Conforms to ISO 15407-2 Standard
5 Port Solenoid Valve/Plug-in Type
Series VS$^{S}_{R}$8-2/VS$^{S}_{R}$8-4

CE

[Option]

How to Order Manifold

VV8 01 5 03 F SDO —W1— R

Size

01	Size 01

Number of stations

1	1 station
↓	↓
12	12 stations

Port size 4(A), 2(B)

Symbol	Port location / size	Application
02	Side, 1/4	Size 01
03	Side, 3/8	Size 01
02B	Bottom, 1/4	Size 01

Port thread

F	G Note1)

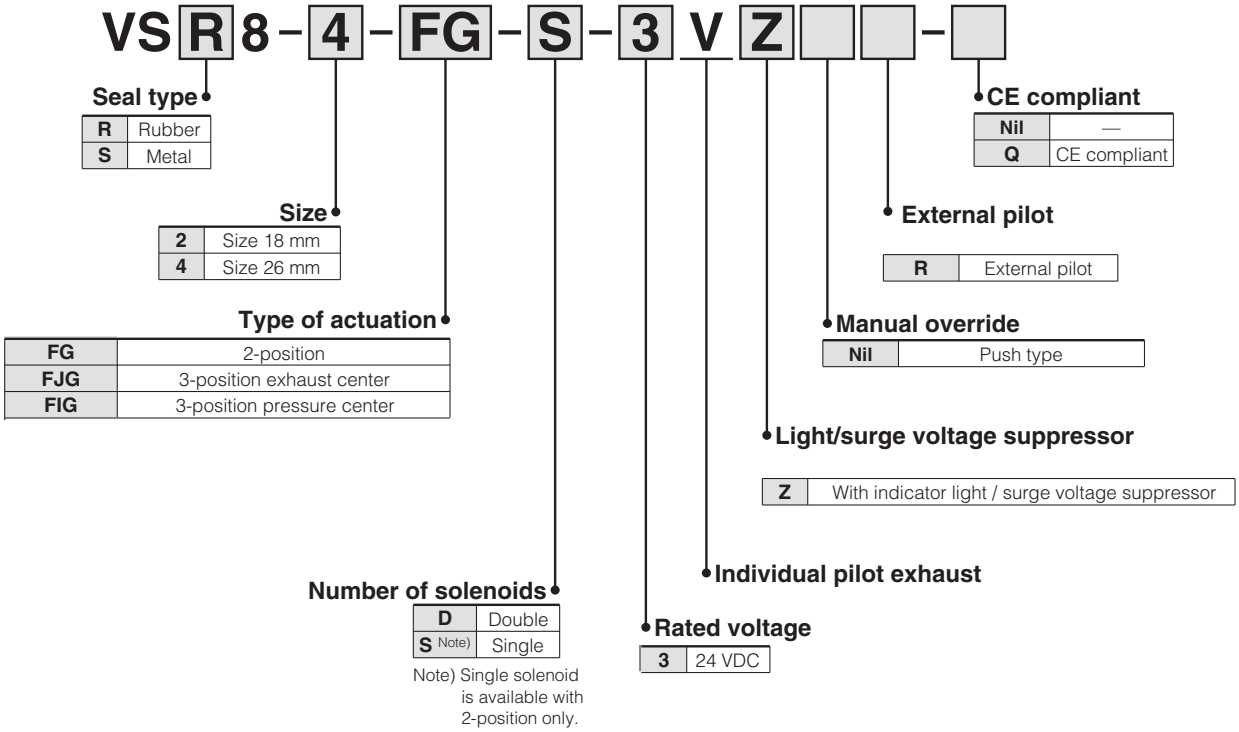
Note 1) According to ISO1179-1 G threads

Kit designation

Kit	
MD0	Multiple connector kit (26P) without cable
SD0	Serial kit without SI unit

Serial Interface Series	EX250	EX600
SI unit COM	PNP	PNP
Profibus DP	EX250-SPR1	EX600-SPR1
DeviceNet	EX250-SDN1	EX600-SDN1
Ethernet	EX250-SEN1	EX600-SEN1-X2
ASi	EX250-SAS3	—
Serial Interface End Plate	EX250-EA2	EX600-ED2
Serial Interface Bracket	—	EX600-ZMV1

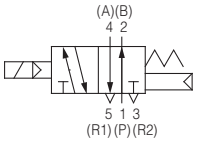
How to Order Valve (ISO15407-2)



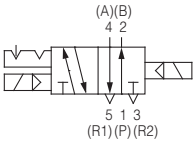
Standard Specifications

Symbol

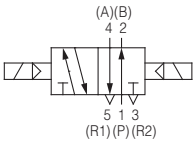
2-position single



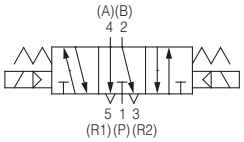
2-position double (Metal)



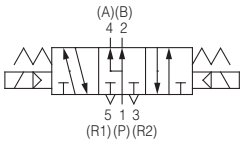
2-position double (Rubber)



3-position exhaust center



3-position pressure center



Valve specifications	**Valve type**		Metal seal	Rubber seal
	Fluid		Air, Inert gas	
	Maximum operating pressure		1.0 MPa	
	Minimum operating pressure	**Single**	0.1 MPa	0.15 MPa
		Double	0.1 MPa	0.1 MPa
		3-position	0.15 MPa	0.2 MPa
		4-position	—	0.15 MPa
	Ambient and fluid temperature		−10° to 60°C Note 1)	−5° to 60°C Note 1)
	Lubrication		Not required (Non-lube)	
	Manual override		Push type (Tool required)/Locking type (Tool required)	
	Impact/Vibration resistance		150, 30 ms^2 Note 2)	
	Enclosure		IP65 (Dust-tight/Water-jet-proof)	
Electrical specifications	**Rated coil voltage**		12 VDC, 24 VDC	
	Allowable voltage fluctuation		±10% of rated voltage	
	Type of coil insulation		Equivalent to Class B	
	Power consumption (Current)	**24 VDC**	1 W DC (42 mA)	
		12 VDC	1 W DC (83 mA)	

Note 1) Use dry air to prevent condensation at low temperatures.

Note 2) Impact resistance: No malfunction resulted during an impact test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature for both energized and de-energized conditions.

Vibration resistance: No malfunction resulted during a one-sweep test between 8.3 and 2000 Hz. The test was performed in the axial and right angle directions of the main valve and armature for both energized and de-energized conditions.

Manifold Specifications

Series	Manifold model	Port size			Mass (g)		Wiring specifications		
		1, 3 (P, R)	2, 4 (A, B)	12, 14 (PE, X)	Note 1) 1-station manifold	1-station addition	Type	Max. number of solenoids	Mass (g)
VS$^{S}_{R}$8-2 Size 18 mm	**VV802**	3/8" Built-in silencer (Option)	1/8" (Side, Bottom)	1/8"	985	170	S kit: Serial transmission		
							• Gateway-type (EX500)	16	90
							• For I/O (EX250)	24 Note 2)	250
							• For I/O (EX600)	24	300
							• For Output (EX126)	16	240
VS$^{S}_{R}$8-4 Size 26 mm	**VV801**	1/2" Built-in silencer (Option)	3/8" (Side) 1/4" (Side, Bottom)	1/8"	1240	330	F kit: D-sub connector	24	70
							P kit: Flat ribbon cable connector	24	70
							T kit: Terminal block box	20	390
							L kit: Lead wire	24	215
							M kit: Circular connector	24	170

Note 1) Mass for each wiring part is not included.

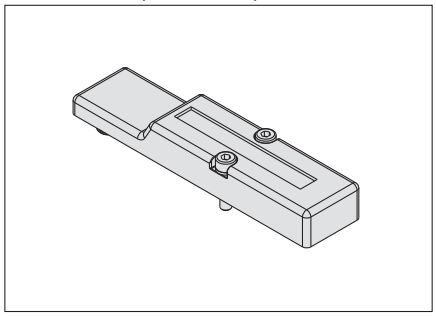
Note 2) The maximum number of solenoids for the unit compatible with the AS-Interface is 4 or 8, depending on the specifications.

Flow-rate Characteristics

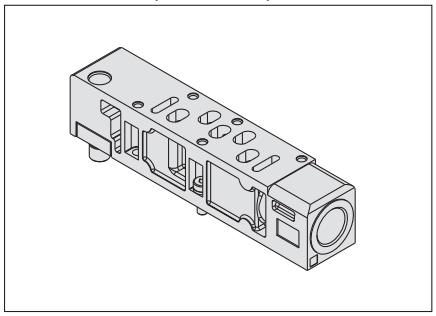
Series	Type of actuation		Seal	Flow-rate characteristics						Response time (msec)	Mass (g)
				1 → 4, 2 (P → A, B)			4, 2 → 5, 3 (A, B → EA, EB)				
				C [dm^3/(s·bar)]	b	Cv	C [dm^3/(s·bar)]	b	Cv		
VS$^{S}_{R}$8-2 Size 18 mm	2-position	Single	Metal	1.50	0.10	0.30	1.70	0.10	0.30	20 or less	140
			Rubber	2.20	0.20	0.50	2.20	0.10	0.50	25 or less	140
		Double	Metal	1.50	0.10	0.30	1.70	0.10	0.30	13 or less	170
			Rubber	2.20	0.20	0.50	2.20	0.10	0.50	15 or less	170
	3-position	Exhaust center	Metal	1.30	0.10	0.20	1.60	0.10	0.20	36 or less	185
			Rubber	2.00	0.16	0.50	2.10	0.10	0.40	40 or less	185
		Pressure center	Metal	1.60	0.10	0.20	1.50	0.10	0.20	36 or less	185
			Rubber	2.20	0.20	0.50	2.10	0.10	0.40	40 or less	185
VS$^{S}_{R}$8-4 Size 26 mm	2-position	Single	Metal	3.10	0.10	0.60	3.40	0.10	0.70	45 or less	225
			Rubber	3.60	0.28	0.90	4.20	0.20	1.00	50 or less	215
		Double	Metal	3.10	0.10	0.60	3.40	0.10	0.70	15 or less	260
			Rubber	3.60	0.28	0.90	4.20	0.20	1.00	20 or less	250
	3-position	Exhaust center	Metal	2.70	0.10	0.60	3.30	0.10	0.70	70 or less	285
			Rubber	3.10	0.26	0.80	4.00	0.25	1.10	80 or less	275
		Pressure center	Metal	3.20	0.10	0.70	3.20	0.10	0.60	70 or less	285
			Rubber	4.40	0.25	1.00	3.60	0.25	1.00	80 or less	275

Manifold Options

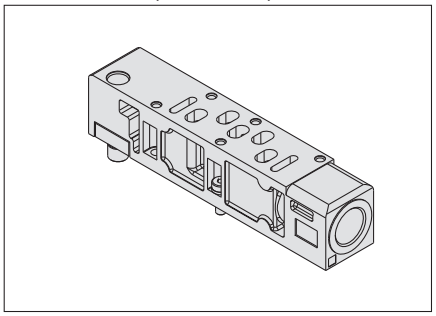
Blanking plate assembly
VVS8020-11A (Size 18 mm)
VVS8040-11A (Size 26 mm)



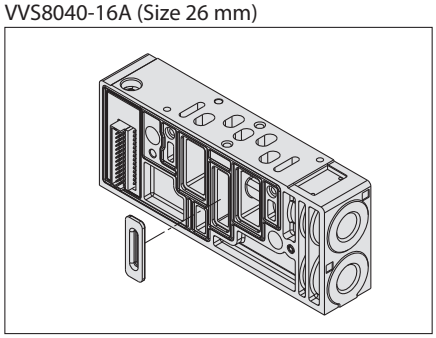
Individual SUP spacer
VV802-P-01 ☐ (Size 18 mm)
VV801-P-03 ☐ (Size 26 mm)



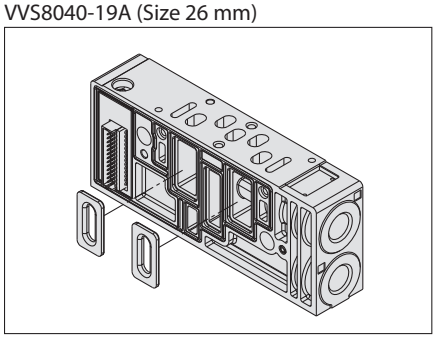
Individual EXH spacer
VV802-R-01 ☐ (Size 18 mm)
VV801-R-03 ☐ (Size 26 mm)



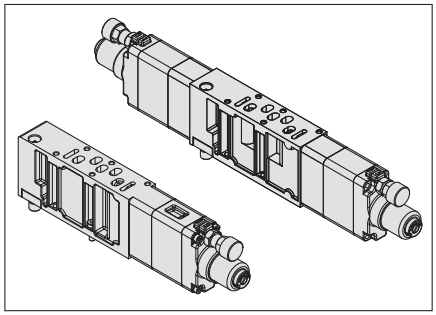
SUP block plate
VVS8020-16A (Size 18 mm)
VVS8040-16A (Size 26 mm)



