

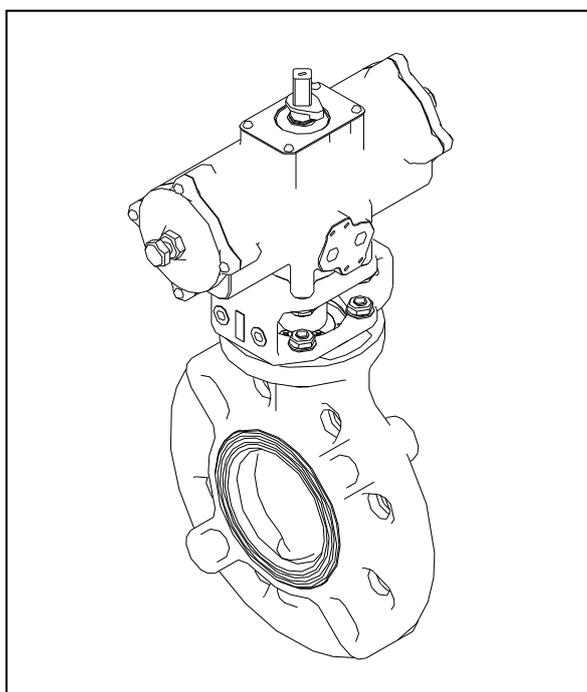
Serial No.	H-A044-E-14
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# Butterfly Valves Pneumatic Actuated Type TA Type TW

## Contents

- Type 57 { Nominal Size: 40-350mm (1 1/2"-14")  
Body Material: U-PVC, PP, PVDF
- Type 56 { Nominal Size: 400mm (16")  
Body Material: PP, PVDF
- Type 56D { Nominal Size: 400mm (16")  
Body Material: PDCPD

User's Manual



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

-   - Never attempt to disassemble an actuator.  
(If disassembled forcible, internal parts may jump out and this is very dangerous.)
- Warning  - 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.
-   - Do not step on or apply excessive weight on valve. (It can be damaged.)
- Caution  - 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.)
- Set valve support on the valve.
- The AV valves must be used within the specifications specifically applicable to the Product.
- 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.
- The operating fluid must be clean air filtered through a pertinent air filter.

**(3) General instructions for transportation, unpacking and storage**

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Warning

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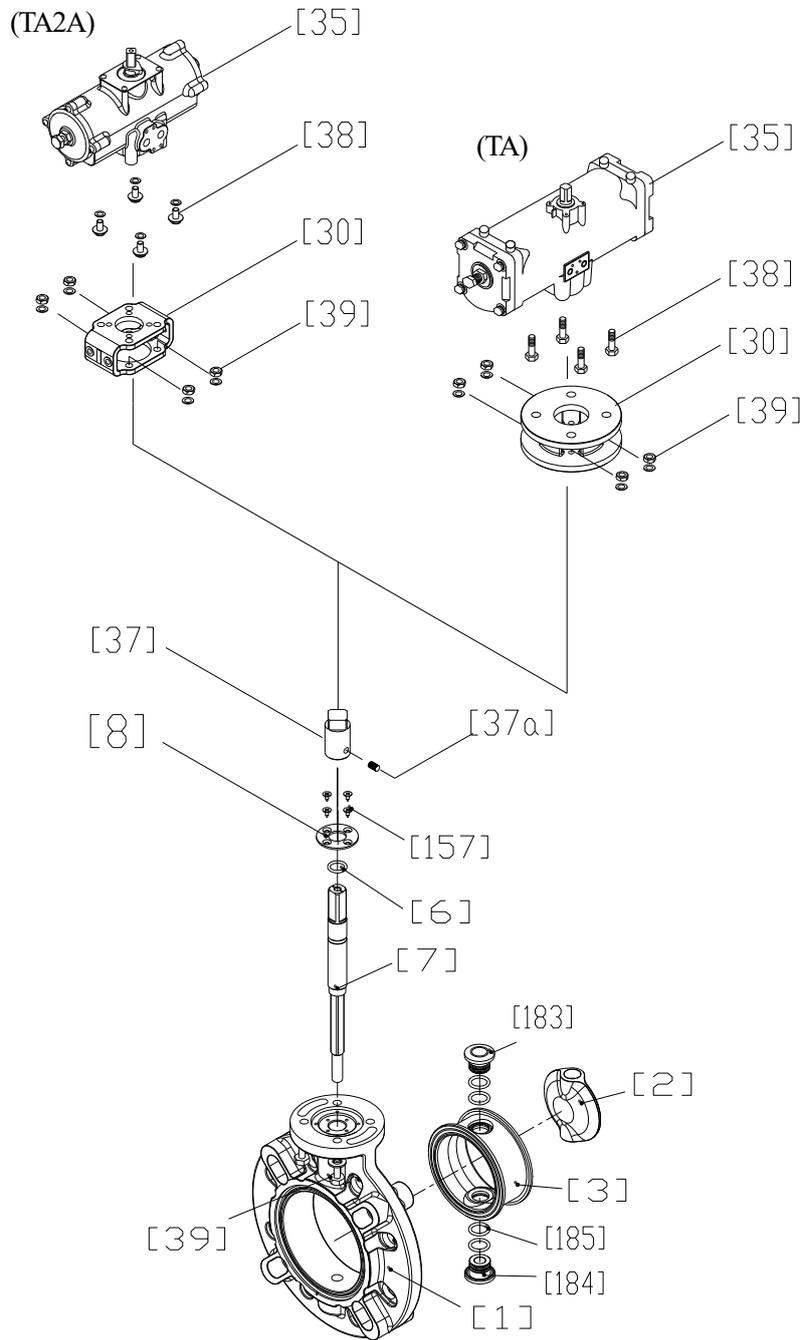
Caution

  - 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

**Type 57: 40-350mm (1 1/2"-14")**

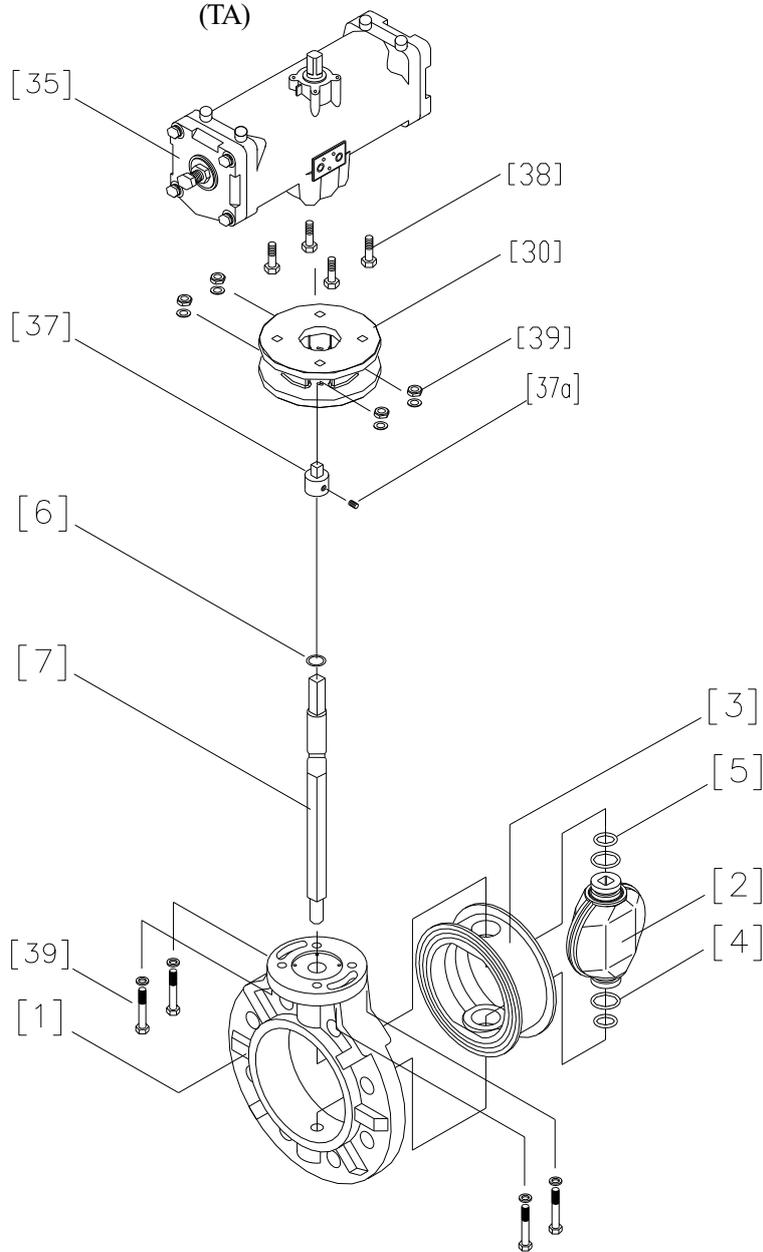
Body material: U-PVC, PP, PVDF



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[30]	Stand	[157]	Screw (F)
[2]	Disc	[35]	Actuator	[183]	Seat Bush (A)
[3]	Seat	[37]	Joint (A)	[184]	Seat Bush (B)
[6]	O-ring (C)	[37a]	Screw (C)	[185]	O-Ring (I)
[7]	Stem	[38]	Bolt (E)		
[8]	Stem Holder (A)	[39]	Bolt·Nut (A)		

