

Serial No.

H – V027 E – 4

## Ball Valve Type 21

### User's Manual



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ASAHI AV VALVES

## (1) General operating instructions

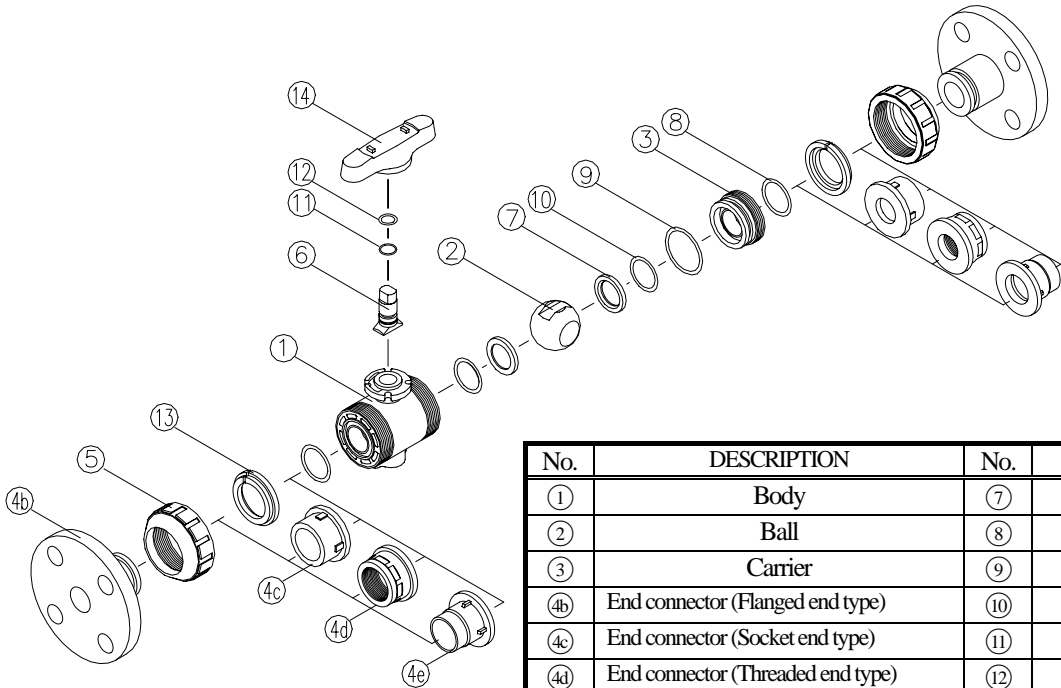
- Operate the valve within the pressure Vs temperature range.  
(The valve can be damaged by operating beyond the allowable range.)
- Select a valve material that is compatible with the media, refer to “CHEMICAL RESISTANCE ON ASAHI AV VALVE”.  
(Some chemicals may damage incompatible valve materials.)
- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)
- Do not use the valve on condition that fluid has crystallized.  
(The valve will not operate properly.)
- Do not step on the valve or apply excessive weight on valve. (It can be damaged.)
- Do not exert excessive force in closing the valve.
- Make sure to consult a waste treatment dealer to dispose of the valves.  
(Poisonous gas is generated when the valve is burned improperly.)
- Allow sufficient space for maintenance and inspection.
- Keep the valve away from excessive heat or fire. (It can be deformed, or destroyed.)
- The valve is not designed to bear any kind of external load. Never stand on or place anything heavy on the valve at anytime.
- Certain liquid such as H<sub>2</sub>O<sub>2</sub>, NaClO, etc may be prone to vaporization which may cause irregular pressure increases, which may destroy the valve.

## (2) General instructions for transportation, unpacking and storage

- Keep the valve packed in the carton or box as delivered until installation.
- Keep the valve away from any coal tar, creosote (antiseptic for wood), termite insecticide, vermicides, and paint.  
(This could cause swelling damage the valve.)
- Do not impact or drop the valve. (It can be damaged.)
- Avoid scratching the valve with any sharp object.

