



Operation Manual

Solenoid Valve

PRODUCT NAME

SY3000/5000/7000/9000 Series
(Pilot Valve:V100)

MODEL/ 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



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.*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.



SY Series

5 Port Solenoid Valve / Precautions ①

Be sure to read before handling.

Design

⚠ Warning

① Operation of actuator

When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation

② Intermediate stopping

When a 3 position closed center valve is used to stop a cylinder at intermediate position, accurate stopping of the piston in a predetermined position is not possible 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 stopped position for an extended length of time. Contact SMC if it is necessary to hold a stopped position for an extended time.

③ Effect of back pressure when using a manifold.

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

④ Holding of pressure (including vacuum)

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

⑤ Cannot be used as an emergency shut off valve, etc.

The valves presented in this operation manual are not designed for safety applications such as an emergency shut off valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

⑥ Maintenance space

The installation should allow sufficient space for maintenance activities (removal of valve, etc.).

⑦ Release of residual pressure

Provide a residual pressure release function for maintenance purpose. Especially in case of 3 position closed center valve or perfect valve, ensure the release of residual pressure between valve and cylinder.

⑧ Vacuum applications

When a valve is used for vacuum switching, etc. take measures against the suction of external dust or other contaminants from vacuum pads and exhaust ports, etc. Moreover, an external pilot type valve should be used in this case. Contact SMC in case of an internal pilot type or air operated valve, etc.

⑨ About using the 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 a valve. Implement countermeasures not to occur any danger by the actuator's operation.

⑩ About ventilation

When it is used inside a sealed control panel, etc. provide ventilation to prevent a pressure increase caused by exhausted air inside the control panel or temperature rise caused by the heat generated by valve.

Selection

⚠ Warning

① Confirm the specifications

The products presented in this operation 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 specifications.) Contact SMC when using a fluid other than compressed air (including vacuum).

② Long period of continuous energization

- Continuous energization of the valve for extended periods of time may have an adverse effect on the solenoid valve performance and the peripheral equipment due to temperature rises caused by the heat generation of the coil. Please consult SMC if valves will be continuously energized for extended periods of time or the energized period per day will be longer than the de-energized period. It is also possible to shorten the energization period by using valves of the N.O. (normally open) type.
- When solenoid valves are mounted in a control, employ measures to radiate excess heat, so that temperatures remain within the valve specification range. Use special caution when three or more stations sequentially aligned on the manifold are continuously energized since this will cause a drastic temperature rise. (As for AC specifications, since the applicable merchandises are ready to provide separately, please contact SMC.)

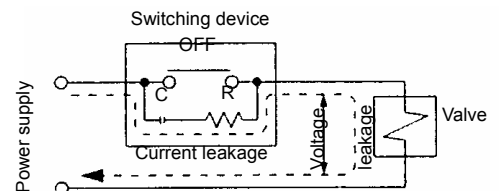
⚠ Caution

① Momentary energization

If a double solenoid valve will be operated with momentary energization, it should be energized for at least 0.1 second. However, depending on the secondary load conditions, it should be energized until the cylinder reaches the stroke end position, as there is a possibility of malfunction otherwise.

② Leakage voltage

When using a resistor in parallel the switching element or using a C-R element (surge voltage suppressor) for protection of the switching element, note that leakage voltage will increase due to leakage current flowing through the resistor or C-R element. Limit the amount of residual leakage voltage to the following values.



DC coil: Should be 3% or less of the rated voltage
AC coil: should be 8% or less of the rated voltage



SY Series

5 Port Solenoid Valve / Precautions ②

Be sure to read before handling.

Selection



Caution

③ Solenoid valve drive for AC with solid state output (SSR, TRIAC output, etc.)

1) Voltage leakage

When using a snubber circuit (C-R element) for surge protection of the output element, very small electric current will still continue to flow in spite of the OFF state. This results in the valve not returning. In the cases when exceeding the tolerance as shown above, take measures to install a bleeder resistor.

2) Minimum allowable load (Min. load current)

When the consumption current of a valve is equal or less than the output element's the minimum allowable load volume or the margin is small, the output element may not be switched normally. Please confirm SMC.

④ Surge voltage suppressor

If a surge protection circuit contains non-ordinary diodes such as Zener diodes or Varistor, a residual voltage that is in proportion to the protective elements and the rated voltage will remain. Therefore, give consideration to surge voltage protection of the controller. In the case of diodes, the residual voltage is approximately 1 V.

⑤ Low temperature operation

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

⑥ Using for air blow

When using a solenoid valve for air blow, use an external pilot type. Take note that when internal pilots and external pilots are used on the same manifold, the pressure drop caused by the air blowing can have an effect on the internal pilot type valves. Moreover, when compressed air within the pressure range of the established specifications is supplied to the external pilot 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

No specific orientation is necessary.

Mounting



Warning

① 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.

② Instruction manual

Mount and operate the product after reading the manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

③ Painting and Coating

Warnings or specifications printed or pasted on the product should not be erased, removed or covered up. Consult SMC if paint is to be applied to resinous parts, as this may have an adverse effect due to the paint solvent.

Piping



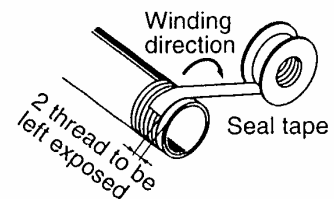
Caution

① 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.

② Wrapping of sealant tape

When connecting pipes and fittings, etc. be sure that chips from the pipe thread and sealing materials do not get inside the valve. Furthermore, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



③ Closed Center valves

When using closed center type valves, check carefully to be sure there are no air leaks from the piping between the valves and cylinders.



SY Series

5 Port Solenoid Valve / Precautions ③

Be sure to read before handling.

Piping



Caution

④ Screwing in

When connecting fittings to valves, tighten as indicated below.

1) M3, M5 types

- When using SMC fitting, follow the guidelines below. After tightening by hand, tighten an additional 1/4 (M3), 1/6 (M5) turn with a tightening tool. However, if miniature fittings are used, tighten an additional 1/4 turn with a tightening tool after tightening by hand. For fittings with gaskets in 2 locations, e.g., universal elbow or universal tee, tighten an additional 1/2 turn.

Note) If fittings are over-tightened, air leakage may result due to breaking of fitting threads or deformation of the gaskets. However, if fittings are not tightened sufficiently, loosening of the threads and air leakage and may occur.

- When fittings other than SMC fittings are used, follow the instructions of the respective fitting manufacturer.

2) For threads

Fasten with the proper tightening torques as shown below.

Tightening torque for piping

Connection threads	Proper tightening torque N·m
1/8	7 to 9
1/4	12 to 14
3/8	22 to 24
1/2	28 to 30
3/4	28 to 30
1	36 to 38
1 1/4	40 to 42
1 1/2	48 to 50
2	48 to 50

⑤ Connection of piping to products

When connecting piping to a product, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

Wiring



Caution

① Polarity

When connecting power to a DC specification solenoid valve equipped with (indicator light) surge voltage suppressor, confirm whether or not there is polarity. If there is polarity, take note of the following points.

Without built-in diode to protect polarity,:

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

With diode to protect polarity:

If a mistake is made regarding polarity, it will not be possible to switch the valve.

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 burn out the coil.

③ Confirm the connections.

After completing the wiring, confirm that the connections are correct.

Lubrication



Caution

① Lubrication

1) The valve has been lubricated for life at the factory, and does not require any further lubrication.

2) In the event that it is lubricated, use class 1 turbine oil (without additives), ISO VG32.

However, once lubrication is applied it must be continued, as loss of the original lubricant may lead to malfunction.

Contact SMC regarding class 2 turbine oil (with additives), ISO VG32.

Air source



Warning

① Use clean air

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.



SY Series

5 Port Solenoid Valve / Precautions④

Be sure to read before handing.

Air source

Caution

① Install air filter

Install air filters close to valves at their upstream side. A filtration degree of 5 μ m or less should be selected.

② Install an air dryer, after cooler or Drain Catch(water separator), etc.

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipments. To prevent this, install an air dryer, after-cooler, or water separator, etc.

③ If excessive carbon dust is generated, eliminate it by installing mist separators at the upstream side of valves.

If excessive carbon dust is generated by the compressor, it may adhere to the inside of valves and cause malfunction.

Refer to SMC 's " Air Cleaning Equipment " catalog for further details on compressed air quality.

Operating Environment

Warning

- ① Do not use valve in atmosphere of corrosive gases, chemicals, salt water, water or steam or where there is direct contact with any of these.
- ② Products with IP65 enclosures (based on IEC529) are protected against dust and water, however, three products cannot be used in water.
- ③ Products compliant to IP65 satisfy the specifications by mounting each product properly. Be sure to read the Specific Product Precautions for each product.
- ④ Do not use in an explosive atmosphere.
- ⑤ Do not use in locations subject to vibration or impact. Confirm the specifications in the main section of this catalog.
- ⑥ A protective cover, etc., should be used to shield valves from direct sunlight.
- ⑦ Shield valves from radiated heat generated by nearby heat sources.
- ⑧ Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.
- ⑨ When solenoid valves are mounted in a control panel or are energized for extended periods of time, employ measures to radiate excess heat. So than temperatures remain within the valve specification range.

Maintenance

Warning

① Perform maintenance procedures as shown in the instruction manual.

If handled improperly, malfunction or damage of machinery or equipment may occur.

② Equipment removal and supply/exhaust of compressed air

When equipment is removed, first confirm that measures that measures are in place to prevent dropping of work pieces and run-away of equipment, etc. Then cut the supply pressure and power, and exhaust all compressed air from the system using its residual pressure release function.

Furthermore, in the case of 3 position closed center type valves, compressed air will remain between valves and cylinders, and must be exhausted similarly.

When the equipment is to be started again after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc., and then confirm that the equipment is operating normally.

③ Low frequency operation

Valves should be switched at least once every 30 days to prevent malfunction. (Use caution regarding the air supply..)

④ Manual override operation

When the manual override is operated, connected equipment will be actuated. Confirm safety before operating.

Caution

① Drain flushing

Remove drainage from air filters regularly.

② Lubrication

In the case of rubber seals, once lubrication has been started, it must continued and use turbine oil Class 1 (no additives), VG32. If other lubricant oil is used, it may cause malfunction. Contact us for suggested turbine oil Class 2(with additive), VG32.



SY Series

Specific Product Precautions 1

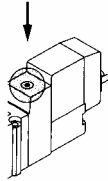
Be sure to read before handing.

Manual Override Operation

Warning

Non-locking push style [Standard]

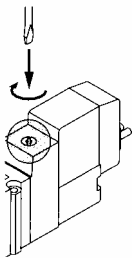
Press in the direction of the arrow



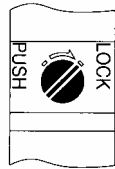
Push-turn slotted locking type [type D]

While pressing, turn in the direction of the arrow.

If it is not turned, it can be operated the same way as the non-locking type.



Locked position



Caution

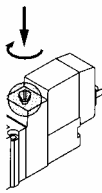
When operating the locking type D with a screw driver, turn it gently using a watchmakers screw driver.

[Torque : Less than 0.1N·m]

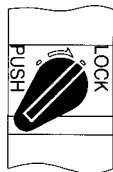
Push-turn lever locking type [type E]

While pressing, turn in the direction of the arrow.

If it is not turned, it can be operated the same way as the non-locking type.



Locked position



Caution

When locking the manual override on the push-turn locking types (D,E), be sure to push it down before turning.

Turning without first pushing it down can cause damage to the manual override and trouble such as air leakage, etc.

Exhaust Throttle

Caution

With series SY, the pilot valve and main valve share a common exhaust inside the valve. Therefore, do not block the exhaust port when arranging the piping

Solenoid Valve for 200, 220VAC Specifications

Warning

Solenoid valves with grommet and L/M type plug connector AC specifications have a built-in rectifier circuit in the in the pilot section to operate the DC coil.

With 200V, 220V VAC specification pilot valves, this built-in rectifier generates heat when energized. The surface may become hot depending on the energized condition; do not touch the solenoid valves.

Series SY3000/5000/7000/9000

Used as a 3-Port Valve

Caution

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

Series SY3000/5000/7000/9000 can be used as normally closed (N.C.) or normally open (N.O.) 3-port port valves by closing one of the cylinder ports (A or B) with a plug. However, they should be used with the exhaust ports kept open.

Plug position		B port	A port
Configuration		N.C.	N.O.
Number of solenoids	Single	Plug (A) (B) (EA) (P) (EB)	Plug (A) (B) (EA) (P) (EB)
	Double	Plug (A) (B) (EA) (P) (EB)	Plug (A) (B) (EAXP) (EB)



SY Series

Specific Product Precautions 2

Be sure to read before handing.

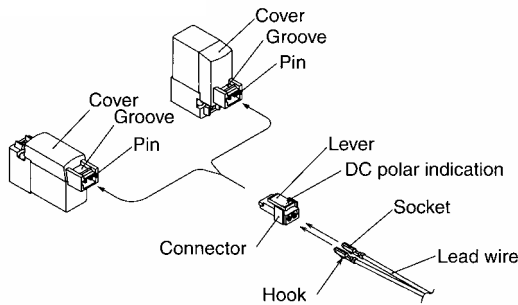
How to Use Plug Connectors



Caution

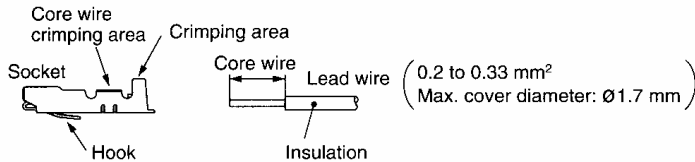
1. Attaching and Detaching Connectors

- 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 connection of lead wire and socket

Strip 3.2 to 3.7mm of the lead wire end, insert each stripped wire into a socket and crimp contact it using special crimping tool. Be careful that the outer insulation of the lead wires does not interfere with the socket contact part. (Contact SMC for a special crimping tool.)



