	1.37
$\phi 20$	M5×0.8	2.84
$\phi 32$	M6×1.0	4.92
$\phi 50$	M8×1.25	11.87

5 When a gripper adaptor is used for mounting

(No gripper adaptor for $\phi 32$ and $\phi 50$)

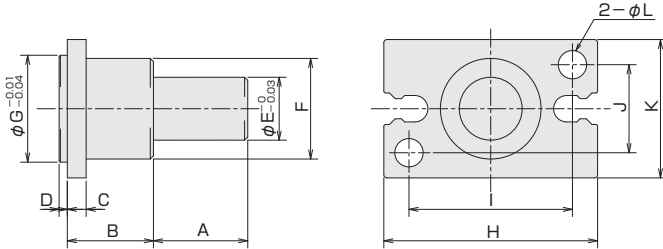


HAE Type

HFE, HFE-L Type (Excluding $\phi 8$)

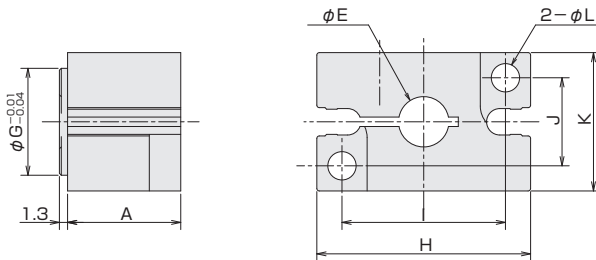
Outline Dimensional Drawing of Gripper Adaptor

HAE Type



Type	Code	A	B	C	D	E	F	G	H	I	J	K	L	Ancillary Bolt (x2)	Product Mass [g] (Including Bolts)
HAE-8		10	10	3	0.8	8	10	9	20	15	9	13	2.8	M2.5×0.45×6 ^L	6
HAE-10		15	15	3	1.3	10	11	11	23	17	10	16	3.4	M3×0.5×8 ^L	11
HAE-16		15	15	3	1.3	10	16	17	34	26	14	22	4.5	M4×0.7×10 ^L	20
HAE-20		15	15	3	1.3	10	18	21	45	35	16	26	5.5	M5×0.8×10 ^L	28

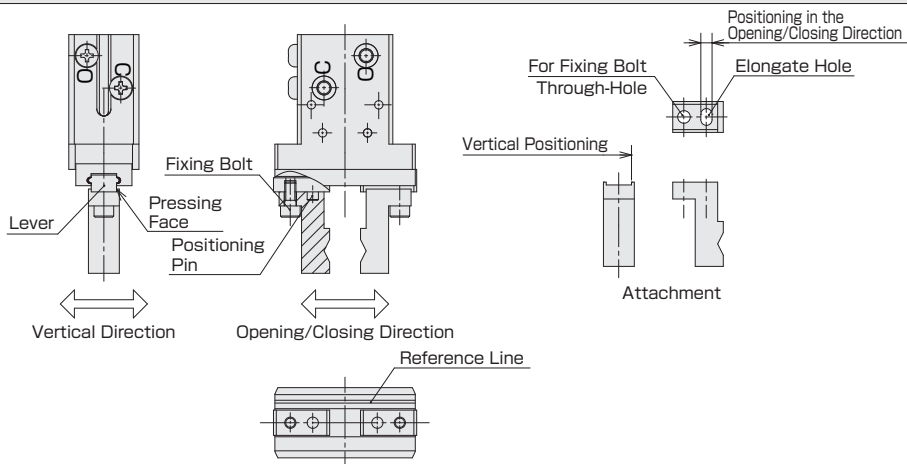
HFE Type



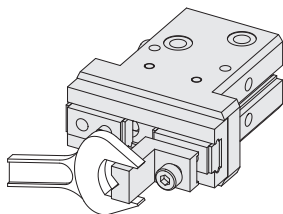
Type	Code	A	E	G	H	I	J	K	L	Ancillary Bolt (x3)		Product Mass [g] (Including Bolts)
										Gripper Mounting (x2)	Adapter Fixing (x1)	
HFE-10		15	6	11	23	17	10	16	3.4	M3×0.5×16 ^L	M3×0.5×12 ^L	14
HFE-16		18	8	17	34	26	14	22	4.5	M4×0.7×20 ^L	M4×0.7×16 ^L	35
HFE-16L		18	10	17	34	26	14	22	4.5	M4×0.7×20 ^L	M4×0.7×16 ^L	33
HFE-20		19	13	21	45	35	16	26	5.5	M5×0.8×20 ^L	M5×0.8×20 ^L	55

