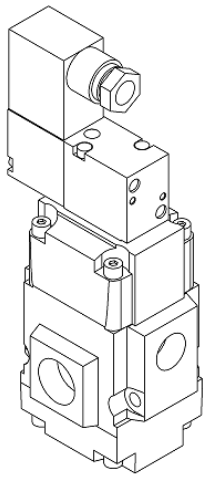
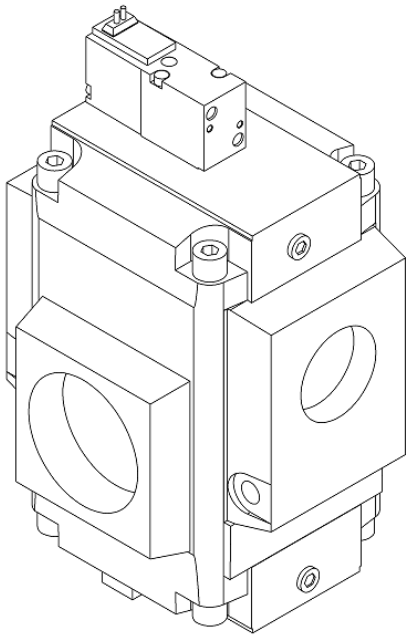
CKD

NP13R Series
NP14R Series
Internal Pilot Solenoid Valve

INSTRUCTION MANUAL

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.





2025-1-7 SM-A97888-A

PREFACE

Thank you for purchasing CKD’s "NP13R Series/NP14R Series" internal pilot solenoid valve.

This Instruction Manual contains basic matters related to the operation of this product 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.

The product, which uses control valves such as solenoid valves, motor valves, and air operated valves, is intended for users who have basic knowledge about materials, fluids, piping, and electricity. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training with respect to 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, make sure that the safety of the machine mechanism of the device, the pneumatic or water control circuit, and the electric system that controls such mechanism is ensured.
To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

- ISO 4414, JIS B 8370, JFPS 2008 (the latest edition of each standard)
- The High Pressure Gas Safety Act, the Industrial Safety and Health Act, other safety rules, organization standards, relevant laws and regulations

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, handling that is not described in this Instruction Manual may lead to an accident. 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.

Some statements classified as "CAUTION" may still lead to serious results depending on the situation.
All statements that follow these labels are important and must be observed.

<Types of warning symbols>

	A general mark indicating a prohibited (not permitted) action.		A mark prohibiting people from touching objects or equipment.
	A mark prohibiting people from putting their fingers into openings.		A general mark warning people of dangers such as electric shock and burns.
	A mark warning people of dangers that occur when starting an automatic equipment.		A general mark indicating that a specific course of action must be taken.
	A mark indicating that an instruction manual must be read carefully.		A mark indicating that the earth terminal must be connected to the ground.

In addition, the following icons indicate general precautions.

- Contains useful information such as general precautions, supplementary information, and reference information.

Precautions on Product Use

WARNING

Do not modify the product or perform additional work on the product.

- Modification or additional work may not only pose a risk of fire or electric shock, but it may also cause the product to fail to satisfy the specifications described in this Instruction Manual.

Do not handle the product or install or remove pipes and devices until confirming safety.

- Inspect and service the machines and devices only after confirming that safety of the entire system related to the product is ensured. Also, turn off the energy source (air supply or water supply) and power to the relevant equipment. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- There may be hot or live parts even after operation has stopped. When performing maintenance on equipment, wear heat-resistant and electric-resistant protective equipment such as gloves and be careful of hot or live parts.
- Before starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

The product must be handled by a qualified person who has extensive knowledge and experience.

- This product is designed and manufactured as a device or part for general industrial machinery and should be handled with care.

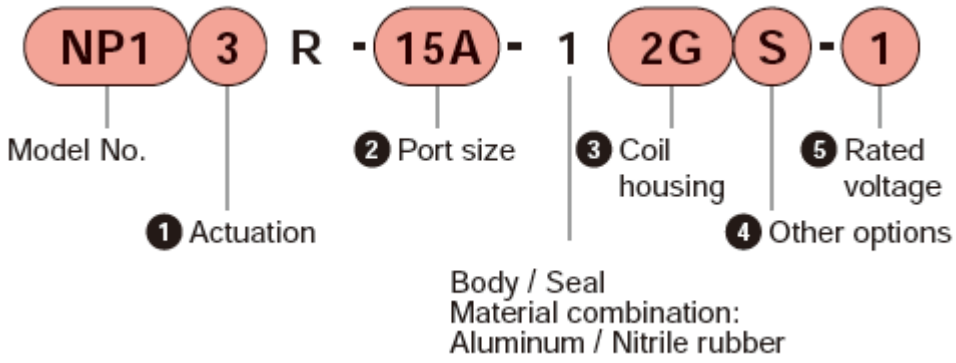
Use the product within the specifications.

- The product must not be used beyond its specifications.
- The product is intended for use as a device or part for general industrial machinery. It is not intended for use under the conditions or in environments listed below. Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.
  - ◎ For use under the conditions or in environments other than those specified or outdoors.
  - ◎ In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
  - ◎ For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
  - ◎ For applications where life or properties may be adversely affected and special safety measures are required.

CONTENTS

1. PRODUCT OVERVIEW

1.1. Model Number Indication



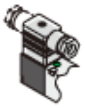
1 Actuation

Code	Description
3	NC (open when energized)
4	NO (closed when energized)

2 Port size

Code	Description
10A	Rc3/8
15A	Rc1/2
20A	Rc3/4
25A	Rc1
32A	Rc1-1/4
40A	Rc1-1/2
50A	Rc2

3 Coil housing

Code	Description		
2C	Standard	Grommet coil	
2G	Option	DIN terminal box (Pg9 thread)	
2H		DIN terminal box with lamp (Pg9 thread)	
3T		With T-type terminal box (G1/2)	
3R		T type terminal box with lamp (G1/2)	

4 Other options

Code	Description
Blank	No option
S	With surge suppressor ✳1

✳1: The surge suppressor is included with the product when the grommet coil is selected. When selecting a coil with terminal box, the surge suppressor is mounted in the terminal box.

