



# Operation Manual

PRODUCT NAME

64-Station Compatible Manifold Valve

MODEL/ Series

JSY1000/3000-L Series  
(Plug-in)

**SMC Corporation**

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# 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: Manipulating industrial robots -- Safety  
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. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, rake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.

3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



# Safety Instructions

## Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing business.

**Use in non-manufacturing business is not covered.**

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

## 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.\*2)

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.

\*2) 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

1.The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2.The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



## Precautions for 5 Port Solenoid Valve 1

Be sure to read before handling. Refer to main text for detailed precautions on every series.

### Design / Selection

#### Warning

##### 1. Confirm the specifications

Products represented in this instruction manual 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.) 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 using a valve, take appropriate measures (such as the installation of a cover or the restricting of access to the product) to prevent potential danger caused by actuator operation.

##### 3. Intermediate stops

For 3-position closed center, 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 actuators may malfunction due to back pressure. For 3-position exhaust center valve of single acting cylinder, take appropriate measures to prevent the malfunction by using it with an individual exhaust manifold.

##### 5. Holding pressure (including vacuum).

Since the valve 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 instruction manual 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 and inspection purposes install a system for releasing residual pressure. Especially in the case of 3-position closed center valve, 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 supply a constant supply of vacuum. 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 valves and vacuum release valves

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

##### 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 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 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 valve with specifications listed below.

- Pilot operated: A 0.4 W or lower valve, such as the SY/JSY series, or a valve with a power-saving circuit
- Direct operated: A continuous duty type valve such as the VK series or the VT series If conflicting instructions are given in the "Specific Product Precautions" or on the "How to Order Valves" page, give them priority.

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

Doing so may cause human injury and/or an accident.

##### 14. Resumption after a long period of holding time

When resuming operation after a long period of holding time, there are cases in which, regardless of whether the product is in an ON or OFF state, there is a delay in the initial response time due to adhesion. Conducting several cycles of running-in operation will solve this problem. Please consider implementing this before resumption.



# Precautions for 5 Port Solenoid Valve 2

Be sure to read before handling. Refer to main text for detailed precautions on every series.

## Design / Selection

### Caution

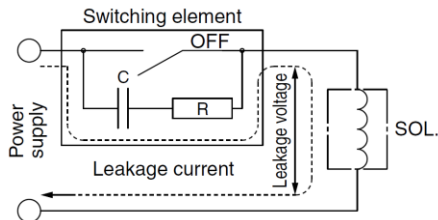
#### 1. Precautions for 2-position double solenoid valves

If a double solenoid valve is operated with momentary energization, it should be energized for at least 0.1 second. However, depending on the piping conditions, the cylinder may malfunction even when the double solenoid valve is energized for 0.1 seconds or longer. In this case, energize the double solenoid valve until the cylinder is exhausted completely.

#### 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 as 3% or less of the rated voltage.



#### 3. Surge voltage suppressor

1) The surge voltage suppressor built into the valve is intended to protect the output contacts so that the surge generated inside valve does not adversely affect the output contacts. Therefore, if an overvoltage or overcurrent is received from an external peripheral device, the surge voltage protection element inside the valve is overloaded, causing the element to break. In the worst case, the breakage causes the electric circuit to enter short-circuit status. If energizing continues while in this state, a large current flows. This may cause secondary damage to the output circuit, external peripheral device, or valve, and may also cause a fire. So, take appropriate protective measures, such as the installation of an overcurrent protection circuit in the power supply or a drive circuit to maintain a sufficient level of safety.

2) If a surge protection circuit contains nonstandard 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 approximately 1V.

#### 4. Surge voltage intrusion

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 a 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).

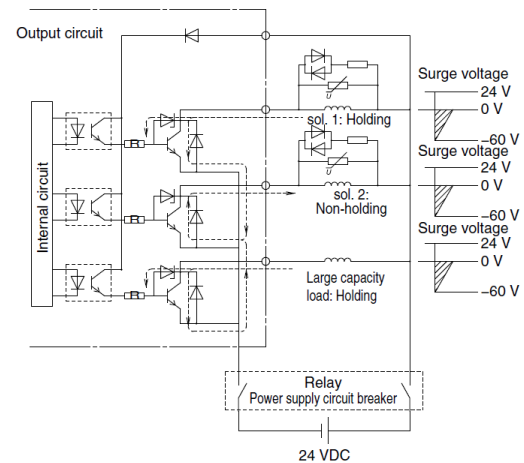


Figure 1. Surge intrusion circuit example (NPN outlet example)

