

Ball Valve Type 21・21α 15~100mm

User's Manual



Thank you for choosing our product.
This instruction manual contains important information for safe use of our product, so please be sure to read it before handling the product.
After reading this manual, please be sure to keep it in a place where the user can see it at any time.

ASAHI YUKIZAI CORPORATION

-SAFETY PRECAUTIONS-

This instruction manual is written on the assumption that the person who handles our products has a basic knowledge of our products, electrical equipment, machinery, control, etc., and it contains technical terms depending on the handling contents.

Please read this manual carefully and fully understand the contents and observe the safety precautions for proper use.

In this manual, the warning, caution, prohibition, and enforcement are categorized together with the symbol to inform the situation and scale of human injury or property damage.

Failure to observe this precaution may result in unexpected failure or damage. Be sure to observe this precaution.

<WARNING/CAUTION indications>

 Warning	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

<Prohibited/Forced display>

 Prohibition	In the handling of the product, it is prohibited to do it in "Do not do it".
 Forcing	In the handling of the product, it is forced by "contents to be carried out without fail".

Table of contents

1. Our product warranty coverage	4
Applicable to	4
Warranty Period.....	4
Guaranteed range.....	4
Disclaimer.....	4
2. Safety Instructions	5
Unpacking, Conveyance and Storage	5
Product Handling.....	6
3. Name of each part	8
4. Product Specifications	10
Model number table.....	10
Valve	10
Relationship between maximum allowable pressure and temperature	11
Specification of limit switch (option)	13
5. Piping method	14
Flanged type.....	14
Threaded type	17
Socket type (adhesive).....	19
Socket type, spigot type (fusing)	21
Limit switch wiring method	23
Installation Procedure of the Locking Device.....	25
6. How to mount actuator, entertainment and frame (panel)	26
7. How to operate	28
8. How to adjust the surface pressure of the ball and seat	29
9. Disassembling method for parts replacement	30
10. Inspection item	32
Daily inspection	33
Periodic inspection.....	34
11. Cause of malfunction and remedy	35
12. Disposal method of residual materials and waste materials	37
Contact	38

1. Our product warranty coverage

Unless otherwise stated in the Contract or Specifications, etc., the warranty for the piping material products (hereinafter referred to as "applicable products") such as valves manufactured or sold by us is as follows.

Applicable to

This warranty applies only when the product is used in Japan. If you intend to use the product overseas, please contact us.

Warranty Period

The warranty period is one year after delivery.

Guaranteed range

In the event of failure or malfunction due to our responsibility during the above warranty period, we will replace or repair the product with a substitute free of charge.

Provided, however, that even within the warranty period, the warranty shall not apply to any of the following cases (charged service).

- ▶ When the storage, operating conditions, precautions, etc. described in the specifications, instruction manual, etc. are not adhered to in the construction, installation, handling, maintenance, etc.
- ▶ Defects, such as the design of the customer's equipment or software, caused by other than the target product.
- ▶ The fault is due to modification or secondary processing of the product by something other than us.
- ▶ In the case of a failure which can be deemed to have been avoided if the periodic inspection described in the instruction manual, etc. or the maintenance or replacement of consumable parts has been performed normally.
- ▶ The component is used for purposes other than the product's intended use.
- ▶ Failure or malfunction due to causes that could not be foreseen by our level of science and technology at the time of shipment.
- ▶ The fault is due to an external factor that is not our responsibility, such as natural disaster or disaster.

Disclaimer

- ▶ The warranty will not cover secondary damage (damage to equipment, loss of opportunity, loss of profit, etc.) or any other damage caused by the failure of our product.
- ▶ Although we strive to improve the quality and reliability of our products, we do not guarantee their integrity. Especially when using this product for equipment that may infringe human life, body or property, take appropriate safety design measures, etc., with full consideration of problems that may normally occur. We assume no responsibility for such use if we have not obtained our consent in advance in writing of specifications, etc.
- ▶ Please observe the product specifications and precautions when using our products. We shall not assume any responsibility for any damage to the customer caused by the customer's negligence. However, this does not apply to damage caused by a defect in our product.

2. Safety Instructions

Unpacking, Conveyance and Storage

 Warning	
 Prohibition	Serious injuries are possible. ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

 Caution	
 Prohibition	The valve can be damaged, or leak. ▶ Do not subject the product to impact by throwing, dropping or hitting. ▶ Do not scratch or pierce the product with a sharp object such as a knife or hand hook. ▶ Do not pile up cardboard boxes forcefully to prevent the load from collapsing. ▶ Avoid contact with coal tar, creosote (a wood preservative), white pesticides, insecticides, paints, etc.
 Forcing	The valve can be damaged, or leak. ▶ Keep in cardboard until just before piping, and store indoors (at room temperature) away from direct sunlight. Also, avoid storing the product in places of high temperature. (The strength of cardboard packaging decreases when it gets wet. Be very careful when storing and handling it.) ▶ After unpacking, make sure that the product is correct and that it meets the specifications.

Product Handling

 Warning	
 Forcing	The valve can be damaged, or leak. ▶ If positive pressure gas is used for our resin piping material, a dangerous condition may occur due to the repulsive force peculiar to compressible fluids even if the pressure is the same as the water pressure. Therefore, be sure to take safety measures for the surrounding area, such as covering the piping with protective materials. If you have any questions, please contact us separately. ▶ This valve is structurally dead space. Vaporizing fluids such as hydrogen hydroxide (H₂O₂) and soda hypochlorite (NaClO) may vaporize in the dead space and cause an abnormal pressure rise inside the valve. Be very careful. (Gas with abnormal pressure increase due to vaporization is a compressible fluid. Therefore, if a valve should break, fragments will scatter explosively, which is very dangerous.) ▶ When conducting a pipe leak test after completion of piping construction, be sure to check with water pressure. Contact us in advance if you are unavoidable to test with a gas.

 Caution	
 Prohibition	The valve can be damaged, or leak. ▶ Do not step on the valve or place heavy objects on it. ▶ Keep away from fire and hot objects. ▶ Do not use the product in places where it may be submerged. ▶ Do not subject the valve to large vibrations.
 Forcing	There is a danger of injury. ▶ Secure sufficient space for maintenance and inspection when piping. The valve can be damaged, or leak. ▶ Pay attention to the atmosphere where the valve is installed. Avoid locations where the product is exposed to sea breezes, corrosive gases, chemical liquids, sea water, steam, etc. ▶ Keep the pressure and temperature of the fluid within the allowable range. (The maximum allowable pressure includes water hammer pressure.) ▶ Use a valve of suitable material for the operating conditions. (Depending on the type of chemical liquid, the parts may be damaged. Contact us in advance for details.) ▶ Use fluids containing crystalline material under conditions that do not recrystallize. ▶ Avoid any place where the valve is constantly exposed to splashes of water and dust, or direct sunlight, or protect the valve with a cover or the like to cover the entire area

