5 Port Pilot Operated Solenoid Valve
Metal Seal, Body Ported
Series VFS1000

Model

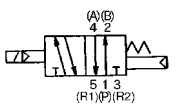
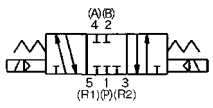
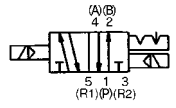
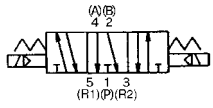
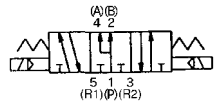
Type of actuation		Model: Plug-in	Model: Non plug-in	Port size	Flow characteristics: 1→4/2 (P→A/B) C [dm³/(s·bar)]	1→4/2 (P→A/B) b	1→4/2 (P→A/B) Cv	4/2→5/3 (A/B→R1/R2) C [dm³/(s·bar)]	4/2→5/3 (A/B→R1/R2) b	4/2→5/3 (A/B→R1/R2) Cv	Max.(1) operating cycle (cpm)	Response(2) time (ms)	Mass(3) (kg)
2 position	Single	**VFS1120**	**VFS1130**	1/8	1.7	0.22	0.38	1.8	0.19	0.40	1200	15 or less	0.18
2 position	Double	**VFS1220**	**VFS1230**	1/8	1.7	0.22	0.39	1.8	0.19	0.40	1200	13 or less	0.26
3 position	Closed center	**VFS1320**	**VFS1330**	1/8	1.6	0.20	0.37	1.8	0.20	0.41	600	20 or less	0.27
3 position	Exhaust center	**VFS1420**	**VFS1430**	1/8	1.7	0.18	0.38	1.9	0.19	0.44	600	20 or less	0.27
3 position	Pressure center	**VFS1520**	**VFS1530**	1/8	1.7	0.24	0.40	1.6	0.18	0.37	600	20 or less	0.27

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) "Note 1)" and "Note 2)" are with controlled clean air.

Compact yet provides a large flow capacity C: 1.8 dm³/(s·bar)

Low power consumption: 1.8 W DC

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
	Min. operating pressure	**2 position**	0.1 MPa
		3 position	0.15 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 (DC)		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 valve manual override	Non-locking push type (Extended), Locking type (Tool required), Locking type (Lever)
Coil rated voltage	110 to 120, 220, 240 VAC (50/60 Hz)
	12, 100 VDC
Option	With light/surge voltage suppressor Note)
Foot bracket (With screw)	Part No.: AXT626-10A, VFS1120 (single) only

Note) Grommet type is available only w/ surge voltage suppressor (which is directly connected with lead wire).

Manifold

Body type	Applicable manifold base (Pilot EXH)
VFS1□20	Bar manifold (Individual EXH)
VFS1□30	Bar manifold (Common EXH base side)

Note) VFS1□30: Manifold only. Cannot be used as a single unit.

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How to Order

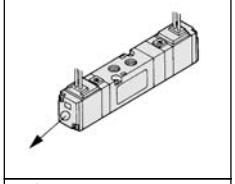
VFS1 [1] [20] – [1] [G] [ ] [ ] – [01] [ ] – [ ] – [ ]

Symbol

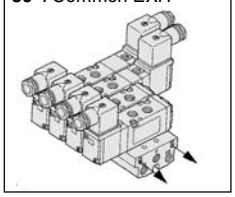
1	2 position single
2	2 position double
3	3 position closed center
4	3 position exhaust center
5	3 position pressure center

Body (Pilot exhaust)

20: Individual EXH



30*: Common EXH



* Manifold only

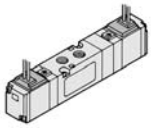
Coil rated voltage

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)
9*	Other

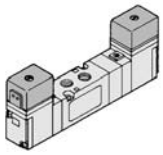
* Option

Electrical entry

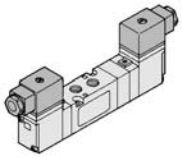
G: Grommet



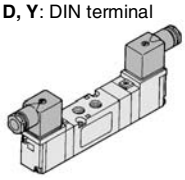
E: Grommet terminal



T: Conduit terminal



D, Y: DIN terminal



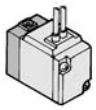
Light/Surge voltage suppressor

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

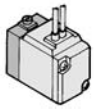
* Grommet type is available only w/ surge voltage suppressor, not w/ indicator light.