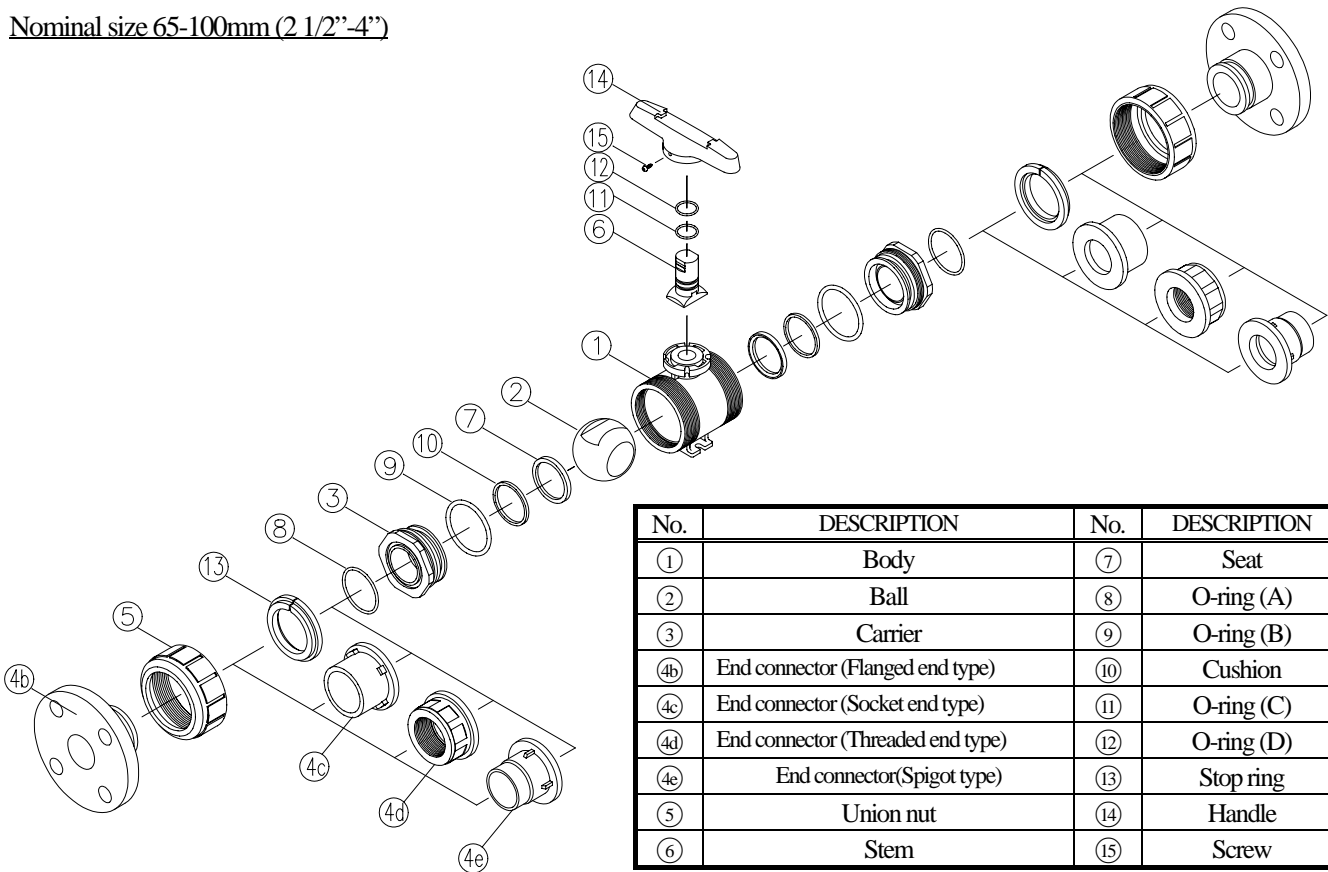
(3) Name of parts

Nominal size 15-50mm (1/2”-2”)



No.	DESCRIPTION	No.	DESCRIPTION
①	Body	⑦	Seat
②	Ball	⑧	O-ring (A)
③	Carrier	⑨	O-ring (B)
④b	End connector (Flanged end type)	⑩	O-ring (C)
④c	End connector (Socket end type)	⑪	O-ring (D)
④d	End connector (Threaded end type)	⑫	O-ring (E)
④e	End connector(Spigot type)	⑬	Stop ring
⑤	Union nut	⑭	Handle
⑥	Stem		

