

# TACMINA

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## Back Pressure Valve

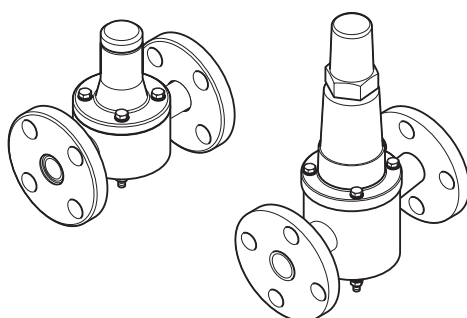
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# BV

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## OPERATION MANUAL

Please read this OPERATION MANUAL carefully before use.  
Operating the product incorrectly in disregard of these instructions  
may lead to death or injury or may cause property damage.



### Applicable Models

BV-F15, F20, F25, F40, F50, F65,  
6x8/Rc1/2,  
12x15/Rc1/2

- TACMINA accepts no liability whatsoever for any damage caused by the malfunction of this product and other damage caused by the use of this product.
- If the product you bought conforms to special specifications not described in this manual, use the product according to the details of the separate meetings, drawings, and approval documents.
- Additional information on this product and manuals in other languages may be found on our website.

[www.tacmina.com](http://www.tacmina.com)

## How to operate the product safely

In order to ensure that the product will be operated correctly and safely, this OPERATION MANUAL contains some guidelines for the user in the form of important safety precautions and considerations that, depending on their seriousness, are categorized as set forth below. Be absolutely sure to heed these precautions and considerations.



### WARNING

- This is used to indicate a condition or action that may result in death or serious injury if the instructions given are ignored and the operations are performed incorrectly.



### CAUTION

- This is used to indicate a condition or action that may result in injury and/or damage to personal property if the instructions given are ignored and the operations are performed incorrectly.

### IMPORTANT

- This is used to indicate a condition or action that must be established or carried out in order to maintain the performance and service life of the equipment.

### NOTE

- This is used to indicate supplementary information.

## Conditions of use



### CAUTION

- Do not use this product with slurry liquids.
- Do not use the product outside the following usage ranges. Doing so may cause malfunctions.

|                             |                                                                   |
|-----------------------------|-------------------------------------------------------------------|
| Ambient temperature         | 0 to 40°C                                                         |
| Transfer liquid temperature | SUS/PVDF: 0 to 60°C (no freezing)<br>PVC: 0 to 40°C (no freezing) |
| Pressure                    | 1.0 MPa or less                                                   |

## Transportation, installation & piping



### WARNING

- Install the product in a location that cannot be accessed by anyone but control personnel.



### CAUTION

- If this product has been dropped or damaged, consult your vendor or a TACMINA representative. Using a dropped or damaged product may result in accidents and/or malfunctions.
- If there is a chance of the liquid solidifying or freezing due to reasons such as using water-diluted solutions in areas where the temperature is low, install a heating apparatus or heat insulation. The liquid solidifying or freezing may lead to damage to the product or surrounding equipment.

- The water used for the shipment tests may remain in the liquid-end section of the product. If the product will transfer chemicals that harden or give off gas when they react with water, be absolutely sure to drain the water and dry off the liquid-end section prior to use.
- This product is not designed to support the piping. Ensure that the product and the pipe joints will not be subjected to any excessive force that might be exerted by, for instance, the weight of the piping or the shifting of the pipe joints out of position.

### Operation & maintenance



#### WARNING

- Install the product in a location that cannot be accessed by anyone but control personnel.
- Take steps to ensure that the power will not be turned on during the course of work. Hang a sign on the power switch indicating that work is in progress.
- When working on the liquid-end section of the product, be sure to wear protective gear (such as rubber gloves, a mask, protective goggles, and work clothes that are resistant to chemicals) suited to the chemical concerned.
- Before maintaining or repairing the product, be sure to release the internal pressure in the piping, drain the chemicals from the liquid-end section, and clean the product with deionized water.

