

Serial No.	H-F004-E-9
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Expansion Joints

User's Manual





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This user's guide contains information important to the proper installation, maintenance and safe use of an ASAH AV Product. Please store this manual in an easily accessible location.

<Warning & Caution Signs>

 Warning	This symbol reminds the user to take caution due to the potential for serious injury or death.
 Caution	This symbol reminds the user to take caution due to the potential for damage to the valve if used in such a manner.

<Prohibited & Mandatory Action Signs>

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

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

- Always observe the specifications of and the precautions and instructions on using our product.
- We always strive to improve product quality and reliability, but cannot guarantee perfection.
Therefore, should you intend to use this product with any equipment or machinery that may pose the risk of serious or even fatal injury, or property damage, ensure an appropriate safety design or take other measures with sufficient consideration given to possible problems. We shall assume no responsibility for any inconvenience stemming from any action on your part without our written consent in the form of specifications or other documented approval.
- The related technical documents, operation manuals, and other documentation prescribe precautions on selecting, constructing, installing, operating, maintaining, and servicing our products. For details, consult with our nearest distributor or agent.
- Our product warranty extends for one and a half years after the product is shipped from our factory or one year after the product is installed, whichever comes first. Any product abnormality that occurs during the warranty period or which is reported to us will be investigated immediately to identify its cause. Should our product be deemed defective, we shall assume the responsibility to repair or replace it free of charge.
- Any repair or replacement needed after the warranty period ends shall be charged to the customer.
- The warranty does not cover the following cases:
 - (1) Using our product under any condition not covered by our defined scope of warranty.
 - (2) Failure to observe our defined precautions or instructions regarding the construction, installation, handling, maintenance, or servicing of our product.
 - (3) Any inconvenience caused by any product other than ours.
 - (4) Remodeling or otherwise modifying our product by anyone other than us.
 - (5) Using any part of our product for anything other than the intended use of the product.
 - (6) Any abnormality that occurs due to a natural disaster, accident, or other incident not stemming from something inside our product.

(2) General Operating Instructions



Warning

- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas is under similar pressures used for liquids. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use a gas in testing, please consult your nearest service station beforehand.



Caution



- Do not step on or apply excessive weight on valve. (It can be damaged.)
- Do not 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.)

