

# 5 Port Pilot Operated Solenoid Valve Metal Seal, Body Ported

## Series VFS2000



### Model

Type of actuation		Model		Port size Rc	Flow characteristics						Max. operating cycle (cpm) <sup>(1)</sup>	Response time (ms) <sup>(2)</sup>	Mass (kg) <sup>(3)</sup>
		Plug-in	Non plug-in		1 → 4/2 (P → A/B)			4/2 → 5/3 (A/B → R1/R2)					
					C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv			
2 position	Single	VFS2120	VFS2130	1/8	3.2	0.24	0.78	3.4	0.28	0.82	1200	22 or less	0.26
				1/4	4.0	0.20	0.90	3.5	0.32	0.85			
	Double	VFS2220	VFS2230	1/8	3.2	0.24	0.78	3.4	0.28	0.82	1200	13 or less	0.35
				1/4	4.0	0.20	0.90	3.5	0.32	0.85			
3 position	Closed center	VFS2320	VFS2330	1/8	3.2	0.24	0.78	3.2	0.27	0.80	600	40 or less	0.42
				1/4	4.0	0.20	0.90	3.4	0.29	0.83			
	Exhaust center	VFS2420	VFS2430	1/8	3.2	0.25	0.79	3.4	0.26	0.82	600	40 or less	0.42
				1/4	4.0	0.20	0.90	3.4	0.32	0.84			
	Pressure center	VFS2520	VFS2530	1/8	3.1	0.23	0.75	3.3	0.27	0.80	600	40 or less	0.42
				1/4	4.0	0.24	0.92	3.3	0.30	0.82			

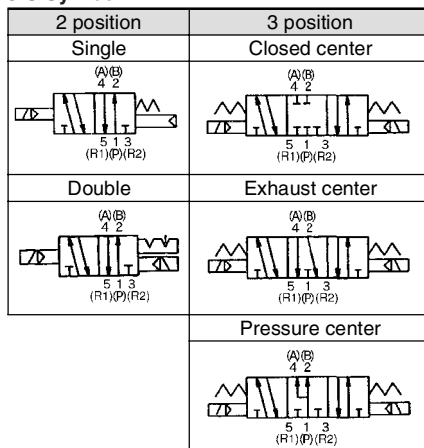
- Note 1) Based on JIS B 8375 (once per 30 days) for the minimum operating frequency.  
 Note 2) According to JIS B 8375-1981. (The value at supply pressure 0.5 MPa.)  
 Note 3) In the case of grommet type Note 4) Factors of "Note 1)" and "Note 2)" are achieved in controlled clean air.

Compact yet provides a high flow capacity  
 1/4: C: 3.4 dm<sup>3</sup>/(s·bar)

Low power consumption:  
 1.8 W DC



### JIS Symbol



### Standard Specifications

Valve specifications	Fluid	Air/Inert gas	
	Maximum operating pressure	1.0 MPa	
	Minimum operating pressure	0.1 MPa	
	Proof pressure	1.5 MPa	
	Ambient and fluid temperature	-10 to 60°C <sup>(1)</sup>	
	Lubrication	Non-lube <sup>(2)</sup>	
	Pilot valve manual override	Non-locking push type (Flush)	
	Shock/Vibration resistance	150/50 m/s <sup>2</sup> <sup>(3)</sup>	
	Enclosure	Dustproof (Degrees of protection 0) <sup>(4)</sup>	
	Electricity specifications	Coil rated voltage	100, 200 VAC, 50/60 Hz; 24 VDC
Allowable voltage fluctuation		-15 to +10% of rated voltage	
Coil insulation type		Class B or equivalent (130°C) <sup>(5)</sup>	
Apparent power (Power consumption) AC		Inrush	5.6 VA (50 Hz), 5.0 VA (60 Hz)
		Holding	3.4 VA (2.1 W)/50 Hz, 2.3 VA (1.5 W)/60 Hz
Power consumption		1.8 W (2.04 W: With light/surge voltage suppressor)	
Electrical entry		Grommet, Grommet terminal, Conduit terminal, DIN terminal	

- Note 1) Use dry air at low temperatures.  
 Note 2) Use turbine oil Class 1 (ISO VG32), if lubricated.  
 Note 3) Impact resistance: No malfunction occurred when it is tested with a drop tester in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)  
 Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)  
 Note 4) Based on JIS C 0920. Note 5) Based on JIS C 4003.

### Option Specifications

Pilot type	External pilot <sup>(1)</sup>
Pilot valve manual override	Non-locking push type (Extended), Locking type (Tool required)
Coil rated voltage	110 to 120, 220, 240 VAC (50/60 Hz)
	12, 100 VDC
Option	With light/surge voltage suppressor <sup>(2)</sup>
Foot bracket (With screw)	Part no.: VFN200-17A, VFS2120 (single) only

- Note 1) Operating pressure: 0 to 1.0 MPa. Pilot pressure: 0.1 to 1.0 MPa.  
 Note 2) Grommet type is available only w/ surge voltage suppressor (which is directly connected with lead wire), not w/ indicator light.