Attachment Design Method

Example of Attachment Design



Attachment Mounting Method

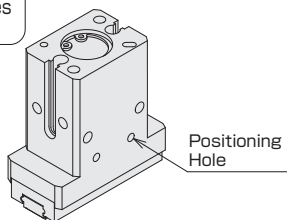


When you mount the attachment, hold the attachment with a spanner or the like to remove load to the lever.

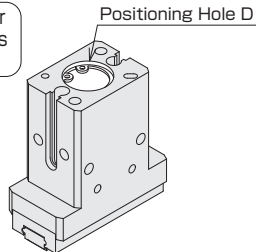
Model	Bolt to be Used	Maximum Tightening Torque[N·m]
φ8	M2×0.4	0.315
φ10	M3×0.5	1.14
φ16	M4×0.7	2.7
φ20	M5×0.8	5.4
φ32	M6×1.0	9.2
φ50	M6×1.0	9.2

Positioning Hole

Positioning hole for Mounting Examples 1 and 2 (P.12)



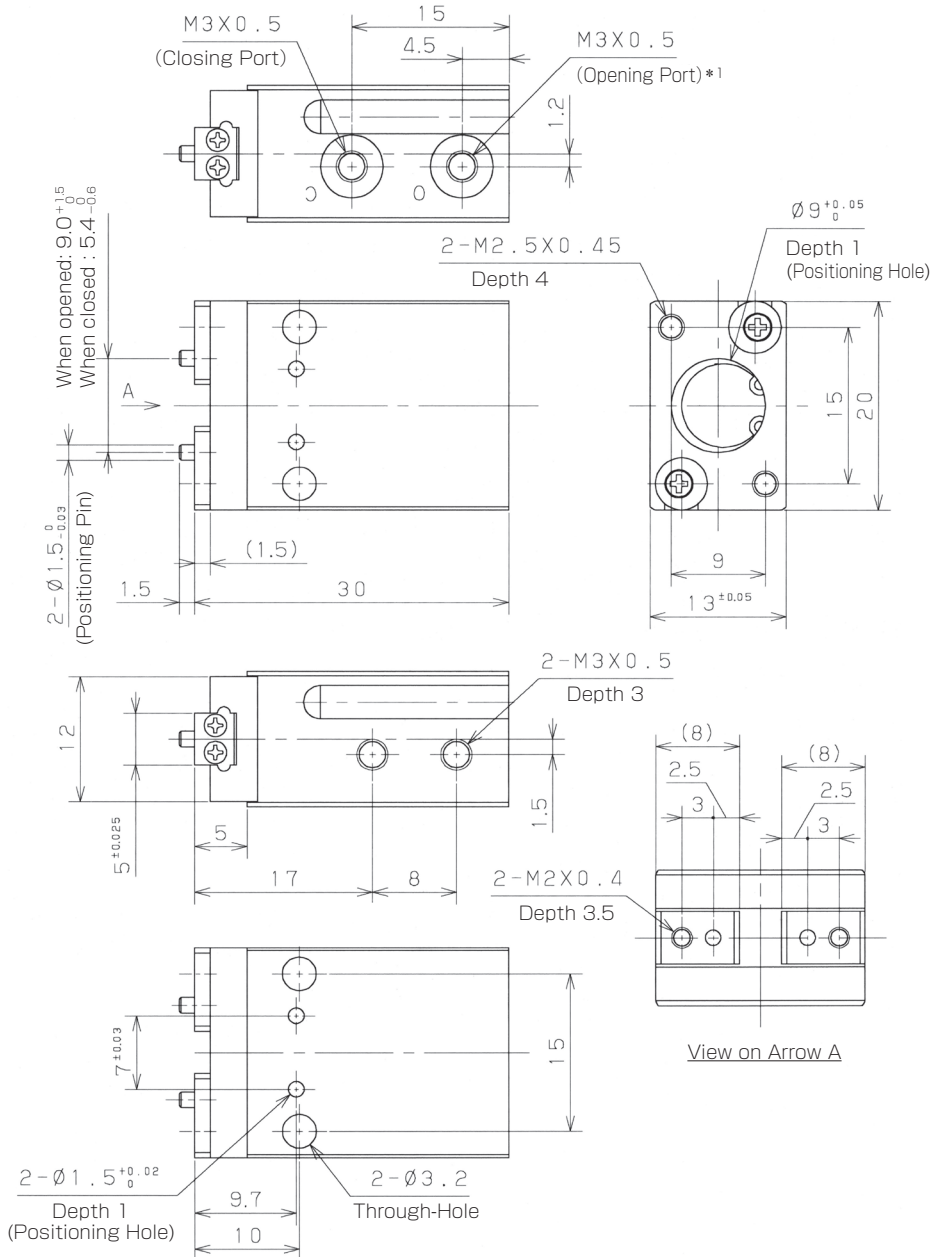
Positioning hole for Mounting Examples 4 (P.12)



