SY-TFP49

ORIGINAL INSTRUCTIONS

Installation and Maintenance Manual

Plug-in Manifold Valve

Series SY3000/5000



The intended use of a valve is to control the movement of an actuator.

Validated Valves according to ISO 13849:
For the part numbers of validated valves refer to Doc. Nr. SY3000V-SMP0007 for rubber seal valves and to Doc. Nr. SY3000V-SMP0008 for metal seal valves.

1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of “Caution”, “Warning” or “Danger”, followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.
- Always ensure compliance with relevant safety laws and standards.

⚠ **Caution**	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
⚠ **Warning**	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
⚠ **Danger**	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

⚠ Warning

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.
  Since the products specified here can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.
- **Only trained personnel should operate pneumatically operated machinery and equipment.**
  Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.
- **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
  1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
  2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.

1 Safety Instructions (Continued)

3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).

- **Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**
  1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
  2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
  3) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

⚠ Caution

- Ensure that the air supply system is filtered to 5 µm.

2 Specifications

2.1 Specifications

Manifold specifications

Plug-in Metal Base

Model			D-sub connector	Flat ribbon cable			Serial wiring
			F type	P type	PG type J type	PH type	S5 type (EX510)
Manifold type			Plug-in metal base				
SUP/EXH Port type			Common SUP/EXH				
Valve station	All double wiring		2 to 12 stations		2 to 9 stations (J type:2 to 8 stations)	2 to 4 stations	2 to 8 stations
	All single wiring				2 to 12 stations	2 to 8 stations	2 to 12 stations
Applicable connector			D-sub connector Conforming to MIL-C24308 JIS-X-5101	Flat ribbon cable connector with strain relief Conforming to MIL-C-83503			-
				Socket: 26 pins MIL type	Socket: 20 pins MIL type	Socket: 10 pins MIL type	
Internal wiring			Positive common, Negative common				
Port size	1(P), 3/5(E) port	SY3000	1/8				
		SY5000	1/4				
	4(A), 2(B) port	SY3000	M5 x 0.8, 1/8 ϕ2 One-touch fitting, ϕ3.2 One-touch fitting, ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ1/8" One-touch fitting, ϕ5/32" One-touch fitting, ϕ1/4" One-touch fitting				
		SY5000	1/8, 1/4 ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ8 One-touch fitting, ϕ5/32 One-touch fitting, ϕ1/4" One-touch fitting, ϕ5/16" One-touch fitting				
Enclosure (Based on IEC60529)			IP40				IP20

Table 1

Plug-in Connector Connection Base

Model			D-sub	Flat ribbon cable			Terminal block box	Lead wire	Circular connector
			F type	P type	PG type J type	PH type	T type	L type	M type
Manifold type			Plug-in connector connecting base						
SUP/EXH Port type			Common SUP/EXH (Common for 3/5 port)						
Valve station			2 to 24 stations		2 to 18 stations (J type: 2 to 16 stations)	2 to 8 stations	2 to 20 stations	2 to 24 stations	
Applicable connector			D-sub connector Conforming to MIL-C-24308 JIS-X-5101		Flat ribbon cable connector with strain relief Conforming to MIL-C-83503		-		
					Socket :26pins MIL type	Socket :20pins MIL type	Socket :10pins MIL type		
Internal wiring			Positive common, Negative common						
Port size	1(P), 3/5(E) port	SY3000	ϕ8 One-touch fitting, ϕ5/16" One-touch fitting						
		SY5000	ϕ10 One-touch fitting, ϕ3/8" One-touch fitting						
	4(A), 2(B) port	SY3000	ϕ2 One-touch fitting, ϕ3.2 One-touch fitting, ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ1/8" One-touch fitting, ϕ5/32" One-touch fitting, ϕ1/4" One-touch fitting						
		SY5000	ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ8 One-touch fitting, ϕ5/32 One-touch fitting, ϕ1/4" One-touch fitting, ϕ5/16" One-touch fitting						
Enclosure (Based on IEC60529)			IP40				IP67		

