CKD

Air Operated Ball Valve

CHB/CHG-W Series with Solenoid Valve

INSTRUCTION MANUAL

SM-A63344-A

- 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 **Air Operated Valve "CHB/CHBF/CHG Series with Solenoid Valve**." 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.

- The product is intended for users who have basic knowledge about materials, fluids, piping and electricity necessary to use control valves (solenoid valves, motor operated valves, air operated valves, etc.). CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- 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 pressure control circuit or hydraulic control circuit, and the electric system that controls them 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 editions)
High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety regulations, organization 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 for using the product

⚠ WARNING

Persons with adequate knowledge and experience shall handle the product.

This product is designed and manufactured as a device or a part for general industrial equipment.

Use the product within the specifications.

It must not be used outside the specifications for the product. Never attempt to modify or additionally machine the product.

This product is intended for use as a device or a part of general industrial equipment. Use of this product under the following conditions or environment is is not covered under the warranty.

(If you consult with us before use and understand the specifications for our product, the warranty is applied. However, also in this case, take safety measures to avoid hazards in case of failure.)

- Use for nuclear power, railway, aircraft, ships, vehicles, medical devices, and devices or purposes in direct contact with drinks or foods
- Use for entertainment equipment, emergency shut-off circuits, press machines, brake circuits and safety devices that are needed to ensure the safety
- Use for purposes that may significantly affect people and properties and are needed to ensure the safety

Never handle this product or remove any piping or device before confirming the safety.

- Before inspecting or maintaining the machine or equipment, ensure the safety of all systems associated with this product. Turn off the energy sources, i.e. the air supply, water supply and power supply to the relevant equipment, discharge compressed air and fluid from the system, and check for water leakage and earth leakage.
- Some parts may be hot or charged even while the operation is stopped. Take care when handling the product and removing any piping or device.
- Before starting or restarting any machine or equipment using pneumatic devices, confirm that the safety of the system is ensured by protrusion preventing means, etc.

Precautions for design and selection

⚠WARNING

Do not use as a valve for ensuring the safety of an emergency shut-off valve.
This product is not designed as a valve for ensuring the safety of an emergency shut-off valve, etc. On such a system, use it after taking reliable safety measures.

The customer shall select and handle the product after confirming the product specifications and compatibility with the customer's system on its own responsibility.
Improper selection or handling may result not only in trouble of the product, but also in customer's system trouble.

Precautions for disposal

⚠CAUTION

When disposing of the product, ask a waste disposal company to dispose of it in accordance with Wastes Disposal and Public Cleansing Act.

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1. PRODUCT OVERVIEW

1.1 Indication of model number

How to order

CHB - W V1 - 25 - E B - S - AC100V

Model No.

Ⓐ Warranty period

Ⓑ Actuator

Ⓒ Port size

Ⓓ Body/rubber material

Ⓔ Coil option

Ⓕ Other options

Ⓖ Voltage

Code	Description	
Ⓐ Warranty period		
W	1 year after delivery	
WG	3 years after delivery (with inspection certificate, inspection guidelines, traceability system diagram)	*1*2
Ⓑ Actuator		
V1	Double acting NC(Open when energized)	
X1	Single acting NC(Open when energized)	
Ⓒ Port size		
10	Rc3/8	
15	Rc1/2	
20	Rc3/4	
25	Rc1	
32	Rc1 1/4	
40	Rc1 1/2	
50	Rc2	
Ⓓ Body/rubber material		
	Body	Rubber
E	Stainless steel	Fluoro rubber *3
F	Stainless steel	Special fluoro rubber *3
Ⓔ Coil option		
B	Round terminal box (G1/2)	
BL	Round terminal box with lamp (G1/2)	
Ⓕ Other options		
Blank	No	
S	Silencer	*4
Ⓖ Voltage		
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz	
AC200V	200 VAC 50/60 Hz and 220 VAC 60 Hz	
DC24V	24 VDC	

[Example of model No.]
CHB-WV1-25-EB-S-AC100V
Model No.: CHB (standard bore)
Ⓐ Warranty period: 1 year after delivery
Ⓑ Actuator: Double acting NC(Open when energized)
Ⓒ Port size: Rc1
Ⓓ Body material: Stainless steel
Ⓔ Coil option: With round terminal box
Ⓕ Other options: With 2 silencers
Ⓖ Voltage: AC100V 50/60Hz.AC110V 60Hz

⚠ Precautions for model No. selection

*1: The warranty period of option WG is 3 years from the date of delivery or 1 year from initial use, whichever comes first.
*2: For option WG, the specifications and drawings must be agreed upon.
*3: The ambient temperature of option E is -10°C to 60°C.With option F, the ambient temperature is -20°C to 60°C.
*4: Two CKD SL-8A-W are attached with Ⓑ WV1, and one is attached with Ⓑ WX1.

How to order

Model No.

Ⓐ Warranty period

Code	Description
Ⓐ Warranty period	
W	1 year after delivery
WG	3 years after delivery *1*2 (with inspection certificate, inspection guidelines, traceability system diagram)

Ⓑ Actuator

Ⓑ Actuator	
V1	Double acting, normally B-C path
X1	Single acting, normally B-C path

Ⓒ Port size

Ⓒ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1¼
40	Rc1½
50	Rc2

Ⓓ Body/rubber material

	Body	Rubber
Ⓓ Body/rubber material		
E	Stainless steel	Fluoro rubber *3
F		Special fluoro rubber *3

Ⓔ Coil option

Ⓔ Coil option	
B	Round terminal box (G½)
BL	Round terminal box with lamp (G½)

Ⓕ Other options

Ⓕ Other options	
Blank	No
S	Silencer *4

Ⓖ Voltage

Ⓖ Voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz and 220 VAC 60 Hz
DC24V	24 VDC

[Example of model No.]

CHG-WX1-15-EB-S-AC200V

Model: CHG

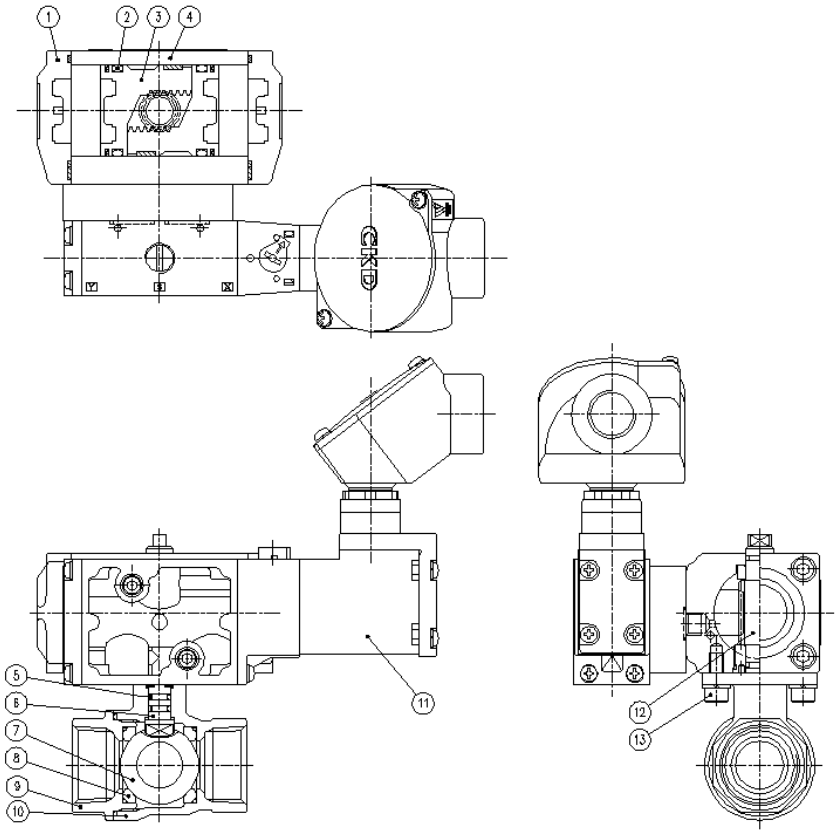
Ⓐ Warranty period : 1 year after delivery
Ⓑ Actuator : Single acting, normally B-C path
Ⓒ Port size : Rc1/2
Ⓓ Body material : Stainless steel
Ⓔ Coil option : With round terminal box
Ⓕ Other options : With 1 silencer
Ⓖ Voltage : 200VAC 50/60Hz. 220VAC 60Hz

