
Air Chamber

User's Manual

Before beginning operation, read this User's Manual carefully. Operating the equipment incorrectly in disregard of these instructions may lead to death, injury and/or cause property damage.

- Be sure to keep this User's Manual in a place where it will be easily available for reference.
- If the product you purchased conforms to special specifications not described in this User's Manual, handle the product according to details of separate meetings, drawings and approved documents.

- TACMINA accepts no liability whatsoever for any damage caused by malfunction of this product and other damage caused by use of this product.
- Additional information on this product and manuals in other languages may be found on our website.

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1 Safety precautions

1-1 Using this manual

This manual is intended to help the operator to handle the product safely and correctly. In support of this aim, important safety-related instructions are classified as explained below. Be sure to follow them at all times.

 WARNING

- If the product is operated incorrectly in contra-vention of this instruction, it is possible that an accident resulting in death of serious injury will occur.

 CAUTION

- This indicates that improper operation can result in an injury or physical damage to the product.

IMPORTANT

- This indicates information that should always be followed to maximize the product's performance and service life.

NOTE

- This indicates supplementary explanations.

1-2 Operating conditions

 CAUTION

- Avoid exposing the PVC type to direct sunlight. This can cause deterioration, possibly resulting in equipment breakage and a major accident.
- Do not use the equipment outside the operating ranges indicated below. This can result in mal-function or equipment breakage, and lead to a major accident.

Conditions for handling liquids

Liquid temperature

PVC type

0 to 40°C (no freezing)

SUS flange type

0 to 80°C (no freezing)

SUS hose type

0 to 40 °C (no freezing)

Maximum working pressure

PVC type: 0.5 MPa

SUS flange type: 0.98 MPa

SUS hose type: 0.5 MPa

1-3 Handling precautions



WARNING

- Install in a location accessible only to the manager.
- Do not operate the pump with the piping valves closed.
- If the equipment shows signs of damage, immediately stop operation. Equipment breakage can lead to a major accident.
- In the event of equipment damage, broken pieces can fly off, fluid can spill, and major damage can occur, so be sure to take the appropriate protective measures.



CAUTION

- Do not use outside the equipment specifications. This can result in malfunction.
- TACMINA CORPORATION is not responsible for and will provide no compensation for any modifications made to the equipment by the customer.
- When handling liquid-end sections, be sure to wear protective coverings (rubber gloves, mask, protective goggles, chemical-resistant overalls, etc.) appropriate for the chemicals be using used.
- Before starting any maintenance or repair work, first relieve pressure from the piping, discharge fluid from the wetted parts, and perform washing.

2 Checking the product

After unpacking the equipment, check the following:

- (1) Is the equipment as per your order?
- (2) Does the information on the equipment label match that of the order?
- (3) Was the equipment damaged by shock or vibration during shipping?

The equipment was shipped with the utmost care. In the unlikely event of the equipment arriving damaged, contact your dealer or Tacmina Co., Ltd.

3 Functions

Unique pulsations are generated within a reciprocating pump. The piping vibrates in accordance with these pulsations, making the discharge amount unstable. This air chamber is installed in the piping to eliminate these pulsations. More specifically, eliminating the pulsations can result in (1) lower inertial resistance and (2) reduced piping vibration.

4 Model code

AC — 05 — V — E — F — 15 — S
(1) (2) (3) (4) (5) (6) (7)

- | | |
|---------------------------|----------------------------------|
| (1) Product name | (5) Connection type |
| AC : Air chamber | F : Flange |
| | HP : PVC hose |
| | HT : PTFE hose |
| (2) Internal capacity | (6) Diameter |
| 05 : 0.5L | 15 : 15A |
| 3 : 3L | 20 : 20A |
| 7 : 7L | 25 : 25A |
| 10 : 10L | 40 : 40A |
| 15 : 15L | 50 : 50A |
| (3) Material of main unit | 65 : 65A |
| V : PVC | 4x9 : $\phi 4 \times \phi 9$ |
| S : SUS304 | 6x11 : $\phi 6 \times \phi 11$ |
| 6 : SUS316 | 10x12 : $\phi 10 \times \phi 12$ |
| X : Special | 12x15 : $\phi 12 \times \phi 15$ |
| | 12x18 : $\phi 12 \times \phi 18$ |
| (4) Material of packing | (7) General specifications |
| E : EPDM | S : Standard |
| F : Fluoro rubber | X : Special |
| N : Nothing | |
| X : Special | |