### Other precautions



#### CAUTION

- Do not modify or alter this product.
- When it comes time to dispose of this product, entrust its disposal to an industrial waste disposal company whose operations have been authorized in accordance with applicable laws and regulations.

### Checking the product

After unpacking the product, check the following.

- (1) Is the product the one that was ordered?
- (2) Do the details on the product's nameplate match what was ordered?
- (3) Are all the accessories included?

Check the included accessories against the "Accessories list" shown below.

- (4) Has the product sustained any damage from vibration or impact during transit?
- (5) Have any of the screws come loose or fallen out?

Every care is taken by TACMINA in the shipment of its products, but if you come across anything untoward, please contact your vendor or a TACMINA representative.

### ■Accessories list

| Name             | Quantity |
|------------------|----------|
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## Introduction

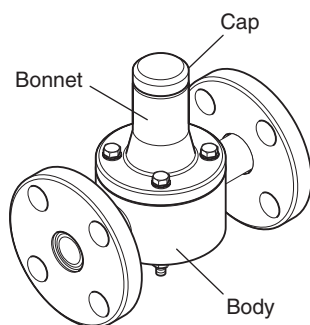
This back pressure valve has a function for applying an arbitrary amount of back pressure to the pump's discharge-side piping.

Use this back pressure valve to prevent pump overfeeding and siphoning.

\* Overfeeding: See "Glossary" (page 16)

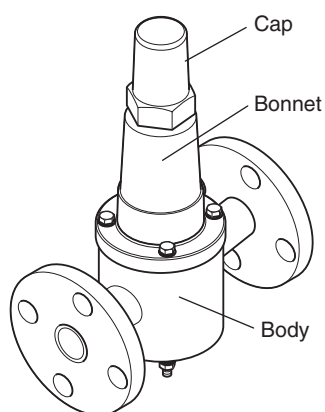
## Structure

### BV-F15, F20, 6x8/Rc1/2, 12x15/Rc1/2

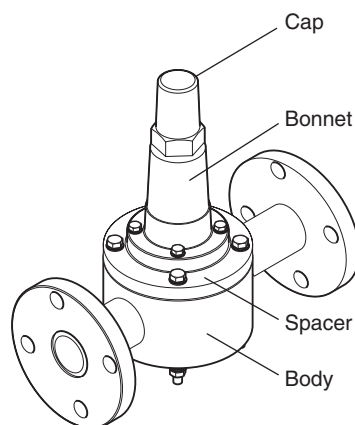


\* The joint shape is different for the BV-6x8/Rc1/2 and BV-12x15/Rc1/2.

### BV-F25, F40



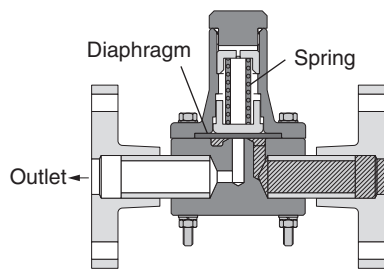
### BV-F50, F65



## Principle of operation

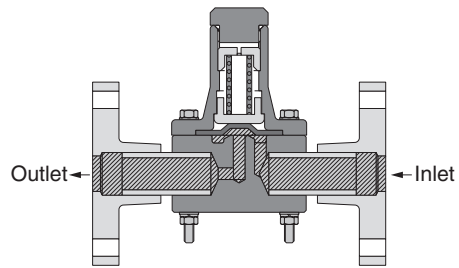
### (1) Pump suction

Liquid does not flow because the diaphragm is held down by the pressure of the spring.



### (2) Pump discharge

The pressure within the piping exceeds the pressure of the spring, which causes the diaphragm to open and the liquid to flow.



## Installation



### WARNING

- Install the product in a location that cannot be accessed by anyone but control personnel.

### Installation location

- Whenever possible, avoid installing the product in a location that will shorten its service life.