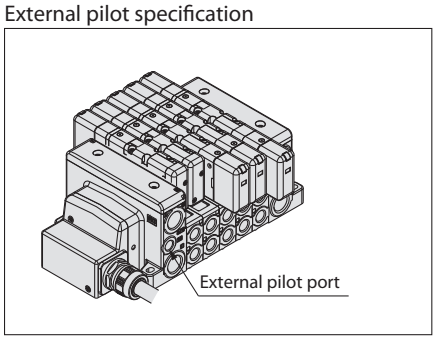
EXH block plate
VVS8020-19A (Size 18 mm)
VVS8040-19A (Size 26 mm)



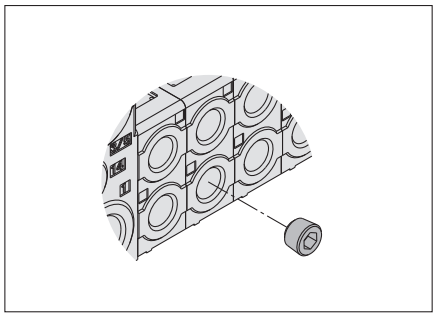
Interface regulator
VVS8040-ARB- ☐-1



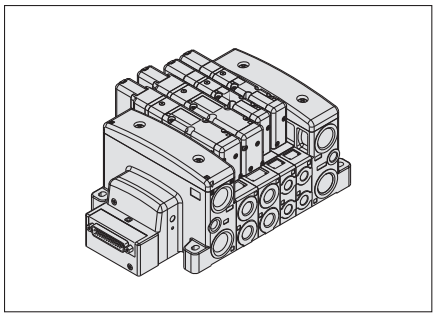
External pilot specification



Port plug
AXT954- ☐



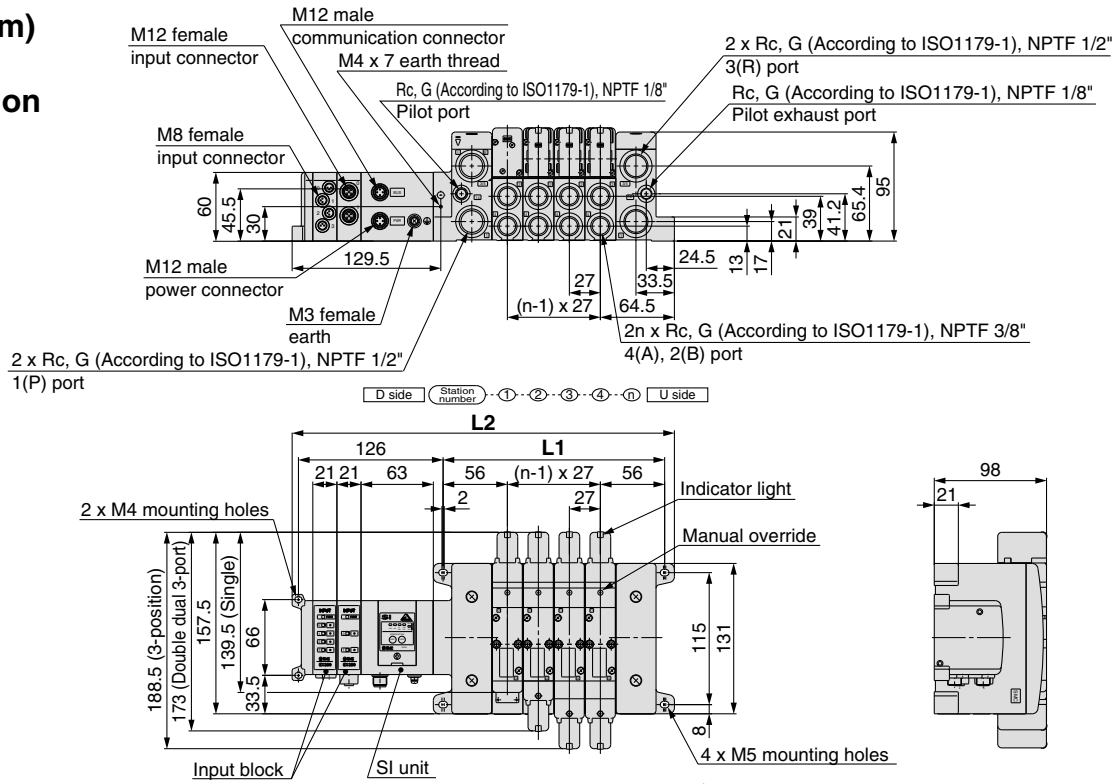
18 mm and 26 mm sizes mixed



S Series VS⁵R8-2/4

kit (Serial transmission) For EX250 Integrated-type (I/O) serial transmission system **IP65 compliant**

VV801 (Size 26 mm) S kit (Serial transmission kit: EX250)



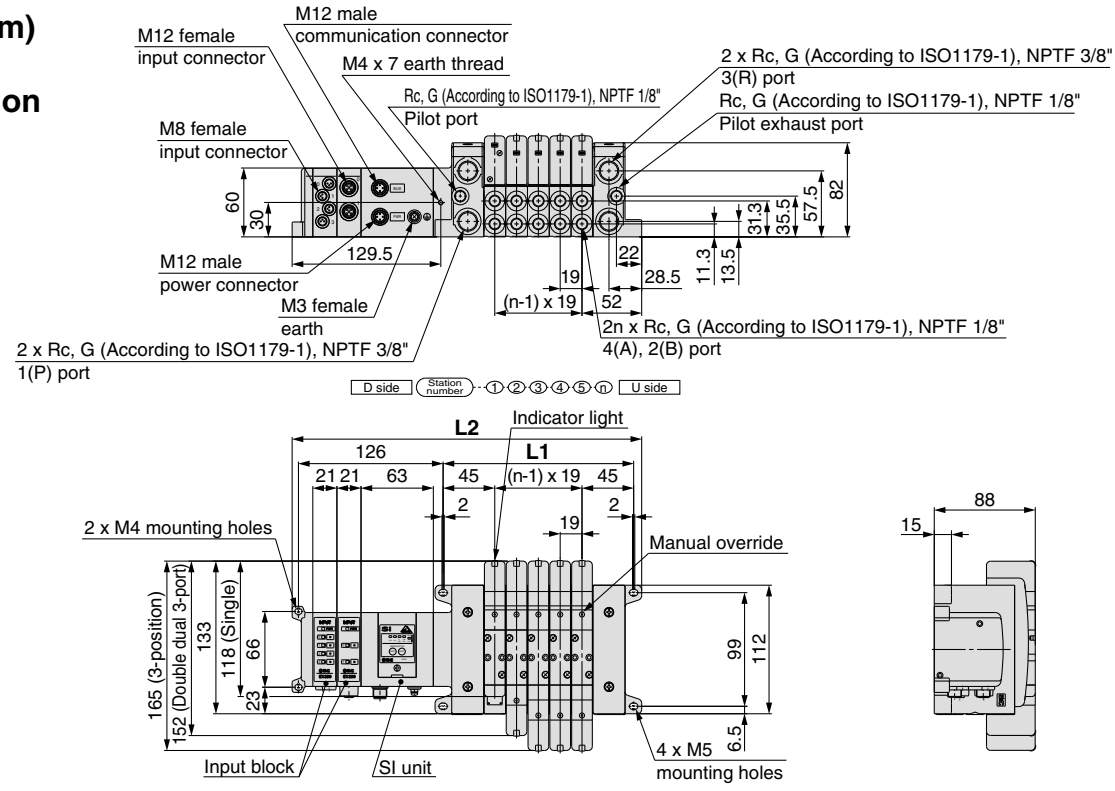
Dimension (mm)

Formula: L1 = 27n + 85, L2* = 27n + 204 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	112	139	166	193	220	247	274	301	328	355	382	409	436	463	490	517
L2	231	258	285	312	339	366	393	420	447	474	501	528	555	582	609	636

* In case of 1 piece in the input block. The dimension is added by 21 mm at 1 piece addition.

VV802 (Size 18 mm) S kit (Serial transmission kit: EX250)



Dimension (mm)

Formula: L1 = 19n + 71, L2* = 19n + 188.5 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	90	109	128	147	166	185	204	223	242	261	280	299	318	337	356	375
L2	207.5	226.5	245.5	264.5	283.5	302.5	321.5	340.5	359.5	378.5	397.5	416.5	435.5	454.5	473.5	492.5

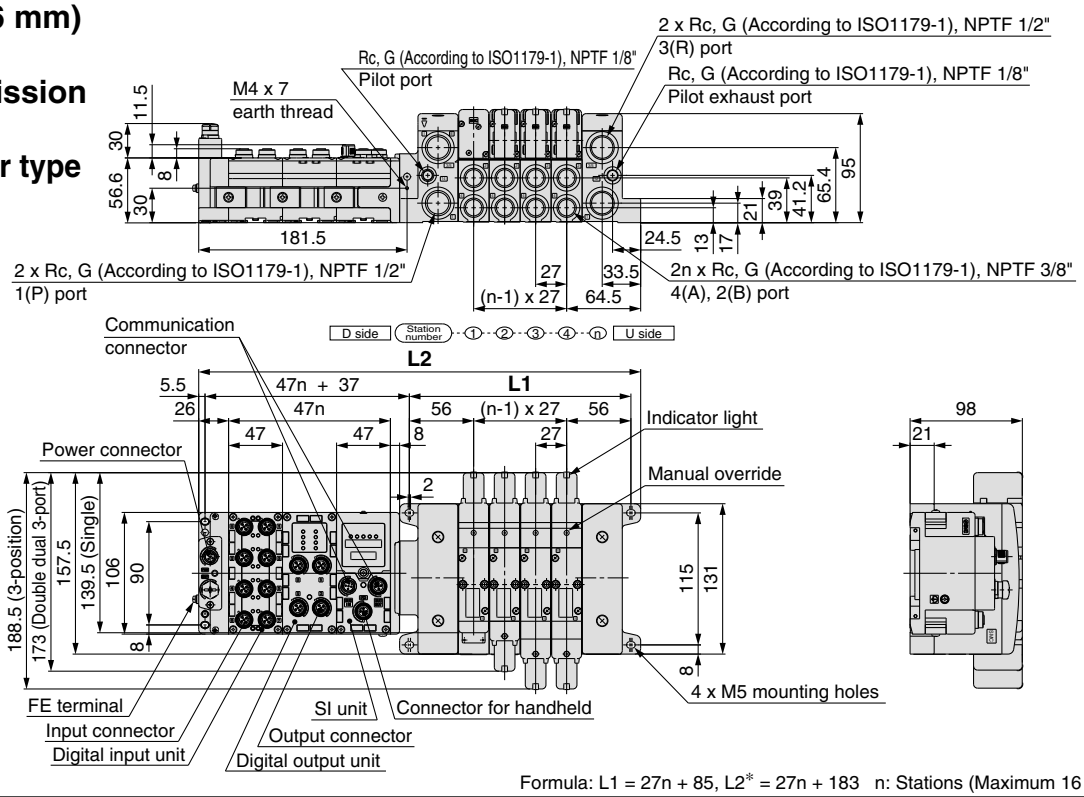
* In case of 1 piece in the input block. The dimension is added by 21 mm at 1 piece addition.