### Manifold

Body type	Applicable manifold base (Pilot EXH)
VFS2□20	Bar manifold (Individual EXH)
VFS2□30	Bar manifold (Common EXH base side)

- Note) VFS2□30: Manifold only. Cannot be used as a single unit.

# 5 Port Pilot Operated Solenoid Valve Metal Seal, Body Ported *Series VFS2000*

## How to Order

**VFS2** 1 20 - 1 G - 01 - - -

**Symbol**

1: 2 position single

2: 2 position double

3: 3 position closed center

4: 3 position exhaust center

5: 3 position pressure center

\* Reverse pressure: Can be used by external pilot specifications.

**Body (Pilot exhaust)**

20: Individual EXH

30: Common EXH\*

\* Manifold only

**Pilot type**

Nil	Internal pilot
R*	External pilot

\* Option: Individual external pilot (External pilot port: Body side)

**Option**

F: With foot bracket

\* Mountable only for VFS2120.

**Thread type**

Nil	Rc
N*	NPT
T*	NPTF
F*	G

\* Option

**Port size**

01	Rc 1/8
02	Rc 1/4

**Manual override**

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

**Light/Surge voltage suppressor**

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

\* Grommet type is available only w/ surge voltage suppressor, not w/ indicator light.

**Electrical entry**

G: Grommet 	E: Grommet terminal 	T: Conduit terminal 	D, Y: DIN terminal 
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**Coil rated voltage**

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

\* Option

**CE-compliant**

Nil	—
Q	CE-compliant

## How to Order Pilot Valve Assembly

**SF4** - 1 DZ - 12

**Coil rated voltage**

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

\* Option

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

G	Grommet
GS	Grommet with surge voltage suppressor
D	DIN terminal
DZ*	DIN terminal with light/surge voltage suppressor
DO*	DIN terminal **
DOZ*	DIN terminal with light/surge voltage suppressor **
Y*	DIN terminal
YZ*	DIN terminal with light/surge voltage suppressor
YO*	DIN terminal **
YOZ*	DIN terminal with light/surge voltage suppressor **
T	Conduit terminal
TZ	Conduit terminal with light/surge voltage suppressor
E	Grommet terminal
EZ	Grommet terminal with light/surge voltage suppressor

\* Y: Conforming to DIN43650B standard  
\*\* DIN connector is not attached.

**Applicable model**

12	For VFS2□20	Individual pilot exhaust
13	For VFS2□30	Common pilot exhaust

**Manual override**

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

\* Option

Gentle Automatic Solution Sdn Bhd

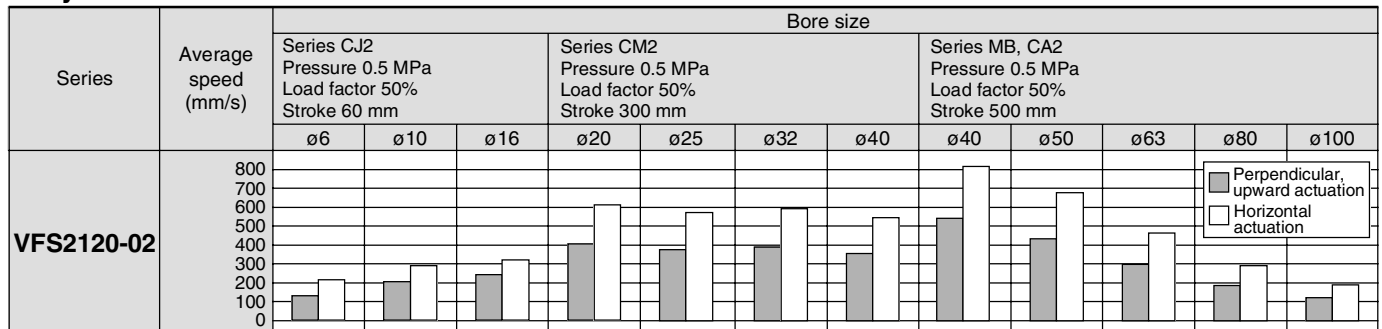
Tel :603-80237743 Fax :603-80239743 Email :sales@gentle.com.my http://www.gentle.com.my

# Series VFS2000

## Cylinder Speed Chart

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

### Body Ported



### Conditions

Body ported		Series CJ2	Series CM2	Series MB, CA2
VFS2120-02	Tube bore x Length	T0604 x 1 m	T1075 x 1 m	
	Speed controller	AS3001F-06	AS4001F-10	
	Silencer	AN110-01		

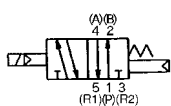


\* It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.

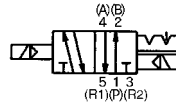
\* The average velocity of the cylinder is the value that the stroke is divided by the total stroke time.