**Type 56: 400mm (16")**

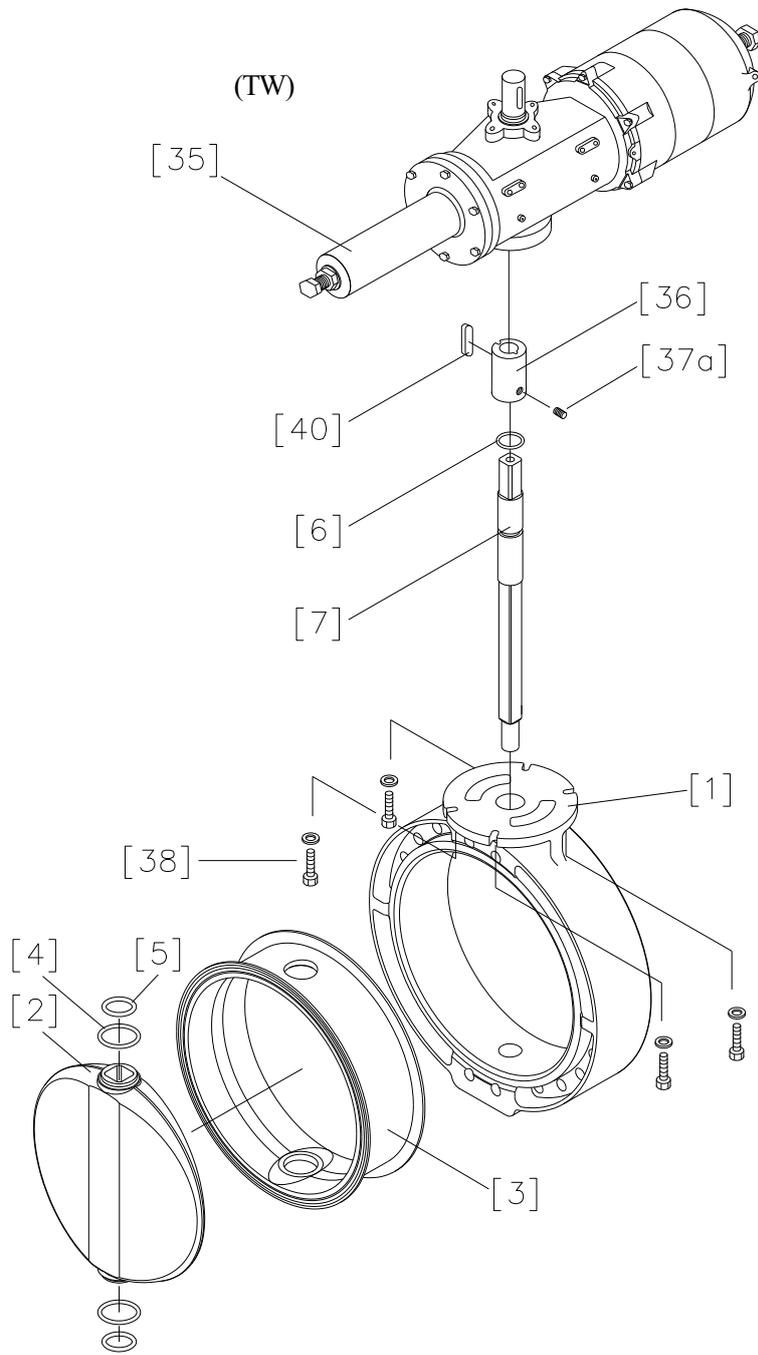
Body material: PP, PVDF



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[6]	O-ring (C)	[37a]	Screw (C)
[2]	Disc	[7]	Stem	[38]	Bolt (E)
[3]	Seat	[30]	Stand	[39]	Bolt·Nut (P)
[4]	O-ring (A)	[35]	Actuator		
[5]	O-ring (B)	[37]	Joint (A)		

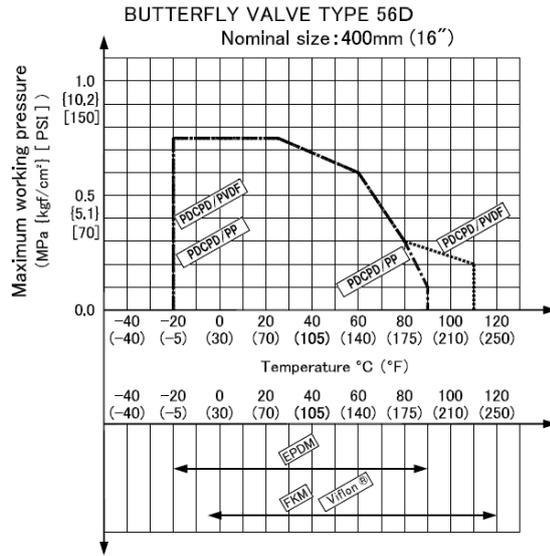
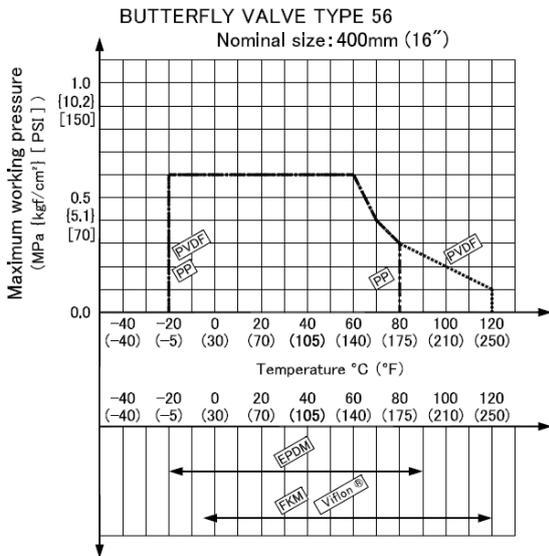
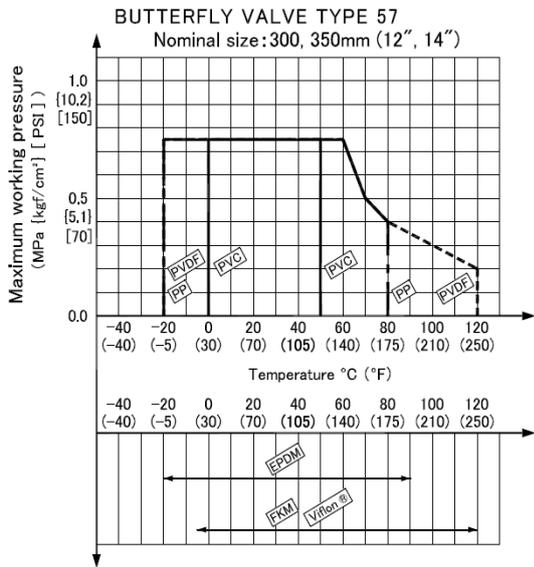
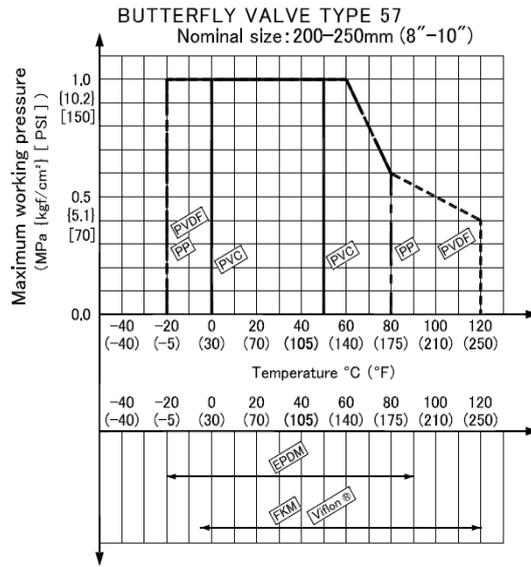
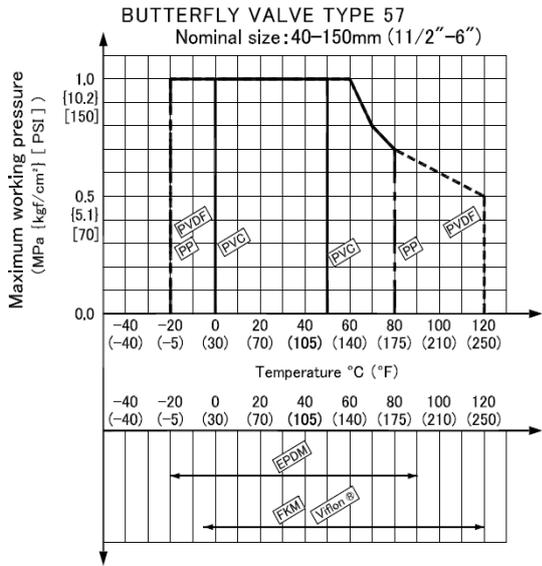
**Type 56D: 400mm (16")**

Body material: PDCPD



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[5]	O-ring (B)	[36]	Stem bush
[2]	Disc	[6]	O-ring (C)	[37a]	Screw (C)
[3]	Seat	[7]	Stem	[38]	Bolt (E)
[4]	O-ring (A)	[35]	Actuator	[40]	Key (B)

**(5) Maximum working pressure vs. temperature**



(6) Specifications of actuator

Valve Type	Actuation	Nominal Size	Actuator Name	Angle Adjustment Range	Operating Pressure MPa {kgf/cm <sup>2</sup> }	Air Consumption N l per 1 Open and Close (at 0.4MPa)	Air Supply Bore
57・56	Double Acting Type	40, 50mm (1 1/2", 2")	TA2A-050D	±5°	0.4~0.7 {4.1~7.1}	0.9	Rc 1/4
		65, 80mm (2 1/2", 3")	TA2A-063D	±5°	0.4~0.7 {4.1~7.1}	1.7	Rc 1/4
		100mm (4")	TA2A-080D	±5°	0.4~0.7 {4.1~7.1}	3.2	Rc 1/4
		125, 150mm (5", 6")	TA2A-100D	±5°	0.4~0.7 {4.1~7.1}	6.6	Rc 1/4
		200mm (8")	TA2A-125D	±5°	0.4~0.7 {4.1~7.1}	13.3	Rc 1/4
		250, 300mm (10", 12")	TA2A-160D	±5°	0.4~0.7 {4.1~7.1}	27.1	Rc 1/4
		350, 400mm (14", 16")	TA-200D	±5°	0.4~0.7 {4.1~7.1}	56.8	Rc 3/8
	Single Acting Type	40, 50mm (1 1/2", 2")	TA2A-050R	±5°	0.4~0.7 {4.1~7.1}	1.7	Rc 1/4
		65, 80mm (2 1/2", 3")	TA2A-063R	±5°	0.4~0.7 {4.1~7.1}	3.3	Rc 1/4
		100,mm (4")	TA2A-080R	±5°	0.4~0.7 {4.1~7.1}	6.1	Rc 1/4
		125, 150mm (5", 6")	TA2A-100R2	±5°	0.4~0.7 {4.1~7.1}	12.8	Rc 1/4
		200mm (8")	TA2A-125R2	±5°	0.4~0.7 {4.1~7.1}	21.6	Rc 1/4
		250, 300mm (10", 12")	TA2A-160R2	±5°	0.4~0.7 {4.1~7.1}	42.7	Rc 1/4
		350, 400mm (14", 16")	TA-200R	±5°	0.4~0.7 {4.1~7.1}	68.4	Rc 3/8
56D	Double Action Type	400mm (16")	TW-250D	±5°	0.4{4.1}	99	Rc 3/8

## (7) Specifications of solenoid valve (Option)

Actuation	Nom. Size	Type Code	Port Bore	Effective Cross Section Area	Power Consumption	Additional Function
All Type	40-300mm (1 1/2"-12")	4N3S102K-W□-G31193	Rc 1/4	10mm <sup>2</sup> (0.016inch <sup>2</sup> ) or more	AC ; 6VA DC ; 5.5W	○Bypass valve built-in
	350, 400 (14", 16") 57·56	453S403C-W□-G30800	Rc 3/8	40mm <sup>2</sup> (0.064inch <sup>2</sup> ) or more	AC ; 6VA DC ; 5W	○Silencer with needle valve attached (to be used as speed controller)
Double Action Type	400 (16") 56D	453S403C-W□	Rc 3/8	40mm <sup>2</sup> (0.064inch <sup>2</sup> ) or more	AC ; 6VA DC ; 5W	○Silencer with needle valve attached (to be used as speed controller)

