Bore Locating Cylinder

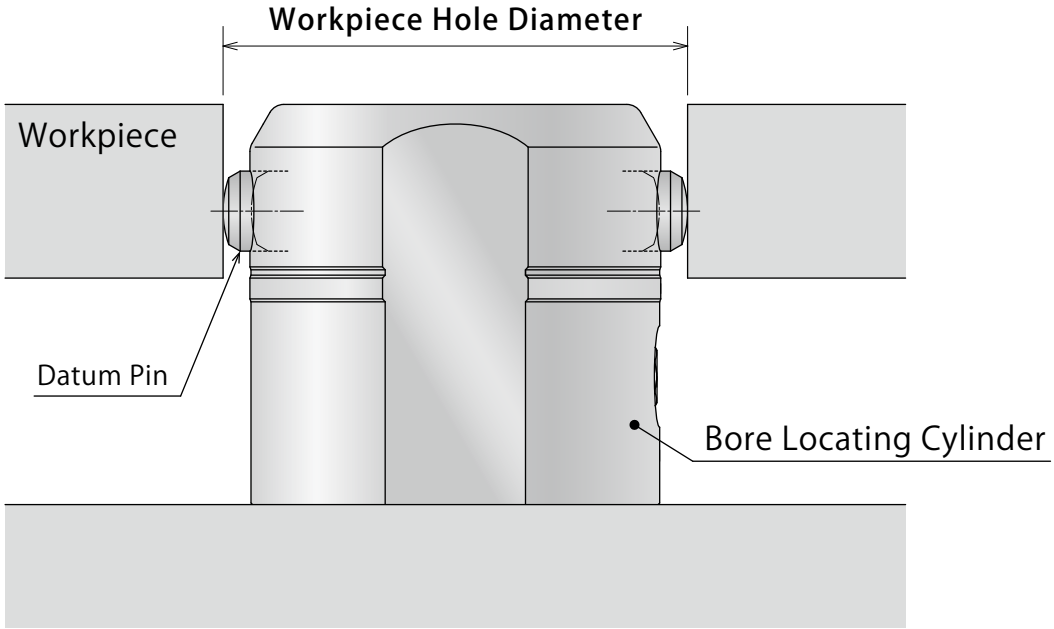
Model **VFP**

Additional Line-up :
VFP0300/0320/0360/0400/0450/0500 (Sep. 2024)
VFP0700/0900/1100 (Feb. 2025)

Large Expansion Stroke,
Zero Clearance with Datum Hole.

Max. Applicable Workpiece Hole : ϕ129

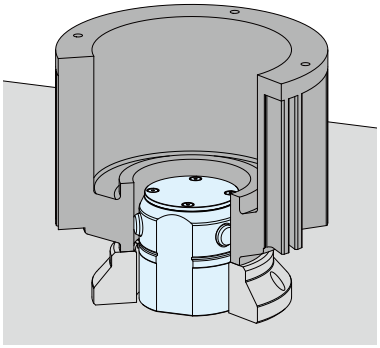
Line-up of 13 body sizes according to workpiece hole diameters.



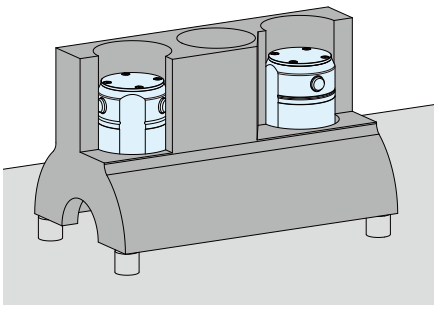
Model No.	VFP 0300	VFP 0320	VFP 0360	VFP 0400	VFP 0450	VFP 0500	VFP 0600	VFP 0700	VFP 0800	VFP 0900	VFP 1000	VFP 1100	VFP 1200
Workpiece Hole Diam. mm	ϕ30 ~ ϕ32	ϕ33 ~ ϕ35	ϕ36 ~ ϕ39	ϕ40 ~ ϕ44	ϕ45 ~ ϕ49	ϕ50 ~ ϕ54	ϕ60 ~ ϕ65	ϕ70 ~ ϕ75	ϕ80 ~ ϕ86	ϕ90 ~ ϕ96	ϕ100 ~ ϕ107	ϕ110 ~ ϕ117	ϕ120 ~ ϕ129
Locating Repeatability mm	0.02										0.03		

Application Examples

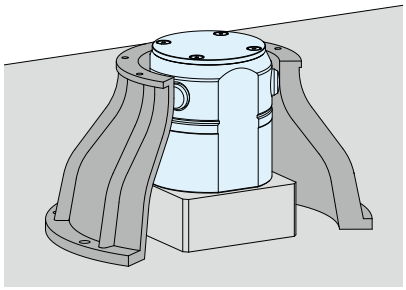
Centering and Locating of Large-Diameter Hole



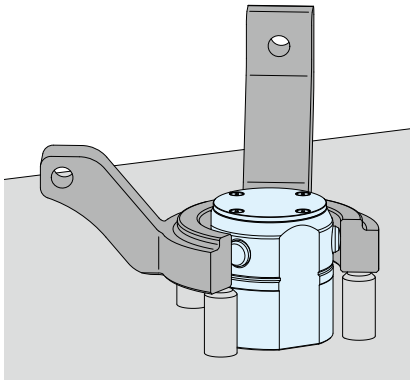
Centering of Motor Housing



Positioning of Cylinder Block



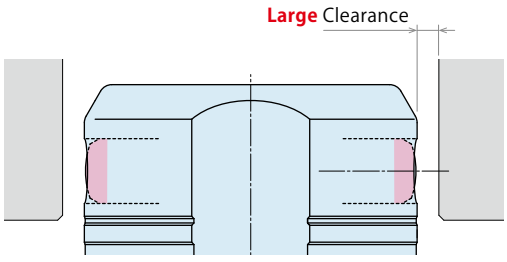
Centering of Transmission Case



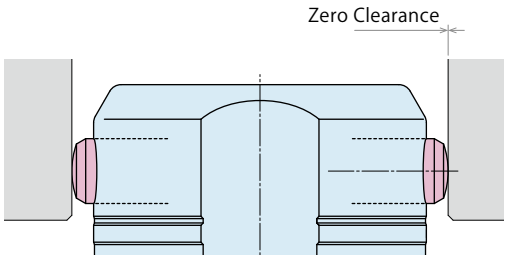
Centering of Knuckle

• Excellent Workpiece Loading and Unloading

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



When Released



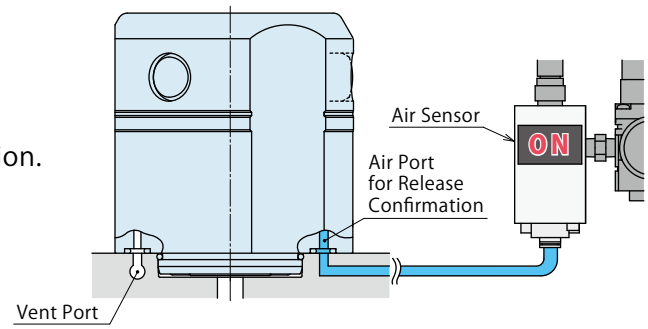
When Locked

OPTION

• Release Confirmation

An air sensor enables release action confirmation.

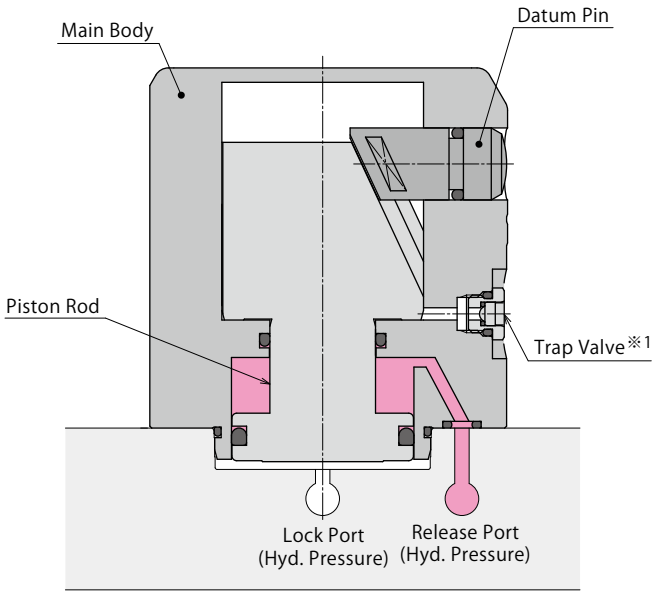
※ Action Confirmation：Blank does not have the release action confirmation function.



Action Description

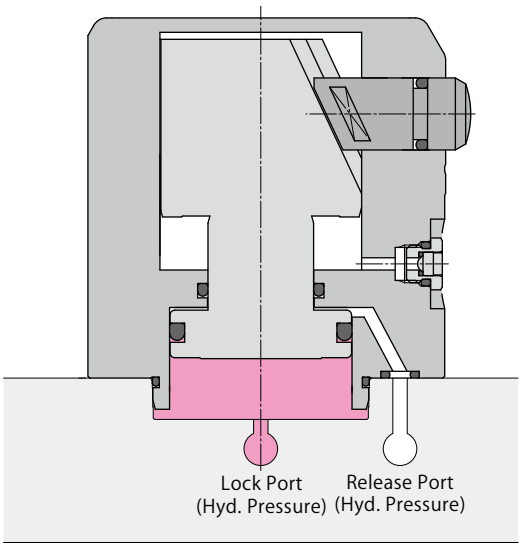
Release Action

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.

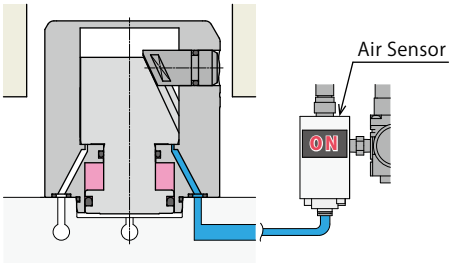
※1. The trap valve is NOT provided for the release confirmation model.

OPTION **Release Confirmation Model**

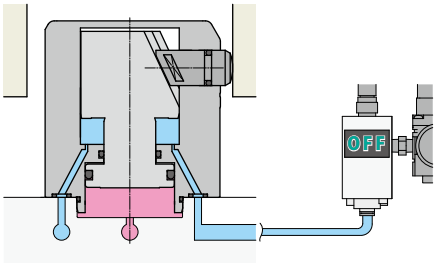
VFP 060 0 - D/C - M

Refer to P.5 ~ P.6 for release confirmation model.

● Release Action (Air Sensor ON)



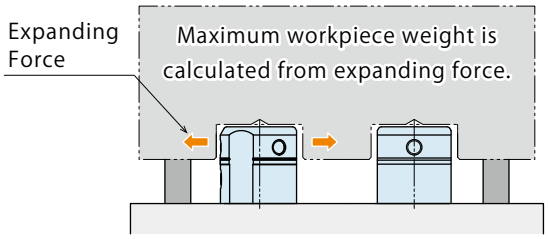
● Lock Action (Air Sensor OFF)



Essential Points

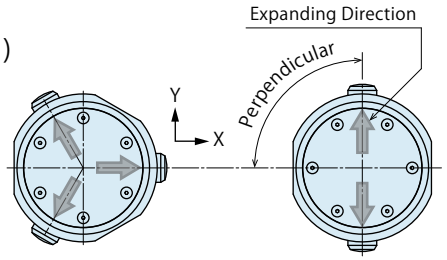
1 Workpiece Weight

- 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).

