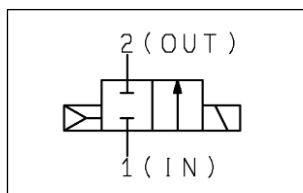




ORIGINAL INSTRUCTIONS

**Instruction Manual**  
**High Speed 2 Port Valve**  
**Series SX10**



The intended use of this product is to be used in high speed applications such as colour sorting or pulse blowing machines, etc.

**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<sup>\*)</sup>, and other safety regulations.

- <sup>\*)</sup> 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: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- 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.

<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
<b>Danger</b>	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.

**Caution**

- The product is provided for use in manufacturing industries only. Do not use in residential premises.

**2 Specifications**

**2.1 Valve specifications**

Fluid	Air											
Type of actuation	2-position 2 port N.C., Air return											
Seal type	Metal poppet seal											
Valve width [mm]	9											
Min. operation pressure [MPa]	0.15											
Ambient and fluid temperature [°C]	-10 to 50 (no freezing)											
Flow rate [L/min] (at 0.25 MPa)	50	100	150									
Power consumption [W]	80	40	10	4	80	40	10	4	80	40	10	4
Max. operating pressure [MPa] (at 24VDC)	0.7	0.6	0.7	0.6	0.4	0.7	0.4	0.25				
Flow rate characteristics	Refer to catalogue											
Response time	Refer to catalogue											
Maximum operating frequency	Refer to catalogue											
Minimum operating frequency	1 cycle / 30 days											
Duty cycle	Contact SMC											

**2 Specifications - continued**

Lubrication	Not required		
Mounting orientation	Unrestricted		
Impact/Vibration resistance[m/s <sup>2</sup> ]	300/50		
Enclosure (based on IEC60529)	IP40 equivalent		
Electrical entry	Grommet		
Weight [g]	Screw mount type	27	
	Quick disconnect type	29	

Table 1.

Note 1) 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 and armature; in both energized and de-energized states and for every time in each condition. (Values quoted are for a new valve)  
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Tests are performed at both energized and de-energized states in the axial direction and at right angles to the main valve and armature. (Values quoted are for a new valve).

**2.2 Solenoid specifications**

Electrical entry	Grommet			
Coil rated voltage [VDC]	24 (For control with other voltages, contact SMC)			
Allowable voltage fluctuation	±5% (at 24 VDC)			
Power consumption [W]	80	40	10	4
Coil resistance value [Ω]	7.2	14.4	58	144

Table 2.

**2.3 Control method (operation example with an energy saving circuit)**

**2.3.1. Control with 2 power supplies, starting power supply and holding power supply. Switching system from high voltage to low voltage.**

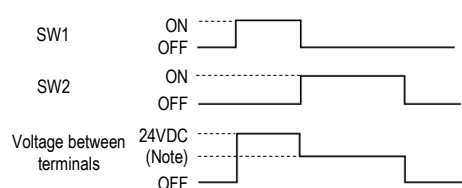
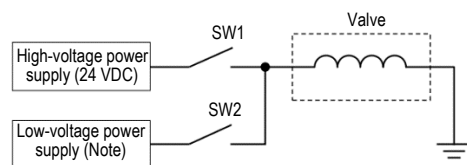


Figure 1.

Note) 80 W type: 3 VDC to 6 VDC.  
40 W type: 4 VDC to 8 VDC.  
10 W type: 8 VDC to 16 VDC.

**2.3.2 High speed switching control of high voltage by PWM control**

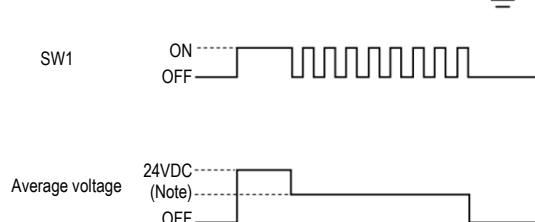
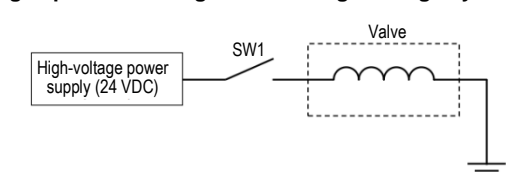


Figure 2.

Note) PWM control circuit not available.

**2.4 Special products**

**Warning**

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

**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 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.

**3.3 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.
- Tighten fittings to the specified tightening torque.

**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, refer to catalogue for details.

**3.5 Air supply**

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

**3.6 Mounting**

**Caution**

- Ensure gaskets are in good condition, not deformed and are dust and debris free.
- When mounting valves ensure gaskets are present, aligned and securely in place. For screw mount type (SX11□-□□), tighten the valve mounting screws (M3 x 0.5) to the recommended tightening torque of 0.5 N·m to 0.7 N·m.

**3.6.1 Installation of quick disconnect type (SX12□-□□)**

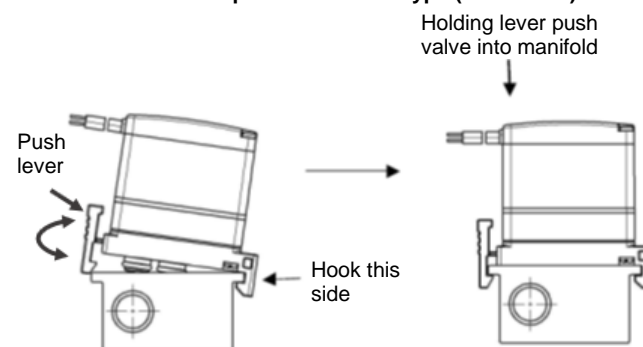


Figure 3.