Caution

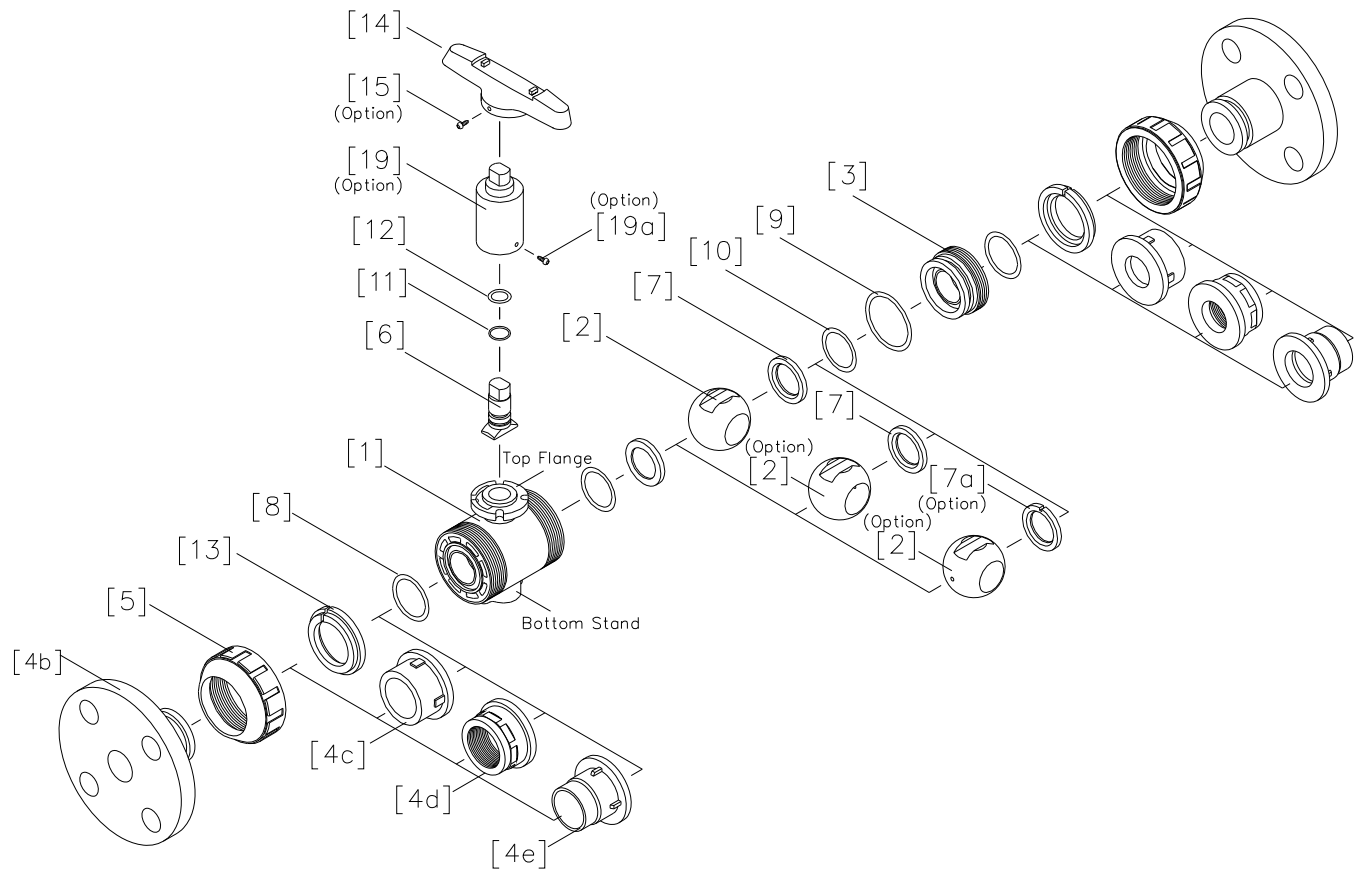


Forcing

- ▶ Perform maintenance on a regular basis referring to "10. Inspection items." Pay particular attention to temperature changes and aging during long-term storage or shutdown or use.
- ▶ When installing a valve, provide an appropriate valve support so that excessive force is not applied to the valve and piping.
- ▶ Always use the product within the indicated product specifications.
- ▶ If the valve is used at an intermediate position, the mark of the ball opening will remain on the seat (**PTFE**), and sealing performance may temporarily deteriorate when the valve is fully closed. Therefore, it is recommended to use the valve fully open or closed.
- ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection.
- ▶ Keep the ambient temperature of the installation location within -10 to 50° C.
- ▶ Avoid locations with volatile gases or poor atmospheres. Provide a cover, etc., to cover the entire area.

3. Name of each part

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

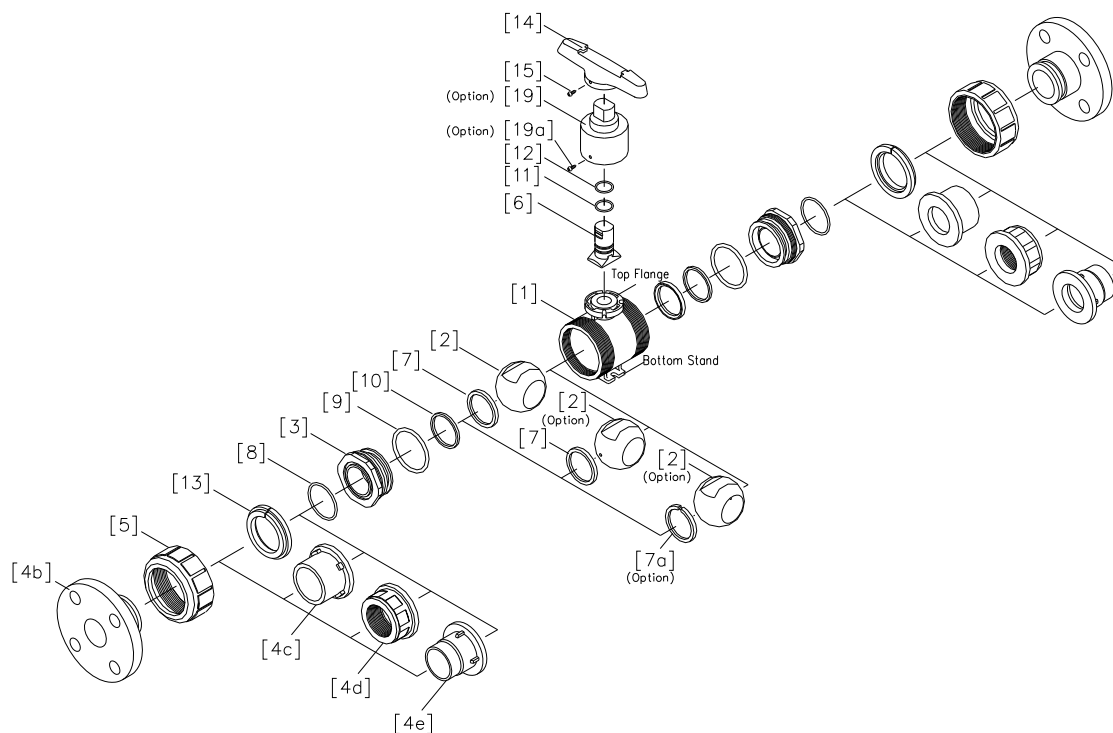


No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body ^{*1)}	[6]	Stem ^{*1)}	[13]	Stop ring
[2]	Ball ^{*1)} /Vented Ball ^{*1)}	[7]	Seat ^{*1)}	[14]	Handle
[3]	Carrier ^{*1)}	[7a]	Seat (A) ^{*1)}	[15]	Tapping screw (A)
[4b]	End connector (Flanged End)	[8]	O-ring (A)	[19]	Extension stem
[4c]	End connector (Socket End)	[9]	O-ring (B) ^{*2)}	[19a]	Tapping screw (B)
[4d]	End connector (Threaded End)	[10]	O-ring (C) ^{*2)}		
[4e]	End connector (Spigot End) *	[11]	O-ring (D)		
[5]	Union nut	[12]	O-ring (E)		

^{*1)} Type21 and 21 α have not all same parts to make one complete.

^{*2)} Type21 and 21 α type are partially incompatible. Please contact us for details.

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



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[6]	Stem	[13]	Stop ring
[2]	Ball / Vented Ball	[7]	Seat	[14]	Handle
[3]	Carrier	[7a]	Seat (A)	[15]	Tapping screw (A)
[4b]	End connector (Flanged End)	[8]	O-ring (A)	[19]	Extension stem
[4c]	End connector (Socket End)	[9]	O-ring (B)	[19a]	Tapping screw (B)
[4d]	End connector (Threaded End)	[10]	Cushion		
[4e]	End connector (Spigot End)	[11]	O-ring (D)		
[5]	Union nut	[12]	O-ring (E)		

4. Product Specifications

Model number table

ACTUATION	TYPE	OPERATING SYSTEM	BODY MATERIAL	SEAL MATERIAL	CONNECTION	STANDARD	SIZE	HIGH PURITY SERIES
V	* *	L V	*	*	*	*	* * *	*
V MANUAL VALVE	21 TYPE 21 2A TYPE 21α	LV LEVER TYPE	U PVC C C-PVC P PP F PVDF	E EPDM V FKM	S SOCKET N THREADED P SPIGOT F FLANGED	J JIS D DIN A ANSI 1 JIS 10K 5 JIS 5K	015 15mm 020 20mm 025 25mm 032 32mm 040 40mm 050 50mm 065 65mm 080 80mm 100 100mm	BLANK NON 1 LUBRICANTFREE

- NOTE**
- Nominal size 10 mm is DIN standard only.
 - We do not manufacture JIS standard C-PVC threaded type 13 mm.
 - The PP/PVDF socket type is a welding type. However, JIS standard PP 32mm socket type is not manufactured.
 - There is no JIS standard for PVDF socket type.