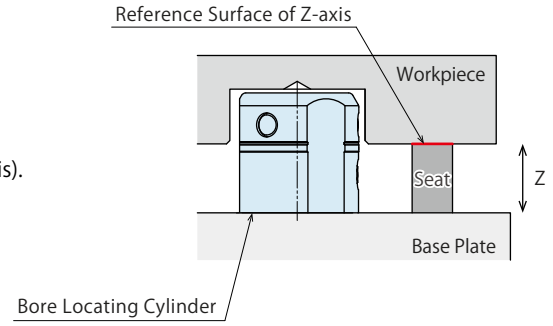


VFP-D (Datum)
For Reference Locating (X-axis / Y-axis)
(Equivalent to Round Pin)

VFP-C (Cut)
For One Direction (Y-axis)
(Equivalent to Diamond Pin)

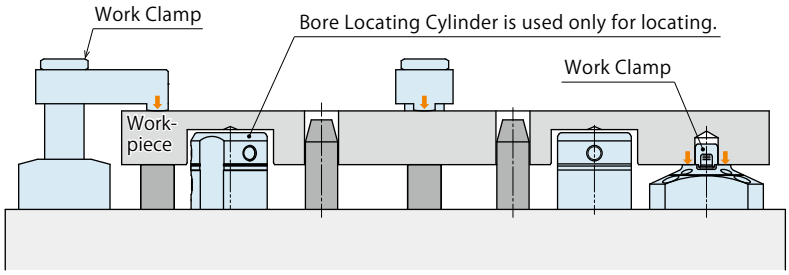
3 Seat Setting

- 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 - DC - M

4 Action Confirmation

M : Release Confirmation

Air Sensor

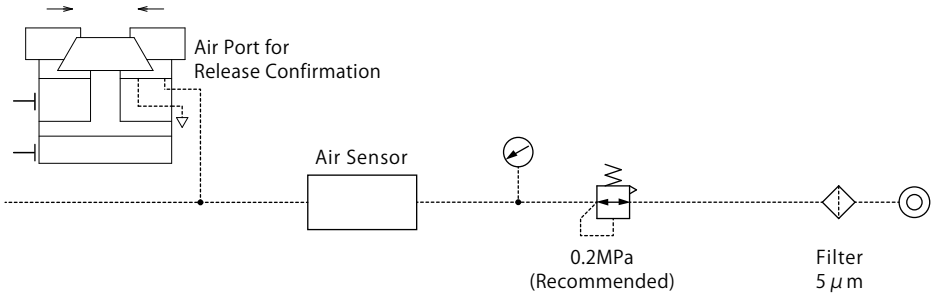
- Requires an air sensor in order to confirm release action.
  Sensing is possible with the air sensor with small flow rate. (Recommended air sensors are listed below.)

  Recommended Operating Air Pressure : 0.2MPa

Recommended Air Sensor

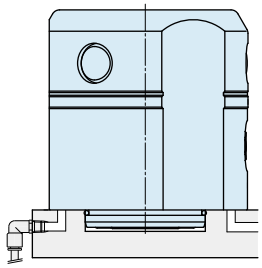
Manufacturer	SMC	CKD
Name	Air Catch Sensor	Gap Switch
Model No.	ISA3-G	GPS3-E

- 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.

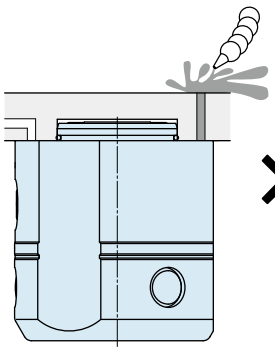


Notes for Design・Installation・Use

- 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.



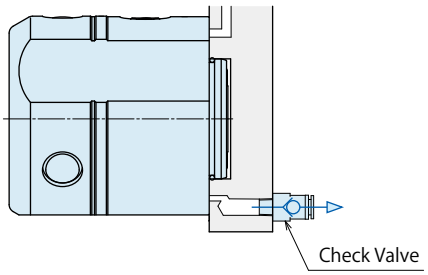
O The air vent port is open to the atmosphere.



× Coolant and chips enter from the air vent hole.

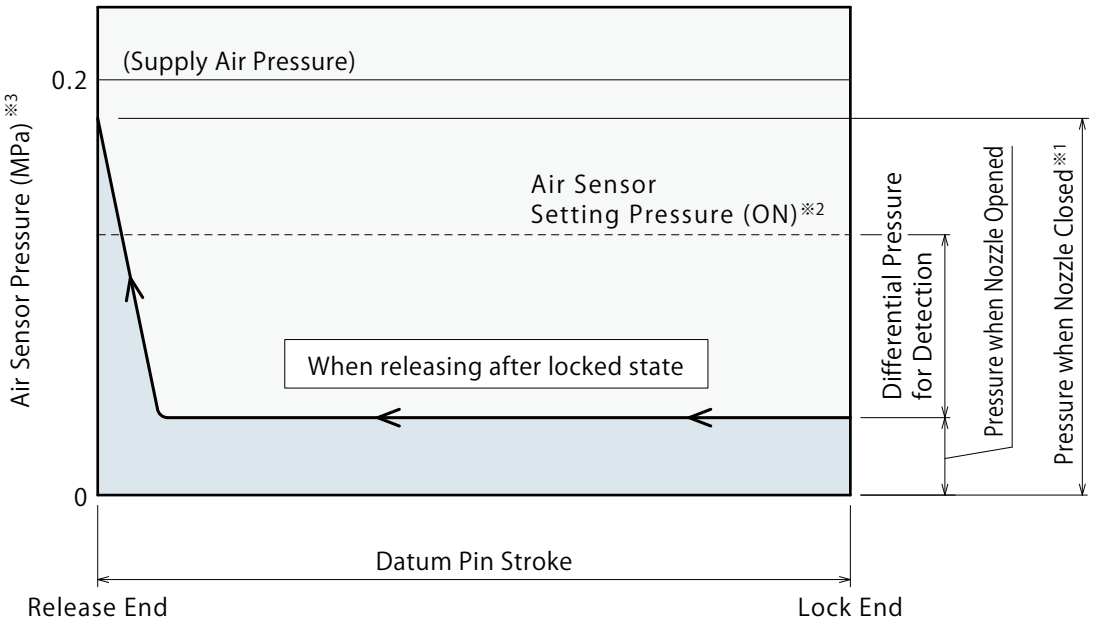
- Continuously supply air pressure to the air port for release confirmation when in use.

- Prevention of Contaminants to the Air Vent 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)

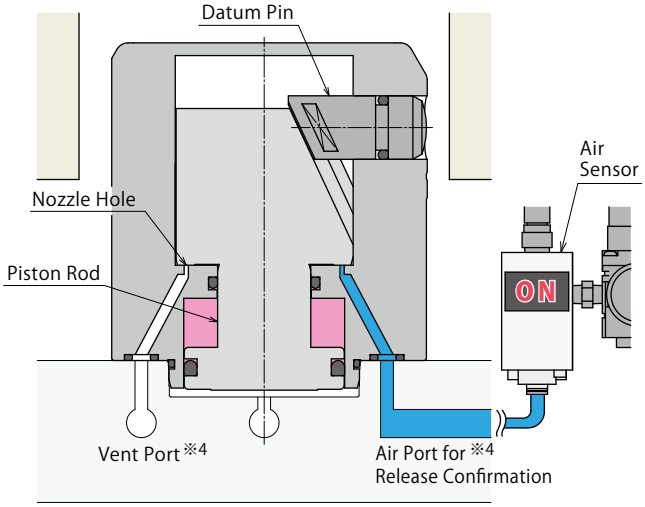


Air Sensing Chart

When Connected to 1 Cylinder

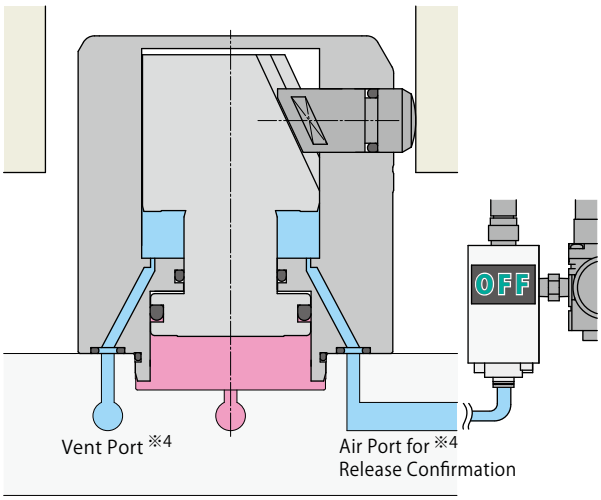


Release Action (Air Sensor ON)



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

VFP 060 0 - D - M

1 2 3 4

1 Body Size

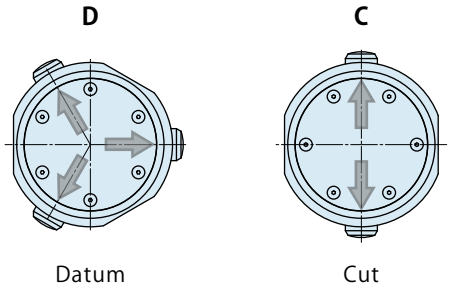
030 : Workpiece Hole Diameter ϕ30 ~ ϕ32
032 : Workpiece Hole Diameter ϕ33 ~ ϕ35
036 : Workpiece Hole Diameter ϕ36 ~ ϕ39
040 : Workpiece Hole Diameter ϕ40 ~ ϕ44
045 : Workpiece Hole Diameter ϕ45 ~ ϕ49
050 : Workpiece Hole Diameter ϕ50 ~ ϕ54
060 : Workpiece Hole Diameter ϕ60 ~ ϕ65
070 : Workpiece Hole Diameter ϕ70 ~ ϕ75
080 : Workpiece Hole Diameter ϕ80 ~ ϕ86
090 : Workpiece Hole Diameter ϕ90 ~ ϕ96
100 : Workpiece Hole Diameter ϕ100 ~ ϕ107
110 : Workpiece Hole Diameter ϕ110 ~ ϕ117
120 : Workpiece Hole Diameter ϕ120 ~ ϕ129

2 Design No.

0 : Revision Number

3 Functions

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



Datum Cut

4 Action Confirmation

Blank : None (Standard)
M : Release Confirmation

Specifications

Model No.		VFP0300-□-□	VFP0320-□-□	VFP0360-□-□	VFP0400-□-□	VFP0450-□-□	VFP0500-□-□	VFP0600-□-□
Workpiece Hole Diam. mm		ϕ30 ~ 32	ϕ33 ~ 35	ϕ36 ~ 39	ϕ40 ~ 44	ϕ45 ~ 49	ϕ50 ~ 54	ϕ60 ~ 65
Locating Repeatability ※1 mm		0.02	0.02	0.02	0.02	0.02	0.02	0.02
Datum Diameter mm	At Release	ϕ29 or less	ϕ32 or less	ϕ35 or less	ϕ39 or less	ϕ44 or less	ϕ48 or less	ϕ58 or less
	At Full Stroke	ϕ33 or more	ϕ36 or more	ϕ40 or more	ϕ45 or more	ϕ50 or more	ϕ55 or more	ϕ66 or more
Expanding Force (F)※2 kN	at 1.5MPa	0.1	0.1	0.2	0.2	0.2	0.4	0.5
	at 2.5MPa	0.2	0.2	0.3	0.4	0.4	0.6	0.9
	at 5.0MPa	0.4	0.4	0.5	0.8	0.8	1.2	1.7
	at 7.0MPa	0.6	0.6	0.7	1.1	1.1	1.7	2.4
Cylinder Capacity (Empty Action) cm³	Lock	1.6	1.6	2.4	3.3	3.3	4.4	7.2
	Release	1.3	1.3	1.9	2.4	2.4	2.9	4.8
Operating Pressure Range MPa		1.5 ~ 7.0						
Withstanding Pressure MPa		10.5						
Air Pressure only for 4 M MPa		0.2						
Operating Temperature Range ℃		0 ~ 70						
Usable Fluid		General Hydraulic Oil equivalent to ISO-VG-32						
Weight kg		0.3	0.3	0.4	0.5	0.7	0.7	1.2

Model No.		VFP0700-□-□	VFP0800-□-□	VFP0900-□-□	VFP1000-□-□	VFP1100-□-□	VFP1200-□-□
Workpiece Hole Diam. mm		ϕ70 ~ 75	ϕ80 ~ 86	ϕ90 ~ 96	ϕ100 ~ 107	ϕ110 ~ 117	ϕ120 ~ 129
Locating Repeatability ※1 mm		0.02	0.02	0.02	0.03	0.03	0.03
Datum Diameter mm	At Release	ϕ68 or less	ϕ77 or less	ϕ87 or less	ϕ96 or less	ϕ106 or less	ϕ116 or less
	At Full Stroke	ϕ76 or more	ϕ87 or more	ϕ97 or more	ϕ108 or more	ϕ118 or more	ϕ130 or more
Expanding Force (F)※2 kN	at 1.5MPa	0.5	0.8	0.8	1.1	1.1	1.3
	at 2.5MPa	0.9	1.3	1.3	1.8	1.8	2.2
	at 5.0MPa	1.7	2.6	2.6	3.5	3.5	4.4
	at 7.0MPa	2.4	3.6	3.6	4.9	4.9	6.2
Cylinder Capacity (Empty Action) cm³	Lock	7.2	13.2	13.2	20.3	20.3	30.5
	Release	4.8	8.7	8.7	13.4	13.4	20.1
Operating Pressure Range MPa		1.5 ~ 7.0					
Withstanding Pressure MPa		10.5					
Air Pressure only for 4 M MPa		0.2					
Operating Temperature Range ℃		0 ~ 70					
Usable Fluid		General Hydraulic Oil equivalent to ISO-VG-32					
Weight kg		1.7	2.5	3.3	4.4	5.4	7.4

Notes :

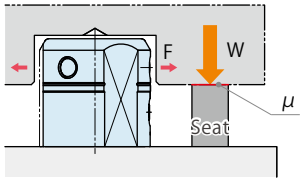
※1. It shows the locating repeatability under specific condition (when no load is applied).

