



Operation Manual

PRODUCT NAME

5 Port Solenoid Valve

MODEL / Series / Product Number

SX3000/5000/7000 Series

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 10218-1992: 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

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, 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 regulations 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.



SX3000/5000/7000 Series

Precautions for 5 Port Solenoid Valve 1

Be sure to read before handling.

Design / Selection

Warning

1. Confirm the specifications.

Products represented in this 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.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

2. Actuator drive

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

3. Intermediate stops

For 3-position closed center type, it is difficult to make a piston stop at the required position accurately due to the compressibility of air.

Furthermore, since valves and cylinders are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time.

Please contact SMC if it is necessary to hold a stopped position for an extended period of time.

4. Effects of back pressure when using a manifold

Use caution when valves are used on a manifold, because an actuator may malfunction due to back-pressure.

Especially when using a 3-position exhaust center valve or single acting cylinder, take appropriate measures to prevent malfunction by using it with an individual EXH spacer assembly or an individual exhaust manifold.

5. Holding pressure (including vacuum)

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

6. Not suitable for use as an emergency shutoff valve, etc.

The valves listed in this 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 type, ensure that the residual pressure between the valve and the cylinder is released.

8. Operation in a vacuum condition

When a valve is used for switching a vacuum, take measures to install a suction filter or similar to prevent external dust or other foreign matter from entering inside the valve.

In addition, at the time of vacuum adsorption, be sure to vacuum at all times. Failure to do so may result in foreign matter sticking to the adsorption pad, or air leakage causing the workpiece to drop.

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

If a non-vacuum valve is installed in the middle of piping system having a vacuum, the vacuum condition will not be maintained. Use a valve designed for use under vacuum 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. It is possible to shorten the energized time by making a valve with an N.O. (normally open) specification.

- For applications such as mounting a valve on a control panel, incorporate measure to limit the heat radiation so that the temperature will be high when a 3 station manifold.

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

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

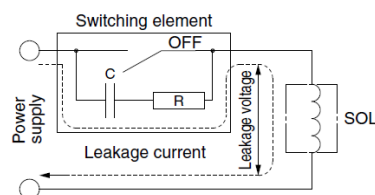
Caution

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 seconds. 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 when 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 3% or less of the rated voltage.





SX3000/5000/7000 Series

Precautions for 5 Port Solenoid Valve 2

Be sure to read before handling.

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 tatus. 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 2).

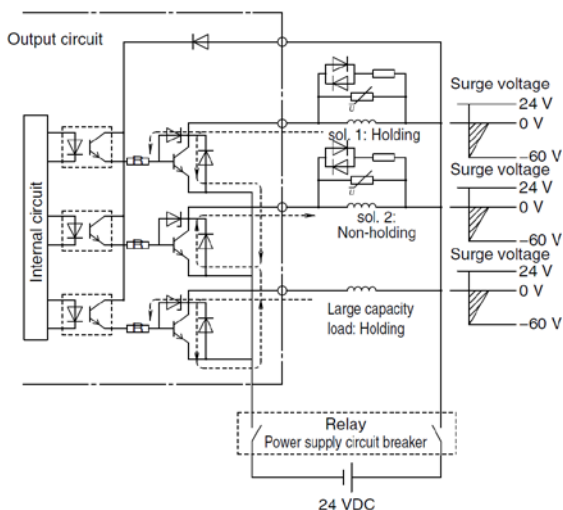


Figure 1. Surge intrusion circuit example (NPN outlet example)

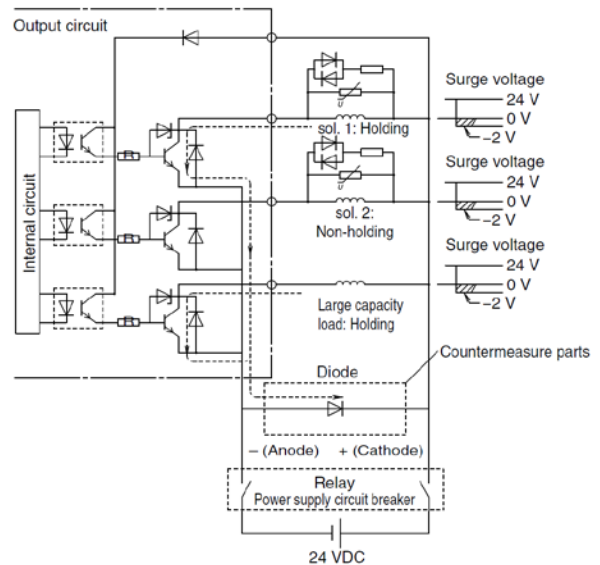


Figure 2. Surge intrusion countermeasure example (NPN outlet example)

5. Operation in a low temperature condition

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

6. Operation for air blowing

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

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

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

7. Mounting orientation

Mounting orientation is free.