S Series VS$^{S}_{R}$8-$^{2}_{4}$

kit (Serial transmission) For EX600 Integrated-type (I/O) serial transmission system

IP65 compliant

VV801 (Size 26 mm)
S kit
(Serial transmission kit: EX600)
M12 connector type



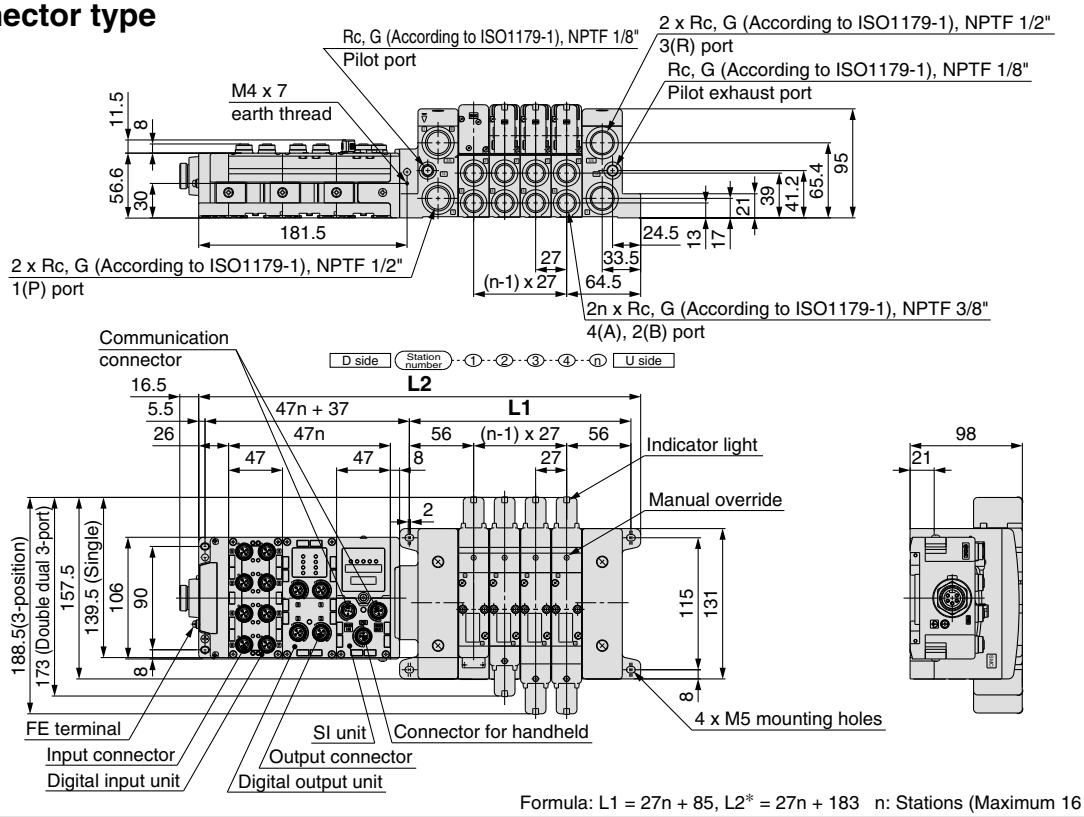
Dimension (mm)

Formula: L1 = 27n + 85, L2* = 27n + 183 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	112	139	166	193	220	247	274	301	328	355	382	409	436	463	490	517
L2	210	237	264	291	318	345	372	399	426	453	480	507	534	561	588	615

* In case of without input/output unit. The dimension is added by 47 mm at 1 piece addition.

7/8 inch connector type



Dimension (mm)

Formula: L1 = 27n + 85, L2* = 27n + 183 n: Stations (Maximum 16 stations)

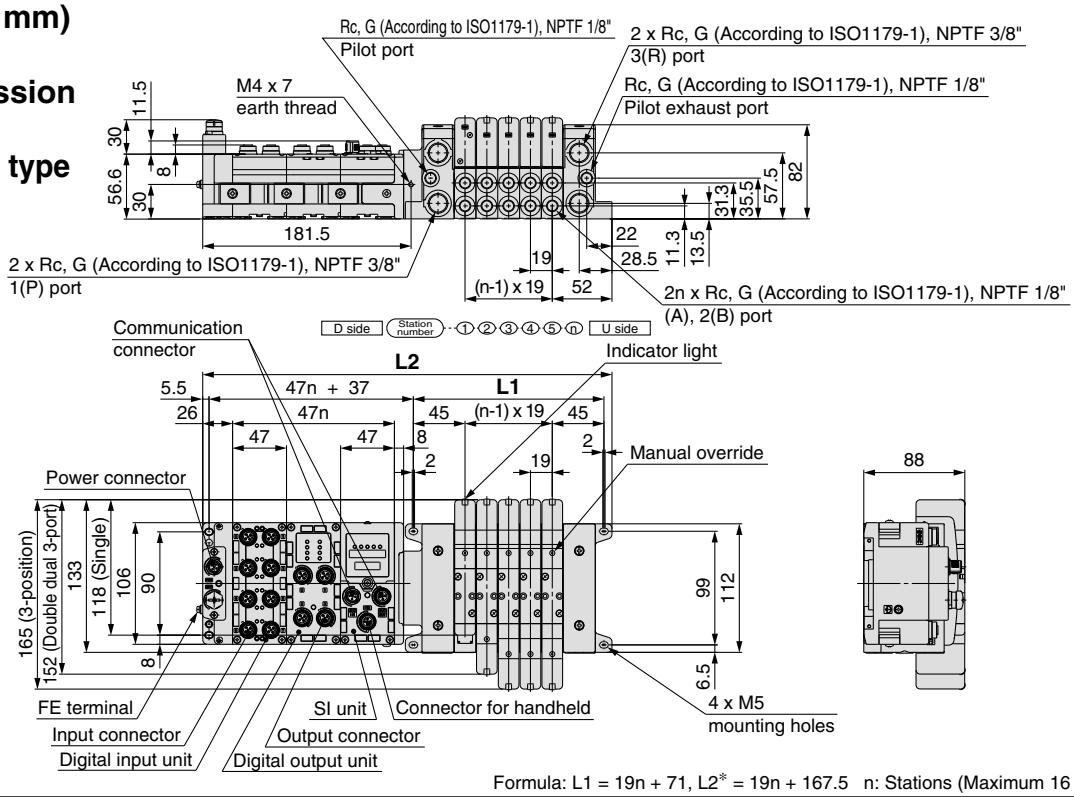
L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	112	139	166	193	220	247	274	301	328	355	382	409	436	463	490	517
L2	210	237	264	291	318	345	372	399	426	453	480	507	534	561	588	615

* In case of without input/output unit. The dimension is added by 47 mm at 1 piece addition.

S Series VS⁵R8-2⁄4

kit (Serial transmission) For EX600 Integrated-type (I/O) serial transmission system **IP65 compliant**

VV802 (Size 18 mm) S kit (Serial transmission kit: EX600) M12 connector type



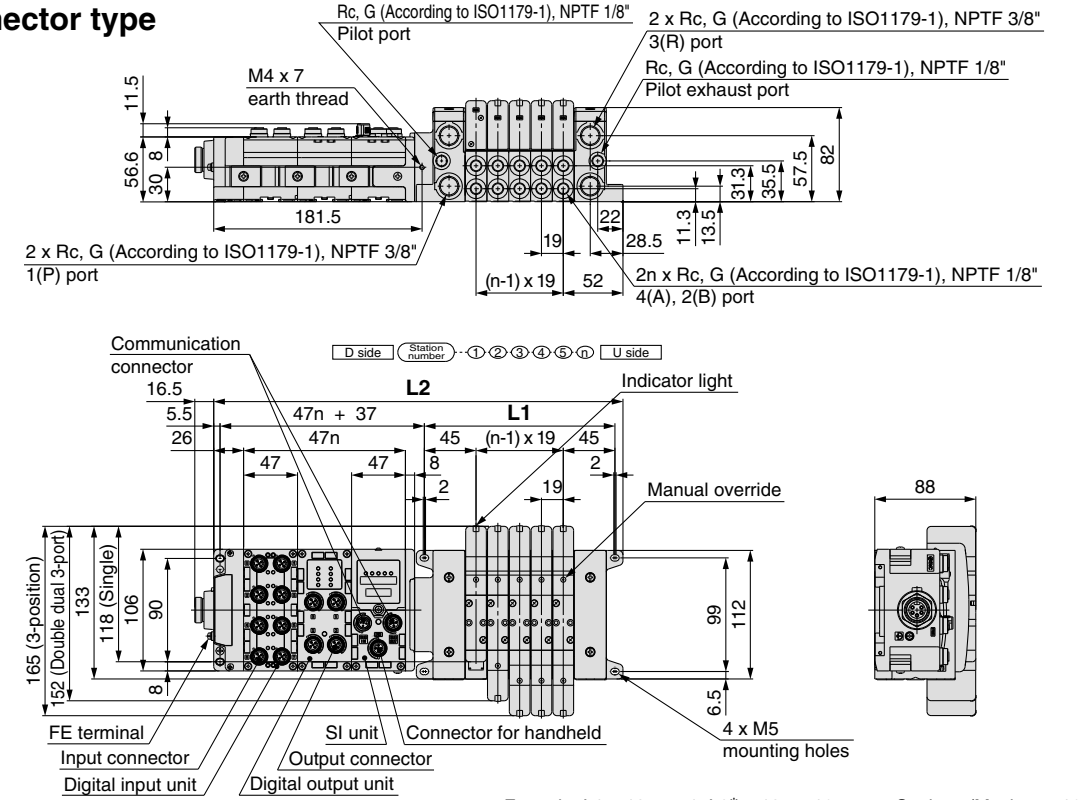
Dimension (mm)

Formula: L1 = 19n + 71, L2* = 19n + 167.5 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	90	109	128	147	166	185	204	223	242	261	280	299	318	337	356	375
L2	186.5	205.5	224.5	243.5	262.5	281.5	300.5	319.5	338.5	357.5	376.5	395.5	414.5	433.5	452.5	471.5

* In case of without input/output unit. The dimension is added by 47 mm at 1 piece addition.

7/8 inch connector type



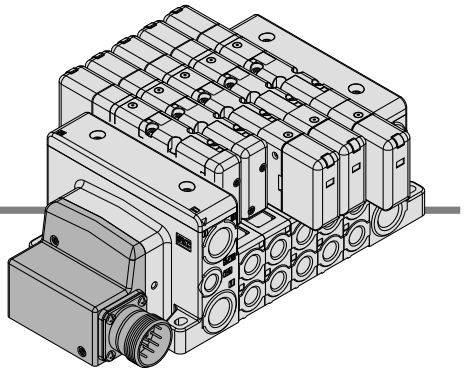
Dimension (mm)

Formula: L1 = 19n + 71, L2* = 19n + 167.5 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	90	109	128	147	166	185	204	223	242	261	280	299	318	337	356	375
L2	186.5	205.5	224.5	243.5	262.5	281.5	300.5	319.5	338.5	357.5	376.5	395.5	414.5	433.5	452.5	471.5

* In case of without input/output unit. The dimension is added by 47 mm at 1 piece addition.

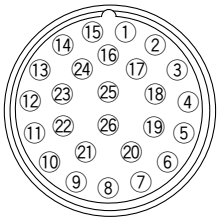
M Series VS$^{S}_{R}$8-$^{2}_{4}$ kit (Circular connector) IP65 compliant



- **Use of circular connectors helps streamline wiring procedure to save labor.**
- **IP65 enclosure is available with use of waterproof circular connectors.**

Electrical Wiring Specifications

Circular connector



Double wiring (connected to SOL.A and SOL.B) is adopted for the internal wiring of each station, regardless of valve and option types. Mixed single and double wiring are available as an option. Refer to the below special wiring specifications (option).

Lead wire colors for circular connector cable assembly (AXT100-MC26-$^{015}_{030}$ $^{}_{050}$)

		Terminal no.	Lead wire color	Dot marking
Station 1	SOL.A	1	Black	None
	SOL.B	2	Brown	None
Station 2	SOL.A	3	Red	None
	SOL.B	4	Orange	None
Station 3	SOL.A	5	Yellow	None
	SOL.B	6	Pink	None
Station 4	SOL.A	7	Blue	None
	SOL.B	8	Purple	White
Station 5	SOL.A	9	Gray	Black
	SOL.B	10	White	Black
Station 6	SOL.A	11	White	Red
	SOL.B	12	Yellow	Red
Station 7	SOL.A	13	Orange	Red
	SOL.B	14	Yellow	Black
Station 8	SOL.A	15	Pink	Black
	SOL.B	16	Blue	White
Station 9	SOL.A	17	Purple	None
	SOL.B	18	Gray	None
Station 10	SOL.A	19	Orange	Black
	SOL.B	20	Red	White
Station 11	SOL.A	21	Brown	White
	SOL.B	22	Pink	Red
Station 12	SOL.A	23	Gray	Red
	SOL.B	24	Black	White
	COM.	25	White	None
	COM.	26	White	None

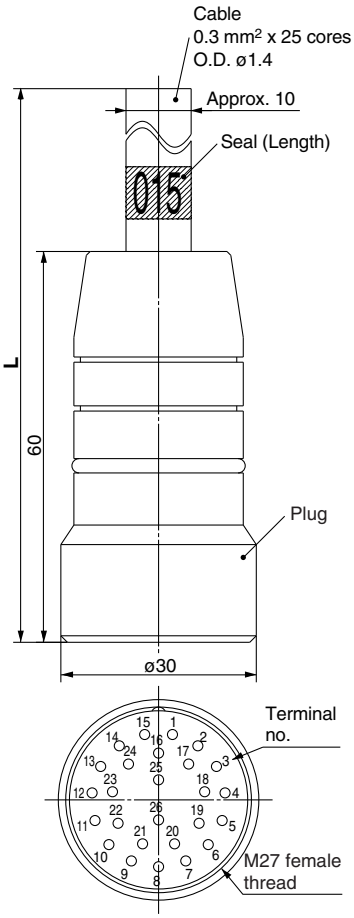
Special Wiring Specifications (Option)

Mixed single and double wiring are available as an option. The maximum number of manifold stations is determined by the number of solenoids. Count one point for a single solenoid type and two points for a double solenoid type. The total number of solenoids (points) must not exceed 24.