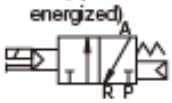
5 Rated voltage

Code		Description
1	Standard	100 VAC (50/60 Hz), 110 VAC (60 Hz)
2		200 VAC (50/60 Hz), 220 VAC (60 Hz)
3		24 VDC
AC110V	Option	110 VAC (50/60Hz)
AC220V		220 VAC (50/60 Hz)

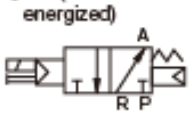
1.2. Specifications

Circuit diagram code

● NC (open when energized)



●NO (closed when energized)



Common specifications

Item		NP13R	NP14R
Actuation		NC (open when energized)	NO (closed when energized)
Fluid pressure supply port		Port P	Port R
Working fluid		Compressed air	
Proof pressure	MPa	1.2	
Working pressure	MPa	0.2 to 0.8	
Fluid temperature	°C	5 to 60	
Ambient temperature	°C	–5 to 60	
Thermal class		Class 130 (B)	
Lubrication		No lubrication (use turbine oil Class 1 ISO VG32 for lubrication)	
Valve seat leakage	cm^3/min	1 or less (at pneumatic pressure 0.2 to 0.8 MPa)	
Valve structure		Internal pilot balance poppet structure	
Mounting orientation		Unrestricted	

Individual specifications

Item / Model No.	Port size P, A ports	Port size Port R	Orifice size (mm)	Response time (ms)	Weight (kg)
NP 13R/14R -10A	Rc3/8	Rc1/2	14.8 or equiv.	30 or less (✱1)	0.7
NP 13R/14R -15A	Rc1/2				0.7
NP 13R/14R -20A	Rc3/4	Rc1	25.4 or equiv.	60 or less (✱1)	1.5
NP 13R/14R -25A	Rc1				1.5
NP 13R/14R -32A	Rc1-1/4	Rc2	41.4 or equiv.	120 or less (✱1)	4.5
NP 13R/14R -40A	Rc1-1/2				4.5
NP 13R/14R -50A	Rc2				4.4

✱1: The response times are values with supply pressure of 0.5 MPa, without lubrication, and with the power ON. They depend on the pressure and the lubricant quality.

Electrical Specifications

Item		NP13R NP14R				
Rated voltage	V	24 DC	100 VAC (50Hz/60Hz) 110 VAC (60 Hz) ✱1	200 VAC (50Hz/60Hz) 220 VAC (60 Hz) ✱1	110 VAC (50Hz/60Hz)	220 VAC (50Hz/60Hz)
Voltage fluctuation range		±10%				
Power consumption	W	1.8	–	–	–	–
Apparent power (when starting)	VA	–	6.8/5.4	6.8/5.4	6.8/5.4	6.8/5.5
Apparent power (when holding)	VA		4.1/3.2	4.2/3.2	4.1/3.2	4.2/3.3

✱1: Rated voltage 100 VAC 50/60Hz can be used at 110 VAC 60Hz, while 200 VAC 50/60Hz can be used at 220 VAC 60Hz.

Flow Characteristics

Model No.	P→A C[dm^3/(s·bar)]	b	S(mm^2)	Q [L/min(ANR)]	A→R C[dm^3/(s·bar)]	b	S(mm^2)	Q [L/min(ANR)]
NC (port P pressurization)								
NP13R-10A	15	0.31	–	3,838	16	0.28	–	4,018
NP13R-15A	18	0.29	–	4,548	17	0.26	–	4,217
NP13R-20A	35	0.27	–	8,735	41	0.21	–	9,877
NP13R-25A	–	–	200	11,758	–	–	210	12,345
NP13R-32A	–	–	600	35,273	–	–	610	35,861
NP13R-40A	–	–	630	37,036	–	–	620	36,448
NP13R-50A	–	–	660	38,800	–	–	630	37,036
Model No.	**R→A** C[dm^3/(s·bar)]	**b**	**S(mm^2)**	**Q [L/min(ANR)]**	**A→P** C[dm^3/(s·bar)]	**b**	**S(mm^2)**	**Q [L/min(ANR)]**
NO (port R pressurization)								
NP14R-10A	15	0.31	–	3,838	15	0.33	–	3,889
NP14R-15A	17	0.30	–	4,323	18	0.31	–	4,606
NP14R-20A	41	0.21	–	9,877	35	0.27	–	8,735
NP14R-25A	–	–	210	12,345	–	–	200	11,758
NP14R-32A	–	–	610	35,861	–	–	600	35,273
NP14R-40A	–	–	620	36,448	–	–	630	37,036
NP14R-50A	–	–	630	37,036	–	–	660	38,800

Note: Formula to calculate sonic conductance C from effective sectional area S is $S=5.0 \times C$.

2. INSTALLATION

WARNING

Consult CKD about the specifications before using the product outside the designated specifications or for a special application.

Prevent water and cutting oil from directly splashing onto the product.

- If water or cutting oil is directly splashed onto the solenoid valve, it may cause the coil to burn out.
- When equipped with a DIN terminal box, this product has a degree of protection equivalent to IPX5. However, this does not guarantee protection of the coil because performance is greatly affected by weather resistance and aging. To prevent direct exposure to water and dust, protect the product by installing it under a cover or inside a paneled casing.
- If there is a possibility that the product may be exposed to spatter during welding, take appropriate protective measures.

Consider measures for dissipating heat generated from the coil.

- Appropriate ventilation or heat dissipation measures must be considered if the product is installed in a control board or needs to be energized for a long period.

CAUTION

Do not paint the product or clean it with water or solvent.

- The resin parts can become damaged and this may lead to a failure or malfunction.

Do not apply a heat insulating material to the coil part.

- If heat insulating material is applied to the coil, it may cause the coil to burn out.

2.1. Environment

WARNING

Do not use the product in the presence of corrosive gas or solvents.
- Do not use the product in an environment where corrosive gases such as sulfur dioxide gas or solvents are present.

Do not use the product in a humid environment.
- Condensation may form on the product due to temperature changes.

Do not use the product in an explosive gas atmosphere.
- The product cannot be used in an explosive gas atmosphere.

CAUTION

Do not use the product in an environment where the valve is subject to vibrations or inertia.

Take measures to prevent dusts from entering the valve.
- In a dusty environment, install a silencer or elbow fitting facing downward on the pilot air exhaust port of the valve to prevent dusts from entering.

Keep the product away from heat-generating equipment and use it in an environment where it is not exposed to radiant heat.

When using the product in cold climates, take appropriate measures against freezing.
- Freezing of the fluid such as water may cause damage to the product.

Install the product where it is not exposed to direct sunlight, ultraviolet rays, water, and rain.
- The product cannot be used outdoors.

2.2. Unpacking

CAUTION

Do not remove the piping port protector and do not take the product out of the plastic bag until immediately prior to performing piping work.

- If the piping port protector is removed or the product is taken out of the plastic bag before ready to begin piping work, foreign matters may enter from the piping ports and cause a 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.

2.3. Mounting

CAUTION

Hold the body firmly when handling and mounting the product.