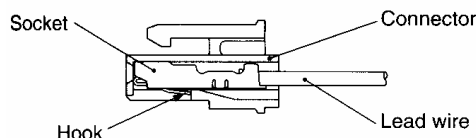
3. Connection/Disconnection of Socket with lead Wire

1) Connection

Insert a socket into the square hole (Indicated as +,-) of connector, push the lead wire in and it by hanging the hook of socket to the seat of connector. (Pushing-in can open the hook and lock it automatically.) Then confirm the lock by lightly pulling on the lead wire.

2) Disconnection

For pulling-out the socket from the connector, pull out the lead wire by pushing the hook on the socket with a stick with a fine point (approx. 1mm). If the socket is to be re-used, spread the hook to the outside.



Surge Voltage Suppressor

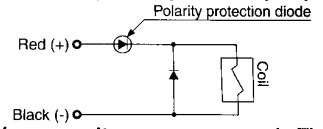
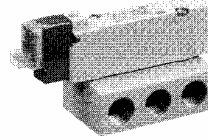


Caution

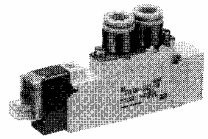
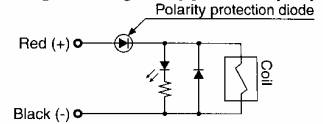
<For DC>

- **Grommet, L and M plug connector**

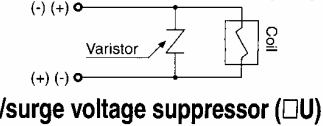
■ Standard style (With polarity) With surge voltage suppressor (□S)



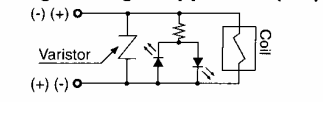
With light/surge voltage suppressor (□Z)



■ Non-polar type With surge voltage suppressor (□R)



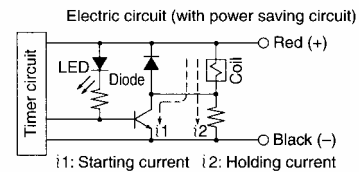
With light/surge voltage suppressor (□U)



- Connect the standard type in accordance with the +,- polarity indication. (The non-polar type can be used with the connections made either way.)
- Since voltage specifications other than standard 24V and 12 VDC do not have diodes for polarity protection, be careful not to make errors in the polarity.
- When wiring is done at the factory, positive (+) is red and negative (-) is black.

■ With power saving circuit

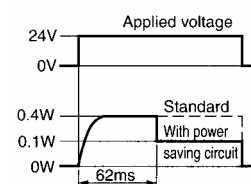
Power consumption is decreased by 1/4 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 62ms at 24 VDC)



Operating principle

With the above circuit, the current consumption when holding is reduced to save energy. Please refer to the electric wave data below.

3
(In the case of SY 5**0T, the electric wave form of energy saving type)
7





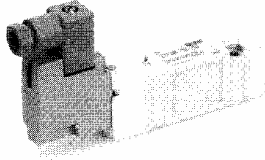
SY Series

Specific Product Precautions 3

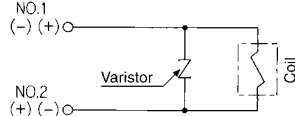
Be sure to read before handing.

Surge Voltage Suppressor

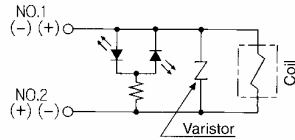
DIN terminal



With surge voltage suppressor (DS)

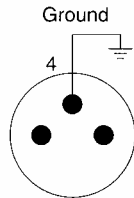


With light/surge voltage suppressor (DZ)

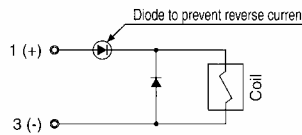


DIN terminal has no polarity.

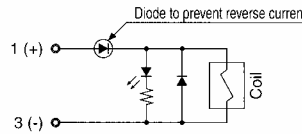
M8 Connector Type



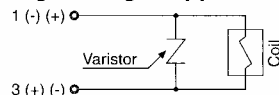
Standard type (without polarity) With surge voltage suppressor (□S)



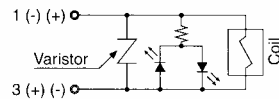
With light/surge voltage suppressor (□Z)



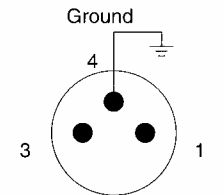
Non-polar type With surge voltage suppressor (□R)



With light/surge voltage suppressor (□U)



Solenoid valve side pin wiring diagram

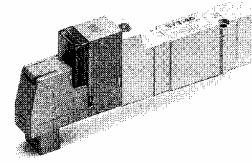


Solenoid valve side pin wiring diagram

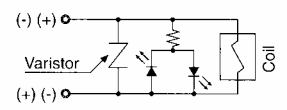
- In the case of standard type, connect + to 1 and - to 3 according to the polarity.
- For DC voltages other than 12 V and 24 V, incorrect wiring will cause damage to the surge suppressor circuit.

Surge Voltage Suppressor

Plug-in



Circuit for non-polar (FU)



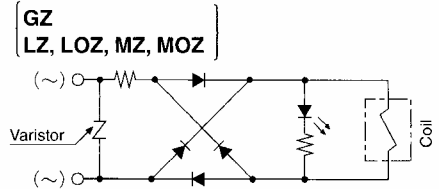
Plug-in valve has no polarity, so its possible to use for both manifold bases for positive (SS5Y³₅-45□) and negative its common (SS5Y³₅-45N□) types. .

<For AC>

(There is no "S" option. Because the generation of surge voltage is prevented by a rectifier)

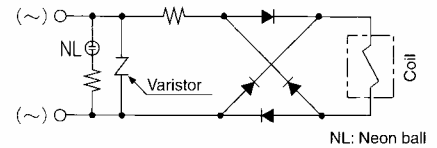
Grommet, L and M plug connector

With light



DIN terminal

With light (DZ)



Note) Surge voltage suppressor of varistor has residual voltage corresponding to the protective element and rate voltage. Therefore, protect the controller side from the surge voltage. The residual voltage of the diode is approximately 1V.



SY Series

Specific Product Precautions 4


Be sure to read before handing.

Plug Connector Lead Wire Length



Caution

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

For DC: **SY100-30-4A** 

For 100 VAC: **SY100-30-1A** 

For 200 VAC: **SY100-30-2A** 

For other voltages of AC: **SY100-30-3A** 

Without lead wire: **SY100-30-A**

(with connector and 2 of sockets only)

• How to Order

Specify the part numbers of the solenoid valve without connector and the connector assembly with protective cover separately.

<Example> Lead wire length 2000 mm

For DC

SY3120-5LO-M5

SY100-30-4A-20

For AC

SY3120-1LO-M5

SY100-30-1A-20

• Lead wire length

Nil	300 mm
6	600 mm
10	1000 mm
15	1500 mm
20	2000 mm
25	2500 mm
30	3000 mm
50	5000 mm

How to Use DIN Terminal



Caution

Connection

1. Loosen the holding screw and pull the connector out of the solenoid valve terminal block.
2. After removing the holding screw, insert a flat head screwdriver, etc. into the notch on the bottom of the terminal block and pry it open, separating the terminal block and the housing.
3. Loosen the terminal screws (slotted screws) on the terminal block, insert the cores of the lead wires into the terminals according to the connection method, and fasten them securely with the terminal screws.
4. Secure the cord by fastening the ground nut.



Caution

When making connections, take note that using other than the supported size ($\phi 3.5$ to $\phi 7$) heavy duty cord will not satisfy IP65 (enclosure) standards. Also, be sure to tighten the ground nut and holding screw within their specified torque ranges.

Changing the entry direction

After separating the terminal block and housing, the cord entry can be changed by attaching the housing in the desired direction (4 directions at 90° intervals)

*When equipped with a light, be careful not to damage the light with the cord's lead wires.

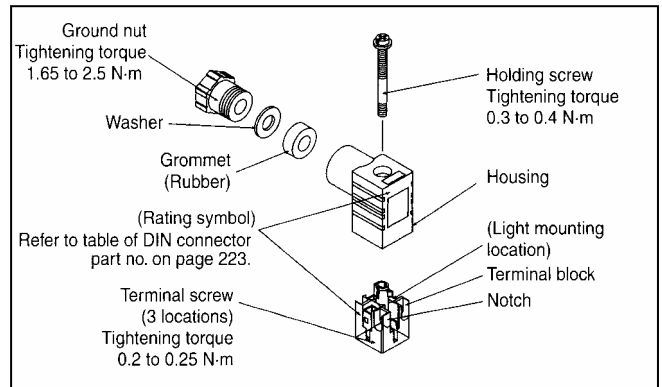
Precautions

Plug in and pull out the connector vertically without tilting to one side.

Compatible cable

Cord O.D.: $\phi 3.5$ to $\phi 7$

(Reference) 0.5mm^2 , 2-core or 3-core, equivalent to JIS C 3306





SY Series

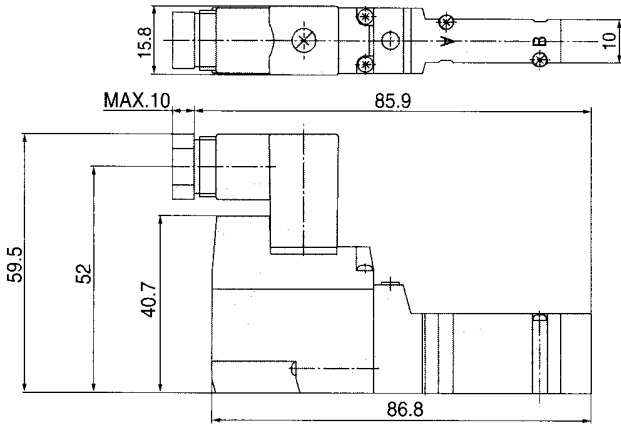
Specific Product Precautions 5

Be sure to read before handing.

SY300,SY3000 Series How to Use DIN Terminal Connector

Caution

SMC can provide a DIN style terminal connector (body ported type, sub-plate type) for the series SY300 and SY3000. This cannot be assembled to a standard manifold since the DIN connector width (15.8mm) exceeds that of the valve body (10mm). Contact SMC if you wish to use with a manifold. Please also note: That brackets F1, F2 cannot be mounted.



DIN connector Part No.

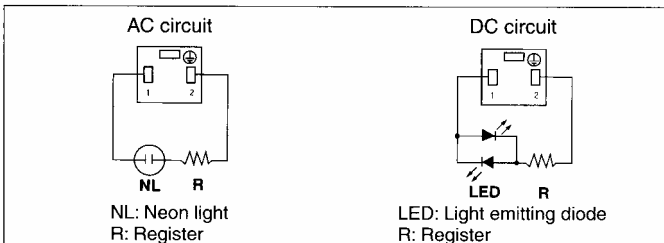
Caution

Without light	SY100-61-1
---------------	------------

With light

Rated voltage	Voltage symbol	No.
24 VDC	24 V	SY100-61-3-05
12 VDC	12 V	SY100-61-3-06
100 VAC	100 V	SY100-61-2-01
200 VAC	200 V	SY100-61-2-02
110 VAC	110 V	SY100-61-2-03
220 VAC	220 V	SY100-61-2-04

Circuit diagram with light



Note) Refer to page 212 for DIN connector (Y) conforming to DIN 43650C.

Connector Assembly With Cover

Connector assembly with dust proof protective cover.

Effective to prevention of short circuit failure due to the entry of foreign matter into the connector.

Simple and unencumbered appearance by adopting round-shaped cord.

Caution

Chloroprene rubber for electrical use, which provides outstanding weather resistance and electrical insulation, is used for the cover material. However, do not allow contact with cutting oil, etc.

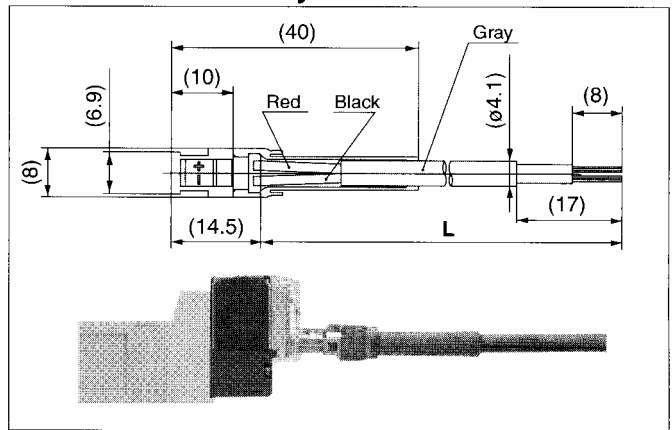
How to Order

SY100-68-A

Lead wire length (L)

Nil	300 mm
6	600 mm
10	1000 mm
15	1500 mm
20	2000 mm
25	2500 mm
30	3000 mm
50	5000 mm

Connector assembly with cover: Dimensions



How to Order

Enter the part number for a plug connector solenoid valve without connector together with the part number for a connector assembly with cover.

<Example 1> Lead wire length of 2000 mm

SY3120-5LOZ-M5
SY100-68-A-20

<Example 2> Lead wire length of 300 mm (standard)

SY3120-5LPZ-M5

Symbol for connector assembly with cover

* In this case, the part number for the connector assembly with cover is not required.



SY Series

Specific Product Precautions 6

Be sure to read before handling.

