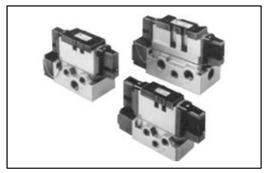
ORIGINAL INSTRUCTIONS

Instruction Manual
ISO Interface Solenoid Valve/ISO5599/II
Series VS#8-(6,8,10)



The intended use of this valve is to control the movement of an actuator.

1 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) [*1)], and other safety regulations.

[*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 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Caution

- The product is provided for use in manufacturing industries only. Do not use in residential premises.

2 Specifications

2.1 Valve specifications

Valve type			Rubber seal	Metal seal
Model			VSR8	VSS8
Valve operation			Pilot operated	
Fluid			Air, inert gas	
Operating pressure [MPa] Note 1)			0.1 to 1	0.1 to 1.6
Proof pressure [MPa]			1.5	2.4
Ambient and fluid temperature [°C] Note 2)			-5 to 50	-20 to 60
Flow characteristics			Refer to catalogue	
Response time [ms]				
Duty cycle			Contact SMC	
Maximum operating frequency [Hz]	2-position	VS#8-6	5	20
		VS#8-8		15
		VS#8-10		10
	3-position	VS#8-6	3	10
		VS#8-8		
		VS#8-10	2	20

2 Specifications - continued

Minimum operating frequency		1 cycle / 30 days	
Manual override		Non-locking push type	
Impact / vibration resistance [m/s^2] Note 3)		150/50	
Lubrication		Not required	
Mounting orientation	2-position single	Unrestricted	
	2-position double, 3-position	Unrestricted	Spool to be horizontal
Enclosure (based on IEC60529)		IP65	
Weight		Refer to catalogue	

Table 1.

Note 1) For metal seal type, the pilot pressure range should be 0.1 to 1 MPa.
Note 2) Use dry air to prevent dew condensation when operating at low temperature (no freezing).
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 quoted are for a new valve).
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized states in the axial direction and at the right angles to the main valve and armature. (Values quoted are for a new valve).

2.2 Solenoid specifications

Rated coil voltage	[VDC]		12, 24
	[VAC]		100, 110, 200, 220
Allowable voltage fluctuation			-15 to 10% of rated voltage
Coil insulation type			Equivalent to Class B
Apparent power [VA]	Inrush	50 Hz	5.6
		60 Hz	5
	Holding	50 Hz	3.4
		60 Hz	2.3
Power consumption [W]			1.8
Surge voltage suppressor			ZNR (Varistor)
Indicator light	DC		LED
	AC		Neon

Table 2.

2.3 Manifold specifications

Manifold block size		ISO size 1	ISO size 2	ISO size 3
Applicable solenoid		VS#8-6	VS#8-8	VS#8-10
Number of stations		1 to 10		
Port size [“]	A, B port	1/4, 3/8, 1/2	3/8, 1/2	1/2, 3/4, 1
	P, R1,R2 port	1/4, 3/8, 1/2	3/8, 1/2, 3/4	3/4, 1
	Pilot ports	1/8		
SUP/EXH port type		Common SUP/EXH		

Table 3.

2.4 Pneumatic symbol

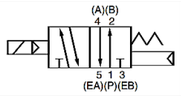
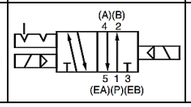
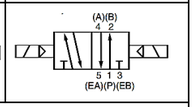
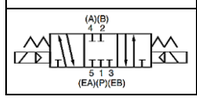
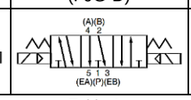
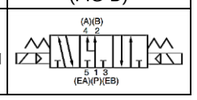
2-position		
Single solenoid (FG-S)	Double solenoid - Metal (FG-D)	Double solenoid – Rubber (FG-D)
		
3-position		
Closed center (FHG-D)	Exhaust center (FJG-D)	Pressure center (FIG-D)
		

Table 4.

2.5 Indicator light

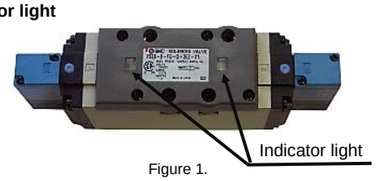


Figure 1.

2 Specifications - continued

2.6 Special products

Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

Warning

Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Products compliant with IP65 enclosure are protected against dust and water, however, these products cannot be used in water.
- Products compliant with IP65 enclosure satisfy the specifications by mounting each product properly. Be sure to read the Specific Product Precautions for each product.

3.3 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Connection thread size (R, G, NPTF)	Tightening Torque [N·m]
1/8”	7 to 9
1/4"	12 to 14
3/8”	22 to 24
1/2"	28 to 30
3/4”	
1”	36 to 38

Table 5.

3.4 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

3.5 Air supply

Warning

- Use clean air. If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas etc., it can lead to damage or malfunction.

Caution

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

3.6 Manual override

Warning

Regardless of an electric signal for the valve, the manual override is used for switching the main valve. Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation.

3.7 Mounting

Caution

- Ensure gaskets are in good condition, not deformed and are dust and debris free.

3 Installation - continued

- When mounting valves ensure gaskets are present, aligned and securely in place and tighten screws to a torque as per table below.