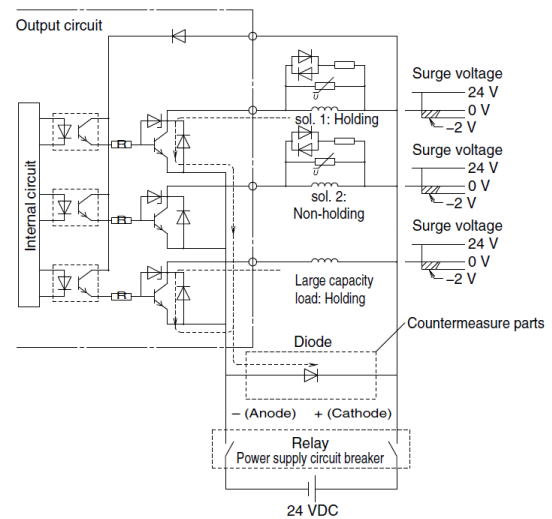


Figure 2. Surge intrusion countermeasure example (NPN outlet example)

#### 5. Operation in low temperature conditions

It is possible to operate a valve in extreme temperatures, as low as -10°C. Take appropriate measures to avoid the freezing of drainage, moisture, etc., in low temperatures.



## Precautions for 5 Port Solenoid Valve 3

Be sure to read before handling. Refer to main text for detailed precautions on every series.

### Design / Selection

#### Caution

##### 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 effect on the internal pilot type valve when 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 be energized when air is being blown.

##### 7. Mounting orientation

Mounting orientation is free.

##### 8. Initial lubrication of main valve

The initial lubricant (Grease) has already been applied to the main valve.

Please consult with SMC, as there are some standard valve products that use fluorine grease for food processing equipment (NSF H-1).

##### 9. For the pilot EXH. (PE) port

If the solenoid valve and the manifold's pilot EXH (PE) port is restricted extremely or blocked, abnormal operation of the solenoid valve may occur.

### 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 and inspection.

##### 3. Tighten threads with the proper tightening torque.

When installing the products, follow the listed torque specifications.

##### 4. If air leakage increases or equipment does not operated 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. Also, applying paint to resinous parts may have an adverse effect due to the solvent in the paint.

### Piping

#### Caution

##### 1. Refer to the Fittings and Tubing Precautions for handling one-touch fittings.

##### 2. Closed center

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

##### 3. Piping to products

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

### Wiring

#### Warning

##### 1. The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use.

#### Caution

##### 1. Polarity

When connecting power to a solenoid valve with a DC specification and equipped with a light or surge voltage suppressor, check for polarity. If there is polarity, take note of the following.

##### No diode to protect polarity.

If a mistake is made regarding the polarity, damage may occur to the diode in the valve, the switching element in a control device or power supply equipment, etc.

##### With diode to protect polarity.

If polarity connection is wrong, the valve will not operate.

##### 2. 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.

##### 3. Check the connections.

Check if the connections are correct after completing all wiring.



# Precautions for 5 Port Solenoid Valve 4

Be sure to read before handling. Refer to main text for detailed precautions on every series.

### Lubrication

#### Warning

##### 1. Lubrication

- 1) The valve has been lubricated for life by the factory and does not require any further.
- 2) If a lubricant is used in the system, use class 1 (no additives) and class 2 (with additives) ISO VG32. For details about lubricant manufacturers' brands, refer to the SMC website. Once lubricant is utilized within the system, since the original lubricant applied within the product during manufacturing will be washed away, please continue to supply lubrication to the system. Without continued lubrication, malfunctions could occur.  
If turbine oil is used, refer to the Safety Data Sheet (SDS) of the oil.

##### 2. Lubrication amount

If the lubrication amount is excessive, the oil may accumulate inside the pilot valve, causing malfunction or response delay. So, do not apply a large amount of oil. When a large amount of oil needs to be applied, use an external pilot type to put the supply air on the pilot valve side in the non-lube state. This prevents the accumulation of oil inside the pilot valve.

### Air Supply

#### Warning

##### 1. Type of fluids

Be sure to use compressed air for the fluid.

##### 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 gasses, etc., as it can cause damage or malfunction.

#### Caution

1. When low dew point 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. Consider using products compatible with low dew points such as those from the 25A-series.