Plug-in

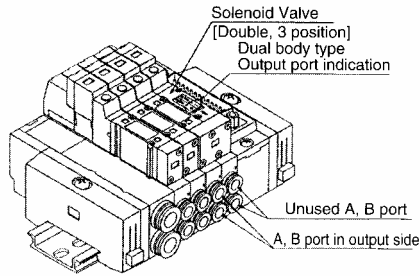
Caution

When using a double solenoid valve (Dual body type: SY³₅245-□FU) on the Plug-in style manifold (SS5Y³₅-45(N)□), two manifold stations are required per valve. Output to A/B ports will be made through the manifold block on the side indicated by an arrow on the top of the solenoid valve. Therefore, arrange the piping on the side indicated by the arrow.

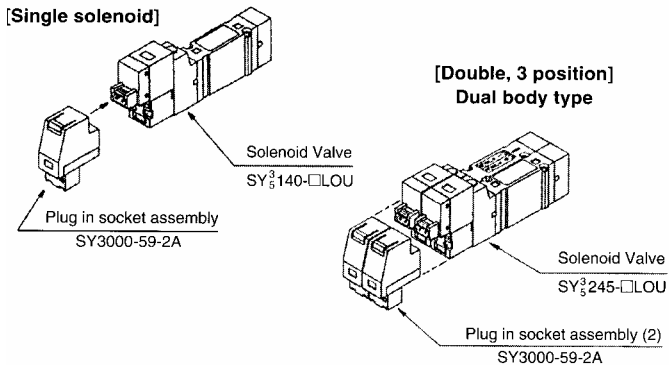
Although the “T” side will not be used, plugs will not be necessary since it is sealed with the valve

Manifold valve

SS5Y³₅-45 (N)□



Plug-in type solenoid valves consist of a non-polar solenoid valve and a plug-in socket. When ordering them separately, refer to the following part numbers. .



Note) using a valve other than a non-polar type may cause trouble

DIN rail for Series SY9000

Caution

The DIN rail used with Series SY9000 is stronger than that used with Series SY3000 and SY5000. Use this exclusive DIN rail with Series SY9000. Furthermore, if using a DIN rail other than that supplied by SMC, refer to the manifold mounting section below, and mount using the same method as prescribed for side facing and rear facing, regardless of the mounting orientation.

Manifold Mounting

Caution

For Type 23, 43, 45 and 45□DIN rail mounting, when attaching a manifold to a mounting surface, etc., with bolts, if the entire bottom surface of the DIN rail contacts the mounting surface in a horizontal mounting, it can be used by simply securing both ends of the DIN rail. However, for any other mounting method or for side facing and rear facing, etc., secure the DIN rail with bolts at uniform intervals using the following as a guide: 2 to 5 stations at 2 locations, 6 to 10 stations at 3 locations, 11 to 15 stations at 4 locations, and 16 to 20 stations at 5 locations. In addition, even in the case of a horizontal mounting if the mounting surface is subject to vibration, etc., take the same measures indicated above. If secured at fewer than the specified number of locations, warping or twisting may occur in the DIN rail and manifold, causing trouble such as air leakage.

One-touch Fittings

Caution

The pitch determined for each of the series SY piping ports(P, A, B, etc.) is based on the assumption that series KJ one-touch fittings will be used. For this reason, other pipe fittings may interfere with each other depending on their type and size. Dimensions should be confirmed in a pipe fitting catalog before they are used.



Specific Product Precautions 7

Be sure to read before handling.

One-touch Fittings



Caution

• Tubing attachment/detachment for One-touch fittings

1) Attaching of tubing

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

2) Detaching of tubing

1. Push in the release button sufficiently, pushing its collar equally around the circumference.
2. Pull out the tubing 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 tubing and it will become more difficult to pull it out.
3. When the removed tubing is to be used again, cut off the portion which has been chewed before reusing it. If the chewed portion of the tubing is used as is, this can cause trouble such as air leakage or difficulty in removing the tubing.

- The pitch determined for each of the series SY piping ports (A, B, etc.) is based on the assumption that series KJ one-touch fittings will be used. For this reason, other pipe fittings may interfere with each other depending on their type and size. Dimensions should be confirmed in a pipe fitting catalogue before they are used.

Other Tubing Brands



Caution

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

- | | |
|------------------------|--|
| 1) Nylon tubing | within ± 0.1 mm |
| 2) Soft nylon tubing | within ± 0.1 mm |
| 3) Polyurethane tubing | within ± 0.15 mm,
Within -0.2 mm. |

Do not use tubing 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 tubing pulling out after connection.

M8 Connector



Caution

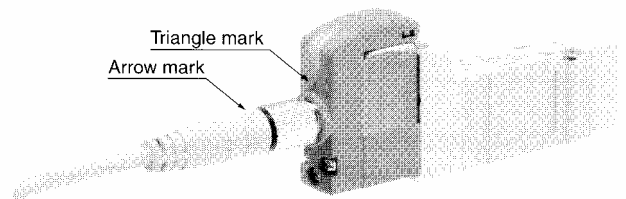
1. M8 connector types have an IP65 (enclosure) rating, offering protection from dust and water. However please note: these products are not intended for use in water.
Select a SMC connector cable (V100-49-1-□) or a FA sensor type connector, with M8 threaded 3 pin specifications conforming to Nippon Electric Control Equipment Association Standard, NECA4202 (IEC60947-5-2). Make sure the connector O.D. is 10.5mm or less when used with the Series SY3000 manifold. If more than 10.5mm, it can not be mounted due to the size.
2. Do not use a tool to mount the connector, as this may cause damage. Only tighten by hand. (0.4 to 0.6N·m)



Caution

Failure to meet IP65 performance may result if using alternative connectors than those shown above, or when insufficiently tightened.

Connector cable mounting



Note) Connector cable should be mounted in the correct direction. Make sure that the arrow symbol on the connector is facing the triangle symbol on the valve when using SMC connector cable (V100-49-1-□).

Be careful not to squeeze it in the wrong direction, as problems such as pin damage may occur.



SY Series

Specific Product Precautions 8

Be sure to read before handling.

M8 connector



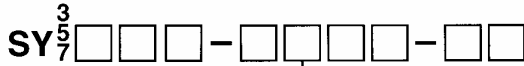
Caution

■ Connector cable

· Connector cable for M8 can be ordered as follows:

How to order

1. To order solenoid valve and connector cable at the same time.
(Connector cable will be included in the shipment of the solenoid valve.)

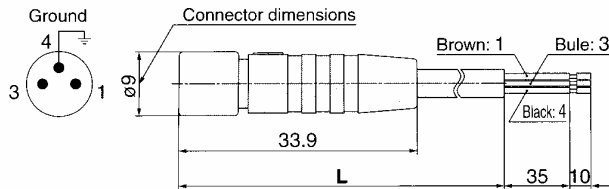


- Electrical entry
- W1: Cable length 300 mm
- W2: Cable length 500 mm
- W3: Cable length 1000 mm
- W4: Cable length 2000 mm
- W7: Cable length 5000 mm

Ex. 1) Cable length: 300mm
SY312-5W1ZE-C4

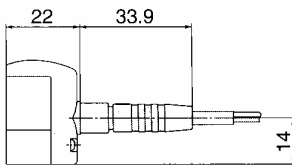
Symbol for electrical entry

2. To order connector cable only



Cable length (L)	No.
300 mm	V100-49-1-1
500 mm	V100-49-1-2
1000 mm	V100-49-1-3
2000 mm	V100-49-1-4
5000 mm	V100-49-1-7

[Dimensions when installed]



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.

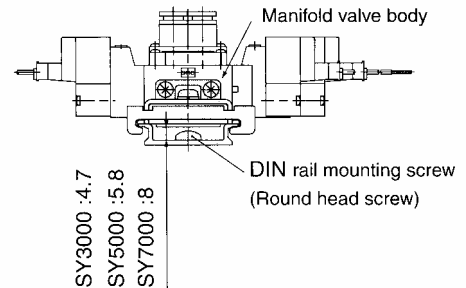
Model	Thread size	Tightening torque
SY3000	M2	0.16 N·m
SY5000	M3	0.8 N·m
SY7000	M4	1.4 N·m

Mounting of Cassette Manifold to DIN Rail



Caution

When using a DIN rail mounting screw beneath the manifold valve (within the dimension of L3, as shown in the printed dimension/contents section), the head size of the screw must be 4.7mm or less for SY3000, 5.8mm or less for SY5000, and 8mm or



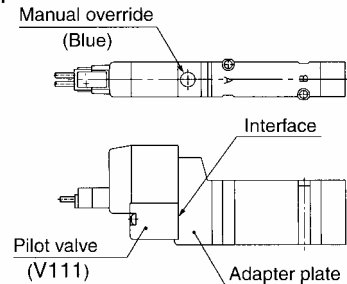
Replacement of Pilot Valve



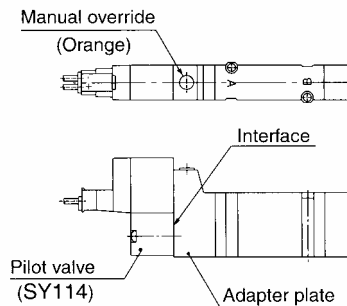
Caution

Pilot valves in this series are improved to provide excellent energy saving results. However following this improvement, these new valves are no longer compatible with the conventional pilot valve used at the interface. Consult SMC when you need to exchange these pilot valves, in the case of manual override (marked in orange) of the adapter plate.

New type



Conventional type





SY Series

Specific Product Precautions 9

Be sure to read before handing.

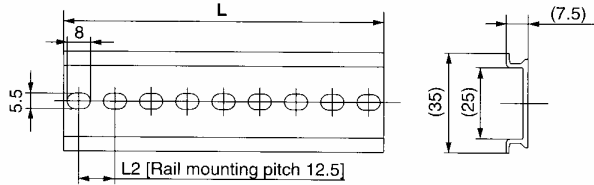
DIN Rail Dimensions/Weight

■ DIN Rail Dimensions/Weight for SY3000/5000

VZ1000-11-1-

● Refer to the L dimension tables

* Enter a number from the DIN rail dimension table below in them.



No.	0	1	2	3	4	5	6	7	8	9
L dimension	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5
Weight (g)	17.6	19.9	22.1	24.4	26.6	28.9	31.1	33.4	35.6	37.9

No.	10	11	12	13	14	15	16	17	18	19
L dimension	223	235.5	248	260.5	273	285.5	298	310.5	323	335.5
Weight (g)	40.1	42.4	44.6	46.9	49.1	51.4	53.6	55.9	58.1	60.4

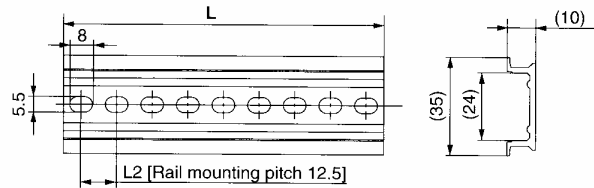
No.	20	21	22	23	24	25	26	27	28	29
L dimension	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5
Weight (g)	62.6	64.9	67.1	69.4	71.6	73.9	76.1	78.4	80.6	82.9

■ DIN Rail Dimensions/Weight for SY7000

VZ1000-11-4-

● Refer to the L dimension tables

* Enter a number from the DIN rail dimension table below in them.



No.	0	1	2	3	4	5	6	7	8	9
L dimension	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5
Weight (g)	24.8	28	31.1	34.3	37.4	40.6	43.8	46.9	50.1	53.3

No.	10	11	12	13	14	15	16	17	18	19
L dimension	223	235.5	248	260.5	273	285.5	298	310.5	323	335.5
Weight (g)	56.4	59.6	62.7	65.9	69.1	72.2	75.4	78.6	81.7	84.9

No.	20	21	22	23	24	25	26	27	28	29
L dimension	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5
Weight (g)	88	91.2	94.4	97.5	100.7	103.9	107	110.2	113.3	116.5

Note) For DIN rail mounting, refer to page 226.

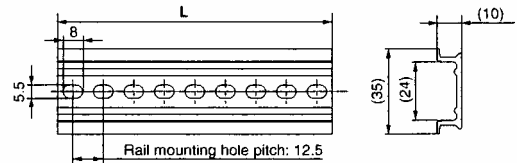
DIN Rail Dimensions/Weight

■ DIN Rail Dimensions/Weight for SY9000

VZ1000-11-4-

● Refer to L dimensions

* Fill in with an appropriate no. listed on the table of DIN rail dimensions shown below.



No.	0	1	2	3	4	5	6	7	8	9
L Dimension	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5
Weight (g)	24.8	28	31.1	34.3	37.4	40.6	43.8	46.9	50.1	53.3

No.	10	11	12	13	14	15	16	17	18	19
L Dimension	223	235.5	248	260.5	273	285.5	298	310.5	323	335.5
Weight (g)	56.4	59.6	62.7	65.9	69.1	72.2	75.4	78.6	81.7	84.9

No.	20	21	22	23	24	25	26	27	28	29
L Dimension	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5
Weight (g)	88	91.2	94.4	97.5	100.7	103.9	107	110.2	113.3	116.5



Note) • For DIN rail, refer to page 224.

• Refer to L1 dimension on pages starting with pages 106 through 108 for lengths that correspond to the number of manifold stations.



Be sure to read before handling.