Cable Assembly

AXT100-MC26-$^{015}_{030}$ $^{}_{050}$

(Type 26P circular connector cable assembly can be ordered with manifolds. Refer to "How to Order Manifold.")



Lead wire colors for circular connector cable assembly terminal numbers

Terminal no.	Lead wire color	Dot marking
1	Black	None
2	Brown	None
3	Red	None
4	Orange	None
5	Yellow	None
6	Pink	None
7	Blue	None
8	Purple	White
9	Gray	Black
10	White	Black
11	White	Red
12	Yellow	Red
13	Orange	Red
14	Yellow	Black
15	Pink	Black
16	Blue	White
17	Purple	None
18	Gray	None
19	Orange	Black
20	Red	White
21	Brown	White
22	Pink	Red
23	Gray	Red
24	Black	White
25	White	None
26	White	None

Electrical characteristics

Item	Property
Conductor resistance Ω/km, 20°C	65 or less
Voltage limit V, 1 minute, AC	1000
Insulation resistance MΩ/km, 20°C	5 or more

Note) The minimum bending radius of the circular connector cable is 20 mm.

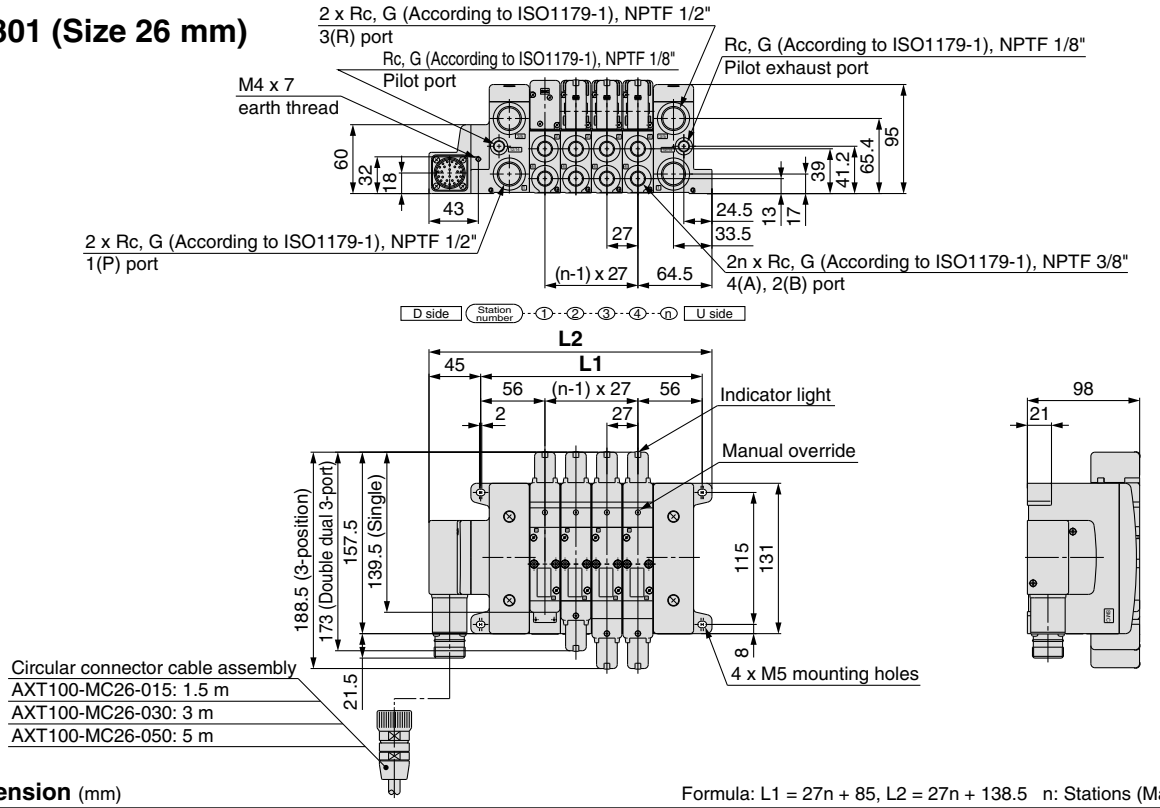
Circular connector cable assembly

Cable length (**L**)	Assembly part no.
	26P
1.5 m	AXT100-MC26-015
3 m	AXT100-MC26-030
5 m	AXT100-MC26-050

∗ Cannot be used for transfer wiring.
∗ Lengths other than the above is also available. Please contact SMC for details.

M Series VS$^{S}_{R}$8-$^{2}_{4}$ kit (Circular connector) IP65 compliant

VV801 (Size 26 mm)

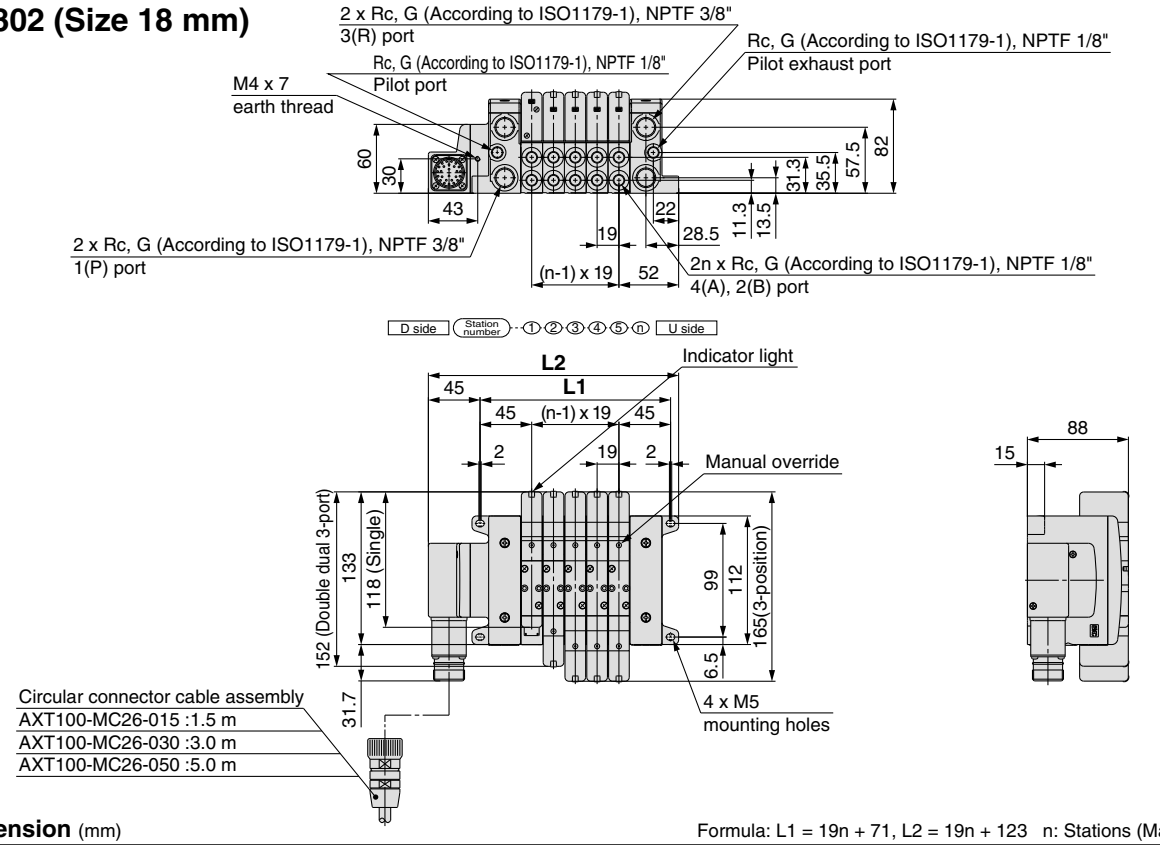


Dimension (mm)

Formula: L1 = 27n + 85, L2 = 27n + 138.5 n: Stations (Maximum 16 stations)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	112	139	166	193	220	247	274	301	328	355	382	409	436	463	490	517
L2	165.5	192.5	219.5	246.5	273.5	300.5	327.5	354.5	381.5	408.5	435.5	462.5	489.5	516.5	543.5	570.5

VV802 (Size 18 mm)



Dimension (mm)

Formula: L1 = 19n + 71, L2 = 19n + 123 n: Stations (Maximum 16 stations)

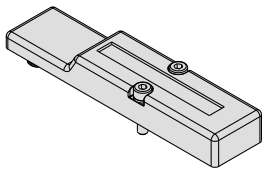
L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	90	109	128	147	166	185	204	223	242	261	280	299	318	337	356	375
L2	142	161	180	199	218	237	256	275	294	313	332	351	370	389	408	427

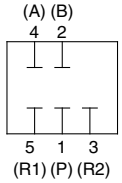
Manifold Options

Blanking plate assembly

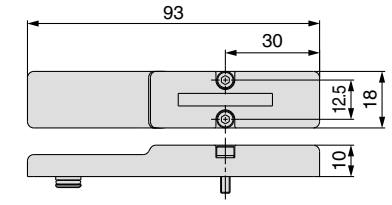
VVS8020-11A (Size 18 mm)
VVS8040-11A (Size 26 mm)

By attaching this on a manifold block, it is possible to prepare for removing a valve for maintenance reasons or planning to mount a spare valve, etc.

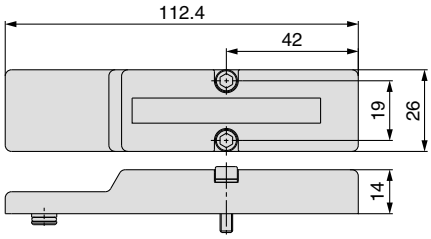




Circuit diagram



Size 18 mm

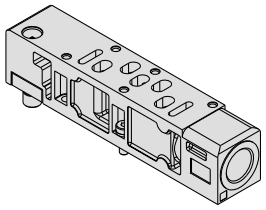


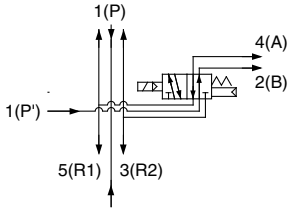
Size 26 mm

Individual SUP spacer

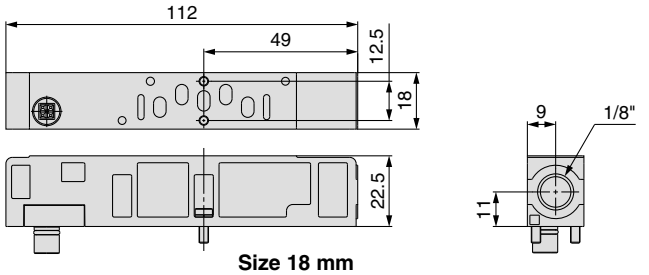
VV802-P-01(F)(T) (Size 18 mm)
VV801-P-03(F)(T) (Size 26 mm)

By mounting individual SUP spacers on a manifold block, it is possible to provide individual SUP ports for each valve.

