

Instruction Manual

Gas Shutoff Valve

HK1

Be sure to read this instruction manual before using the product.
In particular, read the safety instructions carefully.
Keep this instruction manual in a safe place so that you can readily take it out and read it whenever necessary.



To Use This Product Safely

This product is intended to be used by those who have basic knowledge of materials, fluids, piping, and electricity when using control valves (e.g., solenoid valves, motor-operated valves and air-operated valves).

We are not responsible for any accidents caused by the selection or use of this product by those who do not have knowledge or who have not received sufficient training.

The applications of our customers are so diverse that we cannot fully grasp them.

Depending on the application and usage, performance may not be achieved due to fluid, piping, or other conditions, or accidents may occur. Therefore, it is the customer's responsibility to confirm the product specifications and determine the usage method according to the application and usage.

Although various safety measures have been implemented for this product, improper handling by the customer may lead to an accident. To prevent such accidents, **be sure to read this instruction manual carefully and fully understand its contents before using the product.**

In addition to the handling precautions described in the main text, please also note the following items.

Caution

- The coils of solenoid valves and motor-operated valves generate heat when the power is on. In particular, class H models may become hot. Be careful as direct contact may cause burns.
- There is a risk of electric shock if you touch the electrical wiring connections (bare live part) of valves such as solenoid valves and motor-operated valves. Before disassembling or inspecting the product, be sure to turn off the power. In addition, do not touch the live parts with wet hands.
- When using control valves for steam and high-temperature control, there is a risk of burns if high-temperature fluid leaks outside, so please install the piping so that there are no leaks and check carefully that there are no leaks from each part before use.

Introduction

Thank you for choosing CKD's Fluid Operated Valve for Gas (HK1).

This fluid operated valve type is manufactured under our strict quality control.

This product has specific temperature, pressure, and other operating conditions. Please be sure to read this instruction manual before installation and confirm the correct installation and usage methods.

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1. Structure of the valve

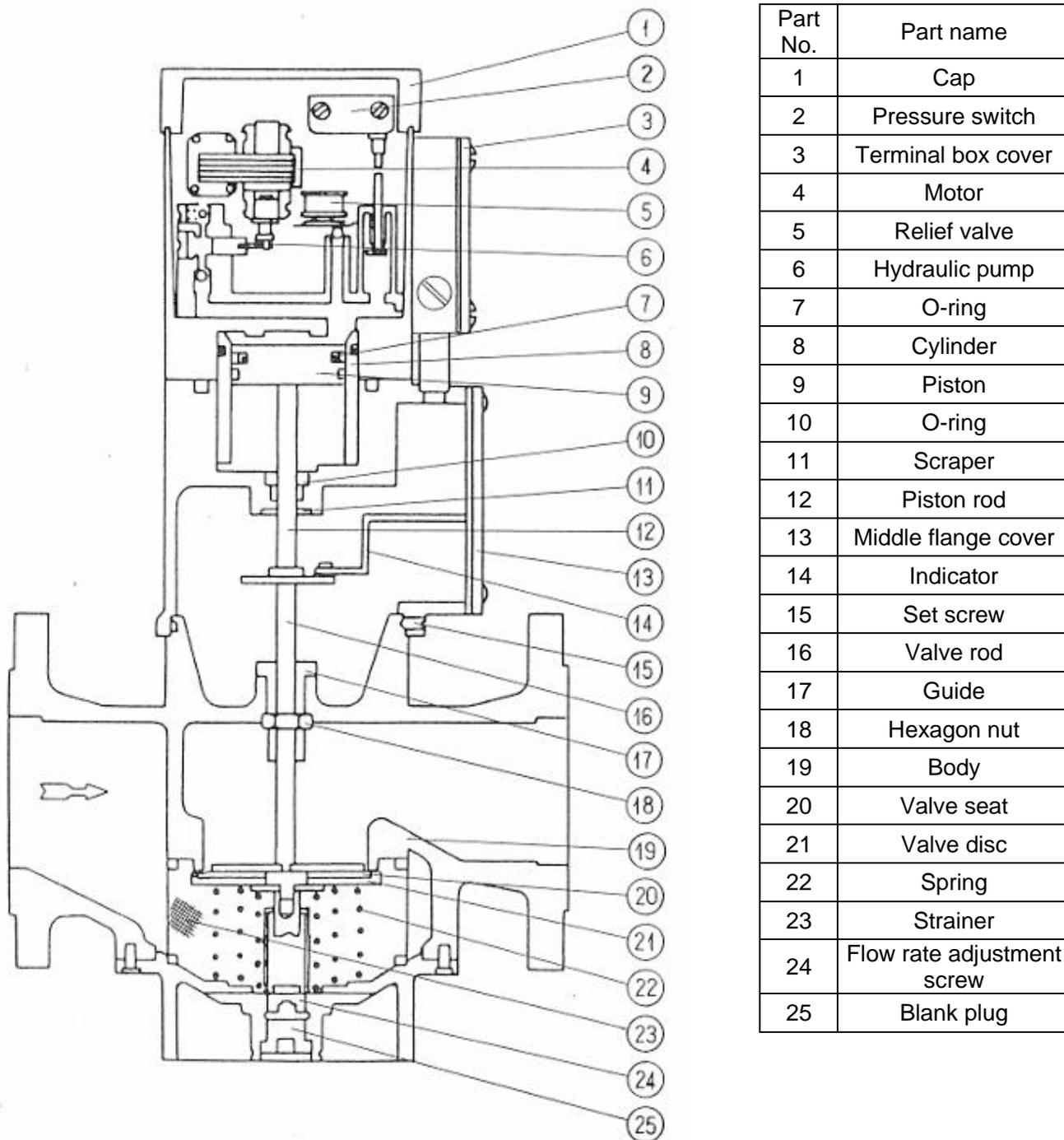
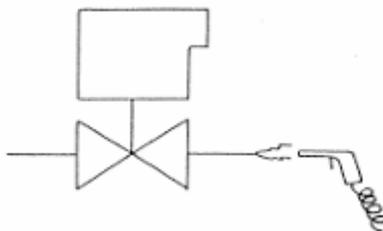