Interface Regulator

Caution

Specifications

Interface regulator model	ARBY3000-□-P-2	ARBY3000-□-A ¹ _{B1} -2	ARBY5000-□-P-2	ARBY5000-□-A ¹ _{B1} -2	ARBY7000-□-P-2	ARBY7000-□-A ¹ _{B1} -2
Applicable solenoid valve model	SY3□40(R)		SY5□40(R)		SY7□40(R)	
Regulated port	P	A B	P	A B	P	A B
Set pressure range	0.1 to 0.7 MPa					
Maximum operating pressure	0.7 MPa					
Fluid	Air					
Ambient and fluid temperature	Max. 50°C					
Connection port of pressure gauge	M5 x 0.8					
Weight W (g)	46 g (05), 50 g (06)		66.8 g		110.8 g	
	20 g		60.4 g		103.2 g	
Supply side effective area ^{Note 3)}	P→A,B	—	2.45 mm ²	—	7.61 mm ²	—
Exhaust side effective area ^{Note 3)}	A,B→EA,EB	4.05 mm ²	3.91 mm ²	11.1 mm ²	10.1 mm ²	15.71 mm ²

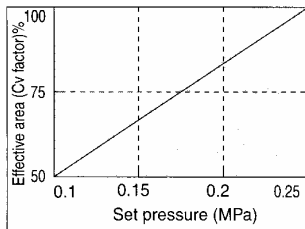
Note 1) Pressurize the interface regulator from P port on the base.

Note 2) With closed center and pressure center valves, the pressure can be regulated through P port only.

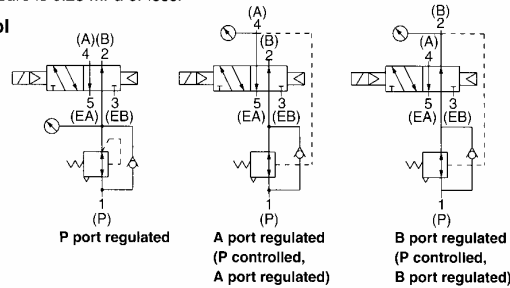
Note 3) Effective area, excluding the regulated port, when a primary pressure of 0.5 MPa is supplied with regulators mounted on the solenoid valves (2 positions) and sub-plate. Refer to "Flow Characteristics" regarding the regulated port.

Note 4) Valves for weight include gasket and mounting screws.

Note 5) With A, B ports regulated (P port controlled A, B ports regulated), the effective area (Cv factor) for the regulated port and unregulated passage (P to B or P to A) decreases as shown in the graph below when the set pressure is 0.25 MPa or less.



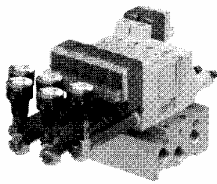
JIS Symbol



How to Order Interface Regulator

How to Order Interface Regulator

ARBY3000-05-P-2



Regulated port

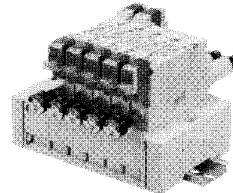
P	P port
A1	A port (P controlled, A port regulated)
B1	B port (P controlled, B port regulated)

Pressure gauge connection port

05	Pressure gauge (G15-10-01) [for odd number stations]
06	Pressure gauge (G15-10-01) [for even number stations]
M1	Plug (M-5P)

Note) For series ARBY3000 with pressure gauge, note that the part numbers for odd number and even number stations differ to prevent interference between the pressure gauges when installing on the manifold.

ARBY5000-00-P-2



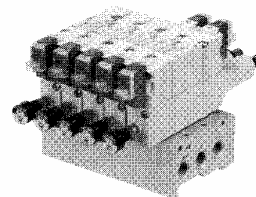
Regulated port

P	P port
A1	A port (P controlled, A port regulated)
B1	B port (P controlled, B port regulated)

Pressure gauge connection port

00	Pressure gauge (G15-10-01)
M1	Plug (M-5P)

ARBY7000-00-P-2



Regulated port

P	P port
A1	A port (P controlled, A port regulated)
B1	B port (P controlled, B port regulated)

Pressure gauge connection port

00	Pressure gauge (G15-10-01)
M1	Plug (M-5P)



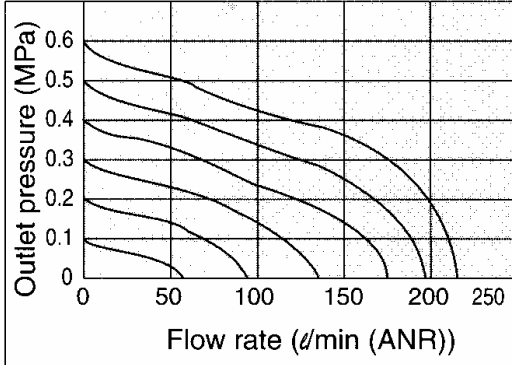
Be sure to read before handling.

Flow Characteristics

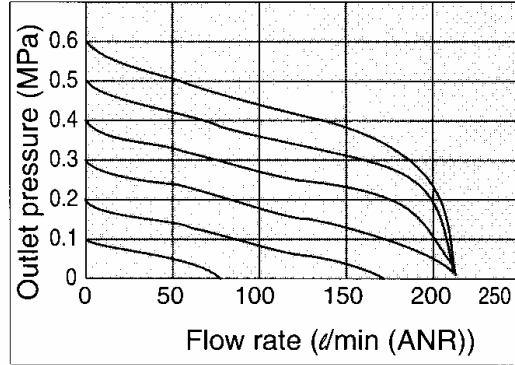
(Conditions: Inlet pressure 0.7 MPa when 2 position solenoid valve is mounted).

ARBY3000

P port regulated (P→A, B)

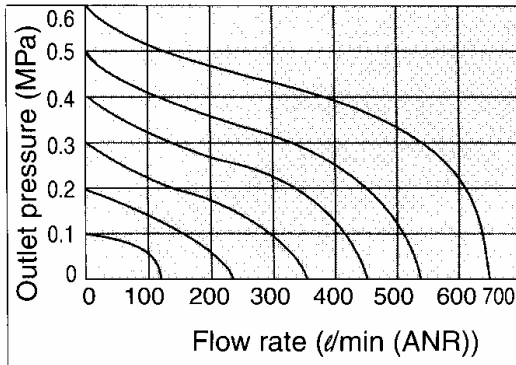


A1 port regulated (P→A),
B1 port regulated (P→B)

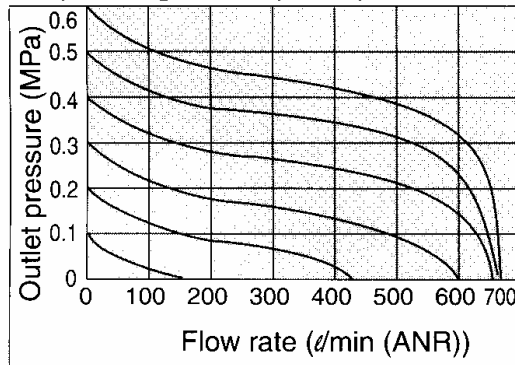


ARBY5000

P port regulated (P→A, B)

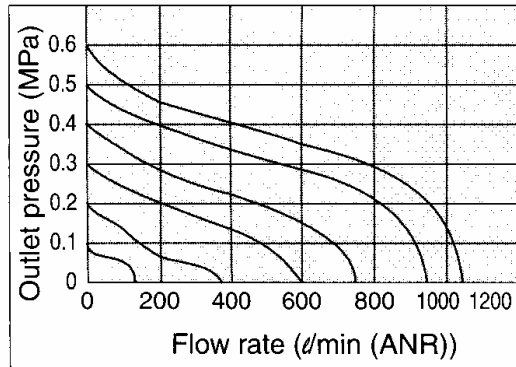


A1 port regulated (P→A),
B1 port regulated (P→B)

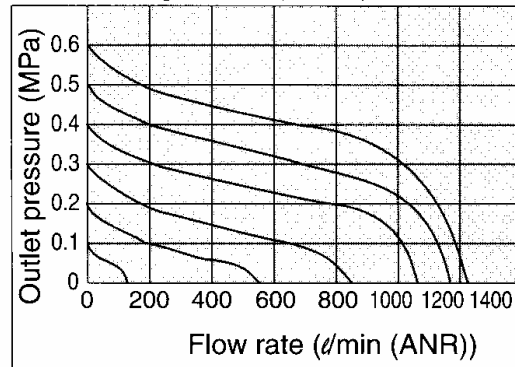


ARBY7000

P port regulated (P→A, B)



A1 port regulated (P→A),
B1 port regulated (P→B)





SY Series

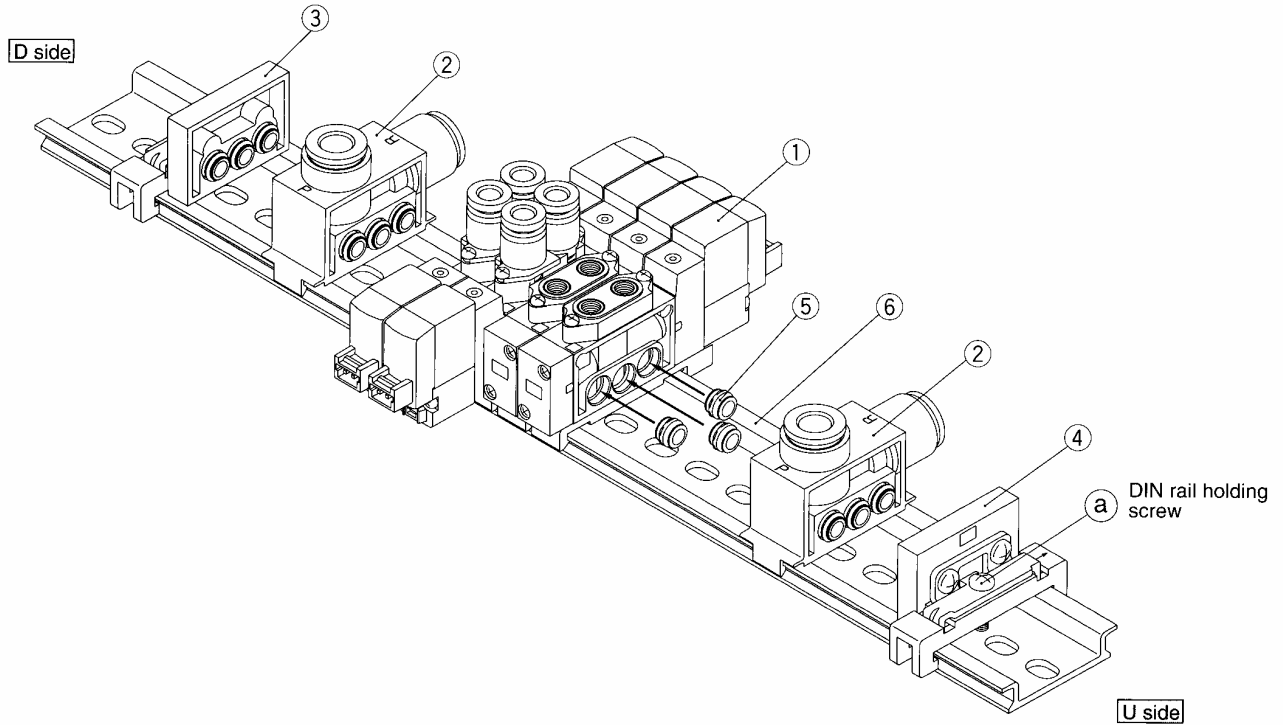
Specific Product Precautions 12

Be sure to read before handing.

DIN Rail Manifold Exploded View

SY3000

Type 60



Replacement parts

No.	Description	No.	Note
1	Valve	SY3□60-□□-□	□ at the end of part number denotes A. B port size: M5, C4, C6, N3, N7. Includes bushing assembly (SY3000-52-1A) 3 pcs.
2	SUP/EXH block assembly	SY3000-55- $\frac{1}{2}$ A	P, R port (1: One-touch fitting for ø8, 2: One-touch fitting for ø5/16") Includes bushing assembly (SY3000-52-1A) 3 pcs.
3	End block assembly	SY3000-56-1A	For D side (Bushing assembly: Not available for SY3000-52-1A)
4	End block assembly	SY3000-56-1B	For U side (Bushing assembly: Not available for SY3000-52-1A)
5	Bushing assembly	SY3000-52-1A	
6	DIN rail	VZ1000-11-1-□	Refer to page 14

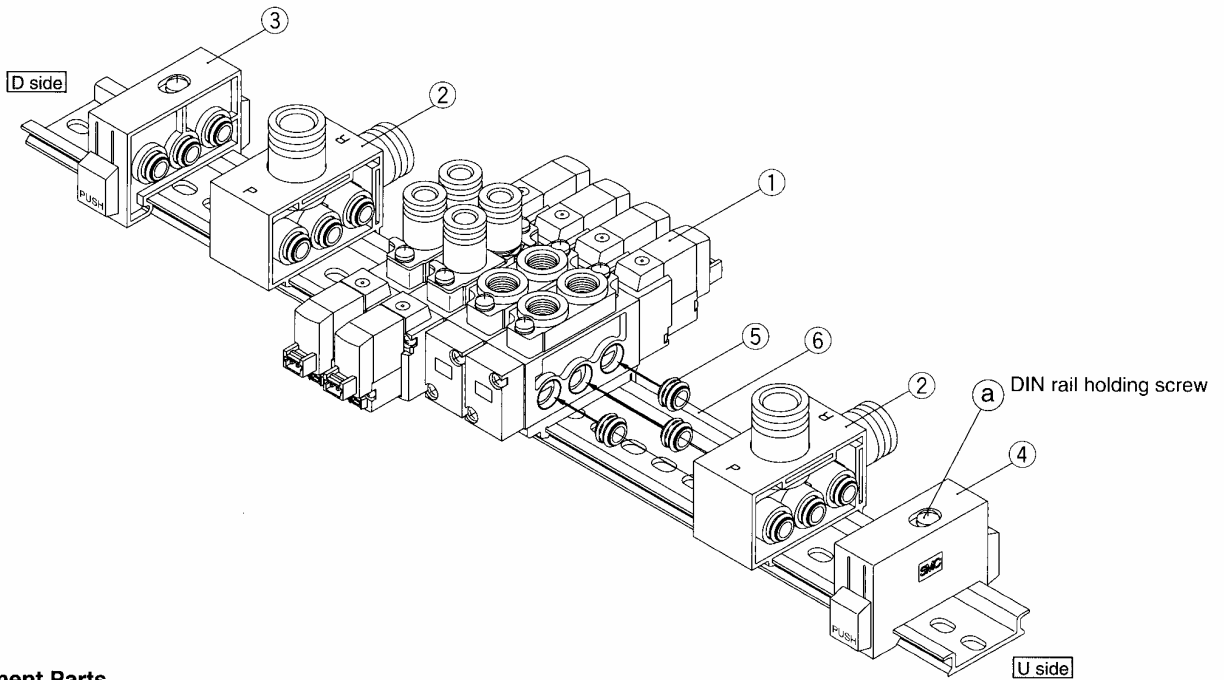


SY Series

Specific Product Precautions 13

Be sure to read before handling.

