

# 5 Port Solenoid Valve

## VFR2000/3000/4000/5000/6000 Series

Rubber Seal

### Series Variations

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



[Option]

| 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  |
|--------------|---|---|--|--|--|---|
| Base Mounted | <b>VFR2000</b><br>Plug-in type<br>Non plug-in type<br><br><b>P.1018</b> | 1/8, 1/4: 3.0<br><br>2 position single<br><b>VFR2000/3000/4000</b><br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br>   |  | <b>Plug-in</b><br>Conduit terminal (F)<br><b>Non plug-in</b><br>Grommet (G)<br><br>Conduit terminal (T)<br>DIN terminal (D, Y)<br><br>L plug connector (L)<br>M plug connector (M) | <input type="checkbox"/> With light/surge voltage suppressor<br><br>• Plug-in type<br>Conduit terminal (FZ)<br><br>• Non plug-in type<br>Grommet terminal (EZ)<br>Conduit terminal (TZ)<br>DIN terminal (DZ, YZ)<br>L plug connector (LZ)<br>M plug connector (MZ)<br><br><input type="checkbox"/> With surge voltage suppressor<br><br>• Non plug-in type<br>Grommet (GS)<br><br>Note) Surge voltage suppressor is equipped midway on the lead wire for grommet type. |   |
|              | <b>VFR3000</b><br>Plug-in type<br>Non plug-in type<br><br><b>P.1038</b> | 1/4: 7.5<br>3/8: 8.7<br><br>2 position double<br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br>  | (Standard)<br>100 VAC <sup>50</sup> / <sub>60</sub> Hz<br>200 VAC <sup>50</sup> / <sub>60</sub> Hz<br>24 VDC   | <b>Plug-in</b><br>Conduit terminal (F)<br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br>DIN terminal (D)<br><br>Grommet (G)<br>Grommet terminal (E)    | <input type="checkbox"/> With light/surge voltage suppressor<br><br>• Plug-in type<br>Conduit terminal (FZ)<br><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><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<br><br>Non-locking push type A (Extended)<br><br>Locking type B (Tool required)<br><br>Locking type C (Lever) |
|              | <b>VFR4000</b><br>Plug-in type<br>Non plug-in type<br><br><b>P.1061</b> | 3/8, 1/2: 14<br><br>3 position closed center<br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br><br><br>3 position exhaust center<br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br> | (Semi-standard)<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 | <b>Plug-in</b><br>Conduit terminal (F)<br><b>Non plug-in</b><br>Grommet (G)<br><br>Conduit terminal (T)<br>DIN terminal (D, Y)   | <input type="checkbox"/> With surge voltage suppressor<br><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.   |   |
|              | <b>VFR5000</b><br>Plug-in type<br>Non plug-in type<br><br><b>P.1084</b> | 3/8: 18<br>1/2: 23<br>3/4: 25<br><br>3 position pressure center<br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br>  |  | <b>Plug-in</b><br>Conduit terminal (F)<br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br>DIN terminal (D)   | <input type="checkbox"/> With light/surge voltage suppressor<br><br>• Plug-in type<br>Conduit terminal (FZ)<br><br>• Non plug-in type<br>DIN terminal (DZ)<br>Grommet terminal (EZ)  |   |
|              | <b>VFR6000</b><br>Plug-in type<br>Non plug-in type<br><br><b>P.1099</b> | 3/4: 41<br>1: (Effective area 191 mm <sup>2</sup> )<br><br>3 position pressure center<br>(A)4 2(B)<br>(EA)513(EB)<br>(P)<br>                                |  | <b>Plug-in</b><br>Conduit terminal (F)<br><b>Non plug-in</b><br>Grommet terminal (E)<br><br>Conduit terminal (T)<br>DIN terminal (D)   | <input type="checkbox"/> With light/surge voltage suppressor<br><br>• Plug-in type<br>Conduit terminal (FZ)<br><br>• Non plug-in type<br>DIN terminal (DZ)<br>Grommet terminal (EZ)  | Non-locking push type   |

SV  
SYJ  
SZ  
VF  
VP4  
VQ 1/2  
VQ 4/5  
VQC 1/2  
VQC 4/5  
VQZ  
SQ  
VFS  
VFR  
VQ7

# VFR2000/3000/4000/5000/6000 Series

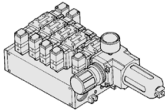
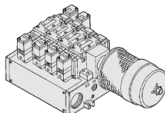
## Manifold Variations

|          |                      | Base Mounted Plug-in Type |                   |                   |                   |
|----------|----------------------|---------------------------|-------------------|-------------------|-------------------|
|          |                      | VFR2000<br>P.1026         | VFR3000<br>P.1046 | VFR4000<br>P.1069 | VFR5000<br>P.1090 |
| Manifold | With multi-connector |                           |                   |                   |                   |
|          | With terminal block  |                           |                   |                   |                   |
|          | With D-sub connector |                           |                   |                   |                   |

| 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> | ● |   |   |
|                       |                          |                  |   |   |   |

Note 1) Used with the manifold base. Please contact SMC for details.  
Note 2) There is no manifold base in the VFR6000 series.

Manifold Option



**With exhaust cleaner**  
Plug-in type, Non plug-in type

- High noise reduction effect:  
35 dB or more
- Collects oil mist: collecting rate 99.9% or more
- Piping work is reduced.

**With control unit** <sup>Note)</sup>  
Plug-in type, Non plug-in type

- Filter, regulator, pressure switch and air release valve in one unit
- Piping work eliminated

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

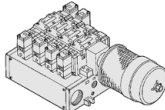
|          |  | Base Mounted Non Plug-in Type |                   |                   |                   |
|----------|--|-------------------------------|-------------------|-------------------|-------------------|
|          |  | VFR2000<br>P.1027             | VFR3000<br>P.1047 | VFR4000<br>P.1070 | VFR5000<br>P.1091 |
| Manifold | Common electrical entry<br>• Grommet terminal<br>• DIN terminal  | —                             |                   |                   |                   |
|          | Individual electrical entry<br>• Grommet<br>• Grommet terminal<br>• Conduit terminal<br>• DIN terminal<br>• L plug connector (Note)<br>• M plug connector (Note) |                               |                   |                   |                   |

Note) VFR2000 series only

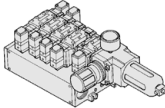
|                       |                          |                  |   |   |   |
|-----------------------|--------------------------|------------------|---|---|---|
| Manifold Option Parts | Individual SUP spacer    | ●                | ● | ● | ● |
|                       | Individual EXH spacer    | ●                | ● | ● | ● |
|                       | SUP block disk           | ●                | ● | ● | ● |
|                       | EXH block disk           | ●                | ● | ● | ● |
|                       | Throttle valve spacer    | ●                | ● | ● | ● |
|                       | Interface regulator      | ●                | ● | ● | ● |
|                       | Blanking plate           | ●                | ● | ● | ● |
|                       | Air release valve spacer | ●                | ● | ● |   |
|                       | SUP stop valve spacer    | ● <sup>(1)</sup> | ● |   |   |
|                       |                          |                  |   |   |   |

Note 1) Used with the manifold base. Please contact SMC for details.  
Note 2) There is no manifold base in the VFR6000 series.

Manifold Option



**With exhaust cleaner**  
Plug-in type, Non plug-in type  
• High noise reduction effect:  
35 dB or more  
• Collects oil mist: collecting rate 99.9% or more  
• Piping work is reduced.



**With control unit** (Note)  
Plug-in type, Non plug-in type  
• Filter, regulator, pressure switch and air release valve in one unit  
• Piping work eliminated

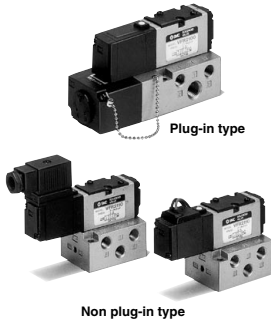
Note) There is no option with control unit in the VFR5000 series.

|            |
|------------|
| SV         |
| SYJ        |
| SZ         |
| VF         |
| VP4        |
| VQ<br>1/2  |
| VQ<br>4/5  |
| VQC<br>1/2 |
| VQC<br>4/5 |
| VQZ        |
| SQ         |
| VFS        |
| VFR        |
| VQ7        |

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



Note) Applicable only for DIN terminal and plug-in types.  
For details, refer to "How to Order".



## Symbol

| 2 position<br>Single                       | 3 position<br>Closed center                |
|--|--|
| <p>(A)4 2(B)<br/>(EA)5 1 3(EB)<br/>(P)</p> | <p>(A)4 2(B)<br/>(EA)5 1 3(EB)<br/>(P)</p> |
| Double                                     | Exhaust center                             |
| <p>(A)4 2(B)<br/>(EA)5 1 3(EB)<br/>(P)</p> | <p>(A)4 2(B)<br/>(EA)5 1 3(EB)<br/>(P)</p> |
| Pressure center                            |  |
| <p>(A)4 2(B)<br/>(EA)5 1 3(EB)<br/>(P)</p> |  |

## 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.)                          |
|                            | Lubrication                           |                                    | Not required <sup>(1)</sup>                         |
|                            | Manual override                       |                                    | Non-locking push type                               |
|                            | Mounting orientation                  |                                    | Unrestricted  |
| Electricity specifications | Impact/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 (2.04 W: With light/surge voltage suppressor) |
| Electrical entry           | Plug-in type                          |                                    | Conduit terminal                                    |
|                            | Non plug-in type                      | Grommet, Grommet terminal          |   |
|                            |                                       | Conduit terminal, DIN terminal     |   |
|                            |                                       | 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),<br>Looking type C (Lever) |
| Coil rated voltage     | 110 to 120, 220, 240 VAC 50/60 Hz<br>12 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<br>actuation |                    | Model   |             | Port<br>size<br>Rc | Flow rate characteristics <sup>(1)</sup> |             |             |                         |             |             | <sup>(2)</sup><br>Max.<br>operating<br>cycle<br>(Hz) | <sup>(3)</sup><br>Response<br>time<br>(ms) | <sup>(4)</sup><br>Weight<br>(kg) |
|----------------------|--------------------|---------|-------------|--------------------|--|-------------|-------------|-------------------------|-------------|-------------|--|--|----------------------------------|
|                      |                    |         |             |                    | 1 → 4/2 (P → A/B)                        |             |             | 4/2 → 5/3 (A/B → EA/EB) |             |             |  |  |                                  |
|                      |                    | Plug-in | Non plug-in |                    | C<br>[dm³/(s·bar)]                       | b           | Cv          | C<br>[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<br>(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<br>(0.44)                   |
|                      |                    |         |             | 1/4                | 2.6                                      | 0.27        | 0.62        | 3.1                     | 0.28        | 0.74        |  |  |                                  |
| 3 position           | Closed<br>center   | VFR2300 | VFR2310     | 1/8                | 1.3                                      | 0.45        | 0.36        | 1.4                     | 0.46        | 0.41        | 5  | 30 or less                                 | 0.43<br>(0.45)                   |
|                      |                    |         |             | 1/4                | 1.3                                      | 0.45        | 0.36        | 1.4                     | 0.46        | 0.41        |  |  |                                  |
|                      | Exhaust<br>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<br>(0.45)                   |
|                      |                    |         |             | 1/4                | 0.79                                     | 0.53        | 0.24        | 3.1 [0.89]              | 0.24 [0.51] | 0.74 [0.27] |  |  |                                  |
|                      | Pressure<br>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<br>(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.

Note 3) Based on dynamic performance test, JIS B 8419: 2010. (0.5 MPa, Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)


Note 4) For VFR2□00-□FZ-□□ ( ) : VFR2□10-□D-□□

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


Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



## How to Order



**Plug-in**



**Non plug-in**

**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 |

\* Semi-standard

**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 |

**CE-compliant**

|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

**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) |
|----------------------------|--|------------------------------------|----------------------------|

\* Semi-standard

**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 |                     | DO, YO: DIN terminal without connector |

**Symbol**

|   |  |
|---|--|
| 1 | 2 position single (A)4 2(B) (EA)5 1 3(EB) (P)          |
| 2 | 2 position double (A)4 2(B) (EA)5 1 3(EB) (P)          |
| 3 | 3 position closed center (A)4 2(B) (EA)5 1 3(EB) (P)   |
| 4 | 3 position exhaust center (A)4 2(B) (EA)5 1 3(EB) (P)  |
| 5 | 3 position pressure center (A)4 2(B) (EA)5 1 3(EB) (P) |

**Pilot type**

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

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 to 120 VAC, 50/60 Hz |
| 4 | 220 VAC, 50/60 Hz        |
| 5 | 24 VDC                   |
| 6 | 12 VDC                   |
| 7 | 240 VAC, 50/60 Hz (Note) |

For other rated voltages, please consult with SMC.  
Note) L and M plug connectors: Max. 220 VAC

## 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)             |

**CE-compliant**

|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F only

**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 (Note) |

For other rated voltages, please consult with SMC.  
Note) L and M plug connectors: Max. 220 VAC

**Electrical entry, Light/Surge voltage suppressor**

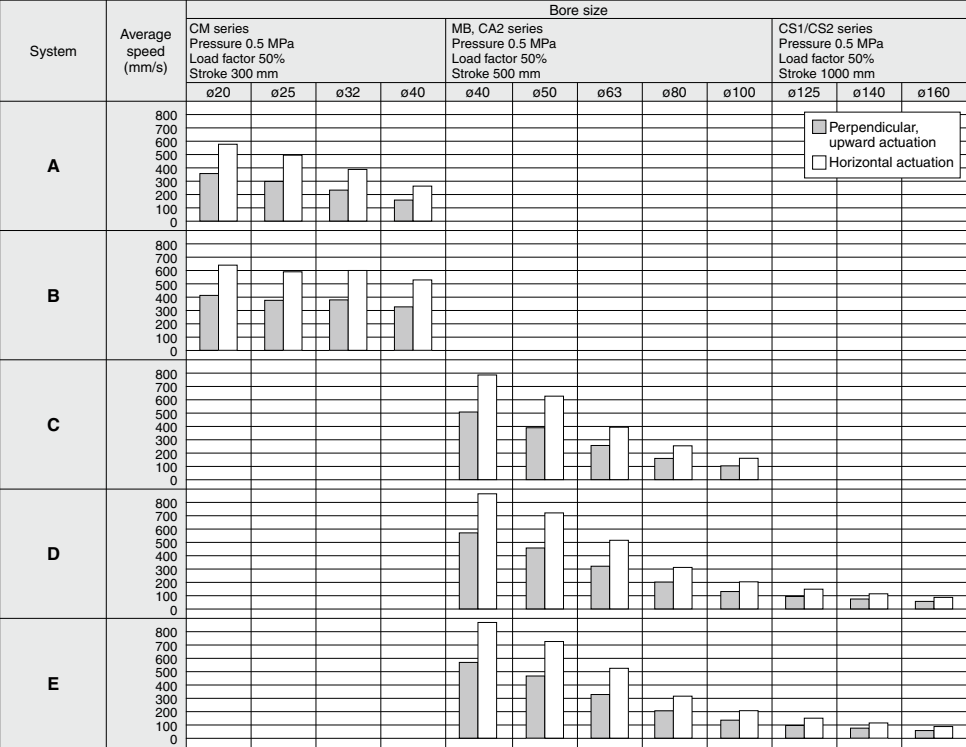
| Symbol | Electrical entry         | Indicator light   | With surge voltage suppressor | Body type        | CE-compliant |
|--------|--------------------------|-------------------|-------------------------------|------------------|--------------|
| F      | Plug-in                  | —                 | —                             | Plug-in type     | ●            |
| G      | Grommet                  | —                 | —                             | —                | —            |
| GS     | Grommet                  | —                 | —                             | —                | —            |
| D      | DIN terminal             | With connector    | —                             | —                | ●            |
| DZ     | DIN terminal             | Without connector | —                             | —                | ●            |
| DO     | DIN terminal             | With connector    | —                             | Non plug-in type | ●            |
| DOZ    | DIN terminal             | Without connector | —                             | Non plug-in type | ●            |
| Y      | DIN terminal (DIN43650B) | With connector    | —                             | —                | ●            |
| YZ     | DIN terminal (DIN43650B) | Without connector | —                             | —                | ●            |
| YO     | DIN terminal (DIN43650B) | With connector    | —                             | —                | ●            |
| YOZ    | DIN terminal (DIN43650B) | Without connector | —                             | —                | ●            |

| Symbol | Electrical entry                     | Indicator light | With surge voltage suppressor | Body type        | CE-compliant |
|--------|--------------------------------------|-----------------|-------------------------------|------------------|--------------|
| T      | Conduit terminal                     | —               | —                             | —                | —            |
| TZ     | Conduit terminal                     | ●               | —                             | —                | —            |
| E      | Grommet terminal                     | —               | —                             | —                | —            |
| EZ     | Grommet terminal                     | ●               | —                             | —                | —            |
| L      | L plug connector                     | —               | —                             | Non plug-in type | —            |
| LO     | L plug connector                     | —               | —                             | Non plug-in type | —            |
| LOZ    | L plug connector (Without connector) | —               | —                             | Non plug-in type | —            |
| M      | M plug connector                     | —               | —                             | Non plug-in type | —            |
| MZ     | M plug connector                     | ●               | —                             | Non plug-in type | —            |
| MO     | M plug connector                     | —               | —                             | Non plug-in type | —            |
| MOZ    | M plug connector (Without connector) | ●               | —                             | Non plug-in type | —            |

# VFR2000 Series

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

## Cylinder Speed Chart

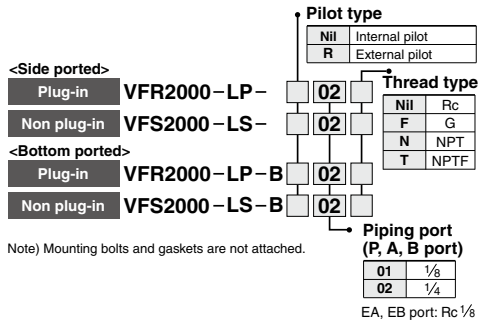


- \* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- \* The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- \* Load factor: ((Load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

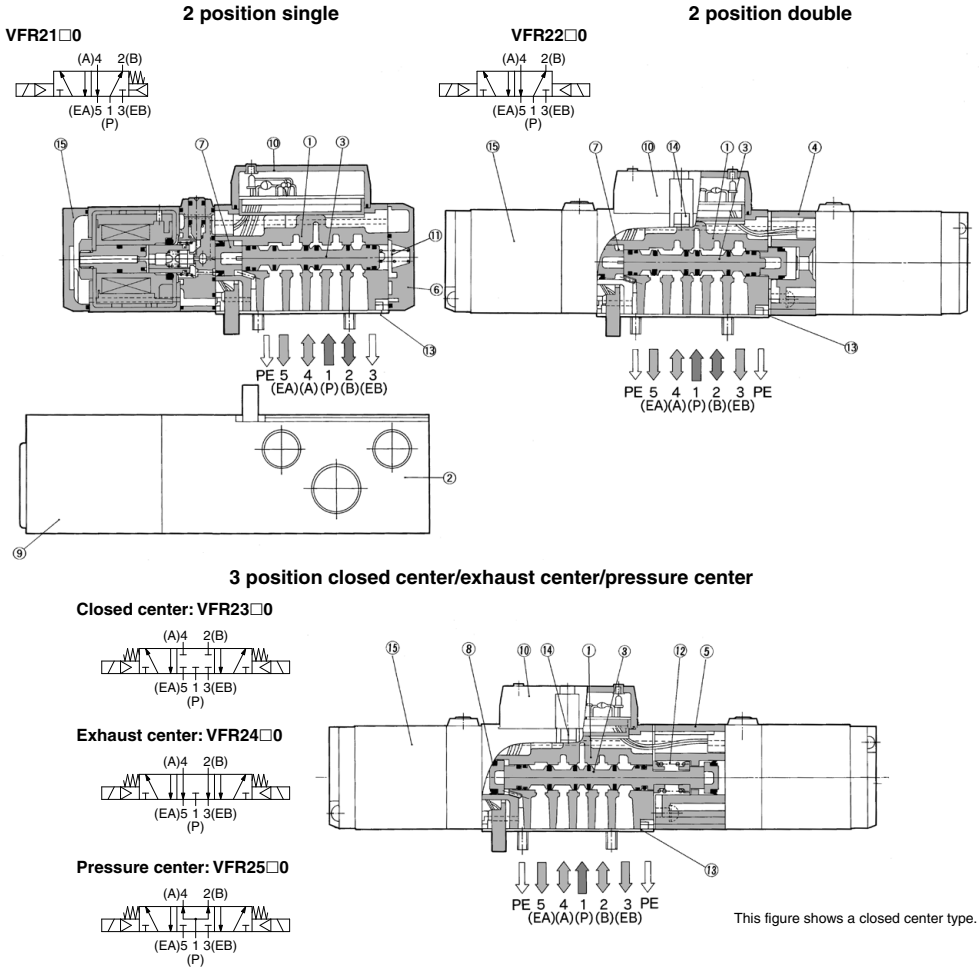
## System Components

| System | Solenoid valve        | Speed controller | Silencer | Tube bore x Length |
|--------|-----------------------|------------------|----------|--------------------|
| A      | VFR2000 Series Rc 1/8 | AS2000-01        | AN110-01 | T0425 x 1 m        |
| B      |                       | AS3000-02        | AN110-01 | T0604 x 1 m        |
| C      |                       | AS3000-02        | AN110-01 | T0806 x 1 m        |
| D      | VFR2000 Series Rc 1/4 | AS4000-02        | AN110-01 | T1075 x 1 m        |
| E      |                       | AS4000-02        | AN110-01 | T1209 x 1 m        |

## How to Order Sub-plate Assembly



## Construction



|            |
|------------|
| SV         |
| SYJ        |
| SZ         |
| VF         |
| VP4        |
| VQ 1/2     |
| VQ 4/5     |
| VQC 1/2    |
| VQC 4/5    |
| VQZ        |
| SQ         |
| VFS        |
| <b>VFR</b> |
| VQ7        |

## 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           |

## Component Parts

| 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

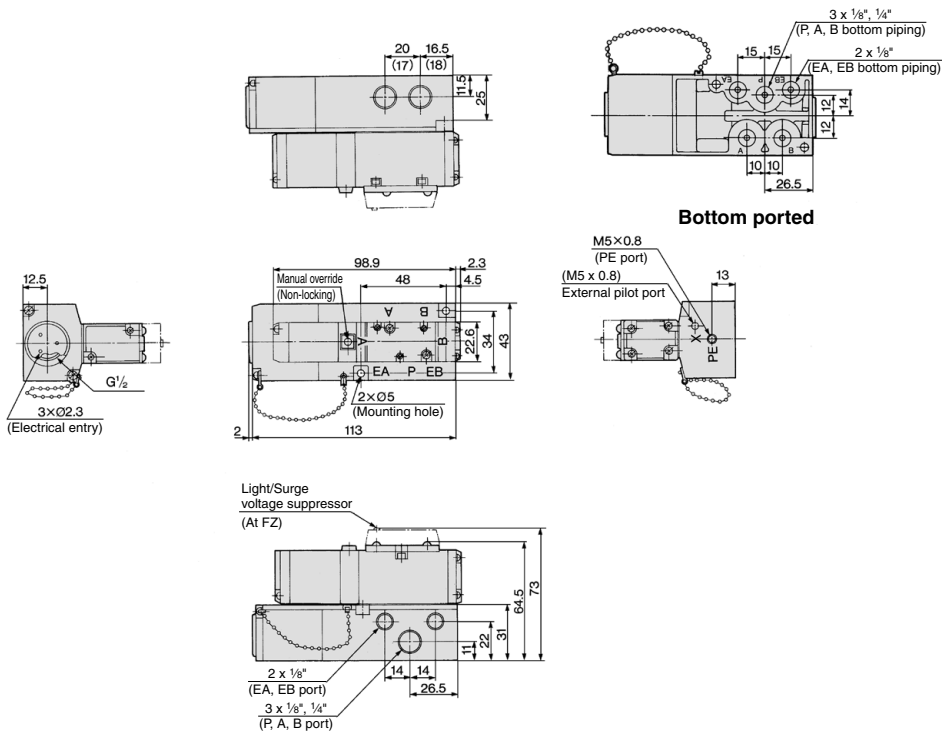
| No. | Description                                | Material | Part no.   |                       |                       |
|-----|--|----------|--|-----------------------|-----------------------|
|     |  |          | VFR21□0  | VFR22□0               | VFR23□0/24□0/25□0     |
| 13  | Gasket                                     | NBR      | AXT624-20-2  | AXT624-20-2           | AXT624-20-2           |
| 14  | Hexagon socket head screw <sup>Note)</sup> | Steel    | AXT624-26#1 (M3 x 31)                                      | AXT624-26#1 (M3 x 31) | AXT624-26#1 (M3 x 31) |
| 15  | Pilot valve assembly                       | —        | Refer to "How to Order Pilot Valve Assembly" on page 1019. |                       |                       |
| —   | Sub-plate assembly                         | —        | Refer to "How to Order Sub-plate Assembly" on page 1020.   |                       |                       |

Note) For the VFR2000 series, it requires 3 pcs.

# VFR2000 Series

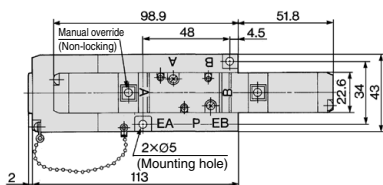
## Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center

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

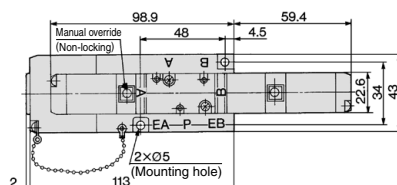


( ): Rc 1/8

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



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>



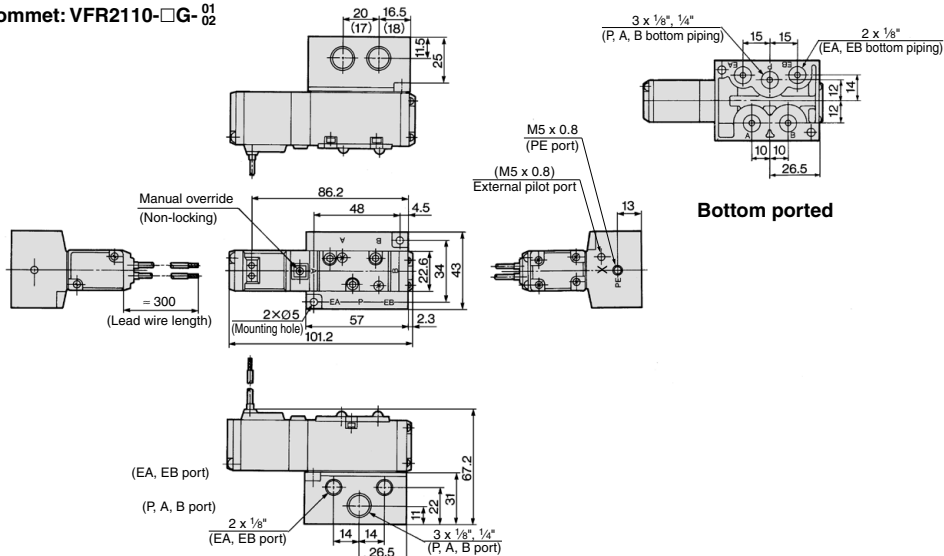
\* Other dimensions are the same as the single type.

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

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

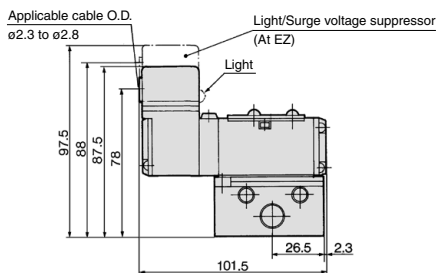
## Non Plug-in: 2 Position Single

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



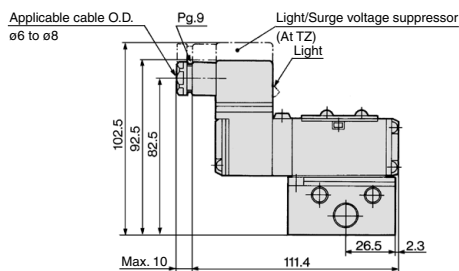
( ) : Rc 1/8

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



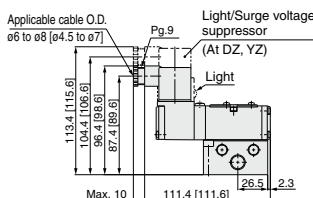
\* Other dimensions are the same as the grommet type.

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



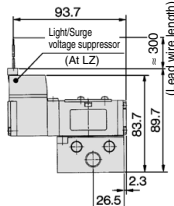
\* Other dimensions are the same as the grommet type.

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



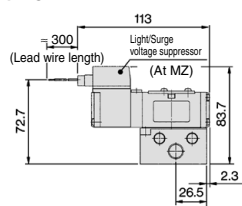
\* [ ] : Type Y  
\* Other dimensions are the same as the grommet type.

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



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

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

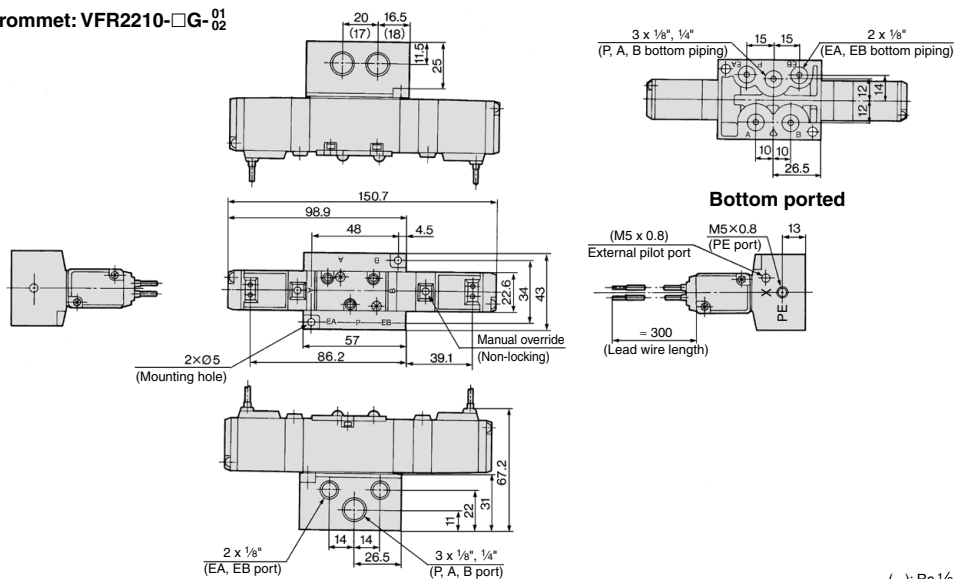


\* Other dimensions are the same as the grommet type.