Figure 1. Structure of the valve

2. Installation Precautions

2-1. Air flushing

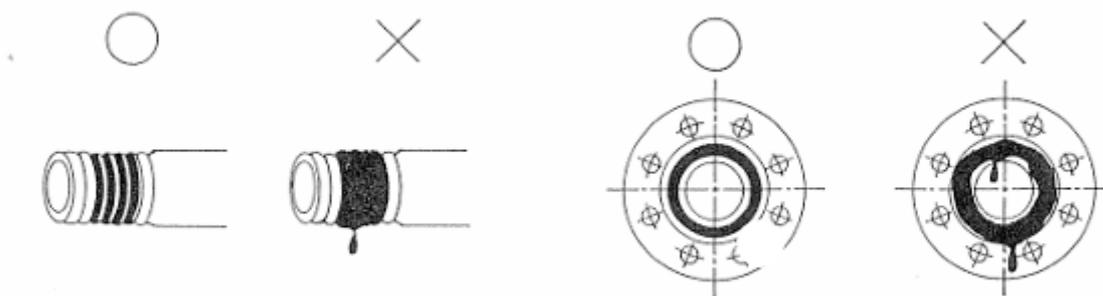
After flushing the piping to remove chips, foreign matter, etc., install the fluid operated valve.



2-2. Sealing

Use sealant specified by the city gas manufacturer.

For threaded connections, apply the sealant starting from the second thread beyond the tip of the pipe thread to prevent sealant from flowing into the pipe. For flanged connections, apply the sealant to the flange face while taking care to prevent sealant from flowing into the pipe or valve interior. Exercise extreme caution to prevent leakage.



2-3. Thread length

Maintain the effective thread length of the gas pipe.

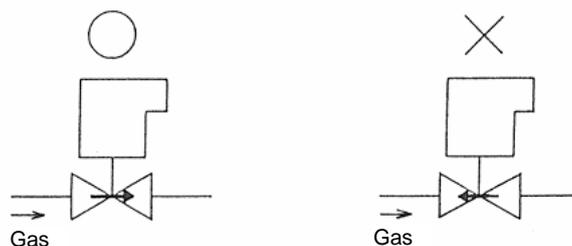
If it is too long or too short, it may cause damage and leakage.