8. Initial lubrication of main valve

The following initial lubricant has already been applied to the main valve.

- Rubber seal, spool valve: Grease

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.



SX3000/5000/7000 Series

Precautions for 5 Port Solenoid Valve 3

Be sure to read before handling.

Mounting

Warning

1. Operation manual

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

2. Ensure sufficient space for maintenance activities.

When installing the products, allow access for maintenance 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 operate properly, stop operation.

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

5. Painting and coating

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

Piping

Caution

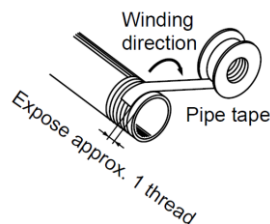
1. Refer to the Fittings and Tubing Precautions for handling One-touch fittings.

2. Preparation before piping

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

3. Winding of sealant tape

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



4. Closed center types

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

5. Connection of piping and fittings

When screwing piping or fittings into valves, tighten them as follows.

(1) When using SMC's fittings, follow the procedures below to tighten them.

1) M5

First, tighten by hand, then use a suitable wrench to tighten the hexagonal portion of the body an additional 1/6 to 1/4 turn. The reference value for the tightening torque is 1 to 1.5 N·m.

Note) Excessive tightening may damage the thread portion or deform the gasket and cause air leakage. Insufficient tightening may loosen the threads or cause air leakage.

(2) When using a fitting other than an SMC fitting, follow the instructions given by the fitting manufacturer.

2) Rc

Tighten with the proper torque shown below.

Screwing piping	Reasonable tightening torque N·m
Rc1/8	3 to 5
Rc1/4	8 to 12
Rc3/8	15 to 20

6. Piping to products

When piping to a product, refer to the operation manual to 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.

Without 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 the control device, power supply equipment, etc.

With diode to protect polarity:

If the 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.

4. External force applied to the lead wire

If an excessive force is applied to the lead wire, this may cause faulty wiring. Take appropriate measures so that a force of 30 N or more is not applied to the lead wire. When instructions are given in the Specific Product Precautions, follow these specifications.



SX3000/5000/7000 Series

Precautions for 5 Port Solenoid Valve 4

Be sure to read before handling.

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 turbine oil (no additive), ISO VG32.
Once a lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.
If turbine oil is used, refer to the Material Safety Data Sheet (MSDS) of the oil.
- 3) Please contact SMC regarding class 2 turbine oil (with additives), ISO VG32.

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

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

2. When there is a large amount of drainage.

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

3. Drain flushing

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

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

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

4. Use clean air.

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

Caution

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

2. Install an air filter.

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

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

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

4. If 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 SMC's 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. 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.
3. Do not use in a place subject to heavy vibration and/or shock.
4. The valve should not be exposed to prolonged sunlight. Use a protective cover. Note that the valve is not for outdoor use.
5. Remove any sources of excessive heat.
6. If it is used in an environment where there is possible contact with oil, weld spatter, etc., exercise preventive measures.
7. 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.



SX3000/5000/7000 Series

Precautions for 5 Port Solenoid Valve 5

Be sure to read before handling.

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 type, exhaust the residual pressure between the valve and the cylinder.

When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent 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 the manual override is operated, connected equipment will be actuated.

Operate 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 turbine oil (with no additives), VG32. If other lubricant oil is used, it may cause a malfunction. Please contact SMC for information on the suggested class 2 turbine oil (with additives), VG32.

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.



SX3000/5000/7000 Series

Specific Product Precautions 1

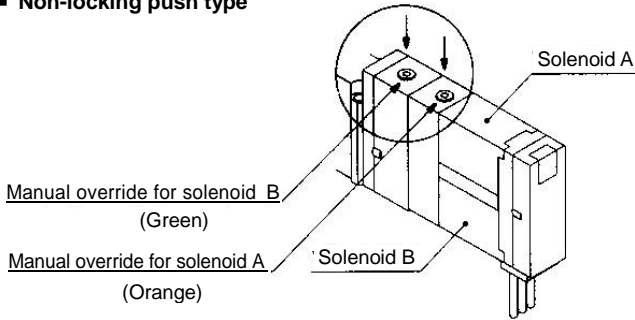
Be sure to read before handling.