※2. Expanding force shows the calculated value when coefficient friction is μ0.2. Refer to the following chart for the relative equation of expanding force and allowable workpiece weight for locating.

1. This product locates and releases with hydraulic pressure. (Hydraulic Pressure Double Acting Model)
2. This product is used only for locating and does not have a clamping function.

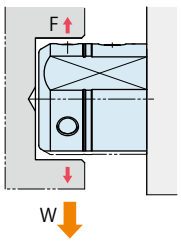
Relative Equation of Expanding Force and Allowable Workpiece Weight for Locating

Horizontal Attitude



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

Vertical Attitude

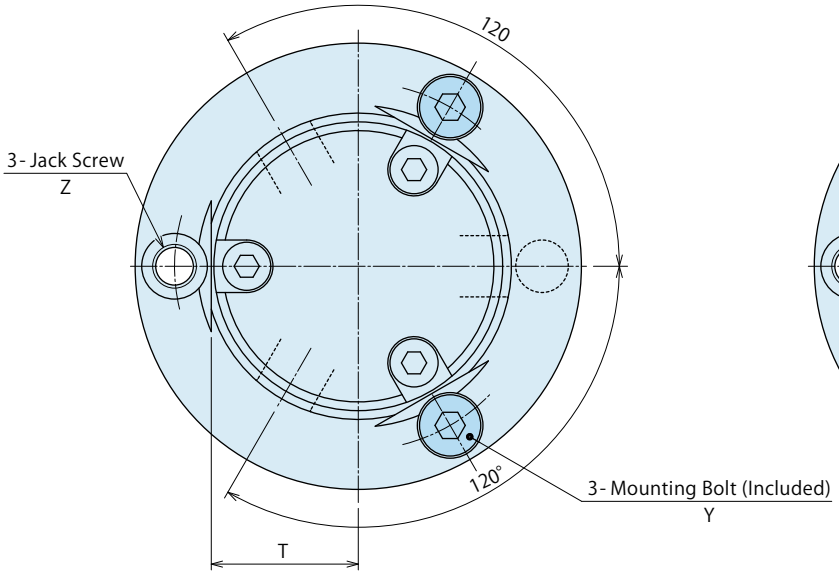


$$\text{Workpiece Weight (W) [kg]} \leqq \frac{\text{Expanding Force per Bore Locating Cylinder (F) [N]}}{9.8} \times \text{Efficiency 0.25}$$

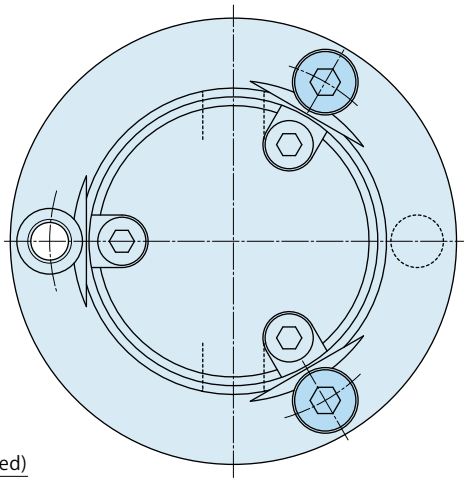
External Dimensions (VFP0300/0320/0360/0400/0450)

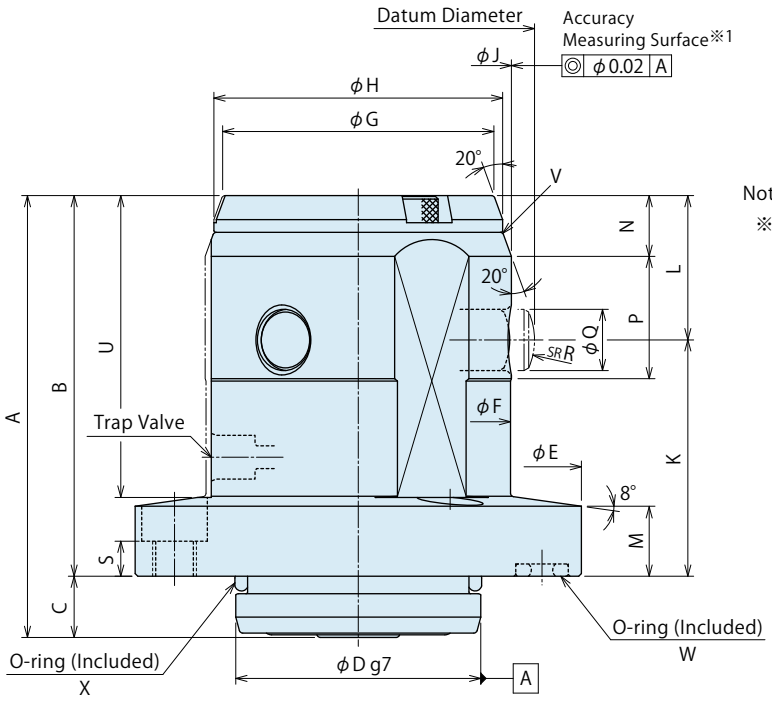
※The drawing shows the released state of VFP0360-D.

Function : **D**



Function : **C**

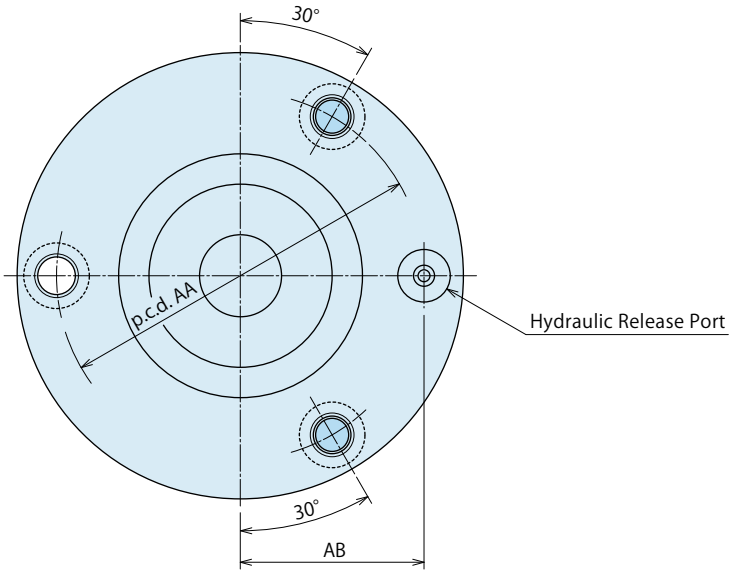




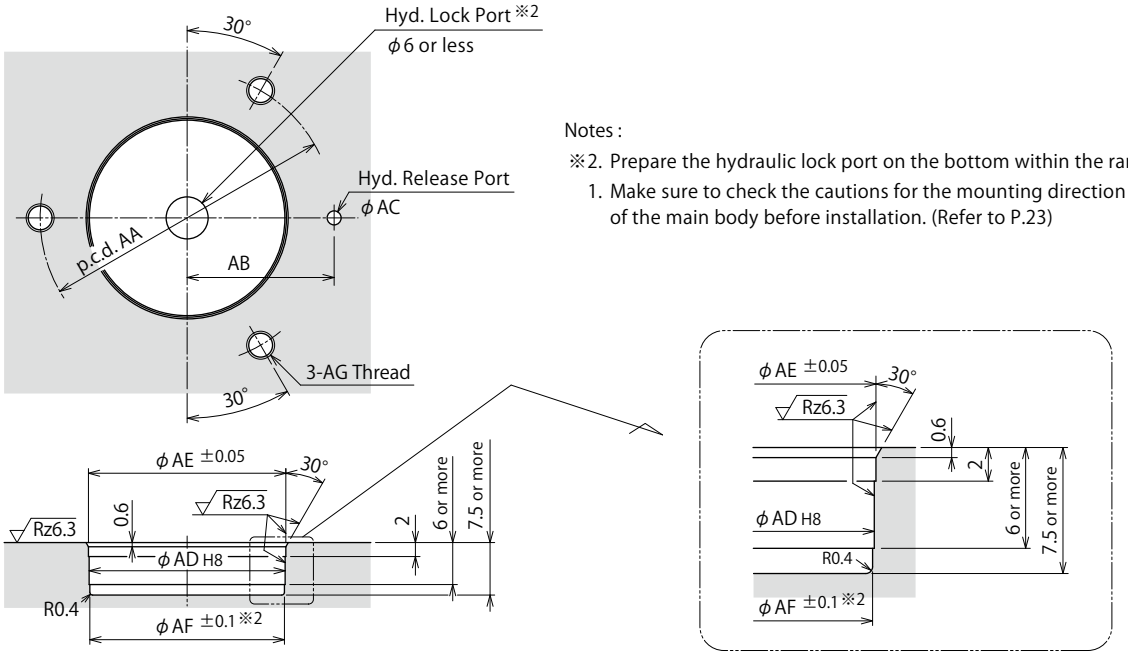
Notes :

※1. 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.

1. This product has no seat. Please prepare another seat if necessary.



Machining Dimensions for Mounting (VFP0300/0320/0360/0400/0450)



Notes :

※2. Prepare the hydraulic lock port on the bottom within the range of ϕAF.