Locations that will shorten the service life of the product

- Locations subject to direct sunlight
- Locations exposed to the wind and rain
- Locations where corrosive gases are generated

- Install the product in a location that has good ventilation in the summer and where the transfer liquid will not freeze in the winter.
- Provide adequate space around the product to facilitate maintenance and inspections.

## Piping

### Requests during piping

#### ●Pipe joints



### CAUTION

- This product is not designed to support the piping. Ensure that the product and the pipe joints will not be subjected to any excessive force that might be exerted by, for instance, the weight of the piping or the shifting of the pipe joints out of position.

#### ●Piping size and length

- In principle, the piping size must be greater than or equal to the diameter of the product's opening.



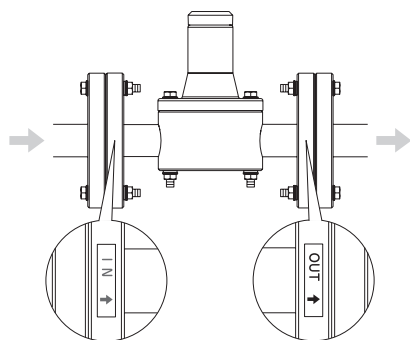
### CAUTION

- If there is a chance of the liquid solidifying or freezing due to reasons such as using water-diluted solutions in areas where the temperature is low, install a heating apparatus or heat insulation. The liquid solidifying or freezing may lead to damage to the product or surrounding equipment.

## Piping

### Installation direction

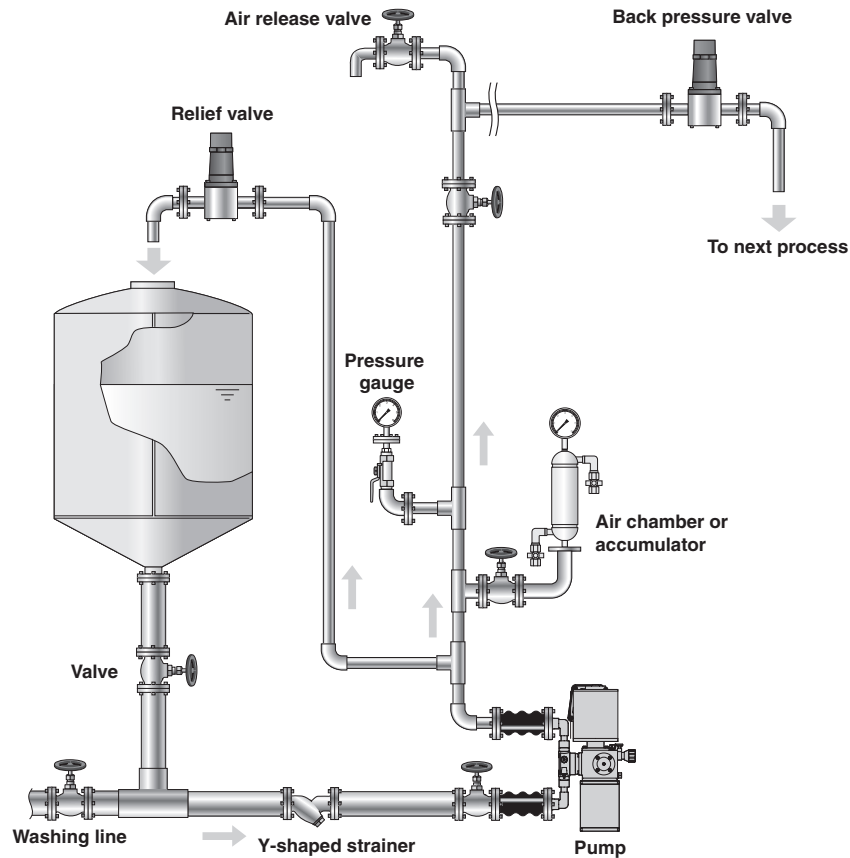
- Check the injection direction arrow stickers and be sure to install the product so that the liquid flows in the injection direction.
- To prevent liquid leaks during maintenance, install the product so that the bonnet faces up. However, note that installing the product with the bonnet facing the side does not cause any problems with the product's performance.