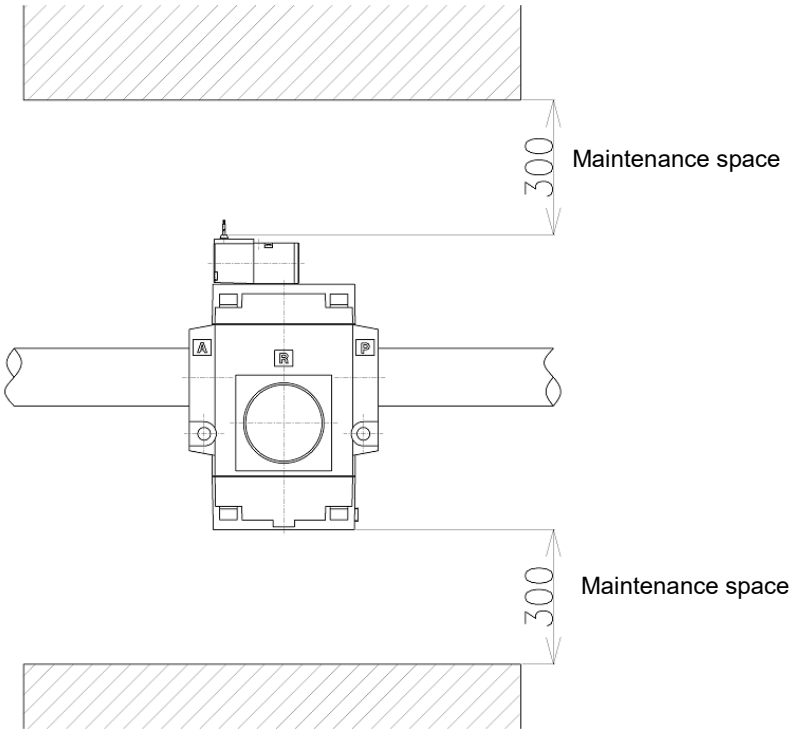
- Do not hold the coil or carry the product by holding the lead wires as it may cause a malfunction.

Do not subject the coil and lead wires to an excessive force when mounting the product.

- Secure sufficient space for working safely during maintenance and troubleshooting (refer to the figure below).
- If the piping is not metal, secure the product in place using the mounting holes provided.
- There is no restriction on the mounting orientation. However, if the coil is mounted facing down, foreign matters in the fluid will more easily stick to the electromagnetic iron core and cause a humming noise and an operation fault. Therefore, it is recommended to mount the product in an orientation other than downward.

1. Ensure sufficient space and secure the product

Hold the body at its width across flats with a spanner wrench, pipe wrench, monkey wrench, or the like, and secure the product by connecting it to piping or using the mounting holes on the front of the body.



2.4. Piping

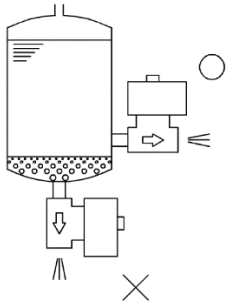
CAUTION

Be careful not to use the wrong supply port or connect to the wrong piping destination.

- Wrong supply port or piping destination may lead to a malfunction or accident.

To prevent the product from malfunctioning or being damaged, observe the following.

- When controlling fluids in a tank, connect the piping slightly above the bottom of the tank.
  If the product is installed at the bottom of the tank, accumulated foreign matter may cause an operation fault.



- Secure the product when retightening or reconnecting the piping.
- Secure and support the pipes to prevent the valve from being subjected to pipe loads and vibrations directly.

Do not apply high pressure suddenly when supplying fluid for the first time after connecting the pipes.

- If the pipes are not secured properly, it may lead to accidents such as pipe disconnection or fluid leakage.

■ Pipe threading

When cutting the threads on the piping, observe the effective thread length of the body and chamfer the tip by about a 1/2 pitch.

■ Pipe cleaning

Before piping, perform flushing with air of more than 0.3 MPa to remove foreign matters such as dust, metal powder, rust, and seal tape.

■ Removal of foreign matters

Remove foreign matters such as dusts in the fluid to prevent causing an operation fault or leakage.
Install a filter of 5 μm or less on the primary side of the valve.

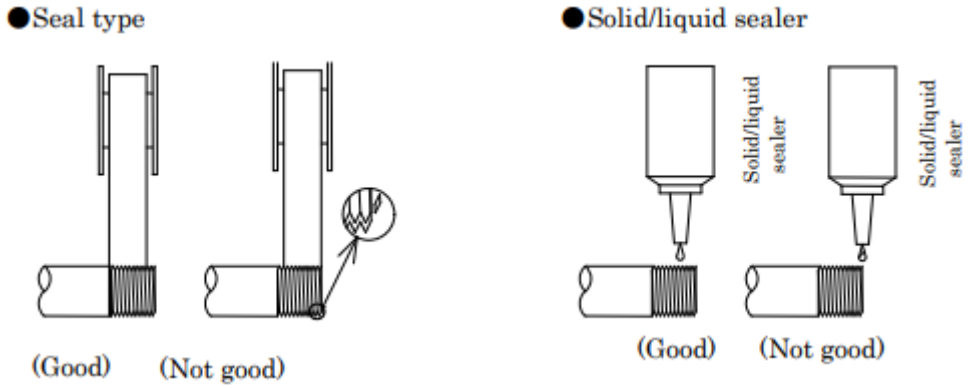
■ Direction of piping connection

Install the piping so that the flow direction of the fluid matches the flow direction (arrow) of the circuit diagram symbol indicated on the product.

■ Seal material

Apply a seal tape or seal material to the screw threads leaving one or two threads at the pipe end uncovered or uncoated.
If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the valve and cause a failure.

- When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.
- When using a liquid seal material, be careful not to apply it to resin parts.
  The resin parts can become damaged and this may lead to a failure or malfunction.
  Also, do not use the seal material excessively or apply it to the internal threads.



■ Tightening

When piping to the valve, secure the body with a wrench or a vise.
Refer to the following table for the tightening torque to be applied when piping.

<Recommended tightening torque for piping>

Port size	Recommended tightening torque (N·m)
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	31 to 33
Rc1	36 to 38
Rc1 1/4	40 to 42
Rc1 1/2	48 to 50
Rc2	54 to 56

■ Lubrication

This valve can also be used without lubrication. Although a lubricator is not required, when lubricating, use Class 1 ISO VG32 turbine oil (additive-free).
If lubrication is stopped in the middle of operation, an operation fault may occur due to the loss of the initial lubricant. Make sure to continuously lubricate the oil so that it does not run out.

■ Minimum operating pressure differential

This valve requires a differential pressure of 0.2 MPa or more to operate.
If the cross-sectional area of the piping at the fluid supply port is reduced, operation may become unstable due to insufficient differential pressure when the valve is actuated.
Use fluid supply port piping with a pipe size that matches the valve port size.

■ Measures against drainage of pilot air

Compressed air contains a large amount of drainage (such as water, oil oxide, tar, and foreign matters). It can significantly reduce the accuracy of pneumatic equipment. To prevent drainage, improve air quality by dehumidifying with an after-cooler dryer, removing foreign matters with a filter, or removing tar with a tar removal filter.

