

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series **VFR4000**

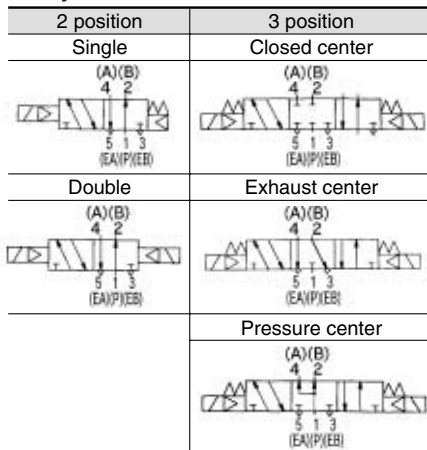


Plug-in type



Non plug-in type

JIS Symbol



Standard Specifications

Valve specifications		Fluid	Air
Operating pressure range	2 position single/3 position	0.2 to 0.9 MPa	
	2 position double	0.1 to 0.9 MPa	
Ambient and fluid temperature		-10 to 50°C (No freezing. Refer to page 3-13-4.)	
Lubrication		Non-lube ⁽¹⁾	
Manual override		Non-locking push type	
Mounting orientation		Unrestricted	
Shock/Vibration resistance		300/50 m/s ² ⁽²⁾	
Enclosure		Dustproof	
Coil rated voltage		100, 200 VAC (50/60 Hz), 24 VDC	
Allowable voltage fluctuation		-15 to -10% of rated voltage	
Apparent power (AC) ⁽³⁾	Inrush	5.6 VA/50 Hz, 5.0 VA/60 Hz	
	Holding	3.4 VA (2.1 W)/50 Hz, 2.3 VA (1.5 W)/60 Hz	
Power consumption (DC) ⁽³⁾		1.8 W	
Electrical entry	Plug-in type	Conduit terminal	
	Non plug-in type	Grommet, Grommet terminal Conduit terminal, DIN terminal	

Note 1) Use turbine oil Class 1 (ISO VG32), if lubricated. Note 3) At rated voltage
 Note 2) Impact resistance: No malfunction occurred when it is tested with a drop tester in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)
 Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Option Specifications

Pilot type		External pilot Note)
Manual override	Main valve	Direct manual override
	Pilot valve	Non-locking push type A (Extended), Locking type B (Tool required), Locking type C (Lever)
Coil rated voltage		110 to 120, 220, 240 VAC 50/60 Hz 12, 100 VDC
Porting specifications		Bottom ported
Option		With light/surge voltage suppressor

Note) Operating pressure: 2 position 0 to 0.9 MPa Pilot pressure: 2 position single 0.2 to 0.9 MPa
 3 position 0.15 to 0.9 MPa 2 position double 0.1 to 0.9 MPa
 3 position 0.5 x P + 0.1 to 0.9 MPa (P: Operating pressure)

Model

Type of actuation	Model		Port size ⁽¹⁾	Flow characteristics ⁽²⁾						Max. operating cycle ⁽³⁾ (Hz)	Response time ⁽⁴⁾ (ms)	Weight ⁽⁵⁾ (kg)
	Plug-in	Non plug-in		1 → 4/2 (P → A/B)			4/2 → 5/3 (A/B → EA/EB)					
				C [dm ³ /(s·bar)]	b	Cv	C [dm ³ /(s·bar)]	b	Cv			
2 position	Single	VFR410□ VFR414□	3/8 1/2	13 15	0.30 0.30	3.2 3.8	14 14	0.28 0.30	3.4 3.8	5	50 or less	1.10 (1.04) <1.04>
	Double	VFR420□ VFR424□	3/8 1/2	14 15	0.31 0.30	3.4 4.0	14 14	0.26 0.30	3.4 3.7	5	50 or less	1.20 (1.16) <1.16>
3 position	Closed center	VFR430□ VFR434□	3/8	13	0.32	3.2	13	0.25	3.0	3	50 or less	1.20 (1.16) <1.16>
			1/2	14	0.28	3.5	13	0.29	3.4			
	Exhaust center	VFR440□ VFR444□	3/8	13	0.31	3.2	14 [13]	0.32 [0.30]	3.6 [3.2]	3	70 or less	1.20 (1.16) <1.16>
			1/2	14	0.30	3.7	14 [13]	0.32 [0.30]	3.6 [3.2]			
Pressure center	VFR450□ VFR454□	3/8	13 [5.0]	0.27 [0.42]	3.2 [1.3]	13	0.28	3.1	3	70 or less	1.20 (1.16) <1.16>	
		1/2	15 [5.3]	0.22 [0.42]	3.7 [1.5]	13	0.28	3.3				

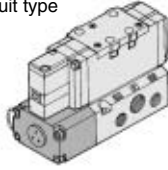
Note 1) EA, EB port: Rc 3/8
 Note 2) []: Normal position
 Note 3) Min. operating frequency is once in 30 days. (Based on JIS B 8375)
 Note 4) Based on dynamic performance test, JIS B 8375-1981. (0.5 MPa, Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)
 Note 5) For VFR4□00-□FZ-⁰³/₀₄, (): VFR4□10- DZ□-⁰³/₀₄, < >: VFR4□40-□G-⁰³/₀₄

Series VFR4000

How to Order

Electrical entry

F: Plug-in type, conduit type



Option

Nil	None
Z	With light/surge voltage suppressor

Porting specifications (P, A, EA, EB port)

Nil	Side ported
B*	Bottom ported

* Option. no bottom piping for external pilot.