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

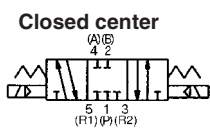
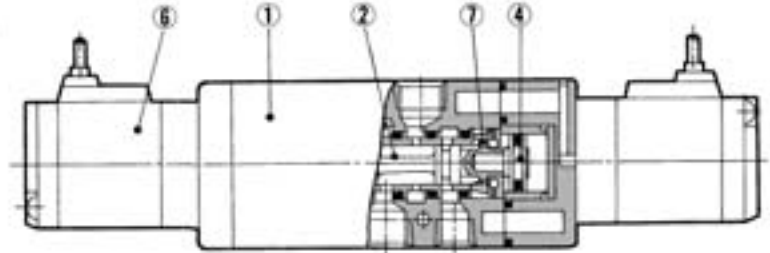
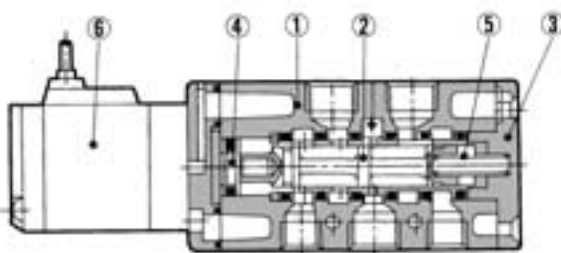
### Construction



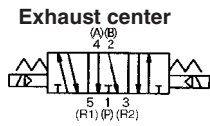
2 position single



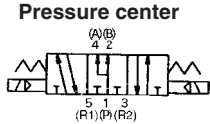
2 position double



Closed center

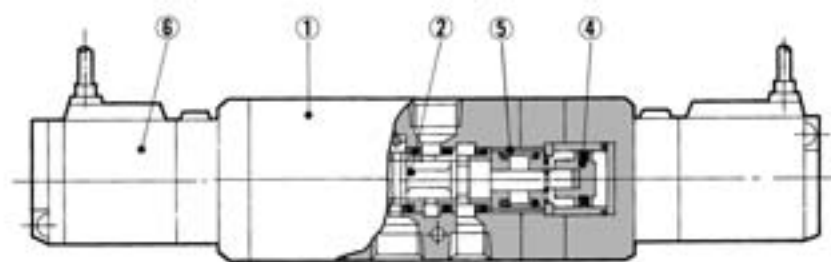


Exhaust center



Pressure center

3 position closed center/exhaust center/pressure center



### Component Parts

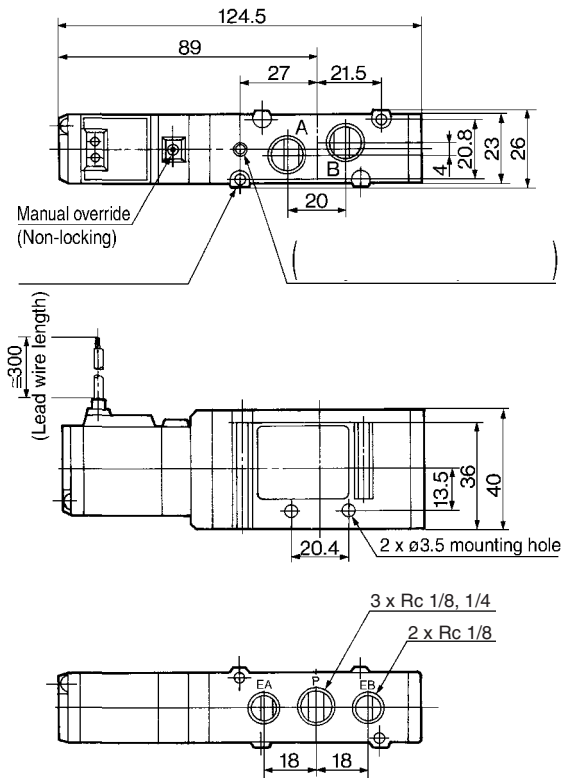
No.	Description	Material	Note
1	Body	Aluminum die-casted	Platinum silver
2	Spool/Sleeve	Stainless steel	—
3	End plate	Resin	—
4	Piston	Resin	—
5	Return spring	Stainless steel	—
6	Pilot valve assembly	—	—
7	Detent assembly	—	—

\* Refer to "How to Order Pilot Valve Assembly" on page 1123.

