Safety Precautions

Be sure to read this section before use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments.
(Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B 8370 (Pneumatics fluid power - General rules and safety requirements for systems and their components)
JFPS2008 (Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of all systems related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility.Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions in the following pages to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

WARNING: If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury.

CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
Every item provides important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.
Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Fluid Control Valve

To Use This Product Safely

Be sure to read before use.
Refer to "Fluid Control Valves (RJ-013)" for general precautions on valves.

Individual Precautions: Direct acting 2, 3-port solenoid valve Multi-fit TM FFB/FFG Series

Design / Selection

1. Working fluid

Warning

■Working fluids

- Do not use any fluid other than the working fluids specified in the catalog.
- Before starting use, check the compatibility between the product and working fluid with the working fluid check list.
- Contact CKD before using this valve for active gas (combustion gas, acetylene gas, etc.). Sales
- When using the brass body in water or hot water, dezincification or erosion/corrosion may cause malfunction or internal leakage. Stainless steel body is also available. Stainless steel body is recommended for use with water or hot water.
- The fluid viscosity must be 50 mm^2/s or less. Malfunctions could occur if the viscosity is higher than 50 mm^2/s.
- Depending on the model, internal parts may wear when the valve operates. Caution is required because wear chips could enter the valve secondary side.
- If rust must be avoided, select a component whose metal sections are not wetted.
- When using tap water with the EPDM sealant for long periods, it could deteriorate due to residual chlorine.

2. Operating Environment

Warning

■The degree of protection has passed IEC standard compliant test, but performance greatly differs based on weather resistance and time, so these values are not guaranteed. Take measures to ensure that water, dust, etc., do not come in direct contact.

■This product is CE-marked, indicating conformity with the EMC Directives. As a condition for compliance with standard EN61000-6-2 for the immunity for industrial environments applied to this product, take surge immunity measures on the equipment side in the case of DC voltage. For AC voltage, noise is generated because the product is equipped with a full-wave rectifier circuit. If noise protection is required, install a capacitor. Refer to the instruction manual for details.

3. Securing Space

Caution

■Securing maintenance space

Secure sufficient space for maintenance and inspection. Ensure sufficient space for maintenance and troubleshooting safety work. To remove the coil, the clip must be removed from the product side. Provide both space on the top of the coil and space on the side where the clip will be removed.

4. Surge suppressor

Caution

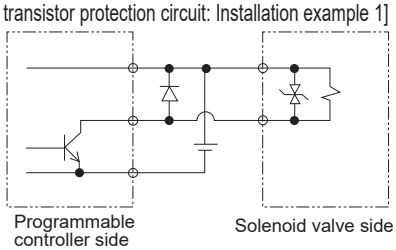
■The surge suppressor included with the solenoid valve aims to protect the output contact for driving the solenoid valve. There is no protection for other peripheral devices, and those devices may be damaged or malfunction by a surge. The suppressor absorbs a surge voltage generated by other devices, and burns itself out protecting the output contact. The following points must be taken into consideration.

- The surge suppressor functions to limit solenoid valve surge voltage, 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. Confirm in advance whether the surge suppressor is suitable for the withstand voltage of both the solenoid valve in use and the output device, circuit structure and the degree of return delay time. When necessary, provide other surge countermeasures. CKD's solenoid valve with surge suppressor can counter inverse voltage surge which occurs when the valve is turned OFF to the level shown in the table below.

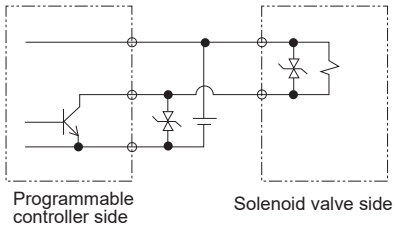
Specification voltage	Inverse voltage when OFF
12 VDC	Approx. 39 V
24 VDC	

- If the output unit is an NPN type, 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.

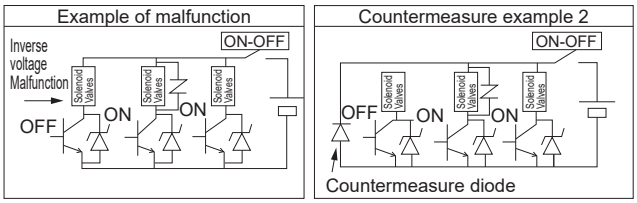
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



- If another device or solenoid valve is connected in parallel to the solenoid valve, the inverse voltage surge generated when the valve is OFF would apply to those devices. 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. A components that is susceptible to inverse polarity voltages (example: Avoid parallel connection with the LED indicator lamp. When driving several solenoid valves in parallel, the surge from other solenoid valves could enter the surge suppressor of one solenoid valve and cause it to burn. When driving several solenoid valves with surge suppressors in parallel, surge current could concentrate at the surge suppressor with the lowest voltage limit and cause similar burning. Even if the solenoid valve is the same, the surge suppressor's voltage limit can be inconsistent, and in the worst case, could result in burning. 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 an 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 the solenoid valve if the surge suppressor becomes faulty. 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.

For cautions about mounting, installation, adjustment, use, and maintenance, refer to CKD Components Product Site (https://www.ckd.co.jp/kiki/en/) → "Model No.→" Instruction Manuals .