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SM-9614-A/2

CKD

INSTRUCTION MANUAL
FAN ROTARY VALVE
FRB2V-10A~40A

- 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.

CKD Corporation

FOR SAFETY USE

The Product is to be used by those who has a basic knowledge about material, fluid, piping electricity regarding Control Valves (solenoid valves, motor valves, air operated valves and so on).

Never use this Product by those who have no knowledge or are not well trained about Control Valves.

Should be any trouble or accident caused by a wrong selection and/or wrong use of the Product even by a person of basic knowledge about Control Valves, we are not responsible therefore.

Since any customer of the Product have a variety of its application, we are not in a position to get all the information on how and where the Product is used.
There may be the cases where that the Product may not meet customers' requirement or may cause any trouble or accident ,by fluid ,piping or other condition that are not within the specifications of the Product.
Under such a circumstance, select with their responsibility the most suitable application and use of the Product according to the customers' requirements.

The Product incorporates a various safety arrangement, however miss-handling of the product may lead to any trouble or accident on customers side.
To avoid any possibility of trouble, read this INSTRUCTION MANUAL carefully and understand it fully.

Pay your attention to the items described in this Text, as well as the items indicated below.

⚠ CAUTIONS

- When energized, heat is generated at coil portion of solenoid valves and motor valves particularly "Class H "coil where may have high temperature.
- There may have electric shock when wire connecting portion of solenoid valves or motor
  valves are touched. In case of disassembly or inspection, turn off power supply beforehand. Do not touch live portion by wet hands.
- Make piping so as not to have leakage and check for no leakage before use, because in case of control valves for high temperature fluid like steam, leakage may cause heat injury

Thank you for choosing FRB2V-series fan rotary valves. CKD's products are all nufactured under strict quality control for your worry-free.
For more effective use of CKD's products, read through this operation manual.

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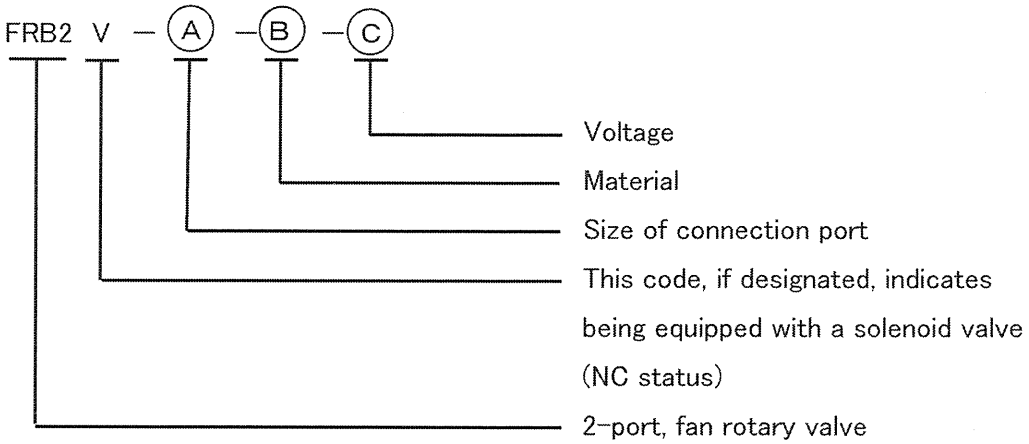
1. Designation of Model



A	Size of connection port
10A	Rc 3/8 ※
15A	Rc 1/2
20A	Rc 3/4
25A	Rc 1
32A	Rc 1 1/4
40A	Rc 1 1/2

B	Material		
	Body	Valve sheet	Shaft seal
Non Code	Bronze	PTFE	FKM,NBR
E	Stainless steel	PTFE	FKM

C	Voltage
AC100V	AC100V (50/60Hz) , AC110V (60Hz)
AC200V	AC200V (50/60Hz) , AC220V (60Hz)
DC24V	DC24V

※ When port size of 10A stainless steel bodey isn't available.

