



Operation Manual

Solenoid Valve

PRODUCT NAME

25A-JSY1000/3000 Series
(Plug-in)

MODEL/ Series

SMC Corporation

Contents

Contents	1
Safety Instructions	2,3
Design / Selection	4,5
Mounting	5
Piping	6
Wiring	6
Lubrication	6
Air Supply	6
Operating Environment	7
Maintenance	7
Precautions	7
Specific Product Precautions	8 to 12
Valve Construction	13 to 18
Trouble shooting	19, 20



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: 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. 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

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, whichever is first. *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.**

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.



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.

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.

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 or 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.

Caution

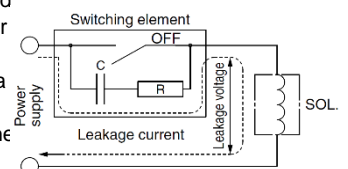
1. Precautions for 2-position double solenoid valves

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 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.





25A-JSY1000/3000 Series

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

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).

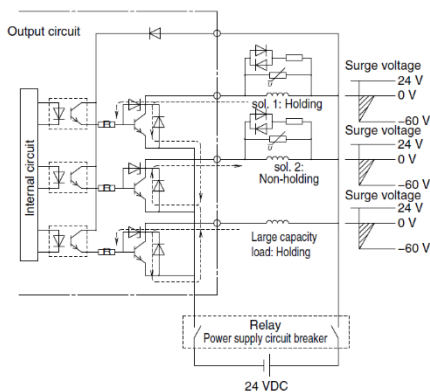


Figure 1. Surge intrusion circuit example (NPN outlet example)

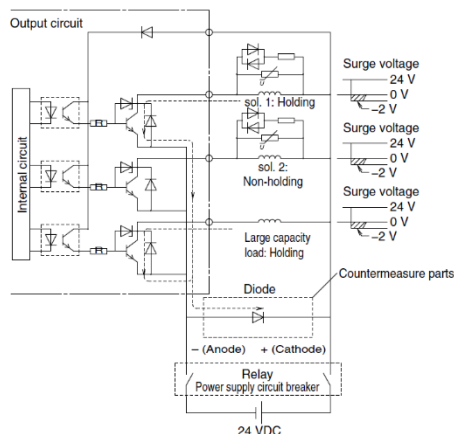


Figure 2. Surge intrusion countermeasure example (NPN outlet example)

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.

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.

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.



25A-JSY1000/3000 Series

Precautions for 5 Port Solenoid Valve 3

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

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.

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 turbine oil. 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. 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.

2. 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.

3. 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.



25A-JSY1000/3000 Series

Precautions for 5 Port Solenoid Valve 4

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

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.

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.

Precautions

Caution

Change of material

For the 25A-series, there is a restriction on the use of copper and zinc as main components in the metal materials used. Keep in mind that the aluminum alloy, aluminum die cast, and some of the stainless steel materials contain traces of copper (Cu) and/or zinc (Zn) as an additive element.

However, copper is used in some parts—the coils of solenoid valves, the circuit boards, connector pins, and lead wires of electrical equipment and auto switches, and the motors, cables, and drivers of electric actuators—whose materials cannot be easily changed to alternative materials.



25A-JSY1000/3000 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
25A-JSY1000	M1.4	0.06 N·m
25A-JSY3000	M2	0.16 N·m

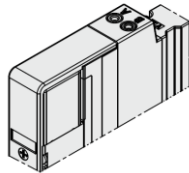
Manual Override

Warning

Manual override is used to switch the main valve without inputting an electrical signal for the valve. Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger.

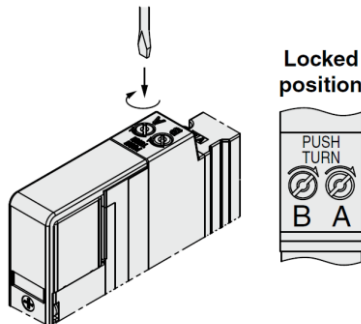
Non-locking push type

Push down on the manual override button until it stops.



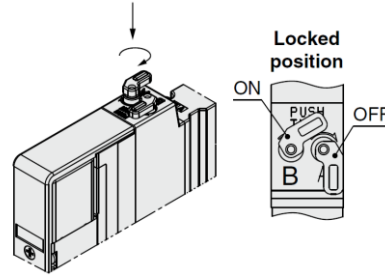
Push-turn locking slotted type [D type]

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.