Manual override

Nil: Non-locking push type (Flush)



A*: Non-locking push type (Extended)



B*: Locking type

C*: Locking type (Lever)

* Option

Port size

01	Rc 1/8

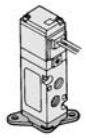
Thread type

Nil	Rc
N*	NPT
T*	NPTF
F*	G

* Option

Option

F: With foot bracket



* Mountable only for VFS1120.

CE-compliant

Nil	—
Q	CE-compliant

How to Order Pilot Valve Assembly

SF4 – [1] [DZ] [ ] – [21]

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.

Manual override

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

* Option

Applicable model

21	For VFS1□20	Individual pilot exhaust
22	For VFS1□30	Common pilot exhaust

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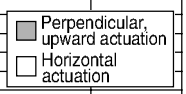
Cylinder Speed Chart

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
VFS1120-01	800 700 600 500 400 300 200 100 0												

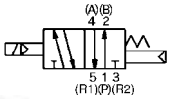


Conditions

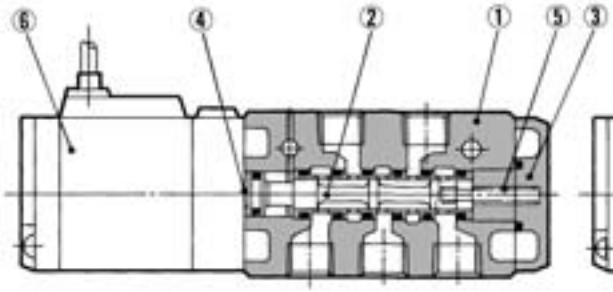
Body ported		Series CJ2	Series CM2	Series MB, CA2
VFS1120-01	Tube bore x Length	T0604 x 1 m	T0806 x 1 m	
	Speed controller	AS3001F-06	AS3001F-08	
	Silencer	AN101-01		

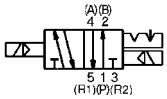
∗ It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
∗ The average velocity of the cylinder is the value that the stroke is divided by the total stroke time.
∗ Load factor: ((Load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

Construction

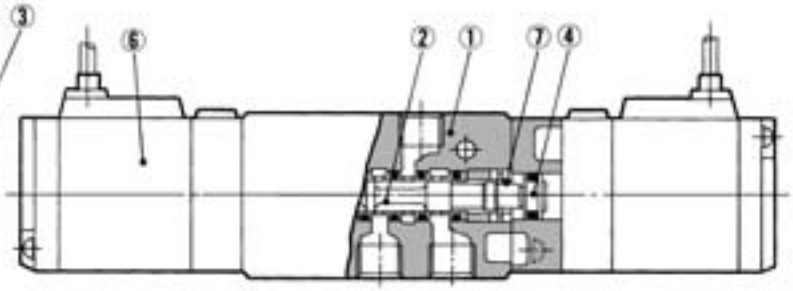


2 position single

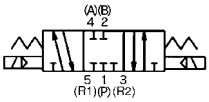




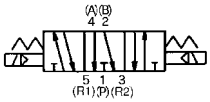
2 position double



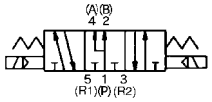
Closed center



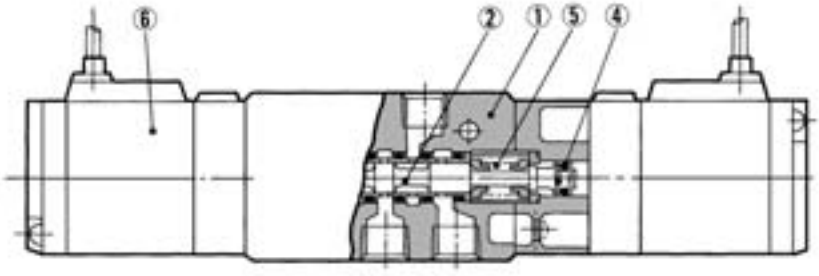
Exhaust center



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 1115.

