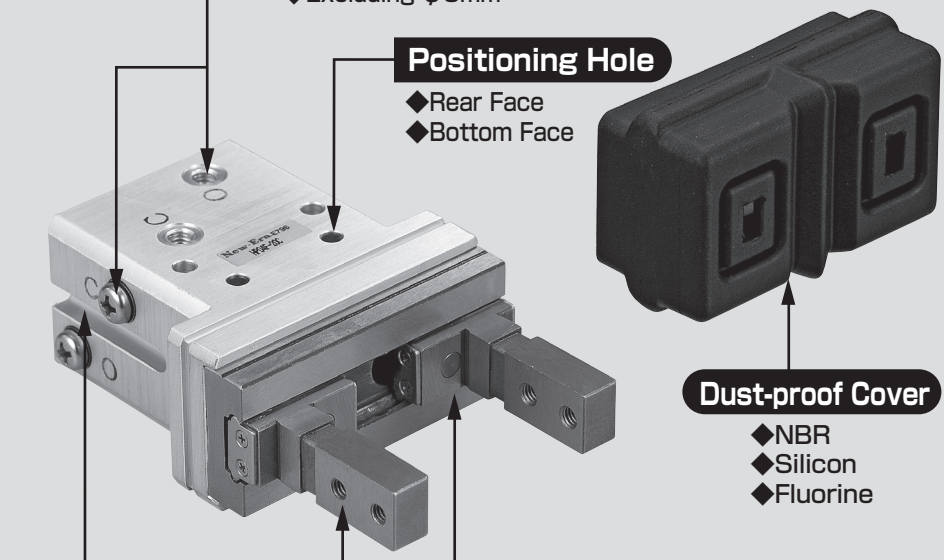
Parallel Linear Gripper (Dust-proof Cover Mount Type)

HP04F Series (Old Type HP11)

Finger(Long Attachment)Type

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

Long Life



Piping Port on 2 faces
◆Excluding ϕ8mm

Positioning Hole
◆Rear Face
◆Bottom Face

Dust-proof Cover
◆NBR
◆Silicon
◆Fluorine

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.

Excellent CENTERING Accuracy

◆±0.07mm or less

HP04F Series (Old Type HP11)

Model Code No.

HP04F – 10 C ※ JN – HAE – ZE135 A 2

Series Name

Bore Size
8: 8mm
10:10mm
16:16mm
20:20mm

Action Type
A : Single Acting Normally Open
C : Double Acting

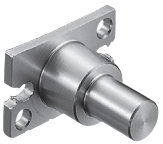
Dust-proof Cover Type
No Code: No Cover
JN: With NBR Rubber Cover
JS: With Silicon Rubber Cover
JF: With Fluorine Rubber Cover

Number of Switches
1:1 Switch
2:2 Switches

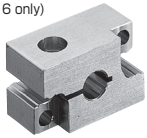
Switch Lead Wire Length
A:1m
B:3m

●Gripper Adaptor Type
No Code: No Gripper Adaptor

HAE



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



●Detailed specifications→P.42～43

●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

●Dust-proof Cover Set

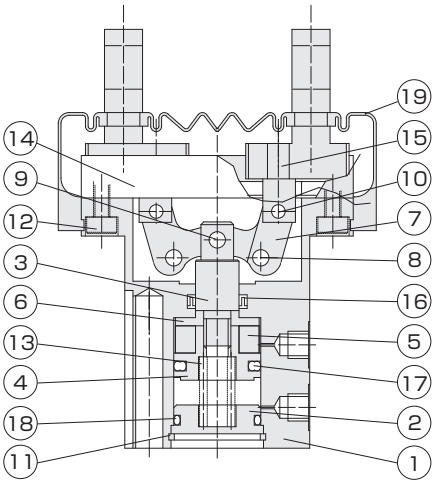
Model Code No. **JS – 04F 16**

Material
JN: With NBR Rubber Cover
JS: With Silicon Rubber Cover
JF: With Fluorine Rubber Cover

Series Name
04F

Size
08: ϕ 8
10: ϕ10
16: ϕ16
20: ϕ20

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	Action Lever	Carbon Steel
8	Fulcrum Pin	Carbon Tool Steel
9	Press Fit Pin	Carbon Tool Steel
10	Press Fit Pin	Carbon Tool Steel
11	Hole Locating Snap Ring	Carbon Tool Steel
12	Hexagon Socket Head Bolt	Stainless Steel
13	Spring	Piano Wire (Single Acting only)
14	Linear Guide	Bearing Steel
15	Knuckle	Stainless Steel
16	Rod Packing	NBR
17	Piston Packing	NBR
18	O Ring	NBR
19	Dust-proof Cover	NBR
		Silicon
		Fluorine