⚠ Precautions for model No. selection

*1: The warranty period of option WG is 3 years from the date of delivery or 1 year from initial use, whichever comes first.
*2: For option WG, the specifications and drawings must be agreed upon.
*3: The ambient temperature of option E is -10°C to 60°C. With option F, the ambient temperature is -20°C to 60°C.
*4: Two CKD SL-8A-W are attached with Ⓑ WV1, and one is attached with Ⓑ WX1.

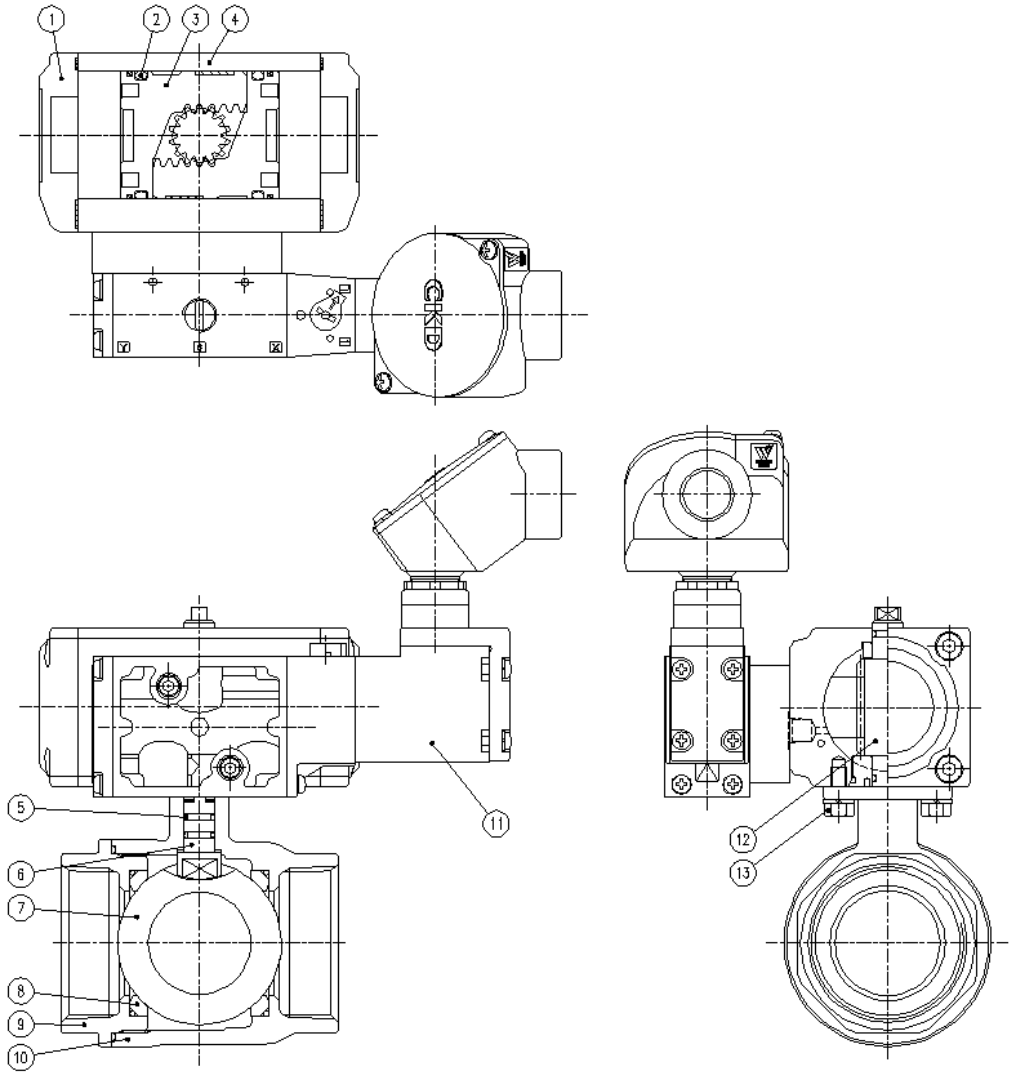
1.2 Internal structure

●CHB-WV1-10･15･20･25



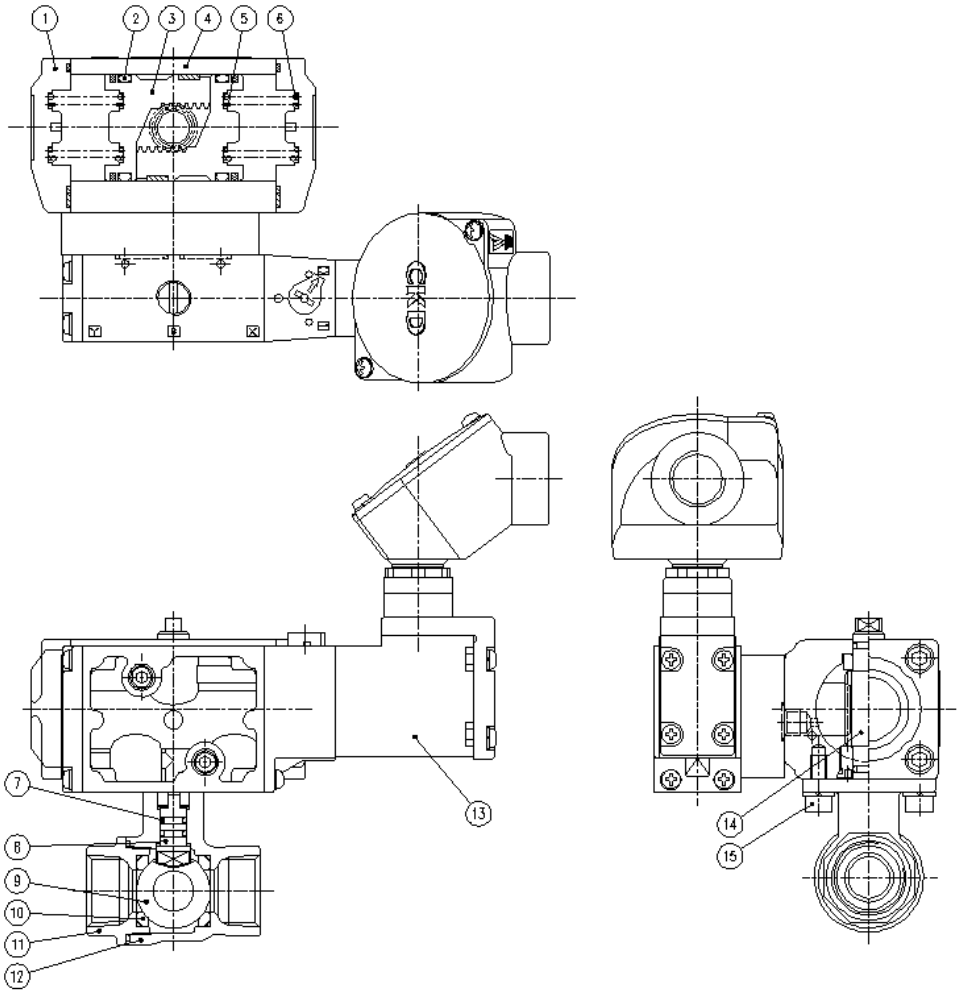
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	O-ring	2
6	Shaft	1
7	Valve ball	1
8	Valve seat	2
9	Valve cap	1
10	Valve body	1
11	Solenoid valve	1
12	Stem	1
13	Hex socket screw	2

