Parallel Linear Gripper

HP04L Series

Long Stroke Type

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

Long Life

Excellent CENTERING Accuracy

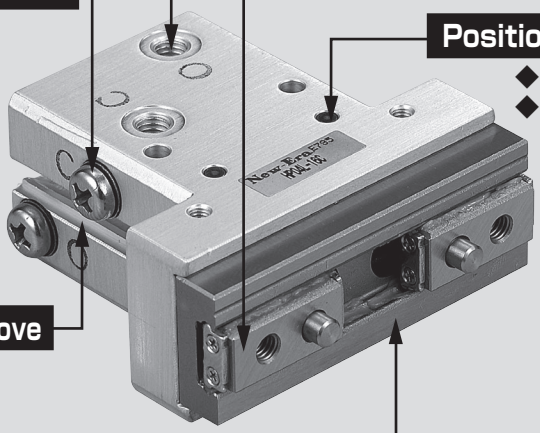
◆±0.07mm or less

Piping Port on 2 faces

◆Excluding ϕ8mm

Positioning Hole

◆Rear Face
◆Bottom Face



Sensor Switch Groove

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.

About twice the stroke than the standard type

The overall length is almost same as the one of the standard type, but the stroke is double.

HP04L Series

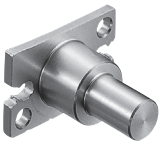
Model Code No.

HP04L – 10 C ※ HAE – ZE135 A 2

- Series Name: HP04L
- Bore Size: 8: 8mm / 10:10mm / 16:16mm / 20:20mm
- Action Type: C : Double Acting
- Number of Switches: 1:1 Switch / 2:2 Switches
- Switch Lead Wire Length: A:1m / B:3m

●Gripper Adaptor Type
No Code: No Gripper Adaptor

HAE



HFE (excluding ϕ8)
HFE-L : Large Diameter Type
(ϕ16 only)

●Detailed specifications→P.28～29

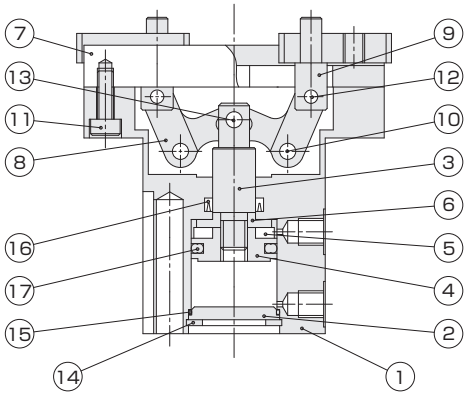
●Switch Type No Code: No Switch

ZE135	ES13
2 Wire System Solid State Switch, Straight Type	
ZE155	ES(P)15
3 Wire System Solid State Switch, Straight Type	

ZE235	ES23
2 Wire System Solid State Switch, L-shaped	
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	Action Lever	Carbon Steel
9	Knuckle	Stainless Steel
10	Fulcrum Pin	Carbon Tool Steel
11	Hexagon Socket Head Bolt	Stainless Steel
12	Press Fit Pin	Carbon Tool Steel
13	Press Fit Pin	Carbon Tool Steel
14	Hole Locating Snap Ring	Carbon Tool Steel
15	O Ring	NBR
16	Rod Packing	NBR
17	Piston Packing	NBR

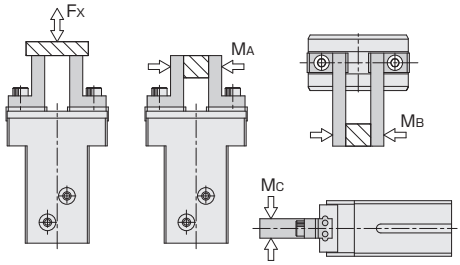
Specifications

Fluid		Air
Maximum Operating Pressure	[MPa]	0.7
Proof Pressure	[MPa]	1.05
Operating Temperature	[℃]	0~60 (No Freezing)
Lubrication		Not Required (Required for sliding parts of the machine) Only ϕ8 required
Pipe Bore		M3×0.5 (HP04L-8, HP04L-10) M5×0.8 (HP04L-16, HP04L-20)
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	HP04L-8C	8	0.22	8	5.8	9.9	13×26×32	27
	HP04L-10C	10	0.2	12	10	15.6	20×45×49	90
	HP04L-16C	16	0.12	16	26	39	25×56×56	168
	HP04L-20C	20	0.1	22	45	60	32×73×73	368

