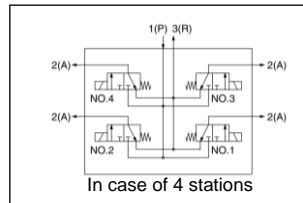




Instruction Manual
3 Port Solenoid Valve
Unit Manifold Valve
Series VV061



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.

Caution

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

2 Specifications

2.1 Unit manifold specifications

| | | | |
|---|--------------------|----------------------------|-------------|
| Fluid | | Air | |
| Operating pressure [MPa] | Standard | 0 to 0.7 | |
| | High flow capacity | 0 to 0.3 | |
| Vacuum specification [MPa] | Standard | 1(P) port | -0.1 to 0.6 |
| | | 3(R) port | -0.1 to 0 |
| | High flow capacity | 1(P) port | -0.1 to 0.2 |
| | | 3(R) port | -0.1 to 0 |
| Ambient/Fluid Temperature [°C] ^{Note 1)} | | -10 to 50 (No freezing) | |
| Flow characteristics | | Refer to catalogue | |
| Response time [ms] ^{Note 2)} | | ≤10 | |
| Duty cycle | | Contact SMC | |
| Min. operating frequency | | 1 cycle / 30 days | |
| Max. operating frequency [Hz] | | 20 | |
| Manual override | | None | |
| Lubrication | | Not required | |

2 Specification – continued

| | | |
|--|--------------|--------------|
| Mounting orientation | | Unrestricted |
| Impact/vibration resistance [m/s ²] ^{Note 3)} | Standard | 150 / 30 |
| | Power-saving | 50 / 10 |
| Enclosure (based on IEC60529) | | IP40 |

Table 1.

- Note 1) Use dry air to prevent condensation at low temperatures.
- Note 2) Based on dynamic performance test, JIS B8374-1981 (Standard type: Coil temperature 20°C, at rated voltage)
- 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 deenergized states every once for each condition (value in the initial state).
Vibration resistance: No malfunction occurred in one sweep test between 45 and 2000 Hz. Test was performed to axis and right angle directions of the main valve and armature when pilot signal is ON and OFF (Value in the initial state).

2.2 Solenoid specifications

| | | | |
|--|--|--|-------------|
| Coil rated voltage [VDC] | | 12, 24 | |
| Electrical entry | | DF11 series connector | |
| Allowable voltage fluctuation ^{Note 1)} | Standard | 12 VDC | -7% to +10% |
| | | 24 VDC | -4% to +10% |
| | Power-saving type | 12 VDC | -5% to +10% |
| | | 24 VDC | -6% to +10% |
| Power consumption [W] | Standard | 0.55 | |
| | Power-saving type (continuous duty type) | 0.23 | |
| Surge voltage suppressor | | Diode ^{Note 2)} (24 VDC only) | |
| Indicator light | | LED | |

Table 2.

- Note 1) Please be careful regarding the allowable voltage fluctuation with power-saving type as there is about a 0.5 volt drop due to the transistor. Please use caution regarding the allowable voltage fluctuation for a valve with polarity protection because there is about a 1 volt drop.
- Note 2) Not included in 12 VDC type.

2.3 Pneumatic symbol

Refer to catalogue for pneumatic symbols.

2.4 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.

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.
- Tighten fittings to the specified tightening torque.

| Port | Type | Torque [N·m] |
|------------------|----------------------------------|--------------|
| 1(P), 2(A), 3(R) | M3 (ø2 One-touch) | 0.4 to 0.5 |
| | O.D. ø4, I.D. ø2.5, Barb fitting | - |

Table 3.

3 Installation - continued

3.3.1 Tube attachment and detachment

Caution

Refer to the Specific Precautions in the catalogue.

3.3.2 Precautions on other tube brands

Caution

When using non-SMC brand tubes, refer to the Specific Precautions in the catalogue.