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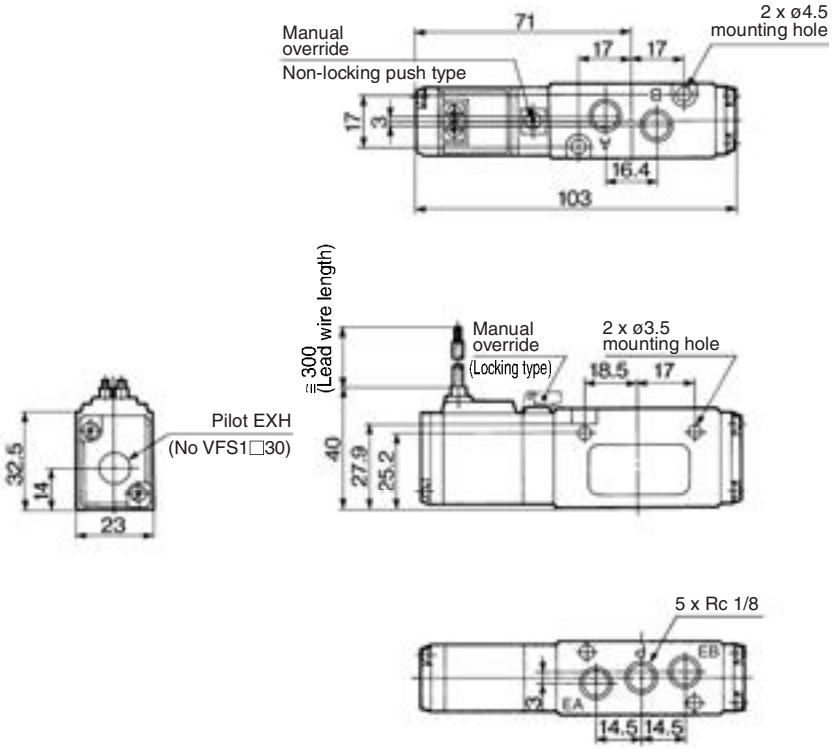
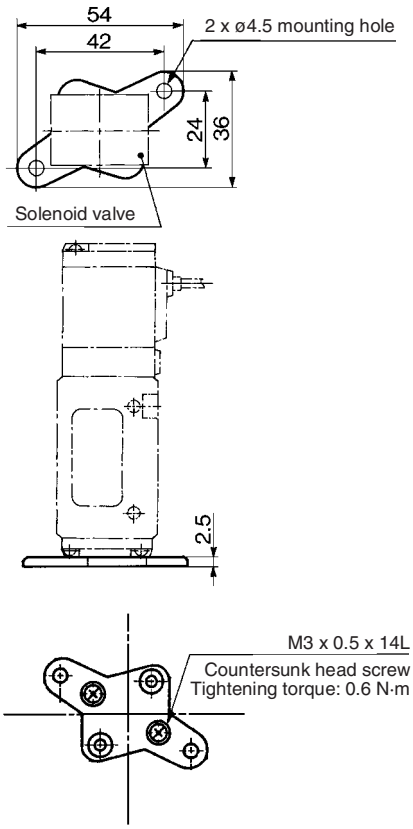
2 Position Single — Grommet, Grommet terminal, Conduit terminal, DIN terminal