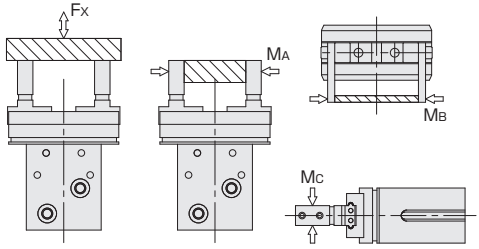
Specifications

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(HP04F-8, HP04F-10) M5×0.8(HP04F-16, HP04F-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]	
			Without dust-proof cover	With dust-proof cover		Close	Open		Without dust-proof cover	With dust-proof cover
Double Acting	HP04F-8C	8	0.22	0.3	4	5.8	9.9	13×20×44	27	JN:28.5、JS:28.5、JF:29
	HP04F-10C	10	0.2	0.25	6.5	10	15.6	20×36×67.5	90	JN:94.5、JS:94、JF:96.5
	HP04F-16C	16	0.12	0.15	10	26	39	25×50×77	180	JN:186.5、JS:186、JF:189
	HP04F-20C	20	0.1	0.15	14	45	60	32×62×97	370	JN:382.5、JS:380、JF:388.5
Single Acting Normally Open	HP04F-8A	8	0.4	0.5	4	4.1	1.3	13×20×44	28	JN:29.5、JS:29.5、JF:30
	HP04F-10A	10	0.35	0.4	6.5	6.8	2.4	20×36×67.5	91	JN:95.5、JS:95、JF:97.5
	HP04F-16A	16	0.25	0.3	10	20	5.4	25×50×77	181	JN:187.5、JS:187、JF:190
	HP04F-20A	20	0.25	0.3	14	34	7.3	32×62×97	371	JN:383.5、JS:381、JF:389.5

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



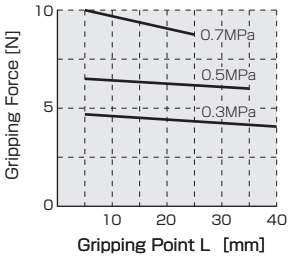
Load and Moment / Model	Fx [N]	MA [N·m]	MB [N·m]	Mc [N·m]
HP04F-8	12	0.04	0.04	0.08
HP04F-10	50	0.4	0.4	0.8
HP04F-16	120	1	1	2
HP04F-20	200	1.5	1.5	3

HP04F Series (Old Type HP11)

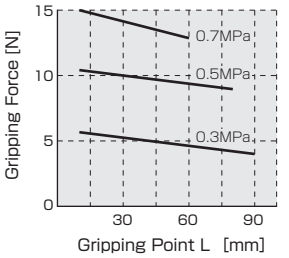
Effective Gripping Force

Closing Force (Double Acting Type)

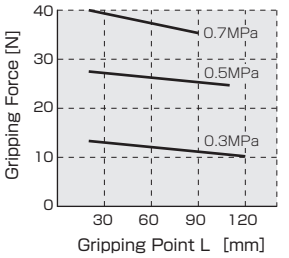
HP04F-8C



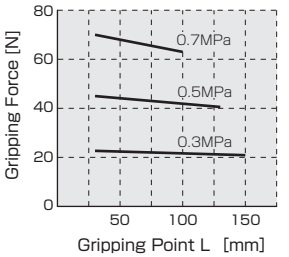
HP04F-10C



HP04F-16C

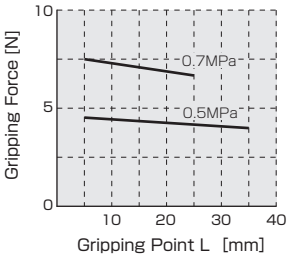


HP04F-20C

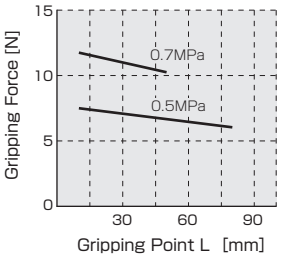


Closing Force (Single Acting Type)

