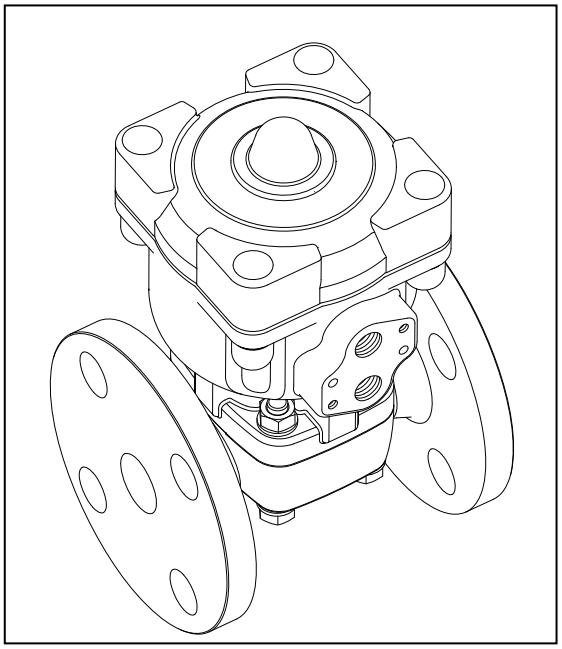
Serial No.	H-A058-E-8

Diaphragm Valve
True Union Diaphragm Valve
Pneumatic Actuated Type AI

User's Manual



Contents

ASAHI AV VALVES

This user's guide contains information important to 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	This symbol reminds the user to take caution due to the potential for serious injury or death.
 Caution	This symbol reminds the user to take caution due to the potential for damage to the valve if used in such a manner.

<Prohibited & Mandatory Action Signs>

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

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

- 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

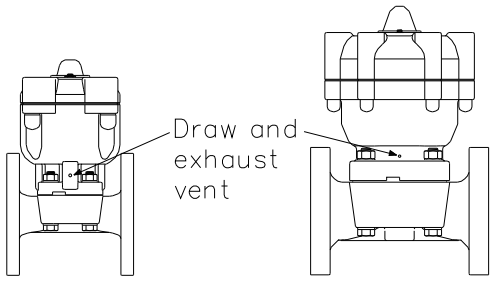
- Do not disassemble or modify the actuator.
  (If disassembled under tension, internal parts may jump out and this is very dangerous.)
- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas 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 AV valves in place where they may become submerged 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.

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.



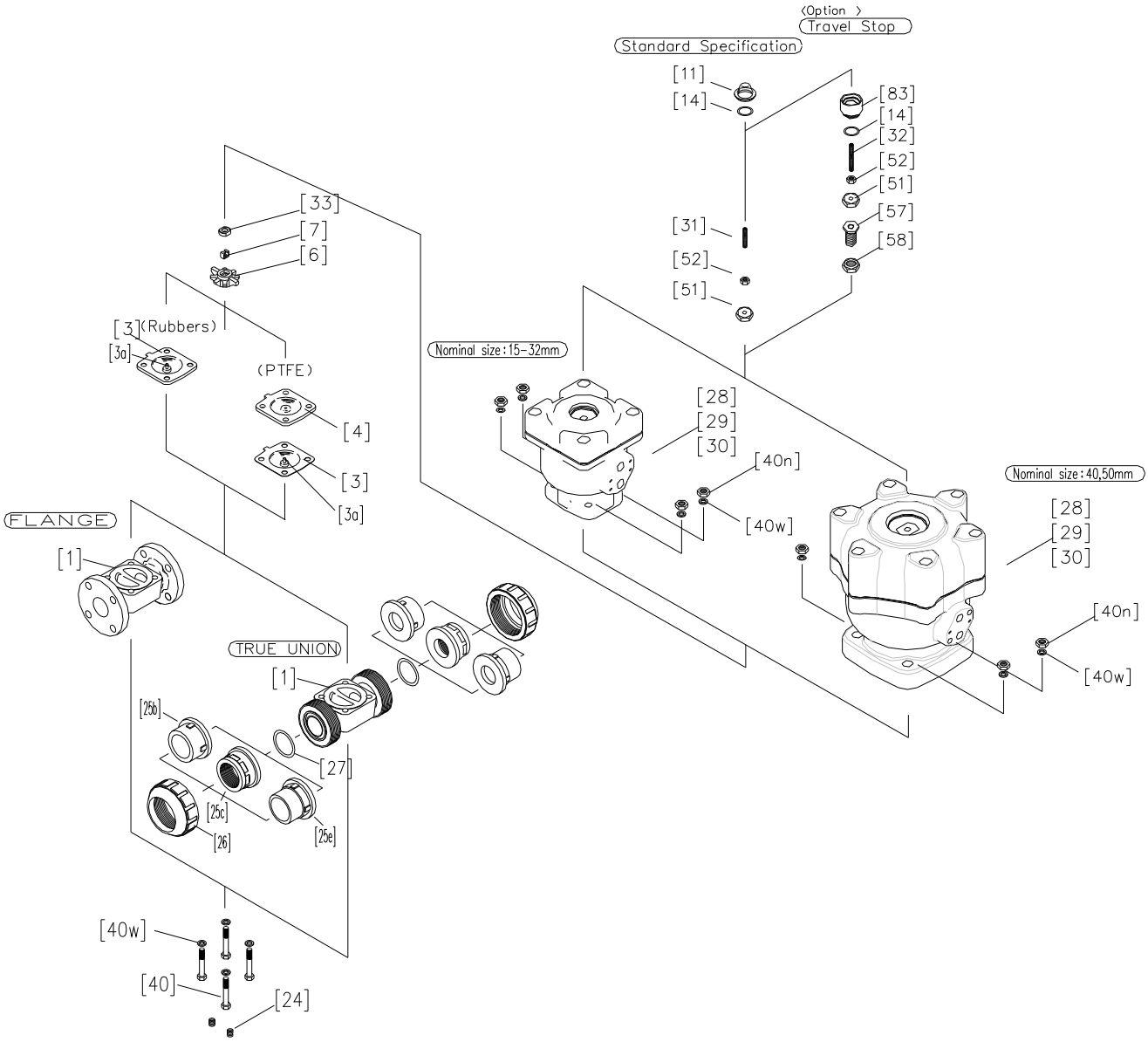
(3) General instructions for transportation, unpacking and storage

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

- This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- 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.)
- When transporting a valve, do not carry it by the handle.

