



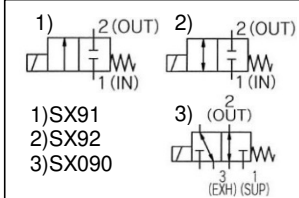
ORIGINAL INSTRUCTIONS



Refer to Declaration of Conformity for relevant Directives

Instruction Manual
SX90/090

Low Profile 2/3 Port Solenoid Valve



The intended use of the SX90/090 is for the control of air/nitrogen in the down-stream pneumatic circuit.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) ¹⁾, and other safety regulations.

¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots -Safety, etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

| | |
|----------------|--|
| 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

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 General specifications

| Model | SX91 | SX92 | SX090 | |
|--|---------------------------------------|---------------------------------------|---------------------------------------|------|
| Valve Structure | 2 Port Direct Operated Solenoid Valve | 2 Port Direct Operated Solenoid Valve | 3 Port Direct Operated Solenoid Valve | |
| Switching Method | N.C. | Universal | Universal | |
| Working Fluid | Air, Nitrogen | | | |
| Operating Pressure range (MPa) | -100kPa~0.2 | | | |
| Proof Pressure (MPa) | 0.6 | | | |
| Ambient Temp. (°C) | 0~50 | 0~50 | 0~50 | |
| Flow Characteristics | C/dm ³ /(s.bar) | 0.25 | 0.12 | 0.5 |
| | b | 0.25 | 0.25 | 0.3 |
| | Cv | 0.07 | 0.032 | 0.14 |
| | L/min(ANR) ¹⁾ | 45 | 22 | 90 |
| Response Time (on/off) ²⁾ | ≤10 ms | | ≤15 ms | |
| Shock/Vibration Resistance (m/s ²) | 150/30 | | | |
| Mounting Orientation | Free | | | |
| IP Rating | IP40 | | | |
| Weight (g) | 10 | 10 | 20 | |

Table 1.

1) Flow rate is calculated at pressure difference of 0.2 MPa
2) Based on JIS B 8373 (SX91/92) & JIS B8419 (SX090)

2 Specifications (continued)

2.2 Coil specifications

| Power Saving Type ¹⁾ | Rated Voltage | Start-Up Power Consumption | SX91/92 | | SX090 | |
|-------------------------------------|-----------------------|----------------------------|---------|-------|--------|--------|
| | | | DC12V | DC24V | DC12V | DC24V |
| Non Power Saving Type ²⁾ | Start-Up | Voltage | DC12V | DC24V | DC12V | DC24V |
| | | Power Consumption | 4W | 4W | 6W | 6W |
| Power Saving Type ²⁾ | Hold-On ³⁾ | Voltage | DC5V | DC10V | DC4.2V | DC8.4V |
| | | Power Consumption | 0.7W | 0.7W | 0.8W | 0.8W |
| Allowable Voltage Fluctuation | Standard Type | ±10% of Rated Voltage | | | | |
| | Power Saving Type | 0 to +10% of Rated Voltage | | | | |
| Coil Insulation Type | | Class B | | | | |

Table 2.

- Power-saving type requires rated voltage to be supplied continuously, for power saving characteristics to take effect.
- When using a valve without the power saving circuit, energise as shown in figure 1, using the voltages from table 2.
- Ensure the inrush time (100±10 msec) is reached before lowering to the holding voltage to ensure clean switching of the valve.

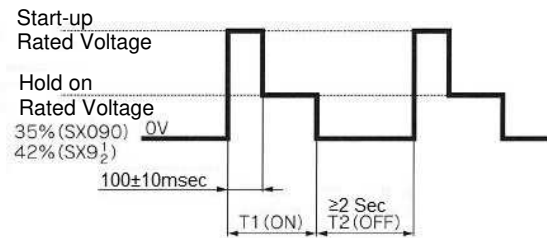


Figure 1. Energisation waveform

3 Installation

3.1 Mounting

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not apply force to the coil or frame when installing valve. Malfunction may occur if force of 10N or more is applied
- Confirm that the gasket is correctly mounted on the body.
- Tighten mounting screws, evenly, to the required tightening torque. Guide torque value is 0.10 to 0.14 N·m. Adjust according to environment.