●CHB-WV1-32・40・50



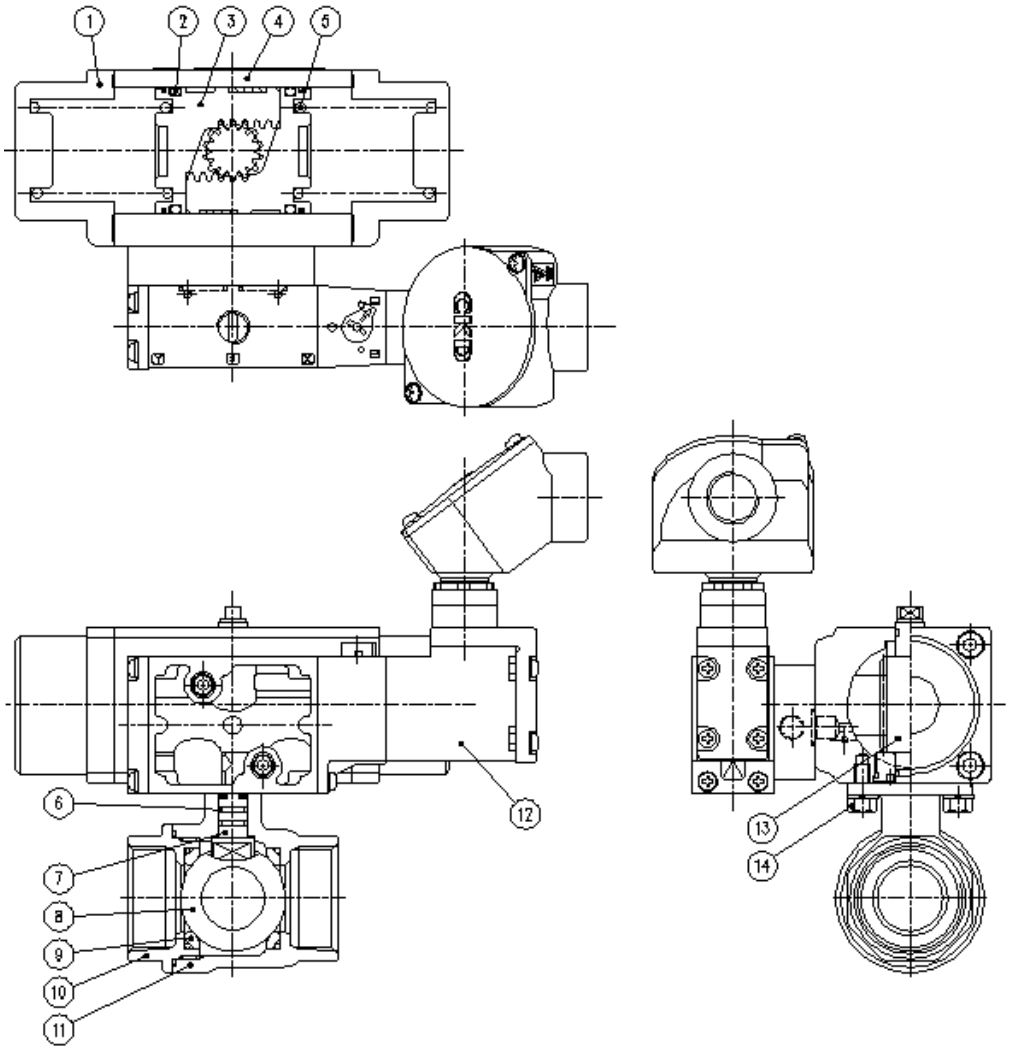
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	O-ring	1
6	Shaft	1
7	Valve ball	1
8	Valve seat	2
9	Valve cap	1
10	Valve body	1
11	Solenoid valve	1
12	Stem	1
13	Hex bolt	2

●CHB-WX1-10・15・20



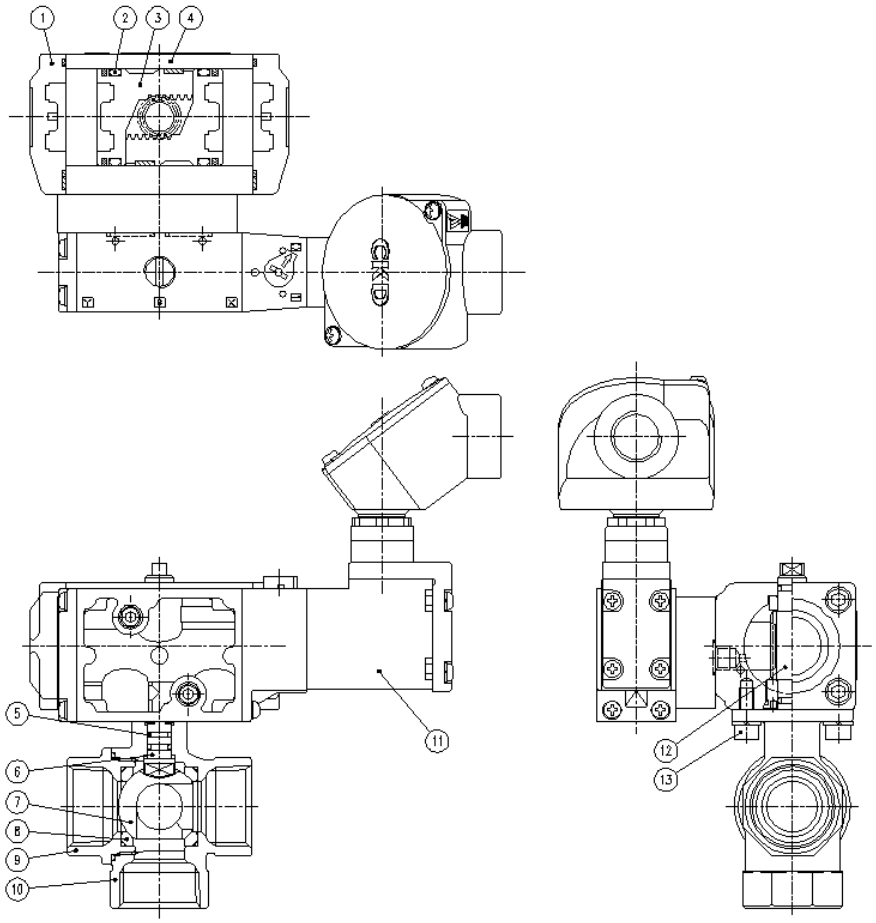
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	Spring	2
6	Spring	2
7	O-ring	2
8	Shaft	1
9	Valve ball	1
10	Valve seat	2
11	Valve cap	1
12	Valve body	1
13	Solenoid valve	1
14	Stem	1
15	Hex socket screw	2