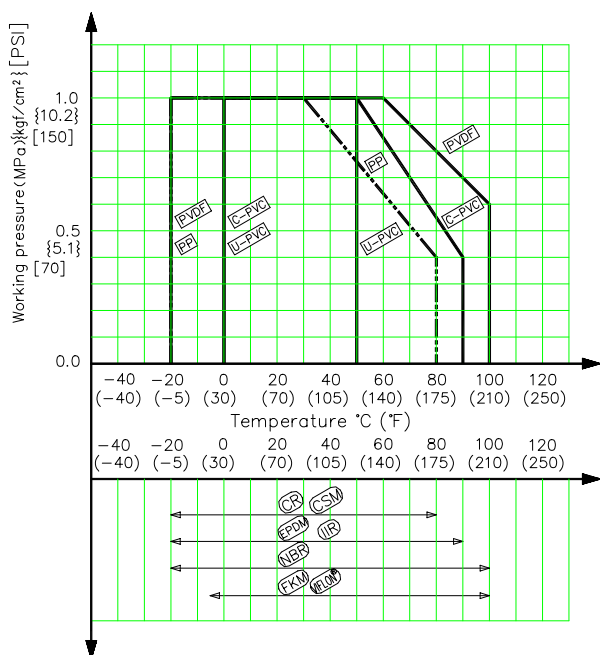
Nominal size 65-100mm (2 1/2”-4”)



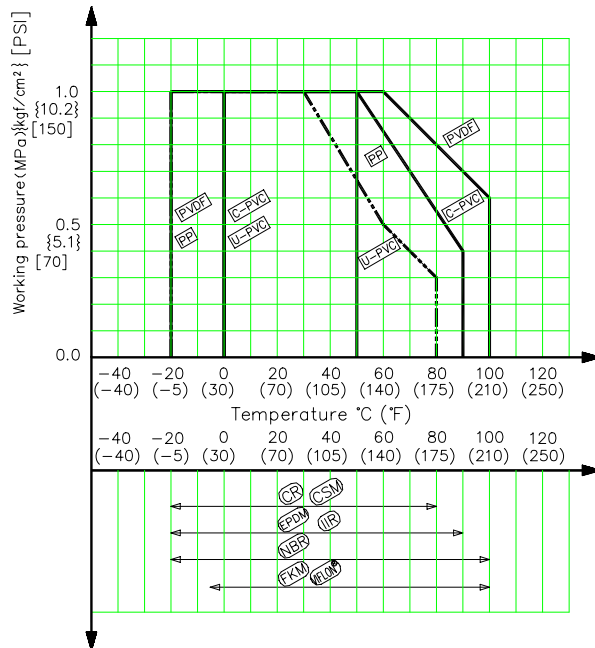
No.	DESCRIPTION	No.	DESCRIPTION
①	Body	⑦	Seat
②	Ball	⑧	O-ring (A)
③	Carrier	⑨	O-ring (B)
④b	End connector (Flanged end type)	⑩	Cushion
④c	End connector (Socket end type)	⑪	O-ring (C)
④d	End connector (Threaded end type)	⑫	O-ring (D)
④e	End connector(Spigot type)	⑬	Stop ring
⑤	Union nut	⑭	Handle
⑥	Stem	⑮	Screw

#### (4) Comparison between working temperature and pressure

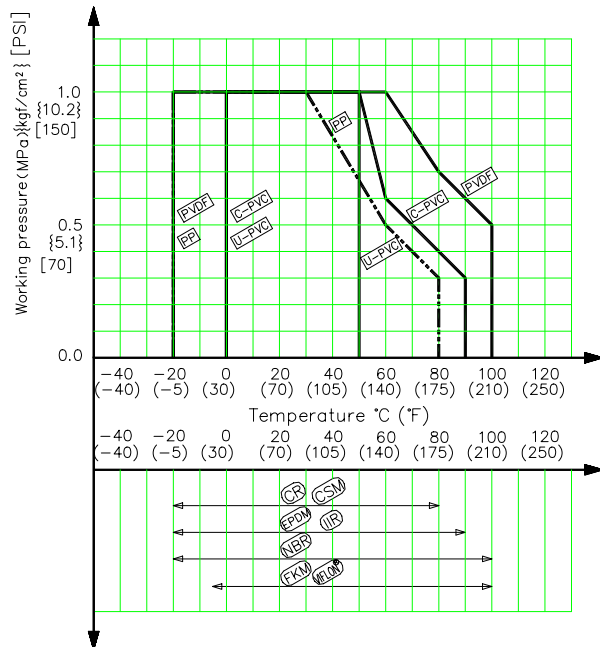
Nominal size: 15mm-50mm (1/2"-2")



Nominal size: 65mm (2 1/2")



Nominal size: 80mm, 100mm (3", 4")



#### Caution

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

## (5) Installation procedure

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

#### Necessary items

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

(When a non-AV gasket is used, a different tightening torque specification should be followed.)