**3 Installation - continued**

**3.6.2 Valve installation on manifold base**

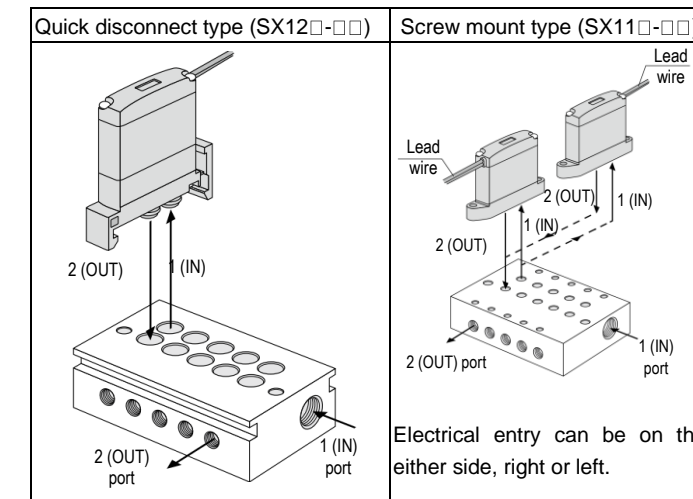


Figure 4.

Electrical entry can be on the either side, right or left.

**3.7 Electrical circuit**

**Caution**

- Using a surge voltage suppressor such as diode and surge absorber for the electric circuit may cause malfunction, such as delay in response, abnormal heat generation or burn out of the coil. Please consult with SMC when using it.
- Use elements that are resistant to the surge voltage of 300 V for the output.
- If a valve type without suppression is used, suppression must be provided by the host controller as close as possible to the valve.
- Make sure that no excessive force larger than 15N is applied to the lead wires as it may cause the wires to break.
- Use electrical circuits which do not generate chattering in their contacts.

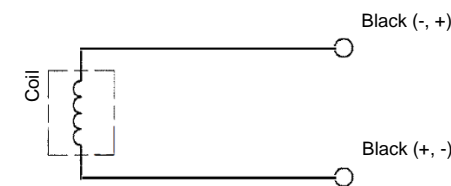


Figure 5.

**3.8 Countermeasure for surge voltage**

**Caution**

- At times of sudden interruption of the power supply, the energy stored in a large inductive device may cause non-polar type valves in a de-energized state to switch.
- When installing a breaker circuit to isolate the power, consider a valve with polarity (with polarity protection diode), or install a surge absorption diode across the output of the breaker.

**3.9 Extended period of continuous energization**

**Warning**

If a valve will be continuously energized for an extended period of time, the temperature of the valve will increase due to the heat generated by the coil assembly. This will likely adversely affect the performance of the valve and any nearby peripheral equipment. Therefore, if the valve is to be energized for periods of longer than 30 minutes at a time or if during the hours of operation the energized period per day is longer than the de-energized period, we advise using a 4 W type valve (SX1□□-(D,H,M)□) or using other valve types as listed below.

Power consumption [W]	Model number	Operating condition (at 24 VDC)
80 W	SX1□□-(A,E,J)□	Use with an energy saving driver with holding voltage of 3 VDC to 6 VDC.
40 W	SX1□□-(B,F,K)□	Use with an energy saving driver with holding voltage of 4 VDC to 8 VDC.
10 W	SX1□□-(C,G,L)□	Use with an energy saving driver with holding voltage of 8 VDC to 16 VDC.

Table 3.

### 3 Installation - continued

#### 3.10 Effect of the back pressure when using a manifold

##### Warning

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

### 4 How to Order

Refer to catalogue for 'How to Order' or to product drawing for special products.

### 5 Outline Dimensions

Refer to catalogue for outline dimensions.

### 6 Maintenance

#### 6.1 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.

### 7 Limitations of Use

#### 7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

##### Warning

#### 7.2 Effect of energy loss on valve switching

Air supply present, electrical supply cut	Valve returns to the OFF position by air force.
Electrical supply present, air supply cut	Valve stops moving after air pressure cut (Position cannot be defined)

Table 4.

#### 7.3 Holding of pressure

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

#### 7.4 Cannot be used as an emergency shut-off valve

This product is 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 be adopted.

##### Caution

#### 7.5 Leakage voltage

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes 0.2 VDC across the valve.

#### 7.6 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.

#### 7.7 Energizing time (without using an energy saving driver)

For 80 W, 40 W and 10 W coils, non-energized time (OFF) must be set longer than the energized time (ON).

#### 7.8 Energizing valve without air supply

If the valve is energized without air supply, the coil may be burned. Make sure to supply pressure to the valve when energizing.

### 7 Limitations of Use - continued

#### 7.9 Fluid flow

- Since this valve is air return (differential pressure return) type, the valve may not close due to back pressure when the flow on the downstream side is restricted extremely.
- Since this valve is air return (differential pressure return) type, the air is discharged to the OUT side momentarily until the valve returns when the IN side is pressurized. Be careful when pressurizing the valve.

### 8 Product Disposal

This product shall 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.

### 9 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

## SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)  
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