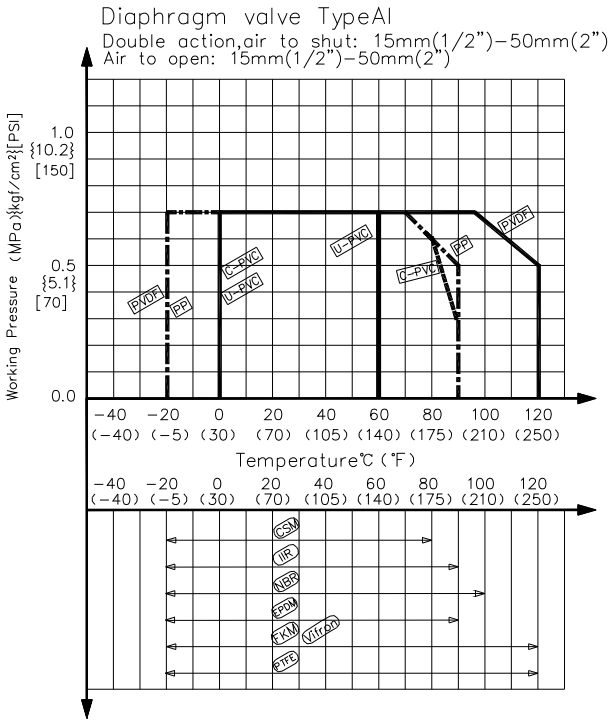
- Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

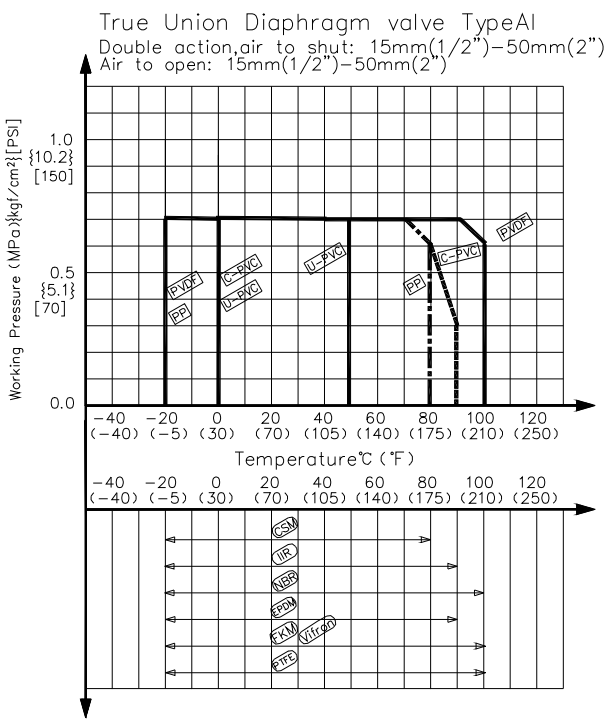
(4) Name of parts



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[25b]	End connector(Socket end type)	[33]	Compressor pushing plate
[3]	Diaphragm	[25c]	End connector(Threaded end type)	[40]	Bolt (No.40)
[3a]	Inserted metal of diaphragm	[25e]	End connector(Spigot end type)	[40n]	Nut (No.40)
[4]	Cushion	[26]	Union nut	[40w]	Washer (No.40)
[6]	Compressor	[27]	O-ring (No.27)	[51]	Stopper for pneumatic actuator
[7]	Joint	[28]	Actuator (double acting)	[52]	Nut (No.52)
[11]	Gauge cover	[29]	Actuator (air to shut)	[57]	Fitting for travel stop
[14]	O-ring (No.14)	[30]	Actuator (air to open)	[58]	Nut (No.58)
[21]	Screw	[31]	Indicator rod	[83]	Adapter
[24]	Ensat (insert metal)	[32]	Stopper (with travel stop)		

(5) Working pressure vs. temperature





(6) Specifications of actuator

Nominal size		15, 20 mm (1/2", 3/4")	25, 32mm (1", 1 1/4")	40 mm (1 1/2")	50 mm (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	0.89 [55]	1.29 [79]	4.35 [269]	4.80 [297]
	Air to open	0.35 [22]	0.49 [30]	1.73 [107]	1.98 [122]
	Air to shut	0.54 [33]	0.79 [49]	2.63 [163]	2.82 [174]
Air supply orifice	Double acting Air to open Air to shut	Rc 1/4			

(7) Specifications of options

(Specifications of Solenoid valve)

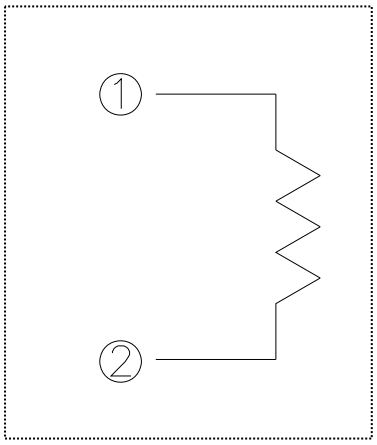
Actuation	Nom. Size	Model No.	Pipe bore	Effective cross section area mm^2(inch^2)	Power consumption	Additional function
All type	15mm(1/2") - 50mm(2")	4N3S102K-W□-G31193	Rc 1/4	10 (0.016) or more	AC ; 6VA DC ; 5.5W	- Bypass valve built – in - Silencer with needle Valve attached (to be used as speed controller)

4N3S102K-W□-G31193

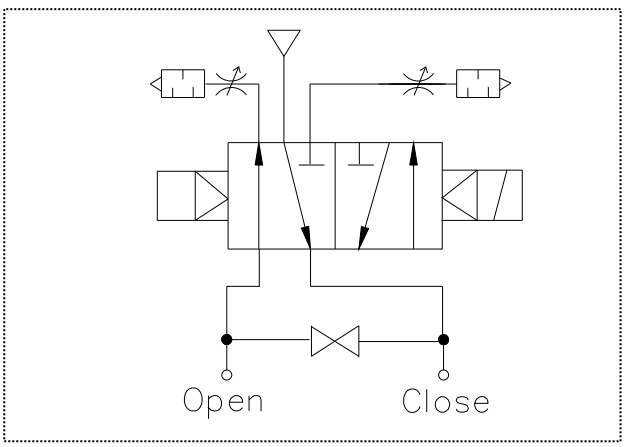
Specification	sign
AC100V 50/60Hz	1
AC110V 50/60Hz	(2)
AC200V 50/60Hz	3
AC220V 50/60Hz	(4)
DC24V	5
DC48V	(6)
DC100V	(7)
DC125V	(9)

* ( )is special order.

connection diagram



JIS sign



(Specifications of limit switch)

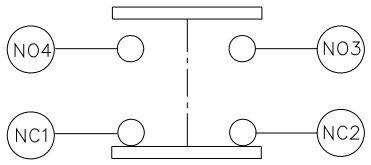
Actuation	Nominal size	Type sign	Protection grade
All type	15mm - 50mm (1/2" – 2")	1LS19-J	IP67 (IEC529)

