CKD

Multilex Valve

ADK11-W Series
ADK21-W Series

INSTRUCTION MANUAL

SM-50811-A/2

- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's **Multilex Valve "ADK11-W Series/ADK21-W Series."** This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- This product is intended for people who have basic knowledge of materials, fluids, piping, electricity, etc. for using control valves (solenoid valves, electric valves, air operation valves, etc.). CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training on control valves.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, ensure the safety of the machine mechanism of the device and pneumatic or water control circuit and the electric system that controls them.

Ensure to observe organization's standards, laws and regulations, etc. for safety related to design and management of the equipment.

ISO 4414, JIS B 8370, JFPS 2008 (latest version of each standard)
High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety regulations, organization's standards, laws, etc.

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER," "WARNING," and "CAUTION."

⚠ DANGER	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ WARNING	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ CAUTION	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by the person who has sufficient knowledge and experience.
This product was designed and manufactured as equipment and parts for general industrial machinery.

Use the product within the specifications.
It cannot be used outside of product-specific specifications. Never modify or additionally process the product.
Since this product is intended for use in general industrial machinery equipment and parts, it is not applicable to be used in the following conditions and environments.
(It will be applicable if you consult with our company at the time of its adoption and understand the specifications of our company's product. However, even in such a case, take safety measures to avoid danger in case of failure.)

- Use in equipment and applications that come into direct contact with nuclear power, railways, aviation, ships, vehicles, medical equipment, beverages and food.
- Use in applications requiring safety, such as recreational equipment, emergency shut off circuits, press machines, brake circuits, and safety measures.
- Use in applications that are expected to have a significant impact on people and property and require special safety.

Never handle the product or remove the piping and equipment until safety is confirmed.

- Check and maintain the machinery and equipment only after confirming that all systems related to the product are safe. Besides, turn off supply air and supply water, which are energy sources, and the power supply of the applicable equipment; exhaust compressed air and fluid from the system; and be careful not to leak water or electricity.
- Even when the operation is stopped, there may be a high-temperature part or a charging part. Handle the product and remove the piping and equipment carefully.
- Before starting or restarting machinery or equipment where pneumatic equipment is used, ensure the safety of the systems by jump-out prevention measures, etc.

Precautions on Product Disposal

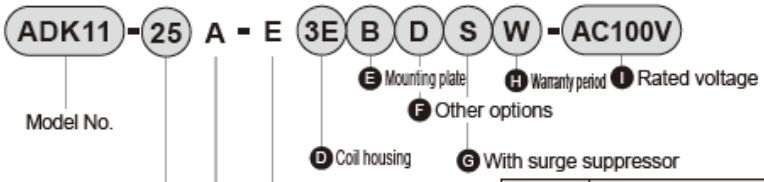
⚠ CAUTION

When disposing of the product, comply with laws pertaining to disposal and cleaning of wastes and have an industrial waste disposal company dispose of the product.

CONTENTS

1. PRODUCT OVERVIEW

1.1 Model Number Indication



Code	Description
Ⓐ Port size	
15	1/2
20	3/4
25	1
Ⓑ Thread	
A	Rc

Ⓒ Body/sealant combination

	Body	Seal	Remarks
D	Stainless steel	Nitrile rubber *5	air/water/low vacuum/kerosene/oil
E		Fluoro rubber *5	air/water/low vacuum/kerosene/oil

Ⓓ to Ⓘ

Refer to the following table for details on the coil housing, other options, voltage, etc.

Ⓗ Warranty period	
W	1 year after delivery
WG	3 years after delivery *3*4 (with inspection certificate, inspection guidelines, traceability system diagram)

[Example of model No. 1]
ADK11-15A-E3EWG-AC100V

Ⓐ Port size : 1/2
Ⓑ Thread : Rc
Ⓒ Body/sealant combination
: Body - stainless steel, sealant - fluoro rubber
Ⓓ Coil housing: Open frame with round terminal box
Ⓔ to Ⓖ : None
Ⓗ Warranty period : 3 years after delivery
Ⓘ Rated voltage : 100 VAC 50/60Hz, 110 VAC 60Hz

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, it should be blank.

Ⓓ Coil housing			**Ⓔ**	**Ⓕ Other options**			**Ⓖ**	**Ⓘ Rated voltage**
Description			Mounting plate	Cable gland (marine cable gland)			With surge suppressor	Description
				A-15a	A-15b	A-15c		
3E	Open Frame type	With round terminal box (G1/2)	B	D	E	F	S	100 VAC, 200 VAC
3L		Round terminal box with lamp(G1/2)						

⚠ Refer to the following cautions for Items Ⓒ to Ⓘ.

