

5 Port Pilot Operated Solenoid Valve

Metal Seal, Plug-in/Non Plug-in

Series VFS5000

Model

Type of actuation		Model		Port size Rc	Flow characteristics						Max. operating cycle (cpm) ⁽¹⁾	Response time (ms) ⁽²⁾	Weight (kg) ⁽³⁾
		Plug-in	Non plug-in		1 → 4/2 (P → A/B)			4/2 → 5/3 (A/B → R1/R2)					
					C [dm ³ /(s·bar)]	b	Cv	C [dm ³ /(s·bar)]	b	Cv			
2 position	Single	VFS5100	VFS5110	3/8	15	0.30	3.7	15	0.30	4.1	600	45 or less	0.88
				1/2	16	0.15	3.7	19	0.15	4.5			
				3/4	17	0.15	3.9	20	0.13	4.7			
	Double	VFS5200	VFS5210	3/8	15	0.30	3.7	15	0.30	4.1	600	25 or less	1.06
				1/2	16	0.15	3.7	19	0.15	4.5			
				3/4	17	0.15	3.9	20	0.13	4.7			
3 position	Closed center	VFS5300	VFS5310	3/8	14	0.25	4.0	14	0.24	4.1	300	55 or less	1.16
				1/2	16	0.25	4.1	16	0.24	4.1			
				3/4	16	0.25	4.1	16	0.23	4.1			
				3/8	14	0.32	3.8	14	0.25	3.5			
				1/2	16	0.17	3.8	16	0.18	4.1			
				3/4	17	0.20	4.2	17	0.13	4.1			
	Exhaust center	VFS5400	VFS5410	3/8	14	0.30	3.7	14	0.31	3.8	300	55 or less	1.14
				1/2	16	0.23	3.9	16	0.22	4.1			
				3/4	18	0.25	4.6	17	0.22	4.3			
	Pressure center	VFS5500	VFS5510	3/8	14	0.30	3.7	14	0.31	3.8	300	55 or less	1.14
				1/2	16	0.23	3.9	16	0.22	4.1			
				3/4	18	0.25	4.6	17	0.22	4.3			
Double check	VFS600	VFS5610	3/8	9.0	—	—	9.0	—	—	180	60 or less	1.99	
			1/2	9.0	—	—	9.0	—	—				
			3/4	9.0	—	—	9.0	—	—				

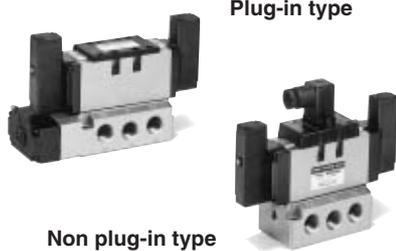
Note 1) Based on JIS B 8375 (once per 30 days) for the minimum operating frequency. Note 2) Based on JIS B8375-1981. (The value at supply pressure 0.5 MPa.)
 Note 3) The figures in the above list are without sub-plate. In the case of with plug-in sub-plate and, with non plug-in sub-plate add 3/8, 1/2—0.577 kg, 3/4—0.823 kg respectively.
 Note 4) "Note 1)" and "Note 2)" are with controlled clean air.

Compact yet provides a large flow capacity
3/4: C: 20 dm³/(s·bar)

Low power consumption: 1.8 W DC

Easy maintenance

2 types of sub-plates:
 Plug-in and non plug-in



Standard Specifications

		Fluid	Air/Inert gas	
Valve specifications	Maximum operating pressure	1.0 MPa		
	Minimum operating pressure	0.1 MPa		
	Proof pressure	1.5 MPa		
	Ambient and fluid temperature	-10 to 60°C ⁽¹⁾		
	Lubrication	Non-lube ⁽²⁾		
	Pilot valve manual override	Non-locking push type (Flush)		
	Shock/Vibration resistance	150/50 m/s ² ⁽³⁾		
	Enclosure	Type E: Dustproof (Level 0), Type F: Dripproof (Level 2), Type D: Splashproof (Level 4) ⁽⁴⁾		
	Electricity specifications	Coil rated voltage	100, 200 VAC, 50/60 Hz; 24 VDC	
Allowable voltage fluctuation		-15 to +10% of rated voltage		
Coil insulation type		Class B or equivalent (130°C) ⁽⁵⁾		
Apparent power (Power consumption) AC		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		1.8 W (2.04 W: With light/surge voltage suppressor)		
Electrical entry		Plug-in type	Conduit terminal	
	Non plug-in type	Grommet terminal, DIN terminal		

Note 1) Use dry air at low temperatures.
 Note 2) Use turbine oil Class 1 (ISO VG32), if lubricated.
 Note 3) 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)

Note 4) Based on JIS C 0920. Note 5) Based on JIS C 4003.