# VFR2000 Series

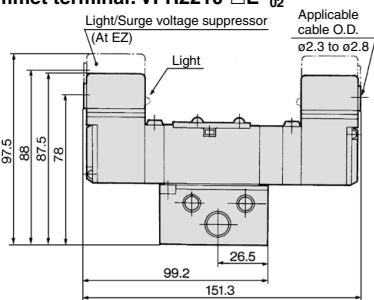
## Non Plug-in: 2 Position Double

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



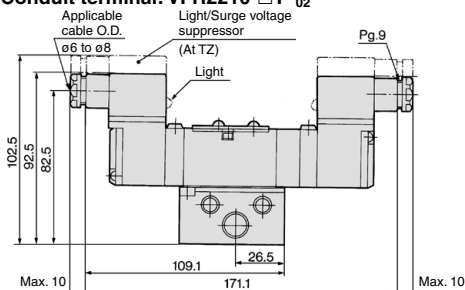
( ): Rc 1/8

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



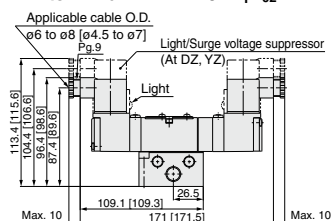
\* Other dimensions are the same as the grommet type.

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



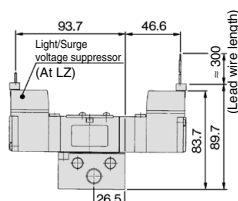
\* Other dimensions are the same as the grommet type.

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



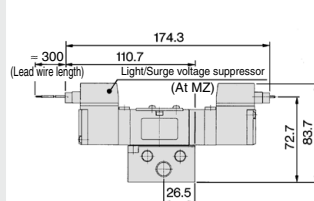
\* [ ] : Type Y  
\* Other dimensions are the same as the grommet type.

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



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

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

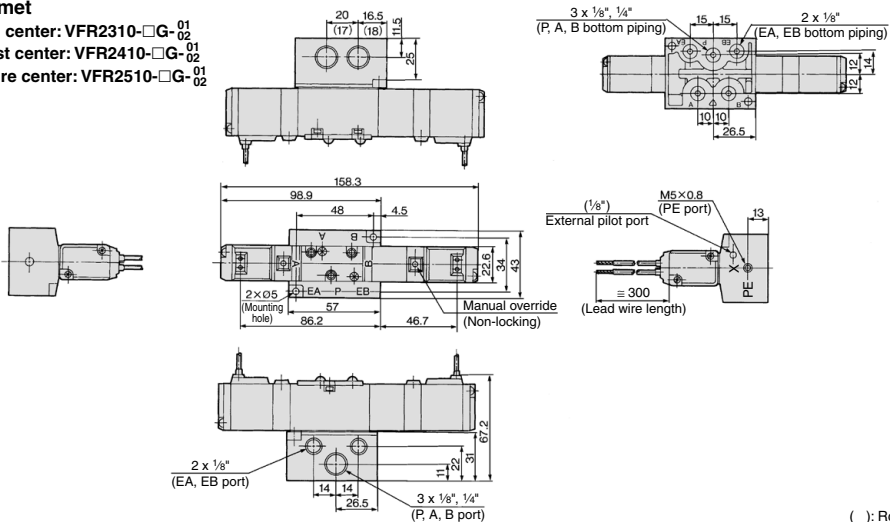


\* Other dimensions are the same as the grommet type.

### 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>

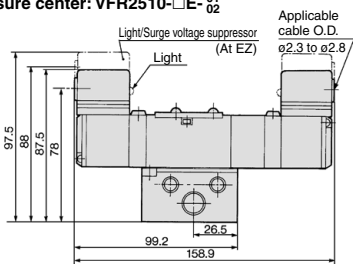
( ): Rc 1/8

### 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-



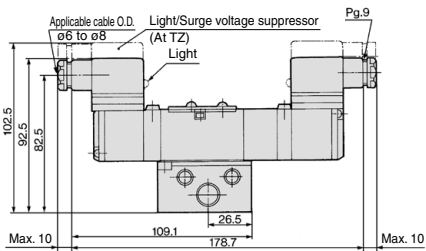
\* Other dimensions are the same as the grommet type.

### 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>



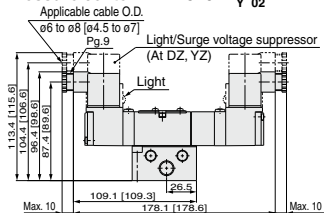
\* Other dimensions are the same as the grommet type.

## DIN terminal

**Closed center: VFR2310-☐ <sub>V</sub><sup>D</sup>-01  
02**

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

Pressure center: VFR2510-☐  $\frac{D}{V}$   $\frac{01}{02}$



\* [ ]: Type Y

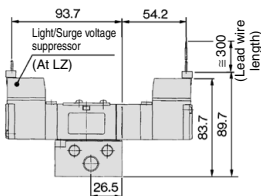
\* Other dimensions are the same as the grommet type.

### 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>



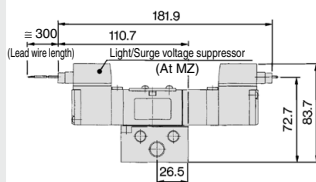
\* Other dimensions are the same as the grommet type.

### 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-



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

# VFR2000 Series Manifold Specifications

## Manifold Specifications

| Base model                               | Wiring  | Porting specifications   | Port size |                    | Stations | Applicable valve model |
|--|---|--------------------------|-----------|--------------------|----------|------------------------|
|  |   | A, B port                | P, EA, EB | A, B               |          |                        |
| Plug-in type<br><b>VV5FR2-01□(-Q)</b>    | <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><br>Note) | 1/4       | 1/8, 1/4<br>C6, C8 | 2 to 15  | VFR2□00-□F(-Q)         |
| Non plug-in type<br><b>VV5FR2-10(-Q)</b> | <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  |                        |

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 (-Q) ..... 1 set (Manifold base part no.)  
 \*VFR2100-5FZ (-Q) ..... 3 sets (2 position single part no.)  
 \*VFR2200-5FZ (-Q) ..... 2 sets (2 position double part no.)  
 \*VVS2000-10A ..... 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 (-Q) ..... 1 set (Manifold base part no.)  
 \*VFR2110-5D (-Q) ..... 5 sets (2 position single part no.)  
 \*VFR2410-5D (-Q) ..... 1 set (3 position exhaust part no.)  
 \*VVS2000-R01-2 ..... 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.

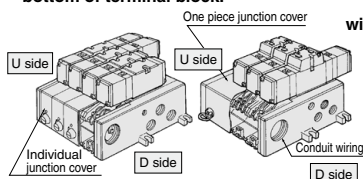
When ordering, specify the part nos. in order from the 1st. station in the D side.

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.



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".

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

VFR2000 Series Manifold

Plug-in type with terminal block

Junction cover

|     |                           |
|-----|---------------------------|
| NII | Individual junction cover |
| 1   | One-piece junction cover  |

Stations

|     |             |
|-----|-------------|
| 02  | 2 stations  |
| ... | ...         |
| 15  | 15 stations |

Symbol<sup>+2, +3</sup>

| Symbol | Passage *1 | Porting specification A, B |
|--------|------------|----------------------------|
| 1      | Common     | Side                       |
| 2      | Common     | Bottom                     |
| 3      | Common     | Side                       |
| 4      | Common     | Bottom                     |
| 5      | Individual | Side                       |
| 6      | Individual | Bottom                     |
| 7      | Individual | Side                       |
| 8      | Individual | Bottom                     |

\* Semi-standard

\* 1 When an individual passage is used, P, EA and EB ports will be bottom ported.

\* 2 For bottom ported, A/B port size is 1/8 (Symbol 01) only.

\* 3 Symbol "1" is only applicable to One-touch fittings (C6, C8).

Port size<sup>+2, +3</sup>

| 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

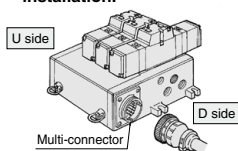
| Symbol | NII | Rc   |
|--------|-----|------|
| F      |     | G    |
| N      |     | NPT  |
| T      |     | NPTF |

CE-compliant

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

### Plug-in Type: With Multi-connector (For wiring specifications, refer to page 1113.)

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



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".

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

VFR2000 Series Manifold

Plug-in type with multi-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 |

Symbol<sup>+2, +3</sup>

| Symbol | Passage *1 | Porting specification A, B |
|--------|------------|----------------------------|
| 1      | Common     | Side                       |
| 2      | Common     | Bottom                     |
| 3      | Common     | Side                       |
| 4      | Common     | Bottom                     |
| 5      | Individual | Side                       |
| 6      | Individual | Bottom                     |
| 7      | Individual | Side                       |
| 8      | Individual | Bottom                     |

\* Semi-standard

\* 1 When an individual passage is used, P, EA and EB ports will be bottom ported.

\* 2 For bottom ported, A/B port size is 1/8 (Symbol 01) only.

\* 3 Symbol "1" is only applicable to One-touch fittings (C6, C8).

Port size<sup>+2, +3</sup>

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

CE-compliant

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

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

# VFR2000 Series

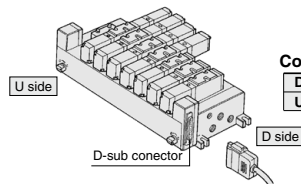
Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



[Option]

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 1113.)

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



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

VFR2000 Series 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 \*2, \*3

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

- \* Semi-standard
- \* 1 When an individual passage is used, P, EA and EB ports will be bottom ported.
- \* 2 For bottom ported, A/B port size is 1/8 (Symbol 01) only.
- \* 3 Symbol "1" is only applicable to One-touch fittings (C6, C8).

Thread type

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

Port size \*2, \*3

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

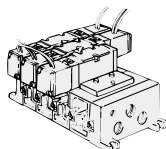
CE-compliant

Note) Electrical entry and light/surge voltage suppressor: F, FZ only.

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**

VFR2000 Series Manifold

Non plug-in type

Stations  
02 2 stations  
15 15 stations

Symbol \*2, \*3

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

- \* Semi-standard
- \* 1 When an individual passage is used, P, EA and EB ports will be bottom ported.
- \* 2 For bottom ported, A/B port size is 1/8 (Symbol 01) only.
- \* 3 Symbol "1" is only applicable to One-touch fittings (C6, C8).

Thread type

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

CE-compliant

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ only.

Port size \*2, \*3

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

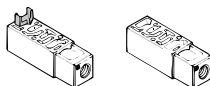
Note) P port or EA/EB port of symbol "3" to "8" can be individual port with block plate. Therefore, if using individual SUP spacer or individual EXH spacer for individual port, its symbol is "1".

## Manifold/Option Parts Assembly

### Individual SUP spacer

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

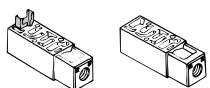
| Body type                      | Plug-in type    | Non plug-in type |
|--------------------------------|-----------------|------------------|
| $\frac{1}{8}$ Rc $\frac{1}{8}$ | VVFS2000-P-01-1 | VVFS2000-P-01-2  |
| $\frac{1}{4}$ Rc $\frac{1}{4}$ | VVFS2000-P-02-1 | VVFS2000-P-02-2  |



### 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 |
|--------------------------------|-----------------|------------------|
| $\frac{1}{8}$ Rc $\frac{1}{8}$ | VVFS2000-R-01-1 | VVFS2000-R-01-2  |
| $\frac{1}{4}$ Rc $\frac{1}{4}$ | VVFS2000-R-02-1 | VVFS2000-R-02-2  |



### SUP block disk <sup>Note)</sup>

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 <sup>Note)</sup>

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   |                  |

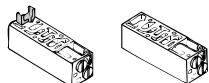


<sup>Note)</sup> Cannot be used for the 2 stations integrated manifold block

### Throttle valve spacer

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

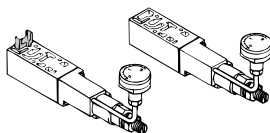
| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS2000-20A-1 | VVFS2000-20A-2   |



### Interface regulator

Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Rate Characteristics" on page 1111 before operation.)

| Body type         | Plug-in type    | Non plug-in type |
|-------------------|-----------------|------------------|
| P port regulation | ARBF2000-00-P-1 | ARBF2000-00-P-2  |

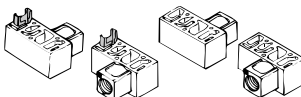


### Air release valve spacer

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 | VVFS2000-24A-2   |

<sup>Note)</sup> L: U side mount R: D side mount



### SUP stop valve spacer <sup>Note)</sup>

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.)

<sup>Note)</sup> 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.

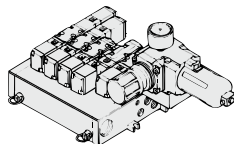
| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | VVFS2000-10A |                  |

## Manifold Option

### With control unit

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

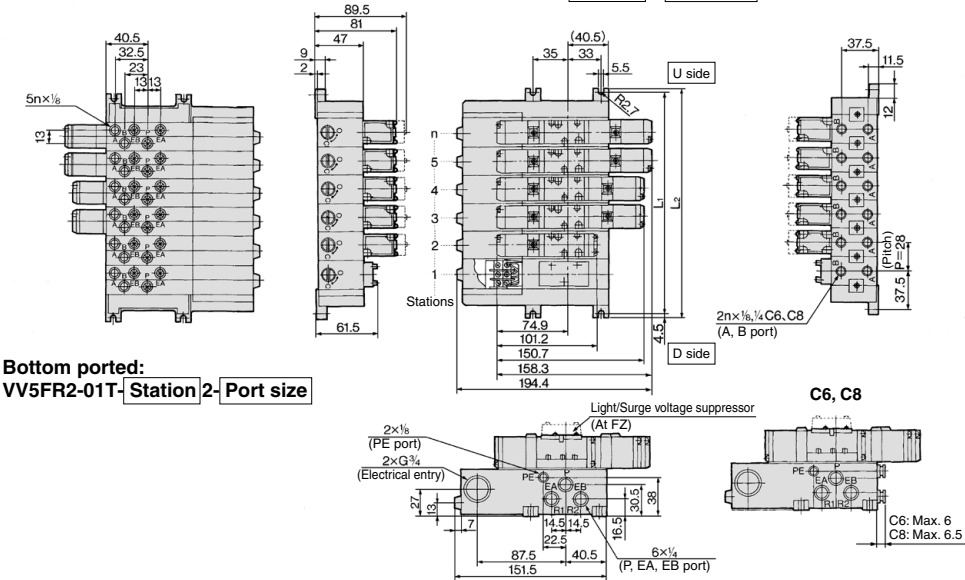
- Filter, regulation valve, pressure switch and air release valve all combine to form one unit.
- Piping processes are eliminated.



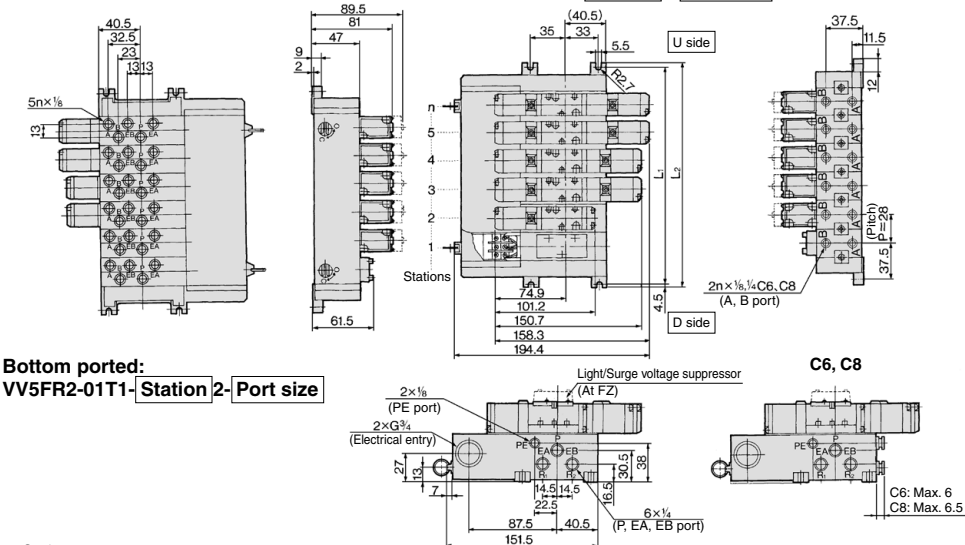
For details, refer to page 1033.

**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**



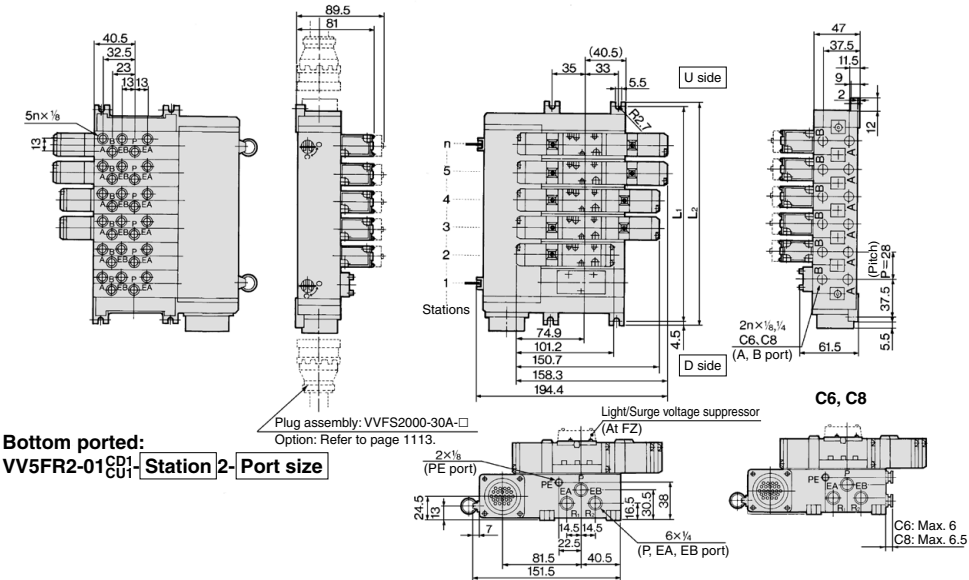
| n: Stations    |    |     |     |     |     |     |     |     |     |     |                              |  |
|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|--|
| Stations       | 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 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 |  |

|         |
|---------|
| SV      |
| SYJ     |
| SZ      |
| VF      |
| VP4     |
| VQ 1/2  |
| VQ 4/5  |
| VQC 1/2 |
| VQC 4/5 |
| VQZ     |
| SQ      |
| VFS     |
| VFR     |
| VQ7     |

# VFR2000 Series

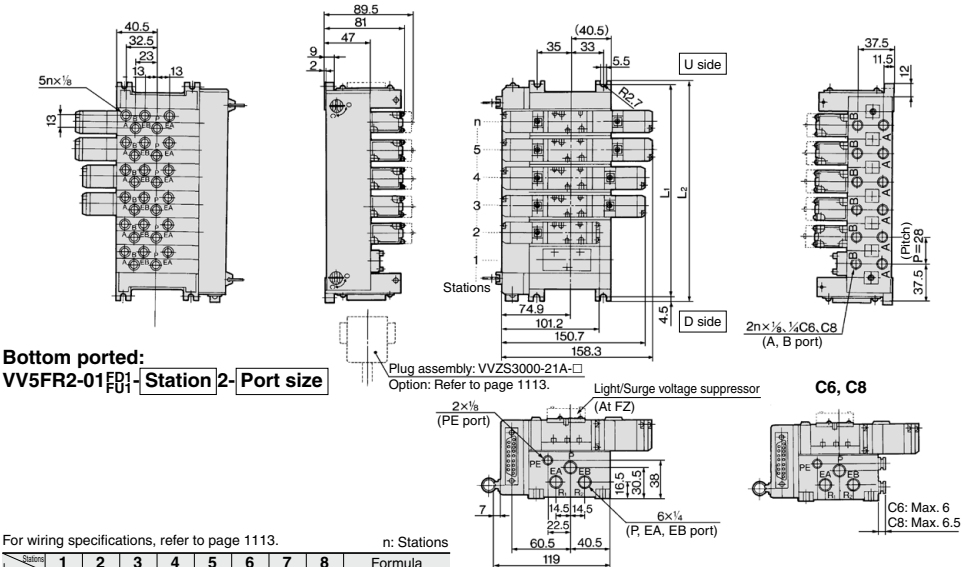
## Manifold/Plug-in Type

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



For wiring specifications, refer to page 1113.

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



For wiring specifications, refer to page 1113.

| 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 |

## VFR2000 Series

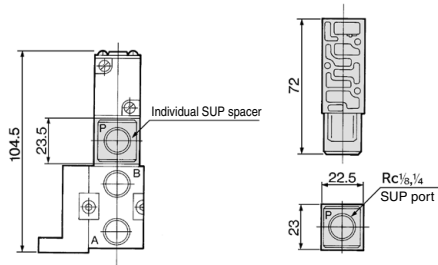
# VFR2000 Series

## 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)

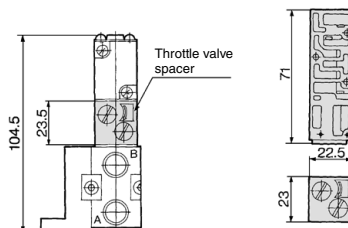
VVFS2000-P-<sup>01</sup><sub>02</sub>-2 (Non plug-in type)



Throttle valve spacer:

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

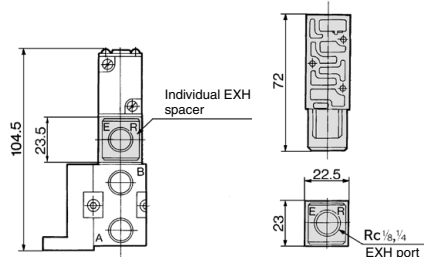
VVFS2000-20A-2 (Non plug-in type)



Individual EXH spacer:

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

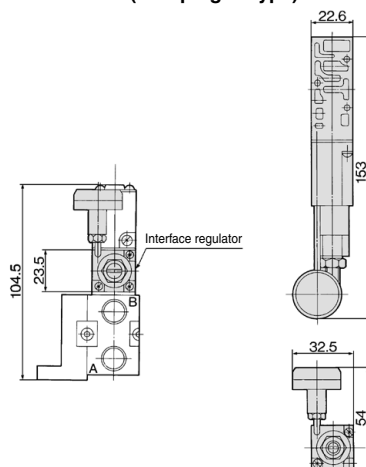
VVFS2000-R-<sup>01</sup><sub>02</sub>-2 (Non plug-in type)



Interface regulator

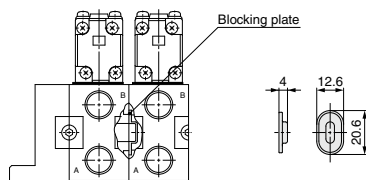
ARBF2000-00-P-1 (Plug-in type)

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



SUP block disk: AXT625-12A

EXH block disk: AXT625-12A

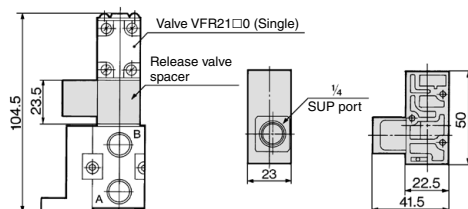


Note) Cannot be used for the 2 stations integrated manifold block

Release valve spacer

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

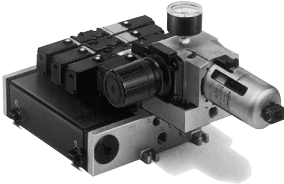
VVFS2000-24A-2<sup>R</sup><sub>L</sub> (Non plug-in type)



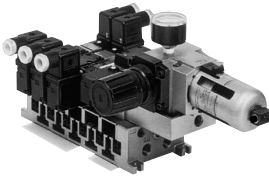
Note) VVFS2000-24A-1/2R (D side mounting)

## 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: <b>VV5FR2-01□(-Q)</b>  | Non plug-in type: <b>VV5FR2-10(-Q)</b>  |
|------------------------|--|---|
| 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(-Q)   | VFR2□10-□G, VFR2□10-□E<br>VFR2□10-□T, VFR2□10-□DY(-Q)<br>VFR2□10-□L, VFR2□10-□M                   |
| Porting specifications | Common SUP, Common EXH   |   |
| Rc                     | 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 VDC or less: 50 mA<br>100 VAC: 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 | <Plug-in type>   |            |
|                          | VVFS2000-24A-1R (D side mounting)<br>VVFS2000-24A-1L (U side mounting) |            |
| Pressure switch          | <Non plug-in type>   |            |
|                          | VVFS2000-24A-2R (D side mounting)<br>VVFS2000-24A-2L (U side mounting) |            |
| Blanking plate           | IS1000P-2-1  |            |
|                          | For filter regulator   | MP2-2      |
| Filter element           | For pressure switch  | MP3-2      |
|                          | For air release valve  | AXT625-18A |
| 111511-5B                |  |            |

Note 1) Refer to "Manifold Option" on page 1032.  
Note 2) Pressure switch cannot be mounted later on non plug-in type.

SV  
SYJ  
SZ  
VF  
VP4  
VQ 1/2  
VQ 4/5  
VQC 1/2  
VQC 4/5  
VQZ  
SQ  
VFS  
VFR  
VQ7

## How to Order

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



**VV5FR2** - **10** - **08** **1** - **01** - **AP** - **1**

VFR2000 Series  
Manifold

Base model

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

Stations

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

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

Symbol \*2, \*3

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

\* Semi-standard

\* 1 When an individual passage is used, P, EA and EB ports will be bottom ported.

\* 2 For bottom ported, A/B port size is 1/8 (Symbol 01) only.

\* 3 Symbol "1" is only applicable to One-touch fittings (C6, C8).

Note) 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".

## How to Order Manifold Assembly

<Example> Plug-in type with terminal block

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

CE-compliant

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

Air release valve coil rating

|     |                   |
|-----|-------------------|
| NII | None              |
| 1   | 100 VAC, 50/60 Hz |
| 5   | 24 VDC            |

Note 1) Adjust the voltage to the coil rated voltage of the mounted valve.

Note 2) For other rated voltages, please consult with SMC.

Control unit type

| Symbol                                 | NII | 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                      |     |    |    |   |   |   |   |   | 1 station |

Note) Control unit is D side mounting only.

Thread type

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

Port size \*2, \*3

| 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                    |

<Example> Non plug-in type

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

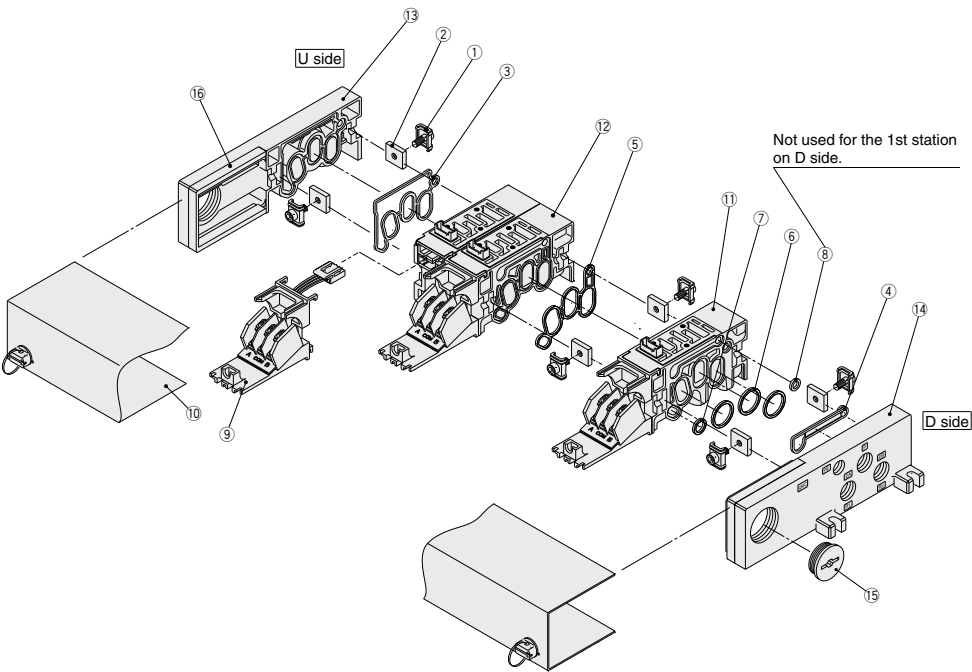
The 1st and 2nd station are used for control unit mounting. When ordering, specify the part nos. in order from the 3rd. station in the D side. When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

## VFR2000 Series

| n: Stations              |       |       |       |       |       |       |       |       |                             |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------------|
| Stations                 | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                     |
| <b>L<sub>1</sub></b>     | 131   | 159   | 187   | 215   | 243   | 271   | 299   | 327   | $L_1 = 28 \times n + 47$    |
| <b>L<sub>2</sub></b>     | 140   | 168   | 196   | 224   | 252   | 280   | 308   | 336   | $L_2 = 28 \times n + 56$    |
| <b>L<sub>1</sub>(MP)</b> | 278   | 306   | 334   | 362   | 390   | 418   | 446   | 474   | $L_1 = 28 \times n + 194$   |
| <b>L<sub>1</sub>(AP)</b> | 319.5 | 347.5 | 375.5 | 403.5 | 431.5 | 459.5 | 487.5 | 515.5 | $L_1 = 28 \times n + 235.5$ |

# VFR2000 Series

## Manifold Base Construction — Plug-in Type, Non Plug-in Type



- \* Manifold Base/Construction: Plug-in type with terminal block (01T1).
- For increasing the manifold bases, please order the manifold block assembly number of the principle number assembly ⑪ and ⑫.  
For plug-in type: The manifold base with terminal stand (integrated with a junction cover) is required with the ⑪ junction cover assembly.
- Manifold base is consisted of the junction of 2 and 3 station bases.

Example) U side (n) ⑥ ⑤ ④ ③ ② ① D side

<5 stations (Odd number)> 2 stations 2 stations 1 station

<6 stations (Even number)> 2 stations 2 stations 1 station 1 station

Note) When A and B ports are C6 or C8, the manifold base is consisted of 1 station base.