Limit switch rating

Rate voltage (V)	Resistive load (A)	Inductive load (A)
AC125	10	6
AC250	10	6
DC125	0.8	0.2
DC230	0.4	0.1

connection diagram

(At intermediate opening)



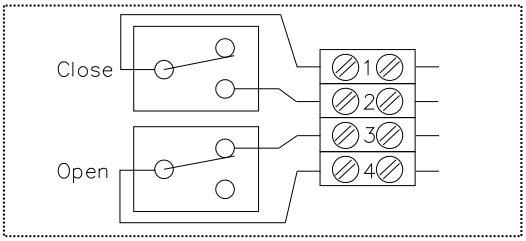
(Specifications of limit switch box)

Actuation	Nominal size	Type sign	Protection grade
All type	15mm – 32mm (1/2" – 1 1/4")	HPCR4MVAZ15	IP65 (IEC529)
	40mm , 50mm (1 1/2" , 2")	HPCR4MVAZ30	

Limit switch rating

connection diagram

Rate voltage (V)	Resistive load (A)
AC250	5.0

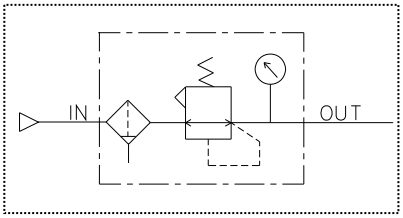


Note. This circuit diagram shows that the position of the opening action has come to an end.

(Specification of pressure reducing valve with filter)

JIS sign

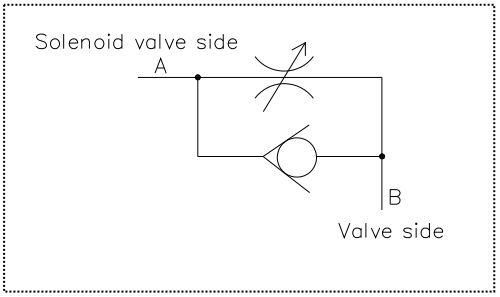
Actuation	Nom. Size	Type sign	Pipe bore	Element degree of filtration
All type	15mm - 50mm (1/2" – 2")	ARU2-02-8A-B	Rc 1/4	5 μ m



(Specification of speed controller)

Actuation	Nom. Size	Type sign	Pipe bore
All type	15mm - 50mm (1/2" – 2")	SC7-08A	Rc 1/4

Effective cross section area mm^2(inch^2)		Needle No. of revolution
Free flow	Control flow	
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 23, respectively.

(8) Installation procedure

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.
- When connecting a ASAHI AV Valve to metal piping, take care not to let the pipe stress on the ASAHI AV Valve.

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

Caution
- 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)

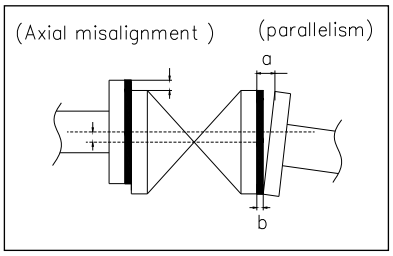
Procedure

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.)

Unit : mm (inch)

Nom. Size	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)



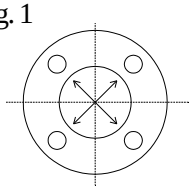
3) Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner. (Refer to Fig.1.)

Caution - 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	15-20mm (1/2"-3/4")	25-40mm (1"-1 1/2")	50 mm (2")
PTFE・PVDF coated	17.5{179}[155]	20.0{204}[177]	22.5{230}[230]
Rubber	8.0{82}[71]	20.0{204}[177]	22.5{230}[230]

Fig. 1



<True Union Diaphragm Valve>

Caution
- Take care not to over-tighten the Union Nut. (The valve can be damaged.)
- Do not use the pipe wrench. (The valve can be damaged.)
- When installing, disassembling, or reassembling the piping, fix the End Connector.
- Before a water test, be sure that the Union Nut is tightly fastened.
- Fasten the Union Nut while avoiding the parallelism and axial misalignment of the flange surface.

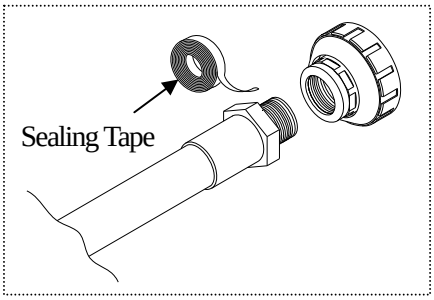
Threaded type (Material : PVC, C-PVC, PP, PVDF)

Caution
- Avoid excessive tightening. (The valve can be damaged.)
- 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.
   * Avoid excessive tightening. (The valve can be damaged.)
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.
   * Take care not to over-tighten the Union Nut. (The valve can be damaged.)



Socket type (Material : PVC, C-PVC)

Warning
- 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 any anomaly, receive a physician's diagnosis and take appropriate measures promptly.

Caution
- 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.

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) Clean the hub part of the end connector [25b] by wiping with a 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.
   * Do not under any circumstances try to insert a pipe into another fitting or valve by striking it, which may break the piping.
7) Wipe away overflowing adhesive.
8) Make sure that O-ring(C)[27] is mounted
9) 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.
11) Using a strap wrench, screw it in by turning 90° - 180° carefully without damaging it.
    * Take care not to over-tighten the Union Nut. (The valve can be damaged.)

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 [25e].

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 [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 union nuts uniformly on each side approx. 90° - 180° turns, 1/4 to 1/2 turns.
* Take care not to over-tighten the Union Nut.
(The valve can be damaged.)

(9) Support setting procedure

Caution

- Do not subject the valve pump vibrations. (The valve may be damaged.)
- Set the valve support. (The valve may be damaged because the actuator is heavy.)