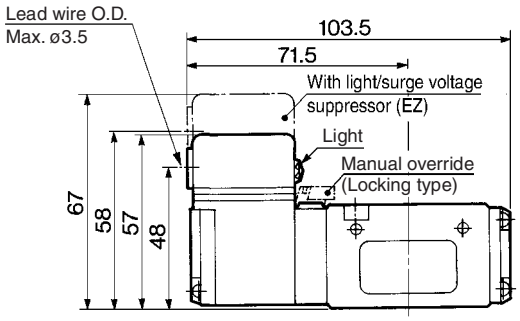
Grommet : VFS1120-□G



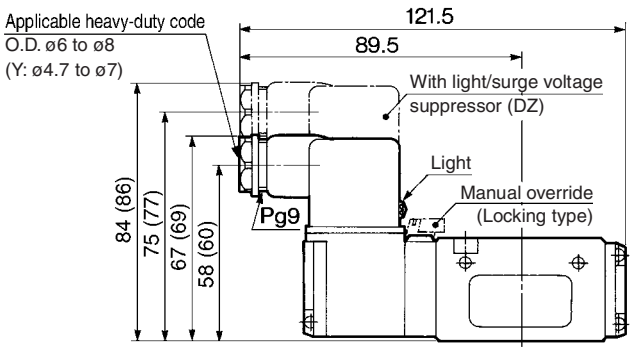
Foot bracket (F)
Part no. : AXT626-10A



Grommet terminal: VFS1120-□E/EZ

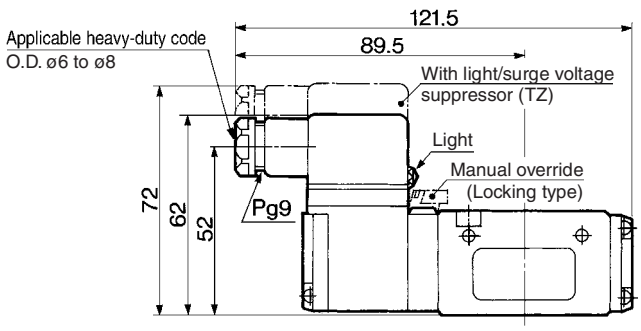


DIN terminal: VFS1120-□D/DZ/Y/YZ



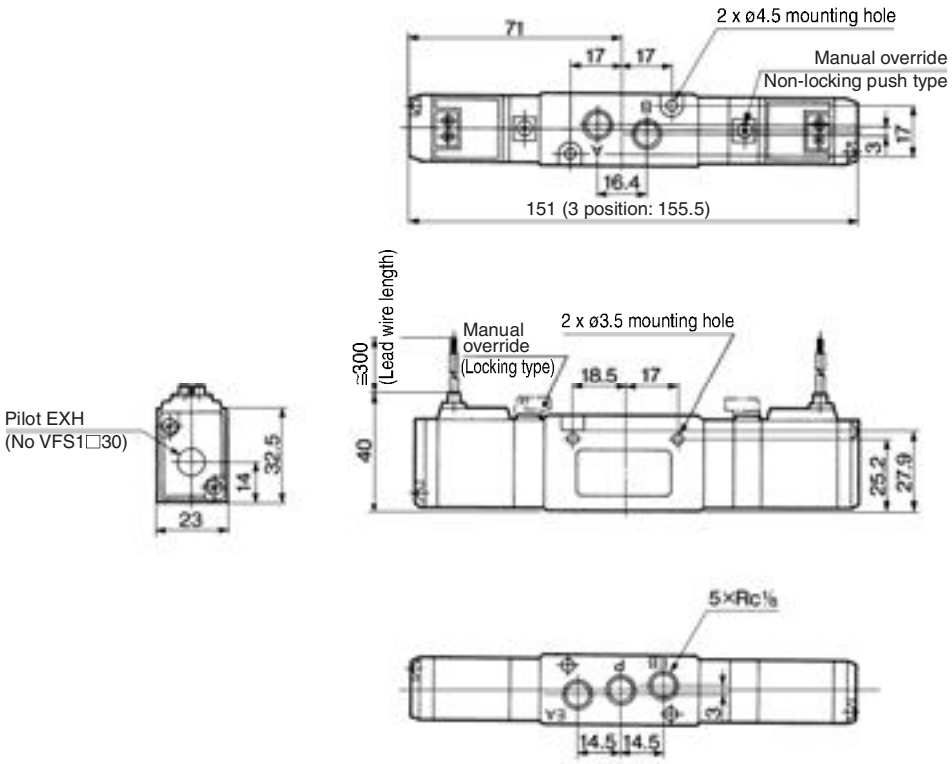
( ): Y, YZ

Conduit terminal: VFS1120-□T/TZ

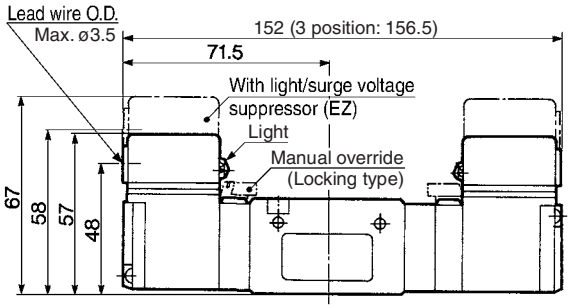


2 Position Double, 3 Position — Grommet, Grommet terminal, Conduit terminal, DIN terminal

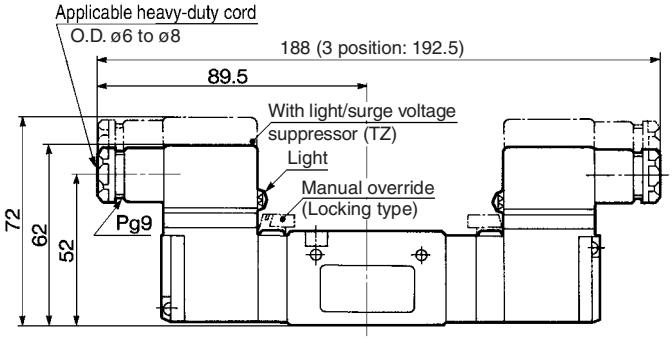
Grommet: VFS1220-□G, VFS1320-□G, VFS1420-□G, VFS1520-□G



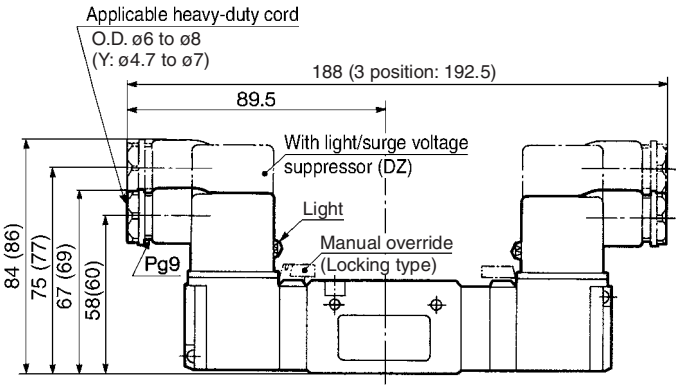
Grommet terminal: VFS1220-□E/EZ VFS1320-□E/EZ VFS1420-□E/EZ VFS1520-□E/EZ



Conduit terminal: VFS1220-□T/TZ VFS1320-□T/TZ VFS1420-□T/TZ VFS1520-□T/TZ



DIN terminal : VFS1220-□D/DZ/Y/YZ VFS1320-□D/DZ/Y/YZ VFS1420-□D/DZ/Y/YZ VFS1520-□D/DZ/Y/YZ

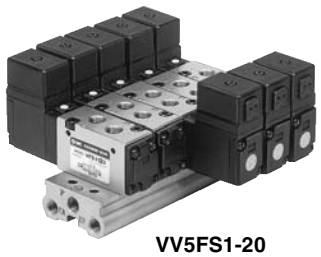


( ): Y, YZ

Series VFS1000
Manifold Specifications
Single Base Type

Compact and lightweight
Compact due to manifolding on a single base for mounting in small spaces.

Keeps environmental air clean from pilot exhaust
Use of the VV5FS1-30 manifold can exhaust intensively the pilot exhaust gas to the base side, and can prevent environmental aggravation due to noise and oil mist.