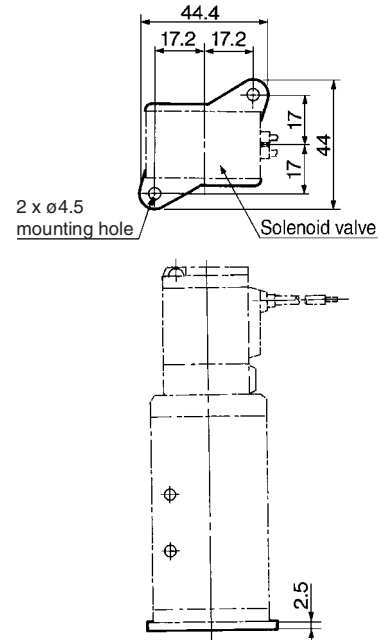
# 5 Port Pilot Operated Solenoid Valve Metal Seal, Body Ported **Series VFS2000**

## 2 Position Single — Grommet, Grommet terminal, Conduit terminal, DIN terminal

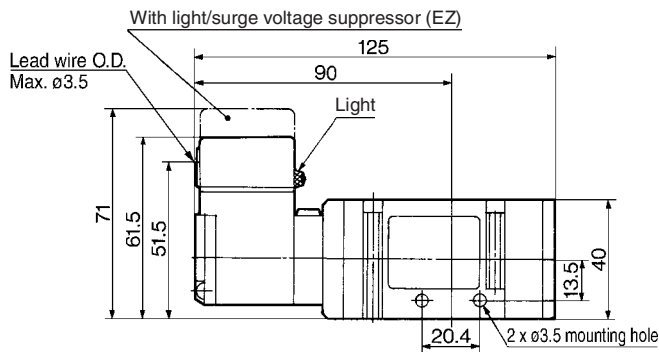
### Grommet: VFS2120-□G



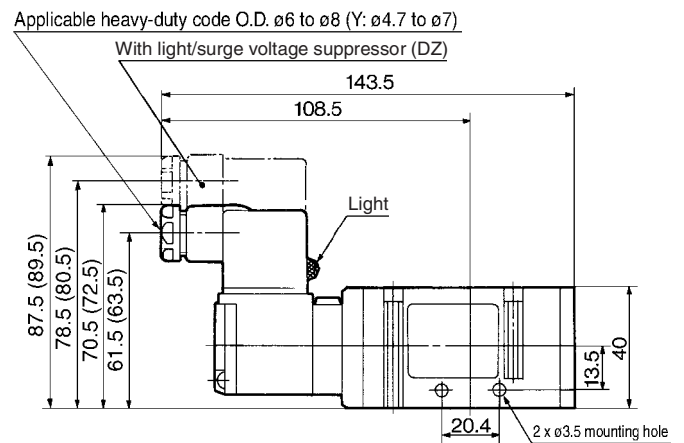
### Foot bracket (F) Part no.: VFN200-17A