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

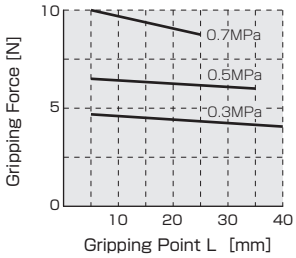


Load and Moment / Model	Fx [N]	MA [N·m]	MB [N·m]	MC [N·m]
HP04L-8	12	0.04	0.04	0.08
HP04L-10	50	0.4	0.4	0.8
HP04L-16	120	1	1	2
HP04L-20	200	1.5	1.5	3

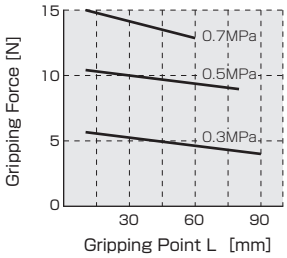
Effective Gripping Force

Closing Force (Double Acting Type)

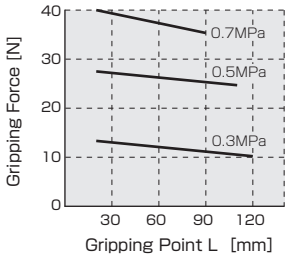
HP04L-8C



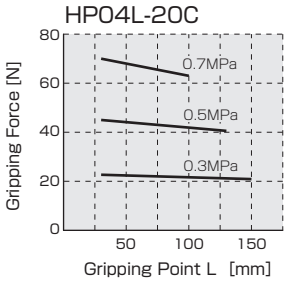
HP04L-10C



HP04L-16C

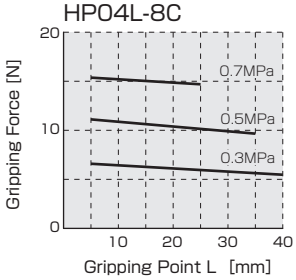


HP04L-20C

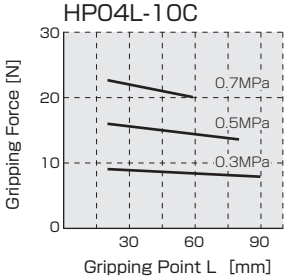


Opening Force (Double Acting Type)