Table 2

2 Specifications (Continued)

Model			Serial wiring			
			S6□ type (EX600)	SA2 type (EX500) S4□ type (EX126)	S1□ type (EX250)	S3□ type (EX120)
Manifold type			Plug-in connector connecting base			
SUP/EXH Port type			Common SUP/EXH (Common for 3/5 port)			
Valve station			2 to 24 stations	2 to 16 stations	2 to 24 stations	2 to 16 stations
Internal wiring			Positive common, Negative common			
Port size	1(P), 3/5(E) port	SY3000	ϕ8 One-touch fitting, ϕ5/16" One-touch fitting			
		SY5000	ϕ10 One-touch fitting, ϕ3/8" One-touch fitting			
	4(A), 2(B) port	SY3000	ϕ2 One-touch fitting, ϕ3.2 One-touch fitting, ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ1/8" One-touch fitting, ϕ5/32" One-touch fitting, ϕ1/4" One-touch fitting			
		SY5000	ϕ4 One-touch fitting, ϕ6 One-touch fitting, ϕ8 One-touch fitting, ϕ5/32 One-touch fitting, ϕ1/4" One-touch fitting, ϕ5/16" One-touch fitting			
Enclosure (Based on IEC60529)			IP67	IP67 (EX500 gateway unit, input unit: IP65)	IP67 (IP40 partially)	IP20

Table 3

Valve specifications

Valve type		Rubber seal	Metal seal
Fluid		Air	
Internal pilot Operating pressure Range / MPa Note 1)	2 position single	0.15 to 0.7	0.1 to 0.7 (High pressure type: 0.1 to 1)
	2 position double	0.1 to 0.7	
	3 position	0.2 to 0.7	
	4 position dual 3 port	0.15 to 0.7	-
External pilot Operating pressure Range / MPa Note 1)	Operating pressure range	-100 kPa to 0.7 (4 position: -100 kPa to 0.6)	-100 kPa to 0.7 (4 position: -100 kPa to 1)
	2 position single	0.25 to 0.7	0.1 to 0.7 (High pressure type: 0.1 to 1)
	2 position double		
	3 position		
	4 position dual 3 port	Operating pressure + 0.1 (Min.0.25)	-
Ambient and fluid temperature/°C		-10 to 50 (No freezing)	
Minimum Operating frequency		1 cycle / 30 days	
Maximum Operating Frequency / Hz	2 position single/double, 4 position dual 3 port	5	20 Note2)
	3 position	3	10 Note 2)
Duty cycle		Continuous (0.15W standard pressure power saving type). Other types see 3.11	
Manual override		Non-locking push type Push turn-locking slotted type Slide locking type	
Pilot exhaust type	Internal pilot rubber seal	Main/Pilot valve common exhaust	
	Internal pilot metal seal	Individual pilot exhaust	
	External pilot	Pilot valve common exhaust	
Lubrication		Not required	
Mounting orientation		Unrestricted	Single: Unrestricted. Double/3 position: Main valve is horizontal.
Impact/vibration resistance Note 3) / m/s^2		150/30	
Enclosure		IP67 (Based on IEC60529)	
Service life B10		Refer for rubber seal valves to SY3000V-SMP0007 and metal seal valves to SY3000V-SMP0008	

Table 4

Note 1) See section 3.17
Note 2) 5Hz or less for power saving circuit type.
Note 3) **Impact resistance:** No malfunction occurred when it was tested with a drop tester in the axial direction and at right angles to the main valve & armature; in both energized & de-energised states and for every time in each condition (Values at the initial period.)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Tests ere performed at both energized and de-energized states in the axial direction and at right angles to the main valve & armature. (Valves at the initial period.)

2 Specifications (Continued)

2.2 Manifold Flow-rate Characteristics Note 1)

Plug-In Connector Connecting Base – Valve Seal Type: Rubber Seal

Model	Port Size		Valve Flow-rate Characteristics			
			1 -> 4/2 (P -> A/B)		4/2 -> 5/3 (A/B -> E)	
	1, 3/5 (P, E)	4, 2 (A, B)	C[dm^3/(s·bar)]	b	C[dm^3/(s·bar)]	b
SS5Y3—10 (Side ported)	C8	C6	1.4	0.30	1.6	0.19
SS5Y3—12 (Top ported)	C8	C6	1.2	0.29	1.3	0.19
SS5Y5—10 (Side ported)	C10	C8	3.3	0.30	3.6	0.17
SS5Y5—11 (Bottom ported)	C10	C8	3.3	0.29	4.2	0.26
SS5Y5—12 (Top ported)	C10	C8	2.8	0.27	3.8	0.23

Plug-In Connector Connecting Base – Valve Seal Type: Metal Seal

Model	Port Size		Valve Flow-rate Characteristics			
			1 -> 4/2 (P -> A/B)		4/2 -> 5/3 (A/B -> E)	
	1, 3, 5 (P, EA, EB)	4, 2 (A, B)	C[dm^3/(s·bar)]	b	C[dm^3/(s·bar)]	b
SS5Y3—50 (Side ported)	01	C6	1.2	0.19	1.3	0.18
SS5Y3—51 (Bottom ported)	01	C6	1.2	0.16	1.3	0.18
SS5Y3—52 (Top ported)	01	C6	1.2	0.16	1.3	0.18
SS5Y5—50 (Side ported)	02	C8	2.7	0.24	3.1	0.17
SS5Y5—51 (Bottom ported)	02	C8	2.8	0.25	3.5	0.15
SS5Y5—52 (Top ported)	02	C8	2.6	0.18	3.0	0.16