In addition, use a file to cleanly sand down about half a pitch from the tip of the screw.



2-4. Flow direction

Install in the direction of the fluid operated valve indicated by the arrow on the valve body.

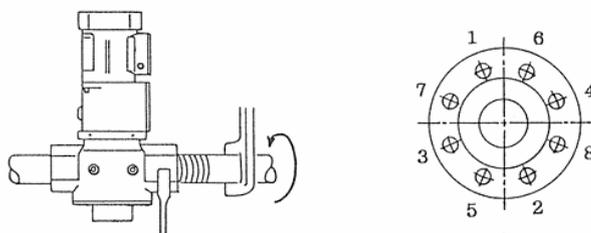


2-5. Installation

Avoid using the actuator for installation.

For screw-in connections, grip the body connection port across the width of the body with a wrench, etc., and screw in the piping.

For flange connections, use an appropriate gasket and tighten the flange bolts in the order shown in the diagram below with even torque to avoid uneven tightening.



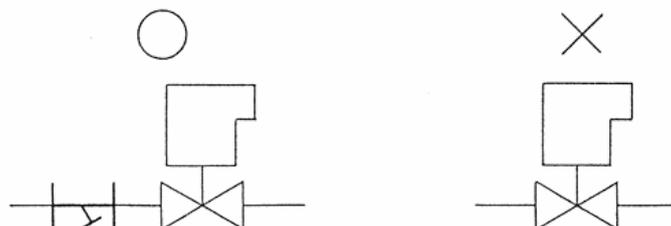
2-6. Mounting posture

Install vertically with the actuator section facing upward, or install horizontally with the terminal box surface of the actuator body facing upward.



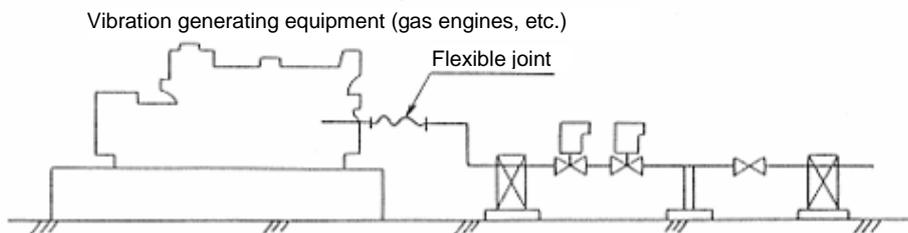
2-7. Filter installation

Install CKD's gas filters from the "GFK" "KGF" series upstream of the fluid operated valve to remove debris and foreign matter.



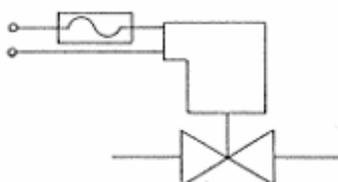
2-8. Anti-vibration measures

When using a fluid operated valve in vibration-type equipment such as a gas engine, install it so that vibration is not transmitted to the fluid operated valve by using a displacement absorbing joint or the like.



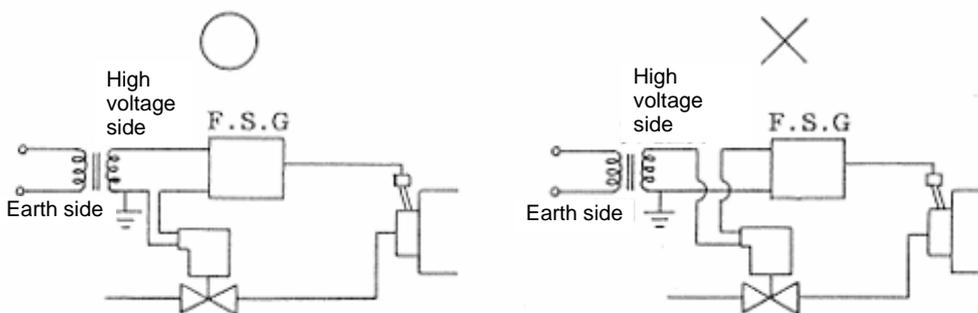
2-9. Fuse installation

When installing a fuse in the fluid operated valve circuit, use one with a capacity of 3A. Use wires with a cross-sectional area of 0.75 mm² or greater, and secure the ends with solder.



