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

NRTL /C

Model

Type of actuation		Model: Plug-in	Model: Non plug-in	Port size Rc	Flow characteristics: 1→4/2 (P→A/B) C [dm³/(s·bar)]	b	Cv	Flow characteristics: 4/2→5/3 (A/B→R1/R2) C [dm³/(s·bar)]	b	Cv	Max. operating cycle (cpm) (1)	Response time (ms) (2)	Mass (kg) (3)
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 dm³/(s·bar)

Low power consumption: 1.8 W DC



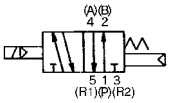
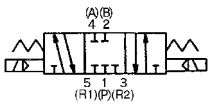
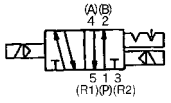
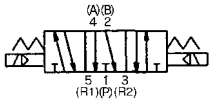
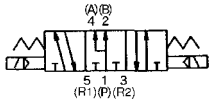
VFS2320-□T-02

VFS2120-□E-02-F

VFS2220-□E-02

VFS2120-□G-02

JIS Symbol

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

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 (1)
	Lubrication		Non-lube (2)
	Pilot valve manual override		Non-locking push type (Flush)
	Shock/Vibration resistance		150/50 m/s² (3)
	Enclosure		Dustproof (Degrees of protection 0) (4)
Electricity specifications	**Coil rated voltage**		100, 200 VAC, 50/60 Hz; 24 VDC
	Allowable voltage fluctuation		–15 to +10% of rated voltage
	Coil insulation type		Class B or equivalent (130°C) (5)
	Apparent power (Power consumption)	**AC** **Inrush**	5.6 VA (50 Hz), 5.0 VA (60 Hz)
		Holding	3.4 VA (2.1 W)/50 Hz, 2.3 VA (1.5 W)/60 Hz
	Power consumption		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 (1)
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 (2)
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)

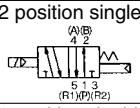
Note) VFS2□30: Manifold only. Cannot be used as a single unit.

How to Order

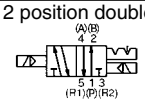
VFS2 [1] [20] [ ] – [1] [G] [ ] [ ] – [01] [ ] – [ ]

Symbol

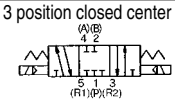
1: 2 position single



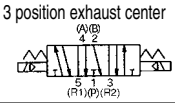
2: 2 position double



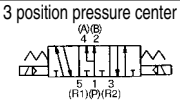
3: 3 position closed center



4: 3 position exhaust center



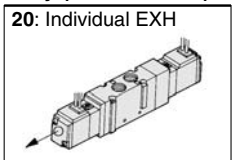
5: 3 position pressure center



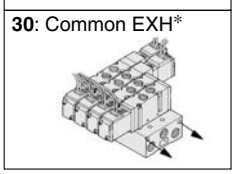
∗ Reverse pressure: Can be used by external pilot specifications.

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)

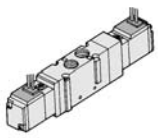
Coil rated voltage

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

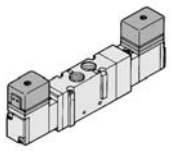
∗ Option

Electrical entry

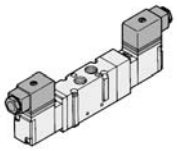
G: Grommet



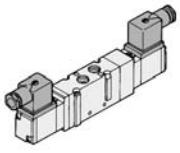
E: Grommet terminal



T: Conduit terminal



D, Y: DIN terminal



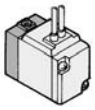
Light/Surge voltage suppressor

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.

Manual override

Nil: Non-locking push type (Flush)



A∗: Non-locking push type (Extended)



B∗: Locking type (Tool required)



∗ Option

Port size

01	Rc 1/8
02	Rc 1/4

Thread type

Nil	Rc
N∗	NPT
T∗	NPTF
F∗	G

∗ Option

Option

F: With foot bracket



∗ Mountable only for VFS2120.