5 Specifications and applicable model

Model	Capacity (L)	Diameter	Applicable model
AC-05-VE-F15-S	0.5	JIS10K15A	S□DA1・S□WA1-31・61・12・22・32・62・82 (standard model)
AC-05-VF-F15-S			F□D1・F□W1-003・006・01・02・03・06・08 (standard model)
AC-05-SN-F15-S			
AC-05-6N-F15-S			
AC-3-VE-F20-S	3	JIS10K20A	S□DA1・S□WA1-62・82 (high-viscosity model)
AC-3-VF-F20-S			F□D1・F□W1-06・08 (high-viscosity model)
AC-3-SN-F20-S			
AC-3-6N-F20-S			
AC-3-VE-F25-S	3	JIS10K25A	S□DA1・S□WA1-13・23・33・43 (standard model)
AC-3-VF-F25-S			S□DA1・S□WA1-13・23・33 (high-viscosity model)
AC-3-SN-F25-S			F□D1・F□W1-1・2・3・4 (standard model)
AC-3-6N-F25-S			F□D1・F□W1-1・2・3 (high-viscosity model)
AC-7-VE-F40-S	7	JIS10K40A	ZD1・ZW1-14・14L・153
AC-7-VF-F40-S			ZD1-24・24L
AC-7-SN-F40-S			FXD1・FXW1-10P・10・15
AC-7-6N-F40-S			FXD1-20P・20
AC-10-VE-F50-S	10	JIS10K50A	RYD1・RYW1-14
AC-10-VF-F50-S			
AC-10-SN-F50-S			
AC-10-6N-F50-S			
AC-15-VE-F65-S	15	JIS10K65A	ZD1-34
AC-15-VF-F65-S			FXD1-30
AC-15-SN-F65-S			
AC-15-6N-F65-S			
AC-05-VE-HP4x9-S	0.5	φ4×φ9	S□DA1・S□WA1-31・61・12 (standard model)
AC-05-VF-HP4x9-S		φ4×φ9	F□D1・F□W1-003・006・01 (standard model)
AC-05-VE-HP6x11-S		φ6×φ11	S□DA1・S□WA1-22・32 (standard model)
AC-05-VF-HP6x11-S		φ6×φ11	F□D1・F□W1-02・03 (standard model)
AC-05-VE-HP12x18-S		φ12×φ18	S□DA1・S□WA1-62・82 (standard model)
AC-05-VF-HP12x18-S		φ12×φ18	F□D1・F□W1-06・08 (standard model)
AC-05-SN-HT10x12-S		φ10×φ12	S□DA1・S□WA1-31・61・12・22・32 (standard model)
AC-05-6N-HT10x12-S		φ10×φ12	F□D1・F□W1-003・006・01・02・03 (standard model)
AC-05-SN-HT12x15-S		φ12×φ15	S□DA1・S□WA1-62 (standard model)
AC-05-6N-HT12x15-S		φ12×φ15	F□D1・F□W1-06 (standard model)

Maximum working pressure

PVC type	0.5MPa
SUS flange type	0.98MPa
SUS hose type	0.5MPa

6 Installation

! WARNING

- To prevent the risk of danger, be sure to install and use a relief valve.
- If the valve is closed or the piping is blocked, the pressure within the piping can increase abnormally, causing the air chamber to break.
- If the air chamber breaks, parts and broken pieces can fly off, chemicals can splatter, and serious injury or death can result.

