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Keeping the World Flowing
for Future Generations



Spool Solenoid Valve

Installation, Operation and
Maintenance Manual



Contents

Section	Page	
1. General	3	The installation, operation and maintenance of Rotork spool solenoid valves must comply with the requirements of this document.
1.1 Product Identification Markings	3	Please read the instructions carefully before installation.
1.2 Pneumatic Spool Valve Technical Specification	4	Any questions or concerns, please contact Rotork.
1.3 Storage	4	
2. Installation	5	
2.1 Conditions for Safe Use	5	
2.2 Operating and Environmental Limitations	6	
2.3 Electrical Installation Requirements	6	
2.4 Pneumatic Connection	6	
3. Maintenance	7	
3.1 General Requirements	7	
3.2 Replacement of Coils	7	

1. General

Rotork 3/2, 5/2 or 5/3 spool solenoid valves (hereinafter referred to as solenoid valves) are compact pilot-operated large flow solenoid valves. Both non-explosionproof version and explosionproof version are offered to be suitable for safe environment and potentially explosive hazardous environment.

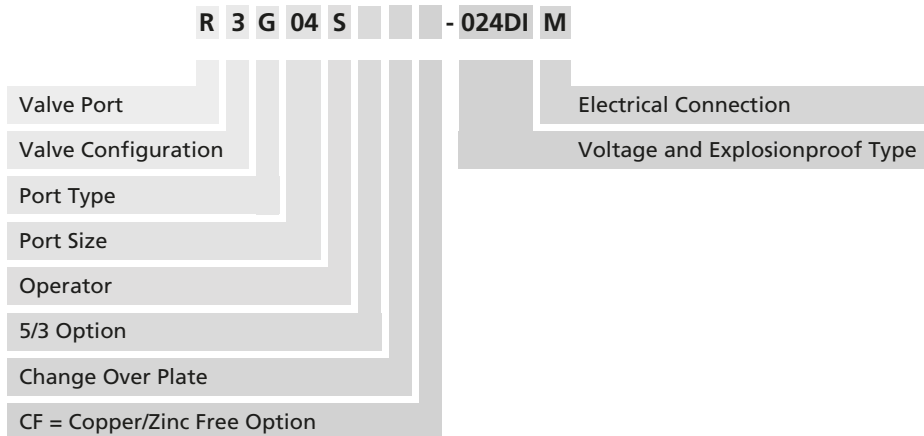
A manual operation function is standard offered on the spool valve for ease of installation, maintenance, and commissioning. Two types of connection interfaces are offered:

- **NAMUR interface:** Mate to NAMUR mounting surface of actuators that comply with the VDI/VDE 3845 standard for installation and use. The 3/2 function is suitable for single-acting actuators, and the 5/2 or 5/3 function is for double-acting actuators. Rotork offers adapter plates to easily convert a 5/2 function solenoid valve to a 3/2 function solenoid valve.
- **Full threaded port:** All ports are threaded port for pipe connections. Thread size ¼" or ½" for direct connection to piping in the system or valve.

1.1 Product Identification Markings

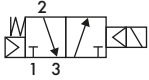
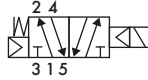
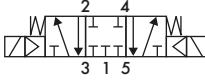
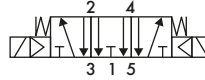
Labels are provided both on the coil and valve body, indicating the model, serial number, certification content, voltage, power consumption and maximum working pressure.

The solenoid valve type number is divided to two parts by "-": The front part is describe pneumatic spool valve characteristics, accessory and optional whole valve requirements of Copper/Zinc free, the secondary half is describe coil options and electrical interface options.



1. General *continued*

1.2 Pneumatic Spool Valve Technical Specification

Mode of Operation	 3/2 Orientation		 5/2 Orientation	
	 5/3 Orientation (Pressure Hold)		 5/3 Orientation (Pressure Release)	
Media	Filtered Compress Are (40µm), Nitrogen			
Body	Anodized Aluminum			
Armature	Brass / Stainless steel			
End Cover	Aluminum / Stainless steel if copper/zinc free version			
Spring	Stainless Steel			
Seal Material	Nitrile (Low Temperature)			
Ambient Temperature Range	-25 to +70 °C			
Operation Pressure Range	0.15 MPa to 0.8 MPa			
Enclosure Protection	IP65			
Port Size	¼"	Flow Coefficient, Cv	1.4	
	½"		2.5	

1.3 Storage

All connection ports of the solenoid valve are factory sealed by protective sleeves. For storage, the original packaging must be used, and it is prohibited to remove the protective sleeve on the connection port. The solenoid valves should be stored indoors to protect them from weather, humidity, or other harmful factors. Prevent water, dust or foreign matter enter into the solenoid valve.

