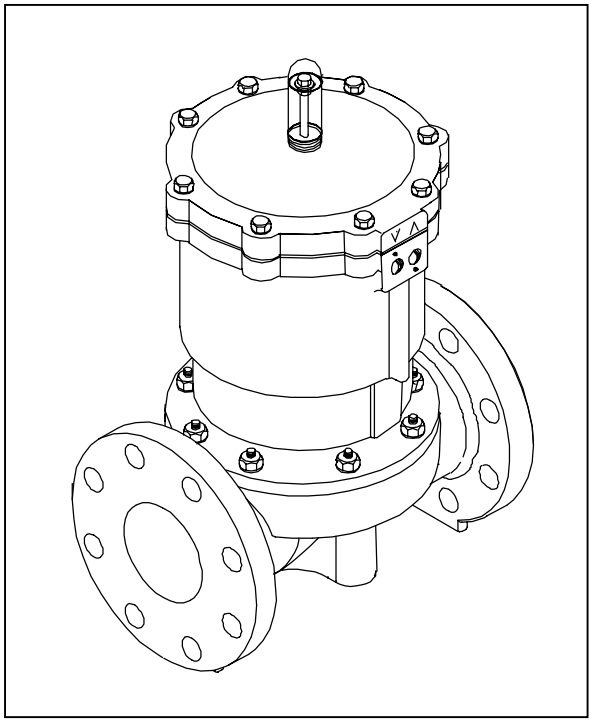
ASAHI AV Valves

Serial No.	H – A015 E – 1

Diaphragm Valve Type 14
Pneumatic Model Type AV

User's Manual



Contents

ASAHI ORGANIC CHEMICALS INDUSTRY CO.,LTD.

(1) General operating instruction

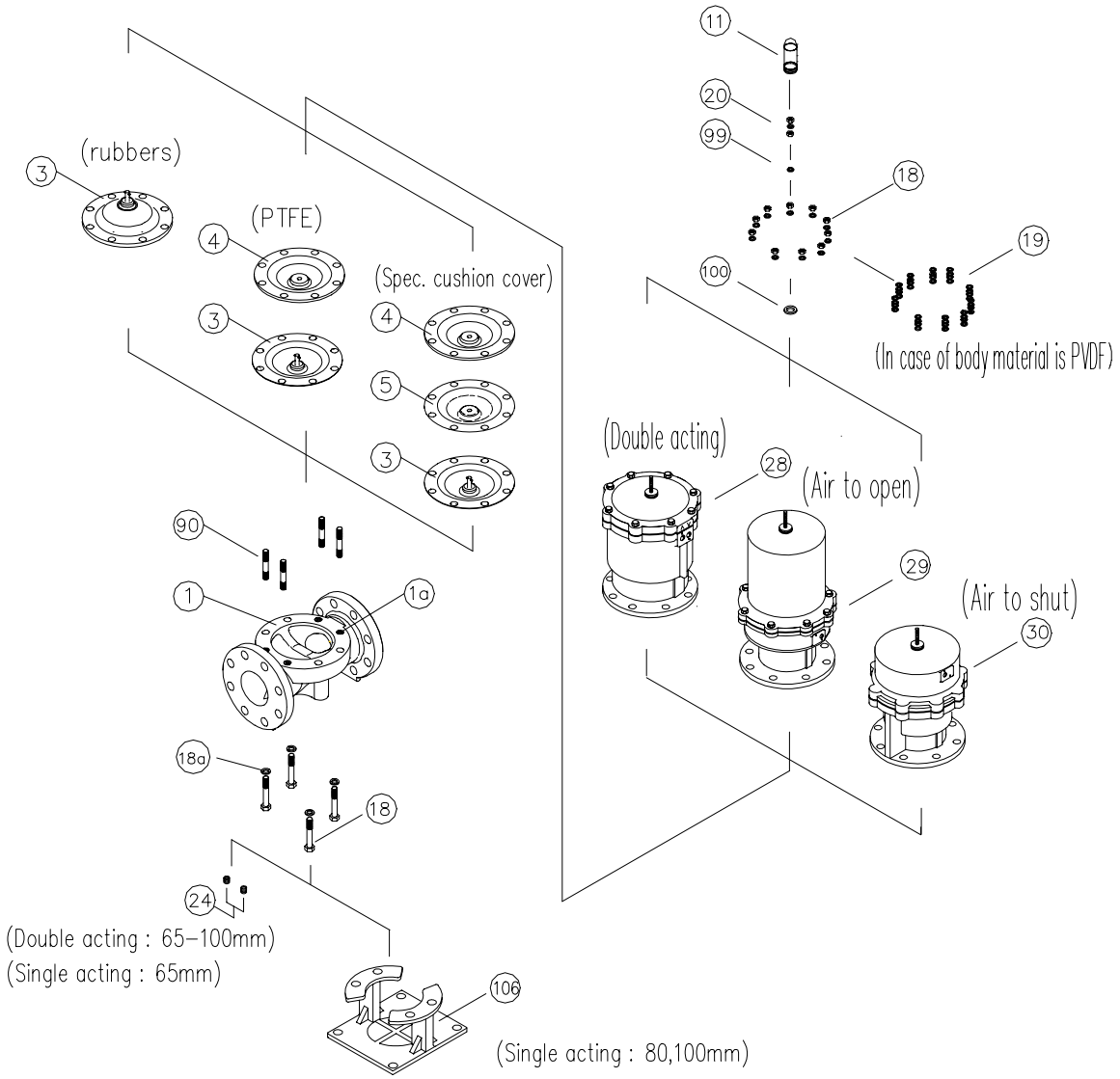
- Operate the valve within the range of the published working temperature and pressure.
  (The valve can be damaged by operation beyond the maximum allowable range of temperature or pressure.)
- To select a valve in appropriate materials, refer to "CHEMICAL RESISTANCE ON ASAHI AV VALVE".
  (Some chemicals give heavy damage to valve materials.)
- Diaphragm part may become loose after long term storage or unused period, or by the change of temperature during operation. Check it, and re-tighten the bolt between the actuator and the body diagonally, refer to the torque value on page 16. (The valve may leak.)
- Do not disassemble the actuator. (Injury may occur.)
- The valve is not designed to bear any kind of external load. Never stand on or place anything heavy on the valve at anytime.
- When the valve is disposed of, contact waste disposal specialist. (The valve generates toxic gas.)
- The valve should be installed at place where space for periodic inspection & maintenance is sufficient.
- Do not store or install the valve near any heat source or hot surface.
- Set valve support on the valve. (Refer to page 9)
- Keep the valve away from places of direct sunlight, water and dust. Use cover to shield the valve.
  (The valve will not operate properly.)
- Do not use AV valves in a place where they may become submerged in water.
  (Submergence will make AV valve fail.)