1. Make sure to check the cautions for the mounting direction (phasing) of the main body before installation. (Refer to P.23)

External Dimensions and Machining Dimensions for Mounting

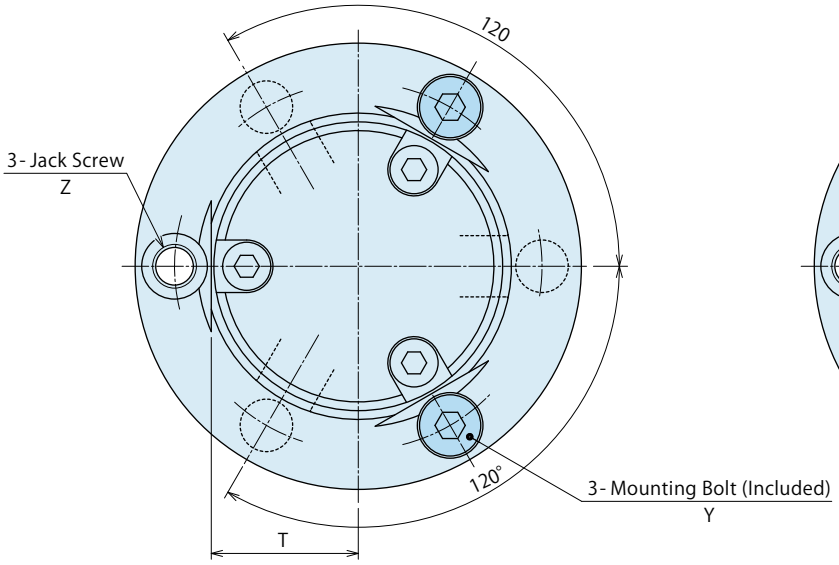
(mm)

Model No.		VFP0300-□	VFP0320-□	VFP0360-□	VFP0400-□	VFP0450-□
Workpiece Hole Diameter		ϕ30 ~ 32	ϕ33 ~ 35	ϕ36 ~ 39	ϕ40 ~ 44	ϕ45 ~ 49
Datum Diameter	When Released	ϕ29 or less	ϕ32 or less	ϕ35 or less	ϕ39 or less	ϕ44 or less
	When Fully Stroked	ϕ33 or more	ϕ36 or more	ϕ40 or more	ϕ45 or more	ϕ50 or more
A		46.5	46.5	50.5	54.5	54.5
B		39.5	39.5	43.5	47.5	47.5
C		7	7	7	7	7
D		$26^{-0.007}_{-0.028}$	$26^{-0.007}_{-0.028}$	$28^{-0.007}_{-0.028}$	$30^{-0.007}_{-0.028}$	$30^{-0.007}_{-0.028}$
E		45	48	51	58	63
F		28.8	31.8	34.8	38.8	43.8
G		26	26	31	34	34
H		28	28	33	36	36
J		29	32	35	39	44
K		25	25	27	30	30
L		14.5	14.5	16.5	17.5	17.5
M		8	8	8	10	10
N		5	9	7	8	12
P		14	10	14	14	10
Q		6	6	7	8	8
R		7	7	8	10	10
S		4	4	4	5	5
T		14	15.5	16.8	18.8	21.3
U		30.5	30.5	34.5	36.5	36.5
V		R0.4	R0.4	R0.4	R0.4	R2
W		AS568-006(90)	AS568-006(90)	AS568-006(90)	AS568-007(90)	AS568-007(90)
X		AS568-021(90)	AS568-021(90)	AS568-022(90)	AS568-023(90)	AS568-023(90)
Y		M4×0.7×10	M4×0.7×10	M4×0.7×10	M5×0.8×12	M5×0.8×12
Z		M5×0.8	M5×0.8	M5×0.8	M6×1	M6×1
AA		36	39	42	47.5	52.5
AB		18	18	21	23.75	23.75
AC		2	2	2	2.6	2.6
AD		$26^{+0.033}_{0}$	$26^{+0.033}_{0}$	$28^{+0.033}_{0}$	$30^{+0.033}_{0}$	$30^{+0.033}_{0}$
AE		26.2	26.2	28.2	30.2	30.2
AF		25.8	25.8	27.8	29.8	29.8
AG		M4×0.7 Thread Depth 7 or more	M4×0.7 Thread Depth 7 or more	M4×0.7 Thread Depth 7 or more	M5×0.8 Thread Depth 8 or more	M5×0.8 Thread Depth 8 or more

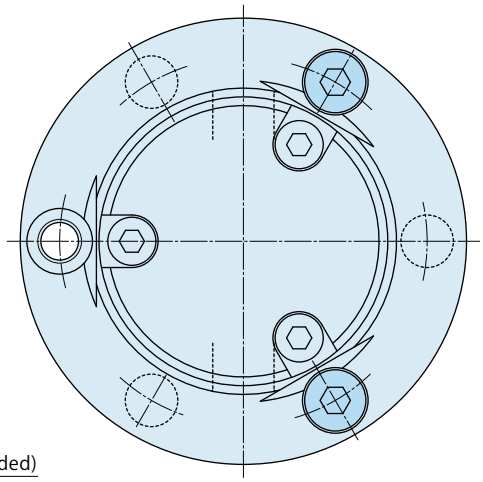
External Dimensions (VFP0300-M/0320-M/0360-M/0400-M/0450-M)

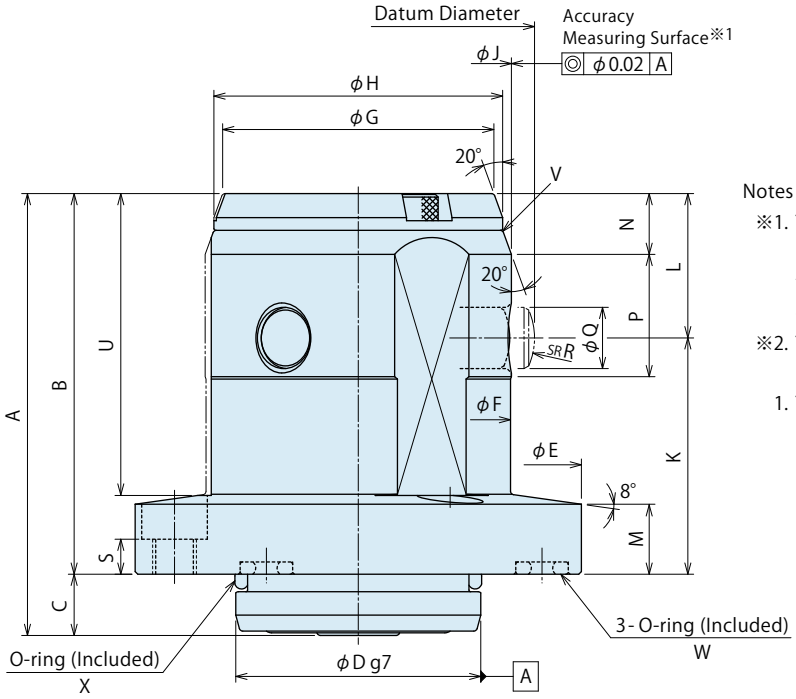
※The drawing shows the released state of VFP0360-D-M.

Function : **D**



Function : **C**



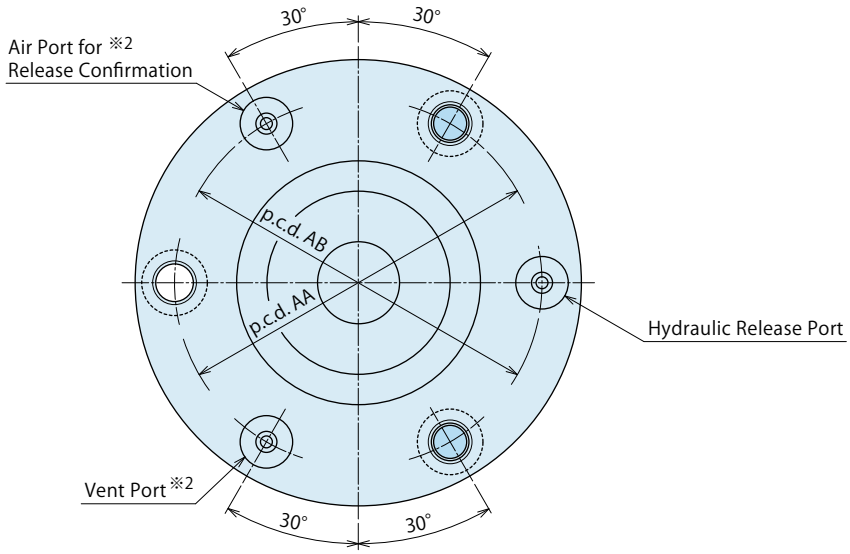


Notes :

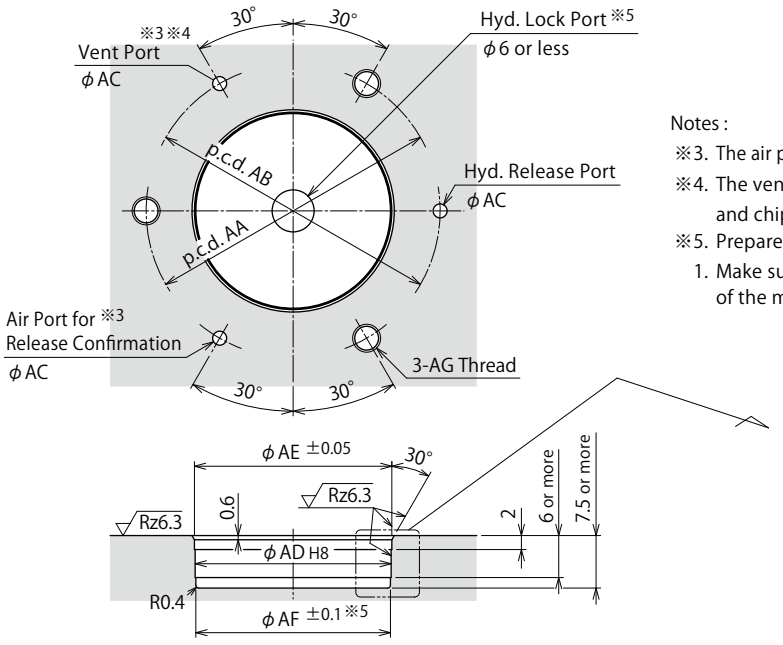
※1. The accuracy measuring surface can be used to check the mounting position accuracy after installation. However, it is different from the center accuracy of the datum pin (locating) part. Make sure to determine the origin with an actual workpiece before machining.

※2. The air port for release confirmation and the vent port are interchangeable.

1. This product has no seat. Please prepare another seat if necessary.



Machining Dimensions for Mounting (VFP0300-M/0320-M/0360-M/0400-M/0450-M)



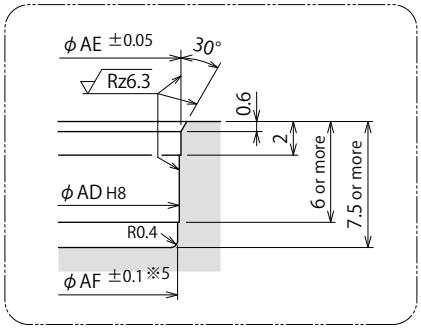
Notes :

※3. The air port for release confirmation and the vent port are interchangeable.

※4. The vent port must be open to the atmosphere, and prevent coolant and chips from entering the vent port.

※5. 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.23)



External Dimensions and Machining Dimensions for Mounting

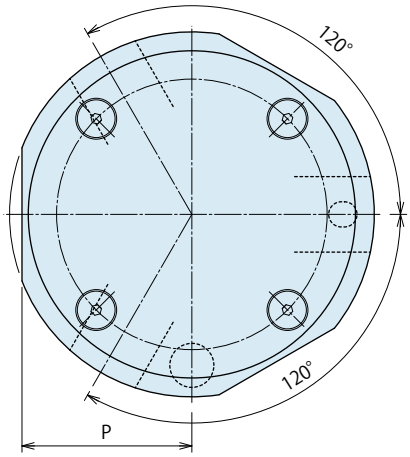
(mm)

Model No.		VFP0300-□-M	VFP0320-□-M	VFP0360-□-M	VFP0400-□-M	VFP0450-□-M
Workpiece Hole Diameter		ϕ30 ~ 32	ϕ33 ~ 35	ϕ36 ~ 39	ϕ40 ~ 44	ϕ45 ~ 49
Datum Diameter	When Released	ϕ29 or less	ϕ32 or less	ϕ35 or less	ϕ39 or less	ϕ44 or less
	When Fully Stroked	ϕ33 or more	ϕ36 or more	ϕ40 or more	ϕ45 or more	ϕ50 or more
A		46.5	46.5	50.5	54.5	54.5
B		39.5	39.5	43.5	47.5	47.5
C		7	7	7	7	7
D		$26^{-0.007}_{-0.028}$	$26^{-0.007}_{-0.028}$	$28^{-0.007}_{-0.028}$	$30^{-0.007}_{-0.028}$	$30^{-0.007}_{-0.028}$
E		45	48	51	58	63
F		28.8	31.8	34.8	38.8	43.8
G		26	26	31	34	34
H		28	28	33	36	36
J		29	32	35	39	44
K		25	25	27	30	30
L		14.5	14.5	16.5	17.5	17.5
M		8	8	8	10	10
N		5	9	7	8	12
P		14	10	14	14	10
Q		6	6	7	8	8
R		7	7	8	10	10
S		4	4	4	5	5
T		14	15.5	16.8	18.8	21.3
U		30.5	30.5	34.5	36.5	36.5
V		R0.4	R0.4	R0.4	R0.4	R2
W		AS568-006(90)	AS568-006(90)	AS568-006(90)	AS568-007(90)	AS568-007(90)
X		AS568-021(90)	AS568-021(90)	AS568-022(90)	AS568-023(90)	AS568-023(90)
Y		M4×0.7×10	M4×0.7×10	M4×0.7×10	M5×0.8×12	M5×0.8×12
Z		M5×0.8	M5×0.8	M5×0.8	M6×1	M6×1
AA		36	39	42	47.5	52.5
AB		36	36	42	47.5	47.5
AC		2	2	2	2.6	2.6
AD		$26^{+0.033}_{0}$	$26^{+0.033}_{0}$	$28^{+0.033}_{0}$	$30^{+0.033}_{0}$	$30^{+0.033}_{0}$
AE		26.2	26.2	28.2	30.2	30.2
AF		25.8	25.8	27.8	29.8	29.8
AG		M4×0.7 Thread Depth 7 or more	M4×0.7 Thread Depth 7 or more	M4×0.7 Thread Depth 7 or more	M5×0.8 Thread Depth 8 or more	M5×0.8 Thread Depth 8 or more