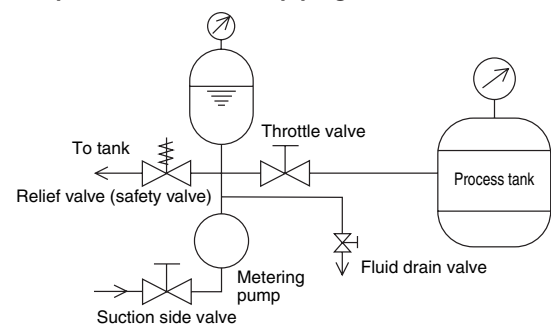
- (1) Install the air chamber within 1 meter directly above the pump outlet.
- (2) Secure the air chamber with an installation mount or other support.
- (3) Install the pressure gauge inside the piping on the discharge side or to the air chamber.
- (4) Install the relief valve inside the piping on the discharge side.
- (5) Please set up a throttle valve or equivalents on the secondary side of air chamber in order to reduce the pulsation from the secondary side of the valve.
- (6) Be sure to provide a fluid drain pipe.

(7) Be careful of freezing when installing in cold climates.

(8) In case of installing the air chamber outdoors, be sure to avoid the direct sunlight.

* See the recommended piping diagram below for the air chamber piping.

Example of recommended piping



7 Handling precautions

WARNING

- Do not exceed the maximum working pressure.
PVC type: 0.5 MPa
SUS flange type: 0.98 MPa
SUS hose type: 0.5 MPa
- Be careful of freezing.
- Regularly supply air.
- Avoid use in direct sunlight.

- (1) When using a PVC type or a SUS hose type, do not allow the working pressure to exceed 0.5 MPa.
Be sure to install a relief valve (safety valve) to prevent a breakage accident due to pipe blockage or freezing.
When using a SUS flange type, use at a working pressure below 0.98 MPa. If the working pressure exceeds 0.5 MPa, air must be supplied frequently, so exercise caution. (See "8. Supplying Air".)
- (2) The PVC type uses hard vinyl chloride resin that deteriorates under ultraviolet light, so avoid use in direct sunlight. Contact with sharp objects can damage the equipment, so it is recommended that the protective cover be attached whenever possible.

WARNING

- If the equipment shows signs of damage, immediately stop operation.

CAUTION

- The PVC type has an operating life of three years and it is recommended that the air chamber be replaced at that time.
- It is recommended that the protective cover be attached.

- (3) The air chamber itself cannot significantly reduce pulsations. A throttle valve or back pressure valve must be installed on the outlet side of the air chamber and resistance must be added to the pipe conduit. In addition, to minimize the relative pulsation, the throttle resistance must be adjusted according to the flow rate. To change the discharge amount of the metering pump, readjust the throttle valve as needed.
- (4) The inside of the air chamber contains air. This air is in contact with a transfer fluid, and as the air penetrates the transfer fluid, it decreases. When the air decreases, the pulsation increases. Therefore, air must be regularly supplied. (See "8. Supplying Air".)
- (5) The air chamber generally contains air, so be especially careful of fluids affected by oxygen and water.
(This includes reducing agents, deoxidizers, antioxidants, and polymers cured with oxygen or water.)
* If the air chamber cannot be used, use an accumulator or pulse-free metering pump. (Discuss separately.)
- (6) If there is a risk of the chemicals freezing in winter months, insulate or take heat reserving measures for the main unit of the air chamber as well as the piping.
* Working temperature range
PVC type: 0 to 40°C (no freezing)
SUS flange type: 0 to 80°C (no freezing)
SUS hose type: 0 to 40°C (no freezing)
- (7) When using a liquid containing slurry or a crystalline liquid, wash the inside of the piping after completing operations.

8 Supplying air

The effect of the air chamber is reduced as the volume of air decreases, so it is necessary to supply air.