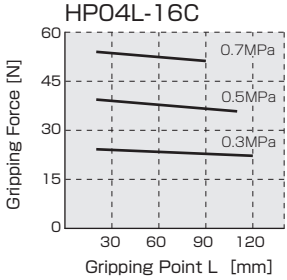
HP04L-8C



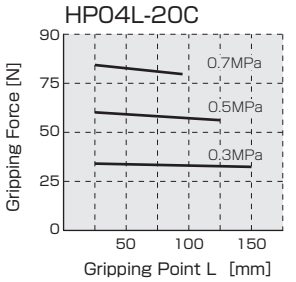
HP04L-10C



HP04L-16C

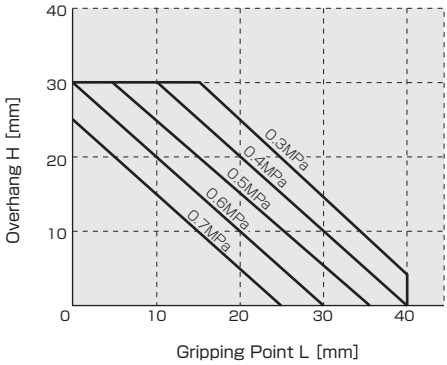


HP04L-20C

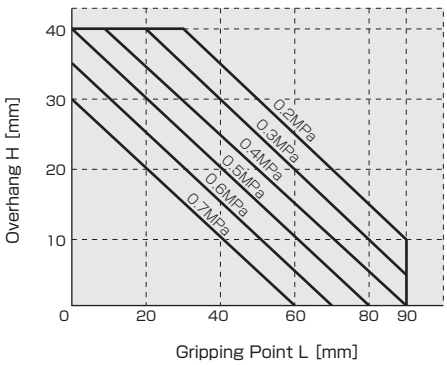


Gripping Point Limit Range

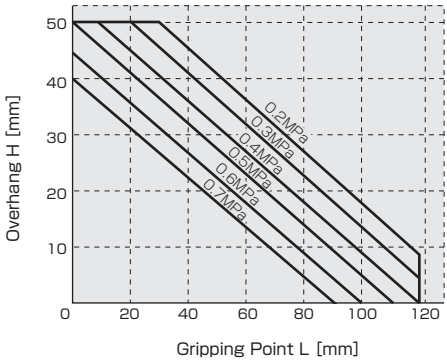
HP04L-8



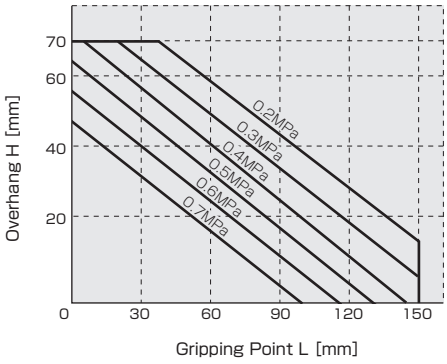
HP04L-10



HP04L-16

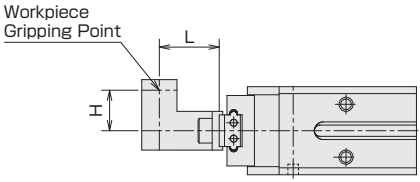


HP04L-20



●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 above drawing (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

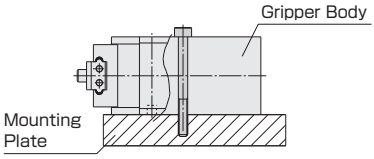
It shall be 5 to 10% of the effective gripping force or any value less than that although it differs depending on the coefficient of friction between the attachment and the workpiece and the shape. It shall be greater than that when great acceleration or impact is applied during workpiece transportation.

Main Body Mounting Method

Mounting Example

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

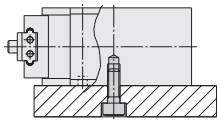
(Switch not mountable for ϕ10, ϕ16 and ϕ20)



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ8	M3×0.5	0.59
ϕ10	M3×0.5	0.59
ϕ16	M3×0.5	0.59
ϕ20	M4×0.7	1.37

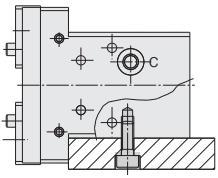
2 When the screw on the back face of the main body is used

(Excluding ϕ8)



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ10	M4×0.7	1.37
ϕ16	M4×0.7	1.37
ϕ20	M5×0.8	2.84

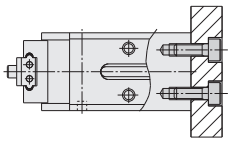
3 When the screw on the side of the main body is used



Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ8	M3×0.5	0.59
ϕ10	M3×0.5	0.59
ϕ16	M4×0.7	1.37
ϕ20	M5×0.8	2.84

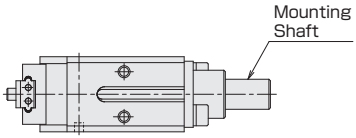
4 When the screw on the bottom face of the main body is used

(Only ϕ8 requires a space such as a relief because the switch protrudes.)

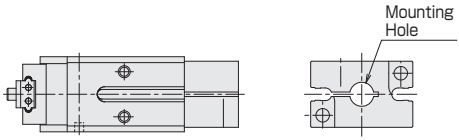


Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ8	M2.5×0.4	0.34
ϕ10	M3×0.5	0.59
ϕ16	M4×0.7	1.37
ϕ20	M5×0.8	2.84

5 When a gripper adaptor is used for mounting



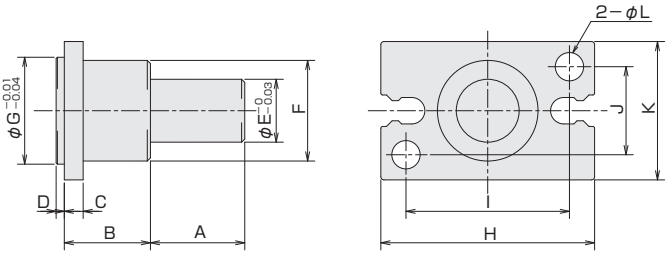
HAE Type



HFE, HFE-L Type (Excluding ϕ8)

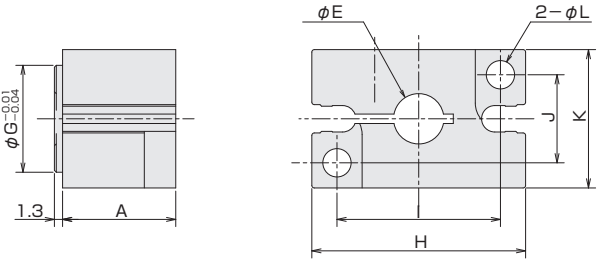
Outline Dimensional Drawing of Gripper Adaptor

