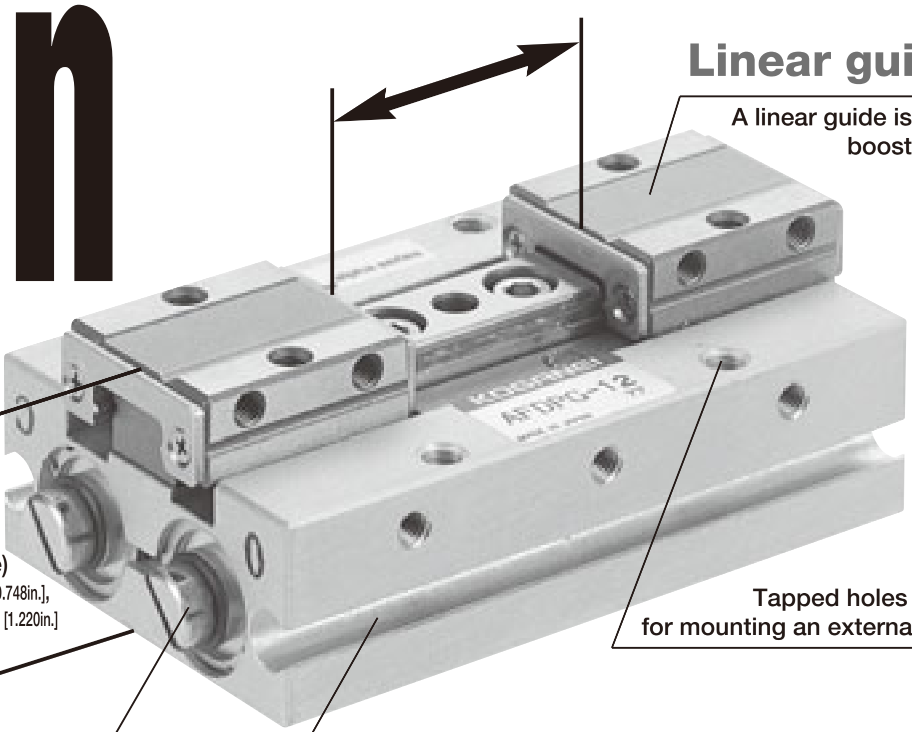
We have added high positioning accuracy and high rigidity to the pneumatic actuator.
The Koganei Alpha Series further enhances the actuator module concept,
supporting superior applications and labor savings in FA line design and manufacturing
with higher performance.

alpha series

FLAT TYPE AIR HANDS

Thin Long Stroke

φ6 [0.236in.]: 12mm [0.472in.], φ8 [0.315in.]: 16mm [0.630in.], φ12 [0.472in.]: 22mm [0.866in.], φ14 [0.551in.]: 30mm [1.181in.] and φ18 [0.709in.]: 40mm [1.575in.].
In addition, the φ14 [0.551in.] and φ18 [0.709in.] sizes include long stroke specifications of 60mm [2.362in.] (φ14 [0.551in.]) and 80mm [3.150in.] (φ18 [0.709in.]).



Linear guide

A linear guide is mounted for boosting precision and rigidity.

Thin design (Synchronous type)
φ6 [0.236in.]: 15mm [0.591in.], φ8 [0.315in.]: 19mm [0.748in.], φ12 [0.472in.]: 25mm [0.984in.], φ14 [0.551in.]: 31mm [1.220in.] and φ18 [0.709in.]: 37mm [1.457in.].

Tapped holes are provided for mounting an external sensor, etc.

Connection ports located on 2 surfaces.

Embedded type sensor switch

Lead wires can include either horizontal or vertical wire types.
(Sensor switch is optional.)

High gripping force

Double piston construction offers high gripping force, including φ6 [0.236in.]: 12N [2.7lbf.], φ8 [0.315in.]: 17N [3.8lbf.], φ12 [0.472in.]: 44N [9.9lbf.], φ14 [0.551in.]: 58N [13.0lbf.] and φ18 [0.709in.]: 105N [23.6lbf.].
(Under grip point length of 30mm [1.18in.] and operating pressure of 0.5MPa [73psi.])

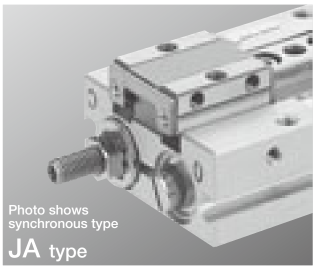
LINE UP
PRODUCTS

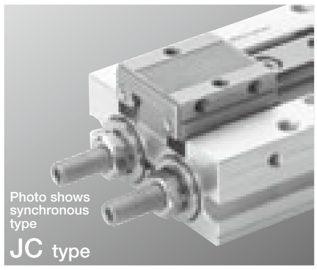
Cylinder bore size	Synchronous type	Asynchronous type	Long type
NEW 6mm [0.236in.]	●		
8mm [0.315in.]	●	●	
12mm [0.472in.]	●	●	
14mm [0.551in.]	●		●
18mm [0.709in.]	●		●

With stroke adjusting mechanism

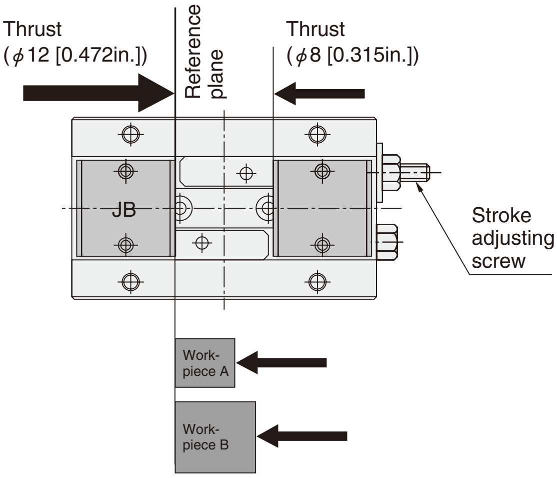
Options available for 6mm [0.236in.] (ϕ6 [0.236in.]), 8mm [0.315in.] (ϕ8 [0.315in.], ϕ12 [0.472in.]), and 15mm [0.591in.] (ϕ14 [0.551in.], ϕ18 [0.709in.]) in open side and closed side stroke adjustment types, and in an open/closed both-side stroke adjustment type.

Note: Asynchronous type is available as either open side or closed side stroke adjustment type only.





■Asynchronous type
(Diagram shows AFDPGH-8)



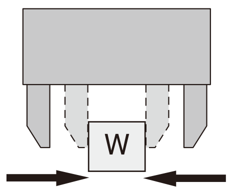
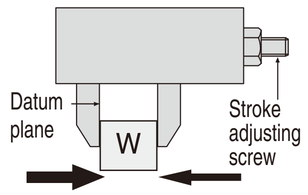
Workpiece location at time of gripping

Even if the size of the workpiece being gripped changes, the reference plane location does not change because the side surface of the workpiece is the locating reference.

Note: For operating principles, see p.1488.

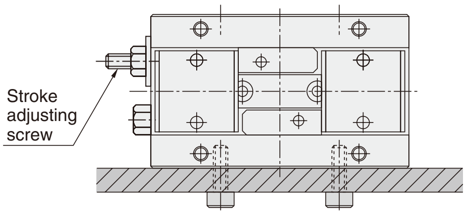
●Synchronous type and asynchronous type

The air hands (grippers) offer the more common synchronous type, and the asynchronous type. Fine stroke adjustment for the workpiece is also available. Because the asynchronous method involves making one side of the bore size of the finger larger to the other side, with that side as the reference plane and gripping is performed by moving the opposite side finger, this system is optimum for workpieces with side reference planes.

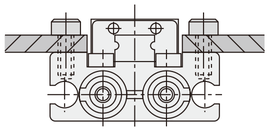
Synchronous type	Asynchronous type
	
The synchronous method is suitable for gripping workpieces with center line as reference.	The asynchronous method is suitable for gripping workpieces with side reference planes, or workpieces of indefinite shape.

■Body mounting examples

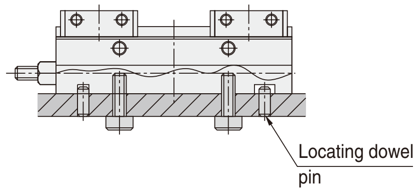
1. Using side mounting threads



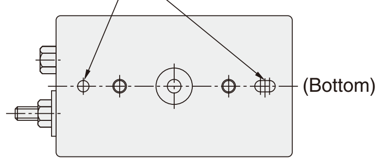
2. Using mounting threads on the top



3. Using mounting threads on the bottom



Locating pin hole: Can be used for location during mounting.



General precautions

Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the air hand (gripper) should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (with filtration of a minimum 40μm) near the air hand (gripper) or valve to remove collected liquid or dust. In addition, drain the air filter periodically.

Piping

Always thoroughly blow off (use compressed air) the tubing before connecting it to the air hand (gripper). Entering metal chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.

Lubrication

Cylinder portion
The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.
Lever slide portion
The product can be used without lubrication, if lithium-based grease or urea-based grease is applied, it will increase the product's operating life.

Atmosphere

Avoid use in locations subject to dripping water or oil, or to large amounts of dust.

Gripping

1. When attaching fingers on the levers, design them as short and as light as possible. If the fingers are longer and heavier, the impact force when opening and closing will increase and cause a decrease in the gripping accuracy and/or wear and damage to the sliding portion. Also, to prevent the workpiece from falling down or being damaged, and to reduce the metal contact noise when gripping, plastic or rubber materials should be attached to the fingers at the part of contact.
   In cases with long grip point length or high air pressure, there will be a large gripping moment exerted on the lever area that could result in damage to the lever. Always refer to the grip point limit range table, and use it within the allowed range.
2. When the lever opening and closing time is faster than necessary in relation to the workpieces, the impact force increases when opening and/or closing and causes a reduction in the gripping accuracy, and wear and damage of the sliding portion etc., therefore speed controllers should be installed and the workpiece should be gripped to make the impact as small as possible.
3. When moving the air gripper in straight lines or during circular actions, use a shock absorber etc., at the travel end to stop it as smoothly as possible. Sudden stops may cause the workpieces to jump out or fall from the gripper.

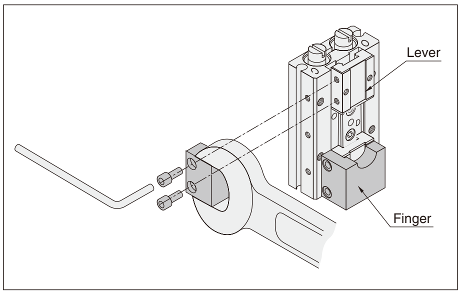
Workpiece

1. Set the mass of the workpiece actually gripped to about 1/10～1/20 of the effective gripping force.
2. Set the workpiece mass to about 1/30～1/50 of the effective gripping force when you move the air gripper while holding the workpiece.
3. As the workpiece mass which can be gripped changes greatly depending on the material and shape of the fingers, the condition of the surface being gripped and the moving speed of the workpiece, etc., and the values in the specifications and graphs should be used for reference only.

Mounting

Mounting

1. Never attempt to convert or disassemble the main body. It could result in breakdowns or accidents.
2. Take care to avoid being pinched hands or fingers in the lever during mounting or operation.
3. Shut off the air supply before mounting the finger or hand (gripper).
4. When mounting the finger to the lever, use a wrench etc., for hold to avoid subjecting the lever to apply more than the allowable moment. Tighten the mounting bolts to the tightening torques shown in the table below.

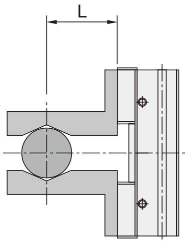


Model	Bolt	Maximum tightening torque N・m [in・lbf]
AFDPG-6-□	M2×0.4	0.15 [1.33]
AFDPG(H)-8-□	M2.5×0.45	0.32 [2.83]
AFDPG(H)-12-□	M3×0.5	0.6 [5.3]
AFDPG(L)-14-□	M3×0.5	0.6 [5.3]
AFDPG(L)-18-□	M3×0.5	0.6 [5.3]

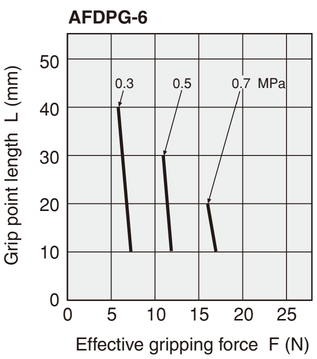
Caution: Side surface mounting on the lever is not available for ϕ14 and ϕ18.

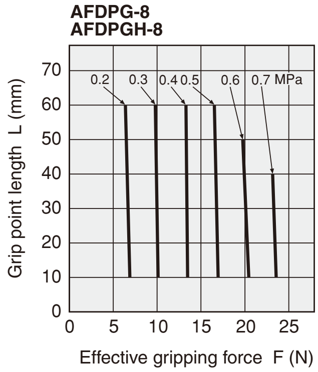
Selection

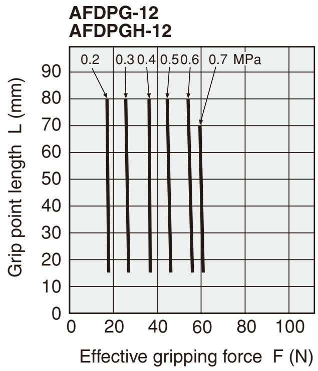
Effective gripping force

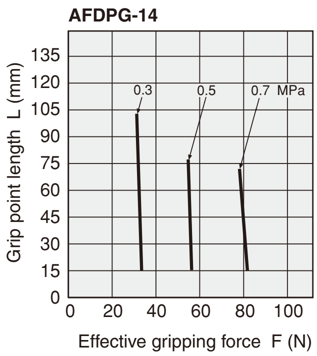


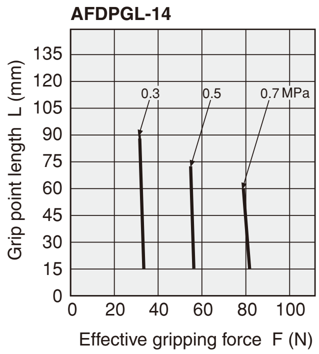
Note: Gripping force is the same for both the open and closed sides.

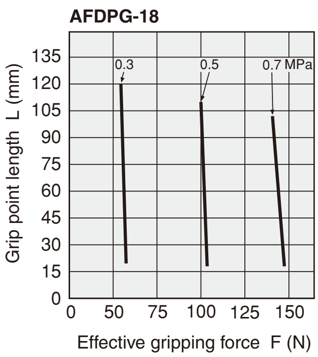


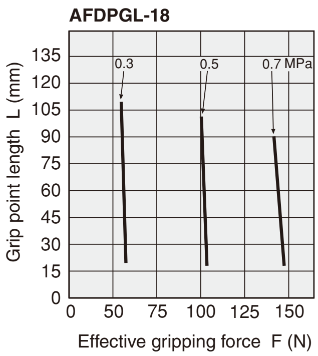








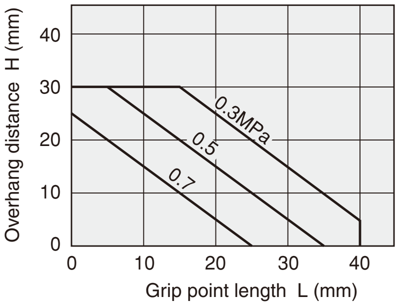




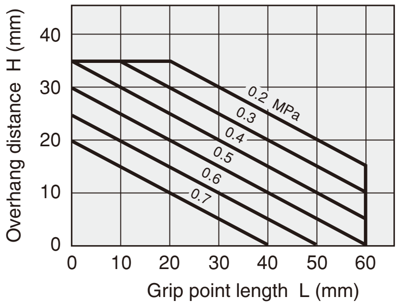
1mm = 0.0394in., 1N = 0.2248lbf.
1MPa = 145psi.

