

5 Port Pilot Operated Solenoid Valve

Rubber Seal, Plug-in/Non Plug-in

Series VFR3000

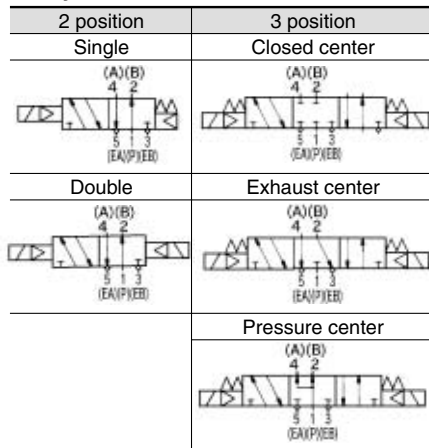


Plug-in type



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⁾
Electricity specifications	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, 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
Porting specifications		12, 100 VDC
Option		Bottom ported
		With light/surge voltage suppressor



Note) Operating pressure: 0 to 0.9 MPa

Pilot pressure: 2 position single/3 position 0.2 to 0.9 MPa
2 position double 0.1 to 0.9 MPa

Model

Type of actuation		Model		Port size Rc	Flow characteristics ⁽¹⁾						Max. operating cycle (Hz)	Response time ⁽³⁾ (ms)	Weight ⁽⁴⁾ (kg)
		Plug-in	Non plug-in		1 → 4/2 (P → A/B)			4/2 → 5/3 (A/B → EA/EB)					
					C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv			
2 position	Single	VFR310□	VFR311□	1/4	7.5	0.38	1.9	7.5	0.34	1.9	5	30 or less	0.61 (0.64) <0.58>
			VFR314□	3/8	8.4	0.39	2.2	8.7	0.38	2.2			
	Double	VFR320□	VFR321□	1/4	7.1	0.41	1.9	7.4	0.40	1.9	5	30 or less	0.71 (0.74) <0.69>
			VFR324□	3/8	7.9	0.36	2.0	8.6	0.37	2.2			
3 position	Closed center	VFR330□	VFR331□	1/4	6.8	0.40	1.8	6.3	0.38	1.6	3	50 or less	0.72 (0.75) <0.71>
			VFR334□	3/8	7.2	0.39	1.9	6.5	0.40	1.7			
	Exhaust center	VFR340□	VFR341□	1/4	6.5	0.42	1.7	7.9 [3.4]	0.41 [0.47]	2.0 [0.96]	3	50 or less	0.72 (0.75) <0.71>
			VFR344□	3/8	6.9	0.42	1.8	9.5 [3.4]	0.39 [0.46]	2.4 [0.96]			
	Pressure center	VFR350□	VFR351□	1/4	7.6 [2.4]	0.33 [0.48]	1.9 [0.69]	6.1	0.36	1.5	3	50 or less	0.72 (0.75) <0.71>
			VFR354□	3/8	9.3 [2.4]	0.34 [0.47]	2.2 [0.69]	6.5	0.41	1.7			



Note 1) []: Denotes the normal position.

Note 2) Min. operating frequency is once in 30 days. (As per JIS B 8375)

Note 3) Based on dynamic performance test, JIS B 8375-1981. (0.5 MPa, Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)


Note 4) For VFR3□00-□FZ-⁰²/₀₃, (): VFR3□10-DZ□-⁰²/₀₃, < >: VFR3□40-□G-⁰²/₀₃

Series VFR3000

How to Order

Electrical entry

F: Plug-in type, conduit terminal



Option

Nil	None
Z	With light/surge voltage suppressor

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

Nil	Side ported
B *	Bottom ported

* Option

Port size (P, A, B, EA, EB port)

Nil	Without sub-plate
02	1/4
03	3/8

* For bottom ported: Rc 1/4

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Plug-in VFR3 1 0 0 5 F 02


Non plug-in VFR3 1 1 1 1 D 02 **Common electrical entry**

Non plug-in VFR3 1 4 0 1 G 02 **Individual electrical entry**

Symbol

2 position single

1



Body option

0	Standard
1 *	Direct manual override

* Option


Pilot type

Nil	Internal pilot
R *	External pilot

* Option

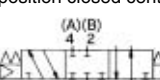
2 position double

2



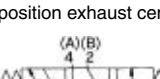
3 position closed center

3



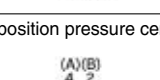
3 position exhaust center

4



3 position pressure center

5



Coil 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

Option/VFR3□1□

Nil	None
Z	With light/surge voltage suppressor

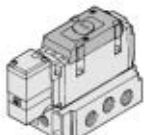
Option/VFR3□4□

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

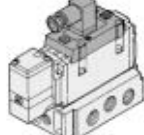
* Indicator light is not available for grommet type. With surge voltage suppressor is available for grommet type only.