(2) General instructions for transportation, unpacking and storage

- Keep the valve in its original packaging until needed for installation.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
  (The force of swelling may damage the valve.)
- The valve is not designed to handle any kind of impact. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.

(3) Name of parts

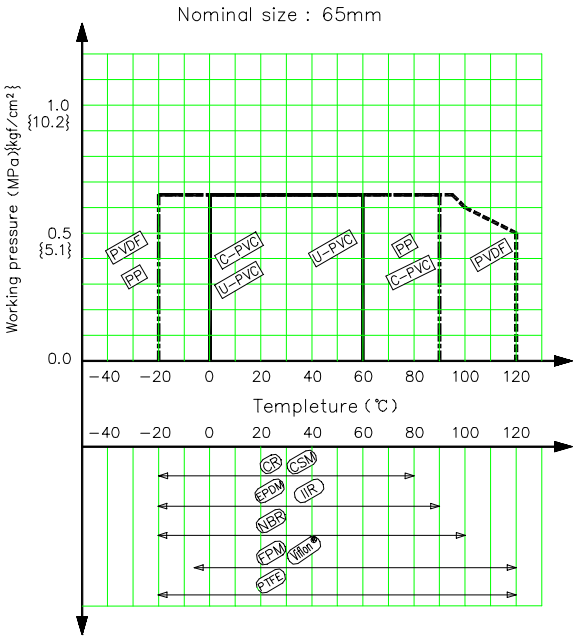
Nominal size 65-100mm (2 1/2"-4")



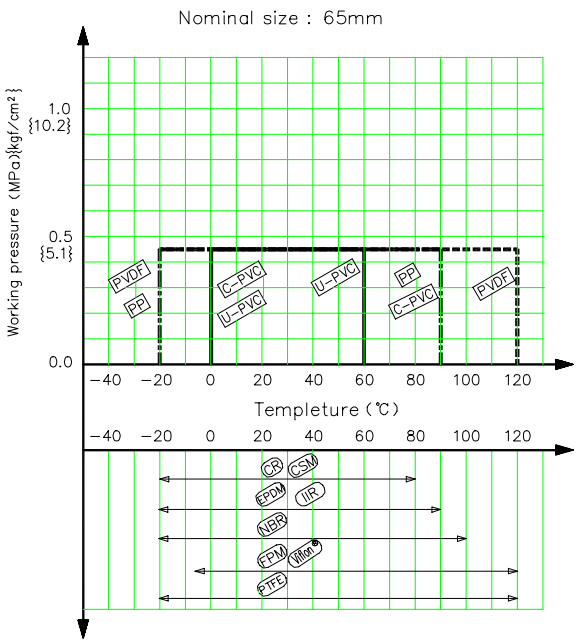
No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
①	Body	⑱	Bolt-nut(A)	㉙	Actuator (air to shut)
⑱	Nut	⑱	Washer(A)	㉚	Actuator (air to open)
③	Diaphragm	⑲	Spring-washer(A)	㉚	Stud bolt-nut
④	Cushion	⑳	Stopper	㉙	Valve sheet
⑤	Cushion cover	㉔	Ensat (inset metal)	⑩⑩	Gasket(A)
⑪	Gauge cover	㉘	Actuator (double action)	⑩⑥	Stand

