Discontinue

CKD

SM－10983－A

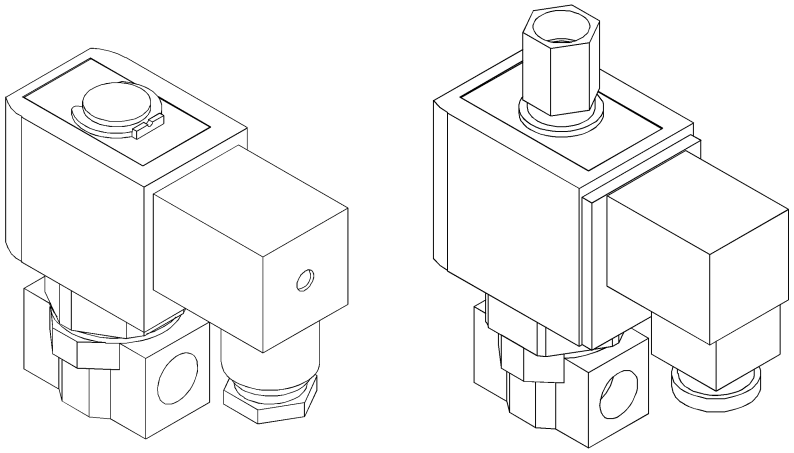
INSTRUCTION MANUAL

JUST FIT VALVE

(Solenoid valve for water)

FWB Series

FWG Series



- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

Ver.2

CKD Corporation

Safety precautions

When designing and manufacturing a device using CKD products, the manufacturer is obligated to manufacture a safe product by confirming safety of the system comprising the following items:

- Device mechanism
- Pneumatic or water control circuit
- Electric control that controls the above

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

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

2. Use this product within its specifications.

This product cannot be used beyond its specifications. Additionally, the product must not be modified or machined.
This product is intended for use in general industrial devices and parts. Use beyond such conditions is not considered. Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environments. In any case, measures for safety shall be provided when the vavle malfunctions.

① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
② Use for applications where life or assets could be adversely affected, and special safety measures are required.

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

ISO4414, JIS B 8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, standards and regulations, etc.

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

① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
② Note that there may be hot or charged sections even after operation is stopped.
③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Release any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that system safety, such as pop-out prevention measures, is secured.

5. Observe warnings and cautions on the pages below to prevent accidents.

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

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

⚠ WARNING : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

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

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Precautions with regard to guarantee

- **Guarantee period**

The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

- **Guarantee coverage**

If any failure for which CKD CORPORATION is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD CORPORATION.

However, the guarantee excludes following cases:

① Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.
② Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.
③ Failure resulting from wrong use of the product.
④ Failure resulting from modification or repairing that CKD CORPORATION is not involved in.
⑤ Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.
⑥ Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products. Any other damage resulting from failure of the delivered products is not covered by this guarantee.

- **Confirmation of product compatibility**

Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

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1. Unpacking

⚠ CAUTION	Do not take off the port protection until just before piping. Otherwise, foreign matter enters the valve and cause malfunction or bad operation.

(1) Check that the model No. shown on the name plate of the product is the same with what you ordered.
(2) Check that the product has no external damages.
(3) When storing the product, keep the product inside the packing box to prevent the intrusion of foreign matter to the valve. Take out the valve when piping.

2. Installation

⚠ WARNING	Contact CKD if the product is to be used beyond specifications, or in special applications.

2. 1 Conditions for installation

⚠ WARNING	a) Do not splash liquid such as water or lubricating oil. Otherwise, liquid splashed on the coil causes the coil to burn. Protection Rating for the DIN Terminal Box type is equivalent to IPX5. However, we do not guarantee protection against continuous pouring of water. Protective measure shall be taken such as covering, or valve installation inside a panel. Protective measure shall be taken against welding spatter. b) The coil generates heat. ・ If the product is to be installed inside a control panel, or if energizing time is long, provide ventilation measures. Temperature around the product will be high. c) The product can not be used in a corrosive or solvent environment. d) Avoid humid environments, since condensation may occur with change in temperature. e) The product cannot be used in an explosive gas atmosphere. In such atmosphere, use our explosion-proof valve. f) Use the product away from radiant heat.

(1) Provide appropriate measures to prevent the product from freezing at cold places.
(2) The product cannot be used outdoors. Protective measure shall be taken such as covering, or valve installation inside a panel.
Please consult us if installation of cover or panel is not possible.
(3) Do not wash the product with water or solvents. Do not paint the product. Resin material used in the product may break down.
(4) Do not use the product under vibration or inertia.

2. 2 Installation method

⚠ CAUTION	a) Read this instruction manual thoroughly and understand the contents before installing the product. b) Always take hold of the body portion when handling and mounting the product. c) Confirm leakage from the piping after installation.

(1) Mounting posture is unrestricted.
However, avoid positioning the coil side down, since foreign matter in the fluid accumulates around the plunger and result in beat sounds and malfunction.

(2) Provide enough space for safe maintenance and troubleshooting work.

2. 3 Piping method

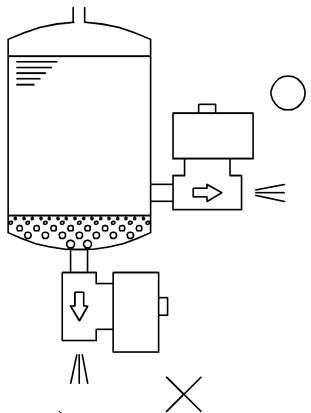
⚠ CAUTION	a) When piping or re-piping, fix the product. b) Fix and provide appropriate support to the piping, so that the weight and vibration of the piping will not directly be applied to the product. c) When piping is finished and fluid is to be flown, supply pressure gradually. ・If the piping is improper, the piping may disconnect or the fluid may leak.