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 clear 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 Installation - continued

3.7 Plug

3.7.1 How to use plug connector

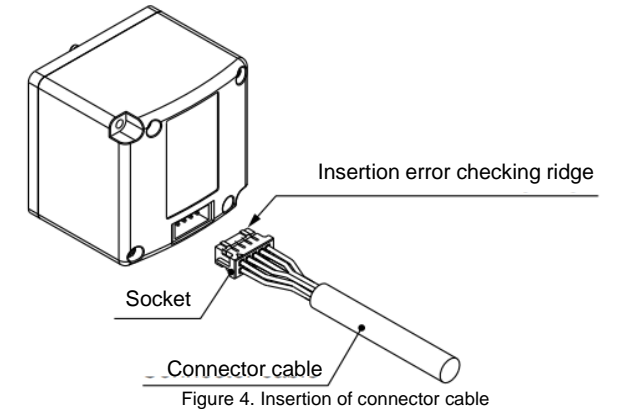


Figure 4. Insertion of connector cable

Caution

- To attach a connector: Insert the connector cable to the end of the socket with the insertion error checking ridge facing upward. Then gently pull the connector cable and check that it does not come out.
- To detach a connector: Remove the socket from the unit manifold by gripping the socket of the connector cable. If excessive force is applied to the connector cable, the connector may come off. Do not apply a force of 20 N or more to the lead wire.

3.7.2 Connector cable specifications

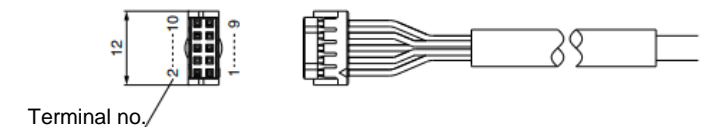


Figure 5. Connector Cable terminal layout

3.7.2.1 Connector cable colour list of each terminal number

| Terminal no. | Lead wire colour | Terminal no. | Lead wire colour |
|--------------|------------------|--------------|------------------|
| 1 | Brown | 1 | Brown |
| 2 | Red | 2 | Red |
| 3 | Orange | 3 | Orange |
| 4 | Yellow | 4 | Yellow |
| 5 | Green | 5 | Green |
| 6 | Blue | 6 | Blue |
| 7 | Purple | 7 | Purple |
| 8 | Grey | 8 | Grey |
| 9 | White | 9 | White |
| 10 | Black | 10 | Black |