Series	Thread	Recommended tightening torque [N·m]
VS#8-6	M5	2.3 to 3.7
VS#8-8	M6	4 to 6
VS#8-10	M8	11 to 15

Table 6.

3.8 Electrical circuits

Caution

Surge suppression should be specified by using the appropriate part number. If a valve type without suppression is used, suppression must be provided by the host controller as close as possible to the valve.

3.8.1 AC and 100 VDC

3.8.1.1 Single solenoid

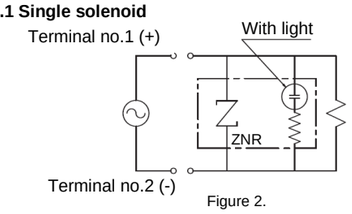


Figure 2.

3.8.1.2 Double solenoid

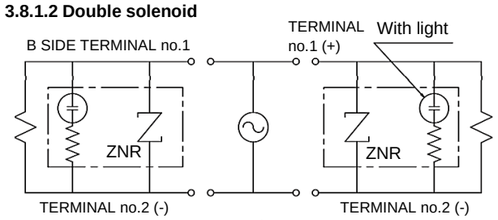


Figure 3.

3.8.2 24 VDC or less

3.8.2.1 Single solenoid

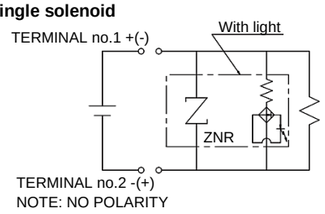


Figure 4.

3.8.2.2 Double solenoid

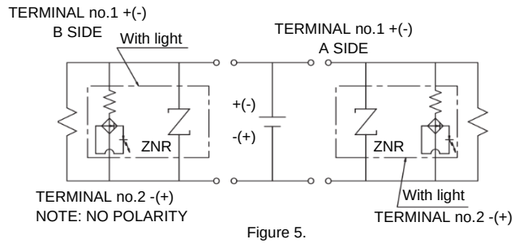


Figure 5.

3.9 Residual voltage

Caution

- If a varistor voltage suppressor is used, the suppressor arrests the back EMF voltage from the coil to a level in proportion to the rated voltage.
- Ensure the transient voltage is within the specification of the host controller.
- Contact SMC for the varistor residual voltage.
- Valve response time is dependent on surge suppression method selected.

3 Installation - continued

3.10 Countermeasure for surge voltage

⚠ Caution

- At times of sudden interruption of the power supply, the energy stored in a large inductive device may cause non-polar type valves in a de-energised state to switch.
- When installing a breaker circuit to isolate the power, consider a valve with polarity (with polarity protection diode), or install a surge absorption diode across the output of the breaker.

3.11 Extended periods of continuous energization

⚠ Warning

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 assembly. This will likely adversely affect the performance of the valve and any nearby peripheral equipment. Therefore, if the valve is to be energized for long periods, the continuous energizing time should not exceed 30 days.

3.12 Effect of back pressure when using a manifold

⚠ Warning

- Use caution when valves are used on a manifold because an actuator may malfunction due to back-pressure.
- Special caution must be taken when using 3 position exhaust centre valve or when driving a single acting cylinder. To prevent a malfunction, implement counter measures such as using an individual EXH spacer assembly, a back pressure check valve or an individual exhaust manifold.

4 How to Order

Refer to product drawing for ‘How to Order’.

5 Outline Dimensions

Refer to drawings for outline dimensions.

6 Maintenance

6.1 General maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

7 Limitations of Use

7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

⚠ Warning

7.2 Intermediate stopping

Refer to Handling Precautions for 3/4/5 port Solenoid Valves.

7.3 Cannot be used as an emergency shut-off valve

This product is not designed for safety applications such as an emergency shut-off valve. If the valves are used in this type of system, other reliable safety assurance measures should be adopted.

7.4 Holding of pressure (including vacuum)

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

7 Limitations of use - continued

⚠ Caution

7.5 Leakage voltage

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes ≤3% (for DC coils) or ≤20% (for AC coils) of the rated voltage across the valve.

7.6 Low temperature operation

Use within the operable ambient temperature range specified in table 1. Appropriate measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

7.7 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 secondary load conditions, it should be energized until the cylinder reaches the stroke end position, as there is a possibility of malfunction otherwise.

7.8 Air returned or air/spring returned spool valves

⚠ Warning

- The use of 2-position single valves with air returned or air/spring returned spools has to be carefully considered.
- The return of the valve spool into the de-energized position depends on the pilot pressure. If the pilot pressure drops below the specified operating pressure the position of the spool cannot be defined.
- The design of the system must take into account such behaviour.
- Additional measures might be necessary. For example, the installation of an additional air tank to maintain the pilot pressure.

Energy source status	Single	Double	3 position
Air supply present, electricity cut	Spool returns to the off position by air force and spring force	Spool stops moving after electricity cut (Position cannot be defined)	Spool returns to the off position by spring force
Air supply cut before electricity cut	Spool returns to the off position by spring force	Spool stops moving after air pressure cut (Position cannot be defined)	Spool returns to the off position by spring force

Table 7.

8 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

9 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL : https:// www.smcworld.com (Global) https:// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

Template DKP50047-F-085M