

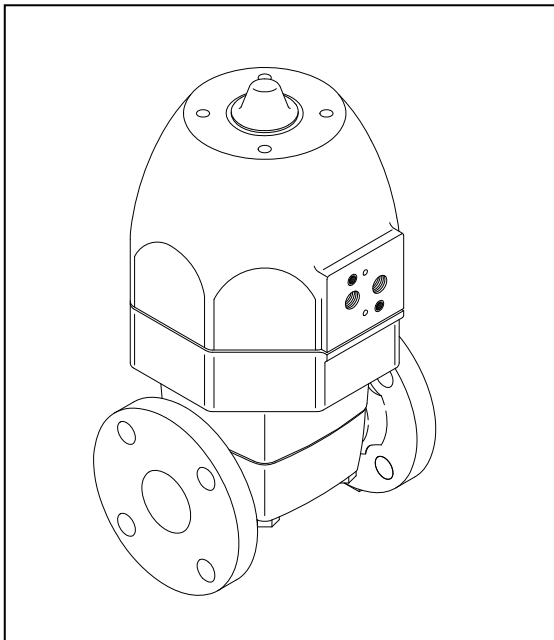
| | |
|------------|-------------|
| Serial No. | H-A007-E-13 |
|------------|-------------|

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| | |
|---|----|
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**Diaphragm Valve Type 14
True Union Diaphragm Valve
Type 14
Pneumatic Actuated Type AN**

User's Manual





This user's guide contains very important information for the proper installation, maintenance and safe use of an ASAHI AV Product. Please store this manual in an easily accessible location.

<Warning & Caution Signs>

| | |
|--|--|
|  Warning | <p>This symbol reminds the user to take caution due to the potential for serious injury or death.</p> |
|  Caution | <p>This symbol reminds the user to take caution due to the potential for damage to the valve if used in such a manner.</p> |

<Prohibited & Mandatory Action Signs>

| | |
|---|---|
|  | <p>Prohibited: When operating the valve, this symbol indicates an action that should not be taken.</p> |
|  | <p>Mandatory action: When operating the valve, this symbol indicates mandatory actions that must be adhered to.</p> |

(1) Be sure to read the following description of our product warranty.

- Always observe the specifications of and the precautions and instructions on using our product.
- We always strive to improve product quality and reliability, but cannot guarantee perfection. Therefore, should you intend to use this product with any equipment or machinery that may pose the risk of serious or even fatal injury, or property damage, ensure an appropriate safety design or take other measures with sufficient consideration given to possible problems. We shall assume no responsibility for any inconvenience stemming from any action on your part without our written consent in the form of specifications or other documented approval.
- The related technical documents, operation manuals, and other documentation prescribe precautions on selecting, constructing, installing, operating, maintaining, and servicing our products. For details, consult with our nearest distributor or agent.
- Our product warranty extends for one and a half years after the product is shipped from our factory or one year after the product is installed, whichever comes first. Any product abnormality that occurs during the warranty period or which is reported to us will be investigated immediately to identify its cause. Should our product be deemed defective, we shall assume the responsibility to repair or replace it free of charge.
- Any repair or replacement needed after the warranty period ends shall be charged to the customer.
- The warranty does not cover the following cases:
 - (1) Using our product under any condition not covered by our defined scope of warranty.
 - (2) Failure to observe our defined precautions or instructions regarding the construction, installation, handling, maintenance, or servicing of our product.
 - (3) Any inconvenience caused by any product other than ours.
 - (4) Remodeling or otherwise modifying our product by anyone other than us.
 - (5) Using any part of our product for anything other than the intended use of the product.
 - (6) Any abnormality that occurs due to a natural disaster, accident, or other incident not stemming from something inside our product.

(2) General operating instructions



Warning

- Never attempt to disassemble an actuator.
(If disassembled forcible, internal parts may jump out and this is very dangerous.)

- Do not touch the actuator when it operated.



- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas is under similar pressures used for liquids. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use a gas in testing, please consult your nearest service station beforehand.



Caution

- Do not step on or apply excessive weight on valve. (It can be damaged.)

- Do not use AV valves in a place where they may become submerged in water.

- Do not use the valve in conditions where the fluid may have crystallized.
(The valve will not operate properly.)



- Keep the valve away from excessive heat or fire. (It can be damaged, or destroyed.)

- Always operate the valve within the pressure vs. temperature range.

(The valve can be damaged or deformed by operating beyond the allowable range.)

- Allow sufficient space for maintenance and inspection.

- Select a valve material that is compatible with the media. For chemical resistance information, refer to "CHEMICAL RESISTANCE ON ASAHI AV VALVE".

(Some chemicals may damage incompatible valve materials.)

- Keep the valve out of direct sunlight, water and dust. Use cover to shield the valve.

(The valve will not operate properly.)

- Perform periodic maintenance. (Leakage may develop due to temperature changes or periods of prolonged storage, rest, or operation.)

- The travel stop may have to be adjusted if media leakage is detected between the upstream & downstream sides of the valve.

- Bonnet bolt torque should be checked before installation, as they may become loose after long-term storage. A periodic check of the valve condition as well as bonnet & flange bolt torque should be made part of preventative maintenance program properly re-tightening the bolts as necessary. It is especially important to re-tighten all bolts during the first shutdown.

- Set valve support on the valve.

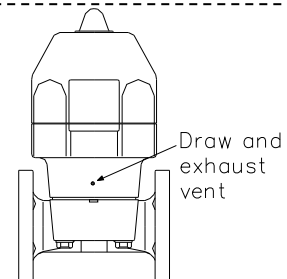
- The AV valves must be used within the specifications specifically applicable to the product.








Warning

- The actuator of diaphragm valve have draw and exhaust vent.
(The back side)

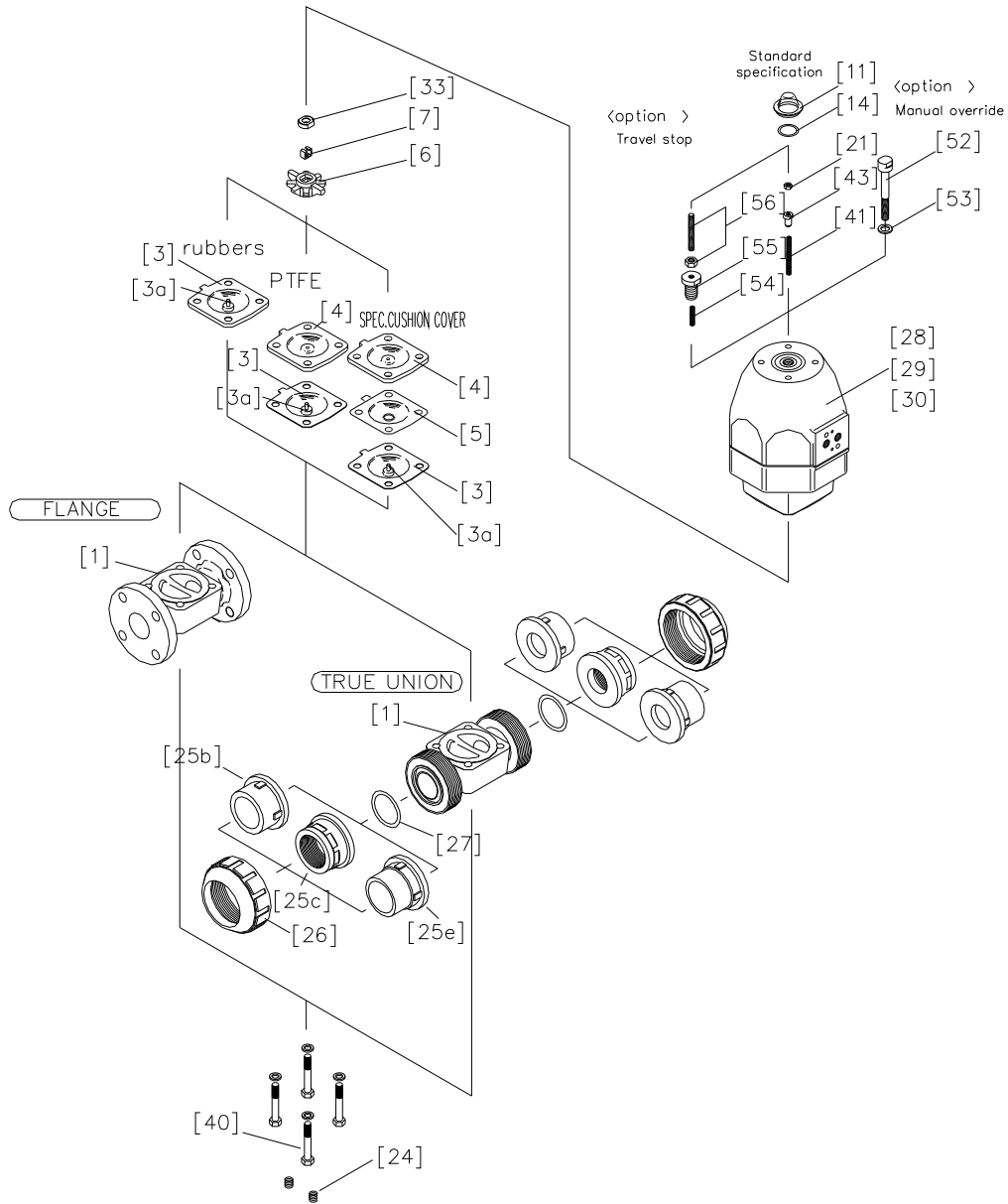
The fluid might spout when the diaphragm is damaged by the condition. Perform periodic maintenance.