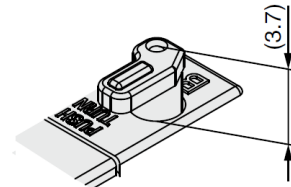


Push-turn locking lever type [E type] (Only for the 25A-JSY3000)

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

The 25A-JSY1000/3000 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)



25A-JSY1000/3000 series Specific Product Precautions 2

Be sure to read this before handling.

Light/Surge Voltage Suppressor

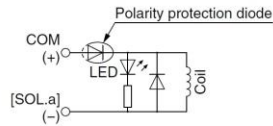
⚠ Caution

■ Polar type

Positive common

Single solenoid

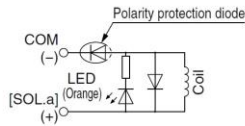
Light/surge voltage suppressor (□Z)



Negative common

Single solenoid

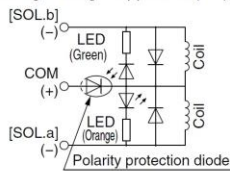
Light/surge voltage suppressor (□NZ)



Positive common

Double solenoid, 3-position, 4-position

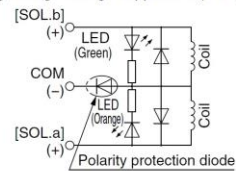
Light/surge voltage suppressor (□Z)



Negative common

Double solenoid, 3-position, 4-position

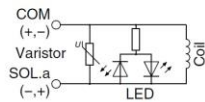
Light/surge voltage suppressor (□NZ)



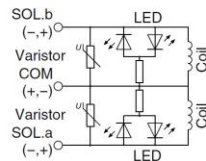
■ Non-polar type

With light/surge voltage suppressor (□U)

Single solenoid



Double solenoid

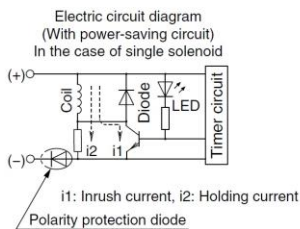


* Non-polar type is not available for the 25A-JSY1000.

■ With power-saving circuit

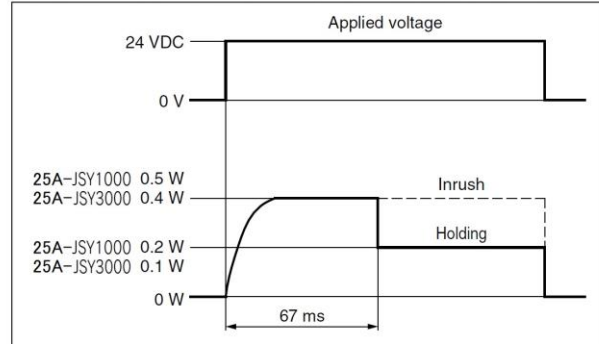
(25A-JSY3000 series products are made to order.)

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 14.

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.



25A-JSY1000/3000 series

Specific Product Precautions 3

Be sure to read this before handling.

Countermeasure for Surge Voltage Intrusion

Caution

With non-polar type valves(25A-JSY3000 series), 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).

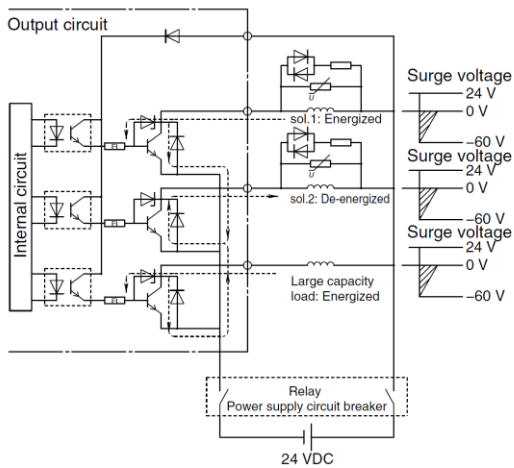


Figure 1. Surge intrusion circuit example (NPN outlet example) (24 VDC)