Option Specifications

Pilot type	External pilot ^{Note)}	
Manual override	Main valve	Direct manual override
	Pilot valve	Non-locking push type (Extended), Locking type (Tool required), Locking type (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, Non-rotating DIN terminal	

Note) Operating pressure: 0 to 1.0 MPa
 Pilot pressure: 0.1 to 1.0 MPa

JIS Symbol

2 position	3 position
Single	Closed center
Double	Exhaust center
	Pressure center
	Double check

How to Order

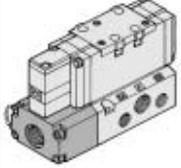
Body type

O: Plug-in type sub-plate




Electrical entry

F: Plug-in type conduit terminal



Porting specifications

Nil	Side ported
B*	Bottom ported

* In the case of external pilot (Option), bottom piping is not available.

Port size

Nil	Without sub-plate
03	Rc 3/8
04	Rc 1/2
06	Rc 3/4

Thread type

Nil	Rc
N*	NPT
T*	NPTF
F*	G

* Option

Plug-in VFS5 1 0 0 2 **F** 04

Non plug-in VFS5 1 1 0 5 **D** 06

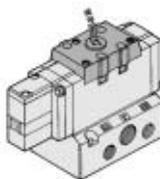
Option

Nil	None
Z	With light/surge voltage suppressor
P*	Non-rotating DIN terminal
ZP*	Light/Surge Voltage Suppressor Non-rotating DIN terminal

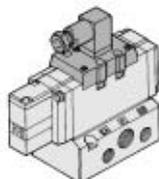
* Type "P", "ZP" is available for DIN type only.

Electrical entry

E: Grommet terminal



D: DIN terminal



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

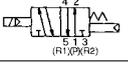
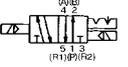
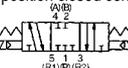
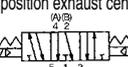
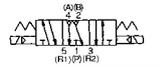
* Option

Pilot type

Nil	Internal pilot
R*	External pilot

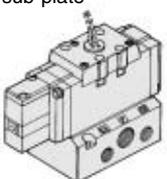
* Option

Symbol

<p>2 position single</p> <p>1 </p> <p>2 position double</p> <p>2 </p> <p>3 position closed center</p> <p>3 </p> <p>3 position exhaust center</p> <p>4 </p>	<p>3 position pressure center</p> <p>5 </p> <p>3 position double check</p> <p>6 </p>
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Body type

1: Non plug-in type sub-plate

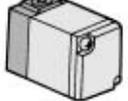
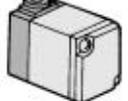
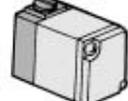
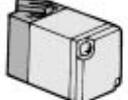


Body option

0	Standard
1*	Direct manual override

* Option

Pilot valve Manual override

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

* Option

How to Order Pilot Valve Assembly

SF4 - 1 F - 30

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

Manual override

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

* Option

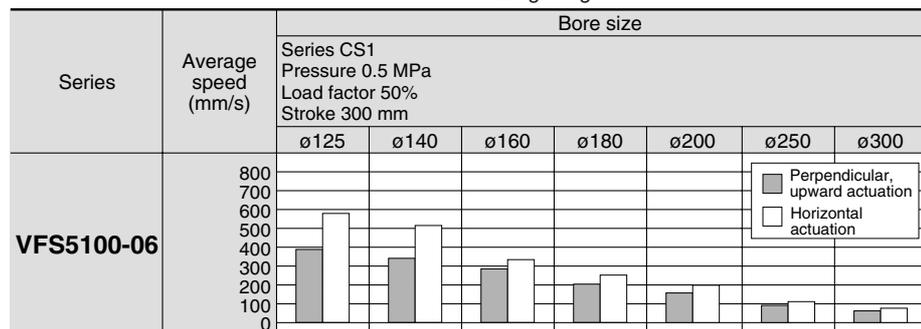


* Refer to page 3-8-5 for voltage conversion.