(4) Comparison between working temperature and pressure

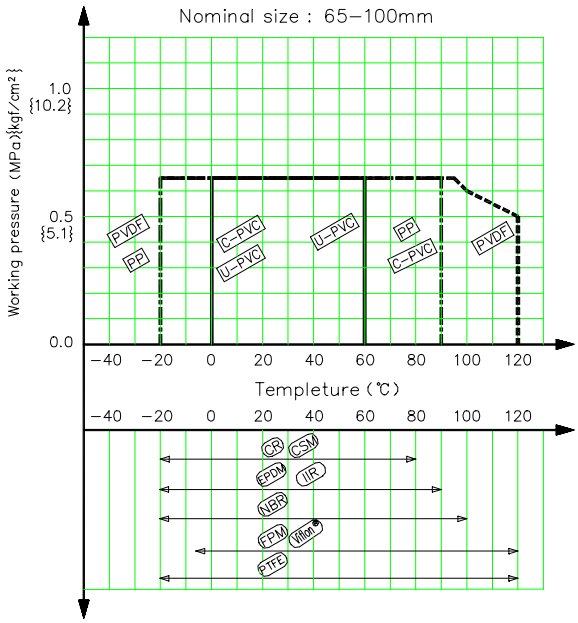
Double acting



Double acting



Single acting



Caution

Do not operate the valve beyond the range of working temperature and pressure.
(The valve can be damaged)

(5) Specifications of Actuator

Nominal size		65mm(2 1/2")	80mm(3")	100mm(4")
Standard operating pressure MPa {kgf/cm^2} [PSI]	All type	0.4{4.1}[58]		
Air consumption N/ per 1 open and close (at 0.4MPa)	Double action type	10.3	11.9	20.7
	Air to open type	10.6	15.9	34.3
	Air to close type	9.4	11.7	26.5
Air supply bore	All type	Rc 1/4		

(6) Specifications of Option

(Specifications of Solenoid valve)

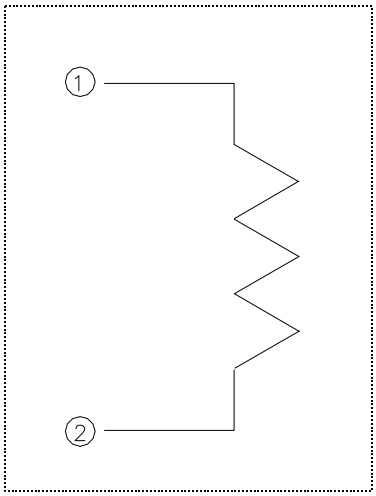
Actuation	Nom. size	Type sign	Pipe bore	Effective cross section area	Power consumption	Additional function
All type	65-100mm (2 1/2"-4)	4N3S102K -W□-G31193	Rc 1/4	10mm^2 or more	AC ; 6VA DC ; 5.5W	○ Bypass valve built – in ○ Silencer with needle valve attached (to be used as speed controller)

4N3S102K-W□-G31193

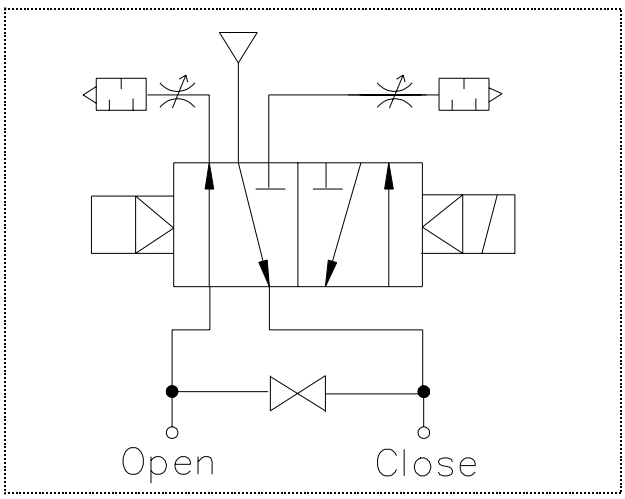
Specification	sign
AC100V 50/60Hz	1
AC110V 50/60Hz	(2)
AC200V 50/60Hz	3
AC220V 50/60Hz	(4)
DC24V	5
DC48V	(6)
DC100V	(7)
DC125V	(9)

* ( )is special order.

connection diagram



JIS sign



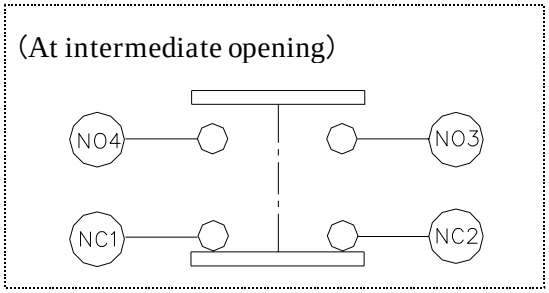
(Specifications of Limit switch)

Actuation	Nominal size	Type sign	Protection grade
Double actuation, Single actuation type	65-100mm (2 1/2"-4")	1LS1-J	Equivalent to IP55

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

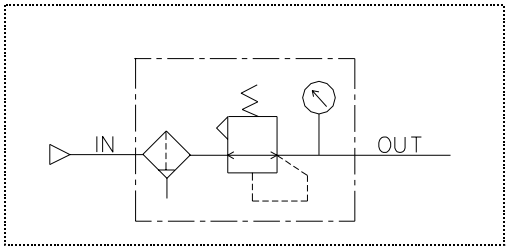
connection diagram



(Specification of pressure reducing valve with filter)