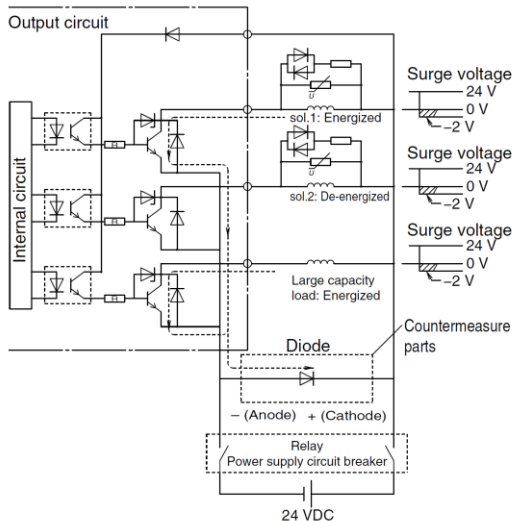


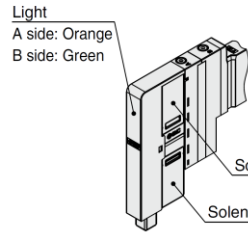
Figure 2. Surge intrusion circuit example (NPN outlet example) (24 VDC)

Light Indication

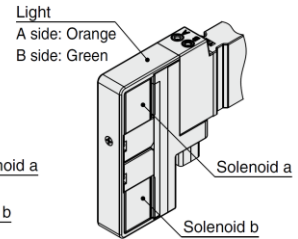
Caution

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.

<25A-JSY1000 series>



<25A-JSY3000 series>



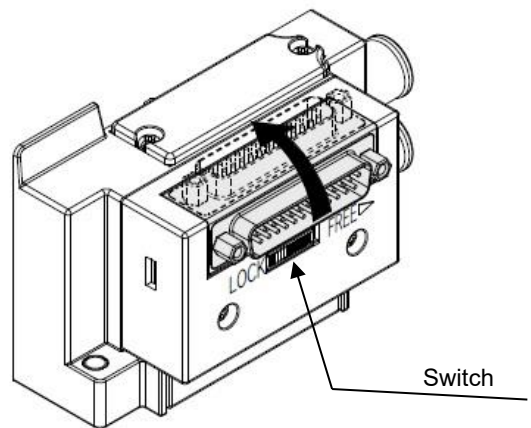
Changing Connector Entry Direction

Caution

Connector direction for electrical entry of D-sub connector and flat ribbon cable <IP40> can be changed. If the directional change is required, slide the lever on the side of the connector block to the FREE position, and then change the direction as shown in the figure. Also, before connecting the connector, be sure to return the lever to the LOCK position. (If the lever is difficult to slide, move the connector a little bit to make it easier to slide the lever.)

If an excessive force is applied on the connector in the LOCK position, the connector block may be damaged. Also, using in such a way that the connector floats in the FREE position, it may cause the lead wire etc., to break.

* Direction cannot be changed for D-sub connector <IP67> or compact type.





25A-JSY1000/3000 series

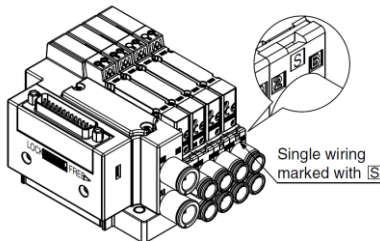
Specific Product Precautions 4

Be sure to read this before handling.

How to Order Manifolds

⚠ Caution

The letter “S” is indicated on manifold blocks for the JSY series as shown below. This indication refers to the type of substrate (single wiring) inside the manifold blocks. When there is no symbol, double wiring is used. When the manifold specification sheet does not include a wiring specification, all stations will be double wiring specification. In this case, single and double solenoid valves can be mounted in any position, but when a single valve is used, there will be an unused control signal. To avoid this, indicate positions of manifold blocks for single wiring specification and double wiring specification on a manifold specification sheet. (Note that double, 3-or 4-position valves cannot be used for manifolds blocks with single wiring specification S.)