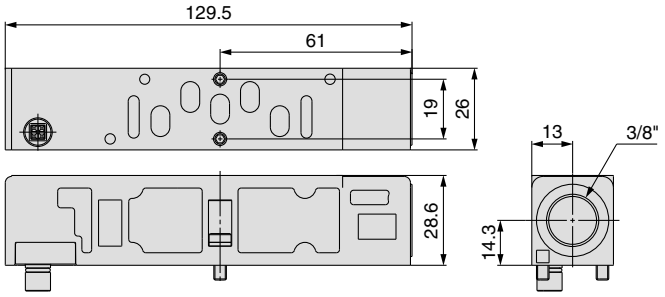




Circuit diagram



Size 18 mm

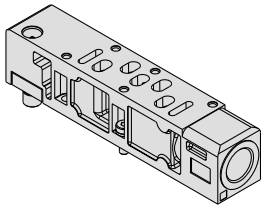


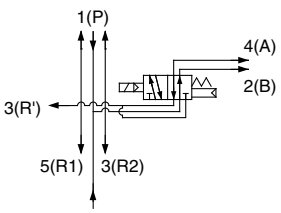
Size 26 mm

Individual EXH spacer

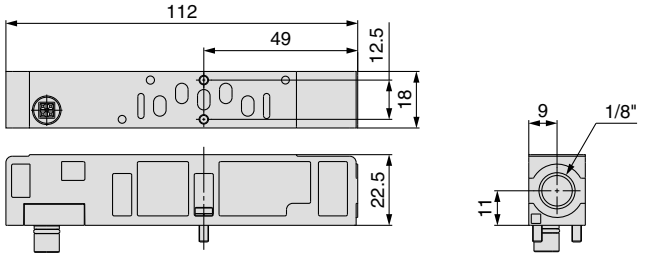
VV802-R-01(F)(T) (Size 18 mm)
VV801-R-03(F)(T) (Size 26 mm)

By mounting individual EXH spacers on a manifold block, it is possible to provide individual EXH ports for each valve. (3(R2), 5(R1) common EXH type)

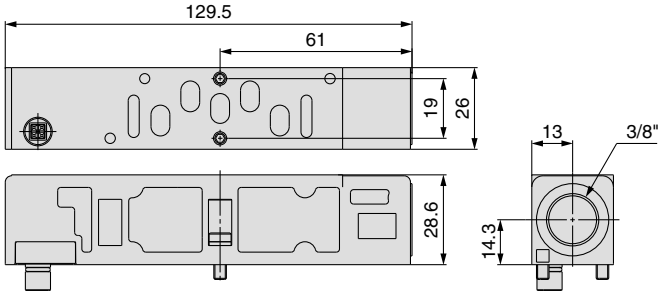




Circuit diagram



Size 18 mm

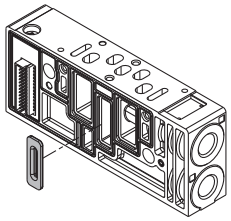


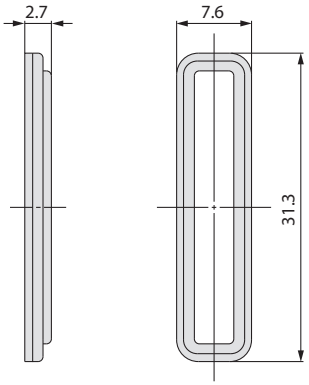
Size 26 mm

SUP block plate

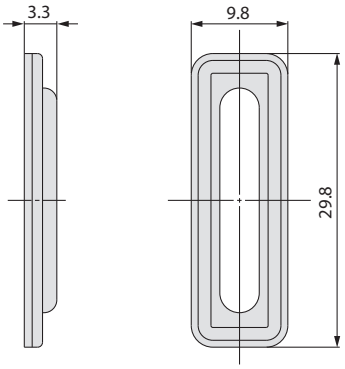
VVS8020-16A (Size 18 mm)
VVS8040-16A (Size 26 mm)

When different pressures are supplied to a manifold, a SUP block plate is used to block the stations under different pressures.





Size 18 mm

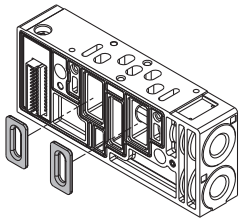


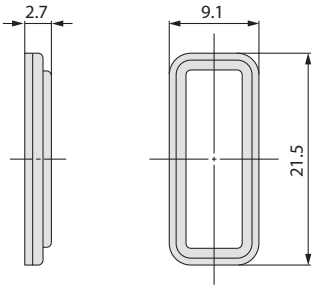
Size 26 mm

EXH block plate

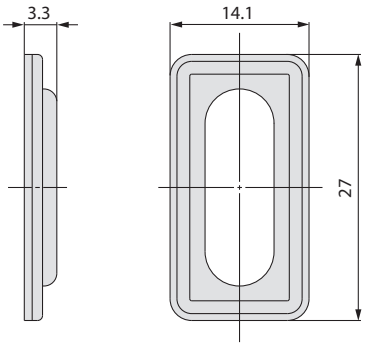
VVS8020-19A (Size 18 mm)
VVS8040-19A (Size 26 mm)

This is used to divide the exhaust passage when the exhaust from a valve interferes with the valve of other stations.





Size 18 mm



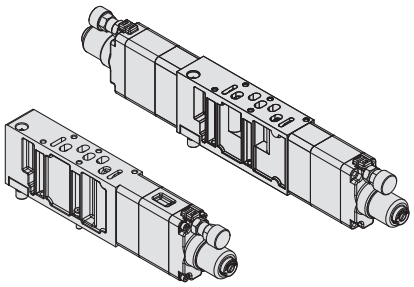
Size 26 mm

Interface regulator (P, A, B port regulation)

Manifold Options

Specifications

Interface regulator model			VVS8040-ARB-*-X1*			
Regulating port			A	B	P	A, B
Applicable solenoid valve			VS 8-4			
Max. operating pressure (MPa)			1.0			
Set pressure range (MPa)			0.05 to 0.85			
Fluid			Air			
Ambient and fluid temperature (°C)			–5 to 60			
Pressure gauge port size			M5 x 0.8			
Mass (kg)			0.35			0.45
Effective area at supply side (mm 2) P1 = 0.7 MPa, P2 = 0.5 MPa	1(P)	4(A)	9.0	11.8	16.7	12.2
	1(P)	2(B)	9.0	11.8	12.8	13.1
Effective area at exhaust side (mm 2) P2 = 0.5 MPa	4(A)	5(R1)	21.3	14.4	21.4	13.1
	2(B)	3(R2)	18.2	14.8	14.9	12.2

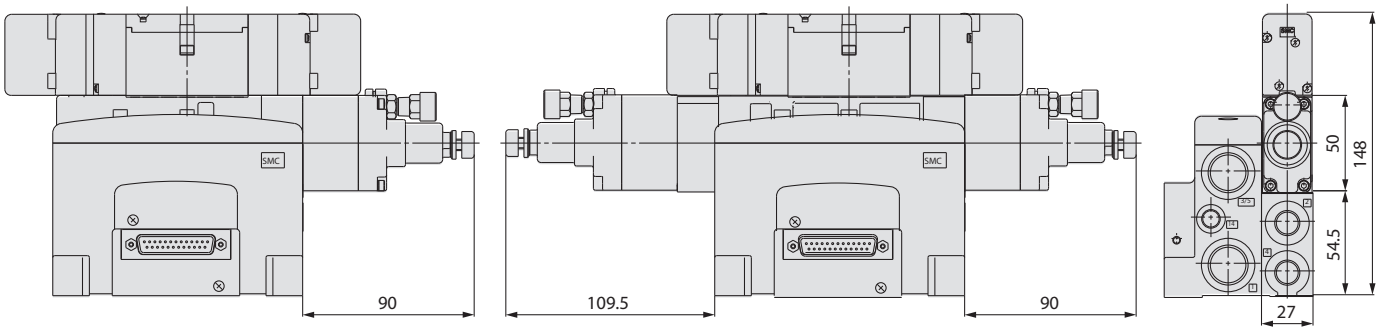


Note 1) Set the pressure within operating pressure range of solenoid valve.
Note 2) When using A port regulation and B port regulation in a closed center, please contact SMC because there will be a problem in its operation.
Note 3) IP65 enclosure is not available with interface regulator.

How to Order

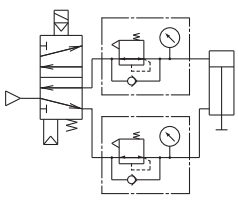
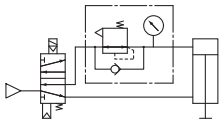
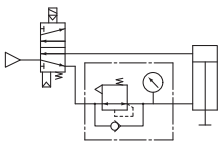
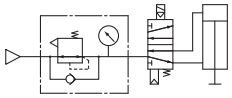
Applicable solenoid valve model	Interface regulator model	Regulating port
VS 8-4 (Size 26 mm)	VVS8040-ARB-A-1-X1S (short) VVS8040-ARB-A-1-X1L (long)	A
	VVS8040-ARB-B-1-X1S (short) VVS8040-ARB-B-1-X1L (long)	, B
	VVS8040-ARB-P-1X1S (short) VVS8040-ARB-P-1-X1L (long)	P
	VV8040-ARB-AB-1-X6S (short) VV8040-ARB-AB -1-X6L (long)	AB

Unit: mm



VVS8040-ARB- -1

VVS8040-ARB-AB-1

Regulating port: A, B	Regulating port: A	Regulating port: B	Regulating port: P
			

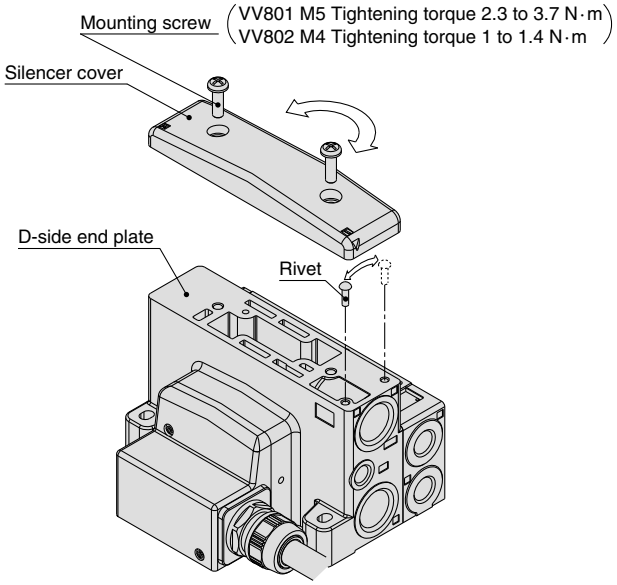
Manifold Options

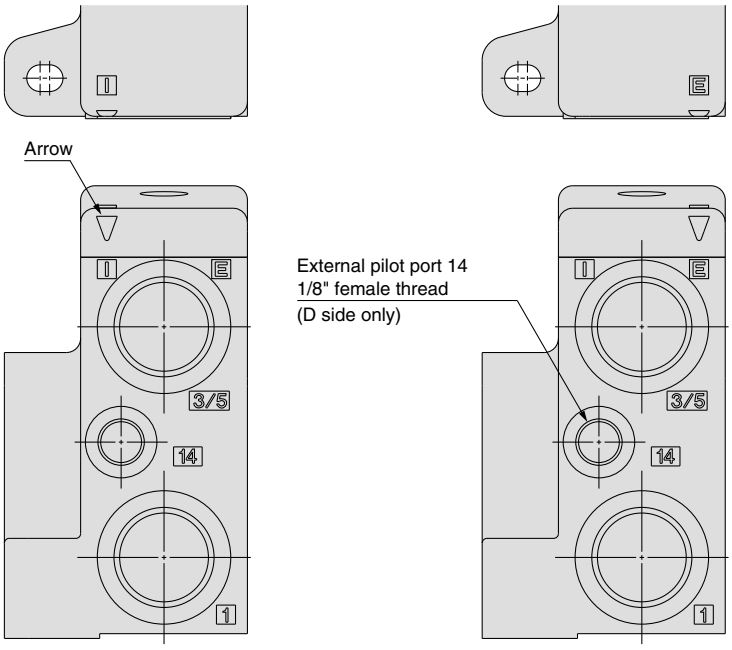
External pilot specification

Either internal pilot or external pilot can be selected when ordering a manifold (internal pilot is standard).
The arrow on the silencer cover points to "I" when using the internal pilot and "E" when using the external pilot. It can be changed later by changing the mounting orientation of the silencer cover.

<How to change the pilot type>
1) Remove the silencer cover.
2) Turn the silencer cover 180° and mount it to the end plate.
   At the same time, mount the built-in rivet as the same place with the arrow on silencer cover.

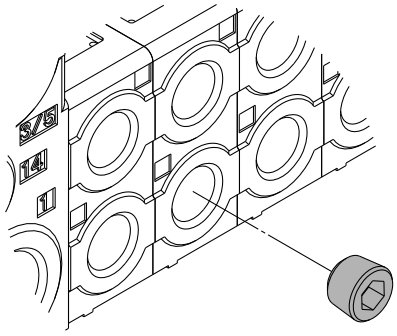
Note 1) Do not let the gasket get caught when mounting the silencer cover.
Note 2) For internal pilot specification, it is not necessary to mount a plug to the external pilot port.





Internal pilot **External pilot**

Port plug



Part no.	Thread size, type
AXT954-01	For Rc 1/8"
AXT954-02	For Rc 1/4"
AXT954-03	For Rc 3/8"
AXT954-04	For Rc 1/2"
AXT954-01T	For NPTF 1/8"
AXT954-02T	For NPTF 1/4"
AXT954-03T	For NPTF 3/8"
AXT954-04T	For NPTF 1/2"
AXT954-01F#1	For G 1/8"
AXT954-02F#1	For G 1/4"
AXT954-03F#1	For G 3/8"
AXT954-04F#1	For G 1/2"

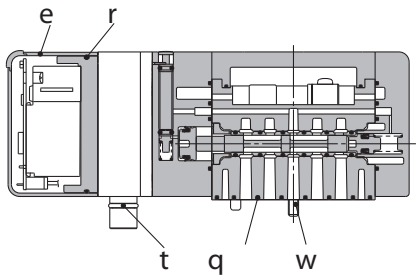
This is used to plug the cylinder ports when using as a 3-port valve, etc.