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

∗ D: Conforming to DIN43650 standard; 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)

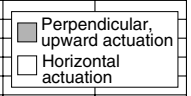
∗ Option

Cylinder Speed Chart

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

Body Ported

Series	Average speed (mm/s)	Bore size											
		Series CJ2 Pressure 0.5 MPa Load factor 50% Stroke 60 mm			Series CM2 Pressure 0.5 MPa Load factor 50% Stroke 300 mm				Series MB, CA2 Pressure 0.5 MPa Load factor 50% Stroke 500 mm				
		ø6	ø10	ø16	ø20	ø25	ø32	ø40	ø40	ø50	ø63	ø80	ø100
VFS2120-02	800 700 600 500 400 300 200 100 0												



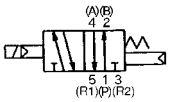
Conditions

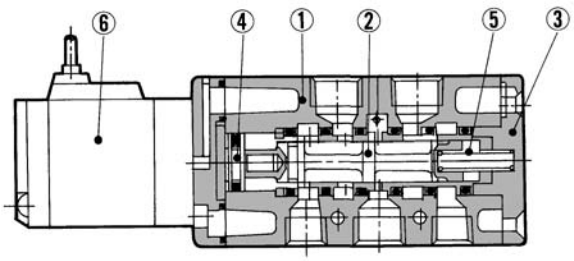
Body ported		Series CJ2	Series CM2	Series MB, CA2
VFS2120-02	Tube bore x Length	T0604 x 1 m	T1075 x 1 m	
	Speed controller	AS3001F-06	AS4001F-10	
	Silencer	AN110-01		