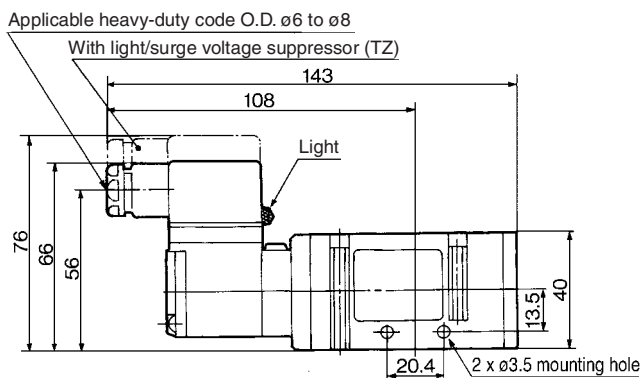
### Grommet terminal: VFS2120-□E/EZ



### DIN terminal: VFS2120-□D/DZ/Y/YZ



### Conduit terminal: VFS2120-□T/TZ

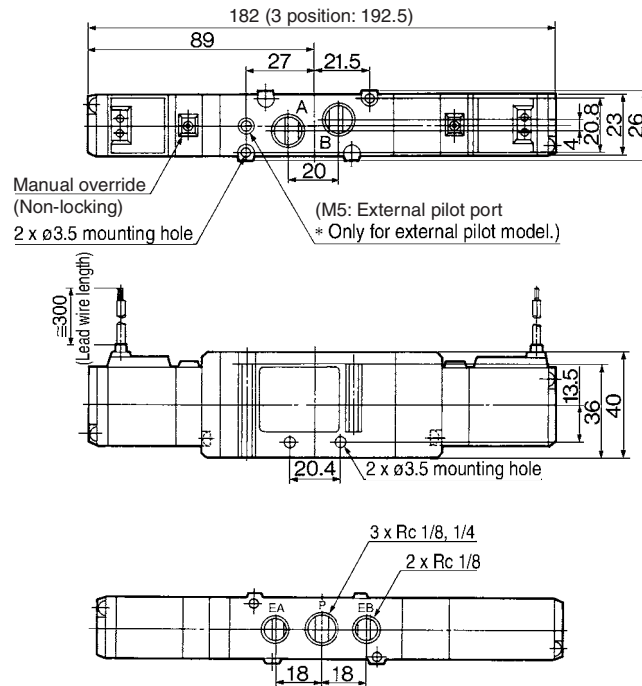


( ): Y, YZ

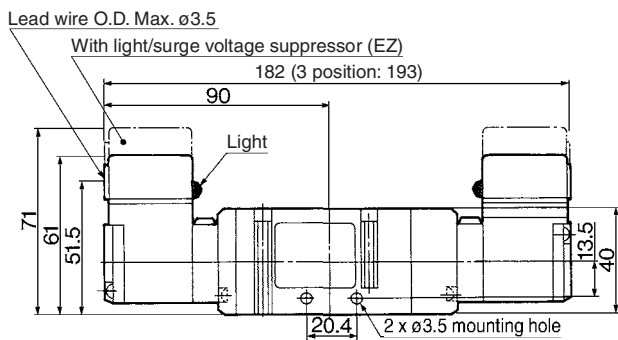
# Series VFS2000

## 2 Position Double, 3 Position — Grommet, Grommet terminal, Conduit terminal, DIN terminal

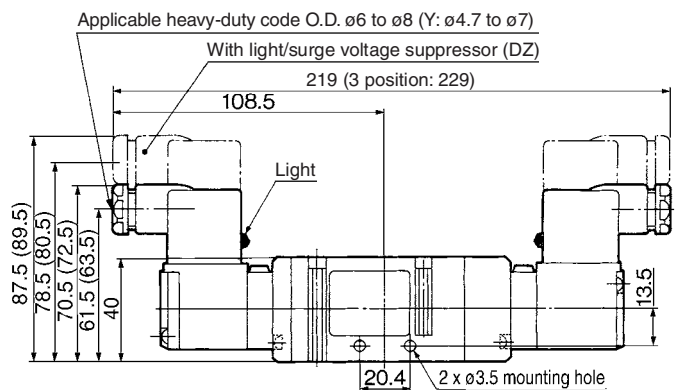
Grommet: VFS2220-□G, VFS2320-□G, VFS2420-□G, VFS2520-□G



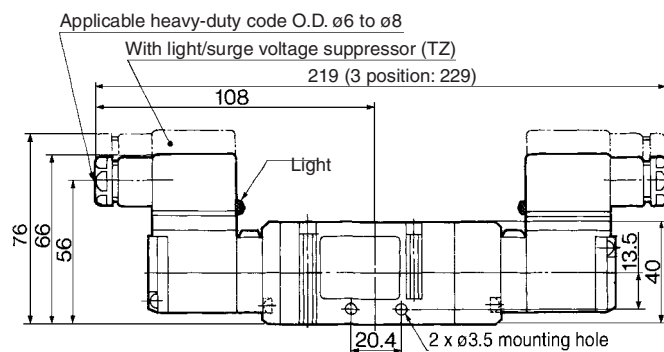
Grommet terminal: VFS2220-□E/EZ VFS2320-□E/EZ  
VFS2420-□E/EZ VFS2520-□E/EZ



DIN terminal: VFS2220-□D/DZ/Y/YZ  
VFS2320-□D/DZ/Y/YZ  
VFS2420-□D/DZ/Y/YZ  
VFS2520-□D/DZ/Y/YZ



Conduit terminal: VFS2220-□T/TZ VFS2320-□T/TZ  
VFS2420-□T/TZ VFS2520-□T/TZ

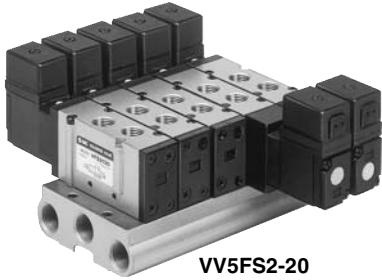


( ): Y, YZ

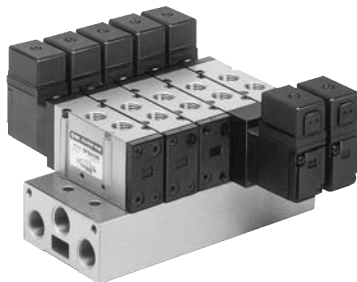
# Series VFS2000 Manifold Specifications Single Base Type

## Keeps environmental air clean from pilot exhaust

Use of the VV5FS2-30 manifold can exhaust intensively the pilot exhaust gas to the base side, and can prevent environmental aggravation due to noise and oil mist.