(3) General instructions for transportation, unpacking and storage

- 

 - When suspending and supporting a valve, take care and do not stand under a suspended valve.
- Warning
- 

 - This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- Caution
- Avoid scratching the valve with any sharp object.
- Do not over-stack cardboard shipping boxes. Excessively stacked packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
- (These chemicals may cause damage to the valve.)
- 
 - Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

(4) Name of parts

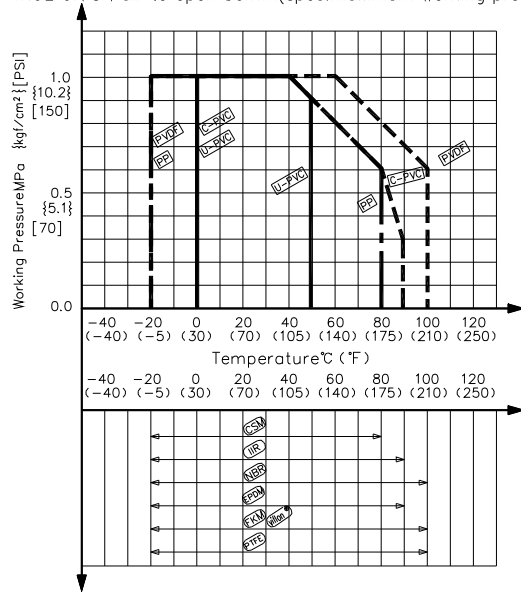
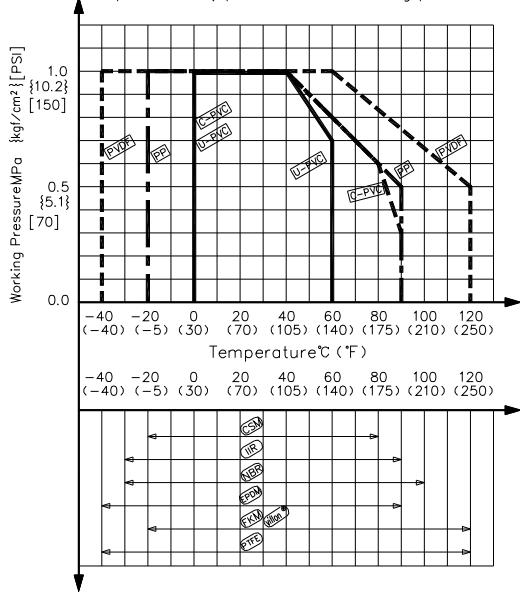


| No. | DESCRIPTION | No. | DESCRIPTION | No. | DESCRIPTION |
|------|-----------------------------|-------|-----------------------------------|------|-------------------------|
| [1] | Body | [24] | Ensats (insert metal) | [40] | Bolt(B) |
| [3] | Diaphragm | [25b] | End connector (Socket end type) | [41] | Indicative rod |
| [3a] | Inserted metal of diaphragm | [25c] | End connector (Threaded end type) | [43] | Stopper |
| [4] | Cushion | [25e] | End connector (Spigot end type) | [52] | Manual shaft |
| [5] | Cushion cover | [26] | Union nut | [53] | Thrust ring |
| [6] | Compressor | [27] | O-ring(C) | [54] | Rod for travel stop |
| [7] | Joint | [28] | Actuator(double acting) | [55] | Fitting for travel stop |
| [11] | Gauge cover | [29] | Actuator(air to shut) | [56] | Bolt & nut |
| [14] | O-ring(A) | [30] | Actuator(air to open) | | |
| [21] | Screw | [33] | Compressor pushing plate | | |

(5) Working pressure vs. temperature

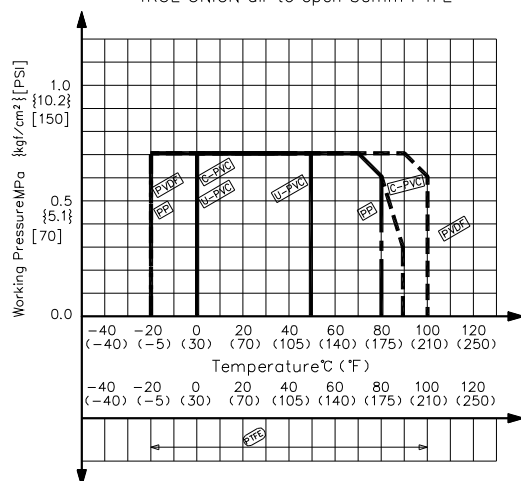
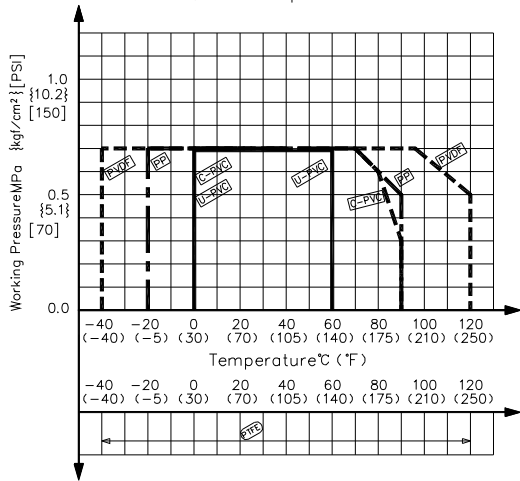
FLANGE double action, air to shut 15~50mm
 FLANGE air to open 15~40mm
 FLANGE air to open 50mm(spec.maxmam working pressure 1.0MPa)

TRUE UNION double action, air to shut 15~50mm
 TRUE UNION air to open 15~40mm
 TRUE UNION air to open 50mm(spec.maxmam working pressure 1.0MPa)



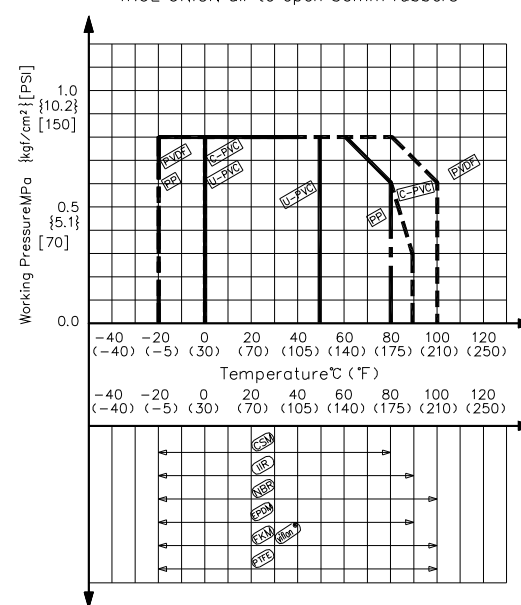
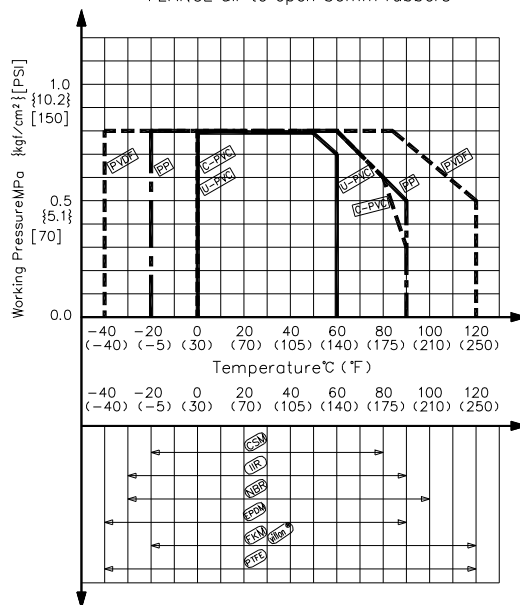
FLANGE air to open 50mm PTFE

TRUE UNION air to open 50mm PTFE



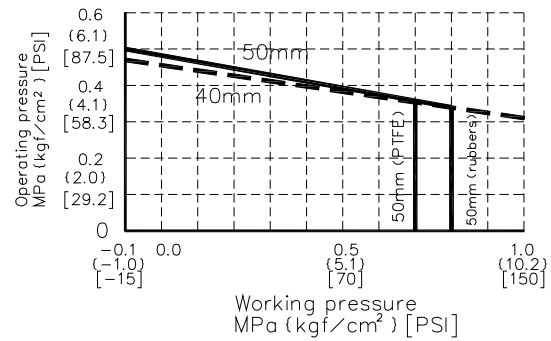
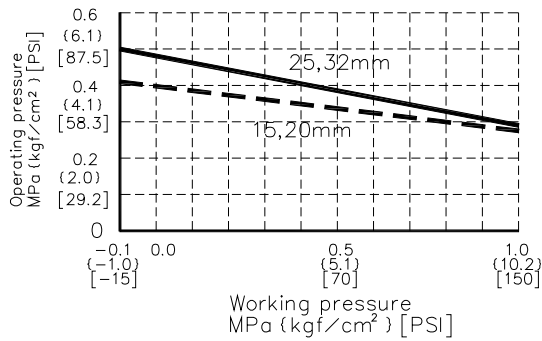
FLANGE air to open 50mm rubbers

