Safety precautions

Fluid Control Components: Warnings and Cautions

Read the handling precautions and safety precautions described in the latest "General Purpose Valves" (Catalog No.CB-03-1SA) before use.

Product-specific cautions: Pneumatic pilot operated 2-port solenoid valve SP Series

Design/selection

1. Checking the specifications

⚠WARNING

- Use the product in the range of conditions specified for the product. Use with pressure or temperature outside the specifications range may result in damage or operation faults. (Refer to specifications)
  To use fluids other than compressed air, contact CKD.

- Working fluids
  Active gases cannot be used, so contact CKD when these applications are required.

- If the product is used under conditions where the pressure differential between the primary side and secondary side while the valve is open is below 0.02MPa, the diaphragm may vibrate, resulting in a short service life.When using under conditions where there is a chance that the differential pressure or flow rate can become very small as described below, contact CKD for details.
  - When the primary or secondary side of solenoid valve has a needle valve
  - When multiple solenoid valves piped in parallel are opened simultaneously (Differential pressure between primary and secondary sides does not develop due to the drop in solenoid valve source pressure.)

2. Safety design

⚠WARNING

- Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

- Check leakage current to prevent malfunction caused by leakage current from other fluid control components.
  - When using a programmable controller, leakage current may affect the solenoid valve and cause malfunction. Note that the values that are affected by leakage current depend on the solenoid valve.

At 12 VDC	1.5 mA or less
At 24 VDC	1.8 mA or less

- Observe the following precautions when using nylon or urethane tubes as the piping material.
  - Use flame-resistant tubes where they could come in contact with spatter.
  - When using the standard push-in fitting on the spiral tube, fix the base of the tube with a hose clamp.Rotation may occur, causing a reduction in holding force.

3. Working environment

- Use clean air.
  - Do not use the compressed air if it contains chemicals, synthetic oils containing organic solvents, salt, or corrosive gas, as it can cause damage and/or operation failure.
  - The ozone content in the compressed air should be 0.1 ppm or below.A higher ozone content may cause malfunction and leakage.

4. Durability

⚠WARNING

- Using the solenoid valve with continuous energizing can cause a deterioration of performance. Contact CKD when using the solenoid valve under such conditions.

5. Pneumatic source

⚠CAUTION

- Install a pneumatic filter just before the pneumatic component in the circuit.

- Do not supply anything other than compressed air.

- Use clean compressed air that does not contain corrosive gases.

- Use dry compressed air that does not cause moisture inside the piping.
  - Moisture will occur if the temperature drops in the pneumatic piping or pneumatic components.
  - Operation failure could occur if moisture enters the air flow path of pneumatic components and temporarily blocks passage.
  - Moisture could cause rust, making the pneumatic components fail.

- Use compressed air that does not contain oil oxides, tar, carbon, etc., from the air compressor.
  - If oil oxides, tar, or carbon enter the pneumatic components and solidify, resistance at the sliding section will increase, leading to operation failure.

- Use compressed air that does not contain solid foreign matter.
  - Any solid foreign matter in the compressed air can enter the pneumatic components and cause wear, locking or internal leakage in the sliding parts.

Mounting, installation and adjustment

1. Mounting

⚠WARNING

- When mounting a valve, do not use a mounting method that relies on support from the piping.
  - Mount and fix the valve body.
- After mounting, do not clean or paint with water or solvent.
  - Otherwise some resin parts may be damaged.
- Do not remove the solenoid valve package until you are ready to connect to the piping.
  - Removing the package before starting piping work may cause foreign matter to enter inside the solenoid valve from the piping port, resulting in failure or malfunction.
- Do not block the exhaust hole.
  - This may cause malfunction.
- When using the products in a row, set intervals of distance of 1 mm or more.

2. Pre-operation confirmation

⚠CAUTION

- When supplying compressed air after connecting pipes, do not suddenly apply high pressure.
  - The pipe connection could dislocate, causing the pipe to fly off, risking accidents.
- Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
  - Apply a leakage detection agent on pipe connections with a brush and check for air leaks before use.

3. Piping

- Connect the piping so that connections are not dislocated by equipment movement, vibration, tension, etc.
  - Cut the push-in fitting tube at right angles with a dedicated tool.
  - Confirm that the tube has been inserted properly, and make sure that there is no tension during use.The tube could be dislocated or damaged if there is any tension.
- Make sure that there is no torsion, tension or moment load applied to the fitting or the tube.
- Check that the tubing is not worn or damaged.
  - Tubing could collapse, rupture, or become dislocated.
- Use the designated tube.
  Designated nylon tube: F-1500 Series
  Designated urethane tube: U-9500 Series
- Securely insert the tube completely to the end, and make sure that the tube cannot be pulled out.
- Cut the tube with a dedicated cutter and always at a right angle.

4. Lead wire connection

⚠CAUTION

- Connect the lead wire appropriately.

The following lead wire should be used:

Electrical connection code	Description	Conductor size	Conductor sectional area	O.D.
2C	Grommet lead wire	AWG#26	0.13 or equiv.	0.98

Use/maintenance

⚠CAUTION

- Sudden leakage
  With the pilot operated 2-port valve, if the pressure is suddenly applied when the compressor starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.
- Disassembly
  Do not disassemble this valve.Once disassembled, the valve may not retain its valve performance.
- The coil will heat up while the valve is energized and immediately after energization. Do not touch these parts with your hands or other body parts.
- Pressure differential
  Under the following conditions, make sure to set the pressure so that the pressure differential while the valve is open does not drop below 0.02 MPa. If a pressure difference (between the primary side and secondary side) of at least 0.02 MPa cannot be secured while the valve is open, the diaphragm may vibrate, resulting in a short service life.
  - When a needle valve is mounted on the secondary side
  - When multiple solenoid valves connected in parallel piping (module and manifold connection) are opened simultaneously (The drop in source pressure causes the pressure differential between the primary side and the secondary side to diminish.)
  - If sufficient pressure differential between the primary side and the secondary side cannot be ensured while the valve is open, or if the pressure differential is unknown, contact CKD for details.

- When installing the valve, make sure that no tension is applied to the coil lead wire.
- When carrying the product, hold the body.
  (Do not dangle the product from the lead wire when carrying it.)
- When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.
- If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation.For the fluid supply side, use piping of a piping size that matches the port size of the valve.
- Depending on the conditions of your usage, the operation of the solenoid valve may become unstable after being left unattended for an extended period of time.
  Be sure to perform a test run before use.
- Avoid using the product for applications that involve continuous fitting rotation or oscillations. Fittings may become damaged.
- Do not drop this product or use it as footing.The product may fail or break.

Related products

Proportional solenoid valve A2-6500 Series

Catalog No. CB-03-1SA

- By controlling the gas flow rate steplessly in proportion to the operation current value, "multi-step flow rate control" and "appropriate amount control" are possible.
- Ideal for the automation of flow rate adjustments using proportional control of air and oxygen for ventilators.

Compact flow rate controller (RAPIFLOW) FCM Series

Catalog No. CB-024SA

- IO-Link communication enables remote operation from the host as well as data collection
- Compact/high speed/high precision
- Compatible with various fluids
- Capable of 0.5 sec high speed control
- Equipped digital display makes control status visible at a glance
- Multiple models realized with built-in microcomputer