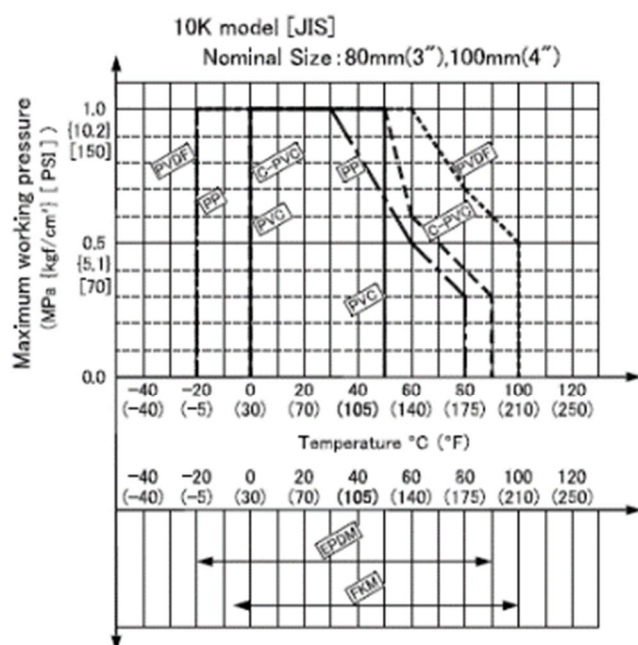
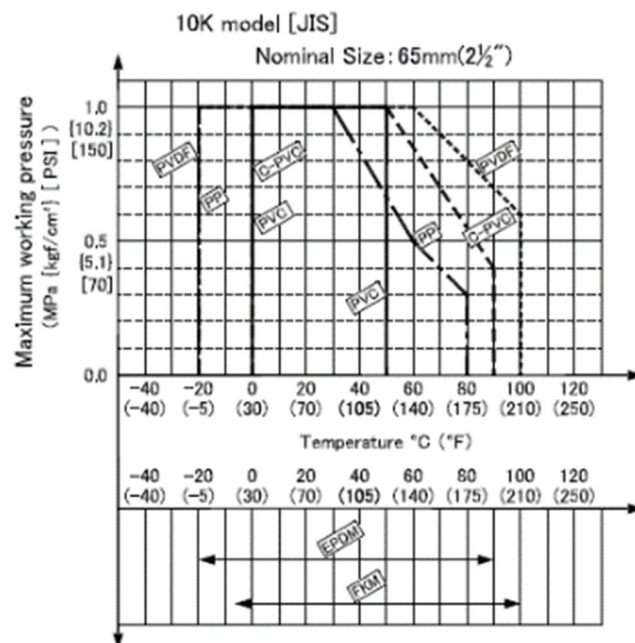
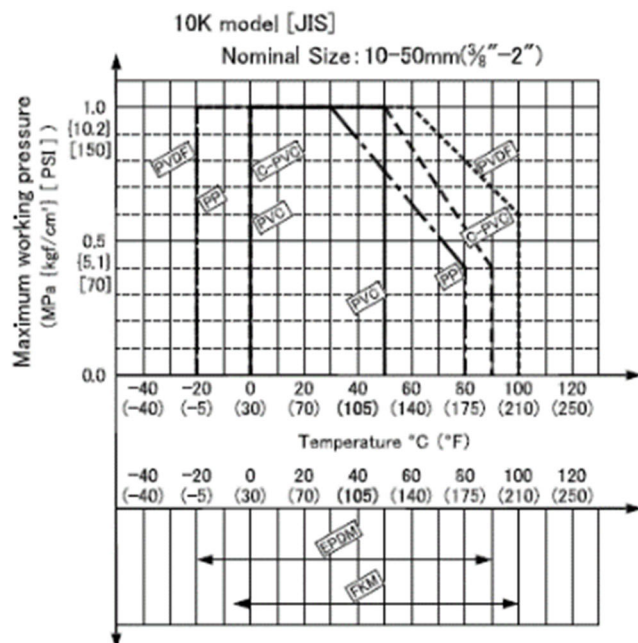
Valve

BODY MATERIAL	U-PVC	C-PVC	PP	PVDF
SIZE	TYPE 21 α		TYPE 21	
15~50mm				
65~100mm				

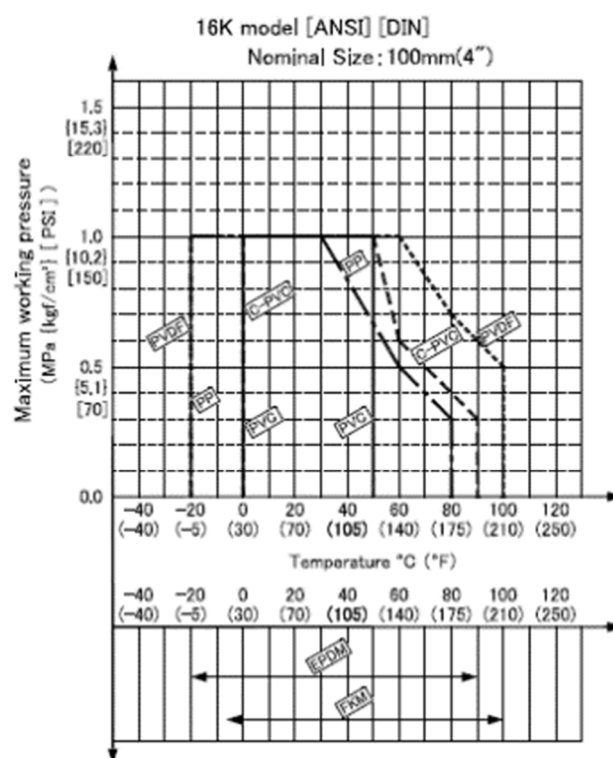
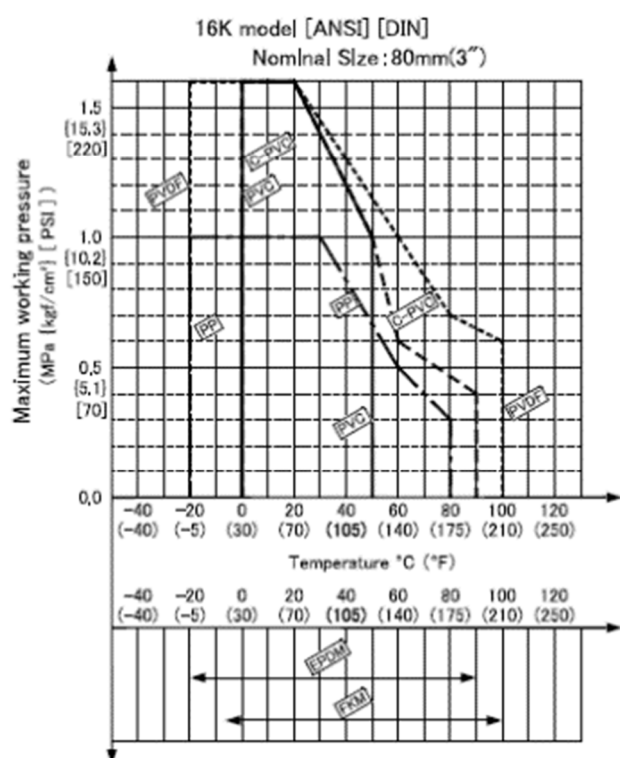
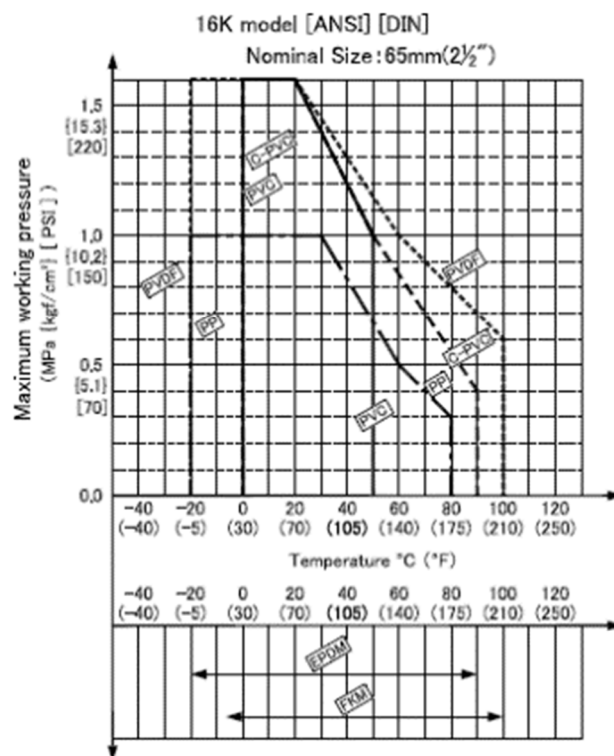
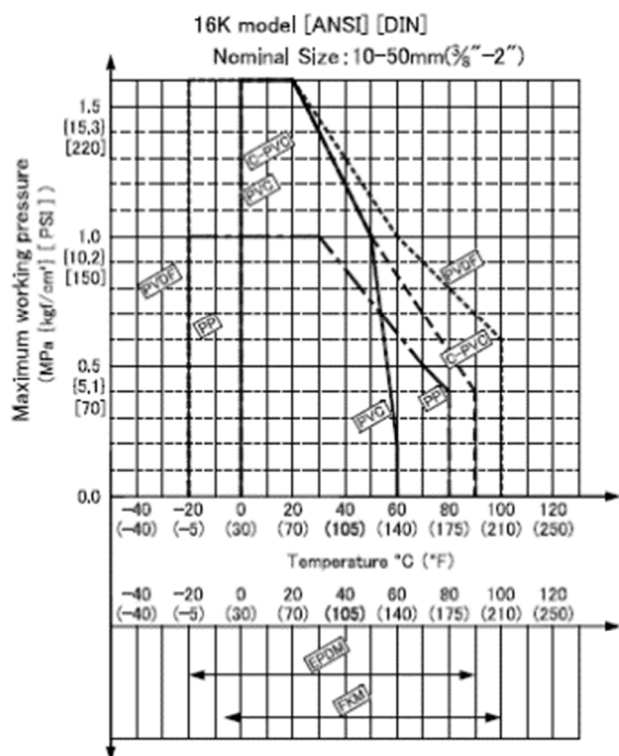
*Models are classified by nominal diameter and material.

