

# **KEMPION METERING PUMPS**

## **ACCESSORIES**

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**Air Chamber(AC) Valve(BV,RV)**

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**Instruction Manual**

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Tank you very much for purchasing KEMPION Accessories.

Before beginning operation, please read this instruction manual carefully. Correct handling, repair, & maintenance are described easily.

Please use these accessories safely to be guaranteed performance & long life of the accessories after reading this instruction manual.

Please keep this instruction manual at the place where you can see it easily.

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## Notice for safety

## 1-1 Introduction

- To use the products safely, the signs are showed on the manual like below.
- As it is a matter of safety, please be sure to keep the directions in manual.
- The sign and indications are as follows.

**Warning** Person death or serious injury will be occurred, if warning is not kept by wrong handling.

**⚠ Caution** Person injury or property damage will be occurred, if cautions is not kept by wrong handling.

### 1-2 Cautions for Use Condition

 **Caution**

- Do not use this pump for other purposes except designated usage (please refer to the chapter 3), otherwise accident or damage may occur.
- Please keep the followings, otherwise it may cause trouble.

Ambient temperature : 0~40°C

Temperature of handling liquid : Body of PP & PVDF material 0~50℃


: Body of SS304 & SS316 material 0~80℃

Pressure in the piping : below the maximum limit indicated on the Specifications.

### 1-3 Cautions for Handling Condition

 **Warning**

- Install this product beyond the reach of children and/ or unauthorized person.
- Use designated parts certainly. Accident or trouble may occur.
- Absolutely do not modify products arbitrarily, accident or trouble may occur.

 **Caution**

- In case of Air Chamber, when using for some liquids reacted to oxygen or moisture, be cautious because the air is filled in the air chamber(example: deoxidating agent, deoxidant, antioxidant, & etc.)
- Put off power and stop pump & other equipment before repair or disassembly.
- Wear suitable protective clothing(gloves, mask, goggles, working clothes, & etc.) during repair & maintenance.
- Before repair & maintenance, release pressure & drain liquid in the piping.
- Products may be damaged when ambient temperature go down below freezing point of liquid. Drain the liquid in the piping certainly.
- Take a precautionary measures in considering unexpected liquid release caused by damage of products or piping.
- Dispose of waste product in accordance with related national law.

## 2 Confirmation of Products

Please check following points immediately after receiving the product.

If the defect in the product is found, please report details to CHEONSEI or local distributor.

We'll take care of it promptly.

- ① Is specification correct as ordered?
- ② Is there any missing parts?
- ③ Is there any visible damage caused by vibration or shock during transport?

## 3 General

### 3-1 Air Chamber

Reciprocating pump has a peculiar pulsation which cause vibration of piping and overfeed phenomena. Air chamber will be used to solve such problems caused by pulsation.

### 3-2 Back Pressure Valve

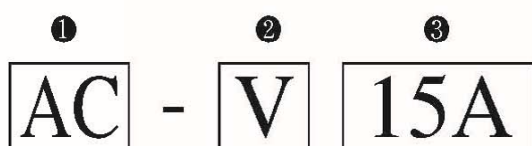
According to the conditions of the piping, the discharge rate may be excessive or the pumping liquid may be continuously leaked in spite of stopping the pump which is caused by overfeed or siphon phenomena. The back pressure valve is for preventing such things.

### 3-3 Relief Valve

When the discharge pressure increases to more than a setting point due to choking the valve with debris or closing the valve, the safety valve will open automatically to relieve the pressure. Relief valve prevents pump and piping from damages.

## 4 Model Code

### 4-1 Air Chamber

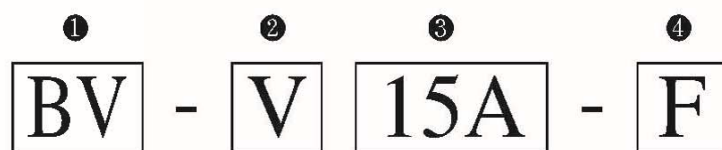


- |                   |                  |           |           |                        |         |
|-------------------|------------------|-----------|-----------|------------------------|---------|
| ① Model           | AC : Air Chamber |           |           |                        |         |
| ② Body Material   | V : PVC          | S : SS304 | 6 : SS316 | F : SS304+ETFE(Lining) |         |
| ③ Flange Standard | 15A              | 20A       | 25A       | 40A                    | 40P 50A |

Note) 40p is size of 40A but the capacity is specially big.