Electrical entry: VFR3□1□

E: Grommet terminal

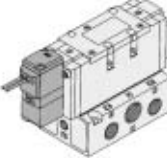


D: DIN terminal

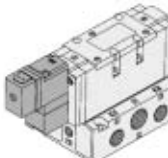


Electrical entry: VFR3□4□


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	—	—	VFR3□0□ VFR3□1□
G	Grommet	—	—	VFR3□4□
GS	Grommet	—	—	
E	Grommet terminal	—	—	
EZ	Grommet terminal	●	●	
T	Conduit terminal	—	—	
TZ	Conduit terminal	●	●	
D	DIN terminal	—	—	
DZ	DIN terminal	●	●	
Y	DIN terminal	—	—	
YZ	DIN terminal (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

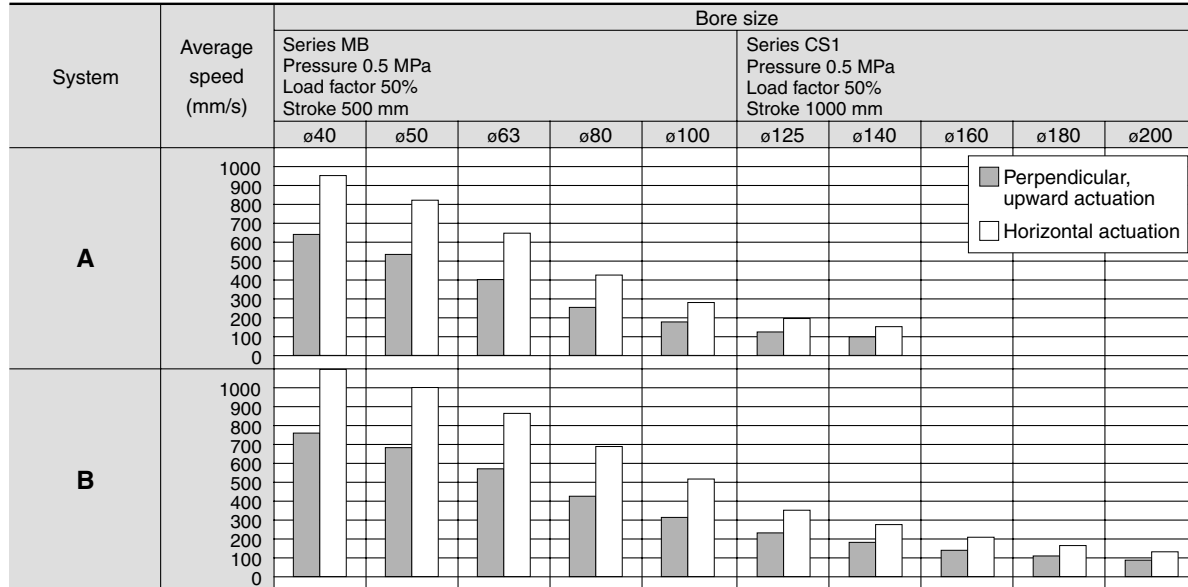
Symbol	Applicable valve model
Nil	VFR3□0□ VFR3□1□
1	VFR3□4□

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

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

Cylinder Speed Chart

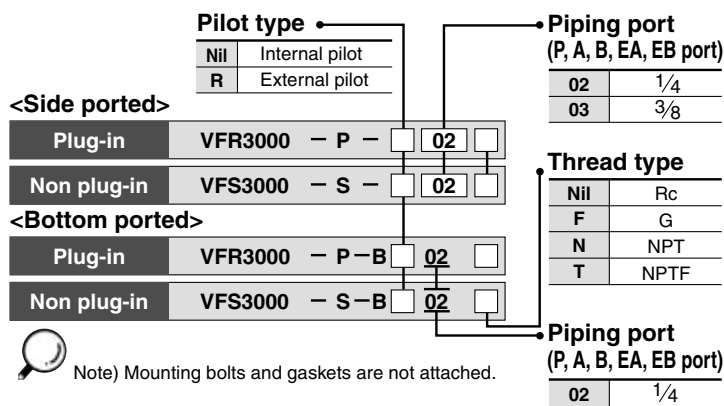


- * It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- * The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- * Load factor: ((Load weight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

System Components

System	Solenoid valve	Speed controller	Silencer	SPG (Steel pipe) dia. x Length
A	Series VFR3000 Rc 1/4	AS4000-02 (S = 24 mm ²)	AN200-02 (S = 35 mm ²)	6A x 1 m
B	Series VFR3000 Rc 3/8	AS420-03 (S = 73 mm ²)	AN300-03 (S = 60 mm ²)	10A x 1 m