Plug-In Metal Base – Valve Seal Type: Rubber Seal

Model	Port Size		Valve Flow-rate Characteristics			
			1 -> 4/2 (P -> A/B)		4/2 -> 5/3 (A/B -> E)	
	1, 3, 5 (P, EA, EB)	4, 2 (A, B)	C[dm^3/(s·bar)]	b	C[dm^3/(s·bar)]	b
SS5Y3—50 (Side ported)	01	C6	1.1	0.19	1.1	0.15
SS5Y3—51 (Bottom ported)	01	C6	1.2	0.31	1.2	0.14
SS5Y3—52 (Top ported)	01	C6	1.1	0.29	1.2	0.20
SS5Y5—50 (Side ported)	02	C8	2.6	0.28	2.6	0.14
SS5Y5—51 (Bottom ported)	02	C8	2.7	0.35	2.8	0.20
SS5Y5—52 (Top ported)	02	C8	2.6	0.26	3.1	0.13

Plug-In Metal Base – Valve Seal Type: Metal Seal

Model	Port Size		Valve Flow-rate Characteristics			
			1 -> 4/2 (P -> A/B)		4/2 -> 5/3 (A/B -> E)	
	1, 3, 5 (P, EA, EB)	4, 2 (A, B)	C[dm^3/(s·bar)]	b	C[dm^3/(s·bar)]	b
SS5Y3—50 (Side ported)	01	C6	0.9	0.14	1.0	0.12
SS5Y3—51 (Bottom ported)	01	C6	1.0	0.21	1.1	0.10
SS5Y3—52 (Top ported)	01	C6	1.1	0.15	1.1	0.14
SS5Y5—50 (Side ported)	02	C8	2.2	0.20	2.3	0.13
SS5Y5—51 (Bottom ported)	02	C8	2.4	0.26	2.5	0.16
SS5Y5—52 (Top ported)	02	C8	2.4	0.18	2.6	0.12

Table 5

Note 1) The value is for a manifold base with 5 stations of individually operated 2-position valves.

2 Specifications (Continued)

2.3 Solenoid Specifications

Coil rated voltage / DC		24 , 12
Allowable voltage fluctuation		±10% of rated voltage Note)
Power consumption / W	Standard	0.35 (With indicator light: 0.4)
	High pressure type, Quick response type	0.9 (With indicator light: 0.95)
	With power saving circuit	Standard: 0.15 (With indicator light only), High pressure type: 0.4 (With indicator light only)
Surge voltage suppressor		Diode (Varistor for non-polar type)
Indicator light		LED

Table 6

Note) Since voltage drops due to the internal circuit in S/Z type and T type (with power saving circuit), the allowable voltage fluctuation should be within the following:
S/Z type 24 VDC: –7% to +10% T type 24 VDC: –8% to +10%
12 VDC: –4% to +10% 12 VDC: –6% to +10%

2.4 Symbol

Rubber seal

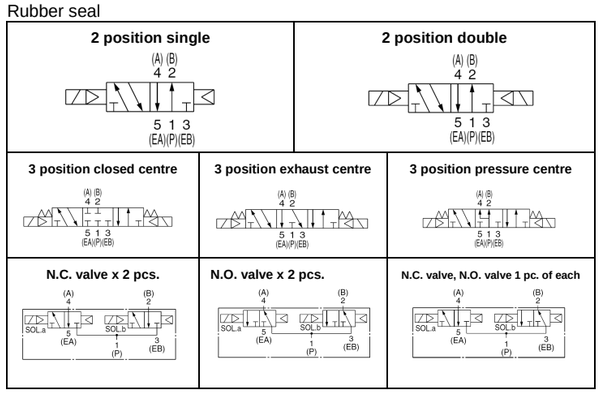


Figure 1

Metal seal

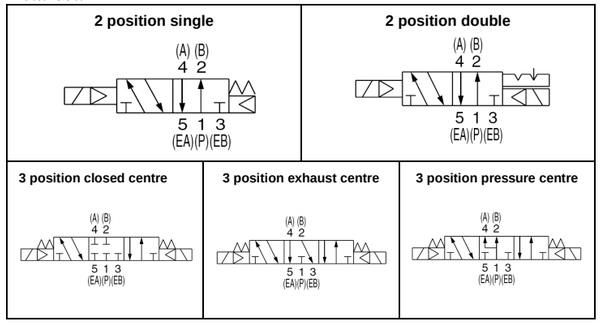


Figure 2

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.