Manual Override Operation

Warning

Handle carefully, as connected equipment can be actuated through manual override operation.

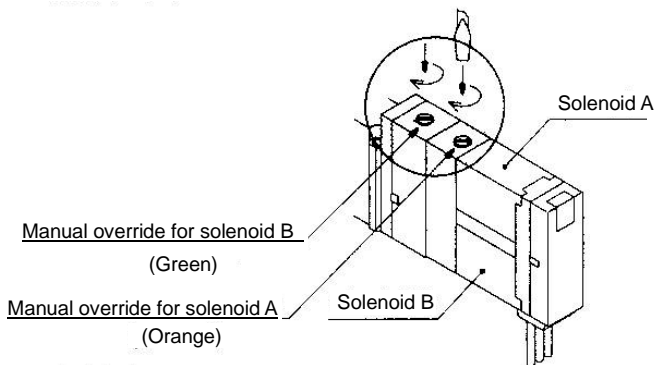
Non-locking push type



Press in the direction of the arrow.

Push-turn locking slotted type

After pushing down, turn in the direction of the arrow. If it is not turned, it can be operated the same way as the non-locking type.



Caution

When locking the manual override on the push-turn locking slotted type, 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. When operating the lock with the driver, use a watchmaker's screwdriver and turn lightly. [Torque: 0.1 N-m or less]

Exhaust Restriction

Caution

Since the SX series is a type in which the pilot valve exhaust joins the main valve exhaust inside the valve, use caution, so that the piping from the exhaust port is not restricted.

When Using a 5 Port Valve as a 3 Port Valve

Caution

When using a 5 port valve as a 3 port valve

The SX3000/5000/7000 series can be used as normally closed (N.C.) or normally open (N.O.) 3 port valves by plugging one of the cylinder ports 4(A) or 2(B). However, exhaust ports should be left open.

It is convenient when a double solenoid 3 port valve is required.

Plug position		B port	A port
Type of actuation		N.C.	N.O.
Number of solenoids	Single		
	Double		

How to Use Plug Connector

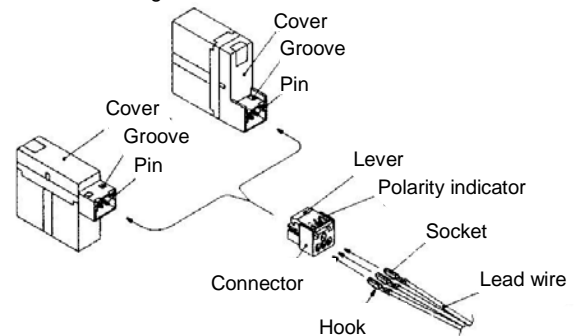
Caution

When attaching and detaching a connector, first shut off the electric power and the air supply.

Also, crimp the lead wires and sockets securely.

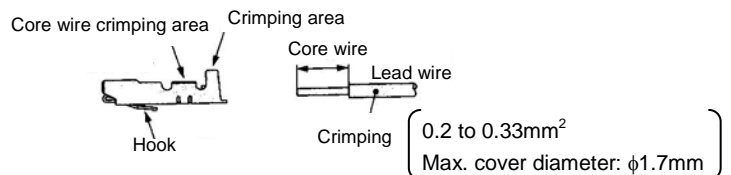
1. Attaching and detaching connectors

- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.



2. Crimping of lead wires and sockets

Peel 3.2 to 3.7 mm of the tip of lead wire, enter the core wires neatly into a socket and crimp it with a special crimp tool. Be careful so that the cover of lead wire does not enter into the crimping part. (Please contact SMC for the dedicated crimping tools.)





SX3000/5000/7000 Series

Specific Product Precautions 2

Be sure to read before handling.

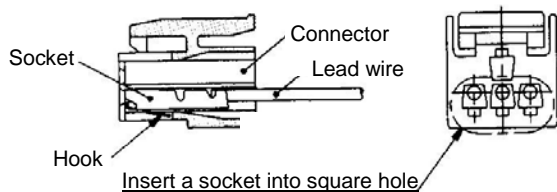
3. Attaching and detaching lead wires with sockets

- Attaching

Insert the sockets into the square holes of the connector (with +,- indication), and continue to push the sockets all the way in until the lock by hooking into the seats in the connector. (When they are pushed in, their hooks open and they are locked automatically.) Next, confirm that they are locked by pulling lightly on the lead wires.