TRUE UNION air to open 50mm rubbers

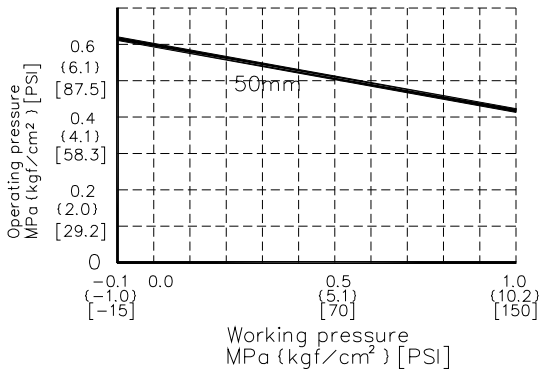


(6) Comparison between operating pressure and working pressure and opening

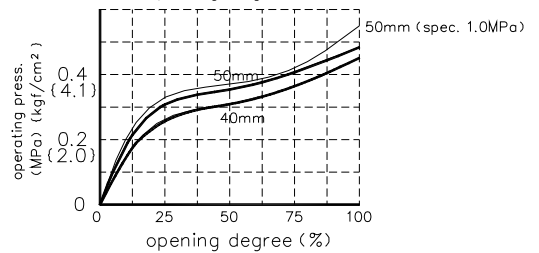
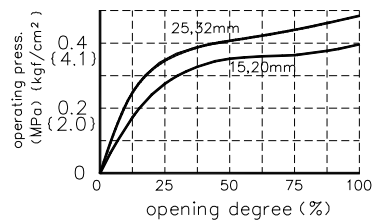
Working pressure—Operating pressure (air to open)



(spec.max.working pressure 1.0MPa)



opening degree—operating press. (working press.0)



(7) Specifications of actuator

| Nominal size | | 15mm, 20mm (1/2", 3/4") | 25mm, 32mm (1", 1 1/4") | 40mm (1 1/2") | 50mm (2") |
|---|---|----------------------------|----------------------------|------------------------|------------------------|
| Operating pressure MPa {kgf/cm ² } [PSI] | Double acting Air to open Air to shut | 0.4-0.6 {4.1-6.1} [57-85] | | | |
| Air consumption, Nl/per [inch ³] 1 opening of closing (0.4MPa) | Double acting | 2.6 [160] | 2.7 [170] | 9.6 [590] | 9.8 [600] |
| | Air to open Air to shut | 0.8 [49] 1.8 [110] | 0.8 [49] 1.9 [120] | 3.4 [210] 6.1 [370] | 3.4 [210] 6.3 [380] |
| Air supply orifice | Double acting Air to open Air to shut | Rc 1/4 | | | |

(8) Specifications of options

(Specifications of Solenoid valve)

| Actuation | Nom. Size | Model No. | Pipe bore | Effective cross section area mm ² (inch ²) | Power consumption | Additional function |
|-----------|------------------------|------------------------|-----------|---|-----------------------|---|
| All type | 15 (1/2") -50mm(2") | 4N3S102K-W□ -G31193 | Rc 1/4 | 10(0.016) or more | AC ; 6VA DC ; 5.5W | - Bypass valve built – in - Silencer with needle Valve attached (to be used as speed controller) |

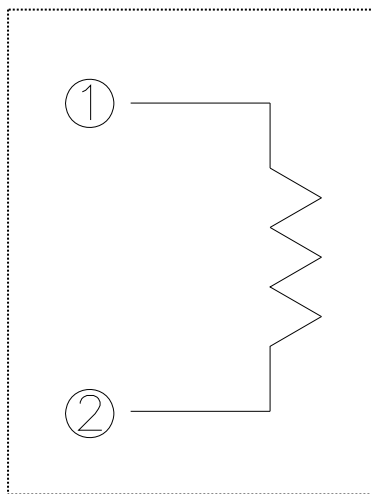
4N3S102K-W□-G31193



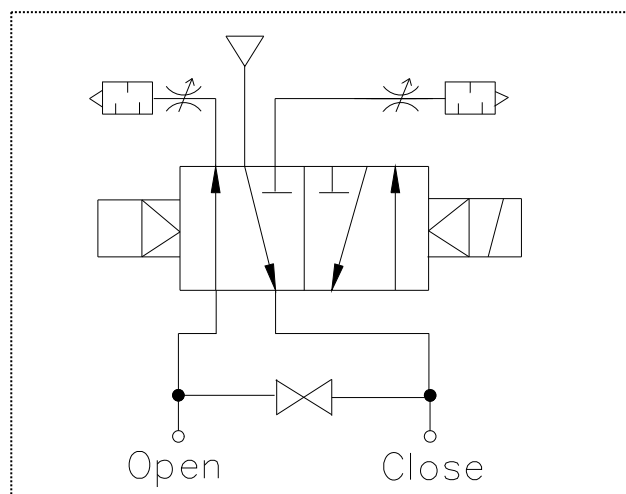
* () is special order.

| Specification | sign |
|----------------|------|
| AC100V 50/60Hz | 1 |
| AC110V 50/60Hz | (2) |
| AC200V 50/60Hz | 3 |
| AC220V 50/60Hz | (4) |
| DC24V | 5 |
| DC48V | (6) |
| DC100V | (7) |
| DC125V | (9) |

connection diagram



JIS sign



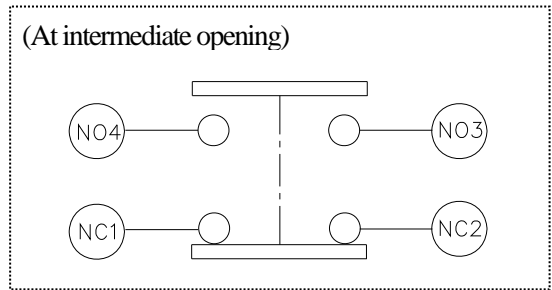
(Specifications of limit switch)

| | | | |
|---|--------------------------|-----------|------------------|
| Actuation | Nominal size | Type sign | Protection grade |
| Double acting Air to open Air to shut | 15mm-50mm (1/2" - 2") | 1LS19-J | IP67 (IEC529) |

Limit switch rating

| Rate voltage (V) | Resistive load (A) | Inductive load (A) |
|------------------|--------------------|--------------------|
| AC125 | 10 | 6 |
| AC250 | 10 | 6 |
| DC125 | 0.8 | 0.2 |
| DC250 | 0.4 | 0.1 |

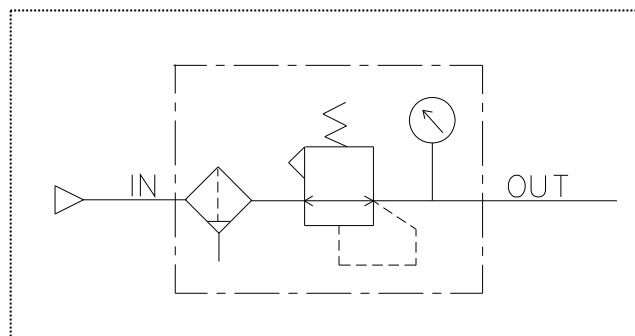
connection diagram



(Specification of pressure reducing valve with filter)

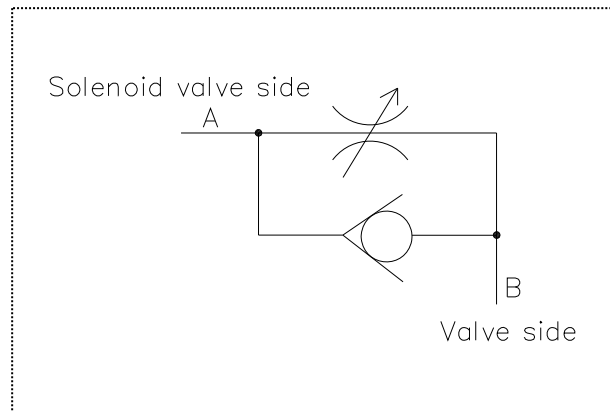
| | | | | |
|-----------|--------------------------|--------------|-----------|------------------------------|
| Actuation | Nom. Size | Type sign | Pipe bore | Element degree of filtration |
| All type | 15mm-50mm (1/2" - 2") | ARU2-02-8A-B | Rc 1/4 | 5 μ m |

JIS sign



(Specification of speed controller)

| Actuation | Nom. Size | Type sign | Pipe bore | Effective cross section area mm ² (inch ²) | | Needle No. of revolution |
|-----------|--------------------------|-----------|-----------|--|--------------|-----------------------------|
| | | | | Free flow | Control flow | |
| All type | 15mm-50mm (1/2" - 2") | SC7-08A | Rc 1/4 | 11 (0.017) | 8.3 (0.013) | 8 turns |



(Specifications of fully open adjustment mechanism)


As to the block diaphragm and adjusting method, refer to pages 4 and 25, respectively.


(Specifications of manual operating mechanism (set only at air to open))


As to the block diaphragm and operating method, refer to pages 4 and 23, respectively.


(9) Installation procedure

Flanged type (Material : PVC, C-PVC, PP, PVDF)

Warning  - When suspending and supporting a valve, take care and do not stand under a suspended valve.

 - Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
 - Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty.
 (You may be injured.)

Caution  - When installing a pipe support by means of a U-band or something similar, take care not to over-tighten. (Excessive force may damage the pipe.)


 - When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.

- Before a water test, be sure that the flange is tightly fastened.
- Fasten the flange while avoiding the parallelism and axial misalignment of the flange surface.
- When connecting a ASAHI AV Valve to metal piping, take care not to let the pipe stress on the ASAHI AV Valve.
- Use flat faced flanges for connection to AV Valves.
- Ensure that the mating flanges are of the same standards.
- Be sure to use sealing gaskets (AV Gasket), bolts, nuts, and washers and tighten them to specified torques. (When a non-AV gasket is used, a different tightening torque instruction should be followed.)