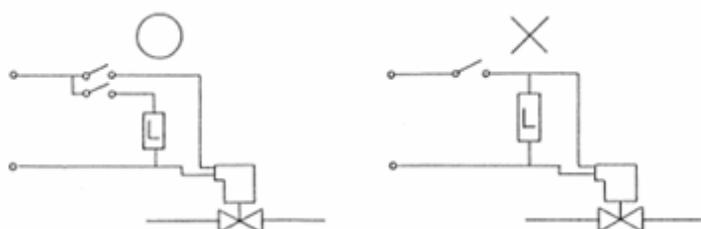
2-10. Wiring

When wiring the power supply, connect the high voltage side and the earth side correctly as shown in the diagram below.



2-11. Surge voltage prevention

When connecting a fluid operated valve and an inductive load (for example, a motor or multiple relays) in parallel, wire as shown in the diagram below so that surge voltage is not applied to the fluid operated valve.



2-12. Power connection to the fluid operated valve

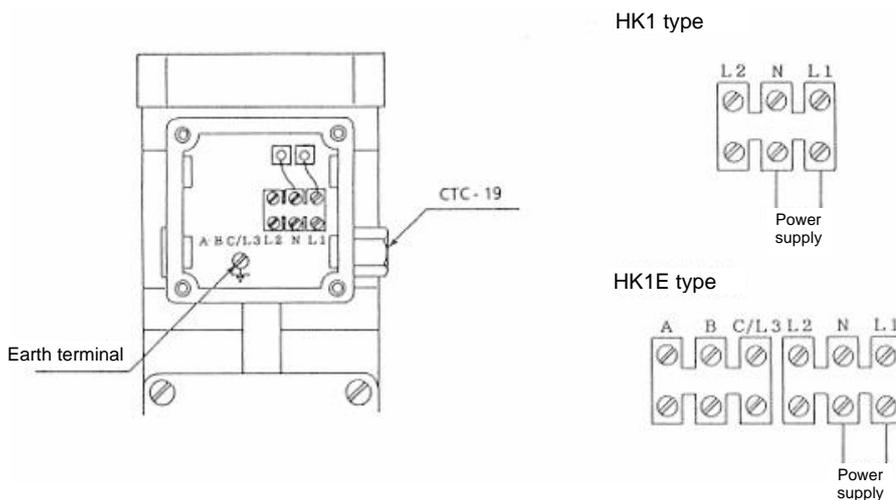
After completing the connections as shown below, apply the rated voltage and check that the valve operates. In addition, check that the valve returns to its original closed state within one second after power is turned off.

To prevent electric shock, connect the earth terminal to the ground.

<HK1, HK1E type>

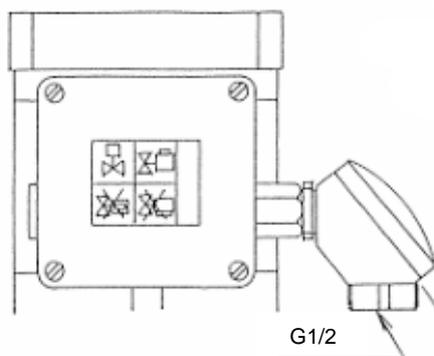
Remove the terminal box cover (3) in Figure 1 on page 2 and connect the power supply to the power terminals N and L1 through the CTC-19 conduit.

After completing the connections, attach the terminal box cover.