Grip point limit range

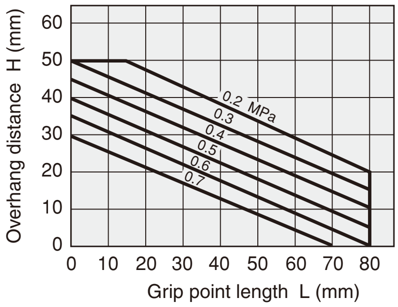
AFDPG-6

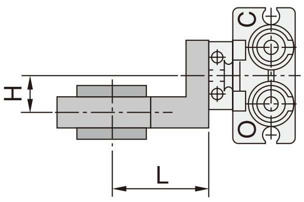


AFDPG-8
AFDPGH-8



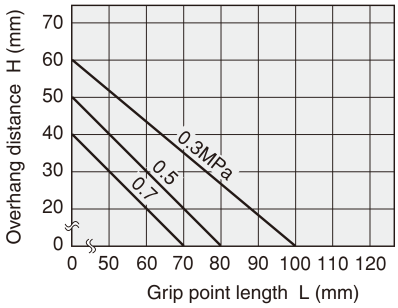
AFDPG-12
AFDPGH-12



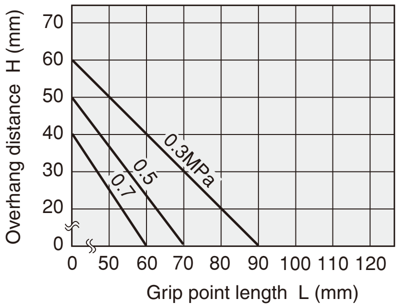


H = Overhang distance
L = Grip point length

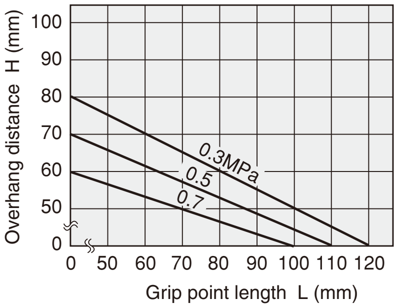
AFDPG-14



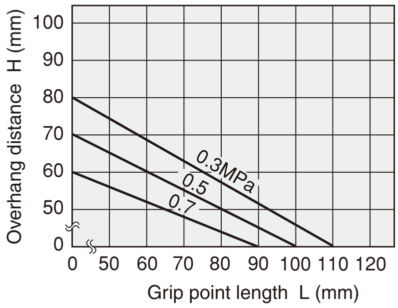
AFDPGL-14



AFDPG-18

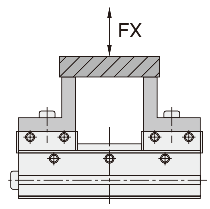


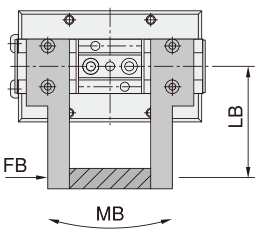
AFDPGL-18

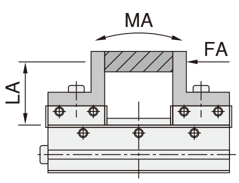


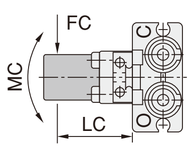
1mm = 0.0394in.

Allowable load and allowable moment







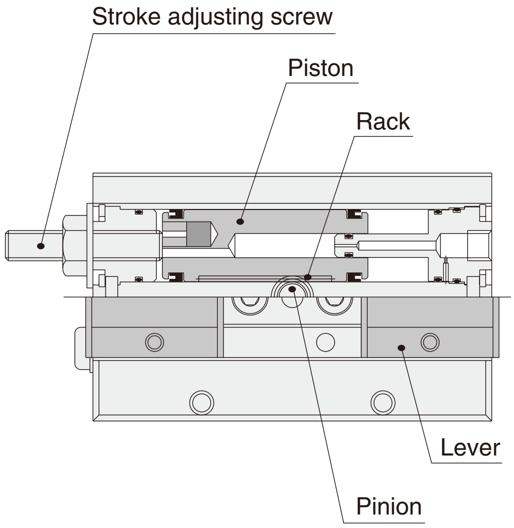


●MA＝FA×LA（N･m）
●MB＝FB×LB（N･m）
●MC＝FC×LC（N･m）

Load and moment / Model	FX N [lbf.]	MA N･m [ft･lbf]	MB N･m [ft･lbf]	MC N･m [ft･lbf]
AFDPG-6	12 [2.7]	0.04 [0.030]	0.04 [0.030]	0.08 [0.059]
AFDPG(H)-8	40 [9.0]	0.3 [0.22]	0.3 [0.22]	0.6 [0.44]
AFDPG(H)-12	120 [27.0]	1.0 [0.74]	1.0 [0.74]	2.0 [1.48]
AFDPG(L)-14	190 [42.7]	3.0 [2.21]	4.0 [2.95]	8.0 [5.90]
AFDPG(L)-18	210 [47.2]	4.0 [2.95]	6.0 [4.43]	9.0 [6.64]

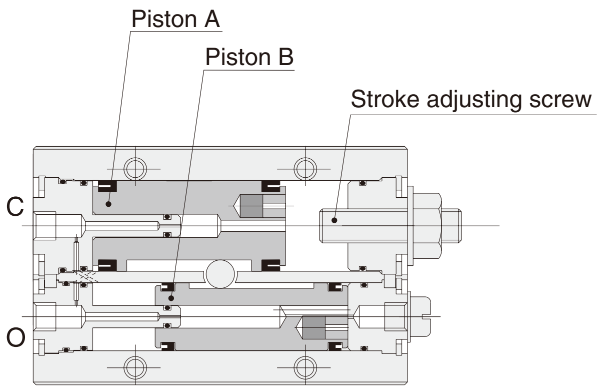
Stroke adjusting method

●Synchronous type

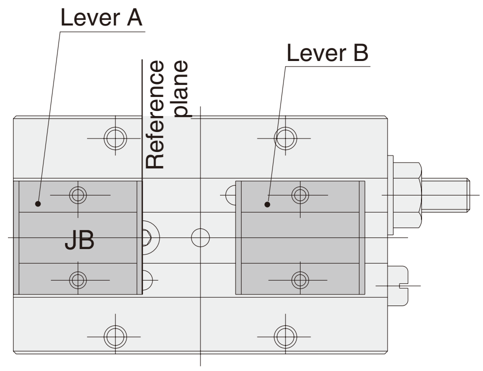


Use a stroke adjusting screw to adjust the piston travel distance.
Applying air pressure moves the piston as far as the stroke adjusting screw.
Synchronized movement of the rack (one piece type with piston) and pinion moves the levers on both sides as far as the preset location.
(Diagram shows open side stroke adjustment. For closed side stroke adjustment, the stroke adjusting screw is reversed in the case.)

●Asynchronous type



Cross section



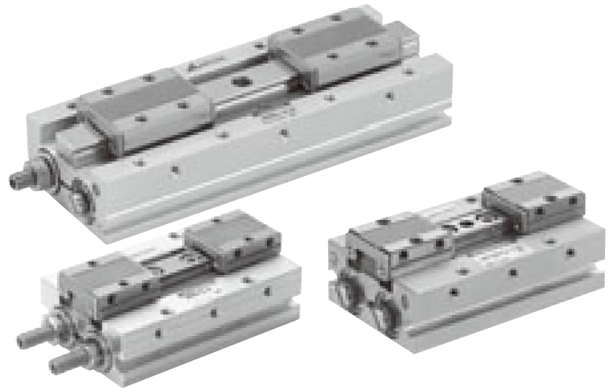
External appearance

●How to determine the reference plane (Diagrams show **AFDPGH-12**)
Inside the air hand (gripper) there are pistons of different diameter (ϕ 12 [0.472in.] and ϕ 14 [0.551in.]). Applying air pressure causes the larger piston (piston A) to move as far as the stroke adjusting screw. The smaller piston (piston B) moves as far as the position where the workpiece can be gripped.
Because the piston thrust is larger on one side, the lever for the larger piston diameter side (lever A) always provides the reference plane for gripping.

The stroke adjusting method is the same as for the synchronous type.

FLAT TYPE AIR HANDS

Synchronous Type and Long Type



Specifications

Item \ Basic model	AFDPG-6	AFDPG-8	AFDPG-12	AFDPG-14	AFDPGL-14	AFDPG-18	AFDPGL-18
Cylinder bore size mm [in.]	6×2 [0.236×2]	8×2 [0.315×2]	12×2 [0.472×2]	14×2 [0.551×2]		18×2 [0.709×2]	
Operation type	Double acting type						
Media	Air						
Operating pressure range MPa [psi.]	0.2～0.7 [29～102]		0.15～0.7 [22～102]				
Proof pressure MPa [psi.]	1.05 [152]						
Operating temperature range °C [°F]	0～60 [32～140]						
Maximum operating frequency cycle/min	120			100			
Lubrication	Not required						
Effective gripping force (F) Note 1 N [lbf.]	12 [2.7]	17 [3.8]	44 [9.9]	58 [13.0]		105 [23.6]	
Open/closed stroke mm [in.]	12 [0.472]	16 [0.630]	22 [0.866]	30 [1.181]	60 [2.362]	40 [1.575]	80 [3.150]
Stroke adjusting range Note 2 mm [in.]	Open/closed stroke max. 6 [0.236]	Open/closed stroke max. 8 [0.315]		Open/closed stroke max. 15 [0.591]			
Repeatability mm [in.]	±0.07 [±0.0028]			±0.08 [±0.0031]			
Port size	M3×0.5		M5×0.8				
Mass Note 3 g [oz.]	52 [1.83] (0.5 [0.018])	74 [2.61] (9 [0.32])	183 [6.46] (12 [0.42])	440 [15.52] (20 [0.71])	510 [17.99] (20 [0.71])	645 [22.75] (25 [0.88])	945 [33.33] (25 [0.88])

Notes: 1. Values are obtained when grip point length is 30mm [1.18in.] under operating pressure 0.5 MPa [73psi.].
2. Applicable range with stroke adjustment mechanism (**-JA, -JB, -JC**). The stroke adjustment range for **-JC** type is shown separately for open side and closed side. When using the ϕ 6 and ϕ 8 both-side adjustment (**-JC**) type, ensure a minimum of 3 mm for the lever stroke to operate.
3. The figure in parentheses ( ) shows the amount of additional mass for the stroke adjustment mechanism. For **-JC**, double the amount of the figure in parentheses ( ).

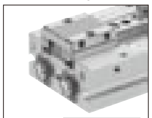
Order Codes

■ Open/closed stroke Note

Blank : Standard type
L : Long type

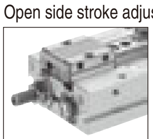
■ Stroke adjusting mechanism

No adjusting mechanism



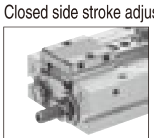
Blank

Open side stroke adjustment



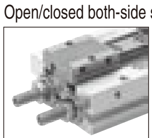
-JA

Closed side stroke adjustment



-JB

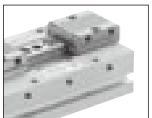
Open/closed both-side stroke adjustment



-JC

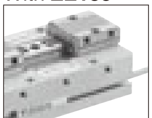
■ Sensor switch

No sensor switch



Blank

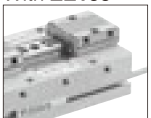
With **ZE135**



-ZE135

- Solid state type
- With indicator lamp
- DC10～28V
- 2-lead wire
- Horizontal lead wire

With **ZE155**



-ZE155

- Solid state type
- With indicator lamp
- DC4.5～28V
- 3-lead wire
- Horizontal lead wire

With **ZE235**

-ZE235

- Solid state type
- With indicator lamp
- DC10～28V
- 2-lead wire
- Vertical lead wire

With **ZE255**

-ZE255

- Solid state type
- With indicator lamp
- DC4.5～28V
- 3-lead wire
- Vertical lead wire

■ Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

■ Number of sensor switches
(for air hands with sensor switches)

●1 : With 1 sensor switch
●2 : With 2 sensor switches

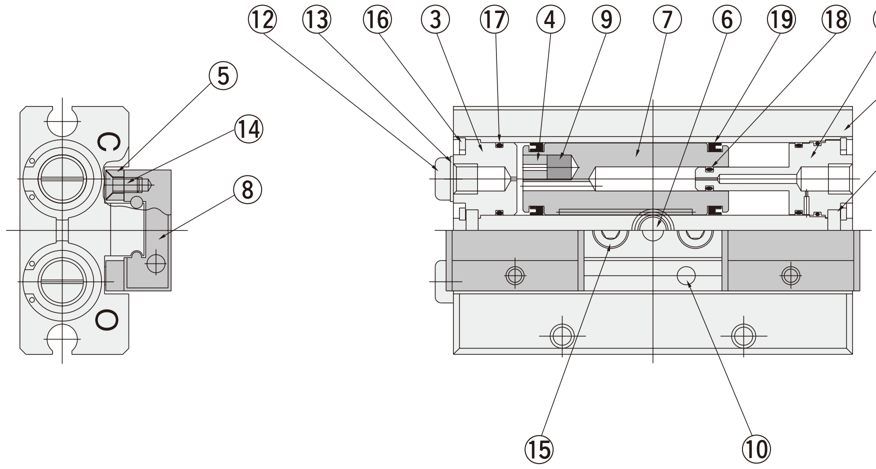
★Included at shipping

	Basic model		Cylinder bore size				
Double acting type	**AFDPG**	**L**	**-6 -8 -12 -14 -18**	**-JA -JB -JC**	**-ZE135 -ZE155 -ZE235 -ZE255**	**A B**	**1 2**

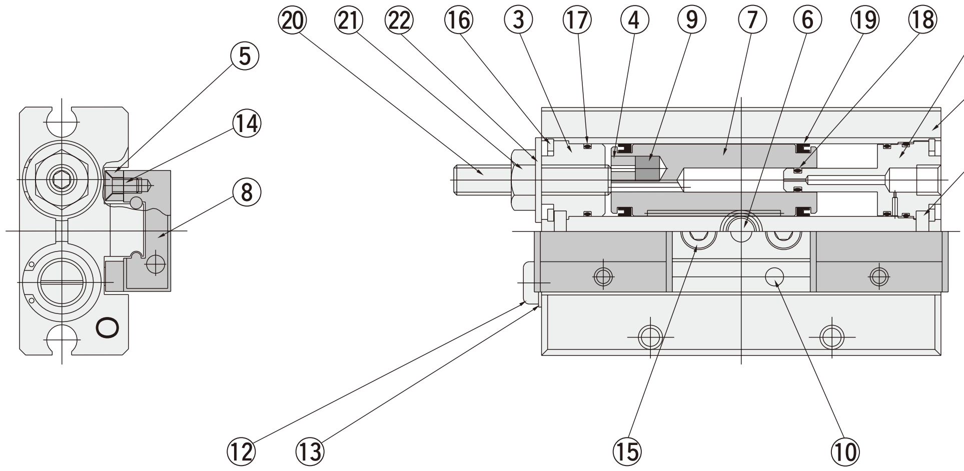
Note: Selection available in ϕ 14 and ϕ 18 only.

Inner Construction

●Diagrams show double acting type ϕ 12 [0.472in.].



●Diagrams show double acting type with open side stroke adjustment ϕ 12 [0.472in.].