VV5FS2-20



VV5FS2-30

Part no. for mounting bolt and gasket  
BG-VFS2030

## Specifications

Manifold base type	Bar manifold, Body ported
Stations	Max. 15 stations

## Port Specifications

Symbol	Passage		Porting specifications: Rc		
	1(P)	5(R1), 3(R2)	Base 1(P)	Valve 2(B), 4(A)	Base 3(R2), 5(R1)
1	Common	Common	Side: 3/8	Top: 1/8, 1/4	Side: 3/8

## Option

Blanking plate	VVFS2000-10A-1	With gasket, screw
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## How to Order Manifold Base

**VV5FS2 - 20 - 05 1 - 03** - [ ] - [ ]

Series VFS2000 Manifold

- CE-compliant**

Nil	—
Q	CE-compliant
- Thread type**

Nil	Rc
N*	NPT
T*	NPTF
F*	G

\* Option
- P, EA, EB port size**

03	Rc 3/8
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- Symbol**

Symbol	Passage		Porting specifications
	1(P)	3(R2), 5(R1)	2(B), 4(A)
1	Common Rc 3/8	Common Rc 3/8	Top Rc 1/8, 1/4
- Stations**

02	2 stations
⋮	⋮
15	15 stations
- Base model**

Model	Pilot exhaust	Applicable valve model
20	Pilot individual EXH 	VFS2□20-□□-01 02
30	Pilot common EXH 	VFS2□30-□□-01 02 *VFS2□20-□□-01 mountable

## How to Order Manifold Assembly [Example]

Add the valve and option part numbers in order starting from the first station on the D side.

### <Example>

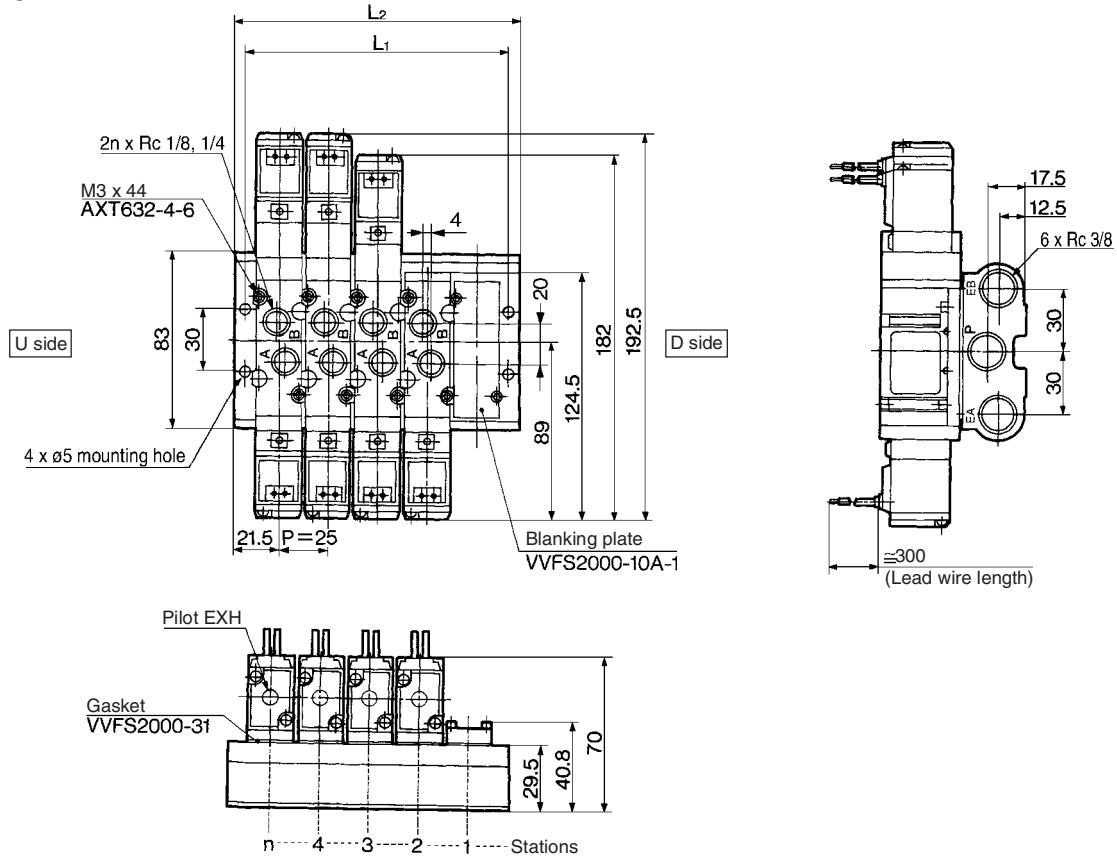
(Manifold base) VV5FS2-20-061-03 ..... 1  
 (2 position single) \* VFS2120-1D-02 ..... 3  
 (2 position double) \* VFS2220-1D-02 ..... 2  
 (Blanking plate) \* VVFS2000-10A-1 ..... 1

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

# Series VFS2000

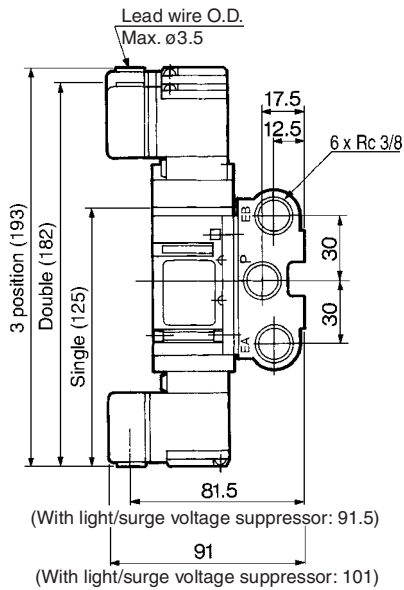
## Type 20 Manifold — Pilot individual exhaust: VVFS2000- Station 1-03