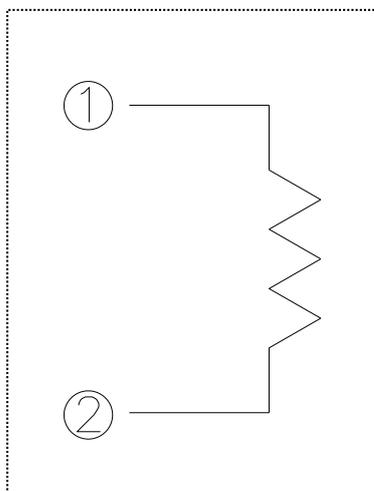
4N3S102K-W□-G31193



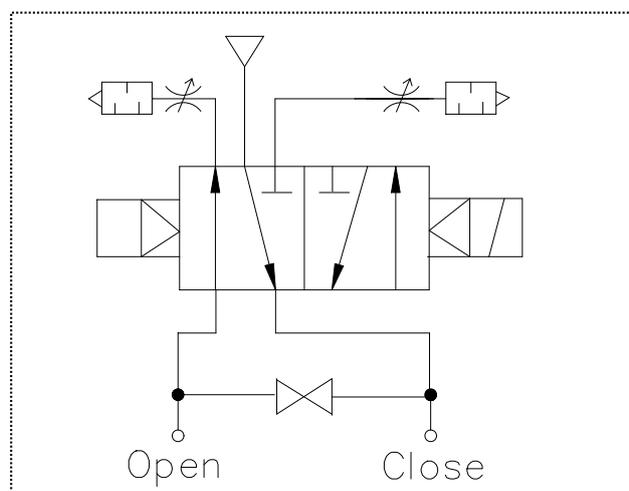
Note: The number shown with ( ) is not standard item.

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



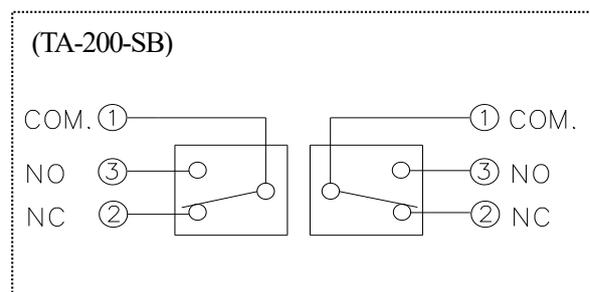
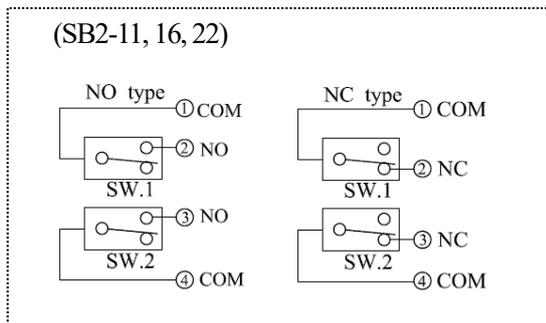
**(8) Specifications of limit switch (Option)**

Valve Type	Actuation	Nominal Size	Type Code	Protection Grade	Limit Switch Type
57•56	All Type	40-80mm (1 1/2"-3")	SB2-11	IP 65	V-112-1C24 (OMRON)
		100-150mm (4"-6")	SB2-16		
		200-300mm (8"-12")	SB2-22		
		350, 400mm (14",16")	TA-200-SB	IP 55	
56D	Double Action Type	400mm (16")	ILS1-J	IP67	—

Limit Switch Rating

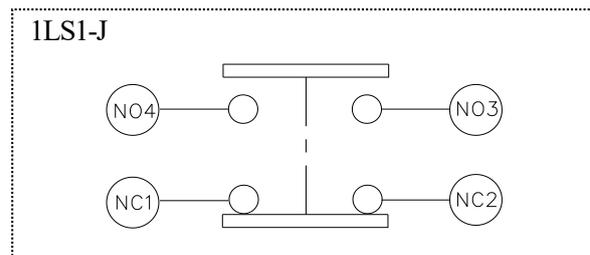
Type	Rate Voltage (V)	Resistive Load (A)	Inductive Load (A)
SB2-11,16,22 TA-200-SB	AC125	11	7
	AC250	11	7
	DC125	0.5	0.1
	DC250	0.25	0.04
ILS1-J	AC125	10	6
	AC250	10	6
	DC125	0.8	0.2
	DC250	0.4	0.1

Connection Diagram (At intermediate opening)



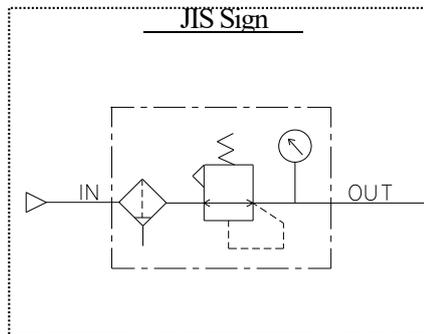
SW.1: Contact closes when valve is closed (double acting/air to open)  
 Contact closes when valve is opened (air to shut)

SW.2: Contact closes when valve is opened (double acting/air to open)  
 The contact closes when the valve is closed (air to shut)



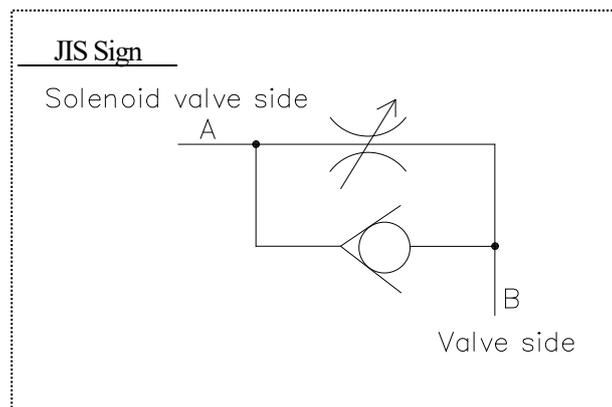
**(9) Specification of filter regulator (Option)**

Valve Type	Actuation	Nom. Size	Type Code	Port Bore	Element degree of Filtration
57•56	All Type	40-300mm (1 1/2"-12")	ARU2-02-8A-G	Rc 1/4	5μm
		350, 400mm (14", 16")	ARU3A-03-10A	Rc 3/8	40μm
56D	Double Action Type	400mm (16")	ARU3A-03-10A	Rc 3/8	40μm



**(10) Specification of speed controller (Option)**

Valve Type	Actuation	Nom. Size(mm)	Type Code	Port Bore	Effective Cross Section Area		Needle No. of Revolution
					Free Flow	Control Flow	
57•56	All Type	40-300mm (1 1/2"-12")	SC7-08A	Rc 1/4	11 mm <sup>2</sup> (0.017inch <sup>2</sup> )	8.3 mm <sup>2</sup> (0.012inch <sup>2</sup> )	8 turns
		350, 400mm (14", 16")	SC7-10A	Rc 3/8	16 mm <sup>2</sup> (0.025inch <sup>2</sup> )	14 mm <sup>2</sup> (0.022inch <sup>2</sup> )	
56D	Double Action Type	400mm (16")	SC6-04-10A	Rc 3/8	38 mm <sup>2</sup> (0.059inch <sup>2</sup> )	32 mm <sup>2</sup> (0.050inch <sup>2</sup> )	20 turns



**(11) Installation procedure**

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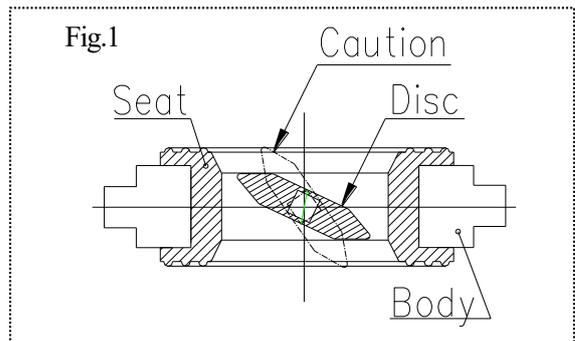
**Warning**

  - 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.)
- 

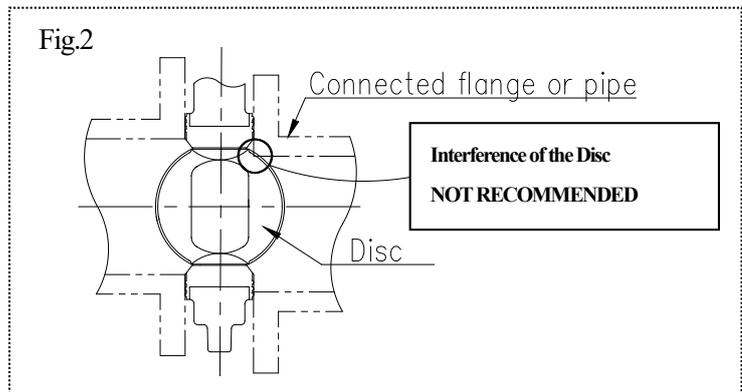
**Caution**

  - 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.)
  - Do not install the valve with the disc fully closed. (The disc may pinch into the seat, resulting in a high operating torque and preventing the valve from operating properly.)
- 
  - When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
  - Use flat faced flanges for connection to AV Valves.
  - Ensure that the mating flanges are of the same standards.
  - The gasket is unnecessary. (The seat carries out the role of the gasket.)

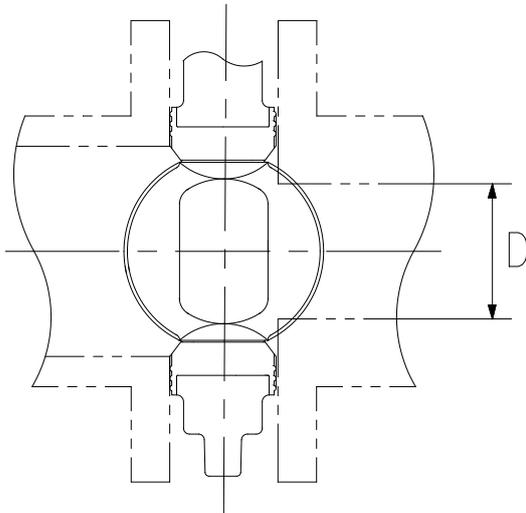
- The valve disc is in the position indicated by solid lines in figure to the right prior to shipment from the factory. If the valve is opened or closed after unpacking, it must be reset in this position before installation. Failure to do so will result in damage to the surface of the valve seat during handling and installation.



