



# 5 Port Pilot Operated Solenoid Valve Rubber Seal Series **VFR**

## Series Variations

| Series              | Sonic conductance<br>C [dm <sup>3</sup> /(s·bar)]  | Type of<br>actuation                                  | Voltage                                                                                                                                                                                                                                                                                    | Electrical entry                                                                                                                                                                                                   | With light/surge voltage suppressor<br>(Option)                                                                                                                                                                                                                                                                                                                                                                                          | Manual<br>override                                                 |
|---------------------|----------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Base Mounted</b> | <b>VFR2000</b><br>Plug-in type<br>Non plug-in type | 1/8, 1/4: 3.0                                         |                                                                                                                                                                                                                                                                                            | <b>Plug-in</b><br>Conduit terminal (F)<br><br><b>Non plug-in</b><br>Grommet (G)<br><br>Conduit terminal (T)<br><br>L plug connector (L)<br><br>Grommet terminal (E)<br>DIN terminal (D, Y)<br>M plug connector (M) | <input type="checkbox"/> With light/surge voltage suppressor<br>• Plug-in type<br>Conduit terminal (FZ)<br>• Non plug-in type<br>Grommet terminal (EZ)<br>Conduit terminal (TZ)<br>DIN terminal (DZ, YZ)<br><br><input type="checkbox"/> With surge voltage suppressor<br>• Non plug-in type<br>Grommet (GS)<br><br>Note) Surge voltage suppressor is equipped midway on the lead wire for grommet type.                                 | Non-locking push type                                              |
|                     | <b>VFR3000</b><br>Plug-in type<br>Non plug-in type | 1/4: 7.5<br>3/8: 8.7                                  | (Standard)<br>100 VAC <sup>50</sup> / <sub>60</sub> Hz<br>200 VAC <sup>50</sup> / <sub>60</sub> Hz<br>24 VDC<br><br>(Option)<br>110 to 120 V <sup>50</sup> / <sub>60</sub> Hz<br>220 VAC <sup>50</sup> / <sub>60</sub> Hz<br>240 VAC <sup>50</sup> / <sub>60</sub> Hz<br>12 VDC<br>100 VDC | <b>Plug-in</b><br>Conduit terminal (F)<br><br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br><br>Grommet (G)<br>DIN terminal (D, Y)                                                     | <input type="checkbox"/> With light/surge voltage suppressor<br>• Plug-in type<br>Conduit terminal (FZ)<br>• Non plug-in type<br>(VFR3□10/4□10)<br>DIN terminal (DZ)<br>Grommet terminal (EZ)<br>Conduit terminal (TZ)<br><br><input type="checkbox"/> With surge voltage suppressor<br>• Non plug-in type<br>(VFR3□40/4□40)<br>Grommet (GS)<br><br>Note) Surge voltage suppressor is equipped midway on the lead wire for grommet type. | Locking type B<br>(Tool required)<br><br>Locking type C<br>(Lever) |
|                     | <b>VFR4000</b><br>Plug-in type<br>Non plug-in type | 3/8, 1/2: 14                                          |                                                                                                                                                                                                                                                                                            | <b>Plug-in</b><br>Conduit terminal (F)<br><br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br><br>Grommet (G)<br>DIN terminal (D, Y)                                                     | <input type="checkbox"/> With light/surge voltage suppressor<br>• Plug-in type<br>Conduit terminal (FZ)<br>• Non plug-in type<br>(VFR3□10/4□10)<br>DIN terminal (DZ)<br>Grommet terminal (EZ)<br>Conduit terminal (TZ)<br><br><input type="checkbox"/> With surge voltage suppressor<br>• Non plug-in type<br>(VFR3□40/4□40)<br>Grommet (GS)<br><br>Note) Surge voltage suppressor is equipped midway on the lead wire for grommet type. | Non-locking push type                                              |
|                     | <b>VFR5000</b><br>Plug-in type<br>Non plug-in type | 3/8: 18<br>1/2: 23<br>3/4: 25                         |                                                                                                                                                                                                                                                                                            | <b>Plug-in</b><br>Conduit terminal (F)<br><br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br><br>Grommet (G)<br>DIN terminal (D)                                                        | <input type="checkbox"/> With light/surge voltage suppressor<br>• Plug-in type<br>Conduit terminal (FZ)<br>• Non plug-in type<br>DIN terminal (DZ)                                                                                                                                                                                                                                                                                       | Non-locking push type                                              |
|                     | <b>VFR6000</b><br>Plug-in type<br>Non plug-in type | 3/4: 41<br>1: (Effective area)<br>191 mm <sup>2</sup> |                                                                                                                                                                                                                                                                                            | <b>Plug-in</b><br>Conduit terminal (F)<br><br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br><br>Grommet (G)<br>DIN terminal (D)                                                        | <input type="checkbox"/> With light/surge voltage suppressor<br>• Plug-in type<br>Conduit terminal (FZ)<br>• Non plug-in type<br>DIN terminal (DZ)                                                                                                                                                                                                                                                                                       | Non-locking push type                                              |

VK  
VZ  
VF  
VFR  
VP4  
VZS  
VFS  
VS4  
VQ7  
EVS  
VFN



\* 2 position single type  
Passage: 4/2 → 5/3 (A/B → EA/EB)



# Series VFR2000/3000/4000/5000/6000

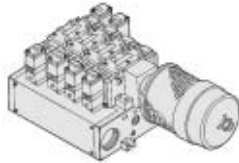
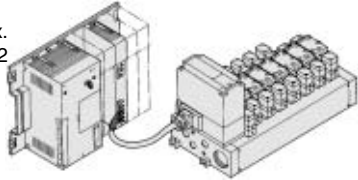
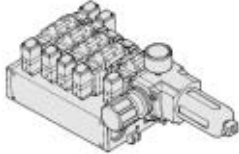
## Manifold Variations

|                       |                                                     | Base Mounted Plug-in Type |         |         |         | Base Mounted Non Plug-in Type |         |         |         |
|-----------------------|-----------------------------------------------------|---------------------------|---------|---------|---------|-------------------------------|---------|---------|---------|
|                       |                                                     | VFR2000                   | VFR3000 | VFR4000 | VFR5000 | VFR2000                       | VFR3000 | VFR4000 | VFR5000 |
| Manifold              | With multi-connector                                | ●                         | ●       | ●       | ●       |                               |         |         |         |
|                       | With terminal block                                 | ●                         | ●       | ●       | ●       |                               |         |         |         |
|                       | With D-sub connector                                | ●                         | ●       | ●       | ●       |                               |         |         |         |
|                       | Non plug-in type<br>(Wiring required to each valve) |                           |         |         |         | ●                             | ●       | ●       | ●       |
| Manifold Option Parts | Individual SUP spacer                               | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | Individual EXH spacer                               | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | SUP block disk                                      | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | EXH block disk                                      | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | Throttle valve spacer                               | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | Interface regulator                                 | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | Blanking plate                                      | ●                         | ●       | ●       | ●       | ●                             | ●       | ●       | ●       |
|                       | Air release valve spacer                            | ●                         | ●       | ●       |         | ●                             | ●       | ●       |         |
|                       | SUP stop valve spacer                               | ● <sup>(1)</sup>          | ●       |         |         | ● <sup>(1)</sup>              | ●       |         |         |



Note 1) Used with the manifold base. Please contact SMC for details.

Note 2) There is no manifold base in Series VFR6000.

|                 |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manifold Option |  <p><b>With exhaust cleaner</b><br/>Plug-in type, Non plug-in type</p> <ul style="list-style-type: none"> <li>• High noise reduction effect: 35 dB or more</li> <li>• Collects oil mist: collecting rate 99.9%</li> <li>• Piping work is reduced.</li> </ul> | <p><b>With serial interface unit for serial transmission</b><br/>Plug-in type</p> <ul style="list-style-type: none"> <li>• Reduces wiring labor and material to manifold.</li> <li>• Possible to locate separately.<br/>Manifold solenoid valve: Max. 8 stations, 32 places (512 solenoids)</li> <li>• Easy maintenance</li> </ul>  |
|                 |  <p><b>With control unit</b> <small>Note)</small><br/>Plug-in type, Non plug-in type</p> <ul style="list-style-type: none"> <li>• Filter, regulator, pressure switch and air release valve in one unit</li> <li>• Piping work eliminated</li> </ul>          | <p>For details, refer to another catalog separately.</p>                                                                                                                                                                                                                                                                                                                                                                 |



Note) There is no option with control unit in Series VFR5000.

# Series VFR2000/3000/4000/5000/6000

## ⚠ Precautions

Be sure to read before handling. For Safety Instructions and Solenoid Valve Precautions, refer to page 3-13-2.

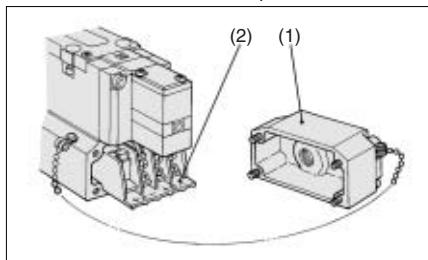
### Lead Wire Connection

#### ⚠ Caution

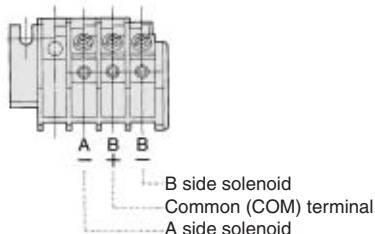
Plug-in type (With terminal block)

##### Series VFR2000/3000/4000

- If you remove the junction cover (1) on the sub-plate, you will see the plug-in terminal block (2) attached to the inside of sub-plate.



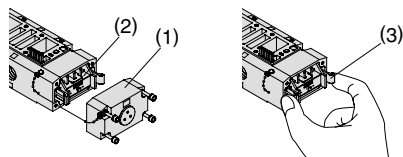
- The following markings are on the terminal block. Connect with corresponding power side.



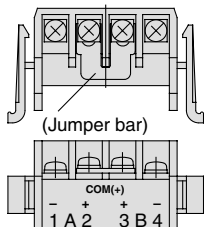
- Although "A-", "B+", and "B-" marks are indicated on the terminal block, this can be used as either "+COM" or "-COM".
- Applicable terminal:  
VFR2000, VFR3000: 1.25-3, 1.25-3S, 1.25Y-3N, 1.25Y-3S  
VFR4000: 1.25-3.5M, 1.25Y-3L, 1.25Y-3M

##### Series VFR5000

- Remove junction cover for sub-plate (1), depress levers (3) of terminal block assembly (2), pull out terminal block assembly.



- Terminal block assembly is marked as below. Connect it to power supply side.

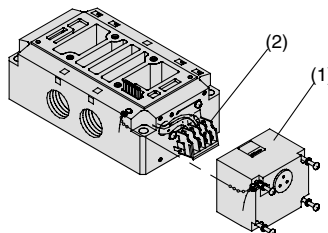


| Model   | Terminal block marking | A- (1) | B+ (3) | B- (4) |
|---------|------------------------|--------|--------|--------|
| VFR510□ |                        | A side | COM    |        |
| VFR520□ |                        | A side | COM    | B side |
| VFR540□ |                        | A side | COM    | B side |

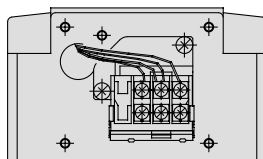
- Terminal block assembly can be used as "+" and "-" common regardless of markings. Do not remove jumper bar because it is used for common connection.
- Applicable terminal:  
1.25-4, 1.25-4M

##### Series VFR6000

- If you remove the junction cover (1) on the sub-plate, you will see the plug-in terminal block (2) attached to the inside of sub-plate.



- Terminal block assembly is wired like the following figure. Connect it to each power supply side.



| Model   | Position | Left   | Center | Right  |
|---------|----------|--------|--------|--------|
| VFR610□ |          | A side | COM    |        |
| VFR620□ |          | A side | COM    | B side |
| VFR640□ |          | A side | COM    | B side |

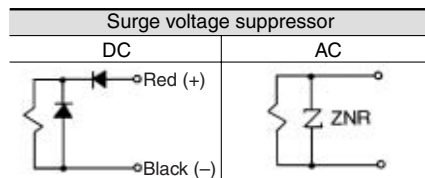
- Can be used as either "+COM" or "-COM".
- Applicable terminal:  
1.25-4, 1.25-4M

##### Non plug-in type

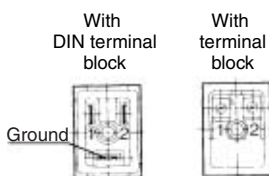
Series VFR2000

Series VFR3000/4000 (VFR3□40/4□40)

- Type G: Lead wire comes directly from the solenoid part. Connect it with the power source. Grommet with DC voltage surge voltage suppressor has polarity. Connect red lead wire to + (positive) side and black to - (negative) side.



- Type E, T, D, Y: In the case of DIN terminal block and terminal block, there is no polarity of positive [+] and negative [-]. Connect no. 1 and no. 2 terminals with corresponding power side.



- Applicable cable O.D.  
Type T:  $\phi 6$  to  $\phi 8$  mm  
Type E:  $\phi 2.3$  to  $\phi 2.8$  mm  
Type D (Series VFR2000):  $\phi 6$  to  $\phi 8$  mm  
Type D (Series VFR3000/4000):  $\phi 4.5$  to  $\phi 7$  mm  
Type Y:  $\phi 4.5$  to  $\phi 7$  mm  $\phi 4.5$  to  $\phi 7$  mm
- Applicable crimp terminal  
Type E, T: 1.25-3, 1.25-3S, 1.25Y-3N, 1.25Y-3S (Round shape or Y shape crimp terminal cannot be used for Type D.)

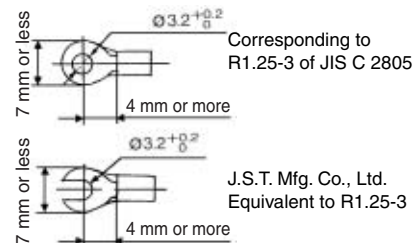
##### Series VFR3000/4000/5000/6000 (VFR3□10/4□10)

###### DIN terminal block type

- Male pin terminal of DIN terminal block of solenoid valves are wired as shown below. Connect to corresponding terminal on the connector.

| Terminal no. | Internal wiring |
|--------------|-----------------|
| 1            | SOL. A side     |
| 2            | SOL. B side     |
| 3            | COM             |
| Ground       | Ground          |

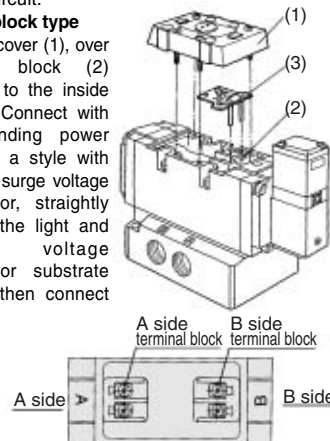
- Can be used as either "+COM" or "-COM".
- Applicable cable  
Cross section of the wire: 0.5 to 1.5 mm<sup>2</sup>  
Cable O.D.:  $\phi 8$  to  $\phi 10$
- Applicable crimp terminal shown below.



- Proper tightening torque of the connector  
Connector set screw 0.5 to 0.6 N·m  
Terminal screw 0.5 to 0.6 N·m
- Incorrect connection of "COM terminal" (DIN terminal no. 3) can cause damage on power source circuit.

###### Terminal block type

- Remove cover (1), over terminal block (2) attached to the inside of body. Connect with corresponding power side. For a style with light and surge voltage suppressor, straightly pull out the light and surge voltage suppressor substrate (3) and then connect them.



- Applicable terminal:  
VFR3000: 1.25-3, 1.25-3S, 1.25Y-3N, 1.25Y-3S  
VFR4000: 1.25-3.5M, 1.25Y-3L, 1.25Y-3M  
VFR5000/6000: 1.25-3.5M, 1.25-3L, 1.25-3M

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

# Series VFR2000/3000/4000/5000/6000

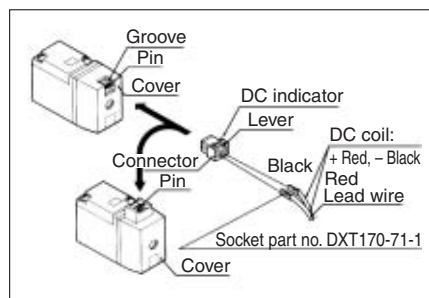
## ⚠ Precautions

**Be sure to read before handling. For Safety Instructions and Solenoid Valve Precautions, refer to page 3-13-2.**

### Attaching and Detaching Connectors

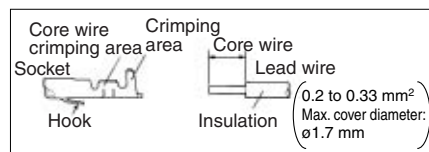
#### ⚠ Caution

1. To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
2. To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.



### Attaching and Detaching Lead Wires with Sockets

Peel 3.2 to 3.7 mm of the tip of lead wire, enter the core wires neatly into a socket and crimp it with a special crimp tool. Be careful so that the cover of lead wire does not enter into the crimping part.



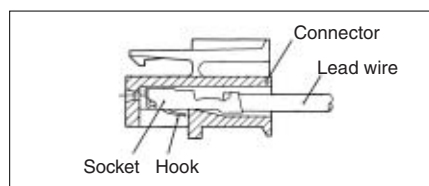
### Attaching and Detaching Lead Wires with Sockets

#### 1. Attaching

Insert the sockets into the square holes of the connector (with + and - indication) and, continue to push the sockets all the way in until the lock by hooking into the seats in the connector. (When they are pushed in, their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.

#### 2. Detaching

To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (approx. 1 mm). If the socket will be used again, first spread the hook outward.



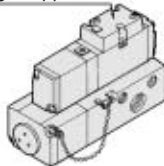
### Light/Surge Voltage Suppressor

Refer to table 1 for "Series VFR2000 Plug-in type", "VFR3□□0, VFR4□□0 type of Series VFR3000/4000" and "VFR5000/6000", and table 2 for "Series VFR2000 Non plug-in type" and "VFR3□□40, VFR4□□40 type of Series VFR3000/4000".

#### Series VFR2000

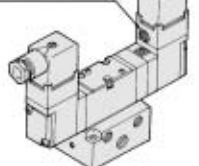
##### Plug-in type (VFR2□□00)

Light/Surge voltage suppressor

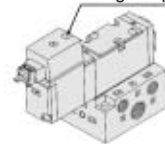


##### Non plug-in type (VFR2□□10)

Light/Surge voltage suppressor



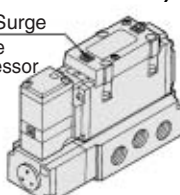
Light/Surge voltage suppressor



#### Series VFR3000/4000

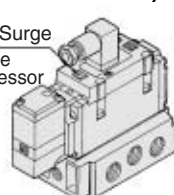
##### Plug-in type (VFR3□□00/4□□00)

Light/Surge voltage suppressor



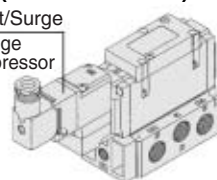
##### Non plug-in type (VFR3□□10/4□□10)

Light/Surge voltage suppressor



##### Non plug-in type (VFR3□□40/4□□40)

Light/Surge voltage suppressor



#### Series VFR5000/6000

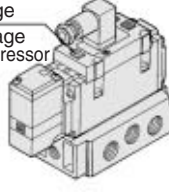
##### Plug-in type (VFR5□□00/6□□00)

Light/Surge voltage suppressor



##### Non plug-in type (VFR5□□10/6□□10)

Light/Surge voltage suppressor



**Table (1) Series VFR2000 (VFR2□□00)  
Series VFR3000/4000 (VFR3□□0/4□□0)  
Series VFR5000/6000**

| Voltage        | Light/Surge voltage suppressor |
|----------------|--------------------------------|
| AC and 100 VDC | Single solenoid<br>            |
|                | Double solenoid<br>            |
| 24 VDC or less | Single solenoid<br>            |
|                | Double solenoid<br>            |

**Table (2) Series VFR2000 (VFR2□□10)  
Series VFR3000/4000 (VFR3□□40/4□□40)**

| Voltage        | Light/Surge voltage suppressor |
|----------------|--------------------------------|
| AC and 100 VDC |                                |
|                |                                |
| 24 VDC or less |                                |

\* For rated voltages between 25 VDC to 99 VDC, please contact SMC.

\* Light/Surge voltage suppressor is not available for grommet type.

For grommet type with surge voltage suppressor, refer to page 3-5-3.

# Series VFR2000/3000/4000/5000/6000

## ⚠ Caution

### Used as a 3 Port Valve

Plugging one of the cylinder ports (A or B) enables use as a normally closed (N.C.) or normally open (N.O.) 3 port valve.

It is convenient when 3 port valve is needed on a manifold, etc., but it can't be used in special applications such as using as a non-leakage valve. Use it with the exhaust port leaving open.

| Plug                | B port | A port |
|---------------------|--------|--------|
| Type of actuation   | N.C.   | N.O.   |
| Number of solenoids | Single |        |
|                     |        |        |
| Double              | Single |        |
|                     |        |        |

### Change Direction of DIN Connector/Cable Entry

- Unscrew retaining screw, pull off outer cover, rotate connector block through 180°. Replace cover and tighten screw.

### How to Calculate the Flow Rate

For obtaining the flow rate, refer to page 3-1-10.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

### How to Exchange Solenoid Valves, Pilot Valve Assemblies

#### How to exchange solenoid valves

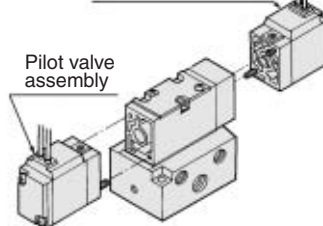
- Loosen set screw and take solenoid valve out vertically, otherwise it may cause damage to the solenoid valve. Never remove valve at an angle.
- When mounting solenoid valve on to the base, plug pin assembly (base-side) into receptacle assembly (body-side) vertically.

#### How to exchange pilot valve assemblies

- Possible to exchange pilot valve assemblies like the following figures.
- Note) Do not change the rated voltage.

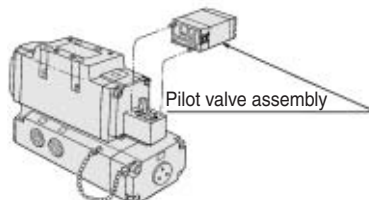
#### Series VFR2000

Pilot valve assembly



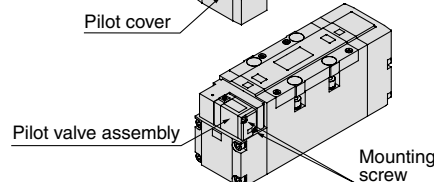
#### Series VFR3000/4000/5000

Pilot valve assembly



#### Series VFR6000

Pilot cover

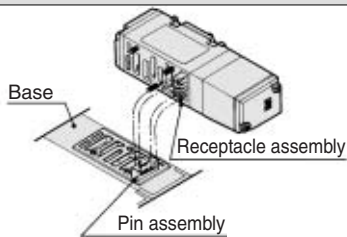


#### Tightening Torque for Mounting Bolt

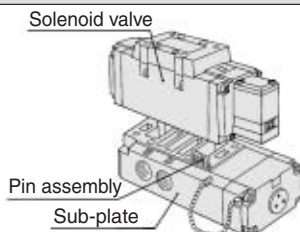
| Model                | Thread      | Tightening torque |
|----------------------|-------------|-------------------|
| Pilot valve assembly | M3 (2 pcs.) | 0.6 N·m           |
| VFR2000              | M3 (3 pcs.) | 0.9 N·m           |
| VFR3000              | M3 (3 pcs.) | 1.1 N·m           |
| VFR4000              | M4 (4 pcs.) | 1.4 N·m           |
| VFR5000              | M5 (4 pcs.) | 2.8 N·m           |
| VFR6000              | M8 (4 pcs.) | 16 N·m            |

Note) For more information about the procedure, refer to the instruction manual.

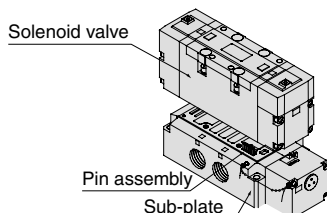
#### Series VFR2000



#### Series VFR3000/4000/5000



#### Series VFR6000



# Series VFR2000/3000/4000/5000/6000

## ⚠ Caution

### Interface Regulator

#### Specifications

| Interface regulator                                    |        | ARBF2000                                |      |      | ARBF3050 |                                |    | ARBF4050 |    |    | ARBF5050 |   |   |
|--------------------------------------------------------|--------|-----------------------------------------|------|------|----------|--------------------------------|----|----------|----|----|----------|---|---|
| Applicable solenoid valve series                       |        | VFR2000                                 |      |      | VFR3000  |                                |    | VFR4000  |    |    | VFR5000  |   |   |
| Regulating port                                        |        | P                                       |      |      | A        | B                              | P  | A        | B  | P  | A        | B | P |
| Maximum operating pressure                             |        | 1.0 MPa <sup>(1)</sup>                  |      |      |          |                                |    |          |    |    |          |   |   |
| Set pressure range                                     |        | 0.05 to 0.83 MPa                        |      |      |          | 0.1 to 0.83 MPa <sup>(2)</sup> |    |          |    |    |          |   |   |
| Ambient and fluid temperature                          |        | −5 to 60°C (No freezing) <sup>(3)</sup> |      |      |          |                                |    |          |    |    |          |   |   |
| Port size for connection of pressure gauge             |        | M5 x 0.8                                |      |      | Rc 1/8   |                                |    |          |    |    |          |   |   |
| Weight (kg)                                            |        | 0.16                                    |      |      | 0.46     |                                |    | 0.72     |    |    | 0.83     |   |   |
| Effective area at supply side (mm <sup>2</sup> )       | P → A  | 5.5                                     | 21   | 18.5 | 11       | 35                             | 31 | 26       | 44 | 38 | 32       |   |   |
| S at P <sub>1</sub> = 0.7 MPa/P <sub>2</sub> = 0.5 MPa | P → B  | 5.1                                     | 18.5 | 22   | 12       | 31                             | 31 | 24       | 38 | 40 | 31       |   |   |
| Effective area at exhaust side (mm <sup>2</sup> )      | A → EA | 12                                      | 40   |      |          | 55                             |    |          | 90 |    |          |   |   |
| S at P <sub>2</sub> = 0.5 MPa                          | B → EB | 11                                      | 36   |      |          | 45                             |    |          | 77 |    |          |   |   |

Note 1) Maximum operating pressure of solenoid valve is 0.9 MPa.

Note 2) Set the pressure within operating pressure range of solenoid valve.

Note 3) Solenoid valve: Max. 50°C

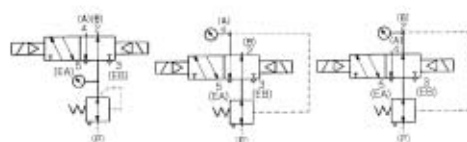
Note 4) Synthesized effective area with 2 position.

Note 5) • Operate an interface regulator only by applying pressure from the "P" port of the base, except when using it as a reverse pressure valve.

- To combine a pressure center valve and the A and B port pressure reduction interface regulator, use the ARBF3000, ARBF4000, or the ARBF5000 model.
- To combine a reverse pressure valve and an interface regulator, use the ARBF3000, ARBF4000, or the ARBF5000 model. The P port pressure reduction cannot be used.
- When combining a double check valve and an interface regulator, use a manifold or sub-plate as a basis, and stack them in the following order; the perfect spacer → the interface regulator → the valve.
- When a closed center valve is combined with the interface regulator's A, B port regulation, note that it cannot be used for intermediate stops of a cylinder because there is leakage from relief port on the regulator.

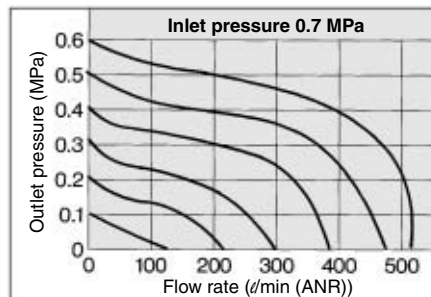
#### Flow Characteristics (P → A) (Condition: Inlet pressure 0.7 MPa when 2 position solenoid valve is mounted.)

##### JIS Symbol

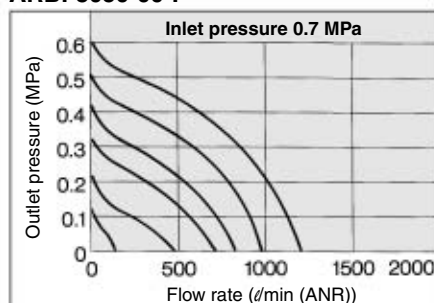


P port regulation    A port regulation    B port regulation

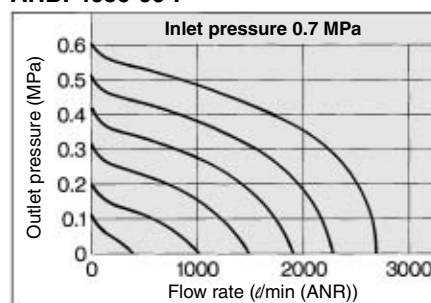
##### ARBF2000-00-P



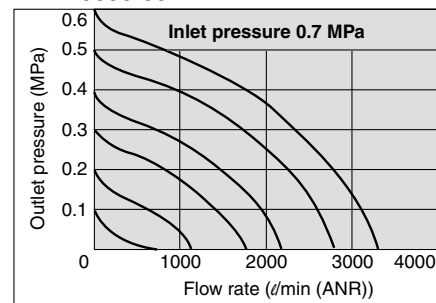
##### ARBF3050-00-P



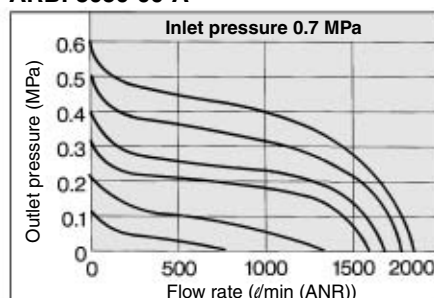
##### ARBF4050-00-P



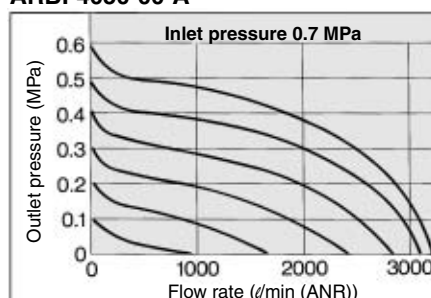
##### ARBF5050-00-P



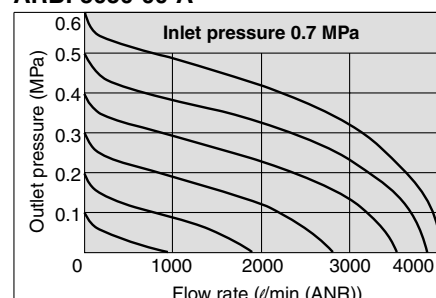
##### ARBF3050-00-A



##### ARBF4050-00-A



##### ARBF5050-00-A



# Series VFR2000/3000/4000/5000/6000

## ⚠ Caution

### Lead Wire Connection

#### Type 01T with Terminal Block

##### Series VFR2000

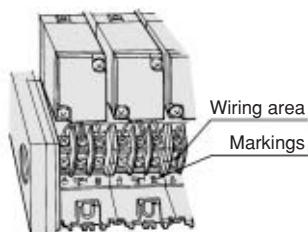
- Remove junction cover of manifold, exposing terminal block attached to the manifold block. Lead wires from solenoid valve are connected with the terminals on upper side of terminal block. (On the terminal block, lead wire is connected with both A and B sides of solenoid valve in accordance with the corresponding markings A and B on the block.)

Connect each lead wire of power side corresponding to respective solenoid valve on the lower terminal block.

Terminal block wiring specifications is in accordance with COM.

| Terminal block marking<br>Model  | A -    | B + | B -    |
|----------------------------------|--------|-----|--------|
| VFR2100                          | A side | COM |        |
| VFR2200                          | A side | COM | B side |
| VFR2 <sup>3</sup> <sub>400</sub> | A side | COM | B side |

- Applicable terminal: 1.25-3, 1.25-3S, 1.25Y-3N, 1.25Y-3S
- Although "A-", "B+" and "B-" marks are indicated on the terminal block, VFR2000 can be used as either "+COM" or "-COM".



##### Series VFR3000

| Terminal block marking<br>Model  | A -    | COM + | B -    |
|----------------------------------|--------|-------|--------|
| VFR3100                          | A side | COM   |        |
| VFR3200                          | A side | COM   | B side |
| VFR3 <sup>3</sup> <sub>400</sub> | A side | COM   | B side |

- Applicable terminal: 1.25-3.5M, 1.25Y-3L, 1.25-3M
- Although "A-", "COM+" and "B-" marks are indicated on the terminal block, VFR3000 can be used as either "+COM" or "-COM".

##### Series VFR4000

| Terminal block marking<br>Model  | A -    | B + | B -    |
|----------------------------------|--------|-----|--------|
| VFR4100                          | A side | COM |        |
| VFR4200                          | A side | COM | B side |
| VFR4 <sup>3</sup> <sub>400</sub> | A side | COM | B side |

- Applicable terminal: 1.25-3.5M, 1.25Y-3L, 1.25-3M
- Although "A-", "B+" and "B-" marks are indicated on the terminal block, VFR4000 can be used as either "+COM" or "-COM".

##### Series VFR5000

| Terminal block marking<br>Model  | A -    | B + | B -    |
|----------------------------------|--------|-----|--------|
| VFR5100                          | A side | COM |        |
| VFR5200                          | A side | COM | B side |
| VFR5 <sup>3</sup> <sub>400</sub> | A side | COM | B side |

- Applicable terminal: 1.25-3.5M, 1.25Y-3L, 1.25-3M
- Although "A-", "B+" and "B-" marks are indicated on the terminal block, VFR5000 can be used as either "+COM" or "-COM".

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

# Series VFR2000/3000/4000/5000/6000

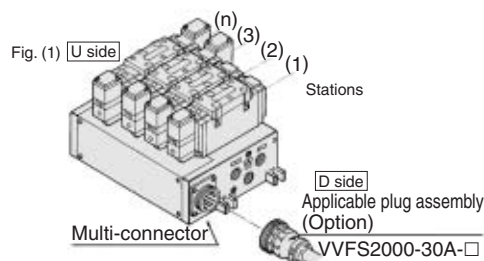
## ⚠ Caution

### Lead Wire Connection Manifold/Plug-in Type

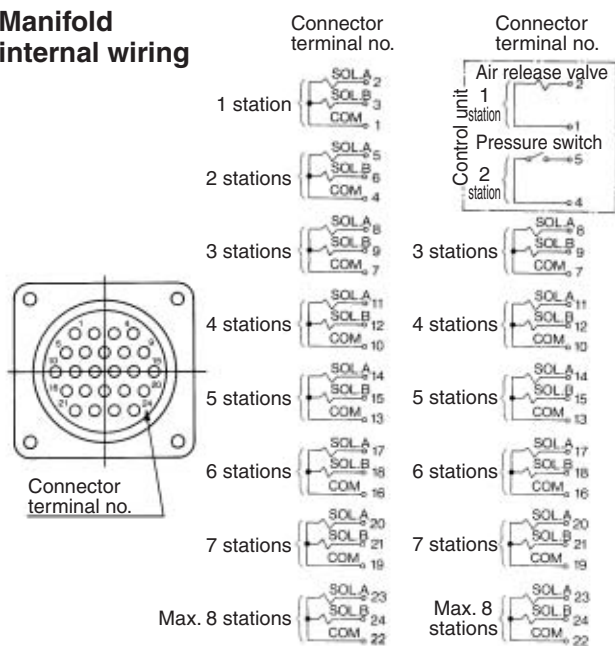
#### Type 01C Circular Connector

##### Series VFR2000/3000/4000/5000

- When multi-connector is used, mass-termination between power supply side and solenoid valve can be done. This saves the wiring connection labor.
- Wire connection specifications  
Lead wire for both solenoid A and B sides in manifold are connected to connector terminal as COM specifications.



#### Manifold internal wiring



\* Except VFR5000

Note 1) Maximum number is 8 stations. Note 2) It is used as +COM and -COM. Note 3) Station numbers are started from D side although connector is mounted on D or U Side.

#### Applicable Plug Assembly (Option)

| Assembly part no. | Cable length | Component parts                                                                                                                                             |
|-------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VVFS2000-30A-1    | 1.5 m        | Plug 206837-1 1 pc.<br>Cable clamp 206138-1 1 pc.<br>Socket 66101-2 24 pcs.<br>Cable VCTF 24 cores x 0.75 mm <sup>2</sup> made by Tyco Electronics AMP K.K. |
| VVFS2000-30A-2    | 3 m          |                                                                                                                                                             |
| VVFS2000-30A-3    | 5 m          |                                                                                                                                                             |
| VVFS2000-30A-4 *  | 7 m          |                                                                                                                                                             |
| VVFS2000-30A-5 *  | 10 m         |                                                                                                                                                             |
| VVFS2000-30A-6 *  | 15 m         |                                                                                                                                                             |
| VVFS2000-30A-7 *  | 20 m         |                                                                                                                                                             |

\* Option

#### Cable Color List of Each Terminal No.

| Terminal no.    | 1      | 2      | 3     | 4     | 5     | 6     | 7   | 8   | 9    | 10   | 11     | 12     | 13    |
|-----------------|--------|--------|-------|-------|-------|-------|-----|-----|------|------|--------|--------|-------|
| Lead wire color | Orange | Orange | Black | Black | Green | Green | Red | Red | Blue | Blue | Yellow | Yellow | Brown |
| Dot marking     | —      | Yes    | —     | Yes   | —     | Yes   | —   | Yes | —    | Yes  | —      | Yes    | —     |

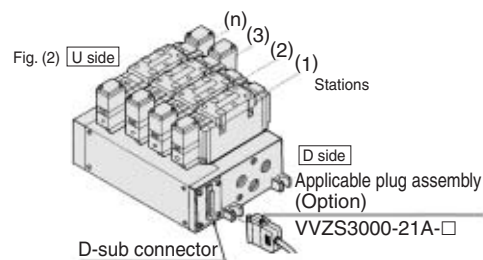
  

| Terminal no.    | 14    | 15    | 16    | 17   | 18   | 19   | 20   | 21     | 22     | 23          | 24          |
|-----------------|-------|-------|-------|------|------|------|------|--------|--------|-------------|-------------|
| Lead wire color | Brown | White | White | Pink | Pink | Gray | Gray | Unused | Unused | Light green | Light green |
| Dot marking     | Yes   | —     | Yes   | —    | Yes  | —    | Yes  | —      | Yes    | —           | Yes         |

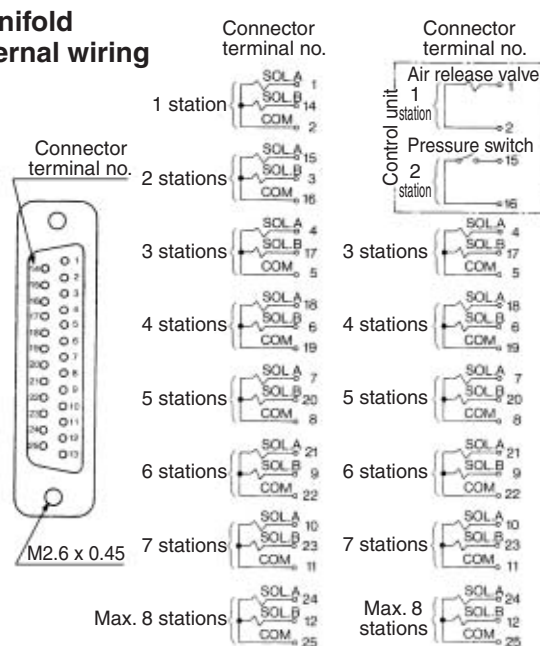
#### Type 01F D-sub Connector

##### Series VFR2000/3000/4000/5000

- MIL standard type D connector (Terminal: 25 pins) has wide exchangeability and saves wiring labor.
- Wire connection specifications  
Lead wire for both solenoid A and B sides in manifold are connected to connector terminal as COM specifications.



#### Manifold internal wiring



\* Except VFR5000

Note 1) Maximum number is 8 stations. Note 2) It is used as +COM and -COM. Note 3) Station numbers are started from D side although connector is mounted on D or U Side.

#### Applicable Plug Assembly (Option)

| Assembly part no. | Cable length | Component parts                                                                                             |
|-------------------|--------------|-------------------------------------------------------------------------------------------------------------|
| VVZS3000-21A-1    | 1.5 m        | Plug MIL standard type D connector<br>Number of terminals: 25 pins<br>Cable: 25 cores x 0.3 mm <sup>2</sup> |
| VVZS3000-21A-2    | 3 m          |                                                                                                             |
| VVZS3000-21A-3    | 5 m          |                                                                                                             |
| VVZS3000-21A-4 *  | 8 m          |                                                                                                             |
| VVZS3000-21A-5 *  | 10 m         |                                                                                                             |
| VVZS3000-21A-6 *  | 15 m         |                                                                                                             |
| VVZS3000-21A-7 *  | 30 m         |                                                                                                             |
| VVZS3000-21A-8 *  | 20 m         |                                                                                                             |

\* Option

#### Cable Color List of Each Terminal No.

| Terminal no.    | 1     | 2     | 3   | 4      | 5      | 6    | 7    | 8      | 9     | 10    | 11    | 12     |
|-----------------|-------|-------|-----|--------|--------|------|------|--------|-------|-------|-------|--------|
| Lead wire color | Black | Brown | Red | Orange | Yellow | Pink | Blue | Purple | Gray  | White | White | Yellow |
| Dot marking     | —     | —     | —   | —      | —      | —    | —    | White  | Black | Black | Red   | Red    |

| Terminal no.    | 13     | 14     | 15    | 16    | 17     | 18   | 19     | 20    | 21    | 22   | 23   | 24    | 25    |
|-----------------|--------|--------|-------|-------|--------|------|--------|-------|-------|------|------|-------|-------|
| Lead wire color | Orange | Yellow | Pink  | Blue  | Purple | Gray | Orange | Red   | Brown | Pink | Gray | Black | White |
| Dot marking     | Red    | Black  | Black | White | —      | —    | Black  | White | White | Red  | Red  | White | —     |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in

# Series VFR2000



Plug-in type



Non plug-in type

### JIS Symbol

| 2 position | 3 position      |
|------------|-----------------|
| Single     | Closed center   |
|            |                 |
| Double     | Exhaust center  |
|            |                 |
|            | Pressure center |
|            |                 |

### 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                           | Not required <sup>(1)</sup>                                          |                                            |
|                            | Manual override                       | Non-locking push type                                                |                                            |
|                            | Mounting orientation                  | Unrestricted                                                         |                                            |
| Electricity specifications | Shock/Vibration resistance            | 300/50 m/s <sup>2</sup> <sup>(2)</sup>                               |                                            |
|                            | 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) <sup>(3)</sup>    | 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) <sup>(3)</sup> | 1.8 W                                                                |                                            |
| Electrical entry           | Plug-in type                          | Conduit terminal                                                     |                                            |
|                            |                                       | Grommet, Grommet terminal                                            |                                            |
|                            | Non plug-in type                      | Conduit terminal, DIN terminal<br>L plug connector, M plug connector |                                            |



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 <sup>Note)</sup>                                                            |
| Manual override        | 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<br>12, 100 VDC                                           |
| Porting specifications | Bottom ported                                                                              |
| Option                 | 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 <sup>(1)</sup> |             |             |                         |             |             | Max. <sup>(2)</sup> operating cycle (Hz) | Response <sup>(3)</sup> time (ms) | Weight <sup>(4)</sup> (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          | VFR2100 | VFR2110     | 1/8          | 2.5                                 | 0.18        | 0.58        | 3.0                     | 0.27        | 0.70        | 10                                       | 20 or less                        | 0.34 (0.32)                |
|                   |                 |         |             | 1/4          | 2.8                                 | 0.24        | 0.62        | 3.0                     | 0.27        | 0.70        |                                          |                                   |                            |
|                   | Double          | VFR2200 | VFR2210     | 1/8          | 2.4                                 | 0.21        | 0.56        | 3.1                     | 0.28        | 0.74        | 10                                       | 20 or less                        | 0.42 (0.44)                |
|                   |                 |         |             | 1/4          | 2.6                                 | 0.27        | 0.62        | 3.1                     | 0.28        | 0.74        |                                          |                                   |                            |
| 3 position        | Closed center   | VFR2300 | VFR2310     | 1/8          | 1.3                                 | 0.45        | 0.36        | 1.4                     | 0.46        | 0.41        | 5                                        | 30 or less                        | 0.43 (0.45)                |
|                   |                 |         |             | 1/4          | 1.3                                 | 0.45        | 0.36        | 1.4                     | 0.46        | 0.41        |                                          |                                   |                            |
|                   | Exhaust center  | VFR2400 | VFR2410     | 1/8          | 0.79                                | 0.53        | 0.24        | 3.1 [0.89]              | 0.24 [0.51] | 0.74 [0.27] | 5                                        | 30 or less                        | 0.43 (0.45)                |
|                   |                 |         |             | 1/4          | 0.79                                | 0.53        | 0.24        | 3.1 [0.89]              | 0.24 [0.51] | 0.74 [0.27] |                                          |                                   |                            |
|                   | Pressure center | VFR2500 | VFR2510     | 1/8          | 2.8 [0.65]                          | 0.24 [0.60] | 0.68 [0.21] | 0.89                    | 0.53        | 0.27        | 5                                        | 30 or less                        | 0.43 (0.45)                |
|                   |                 |         |             | 1/4          | 3.2 [0.75]                          | 0.26 [0.55] | 0.73 [0.23] | 0.89                    | 0.53        | 0.27        |                                          |                                   |                            |



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)

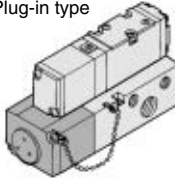
Note 4) For VFR2□00-□FZ-<sup>01</sup>/<sub>02</sub>, ( ) : VFR2□10-□DZ-<sup>01</sup>/<sub>02</sub>

# Series VFR2000

## How to Order

**Electrical entry**

F: Plug-in type

**Option**

|     |                                     |
|-----|-------------------------------------|
| Nil | None                                |
| Z   | With light/surge voltage suppressor |

**Piping (P, A, B, EA, EB port)**

|     |               |
|-----|---------------|
| Nil | Side ported   |
| B * | Bottom ported |

\* Option

**Port size (P, A, B port)**

|     |                   |
|-----|-------------------|
| Nil | Without sub-plate |
| 01  | 1/8               |
| 02  | 1/4               |

EA, EB port: Rc 1/8

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Plug-in** VFR2 1 00 5 F 01

**Non plug-in** VFR2 1 10 1 E 02

**Symbol**

1 2 position single (A/B) (EA/PEB)

2 2 position double (A/B) (EA/PEB)

3 3 position closed center (A/B) (EA/PEB)

4 3 position exhaust center (A/B) (EA/PEB)

5 3 position pressure center (A/B) (EA/PEB)

**Pilot type**

|     |                |
|-----|----------------|
| Nil | Internal pilot |
| R * | External pilot |

\* Option (External pilot is available only on sub-plate type.)

**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

**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

**Option**

|     |                                     |
|-----|-------------------------------------|
| 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**

G: Grommet

E: Grommet terminal

T: Conduit terminal

D, Y: DIN terminal

L: L plug connector

M: M plug connector

## How to Order Pilot Valve Assembly

SF4 - 1 DZ - 60

### 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

### Electrical entry, Light/Surge voltage suppressor

#### 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

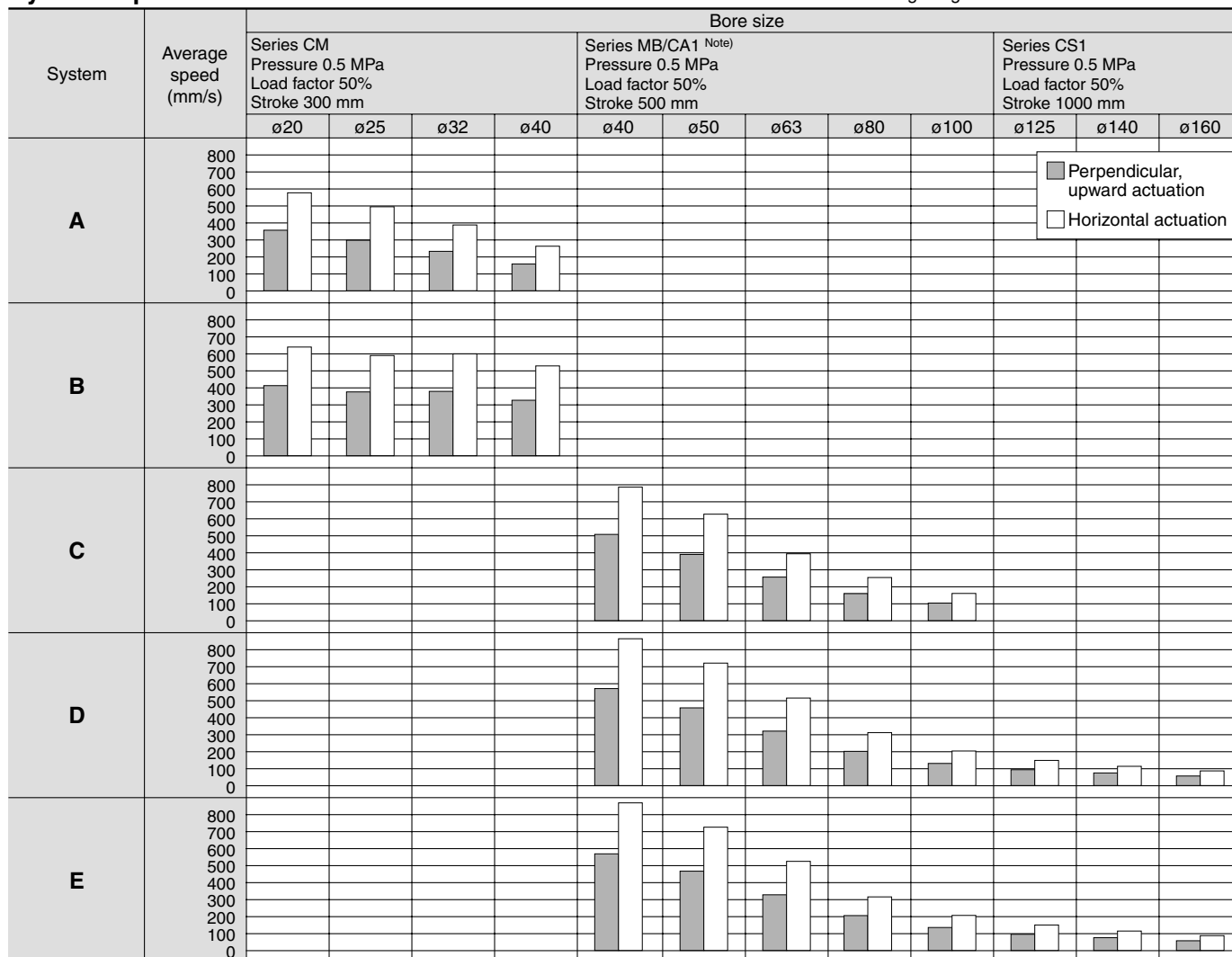
| Symbol | Electrical entry                     | Indicator light   | With surge voltage suppressor | Body type        |
|--------|--------------------------------------|-------------------|-------------------------------|------------------|
| F      | Plug-in                              | —                 | —                             | Plug-in type     |
| G      | Grommet                              | —                 | —                             | Non plug-in type |
| GS     |                                      | —                 | ●                             |                  |
| D      | DIN terminal                         | With connector    | —                             |                  |
| DZ     |                                      | Without connector | —                             |                  |
| DO     |                                      | —                 | —                             |                  |
| DOZ    |                                      | —                 | —                             |                  |
| Y      | DIN terminal (DIN43650B)             | With connector    | —                             |                  |
| YZ     |                                      | Without connector | —                             |                  |
| YO     |                                      | —                 | —                             |                  |
| YOZ    |                                      | —                 | —                             |                  |
| Symbol | Electrical entry                     | Indicator light   | With surge voltage suppressor | Body type        |
| T      | Conduit terminal                     | —                 | —                             | Non plug-in type |
| TZ     |                                      | ●                 | ●                             |                  |
| E      | Grommet terminal                     | —                 | —                             |                  |
| EZ     |                                      | ●                 | ●                             |                  |
| L      | L plug connector                     | —                 | —                             |                  |
| LZ     |                                      | ●                 | ●                             |                  |
| LO     | L plug connector (Without connector) | —                 | —                             |                  |
| LOZ    |                                      | ●                 | ●                             |                  |
| M      | M plug connector                     | —                 | —                             |                  |
| MZ     |                                      | ●                 | ●                             |                  |
| MO     | M plug connector (Without connector) | —                 | —                             |                  |
| MOZ    |                                      | ●                 | ●                             |                  |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

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.

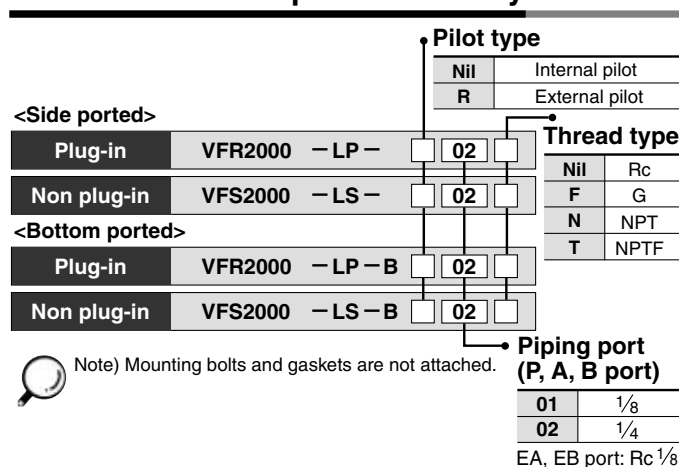
\* Load factor: ((Load weight x 9.8)/Theoretical force) x 100%

Note) The Series CA1 has been changed to the Series CA2.

