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JQA-QMA10823 KOSMEK HEAD OFFICE  
2021/10 First 1Ry

**New**

# Bore Locating Cylinder

High-Accuracy Locating Bore Holes up to  $\phi$  129mm



Model VFP



Bore Locating Cylinder

# Bore Locating Cylinder

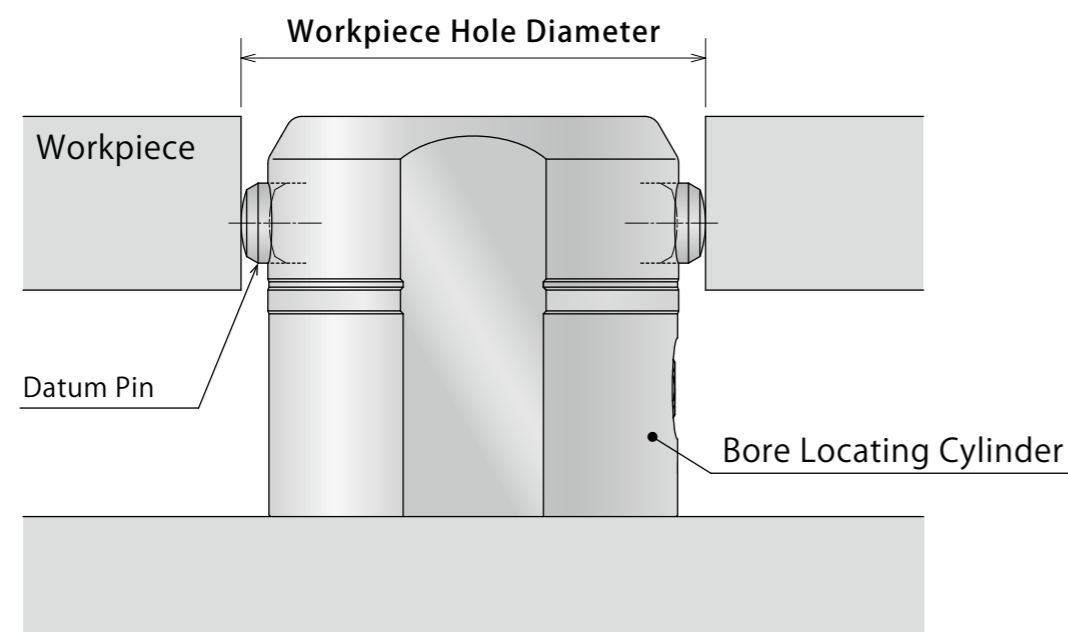
Model VFP



Large Expansion Stroke,  
Zero Clearance with Datum Hole.

## Max. Applicable Workpiece Hole : $\phi 129$

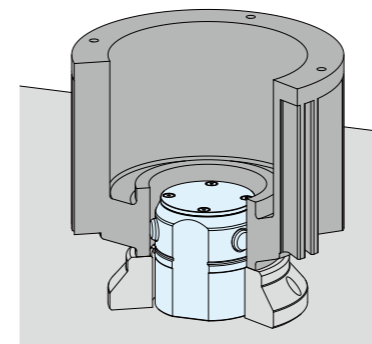
Line-up of 4 body sizes according to workpiece hole diameters.



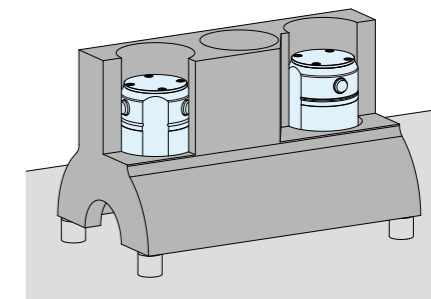
Model No.	VFP0600-□ VFP0600-□-M	VFP0800-□ VFP0800-□-M	VFP1000-□ VFP1000-□-M	VFP1200-□ VFP1200-□-M
Workpiece Hole Diam. mm	$\phi 60 \sim \phi 65$	$\phi 80 \sim \phi 86$	$\phi 100 \sim \phi 107$	$\phi 120 \sim \phi 129$
Locating Repeatability mm	0.02	0.02	0.03	0.03

### Application Examples

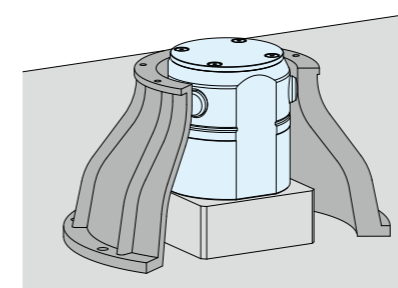
#### Centering and Locating of Large-Diameter Hole



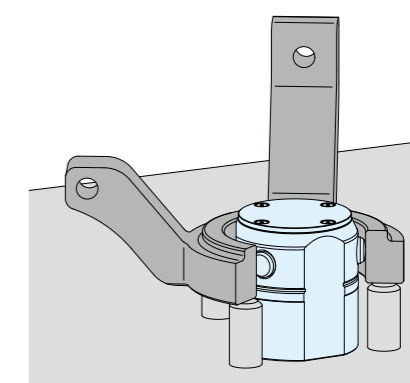
Centering of Motor Housing



Positioning of Cylinder Block



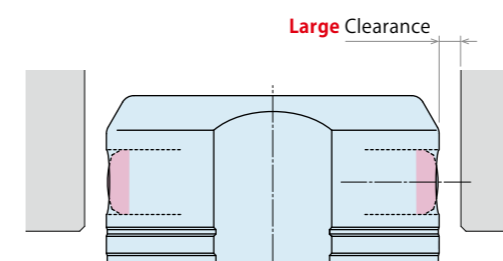
Centering of Transmission Case



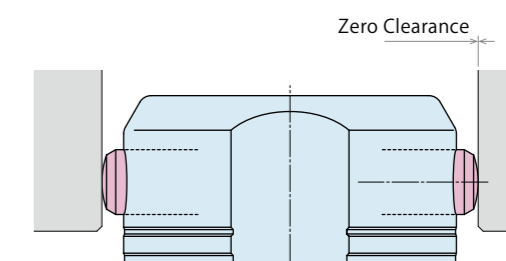
Centering of Knuckle

### Excellent Workpiece Loading and Unloading

Long stroke of the pin allows for large clearance when released, simplifying loading and unloading the workpiece.



When Released



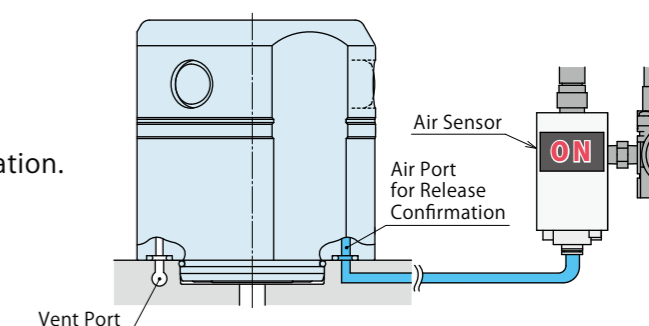
When Locked

#### OPTION

### Release Confirmation

An air sensor enables release action confirmation.