Port size (P, A and B port)

Nil	Without sub-plate
03	3/8
04*	1/2

EA, EB port: Rc 3/8

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Plug-in VFR4 0 5 F 03

Non plug-in VFR4 1 1 D 03 **Common electrical entry**

Non plug-in VFR4 4 1 G 03 **Individual electrical entry**

Symbol

1	2 position single	
2	2 position double	
3	3 position closed center	
4	3 position exhaust center	
5	3 position pressure center	

Body option

0	Standard
1*	Direct manual override

* Option

Pilot type

Nil	Internal pilot
R*	External pilot

* Option

Coil rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 V to 120 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option

Option: VFR4□1□

Nil	None
Z	With light/surge voltage suppressor

Option: VFR4□4□

Nil	None
Z*	With light/surge voltage suppressor
S*	With surge voltage suppressor

* Indicator light (Z) is not available for grommet type. Surge voltage suppressor (S) is available only on grommet.

Electrical entry: VFR4□1□

E: Grommet terminal	
D: DIN terminal	

Electrical entry: VFR4□4□

G: Grommet	
E: Grommet terminal	
T: Conduit terminal	
D, Y: DIN terminal	

Pilot valve Manual override

Nil: Non-locking push type	
A*: Non-locking push type A (Extended)	
B*: Locking type B (Tool required)	
C*: Locking type C (Lever)	

* Option

How to Order Pilot Valve Assembly

SF4 - 1 F - 70 -

Coil rated voltage

Symbol	Rated voltage
1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 to 120 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option

Electrical entry, Light/Surge voltage suppressor

Symbol	Electrical entry	Indicator light	With surge voltage suppressor	Applicable valve model
F*	Plug-in	—	—	VFR4□0□ VFR4□1□
G	Grommet	—	—	VFR4□4□
GS		—	●	
E	Grommet terminal	—	—	
EZ		●	●	
T	Conduit terminal	—	—	
TZ		●	●	
D	DIN terminal	—	—	
DZ		●	●	
Y	DIN terminal	—	—	
YZ	(DIN43650B type)	●	●	

Manual override

Nil	Non-locking push type
A*	Non-locking push type A (Extended)
B*	Locking type B (Tool required)
C*	Locking type C (Lever)