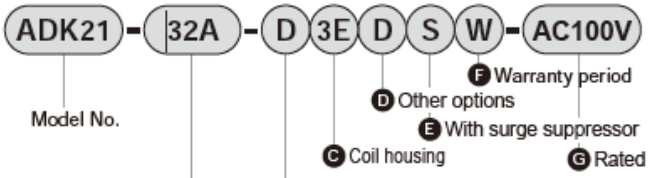
⚠ Precautions for model No. selection

Ⓒ to Ⓗ Notes for Item

*1: For Item Ⓕ, select an option from D, E and F.
*2: The surge suppressor is mounted in the terminal box.
*3: The warranty period of option WG is 3 years from the date of delivery or 1 year from initial use.
*4: For option WG, the specifications and drawings must be agreed upon.
*5: The ambient temperature for option D is −20°C to 60°C.
For option E, the ambient temperature is −10°C to 60°C.

Ⓘ Notes for Item

*6: 100VAC coil can be used at 100VAC50/60Hz and 110VAC60Hz, and 200VAC coil can be used at 200VAC50/60Hz and 220VAC60Hz.



Code	Description
Ⓐ Port size	
32A	Rc1¼
32F	32 flange
40A	Rc1½
40F	40 flange
50A	Rc2
50F	50 flange

Ⓑ Body/sealant combination

	Body	Seal		Remarks
D	Stainless steel	Nitrile rubber	*6	air/water/low vacuum/kerosene/oil
E		Fluoro rubber	*6	air/water/low vacuum/kerosene/oil

Ⓒ to Ⓖ

Refer to the following table for details on the coil housing, other options, voltage, etc.

Ⓕ Warranty period

W	1 year after delivery
WG	3 years after delivery *4*5 (with inspection certificate, inspection guidelines, traceability system diagram)

[Example of model No. 1]

ADK21-50F-E3EWG-AC100V

Model: ADK21

Ⓐ Port size : 50 flange
Ⓑ Body/sealant combination
: Body - stainless steel, sealant - fluoro rubber
Ⓒ Coil housing : Open frame with round terminal box
Ⓓ Ⓔ : None
Ⓕ Warranty period : 3 years after delivery
Ⓖ Rated voltage : 100VAC 50/60Hz

For Items Ⓒ to Ⓖ, the combinations indicated with codes are available.
Note that if options for Items Ⓓ to Ⓔ are not required, it should be blank.

Ⓒ Coil housing			Ⓓ Other options			Ⓔ	Ⓖ Rated voltage
Description			Cable gland (marine cable gland)			With surge suppressor	Description
			A-15a	A-15b	A-15c		
3E	Open	With round terminal box (G1/2)	**D**	**E**	**F**	**S**	100 VAC, 200 VAC
3L	Frame type	Round terminal box with lamp (G1/2)					

⚠ Refer to the following cautions for Items Ⓐ to Ⓖ.