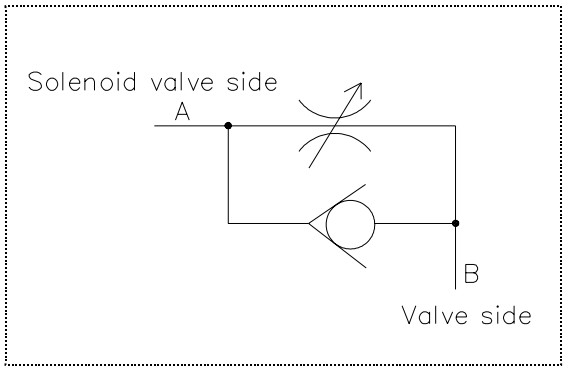
Actuation	Nom. size	Type sign	Pipe bore	Element degree of filtration
All type	65mm(2 1/2") 80mm(3") 100mm(4")	ARU2-02-8A-B	Rc 1/4	5μm

JIS sign



(Specification of speed controller)

JIS sign



Actuation	Nom. size	Type sign	Pipe bore
All type	65-100mm (2 1/2"-4")	SC7-08A	Rc 1/4

Actuation	Effective cross section area mm^2 (inch^2)		Needle No. of revolution
	Free flow	Control flow	
All type	11.0(0.017)	8.3(0.013)	8turns

(7) Installation procedure

Necessary items

- Torque wrench
- Spanner wrench
- Bolt, Nut, Washer (For many flanges specification)
- AV gasket（When a non-AV gasket is used, a different tightening torque instruction should be followed.)

Procedure

1) Set the AV gasket between the flanges.

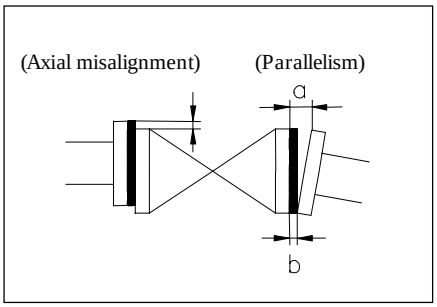
2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.

Caution

The parallelism and axial misalignment of the flange surface should be below the values in the following
（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)
65, 80mm (2 1/2", 3")	1.0mm (0.04")	0.8mm (0.03")
100mm (4")	1.0mm (0.04")	1.0mm (0.04")

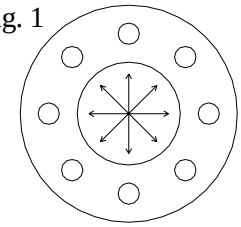


3) Using a torque wrench, tighten the bolts and nuts gradually to the specified torque in a diagonal manner. (Refer to fig.1.)

Specified torque value Unit: N-m{kgf-cm}[lb-inch]

Nom. Size	65 mm (2 1/2")	80, 100 mm (3", 4")
Torque value	22.5 {230} [200]	30.0 {306} [266]

Fig. 1



Caution

Avoid excessive tightening. (The valve can be damaged.)

(8) Air Piping procedure

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

Necessary items

- Spanner wrench
- Seal tape (If seal tape isn't used, leakage may occur)
- Steel pipe or tube for piping
- Joint for steel pipe or tube

Caution

Use compressed air as operating fluid. Don't use oil pressure or water pressure.
(Actuator may be damaged.)
Use clean, filtered compressed air.
(If not, 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.)
Don't forget to remove flash in the screw part of the joint.
(A creak and air leakage may be caused.)
Don't remove the protective plug until piping.
(The intrusion of contaminants and water may cause the malfunction of the actuator.)
Clean the pipe by brushing before piping to prevent the malfunction of the actuator.

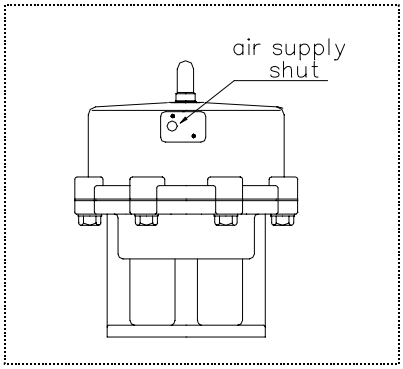
Procedure

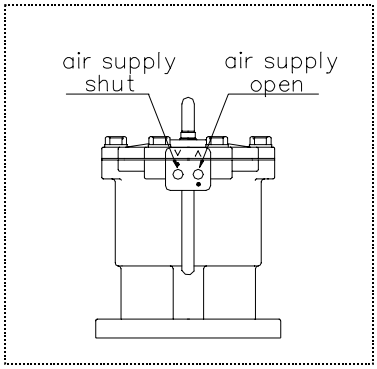
1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.
2) Screw the joint in the piping female screw of the actuator by hand to the full.
3) Screw the joint one turn with a spanner wrench.

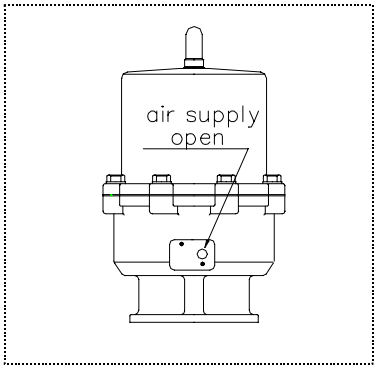
Caution

Avoid excessive tightening. （The valve can be damaged.）

4) Mount a steel pipe or a tube.







*Pictures above have no speed controller, but the piping procedure is the same as above.