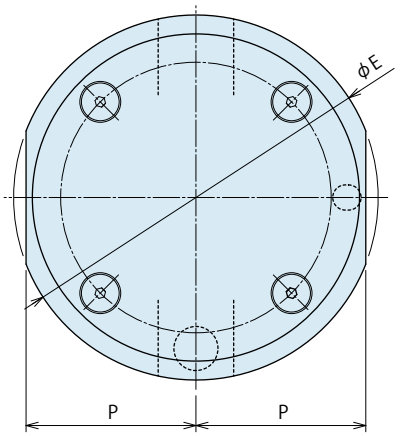
External Dimensions (VFP0500/0600)

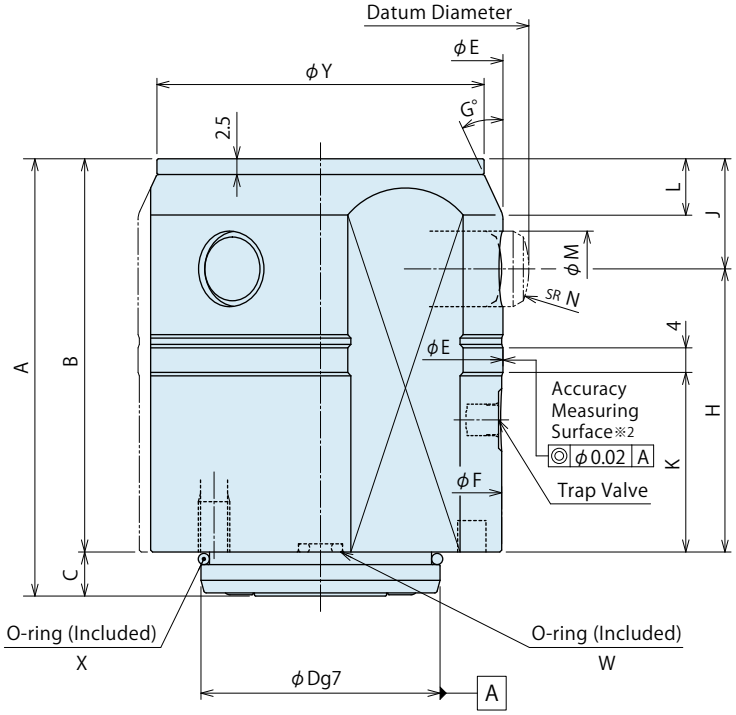
※The drawing shows the released state of VFP0600-D.

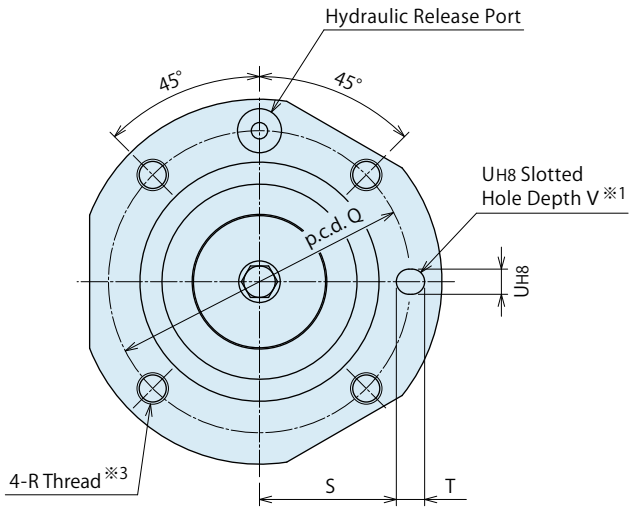
Function : **D**



Function : **C**







Notes :

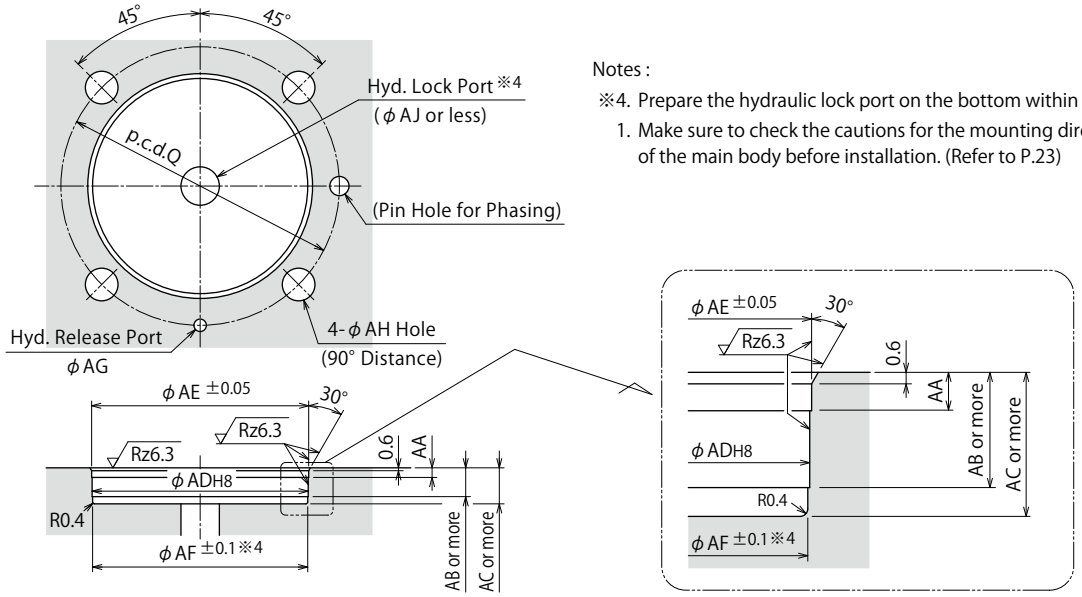
※1. Use the slotted hole for phasing when mounting.
A pin is not included. Please prepare it by customer.

※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 provided with the product.

1. This product has no seat. Please prepare another seat if necessary.

Machining Dimensions for Mounting (VFP0500/0600)



Notes :

※4. Prepare the hydraulic lock port on the bottom within the range of ϕAF.

1. Make sure to check the cautions for the mounting direction (phasing) of the main body before installation. (Refer to P.23)

External Dimensions and Machining Dimensions for Mounting

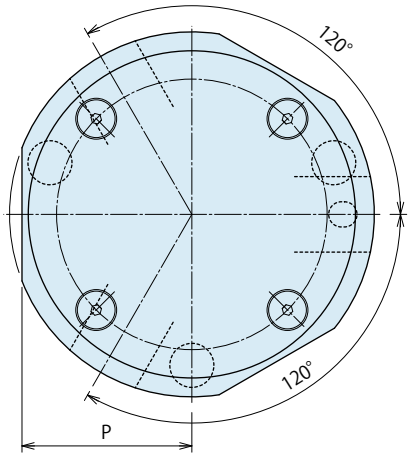
(mm)

Model No.		VFP0500-□	VFP0600-□
Workpiece Hole Diameter		ϕ50 ~ 54	ϕ60 ~ 65
Datum Diameter	When Released	ϕ48 or less	ϕ58 or less
	When Fully Stroked	ϕ55 or more	ϕ66 or more
A		57.5	69.5
B		50.5	62.5
C		7	7
D		$32^{-0.009}_{-0.034}$	$38^{-0.009}_{-0.034}$
E		48	58
F		47.6	57.6
G		25	25
H		35	45
J		15.5	17.5
K		22.5	28.5
L		8	9
M		10	12
N		12	15
P		22.5	27
Q		40	48
R		M4×0.7 Thread Depth 7	M5×0.8 Thread Depth 8
S		18.25	21.75
T		3.5	4.5
U		$3^{+0.014}_{0}$	$4^{+0.018}_{0}$
V		4	5
W		SS3.5	AS568-007(90)
X		AS568-024(90)	AS568-028(90)
Y		43	52
AA		2	2
AB		6	6
AC		7.5	7.5
AD		$32^{+0.039}_{0}$	$38^{+0.039}_{0}$
AE		32.2	38.2
AF		31.8	37.8
AG		2	2.6
AH		4.5	5.5
AJ		8	8

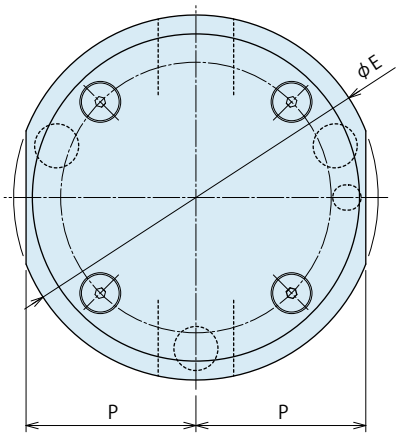
External Dimensions (VFP0500-M/0600-M)

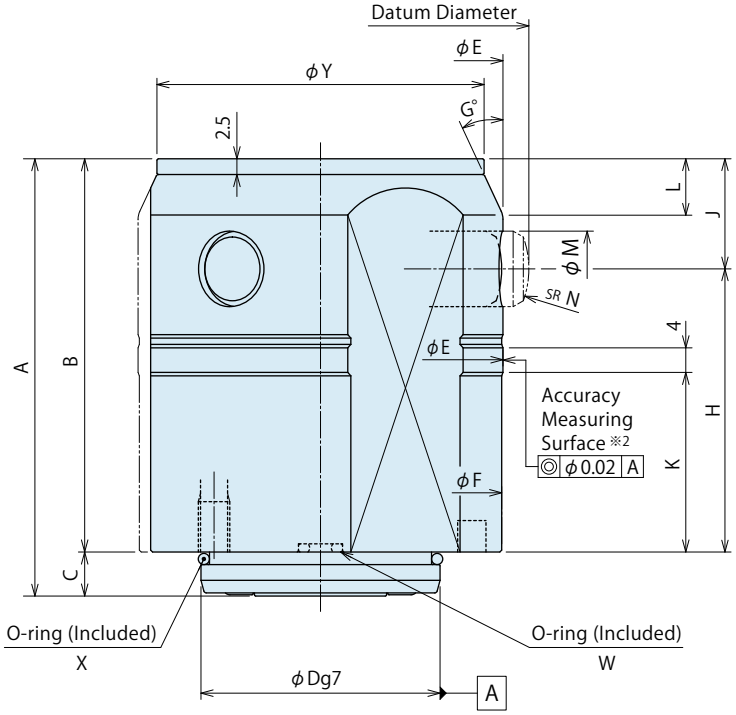
※The drawing shows the released state of VFP0600-D-M.

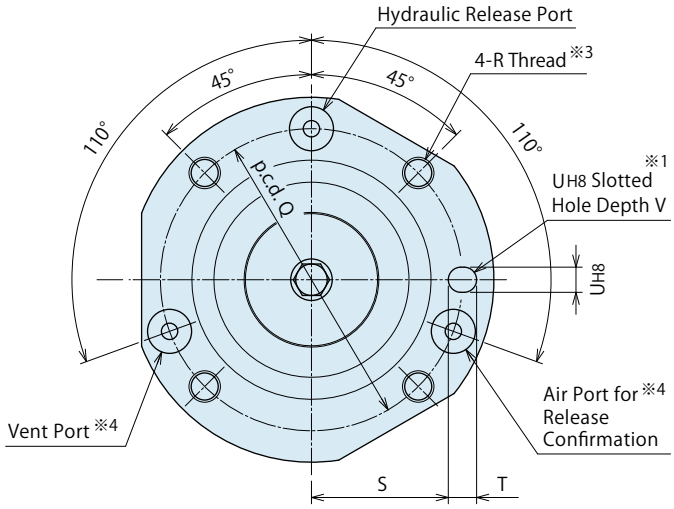
Function : **D**



Function : **C**







Notes :

※1. Use the long hole for phasing when mounting.
A pin is not included. Please prepare it by customer.