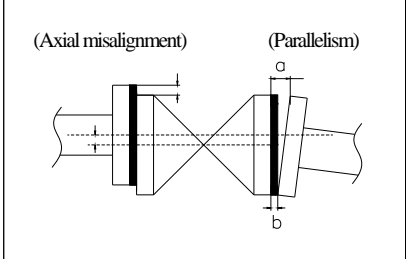
- Necessary items
- Torque wrench
 - Spanner wrench
 - AV gasket
 - Bolt, Nut, Washer (For many flanges specification)

Procedure



- 1) Set the AV gasket between the flanges.
- 2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten by hand.

Caution  - The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve.
 (A failure to observe them can cause destruction due to stress application to the pipe.)

| Nom. Size | Unit : mm (inch) | |
|------------------------------|--------------------|-------------------|
| | Axial Misalignment | Parallelism (a-b) |
| 15mm-32mm (1/2" - 1 1/4") | 1.0 (0.04) | 0.5 (0.02) |
| 40mm, 50mm (1 1/2" - 2") | 1.0 (0.04) | 0.8 (0.03) |

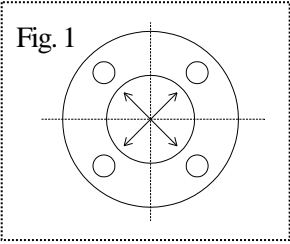


- 3) Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner. (Refer to Fig.1.)



  - Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner.

Recommended torque value Unit : N·m {kgf·cm} [lb·inch]




| Nom. Size | 15mm, 20mm (1/2", 3/4") | 25mm - 40mm (1" - 1 1/2") | 50 mm (2") |
|------------------|----------------------------|------------------------------|----------------|
| PTFE·PVDF coated | 17.5{179}[155] | 20.0{204}[177] | 22.5{230}[200] |
| Rubber | 8.0{82}[71] | 20.0{204}[177] | 22.5{230}[200] |



True Union Diaphragm Valve Type 14

  - Take care not to over-tighten the Union Nut. (The valve can be damaged.)
 Caution - Do not use the pipe wrench. (The valve can be damaged.)

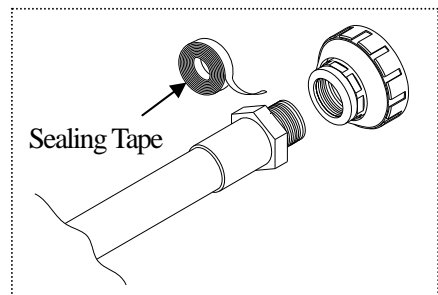
Threaded type (Material : PVC, C-PVC, PP, PVDF)

  - Avoid excessive tightening. (The valve can be damaged.)
 Caution  - Make sure that the threaded connections are plastic x plastic. (Metallic thread can cause damage.)
 - Wrap the threaded joints on our plastic piping with sealing tape. Using a liquid sealing agent or liquid gasket may cause stress cracks (Environmental Stress Cracking). Our product warranty shall not apply in case of said use, even when said use is unavoidable.


- Necessary items
- Sealing tape
 - Strap wrench
 - Spanner wrench


Procedure


- 1) Wind a sealing tape around the external thread of joint, leaving the end (about 3mm) free.
- 2) Loosen the union nut [26] with a strap wrench.
- 3) Remove the union nut [26] and the end connector [25c].
- 4) Tighten the external thread of the joint and the end connector [25c] hardly with hand.
- 5) Using a spanner wrench, screw in the end connector [25c] by turning 180° -360° carefully without damaging it.
- 6) Make sure that the O-ring (C) [27] is mounted.
- 7) Set the end connector [25C] and union nut [26] directly on the body without allowing the O-ring (C) [27] to come off.
- 8) Tighten union nut [26] on each valve until hand tight.
- 9) Using a strap wrench tighten union nuts uniformly on each side approx. 90° - 180° turns, 1/4 to 1/2 turns.




Socket type (Material : PVC, C-PVC)

 - When using an adhesive, ventilate the space sufficiently, prohibit the use of a fire in the vicinity, and do not inhale adhesive vapors directly.

 - If an adhesive gets into contact with your skin, wash it off immediately. If you feel sick or find anomaly, receive a physician's diagnosis and take appropriate measures promptly.

 - Take care in doing work at low temperatures. Solvent vapors are hard to evaporate and are likely to remain. (Solvent cracks may occur, damaging the equipment.) After assembling the piping system, open both ends of the piping and use a fan (of the Low-Voltage Type) or something similar to ventilate the space, thus removing the solvent vapors.

 - Use the appropriate Asahi AV cement.


- Conduct a water test at least 24 hours after joining the pipes with an adhesive.
- Do not install a socket type valve where the atmospheric temperature is 5 °C (23 °F) or lower. (The valve joint can fail.)

Necessary items

- Adhesive for hard vinyl chloride pipes
- Strap wrench

Procedure

- 1) Loosen the union nut [26] with a strap wrench.
- 2) Remove the union nut [26] and end connector [25b].
- 3) Lead the union nut through the pipe.
- 4) Make sure the hub part of the end connector [25b] is clean with waste cloth.
- 5) Apply adhesive evenly to the hub part of the end connector [25b] and the pipe spigot.

 - Do not apply more adhesive than necessary. (The valve can be damaged due to solvent cracking.)

Adhesive Quantity (guideline)

| Nom. Size | 15mm (1/2") | 20mm (3/4") | 25mm (1") | 32mm (1 1/4") | 40mm (1 1/2") | 50mm (2") |
|-------------|----------------|----------------|--------------|------------------|------------------|--------------|
| Quantity(g) | 1.0 | 1.3 | 2.0 | 2.4 | 3.5 | 4.8 |

- 6) After applying adhesive, insert the pipe quickly to the end connector [25b] and leave it alone for at least 60 seconds.
- 7) Wipe away overflowing adhesive.
- 8) Make sure that O-ring(C) [27] is mounted
- 9) Set the end connector [25b] and union nut [26] directly on the body without allowing the O-ring(C) [27] to come off.
- 10) Tighten union nut [26] on each valve until hand tight.
- 10) Using a strap wrench tighten union nuts uniformly on each side approx. 90° - 180° turns, 1/4 to 1/2 turns.

Socket type (Material : PP, PVDF)

Spigot type (Material : PP, PVDF)



Necessary items

- Strap wrench
- Sleeve welder or automatic welding machine
- User's manual for sleeve welder or automatic welding machine

Procedure

- 1) Loosen the union nut with a strap wrench.
- 2) Remove the union nut [26] and the end connector.
- 3) Lead the union nut [26] through the pipe.
- 4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.
- 5) After welding, make sure that the O-ring (C) [27] is mounted.
- 6) Set the end connector [25b], [25e] and the union nut [26] directly without allowing the O-ring (C) [27] to come off.
- 7) Tighten union nut [26] on each valve until hand tight.
- 8) Using a strap wrench, tighten the union nut an additional 90° - 180° carefully without damaging it.

(10) Support setting procedure

Caution   - Set valve support on the valve.
 - When installing a pipe support by means of a U-band or something similar, take care not to fasten it too much. (Excessive tension may damage it.)

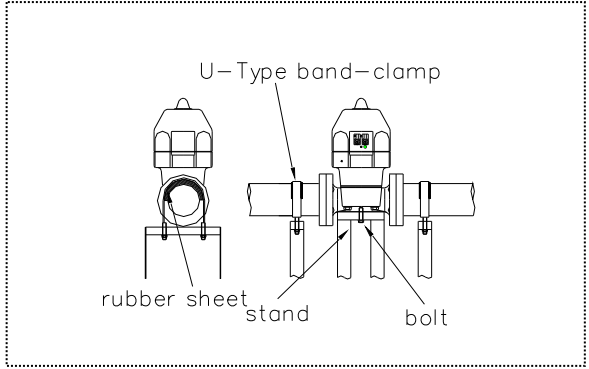
Necessary items
 ● Spanner wrench ● U-type clamp (with bolt) ● Rubber sheet

Level plumber

- Using metal insert (Ensert) & U-type clamp

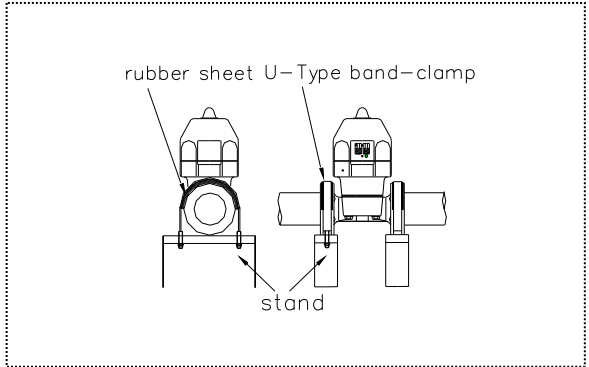
Fix the installation jig (under the valve) and stand with bolts (Refer to page 22)

Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



- Using U-type clamp (Only Flanged type)

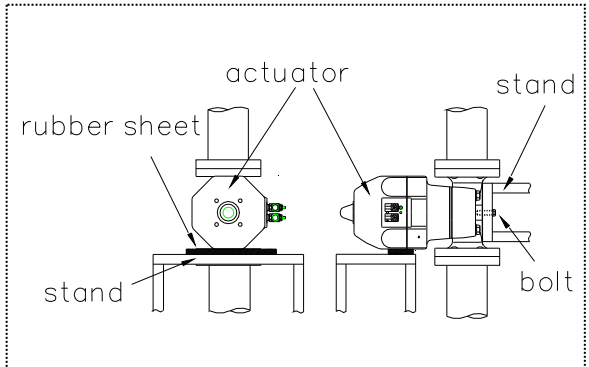
Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