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 the 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 an excessive amount of carbon powder is present, 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 the SMC Best Pneumatics catalog.

### Operating Environment

#### Warning

1. Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.
2. Products with IP65 and IP67 enclosures (based on IEC60529) are protected against dust and water. However, these products cannot be used in water.
3. Products compliant with IP65 and IP67 satisfy the product specifications when mounted properly. Be sure to read the precautions for each product.
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. Note that the valve is not for outdoor use.
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 it's energized for a long period of time, make sure the ambient temperature is within the specifications of the valve.



## Precautions for 5 Port Solenoid Valve 5

Be sure to read before handling. Refer to main text for detailed precautions on every series.

### Operating Environment

#### ⚠ Caution

- 1. Temperature of ambient environment**  
Use the valve within the range of the ambient temperature specification of each valve. In addition, pay attention when using the valve in environments where the temperature changes drastically.
- 2. Humidity of ambient environment**
  - When using the valve in environments with low humidity, take measures to prevent static.
  - If the humidity rises, take measures to prevent the adhesion of water droplets on the valve.

### Maintenance

#### ⚠ Warning

- 1. Perform maintenance and inspection according to the procedures indicated in the operation manual.**  
If handled improperly, human injury and/or malfunction or damage of machinery and equipment may occur.
- 2. Removal of equipment, and supply/exhaust of compressed air**  
Before components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply air and electric power, and exhaust all air pressure from the system using the residual pressure release function.  
For the 3-position closed center, 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 the lurching of actuators, etc. Then, confirm that the equipment is operating normally. In particular, when a 2-position double solenoid valve is used, releasing residual pressure rapidly may cause the spool valve to malfunction, depending on the piping conditions, or the connected actuator to operate.
- 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 a manual override is operated, connected equipment will be actuated.  
Operate only after safety is confirmed.
- 5. If the volume of air leakage increases or the valve does not operate normally, do not use the valve.**  
**Perform periodic maintenance on the valve to confirm the operating condition and check for any air leakage.**

#### ⚠ Caution

- 1. Drain flushing**  
Remove drainage from the air filters regularly.
- 2. Lubrication**  
In the case of rubber seals, once lubrication has been started, it must be continued.  
Use class 1 (no additives) and class 2 (with additives) ISO VG32 turbine oil. For details about lubricant manufacturers' brands, refer to the SMC website. If other lubricant oil is used, it may cause a malfunction.
- 3. Manual override operation**  
When switching a double solenoid valve via the manual override operation, instantaneous operation may cause the malfunction of the cylinder. It is recommended that the manual override be held until the cylinder reaches the stroke end position.



# JSY1000/3000-L series Specific Product Precautions 1

Be sure to read this before handling.

## Environment

### Warning

1. Products compliant with IP67 enclosures (based on IEC60529) are protected against dust and water, however, these products cannot be used in water. If using in an environment that is exposed to water and dust splashes, take measures such as using a protective cover.
2. When using built-in silencer type manifold with an IP67 enclosure, keep the exhaust port of the silencer from coming in direct contact with water or other liquids.

## Valve Mounting

### Caution

Mount it so that there is no slippage or deformation in gaskets, and tighten with the tightening torque as shown on the right.

Series	Thread size	Tightening torque
JSY1000	M1.4	0.06 N·m
JSY3000	M2	0.16 N·m

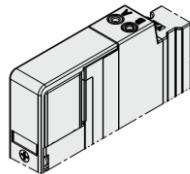
## Manual Override

### Warning

Regardless of an electric signal for the valve, the manual override is used for switching the main valve. Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger.

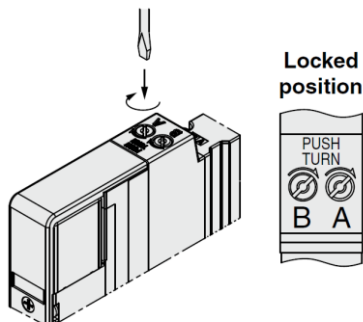
#### Non-locking push type

Push down on the manual override button until it stops.



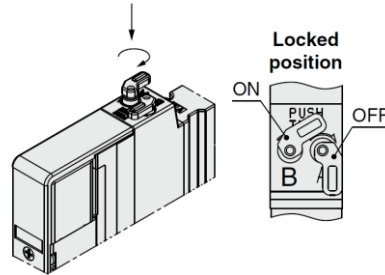
#### Push-turn locking slotted type [D type]

Push down on the manual override with a small flat head screwdriver until it stops, and then turn it 90° clockwise. The manual override is then locked. To release it, turn it counterclockwise. If it is not turned, it can be operated the same way as the non-locking push type.