* Option

Symbol

Symbol	Applicable valve model
Nil	VFR4□0□ VFR4□1□
1	VFR4□4□

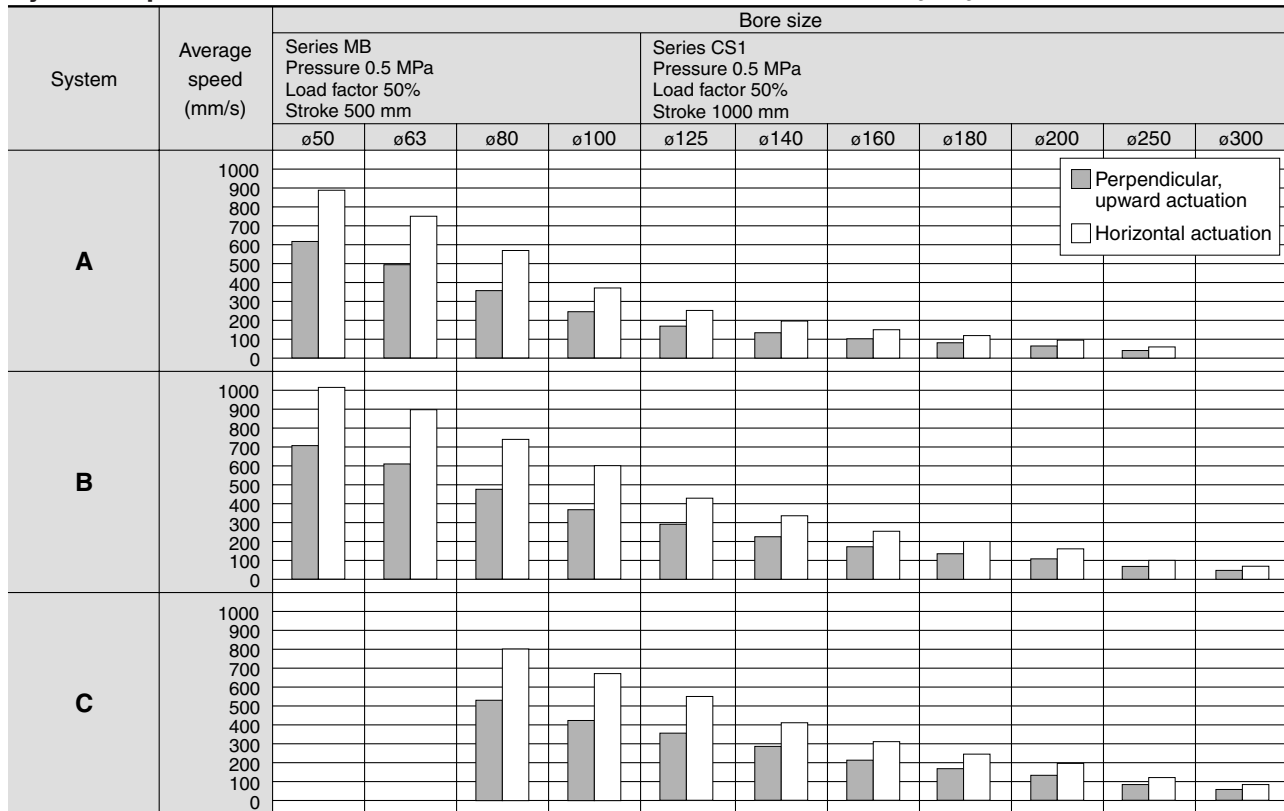


* VFR3□0□, VFR3□1□: Pilot valve assembly is all plug-in (F).

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR4000

Use as a guide for selection.
Please confirm the actual conditions with SMC Sizing Program.

Cylinder Speed Chart



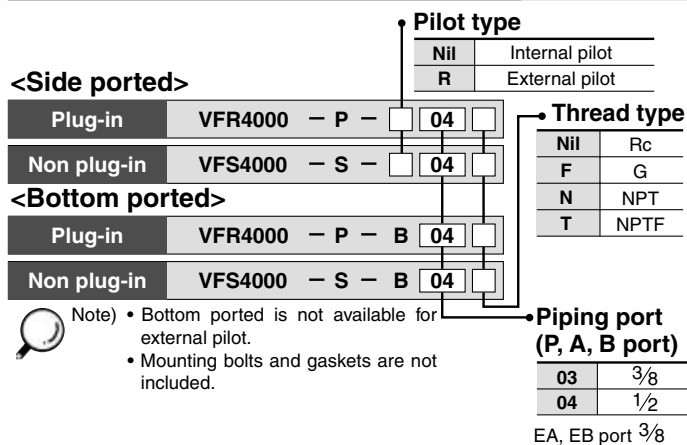
- VK
- VZ
- VF
- VFR**
- VP4
- VZS
- VFS
- VS4
- VQ7
- EVS
- VFN

- * It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- * The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- * Load factor: ((Load weight x 9.8)/Theoretical force) x 100%

System Components

System	Solenoid valve	Speed controller	Silencer	SPG (Steel pipe) dia. x Length
A	Series VFR4000 Rc 3/8	AS4000-03 (S = 21 mm ²)	AN300-03 (S = 60 mm ²)	10A x 1 m
B	Series VFR4000 Rc 3/8	AS420-03 (S = 73 mm ²)	AN300-03 (S = 60 mm ²)	10A x 1 m
C	Series VFR4000 Rc 1/2	AS420-04 (S = 97 mm ²)	AN400-04 (S = 90 mm ²)	15A x 1 m