SY5000 Type 60



Replacement Parts

No.	Description	No.	Note
1	Valve	SY5□60-□□-□	□ at the end of part number denotes A, B port size: 01, C4, C6, C8, N3, N7, N9. Includes bushing assembly (SY5000-52-1A) 3 pcs.
2	SUP/EXH block assembly	SY5000-55- $\frac{1}{2}$ A	P, R port (1: One-touch fitting for $\phi 10$, 2: One-touch fitting for $\phi 3/8$ ") Includes bushing assembly (SY5000-52-1A) 3 pcs.
3	End block assembly	SY5000-56-1A	For D side (Bushing assembly: Not available for SY5000-52-1A)
4	End block assembly	SY5000-56-1B	For U side (Bushing assembly: Not available for SY5000-52-1A)
5	Bushing assembly	SY5000-52-1A	
6	DIN rail	VZ1000-11-1-□	Refer to page 14

How to Add Additional Valves to the DIN Rail

Valves can be added at any station on the rail.

- 1 Loosen the manifold base clamping screw (a).
- 2 Separate the valves at the point where more valves are to be added.
- 3 Mount the additional valves on the DIN rail as shown in Fig. 1
- 4 Connect them together while pressing the block assemblies toward each others, and tighten the holding screw (a) to fix them to the DIN rail.

⚠ Caution

Tightening torque

SY3000: 1 N·m

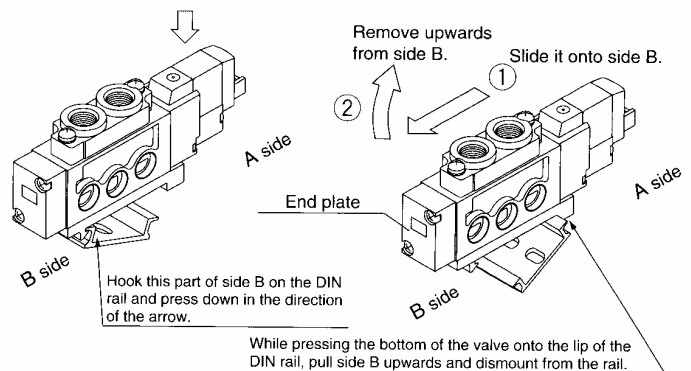
SY5000: 1.4 N·m

(While lightly holding the blocks after fixing an end block on one side, tighten the other end block for better sealing after no gap between valves is confirmed.)

- Bushing assembly must be seated properly to each valve block in order to prevent air leaks from occurring.
- Refer to the fig. 2 when dismantling the valve from the DIN rail.

Fig. 1 Manifold mounting procedure

Fig. 2 Manifold dismantling procedure



⚠ Caution

When clamping screw (a) of the end block is not sufficiently tightened during reassembly, air leakage may result. Before supplying air, check that there are no gaps between valves and that the end block is firmly secured to the DIN rail in order to ensure air supply without leakage.



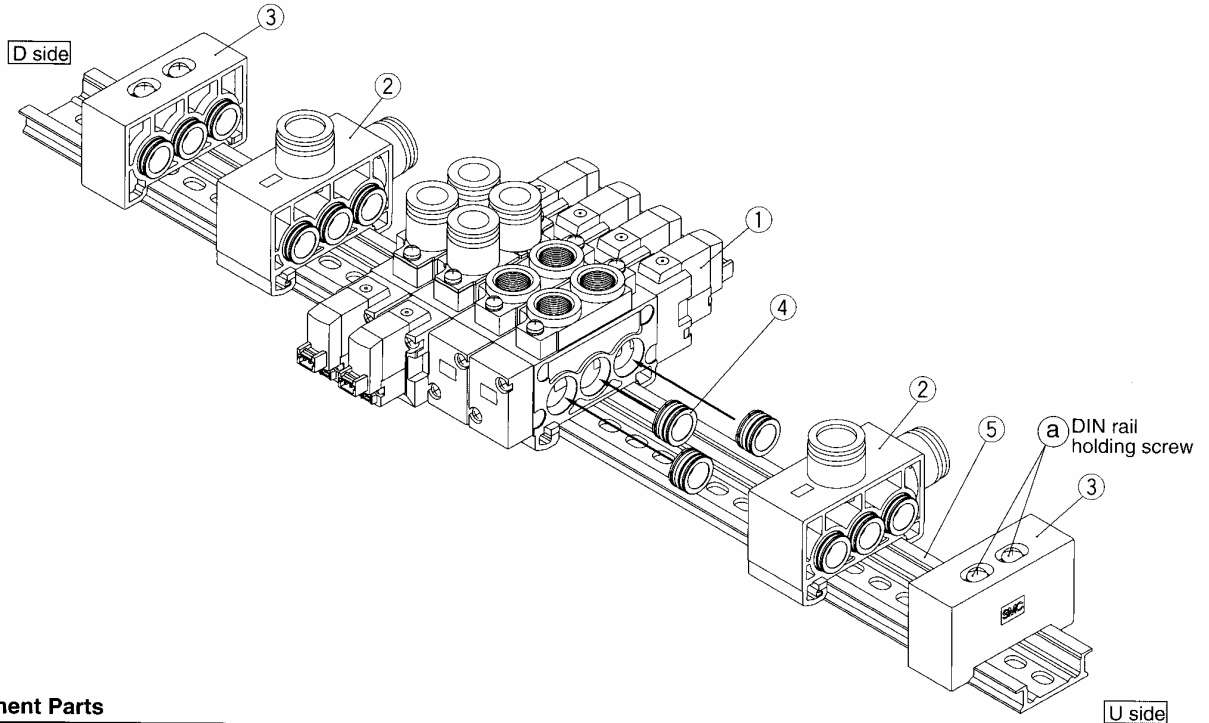
SY Series Specific Product Precautions 14

Be sure to read before handling.

DIN Rail Manifold Exploded View

SY7000

Type 60



Replacement Parts

No.	Description	No.	Note
1	Valve	SY7□60-□□-□	□ at the end of part number denotes A. B port size: 02, C8, C10, N9, N11. Includes bushing assembly (SY5000-52-1A) 3 pcs.
2	SUP/EXH block assembly	SY7000-75- $\frac{1}{3}$ A	
3	End block assembly	SY7000-56-1A	In common for D side and U side (Bushing assembly: Not available for SY7000-70-1A.)
4	Bushing assembly	SY7000-70-1A	
5	DIN rail	VZ1000-11-4-□	Refer to page 14

How to Add Additional Valves to the DIN Rail

Valves can be added at any station on the rail.

- 1 Loosen the rail holding screw (a) at both of 2 locations which holds the manifold base either in the U side or D side.
When removing the end block assembly from the DIN rail, loosen the holding screws for DIN rail at first, then slide it to the edge of the rail.
- 2 Separate the valves at the point where more valves are to be added.
- 3 Mount the additional valves on the DIN rail as shown in Fig. 1.
- 4 Connect them together while pressing the block assemblies toward each others, and tighten the 2 holding screws (a) for DIN rail alternately (2 to 3 times) with the prescribed torque (1.4 N·m) to fix them to the DIN rail.

⚠ Caution

Tightening torque

SY7000: 1.4 N·m

(While lightly holding the blocks after fixing an end block on one side, tighten the other end block for better sealing after no gap between valves is confirmed.)

- Bushing assembly must be seated properly to each valve block in order to prevent air leaks from occurring.
- Refer to the fig. 2 when dismantling the valve from the DIN rail.

Fig. 1 Manifold mounting procedure

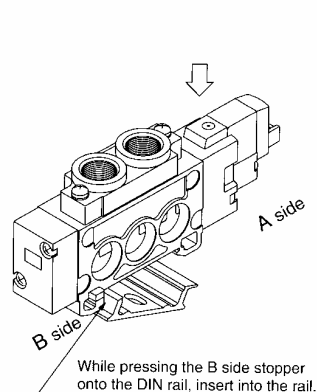
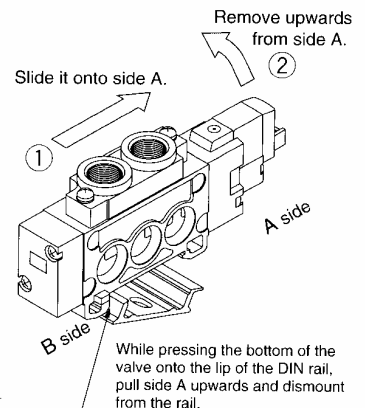


Fig. 2 Manifold dismantling procedure



⚠ Caution

When clamping screw (a) of the end block is not sufficiently tightened during reassembly, air leakage may result. Before supplying air, check that there are no gaps between valves and that the end block is firmly secured to the DIN rail in order to ensure air supply without leakage.



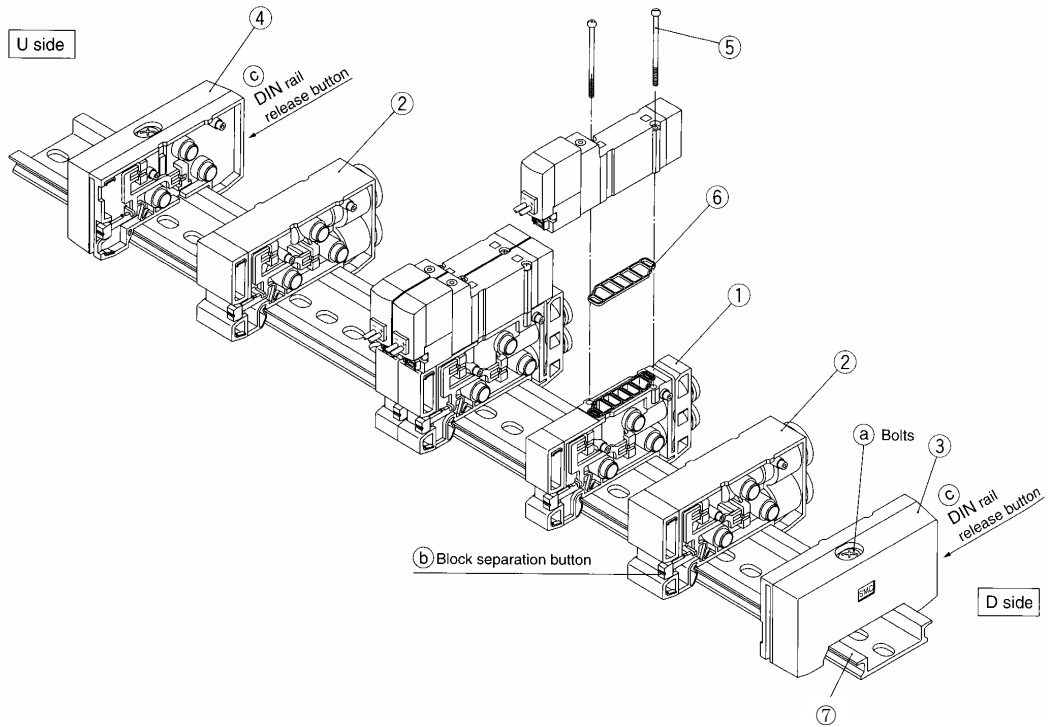
SY Series

Specific Product Precautions 15

Be sure to read before handling.

Exploded View/DIN Rail Manifold

Type 45



No.	Description	No.		Note
		SY3000	SY5000	
1	Manifold block assembly	SX3000-50-1A-□□	SX5000-50-1A-□□	□□:SY3000(Metric size)C4:With one-touch fitting for ϕ 4 C6:With one-touch fitting for ϕ 6 (Inch size)N3:With one-touch fitting for ϕ 5/32" N7:With one-touch fitting for ϕ 1/4" □□:SY5000(Metric size)C4:With one-touch fitting for ϕ 4 C6:With one-touch fitting for ϕ 6 C8:With one-touch fitting for ϕ 8 (Inch size)N3:With one-touch fitting for ϕ 5/32" N7:With one-touch fitting for ϕ 1/4" N9:With one-touch fitting for ϕ 5/16" (Gasket 6 is supplied as an accessory.)
2	SUP/ EXH block assembly	SX3000-51-1A (Metric size) SX3000-51-15A (Inch size)	SX5000-51-1A (Metric size) SX5000-51-15A (Inch size)	P,R port SY3000(Metric size):With one-touch fitting for ϕ 8 (Inch size):With one-touch fitting for ϕ 5/16" P,R port SY5000(Metric size):With one-touch fitting for ϕ 10 (Inch size):With one-touch fitting for ϕ 3/8"
3	End block assembly R	SX3000-52-1A	SX5000-52-1A	For D side
4	End block assembly L	SX3000-53-1A	SX5000-53-1A	For U side
5	Round head combination screw	SY3000-23-4	M3X26(Matt nickel plated)	
6	Gasket	SX3000-57-4	SX5000-57-6	
7	DIN rail	VZ1000-11-1-□		Refer to page 14



DIN Rail Manifold Exploded View

How to Increase Manifold Bases

Station expansion is possible at any position.