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

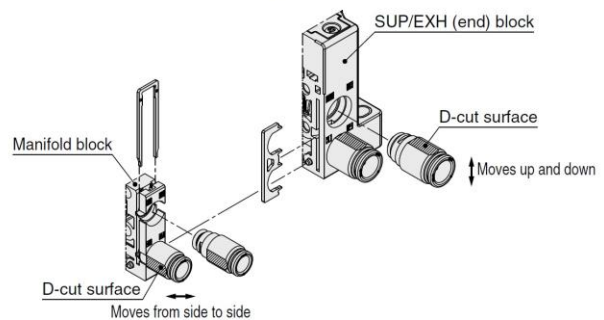
1. When the manifold is fixed with bolts on a mounting surface etc., it can be operated just by fixing on both ends of the DIN rail if the bottom surface of the DIN rail is entirely in contact with the mounting surface when mounted horizontally. However, if it is used with other mounting or with side or reverse mounting, fix the DIN rail with bolts at regular intervals. As a guide, insert bolts in 2 locations for 2-5 stations, 3 locations for 6-10 stations, 4 locations for 11-15 stations, 5 locations for 16-20 stations and 6 locations for 21-24 stations.
2. When using the manifold with DIN rail in an environment where any vibration or impact is applied to it, the DIN rail itself may be broken. 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 be broken, causing the manifold to drop. When any vibration, impact, or load is applied to the manifold, be sure to use the direct mounting manifold.

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.

■ Connector connecting base



<Assembly method>

· SUP/EXH (end) block

Fitting direction is specified when the fittings below are used. Assemble the fitting so that the D-cut surfaces of the fitting face up and down.

Fitting part no.: 25A-KQSY30-C8-X1336 (25A-JSY1000)

· Manifold block

Assemble the fitting so that the D-cut surfaces of the fitting face sideways.

Fitting part no.: 25A-KQSY10-C4-X1336 (25A-JSY1000)
25A-KQSY11-C6-X1336 (25A-JSY1000)
25A-KQSY30-C8-X1336 (25A-JSY3000)



25A-JSY1000/3000 series

Specific Product Precautions 5

Be sure to read this before handling.

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 ± 0.1 mm |
| 2) Soft nylon tube | within ± 0.1 mm |
| 3) Polyurethane tube | within $+0.15$ mm
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

- 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.
- Grasp the tube and push it in slowly, inserting it securely all the way into the fitting.
- 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. Refer to page 30 for releasing tools.

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

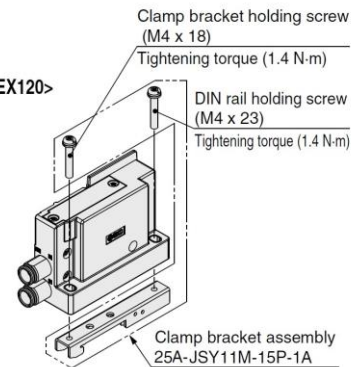
Fixing Method of 25A-JSY1000 Series Clamp Bracket

⚠ Caution

The clamp bracket fixing method for the 25A-JSY1000 series is different depending on wiring.

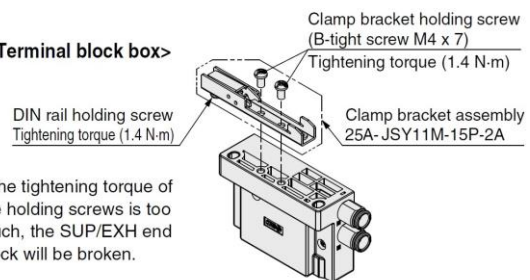
■ Wiring

<For D-sub connector/EX260/EX120>



- * When the DIN rail is not accommodated in the clamp bracket, loosen the DIN rail holding screw once and insert the DIN rail.

<For Terminal block box>



- * If the tightening torque of the holding screws is too much, the SUP/EXH end block will be broken.

Installation

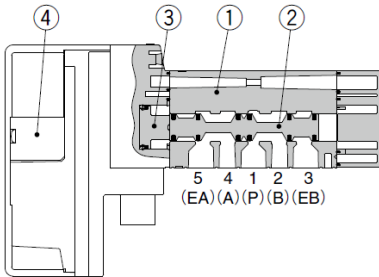
⚠ Caution

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.

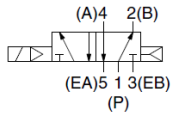
Valve Construction

Rubber Seal

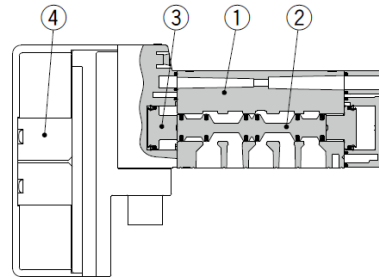
2-position single



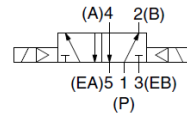
2-position single



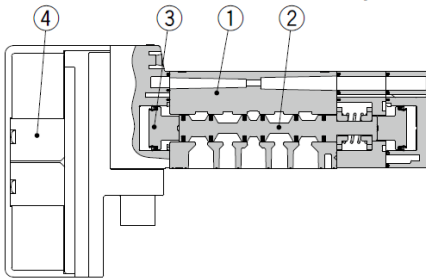
2-position double



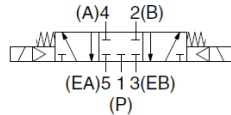
2-position double



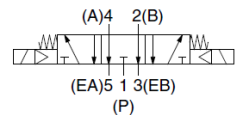
3-position closed center/exhaust center/pressure center