∗ 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%

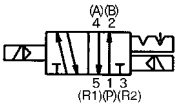
Construction

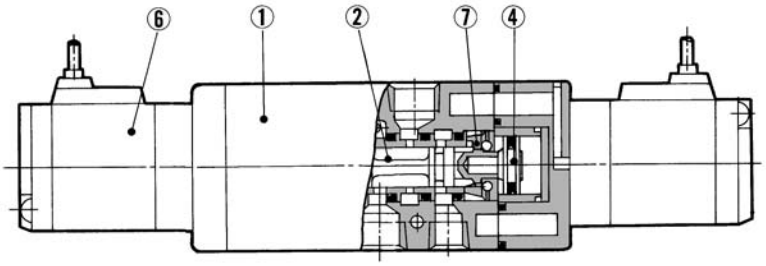
2 position single



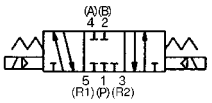


2 position double

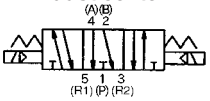




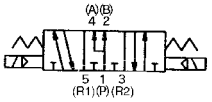
Closed center



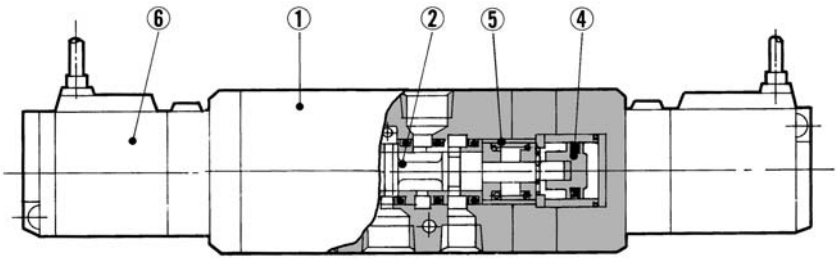
Exhaust center



Pressure center



3 position closed center/exhaust center/pressure center



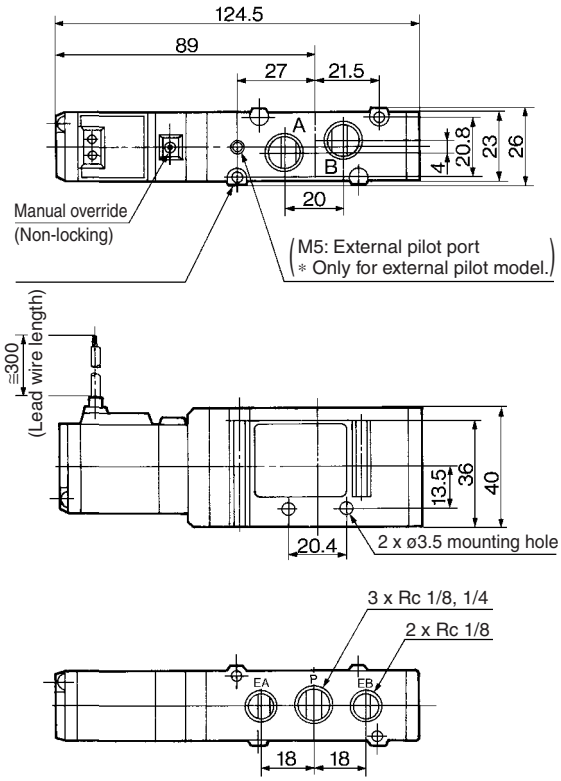
Component Parts

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**	—	—

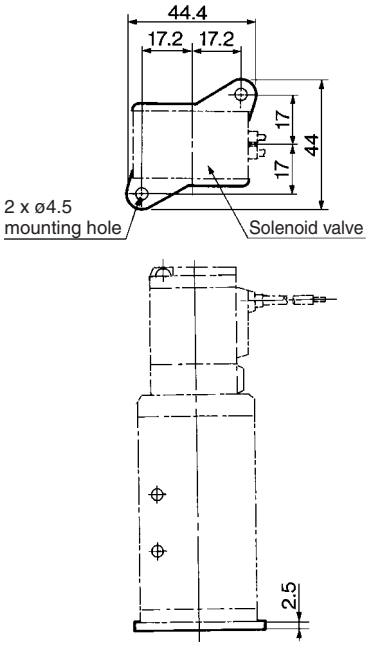
∗ Refer to “How to Order Pilot Valve Assembly” on page 1123.