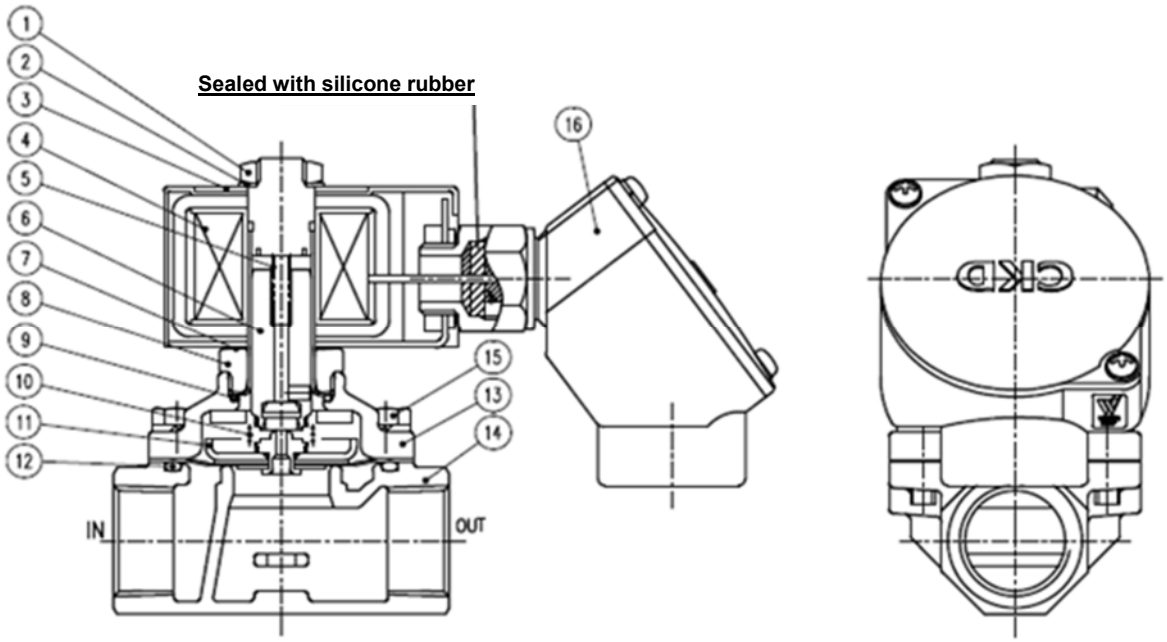
⚠ Precautions for model No. selection

Ⓐ to Ⓕ Notes for Item

*1: The companion flange is JIS B2210 10K. (Flange is not attached with the product and must be purchased separately.)
*2: For Item Ⓓ, select an option from D, E and F.
*3: The surge suppressor is mounted in the terminal box.
*4: The warranty period of option WG is 3 years from the date of delivery or 1 year from initial use.
*5: For option WG, the specifications and drawings must be agreed upon.
*6: The ambient temperature for option D is −20°C to 60°C.
For option E, the ambient temperature is −10°C to 60°C.

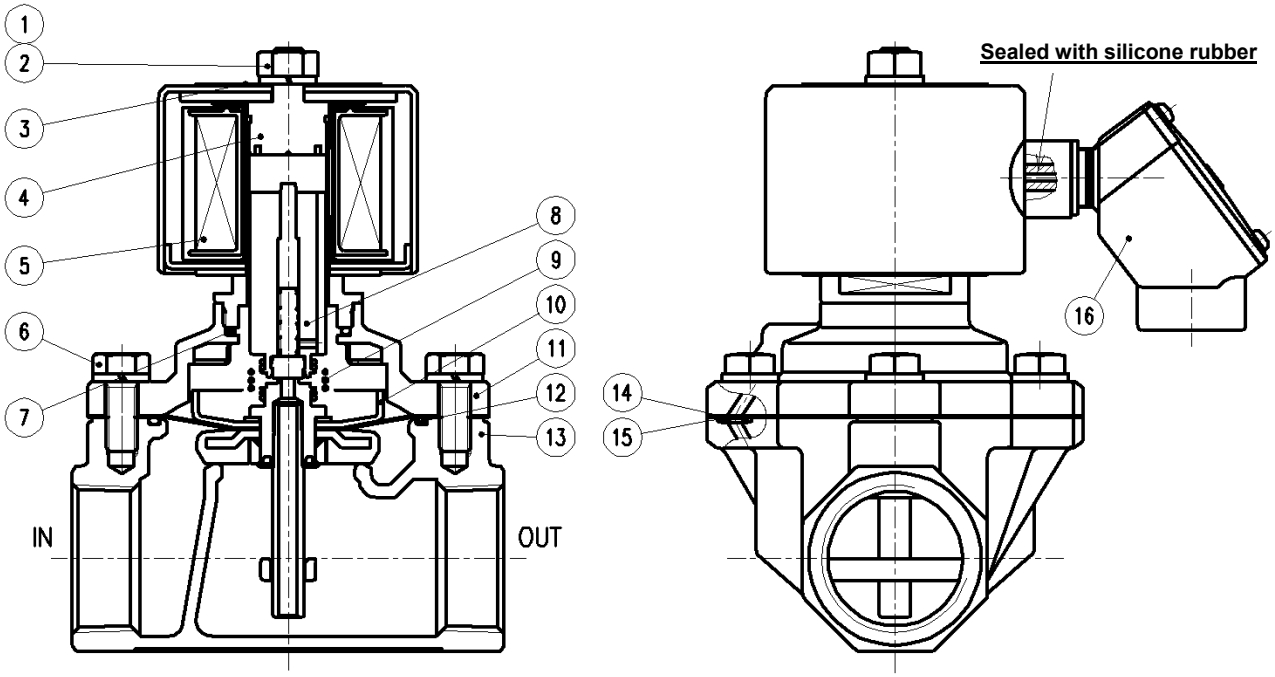
1.2 Internal Structure

■ Internal structure of ADK11



No.	Part name	Quantity
1	Nut	1
2	Spacer A	1
3	Nameplate	1
4	Coil assembly	1
5	Spring	1
6	Plunger assembly	1
7	Wave washer	1
8	Core assembly	1
9	O-ring	1
10	Kick spring	1
11	Diaphragm assembly	1
12	O-ring	1
13	Stuffing	1
14	Body	1
15	Hexagon head screw with washer mounted	4
16	Terminal box	1