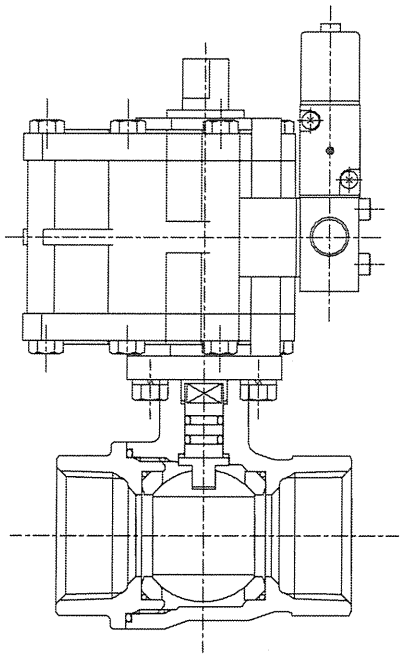
2. Operation and Internal Construction and Parts LIst

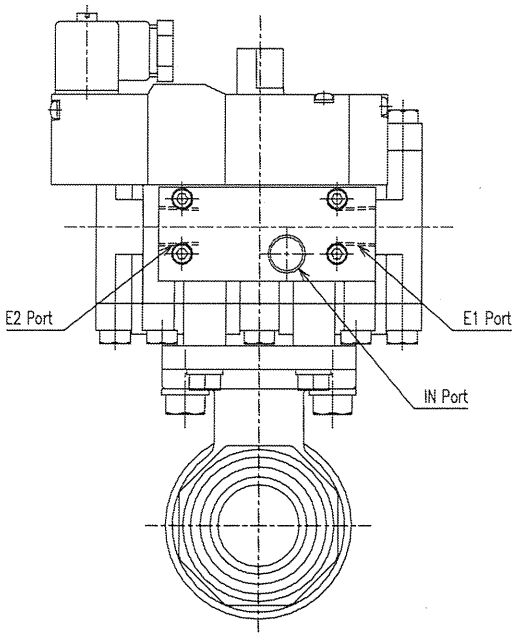
2-1 Operation

(1) Opening operation (fully closed → fully open)

Charge air through the IN port to a certain pressure and energize the solenoid valve coil, the valve ball will open, allowing the fluid to flow.

(Exhausted from the E1 port)

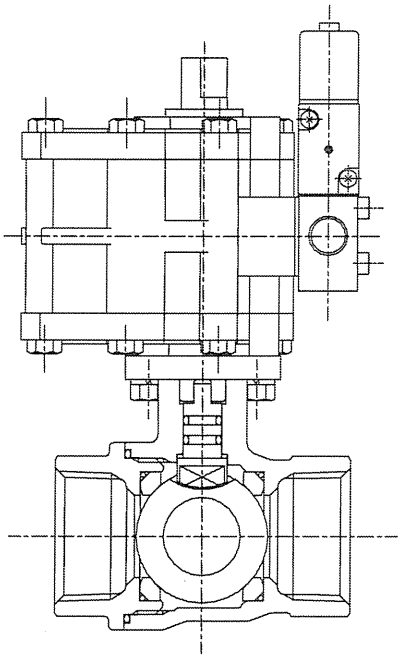


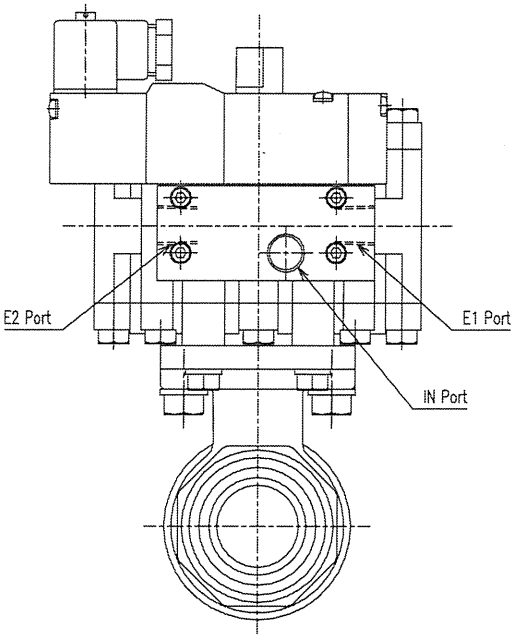


(2) Closing operation (fully open → fully closed)