How to Order Sub-plate Assembly



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

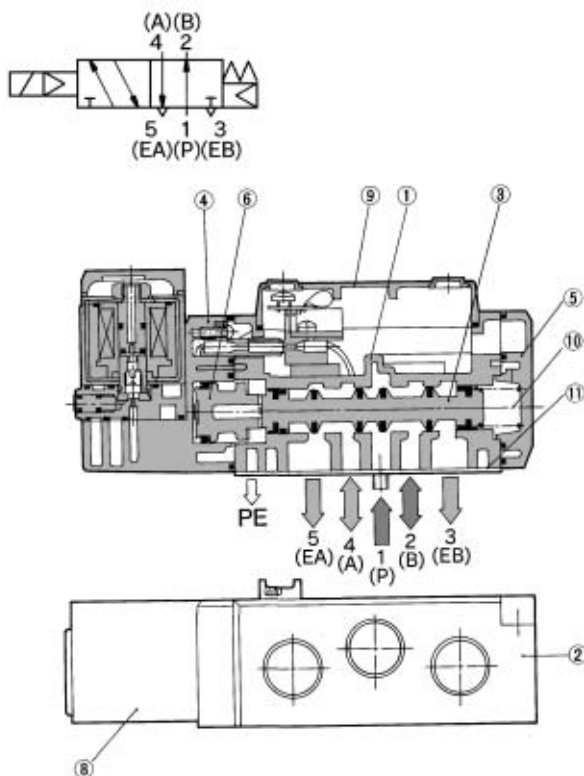
VFN

Series VFR3000

Construction

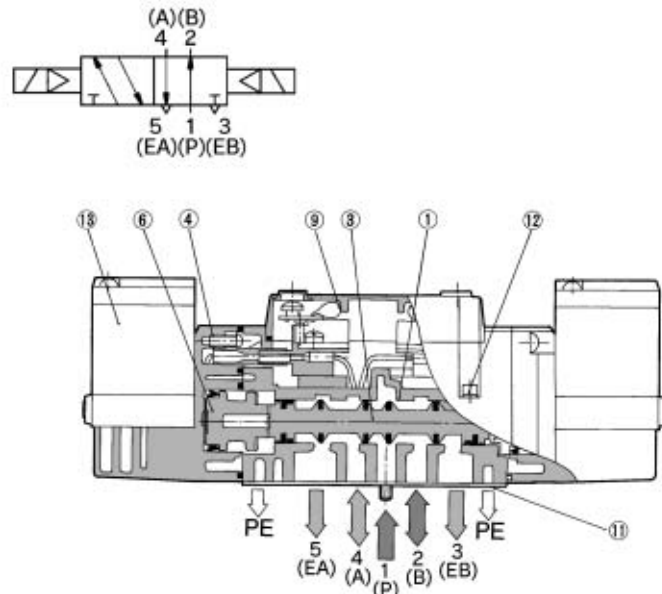
2 position single

VFR31□0



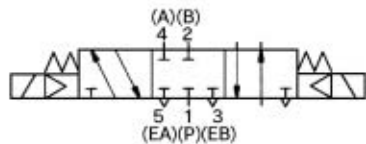
2 position double

VFR32□0

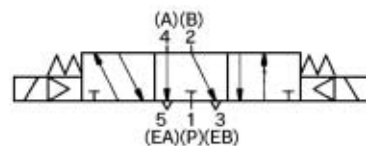


3 position closed center/exhaust center/pressure center

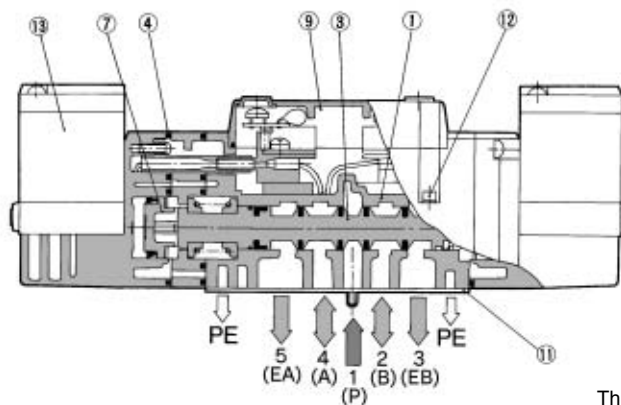
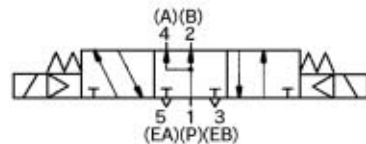
Closed center: VFR33□0