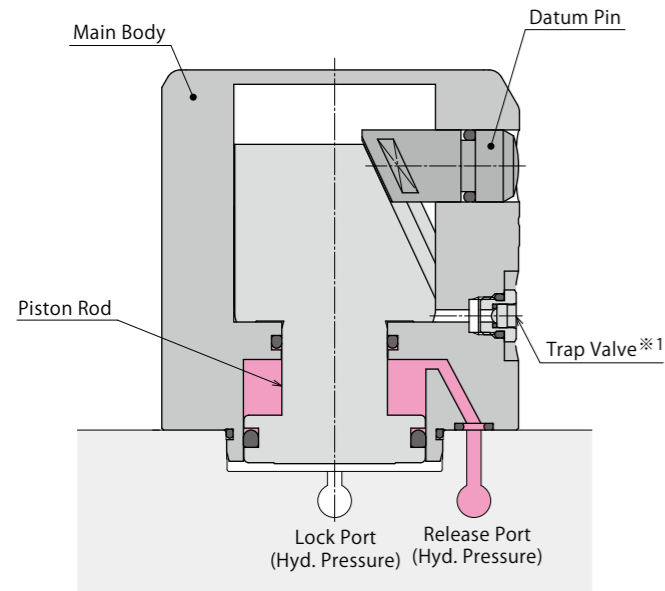
※ Action Confirmation : Blank does not have the release action confirmation function.



Action Description

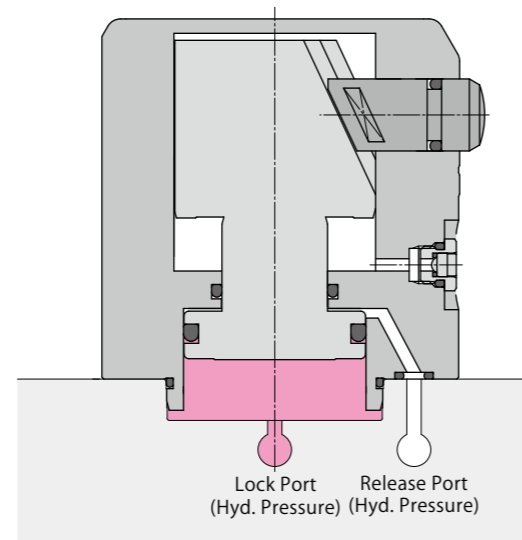
Release Action

When hydraulic pressure is supplied to the release port, the piston rod descends and the datum pin is retracted.



Lock Action

When hydraulic pressure is supplied to the lock port, the piston rod ascends and the datum pin expands to locate a workpiece.



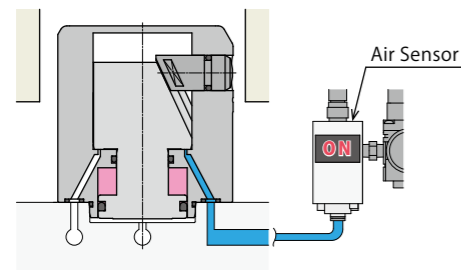
Notes :

- 1. Refer to P.6 for the action description of the release confirmation model.
- \*1. The trap valve is NOT provided for the release confirmation model.

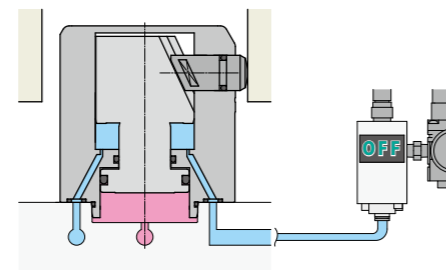
OPTION Release Confirmation Model

VFP 060 0 -  $\begin{matrix} D \\ C \end{matrix}$  - M Refer to P.5 ~ P.6 for release confirmation model.

● Release Action (Air Sensor ON)



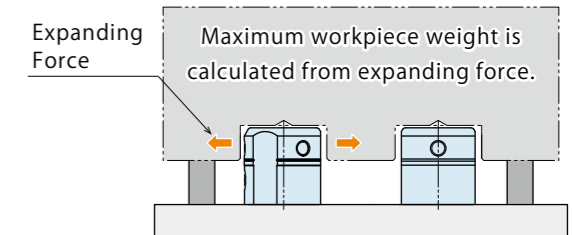
● Lock Action (Air Sensor OFF)



Essential Points

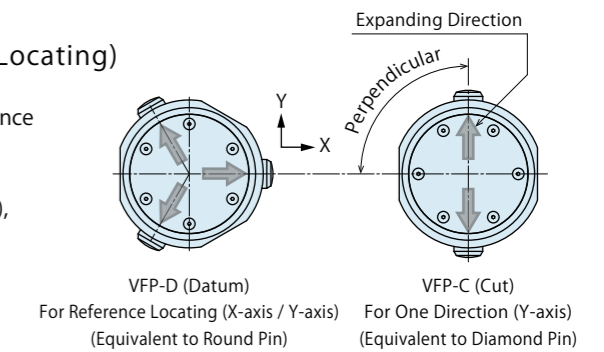
1 Workpiece Weight

- Workpiece weight that the bore locating cylinder is able to locate with is calculated from expanding force.
- Expanding force is the force that the bore locating cylinder pushes out (expands) against the workpiece.
- Refer to the specification page for each model's calculation method of expanding force and allowable workpiece weight for locating.



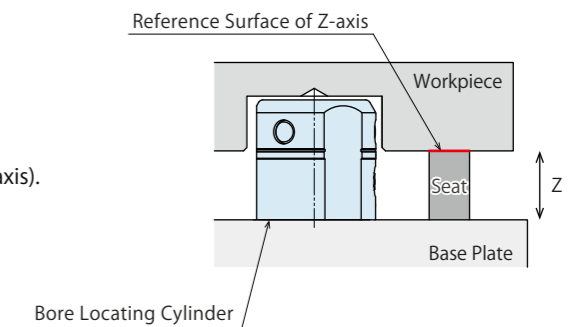
2 Mounting Phase of VFP-C (Cut : for One Direction Locating)

- Reference position (origin) is determined by VFP-D (Datum : for reference locating).
  - VFP-C (Cut : for one direction locating) locates in one direction (Y-axis), so phasing is necessary.
- When mounting, ensure the expanding direction of VFP-C (Cut) is perpendicular to VFP-D (Datum).



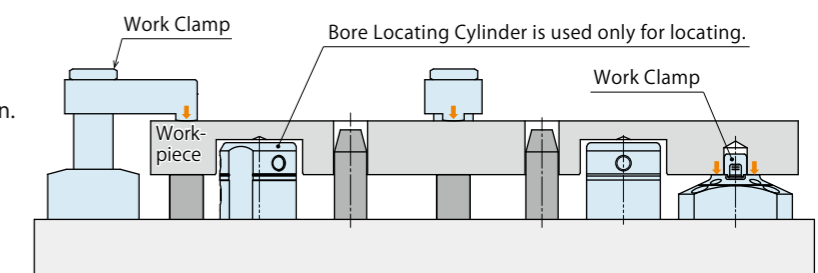
3 Seat Setting

- This product has no seating surface (reference surface towards Z-axis). Please prepare the seat separately.



4 Setting Additional Work Clamps

- Bore locating cylinder has no clamping function.
- Additional clamps should be added to clamp workpieces.



● Action Description (Air Sensing Chart Explanation)

Action confirmation can be conducted by detecting differential pressure with the air sensor.