Relationship between maximum allowable pressure and temperature

[When the connection standard is JIS]



[When the connection standard is ANSI and DIN]

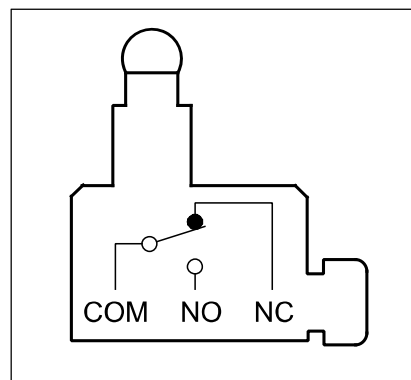


Specification of limit switch (option)

Nominal Size	Type Code	Switch Contact	Protection Grade
15 - 100mm (1/2" - 4")	SL1-A	Silver Contact	IP67
	SL1-AK	Gold Contact (Micro load)	

Limit Switch Rating

Type Code	Rate Voltage (V)	Resistive Load (A)	Inductive Load (A)
SL1-A	AC125	5	3
	AC250	5	3
	DC8	5	3
	DC14	5	3
	DC30	5	3
	DC115	0.5	0.1
	DC230	0.25	0.05
SL1-AK	AC115	0.1	-
	DC8	0.1	-
	DC14	0.1	-
	DC30	0.1	-

Connection Diagram


Valve full open (or close); COM and NC connected

5. Piping method

Flanged type

 Warning	
 Prohibition	Serious injury can result. ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

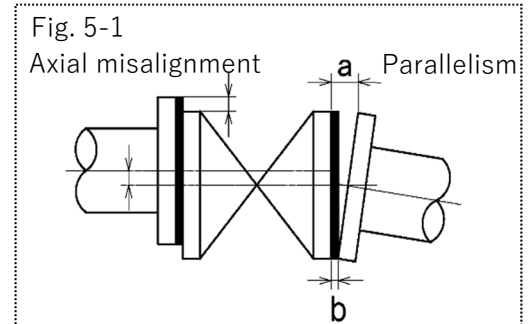
 Caution	
 Prohibition	The valve can be damaged, or leak. ▶ Do not overtighten the cap nut. ▶ Do not use a pipe wrench to tighten the cap nut. ▶ Do not tighten the bolts and nuts for piping to the specified torque values in Table 5-2.
 Forcing	There is a danger of injury. ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. The valve can be damaged, or leak. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the body cap during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side). ▶ When connecting to metal piping, do not apply piping stress to the valve. ▶ Use a connection flange with a full-face seat. ▶ Check that there is no difference in mutual flange standards. ▶ Be sure to use a sealing gasket (AV packing) between the flanges and tighten the pipe bolts/nuts to the specified torque values in Table 5-2 "Flange tightening torque." (When other than AV packing, the tightening torque value will change.) ▶ Keep the axis misalignment and parallelism of the flange surface below the values shown in Table 5-1 "Axis misalignment and parallelism." ▶ Tighten the bolts and nuts for piping diagonally with the specified torque values in Table 5-2.

Forcing	Safe use. ▶ When installing the valve at the end of the pipe, pay attention to the flow direction. (Check the ◀ mark on the body of the union side. The union part of the secondary side (downstream side) is integrated with the body, so if it is installed at the end of the pipe, it will be safer to use.) The diagram illustrates the correct installation of the ball valve at the end of a pipe. It shows the 'Body' of the valve, a 'Union Nut', and an 'End connector'. A 'Designation (Carrier side)' is indicated on the right. A large arrow points to the left, indicating the flow direction. A small black triangle (◀) is shown on the body of the union side, pointing towards the flow direction.
---	---

Preparations	▶ Torque wrench ▶ spanner or ophthalmic wrench ▶ belt wrench
	▶ Pipe head bolts/nuts, washers ▶ and AV packing ▶ cloth

[Procedure]

- 1) Clean mutual flange surfaces with a waste cloth.
- 2) Set AV packing between the flanges.
- 3) Insert the washer and bolt from the connecting flange side, insert the washer and nut from the valve side, and tighten temporarily by hand.
- 4) Set the axis misalignment and parallelism of the flange surface below the values shown in Table 5-1, "Axis misalignment and parallelism." (See Fig. 5-1.)



Unit: mm {inch}

- 5) Using a torque wrench, gradually tighten the screws diagonally to "Table 5-2 Flange Tightening Specified Torque Values". (See Fig. 5-2.)
- 6) Tighten it more than two turns clockwise with "Table 5-2 Flange Tightening Torque Specified Values" (See Fig. 5-2.)

Nominal Size	Axial Misalignment	Parallelism (a-b)
15-32mm (1/2"-1 1/4")	1.0 {0.04}	0.5 {0.02}
40-80mm (1 1/2"-3")	1.0 {0.04}	0.8 {0.03}
100mm (4")	1.0 {0.04}	1.0 {0.04}

- 7) When it is necessary to loosen or remove the cap nut for construction reasons, follow the procedure below to tighten the cap nut.

- 7-1) Make sure that the O-ring (A) is installed in the body correctly.
- 7-2) Bring the body cap and cap nut into contact with the body side so that the O-ring (A) does not come off.
- 7-3) Tighten the cap nut by hand until it is tight.
- 7-4) Screw in the cap nut by 1/4 to 1/2 turn with a belt wrench to prevent damage to the cap nut.

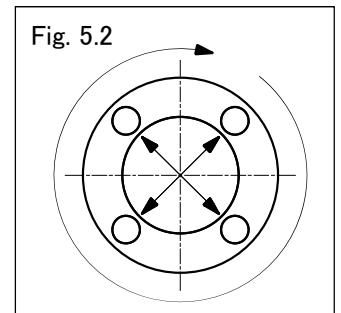
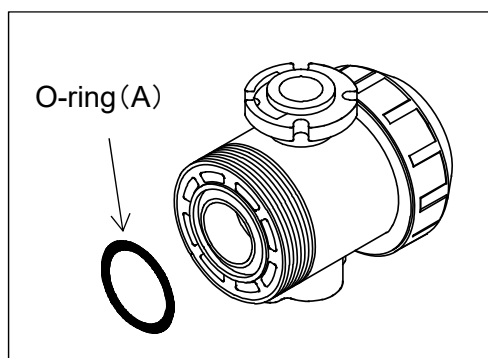


Table 5-2 Flange tightening specified torque value

Unit: N·m {kgf·cm} [lb·inch]

AV gasket material	15-20mm(1/2"-3/4")	25-40mm(1"-1 1/2")	50, 65 mm(2", 2 1/2")	80, 100 mm(3", 4")
PTFE coated PVDF coated	17.5 {179} [155]	20.0 {204} [177]	22.5 {230} [230]	30.0 {306} [266]
Rubber	8.0 {82} [71]	20.0 {204} [177]	22.5 {230} [230]	30.0 {306} [266]



Threaded type
 Warning

Prohibition
Serious injury can result.

- ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

 Caution

Prohibition
The valve can be damaged, or leak.

- ▶ Do not overtighten the screws at the joints.
- ▶ Do not overtighten the cap nut.
- ▶ Do not use a pipe wrench to tighten the cap nut.


Forcing
There is a danger of injury.

- ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.
- ▶ Wear appropriate protective equipment according to the type of work being performed.

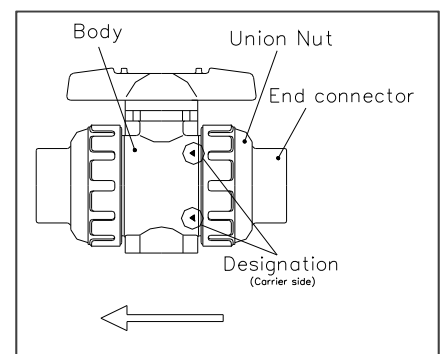
The valve can be damaged, or leak.

- ▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation.
- ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.
- ▶ Fix the body cap during piping work or disassembly and reassembly.
- ▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side).
- ▶ When connecting to metal piping, do not apply piping stress to the valve.
- ▶ Make sure that the screws at the joints are made of resin.
- ▶ Use sealing tape for the sealing material of the screw-in part. If liquid sealant or liquid gasket is used, stress cracking (environmental stress cracking) may occur.

-

Safe to use.

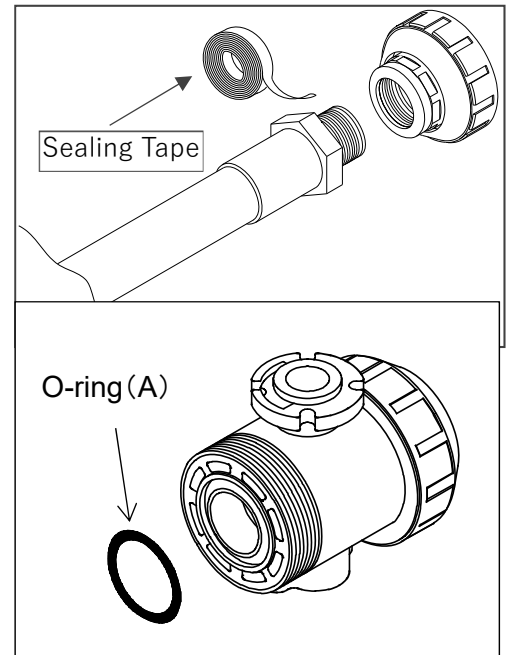
- ▶ When installing the valve at the end of the pipe, pay attention to the flow direction. (Check the ◀ mark on the body of the union side. The union part of the secondary side (downstream side) is integrated with the body, so if it is installed at the end of the pipe, it will be safer to use.)



Preparations : ▶ Sealing tape ▶ Belt wrench ▶ spanner or motor wrench

[Procedure]

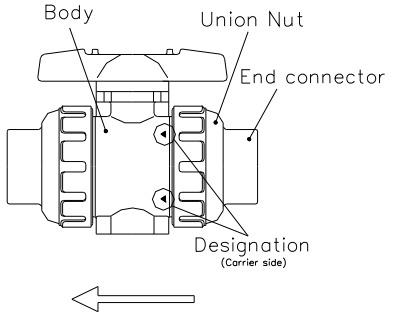
- 1) Wrap sealing tape around the male thread of the fitting, leaving approximately 3mm at the end.
- 2) Loosen the cap nut by hand.
- 3) Remove the cap nut and body cap from the body.
- 4) Tighten the male thread of the fitting and the body cap until tight.
- 5) Screw in with a wrench or a motor wrench 1/2 to 1 turn to prevent
- 6) Check that the O-ring (A) is correctly installed in the body.
- 7) Bring the body cap and cap nut into contact with the body side so that the O-ring (A) does not come off.
- 8) Tighten the cap nut by hand until it is tight.
- 9) Screw in the cap nut by 1/4 to 1/2 turn with a belt wrench to prevent damage to the nut.



Socket type (adhesive)

 Warning	
 Prohibition	Serious injury can result. ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load. Fire or an explosion can result. ▶ Ensure adequate ventilation when using adhesives and do not use open flames in the surroundings.

 Caution	
 Prohibition	There is a danger of injury. ▶ The adhesive contains volatile solvents, so do not inhale odors directly. The valve can be damaged, or leak. ▶ Do not apply too much adhesive. Excessive adhesive will flow into the valve. ▶ Do not strike the pipe when inserting it into the body cap. ▶ Do not overtighten the cap nut. ▶ Do not use a pipe wrench to tighten the cap nut.
 Forcing	There is a danger of injury. ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. ▶ If the adhesive adheres to the skin, remove it immediately. ▶ If you feel worse or feel unusual when using the adhesive, promptly seek a doctor's diagnosis and take appropriate action. The valve can be damaged, or leak. ▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the body cap during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side). ▶ Be careful when constructing under low temperature, as solvent vapor is less likely to evaporate and tends to remain. ▶ After piping, open both ends of the pipe and use a blower (low-pressure type) to ventilate to remove the solvent vapor. ▶ Use "ASAHI AV adhesive" depending on the material.

 Forcing	The valve can be damaged, or leak. ▶ Perform the water flow test after 24 hours or more have elapsed after completion of bonding.
-	Safe to use. ▶ When installing the valve at the end of the pipe, pay attention to the flow direction.(Check the ◀ mark on the body of the union side. The union part of the secondary side (downstream side) is integrated with the body, so if it is installed at the end of the pipe, it will be safer to use.) 

Preparations	▶ ASAHI AV adhesive ▶ belt wrench ▶ cloth
--------------	---

[Procedure]

- 1) Loosen the cap nut by hand.
- 2) Remove the cap nut and body cap from the body.
- 3) Pass the cap nut to the pipe side.
- 4) Wipe off the insertion part of the pipe and the socket part of the body cap with a waste cloth.
- 5) Refer to "Table 5-3 Adhesive Consumption (Reference)" and apply adhesive evenly in the order of the socket part of the body cap and the pipe insertion part.
- 6) After applying the adhesive, quickly insert the pipe into the body cap and hold it as is for at least 60 seconds.
- 7) Wipe off any excess adhesive with a waste cloth.
- 8) Check that the O-ring (A) is correctly installed in the body.
- 9) Bring the body cap into contact with the body so that the O-ring (A) does not come off.
- 10) Tighten the cap nut by hand until it is tight.
- 11) Screw in the cap nut by 1/4 to 1/2 turn with a belt wrench to prevent damage to the nut.

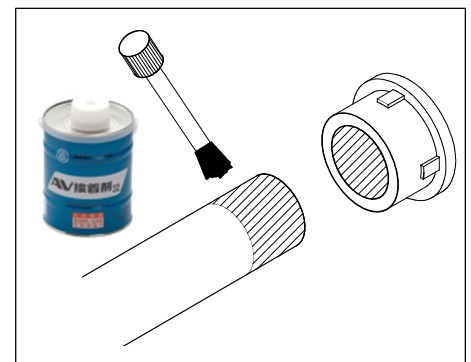
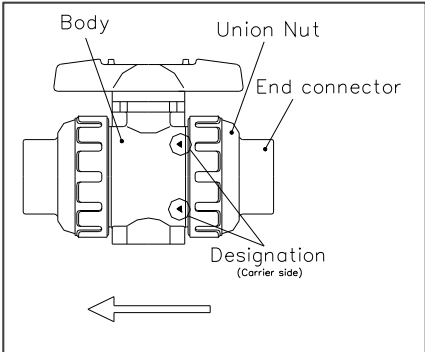


Table 5-3 Adhesive quantity (guideline)

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

Socket type, spigot type (fusing)

 Warning	
 Prohibition	Serious injury can result. ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

 Caution	
 Prohibition	The valve can be damaged, or leak. ▶ Do not overtighten the cap nut. ▶ Do not use a pipe wrench to tighten the cap nut.
 Forcing	There is a danger of injury. ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. The valve can be damaged, or leak. ▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the body cap during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side).
-	Safe to use. ▶ When installing the valve at the end of the pipe, pay attention to the flow direction. (Check the ◀ mark on the body of the union side. The union part of the secondary side (downstream side) is integrated with the body, so if it is installed at the end of the pipe, it will be safer to use.) 