## Piping

### Recommended piping example



- Install this product ensuring that the liquid flows in the injection direction. (Install in the same direction as indicated on the injection direction arrow labels.)
- Install the back pressure valve at the end of the discharge side piping of the pump.
- Ensure that a pressure gauge is installed in the piping between the discharge outlet of the pump and the back pressure valve in order to monitor the piping pressure and to adjust the back pressure.
- Only use this product to prevent the overfeeding phenomenon and siphoning phenomenon of metering pumps made by TACMINA.
- Avoid direct sunlight when installing this product outdoors.
- Install the back pressure valve ensuring that the difference between the pressure on the primary side (in) of the pressure valve and the set pressure is 0.1 MPa or more.

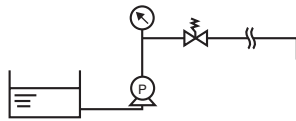
## Piping

### Bad piping example

Do not lay out the piping for the product as shown below.

Installation in a position far from the end of the discharge-side piping  
(Discharge delays and dripping will occur.)

Installation



#### Symbols

- |  |                     |
|--|---------------------|
|  | Metering pump       |
|  | Back pressure valve |
|  | Chemical tank       |
|  | Pressure gauge      |

## Pressure adjustment



### WARNING

- When working on the liquid-end section of the product, be sure to wear protective gear (such as rubber gloves, a mask, protective goggles, and work clothes that are resistant to chemicals) suited to the chemical concerned.



### CAUTION

- Adjust the pressure within the pressure adjustment range. (See "Product specifications" on page 15.)

The setting pressure when the product is shipped from the factory is written on the model nameplate.

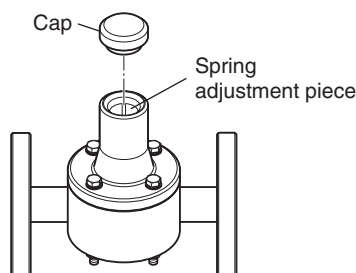
- \* If you change the setting pressure after purchasing the product, we recommend that you indicate the changed pressure using a label or a similar method.

| BACK PRESSURE VALVE                                                                                   |           |     |
|-------------------------------------------------------------------------------------------------------|-----------|-----|
| MODEL                                                                                                 | BV-F25-VE |     |
| SETTING PRESSURE                                                                                      | 0.1       | MPa |
| PRESSURE ADJUST RANGE                                                                                 | 0.1 - 0.3 | MPa |
| SERIAL NO.                                                                                            | 00000000  |     |
|  TACMINA CORPORATION |           |     |

Model nameplate (example)

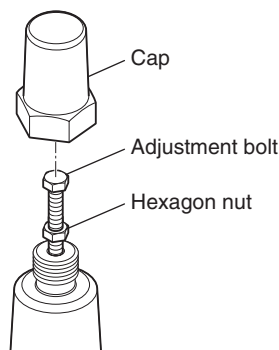
### BV-F15, F20, 6x8/Rc1/2, 12x15/Rc1/2

- (1) Remove the cap.
- (2) While checking the indicated value of the pressure gauge, use a flathead screwdriver to turn the spring adjustment piece.
  - Clockwise: The setting pressure increases.
  - Counterclockwise: The setting pressure decreases.
- (3) Attach the cap.
  - \* Inspect the O-ring attached to the Cap. Replace the O-ring if it has deteriorated.
  - \* When adjusting the pressure after replacing the diaphragm, gradually increase the setting pressure from the state where the flow rate adjustment piece is most loose. The reason for this is to protect the pump and piping.