Applicable Model

VFP 060 0 - D - M

4 Action Confirmation  
M : Release Confirmation

■ Air Sensor

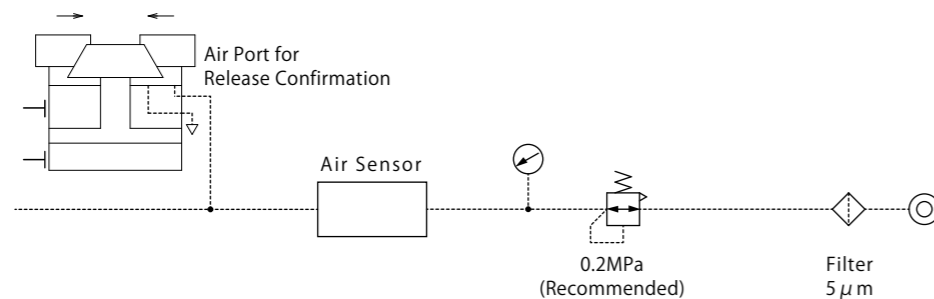
- Requires an air sensor in order to confirm release action. Sensing is possible with the air sensor with small flow rate. (Recommended air sensors are listed below.)

Recommended Operating Air Pressure : 0.2MPa

Recommended Air Sensor

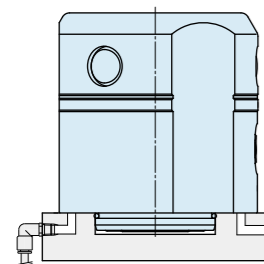
Maker	SMC	CKD
Name	Air Catch Sensor	Gap Switch
Model No.	ISA3-G	GPS3-E

- Please refer to maker's catalog, etc. for the details about the air sensor.
- Continuously supply air pressure when in use.
- Refer to the drawing below for the air circuit construction.

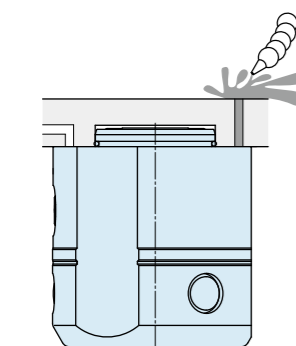


■ Notes for Design • Installation • Use

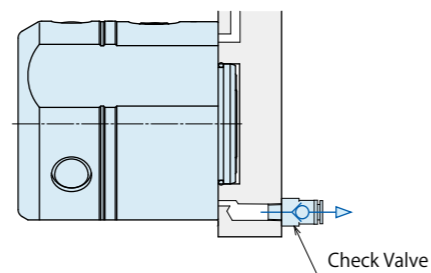
- Air vent port must be open to the atmosphere, and prevent coolant and chips from entering the air vent port. The air sensor can malfunction if the air vent port is blocked.
- Continuously supply air pressure to the air port for release confirmation when in use.
- Prevention of Contaminants to the Air Port  
Coolant and chips can be prevented by setting a check valve with low cracking pressure. (Recommended Check Valve : SMC-made AKH series, cracking pressure 0.005MPa)



○ The air vent port is open to the atmosphere.

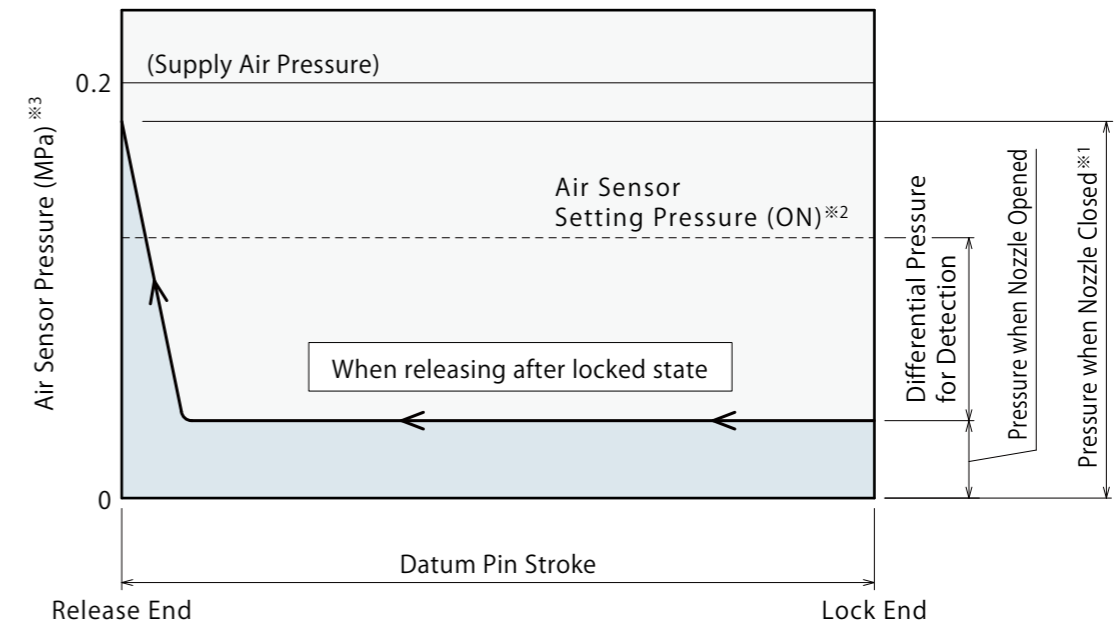


✗ Coolant and chips enter from the air vent hole.

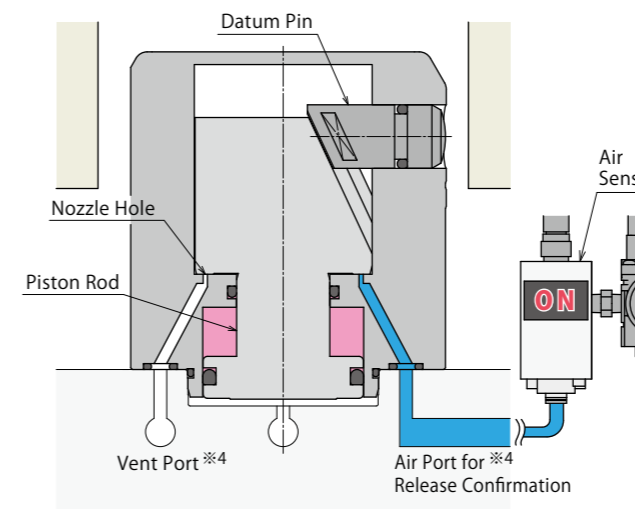


■ Air Sensing Chart

When Connected to 1 Cylinder

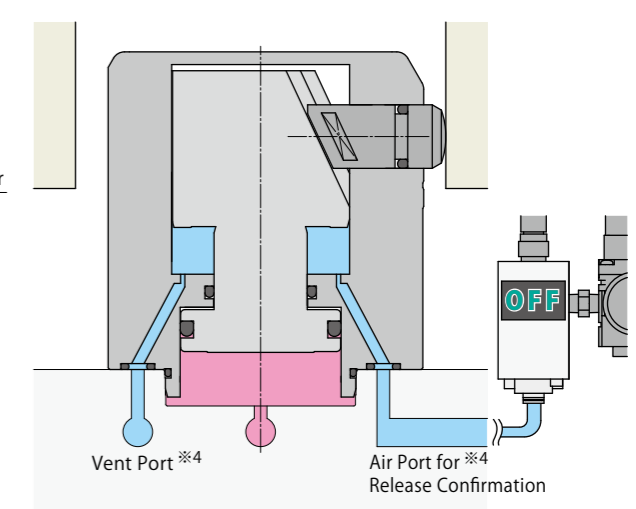


Release Action (Air Sensor ON)



Hydraulic Pressure Switch		Release Confirmation
Lock Hyd.	Release Hyd.	(Air Sensor)
OFF	ON	ON

Lock Action (Air Sensor OFF)

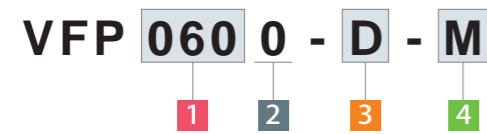


Hydraulic Pressure Switch		Release Confirmation
Lock Hyd.	Release Hyd.	(Air Sensor)
ON	OFF	OFF

Notes :

1. The sensing chart shows the relationship between the datum pin stroke and the air sensor pressure.
2. The specifications may vary depending on the air circuit construction. The length of hose should be as short as possible. (Suggest shorter than 5m)
- ※1. The position where the pressure for closing nozzle is reached is the release end. (Refer to the sensing chart.)
- ※2. The position of a signal from air sensor output varies depending on the sensor setting.
- ※3. The air sensor pressure varies depending on the number of cylinders connected per circuit. The air sensor pressure will be lower as the connected number is increased.
- ※4. The air port for release confirmation and the vent port are interchangeable.