VV5FS1-20

VV5FS1-30

Part no. for mounting bolt and gasket
BG-VFS1030

Specifications

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

Port Specifications

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

Option

Blanking plate	VVFS1000-10A-1	With gasket, screw

How to Order Manifold Base

VV5FS1 – 20 – 05 1 – 01 ☐ – ☐

Series VFS1000 Manifold

CE-compliant

Nil	—
Q	CE-compliant

Thread type

Nil	Rc
N*	NPT
T*	NPTF
F*	G

* Option

P, EA, EB port size

01	Rc 1/8

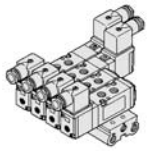
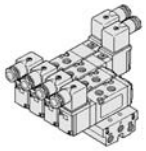
Symbol

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

Stations

02	2 stations
⋮	⋮
15	15 stations

Base model

Model	Pilot exhaust	Applicable valve model
20	Pilot individual EXH 	VFS1□20-□□-01
30	Pilot common EXH 	VFS1□30-□□-01 *VFS1□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) **VV5FS1-20-061-01** ····· **1**
(2 position single) * **VFS1120-1D-01**····· **3**
(2 position double) * **VFS1220-1D-01**····· **2**
(Blanking plate) * **VVFS1000-10A-1**····· **1**

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

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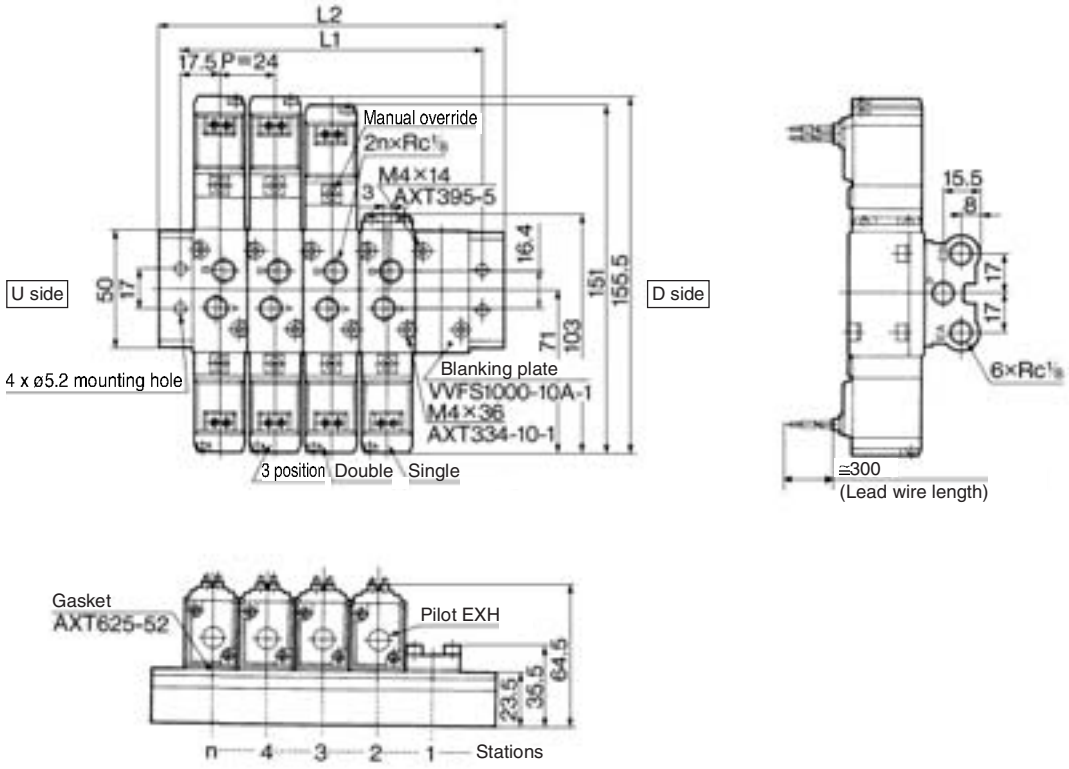
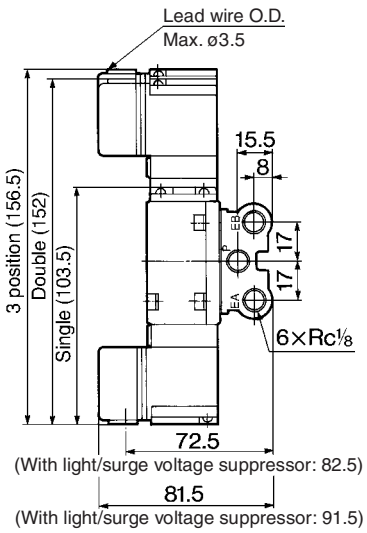
Type 20 Manifold — Pilot individual exhaust: VV5FS1-20-Station 1-01