(1) Cleaning the piping

・Before piping, flush the piping with compressed air 0.3MPa or more to remove foreign material such as dust, metal powder, rust and sealing material.

(2) When installing the product on a drain circuit of a tank

・When installing the product to control drain from a tank, do not install the product at the bottom of the tank. Otherwise, foreign matter accumulated at the bottom of the tank enters the product and cause malfunction. Install the product a little above the tank bottom. (Refer to Figure 1.)



(Figure 1.) Drain circuit from the tank

(2) Removal of foreign matter

・Foreign matter such as dust in the fluid causes malfunction and leakage.
When the fluid is water, attach a strainer 80 mesh or finer to the primary side of the valve to remove foreign matter.

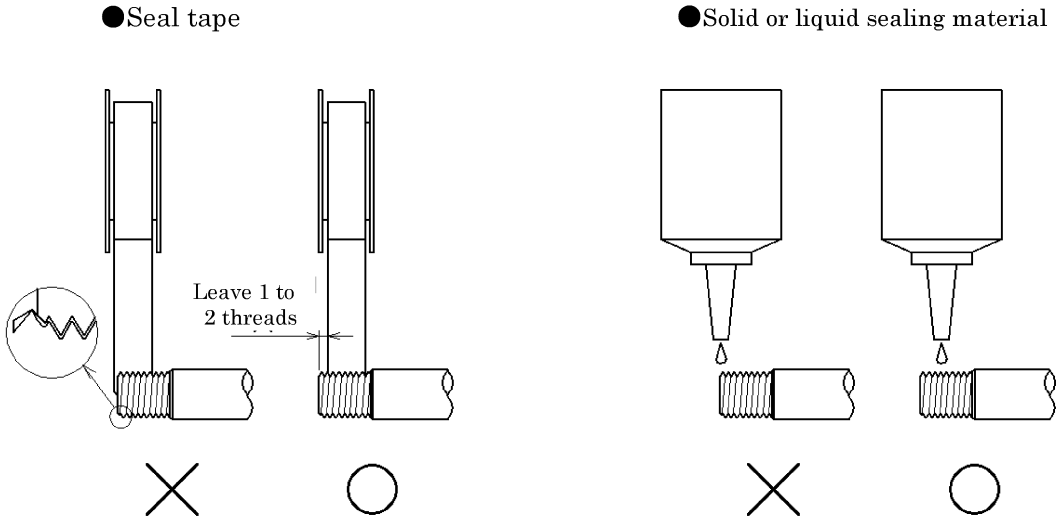
(3) Piping

・Make sure that the piping port is correct.
If the supply port is not clear, refer to the product model number and the JIS symbol in the catalogue.

・When piping to the Socket (“NO” side) of the 3-port valve (Model: FWG), fix the Socket with a tool such as an adjustable spanner.

(4) Sealing material

・When using sealing material, make sure the sealing material do not enter the piping. Also, make sure there is no external leakage. When taping seal tape to the pipe thread, leave 1 to 2 threads at the tip without taping.
Also, when using liquid sealing material, leave 1 to 2 threads at the tip without sealing material. Do not apply too much sealing material on the thread. Do not apply sealing material to the internal thread (refer to figure 2.).



(Figure 2.)How to apply sealing material

(5) Tightening

・Refer to Table 1. for the recommended port tightening torque.

Table 1. Recommended port tightening torque

Port size	Recommended tightening torque
Rc1/8	18 to 20 N･m
Rc1/4	23 to 25 N･m
Rc3/8	31 to 33 N･m
Rc1/2	41 to 43 N･m

(6) Insulation cover of the piping

・When placing an insulation cover to the piping conveying fluids such as hot water, structure the insulation cover so that it can be easily detached at the time of maintenance.

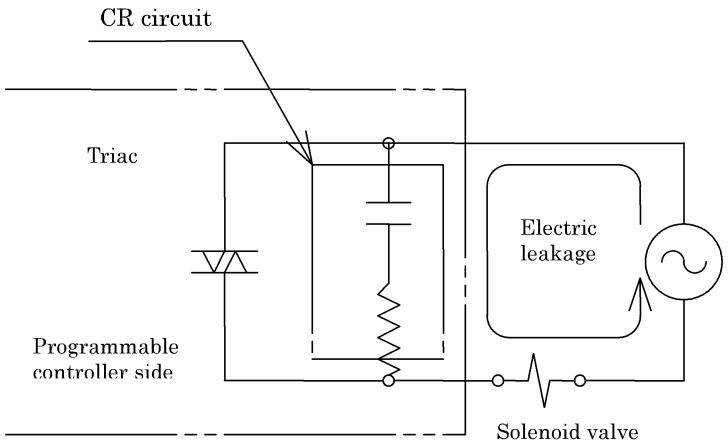
・Do not insulate the coil portion of the solenoid valve.

2. 4 Wiring

⚠ CAUTION	Read this instruction manual thoroughly and understand the contents before wiring the product. ・You need to understand the structure and the operation principle of the solenoid valve. You additionally need knowledge to secure safety.

⚠ CAUTION	a) Confirm the voltage and the alternating or direct current type. b) To prevent unintended operation caused by electric leakage of other control components, confirm electric leakage. ・When using a control circuit such as a programmable controller, the solenoid valve may operate without intention because of the electric leakage from the control components. ・When using this product, keep the electric leakage from other components below the value shown in the table below.

Model	Rated voltage	Electric leakage
FWB2 FWG2	AC100V	3mA or less
	AC200V	1.5mA or less
	DC12V	2mA or less
	DC24V	1mA or less
FWB3 FWG3 FWB4 FWG4 FWB5 FWG5	AC100V	6mA or less
	AC200V	3mA or less
	DC12V	2mA or less
	DC24V	1mA or less



(1) Maintenance of the electric equipment

・To maintain the electric equipment, install a breaker such as a fuse in the control circuit side.