2.5. Wiring

WARNING

Thoroughly read and understand this Instruction Manual before working on electrical wiring.

- The person handling this product must understand the structure and operating principles of solenoid valves and be well informed and capable of ensuring safety.

CAUTION

Check the rated voltage and whether AC or DC is used, and wire properly.

- To prevent the product from malfunctioning or being damaged, observe the items described in this section and wire properly.

■ Protection of electrical equipment

Use a circuit breaker such as a fuse on the control circuit.

- The durability of the solenoid valve can be increased by using a switching circuit that does not cause contact chattering.

■ Wiring of lead wire type product

Use wires with a nominal cross-sectional area of approximately 0.5 mm^2 or more. In addition, do not subject the lead wires to an excessive force.
The conductor size of the lead wire of this product is 20 AWG (cord outer diameter is 2 mm). Use a crimp terminal suitable for the conductor size and make sure to insulate them.

- For this product, even when the rated voltage is DC voltage, the solenoid valve has no (+)/(-) polarity.

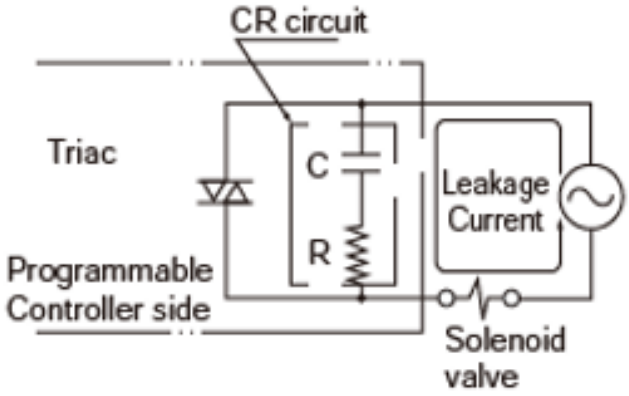
■ Prevention of malfunction of this product and control devices

To prevent this product and control devices from malfunctioning, observe the following.

- Surge voltages generated during the operation of solenoid valves can affect control devices and electrical circuits. In this case, use a solenoid valve that comes with a surge suppressor (coil option) or install a surge absorber in parallel with the solenoid valve.
- Make sure that the leakage currents from other control devices are less than or equal to the allowable value shown below.
  When using a control device such as a programmable controller that incorporates a CR circuit to absorb the surge voltage generated by the switching element, leakage currents from the control device may affect the solenoid valve and cause it to malfunction.

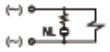
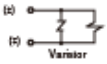
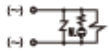
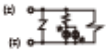
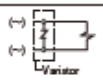
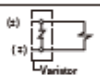
<Allowable leakage current>

Rated voltage	Leakage current
100 VAC	3.0 mA or less
110 VAC	3.0 mA or less
200 VAC	1.5 mA or less
220 VAC	1.5 mA or less
24 VDC	1.8 mA or less



■ Electrical connection circuit diagram for each coil option

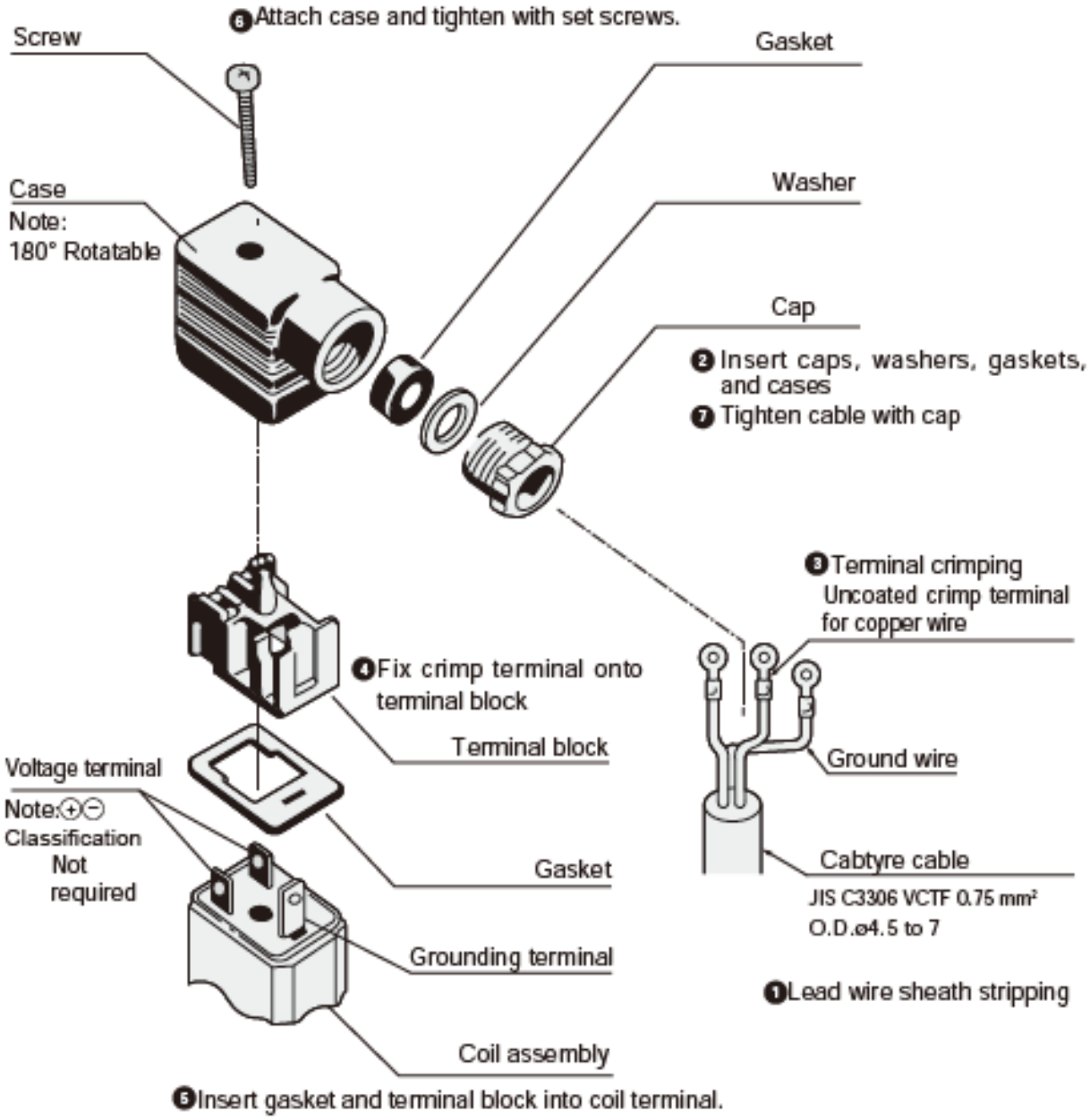
Electrical connection circuit diagram

Option	Wiring circuit		Coil housing
	AC	DC	
–			Grommet coil (2C) DIN terminal box (2G) T-type terminal box (3T)
With indicator lamp			DIN terminal box (2H) T type terminal box (3R)
With surge suppressor			DIN terminal box (2GS) T-type terminal box (3TS)
with surge suppressor and indicator lamp			DIN terminal box (2HS) T-type terminal box (3RS)
Surge suppressor included			Grommet coil (2CS)

2.5.1. How to wire the DIN terminal box

For products which have a DIN terminal box, if the coil option code is "2G" or "2H", refer to this section for wiring.
Use the cabtyre cord described in the following table.