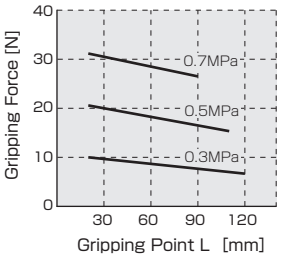
HP04F-8A



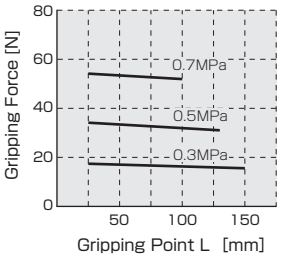
HP04F-10A



HP04F-16A

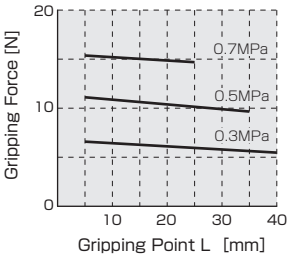


HP04F-20A

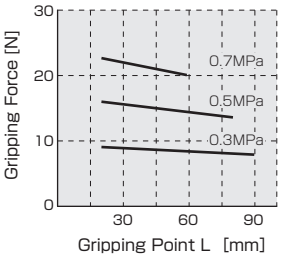


Opening Force (Double Acting Type)

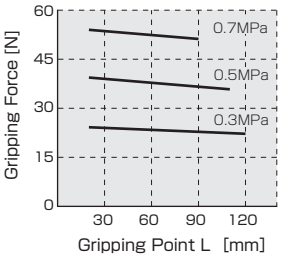
HP04F-8C



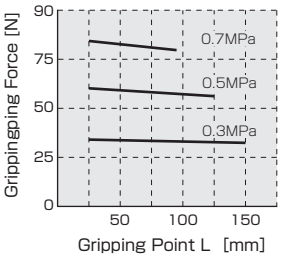
HP04F-10C



HP04F-16C

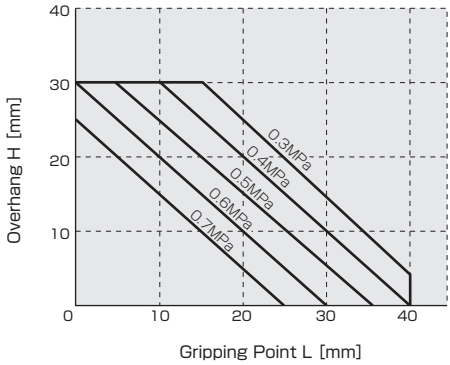


HP04F-20C

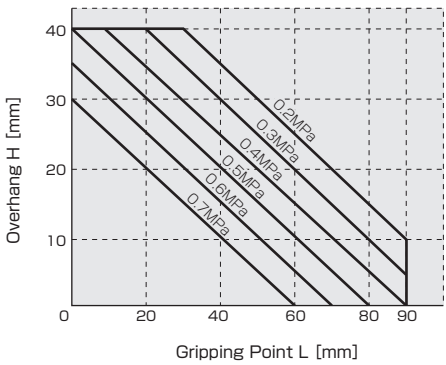


■Gripping Point Limit Range

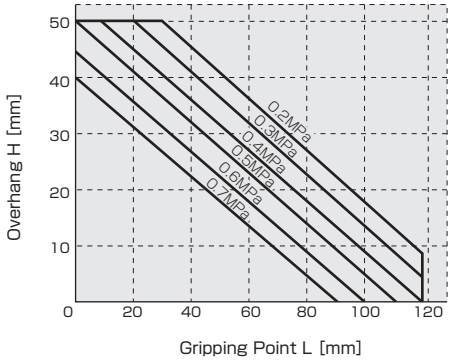
HP04F-8



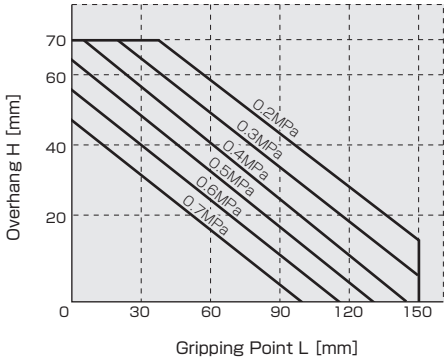
HP04F-10



HP04F-16



HP04F-20

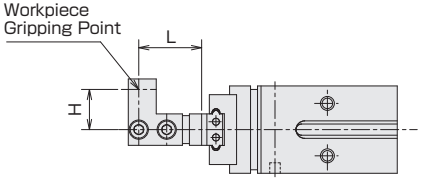


●Mounting of the attachment

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.