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

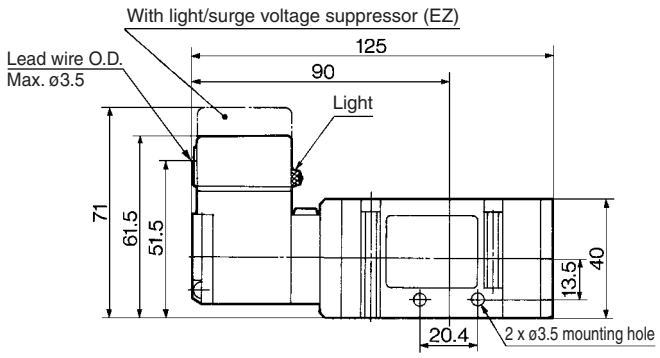
Grommet: VFS2120-□G



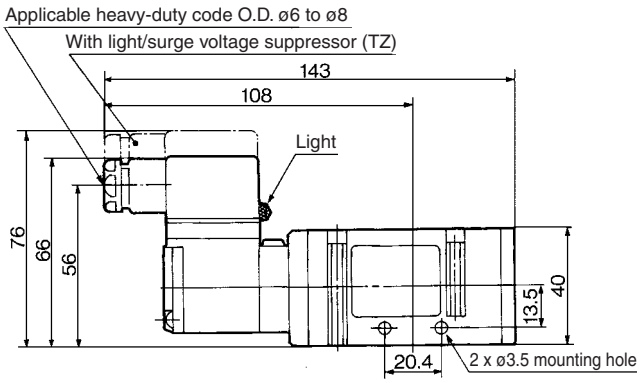
Foot bracket (F)
Part no.: VFN200-17A



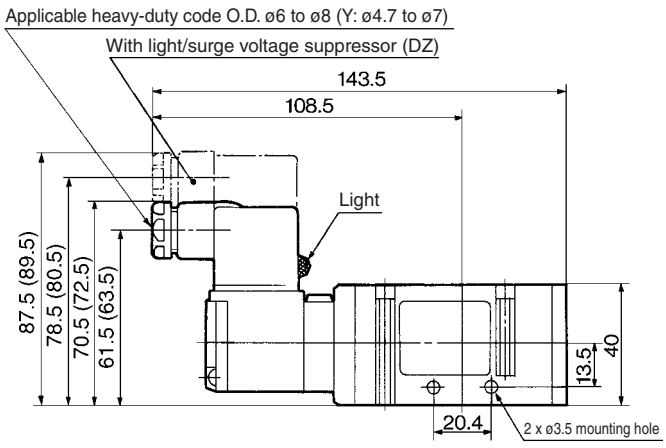
Grommet terminal: VFS2120-□E/EZ



Conduit terminal: VFS2120-□T/TZ



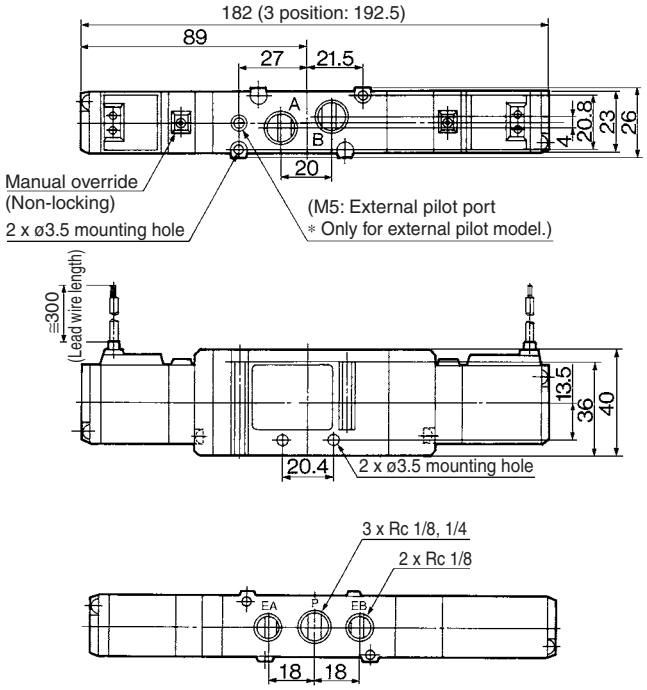
DIN terminal: VFS2120-□D/DZ/Y/YZ



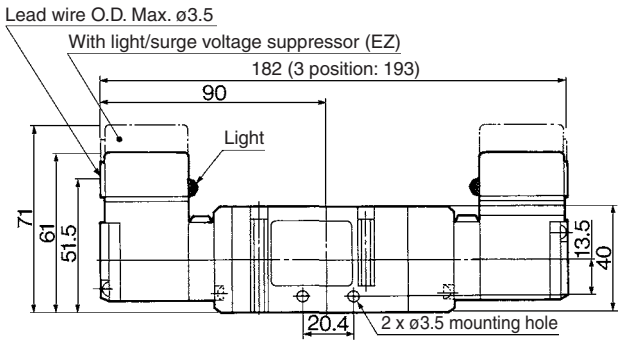
( ): Y, YZ

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

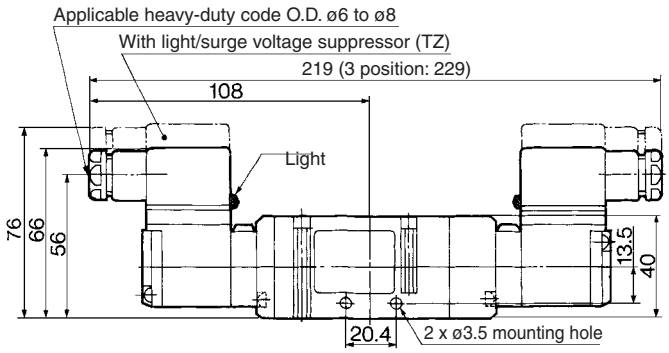
Grommet: VFS2220-□G, VFS2320-□G, VFS2420-□G, VFS2520-□G