Necessary items

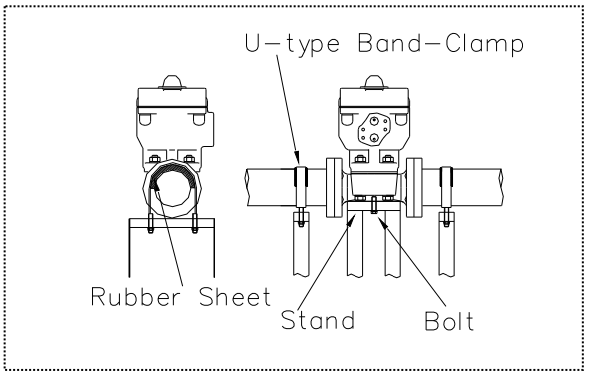
- Spanner wrench
- U-type clamp (with bolt)
- Rubber sheet

Level plumber

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

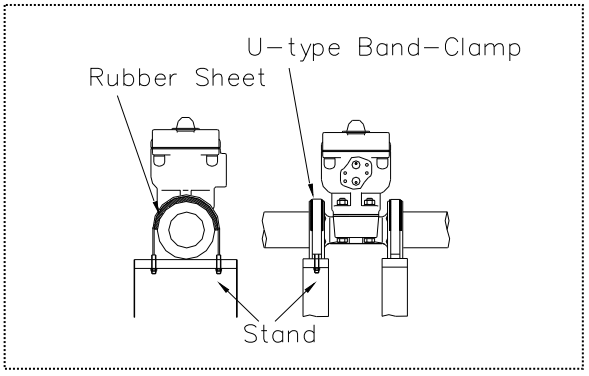
Fix the installation jig (under the valve) and stand with bolts (Bolt size: M5)

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



○ Using U-type clamp (Only Flanged type)

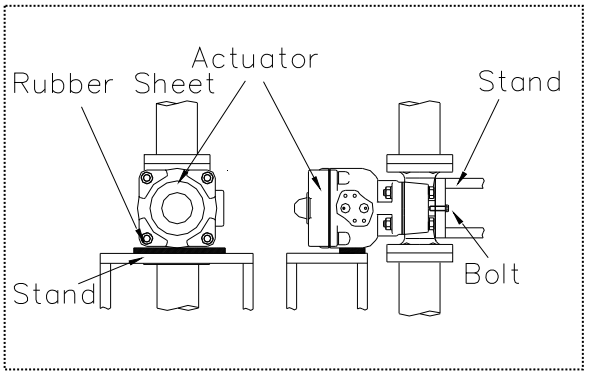
Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



Perpendicular plumber

Fix the installation jig (under the valve) and stand with bolts (Refer to page 21)

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



(10) Air piping procedure

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

Caution

- Don't forget to remove flash in the screw part of the joint. (A crack and air leakage may be caused.)
- Don't remove the protective plug up until piping.
  (The intrusion of contaminants and water may cause the malfunction of the actuator.)
- Use compressed air as operating fluid. Don't use oil pressure and water pressure.
  (Actuator may be damaged.)
- Use clean, filtered compressed air. (Actuator may not work normally.)
- When a steel pipe is used for piping, use the pipe the inside of which is treated to be rust preventive.
  (The intrusion of rust into the actuator the electromagnetic valve may cause a malfunction.)
- Clean the pipe by flashing before piping to prevent the malfunction of the actuator.

Necessary items

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

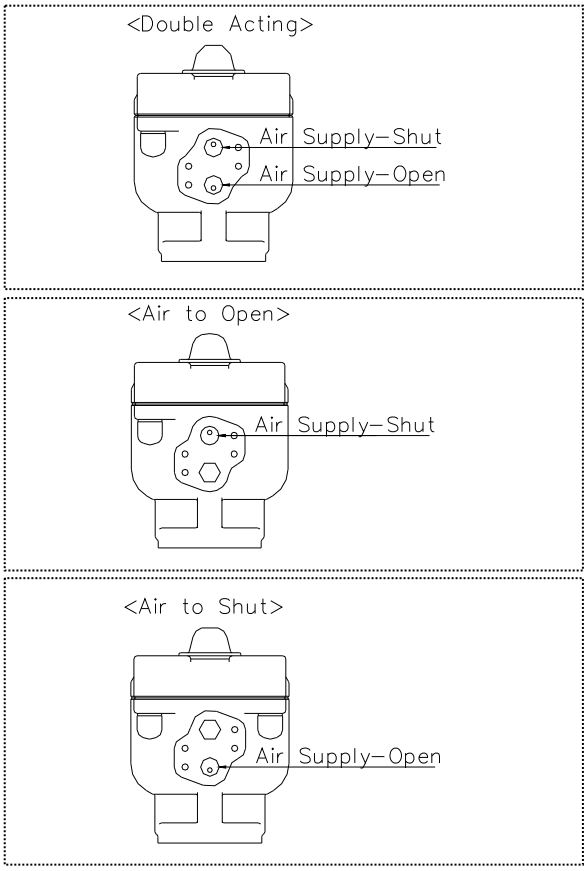
Procedure

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.



<2> For a pressure reducing valve with a solenoid valve and a pressure reducing valve with a filter.

Caution

- Don't forget to remove flash in the screw part of the joint. (A crack and air leakage may be caused.)
- Don't remove the protective plug up until piping.
  (The intrusion of contaminants and water may cause the malfunction of the actuator.)
- Shut down the power before connecting wires. Here are risks of electrical shock depending on the level of operating voltage.
- A speed controller adjusts and fasten a lock nut by open ended spanners.
- Use compressed air as operating fluid. Don't use oil pressure and water pressure.
  (Actuator may be damaged.)
- Use clean, filtered compressed air. (Actuator may not work normally.)
- When a steel pipe is used for piping, use the pipe the inside of which is treated to be rust preventive.
  (The intrusion of rust into the actuator the electromagnetic valve may cause a malfunction.)
- Clean the pipe by flashing before piping to prevent the malfunction of the actuator.

Necessary items

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

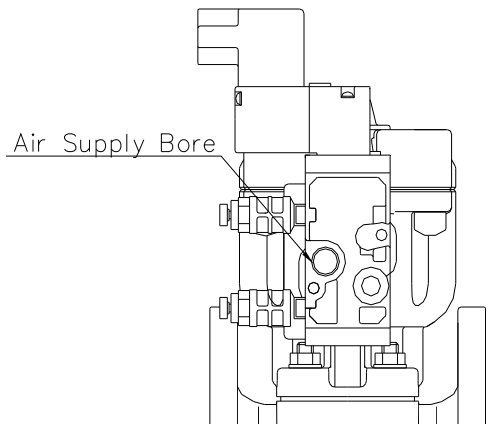
Procedure

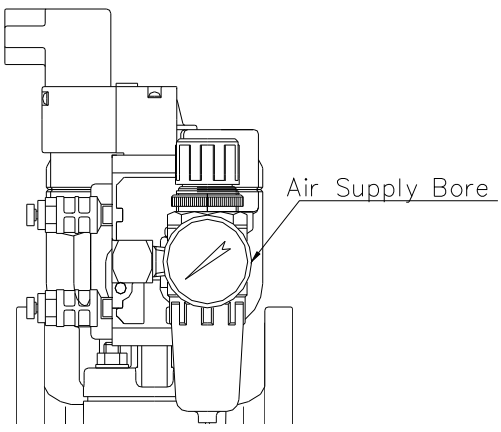
1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.

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.

4) Mount a steel pipe or a tube.





(11) Connection of limit switch procedure

< Limit Switch: 1LS19-J>

Warning - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.