5 Port Pilot Operated Solenoid Valve Metal Seal, Plug-in/Non Plug-in Series VFS5000

Cylinder Speed Chart

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



- * 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%

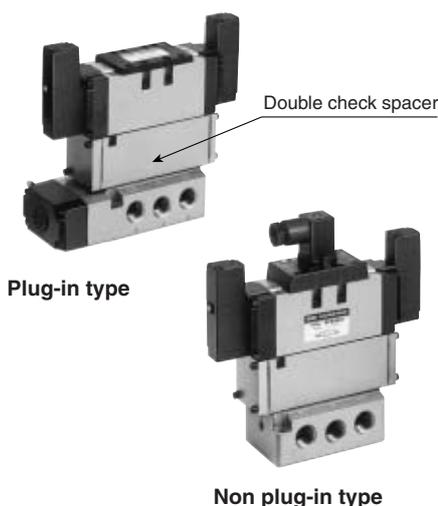
Conditions

		Series CS1
VFS5100-06	Tube bore x Length	SGP20A x 1 m
	Speed controller	AS500-06
	Silencer	AN500-06

Double Check Spacer/Specifications

Can hold an intermediate cylinder position for an extended time

If the double check spacer with a built-in double check valve is combined, it will enable the cylinder to stop in the intermediate stroke and maintain its position for a long time without being affected by the leakage between the spools.



Specifications

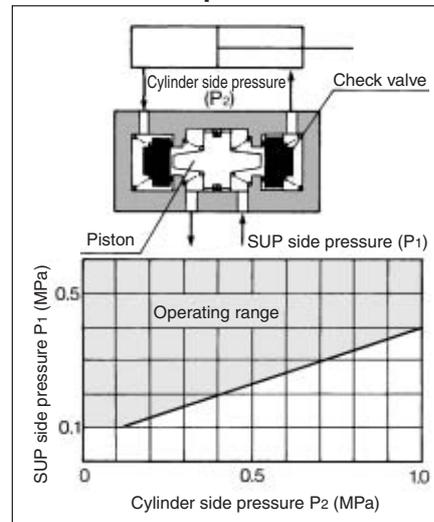
Double check spacer part no.	Plug-in type	Non plug-in type
		VVFS5000-22A-1
Applicable valve model	VFS5400-□F	VFS5410-□D VFS5410-□E
Leakage* (cm ³ /min)	Solenoid one side energized	P R1 320
		R2 or less
	Solenoid both sides de-energized	P R1 320
		R2 or less
	A R1 0	
	B R2	

* Supply pressure: 0.5 MPa

Caution

- In the case of 3 position double check valve (VFS56□0), check the leakage from piping and fittings in between valve and cylinder by means of synthetic detergent solutions, and ensure that there is no such leakage found there. Also check the leakage from cylinder seal and piston seal. If there is any leakage, sometimes the cylinder, when valve is de-energized, can move without stopping at intermediate position.
- Be aware that if the exhaust side is restricted excessively, the intermediate stopping accuracy will decrease and will lead to improper intermediate stops.

Check Valve Operation



- The combination of VFS51□0, VFS52□0 and a double check spacer can be used as prevention of falling at the stroke end but cannot hold the intermediate position of the cylinder.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