Model	Positioning Hole
φ8	φ1.5 ^{+0.02} depth 1
φ10	φ2.5 ^{+0.02} depth 2.5
φ16	φ3 ^{+0.02} depth 3
φ20	φ4 ^{+0.02} depth 3.5
φ32	φ5 ^{+0.03} depth 4
φ50	φ6 ^{+0.03} depth 7

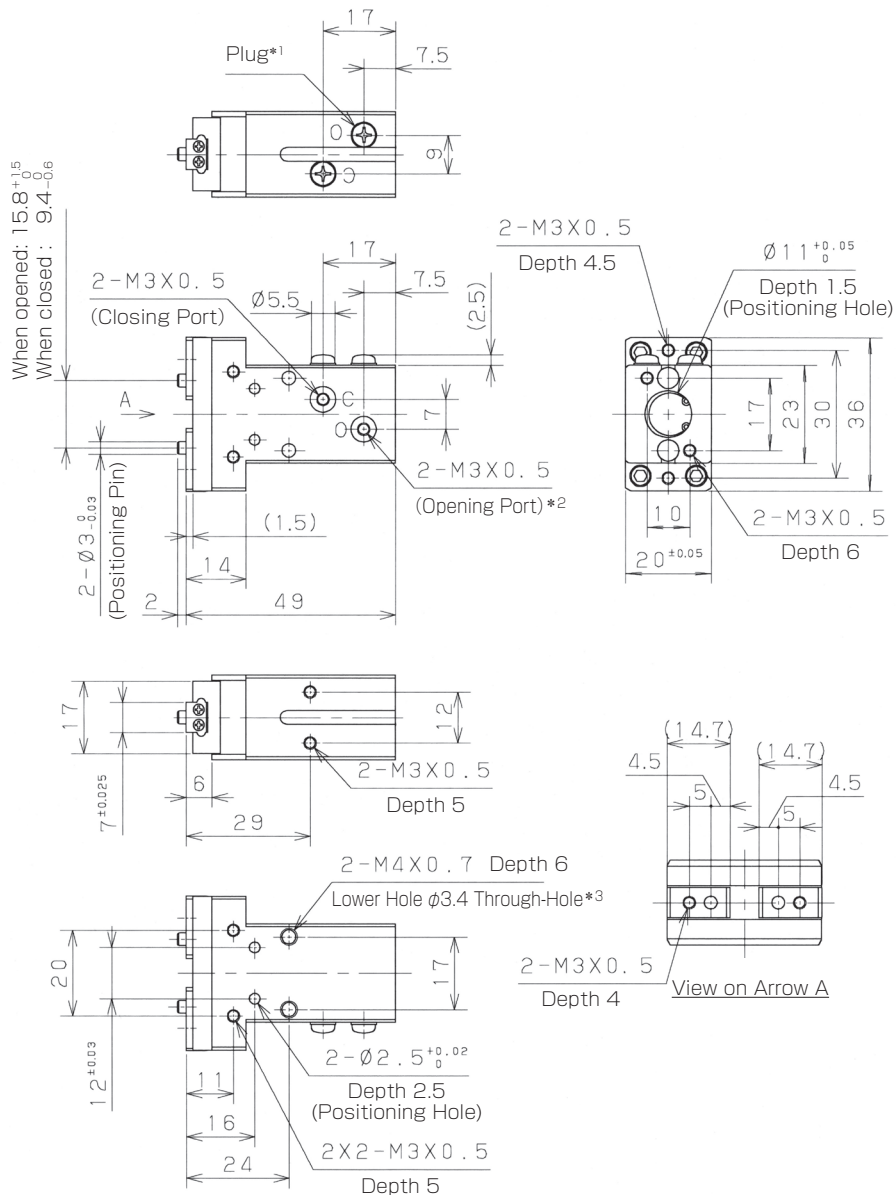
Model	Positioning Hole D
φ8	φ9 ^{+0.05} depth 1
φ10	φ11 ^{+0.05} depth 1.5
φ16	φ17 ^{+0.05} depth 1.5
φ20	φ21 ^{+0.05} depth 1.5
φ32	φ34 ^{+0.05} depth 2
φ50	φ52 ^{+0.05} depth 3