<HK1-B, HK1-ZZ, HK1E-B, HK1E-ZZ type>

HK1-B, HK1-ZZ type

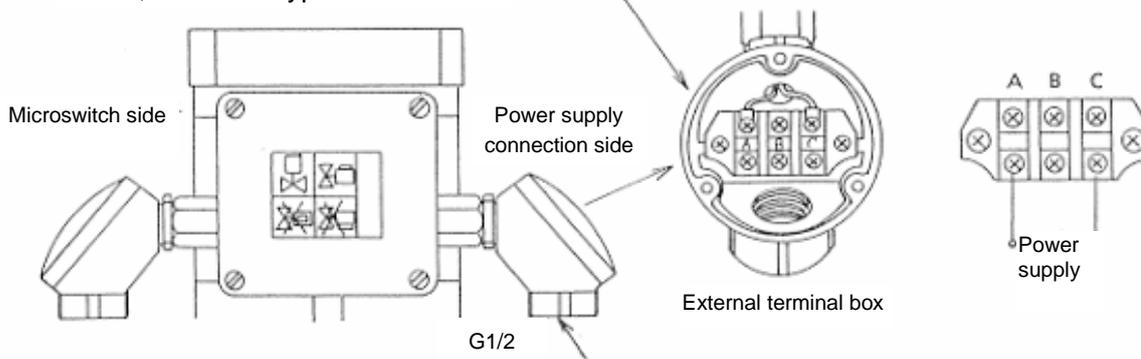


Remove the cover from the external terminal box (see left diagram), then connect the power source to terminals A and C through the G1/2 conduit.

After completing the connections, attach the external terminal box cover.

Note: The HK1-ZZ and HK1E-ZZ types are designed for outdoor use, so after connecting the power supply, take measures to waterproof the G1/2 conduit to prevent water from entering.

HK1-B, HK1E-ZZ type



2-13. Open/Close indicator (HK1E, HK1E-B, HK1E-ZZ type)

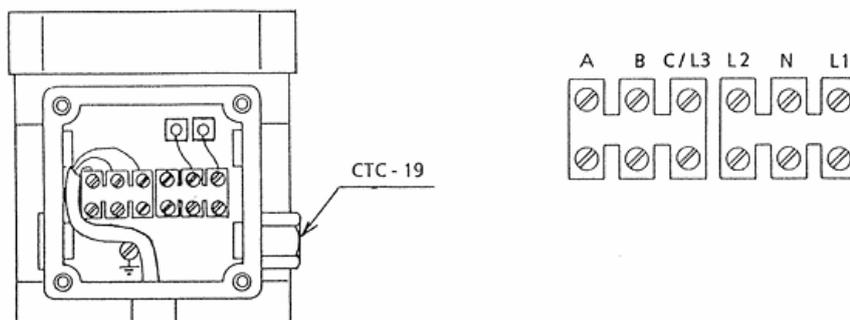
For types with a built-in microswitch for checking the open/closed state of the valve, the valve open/close signal can be output to the outside as an electrical signal by using terminals A, B, and C.

In addition, even for types with built-in microswitches, the obtainable gear ratio and lead wire connections differ depending on factors such as the microswitch mounting method. Refer to the information below.

<HK1E type>

Remove the terminal box cover (3) in Figure 1 on page 2 and connect them to the terminals as shown below through the CTC-19 conduit.

After completing the connections, attach the terminal box cover.



HK1E type (with microswitch for checking valve opening)

- When the valve is open: Conductivity between terminals A and B
- When the valve is not open: Conductivity between terminals A-C/L3

HK1E-ES type (with microswitch for checking valve opening and closing)

- When the valve is open: Conductivity between terminals A and B
- When the valve is closed: Conductivity between terminals B-C/L3

HK1E-S type (with microswitch for checking valve closing)

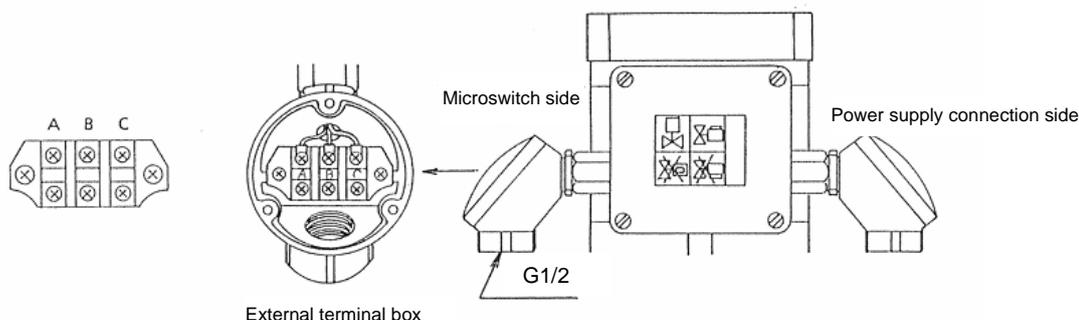
- When the valve is closed: Conductivity between terminals A and B
- When the valve is not closed: Conductivity between terminals A-C/L3

<HK1E-B, HK1E-ZZ type>

Remove the external terminal box cover shown below, and connect the lead wires to the terminals as shown below through the G1/2 conduit.