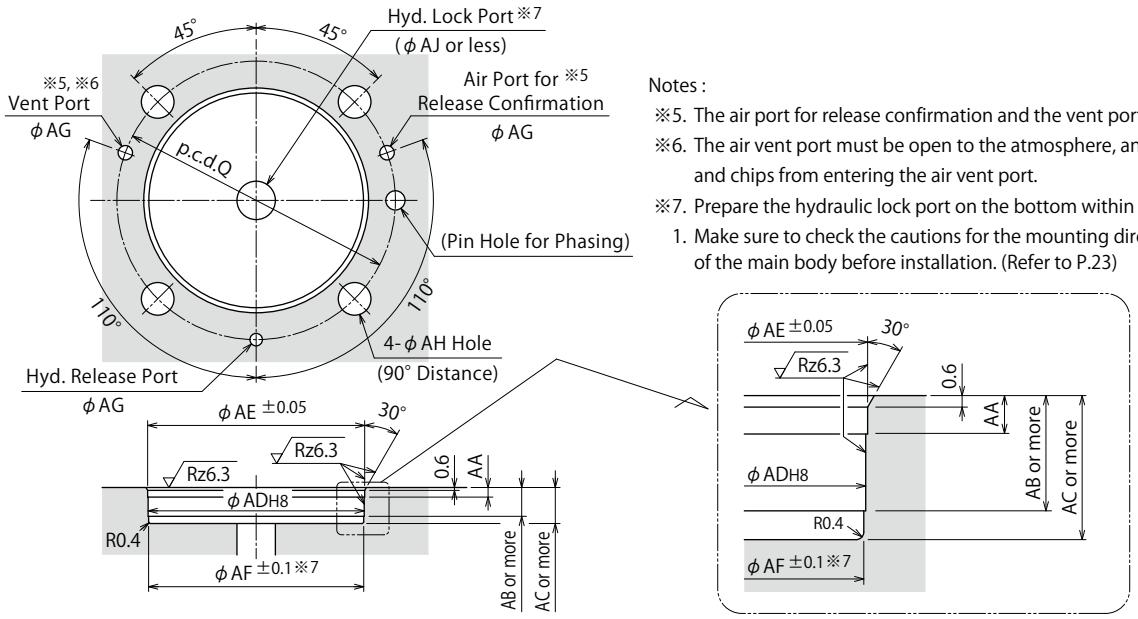
※2. The accuracy measuring surface can be used to check the mounting position accuracy after installation. However, it is different from the center accuracy of the datum pin (locating) part. Make sure to determine the origin with an actual workpiece before machining.

※3. Mounting bolts are not provided with the product.

※4. The air port for release confirmation and the vent port are interchangeable.

1. This product has no seat. Please prepare another seat if necessary.

Machining Dimensions for Mounting (VFP0500-M/0600-M)



Notes :

※5. The air port for release confirmation and the vent port are interchangeable.

※6. The air vent port must be open to the atmosphere, and prevent coolant and chips from entering the air vent port.

※7. 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.23)

External Dimensions and Machining Dimensions for Mounting

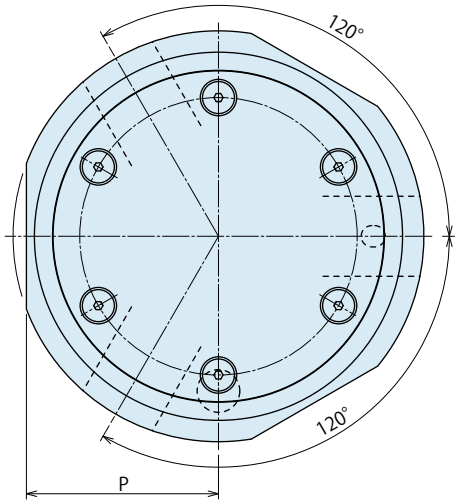
(mm)

Model No.		VFP0500-□-M	VFP0600-□-M
Workpiece Hole Diameter		ϕ 50 ~ 54	ϕ 60 ~ 65
Datum Diameter	When Released	ϕ 48 or less	ϕ 58 or less
	When Fully Stroked	ϕ 55 or more	ϕ 66 or more
A		57.5	69.5
B		50.5	62.5
C		7	7
D		$32^{-0.009}_{-0.034}$	$38^{-0.009}_{-0.034}$
E		48	58
F		47.6	57.6
G		25	25
H		35	45
J		15.5	17.5
K		22.5	28.5
L		8	9
M		10	12
N		12	15
P		22.5	27
Q		40	48
R		M4×0.7 Thread Depth 7	M5×0.8 Thread Depth 8
S		18.25	21.75
T		3.5	4.5
U		$3^{+0.014}_{0}$	$4^{+0.018}_{0}$
V		4	5
W		SS3.5	AS568-007(90)
X		AS568-024(90)	AS568-028(90)
Y		43	52
AA		2	2
AB		6	6
AC		7.5	7.5
AD		$32^{+0.039}_{0}$	$38^{+0.039}_{0}$
AE		32.2	38.2
AF		31.8	37.8
AG		2	2.6
AH		4.5	5.5
AJ		8	8

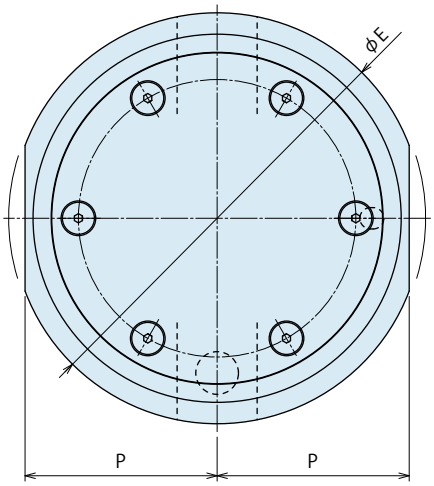
External Dimensions (VFP0700/0800/0900/1000/1100/1200)

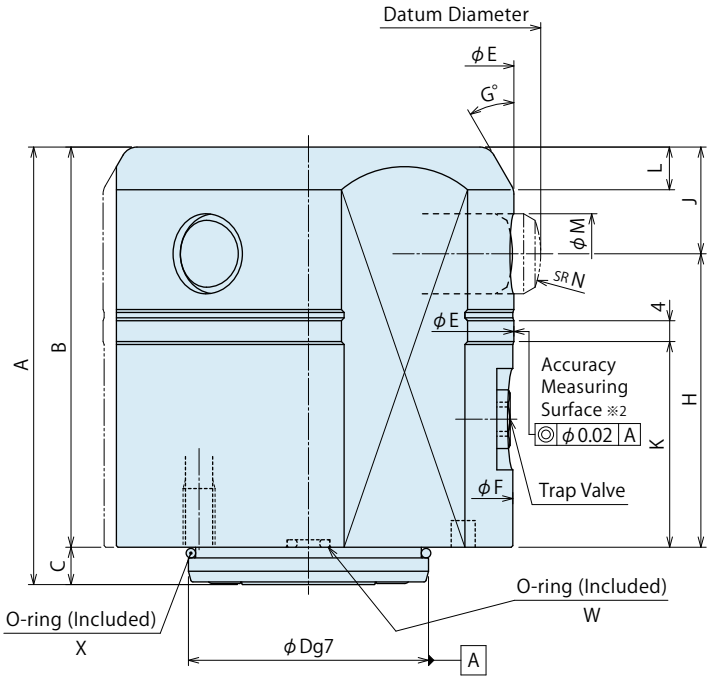
※The drawing shows the released state of VFP0800-D.

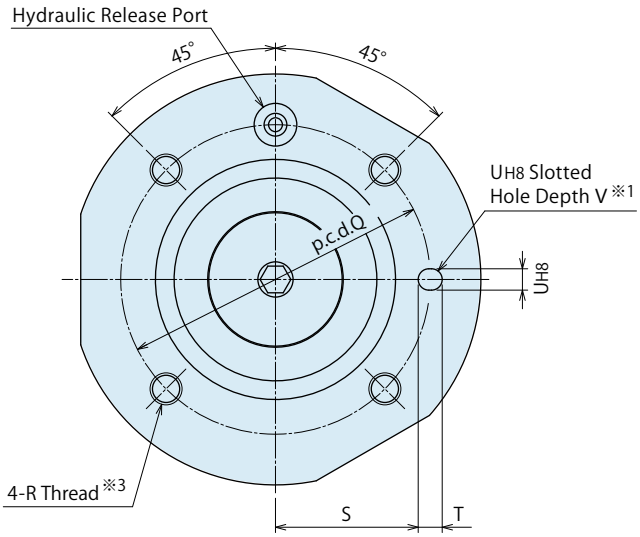
Function : **D**



Function : **C**







Notes :

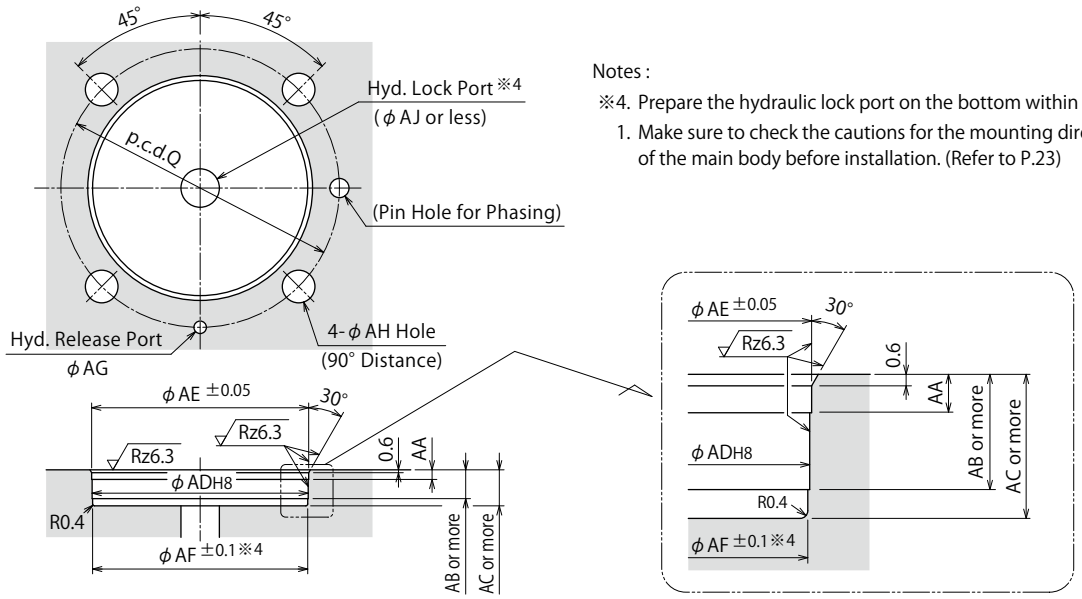
※1. Use the slotted hole for phasing when mounting.
A pin is not included. Please prepare it by customer.

※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 provided with the product.

1. This product has no seat. Please prepare another seat if necessary.

Machining Dimensions for Mounting (VFP0700/0800/0900/1000/1100/1200)



Notes :

※4. Prepare the hydraulic lock port on the bottom within the range of ϕAF.