Perpendicular plumber

Fix the installation jig (under the valve) and stand with bolts (Refer to page 22)

Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



(11) Air piping procedure

<1> For a standard type and an attached speed controller type

Caution

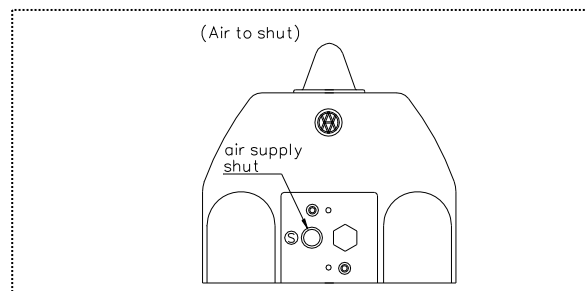
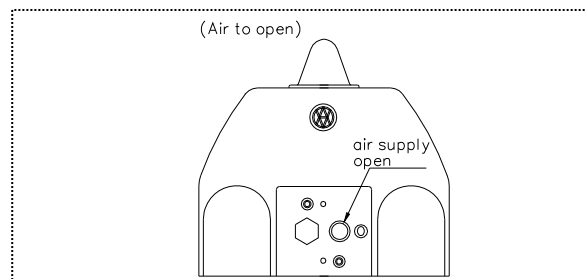
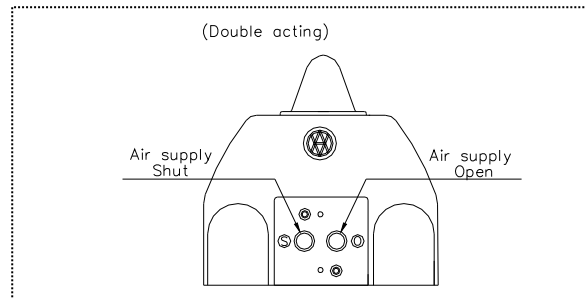
- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- Check the connection locations, air pipe sizes, and screw types with the approved drawings and other documents for the product. Then lay the air piping.
- The operating fluid must be clean air filtered through a pertinent air filter.
- If the actuator is used in an environment below 5°C temperature, its operating fluid must be free from the water and moisture contained in it because of possible problems due to the freeze.
- Steel pipes must always be of the plated.
- Before installing an actuator in pipeline, flash the inside of pipeline completely.
- Do not apply a sealant excessively lest it fall off in the pipeline when an actuator is piped.
- Threaded area of a pipe must be free from the sharp edges and burr.

Necessary items

- Spanner wrench
- Sealing tape
- Steel pipe or tube for piping
- Joint for steel pipe or tube

Procedure

- 1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.
- 2) Screw the joint in the piping female screw of the actuator by hand fully.
- 3) Screw the joint one turn with a spanner wrench.
※Avoid excessive tightening.
(The valve can be damaged.)
- 4) Mount a steel pipe or a tube.



↳ For a pressure reducing valve with a solenoid valve and a pressure reducing valve with a filter.

Caution

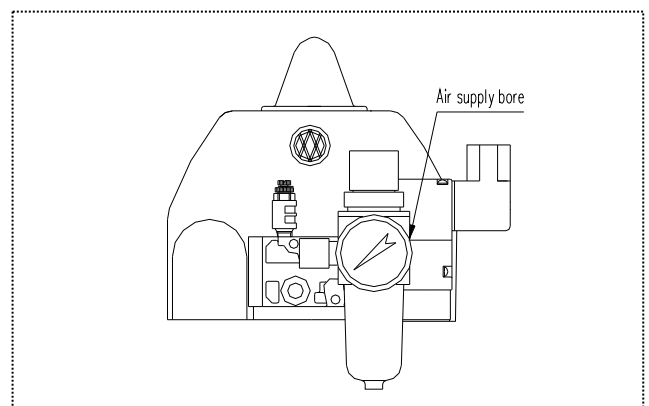
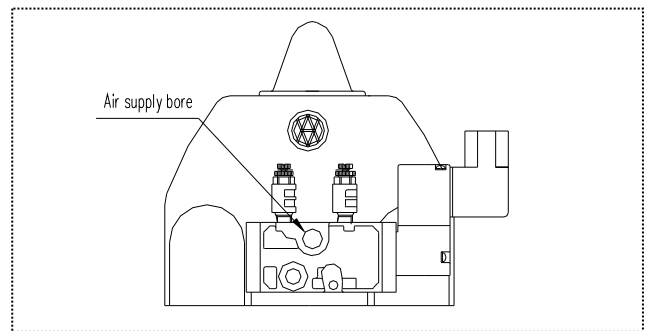
- ⚠ - Do not remove a dust-proof cap provided to piping port before piping work starts.
- ⊘ - Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- ⊘ - Do not apply a sealant excessively lest it fall off in the pipeline when an actuator is piped.
- ! - Steel pipes must always be of the plated.
- ! - Before installing an actuator in pipeline, flash the inside of pipeline completely.
- ! - Threaded area of a pipe must be free from the sharp edges and burr.
- ! - Solenoid valve-A speed controller adjusts and fasten a lock nut by open ended spanners.
- ! - Open the drain periodically in order to exhaust the deposit.
- ! - The equipment must be used at a pressure below the maximum operating pressure specified for the product.

Necessary items



- Spanner wrench
- Sealing tape
- Steel pipe or tube for piping
- Joint for steel pipe or tube

Procedure

- 1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.
- 2) Screw the joint in the piping female screw of the actuator by hand fully.
- 3) Screw the joint one turn with a spanner wrench.
※Avoid excessive tightening.
(The valve can be damaged.)
- 4) Mount a steel pipe or a tube.



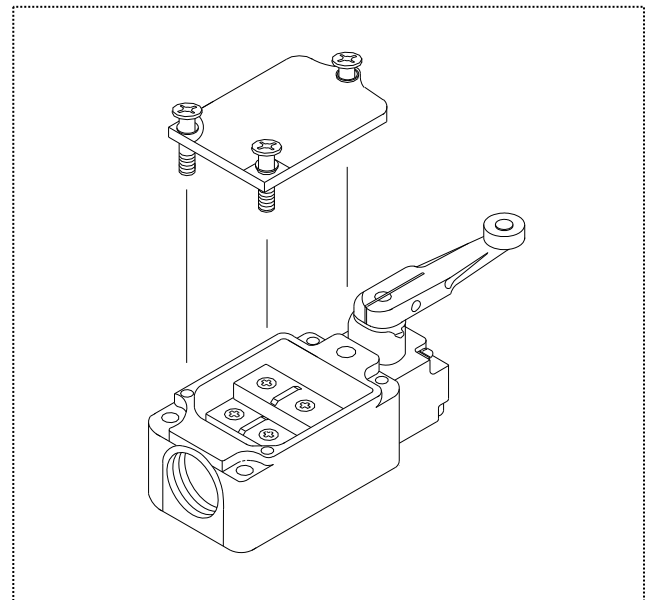
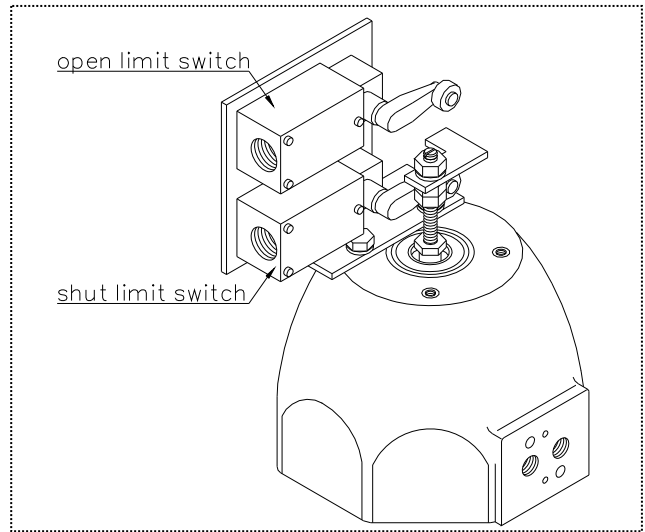
(12) Connection of limit switch procedure

-  - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.
-  - Be sure that the terminal cover and body cover are put on during the operation.
- If you use the limit switch at 1mA-100mA or 5-30V, consult near Asahi dealer.


- Necessary items
- Crimp-style terminal
 - Phillips head screw driver
 - connector (G1/2)
 - Terminal crimping tool
 - Wire stripper


Procedure

- 1) Loosen the three screws used to attach the limit switch cover with a Phillips head screwdriver and remove cover from the limit switch.
(The screw is made so that it will not detach from the cover.)
- 2) Pull and remove protective cap, made of resin, from the cover.
- 3) Draw a cable through the connector.
- 4) Strip cable with a wire stripper.
- 5) Install a crimp-style terminal on the lead wire with a terminal crimping tool.
- 6) Connect terminal screw with a Phillips head screwdriver according to the internal circuit diagram shown in page 8.
※Tighten the screws.
(If not, electric leaks or shocks may occur.)
- 7) Tighten the above three screws with a Phillips head screwdriver to install cover on the limit switch.
- 8) Tighten the cable by connector.