Grommet: G

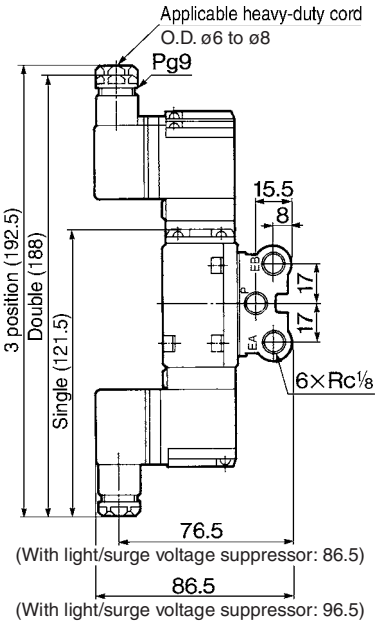


Formula for manifold weight M = 0.049n + 0.059 (kg) n: Station

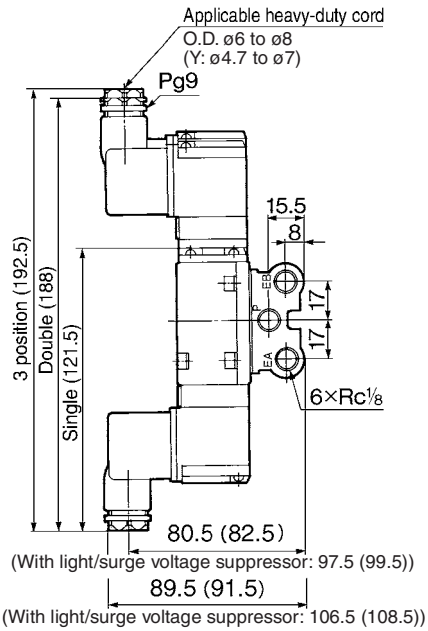
Grommet terminal: E/EZ



Conduit terminal: T/TZ



DIN terminal: D/DZ/Y/YZ



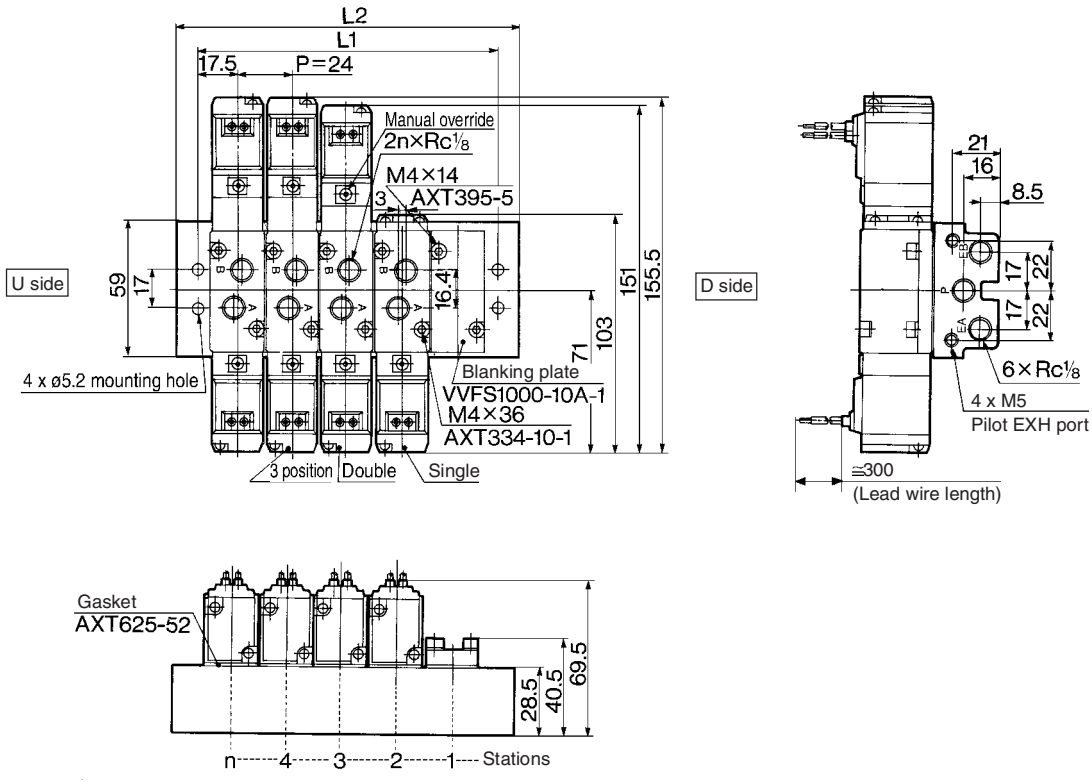
( ): Y, YZ

n: Station

Symbol / Stations	2	3	4	5	6	7	8	9	10	Formula
L_1	59	83	107	131	155	179	203	227	251	L1 = 24 x n + 11
L_2	77	101	125	149	173	197	221	245	269	L2 = 24 x n + 29

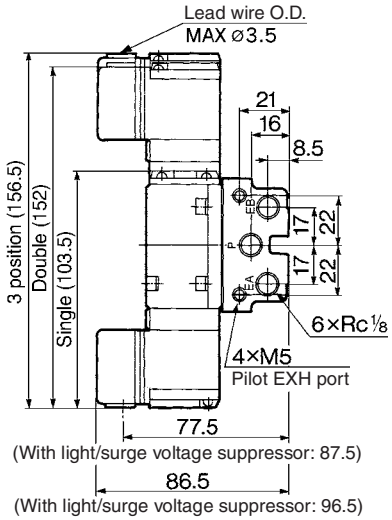