(3) General Instructions for Transportation, Unpacking and Storage

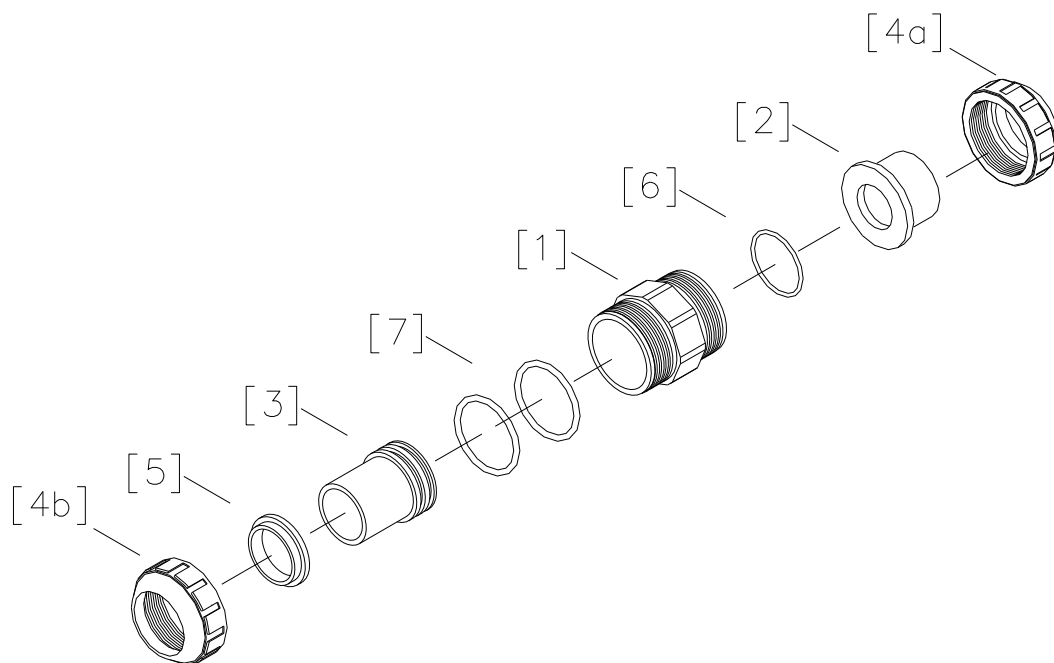


Caution



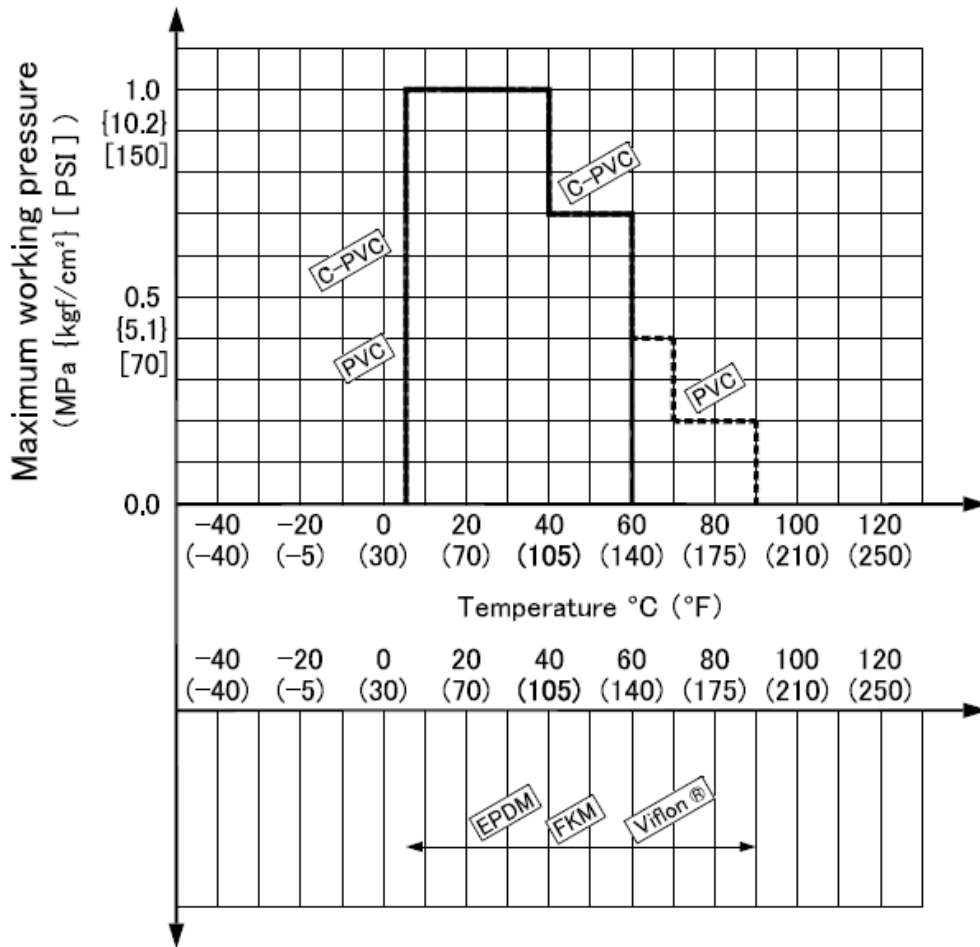
- This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.
 - Do not over-stack cardboard shipping boxes. Excessively stacked packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
(These chemicals may cause damage to the valve.)
- Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures.
(Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

(4) Name of parts



No.	DESCRIPTION	REMARKS
[1]	Body	
[2]	End connector (A)	Fixing side
[3]	End connector (B)	Expansion side
[4]	Union nut (A)	Fixing side
[4b]	Union nut (B)	Expansion side
[5]	Stop ring	
[6]	O-ring(A)	Used between the body and the end connector (A)
[7]	O-ring(B)	Used between the body and the end connector (B)

(5) Working pressure vs. temperature



(6) Installation procedure



Warning

- When using an adhesive, ventilate the space sufficiently, prohibit the use of a fire in the vicinity, and do not inhale adhesive vapors directly.



- 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.)

- If an adhesive gets into contact with your skin, wash it off immediately. If you feel sick or find any anomaly, receive a physician's diagnosis and take appropriate measures promptly.



Caution

- 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.)

- Take care in doing work at low temperatures. Solvent vapors are hard to evaporate and are likely to remain. (Solvent cracks may occur, damaging the equipment.) After assembling the piping system, open both ends of the piping and use a fan (of the Low-Voltage Type) or something similar to ventilate the space, thus removing the solvent vapors.

- Do not under any circumstances try to insert a pipe into another fitting or valve by striking it, which may break the piping.

- Take care not to over-tighten the Union Nut. (The valve can be damaged.)

- Do not use the pipe wrench. (The valve can be damaged.)

- Do not apply more adhesive than necessary. (The valve can be damaged due to solvent cracking.)



- Conduct a water test at least 24 hours after joining the pipes with an adhesive/cement.