Dimensions HP04-8



*1) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.

Dimensions HP04-10

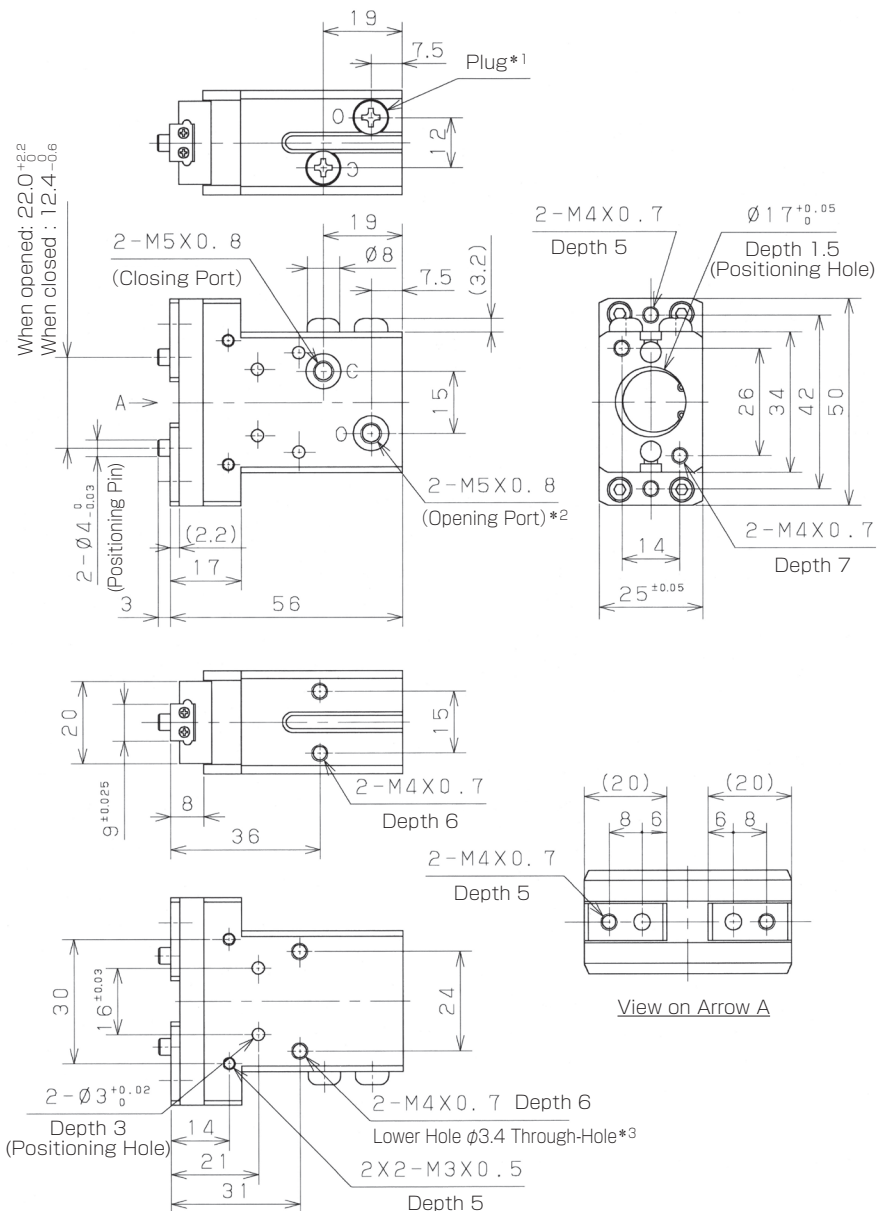


*1) Two faces have an air port. Select the one you use