Model No. Indication



1 Body Size

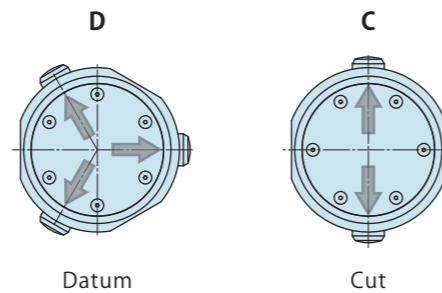
- 060** : Workpiece Hole Diameter  $\phi 60 \sim \phi 65$
- 080** : Workpiece Hole Diameter  $\phi 80 \sim \phi 86$
- 100** : Workpiece Hole Diameter  $\phi 100 \sim \phi 107$
- 120** : Workpiece Hole Diameter  $\phi 120 \sim \phi 129$

2 Design No.

- 0** : Revision Number

3 Functions

- D** : Datum (for Reference Locating)
- C** : Cut (for One Direction Locating)



4 Action Confirmation

- Blank** : None (Standard)
- M** : Release Confirmation

Specifications

Model No.	VFP0600-□-□	VFP0800-□-□	VFP1000-□-□	VFP1200-□-□
Workpiece Hole Diam. mm	$\phi 60 \sim 65$	$\phi 80 \sim 86$	$\phi 100 \sim 107$	$\phi 120 \sim 129$
Locating Repeatability <sup>※1</sup> mm	0.02	0.02	0.03	0.03
Datum Diameter mm	At Release	$\phi 58$ or less	$\phi 77$ or less	$\phi 96$ or less
	At Full Stroke	$\phi 66$ or more	$\phi 87$ or more	$\phi 108$ or more
Expanding Force (F) <sup>※2</sup> kN	at 1.5MPa	0.5	0.8	1.1
	at 2.5MPa	0.9	1.3	1.8
	at 5.0MPa	1.7	2.6	3.5
Cylinder Capacity (Empty Action) cm <sup>3</sup>	Lock	7.2	13.2	20.3
	Release	4.8	8.7	13.4
Operating Pressure Range MPa	1.5 ~ 7.0			
Withstanding Pressure MPa	10.5			
Air Pressure only for <b>4M</b> MPa	0.2			
Operating Temperature Range °C	0 ~ 70			
Usable Fluid	General Hydraulic Oil equivalent to ISO-VG-32			
Weight kg	1.2	2.5	4.4	7.4

Notes :

- ※1. It shows the locating repeatability under specific condition (when no load is applied).
- ※2. Expanding force shows the calculated value when coefficient friction is  $\mu 0.2$ . Refer to the following chart for the relative equation of expanding force and allowable workpiece weight for locating.
  - This product locates and releases with hydraulic pressure. (Hydraulic Pressure Double Acting Model)
  - This product is used only for locating and does not have a clamping function.

Relative Equation of Expanding Force and Allowable Workpiece Weight for Locating

Horizontal Attitude

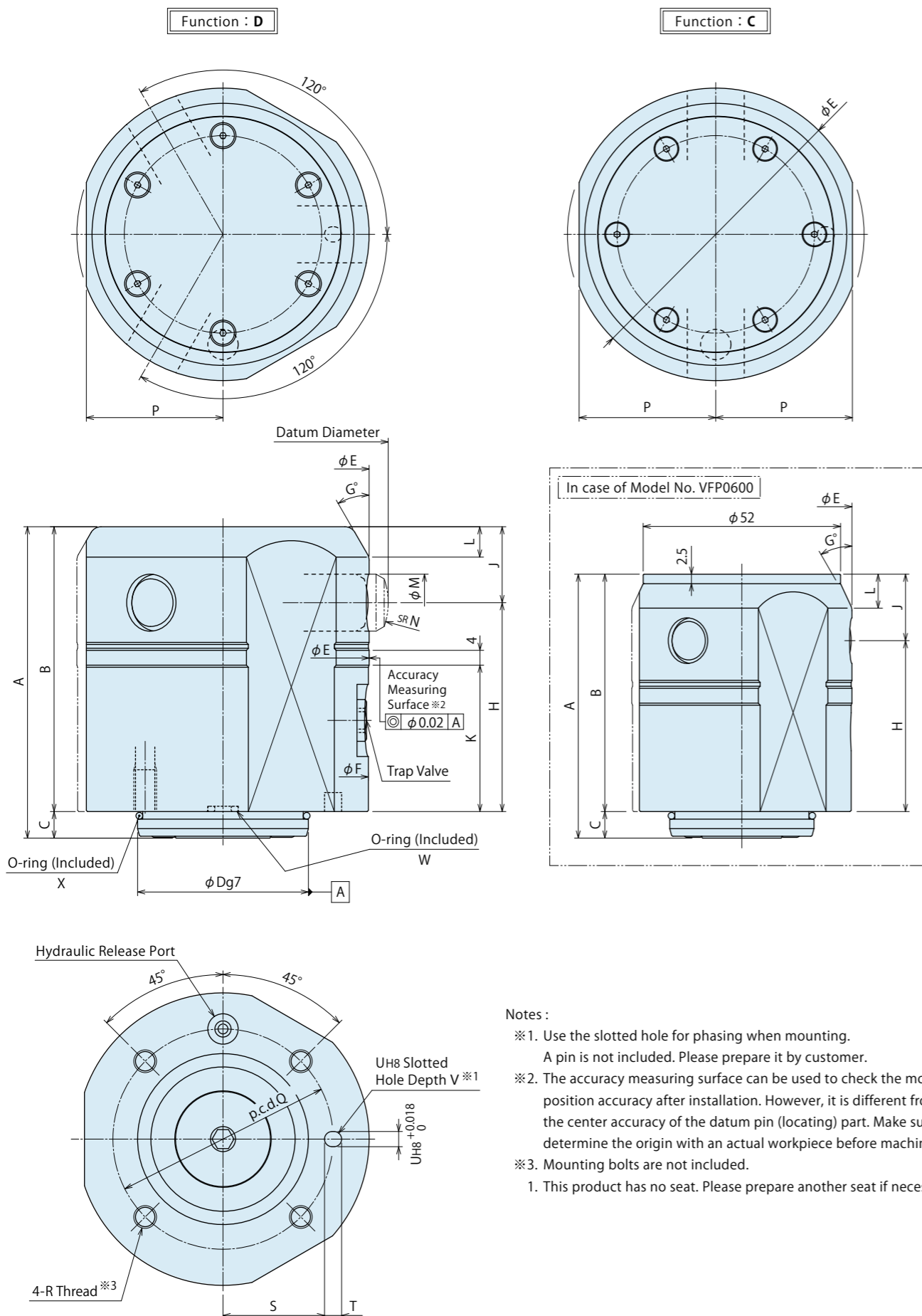
$$\text{Workpiece Weight (W) [kg]} \leq \frac{\text{Expanding Force per Expansion Locating Pin (F) [N]} \times \text{Efficiency } 0.25}{\text{Friction Coefficient of Workpiece Seat Face } (\mu) \times 9.8}$$