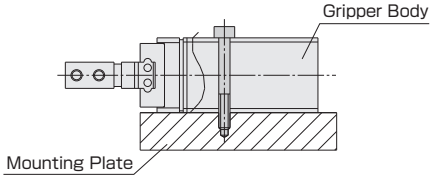


Main Body Mounting Method

Mounting Example

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

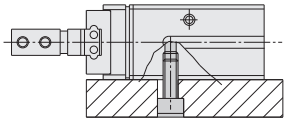
(Switch not mountable for ϕ10, ϕ16 and ϕ20)



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

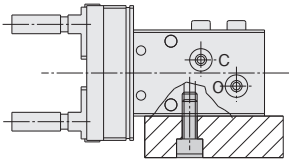
2 When the screw on the back face of the main body is used

(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

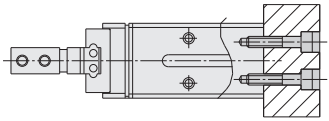
3 When the screw on the side of the main body is used



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

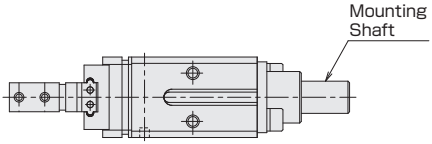
4 When the screw on the bottom face of the main body is used

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

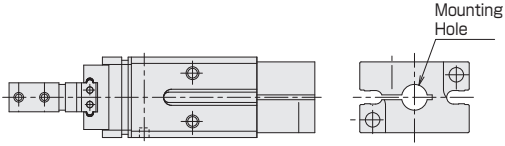


Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ8	M2.5×0.4	0.34
ϕ10	M3×0.5	0.59
ϕ16	M4×0.7	1.37
ϕ20	M5×0.8	2.84

5 When a gripper adaptor is used for mounting



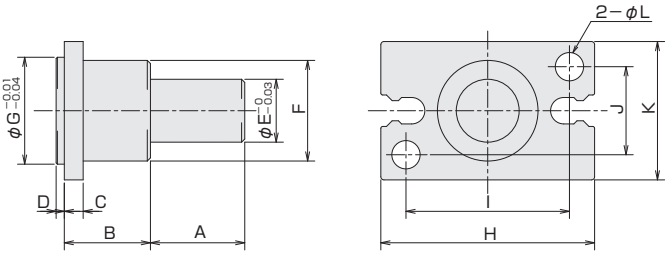
HAE Type



HFE, HFE-L Type (Excluding ϕ8)

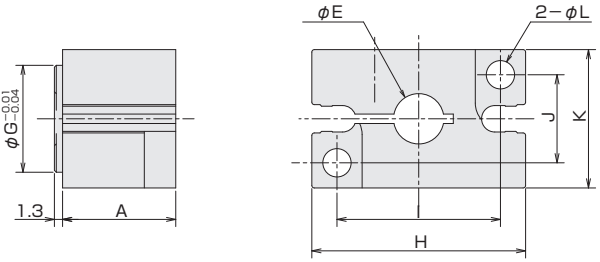
Outline Dimensional Drawing of Gripper Adaptor

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

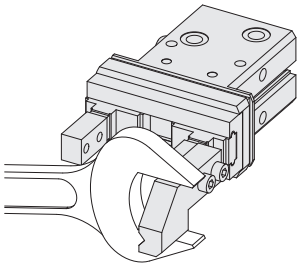
HFE Type



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

Attachment Mounting Method

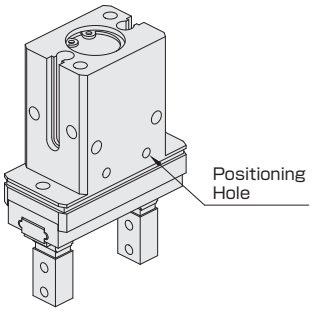


When you mount the attachment, hold the attachment with a spanner or the like to remove load to the lever.

Model	Bolt to be Used	Maximum Tightening Torque[N·m]
ϕ8	M2×0.4	0.315
ϕ10	M3×0.5	1.14
ϕ16	M3×0.5	1.14
ϕ20	M4×0.7	2.7

Positioning Hole

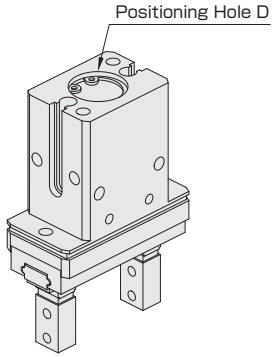
Positioning Hole for Mounting Examples 1 and 2 (P.42)



Use this positioning hole for Mounting Examples 1 and 2.