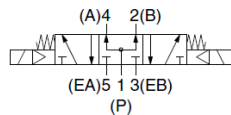
3-position closed center



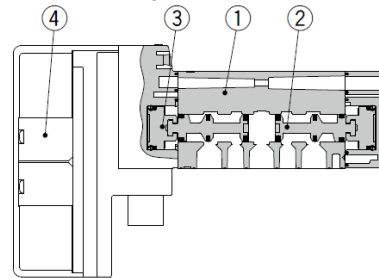
3-position exhaust center



3-position pressure center

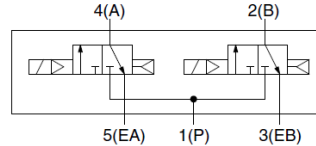


4-position dual 3-port valve

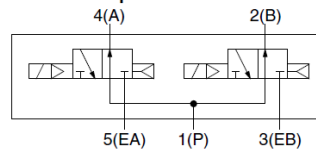


4-position dual 3-port valve

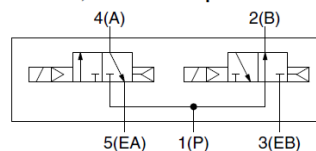
N.C. valve x 2 pcs.



N.O. valve x 2 pcs.



N.C. valve, N.O. valve 1 pc. of each



Component Parts

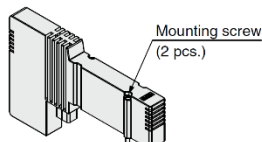
No.	Description	Material
1	Body	Aluminum die-casted
2	Spool valve	Aluminum/HNBR (4-position solenoid valve: Resin/HNBR)
3	Piston	Resin
4	Pilot valve assembly	—

25A-JSY1000/3000 Series Manifold Options

■ Blanking plate assembly

(With two mounting screws)

Used when valve additions are expected or for maintenance. A structure is in place on the blanking plate to prevent the mounting screws from sliding.



How to Order Blanking Plate Assembly

25A - JSY **3** 1M - 26P - 1A

● Series

1	JSY1000
3	JSY3000

SI Unit Part Nos.

Description	SI unit part no.	Note
EX260 SI unit	EX260-SPR1-X117	PROFIBUS DP M12 connector, 32 outputs, Negative common (PNP)
	EX260-SPR2-X117	PROFIBUS DP M12 connector, 32 outputs, Positive common (NPN)
	EX260-SPR3-X117	PROFIBUS DP M12 connector, 16 outputs, Negative common (PNP)
	EX260-SPR4-X117	PROFIBUS DP M12 connector, 16 outputs, Positive common (NPN)
	EX260-SDN1-X117	DeviceNet® M12 connector, 32 outputs, Negative common (PNP)
	EX260-SDN2-X117	DeviceNet® M12 connector, 32 outputs, Positive common (NPN)
	EX260-SDN3-X117	DeviceNet® M12 connector, 16 outputs, Negative common (PNP)
	EX260-SDN4-X117	DeviceNet® M12 connector, 16 outputs, Positive common (NPN)
	EX260-SEC1-X117	EtherCAT M12 connector, 32 outputs, Negative common (PNP)
	EX260-SEC2-X117	EtherCAT M12 connector, 32 outputs, Positive common (NPN)
	EX260-SEC3-X117	EtherCAT M12 connector, 16 outputs, Negative common (PNP)
	EX260-SEC4-X117	EtherCAT M12 connector, 16 outputs, Positive common (NPN)
	EX260-SMJ1-X117	CC-Link M12 connector, 32 outputs, Negative common (PNP)
	EX260-SMJ2-X117	CC-Link M12 connector, 32 outputs, Positive common (NPN)
	EX260-SMJ3-X117	CC-Link M12 connector, 16 outputs, Negative common (PNP)
	EX260-SMJ4-X117	CC-Link M12 connector, 16 outputs, Positive common (NPN)
	EX260-SPN1-X117	PROFINET M12 connector, 32 outputs, Negative common (PNP)
	EX260-SPN2-X117	PROFINET M12 connector, 32 outputs, Positive common (NPN)
	EX260-SPN3-X117	PROFINET M12 connector, 16 outputs, Negative common (PNP)
	EX260-SPN4-X117	PROFINET M12 connector, 16 outputs, Positive common (NPN)
EX120 SI unit	EX260-SEN1-X117	EtherNet/IP™ M12 connector, 32 outputs, Negative common (PNP)
	EX260-SEN2-X117	EtherNet/IP™ M12 connector, 32 outputs, Positive common (NPN)
	EX260-SEN3-X117	EtherNet/IP™ M12 connector, 16 outputs, Negative common (PNP)
	EX260-SEN4-X117	EtherNet/IP™ M12 connector, 16 outputs, Positive common (NPN)
	EX120-SMJ1-X220	CC-Link (Terminal block, 16 outputs, Positive common (NPN))
	EX120-SDN1-X220	DeviceNet® (Terminal block, 16 outputs, Positive common (NPN))