3 Installation (Continued)

- Products with IP65 enclosures (based on IEC60529) are protected against dust and water, however, these products cannot be used in water.
- Products compliant to IP65 satisfy the specifications through mounting.
- If using in an atmosphere where there is possible contact with water drop-lets, oil, weld spatter, etc., take suitable preventive measures.
- When the solenoid valve is mounted in a control panel or it is energized for a long time, make sure that the ambient temperature is within the specification of the valve.

3.3 Piping

Caution

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings according to appropriate tightening torque.

Thread	Tightening Torque
Rc 1/8	7 to 9
Rc 1/4	12 to 14

Table 7

3.4 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, use turbine oil Class 1(no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

3.5 One-touch fittings

Caution

Tube attachment

- Take a tube having no flaws on its periphery and cut it off at a right angle. When cutting the tube, use tube cutters TK-1, 2 or 3. Do not use pincers, nippers or scissors etc. If cutting is done with tools other than tube cutters, the tube may be cut diagonally or become flattened. This makes a secure installation impossible, and causes problems such as air leakage or the tube being pulled out after installation. Allow some extra length in the tube.
- Grasp the tube and push it in slowly, inserting it securely all the way into the fitting.
- After inserting the tube, pull on it lightly to confirm that it will not come out. Problems such as air leakage or the tube being pulled out can occur if the tube is not inserted securely all the way into the fittings.

Tube detachment

- Push in the release bushing and the collar at the same time.
- Pull out the tube while holding down the release bushing so that it does not come out. If the release bushing is not pressed down sufficiently there will be increased bite on the tube and it will become more difficult to pull out.
- When the removed tube is to be used again, cut off the portion which has been chewed before reusing it. If this is not done then the chewed portion of the tube can cause problems such as air leakage or difficulty in removing the tube from the fitting.

3.6 Precautions on other tube brands

Caution

- When using non-SMC brand tubes, confirm that the following specifications are satisfied with respect to the outside diameter tolerance of the tube.
  Nylon tube ±0.1mm
  Soft nylon tube ±0.1mm
  Polyurethane tube +0.15mm -0.2mm
- Do not use tubing that does not meet these outside diameter tolerances. It may not be possible to connect them, or they may cause other problems, such as air leakage or the tubing pulling out after connection.

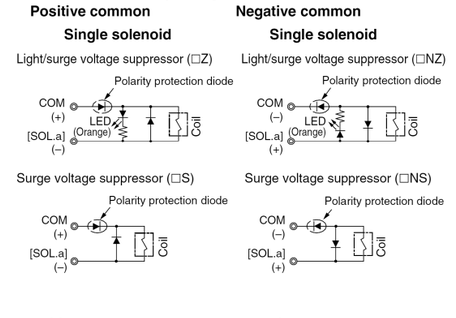
3 Installation (Continued)

3.7 Indicator Light/Surge Voltage Suppressor

Surge suppression should be specified by using the appropriate part number. In ISO 13849 validated systems, if a valve type without suppression is used, suppression must be provided by the host controller.

- **Polar type**

When the solenoid valve has polarity.



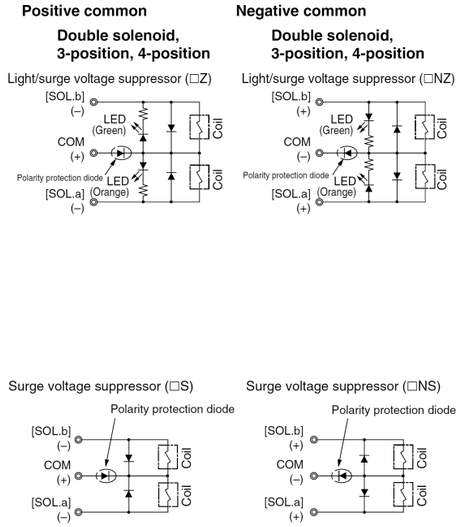
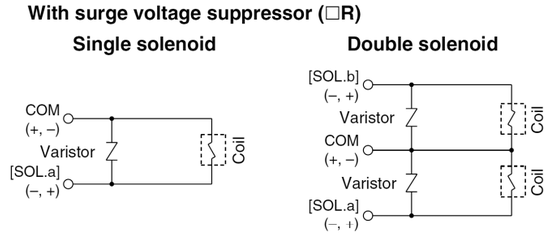