(13) Connection of solenoid valve procedure

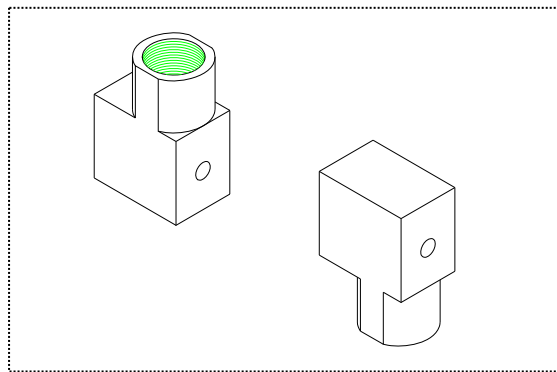
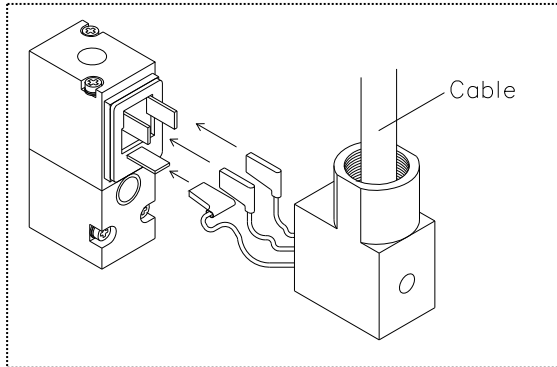
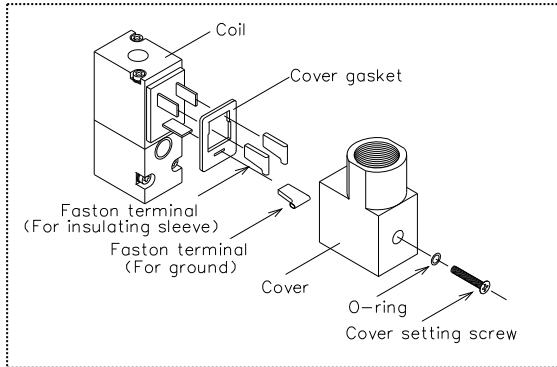
Caution  - Go after you surely interrupt a power supply when you do the installation of the terminal base line is combined.

 - Be sure that the terminal cover and body cover are put on during the operation.

- Necessary items**
- Terminal crimping tool
 - Connector (G1/2)
 - Screw driver (+)
 - Wire stripper



Procedure


- 1) Loosen the hexagon socket head cap screws, and remove the cover.
 ※Don't loose O ring.
 (Short circuit or shocks may occur.)
- 2) Remove the Fasten terminal inserted into coil side and the insulating sleeve.
 ※Insulating sleeve isn't attached in Faston terminal.
- 3) Draw the cable through the connector to the cover.
- 4) Strip the cable with wire stripper.
- 5) Draw the lead wire through the cover.
- 6) Install the Faston terminal on the lead wire with a terminal-crimping tool.
- 7) Insert the Faston terminal into the coil side. And fit the cover.
- 8) Tighten the cover setting screws to fix it.
 (The cover can be set with the wire extraction opening turned upward or downward.)
- 9) Tighten the cable by connector.



(14) Operating procedure

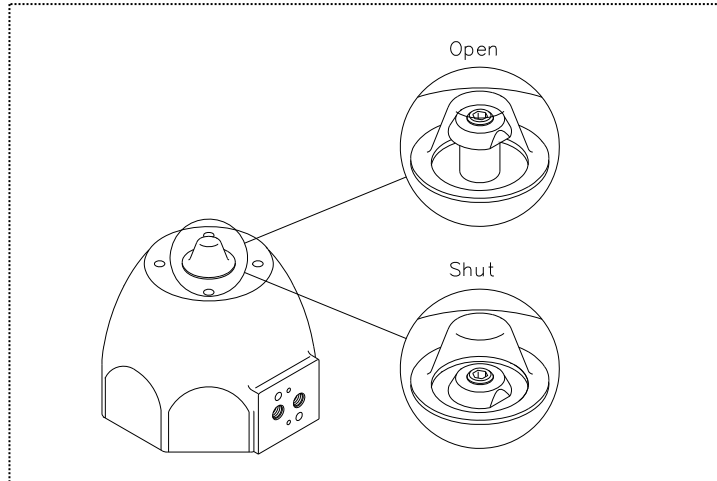
Automatic (Air) Operating Procedure



 -When AV valve is equipped with a solenoid valve, do not leave solenoid valve terminal cover off.
 (Contact with the terminal will cause an electric shock.)


 - Check that the supply pressure of the pressure reducing valve with a filter is 0.4MPa{4.1kgf/cm2} or more.
 (AV valve may not function.)

Procedure

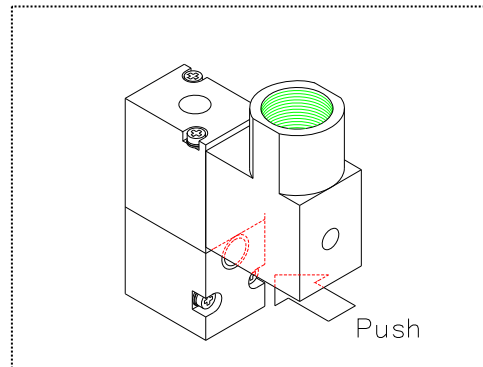
- 1) Supply air to the air supply opening.
- 2) Check that the air supplying side and the stopper [43] position are matching.
- 3) Stop supplying air.



<For the solenoid valve >

Procedure

- 1) Supply the air to the solenoid valve.
- 2) Push the button with a finger, and confirm the action mode shown in the following table.
- 3) Apply regular rated voltage to the solenoid valve, and confirm the action mode shown in the following table.
- 4) Turn off the solenoid valve



| Push button | Current | Double action | Single action | |
|-------------|---------|---------------|---------------|--------------|
| | | | Air to open | Air to close |
| Pushed | On | Open | Shut | |
| Not pushed | Off | Shut | Open | |

(15) Adjustment of opening / closing speed procedure

○ Double action type

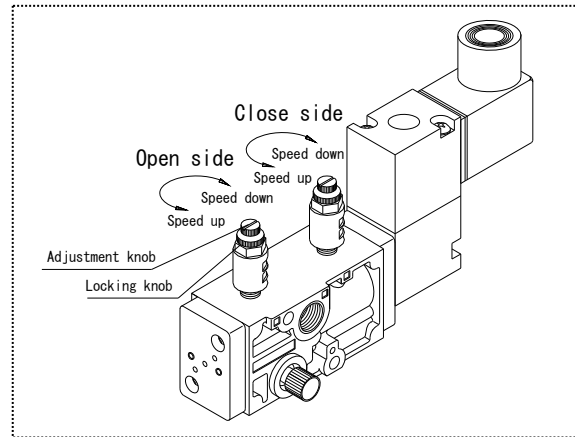
Necessary items

- Spanner wrench

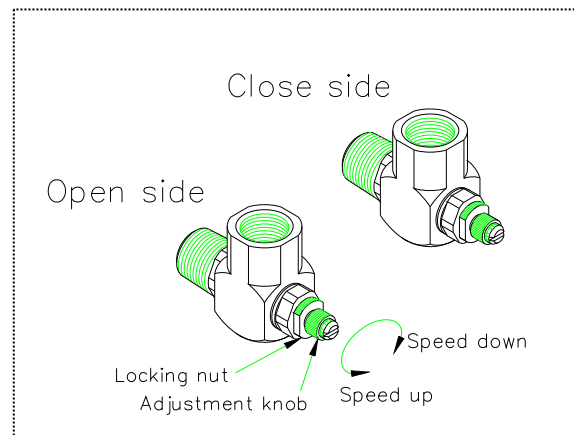
Procedure

- 1) Turn right the adjustment knob of the solenoid valve fully.
 ※Avoid excessive tightening.
 (The speed controller can be damaged.)
- 2) Supply the air to the solenoid valve.
- 3) Apply regular rated voltage to solenoid valve, and turn left the open side adjustment knob little by little.
- 4) Turn off the solenoid valve, and turn left the close side adjustment knob little by little.
- 5) Repeat item 3), 4) to adjust the opening / closing speed required.
- 6) When the adjustment is finished, fix the adjustment knob with locking nuts.
 ※Avoid excessive tightening.
 (The locking nut can be damaged.)