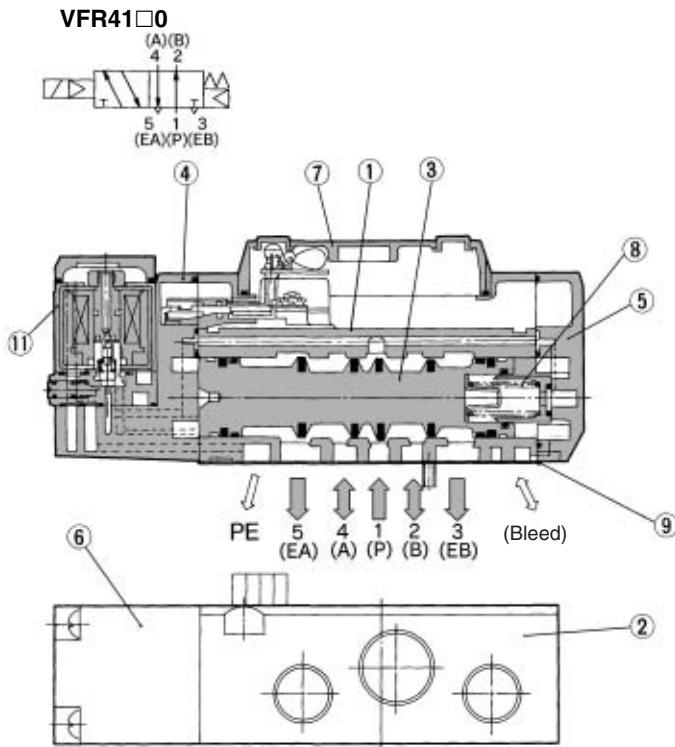
How to Order Sub-plate Assembly



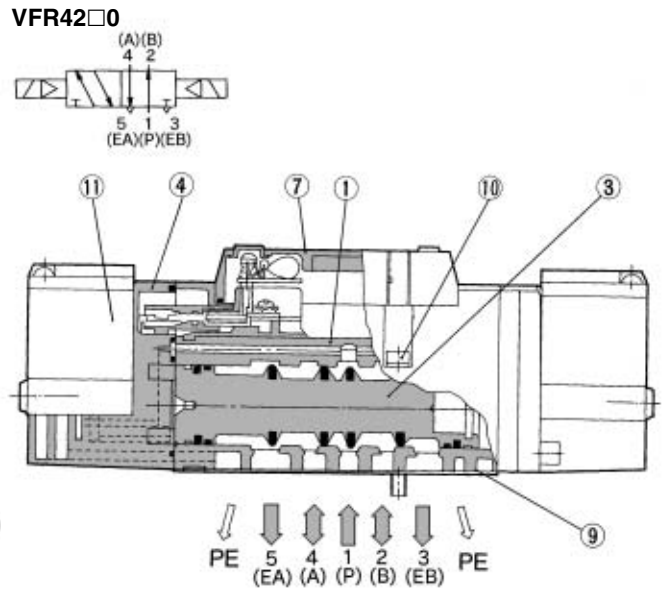
Series VFR4000

Construction

2 position single

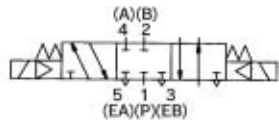


2 position double

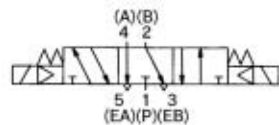


3 position closed center/exhaust center/pressure center

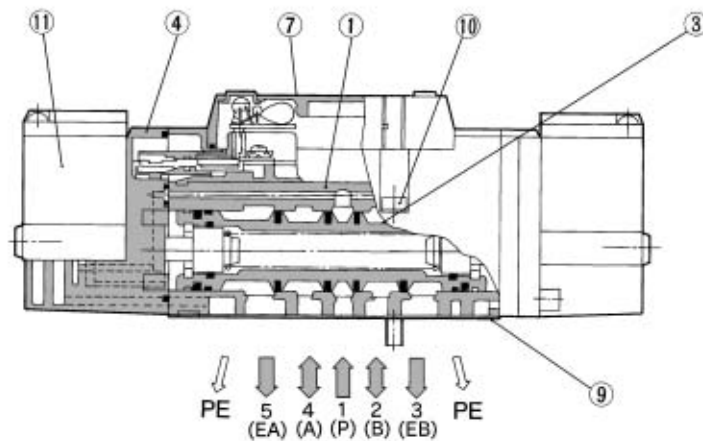
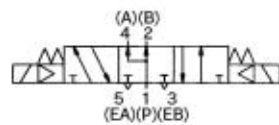
Closed center: VFR43□0



Exhaust center: VFR44□0



Pressure center: VFR45□0



This figure shows a closed center type.

Component Parts

No.	Description	Material	Note
①	Body	Aluminum die-casted	Platinum silver
②	Sub-plate	Aluminum die-casted	Platinum silver
③	Spool valve	Aluminum, NBR	
④	Adapter plate	Resin	Black

No.	Description	Material	Note
⑤	End plate	Resin	Black
⑥	Junction cover	Resin	
⑦	Light cover	Resin	
⑧	Spool spring	Stainless steel	