■ Internal structure of ADK21



No.	Part name	Quantity
1	Hexagonal nut	1
2	Spring washer	1
3	Nameplate	1
4	Core assembly	1
5	Coil assembly	1
6	Hexagon head screw with washer mounted	6
7	O-ring	1
8	Plunger assembly	1
9	Kick spring	1
10	Diaphragm assembly	1
11	Stuffing	1
12	O-ring	1
13	Body	1
14	Orifice plate	1
15	Gasket	2
16	Terminal box	1

2. INSTALLATION

2.1 Environment

⚠WARNING

a) If spatter may occur during welding, take appropriate protective measures.

b) A coil generates heat.
- If the product is installed in a control panel or energized for a long time, take into account heat dissipation by ventilation, etc.
  Otherwise, the temperature will be high.

c) This product cannot be used in corrosive or solvent environments.

d) Avoid humid environments because condensation may occur due to temperature changes.

e) This product cannot be used in an explosive gas atmosphere.
- Choose an explosion-proof solenoid valve.

f) Use in an environment that is not exposed to radiant heat.

- If using in a cold climate, take appropriate measures against freezing.
  Freezing can cause leakage or operation failure.
  Conduct appropriate dew point management of air quality.
- Avoid washing or painting with solvents after installation.
  Some plastic parts may be damaged.
- Do not use this product in an environment where vibration or inertia is applied to a solenoid valve.

2.2 Unpacking

⚠CAUTION

Do not remove the pipe port protection until just before the piping is in operation.
If the pipe port protection is removed before piping connection work, foreign matter may enter through a piping port, causing failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.
- Store the valve in its individual packaging box to prevent foreign matter from entering the valve, and take it out of the box when piping.

2.3 Installing

⚠CAUTION

a) Read this Instruction Manual carefully before installing the product.
b) Grip the body when handling and mounting the product.
c) After installation, check for any leakage from piping and make sure that the piping is properly installed.

- This solenoid valve must be vertically installed with coil up.
  The angle of vertical installation here means 90 ± 15°.
- If the operation pressure is less than 0.02 MPa, the seal may become unstable; therefore, consult with us before using.
- Allow sufficient space for maintenance and troubleshooting.

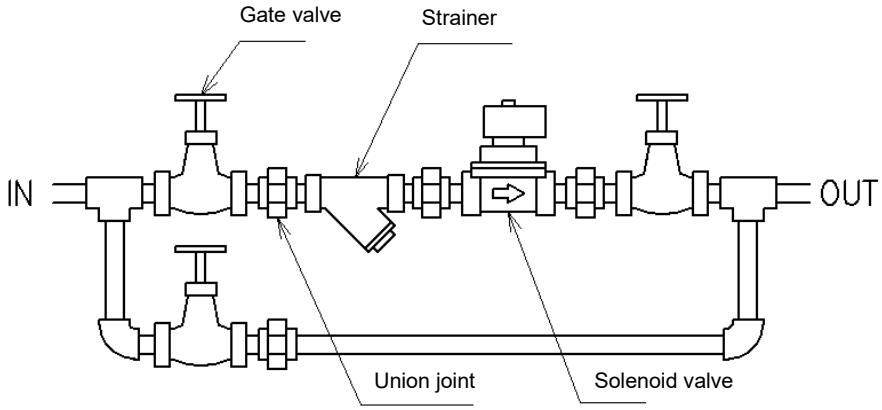
2.4 Piping

⚠ CAUTION

a) When tightening piping and re-piping, fix the product.
b) Fix and support the piping so that the weight and vibration of the piping is not directly applied to the valve.
c) After piping connection is completed, supply the fluid so that the pressure is not applied suddenly.
   • Insufficient piping connections can lead to disconnection or fluid leakage.

■ Installing bypass circuits

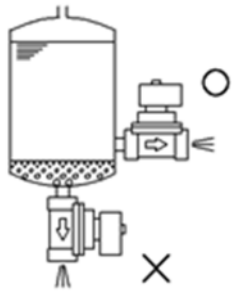
• Install a bypass circuit for piping. This makes maintenance work easy. (See Figure 1)



(Figure 1) Bypass Circuit

■ To install in drainage circuit from tank

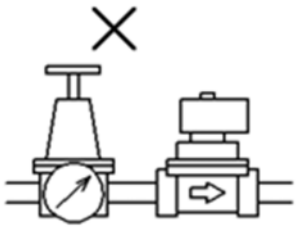
In controlling the water discharge from a tank, if a solenoid valve is installed at the bottom of the tank, accumulated foreign matter may cause malfunction of the solenoid valve.
Install the solenoid valve slightly above the bottom of the tank. (See Figure 2)