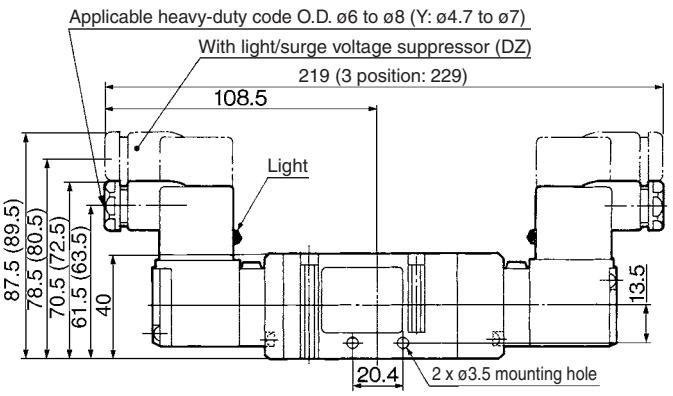
Grommet terminal: VFS2220-□E/EZ VFS2320-□E/EZ VFS2420-□E/EZ VFS2520-□E/EZ



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



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

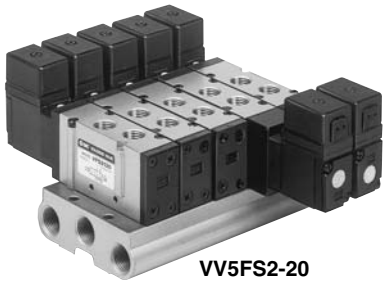


( ): Y, YZ

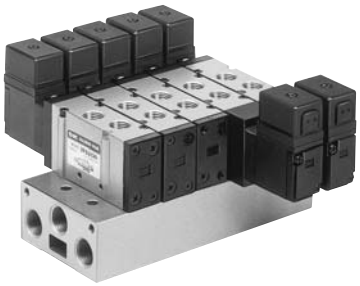
Series VFS2000
Manifold Specifications
Single Base Type

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

Option

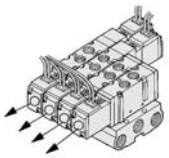
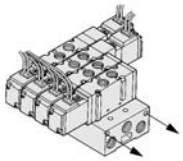
Blanking plate	VVFS2000-10A-1	With gasket, screw

How to Order Manifold Base

VV5FS2 - 20 - 05 1 - 03 □

Series VFS2000 Manifold

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-□□-$^{01}_{02}$ mountable

Stations

02	2 stations
⋮	⋮
15	15 stations

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

P, EA, EB port size

03	Rc 3/8

Thread type

Nil	Rc
N*	NPT
T*	NPTF
F*	G

∗ Option

How to Order Manifold Assembly [Example]

