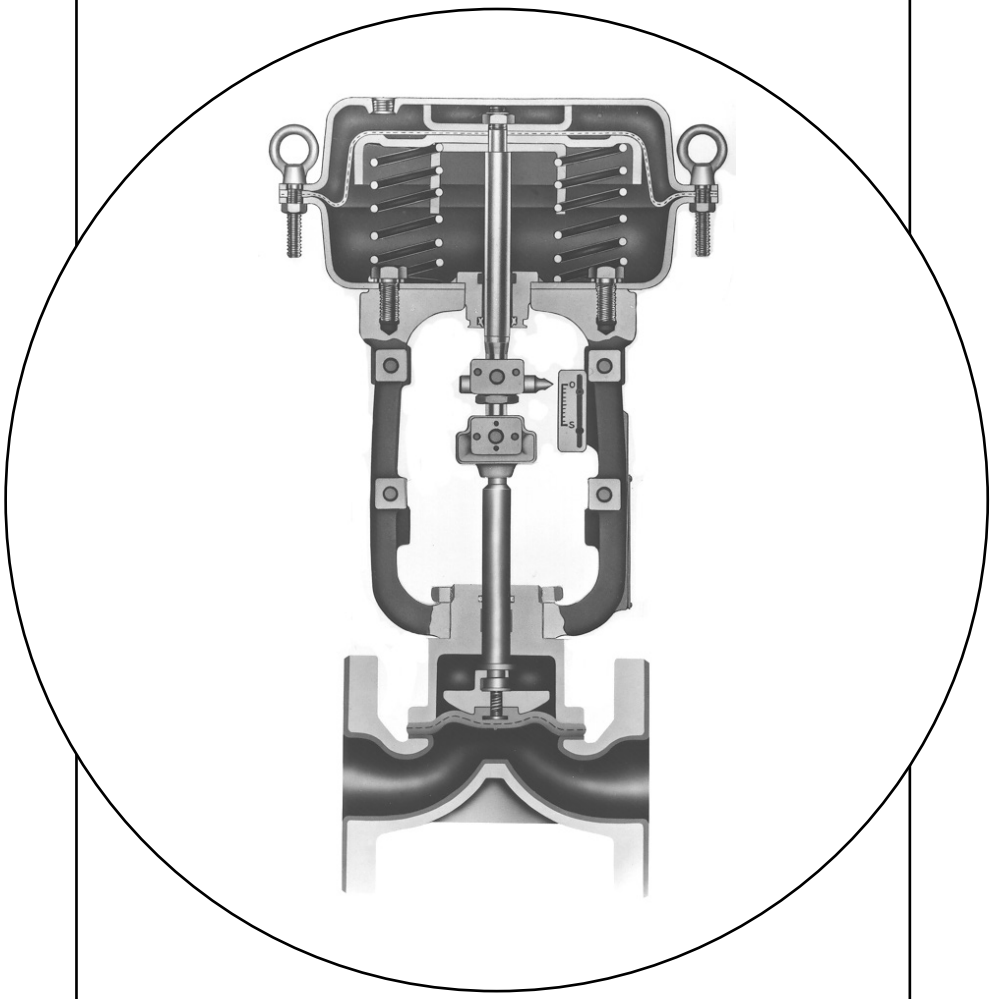
azbil

OM2-8110-0530

Weir Diaphragm Control Valve

Model VDD_ _ _

User's Manual



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Conventions Used in This Manual

■ The safety precautions explained below aim to prevent injury to you and others, and to prevent property damage.

WARNING	**Warnings are indicated when mishandling this product may result in death or serious injury.**
CAUTION	**Cautions are indicated when mishandling this product may result in minor injury or property damage only.**

■ In describing the product, this manual uses the icons and conventions listed below.

Indicates that caution is required in handling.

The indicated action is prohibited.

Be sure to follow the indicated instructions.

Precautions for Safe Operation

⚠ WARNING

Before starting to work, check that the pressure in the pipes has dropped to atmospheric pressure. If fluid spews out, injury may result.

⚠ CAUTION

Do not stand on the device or use it as a step. There is a risk of falling.
Do not touch the device unnecessarily while it is operating. Depending on the operating conditions, the surface might be extremely hot or cold.
Since this product is heavy, when handling it, wear safety shoes and watch your step.
During work, wear protective goggles to prevent injury from flying objects and harm from chemicals.
During work, wear protective gloves to prevent injury from burrs on bolt heads or edges and harm from chemicals.
While this device is operating, do not touch movable parts such as the stem connector. **Your hand, etc., may be caught in the mechanism and be injured.**
When assembling or disassembling the diaphragm, which is part of the actuator, wear protective gloves to prevent prolonged contact with your skin. "Prolonged contact" refers to total daily skin contact of 10 minutes continuously or 30 minutes intermittently.

Handling Precautions

■ Installation Precautions

⚠ WARNING

If the rated pressure or standards for connection are ignored when this device is used, damage to the product or leakage may cause a serious accident.
When connecting the valve to the piping, do not put your hand or foot under the valve or between flanges. You may lose your fingers or your foot may be injured.
Before reinstalling the valve after maintenance or modification, wash out any residual fluid in the pipes or replace it with a safe fluid. Otherwise, the residual fluid may cause an injury.