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

Necessary items

- Spanner wrench
- Steel pipe or tube for piping
- Seal tape (If seal tape isn't used, leakage may be caused)
- Joint for steel pipe or tube

Caution

Use compressed air as operating fluid. Don't use oil pressure and water pressure.
(Actuator may be damaged.)
Use clean, filtered compressed air.
(If not, 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.)
Don't forget to remove flash in the screw part of the joint.
(A creak and air leakage may be caused.)
Don't remove the protective plug until piping.
(The intrusion of contaminants and water may cause the malfunction of the actuator.)
Clean the pipe by brushing before piping to prevent the malfunction of the actuator.

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 to the full. (fig.2, 3)

3) Screw the joint one turn with a spanner wrench.

Caution

Avoid excessive tightening.
(The valve can be damaged.)

4) Mount a steel pipe or a tube.

Fig.1

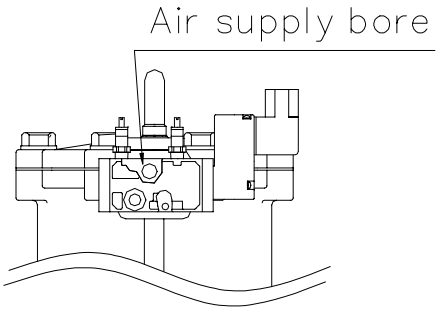
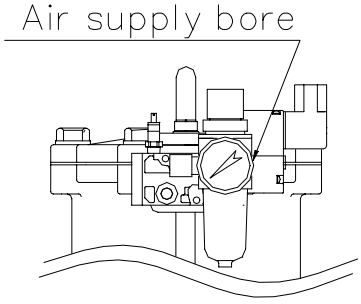


Fig.2



(9) Support Setting Procedure

Necessary items

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

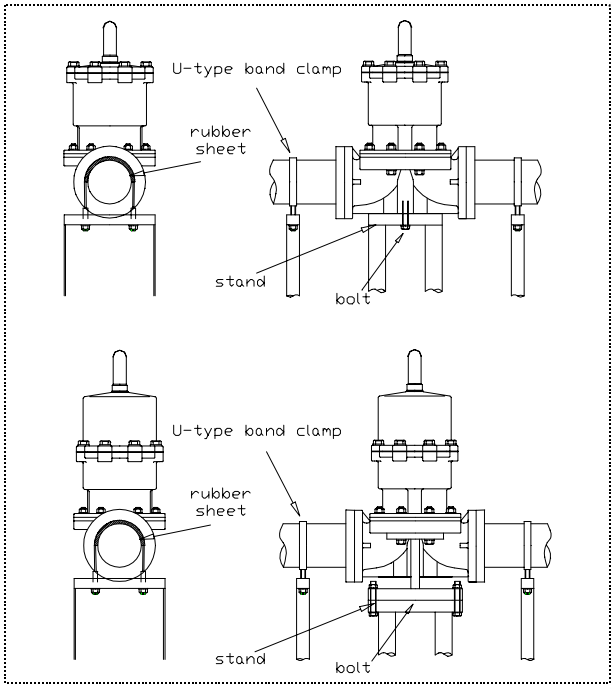
Caution

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

Level installation

Fix the insert metal (under the valve) and the stand with bolts.

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



Bolt size (insert metal : Ensat)

Nom. size	65mm (2 1/2")	80, 100mm(3", 4")
Nominal	M8	M12

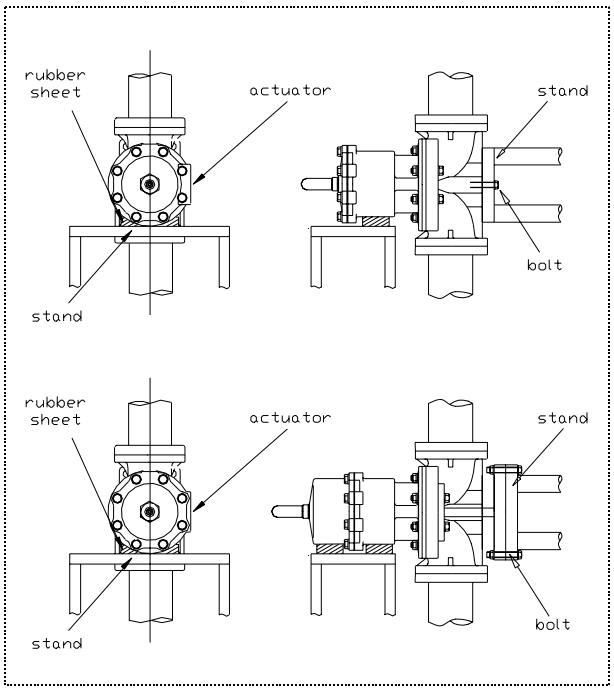
Bolt size (Stand)

Nom. size	80mm (3")	100mm (4")
Nominal	M16	M16

Perpendicular installation

Fix the insert metal (under the valve) and the stand with bolts.

Spread the rubber sheet under the actuator and support it with the stand.

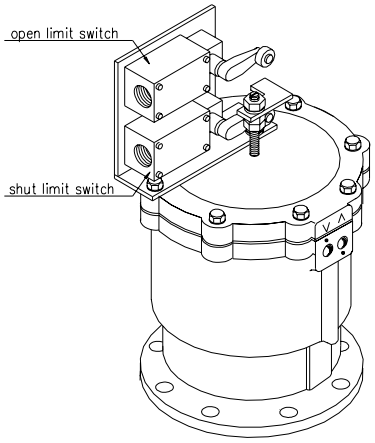


(10) Connection of limit switch procedure

Necessary items

- Screw driver (+)
- Crimp-style terminal
- Terminal crimping tool
- Connector (G1/2)
- Wire stripper

Procedure



1) Loosen the three screws used to attach the limit switch cover with a screwdriver (+) and remove the cover from the limit switch.