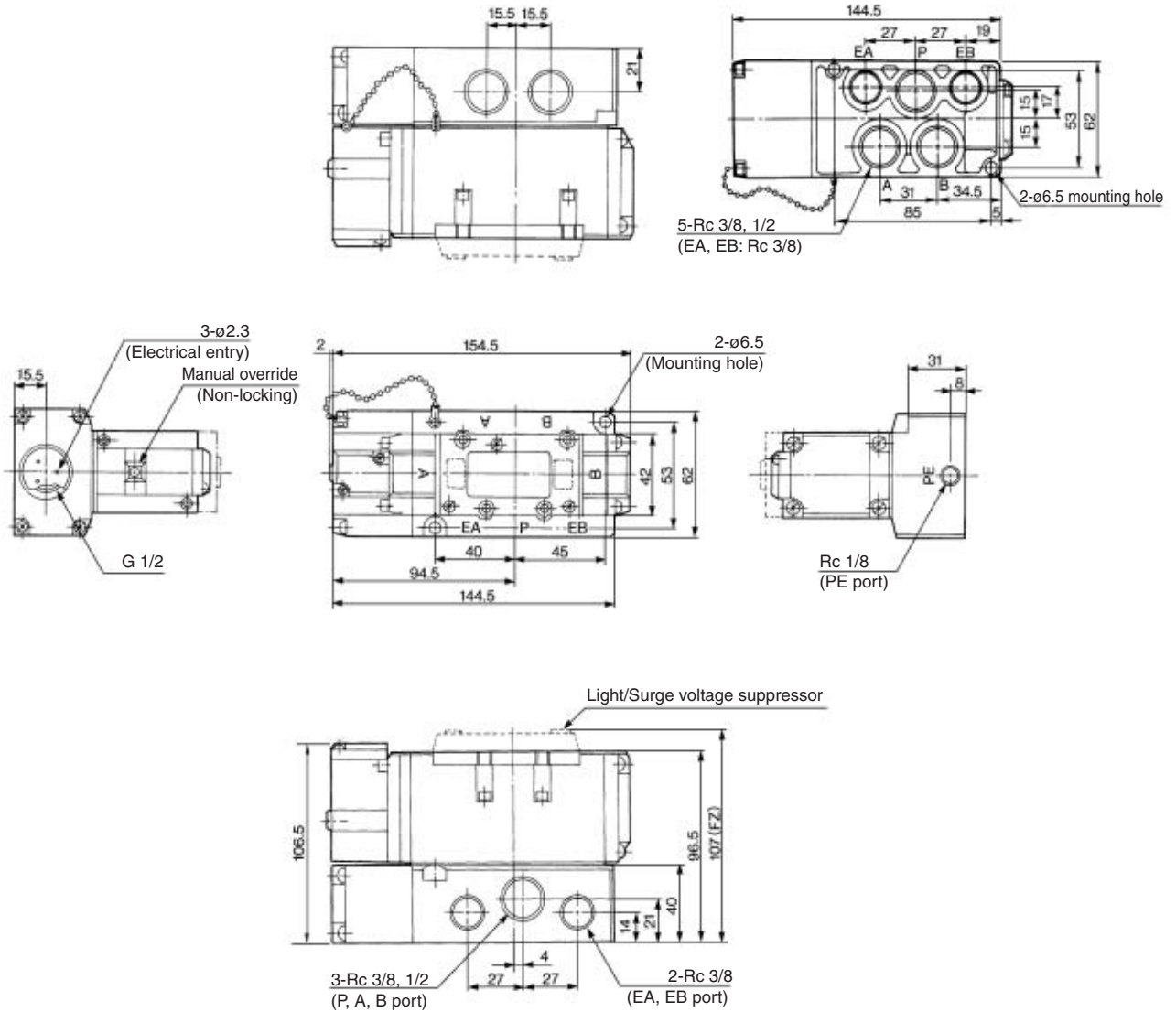
Replacement Parts

No.	Description	Material	Part no.		
			VFR41□□	VFR42□□	VFR43□□/44□□/45□□
⑨	Gasket	NBR	VF4000-20-1	VF4000-20-1	VF4000-20-1
⑩	Hexagon socket head screw	Steel	AXT335-1-11(M4 x 40)	AXT335-1-11(M4 x 40)	AXT335-1-11(M4 x 40)
⑪	Pilot valve assembly	—	Refer to "How to Order Pilot Valve Assembly" on page 3-5-54.		
—	Sub-plate assembly	—	Refer to "How to Order Sub-plate Assembly" on page 3-5-55.		

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR4000

Plug-in 2 position single/double, 3 position closed center/exhaust center/pressure center