●CHB-WX1-25・32・40・50



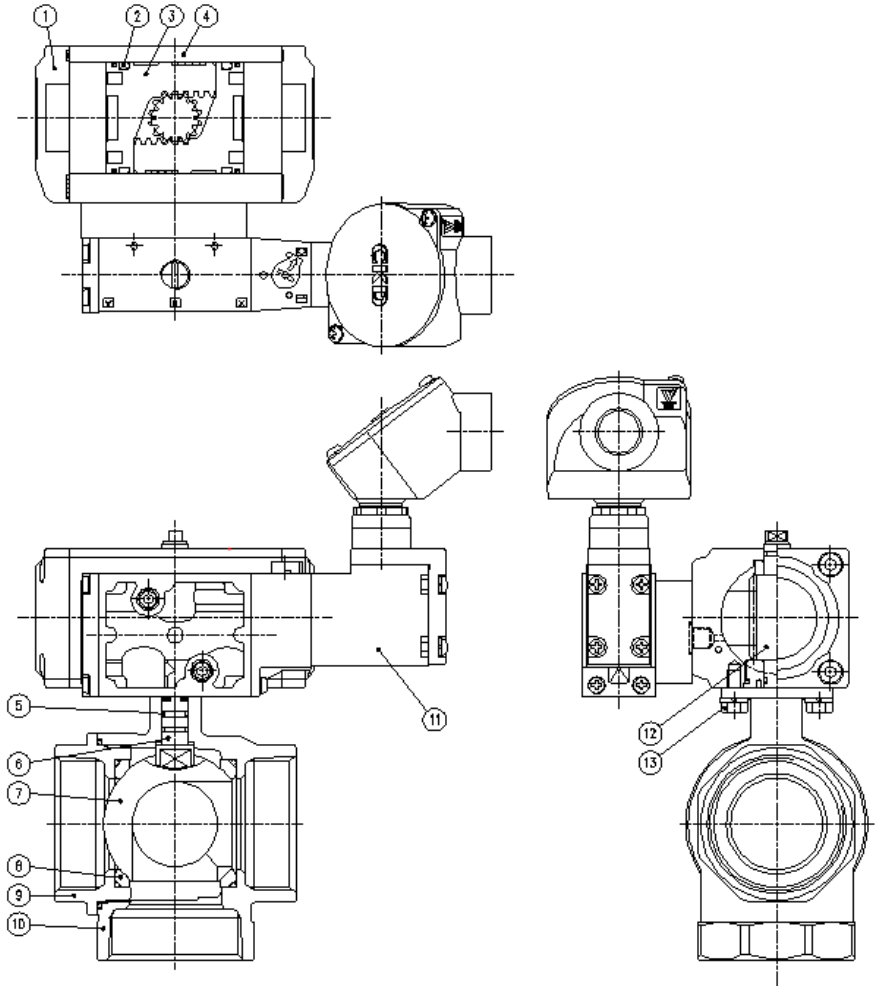
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	Spring	2
6	O-ring	2
7	Shaft	1
8	Valve ball	1
9	Valve seat	2
10	Valve cap	1
11	Valve body	1
12	Solenoid valve	1
13	Stem	1
14	Hex bolt	2

●CHG-WV1-15・20・25



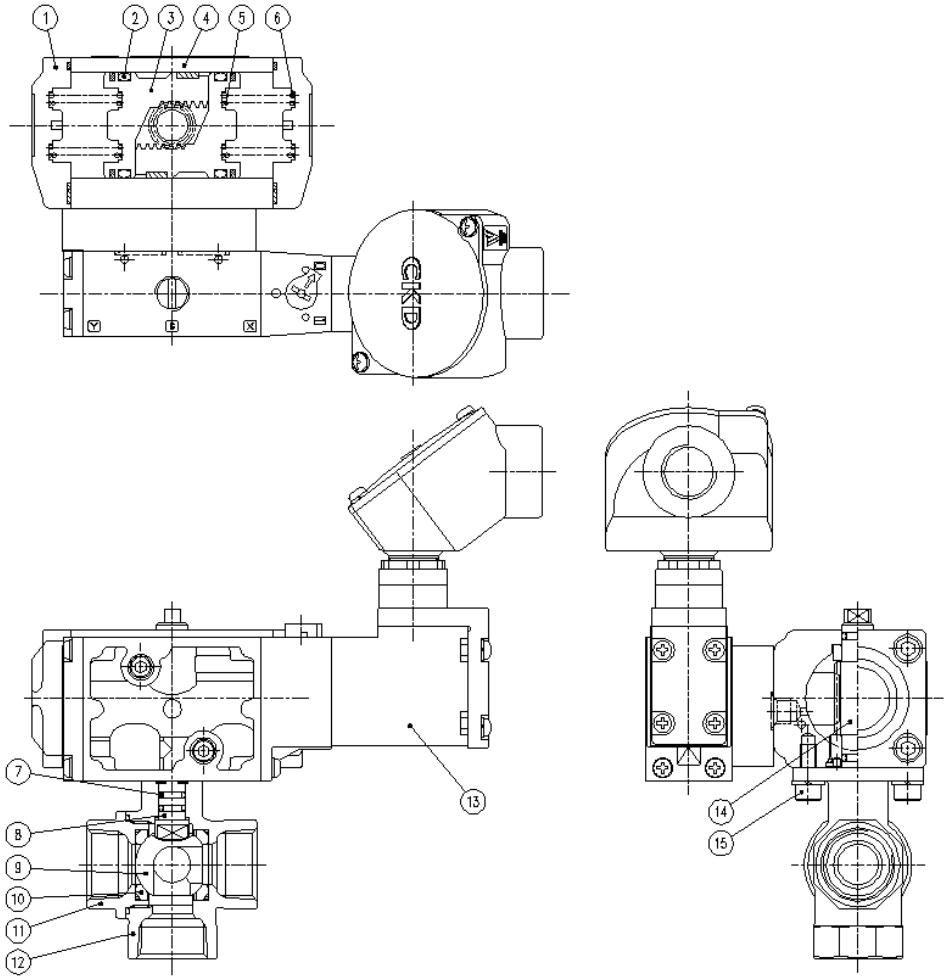
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	O-ring	2
6	Shaft	1
7	Valve ball	1
8	Valve seat	2
9	Valve cap	1
10	Valve body	1
11	Solenoid valve	1
12	Stem	1
13	Hex socket screw	2