Caution - Connect the cables by using insulated sheathed crimping terminals in such a way as not to contact the cover or housing. (Contact of a crimping terminal with the cover may disable the cover from being closed or may cause a ground fault.)

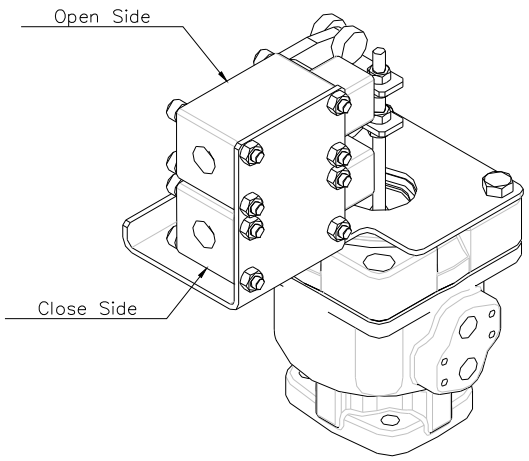
- Be sure that the cover is attached on during the operation.
- If you use the limit switch at 1 mA – 100 mA or 5 – 30 V, consult near Asahi dealer.

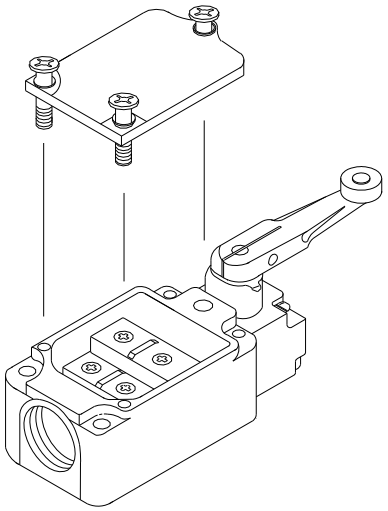
Necessary items

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

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 7.
* 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 cap.





< Limit Switch Box: HPCR4MVAZ15>

Warning - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.

Caution - Connect the cables by using insulated sheathed crimping terminals in such a way as not to contact the cover or housing. (Contact of a crimping terminal with the cover may disable the cover from being closed or may cause a ground fault.)

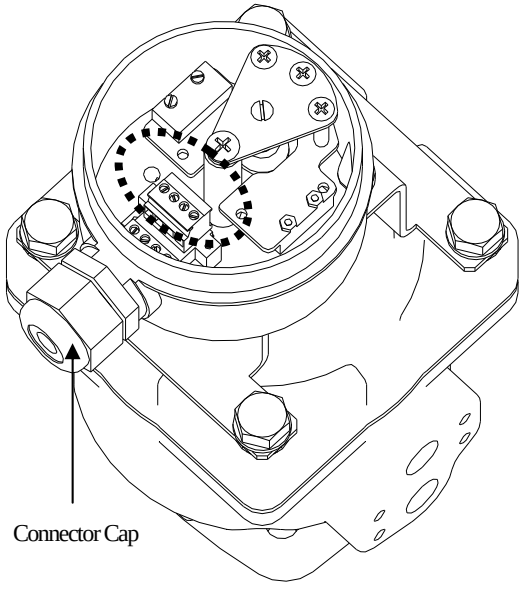
- Be sure that the cover is attached on during the operation.
- If you use the limit switch at 1mA - 100mA or 5 – 30 V, consult near Asahi dealer.

Necessary items

- Driver (Flat head screw)
- Wire stripper

Procedure

1) Loosen the cover of limit switch, and remove the cover.
2) Remove the connecter cap.
3) Draw the cable through the connector cap.
4) Strip the cable with wire stripper.
5) Install a crimp-style terminal on the lead wire with a terminal crimping tool.
6) Connect terminal screw with a flat head screwdriver according to the internal circuit diagram shown in page 7.
   * Tighten the screws. (If not, electric leaks or shocks may occur.)
7) Tighten the cable by connector cap.
8) Install the caver.



(12) Connection of solenoid valve procedure

Warning - Shut down the power before connecting wires. Here are risks of electrical shock depending on the level of operating voltage.

Caution - A speed controller adjusts and fasten a lock nut by open ended spanners.

- Make sure of the agreement between the power voltage indicated on the solenoid valve and the voltage wiring to be done. (Wiring with wrong voltage may cause the failure in the solenoid unit.)

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.

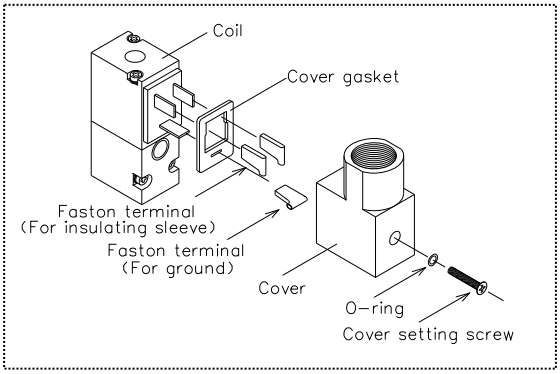
5) Draw the lead wire through the cover.

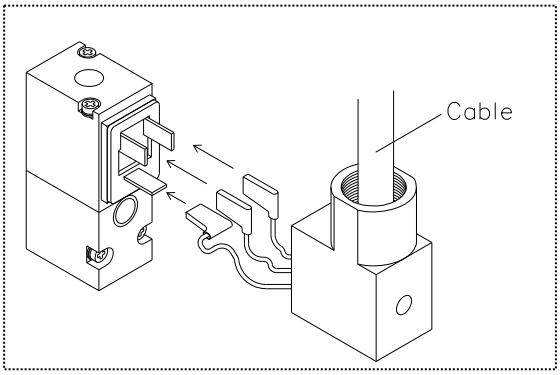
6) Install the Faston terminal on the lead wire with a terminal-crimping tool.

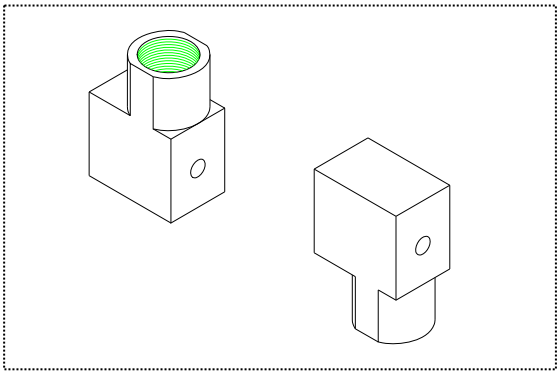
7) Insert the Faston terminal into the coil side. And fit the cover.

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.