according to the mounting condition.

*2) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.

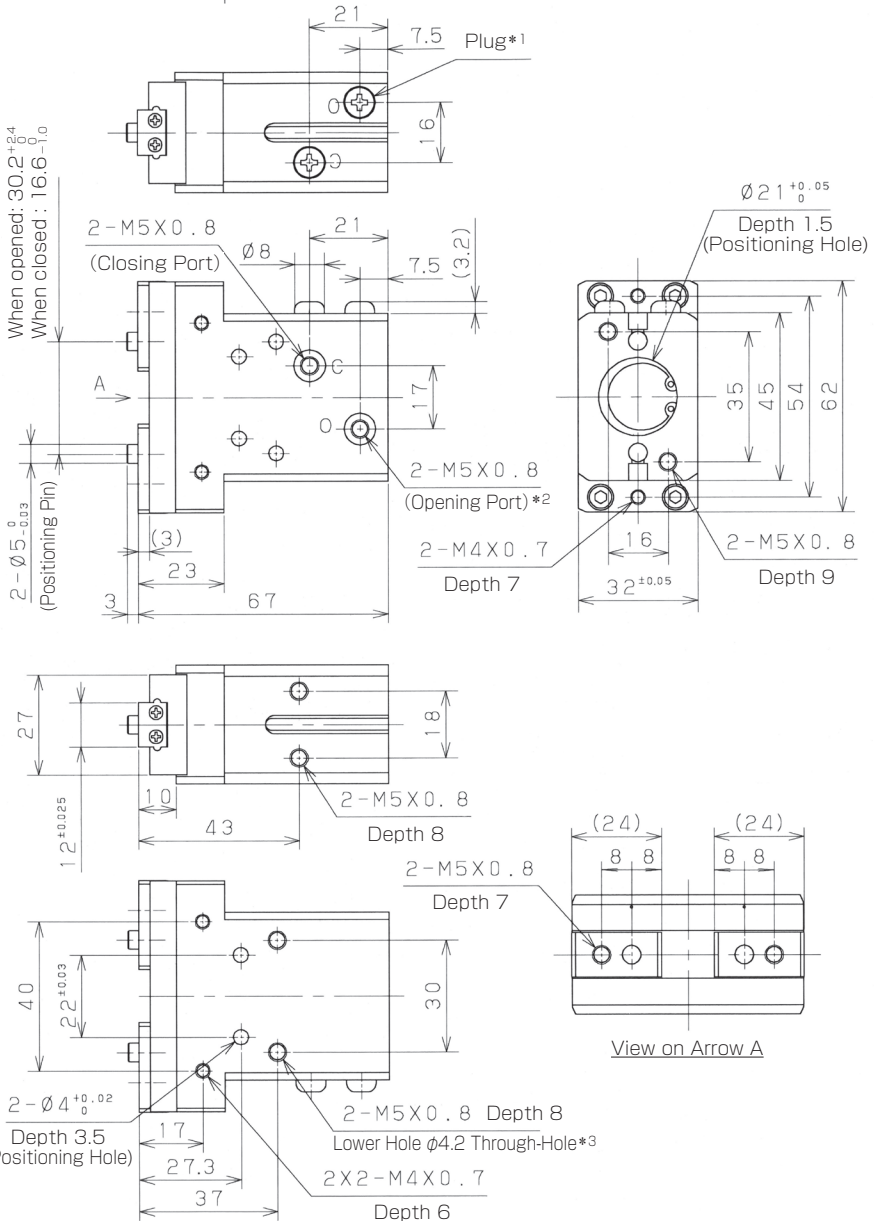
*3) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