Vertical Attitude

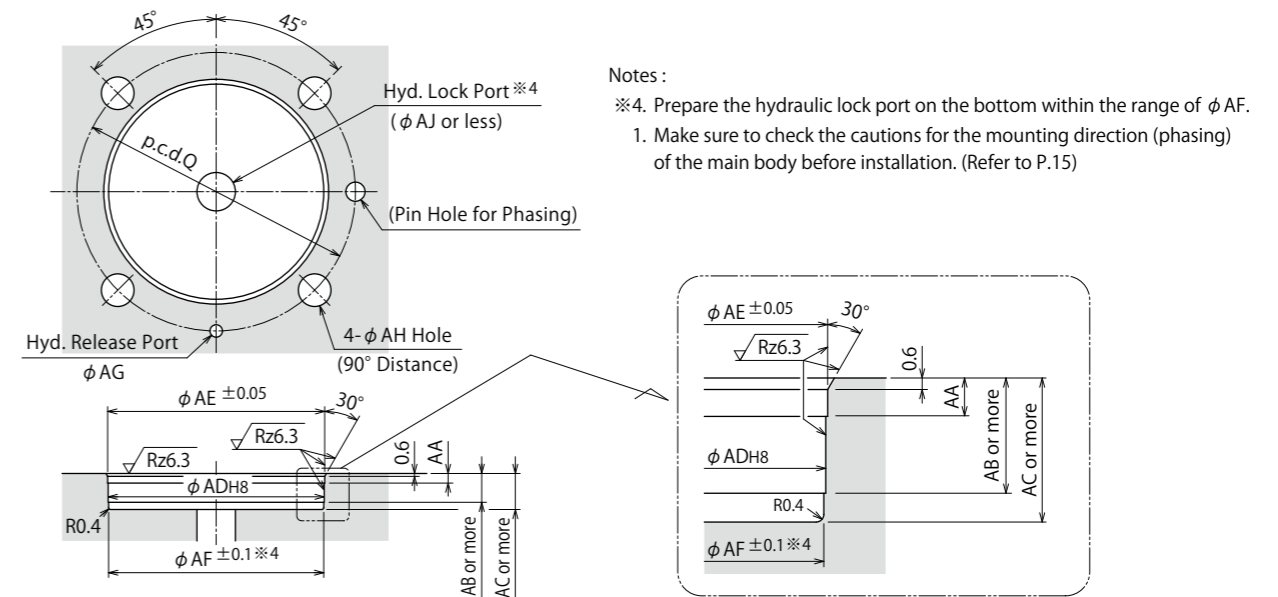
$$\text{Workpiece Weight (W) [kg]} \leq \frac{\text{Expanding Force per Expansion Locating Pin (F) [N]} \times \text{Efficiency } 0.25}{9.8}$$

External Dimensions

※ The drawing shows the released state of VFP0800-D.



Machining Dimensions for Mounting



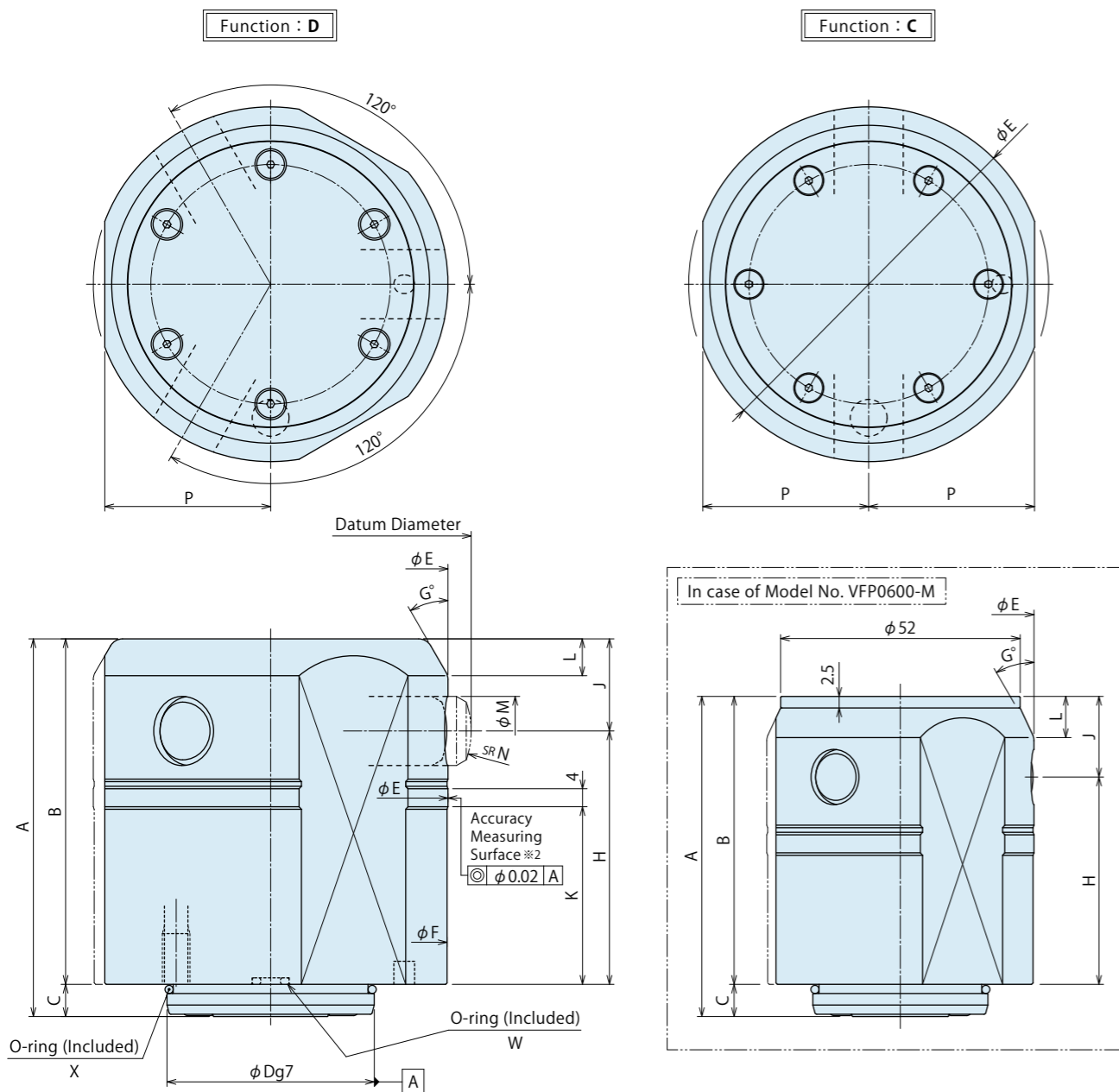
External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	VFP0600-□	VFP0800-□	VFP1000-□	VFP1200-□
Workpiece Hole Diameter	$\phi 60 \sim 65$	$\phi 80 \sim 86$	$\phi 100 \sim 107$	$\phi 120 \sim 129$
Datum Diameter	When Released $\phi 58$ or less When Fully Stroked $\phi 66$ or more	$\phi 77$ or less $\phi 87$ or more	$\phi 96$ or less $\phi 108$ or more	$\phi 116$ or less $\phi 130$ or more
A	69.5	82	90	103
B	62.5	75	82	95
C	7	7	8	8
D	$38^{+0.009}_{-0.034}$	$45^{+0.009}_{-0.034}$	$58^{+0.010}_{-0.040}$	$64^{+0.010}_{-0.040}$
E	58	77	96	116
F	57.6	76.6	95.6	115.6
G	25	30	30	30
H	45	55	60	70
J	17.5	20	22	25
K	28.5	38.5	40.5	48.5
L	9	8	9	10
M	12	15	18	20
N	15	19	22.5	25
P	27	36	45.5	53.5
Q	48	58	73	84
R	M5×0.8 Thread Depth 8	M6×1 Thread Depth 11	M8×1.25 Thread Depth 13	M10×1.5 Thread Depth 15
S	21.75	26.75	33.75	39.25
T	4.5	4.5	5.5	5.5
U	4	4	5	5
V	5	5	6	6
W	AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N
X	AS568-028(90)	AS568-030(90)	AS568-137(90)	AS568-141(90)
AA	2	2	2.8	2.8
AB	6	6	7	7
AC	7.5	7.5	8.5	8.5
AD	$38^{+0.039}_{0}$	$45^{+0.039}_{0}$	$58^{+0.046}_{0}$	$64^{+0.046}_{0}$
AE	38.2	45.2	58.2	64.2
AF	37.8	44.8	57.8	63.8
AG	2.6	3	5	5
AH	5.5	6.8	9	11
AJ	8	8	10	10