- Care must be used during piping installation to ensure that the pipes or flanges are properly aligned so that the valve disc does not contact them in any setting. Misalignment as in Figure below will result in damage to the valve.



In case the wall-thickness of the connection part (Flange and Pipe) is too thick, shave the flange or the pipe inside in order to avoid the contact of pipe and disc. If inside diameter of the connection part is larger than size D, shaving is not necessary.



Unit: mm (inch)

Nominal size		Diameter D	
40	(1 1/2")	31	(1.22")
50	(2")	43	(1.69")
65	(2 1/2")	57	(2.25")
80	(3")	67	(2.64")
100	(4")	91	(3.59")
125	(5")	115	(4.53")
150	(6")	137	(5.40")
200	(8")	179	(7.05")
250	(10")	231	(9.10")
300	(12")	280	(11.03")
350	(14")	333	(13.12")
400	(16")	370	(14.57")

### Necessary items

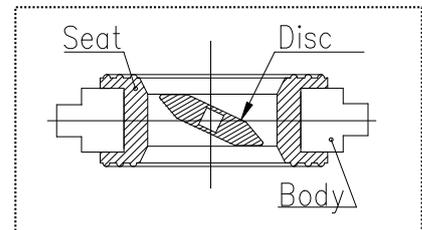
- Torque Wrench
- Spanner Wrench or Lever Handle (Option)
- Bolt, Nut, Washer (For many flanges specification)

### Procedure

- 1) Install the valve between flanges and open the valve slightly.
- 2) Insert bolts, set nuts and washer and tighten the bolts and nuts temporarily by hand.

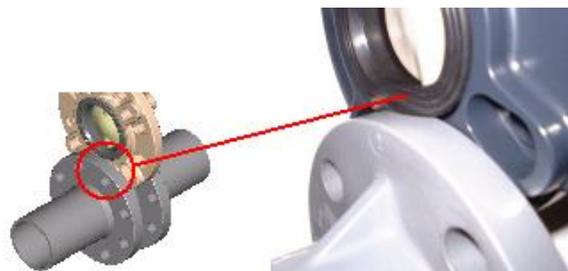
\* Gasket is not necessary. (Seat [3] of valve serves as the part of gasket.)

\* Don't make the disc protrude from the seat. (If not, the disc may be damaged.)



Caution

- When you insert a valve between flanges, please insert after extending the fields of flanges fully. (If you insert a valve by force without fully extending fields of flanges, a liner may be turned over and suffer a crack.)



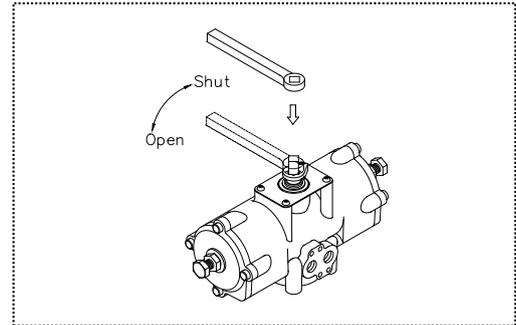
### Valve Face to Face Dimensions

Unit : mm (inch)

Nom. Size	40mm (1 1/2")	50mm (2")	65mm (2-1/2")	80mm (3")	100mm (4")	125mm (5")	150mm (6")	200mm (8")
Face to Face	39 (1.5)	42 (1.7)	46 (1.8)	46 (1.8)	56 (2.2)	66 (2.6)	71 (2.8)	87 (3.4)

Nom. Size	250mm (10")	300mm (12")	350mm (14")	400mm (16")
Face to Face	112 (4.3)	129 (5.0)	129 (5.0)	169 (6.6)

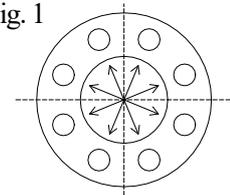
- 3) Leave the valve slightly opened by spanner wrench or lever handle (Option).
- 4) Tighten the bolts and nuts gradually with torque wrench to the specified torque in a diagonal manner (Refer to fig.1.)



**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	40mm (1 1/2")	50, 65mm (2", 2 1/2")	80, 100mm (3", 4")	
Torque value	20.0 {204} [177]	22.5 {230} [200]	30.0 {306} [266]	

Fig. 1



Nom. Size	125, 150mm (6", 8")	200, 250mm (10", 12")	300, 350mm (12", 14")	400mm (16")
Torque value	40.0 {408} [355]	55.0 {561} [488]	60.0 {612} [532]	80.0 {816} [710]

## Dimension of insert bolt A and B

### JIS Standard (10K)

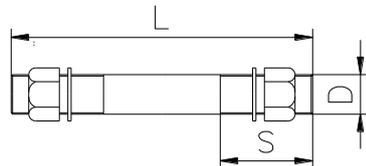
Body material: U-PVC, PP, PVDF, PDCPD

Nominal Size mm (inch)		Bolt A			Bolt B		Quantity		
		D	L	S	D1	L1	Bolt A	Bolt B	Nut & Washer
40	(1 1/2")	M16	more than 115mm (4.53")	40mm (1.57")	-	-	4	-	8
50	(2")		more than 125mm (4.92")						
65	(2 1/2")		more than 135mm (5.31")	45mm (1.77")					
80	(3")		more than 135mm (5.31")						
100	(4")		more than 145mm (5.71")						
125	(5")	M20	more than 165mm (6.50")	50mm (2")			8	-	16
150	(6")		more than 175mm (6.89")	55mm (2.17")					
200	(8")		more than 195mm (7.68")						
250	(10")	M22	more than 225mm (8.86")	60mm (2.36")			12	-	24
300	(12")		more than 245mm (9.65")						
350	(14")		more than 255mm (10.04")	65mm (2.56")					
400	(16")	M24	more than 290mm (11.42")	60mm (2.36")	M24	120mm (4.72")	14	4	32

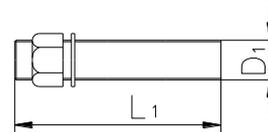
\*Body material U-PVC is available to nominal size 40-350mm (1 1/2"-14") only.

\*Body material PDCPD is available to nominal size 400mm (16") only.

Bolt A



Bolt B



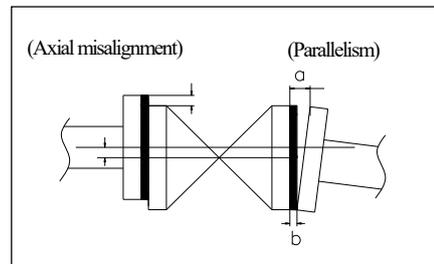
Caution

- The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage to 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)
40-80mm (1 1/2"-3")	1.0 (0.04)	0.8 (0.03)
100-150mm (4"-6")	1.0 (0.04)	1.0 (0.04)
200-400mm (8"-16")	1.5 (0.06)	1.0 (0.04)



## (12) Support setting procedure



Caution



- Do not subject the valve to pump vibration. (The valve may be damaged.)



- Set the valve support. (If not, the valve may be damaged because the actuator is heavy.)

### Necessary items

● Spanner Wrench

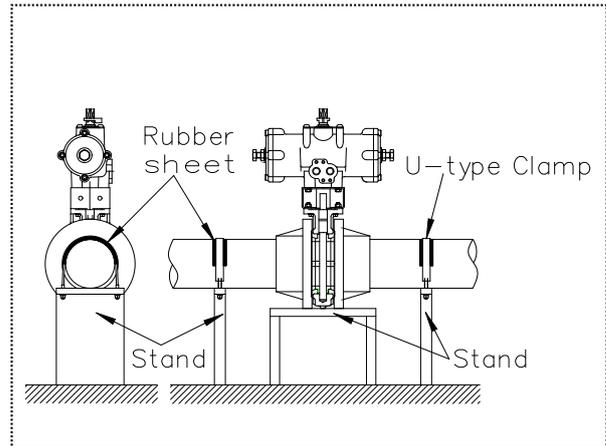
● U-Type Clamp (with bolt)

● Rubber Sheet

### Level Installation

Set the stand under the valve.

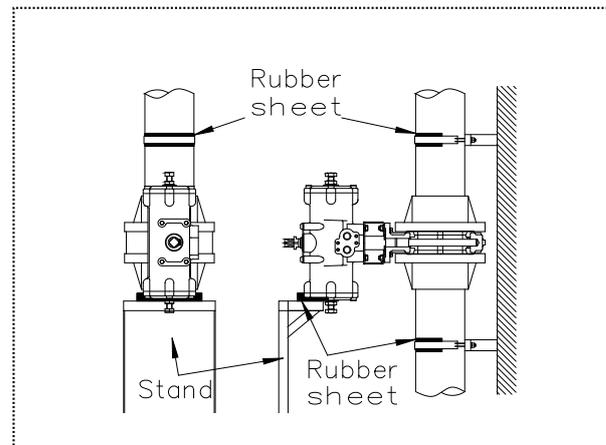
Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



### Perpendicular Installation

Spread the rubber sheet under the actuator and connection part of body and actuator.

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



**(13) Air piping procedure**

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

**Caution**

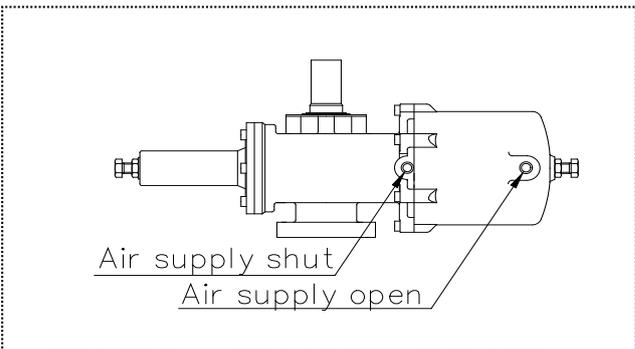
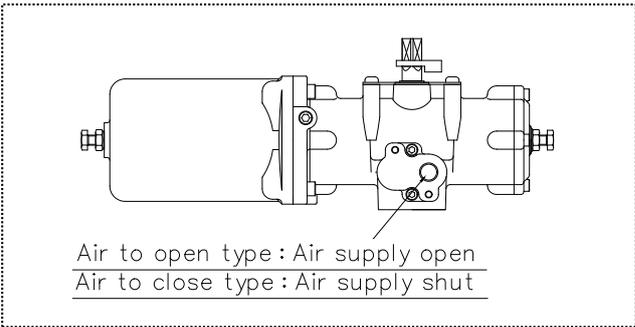
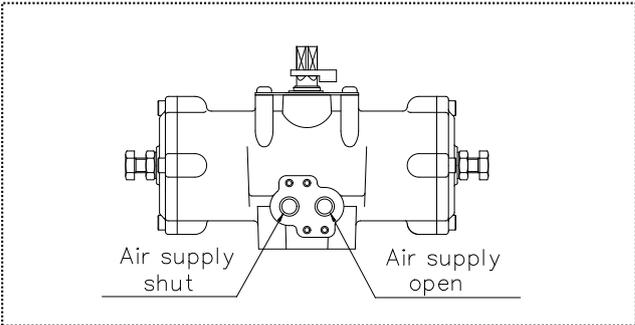
- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- The operating fluid must be clean air filtered through a pertinent air filter.
- If the actuator is used in an environment below 5°C temperature, 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
- Seal Tape (If seal tape isn't used, leakage may be caused)
- Steel Pipe or Tube for Piping
- Joint for Steel Pipe or Tube

Procedure

- 1) Wind a seal tape onto the male thread of the joint with a blank about 3mm (0.12") (about 2 threads) left at the end.
- 2) Screw the joint in the piping female thread of the actuator by hand to the full.
- 3) Screw the joint one turn with a spanner wrench.
- 4) Mount a steel pipe or a tube.  
\*The diagrams at left are without speed controllers, however, air piping procedure is the same way as above.