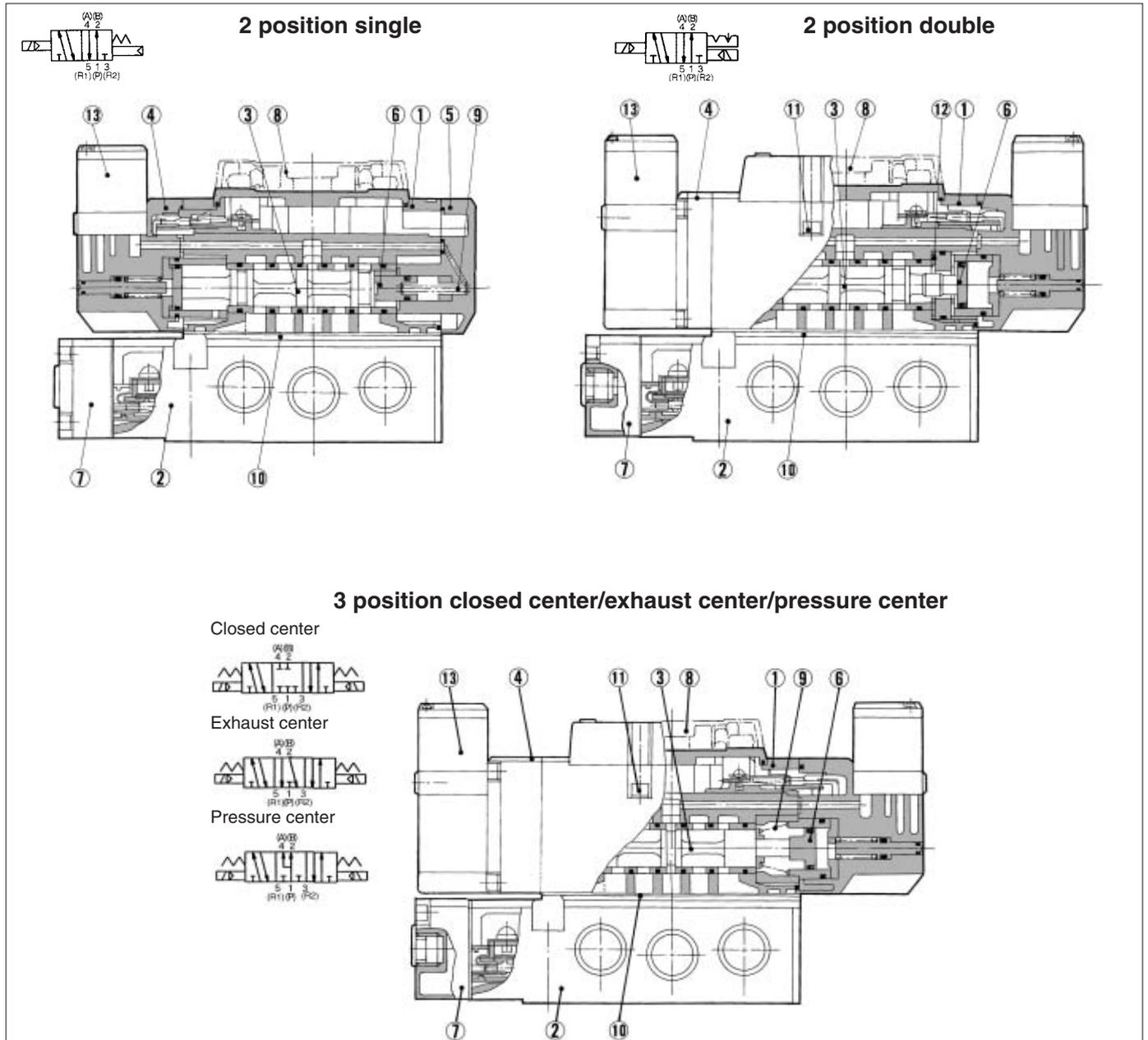
VQ7

EVS

VFN

Series VFS5000

Construction



Component Parts

No.	Description	Material	Note
①	Body	Aluminum die-casted	Platinum silver
②	Sub-plate	Aluminum die-casted	Platinum silver
③	Spool/Sleeve	Stainless steel	—
④	Adapter plate	Aluminum die-casted	Black
⑤	End plate	Aluminum die-casted	Black
⑥	Piston	Resin	—
⑦	Junction cover	Resin	—
⑧	Light cover	Resin	—

Sub-plate Assembly Part No.

Plug-in	VFS5000-P ⁰³ ₀₄ ₀₆
Non plug-in	VFS5000-S ⁰³ ₀₄ ₀₆



* Mounting bolt and gasket are not included.