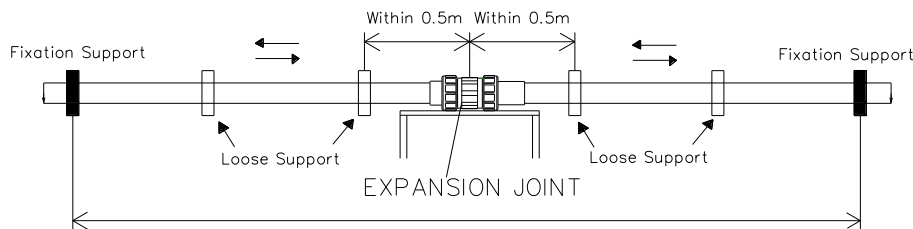
- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.

- For temperature differences, consider the ambient temperature and the internal fluid temperature.

- When installing the AV Expansion Joint, consider the temperature changes (ambient air and internal fluid) (whether expanded or contracted).

- Be sure to provide a fixed support at either end of the piping. Install a loose support to prevent snaking, midway in the piping.

- To prevent the expansion unit from going out of center, install a first support within 0.5 m from the center of the AV EXPANSION JOINT. At that time, ensure that the expansion side is based on a loose support, thus avoiding interference with the expansion. Even higher safety can be ensured by installing a rack or something similar below the expansion joint as shown in the figure below.



- Take care to apply a thin, equal coat of adhesive. Applying too much adhesive in the reception port may cause the adhesive to flow inside the AV Expansion Joint, thus adhering the slide. Particular attention is needed in vertical piping.

- Calculate a piping length great enough to absorb the pipe expansion. Confirm that such absorption is possible, and then install the AV Expansion Joint.

- Take care to protect the slide from dirt and other foreign matter. In the case of vertical piping, in particular, it is recommended to install it with the slide facing downwards.

- Use the appropriate Asahi AV cement.

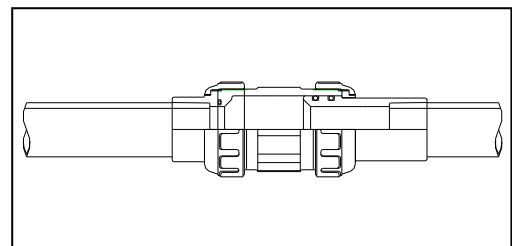
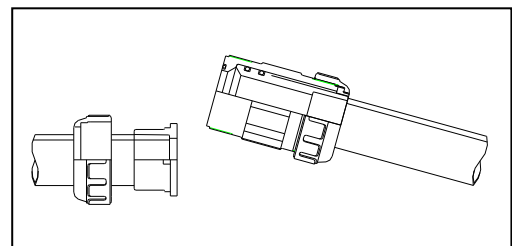
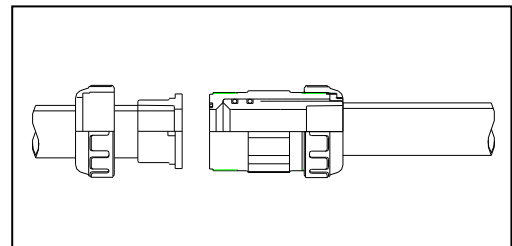
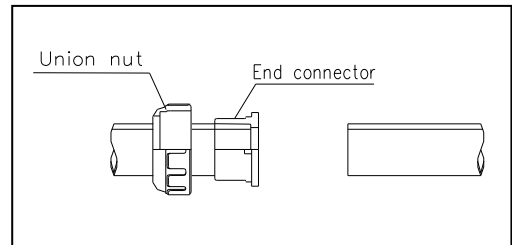
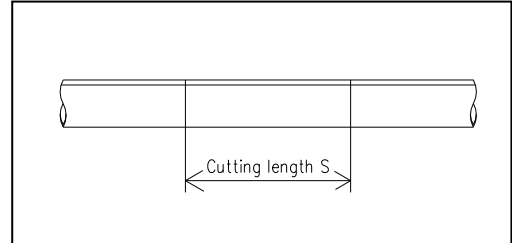
Necessary items

- Pipe cutter
- Strap wrench
- Adhesive for hard vinyl chloride pipes

* When installing the AV Expansion Joint, consider the temperature changes (ambient air and internal fluid) (whether expanded or contracted).