External Dimensions

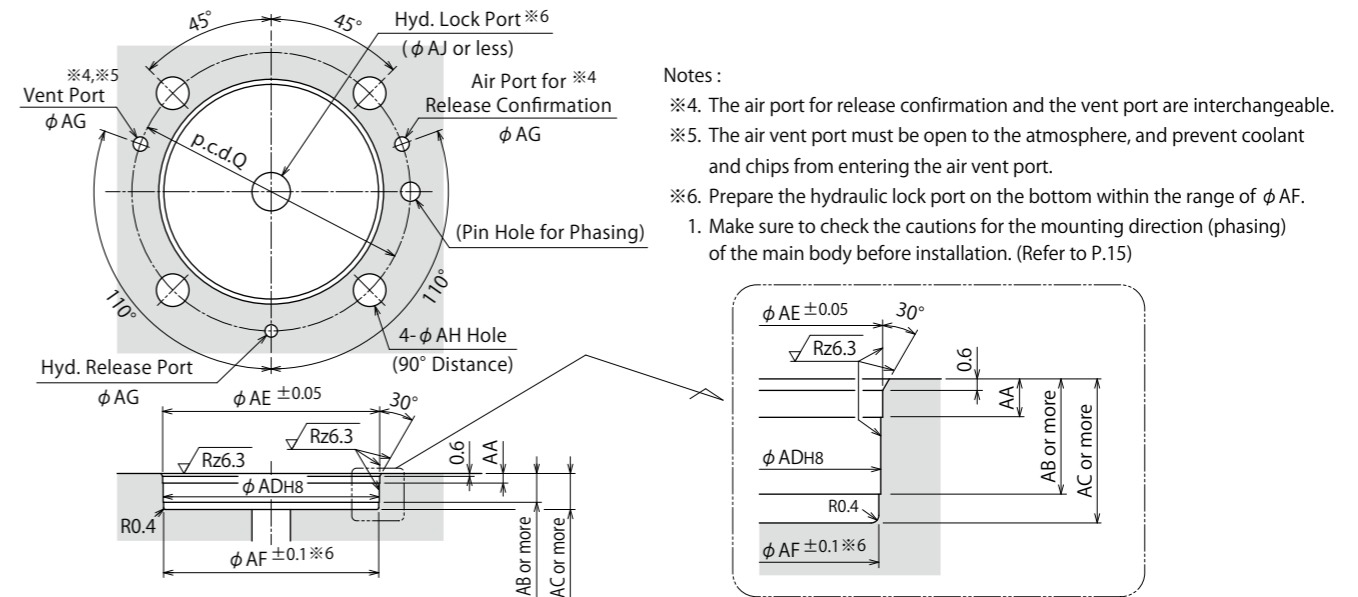
※ The drawing shows the released state of VFP0800-D-M.



Notes :

- ※1. Use the long hole for phasing when mounting.  
A pin is not included. Please prepare it by customer.
- ※2. The accuracy measuring surface can be used to check the mounting position accuracy after installation. However, it is different from the center accuracy of the datum pin (locating) part. Make sure to determine the origin with an actual workpiece before machining.
- ※3. Mounting bolts are not included.  
1. This product has no seat. Please prepare another seat if necessary.

Machining Dimensions for Mounting



- Notes :
- ※4. The air port for release confirmation and the vent port are interchangeable.
  - ※5. The air vent port must be open to the atmosphere, and prevent coolant and chips from entering the air vent port.
  - ※6. Prepare the hydraulic lock port on the bottom within the range of φ AF.
1. Make sure to check the cautions for the mounting direction (phasing) of the main body before installation. (Refer to P.15)

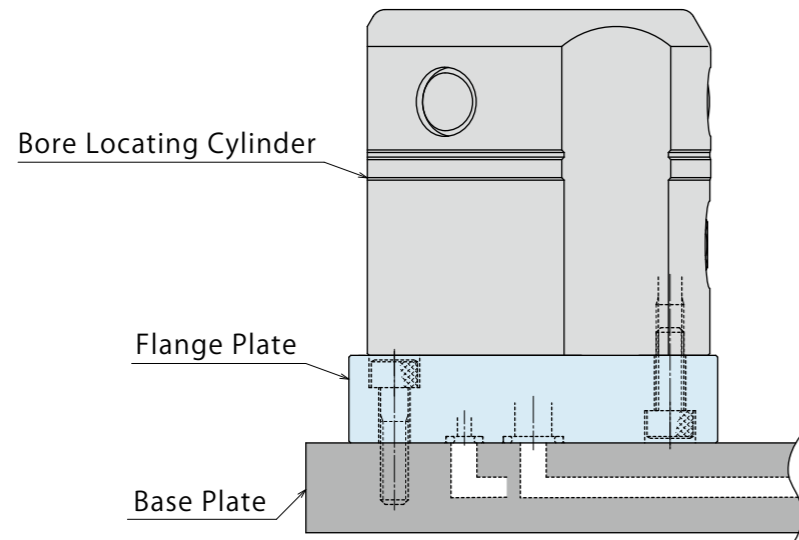
External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	VFP0600-□-M	VFP0800-□-M	VFP1000-□-M	VFP1200-□-M
Workpiece Hole Diameter	φ 60 ~ 65	φ 80 ~ 86	φ 100 ~ 107	φ 120 ~ 129
Datum Diameter	When Released	φ 58 or less	φ 77 or less	φ 96 or less
	When Fully Stroked	φ 66 or more	φ 87 or more	φ 108 or more
A	69.5	82	90	103
B	62.5	75	82	95
C	7	7	8	8
D	38 <sup>-0.009</sup> <sub>-0.034</sub>	45 <sup>-0.009</sup> <sub>-0.034</sub>	58 <sup>-0.010</sup> <sub>-0.040</sub>	64 <sup>-0.010</sup> <sub>-0.040</sub>
E	58	77	96	116
F	57.6	76.6	95.6	115.6
G	25	30	30	30
H	45	55	60	70
J	17.5	20	22	25
K	28.5	38.5	40.5	48.5
L	9	8	9	10
M	12	15	18	20
N	15	19	22.5	25
P	27	36	45.5	53.5
Q	48	58	73	84
R	M5×0.8 Thread Depth 8	M6×1 Thread Depth 11	M8×1.25 Thread Depth 13	M10×1.5 Thread Depth 15
S	21.75	26.75	33.75	39.25
T	4.5	4.5	5.5	5.5
U	4	4	5	5
V	5	5	6	6
W	AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N
X	AS568-028(90)	AS568-030(90)	AS568-137(90)	AS568-141(90)
AA	2	2	2.8	2.8
AB	6	6	7	7
AC	7.5	7.5	8.5	8.5
AD	38 <sup>+0.039</sup> <sub>0</sub>	45 <sup>+0.039</sup> <sub>0</sub>	58 <sup>+0.046</sup> <sub>0</sub>	64 <sup>+0.046</sup> <sub>0</sub>
AE	38.2	45.2	58.2	64.2
AF	37.8	44.8	57.8	63.8
AG	2.6	3	5	5
AH	5.5	6.8	9	11
AJ	8	8	10	10