- Detaching

To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (approx. 1 mm). If the socket is used again, spread the hook outward.



■ Plug connector lead wire lengths

Standard length is 300 mm, but the following lengths are also available.

How to order L/M connector assembly

Positive common specifications

For single solenoid : SX100-40-4S-

For double solenoid : SX100-40-4D-

For 3 position

Negative common specifications

For single solenoid : SX100-41-4S-

For double solenoid : SX100-41-4D-

For 3 position

NI	Lead wire length
3	300mm
6	600mm
10	1000mm
15	1500mm
20	2000mm
25	2500mm
30	3000mm
50	5000mm

How to order

Include the connector assembly part number together with the part number for the plug connector's solenoid valve without connector.

<Example>

Lead wire length 2000mm
 SX3120-5LO-M5
 SX100-40-4S-20

Common Connector Assembly for Manifold

⚠ Caution

With the common connector assembly all of the common lead wires are tied together and this reduces wiring time.

Common connector assembly part number

Positive common specifications

For single solenoid

SX100-42-4S

For double solenoid, 3 position type

SX100-42-4D

With common lead wire for single solenoid

SX100-40-4S

With common lead wire for double solenoid, 3 position type

SX100-40-4D

(Lead wire length 300mm)

Negative common specifications

For single solenoid

SX100-43-4S

For double solenoid, 3 position type

SX100-43-4D

With common lead wire for single solenoid

SX100-41-4S

With common lead wire for double solenoid, 3 position type

SX100-41-4D

(Lead wire length 300mm)

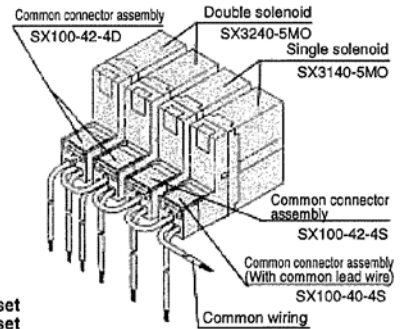
How to Order

When ordering a common connector lead wire assembly, indicate the model no. for manifold, solenoid valve and common connector assembly. For more complicated assemblies, refer to the manifold specification sheet.

Note1) Applications like connectors not wired to a valve or when there is a blank station between valves is not possible.

Note2) Designate "Without connector" of plug connector style for solenoid valve. Grommet style is not applicable.

Note3) Connector assembly with lead wire for place where the signals are transmitted to the common wiring. (Only the valves of first station and/or last station of manifold are compatible to connector with lead wire for common.)

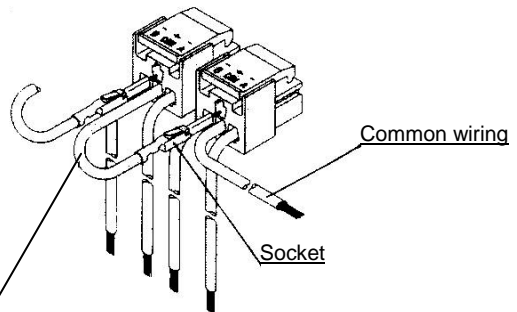


- SS5X3-41-04-C6 1 set
- * SX3140-5MO 2 set
- * SX3240-5MO 2 set
- * SX100-40-4S 1 set (Single solenoid with lead wire for common)
- * SX100-42-4S 1 set (Single solenoid)
- * SX100-42-4D 2 set (Double solenoid, 3 position)

↳ The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

Common Connector Assembly Wiring

When ordering common connector assemblies alone, wiring should be performed as outlined in the drawing below. For details on attachment of sockets, refer to the section "How to Use Plug Connectors" on page 9.



Insert the socket into the connector (below COM indicator) of the neighboring solenoid valve.

Flat ribbon cable/Connector assembly no. for 20P, 41P, 42P

SX3000/5000/7000

● Positive common specifications

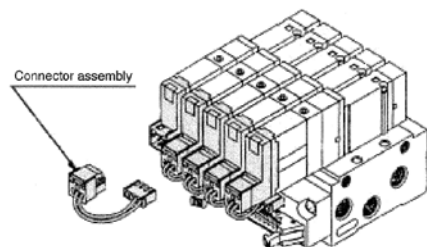
For single solenoid: SX3000-23-1A

For double solenoid, 3 position type: SX3000-23-2A

● Negative common specifications

For single solenoid: SX3000-24-1A

For double solenoid, 3 position type: SX3000-24-2A





SX3000/5000/7000 Series

Specific Product Precautions 3

Be sure to read before handling.