HAE Type



Code / Type	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	M2.5×0.45×6L	6
HAE-10	15	15	3	1.3	10	11	11	23	17	10	16	3.4	M3×0.5×8L	11
HAE-16	15	15	3	1.3	10	16	17	34	26	14	22	4.5	M4×0.7×10L	20
HAE-20	15	15	3	1.3	10	18	21	45	35	16	26	5.5	M5×0.8×10L	28

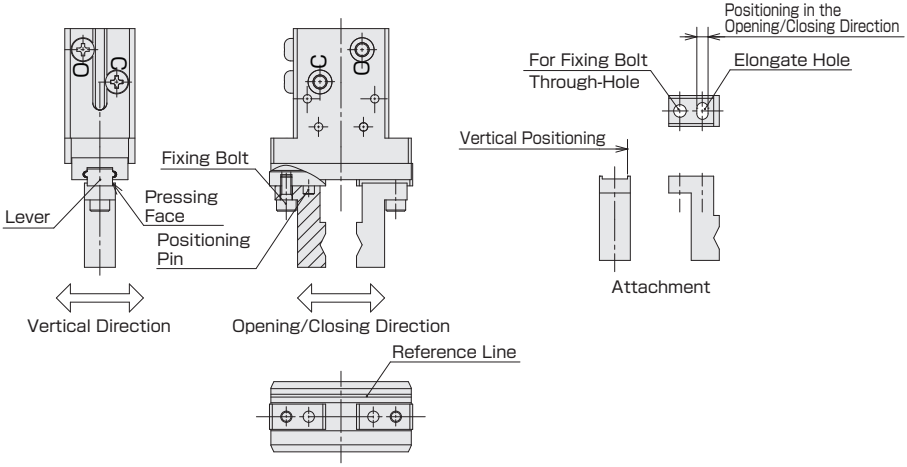
HFE Type



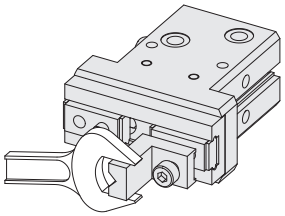
Code / Type	A	E	G	H	I	J	K	L	Ancillary Bolt (x3)		Product Mass[g] (Including Bolts)
									Gripper Mounting (x2)	Adapter Fixing (x1)	
HFE-10	15	6	11	23	17	10	16	3.4	M3×0.5×16L	M3×0.5×12L	14
HFE-16	18	8	17	34	26	14	22	4.5	M4×0.7×20L	M4×0.7×16L	35
HFE-16L	18	10	17	34	26	14	22	4.5	M4×0.7×20L	M4×0.7×16L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

■Attachment Design Method

Example of Attachment Design



Attachment Mounting Method

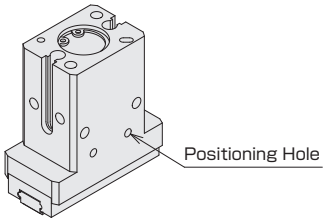


When you mount the attachment, hold the attachment with a spanner or the like to remove load to the lever.

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

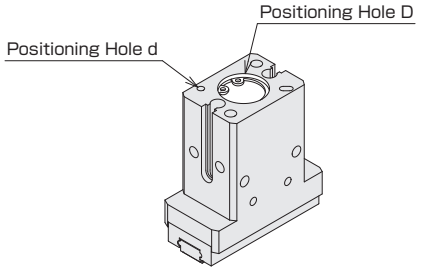
Positioning Hole

Positioning Hole for Mounting Examples 1 and 2 (P.28)