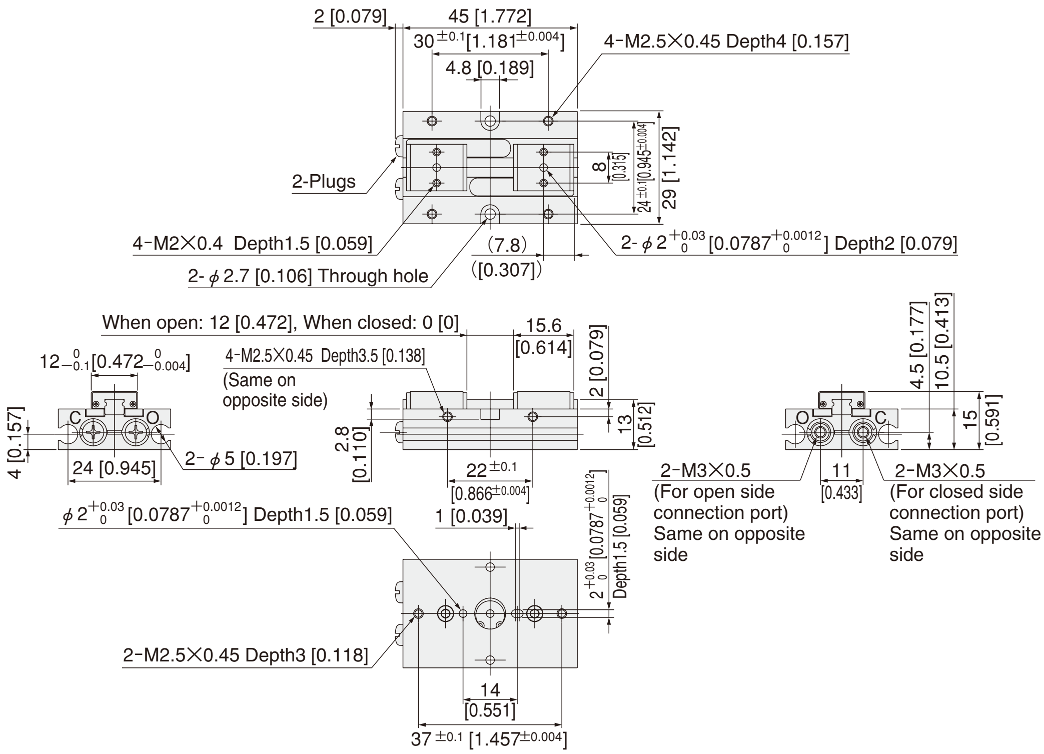


Major Parts and Materials

No.	Parts	Materials
①	Body	Aluminum alloy
②	Head cover	Aluminum alloy
③	Head cover	Aluminum alloy
④	Cap (magnet)	Aluminum alloy
⑤	Lever	Carbon steel
⑥	Pinion rod	Stainless steel
⑦	Rack piston	Stainless steel
⑧	Bearing	Stainless steel
⑨	Magnet	Plastic magnet
⑩	Roller	Carbon steel
⑪	Roller	Carbon steel

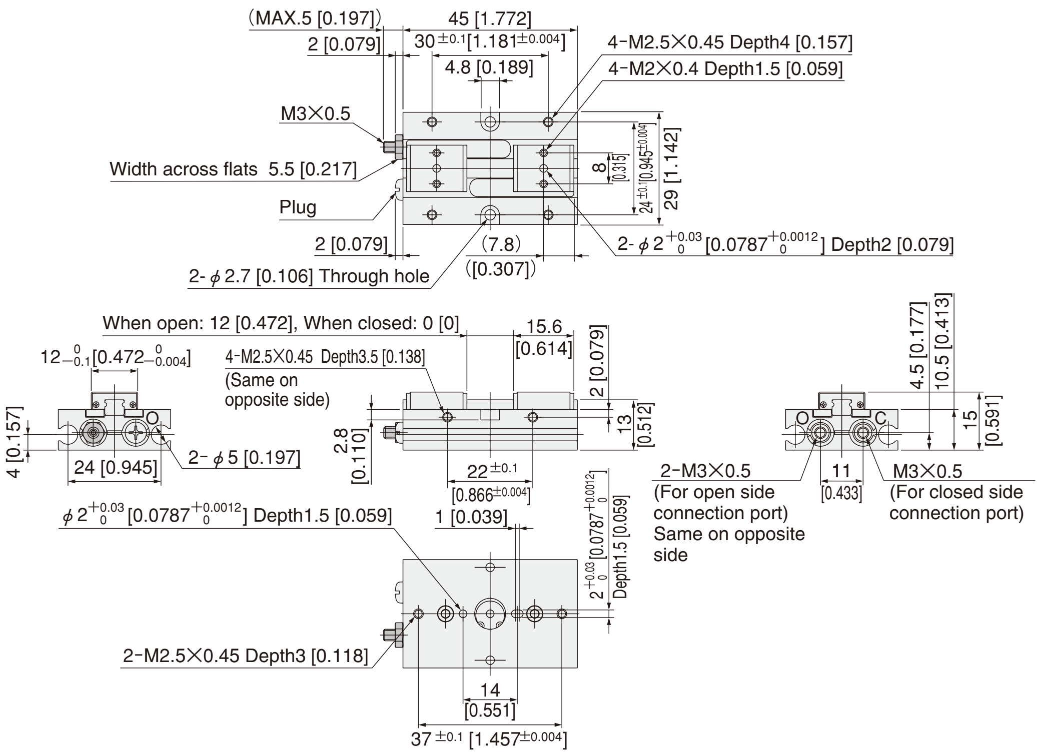
No.	Parts	Materials
⑫	Plug	Brass (nickel plated)
⑬	Gasket	Synthetic rubber (NBR)
⑭	Screw	Mild steel
⑮	Hexagon socket head bolt	Alloy steel
⑯	Internal snap ring	Carbon steel
⑰	O-ring	Synthetic rubber (NBR)
⑱	O-ring	Synthetic rubber (NBR)
⑲	Seal	Synthetic rubber (NBR)
⑳	Hexagon socket setscrew	Mild steel
㉑	Hexagon nut	Mild steel
㉒	Sealing washer	Steel ＋Synthetic rubber (NBR)

AFDPG-6



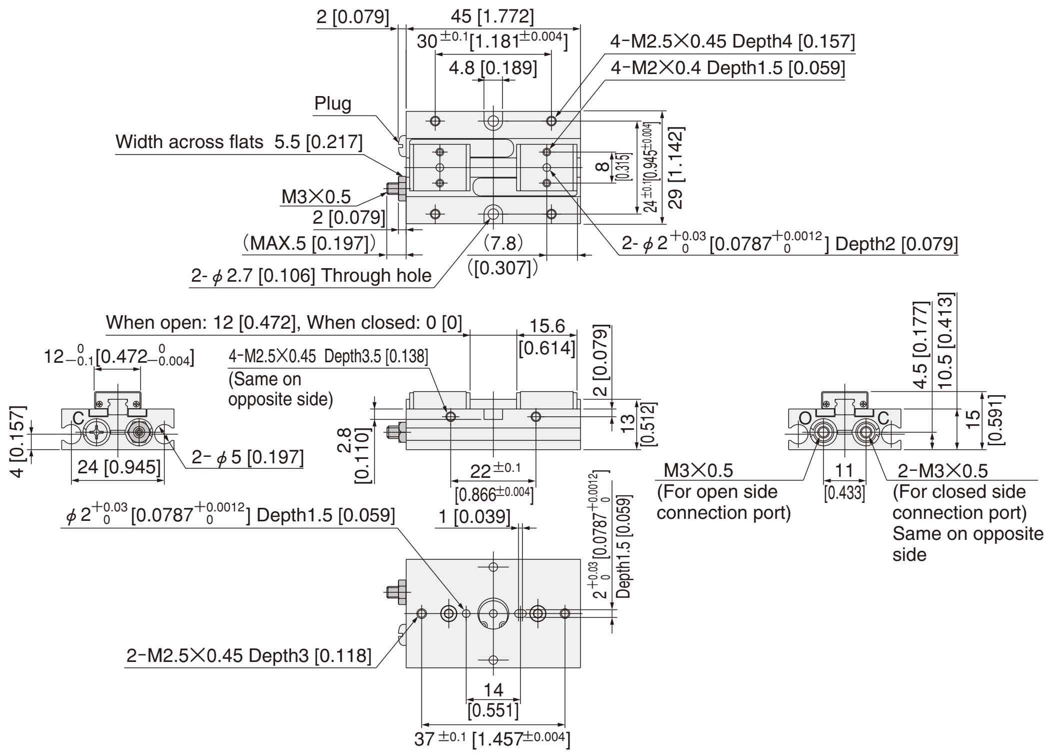
AFDPG-6-JA

(Open side stroke adjustment)



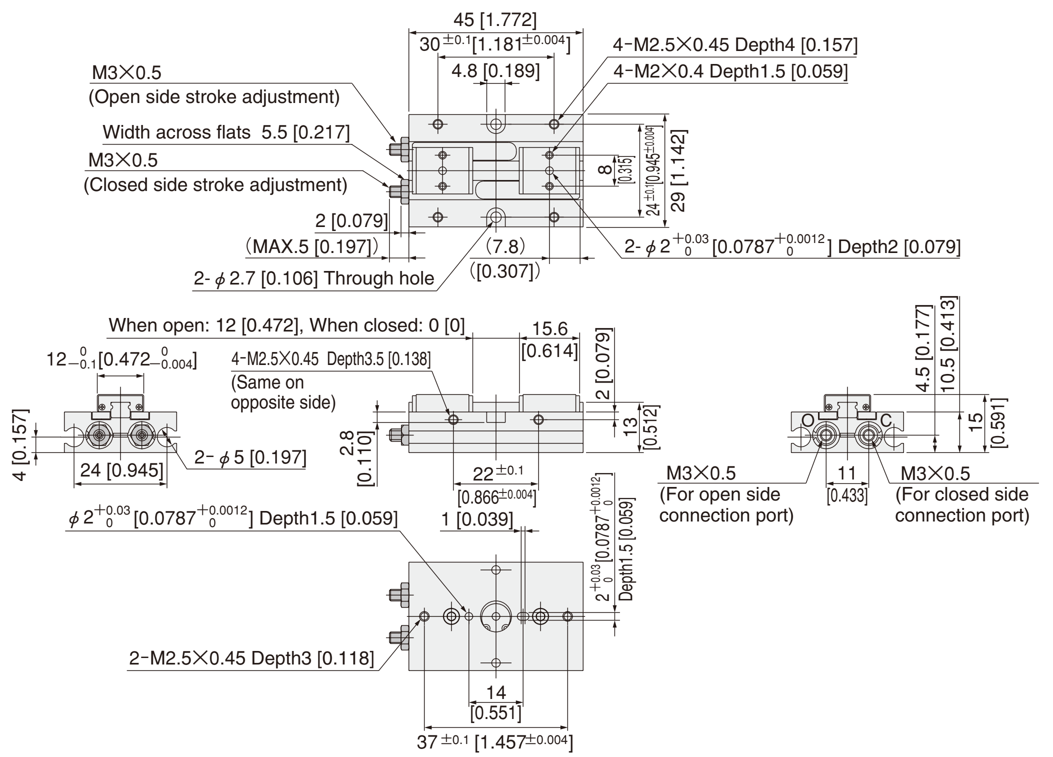
AFDPG-6-JB

(Closed side stroke adjustment)



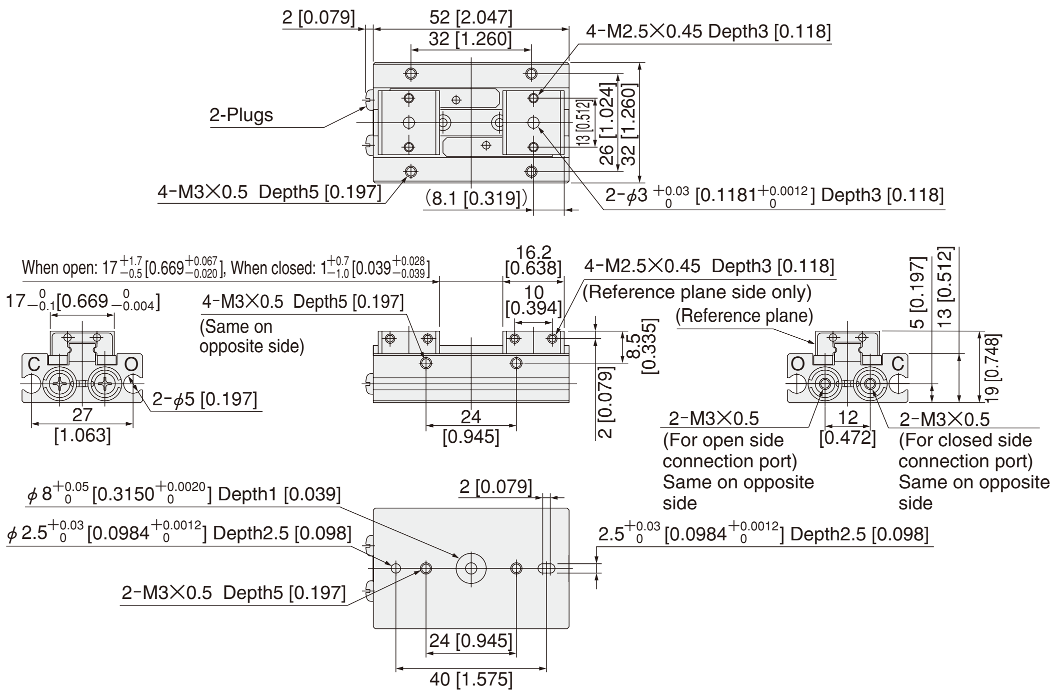
AFDPG-6-JC

(Open/closed both-side stroke adjustment)



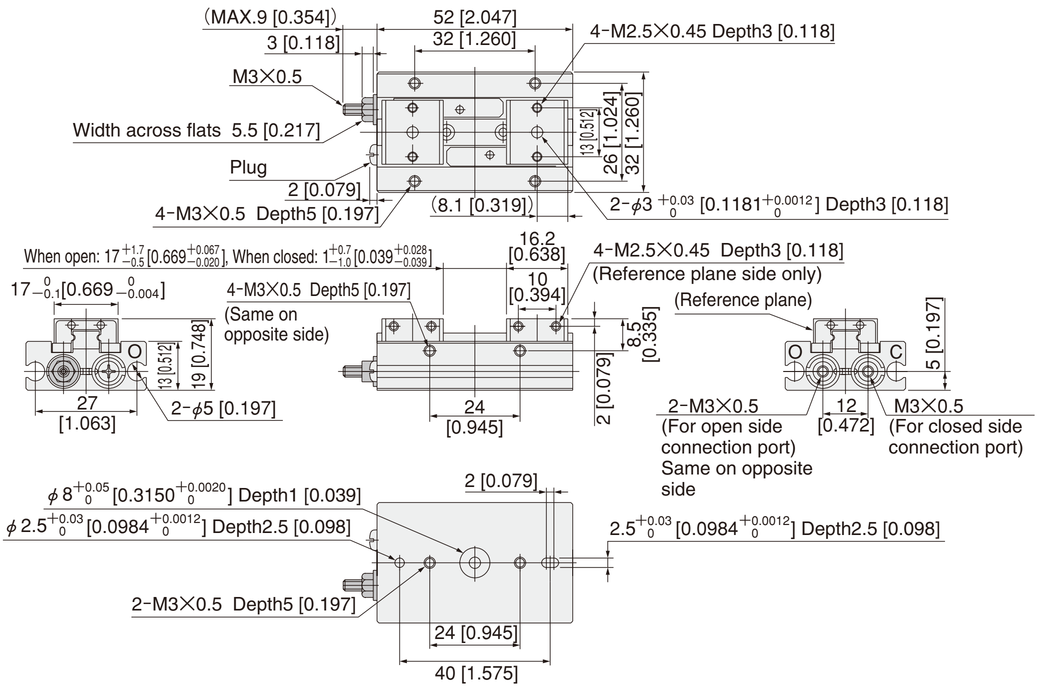
AFDPG-8

AFDPG-8



AFDPG-8-JA
(Open side stroke adjustment)

