Pneumatic components

Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions for using valves.

Product-specific cautions: Pilot operated 5-port valve PV5G/PV5/GMF/PV5S-0 Series

Design/selection

1. Safety design

⚠WARNING

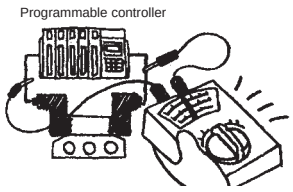
■ Use the product in the range of conditions specified for the product.
The product in this catalog is designed for use only in a compressed air system. Use with pressure or temperature exceeding the specifications range may result in damage or operation faults. (Refer to specifications)
Contact CKD when using fluids other than compressed air.

■ When using a 3-position all ports closed valve with a custom stroke, the properties of compressed air make it impossible to brake at an accurate position. In addition, as valves and cylinders, etc., are designed to allow air leakage, pressure retention applications may cause the stop position to change or cause a pressure drop.

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

⚠CAUTION

■ Check for leakage current to avoid 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.



Using 100 VAC	3.0 mA or less
Using 12 VDC	1.5 mA or less
Using 24 VDC	1.8 mA or less

2. Common

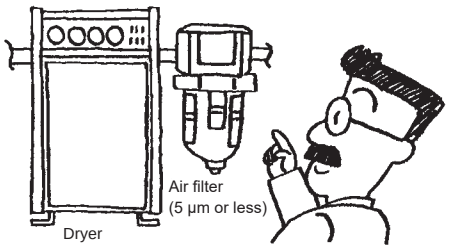
⚠WARNING

■ Do not narrow the exhaust port of the manifold valves.
Other cylinders may be subject to unintended operation due to back pressure generated from the exhaust of the switching valve. In this case, individually install a manifold two-sided exhaust or a single exhaust spacer equipped with the valve causing the situation.

⚠CAUTION

■ Make sure that the instantaneous energizing/ manual override of the double solenoid 2 position valve is 0.1 seconds or more.
However, as the cylinder may malfunction due to secondary side load conditions, it is recommended that energizing/manual override is performed until the cylinder reaches the stroke end position.

■ 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 faults 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.
- The drain will flush the lubricant oil and cause a lubrication defect.

Design/selection

3. Surge suppressor

⚠CAUTION

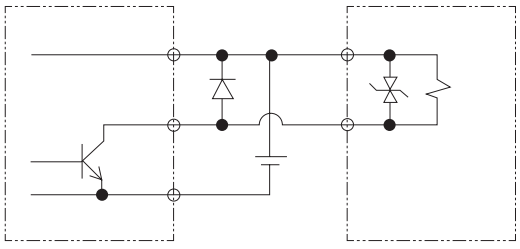
■ The surge suppressor attached with the solenoid valve is intended to protect the output contacts for the solenoid valve drive. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other devices may be absorbed and cause damage such as burning. Note the following points.

● The surge suppressor functions to limit a voltage surge in the solenoid valve, which can reach several hundred volts, to a low voltage level that the output contact can withstand. Depending on the output circuit used, this may be insufficient and could result in damage or malfunction. Check whether the surge suppressor can be used within the surge voltage limit of the solenoid valve in use, the output device's withstand pressure and circuit structure, and by the degree of return delay time. When necessary, provide other surge countermeasures. The solenoid valve with surge suppressor can suppress the inverse voltage surge that may occur when the solenoid valve is OFF to the level in the table below.

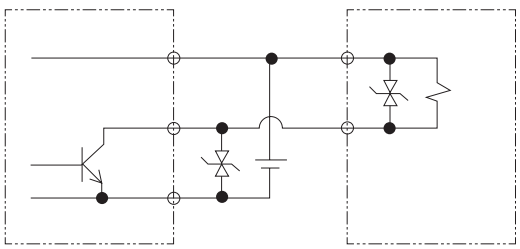
Specification voltage	Inverse voltage when OFF
12 VDC	Approx. 27 V
24 VDC	Approx. 47 V

● If the output unit is an NPN, a surge voltage equaling the voltage shown in the table above plus the power supply voltage may be applied to the output transistor. Make sure to implement a contact protection circuit to avoid the risk.

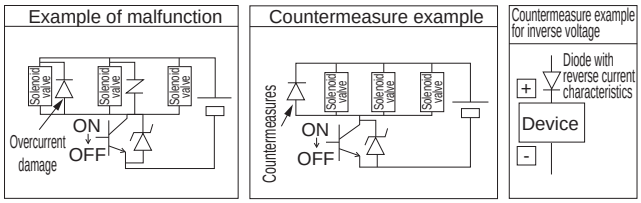
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



● "When solenoid valves are connected in parallel with other components or solenoid valves, inverse voltage is applied to these components and/or solenoid valves when the solenoid valve is turned OFF. Even in the case of a solenoid valve with 24 VDC surge suppressor, a surge voltage may reach negative tens of volts for some models. This inverse voltage may cause damage or malfunction to other components connected in parallel. Avoid parallel connection of devices susceptible to inverse polarity voltages, e.g., LED indicators. When driving several solenoid valves in parallel, the surge from other solenoid valves may enter the surge suppressor of one solenoid valve, and it may burn depending on the current value. When driving several solenoid valves with surge suppressors in parallel, surge current could concentrate at the surge suppressor with the lowest limit voltage and cause similar burning. Due to the variations in surge suppressor limit voltage that exist even among solenoid valves of the same model No., in the worst case the surge suppressor may burn out. Avoid driving multiple solenoid valves in parallel.