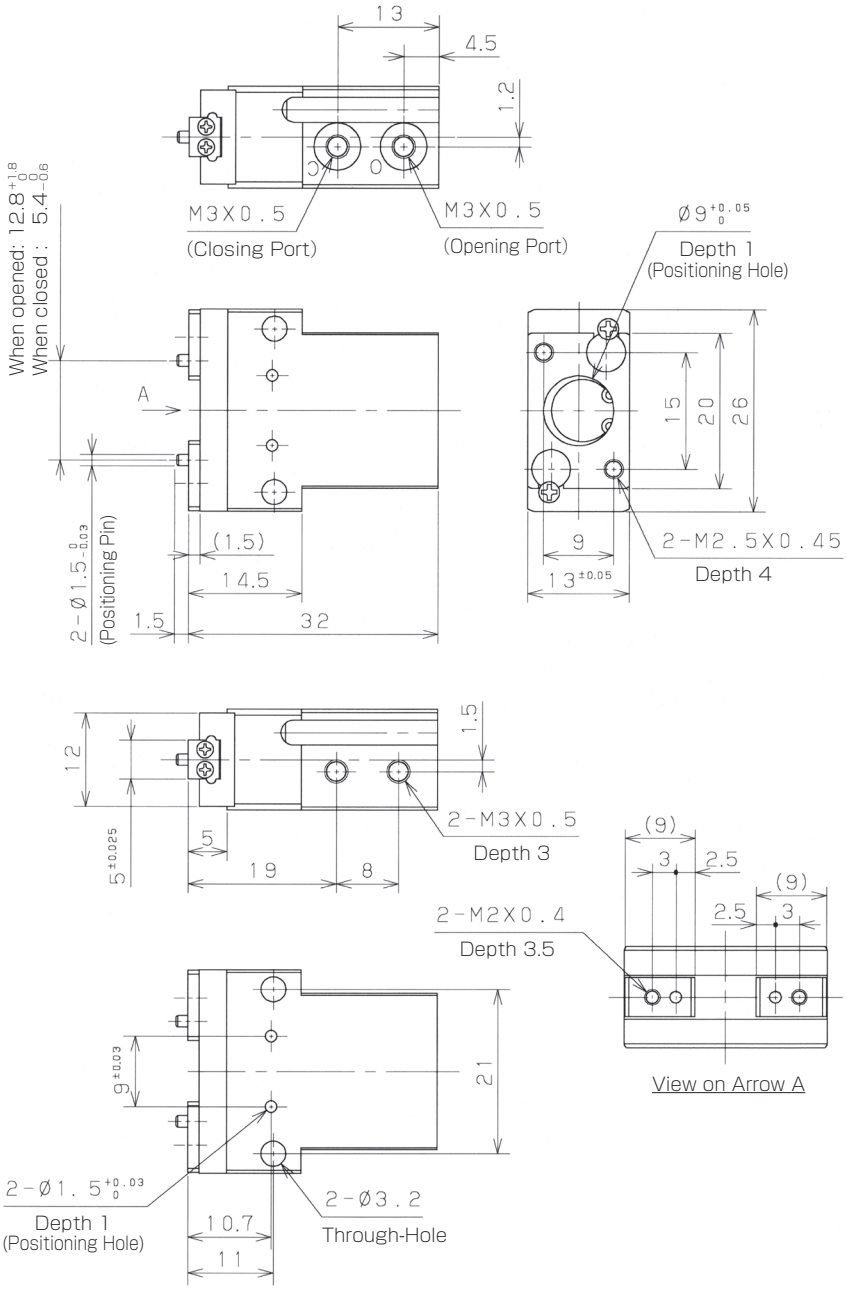
Model	Positioning Hole
ϕ8	$\phi 1.5^{+0.02}_{0}$ depth 1
ϕ10	$\phi 2.5^{+0.02}_{0}$ depth 2.5
ϕ16	$\phi 3^{+0.02}_{0}$ depth 3
ϕ20	$\phi 4^{+0.02}_{0}$ depth 3.5

Positioning Hole for Mounting Examples 4 (P.28)