Cord outer diameter	Nominal cross-sectional area
4.5 mm to 7 mm	0.75 mm^2



Wire with steps ❶ to ❼.

1. Strip the lead wire sheath.

Strip the sheath of the lead wires of the cabtyre cord.

- Use an appropriate tool to strip the lead wire sheath so as not to damage the copper wire.

2. Pull in the cabtyre cord.

Insert the cabtyre cord into the cap, washer, gasket, and case.

3. Attach the crimp terminal.

Insert the crimp terminals for copper wires into the lead wires of the cabtyre cord and crimp the terminals.
(Terminal screw size: M3)

- To attach the crimp terminals, use a tool specifically for this purpose.

4. Secure the crimp terminals and ground wire.

Insert the crimp terminals of the lead wires under the terminal screws on the terminal block and tighten the screws with a tightening torque of 0.45 N·m to 0.55 N·m.
Connect the ground wire to the grounding terminal on the terminal block.

5. Insert the gasket and the terminal block into the coil assembly.

6. Attach the case.

Put the case on the terminal block and secure the screw with a tightening torque of 0.45 N·m to 0.55 N·m.
To change the outlet direction of the cord, take the terminal block out of the case, turn it by 180°, and put it into the case.

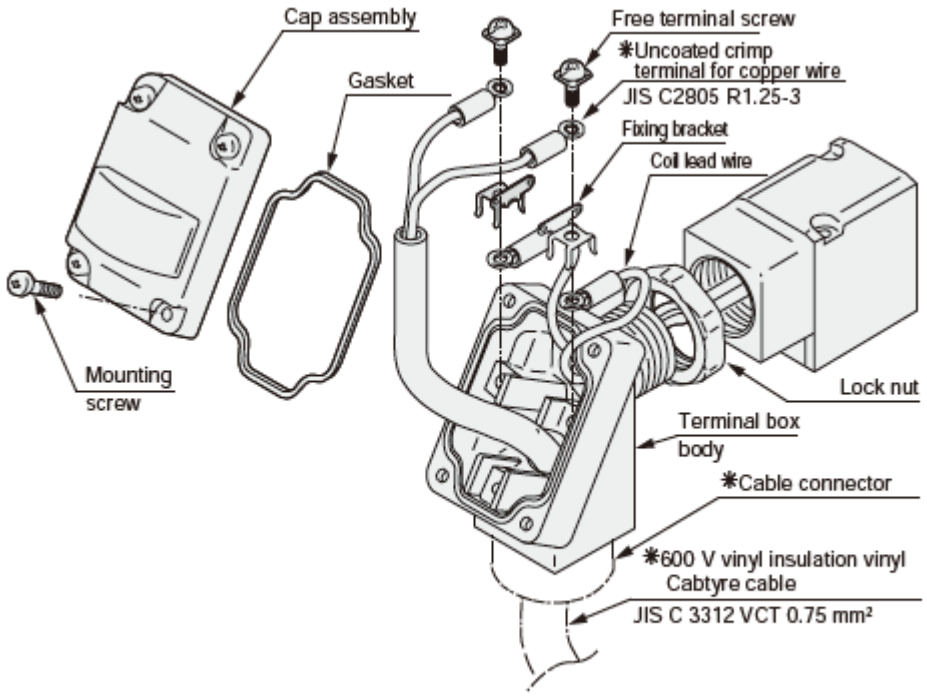
7. Secure the cabtyre cord.

Tighten the cap and secure the cabtyre cord.

2.5.2. How to wire the T-type terminal box

For products which have a T-type terminal box, if the coil option code is "3T" or "3R", refer to this section for wiring.

- Use a cabtyre cord with a nominal cross-sectional area of 0.75 mm^2 to 1.5 mm^2.



✱Parts marked with an asterisk are not included with CKD products.

1. Strip the lead wire sheath.

Strip the sheath of the lead wires of the cabtyre cord.

- Use an appropriate tool to strip the lead wire sheath so as not to damage the copper wire.

2. Pull in the cabtyre cord.

Pass the cabtyre cord through the terminal box body.

3. Attach the crimp terminal.

Insert the crimp terminals for copper wires into the lead wires of the cabtyre cord and crimp the terminals.
(Terminal screw size: M3)

- To attach the crimp terminals, use a tool specifically for this purpose.

4. Secure the crimp terminals.

Insert the free terminal screws into the crimp terminals, the fixing brackets, and the terminals of the coil lead wires, in that order, and tighten the screws with a tightening torque of 0.45 N·m to 0.55 N·m.

5. Attach the gasket and the cap assembly.

Place the gasket and cap assembly over the terminal box body and tighten the mounting screws with a tightening torque of 0.45 N·m to 0.55 N·m.

2.5.3. How to change the orientation of the T-type terminal box

To change the orientation of the T-type terminal box, follow the procedure below.

1. Loosen the terminal box.

Place a spanner wrench (or a similar tool) on the terminal box body at its width across flats (where the width is 25) and turn it counterclockwise by 1/2 turn to loosen the terminal box.

2. Loosen the lock nut.

3. Temporarily fasten the terminal box.

Rotate the T-type terminal box in the tightening direction (clockwise) until it is approximately 15° from the desired position.
When rotating the T-type terminal box further in the clockwise direction from the factory default position, it should not be rotated more than 1/2 turn.

4. Tighten the lock nut.

Tighten the lock nut clockwise by hand toward the coil until it is lightly tightened.

5. Fully tighten the terminal box.

Place the spanner on the terminal box body at its width across flats, rotate the terminal box to the desired position (approximately 15°), and then tighten.

3. USAGE

WARNING

Do not use the product as a valve for ensuring safety such as an emergency shut-off valve.

- The product is not designed to be used as a valve for ensuring safety such as an emergency shut-off valve. If using the product for such a system, take appropriate measures in advance to secure safety.

Do not use fluids other than those specified in the Specifications.