- 1 Loosen bolt **a** fixing the manifold base until it begins to turn idly. (While pressing DIN rail releasing buttons, at two locations, separate the manifold base from the DIN rail.)
- 2 Press manifold block assembly dividing button **b**, that are at the location where manifold bases are to be added, until button **b** locks, and then separate the block assemblies.
- 3 Mount additional manifold block assembly on the DIN rail as shown in the figure 1.
- 4 Press the block assemblies until a click sound is produced, and tighten the bolts **a** to fix them to the DIN rail.

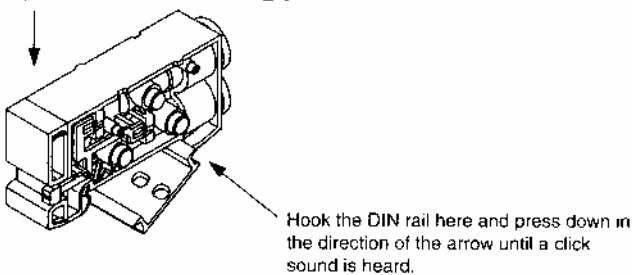
Caution (Tightening torque: 1.4 N.m)

(While lightly holding the blocks after fixing an end block on one side, tighten the other end block for better sealing.)

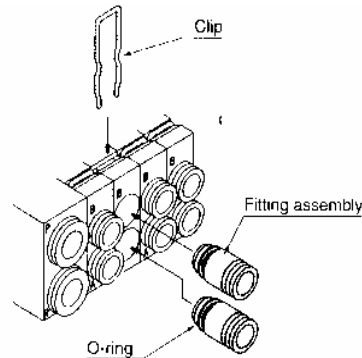
Caution

- Note 1) When there are 10 or fewer manifold block assemblies, and more are added to make a total of 11 or more, a supply/exhaust block assembly must also be added.
- Note 2) When disassembly and assembly are performed air leakage may result if connections between blocks and tightening of the end block's holding screw, is inadequate. Before supplying air, confirm that there are no gaps, etc. between blocks, and that manifold blocks are securely fastened to the DIN rail. Then supply air and confirm that there is no air leakage before operating.

Fig. (1) Block mounting procedure



How to Change Fitting Assembly



Type 45 manifold permits change in the A and B port sizes by changing the manifold block fitting assembly. After removing the valve, remove the clip with a screwdriver, etc. For mounting a new fitting assembly, insert it and then insert a clip until it will not come out of the manifold block.

Fitting assembly part numbers

Metric size

SY3000	One-touch fitting for $\phi 4$	VVQ1000-50A-C4
	One-touch fitting for $\phi 6$	VVQ1000-50A-C6
SY5000	One-touch fitting for $\phi 4$	VVQ1000-51A-C4
	One-touch fitting for $\phi 6$	VVQ1000-51A-C6
	One-touch fitting for $\phi 8$	VVQ1000-51A-C8

Inch size

SY3000	One-touch fitting for $\phi 5/32$ "	VVQ1000-50A-N3
	One-touch fitting for $\phi 1/4$ "	VVQ1000-50A-N7
SY5000	One-touch fitting for $\phi 5/32$ "	VVQ1000-51A-N3
	One-touch fitting for $\phi 1/4$ "	VVQ1000-51A-N7
	One-touch fitting for $\phi 5/16$ "	VVQ1000-51A-N9

Note 1) P and R ports cannot be changed.

Note 2) Use caution that O-rings must be free from scratches and dust. Otherwise, air leakage may result.



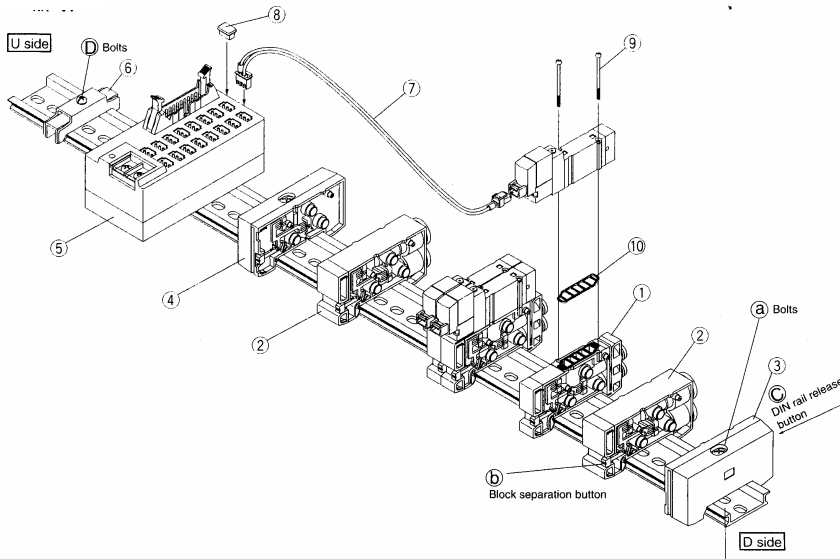
SY Series

Specific Product Precautions 17

Be sure to read before handling.

DIN Rail Manifold Exploded View

45-A, NA Type



No.	Description	No.		Note
		SY3000	SY5000	
1	Manifold block assembly	SX3000-50-1A-□□	SX5000-50-1A-□□	SY3000 (Metric size) C4:With one-touch fitting for ϕ 4 C6:With one-touch fitting for ϕ 6 (Inch size) N3:With one-touch fitting for ϕ 5/32" N7:With one-touch fitting for ϕ 1/4" SY5000 (Metric size) C4:With one-touch fitting for ϕ 4 C6:With one-touch fitting for ϕ 6 C8:With one-touch fitting for ϕ 8 (Inch size) N3:With one-touch fitting for ϕ 5/32" N7:With one-touch fitting for ϕ 1/4" N9:With one-touch fitting for ϕ 5/16" (Gasket 10 is supplied as an accessory.)
2	SUP/ EXH block assembly	SX3000-51-1A (Metric size) SX3000-51-15A (Inch size)	SX5000-51-1A (Metric size) SX5000-51-15A (Inch size)	Metric size SY3000:P,R port with one-touch fitting for ϕ 8 SY5000:P,R port with one-touch fitting for ϕ 10 Inch size SY3000:with one-touch fitting for ϕ 5/16" SY5000:with one-touch fitting for ϕ 3/8"
3	End block assembly R	SX3000-52-1A	SX5000-52-1A	For D side
4	End block assembly L	SX3000-53-1A	SX5000-53-1A	For U side
5	Connector box	VZ3000-106-1A		For 24VDC only
6	Rail stopper	TXE1-SMC		Maybe by Kasuga Electric Works
7	Connector assembly	SY3000-43-1A-□	SY 3 000-43-2A-□	Type D, 2 to 8 stations Type u, 9 to 16 stations
		SY3000-43-2A-□	SY3000-43-3A-□	Type D, 9 to 16 stations Type u, 2 to 8 stations
		SY3000-43-1NA-□	SY3000-43-2NA-□	Type D, 2 to 8 stations Type u, 9 to 16 stations
		SY3000-43-2NA-□	SY3000-43-3NA-□	Type D, 9 to 16 stations Type u, 2 to 8 stations
8	Dust cup	VZ3000-63-2		
9	Round head combination screw	SY3000-23-4	M3×26 Matt nickel plated	
10	Gasket	SX3000-57-4	SX5000-57-6	
11	DIN rail	VZ1000-11-1-□		



SY Series

Specific Product Precautions 18

Be sure to read before handing.

How to Increase Manifold Bases

Station expansion is possible at any position.

- 1 Loosen bolt ϕ fixing the manifold base until it begins to turn idly. (While pressing DIN rail releasing buttons ϕ , at two locations, separate the manifold base from the DIN rail.)
- 2 Press manifold block assembly dividing button ϕ , that are at the location where manifold bases are to be added, until button ϕ locks, and then separate the block assemblies.
- 3 Mount additional manifold block assembly on the DIN rail as shown in the figure 1.
- 4 Press the block assemblies until a click sound is produced, and tighten the bolts ϕ to fix them to the DIN rail.

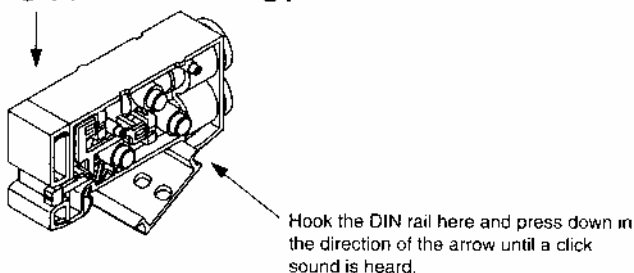
Caution (Tightening torque: 1.4N · m)

(While lightly holding the blocks after fixing an end block on one side, tighten the other end block for better sealing.)
- 5 Untighten the rail stopper bolt ϕ to demount the connector box from the DIN rail, and when remounting it, tighten the bolt while pressing it against the rail.

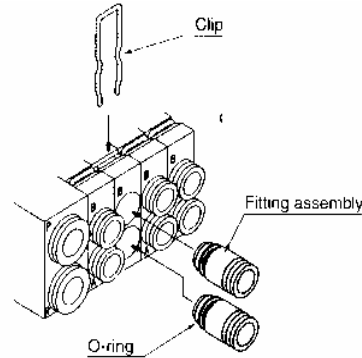
Caution

- Note 1) When there are 10 or fewer manifold block assemblies, and more are added to make a total of 11 or more, a supply/exhaust block assembly must also be added.
- Note 2) When disassembly and assembly are performed, air leakage may result if connections between block and tightening of the end block's holding screw, is inadequate. Before supplying air, confirm that there are no gaps, etc. between blocks, and that manifold blocks are securely fastened to the DIN rail. Then supply air and confirm that there is no air leakage before operating.
- Note 3) One connector assembly is necessary for one solenoid. When a number is necessary for the connector assembly mark tube, suffix the number to the part no. (0 to 15 are provided as mark tube numbers.)
- Ex)+COM spec.. D type for 2 to 8 stations; No.10
SY3000-43-1A-10

Fig. (1) Block mounting procedure



How to Change Fitting Assembly



Type 45 manifold permits change in the A and B port sizes by changing the manifold block fitting assembly. After removing the valve, remove the clip with a screwdriver, etc. For mounting a new fitting assembly, insert it and then insert a clip until it will not come out of the manifold block.

Fitting assembly part numbers

Metric size

SY3000	One-touch fitting for ϕ 4	VVQ1000-50A-C4
	One-touch fitting for ϕ 6	VVQ1000-50A-C6
SY5000	One-touch fitting for ϕ 4	VVQ1000-51A-C4
	One-touch fitting for ϕ 6	VVQ1000-51A-C6
	One-touch fitting for ϕ 8	VVQ1000-51A-C8

Inch size

SY3000	One-touch fitting for ϕ 5/32"	VVQ1000-50A-N3
	One-touch fitting for ϕ 1/4"	VVQ1000-50A-N7
SY5000	One-touch fitting for ϕ 5/32"	VVQ1000-51A-N3
	One-touch fitting for ϕ 1/4"	VVQ1000-51A-N7
	One-touch fitting for ϕ 5/16"	VVQ1000-51A-N9

Note 1) P and R ports cannot be changed.

Note 2) Use caution that O-rings must be free from scratches and dust. Otherwise, air leakage may result.



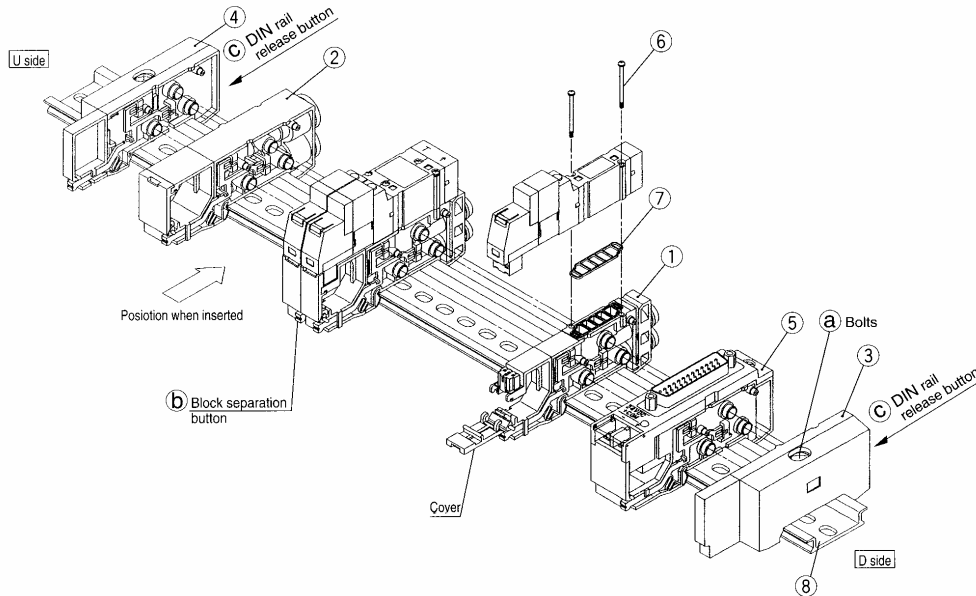
SY Series

Specific Product Precautions 19

Be sure to read before handling.