## Replacement Parts

| No. | Description                 | Material    | Part no.   |
|-----|-----------------------------|-------------|--|
| 1   | Connection fitting assembly | Steel plate | AXT625-4-1A  |
| 2   | Connection fitting B        | Steel plate | AXT625-5   |
| 3   | Gasket A                    | NBR         | AXT625-17  |
| 4   | Gasket B                    | NBR         | AXT625-16  |
| 5   | Gasket                      | HNBR        | VVFS2000-32-1H   |
| 6   | O-ring                      | NBR         | KA00292H   |
| 7   | O-ring                      | NBR         | KA00276H   |
| 8   | O-ring                      | NBR         | KA00326H   |
| 9   | Adapter plate               | Resin       | For 01<br>AXT625-6   |
|     | Adapter plate assembly      | —           | For 01T<br>For 01T1<br>AXT625-28-13A<br>(Terminal section with adapter plate and lead wire assembly) |
|     | Adapter plate               | Resin       | For 01C<br>For 01F<br>AXT625-28-1<br>VVF2000-26-6  |
| 10  | Junction cover assembly     | —           | For 01<br>AXT625-7A  |
|     |                             |             | For 01T<br>AXT625-28-3A  |
|     |                             |             | For 01T1<br>AXT625-28-7A- <span style="border: 1px solid black;">Stations</span>                     |
|     |                             |             | For 01C<br>AXT625-28-7A- <span style="border: 1px solid black;">Stations</span>                      |
|     |                             |             | For 01F<br>VVF2000-26-5A- <span style="border: 1px solid black;">Stations</span>                     |
| 15  | Rubber plug                 | NBR         | For 01<br>AXT333-12  |
| 16  | Guard                       | Resin       | For 01T (1)<br>AXT625-22   |
|     |                             |             | For $\frac{01}{01T(1)}$<br>AXT625-28-4   |

## Replacement Parts: Sub Assembly

| No. | Description                              | Part no.  | Component parts  | Applicable manifold base                       |
|-----|--|---|--|--|
| 11  | Manifold block assembly (for 1 station)  | AXT625-01A- $\frac{1}{2}$ C <sub>6</sub> (-B) <sup>1</sup> Note | Manifold block ⑪, Metal joint ①, ②, O-ring ⑥, ⑦, ⑧, Junction cover ⑩, Adapter plate ⑨, Pin housing, Guide, Insert plug lead wire   | Plug-in type<br>With attachment plug lead wire |
|     |  | AXT625-20A- $\frac{1}{2}$ C <sub>6</sub> (-B) <sup>1</sup> Note | Manifold block ⑪, Metal joint ①, ②, O-ring ⑥, ⑦, ⑧, Junction cover ⑩, Adapter plate assembly (with terminal) ⑨, Pin housing, Guide | Plug-in type<br>With terminal block            |
|     |  | AXT625-10A- $\frac{1}{2}$ C <sub>6</sub> (-B) <sup>1</sup> Note | Manifold block ⑪, Metal joint ①, ②, O-ring ⑥, ⑦, ⑧   | Non plug-in type                               |
| 12  | Manifold block assembly (for 2 stations) | AXT625-01A2- $\frac{1}{2}$ <sup>1</sup> Note                    | Manifold block ⑫, Metal joint ①, ②, Gasket ⑤, Junction cover ⑩, Adapter plate ⑨, Pin housing, Guide, Insert plug lead wire         | Plug-in type<br>With attachment plug lead wire |
|     |  | AXT625-20A2- $\frac{1}{2}$ <sup>1</sup> Note                    | Manifold block ⑫, Metal joint ①, ②, Gasket ⑤, Junction cover ⑩, Adapter plate assembly (with terminal) ⑨, Pin housing, Guide       | Plug-in type<br>With terminal block            |
|     |  | AXT625-10A2- $\frac{1}{2}$ <sup>1</sup> Note                    | Manifold block ⑪, Metal joint ①, ②, Gasket ⑤   | Non plug-in type                               |
| 13  | End plate (U side) assembly              | AXT625-2A   | End plate (U) ⑬, Metal joint ①, ②, Gasket A ③, Guard ⑯   | Plug-in type<br>With attachment plug lead wire |
|     |  | AXT625-2A-20  | End plate (U) ⑬, Metal joint ①, ②, Gasket A ③, Guard ⑯   | Plug-in type<br>With terminal block            |
|     |  | AXT625-2A-10  | End plate (U) ⑬, Metal joint ①, ②, Gasket A ③  | Non plug-in type                               |
| 14  | End plate (D side) assembly              | AXT625-3A   | End plate (D) ⑭, Metal joint ①, ②, Gasket B ④, Guard ⑯, Steel ball   | Plug-in type<br>With attachment plug lead wire |
|     |  | AXT625-3A-20  | End plate (D) ⑭, Metal joint ①, ②, Gasket B ④, Guard ⑯, Steel ball   | Plug-in type<br>With terminal block            |
|     |  | AXT625-3A-10  | End plate (D) ⑭, Metal joint ①, ②, Gasket B ④, Steel ball  | Non plug-in type                               |

Note) 1: A, B port size Rc 1/8, 2: A, B port size Rc 1/4, (-B): A, B port bottom ported

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



[Option] Note



NRTL / C  
(Details→P.1106)

Note) Applicable only for DIN terminal and plug-in types.  
For details, refer to "How to Order".



Plug-in type



Non plug-in type

## Symbol

| 2 position                         | 3 position                         |
|------------------------------------|------------------------------------|
| Single                             | Closed center                      |
|                                    |                                    |
| (A)4 2(B)<br>(EA)5 1 3 (EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3 (EB)<br>(P) |
| Double                             | Exhaust center                     |
|                                    |                                    |
| (A)4 2(B)<br>(EA)5 1 3 (EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3 (EB)<br>(P) |
|                                    | Pressure center                    |
|                                    |                                    |
|                                    | (A)4 2(B)<br>(EA)5 1 3 (EB)<br>(P) |

## 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.)             |   |
|                            | Lubrication                           | Not required <sup>(1)</sup>            |   |
| Electricity specifications | Manual override                       | Non-locking push type                  |   |
|                            | Mounting orientation                  | Unrestricted                           |   |
|                            | Impact/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> | 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 <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  |
|                        |                                | 12 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<br>Rc | Flow rate characteristics <sup>(1)</sup> |             |            |                         |             |            | Max. <sup>(2)</sup><br>operating<br>cycle<br>(Hz) | <sup>(3)</sup><br>Response<br>time<br>(ms) | <sup>(4)</sup><br>Weight<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 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 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                                 | 0.75<br>(0.75)<br>0.72           |
|                   |                 |         | VFR344□     | 3/8             | 6.9                                      | 0.42        | 1.8        | 9.5 [3.4]               | 0.39 [0.46] | 2.4 [0.96] |   |  |                                  |
|                   | Pressure center | VFR350□ | VFR351□     | 1/4             | 7.6 [2.4]                                | 0.33 [0.48] | 1.9 [0.69] | 6.1                     | 0.36        | 1.5        | 3   | 50 or less                                 | 0.72<br>(0.75)<br>0.75           |
|                   |                 |         | 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.

Note 3) Based on dynamic performance test, JIS B 8419: 2010. (0.5 MPa, Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)

Note 4) For VFR3□0□-FZ□, ( ): VFR3□10-DZ□, < >: VFR3□40-□G□

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

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



## How to Order

**Electrical entry**

F: Plug-in type, conduit terminal

CE-compliant

**Option**

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

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

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

\* Semi-standard

**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 |

**CE-compliant**

|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

**Plug-in** VFR3 1 0 0 - 5 F - - - 02 - -

**Non plug-in** VFR3 1 1 1 - 1 D - - - 02 - -

**Non plug-in** VFR3 1 4 0 - 1 G - - - 02 - -

**Common electrical entry Individual electrical entry**

**Thread type**

**Symbol**

|                            |                   |
|----------------------------|-------------------|
| 2 position single          | (A)4 2(B)         |
| 1                          | (EA)5 1 3(EB) (P) |
| 2 position double          | (A)4 2(B)         |
| 2                          | (EA)5 1 3(EB) (P) |
| 3 position closed center   | (A)4 2(B)         |
| 3                          | (EA)5 1 3(EB) (P) |
| 3 position exhaust center  | (A)4 2(B)         |
| 4                          | (EA)5 1 3(EB) (P) |
| 3 position pressure center | (A)4 2(B)         |
| 5                          | (EA)5 1 3(EB) (P) |

**Body option**

|     |                        |
|-----|------------------------|
| 0   | Standard               |
| 1 * | Direct manual override |

\* Semi-standard

**Pilot type**

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

**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       |

For other rated voltages, please consult with SMC.

**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 |
| DO: DIN terminal without connector |                 |

CE-compliant

**Electrical entry: VFR3□4□**

|            |                     |                     |  |
|------------|---------------------|---------------------|--|
| G: Grommet | E: Grommet terminal | T: Conduit terminal | D, Y: DIN terminal                     |
|            |                     |                     | DO, YO: DIN terminal without connector |

**Symbol**

|                            |                   |
|----------------------------|-------------------|
| 2 position single          | (A)4 2(B)         |
| 1                          | (EA)5 1 3(EB) (P) |
| 2 position double          | (A)4 2(B)         |
| 2                          | (EA)5 1 3(EB) (P) |
| 3 position closed center   | (A)4 2(B)         |
| 3                          | (EA)5 1 3(EB) (P) |
| 3 position exhaust center  | (A)4 2(B)         |
| 4                          | (EA)5 1 3(EB) (P) |
| 3 position pressure center | (A)4 2(B)         |
| 5                          | (EA)5 1 3(EB) (P) |

**Body option**

|     |                        |
|-----|------------------------|
| 0   | Standard               |
| 1 * | Direct manual override |

\* Semi-standard

**Pilot type**

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

**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       |

For other rated voltages, please consult with SMC.

**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 |
| DO: DIN terminal without connector |                 |

CE-compliant

**Electrical entry: VFR3□4□**

|            |                     |                     |  |
|------------|---------------------|---------------------|--|
| G: Grommet | E: Grommet terminal | T: Conduit terminal | D, Y: DIN terminal                     |
|            |                     |                     | DO, YO: DIN terminal without connector |

## How to Order Pilot Valve Assembly

**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        |

For other rated voltages, please consult with SMC.

**Electrical entry, Light/Surge voltage suppressor**

| Symbol | Electrical entry              | Indicator light | With surge voltage suppressor | Applicable valve model | CE-compliant |
|--------|-------------------------------|-----------------|-------------------------------|------------------------|--------------|
| F *    | Plug-in                       | —               | —                             | VFR3□□ VFR3□1□         | ●            |
| G      | Grommet                       | —               | —                             | —                      | —            |
| GS     | Grommet                       | —               | —                             | —                      | —            |
| EZ     | Grommet terminal              | ●               | ●                             | —                      | —            |
| T      | Conduit terminal              | ●               | ●                             | —                      | —            |
| DZ     | DIN terminal                  | ●               | ●                             | —                      | —            |
| DOZ    | DIN terminal                  | ●               | ●                             | —                      | —            |
| YOZ    | 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)             |

**Symbol**

| Symbol | Applicable valve model |
|--------|------------------------|
| Nil    | VFR3□□□                |
| 1      | VFR3□4□                |

**CE-compliant**

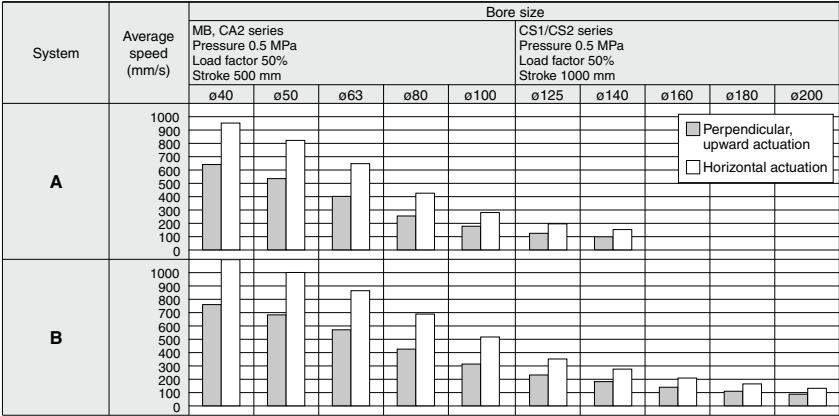
|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F only.

# VFR3000 Series

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

## Cylinder Speed Chart

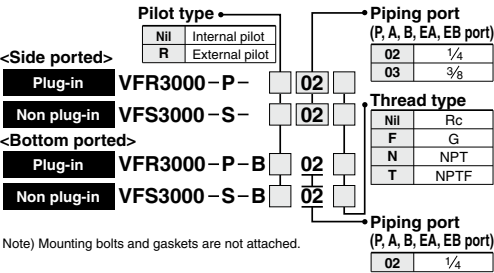


\* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.  
\* The average velocity of the cylinder is what the stroke is divided by the total stroke time.  
\* Load factor: ((Load mass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

## System Components

| System | Solenoid valve        | Speed controller | Silencer | SPG (Steel pipe) dia. x Length |
|--------|-----------------------|------------------|----------|--------------------------------|
| A      | VFR3000 Series Rc 1/4 | AS4000-02        | AN20-02  | 6A x 1 m                       |
| B      | VFR3000 Series Rc 3/8 | AS420-03         | AN30-03  | 10A x 1 m                      |

## How to Order Sub-plate Assembly

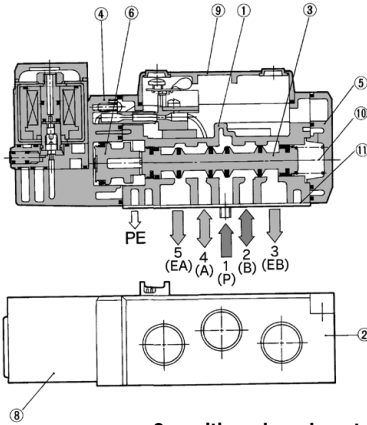
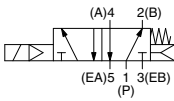


# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR3000 Series**

## Construction

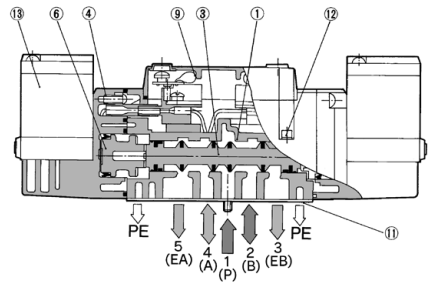
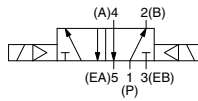
### 2 position single

VFR31□0



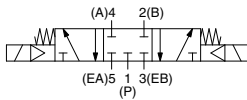
### 2 position double

VFR32□0

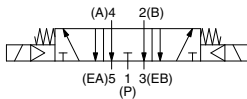


### 3 position closed center/exhaust center/pressure center

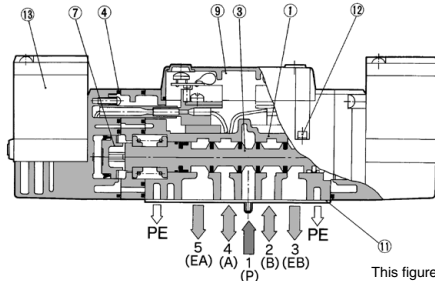
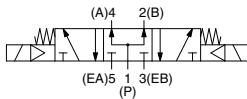
Closed center: VFR33□0



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           |

## Component Parts

| 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

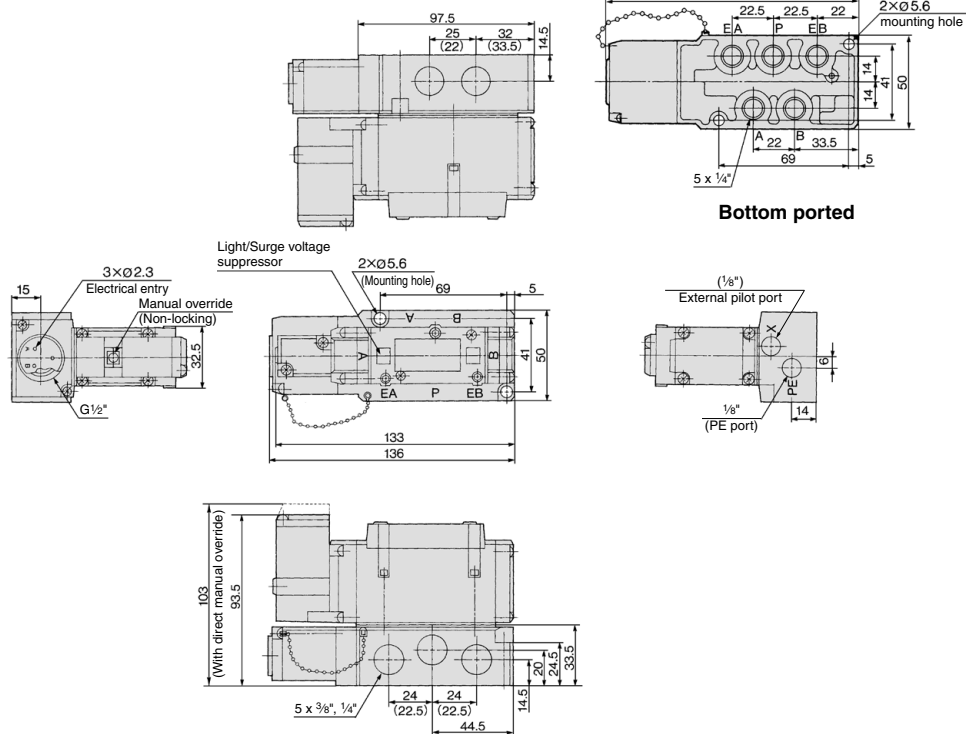
| No. | Description                                   | Material | Description  |                      |                      |
|-----|---|----------|--|----------------------|----------------------|
|     |   |          | VFR31□□  | VFR32□□              | VFR33□□/34□□/35□□    |
| 11  | Gasket  | NBR      | VFR3000-26-4   | VFR3000-26-4         | VFR3000-26-4         |
| 12  | Hexagon socket head screw <small>Note</small> | Steel    | AXT632-3#1 (M3 x 32)                                       | AXT632-3#1 (M3 x 32) | AXT632-3#1 (M3 x 32) |
| 13  | Pilot valve assembly                          | —        | Refer to "How to Order Pilot Valve Assembly" on page 1039. |                      |                      |
| —   | Sub-plate assembly                            | —        | Refer to "How to Order Sub-plate Assembly" on page 1040.   |                      |                      |

Note) For the VFR3000 series, it requires 3 pcs.

# VFR3000 Series

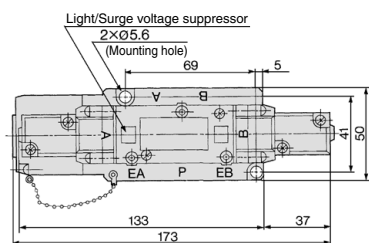
## Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center

### 2 position single: VFR310 □-□FZ



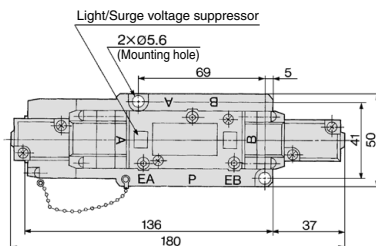
( ): Rc 1/4

### 2 position single: VFR320 □-□FZ



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

### 3 position closed center: VFR330 □-□FZ 3 position exhaust center: VFR340 □-□FZ 3 position pressure center: VFR350 □-□FZ



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

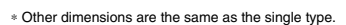
## 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR3000 Series**

**Non Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center**

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



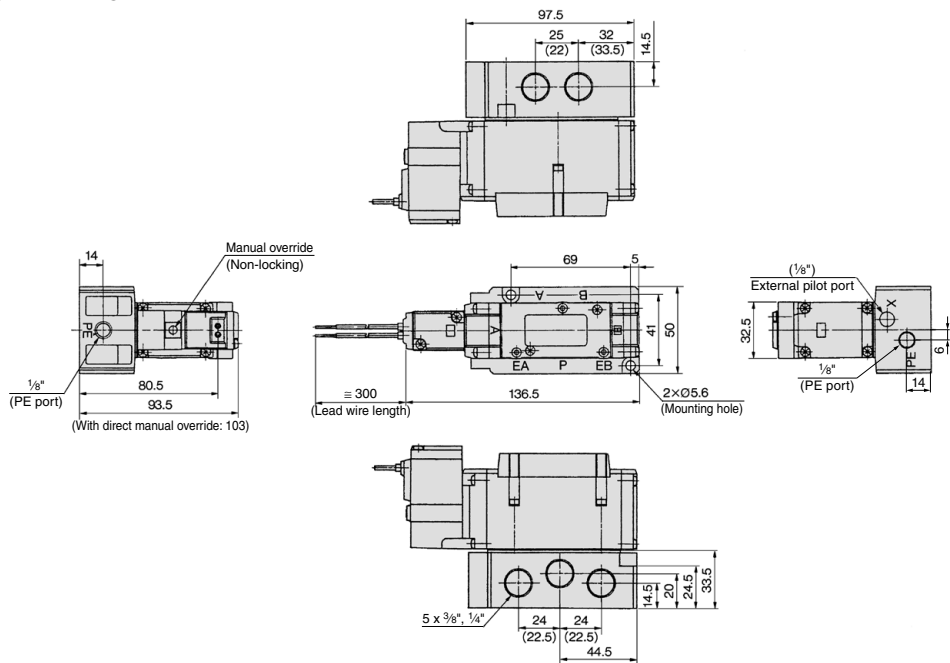
**2 position double: VFR321<sup>0</sup>-□E, VFR321<sup>0</sup>-□DZ**



# VFR3000 Series

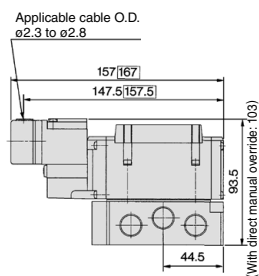
## Non Plug-in: 2 Position Single

2 position single: VFR314 □ □ □



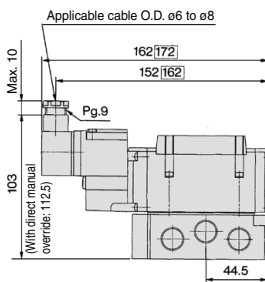
( ): Rc 1/4

### E: Grommet terminal



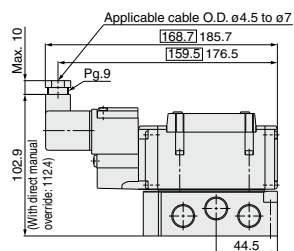
□ : With light/surge voltage suppressor

### T: Conduit terminal



□ : With light/surge voltage suppressor

### D, Y: DIN terminal



□ : With light/surge voltage suppressor

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

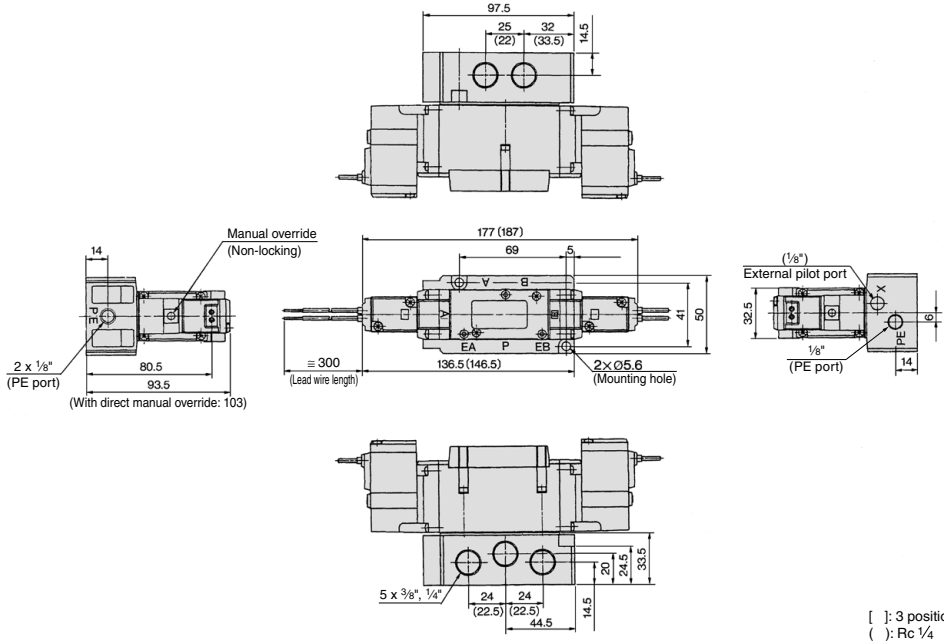
## Non Plug-in: 2 Position Double, 3 Position Closed Center/Exhaust Center/Pressure Center

2 position double: VFR324  $\frac{0}{1}$ -□G

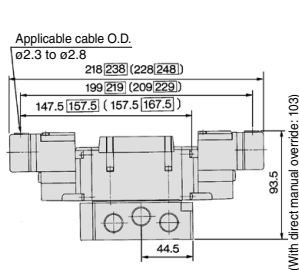
3 position closed center: VFR334  $\frac{0}{1}$ -□G

3 position exhaust center: VFR344  $\frac{0}{1}$ -□G

3 position pressure center: VFR354  $\frac{0}{1}$ -□G

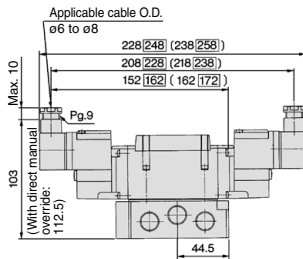


### E: Grommet terminal



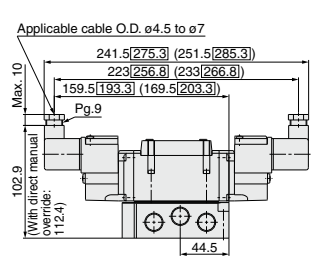
[ ] : 3 position  
□ : With light/surge voltage suppressor

### T: Conduit terminal



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

### D, Y: DIN terminal



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

# VFR3000 Series

## Manifold Specifications

### Manifold Specifications

| Base mounted                             | Wiring  | Porting specifications | Port size     |                     | Stations | Applicable valve model                                   |
|--|---|------------------------|---------------|---------------------|----------|--|
|  |   | A, B port              | P, EA, EB     | A, B                |          |  |
| Plug-in type<br><b>VV5FR3-01□(-Q)</b>    | • With terminal block<br>• With multi-connector<br>• With D-sub connector | Side/Bottom            | Notes)<br>1/2 | 1/4, 3/8<br>C8, C10 | 2 to 10  | VFR3□0□-□F(-Q)   |
| Non plug-in type<br><b>VV5FR3-10(-Q)</b> | • Grommet terminal<br>• DIN terminal                                      |                        |               |                     | 2 to 8   | VFR3□1□-□E<br>VFR3□1□-□D(-Q)                             |
| Non plug-in type<br><b>VV5FR3-40(-Q)</b> | • Grommet<br>• Grommet terminal<br>• Conduit terminal<br>• DIN terminal   |                        |               |                     | 2 to 10  | VFR3□4□-□G<br>VFR3□4□-□E<br>VFR3□4□-□T<br>VFR3□4□-□D(-Q) |

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 (-Q) ..... 1 set (Manifold base part no.)  
 \*VFR3100-5FZ (-Q) ..... 3 sets (2 position single part no.)  
 \*VFR3200-5FZ (-Q) ..... 2 sets (2 position double part no.)  
 \*VVFS3000-10A ..... 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 (-Q) ..... 1 set (Manifold base part no.)  
 \*VFR3110-5D (-Q) ..... 5 sets (2 position single part no.)  
 \*VFR3410-5D (-Q) ..... 1 set (3 position exhaust center part no.)  
 \*VVFS3000-R-03-2 ..... 1 set (Individual EXH spacer part no.)

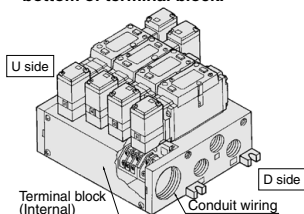
↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

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**

VFR3000 Series Manifold

Plug-in type with terminal block

**Stations**

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

**Symbol**

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

\* Semi-standard

**Port size**

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

\* For bottom ported: Rc 1/4, 3/8 only.  
 \* For C8 and C10, the thread type is only Rc.

**Thread type**

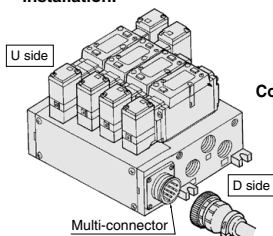
| Symbol | Rc   |
|--------|------|
| NH     |      |
| F      | G    |
| T      | NPTF |

**CE-compliant**

|    |              |
|----|--------------|
| NH | —            |
| Q  | CE-compliant |

### Plug-in Type: With Multi-connector (For wiring specifications, refer to page 1113.)

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



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

VFR3000 Series 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  | Side                          |
| 2      | Common  | Bottom *                      |

\* Semi-standard

**Port size**

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

\* For bottom ported: Rc 1/4, 3/8 only.  
 \* For C8 and C10, the thread type is only Rc.

**Thread type**

| Symbol | Rc   |
|--------|------|
| NH     |      |
| F      | G    |
| T      | NPTF |

**CE-compliant**

|    |              |
|----|--------------|
| NH | —            |
| Q  | CE-compliant |

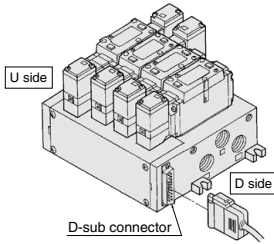
Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



[Option]

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 1113.)

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



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

VFR3000 Series 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) |
|--------|---------|-------------------------------|
| 1      | Common  | Common                        |
| 2      | Common  | Side Bottom *                 |

\* Semi-standard

### Port size

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

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

\* For C8 and C10, the thread type is only Rc.

### CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

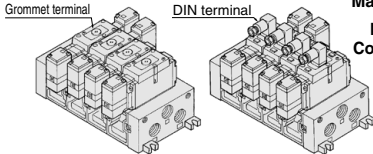
Note) Electrical entry and light/surge voltage suppressor: F, FZ only

### Thread type

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

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

- Individual wiring for every valve



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

VFR3000 Series Manifold

Non plug-in type  
Common electrical

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

\* Semi-standard

### Symbol

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

### Port size

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

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

\* For C8 and C10, the thread type is only Rc.

### CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

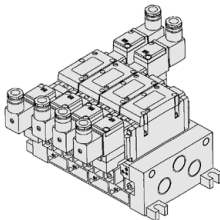
Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ only.

### Thread type

|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| 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**

VFR3000 Series Manifold

Non plug-in type  
Individual electrical entry

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

Note) Manifold base is in common with the VFS3000 series.

### Symbol

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

\* Semi-standard

### Port size

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

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

\* For C8 and C10, the thread type is only Rc.

### CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ only.

### Thread type

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

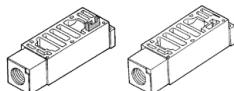
# VFR3000 Series

## Manifold/Option Parts Assembly

### Individual SUP spacer

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

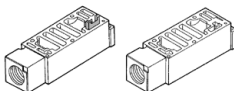
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS3000-P-03-1 | VVFS3000-P-03-2  |



### 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 <sup>Note)</sup>

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 <sup>Note)</sup>

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    |                  |



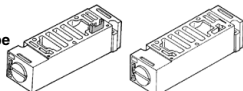
<sup>Note)</sup> When mounting on the 2 stations integrated manifold block, be sure to mount it only after the gasket has been cut.

### 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   |

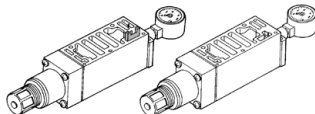
Shape



### Interface regulator

Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Rate Characteristics" on page 1111 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 |                  |

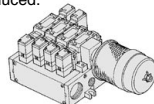
\* Mounting screws: 4 positions

## 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.

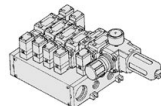


For details, refer to page 1053.