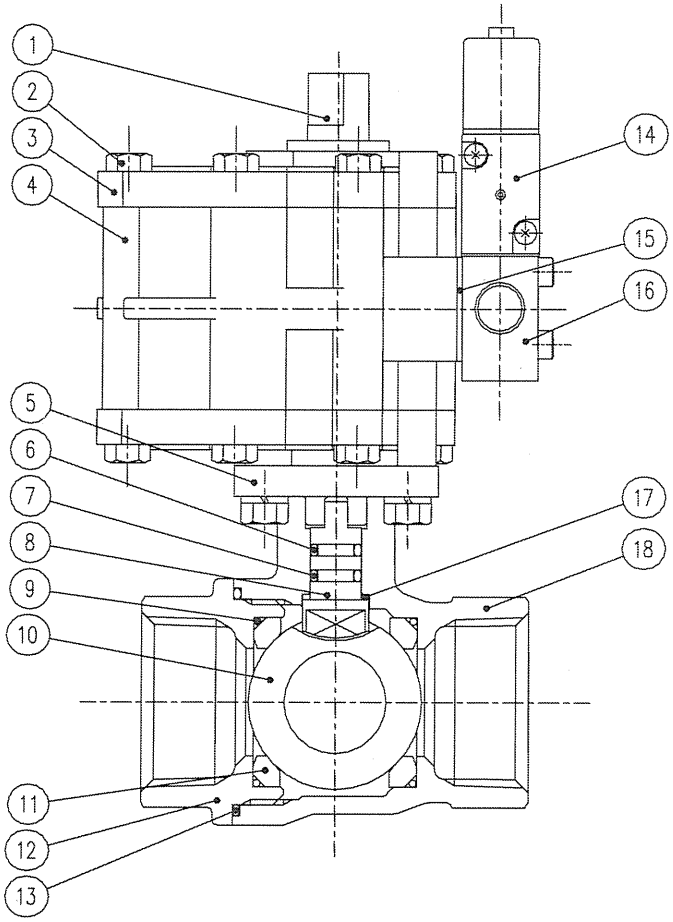
Charge air through the IN port to a certain pressure and stop energizing the solenoid valve coil, and the valve ball will become closed, stopping flow of the fluid.

(Exhausted from the E2 port)





2-2 Internal Construction and Parts List

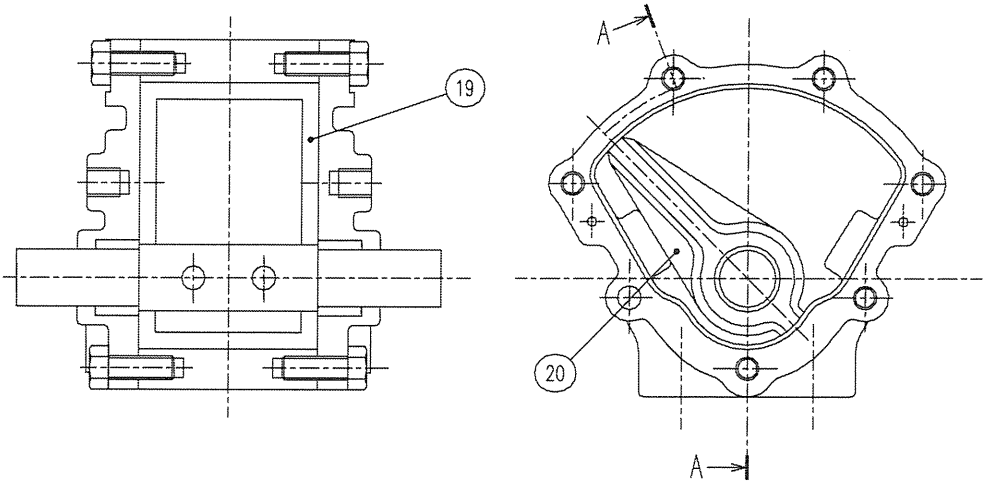


Part List		
Part No.	Part Name	Material
①	Driving shaft	S45C
②	Hexagon head bolt	SWCH
③	Cover	ADC12
④	Cylinder	ADC12
⑤	Frame	SS400
⑥	O-ring	NBR(FKM)
⑦	O-ring	FKM
⑧	Shaft	SUS303(SUS304)
⑨	O-ring	FKM
⑩	Valve ball	C3771,Hard chromium plating (SUS304)
⑪	Valve sheet	PTFE
⑫	Vale cap	CAC408(SCS13)
⑬	O-ring ※2	(FKM)
⑭	Solenoid valve	4KB119-00-B
⑮	Gasket	Cork
⑯	Sub plate	A2017
⑰	Spacer ※2	(PTFE)
⑱	Valve body	CAC408(SCS13)
⑲	Packing	NBR
⑳	Vane	AC4B

※1 : The inside of ( ) is the case where the body material of a ball valve SCS13 (stainless steel).