(2) Wiring of the lead wire type

・For wiring, use wire with nominal cross-sectional area 0.5mm² or larger. Additionally, take care not to apply too much force on the lead wire.

There is no polarity for DC coils.

(3) Wiring of the DIN terminal box (Pg9) type・・・・Model: FWB2, FWG2

・Refer to figure 3. when wiring the DIN terminal box (Pg9) type.

① Use the following cabtire cable. Cable outer diameter: φ4.5-φ7; Nominal cross-sectional area:0.5-1.5mm²

② Pass the cabtire cable through the Cap, Washer, Gasket, and Case.

③ Put bare crimp terminal on the lead wire of the cabtire cable and crimp the terminal.

④ Fix the crimp terminal of the lead wire on to the screw of the gland.

Gland screw tightening torque: 0.5 N・m

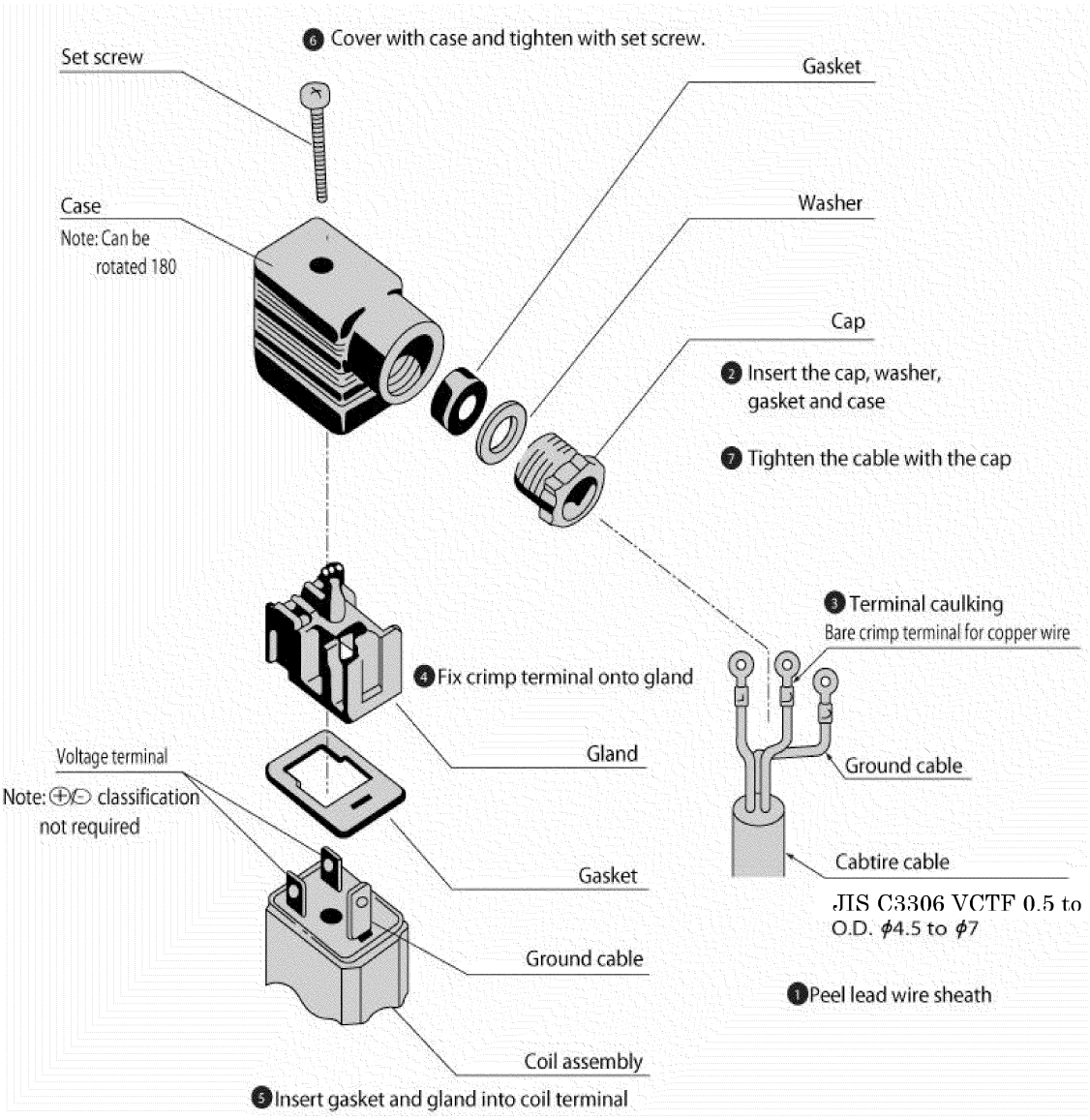
Connect the ground cable to the ground cable on the gland.

⑤ Cover the Case onto the gland, and tighten the Case with the Set Screw.

Set screw tightening torque: 0.5 N・m

The case can be rotated every 180°.

⑥ Tighten the Cap onto the Case.



(Figure 3.) Wiring of the DIN terminal box (Pg9)

(4) Wiring of the DIN terminal box (Pg11) type

・・・・Model: FWB3, FWB4, FWB5, FWG3, FWG4, FWG5

・Refer to figure 4. when wiring the DIN terminal box (Pg11) type.

① Use the following cabtire cable. Cable outer diameter: φ6-φ10; Nominal cross-sectional area: 0.75-1.5mm^2

② Pass the cabtire cable through the Cap, Washer, Gasket, and Case.

③ Put bare crimp terminal on the lead wire of the cabtire cable and crimp the terminal.

④ Fix the crimp terminal of the lead wire on to the screw of the gland.