Reference : Flange Plate Example

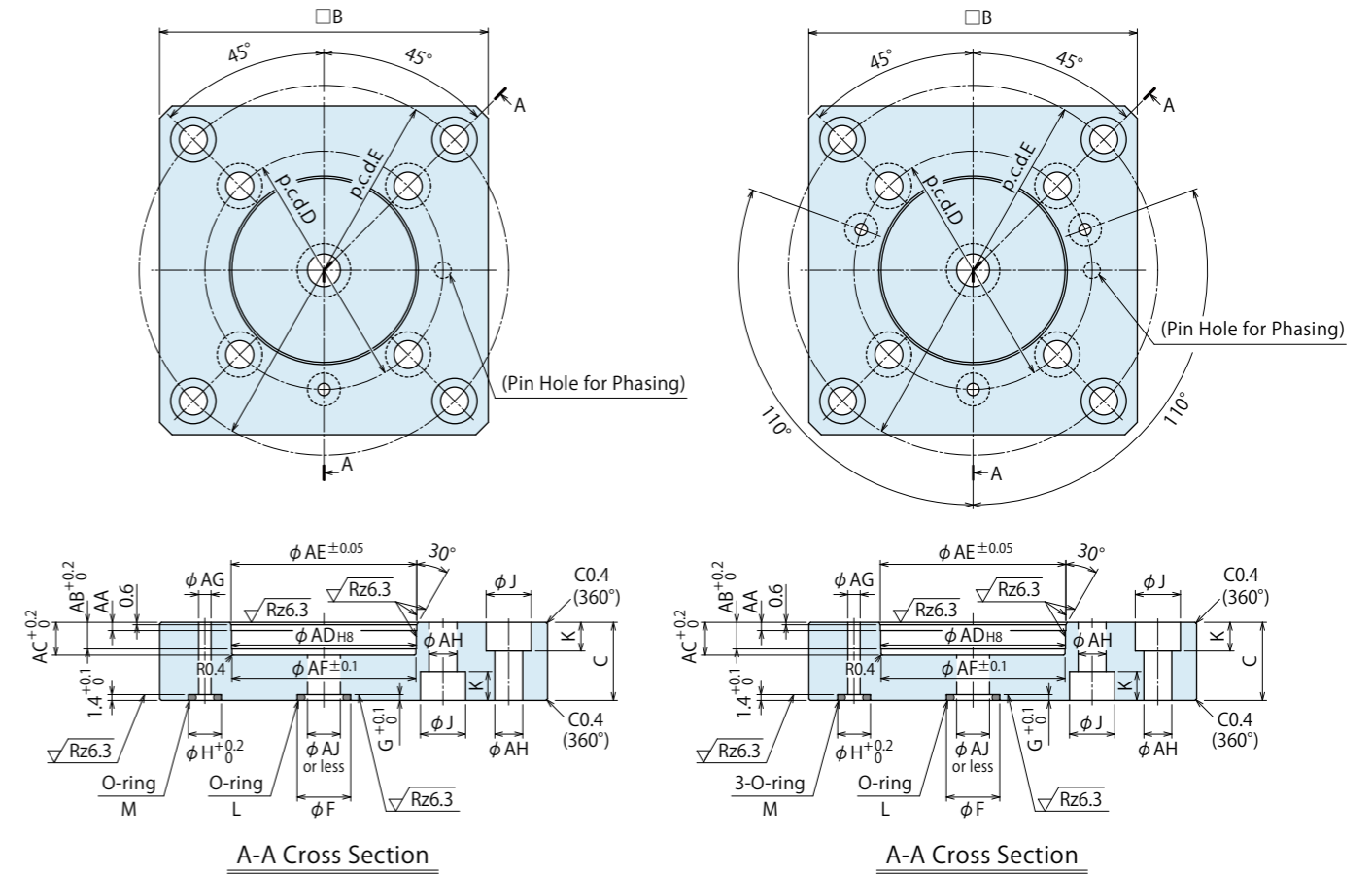
※ This shows a fixture (flange plate) design example when installing the bore locating cylinder above than the top surface of the base plate.



Flange Plate Reference External Dimensions

VFP□0-□ : For Standard Model

VFP□0-□-M : For Release Confirmation Model



Reference External Dimension List

Applicable Model No.	VFP0600-□-□	VFP0800-□-□	VFP1000-□-□	VFP1200-□-□
B	60	80	100	120
C	16	19	22	25
D	48	58	73	84
E	68	90	114	136
F	13 <sup>+0.2</sup> <sub>0</sub>	13 <sup>+0.2</sup> <sub>0</sub>	18 ±0.1	18 ±0.1
G	1.4	1.4	1.8	1.8
H	8	8	10	10
J	9	11	14	17.5
K	6	7	9	11
L ※1	OR NBR-90 P10-N	OR NBR-90 P10-N	OR NBR-90 P14-N	OR NBR-90 P14-N
M	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N
AA	2	2	2.8	2.8
AB	6	6	7	7
AC	7.5	7.5	8.5	8.5
AD	38 <sup>+0.039</sup> <sub>0</sub>	45 <sup>+0.039</sup> <sub>0</sub>	58 <sup>+0.046</sup> <sub>0</sub>	64 <sup>+0.046</sup> <sub>0</sub>
AE	38.2	45.2	58.2	64.2
AF	37.8	44.8	57.8	63.8
AG	2.6	3	5	5
AH	5.5	6.8	9	11
AJ	8	8	10	10

Note :

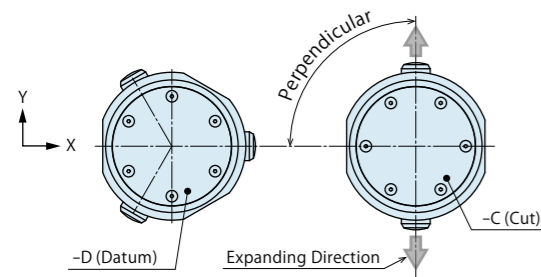
※1. The listed O-ring is an example. When changing the O-ring size, change φ F, φ G and φ AJ appropriately.