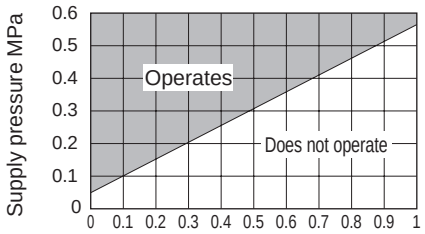
● The surge suppressor incorporated in the solenoid valve will often be short-circuited if it is damaged by overvoltage or overcurrent from other solenoid valves. Where there is a failed surge suppressor, if a large current flows when the output is ON, in the worst case scenario, the output circuit or solenoid valve could be damaged or ignited. Do not continue energizing in a state of failure. Additionally, to prevent large currents from continuing to flow, connect an overcurrent protection circuit to the power supply and drive circuit, or use a power supply with overcurrent protection.

Mounting, installation and adjustment

1. Common

⚠CAUTION

- When using a pilot check valve (PV5G-*-FPG-D, CMF*-PC), as the cylinder is retained by this pilot check valve, be aware that when the pressure to be supplied next is too low, the unit may not operate due to the pressure balance between the primary side and the secondary side of the poppet valve.



- When back pressure is applied to the exhaust ports R1/R2 while using a pilot check valve, as the cylinder may drop or the midway stopping accuracy may decrease, use as a combination with an independent exhaust spacer (CMF*-R) to prevent the back pressure from being applied as much as possible.
- When transporting the solenoid valves, do not hold by the cables. There is a risk of disconnection.
- Be sure to shut off the power supply externally before installation and wiring. Failure to do so may result in electric shock or damage.
- Check the rated voltage and terminal layout for correct wiring. If the connected power supply is not the rated voltage or wiring is wrong, fire or damage may occur.
- Use the specified torque to tighten the waterproof connector and terminal screw. If tightening is done haphazardly, fire or malfunction may occur.
- Do not use submerged in water.
- Use appropriate torque to tighten the pipes when connecting them.
  The purpose is to prevent air leakage and damage to bolts.
  First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

[Reference value]

Port thread	Tightening torque N·m
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18
Rc3/4	19 to 40

2. DIN terminal box

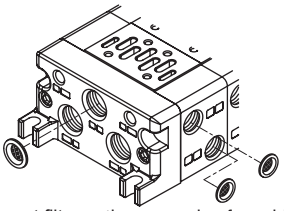
⚠CAUTION

- Use a JIS C3312 (600 V vinyl insulated vinyl cable) 2, 3, or 4-conductor (O.D.: ø8.5 to 11.5) cable with a conductor sectional area of 0.75 mm^2 or 1.25 mm^2.
- In order to prevent defective contact and detachment, use a crimping terminal at the tip of the cable. (Example: Use items within 1.25Y-3U, 1.25-3.5S, 1.25-4M, inner diameter M3.5 outer diameter 7 mm.
- Incorrect connections of terminals may cause the unit to malfunction. Refer to page 1470 for the correct connections.

3. Port filter

⚠CAUTION

- The port filter prevents the entry of foreign matter, and prevents problems from occurring in the valve. As this does not improve the quality of the compressed air, read Warnings and Precautions on Intro Page 61, then mount, install, and adjust the filter accordingly. Do not detach or press down the port filter forcibly. The filter could deform, causing problems. If contaminants and foreign matter are found on the filter surface, blow them lightly, or remove them by tweezers, etc.



P, A, B port filter option example of combination

Use/maintenance

1. Disassembly/assembly

⚠WARNING

- Read the relevant product's instruction manual thoroughly and fully familiarize yourself with the work before disassembling or assembling the solenoid valve.
  - Personnel must be fully familiar with solenoid valve structure and operational principles and safety requirements.
  - Pneumatic Pressure Skill Test Class 2 or higher level is required.

2. Pneumatic source

⚠CAUTION

- The no-lubrication function cannot be maintained once lubrication has been applied to a no-lubrication valve. Once lubrication has been applied, it will be necessary to continue lubricating the valve.
  - Decide on lubrication or no-lubrication for the pneumatic components and ensure that implementation of the corresponding method is properly managed.
  - With the lubrication method, lubricants other than ISO VG32 (no additives) turbine oil cannot be used.