(13) Operating procedure

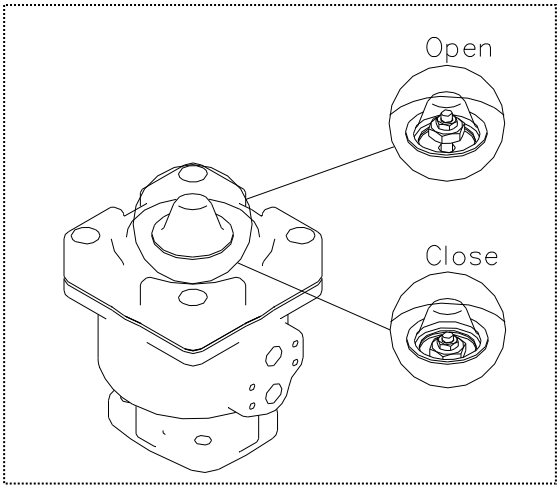
Automatic (Air) Operating Procedure

Warning
- 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.)

Caution
- 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.)
- Do not increase the set pressure of the pressure reducing valve with a filter is 0.6MPa{6.1kgf/cm2} or more. (AV valve may malfunction.)

Procedure

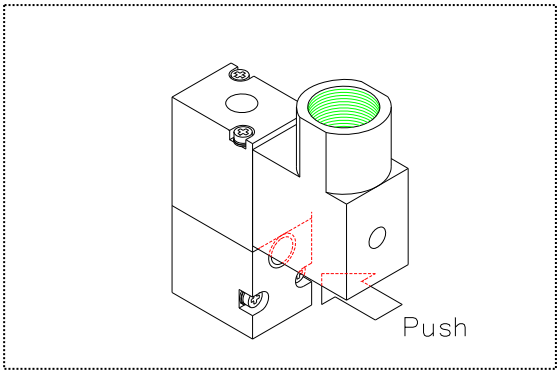
1) Supply air to the air supply opening.
2) Check that the air supplying side and the stopper [43] position are matching.
3) Stop supplying air.



<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

<Adjustment of opening / closing speed procedure>

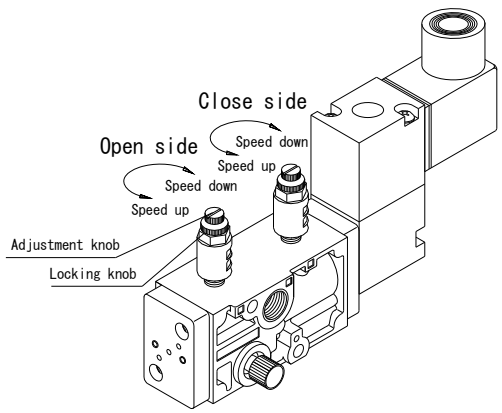
○ Double action type

Necessary items
- ● Spanner wrench

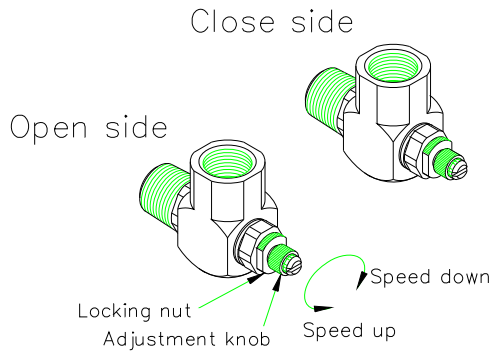
Procedure

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

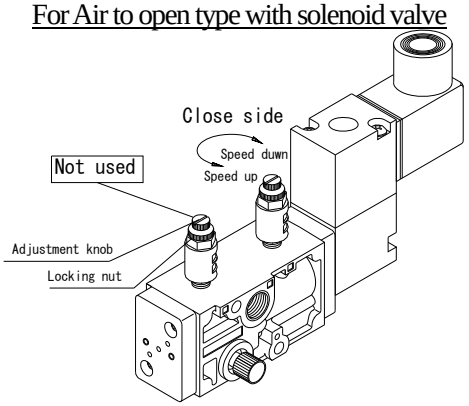
The actuation type changes the speed-adjustable direction.

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

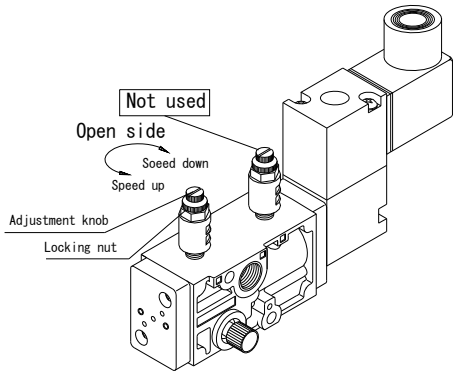
Procedure

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.)

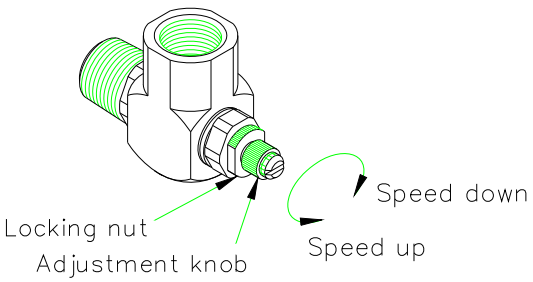
For Air to open type with solenoid valve



For Air to close type with solenoid valve



For Single action type with speed controller

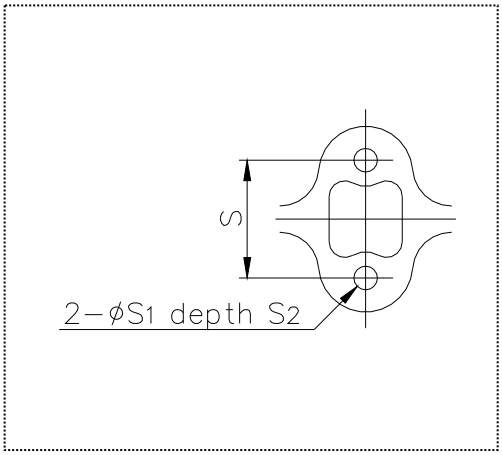


(14) Mounting insert-metal and base (panel)

Caution - 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)
Commercially available.