8-1 Recommended timing for supplying air

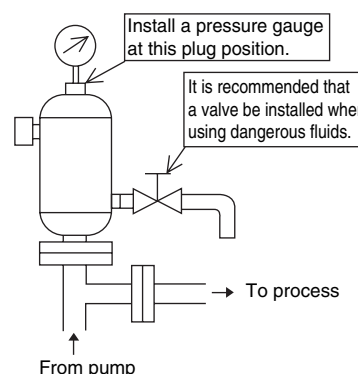
- (1) When the fluctuation width of the needle on the pressure gauge is twice that at the start
 - (2) When vibration starts in the piping
 - (3) When the pulsation at the discharge side increases
- * Inspect the air supply once a week.
* If the working pressure exceeds 0.5 MPa, the speed at which the air penetrates the transfer fluid greatly increases, reducing the effective period of the air chamber. In this case, air must be supplied frequently.

8-2 Procedure for supplying air

WARNING

- Be sure to wear safety glasses and protective gloves.

- (1) Close the front and rear valves on the air chamber.
 - (2) Slowly loosen the plug on top, and gradually release the air. After the air has been released (when a hissing sound can no longer be heard), close the plug.
 - (3) Loosen the plug on top again and open the plug on bottom to release the fluid from inside.
(Be sure to wear safety glasses and protective gloves, and use a bucket or other container to catch the fluid.)
 - (4) When all fluid has been released, tighten the top and bottom plugs securely.
 - (5) Open the front and rear valves on the air chamber.
- * When using dangerous chemicals, install piping for draining the fluid and install valves instead of plugs.

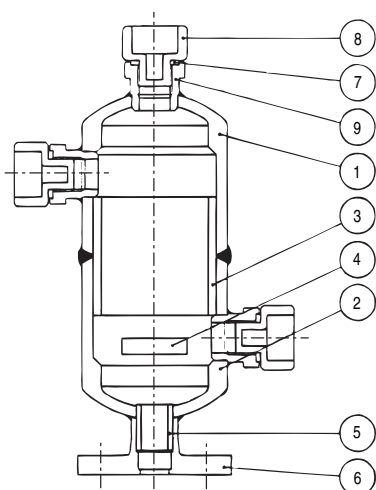


9 Troubleshooting

Problem	Cause	Solution
Cannot reduce pulsation.	- There is an inappropriate amount of air inside the air chamber. - There is an inappropriate amount of back pressure at the outlet side.	- Supply air. - Adjust the back pressure valve or throttle valve.
Piping vibrates.	There is an inappropriate amount of air inside the air chamber.	Supply air.

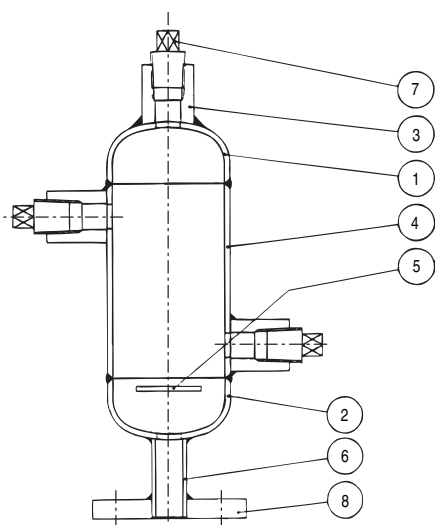
10 Configuration

* For hose connection types, the flange parts in the diagrams below are the hose connecting joints.



AC-05/3/7/10/15-VE/VF-F15/20/25/40/50/65

No.	Part	Material
1	Top cap	PVC
2	Bottom cap	PVC
3	Pipe	PVC
4	Plate	PVC
5	Pipe	PVC
6	TS flange	PVC
7	Packing	EPDM/Fluoro rubber
8	Plug	PVC(G1/2)
9	Socket	PVC



AC-05/3/7/10/15-6N/SN-F15/20/25/40/50/65

No.	Part	Material	
		6N	SN
1	Top cap	SUS316	SUS304
2	Bottom cap	SUS316	SUS304
3	Socket	SUS316	SUS304
4	Pipe	SUS316	SUS304
5	Plate	SUS316	SUS304
6	Pipe	SUS316	SUS304
7	Plug	SUS316	SUSXM7
8	Flange	SUS316	SUS304

11 After-sales services

If any aspects of the terms and conditions of the after-sales service applying to the repairs to be provided during the warranty period and other such matters are not clear, consult your vendor or a TACMINA representative.