### BV-F25, F40, F50, F65

- (1) Remove the cap.
- (2) Loosen the hexagon nut.
- (3) Turn the adjustment bolt while checking the indicated value of the pressure gauge.
  - Clockwise: The setting pressure increases.
  - Counterclockwise: The setting pressure decreases.
- (4) Tighten the hexagon nut to fix it in place.
- (5) Attach the cap.
  - \* When adjusting the pressure after replacing the diaphragm, gradually increase the setting pressure from the state where the adjustment bolt is most loose. The reason for this is to protect the pump and piping.



## Operation

### Before the first operation

Check that the usage conditions are suited to the product. (See "Conditions of use" on page 1.)

### Before operation

For safety, check the following item before operation.

| Check location | Details of check/action to perform       | Remarks                                                                       |
|----------------|------------------------------------------|-------------------------------------------------------------------------------|
| Body           | Check for looseness.                     | When first using the product after maintenance, retighten in the same manner. |
| Joints         | If the joints are loose, retighten them. |                                                                               |

## Operation

### During operation

For safety, check the following items during operation.

| Check location                              | Details of check/action to perform                                                                                                    | Remarks                                                                       |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Body                                        | Check for leaking liquid.                                                                                                             | When first using the product after maintenance, retighten in the same manner. |
| Joints                                      | If there are leaks, retighten the loose parts.                                                                                        |                                                                               |
| Pressure gauge on the pump's discharge side | An abnormal value may indicate that the back pressure valve is not operating normally. Stop the pump, and then perform an inspection. | See "Troubleshooting" (page 14).                                              |

- When using the product for the first time
- When resuming operation after a prolonged shutdown of operation



Use the procedure under "Pressure adjustment" (page 10) as a reference to check that the back pressure valve operates normally at the specified pressure.

## When stopping operation for a long period of time

### To stop

- (1) Wipe the product clean of liquid, and then clean the product with clean water or cleaning solution.
- (2) Put a cover on the product.  
Protect the product from dust accumulation and corrosive environments.

### To resume

- (1) Check the product's internal diaphragm.  
If debris has affixed to the diaphragm, clean it.  
If there are signs of damage or deterioration, replace the diaphragm.
- (2) Check that the back pressure valve operates normally at the specified pressure.

## Diaphragm replacement



### WARNING

- When working on the liquid-end section of the product, be sure to wear protective gear (such as rubber gloves, a mask, protective goggles, and work clothes that are resistant to chemicals) suited to the chemical concerned.
- Before maintaining or repairing the product, be sure to release the discharge-side pressure, drain the liquid from the liquid-end section, and clean the product with deionized water.

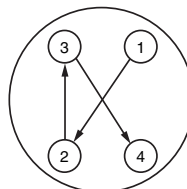
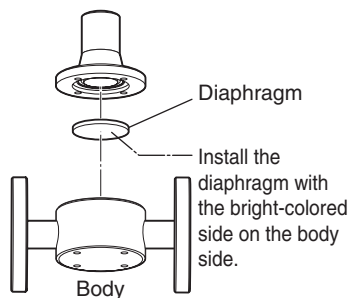


### CAUTION

- When you remove the bonnet, exercise caution to avoid dropping the internal parts.

### IMPORTANT

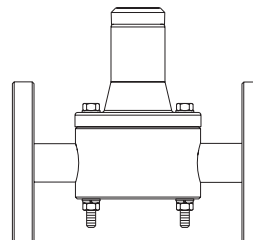
- Do not mistake the front and the back of the diaphragm.
  - If the diaphragm's liquid-end section material is PTFE (the last letter in the model is "T"), install the diaphragm so that the bright-colored PTFE side is on the body side.
  - If the diaphragm's liquid-end section material is EPDM (the last letter in the model is "E"), the diaphragm has no set front or back.
- When tightening the bolts, tighten them evenly a little bit at a time.  
If the bolts are tightened unevenly, liquid may leak from the product.



