



Safety precautions

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Pilot operated 2-port solenoid valve (AP/AD) and pilot kick 2-port solenoid valve (APK/ADK)

Design/selection

⚠ WARNING

1 Working fluids

- (1) When using this valve for dry air or inert gas, the life can be shortened considerably due to wear. Use a valve intended for dry air.
- (2) This valve cannot be used for maintaining vacuum.

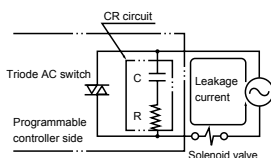
⚠ CAUTION

1 Fluid viscosity

The fluid viscosity must be 50 mm²/s or less. Malfunctions could occur if the viscosity is higher than 50 mm²/s.
(For APK Series, 20 mm²/s or less)

2 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.



| Model No. | AC | | AC diode | | DC | |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 100 V | 200 V | 100 V | 200 V | 12 V | 24 V |
| AP,AD | 6 mA or less | 3 mA or less | 2 mA or less | 1 mA or less | 2 mA or less | 1 mA or less |
| APK,ADK | 6 mA or less | 3 mA or less | 2 mA or less | 1 mA or less | 2 mA or less | 1 mA or less |

Mounting, piping and wiring

⚠ CAUTION

1 Mounting

- (1) As a general rule, the mounting orientation is vertical, with the coil on top.

2 Piping

- (1) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.
- (2) For steam fluids, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.
- (3) When passing steam, the make-up water in the boiler will contain substances such as "calcium salt" and "magnesium salt". As these substances will react with oxygen and carbon dioxide, and cause scales and sludge to form, always install a "water softener" and a filter for steam.
- (4) When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.
- (5) 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 inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

3 Wiring

- (1) Refer to Intro Page 64 for information on how to wire a terminal box.

When using the product

⚠ CAUTION

1 Sudden leakage

With the pilot operated or pilot kick 2-port valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

2 Operation

Do not apply back pressure. This could lead to malfunction.

3 Water hammer

If the water hammer poses problems, consider using the CKD "RSV type" solenoid valve or a motor valve.

4 Manual operation

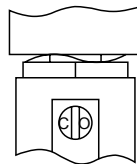
When using a product with a manual override, follow the operations below:
[For NC]

Opening: Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 120° to the right or left. The plunger will rise and the valve will open.

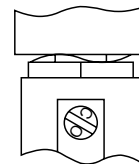
The open state is held even when the screwdriver is removed.

Always return the valve to the original position after use.

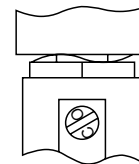
Closing: From the open position, turn the manual adjustment shaft so that the slit is returned to the perpendicular position, which will lower the plunger and close the valve. (Refer to the figure below)



Valve closed state



Valve open state



Valve open state

[For NO]

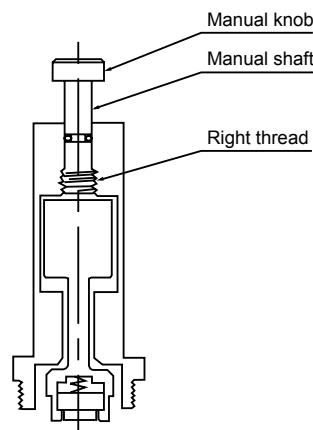
(1) When closing the valve with manual operation

The manual shaft is threaded, so hold the manual dial and rotate the shaft clockwise.

When the manual dial has been rotated downward 5 to 6 mm and no longer rotates, the solenoid valve will switch to closing operation.

(2) Reset (when not using a manual override)

Always rotate the manual dial counterclockwise and return it to the highest point.



Maintenance

⚠ CAUTION

1 Thermal insulation cover

When piping for steam or hot water, etc., use an insulating cover structure that can be disassembled for maintenance purposes.

Avoid placing an insulating cover on the entire solenoid valve or on the coil section. The coil could burn.

2 Tightening torque

When disassembling or assembling, tighten the body bolt, core assembly and nut with the following tightening torques.

| | | Body bolt tightening torque | Core assembly tightening torque | Nut tightening torque |
|--|------------------------------|--------------------------------|--|--------------------------|
| AP ₁₂ ¹¹ AD ₁₂ ¹¹ | 8A | 3 to 4 Nm | 30 to 45 Nm (45 to 60 Nm for APK11-15A to 25A) | 8 to 16 Nm |
| | 10A | | | |
| APK11 ADK ₁₂ ¹¹ | 15A | 5 to 7 Nm | | |
| | 20A | 9 to 12 Nm | | |
| AP ₂₂ ²¹ AD ₂₂ ²¹ | 25A | | 18 to 28 Nm | |
| | 32 _F ^A | | | |
| | 40 _F ^A | | | |
| APK21 ADK21 | 50 _F ^A | 80 to 120 Nm | | |
| | 32 _F ^A | | | |
| | 40 _F ^A | | | |
| | 50 _F ^A | | | |

Working environment

⚠ CAUTION

IP65 (IEC60529 [IEC529:1989-11]) standards are applied to the test. Avoid use in conditions where water or cutting oil directly contacts the valve.

Degree of protection of IP65 and explanation of test method

● Degree of protection

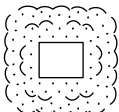
Note: IP65 is based on the following testing method.

■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

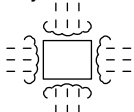
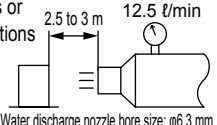
IP-

Degree of protection (International Protection)

1st characteristic No. (degree of protection for foreign solid matter)

| Grade | Degree of protection | |
|-------|---|--------------------|
| 6 | Dust proof  | No inflow of dust. |

2nd characteristic No. (degree of protection for water entry)

| Grade | Degree of protection | | Overview of test method (fresh water is used) |
|-------|--|---|--|
| 5 | Protection against water jets  | No harmful effects occur even when water is sprayed with nozzles from all directions. | The sample (exterior) is exposed to water jetting of 1 m ² per minute for a total of 3 minutes or more from all directions with the testing equipment in the figure below.  |

| |
|--------------------------|
| EXA |
| FWD |
| HNB/G |
| USB/G |
| FAB/G |
| FGB/G |
| FVB |
| FWB/G |
| FHB |
| FLB |
| AB |
| AG |
| AP/ AD |
| APK/ ADK |
| DryAir |
| EX- XPLNprf |
| XPLNprf |
| HVB/ HVL |
| S [◇] B/ NAB |
| LAD/ NAD |
| Water- Rela |
| NP/NAP/ NVP |
| SNP |
| CHB/G |
| MXB/G |
| Other valves |
| SWD/ MWD |
| DustColl |
| CVE/ CVSE |
| CCH / CPE/D |
| LifeSci |
| Gas- Combust |
| Auto- Water |
| SpecFld |
| Custom |
| Ending |