Figure 3

■Non-polar type

With surge voltage suppressor (□R)



With light/surge voltage suppressor (□U)

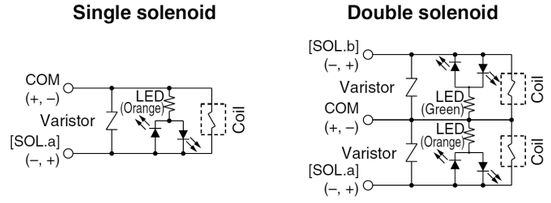


Figure 4

3 Installation (Continued)

3.8 With power saving circuit

Power consumption is decreased by approx. 1/3 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 67 ms at 24 VDC.)

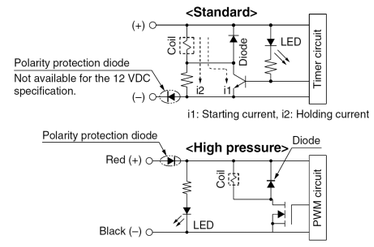


Figure 5

The above circuit reduces the current consumption when holding in order to save energy. Refer to the electrical power waveform as shown below.

<Electrical power waveform with power saving circuit>

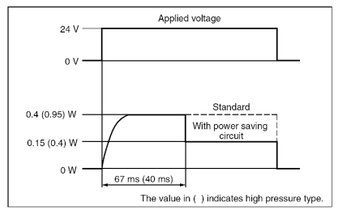


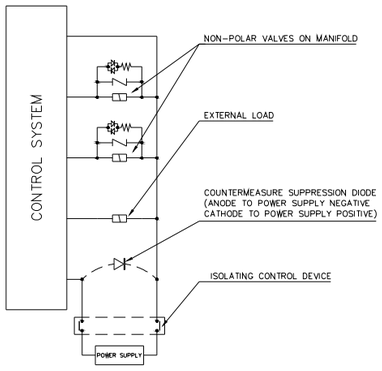
Figure 6

• The 12 VDC specification with power saving circuit (standard specification) does not have the polarity protection diode. Do not make a mistake with the polarity.

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

3.9 Surge voltage from external power isolation

Caution



Countermeasures are required if non-polar valves are used in a system with a power supply isolating device.
When the power supply is suddenly isolated due to emergency stop etc, transient surge voltage can be caused by energy stored in energised devices within the control system. This transient voltage can cause bipolar valves to be temporarily energised.
As a countermeasure, a power supply suppression diode should be fitted within the control system as shown.
Contact SMC for more details.

3 Installation (Continued)

3.10 Transient voltage of the surge suppressor

Note) Even with surge suppressed valves, some transient voltage will be experienced by the host controller. The table below gives the voltage transients for the different types of suppressor. Ensure the transient voltage is within the specification of the host controller.

Residual Voltage

Surge voltage suppressor	DC	
	24 V	12 V
S,Z	Approx. 1 V	
R,U	Approx. 47 V	Approx. 32 V

Table 8

3.11 Continuous Duty

⚠ Caution

For continuous duty use the 0.15W power saving variant. If other variants are energized continuously for a long period of time, the rise in temperature due to heat-up of the coil assembly may cause a decline in solenoid valve performance, reduce service life, or have adverse effects on peripheral equipment. In particular, if three or more adjacent stations on the manifold are energized simultaneously for extended periods of time or if the valves on A side and B side are energized simultaneously for a long period of time, take special care as the temperature rise will be greater. Refer to SMC for more information.

3.12 Light Indication

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

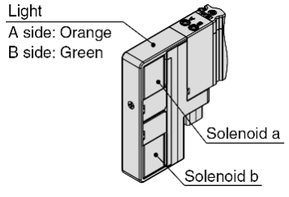


Figure 7

3.13 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 Nm
SY5000	M3	0.8 Nm

Table 9

3.14 Manual override

⚠ Warning

The manual override will change the state of the main valve regardless of the electrical state. Any connected actuator will respond to the operation of the manual override. The manual override must only be used after confirming that the operation does not increase the safety risk.

■Non-locking push type

Press in the direction of the arrow.

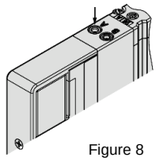


Figure 8

Locked manual overrides might prevent the valve responding to being de-energised. Ensure the selected manual override type is suitable if used in an ISO 13849 validated system.