⚠ CAUTION

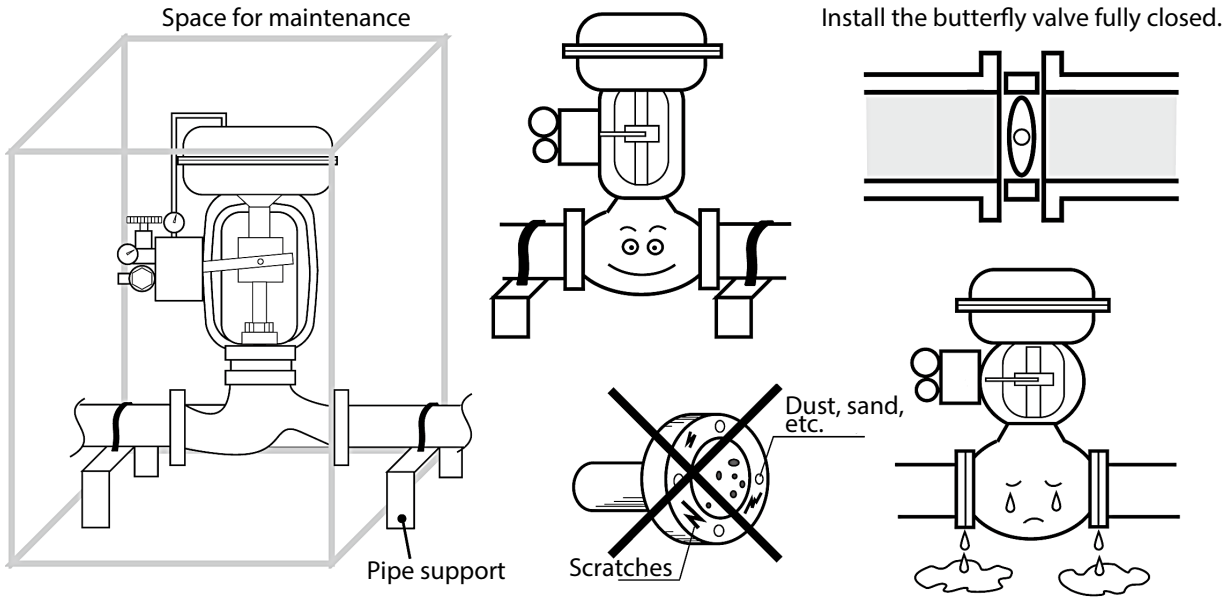
Make sure that there is a straight pipe section at least 10 times the pipe diameter on the upstream side and 6 times the pipe diameter on the downstream side (D: nominal diameter). If the straight pipe sections are not long enough, insufficient valve capacity or unusual noise or vibration could result.
Install the valve in the correct direction, leaving clearance around the valve as much as possible for easy maintenance (piping, wiring, adjustment, etc.).
Provide appropriate support for the valve itself and for connected pipes to prevent an excessive load from the weight and operation of the valve. (Care is needed especially for large valves and valves for low-temperature fluid.)
If the valve is installed along a passageway used by outsiders, install a fence or cover as a protective measure.
Do not install the valve where it may be submerged by rainwater, covered with snow, or subject to freezing. Otherwise the valve might be damaged.
If the valve is exposed to radiant heat, provide a shielding plate or the like. Failure to do so may result in damage to the actuator or auxiliary equipment.
If the valve is exposed to salt or a corrosive atmosphere, take measures against corrosion. Otherwise the valve might be damaged.
Check that there is no damage to the valve (including the actuator and auxiliary equipment).
Check that there is no damage to the flanges or welded piping. **Otherwise fluid leakage could result.**
If pipe flanges connected to the valve are being welded, the valve surface may also heat up. Do not touch the valve unnecessarily.
Chamfer the edges of the pipe flanges. Sharp edges can cause an injury.
Check that the pipes on both sides of the valve are firmly supported. Insufficient support may cause leakage from pipe connections.
After installation, check that the pipes are still properly aligned. Misalignment may cause fluid leakage from pipe connections.
Install the butterfly valve with the valve (blade or disk) fully closed. Otherwise the valve might be damaged.
If the eyebolts (eyenuts) attached to the actuator are used to hoist the valve, make sure that the weight does not exceed the limit specified in the user's manual. An excessive load may damage the actuator or cause air leakage.

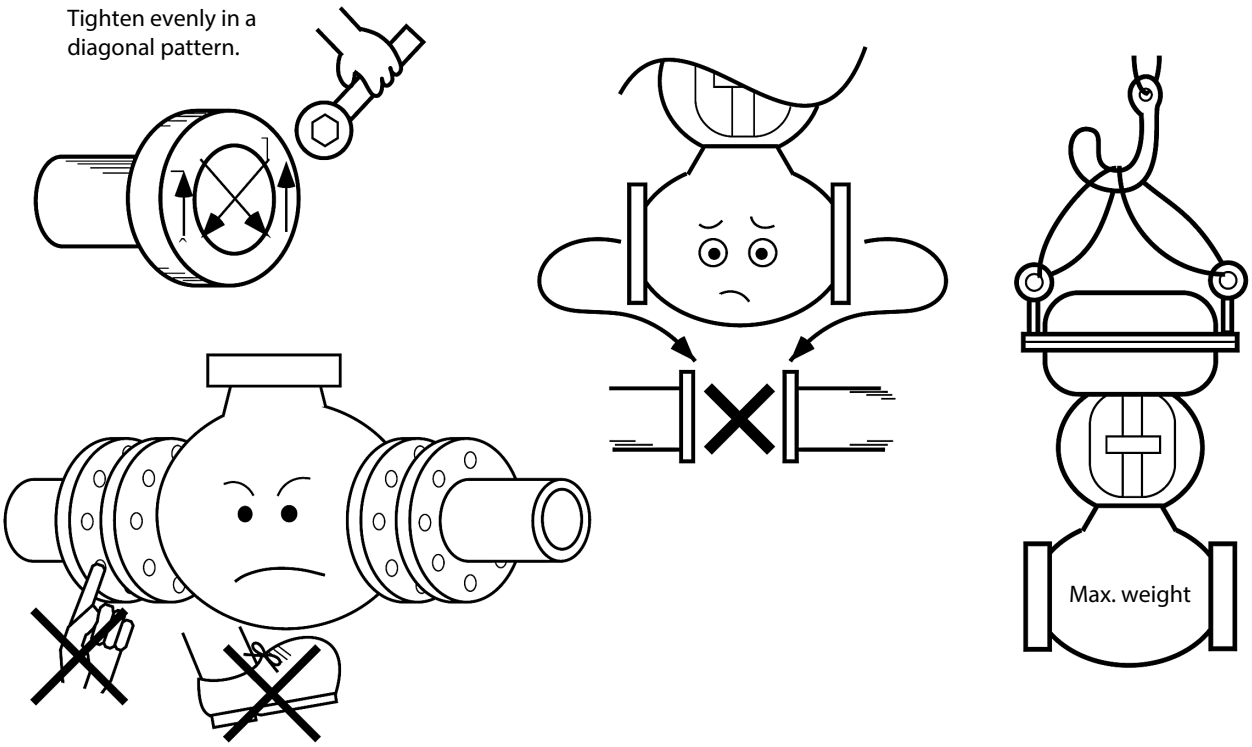
⚠ CAUTION

Use bolts and nuts that conform to the standards for the pipe flange. Otherwise fluid leakage could result.
Use new flange gaskets that are appropriate for the properties of the fluid, the operating temperature, and the pressure. Damaged gaskets may cause fluid leakage.
Open the valve fully before flushing the inside of the piping, and do not change the valve travel while the pipes are being flushed. Otherwise, the valve may be damaged by welding spatter or other foreign matter.
When keeping the valve warm or cold, also keep the stud bolts and nuts that connect the valve and the bonnet warm or cold. Otherwise, fluid leakage due to thermal deformation may occur.