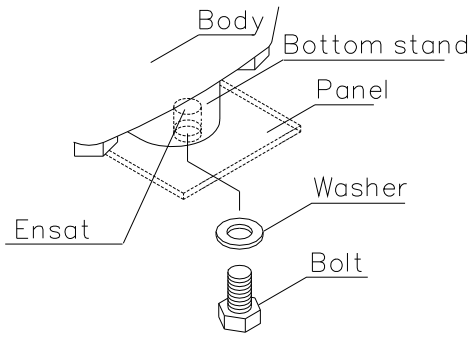
Bottom stand dimension

Unit ; mm (inch)

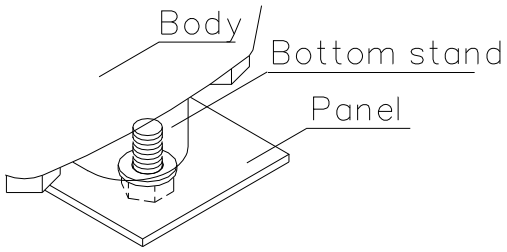
Nom. Size	S1	S2	S3
15mm-32mm (1/2", 1 1/4")	25 (0.98)	7 (0.28)	13 (0.51)
40mm, 50mm (1 1/2", 2")	45 (1.8)	9 (0.35)	15 (0.59)

Panel mount procedure

Before



After



(15) Adjustment procedure for stopper

Warning - Do not touch the actuator when it operated.

Caution - If a stopper is loose, adjust it.
- Tighten the stoppers securely. (Too weak a torque on a stopper may cause it to loosen.)

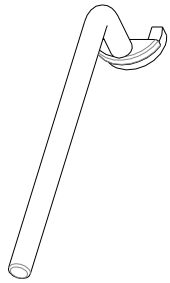
<Adjustment Procedure for Stopper>

Necessary items

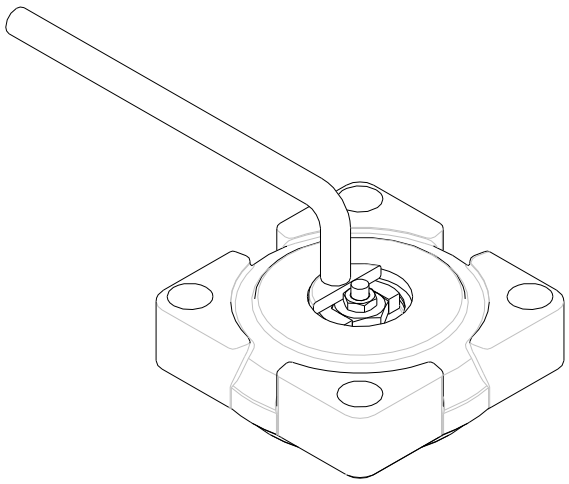
- Spanner wrench
- Stopper adjustment tool (Option)
- Driver
- Protective Gloves
- Goggles

Procedure

1) Remove the gauge cover [11] with a flat head screw.
   * Do not damage O ring (A) [14].
2) Fully open the valve by controlling volume of air.
3) Fix stopper [51] with spanner wrench (Stopper adjustment tool) and use spanner wrench to loosen nut [52].
4) Remove stopper [51] and nut [52].
5) Fully close valve by controlling the volume of air.
6) Attach stopper [51] by hand and tightens until not turning round the stopper [51] with the hand.
7) Turn stopper [51] with spanner wrench (Stopper adjustment tool) until the position in which fluid begins to leak.
8) Turn stopper [51] with spanner wrench (Stopper adjustment tool) 1/4 – 1/2 turns, counterclockwise.
9) Fix stopper [51] with spanner wrench (Stopper adjustment tool) and use spanner wrench to tighten nut [52].
   * 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 9) until leakage stops.
11) Install gauge cover [11].



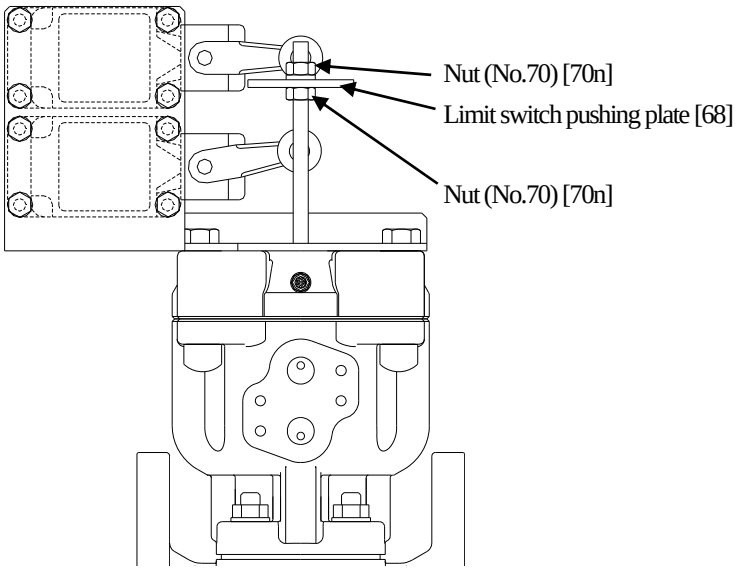
Stopper adjustment tool (Option)



Limit switch: 1LS19-J

Procedure

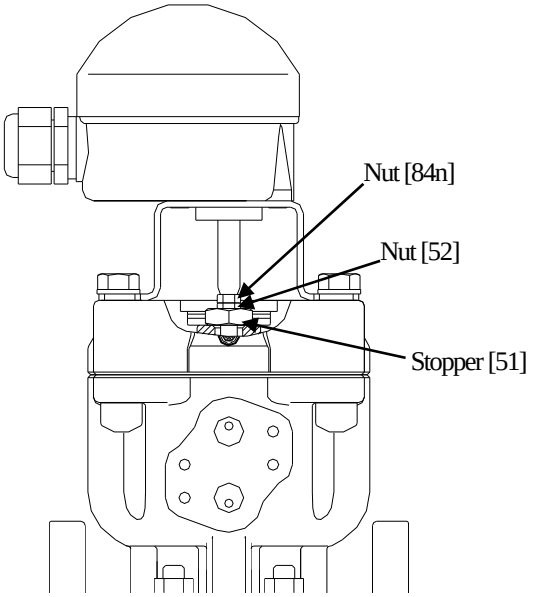
1) Fully open the valve by controlling volume of air.
2) Fix the stopper [51] with spanner wrench (Stopper adjustment tool) and use spanner wrench to loosen nut [52].
3) Loosen the stopper [51].
4) Adjustment for stopper [51]. (See page 22, 5)-10))
5) Fix the lower nut (No.70) [70n] with spanner wrench and use spanner wrench to loosen the upper nut (No.70)[70n].
6) Adjust the upper-lower position of limit switch pushing plate [68].
7) Fix the lower nut (No.70) [70n] and use spanner wrench to tighten the upper nut (No.70) [70n].
8) Check for the normal operation of limit switch. ("Open position" and "shut position")