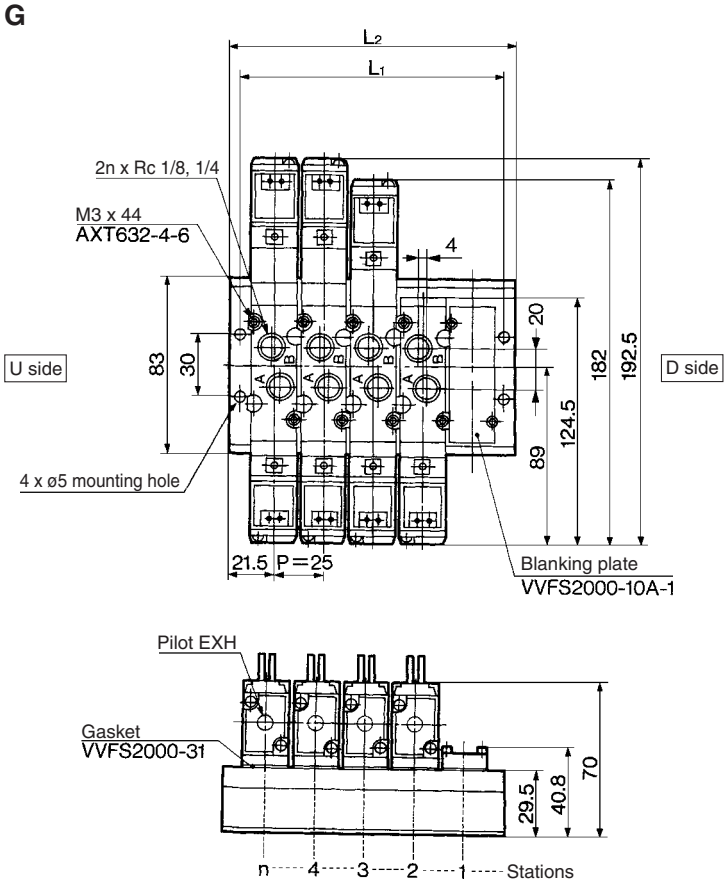
Add the valve and option part numbers in order starting from the first station on the D side.

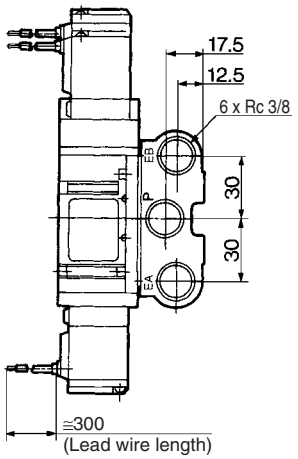
<Example>
(Manifold base) **VV5FS2-20-061-03** ····· **1**
(2 position single) ∗ **VFS2120-1D-02** ····· **3**
(2 position double) ∗ **VFS2220-1D-02** ····· **2**
(Blanking plate) ∗ **VVFS2000-10A-1** ····· **1**