2 position single: VFR410⁰-□F

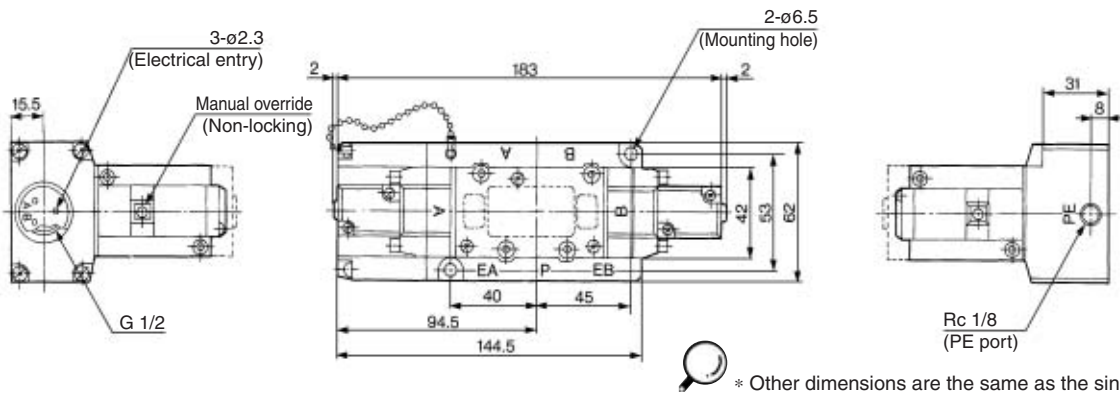


2 position double: VFR420⁰-□F

3 position closed center: VFR430⁰-□F

3 position exhaust center: VFR440⁰-□F

3 position pressure center: VFR450⁰-□F

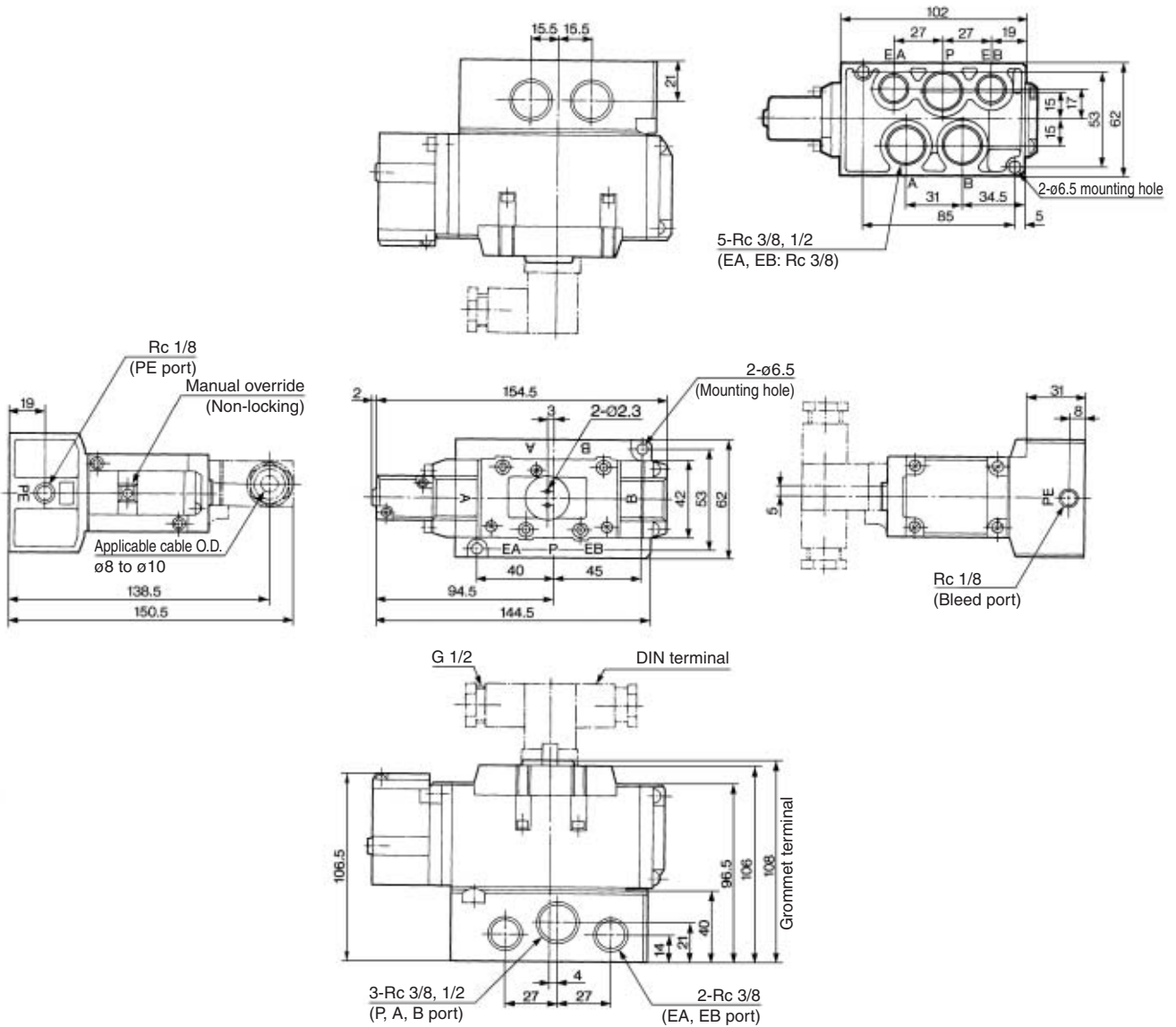


- VK
- VZ
- VF
- VFR**
- VP4
- VZS
- VFS
- VS4
- VQ7
- EVS
- VFN

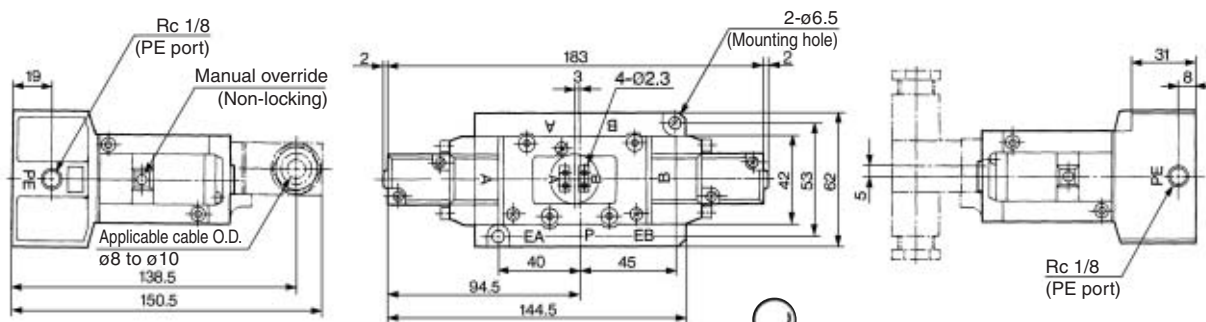
Series VFR4000

Non Plug-in 2 position single/double, 3 position closed center/exhaust center/pressure center

2 position single: VFR411⁰-□E, VFR411⁰-□D



2 position double: VFR421⁰-□E, VFR421⁰-□D **3 position closed center: VFR431⁰-□E, VFR431⁰-□D**
3 position exhaust center: VFR441⁰-□E, VFR441⁰-□D
3 position pressure center: VFR451⁰-□E, VFR451⁰-□D