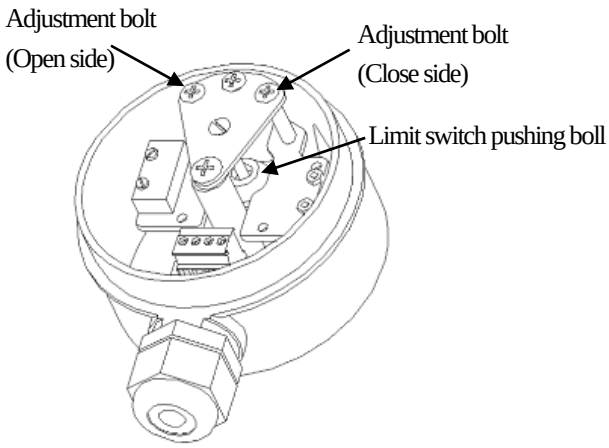


Limit switch box: BPCR4MVAZ15

Procedure

1) Fully open the valve by controlling volume of air.
2) Fix the nut [52] with spanner wrench and use spanner wrench to loosen nut [84n].
3) Fix the stopper [51] with spanner wrench (Stopper adjustment tool) and use spanner wrench to loosen nut [52].
4) Loosen the stopper [52].
5) Adjustment for stopper [51]. (See page 22, 5)-10))
6) Fix the nut [52] with spanner wrench and use spanner wrench to tighten the nut [?].
7) Loosen the cover of limit switch box, and remove the cover.
   * Don't loose O-ring.
8) Adjust the adjustment bolt (open-close side) with driver (+).
9) Check for the normal operation of limit switch. ("Open position" and "shut position")
10) Install the cover of limit switch box.





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

Necessary items

- Spanner wrench (16 mm and 19mm)
- Driver (Flat head screw)
- Protective Gloves
- Goggles

Procedure

1) Remove the adapter [83] with driver.
   * Don't damage the O-ring [14].

2) Completely open the valve by controlling the volume of air.

3) Fix the stopper [51] with spanner wrench, and use spanner wrench to loosen the nut [52].

4) Remove the nut [52].

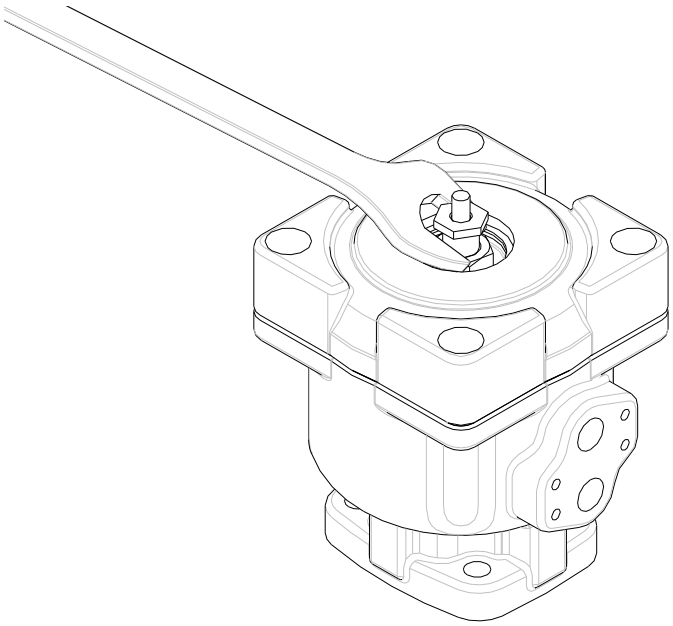
5) Fix the fitting for travel stop [57] with spanner wrench (16 mm), and use spanner wrench (19 mm) to loosen the nut [58].

6) The Fitting for travel stop [57] into requires position.

7) Attach the Fitting for travel stop [57] with a spanner wrench (16 mm), and use a spanner wrench (19 mm) to tighten the nut [58].
   * The nut may loosen if insufficiently tightened.

8) Adjust the stopper [51]. (See page 22, 5)-10))

9) Install the adapter [83].



(16) Disassembling method for replacing parts

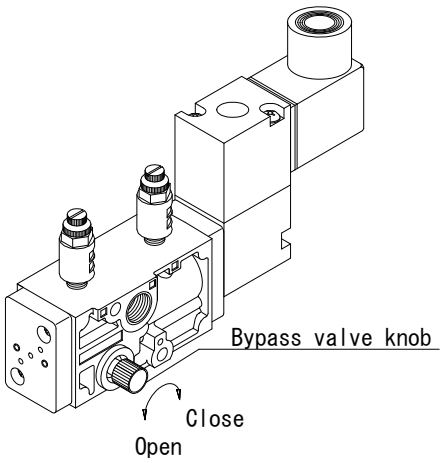
Warning
- Never attempt to disassemble an actuator.
  (If disassembled under tension, internal parts may jump out and this is very dangerous.)
- Do not touch the actuator when it operated.
- Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective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

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], [29], [30].
6) Remove diaphragm [3] by turning it 90 degrees.
7) Remove compressor [6].
8) Remove joint [7].
9) Remove Compressor pushing plate [33].



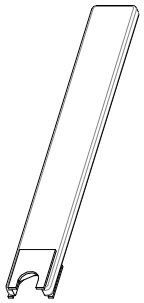
<Assembly>

Procedure

Assembly by using reverse procedures on steps 9) to 1).
(As to the body tightening torque, refer to Table 1.)
* Nominal size 15 mm; Use the assembly tool (Option).

(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]



Assembly tool (Option)

(17) Inspection items

Caution - 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	- Existence of rust, peeling of paint, and dirt of inspection hole of valve travel indicator. - Tightening condition of respective threaded portions. (Loose or not) - Existence of rust and corrosion around the limit switch, and existence of internal disconnection. - Existence of abnormality in opening and closing operating sounds. - Smooth operation of the valve. (more than once the 30 days) * It is unnecessary to supply oil to this actuator.
Valve	- Existence of scratches, cracks, deformation, and discoloring. - Existence of leakage from the valve to the outside. - Existence of leakage when the valve is opened fully at right or left. - Tightening condition of bolt (B). (loose or not)

(18) Disassembling method for replacing parts

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 6, 17)
	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 19 and 20.)
	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)
	The diaphragm or the body is scratched.	Replace scratched parts with new one.(Refer to pages 25)
	Foreign matter is in the valve.	Disassemble valve to remove foreign matter.(Refer to pages 25)
	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)
	The diaphragm or the body is scratched.	Replace scratched parts with new one.(Refer to pages 25)
	There is foreign matter between the diaphragm and the body.	Disassemble valve to remove foreign matter.(Refer to pages 25)
	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)

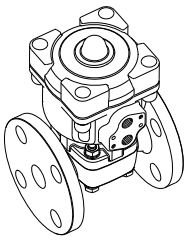
(19) Handling of residual and waste materials

Warning - 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 Pneumatic Actuated Type AI

[Automatic Valve]

ASAHI *AV* VALVES



Asahi Organic Chemicals Industry's homepage http://www.asahi-yukizai.co.jp/en/

Information in this manual is subject to change without notice. 2013.07