(Figure 2) Drain circuit from tank

■ Direct piping to a regulator

Connecting a regulator and solenoid valve directly may cause mutual vibration and resonance, leading to malfunction.
(See Figure 3)



(Figure 3) Direct piping to a regulator

■ Cross-sectional area of piping

In order to avoid narrowing the cross-sectional area of the piping on the fluid supply side, ensure the piping size matches the connection diameter of the solenoid valve.
If the cross-sectional area of the piping on the fluid supply side is narrowed, even if the fluid pressure is within the specified range when the solenoid valve is closed, the fluid pressure drops extremely when the solenoid valve is opened, resulting in a slight difference in operating pressure, which may cause unstable operation of the solenoid valve.

■ Cleaning piping materials

Flush the piping with air of 0.3 MPa or more to remove dust, metal powder, rust, sealing tape, and other foreign matter.

■ Removing foreign matter

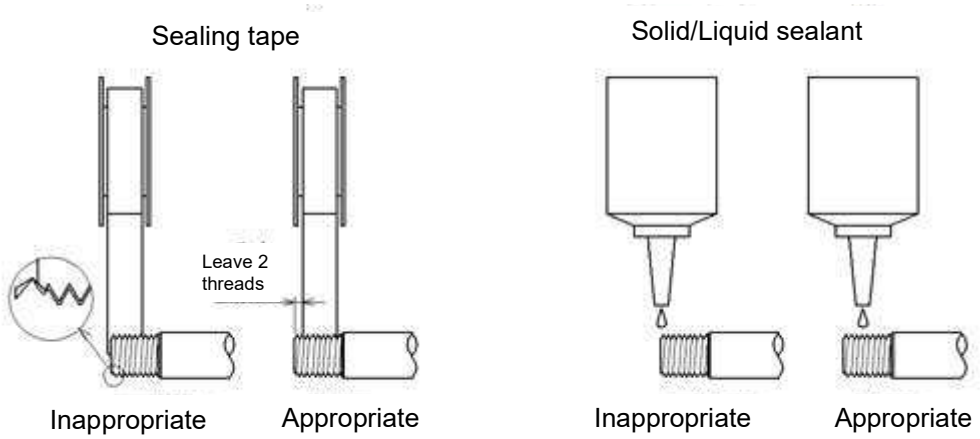
Dust, foreign matter, etc. in fluid may cause malfunction or leakage.
On the primary side of the valve, install a filter of 5 μm or less if the fluid is air; and a strainer of 80 mesh or more if the fluid is water.

■ Piping

When piping, be careful not to mistake the supply port, etc.
Ensure that the flow direction of the fluid matches the direction of the arrow displayed on the body of the solenoid valve.

■ Sealant

When using a sealant, be careful not to let it enter the piping and prevent it from leaking outside. When winding a sealing tape around a threaded area, leave 1 to 2 threads at the tip of the screw.
When applying a liquid sealant, leave 1 to 2 threads at the tip of the screw and do not apply sealant too much. Do not apply sealant to the female thread side of a device. (See Figure 4)



(Figure 4) Sealant application method

■ Tightening

- Refer to Table 1 for tightening torque during piping.

Table 1. Recommended values of pipe tightening torque

Connection diameter of piping	Recommended tightening torque (N·m)
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108
Rc2	132 to 136

■ Lubrication/No-lubrication

A lubricator is not necessary because it can be used without lubrication, but if lubricating, continue lubrication so that lubricant does not run out. Use lubricating oil of Class 1 turbine oil, ISO VG32.

■ Heat insulation cover for piping

If you attach a heat insulation cover to piping of hot water, etc., select a cover with a structure that can be disassembled in consideration of maintenance work. Do not attach a heat insulation cover to the coil unit of the solenoid valve.
The heat generated by the coil will increase, risking early deterioration or coil disconnection.

2.5 Wiring

⚠ WARNING

Read and fully understand this Instruction Manual before performing the electrical wiring.
In order to ensure safety, person who performs wiring needs to have knowledge to understand the structure and operating principle of the solenoid valve.

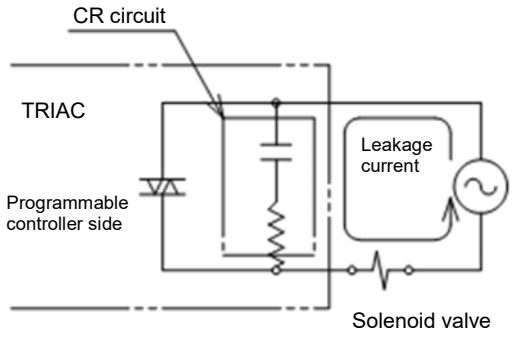
⚠ CAUTION

Check the voltage, AC/DC of the power supply.