### With control unit

Plug-in type/Non plug-in type

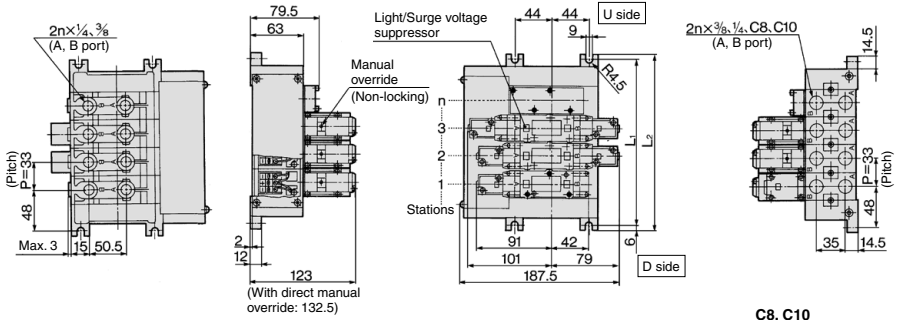
- Filter, regulation valve, pressure switch and air release valve are all combined to form one unit.
- Piping processes are eliminated.



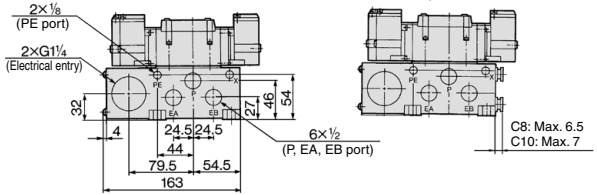
For details, refer to page 1056.

## Manifold: Plug-in Type

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

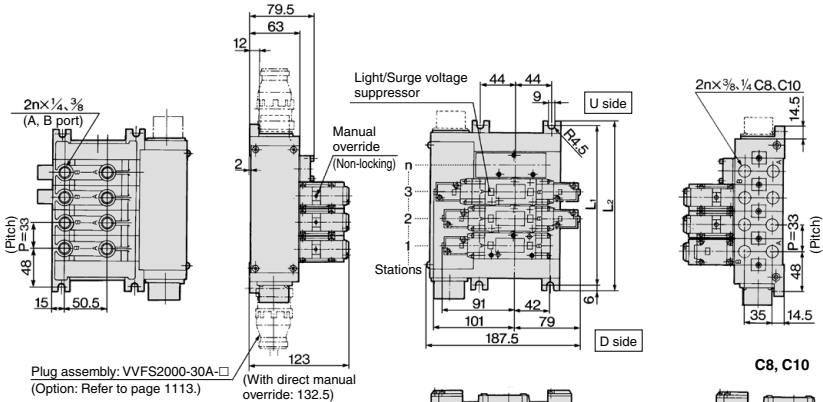


Bottom ported:  
VV5FR3-01T-Station 2-Port size



| 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 <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

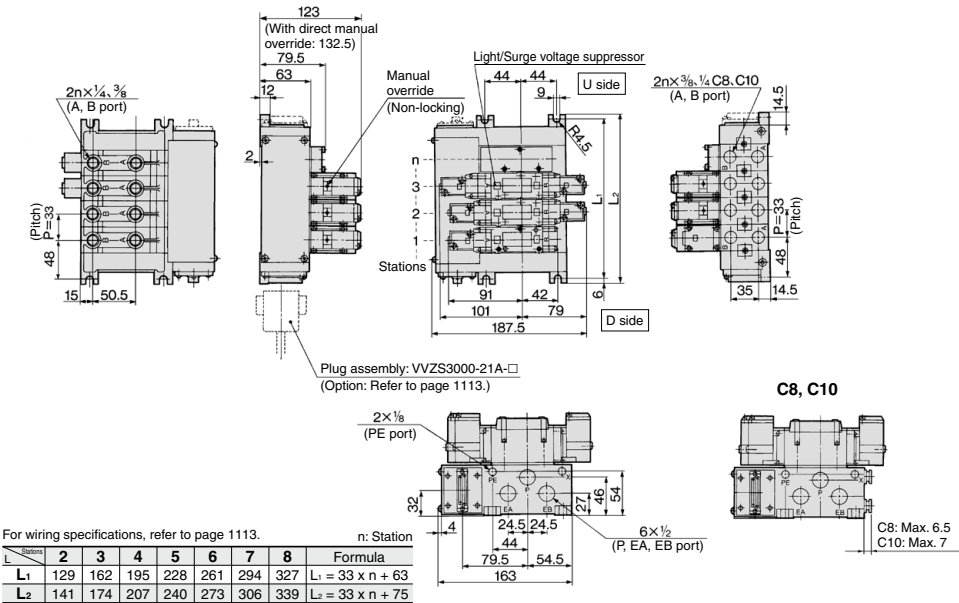


| n: Station     |     |     |     |     |     |     |     |     |     |                              |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| Station        | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | L <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 |

# VFR3000 Series

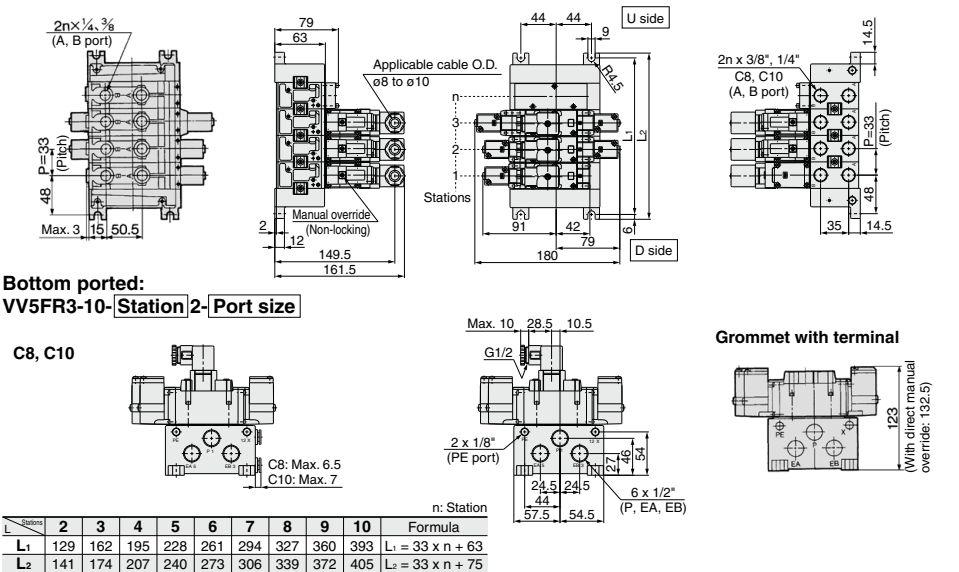
## Manifold: Plug-in Type

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



## Manifold: Non Plug-in Type

**VV5FR3-10-Station 1-Port size**

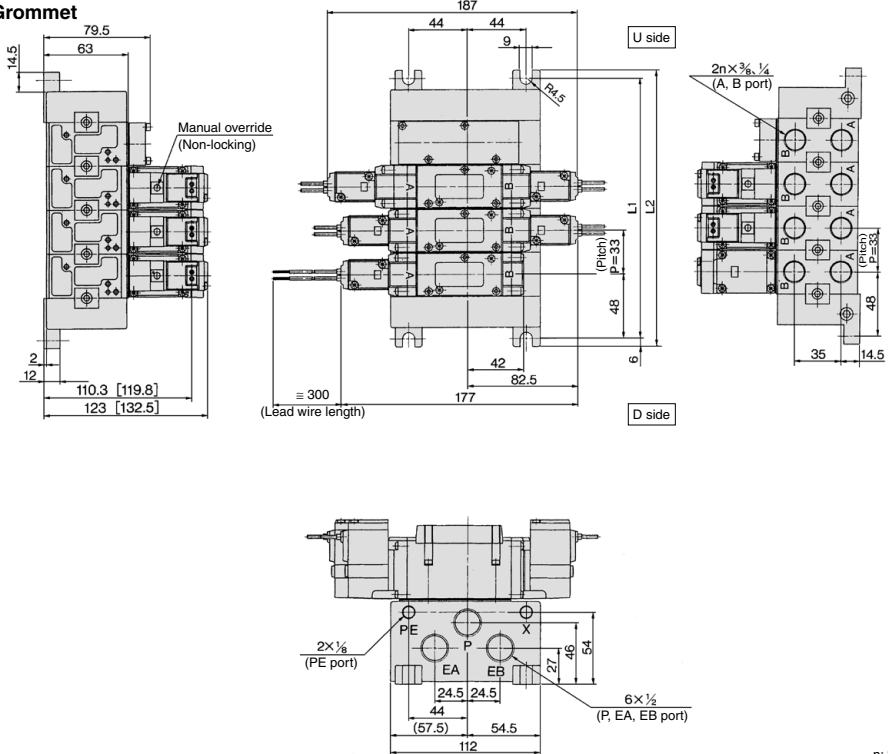


# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR3000 Series**

## Manifold: Plug-in Type

VV5FR3-40-Station 1- Port size

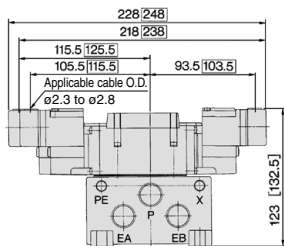
G: Grommet



[ ] : With direct manual override

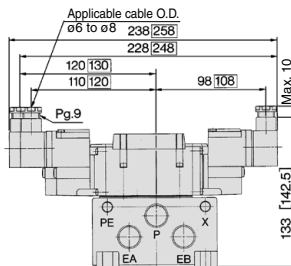
| n: Station     |     |     |     |     |     |     |     |     |     |                              |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| Station        | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
| L <sub>1</sub> | 129 | 162 | 195 | 228 | 261 | 294 | 327 | 360 | 393 | L <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 |

## E: Grommet terminal



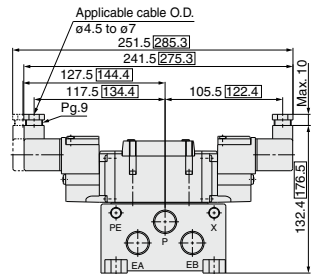
☐ : With light/surge voltage suppressor

## T: Conduit terminal



☐ : With light/surge voltage suppressor

## D, Y: DIN terminal



☐ : With light/surge voltage suppressor

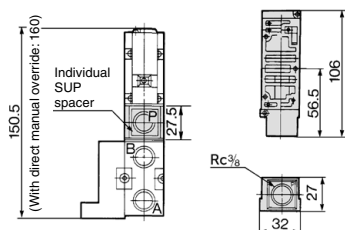
# VFR3000 Series

## Manifold/Option Parts Assembly: Plug-in Type/Non Plug-in Type

**Individual SUP spacer:**

**VVFS3000-P-03-1 (Plug-in type)**

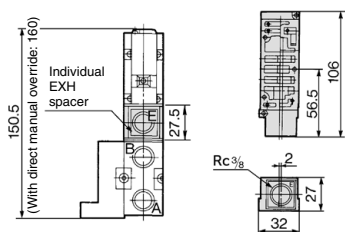
**VVFS3000-P-03-2 (Non plug-in type)**



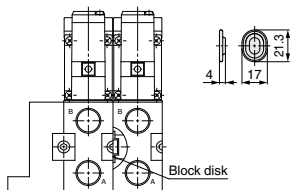
**Individual EXH spacer:**

**VVFS3000-R-03-1 (Plug-in type)**

**VVFS3000-R-03-2 (Non plug-in type)**



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

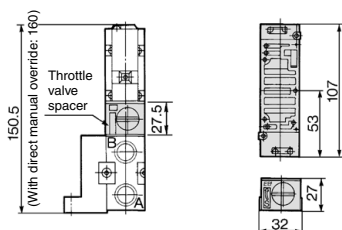


Note) When mounting on the 2 stations integrated manifold block, be sure to mount it only after the gasket has been cut.

**Throttle valve spacer:**

**VVFS3000-20A-1 (Plug-in type)**

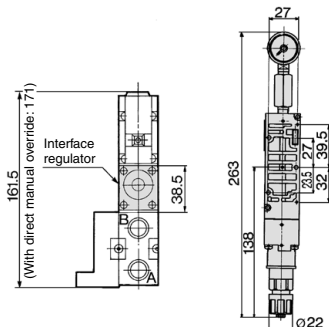
**VVFS3000-20A-2 (Non plug-in type)**



**Interface regulator/P port regulation:**

**ARBF3050-00-P-1 (Plug-in type)**

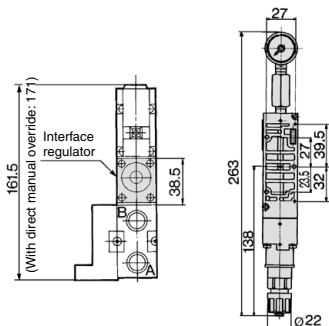
**ARBF3050-00-P-2 (Non plug-in type)**



**Interface regulator/A port regulation:**

**ARBF3050-00-A-1 (Plug-in type)**

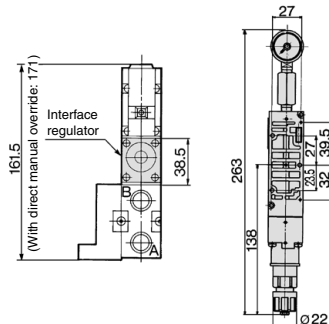
**ARBF3050-00-A-2 (Non plug-in type)**



**Interface regulator/B port regulation:**

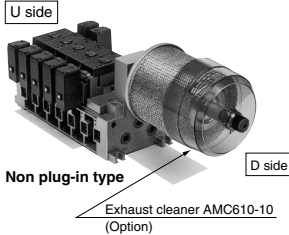
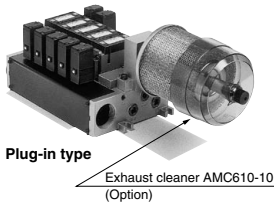
**ARBF3050-00-B-1 (Plug-in type)**

**ARBF3050-00-B-2 (Non plug-in type)**



## 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□(-Q)   | Non plug-in type: VV5FR3-10(-Q)  | Non plug-in type: VV5FR3-40(-Q)                                      |
|-----------------------------|--|--|--|
| 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□□□□□□(-Q)   | VFR3□1□□□□□(-Q)<br>VFR3□1□□□□□(-Q)   | VFR3□4□□□□□(-Q), VFR3□4□□□□□(-Q)<br>VFR3□4□□□□□(-Q), VFR3□4□□□□□(-Q) |
| Porting specifications      | Common SUP, Common EXH   |  |  |
| Rc                          | A, B port<br>P port  | Side: Rc 1/4, 3/8, C8, C10 Bottom: Rc 1/4, 3/8 (Option)<br>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.

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only



### How to Order

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

**VFR3000 Series 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 |                 |

**Thread type**

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

**Exhaust cleaner mounting direction**

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

**Port size**

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

\* For bottom ported: Rc 1/4, 3/8  
\* For C8 and C10, the thread type is only Rc.

**Stations**

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

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

**Symbol**

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

\* Semi-standard

### How to Order Manifold Assembly

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

|                                 |  |
|---------------------------------|--|
| VV5FR3-01T-061-03-CD (-Q) ..... | 1 set (Manifold base part no.)           |
| *VFR3100-5FZ (-Q) .....         | 3 sets (2 position single part no.)      |
| *VFR3200-5FZ (-Q) .....         | 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 (-Q) ..... | 1 set (Manifold base part no.)           |
| *VFR3110-5E (-Q) .....         | 3 sets (2 position single part no.)      |
| *VFR3210-5E (-Q) .....         | 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.

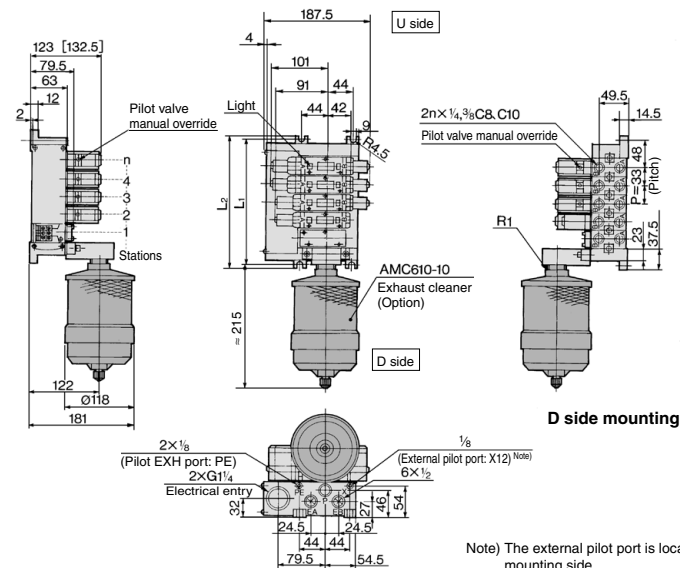
Valve arrangement is counted from the D side.  
When ordering, specify the part nos. in order from the 1st. station in the D side.  
When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

Refer to Best Pneumatics No. 7 for Exhaust Cleaner details.

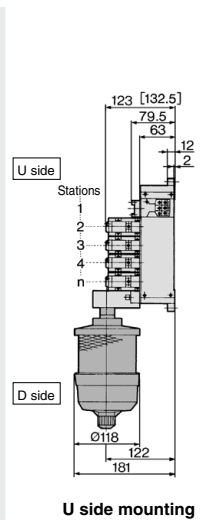
# VFR3000 Series

## Manifold with Exhaust Cleaner: Plug-in Type/Non Plug-in Type

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

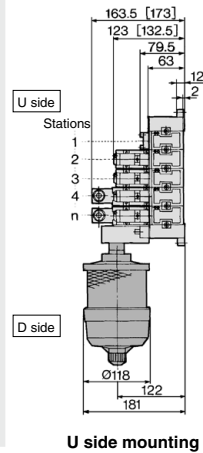
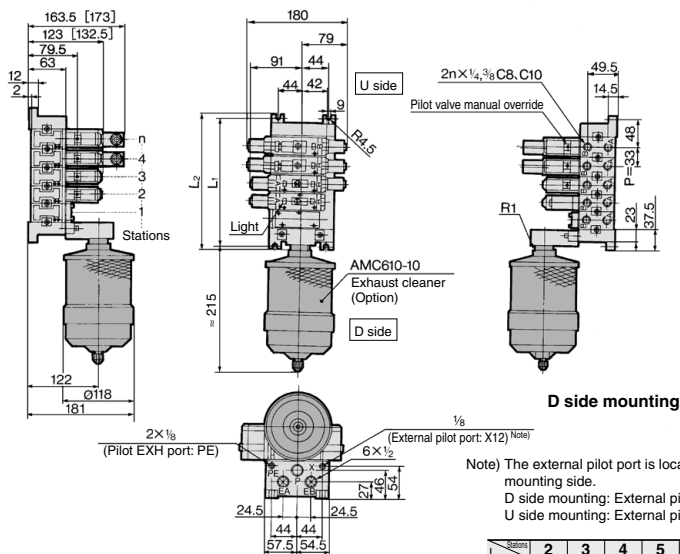


[ ] : With direct manual override



Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.  
D side mounting: External pilot port U side  
U side mounting: External pilot port D side

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



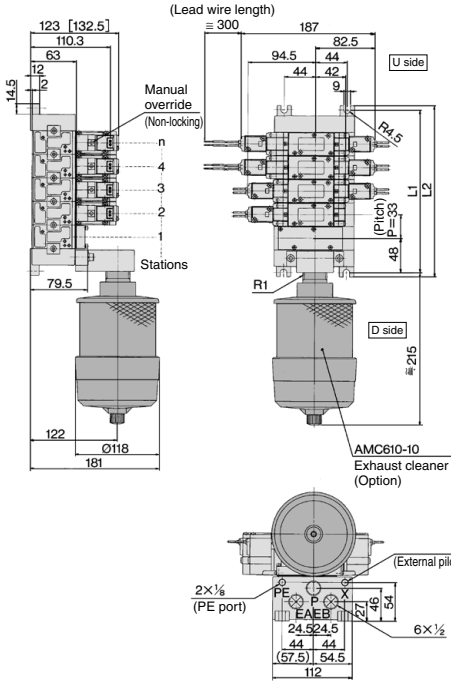
Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.  
D side mounting: External pilot port U side  
U side mounting: External pilot port D side

[ ] : With direct manual override

| n: Station     |     |     |     |     |     |     |     |     |     |                              |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L              | 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 |

Manifold with Exhaust Cleaner: Non Plug-in Type

Non plug-in type: VV5FR3-40-Station 1-Port size-CD



Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.  
D side mounting: External pilot port U side  
U side mounting: External pilot port D side

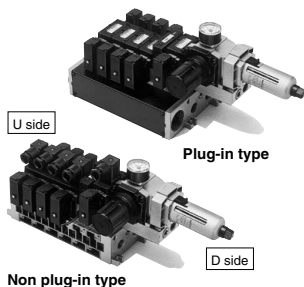
[ ]: With direct manual override

|            |
|------------|
| SV         |
| SYJ        |
| SZ         |
| VF         |
| VP4        |
| VQ<br>1/2  |
| VQ<br>4/5  |
| VQC<br>1/2 |
| VQC<br>4/5 |
| VQZ        |
| SQ         |
| VFS        |
| VFR        |
| VQ7        |

| 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 <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 |

## 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: <b>VV5FR3-01□(-Q)</b>                                 | Non plug-in type: <b>VV5FR3-10(-Q)</b>                  | Non plug-in type: <b>VV5FR3-40(-Q)</b>                      |
|-------------------------------|---|---|---|
| <b>Wiring</b>                 | 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 |
| <b>Applicable valve model</b> | VFR3□0□□F(-Q)   | VFR3□1□□D(-Q)<br>VFR3□1□□E                              | VFR3□4□□G, VFR3□4□□E<br>VFR3□4□□T, VFR3□4□□Y(-Q)            |
| <b>Porting specifications</b> | 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  |   |
| <b>Stations</b>               | 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 VDC or less: 50 mA<br>100 VAC: 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 | <Plug-in type><br>VVFS3000-24A-1R (D side mounting)     |                 |
|                          | <Non plug-in type><br>VVFS3000-24A-2R (D side mounting) |                 |
| Pressure switch          | IS1000P-2-1   |                 |
| Blanking plate           | For filter regulator                                    | MP2-3           |
|                          | For pressure switch                                     | MP3-2           |
| Filter element           | For air release valve                                   | VVFS3000-24A-10 |
|                          | 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.

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

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



## How to Order

**VV5FR3 - 10 - 08 1 - 02 - AP -**

**VFR3000 Series 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 |                 |

### 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      |         |        | Bottom *                      |

\* Semi-standard

### Port size

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

- \* For bottom ported: only 1/4, 3/8  
\* For C8 and C10, the thread type is only Rc.

### Thread type

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

### CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

### Control unit type

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

Note 1) Adjust the voltage to the coil rated voltage of the mounted valve.

Note 2) For other rated voltages, please consult with SMC.

### 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

VV5FR3-01T-081-03-AP5 (-Q) ..... 1 set (Manifold base part no.)

\*VFR3100-5FZ (-Q) ..... 4 sets (2 position single part no.)

\*VFR3200-5FZ (-Q) ..... 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 (-Q) ..... 1 set (Manifold base part no.)

\*VFR3110-5D (-Q) ..... 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.

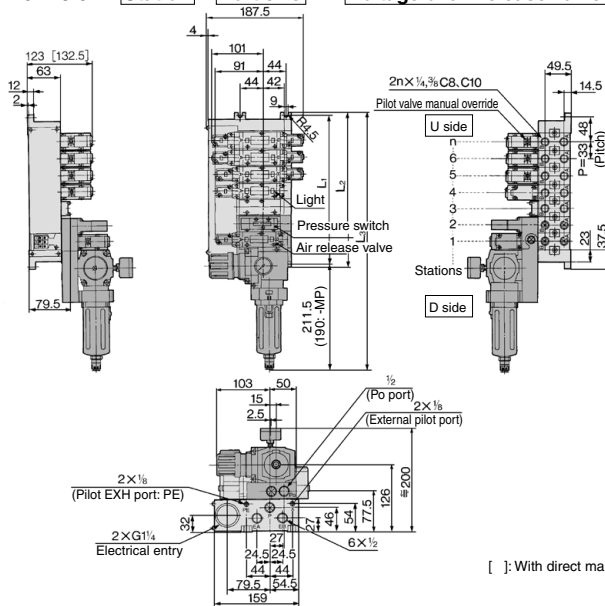
When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

# VFR3000 Series

## Manifold with Control Unit: Plug-in Type/Non Plug-in Type

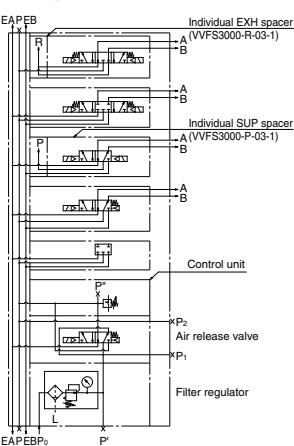
Plug-in type:

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



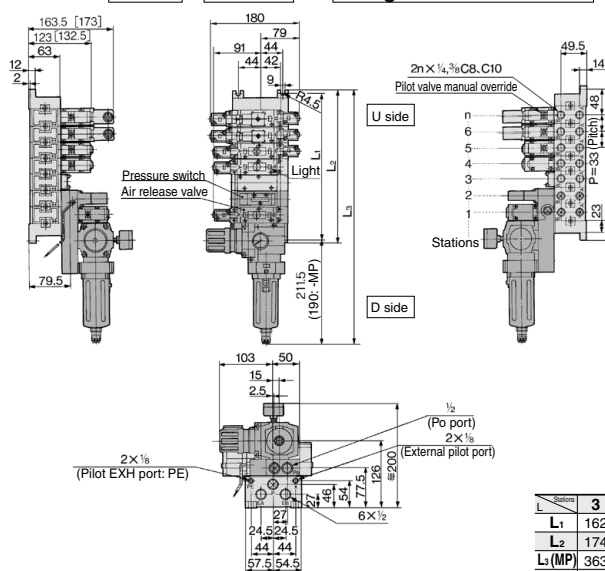
[ ]: With direct manual override

Example for manifold

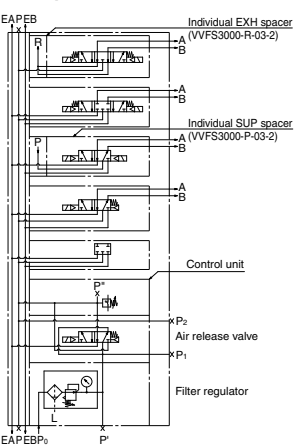


Non plug-in type:

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



Example for manifold

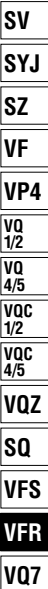


| n: Station          |       |       |       |       |       |       |       |       |                                 |  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|--|
| Station             | 3     | 4     | 5     | 6     | 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>1</sub> (MP) | 363   | 396   | 429   | 462   | 495   | 528   | 561   | 594   | L <sub>1</sub> = 33 x n + 264   |  |
| L <sub>1</sub> (AP) | 384.5 | 417.5 | 450.5 | 483.5 | 516.5 | 549.5 | 582.5 | 615.5 | L <sub>1</sub> = 33 x n + 285.5 |  |

[ ]: With direct manual override

## VFR3000 Series

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

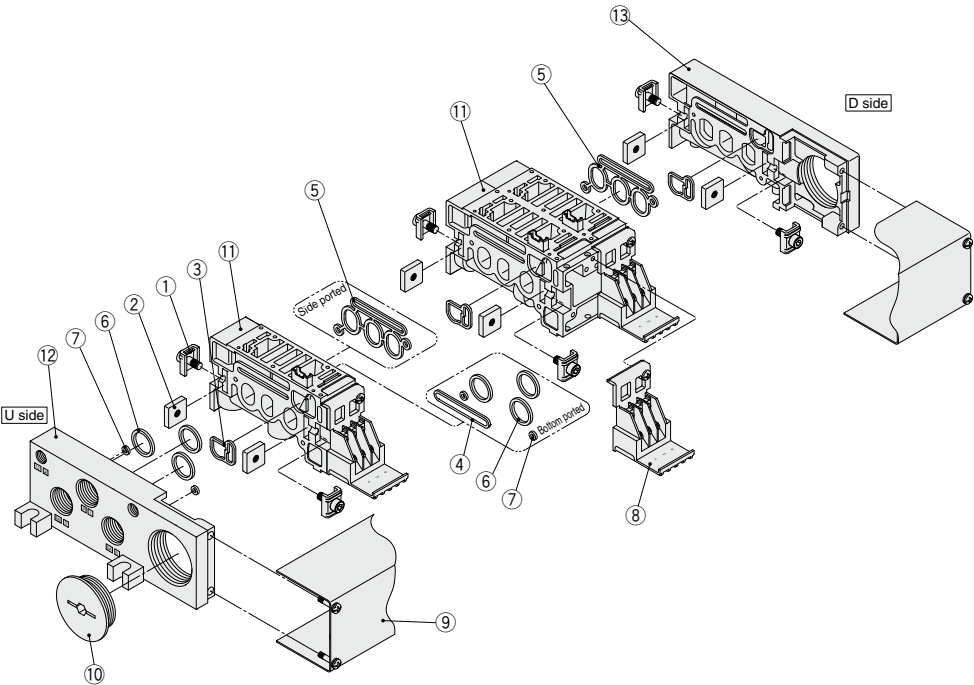


( ): MP

1059

# VFR3000 Series

## Manifold Base Construction: Plug-in Type/Non Plug-in Type



### 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   | Gasket                  | NBR      | VVFS3000-32-1                        |
| 6   | O-ring                  | NBR      | KA00232                              |
| 7   | O-ring                  | NBR      | KA00020                              |
| 8   | Terminal assembly       | —        | VVFS3000-6A                          |
| 9   | Junction cover assembly | —        | For 01T VVFS3000-4A- <u>Stations</u> |
| 10  | Rubber plug             | NBR      | AXT336-9                             |

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

### Replacement Parts: Sub Assembl

| No. | Description                 | Assembly part no.                                 | Component parts   | Applicable manifold base |
|-----|-----------------------------|---|---|--------------------------|
| 11  | Manifold block assembly     | VVFS3000-1A-1- <sup>02</sup> <sub>03</sub><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- <sup>02</sup> <sub>03</sub><br>C10 | Manifold block 9, Connection bracket 1, 2, Gasket 3, 4, O-ring 6, 7                                   | Non plug-in type         |
| 12  | 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         |
| 13  | 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   | Non plug-in type         |

Note) For side ported

\* Contact SMC for CE-compliant products.

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



[Option] Note)



NRTL / C

Note) Applicable only for DIN terminal and plug-in types.  
For details, refer to "How to Order".