※2 : When the body material of a ball valve is CAC408(bronze), there are not the O-rinng ⑬ and the apacer ⑰.

Internal Construction of Actuator



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3. Precaution in Handling

3-1 Precautions for Operation

(1) Use within the specified pressure range. Use at pressures outside the range may cause malfunctions or greatly shorten its life.

(2) It is recommended that the pilot-operating section be used without lubrication. If the valve is lubricated, however, continue to lubricate it. If lubrication is stopped, wear of the packings will advance, causing malfunctions or air leakage. As lubricating oil, use an equivalent of classification 1, ISO VG32 (JIS #90) turbine oil. Also, use a filter with a filter element of 5 μm or smaller in mesh size.

(3) Strictly observe the specified conditions of ambient temperature, fluid temperature, and operation frequency.

(4) Do not put a heavy object on the actuator, and do not use it as a footboard.

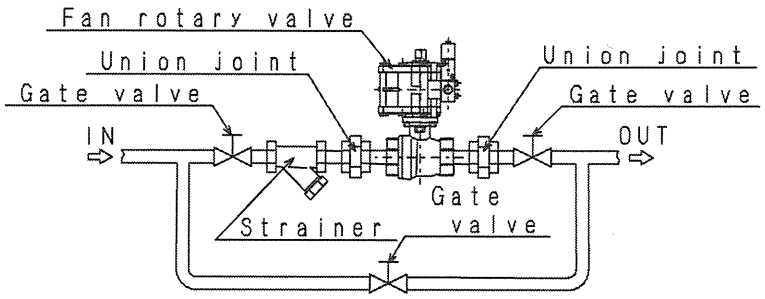
(5) Incorporation of solid impurities into the fluid may damage the valve ball, valve sheet, or O-ring, causing inward and outward leaks; so be sure to mount on the inlet side of the valve: an appropriate air filter or a water strainer of 80 mesh or larger.

(6) This valve is for indoor use. Do not use this outdoors.

3-2 Precautions for Piping Work

(1) Any mounting positions are permitted. Secure the valve with the piping support for the ball valve section.

(2) It is recommended that the pipes be arranged as illustrated below.



For easy maintenance and inspection, use union joints or flange joints, and install bypass pipes.

(3) Before mounting this valve, remove foreign matter such as dust and scale from the piping. Flush the piping carefully to ensure the removal of chips, welding residue, and other dirt, which were produced during the piping work, because they may be caught in the valve sheet and thereby cause leaks.

(4) Fix the product when tightening or reinstalling the pipeing. When pipeing to the body side, fix the body, and when piping to the cap side, fix the cap.

(5) When the valve is tightened, please apply the torque indicated on the diagram blow.

size of port	torqe (N・m)
10A	31～33
15A	41～43
20A	62～65
25A	83～86
32A	97～100
40A	104～108

(6) Support and secure the piping so that its weight and vibration are not applied directly to the valve.

(7) If there is a possibility of the fluid becoming frozen, perform an antifreezing treatment, for example, a heat retaining treatment.

(8) Secure sufficient space for disassembly of this valve during maintenance and inspection.

(9) The parts (tube, joint) fitted on the ports of the pilot-operating section should be selected according to the specifications and the application of the pilot-operating solenoid valve. (For details, refer to the catalogue.)

(10) After completion of the piping work, check the connections for leaks. Also, conduct the operation test several times with the fluid.

3-3 Precautions for Wiring Work

(1) Voltage should be within plus or minus 10% of the rated voltage.
Frequency can be either 50 or 60Hz (in the case of alternating current).

(2) Wires used should be over 0.3 square milimeter in nominal sectional area.
If cabtyre cords are used in the small terminal box, use wires of 6.6 or less in diameter.

(3) For the other detailed specifications about 4KB119, refer to the catalogue for our SELEX VALVE 4KB.