Preparations	▶ Belt wrench ▶ Fusing machine ▶ Fusing machine Operation Manual
--------------	--

[Procedure]

- 1) Loosen the cap nut by hand.
- 2) Remove the cap nut and body cap from the body.
- 3) Pass the cap nut to the pipe side.
- 4) From here, refer to the instruction manual of the fusing machine for fusing.
- 5) Check that the O-ring (A) is correctly installed in the body.
- 6) Bring the body cap into contact with the body so that the O-ring (A) does not come off.
- 7) Tighten the cap nut by hand until it is tight.
- 8) Screw in the cap nut by 1/4 to 1/2 turn with a belt wrench to prevent damage to the nut.

Limit switch wiring method

 Warning	
 Prohibition	Serious injury can result. ► Do not connect or separate lines to the limit switch in the power supply status. (Electric shock or sudden start of opportunity)

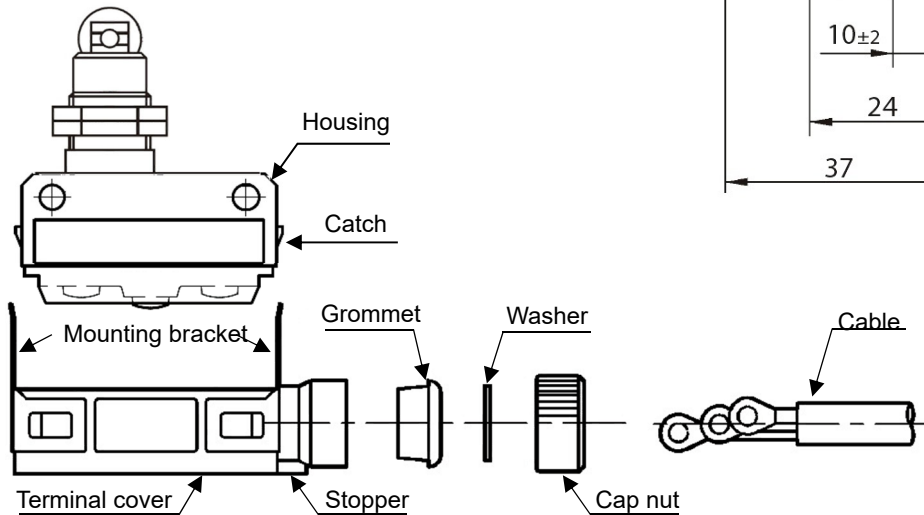
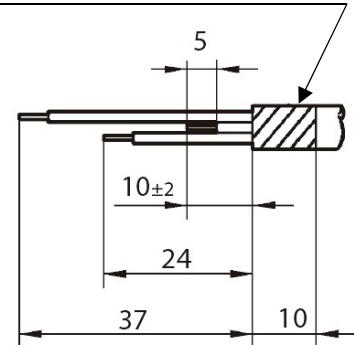
 Caution	
 Prohibition	Doing so may cause a malfunction. ► Do not leave or use with the cover open. (Water, dust, etc. may penetrate and cause operation failure.)
 Forcing	Otherwise failure or malfunction can result. ► Connect the wires using solderless terminals with insulation covering so that they do not come into contact with the cover or housing. (If the crimp terminal comes into contact with the cover, the cover may not be tightened or a ground fault may occur.) ► Securely attach the cover. (Rainwater, etc. may enter the product and cause malfunction.)

Necessary items	▶ Phillips head screw driver	▶ Flathead screw driver	▶ Connector (G1/2)
	▶ Wire stripper	▶ Terminal crimping tool	

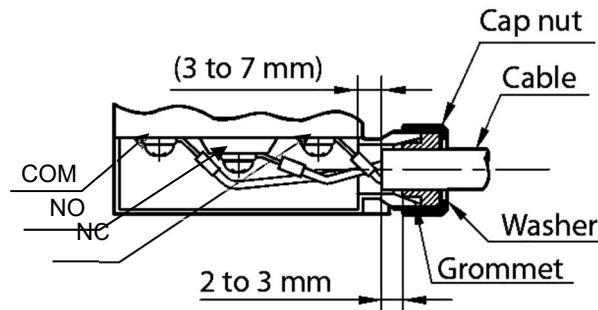
Procedure

- 1) Cut and strip wires as shown figure right.
- 2) Attach M3 ring crimp terminals with insulating sleeves.
(If bare crimp terminals are used, a short circuit may occur.)
- 3) Remove the terminal cover from the housing by using a flathead sc
- 4) Draw a cable through each part as shown in the figure below.

Grommet contact area
(Take care not to damage the surface.)



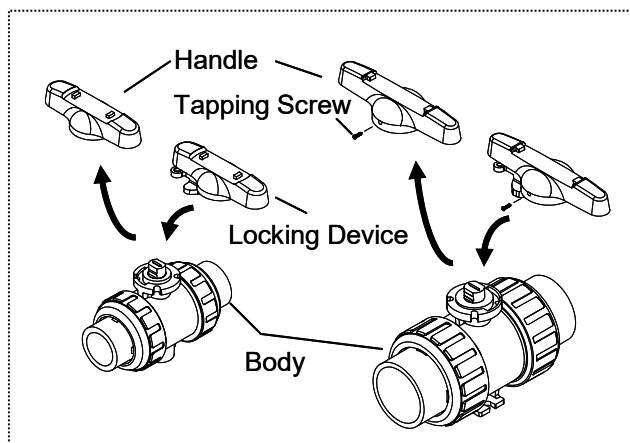
- 5) Connect the crimp style terminal to the terminal board with a phillips head screw driver.



- 6) Attach the terminal cover to the housing.
- 7) Set the seal and washer, and tighten the nut to the terminal cover.

Installation Procedure of the Locking Device

The handle lock can be done by full-open (close). Refer to the User's manual for Locking Device (Option).



The location hole for the lock is already installed in the handle. (Table 1)

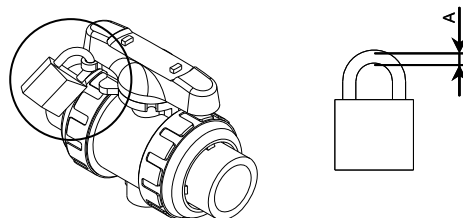


Table 1 <Size of Key>

Nominal Size mm (inch)	A mm (inch)
15-25 ($1\frac{1}{2}$ -1")	5 (0.20")
32-50 ($1\frac{1}{4}$ -2")	6 (0.24")
65-100 ($2\frac{1}{2}$ -4")	7 (0.28")

6. How to mount actuator, entertainment and frame (panel)

⚠ Caution



Forcing

The valve can be damaged, or leak.

- ▶ Install it vertically when screwing in the enterttto.
- ▶ For detailed handling of the special tool for installation of the entertainment, refer to the instruction manual of the entertainment manufacturer separately.

How to attach the actuator, Ensats, and frame (panel) (continued)

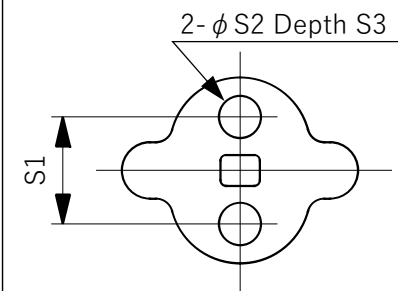
[Procedure]

Refer to the instruction manual of the Ensats (commercially available).

Bottom Stand and Ensats Dimensions

Nominal size	Bottom Stand		
	S1	S2	S3
15mm	19	7.3	11
20mm	19	7.3	11
25mm	19	7.3	11
32mm	30	9	15
40mm	30	9	15
50mm	30	9	15
65mm	48	9	6
80mm	55	11	7
100mm	65	11	8

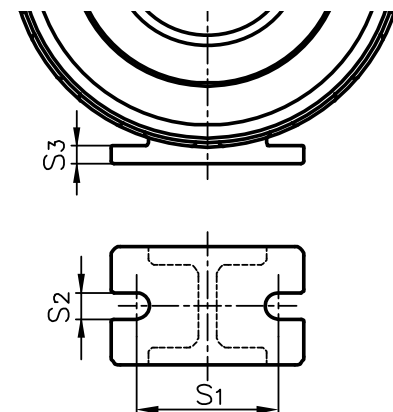
DN 15~50 mm Bottom Stand



Nominal size	Ensats		
	Nominal thread	Length	Material
15mm	M5	10	Brass (CuZn39Pb3)
20mm	M5	10	
25mm	M5	10	
32mm	M6	14	
40mm	M6	14	
50mm	M6	14	
65mm	—	—	—
80mm	—	—	—
100mm	—	—	—