### System Components

| System | Solenoid valve           | Speed controller                        | Silencer                              | Tube bore x Length |
|--------|--------------------------|-----------------------------------------|---------------------------------------|--------------------|
| A      | Series VFR2000<br>Rc 1/8 | AS2000-01<br>(S = 2.5 mm <sup>2</sup> ) | AN110-01<br>(S = 35 mm <sup>2</sup> ) | T0425 x 1 m        |
| B      |                          | AS3000-02<br>(S = 12 mm <sup>2</sup> )  | AN110-01<br>(S = 35 mm <sup>2</sup> ) | T0604 x 1 m        |
| C      |                          | AS3000-02<br>(S = 12 mm <sup>2</sup> )  | AN110-01<br>(S = 35 mm <sup>2</sup> ) | T0806 x 1 m        |
| D      | Series VFR2000<br>Rc 1/4 | AS4000-02<br>(S = 21 mm <sup>2</sup> )  | AN110-01<br>(S = 35 mm <sup>2</sup> ) | T1075 x 1 m        |
| E      |                          | AS4000-02<br>(S = 21 mm <sup>2</sup> )  | AN110-01<br>(S = 35 mm <sup>2</sup> ) | T1209 x 1 m        |

### How to Order Sub-plate Assembly



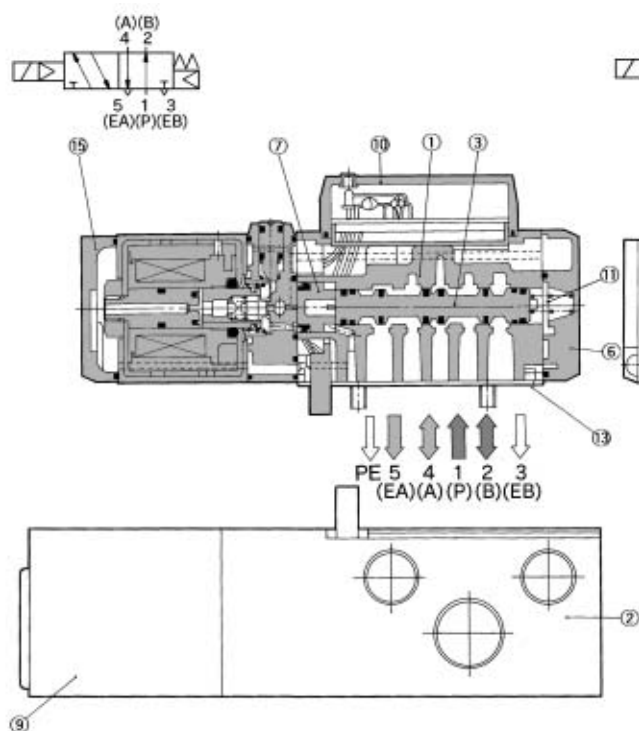
# Series VFR2000

## Construction

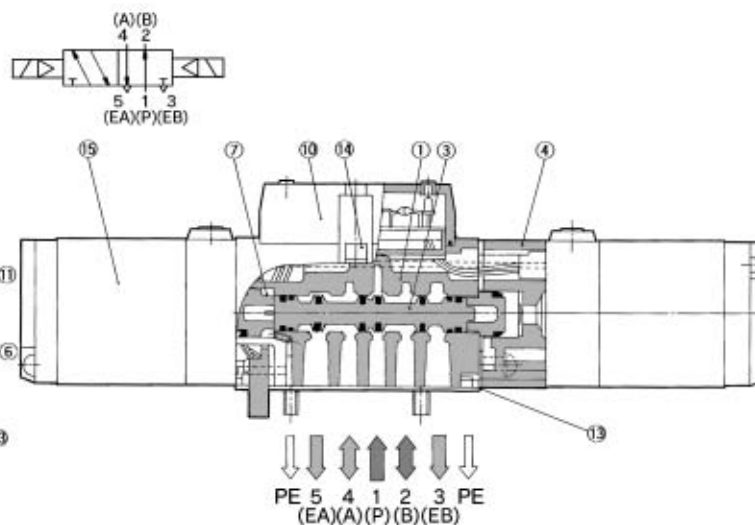
### 2 position single

### 2 position double

VFR21□0

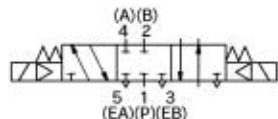


VFR22□0

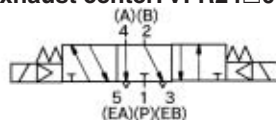


### 3 position closed center/exhaust center/pressure center

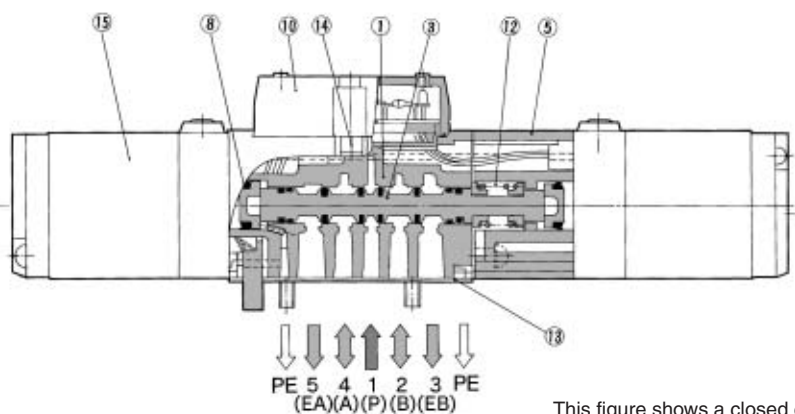
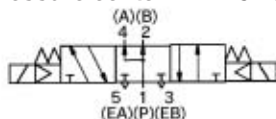
Closed center: VFR23□0



Exhaust center: VFR24□0



Pressure center: VFR25□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 | Aluminum die-casted | Platinum silver |
| ⑤   | Adapter plate | Aluminum die-casted | Platinum silver |
| ⑥   | End plate     | Resin               | Black           |

| No. | Description          | Material        | Note |
|-----|----------------------|-----------------|------|
| ⑦   | Piston               | Resin           |      |
| ⑧   | Piston               | Resin           |      |
| ⑨   | Junction cover       | Resin           |      |
| ⑩   | Light cover assembly | Resin           |      |
| ⑪   | Spool spring         | Stainless steel |      |
| ⑫   | Return spring        | Stainless steel |      |

## Replacement Parts

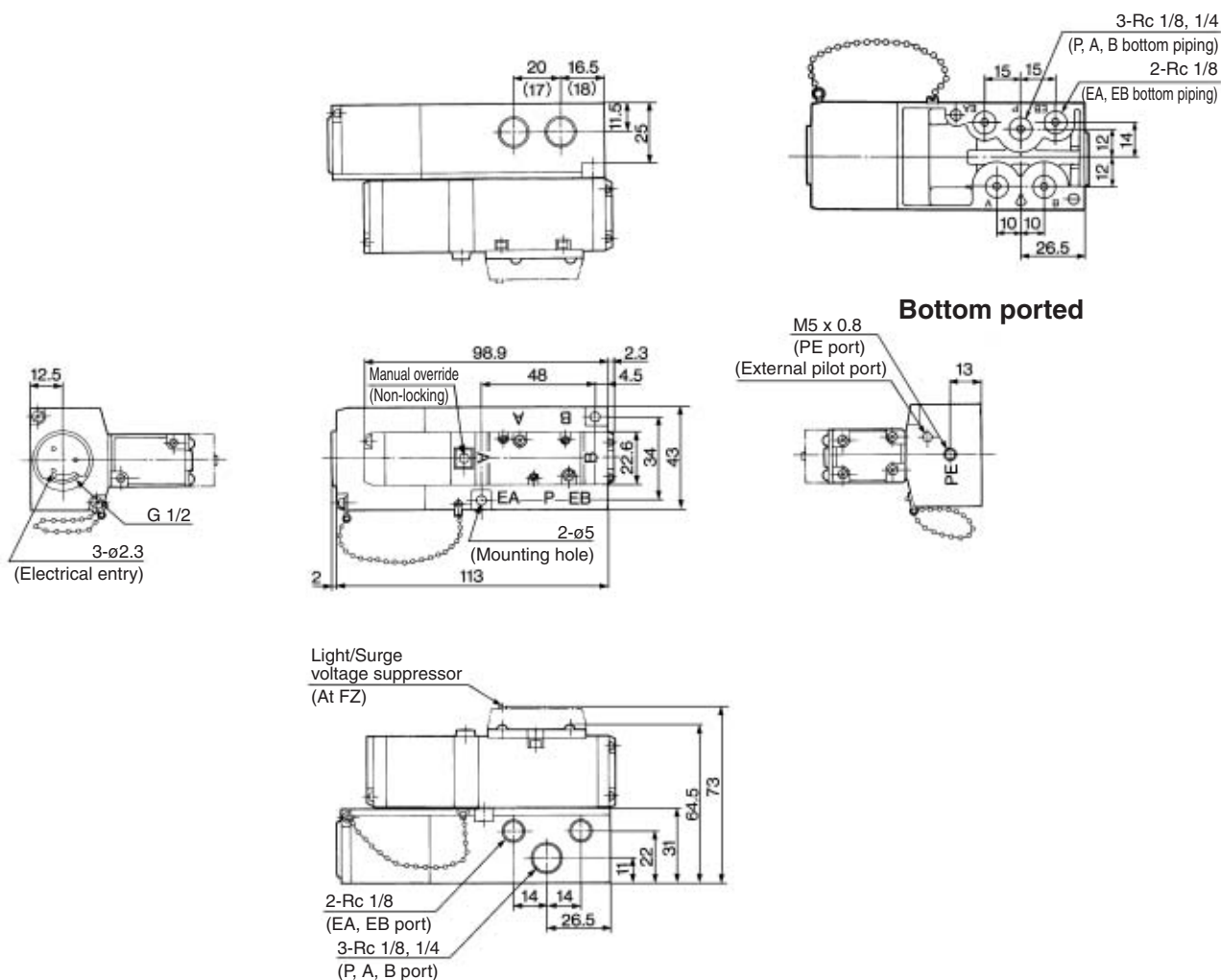
| No. | Description               | Material | Part no.                                                     |                     |                     |
|-----|---------------------------|----------|--------------------------------------------------------------|---------------------|---------------------|
|     |                           |          | VFR21□0                                                      | VFR22□0             | VFR23□0/24□0/25□0   |
| ⑬   | Gasket                    | NBR      | AXT624-20-2                                                  | AXT624-20-2         | AXT624-20-2         |
| ⑭   | Hexagon socket head screw | Steel    | AXT624-26 (M3 x 31)                                          | AXT624-26 (M3 x 31) | AXT624-26 (M3 x 31) |
| ⑮   | Pilot valve assembly      | —        | Refer to "How to Order Pilot Valve Assembly" on page 3-5-10. |                     |                     |
| —   | Sub-plate assembly        | —        | Refer to "How to Order Sub-plate Assembly" on page 3-5-11.   |                     |                     |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

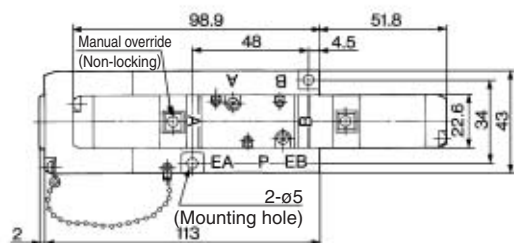
### Plug-in 2 position single/double, 3 position closed center/exhaust center/pressure center

2 position single: VFR2100-□F-<sup>01</sup><sub>02</sub>



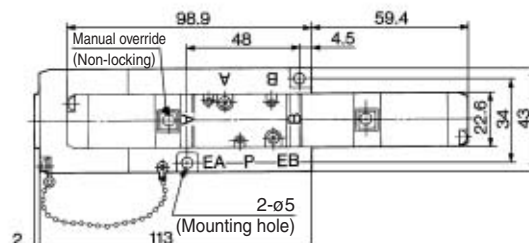
( ) : Rc 1/8

2 position double: VFR2200-□F-<sup>01</sup><sub>02</sub>



\* Other dimensions are the same as the single type.

3 position closed center: VFR2300-□F-<sup>01</sup><sub>02</sub>  
3 position exhaust center: VFR2400-□F-<sup>01</sup><sub>02</sub>  
3 position pressure center: VFR2500-□F-<sup>01</sup><sub>02</sub>



\* Other dimensions are the same as the single type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

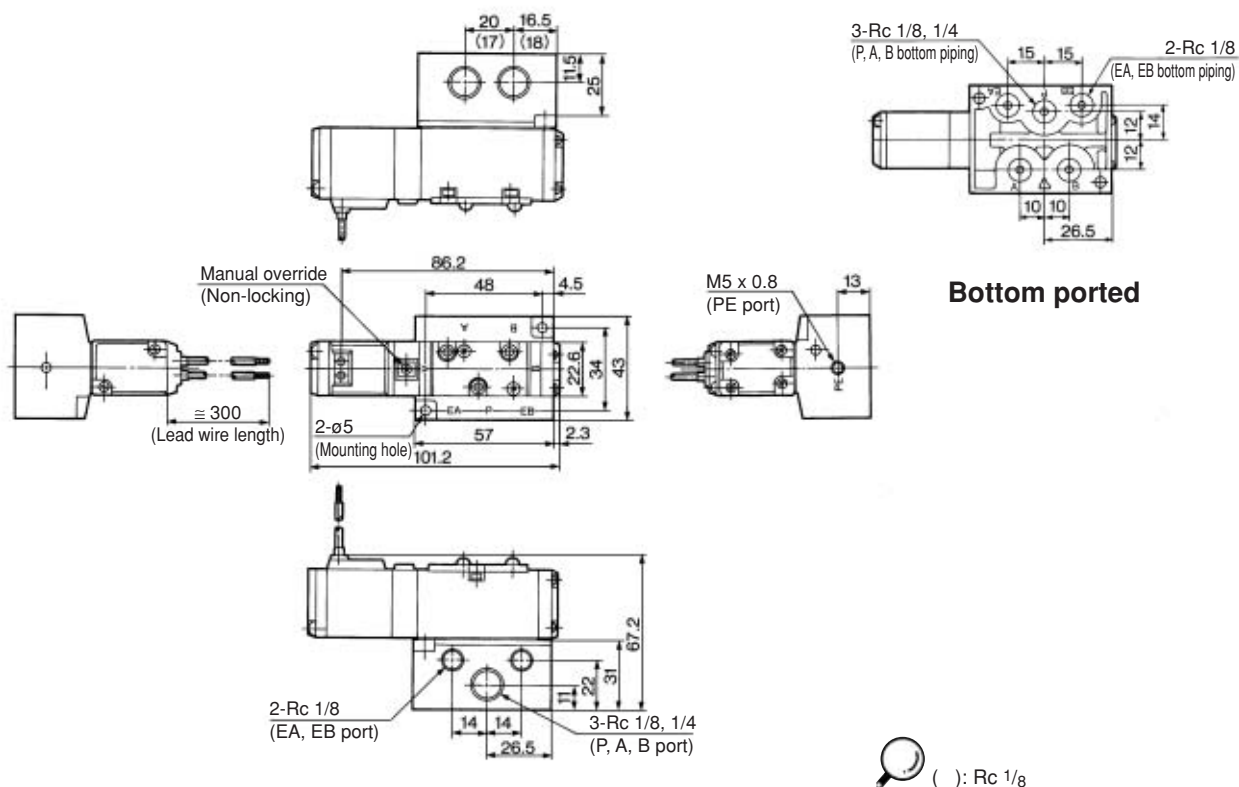
EVS

VFN

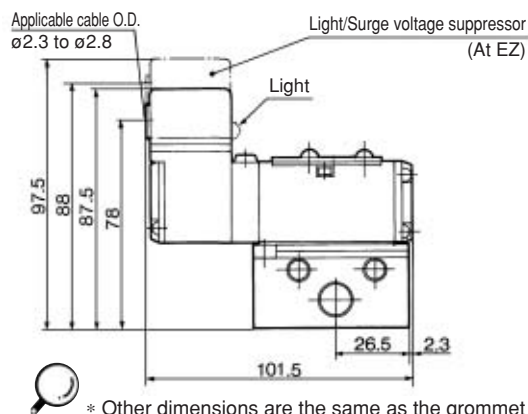
# Series VFR2000

## Non Plug-in 2 position single

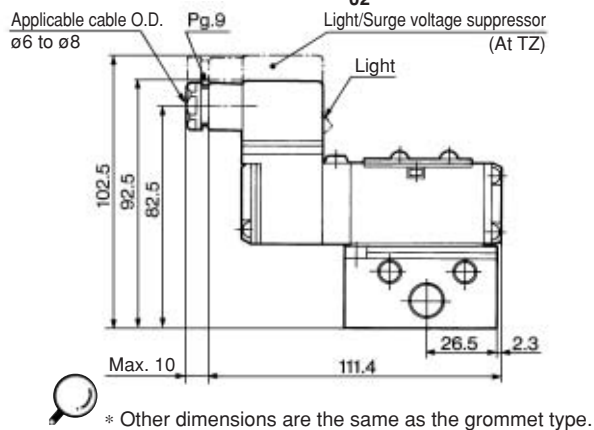
Grommet: VFR2110-□G-<sup>01</sup><sub>02</sub>



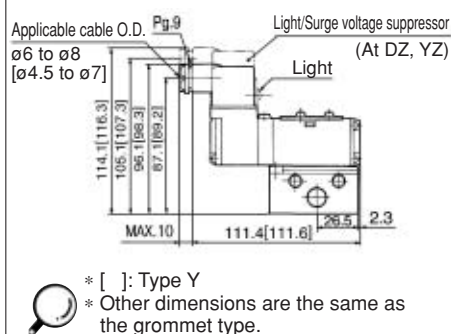
Grommet terminal: VFR2110-□E-<sup>01</sup><sub>02</sub>



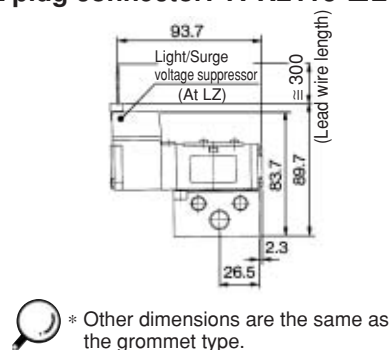
Conduit terminal: VFR2110-□T-<sup>01</sup><sub>02</sub>



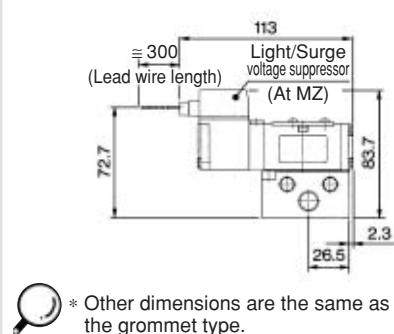
DIN terminal: VFR2110-□D-<sup>01</sup><sub>02</sub>



L plug connector: VFR2110-□L-<sup>01</sup><sub>02</sub>



M plug connector: VFR2110-□M-<sup>01</sup><sub>02</sub>

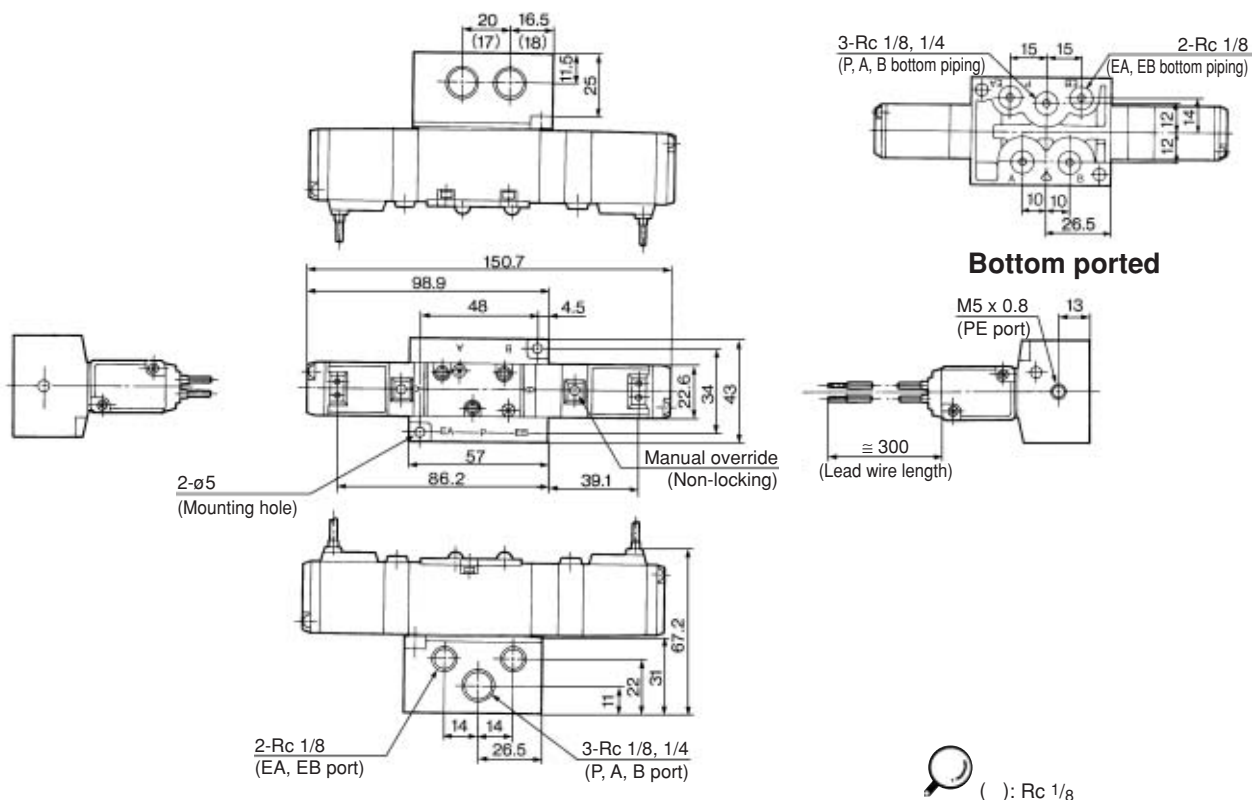


# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

### Non Plug-in 2 position double

Grommet: VFR2210-□G-<sup>01</sup><sub>02</sub>



VK

VZ

VF

VFR

VP4

VZS

VFS

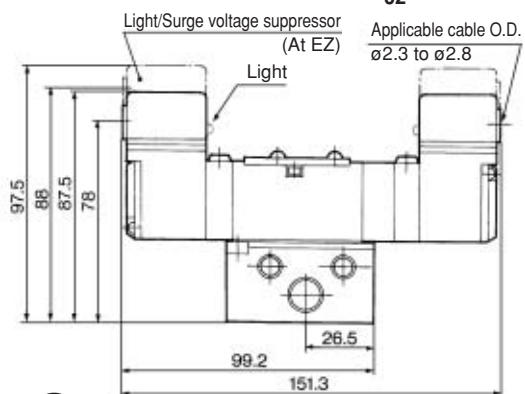
VS4

VQ7

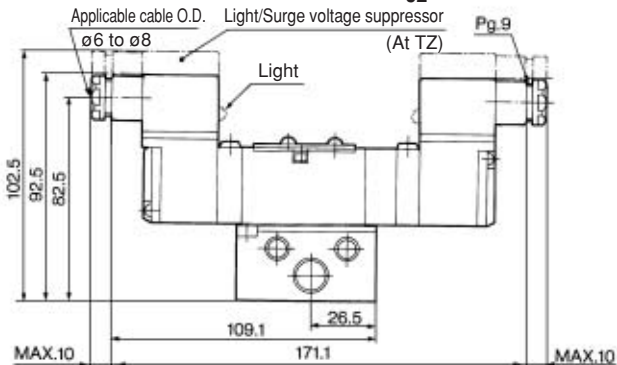
EVS

VFN

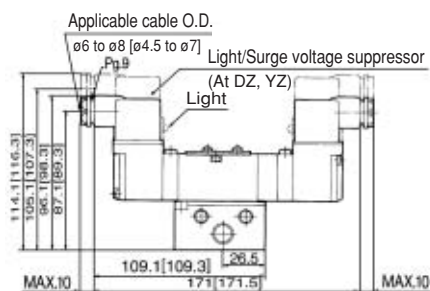
Grommet terminal: VFR2210-□E-<sup>01</sup><sub>02</sub>



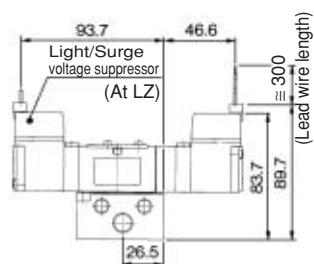
Conduit terminal: VFR2210-□T-<sup>01</sup><sub>02</sub>



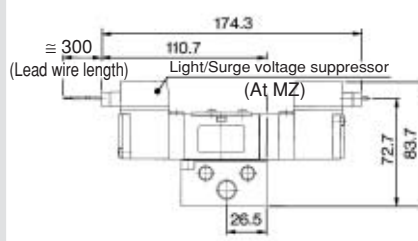
DIN terminal: VFR2210-□D<sup>01</sup><sub>Y 02</sub>



L plug connector: VFR2210-□L-<sup>01</sup><sub>02</sub>



M plug connector: VFR2210-□M-<sup>01</sup><sub>02</sub>



# Series VFR2000

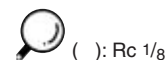
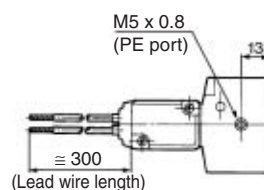
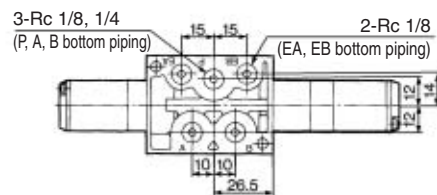
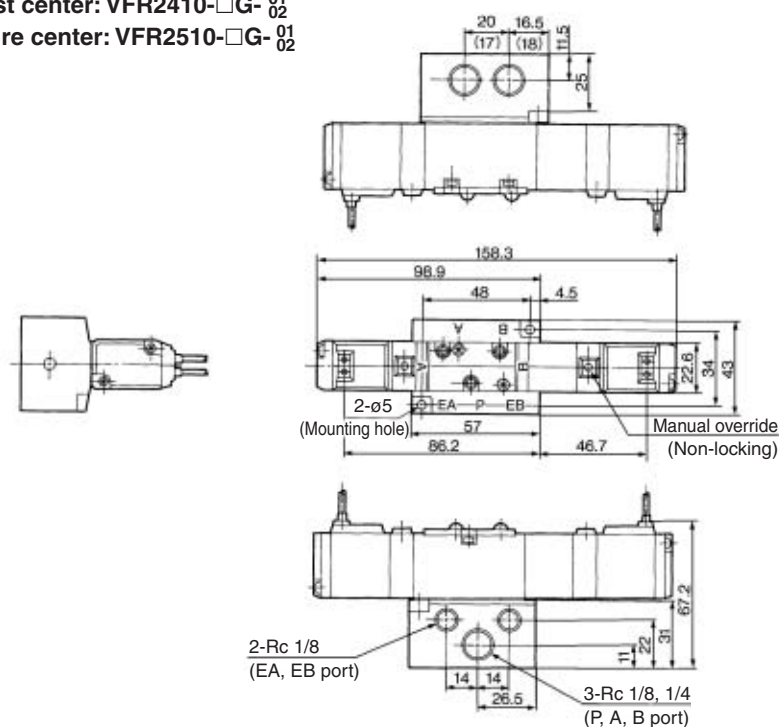
## Non Plug-in 3 position closed center/exhaust center/pressure center

### Grommet

Closed center: VFR2310-□G-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□G-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□G-<sup>01</sup>/<sub>02</sub>

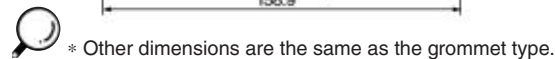
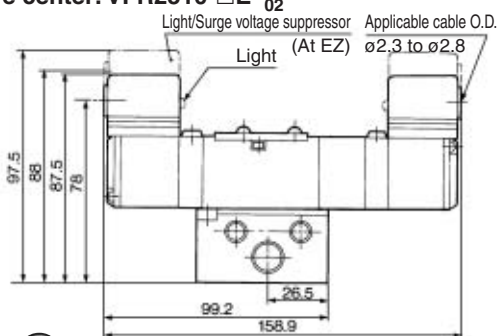


### Grommet terminal

Closed center: VFR2310-□E-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□E-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□E-<sup>01</sup>/<sub>02</sub>



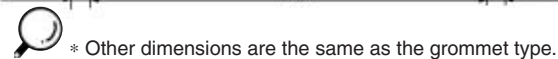
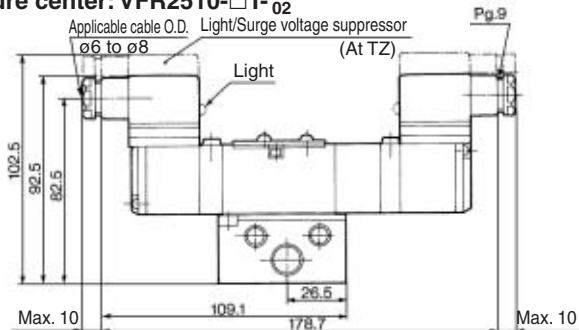
\* Other dimensions are the same as the grommet type.

### Conduit terminal

Closed center: VFR2310-□T-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□T-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□T-<sup>01</sup>/<sub>02</sub>



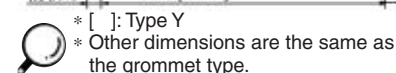
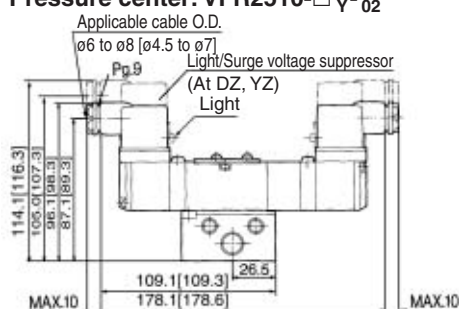
\* Other dimensions are the same as the grommet type.

### DIN terminal

Closed center: VFR2310-□D-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□D-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□D-<sup>01</sup>/<sub>02</sub>



\* [ ] : Type Y

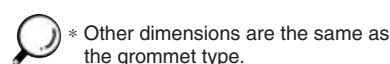
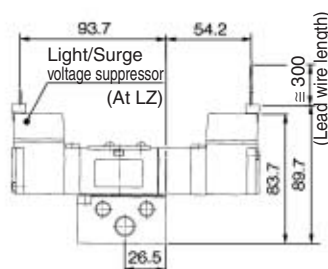
\* Other dimensions are the same as the grommet type.

### L plug connector

Closed center: VFR2310-□L-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□L-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□L-<sup>01</sup>/<sub>02</sub>



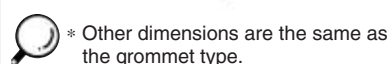
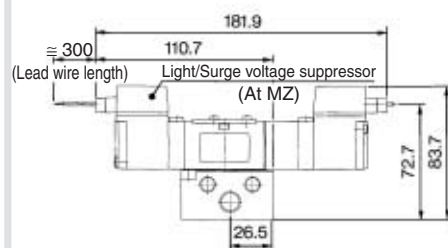
\* Other dimensions are the same as the grommet type.

### M plug connector

Closed center: VFR2310-□M-<sup>01</sup>/<sub>02</sub>

Exhaust center: VFR2410-□M-<sup>01</sup>/<sub>02</sub>

Pressure center: VFR2510-□M-<sup>01</sup>/<sub>02</sub>



\* Other dimensions are the same as the grommet type.

# Series VFR2000 Manifold Specifications

## Manifold Specifications

| Base model                           | Wiring                                                                                                                                                                                              | Porting specifications               | Port size |                    | Stations | Applicable valve model                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|--------------------|----------|----------------------------------------------------------------------------------|
|                                      |                                                                                                                                                                                                     | A, B port                            | P, EA, EB | A, B               |          |                                                                                  |
| <b>Plug-in type</b><br>VV5FR2-01□    | <ul style="list-style-type: none"> <li>• With terminal block</li> <li>• With multi-connector</li> <li>• With D-sub connector</li> </ul>                                                             | Side/Bottom<br><small>(Note)</small> | 1/4       | 1/8, 1/4<br>C6, C8 | 2 to 15  | VFR2□00-□F                                                                       |
|                                      |                                                                                                                                                                                                     |                                      |           |                    | 2 to 8   |                                                                                  |
| <b>Non plug-in type</b><br>VV5FR2-10 | <ul style="list-style-type: none"> <li>• Grommet</li> <li>• Grommet terminal</li> <li>• Conduit terminal</li> <li>• DIN terminal</li> <li>• L plug connector</li> <li>• M plug connector</li> </ul> |                                      |           |                    | 2 to 15  | VFR2□10-□G<br>VFR2□10-□E<br>VFR2□10-□T<br>VFR2□10-□D<br>VFR2□10-□L<br>VFR2□10-□M |



(Note) Side ported and bottom ported cannot be taken at the same time.

## How to Order Manifold Assembly

<Example> Plug-in type with terminal block (6 stations, one-piece junction cover)

VV5FR2-01T1-061-02 ..... 1 set (Manifold base part no.)  
 \*VFR2100-5FZ ..... 3 sets (2 position single part no.)  
 \*VFR2200-5FZ ..... 2 sets (2 position double part no.)  
 \*VVFS2000-10A ..... 1 set (Blanking plate assembly part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

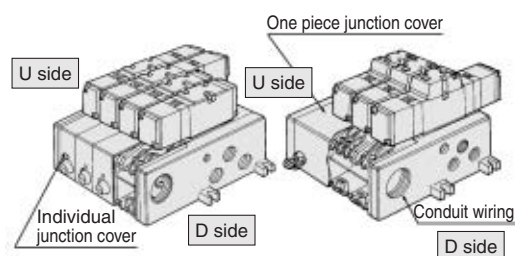
<Example> Non plug-in type: 6 stations

VV5FR2-10-061-01 ..... 1 set (Manifold base part no.)  
 \*VFR2110-5D ..... 5 sets (2 position single part no.)  
 \*VFR2410-5D ..... 1 set (3 position exhaust part no.)  
 \*VVFS2000-R-01-2 ..... 1 set (Individual EXH spacer part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

## Plug-in Type: With Terminal Block

- Since 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.



**VV5FR2 - 01T 1 - 08 1 - 02**

Series VFR2000 Manifold

**Plug-in type with terminal block**

**Junction cover**

| Symbol | Passage    | Porting specification |
|--------|------------|-----------------------|
| Symbol | P          | EA, EB                |
| 1      | Common     | Common                |
| 2*     | Common     | Common                |
| 3*     | Common     | Individual            |
| 4*     | Common     | Individual            |
| 5*     | Individual | Common                |
| 6*     | Individual | Common                |
| 7*     | Individual | Individual            |
| 8*     | Individual | Individual            |

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 15 | 15 stations |

**Port size**

| Symbol | P, EA, EB | A, B *                   |
|--------|-----------|--------------------------|
| 01     |           | 1/8                      |
| 02     |           | 1/4                      |
| C6     | 1/4       | One-touch fitting for ø6 |
| C8     |           | One-touch fitting for ø8 |
| M      |           | Mixed                    |

**Thread type**

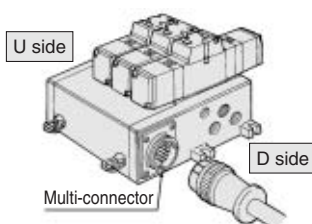
| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| Nil    |           | Rc     |
| F      |           | G      |
| N      |           | NPT    |
| T      |           | NPTF   |

\* For bottom ported, 1/8 is only available.

\* Option

## Plug-in Type: With Multi-connector (For wiring specifications, refer to page 3-5-8.)

- Master connection of power and solenoid valves.
- Quick wiring permits ease of installation.



**VV5FR2 - 01C D 1 - 05 1 - 01**

Series VFR2000 Manifold

**Plug-in type with multi-connector**

**Connector mounting direction**

| Symbol | Passage    | Porting specification |
|--------|------------|-----------------------|
| Symbol | P          | EA, EB                |
| 1      | Common     | Common                |
| 2*     | Common     | Common                |
| 3*     | Common     | Individual            |
| 4*     | Common     | Individual            |
| 5*     | Individual | Common                |
| 6*     | Individual | Common                |
| 7*     | Individual | Individual            |
| 8*     | Individual | Individual            |

**Stations**

|    |            |
|----|------------|
| 02 | 2 stations |
| ⋮  | ⋮          |
| 08 | 8 stations |

**Port size**

| Symbol | P, EA, EB | A, B *                   |
|--------|-----------|--------------------------|
| 01     |           | 1/8                      |
| 02     |           | 1/4                      |
| C6     | 1/4       | One-touch fitting for ø6 |
| C8     |           | One-touch fitting for ø8 |
| M      |           | Mixed                    |

**Thread type**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| Nil    |           | Rc     |
| F      |           | G      |
| N      |           | NPT    |
| T      |           | NPTF   |

\* For bottom ported, 1/8 is only available.

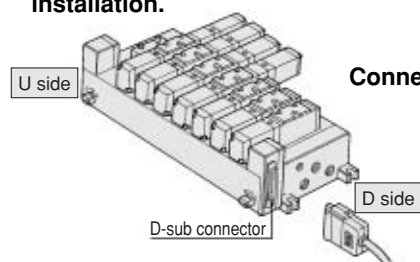
\* Option

\* Max. 8 stations

# Series VFR2000

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 3-5-8.)

- Wide range of interchangeability (D-sub connector (25P) conforming to MIL standard)
- Quick wiring permits easier installation.



**VV5FR2 - 01F U 1 - 06 1 - 01**

Series VFR2000  
Manifold  
Plug-in type  
with D-sub connector

Connector mounting direction

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

Junction cover

|   |                          |
|---|--------------------------|
| 1 | One-piece junction cover |
|---|--------------------------|

Stations

|    |            |
|----|------------|
| 02 | 2 stations |
| ⋮  | ⋮          |
| 08 | 8 stations |

\* Max. 8 stations

| Symbol |            |                        | Port size |           |                          | Thread type |      |
|--------|------------|------------------------|-----------|-----------|--------------------------|-------------|------|
| Symbol | Passage    | Porting specifications | Symbol    | P, EA, EB | A, B *                   | Nil         | Rc   |
|        | P          | EA, EB                 |           |           |                          |             |      |
| 1      |            |                        | 01        |           | 1/8                      | F           | G    |
| 2 *    | Common     | Common                 | 02        |           | 1/4                      | N           | NPT  |
| 3 *    | Common     | Individual             | C6        | 1/4       | One-touch fitting for ø6 | T           | NPTF |
| 4 *    | Common     | Individual             | C8        |           | One-touch fitting for ø8 |             |      |
| 5 *    | Individual | Common                 | M         |           | Mixed                    |             |      |
| 6 *    | Individual | Common                 |           |           |                          |             |      |
| 7 *    | Individual | Individual             |           |           |                          |             |      |
| 8 *    | Individual | Individual             |           |           |                          |             |      |

\* For bottom ported, 1/8 is only available.

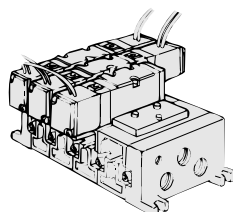
\* Option



Note) P port or EA/EB port of symbol "3" to "8" can be individual port with block plate. Therefore, if using individual SUP spacer or individual EXH interface for individual port, its symbol is "1".

## Non Plug-in Type: Grommet, Grommet Terminal, Conduit Terminal, DIN Terminal

- Wiring for every valve



**VV5FR2 - 10 - 05 1 - 01**

Series VFR2000  
Manifold  
Non plug-in type

Stations

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 15 | 15 stations |

| Symbol |            |                        | Port size |           |                          | Thread type |      |
|--------|------------|------------------------|-----------|-----------|--------------------------|-------------|------|
| Symbol | Passage    | Porting specifications | Symbol    | P, EA, EB | A, B *                   | Nil         | Rc   |
|        | P          | EA, EB                 |           |           |                          |             |      |
| 1      |            |                        | 01        |           | 1/8                      | F           | G    |
| 2 *    | Common     | Common                 | 02        |           | 1/4                      | N           | NPT  |
| 3 *    | Common     | Individual             | C6        | 1/4       | One-touch fitting for ø6 | T           | NPTF |
| 4 *    | Common     | Individual             | C8        |           | One-touch fitting for ø8 |             |      |
| 5 *    | Individual | Common                 | M         |           | Mixed                    |             |      |
| 6 *    | Individual | Common                 |           |           |                          |             |      |
| 7 *    | Individual | Individual             |           |           |                          |             |      |
| 8 *    | Individual | Individual             |           |           |                          |             |      |

\* For bottom ported, 1/8 is only available.

\* Option



Note) P port or EA/EB port of symbol "3" to "8" can be individual port with block plate. Therefore, if using individual SUP spacer or individual EXH spacer for individual port, its symbol is "1".

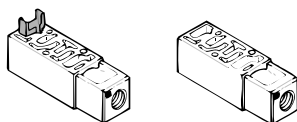
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR2000

## Manifold/Option Parts Assembly

### Individual SUP spacer

Setting individual SUP spacer on the manifold block enables individual SUP port for each valve.

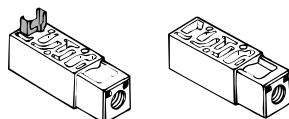
| Body type |        | Plug-in type    | Non plug-in type |
|-----------|--------|-----------------|------------------|
| Part no.  | Rc 1/8 | VVFS2000-P-01-1 | VVFS2000-P-01-2  |
|           | Rc 1/4 | VVFS2000-P-02-1 | VVFS2000-P-02-2  |



### Individual EXH spacer

Setting individual EXH spacer on the manifold block enables individual EXH port for each valve.

| Body type |        | Plug-in type    | Non plug-in type |
|-----------|--------|-----------------|------------------|
| Part no.  | Rc 1/8 | VVFS2000-R-01-1 | VVFS2000-R-01-2  |
|           | Rc 1/4 | VVFS2000-R-02-1 | VVFS2000-R-02-2  |



### SUP block disk

When supplying manifold with more than two different kinds of pressure, high and low, insert a block disk in between stations subjected to different pressures.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  |              | AXT625-12A       |

### EXH block disk

When valve exhaust affects the other stations in the circuit, insert EXH block disk in between stations to separate valve exhaust.

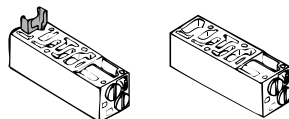
| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  |              | AXT625-12A       |



### Throttle valve spacer

Needle valve set on the manifold block can control cylinder speed by throttling exhaust.

| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS2000-20A-1 | VVFS2000-20A-2   |

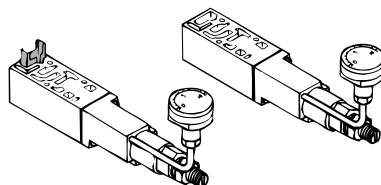


### Interface regulator



Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Characteristics" on page 3-5-6 before operation.)

| Body type         | Plug-in type   | Non plug-in type |
|-------------------|----------------|------------------|
| P port regulation | ARB2000-00-P-1 | ARB2000-00-P-2   |



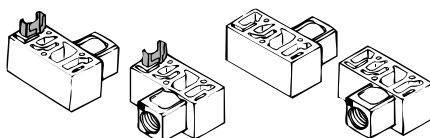
### Air release valve spacer

Valve VFR21□0 (single) can be used as air release valve by combining with release valve spacer.

| Body type | Plug-in type     | Non plug-in type |
|-----------|------------------|------------------|
| Part no.  | VVFS2000-24A-1 L | VVFS2000-24A-2 R |



Note) L: U side mount R: D side mount



### SUP stop valve spacer Note)

If SUP stop valve spacer is set, valve can be removed for maintenance without stopping air pressure supply for other valves.

| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS2000-37A-1 | VVFS2000-37A-2   |

(Height will be 23.2 mm higher.)



Note) Used with manifold base.  
Please contact SMC for details.

### Blanking plate

It is used by attaching on the manifold block for being prepared for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

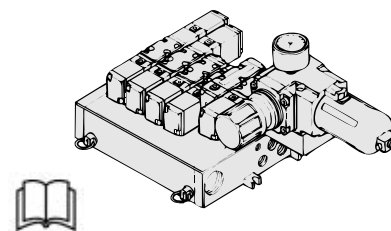
| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  |              | VVFS2000-10A     |

## Manifold Option

### With control unit

#### Plug-in/Non Plug-in type

- Filter, regulation valve, pressure switch and air release valve all combine to form one unit.
- Piping processes are eliminated.

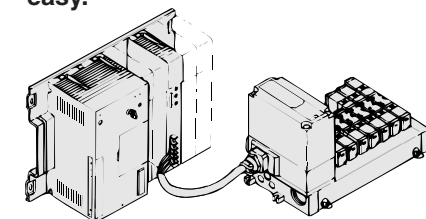


For details, refer to page 3-5-24.

### With serial interface unit for serial transmission

#### Plug-in type

- Solenoid valve wiring process reduced considerably.
- Disperse installation possible. Manifold solenoid valve: 8 stations max, 32 positions (512 solenoids).
- Maintenance and inspection are easy.



For details, refer to "Serial Transmission" catalog separately.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

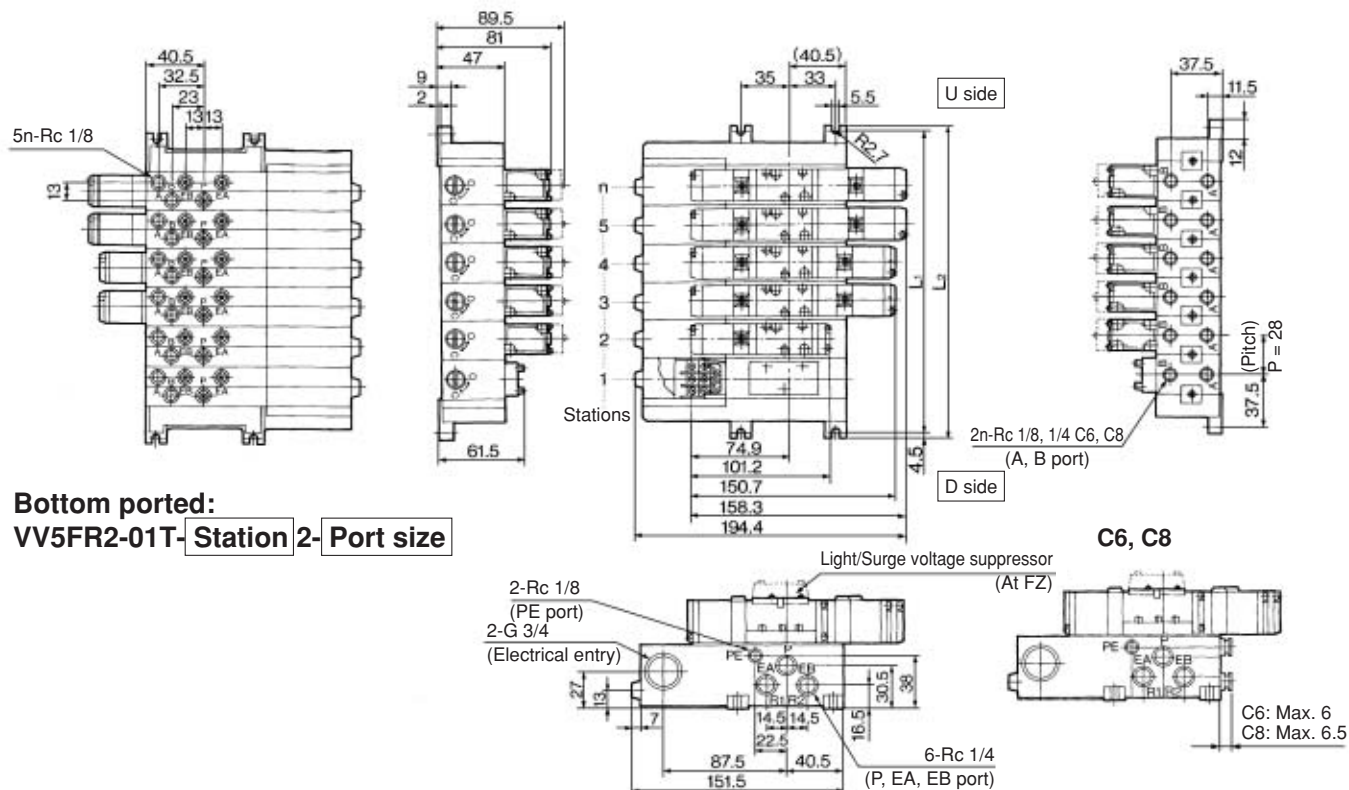
EVS

VFN

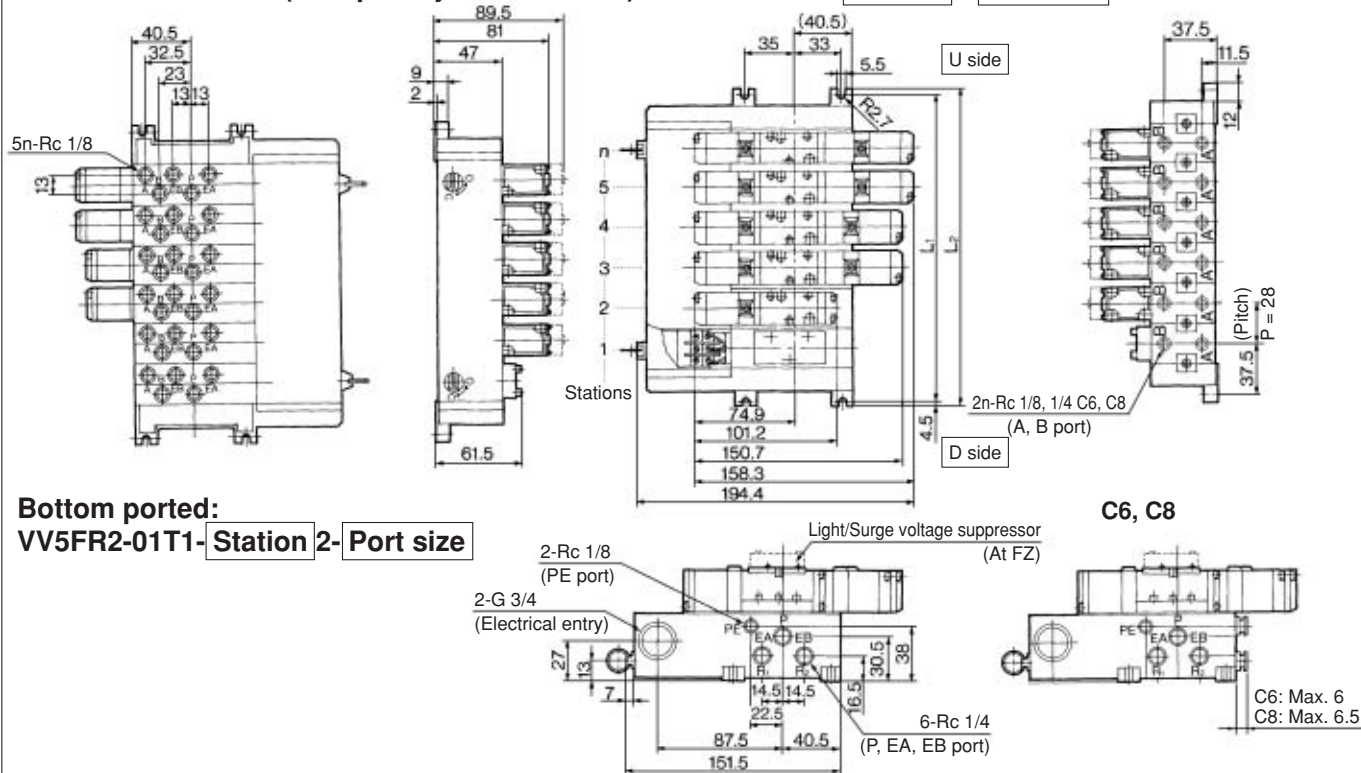
# Series VFR2000

## Manifold Plug-in type

With terminal block (Individual junction cover): VV5FR2-01T- Station 1- Port size



With terminal block (One-piece junction cover): VV5FR2-01T1- Station 1- Port size

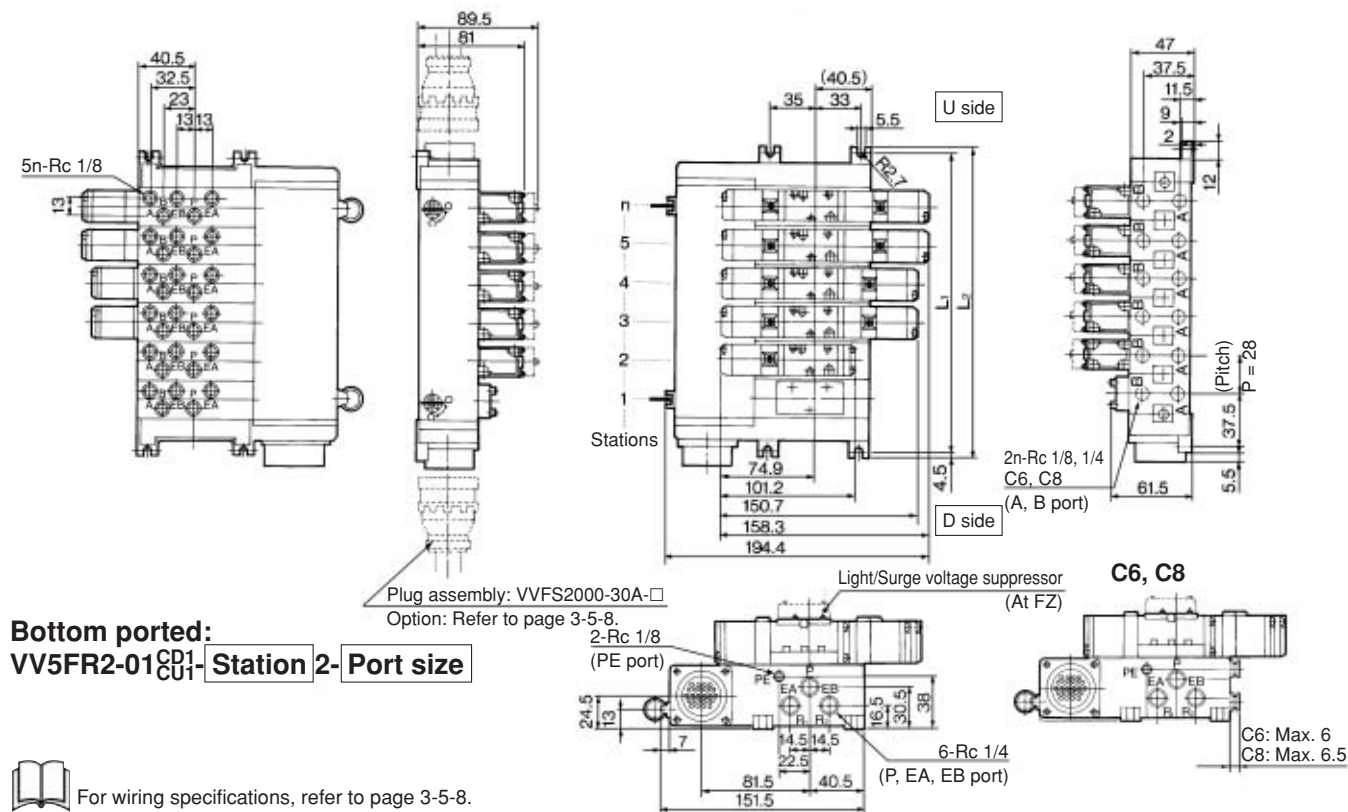


n: Stations

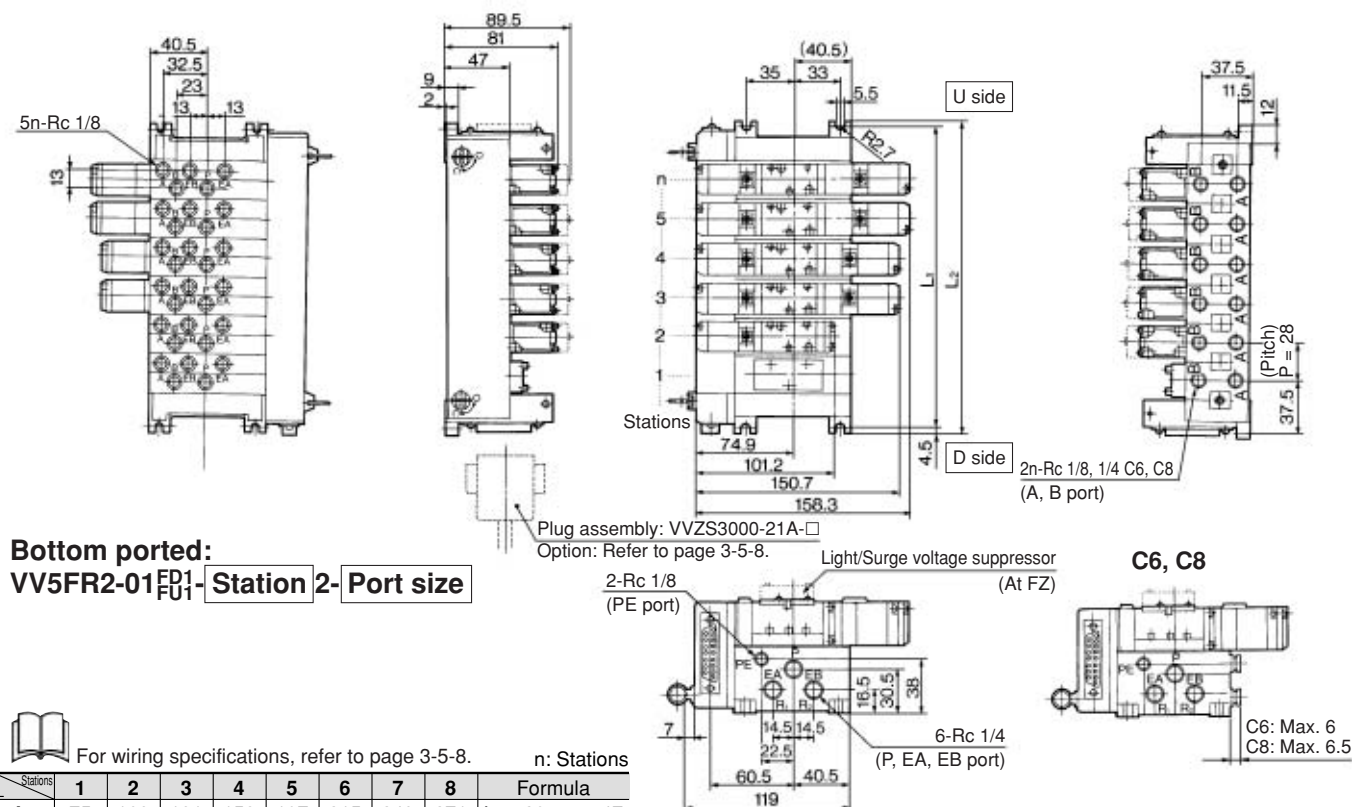
| Stations       | 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> | 75 | 103 | 131 | 159 | 187 | 215 | 243 | 271 | 299 | 327 | L <sub>1</sub> = 28 x n + 47 |
| L <sub>2</sub> | 84 | 112 | 140 | 168 | 196 | 224 | 252 | 280 | 308 | 336 | L <sub>2</sub> = 28 x n + 56 |

**Manifold** **Plug-in type**

**With multi-connector: VV5FR2-01CD1- Station 1- Port size, VV5FR2-01CU1- Station 1- Port size**



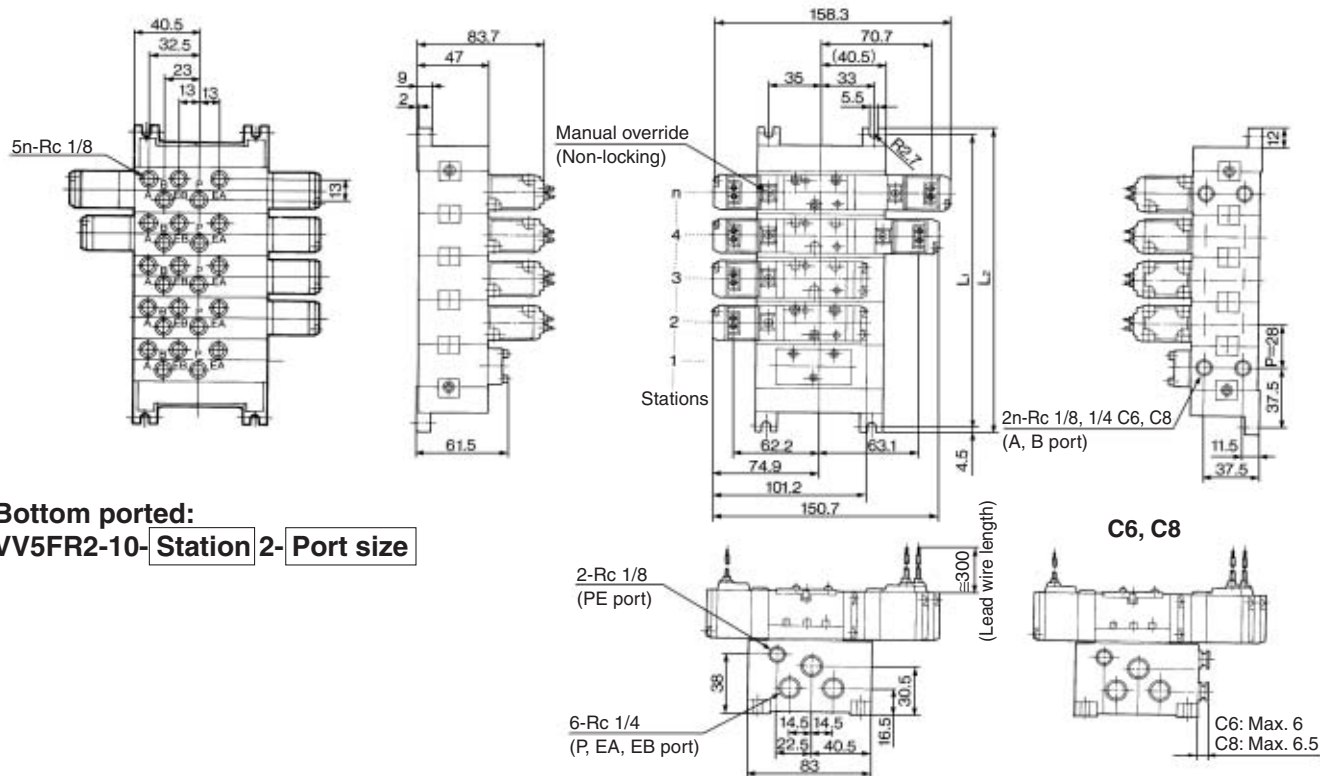
**With D-sub connector: VV5FR2-01FD1-Station 1-Port size, VV5FR2-01FU1-Station 1-Port size**