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

**Caution**

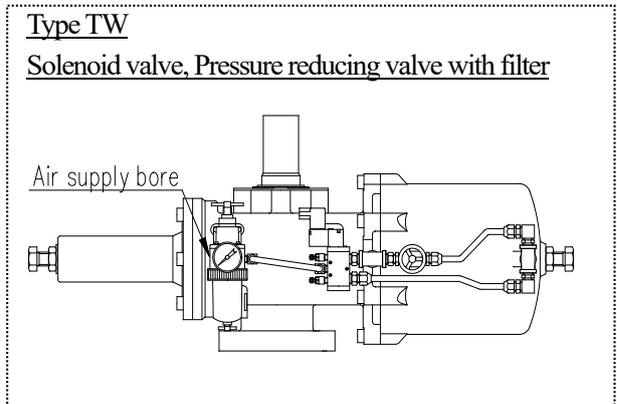
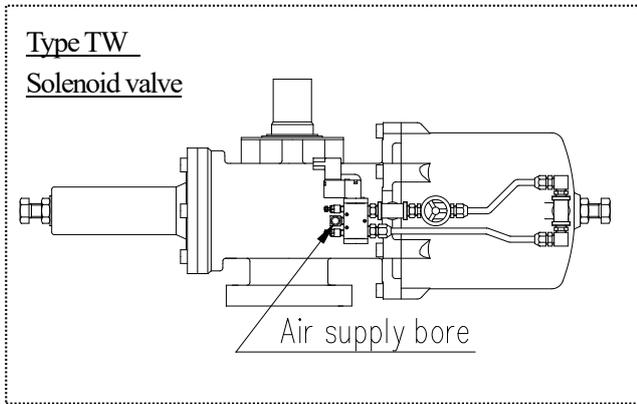
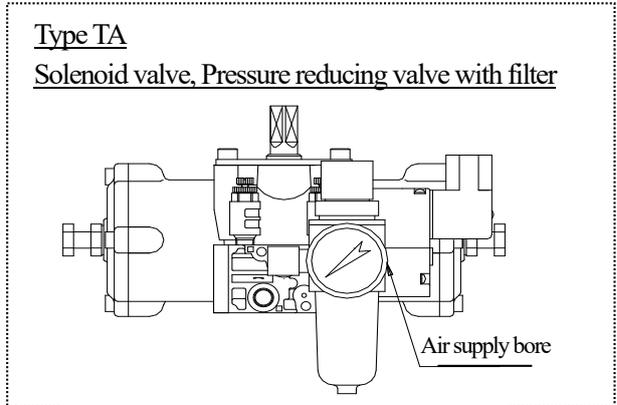
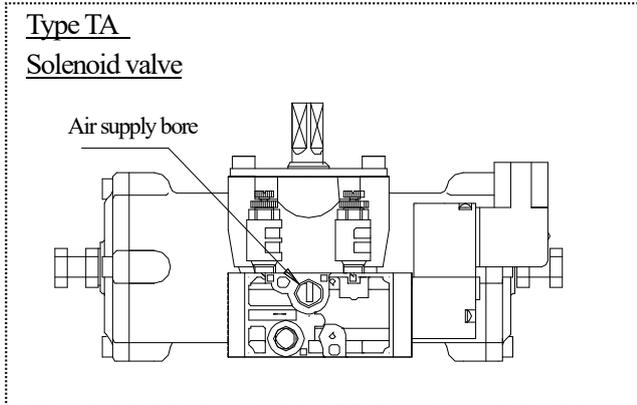
- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- Steel pipes must always be of the plated.
- Before installing an actuator in pipeline, flash the inside of pipeline completely.
- Do not apply 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.
- 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
- Seal Tape (If seal tape isn't used, leakage may be caused)
- 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 (0.12") (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.
- 4) Mount a steel pipe or a tube.



## (14) Connection of limit switch procedure

- 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**   - Be sure that the cover are put on during the operation.
- 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.)
  - If you use the limit switch at 1mA-100mA or 5-30V, consult near Asahi dealer.
  - Be sure that the terminal cover and body cover are put on during the operation.

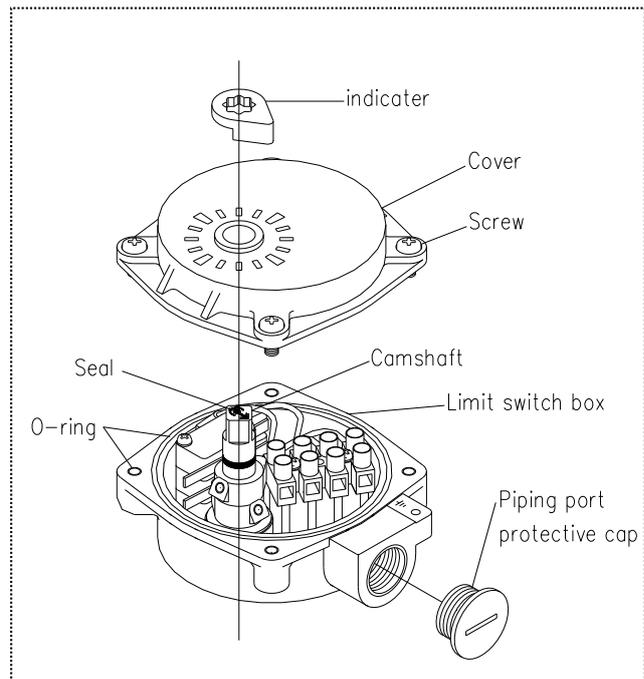
<Type TA>

### Necessary items

- Screw Driver (+: Phillips)
- Screw Driver (-: Flat)
- Connector(G1/2)
- Wire Stripper

### Procedure

- 1) Remove the indicator.
- 2) Remove the fixed screws from casing using screw driver (+).  
※Don't be missing the o-ring of case end.
- 3) Turn to counter clockwise and remove the piping port protective cap.
- 4) Draw the cable through the connector.
- 5) Strip the cable with wire stripper.
- 6) Connect the cable to terminal board with a screw driver (-) in accordance page 10.  
※Tighten the screws.  
(Short circuit or shocks may occur.)
- 7) Tighten up the connector to fix the cable.
- 8) The screws must be tightened in turn after set the casing with screws driver (+)  
※Be sure to set the o-ring when the casing is re-set. (Short circuit or shocks may occur.)
- 9) Inset the indicator to the upper camshaft which must be set same direction of the seal's arrow.



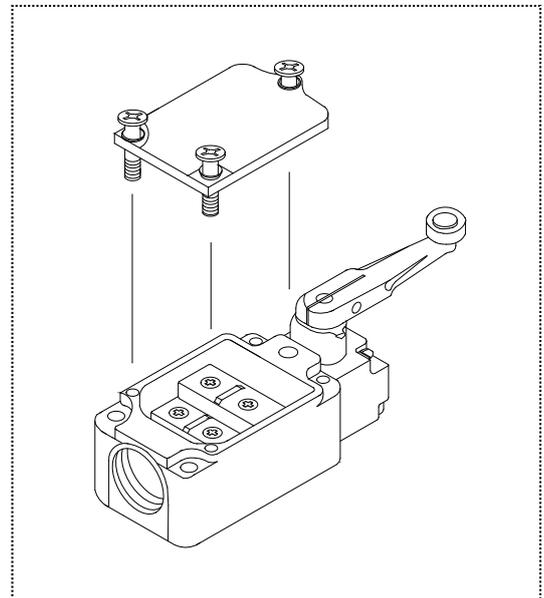
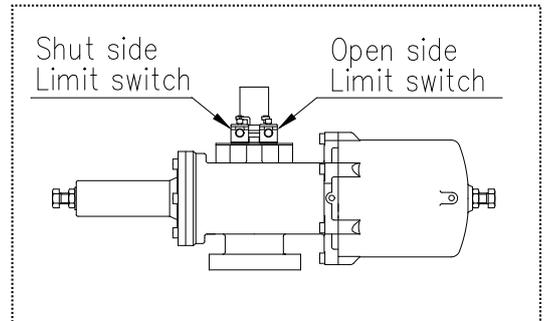
<Type TW>

Necessary items

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

Procedure

- 1) Loosen the three screws used to attach the limit switch cover with a 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) Connect terminal screw with a screwdriver (-) according to the internal circuit diagram shown in page 10.  
\* Tighten up the screws. (Short circuit may occur.)