Gland screw tightening torque: 0.5 N･m

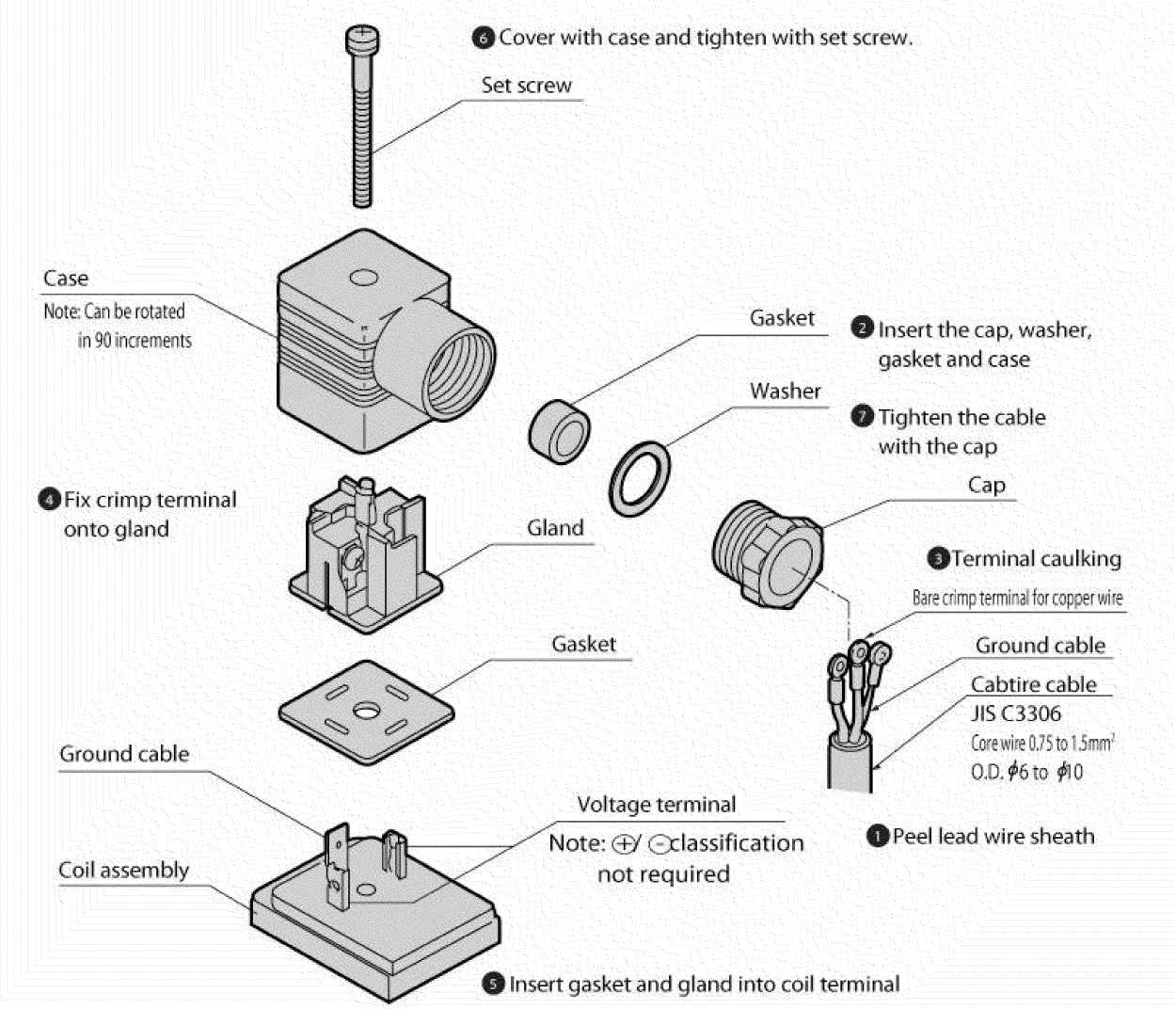
Connect the ground cable to the ground cable on the gland.

⑥ Cover the Case onto the gland, and tighten the Case with the Set Screw.

Set screw tightening torque: 0.5 N･m

The case can be rotated every 90°.

⑥ Tighten the Cap onto the Case.



(Figure 4.) Wiring of the DIN terminal box (Pg11)

(5) Wiring the T type terminal box (G1/2), T type terminal box with lamp (G1/2) types

····Model:FWB3, FWB4, FWB5, FWG3, FWG4, FWG5

・Refer to figure 5. when wiring the T type terminal box (G1/2), T type terminal box with lamp (G1/2)

①Use the cabtire cable with nominal cross-sectional area of 0.75-1.5mm².