2. Installation

2.1 Conditions for Safe Use

- The solenoid valve has been tested and verified by Rotork for overall performance and must be used in conjunction. Unauthorized modification of the equipment without Rotork's permission is strictly prohibited.
- The solenoid valves are suitable for use only within the technical limits indicated on the nameplate or label. Please determine the surface temperature level based on the power and ambient temperature shown on the nameplate. Also select cables suitable for the temperature indicated on the nameplate based on the ambient temperature and power.
- The electrical load should not exceed the range shown on the nameplate to avoid damaging the coil or shortening its life.
- After disassembling the packaging and during product installation and maintenance, beware of water ingress or entry of other foreign matter into the product. Before installation of the solenoid valve, check whether there is dirt on the actuator or other valve pipeline casing.
- The selection, installation, operation, and maintenance of solenoid valves must be performed by trained and authorized qualified professionals in accordance with relevant specifications, rules, and regulations. Relevant engineering codes or regulations should be followed during installation, operation and maintenance, for example:

GB/T 3836.13-2021 Explosive Atmospheres – Part 13: Equipment Repair, Overhaul, Reclamation and Modification

GB/T 3836.15-2017 Explosive Atmospheres – Part 15: Electrical Installations Design, Selection and Erection

GB/T 3836.16-2022 Explosive Atmospheres – Part 16: Electrical Installations Inspection and Maintenance
- The solenoid valve is designed to filter air or neutral gas. The minimum pilot working pressure of the solenoid valve is 0.15 MPa, and the maximum working pressure is 0.8 MPa.

ATTENTION: Do not exceed the maximum working pressure. The maximum temperature of the fluid must not exceed the ambient temperature of spool valve or coil.

- Risk of Electrostatic discharge: When used in explosive environments, appropriate installation and cleaning measures should be taken to prevent static electricity hazards of solenoid valves. Do not rub the products against each other, dry wipe the surface of the shell and use solvents for cleaning. Please use a damp cloth when cleaning.

ATTENTION: The solenoid valve must be grounded in accordance with standards and regulations.

- The solenoid valves needs to be fixed to the actuator or other valve surface through the mounting holes on the valve body to prevent or reduce vibration during installation. The coil can be oriented according to the on-site space and environment.

ATTENTION: The installation must use a suitable cable gland to ensure that the required degree of protection provided by the enclosure is maintained.

- Care should be taken to avoid undue stress to the components in the solenoid, the design minimum bend radius for the cable should be observed, if applicable. To facilitate coil replacement, do not allow the cable outer sheathing to protrude beyond the cable entry into the housing.
- Switching off a solenoid inductive coil may generate a voltage spike of hundreds of Volts. These voltage spikes may damage solid state devices or generate electromagnetic interference into adjacent circuits. Most system specifications require the suppression of voltage spikes that result from inductive discharge. Voltage spikes can be eliminated with using appropriate attenuation devices, such as diodes, Zener diodes, varistor, resistor/ capacitor components, or filters.
- The restrictions regarding opening of the solenoid enclosure lid apply as required by the relevant codes of practice, e.g. hot work permit, gas free permit, isolate elsewhere before opening etc.
- Avoid missing or damaging O-rings, seals, or fasteners during installation.

2. Installation *continued*

2.2 Operating and Environmental Limitations

- Humidity level up to 100% is acceptable down to +5 °C ambient. When the ambient temperature is below +5 °C, take the necessary measures to prevent internal components from freezing.
- The coil can be rotated to a suitable installation position according to the working site environment.
- Sufficient space should be reserved above and below the coil for maintenance operations.

2.3 Electrical Installation Requirements

- **Before performing any operation, the power supply must be cut off and insulated.**
- Before energizing the solenoid valve, make sure all screws are tightened to the appropriate torque.
- The coil can be mounted in 360° increments at 45° to adapt to different installation spaces and environments.
- The introduction of external conductors and cables must correspond to the explosionproof mark of the solenoid valve and be installed correctly.
- Select applicable cable entry waterproof glands, seals, etc. according to the cable structure, certification requirements, and installation regulations. It should be ensured that the protection level (IP) meets the requirements of EN/IEC 60529 according to the product mark or product certification.

NOTE: Do not leave debris such as cable sheath inside the coil housing. Grounding must be in accordance with local standards and regulations.

- Continuous operation of the coil will cause heat generation. Do not touch or take necessary measures to avoid accidental contact resulting in personal injury.