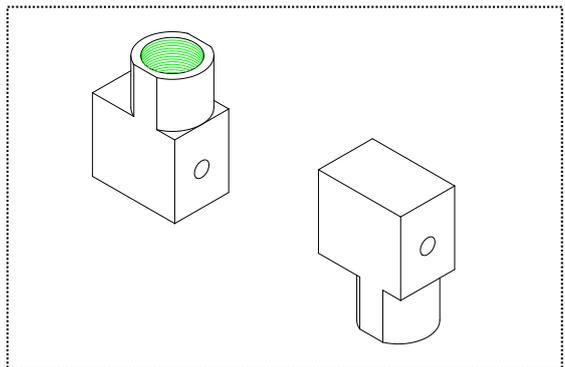
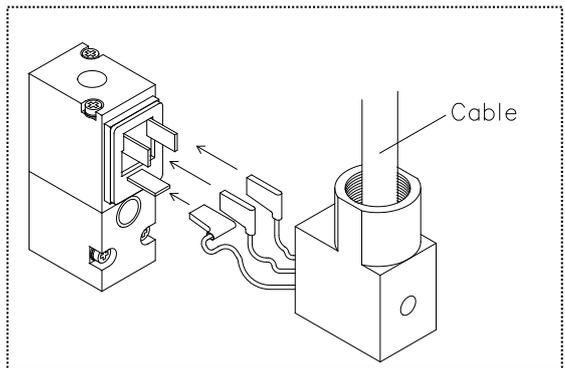
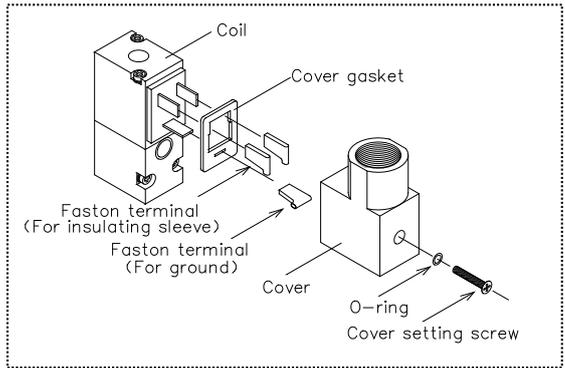
**(15) Connection of solenoid valve procedure**

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

- 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.  
 (Otherwise electric leaks or shocks may occur.)
- 2) Remove the Faston 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.
- 3) Strip the cable with wire stripper.
- 4) Draw the lead wire through the cover.
- 5) Install the Faston terminal on the lead wire with a terminal-crimping tool.
- 6) Insert the Faston terminal into the coil side. And fit the cover.
- 7) Tighten the cover setting screws to fix it.  
 (The cover can be set with the wire extraction opening turned upward or downward.)
- 8) Tighten the cable by connector.



## (16) Operating procedure

### Manual Operating Procedure

 - Don't supply air during manual operation.  
 Warning (When air is supplied during the manual operation, you may be injured.)

 - In case of solenoid valve mounted, open the bypass valve to make atmospheric pressure in the actuator.  
 Caution (It can't do Manual operation.)

○ Double acting type

<Type TA>

Necessary items

- Spanner wrench or lever handle (Option)

### Procedure

\* In case of solenoid valve mounted, open the bypass valve to make pressure in the actuator atmospheric.  
 (It allows to operating manually.)

1) Attach the lever handle (Option) or the spanner wrench to the output shaft in the upper part of the actuator, and turn the handle 1-2 times between full open and full shut.  
 When the limit switch is attached, remove the cap, and use the shaft for the operation.

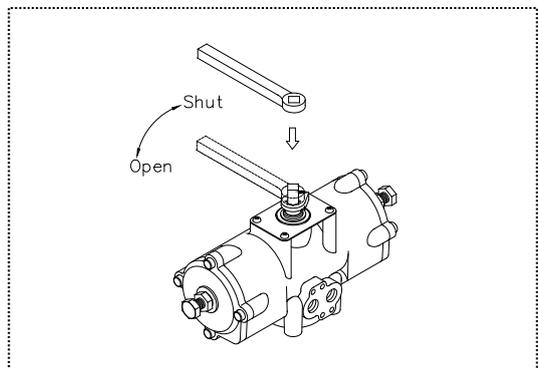
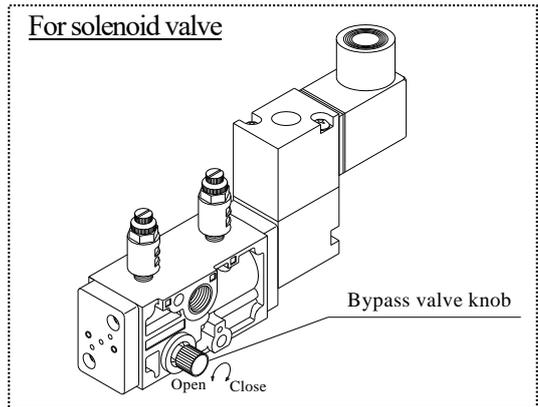
Right turn (clock·wise) → Shut direction

Left turn (counterclock·wise) → Open direction

\* Do not turn the lever handle or the spanner wrench forcibly when the actuator is at the fully open or shut positions. (Otherwise the valve may be damaged.)

2) Remove the lever handle (Option) or the spanner wrench from the output shaft in the upper part of the actuator.

\* In case of solenoid valve mounted, shut the bypass valve.  
 (Otherwise the air may leak.)



<Type TW>

Necessary items

- Padlock

- \* Don't supply air during manual operation. (Injury may occur.)
- Don't remove the indicator. (A trouble may develop.)
- Only for the actuator which is the manual operation with groove.

Procedure

- \* In case of solenoid valve mounted, open the bypass valve to make atmospheric pressure in the actuator.

- 1) Open the padlock and release the chain.
- 2) Turn the handle full open or full close.

Right turn (clock wise) → Shut direction

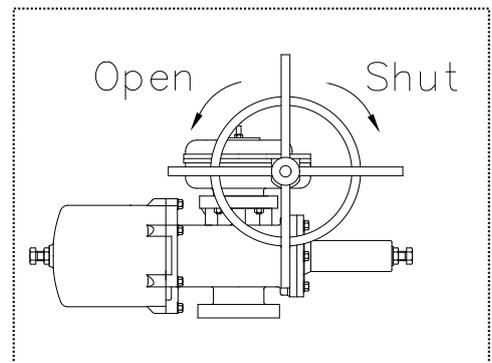
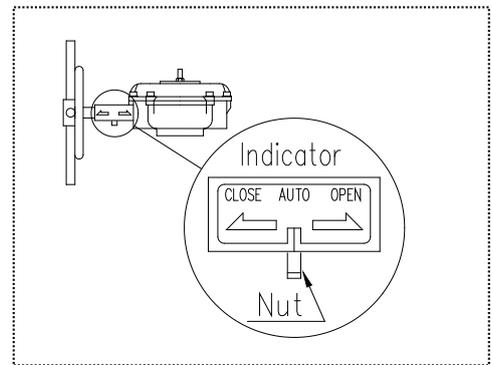
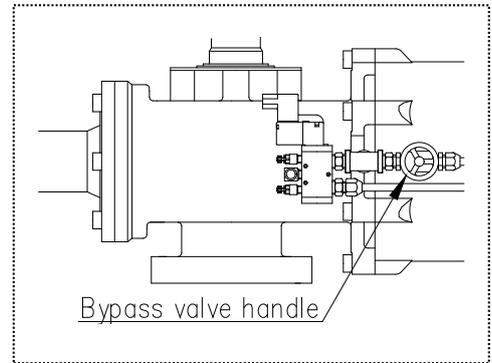
Left turn (counter clock wise) → Open direction

- \* Do not turn the lever handle (option) or spanner wrench forcibly at the right and left full operating positions.

(A trouble will develop.)

There are about thirteen idle turns between full open and full close.

- 3) Turn the handle to adjust the nut to "AUTO" of the indicator.
  - 4) Lead the chain through the handle and the gear case and tighten up with the pad lock.
- \* In case of solenoid valve mounted, turn the bypass valve right. (If not, the air leaks.)



Manual Operating Procedure

○ Single acting type

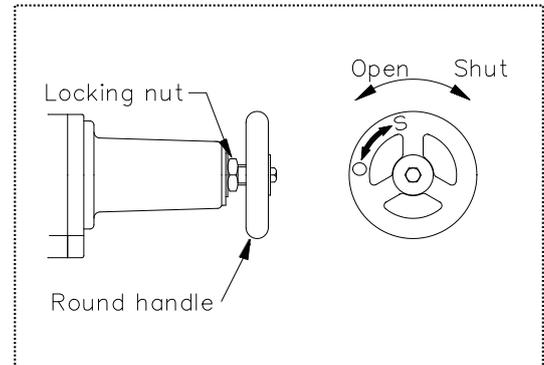
Necessary items

- Spanner Wrench

Procedure

- 1) Loosen the locking nut with a spanner.
- 2) Turn the round handle for manual operation 1-2 times between full open and full shut.

Rotational direction of round handle	Air to open type	Air to close type
Clockwise	Shut	Open
C-Clockwise	Open	Shut



Nominal size	40, 50mm (1 1/2", 2")	65, 80mm (2 1/2", 3")	100mm (4")	125, 150mm (5", 6")	200mm (8")	250, 300mm (10", 12")	350, 400mm (14", 16")
Number of turns of the handle	About 24	About 25	About 27	About 28	About 36	About 38	About 40

- 3) Turn right the round handle to the full open or full shut.  
\* Do not turn the handle forcibly at the full open or shut. (Otherwise the valve may be damaged.)
- 4) Tighten the locking nut with a spanner wrench.

Automatic (Air) Operating Procedure

**Warning**  - Make sure that the manual handle (Option) or spanner wrench is not attached to the output shaft in the upper part of the actuator securely. (Otherwise the manual handle (Option) or spanner wrench will be flung off by the rotation of the output shaft and the manual handle (Option) or spanner may injure you.)

**Caution**  - Keep air supply pressure from a compressor at least 0.4 MPa (4.1kgf/cm<sup>2</sup>). (Actuator may not work normally.)

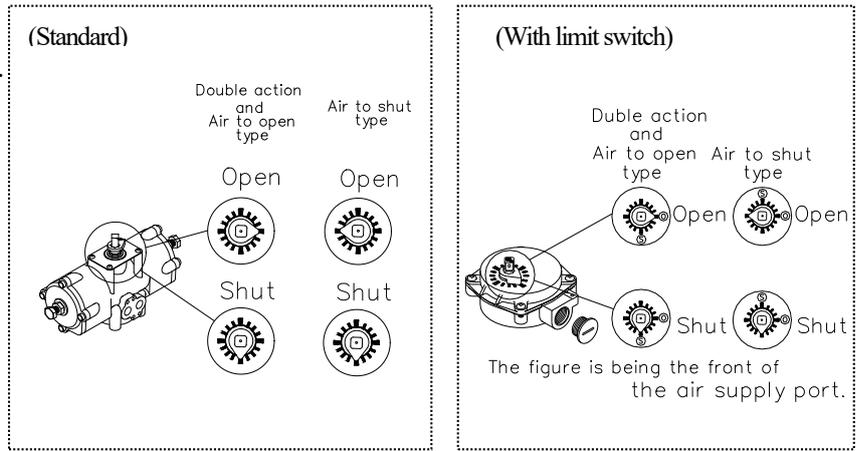
- The AV valves must be used within the specifications specifically applicable to the product.

<Type TA>

Procedure

- 1) Supply air to the air supply opening.
- 2) Check to ensure that the valve indicating direction and the operating direction agree with each other.
- 3) Stop supplying air.