Procedure

- 1) Decide the cutting length "S" for AV Expansion Joint.
* Cutting length "S": Calculate the piping length great enough to absorb the pipe expansion. Conform that such absorption is possible, and then install the valve.
- 2) Cut off the pipe according to the size of AV Expansion joints.
- 3) Thread the fixing side's union nut [4a, 4b] through the pipe, stick the end connector (A) [2] to the pipe using the AV adhesive.
- 4) Make the expansion side's end connector (B) [2] short at the minimum size and bond it to the pipe.
- 5) As for the nominal size 80mm(3")-100mm(4"), bonding the carrier should perform shifting the pipe end as shown in figure.
- 6) Make the expansion side's body long and fit it with the fixing side's end connector. After making sure that the axial matches each other, tighten the fixing side's union nut.
- 7) Tighten up the union nut hardly with hand, then retighten 90-180 degrees with a strao wrench.



< Reference for the construction >

Volume of thermal expansion on C-PVC pipe and PVC

Unit : mm [inch]

Pipe length Diffence temp.	5m [197]	10m [394]	20m [778]	30m [1180]	40m [1580]	50m [1970]	60m [2360]	70m [2760]	80m [3160]
1°C	0.35[0.014]	0.7[0.028]	1.4[0.055]	2.1[0.083]	2.8[0.11]	3.5[0.14]	4.2[0.17]	4.9[0.19]	5.6[0.22]
10°C	3.5[0.14]	7.0[0.28]	14.0[0.55]	21.0[0.83]	28.0[1.1]	35.0[1.4]	42.0[1.7]	49.0[1.9]	56.0[2.2]
20°C	7.0[0.28]	14.0[0.55]	28.0[1.1]	42.0[1.7]	56.0[2.2]	70.0[2.8]	84.0[3.3]	98.0[3.9]	112.0[4.4]
30°C	10.5[0.41]	21.0[0.83]	42.0[1.7]	63.0[2.5]	84.0[3.3]	105.0[4.1]	126.0[5.0]	147.0[5.8]	168.0[6.6]
40°C	14.0[0.55]	28.0[1.1]	56.0[2.2]	84.0[3.3]	112.0[4.4]	140.0[5.5]	168.0[6.6]	196.0[7.7]	224.0[8.8]
50°C	17.5[0.69]	35.0[1.4]	70.0[2.8]	105.0[4.1]	140.0[5.5]	175.0[6.9]	210.0[8.3]	245.0[9.6]	280.0[11.0]
60°C	21.0[0.83]	42.0[1.7]	84.0[3.3]	126.0[5.0]	168.0[6.6]	210.0[8.3]	252.0[9.9]	294.0[11.6]	336.0[13.2]
70°C	24.5[0.96]	49.0[1.9]	98.0[3.9]	147.0[5.8]	196.0[7.7]	245.0[9.6]	294.0[11.6]	343.0[13.5]	392.0[15.4]
80°C	28.0[1.1]	56.0[2.2]	112.0[4.4]	168.0[6.6]	224.0[8.8]	280.0[11]	336.0[13.2]	392.0[15.4]	448.0[17.6]

< e.g. >

As for the nominal size 75mm and the temperature difference 20°C, every how meter should an expansion joint be inserted?

*Calculating expression
$$L = \frac{\Delta l}{\alpha \cdot \Delta t} \quad (1)$$

L: Pipe length absorbed into the expansion joint (mm).

Δl : Pipe length on elongation and contraction

The expansion volume l_2 for nominal size 75mm from the table above = 80mm

Free volume on both edges 5mm x 2 = 10mm

$$\Delta l = (80 - 10) \text{mm}$$

α Coefficient of thermal expansion on CPVC pipe or PVC pipe

$$7 \times 10^{-5} (\text{°C})$$






Δt : The temperature difference 20(°C)

Calculate values above with (1),




$$L = \frac{80 - 10}{7.0 \times 10^{-5} \times 20} = 50,000 \text{ mm}$$

Ans. An expansion joint should be installed every 50 m.

(7) Disassembling Method for replacing parts

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

Necessary items



-  Strap wrench
-  Protective gloves
-  Safety goggles

<Disassembly>

Procedure

- 1) Completely discharge fluid from pipes.
- 2) Loosen union nuts [4a, 4b] at right and left with a strap wrench.

(8) Inspection items

- Caution**   - Perform periodic maintenance. (Leakage may develop due to temperature changes or over periods of prolonged storage, rest or operation.)

○Inspect the follow items;

(1)	Check for any flaw, crack, or deformation on the outside.
(2)	Check whether fluid leaks to the outside.
(3)	Check the tightness of union nuts (loose or not).

(9) Troubleshooting

Problem	Cause	Treatment
Fluid leaks to the outside.	The union nut is loose.	Retighten.
	The O-ring is scratched or worn.	Replace the O-ring.
Elongation and contraction can not be done smoothly.	Foreign materials have adhered.	Clean the valve.
	Deformation. (Due to heat etc.)	Replace parts.

(10) 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.)

Expansion Joints

ASAHI YUKIZAI CORPORATION

Distributor

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