After completing the connections, attach the external terminal box cover.

Note: The HK1E-ZZ type is designed for outdoor use, so after connecting the lead machine, take measures to waterproof it so that water does not get in through the G1/2 conduit.



- HK1E type (with microswitch for checking valve opening)
 - When the valve is open: Conductivity between terminals A and B
 - When the valve is not open: Conductivity between terminals A-C

- HK1E-ES type (with microswitch for checking valve opening and closing)
 - When the valve is open: Conductivity between terminals A and B
 - When the valve is closed: Conductivity between terminals B-C

- HK1E-S type (with microswitch for checking valve closing)
 - When the valve is closed: Conductivity between terminals A and B
 - When the valve is not closed: Conductivity between terminals A-C

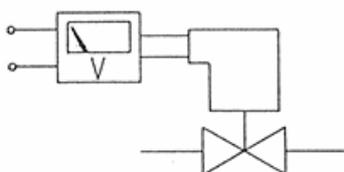
3. Precautions during trial operation

3-1. Confirmation of specifications

Check that the voltage, gas pressure, etc. conform to the specifications printed on the fluid operated valve nameplate.

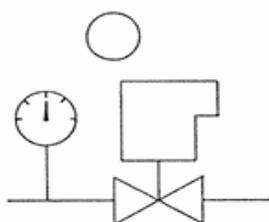
<Power supply voltage>

Make sure that the power supply voltage is within the range of -10 to +10% of the rated voltage.

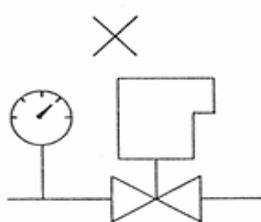


<Operating pressure>

Make sure that the inlet pressure of the fluid operated valve does not exceed the maximum operating pressure indicated on the nameplate.



Within maximum operating pressure



Outside the maximum operating pressure

<Ambient temperature>

Make sure that the ambient temperature at the installation location of the fluid operated valve is within the allowable range indicated on the nameplate.



Within the allowable ambient temperature



Outside the allowable ambient temperature

3-2. Cause of leakage

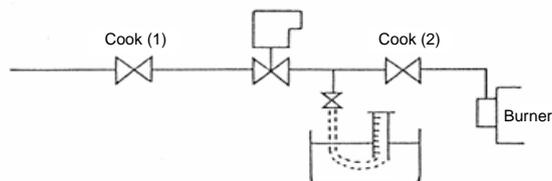
<External leakage>

Check with a gas leak detector or soapy water to see if there are any external leaks from the piping connections.

<Internal leakage>

Open the cock (1) and close the cock (2), connect a rubber hose to the end of the fluid operated valve, and submerge the end in water about 10 mm to check for leaks by checking for bubbles.

Accurate measurement of leakage volume should be performed by collecting gas in a graduated cylinder filled with water.



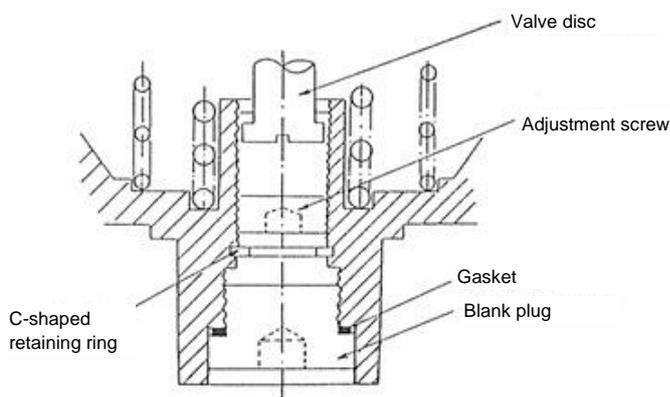
3-3. Flow control

- 1) Remove the blank plug and gasket shown in the right figure.
- 2) The flow rate can be adjusted by turning the flow rate adjustment screw with a hexagon wrench (opposite side 10 mm).