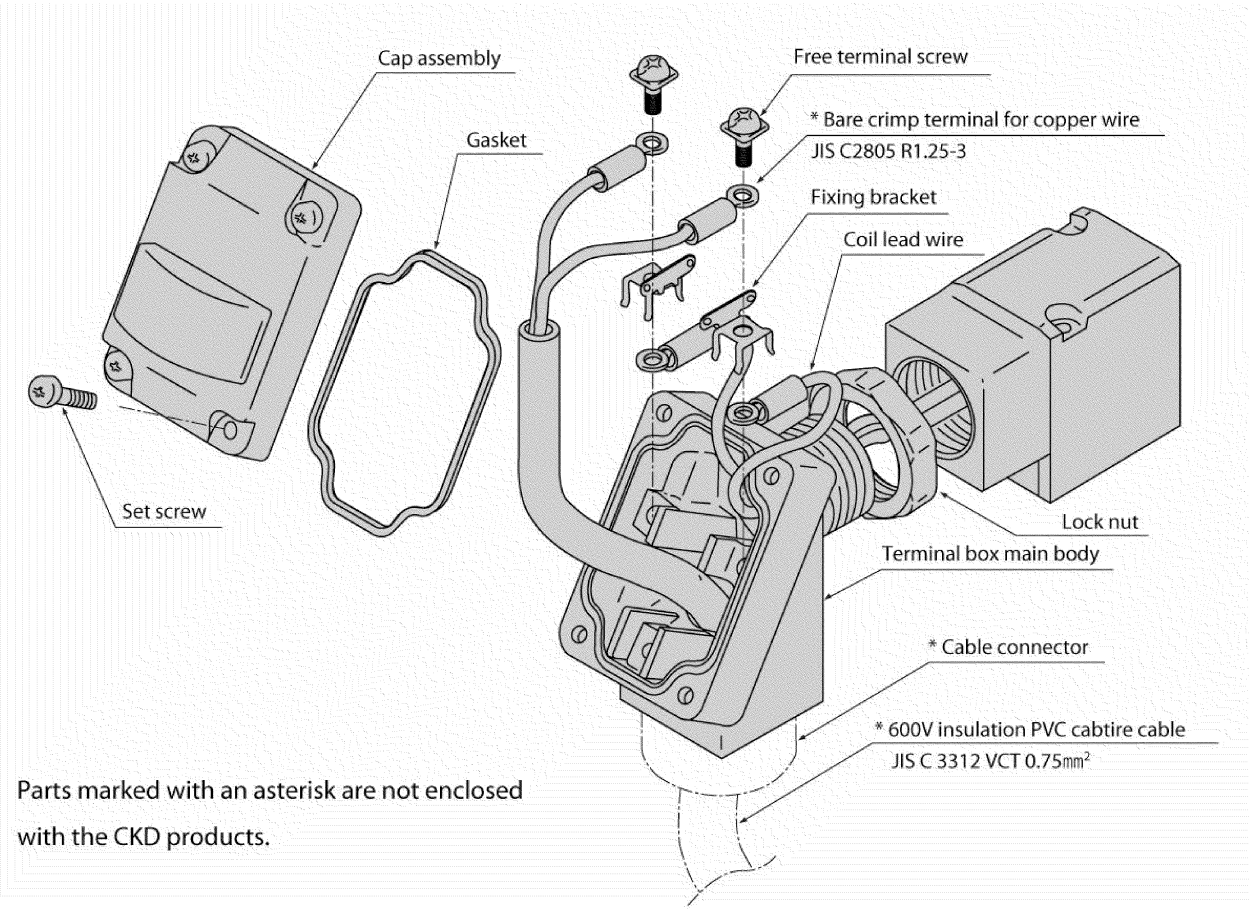
②Pass the cabtire cable through the main body of the terminal box.

③Put the bare crimp terminal on the lead wire of the cabtire cable and crimp the terminal.

④Tighten the free terminal screw with tightening torque 0.5 N･m, and fix the coil lead wire, fixing bracket, and bare crimp terminal in that order.

There is no (+) (-) polarity for T type terminal box, T type terminal box with lamp.

⑤After wiring is complete, confirm that the Gasket is attached properly. Then, assemble the Cap Assembly, and tighten the Set Screw with tightening torque 0.5 N･m.



(Figure 5.) Wiring the T type terminal box (G1/2), T type terminal box with lamp (G1/2)

(6) Changing the orientation of the T type terminal box

Follow the steps below to change the orientation of the T type terminal box from the initial position.

①Hold the opposing two flat sides (width 25) on the terminal box main body with a tool such as an adjustable wrench. Turn it counterclockwise to loosen the screw.

②Loosen the Lock Nut.

③Turn the terminal box clockwise to 15° before the intended tightening orientation.

④By hand, tighten the Lock Nut to the direction of the coil.

⑤Grip the opposing two flat sides (width 25) of the terminal box main body with a tool such as an adjustable wrench. Rotate the main body (around 15°) to the intended orientation.

⑥When further tightening the terminal box to change the orientation from the initial position, rotate it within 1/2 turn.

3. Pre-operation (post-installation) check

3. 1 Appearance check

⚠WARNING	Stop the flow of the fluid（shut the supply）. Discharge the fluid inside the product.

(1) Push the product by hand and confirm that the product is firmly fixed on the piping.
(2) Confirm that threaded parts such as bolts, nuts and screws are not loose.

3. 2 Leakage check

(1) Confirm leakage at the connection part by applying pressure to the fluid.
We recommend leakage check by the following method:

- Supply compressed air (0.3-0.5MPa)
- Apply soap water to the portion to check for leakage
- Bubbles will appear if there is any leakage.

3. 3 Electrical check

⚠WARNING	Cut off the electricity. Check while taking serious care to avoid electric shock.

(1) Check the supply voltage.
Voltage variation shall be within 10% of the rated voltage.
Use beyond the allowed variation range will cause malfunction or damage to the coil.
(2) Check insulation resistance
Check the insulation resistance between dead metal parts and uninsulated live parts (such as the tip of the lead wire) that are assembled to the product.
Confirm that insulation resistance is over 100MΩ at DC500V megger.

3. 4 Operation check

(1) Apply rated voltage to the valve and rated pressure to the working fluid. Confirm normal operation of the product.

4. Instructions for proper use

4. 1 Handling precautions

⚠ WARNING	a) Do not use this product as an emergency shut-off valve. ・ This product is not designed as a safety-securing valve, such as an emergency shut-off valve. For such systems, use this valve after providing another method to secure safety. b) Take measures to prevent harm to operators or objects if this product fails. c) Liquid-filled state ・ When conveying a liquid in a circuit, operation may fail if liquid-filled state occurs. This is because pressure rises in the liquid-filled state when temperature rises. Provide an escape valve in the system so that a liquid-filled state circuit is not created. d) Working fluids ・ Do not use this product for fluids other than the working fluids listed in the catalog specifications. ・ Before use, confirm the compatibility of the product and applicable fluid with the Applicable Fluid Check List. ・ Depending on the model, internal parts may wear when the valve operates. Caution is required because wear chips could enter the secondary side of the valve.