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

Type 20 Manifold — Pilot individual exhaust: VV5FS2-20- Station 1-03

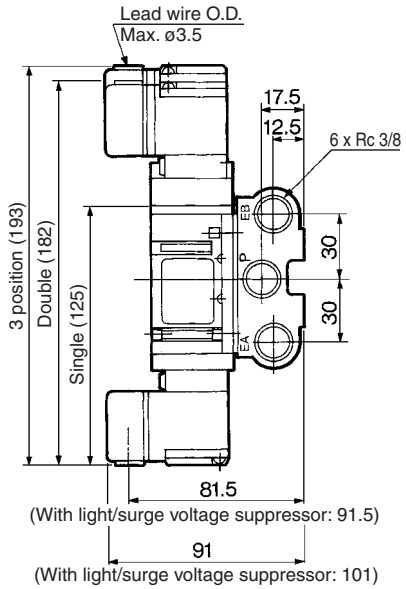
Grommet: G



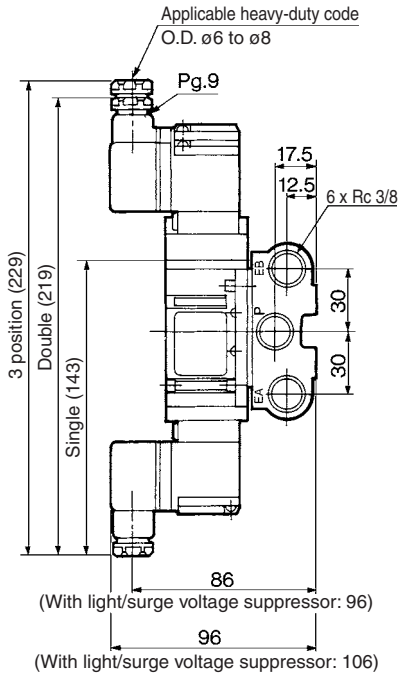


Formula for manifold weight M = 0.108n + 0.068 (kg) n: Station

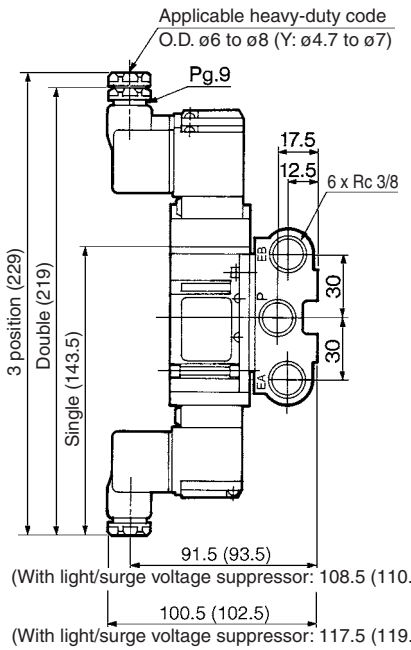
Grommet terminal: E/EZ



Conduit terminal: T/TZ



DIN terminal: D/DZ/Y/YZ



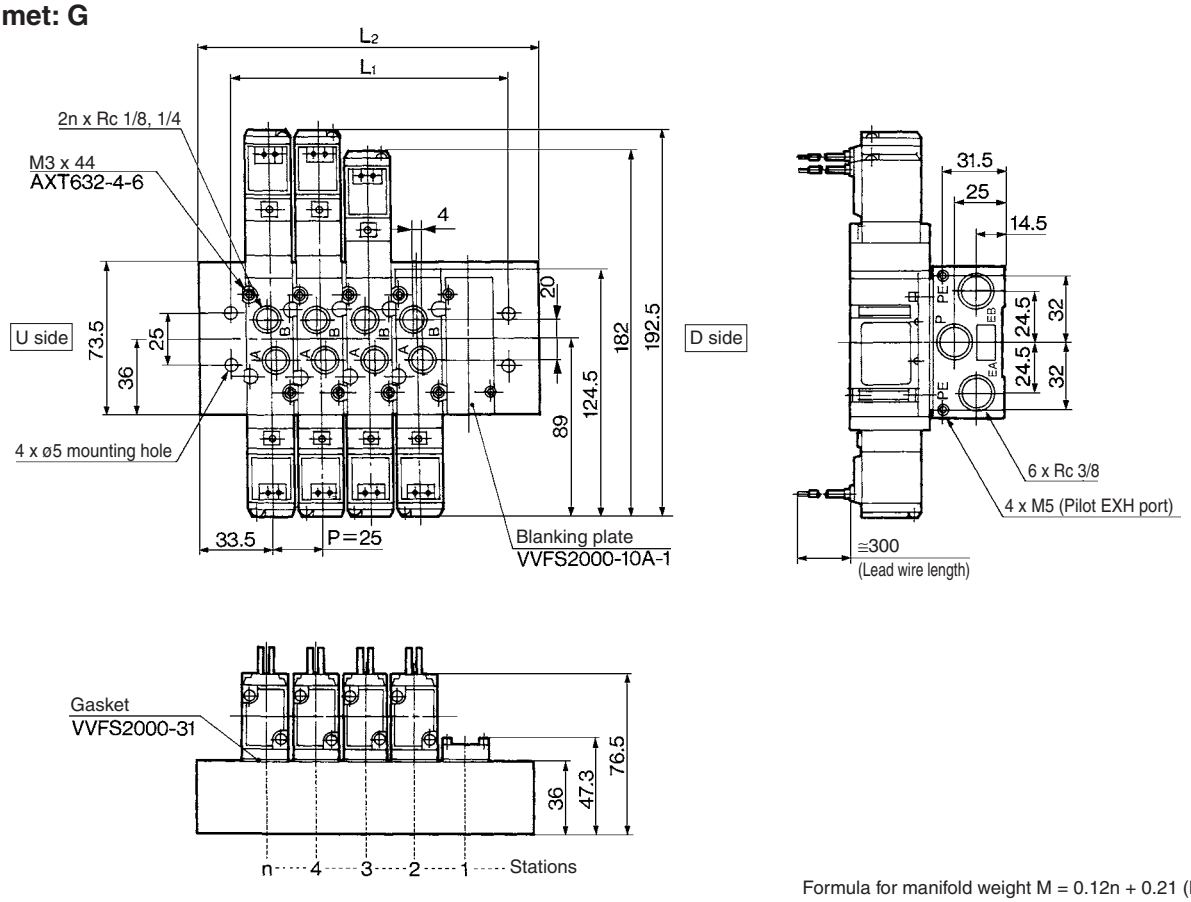
( ): Y, YZ

n: Station

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