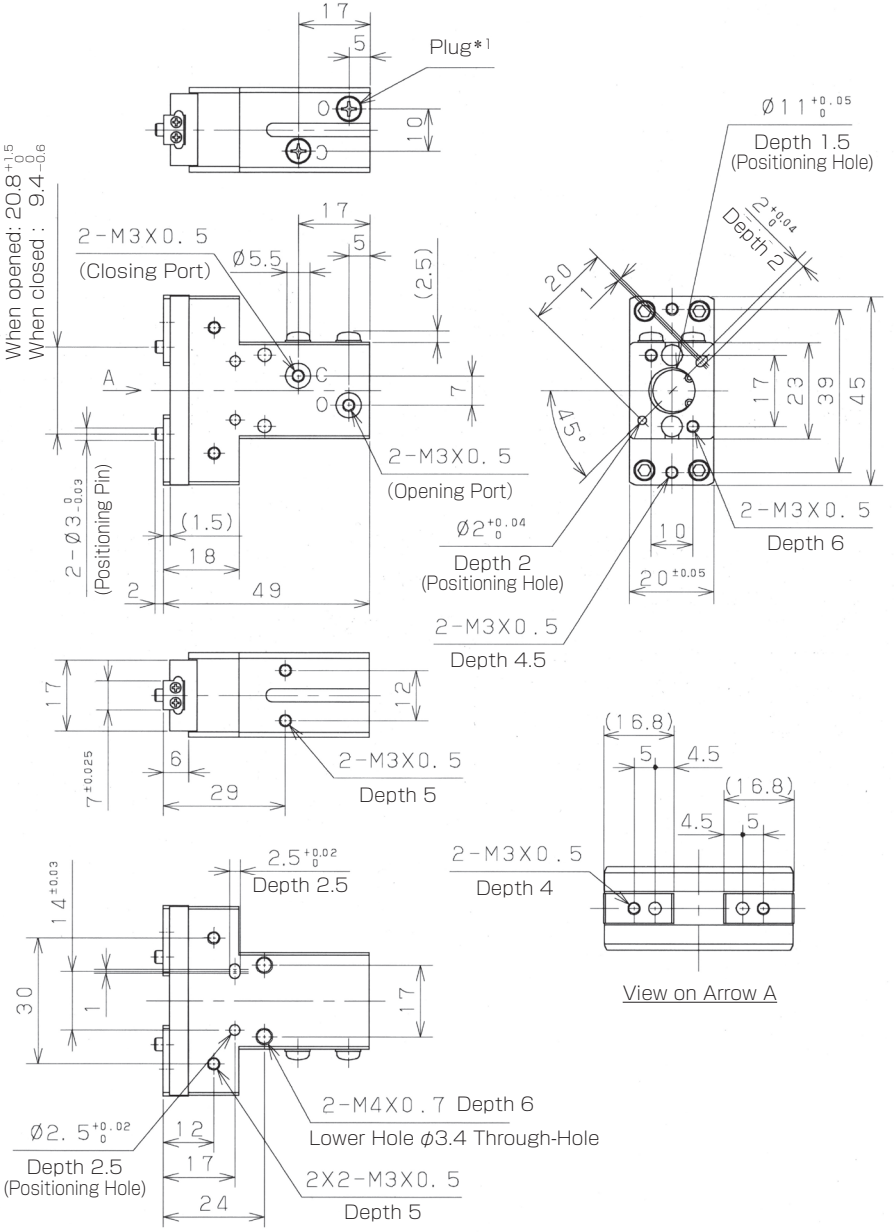
Model	Positioning Hole D	Positioning Hole d
ϕ8	$\phi 9^{+0.05}_{0}$ depth 1.5	—
ϕ10	$\phi 11^{+0.05}_{0}$ depth 1.5	$\phi 2^{+0.04}_{0}$ depth 2
ϕ16	$\phi 17^{+0.05}_{0}$ depth 1.5	$\phi 2.5^{+0.04}_{0}$ depth 3
ϕ20	$\phi 21^{+0.05}_{0}$ depth 1.5	$\phi 3^{+0.04}_{0}$ depth 3