## 4-2 Valve



- ① Model                      BV : Back Pressure Valve                      RV : Relief Valve  
 ② Body Material           V : PVC                      S : SS316                      F : PVDF  
 ③ Flange Standard       15A    20A    25A    40A    40P    50A  
 ④ Connection              F : Flang    T : Thread

Note) 1. In case of plastic material, do not specify connection type (④) separately since standard connection is only flange connection.  
 2. 40p is size of 40A but the capacity is specially big.

# 5 Specification & Applicable Pump Models

※ The applicable pump models may vary depending upon the piping condition.

## 5-1 Air Chamber

Model	Capacity (cm <sup>3</sup> )	Max. Pressure(bar)		Applicable pump models
		PVC	STS	
AC-□15A	500	10	10	KD-21H~23H KM-500~212 KH-51~23
AC-□20A	1,000	10	10	
AC-□25A	2,000	10	10	KD-33L~73H, 43H~14M KH-33, 63
AC-□40A	4,000	9	10	KD-14H, 14G, 24L, 24H KH-14, 24
AC-□40P	6,000	6	10	KD-24S, 34H
AC-□50A	10,000	5	10	KD-54L

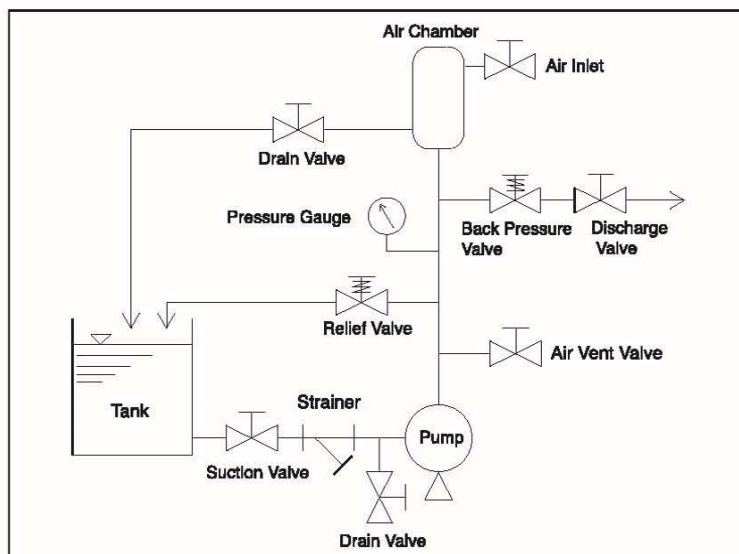
## 5-2 Valve

Model	Pressure Control Range(bar)			Standard Setting Pressure(bar)			Applicable pump models
	BV	BV(H.P)	RV	BV	BV(H.P)	RV	
B·RV-□15A	0.5~3	3~10	3~10	1	5	5	KD-21H~23H KM-500~212 KH-51~23 PKD-500~412
B·RV-□20A	0.5~3	3~10	3~10	1	5	3	
B·RV-□25A	0.5~3	3~8	3~10	1	5	5	KD-33L~73H, 43H~14M KH-33, 63 PKD-702~203
B·RV-□40A	0.5~3	3~8	3~10	1	5	5	KD-14H, 14G, 24L, 24H KH-14, 24 PKD-243, 333
B·RV-□40P	0.5~3	2~5	3~8	1	5	5	KD-24S, 34H PKD-423
B·RV-□50A	0.5~3	2~5	3~8	1	3	3	KD-54L

Note) H.P : High Pressure

# 6 Installation

- 1 Install the Air Chamber at the close range within 1~2 meters from the metering pump.
- 2 Fix the Air Chamber with support.
- 3 For safety, do not install a valve between the metering pump and the Relief Valve .
- 4 Make sure that the inlet/outlet direction of the BV and RV is not installed reversely.
- 5 Install the pressure gauge on the discharge piping
- 6 Install the pipe & valve for draining certainly.
- 7 Take precautionary measures against the freezing of the liquid in winter