To avoid malfunction due to leakage current from other control equipment, check that the leakage current is below the allowable value.

- When using a control device such as a programmable controller, leakage current from the control device may cause the solenoid valve to malfunction.
- When using this product, make sure that the leakage current from other control equipment is as shown in the table below.

Rated voltage	Leakage current
100 VAC	6 mA or less
200 VAC	3 mA or less



Maintenance of electrical equipment
To maintain electrical equipment, use a circuit breaker such as a fuse on the control circuit side.

2.5.1 Termination method

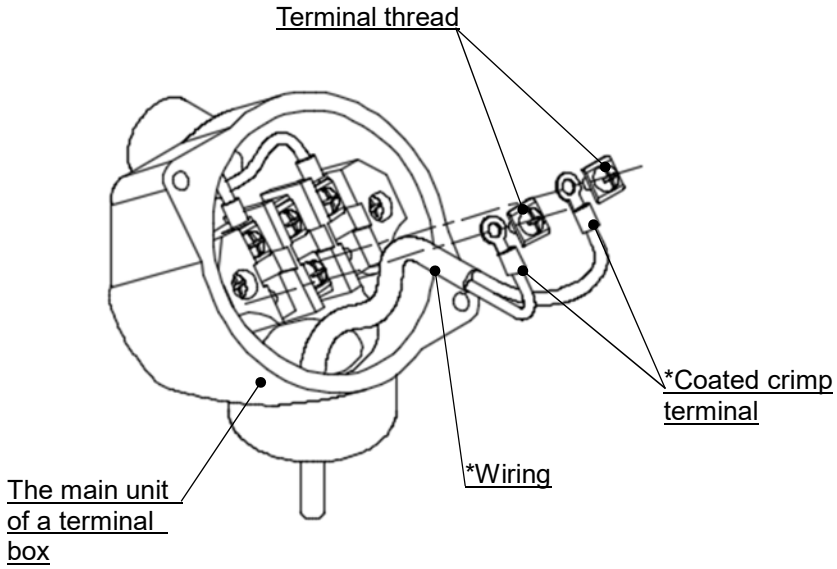
1 For wiring, crimp the crimp terminals and terminate the ends of wires.
*Use a terminal with a terminal thread size of M3 and crimp terminal with an outer dimensions of 7 mm or less.
*Use coated crimp terminals.

2 Tighten the threads with the following torque.
*Tightening torque of cap mounting thread: 0.5 N·m
*Tightening torque of terminal thread: 0.5 N·m

3 ■There is no polarity if two lead wires are connected from the coil to the terminal block.
Connect the wires to the A and C terminals of the terminal block.

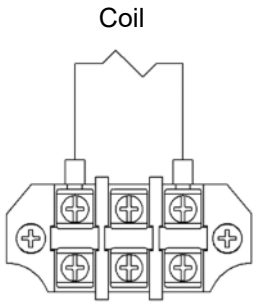
■There is no polarity if three lead wires are connected from the coil to the terminal block.
If the operating frequency is 50 Hz, wire the terminal to each of the A and C terminals of the terminal block.
If the operating frequency is 60 Hz, wire the terminal to each of the A and B terminals of the terminal block.

Note: To ensure safety and protect devices, it is recommended to set a fuse into the electrical circuit.



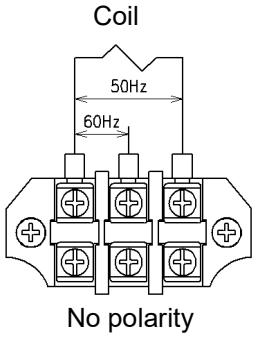
Products with the symbol * are not included in CKD's products.

(Figure 5) How to connect a terminal box



No polarity

[If the number of the lead wires is 2]



No polarity

[If the number of the lead wires is 3]

3. USAGE

⚠ WARNING

a) This product cannot be used for emergency shutoff valves.
- It is not designed as a safety valve such as an emergency shut-off valve.
  If using this product in such a system, take other measures to ensure safety before use.

b) Take necessary measures in advance so that the product will not adversely affect people, objects, etc. in case of failure.

c) About liquid sealing
- When flowing a liquid, a liquid sealed circuit may cause pressure to rise due to a temperature change, impeding the operation.
  Install a relief valve in the system to prevent a liquid sealed circuit.

d) About operating fluids
- Do not use any fluid other than those listed in the specifications.
- Check the control fluid checklist in the catalog for compatibility with the operating fluid.
- Note that when the solenoid valve is operated, wear particles may be generated due to the abrasion of internal parts, flowing to the secondary side of the solenoid valve.

e) Do not touch the coil or actuator with your hands or body while and immediately after this product is energized.
Burn hazard may result.

f) Do not touch an electrical wiring part (bare live part) with your hands or body while this product is energized. Electric shock may result.