Grommet: G

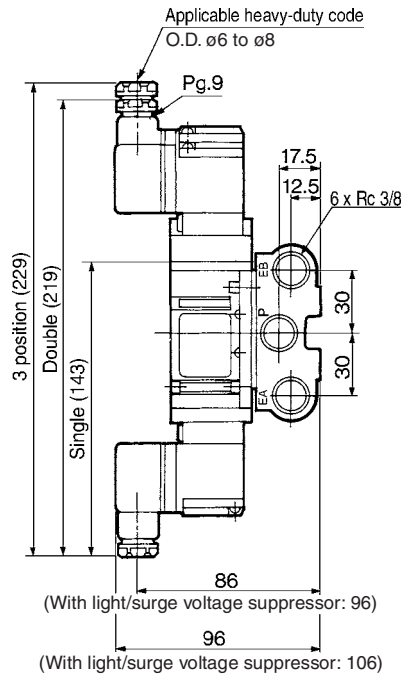


Formula for manifold weight  $M = 0.108n + 0.068$  (kg) n: Station

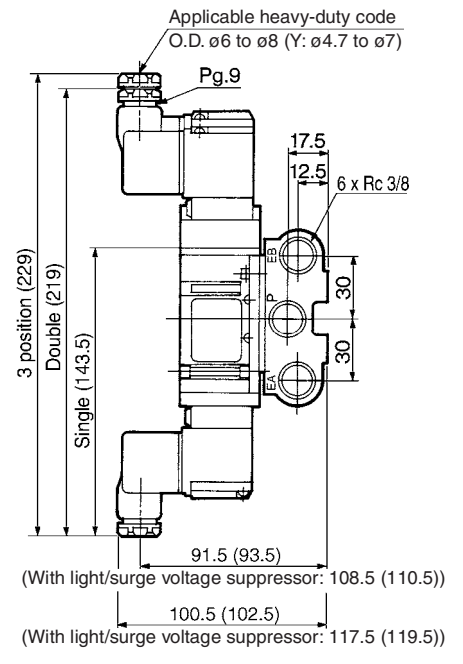
### Grommet terminal: E/EZ



### Conduit terminal: T/TZ



### DIN terminal: D/DZ/Y/YZ



( ): Y, YZ

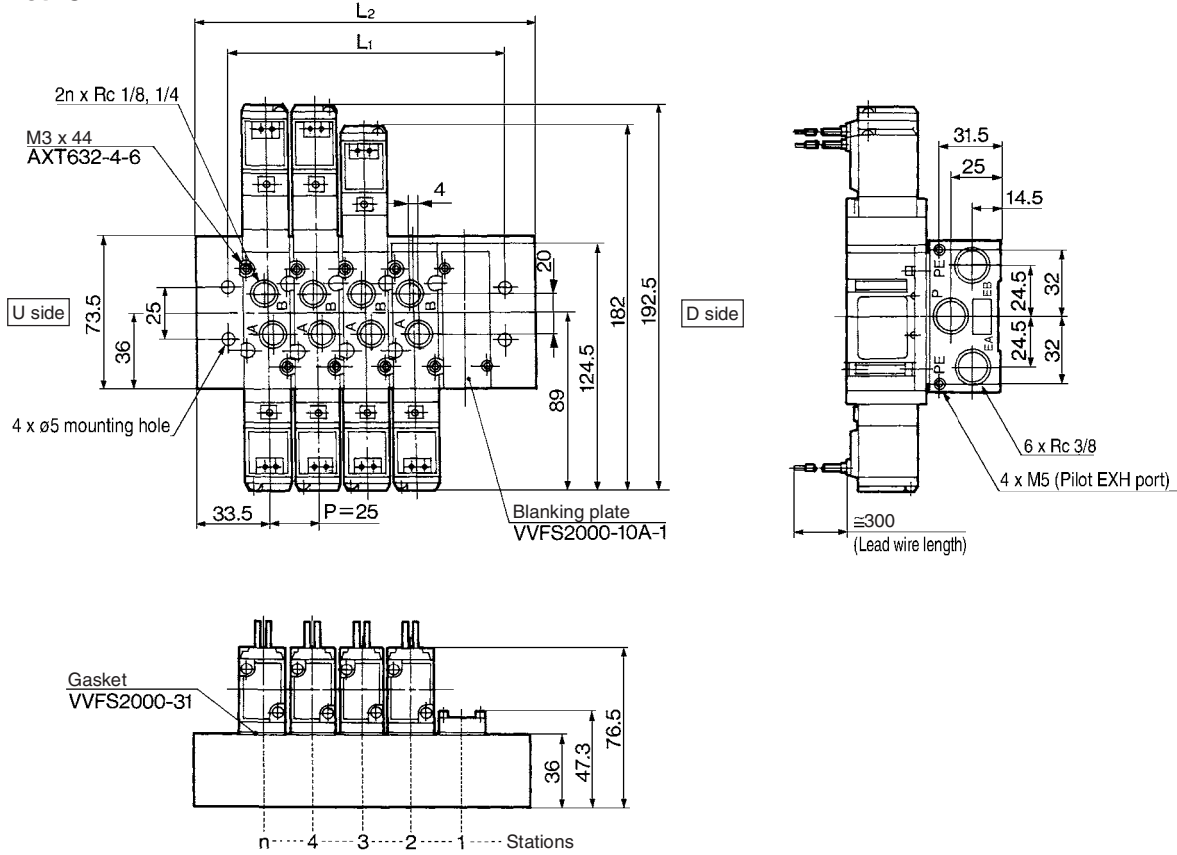
n: Station

L	Stations	2	3	4	5	6	7	8	9	10	Formula
L <sub>1</sub>		58	83	108	133	158	183	208	233	258	$L_1 = 25 \times n + 8$
L <sub>2</sub>		68	93	118	143	168	193	218	243	268	$L_2 = 25 \times n + 18$

# 5 Port Pilot Operated Solenoid Valve Metal Seal, Body Ported *Series VFS2000*

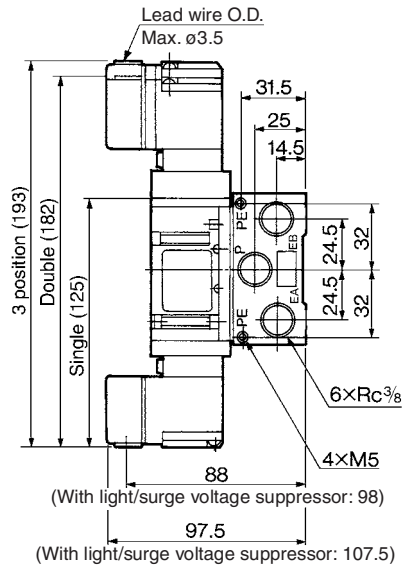