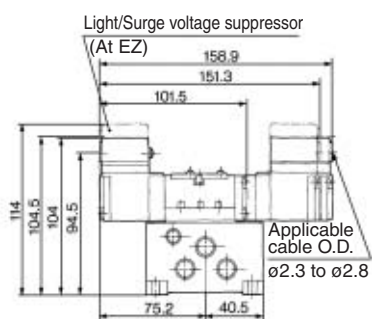
| Stations       | 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | Formula                      |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> | 75 | 103 | 131 | 159 | 187 | 215 | 243 | 271 | L <sub>1</sub> = 28 x n + 47 |
| L <sub>2</sub> | 84 | 112 | 140 | 168 | 196 | 224 | 252 | 280 | L <sub>2</sub> = 28 x n + 56 |

|                 |                              |                |    |                  |
|-----------------|------------------------------|----------------|----|------------------|
| <b>Manifold</b> | Non plug-in type: VV5FR2-10- | <b>Station</b> | 1- | <b>Port size</b> |
|-----------------|------------------------------|----------------|----|------------------|

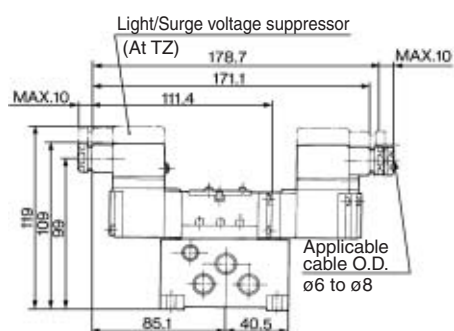
**Grommet: G**



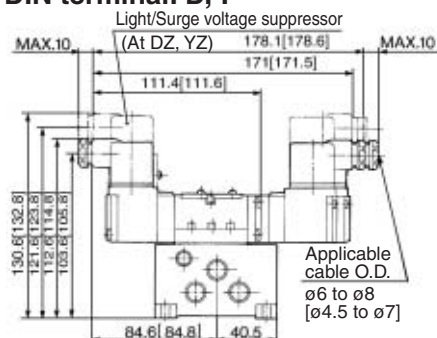
**Grommet terminal: E**



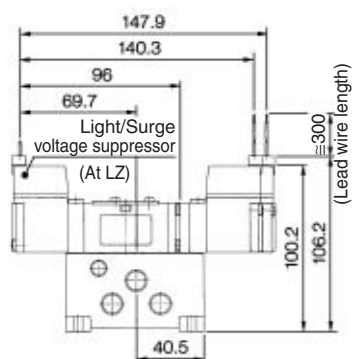
**Conduit terminal: T**



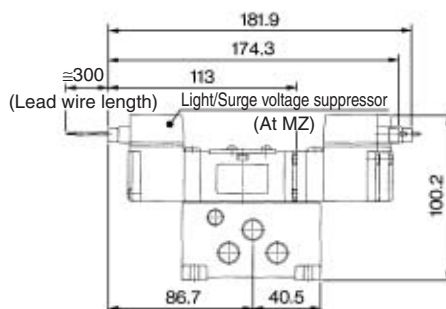
**DIN terminal: D, Y**



**L plug connector: L**



**M plug connector: M**



\* [ ]: Type Y

n: Stations

| Stations       | 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> | 75 | 103 | 131 | 159 | 187 | 215 | 243 | 271 | 299 | 327 | L <sub>1</sub> = 28 x n + 47 |
| L <sub>2</sub> | 84 | 112 | 140 | 168 | 196 | 224 | 252 | 280 | 308 | 336 | L <sub>2</sub> = 28 x n + 56 |

# 5 Port Pilot Operated Solenoid Valve

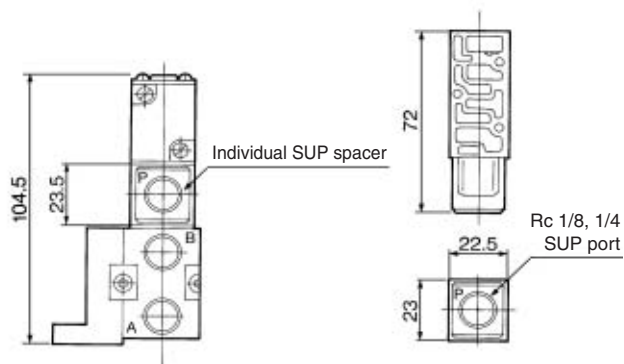
## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

### Manifold/Option Parts Assembly Plug-in type/Non plug-in type

#### Individual SUP spacer:

VVFS2000-P-<sup>01</sup><sub>02</sub>-1 (Plug-in type)

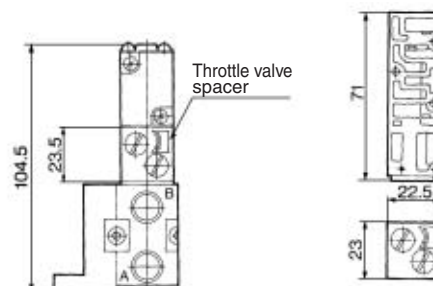
VVFS2000-P-<sup>01</sup><sub>02</sub>-2 (Non plug-in type)



#### Throttle valve spacer:

VVFS2000-20A-1 (Plug-in type)

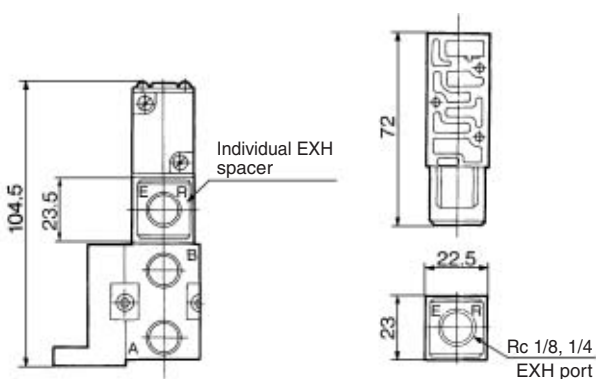
VVFS2000-20A-2 (Non plug-in type)



#### Individual EXH spacer:

VVFS2000-R-<sup>01</sup><sub>02</sub>-1 (Plug-in type)

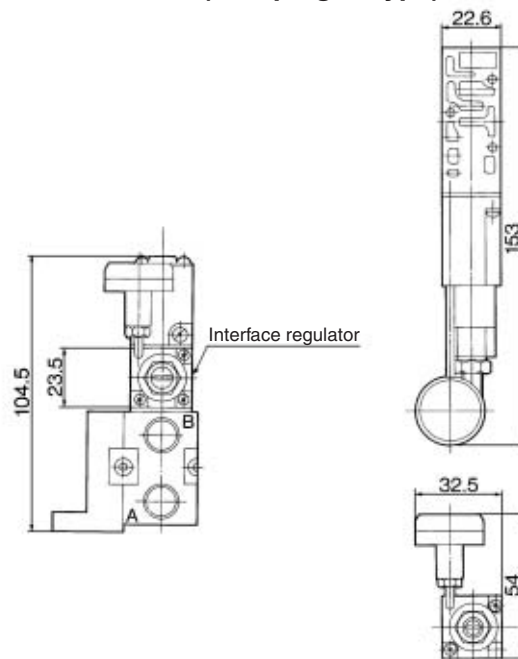
VVFS2000-R-<sup>01</sup><sub>02</sub>-2 (Non plug-in type)



#### Interface regulator

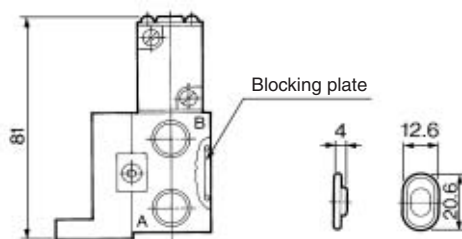
ARBF2000-00-P-1 (Plug-in type)

ARBF2000-00-P-2 (Non plug-in type)



#### SUP block disk: AXT625-12A

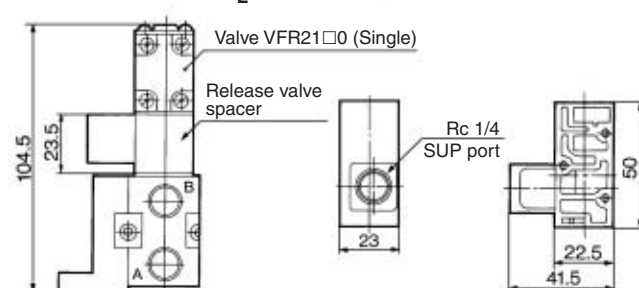
EXH block disk: AXT625-12A



#### Release valve spacer

VVFS2000-24A-1<sup>R</sup><sub>L</sub> (Plug-in type)

VVFS2000-24A-2<sup>R</sup><sub>L</sub> (Non plug-in type)



Note) VVFS2000-24A-1/2R (D side mounting)

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

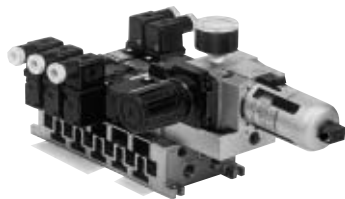
# Series VFR2000

## Manifold with Control Unit

- Control unit (Filter, Regulator, Pressure switch, Air release valve) are all standardized to the one unit, and can be mounted on the manifold base without any attachments.
- Piping processes are eliminated.



Plug-in type



Non plug-in type

### ⚠ Caution

Air filter with auto-drain or manual drain must be mounted with the air filter at the bottom.

### Manifold Specifications

| Manifold                     | Plug-in type: VV5FR2-01□                                                   | Non plug-in type: VV5FR2-10                                                                       |
|------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Wiring                       | With terminal block<br>With multi-connector<br>With D-sub connector        | Grommet, Grommet terminal<br>Conduit terminal, DIN terminal<br>L plug connector, M plug connector |
| Applicable valve model       | VFR2□00-□F                                                                 | VFR2□10-□G, VFR2□10-□E<br>VFR2□10-□T, VFR2□10-□DY<br>VFR2□10-□L, VFR2□10-□M                       |
| Porting specifications<br>Rc | Common SUP, Common EXH                                                     |                                                                                                   |
|                              | A, B port                                                                  | Side: Rc 1/8, 1/4, C6, C8, Bottom: Rc 1/8 (Option)                                                |
|                              | P, EA, EB port                                                             | Side: Rc 1/4, Bottom: Rc 1/8 (Option)                                                             |
| Stations                     | 2 to 15 stations * (With multi-connector/D-sub connector: 2 to 8 stations) |                                                                                                   |



\* Including station of control unit

### Control Unit Specifications

|                                                |                                                 |
|------------------------------------------------|-------------------------------------------------|
| Air filter (With auto-drain/With manual drain) |                                                 |
| Filtration degree                              | 5 μm                                            |
| Regulator                                      |                                                 |
| Set pressure (Outlet pressure)                 | 0.05 to 0.85 MPa                                |
| Pressure switch                                |                                                 |
| Set pressure range: OFF                        | 0.1 to 0.6 MPa                                  |
| Differential                                   | 0.08 MPa                                        |
| Contact                                        | 1a                                              |
| Indicator light                                | LED (RED)                                       |
| Max. switch capacity                           | 2 VA AC, 2 W DC                                 |
| Max. operating current                         | 24 VAC, DC or less: 50 mA<br>100 VAC, DC: 20 mA |
| Inside voltage drop                            | 4 V or less                                     |
| Air release valve (Single only)                |                                                 |
| Operating pressure range                       | 0.2 to 0.9 MPa                                  |

### Control Unit/Option

|                                         |                                   |                                   |
|-----------------------------------------|-----------------------------------|-----------------------------------|
| Air release valve spacer <sup>(1)</sup> | <Plug-in type>                    |                                   |
|                                         | VVFS2000-24A-1R (D side mounting) | VVFS2000-24A-1L (U side mounting) |
| Pressure switch <sup>(2)</sup>          | <Non plug-in type>                |                                   |
|                                         | VVFS2000-24A-2R (D side mounting) | VVFS2000-24A-2L (U side mounting) |
| Blanking plate                          | For filter regulator              | MP2-2                             |
|                                         | For pressure switch               | MP3-2                             |
|                                         | For air release valve             | AXT625-18A                        |
| Filter element                          | 111511-5B                         |                                   |



Note 1) Refer to "Manifold Option" on page 3-5-23.

Note 2) Pressure switch cannot be mounted later on non plug-in type.

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

### How to Order

**VV5FR2** — **10** — **08** **1** — **01** — **AP** —

**Series VFR2000 Manifold**

**Base model**

| Symbol       | Electrical entry             | Connector mounting direction | Junction cover  |
|--------------|------------------------------|------------------------------|-----------------|
| <b>01T</b>   | Plug-in type terminal block  | —                            | Stacking type   |
| <b>01T1</b>  | Plug-in type terminal block  | —                            | Integrated type |
| <b>01CD1</b> | Plug-in type multi-connector | D side                       | Integrated type |
| <b>01CU1</b> | Plug-in type multi-connector | U side                       | Integrated type |
| <b>01FD1</b> | Plug-in type D-sub connector | D side                       | Integrated type |
| <b>01FU1</b> | Plug-in type D-sub connector | U side                       | Integrated type |
| <b>10</b>    | Non plug-in type             | —                            | —               |

**Stations**

|                  |             |
|------------------|-------------|
| <b>02</b>        | 2 stations  |
| <b>15</b> (Note) | 15 stations |

Note) • 01CD1, 01CU1, 01FD1, 01FU1: Max. 8 stations  
• 01T, 01T1, 10: Max. 15 stations  
• Including station of control unit

**Symbol**

| Symbol     | Passage    | Porting specifications |
|------------|------------|------------------------|
|            | P EA, EB   | (A, B)                 |
| <b>1</b>   | Common     | Common                 |
| <b>2</b> * | Common     | Common                 |
| <b>3</b> * | Common     | Individual             |
| <b>4</b> * | Common     | Individual             |
| <b>5</b> * | Individual | Common                 |
| <b>6</b> * | Individual | Common                 |
| <b>7</b> * | Individual | Individual             |
| <b>8</b> * | Individual | Individual             |

\* Option  
P port or EA/EB port of symbol "3" to "8" can be individual port with block disk. Therefore, if using individual SUP spacer or individual EXH spacer for individual port, its symbol is "1".

**Air release valve coil rating**

|            |                   |
|------------|-------------------|
| <b>Nil</b> | None              |
| <b>1</b>   | 100 VAC, 50/60 Hz |
| <b>5</b>   | 24 VDC            |
| <b>9</b>   | Other             |

**Control unit type**

| Symbol                                 | Nil | MP         | AP | M | A | G | F | C | E         |
|----------------------------------------|-----|------------|----|---|---|---|---|---|-----------|
| Control equipment                      |     |            |    |   |   |   |   |   |           |
| Air release valve                      |     | ●          | ●  | ● | ● |   |   | ● | ●         |
| Air filter regulator with manual drain |     | ●          |    | ● |   | ● |   |   |           |
| Air filter regulator with auto-drain   |     |            | ●  |   | ● |   | ● |   |           |
| Pressure switch                        |     | ●          | ●  |   |   |   |   |   |           |
| Blanking plate (Air release valve)     |     |            |    |   |   | ● | ● |   |           |
| Blanking plate (Filter regulator)      |     |            |    |   |   |   |   | ● |           |
| Blanking plate (Pressure switch)       |     |            |    | ● | ● | ● | ● | ● |           |
| Required stations                      |     | 2 stations |    |   |   |   |   |   | 1 station |

Note) Control unit is D side mounting only.

**Thread type**

|            |      |
|------------|------|
| <b>Nil</b> | Rc   |
| <b>F</b>   | G    |
| <b>N</b>   | NPT  |
| <b>T</b>   | NPTF |

**Port size**

| Symbol    | P, EA, EB | A, B                     |
|-----------|-----------|--------------------------|
| <b>01</b> | 1/4       | 1/8                      |
| <b>02</b> |           | 1/4                      |
| <b>C6</b> |           | One-touch fitting for ø6 |
| <b>C8</b> |           | One-touch fitting for ø8 |
| <b>M</b>  |           | Mixed                    |

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

### How to Order Manifold Assembly

<Example> Plug-in type with terminal block

VV5FR2-01T1-091-02-MP5..... 1 set (Manifold base part no.)  
 \*VFR2100-5FZ..... 5 sets (2 position single part no.)  
 \*VFR2200-5FZ..... 2 sets (2 position double part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

The 1st and 2nd station are used for control unit mounting.  
 When ordering, specify the part nos. in order from the 3rd. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

<Example> Non plug-in type

VV5FR2-10-071-01-M5..... 1 set (Manifold base part no.)  
 \*VFR2110-5D..... 5 sets (2 position single part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

The 1st and 2nd station are used for control unit mounting.  
 When ordering, specify the part nos. in order from the 3rd. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

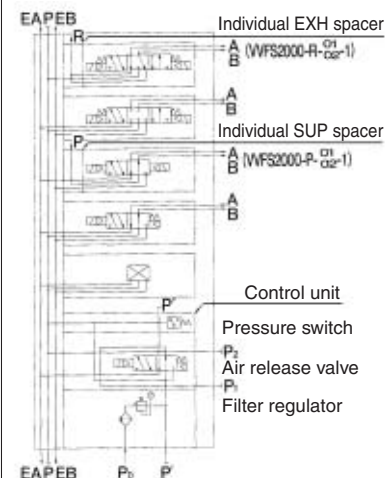
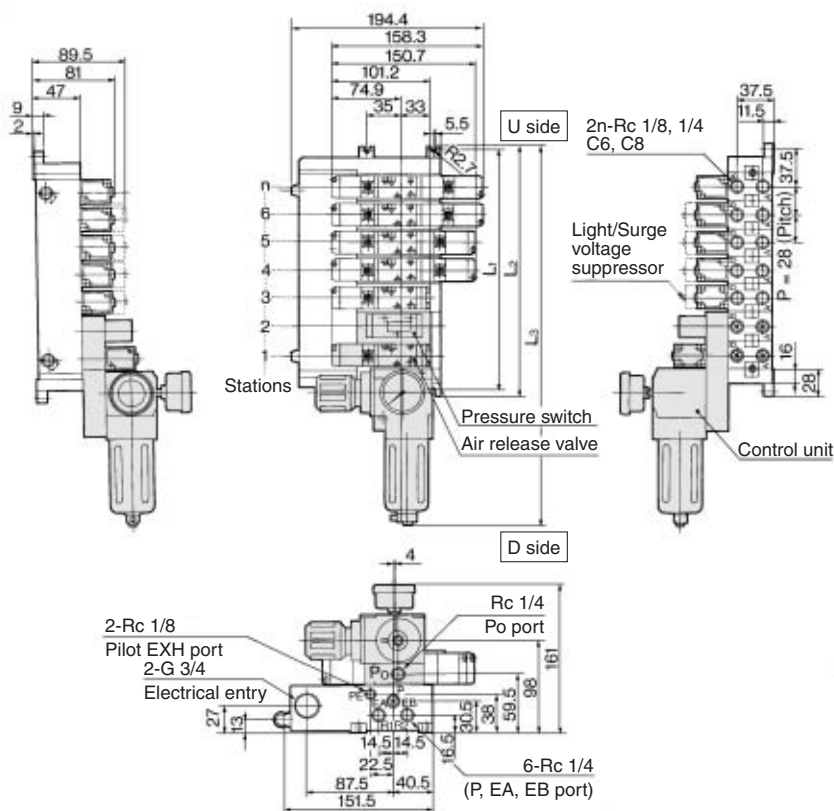
# Series VFR2000

## Manifold with Control Unit Plug-in type/Non plug-in type

### Plug-in type:

VV5FR2-01T- Station 1- Port size- Control unit Voltage of air release valve

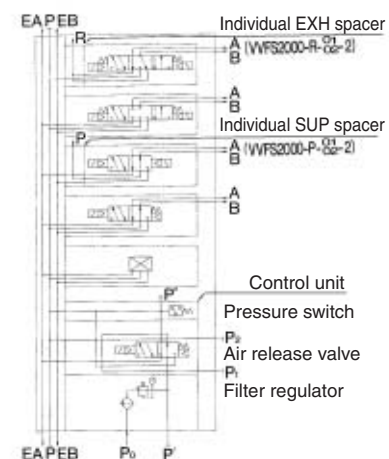
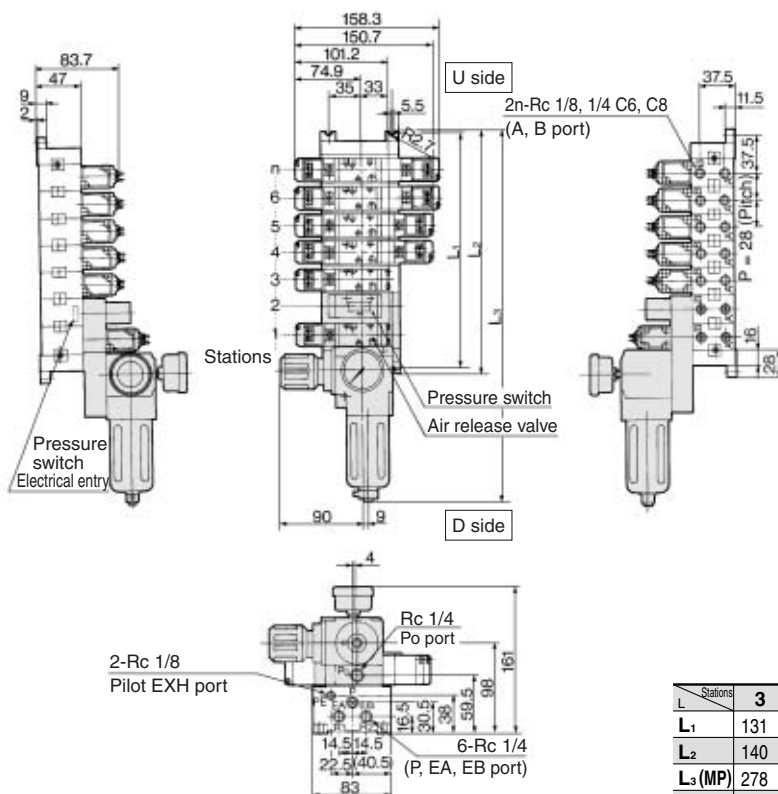
### Example for manifold



### Non plug-in type:

VV5FR2-10- Station 1- Port size- Control unit Voltage of air release valve

### Example for manifold

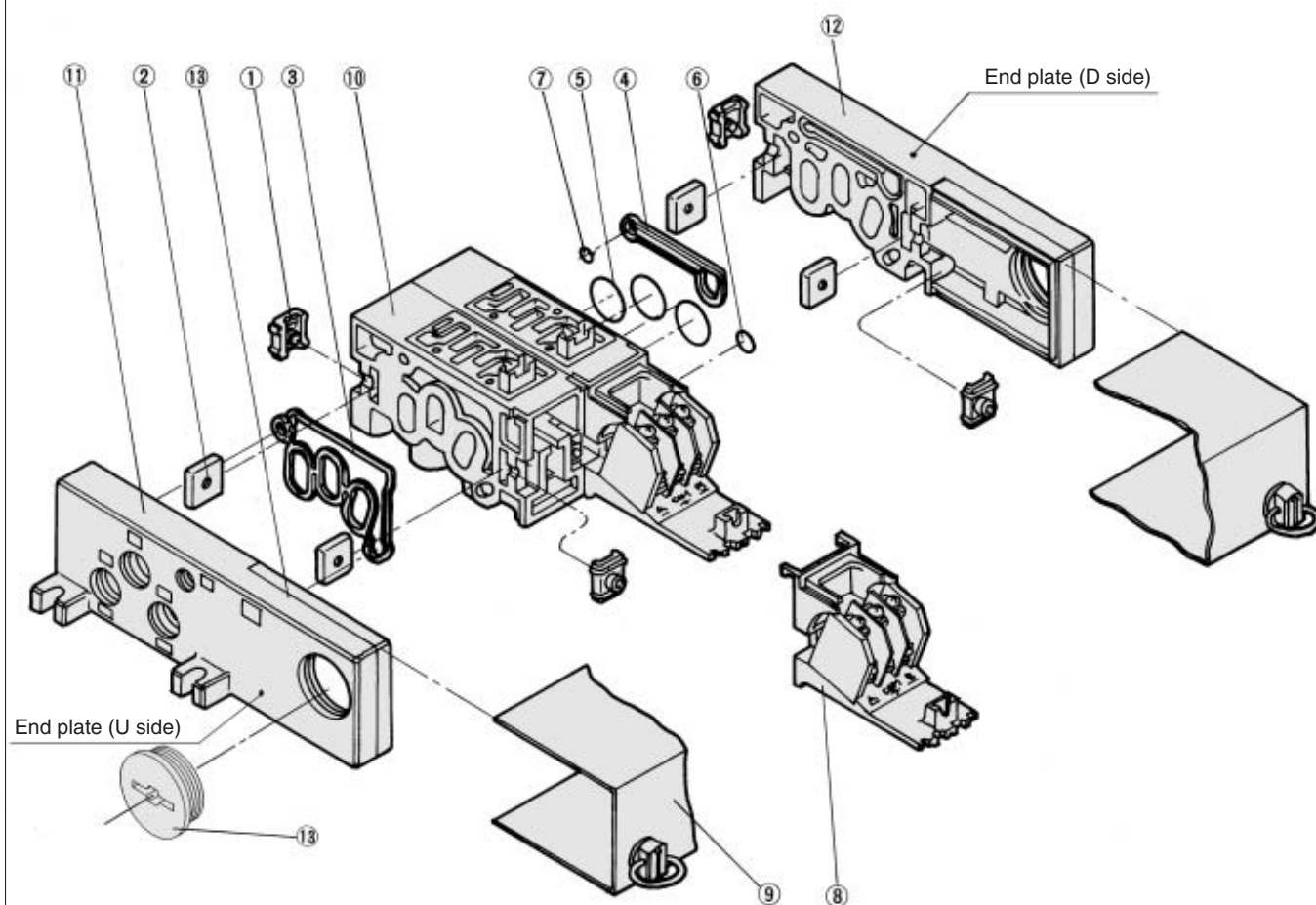


| n: Stations         |       |       |       |       |       |       |       |       |                                 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| Stations            | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                         |
| L <sub>1</sub>      | 131   | 159   | 187   | 215   | 243   | 271   | 299   | 327   | L <sub>1</sub> = 28 x n + 47    |
| L <sub>2</sub>      | 140   | 168   | 196   | 224   | 252   | 280   | 308   | 336   | L <sub>2</sub> = 28 x n + 56    |
| L <sub>3</sub> (MP) | 278   | 306   | 334   | 362   | 390   | 418   | 446   | 474   | L <sub>3</sub> = 28 x n + 194   |
| L <sub>3</sub> (AP) | 319.5 | 347.5 | 375.5 | 403.5 | 431.5 | 459.5 | 487.5 | 515.5 | L <sub>3</sub> = 28 x n + 235.5 |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR2000

### Manifold Base Construction Plug-in type/Non plug-in type



### Replacement Parts

| No. | Description            | Material    | Part no.                                                         |
|-----|------------------------|-------------|------------------------------------------------------------------|
| ①   | Connection fitting A   | Steel plate | AXT625-4-1                                                       |
| ②   | Connection fitting B   | Steel plate | AXT625-5                                                         |
| ③   | Gasket A               | NBR         | AXT625-17                                                        |
| ④   | Gasket B               | NBR         | AXT625-16                                                        |
| ⑤   | O-ring                 | NBR         | 18 x 15 x 1.5                                                    |
| ⑥   | O-ring                 | NBR         | 10.5 x 7.5 x 1.5                                                 |
| ⑦   | O-ring                 | NBR         | 8 x 5 x 1.5                                                      |
| ⑧   | Adapter plate assembly | —           | For 01T AXT625-28-1A<br>For 01T1 (Terminal and adapter plate)    |
|     | Adapter plate          | Resin       | For 01C AXT625-28-1<br>For 01F VVF2000-26-6<br>For 01SU AXT625-6 |

| No. | Description             | Material | Part no.                                       |
|-----|-------------------------|----------|------------------------------------------------|
| ⑨   | Junction cover assembly | —        | For 01T AXT625-28-3A                           |
|     |                         |          | For 01T1 AXT625-28-7A- <sup>(3)</sup> Stations |
|     |                         |          | For 01C AXT625-28-7A- <sup>(3)</sup> Stations  |
|     |                         |          | For 01F VVF2000-26-5A- <sup>(3)</sup> Stations |
|     |                         |          | For 01SU AZ738-10A- <sup>(3)</sup> Stations    |
| ⑬   | Rubber plug             | NBR      | For 01T AXT623-22                              |
|     |                         |          | For 01SU AXT623-22                             |

### Replacement Parts: Sub Assembly

| No. | Description                            | Assembly part no.                                         | Component parts                                                                                                    | Applicable manifold base                                                     |
|-----|----------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| ⑩   | Manifold block assembly <sup>(1)</sup> | AXT625-20A- <sup>1</sup> / <sub>2</sub> CS <sup>(2)</sup> | Manifold block ⑩, Metal joint ①, ②, O-ring ⑤, ⑥, ⑦ Terminal ⑧, Junction cover ⑨, Adaptor plate, Pin housing, Guide | Plug-in type                                                                 |
|     |                                        | AXT625-10A- <sup>1</sup> / <sub>2</sub> CS <sup>(3)</sup> | Manifold block ⑩, Metal joint ①, ②, O-ring ⑤, ⑥, ⑦                                                                 | Non plug-in type                                                             |
| ⑪   | End plate (U side) assembly            | AXT625-2A-20                                              | End plate (U) ⑪, Metal joint ①, ②, Gasket A ③, Guard ⑬                                                             | Plug-in type <sup>(For 01T) <sup>(3)</sup></sup><br>With terminal block ⑩1T1 |
|     |                                        | AXT625-2A-10                                              | End plate (U) ⑪, Metal joint ①, ②, Gasket A ③, Guard ⑬                                                             | Non plug-in type (For 10) <sup>(3)</sup>                                     |
| ⑫   | End plate (D side) assembly            | AXT625-3A-20                                              | End plate (D) ⑫, Metal joint ①, ②, Gasket B ④, Guard ⑬, Steel ball                                                 | Plug-in type <sup>(For 01T) <sup>(3)</sup></sup><br>With terminal block ⑩1T1 |
|     |                                        | AXT625-3A-10                                              | End plate (D) ⑫, Metal joint ①, ②, Gasket B ④, Guard ⑬, Steel ball                                                 | Non plug-in type (For 10) <sup>(3)</sup>                                     |



Note 1) For side ported

Note 2) 1: A, B port size Rc 1/8, 2: A, B port size Rc 1/4

Note 3) Please contact SMC if parts except for 10/01T/01T1 are needed.



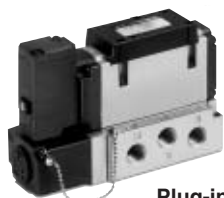
Note) Manifold Base/Construction: Plug-in type with terminal block.



# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in

# Series VFR3000

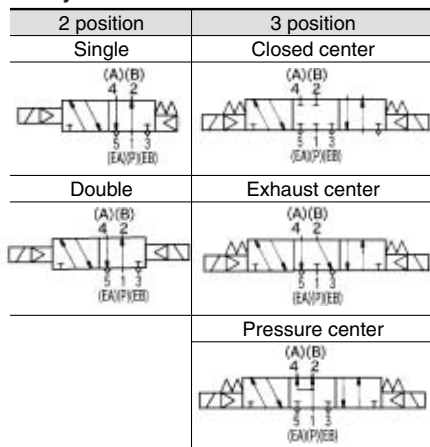


Plug-in type



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 <sup>(1)</sup>                          |
|                            | Manual override                       |                              | Non-locking push type                            |
|                            | Mounting orientation                  |                              | Unrestricted                                     |
|                            | Shock/Vibration resistance            |                              | 300/50 m/s <sup>2</sup> <sup>(2)</sup>           |
| 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) <sup>(3)</sup>    | 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) <sup>(3)</sup> |                              | 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 <sup>Note)</sup> |                                                                                            |
| 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<br>actuation |                    | Model   |             | Port size<br>Rc | Flow characteristics <sup>(1)</sup> |             |            |                         |             |            | Max. <sup>(2)</sup><br>operating<br>cycle<br>(Hz) | Response <sup>(3)</sup><br>time<br>(ms) | Weight <sup>(4)</sup><br>(kg) |
|----------------------|--------------------|---------|-------------|-----------------|-------------------------------------|-------------|------------|-------------------------|-------------|------------|---------------------------------------------------|-----------------------------------------|-------------------------------|
|                      |                    | Plug-in | Non plug-in |                 | 1 → 4/2 (P → A/B)                   |             |            | 4/2 → 5/3 (A/B → EA/EB) |             |            |                                                   |                                         |                               |
|                      |                    |         |             |                 | C<br>[dm³/(s·bar)]                  | b           | Cv         | C<br>[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<br>(0.64)<br><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<br>(0.74)<br><0.69>      |
|                      |                    |         | VFR324□     | 3/8             | 7.9                                 | 0.36        | 2.0        | 8.6                     | 0.37        | 2.2        |                                                   |                                         |                               |
| 3 position           | Closed<br>center   | VFR330□ | VFR331□     | 1/4             | 6.8                                 | 0.40        | 1.8        | 6.3                     | 0.38        | 1.6        | 3                                                 | 50 or less                              | 0.72<br>(0.75)<br><0.71>      |
|                      |                    |         | VFR334□     | 3/8             | 7.2                                 | 0.39        | 1.9        | 6.5                     | 0.40        | 1.7        |                                                   |                                         |                               |
|                      | Exhaust<br>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<br>(0.75)<br><0.71>      |
|                      |                    |         | VFR344□     | 3/8             | 6.9                                 | 0.42        | 1.8        | 9.5 [3.4]               | 0.39 [0.46] | 2.4 [0.96] |                                                   |                                         |                               |
|                      | Pressure<br>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<br>(0.75)<br><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)

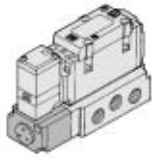
Note 4) For VFR3□00-□FZ-□□, ( ): VFR3□10-DZ□-□□, &lt; : VFR3□40-□G-□□

# 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

**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       |

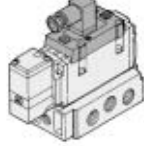
\* Indicator light is not available for grommet type. With surge voltage suppressor is available for grommet type only.

**Electrical entry: VFR3□1□**

E: Grommet terminal



D: DIN terminal

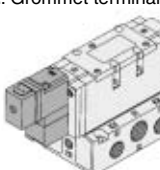


**Electrical entry: VFR3□4□**

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□<br>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                  | —               | —                             | VFR3□4□                |
| 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□<br>VFR3□1□     |
| 1      | VFR3□4□                |



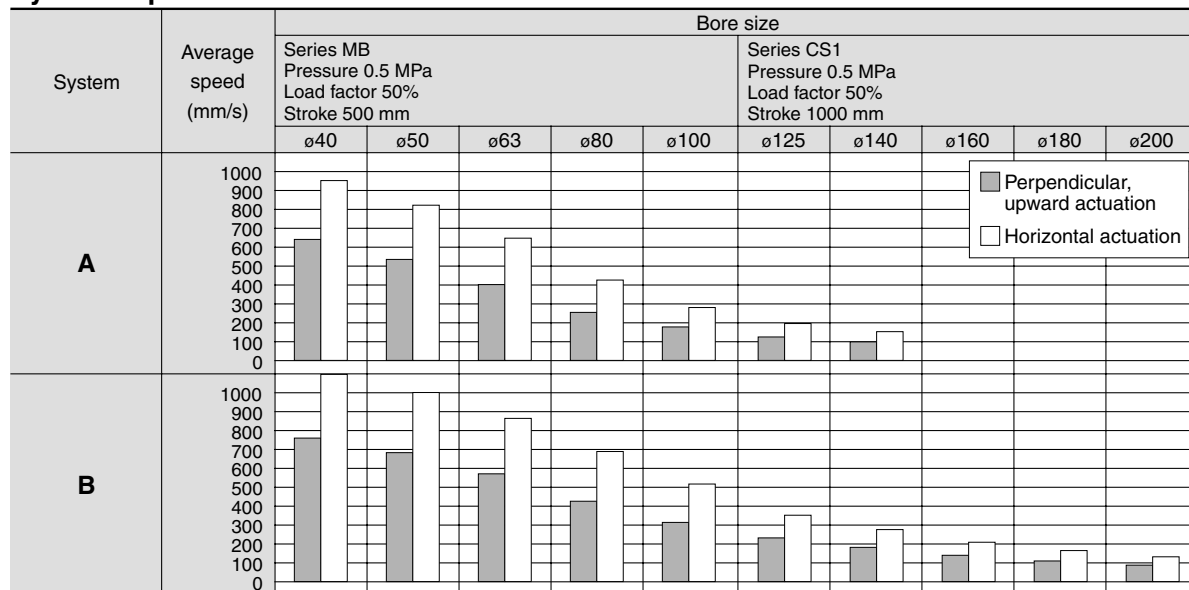
\* "VFR3□0□", "VFR3□1□": Pilot valve assembly is all plug-in (F).

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR3000

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

### Cylinder Speed Chart

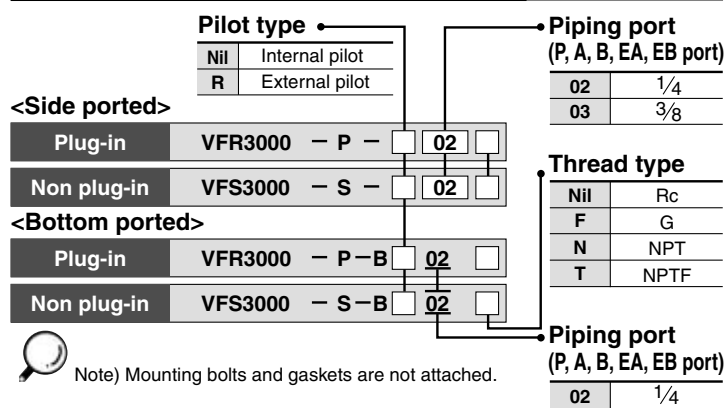


- \* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- \* The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- \* Load factor: ((Load 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<br>Rc 1/4 | AS4000-02<br>(S = 24 mm <sup>2</sup> ) | AN200-02<br>(S = 35 mm <sup>2</sup> ) | 6A x 1 m                       |
| B      | Series VFR3000<br>Rc 3/8 | AS420-03<br>(S = 73 mm <sup>2</sup> )  | AN300-03<br>(S = 60 mm <sup>2</sup> ) | 10A x 1 m                      |

### How to Order Sub-plate Assembly



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

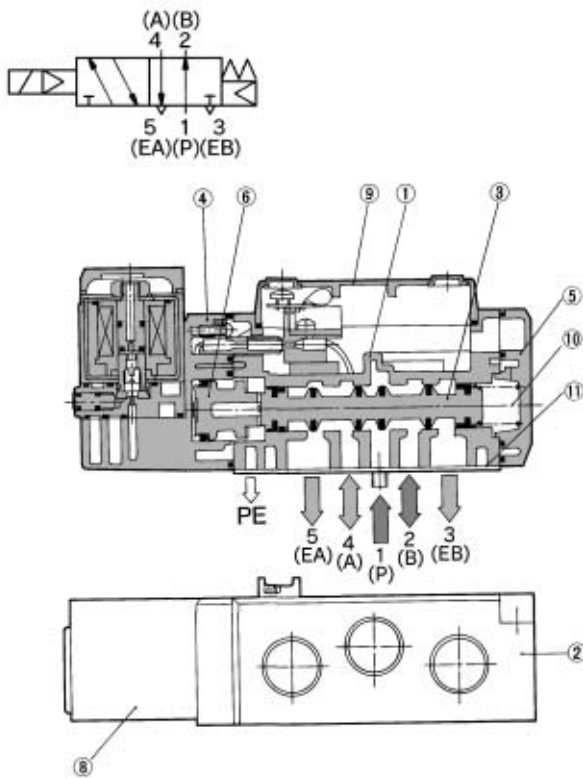
VFN

# Series VFR3000

## Construction

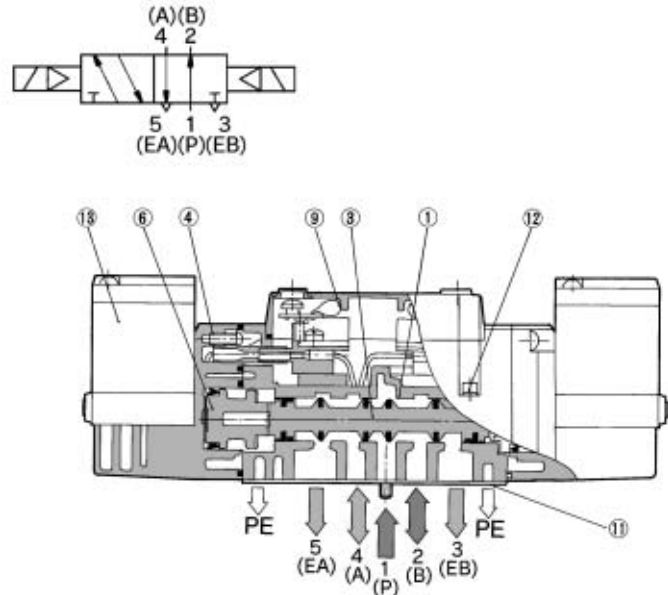
### 2 position single

VFR31□0



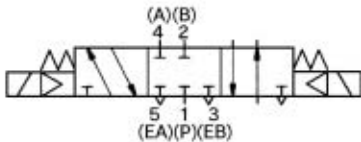
### 2 position double

VFR32□0

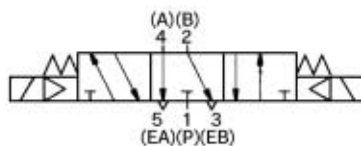


### 3 position closed center/exhaust center/pressure center

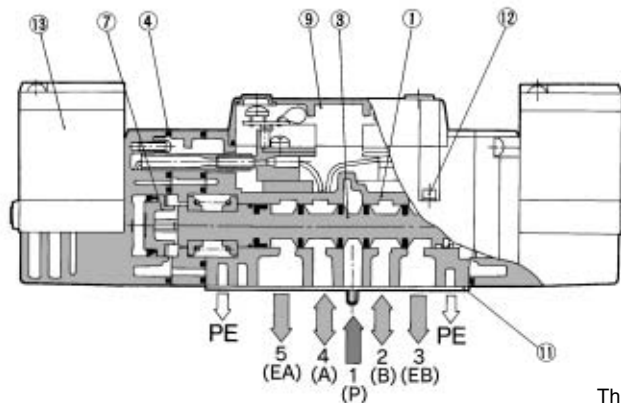
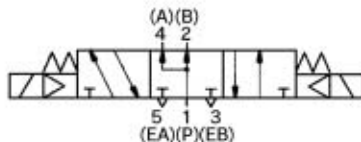
Closed center: VFR33□0



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 |      |

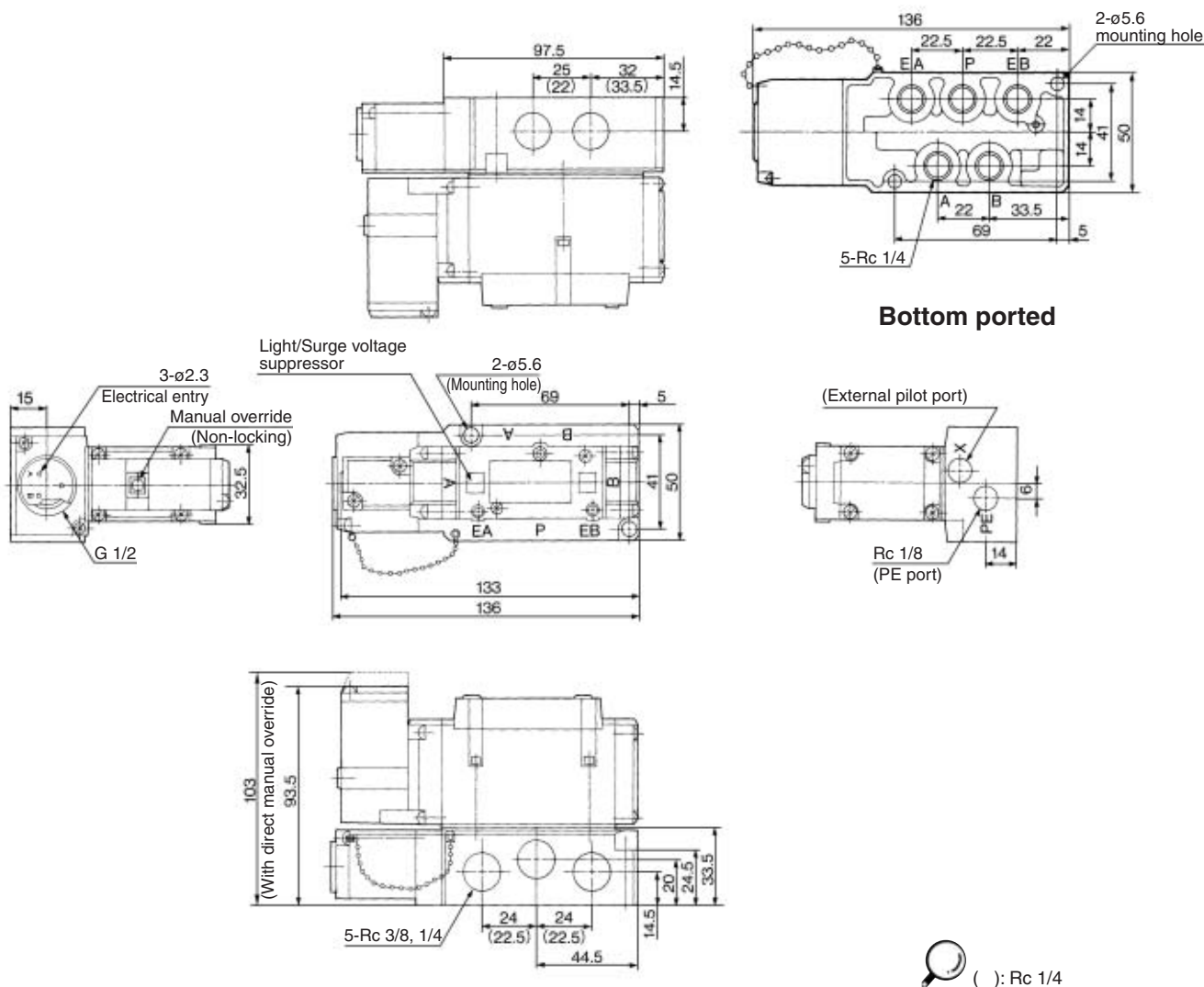
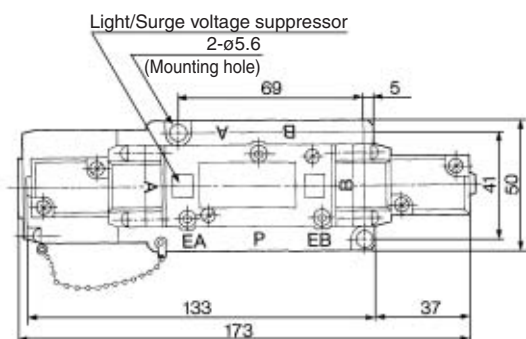
## Replacement Parts

| 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.   |                   |                   |

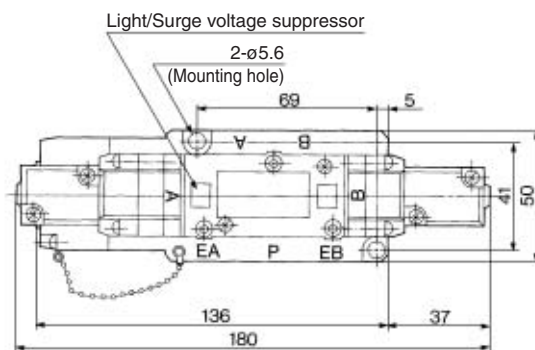
# 5 Port Pilot Operated Solenoid Valve

## 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: VFR310<sup>0</sup><sub>1</sub>-□FZ**

**2 position single: VFR320<sup>0</sup><sub>1</sub>-□FZ**


\* Other dimensions are the same as the single type.

**3 position closed center: VFR330<sup>0</sup><sub>1</sub>-□FZ**  
**3 position exhaust center: VFR340<sup>0</sup><sub>1</sub>-□FZ**  
**3 position pressure center: VFR350<sup>0</sup><sub>1</sub>-□FZ**


\* Other dimensions are the same as the single type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

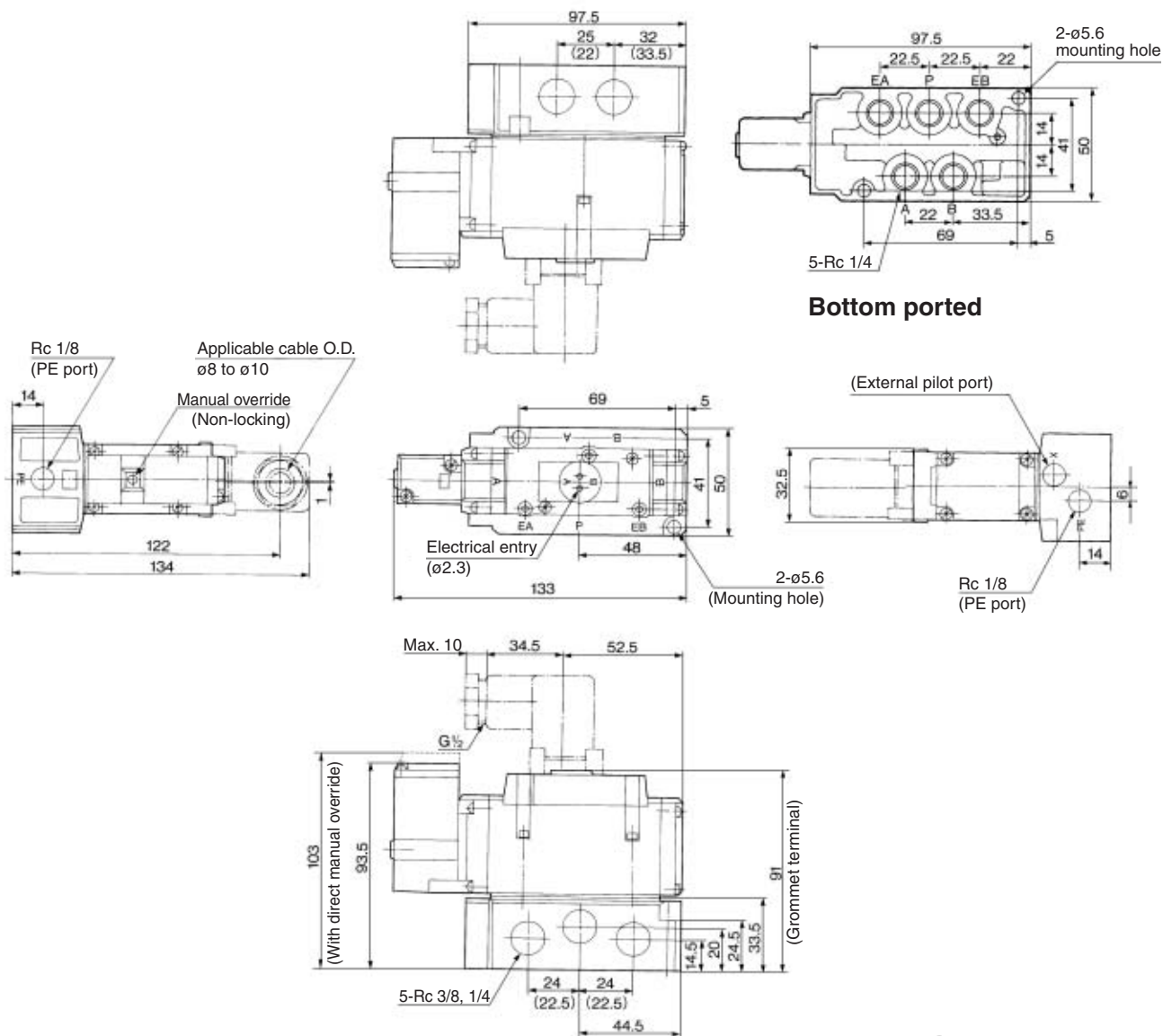
EVS

VFN

# Series VFR3000

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

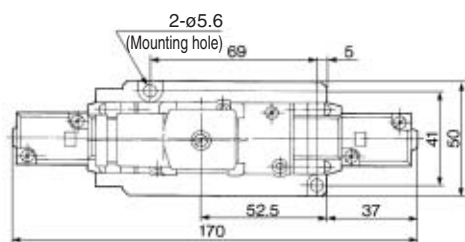
**2 position single: VFR311<sup>0</sup><sub>1</sub>-□E, VFR311<sup>0</sup><sub>1</sub>-□DZ**



**Bottom ported**

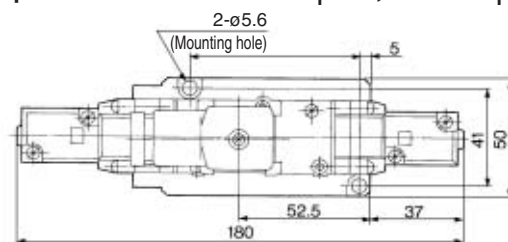
( ) : Rc 1/4

**2 position double: VFR321<sup>0</sup><sub>1</sub>-□E, VFR321<sup>0</sup><sub>1</sub>-□DZ**



\* Other dimensions are the same as the single type.

**3 position closed center: VFR331<sup>0</sup><sub>1</sub>-□E, VFR331<sup>0</sup><sub>1</sub>-□DZ**  
**3 position exhaust center: VFR341<sup>0</sup><sub>1</sub>-□E, VFR341<sup>0</sup><sub>1</sub>-□DZ**  
**3 position pressure center: VFR351<sup>0</sup><sub>1</sub>-□E, VFR351<sup>0</sup><sub>1</sub>-□DZ**



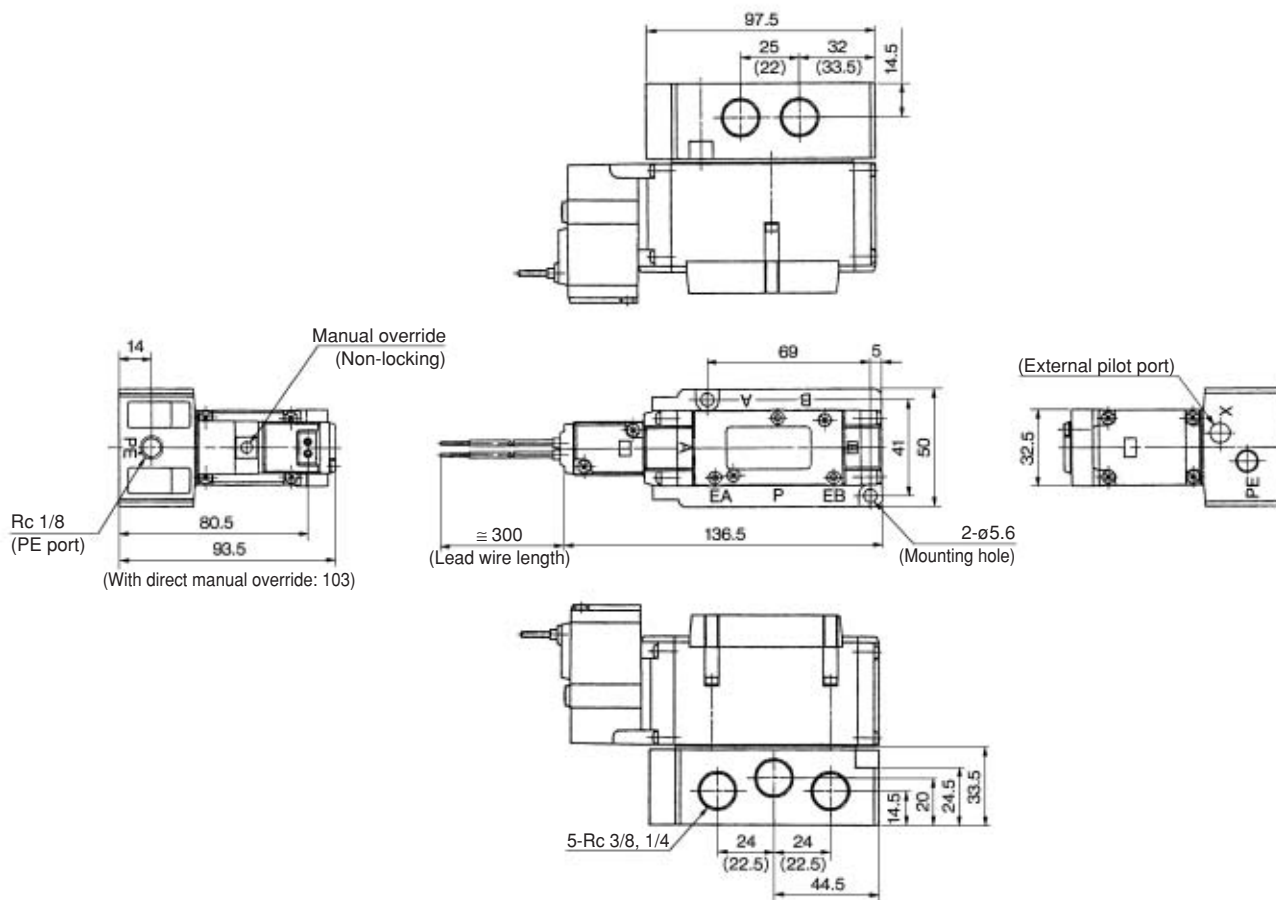
\* Other dimensions are the same as the single type.