One-touch Fittings

Caution

The pitch of the SX series piping ports (PE, A, B etc.) has been set assuming the use of KJ series one-touch fittings. Therefore, when using fittings, there may be some interference between fittings, depending on the type and size, so please use after checking dimensions in the catalog for the pipe fitting being used.

1. Tube attachment/detachment for one-touch fittings

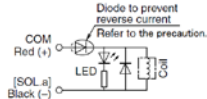
- 1) Attaching of tubing
 - (1) Take a tube having no flaws on its periphery and cut it off at a right angle. When cutting the tube, use tube cutters TK-1, 2 or 3. Do not use pinchers, nippers or scissors, etc. If cutting is done with tools other than tube cutters, there is the danger that the tube may be cut diagonally or become flattened, etc., making a secure installation impossible and flatness cannot be surely installed and it causes the tube omission and the air leakage after it closes it.
 - (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) Detaching of tubing
 - (1) Push in the release button sufficiently, and push the collar evenly at the same time.
 - (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.

Light/surge Voltage Suppressor

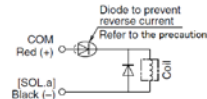
Caution

Pos. common specifications
Single solenoid type

Light/Surge voltage suppressor

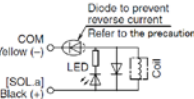


Surge voltage suppressor

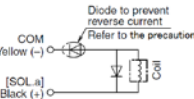


Neg. common specifications
Single solenoid type

Light/Surge voltage suppressor

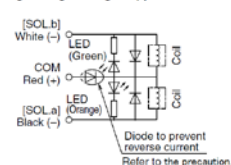


Surge voltage suppressor

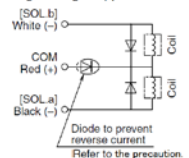


Pos. common specifications
Double solenoid, 3 position type, 4 position type

Light/Surge voltage suppressor

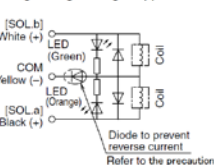


Surge voltage suppressor

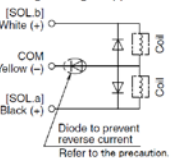


Neg. common specifications
For double solenoid, 3 position type, 4 position type

Light/Surge voltage suppressor



Surge voltage suppressor



Connect so that polarity is matched to the connector's (+), (-) and A, B and COM indicators. In the case of voltage specifications other than 12 or 24 VDC, take care to avoid mistaking polarity, as there is no diode to prevent reverse current.

In the event that lead wires are connected in advance, they will be as shown below.

Pos. common specifications

- A (-) : Black
- COM (+) : Red
- B (-) : White(Without lead wire case of single solenoid)

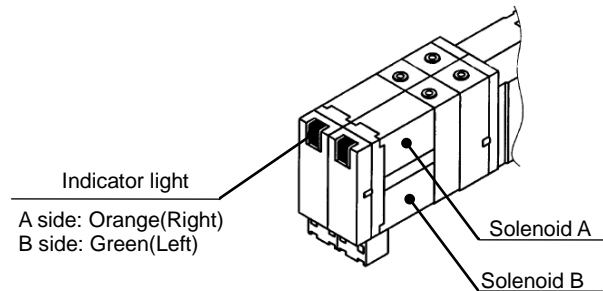
Neg. common specifications

- A (+) : Black
- COM (-) : Yellow
- B (+) : White(Without lead wire case of single solenoid)

Light Indication

Caution

When equipped with light/surge voltage suppressor, the light window turns orange when solenoid A is energized, and it turns green when solenoid B is energized.



Fixed DIN rail manifold

Caution

Fixed "45", "45□" DIN rail manifold to the setting side with screws, fix points as follows: 2 to 5 stations: 2 points 6 to 10 stations : 3points 11 to 15 stations: 4 points 16 to 20 stations:5 points
If fixed at lesser points than specified and use it, there could be a warp or torsion in the DIN rail and the manifold and lead to bring some troubles such as air leakage.