Handling Precautions

- Avoid installing the valve where it will be subject to vibration or other external forces that may affect its performance.
- Protective covers are attached to the flanges to protect the gasket-contacting surfaces and to prevent foreign matter from entering the valve. When installing the valve, remove the covers.
- Check that there is no damage to the valve (including the actuator and auxiliary equipment).
- To prevent seat damage and impaired closing performance, remove foreign matter such as dust, sand, and welding spatter from the inside of the piping, and clean the inside of the valve.
- Check that the distance between the pipe flanges is equal to the total of the face-to-face length of the valve and the thickness of the gaskets.
- Tighten the bolts and nuts for the flanges evenly in a diagonal pattern.




Tighten evenly in a diagonal pattern.
Max. weight

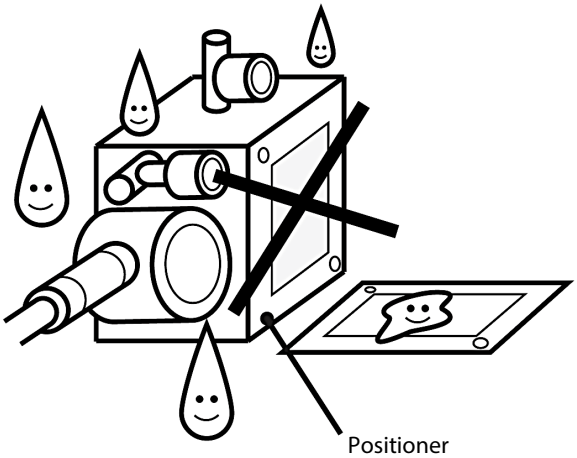
Precautions for Air Supply Piping and Electrical Work

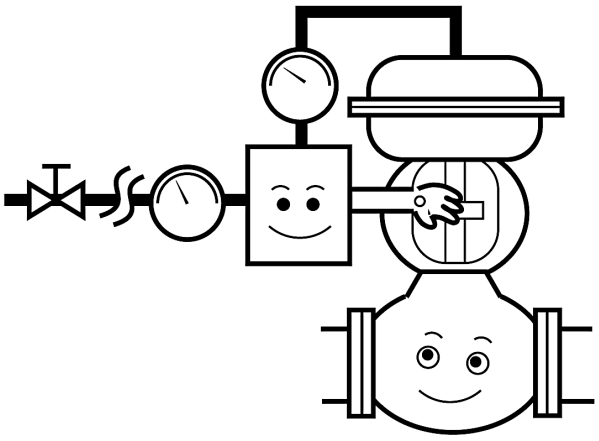
⚠ CAUTION

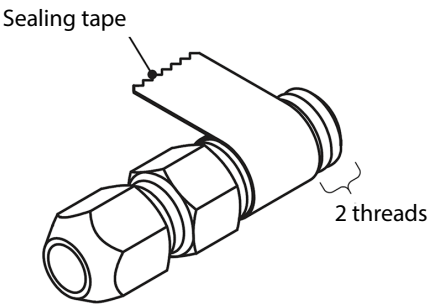
❗	**For air supply, use pipes with an appropriate internal diameter so that pressure will not drop while the valve is operating. Failure to do so may result in poor valve performance.**
❗	**Wiring work should be carried out only by qualified technicians following local electrotechnical standards.**
❗	**Cabling should be carried out in accordance with facility conditions. Use an adapter (and packing) whose size is appropriate for the outer diameter of the cable.**
⃠	**If sealing tape is applied to air supply pipe threads, leave the two threads nearest the tip bare. Clogging caused by pieces of tape may result in poor valve performance.**
❗	**If liquid packing (thread lock sealant) is used for air supply piping work, do not allow it to enter inside the pipes. If it does, poor valve performance may result.**
❗	**Avoid doing wiring work on a rainy day or in high humidity. Moisture inside connectors or the terminal box may cause a short-circuit or rust.**

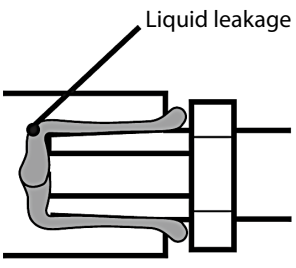
! Handling Precautions

- A packing (gasket) is attached to the cap of auxiliary equipment such as positioners.
  Do not lose it during wiring work.
- If it is necessary to bend the air supply pipes, make gentle bends (using a dedicated tool like a tube bender), and use a band to hold parallel pipes together.









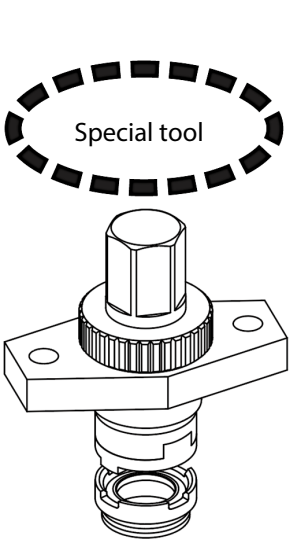
Precautions for Assembly and Disassembly