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR3000

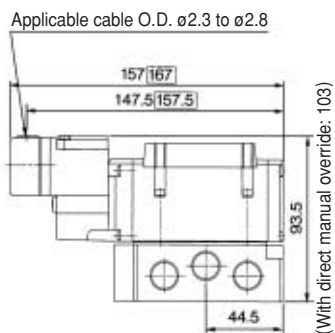
### Non Plug-in 2 position single

2 position single: VFR314<sup>0</sup><sub>1</sub>-□G



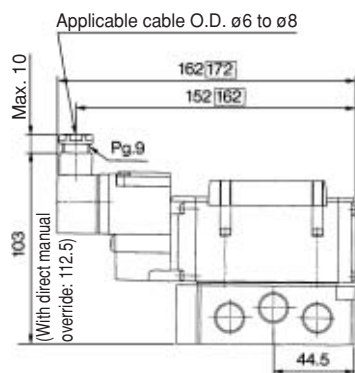
( ): Rc 1/4

#### E: Grommet terminal



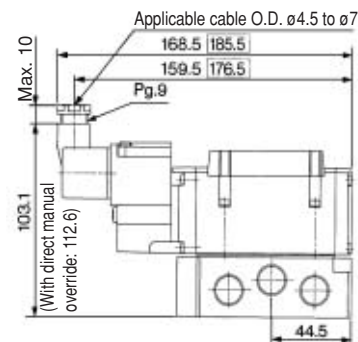
□: With light/surge voltage suppressor

#### T: Conduit terminal



□: With light/surge voltage suppressor

#### D, Y: DIN terminal



□: With light/surge voltage suppressor

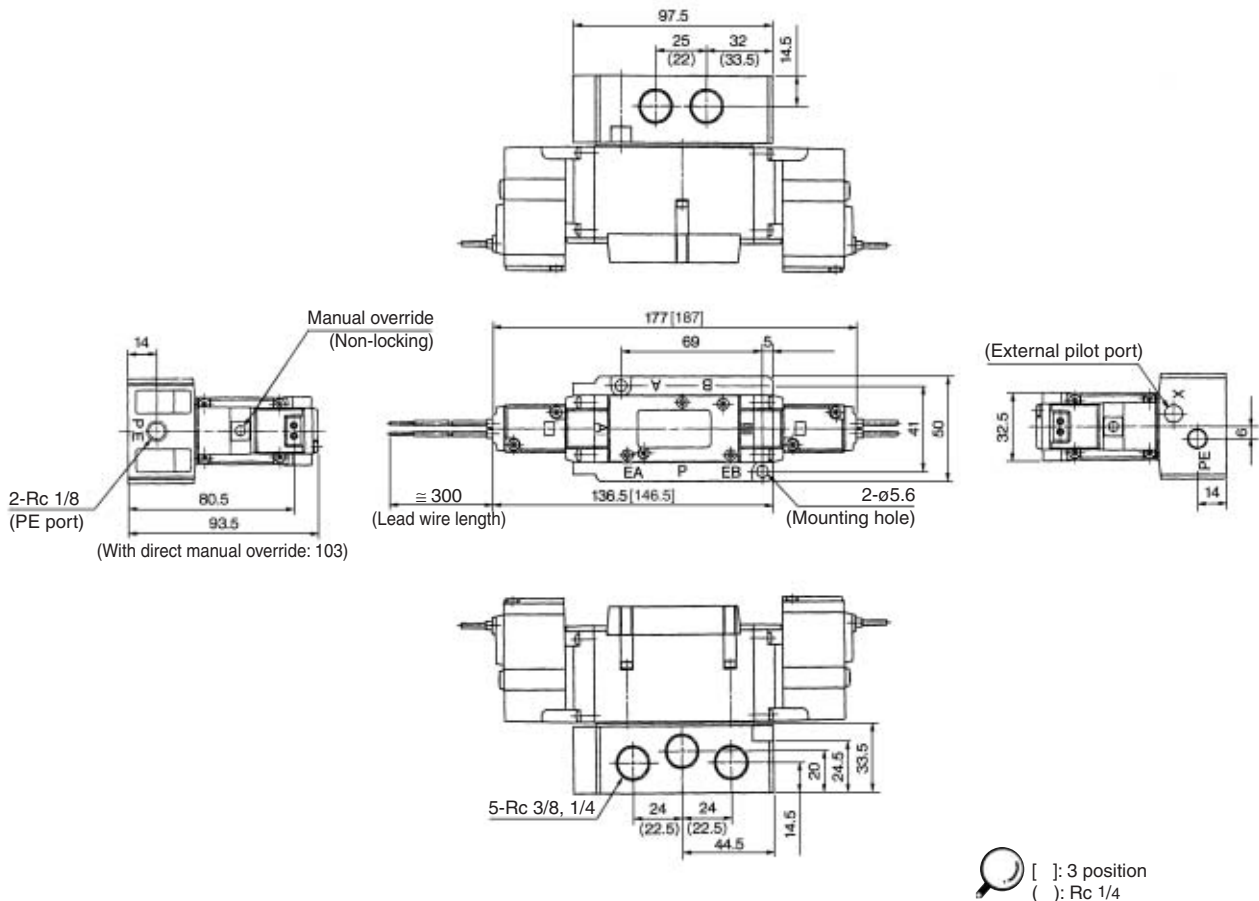
**Non Plug-in** 2 position double, 3 position closed center/exhaust center/pressure center

**2 position double: VFR324<sup>0</sup>-□G**

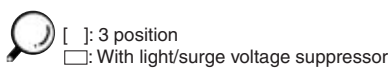
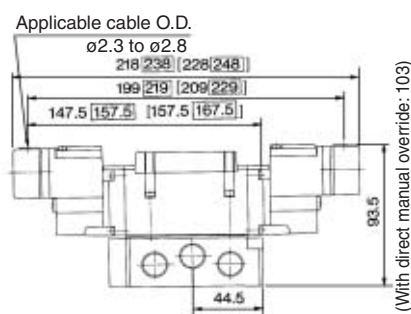
**3 position closed center: VFR334<sup>0</sup><sub>1</sub>-□G**

**3 position exhaust center: VFR344<sup>0</sup><sub>1</sub>-□G**

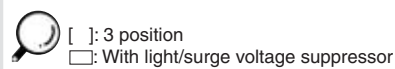
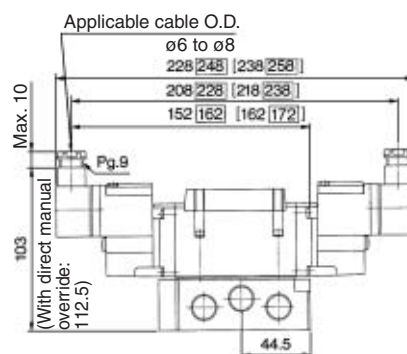
**3 position pressure center: VFR354<sup>0</sup><sub>1</sub>-□G**



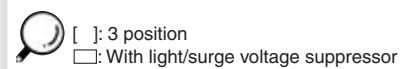
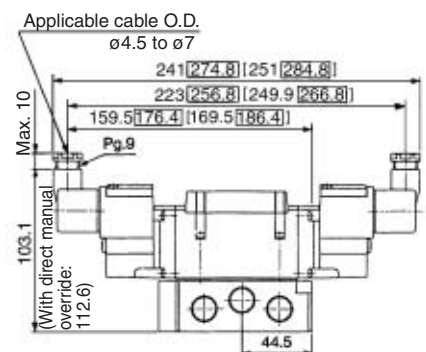
### E: Grommet terminal



**T: Conduit terminal**



**D, Y: DIN terminal**



# Series VFR3000 Manifold Specifications

## Manifold Specifications

| Base mounted                         | Wiring                                                                                                                              | Porting specifications | Port size    |                     | Stations | Applicable valve model                                                           |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------------|----------|----------------------------------------------------------------------------------|
|                                      |                                                                                                                                     | A, B port              | P, EA, EB    | A, B                |          |                                                                                  |
| <b>Plug-in type</b><br>VV5FR3-01□    | <ul style="list-style-type: none"> <li>With terminal block</li> <li>With multi-connector</li> <li>With D-sub connector</li> </ul>   | Side/Bottom            | Note)<br>1/2 | 1/4, 3/8<br>C8, C10 | 2 to 10  | VFR3□00-□F                                                                       |
| <b>Non plug-in type</b><br>VV5FR3-10 | <ul style="list-style-type: none"> <li>Grommet terminal</li> <li>DIN terminal</li> </ul>                                            |                        |              |                     | 2 to 8   |                                                                                  |
| <b>Non plug-in type</b><br>VV5FR3-40 | <ul style="list-style-type: none"> <li>Grommet</li> <li>Grommet terminal</li> <li>Conduit terminal</li> <li>DIN terminal</li> </ul> |                        |              |                     | 2 to 10  | VFR3□1□-□E<br>VFR3□1□-□D<br>VFR3□4□-□G<br>VFR3□4□-□E<br>VFR3□4□-□T<br>VFR3□4□-□D |



Note) If silencer is mounted to EA/EB port, use silencer "AN403-04" (O.D. ø27).

## How to Order Manifold Assembly

<Example> Plug-in type with terminal block: 6 stations

VV5FR3-01T-061-02..... 1 set (Manifold base part no.)  
 \*VFR3100-5FZ..... 3 sets (2 position single part no.)  
 \*VFR3200-5FZ..... 2 sets (2 position double part no.)  
 \*VVF3000-10A..... 1 set (Blanking plate)

↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

<Example> Non plug-in type: 6 stations

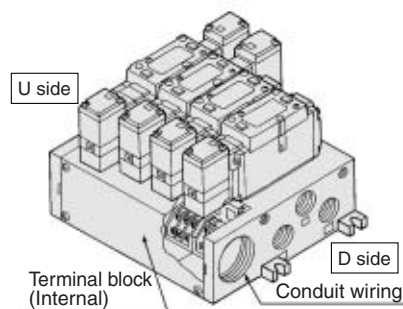
VV5FR3-10-061-03..... 1 set (Manifold base part no.)  
 \*VFR3110-5D..... 5 sets (2 position single part no.)  
 \*VFR3410-5D..... 1 set (3 position exhaust center part no.)  
 \*VVF3000-R-03-2..... 1 set (Individual EXH spacer part no.)

↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

## Plug-in Type: With Terminal Block

- Since 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.



**VV5FR3 - 01T - 06 1 - 02**

Series VFR3000 Manifold

Plug-in type with terminal block

Stations

|    |             |
|----|-------------|
| 02 | 2 stations  |
| 10 | 10 stations |

Symbol

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
| 1      | Common  | Common                        |
| 2      | Common  | Bottom *                      |

\* Option

Port size

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

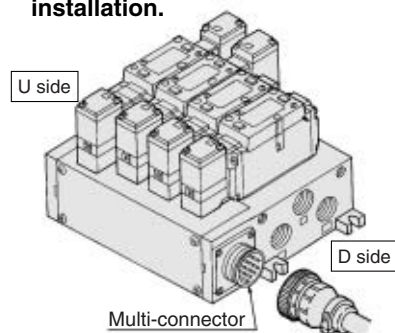
\* For bottom ported: Rc 1/4, 3/8 only.

Thread type

| Nil | Rc   |
|-----|------|
| F   | G    |
| N   | NPT  |
| T   | NPTF |

## Plug-in Type: With Multi-connector (For wiring specifications, refer to page 3-5-8.)

- Master connection of power and solenoid valves.
- Quick wiring permits ease of installation.



**VV5FR3 - 01C D - 05 1 - 02**

Series VFR3000 Manifold

Plug-in type with multi-connector

Connector mounting direction

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

Stations

|    |            |
|----|------------|
| 02 | 2 stations |
| 08 | 8 stations |

\* Max: 8 stations

Symbol

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
| 1      | Common  | Common                        |
| 2      | Common  | Bottom *                      |

\* Option

Port size

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

\* For bottom ported: Rc 1/4, 3/8 only.

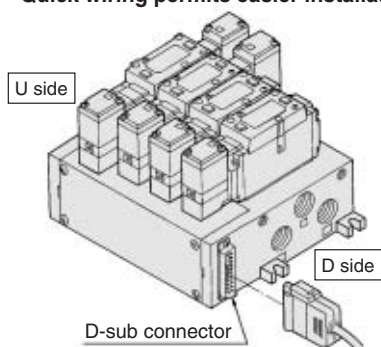
Thread type

| Nil | Rc   |
|-----|------|
| F   | G    |
| N   | NPT  |
| T   | NPTF |

# Series VFR3000

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 3-5-8.)

- Wide range of interchangeability (25 pin D-sub connector conforms to MIL standard)
- Quick wiring permits easier installation.



**VV5FR3 - 01F D-06 1-02**

Series VFR3000 Manifold  
Plug-in type with D-sub connector

**Connector mounting direction**

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 08 | 8 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

\* Max: 8 stations

**Symbol**

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
|        | P       | EA, EB                        |
| 1      | Common  | Common                        |
| 2      | Common  | Common                        |

\* Option

**Port size**

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

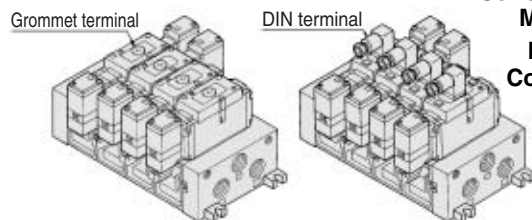
\* For bottom ported: Rc 1/4, 3/8 only.

**Thread type**

|     | Rc   |
|-----|------|
| Nil |      |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

## Non Plug-in Type: Grommet Terminal, DIN Terminal (Common electrical entry)

- Individual wiring for every valve



**VV5FR3 - 10-05 1-02**

Series VFR3000 Manifold  
Non plug-in type  
Common electrical entry

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

**Symbol**

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
|        | P       | EA, EB                        |
| 1      | Common  | Common                        |
| 2      | Common  | Common                        |

\* Option

**Port size**

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

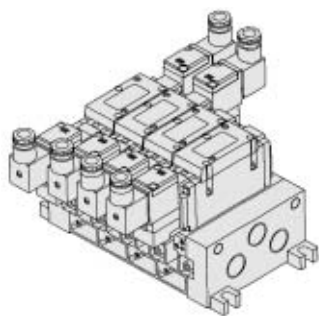
\* For bottom ported: Rc 1/4, 3/8 only.

**Thread type**

|     | Rc   |
|-----|------|
| Nil |      |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

## Non Plug-in Type: Grommet, Grommet Terminal, Conduit Terminal, DIN Terminal (Individual electrical entry)

- Individual wiring for every valve



**VV5FR3 - 40-05 1-02**

Series VFR3000 Manifold  
Non plug-in type  
Individual electrical entry

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

**Symbol**

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
|        | P       | EA, EB                        |
| 1      | Common  | Common                        |
| 2      | Common  | Common                        |

\* Option

**Port size**

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

\* For bottom ported: Rc 1/4, 3/8 only.

**Thread type**

|     | Rc   |
|-----|------|
| Nil |      |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

Note) Manifold base is in common with "VV5FR3-10".

Note) Manifold base is in common with Series VFS3000.

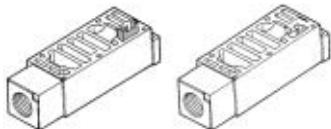
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR3000

## Manifold/Option Parts Assembly

### Individual SUP spacer

Setting individual SUP spacer on the manifold block enables individual SUP port for each valve.

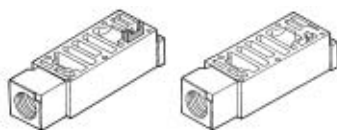
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS3000-P-03-1 | VVFS3000-P-03-2  |



### Individual EXH spacer

Setting individual EXH spacer on the manifold block enables individual EXH port for each valve.

| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS3000-R-03-1 | VVFS3000-R-03-2  |



### SUP block disk

When supplying manifold with more than two different pressures, high and low, insert a block disk in between stations subjected to different pressures.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT636-1A    |                  |

### EXH block disk

When valve exhaust affects the other stations on the circuit, insert EXH block disk in between stations to separate valve exhaust.

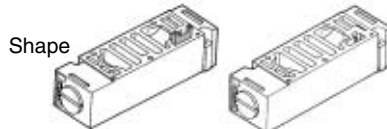
| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT636-1A    |                  |



### Throttle valve spacer

Needle valve set on the manifold block can control cylinder speed by throttling exhaust.

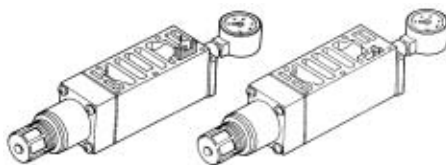
| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS3000-20A-1 | VVFS3000-20A-2   |



### Interface regulator

Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Characteristics" on page 3-5-6 before operation.)

| Body type         | Plug-in type    | Non plug-in type |
|-------------------|-----------------|------------------|
| P port regulation | ARBF3050-00-P-1 | ARBF3050-00-P-2  |
| A port regulation | ARBF3050-00-A-1 | ARBF3050-00-A-2  |
| B port regulation | ARBF3050-00-B-1 | ARBF3050-00-B-2  |



### SUP stop valve spacer

If SUP stop valve spacer is set, valve can be removed for maintenance without stopping air pressure supply for other valves.

| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS3000-37A-1 | VVFS3000-37A-2   |

(Height will be 27.5 mm higher.)

### Blanking plate

It is used by attaching on the manifold block for being prepared for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | VVFS3000-10A |                  |

\* Mounting screws: 4 positions



## Manifold Option

### With exhaust cleaner

Plug-in type/Non plug-in type

- Valve exhaust noise dampening: 35 dB or more.
- Collects oil mist: collecting rate 99.9% or more
- Piping process reduced.



For details, refer to page 3-5-44.



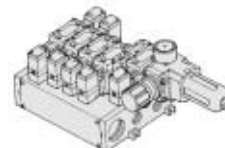
### With control unit

Plug-in type/Non plug-in type

- Filter, regulation valve, pressure switch and air release valve are all combined to form one unit.
- Piping processes are eliminated.



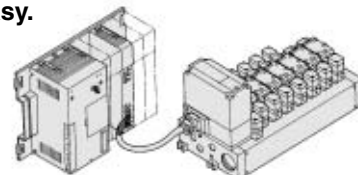
For details, refer to page 3-5-44.



### With serial interface unit for serial transmission

Plug-in type

- Solenoid valve wiring process reduced considerably.
- Disperse installation possible. Manifold solenoid valve: 8 stations max. 32 positions (512 solenoids).
- Maintenance and inspection are easy.



For details, refer to "Serial Transmission" catalog separately.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

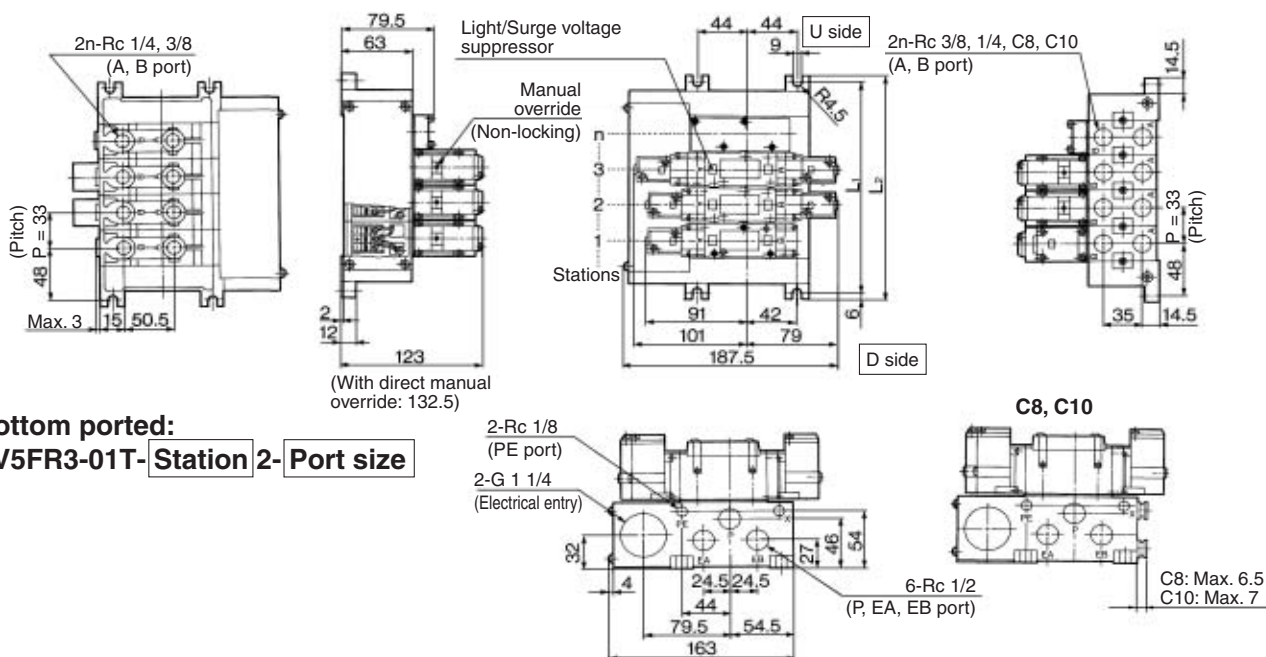
VQ7

EVS

VFN

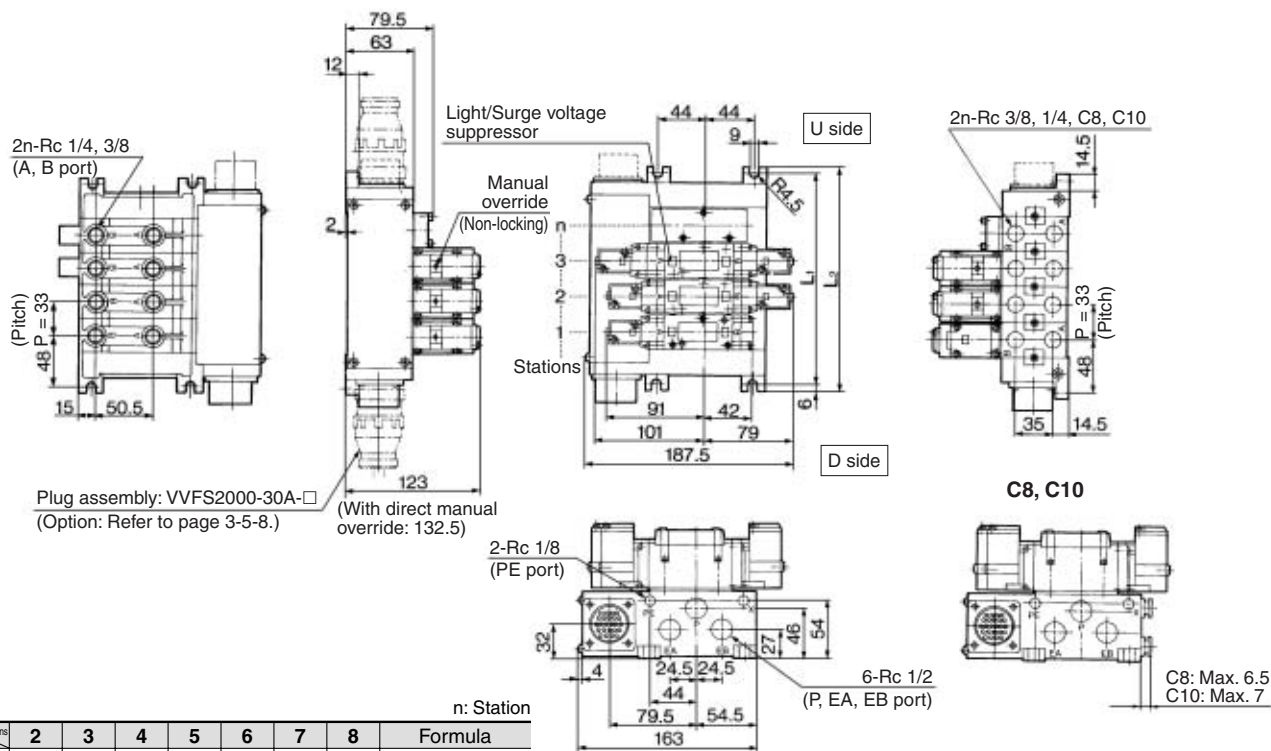
**Manifold** **Plug-in type**

**With terminal block: VV5FR3-01T- Station 1- Port size**



|                |     |     |     |     |     |     |     |     |     | n: Station                   |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | L <sub>1</sub> = 33 x n + 63 |
| L <sub>2</sub> | 141 | 174 | 207 | 240 | 273 | 306 | 339 | 372 | 405 | L <sub>2</sub> = 33 x n + 75 |

**With multi-connector: VV5FR3-01CD-Station 1-Port size, VV5FR3-01CU-Station 1-Port size**



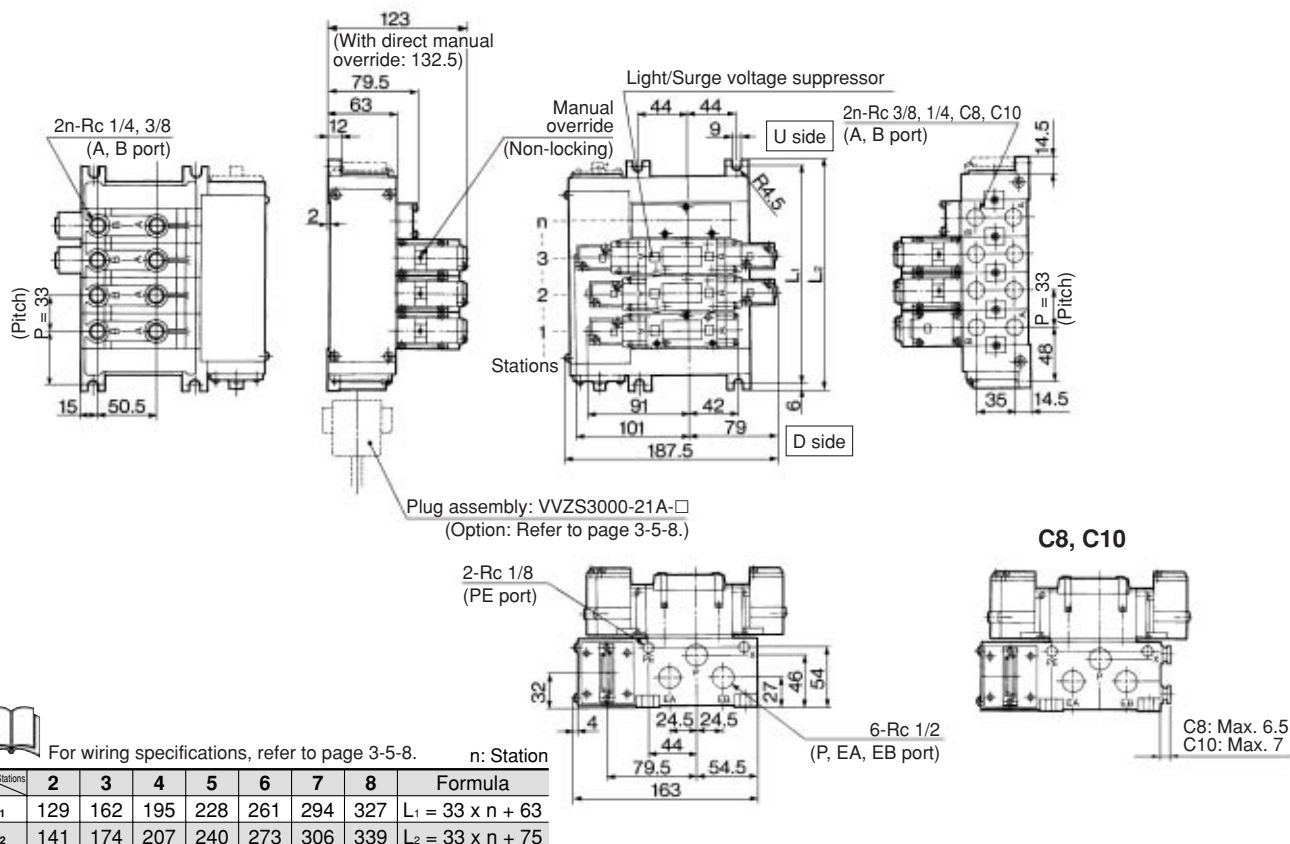
|                |     |     |     |     |     |     |     | n: Stations              |
|----------------|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | Formula                  |
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | $L_1 = 33 \times n + 63$ |
| L <sub>2</sub> | 141 | 174 | 207 | 240 | 273 | 306 | 339 | $L_2 = 33 \times n + 75$ |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR3000

### Manifold Plug-in type

With D-sub connector: VV5FR3-01FD-Station 1-Port size, VV5FR3-01FU-Station 1-Port size



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

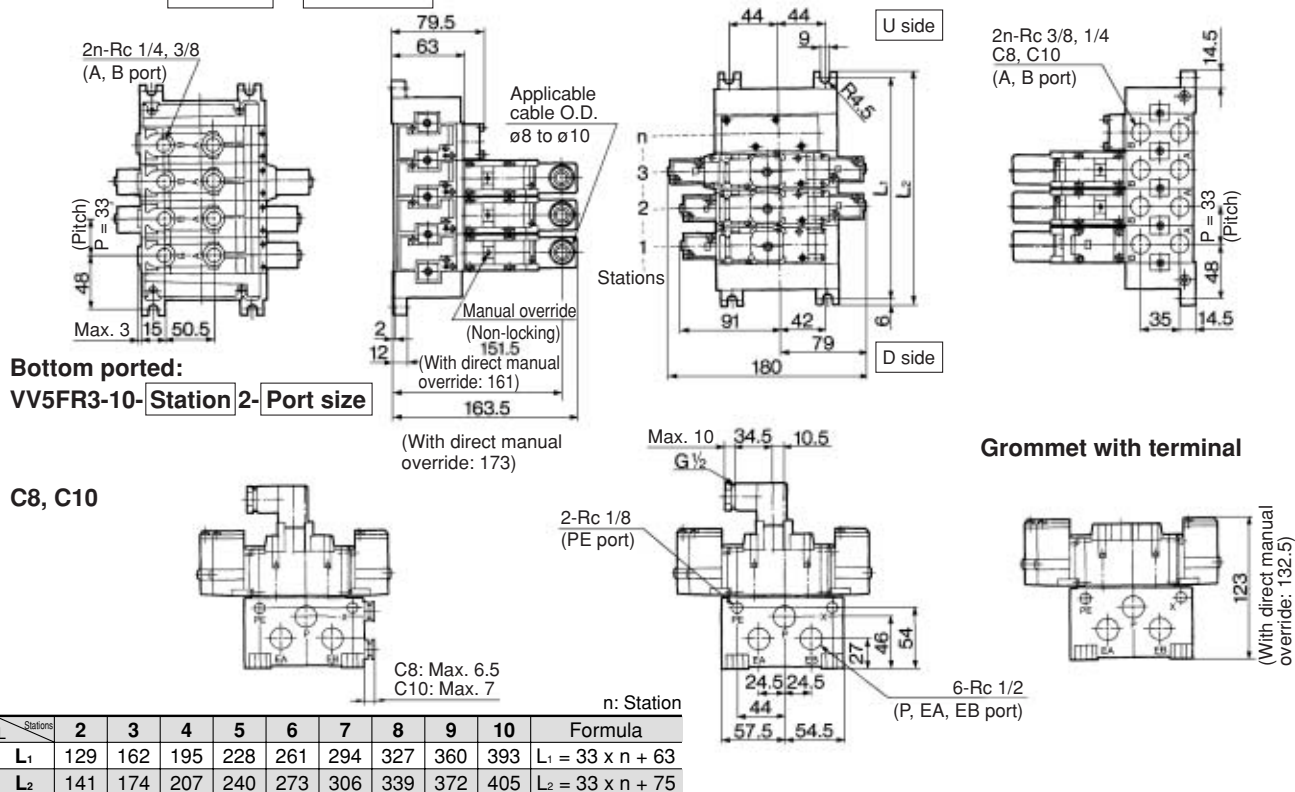
VQ7

EVS

VFN

### Manifold Non plug-in type

VV5FR3-10-Station 1-Port size

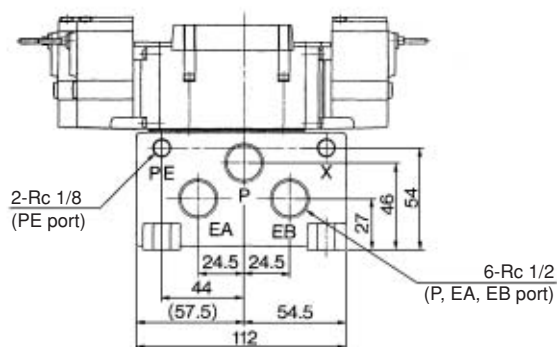
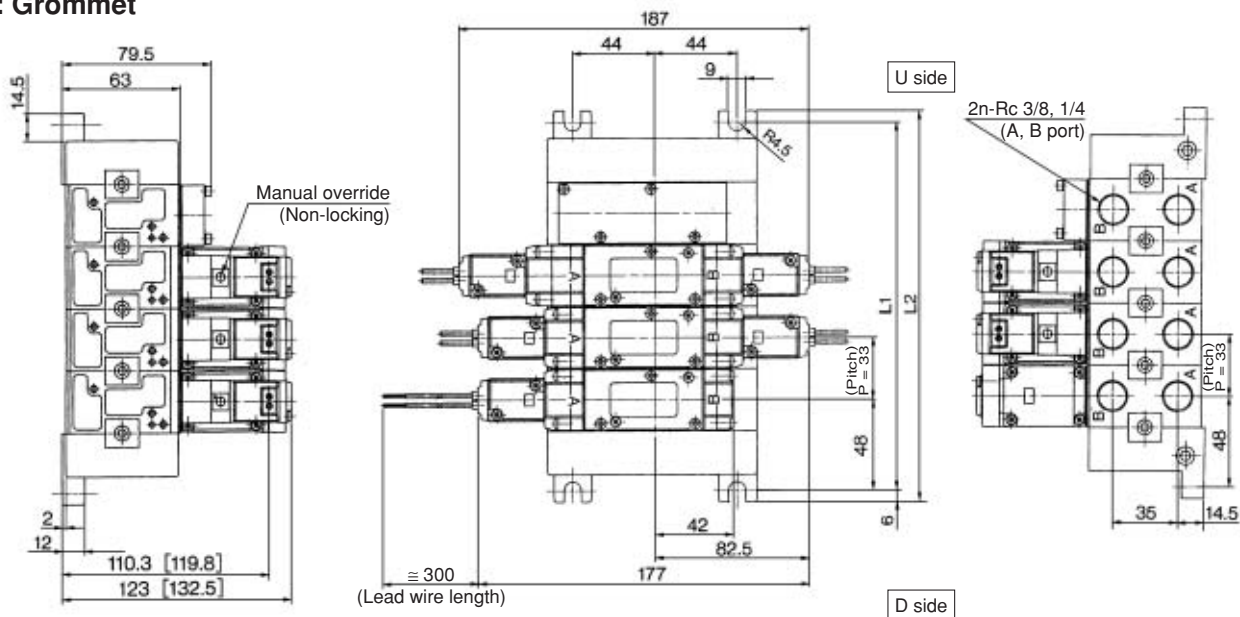


# Series VFR3000

## Manifold Plug-in type

VV5FR3-40-Station 1-Port size

G: Grommet

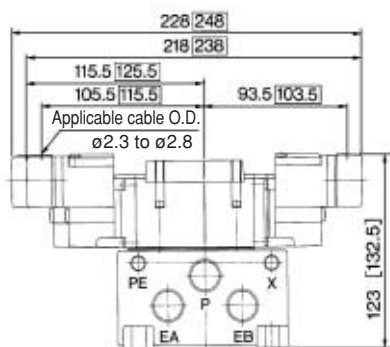


n: Station

| Station        | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                  |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | $L_1 = 33 \times n + 63$ |
| L <sub>2</sub> | 141 | 174 | 207 | 240 | 273 | 306 | 339 | 372 | 405 | $L_2 = 33 \times n + 75$ |

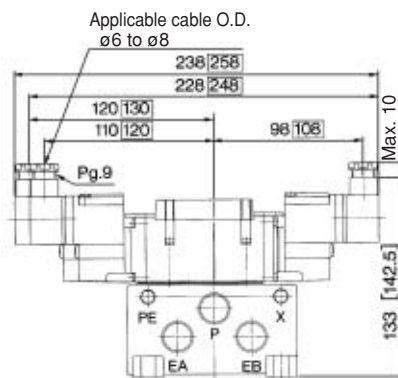
[ ]: With direct manual override

### E: Grommet terminal



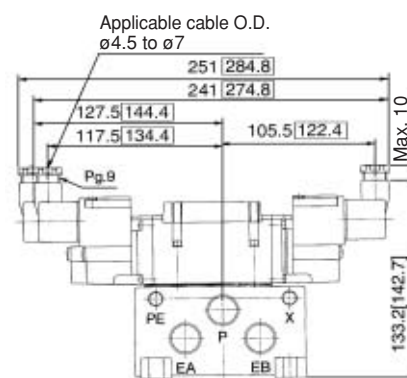
☐: With light/surge voltage suppressor

### T: Conduit terminal



☐: With light/surge voltage suppressor

### D, Y: DIN terminal



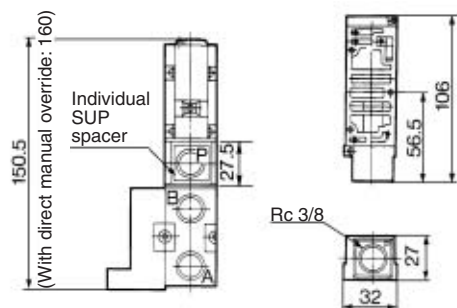
☐: With light/surge voltage suppressor

# 5 Port Pilot Operated Solenoid Valve

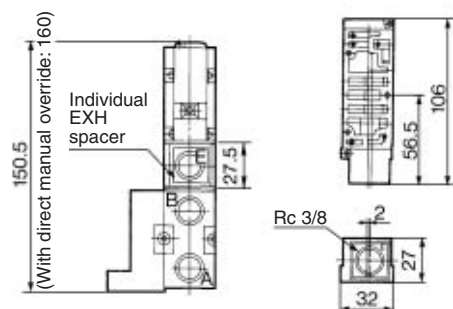
## Rubber Seal, Plug-in/Non Plug-in Series VFR3000

### Manifold/Option Parts Assembly Plug-in type/Non plug-in type

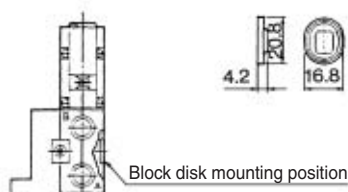
**Individual SUP spacer:**  
 VVFS3000-P-03-1 (Plug-in type)  
 VVFS3000-P-03-2 (Non plug-in type)



**Individual EXH spacer:**  
 VVFS3000-R-03-1 (Plug-in type)  
 VVFS3000-R-03-2 (Non plug-in type)

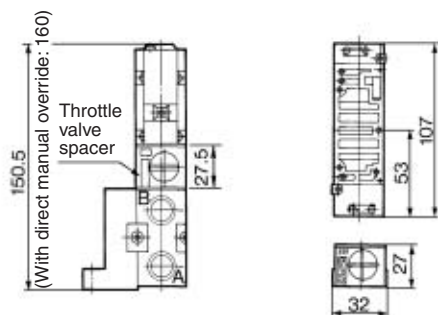


**SUP/EXH block disk: AXT636-1A**

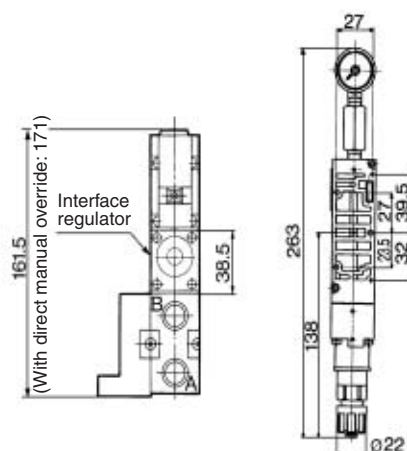


Note) Used with exclusive manifold block

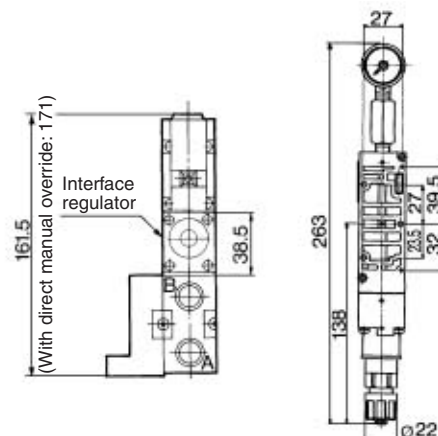
**Throttle valve spacer:**  
 VVFS3000-20A-1 (Plug-in type)  
 VVFS3000-20A-2 (Non plug-in type)



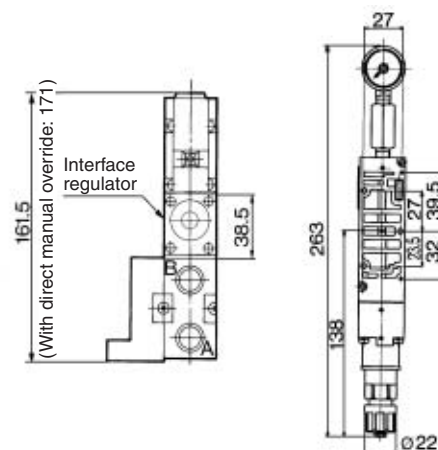
**Interface regulator/P port regulation:**  
 ARBF3050-00-P-1 (Plug-in type)  
 ARBF3050-00-P-2 (Non plug-in type)



**Interface regulator/A port regulation:**  
 ARBF3050-00-A-1 (Plug-in type)  
 ARBF3050-00-A-2 (Non plug-in type)



**Interface regulator/B port regulation:**  
 ARBF3050-00-B-1 (Plug-in type)  
 ARBF3050-00-B-2 (Non plug-in type)



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

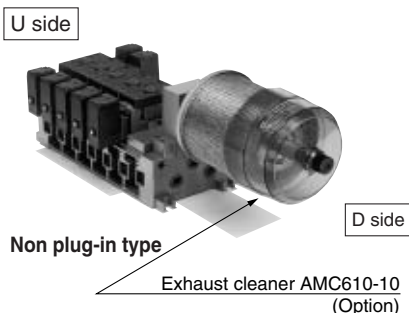
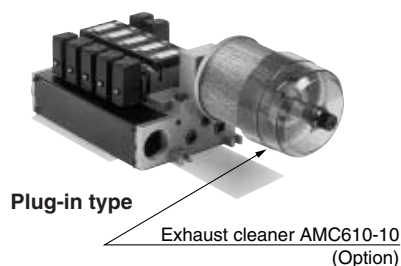
EVS

VFN

# Series VFR3000

## Manifold with Exhaust Cleaner

- Serves to protect working environment.
- Valve exhaust noise dampening: 35 dB or more.
- Collection rate of drainage and oil mist: 99.9% or more
- Piping work is reduced.



### Manifold Specifications

| Manifold                    | Plug-in type: VV5FR3-01□                                                 | Non plug-in type: VV5FR3-10                                | Non plug-in type: VV5FR3-40                                 |
|-----------------------------|--------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|
| Wiring                      | With terminal block<br>With multi-connector<br>With D-sub connector      | DIN terminal<br>Grommet terminal                           | Grommet, Grommet terminal<br>Conduit terminal, DIN terminal |
| Applicable valve model      | VFR3□0□-□F                                                               | VFR3□1□-□D<br>VFR3□1□-□E                                   | VFR3□4□-□G, VFR3□4□-□E<br>VFR3□4□-□T, VFR3□4□-□D            |
| Porting specifications      | Common SUP, Common EXH                                                   |                                                            |                                                             |
| Rc                          | A, B port<br>P port                                                      | Side: Rc 1/4, 3/8, C8, C10<br>Bottom: Rc 1/4, 3/8 (Option) | Side: Rc 1/2 EXH port: Rc 1                                 |
| Stations                    | 2 to 10 stations (With multi-connector/D-sub connector: 2 to 8 stations) |                                                            |                                                             |
| Applicable exhaust cleaners | AMC610-10 (Port size: R1) <sup>Note)</sup>                               |                                                            |                                                             |



Note) Exhaust cleaner "AMC610-10" is not included.

### How to Order

**VV5FR3-10-06-1-03-CD**

Series VFR3000 Manifold

**Base type/ Electrical entry**

|     |                                              |
|-----|----------------------------------------------|
| 01T | Plug-in type with terminal block             |
| 01C | Plug-in type with multi-connector            |
| 01F | Plug-in type with D-sub connector            |
| 10  | Non plug-in type Common electrical entry     |
| 40  | Non plug-in type Individual electrical entry |

**Connector mounting direction**

| Symbol | With connector  | Applicable base |
|--------|-----------------|-----------------|
| Nil    | None            | 01T, 10, 40     |
| D      | D side mounting | 01C, 01F        |
| U      | U side mounting | 01C, 01F        |

**Stations**

|                     |             |
|---------------------|-------------|
| 02                  | 2 stations  |
| ⋮                   | ⋮           |
| 10 <sup>Note)</sup> | 10 stations |

Note) • Base 01T/10/40: 2 to 10 stations  
• Base 01C/01F: 2 to 8 stations

**Exhaust cleaner mounting direction**

| Symbol | Exhaust cleaner mounting direction |
|--------|------------------------------------|
| CD     | D side   D side mounting           |
| CU     | U side   U side mounting           |

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

| Symbol | P, EA, EB | A, B*                     |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

\* For bottom ported: Rc 1/4, 3/8

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

### How to Order Manifold Assembly

<Example> Plug-in type with terminal block (6 stations)

VV5FR3-01T-061-03-CD ..... 1 set (Manifold base part no.)  
 \*VFR3100-5FZ ..... 3 sets (2 position single part no.)  
 \*VFR3200-5FZ ..... 2 sets (2 position double part no.)  
 \*VVFS3000-10A ..... 1 set (Blanking plate assembly part no.)  
 \*AMC610-10 ..... 1 set (Exhaust cleaner part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

#### ⚠ Caution

When using an exhaust cleaner, mount it downwards.

<Example> Non plug-in type: 6 stations

VV5FR3-10-061-03-CU ..... 1 set (Manifold base part no.)  
 \*VFR3110-5E ..... 3 sets (2 position single part no.)  
 \*VFR3210-5E ..... 2 sets (2 position double part no.)  
 \*VVFS3000-10A ..... 1 set (Blanking plate assembly part no.)  
 \*AMC610-10 ..... 1 set (Exhaust cleaner part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

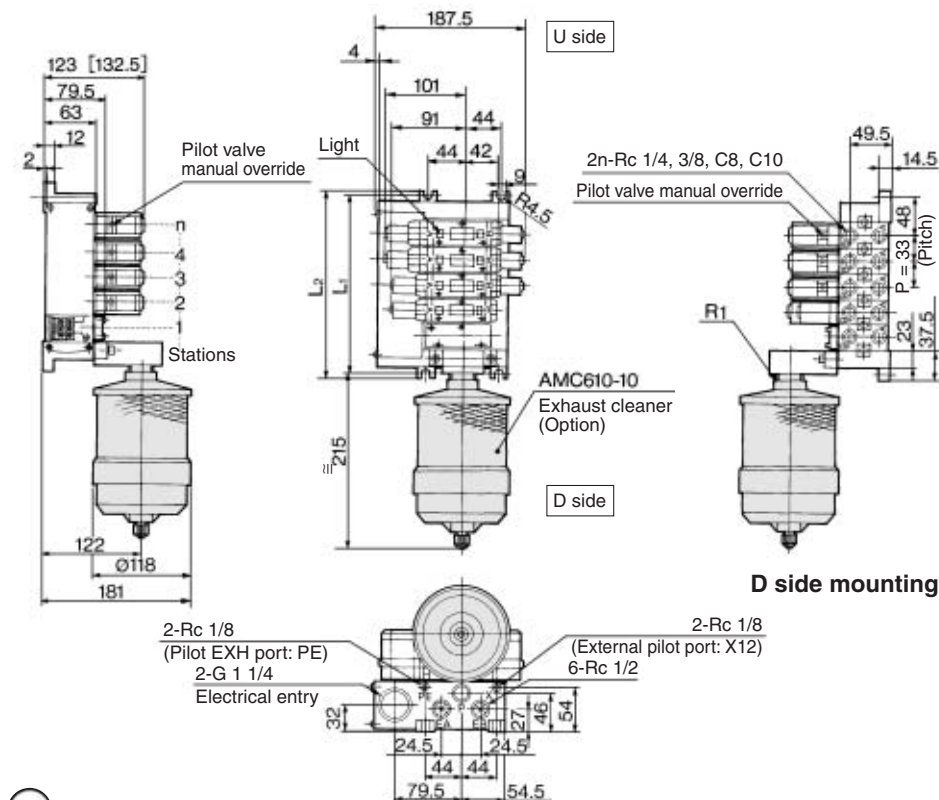


Refer to Best Pneumatics Vol. 5 for Exhaust Cleaner details.

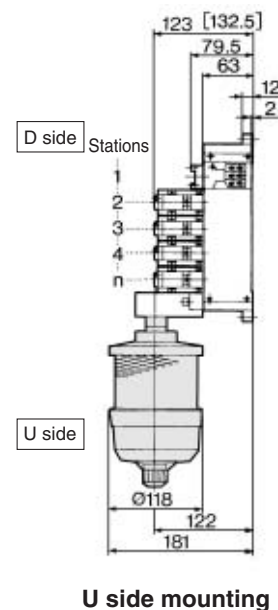
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR3000

## Manifold with Exhaust Cleaner Plug-in type/Non plug-in type

Plug-in type: VV5FR3-01T-Station 1-Port size  $\frac{CD}{CU}$



[ ]: With direct manual override



VK

VZ

VF

VFR

VP4

VZS

VFS

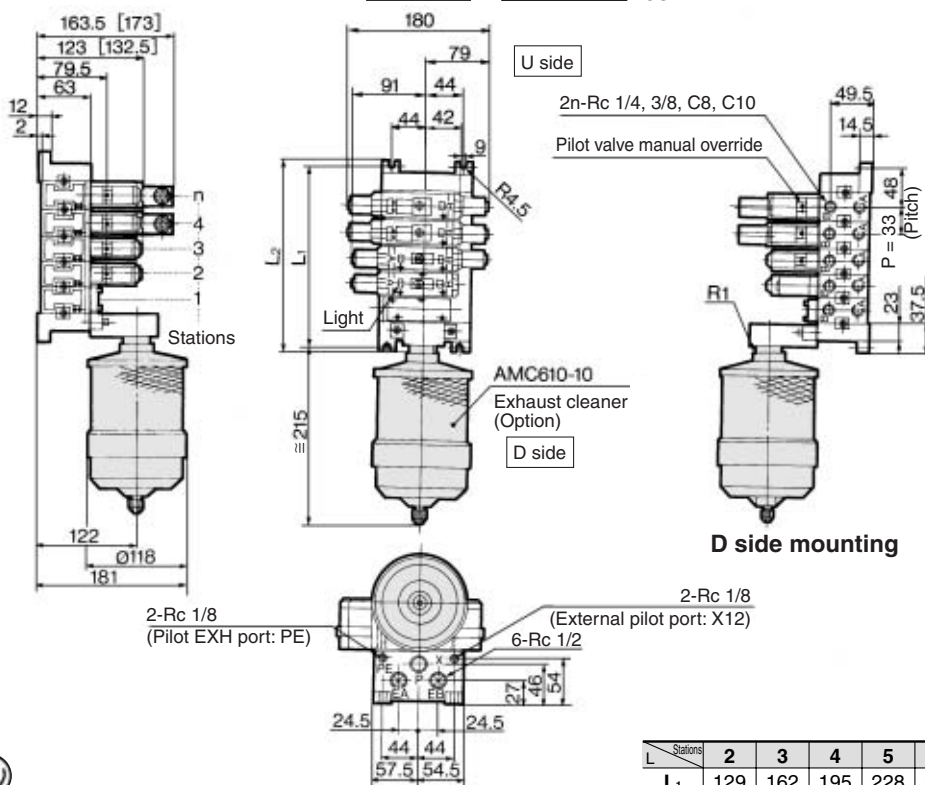
VS4

VQ7

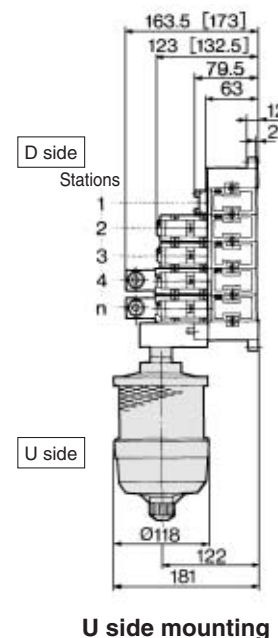
EVS

VFN

Non plug-in type: VV5FR3-10-Station 1-Port size  $\frac{CD}{CU}$



[ ]: With direct manual override



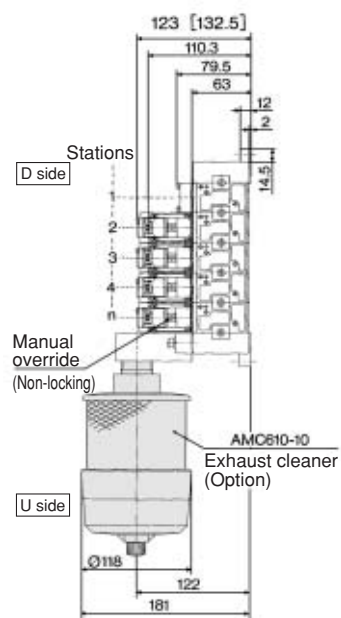
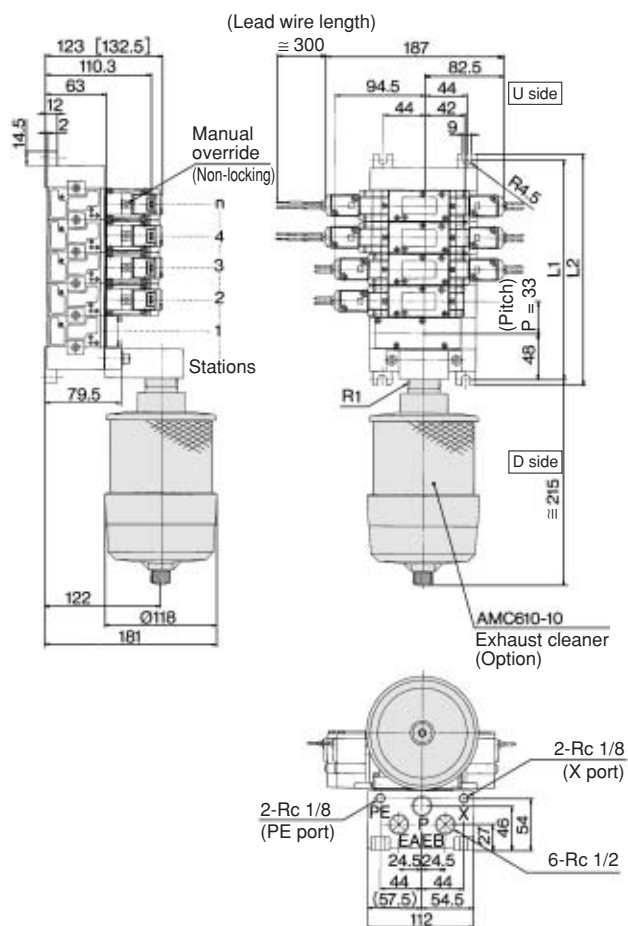
n: Station

| L              | Stations | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
|----------------|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> |          | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | L <sub>1</sub> = 33 x n + 63 |
| L <sub>2</sub> |          | 141 | 174 | 207 | 240 | 273 | 306 | 339 | 372 | 405 | L <sub>2</sub> = 33 x n + 75 |

# Series VFR3000

## Manifold with Exhaust Cleaner Non plug-in type

Non plug-in type: VV5FR3-40- Station 1- Port size -  $\frac{CD}{CU}$



U side mounting



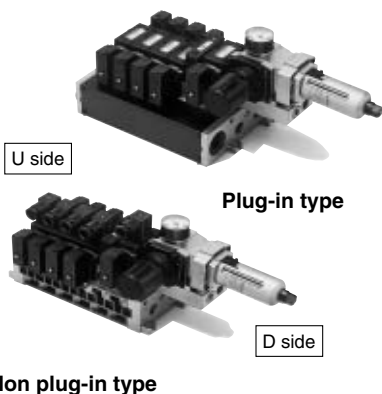
[ ]: With direct manual override

| n: Station     |     |     |     |     |     |     |     |     |     |                          |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                  |
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | $L_1 = 33 \times n + 63$ |
| L <sub>2</sub> | 141 | 174 | 207 | 240 | 273 | 306 | 339 | 372 | 405 | $L_2 = 33 \times n + 75$ |

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

## Manifold with Control Unit

- Control unit (Filter, Regulator, Pressure switch, Air release valve) are all standardized to the one unit, and can be mounted on the manifold base without any attachments.
- Piping processes are eliminated.



### Caution

Air filter with auto-drain or manual drain must be mounted with the air filter at the bottom.

### Manifold Specifications

| Manifold                     | Plug-in type: VV5FR3-01□                                            | Non plug-in type: VV5FR3-10                             | Non plug-in type: VV5FR3-40                                 |
|------------------------------|---------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------|
| Wiring                       | With terminal block<br>With multi-connector<br>With D-sub connector | DIN terminal<br>Grommet terminal                        | Grommet, Grommet terminal<br>Conduit terminal, DIN terminal |
| Applicable valve model       | VFR3□0□-□F                                                          | VFR3□1□-□D<br>VFR3□1□-□E                                | VFR3□4□-□G, VFR3□4□-□E<br>VFR3□4□-□T, VFR3□4□-□Y            |
| Porting specifications<br>Rc | Common SUP, Common EXH                                              |                                                         |                                                             |
|                              | A, B port                                                           | Side: Rc 1/4, 3/8, C8, C10 Bottom: Rc 1/4, 3/8 (Option) |                                                             |
|                              | P, EA, EB port                                                      | Side: Rc 1/2                                            |                                                             |
| Stations                     | 2 to 10 (With multi-connector/D-sub connector: 2 to 8) *            |                                                         |                                                             |



\* Including station of control unit

### Control Unit Specifications

|                                                |                                                 |
|------------------------------------------------|-------------------------------------------------|
| Air filter (With auto-drain/With manual drain) |                                                 |
| Filtration degree                              | 5 μm                                            |
| Regulator                                      |                                                 |
| Set pressure (Outlet pressure)                 | 0.05 to 0.85 MPa                                |
| Pressure switch                                |                                                 |
| Set pressure range: OFF                        | 0.1 to 0.6 MPa                                  |
| Differential                                   | 0.08 MPa                                        |
| Contact                                        | 1a                                              |
| Indicator light                                | LED (RED)                                       |
| Max. switch capacity                           | 2 VA AC, 2 W DC                                 |
| Max. operating current                         | 24 VAC, DC or less: 50 mA<br>100 VAC, DC: 20 mA |
| Inside voltage drop                            | 4 V or less                                     |
| Air release valve (Single only)                |                                                 |
| Operating pressure range                       | 0.2 to 0.9 MPa                                  |

### Control Unit/Option

|                                         |                                                         |                 |
|-----------------------------------------|---------------------------------------------------------|-----------------|
| Air release valve spacer <sup>(1)</sup> | <Plug-in type><br>VVFS3000-24A-1R (D side mounting)     |                 |
|                                         | <Non plug-in type><br>VVFS3000-24A-2R (D side mounting) |                 |
| Pressure switch <sup>(2)</sup>          | IS1000P-2-1                                             |                 |
| Blanking plate                          | For filter regulator                                    | MP2-3           |
|                                         | For pressure switch                                     | MP3-2           |
|                                         | For air release valve                                   | VVFS3000-24A-10 |
| Filter element                          | INA-13-854-12-5B                                        |                 |



Note 1) Combining valve "VFR31□□" (single) and release valve spacer makes it possible to use this as an air release valve.