Dimensions **HP04-16**



- *1) Two faces have an air port. Select the one you use according to the mounting condition.
- *2) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.
- *3) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

Dimensions HP04-20

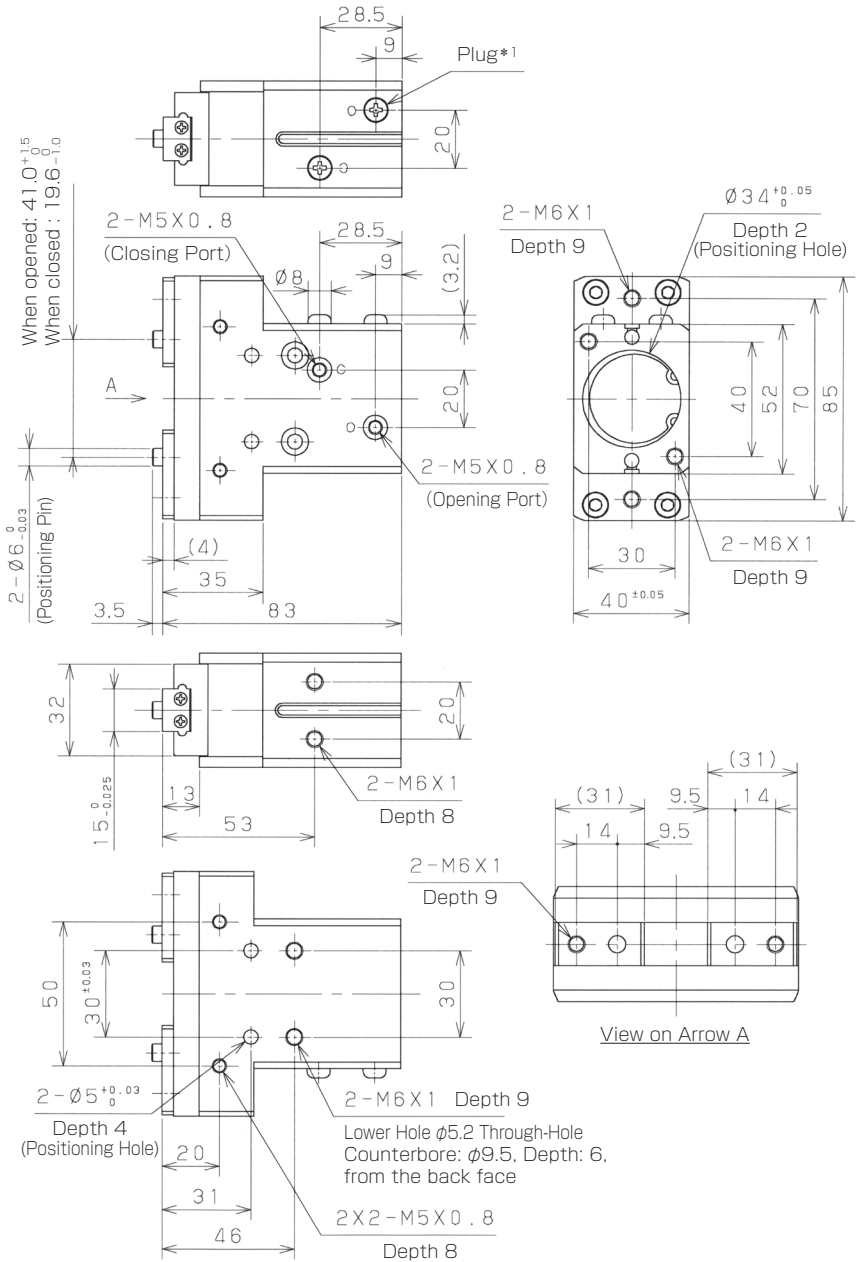


*1) Two faces have an air port. Select the one you use according to the mounting condition.

*2) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.

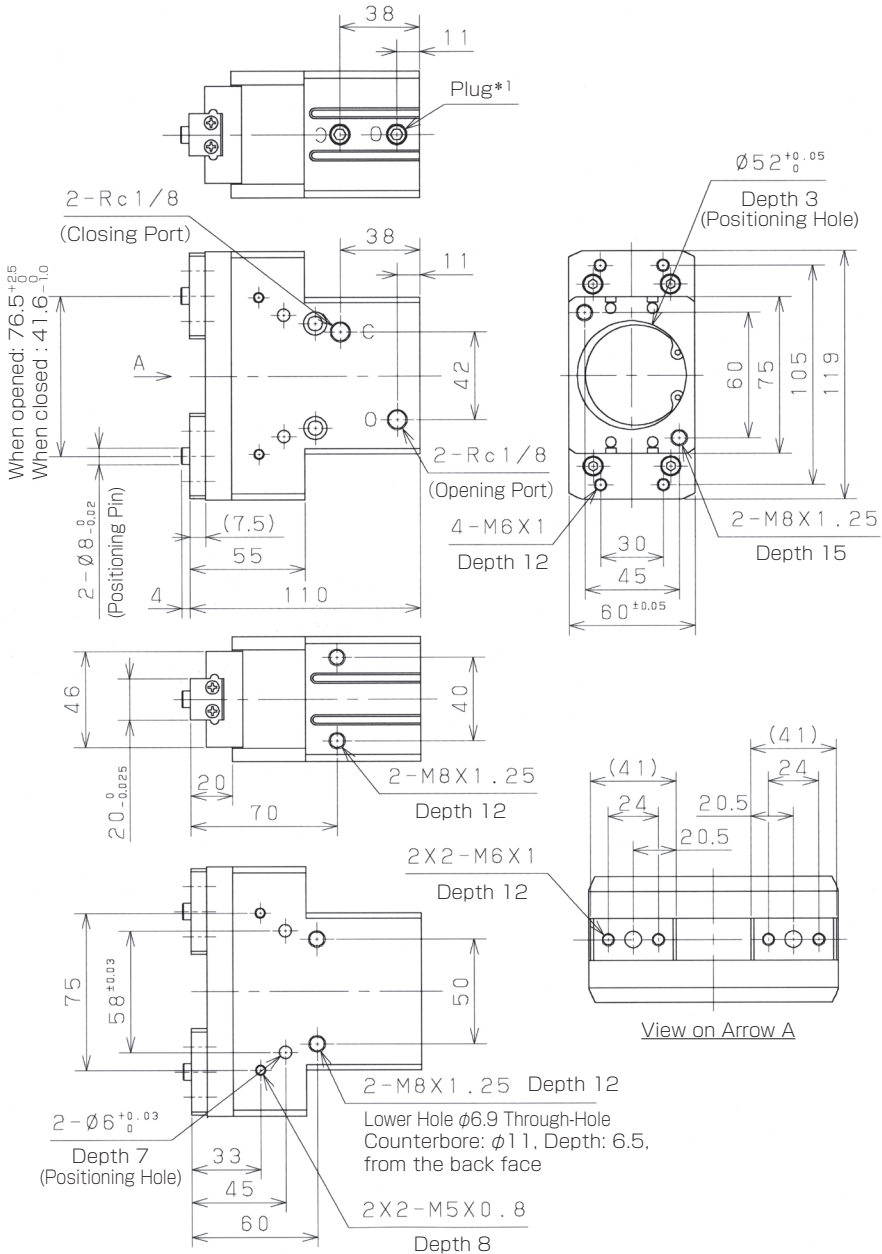
*3) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