●CHG-WV1-32・40・50



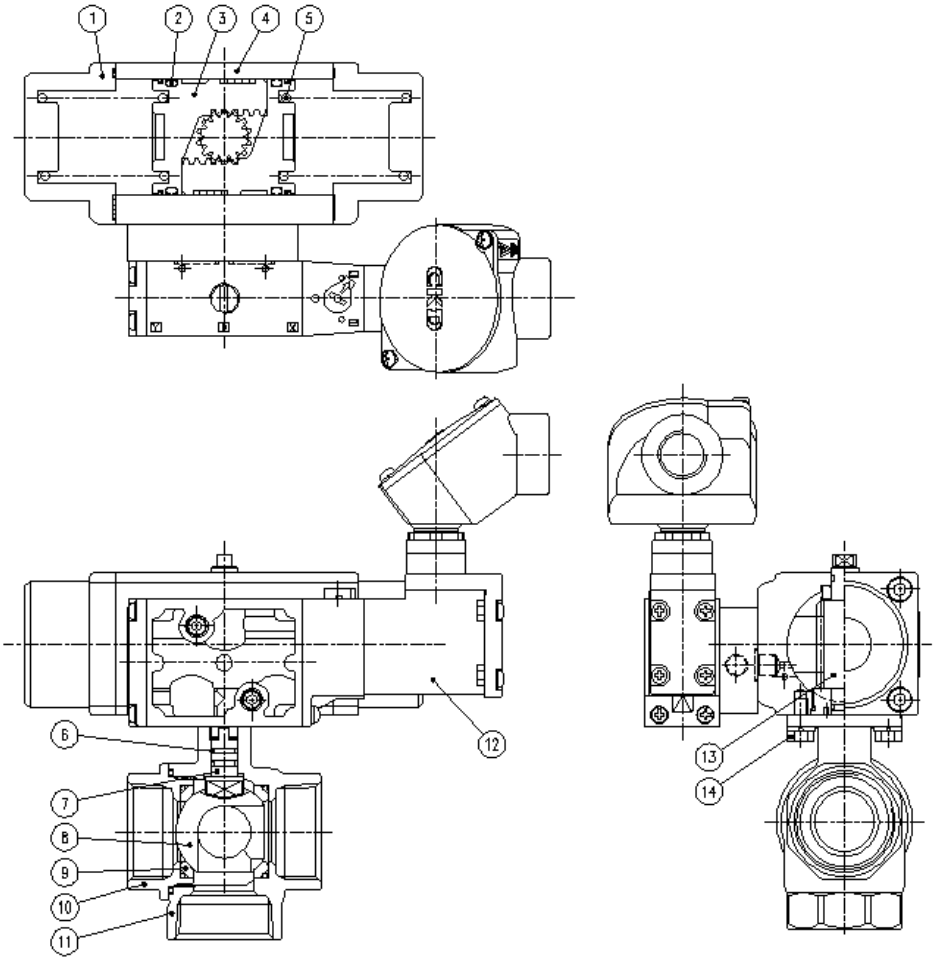
No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	O-ring	2
6	Shaft	1
7	Valve ball	1
8	Valve seat	2
9	Valve cap	1
10	Valve body	1
11	Solenoid valve	1
12	Stem	1
13	Hex bolt	2

●CHG-WX1-15・20



No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	Spring	2
6	Spring	2
7	O-ring	2
8	Shaft	1
9	Valve ball	1
10	Valve seat	2
11	Valve cap	1
12	Valve body	1
13	Solenoid valve	1
14	Stem	1
15	Hex socket screw	2

●CHG-WX1-25・32・40・50



No.	Part name	Quantity
1	Cylinder cap	2
2	O-ring	2
3	Piston	2
4	Cylinder body	1
5	Spring	2
6	O-ring	2
7	Shaft	1
8	Valve ball	1
9	Valve seat	2
10	Valve cap	1
11	Valve body	1
12	Solenoid valve	1
13	Stem	1
14	Hex bolt	2

2. INSTALLATION

2.1 Installation Environment

⚠ WARNING

When using the product outside the prescribed specifications or for a special purpose, consult with us about the specifications.

Take care that the product is not exposed directly to water or cutting oil.

- If the ball valve is splashed with water or cutting oil, it may malfunction.

The coil will generate heat. Install in consideration of heat dissipation.

When the valve is installed in a control panel or energized for a long time, it will become hot. Take measures for ventilation to dissipate heat.

Do not use in an explosive gas or corrosive gas atmosphere.

The models with solenoid valve cannot be used in an explosive gas atmosphere. If you want to use a valve in an explosive gas atmosphere, select from CHB/CHG-W Series, and install an explosion-proof solenoid valve on the pilot air circuit.

Do not use in a high humidity environment.

Dew condensation may be caused by temperature changes.

If freezing may occur, discharge water, and take heat insulation measures.

Dew condensation may be caused by temperature changes.

Do not use in environment exposed to radiation heat.

⚠ CAUTION

Protect the valve to prevent entry of particles into it.

- In a dusty atmosphere, fit a silencer or an elbow fitting (facing down) to the pilot air exhaust port of the valve to prevent entry of dust.

When tightening or re-tightening the piping, secure the product.

- When piping on the body side, secure the body, and, when piping on the cap side, secure the cap.
- Take care not to excessively tighten the piping.

- Models with solenoid valves cannot be used in an explosive gas atmosphere. If you want to use a valve in an explosive gas atmosphere, select from CHB/CHG-W Series, and install an explosion-proof solenoid valve on the pilot air circuit.
- When using the ball valve in cold climates, take appropriate anti-freezing measures.
- Do not use the ball valve in an environment where vibration or inertia is applied to it.

2.2 Unpacking

⚠CAUTION

Do not remove the piping port protection or take out the product from the vinyl bag until just before piping the product.

If the piping port protection is removed or the product is taken out from the vinyl bag before the piping work, foreign matter may enter the valve through the piping port, resulting in failure or malfunction.

- Confirm that the model number you ordered is identical with the model number indicated on the product.
- Check that there is no damage to the product exterior.
- When storing the valve, keep it in the individual package to prevent entry of foreign matter. Take it out from the package when piping it.

2.3 Installation

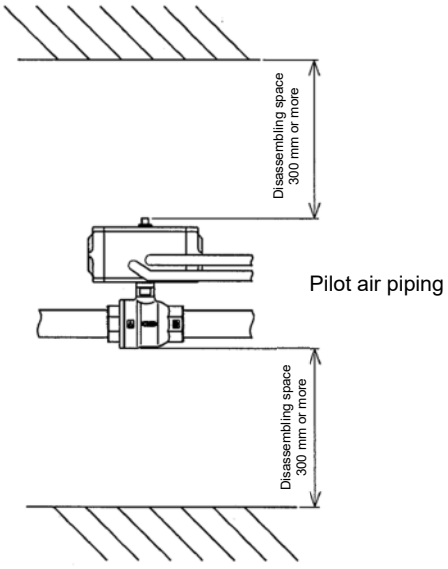
⚠CAUTION

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

When handling and installing the product, securely hold its body.

After installing, check for leakage from the piping, and make sure that the valve is installed correctly.

- It may be installed in any direction.
- Pipe the ball valve and pilot air supply ports as shown below.
- Secure enough space for safety during maintenance and troubleshooting.



- Secure the valve with the piping support of the ball valve part.
- To control the fluid in the tank, pipe the valve slightly above the bottom of the tank.

2.4 Piping

⚠ CAUTION

When piping, take care not to apply force to the actuator.

When tightening the piping or reconnecting the piping, secure the product.

Secure and support the piping so that the piping load and vibration are not applied directly to the valve.

Do not plug the EXH port.
The pilot pressure will not be exhausted, and the valve will not operate.

When supplying a fluid after completing the piping connection, take care that high pressure is not applied suddenly to the valve.
If the piping is not connected properly, accidents, such as piping disconnection and fluid leakage, may occur.

■ Cleaning of piping

Before piping, flush the piping with air of 0.3 MPa or more to remove foreign matter, such as dust, metallic powder, rust and sealing tape.

■ Removal of foreign matter

Remove dust and foreign matter in the fluid because they may cause malfunction and leakage.
Install a strainer (about 80 to 100 mesh) before the ball valve.
Install a filter of 5 μm or less in the pilot circuit.