1. Make sure to check the cautions for the mounting direction (phasing) of the main body before installation. (Refer to P.23)

External Dimensions and Machining Dimensions for Mounting

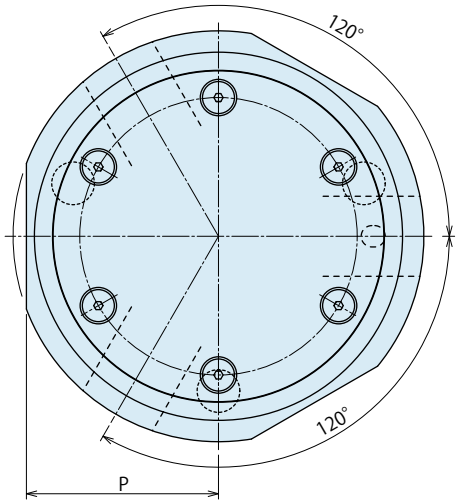
(mm)

Model No.		VFP0700-□	VFP0800-□	VFP0900-□	VFP1000-□	VFP1100-□	VFP1200-□
Workpiece Hole Diameter		ϕ70 ~ 75	ϕ80 ~ 86	ϕ90 ~ 96	ϕ100 ~ 107	ϕ110 ~ 117	ϕ120 ~ 129
Datum Diam.	When Released	ϕ68 or less	ϕ77 or less	ϕ87 or less	ϕ96 or less	ϕ106 or less	ϕ116 or less
	When Fully Stroked	ϕ76 or more	ϕ87 or more	ϕ97 or more	ϕ108 or more	ϕ118 or more	ϕ130 or more
A		69.5	82	82	90	90	103
B		62.5	75	75	82	82	95
C		7	7	7	8	8	8
D		$38^{-0.009}_{-0.034}$	$45^{-0.009}_{-0.034}$	$45^{-0.009}_{-0.034}$	$58^{-0.010}_{-0.040}$	$58^{-0.010}_{-0.040}$	$64^{-0.010}_{-0.040}$
E		68	77	87	96	106	116
F		67.6	76.6	86.6	95.6	105.6	115.6
G		25	30	30	30	30	30
H		45	55	55	60	60	70
J		17.5	20	20	22	22	25
K		28.5	38.5	38.5	40.5	40.5	48.5
L		9	8	8	9	9	10
M		12	15	15	18	18	20
N		15	19	19	22.5	22.5	25
P		31.5	36	41	45.5	50.5	53.5
Q		48	58	58	73	73	84
R		M5×0.8 Thread Depth 8	M6×1 Thread Depth 11	M6×1 Thread Depth 11	M8×1.25 Thread Depth 13	M8×1.25 Thread Depth 13	M10×1.5 Thread Depth 15
S		21.75	26.75	26.75	33.75	33.75	39.25
T		4.5	4.5	4.5	5.5	5.5	5.5
U		$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$5^{+0.018}_{0}$	$5^{+0.018}_{0}$	$5^{+0.018}_{0}$
V		5	5	5	6	6	6
W		AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N	OR NBR-90 P7-N
X		AS568-028(90)	AS568-030(90)	AS568-030(90)	AS568-137(90)	AS568-137(90)	AS568-141(90)
AA		2	2	2	2.8	2.8	2.8
AB		6	6	6	7	7	7
AC		7.5	7.5	7.5	8.5	8.5	8.5
AD		$38^{+0.039}_{0}$	$45^{+0.039}_{0}$	$45^{+0.039}_{0}$	$58^{+0.046}_{0}$	$58^{+0.046}_{0}$	$64^{+0.046}_{0}$
AE		38.2	45.2	45.2	58.2	58.2	64.2
AF		37.8	44.8	44.8	57.8	57.8	63.8
AG		2.6	3	3	5	5	5
AH		5.5	6.8	6.8	9	9	11
AJ		8	8	8	10	10	10

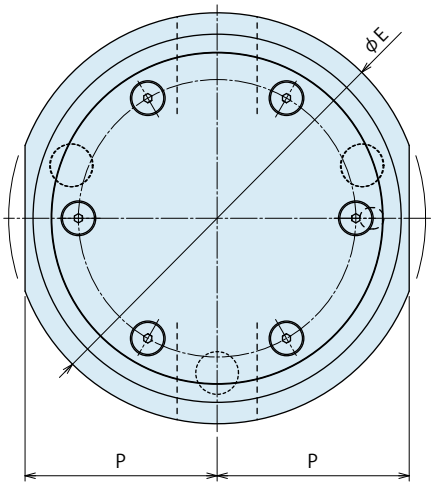
External Dimensions (VFP0700-M/0800-M/0900-M/1000-M/1100-M/1200-M)

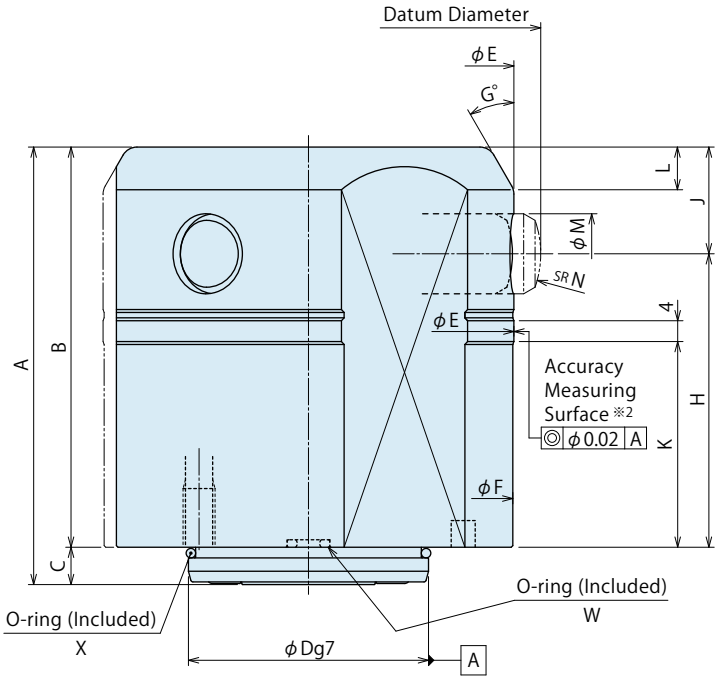
※The drawing shows the released state of VFP0800-D-M.

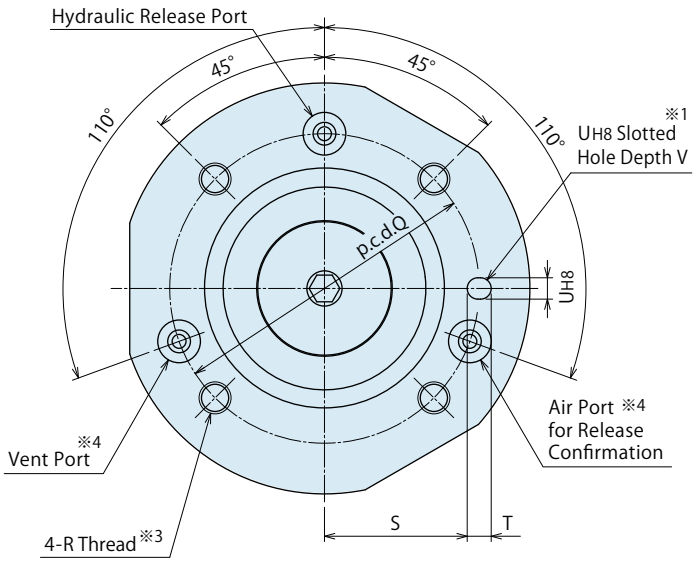
Function : **D**



Function : **C**







Notes :

※1. Use the long hole for phasing when mounting.
A pin is not included. Please prepare it by customer.

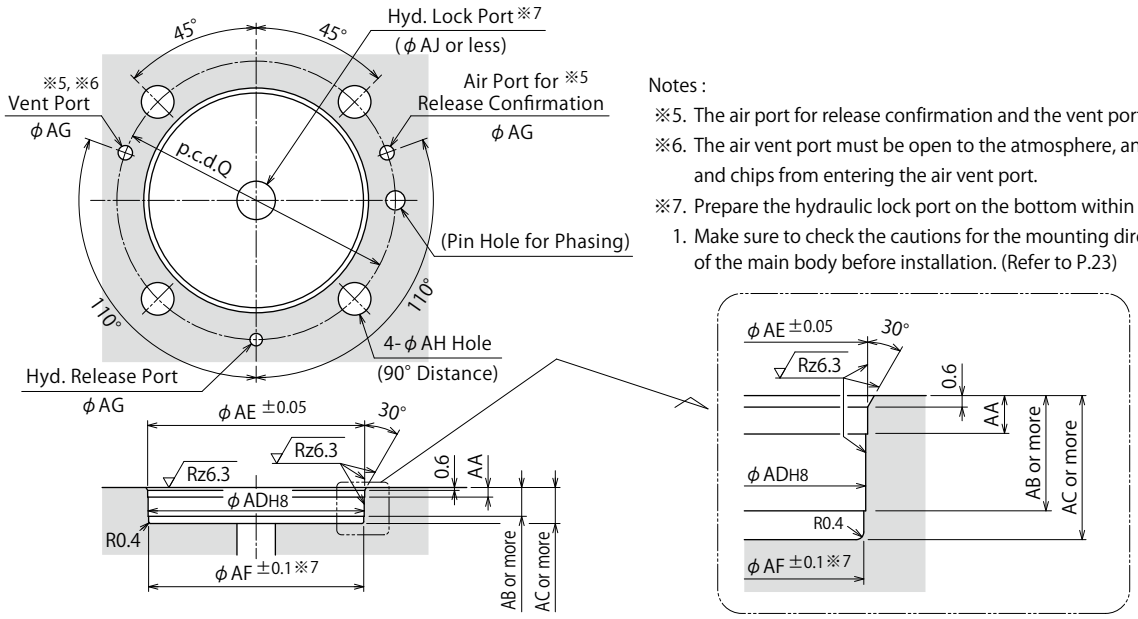
※2. The accuracy measuring surface can be used to check the mounting position accuracy after installation. However, it is different from the center accuracy of the datum pin (locating) part. Make sure to determine the origin with an actual workpiece before machining.

※3. Mounting bolts are not provided with the product.

※4. The air port for release confirmation and the vent port are interchangeable.

1. This product has no seat. Please prepare another seat if necessary.

Machining Dimensions for Mounting (VFP0700-M/0800-M/0900-M/1000-M/1100-M/1200-M)



Notes :

※5. The air port for release confirmation and the vent port are interchangeable.

※6. The air vent port must be open to the atmosphere, and prevent coolant and chips from entering the air vent port.

※7. Prepare the hydraulic lock port on the bottom within the range of ϕAF.