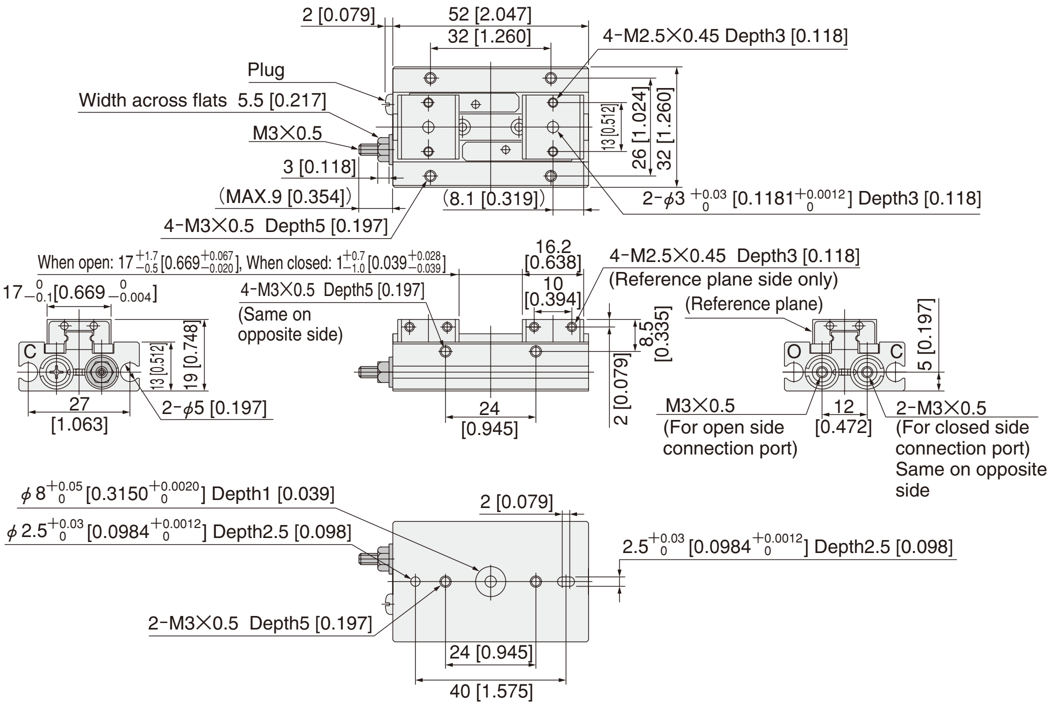
AFDPG-8-JA



AFDPG-8-JB

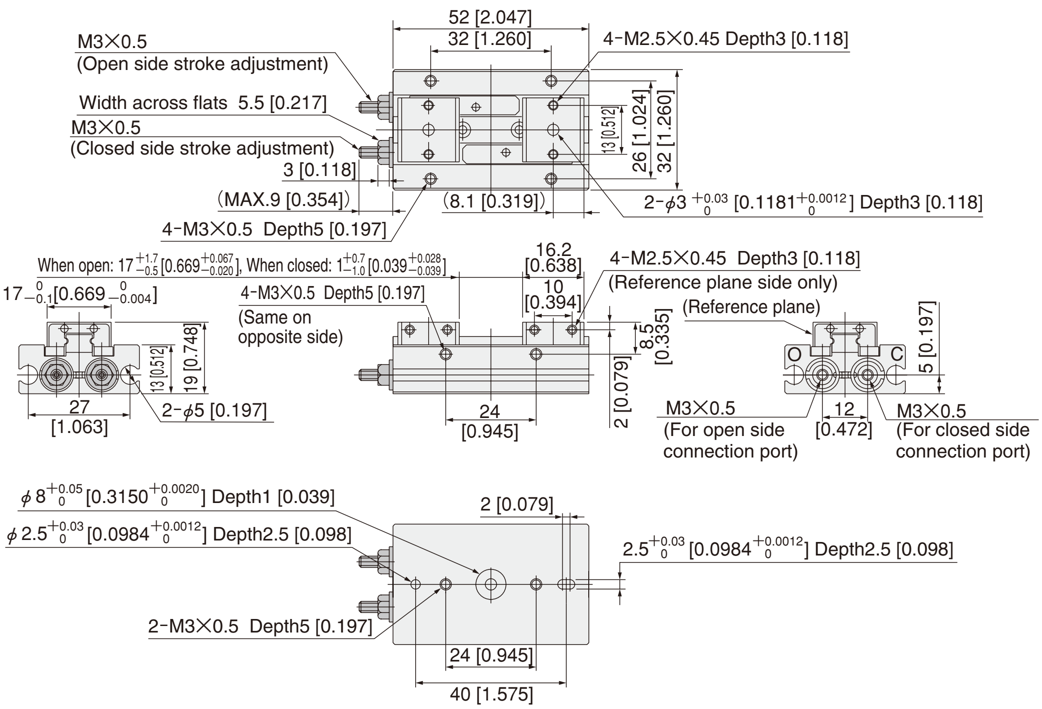
CAD AFDPG-8-JB

(Closed side stroke adjustment)



AFDPG-8-JC

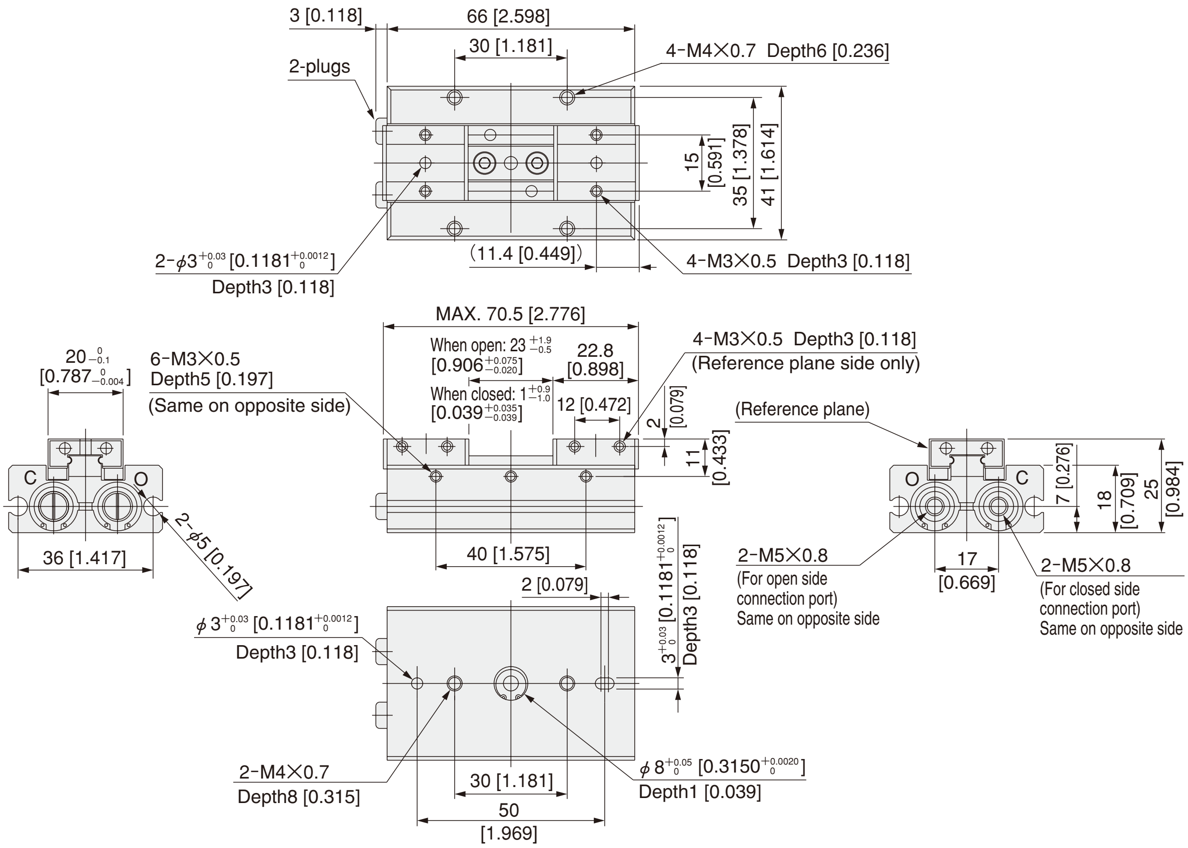
(Open/closed both-side stroke adjustment)



Dimensions of Synchronous Type mm [in.]

AFDPG-12

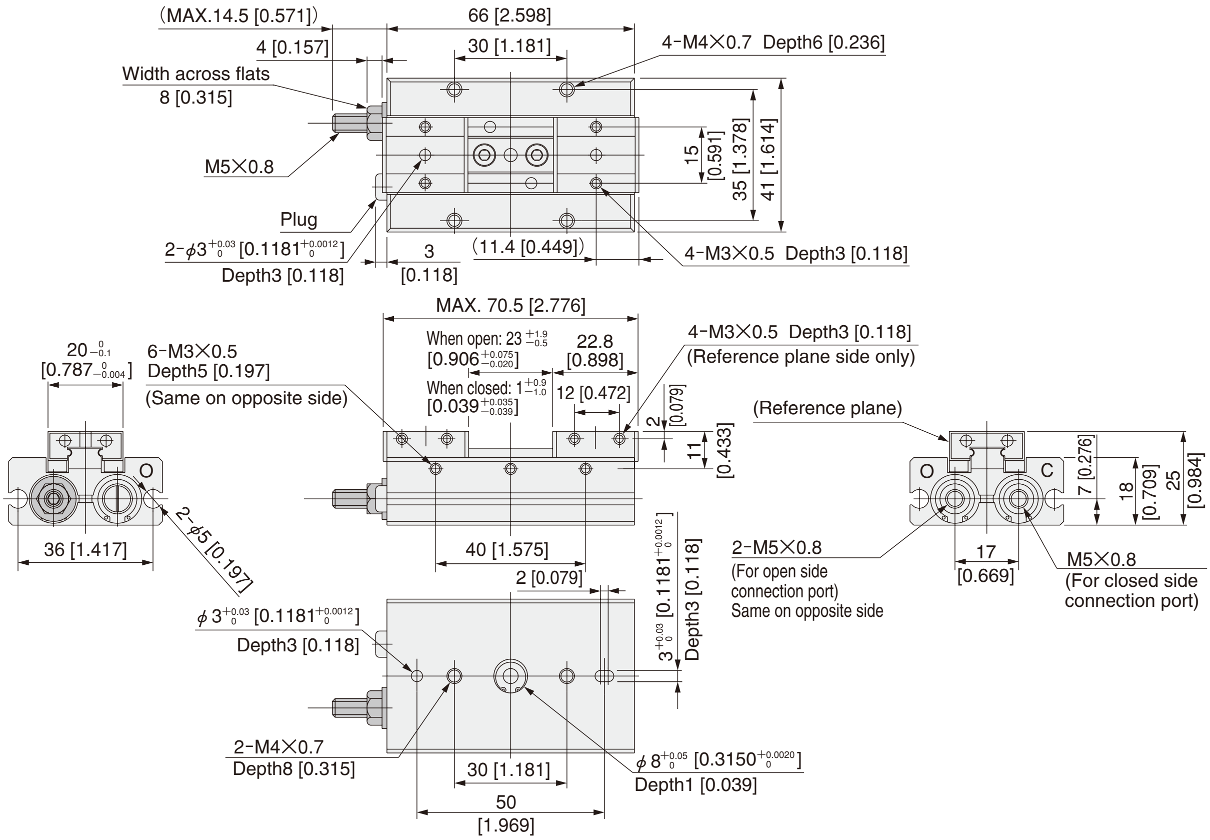
CAD AFDPG-12



AFDPG-12-JA

(Open side stroke adjustment)

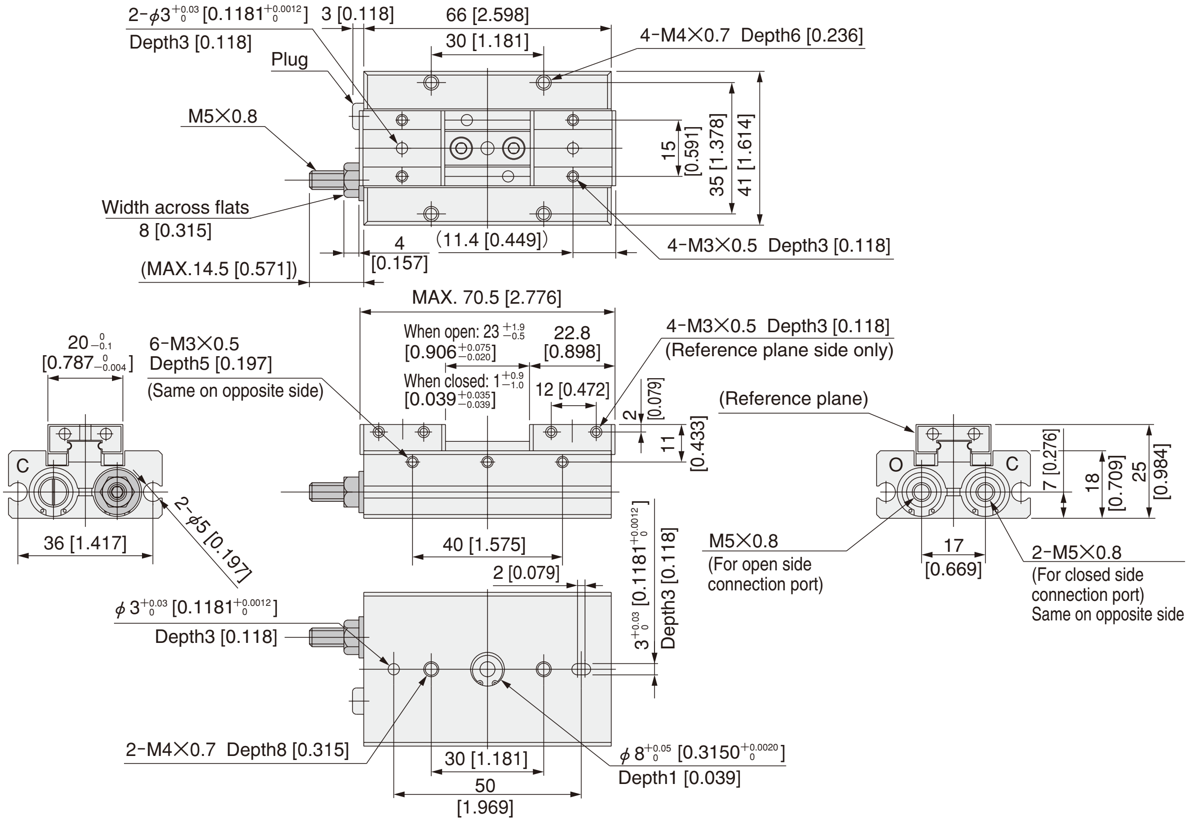
CAD AFDPG-12-JA



AFDPG-12-JB

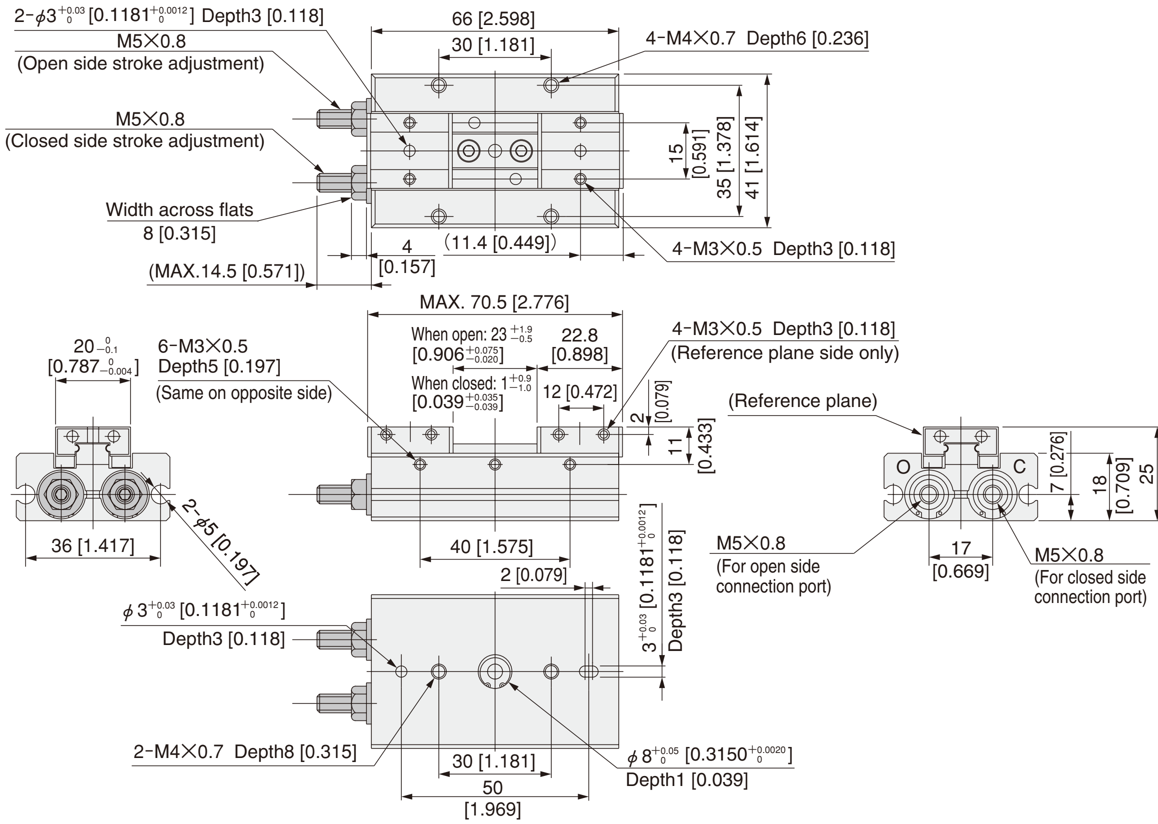
(Closed side stroke adjustment)