# 7 Operation

## Caution

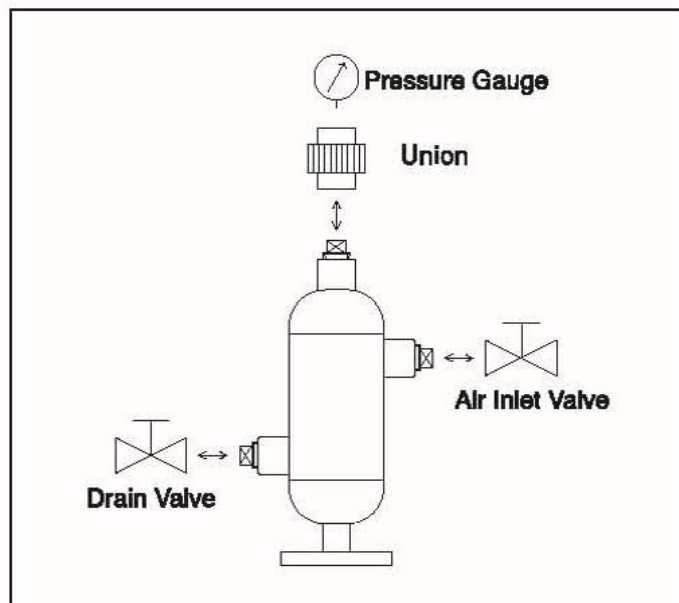
- Wear suitable protective clothing(gloves, mask, goggles, working clothes, & etc.) during repair & maintenance.
- Before repair & maintenance, release pressure & drain liquid in the piping.
- In case of Air Chamber, In case of use for some liquids reacted to oxygen or moisture, be cautious because the air is filled in the air chamber(example: deoxidating agent, deoxidant, antioxidant, & etc.)

## 7-1 Air Chamber

- 1 In case of PVC material, if possible, please be careful that the operating pressure does not exceed 5 bar.
- 2 In case of PVC material, avoid the direct rays of the sun because PVC material is deteriorated with UV rays and, if possible, put a protective cover on it in order to prevent damage from impact by a sharp object
  - ※ In case of PVC material, we recommend replacement of air chamber every three years.
- 3 It is impossible to reduce the pulsation extremely by itself. Therefore it is necessary to install Control Valve or Back Pressure Valve on the discharge side of Air Chamber in order to make a resistant to the piping. It is also necessary to adjust the resistance according to flow rate in order to minimize the pulse rate. Every time flow rate of metering pump is adjusted, need to adjust the resistance to the suitable resistance by Control Valve.
- 4 Air is contained in the Air Chamber. Air in the Air Chamber is dissolved into the liquid and air decrease little by little because air is constantly contacting the liquid. If air in the Air Chamber decrease, pulsation will be bigger. Therefore, supplement air into the Air Chamber periodically.
- 5 Pay attention to the liquids reacted to oxygen or moisture because the air is filled in the air chamber.
- 6 When pumping the liquids contains slurry or the crystalloid liquid, clean the inside of piping after stop of operation.



- 7 When the needle of the pressure gauge is swayed over twice as wide as the usual one or vibration occur in the piping or the pulsation of the discharge side becomes bigger, should supplement air into the Air Chamber
- ※ Weekly inspection is recommended
  - ※ If the operating pressure exceeds 5 bar, the dissolution speed of the air into the liquid will be accelerated and the function of air chamber cannot be maintained. At this situation, should supplement air into the Air Chamber frequently
- 8 When supplementing air into the Air Chamber, please keep the following procedures
- ① After stop of pump, close both front valve and rear valve of the Air Chamber.
  - ② Slowly unfasten the upper plug and drain the air. When the air is completely drained, fasten upper plug.
  - ③ Unfasten the lower plug and unfasten the upper plug again in order to drain the liquid.
  - ④ Fasten the upper & lower plug firmly, when the flow of liquid comes to a stop.
  - ⑤ Open both front valve and rear valve of the Air Chamber.
- ※ In case of dangerous liquid, install valves instead of a plug, together with a drain pipe.
  - ※ If the pressure gauge should be installed, use Union.