⚠ CAUTION	a) Do not touch the coil sections or actuator sections when energized or immediately after energizing. Depending on the product, directly touching these products could cause burns. b) Do not touch the wiring connection sections (bare live part) when energized. There is a risk of electric shock. c) Always use within the specified pressure range.

(1) When carrying the solenoid valve, hold the main body.
Do not carry the valve by the lead wire, or by the cable attached to the terminal box.

(2) Do not use the product as footings, or place heavy loads on the product.

(3) If the product has not been used for more than a month, the seal rubber and metal at the valve seat may stick and delay operation. Carry out trial run in such cases.

(4) If the 3-port valve (Model: FWG) is to be energized continuously, select fluororubber sealing.

(5) This product cannot be used for vacuum holding. Please contact us if the intended usage is vacuum holding. We recommend our FVB series (for medium vacuum) if its internal leakage is allowable.

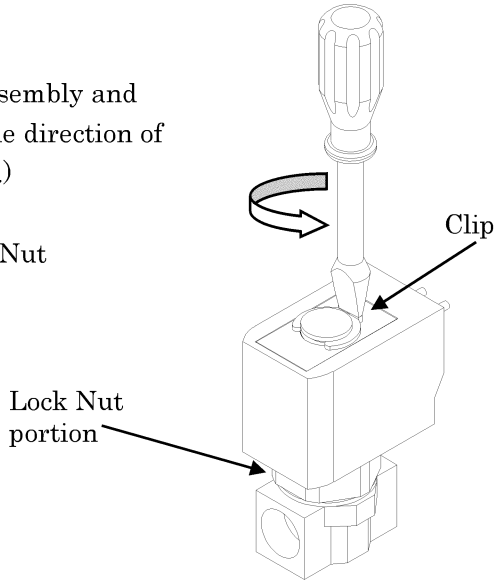
(6) If any abnormalities occur, refer to “6. Troubleshooting”.

4. 2 Disassembling work precautions

(1) Shut off the power supply and release the fluid and pressure before performing disassembly work.

(2) How to disassemble the Clip
Insert the tip of a screwdriver between the Core Assembly and the handle of the Clip. Rotate the screwdriver in the direction of the arrow to disassemble the Clip (refer to figure 6.)

(3) How to disassemble the Core Assembly
To disassemble the Core Assembly, rotate the Lock Nut portion of the Core Assembly while fixing the Body.
Do not grip the pipe portion of the Core Assembly. Otherwise, the pipe deforms and the valve malfunctions.



(Figure 6.) How to disassemble the Clip

(4) When washing the parts, use a neutral detergent or pure ethyl alcohol. However, in order to protect live parts, do not wash the Coil Assembly; instead, foreign matter may be wiped off. Additionally, do not use organic solvents; otherwise, rubber parts and resin parts may swell and degrade.

4. 3 Assembling work precautions

(1) Follow the procedure opposite to disassembly when re-assembling. Make sure all parts are assembled.

(2) When re-assembling, tighten the threaded parts with torque shown in table 2. and 3.
When assembling the Core Assembly to the Body, observe the following procedures to prevent the Spring from clogging. 1) Temporarily tighten the Core Assembly until the Core Assembly touches the O ring. 2) Finally tighten the Core Assembly with torque shown below.
When assembling the Socket to the Core Assembly, be careful not to squash and tear the O ring.

Table 2. Recommended tightening torque of the Core Assembly

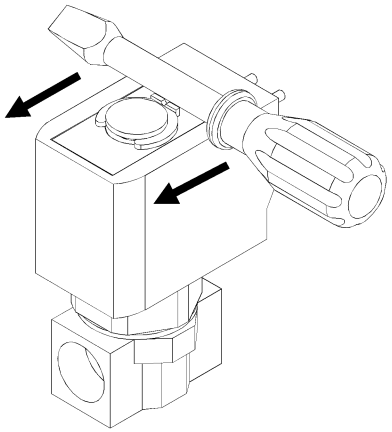
Model	Core Assembly
FWB2･FWG2	12 to 18 N･m
FWB3･FWG3	16 to 24 N･m
FWB4･FWG4	21 to 31 N･m
FWB5･FWG5	21 to 31 N･m

Table 3. Recommended tightening torque of the Socket

Model	Socket
FWG2	3 to 5 N･m
FWG3	6 to 10 N･m
FWG4	10 to 14 N･m
FWG5	10 to 14 N･m

(3) How to assemble the Clip

As shown in figure 7., apply force on the handle of the Clip in the direction of the arrow with a screwdriver.



(Figure 7.) How to assemble the Clip

5. Maintenance

5. 1 Maintenance and inspection

⚠ CAUTION	a) Read this Instruction manual thoroughly and understand the contents well before performing maintenance and inspection. b) Shut off the power supply and release fluid pressure before performing maintenance.

(1) Regularly inspect the product to ensure optimum performance. Although inspection frequency differs based on the working state, the product should be inspected every half year.

(2) Refer to “3. Pre-operation check” for contents of inspection.

(3) If the valve is not to be operated for one month or more after conveying water or hot water, completely remove residual water or hot water.
Otherwise, rust will emerge and may cause malfunction and leakage.

(4) Beware the clogging of the strainer and filter.

5. 2 Parts for Maintenance

(1) O ring

Replace when the valve leaks while use, or at disassembly and reassembly.

(2) Plunger Assembly, Spring

Replace when the valve shows abnormality such as leak, malfunction, or beat sounds.

(3) Parts kit

Parts shown in table 4. and 5. are available as parts kit.