#### Procedure

- 1) When the union nut ⑤ flange assembly set was removed or loosen from body ①, O-ring (A) ⑧ should be installed into carrier and body groove. (In either horizontal or vertical installation, if necessary apply a small amount of lubricant to O-ring to hold in place.) Align union nut and end connector with the body. Insure end connector mates with body and O-ring. Make certain union nut threads onto body smoothly. Tighten union nuts on each side valve until hand tight. Then using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turns.
- 2) Set the AV gasket between the flanges.
- 3) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.



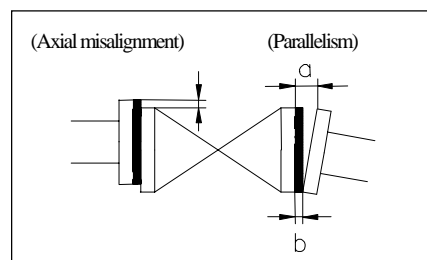
#### Caution

The parallelism and axial misalignment of the flange surface should be 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)
15-32mm (1/2"-1 1/4")	1.0mm (0.04")	0.5mm (0.02")
40-80mm (1 1/2"-3")	1.0mm (0.04")	0.8mm (0.03")
100mm (4")	1.0mm (0.04")	1.0mm (0.04")



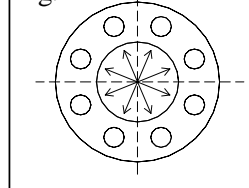
- 4) Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner. (Refer to fig.1.)

#### 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, 65 mm (2", 2 1/2")	80, 100 mm (3", 4")
Torque value	17.5 { 179 } [155]	20.0 { 204 } [177]	22.5 { 230 } [230]	30.0 { 306 } [266]

Fig. 1



#### Caution

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

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

## Necessary items

- Sealing tape (A non-sealing tape can cause leakage.)
- Strap wrench (Do not use Pipe wrench.)
- Spanner wrench



## Caution

Make sure that the threaded connections are plastic x plastic.  
(Metallic thread can cause damage.)

**Procedure**

- 1) Wind a sealing tape around the external thread of joint, leaving the end (about 3mm) free.
- 2) Loosen the union nut (5) with a strap wrench..
- 3) Remove the union nut (5) and the end connector (4d).
- 4) Lead the union nut (5) through the pipe.
- 5) Tighten the external thread of the joint and the end connector (4d) hardly with hand.
- 6) Using a spanner wrench, screw in the end connector (4d) by turning 180° -360° carefully without damaging it.



## Caution

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

- 7) Make sure that the O-ring (A) (8) is mounted.
- 8) Set the end connector (4d) and union nut (5) directly on the body without allowing the O-ring (A) (8) to come off.
- 9) Tighten union nuts (5) on each valve until hand tight.
- 10) Using a strap wrench tighten union nuts uniformly on each on each side approx 90° -180° turns, 1/4 to 1/2 turns.



## Caution

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

Socket type (Material : PVC, C-PVC)

## Necessary items

- Adhesive for hard vinyl chloride pipes
- Strap wrench (Do not use the pipe wrench)



## Caution

Do not install a socket type valve where the atmospheric temperature is 5°C or lower.  
(The valve can be damaged.)

Procedure

- 1) Loosen the union nut ⑤ with a strap wrench.
- 2) Remove the union nut ⑤ and end connector ④c.
- 3) Lead the union nut through the pipe.
- 4) Clean the hub part of the end connector ④c by wiping the waste cloth.
- 5) Apply adhesive evenly to the hub part of the end connector ④c and the pipe spigot.



## Caution

Do not apply more adhesives 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")	65mm (2 1/2")	80mm (3")	100mm (4")
Quantity (g)	1.0	1.3	2.0	2.4	3.5	4.8	6.9	9.0	13.0

- 6) After applying adhesive, insert the pipe quickly to the end connector ④c and leave it alone for at least 60 seconds.
- 7) Wipe away overflowing adhesive.
- 8) Make sure that O-ring(A) ⑧ is mounted
- 9) Set the end connector ④c and union nut ⑤ directly on the body without allowing the O-ring (A) ⑧ to come off.
- 10) Tighten union nut ⑤ hardly with hand.
- 11) Using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turns.