Exploded View/DIN Rail Manifold

Type 45F (D-sub Connector) Manifold



No.	Description	No.		Note	
		SY3000	SY5000		
1	Manifold block assembly	Manifold block assembly part number differs according to an attached lead wire assembly based on the connector spec. Select an appropriate port number from the table of manifold block assembly part number shown below. (Gasket 7 is supplied as an accessory.)			
2	SUP/ EXH block assembly	SX3000-51-2A (Metric size) SX3000-51-16A (Inch size)	SX5000-51-2A (Metric size) SX5000-51-16A (Inch size)	Metric size SY3000:with one-touch fitting for ϕ 8 SY5000:with one-touch fitting for ϕ 10 Inch size SY3000:with one-touch fitting for ϕ 5/16" SY5000:with one-touch fitting for ϕ 3/8"	
3	End block assembly	SX3000-52-2A	SX5000-52-2A	For D side	
4	End block assembly	SX3000-53-2A	SX5000-53-2A	For U side	
5-1	Connector block assembly (for D-sub connector)	SX3000-64-1A, 1NA	SX5000-64-1A 1NA	-1A:+COM -1NA:-COM	Note) For 24 VDC
5-2	Connector block assembly (for 26 pins flat cable)	SX3000-64-2A-26 2NA	SX5000-64-2A-26 2NA	-2A:+COM -2NA:-COM	
5-3	Connector block assembly (for 20 pins flat cable)	SX3000-64-2A-20 2NA	SX5000-64-2A-20 2NA		
5-4	Connector block assembly (for 10 pins flat cable)	SX3000-64-2A-10 2NA	SX5000-64-2A-10 2NA		
5-5	Connector block assembly (for 2 to 8 stations (T, T1) terminal block)	SX3000-64-3A	SX5000-64-3A	In common between +COM and -COM	
5-6	Connector block assembly (for 9 to 17 stations (T1) terminal block)	SX3000-64-8A	SX5000-64-8A		
6	Round head Combination screw	SY3000-23-4	M3x26, Matt nickel plated		
7	Gasket	SX3000-57-4	SX5000-57-6		
8	DIN rail	VZ1000-11-1-□		Refer to page 14	



SY Series

Specific Product Precautions 20

Be sure to read before handling.

Style of manifold	Manifold block assembly part no.	Note
For 45(N)F (D-sub connector)	SX ³ ₅ 000-50-3A-□□	□□ : A,B port SY3000(metric size) C4:With one-touch fitting for φ 4 C6:With one-touch fitting for φ 6 (inch size) N3:With one-touch fitting for φ 5/32" N7:With one-touch fitting for φ 1/4" A,B port SY5000(metric size) C4:With one-touch fitting for φ 4 C6:With one-touch fitting for φ 6 C8:With one-touch fitting for φ 8 (inch size) N3:With one-touch fitting for φ 5/32" N7:With one-touch fitting for φ 1/4" N9:With one-touch fitting for φ 5/16"
For 45(N) (Flat ribbon cable)	SX ³ ₅ 000-50-5A-□□	
For 45 G PC Wiring System compatible		
For 45 (Terminal block)	SX ³ ₅ 000-50-7A-□□	

DIN Rail Manifold Exploded View

How to Increase Manifold Bases

Station expansion is possible at any position.

- ① Loosen bolt^a fixing the manifold base until it begins to turn idly.(While pressing DIN rail releasing buttons^c, at two locations, separate the manifold base from the DIN rail.)
- ② Additional bases are to be added to the U side. Press splitting button ^b of the manifold block assembly on the U side until button ^b locks and then separate the block assemblies.
- ③ Separate the connector block assembly in the same manner as ②, and remove the connector mounting screw shown in Fig. 1
- ④ Loosen the valve mounting screw on the U side, remove the valve, and take out the receptacle housing.(Refer to Fig. 2.)
- ⑤ Insert the common wire (red) of the manifold block assembly to be added into the pin insertion section(N mark) of the receptacle housing that was taken out in ④, mount it on the manifold block, and mount the removed valve.
- ⑥ As shown in Fig. 3, mount the additional manifold block assembly on the DIN rail on the U side. Refer to the circuit diagram, and insert the lead wire (black) as shown in Fig. 4.
- ⑦ Press the blocks against each other until a click sound is produced, place the lead wire in the manifold block, and close the lid without pinching the lead wire.
- ⑧ While lightly holding the blocks together so that there are no gaps between them, secure them to the DIN rail by tightening the DIN rail holding screws^a. (Tightening torque: 1.4Nm)



Caution

- Note 1) Depending on the connector, there is a limit to the number of solenoids that can be used. Manifold bases that can be added cannot exceed the number of usable solenoids.
- Note 2) The manifold block assembly mounting position for additional manifold bases is always on the U side,because wires are connected to repective connectors sequentially from the D side.
- Note 3) When bolt^a for the end bolck is not sufficiently tightened during reassembly, air leakage may result.
Before supplying air, check that there is no gap between blocks and that the manifold block is firmly fixed to the DIN rail in order to ensure air supply without leakage.



SY Series Specific Product Precautions 21

Be sure to read before handling.

How to Increase Manifold Bases

Station expansion is possible at any position.

Fig. 1

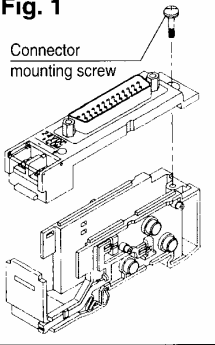


Fig. 2

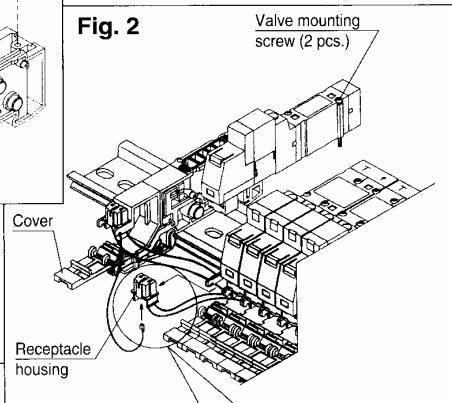


Fig. 3

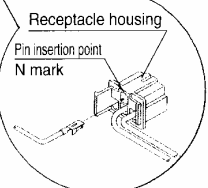
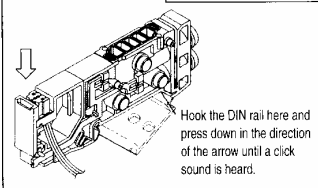
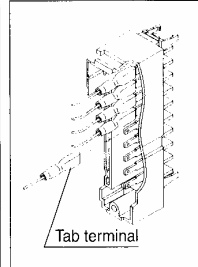
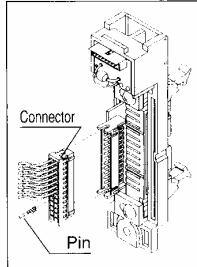
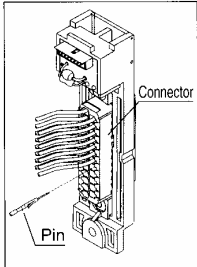


Fig. 4

D-sub connector (45F) Flat ribbon cable (45P□) Terminal block (45T₁)



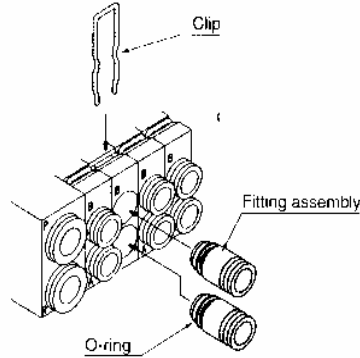
Note) After inserting pins, lightly pull lead wire to check that pins are locked.

Note) Insert pins after removing the connector from the main unit. After inserting pins, lightly pull lead wires to check that the pins are locked.

Note) Insert tab terminals completely.

How to Increase Manifold Bases.

How to Change Fitting Assembly



Type 45 manifold permits change in the A and B port sizes by changing the manifold block fitting assembly. After removing the valve, remove the clip with a screwdriver, etc. For mounting a new fitting assembly, insert it and then insert a clip until it will not come out of the manifold block.

Fitting assembly part numbers

Metric size

SY3000	One-touch fitting for $\phi 4$	VVQ1000-50A-C4
	One-touch fitting for $\phi 6$	VVQ1000-50A-C6
SY5000	One-touch fitting for $\phi 4$	VVQ1000-51A-C4
	One-touch fitting for $\phi 6$	VVQ1000-51A-C6
	One-touch fitting for $\phi 8$	VVQ1000-51A-C8

Inch size

SY3000	One-touch fitting for $\phi 5/32$ "	VVQ1000-50A-N3
	One-touch fitting for $\phi 1/4$ "	VVQ1000-50A-N7
SY5000	One-touch fitting for $\phi 5/32$ "	VVQ1000-51A-N3
	One-touch fitting for $\phi 1/4$ "	VVQ1000-51A-N7
	One-touch fitting for $\phi 5/16$ "	VVQ1000-51A-N9

Note 1) P and R ports cannot be changed.

Note 2) Use caution that O-rings must be free from scratches and dust. Otherwise, air leakage may result.



SY Series

Specific Product Precautions 22

Be sure to read before handing.

How to increase manifold bases (Series SY9000 only) Manifold case can be added at any location.

When a type 23 manifold base is added, tension bolts as well as manifold block assembly will be required. Order the tension bolt suitable for the stations after a station was increased (decreased), since the length of a tension by the number of stations. (For changing the number of stations for a type 23P manifold, wiring unit for the stations and lead assembly will be required.)

- 1 Loosen the tension bolts ⑤ connecting the manifold base, and out both of 2 tension bolts.
(When equipped with a DIN rail, loosen one DIN rail holding screw on either U side or D side.)
- 2 Separate the blocks at the location where station expansion is desired.
- 3 Mount additional manifold block assembly.
- 4 Press block-to-block so than there's no gap. After connection, insert a tension bolt for desired stations and then tighten it.



Caution (Tightening torque: 2.9 N.m)


(When equipped with a DIN rail, be sure to tighten the DIN rail holding screws after tightening the tension bolts. Tightening torque: 1.4N.m)

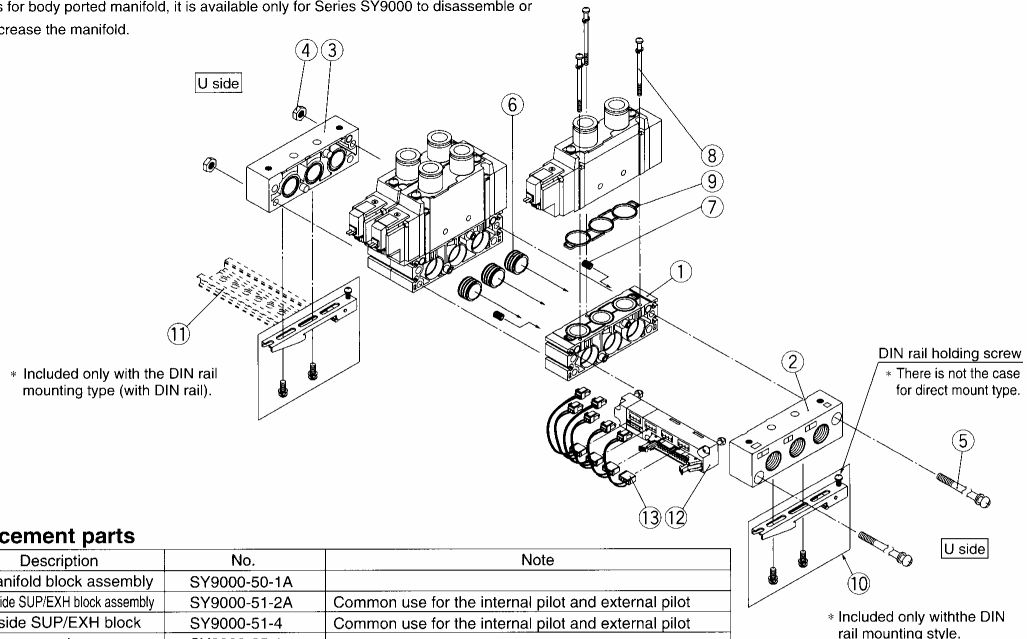


Caution

1. Be sure to shut off the power and air supplies before disassembly. Furthermore, since air may remain inside the actuator, piping and manifold, confirm that the air is completely exhausted before performing any work.
2. When disassembly and assembly are performed, air leakage may result if connections between blocks and DIN tightening of the end block's holding screw, is inadequate.
3. By adding wiring unit assembly to type 23 manifold, it can be changed to type 23P manifold, too.

Body Ported Manifold Exploded View, 23/23P Common

 As for body ported manifold, it is available only for Series SY9000 to disassemble or increase the manifold.



Replacement parts

No.	Description	No.	Note
1	Manifold block assembly	SY9000-50-1A	
2	D side SUP/EXH block assembly	SY9000-51-2A	Common use for the internal pilot and external pilot
3	U side SUP/EXH block	SY9000-51-4	Common use for the internal pilot and external pilot
4	Hexagon nut	SY9000-25-1	M5 x 0.8
5	Tension bolt	SY9000-23-□	Since □ at the end of part number corresponds with the number of stations, fill in the same number as the number of stations.
6	SUP Block bush assembly	SY9000-61-1A	Included in the Manifold block assembly and the D side SUP/EXH block assembly.
7	SUP Block bush assembly	SY9000-61-3A	Included in the Manifold block assembly and the D side SUP/EXH block assembly.
8	Round head combination screw	SY9000-18-2	Included in the Manifold block assembly.
9	Manifold gasket	SY9000-11-1	Included in the Manifold block assembly.
10	Clamp sub assembly	SY9000-29-1A	
11	DIN rail	VZ1000-11-4-□	Refer to p. 57.
12	Wiring unit assembly	SY9000-36-□A	Since □ in part number corresponds with the number of stations, fill in the number of stations (4 to 12).
13	Connector assembly	SY9000-37-□□	Refer to page 54.