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

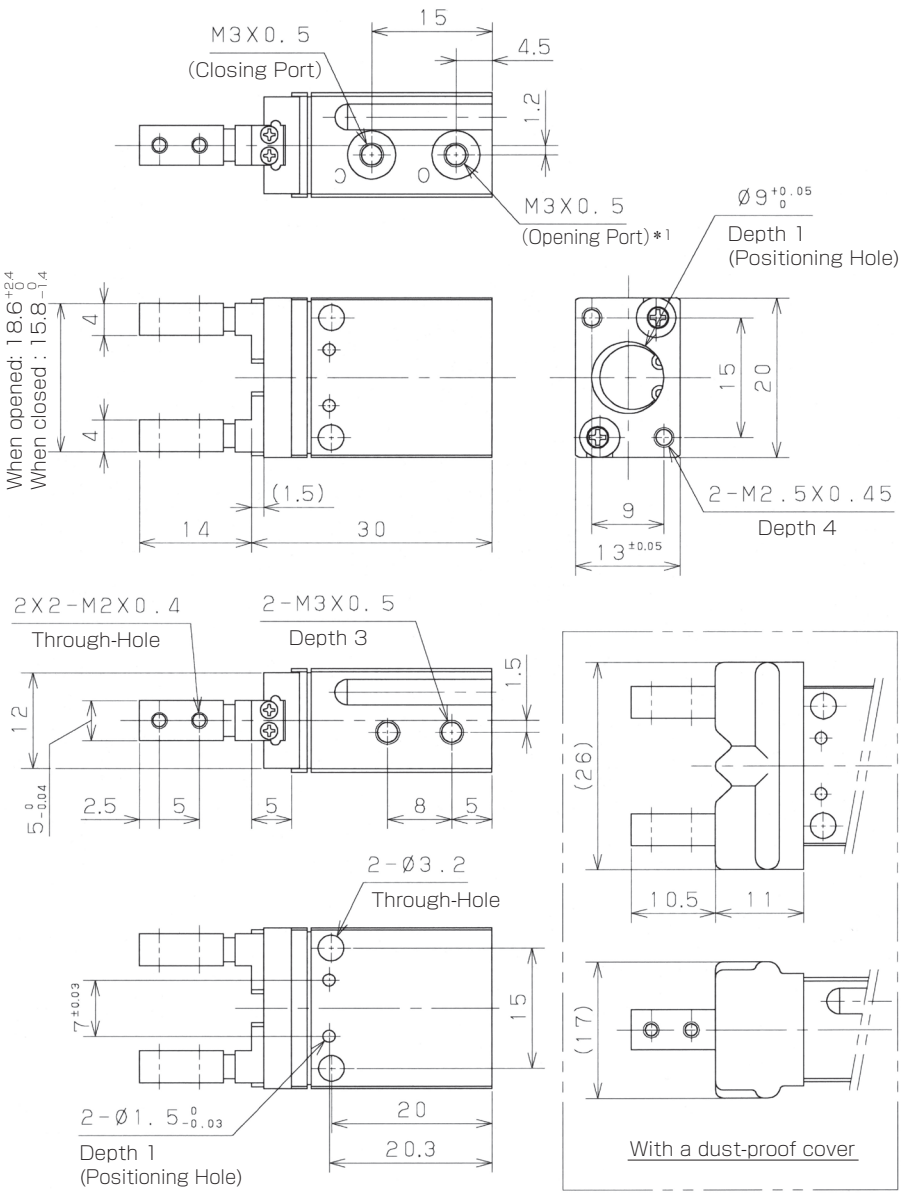
Positioning Hole for Mounting Examples 4 (P.42)



Use this positioning hole for Mounting Example 4.