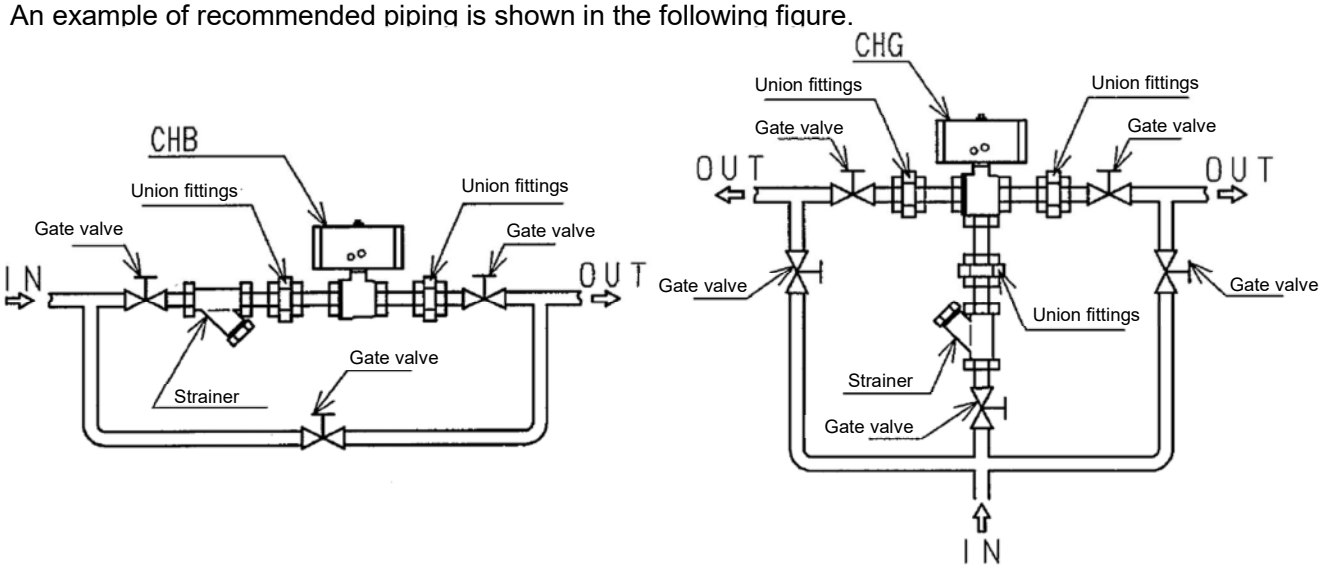
■ Piping of fluid supply ports

Pipe the supply ports on the body side and pilot air side as shown in the following table.

Supply ports on body side and pilot air side

Acting type	Supply port on body side	Supply port on pilot air side
2-port valve, double-acting	A or B	P
2-port valve, single-acting	A or B	P
3-port valve, double-acting	C	P
3-port valve, single-acting	C	P

An example of recommended piping is shown in the following figure.

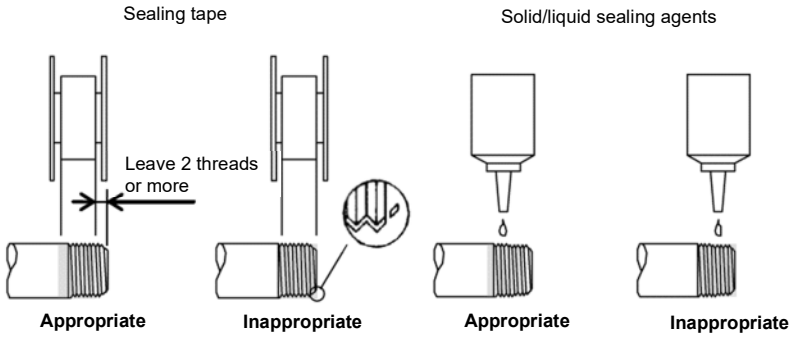


Use union fittings or flange fittings and provide a bypass pipe to facilitate maintenance.

■ Sealing agent

Apply a sealing tape or sealing agent leaving two threads or more from the end of the threaded portion. If the sealing tape or agent protrudes from the end of the threaded portion, the tape fragment or agent residue may enter the valve, thereby causing trouble.

When using a sealing tape, wind the tape in the opposite direction to the threading direction, and press the tape with your finger to bring it into close contact with the threads.
When using a liquid sealing agent, take care that the agent does not adhere to the plastic parts. The agent will damage the plastic parts, thereby causing trouble or malfunction. Do not apply any sealing agent to the internally threaded portion.



■ Tightening

When piping the valve, secure the cap or body with a spanner or vice, and tighten the piping.
For the tightening torque for piping, refer to the following table.

Recommended tightening torque for pilot air port piping

Piping connection port diameter	Recommended tightening torque (N.m)
Rc1/8	7-9

Recommended tightening torque for main port piping

Piping connection port diameter	Recommended tightening torque (N.m)
Rc3/8	31-33
Rc1/2	41-43
Rc3/4	62-65
Rc1	83-86
Rc1 1/4	97-100
Rc1 1/2	104-108
Rc2	132-136

■ Lubrication

This valve can be used without lubrication. A lubricator is not required. To lubricate, use turbine oil Class 1 ISO VG32 (no additives).
If lubrication is interrupted, loss of the initial lubricant may cause malfunction. Continue to lubricate the valve to prevent the oil from being exhausted.

■ Piping insulation cover

Hot water piping may be insulated with a cover. Use an insulation cover that can be disassembled for maintenance. Do not cover the coil of the solenoid valve.

■ Measures against drain in pilot air

Compressed air contains a large amount of drain (water, oxidized oil, tar, foreign matter, etc.). The drain may significantly deteriorate the accuracy of pneumatic devices. Take measures against the drain by dehumidifying with an after cooler dryer, removing foreign matter with a filter and removing tar with a tar removal filter to improve the air quality.

■ Prevention of entry of dust

In a dusty atmosphere, fit a silencer or a filter to the pilot air exhaust port or the breathing hole to prevent entry of dust. Dust may cause malfunction and fluid leakage.

■ Solenoid valve for pilot operation

As the solenoid valve for pilot operation, CKD’s 4-way valve (4F110) is used. Use CKD’s solenoid valve.
Use the solenoid valve for pilot operation according to its specifications and intended use.
(For more information, refer to the catalog of the series.)

■ Peripheral devices of pilot operation part (fittings and tubes)

Use fittings and tubes suitable for the purpose of use and the surrounding environment.

Recommended fitting: Stainless steel double bite type fitting

Recommended tube: Stainless steel tube

2.5 Wiring

⚠ WARNING

Before wiring, thoroughly read and understand this instruction manual.
The workers must understand the product structure and operating principle and be acquainted with safety measures.

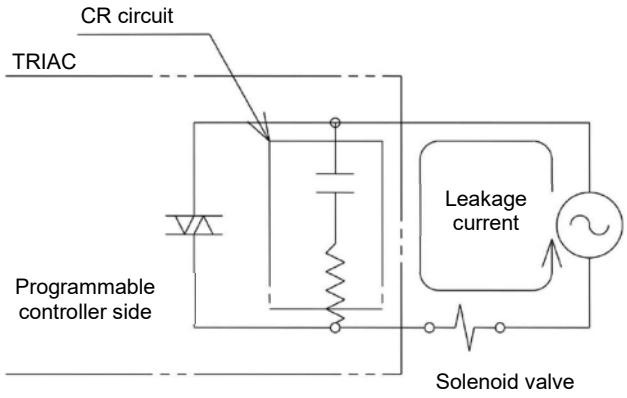
⚠ CAUTION

Check the power supply voltage and current type, AC or DC.

Make sure that the leakage current is less than the allowable value to avoid malfunction due to leakage current from other control devices.