One-touch Fittings Part Nos.

Port size	Series	25A-JSY1000		25A-JSY3000	Note
		6.5 mm pitch	9 mm pitch		
A, B port	ø4	25A-KQSY10-C4-X1336	—	25A-KQSY30-C4	The part number is for 1 piece. (Sales unit: 10 pcs.)
	ø6	—	25A-KQSY11-C6-X1336	25A-KQSY30-C6	
	ø8	—	—	25A-KQSY30-C8-X1336	
P, E port	ø8	25A-KQSY30-C8-X1336		—	
	ø10	—	—	25A-KQSY31-C10-X1336	

How to Order Individual SUP/EXH Spacer Assembly

One-touch fitting Straight type 25A - JSY **3** 1M - **38** P - 1A - **C6**

● Series

1	JSY1000
3	JSY3000

● Spacer type

38	Individual SUP spacer
39	Individual EXH spacer

● Port size (Metric)

Symbol	P, E port	JSY1000	JSY3000
C4	ø4 One-touch fitting	●	—
C6	ø6 One-touch fitting	—	●

Part numbers of mounting screw
(2 pcs. of each)

JSY1000: 25A-JSY11V-23-5A
JSY3000: 25A-JSY31V-23-2A

Manifold Options **25A-JSY1000/3000 Series**

Manifold Parts Nos./For the 25A-JJ5SY1-10, 25A-JJ5SY3-10

Description	25A-JSY1000		25A-JSY3000
	6.5 mm pitch	9 mm pitch	
Tie-rod for additional stations	JSY11M-49P-4-1-A (6.5 mm pitch)	JSY11M-49P-3-1-A (9 mm pitch)	JSY31M-49P-2-1-A (11.5 mm pitch)
Tie-rod	JSY11M-49P-4-□-A (6.5 mm pitch)	JSY11M-49P-3-□-A (9 mm pitch)	JSY31M-49P-2-□-A (11.5 mm pitch)
Valve mounting screw	25A-JSY11V-23-4A (M1.4 x 21.5)		25A-JSY31V-23-1A (M2 x 25)
Clamp bracket (for connector connecting base)	25A-JSY11M-15P-1A (Refer to the table below.) 25A-JSY11M-15P-2A (Refer to the table below.)		25A-SY30M-15-1A

Table. 25A-JSY1000 series clamp bracket

Wiring (JSY1000 series)		25A-JSY11M-15P-1A	25A-JSY11M-15P-2A
F	D-sub connector	●	—
T	Terminal block box	—	●
S□□	EX260	●	—
S3	EX120	●	—

Manifold Parts Nos.

Ⓐ Manifold block assembly

25A - JSY 3 1M - 2P - 1 D A - C8

● **Series**

1	JSY1000
3	JSY3000

● **Manifold pitch**

1	JSY1000 (6.5 mm pitch) JSY3000 (11.5 mm pitch)
2	JSY1000 (9 mm pitch)

● **A, B port size (One-touch fittings)**

Symbol	A, B port	JSY1000		JSY3000
		6.5 mm pitch	9 mm pitch	
C4	ø4 One-touch fitting	●	—	●
C6	ø6 One-touch fitting	—	●	●
C8	ø8 One-touch fitting	—	—	●

● **Wiring type**

S	Single wiring
D	Double wiring

25A-JSY1000/3000 Series

Manifold Parts Nos.