Construction

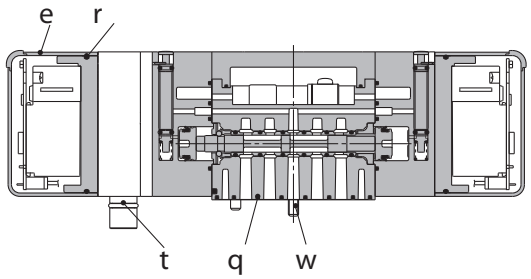
Construction

Metal seal

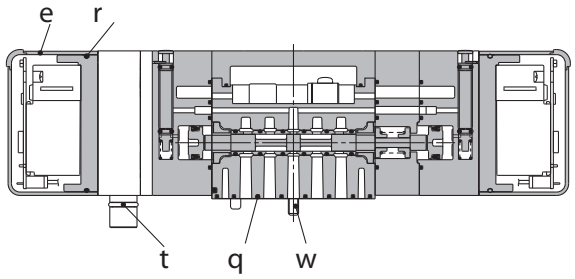
VSS8-2-FG-S- □



VSS8-2-FG-D- □

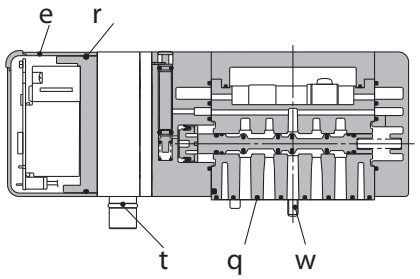


VSS8-2- FHG FKG FJG -D- □

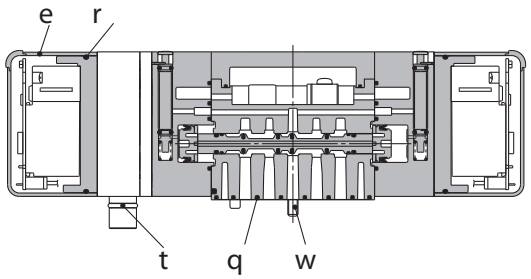


Rubber seal

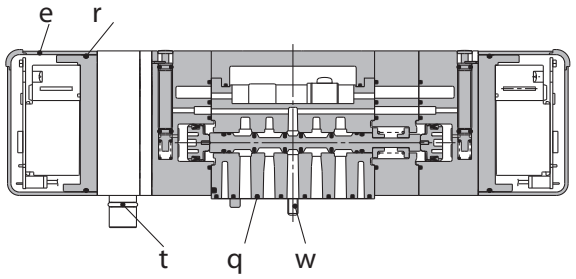
VSR8-2-FG-S- □



VSR8-2-FG-D- □



VSR8-2- FHG FKG FJG -D- □



Replacement Parts

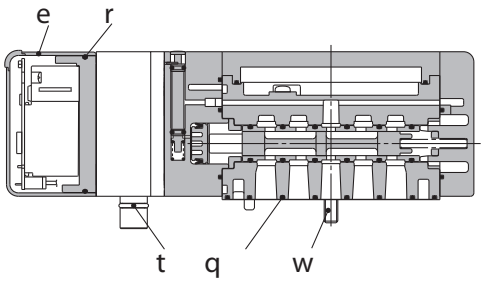
No.	Description	VSS8-2-FG-S- □	VSS8-2-FG-D- □	VSS8-2- FHG FKG FJG -D- □	VSR8-2-FG-S- □	VSR8-2-FG-D- □	VSR8-2- FHG FKG FJG -D- □	VSR8-2- FDAG FDBG FDCG -D-□
1	Gasket	EVS1002-13-11H						
2	Hexagon bolt	AXT632-17-7 (M3 x 30, with washer, nickel plated)						
3	Light cover	EVS1001-9-1						
4	O-ring	29.5 x 1.2						
5	O-ring	OR-0500-130-H						

Construction

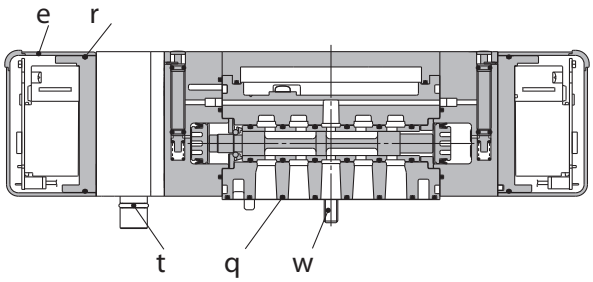
Construction

Metal seal

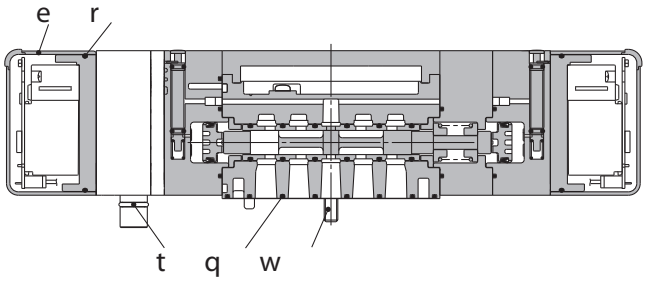
VSS8-4-FG-S- □



VSS8-4-FG-D- □

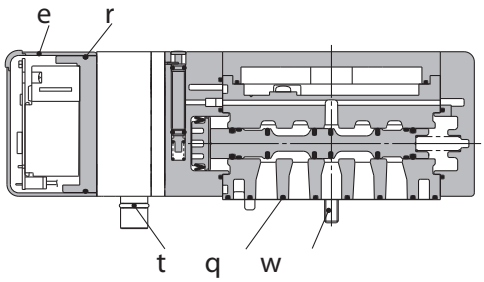


VSS8-4-[FHG/FKG/FJG]D- □

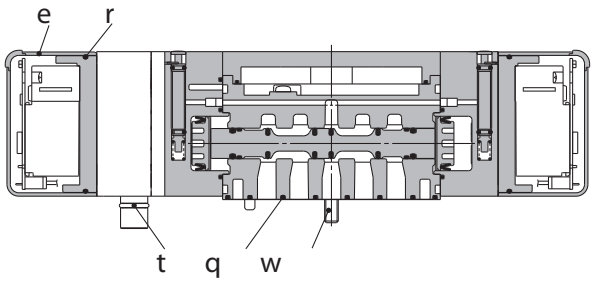


Rubber seal

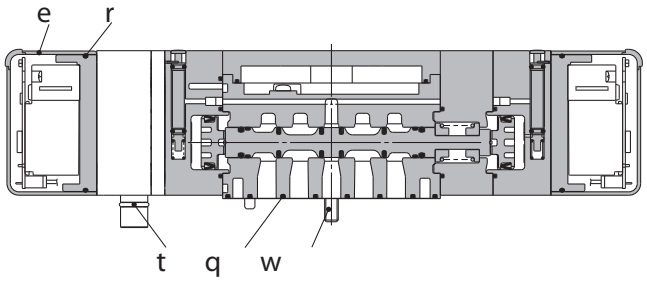
VSR8-4-FG-S- □



VSR8-4-FG-D- □



VSR8-4-[FHG/FKG/FJG]D- □



Replacement Parts

No.	Description	VSS8-4-FG-S- □	VSS8-4-FG-D- □	VSS8-4-[FHG/FKG/FJG]D- □	VSR8-4-FG-S- □	VSR8-4-FG-D- □	VSR8-4-[FHG/FKG/FJG]D- □	VSR8-4-[FDAG/FDBG/FDCG]-D-□
1	Gasket	EVS1001-9-2H						
2	Hexagon bolt	AXT632-25-15 (M4 x 30, with washer, nickel plated)						
3	Light cover	EVS1001-9-1						
4	O-ring	29.5 x 1.2						
5	O-ring	OR-0500-130-H						

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots - Safety.
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots – Safety.
etc.
*2) Labor Safety and Sanitation Law, etc.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Safety Instructions

⚠Caution

1. The product is provided for use in manufacturing industries.
   The product herein described is basically provided for peaceful use in manufacturing industries.
   If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered. 3)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

3) Vacuum pads are excluded from this 1 year warranty.
   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
   Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

5 Port Solenoid Valves Precautions 1

Be sure to read this before handling.

Design/Selection

⚠ Warning

1. Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems (including vacuum).
Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)
Please contact SMC when using a fluid other than compressed air (including vacuum).
We do not guarantee against any damage if the product is used outside of the specification range.

2. Actuator drive

When an actuator, such as a cylinder, is to be driven by a valve, take appropriate measures such as cover installation or approach prohibition to prevent potential danger caused by actuator operation.

3. Intermediate stops

For 3-position closed center or double check valve type, it is difficult to make a piston stop at the required position accurately due to the compressibility of air.
Furthermore, since valves and cylinders are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time.
Please contact SMC if it is necessary to hold a stopped position for an extended period of time.

4. Effect of back pressure when using a manifold

Use caution when valves are used on a manifold, because an actuator may malfunction due to back-pressure.
For 3-position exhaust center valve or single acting cylinder, take appropriate measures to prevent malfunction by using it with an individual EXH spacer assembly, a back pressure check valve or an individual exhaust manifold.

5. Holding pressure (including vacuum)

Since the valves are subject to air leakage, they cannot be used for applications such as holding pressure (including vacuum) in a pressure vessel.

6. Not suitable for use as an emergency shut-off valve, etc.

The valves listed in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used for the mentioned applications, additional safety measures should be adopted.

7. Release of residual pressure

For maintenance purposes install a system for releasing residual pressure. Especially in the case of 3-position closed center valve or double check valve type, ensure that the residual pressure between the valve and the cylinder is released.

8. Operation in a vacuum condition

When a valve is used for switching a vacuum, take measures to install a suction filter or similar to prevent external dust or other foreign matter from entering inside the valve.
In addition, at the time of vacuum adsorption, be sure to vacuum at all times. Failure to do so may result in foreign matter sticking to the adsorption pad, or air leakage causing the workpiece to drop.

9. Regarding a vacuum switch valve and a vacuum release valve

If a non-vacuum valve is installed in the middle of piping system having a vacuum, the vacuum condition will not be maintained. Use a valve designed for use under vacuum condition.

10. Double solenoid type

When using the double solenoid type for the first time, actuators may travel in an unexpected direction depending on the switching position of the valve. Implement measures to prevent any danger from occurring when operating the actuator.

11. Ventilation

Provide ventilation when using a valve in a confined area, such as in a closed control panel. For example, install a ventilation opening, etc. in order to prevent pressure from increasing inside of the confined area and to release the heat generated by the valve.

12. Extended periods of continuous energization

- If a valve will be continuously energized for an extended period of time, the temperature of the valve will increase due to the heat generated by the coil. This will likely adversely affect the performance of the solenoid valve and any nearby peripheral equipment. Therefore, when it is continuously energized or the energized period per day is longer than the de-energized period, please contact SMC. In addition, it is possible to shorten the energized time by making a valve with an N.O. (normally open) specification.
- For applications such as mounting a valve on a control panel, incorporate measure to limit the heat radiation so that it is within the operating temperature range. For example, the temperature will be high when a 3-station manifold or larger is put next to other valves and continuously energized or the long and continuous energization on both the A and B sides (simultaneous) of dual 3-port valves.

13. Do not disassemble the product or make any modifications, including additional machining.

It may cause human injury and/or an accident.

5 Port Solenoid Valves Precautions 2

Be sure to read this before handling.

Design/Selection

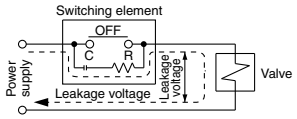
⚠Caution

1. Momentary energization

If a double solenoid valve is operated with momentary energization, it should be energized for at least 0.1 second. However, depending on the condition of the secondary load, it should be energized until the cylinder reaches the stroke end position, since there is a possibility of malfunction.

2. Leakage voltage

Take note that the leakage voltage will increase when a resistor is used in parallel with switching element or a C-R circuit (surge voltage suppressor) is used for protecting a switching device because of the passing leakage voltage through the C-R circuit. The suppressor residual leakage voltage should be 2% or less of the rated voltage.



3. Surge voltage suppressor

If a surge voltage protection circuit contains non-standard diodes, such as Zener diodes or varistor, a residual voltage that is in proportion to the protective circuit and the rated voltage will remain. Therefore, take into consideration the surge voltage protection of the controller.

In the case of diodes, the residual voltage is approx. 1 V.

4. Surge voltage intrusion

There is no polarity for this series solenoid valves.

With non-polar type solenoid valves, at times of sudden interruption of the loading power supply, such as emergency shutdown, surge voltage intrusion may be generated from loading equipment with a large capacity (power consumption), and the solenoid valve in a de-energized state may switch over (see Figure 1).

When installing a breaker circuit for the loading power supply, consider using a solenoid valve with polarity (with polarity protection diode), or install a surge absorption diode between the loading equipment COM line and the output equipment COM line (see Figure 2).