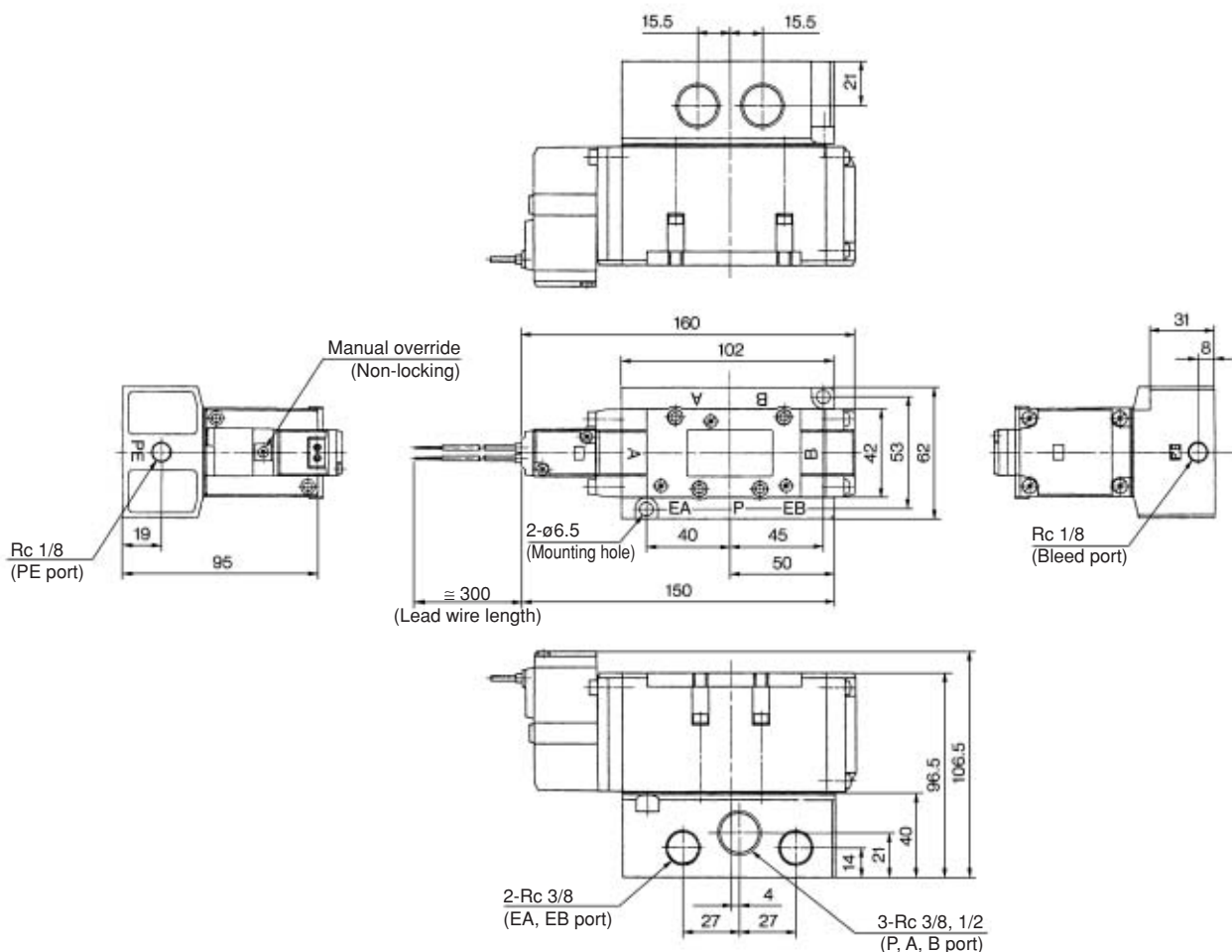


* Other dimensions are the same as the single type.