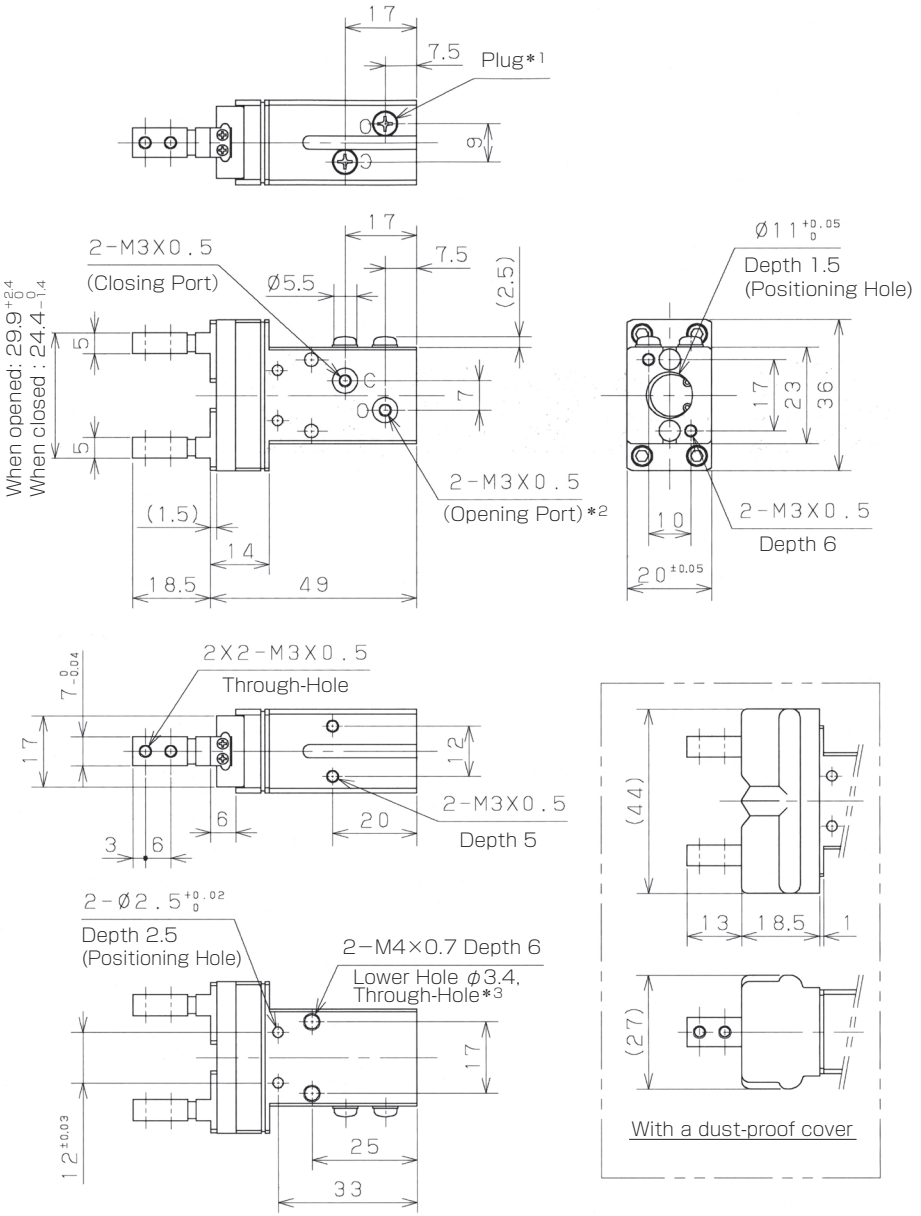
Model	Positioning Hole
ϕ8	$\phi 9^{+0.05}_{0}$ depth 1.5
ϕ10	$\phi 11^{+0.05}_{0}$ depth 1.5
ϕ16	$\phi 17^{+0.05}_{0}$ depth 1.5
ϕ20	$\phi 21^{+0.05}_{0}$ depth 1.5