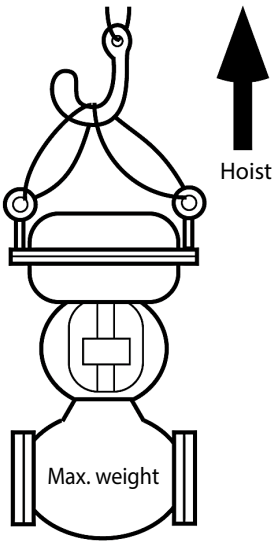
⚠ WARNING

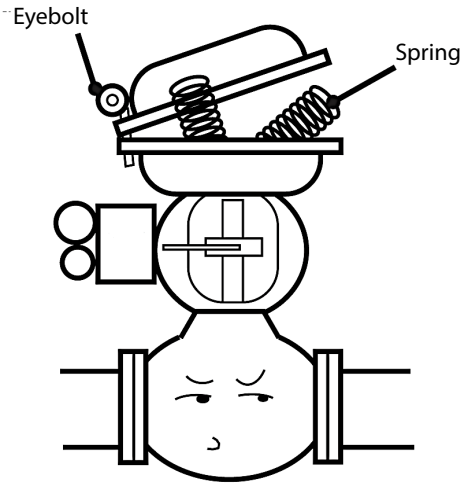
Before starting work, clean the inside of the valve, replace any residual gas, etc. Otherwise, the residual fluid may cause an injury.
Do not disassemble the pneumatic actuator while supply air pressure is being applied. The compressed air may cause an injury.
Because damaged or corroded bolts and nuts may damage the valve and cause injury, replace them with new ones.

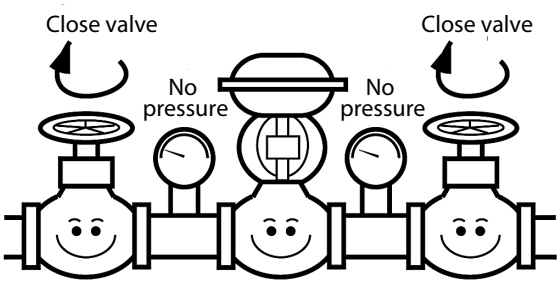
⚠ CAUTION

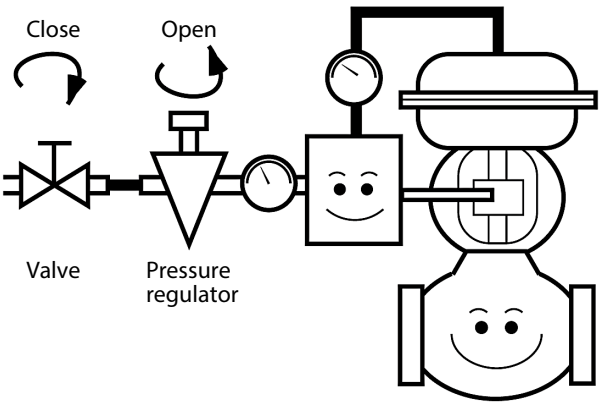
Observe the tightening torques indicated in the user's manual when tightening bolts and nuts.
For an actuator that incorporates springs, follow the disassembly procedure when removing bolts, nuts, etc. Otherwise, the springs may jump out, causing injury.
When removing the valve from the piping, if the eyebolts (eyenuts) attached to the actuator are used to hoist the valve, make sure that the weight does not exceed the limit specified in the user's manual. Otherwise, the valve may fall.
Before removing or attaching the trim (internal valve), check whether a dedicated tool is necessary. If it is needed, be sure to use it. Otherwise, parts may be damaged.
Assemble the valve using the parts, bolts, nuts, etc., in the order stated in the assembly procedure. Otherwise, malfunction may result.
When reassembling the valve body, always use new packing and gaskets. The reuse of old parts will cause fluid leakage.



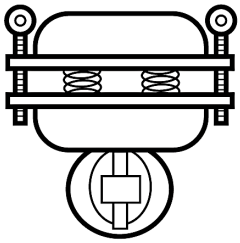




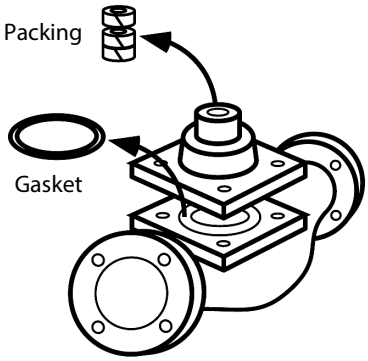




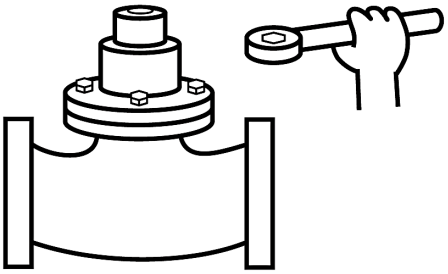
- Follow the assembly procedure



- Replace the packing and gasket



- Tighten bolts to specified torque



Precautions for Maintenance

⚠WARNING

If fluid leakage from the valve is found, stay away from the valve until safety can be confirmed. Depending on the properties of the fluid, a serious accident or injury may result.

⚠CAUTION

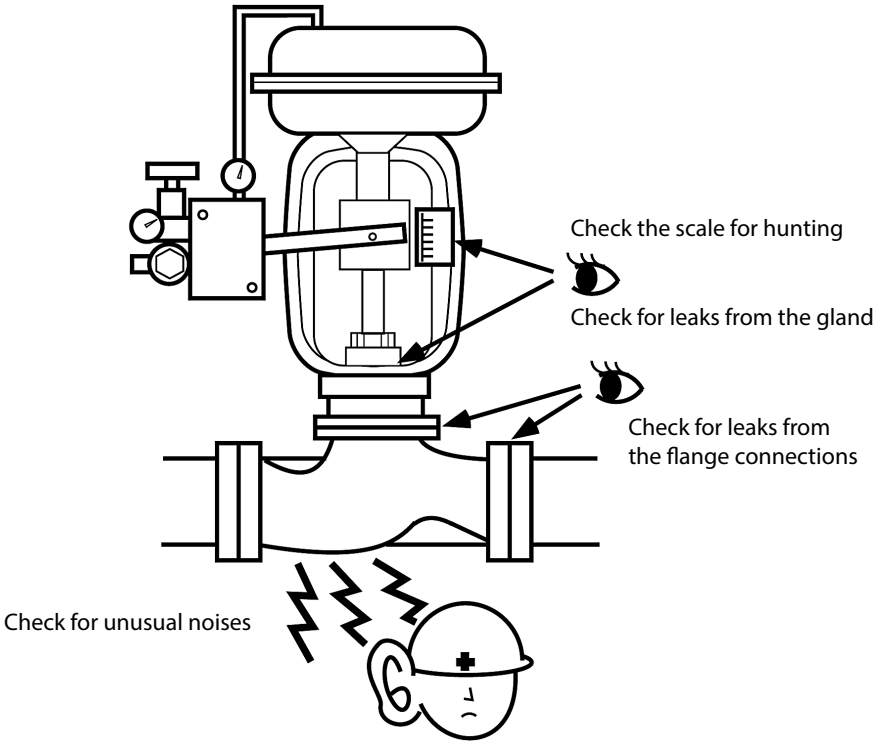
Check the gland daily, and tighten the packing if leakage is found.