2.4 Pneumatic Connection

- Select solenoid valves with 3/2 or 5/2, 5/3 functions based on actual application conditions.
- Before connecting, check and make sure that no foreign objects enter the system, and then connect the pipeline according to the port markings on the valve body.

ATTENTION: Adjust the pipeline and support during connection to prevent mechanical stress on the valve. Do not rotate the solenoid valve body and tighten the pipe joint. To prevent damage to the equipment, do not overtighten.

- Fix the solenoid valve body to the actuator or other working plane with two M5 screws. The recommended screw torque range is $0.8 \pm 0.1 \text{ Nm}$. If the coil interferes with the installation surface, select a plate to increase the position of the valve body.
 - When installing the NAMUR port solenoid valve, ensure that the NAMUR O-ring is in the correct position.

ATTENTION: Do not overtighten the screws to avoid damage to the solenoid valve or mounting surface.

- Port connection:
 - 3/2 function: Port 1 is the pressure inlet, Port 2 is the working port, and Port 3 is the exhaust port;
 - 5/2 or 5/3 function: Port 1 is the pressure inlet, ports 2 and 4 are the working ports, and ports 3 and 5 are the exhaust ports.

ATTENTION: Protect the exhaust port to prevent water, dust, or other foreign objects from entering the interior of the solenoid valve. DO NOT BLOCK THE EXHAUST PORT.

- Before pressurizing the pipeline, an electrical test must be conducted. Repeatedly energize the coil several times, if you hear the click sound of metal impact, it means the coil can work properly.

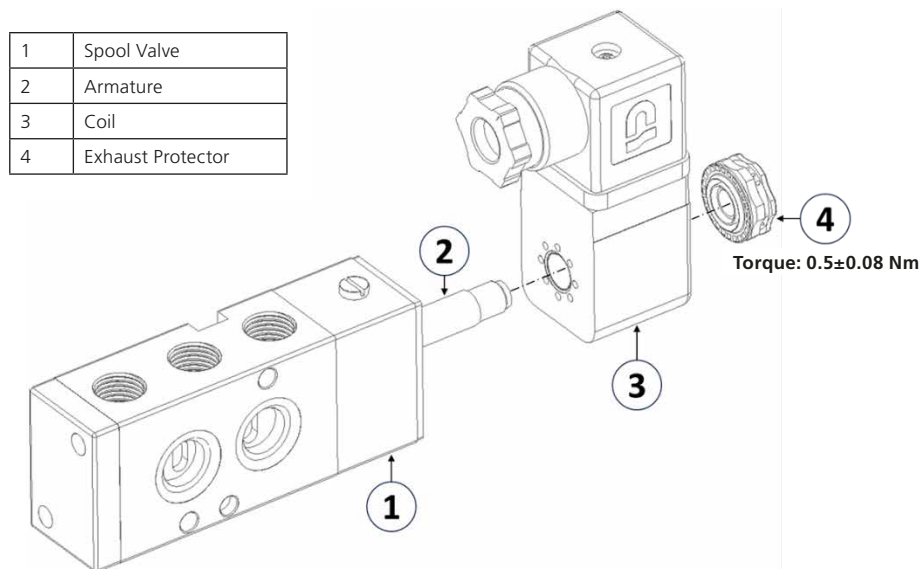
3. Maintenance

3.1 General Requirements

- Before maintenance, the solenoid must be de-energized, relieved of pressure and vented to avoid injury to personnel or damage to equipment.
- Recommend check the valve operation and cleaning the valve at regular intervals. Maintenance of the valve depends on the operation conditions. If any abnormal noise or leakage is found, the parts should be cleaned promptly.
- Operate the solenoid valve at least once a month to check whether it works normally.
- To avoid personal injury or equipment damage, the solenoid valve must be checked for proper operation before resuming operation. Check if the supply pressure of the solenoid valve meets the pressure range specified in the product manual.

3.2 Replacement of Coils

- Coils can be ordered and replaced as spare parts.
- Before replacing coils, the solenoid must be de-energized, relieved of pressure and vented to avoid injury to personnel or damage to equipment.
- Disconnect the wires connected coil 3 and extract the cable from the connection box. Remove the exhaust handle cap 4 and remove the coil 3 from the armature 2. Replace the combination of coil 3 with a new one and install it on the armature 2. Rotate the coil to the appropriate position and tighten the exhaust handle cap 4 to a tightening torque of 0.5 ± 0.08 Nm. Connect the cable wires and ground them correctly. Cycle the power to the solenoid valve several times to confirm that it is functioning properly.



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