Exhaust center: VFR34□0



Pressure center: VFR35□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
⑤	End plate	Resin	Black

No.	Description	Material	Note
⑥	Piston	Resin	
⑦	Piston	Resin	
⑧	Junction cover	Resin	
⑨	Light cover	Resin	
⑩	Return spring	Stainless steel	

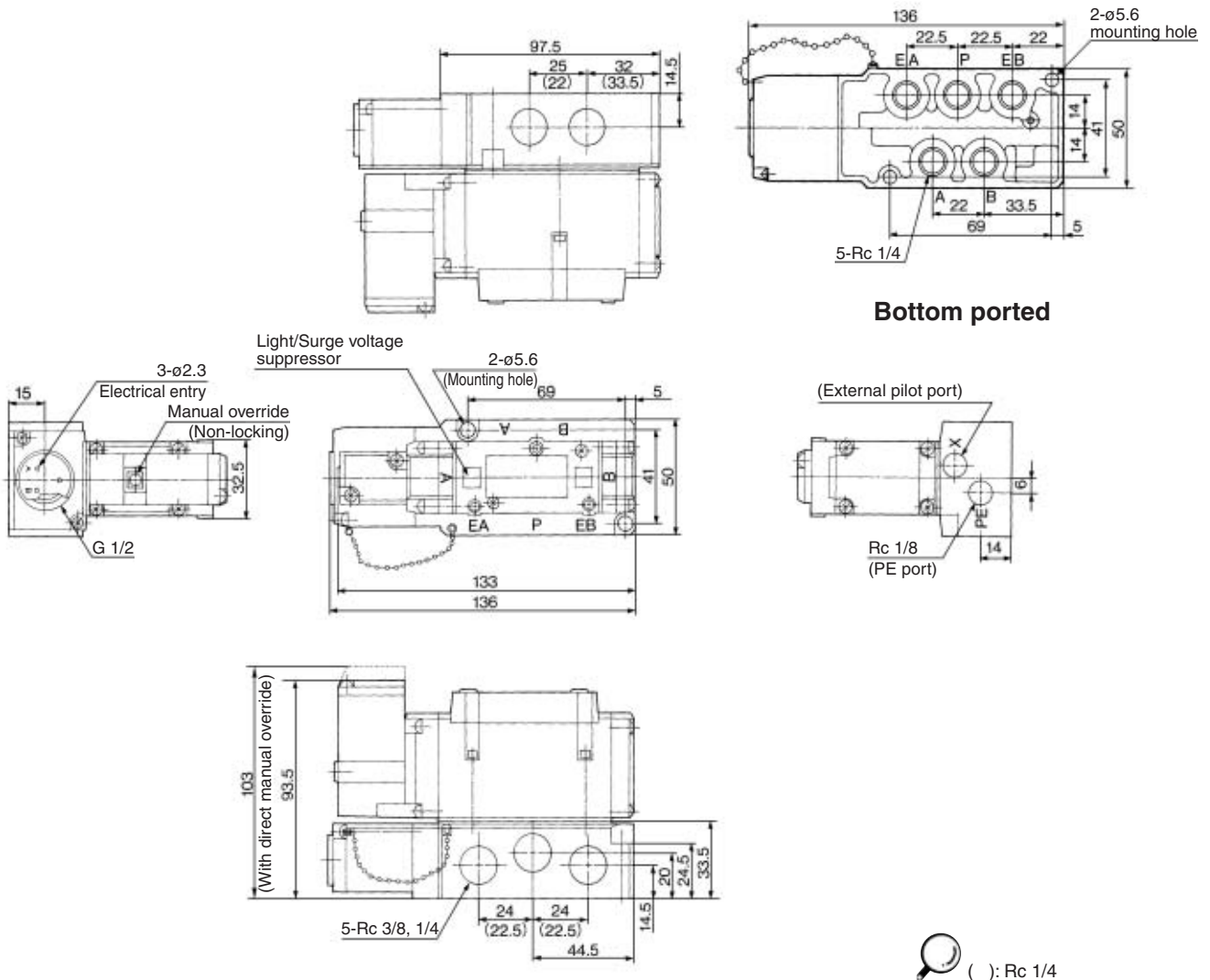
Replacement Parts

No.	Description	Material	Part no.		
			VFR31□□	VFR32□□	VFR33□□/34□□/35□□
⑪	Gasket	NBR	VFR3000-26-4	VFR3000-26-4	VFR3000-26-4
⑫	Hexagon socket head screw	Steel	AXT632-3(M3 x 32)	AXT632-3(M3 x 32)	AXT632-3(M3 x 32)
⑬	Pilot valve assembly	—	Refer to "How to Order Pilot Valve Assembly" on page 3-5-30.		
—	Sub-plate assembly	—	Refer to "How to Order Sub-plate Assembly" on page 3-5-31.		