Check valve operation daily, including a visual check for hunting.

During valve operation, look and listen for unusual noise or vibration.

Handling Precautions

- Avoid installing the valve where it will be subject to vibration or other external forces that may affect its performance.
- A packing (gasket) is attached to the cap of auxiliary equipment such as positioners. Do not lose it during wiring work.
- Take care not to lose screws for the cap of auxiliary equipment such as positioners.
- Make sure that the seal of cable glands and electrical conduits is sufficient to prevent the entry of moisture.
- Dispose of old parts that were replaced during valve disassembly or maintenance as industrial waste.
  If they are burned or discarded carelessly, environmental pollution will result.
- When assembling the valve, check that the packing (gaskets) are in place and tighten the screws evenly.



Introduction

Thank you for purchasing this control valve (hereafter, “the valve” or “this device”).

This manual contains information for ensuring the safe and correct use of the product.

■ Unpacking and Storing the Product

● Unpacking

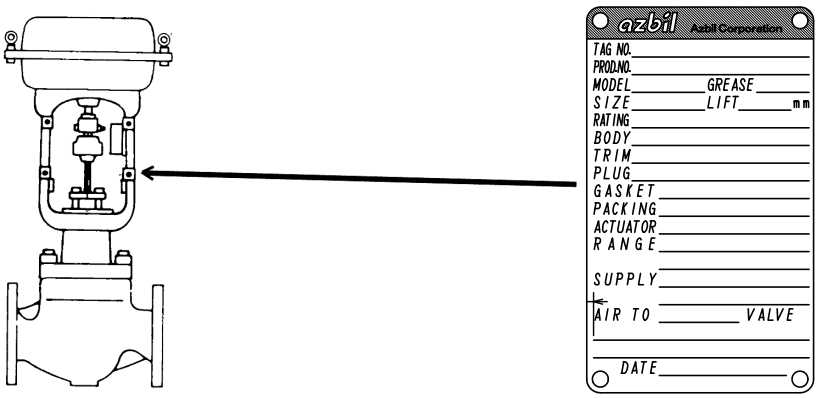
This valve is a precision instrument. Take special care in handling it to prevent accidents, damage, etc.

When unpacking, check that the following items are included:

- The valve, actuator, and parts to be mounted
- Any auxiliary devices that you ordered

● Checking the Specifications

Check that the fluid conditions, valve number (tag No.), and the specifications printed on the name plate are correct and appropriate. The location of the product’s nameplate is shown in the figure below.



● Inquiries

For inquiries about this device, contact the azbil Group.

When making an inquiry, have your model number and product number ready.

● Precautions for Storage

Observe the following precautions in order to store the purchased valve properly.

- If the valve is packed in a cardboard box, store it indoors at room temperature and humidity.
- A valve packed in a wooden crate should also generally be stored indoors at room temperature and humidity. For outdoor storage, after unpacking the valve and checking the specifications, cover it with a polyethylene protective sheet to keep rainwater out.

To store a valve that has been used, follow the instructions below.

1. Wash out any fluid stuck to or remaining in the interior of the valve.
2. If it is likely that the valve will corrode, take preventive measures.
3. Cover the openings for air supply and electrical conduit connections with waterproof caps or tape to keep water out.
   In addition, protect the threads on the connectors.
4. Protect the ends of piping connections (flanges, welded surfaces) using flange caps or the like.

Contents

Chapter 1: Overview

1.1 Scope

This manual contains handling instructions for the weir diaphragm control valve.

1.2 Composition

The weir diaphragm control valve is composed the valve body section and the actuator. The combinations of valve size, pressure rating, connection method, and material vary depending on the purpose of use.

For detailed specifications, see the specifications sheet (document No. SS2-8110-0530).

1.3 Structure

Figure 1-1 illustrates the structure of this device.

The valve body section consists of the valve body, diaphragm, spindle, compressor, bonnet, etc. The diaphragm controls the flow as it is driven vertically into or out of the weir section of the valve body by the actuator via the spindle and compressor.

The wetted parts are the bottom surface of the diaphragm and the inner surface of the valve body only. The multi-spring diaphragm actuator converts changes in air pressure into changes in position using the diaphragm and springs, thus adjusting the valve opening in accordance with the signal from the instrument.

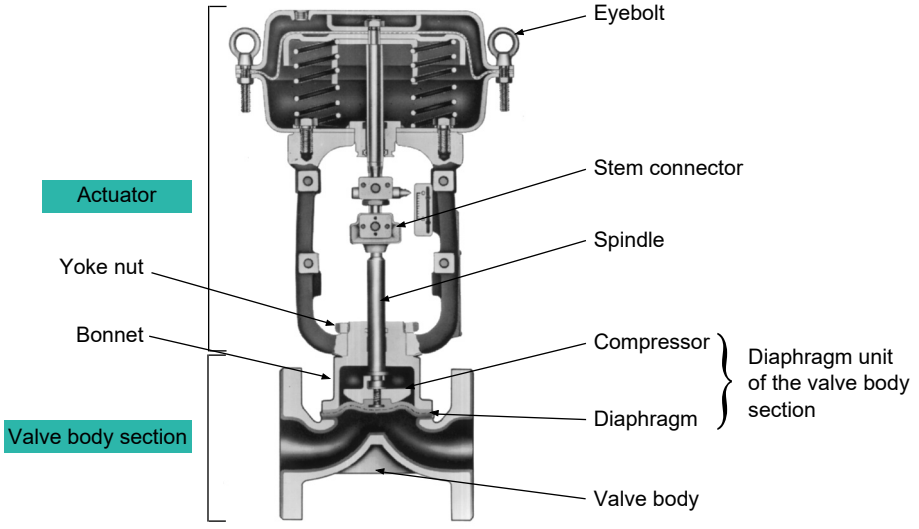


Figure 1-1

1.4 Nameplate

A nameplate (Figure 1-2) is attached to the control valve. The nameplate indicates the model number, valve size, pressure rating, material, date of manufacture, and other major specifications of the control valve. Check that the specifications indicated on the nameplate are appropriate for the application.