Dimensions HP04F-8□



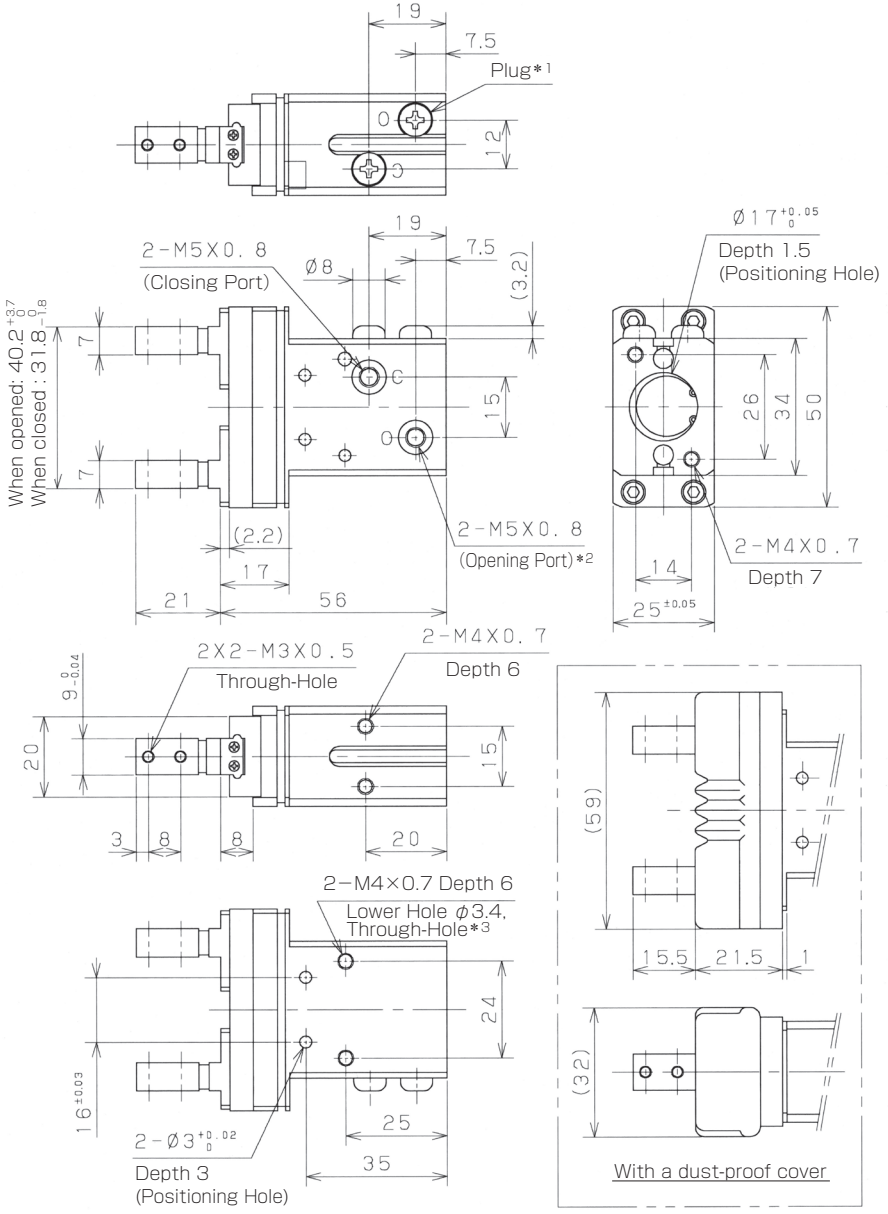
*1) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.

■Dimensions HP04F-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 HP04F-16□