Solenoid Valve Mounting

Caution

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

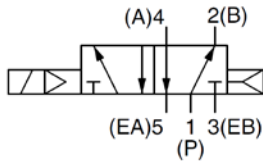
Model	Thread size	Tightening torque
SX3000	M2	0.17 N·m
SX5000	M3	0.8 N·m
SX7000	M4	1.4 N·m

Construction Body ported type

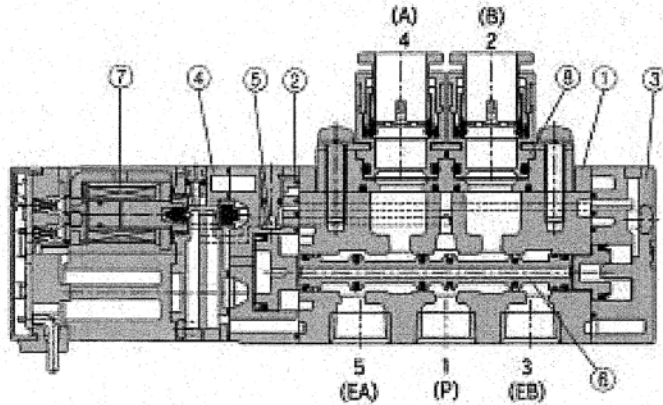
Series SX

JIS Symbol

2 position single

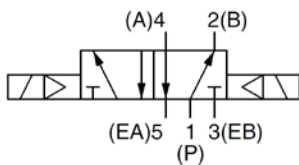


2 position single

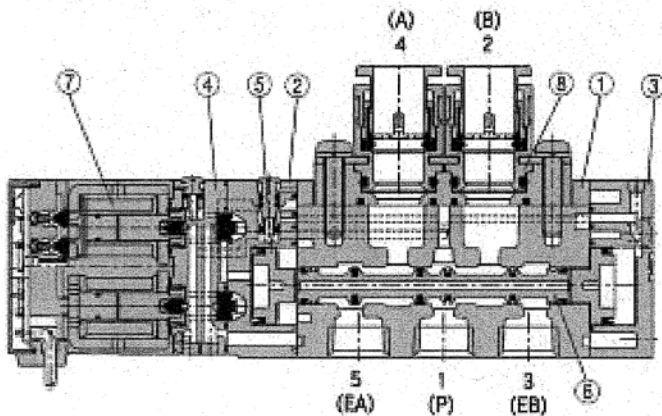


JIS Symbol

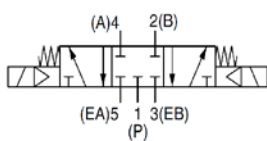
2 position double



2 position double

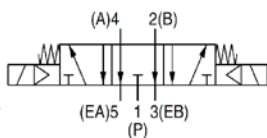


3 position closed center

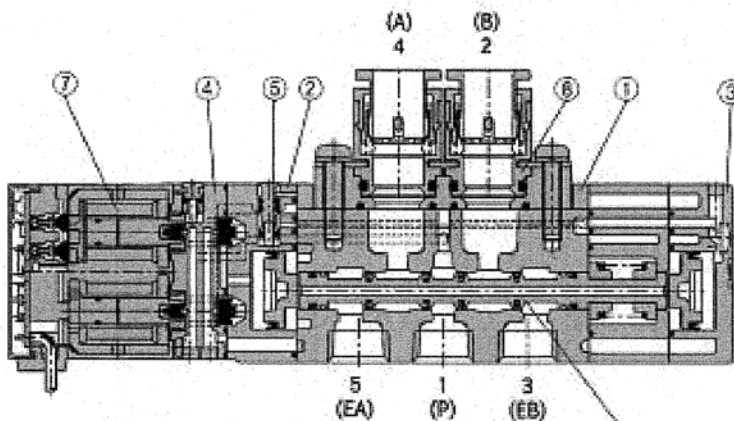
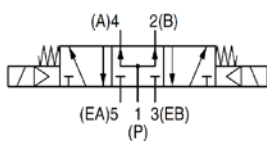


3 position closed center/exhaust center/pressure center

3 position exhaust center



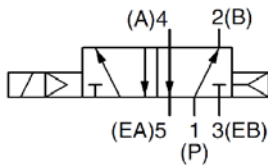
3 position pressure center



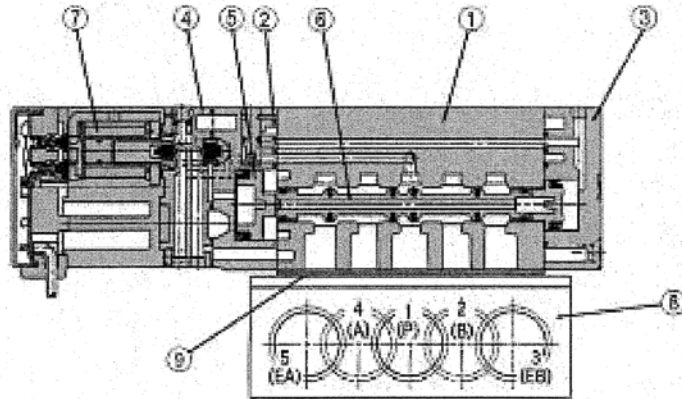
(This figure shows a closed center type.)