■Dimensions HP04L-8C



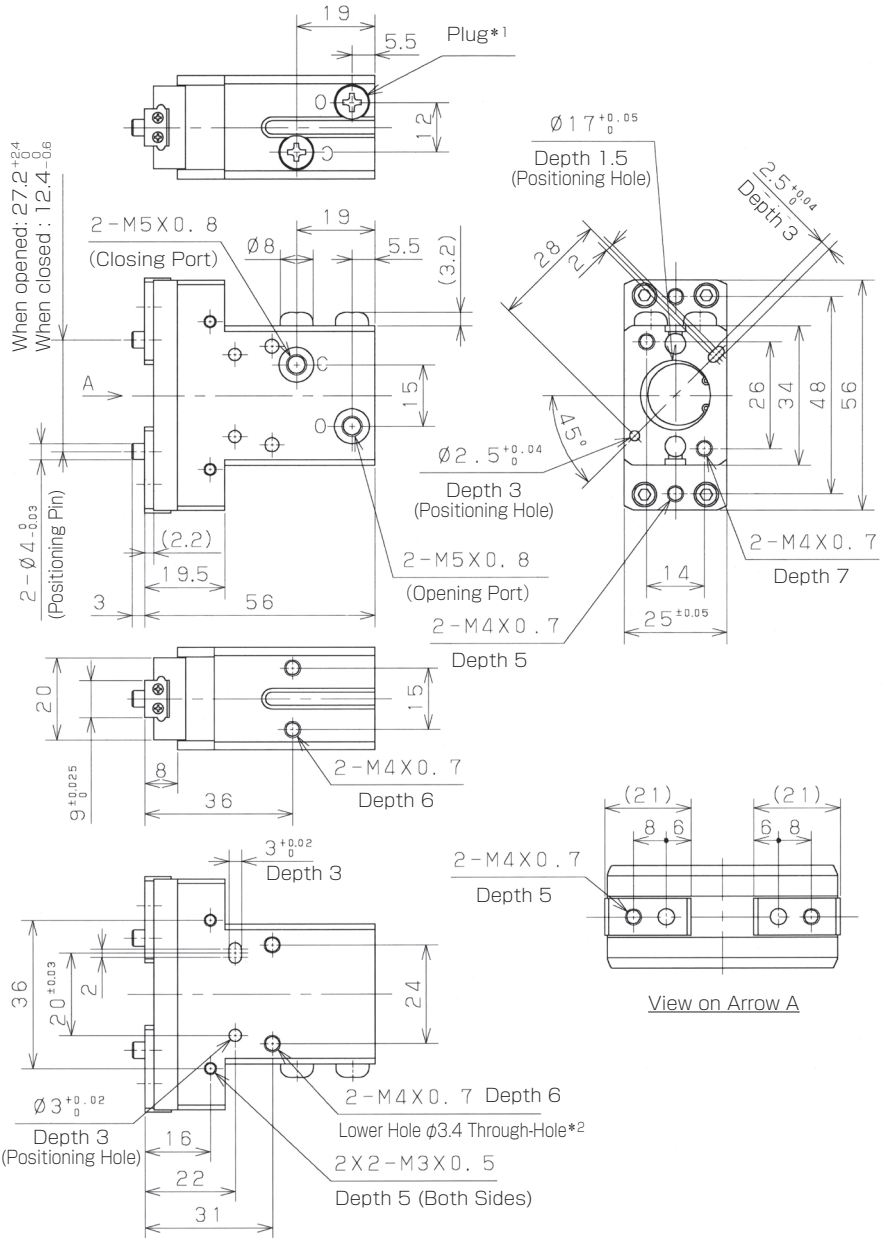
CAD data provided

Dimensions HP04L-10C



*1) Two faces have an air port. Select the one you use according to the mounting condition.
*2) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