The nameplate also includes the product number (PROD. No.) of the control valve. When making inquiries about modification of specifications or replacement of parts, please include this number along with other information.

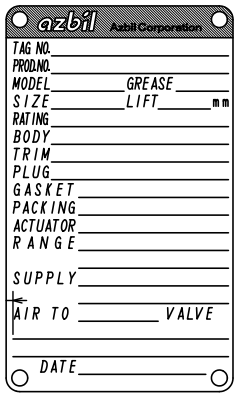


Figure 1-2 Nameplate

Chapter 2: Installation

~CAUTION

The inner surfaces of certain models of control valves are lined with glass, hard rubber, or other material which is not highly resistant to mechanical shock. Exercise care when handling these models.

2.1 Maximum Weight for Hoisting with Eyebolts

In principle, use the eyebolts* attached to the diaphragm case for mounting or removing the actuator only. When hoisting the valve body or accessories along with the actuator using the eyebolts, observe the maximum total weight shown below.

Table 2-1

Actuator model	Maximum weight (kg)	Product weight (kg)
PSA1	160	11-15
HA2	160	20-35
HA3	160	40-60
HA4	220	90-100

* A pair of bolts with a ring-shaped head that tighten the diaphragm case.

Note: The eyebolts included with the weir diaphragm control valve can be used to hoist the entire control valve. However, be extremely careful that no mechanical shock is applied to the control valve.

2.2 Installation on the Piping

(1) Before installing the valve on the piping, remove foreign matter (scale, welding spatter, etc.) from both upstream and downstream sides of the pipe.

(2) Make sure that the gaskets do not protrude into the flow path and constrict the inner diameter of the valve.
Be sure to use gaskets made of a material that is suitable for the process fluid.

(3) Make sure that no excessive stress is conveyed from the process pipe to the valve body. Tighten the bolts for flange connection evenly.

(4) Install the flange gaskets correctly, not slanted or off-center. Otherwise, damage on the valve body or poor seal of the gaskets may result.

(5) Before connecting the air pipes to the actuator and positioner, blow air through the pipes to remove dust and foreign matter.

(6) Do not keep the bonnet in damp or cold conditions.

(7) Do not drop the valve or subject it to impact.

(8) To change the orientation of the actuator, follow the procedure described in steps 1 and 2 in section 4-1, loosen the nuts that hold the yoke, rotate the actuator to the desired orientation, tighten the yoke nuts again, and then follow the procedure in steps 2–6 in section 4-4.

CAUTION

If a pressure regulator with air filter is mounted on this device, install this device on the piping so that the drain of the regulator faces downward. If the regulator cannot be vertical (if its drain does not face downward), remove it from this device.
Rainwater may enter the pressure gauge, so install this device so that the gauge does not face upward or downward. Also, there is a rainwater drain hole at the bottom of the pressure gauge. The hole must be positioned facing downward.

2.3 Inspection after Installation and Precautions for Operation

(1) Check the air pipe connections for leakage before use.

(2) Make sure that the bolts and nuts of the diaphragm case, etc., are firmly tightened.
Use the tightening torque below:

Models PSA1, HA2, HA3 (M8): 16 N·m

Model HA4 (M12): 54 N·m

(3) After applying pressure to the valve, check for leakage from the valve body and gaskets.

(4) Do not feed steam with a temperature higher than the maximum operating temperature of the control valve to clean or sterilize the valve.

(5) The temperature inside and outside the valve should be increased or decreased gradually (100 °C/h or less). Avoid operating the valve while the valve temperature is increasing or decreasing.

Chapter 3: Maintenance and Inspection

(1) As a part of regular maintenance, inspect the control valve routinely for the following.

(a) Hunting in response to the valve travel signal

(b) Abnormal sound or vibration

(c) Leaks of fluid from the air vent hole of the bonnet

(d) Leaks of fluid from between the valve body and the bonnet

Table 3-2 Troubleshooting

Phenomenon	Inspection	Action
Valve travel hunting Abnormal sound or vibration	Is there hunting in the input signal?	Eliminate the hunting.
	Is there any abnormality with the accessories?	Readjust and correct the defective part.
	Are all screws tightened firmly and evenly?	Tighten them appropriately.
Leaks of fluid from the air vent hole of the bonnet	Visual check, check with effervescent liquid, etc.	The diaphragm is damaged. Replace the diaphragm with a new one using the procedure described in chapter 4, “Disassembly and Assembly.”
Leaks of fluid from between the valve body and the bonnet	Visual check, check with effervescent liquid, etc.	Release the fluid pressure, and then retighten the screws to the torque shown in Table 3-3.

⚠WARNING

If fluid leakage from the valve is found, stay away from the valve until safety can be confirmed. Depending on the properties of the fluid, a serious accident or injury may result.

(2) Tightening the bolts and nuts that connect the body with the bonnet

Due to stress relaxation generated by the nature of the rubber used for the diaphragm, the tightening pressure may decrease and the bolts connecting the valve body with the bonnet may loosen.

Check the bolts for looseness periodically (for example, every 6 months).

If they are loose, retighten them evenly to the torque shown in Table 3-3. In particular, for a valve with a PTFE diaphragm, be sure to retighten the bolts. In addition, if the operation of equipment that runs continuously with fluid above 100 °C is stopped, be sure to retighten the bolts before resuming operation.

Table 3-3 Tightening torque of bolts and nuts that connect body with bonnet

Unit: N·m

Connection diameter (inches)	Diaphragm material: PTFE (body material: anything other than hard natural rubber)	Diaphragm material: rubber (natural rubber, chloroprene, EPDM)
1/2	4.0	2.0
3/4	5.5	3.0
1	9.0	4.0
1-1/2	17.0	9.0
2	30.0	13.0
2-1/2	55.0	20.0
3	90.0	35.0
4	45.0	14.0

Chapter 4: Disassembly and Assembly

This chapter describes disassembly and assembly procedures for overhaul inspection and for parts replacement due to modification of specifications, etc.