② SUP/EXH end block assembly

25A – JSY **3** 1M – 3P – 1A – **C10**

● **Series**

1	JSY1000
3	JSY3000

● **Pilot, Silencer type**

Symbol	Pilot type		Built-in silencer
	Internal		
Nil	●	—	—
S	●	●	●

● **P, E port size (One-touch fittings)**

Symbol	P, E port	JSY1000	JSY3000
		C8	ø8 One-touch fitting
C10	ø10 One-touch fitting	—	●
00	Plug	●	●

● **Mounting**

Nil	Direct mounting
D0	DIN rail mounting (Without DIN rail)
D00 ^{*1}	DIN rail mounting (Without DIN rail)

^{*1} Part number only for the 25A-JSY1000
Part number is different depending on the wiring.
Refer to Table 1.

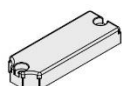
Table 1. JSY1000 series DIN rail mounting

Symbol	Wiring	
	D0	D-sub connector (F type) EX260 (S□□ type) EX120 (S3 type)
D00	Terminal block box (T type)	

Clamp bracket

Series		Part no.
JSY1000	For D0	25A-JSY11M-15P-1A
	For D00	25A-JSY11M-15P-2A
JSY3000		25A-SY30M-15-1A

■ Cover, Silencer cover for SUP/EXH (end) block assembly



Cover
(Internal pilot)



Silencer cover
(Internal pilot, Built-in silencer)

25A – JSY **3** 1M – 4P – 1A

25A – JSY **3** 1M – 5P – 1A

● **Series**

1	JSY1000
3	JSY3000

Manifold Options **25A-JSY1000/3000 Series**

Manifold Parts Nos.

© SUP/EXH block assembly

For D-sub connector

25A-JSY 3 1M-1P-3A 1-C10

Series

1	JSY1000
3	JSY3000

Pilot, Silencer type

Symbol	Pilot type	Built-in silencer
	Internal	
Nil	●	—
S	●	●

Mounting

Nil	Direct mounting
D0	DIN rail mounting (Without DIN rail)

P, E port size (One-touch fittings)

Symbol	P, E port	JSY1000	JSY3000
C8	ø8 One-touch fitting	●	—
C10	ø10 One-touch fitting	—	●
00	Plug	●	●

Connector entry direction

1	Upward
2	Lateral

For the terminal block box or EX260

25A-JSY 3 1M-1P-1A-C10

Series

1	JSY1000
3	JSY3000

Pilot, Silencer type

Symbol	Pilot type	Built-in silencer
	Internal	
Nil	●	—
S	●	●

Mounting

Symbol	Mounting	JSY1000		JSY3000
		Terminal block	EX260	
Nil	Mounting	●	●	●
D00	Direct mounting	●	—	—
D0	DIN rail mounting (Without DIN rail)	—	●	●

P, E port size (One-touch fittings)

Symbol	P, E port	JSY1000	JSY3000
C8	ø8 One-touch fitting	●	—
C10	ø10 One-touch fitting	—	●
00	Plug	●	●

For EX120

25A-JSY 3 1M-1P-14A-C10

Series

1	JSY1000
3	JSY3000

Pilot, Silencer type

Symbol	Pilot type	Built-in silencer
	Internal	
Nil	●	—
S	●	●

Mounting

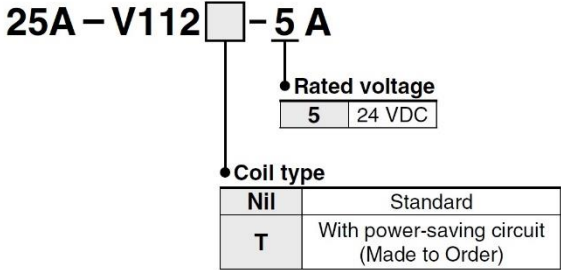
Nil	Direct mounting
D0	DIN rail mounting (Without DIN rail)

P, E port size (One-touch fittings)

Symbol	P, E port	JSY1000	JSY3000
C8	ø8 One-touch fitting	●	—
C10	ø10 One-touch fitting	—	●
00	Plug	●	●

25A-JSY3000 Series

How to Order Pilot Valves



Pilot cover

25A – SY30V – 25AS (For 25A-JSY3000)

* The pilot valve of the 25A-JSY1000 series cannot be replaced.