Maintenance

### Replacement procedure

- (1) Remove the hexagon head bolts and the hexagon nuts in order to remove the bonnet.
- (2) Replace the diaphragm.
- (3) Attach the parts in their original positions.
- (4) Turn the spring adjusting piece or the adjusting bolt (see the illustration on page 10) clockwise to tighten it until it will not turn any further.
- (5) With this part tightened, leave the product for 15 minutes.
- (6) Fully loosen the spring adjusting piece or the adjusting bolt.
- (7) Adjust the pressure according to the procedure on page 10.



## Diaphragm replacement

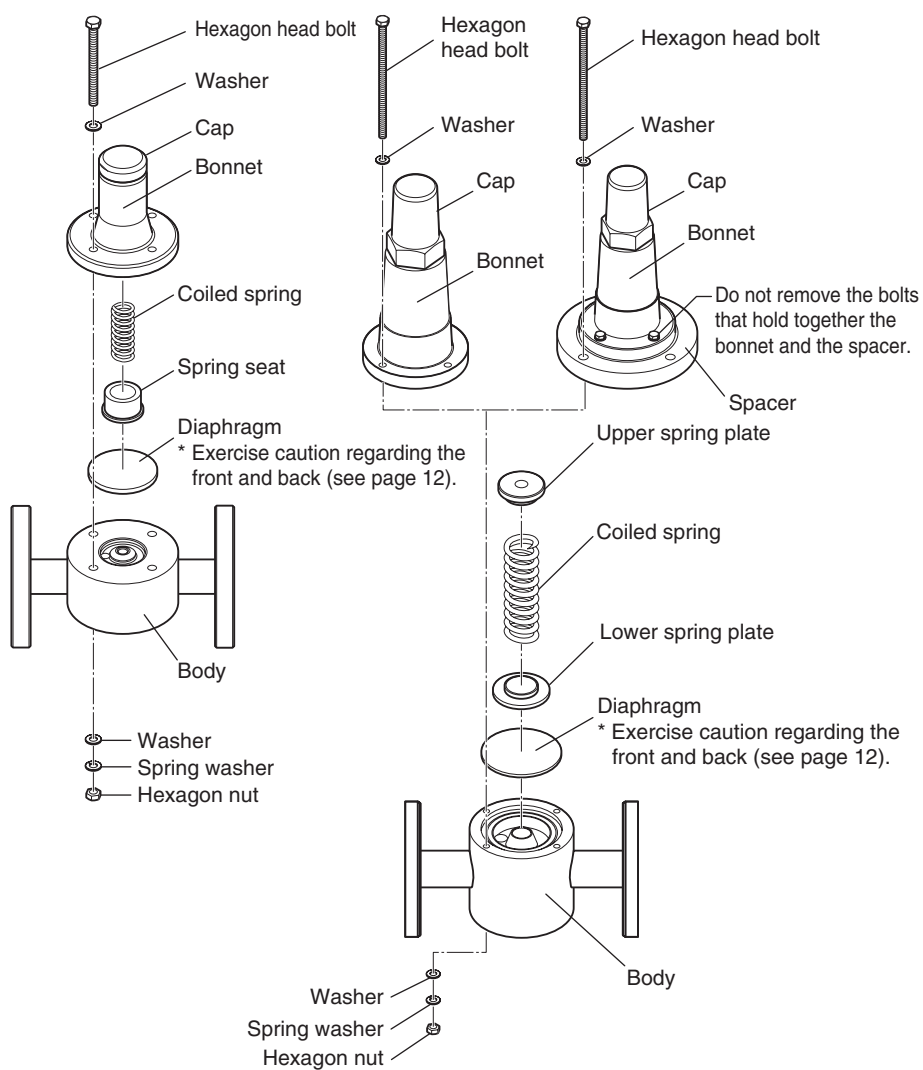
### Exploded view

●BV-F15, F20,  
6x8/Rc1/2,  
12x15/Rc1/2

●BV-F25, F40

●BV-F50, F65

Maintenance



## Troubleshooting

| Details                                                      | Cause                                                                                             | Remedy                                                                          |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Liquid is discharged at low pressure.                        | The sealed part of the body is clogged with debris.                                               | Disassemble and clean the product.                                              |
|                                                              | The diaphragm is damaged.                                                                         | Replace the diaphragm.                                                          |
|                                                              | The pressure has been set too low as a mistake.                                                   | Set the pressure to the correct value.                                          |
|                                                              | The pressure gauge is malfunctioning.                                                             | Replace the pressure gauge.                                                     |
| Liquid is leaking.                                           | The diaphragm is damaged.                                                                         | Replace the diaphragm.                                                          |
|                                                              | The screws are not tight enough.                                                                  | Retighten them.                                                                 |
|                                                              | The piping is clogged, which has led to an increase in pressure.                                  | Disassemble and clean the clogged part.                                         |
|                                                              | The bolts have been tightened unevenly.                                                           | Tighten the bolts evenly.                                                       |
| No liquid is discharged even when the pressure is increased. | The back pressure has been set too high as a mistake.                                             | Set the pressure to the correct value.                                          |
|                                                              | A valve is closed on the back pressure valve's outlet-side piping.                                | Do not install a valve on the back pressure valve's outlet side.                |
|                                                              | The back pressure valve's outlet-side piping is clogged with debris, which has caused a blockage. | Clean the piping.                                                               |
|                                                              | The product is installed in the reverse direction.                                                | Check the injection direction arrow stickers and install the product correctly. |
|                                                              | The pressure gauge is malfunctioning.                                                             | Replace the pressure gauge.                                                     |

## Model code

BV - 
 F
15 - 
 V
E

(1)                      (2)                      (3)                      (4)                      (5)

### (1) Series name

|    |                     |
|----|---------------------|
| BV | Back pressure valve |
|----|---------------------|