~CAUTION

(1) Before disassembling a control valve that is installed on the piping, be sure to shut off the fluid in the piping, release the process pressure completely from the valve, and wait until the valve cools off.

(2) Fluid may remain in the valve when it is removed from the piping. If the fluid is corrosive, drain it out completely before disassembling the valve.

(3) Wear protective gloves and work in a well-ventilated place.

4.1 Detaching the Actuator from the Valve Body

(1) Apply air pressure to the actuator so that the pointer indicates about 10 to 20 % above the fully closed position, and maintain that pressure.

(2) Loosen the hex bolts that hold the stem connector, remove the stem connector, and detach the actuator stem from the valve stem.

(3) Loosen and remove the nuts that hold the yoke, and lift and remove the actuator from the valve body.

4.2 Disassembly and Assembly of the Valve Body

Disassembly procedure

(1) Remove the hex nuts from the bonnet using a wrench.

(2) Remove the bonnet, spindle, and diaphragm unit from the valve body, paying attention not to damage the O-ring inside the bonnet.
If the diaphragm sticks to the valve body and does not readily comes off, gradually detach the diaphragm by slightly tilting the bonnet to the right and left, and front and back. Never attempt to forcibly detach the diaphragm using a sharp-edged object such as a screwdriver.

~CAUTION

The inner surfaces of certain models of control valves are lined with glass, hard rubber, or other material which is not highly resistant to mechanical shock. Do not apply any strong impact to the valve using a hammer, etc.

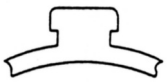
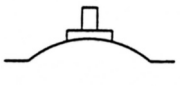
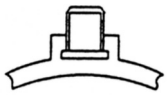
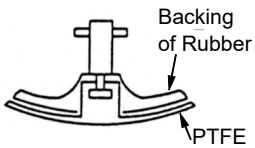
(3) The structure of the diaphragm differs according to its material and the valve size as shown in Table 4-4. To detach the diaphragm from the compressor, observe the instructions given below.

  (a) Fit-in type: Pull out the diaphragm while twisting it.

  (b) Screw-in type: Turn the diaphragm counterclockwise.

  (c) Bayonet type: Turn the diaphragm 90° clockwise or counterclockwise and then pull it out.

Table 4-4 Connection methods and diaphragm shapes

Diaphragm material	Valve nominal diameter (inches)	Connection method	Shape
Rubber	1/2 – 3/4	 Fit-in type	 Normally open
	1 – 4	 Screw-in type	
PTFE	1/2 – 4	 Bayonet type	 Normally closed

Inspection before assembly

Check the disassembled parts for the types of damage listed below. If any damage is found, replace the part. When ordering parts, please inform us of the production No. of the valve, which is printed on the nameplate.

(1) Valve body: corrosion or wear of the wetted parts, cracks on the lining

(2) Diaphragm: deterioration, wear, cracks

(3) Spindle: damage on the sliding parts

Assembly procedure

(1) Attach the diaphragm to the compressor.

(a) Fit-in type: Wet the protrusion of the diaphragm with water, and push it into the hole of the compressor. (See Table 4-4.)

(b) Screw-in type: Screw in the diaphragm until its rubber part comes into contact with the indentation in the compressor. Then, unscrew the diaphragm to the level where it is aligned with the bonnet hole when the valve is assembled.

(c) Bayonet type: Align the pins with the compressor slots, fully insert, and then turn the diaphragm 90° clockwise or counterclockwise. (See Table 4-4.)

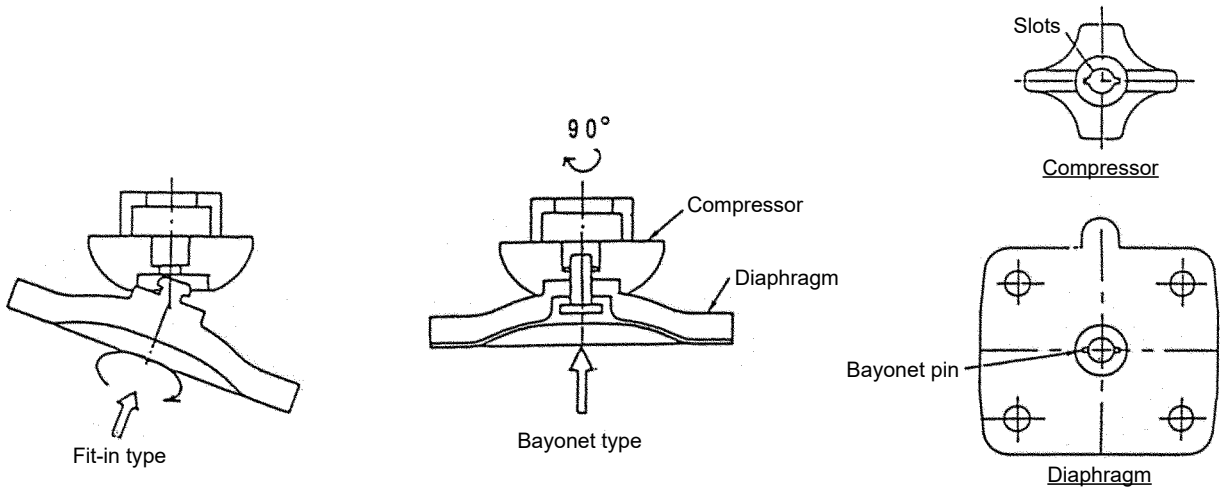


Figure 4-1 Types Of Couplings Between Diaphragm and Compressor

(2) Attach the spindle to the diaphragm unit of the valve body section.

(3) Apply grease to the surface of the spindle, O-rings, and threads of the bolts and nuts. Assemble the diaphragm unit, bonnet, and valve body by tightening the nuts to the torque shown in Table 3-3 while checking the position of the edge of the diaphragm. Tighten the nuts evenly in a diagonal pattern using a wrench.