3 Installation (Continued)

■Push-turn locking slotted type [Type D]

⚠ Caution

Push down on the manual override with a small flat head screwdriver until it stops. Turn it clockwise by 90°to lock it.
Turn it counterclockwise to release it.
If it is not turned, it can be operated the same way as the non-locking type.

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

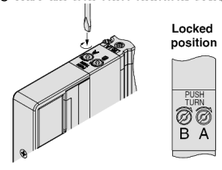


Figure 9

■Sliding locking type (manual)

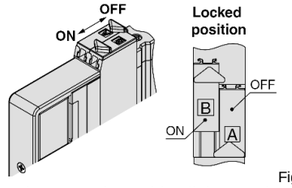


Figure 10

It is locked by sliding the manual override all the way in the direction indicated by the arrow (ON side) with a small flat head screwdriver or with your fingers. Slide it in the direction indicated by the arrow (OFF side) to release it.

3.15 Type 5□ (Metal Base) Changing Connector Entry Direction

⚠ Caution

Connector direction for electrical entry of D-sub connector, flat ribbon cable and PC wiring can be changed.

If the directional change is required, push the lever on both sides to remove the connector and change the connector direction for electrical entry as shown in the figure. Since lead wire assemblies are attached to the connector, excessive pulling or twisting can cause broken wires or other problems. Also, take precautions so that lead wires are not caught and pinched when installing the connector.

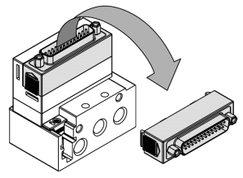


Figure 11

3.16 Type 1□ (Connector Connecting Base) Changing Connector Entry Direction

⚠ Caution

Connector direction for electrical entry of D-sub connector, flat ribbon cable and PC wiring can be changed. If the directional change is required, slide the lever on the side of the connector block to the FREE position, and then change the direction as shown in the figure. Also, before connecting the connector, be sure to return the lever to the LOCK position. (If the lever is difficult to slide, move the connector a little bit to make it easier to slide the lever.) If an excessive force is applied on the connector in the LOCK position, the connector block may be damaged. Also, using in such a way that the connector floats in the FREE position, it may cause the lead wire, etc. to break. Thus, refrain from using in these ways.

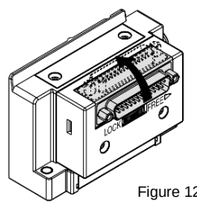


Figure 12

3 Installation (Continued)

3.17 Reverse flow

⚠ Caution

Only the external pilot variants are suitable for reverse flow with pressure supplied on ports 3 and 5 provided the pressure is less than 0.7 MPa. Reverse flow cannot be applied to 'H' variants with built in check-valves or valves fitted with SY#0M-24-1A check valves.

3.18 Back pressure check valves.

Back pressure from the common manifold exhausts can be prevented from affecting actuators connected to ports 2 and 4 by using the 'H' variant valve or fitting SY#0M-24-1A check valves. Contact SMC for details.
The flow capacity of the valve is reduced in these cases.

3.19 External pilot exhausts

⚠ Caution

The external pilot variants use the manifold PE connection for pilot exhaust – see manifold footprint 4.5. Ensure that this connection is always vented to atmosphere and not subject to any pressure pulses from other devices.

3.18 Valve and Manifold Combination

The SY series plug-in valve has the common configuration of the valve mounting surface between base mounted type (SY3/5□0□) and top ported type (SY3/5□3□), therefore, it can be mounted to all manifolds of the side ported type (type 50 and type 10), the bottom ported type (type 51 and type 11) and the top ported type (type 52 and type 12).
For example, air output can be obtained from both sides of the A and B ports of the manifold and the valve by mounting a top ported valve to a side ported or bottom ported manifold , and a pressure switch can be connected to the output port on one side.

4 Settings

4.1 Port Block Assembly and How to Change Piping Types between Top and Side

⚠ Caution

On the top ported type, the port size of A and B ports can be changed by switching the port block assemblies which are mounted on the body. The piping method can also be changed by switching the top ported type port block assembly with the side ported type cover assembly. Note, not tightening the mounting screws securely may cause air to leak when they are switched.