Ensats Manufacturer: KKV. Corporation

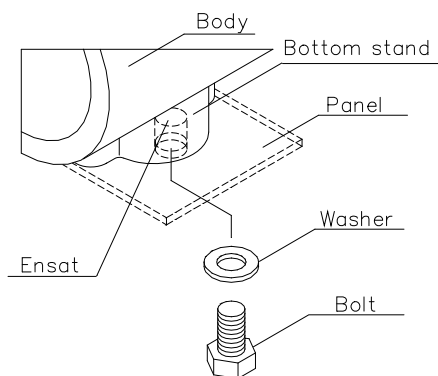
DN 65~100 mm Bottom Stand



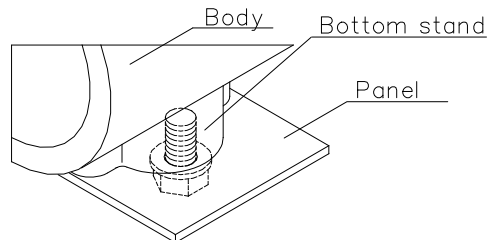
► Fastening the Bottom Stand to the Panel

DN (15~50 mm)

-Before fixation-

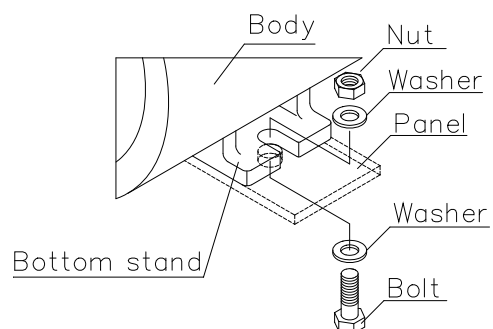


-After fixing-

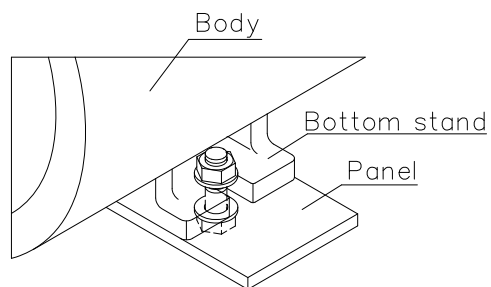


DN (65~100 mm)

-Before fixation-



-After fixing-



7. How to operate

▶ Valve opening and closing operations

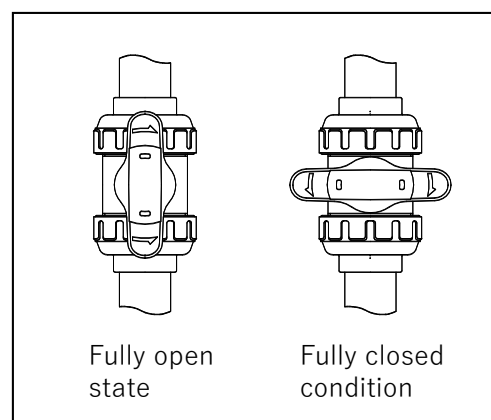
 Caution	
 Prohibition	Damage may occur. ▶ When fully closing or opening the valve, do not turn the handle unnecessarily with excessive force. ▶ Do not open/close the product with dust or other foreign matter mixed in the fluid.
 Forcing	Doing so may cause a malfunction. ▶ Even after the valve is installed, foreign matter such as sand may remain in the pipeline. Clean the inside of the pipe before opening or closing the valve. ▶ Handle operation must be done by hand. (Use of an instrument, etc. may cause damage.) ▶ Be sure to pass water before opening/closing the oil-prohibited parts.

▶ Rotate the handle gently to open/close the camera.

(Turn clockwise/clockwise to close and counterclockwise/counterclockwise to open.)

Fully closed: The position of the handle is perpendicular to the tube axis.

Full open: The handle position is parallel to the tube axis direction.



8. How to adjust the surface pressure of the ball and seat

⚠ Caution

 Prohibition	Damage may occur. ▶ Do not over tighten the cap nut. ▶ Do not open/close the product with dust or other foreign matter mixed in the fluid.
 Forcing	There is a danger of injury. ▶ Some fluid remains in the body. Wear protective gloves and goggles.

Preparations	▶ Belt Wrench	▶ Protective goggles
	▶ Protective gloves	▶ Phillips screwdriver (only for nominal diameter 65~100mm)

[Procedure]

- 1) Completely drain the fluid in the piping.
- 2) Turn valve fully closed.
- 3) Loosen the right and left cap nuts [5] with a belt wrench.
- 4) Remove the body from the piping.
- 5) Pull the handle [14] off the body.

For nominal diameter 65~100mm, use a Phillips screwdriver.

Loosen the tapping screw [15] completely before proceeding.

- 6) Mate the convex part on the upper part of the handle with the concave part of the union [3].

Toward the trademark (AV Mark) for nominal diameter 15~50mm

Only the right union [3] is adjustable.

If the nominal diameter is 65~100mm, adjust both sides.

- 7) Turn union [3] clockwise or counterclockwise for adjustment.

- Direction to loosen the union

Ball Valve 21: Counterclockwise

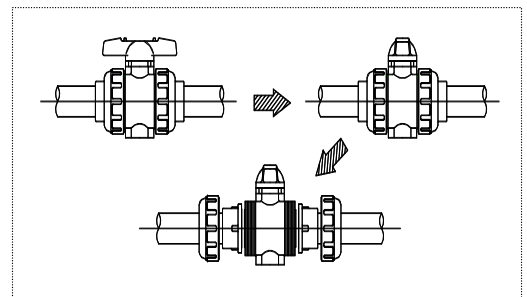
Ball Valve 21 α Type •••Clockwise

- Direction for tightening the union

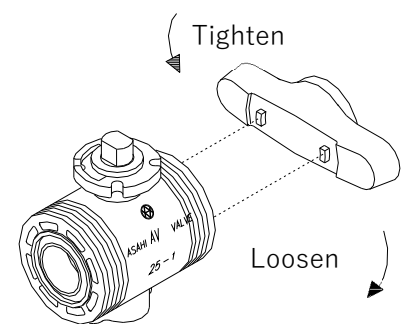
Ball Valve 21: Clockwise

Ball Valve 21 α Type •••Counterclockwise

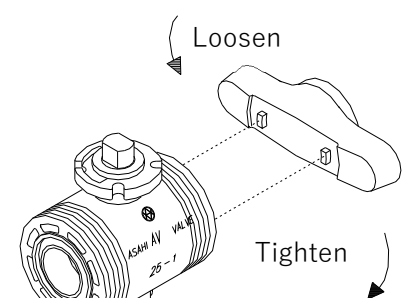
- 8) Check that the handle operation can be performed smoothly.
- 9) Replace it in the reverse order from 6).



Ball valve type 21



Ball valve 21 α type



9. Disassembling method for parts replacement

Warning

Forcing

There is a danger of injury.

- ▶ Be sure to perform safety inspections of the machine tool and power tool before starting operation.
- ▶ Wear appropriate protective equipment for the work details when installing piping.

Caution

Prohibition

Damage may occur.

- ▶ When replacing the valve or replacing parts, completely drain the fluid from the piping to reduce the fluid pressure to zero.
- ▶ Do not over tighten the cap nut.
- ▶ Do not use a pipe wrench when tightening the cap nut.

Forcing

Damage may occur.

- ▶ Fix the body cap during piping installation or disassembly and reassembly.
 - ▶ Be sure to confirm that the cap nut is fully tightened before the water flow test.
 - ▶ Tighten the cap nut paying attention to the shaft center misalignment and face-to-face dimension.
 - ▶ When connecting a resin valve to metal piping, be careful not to apply piping stress to the resin valve.
 - ▶ The ball valve 21 and 21 α types differ in some parts. Check the valve model when replacing parts.
- (Some parts: Body [1], Ball [2], Union [3], Stem [6], Sheet [7])

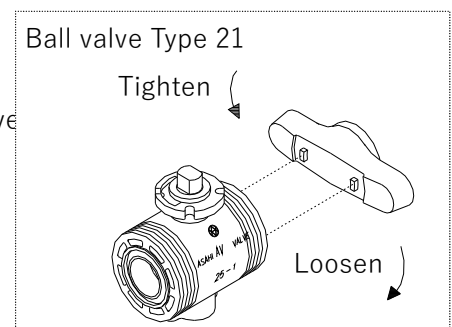
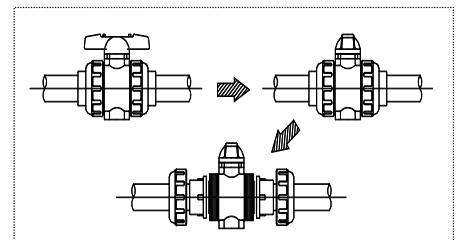
Preparations	▶ Belt Wrench	▶ Protective goggles
	▶ Protective gloves	▶ Phillips screwdriver (only for nominal diameter 65~100mm)

[Disassembly procedure]

- 1) Completely drain the fluid in the piping.
- 2) Turn valve fully closed.
- 3) Loosen the right and left cap nuts [5] with a belt wrench.
- 4) Remove the body from the piping.
- 5) Pull the handle [14] off the body.