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR3000

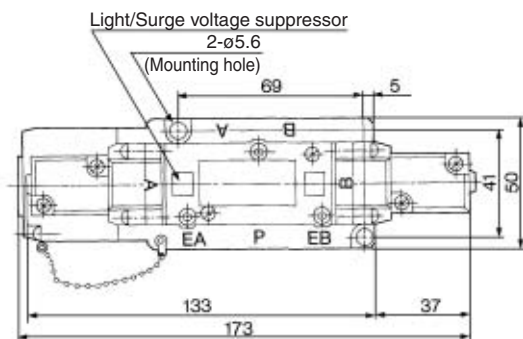
Plug-in 2 position single/double, 3 position closed center/exhaust center/pressure center

2 position single: VFR310⁰₁-□FZ



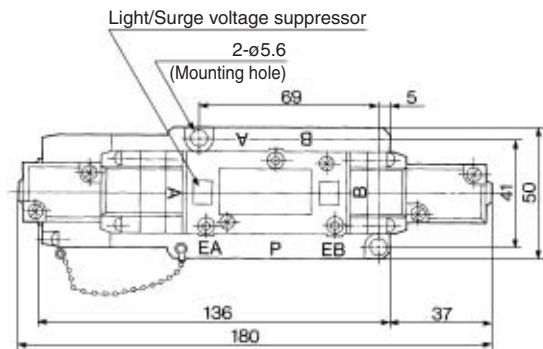
() : Rc 1/4

2 position single: VFR320⁰₁-□FZ



* Other dimensions are the same as the single type.

3 position closed center: VFR330⁰₁-□FZ
3 position exhaust center: VFR340⁰₁-□FZ
3 position pressure center: VFR350⁰₁-□FZ



* Other dimensions are the same as the single type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