4. Maintenance and Inspection

4-1 Periodic Inspection

(1) To use the valve in an optimum condition, perform periodic inspections, ordinarily, every 6 months.

(2) Inspection items

a) Check the bolts and the like for looseness.

b) Check the valve for inward or outward leaks.

c) If the valve is not operated for a long period of time, conduct a non-load run periodically to check for abnormality.

4-2 Disassembly, Assembly, and Inspection

4-2-1 Disassembly (When the body material is stainless steel)

(1) Prior to disassembly, always relieve the pilot-air and fluid pressures.
Then bring the ball valve into the half-opened condition by manual operation, see paragraph 4-3, to check for internal pressure.

(2) Remove the hexagon head bolt ⑩, and spring washers ⑨, then the actuator assembly and ball valve assembly can be disconnected.

* Disassembly of the ball valve assembly. (Replacement of the valve ball, valve sheet, and O-ring)

(3) Close the ball valve.

(4) Hold the opposite sides of the octagon-shaped valve body ⑧ and remove the valve cap ⑪, with the monkey wrench or a similar tool, then take out the valve ball ⑮.
If the valve ball has defects such as flaws and corrosion, replace it with a new valve ball.

(5) When replacing the valve sheets ⑭, and the O-rings ⑬, first remove those from the valve body ⑧ and valve cap ⑪, and then check the places where they are fitted, for corrosion or the attachment of foreign matter.

(6) Remove the shaft ⑦ from the valve body ⑧. If the O-rings ⑤ have flaws or permanent strain, replace those with new ones.

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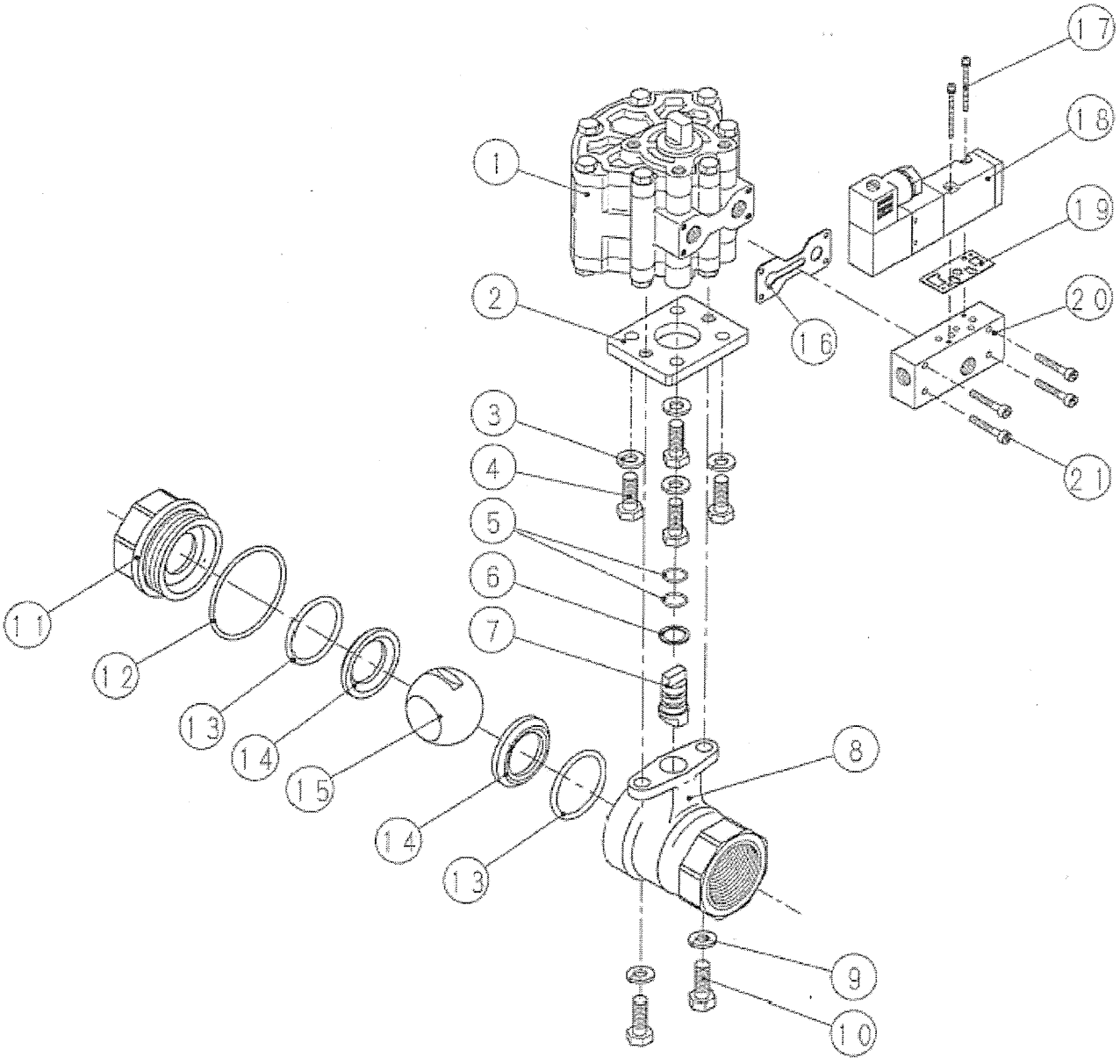
Part No.	Part Name	Part No.	Part Name
1	Actuator assembly	11	Valve cap
2	Frame	12	O-ring
3	Spring washer	13	O-ring
4	Hexagon head bolt	14	Valve sheet
5	O-ring	15	Valve ball
6	Spacer	16	Gasket
7	Shaft	17	Cross recessed head machine screw
8	Valve body	18	Solenoid valve
9	Spring washer	19	Gasket
10	Hexagon head bolt	20	Sub plate
		21	Hexagon socket head cap screw