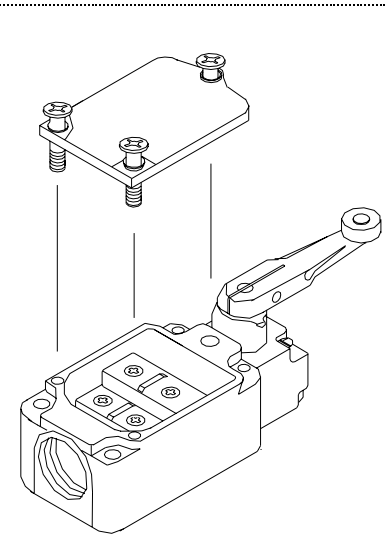
2) These screws are made so that they won't detach from the cover.

3) Pull and remove the protective cap, made of resin, from the cover.

4) Draw the cable through the connector.

5) Strip the cable with a wire stripper.

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



7) Connect the terminal screw with a screwdriver (+) according to the internal circuit diagram show in page 5.

> ⚠ Caution
> Tighten up the screws.
> (If not, electric leaks or shocks may occur.)

8) Tighten the above three screws with a screw driver (+) to install the cover on the limit switch.

9) Tighten the cable by connector.

(11) Connection of solenoid valve procedure

Necessary items

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

Caution

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

Procedure

1) Loosen the hexagon socket head cap screws, and remove the cover.

   Caution

   Don't loose O-ring.
   (Electric leaks or shocks may occur.)

2) Remove the Faston terminal inserted into coil side and the insulating sleeve.

   Caution

   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.

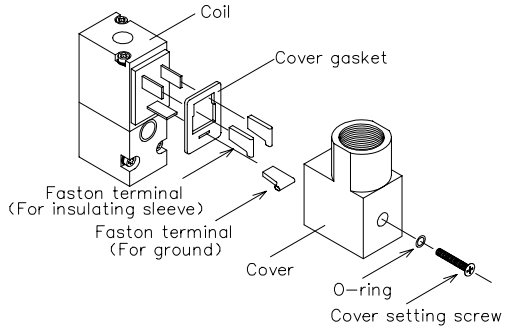
5) Draw the lead wire through the cover.

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.(fig.3)]

9) Tighten the cable by connector.



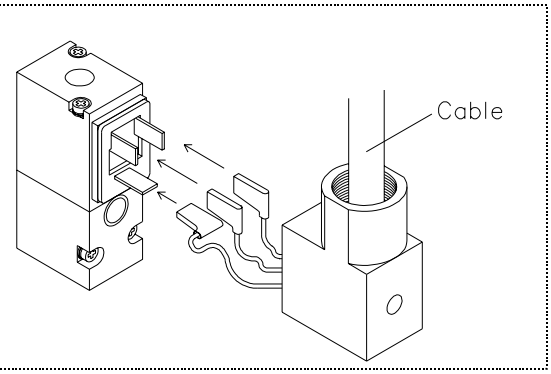
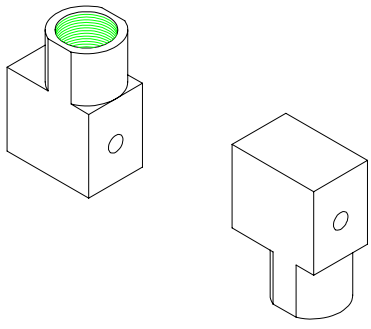


Fig.3



(12) Operating Procedure

Procedure

Caution

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/cm^2} 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 ⑳ position are matching.

Caution

When AV valve is equipped with a fully opened adjustment switch, they do not have stoppers. Check open or close by the direction of the fluid.

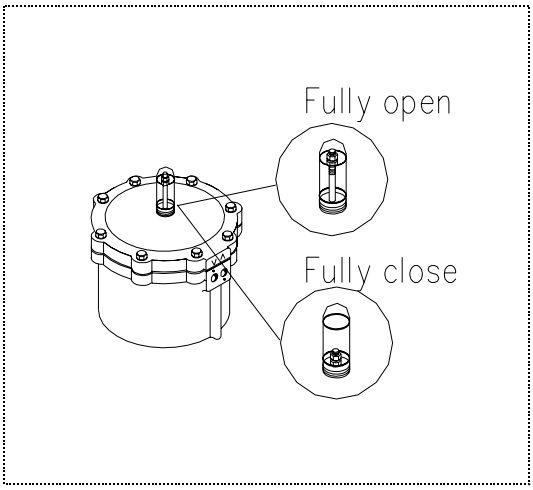


Fig.2

3) Stop supplying air.