Table 4. 4 stations

Table 5. 8 stations

3.6 Mounting

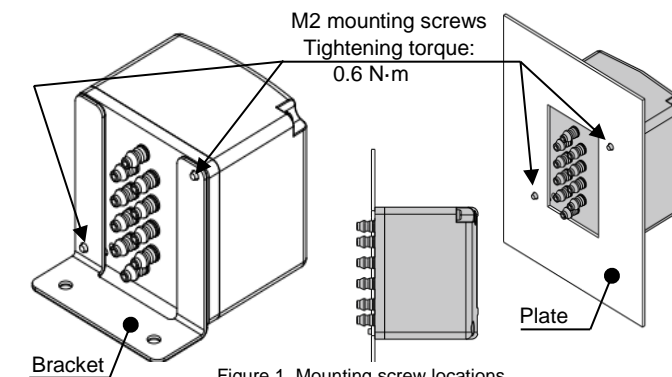


Figure 1. Mounting screw locations

3.6.1 Cut dimensions for panel mounted (mounting surface)

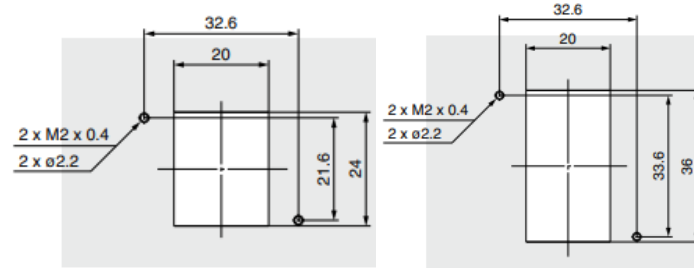


Figure 3. Mounting footprint - 4 stations

Figure 2. Mounting footprint - 8 stations

3.7.3 Unit manifold internal wiring

Caution

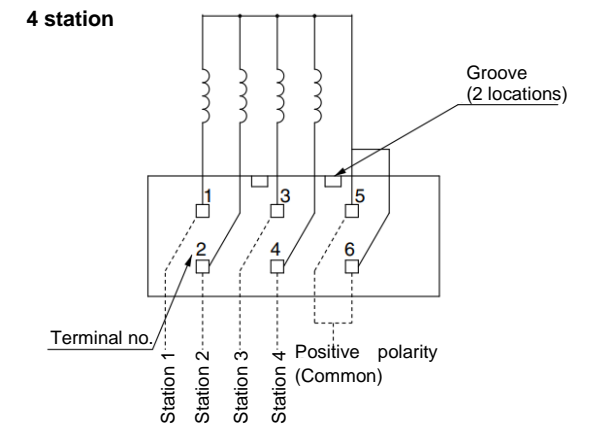


Figure 6. Wiring diagram - 4 stations

3 Installation - continued

8 station

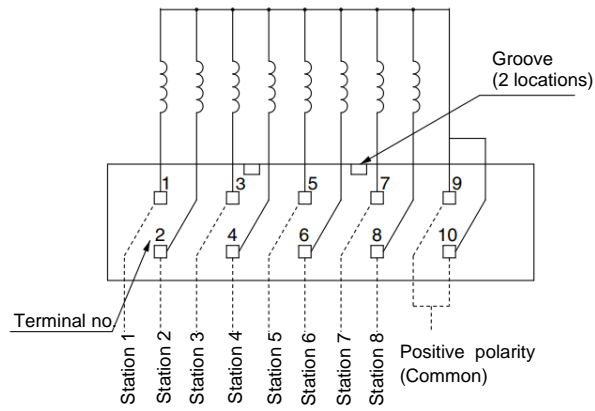


Figure 7. Wiring diagram - 8 stations

3.8 Surge voltage suppressor

3.8.1 Without power-saving circuit

Caution

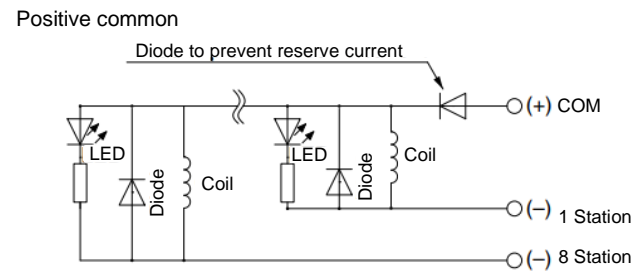


Figure 8. Circuit diagram - Without power-saving circuit, positive common

Negative common

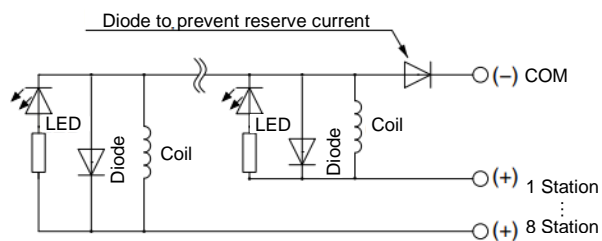


Figure 9. Circuit diagram - Without power-saving circuit, negative common

- Since 12 VDC specification does not have diodes for polarity protection, take care to avoid errors in the polarity.
- For 24 VDC, please use caution regarding the allowable voltage fluctuation, there is an approximate 1 volt drop for a valve with polarity protection. (For details, refer to solenoid specifications for the industrial valve.)

3.8.2 With power-saving circuit

Caution

- Power consumption is decreased by approx. 1/2 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 62 ms.)