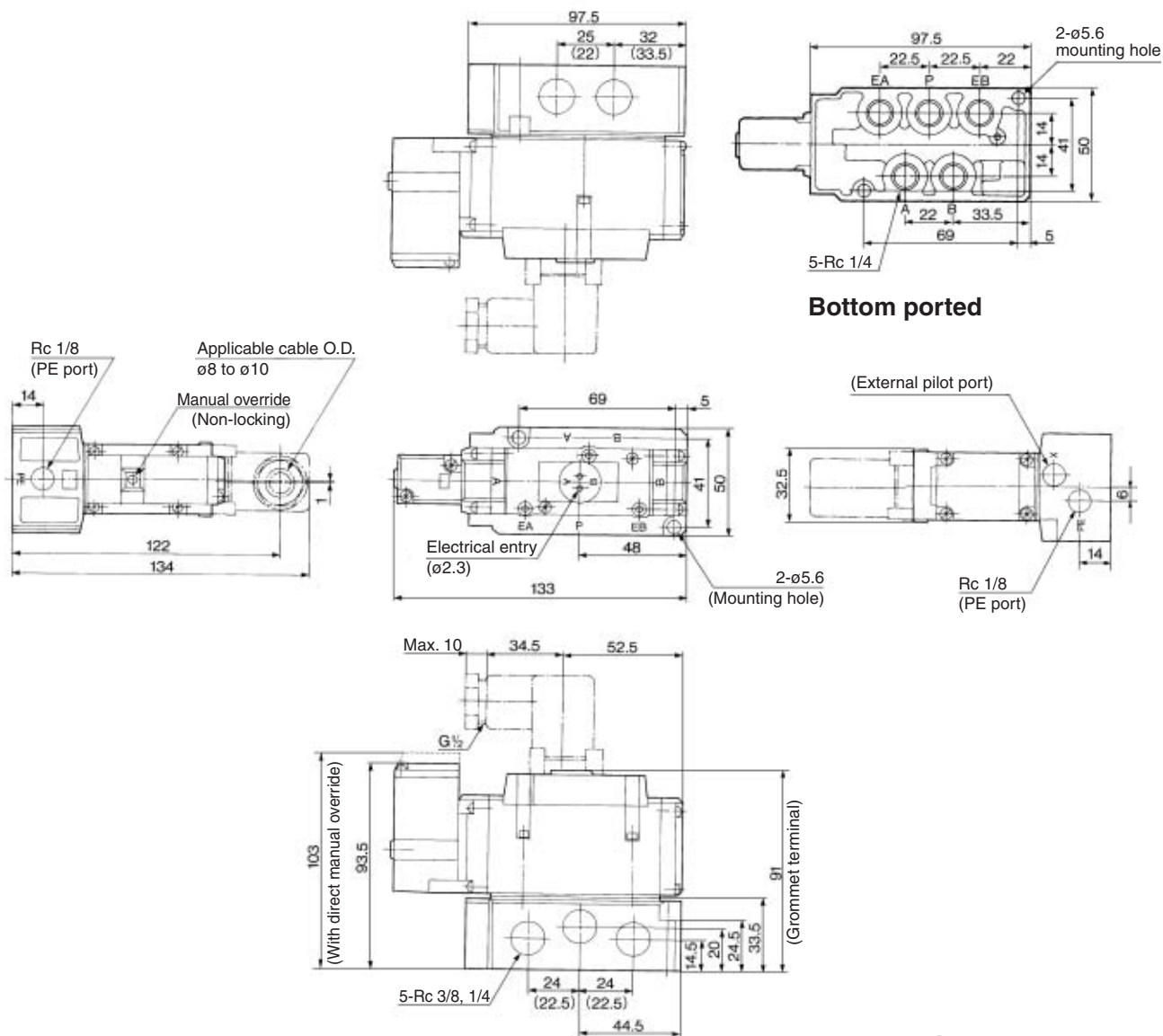
EVS

VFN

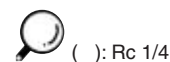
Series VFR3000

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

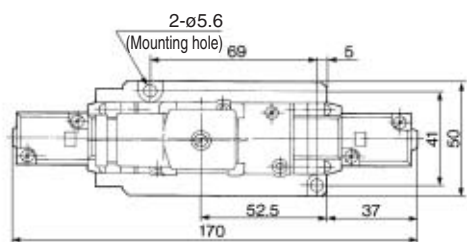
2 position single: VFR311⁰₁-□E, VFR311⁰₁-□DZ



Bottom ported

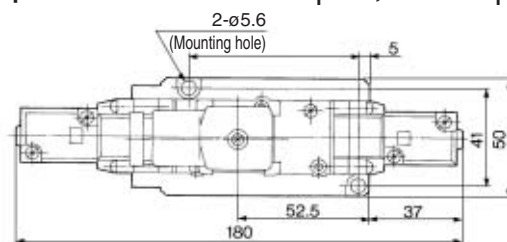


2 position double: VFR321⁰₁-□E, VFR321⁰₁-□DZ



* Other dimensions are the same as the single type.

3 position closed center: VFR331⁰₁-□E, VFR331⁰₁-□DZ
 3 position exhaust center: VFR341⁰₁-□E, VFR341⁰₁-□DZ
 3 position pressure center: VFR351⁰₁-□E, VFR351⁰₁-□DZ