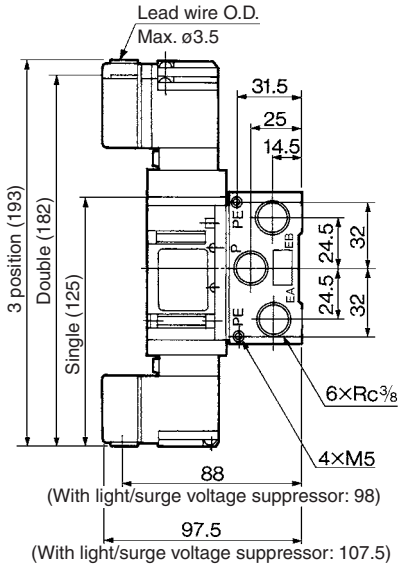
Type 30 Manifold — Pilot common exhaust: VV5FS2-30-Station 1-03

Grommet: G

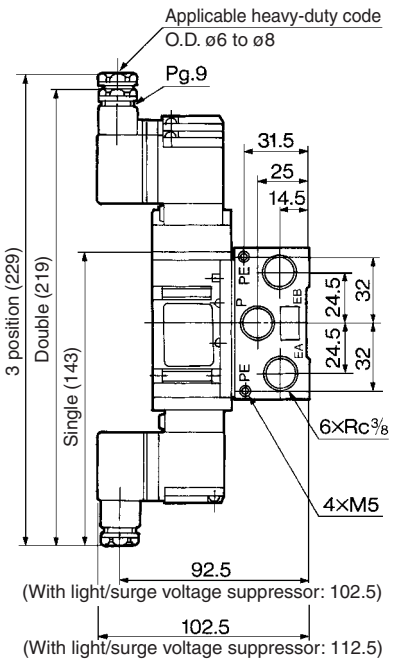


Formula for manifold weight M = 0.12n + 0.21 (kg) n: Station

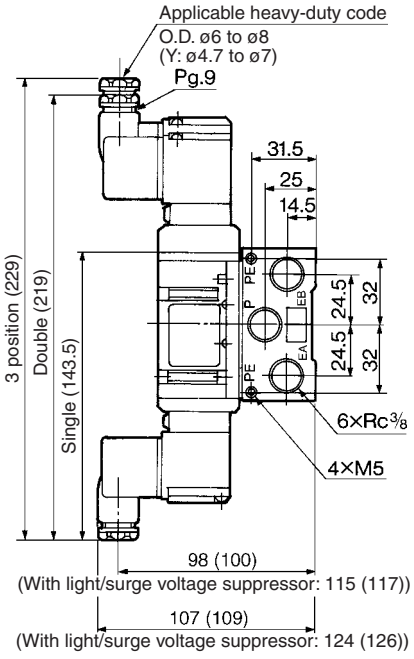
Grommet terminal: E/EZ



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
L1	62	87	112	137	162	187	212	237	262	L1 = 25 x n + 12
L2	92	117	142	167	192	217	242	267	292	L2 = 25 x n + 42

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