

I-TORK SOLENOID VALVES

INSTALLATION & MAINTENANCE INSTRUCTIONS

5/2 (4-WAY) OR 3/2 (3-WAY), 2 POSITION SINGLE SOLENOID VALVES
FOR NAMUR ACTUATORS

1/4 NPT PRESSURE & EXHAUST CONNECTIONS - AIR OR INERT GAS SERVICE
CORROSION RESISTANT COMPOSITE CONSTRUCTION.

SERVICE NOTICE

Except for coil replacement, the **solenoid** STANDARD SERIES valves are not repairable. When any performance problems are detected during routine inspection, replace valve immediately. For EX-PROOF, I-SAFE and ATEX SERIES, please refer to separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Cause of Improper Operation and Coil Replacement.

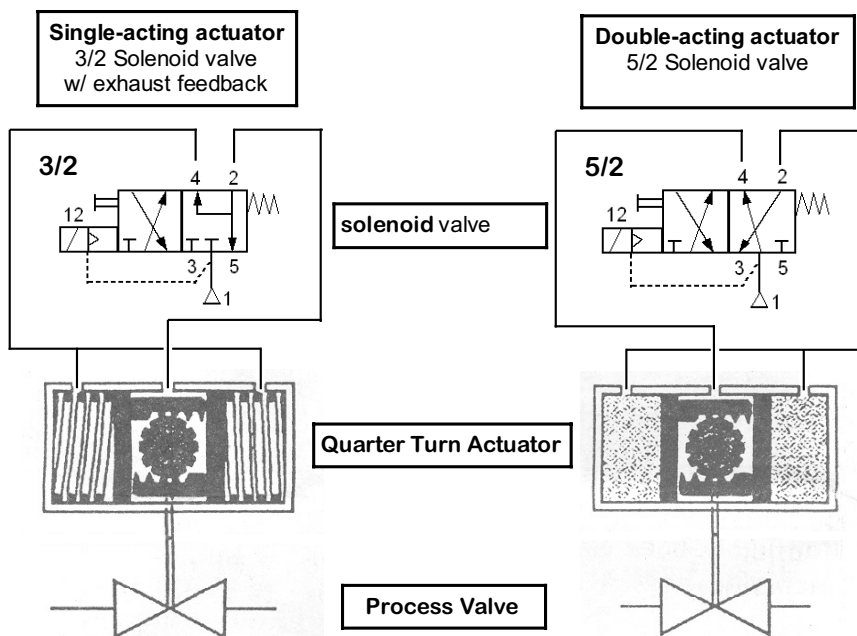
DESCRIPTION

Solenoid STANDARD SERIES valves are 3-way or 4-way, 5 ported 2 position piloted poppet type single solenoid valves designed for air or inert gas service. Valves are made of rugged corrosion resistant composite material. A built-in manual operator allows manual operation when desired or during an electrical power outage. A separate valve is required for 3/2 (3-way, spring return) or 5/2 (4-way, double acting) operation. These valves are supplied with all necessary hardware for a NAMUR direct mount installation i.e. o-rings, mounting screws and a locating set screw.

Solenoid STANDARD SERIES valves are supplied with an open-frame spade plug connection coil (3x DIN 46244) and a DIN Plug Connector.

APPLICATIONS

Typically, the 3-way (3/2) normally closed valve is used for a single acting (spring return) actuator; 4-way (5/2) valve for a double acting actuator.



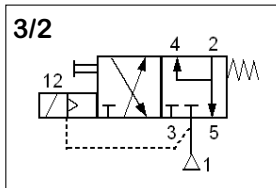
OPERATION

IMPORTANT: Minimum operating pressure differential 25 psi; maximum 120 psi.

Exhaust feedback (re-breather) function on 3/2 (3-way) valves only: Provides spring chamber with instrument air preventing corrosion

Single Solenoid: This type of operation is used where automatic return of the valve on electrical power failure or loss of main line pressure is required.

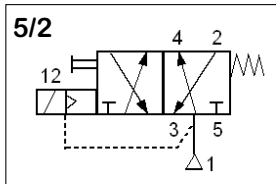
3/2 (3-Way) Operation



Solenoid De-energized: With port 3 sealed, supply port 1 is blocked and port 2 exhaust is fed back to port 4 with excess vented to atmosphere via port 5.

Solenoid Energized: With port 3 sealed, supply port 1 flows to port 2 and port 4 exhaust is vented to atmosphere via port 5.

5/2 (4-Way) Operation



Solenoid De-energized: With supply to port 1, flow is directed to port 4 and port 2 exhaust is vented to atmosphere via port 3.

Solenoid Energized: With port 3 sealed, supply port 1 flows to port 2 and port 4 exhaust is vented to atmosphere via port 5.

Manual Operator



Manual operator provides manual operation when desired or during an electrical power outage. To engage manual operator, rotate the red screw clockwise as far as possible to "1". Valve will now be in the same position as when the solenoid is energized. To disengage manual operator, rotate screw counterclockwise as far as possible to "0".