CAD AFDPG-12-JB



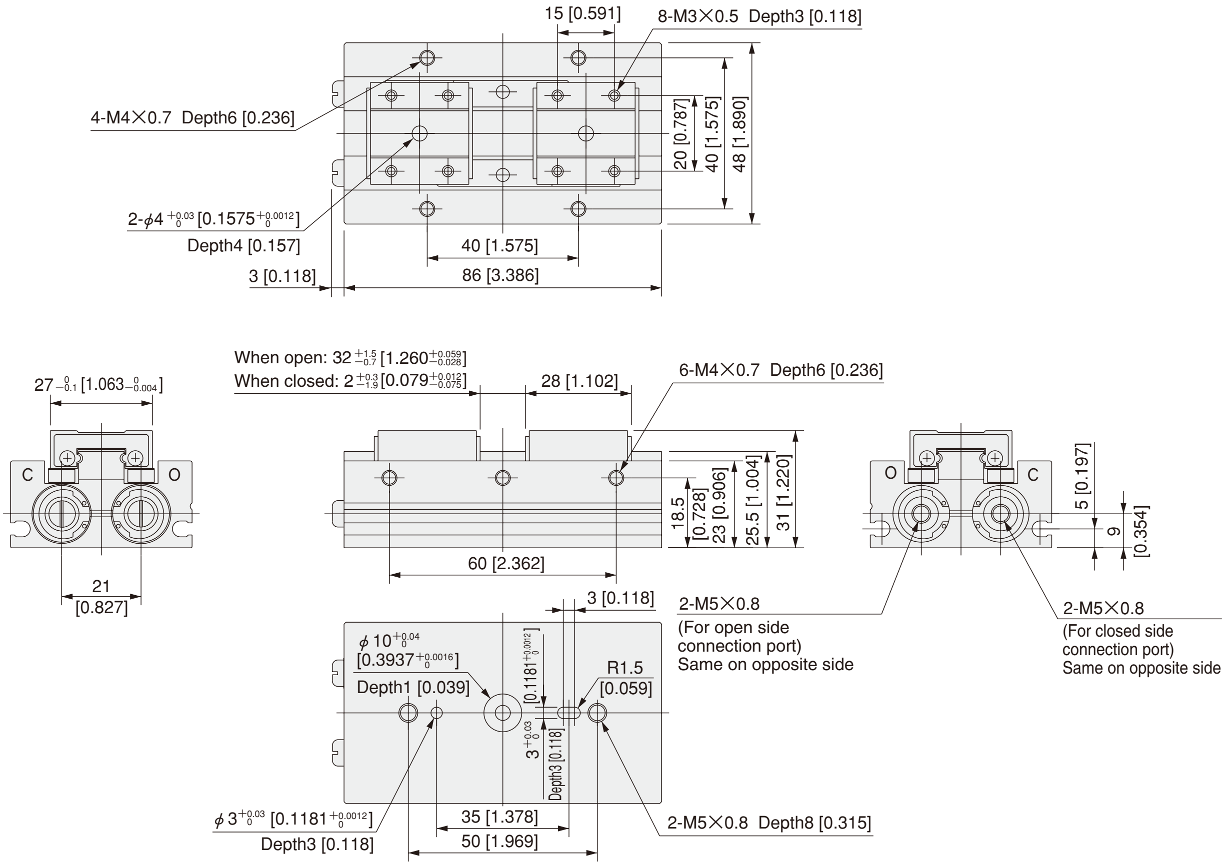
AFDPG-12-JC

(Open/closed both-side stroke adjustment)



AFDPG-14

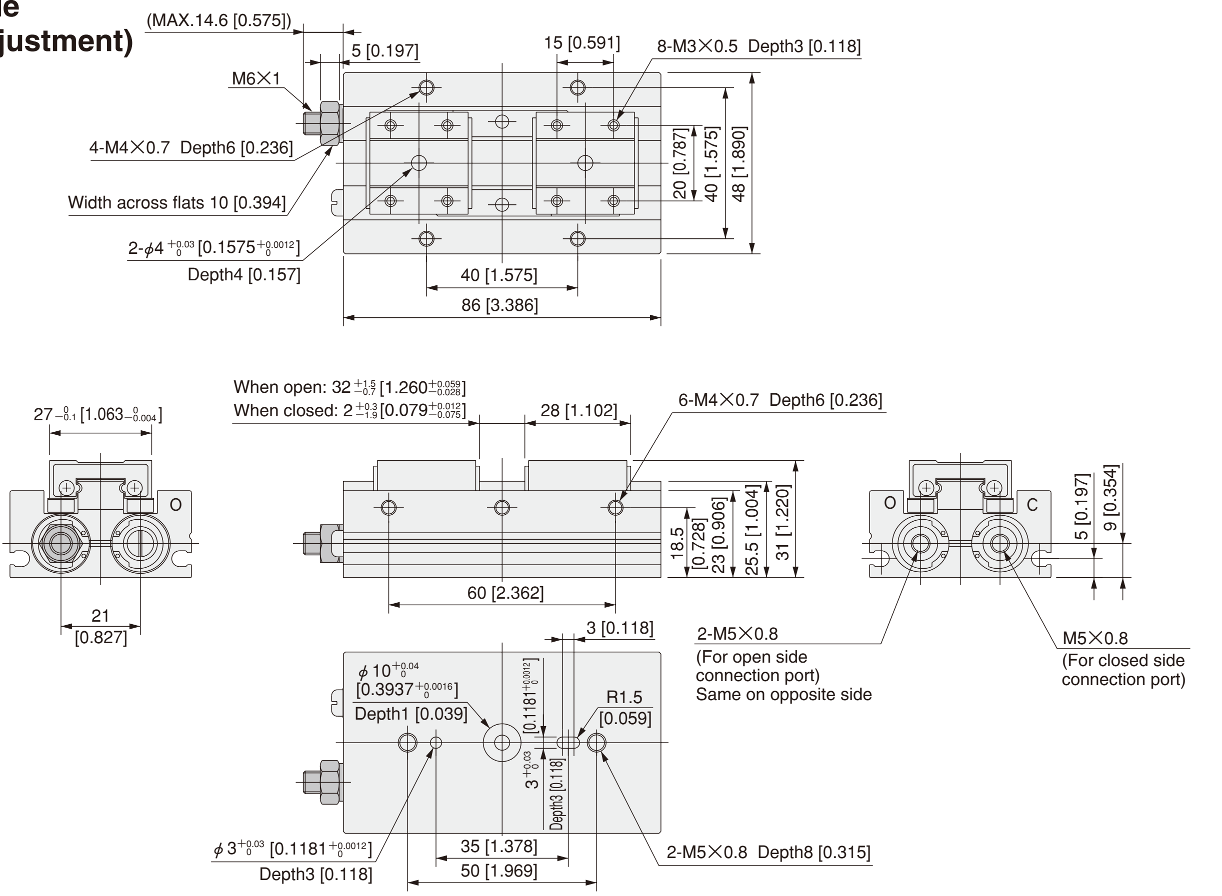
CAD AFDPG-14



AFDPG-14-JA

(Open side stroke adjustment)

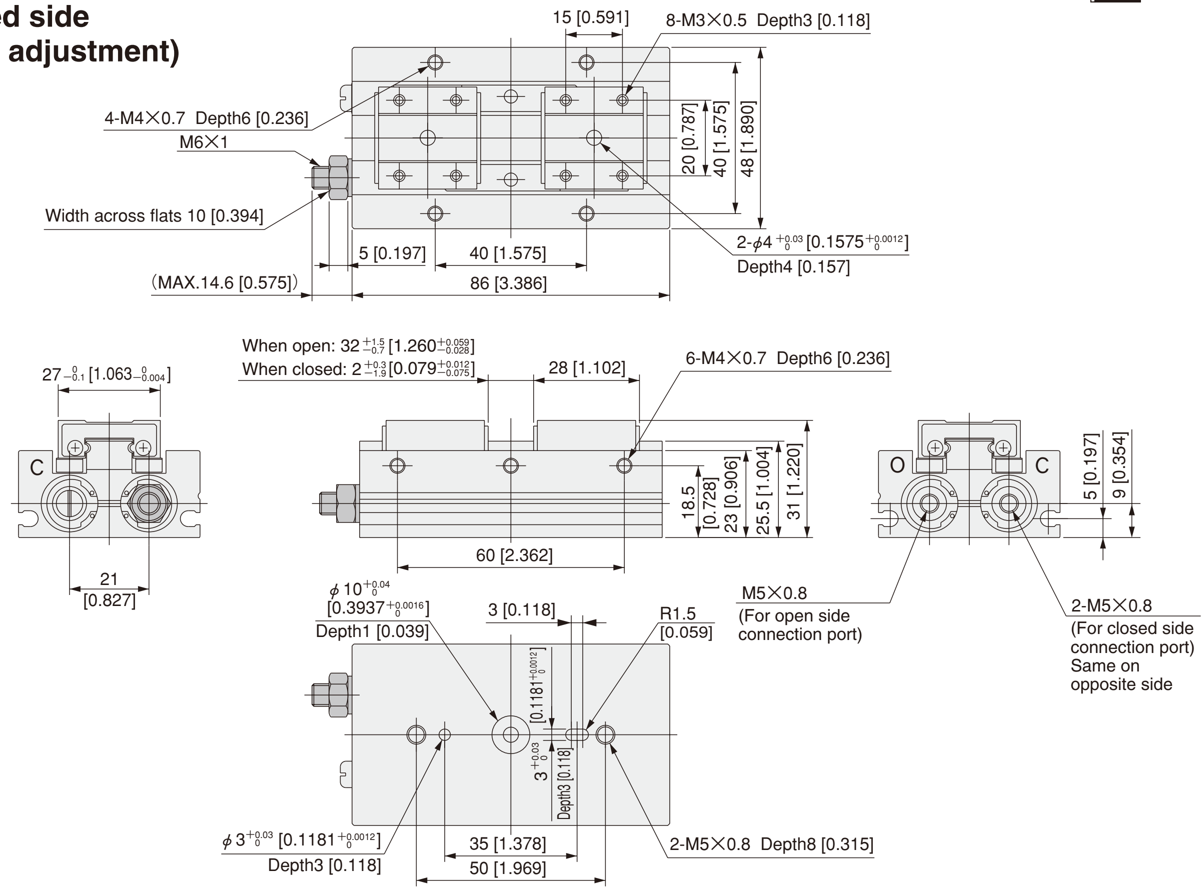
CAD AFDPG-14-JA



AFDPG-14-JB

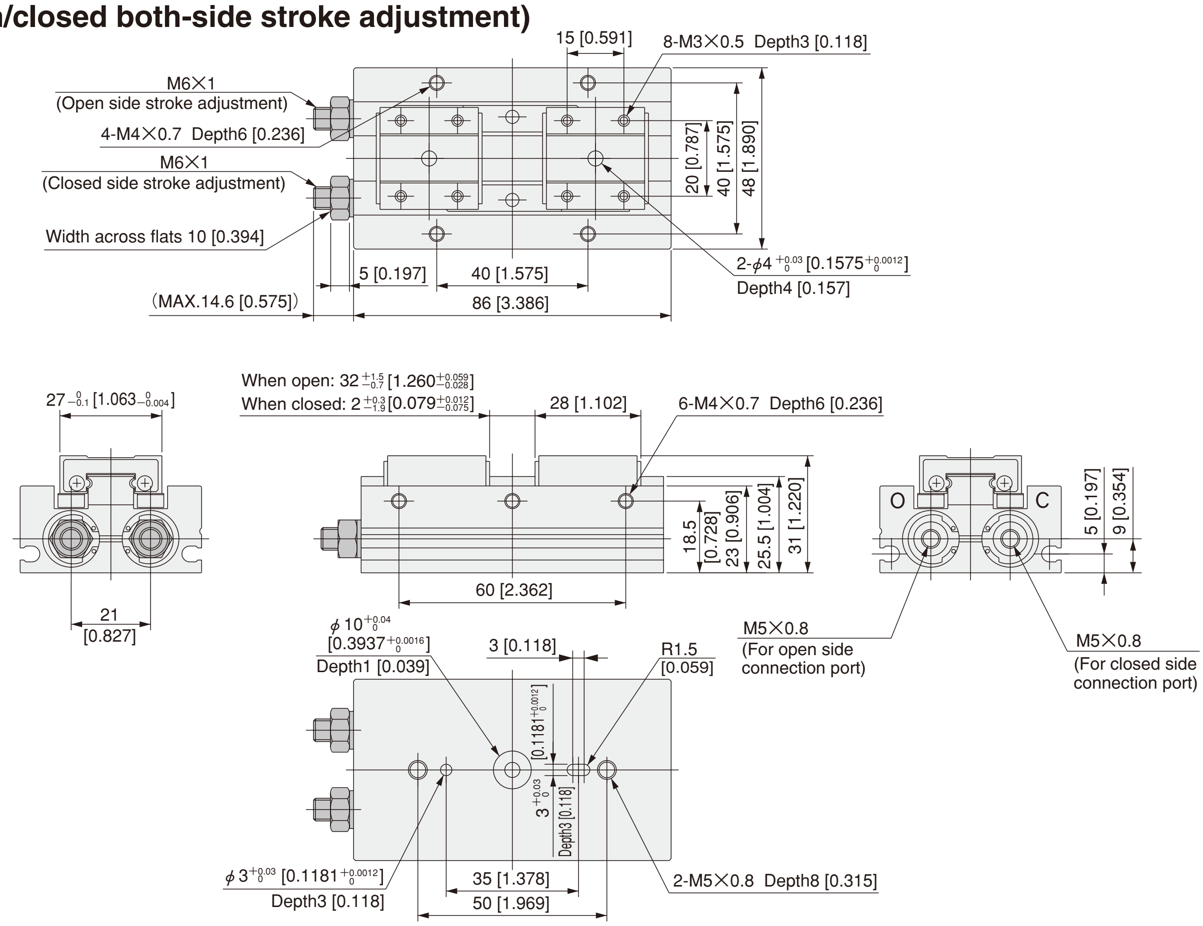
AFDPG-14-JB

(Closed side stroke adjustment)