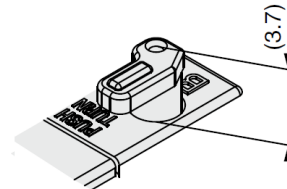


#### Push-turn locking lever type [E type]

Push down on the manual override by finger until it stops, and then turn it 60° clockwise. The manual override is then locked. To release it, turn it counterclockwise. If it is not turned, it can be operated the same way as the non-locking push type.



Carefully check the manual override projection amount. Max. (at OFF): 3.7 mm



### Caution

Do not apply excessive torque when turning the manual override. [0.1 N·m]  
When locking the manual override, be sure to push it down before turning. Turning without first pushing it down can cause damage to the manual override and other trouble such as air leakage, etc.

## Used as a 3-Port Valve

### Caution

#### In case of using a 5-port valve as a 3-port valve

This series can be used as normally closed (N.C.) or normally open (N.O.) 3-port port valves by closing one of the cylinder ports 4(A) or 2(B) with a plug. However, they should be used with the exhaust ports kept open. Use them when a double solenoid type 3-port valve is required.

Plug position		B port	A port
Type of actuation		N.C.	N.O.
Number of solenoids	Single	(A)4 2(B)  (EA)5 1 3(EB) (P)	(A)4 2(B)  (EA)5 1 3(EB) (P)
	Double	(A)4 2(B)  (EA)5 1 3(EB) (P)	(A)4 2(B)  (EA)5 1 3(EB) (P)



# JSY1000/3000-L series Specific Product Precautions 2

Be sure to read this before handling.

## Light/Surge Voltage Suppressor

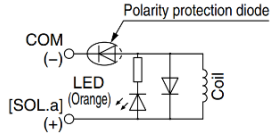
### Caution

#### ■ Polar type

##### Negative common

##### Single solenoid

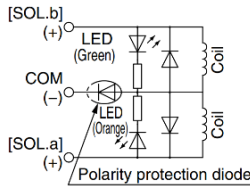
Light/surge voltage suppressor (□NZ)



##### Negative common

##### Double solenoid, 3-position, 4-position

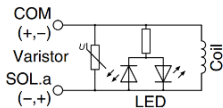
Light/surge voltage suppressor (□NZ)



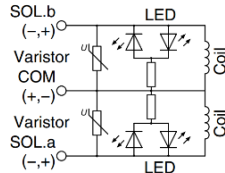
#### ■ Non-polar type

##### With light/surge voltage suppressor (□U)

##### Single solenoid

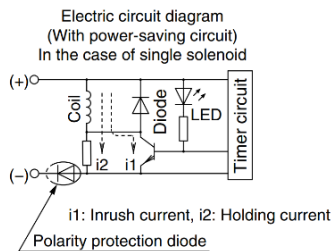


##### Double solenoid



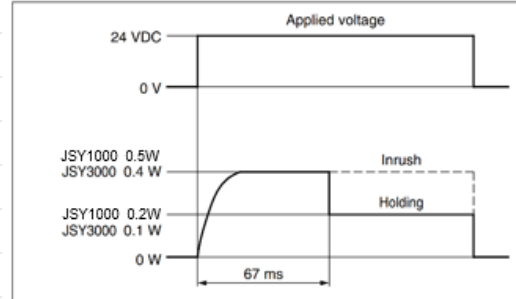
#### ■ With power-saving circuit

Power consumption is decreased to approx. 1/2.5 to 1/4 of the amount consumed at startup by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 67 ms at 24 VDC.)



The circuit shown to the left reduces the power consumption for holding in order to save energy. Refer to the electrical power waveform as shown below.

#### <Electrical power waveform with power-saving circuit>



Since the voltage will drop by approx. 0.5 V due to the transistor, pay attention to the allowable voltage fluctuation. (For details, refer to the solenoid specifications of each type of valve.)

#### Residual voltage of the surge voltage suppressor

If a varistor or diode surge voltage suppressor is used, there is some residual voltage to the protection element and rated voltage. Therefore, refer to the table below and pay attention to the surge voltage protection on the controller side. Also, since the response time does change, refer to the valve specifications on page 35.