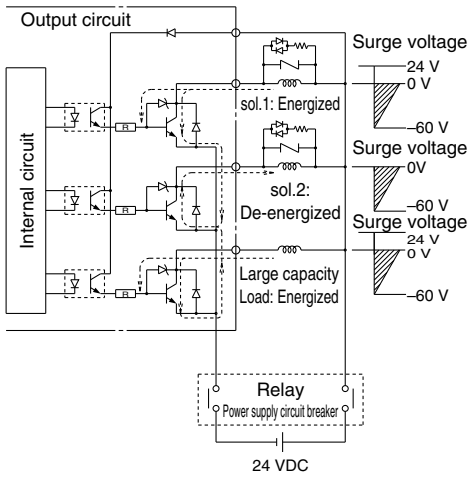


Figure 1. Surge intrusion circuit example (NPN outlet example)

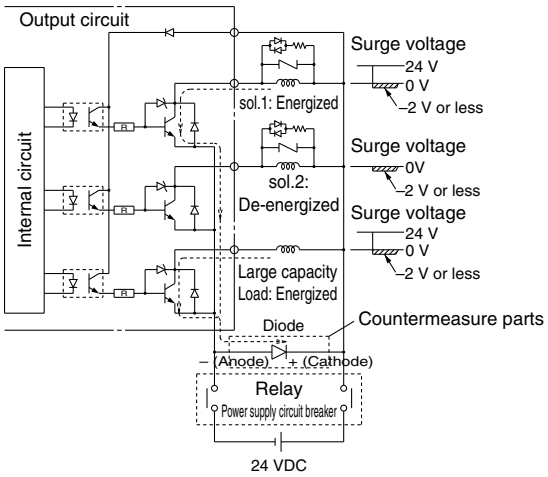


Figure 2. Surge intrusion circuit example (NPN outlet example)

5. Operation in a low temperature condition

Do not operate the valve when the ambient temperature is not between –10°C and 50°C.

Take appropriate measures to avoid freezing of drainage, moisture etc. in low temperature.

6. Operation for air blowing

When using a solenoid valve for air blowing, use an external pilot type.

Use caution because the pressure drop caused by the air blowing can have an affect on the internal pilot type valve when the internal pilot type valves and external pilot type valves are used on the same manifold.

Additionally, when compressed air within the pressure range of the established specifications is supplied to the external pilot type valve's port, and a double solenoid valve is used for air blowing, the solenoids should normally be energized when air is being blown.

7. Mounting orientation

Mounting orientation of a single solenoid 4-position dual 3-port is universal. No specific orientation is necessary. When installing a double solenoid or a 3-position configuration, mount the valve so that spool valve is horizontal.

5 Port Solenoid Valves Precautions 3

Be sure to read this before handling.

Mounting

⚠Warning

1. Operation manual

Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

2. Ensure sufficient space for maintenance activities.

When installing the products, allow access for maintenance.

3. Tighten threads with the proper tightenig torque.

When installing the products, follow the listed torque specifications.

4. If air leakage increases or equipment does not operate properly, stop operation.

Check mounting conditions when air and power supplies are connected. Initial function and leakage tests should be performed after installation.

5. Painting and coating

Warnings or specifications printed or affixed to the product should not be erased, removed or covered up.
Please consult with SMC before applying paint to resinous parts, as this may have an adverse effect due to the solvent in the paint.

Piping

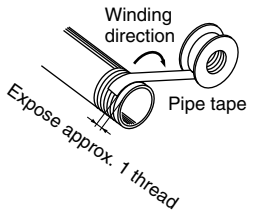
⚠Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping. Also, if pipe tape is used, leave 1 thread ridge exposed at the end of the threads.



3. Closed center type

For closed center type, check the piping to prevent air leakage from the piping between the valve and the cylinder.

4. Connection of fittings

When screwing fittings into valves, tighten as follows.

Tightening Torque for Piping

Connection thread	Proper tightening torque (N·m)
Rc 1/8	7 to 9
Rc 1/4	12 to 14
Rc 3/8	22 to 24
Rc 1/2	28 to 30

5. Piping to products

When piping to a product, refer to the operation manual to avoid mistakes regarding the supply port, etc.

Wiring

⚠Caution

1. Applied voltage

When electric power is connected to a solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

2. Check the connections.

Check if the connections are correct after completing all wiring.

Lubrication

⚠Warning

1. Lubrication

[Rubber seal]

1) All valves have been lubricated for life by the manufacturer and therefore, do not require lubrication while in service.
2) If a lubricant is used in the system, use class 1 turbine oil (no additive), ISO VG32.
   Once a lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.
   If turbine oil is used, refer to the Material Safety Data Sheet (MSDS) of the oil.

[Metal seal]

1) These valves can be used without lubrication.
2) If a lubricant is used in the system, use class 1 turbine oil (no additive), ISO VG32.

If turbine oil is used, refer to the Material Safety Data Sheet (MSDS) of the oil.

Class 1 Turbine Oil (with no additive), ISO VG32

Lubricant manufacturer	Class 1 turbine oil (with no additive), ISO VG32
Idemitsu Kosan Co., Ltd.	Diana Fresia S32
Nippon Oil Corp.	Turbine Oil 32
Cosmo Oil Co., Ltd.	Cosmo Turbine 32
Japan Energy Corp.	Turbine 32
Kygnus Oil Co.	Turbine Oil 32
Fuji Kosan Co., Ltd.	Fucoal Turbine 32

Please contact SMC regarding class 2 turbine oil (with additives), ISO VG32.

5 Port Solenoid Valves Precautions 4

Be sure to read this before handling.

Air Supply

⚠Warning

1. Type of fluids

Please consult with SMC when using the product in applications other than compressed air.

2. When there is a large amount of drainage.

Compressed air containing a large amount of drainage can cause malfunction of pneumatic equipment. An air dryer or water separator should be installed upstream from filters.

3. Drain flushing

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic equipment.

If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.

For compressed air quality, refer to SMC's Best Pneumatics catalog.

4. Use clean air.

Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

⚠Caution

1. When extremely dry air is used as the fluid, degradation of the lubrication properties inside the equipment may occur, resulting in reduced reliability (or reduced service life) of the equipment. Please consult with SMC.

2. Install an air filter.

Install an air filter upstream near the valve. Select an air filter with a filtration size of 5 μm or smaller.

3. Take measures to ensure air quality, such as by installing an aftercooler, air dryer, or water separator.

Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment such as valves. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.

4. If excessive carbon powder is seen, install a mist separator on the upstream side of the valve.

If excessive carbon dust is generated by the compressor, it may adhere to the inside of a valve and cause it to malfunction.

For compressed air quality, refer to SMC's Best Pneumatics catalog.

Operating Environment

⚠Warning

1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.

2. Products with IP65 enclosures (based on IEC60529) are protected against dust and water, however, these products cannot be used in water.

3. Products compliant to IP65 satisfy the specifications through mounting. Be sure to read the precautions.

Operating Environment

⚠Warning

4. Do not use in an environment where flammable gas or explosive gas exists. Usage may cause a fire or explosion. The products do not have an explosion proof construction.

5. Do not use in a place subject to heavy vibration and/or shock.

6. The valve should not be exposed to prolonged sunlight. Use a protective cover.

7. Remove any sources of excessive heat.

8. If it is used in an environment where there is possible contact with oil, weld spatter, etc., exercise preventive measures.

9. When the solenoid valve is mounted in a control panel or its energized for long periods of time, make sure ambient temperatures is within the specification of the valve.

Maintenance

⚠Warning

1. Perform maintenance inspection according to the procedures indicated in the operation manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

2. Removal of equipment, and supply/exhaust of compressed air

When components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply pressure and electric power, and exhaust all compressed air from the system using the residual pressure release function.

For 3-position closed center type, exhaust the residual pressure between the valve and the cylinder.

When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc. Then, confirm that the equipment is operating normally.

3. Low frequency operation

Valves should be operated at least once every 30 days to prevent malfunction. (Use caution regarding the air supply.)

4. Manual override

When the manual override is operated, connected equipment will be actuated. Operate after safety is confirmed.

⚠Caution

1. Drain flushing

Remove drainage from the air filters regularly. (Refer to the specifications.)

2. Lubrication

In the case of rubber seals, once lubrication has been started, it must be continued.

Use class 1 turbine oil (with no additive), VG32 because if other lubricant oil is used, it may cause malfunction. Please contact SMC for suggested class 2 turbine oil (with additive), VG32.

Series $VS^{S}_{R}8\text{-}^{2}_{4}$
Specific Product Precautions 1

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions and back pages 3 to 6 for 5 Port Solenoid Valves Precautions.

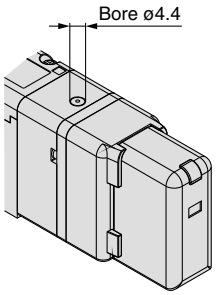
Manual Override

⚠ Warning

Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger. Push type is standard. (Tool required) Locking type is semi-standard. (Tool required)

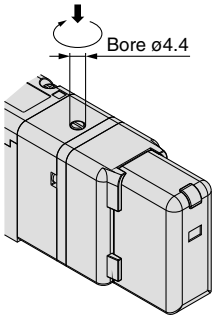
■ $VS^{S}_{R}8\text{-}^{2}_{4}$

Non-locking push type (Tool required)

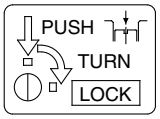


Push down on the manual override with a small screwdriver until it stops. Release the screwdriver and the manual override will return.

Locking type (Tool required) <Semi-standard>



Push down on the manual override with a small flat head screwdriver until it stops. Turn it clockwise by 90° to lock it. Turn it counterclockwise to release it.

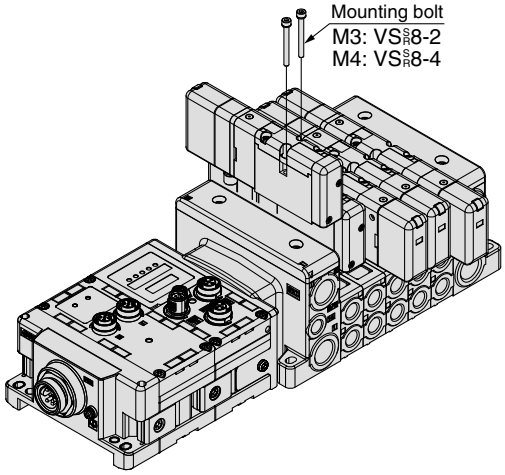


Valve Mounting

⚠ Caution

After confirming the gasket is correctly placed under the valve, securely tighten the bolts with the proper torque shown in the below table.

Series	Proper tightening torque (N·m)
$VS^{S}_{R}8$-2	0.8 to 1.2
$VS^{S}_{R}8$-4	1.0 to 1.8



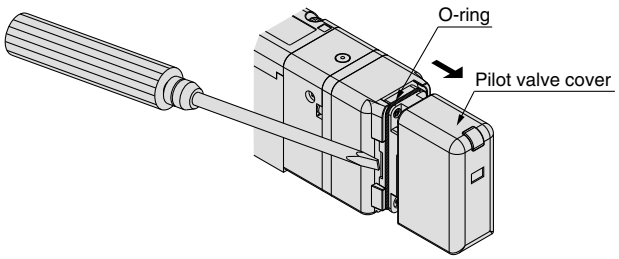
Installation and Removal of Pilot Valve Cover

⚠ Caution

Installation and Removal of Pilot Valve Cover

● **Removal**
To remove the pilot valve cover, spread the cover's hook outward about 1 mm with a flat head screwdriver, and pull the cover straight off.
If it is pulled off at an angle, the pilot valve may be damaged or the protective O-ring may be scratched.

● **Installation**
Put the cover back on straight without touching the pilot valve, and push it all the way until the cover's hook locks, without twisting the protective O-ring. (When pushed in, the hook opens and locks automatically.)



Series VS$^{S}_{R}$8-$^{2}_{4}$
Specific Product Precautions 2

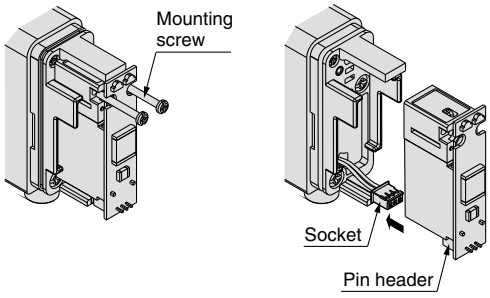
Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions and back pages 3 to 6 for 5 Port Solenoid Valves Precautions.

Pilot Valve Replacement

⚠ Caution

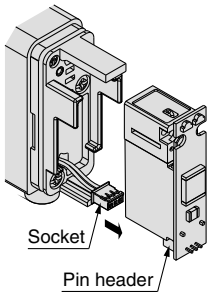
● **Removal**

1) Remove the pilot valve mounting screws with a small screwdriver.
2) Remove the sockets which are installed on the pilot valve pin headers by pulling them straight upward.