### (2) Connection

|   |          |
|---|----------|
| F | Standard |
|---|----------|

### (3) Body size

|    |
|----|
| 15 |
| 20 |
| 25 |
| 40 |
| 50 |
| 65 |

### (4) Body liquid-end section materials

|   |        |
|---|--------|
| V | PVC    |
| S | SUS304 |
| 6 | SUS316 |
| F | PVDF   |

### (5) Diaphragm materials

|   |      |
|---|------|
| E | EPDM |
| T | PTFE |

Troubleshooting

Specifications

## Product specifications

Specifications

| Model     | Connection  | Pressure<br>adjustment range<br>(MPa) | Standard setting<br>pressure<br>(MPa) | Material |           | Weight<br>(kg) |
|-----------|-------------|---------------------------------------|---------------------------------------|----------|-----------|----------------|
|           |             |                                       |                                       | Body     | Diaphragm |                |
| BV-F15-VE | JIS 10K 15A | 0.1 to 0.3                            | 0.1                                   | PVC      | EPDM      | 1              |
| BV-F15-VT |             |                                       |                                       | PVC      | PTFE      | 1              |
| BV-F15-ST |             |                                       |                                       | SUS304   | PTFE      | 3              |
| BV-F15-6T |             |                                       |                                       | SUS316   | PTFE      | 3              |
| BV-F15-FT |             |                                       |                                       | PVDF     | PTFE      | 1              |
| BV-F20-VE | JIS 10K 20A |                                       |                                       | PVC      | EPDM      | 2              |
| BV-F20-VT |             |                                       |                                       | PVC      | PTFE      | 2              |
| BV-F20-ST |             |                                       |                                       | SUS304   | PTFE      | 6              |
| BV-F20-6T |             |                                       |                                       | SUS316   | PTFE      | 6              |
| BV-F20-FT |             |                                       |                                       | PVDF     | PTFE      | 2              |
| BV-F25-VE | JIS 10K 25A | 0.1 to 0.25                           |                                       | PVC      | EPDM      | 5              |
| BV-F25-VT |             |                                       |                                       | PVC      | PTFE      | 5              |
| BV-F25-ST |             |                                       |                                       | SUS304   | PTFE      | 10             |
| BV-F25-6T |             |                                       |                                       | SUS316   | PTFE      | 10             |
| BV-F25-FT |             |                                       |                                       | PVDF     | PTFE      | 5              |
| BV-F40-VE | JIS 10K 40A |                                       |                                       | PVC      | EPDM      | 5              |
| BV-F40-VT |             |                                       |                                       | PVC      | PTFE      | 5              |
| BV-F40-ST |             |                                       |                                       | SUS304   | PTFE      | 12             |
| BV-F40-6T |             |                                       |                                       | SUS316   | PTFE      | 12             |
| BV-F40-FT |             |                                       |                                       | PVDF     | PTFE      | 5              |