Dimensions **HP04-32C**



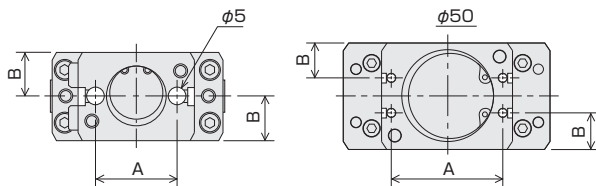
*1) Two faces have an air port. Select the one you use according to the mounting condition.

Dimensions HP04-50C



*1) Two faces have an air port. Select the one you use according to the mounting condition.

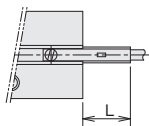
Switch Groove Dimensions



Code	Size	8	10	16	20	32	50
A		15	17	24	30	43	64
B		3	10	12.5	16	20	20

Switch Protrusion Distance

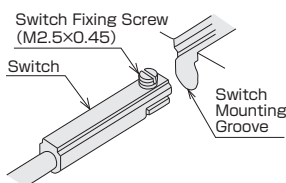
The maximum switch protrusion from the switch body end face (when the levers are full closed) is shown in the table below. Use it as a guide for mounting.



Cylinder Bore (mm)	φ8	φ10	φ16	φ20	φ32	φ50
Maximum Protrusion (mm)	2	0	0	0	0	0

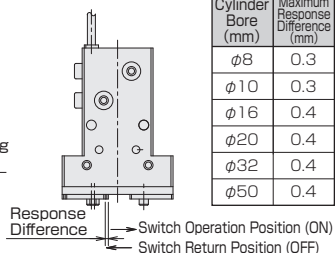
Switch Mounting

Insert the switch into the switch mounting groove. After setting the mounting position, tighten the switch fixing screw with a precision screwdriver. The tightening torque shall be 0.1 N·m or less.



Switch Response Difference

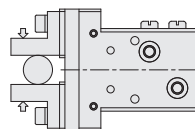
The distance from the position where the levers move and the switch turns on to the position where the levers move in the reverse direction and the switch turns off is called "response difference".



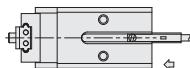
Cylinder Bore (mm)	Maximum Response Difference (mm)
φ8	0.3
φ10	0.3
φ16	0.4
φ20	0.4
φ32	0.4
φ50	0.4

Switch Mounting Position Adjustment Method

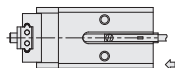
For external gripping



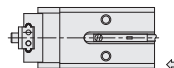
① Check the workpiece external gripping and full close.



② Insert the switch into the switch mounting groove of the main body in the arrow direction.

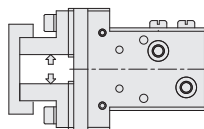


③ The LED lamp lights up by turning on the switch in the arrow direction.

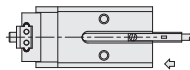


④ Fix the switch by a switch fixing screw at the position where the switch is moved 0.6 mm in the arrow direction from the position where the lamp lights up in [3].

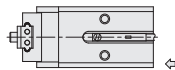
For internal gripping



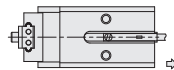
① Check the workpiece internal gripping and full opening.



② Insert the switch into the switch mounting groove of the main body in the arrow direction.



③ The LED lamp lights up by moving the switch in the arrow direction. It goes off by moving it further.



④ Fix the switch at the position that is 0.6 mm moved from the position where the LED lamp lights up when it is returned in the arrow direction (reverse direction) in [3].

① Indicates the position where you need to check if the switch is ON. Mount the switch by adjusting it in the order from ① to ④.