- When a control device, such as a programmable controller, is used, the leakage current from the control device may affect the solenoid valve, and the valve may malfunction.
- When using this product, ensure that the leakage current from other control devices is as shown in the following table.

Rated voltage	Leakage current
100 V AC	3.0 mA or less
200 V AC	1.5 mA or less
24 V DC	1.0 mA or less



Polarity of solenoid

The solenoid valve of this valve does not have (+) or (-) polarity even when the rated voltage is DC.
Even if a lamp surge killer is provided, it does not have polarity.

Continuous energization

When the valve is installed in a control panel or energized for a long time, the solenoid will be heated to 40 to 60°. Take measures for ventilation to dissipate heat.

Surge in electrical circuit

When the electrical circuit system is susceptible to surge from the solenoid, use a solenoid with a surge killer (option), or connect a surge absorber in parallel with the solenoid.

Security of electric equipment

To protect the electric equipment, use a circuit breaker, such as a fuse, on the control circuit side.

- When waterproof performance is required, use a cabtyre cord with an outside diameter of 4 to 6.5. (The waterproof performance can be improved, but the valve is not designed for outdoor use.)
- As the electrical circuit, use a switching circuit that does not cause chattering.
- Use within ±10% of the rated voltage.

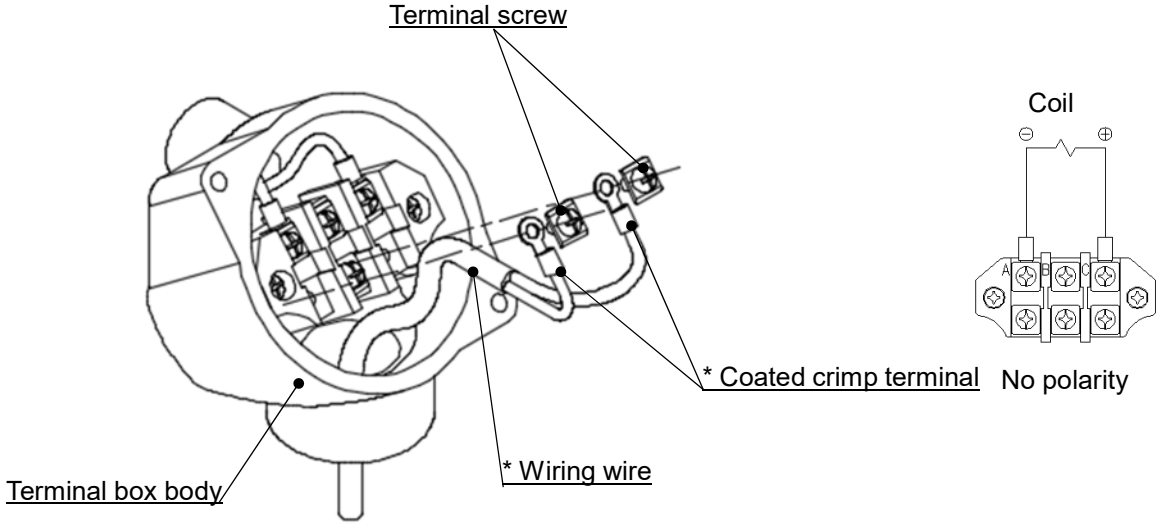
2.1.1 Connecting method

1 Attach crimp terminals to the wiring wires, trim the wires, and connect the terminals.
* Use terminal screws M3 and crimp terminals with an external dimension of 7 mm or less.
* Use coated crimp terminals.

2 Tighten the screws to the torque shown below.
* Cap fitting screw tightening torque: 0.5 N.m
* Terminal screw tightening torque: 0.5 N.m

3 Two lead wires are wired to the terminal block from the coil.
The lead wires do not have polarity.
Wire the terminals A and C on the terminal block.

Note: It is recommended to connect a fuse on the electrical circuit to ensure the safety and protect the equipment.



The asterisked parts are not included in CKD's product.

(Fig. 3) Terminal box connecting method

3. USAGE

⚠ WARNING

Do not use as a valve for ensuring the safety of an emergency shut-off valve.
This product is not designed as a valve for ensuring the safety of an emergency shut-off valve, etc. On such a system, use it after taking reliable safety measures.

Take necessary measures in advance so that people and properties are not affected when product failure occurs.

Liquid sealing
When a liquid is fed, if a liquid sealed circuit is formed, the pressure will increase due to temperature change, and the valve may not operate. Provide a relief valve on the system, so that a liquid sealed circuit is not formed.

Do not use any fluid other than those listed in the specification column.
Check the control fluid check list contained in the catalog to confirm the compatibility with the fluid used.
If the fluid used contains particles, sludge or foreign matter and its quality is poor, the durability of the ball seat will significantly deteriorate. If the sealing performance of the ball seat is lost, the fluid cannot be controlled. Periodically maintain the ball seat, or take appropriate measures.

Do not use in an explosion-proof atmosphere.
If you want to use a valve in an explosion-proof atmosphere, select from explosion-proof solenoid valve series.

Fluid temperature
Use the valve in the specified fluid temperature range.

Surrounding environment
Do not use in a corrosive gas atmosphere or any atmosphere that affects the component materials.
Do not use near a heating element or in a place affected by radiation heat.
Use within the operating ambient temperature range.
When using in cold climates, take appropriate anti-freezing measures.

Do not touch any electric wiring connections (bare live parts) with your hands or any part of your body while current is being applied.
Doing so may cause electric shock.

⚠ CAUTION

Use within the specified pressure range.

To prevent water hammer, throttle the exhaust side with a metering valve with silencer, speed controller, etc.

Observe the operation frequency. If the frequency exceeds the specified value, the service life will reduce.

When operating, do not touch the stem on the actuator.

Generally, fluids with a viscosity of up to 500 mm^2/S can be used. However, the characteristics vary depending on the liquid type. Consult with us.

Observe the pressure application direction in the 3-port valve (limited to the port C).

3.1 Checking before use (checking after installation)

⚠ WARNING

Before checking the appearance, close the main valve, and discharge the fluid in the valve.
Before checking the power supply and insulation resistance, turn off the power supply.
When checking, take due care to avoid electric shock.

■ Visual check

- Push the valve with your hand to check that the valve is secured tightly to the piping.
- Check that the threaded parts, such as bolts, nuts and screws, are not loose.

■ Leak check

- Pressurize the pilot air, and check for leakage from the piping connections.
- Pressurize the fluid, and check for leakage from the piping connections.
- To check for leakage, it is recommended to supply compressed air (0.3 to 0.5 MPa), apply soapy water and check for air bubbles.

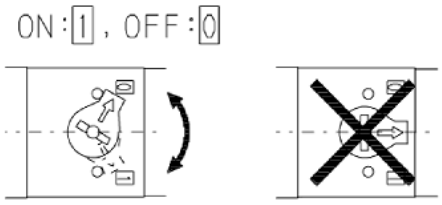
■ Check of manual operation of solenoid valve

<Manual operation procedure for lock type>

1 Supply air pressure within the specified range to the pilot.

2 When the lock type manual device is turned about 45° with a screwdriver, the valve will be set to the same state as the energized state and locked (ON: 1).
The device can be turned only clockwise. If it is turned further after the valve is locked, it will be damaged. Do not turn it forcibly. Before starting the regular operation, unlock (OFF: 0) the manual device.

