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 explosion-proof 5-port valve pneumatic valve 4F**0E series

## Design/selection

### ⚠ WARNING

■ Usable in Class 1 and 2 danger zones where there is combustible gas or steam. Cannot be used in Class 0 zones.

■ Select models and perform installation in accordance with JIS.C.0902 (general explosion-proof rules for electrical equipment), “RIIS Explosion-Proof Guidelines for Electrical Equipment in Factories”.

### ⚠ CAUTION

■ Explosive gas and explosion-proof enclosure

The degree of explosive gas danger is classified according to the ignitability and flame-proof grade. Gases with equivalent risk are grouped into one group, and explosion-proof structure standards are set for each group. Codes to indicate the type, flame-proof grade and ignitability must be indicated in this order on the electrical components of explosion-proof structures. These codes indicate which flame-proof grade and ignitability class the electrical components have been manufactured for, and which gases can be used. For the example of explosion-proof solenoid valve of d2G4

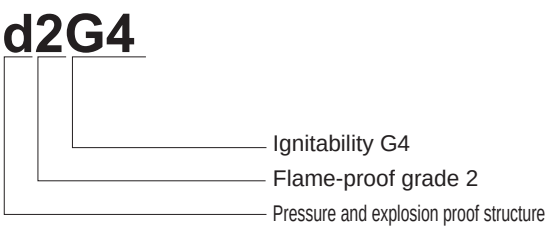



Table 1 indicates the classification of gases with a danger category of G4 ignitability to Grade 2 explosibility that are compatible with the product. Less dangerous gases are also listed that are guaranteed to be flame-proof.

Table 1

| Ignitability / Flame-proof grade | G1 | G2 | G3 | G4 | G5 |
|---|---|---|---|---|---|
| 1 | Acetone | Ethanol | Gasoline | Acetaldehyde | |
| | Ammonia | Isoamyl acetate | Hexane | Ethyl ether | |
| | Carbon monoxide | 1-butanol | | | |
| | Ethane | Butane | | | |
| | Acetic acid | Acetic anhydride | | | |
| | Ethyl acetate | | | | |
| | Toluene | | | | |
| | Propane | | | | |
| | Benzene | | | | |
| | Methanol | | | | |
| | Methane | | | | |
| 2 | Coal gas | Ethylene | Isoprene | | |
| | | Ethylene oxide | | | |
| 3 | Water gas, hydrogen | Acetylene | | | Carbon disulfide |

Use in the above ranges.

■ Dangerous zone

Situations where explosive gases and air mix at a high enough level to cause an explosion or fire are called danger zones. These zones are classified into Class 0 zones, Class 1 zones and Class 2 zones according to the time and frequency at which the dangerous atmosphere is reached. The explosion-proof structure that can be used is determined according to these classes.

● Class 0 zone

Zones where a dangerous atmosphere is or could be continuously generated, and where the concentration of explosive gas is maintained continuously or for a long time above the lower limit for explosions.

Example a: The open space above a flammable fluid inside a container or tank
b: Inside a combustible gas container or tank c: Near flammable fluid in an open container

● Class 1 zone

(1) Zones where explosive gas could accumulate to a dangerous concentration during operations such as the opening/closing of the lid for removing the product or operation of the safety valve, etc.
(2) Zones where explosive gases are likely to accumulate to dangerous concentrations during repair or maintenance or due to leakage, etc.

● Class 2 zone

(1) Zones where combustible gases or flammable fluids are regularly handled, but where the gases and fluids are sealed in a vessel or equipment, and where the gases and fluids could leak to dangerous concentrations only if the vessel or equipment breaks by accident or due to misoperation.
(2) Zones where measures to prevent the accumulation of explosive gases are taken with a reliable mechanical ventilation device, but where explosive gases could accumulate to a dangerous concentration if the ventilation device fails.
(3) Zones near or adjacent to a Class 1 zone where explosive gases could infiltrate at a dangerous concentration.

■ Explosion-proof test model No.

Explosion-proof certification has been obtained with the pilot actuator assembly.

The test model and product model No. of the pilot actuator assembly are as listed in the table below.

(Example)

| Product model No. | Test model |
|---|---|
| 4F3 □ 0E-G P | E3-G P |
| 4F410E to 4F710E-G P | E4-G P |
| 4F 420/430/440/450 E to 4F 720/730/740/750 E-G P | E5-G P |
| 4F3 □ 0E-G P-X | H3-G P |
| 4F410E to 4F710E-G P-X | H4-G P |
| 4F 420/430/440/450 E to 4F 720/730/740/750 E-G P-X | H5-G P |

# Mounting, installation and adjustment

## 1. Piping

### ⚠ CAUTION

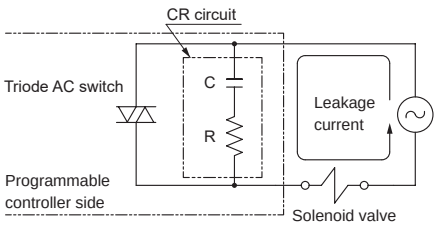
■ A pilot exhaust hole is provided on the pilot actuator. Contact CKD when using this product where problems could occur from exhaust, such as in a clean room.

## 2. Wiring

### ⚠ CAUTION

■ Check for leakage current to avoid malfunction caused by leakage current from other fluid control components.

● When absorbing a surge voltage with the CR circuit and using a PLC that protects the switching element, be careful as a leakage current will flow through the CR element and negatively affect product operation.