## Caution

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

**Socket type** (Material : PP, PVDF)

## Necessary items

- Strap wrench (Do not use the pipe 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 ⑤ and the end connector.
- 3) Lead the union nut ⑤ 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 (A) ⑧ is mounted.
- 6) Set the end connector ④c and the union nut ⑤ directly without allowing the O-ring (A) ⑧ to come off.
- 7) Tighten union nut ⑤ hardly with hand.
- 8) Using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turns.

**Caution**

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

**Spigot type** (Material : PVDF)

## Necessary items

- Strap wrench (Do not use the pipe wrench.)
- Automatic welding machine
- User's manual for automatic welding machine

**Procedure**

- 1) Loosen the union nut with a strap wrench.
- 2) Remove the union nut ⑤ and the end connector.
- 3) Lead the union nut ⑤ 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 (A) ⑧ is mounted.
- 6) Set the end connector ④c and the union nut ⑤ directly without allowing the O-ring (A) ⑧ to come off.
- 7) Tighten union nut ⑤ hardly with hand.
- 8) Using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turns.

**Caution**

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



**Caution**

{15mm-50mm(1/2"-2")}

It is recommended to install the valve with the threaded carrier to the upstream side of the system.

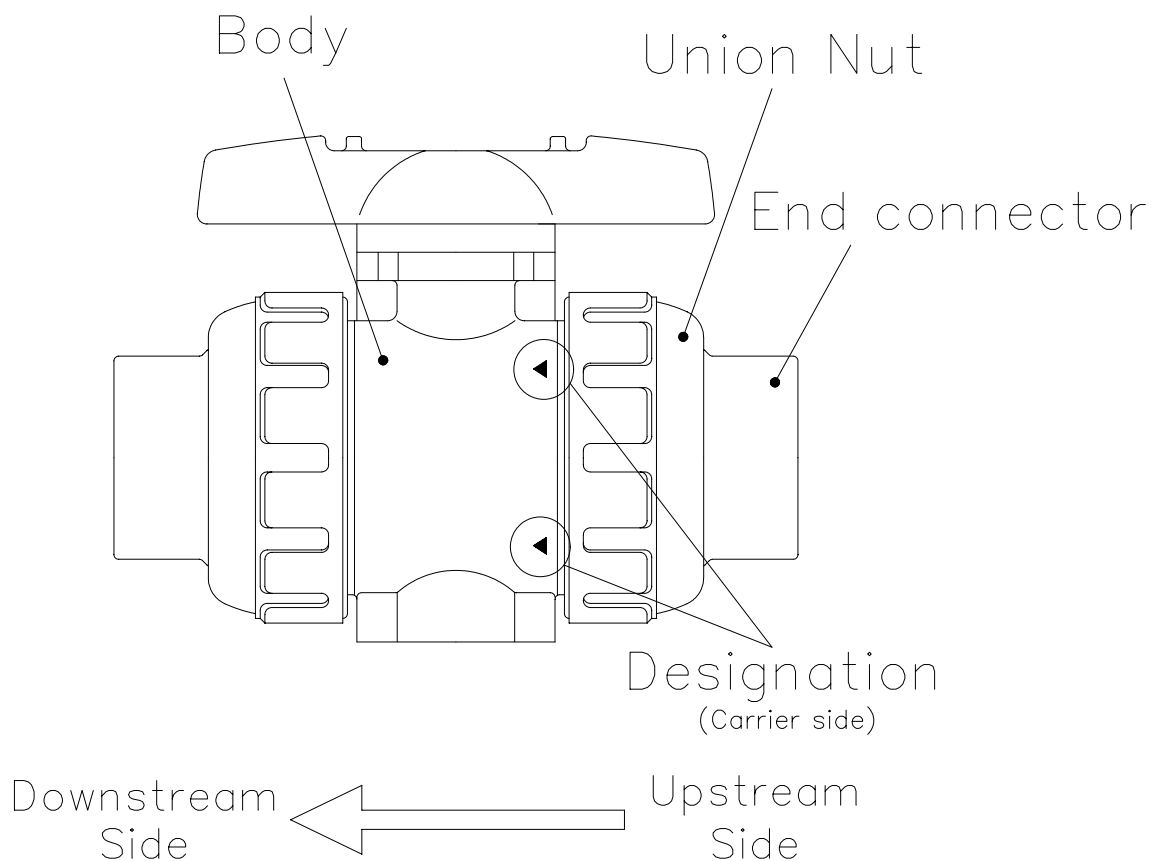
This allows for an increase safety factor and eliminating a threaded connection when used as a blocking valve.