Lock type manual device



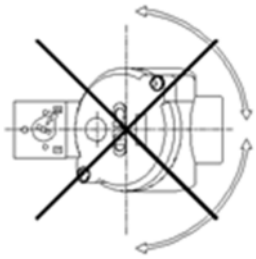
■ Electric check (solenoid valve)

- Insulation resistance check
  Measure the insulation resistance between a metal part such as a screw of the solenoid valve and a live part such as a lead wire.
  100 MΩ or more with 1000 VDC Megger Pressurize the pilot air, and check for leakage from the piping connections.

- Supply voltage check
  Use within voltage fluctuation range of ±10% of the rated voltage.
  Use outside the allowable voltage range may cause operation failure or damage to the coil.

3.2 Cautions for use

- Do not step on the ball valve, or do not place any heavy goods on it.
- Observe the specified fluid operating pressure, operating temperature range and operating ambient temperature range.
- Do not use in an explosive gas atmosphere.
- If the valve has not been used for a long period, conduct a test run before use.
- Do not remove the round terminal box body or change the wiring port direction. Rainwater may enter through the externally threaded portions of the round terminal box body.



- This product is warranted for outdoor use. However, its corrosion resistance is not warranted.
- The exterior parts of this product are resistant to corrosion under general environmental conditions.

  However, if it is used in a special environment, the risk of defects, such as rusting in a short period of time, may increase.
  If any abnormality occurs, refer to 5 “Troubleshooting.”

3.3 Manual operation

⚠ WARNING

In case of emergency, such as power failure and malfunction, operate the valve manually.

The single-acting type cannot be manually operated.
The actuator of the single-acting type has a built-in spring, and it cannot be manually operated.

■ Manual operation procedure

- Turn off the pilot air, remove the residual pressure in the actuator, and slowly turn the stem on the actuator with a monkey wrench.

4. MAINTENANCE AND INSPECTION

⚠WARNING

Before maintaining and inspecting the product, thoroughly read and understand this instruction manual.

4.1 Parts to be maintained

■ Ball valve

If abnormalities, such as leakage, valve seizure and delay in operation, are detected during use, replace the ball valve.
The standard number of times it can operate is 50,000.

■ Actuator

If abnormalities, such as leakage and malfunction, are detected during use, replace the actuator.
The standard number of times it can operate is 20,000.

°

4.2 Disassembly and reassembly procedures

⚠WARNING

Before disassembling, close the main valve, and discharge the fluid in the valve.

Before disassembling or reassembling, turn off the power supply.
Doing so may cause electric shock.

When disassembling, be careful because the spring may jump out.
It may cause personal injury.

Never disassemble the single-acting actuator.
It contains a strong spring. If it is disassembled, the spring may jump out, thereby causing a danger.

⚠CAUTION

It is prohibited to disassemble the ball valve.

- Once the valve is disassembled, the product performance may not be assured. Replace the ball valve.

It is prohibited to disassemble the actuator.

- The actuator has press-fitted parts. Once the parts are removed, they cannot be reused.

Defects caused by disassembly and replacement of the product and parts are excluded from the scope of warranty.

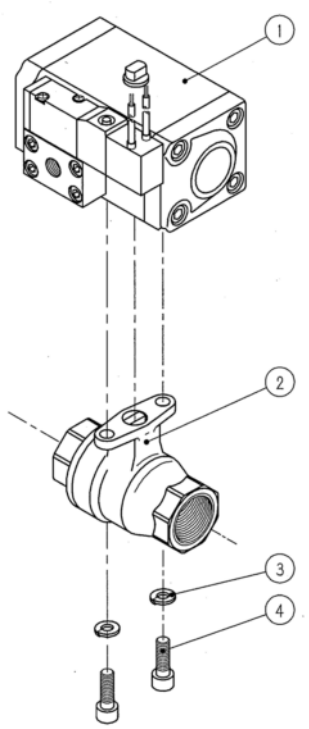
4.2.1 Disassembly procedure

■ Disassembly of valve

1 Remove the hex socket screws (4) or hex bolts and the spring washers (3).
2 Lift the actuator assembly (1).

Part No.	Part name	Quantity
1	Actuator assembly	1
2	Ball valve	1
3	Spring washer	2
4	Hex socket screw (*1) Hex bolt (*2)	2

1：In the case of CHB－WV－10 to 25, CHB－WX*－10 to 20, CHG－WV*－15 to 20, and CHG-WX*-10 to 20
2： In case of CHB－WV－32 to 50, HB－WX*－25 to 50, CHG－WV*－32 to 50 and CHG－WX*－25 to 50



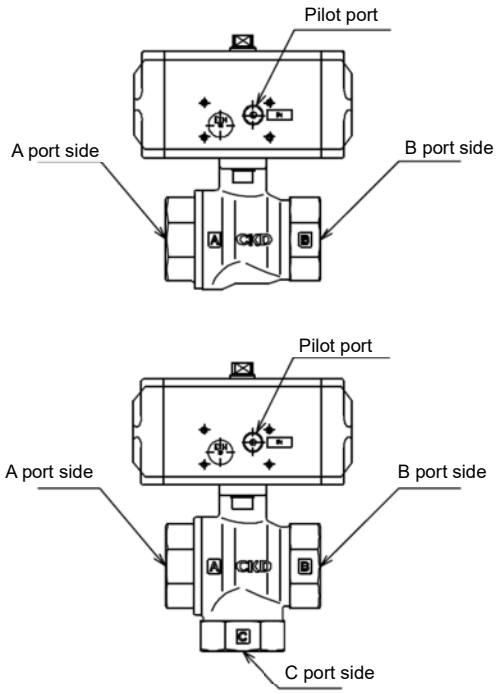
4.2.2 Reassembly procedure

■ Reassembly of valve

1 Place the actuator assembly (1) on the ball valve (2). Align the actuator stem with the ball valve shaft.

2 Tighten the two hex socket screws (4) or hex bolts and the two spring washers (3).

(Tightening torque: 4.5 to 5.5 N.m)



5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If this product does not operate as specified, inspect it according to the following table.

Problem	Cause	Solution
The valve does not operate.	The operating pressure to the actuator is low.	Set the pressure within the specified operating pressure range.
	The actuator operating pressure is not switched.	Check and inspect the operating valve.
	The pressure of the control fluid is too high.	Set the pressure within the specified pressure range.
	The viscosity of the control fluid is too high.	Reduce the viscosity to 500 mm^2/s or less.
	Foreign matter, such as solid particles, is included in the control fluid.	Replace the ball valve.
	Foreign matter is deposited on the valve seat and ball valve.	
	Electric signals are not input to the operation solenoid valve.	Input electric signals to the operation solenoid valve.
	The voltage of the operation solenoid valve is different from the input voltage.	Apply the rated voltage to the operation solenoid valve.
The valve operates but its movement is abnormal.	The operating pressure to the actuator is low.	Set the pressure within the specified operating pressure range.
	The pressure of the control fluid is too high.	Set the pressure within the specified pressure range.
	Foreign matter, such as solid particles, is included in the control fluid.	Replace the ball valve.
	Foreign matter is deposited on the valve seat and ball valve.	
The valve leaks. (The valve does not fully close.)	Foreign matter, such as solid particles, is included in the control fluid.	Replace the ball valve.
	The valve seat is worn out.	
	Pressure is applied in a wrong direction. (In CHG, pressure is applied from the port A or B.)	Change the pressure application port to the port C (COM).

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 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 careless handling, incorrect use 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 your machine or equipment containing this product has functions and structures that are required to be provided under industrial standards
- 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.
However, when the option "WG" is selected, it is warranted for three (3) years from the date of delivery or one (1) year from the date of start of use, whichever is shorter.
When the option "WG" is selected, the specifications and drawings must be exchanged.