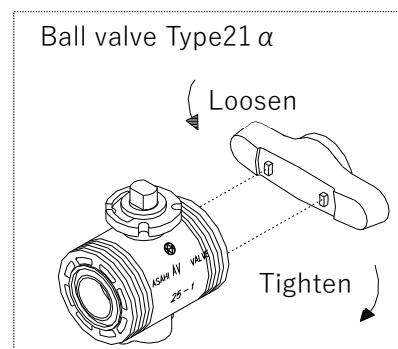
For nominal diameter 65~100mm, use a Phillips screwdriver.
Completely loosen the tapping screw [15] before removing it.

- 6) Mate the convex part on the upper part of the handle with the concave
Toward the trademark (AV Mark) for nominal diameter 15~50mm
Only the right union [3] is adjustable.
If the nominal diameter is 65~100mm, adjust both sides.



How to disassemble for parts replacement (continued)

- 7) Turn handle [14] with mated to remove union [3].
 - Direction to loosen the union
 Ball Valve Type21: Counterclockwise
 Ball Valve Type21 α : Clockwise
- 8) Remove the seat [7] by hand to avoid scratching.
- 9) Push out the ball [2] by hand.
- 10) Push the stem [6] out from the top flange side to the body side.



[Assembly Procedure]

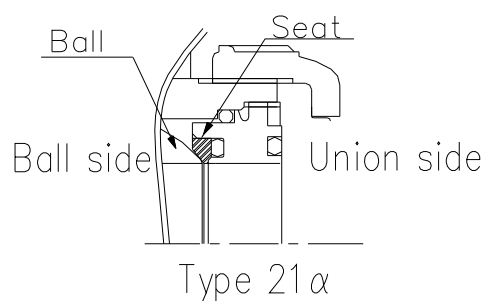
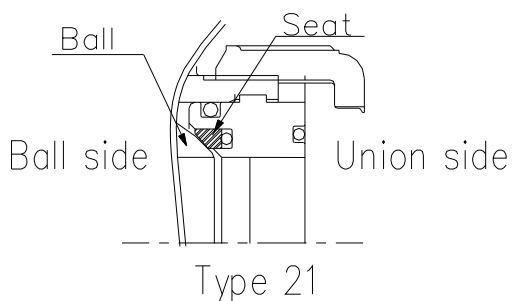
- 10) to reverse the procedure.

⚠ Caution

! Forcing

Damage may occur.

- ▶ Check the front and back sides of the sheet before attaching it.
 (Recessed side = Mated with ball)



10. Inspection item

 Caution**Forcing****Fluid may leak from the valve.**

- ▶ Maintenance should be performed every 3 to 6 months as a guide in order to keep the watch in normal condition and use it for a long time. Pay particular attention to temperature changes and aging during long-term storage or shutdown or use.
- ▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work.
- ▶ If any trouble is found, take the appropriate action referring to **"11. Causes and remedies for problems."**

Daily inspection

Inspection items and inspection methods	Guideline of judgment	Check point	Treatment method
External leakage (visual inspection)	No leakage	[Flange type] Pipe flange connection	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and re-tighten the pipe bolts. (Ref: 5. Piping method [Flange type])
		[Socket type] Adhesive construction section	Remove the valve from the piping and retry the bonding process. (Ref: 5. Piping method [Socket type])
		[Threaded type] Threaded connection	Remove the valve from the piping and screw the valve in again. (Ref: 5. Piping method [Threaded type])
		Top flange of the valve	Remove the valve from the piping and replace the valve or defective part. (Ref: 9. How to disassemble for parts replacement)
		Union nut portion of the valve	① Retighten the Union nut ② Remove the valve from the piping, check the O-ring and sealing surface, and replace the defective part. (Ref: 5. Piping method)
		Surface of the entire valve	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)
Internal leakage (visual and measurement)	No leakage	Leakage to secondary side when valve is fully closed	Remove the valve from the piping and replace the valve or defective part. (Ref: 9. How to disassemble for parts replacement)
		Measured values of flowmeters, pressure gauges, etc.	Remove the valve from the piping and replace the valve or defective part. (Ref: 9. How to disassemble for parts replacement)
Abnormal noise (hearing)	No abnormal noise	Valve	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2. Safety Precautions [Handling the Product])
Odor (sniffing)	No odor	Valve	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)

Periodic inspection

●Guideline for the inspection cycle: 3 months

Inspection items and inspection methods	Guideline of judgment	Check point	Remedy for failures
Vibration (palpation)	No different from other parts	Valve	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Precautions [Handling the Product])
		Piping around the valve	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Precautions [Handling the Product])

●Guideline of the inspection cycle: 6 months

Inspection items and inspection methods	Guideline of judgment	Check point	Remedy for failures
Operability of manual handle (touch)	Rotates smoothly	Manual operation unit	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)
Looseness of bolts (visual and palpation)	No Loose	[Flange type] For flange piping	Retighten the pipe bolts to the specified torque. (Ref: 5. Piping method [Flange type])
Corrosion or rust (visual inspection)	No corrosion	Appearance of the product	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)
Product damage	No scratches, cracks, or deformation	Appearance of the product	Remove the valve from the pipe and replace the valve. (Ref: 9. How to disassemble for parts replacement)

11. Cause of malfunction and remedy

Caution



Forcing

There is a danger of injury.

- ▶ If any malfunction is found, immediately stop using the product and take appropriate action.
- ▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work.

Failure phenomenon	Possible cause	Measures and measures
The handle does not turn (cannot turn) during manual operation.	The valve is already fully open (or fully closed).	Rotate the handle in the reverse direction (Ref: 7. Operation)
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement)
	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Precautions [Handling the Product])
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement)
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Precautions [Handling the Product])

Cause of malfunction and remedy (continued)

Failure phenomenon	Possible cause	Measures and measures
Fluid leaks even when fully closed (internal leak)	High fluid pressure	Use below the maximum allowable pressure (Ref: 9. How to disassemble for parts replacement)
	The Carrier is loose.	Remove the valve from the pipe and tighten the union to adjust the surface pressure. (Ref: 8. How to adjust the surface pressure of the ball and seat)
	Sheet or ball is worn or scratched	Remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement)
	Missing parts	Remove the valve from the piping and attach the relevant part or replace the valve. (Ref: 9. How to disassemble for parts replacement)
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement)
	Piping stress is applied to the valve.	Remove the piping stress

Cause of malfunction and remedy (continued)

Failure phenomenon	Possible cause	Measures and measures
Fluid leaks from valve (external leak)	Cap nut is loose	Retighten the cap nut (Ref: 5. Piping method)
	O-ring is scratched, worn, melted, or altered	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement)
	Scratches or wear are found on the sliding or fixing surfaces of the O-ring.	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement)
	Valve is cracked or broken	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 9. How to disassemble for parts replacement)
Heavy handle opening/closing	Adhesion of foreign matter	Cleaning (Ref: 9. How to disassemble for parts replacement)
	Deformation (thermal deformation, etc.)	Parts replacement (Ref: 9. How to disassemble for parts replacement)
	Over-tightening the union	Adjusting the surface pressure between the ball and seat (Ref: 9. How to disassemble for parts replacement)
Valve is corroded or deformed	The watch is exposed to water, chemical liquids, or other liquids.	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 9. How to disassemble for parts replacement)

12. Disposal method of residual materials and waste materials

 Warning	
 Forcing	When burnt, toxic gas is generated. ► When disposing of the product or parts, please dispose of them according to the guidelines of each local authority by a professional disposal company.

Contact

Contact the nearest distributor, our sales office, or our web website for inquiries about this product.

[User's Manual]

Ball valve Type 21 • 21 α
15~100mm



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

Please note that the content of this manual is subject to change without notice.

May 2024

[User's Manual] Ball Valve Type21 • 21 α 15 ~ 100mm