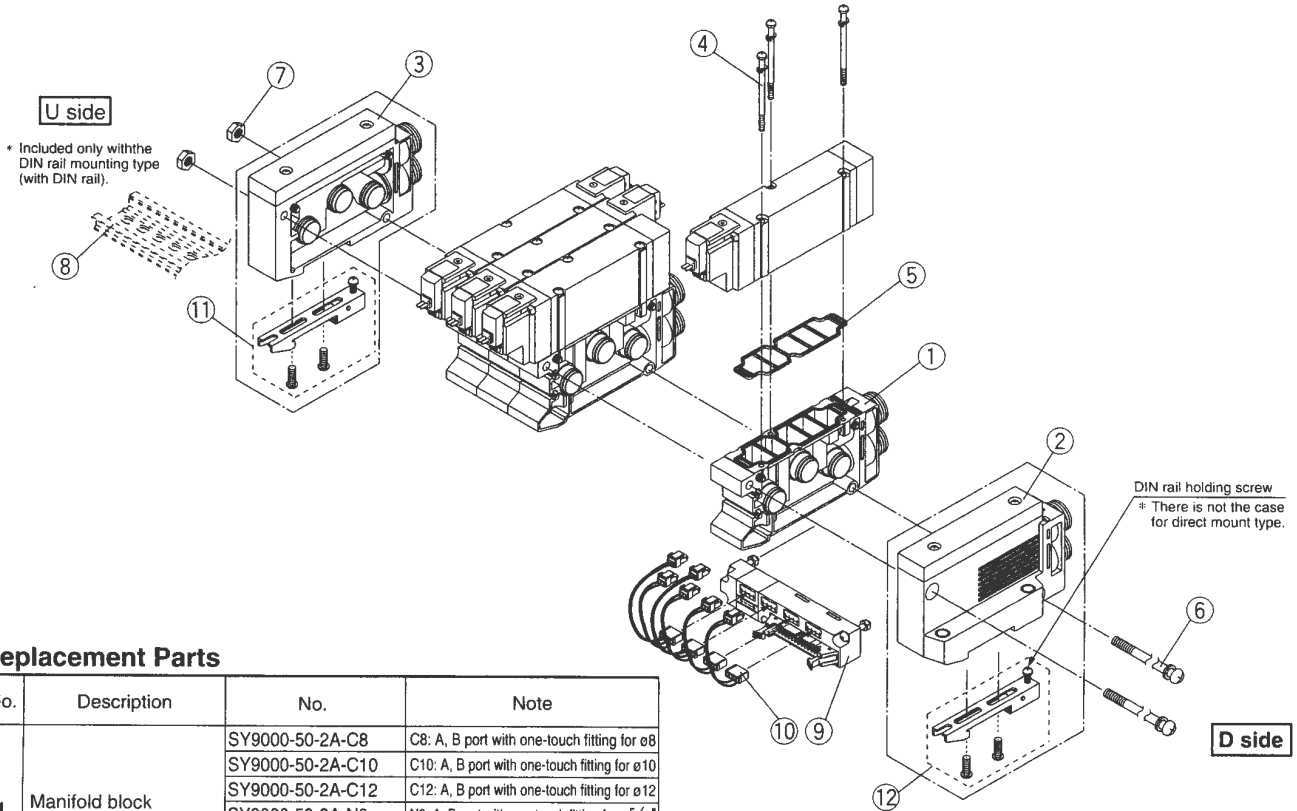


SY Series

Specific Product Precautions 23

Be sure to read before handling.

Base Mounted Manifold Exploded View

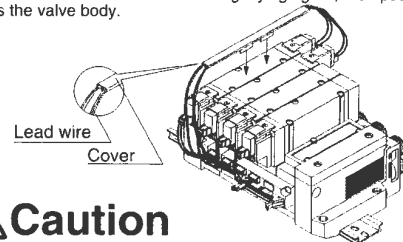


Replacement Parts

No.	Description	No.	Note
1	Manifold block assembly	SY9000-50-2A-C8	C8: A, B port with one-touch fitting for $\phi 8$
		SY9000-50-2A-C10	C10: A, B port with one-touch fitting for $\phi 10$
		SY9000-50-2A-C12	C12: A, B port with one-touch fitting for $\phi 12$
		SY9000-50-2A-N9	N9: A, B port with one-touch fitting for $\phi 5/16"$
		SY9000-50-2A-N11	N11: A, B port with one-touch fitting for $\phi 3/8"$
		SY9000-50-2A-02*	O2: A, B port $1/4"$ (* thread type)
		SY9000-50-2A-03*	O3: A, B port $3/8"$ (* thread type)
4	Round head combination screw	SY9000-18-2	M3 x 42, Matt nickel plated
5	Gasket	SY9000-11-2	
6	Tension bolt	SY9000-23-□	□ at the end of part number corresponds with the number of manifold station. Specify the same number as the number of stations.
7	Hexagon nut	SY9000-25-1	
8	DIN rail	VZ1000-11-4-□	Refer to page 110.
9	Wiring unit assembly	SY9000-36-□A	□ at the end of part number corresponds with the number of manifold station. Specify the same number as the number of stations (4 to 12 stations)
10	Connector assembly	SY9000-37-□□	Refer to page 104.
11	Lead wire cover	SY9000-41-1	
12	Clamp sub assembly	SY9000-30-1A	Included only with the DIN rail mounting type.

⑪ How to assemble lead wire cover

Lead wire cover is only usable for double solenoid valves. Lead wire is inserted into the lead wire cover as magnifying figure, then push it until it touches the valve body.



⚠ Caution

For type 43P (Flat cable manifold) of Series SY9000, the lead wire cover is attached for bundling the lead wires for each solenoid. In case such as adding double solenoid valve, etc., order separately lead wire cover as well.

② SUP/EXH block assembly no. (D side mounting)

• Direct mount type: **SY9000-70-□ A-□**

• DIN rail mounting type: **SY9000-72-□ A-□**

• P, R port

C12	One-touch fitting for $\phi 12$
N11	One-touch fitting for $\phi 3/8"$
00	Plug

• Specifications

1	Internal pilot type
3	External pilot type
4	Internal pilot / Built-in silencer type
5	External pilot / Built-in silencer type

③ SUP/EXH block assembly no. (U side mounting)

• Direct mount type: **SY9000-71-□ A-□**

• DIN rail mounting type: **SY9000-73-□ A-□**

• P, R port

C12	One-touch fitting for $\phi 12$
N11	One-touch fitting for $\phi 3/8"$
00	Plug

• Specifications

1	Internal pilot type
3	External pilot type
4	Internal pilot/Built-in silencer type
5	External pilot/Built-in silencer type



SY Series

Specific Product Precautions 24

Be sure to read before handing.

How to increase manifold bases (Series SY9000 only) Manifold case can be added at any location.

When a type 43 manifold base is added, tension bolts as well as manifold block assembly will be required. Order the tension bolt suitable for the stations after a station was increased (decreased), since the length of a tension bolt differs by the number of stations. (For changing the number of stations for a type 43P manifold, wiring unit for the stations and lead assembly will be required.)

- 1 Loosen the tension bolts connecting the manifold base, and pull out both of 2 tension bolts.
(When equipped with a DIN rail, loosen one DIN rail holding screw on either U side or D side.)
- 2 Separate the blocks at the location where station expansion is desired.
- 3 Mount additional manifold block assembly.
- 4 Press block-to-block so than there's no gap. After connection, insert a tension bolt for desired stations and then tighten it.

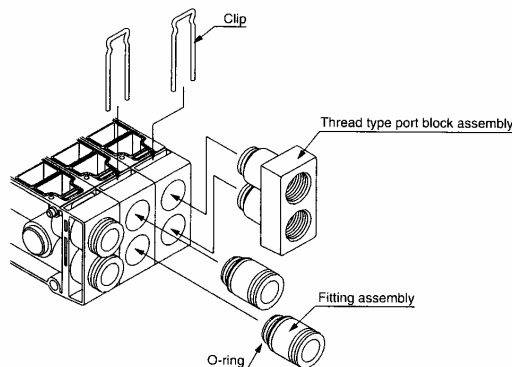
⚠ Caution (Tightening torque: 2.9 N.m)
(When equipped with a DIN rail, be sure to tighten the DIN rail holding screws after tightening the tension bolts. Tightening torque: 1.4N.m)

⚠ Caution

- 1 Be sure to shut off the power and air supplies before disassembly. Furthermore, since air may remain inside the actuator, piping and manifold, confirm that the air is completely exhausted before performing any work.
- 2 When disassembly and assembly are performed, air leakage may result if connections between blocks and tightening of the end block's holding screw, is inadequate.
- 3 By adding wiring unit assembly to type 43 manifold, it can be changed to type 43P manifold, too.

How to replace A, B port fitting assembly

By replacing manifold block fitting assemblies or the threaded port block assembly of a type 43(P) manifold, the port size of the A and B ports can be changed. To replace these parts, remove the clip with a flat head screwdriver after the valve has been removed. Insert the fitting assemblies or threaded port block assembly, and then reinsert the clip so that it dose not protrude from the manifold block.



Fitting assembly part numbers

Port size	No.	Note
One-touch fitting assembly for $\phi 8$	VVQ4000-50B-C8	
One-touch fitting assembly for $\phi 10$	VVQ4000-50B-C10	
One-touch fitting assembly for $\phi 12$	VVQ4000-50B-C12	
One-touch fitting for $\phi \frac{5}{16}$ "	VVQ4000-50B-N9	
One-touch fitting for $\phi \frac{3}{8}$ "	VVQ4000-50B-N11	
$\frac{1}{4}$ threaded type port block assembly	SY9000-58A-02*	* at the end of part number denotes the thread type.
$\frac{3}{8}$ threaded type port block assembly	SY9000-58A-03*	* at the end of part number denotes the thread type.
Plug assembly	SY9000-62-1A	

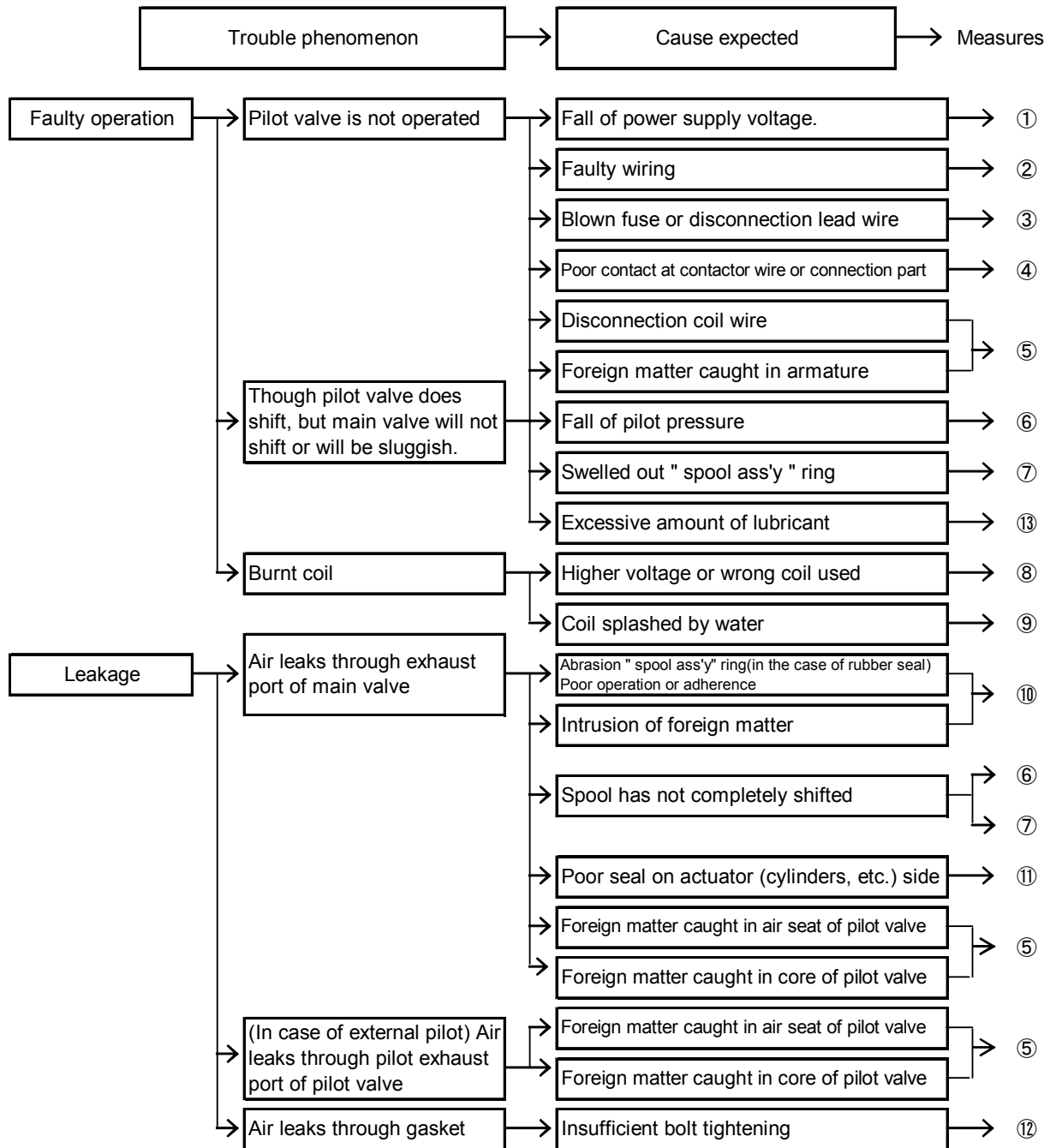
Note 1) Be careful to avoid damage or contamination of O-rings, as this can cause air leakage.

Note 2) Although replacing One-touch fittings of P, R port is also possible, use caution to the cases, etc. in which solenoid valves are often used at the same time by using the smaller sized fittings than the standard size ($\phi 12$). Because there may not be able to supply or exhaust air sufficiently in comparison with the valve performances. Besides, although fittings used for A, B port are the same, it is not possible to use the threaded type port block assembly.

SY3000*-OMJ0003-A

TROUBLESHOOTING

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



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 history

A	Safety Instructions	oZ
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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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