This also allows the down stream union nut and end connector to be removed safely under pressure.

It increases the safety where there is no chance of thread leakage or accidentally removing the carrier.

The designation of the up stream side (non threaded carrier is marked as shown) on the body.

Nominal size 15mm - 50mm (1/2" – 2")



## (6) Operating Procedure



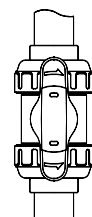
### Caution

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

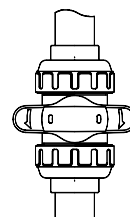
- Turn the handle gently to open or close.  
(Turn the handle clockwise to close and counter clockwise to open.)

Fully closed ..... The position of the handle should be perpendicular to the pipe.

Fully opened ..... The position of the handle should be parallel to the pipe.



Fully opened



Fully closed

## (7) Method of Adjusting Face Pressure between Ball and Seat

### Necessary items

- Strap wrench
- Safety goggles
- Protective gloves
- Screwdriver (+) (only with nominal size 65~100mm)

### Procedure

- 1) Completely discharge fluid from pipes.
- 2) Turn the handle to full close.
- 3) Loosen the right union nut and the left one ⑤ with a strap wrench.
- 4) Remove the body part from piping system.



### Caution

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

- 5) Pull the handle off the body part.



### Caution

As for nominal size 65-100mm (2 1/2"-4"), loosen the screw ⑮ properly with a screwdriver before pulling it off..

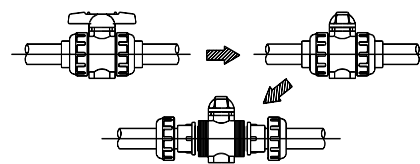
- 6) Engage the upper convex part of the handle with the concave part of the union ③.



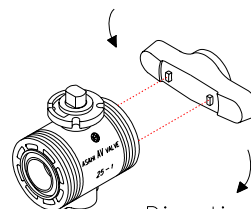
### Caution

As for nominal size 15-50mm  
Only the union ③ on the right side when viewed from the trademark (AV mark) can be adjusted.  
As for nominal size 65-100mm  
adjust the unions on both sides.

- 7) Make an adjustment by turning the union clockwise (to tighten it) or counter clockwise (to loosen it).
- 8) Make sure that the handle can be operated smoothly.
- 9) Assemble the valve by following the above procedure in the reverse order, starting at 6)



Direction where carrier is tightened



Direction where carrier is loosened

## (8) Disassembling Method for Replacing Parts

### Necessary items

- Strap wrench
- Safety goggles
- Protective gloves



### 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) Turn the handle to full close.
- 3) Loosen the right union nut and the left one ⑤ with a strap wrench.
- 4) Remove the body part from piping system.
- 5) Pull the handle off the body part.



### Caution

As for nominal size 65-100mm (2 1/2"-4"), loosen the screw ⑮ properly with a screwdriver before pulling it off..

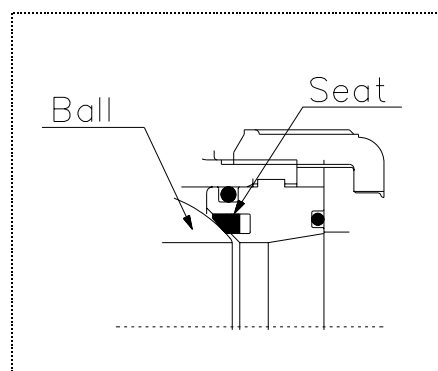
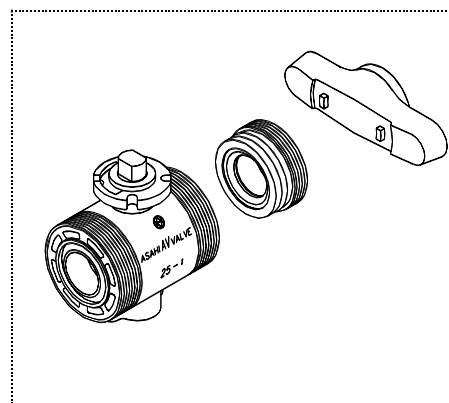
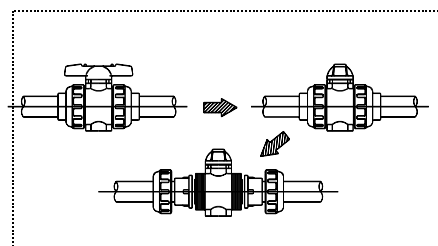
- 6) Engage the upper convex part of the handle with the concave part of the union.