**Cautions**

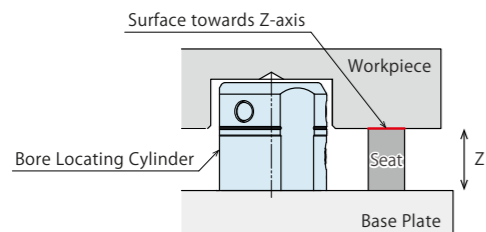
● Notes for Design

- 1) Check Specifications
  - Please use each product according to the specifications. VFP locates and releases with hydraulic pressure. (Hydraulic Double Acting Model)  
Operating pressure range is 1.5 ~ 7.0MPa.
- 2) Setting Up a Clamp
  - The bore locating cylinder is a positioning cylinder and has no clamping function. A clamp must be provided separately.
- 3) Mounting Direction (Phase)
  - The Cut (VFP-C) locates a workpiece in the direction of rotation, based on the datum (VFP-D). VFP-C (Cut : for locating in one direction) locates in one direction (Y-axis), so phasing is necessary. When mounting the product, make sure that expanding direction of -C (Cut) is perpendicular to -D (Datum).



4) Reference Surface towards Z-axis

- This product has no seating. Please prepare an additional seat if necessary.

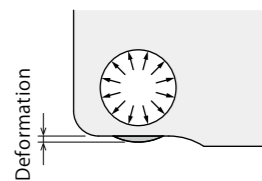


5) Inclination in the Z-axis direction.

- If a workpiece is loaded/unloaded in a tilted position when difference between the outer diameter of this product and the workpiece hole diameter is small, it causes damage on the bore locating cylinder and the workpiece. In this case, please prepare guide pin (rough guide), etc.

6) Thickness around the Workpiece Hole

- Thin wall around the workpiece hole could be deformed by expanding action, and locating accuracy would not fill the specification. Please conduct trial testing before use.



- 7) Make sure to check the notes for design, installation and use on P.5 in case of air sensing with an air sensor.

● Installation Notes

- 1) Usable Fluid
  - Use the appropriate fluid by referring to the Hydraulic Fluid List.
- 2) Preparation before Piping
  - The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
  - Dust and cutting chips in circuits may lead to oil leakage and malfunction.
  - Our products except for a part of valves are not provided with a filter which prevents contaminants from getting into the circuit.
- 3) Applying Sealing Tape
  - Wrap with tape 1 to 2 times following the screw direction.
  - Pieces of the sealing tape can lead to oil leakage and malfunction.
  - Please implement piping construction in a clear environment to prevent anything getting in products.
- 4) Installation / Removal of Bore Locating Cylinder
  - Use 4 bolts with hex holes (Strength Grade 12.9) and tighten them with torque as shown in the table below. Tighten them evenly to prevent tilting of the product.

Model No.	Mounting Bolt Size	Tightening Torque (N·m)
VFP0600	M5×0.8	6.3
VFP0800	M6×1	10
VFP1000	M8×1.25	25
VFP1200	M10×1.5	50

5) Air Bleeding of the Hydraulic Circuit

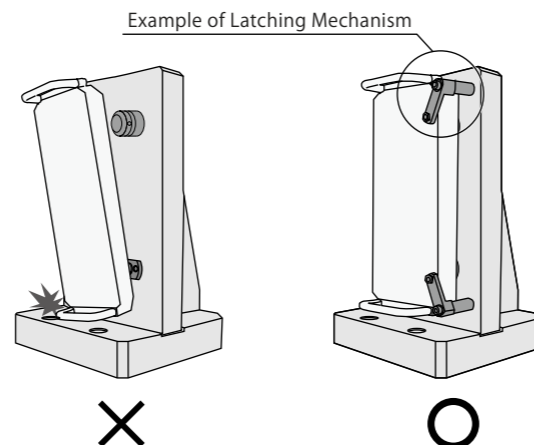
- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform air bleeding.

6) Checking Looseness and Retightening

- At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

7) When the workpiece is in vertical position.

- When setting a workpiece, make sure it is in proper proximity and square to the bore locating cylinders. If it is locked out of position, the products may be damaged.
- As the workpiece may fall down during releasing, it is recommended to set up the latching mechanism to prevent it from falling down.
- When the workpiece is used in vertical position (hanging on the wall), the internal moving parts tend to wear out. Check the locating accuracy regularly, and if exceeding the allowable range, replace the product.



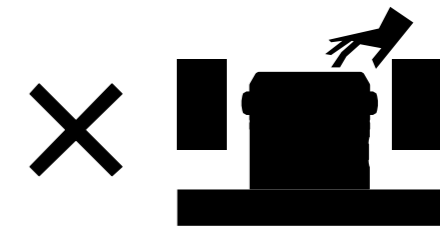
● Hydraulic Fluid List

Maker	ISO Viscosity Grade ISO-VG-32	
	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

Note : Please contact manufacturers when customers require products in the list above.

● Notes on Handling

- 1) It should be operated by qualified personnel.
  - The hydraulic machine and air compressor should be operated and maintained by qualified personnel.
- 2) Do not operate or remove the product unless the safety protocols are ensured.
  - ① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
  - ② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
  - ③ After stopping the product, do not remove until the temperature cools down.
  - ④ Make sure there is no trouble/issue in the bolts and respective parts before restarting the machine or equipment.
- 3) Do not touch the Bore Locating Cylinder while it is working. Otherwise, your hands may be injured due to clinching.

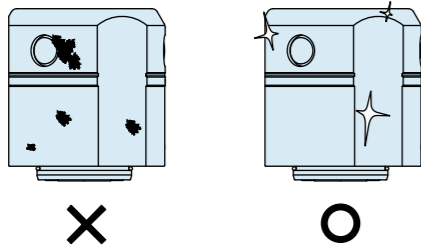


- 4) Do not disassemble or modify.
  - If the product is taken apart or modified, the warranty will be voided even within the warranty period.

## ● Cautions

### ● Maintenance and Inspection

- 1) Removal of the Product and Shut-off of Pressure Source
  - Before removing the product, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
  - Make sure there is no trouble/issue in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the bore locating cylinder.
  - If it is used when the surface is contaminated with dirt, it may lead to low locating accuracy, malfunctioning and oil leakage.



- 3) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.
- 4) Regularly tighten pipe line and mounting bolts to ensure proper use.
- 5) Make sure the hydraulic fluid has not deteriorated.
- 6) Make sure there is a smooth action without an irregular noise.
  - Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 7) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 8) Please contact us for overhaul and repair.
  - If there is malfunction even after cleaning the bore locating cylinder from outside, there may be contaminants or damage within internal parts. In this case, overhaul is required. Please call us for overhaul. If overhauled by unauthorized personnel, the warranty will be void even the period is still active.

### ● Warranty

- 1) Warranty Period
    - The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.
  - 2) Warranty Scope
    - If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense. Defects or failures caused by the following are not covered.
      - ① If the stipulated maintenance and inspection are not carried out.
      - ② Failure caused by the use of the non-confirming state at the user's discretion.
      - ③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
      - ④ If the defect is caused by reasons other than our responsibility.
      - ⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
      - ⑥ Other caused by natural disasters or calamities not attributable to our company.
      - ⑦ Parts or replacement expenses due to parts consumption and deterioration. (Such as rubber, plastic, seal material and some electric components.)
- Damages excluding from direct result of a product defect shall be excluded from the warranty.

## ● MEMO



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