AFDPG-14-JC

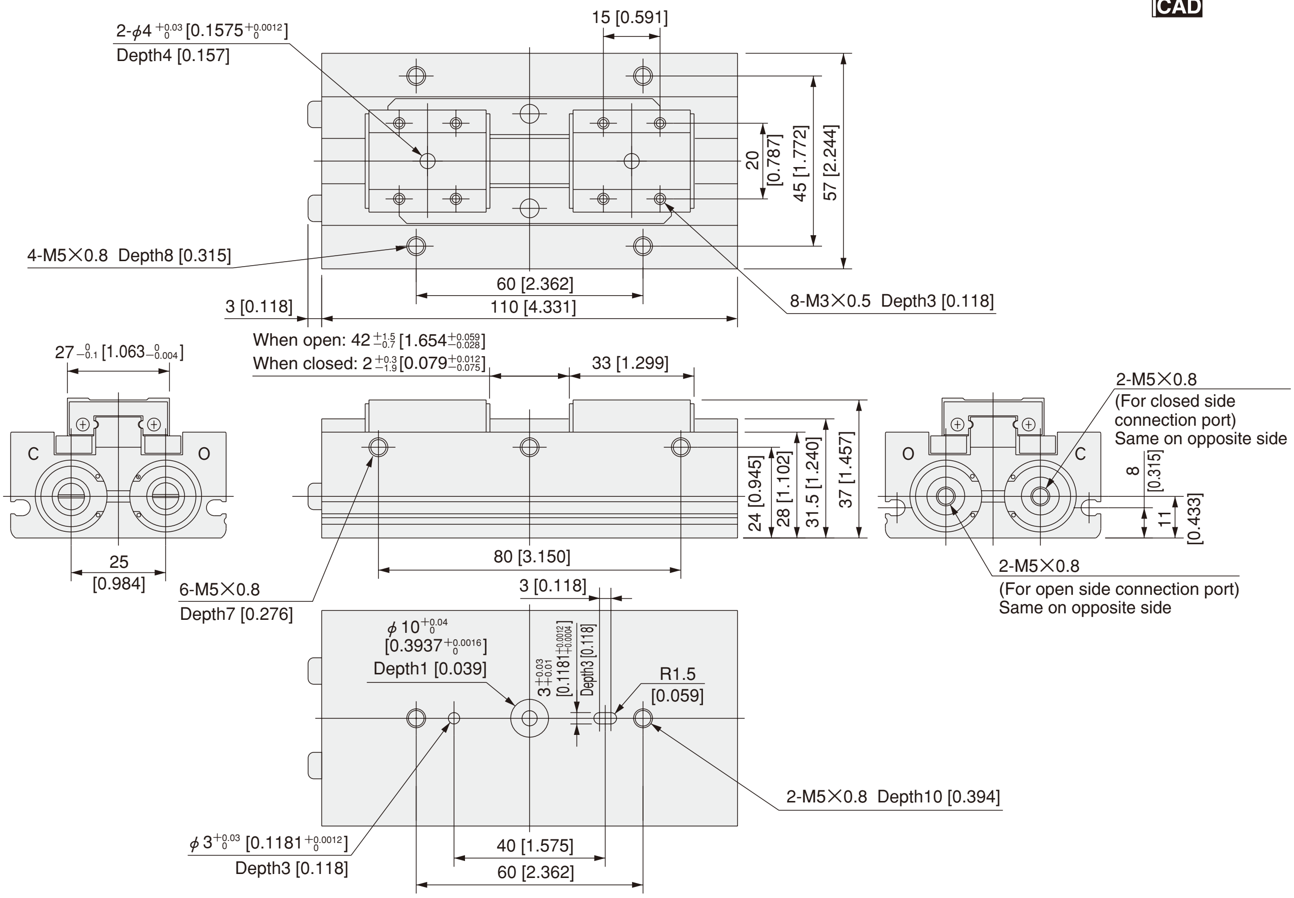
(Open/closed both-side stroke adjustment)



Dimensions of Synchronous Type mm [in.]

AFDPG-18

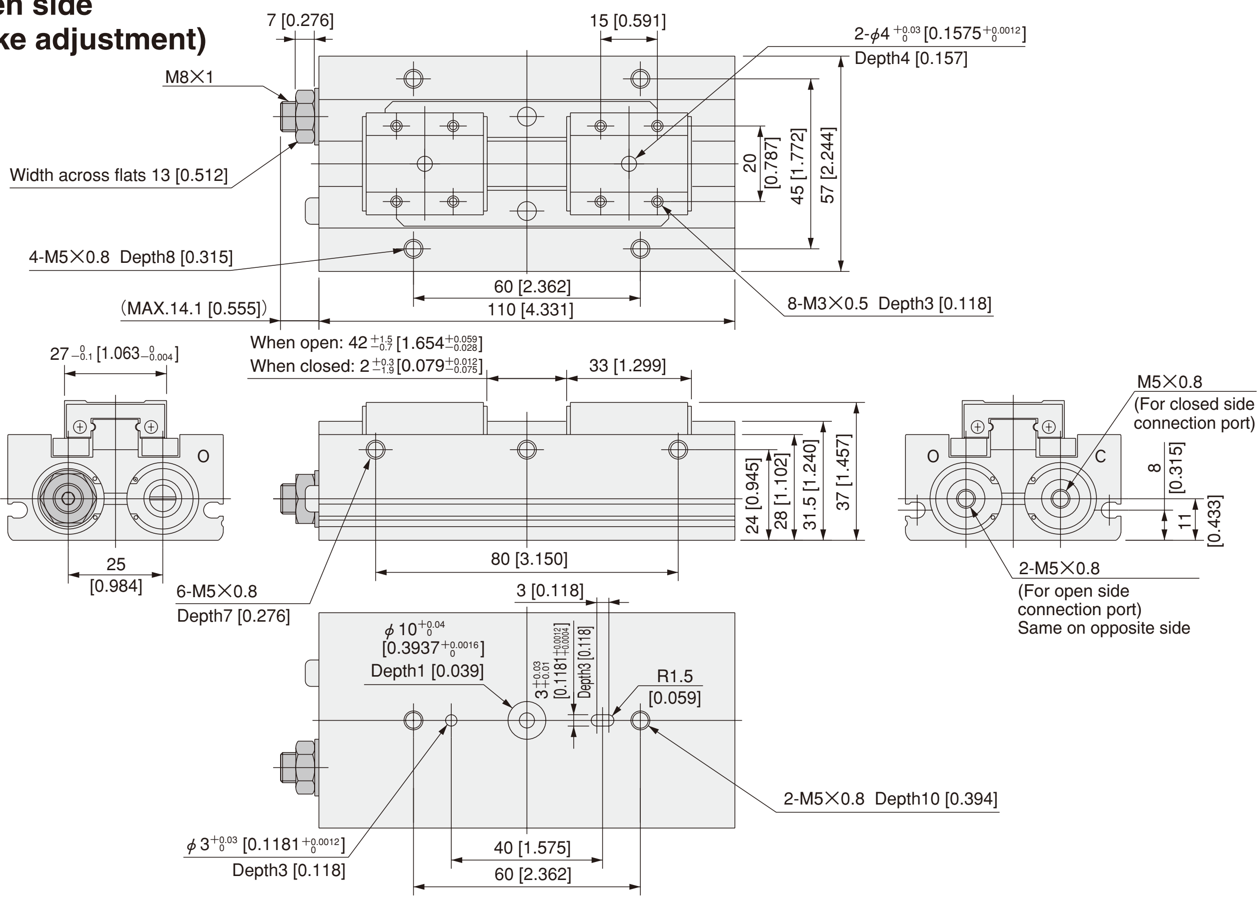
CAD AFDPG-18



AFDPG-18-JA

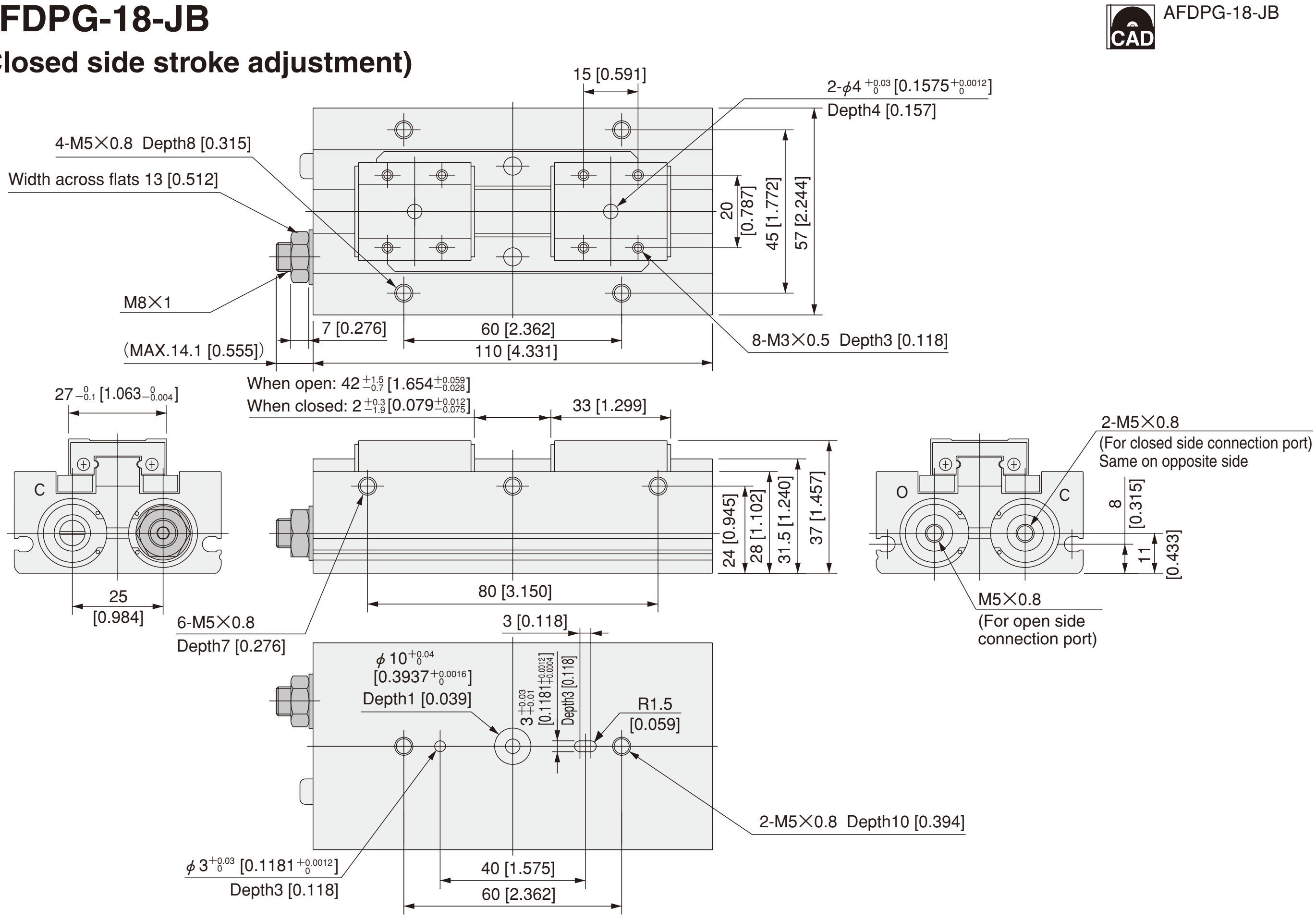
(Open side stroke adjustment)

CAD AFDPG-18-JA



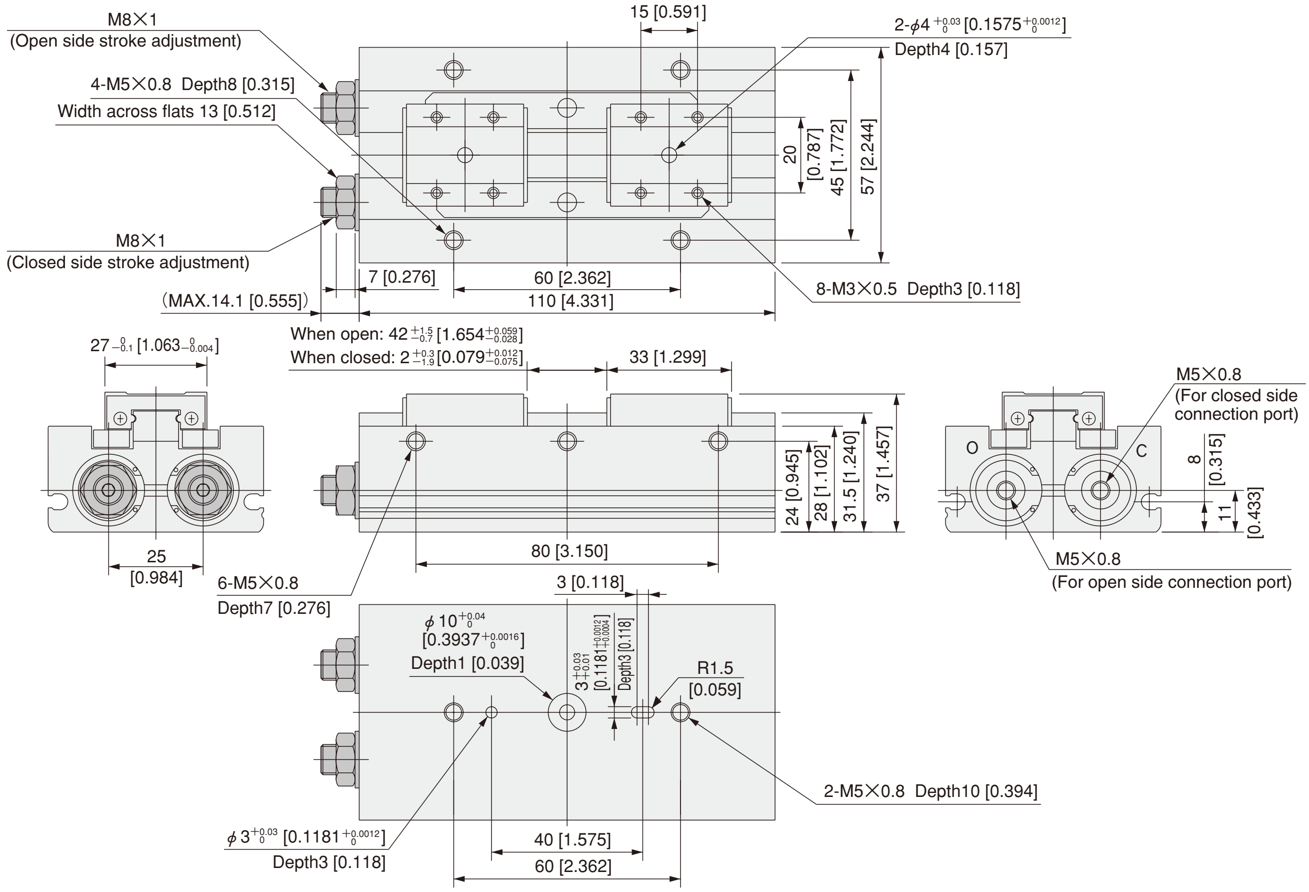
AFDPG-18-JB

(Closed side stroke adjustment)