Table 4. Parts kit (For normally closed 2-port valves and 3-port valves)

Model	Kit name	Component parts
FWB21 to 51 FWG	Coil Kit	*Clip *Coil Assembly (Includes a terminal box for terminal box options) *Waving Washer
FWB21 to 51 FWG	Core Assembly Kit	*Core Assembly
FWB21 to 51 FWG	Plunger Assembly Kit	*Spring *Plunger Assembly *O ring

Table 5. Parts kit (For normally open 2-port valves)

Model	Kit name	Component parts
FWB32 FWB42 FWB52	Coil Kit	*Clip *Coil Assembly (Includes a terminal box for terminal box options) *Waving Washer
	Core Assembly Kit	*Core Assembly
	Valve Seal Guide Assembly Kit	*O ring *Valve Seal Guide Assembly *Spring

6. Troubleshooting

(1) If the solenoid valve does not operate as intended, check according to tables 6., 7., and 8.

Table 6. Cause of malfunction and countermeasures for normally closed 2-port valves (Model:FWB21, FWB31, FWB41, FWB51)

State of failure	Cause	Countermeasure
Fluid does not flow	Valve is not energized.	Confirm wiring and fuse, then energize the valve.
	Voltage applied is lower than the allowable voltage range.	Confirm the power supply, and apply rated voltage.
	Applied fluid pressure is too high.	Set pressure within allowable range.
Fluid does not stop flowing	Wrong port is connected to the high pressure side.	Pipe correctly.
	Electricity is not shut off.	Check for leak of electricity. Modify the circuit to cut off electricity completely.
	Plunger does not move because foreign matter is caught in.	Disassemble and remove foreign matter.
Valve leaks externally	Abrasion or flaw of O ring.	Replace parts.
	Core Assembly is loose.	Tighten the Core Assembly.
Valve leaks internally	The valve seat of the Body is worn or damaged.	Replace the product.
	Abrasion or flaw of the sealing side of the rubber parts.	Replace parts.
	Foreign matter caught in the valve seat.	Disassemble and remove foreign matter.

Table 7. Cause of malfunction and countermeasures for normally open 2-port valves
(Model:FWB32, FWB42, FWB52)

State of failure	Cause	Countermeasure
Fluid does not stop flowing	Valve is not energized.	Confirm wiring and fuse, then energize the valve.
	Voltage applied is lower than the allowable voltage range.	Confirm the power supply, and apply rated voltage.
	Applied fluid pressure is too high.	Set pressure within allowable range.
	Wrong port is connected to the high pressure side.	Pipe correctly.
Fluid does not flow	Fluid is not pressurized.	Adjust to proper pressure.
	Electricity is not shut off.	Check for leak of electricity. Modify the circuit to cut off electricity completely.
	Valve Seal Guide Assembly does not move because foreign matter is caught in.	Disassemble and remove foreign matter.
Valve leaks externally	Abrasion or flaw of O ring.	Replace parts.
	Core Assembly is loose.	Tighten the Core Assembly.
Valve leaks internally	The valve seat of the Body is worn or damaged.	Replace the product.
	Abrasion or flaw of the sealing side of the rubber parts.	Replace parts.
	Foreign matter caught in the valve seat.	Disassemble and remove foreign matter.

Table 8. Cause of malfunction and countermeasures for 3-port valves
(Model: FWG21, FWG31, FWG41, FWG51)

State of failure	Cause	Countermeasure
Fluid does not flow	Valve is not energized.	Confirm wiring and fuse, then energize the valve.
	Voltage applied is lower than the allowable voltage range.	Confirm the power supply, and apply rated voltage.
	Applied fluid pressure is too high.	Set pressure within allowable range.
	Valve Seal Guide Assembly does not move because foreign matter is caught in.	Disassemble and remove foreign matter.
Fluid does not stop flowing	Wrong port is connected to the high pressure side.	Pipe correctly.
	Electricity is not shut off.	Check for leak of electricity. Modify the circuit to cut off electricity completely.
	Plunger does not move because foreign matter is caught in.	Disassemble and remove foreign matter.
Valve leaks externally	Abrasion or flaw of O ring.	Replace parts.
	Core Assembly or Socket is loose.	Tighten the Core Assembly or Socket.
Valve leaks internally	Abrasion or flaw of the valve seat of the Body and Core Assembly.	Replace the product.
	Abrasion or flaw of the sealing side of the rubber parts.	Replace parts.
	Foreign matter caught in the valve seat.	Disassemble and remove foreign matter.

(2) Please contact CKD or your nearest agent for any unclear points.

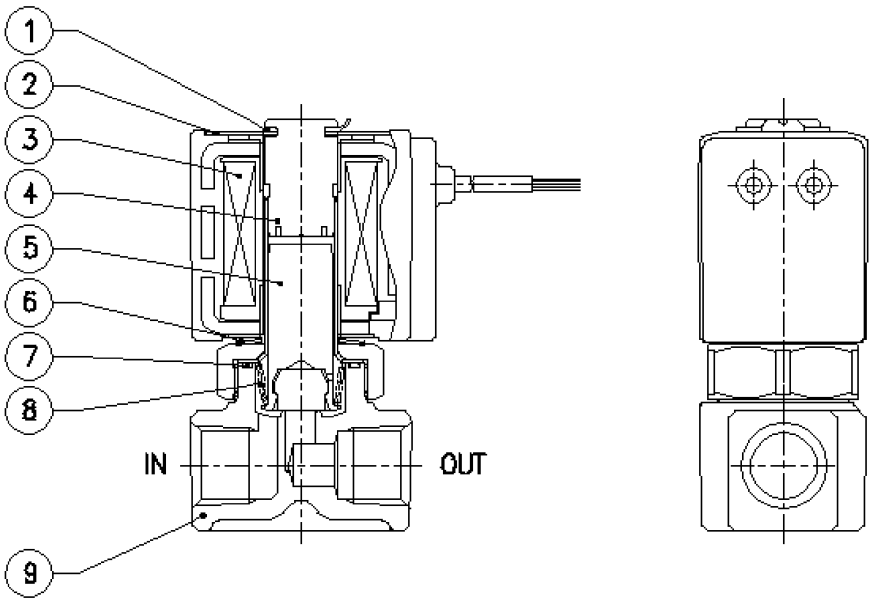
7. Appropriate disposal

(1) When disposing this product, dispose this product as industrial waste.