Note 2) Pressure switch cannot be mounted later on non plug-in type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

# Series VFR3000

## How to Order

**VV5FR3** — **10** — **08** — **1** — **02** — **AP** —

**Series VFR3000 Manifold**

**Base type/Electrical entry**

|     |                                     |
|-----|-------------------------------------|
| 01T | Plug-in with terminal block         |
| 01C | Plug-in with multi-connector        |
| 01F | Plug-in type with D-sub connector   |
| 10  | Non plug-in type (Common entry)     |
| 40  | Non plug-in type (Individual entry) |

**Connector mounting direction**

| Symbol | With connector  | Applicable base |
|--------|-----------------|-----------------|
| Nil    | None            | 01T, 10, 40     |
| D      | D side mounting | 01C, 01F        |
| U      | U side mounting | 01C, 01F        |

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| :  | :           |
| 10 | 10 stations |

Note) • Base 01T/10/40: 2 to 10 stations  
• Base 01C/01F: 2 to 8 stations  
• Including stations of control unit.

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      | Common  | Common | Bottom *                      |

\* Option

**Port size**

| Symbol | P, EA, EB | A, B *                    |
|--------|-----------|---------------------------|
| 02     | 1/2       | 1/4                       |
| 03     |           | 3/8                       |
| C8     |           | One-touch fitting for ø8  |
| C10    |           | One-touch fitting for ø10 |
| M      |           | Mixed                     |

\* For bottom ported: only 1/4, 3/8

**Air release valve coil rating**

|     |                   |
|-----|-------------------|
| Nil | None              |
| 1   | 100 VAC, 50/60 Hz |
| 5   | 24 VDC            |
| 9   | Other             |

**Control unit type**

| Control equipment                      | Symbol | Nil | MP         | AP | M | A | G | F | C | E         |  |
|----------------------------------------|--------|-----|------------|----|---|---|---|---|---|-----------|--|
| Air release valve                      |        |     | ●          | ●  | ● | ● |   |   | ● | ●         |  |
| Air filter regulator with manual drain |        |     | ●          |    | ● |   | ● |   |   |           |  |
| Air filter regulator with auto-drain   |        |     |            | ●  |   | ● |   | ● |   |           |  |
| Pressure switch                        |        |     | ●          | ●  |   |   |   |   |   |           |  |
| Blanking plate (Air release valve)     |        |     |            |    |   |   | ● | ● |   |           |  |
| Blanking plate (Filter regulator)      |        |     |            |    |   |   |   |   | ● |           |  |
| Blanking plate (Pressure switch)       |        |     |            |    | ● | ● | ● | ● | ● |           |  |
| Required stations                      |        |     | 2 stations |    |   |   |   |   |   | 1 station |  |

Note) Control unit is D side mounting only.

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

## How to Order Manifold Assembly

### <Example> Plug-in type with terminal block

VV5FR3-01T-081-03-AP5 ..... 1 set (Manifold base part no.)  
 \*VFR3100-5FZ ..... 4 sets (2 position single part no.)  
 \*VFR3200-5FZ ..... 2 sets (2 position double part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

The 1st and 2nd station are used for control unit mounting.  
 When ordering, specify the part nos. in order from the 3rd. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

### <Example> Non plug-in type

VV5FR3-10-061-03-A5 ..... 1 set (Manifold base part no.)  
 \*VFR3110-5D ..... 4 sets (2 position single part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

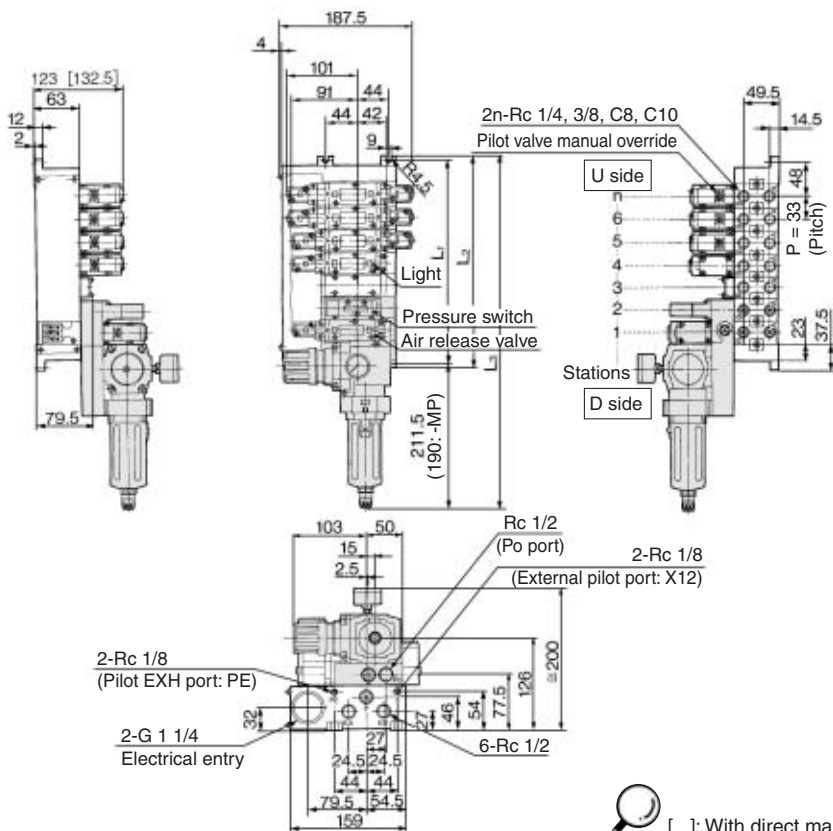
The 1st and 2nd station are used for control unit mounting.  
 When ordering, specify the part nos. in order from the 3rd. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

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

## Manifold with Control Unit Plug-in type/Non plug-in type

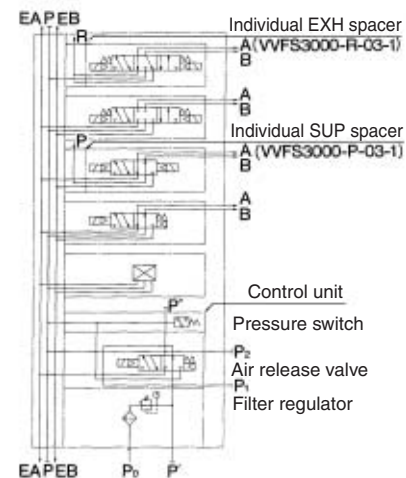
Plug-in type:

VV5FR3-01T- Station 1- Port size -AP Voltage of air release valve



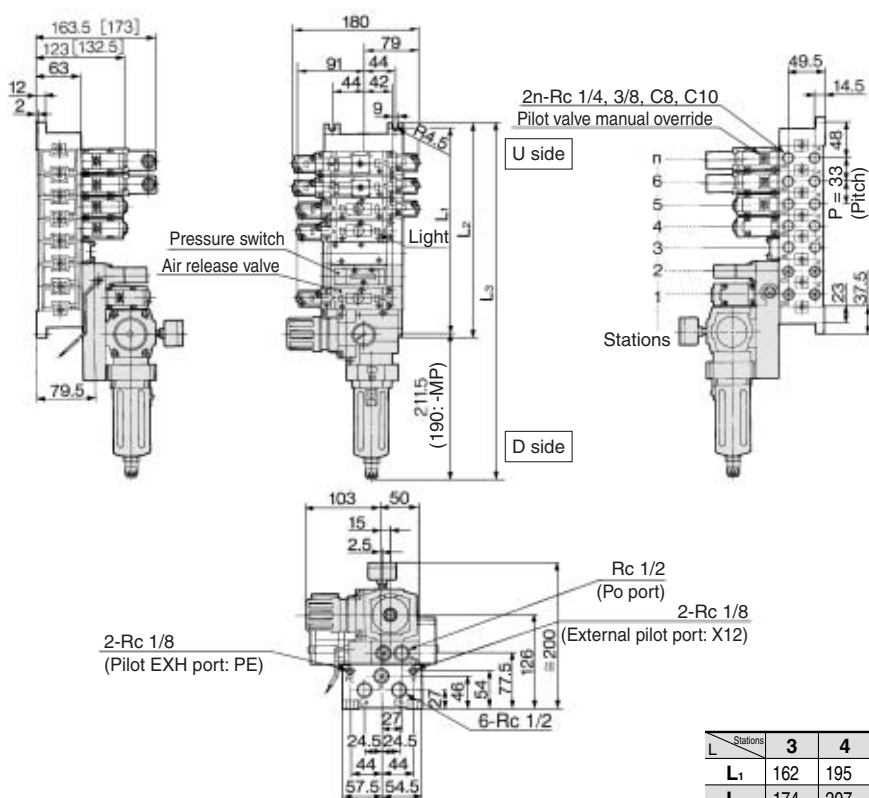
[ ] : With direct manual override

Example for manifold

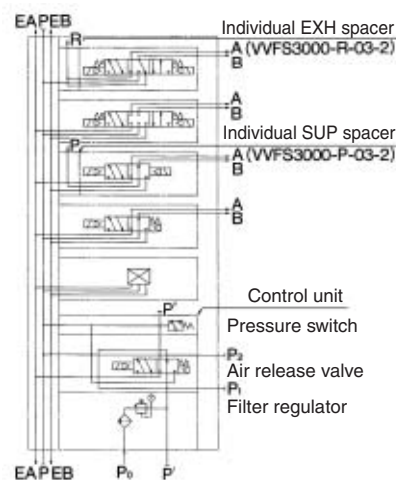


Non plug-in type:

VV5FR3-10- Station 1- Port size -AP Voltage of air release valve



Example for manifold



n: Station

| Stations            | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                         |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| L <sub>1</sub>      | 162   | 195   | 228   | 261   | 294   | 327   | 360   | 393   | L <sub>1</sub> = 33 x n + 63    |
| L <sub>2</sub>      | 174   | 207   | 240   | 273   | 306   | 339   | 372   | 405   | L <sub>2</sub> = 33 x n + 75    |
| L <sub>3</sub> (MP) | 363   | 396   | 429   | 462   | 495   | 528   | 561   | 594   | L <sub>3</sub> = 33 x n + 264   |
| L <sub>3</sub> (AP) | 384.5 | 417.5 | 450.5 | 483.5 | 516.5 | 549.5 | 582.5 | 615.5 | L <sub>3</sub> = 33 x n + 285.5 |

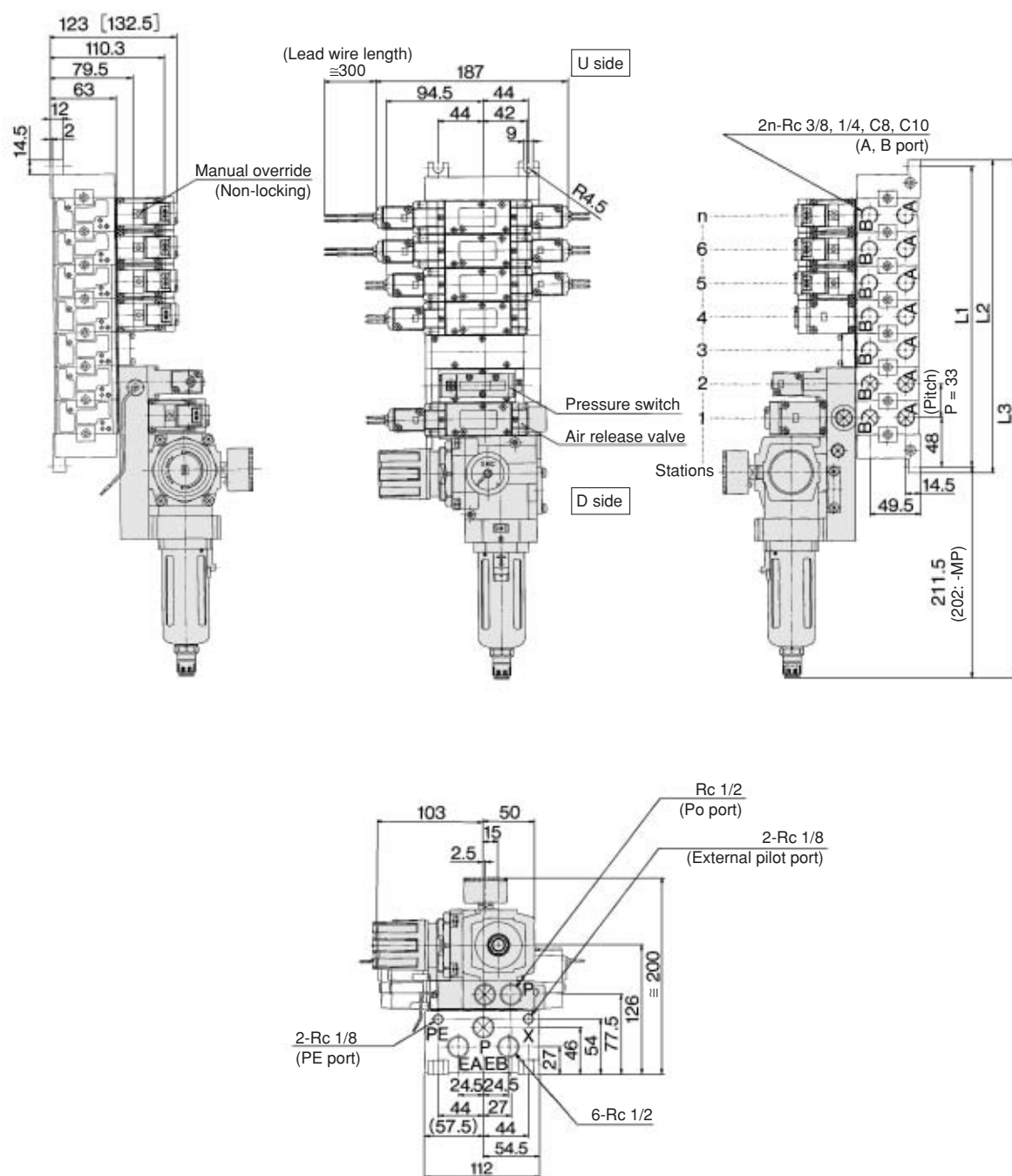


[ ] : With direct manual override

# Series VFR3000

## Manifold with Control Unit Non plug-in type

Non plug-in type: VV5FR3-40- Station 1- Port size -AP Voltage of air release valve



[ ]: With direct manual override



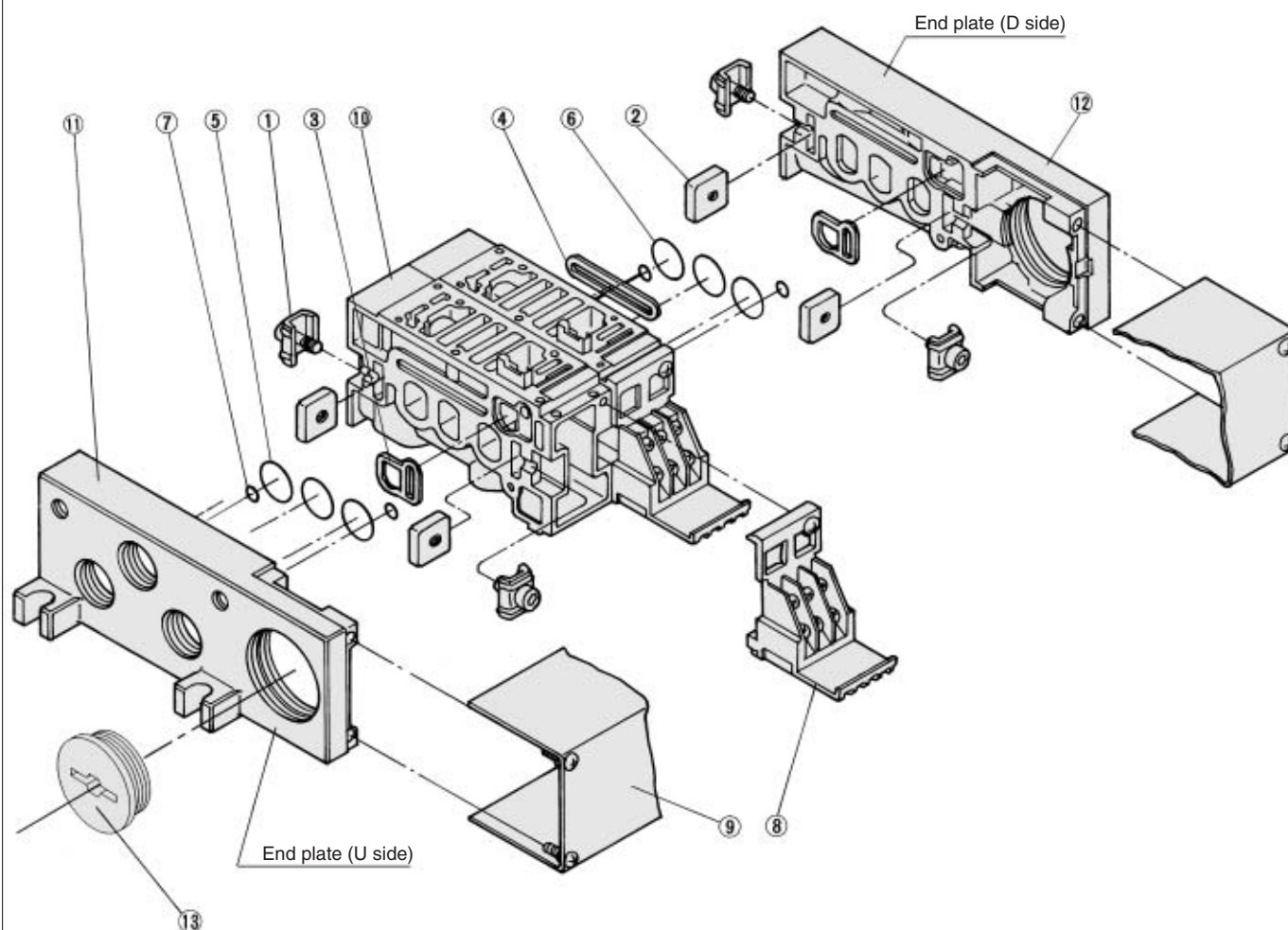
( ): MP

| n: Station          |       |       |       |       |       |       |       |       |                                 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| Stations            | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                         |
| L <sub>1</sub>      | 162   | 195   | 228   | 261   | 294   | 327   | 360   | 393   | L <sub>1</sub> = 33 x n + 63    |
| L <sub>2</sub>      | 174   | 207   | 240   | 273   | 306   | 339   | 372   | 405   | L <sub>2</sub> = 33 x n + 75    |
| L <sub>3</sub> (MP) | 363   | 396   | 429   | 462   | 495   | 528   | 561   | 594   | L <sub>3</sub> = 33 x n + 264   |
| L <sub>3</sub> (AP) | 384.5 | 417.5 | 450.5 | 483.5 | 516.5 | 549.5 | 582.5 | 615.5 | L <sub>3</sub> = 33 x n + 285.5 |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR3000

### Manifold Base Construction Plug-in type/Non plug-in type



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

### Replacement Parts

| No. | Description             | Material | Part no.                                                                                      |
|-----|-------------------------|----------|-----------------------------------------------------------------------------------------------|
| ①   | Connection fitting A    | Steel    | VVFS3000-5-1A                                                                                 |
| ②   | Connection fitting B    | Steel    | VVFS3000-5-2                                                                                  |
| ③   | Gasket                  | NBR      | VVFS3000-7-1                                                                                  |
| ④   | Gasket                  | NBR      | VVFS3000-8                                                                                    |
| ⑤   | O-ring                  | NBR      | 19.8 x 16.6 x 1.6 (for end plate)                                                             |
| ⑥   | O-ring                  | NBR      | 20 x 16 x 2 (for manifold block)                                                              |
| ⑦   | O-ring                  | NBR      | 6.2 x 3 x 1.6                                                                                 |
| ⑧   | Terminal assembly       | —        | VVFS3000-6A                                                                                   |
| ⑨   | Junction cover assembly | —        | For 01T VVFS3000-4A- <a href="#">Stations</a><br>For 01SU AZ738-22A- <a href="#">Stations</a> |
| ⑬   | Rubber plug             | NBR      | AXT336-9                                                                                      |

### Replacement Parts: Sub Assembly



Note) Manifold Base/Construction: Plug-in type with terminal block.

| No. | Description                                  | Assembly part no.                       | Component parts                                                                                      | Applicable manifold base |
|-----|----------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------|
| ⑩   | Manifold block assembly <small>Note)</small> | VVFS3000-1A-1-<br>02<br>03<br>C8<br>C10 | Manifold block ⑩, Terminal ⑧, Connection bracket ①, ②, Gasket ③, ④, O-ring ⑥, ⑦, Receptacle assembly | Plug-in type             |
|     |                                              | VVFS3000-1A-2-<br>02<br>03<br>C8<br>C10 | Manifold block ⑨, Connection bracket ①, ②, Gasket ③, ④, O-ring ⑥, ⑦                                  | Non plug-in type         |
| ⑪   | End plate (U side) assembly                  | VVFS3000-2A-1                           | End plate (U) ⑪, Connection bracket ①, ②, Gasket ④, O-ring ⑤, ⑦                                      | Plug-in type             |
|     |                                              | VVFS3000-2A-2                           | End plate (U) ⑪, Connection bracket ①, ②, Gasket ④, O-ring ⑤, ⑦                                      | Non plug-in type         |
| ⑫   | End plate (D side) assembly                  | VVFS3000-3A-1                           | End plate (D) ⑫, Connection bracket ①, ②, Gasket ③                                                   | Plug-in type             |
|     |                                              | VVFS3000-3A-2                           | End plate (D) ⑫, Connection bracket ①, ②, Gasket ③                                                   | Non plug-in type         |



Note) For side ported



# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in

### Series VFR4000



Plug-in type



Non plug-in type

#### JIS Symbol

| 2 position | 3 position      |
|------------|-----------------|
| Single     | Closed center   |
|            |                 |
| Double     | Exhaust center  |
|            |                 |
|            | Pressure center |
|            |                 |

#### 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 <sup>(1)</sup>                                     |  |
|                            | Manual override                       |                              | Non-locking push type                                       |  |
|                            | Mounting orientation                  |                              | Unrestricted                                                |  |
|                            | Shock/Vibration resistance            |                              | 300/50 m/s <sup>2</sup> <sup>(2)</sup>                      |  |
| 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) <sup>(3)</sup>    | 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) <sup>(3)</sup> |                              | 1.8 W                                                       |  |
|                            | Electrical entry                      | Plug-in type                 | Conduit terminal                                            |  |
|                            |                                       | Non plug-in type             | Grommet, Grommet terminal<br>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<br>12, 100 VDC                                           |
| Porting specifications |             | Bottom ported                                                                              |
| Option                 |             | With light/surge voltage suppressor                                                        |

Note) Operating pressure: 2 position 0 to 0.9 MPa  
3 position 0.15 to 0.9 MPaPilot pressure: 2 position single 0.2 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 <sup>(1)</sup> | Flow characteristics <sup>(2)</sup> |             |           |                                 |             |           | Max. <sup>(3)</sup><br>operating<br>cycle (Hz) | Response <sup>(4)</sup><br>time (ms) | Weight <sup>(5)</sup><br>(kg) |
|-------------------|-----------------|---------|-------------|--------------------------|-------------------------------------|-------------|-----------|---------------------------------|-------------|-----------|------------------------------------------------|--------------------------------------|-------------------------------|
|                   |                 | Plug-in | Non plug-in |                          | 1 → 4/2 (P → A/B)                   |             |           | 4/2 → 5/3 (A/B → EA/EB)         |             |           |                                                |                                      |                               |
|                   |                 |         |             |                          | C<br>[dm <sup>3</sup> /(s·bar)]     | b           | Cv        | C<br>[dm <sup>3</sup> /(s·bar)] | b           | Cv        |                                                |                                      |                               |
| 2 position        | Single          | VFR410□ | VFR411□     | 3/8                      | 13                                  | 0.30        | 3.2       | 14                              | 0.28        | 3.4       | 5                                              | 50 or less                           | 1.10<br>(1.04)<br><1.04>      |
|                   |                 |         | VFR414□     | 1/2                      | 15                                  | 0.30        | 3.8       | 14                              | 0.30        | 3.8       |                                                |                                      |                               |
|                   | Double          | VFR420□ | VFR421□     | 3/8                      | 14                                  | 0.31        | 3.4       | 14                              | 0.26        | 3.4       | 5                                              | 50 or less                           | 1.20<br>(1.16)<br><1.16>      |
|                   |                 |         | VFR424□     | 1/2                      | 15                                  | 0.30        | 4.0       | 14                              | 0.30        | 3.7       |                                                |                                      |                               |
| 3 position        | Closed center   | VFR430□ | VFR431□     | 3/8                      | 13                                  | 0.32        | 3.2       | 13                              | 0.25        | 3.0       | 3                                              | 50 or less                           | 1.20<br>(1.16)<br><1.16>      |
|                   |                 |         | VFR434□     | 1/2                      | 14                                  | 0.28        | 3.5       | 13                              | 0.29        | 3.4       |                                                |                                      |                               |
|                   | Exhaust center  | VFR440□ | VFR441□     | 3/8                      | 13                                  | 0.31        | 3.2       | 14 [13]                         | 0.32 [0.30] | 3.6 [3.2] | 3                                              | 70 or less                           | 1.20<br>(1.16)<br><1.16>      |
|                   |                 |         | VFR444□     | 1/2                      | 14                                  | 0.30        | 3.7       | 14 [13]                         | 0.32 [0.30] | 3.6 [3.2] |                                                |                                      |                               |
|                   | Pressure center | VFR450□ | VFR451□     | 3/8                      | 13 [5.0]                            | 0.27 [0.42] | 3.2 [1.3] | 13                              | 0.28        | 3.1       | 3                                              | 70 or less                           | 1.20<br>(1.16)<br><1.16>      |
|                   |                 |         | VFR454□     | 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-<sup>03</sup>/<sub>04</sub>, ( ): VFR4□10- DZ□-<sup>03</sup>/<sub>04</sub>, < : VFR4□40-□G-<sup>03</sup>/<sub>04</sub>

# 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  0  5 F    03

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

**Non plug-in** VFR4  4  0  1 G    03  **Individual electrical entry**

**Symbol**

2 position single

1

2 position double

2

3 position closed center

3

3 position exhaust center

4

3 position pressure center

5

**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□<br>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□<br>VFR4□1□     |
| 1      | VFR4□4□                |



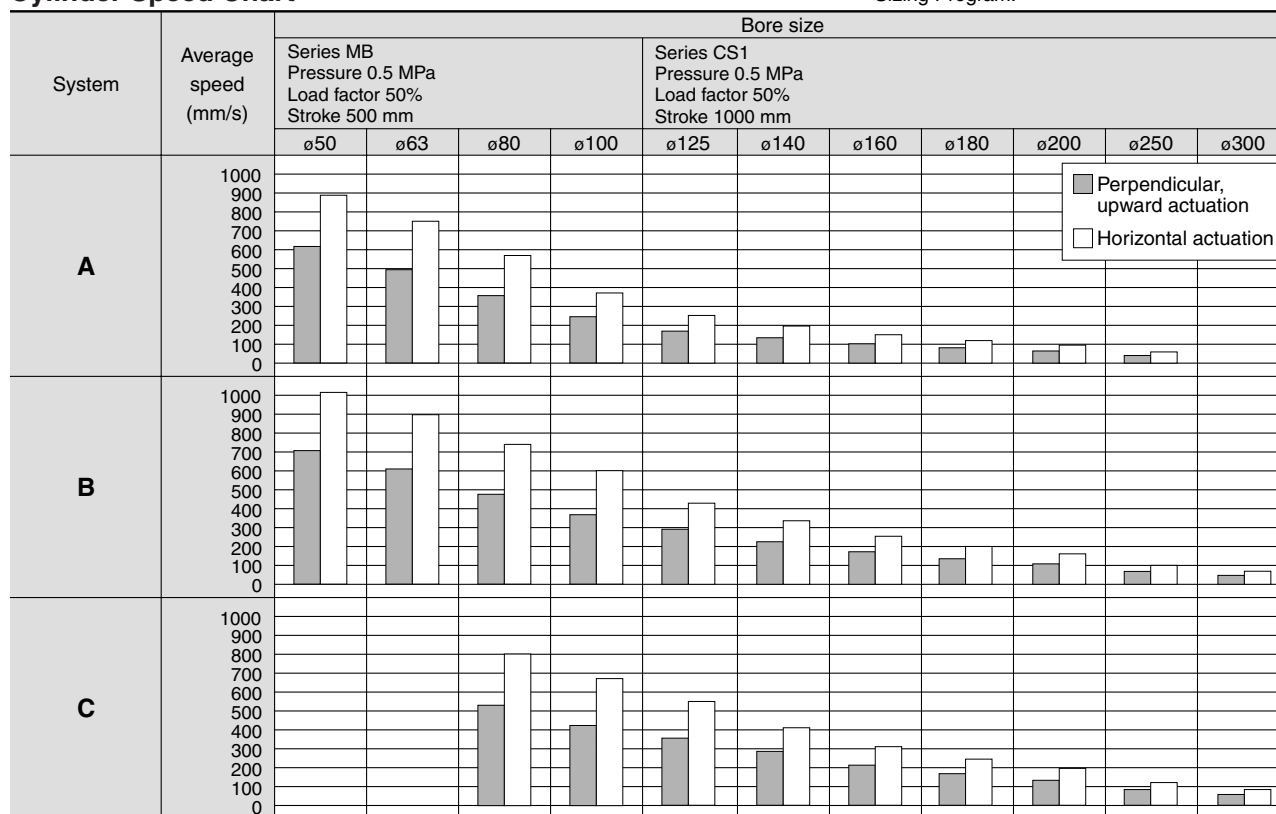
\* VFR3□0□, VFR3□1□: Pilot valve assembly is all plug-in (F).

# 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

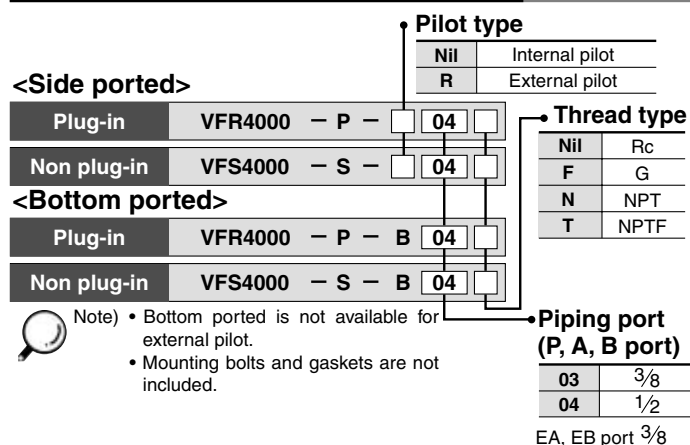


- \* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- \* The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- \* Load factor: ((Load 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<br>Rc 3/8 | AS4000-03<br>(S = 21 mm <sup>2</sup> ) | AN300-03<br>(S = 60 mm <sup>2</sup> ) | 10A x 1 m                      |
| B      | Series VFR4000<br>Rc 3/8 | AS420-03<br>(S = 73 mm <sup>2</sup> )  | AN300-03<br>(S = 60 mm <sup>2</sup> ) | 10A x 1 m                      |
| C      | Series VFR4000<br>Rc 1/2 | AS420-04<br>(S = 97 mm <sup>2</sup> )  | AN400-04<br>(S = 90 mm <sup>2</sup> ) | 15A x 1 m                      |

### How to Order Sub-plate Assembly



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

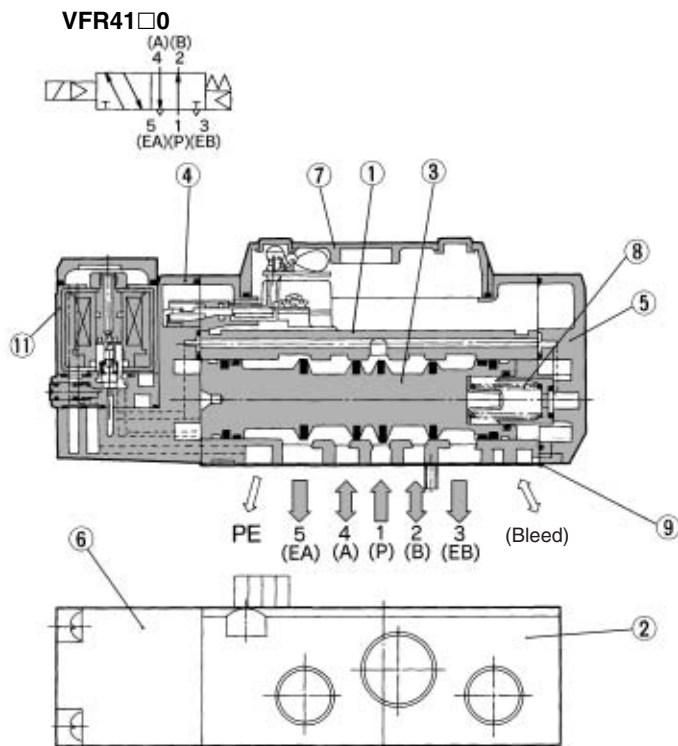
EVS

VFN

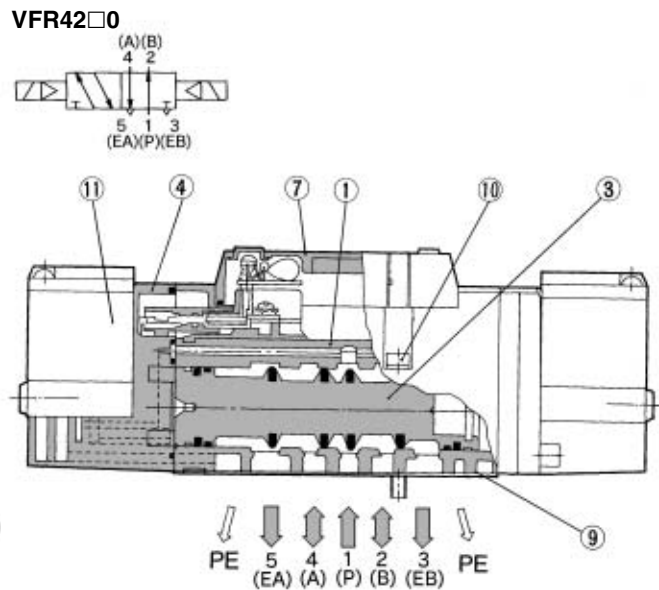
# Series VFR4000

## Construction

### 2 position single

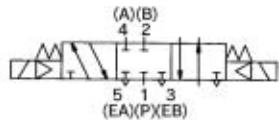


### 2 position double

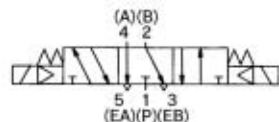


### 3 position closed center/exhaust center/pressure center

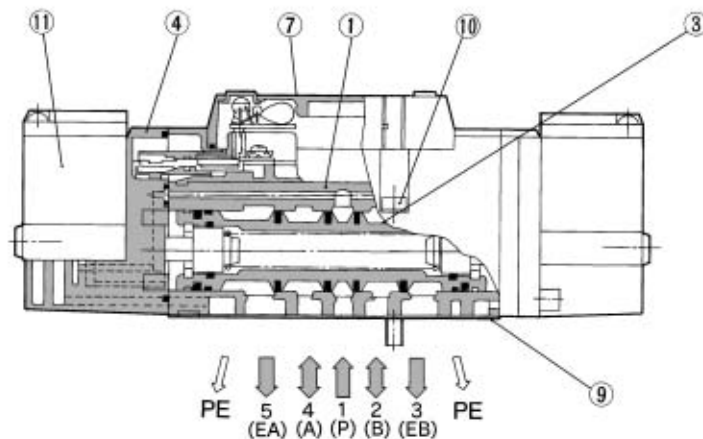
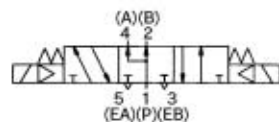
#### Closed center: VFR43□0



#### 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 |       |

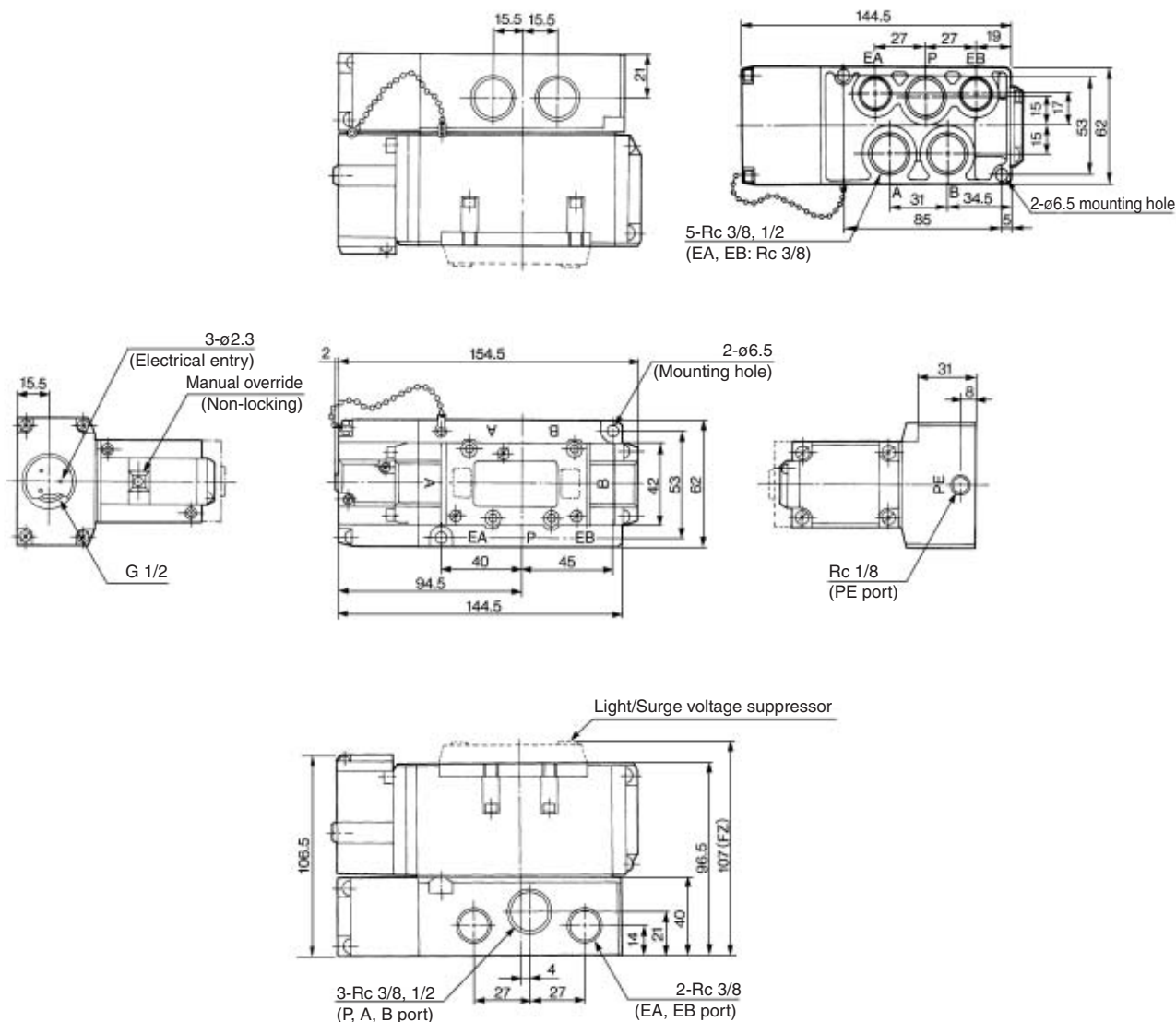
## Replacement Parts

| 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: VFR410<sup>0</sup><sub>1</sub>-□F

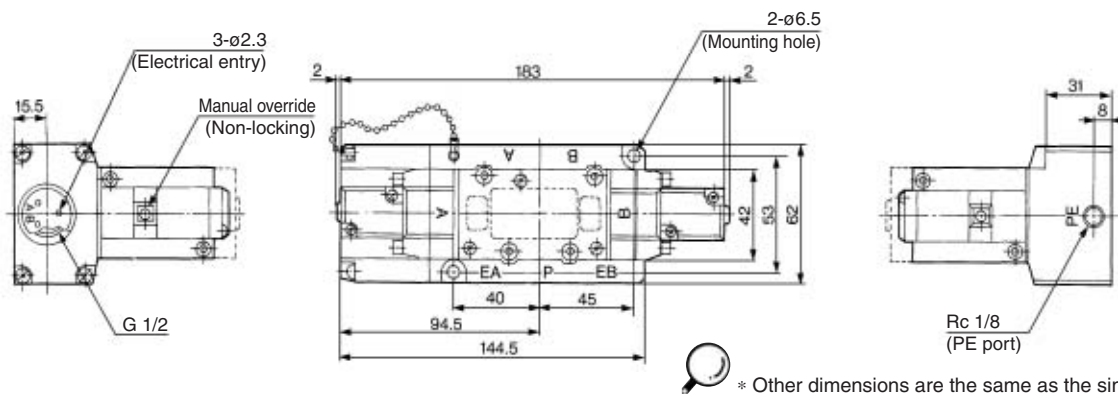


2 position double: VFR420<sup>0</sup><sub>1</sub>-□F

3 position closed center: VFR430<sup>0</sup><sub>1</sub>-□F

3 position exhaust center: VFR440<sup>0</sup><sub>1</sub>-□F

3 position pressure center: VFR450<sup>0</sup><sub>1</sub>-□F



\* Other dimensions are the same as the single type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

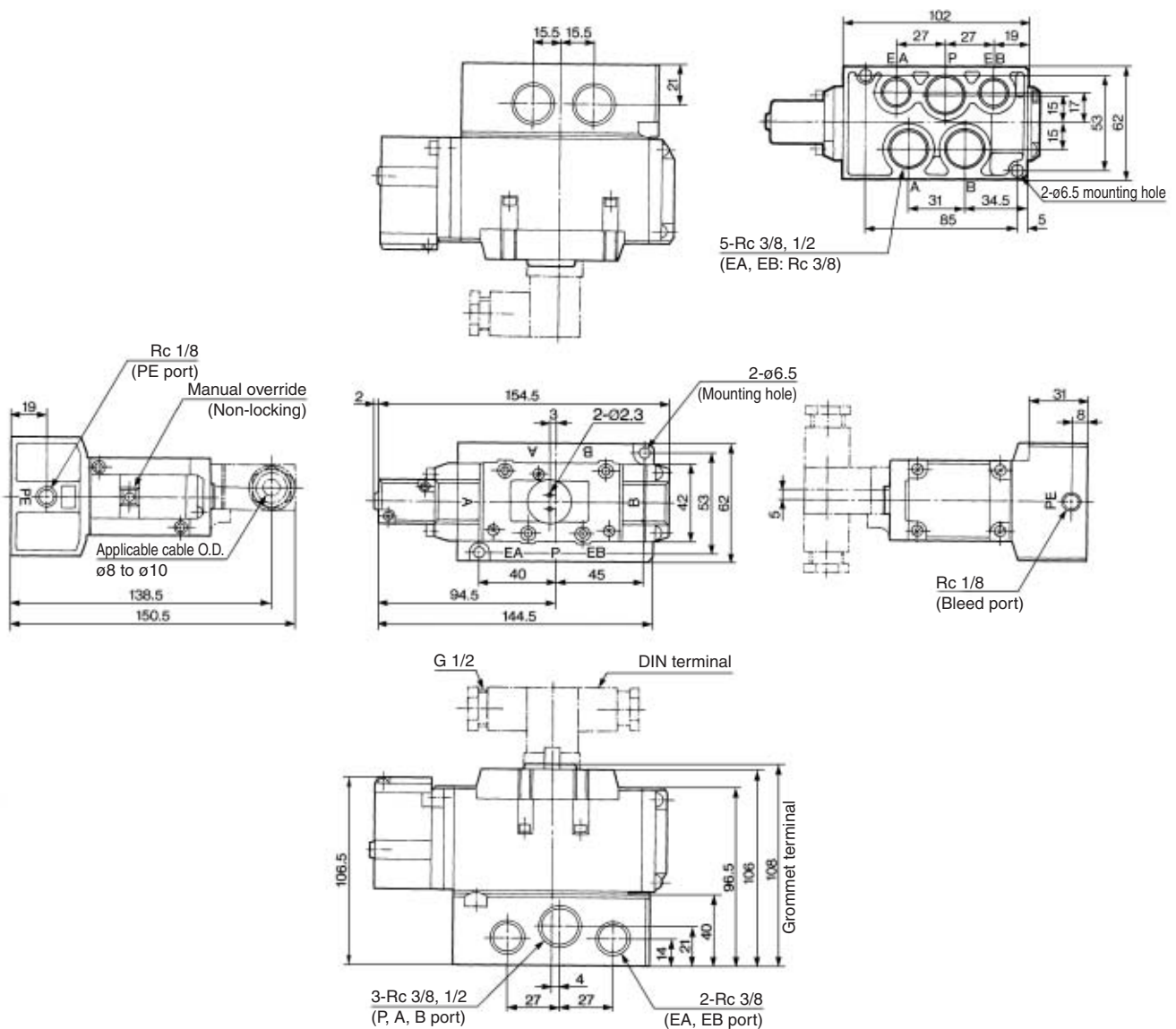
EVS

VFN

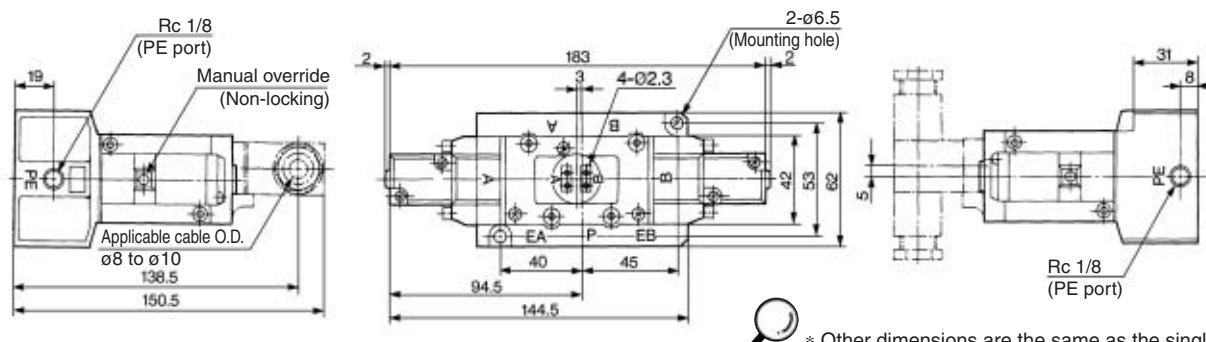
# Series VFR4000

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

2 position single: VFR411<sup>0</sup>-□E, VFR411<sup>0</sup>-□D



2 position double: VFR421<sup>0</sup>-□E, VFR421<sup>0</sup>-□D    3 position closed center: VFR431<sup>0</sup>-□E, VFR431<sup>0</sup>-□D  
 3 position exhaust center: VFR441<sup>0</sup>-□E, VFR441<sup>0</sup>-□D  
 3 position pressure center: VFR451<sup>0</sup>-□E, VFR451<sup>0</sup>-□D



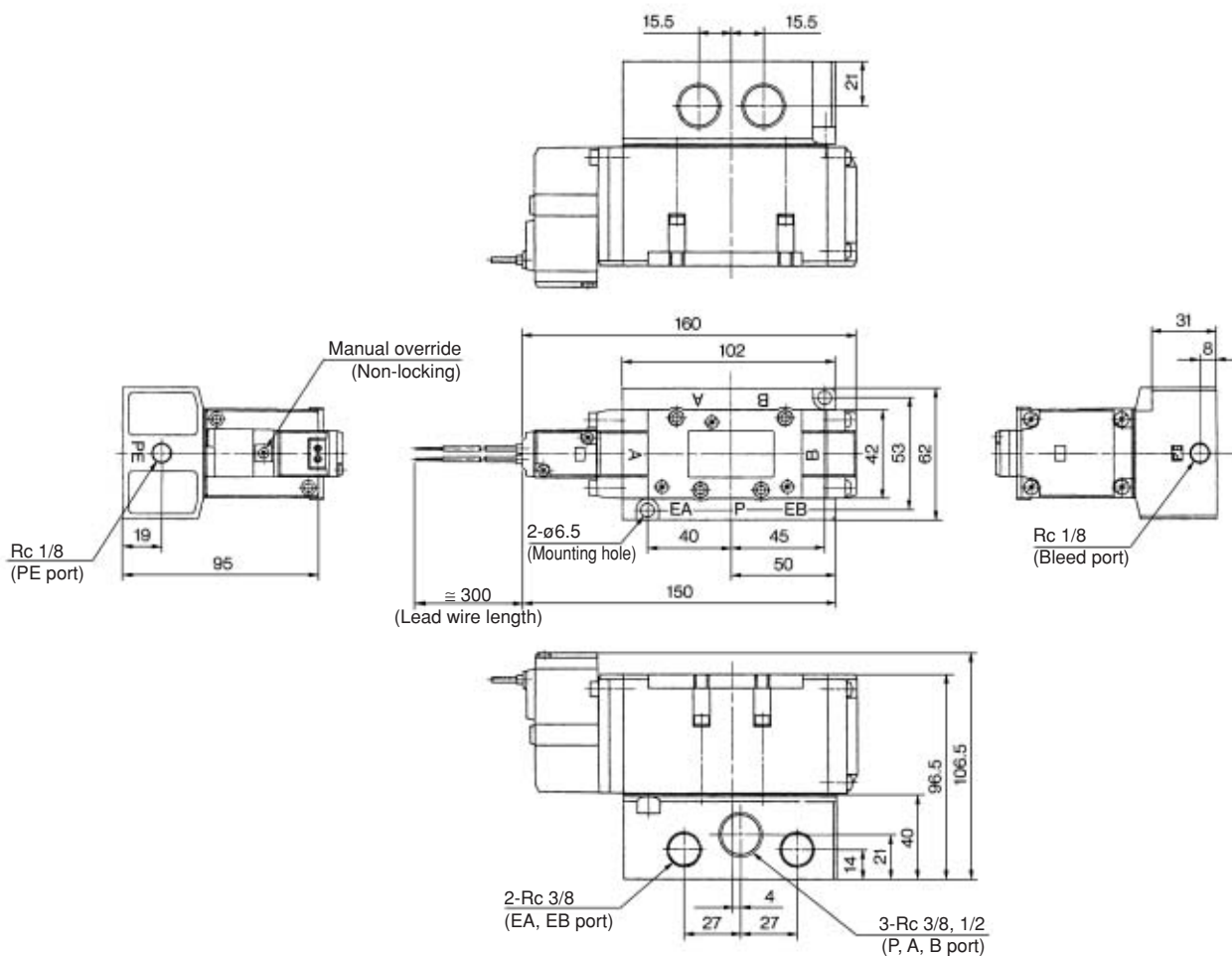
\* Other dimensions are the same as the single type.

# 5 Port Pilot Operated Solenoid Valve

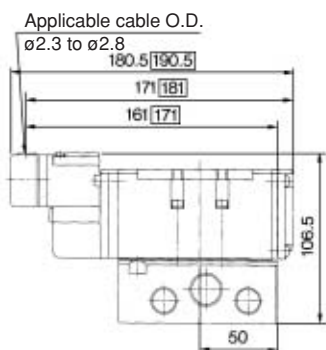
## Rubber Seal, Plug-in/Non Plug-in Series VFR4000

### Non Plug-in 2 position single

2 position single: VFR414<sup>0</sup><sub>1</sub>-□G

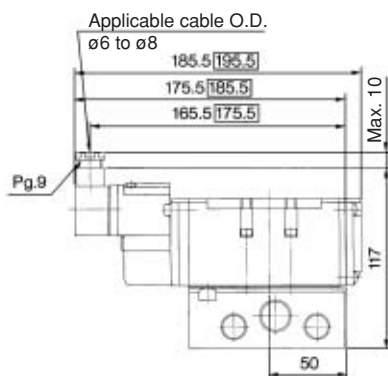


#### E: Grommet terminal



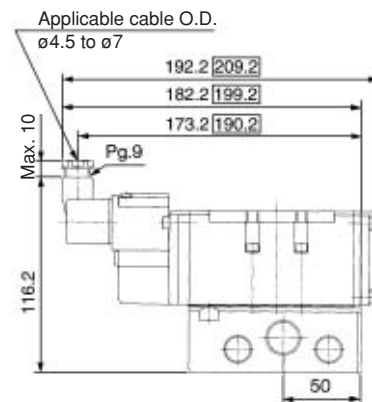
□: With light/surge voltage suppressor

#### T: Conduit terminal



□: With light/surge voltage suppressor

#### D, Y: DIN terminal



□: With light/surge voltage suppressor

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

# Series VFR4000

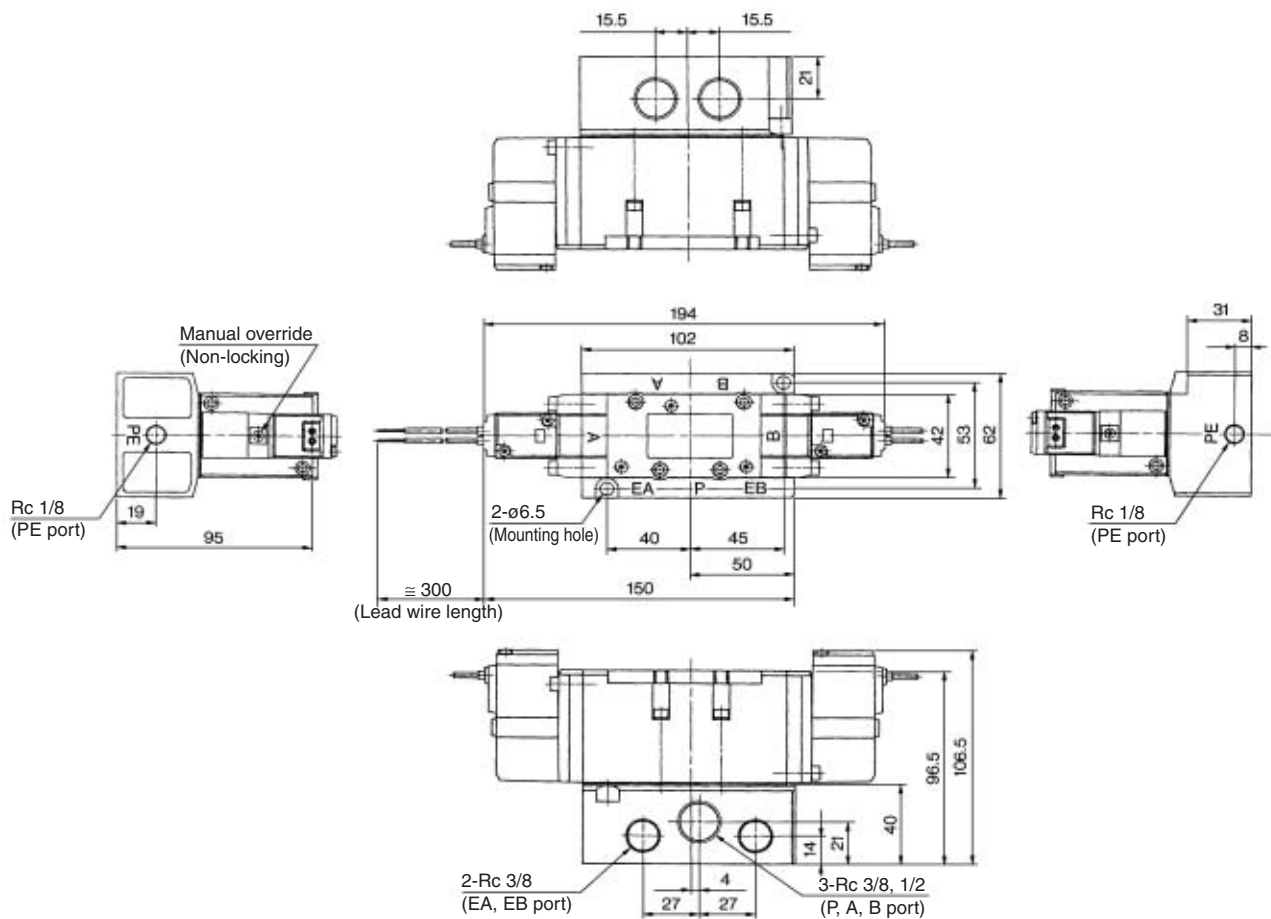
## Non Plug-in 2 position double, 3 position closed center/exhaust center/pressure center

2 position double: VFR424<sup>0</sup><sub>1</sub>-□G

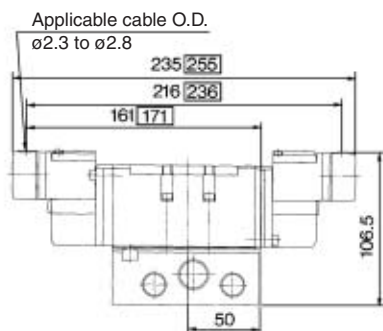
3 position closed center: VFR434<sup>0</sup><sub>1</sub>-□G

3 position exhaust center: VFR444<sup>0</sup><sub>1</sub>-□G

3 position pressure center: VFR454<sup>0</sup><sub>1</sub>-□G

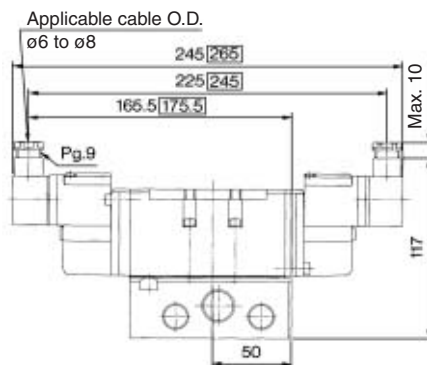


### E: Grommet terminal



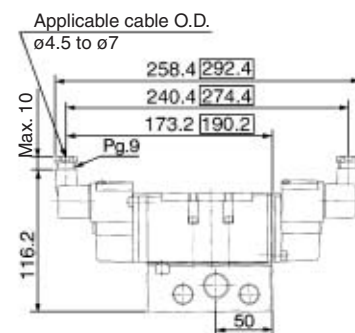
□: With light/surge voltage suppressor

### T: Conduit terminal



□: With light/surge voltage suppressor

### D: DIN terminal



□: With light/surge voltage suppressor

# Series VFR4000

## Manifold Specifications

### Manifold Specifications

| Base model                           | Wiring                                           | Porting specifications | Port size |          | Stations | Applicable valve model                                                  |
|--------------------------------------|--------------------------------------------------|------------------------|-----------|----------|----------|-------------------------------------------------------------------------|
|                                      |                                                  | A, B port              | P, EA, EB | A, B     |          |                                                                         |
| <b>Plug-in type</b><br>VV5FR4-01□    | • With terminal block                            | Side/Bottom            | 1/2       | 3/8, 1/2 | 2 to 10  | VFR4□0□-□F                                                              |
|                                      | • With multi-connector<br>• With D-sub connector |                        |           |          | 2 to 8   |                                                                         |
| <b>Non plug-in type</b><br>VV5FR4-10 | • Grommet terminal<br>• DIN terminal             |                        |           |          | 2 to 10  | VFR4□1□-□E<br>VFR4□1□-□D                                                |
|                                      | <b>Non plug-in type</b><br>VV5FR4-40             |                        |           |          |          | • Grommet<br>• Grommet terminal<br>• Conduit terminal<br>• DIN terminal |

### How to Order Manifold Assembly

<Example> Plug-in type with terminal block: 6 stations

VV5FR4-01T-061-03..... 1 set (Manifold base part no.)  
 \*VFR4100-5FZ..... 3 sets (2 position single part no.)  
 \*VFR4200-5FZ..... 2 sets (2 position double part no.)  
 \*VVFS4000-10A..... 1 set (Blanking plate assembly part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

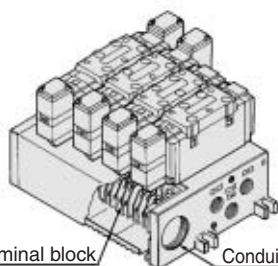
<Example> Non plug-in type: 6 stations

VV5FR4-10-061-03..... 1 set (Manifold base part no.)  
 \*VFR4110-5D..... 5 sets (2 position single part no.)  
 \*VFR4410-5D..... 1 set (3 position exhaust center part no.)  
 \*VVF4000-R-04-2..... 1 set (Individual EXH spacer part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

### Plug-in Type: With Terminal Block

- Since 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.