#### Residual Voltage

Surge voltage suppressor	24 VDC
Z	Approx. 1 V
U	Approx. 47 V

## Continuous Duty

### Caution

If a valve is energized continuously for long periods of time, the rise in temperature due to heat-up of the coil assembly may cause a decline in solenoid valve performance, reduce service life, or have adverse effects on peripheral equipment. If the valve is energized continuously for long periods of time, be sure to use a valve with power saving circuit. In particular, if three or more adjacent stations on the manifold are energized simultaneously for extended periods of time or if the valves on A side and B side are energized simultaneously for long periods of time, take special care as the temperature rise will be greater.

## Energization of a 2-Position Double Solenoid Valve

### Caution

To avoid operation failure, do not energize the A side and B side of 2-position double solenoid valve at the same time.



# JSY1000/3000-L series

## Specific Product Precautions 3

Be sure to read this before handling.

### Countermeasure for Surge Voltage Intrusion

#### Caution

With non-polar type valves(JSY3000series), 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 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 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).

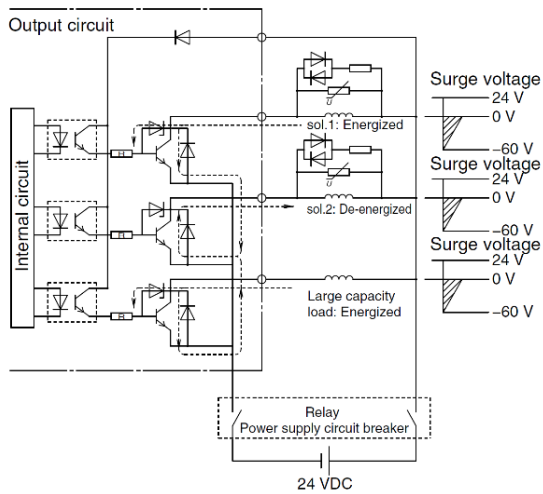


Figure 1. Surge intrusion circuit example (NPN outlet example) (24 VDC)

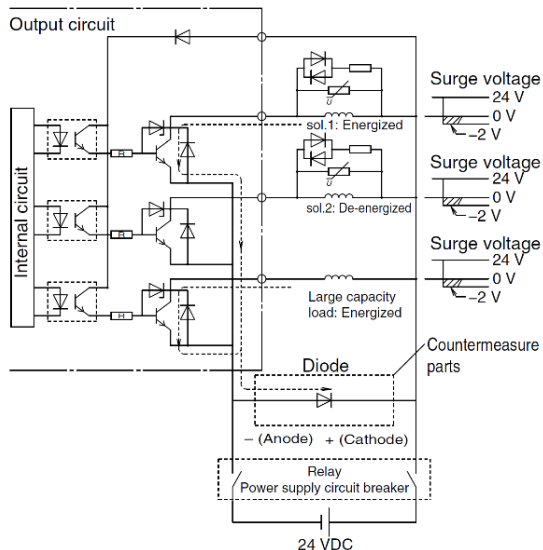
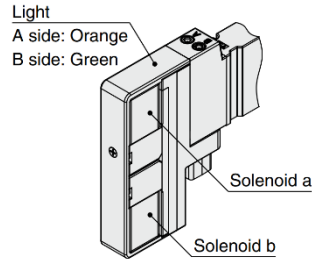


Figure 2. Surge intrusion circuit example (NPN outlet example) (24 VDC)

### Light Indication

#### Caution

When equipped with indicator light and surge voltage suppressor, the light window turns orange when solenoid a is energized, and it turns green when solenoid b is energized.



### Substrate inside Manifolds

#### Caution

The substrate inside of manifolds cannot be taken apart. Attempting to do so may damage parts.

### Fixation of DIN Rail Mounting Type Manifolds

#### Caution

1. When mounting the manifold to a DIN rail using bolts, be sure that the bottom surface of the DIN rail is in contact with the manifold installation surface (in a horizontal state), then secure both ends of the DIN rail with the bolts. However, for other mounting methods or for side facing or upside down orientations, use the formula below to calculate the number of bolts to use at even intervals along the DIN rail.

**Formula: Number of bolts = (Manifold stations + 5) / 5**  
(Round up to the nearest whole number)  
Example) For 28 stations, secure in 7 locations as a guide.

2. When using the manifold with a DIN rail in an environment where any vibration or impact is applied to it, the DIN rail itself may break. In particular, if the installation surface vibrates when mounting the manifold on the wall, or if a load is directly applied to the manifold, the DIN rail may break, causing the manifold to drop. When any vibration, impact, or load will be applied to the manifold, be sure to use a direct mounting manifold.