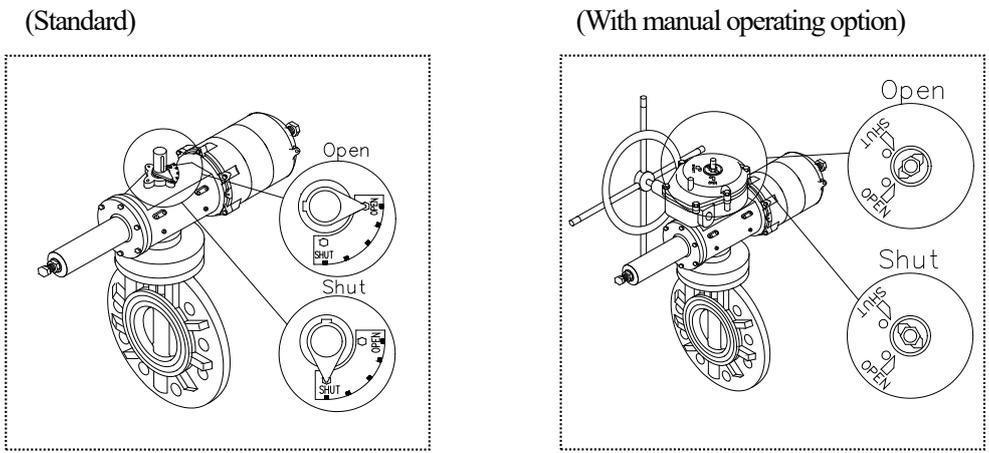
Opening indicator



<Type TW>

Procedure

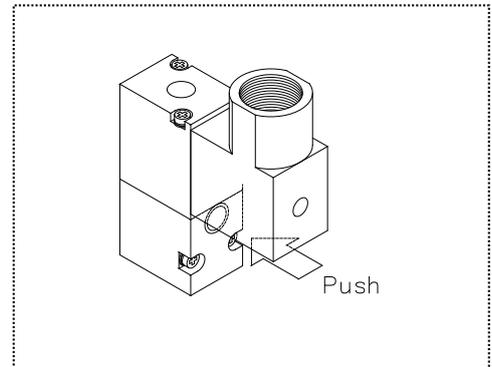
- 1) Supply the air to the actuator.
- 2) Check to ensure that the valve indicating direction and the operating direction agree with each other.
- 3) Stop air supply.



<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	

**(17) Adjustment of opening / closing speed procedure**

 - Fasten a lock nut after adjusting a speed controller of solenoid valve.  
 Caution

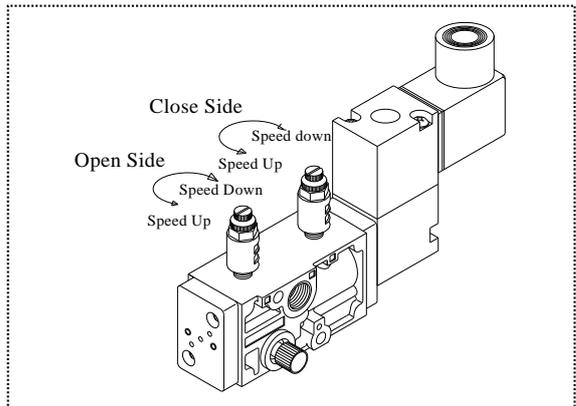
○ Double acting type

Necessary items  
 ● Spanner Wrench

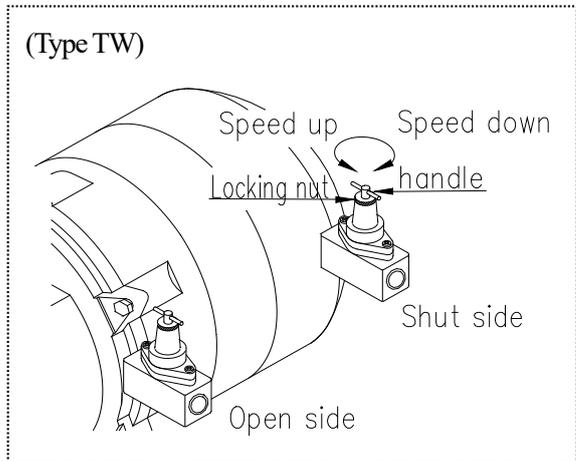
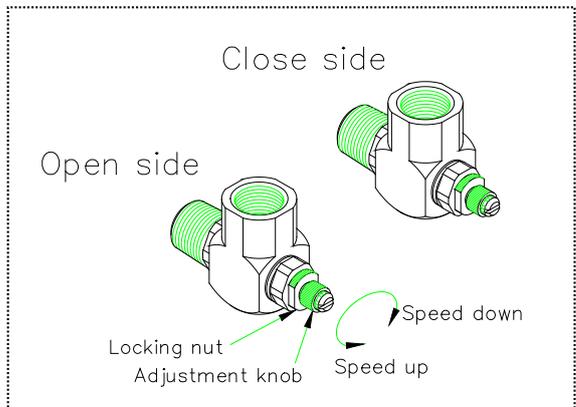
Procedure

- 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





- Fasten a lock nut after adjusting a speed controller of solenoid valve.

Caution

○ Single acting type

Necessary items

- Spanner Wrench

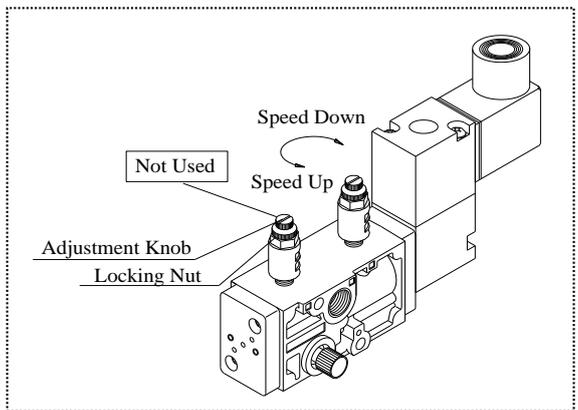
The actuation type changes the speed-adjustable direction.

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

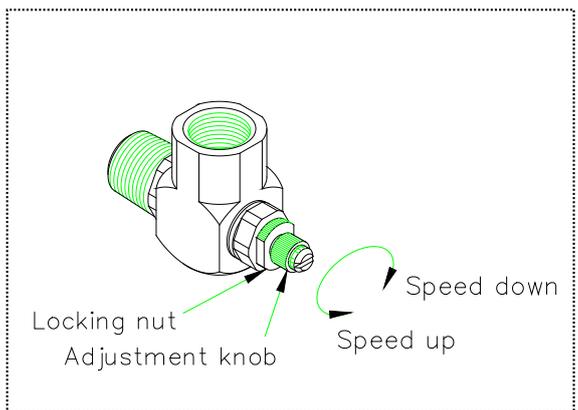
### Procedure

- 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 Single action type with solenoid valve



#### For Single action type with speed controller



## (18) Disassembling method for replacing parts

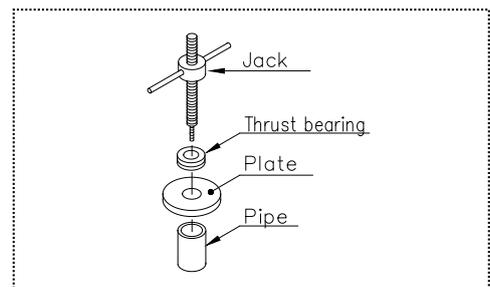
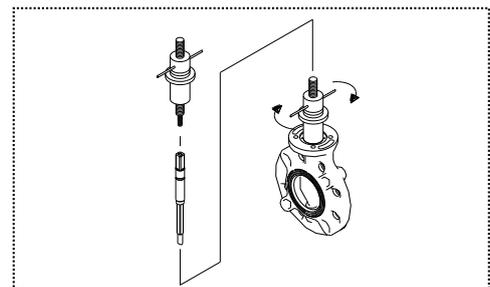
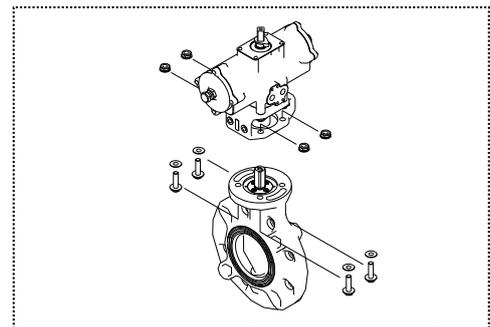
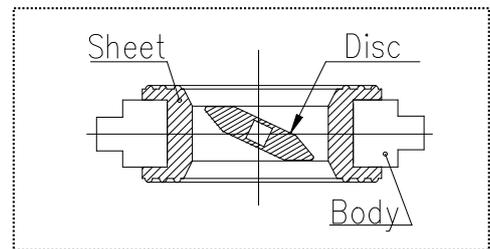
- Warning**  - Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)
- Caution**  - When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
- Do not change or replace valve parts under line pressure.

### Necessary items

- Jack
- Pipe
- Plate
- Allen Wrench
- Thrust Bearing
- Pliers
- Protective Gloves
- Safety Goggles

### Disassembly Procedure

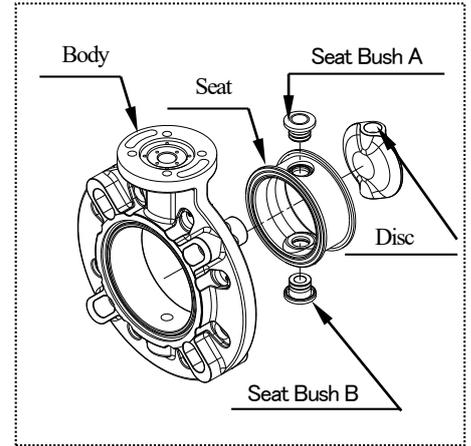
- 1) Completely discharge fluid from pipes.
- 2) Fully shut the valve by the air-operation or manual operation.
- 3) Turn off the power source of solenoid valve.
- 4) Leave the valve slightly opened with a spanner wrench.
- 5) Loosen the bolts·nuts of piping system and remove them.
- 6) Remove the body part from piping system.
- 7) Loosen the bolt·nut (A) [39] or bolt·nut (P) [39], and remove the actuator.
- 8) <Nominal size 40-100mm (1 1/2"-4")>  
Pull out the stem [7] by hand or pliers.  
<Nominal size 125-400mm (5"-16")>  
Attach jack, thrust bearing, plate, and pipe to the valve, and thrust the jack into the stem [7].  
Turn the handle of jack to pull out the stem [7].
- 9) Hold flat surface [7] with vise and pull off the valve body [1].
- 10) Remove the O-ring (C) [6].
- 11) Make the disc [2] fully open.
- 12) Insert the screw driver (-) between body [1] and seat [3]. Disc [2] and seat [3] are extruded by using screw driver (-).
- 13) <Nominal size 40-350mm (1 1/2"-14")>  
Remove the disc [2], seat bush A [183] and seat bush B [184] from the seat [3].  
<Nominal size 400mm (16")>  
Remove the disc [2] from the seat [3].