- Take appropriate measures specific to the fluid, such as installing a filter in the fluid circuit to remove contaminants.
  If the quality of the working fluid is poor, for example, if it contains fine particles, sludge, or foreign matters, the durability of the rod packing will decrease significantly. If the sealing performance of the rod packing is lost, fluid may leak into the cylinder, flow back through the pilot air piping, and damage equipment in the air circuit.
- The piston rod sealing part of the cylinder valve is coated with grease. Make sure that the system will not be affected by grease mixing with the working fluid.

Do not touch the coil and the actuator while the product is energized.

- There is a risk of burns.

Do not touch the electrical wiring connections (such as crimp terminals and terminal screws) while the product is energized.

- There is a risk of electric shock.

Take necessary measures in advance so that people and objects will not be adversely affected in the event of a failure of the product.

CAUTION

Use the fluid temperature, ambient temperature, and working pressure within the specified range.

Be careful not to clog the filter.

3.1. Checks to Make Before Use (Checks Made After Mounting)

WARNING

Make sure to turn off the power and remove the fluid and the pressure in the piping before performing checks.

- Failure to do so may result in electric shock or injury.
  If it is necessary to perform checks while the product is energized and in an operating condition, be careful not to get an electric shock or injured by the fluid or residual pressure.

■ Appearance check

Check the following:

- Check that the valve is securely fixed to the piping by pressing it by hand.
- Check that the threaded parts such as bolts, nuts, and screws are not loose.
- Check that the piping and wiring are installed correctly.

■ Leakage check

Pressurize the fluid to check for leakage from the piping connection.

- It is recommended to check for leakage by supplying compressed air (0.3 MPa to 0.5 MPa) and applying soapy water to see if bubbles form.

■ Electricity check

Check the power supply voltage.

- Keep the voltage fluctuations within ±10% of the rated voltage range.
  Using the product beyond the voltage fluctuation range may cause an operation fault or damage to the coil.

Check the insulation resistance.

- Measure the insulation resistance between a non-live metal part mounted to the solenoid valve and a bare live part such as a lead wire. Check that the insulation resistance is 100 MΩ or more with 500 VDC megger.

■ Operation check

Apply the rated voltage and pressurize the working fluid to check if the solenoid valve performs opening and closing movement properly.

3.2. Safety Instructions

CAUTION

Do not stand or put a heavy object on the solenoid valve.
- It may cause injury, accident, or damage to the solenoid valve.

Do not hold the solenoid valve when carrying the product.
- It may cause the product to fall, cause an accident, or damage the solenoid valve.

Do not carry the solenoid valve by holding the lead wires and cables connected to the terminal box.
- It may cause disconnection or failure.

When storing the product, keep it packaged in the individual package box.
- Storing valves out of their individual package box can cause foreign matters to enter the valve.

- If the product has not been used for seven days or more, the initial response time may be delayed. Perform a trial run before starting operation.
- When an abnormality is found, refer to "5 TROUBLESHOOTING".
- Contact CKD before operating the product continuously for one month or more, or operating the product infrequently (such as once a month). It is a commonly accepted concept that solenoid valves are operated several times a day, and periodic inspections (at least once a month) are recommended by safety standards for equipment such as gas industrial furnaces. Even when using the product with continuous energization, it is recommended to perform periodic inspection at least once a month.
- If the energization time of the pilot solenoid valve is short, the valve operation may not be able to follow (respond).
- To eliminate the exhaust noise from the pilot solenoid valve, install a silencer (port size: 6A) to the exhaust port.

■ Operation frequency

Refer to the table below for operation frequency.

Port size	Operation frequency
10A, 15A	360 times/min or less
20A, 25A	180 times/min or less
32A, 40A, 50A	90 times/min or less

3.3. Manual Operation

CAUTION

After performing manual operation, make sure that the manual shaft has returned to its original position.

When pushing down on the manual shaft, push it down straight and parallel to the center.

- Failure to do so may result in an operation fault or damage to the manual shaft.

To use this product in manual operation (non-locking), follow the procedure below.

1. Pressurize the fluid.

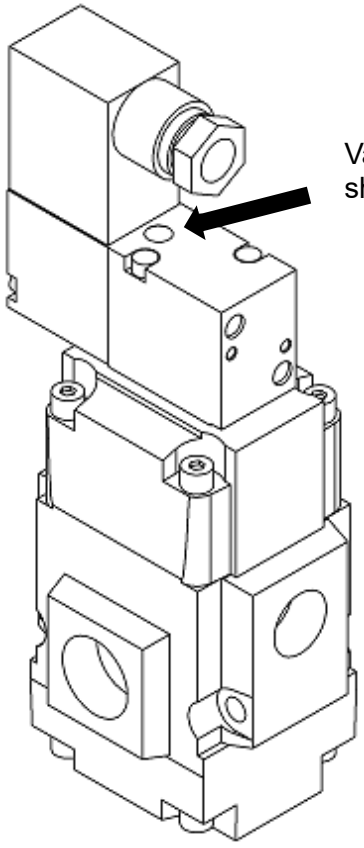
Pressurize the fluid to the product.

2. Push down on the manual shaft.

While the manual shaft is pushed and held down, the valve is in the same state as when energized and operates.
When the manual shaft is released, the valve returns from the operating state.

3. Check the position of the manual shaft.

Make sure that the manual shaft is in its original position.



Valve operates while the manual shaft is pushed and held down.

4. MAINTENANCE AND INSPECTION

WARNING

Make sure to turn off the power and remove the fluid and the pressure in the piping before performing maintenance.
• Failure to do so may result in electric shock or injury.

4.1. Maintenance Parts

Maintenance Parts	General rule for when to make replacements
Actuator assembly kit	Replace it when an abnormality such as electrical failure, leakage, or delay in operation is found. Replace all parts included in the set at the same time. As a rule of thumb, replace it after 10 million operations.
Valve stem kit	Replace it when an abnormality such as leakage, sticking of the valve, or delay in operation is found while using the product. Replace all parts included in the set at the same time. As a rule of thumb, replace it after 10 million operations.
Valve seat kit	
Spring kit	
Body packing kit	
Packing kit	

4.2. Periodic Inspection

In order to use the product under optimum conditions, perform periodic inspections every six months.
For the inspection details, refer to "3.1 Checks to Make Before Use (Checks Made After Mounting)" in this Instruction Manual.