CAUTION: To prevent malfunction be sure to turn screw counterclockwise to "0" before operating valve electrically.

Figure 1: Manual operator

Metering Device with Filter for 1/4 NPT Connections (Optional Feature)

These metering devices can be used to vary the operating speed of the actuator/cylinder this valve is piloting. For 5/2 (4-way) valves, install metering devices in either or both of the 1/4 NPT exhaust connections (port 3 and /or port 5) and tighten securely. Because of the exhaust feedback (re-breather) function, the use of a metering device is not recommended for 3-way (3/2) valves.



Metering Device Adjustment:

Since the metering devices are spring loaded, simply rotate the knurled screw clockwise to decrease flow (speed) and counter-clockwise to increase flow (speed).

Figure 2: Metering device (Speed control)

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

WARNING: To prevent the possibility of electrical shock from the accessibility of live parts, connections to the open-frame solenoid coil must be made thru the supplied DIN style connector with sealing gasket installed.

Future Service Considerations

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid.

Temperature Limitations

All **solenoid** STANDARD SERIES coils can operate in an ambient temperature range of -20 to $+50^{\circ}\text{C}$ [-5 to 125°F]. Consult factory for use in ambient temperatures outside this range. **NOTE: For temperatures below 0°C [32°F] moisture-free air must be used.**

Mounting

Valve may be mounted in any position.

For Mounting instructions and proper orientation of o-rings, mounting screws and locating set screw, refer to Figure 3.

1. If required, install locating set screw onto the actuator NAMUR mount using a 2 mm hex key wrench. This insures correct orientation of the solenoid if removed in the future.
2. Verify o-rings are installed over Port 2 and Port 4 to interface with the NAMUR pad on the actuator.
3. Position the solenoid valve on actuator. Then install two socket head cap screws in offset center holes on either side. Hand thread screws a few turns into actuator. Then tighten screws evenly using a 4 mm hex key wrench. **DO NOT OVERTIGHTEN MOUNTING SCREWS.**

NOTE: M5 mounting screws are provided as standard. Other sizes i.e. #10-24 UNC-2A and #10-32 UNF-2A are available as an option.

Piping

There is pilot exhaust from the top of the solenoid when the solenoid is de-energized. The pilot exhaust maybe connected to the main exhaust if the air or inert gas cannot be exhausted directly to the atmosphere. An exhaust protector is provided in the top of the pilot armature tube assembly to prevent debris from entering pilot exhaust.

Connect piping or tubing to valve according to markings on valve body. Refer to flow diagrams in *OPERATION* section. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads the compound may enter the valve and cause operational difficulty. We recommend the use of flexible pneumatic tube and push-type fittings rather than hard pipe. This avoids pipe strain on the valve and provides easier and faster installation and removal. When tightening the fittings, do not use pilot assembly and coil as a lever. Locate wrenches applied to valve body or fittings as close as possible to connection point.

CAUTION: To avoid damage to the valve body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If TEFLON* tape, paste, spray or similar lubricant is used, use extra care when tightening due to reduced friction.

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CAUTION: To protect the solenoid valve, install a strainer or filter, suitable for the service involved, in the inlet side as close to the valve as possible. Clean periodically depending on service conditions.

Wiring

Wiring must comply with local codes and the National Electrical Code. The open-frame solenoid may be rotated 360°. The open-frame solenoid is provided with 1/4" spade terminals and a grounding spade terminal connection.

NOTE: Valves can be converted from alternating current (AC) to direct current (DC), or vice-versa, by changing the coil.

Solenoid Temperature

Solenoid STANDARD SERIES valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid coil becomes hot and can be touched with the hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize valve, and vent fluid to a safe area before inspecting or servicing the valve.

Preventive Maintenance

- Prepare and follow a routine inspection schedule based on the media, environment, and frequency of use.
- Keep the medium flowing through the valve as free from dirt and foreign material as possible. Depending on medium and service conditions, clean valve strainer or filter as required to keep the valve free of contamination. In the extreme case, contamination will cause faulty valve operation and the valve may fail to shift.
- While in service, the valve should be operated at least once a month to ensure proper operation.

Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Faulty Control Circuits:** Check the electrical system by energizing the solenoid. A metallic click signifies that the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown fuses, open - circuited or grounded coil, broken lead wires or splice connections.
- **Burned-Out Coil:** Check for open-circuited coil. Replace coil as necessary. Check supply voltage; it must be the same as specified on nameplate.
- **Low Voltage:** Check voltage across the coil terminals. Voltage must be at least 85% of nameplate rating.

Coil Replacement:

1. Disconnect grounding and supply wires from coil.
2. Remove coil nut and slip coil off the armature tube assembly.
3. Install new coil and replace nut.
4. Make electrical hookup to coil.