## JSY1000/3000-L series

# Specific Product Precautions 4

Be sure to read this before handling.

### How to Replace One-touch Fittings

#### Caution

By replacing One-touch fittings of manifold base, it is possible to change the connection diameter of the 4(A), 2(B), 1(P), 3/5(E) ports. When replacing the One-touch fittings, remove the clip or the plate before pulling the One-touch fittings off. Mount the One-touch fittings by following the removal procedure in reverse.

Use caution as it may cause air leakage if the clip and the plate are not inserted securely enough when they are switched.

For details, refer to the specific product precautions for the 5-port solenoid valve plug-in JSY series in the web catalog.

### Other Tube Brands

#### Caution

**When using other than SMC brand tube, confirm that the following specifications are satisfied with respect to the tube outside diameter tolerance.**

- |                      |                                       |
|----------------------|---------------------------------------|
| 1) Nylon tube        | within $\pm 0.1$ mm                   |
| 2) Soft nylon tube   | within $\pm 0.1$ mm                   |
| 3) Polyurethane tube | within $+0.15$ mm<br>within $-0.2$ mm |

Do not use tube which do not meet these outside diameter tolerances. It may not be possible to connect them, or they may cause other trouble, such as air leakage or the tube pulling out after connection.

### One-touch Fittings

#### Caution

##### ■ Tube attachment/detachment for One-touch fittings

###### 1) Tube attachment

1. Take a tube having no flaws on its periphery and cut it off at a right angle. When cutting the tube, use tube cutters TK-1, 2 or 3. Do not use pliers, nippers or scissors, etc. If cutting is done with tools other than tube cutters, the tube may be cut diagonally or become flattened, etc., making a secure installation impossible, and causing problems such as the tube pulling out after installation or air leakage. Allow some extra length in the tube.

2. Grasp the tube and push it in slowly, inserting it securely all the way into the fitting.

3. After inserting the tube, pull on it lightly to confirm that it will not come out. If it is not installed securely all the way into the fitting, this can cause problems such as air leakage or the tube pulling out.

###### 2) Tube detachment

Use the release tool when the removal of tube is difficult due to the tube size. For information on tube release tools, please refer to the web catalog for the 5-port solenoid valve plug-in JSY series.

1. Push in the release button sufficiently, pushing its collar equally around the circumference.

2. Pull out the tube while holding down the release button so that it does not come out. If the release button is not pressed down sufficiently, there will be increased bite on the tube and it will become more difficult to pull it out.

3. When the removed tube is to be used again, cut off the portion which has been chewed before reusing it. If the chewed portion of the tube is used as is, this can cause trouble such as air leakage or difficulty in removing the tube.

### Installation

#### Caution

Even though the inlet pressure is within the operating pressure range, when the piping diameter is restricted due to size reduction of supply port (P), the flow will be insufficient. In this case, the valve does not switch completely and the cylinder may malfunction.

# TROUBLE SHOOTING

Trouble		Possible cause	Countermeasures
Malfunction No air changeover.	The valve operates when the manual override button is pushed?  Yes	<b>1) Operation failure or sticking of the main valve.</b> ● Foreign matter from the piping and air source got caught in the main valve, causing a malfunction. ● Malfunction occurred due to sticking such as swelling of the rubber part of the main valve.	- Replace the valve. - Clean the air supply. - If incorrect oil has been used for lubrication, remove the oil by air blow. - If there is a large amount of condensate or condensate cannot be removed completely, mount an auto drain or install a dryer and replace the valve.
	No	<b>2) Pressure drop</b> Air source pressure is reduced and minimum operating pressure of the valve was not reached, causing an operation failure.	- Adjust the pressure within the specification range for the valve.
	Yes	<b>3) Excessive oil supply</b> Due to excessive lubrication, oil accumulated inside the valve, causing malfunction.	- Reduce the amount of lubrication to the amount at which the oil does not splash from the exhaust port [5/3 (EA/EB)].
	Energized? Is valve switched?  Yes	<b>1) Non-conformance of electric system</b> - Incorrect wiring - Fuse blown out, lead wire broken - Incorrect contact at the contact and connection - Sequencer non-conformance - Supply voltage insufficient	- Check all parts and replace the part, if necessary.  - Check the supply voltage.
	No	<b>2) Drop of supply voltage</b> Operation failure of the valve due to voltage drop.	- Check the supply voltage. Take corrective action if voltage drop is confirmed.
	Yes	<b>3) Non-conformance of the installed pilot valve</b> - Broken wire in the coil or burnout (High supply voltage, incorrect coil specification, entry of water)	- Replace the valve. - Protect the valve especially the coil to prevent being exposed to water.
	No	<b>1) Leakage current</b> Operation failure of the valve occurred due to residual voltage. (Valve is not turned OFF)	- Check the residual voltage. - Keep the residual voltage at 3% of the rated voltage or less.
	Yes	<b>2) Non-conformance of the installed pilot valve</b> - Foreign matter is caught in the moving part of the valve (or pilot valve). - Swelling of rubber parts inside the valve (or pilot valve)	- Clean the air supply. - Eliminate foreign matter with air blow. - Replace the valve when actions above do not improve the condition.