## 7-2 Valve

- 1 Setting pressure of Back Pressure Valve and Relief Valve is set at our factory with the clean water. So you have to readjust it according to actual flow rate & actual pressure, if necessary.
- 2 If you want to adjust setting pressure, unfasten the housing cap counterclockwise and, if you fasten the valve guide(rear) & the control bolt clockwise, setting pressure will get higher. On the contrary, if you unfasten the valve guide(rear) & the control bolt counterclockwise, setting pressure will get lower.
- ※ Adjust setting pressure by watching the pressure gauge on the piping while the pump is working.
- 3 If the setting pressure is correctly adjusted, fasten the housing cap.
- 4 If you want to remove foreign substance from the valve or change a diaphragm, close the front piping of the valve and drain the liquid.
- 5 Then, unfasten the bolts and disassemble the housing & the diaphragm from the valve.
- 6 After removing the foreign substance, make sure that you re-assemble the diaphragm in such a way that the PTFE-coated side of the diaphragm faces the main body .

## 8 Cause of Trouble and Troubleshooting

Trouble	Cause	Troubleshooting
Can't reduce pulsation	<ul style="list-style-type: none"> <li>Air is insufficient in the Air Chamber</li> <li>Back pressure is insufficient at the discharge side</li> </ul>	<ul style="list-style-type: none"> <li>Refill air.</li> <li>Adjust the Back Pressure Valve or Control Valve</li> </ul>
Vibration of the piping	<ul style="list-style-type: none"> <li>Air is insufficient in the Air Chamber</li> </ul>	<ul style="list-style-type: none"> <li>refill air.</li> </ul>
Liquid cannot be discharged	<ul style="list-style-type: none"> <li>Relief valve is being operated to abnormal pressure</li> </ul>	<ul style="list-style-type: none"> <li>Remove the cause of abnormal pressure(closing or freezing of valve)</li> </ul>
Liquid is released before the setting pressure is reached	<ul style="list-style-type: none"> <li>Foreign substance are accumulated</li> <li>Diaphragm is damaged</li> </ul>	<ul style="list-style-type: none"> <li>Remove the foreign substance and wash</li> </ul>

## 9 Warranty



### Warning

- If the product is reconstructed arbitrarily or the undesignated parts are used into the pump, CHEONSEI will not warrant and CHEONSEI is not responsible for any expense caused by accident or trouble.

- 1 Warranty period is one year from purchase date.
- 2 During warranty period, repair or change of product is free of charge, if trouble or damage of pump due to design or manufacturing of CHEONSEI. ( ※ Consumable parts are excluded.)
- 3 Repair or change product due to following reasons will be charged regardless the warranty period.
  - ① Trouble or damage of product expired warranty period.
  - ② Trouble of using by careless handling.
  - ③ Trouble or damage due to using non-designated part & reconstructing the pump arbitrarily.
  - ④ Trouble by fire or natural disaster.



# 10 Repair Service

## ⚠ Caution

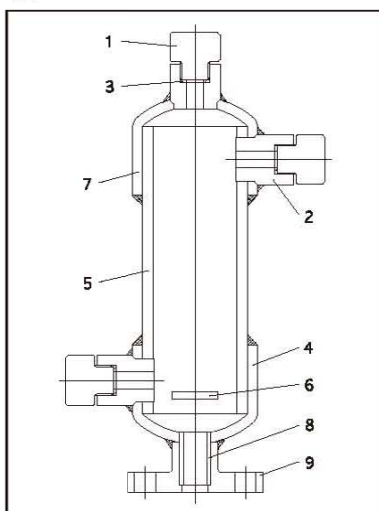
- When the product is sent to factory for repair service, clean out inside of product.

- 1 Contact to CHEONSEI or local distributor as shown on back of the manual, if you have any problem or questions.
- 2 If you want to repair, please inform the following.
  - ① Model Name & manufacture number written in name plate
  - ② Used period, operation condition, operation status, and transfer liquid
- 3 If warranty period is over, it may charge according to repair part. Please contact with sales agent for more information.
- 4 Minimum retention period of parts for repair is 5 years from the date of production.