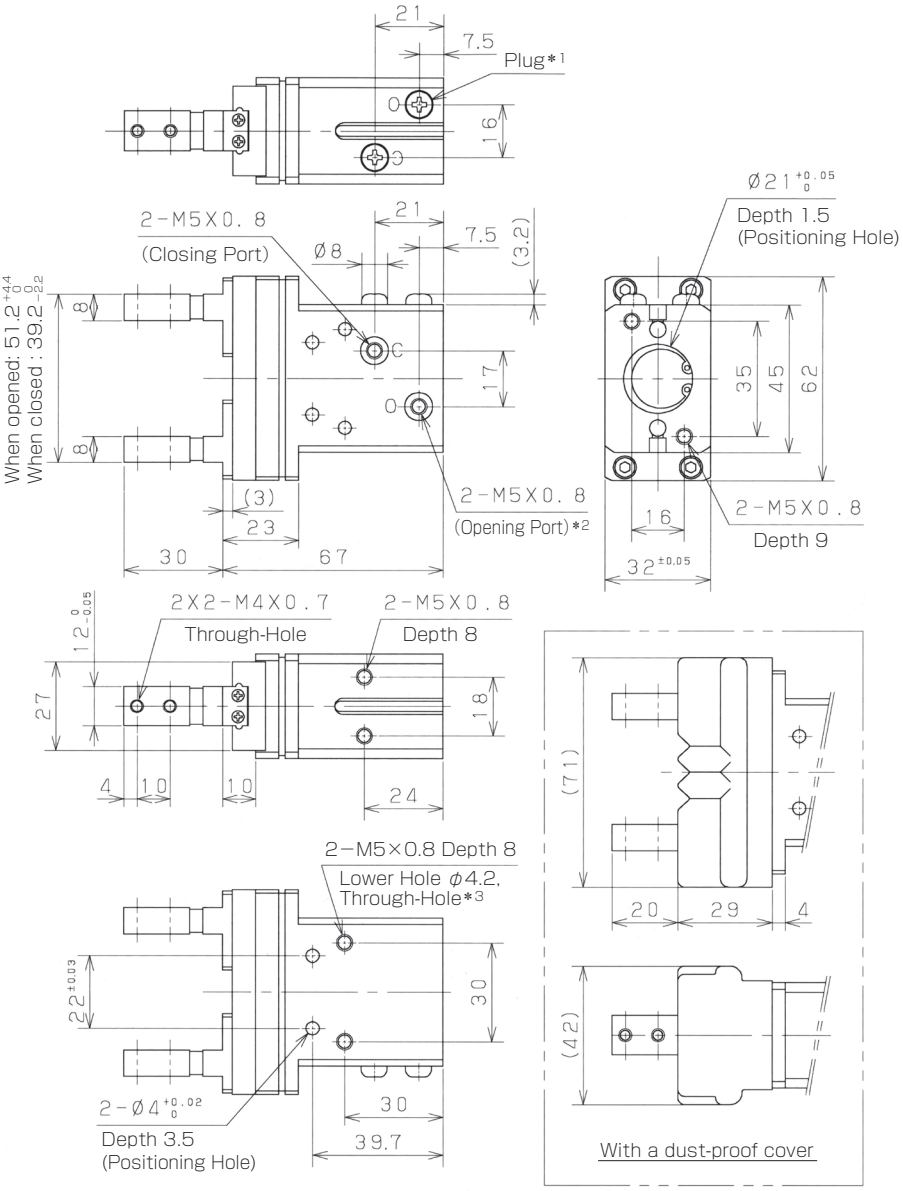


∗1) Two faces have an air port. Select the one you use according to the mounting condition.
∗2) For the single acting type, the opening port cannot be used because it is used for the exhaust plug.
∗3) Note that when the main body is mounted using the through-hole, you cannot mount the opening side sensor.

HP04F Series (Old Type HP11)

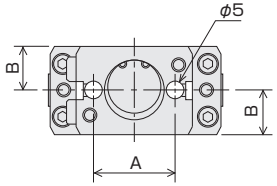
CAD data provided

■Dimensions HP04F-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.

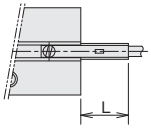
Switch Groove Dimensions



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

Switch Protrusion Distance

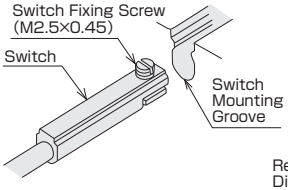
The maximum switch protrusion from the switch body end face (when the levers are full closed) is shown in the table below. Use it as a guide for mounting.



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

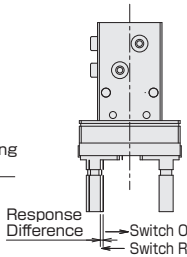
Switch Mounting

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

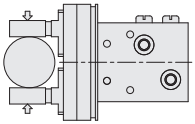
The distance from the position where the levers move and the switch turns on to the position where the levers move in the reverse direction and the switch turns off is called "response difference".



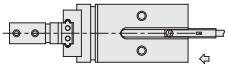
Cylinder Bore (mm)	Maximum Response Difference (mm)
ϕ8	0.3
ϕ10	0.3
ϕ16	0.4
ϕ20	0.4

Switch Mounting Position Adjustment Method

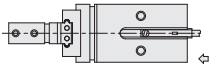
For external gripping



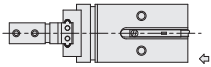
①Check the workpiece external gripping and full close.



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

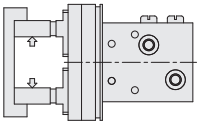


③The LED lamp lights up by turning on the switch in the arrow direction.

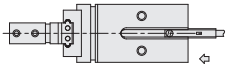


④Fix the switch by a switch fixing screw at the position where the switch is moved 0.6 mm in the arrow direction from the position where the lamp lights up in [3].

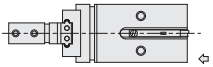
For internal gripping



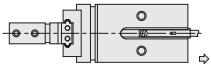
①Check the workpiece internal gripping and full opening.



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.