## Type 30 Manifold — Pilot common exhaust: VV5FS2-30- Station 1-03

### Grommet: G

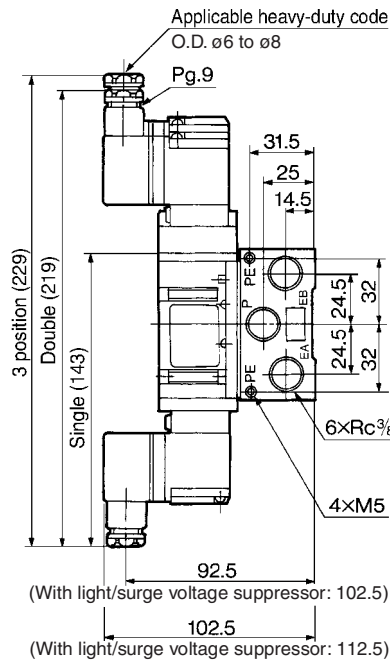


Formula for manifold weight M = 0.12n + 0.21 (kg) n: Station

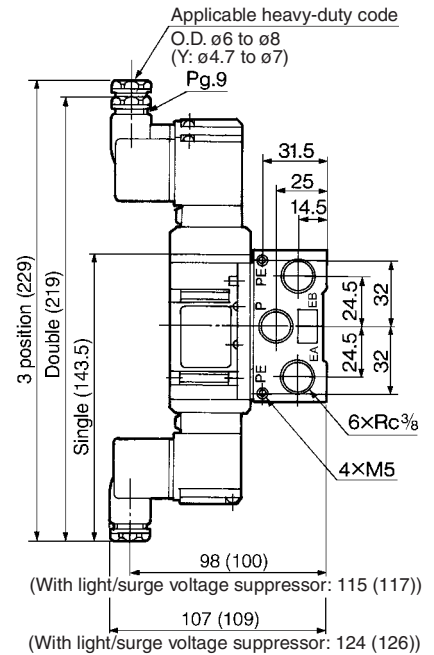
### Grommet terminal: E/EZ



### Conduit terminal: T/TZ



### DIN terminal: D/DZ/Y/YZ



( ): Y, YZ

n: Station

L	Stations	2	3	4	5	6	7	8	9	10	Formula
L <sub>1</sub>		62	87	112	137	162	187	212	237	262	L <sub>1</sub> = 25 x n + 12
L <sub>2</sub>		92	117	142	167	192	217	242	267	292	L <sub>2</sub> = 25 x n + 42