4-2-2 Assembly

(1) When reassembling the valve, reverse the disassembly procedures.

(2) Apply a coat of grease* to the O-ring ⑤, ⑫, ⑬ and the sliding surfaces of the shaft ⑦.

* Made by the Shin-Etsu Kagaku Co., Ltd: Shin-Etsu silicon G-30H or equivalent.

(3) When tightening the valve cap ⑪, torque to the value shown below.

size of port	torqe (N・m)
10A	38～42
15A	38～42
20A	76～84
25A	95～105
32A	171～189
40A	209～231

4-2-3 Inspection

(1) Pressurize the fluid and check for internal leaks in the fully closed state by manual operation.

Then bring the valve to the half-opened state to check for outward leaks.

(2) Next, pressurize the pilot air to check for normal closing and opening operations.

4-3 Manual Operation

Cut off the pilot air, relieve the residual pressure in the actuator, set the monkey wrench on the opposite sides of the shaft at the top of the actuator, then rotate slowly.

4-4 Troubleshooting

When the valve does not operate normally, check according to the table below.

Fault	Causes	Measures
Valve will not operate	Actuator operating pressure is too low.	Ajust within the specified operating pressure range.
	Actuator operating pressure is not switched.	Investigate the operating valve.
	Controlled fluid pressure is too high.	Set the pressure within the specified range.
	Controlled fluid viscosity is too high.	Reduce the viscosity below 500 mm^2/S.
	Foreign matter in the controlled fluid, such as solids, are caught.	Check the inside of the ball valve to remove the cause.
	Foreign matter are stuck to the valve sheet or valve ball.	
	No electric signal is sent to operating solenoid valve.	Send an electric signal to the operating solenoid valve.
	Input voltage to operating solenoid valve is wrong.	Apply the rated voltage.
Valve operates abnormally	Actuator operating pressure is too low.	Ajust within the specified operating pressure range.
	Controlled fluid pressure is too high.	Set the pressure within the specified range.
	Foreign matter in the controlled fluid, such as solids, are caught.	Check the inside of the ball valve to remove the cause.
	Foreign matter are stuck to the valve sheet or valve ball.	
Leaks are occurring. (Valve is not closed completely)	Foreign matter in the controlled fluid, such as solids, are caught.	1.Replacement of ball valve. 2.Repair of ball valve. (Replacement of valve ball, Replacement of valve sheet, Replacement of O-ring)

When your problem turns out to be difficult to solve by yourself, consult us or our agency through the store from which you purchased the valve with the model and size of your valve, the fluid used, and the fault content.