<For the solenoid valve>

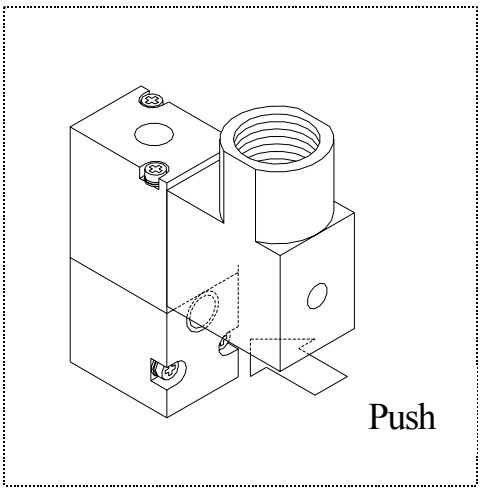
Procedure

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.(fig.2)

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/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.

Caution

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.

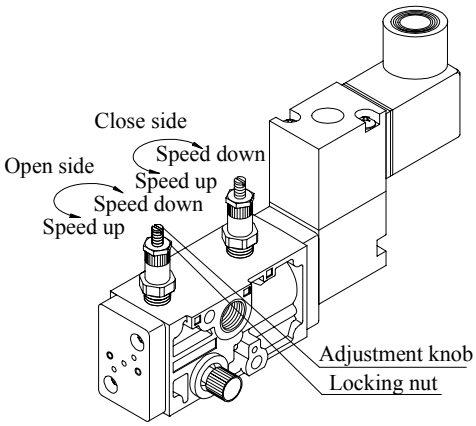
5) Repeat item 3), 4) to adjust the opening / closing speed required.

6) When the adjustment is finished, while holding the knob with a finger, fix the adjustment knob by turning the locking nut right with a spanner.

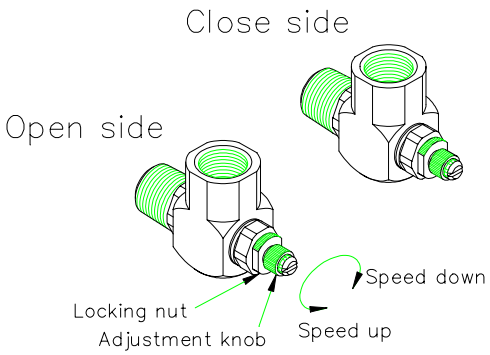
Caution

Avoid excessive tightening.
(The locking nut can be damaged.)

For Double action type with solenoid valve



For Double action type with speed controller



<Adjustment of opening / closing speed procedure>

○ 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.

> ⚠ Caution
> Avoid excessive tightening.
> (The speed controller can be damaged.)

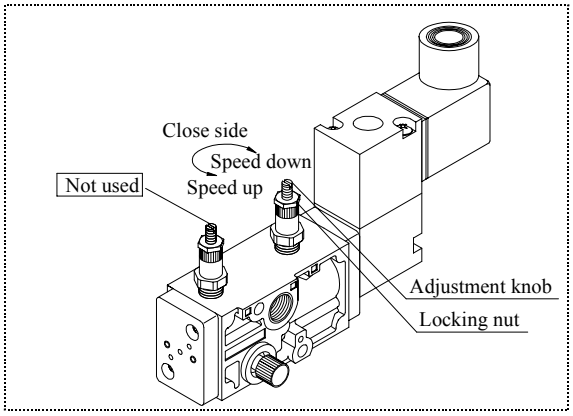
2) Supply the air to the solenoid valve.

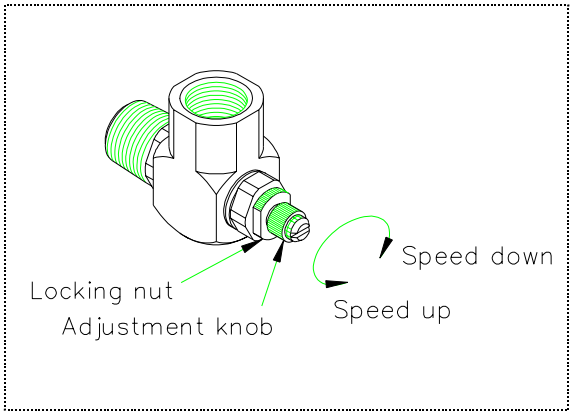
3) Apply regular rated voltage to solenoid valve, and turn off the solenoid valve, then turn left the adjustment knob little by little to adjust the opening / closing speed required.

4) When the adjustment is finished, while holding the knob with a finger, fix the adjustment knob by turning the locking nut right with a spanner.

> ⚠ Caution
> Avoid excessive tightening.
> (The locking nut can be damaged.)

For Single action type with solenoid valve





(13) Adjustment procedure for stopper

Necessary items

- Spanner wrench

Procedure

1) Remove the gauge cover ⑪ by hand.

2) Fully open the valve.

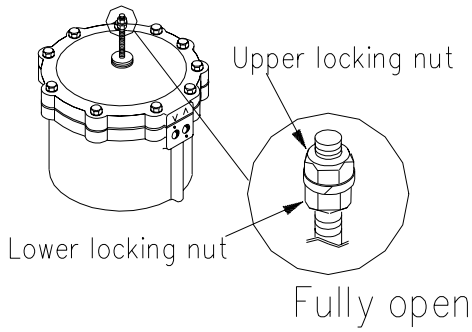
3) Loosen the upper part of the locking nut about a half turn.

4) Tighten the lower part of the locking nut by turning it left little by little.

5) Fix the lower part of the locking nut not to move with a spanner, and tighten the upper part of that.