Part no. for mounting bolt and gasket
BG-VFS5000

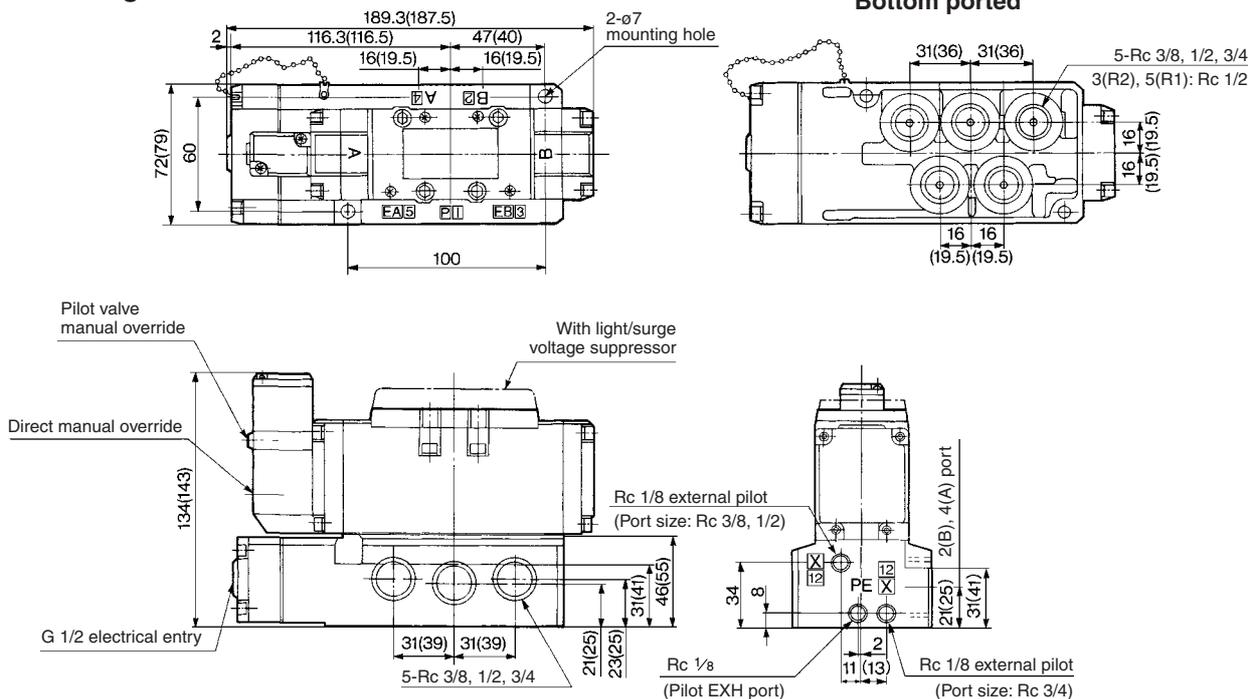
Replacement Parts

No.	Description	Material	Part no.		
			VFS51□□	VFS52□□	VFS53□□/54□□/55□□
⑨	Return spring	Stainless steel	VFS5000-9	—	AXT627-18
⑩	Gasket	NBR	AXT627-10-1	AXT627-10-1	AXT627-10-1
⑪	Hexagon socket head screw	Steel	M5 x 50	M5 x 50	M5 x 50
⑫	Detent assembly	—	—	AXT510-9	—
⑬	Pilot valve assembly	—	Refer to "How to Order Pilot Valve Assembly" on page 3-8-86.		

5 Port Pilot Operated Solenoid Valve Metal Seal, Plug-in/Non Plug-in Series VFS5000

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

2 position single: VFS5100-□F



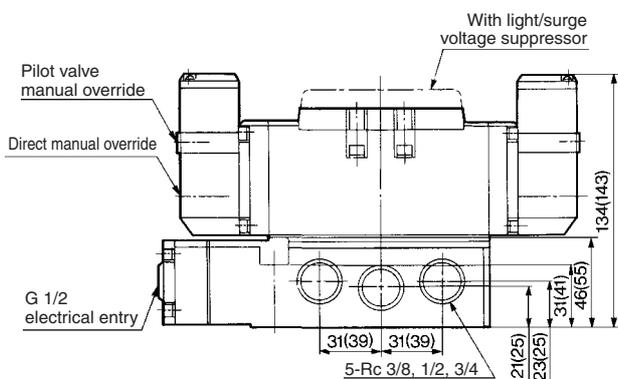
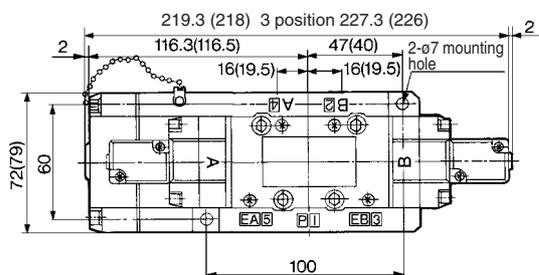
(): Rc 3/4

2 position double: VFS5200-□F

3 position closed center: VFS5300-□F

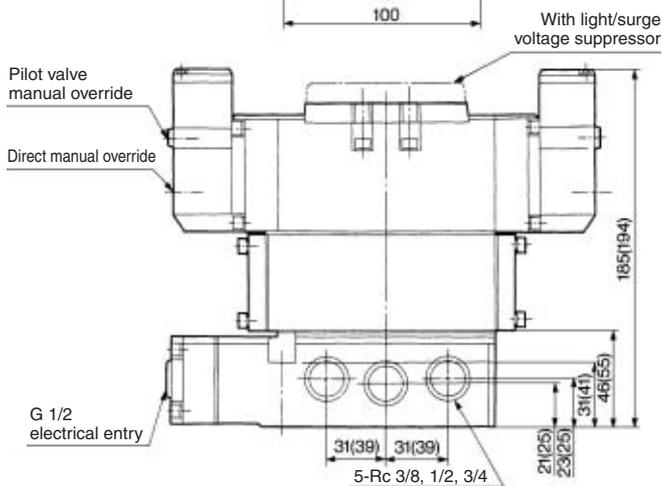
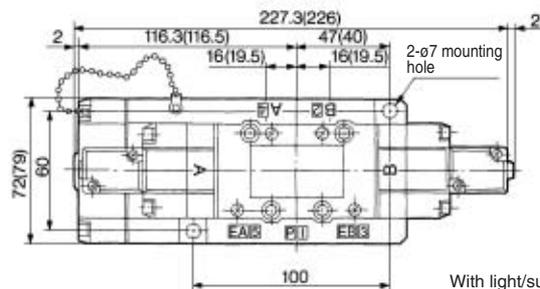
3 position exhaust center: VFS5400-□F