Construction Base mounted type

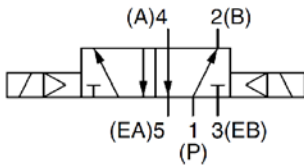
JIS Symbol
2 position single



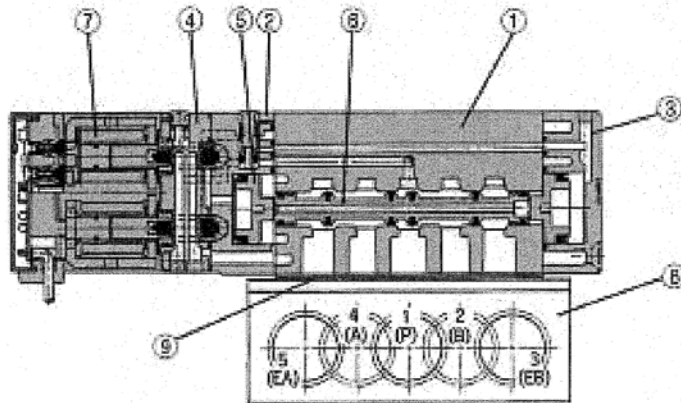
2 position single



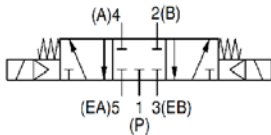
JIS Symbol
2 position double



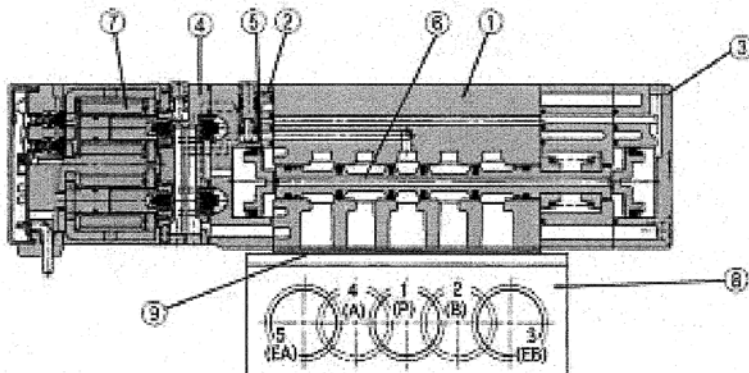
2 position double



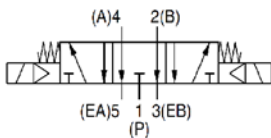
3 position closed center



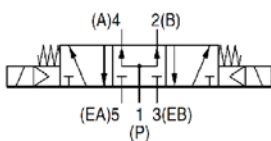
3 position closed center/exhaust center/pressure center