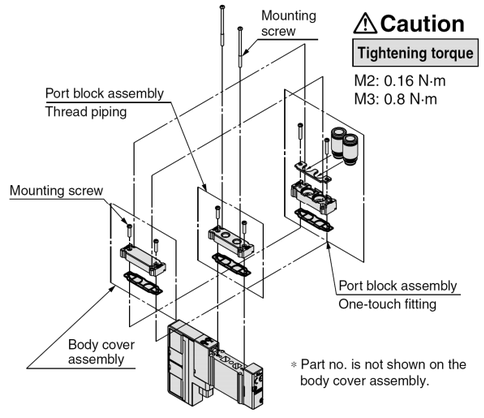
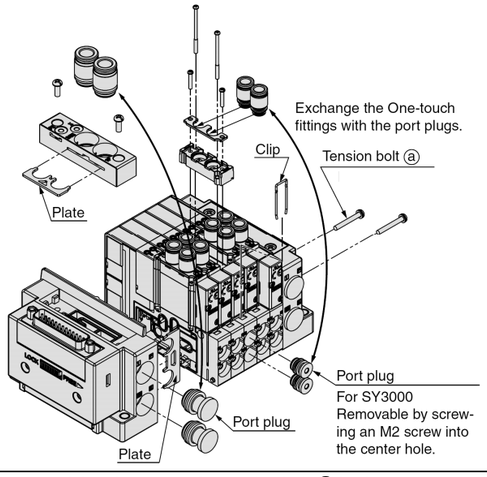


Figure 13

4.2 How to change while mounted on a manifold

To switch the port blocks while the valves are mounted to a manifold; remove the clip with a flat head screwdriver before switching the port plugs and the One-touch fittings. Air may leak if the mounting screws are not tightened or the clip is not inserted securely enough. Take care to tighten to the correct tightening torque.

4 Settings (Continued)



Tightening torque for tension bolt ⓐ(M3): 0.6 Nm

4 Settings (Continued)

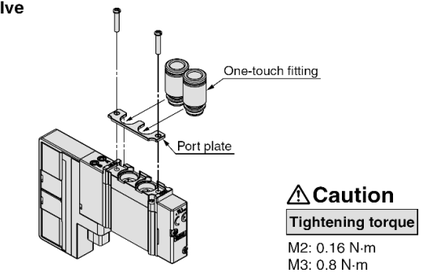
4.3 Changing One-touch Fittings

⚠ Caution

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

It may cause air leakage if the mounting screws are not tightened or the clip and the clip plate are not inserted securely enough when they are switched. Take care to tighten to the correct tightening torque.

■Valve



■Plug-in metal base

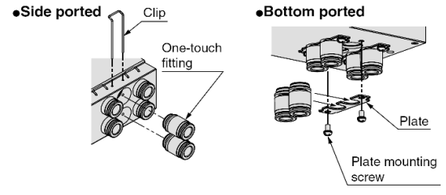
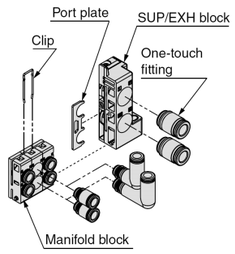


Figure 15

4 Settings (Continued)

■Plug-in connector connecting base

• Side ported



• Bottom ported

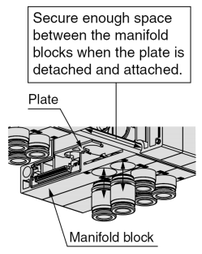


Figure 16

4.4 One-touch Fittings

⚠ Caution

When fittings are used, they may interfere with one another depending on their types and sizes. Therefore, the dimensions of the fittings to be used should first be confirmed in their respective catalogues.
Fittings whose compliance with the SY series is already confirmed are stated below. If the fitting within the applicable range is selected, there will not be any interference.

Applicable Fittings: **Series KQ2H, KQ2S**
Series KJH, KJS

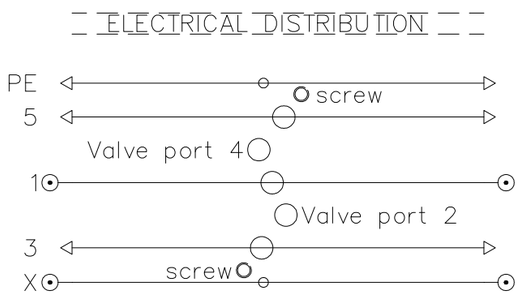
Series	Model	Piping port	Port size	Fittings	Applicable tube O.D. ø2	ø3.2	ø4	ø6	ø8	ø10	ø12
SY3000	SY3□3[1]-□□-M5	4A, 2B	M5	KQ2H KJH			●				
				KQ2S KJS			●				
	SS5Y3-50/51/52 (R) Manifold base	1P, 5EA, 3EB	1/8	KQ2H KJH				●			
				KQ2S KJS				●			
		X, PE	M5	KQ2H KJH			●				
				KQ2S KJS			●				
		4A, 2B	1/8	KQ2H KJH			●				
				KQ2S KJS			●				
			M5	KQ2H KJH			●				
				KQ2S KJS			●				