Warranty

- (1) The warranty period shall be one year from the date of dispatch from TACMINA's factory.
- (2) If, during the warranty period, the product sustains malfunctions or damages as a result of design, manufacturing, or material defect, or if the product does not meet its specifications, TACMINA will arrange for repairs, provide replacement components, or replace the product, at TACMINA's discretion, at no charge to the customer. However, this warranty only covers direct damage to the product. Any consequential losses or damages, including, but not limited to, profit losses and any secondary damages, caused by malfunctions, breakage, or impaired performance of this product shall not be covered by this warranty. The limitation of TACMINA's liability shall not exceed the sales value of the defective product.
- (3) If a malfunction or damage is found, notice shall be given to distributor or TACMINA with documents that prove the malfunction or damage is caused by improper design, manufacturing failure or material defect within 14 days after awareness of such malfunction or damage. If the distributor or TACMINA does not receive such notice within aforementioned period, even though the warranty period is still in effect, TACMINA shall not be liable for any malfunction and damage.
Please note that TACMINA may request to give further information or to return the product for investigation. If the cause is attributable to TACMINA's action, the shipping fees, cost of investigation and checks performed by TACMINA shall be borne by TACMINA.
- (4) Even in the warranty period, the cost of repairs in the following conditions shall be paid to the distributor or TACMINA.
 - 1) Damages and deterioration of consumables.
 - 2) Damages or malfunctions of the warranted product caused by carelessness in handling or incorrect use.
 - 3) Damages or malfunctions of the warranted product caused by the failure to perform maintenance such as periodic inspections and repairs and replacements of consumables.
 - 4) Damages or malfunctions of the warranted product caused by falls or impacts.
 - 5) Damages or malfunctions of the warranted product resulting from the use of parts other than the ones supplied by TACMINA.
 - 6) Damages or malfunctions of the warranted product resulting from product repairs or remodeling undertaken by individuals other than TACMINA employees or personnel of businesses authorized by TACMINA.

- 7) Damages or malfunctions of the warranted product resulting from fires, natural disasters, geological calamities, and force majeure.
- 8) Damages or malfunctions of the warranted product resulting from loose bolts or nuts or from defective hose connections.
- 9) Discoloration, deterioration, damages, or malfunctions of the warranted product resulting from ultraviolet rays, corrosive gases, or flooding.
- 10) Damages or malfunctions of the warranted product resulting from corrosion, swelling, or melting caused by the adhesion or chemical effect of the used liquid.
- 11) Damages or malfunctions of the warranted product resulting from damages to products other than those made by TACMINA.
- 12) Damages or malfunctions of the warranted product resulting from usage outside of the range of the usage conditions listed in the operation manual.
- (5) The judgment of damages, malfunctions, and impaired performance as well as the judgment of whether the cause is the design of the product and product defects shall be performed by TACMINA's technical department.

Repairs

■Before requesting repairs

Please read this operation manual carefully and inspect the product again.

■Who to request repairs from

Ask your vendor to take care of the repairs. If you are not sure of who your vendor is, contact TACMINA.

■Precautions when sending the product for repairs

Be sure to observe the following items to protect worker safety and to protect the environment:

- If any chemicals have affixed to the product, wash it clean.
- Attach the safety data sheet (SDS) to the product.
- If a "maintenance data" page is present at the end of the operation manual, fill in this page and attach it to the product.
- * The product may not be repaired if the necessary materials are not attached.
- * Even when the necessary materials are attached, TACMINA may send the product back if it is determined that repairing the product will constitute risks or dangers.

■Minimum retention period for consumables

TACMINA will continue to supply consumables for its pumps for a period of eight (8) years after the manufacture of the pumps has been discontinued.

TACMINA CORPORATION

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Product designs and specifications are subject to change without notice for product improvement.

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