Plug-in type



Non plug-in type

## Symbol

| 2 position                        | 3 position                        |
|-----------------------------------|-----------------------------------|
| Single                            | Closed center                     |
| (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |
| Double                            | Exhaust center                    |
| (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |
|                                   | Pressure center                   |
|                                   | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

## 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.)  |
| Lubrication                   |   | Non-lube <sup>(1)</sup>   |
| Manual override               |   | Non-locking push type   |
| Mounting orientation          |   | Unrestricted  |
| Impact/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<br>5.6 VA/50 Hz, 5.0 VA/60 Hz<br>Holding<br>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 (2.04 W: With light/surge voltage suppressor)   |
|                               | Electrical entry                                  | Plug-in type<br>Conduit terminal<br>Non plug-in type<br>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<br>Direct manual override<br>Pilot valve<br>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 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 MPa

Pilot 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 rate characteristics <sup>(2)</sup> |             |           |                                 |             |           | Max <sup>(3)</sup><br>operating cycle (Hz) | <sup>(4)</sup><br>Response time (ms) | <sup>(5)</sup><br>Weight (kg) |
|-------------------|-----------------|---------|-------------|--------------------------|--|-------------|-----------|---------------------------------|-------------|-----------|--|--------------------------------------|-------------------------------|
|                   |                 |         |             |                          | 1 → 4/2 (P → A/B)                        |             |           | 4/2 → 5/3 (A/B → EA/EB)         |             |           |  |                                      |                               |
|                   |                 | Plug-in | Non plug-in |                          | 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>      |
|                   |                 | VFR410□ | 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>      |
|                   |                 | VFR420□ | 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  | 70 or less                           | 1.20<br>(1.16)<br><1.16>      |
|                   |                 | VFR430□ | 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>      |
|                   |                 | VFR440□ | 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>      |
|                   |                 | VFR450□ | 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.

Note 4) Based on dynamic performance test, JIS B 8419: 2010. (0.5 MPa, Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)

Note 5) For VFR4□00-□FZ-□□, ( ) : VFR4□10- DZ□-□□, < > : VFR4□40-□G-□□

# VFR4000 Series

## How to Order

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only



**Electrical entry**

F: Plug-in type, conduit type

CE-compliant

**Option**

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

**Porting specifications**  
(P, A, B, 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 |

**CE-compliant**

|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

**Plug-in** VFR4 0 0 — 5 F — — — 03 — —

**Non plug-in** VFR4 1 1 — 1 D — — — 03 — —

**Non plug-in** VFR4 4 0 — 1 G — — — 03 — —

**Common electrical entry**

**Individual electrical entry**

**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)

**Symbol**

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

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

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

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

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

**Body option**

|     |                        |
|-----|------------------------|
| 0   | Standard               |
| 1 * | Direct manual override |

\* Semi-standard

**Pilot type**

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

**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          |

For other rated voltages, please consult with SMC.

**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 |
| DO: DIN terminal without connector |                 |

CE-compliant

**Electrical entry: VFR4□4□**

|            |                     |                     |  |
|------------|---------------------|---------------------|--|
| G: Grommet | E: Grommet terminal | T: Conduit terminal | D, Y: DIN terminal                     |
|            |                     |                     | DO, YO: DIN terminal without connector |

CE-compliant

## 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        |

For other rated voltages, please consult with SMC.

**Electrical entry, Light/Surge voltage suppressor**

| Symbol | Electrical entry              | Indicator light | With surge voltage suppressor | Applicable valve model | CE-compliant |
|--------|-------------------------------|-----------------|-------------------------------|------------------------|--------------|
| F *    | Plug-in                       | —               | —                             | VFR4□□□<br>VFR4□1□     | ●            |
| G      | Grommet                       | —               | —                             | —                      | —            |
| GS     | Grommet                       | —               | —                             | —                      | —            |
| E      | Grommet terminal              | ●               | ●                             | —                      | —            |
| EZ     | Grommet terminal              | ●               | ●                             | —                      | —            |
| T      | Conduit terminal              | ●               | ●                             | —                      | —            |
| TZ     | Conduit terminal              | ●               | ●                             | —                      | —            |
| D      | DIN terminal                  | ●               | ●                             | VFR4□4□                | ●            |
| DZ     | DIN terminal                  | ●               | ●                             | —                      | —            |
| DO     | DIN terminal                  | ●               | ●                             | —                      | —            |
| DOZ    | DIN terminal                  | ●               | ●                             | —                      | —            |
| Y      | DIN terminal (DIN43650B type) | ●               | ●                             | —                      | —            |
| YO     | DIN terminal (DIN43650B type) | ●               | ●                             | —                      | —            |
| YOZ    | 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)             |

**CE-compliant**

|     |                     |
|-----|---------------------|
| Nil | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F only.

**Symbol**

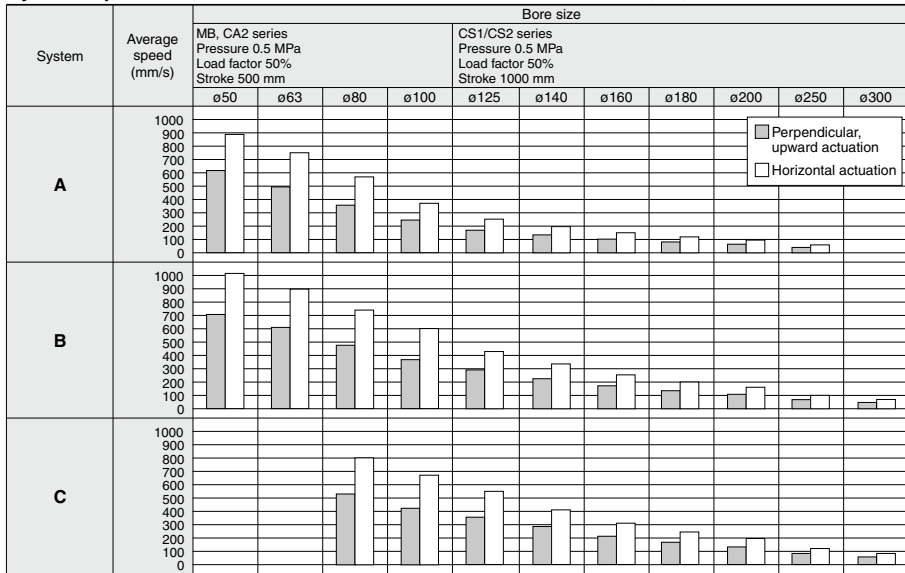
| Symbol | Applicable valve model |
|--------|------------------------|
| Nil    | VFR4□□□<br>VFR4□1□     |
| 1      | VFR4□4□                |

\* VFR4□□□, VFR4□1□: Pilot valve assembly is all plug-in (F).

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

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.

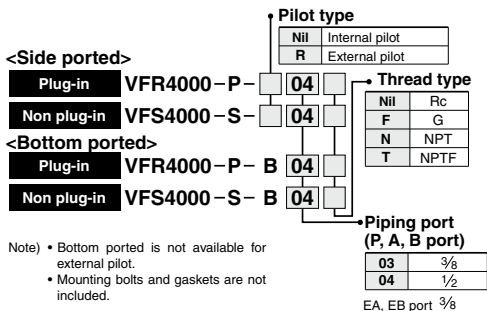
\* The average velocity of the cylinder is what the stroke is divided by the total stroke time.

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

## System Components

| System | Solenoid valve           | Speed controller | Silencer | SPG (Steel pipe) dia. x Length |
|--------|--------------------------|------------------|----------|--------------------------------|
| A      | VFR4000 Series<br>Rc 3/8 | AS4000-03        | AN30-03  | 10A x 1 m                      |
| B      | VFR4000 Series<br>Rc 3/8 | AS420-03         | AN30-03  | 10A x 1 m                      |
| C      | VFR4000 Series<br>Rc 1/2 | AS420-04         | AN40-04  | 15A x 1 m                      |

## How to Order Sub-plate Assembly

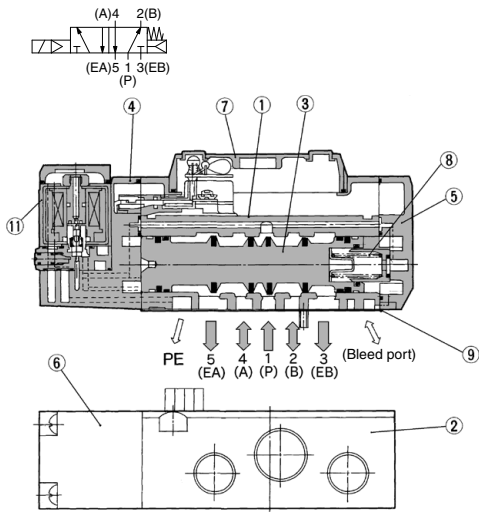


# VFR4000 Series

## Construction

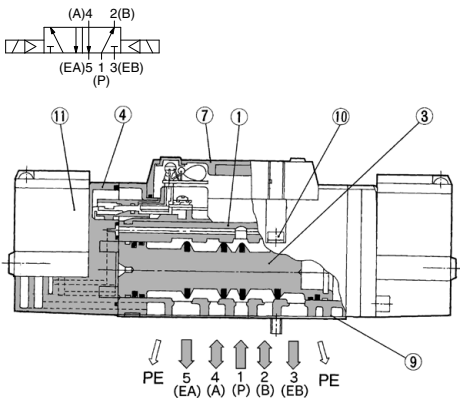
### 2 position single

VFR41□□



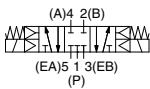
### 2 position double

VFR42□□



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

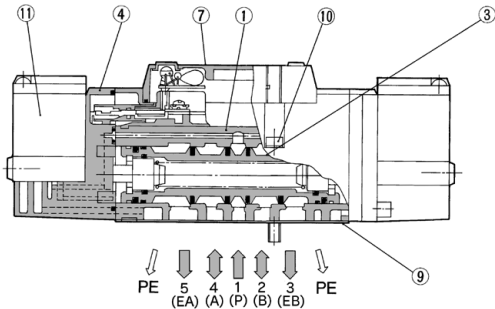
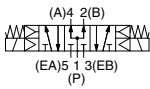
Closed center: VFR43□□



Exhaust center: VFR44□□



Pressure center: VFR45□□



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           |

## Component Parts

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

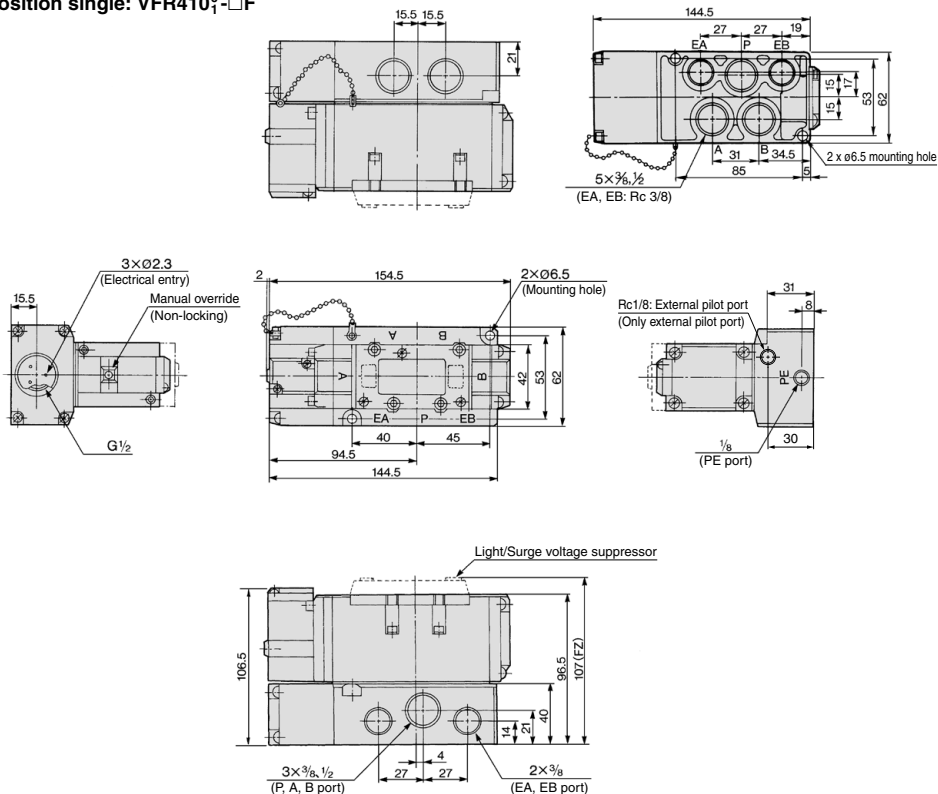
## Replacement Parts

| No. | Description                                | Material | Part no.   |                         |                         |
|-----|--|----------|--|-------------------------|-------------------------|
|     |  |          | VFR41□□  | VFR42□□                 | VFR43□□/44□□/45□□       |
| 9   | Gasket                                     | NBR      | VFR4000-32-3   | VFR4000-32-3            | VFR4000-32-3            |
| 10  | Hexagon socket head screw <sup>Note)</sup> | Steel    | AXT335-1-11#1 (M4 x 40)                                    | AXT335-1-11#1 (M4 x 40) | AXT335-1-11#1 (M4 x 40) |
| 11  | Pilot valve assembly                       | —        | Refer to "How to Order Pilot Valve Assembly" on page 1062. |                         |                         |
| —   | Sub-plate assembly                         | —        | Refer to "How to Order Sub-plate Assembly" on page 1063.   |                         |                         |

Note) For the VFR4000 series, it requires 4 pcs.

**Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center**

**2 position single: VFR410<sup>0</sup>-□F**

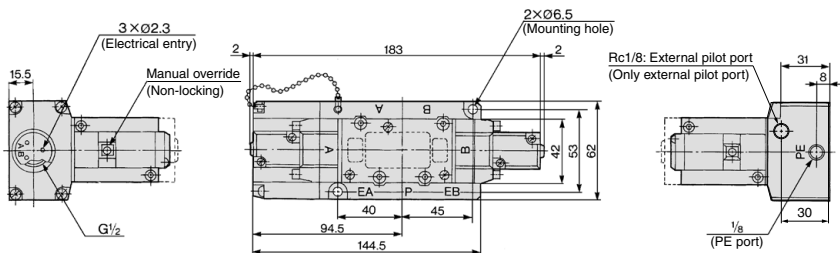


**2 position double: VFR420<sup>0</sup>-□F**

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

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

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

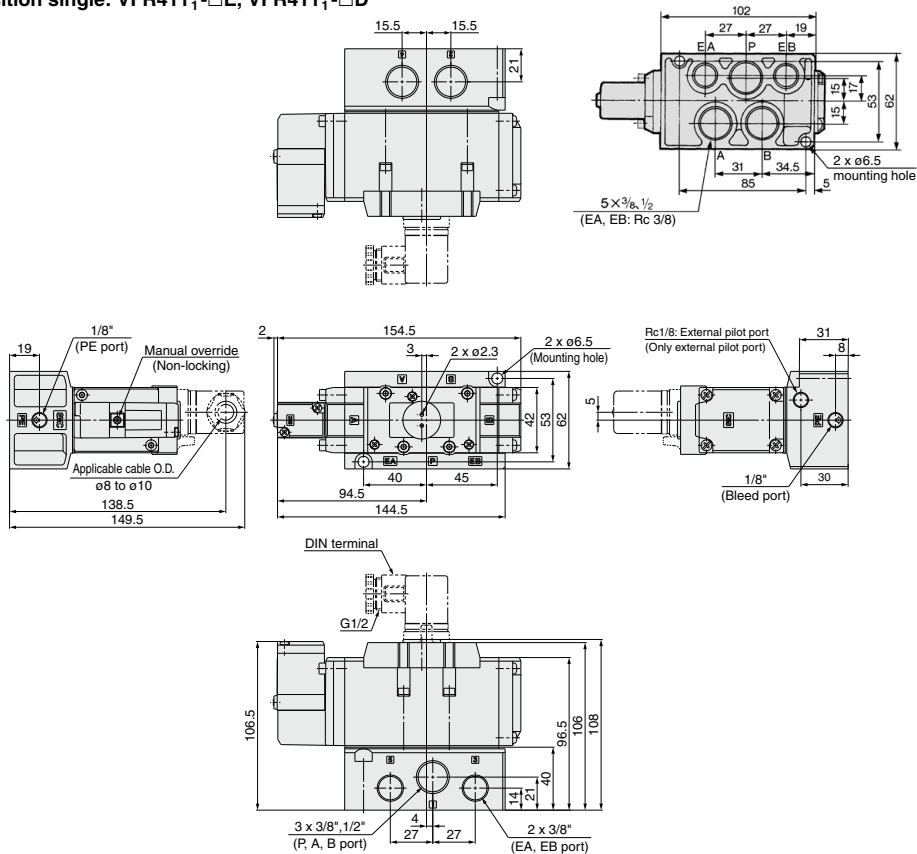


|         |
|---------|
| SV      |
| SYJ     |
| SZ      |
| VF      |
| VP4     |
| VQ 1/2  |
| VQ 4/5  |
| VQC 1/2 |
| VQC 4/5 |
| VQZ     |
| SQ      |
| VFS     |
| VFR     |
| VQ7     |

# VFR4000 Series

## Non Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center

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

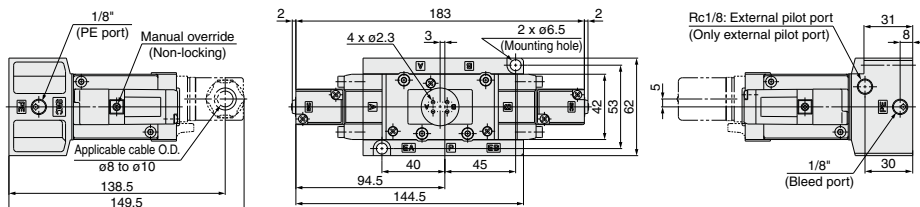


### 2 position double: VFR421<sup>□</sup>-□E, VFR421<sup>□</sup>-□D

### 3 position closed center: VFR431<sup>□</sup>-□E, VFR431<sup>□</sup>-□D

### 3 position exhaust center: VFR441<sup>□</sup>-□E, VFR441<sup>□</sup>-□D

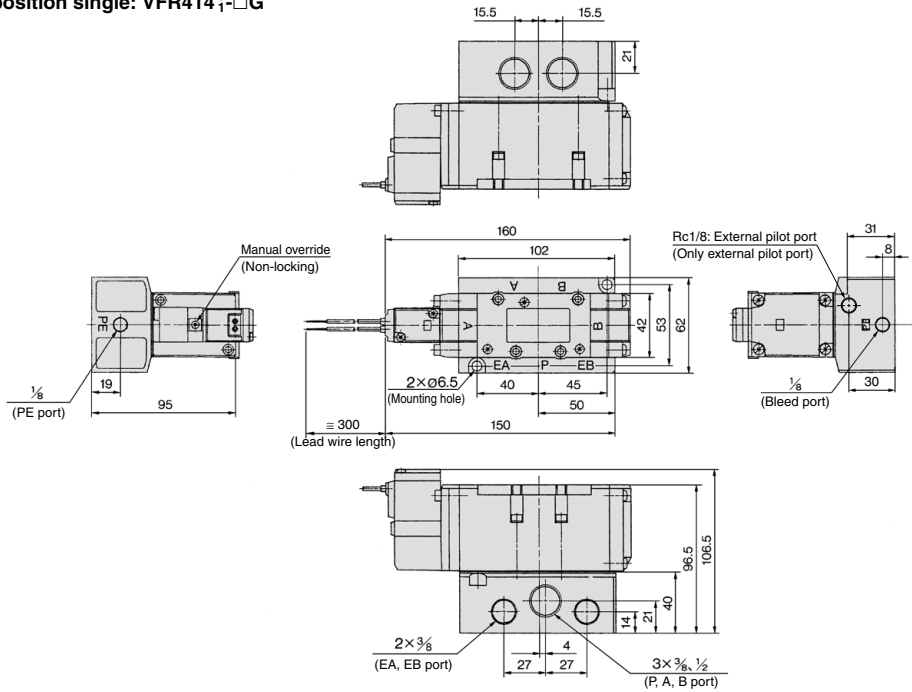
### 3 position pressure center: VFR451<sup>□</sup>-□E, VFR451<sup>□</sup>-□D



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

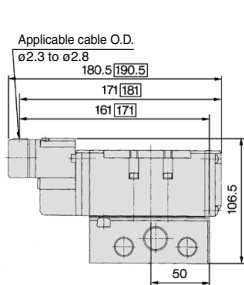
## Non Plug-in: 2 Position Single

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



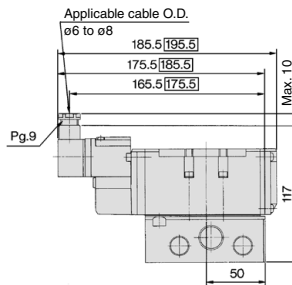
|            |
|------------|
| SV         |
| SYJ        |
| SZ         |
| VF         |
| VP4        |
| VQ<br>1/2  |
| VQ<br>4/5  |
| VQC<br>1/2 |
| VQC<br>4/5 |
| VQZ        |
| SQ         |
| VFS        |
| VFR        |
| VQ7        |

### E: Grommet terminal



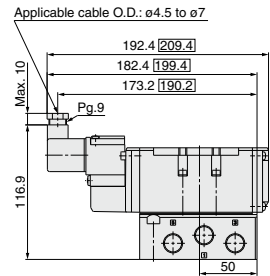
□: With light/surge voltage suppressor

### T: Conduit terminal



□: With light/surge voltage suppressor

### D, Y: DIN terminal



□: With light/surge voltage suppressor

# VFR4000 Series

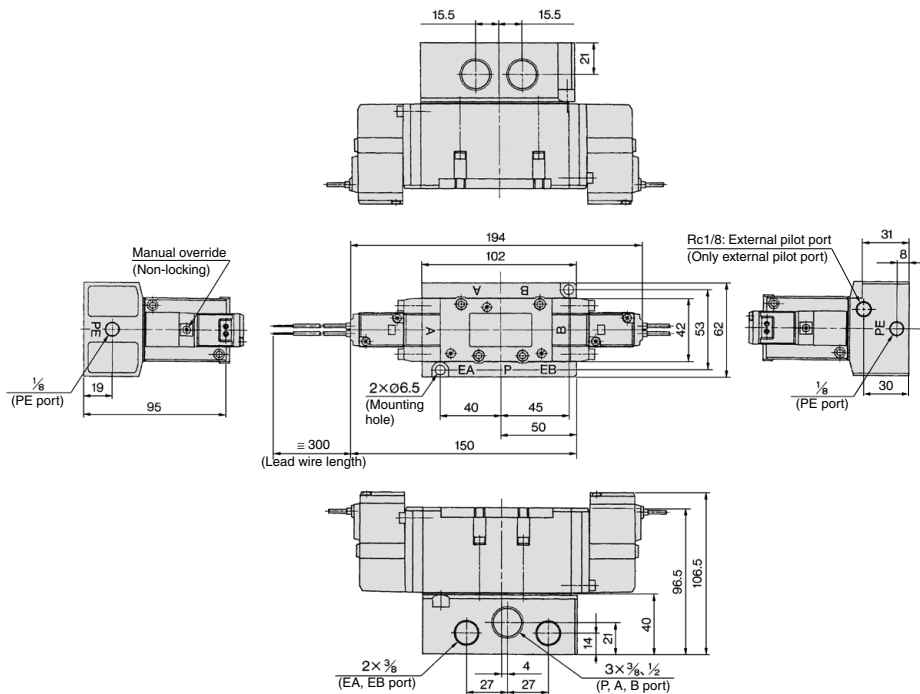
## Non Plug-in: 2 Position Double, 3 Position Closed Center/Exhaust Center/Pressure Center

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

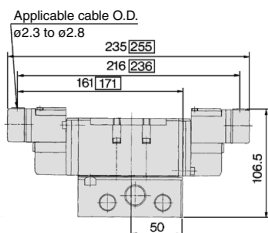
3 position closed center: VFR434<sup>0</sup>-□G

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

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

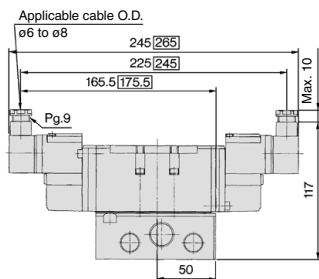


### E: Grommet terminal



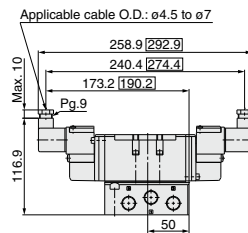
□: With light/surge voltage suppressor

### T: Conduit terminal



□: With light/surge voltage suppressor

### D: DIN terminal



□: With light/surge voltage suppressor

# VFR4000 Series

## Manifold Specifications

### Manifold Specifications

| Base model                               | Wiring  | Porting specifications |  | Port size |          | Stations | Applicable valve model                                   |
|--|---|------------------------|--|-----------|----------|----------|--|
|  |   | A, B port              |  | P, EA, EB | A, B     |          |  |
| Plug-in type<br><b>VV5FR4-01□(-Q)</b>    | <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            |  | 1/2       | 3/8, 1/2 | 2 to 10  | VFR4□0□-□F(-Q)   |
| Non plug-in type<br><b>VV5FR4-10(-Q)</b> | <ul style="list-style-type: none"> <li>• Grommet terminal</li> <li>• DIN terminal</li> </ul>  |                        |  |           |          | 2 to 8   | VFR4□1□-□E<br>VFR4□1□-□D(-Q)                             |
| Non plug-in type<br><b>VV5FR4-40(-Q)</b> | <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  | VFR4□4□-□G<br>VFR4□4□-□E<br>VFR4□4□-□T<br>VFR4□4□-□D(-Q) |

### How to Order Manifold Assembly

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

**VV5FR4-01T-061-03 (-Q)** ..... 1 set (Manifold base part no.)  
**\*VFR4100-5FZ (-Q)** ..... 3 sets (2 position single part no.)  
**\*VFR4200-5FZ (-Q)** ..... 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 (-Q)** ..... 1 set (Manifold base part no.)  
**\*VFR4110-5D (-Q)** ..... 5 sets (2 position single part no.)  
**\*VFR4410-5D (-Q)** ..... 1 set (3 position exhaust center part no.)  
**\*VVFS4000-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.

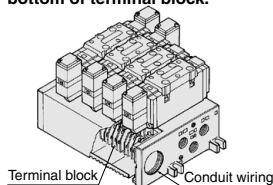
When entry of part numbers becomes complicated, indicate on the manifold specification sheet.



[Option]

### 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.



**VV5FR4-01T-061-03** - [ ] - [ ] - [ ]

VFR4000 Series 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  | Side                          |
| 2      | Common  | Bottom *                      |

\* Semi-standard

Thread type

|     |      |
|-----|------|
| Nll | 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  |

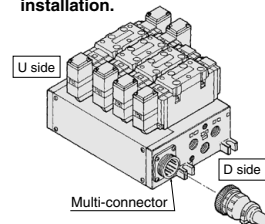
\* For bottom ported: Rc 3/8 only.

CE-compliant

|     |              |
|-----|--------------|
| Nll | —            |
| Q   | CE-compliant |

### Plug-in Type: With Multi-connector (For wiring specifications, refer to page 1113.)

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



**VV5FR4-01C D-051-03** - [ ] - [ ] - [ ]

VFR4000 Series 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  | Side                          |
| 2      | Common  | Bottom *                      |

\* Semi-standard

Thread type

|     |      |
|-----|------|
| Nll | 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.

CE-compliant

|     |              |
|-----|--------------|
| Nll | —            |
| Q   | CE-compliant |

# VFR4000 Series

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



[Option]

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 1113.)

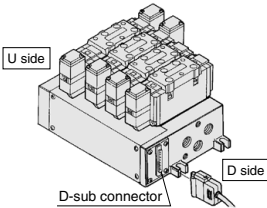
- Wide range of interchangeability (D-sub connector (25P) conforming to MIL standard)
- Quick wiring permits easier installation.

VV5FR4-01F D-06 1-03

VFR4000 Series  
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 |            |

Thread type

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

CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: F, FZ only.

Port size

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

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

Symbol

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

\* Semi-standard

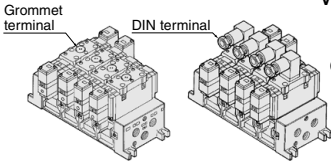
## Non Plug-in Type: Grommet Terminal, DIN Terminal (Common electrical entry)

- Individual wiring for every valve

VV5FR4-10-05 1-03

VFR4000 Series  
Manifold

Non plug-in type  
Common electrical  
entry



Stations

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

Thread type

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

CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ only

Symbol

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

\* Semi-standard

Port size

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

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

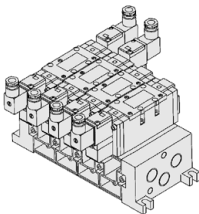
## Non Plug-in Type: Grommet, Grommet Terminal, Conduit Terminal, DIN Terminal (Individual electrical entry)

- Individual wiring for every valve

VV5FR4-40-05 1-03

VFR4000 Series  
Manifold

Non plug-in type  
Individual electrical entry



Stations

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

Thread type

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

CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ only

Symbol

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

\* Semi-standard

Port size

| Symbol | P, EA, EB | A, B * |
|--------|-----------|--------|
| 03     | 3/8       | 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.

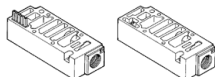
Note) Manifold base is in common with VFS4000 series but the connection of terminal block for plug-in type is different.

## Manifold/Option Parts Assembly

### Individual SUP spacer

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

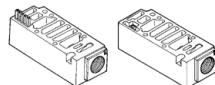
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS4000-P-03-1 | VVFS4000-P-03-2  |



### 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   |                  |



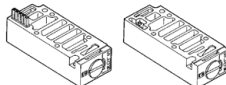
EXH block disk

SUP block disk

### Throttle valve spacer

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

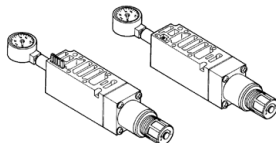
| Body type | Plug-in type   | Non plug-in type |
|-----------|----------------|------------------|
| Part no.  | VVFS4000-20A-1 | VVFS4000-20A-2   |



### Interface regulator

Interface regulator set on the manifold block can regulate pressure for each valve. (Refer to "Flow Rate Characteristics" on page 1111 before operation.)

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



### Blanking plate

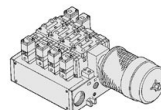
It is used by attaching on the manifold block for being prepared for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

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

## Manifold Option

### With exhaust cleaner

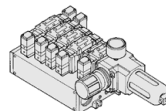
- Valve exhaust noise dampening: 35 dB or more.
- Collects oil mist: collecting rate 99.9% or more
- Piping process reduced.



For details, refer to page 1076.