Terminal block

Conduit wiring

**VV5FR4 - 01T - 06 1 - 03**

Series VFR4000 Manifold  
 Plug-in type with terminal block

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| :  | :           |
| 10 | 10 stations |

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

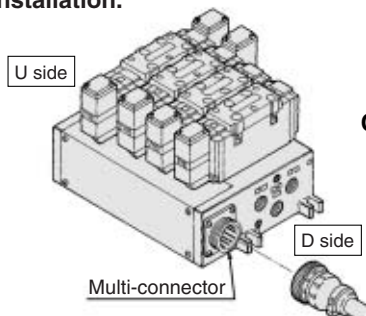
**Port size**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

### Plug-in Type: With Multi-connector (For wiring specifications, refer to page 3-5-8.)

- Master connection of power and solenoid valves.
- Quick wiring permits ease of installation.



Multi-connector

**VV5FR4 - 01C D - 05 1 - 03**

Series VFR4000 Manifold  
 Plug-in type with multi-connector  
 Connector mounting direction

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

**Stations**

|    |            |
|----|------------|
| 02 | 2 stations |
| :  | :          |
| 08 | 8 stations |

\* Max: 8 stations

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

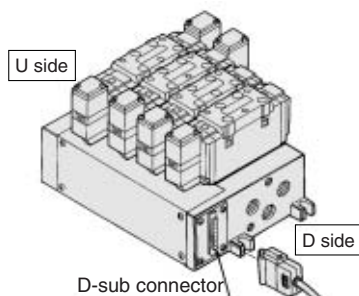
| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

# Series VFR4000

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 3-5-8.)

- Wide range of interchangeability (D-sub connector (25P) conforming to MIL standard)
- Quick wiring permits easier installation.



**VV5FR4 - 01F D 06 1 03**

Series VFR4000 Manifold

Plug-in type with D-sub connector

Connector mounting direction

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

Stations

|    |                   |
|----|-------------------|
| 02 | 2 stations        |
| ⋮  | ⋮                 |
| 08 | 8 stations        |
| ⋮  | ⋮                 |
| ⋮  | * Max: 8 stations |

Symbol

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

Thread type

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

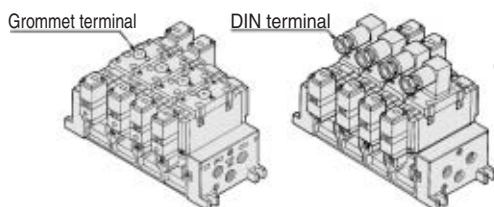
Port size

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

## Non Plug-in Type: Grommet Terminal, DIN Terminal (Common electrical entry)

- Individual wiring for every valve



**VV5FR4 - 10 - 05 1 03**

Series VFR4000 Manifold

Non plug-in type Common electrical entry

Stations

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

Symbol

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

Thread type

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

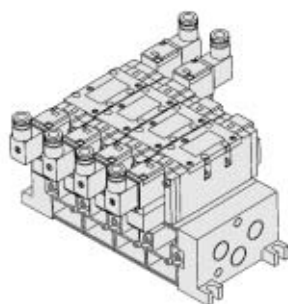
Port size

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

## Non Plug-in Type: Grommet, Grommet Terminal, Conduit Terminal, DIN Terminal (Individual electrical entry)

- Individual wiring for every valve



**VV5FR4 - 40 - 05 1 03**

Series VFR4000 Manifold

Non plug-in type Individual electrical entry

Stations

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

Symbol

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

Thread type

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

Port size

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

Note) Manifold base is in common with VV5FR4-10.

Note) Manifold base is in common with Series VFS4000 but the connection of terminal block for plug-in type is different.

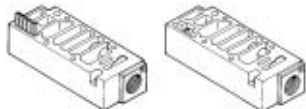
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR4000

## Manifold/Option Parts Assembly

### Individual SUP spacer

Setting individual SUP spacer on the manifold block enables individual SUP port for each valve.

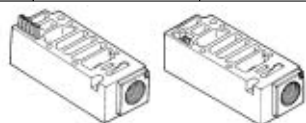
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS4000-P-03-1 | VVFS4000-P-03-2  |



### Individual EXH spacer

Setting individual EXH spacer on the manifold block enables individual EXH port for each valve.

| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS4000-R-04-1 | VVFS4000-R-04-2  |



### SUP block disk

When supplying manifold with more than two different pressures, high and low, insert a block disk in between stations subjected to plug-in different pressures.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT634-10A   |                  |

### EXH block disk

When valve exhaust affects the other stations on the circuit, insert EXH block disk in between stations to separate valve exhaust.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT634-11A   |                  |



EXH block disk

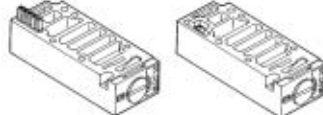


SUP block disk

### Throttle valve spacer

Needle valve set on the manifold block can control cylinder speed by throttling exhaust.

| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS4000-20A-1 | VVFS4000-20A-2   |

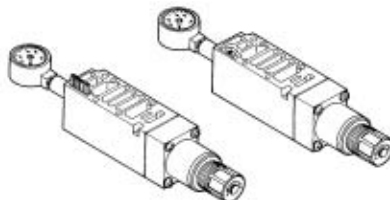


### Interface regulator



Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Characteristics" on page 3-5-6 before operation.)

| Body type          | Plug-in type    | Non plug-in type |
|--------------------|-----------------|------------------|
| P port regulation  | ARBF4050-00-P-1 | ARBF4050-00-P-2  |
| A reduced pressure | ARBF4050-00-A-1 | ARBF4050-00-A-2  |
| B reduced pressure | ARBF4050-00-B-1 | ARBF4050-00-B-2  |



### Blanking plate

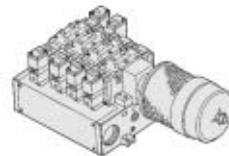
It is used by attaching on the manifold block for being prepared for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | VVFS4000-10A |                  |

## Manifold Option

### With exhaust cleaner

- Valve exhaust noise dampening: 35 dB or more.
- Collects oil mist: collecting rate 99.9% or more
- Piping process reduced.

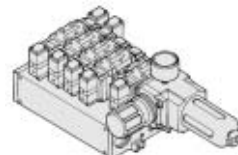


For details, refer to page 3-5-68.

### With control unit

#### Plug-in type/Non Plug-in type

- Filter, regulation valve, pressure switch and air release valve are all combined to form one unit.
- Piping processes are eliminated.

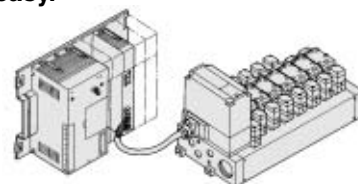


For details, refer to page 3-5-71.

### With serial interface unit for serial transmission

#### Plug-in type

- Solenoid valve wiring process reduced considerably.
- Disperse installation possible. Manifold solenoid valve: 8 stations max. 32 positions (512 solenoids).
- Maintenance and inspection are easy.



For details, refer to "Serial Transmission" catalog separately.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

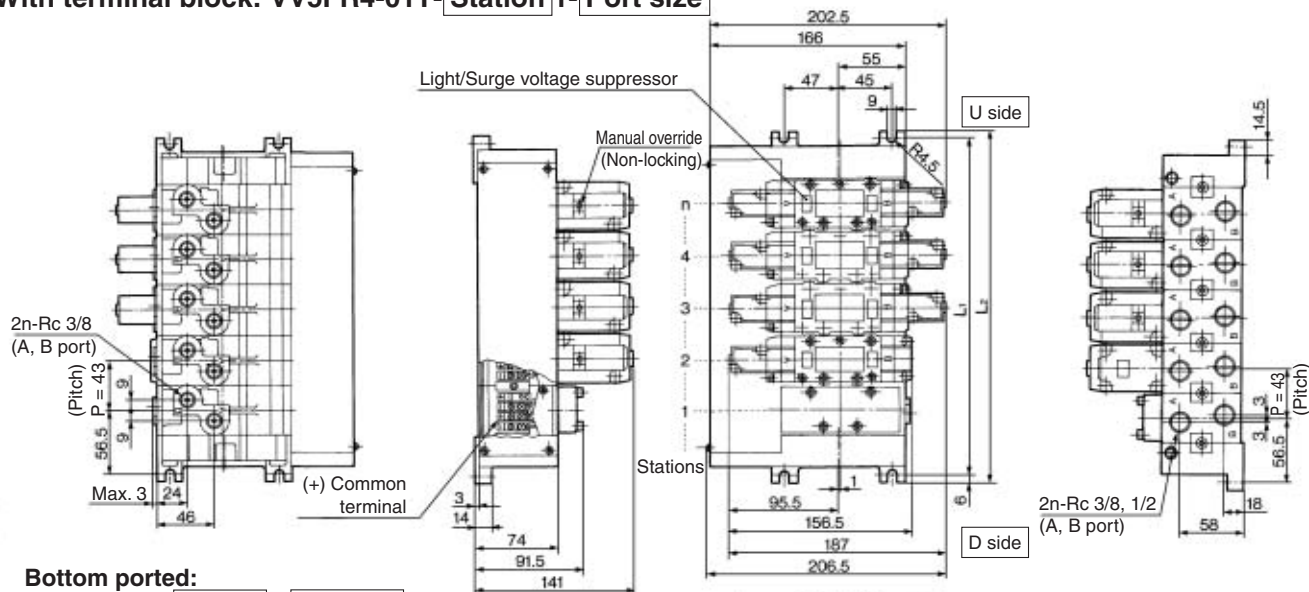
EVS

VFN

# Series VFR4000

## Manifold Plug-in type

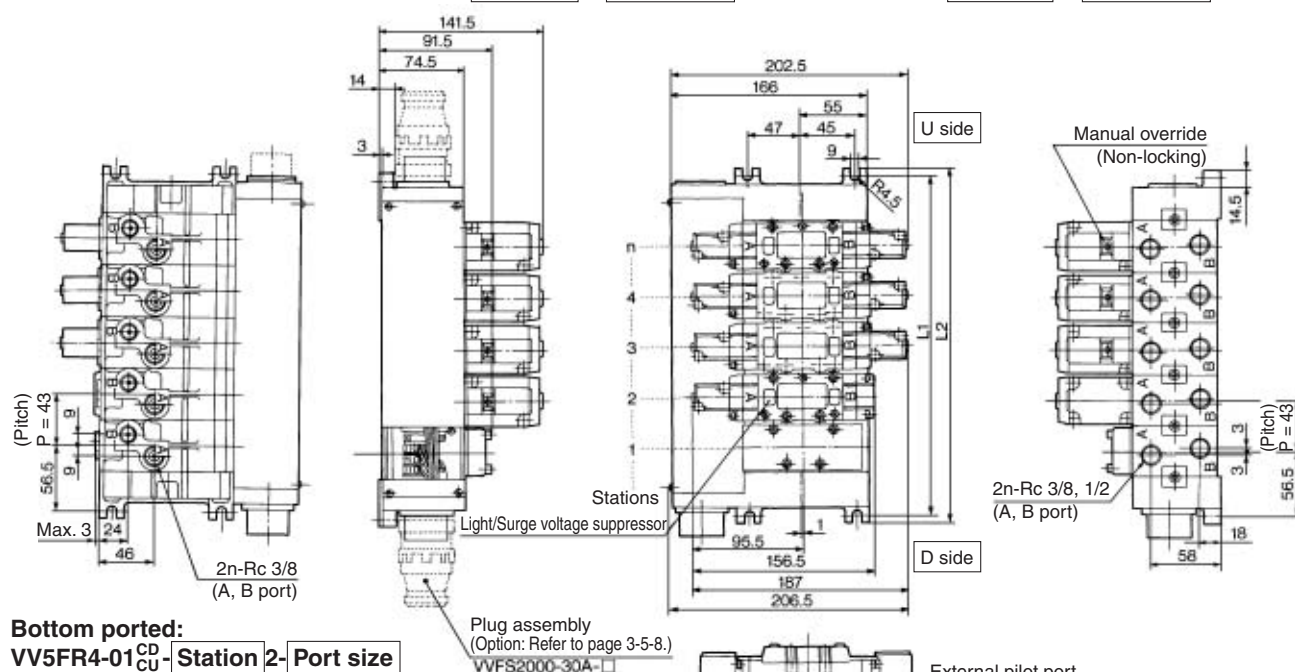
### With terminal block: VV5FR4-01T-Station 1-Port size



### Bottom ported: VV5FR4-01T-Station 2-Port size

| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                  |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | $L_1 = 43 \times n + 70$ |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | 469 | 512 | $L_2 = 43 \times n + 82$ |

### With multi-connector: VV5FR4-01CD-Station 1-Port size, VV5FR4-01CU-Station 1-Port size



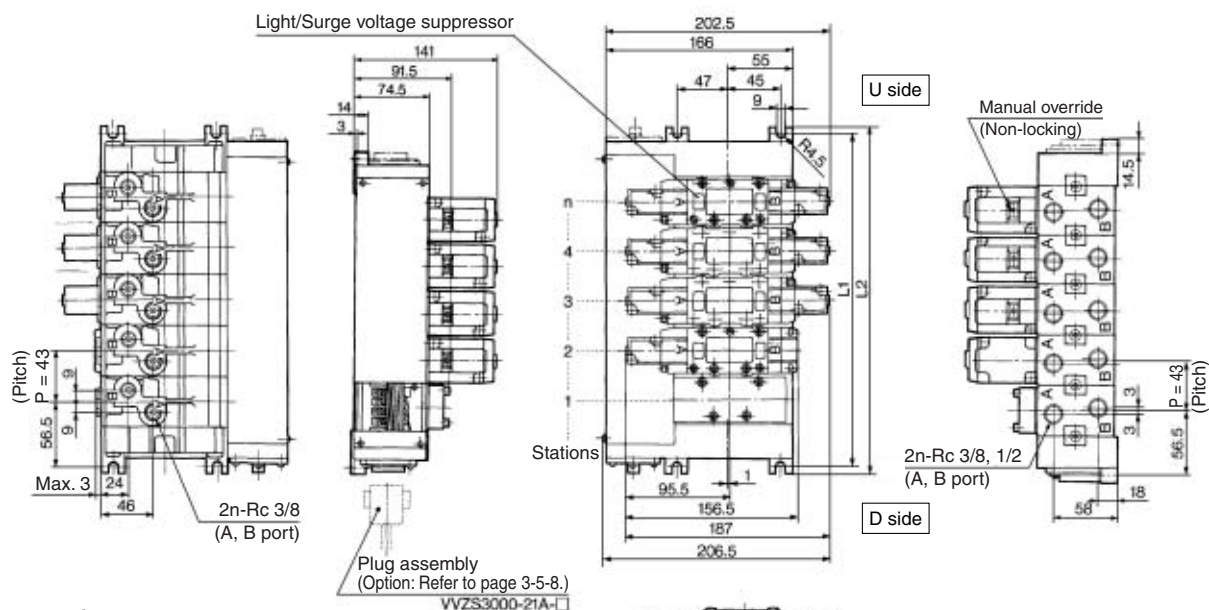
### Bottom ported: VV5FR4-01<sup>CD</sup>/<sub>CU</sub>-Station 2-Port size

For wiring specifications, refer to page 3-5-8.

| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | Formula                  |
|----------------|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | $L_1 = 43 \times n + 70$ |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | $L_2 = 43 \times n + 82$ |

| Manifold                                                | Plug-in type                                            |
|---------------------------------------------------------|---------------------------------------------------------|
| <p>1. <b>Manifold</b></p> <p>2. <b>Plug-in type</b></p> | <p>1. <b>Manifold</b></p> <p>2. <b>Plug-in type</b></p> |

**With D-sub connector: VV5FR4-01FD- Station 1- Port size , VV5FR4-01FU- Station 1- Port size**

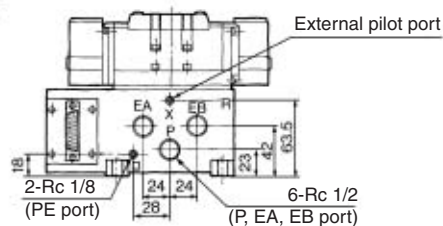


**Bottom ported:**  
VV5FR4-01<sup>FD</sup><sub>FU</sub> - **Station 2** - **Port size**



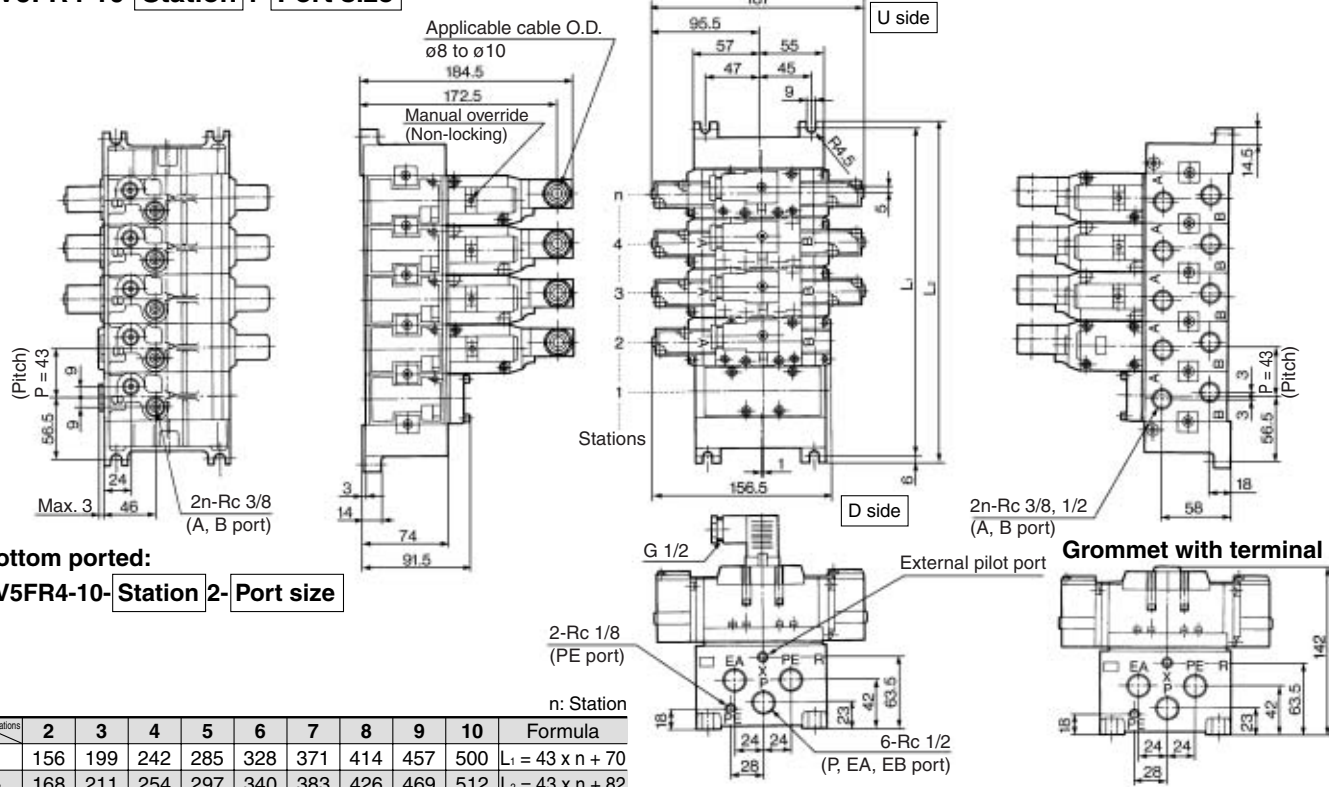
For wiring specifications, refer to page 3-5-8.

|                |     |     |     |     |     |     |     | n: Station               |
|----------------|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | Formula                  |
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | $L_1 = 43 \times n + 70$ |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | $L_2 = 43 \times n + 82$ |



| Manifold | Non plug-in type |
|----------|------------------|
| 1        | 1                |
| 2        | 2                |
| 3        | 3                |
| 4        | 4                |
| 5        | 5                |
| 6        | 6                |
| 7        | 7                |
| 8        | 8                |
| 9        | 9                |
| 10       | 10               |
| 11       | 11               |
| 12       | 12               |
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| 14       | 14               |
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| 91       | 91               |
| 92       | 92               |
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| 95       | 95               |
| 96       | 96               |
| 97       | 97               |
| 98       | 98               |
| 99       | 99               |
| 100      | 100              |

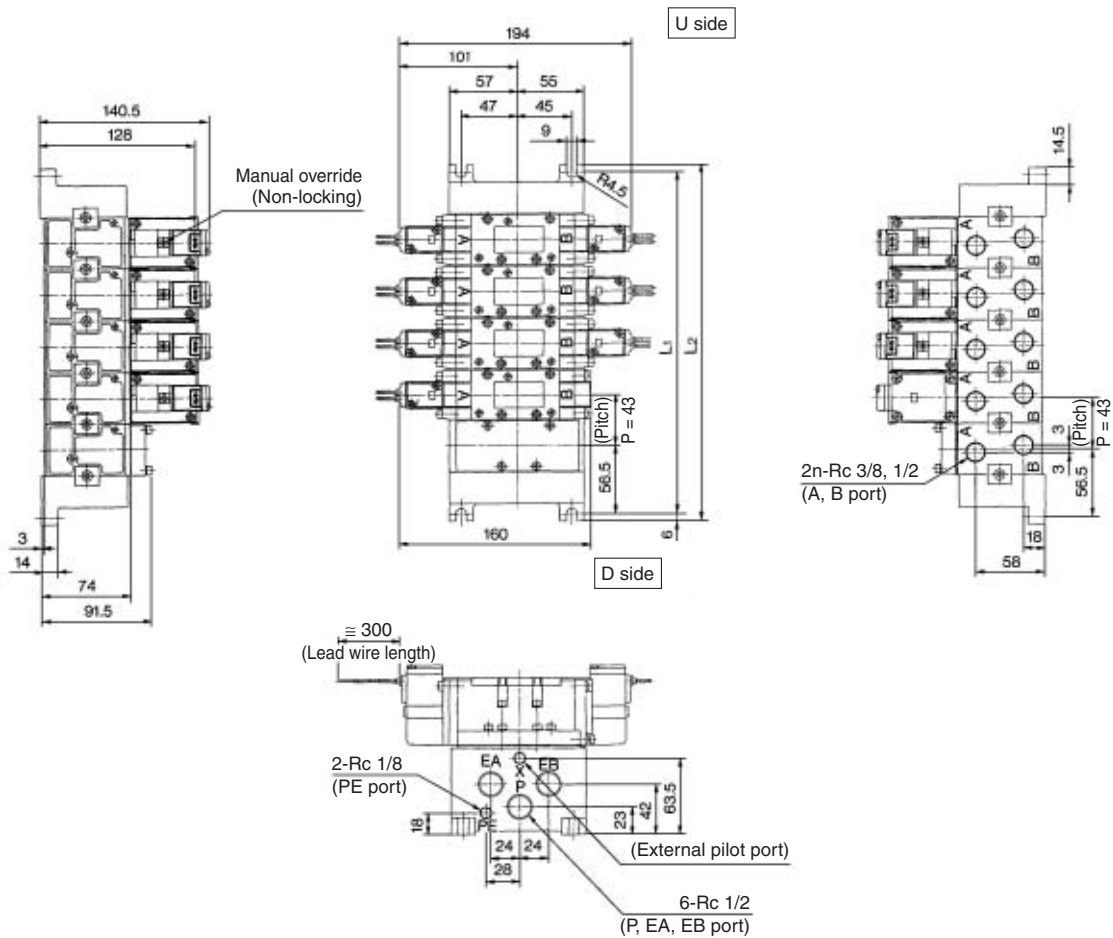
**VV5FR4-10- Station 1- Port size**



| n: Station     |     |     |     |     |     |     |     |     |     |                          |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| L Stations     | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                  |
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | $L_1 = 43 \times n + 70$ |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | 469 | 512 | $L_2 = 43 \times n + 82$ |

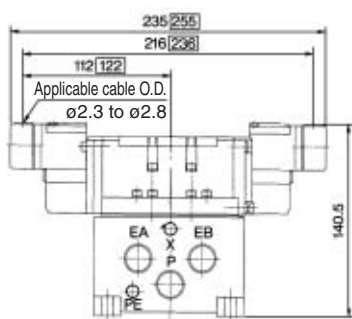
| Manifold | Non plug-in type |
|----------|------------------|
| 1        | 1                |
| 2        | 2                |
| 3        | 3                |
| 4        | 4                |
| 5        | 5                |
| 6        | 6                |
| 7        | 7                |
| 8        | 8                |
| 9        | 9                |
| 10       | 10               |
| 11       | 11               |
| 12       | 12               |
| 13       | 13               |
| 14       | 14               |
| 15       | 15               |
| 16       | 16               |
| 17       | 17               |
| 18       | 18               |
| 19       | 19               |
| 20       | 20               |
| 21       | 21               |
| 22       | 22               |
| 23       | 23               |
| 24       | 24               |
| 25       | 25               |
| 26       | 26               |
| 27       | 27               |
| 28       | 28               |
| 29       | 29               |
| 30       | 30               |
| 31       | 31               |
| 32       | 32               |
| 33       | 33               |
| 34       | 34               |
| 35       | 35               |
| 36       | 36               |
| 37       | 37               |
| 38       | 38               |
| 39       | 39               |
| 40       | 40               |
| 41       | 41               |
| 42       | 42               |
| 43       | 43               |
| 44       | 44               |
| 45       | 45               |
| 46       | 46               |
| 47       | 47               |
| 48       | 48               |
| 49       | 49               |
| 50       | 50               |
| 51       | 51               |
| 52       | 52               |
| 53       | 53               |
| 54       | 54               |
| 55       | 55               |
| 56       | 56               |
| 57       | 57               |
| 58       | 58               |
| 59       | 59               |
| 60       | 60               |
| 61       | 61               |
| 62       | 62               |
| 63       | 63               |
| 64       | 64               |
| 65       | 65               |
| 66       | 66               |
| 67       | 67               |
| 68       | 68               |
| 69       | 69               |
| 70       | 70               |
| 71       | 71               |
| 72       | 72               |
| 73       | 73               |
| 74       | 74               |
| 75       | 75               |
| 76       | 76               |
| 77       | 77               |
| 78       | 78               |
| 79       | 79               |
| 80       | 80               |
| 81       | 81               |
| 82       | 82               |
| 83       | 83               |
| 84       | 84               |
| 85       | 85               |
| 86       | 86               |
| 87       | 87               |
| 88       | 88               |
| 89       | 89               |
| 90       | 90               |
| 91       | 91               |
| 92       | 92               |
| 93       | 93               |
| 94       | 94               |
| 95       | 95               |
| 96       | 96               |
| 97       | 97               |
| 98       | 98               |
| 99       | 99               |
| 100      | 100              |

**VV5FR4-40- Station 1- Port size**



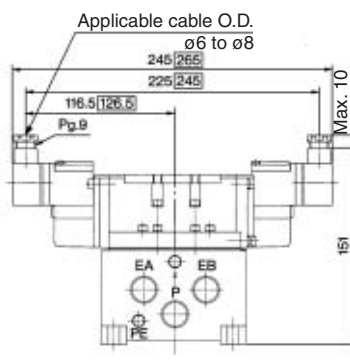
|                |     |     |     |     |     |     |     |     |     | n: Stations                  |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| Stations<br>L  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | L <sub>1</sub> = 43 x n + 70 |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | 469 | 512 | L <sub>2</sub> = 43 x n + 82 |

### E: Grommet terminal



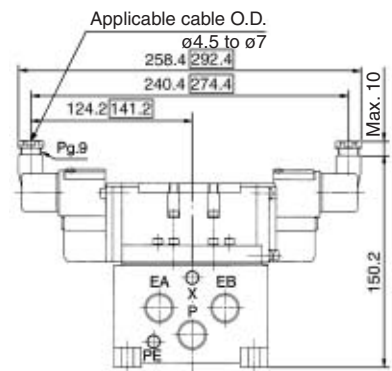
☐: With light/surge voltage suppressor

**T: Conduit terminal**



☐: With light/surge voltage suppressor

**D, Y: DIN terminal**



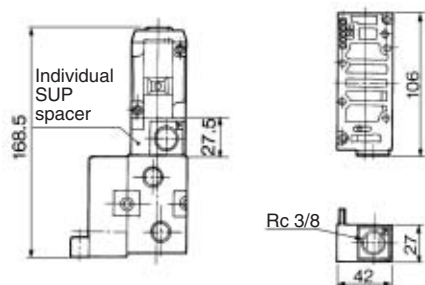
☐: With light/surge voltage suppressor

# 5 Port Pilot Operated Solenoid Valve

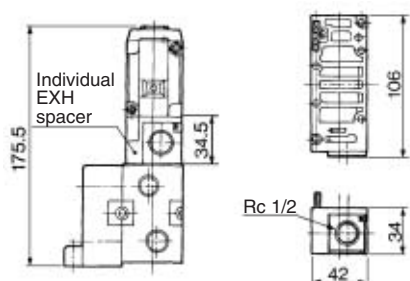
## Rubber Seal, Plug-in/Non Plug-in Series VFR4000

### Manifold/Option Parts Assembly Plug-in type/Non plug-in type

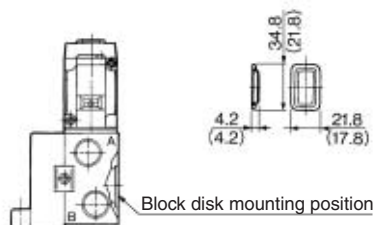
**Individual SUP spacer:**  
 VVFS4000-P-03-1 (Plug-in type)  
 VVFS4000-P-03-2 (Non plug-in type)



**Individual EXH spacer:**  
 VVFS4000-R-04-1 (Plug-in type)  
 VVFS4000-R-04-2 (Non plug-in type)

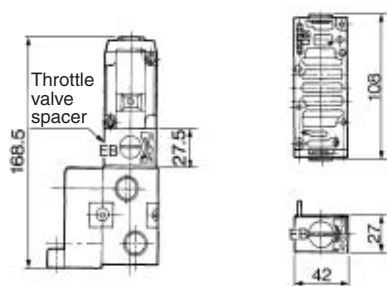


**SUP block disk: AXT634-10A**  
**EXH block disk: AXT634-11A**

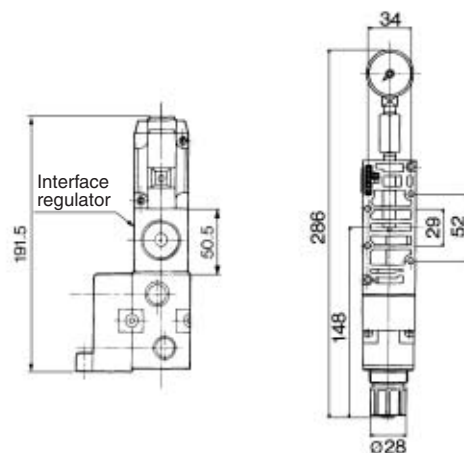


Note) Used with exclusive manifold block ( ): EXH block disk

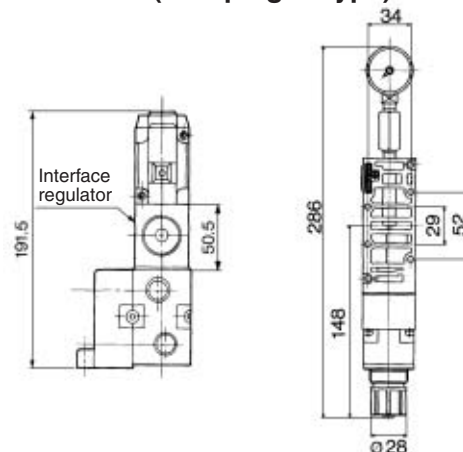
**Throttle valve spacer:**  
 VVFS4000-20A-1 (Plug-in type)  
 VVFS4000-20A-2 (Non plug-in type)



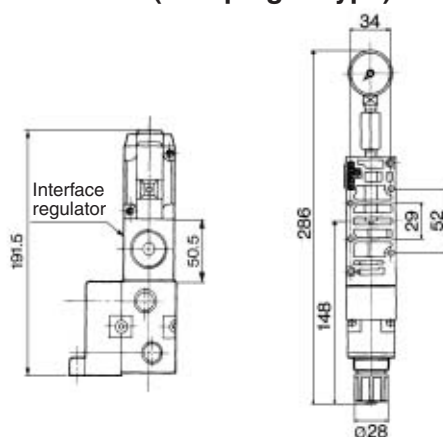
**Interface regulator/P port regulation:**  
 ARBF4050-00-P-1 (Plug-in type)  
 ARBF4050-00-P-2 (Non plug-in type)



**Interface regulator/A port regulation:**  
 ARBF4050-00-A-1 (Plug-in type)  
 ARBF4050-00-A-2 (Non plug-in type)



**Interface regulator/B port regulation:**  
 ARBF4050-00-B-1 (Plug-in type)  
 ARBF4050-00-B-2 (Non plug-in type)



Dimensions: FZ type dimensions of direct manual style are also the same.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

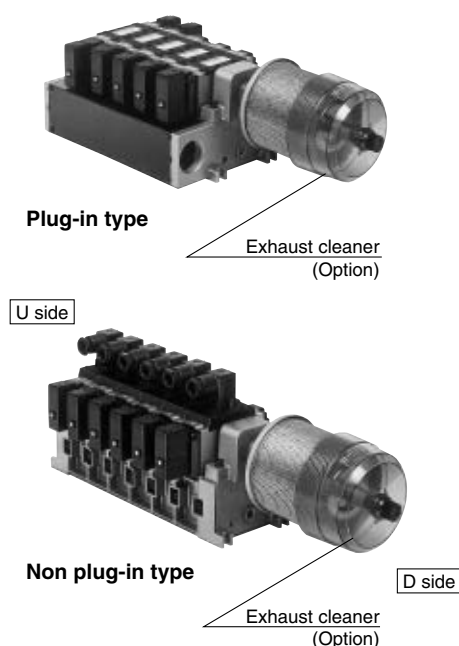
EVS

VFN

# Series VFR4000

## Manifold with Exhaust Cleaner

- Serves to protect working environment.
- Valve exhaust noise dampening: 35 dB or more.
- Collection rate of drainage and oil mist: 99.9% or more.
- Piping work is reduced.



### Manifold Specifications

| Manifold                     | Plug-in type: VV5FR4-01□                                                    | Non plug-in type: VV5FR4-10               | Non plug-in type: VV5FR4-40                                  |
|------------------------------|-----------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------|
| Wiring                       | With terminal block<br>With multi-connector<br>With D-sub connector         | DIN terminal<br>Grommet terminal          | Grommet, Grommet terminal,<br>Conduit terminal, DIN terminal |
| Applicable valve model       | VFR4□0□-□F                                                                  | VFR4□1□-□D<br>VFR4□1□-□E                  | VFR4□4□-□G, VFR4□4□-□E<br>VFR4□4□-□T, VFR4□4□-□D             |
| Porting specifications<br>Rc | Common SUP, Common EXH                                                      |                                           |                                                              |
|                              | A, B port                                                                   | Side: Rc 3/8, 1/2 Bottom: Rc 3/8 (Option) |                                                              |
|                              | P port                                                                      | Side: Rc 1/2 EXH Rc 1.1 1/2               |                                                              |
| Stations                     | 2 to 10 stations (With multi-connector/D-sub connector: 2 to 8 stations)    |                                           |                                                              |
| Applicable exhaust cleaners  | AMC610-10 (Port size: R 1). AMC810-14 (Port size: R 1 1/2) <sup>Note)</sup> |                                           |                                                              |



Note) Use "AMC810-14" when used with 5 or more stations or in high frequency.  
Exhaust cleaner "AMC610-10" and "AMC810-14" are not attached.

### How to Order

**VV5FR4-10-06-1-03-CD**

Series VFR4000 Manifold

**Base type/ Electrical entry**

|     |                                              |
|-----|----------------------------------------------|
| 01T | Plug-in type with terminal block             |
| 01C | Plug-in type with multi-connector            |
| 01F | Plug-in type with D-sub connector            |
| 10  | Non plug-in type Common electrical entry     |
| 40  | Non plug-in type Individual electrical entry |

**Connector mounting direction**

| Symbol | With connector  | Applicable base |
|--------|-----------------|-----------------|
| Nil    | None            | 01T, 10, 40     |
| D      | D side mounting | 01C, 01F        |
| U      | U side mounting | 01C, 01F        |

**Stations**

|                     |             |
|---------------------|-------------|
| 02                  | 2 stations  |
| ⋮                   | ⋮           |
| 10 <sup>Note)</sup> | 10 stations |

Note) • Base 01T/10/40: 2 to 10 stations  
• Base 01C/01F: 2 to 8 stations

**Exhaust cleaner mounting direction**

| Symbol | Exhaust cleaner mounting direction |
|--------|------------------------------------|
| CD     | D side   D side mounting           |
| CU     | U side   U side mounting           |

\* Please indicate size or port size of exhaust cleaner.

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     | 1/2       | 3/8    |
| 04     |           | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: Rc 3/8 only.

**Symbol**

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
| 1      | Common  | Side                          |
| 2      | Common  | Bottom *                      |

\* Option

### How to Order Manifold Assembly

<Example> Plug-in type with terminal block (6 stations)

VV5FR4-01T-061-03-CD..... 1 set (Manifold base part no.)  
 \*VFR4100-5FZ..... 3 sets (2 position single part no.)  
 \*VFR4200-5FZ..... 2 sets (2 position double part no.)  
 \*VVFS4000-10A..... 1 set (Blanking plate assembly part no.)  
 \*AMC610-10..... 1 set (Exhaust cleaner part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

### ⚠ Caution

When using an exhaust cleaner, mount it downwards.

<Example> Non plug-in type: 6 stations

VV5FR4-10-061-03-CU..... 1 set (Manifold base part no.)  
 \*VFR4210-5E..... 3 sets (2 position single part no.)  
 \*VFR4210-5E..... 2 sets (2 position double part no.)  
 \*VVFS4000-10A..... 1 set (Blanking plate assembly part no.)  
 \*AMC810-14..... 1 set (Exhaust cleaner part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.



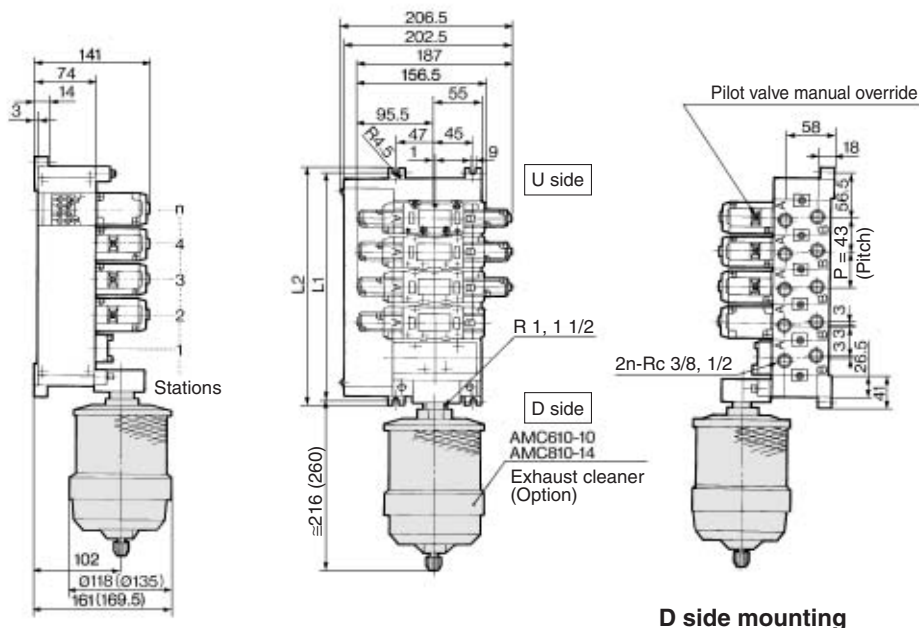
Refer to Best Pneumatics Vol. 5 for Exhaust Cleaner details.

# 5 Port Pilot Operated Solenoid Valve

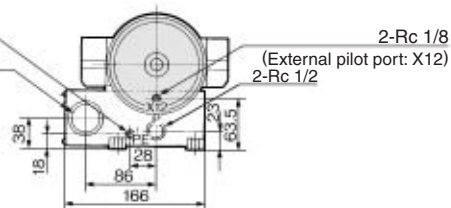
## Rubber Seal, Plug-in/Non Plug-in Series VFR4000

### Manifold with Exhaust Cleaner Plug-in type/Non plug-in type

Plug-in type: VV5FR4-01T- Stations 1- Port size  $\frac{CD}{CU}$

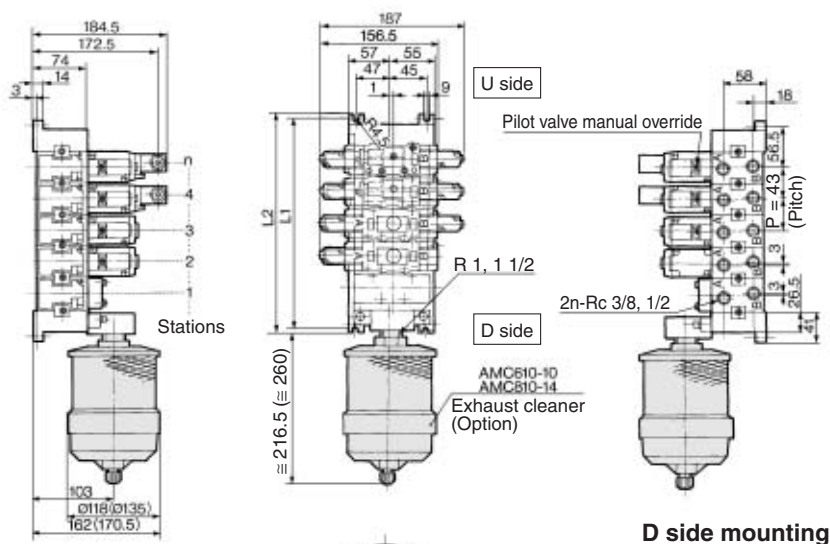


2-Rc 1/8  
(Pilot EXH port: PE)  
2-G 1 1/4  
Electrical entry

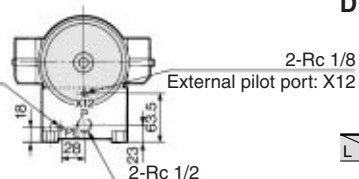


( ): AMC810

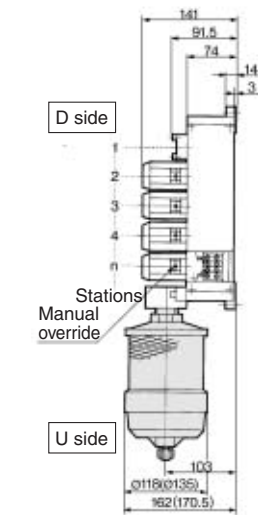
Non plug-in type: VV5FR4-10- Stations 1- Port size  $\frac{CD}{CU}$



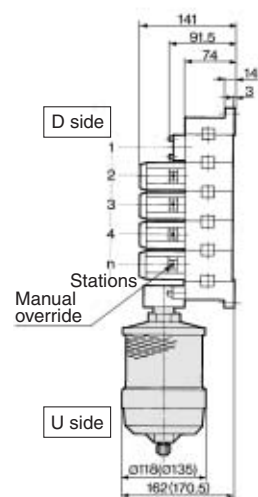
2-Rc 1/8  
Pilot EXH port: PE



( ): AMC810



U side mounting



U side mounting

n: Station

| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | L <sub>1</sub> = 43 x n + 70 |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | 469 | 512 | L <sub>2</sub> = 43 x n + 82 |

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

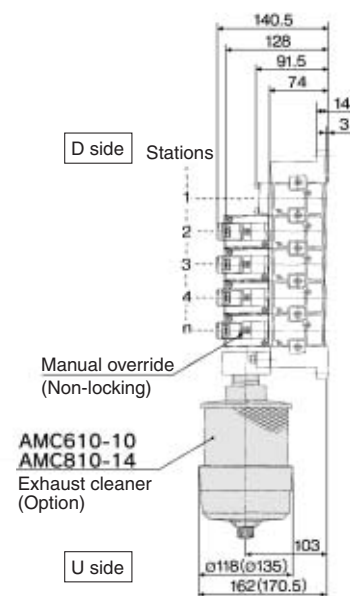
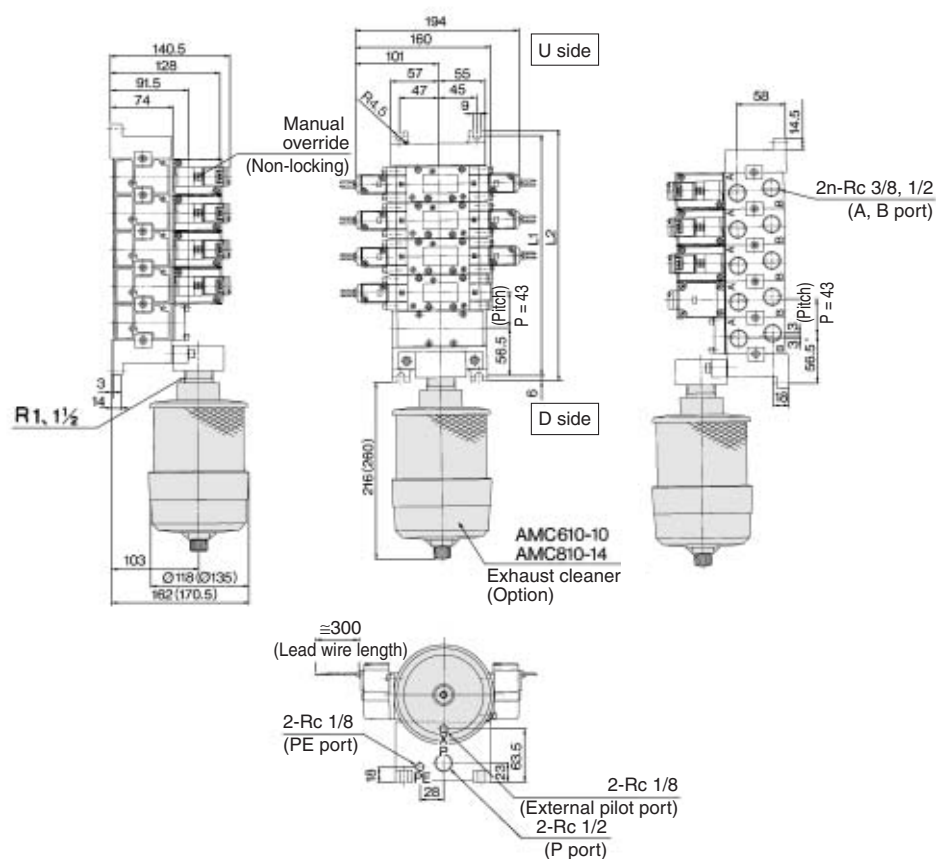
EVS

VFN

# Series VFR4000

## Manifold with Exhaust Cleaner Non plug-in type

Non plug-in type: VV5FR4-40-Station 1-Port size -<sup>CD</sup><sub>CU</sub>



U side mounting



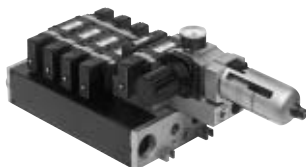
( ) : AMC810

| n: Station     |     |     |     |     |     |     |     |     |     |                              |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L              | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | L <sub>1</sub> = 43 x n + 70 |
| L <sub>2</sub> | 168 | 211 | 254 | 297 | 340 | 383 | 426 | 469 | 512 | L <sub>2</sub> = 43 x n + 82 |

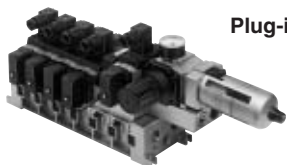
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR4000

## Manifold with Control Unit

- Control unit (Filter, Regulator, Pressure switch, Air release valve) are all standardized to the one unit, and can be mounted on the manifold base without any attachments.
- Piping processes are eliminated.



Plug-in type



Non plug-in type

### Caution

Air filter with auto-drain or manual drain must be mounted with the air filter at the bottom.

### Manifold Specifications

| Manifold               | Plug-in type: VV5FR4-01□                                            | Non plug-in type: VV5FR4-10       | Non plug-in type: VV5FR4-40                                  |
|------------------------|---------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------|
| Wiring                 | With terminal block<br>With multi-connector<br>With D-sub connector | DIN terminal<br>Grommet terminal  | Grommet, Grommet terminal,<br>Conduit terminal, DIN terminal |
| Applicable valve model | VFR4□0□-□F                                                          | VFR4□1□-□D<br>VFR4□1□-□E          | VFR4□4□-□G, VFR4□4□-□E<br>VFR4□4□-□T, VFR4□4□-□D             |
| Porting specifications | Common SUP, Common EXH                                              |                                   |                                                              |
|                        | A, B port                                                           | Side: Rc 3/8, 1/2, Bottom: Rc 3/8 |                                                              |
|                        | P, EA, EB port                                                      | Side: Rc 1/2                      |                                                              |
| Stations               | 2 to 10 (With multi-connector/D-sub connector: 2 to 8) *            |                                   |                                                              |



\* Including station of control unit

### Control Unit Specifications

|                                                |                                                                      |
|------------------------------------------------|----------------------------------------------------------------------|
| Air filter (With auto-drain/With manual drain) |                                                                      |
| Filtration degree                              | 5 μm                                                                 |
| Regulator                                      |                                                                      |
| Set pressure (Outlet pressure)                 | 0.05 to 0.85 MPa                                                     |
| Pressure switch                                |                                                                      |
| Set pressure range: OFF                        | 0.1 to 0.6 MPa                                                       |
| Differential                                   | 0.08 MPa                                                             |
| Contact                                        | 1a                                                                   |
| Indicator light                                | LED (RED)                                                            |
| Max. switch capacity                           | 2 VA AC, 2 W DC                                                      |
| Max. operating current                         | 24 VAC, DC or less: 50 mA<br>48 VAC, DC: 40 mA<br>100 VAC, DC: 20 mA |
| Inside voltage drop                            | 4 V or less                                                          |
| Air release valve (Single only)                |                                                                      |
| Operating pressure range                       | 0.2 to 0.9 MPa                                                       |

### Control Unit/Option

|                                         |                                   |                 |
|-----------------------------------------|-----------------------------------|-----------------|
| Air release valve spacer <sup>(1)</sup> | <Plug-in type>                    |                 |
|                                         | VVFS4000-24A-1R (D side mounting) |                 |
| Pressure switch <sup>(2)</sup>          | <Non plug-in type>                |                 |
|                                         | VVFS4000-24A-2R (D side mounting) |                 |
| Blanking plate                          | For filter regulator              | MP2-3           |
|                                         | For pressure switch               | MP3-2           |
|                                         | For air release valve             | VVFS4000-24A-10 |
| Filter element                          | 11104-5B                          |                 |



Note 1) Combining valve "VFR41□□" (single) and release valve spacer makes it possible to use this as an air release valve.

Note 2) Pressure switch cannot be mounted later on non plug-in type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN

# Series VFR4000

## How to Order

**VV5FR4-01C-D-08-1-03-AP**

**Series VFR4000 Manifold**

**Base type/Electrical entry**

|     |                                     |
|-----|-------------------------------------|
| 01T | Plug-in with terminal block         |
| 01C | Plug-in with multi-connector        |
| 01F | Plug-in type with D-sub connector   |
| 10  | Non plug-in type (Common entry)     |
| 40  | Non plug-in type (Individual entry) |

**Connector mounting direction**

| Symbol | With connector  | Applicable base |
|--------|-----------------|-----------------|
| Nil    | None            | 01T, 10, 40     |
| D      | D side mounting | 01C, 01F        |
| U      | U side mounting | 01C, 01F        |

**Stations**

|           |             |
|-----------|-------------|
| 02        | 2 stations  |
| :         | :           |
| 10 (Note) | 10 stations |

Note) • Base 01T/10/40: 2 to 10 stations  
• Base 01C/01F: 2 to 8 stations  
• Including stations of control unit.

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      | Common  | Common | Bottom *                      |

\* Option

**Port size**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 3/8    |
| 04     | 1/2       | 1/2    |
| M      |           | Mixed  |

\* For bottom ported: only 3/8

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Air release valve coil rating**

|     |                   |
|-----|-------------------|
| Nil | None              |
| 1   | 100 VAC, 50/60 Hz |
| 5   | 24 VDC            |
| 9   | Other             |

**Control unit type**

| Control equipment                      | Symbol |            |    |   |   |   |   |   |           |  |
|----------------------------------------|--------|------------|----|---|---|---|---|---|-----------|--|
|                                        | Nil    | MP         | AP | M | A | G | F | C | E         |  |
| Air release valve                      |        | ●          | ●  | ● | ● |   |   | ● | ●         |  |
| Air filter regulator with manual drain |        | ●          |    | ● |   | ● |   |   |           |  |
| Air filter regulator with auto-drain   |        |            | ●  |   | ● |   | ● |   |           |  |
| Pressure switch                        |        | ●          | ●  |   |   |   |   |   |           |  |
| Blanking plate (Air release valve)     |        |            |    |   |   | ● | ● |   |           |  |
| Blanking plate (Filter regulator)      |        |            |    |   |   |   |   | ● |           |  |
| Blanking plate (Pressure switch)       |        |            |    | ● | ● | ● | ● | ● |           |  |
| Required stations                      |        | 2 stations |    |   |   |   |   |   | 1 station |  |

Note) Control unit is D side mounting only.

## How to Order Manifold Assembly

<Example> Plug-in type with terminal block

VV5FR4-01T-081-03-AP5..... 1 set (Manifold base part no.)

\*VFR4100-5FZ..... 5 sets (2 position single part no.)

\*VFR4200-5FZ..... 2 sets (2 position double part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

The 1st and 2nd station are used for control unit mounting.  
When ordering, specify the part nos. in order from the 3rd. station in the D side.  
When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

<Example> Non plug-in type

VV5FR4-10-061-03-A5..... 1 set (Manifold base part no.)

\*VFR4110-5D..... 5 sets (2 position single part no.)

→ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

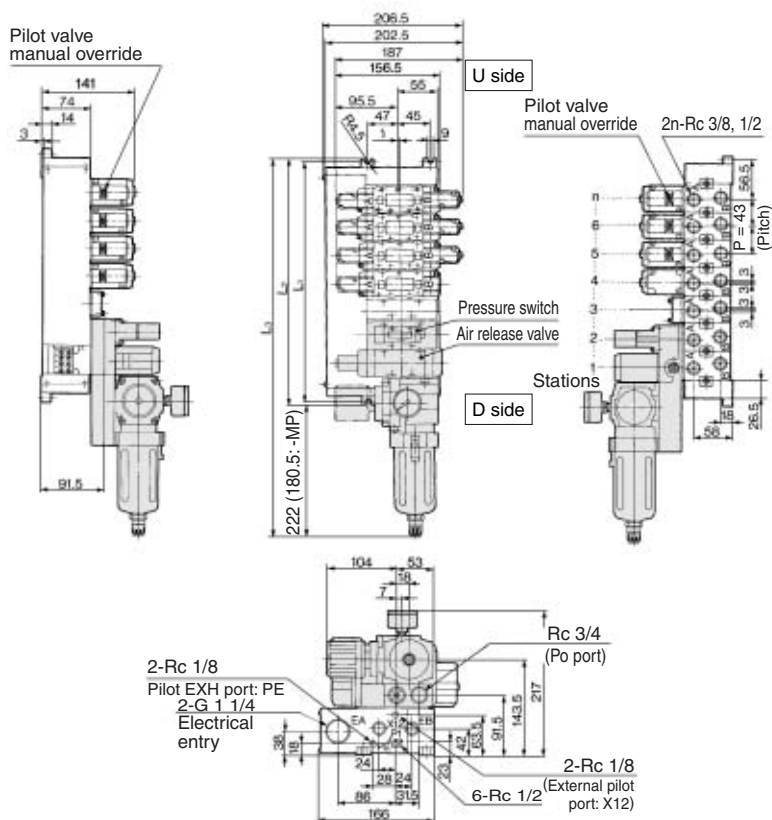
The 1st and 2nd station are used for control unit mounting.  
When ordering, specify the part nos. in order from the 3rd. station in the D side.  
When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

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

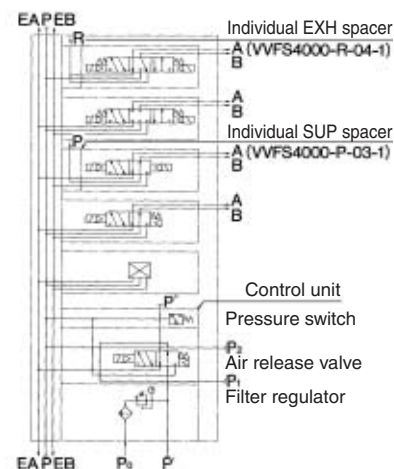
## Manifold with Control Unit Plug-in type/Non plug-in type

### Plug-in type:

VV5FR4-01T- Stations 1- Port size -AP Voltage of air release valve



### Example for manifold



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

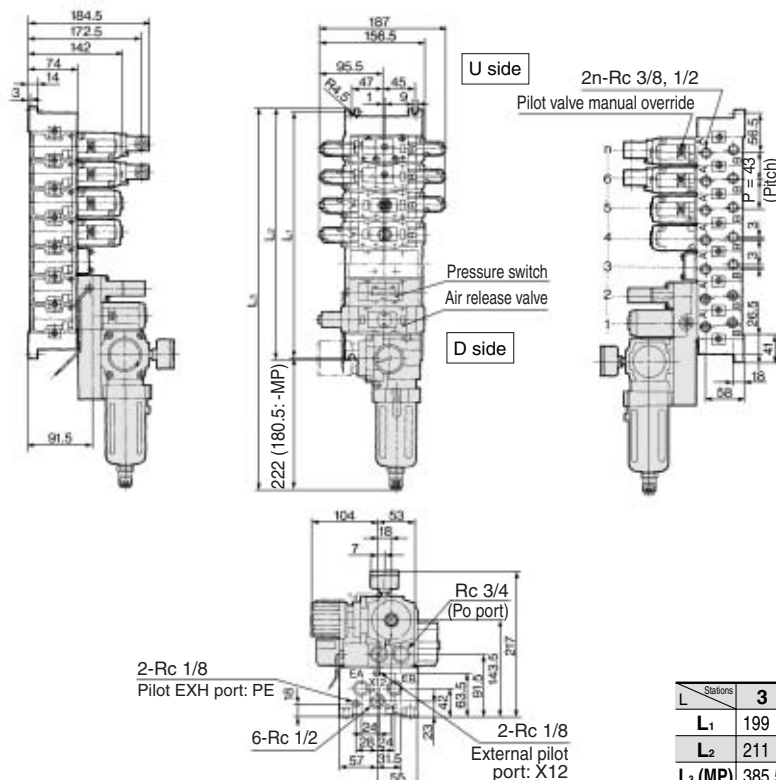
VQ7

EVS

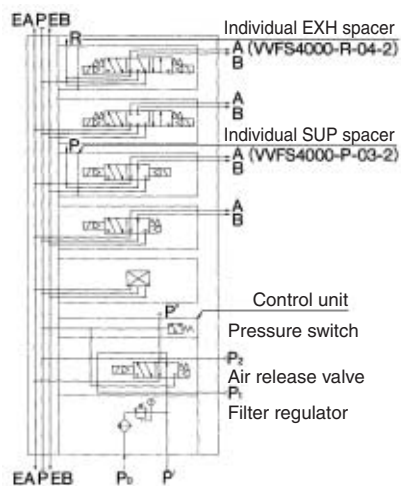
VFN

### Non plug-in type:

VV5FR4-10- Stations 1- Port size -AP Voltage of air release valve



### Example for manifold



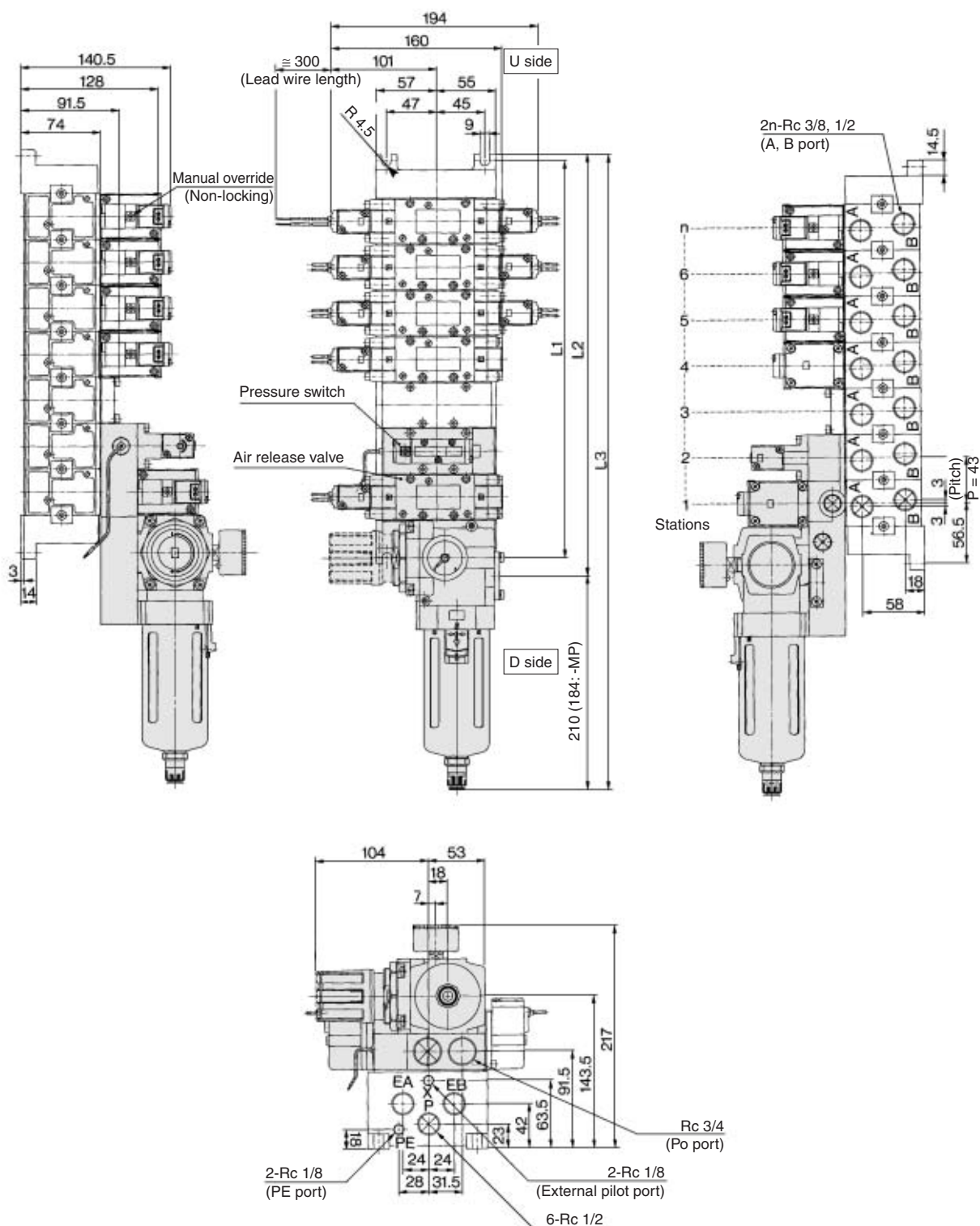
n: Station

| Stations            | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                         |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| L <sub>1</sub>      | 199   | 242   | 285   | 328   | 371   | 414   | 457   | 500   | L <sub>1</sub> = 43 x n + 70    |
| L <sub>2</sub>      | 211   | 254   | 297   | 340   | 383   | 426   | 469   | 512   | L <sub>2</sub> = 43 x n + 82    |
| L <sub>3</sub> (MP) | 385.5 | 428.5 | 471.5 | 514.5 | 557.5 | 600.5 | 643.5 | 686.5 | L <sub>3</sub> = 43 x n + 256.5 |
| L <sub>3</sub> (AP) | 427   | 470   | 513   | 556   | 599   | 642   | 685   | 728   | L <sub>3</sub> = 43 x n + 298   |

# Series VFR4000

## Manifold with Control Unit Non plug-in type

Non plug-in type: VV5FR4-40- Stations 1- Port size -AP Voltage of air release valve



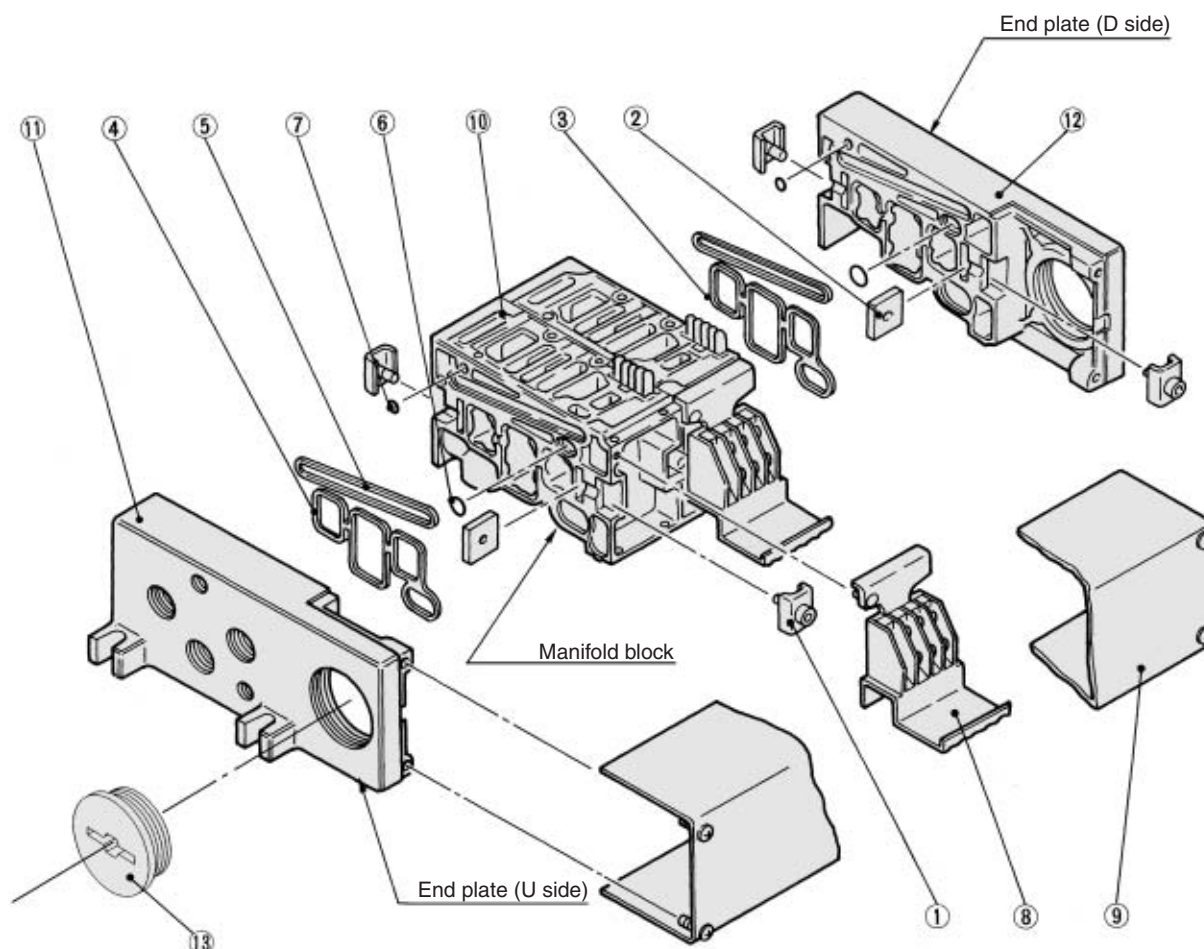
n: Station

| Stations            | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                         |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| L <sub>1</sub>      | 199   | 242   | 285   | 328   | 371   | 414   | 457   | 500   | L <sub>1</sub> = 43 x n + 70    |
| L <sub>2</sub>      | 211   | 254   | 297   | 340   | 383   | 426   | 469   | 512   | L <sub>2</sub> = 43 x n + 82    |
| L <sub>3</sub> (MP) | 385.5 | 428.5 | 471.5 | 514.5 | 557.5 | 600.5 | 643.5 | 686.5 | L <sub>3</sub> = 43 x n + 256.5 |
| L <sub>3</sub> (AP) | 427   | 470   | 513   | 556   | 599   | 642   | 685   | 728   | L <sub>3</sub> = 43 x n + 298   |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR4000

### Manifold Base Construction Plug-in type/Non plug-in type



### Replacement Parts

| No. | Description             | Material | Part no.                                                                               |
|-----|-------------------------|----------|----------------------------------------------------------------------------------------|
| ①   | Connection fitting A    | Steel    | VVF4000-5-1A                                                                           |
| ②   | Connection fitting B    | Steel    | VVF4000-5-2                                                                            |
| ③   | Gasket                  | NBR      | VVF4000-7 (for end plate)                                                              |
| ④   | Gasket                  | NBR      | VVF4000-7-1 (for manifold block)                                                       |
| ⑤   | Gasket                  | NBR      | VVF4000-8                                                                              |
| ⑥   | O-ring                  | NBR      | AS568-011                                                                              |
| ⑦   | O-ring                  | NBR      | P-3                                                                                    |
| ⑧   | Terminal assembly       | —        | VFR4000-14-1A                                                                          |
| ⑨   | Junction cover assembly | —        | For 01T VVF4000-4A- <sup>[Stations]</sup><br>For 01SU AZ738-30A- <sup>[Stations]</sup> |
| ⑬   | Rubber plug             | NBR      | AXT336-9                                                                               |

### Replacement Parts: Sub Assembly



Note) Manifold Base/Construction: Plug-in type with terminal block.

| No. | Description                              | Assembly part no.                          | Component parts                                                                                      | Applicable manifold base |
|-----|------------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------|
| ⑩   | Manifold block assembly <sup>Note)</sup> | VFR4000-19-1A- <sup>03</sup> <sub>04</sub> | Manifold block ⑩, Terminal ⑧, Connection bracket ①, ②, Gasket ④, ⑤, O-ring ⑥, ⑦, Receptacle assembly | Plug-in type             |
|     |                                          | VFR4000-19-2A- <sup>03</sup> <sub>04</sub> | Manifold block ⑩, Connection bracket ①, ②, Gasket ④, ⑤, O-ring ⑥, ⑦                                  | Non plug-in type         |
| ⑪   | End plate (U side) assembly              | VVF4000-2A-1                               | End plate (U) ⑪, Metal joint ①, ②                                                                    | Plug-in type             |
|     |                                          | VVF4000-2A-2                               | End plate (U) ⑪, Metal joint ①, ②                                                                    | Non plug-in type         |
| ⑫   | End plate (D side) assembly              | VVF4000-3A-1                               | End plate (D) ⑫, Connection bracket ①, ②, Gasket ③, ④, O-ring ⑥, ⑦                                   | Plug-in type             |
|     |                                          | VVF4000-3A-2                               | End plate (D) ⑫, Connection bracket ①, ②, Gasket ③, ⑤, O-ring ⑥, ⑦                                   | Non plug-in type         |



Note) For side ported

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

VFN



# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in

# Series VFR5000

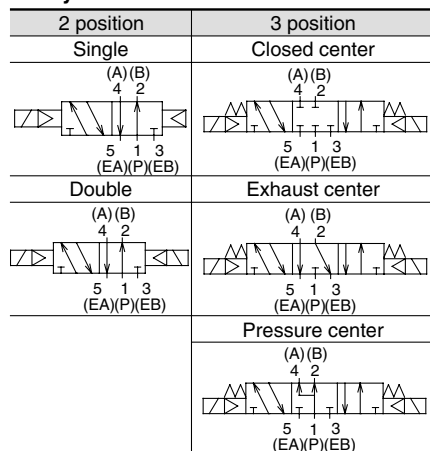


Plug-in type



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 <sup>(1)</sup>                          |                                |
|                            | Manual override                       | Non-locking push type                            |                                |
|                            | Mounting orientation                  | Unrestricted                                     |                                |
| Electricity specifications | Shock/Vibration resistance            | 300/50 m/s <sup>2</sup> <sup>(2)</sup>           |                                |
|                            | 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) <sup>(3)</sup>    | Inrush                                           | 5.6 VA/50 Hz, 5.0 VA/60 Hz     |
|                            |                                       | Holding                                          | 3.4 VA/50 Hz, 2.3 VA/60 Hz     |
|                            | Power consumption (DC) <sup>(3)</sup> | 1.8 W                                            |                                |
| Electrical entry           |                                       | Plug-in type                                     | Conduit terminal               |
|                            |                                       | Non plug-in type                                 | 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:  
2 position 0 to 0.9 MPa  
3 position 0.15 to 0.9 MPa

Pilot pressure:  
2 position single 0.2 to 0.9 MPa  
2 position double 0.1 to 0.9 MPa  
3 position 0.3 x P + 0.1 to 0.9 MPa  
(P: Operating pressure)

### Model

| Type of<br>actuation |                    | Model   |             | Port<br>size | Flow characteristics <sup>(1)</sup> |             |           |                         |             |           | Max. <sup>(2)</sup><br>operating cycle<br>(Hz) | Response<br>time <sup>(3)</sup><br>(ms) | Weight <sup>(4)</sup><br>(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             | VFR510□ | VFR511□     | 3/8          | 17                                  | 0.36        | 4.7       | 18                      | 0.40        | 5.0       | 5                                              | 60 or less                              | 1.77<br>(1.72)                |
|                      |                    |         |             | 1/2          | 20                                  | 0.28        | 5.2       | 23                      | 0.32        | 6.2       |                                                |                                         |                               |
|                      |                    |         |             | 3/4          | 23                                  | 0.27        | 5.8       | 25                      | 0.21        | 6.2       |                                                |                                         |                               |
|                      | Double             | VFR520□ | VFR521□     | 3/8          | 16                                  | 0.37        | 4.6       | 18                      | 0.41        | 5.1       | 5                                              | 60 or less                              | 1.88<br>(1.83)                |
|                      |                    |         |             | 1/2          | 20                                  | 0.27        | 5.2       | 23                      | 0.32        | 6.1       |                                                |                                         |                               |
|                      |                    |         |             | 3/4          | 23                                  | 0.26        | 5.8       | 25                      | 0.20        | 6.1       |                                                |                                         |                               |
| 3 position           | Closed<br>center   | VFR530□ | VFR531□     | 3/8          | 15                                  | 0.38        | 4.1       | 16                      | 0.31        | 4.3       | 3                                              | 80 or less                              | 1.87<br>(1.82)                |
|                      |                    |         |             | 1/2          | 17                                  | 0.31        | 4.6       | 20                      | 0.33        | 5.4       |                                                |                                         |                               |
|                      |                    |         |             | 3/4          | 18                                  | 0.28        | 4.7       | 21                      | 0.30        | 5.4       |                                                |                                         |                               |
|                      | Exhaust<br>center  | VFR540□ | VFR541□     | 3/8          | 14                                  | 0.38        | 3.6       | 17 [16]                 | 0.39 [0.35] | 4.8 [4.3] | 3                                              | 80 or less                              | 1.87<br>(1.82)                |
|                      |                    |         |             | 1/2          | 17                                  | 0.29        | 4.6       | 21 [18]                 | 0.31 [0.34] | 5.6 [5.0] |                                                |                                         |                               |
|                      |                    |         |             | 3/4          | 18                                  | 0.29        | 4.6       | 23 [20]                 | 0.27 [0.33] | 5.9 [5.2] |                                                |                                         |                               |
|                      | Pressure<br>center | VFR550□ | VFR551□     | 3/8          | 16 [9.4]                            | 0.39 [0.40] | 4.2 [2.6] | 17                      | 0.36        | 4.5       | 3                                              | 80 or less                              | 1.87<br>(1.82)                |
|                      |                    |         |             | 1/2          | 18 [9.7]                            | 0.32 [0.45] | 5.0 [2.9] | 20                      | 0.31        | 5.3       |                                                |                                         |                               |
|                      |                    |         |             | 3/4          | 19 [9.2]                            | 0.35 [0.48] | 5.4 [2.8] | 21                      | 0.29        | 5.6       |                                                |                                         |                               |



Note 1) [ ]: Denotes the normal position.

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

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

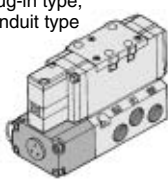
Note 4) For VFR5□00-□FZ-06, ( ): VFR5□10-□DZ-06

# Series VFR5000

## How to Order

**Electrical entry**

F: Plug-in type, conduit type



**Option**

|     |                                     |
|-----|-------------------------------------|
| Nil | None                                |
| Z * | With light/surge voltage suppressor |

**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  | 3/8               |
| 04  | 1/2               |
| 06  | 3/4               |

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Plug-in** VFR5 0 0 5 F     06  

**Non plug-in** VFR5 1 1 1 D     06  

**Symbol**

1 2 position single (A)(B) 4 2 5 1 3 (EA)(P)(EB)

2 2 position double (A)(B) 4 2 5 1 3 (EA)(P)(EB)

3 3 position closed center (A)(B) 4 2 5 1 3 (EA)(P)(EB)

4 3 position exhaust center (A)(B) 4 2 5 1 3 (EA)(P)(EB)

5 3 position pressure center (A)(B) 4 2 5 1 3 (EA)(P)(EB)

**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 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**

E: Grommet terminal

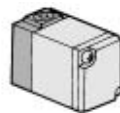


D: DIN terminal

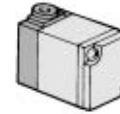


**Pilot valve Manual override**

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

### Manual override

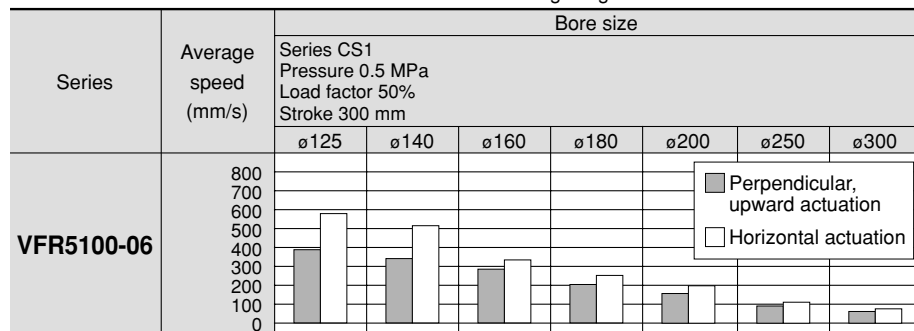
|     |                                    |
|-----|------------------------------------|
| Nil | Non-locking push type              |
| A * | Non-locking push type A (Extended) |
| B * | Locking type B (Tool required)     |
| C * | Locking type C (Lever)             |

\* Option

# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR5000

## 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.

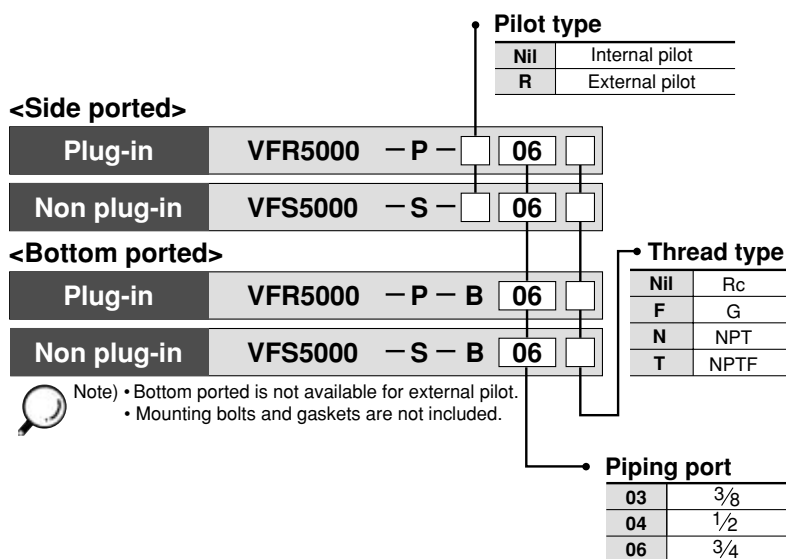
\* The average velocity of the cylinder is what the stroke is divided by the total stroke time.

\* Load factor: ((Load weight x 9.8)/Theoretical force) x 100%

## Conditions

|            |                  | Series CS1   |
|------------|------------------|--------------|
| VFR5110-06 | Tube x Length    | SGP20A x 1 m |
|            | Speed controller | AS500-06     |
|            | Silencer         | AN500-06     |

## How to Order Sub-plate Assembly



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

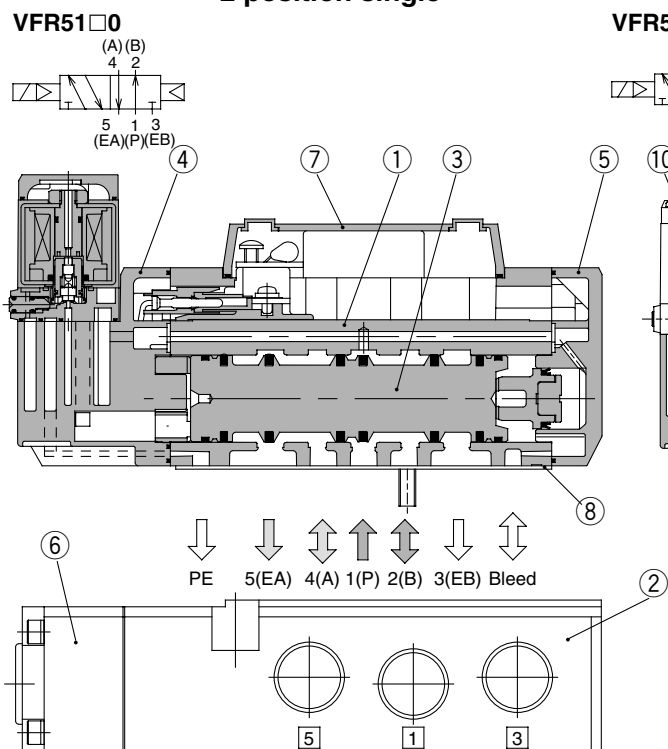
EVS

VFN

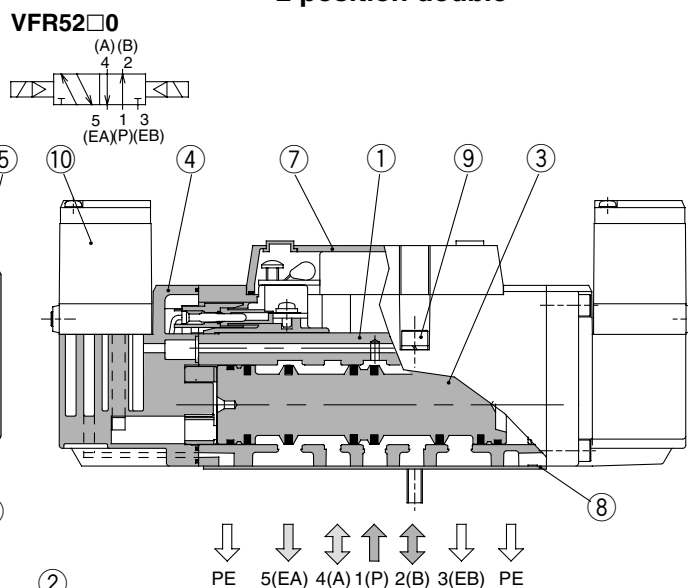
# Series VFR5000

## Construction

### 2 position single

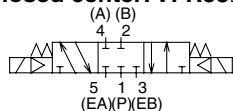


### 2 position double

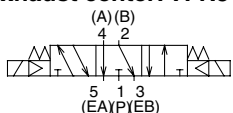


### 3 position closed center/exhaust center/pressure center

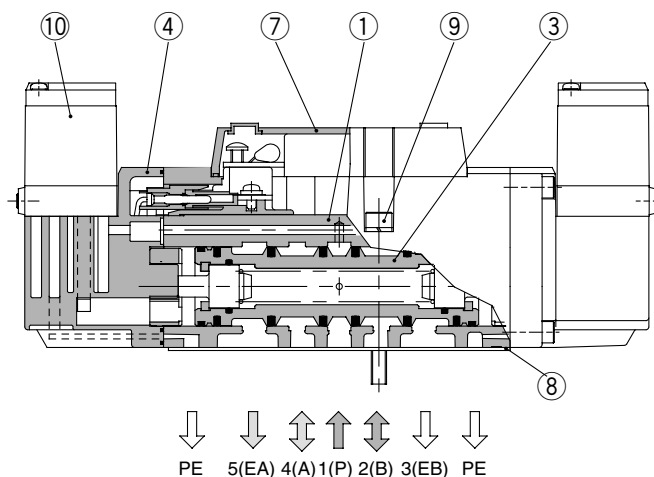
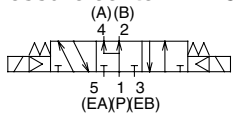
#### Closed center: VFR53□0



#### Exhaust center: VFR54□0



#### Pressure center: VFR55□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    | Black |
| ⑦   | Light cover    | Resin    |       |

## Replacement Parts

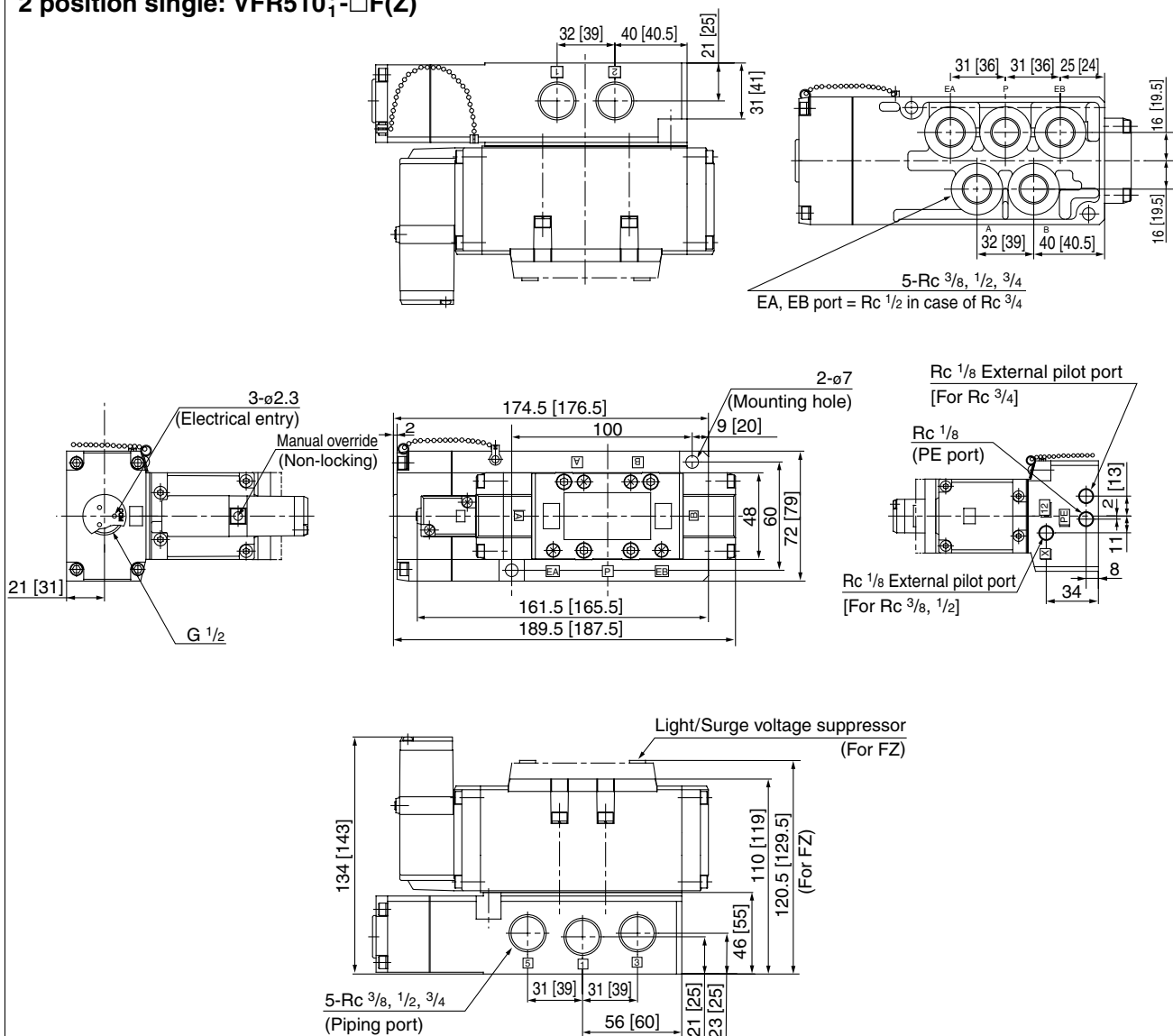
| No. | Description               | Material | Part no.                                                     |                      |                      |
|-----|---------------------------|----------|--------------------------------------------------------------|----------------------|----------------------|
|     |                           |          | VFR51□□                                                      | VFR52□□              | VFR53□□/54□□/55□□    |
| ⑧   | Gasket                    | NBR      | AXT627-10-1                                                  | AXT627-10-1          | AXT627-10-1          |
| ⑨   | Hexagon socket head screw | Steel    | AXT627-42-1(M5 x 50)                                         | AXT627-42-1(M5 x 50) | AXT627-42-1(M5 x 50) |
| ⑩   | Pilot valve assembly      |          | Refer to "How to Order Pilot Valve Assembly" on page 3-5-78. |                      |                      |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR5000

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

2 position single: VFR510<sup>0</sup>-□F(Z)



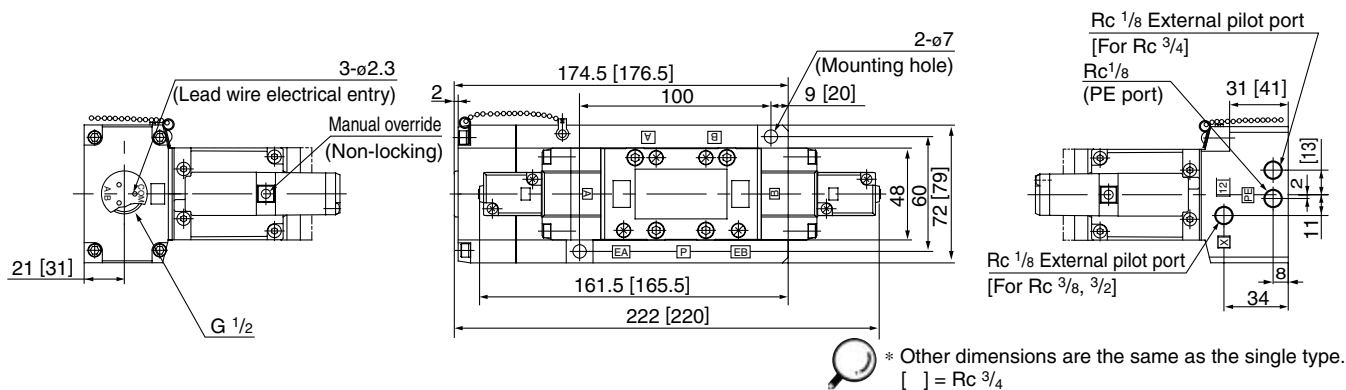
[ ] = Rc  $\frac{3}{4}$

2 position double: VFR520<sup>0</sup>-□F(Z)

3 position closed center: VFR530<sup>0</sup>-□F(Z)

3 position exhaust center: VFR540<sup>0</sup>-□F(Z)

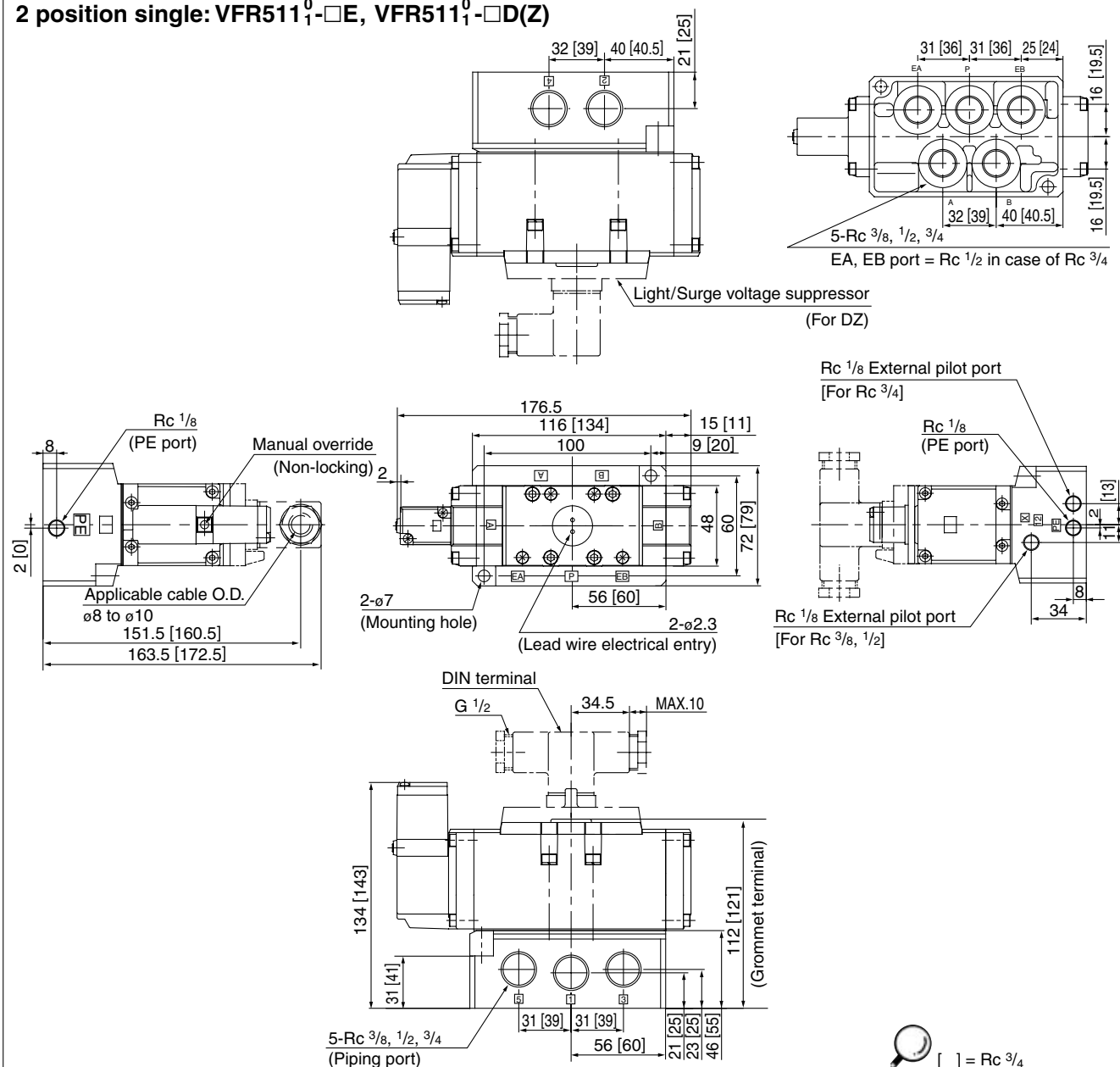
3 position pressure center: VFR550<sup>0</sup>-□F(Z)



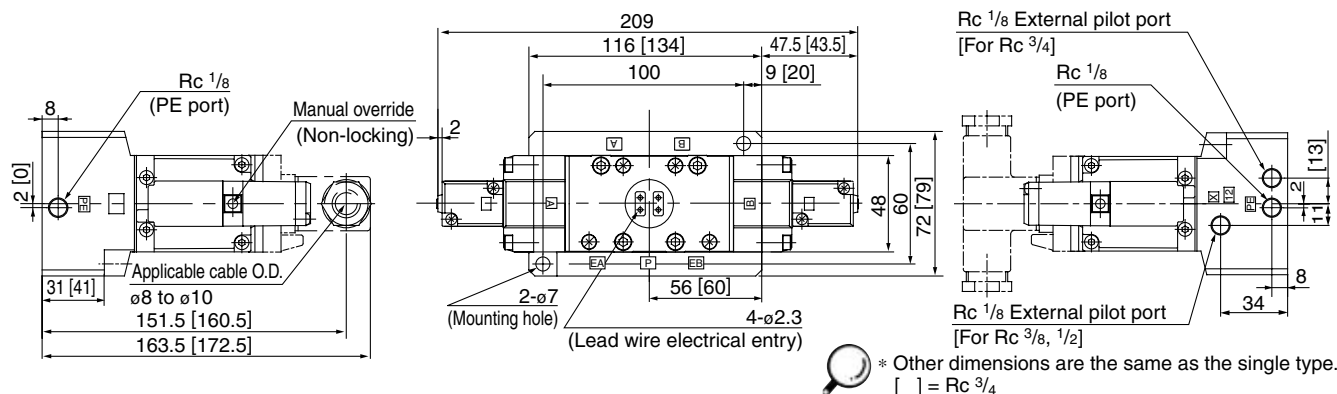
# Series VFR5000

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

### 2 position single: VFR511<sup>0</sup>-□E, VFR511<sup>0</sup>-□D(Z)



### 2 position double: VFR521<sup>0</sup>-□E, VFR521<sup>0</sup>-□D(Z) 3 position closed center: VFR531<sup>0</sup>-□E, VFR531<sup>0</sup>-□D(Z) 3 position exhaust center: VFR541<sup>0</sup>-□E, VFR541<sup>0</sup>-□D(Z) 3 position pressure center: VFR551<sup>0</sup>-□E, VFR551<sup>0</sup>-□D(Z)



# Series VFR5000

## Manifold Specifications

### Manifold Specifications

| Base model                    | Wiring                 | Porting specifications | Port size Rc |          | Stations | Applicable valve model   |
|-------------------------------|------------------------|------------------------|--------------|----------|----------|--------------------------|
|                               |                        | A, B port              | P, EA, EB    | A, B     |          |                          |
| Plug-in type<br>VV5FR5-01□    | • With terminal block  | Side/Bottom            | 3/4          | 1/2, 3/4 | 2 to 10  | VFR5□□□-□F               |
|                               | • With multi-connector |                        |              |          | 2 to 8   |                          |
| Non plug-in type<br>VV5FR5-10 | • With D-sub connector |                        |              |          | 2 to 10  | VFR5□1□-□E<br>VFR5□1□-□D |
|                               | • Grommet terminal     |                        |              |          |          |                          |
|                               | • DIN terminal         |                        |              |          |          |                          |



### How to Order Manifold Assembly

Instruct by specifying the valves, blanking plate and manifold option parts assembly to be mounted on the manifold along with the manifold base model no.

<Example> Plug-in type with terminal block: 6 stations

VV5FR5-10T-061-04..... 1 set (Manifold part number)  
 \* VFR5100-5FZ..... 3 sets (2 position single)  
 \* VFR5200-5FZ..... 2 sets (2 position double)  
 \* VVFS5000-10A..... 1 set (Blanking plate assembly part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.

When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

<Example> Non plug-in type: 6 stations

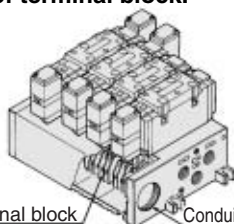
VV5FR5-10-061-04..... 1 set (Manifold part number)  
 \* VFR5110-5D..... 5 sets (2 position single)  
 \* VFR5410-5D..... 1 set (3 position exhaust center)  
 \* VVFS5000-R-04-2..... 1 set (Individual EXH spacer)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.

When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

### Plug-in Type: With Terminal Block

- Since 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.



Terminal block Conduit porting

VV5FR5 - 01T - 06 1 - 04 □

Series VFR5000  
Manifold

Plug-in type  
with terminal block

Stations

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      | Common  | Common | Bottom *                      |

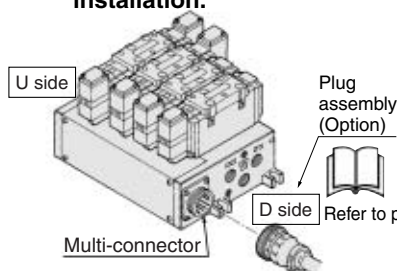
\* Option

| Symbol | P, EA, EB | A, B * | Thread type |      |
|--------|-----------|--------|-------------|------|
|        |           |        | Nil         | Rc   |
| 04     | 3/4       | 1/2    | F           | G    |
| 06     |           | 3/4    | N           | NPT  |
| M      |           | Mixed  | T           | NPTF |

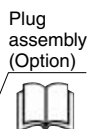
\* For bottom ported: 1/2 only.

### Plug-in Type: With Multi-connector (For wiring specifications, refer to page 3-5-8.)

- Master connection of power and solenoid valves.
- Quick wiring permits ease of installation.



Multi-connector



Plug assembly (Option) Refer to page 3-5-8.

VV5FR5 - 01C D - 05 1 - 04 □

Series VFR5000  
Manifold

Plug-in Type  
with multi-connector  
Connector mounting  
direction

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      | Common  | Common | Bottom *                      |

\* Option

\* Max: 8 stations

| Symbol | P, EA, EB | A, B * | Thread type |      |
|--------|-----------|--------|-------------|------|
|        |           |        | Nil         | Rc   |
| 04     | 3/4       | 1/2    | F           | G    |
| 06     |           | 3/4    | N           | NPT  |
| M      |           | Mixed  | T           | NPTF |

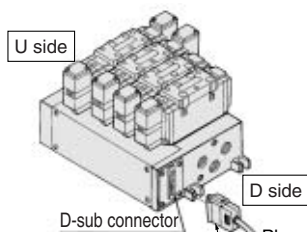
| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
|        |           |        |
| 04     | 3/4       | 1/2    |
| 06     |           | 3/4    |
| M      |           | Mixed  |

\* For bottom ported: 1/2 only.

# Series VFR5000

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 3-5-8.)

- Wide range of interchangeability (D-sub connector (25P) conforming to MIL standard)
- Quick wiring permits easier installation.



**VV5FR5 - 01F D-06 1-04**

Series VFR5000 Manifold Plug-in type with D-sub connector

**Connector mounting direction**

|   |                 |
|---|-----------------|
| D | D side mounting |
| U | U side mounting |

**Stations**

|      |            |
|------|------------|
| 02   | 2 stations |
| ...  | ...        |
| 08 * | 8 stations |

\* Max: 8 stations

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

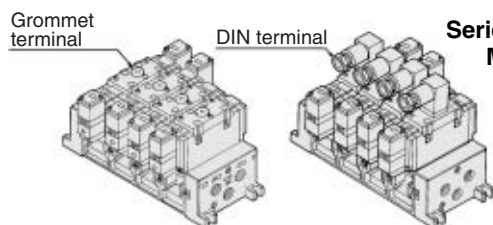
| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 04     |           | 1/2    |
| 06     | 3/4       | 3/4    |
| M      |           | Mixed  |

\* For bottom ported: 1/2 only.

Refer to page 3-5-8.

## Non Plug-in Type: Grommet Terminal, DIN Terminal

- Wiring for every valve



**VV5FR5 - 10-05 1-04**

Series VFR5000 Manifold Non plug-in type

**Stations**

|     |             |
|-----|-------------|
| 02  | 2 stations  |
| ... | ...         |
| 10  | 10 stations |

**Symbol**

| Symbol | Passage |        | Porting specifications (A, B) |
|--------|---------|--------|-------------------------------|
|        | P       | EA, EB |                               |
| 1      | Common  | Common | Side                          |
| 2      |         |        | Bottom *                      |

\* Option

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 04     |           | 1/2    |
| 06     | 3/4       | 3/4    |
| M      |           | Mixed  |

\* For bottom ported: 1/2 only.

Note) Manifold base is common for Series VFS5000. Terminal block is not required.

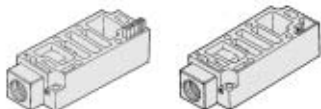
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR5000

## Manifold/Option Parts Assembly

### Individual SUP spacer

Supply port can be located at each valve individually after individual SUP spacer is mounted on manifold block.

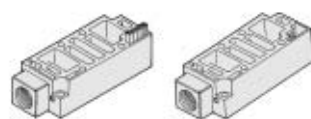
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS5000-P-04-1 | VVFS5000-P-04-2  |



### Individual EXH spacer

Exhaust port can be located at each valve individually after individual EXH spacer is mounted on manifold block. (Common EXH type)

| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS5000-R-04-1 | VVFS5000-R-04-2  |



### SUP block disk

When 2 or more pressures (high and low) are supplied to one manifold, insert a disk between the stations which are supplied different pressures.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT628-12A   |                  |

### EXH block disk

Use exhaust blocks to eliminate back flow to other stations. Use supply disks to operate two pressures on the same manifold.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | AXT512-14-1A |                  |



EXH block disk

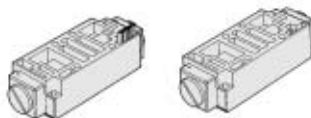


SUP block disk

### Throttle valve spacer

Mount interface speed control on manifold block. Cylinder speed can be controlled by metered out flow.

| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS5000-20A-1 | VVFS5000-20A-2   |

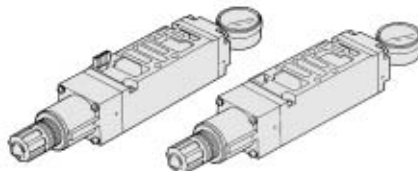


### Interface regulator

When interface regulator is mounted on manifold block, regulation to that valve is possible.

(Refer to "Flow Characteristics" on page 3-5-8 before operation.)

| Body type          | Plug-in type    | Non plug-in type |
|--------------------|-----------------|------------------|
| P port regulation  | ARBF5050-00-P-1 | ARBF5050-00-P-2  |
| A reduced pressure | ARBF5050-00-A-1 | ARBF5050-00-A-2  |
| B reduced pressure | ARBF5050-00-B-1 | ARBF5050-00-B-2  |



### Blanking plate

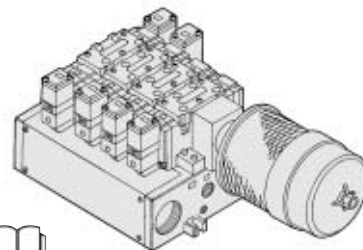
It is used by attaching on the manifold block for being prepared for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | VVFS5000-10A |                  |

## Manifold Option

### With exhaust cleaner Plug-in type/Non plug-in type

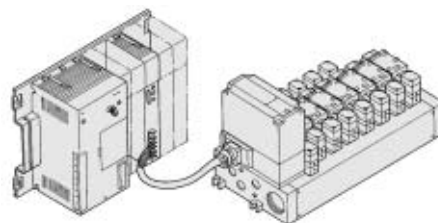
- High noise reduction effect: 35 dB or more
- Drainage and mist are collected (99.9% or more).
- Piping work is reduced.



For details, refer to page 3-5-88.