### Caution

As for nominal size 15-50mm  
Only the union ③ on the right side when viewed from the trademark (AV mark) can be adjusted.  
As for nominal size 65-100mm, adjust the unions on both sides.

- 7) In the engaged state, turn the handle ⑭ counter clockwise to loosen it and remove the union ③.
- 8) Remove the seat ⑦ carefully by hand without damaging it.
- 9) Push out the ball ② by hand.
- 10) Push out the stem ⑥ from the top flange side to the body side.



### <Assembly>

#### Procedure

Carry out the assembly work in the reverse procedure from item 10)



### Caution

With regard to item 8), before installing seat ⑦ on the valve, check the seat for its face and back.

## (9) Mounting actuator, Ensaf and base (panel)

### ○ Attach actuator to the top flange

#### Procedure

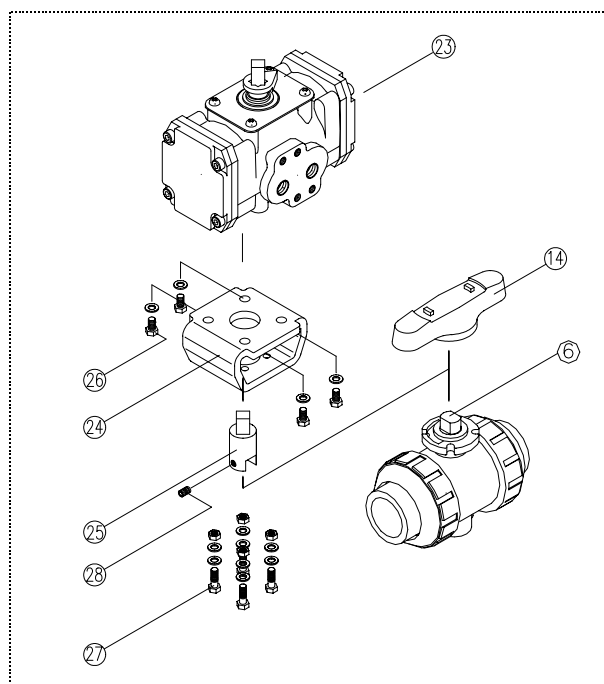
- 1) Remove the handle (14).



#### Caution

As for nominal 65mm-100mm, tighten the screw (15) properly before removing it.

- 2) Fix the stand (24) to actuator (23) with bolt (A).
- 3) Fix the stem (6) to the joint (25) with screw (B) (28).
- 4) Engage the joint (25) with actuator (23).
- 5) Fix the stand (24) to the top flange with bolt-nut (B) (27).
- 6) Make sure that the valve works smoothly, by operating actuator (23) by hand.



### ○ Attach Inserted metal to the bottom stand.

#### Procedure

Refer to the user's manual for the Inserted metal  
(Commercially available.)

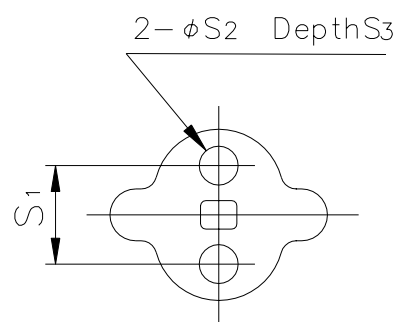
#### Bottom stand dimension

Unit; mm

Nom.Size	S1	S2	S3
15mm (1/2")	19	7.3	11
20mm (3/4")	19	7.3	11
25mm (1")	19	7.3	11
32mm (1 1/4")	30	9	15
40mm (1 1/2")	30	9	15
50mm (2")	30	9	15
65mm (2 1/2")	48	9	6
80mm (3")	55	11	7
100mm (4")	65	11	8