For Double action type with solenoid valve



For Double action type with speed controller



- Single action type

Necessary items

- Spanner wrench

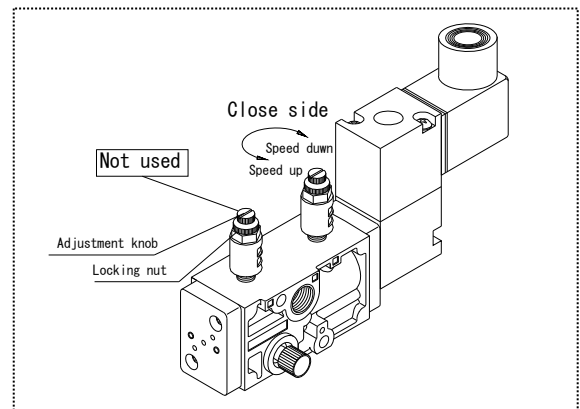
The actuation type changes the speed-adjustable direction.

| Single action | Opening speed | Closing speed |
|-------------------|----------------|----------------|
| Air to open type | Not adjustable | Adjustable |
| Air to close type | Adjustable | Not adjustable |

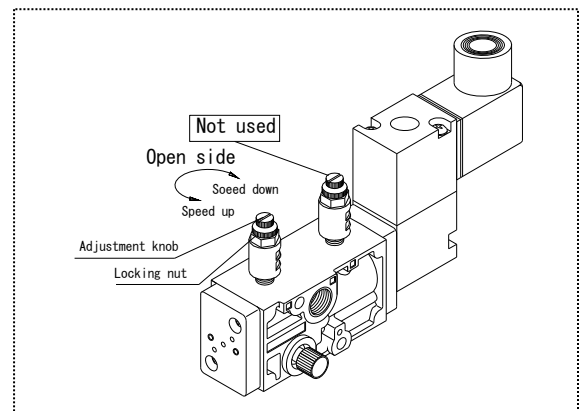
Procedure

- 1) Turn right the adjustment knob of the solenoid valve fully.
 ※Avoid excessive tightening.
 (The speed controller can be damaged.)
- 2) Supply the air to the solenoid valve.
- 3) Apply regular rated voltage to solenoid valve, and turn left the open side adjustment knob little by little.
- 4) Turn off the solenoid valve, and turn left the close side adjustment knob little by little.
- 5) Repeat item 3), 4) to adjust the opening / closing speed required.
- 6) When the adjustment is finished, fix the adjustment knob with locking nuts.
 ※Avoid excessive tightening.
 (The locking nut can be damaged.)

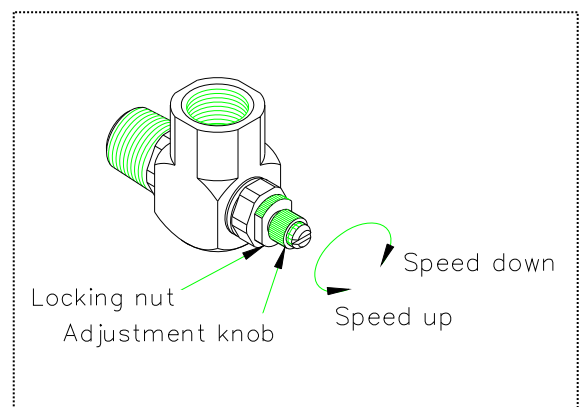
For Air to open type with solenoid valve





For Air to close type with solenoid valve



For Single action type with speed controller



(16) Mounting insert-metal and base (panel)

  - When screwing in a Metal Insert (Ensat), install it vertically. Refer to the User's Manual for Metal Insert (Ensat) by the Maker.

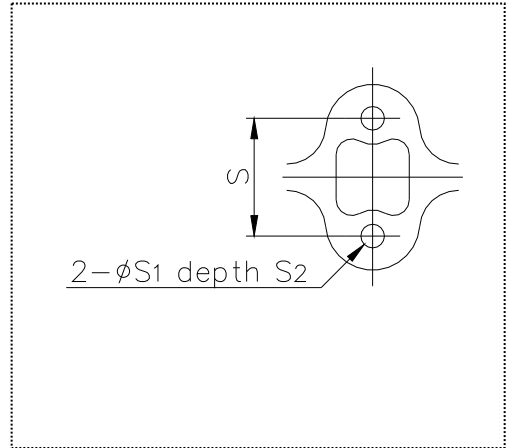
Procedure

Refer to the user's manual for the Ensat (Insert metal).

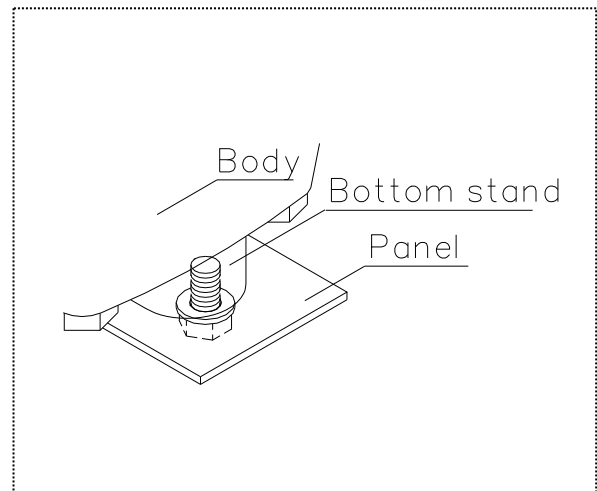
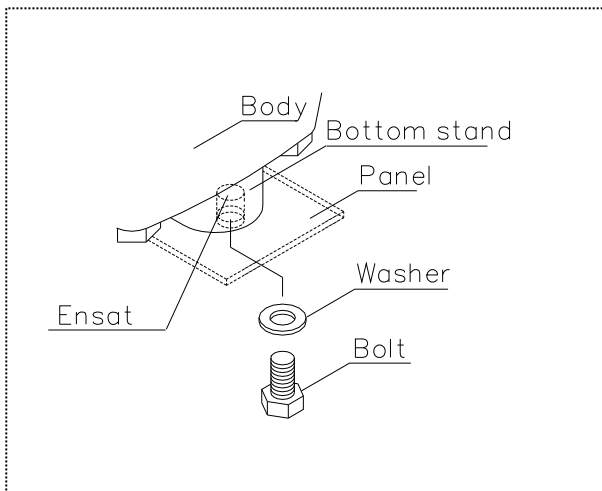
Bottom stand dimension

Unit ; mm (inch)




| Nom. Size | S1 | S2 | S3 |
|-----------------------------|--------------|-------------|--------------|
| 15mm-32mm (1/2", 1 1/4") | 25 (0.98) | 7 (0.28) | 13 (0.51) |
| 40mm, 50mm (1 1/2", 2") | 45 (1.8) | 9 (0.35) | 15 (0.59) |



Panel mount procedure



(17) Adjustment procedure for stopper

-  - Do not touch the actuator when it operated.
- Warning**
-   - If a stopper is loose, adjust it.
- Caution** - Tighten the stoppers securely. (Too weak a torque on a stopper may cause it to loosen.)

- Necessary items
- Spanner wrench
 - Driver(Flat head screw)
 - Protective Gloves
 - Goggles

Procedure

- 1) Remove gauge cover [11] with a flat head screw. *Do not damage O ring (A) [14]
- 2) Fully open the valve by controlling the pressure of air.
- 3) Fix stopper [43] with spanner wrench and use spanner wrench to loosen nut [21].
- 4) Remove stopper [43] and nut [21].
- 5) Fully close valve by controlling the volume of air.
- 6) Attach stopper [43] by hand and tightens until not turning round the stopper [43] with the hand.
- 7) Turn stopper [43] with spanner wrench until the position in which fluid begins to leak.
- 8) Turn stopper [43] with spanner wrench 1/4 – 1/2 turns, counterclockwise.
- 9) Fix stopper [43] with spanner wrench and use spanner wrench to tighten nut [21].
 - * Insufficient tightening may loosen the stopper.
- 10) Completely close valve by controlling the volume of air and check for leakage.
 - If there is leakage, repeat steps 2) to 8) until leakage stops.
- 11) Install gauge cover [11].

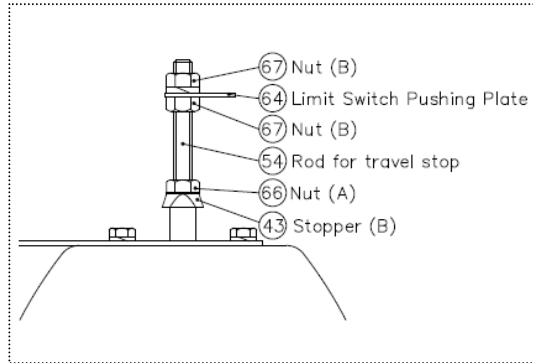
- * Valve option equipped with limit switch or positioner can adjust by same method.
- * Turn off the power source of positioner.

<For Limit Switch (Limit Switch is optional)>

- Necessary items
- Spanner wrench

Procedure

- 1) Fully open valve by controlling the volume of air.
- 2) Fix nut (B) [67] lower part with spanner wrench and use spanner wrench to loosen nut (B) [67] upper part.
- 3) Remove nut (B) [67], limit switch pushing plate [64], spring washer from rod for travel stop [54].
- 4) Loosen nut (A) [66] while putting stopper (B) [43] in stationary position by a spanner wrench.
- 5) Remove stopper [43] from rod for travel stop [54].
- 6) Fully close valve by controlling the volume of air.
- 7) Attach stopper [43] by hand and tightens until not turning round the stopper [43] with the hand.
- 8) Turn stopper [43] with spanner wrench until the position in which fluid begins to leak.
- 9) Turn stopper [43] with spanner wrench 1/4 – 1/2 turns, counterclockwise.
- 10) Fix stopper [43] with spanner wrench and use spanner wrench to tighten nut (A) [66].
 - *Insufficient tightening may loosen the stopper.



- 11) Completely close valve by controlling the volume of air and check for leakage.
If there is leakage, repeat steps 4), 9) and 10) until leakage stops.
- 12) Install nut (B) [67] lower part, limit switch pushing plate [64], spring washer, nut (B) [67] upper part according with rod for travel stop [54] by hand.
- 13) Adjust limit switch pushing plate [64] to the orientation of its vertical position.
- 14) Tighten the both part of nut (B) [67] (top and down) by spanner wrenches.
- 15) By supplying air to valve repeat the open/close operation confirm if the limit switch is working properly.
*If the limit switch is not working properly, then go back to step 13) and repeat the adjusting procedure.