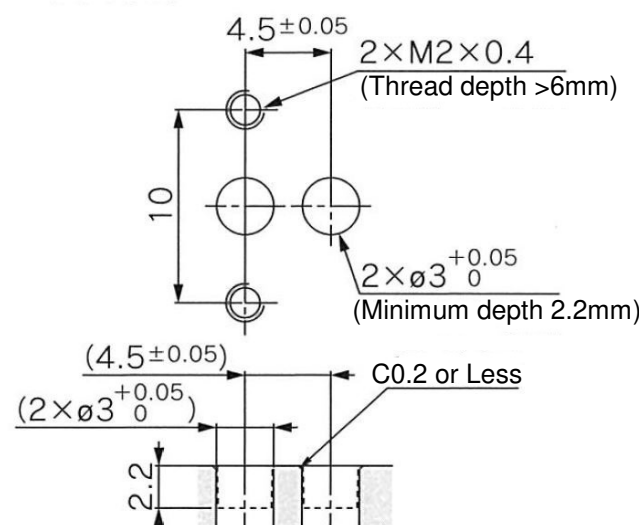
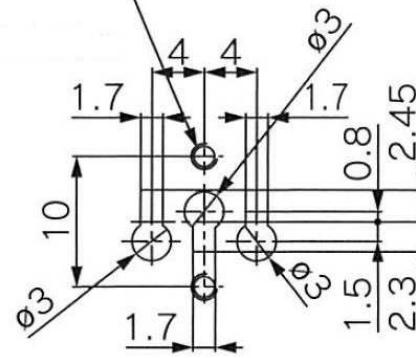


Figure 2. SX91/92 Manifold footprint dimensions

3 Installation (continued)

2xM2x0.4 (Thread depth >6mm)



2xM2x0.4 (Thread depth >6mm)

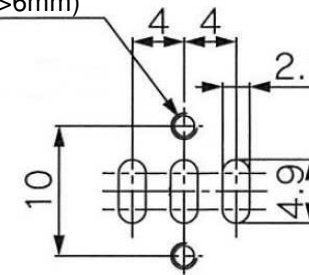


Figure 3. SX090 Manifold footprint dimensions

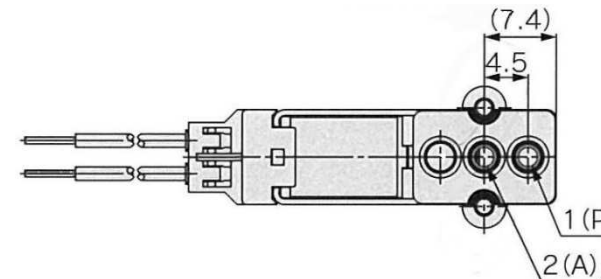


Figure 4. SX90 Footprint

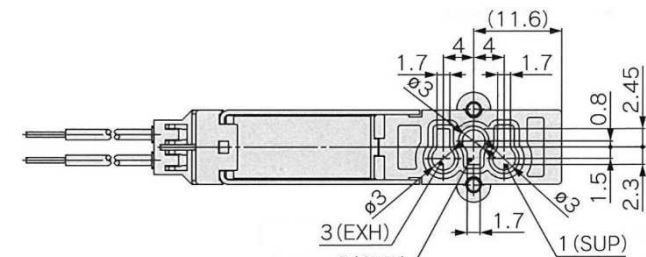


Figure 5. SX090 Footprint

3.1 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 in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

3 Installation (continued)

3.2 Piping

Caution

- Before connecting 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 thread exposed on the end of the pipe/fitting.