4.3. Disassembling and Assembling

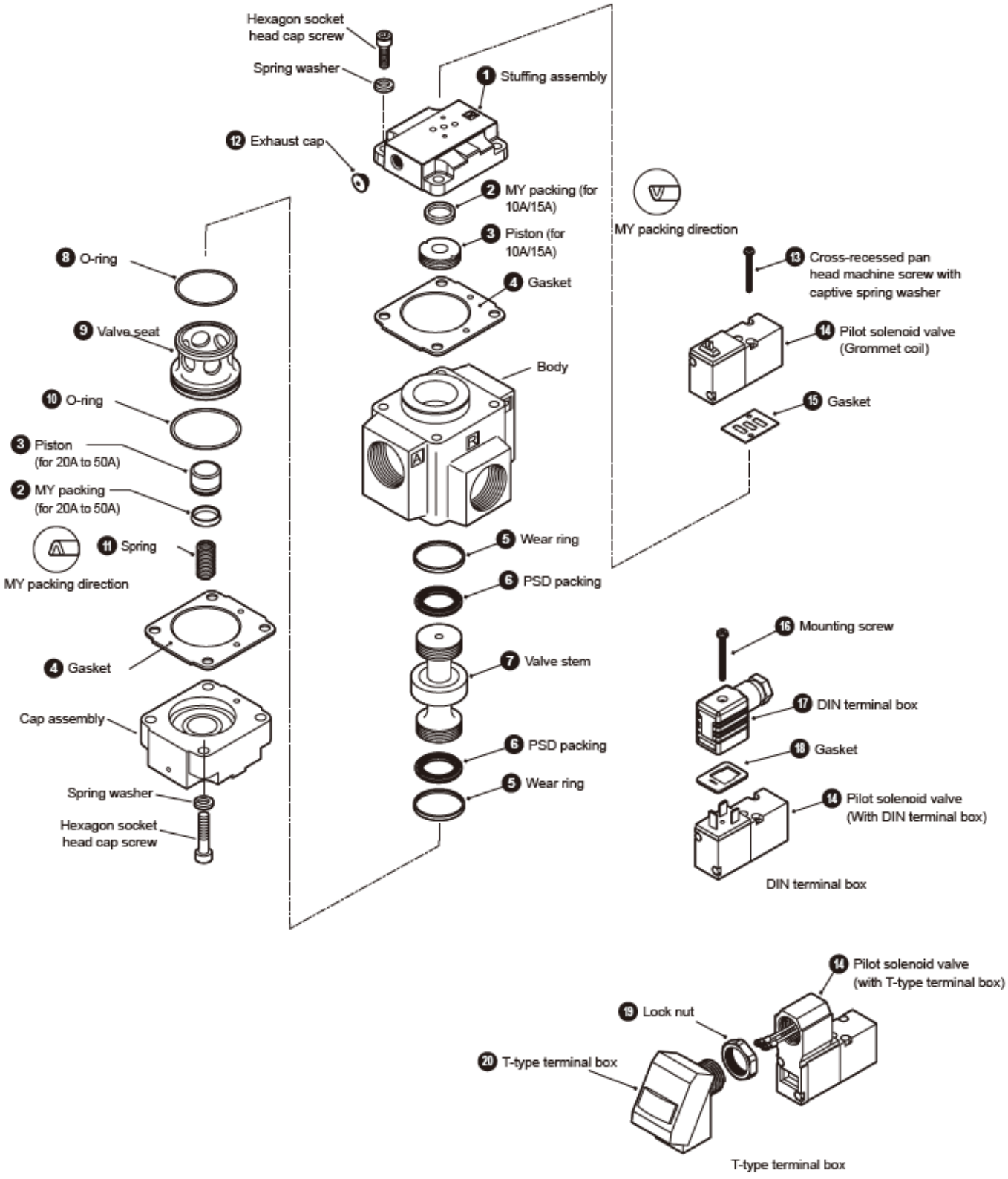
WARNING

Turn off the power before disassembling and assembling.
- Working with the power turned on may cause an electric shock.

Close the main cock and discharge the fluid in the valve before disassembling.
When disassembling the product, be careful of the springs as they may pop out.
- Failure to do so may result in injury. See "Exploded view" for the location of the springs.

- Faults caused by disassembly or replacement of the product or parts are not covered by the warranty.
- There is a specific orientation for assembling the MY packing and gasket. Assemble them in the correct orientation.
- After assembling, perform a trial run to check that there is no abnormality such as leakage or operation fault.

<Parts Expanded View>



4.3.1. Disassembling

1. Loosen the hexagon socket head bolts on the stuffing side.

2. Lift the stuffing up.

3. Loosen the hexagon socket head bolts on the cap side.

Loosen the hexagon socket head bolts on the cap side. When doing so, be careful not to lose the spring inside.

- When cleaning parts, use a neutral detergent or other cleaning solution that has minimal impact on the environment. Do not use organic solvents as they may cause swelling or deterioration of rubber parts and resin parts.
- Replace the rubber parts if they are noticeably dirty or deteriorated.

4.3.2. Assembling

1. Apply grease to sealing parts.

Apply grease to packings and O-rings.
Use G-40H silicone grease (manufactured by Shin-Etsu Chemical Co., Ltd.).

2. Apply grease to sliding surfaces.

Apply grease to the packing sliding surfaces of the body, piston, and valve seat.

3. Insert the valve stem from under the body.

4. Insert the valve seat into the body.

5. Tighten the hexagon socket head bolts on the cap side.

Attach the gasket, piston, spring, and cap, and tighten the hexagon socket head bolts with the tightening torque shown in the table below.
When doing so, make sure to align the holes in the gasket with the holes in the body and cap.

6. Tighten the hexagon socket head bolts on the stuffing side.

Attach the stuffing and tighten the hexagon socket head bolts with the tightening torque shown in the table below. Again, note the position of the holes in the gasket.

7. Make sure that there is no leakage.

Apply fluid pressure and make sure that there is no leakage.

8. Turn on the power and put the fluid circuit in service.

<Recommended tightening torque>

Port size	Screw size	Recommended tightening torque (N·m)
10A, 15A	M4	1.8 to 2.2
20A, 25A	M6	7 to 11
32A, 40A, 50A	M8	16 to 20

4.4. Precautions on Product Disposal

CAUTION

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

5. TROUBLESHOOTING

5.1. Problems, Causes, and Solutions

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

- If the problem is not resolved even after conducting inspections and taking corrective actions, contact your nearest CKD sales office or distributor.

Problem	Cause	Solution
Valve does not operate.	Valve is not energized.	Check the wiring, fuse, etc., and turn on the power.
	Applied voltage is lower than the voltage fluctuation range.	Check the power and input the rated voltage.
	Fluid pressure is too high.	Adjust it to be within the specified range.
	Fluid pressure is too low.	Adjust it to be within the specified range.
	Pressure drop during operation is large.	If the piping at the fluid supply port is reduced too much, adjust the piping size to match the valve.
	Pilot solenoid valve does not operate.	Replace the pilot solenoid valve.
	Foreign matter is stuck in the valve stem.	Disassemble the valve and clean its inside.
	Gasket orientation is reversed.	Disassemble and reassemble the valve.
Valve does not return to its original position.	Power is not turned off.	Check for leakage current and correct the circuit to make sure that the power turns off properly.
	Pilot solenoid valve does not return to its original position.	Replace the pilot solenoid valve.
	Foreign matter is stuck in the valve stem.	Disassemble the valve and clean its inside.
	Gasket orientation is reversed.	Disassemble and reassemble the valve.
	Packing is out of grease.	Disassemble the valve and clean and grease the inside.
There is external leakage.	Fluid pressure is too high.	Adjust it to be within the specified range.
	There are abrasions and scratches on the packing or O-ring.	Disassemble the valve to replace the packing and the O-ring.
	Bolts are loose.	Tighten the bolts.