3 position pressure center: VFS5500-□F



(): Rc 3/4

3 position double check: VFS5600-□F



(): Rc 3/4

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

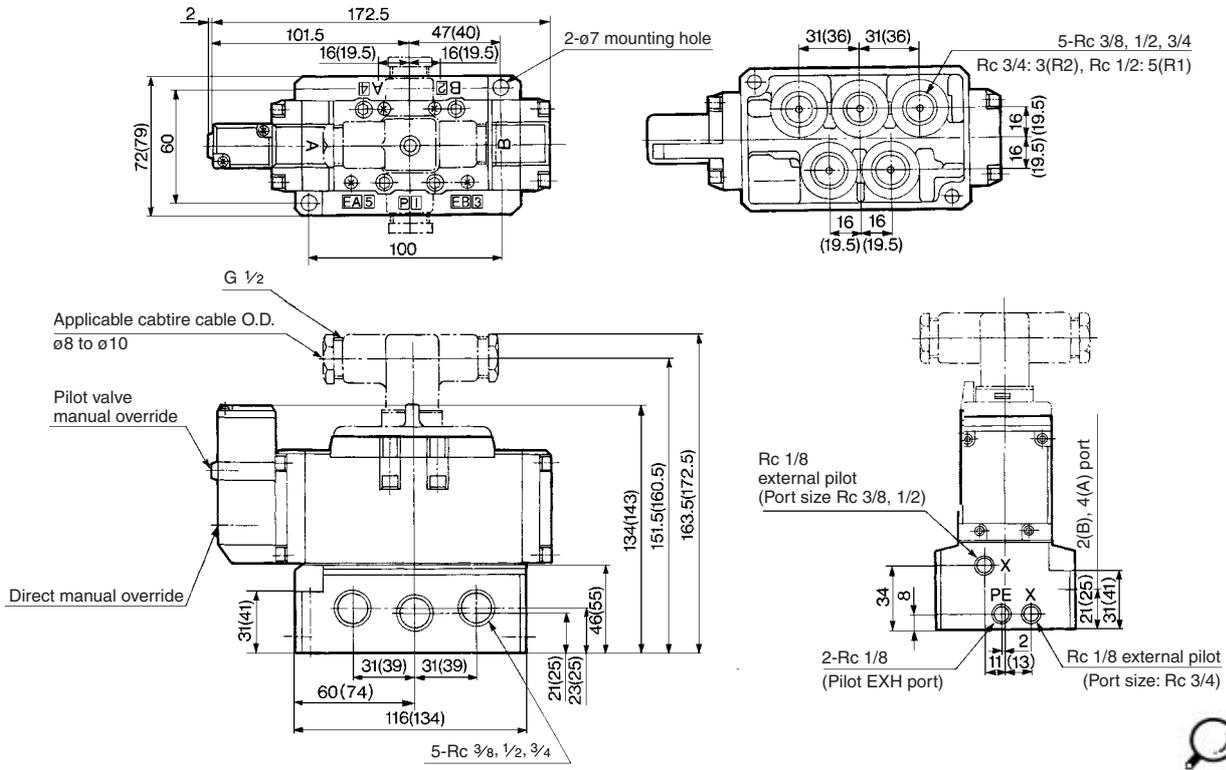
EVS

VFN

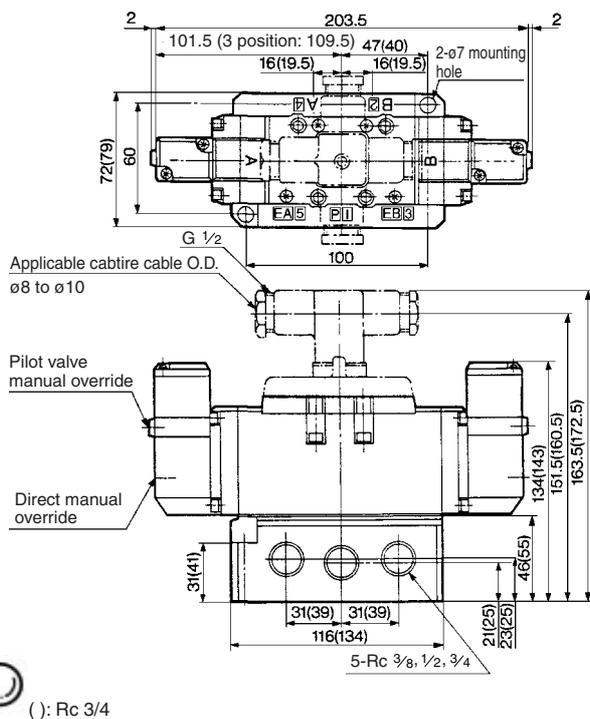
Series VFS5000

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

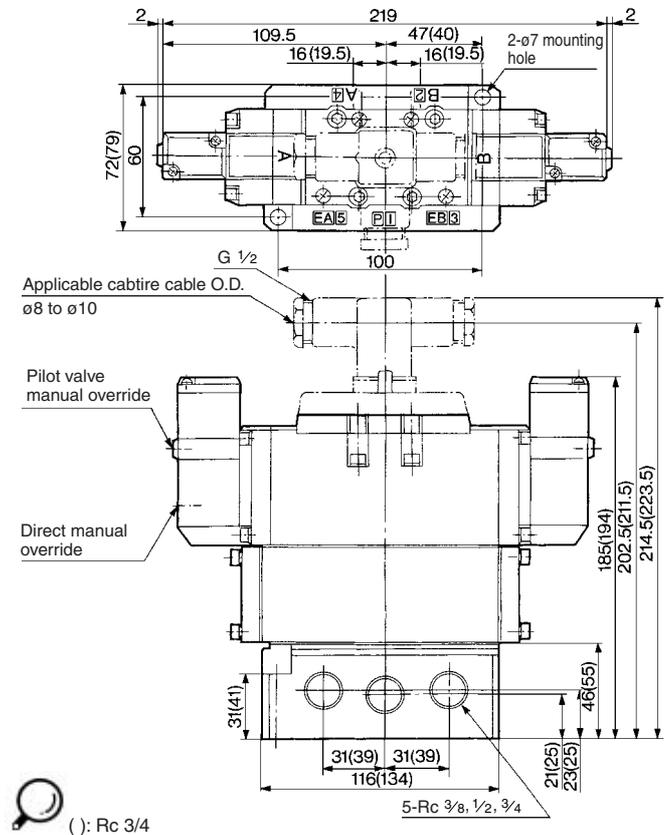
2 position single: VFS5110-□E, VFS5110-□D



2 position double: VFS5210-□E, VFS5210-□D 3 position closed center: VFS5310-□E, VFS5310-□D 3 position exhaust center: VFS5410-□E, VFS5410-□D 3 position pressure center: VFS5510-□E, VFS5510-□D