3.3 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

3.4 Electrical connection

- Avoid mis-wiring, as this can cause malfunction and damage to the product.
- To prevent noise and surge in signal lines, keep all wiring separate from power lines and high voltage lines. Otherwise this can cause malfunction.
- When a surge from the solenoid affects the electrical circuitry, install a surge absorber, etc., in parallel with the solenoid.
- Use electrical circuits that do not generate chattering in their contacts.
- For the standard valve use voltage that is within ±10% of the rated voltage. For the power saving type use voltage 0 to +10% of the rated voltage.
- Do not pull the lead wire. Damage may occur if force of 10N or more is applied.

3.5 Electrical circuits

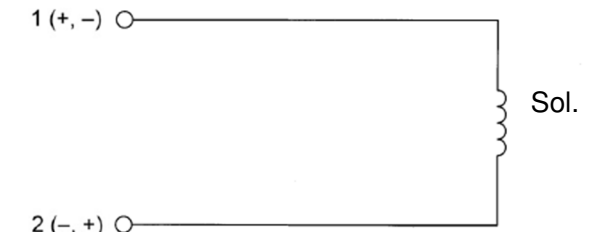


Figure 6. Standard type - Without power saving circuit

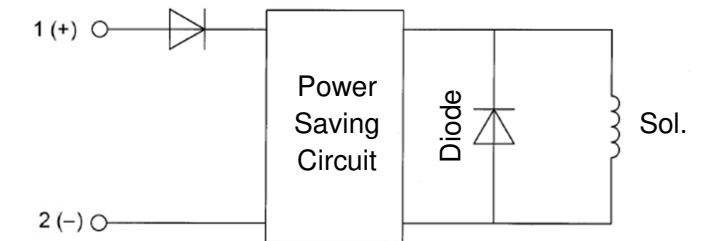


Figure 7. With power saving circuit integrated

| Rated Voltage | Lead wire colour | |
|---------------|------------------|-------|
| | 1 | 2 |
| DC | Red | Black |

Table 3.

4 Settings

4.1 Manual Override

Caution

- For SX090. Push the $\varnothing 3$ mm button in the direction shown by the arrow to engage the manual override. Travel of button should be approximately 0.5 mm. The valve will be turned off when the button is released.

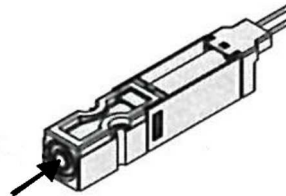


Figure 8. SX090 Manual Override

5 How to Order

- Refer to catalogue for 'How to Order'.

6 Outline Dimensions (mm)

- Refer to catalogue for outline dimensions.

7 Maintenance

7.1 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.
-
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly, and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
 - Do not make any modification to the product.
 - Do not disassemble the product, unless required by installation or maintenance instructions.

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

- Refer to Handling Precautions for SMC Products

8.2 Extended Periods of Continuous Energisation

Caution

- Do not energise continuously at rated (start-up) voltage if no energy-saving circuit is included. This may damage the coil.
- Make sure coil surface temperature does not exceed 80°C if the valve is continuously energised at the holding voltage.
- After continuous energisation, do not touch the valve by hand. Coil temperature may be high due to extended period of energisation.
- If the coil is likely to be touched, use a protective cover for the valve and provide a warning label according to local regulation.
- If 3 or more adjacent coils are continuously energised in a manifold assembly, make sure fluid supply is maintained to avoid temperature rise above 80°C.

8.3 Response time reduction

- Response time may become extremely slow under the following conditions:
 - When the valve is energised for the first time after a long period of de-energisation.
 - When the operating pressure is low (0.1MPa or less).
 - When the ambient temperature is 10°C or less.

8 Limitations of Use (continued)

8.1 Applicable Fluids

Caution

- Please contact SMC before using the valve with a fluid other than air or nitrogen.

9 Product Disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

10 Limitations of Use

Refer to www.smcworld.com or www.smc.eu for contacts.

SMC Corporation

URL : <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

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Specifications are subject to change without prior notice from the manufacturer.

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