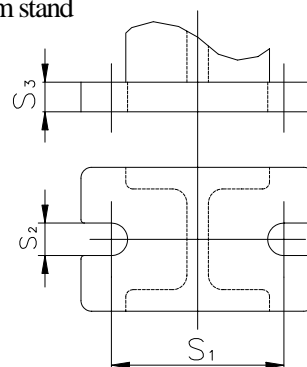
Nominal 15-50mm(1/2"-2")

Bottom stand



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

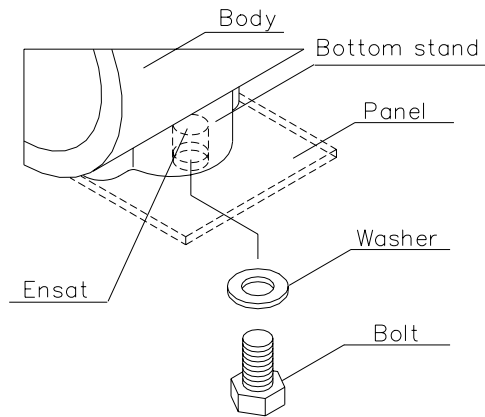
Bottom stand



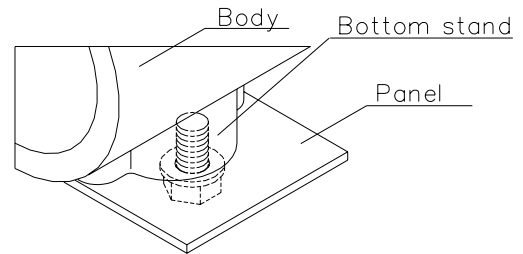
## ○ Fixation of bottom stand with panel

Nominal size: 15mm-50mm (1/2"-2")

Before the fixation

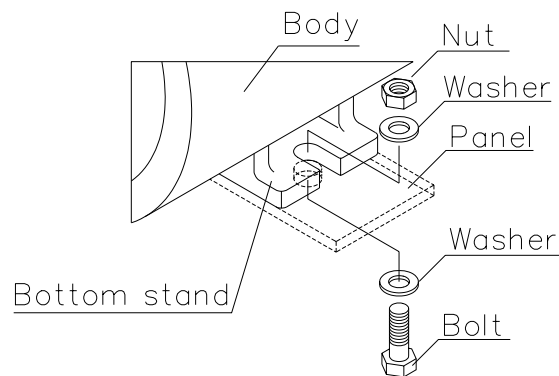


After the fixation

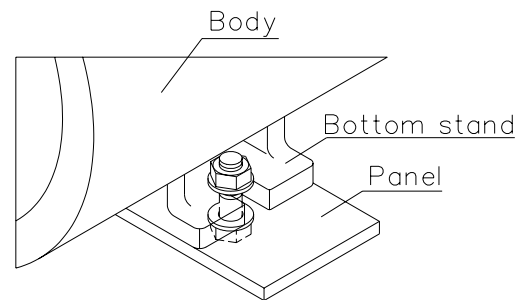


Nominal size: 65mm-100mm (2 1/2"-4")

Before the fixation



After the fixation



## (10) Inspection items

○Inspect the following items.

(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.

## (11) Troubleshooting

Problem	Cause	Treatment
Fluid leaks from the valve even when the valve is closed fully.	The carrier is loosened.	Adjust the face pressure between the ball and the seat. (Refer to page 9)
	The seat is scratched or worn.	Replace the seat with a new one.
	Foreign matter is in the valve.	Clean up.
	The ball is scratched or worn.	Replace the scratched ball with a new one.
Fluid leaks from the valve.	The union nut is loosened.	Tighten up the union nut.
	The carrier is loosened.	Adjust the face pressure between the ball and the seat. (Refer to page 9)
	The O-ring is scratched or worn.	Replace the O-ring with a new one.
The handle can not be turned smoothly.	Foreign matter is in the valve.	Clean up.
	Deformation. (By heat etc.)	Replace the parts.
The handle fails to engage.	The stem is broken.	Replace the stem with a new one.
	The engagement between the stem and the ball is broken.	Replace the stem and ball with new ones.

## (12) Handling of residual and waste materials



Caution

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

**(13) Inquiries****ASAHI ORGANIC CHEMICALS INDUSTRY CO., LTD.**

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**Distributor**

## Ball Valves Type 21



ASAHI AV VALVES

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