### 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 1079.

SV

SYJ

SZ

VF

VP4

VQ

1/2

VQ

4/5

VQC

1/2

VQC

4/5

VQZ

SQ

VFS

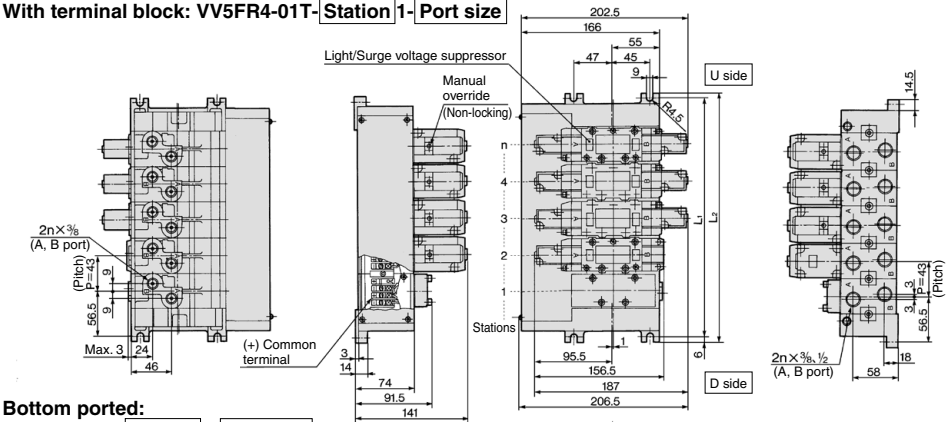
VFR

VQ7

# VFR4000 Series

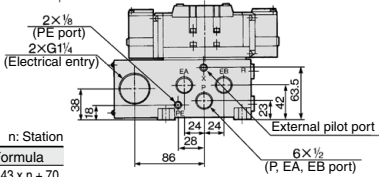
## Manifold/Plug-in Type

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

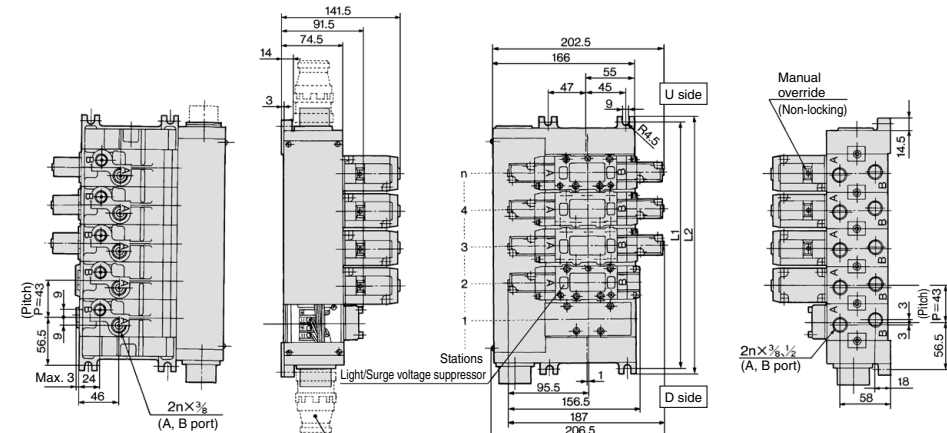


Bottom ported:  
VV5FR4-01T-Station 2-Port size

| n: Station     |  | 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 |



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

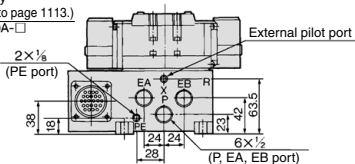


Bottom ported:  
VV5FR4-01CD-Station 2-Port size

Plug assembly  
(Option: Refer to page 1113.)  
VVF52000-30A-□

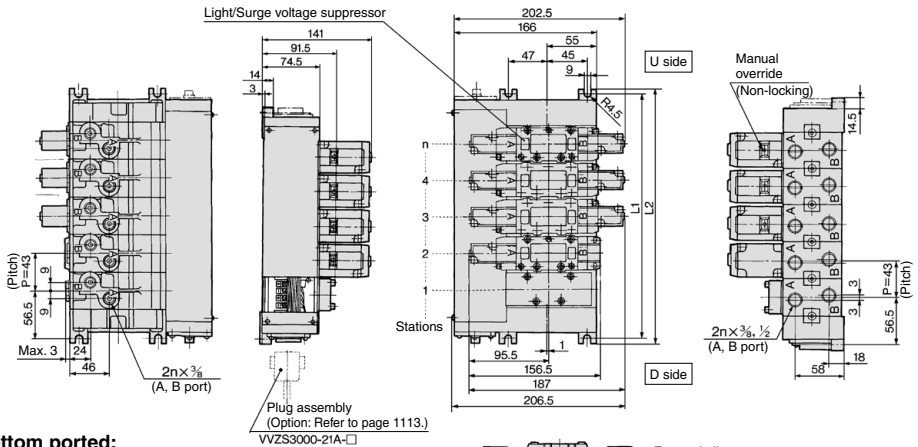
For wiring specifications, refer to page 1113.

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



### Manifold/Plug-in Type

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



**Bottom ported:**

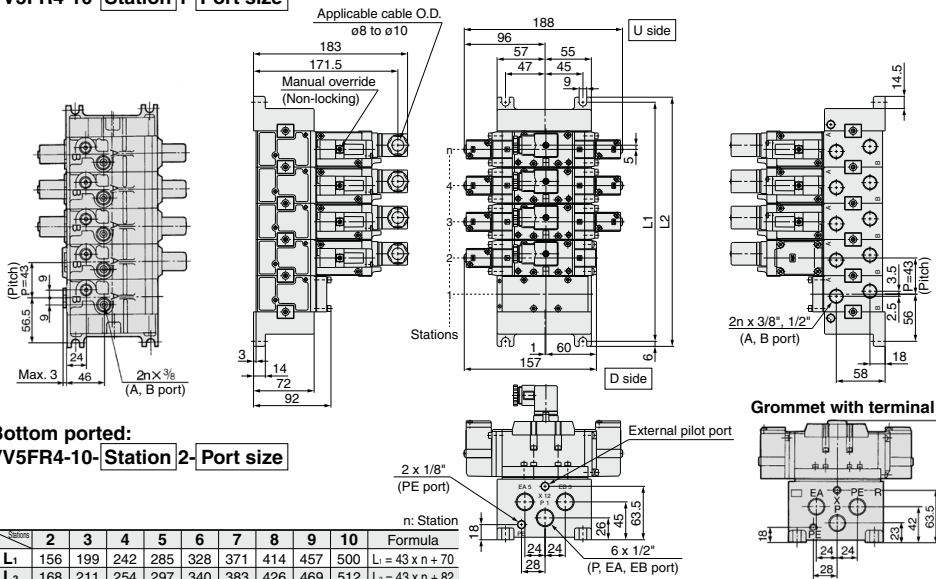
VV5FR4-01<sup>CD</sup><sub>CU</sub>- Station 2- Port size

For wiring specifications, refer to page 1113.

|                |     |     |     |     |     |     |     | n: Station               |
|----------------|-----|-----|-----|-----|-----|-----|-----|--------------------------|
| Stations<br>L  | 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

VV5FR4-10- **Station 1- 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 | $L_2 = 43 \times n + 82$ |

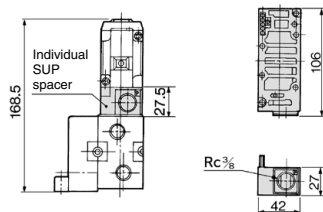


## Manifold/Option Parts Assembly: Plug-in Type/Non Plug-in Type

### Individual SUP spacer:

VVFS4000-P-03-1 (Plug-in type)

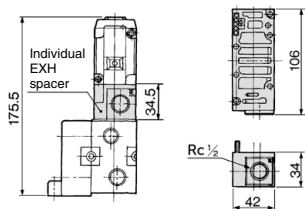
VVFS4000-P-03-2 (Non plug-in type)



### Individual EXH spacer:

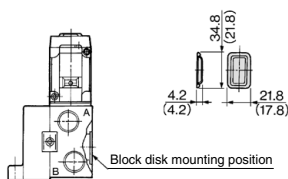
VVFS4000-R-04-1 (Plug-in type)

VVFS4000-R-04-2 (Non plug-in type)



### SUP block disk: AXT634-10A

EXH block disk: AXT634-11A



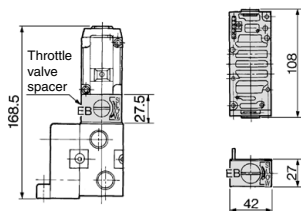
Note) Used with exclusive manifold block

( ): EXH block disk

### Throttle valve spacer:

VVFS4000-20A-1 (Plug-in type)

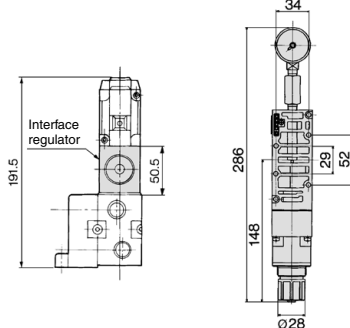
VVFS4000-20A-2 (Non plug-in type)



### Interface regulator/P port regulation:

ARBF4050-00-P-1 (Plug-in type)

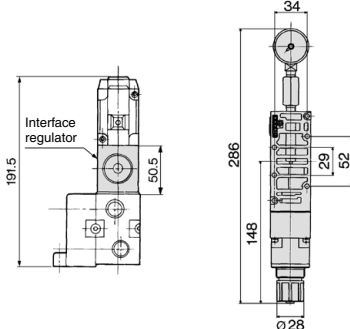
ARBF4050-00-P-2 (Non plug-in type)



### Interface regulator/A port regulation:

ARBF4050-00-A-1 (Plug-in type)

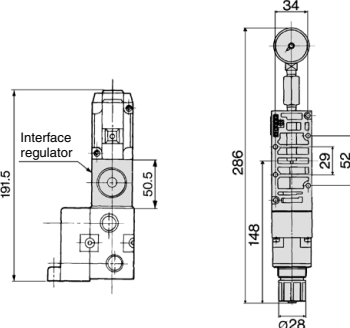
ARBF4050-00-A-2 (Non plug-in type)



### Interface regulator/B port regulation:

ARBF4050-00-B-1 (Plug-in type)

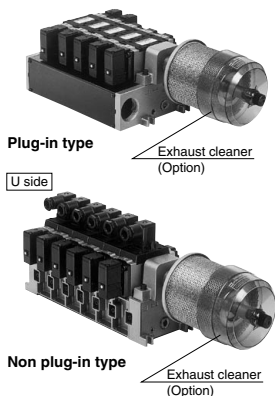
ARBF4050-00-B-2 (Non plug-in type)



|         |
|---------|
| SV      |
| SYJ     |
| SZ      |
| VF      |
| VP4     |
| VQ 1/2  |
| VQ 4/5  |
| VQC 1/2 |
| VQC 4/5 |
| VQZ     |
| SQ      |
| VFS     |
| VFR     |
| VQ7     |

## 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□(-Q)  | Non plug-in type: VV5FR4-10(-Q)     | Non plug-in type: VV5FR4-40(-Q)                              |
|-----------------------------|---|-------------------------------------|--|
| 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□□□□□F(-Q)  | VFR4□1□□□□□D(-Q)<br>VFR4□1□□□□□E    | VFR4□4□□□□□G, VFR4□4□□□□□E<br>VFR4□4□□□□□I, VFR4□4□□□□□J(-Q) |
| Porting specifications      | Common SUP, Common EXH  |                                     |  |
|                             | A, B port   | Side: 3/8, 1/2 Bottom: 3/8 (Option) |  |
|                             | P port  | Side: 1/2 EXH 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>(1)</sup> |                                     |  |

Note 1) Use "AMC810-14" when used with 5 or more stations or in high frequency.  
Exhaust cleaner "AMC610-10" and "AMC810-14" are not attached.

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



### How to Order

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

VFR4000 Series 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 |                 |

#### Stations

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

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

#### Thread type

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

#### 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.

#### 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.

#### Symbol

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

\* Semi-standard

#### CE-compliant

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

## How to Order Manifold Assembly

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

VV5FR4-01T-061-03-CD (-Q) ... 1 set (Manifold base part no.)  
 \*VFR4100-5FZ (-Q) ..... 3 sets (2 position single part no.)  
 \*VFR4200-5FZ (-Q) ..... 2 sets (2 position double part no.)  
 \*VFS4000-10A ..... 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 (-Q) ..... 1 set (Manifold base part no.)  
 \*VFR4110-5E (-Q) ..... 3 sets (2 position single part no.)  
 \*VFR4210-5E (-Q) ..... 2 sets (2 position double part no.)  
 \*VFS4000-10A ..... 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.

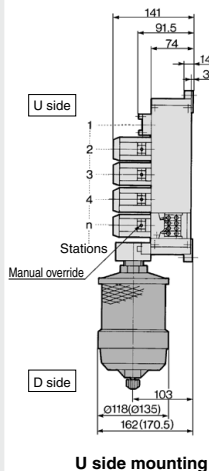
When ordering, specify the part nos. in order from the 1st. station in the D side.

When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

Refer to Best Pneumatics No. 7 for Exhaust Cleaner details.

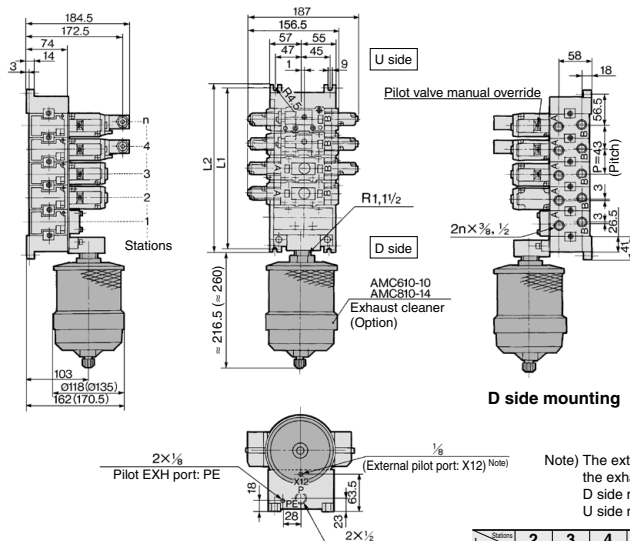
## VFR4000 Series

**Plug-in type:** VV5FR4-01T- **Station** 1- **Port size** - **CD**



Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.  
D side mounting: External pilot port U side  
U side mounting: External pilot port D side

**Non plug-in type: VV5FR4-10-Station 1-Port size-** CD CU



Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.  
D side mounting: External pilot port U side  
U side mounting: External pilot port D side

n: Station

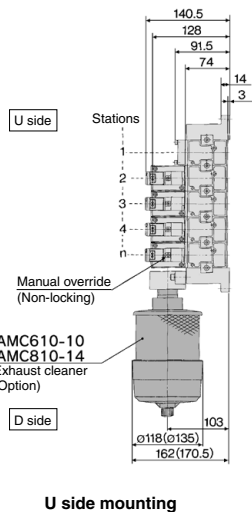
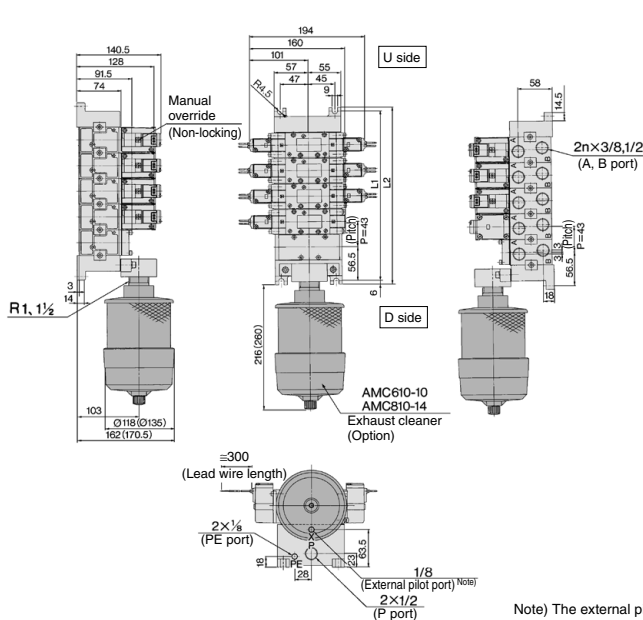
| Stations       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | Formula                      |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| L <sub>1</sub> | 156 | 199 | 242 | 285 | 328 | 371 | 414 | 457 | 500 | L <sub>1</sub> = 43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



## VFR4000 Series

### Manifold with Exhaust Cleaner: Non Plug-in Type

**Non plug-in type: VV5FR4-40-Station 1-Port size-CD**  
CU



Note) The external pilot port is located on a side opposite to the exhaust cleaner mounting side.

D side mounting: External pilot port U side

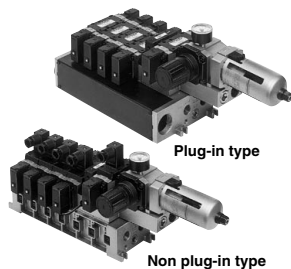
U side mounting: External pilot port D side

( ): AMC810

| n: Station                                 |     |     |     |     |     |     |     |     |     |                              |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|
| <div><div>L</div><div>Stations</div></div> | 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 |

## 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: VV5FR4-01□(-Q)  | Non plug-in type: VV5FR4-10(-Q)  | Non plug-in type: VV5FR4-40(-Q)                              |
|------------------------|---|----------------------------------|--|
| 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(-Q)   | VFR4□1□□D(-Q)<br>VFR4□1□□E       | VFR4□4□□G, VFR4□4□□E<br>VFR4□4□□T, VFR4□4□□D(-Q)             |
| Porting specifications | Common SUP, Common EXH  |                                  |  |
|                        | A, B port   | Side: 3/8, 1/2, Bottom: 3/8      |  |
|                        | P, EA, EB port  | Side: 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 VDC or less: 50 mA<br>100 VAC: 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 | <Plug-in type><br>VVFS4000-24A-1R (D side mounting)     |                 |
|                          | <Non plug-in type><br>VVFS4000-24A-2R (D side mounting) |                 |
| Pressure switch          | IS1000P-2-1   |                 |
| Blanking plate           | For filter regulator                                    | MP2-3           |
|                          | For pressure switch                                     | MP3-2           |
| Filter element           | For air release valve                                   | VVFS4000-24A-10 |
|                          | 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.

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.



## How to Order

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

VFR4000 Series  
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 entry)     |
| 40  | Non plug-in type (Individual entry) |

### Connector mounting direction

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

### 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      |         |        | Bottom *                      |

\* Semi-standard

### Port size

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

\* For bottom ported:  
only 3/8

### CE-compliant

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D/DZ/DO/DOZ, F/DZ/DO/DOZ, Y/YZ/YO/YOZ, F, FZ only.

### Air release valve coil rating

|     |                   |
|-----|-------------------|
| NII | None              |
| 1   | 100 VAC, 50/60 Hz |
| 5   | 24 VDC            |

Note 1) Adjust the voltage to the coil rated voltage of the mounted valve.  
Note 2) For other rated voltages, please consult with SMC.

### Control unit type

| Control equipment                      | Symbol | NII | 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

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

## How to Order Manifold Assembly

<Example> Plug-in type with terminal block

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

\*VFR4100-5FZ (-Q) ..... 4 sets (2 position single part no.)

\*VFR4200-5FZ (-Q) ..... 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 (-Q) ..... 1 set (Manifold base part no.)

\*VFR4110-5D (-Q) ..... 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.

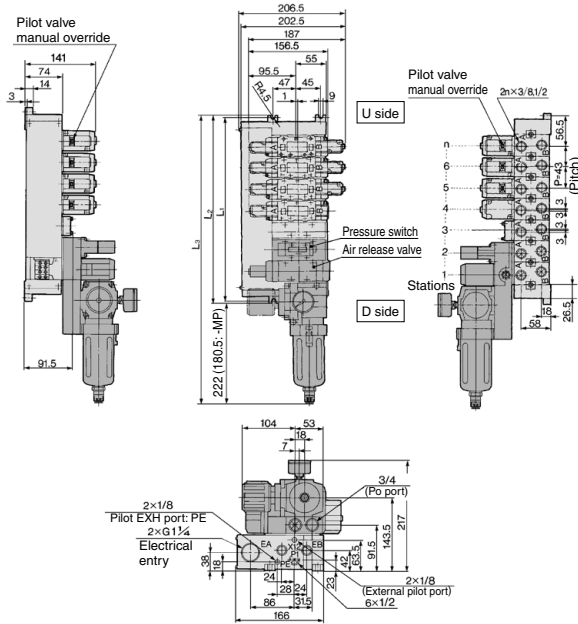
When ordering, specify the part nos. in order from the 3rd. station in the D side.

When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

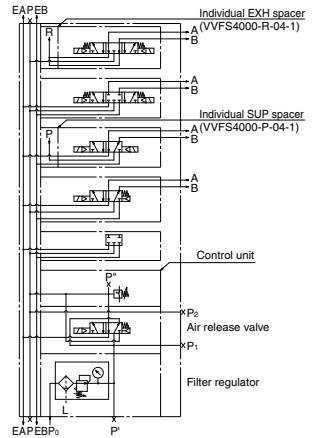
## Manifold with Control Unit: Plug-in Type/Non Plug-in Type

### Plug-in type:

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

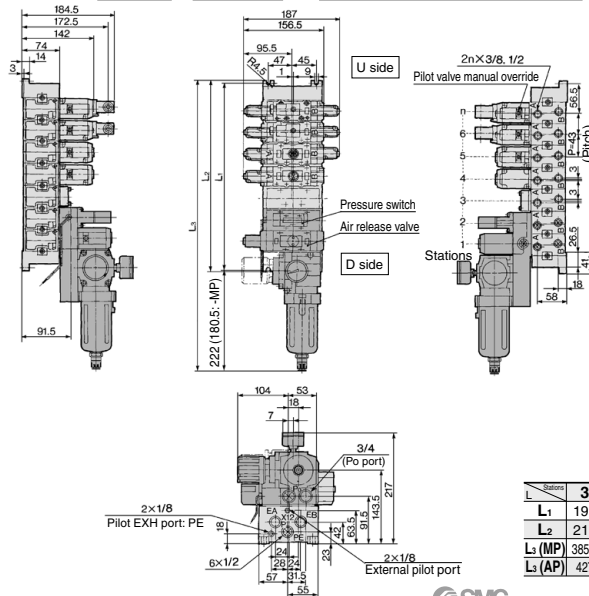


### Example for manifold

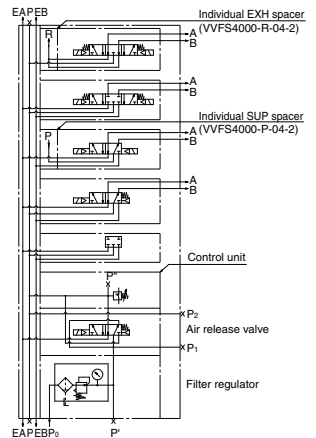


### Non plug-in type:

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



### Example for manifold

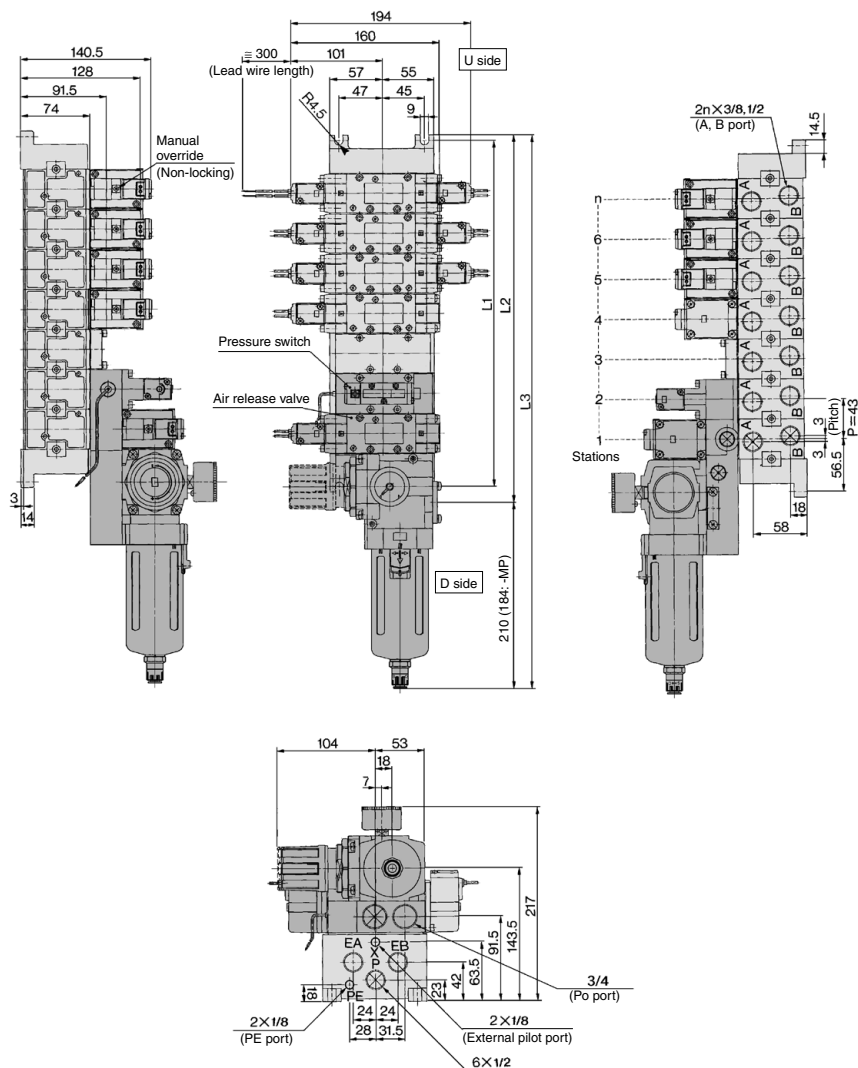


| n: Station          |       |       |       |       |       |       |       |       |                                 |  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|--|
| Station             | 3     | 4     | 5     | 6     | 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>1</sub> (MP) | 385.5 | 428.5 | 471.5 | 514.5 | 557.5 | 600.5 | 643.5 | 686.5 | L <sub>1</sub> = 43 x n + 256.5 |  |
| L <sub>1</sub> (AP) | 427   | 470   | 513   | 556   | 599   | 642   | 685   | 728   | L <sub>1</sub> = 43 x n + 298   |  |

## VFR4000 Series

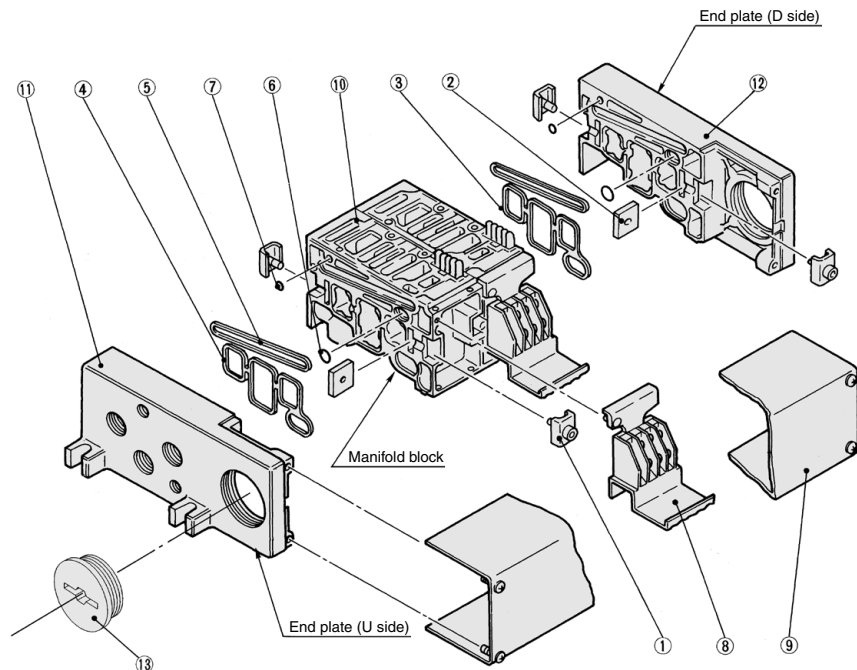
### Manifold with Control Unit: Non Plug-in Type

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



| n: Station    |       |       |       |       |       |       |       |       |                             |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------------|
| $\frac{L}{n}$ | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | Formula                     |
| $L_1$         | 199   | 242   | 285   | 328   | 371   | 414   | 457   | 500   | $L_1 = 43 \times n + 70$    |
| $L_2$         | 211   | 254   | 297   | 340   | 383   | 426   | 469   | 512   | $L_2 = 43 \times n + 82$    |
| $L_3$ (MP)    | 385.5 | 428.5 | 471.5 | 514.5 | 557.5 | 600.5 | 643.5 | 686.5 | $L_3 = 43 \times n + 256.5$ |
| $L_3$ (AP)    | 427   | 470   | 513   | 556   | 599   | 642   | 685   | 728   | $L_3 = 43 \times n + 298$   |

## 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      | KA01579M                         |
| 7   | O-ring                  | NBR      | KA00078                          |
| 8   | Terminal assembly       | —        | VFR4000-14-1A                    |
| 9   | Junction cover assembly | —        | For 01T VVF4000-4A- Stations     |
| 13  | Rubber plug             | NBR      | AXT336-9                         |

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

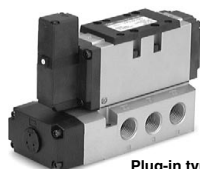
### Replacement Parts: Sub Assembly

| No. | Description                              | Assembly part no. | Component parts   | Applicable manifold base |
|-----|--|-------------------|---|--------------------------|
| 10  | Manifold block assembly <sup>Note)</sup> | VFR4000-19-1A-03  | Manifold block 10, Terminal 8, Connection bracket 1, 2, Gasket 4, 5, O-ring 6, 7, Receptacle assembly | Plug-in type             |
|     |  | VFR4000-19-2A-03  | 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

\* Contact SMC for CE-compliant products.

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



Plug-in type



Non plug-in type

## Symbol

| 2 position                            | 3 position                            |
|---------------------------------------|---------------------------------------|
| Single                                | Closed center                         |
| (A)4 2(B)<br><br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br><br>(EA)5 1 3(EB)<br>(P) |
| Double                                | Exhaust center                        |
| (A)4 2(B)<br><br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br><br>(EA)5 1 3(EB)<br>(P) |
|                                       | Pressure center                       |
|                                       | (A)4 2(B)<br><br>(EA)5 1 3(EB)<br>(P) |

## Standard Specifications

| Valve specifications       | Fluid                                 |   | Air  |
|----------------------------|---------------------------------------|---|--|
|                            | Operating pressure range              | 2 position single/3 position pressure range | 0.2 to 0.9 MPa<br>0.1 to 0.9 MPa   |
|                            | Ambient and fluid temperature         |   | -10 to 50°C (No freezing.)   |
|                            | Lubrication                           |   | Non-lube <sup>(1)</sup>  |
|                            | Manual override                       |   | Non-locking push type  |
| Electricity specifications | Mounting orientation                  |   | Unrestricted   |
|                            | Impact/Vibration resistance           |   | 300/50m/s <sup>2</sup> <sup>(2)</sup>  |
|                            | Enclosure                             |   | Dustproof  |
|                            | Coil rated voltage                    |   | 100, 200 VAC (50/60 Hz), 24 VDC  |
| Electricity specifications | Allowable voltage fluctuation         |   | -15 to -10% of rated voltage   |
|                            | Apparent power (AC) <sup>(3)</sup>    |   | Inrush<br>5.6 VA/50 Hz, 5.0 VA/60 Hz<br>Holding<br>3.4 VA/50 Hz, 2.3 VA/60 Hz    |
|                            | Power consumption (DC) <sup>(3)</sup> |   | 1.8 W (2.04 W: With light/surge voltage suppressor)                              |
|                            | Electrical entry                      |   | Plug-in type Conduit terminal<br>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                      |
| Coil rated voltage     |            | 110 to 120, 220, 240 VAC 50/60 Hz<br>12 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 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 actuation | Model           |             | Port size | Flow rate characteristics <sup>(1)</sup> |          |             |                            |         |             | Max. <sup>(2)</sup><br>operating 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 [dm <sup>3</sup> /s-bar]               | b        | Cv          | C [dm <sup>3</sup> /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 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 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 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.