1. Make sure to check the cautions for the mounting direction (phasing) of the main body before installation. (Refer to P.23)

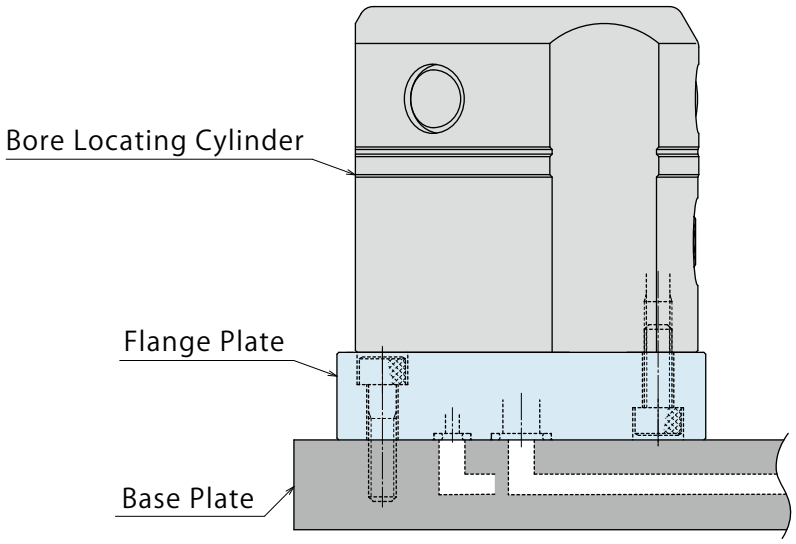
External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		VFP0700-□-M	VFP0800-□-M	VFP0900-□-M	VFP1000-□-M	VFP1100-□-M	VFP1200-□-M
Workpiece Hole Diameter		ϕ70 ~ 75	ϕ80 ~ 86	ϕ90 ~ 96	ϕ100 ~ 107	ϕ110 ~ 117	ϕ120 ~ 129
Datum Diam.	When Released	ϕ68 or less	ϕ77 or less	ϕ87 or less	ϕ96 or less	ϕ106 or less	ϕ116 or less
	When Fully Stroked	ϕ76 or more	ϕ87 or more	ϕ97 or more	ϕ108 or more	ϕ118 or more	ϕ130 or more
A		69.5	82	82	90	90	103
B		62.5	75	75	82	82	95
C		7	7	7	8	8	8
D		$38^{-0.009}_{-0.034}$	$45^{-0.009}_{-0.034}$	$45^{-0.009}_{-0.034}$	$58^{-0.010}_{-0.040}$	$58^{-0.010}_{-0.040}$	$64^{-0.010}_{-0.040}$
E		68	77	87	96	106	116
F		67.6	76.6	86.6	95.6	105.6	115.6
G		25	30	30	30	30	30
H		45	55	55	60	60	70
J		17.5	20	20	22	22	25
K		28.5	38.5	38.5	40.5	40.5	48.5
L		9	8	8	9	9	10
M		12	15	15	18	18	20
N		15	19	19	22.5	22.5	25
P		31.5	36	41	45.5	50.5	53.5
Q		48	58	58	73	73	84
R		M5×0.8 Thread Depth 8	M6×1 Thread Depth 11	M6×1 Thread Depth 11	M8×1.25 Thread Depth 13	M8×1.25 Thread Depth 13	M10×1.5 Thread Depth 15
S		21.75	26.75	26.75	33.75	33.75	39.25
T		4.5	4.5	4.5	5.5	5.5	5.5
U		$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$5^{+0.018}_{0}$	$5^{+0.018}_{0}$	$5^{+0.018}_{0}$
V		5	5	5	6	6	6
W		AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N	OR NBR-90 P7-N
X		AS568-028(90)	AS568-030(90)	AS568-030(90)	AS568-137(90)	AS568-137(90)	AS568-141(90)
AA		2	2	2	2.8	2.8	2.8
AB		6	6	6	7	7	7
AC		7.5	7.5	7.5	8.5	8.5	8.5
AD		$38^{+0.039}_{0}$	$45^{+0.039}_{0}$	$45^{+0.039}_{0}$	$58^{+0.046}_{0}$	$58^{+0.046}_{0}$	$64^{+0.046}_{0}$
AE		38.2	45.2	45.2	58.2	58.2	64.2
AF		37.8	44.8	44.8	57.8	57.8	63.8
AG		2.6	3	3	5	5	5
AH		5.5	6.8	6.8	9	9	11
AJ		8	8	8	10	10	10

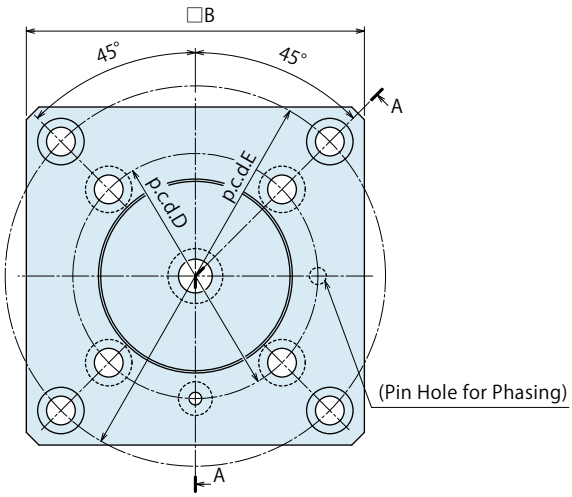
Reference：Flange Plate Example

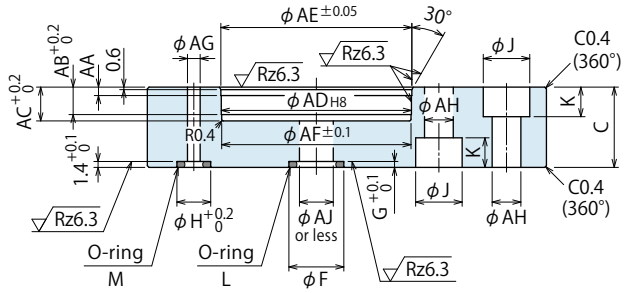
※ This shows a fixture (flange plate) design example when installing the bore locating cylinder above than the top surface of the base plate.



Flange Plate Reference External Dimensions

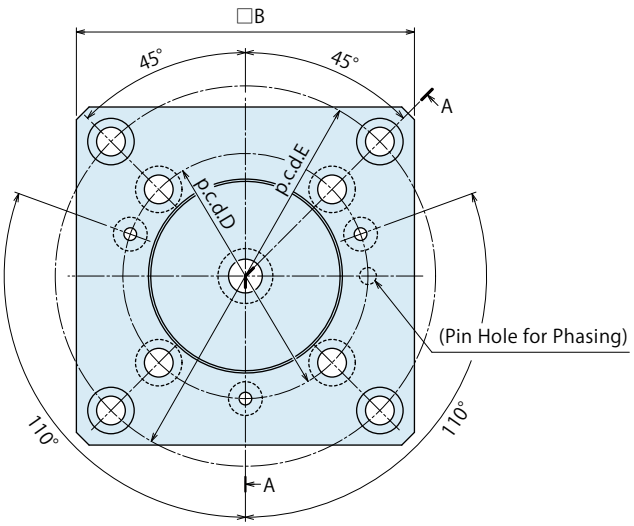
VFP□0-□ : For Standard Model

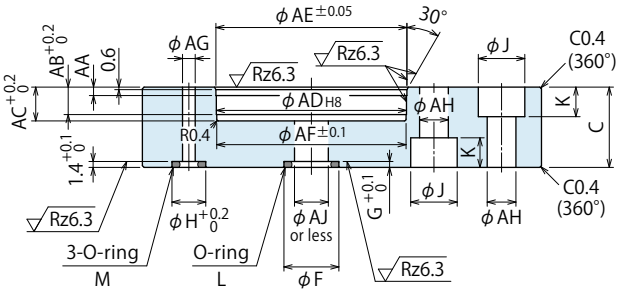




A-A Cross Section

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





A-A Cross Section

Reference External Dimension List

(mm)

Applicable Model No.	VFP0500-□-□	VFP0600-□-□	VFP0700-□-□	VFP0800-□-□	VFP0900-□-□	VFP1000-□-□	VFP1100-□-□	VFP1200-□-□
B	50	60	70	80	90	100	110	120
C	16	16	16	19	19	22	22	25
D	40	48	48	58	58	73	73	84
E	57	68	78	90	100	114	124	136
F	$13^{+0.2}_{0}$	$13^{+0.2}_{0}$	$13^{+0.2}_{0}$	$13^{+0.2}_{0}$	$13^{+0.2}_{0}$	$18^{\pm0.1}$	$18^{\pm0.1}$	$18^{\pm0.1}$
G	1.4	1.4	1.4	1.4	1.4	1.8	1.8	1.8
H	8	8	8	8	8	10	10	10
J	7.5	9	9	11	11	14	14	17.5
K	5	6	6	7	7	9	9	11
L ※1	OR NBR-90 P10-N	OR NBR-90 P10-N	OR NBR-90 P10-N	OR NBR-90 P10-N	OR NBR-90 P10-N	OR NBR-90 P14-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 P5-N	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P7-N	OR NBR-90 P7-N	OR NBR-90 P7-N
AA	2	2	2	2	2	2.8	2.8	2.8
AB	6	6	6	6	6	7	7	7
AC	7.5	7.5	7.5	7.5	7.5	8.5	8.5	8.5
AD	$32^{+0.039}_{0}$	$38^{+0.039}_{0}$	$38^{+0.039}_{0}$	$45^{+0.039}_{0}$	$45^{+0.039}_{0}$	$58^{+0.046}_{0}$	$58^{+0.046}_{0}$	$64^{+0.046}_{0}$
AE	32.2	38.2	38.2	45.2	45.2	58.2	58.2	64.2
AF	31.8	37.8	37.8	44.8	44.8	57.8	57.8	63.8
AG	2	2.6	2.6	3	3	5	5	5
AH	4.5	5.5	5.5	6.8	6.8	9	9	11
AJ	8	8	8	8	8	10	10	10

Note :

※1. The listed O-ring is an example. When changing the O-ring size, change ϕF, ϕG and ϕAJ appropriately.

Cautions

Notes for Design

1) Check Specifications

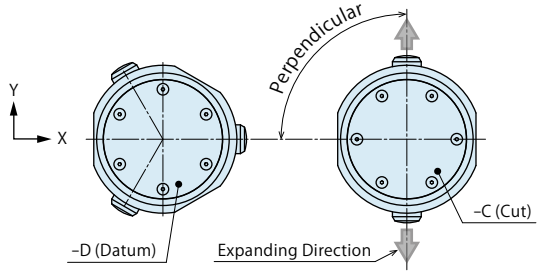
- Please use each product according to the specifications.
  VFP locates and releases with hydraulic pressure.
  (Hydraulic Double Acting Model)
  Operating pressure range is 1.5 ~ 7.0MPa.

2) Setting Up a Clamp

- The bore locating cylinder is a positioning cylinder and has no clamping function. A clamp must be provided separately.

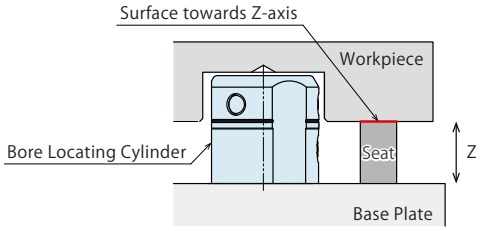
3) Mounting Direction (Phase)

- 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.

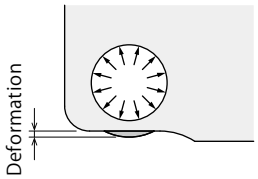


5) Inclination in the Z-axis direction.

- 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 for 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 hexagonal socket bolts (with tensile strength 12.9) and tighten them with torque as shown in the table below. Tighten them evenly to prevent tilting of the product.

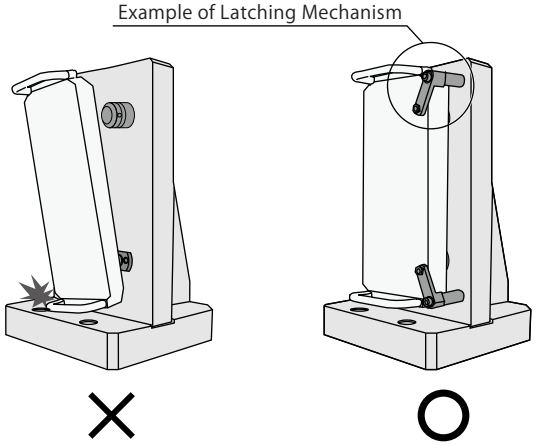
Model No.	Mounting Bolt Size	Tightening Torque (N·m)
VFP0300	M4×0.7	3.2
VFP0320		
VFP0360		
VFP0400	M5×0.8	6.3
VFP0450		
VFP0500	M4×0.7	3.2
VFP0600	M5×0.8	6.3
VFP0700		
VFP0800	M6×1	10
VFP0900		
VFP1000	M8×1.25	25
VFP1100		
VFP1200	M10×1.5	50

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.

Example of Latching Mechanism



Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	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.

Cautions

Notes on Handling

1) It should be operated by qualified personnel.
- Machines and devices with hydraulic and pneumatic products should be operated and maintained by qualified personnel.

2) Do not operate or remove the product unless the safety protocols are ensured.
① Machines and devices 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.

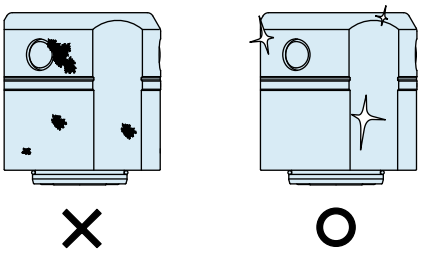
3) Do not touch the Bore Locating Cylinder while it is working. Otherwise, your hands may be injured.

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

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.