Table 10

Series	Model	Piping port	Port size	Fittings	Applicable tube O.D. ø2	ø3.2	ø4	ø6	ø8	ø10	ø12
SY5000	SY5□3[1]-□□-01	4A, 2B	1/8	KQ2H KJH			●				
				KQ2S KJS			●				
	SS5Y5-50/51/52 (R) Manifold base	1P, 5EA, 3EB	1/4	KQ2H				●			
				KQ2S				●			
		X, PE	M5	KQ2H KJH			●				
				KQ2S KJS			●				
		4A, 2B	1/4	KQ2H				●			
				KQ2S				●			
			1/8	KQ2H KJH			●				
				KQ2S KJS			●				

Table 11

4.5 Manifold footprint



5 Maintenance

5.1 General Maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- When the 3-position closed centre type is in it's rest position, air can be trapped between the valve and the cylinder. Exhaust this air pressure before removing piping or performing any maintenance.
- When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc. Then, confirm that the equipment is operating normally.
- **Low frequency operation**

Refer to table 4.

5.2 Supply air

⚠ Warning

Use clean air
If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas etc., it can lead to damage or malfunction.

⚠ Caution

Install an air filter
Install an air filter at the upper streamside of the valve. Filtration degree should be 5 μm or less.

6 Limitations of Use

⚠ Caution

- **Leakage voltage**

Ensure that any leakage current when the switching element is OFF causes < 3% of the rated voltage across the valve.:.

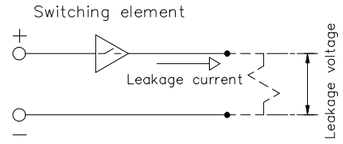


Fig 17

- **Low temperature operation**

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

6 Limitations of Use (Continued)

- **Mounting orientation**

Refer to table 4.

⚠ DANGER

Any use in an EN ISO 13849 validated system must be within the specified limits and foreseeable application conditions. The user is responsible for the specification, design, implementation, validation and maintenance of the safety system (SRP/CS).

The use of 2-position single valves with air returned or air/spring returned spools has to be carefully considered.

The return of the valve spool into the safe position depends on the pilot pressure. If the pilot pressure drops below the specified operating pressure the following might occur:

- unexpected movement of the actuator when the pilot air pressure is restored.
- prevention or delay of a stopping or reversing of movement
- an uncommanded change of the original position (without an input signal).

The design of the safety system must take into account such behaviour. Additional measures might be necessary. For example, the installation of an additional air tank to maintain the pilot pressure. Such measures must be evaluated by risk assessment within the validation process.

⚠ Warning

If a safe output from a safety relay or PLC is used to operate this valve, ensure that any output test pulse duration is shorter than 1 ms to avoid the valve solenoid responding.

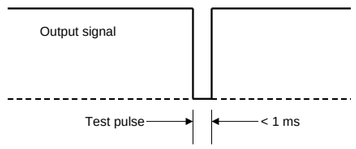


Fig 18

7 Valve options

For product part numbers refer to the catalogue.

7 Contacts

AUSTRIA	(43) 2262 62280-0	**LATVIA**	(371) 781 77 00
BELGIUM	(32) 3 355 1464	**LITHUANIA**	(370) 5 264 8126
BULGARIA	(359) 2 974 4492	**NETHERLANDS**	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	**NORWAY**	(47) 67 12 90 20
DENMARK	(45) 7025 2900	**POLAND**	(48) 22 211 9600
ESTONIA	(372) 651 0370	**PORTUGAL**	(351) 21 471 1880
FINLAND	(358) 207 513513	**ROMANIA**	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	**SLOVAKIA**	(421) 2 444 56725
GERMANY	(49) 6103 4020	**SLOVENIA**	(386) 73 885 412
GREECE	(30) 210 271 7265	**SPAIN**	(34) 945 184 100
HUNGARY	(36) 23 511 390	**SWEDEN**	(46) 8 603 1200
IRELAND	(353) 1 403 9000	**SWITZERLAND**	(41) 52 396 3131
ITALY	(39) 02 92711	**UNITED KINGDOM**	(44) 1908 563888

SMC Corporation

SMC Corporation www.smcworld.com (Global) www.smceu.com (Europe)
SMC Corporation, Akihabara UDX15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN
Specifications are subject to change without prior notice from the manufacturer.
The descriptions of products in this document may be used by other companies.
© 2013 SMC Corporation All Rights Reserved.