Trouble	For valve non-conformance, take following countermeasures referring to trouble.	Possible causes	Countermeasures
Response failure  Valve and actuator become slow.	The valve is slow. Actuators including cylinder become slow.	<p><b>1) Leakage voltage</b> When the valve is turned off, it became slow due to the leakage voltage.</p> <p><b>2) Clogging of the filter and silencer</b> Filter or silencer is clogged, or exhaust port [5/3 (EA/EB)] is blocked.</p> <p><b>3) Operation failure or sticking of the main valve.</b> Foreign matter from the piping and air source got caught in the main valve of the valve, causing a delay. Malfunction occurred due to sticking such as swelling of the rubber part of the main valve.</p>	<p>-Check the leakage voltage. -Keep the leakage voltage at 3% of the rated voltage or less.</p> <p>- Replace the filter. - Replace the silencer. - Do not block the valve exhaust port.</p> <p>- Replace the valve. - Check for abnormalities in devices other than valves. - Clean the air supply. - If incorrect oil has been used for lubrication, remove the oil by air blow. - If there is a large amount of condensate or condensate cannot be removed completely, mount an auto drain or install a dryer and replace the valve.</p>
Air leakage	<p>Find and check the air leakage point.</p> <p>1. Leakage between valve and base. (Base mounted type) Leakage between body and PE plate. (Body ported type)</p> <p>2. Air leakage from output [2(B),4(A)] port and exhaust [5 (EA),3(EB)] port.</p> <p>3. Air leakage from the pilot valve air exhaust port (PE port). (External pilot type)</p>	<p><b>1) Valve mounting screw is loose</b></p> <p><b>2) Damage or displacement of the gasket</b></p> <p><b>3) Foreign matter caught in the gasket seat</b></p> <p><b>1) Valve mounting screw is loose</b></p> <p><b>2) Internal air leakage increased because foreign matter get caught in the main valve.</b></p> <p><b>3) Sealing failure of the actuator (cylinder)</b></p> <p><b>1) Foreign matter is caught in the pilot valve armature.</b></p>	<p>-Tighten the mounting screw. <b>Proper tightening torque</b> - M1.4 : 0.06N · m - M2 : 0.16N · m</p> <p>- If gasket is scratched, replace the gasket.</p> <p>- Eliminate foreign matter with air blow. -If gasket is scratched, replace the gasket.</p> <p>-Tighten the mounting screw. <b>Proper tightening torque</b> - M1.4 : 0.06N · m - M2 : 0.16N · m</p> <p>- If gasket is scratched, replace the gasket.</p> <p>- Replace the valve. - Clean the air supply.</p> <p>- Refer to the operation manual of the actuator for details.</p> <p>- Replace the valve. - Clean the air supply.</p>

If the countermeasures above are not effective, there may be a trouble with the valve. Stop using the valve immediately.

If any of the examples below are applicable, there may be an internal trouble with the valve. Stop using the valve immediately.

- ① It was used with a voltage other than the rated voltage.
- ② The supplied oil was not the specified type.
- ③ Lubrication was stopped during operation. OR lubrication was interrupted temporarily.
- ④ Severe impact was applied.
- ⑤ Foreign matter such as condensate or dust has entered into the product.
- ⑥ Other than the cases mentioned above, any usage which falls under the precautions in this operation manual.

※ If the product has failed, then please return the valve without any modifications.

#### Revision history

1	Revision to Precautions.	2024.12
2	Addition of JSY1000	2025.11

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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