Note 3) Based on dynamic performance test, JIS B 8419: 2010. (Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)

Note 4) For VFR5□0□-□FZ-06, ( ): VFR5□10□-□DZ-06

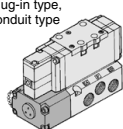
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR5000 Series**



## How to Order

Note) Electrical entry and light/surge voltage suppressor: D, DO, DOZ, F, FZ only. [Option]

**Electrical entry**



F: Plug-in type, conduit type

CE-compliant

**Option**

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

**Porting specifications**

|     |               |
|-----|---------------|
| NII | Side ported   |
| B*  | Bottom ported |

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

**Port size**

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

**Thread type**

|     |      |
|-----|------|
| NII | 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<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 2 | 2 position double<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 3 | 3 position closed center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)   |
| 4 | 3 position exhaust center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)  |
| 5 | 3 position pressure center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

**Body option**

|    |                        |
|----|------------------------|
| 0  | Standard               |
| 1* | Direct manual override |

\* Semi-standard

**Pilot type**

|     |                |
|-----|----------------|
| NII | Internal pilot |
| R   | External pilot |

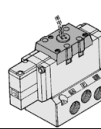
**Coil rated voltage**

|   |                          |
|---|--------------------------|
| 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        |

Note) Electrical entry: D, F only. For other rated voltages, please consult with SMC.

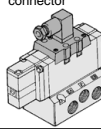
**Electrical entry**

E: Grommet terminal




CE-compliant

D: DIN terminal  
DO: DIN terminal without connector




**Pilot valve Manual override**


NII: Non-locking push type




A\*: Non-locking push type A (Extended)



B\*: Locking type B (Tool required)



C\*: Locking type C (Lever)



\* Semi-standard

**CE-compliant**

|     |                     |
|-----|---------------------|
| NII | —                   |
| Q   | CE-compliant (Note) |

Note) Electrical entry and light/surge voltage suppressor: D, DO, DOZ, F, FZ only.

## 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        |

For other rated voltages, please consult with SMC.

**Manual override**

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

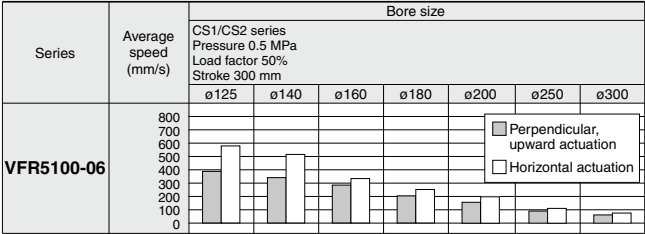
**CE-compliant**

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

# VFR5000 Series

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

## Cylinder Speed Chart

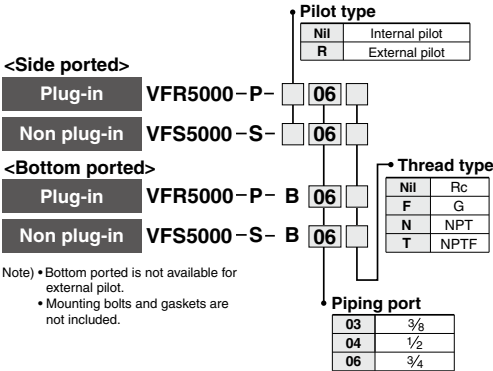


- \* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
- \* The average velocity of the cylinder is what the stroke is divided by the total stroke time.
- \* Load factor: ((Load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

## Conditions

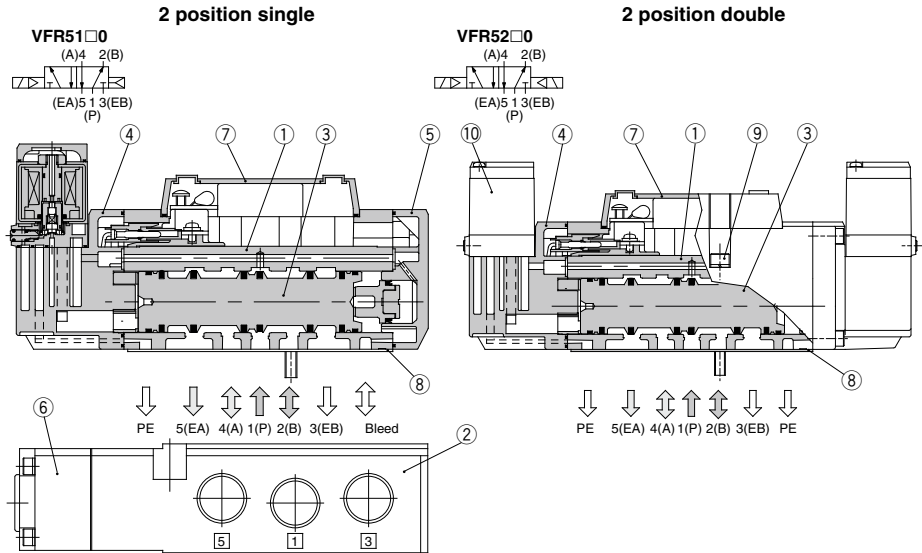
|            |                  |                |
|------------|------------------|----------------|
|            |                  | CS1/CS2 series |
| VFR5110-06 | Tube x Length    | SGP20A x 1 m   |
|            | Speed controller | AS500-06       |
|            | Silencer         | AN500-06       |

## How to Order Sub-plate Assembly



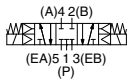
# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR5000 Series**

## Construction

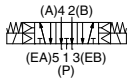


### 3 position closed center/exhaust center/pressure center

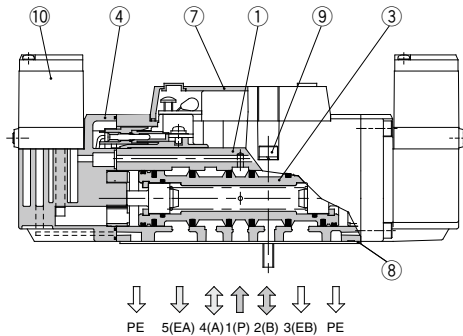
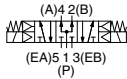
#### Closed center: VFR5300



#### Exhaust center: VFR5400



#### Pressure center: VFR5500



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           |

## Component Parts

| 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.   |                         |                         |
|-----|--|----------|--|-------------------------|-------------------------|
|     |  |          | VFR5100  | VFR5200                 | VFR5300/5400/5500       |
| 8   | Gasket                                     | NBR      | AXT627-10-1  | AXT627-10-1             | AXT627-10-1             |
| 9   | Hexagon socket head screw <sup>Note)</sup> | Steel    | AXT627-42-1#1 (M5 x 50)                                    | AXT627-42-1#1 (M5 x 50) | AXT627-42-1#1 (M5 x 50) |
| 10  | Pilot valve assembly                       | —        | Refer to "How to Order Pilot Valve Assembly" on page 1085. |                         |                         |

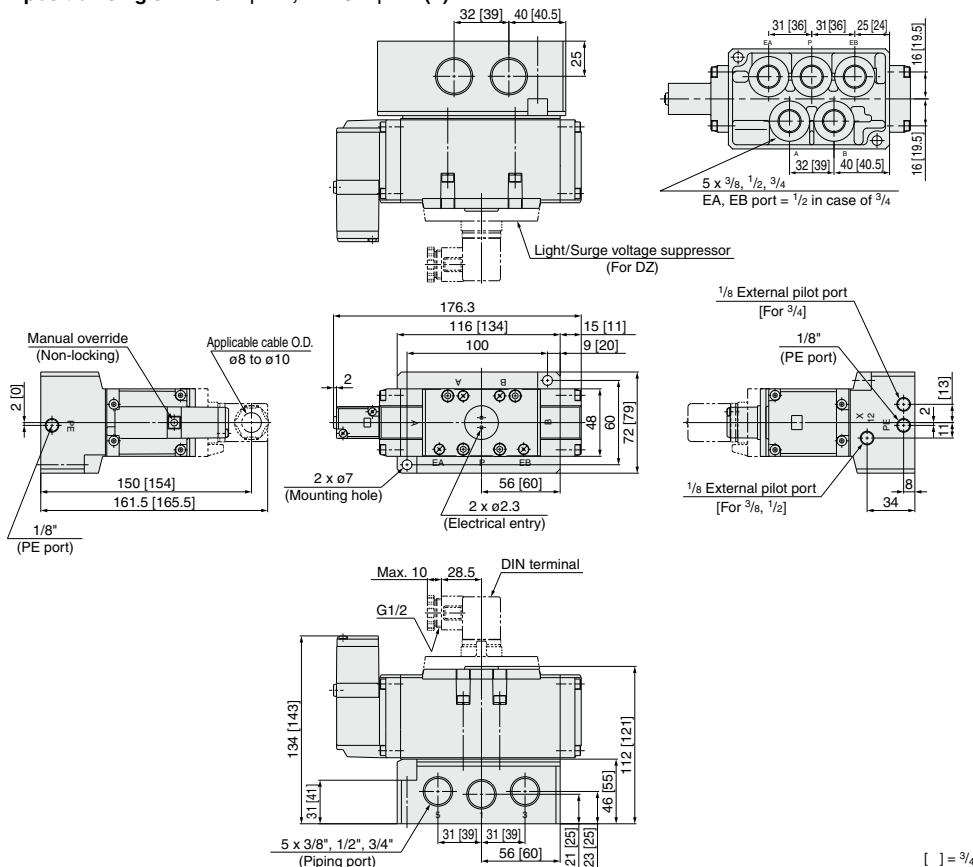
Note) For the VFR5000 series, it requires 4 pcs.



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

## Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center

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



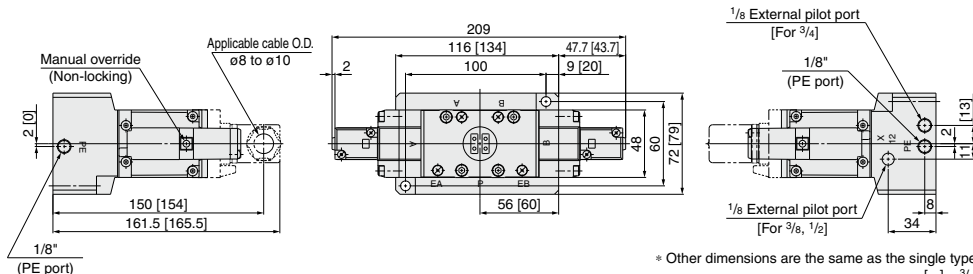
|         |
|---------|
| SV      |
| SYJ     |
| SZ      |
| VF      |
| VP4     |
| VQ 1/2  |
| VQ 4/5  |
| VQC 1/2 |
| VQC 4/5 |
| VQZ     |
| SQ      |
| VFS     |
| VFR     |
| VQ7     |

2 position double: VFR521<sup>□</sup>-□E, VFR521<sup>□</sup>-□D(Z)

3 position closed center: VFR531<sup>□</sup>-□E, VFR531<sup>□</sup>-□D(Z)

3 position exhaust center: VFR541<sup>□</sup>-□E, VFR541<sup>□</sup>-□D(Z)

3 position pressure center: VFR551<sup>□</sup>-□E, VFR551<sup>□</sup>-□D(Z)



\* Other dimensions are the same as the single type.  
 [ ] = 3/4

# VFR5000 Series 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□(-Q)    | <ul style="list-style-type: none"> <li>• With terminal block</li> <li>• With multi-connector</li> <li>• With D-sub connector</li> </ul> | Side/<br>Bottom        | 3/4          | 1/2, 3/4 | 2 to 10  | VFR5□□□-□F(-Q)                 |
|                                   |   |                        |              |          | 2 to 8   |                                |
| Non plug-in type<br>VV5FR5-10(-Q) | <ul style="list-style-type: none"> <li>• Grommet terminal</li> <li>• DIN terminal</li> </ul>  |                        |              |          | 2 to 10  | VFR5□1□□-□E<br>VFR5□1□□-□D(-Q) |

## 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 (-Q) ..... 1 set (Manifold part number)  
 \*VFR5100-5FZ (-Q) ..... 3 sets (2 position single)  
 \*VFR5200-5FZ (-Q) ..... 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 (-Q) ..... 1 set (Manifold part number)  
 \*VFR5110-5D (-Q) ..... 5 sets (2 position single)  
 \*VFR5410-5D (-Q) ..... 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.

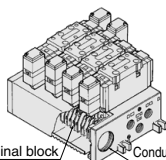
When ordering, specify the part nos. in order from the 1st. station in the D side.

When entry of part numbers becomes complicated, indicate on the manifold specification sheet.

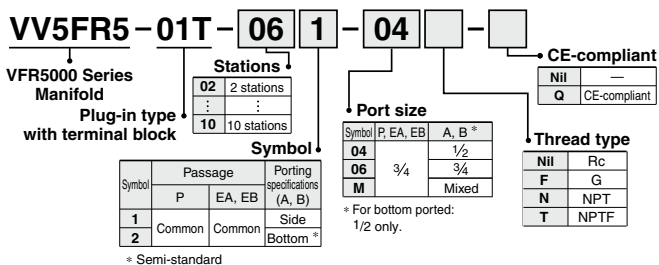


## Plug-in Type: With Terminal Block

- 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.

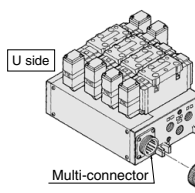


Terminal block Conduit porting

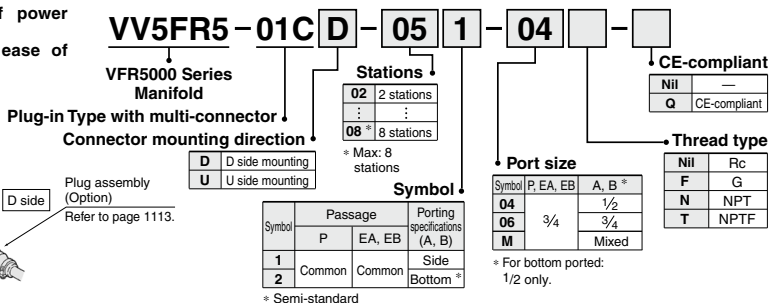


## Plug-in Type: With Multi-connector (For wiring specifications, refer to page 1113.)

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



Multi-connector



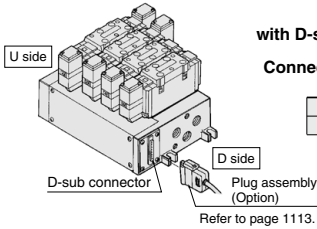
Note) Electrical entry and light/surge voltage suppressor for CE-compliant non plug-in type : D, DZ, F, FZ only.



[Option]

## Plug-in Type: With D-sub Connector (For wiring specifications, refer to page 1113.)

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



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

VFR5000 Series  
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      | Common  | Common | Bottom *                      |

\* Semi-standard

Thread type

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

CE-compliant

|     |              |
|-----|--------------|
| Nll | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: F, FZ only.

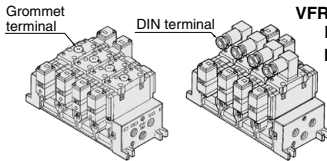
Port size

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

\* For bottom ported:  
1/2 only.

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

- Wiring for every valve



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

VFR5000 Series  
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      | Common  | Common | Bottom *                      |

\* Semi-standard

Thread type

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

CE-compliant

|     |              |
|-----|--------------|
| Nll | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D, DZ only.

Port size

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

\* For bottom ported:  
1/2 only.

Note) Manifold base is common for the VFR5000 series. Terminal block is not required.

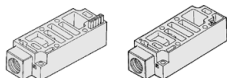
# VFR5000 Series

## 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.

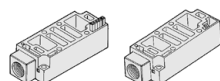
| Body type | Plug-in type    | Non plug-in type |
|-----------|-----------------|------------------|
| Part no.  | VVFS5000-P-04-1 | VVFS5000-P-04-2  |



### 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

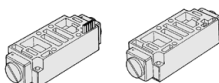


SUP block disk

### 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   |

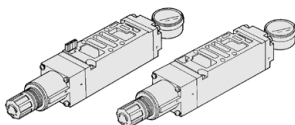


### Interface regulator

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

(Refer to "Flow Rate Characteristics" on page 1111 before operation.)

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

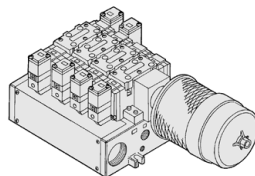
| Body type | Plug-in type | Non plug-in type |
|-----------|--------------|------------------|
| Part no.  | VVFS5000-10A |                  |

## 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.



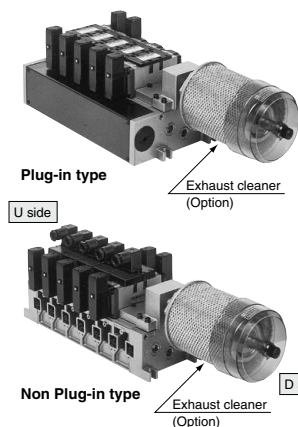
For details, refer to page 1095.

## VFR5000 Series



## 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: <b>VV5FR5-01□(-Q)</b>                                 | Non plug-in type: <b>VV5FR5-10(-Q)</b> |
|-----------------------------|---|--|
| Wiring                      | With terminal block<br>With multi-connector<br>With D-sub connector | DIN terminal<br>Grommet terminal       |
| Applicable valve model      | VFR5□00-□F(-Q)  | VFR5□10-□D(-Q), VFR5□10-□E             |
| Porting specifications      | Common SUP/Common EXH   |  |
|                             | A, B port   | Side: 1/2, 3/4, Bottom: 1/2 (Option)   |
|                             | P port  | Side: 3/4 EXH: 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.

Note) Electrical entry and light/surge voltage suppressor: D, DZ, F, FZ only



### How to Order

**VV5FR5 - 10 - 06 1 - 04 - CD -**

**VFR5000 Series 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                  |

**Connector mounting direction \***

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

**Stations**

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

**CE-compliant**

|     |              |
|-----|--------------|
| NII | —            |
| Q   | CE-compliant |

Note) Electrical entry and light/surge voltage suppressor: D, DZ, F, FZ only.

**Exhaust cleaner mounting direction**

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

**Thread type**

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

\* For bottom ported: 1/2 only.

**Port size**

**Symbol**

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

\* Semi-standard

## 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.

<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.

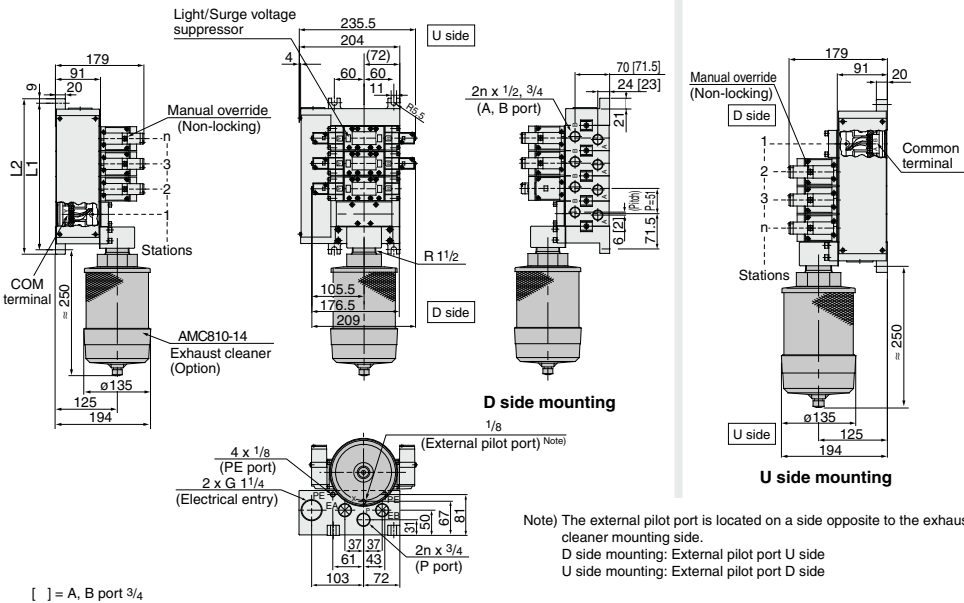


When using exhaust cleaner, mount it downwards.

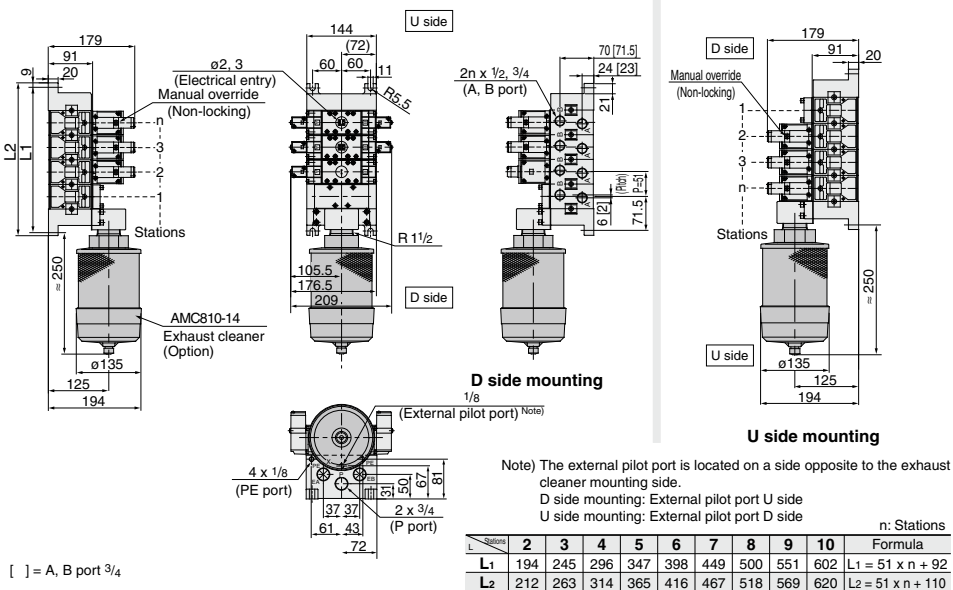
VFR5000 Series

Manifold with Exhaust Cleaner: Plug-in Type/Non Plug-in Type

Plug-in type: VV5FR5-01T- Station 1- Port size -  $\frac{3}{4}$ "



Non plug-in type: VV5FR5-10- Station 1- Port size -  $\frac{3}{4}$ "

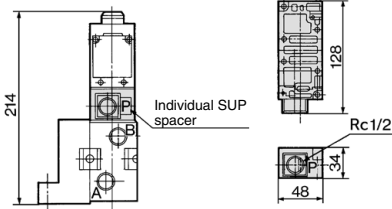


**Manifold Option Parts Assembly/Plug-in Type, Non Plug-in Type**

**Individual SUP spacer**

VVFS5000-P-04-1 (Plug-in type)

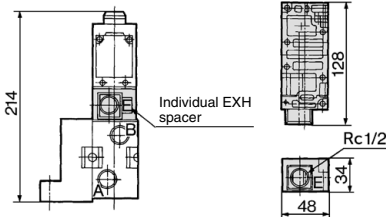
VVFS5000-P-04-2 (Non plug-in type)



**Individual EXH spacer**

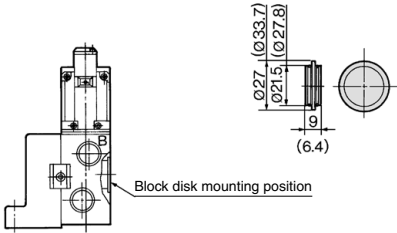
VVFS5000-R-04-1 (Plug-in type)

VVFS5000-R-04-2 (Non plug-in type)



**SUP block disk: AXT628-12A**

EXH block disk: AXT512-14-1A

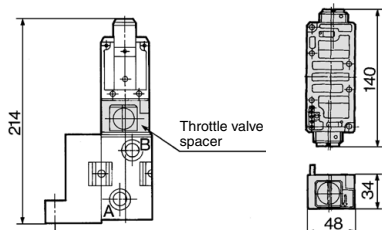


( ) : SUP block disk

**Throttle valve spacer**

VVFS5000-20A-1 (Plug-in type)

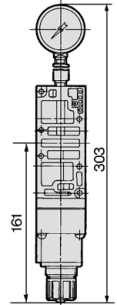
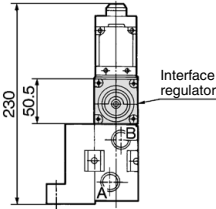
VVFS5000-20A-2 (Non plug-in type)



**Interface regulator/P port regulation**

ARBF5050-00-P-1 (Plug-in type)

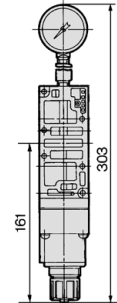
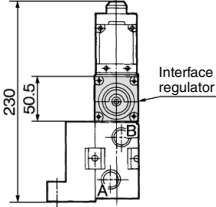
ARBF5050-00-P-2 (Non plug-in type)



**Interface regulator/A port regulation**

ARBF5050-00-A-1 (Plug-in type)

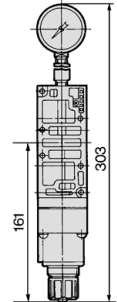
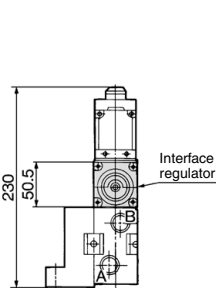
ARBF5050-00-A-2 (Non plug-in type)



**Interface regulator/B port regulation**

ARBF5050-00-B-1 (Plug-in type)

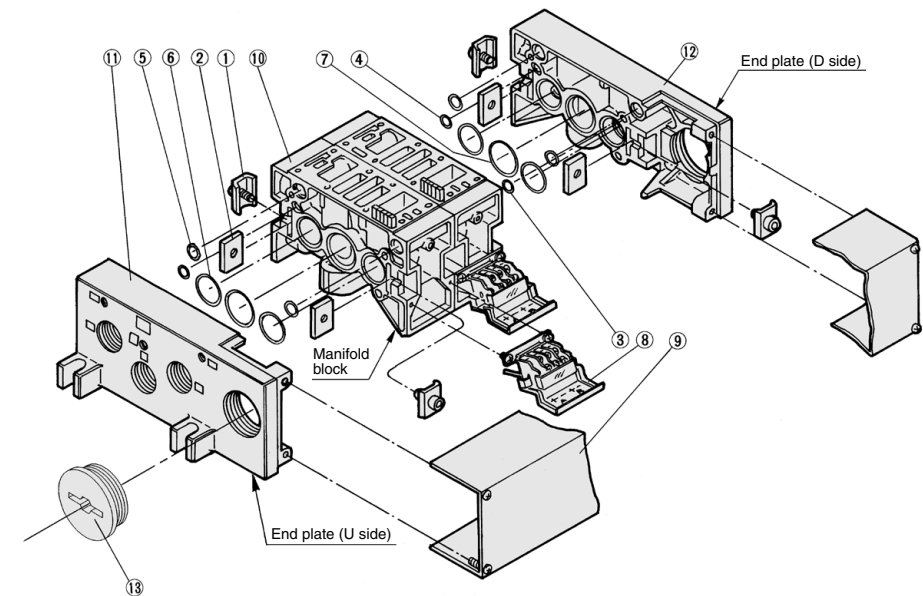
ARBF5050-00-B-2 (Non plug-in type)



|         |
|---------|
| SV      |
| SYJ     |
| SZ      |
| VF      |
| VP4     |
| VQ 1/2  |
| VQ 4/5  |
| VQC 1/2 |
| VQC 4/5 |
| VQZ     |
| SQ      |
| VFS     |
| VFR     |
| VQ7     |

# VFR5000 Series

## 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         | KA00078                                |
| 4   | O-ring                  | NBR         | KA00495                                |
| 5   | O-ring                  | NBR         | KA00328M                               |
| 6   | O-ring                  | NBR         | KA00523M                               |
| 7   | O-ring                  | NBR         | KA01587M                               |
| 8   | Terminal block assembly | —           | VFR5000-21-1A                          |
| 9   | Junction cover assembly | For 01T     | VVFS5000-4A- <small>[Stations]</small> |
| 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- <small>04 06</small> | 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- <small>04 06</small> | 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         |

\* Contact SMC for CE-compliant products.

# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in VFR6000 Series



## Standard Specifications



Plug-in type



Non plug-in type

|                            |                                       |   |                                  |
|----------------------------|---------------------------------------|---|----------------------------------|
| 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.)                          |                                  |
|                            | Lubrication                           | Non-lube <sup>(1)</sup>                             |                                  |
|                            | Manual override                       | Non-locking push type                               |                                  |
|                            | Impact/Vibration resistance           | 300/50m/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 (2.04 W: With light/surge voltage suppressor) |                                  |
|                            | Electrical entry                      | Plug-in type  | Conduit terminal                 |
|                            |                                       | Non plug-in type                                    | Grommet terminal, DIN terminal   |

Note 1) Use 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 VDC |
| Option                     | With light/surge voltage suppressor         |

## Model

| Type of actuation |                 | Model   |             | Port size | Flow rate characteristics <sup>(1)</sup> |             |           |                             |             |           | Max. operating cycle (Hz) | <sup>(3)</sup> Response time (ms) | <sup>(4)</sup> Weight (kg) |
|-------------------|-----------------|---------|-------------|-----------|--|-------------|-----------|-----------------------------|-------------|-----------|---------------------------|-----------------------------------|----------------------------|
|                   |                 |         |             |           | 1 → 4/2 (P → A/B)                        |             |           | 4/2 → 5/3 (A/B → EA/EB)     |             |           |                           |                                   |                            |
|                   |                 | Plug-in | Non plug-in |           | C [dm <sup>3</sup> /s(bar)]              | b           | Cv        | C [dm <sup>3</sup> /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       | 40 [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.

Note 3) Based on dynamic performance test, JIS B 8419: 2010. (Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)

Note 4) For VFR6□0□-□FZ-06, ( ): VFR6□10□-□DZ-06

## Symbol

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| 2 position<br>Single              | 3 position<br>Closed center       |
| (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |
| Double                            | Exhaust center                    |
| (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |
|                                   | Pressure center                   |
|                                   | (A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

## 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.

SV

SYJ

SZ

VF

VP4

VQ

1/2

VQ

4/5

VQC

1/2

VQC

4/5

VQZ

SQ

VFS

VFR

VQ7

## How to Order

Note) Electrical entry and light/surge voltage suppressor: D, DZ, DO, DOZ, F, FZ only.



**Electrical entry**

F: Plug-in type, conduit type

CE-compliant

**Option**

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

**Port size**

|     |                   |
|-----|-------------------|
| Nil | Without sub-plate |
| 06  | 3/4               |
| 10  | 1                 |

**CE-compliant**

|     |                               |
|-----|-------------------------------|
| Nil | —                             |
| Q   | CE-compliant <sup>Note)</sup> |

Note) Electrical entry and light/surge voltage suppressor: D, DZ, DO, DOZ, F, FZ only.