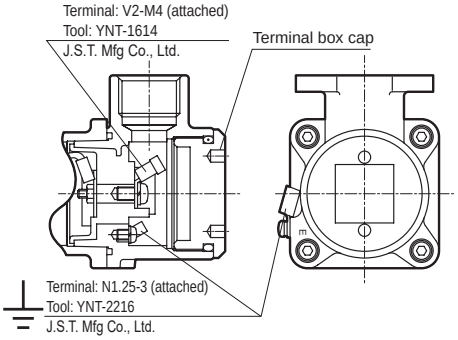

Be sure to keep the size of the residual leakage current
4.0 mA or less with 12 to 127 VAC,
2.0 mA or less with 200 to 380 VAC,
1.5 mA or less with 12 to 48 VDC, and
0.6 mA or less with 80 to 125 VDC.

■ When using the unit outdoors, use type T and take care that rain water does not enter from lead wire outlet G1/2. As type G has been specifically designed for indoor applications, do not use this outdoors.

■ Wiring

● Install wiring in accordance with JIS explosion-proof guidelines.

● Remove the terminal box cap with the attached tools for disassembly and install the wiring. Use the tools specified in the following diagram for crimping the crimp terminals upon wiring. After finishing wiring, securely tighten the terminal box cap.
Keep the disassembly tools for future maintenance.



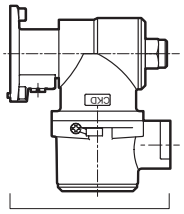

■ In order to ensure explosion-proof specifications, select a cable from the following for use with type G.

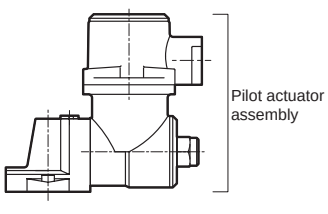
| Cable | No. of cores | Nominal section area | Wire config | Finished outer ø |
|---|---|---|---|---|
| Polyethylene cable (EV) | 2-conductor | 2 mm$^2$ | 7/0.6 | ø10.5 |
| 600 V vinyl insulation vinyl sheath cable (VV) | 2-conductor | 2 mm$^2$ | 7/0.6 | ø10.5 |
| Control vinyl insulation vinyl sheath cable (CVV) | 2-conductor | 2 mm$^2$ | 7/0.6 | ø10.5 |

# Use/maintenance

### ⚠ WARNING

■ With the pilot actuator assembly, do not disassemble anything other than the terminal box cap (as performance of the explosion-proof enclosure cannot be guaranteed if the unit has been disassembled.)
As explosion-proof certification has been obtained with the pilot actuator assembly, perform replacement of the coil with the pilot actuator assembly.

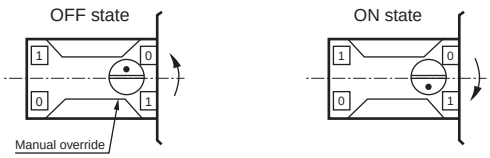



■ Manual override
As the manual override is equipped with a lock, turn this OFF when it will not be in use. For use, turn with a flathead ⊖ screwdriver.

● **4F3**
C: Align letters with OFF arrow
O: Turn in direction of ON arrow until it stops
(arrow and O may not align with each other)


● **4F4/5/6/7**
0..... Align OFF ● with the number
1..... Turn in direction of ON 1 until it stops
(1 and ● may not align with each other)

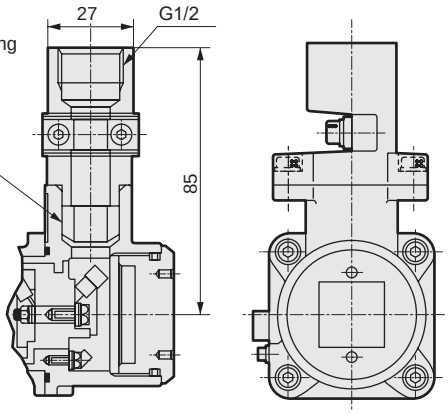


## Dimensions

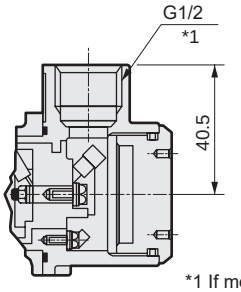
### External wire pull method

G type
Pressure proof packing
Protective tube threading

Pressure proof packing




T type
Conduit thread system



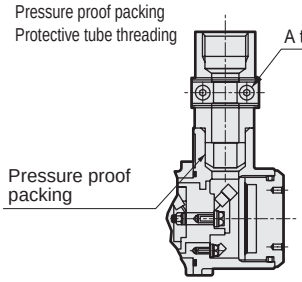

*1 If model No. "-CN", it will be NPT1/2.

## [Safety precautions]

G type
Pressure proof packing
Protective tube threading

A type specifically designed for indoor use

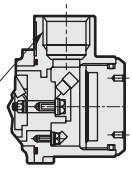
Pressure proof packing



While the structure prevents water from entering inside the valve, it also allows water to enter the cable between the valve and the terminal box. For this reason, as long periods of use will cause the pressure proof packing to deteriorate and increase the possibility of water entering the valve, the model has been specified for indoor use.

T type
Conduit thread system

When using the unit outdoors, use thick steel conduits and take care by installing sealants, etc., to prevent water from entering via the thread part.



Take care that water will not enter when being left without electrical piping after installation of outdoor piping as well. (Water may infiltrate the wiring section)