(4) For a PTFE diaphragm, the valve body and the diaphragm will be sealed better if the bolts and nuts are tightened further to the torque shown in Table 3-3 after 4 hours or more have passed since the first tightening.
When tightening is complete, carry out the pressure resistance test shown below to check for leakage. If bolt or nut threads are damaged due to repeated maintenance, the required tightening force may not be achieved even if they are tightened to the torque shown in Table 3-3. Be sure to carry out the pressure resistance test to check for leakage before use.

Table 4-5 Pressure resistance test (water pressure)

Unit: MPa

Connection diameter (inches)	Diaphragm material: PTFE (body material: anything other than hard natural rubber)	Diaphragm material: rubber (natural rubber, chloroprene, EPDM)
1/2	1.2	1.6
3/4	1.2	1.6
1	1.2	1.6
1-1/2	1.2	1.6
2	1.2	1.6
2-1/2	1.2	1.2
3	1.2	1.2
4	1.2	1.2

~CAUTION

(1) Make sure that grease is not applied to the diaphragm.

(2) Before starting assembly, check that there is no foreign matter on the diaphragm, lining, or weir section so that foreign matter will not be caught in the valve during operation.

4.3 Disassembly and Reassembly of the Actuator

In principle, disassembly of the actuator should not be necessary. However, when changing specifications or when replacing parts in the event of a failure, disassemble it by referring to the user's manual for the multi-spring diaphragm actuator (document No. OM2-8213-0500).

4.4 Mounting the Actuator on the Valve Body

(1) Place the actuator on the valve body and tighten the yoke nuts firmly.

(2) Connect air piping to the actuator to provide a pneumatic control signal.
A pressure regulator may be used for the pneumatic control signal source.
(Connect the air piping to the upper diaphragm case for direct-action actuators or to the lower diaphragm case for reverse-action actuators.)

(3) Lower the spindle until the diaphragm is fully seated on the weir of the valve.

For direct-action actuators

(4) Set the air pressure to the spring range upper limit shown in Table 4-6.

(5) Increase the air pressure to the supply pressure and check that the actuator stem moves in response. (This is a margin for stroke.)

(6) Reduce the air pressure slightly and set the air pressure to the spring range upper limit again. Then, tighten the hex bolts that hold the stem connector so that the threads of the actuator stem and the spindle are engaged.

For reverse-action actuators

(4) Set the air pressure to the spring range lower limit printed on the nameplate. Check that the actuator stem moves 1–2 mm in response. (This is the margin for the stroke.)

(5) After increasing the air pressure slightly, lower it to the spring range lower limit again. Then, tighten the hex bolts that hold the stem connector so that the threads of the actuator stem and the spindle are engaged.

Table 4-6 Spring range of direct-action actuators

Connection diameter (inches)	Spring range (kPa)
1/2	20–53
3/4	20–64
1	20–74
1-1/2	20–96
2	20–82
2-1/2	20–95
3	20–81
4	20–102

4.5 Adjustment of Positioner

For details on positioners, refer to the user's manuals below.

- Pneumatic single-acting valve positioner (model HTP):
  document No. OM2-8310-0200
- Pneumatic single-acting valve positioner (model VPE):
  document No. OM2-8310-0410
- Smart valve positioners
  Model AVP300/301/302 (integrated type)/
  Model AVP200/201/202 (remote type): document No. CM2-AVP300-2001
  Model AVP701/702: document No. CM2-AVP702-2001
  Model AVP77_/78_/79_: document No. CM2-AVP772-2001
- Smart valve positioners (with fieldbus support)
  Model AVP703: document No. CM2-AVP703-2001

Chapter 5: Main Parts to be Replaced

Parts of this control valve can be used for a long period of time, but the following parts should be replaced at every periodic inspection.

● Valve body section

O-rings:	Every five years
Diaphragm:	Every year

● Actuator

- Diaphragm: Every five years
- Bushings: Every five years
  (HA2/3/4 only. For replacement, please contact us.)
- Cap: Every five years
- Seal washers: Every five years (and whenever disassembling)
- Dust seal: Every five years (and whenever disassembling)
- Rod seal: Every five years (and whenever disassembling)

Chapter 6: Disposal

If this device is no longer needed, dispose of it appropriately as industrial waste, in accordance with local regulations. Do not reuse all or a part of the device.

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

   1.1 Warranty period

   Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

   1.2 Warranty scope

   In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

   (1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
   (2) Failure caused for other reasons than Azbil Corporation's product;
   (3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
   (4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
   (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
   (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

   Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

   You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

   (1) Regulations and standards or laws that your Equipment is to comply with.
   (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
   (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use
   Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

   *1. A design that is safe even if the user makes an error.
   *2. A design that is safe even if the device fails.
   *3. Avoidance of device failure by using highly reliable components, etc.
   *4. The use of redundancy.

3. Precautions and restrictions on application

   3.1 Restrictions on application

   Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

   *5. Nuclear power quality: compliance with JEAG 4121 required
   *6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes,"etc.
   *7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

   Any Azbil Corporation's products shall not be used for/with medical equipment.

   The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

   3.2 Precautions on application

   you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

(1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
(2) For use of specific purposes, such as:
    * Nuclear energy/radiation related facilities
      [When used outside a radiation controlled area and where nuclear power quality is not required]
      [When the limit switch for nuclear power is used]
    * Machinery or equipment for space/sea bottom
    * Transportation equipment
      [Railway, aircraft, vessels, vehicle equipment, etc.]
    * Antidisaster/crime-prevention equipment
    * Burning appliances
    * Electrothermal equipment
    * Amusement facilities
    * Facilities/applications associated directly with billing
(3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
(4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
(5) Machinery or equipment that may affect human lives, human bodies or properties
(6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

   Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

   Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

   In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals. System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts. For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

   Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

   Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

   Please note that the production of any Azbil Corporation's product may be discontinued without notice. After manufacturing is discontinued, we may not be able to provide replacement products even within the warranty period.

   For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

   Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

   (1) Installation, adjustment, guidance, and attendance at a test run
   (2) Maintenance, inspection, adjustment, and repair
   (3) Technical guidance and technical education
   (4) Special test or special inspection of a product under the conditions specified by you

   Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

Document Number :	OM2-8110-0530
Document Name :	Weir-Type Diaphragm Control Valve Model VDD User's Manual
Date :	1st edition: Nov. 1988 4th edition: Feb. 2022
Issued / Edited by :	Azbil Corporation

Azbil Corporation