Type 30 Manifold — Pilot common exhaust: VV5FS1-30-Station 1-01

Grommet: G

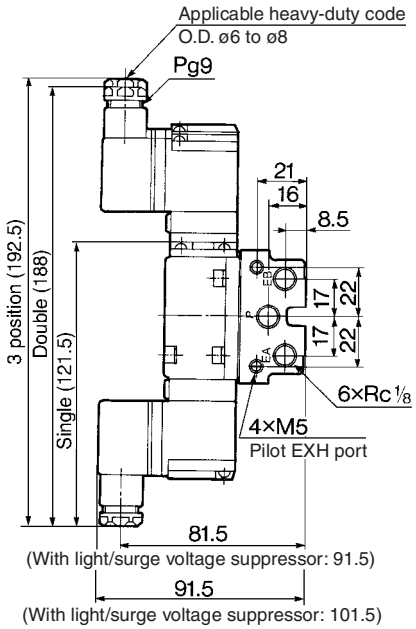


Formula for manifold weight M = 0.079n + 0.093 (kg) n: Station

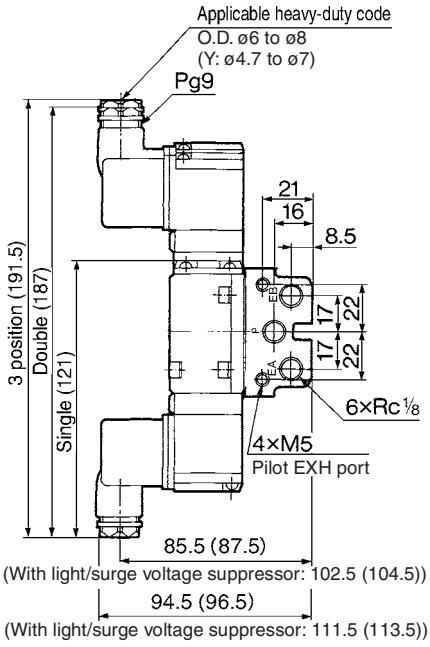
Grommet terminal: E/EZ



Conduit terminal: T/TZ



DIN terminal: D/DZ/Y/YZ



( ): Y, YZ

n: Station

Symbol / Stations	2	3	4	5	6	7	8	9	10	Formula
L_1	59	83	107	131	155	179	203	227	251	L1 = 24 x n + 11
L_2	77	101	125	149	173	197	221	245	269	L2 = 24 x n + 29