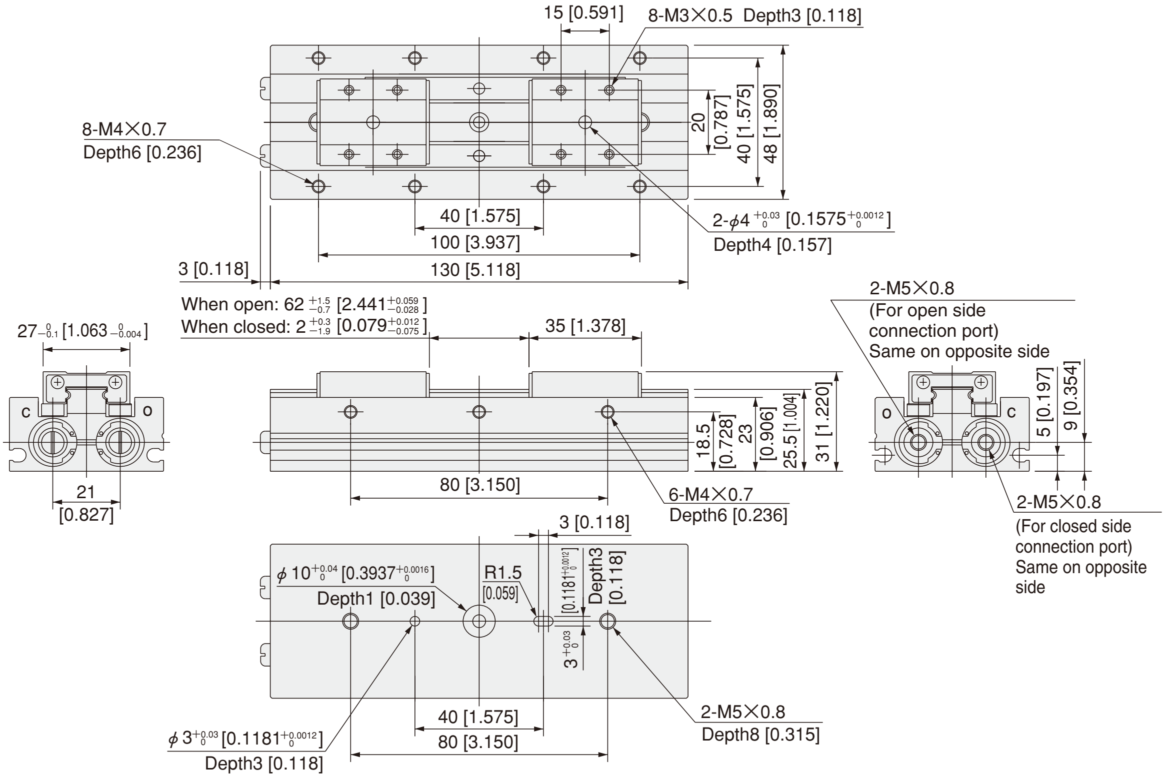
AFDPG-18-JC

(Open/closed both-side stroke adjustment)



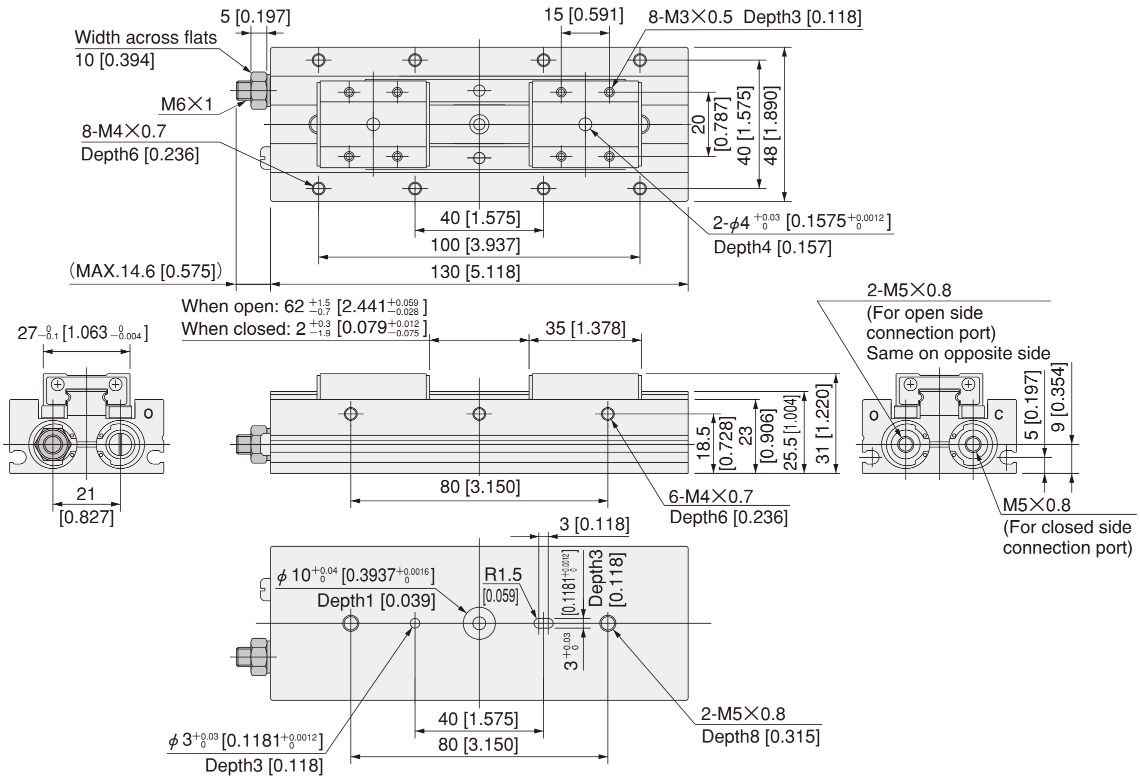
AFDPGL-14

CAD AFDPGL-14



AFDPGL-14-JA
(Open side stroke adjustment)

CAD AFDPGL-14-JA

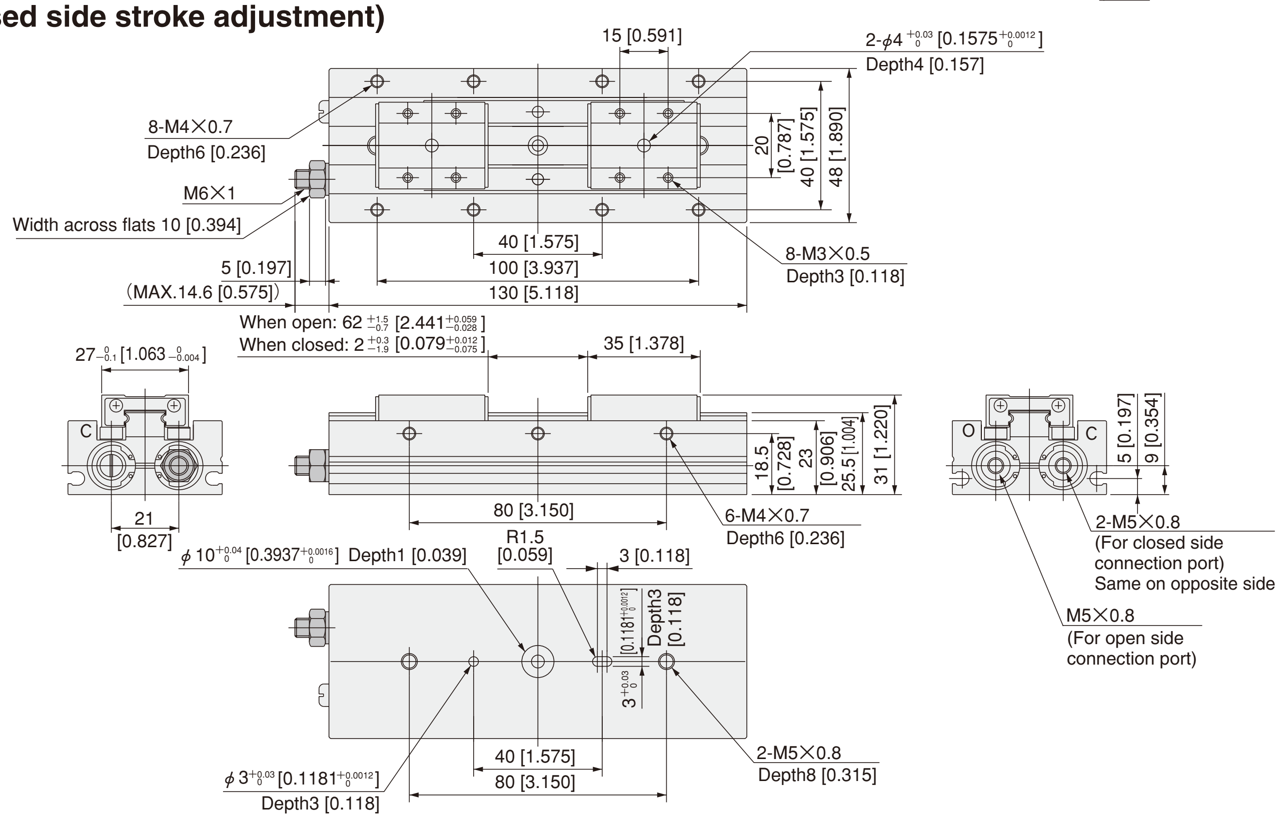


Dimensions of Long Type mm [in.]

AFDPGL-14-JB

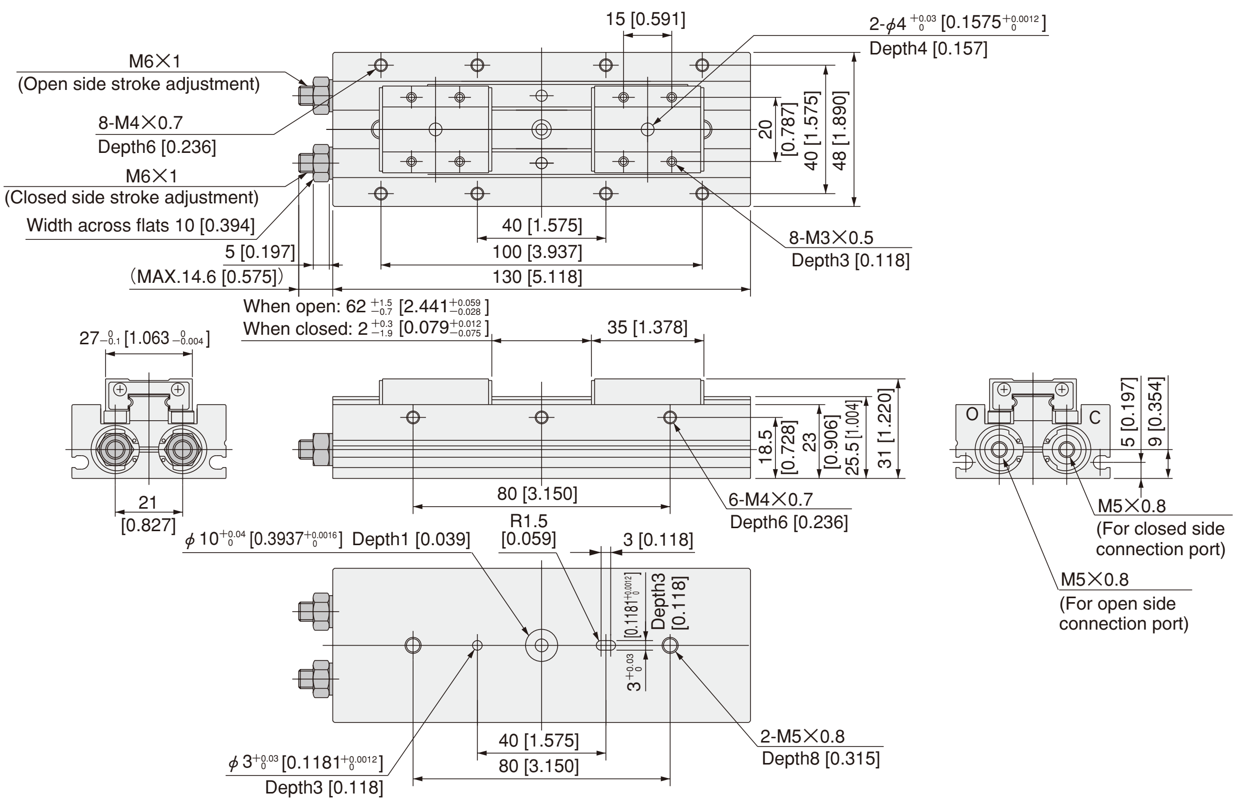
CAD AFDPGL-14-JB

(Closed side stroke adjustment)



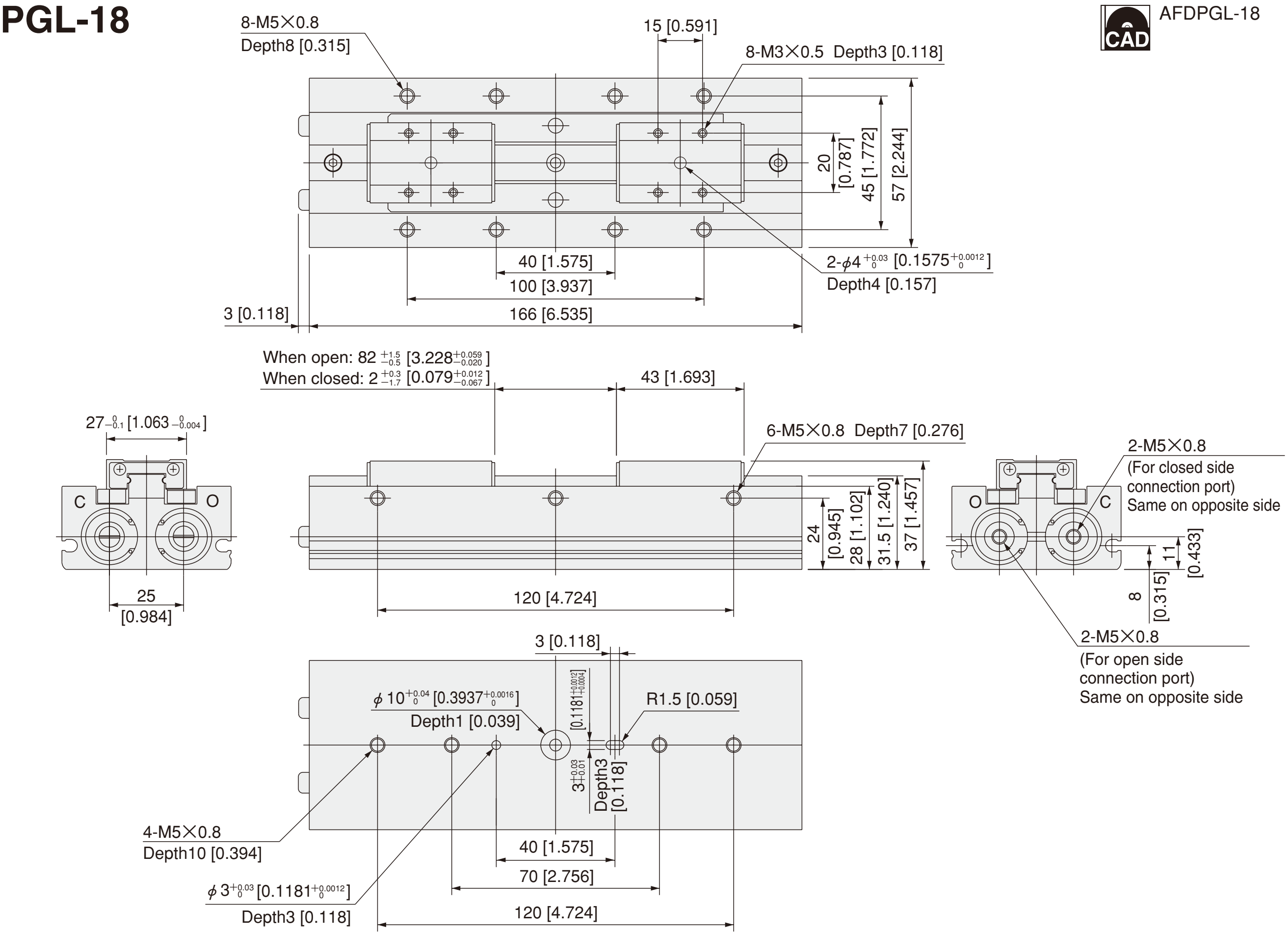
AFDPGL-14-JC

(Open/closed both-side stroke adjustment)