Clockwise rotation:
Flow rate decreases
Counterclockwise rotation:
Flow rate increases

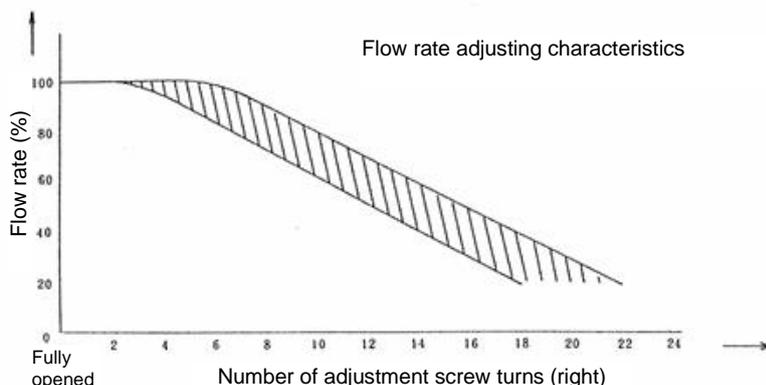
The flow rate adjustment range is 0 to 100% of the maximum flow rate. The maximum flow rate is set at the time of shipment.

- 3) After completing the adjustment, install the gasket and blank plug. After installation, check that there is no external leakage from this point.



Note: Please note that for types with a built-in microswitch for checking the open/close status of the valve (HK1E, HK1E-ZZ types), adjusting the flow rate may result in the valve open/close signal not being obtained.

The relationship between the number of rotations of the adjusting screw and the flow rate is shown in the figure below.



4. Periodic inspection

Carry out periodic inspections in accordance with the periodic inspection procedures for safety shut-off valves as described in the safety standards listed below.

Issued by The Japan Gas Association

"Safety Technical Indicators for Gas Boiler Combustion Equipment"

"Safety Technical Indicators for Industrial Gas Combustion Equipment"

"Safety Technology Indicators for Gas Engines Used for Power Generation"

Issued by The Japan Refrigeration and Air Conditioning Industry Association

"Safety Standards for Gas Absorption Chillers and Heaters (JRA-4004)"

"Safety Standards for Small Gas Absorption Chiller-Heaters (JRA-4016)"

"Technical Specifications for Regular Maintenance of Gas-Absorption Chillers"

5. Trouble shooting

Trouble	Cause	Check	Remedy
1. The valve does not open	a. Malfunction of the control circuit	Allowable voltage range for measuring terminal voltage inside the actuator terminal box AC 100/200 V, $\pm 10\%$	If the measured voltage is not within the range shown on the left, inspect and repair the electrical circuit
	b. Excess pressure applied	Check the pressure to see if it exceeds the maximum operating pressure	Inspection and repair the pressure regulator
	c. Hydraulic motor stopped due to faulty pressure switch	No hydraulic pump noise inside the actuator	Replace the actuator
	d. Oil leakage due to malfunction of relief valve	The hydraulic pump can be heard operating, but the actuator piston rod does not move	Replace the actuator
	e. External leakage of hydraulic oil	Check for leakage from the scraper Check for leakage from the cap gasket	Replace the actuator
2. The valve does not close	a. Malfunction of the control circuit	Measure terminal voltage inside the actuator terminal box	If voltage is applied, inspect and repair the electrical circuit
3. External leakage	a. Poor sealing of piping connections	Check for leakage from piping connections	Repair the seal of the piping connections
	b. Damage to the O-ring in the valve rod slide	Contact your nearest service center. (Never disassemble)	Repair by a designated service technician
4. Internal leakage	a. Foreign matter adhering to and damage to the valve disc and valve seat	Contact your nearest service center. (Never disassemble)	Replace the entire product or have it repaired by a designated service technician
5. Low flow rate	a. Improper adjustment of the flow rate adjustment screw	Checking the flow rate adjustment screw	Adjust the flow rate adjustment screw
	b. Clogging of the strainer	Contact your nearest service center. (Never disassemble)	Repair by a designated service technician
6. The microswitch does not work (E type only)	a. Misalignment of the mounting position	Inspect for loose screws on switches and L-shaped brackets for switch mounting	Tighten the mounting position adjustment
	b. Microswitch failure	Remove the microswitch wiring and check the continuity at the switch terminal	Replace the microswitch