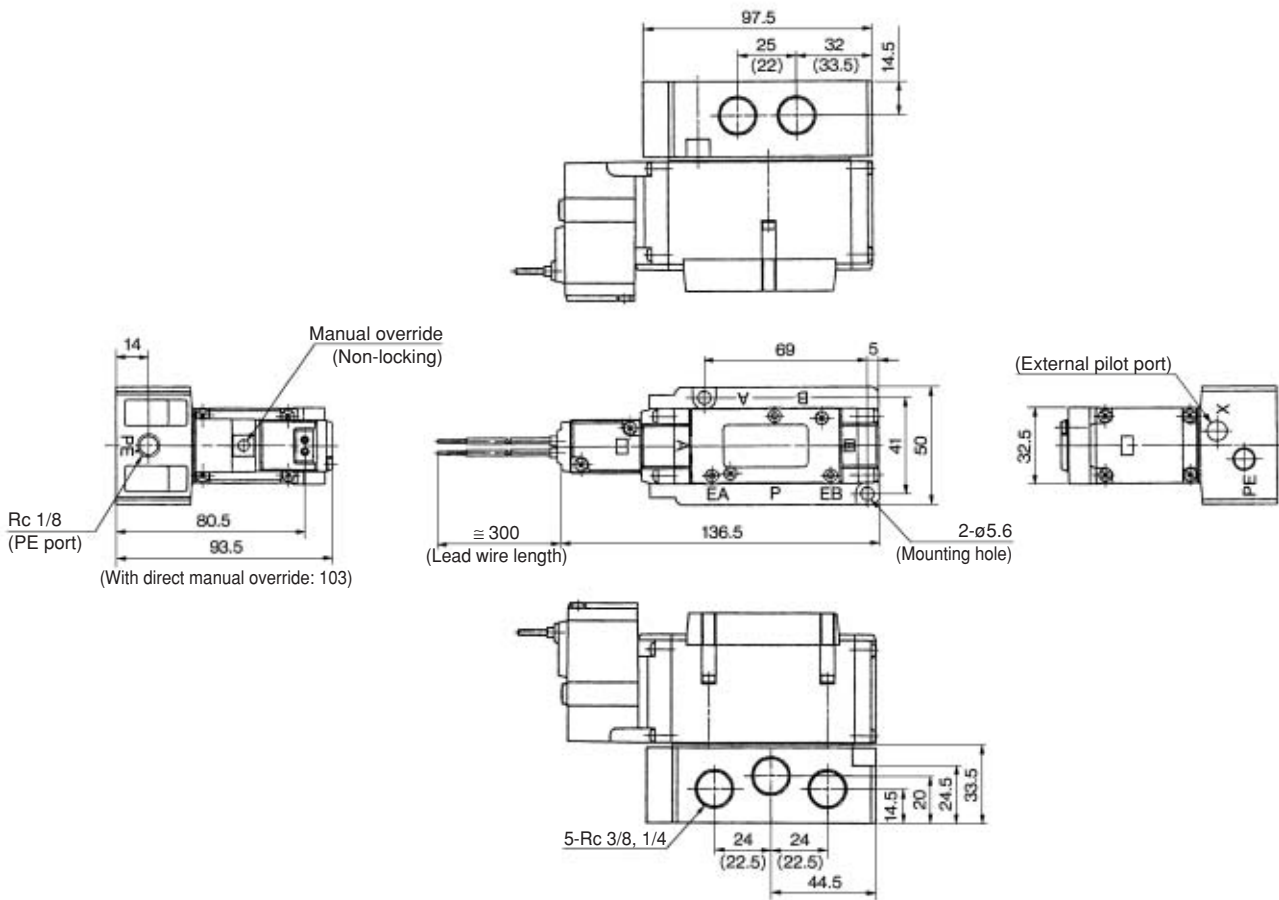


* Other dimensions are the same as the single type.