| BV-F50-VE | JIS10K 50A  | 0.1 to 0.15                           |                                       | PVC      | EPDM      | 8              |
| BV-F50-VT |             |                                       |                                       | PVC      | PTFE      | 8              |
| BV-F50-ST |             |                                       |                                       | SUS304   | PTFE      | 14             |
| BV-F50-6T |             |                                       |                                       | SUS316   | PTFE      | 14             |
| BV-F65-VE | JIS 10K 65A |                                       |                                       | PVC      | EPDM      | 13             |
| BV-F65-VT |             |                                       |                                       | PVC      | PTFE      | 13             |
| BV-F65-ST |             |                                       |                                       | SUS304   | PTFE      | 18             |
| BV-F65-6T |             |                                       |                                       | SUS316   | PTFE      | 18             |

Specifications

\* For the BV-F25, BV-F40, BV-F50, and BV-F65 models, it is possible to design special valves that can exceed the pressures listed in the pressure adjustment range, so please contact us for details.

Possible adjustable pressure ranges for special design valve. (0.26 to 0.3 MPa for BV-F25 and BV-F40, 0.16 to 0.25 MPa for BV-F50 and BV-F65)



## Consumables list

The recommended replacement cycles are for cases where the product is operated under constant conditions (room temperature and clean water). These cycles change according to individual site conditions, so use the recommended replacement cycles as a guide for replacing consumables. Neglecting to replace consumables may cause malfunctions or breakdowns.

### IMPORTANT

- Inspect the O-ring in the cap and replace it if it has deteriorated.

| Part name | Quantity per product | Recommended replacement interval |
|-----------|----------------------|----------------------------------|
| Diaphragm | 1                    | 4,000 hours or 1 year            |

## Glossary

### ●Overfeeding

A phenomenon where liquid continues flowing from the piping due to the discharge momentum (inertia), even when the pump is stopped. For a flow with pulsation in particular, this phenomenon appears prominently, and the liquid is discharged at a volume larger than the rated volume.

### ●Siphoning

A phenomenon where the transfer liquid continues to flow even when the pump is stopped because the position of the end of the pump's discharge-side piping is lower than the level of the liquid in the suction-side tank.

## Tool list

### ●Pressure adjustment

|                                           |                                |
|-------------------------------------------|--------------------------------|
| BV-F15, F20,<br>6×8/Rc1/2,<br>12×15/Rc1/2 | Flathead<br>screwdriver        |
| BV-F25, F40, F50,<br>F65                  | Spanner, 16 mm<br>across flats |

### ●Diaphragm replacement

|                                      |                                |
|--------------------------------------|--------------------------------|
| BV-F15,<br>6×8/Rc1/2,<br>12×15/Rc1/2 | Spanner, 8 mm<br>across flats  |
| BV-F20, F25, F40                     | Spanner, 10 mm<br>across flats |
| BV-F50, F65                          | Spanner, 13 mm<br>across flats |

## 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 vender 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.

## After-sales services

- 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.

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

## TACMINA CORPORATION

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