<Fully open adjustment method (fully open adjustment mechanism is optional)>

Necessary items

- Spanner wrench
- Allen wrench
- Driver(Flat head screw)
- Protective Gloves
- Goggles

Procedure

- 1) Remove gauge cover [11] with a flat head screw. * Do not damage O ring (A) [14].
- 2) Fully close valve by controlling the volume of air.
- 3) Fix bolt [56] with an allen wrench, and use spanner wrench to loosen the nut [56].
- 4) Screw bolt [56] into requires position.
- 5) Fix bolt [56] with an allen wrench, and use a spanner wrench to tighten the nut [56].
*The bolt and nut may loosen if insufficiently tightened.
- 6) Open valve by controlling the volume of air and check valve for openness.
*If desired degree is not reached, repeat steps 2) to 5).
- 7) Install gauge cover [11].

<Manual operating method for (Manual operating mechanism is optional only for inverse operations.)>



Necessary items

- Spanner wrench
- Allen wrench
- Driver (Flat head screw)

Procedure

- 1) Remove gauge cover [11] with a flat head screw. *Do not damage O ring (A) [14].
- 2) Fully open valve by controlling the volume of air.
*When it is impossible to control the volume of air due to power failure, omit step 2).
- 3) Fix stopper [43] with spanner wrench, and use spanner wrench to loosen nut [21].
- 4) Remove stopper [43] and nut [21].
- 5) Loosen indicative rod [41] completely with an allen wrench to remove indicative rod [41] from the upper portion of the actuator.
- 6) Fully close valve by controlling the volume of air.
*When it is impossible to supply air to the valve due to power failure, omit step 6).
- 7) Install thrust ring [53].
- 8) Install manual shaft [52] at the same position as the indicative rod [41].
- 9) When manual shaft [52] is turned with spanner wrench clockwise, the valve will open and counterclockwise, the valve will shut.
- 10) Replace manual shaft [52] and thrust ring [53] with stopper [43] and nut [21] using the reverse procedure insteps (3 to 8).
- 11) Adjust stopper (refer to page 23).
- 12) Install gauge cover [11].

(18) Disassembling method for replacing parts

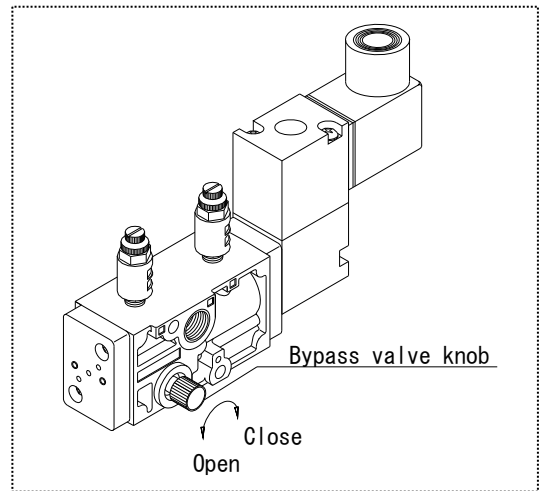
- Warning**  - Never attempt to disassemble an actuator.
 (If disassembled forcible, internal parts may jump out and this is very dangerous.)
- Do not touch the actuator when it operated.
- Caution**  - Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty.
 (You may be injured.)
- Do not change or replace valve parts under line pressure.

- Necessary items**
- Spanner wrench
 - Protective gloves
 - Safety goggles

(Disassemble)

Procedure

- 1) Completely discharge fluid from line.
- 2) Close main valve for air and open bypass valve to discharge air from the actuator.
- 3) Remove air line.
- 4) Loosen bolt [40] between the body and the actuator.
- 5) Remove actuator [28] or [29].
- 6) Remove diaphragm [3] by turning it 90 degrees.
- 7) Remove compressor [6].
- 8) Remove joint [7].



(Assembly)

Procedure

Assembly by using reverse procedures on steps 8) to 1).


(As to the body tightening torque, refer to Table 1.)

(Table 1) Body tightening torque value


Unit: N·m {kgf·cm} [lb·inch]

| Nominal size Diaphragm material | 15mm, 20mm (1/2", 3/4") | 25mm, 32mm (1", 1 1/2") | 40mm (1 1/2") | 50mm (2") |
|------------------------------------|----------------------------|----------------------------|------------------------|------------------------|
| Rubber | 3.0 {31} [27] | 5.0 {51} [44] | 12.0 {122} [106] | 15.0 {153} [133] |
| PTFE | 5.0 {51} [44] | 8.0 {82} [71] | 15.0 {153} [133] | 20.0 {204} [177] |

(19) Installation procedure of fully open adjustment mechanism

 - Do not touch the actuator when it operated.

Warning

 - Be sure to conduct a safety check on all hand and power tools to be used before beginning work.

Caution - Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty.
(You may be injured.)



Necessary items

- Spanner wrench
- Driver(flat head screw)
- Protective gloves
- Allen wrench
- Safety goggles

Procedure

- 1) Remove gauge cover [11] with a flat head screw. *Do not damage O ring (A)[14].
- 2) Fully open valve by controlling the volume of air.
- 3) Fix stopper [43] with spanner wrench, and use spanner wrench to loosen nut [21].
- 4) Remove stopper [43] and nut [21].
- 5) Loosen indicative rod [41] completely, with an allen wrench, to remove indicative rod [41] from the upper portion of the actuator.
- 6) Install rod [54] with an allen wrench at the same position as the indicative rod [41].
*Rod for travel stop may loosen if insufficiently tightened [54].
- 7) Install fitting [55] on the upper portion of the actuator, and tightens by spanner wrench.
*Fitting for travel stop [55] may loosen if insufficiently installed.
- 8) Put bolt [56] in the open adjustment fitting [55].
- 9) Adjust bolt [56] by hand into requires position.
- 10) Put nut [56] in bolt [56].
- 11) Fix bolt [56] with an allen wrench, and use spanner wrench to tighten up the nut [56].
- 12) Open valve by controlling the volume of air and check valve for openness.
*If desired degree is not reached, repeat steps 9) to 11).
- 13) Install gauge cover [11].

(20) Inspection items

  - Perform periodic maintenance. (Leakage may develop due to temperature changes or over periods of prolonged storage, rest or operation.)

- Periodically inspect and maintain the AV valve in accordance with the plant schedule.



| Portion to be inspected | Inspection item |
|-------------------------|---|
| Actuator | <ol style="list-style-type: none"> 1) Existence of rust, peeling of paint, and dirt of inspection hole of valve travel indicator. 2) Tightening condition of respective threaded portions. (Loose or not) 3) Existence of rust and corrosion around the limit switch, and existence of internal disconnection. 4) Existence of abnormality in opening and closing operating sounds. 5) Smooth operation of manual handle. <p>* It is unnecessary to supply oil to this actuator.</p> |
| Valve | <ol style="list-style-type: none"> 1) Existence of scratches, cracks, deformation, and discoloring. 2) Existence of leakage from the valve to the outside. 3) Existence of leakage when the valve is opened fully at right or left. 4) Tightening condition of bolt (B) (loose or not) . |

(21) Troubleshooting

| Problem | Cause | Treatment |
|--|---|--|
| The valve does not operate by air operations | The power source of the control panel is Turned off. | Turn on the power source. |
| | The solenoid valve is disconnected. | Check the connection again. (Refer to page 7,18) |
| | Air is not supplied to the solenoid valve. | Supply air to solenoid valve. |
| | The supply voltage to the solenoid valve is wrong. | Check voltage with a tester and set specified voltage. |
| | The voltage to the solenoid valve is low. | |
| | The bypass valve opens. | Close bypass valve by turning the bypass valve knob in a clockwise direction. |
| | The speed controller's knob is fully turned in a clockwise direction. | Turn speed controller's knob in a counterclockwise direction.(Refer to pages 20 and 21.) |
| | The operation pressure is low. | Check the operating pressure. |

| Problem | Cause | Treatment |
|---|---|---|
| Fluid leaks from the valve even when the valve is closed fully. | The diaphragm is worn. | Replace the diaphragm with a new one.(Refer to pages 25 and 26) |
| | The diaphragm or the body is scratched. | Replace scratched parts with new one.(Refer to pages 25 and 26) |
| | Foreign matter is in the valve. | Disassemble valve to remove foreign matter.(Refer to pages 25 and 26) |
| | The operating pressure is low. | Check the operating pressure. |
| Fluid leaks from the valve. | The bolt between the body and actuator is loose. | Tighten up the bolt to the specified torque.(Refer to page 25 and 26) |
| | The diaphragm or the body is scratched. | Replace scratched parts with new one.(Refer to pages 25 and 26) |
| | There is foreign matter between the diaphragm and the body. | Disassemble valve to remove foreign matter.(Refer to pages 25 and 26) |
| | The union nut is loosened. | Tighten the union nut. |
| | The O ring is scratched or worn. | Replace the O ring with a new one. |
| The actuator operates, but the valve does not open or close. | The diaphragm or the joint metal fitting is broken. | Replace broken parts.(Refer to pages 25 and 26) |

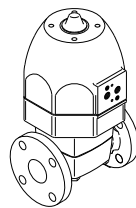
(22) Handling of residual and waste materials

  - Make sure to consult a waste treatment dealer for recommendations on the proper disposal of plastic valves. (Poisonous gas is generated when the valve is burned improperly.)

**Diaphragm Valve Type 14
Pneumatic Actuated Type AN**

[Automatic Valve]

ASAHI YUKIZAI CORPORATION



Distributor

<http://www.asahi-yukizai.co.jp/en/>

Information in this manual is subject to change without notice.

2016.4