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR4000

Non Plug-in 2 position single

2 position single: VFR414⁰₁-□G



VK

VZ

VF

VFR

VP4

VZS

VFS

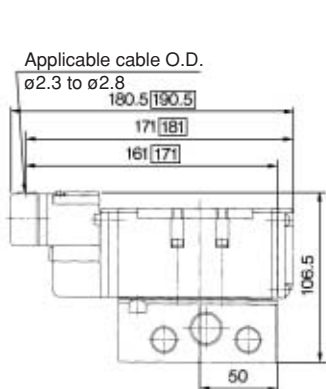
VS4

VQ7

EVS

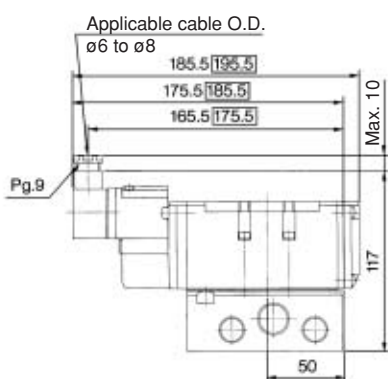
VFN

E: Grommet terminal



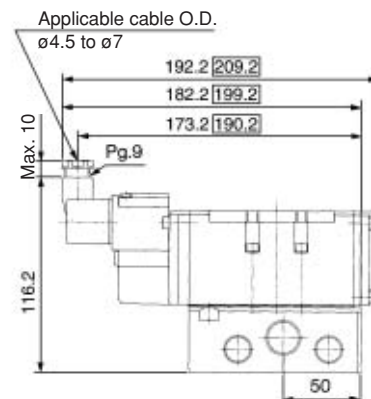
□: With light/surge voltage suppressor

T: Conduit terminal



□: With light/surge voltage suppressor

D, Y: DIN terminal



□: With light/surge voltage suppressor

Series VFR4000

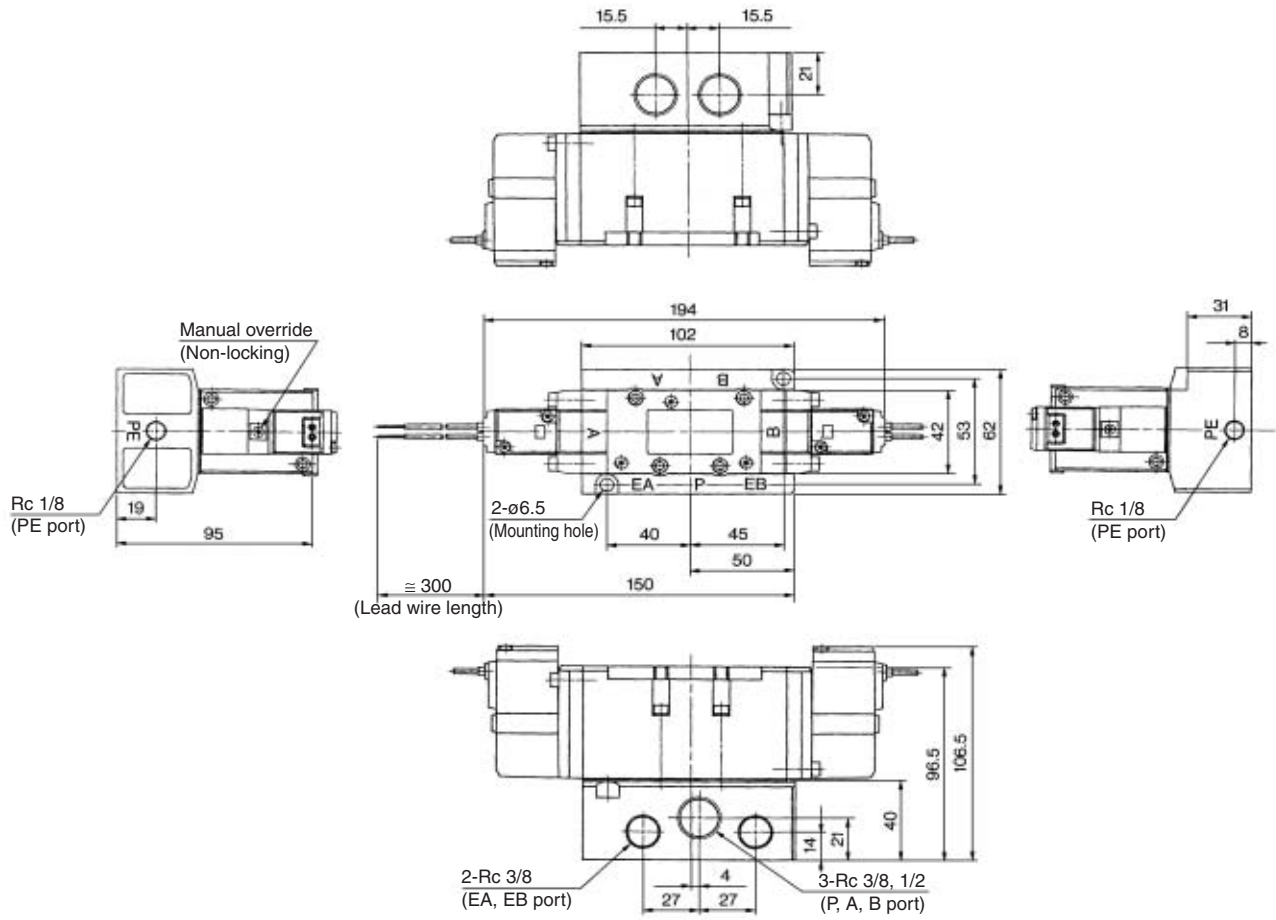
Non Plug-in 2 position double, 3 position closed center/exhaust center/pressure center

2 position double: VFR424⁰₁-□G

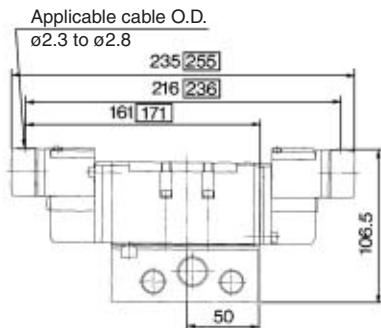
3 position closed center: VFR434⁰₁-□G

3 position exhaust center: VFR444⁰₁-□G

3 position pressure center: VFR454⁰₁-□G

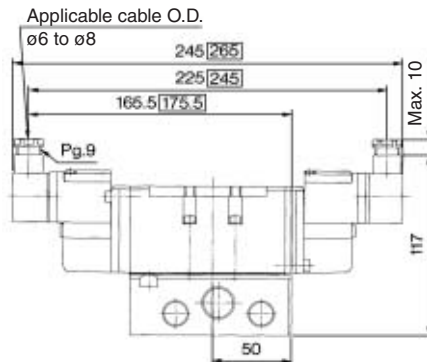


E: Grommet terminal



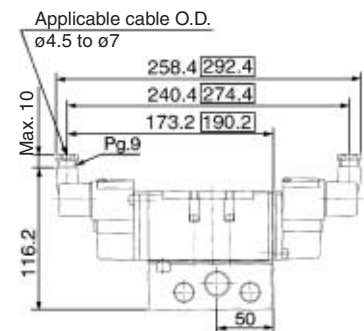
With light/surge voltage suppressor

T: Conduit terminal



With light/surge voltage suppressor

D: DIN terminal



With light/surge voltage suppressor