3 position exhaust center



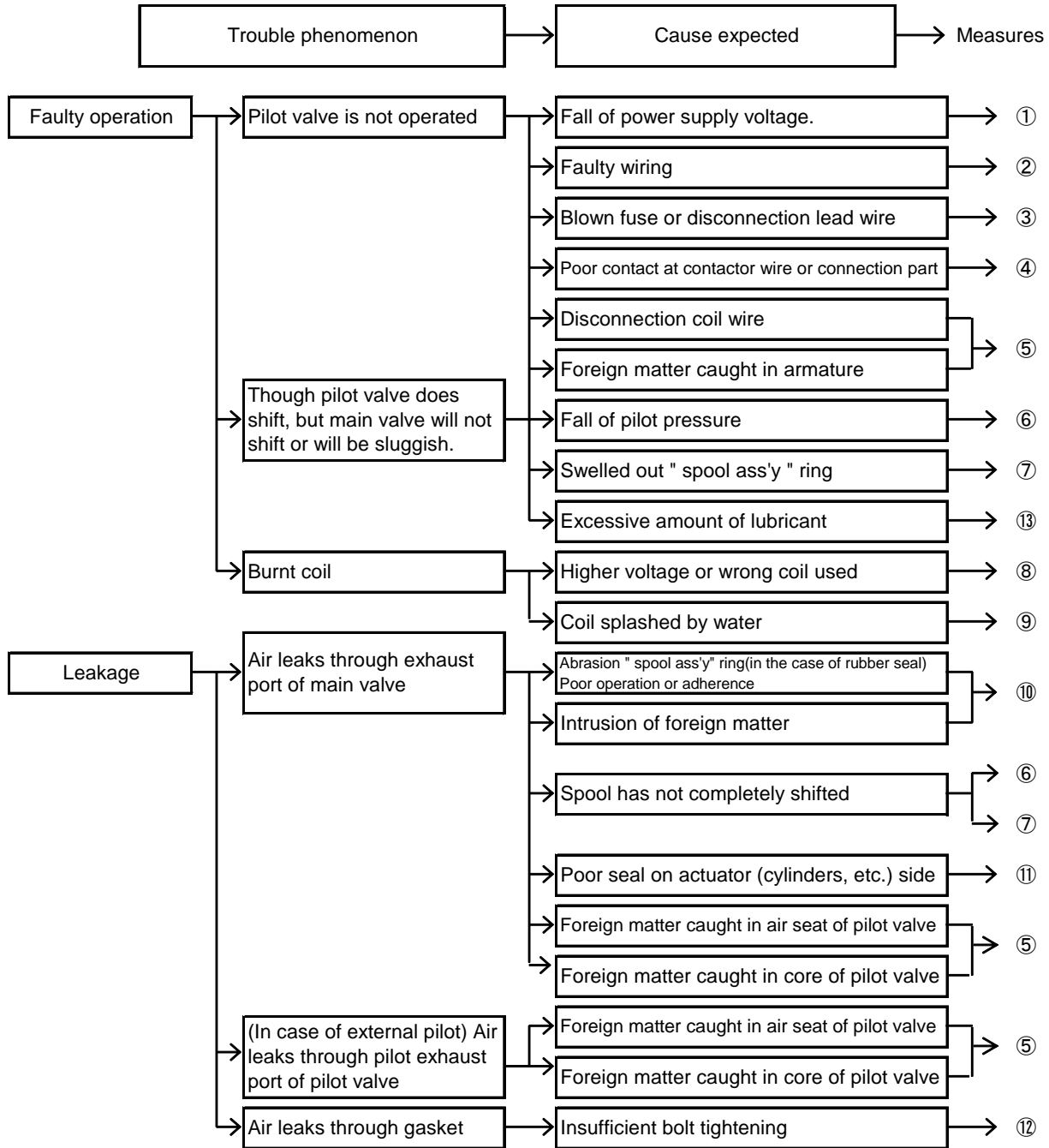
3 position pressure center



(This figure shows a closed center type.)

TROUBLESHOOTING

Should any trouble be found during operation, trace the source of the trouble in the following order and take corrective action.



Remedy

No.	Remedy
①	Regulate voltage, so that the voltage at the time of the operation becomes specifications range.
②	Re-wire correctly.
③	Replace part.
④	Replace part or re-wire positively.
⑤	Replace valve.
⑥	Regulate pressure so that pilot pressure will fall within operating pressure range during operation.
⑦	·If wrong oil is used, completely air blow to remove oil, and replace valve. After valve is replaced, use turbine oil class 1 (ISO VG32). ·When a large quantity of drain is given and cannot carry out drain omission surely, install either an auto-drain or a dryer. The valve should be replaced.
⑧	Check voltage. Replace valve (pilot valve).
⑨	Protect the valve so that water does not splash the coil. Replace valve (pilot valve).
⑩	In case of intrusion of foreign matter, to remove foreign matter by air blow of piping and then replace valve.
⑪	Repair or replace actuators.
⑫	After stopping air and re-tighten the bolts.
⑬	Reduce the amount of lubricant to the degree that no oil splashes out of the air exhaust (E) port.

If no improvement is achieved in spite of the above countermeasure, inside of the valve may have some abnormality. In this case, stop using the valve immediately.

If any of followings are carried out, inside of the valve may have some failure. In this case, stop using the valve immediately.

- ① Voltage out of rated voltage has been used.
- ② Oil other than the specified one has been lubricated.
- ③ Lubrication has been stopped intermediately, or lubrication was suspended temporary.
- ④ Water splashed directly.
- ⑤ Strong impact was given.
- ⑥ Alien substance such as drain and particle got into. Drain or garbage invaded a valve.
- ⑦ Prohibited way of using the valve which is written at "Precautions" section in this operation manual was carried out excluding above-mentioned.

In addition, in the case of trouble, please send it back to the supplier for repair or replacement.

Revision	
B	RENEWAL 2018.8

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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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SX3000-OMM0002-B