⚠ CAUTION

Use this product within the specified pressure range.
- Using it outside the specified pressure range may cause malfunction.

3.1 Confirmation Before Use (Confirmation After Installation)

⚠ WARNING

a) Stop the flow of fluid. (close the main plug)
Discharge the fluid from the solenoid valve.
b) Turn off the power.
Check carefully while exercising a caution about electric shock.

■ Checking appearance

- Make sure that the solenoid valve is securely fixed to the piping.
- Make sure that the screw parts such as bolts, nuts, and screws are not loose.

■ Checking for leaks

- Pressurize the fluid and check for leaks at the connection parts.
  To check for leaks, it is recommended to supply compressed air (0.3 to 0.5 MPa), apply soap solution, and check for air bubbles.

■ Checking electricity

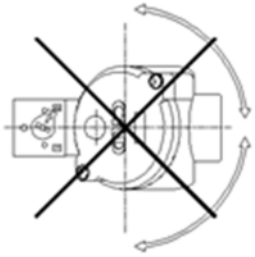
- Check the power supply voltage.
  Voltage fluctuation must be limited within ± 10% of the rated voltage.
  Operation outside the voltage fluctuation range may cause malfunction or coil damage.
- Checking insulation resistance
  Measure the insulation resistance between an uncharged metal part attached to the solenoid valve and a bare live part such as lead wire.
  Confirm that the resistance is 100 MΩ or more with a 500 V DC ohmmeter.

■ Checking operation

- Apply the rated voltage and pressurize the fluid to check that the solenoid valve opens and closes normally.

3.2 Safety Instructions

- To carry the solenoid valve, hold the main body of the product.
  Do not hang the cable connected to the terminal box.
- Do not use the solenoid valve as scaffolding or place heavy objects on it.
- While the solenoid valve is closed, if the pressure is suddenly applied by starting the hydraulic pump, etc., the instantaneous valve may open, leaking the fluid. Install a gate valve on the IN side of the solenoid valve, and operate the gate valve so that the pressure gradually increases when the pump starts.
- Water hammer may occur when the valve is closed.
- If the product remains unused for one month or more, the diaphragm or valve seat packing may fix to the valve seat, delaying the operation time. Perform a trial run before starting work.
- If dry air or inert gas is used, the durability may be remarkably deteriorated due to wear.
- This product cannot be used for vacuum retention.
- Use with a fluid viscosity of 50 mm^2/s or less.
  A viscosity exceeding 50 mm^2/s may lead to malfunction.
- Do not remove the round terminal box or change the direction of the wiring port. Otherwise, rain water may enter from the male thread of the round terminal box.



- This product is guaranteed for outdoor use, but does not guarantee corrosion resistance.
- The exterior parts of this product are corrosion-resistant to use under general environmental conditions.
  Note that if this product is used in a special environment, there is a high possibility of defects such as rusting in a short period of time.
- If an error occurs, refer to "5. TROUBLESHOOTING."

4. MAINTENANCE AND INSPECTION

⚠WARNING

a) Read this Instruction Manual carefully before performing maintenance and inspection.
b) Be sure to turn off the power to release fluid and pressure before maintenance.

4.1 Maintenance Parts

■ O-ring, gasket

Replace them when leakage is detected during use or when disassembling or reassembling the solenoid valve.

■ Plunger assembly, spring, and kick spring

Replace them if abnormalities such as leakage, malfunction, and buzzing are observed during use.

■ Diaphragm assembly

Replace them if abnormalities such as leakage and malfunction are observed during use.
In addition, replace it if damage or weakness is observed in the valve seat seal surface of the diaphragm assembly.

4.2 Periodic Inspection

- In order to use the product under optimum conditions, perform a periodic inspection once every six months.
- Refer to "3.1 Confirmation Before Use (Confirmation After Installation)" in this Instruction Manual for the details of inspection.
- If the product remains unused for one month or more after running cold water or hot water, remove any remaining cold water or hot water from the inside completely.
  Residual cold water and hot water may cause rust, leading to malfunction and leakage.
- Be careful not to clog the strainer or filter.

4.3 Precautions for Disassembly and Assembly

⚠WARNING

Be sure to turn off the power to release fluid and pressure before disassembly.

Defects caused by the disassembly or replacement of this product or parts are not covered by the warranty.