Positive common

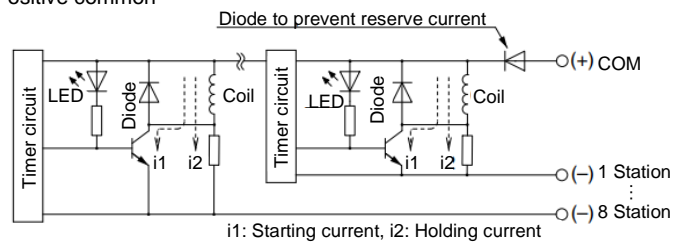


Figure 10. Circuit diagram - With power-saving circuit, positive common

3 Installation - continued

Negative common

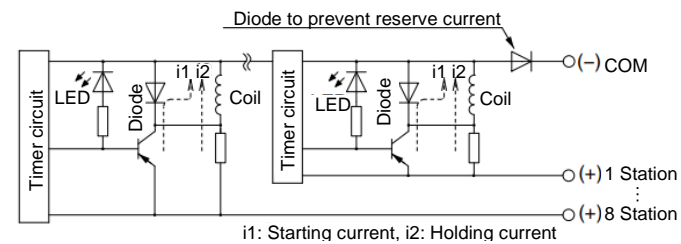


Figure 11. Circuit diagram - With power-saving circuit, negative common

3.9 Residual voltage

Caution

- Since diodes are used for surge voltage suppressor, the suppressor arrests the back EMF voltage from the coil. In this case, to approximately 1 V.
- Ensure the transient voltage is within the specification of the host controller.

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-energized 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 period 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. This will likely adversely affect the performance of the solenoid valve and any nearby peripheral equipment. Therefore, if the valve is to be energized for periods of longer than 30 minutes at a time or if during the hours of operation the energized period per day is longer than the de-energized period, we advise using a power-saving type (continuous

duty type) valve.

- 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.

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.

4 How to Order

Refer to catalogue for 'How to Order'.

5 Outline Dimensions

Refer to catalogue 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.

6 Maintenance - continued

- Do not disassemble the product, unless required by installation or maintenance instructions.

6.2 Replacement parts

- Available as replacement parts (see Figure 12):
 - 1) Unit Assembly
 - 2) Plate Assembly
 - 3) Fitting (Barb/One-touch)
 - 4) Bracket Assembly
 - 5) Connector cable
- See catalogue for more details including part numbers.

6.2.1 Mounting unit assembly to plate assembly

Caution

- Ensure gaskets are in good condition, not deformed and are dust and debris free.
- When mounting, ensure gaskets are present, aligned and securely in place and tighten screws to a torque of 0.12 N·m.

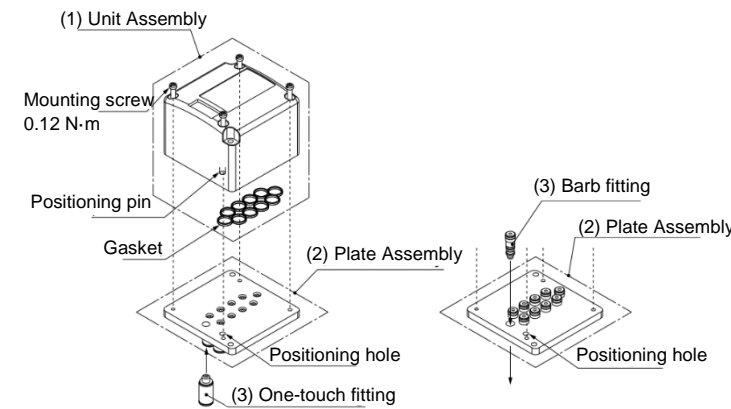


Figure 12. Manifold assembly and components

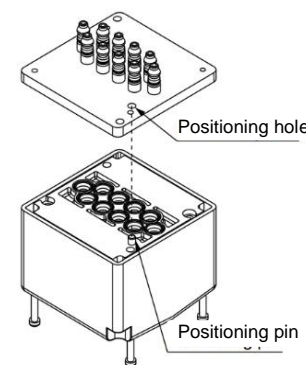


Figure 13. Mounting pin location

Align positioning pin on unit with position hole in the plate prior to assembly, then assemble with mounting screws.

7 Limitations of Use

7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

7.2 Intermediate stopping

Warning

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

7.3 Holding of pressure

Warning

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

7.4 Cannot be used as an emergency shut-off valve

Warning

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 Limitations of Use - continued

7.5 Leakage voltage

Caution

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes $\leq 3\%$ (for DC coils) of the rated voltage across the valve.

7.6 Low temperature operation

Caution

Unless otherwise indicated in the specifications for each valve, operation is possible to -10°C , but appropriate measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

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)
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