Installation & Maintenance Manual
Solenoid valve for actuator control: VQC4101R-5-X17 / VQC4301R-5-X17
VQC4401R-5-X17 / VQC4501R-5-X17

(Basic and well-tried safety principles in accordance to ISO 13849)

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

Installation Manual

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 “DANGER”, “WARNING” or “CAUTION”, followed by important safety information which must be carefully followed.
• To ensure safety of personnel and equipment the instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

1.1 Safety Instructions (continued)

• 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.

• Effect of back pressure when using a manifold

This valve is designed to be used in a manifold. The valve may experience back pressure due to pressure in the manifold exhaust ports. Back pressure check valves can be used to prevent back pressure affecting the outlet ports of this valve.

• Ventilation

Provide ventilation when using a valve in a confined area, such as in a closed control panel. For example, install a ventilation opening, etc. in order to prevent pressure from increasing inside of the confined area and to release the heat generated by the valve.

• Operation in a low temperature condition

It is possible to operate a valve in extreme temperature, as low as –30°C. Take appropriate measures to avoid freezing of drainage, moisture etc. in low temperature.

• Do not disassemble the product or make any modifications

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

2 Specifications

2.1 General specifications

<table>
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<tr>
<th>Valve Type</th>
<th>Operating characteristic</th>
<th>Special Port Ball valve Value</th>
<th>Special Port Needle valve Value</th>
<th>Special Port Proportion valve Value</th>
<th>Special Port Pressure valve Value</th>
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<td>Valve</td>
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<td>Actuator state (De-energized)</td>
<td>Actuator state (De-energized)</td>
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2.2 Flow-rate

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<th>Flow-rate Characteristics</th>
<th>Model</th>
<th>Flow-rate Value</th>
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<td>VQC4501R-5-X17</td>
<td>4.2 + 0.5 (A+B)</td>
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</tbody>
</table>

3 Installation

3.1 Environment

Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt, water, water or steam.

3.2 Piping

1. Preparation before piping

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

Install piping so that it does not apply pulling, pressing, bending or other forces the valve body.

2. Holding of pressure

Rubber sealed spool valves may have a slight leakage. This has to be taken into account for applications, in which the loss of pressure leads to a hazardous movement.

3. Maintenance space.

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

4. Release of residual pressure

Provide a residual pressure release function for maintenance activities (removal of valve, etc.).

3.3 Lubrication

• 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.

3.4 Mounting

1. Stop operation if air leakage increases and the equipment do not operate properly.

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

2. Instruction manual (this document)

Install only after reading and understanding the safety instructions. Keep on file so that it can be referred to when necessary.

3. Coating

Warnings or specifications indicated on the product should not be erased, removed, or covered up.

3.5 Wiring

1. Applied voltage.

When electric power is connected to the solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

2. Confirm the connections.

After completing the wiring, confirm that the connections are made correctly.

4 Settings

4.1 Manual override

Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation. The non-locking push type (tool required) is fitted.

Figure 5

The manual override will pressurize the pilot actuator and cause the main valve to change state.
4.2 Solenoid Valve Removal and Mounting (VQC4000)

4.2.1 Removal steps
1. Loosen the screws until they turn freely.
2. Remove the solenoid valve by lifting the coil side of the valve. If pushing down on the screw is difficult, you can alternately press down on the valve gently in the area near the manual override.

4.2.2 Mounting steps
1. Push the valve down into place.
2. Tighten the clamp screws with a tightening torque of 0.8 to 1.2 N-m.

Caution

Dust on the sealing surface of the gasket or solenoid valve can cause air leakage.

Take care that the pilot pressure is able to exhaust. Do not block the Exhaust Puck.

5. How to order

Order Number
VQC4101R-S-X17 2-position single
VQC4501R-S-X17 3-position pressure center

VQC4501R-S-X17 3-position pressure center

8. Limitations of Use

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

3. Removing the product
To avoid the risk of being burned, ensure that the valve has had sufficient time to cool before performing work.
1. Shut off the fluid supply and release the fluid pressure in the system.
2. In the case of air pilot or air-operated type, shut off the air source and discharge the compressed air inside the pilot piping.
3. Shut off the power supply.
4. Remove the product.

3. Low frequency operation.
Valves should be operated at least once every 30 days to prevent malfunction. (Use caution regarding the air supply).

4. Manual override
When the manual override is operated, connected equipment will be actuated.

5. Do not disassemble the product.

7. Maintenance

1. Perform maintenance procedures shown in this instruction manual. If handled improperly malfunction or damage of machinery/equipment may occur.

2. Cylinder port fittings are available with cassette type manifolds and are easily replaced. Fittings are secured with a retaining clip that is installed vertically from either the top or bottom of the manifold. After removing the valve, remove the clip with a flat head screwdriver to replace the fittings. To mount a fitting, insert the fitting assembly into the fitting until it stops and reinsert the retaining clip to its designated position.

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.

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

Warning

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

Output signal

Test pulse < 1 ms