6) Fully close the valve by air operation, and check if it leaks or not. When the valve leaks, repeat the item 2) to 6) until it stops.

7) Install the gauge cover ⑪.



(14) Disassembling Method for Replacing Parts

○ Double action and air to open

Necessary items

● Protective gloves ● Safety goggles ● Spanner wrench

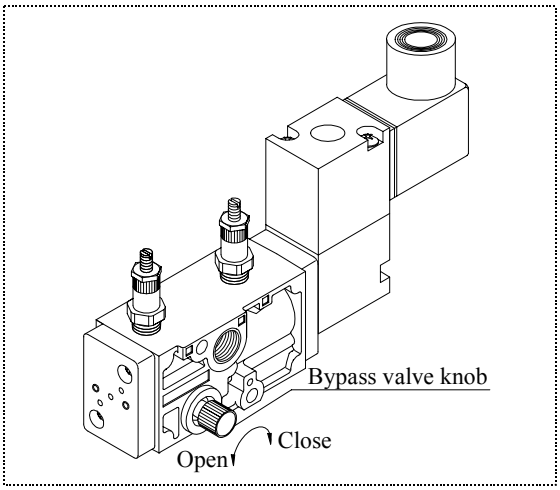
Caution

Wear protective gloves and safety goggles as some fluid remains in the valve.
(You may be injured.)

<Disassembly>

Procedure

1) Completely discharge fluid from pipes.
2) Shut the main air valve, and open the bypass valve to discharge the air from the actuator.
3) Remove the air piping.
4) Loosen the bolt nut [A] between the body and the actuator.
5) Remove the actuators ㉘,㉙.
6) Remove the diaphragm ③ by turning it 90 degrees.



<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]

Nom. Size / Diaphragm material	65mm (2 1/2")	80mm (3")	100mm (4")
Rubber	13 {133} [116]	18 {184} [160]	35 {357} [310]
PTFE	15 {153} [133]	20 {204} [177]	40 {408} [355]

○ Air to shut

Necessary items

- Spanner wrench
- Screwdriver (–)
- Hexagon wrench
- Protective gloves
- Safety goggles

Caution

Wear protective gloves and safety goggles as some fluid remains in the valve.
(Injury may occur.)

<Disassemble>
Procedure

1) Completely discharge fluid from line.

2) Remove the gauge cover.

3) Fully close the valve by air operation.

4) Loosen the bolt-nut (A) between the body ① and the actuator ㉚ completely.

5) Remove the actuator ㉚ .

6) Remove the diaphragm by turning it 90 degrees.

<Assemble>
Procedure

Assemble by using reverse procedures from steps 6) to 1).
(As to body tightening torque, refer to Table 1 shown on page 16.)

(15) Inspection items

○ Periodically inspect and maintain the AV valve in accordance with the decided schedule.

Portion to be inspected	Inspection item
Actuator	1) Existence of rust, peeling of paint. 2) Tightening condition of respective threaded portions. (Loose or not) 3) Existence of abnormality in opening and closing operating sounds. * This actuator can be used without oiling. However, if lubricating oil is used, use addition turbine oil specified follow: JIS K 2213 Addition Turbine oil (ISO VG 32, 46)
Valve	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).

(16) Troubleshooting and action

Problem	Cause	Action
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 4)
	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.	Closed 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.
	The operation pressure is low.	Check the operating pressure.

Problem	Cause	Action
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 page 16, 17)
	The diaphragm or the body is scratched.	Replace scratched parts with new ones. (Refer to page 16, 17)
	Foreign matter is in the valve.	Disassemble valve to remove foreign matter. (Refer to page 16, 17)
	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 16).
	The diaphragm or the body is scratched.	Replace scratched parts with new one.
	There is foreign matter between the diaphragm and the body.	Disassemble valve to remove foreign matter. (Refer to page 16, 17)
The actuator operates, but the valve is not opened or close.	The diaphragm or the joint metal fitting is broken.	Replace broken parts. (Refer to page 16, 17)

(17) Handling of residual and waste materials

Caution

In discarding remaining or waste materials, be sure to ask waste service company.
(Poisonous gas is generated.)

(18) Inquiries

Nobeoka Head Office : 2-5955, Nakanose- Cho, Nobeoka –City, Miyazaki- Pref. , Japan.
Tel : (81) 982-35-0880 Fax : (81) 982-35-9350

Tokyo Head Office : (Furukawachiyoda Bldg.) 15-9, Uchikanda 2- Chome, Chiyoda-Ku, Tokyo, Japan.
Tel : (81) 3-3254-8177 Fax : (81) 3-3254-3474

Singapore Branch Office : 16 Raffles Quay, #40-03 Hong Leong Building, Singapore 048581.
Tel : (65) 220-4022 Fax : (65) 324-6151

Europe Representative Office : Kaiser-Friedrich-Promenade 61 D-61348 Bad Homburg v. d. H. Germany.
Tel : (49) 6172-9175-0 Fax : (49) 6172-9175-25

ASAHI AMERICA Inc. : 35 Green Street P.O.Box 653 , Malden, Massachusetts 02148 U.S.A.
Tel : (1) 781-321-5409 Fax : (1) 781-321-4421

Diaphragm Valve Type 14 Pneumatic Model Type AV

[Automatic Valve]

ASAHI ORGANIC CHEMICALS INDUSTRY CO.,LTD.

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