### With serial interface unit for serial transmission Plug-in type

- Reduces wiring labor and material to manifold.
- Possible to locate separately.  
Manifold solenoid valve: 8 stations max, 32 positions (512 solenoids).
- Easy maintenance



For details, refer to "Serial Transmission" catalog separately.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

EVS

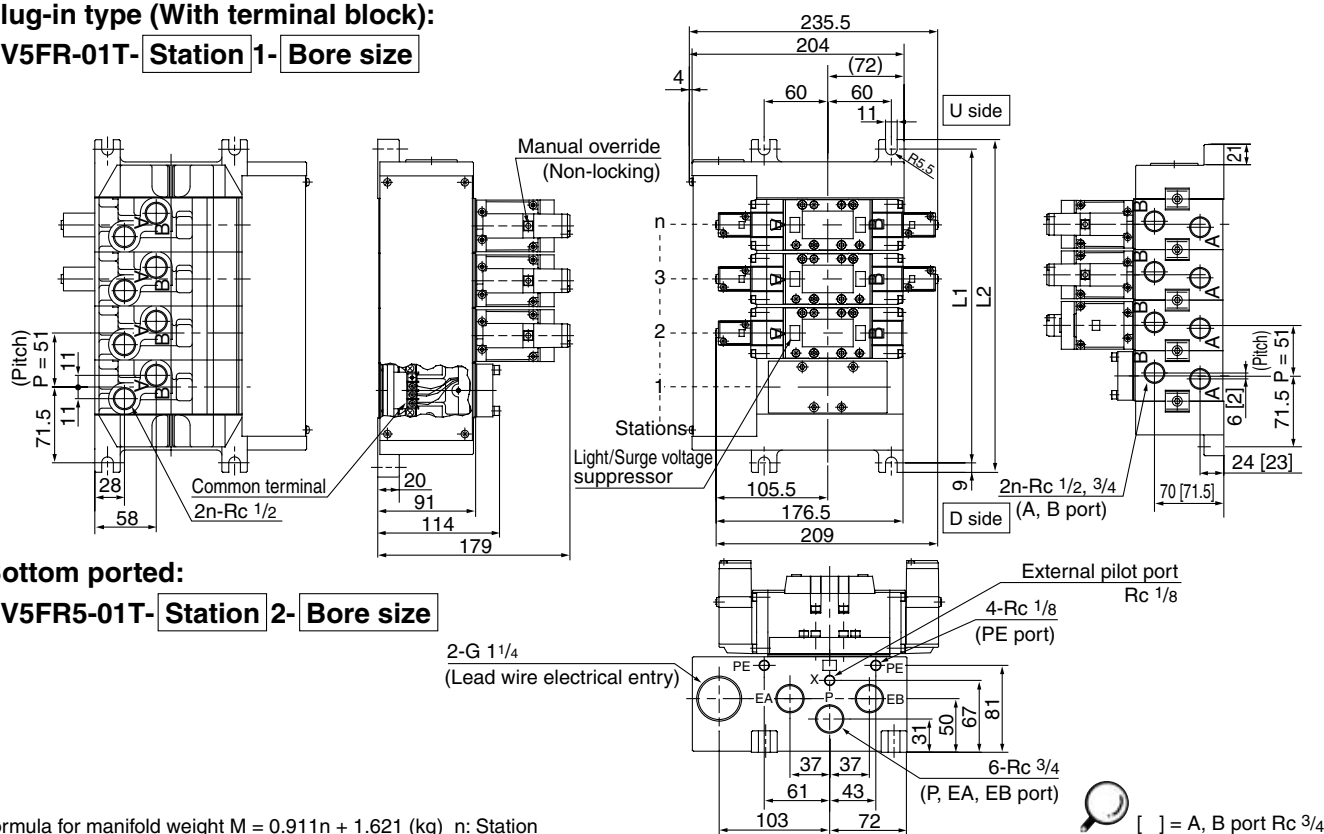
VFN

# Series VFR5000

## Manifold Plug-in type/Non plug-in type

### Plug-in type (With terminal block):

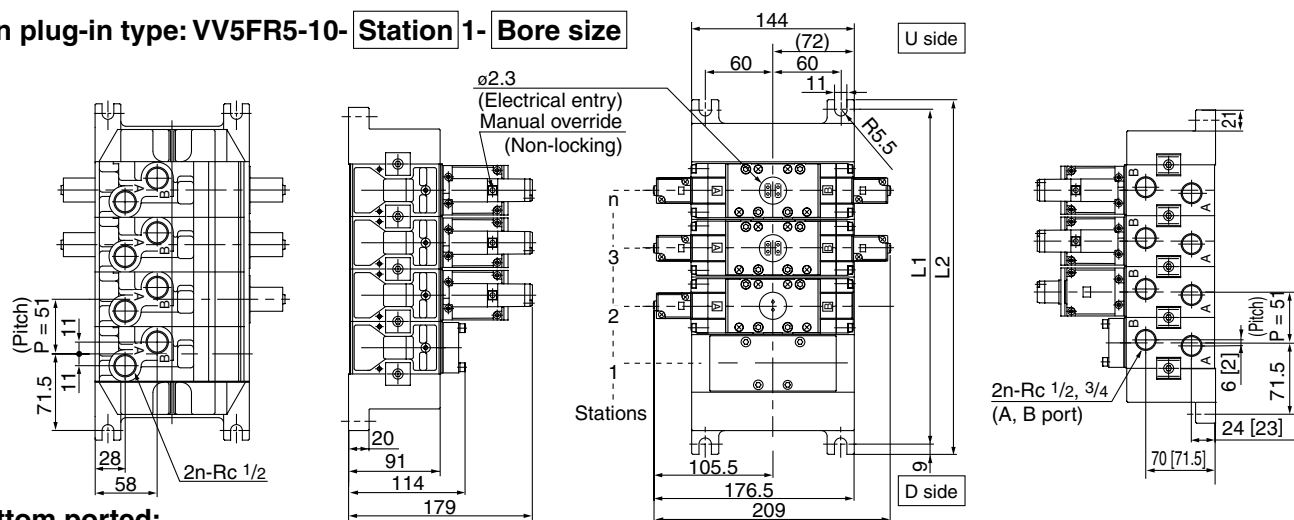
#### VV5FR-01T- Station 1- Bore size



### Bottom ported:

#### VV5FR5-01T- Station 2- Bore size

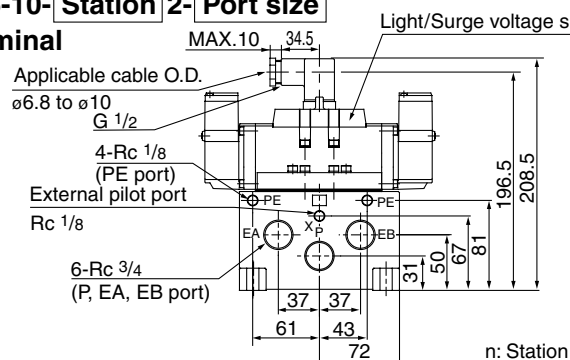
### Non plug-in type: VV5FR5-10- Station 1- Bore size



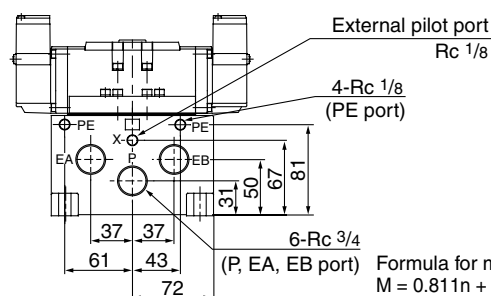
### Bottom ported:

#### VV5FR5-10- Station 2- Port size

#### DIN terminal



#### Grommet with terminal



Formula for manifold weight  $M = 0.811n + 1.231$  (kg)  $n$ : Stations

| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                       |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------------|
| L <sub>1</sub> | 194 | 245 | 296 | 347 | 398 | 449 | 500 | 551 | 602 | L <sub>1</sub> = 51 x n + 92  |
| L <sub>2</sub> | 212 | 263 | 314 | 365 | 416 | 467 | 518 | 569 | 620 | L <sub>2</sub> = 51 x n + 110 |

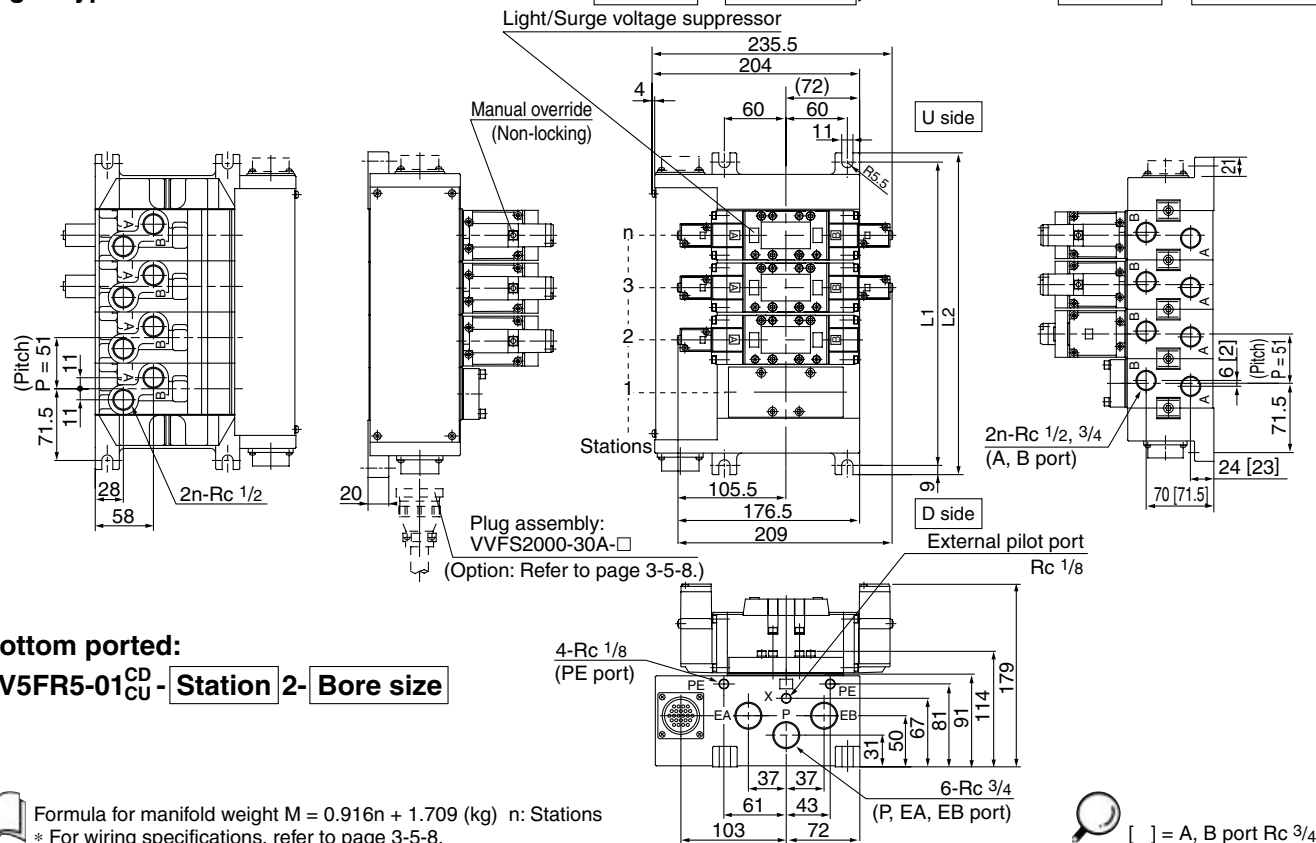
[ ] = A, B port  $Rc\ 3/4$

# 5 Port Pilot Operated Solenoid Valve

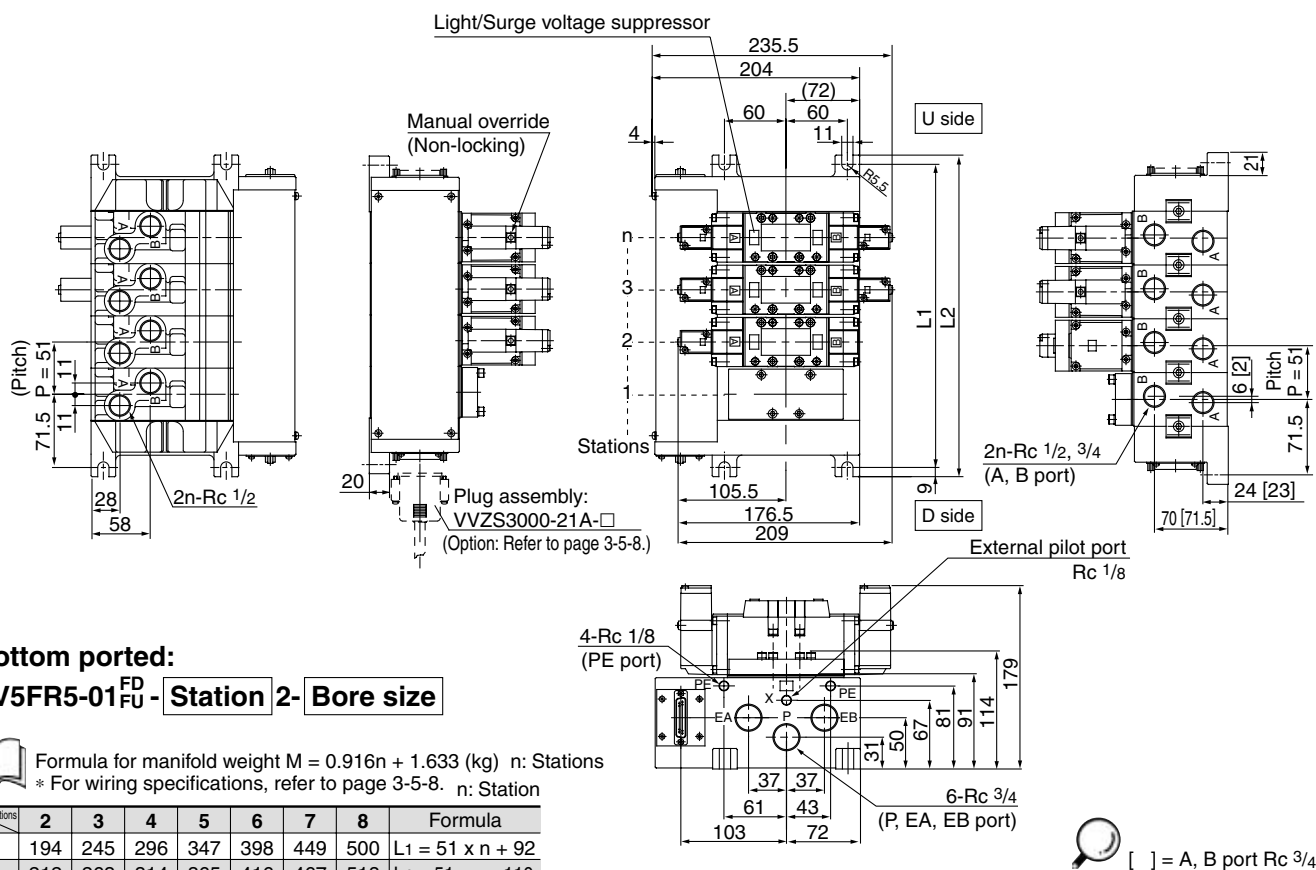
## Rubber Seal, Plug-in/Non Plug-in Series VFR5000

### Manifold Plug-in type: With multi-connector/With D-sub connector

Plug-in type/With multi-connector: VV5FR5-01CD-Station 1- Bore size, VV5FR5-01CU-Station 1- Bore size



Plug-in type/With D-sub connector: VV5FR5-01FD-Station 1- Bore size, VV5FR5-01FU-Station 1- Bore size



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

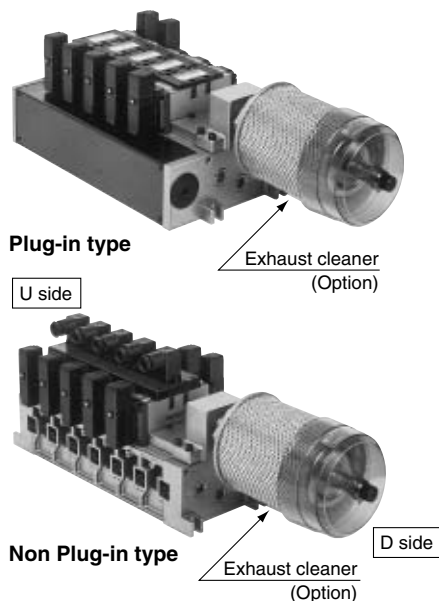
EVS

VFN

# Series VFR5000

## Manifold with Exhaust Cleaner

- Protection of work environment
- Reduction of valve exhaust noise of 35 dB or more
- Drainage and mist are collected. (99.9% or more)
- Piping work is reduced.



### Manifold Specifications

| Manifold                     | Plug-in type: VV5FR5-01□                                            | Non Plug-in type: VV5FR5-10                |
|------------------------------|---------------------------------------------------------------------|--------------------------------------------|
| Wiring                       | With terminal block<br>With multi-connector<br>With D-sub connector | DIN terminal<br>Grommet terminal           |
| Applicable valve model       | VFR5□00-□F                                                          | VFR5□10-□D, VFR5□10-□E                     |
| Porting specifications<br>RC | Common SUP/Common EXH                                               |                                            |
|                              | A, B port                                                           | Side: Rc 1/2, 3/4, Bottom: Rc 1/2 (Option) |
|                              | P port                                                              | Side: Rc 3/4 EXH: Rc 1 1/2                 |
| Stations                     | 2 to 10 <sup>(1)</sup>                                              |                                            |
| Applicable exhaust cleaners  | AMC810-14 (Connecting port R 1 1/2) <sup>(2)</sup>                  |                                            |



Note 1) With multi connector, or with D-sub connector: 8 stations max.

Note 2) Exhaust cleaner: Not attached.

### How to Order

**VV5FR5-10-061-04-CD**

Series VFR5000 Manifold

**Base type/ Electrical entry**

|     |                                      |
|-----|--------------------------------------|
| 01T | Plug-in type<br>With Terminal block  |
| 01C | Plug-in type<br>with multi-connector |
| 01F | Plug-in type<br>with D-sub connector |
| 10  | Non plug-in type                     |

**Connector mounting direction**

| Symbol | With connector  | Applicable base |
|--------|-----------------|-----------------|
| Nil    | None            | 01T, 10         |
| D      | D side mounting | 01C, 01F        |
| U      | U side mounting |                 |

**Stations**

|    |             |
|----|-------------|
| 02 | 2 stations  |
| ⋮  | ⋮           |
| 10 | 10 stations |

• Base 01T, 10: 2 to 10 stations  
• Base 01C/01F: 2 to 8 stations

**Exhaust cleaner mounting direction**

| Symbol | Exhaust cleaner mounting direction |
|--------|------------------------------------|
| CD     | D side D side mounting             |
| CU     | U side U side mounting             |

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Port size**

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     |           | 1/2    |
| 04     | 1/2       | 3/4    |
| M      |           | Mixed  |

\* For bottom ported: 1/2 only.

**Symbol**

| Symbol | Passage | Porting specifications (A, B) |
|--------|---------|-------------------------------|
|        | P       | EA, EB                        |
| 1      | Common  | Common                        |
| 2      |         | Side<br>Bottom *              |

\* Option

### How to Order Manifold Assembly

Instruct by specifying the valves and blanking plate to be mounted on the manifold along with the manifold base model no.

<Example> Plug-in type with terminal block: 6 stations

VV5FR5-01T-061-04-CD..... 1 set (Manifold part no.)  
 \* VFR5100-5FZ..... 3 sets (2 position single part no.)  
 \* VFR5200-5FZ..... 2 sets (2 position double part no.)  
 \* VVFS5000-10A..... 1 set (Blanking plate assembly part no.)  
 \* AMC810-14..... 1 set (Exhaust cleaner part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

### ⚠ Caution

When using exhaust cleaner, mount it downwards.

<Example> Non plug-in type: 6 stations

VV5FR5-10-061-04-CU..... 1 set (Manifold part no.)  
 \* VFR5110-5E..... 3 sets (2 position single part no.)  
 \* VFR5210-5E..... 2 sets (2 position double part no.)  
 \* VVFS5000-10A..... 1 set (Blanking plate assembly part no.)  
 \* AMC810-14..... 1 set (Exhaust cleaner part no.)  
 ↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

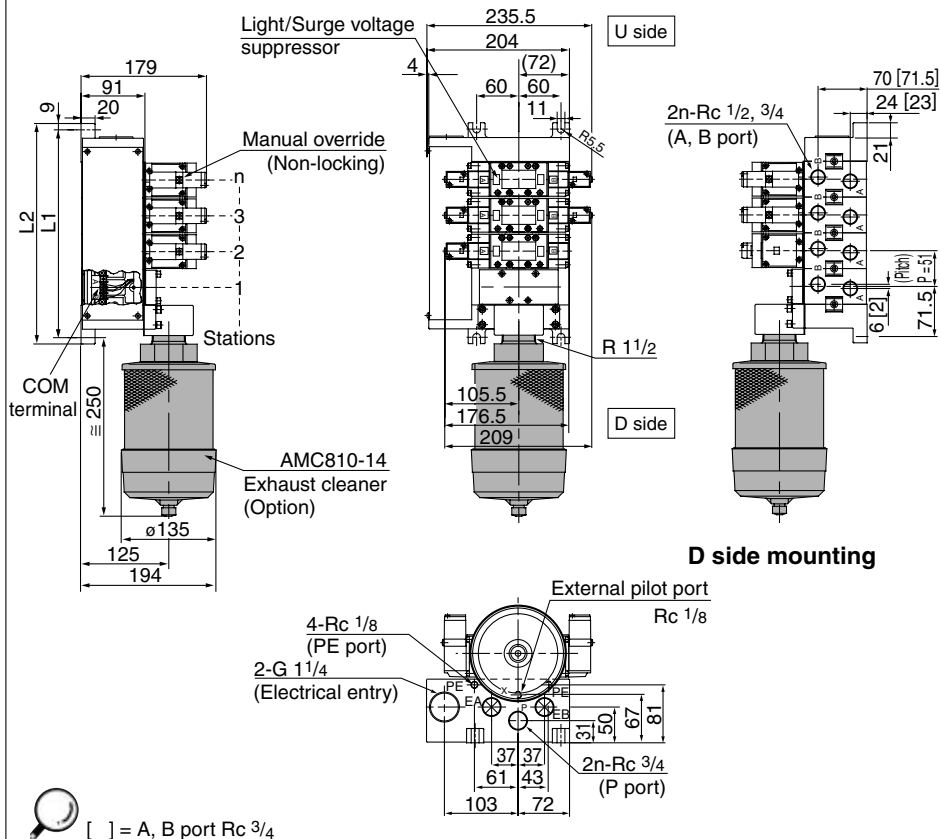
Valve arrangement is counted from the D side.  
 When ordering, specify the part nos. in order from the 1st. station in the D side.  
 When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

# 5 Port Pilot Operated Solenoid Valve

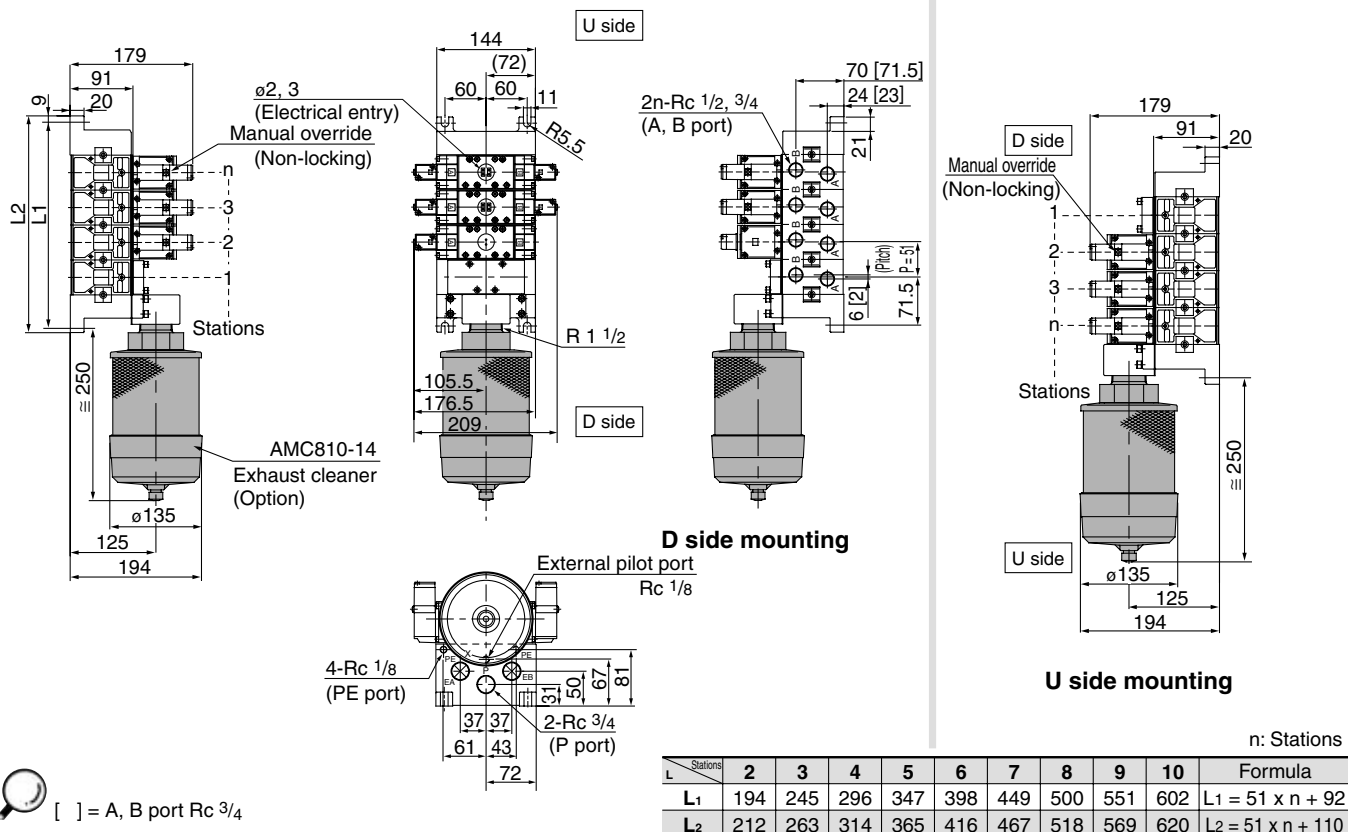
## Rubber Seal, Plug-in/Non Plug-in Series VFR5000

### Manifold with Exhaust Cleaner Plug-in type/Non plug-in type

#### Plug-in type: VV5FR5-01T- Station 1- Bore size - $\phi 20$



#### Non plug-in type: VV5FR5-10- Station 1- Bore size - $\phi 20$



VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

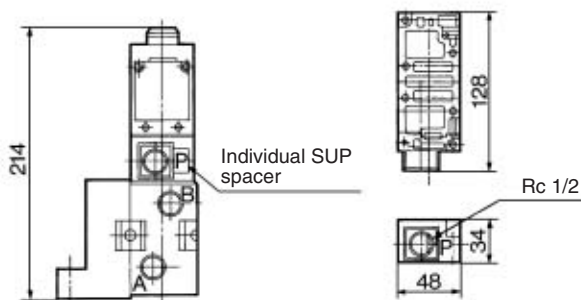
EVS

VFN

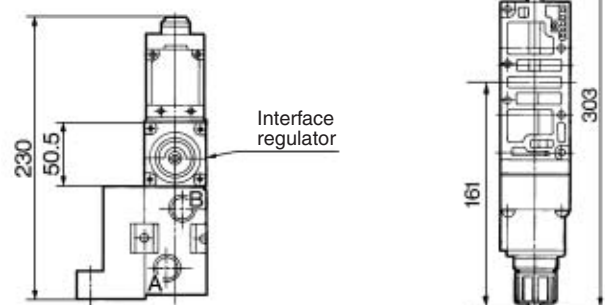
# Series VFR5000

## Manifold Option Parts Assembly Plug-in type, Non plug-in type

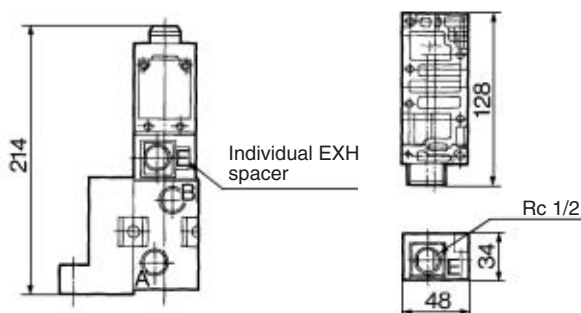
**Individual SUP spacer**  
**VVFS5000-P-04-1 (Plug-in type)**  
**VVFS5000-P-04-2 (Non plug-in type)**



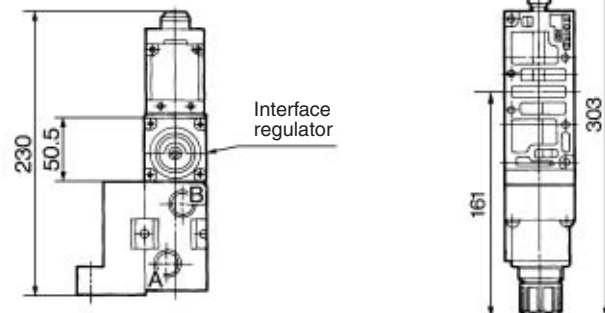
**Interface regulator/P port regulation**  
**ARBF5050-00-P-1 (Plug-in type)**  
**ARBF5050-00-P-2 (Non plug-in type)**



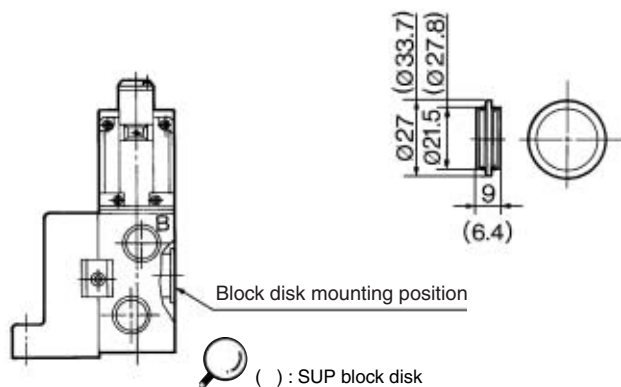
**Individual EXH spacer**  
**VVFS5000-R-04-1 (Plug-in type)**  
**VVFS5000-R-04-2 (Non plug-in type)**



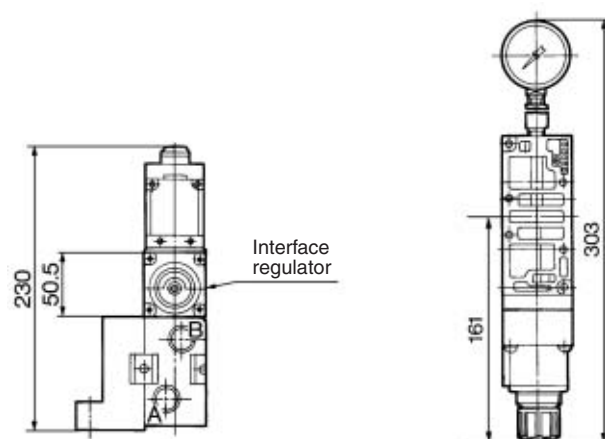
**Interface regulator/A port regulation**  
**ARBF5050-00-A-1 (Plug-in type)**  
**ARBF5050-00-A-2 (Non plug-in type)**



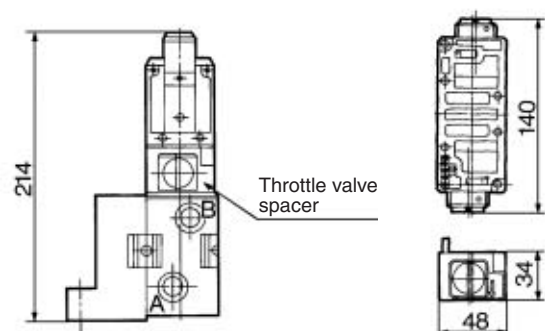
**SUP block disk: AXT628-12A**  
**EXH block disk: AXT512-14-1A**



**Interface regulator/B port regulation**  
**ARBF5050-00-B-1 (Plug-in type)**  
**ARBF5050-00-B-2 (Non plug-in type)**



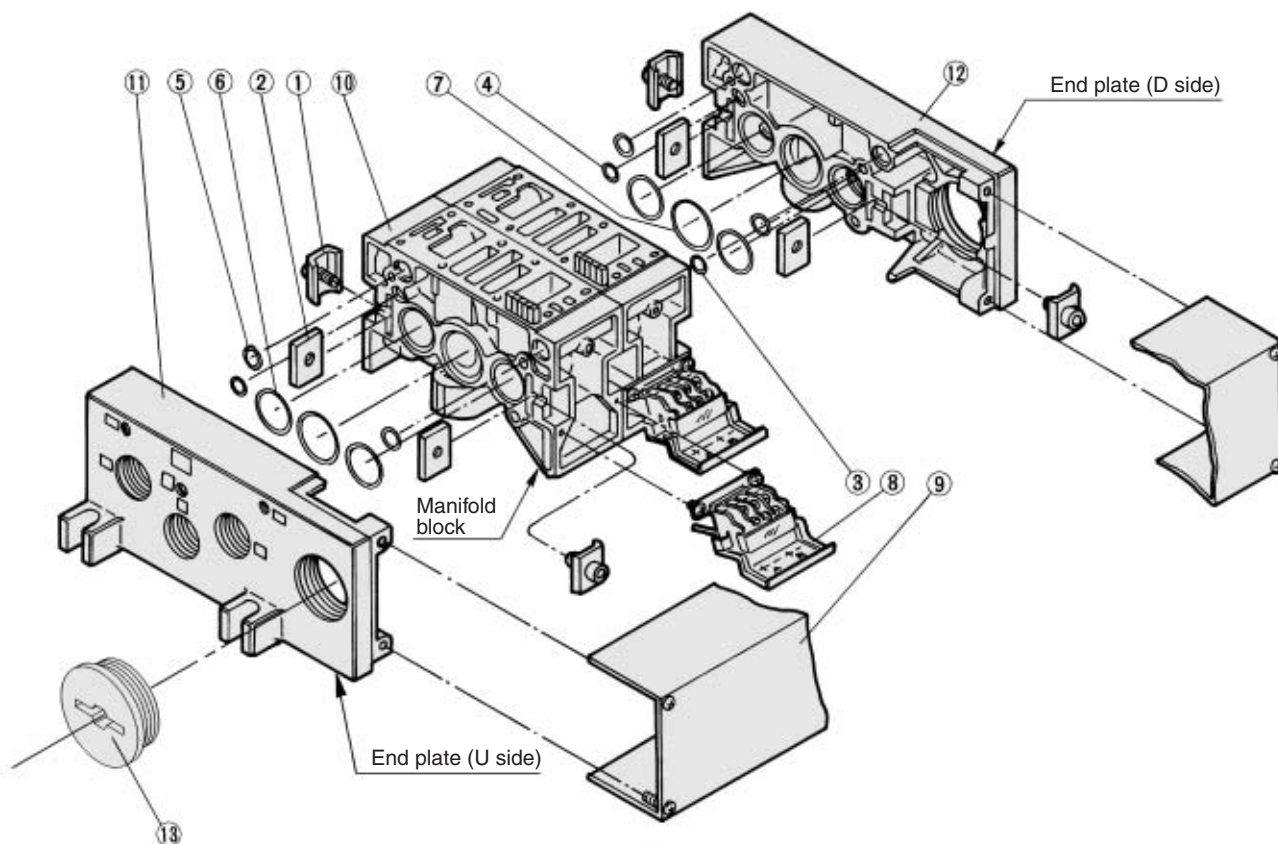
**Throttle valve spacer**  
**VVFS5000-20A-1 (Plug-in type)**  
**VVFS5000-20A-2 (Non plug-in type)**



# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR5000

### Manifold Base Construction Plug-in type/Non plug-in type



### Replacement Parts

| No. | Description             | Material    | Part no.                                            |
|-----|-------------------------|-------------|-----------------------------------------------------|
| ①   | Connection fitting A    | Steel plate | AXT628-6-1A                                         |
| ②   | Connection fitting B    | Steel plate | AXT628-6-2                                          |
| ③   | O-ring                  | NBR         | AS568-006                                           |
| ④   | O-ring                  | NBR         | AS568-010                                           |
| ⑤   | O-ring                  | NBR         | AS568-013                                           |
| ⑥   | O-ring                  | NBR         | AS568-022                                           |
| ⑦   | O-ring                  | NBR         | AS568-026                                           |
| ⑧   | Terminal block assembly | —           | VFR5000-21-1A                                       |
| ⑨   | Junction cover assembly | For 01T     | VVFS5000-4A- <sup>04</sup> <sub>06</sub> [Stations] |
|     |                         | For 01SU    | AZ738-31A- [Stations]                               |
| ⑬   | Rubber plug             | NBR         | AXT336-9                                            |

- When requiring replacement manifold stations, order replacement parts assembly no. ⑩: manifold block assembly part.

For plug-in type: The manifold base with terminal stand (integrated with a junction cover) is required with the ⑨ junction cover assembly.

### Replacement Parts: Sub Assembly



Note) Manifold Base/Construction: Plug-in type with terminal block.

| No. | Description                 | Assembly part no.                          | Component parts                                                                                 | Applicable manifold base |
|-----|-----------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------|
| ⑩   | Manifold block assembly     | VFR5000-20-1A- <sup>04</sup> <sub>06</sub> | Manifold block ⑩, Metal joint ①, ②, Terminal block ⑧, O-ring ③, ④, ⑤, ⑥, ⑦, Receptacle assembly | Plug-in type             |
|     |                             | VVFS5000-1A-2- <sup>04</sup> <sub>06</sub> | Manifold block ⑩, Metal joint ①, ②, O-ring ③, ④, ⑤, ⑥, ⑦                                        | Non plug-in type         |
| ⑪   | End plate (U side) assembly | VVFS5000-2A-1                              | End plate (U) ⑪, Metal joint ①, ②                                                               | Plug-in type             |
|     |                             | VVFS5000-2A-2                              | End plate (U) ⑪, Metal joint ①, ②                                                               | Non plug-in type         |
| ⑫   | End plate (D side) assembly | VVFS5000-3A-1                              | End plate (D) ⑫, Metal joint ①, ②, O-ring ③, ④, ⑤, ⑥, ⑦                                         | Plug-in type             |
|     |                             | VVFS5000-3A-2                              | End plate (D) ⑫, Metal joint ①, ②, O-ring ③, ④, ⑤, ⑥, ⑦                                         | Non plug-in type         |



# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in

# Series VFR6000

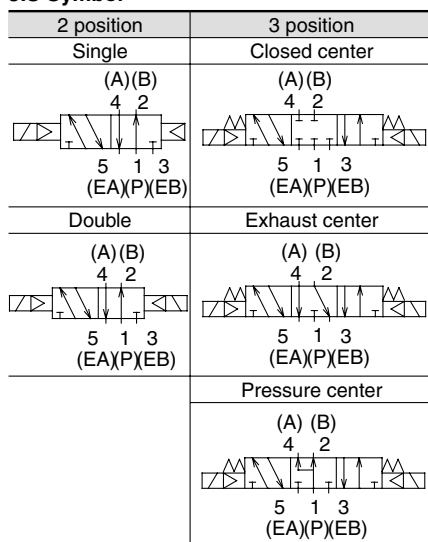


Plug-in type



Non plug-in type

### JIS Symbol



### Caution

When double solenoid is used, spool valve should be mounted horizontally.  
If there are vibrations, spool valve should be mounted perpendicular to the vibration direction.

### Standard Specifications

| Valve specifications       | Fluid                                 |                                                   | Air                                              |                                                    |
|----------------------------|---------------------------------------|---------------------------------------------------|--------------------------------------------------|----------------------------------------------------|
|                            | Operating pressure range              | 2 position single/3 position<br>2 position double | 0.2 to 0.9 MPa<br>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 <sup>(1)</sup>                          |                                                    |
|                            | Manual override                       |                                                   | Non-locking push type                            |                                                    |
|                            | Shock/Vibration resistance            |                                                   | 300/50 m/s <sup>2</sup> <sup>(2)</sup>           |                                                    |
|                            | Enclosure                             |                                                   | Dustproof                                        |                                                    |
| Electricity specifications | Coil rated voltage                    |                                                   | 100, 200 VAC (50/60 Hz), 24 VDC                  |                                                    |
|                            | Allowable voltage fluctuation         |                                                   | -15 to -10% of rated voltage                     |                                                    |
|                            | Apparent power (AC) <sup>(3)</sup>    | Inrush                                            | 5.6 VA/50 Hz, 5.0 VA/60 Hz                       |                                                    |
|                            |                                       | Holding                                           | 3.4 VA/50 Hz, 2.3 VA/60 Hz                       |                                                    |
|                            | Power consumption (DC) <sup>(3)</sup> |                                                   | 1.8 W                                            |                                                    |
|                            | Electrical entry                      |                                                   | Plug-in type<br>Non plug-in type                 | Conduit terminal<br>Grommet terminal, DIN terminal |



Note 1) Use turbine oil Class 1 (ISO VG32), if lubricated.

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

|                            |                                                  |
|----------------------------|--------------------------------------------------|
| Main valve manual override | Direct manual override                           |
| Coil rated voltage         | 110 to 120, 220, 240 VAC 50/60 Hz<br>12, 100 VDC |
| Option                     | With light/surge voltage suppressor              |

### Model

| Type of actuation |                 | Model   |             | Port size | Flow characteristics <sup>(1)</sup> |             |           |                         |             |           | Max. operating cycle (Hz) <sup>(2)</sup> | Response time (ms) <sup>(3)</sup> | Weight (kg) <sup>(4)</sup> |
|-------------------|-----------------|---------|-------------|-----------|-------------------------------------|-------------|-----------|-------------------------|-------------|-----------|------------------------------------------|-----------------------------------|----------------------------|
|                   |                 |         |             |           | 1 → 4/2 (P → A/B)                   |             |           | 4/2 → 5/3 (A/B → EA/EB) |             |           |                                          |                                   |                            |
|                   |                 | Plug-in | Non plug-in |           | C [dm³/s(bar)]                      | b           | Cv        | C [dm³/s(bar)]          | b           | Cv        |                                          |                                   |                            |
| 2 position        | Single          | VFR610□ | VFR611□     | 3/4       | 40                                  | 0.12        | 9.1       | 41                      | 0.15        | 9.6       | 2                                        | 100 or less                       | 4.73 (4.56)                |
|                   | Double          | VFR620□ | VFR621□     | 3/4       | 40                                  | 0.14        | 9.2       | 41                      | 0.17        | 9.7       | 2                                        | 100 or less                       | 4.78 (4.61)                |
| 3 position        | Closed center   | VFR630□ | VFR631□     | 3/4       | 39                                  | 0.17        | 9.3       | 39                      | 0.15        | 9.3       | 1                                        | 150 or less                       | 4.72 (4.55)                |
|                   | Exhaust center  | VFR640□ | VFR641□     | 3/4       | 38                                  | 0.14        | 8.9       | 42 [40]                 | 0.12 [0.15] | 9.6 [9.4] | 1                                        | 150 or less                       | 4.72 (4.55)                |
|                   | Pressure center | VFR650□ | VFR651□     | 3/4       | 38 [20]                             | 0.10 [0.44] | 8.7 [5.7] | 40                      | 0.16        | 9.3       | 1                                        | 150 or less                       | 4.72 (4.55)                |

| Type of actuation |                 | Model   |             | Port size | Effective area (mm <sup>2</sup> )                           |
|-------------------|-----------------|---------|-------------|-----------|-------------------------------------------------------------|
|                   |                 | Plug-in | Non plug-in |           |                                                             |
| 2 position        | Single          | VFR610□ | VFR611□     | 1         | 191                                                         |
|                   | Double          | VFR620□ | VFR621□     | 1         | 191                                                         |
| 3 position        | Closed center   | VFR630□ | VFR631□     | 1         | 180                                                         |
|                   | Exhaust center  | VFR640□ | VFR641□     | 1         | P → A, B: 178<br>A, B → EA, EB: 212<br>Normal position: 193 |
|                   | Pressure center | VFR650□ | VFR651□     | 1         | P → A, B: 183<br>Normal position: 82<br>A, B → EA, EB: 199  |



Note 1) [ ]: Denotes the normal position.

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

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

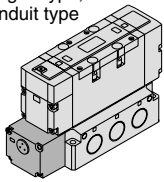
Note 4) For VFR6□00-□FZ-06, ( ): VFR6□10-□DZ-06

# Series VFR6000

## How to Order

**Electrical entry**

F: Plug-in type, conduit type



**Option**

|     |                                     |
|-----|-------------------------------------|
| Nil | None                                |
| Z * | With light/surge voltage suppressor |

\* Not applicable to grommet terminal.

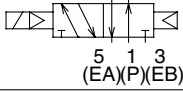
**Port size**

|     |                   |
|-----|-------------------|
| Nil | Without sub-plate |
| 06  | 3/4               |
| 10  | 1                 |

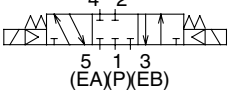
**Plug-in** VFR6   0   0   5 F   10  

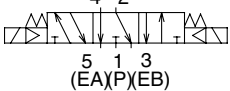
**Non plug-in** VFR6   1   1   1 D   10  

**Symbol**

1 2 position single (A)(B)  
  
 5 1 3 (EA)(P)(EB)

2 2 position double (A)(B)  
  
 5 1 3 (EA)(P)(EB)

3 3 position closed center (A)(B)  
  
 5 1 3 (EA)(P)(EB)

4 3 position exhaust center (A)(B)  
  
 5 1 3 (EA)(P)(EB)

5 3 position pressure center (A)(B)  
  
 5 1 3 (EA)(P)(EB)

**Body option**

|     |                        |
|-----|------------------------|
| 0   | Standard               |
| 1 * | Direct manual override |

\* Option

**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                    |

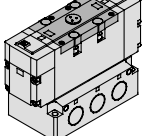
\* Option

**Thread type**

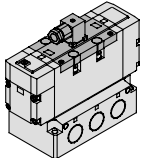
|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

**Electrical entry**

E: Grommet terminal



D: DIN terminal



## How to Order Pilot Valve Assembly

SF4 - 1 F - 22

**Coil rated voltage**

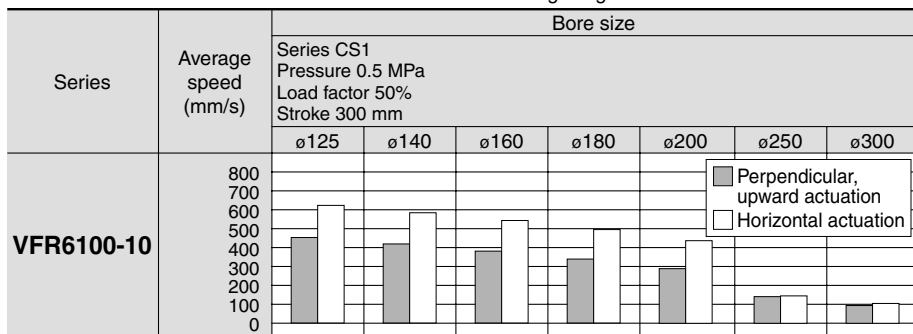
| Symbol | Rated voltage            |
|--------|--------------------------|
| 1      | 100 VAC, 50/60 Hz        |
| 2      | 200 VAC, 50/60 Hz        |
| 3 *    | 110 to 120 VAC, 50/60 Hz |
| 4 *    | 220 VAC, 50/60 Hz        |
| 5      | 24 VDC                   |
| 6 *    | 12 VDC                 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

\* Option

# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in Series VFR6000

## 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   |
|------------|------------------|--------------|
| VFR6110-10 | Tube x Length    | SGP25A x 1 m |
|            | Speed controller | AN600-10     |
|            | Silencer         | AS600-10     |

## How to Order Sub-plate Assembly

|                    |                |            |           |                          |
|--------------------|----------------|------------|-----------|--------------------------|
| <b>Plug-in</b>     | <b>VFR6000</b> | <b>- P</b> | <b>10</b> | <input type="checkbox"/> |
| <b>Non plug-in</b> | <b>VFS6000</b> | <b>- S</b> | <b>10</b> | <input type="checkbox"/> |

Note) • Not applicable for external pilot.  
 • Not applicable for bottom ported.  
 • Mounting bolt and gasket are not included.

**Piping port (P, A, B, EA, EB port)**

|    |     |
|----|-----|
| 06 | 3/4 |
| 10 | 1   |

**Thread type**

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

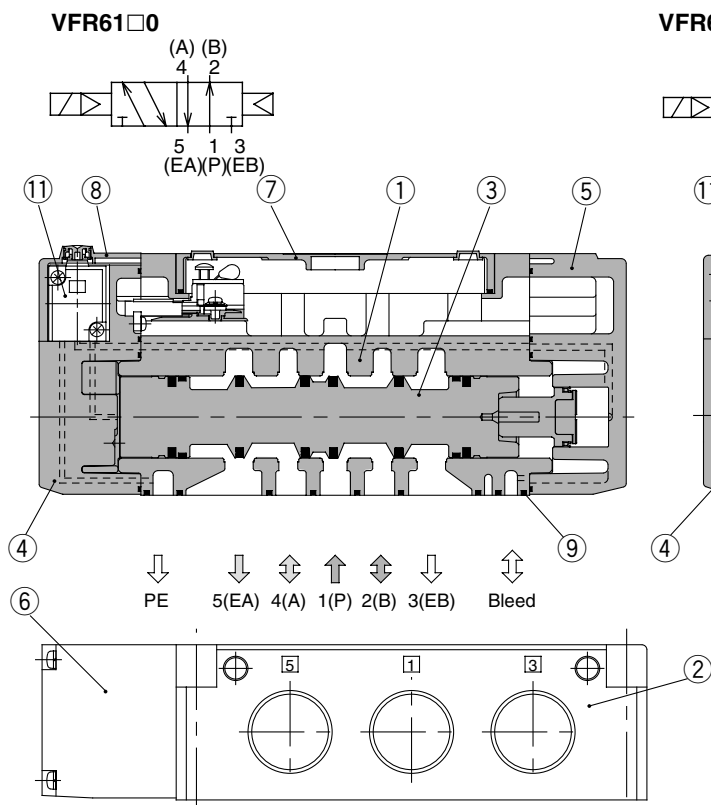
EVS

VFN

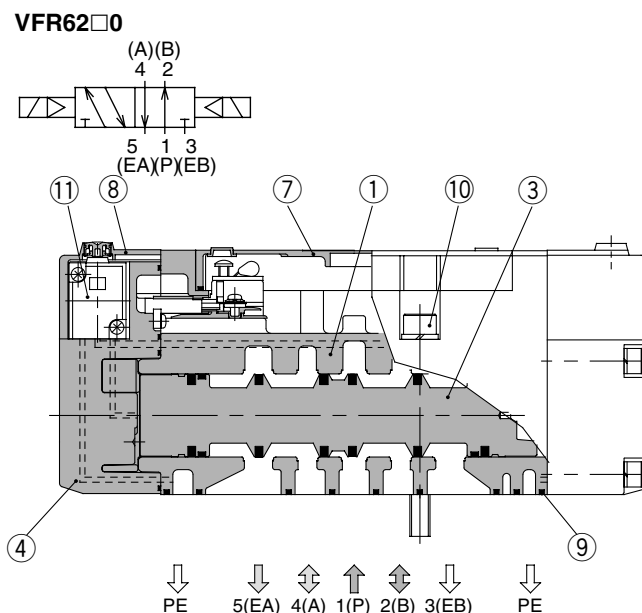
# Series VFR6000

## Construction

### 2 position single

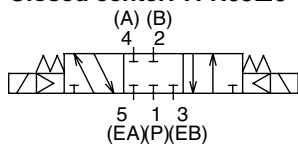


### 2 position double

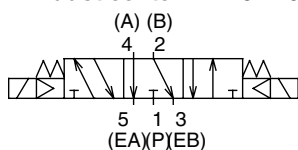


### 3 position closed center/exhaust center/pressure center

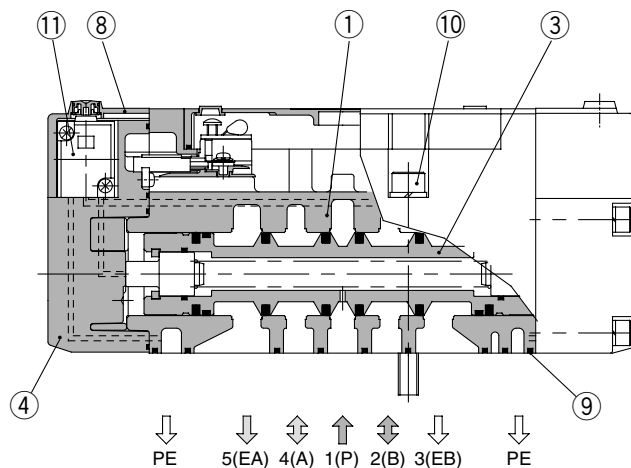
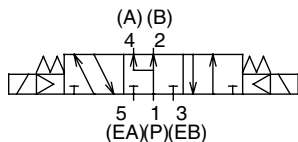
#### Closed center: VFR63□0



#### Exhaust center: VFR64□0



#### Pressure center: VFR65□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 | Aluminum die-casted | Black           |

| No. | Description       | Material            | Note  |
|-----|-------------------|---------------------|-------|
| ⑤   | End plate         | Aluminum die-casted | Black |
| ⑥   | Junction cover    | Resin               | Black |
| ⑦   | Light cover       | Resin               |       |
| ⑧   | Pilot valve cover | Resin               | Black |

## Replacement Parts

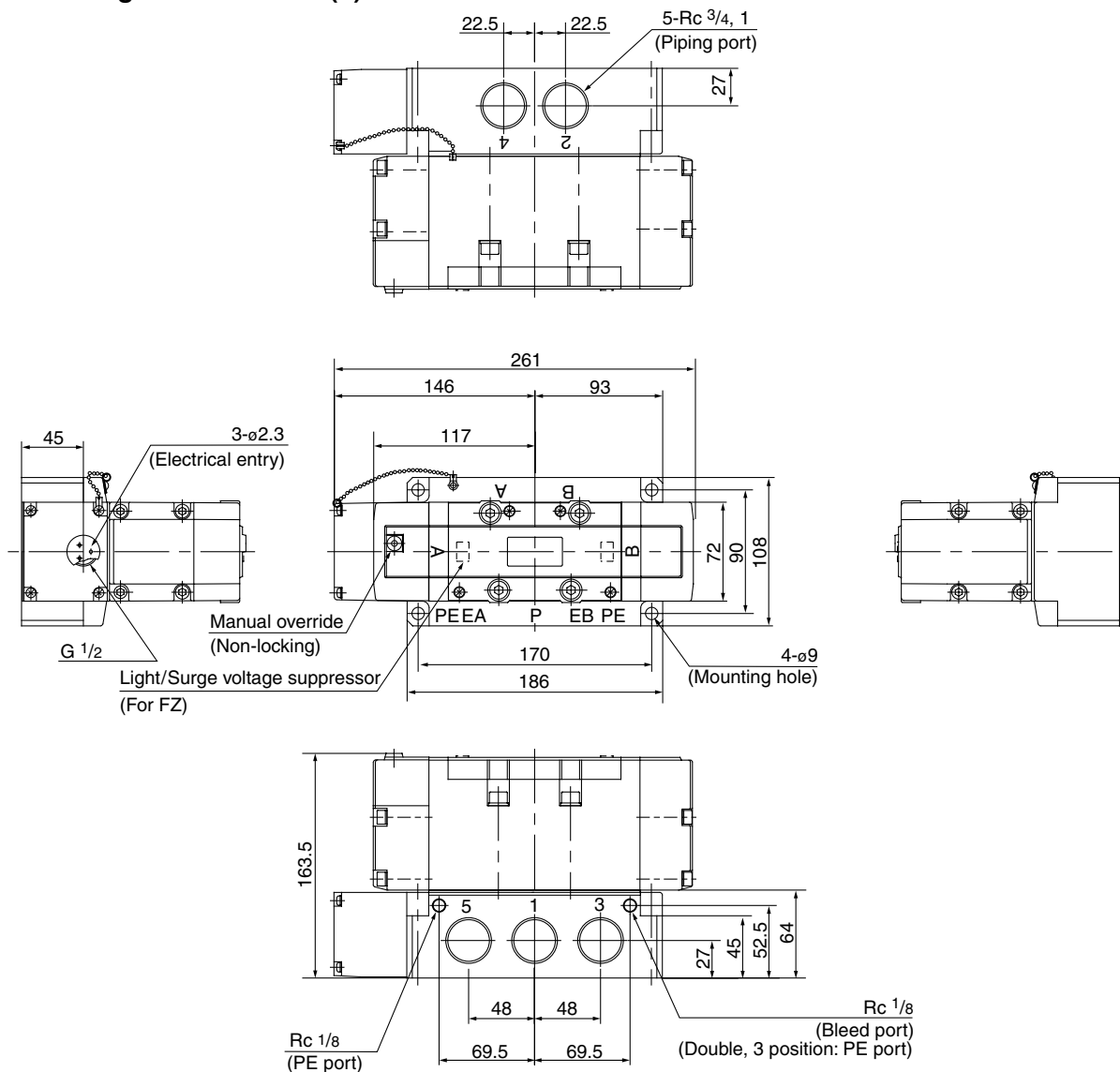
| No. | Description               | Material | Part no.                                                     |            |                   |
|-----|---------------------------|----------|--------------------------------------------------------------|------------|-------------------|
|     |                           |          | VFR61□□                                                      | VFR62□□    | VFR63□□/64□□/65□□ |
| ⑨   | Gasket                    | NBR      | VFS6000-15                                                   | VFS6000-15 | VFS6000-15        |
| ⑩   | Hexagon socket head screw | Steel    | M8 x 80                                                      | M8 x 80    | M8 x 80           |
| ⑪   | Pilot valve assembly      | —        | Refer to "How to Order Pilot Valve Assembly" on page 3-5-94. |            |                   |

# 5 Port Pilot Operated Solenoid Valve

## Rubber Seal, Plug-in/Non Plug-in Series VFR6000

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

**2 position single: VFR610<sup>0</sup>-□F(Z)**

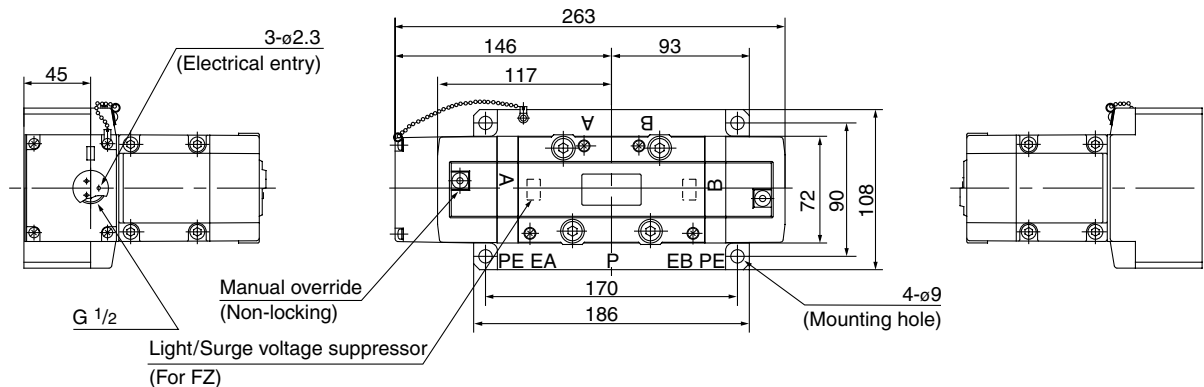


**2 position double: VFR620<sup>0</sup>-□F(Z)**

**3 position closed center: VFR630<sup>0</sup>-□F(Z)**

**3 position exhaust center: VFR640<sup>0</sup>-□F(Z)**

**3 position pressure center: VFR650<sup>0</sup>-□F(Z)**



\* Other dimensions are the same as the single type.

VK

VZ

VF

VFR

VP4

VZS

VFS

VS4

VQ7

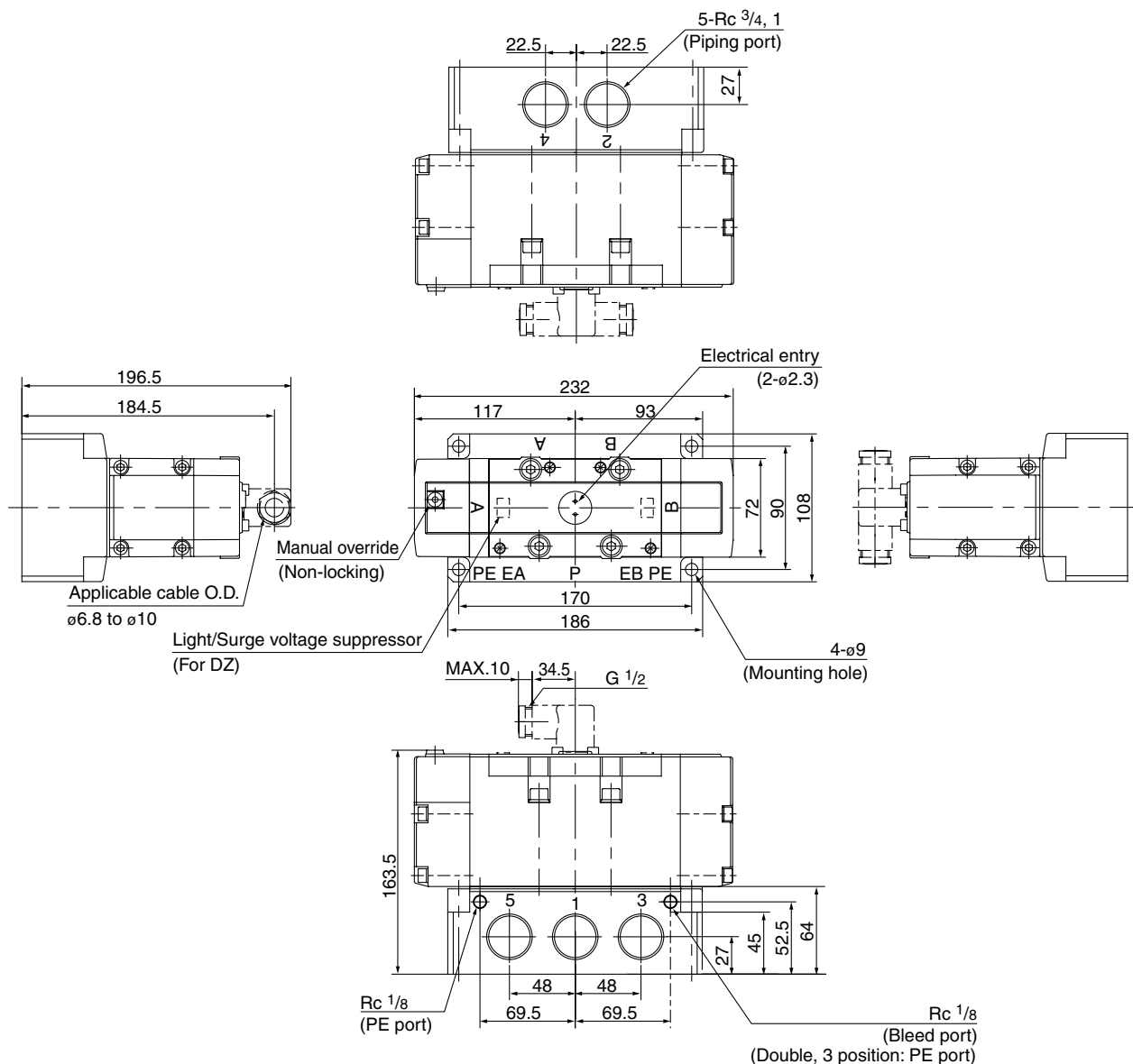
EVS

VFN

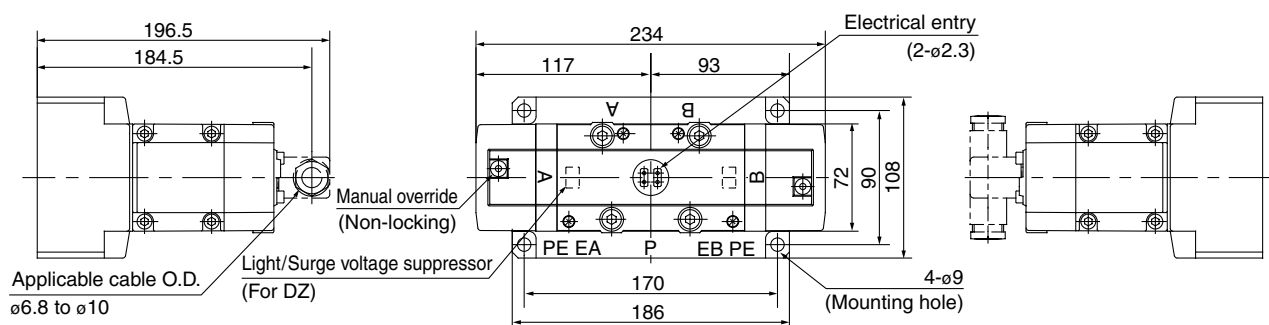
# Series VFR6000

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

2 position single: VFR611<sup>0</sup>-□E, VFR611<sup>0</sup>-□D(Z)



2 position double: VFR621<sup>0</sup>-□E, VFR621<sup>0</sup>-□D(Z) 3 position closed center: VFR631<sup>0</sup>-□E, VFR631<sup>0</sup>-□D(Z)  
 3 position exhaust center: VFR641<sup>0</sup>-□E, VFR641<sup>0</sup>-□D(Z)  
 3 position pressure center: VFR651<sup>0</sup>-□E, VFR651<sup>0</sup>-□D(Z)



\* Other dimensions are the same as the single type.