Problem	Cause	Solution
There is internal leakage.	Fluid pressure is too high.	Adjust it to be within the specified range.
	There are abrasions and scratches on the valve seat of body.	Replace the product.
	There are abrasions and scratches on the sealing surface of valve seat.	Replace the valve seat.
	There are abrasions and scratches on the rubber or sealing surface of valve stem.	Replace the valve stem.
	Foreign matter is stuck in the valve stem.	Disassemble the valve and clean its inside.

6. STANDARDS COMPLIANCE

Products that bear the CE marking conform to European standards.
This product is a component to be incorporated into the customer's equipment, and the CE marking affixed to the product itself indicates that CKD has declared conformity to the following directive(s) under our limited conditions. If the customer incorporates this product into a piece of equipment and ships it to or uses it within the European Economic Area as a final product, it is the responsibility of the customer to confirm compliance with the EU Directives.

6.1. EU Directives/European Standards

- EMC Directive: 2014/30/EU
  EN 61000-6-2:2005
- Low Voltage Directive: 2014/35/EU
  DIN VDE 0580:2011

6.2. Precautions for Use in Europe (EU Member States)

WARNING

For CE compliance, use the product under the following conditions.

- DC voltage type product should have measures against lightning surges implemented on the device system side.

7. WARRANTY PROVISIONS

7.1. 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 use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
- 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 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.

7.2. Warranty Period

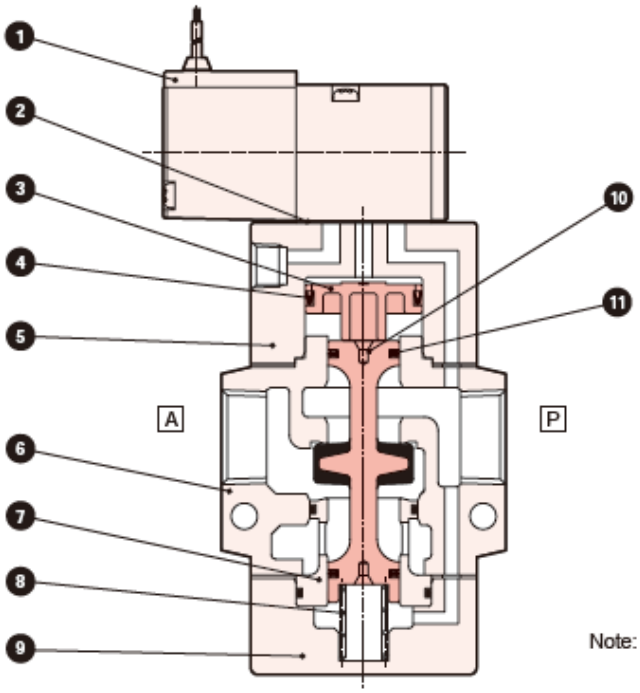
The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

8. REFERENCE INFORMATION

8.1. Internal Structure

8.1.1. NP1☐R Series (10A, 15A)

● NP $^{13}_{14}$ R-10A / 15A

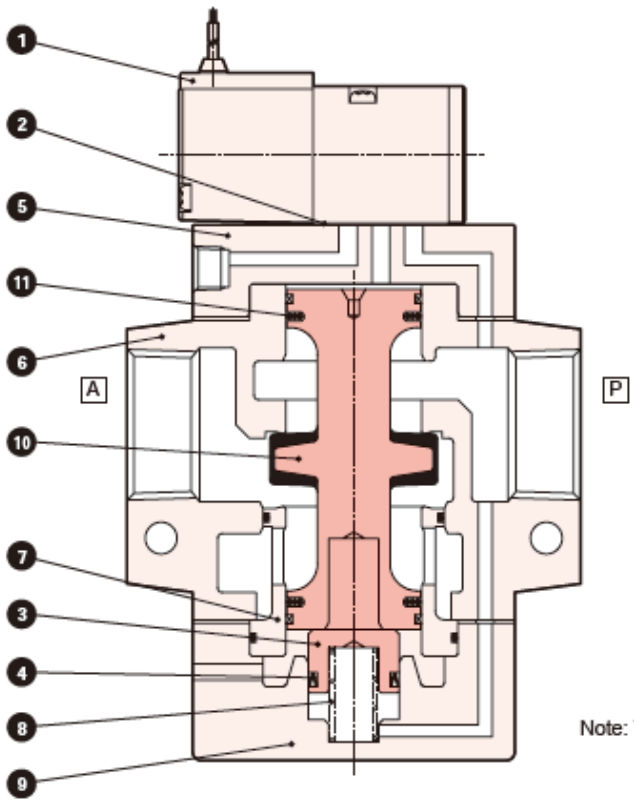


Note: The figure shows NP13R.

Part No.	Part name	Material		Part No.	Part name	Material	
1	Pilot solenoid valve	–	–	7	Valve seat	C3604	Brass
2	Gasket	NBR	Nitrile Rubber	8	Spring	SUS304	Stainless steel
3	Piston	POM	Acetal resin	9	Cap	AC4C	Aluminum casting
4	MY packing	NBR	Nitrile Rubber	10	Valve stem	NBR, A2017	Nitrile Rubber, Aluminum
5	Stuffing	AC4C	Aluminum casting	11	Packing	NBR	Nitrile Rubber
6	Body	AC4C	Aluminum casting				

8.1.2. NP1☐R Series (20A to 50A)

● NP $^{13}_{14}$ R-20A to 50A



Note: The figure shows NP13R.

Part No.	Part name	Material		Part No.	Part name	Material	
1	Pilot solenoid valve	–	–	7	Valve seat	C3604	Brass
2	Gasket	NBR	Nitrile Rubber	8	Spring	SUS304	Stainless steel
3	Piston	POM	Acetal resin	9	Cap	AC4C	Aluminum casting
4	MY packing	NBR	Nitrile Rubber	10	Valve stem	NBR, A2017	Nitrile Rubber, Aluminum
5	Stuffing	AC4C	Aluminum casting	11	Packing	NBR	Nitrile Rubber
6	Body	AC4C	Aluminum casting				