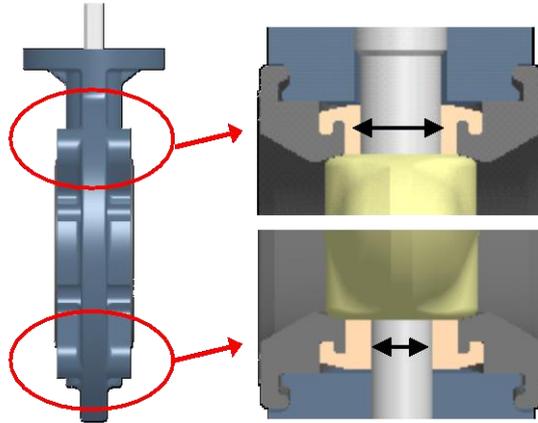
## Assembly Procedure

Nominal size: 40-350mm (1 1/2"-14")

- 1) Before starting assembly, grease (Silicone) should be spread on the O-ring (C) [6] and O-ring (I) [185].
- 2) Put the O-ring (C) [6] onto the stem [7]. Put the O-ring (I) [185] onto the stem bush A [183] and B [184].
- 3) Grease (Silicone) should be spread on the top and bottom disc [2], the stem of the seat [3].
- 4) Put the disc [2], seat bush A [183] and seat bush B [184] onto the seat [3]. "The set of seat - disc" call for combined parts.
- 5) Put it into the state of open the valve slightly. Insert the set of seat - disc [3] into the body [1].



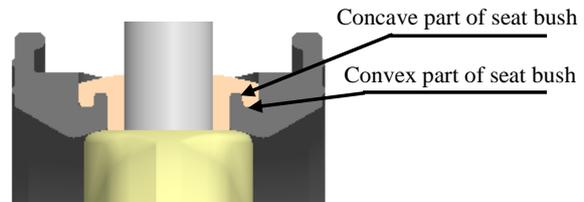
- Make certain stem hole of seat are properly aligned. The upper side stem hole of seat bush A [183] has larger than seat bush B [184] of lower side. When the stem bush is assembled oppositely, the stem [7] cannot be inserted.



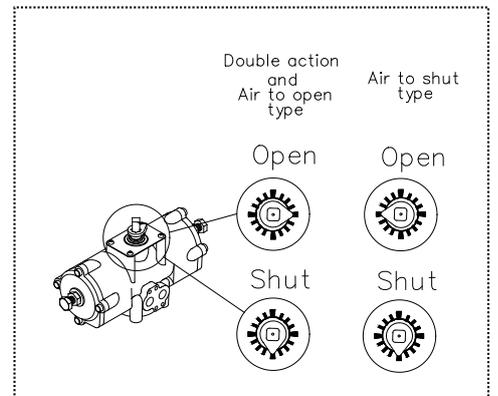
Upper side:  
Stem hole is large size

Lower side:  
Stem hole is small size

- Make certain tabs are properly aligned.



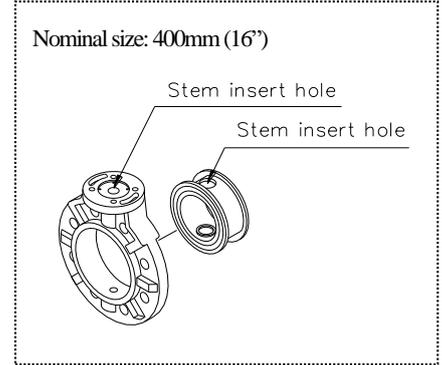
- 6) Insert the stem [7] of the body [1].
- 7) Install the stem holder [8] onto valve body [1] with countersunk holes facing up using 4 screws [157].
- 8) Install the actuator [35] and stand [30] onto the valve body using bolt (E) [38] and bolt·nut (A) [39].
- 9) After assembly, make sure that the valve can be fully opened and closed smoothly.
- 10) Fully open or close the valve by air operation. (Refer to page 23)  
\* In case that the travel indicator shows incorrect position of, turn off the power source and remove the cover of the actuator with a spanner wrench, then adjust the travel indicator.



## Assembly Procedure

Nominal size: 400mm (16")

- 1) Before starting assembly, grease (Silicone) should be spread on the O-ring.
- 2) Put the O-ring (C) [6] onto the stem [7]. Put the O-ring (A) [4] and O-ring (B) [5] onto the disc [2].
- 3) Grease (Silicone) should be spread on the top and bottom disc [2], the stem of the seat [3].
- 4) Put it into the state of open the valve slightly. Insert the set of seat - disc [3] into the body [1].
- 5) Insert the stem [7] of the body [1].
- 6) To install gear operator reverse disassembly procedure #5).
  - \* Make certain line scribed on top of stem [7] indicates disc [2] position while installing stem [7].
- 7) After assembly, make sure that the valve can be fully opened and closed smoothly.



## (19) Stopper adjustment procedure



Warning - Don't supply air during adjusting stopper.  
(When air is supplied during adjusting stopper, you may be injured.)

Necessary items

- Spanner Wrench

### Procedure

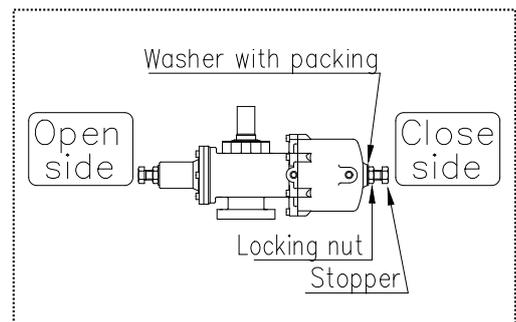
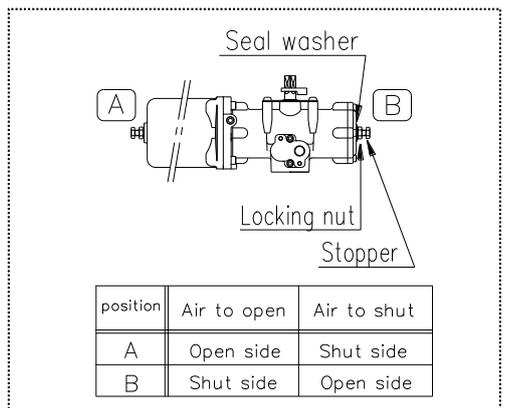
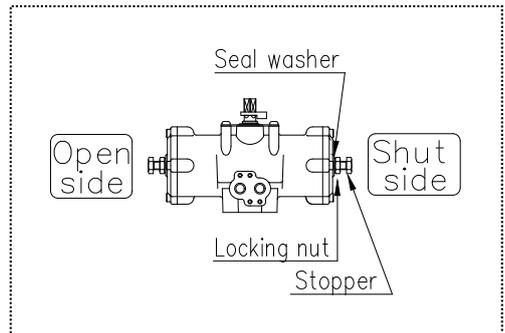
- 1) Stop supplying air, and open the bypass valve to exhaust the air in actuator.
- 2) Attach the spanner wrench or the hexagon wrench to stopper. And loose slowly the rocking nut with the spanner wrench.
  - \* Don't damage the seal washer. (Otherwise air may leak.)
- 3) Turn the stopper with the spanner or the Allen wrench to adjusting direction.

### Opening degree

Direction	Clock wise	Counter clock wise
Open side	Smaller	Larger
Close side	Larger	Smaller

\* Avoid excessive tightening. (Otherwise air may leak.)

- 4) Close the bypass valve, and supply the air to the actuator. Operate the valve with air to make sure that opening degree is adjusted correctly. Otherwise repeat item 1)-4) to adjust opening degree.



## (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 decided schedule.

Portion to be inspected	Inspection item
Actuator	<ul style="list-style-type: none"> <li>● Existence of rust, peeling of paint, and dirt in inspection hole of valve travel indicator.</li> <li>● Tightening condition of respective threaded portions. (Loose or not)</li> <li>● Existence of abnormality in opening and closing operating sounds.</li> <li>● Smooth operation of manual handle.</li> </ul>
Note :	It is unnecessary to supply oil to this actuator.
Valve	<ul style="list-style-type: none"> <li>● Existence of scratches, cracks, deformation, and discoloring.</li> <li>● Existence of leakage from the valve to the outside.</li> <li>● Existence of leakage when the valve is opened fully at right or left.</li> </ul>

## (21) Troubleshooting

Problem	Cause	Treatment
The handle is not (can't be) turned when the valve is operated manually.	The valve has already been opened (or closed) fully.	Turn the handle in the reverse direction.
	The air is supplied to actuator.	Shut the main valve, and open the bypass valve.
	Foreign matter is in the valve.	Disassemble the valve to remove foreign matter. (Refer to page 12)
	The torque of the valve is increased by the piping stress.	Remove the piping stress. (Refer to page 12)
	The torque is increased by the influence (temperature, components, pressure) of fluid on the valve.	Check service condition. (Refer to page 7)
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 21)
	The supply voltage to the solenoid valve is wrong.	Check voltage with a tester and set specified voltage. (Refer to page 10)
	The supply voltage to the solenoid valve is low.	
	The air is not supplied to actuator.	Supply the air to the actuator.
	The bypass valve is opened.	Close the bypass valve to turn the bypass valve knob right.

Problem	Cause	Treatment
The valve does not operate by air operations	Adjustment knob of speed controller is turned full right.	Turn the adjustment knob left.
	Foreign matter is in the valve.	Disassemble the valve to remove foreign matter. (Refer to page 12)
	The torque of the valve is increased by the piping stress.	Remove the piping stress. (Refer to page 12)
	The torque is increased by the influence (temperature, components, pressure) of fluid on the valve.	Check service condition. (Refer to page 7)
Fluid leaks from the valve even when the valve is closed fully.	The seat is worn.	Replace the seat with a new one. (Refer to page 29)
	The seat and disc are scratched.	Replace the scratched seat and disc with new ones. (Refer to page 29)
	Foreign matter is in the valve.	Discharge the foreign matter from the valve by opening and closing the valve several times. (Refer to page 22)
	Connecting bolts are over tightened or tightened unevenly.	Adjust and retighten the valve properly. (Refer to page 14)
Fluid leaks from the valve.	The seat or the O-ring is scratched or worn.	Replace the seat or the O-ring with a new one. (Refer to page 29)
	The O-ring is projected from the groove.	
	The sliding face or the fixed face of the seat is scratched or worn.	
The actuator operates, but the valve is not opened or closed.	The stem or the joint is broken.	Replace the stem or the joint with a new one. (Refer to page 29)
	The engagement between the stem and the disc is broken.	Replace the engagement with a new one. (Refer to page 29)

**(22) 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.)

**Butterfly Valves Type 57, 56, 56D  
Pneumatic Actuated Type TA, TW**

[Automatic Valve]

**ASAHI YUKIZAI CORPORATION**

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Information in this manual is subject to change without notice

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