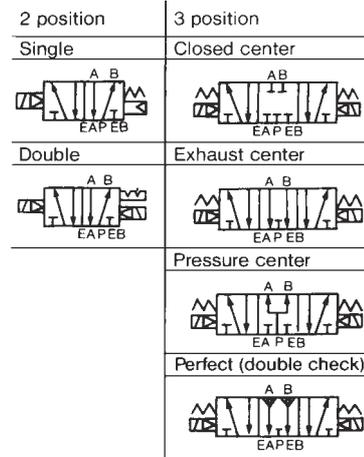
3 position double check: VFS5610-□E, VFS5610-□D



MODEL NVFS5000

Position	Number Of Solenoid	Type Plug-In	Port Size (NPTF)	Cv Factor	Response Time (ms)
2 Position	Single	NVFS5100	3/8	4.4	45 or less
			1/2	5.4	
			3/4	5.7	
2 Position	Double	NVFS5200	3/8	4.4	25 or less
			1/2	5.4	
			3/4	5.7	
3 Position	Closed Center	NVFS5300	3/8	3.7	55 or less
			1/2	4.6	
			3/4	4.8	
	Exhaust Center	NVFS5400	3/8	3.9	55 or less
			1/2	4.8	
			3/4	5	
Pressure Center	NVFS5500	3/8	3.9	55 or less	
		1/2	4.8		
		3/4	4.9		
Perfect (Double Check)	NVFS5600	3/8	2.2	60 or less	
		1/2	2.7		
		3/4	2.8		