5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR3000

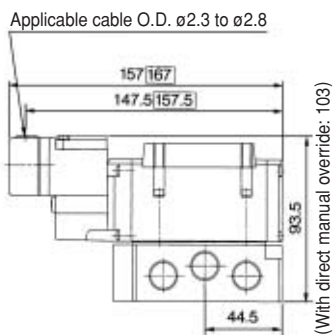
Non Plug-in 2 position single

2 position single: VFR314⁰₁-□G



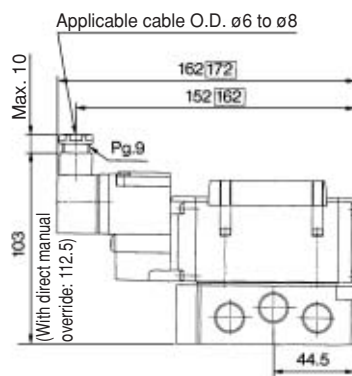
() : Rc 1/4

E: Grommet terminal



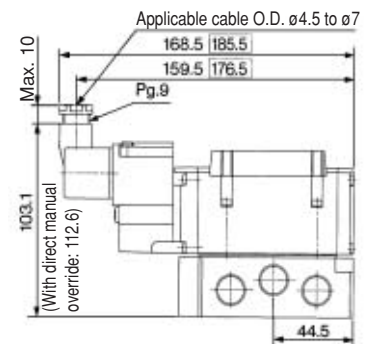
□: With light/surge voltage suppressor

T: Conduit terminal



□: With light/surge voltage suppressor

D, Y: DIN terminal



□: With light/surge voltage suppressor

Series VFR3000

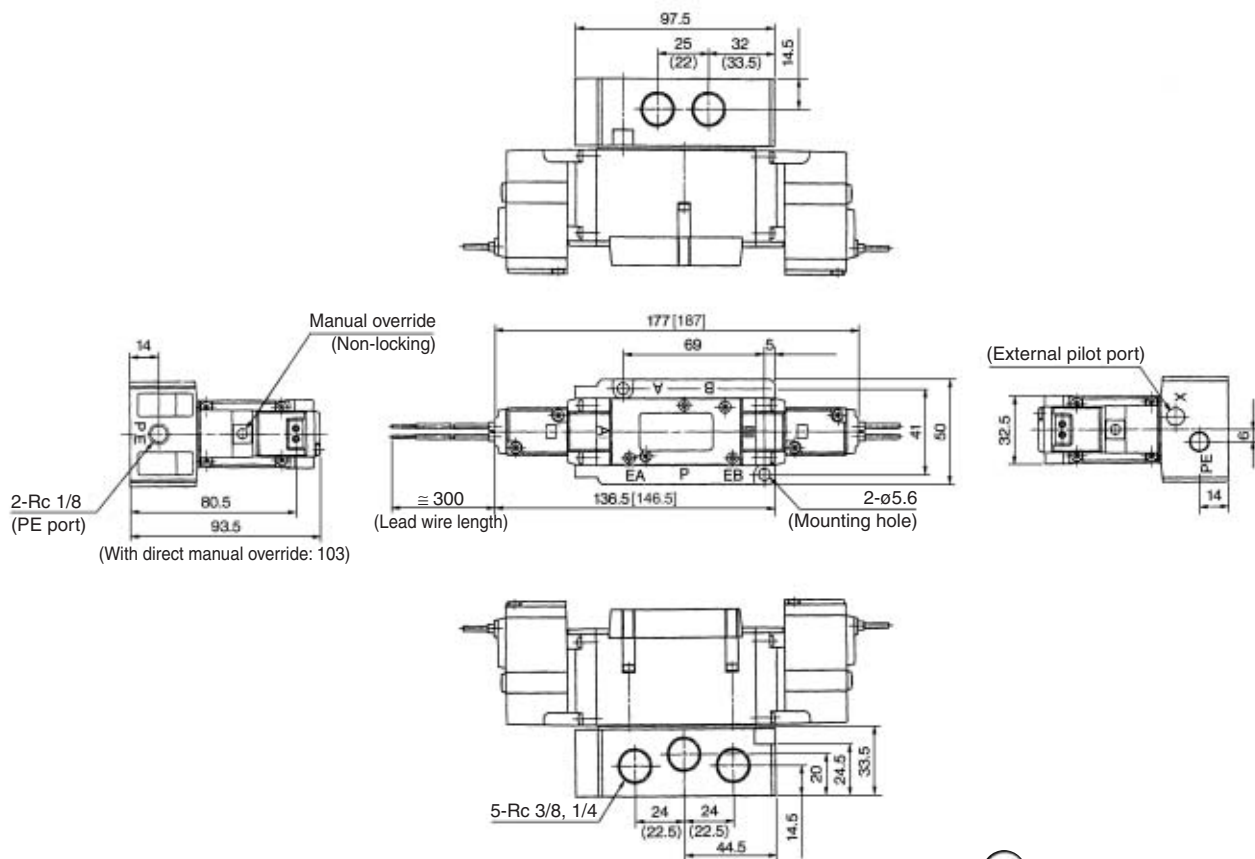
Non Plug-in 2 position double, 3 position closed center/exhaust center/pressure center

2 position double: VFR324⁰₁-□G

3 position closed center: VFR334⁰₁-□G

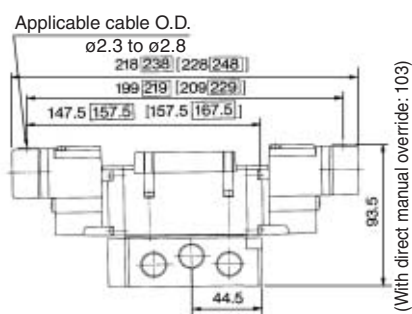
3 position exhaust center: VFR344⁰₁-□G

3 position pressure center: VFR354⁰₁-□G



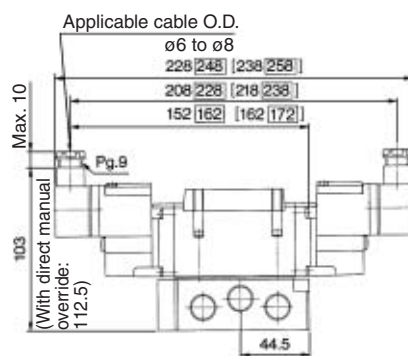
⌕ [] : 3 position
() : Rc 1/4

E: Grommet terminal



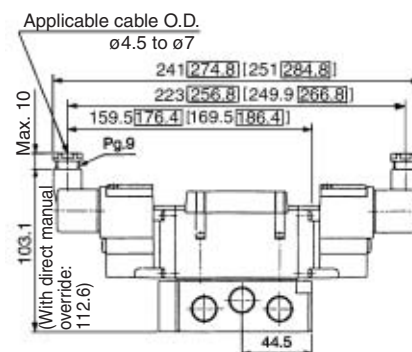
⌕ [] : 3 position
□ : With light/surge voltage suppressor

T: Conduit terminal



⌕ [] : 3 position
□ : With light/surge voltage suppressor

D, Y: DIN terminal



⌕ [] : 3 position
□ : With light/surge voltage suppressor