TROUBLE SHOOTING

Trouble		Possible cause	Countermeasures
Malfunction No air changeover.	<p>The valve operates when the manual override button is pushed?</p> <p>No →</p> <p>Yes</p>	<p>1) Operation failure or sticking of the main valve.</p> <ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> - 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.
		<p>2) Pressure drop</p> <p>Air source pressure is reduced and minimum operating pressure of the valve was not reached, causing an operation failure.</p>	<ul style="list-style-type: none"> - Adjust the pressure within the specification range for the valve.
		<p>3) Excessive oil supply</p> <p>Due to excessive lubrication, oil accumulated inside the valve, causing malfunction.</p>	<ul style="list-style-type: none"> - Reduce the amount of lubrication to the amount at which the oil does not splash from the exhaust port [5/3 (EA/EB)].
	<p>Energized? Is valve switched?</p> <p>No →</p> <p>Yes</p>	<p>1) Non-conformance of electric system</p> <ul style="list-style-type: none"> - Incorrect wiring - Fuse blown out, lead wire broken - Incorrect contact at the contact and connection - Sequencer non-conformance - Supply voltage insufficient 	<ul style="list-style-type: none"> - Check all parts and replace the part, if necessary. - Check the supply voltage.
		<p>2) Drop of supply voltage</p> <p>Operation failure of the valve due to voltage drop.</p>	<ul style="list-style-type: none"> - Check the supply voltage. Take corrective action if voltage drop is confirmed.
		<p>3) Non-conformance of the installed pilot valve</p> <ul style="list-style-type: none"> - Broken wire in the coil or burnout (High supply voltage, incorrect coil specification, entry of water) 	<ul style="list-style-type: none"> - Replace the valve. - Protect the valve especially the coil to prevent being exposed to water.
	<p>→</p>	<p>1) Leakage current</p> <p>Operation failure of the valve occurred due to residual voltage. (Valve is not turned OFF)</p>	<ul style="list-style-type: none"> - Check the residual voltage. - Keep the residual voltage at 3% of the rated voltage or less.
		<p>2) Non-conformance of the installed pilot valve</p> <ul style="list-style-type: none"> - Foreign matter is caught in the moving part of the valve (or pilot valve). - Swelling of rubber parts inside the valve (or pilot valve) 	<ul style="list-style-type: none"> - 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.	1) Leakage voltage When the valve is turned off, it became slow due to the leakage voltage.	-Check the leakage voltage. -Keep the leakage voltage at 3% of the rated voltage or less.
		2) Clogging of the filter and silencer Filter or silencer is clogged, or exhaust port [5/3 (EA/EB)] is blocked.	- Replace the filter. - Replace the silencer. - Do not block the valve exhaust port.
		3) Operation failure or sticking of the main valve. 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.	- 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.
Air leakage	Find and check the air leakage point. 1. Leakage between valve and base. (Base mounted type) Leakage between body and PE plate. (Body ported type) 2. Air leakage from output [2(B),4(A)] port and exhaust [5 (EA),3(EB)] port. 3. Air leakage from the pilot valve air exhaust port (PE port). (External pilot type)	1) Valve mounting screw is loose	-Tighten the mounting screw. Proper tightening torque - M1.4 : 0.06N · m - M2 : 0.16N · m
		2) Damage or displacement of the gasket	- If gasket is scratched, replace the gasket.
		3) Foreign matter caught in the gasket seat	- Eliminate foreign matter with air blow. -If gasket is scratched, replace the gasket.
		1) Valve mounting screw is loose	-Tighten the mounting screw. Proper tightening torque - M1.4 : 0.06N · m - M2 : 0.16N · m - If gasket is scratched, replace the gasket.
		2) Internal air leakage increased because foreign matter get caught in the main valve.	- Replace the valve. - Clean the air supply.
		3) Sealing failure of the actuator (cylinder)	- Refer to the operation manual of the actuator for details.
		1) Foreign matter is caught in the pilot valve armature.	- Replace the valve. - Clean the air supply.

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

A	RENEWAL	2022.2
B	Corrected notes on manual operation.	2024.5
C	Corrected notes and added fittings size.	2024.10

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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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