SYMBOLS



TECHNICAL SPECIFICATIONS STANDARD

	Fluid	Air and Inert Gas	
Valve	Max Operating Pressure	150 PSI (1MPa)	
	Min Operating Pressure	15 PSI (0.15MPa)	
	Ambient & Fluid Temperature	Note 1) 14~140°F (-10~60°C)	
	Lubrication	Note 2) Not Required	
	Pilot Operator Manual Override	Non Locking Push Type (Flush)	
	Protection Construction	Dust Proof	
Electrical	Rated Voltage	AC 110VAC50/60Hz, 220V50/60Hz, 24V50/60Hz	
		DC 12V, 24V	
	Allowable Voltage Range	-15 ~ 10% Rated Voltage	
	Coil Insulation	Class B or Equivalent	
	Apparent Power AC (Power Consumption)	InRush	5.0VA/60Hz, 5.6VA/50Hz
		Holding	2.3VA(1.5W)/60Hz, 3.4VA(2.1W)/50Hz
	Power Consumption DC	1.8W	
Electrical Entry	Plug In	Conduit Terminal (Base Access)	

TECHNICAL SPECIFICATIONS OPTIONAL

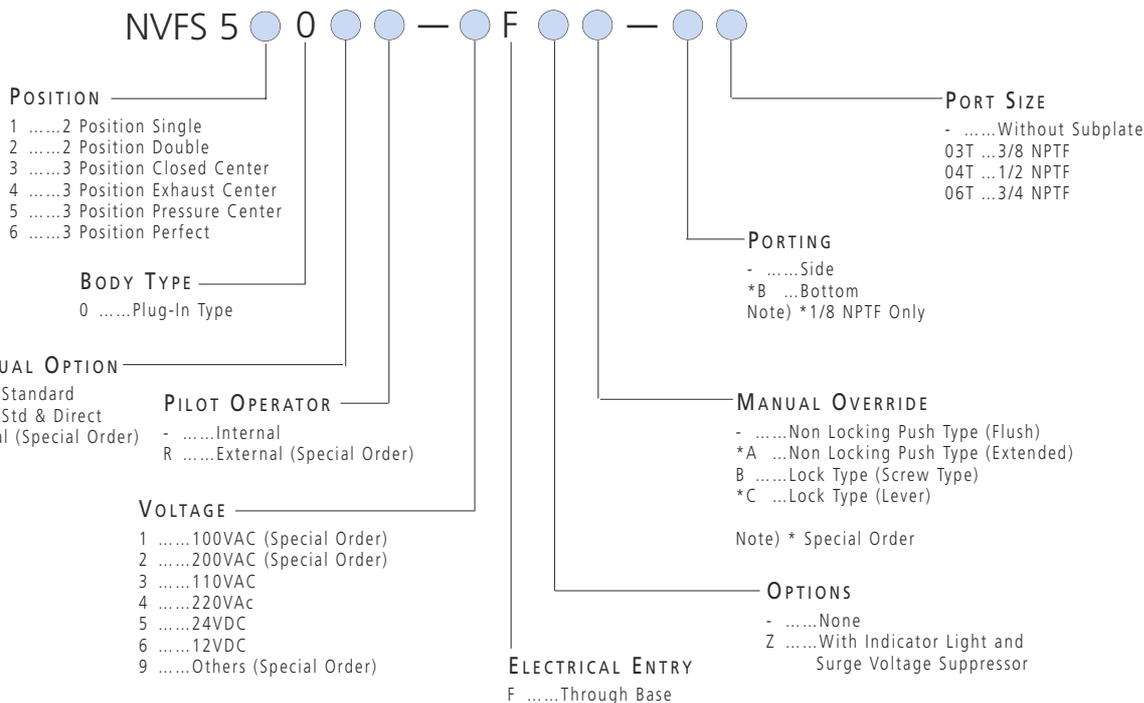
	Pilot Type	External Pilot Type
Manual Override	Main Valve	Direct Manual Override Type
	Pilot Operator	Non Locking Push Type (Extended), Lock Type (Tool), Lock Type (Lever)
Voltage	AC	100V50/60Hz, 200V50/60Hz
	DC	6V, 48V, 100V
Porting		Bottom Ported Subplate
Option		W/Indicator Light & Surge Voltage Suppressor

Note 1) Use Dry Air at Low Temperature

Note 2) Use Turbine Oil No 1 (ISOVG32), if lubricated



How To
ORDER
NVFS5000



How To
ORDER
MANIFOLD

Plug-in Type: With Terminal Block

● Lead wires of solenoid valve are connected with the terminals on upper surface of terminal block, corresponding lead wires from power source can be wired at the bottom of terminal block.