8. Internal construction

8. 1 Internal construction of the normally closed 2-port valve

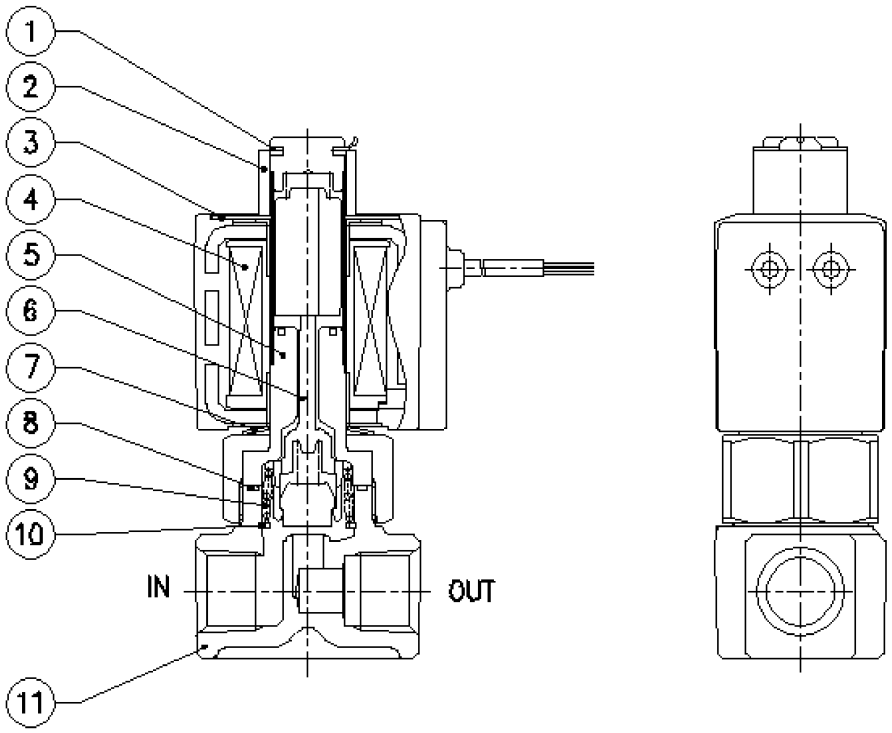
・Model: FWB21, FWB31, FWB41, FWB51



No.	Part name	Remarks
①	Clip	
②	Name Plate	
③	Coil Assembly	
④	Core Assembly	
⑤	Plunger Assembly	Consumable part
⑥	Waving Washer	
⑦	O ring	Consumable part
⑧	Spring	Consumable part
⑨	Body	

8．2 Internal construction of the normally open 2-port valve

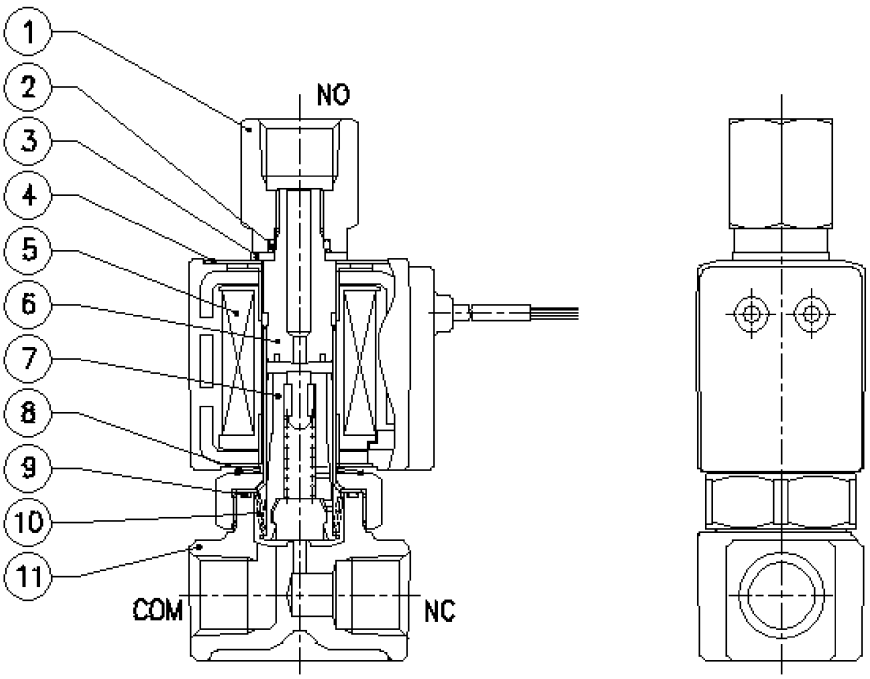
・Model： FWB32, FWB42, FWB52



No.	Part name	Remarks
①	Clip	
②	Spacer	
③	Name Plate	
④	Coil Assembly	
⑤	Core Assembly	Consumable part
⑥	Valve Seal Guide Assembly	Consumable part
⑦	Waving Washer	
⑧	O ring	Consumable part
⑨	Spring	Consumable part
⑩	Spring Holder	
⑪	Body	

8. 3 Internal construction of the 3-port valve

・Model: FWG21, FWG31, FWG41, FWG51



No.	Part name	Remarks
①	Socket	
②	O ring	Consumable part
③	Spacer	
④	Name Plate	
⑤	Coil Assembly	
⑥	Core Assembly	
⑦	Plunger Assembly	Consumable part
⑧	Waving Washer	
⑨	O ring	Consumable part
⑩	Spring	Consumable part
⑪	Body	