4.3.1 Precautions for disassembly

- Refer to "1.2 Internal structural drawing" in this Instruction Manual for disassembly.
- Precautions for removing core assembly

  When removing the core assembly from the stuffing, use the spanner engaging part of the core assembly.

  Then, be careful not to apply external force to the piping part of the core assembly.

  Otherwise, piping may be deformed, leading to leakage and malfunction.
- Precautions for removing diaphragm assembly
- When disassembling the plunger assembly, kick spring, or diaphragm assembly, rotate the kick spring clockwise because the kick spring is left-handed.

  Then, for smooth disassembly work, raise the kick spring by the height of one rotation at the top of the shaft and push the end of the kick spring in the direction of rotation.

  Be careful not to permanently deform the kick spring.
- When cleaning parts, use a cleaning solution such as a neutral detergent that causes less pollution.

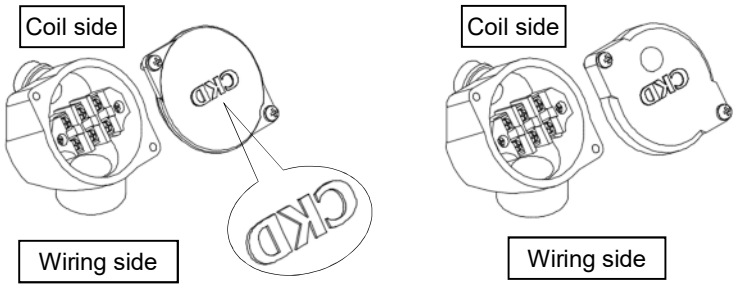
  Note that the rubber parts must be replaced. Otherwise, it may swell.

4.3.2 Precautions for assembly

- To reassemble the parts, follow the opposite procedure to disassembly and ensure to assemble all the parts.
- Assembly of plunger assembly, kick spring and diaphragm assembly
  - Turn the wound end of the kick spring counterclockwise so that it enters the threaded groove of the shaft of the plunger assembly, and attach it as if screwing it in.
  - Follow the same procedure for the pilot valve seat shaft of the diaphragm assembly. Be careful not to permanently deform the kick spring.
- Precautions for assembling stuffing into the body
  - This section applies only to the model ADK21.
  - Make sure the orifice plate is attached to the specified position of the body. The absence of an orifice plate may cause malfunction.
- Precautions for installing the cap

  The cap must be assembled in a specified orientation. When mounting the cap after wiring, etc., be careful of the assembly orientation of the cap. (Orient the cap with the CKD logo directing as shown in the image below.)

  The cap cannot be assembled in the opposite orientation.



- Tightening torque

  Tighten the threaded parts with the torque shown in Table 2.

Table 2. Tightening torque of threaded parts

Part name	Diameter: 15 A/20 A	Diameter: 25 A	Diameter: 32 A/32 F	Diameter: 40 A/40 F/50 A/50 F
Hexagon bolt	5 to 7 N·m	9 to 12 N·m	9 to 12 N·m	15 to 22 N·m
Core assembly	30 to 45 N·m	30 to 45 N·m	80 to 120 N·m	80 to 120 N·m
Nut	8 to 16 N·m	8 to 16 N·m	8 to 16 N·m	8 to 16 N·m

5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate as intended, check the table below for a possible solution.

Problem	Cause	Solution
The valve does not work	The valve is not energized.	Check wiring, fuses, etc., and turn on the power.
	The applied voltage is lower than the voltage fluctuation range.	Check the power supply and apply the rated voltage.
	The fluid pressure is high.	Adjust the pressure so it falls within the fluid pressure range.
	Foreign matter is caught.	Disassemble and clean the valve.
The valve does not recover.	The piping in the pressurization port is wrong.	Connect the piping properly.
	The power is not turned off.	Check the leakage current and correct the circuit to ensure turning off the power supply.
	Foreign matter is caught.	Disassemble and clean the valve.
Leakage to outside has occurred.	The packing or O-ring is worn or damaged.	Replace the part.
	A screw or bolt is loose.	Tighten the screw or bolt.
	The core assembly is loose.	Tighten the core assembly.
Leakage has occurred inside.	The body or pilot valve seat is worn or damaged.	Replace the product.
	The sealing surface of the valve seat or diaphragm is worn or damaged.	Replace the part.
	Foreign matter is caught in the valve seat or diaphragm.	Disassemble and clean the valve.

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, 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:

- 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 this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- 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.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

6.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.
Note that if you select the option "WG," the period will be three (3) years after the delivery or one (1) year after the commencement of use, whichever is shorter.
In addition, when you select the option "WG," the Specifications and drawings must be exchanged.