Dimensions HP04L-16C

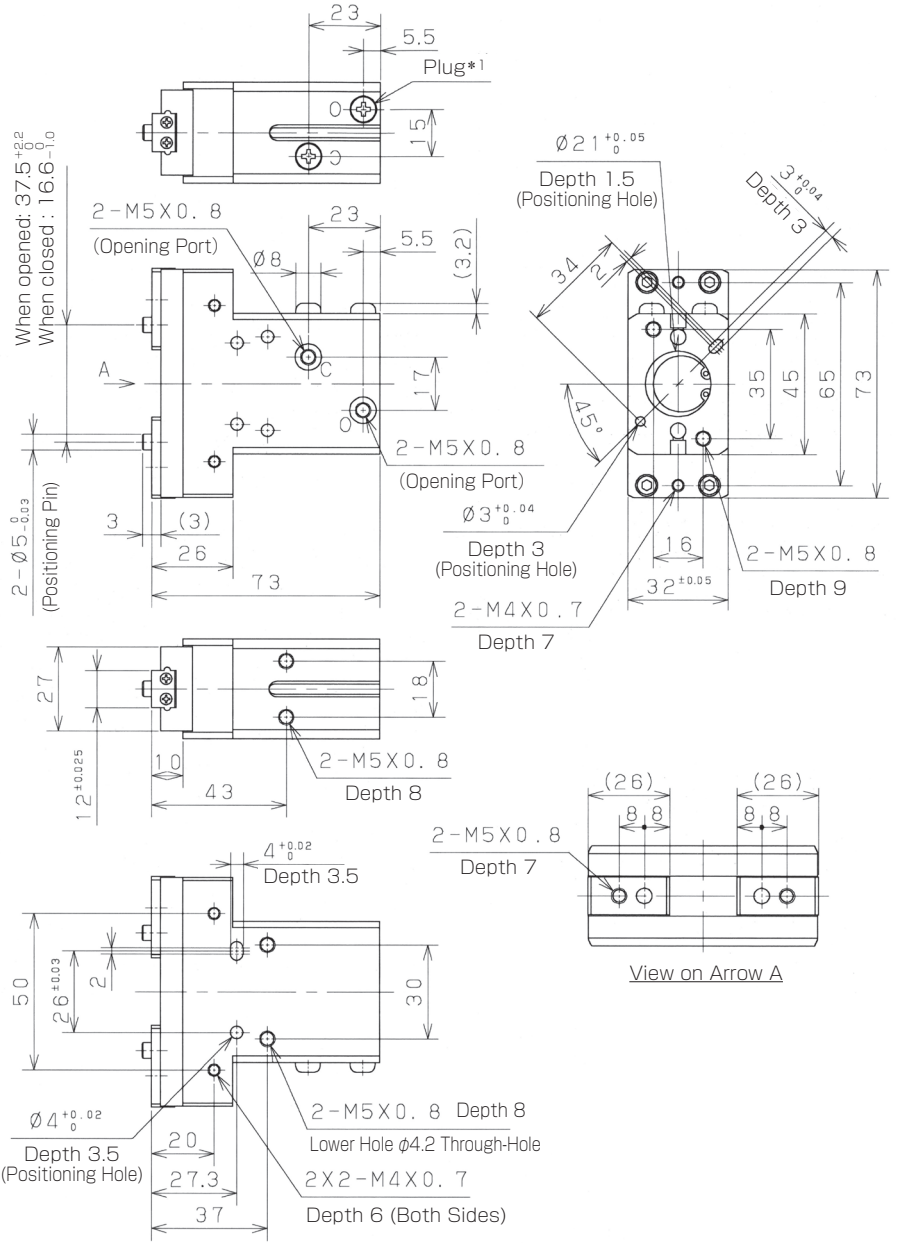


*1) Two faces have an air port. Select the one you use according to the mounting condition.
*2) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

HP04L Series

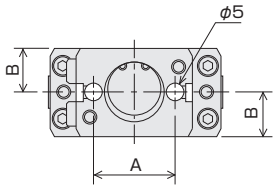
CAD data provided

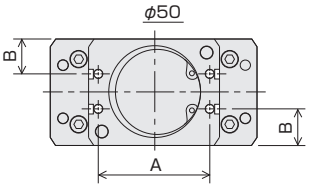
Dimensions HP04L-20C



∗1) Two faces have an air port. Select the one you use according to the mounting condition.
∗2) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

Switch Groove Dimensions

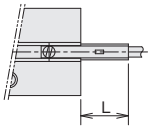




Code \ Size	8	10	16	20
A	15	17	24	30
B	3	10	12.5	16

Switch Protrusion Distance

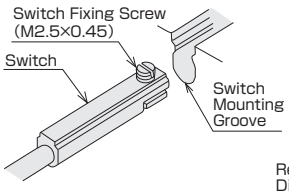
The maximum switch protrusion from the switch body end face (when the levers are full closed) is shown in the table below. Use it as a guide for mounting.



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

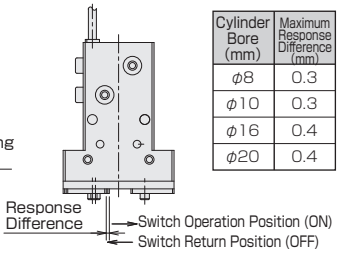
Switch Mounting

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

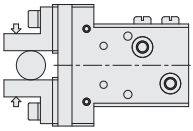
The distance from the position where the levers move and the switch turns on to the position where the levers move in the reverse direction and the switch turns off is called "response difference".



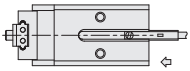
Cylinder Bore (mm)	Maximum Response Difference (mm)
ϕ8	0.3
ϕ10	0.3
ϕ16	0.4
ϕ20	0.4

Switch Mounting Position Adjustment Method

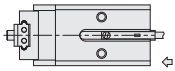
For external gripping



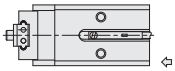
①Check the workpiece external gripping and full close.



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

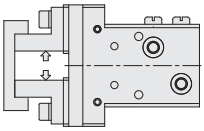


③The LED lamp lights up by turning on the switch in the arrow direction.

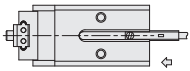


④Fix the switch by a switch fixing screw at the position where the switch is moved 0.6 mm in the arrow direction from the position where the lamp lights up in [3].

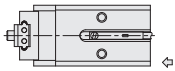
For internal gripping



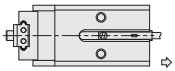
①Check the workpiece internal gripping and full opening.



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



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



④Fix 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].

①Indicates 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.