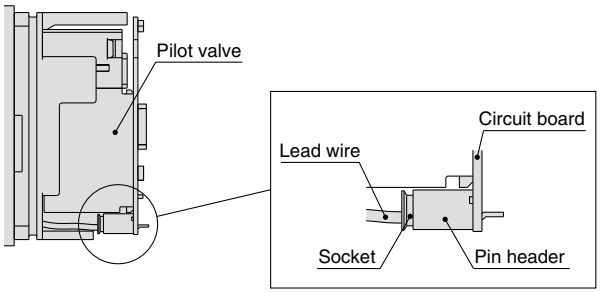


● **Installation**

1) Insert the socket into the pin header horizontally. Pushing it in forcefully may damage the circuit board.
2) After confirming installation of the gasket, securely tighten the mounting screws with the proper torque shown in the below table.

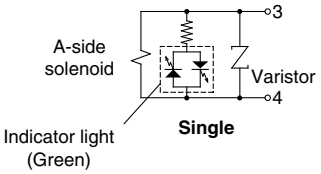


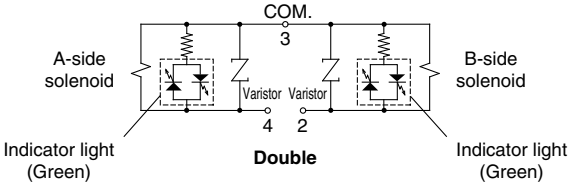
Mounting screw	Proper tightening torque (N·m)
M1.7 x 12	0.12 to 0.13



Internal Wiring Specification

⚠ Caution





Series VS$^{S}_{R}$8-$^{2}_{4}$
Specific Product Precautions 3

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions and back pages 3 to 6 for 5 Port Solenoid Valves Precautions.

EX600 Precautions

Design/Selection

⚠Warning

1. Use this product within the specification range.
Using beyond the specified specifications range can cause fire, malfunction, or damage to the system.
Confirm the specifications when operating.

2. When using for an interlock circuit:
- **Provide a multiple interlock system which is operated by another system (such as mechanical protection function).**
- **Perform an inspection to check that it is working properly.**

This may cause possible injury due to malfunction.

⚠Caution

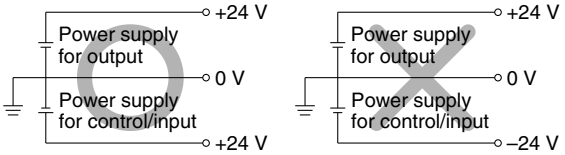
1. Use the UL-certified products below for combined direct current power supply.
(1) Circuit in which voltage and current are controlled in accordance with UL508
Circuit which makes the winding wire in the secondary side of the insulation transformer (which meets the following conditions) to be as the power supply
- Maximum voltage (with no load):
  30 Vrms (42.4 V at peak) or less
- Maximum current:
  1. 8 A or less (including short-circuited)
  2. and in case of being controlled by circuit protection devices (fuse, etc) which meets the below rated voltages.

Voltage with no load (V peak)	Maximum rated current
0 to 20 (V)	5.0
Exceeding 20 (V) up to 30 (V)	$\frac{100}{\text{Voltage figure at peak}}$

(2) Class 2 power supply unit in accordance with UL1310 or circuit (Class 2 circuit) in accordance with UL1585, that is powered by Class 2 transformer with the maximum of 30 Vrms (42.4 V at peak)

2. Use this product within the specified voltage range.
Using beyond the specified voltage range is likely to cause the units and connecting devices to be damaged or to malfunction.

3. The power supply for the unit should be 0 V as the standard for both power supply for output as well as power supply for control/input.



4. Do not install a unit in a place where it can be used as a foothold.
Applying any excessive load such as stepping on the unit by mistake or placing a foot on it, will cause it to break.

5. Keep the surrounding space free for maintenance.
When designing a system, take into consideration the amount of free space needed for performing maintenance.

6. Do not remove the name plate.
Improper maintenance or incorrect use of operation manual can cause failure and malfunction. Also, there is a risk of losing conformity with safety standards.

7. Beware of inrush current when the power supply is turned on.
Some connected loads can apply an initial charge current which will trigger the over current protection function, causing the unit to malfunction.

Mounting

⚠Caution

1. When handling and assembling units:
- **Do not touch the sharp metal parts of the connector or plug.**
- **Do not apply excessive force to the unit.**
  The connecting portions of the unit are firmly joined with seals.
- **When joining units, take care not to get fingers caught between units.**
  Injury can result.

2. Do not drop, bump, or apply excessive impact.
Otherwise, the unit can become damaged, malfunction, or fail to function.

3. Observe the tightening torque range.
Tightening outside of the allowable torque range will likely damage the product.
IP67 protection class cannot be guaranteed if the screws are not tightened to the specified torque.

4. When lifting a large size manifold solenoid valve unit, take care to avoid causing stress to the valve connection joint.
The connection parts of the unit may be damaged.
Because the unit may be heavy, carrying and installation should be performed by more than one operator to avoid strain or injury.

5. When placing a manifold, mount it on a flat surface.
Torsion in the whole manifold can lead to trouble such as air leakage or defective insulation.

Wiring

⚠Caution

1. Confirm grounding to maintain the safety of the reduced wiring system and for anti-noise performance.
Provide a specific grounding as close to the unit as possible to minimize the distance to grounding.

2. Avoid repeatedly bending or stretching the cable and applying a heavy object or force to it.
Wiring applying repeated bending and tensile stress to the cable can break the circuit.

3. Avoid miswiring.
If miswired, there is a danger of malfunction or damage to the reduced wiring system.

4. Do not wire while energizing the product.
There is a danger of malfunction or damage to the reduced wiring system or input/output equipment.

Series VS$^{S}_{R}$8-$^{2}_{4}$
Specific Product Precautions 4

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions and back pages 3 to 6 for 5 Port Solenoid Valves Precautions.

EX600 Precautions

Wiring

⚠Caution

5. Avoid wiring the power line and high-pressure line in parallel.

Noise or surge produced by signal line resulting from the power line or high pressure line could cause malfunction.
Wiring of the reduced wiring system or input/output device and the power line or high-pressure line should be separated from each other.

6. Confirm the wiring insulation.

Defective insulation (contact with other circuits, improper insulation between terminals, etc.) may cause damage to the reduced wiring system or input/output device due to excessive voltage or current.

7. When a reduced wiring system is installed in machinery/equipment, provide adequate protection against noise by using noise filters, etc.

Noise in signal lines may cause malfunction.

8. When connecting wires of input/output device or handheld terminal, prevent water, solvent or oil from entering inside from the connecter section.

This can cause damage, equipment failure, or malfunction.

9. Avoid wiring patterns in which excessive stress is applied to the connector.

This may cause malfunction or damage to the unit due to contact failure.

Operating Environment

⚠Warning

1. Do not use in an atmosphere containing an inflammable gas or explosive gas.

Use in such an atmosphere is likely to cause a fire or explosion. This system is not explosion-proof.

⚠Caution

1. Select the proper type of enclosure according to the environment of operation.

IP65/67 protection class is achieved when the following conditions are met.

1) The units are connected properly with wiring cable for power supply, communication connector, and cable with M12 connector.
2) Suitable mounting of each unit and manifold valve.
3) Be sure to mount a seal cap on any unused connectors.

If using in an environment that is exposed to water splashes, take measures such as using a cover.
Also, the Handheld Terminal confirms to IP20, so prevent foreign matter from entering inside, and water, solvent or oil from coming in direct contact with it.

Operating Environment

⚠Caution

2. Provide adequate protection when operating in locations such as follows.

Failure to do so may cause damage or malfunction.
The effect of countermeasures should be checked in individual equipment and machine.

1) Where noise is generated by static electricity, etc.
2) Where there is a strong electric field
3) Where there is a danger of exposure to radiation
4) When in close proximity to power supply lines

3. Do not use in an environment where oil and chemicals are used.

Operating in environments with coolants, cleaning solvents, various oils or chemicals may cause adverse effects (damage, malfunction) to the unit even in a short period of time.

4. Do not use in an environment where the product could be exposed to corrosive gas or liquid.

This may damage the unit and cause it to malfunction.

5. Do not use in locations with sources of surge generation.

Installation of the unit in an area around the equipment (electromagnetic lifters, high frequency induction furnaces, welding machine, motors etc.), which generates the large surge voltage could cause to deteriorate an internal circuitry element of the unit or result in damage. Implement countermeasures against the surge from the generating source, and avoid touching the lines with each other.

6. Use the product type that has an integrated surge absorption element when directly driving a load which generates surge voltage by relay, solenoid valves or lamp.

When a surge generating load is directly driven, the unit may be damaged.

7. The product is CE marked, but not immune to lightning strikes. Take measures against lightning strikes in your system.

8. Keep dust, wire scraps and other extraneous material from getting inside the product.

This may cause malfunction or damage.

9. Mount the unit in such locations, where no vibration or shock is affected.

This may cause malfunction or damage.

10. Do not use in places where there are cyclic temperature changes.

In case that the cyclic temperature is beyond normal temperature changes, the internal unit is likely to be adversely effected.

11. Do not use in direct sunlight.

Do not use in direct sunlight. It may cause malfunction or damage.

12. Use this product within the specified ambient temperature range.

This may cause malfunction.

13. Do not use in places where there is radiated heat around it.

Such a place is likely to cause malfunction.

Series VS$^{S}_{R}$8-$^{2}_{4}$
Specific Product Precautions 5

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions and back pages 3 to 6 for 5 Port Solenoid Valves Precautions.

EX600 Precautions

Adjustment/Operation

⚠Warning

1. Do not perform operation or setting with wet hands.
There is a risk of electrical shock.

<Handheld Terminal>

2. Do not apply pressure to the LCD display.
There is a possibility of the crack of LCD display and injuring.

3. The forced input/output function is used to change the signal status forcibly. When operating this function, be sure to check the safety of the surroundings and installation.
Otherwise, injury or equipment damage could result.

4. Incorrect setting of parameters can cause malfunction. Be sure to check the settings before use.
This may cause injury or equipment damage.

⚠Caution

1. Use a watchmaker's screwdriver with thin blade for the setting of each switch of the SI unit.
When setting the switch, do not touch other unrelated parts.
This may cause parts damage or malfunction due to a short circuit.

2. Provide adequate setting for the operating conditions.
Failure to do so could result in malfunction.
Refer to the operation manual for setting of the switches.

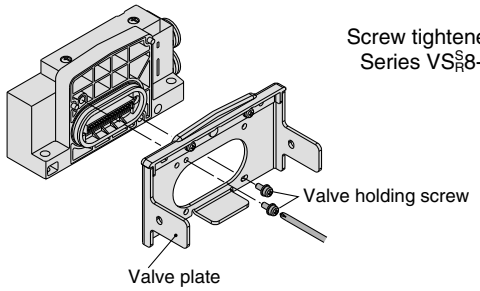
3. For the details of programming and address setting, refer to the manual from the PLC manufacturer.
The content of programming related to protocol is designed by the manufacturer of the PLC used.

<Handheld Terminal>

4. Do not press the setting buttons with a sharp pointed object.
This may cause damage or malfunction.

5. Do not apply excessive load and impact to the setting buttons.
This may cause damage, equipment failure or malfunction.

When the order does not include the SI unit, the valve plate to connect the manifold and SI unit is not mounted. Use attached valve fixing screws and mount the valve plate.
(Tightening torque: 0.6 to 0.7 N·m)



Maintenance

⚠Warning

1. Do not disassemble, modify (including circuit board replacement) or repair this product.
Such actions are likely to cause injuries or breakage.

2. When an inspection is performed,
- **Turn off the power supply.**
- **Stop the air supply, exhaust the residual pressure in piping and verify that the air is released before performing maintenance work.**

Unexpected malfunction of system components and injury can result.

⚠Caution

1. When handling and replacing the unit:
- **Do not touch the sharp metal parts of the connector or plug.**
- **Do not apply excessive force to the unit.**
The connecting portions of the unit are firmly joined with seals.
- **When joining units, take care not to get fingers caught between units.**
Injury can result.

2. Perform periodic inspection.
Unexpected malfunction in the system composition devices is likely to occur due to malfunction of machinery or equipment.

3. After maintenance, make sure to perform an appropriate functionality inspection.
In cases of abnormality such as faulty operation, stop operation. Unexpected malfunction in the system composition devices is likely to occur.

4. Do not use benzene and thinner for cleaning units.
Damage to the surface or erasure of the display can result. Wipe off any stains with a soft cloth.
If the stain is persistent, wipe off with a cloth soaked in a dilute solution of neutral detergent and wrung out tightly, and then finish with a dry cloth.

Other

⚠Caution

1. For precautions and product specific precautions for manifold solenoid valves, refer to the catalog that includes each product series.