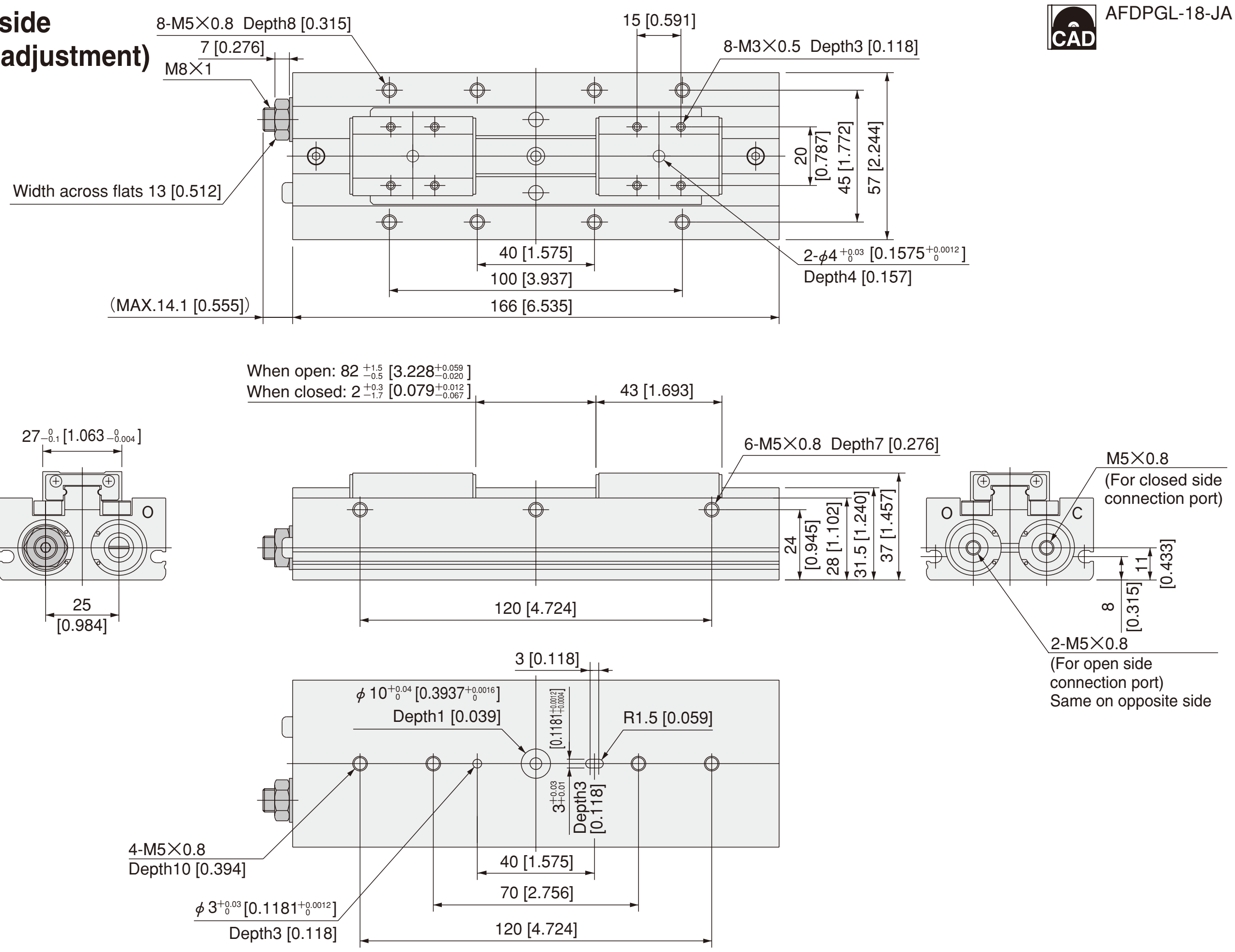
AFDPGL-18

CAD AFDPGL-18



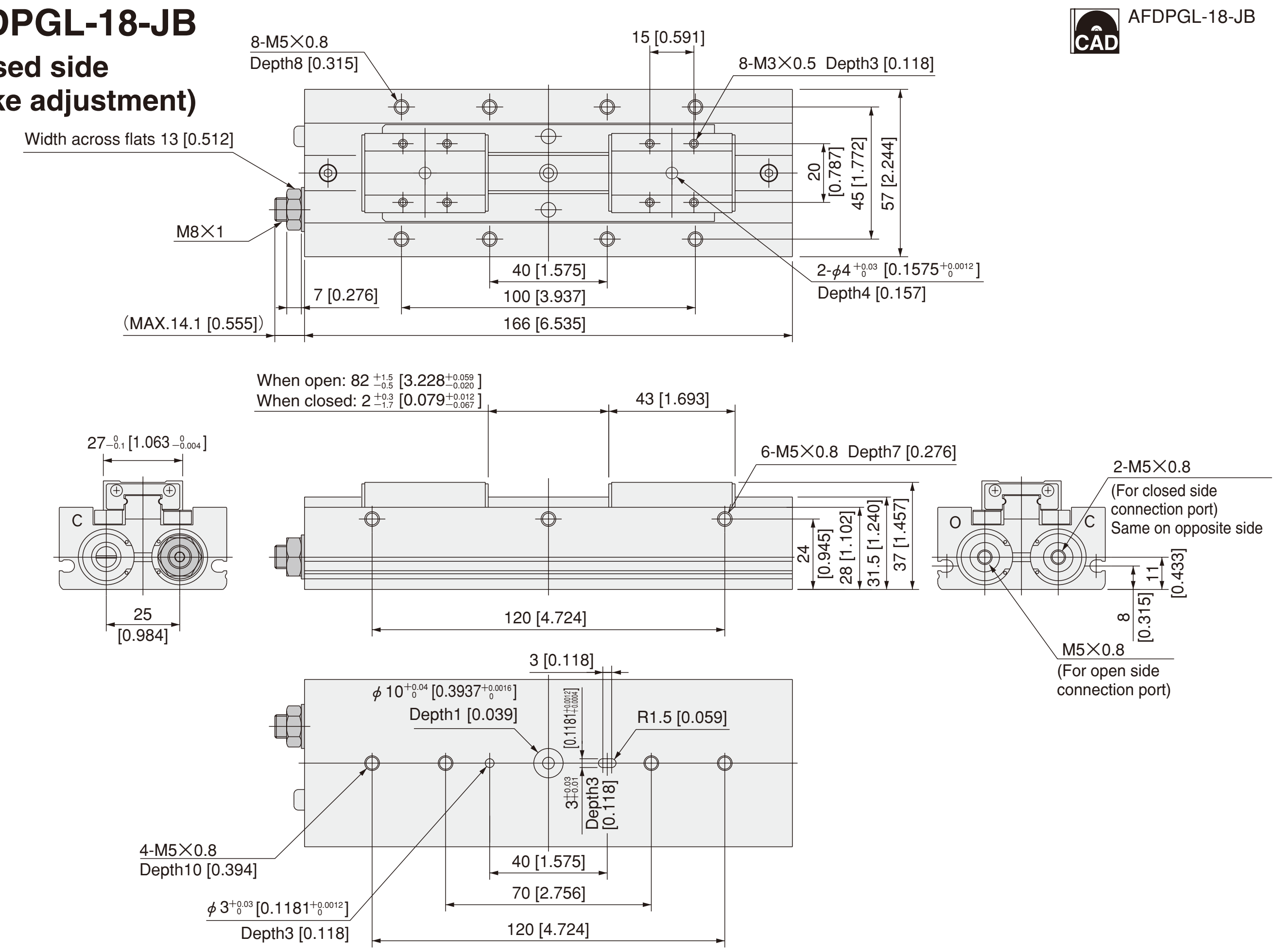
AFDPGL-18-JA
(Open side stroke adjustment)

CAD AFDPGL-18-JA

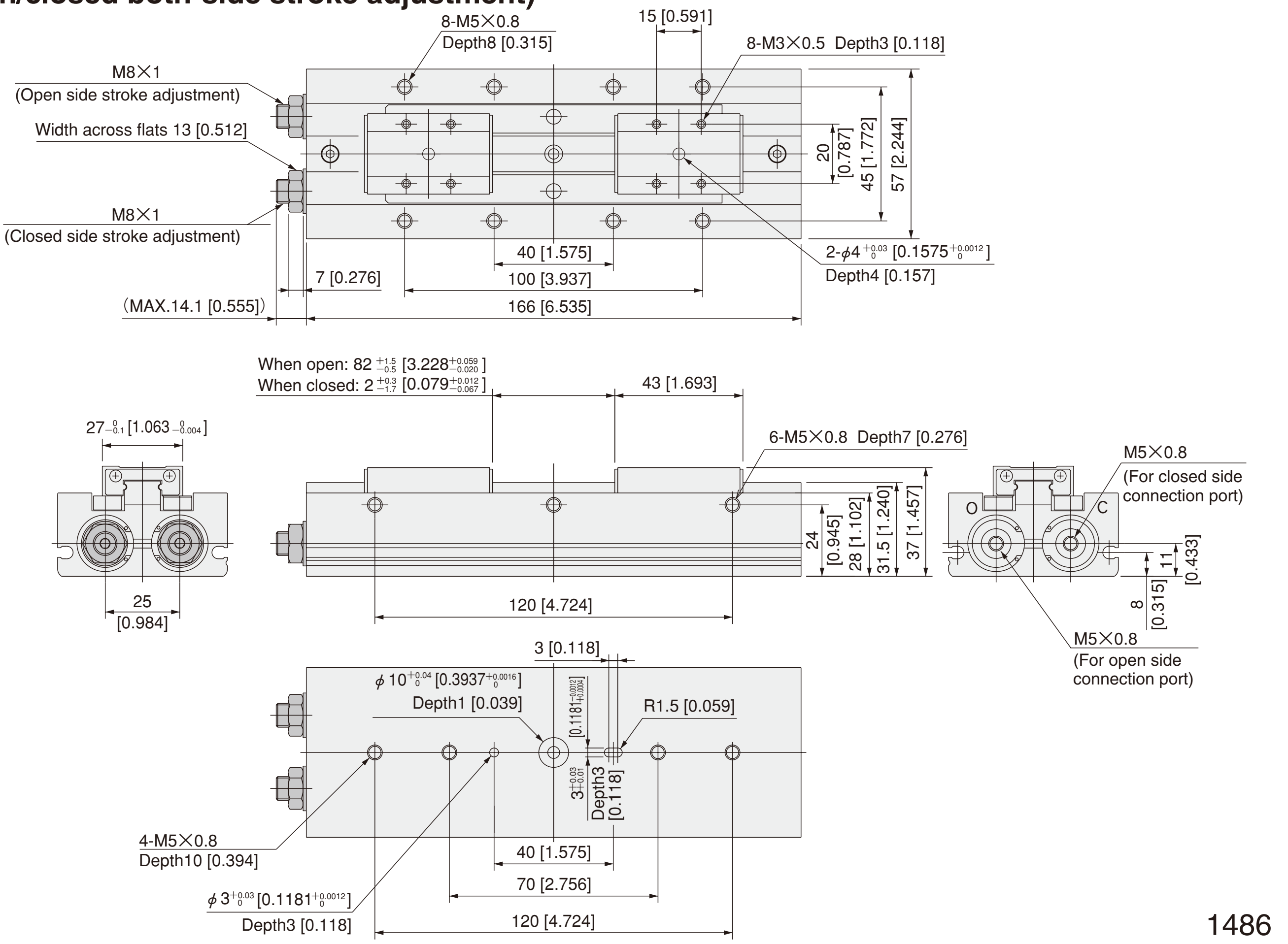


Dimensions of Long Type mm [in.]

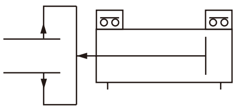
AFDPGL-18-JB
(Closed side stroke adjustment)



AFDPGL-18-JC
(Open/closed both-side stroke adjustment)



Symbol



Order Codes

●Sensor switch only

☐ ☐ — **AFDPG**

Flat type air hands

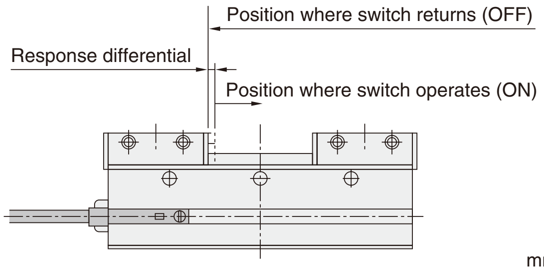
Lead wire length
A — 1000mm [39in.]
B — 3000mm [118in.]

ZE135 — Solid state type 2-lead wire with indicator lamp DC10～28V Horizontal lead wire
ZE235 — Solid state type 2-lead wire with indicator lamp DC10～28V Vertical lead wire
ZE155 — Solid state type 3-lead wire with indicator lamp DC4.5～28V Horizontal lead wire
ZE255 — Solid state type 3-lead wire with indicator lamp DC4.5～28V Vertical lead wire

●For details of sensor switches, see p.1544.

Sensor Switch Response Differential and Operating Position Repeatability

●Open/closed stroke differential
The stroke differential between the point where the lever on one side moves and turns the switch ON and the point where the switch is turned OFF as the lever travels in the opposite direction.
●Operating position repeatability
When the lever on one side moves in the same direction, operating position repeatability is defined as the range of the deviation of the position where the switch is turned ON or turned OFF.



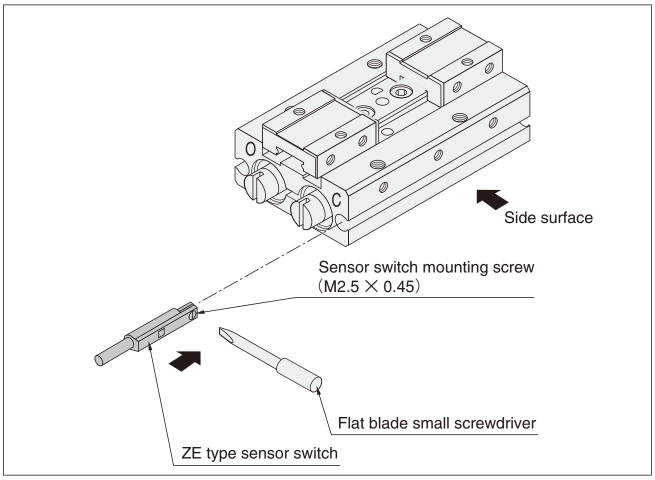
mm [in.]

Model	Open/closed stroke differential	Operating position repeatability	Operating range
AFDPG-6	0.2 [0.008]	0.2 [0.008]	2.1 [0.083]
AFDPG(H)-8	0.2 [0.008]	0.2 [0.008]	2.6 [0.102]
AFDPG(H)-12	0.2 [0.008]	0.2 [0.008]	3.1 [0.122]
AFDPG(L)-14	0.2 [0.008]	0.2 [0.008]	4.5 [0.177]
AFDPG(L)-18	0.2 [0.008]	0.2 [0.008]	4.4 [0.173]

Remark: The above table shows reference values.

Mounting Sensor Switch

Tighten the mounting screw after the sensor switch is inserted in the switch mounting groove in the direction of the arrow in the diagram and moved to the proper location. Tightening torque of the mounting screw is 0.1～0.2N･m [0.9～1.8in･lbf].



Caution: Care must be exercised that the sensor switch cannot be inserted into the switch mounting groove from the diagram's side surface direction.

Mounting Location of Sensor Switch

When the sensor switch is mounted in the locations shown below, the magnet in the piston comes to the maximum sensing location of the sensor switch at the end of the stroke.

Cylinder bore size (mm [in.])	**6 [0.236]**		**8 [0.315]**		**12 [0.472]**		**14 [0.551]**		**18 [0.709]**	
Sensor switch mounting location (mm [in.])	**L1**	**L2**	**L1**	**L2**	**L1**	**L2**	**L1**	**L2**	**L1**	**L2**
	18.5 [0.728]	6 [0.236]	21 [0.827]	7.5 [0.295]	23.5 [0.925]	10 [0.394]	19 [0.748]	6 [0.236]	20 [0.787]	7 [0.276]