**Plug-in**

VFR6 0 0 - 5 F - 10 -

**Non plug-in**

VFR6 1 1 - 1 D - 10 -

**Thread type**

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

**Symbol**

|   |   |
|---|---|
| 1 | 2 position single<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 2 | 2 position double<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 3 | 3 position closed center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)   |
| 4 | 3 position exhaust center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)  |
| 5 | 3 position pressure center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

**Body option**

|    |                        |
|----|------------------------|
| 0  | Standard               |
| 1* | Direct manual override |

\* Semi-standard

**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        |

Note) Electrical entry: D, F only.  
For other rated voltages, please consult with SMC.

**Electrical entry**

E: Grommet terminal

CE-compliant

D: DIN terminal  
DO: DIN terminal without connector

## 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        |

\* Semi-standard  
For other rated voltages, please consult with SMC.

**CE-compliant**

|     |              |
|-----|--------------|
| Nil | —            |
| Q   | CE-compliant |

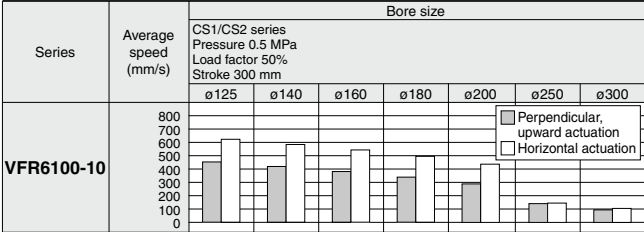
5 Port Pilot Operated Solenoid Valve

Rubber Seal, Plug-in/Non Plug-in

VFR6000 Series

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 mass x 9.8)/Theoretical force) x 100%

Conditions

|            |                  |              |
|------------|------------------|--------------|
| VFR6110-10 | CS1/CS2 series   |              |
|            | Tube x Length    | SGP25A x 1 m |
|            | Speed controller | AS600-10     |
|            | Silencer         | AN600-10     |

How to Order Sub-plate Assembly

Plug-in

VFR6000-P-10

Non plug-in

VFS6000-S-10

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

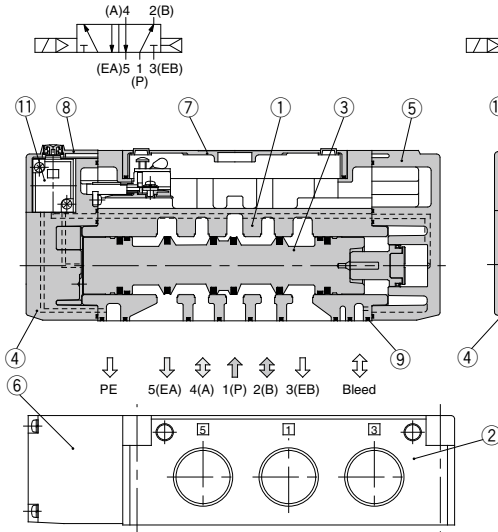
|     |      |
|-----|------|
| Nil | Rc   |
| F   | G    |
| N   | NPT  |
| T   | NPTF |

# VFR6000 Series

## Construction

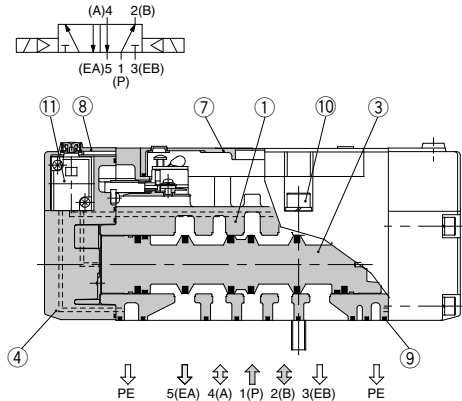
### 2 position single

VFR61□0



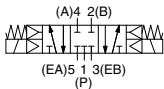
### 2 position double

VFR62□0

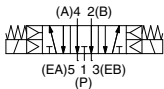


### 3 position closed center/exhaust center/pressure center

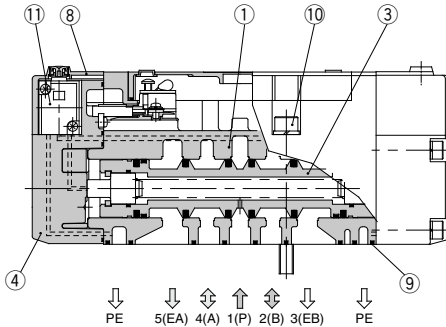
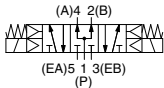
Closed center: VFR63□0



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           |

### Component Parts

| 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

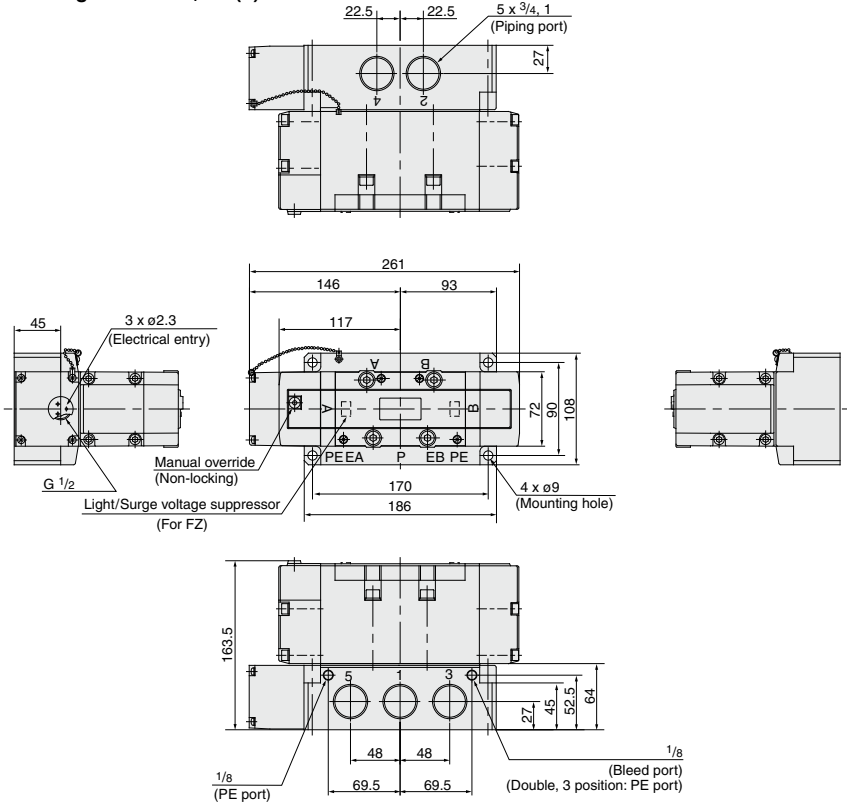
| No. | Description                                    | Material | Part no.   |            |                   |
|-----|--|----------|--|------------|-------------------|
|     |  |          | VFR61□□  | VFR62□□    | VFR63□□/64□□/65□□ |
| 9   | Gasket   | NBR      | VFS6000-15   | VFS6000-15 | VFS6000-15        |
| 10  | Hexagon socket head screw <small>Note)</small> | Steel    | CA00160C   | CA00160C   | CA00160C          |
| 10  | M8 spring washer <small>Note)</small>          | Steel    | EC00014  | EC00014    | EC00014           |
| 11  | Pilot valve assembly                           | —        | Refer to "How to Order Pilot Valve Assembly" on page 1100. |            |                   |

Note) For the VFR6000 series, it requires 4 pcs.

# 5 Port Pilot Operated Solenoid Valve Rubber Seal, Plug-in/Non Plug-in **VFR6000 Series**

**Plug-in: 2 Position Single/Double, 3 Position Closed Center/Exhaust Center/Pressure Center**

**2 position single: VFR610<sup>0</sup>-□F(Z)**

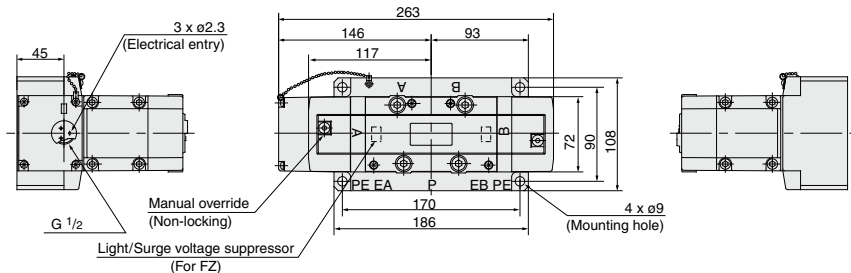


**2 position double: VFR620<sup>0</sup>-□F(Z)**

**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)**

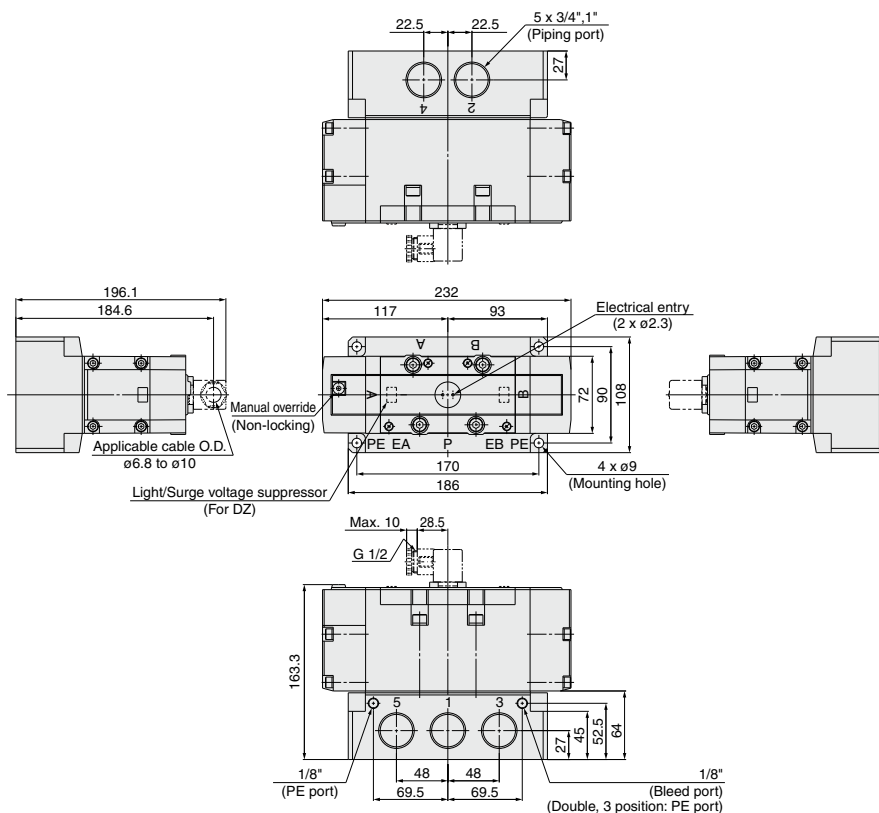


\* Other dimensions are the same as the single type.

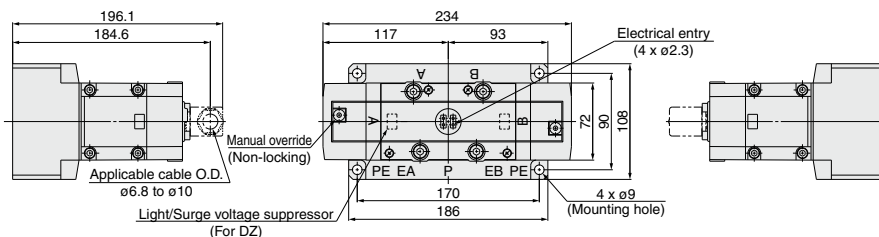
# VFR6000 Series

## 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.

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



Non plug-in type

## How to Order

Non plug-in



Conforming to  
CSA standard

### Symbol

|   |   |
|---|---|
| 1 | 2 position single<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 2 | 2 position double<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 3 | 3 position closed center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)   |
| 4 | 3 position exhaust center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)  |
| 5 | 3 position pressure center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

### 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 to 120 VAC, 50/60 Hz |
| 4 * | 220 VAC, 50/60 Hz        |
| 5   | 24 VDC                   |
| 6 * | 12 VDC                   |
| 7 * | 240 VAC, 50/60 Hz        |

\* Semi-standard

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

|     |             |
|-----|-------------|
| Nil | Side ported |
|-----|-------------|

\* Semi-standard

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

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

EA, EB port: 1/8

### Thread type

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

### Pilot valve manual override

Nil: Non-locking push type      B\*: Locking type B (Tool required)



A\*: Non-locking push type A (Extended)      C\*: Locking type C (Lever)



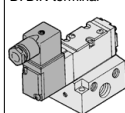
\* Semi-standard

### Option

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

### Electrical entry

D: DIN terminal



Refer to the standard product for product specifications, dimensions and model selection procedures.

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



## How to Order

**Non plug-in** **30 - VFR3** **1** **4** **0** **-** **1** **D** **-** **02** **Individual electrical entry**

**Conforming to CSA standard**

**Symbol**

|   |   |
|---|---|
| 1 | 2 position single<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 2 | 2 position double<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 3 | 3 position closed center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)   |
| 4 | 3 position exhaust center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)  |
| 5 | 3 position pressure center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

**Body option**

|   |          |
|---|----------|
| 0 | Standard |
|---|----------|

**Pilot type**

|     |                |
|-----|----------------|
| NII | Internal pilot |
| R * | External pilot |

\* Semi-standard

**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        |

\* Semi-standard

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

|     |               |
|-----|---------------|
| NII | Side ported   |
| B * | Bottom ported |

\* Semi-standard

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

|     |                   |
|-----|-------------------|
| NII | Without sub-plate |
| 02  | 1/4               |
| 03  | 3/8               |

\* For bottom ported: 1/4

**Thread type**

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

**Pilot valve manual override**

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

\* Semi-standard

**Option**

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

**Electrical entry**

D: DIN terminal

Refer to the standard product for product specifications, dimensions and model selection procedures.

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



## How to Order

**Non plug-in** **30 - VFR4** **4 0** **- 1 D** **03** **Individual electrical entry**

Conforming to CSA standard

**Symbol**

|   |   |
|---|---|
| 1 | 2 position single<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 2 | 2 position double<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)          |
| 3 | 3 position closed center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)   |
| 4 | 3 position exhaust center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P)  |
| 5 | 3 position pressure center<br>(A)4 2(B)<br>(EA)5 1 3(EB)<br>(P) |

**Pilot type**

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

\* Semi-standard

**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        |

\* Semi-standard

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

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

\* Semi-standard : Bottom ported is not available for external pilot.

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

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

EA, EB port: 3/8

**Thread type**

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

**Pilot valve manual override**

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

\* Semi-standard

**Option**

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

**Electrical entry**

D: DIN terminal

Refer to the standard product for product specifications, dimensions and model selection procedures.



# VFR2000/3000/4000/5000/6000 Series Specific Product Precautions 1

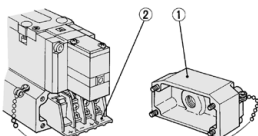
Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

## ⚠ Caution

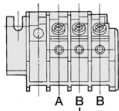
### Plug-in type (With terminal block)

#### VFR2000/3000/4000 Series

- 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.



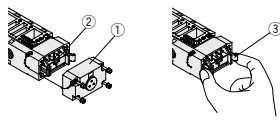
--- B side solenoid  
--- Common (COM) terminal  
--- A side solenoid

- Although "A-", "B+", and "B-" marks are indicated on the terminal block, this can be used as either "+COM" or "-COM".

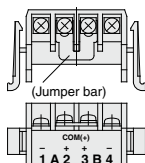
- Applicable terminal:  
VFR2000, VFR3000: 1.25-3, 1.25-3S, 1.25Y-3N, 1.25Y-3S  
VFR4000: 1.25-3.5M, 1.25Y-3L, 1.25Y-3M

#### VFR5000 Series

- 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.



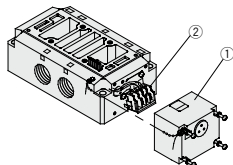
| Model   | Terminal block marking | A- (1) | B+ (3) | B- (4) |
|---------|------------------------|--------|--------|--------|
| VFR510□ |                        | A side | COM    |        |
| VFR520□ |                        | A side | COM    | B side |
| VFR540□ |                        | A side |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

## Lead Wire Connection

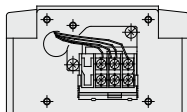
- Terminal block assembly can be used as "+" and "-" common regardless of markings. Do not remove jumper bar because it is used for common connection.
- Applicable terminal:  
1.25-4, 1.25-4M

#### VFR6000 Series

- 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.



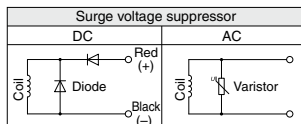
| Model   | Position | Left   | Center | Right  |
|---------|----------|--------|--------|--------|
| VFR610□ |          | A side | COM    |        |
| VFR620□ |          | A side | COM    | B side |
| VFR640□ |          | A side | COM    | B side |

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

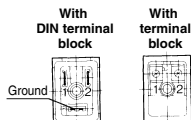
### Non plug-in type

#### VFR2000 Series VFR3000/4000 Series (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 (VFR2000 series):  $\phi 6$  to  $\phi 8$  mm  
Type D (VFR3000/4000 series):  $\phi 4.5$  to  $\phi 7$  mm  
Type Y:  $\phi 4.5$  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.)

#### VFR3000/4000/5000/6000 Series

##### (VFR3□10/4□10)

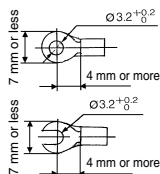
#### DIN terminal block type

- 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          |

- 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.



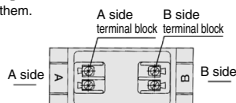
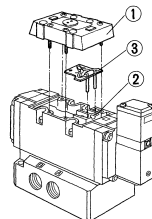
Corresponding to  
R1.25-3 of JIS C 2805

J.S.T. Mfg. Co., Ltd.  
Equivalent to R1.25-3

- 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 type 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



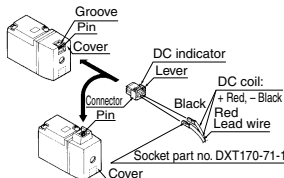
# VFR2000/3000/4000/5000/6000 Series Specific Product Precautions 2

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

## ⚠ Caution

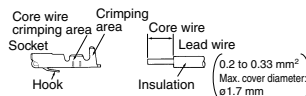
### Attaching and Detaching Connectors

- 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 the lock.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.



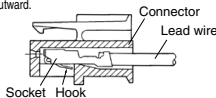
### Attaching and Detaching Lead Wires with Sockets

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

- 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.
- Detaching**  
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.



### Plug Connector Lead Wire Length

Standard length is 300 mm, but the following lengths are also available.

### How to Order Connector Assembly DXT170-80-□ A-□

#### Lead wire color

| Symbol     | Lead wire with socket | Note              |
|------------|-----------------------|-------------------|
| <b>Nil</b> | Sockets (2 pcs.) only | Without lead wire |
| <b>1</b>   | Blue (2 pcs.)         | For 100 VAC       |
| <b>2</b>   | Red (2 pcs.)          | For 200 VAC       |
| <b>3</b>   | Gray (2 pcs.)         | Other VAC         |
| <b>4</b>   | Red; + Black; -       | For DC            |

#### How to Order

Include the connector assembly part number together with the part number for the plug connector's solenoid valve without a connector.  
<Example> For lead wire length 2000 mm  
VFR2210-5MC-02 ..... 3 pcs.  
DXT170-80-4A-20 ..... 6 pcs.

#### Lead wire length

| Symbol     | Lead wire length (L mm) |
|------------|-------------------------|
| <b>Nil</b> | 300                     |
| <b>6</b>   | 600                     |
| <b>10</b>  | 1000                    |
| <b>15</b>  | 1500                    |
| <b>20</b>  | 2000                    |
| <b>25</b>  | 2500                    |
| <b>30</b>  | 3000                    |

## Light/Surge Voltage Suppressor

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

### VFR2000 Series

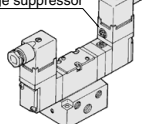
#### Plug-in type (VFR2□00)

Light/Surge voltage suppressor

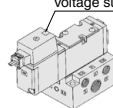


#### Non plug-in type (VFR2□10)

Light/Surge voltage suppressor



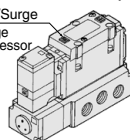
Light/Surge voltage suppressor



### VFR3000/4000 Series

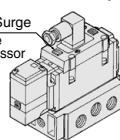
#### Plug-in type (VFR3□00/4□00)

Light/Surge voltage suppressor



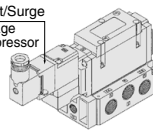
#### Non plug-in type (VFR3□10/4□10)

Light/Surge voltage suppressor



#### Non plug-in type (VFR3□40/4□40)

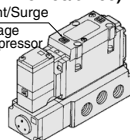
Light/Surge voltage suppressor



### VFR5000/6000 Series

#### Plug-in type (VFR5□00/6□00)

Light/Surge voltage suppressor



#### Non plug-in type (VFR5□10/6□10)

Light/Surge voltage suppressor

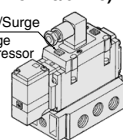


Table (1) VFR2000 Series (VFR2□00)

VFR3000/4000 Series (VFR3□□0, VFR4□□0)  
VFR5000/6000 Series (VFR5□□0, VFR6□□0)

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

Table (2) VFR3000/4000 Series (VFR3□10-E, VFR4□10-E)  
VFR5000/6000 Series (VFR5□10-E, VFR6□10-E)

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

Table (3) VFR2000 Series (VFR2□10)

VFR3000/4000 Series (VFR3□40, VFR4□40)

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

\* Light/Surge voltage suppressor is not available for grommet type.  
For grommet type with surge voltage suppressor, refer to page 1108.



# VFR2000/3000/4000/5000/6000 Series

## Specific Product Precautions 3

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

### ⚠ Caution

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.

#### Used as a 3 Port Valve

| Plug                | B port            | A port |
|---------------------|-------------------|--------|
| Type of actuation   | N.C.              | N.O.   |
| Number of solenoids | <b>Single</b><br> |        |
|                     |                   |        |
| <b>Double</b>       |                   |        |

#### 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 front matter.

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

#### How to exchange solenoid valves

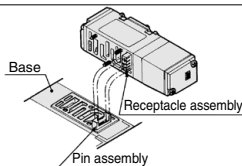
- Loosen set screw and take solenoid valve out vertically, otherwise it may cause damage to the solenoid valve. Never remove valve at an angle.
- When mounting solenoid valve on to the base, plug pin assembly (base-side) into receptacle assembly (body-side) vertically.

#### Tightening Torque for Mounting Bolt

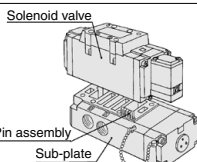
| Model                | Thread      | Tightening torque |
|----------------------|-------------|-------------------|
| Pilot valve assembly | M3 (2 pcs.) | 0.6 N·m           |
| VFR2000              | M3 (3 pcs.) | 0.9 N·m           |
| VFR3000              | M3 (3 pcs.) | 1.1 N·m           |
| VFR4000              | 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 Operation Manual.

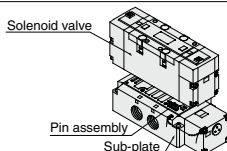
#### VFR2000 Series



#### VFR3000/4000/5000 Series



#### VFR6000 Series



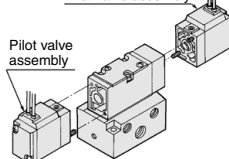
#### How to exchange pilot valve assemblies

- Possible to exchange pilot valve assemblies like the following figures.

Note) Do not change the rated voltage.

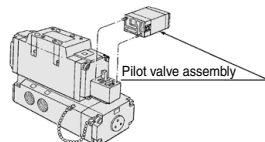
#### VFR2000 Series

##### Pilot valve assembly



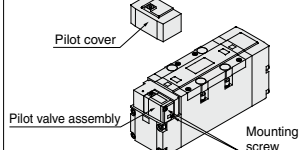
#### VFR3000/4000/5000 Series

##### Pilot valve assembly



#### VFR6000 Series

##### Pilot cover





# VFR2000/3000/4000/5000/6000 Series

## Specific Product Precautions 4

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

### Interface Regulator

#### ⚠ Caution

#### Specifications

| Interface regulator                                    | ARB2000                                 | ARB3050                        | ARB4050    | ARB5050           |
|--|---|--------------------------------|------------|-------------------|
| 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 (mm²)                    | 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 (mm²)                   | 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.

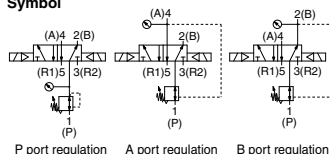
• To combine a reverse pressure valve and an interface regulator, use the ARBF3000, ARBF4000, or the ARBF5000 model. The P port pressure reduction cannot be used.

• When combining a double check valve and an interface regulator, use a manifold or a sub-plate as a basis, and stack them in the following order: the perfect spacer → the interface regulator → the valve.

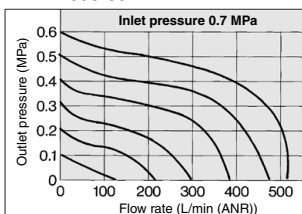
• When a closed center valve is combined with the interface regulator's A, B port regulation, note that it cannot be used for intermediate stops of a cylinder because there is leakage from relief port on the regulator.

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

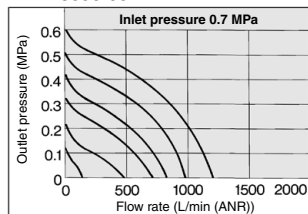
#### Symbol



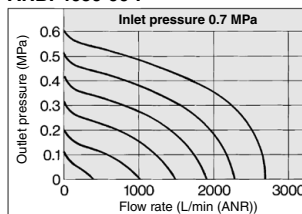
#### ARB2000-00-P



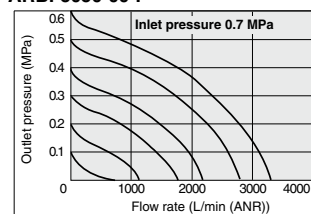
#### ARB3050-00-P



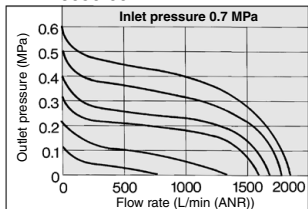
#### ARB4050-00-P



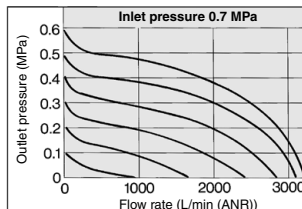
#### ARB5050-00-P



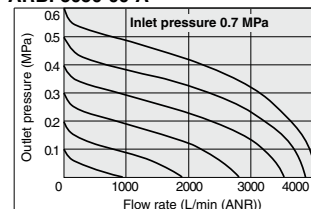
#### ARB3050-00-A



#### ARB4050-00-A



#### ARB5050-00-A





# VFR2000/3000/4000/5000/6000 Series

## Specific Product Precautions 5

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

### Lead Wire Connection

#### ⚠ Caution

#### Type 01T with Terminal Block

##### VFR2000 Series

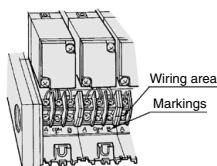
- Remove junction cover of manifold, exposing terminal block attached to the manifold block. Lead wires from solenoid valve are connected with the terminals on upper side of terminal block. (On the terminal block, lead wire is connected with both A and B sides of solenoid valve in accordance with the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

| Model                               | A -    | B + | B -    |
|-------------------------------------|--------|-----|--------|
| VFR2100                             | A side | COM |        |
| VFR2200                             | A side | COM | B side |
| VFR2 <sup>3</sup> / <sub>5</sub> 00 | 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".



##### VFR4000 Series

| Model                               | A -    | B + | B -    |
|-------------------------------------|--------|-----|--------|
| VFR4100                             | A side | COM |        |
| VFR4200                             | A side | COM | B side |
| VFR4 <sup>3</sup> / <sub>5</sub> 00 | 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".

##### VFR5000 Series

| Model                               | A -    | B + | B -    |
|-------------------------------------|--------|-----|--------|
| VFR5100                             | A side | COM |        |
| VFR5200                             | A side | COM | B side |
| VFR5 <sup>3</sup> / <sub>5</sub> 00 | 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".

##### VFR3000 Series

| Model                               | A -    | COM + | B -    |
|-------------------------------------|--------|-------|--------|
| VFR3100                             | A side | COM   |        |
| VFR3200                             | A side | COM   | B side |
| VFR3 <sup>3</sup> / <sub>5</sub> 00 | 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".



# VFR2000/3000/4000/5000/6000 Series Specific Product Precautions 6

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

## ⚠ Caution

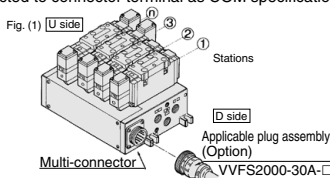
### Lead Wire Connection

### Manifold/Plug-in Type

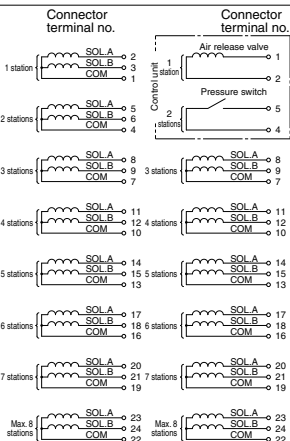
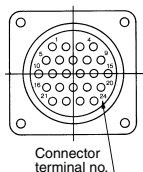
#### Type 01C Circular Connector

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

- 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        |  |
| VVFS2000-30A-2    | 3 m          | Plug 206837-1 1 pc.                        |
| VVFS2000-30A-3    | 5 m          | Cable clamp 206138-1 1 pc.                 |
| VVFS2000-30A-4 *  | 7 m          | Socket 66101-2 24 pcs.                     |
| VVFS2000-30A-5 *  | 10 m         | Cable VCTF 24 cores x 0.75 mm <sup>2</sup> |
| VVFS2000-30A-6 *  | 15 m         | made by Tyco Electronics AMP K.K.          |
| 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 | Green |
| Dot marking     | —      | Yes    | —     | Yes   | —     | Yes   | —   | Yes | —    | Yes  | —      | Yes    | —     |

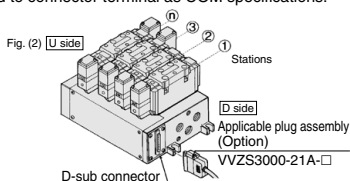
  

| Terminal no.    | 14    | 15    | 16    | 17   | 18   | 19   | 20   | 21       | 22       | 23          | 24          |
|-----------------|-------|-------|-------|------|------|------|------|----------|----------|-------------|-------------|
| Lead wire color | Brown | White | White | Pink | Pink |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

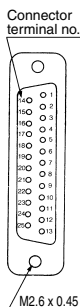
#### Type 01F D-sub Connector

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

- 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        |                                       |
| VVZS3000-21A-2    | 3 m          |                                       |
| VVZS3000-21A-3    | 5 m          |                                       |
| VVZS3000-21A-4 *  | 8 m          | Plug MIL standard type D connector    |
| VVZS3000-21A-5 *  | 10 m         | Number of terminals: 25 pins          |
| VVZS3000-21A-6 *  | 15 m         | Cable: 25 cores x 0.3 mm <sup>2</sup> |
| 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    |

| 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 | —     |