# 11 Structure and Name of Each Parts

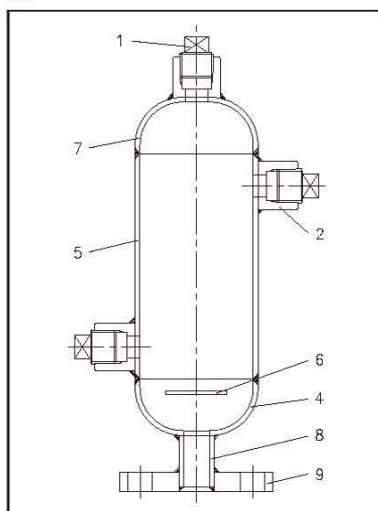
## 11-1 Air Chamber

### 1 Model : AC-V15A~V50A



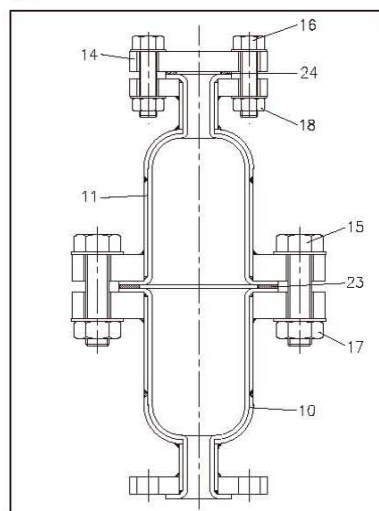
No	Part Name	Q' ty
1	Plug	3
2	Socket	3
3	Packing	3
4	End Cap(Lower)	1
5	Pipe	1
6	Plate	1
7	End Cap(Upper)	1
8	Pipe	1
9	Flange	1

### 2 Model : AC-S .615A~S .650A



No	Part Name	Q' ty
1	Plug	3
2	Socket	3
4	End Cap(Lower)	1
5	Pipe	1
6	Plate	1
7	End Cap(Upper)	1
8	Pipe	1
9	Flange	1

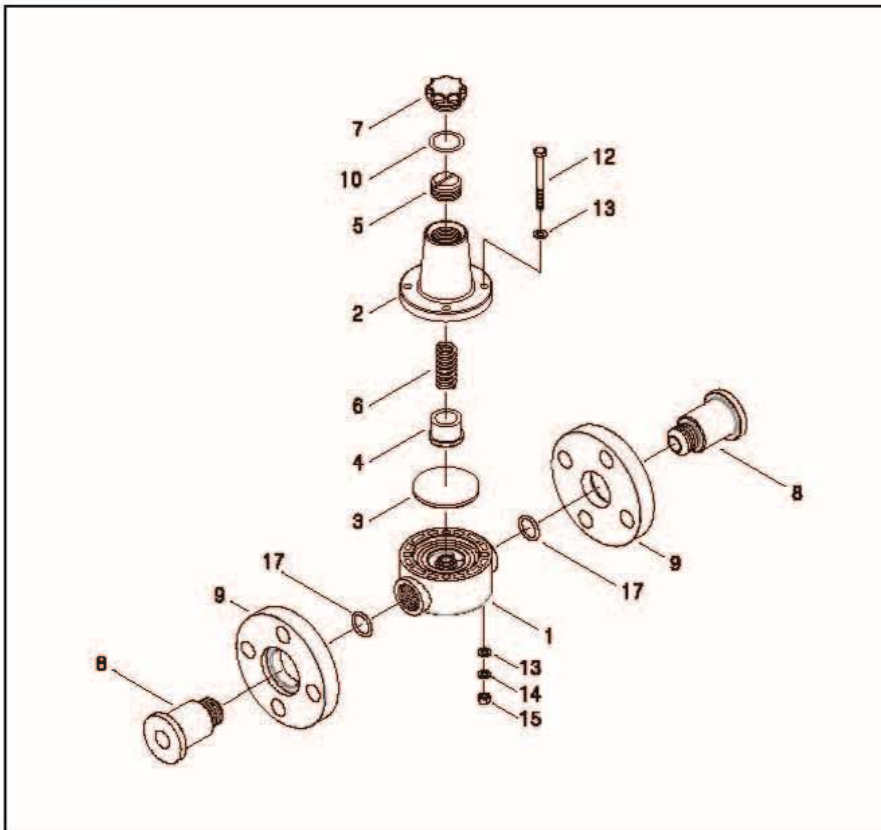
### 3 Model : AC-F15A~F50A



No	Part Name	Q' ty
10	Casing(Lower)	1
11	Casing(Upper)	1
14	Flange	1
15	Bolt(Hex.)	4/8
16	Bolt(Hex.)	4
17	Nut(Hex.)	4/8
18	Nut(Hex.)	4
23	Gasket	1
24	Gasket	1

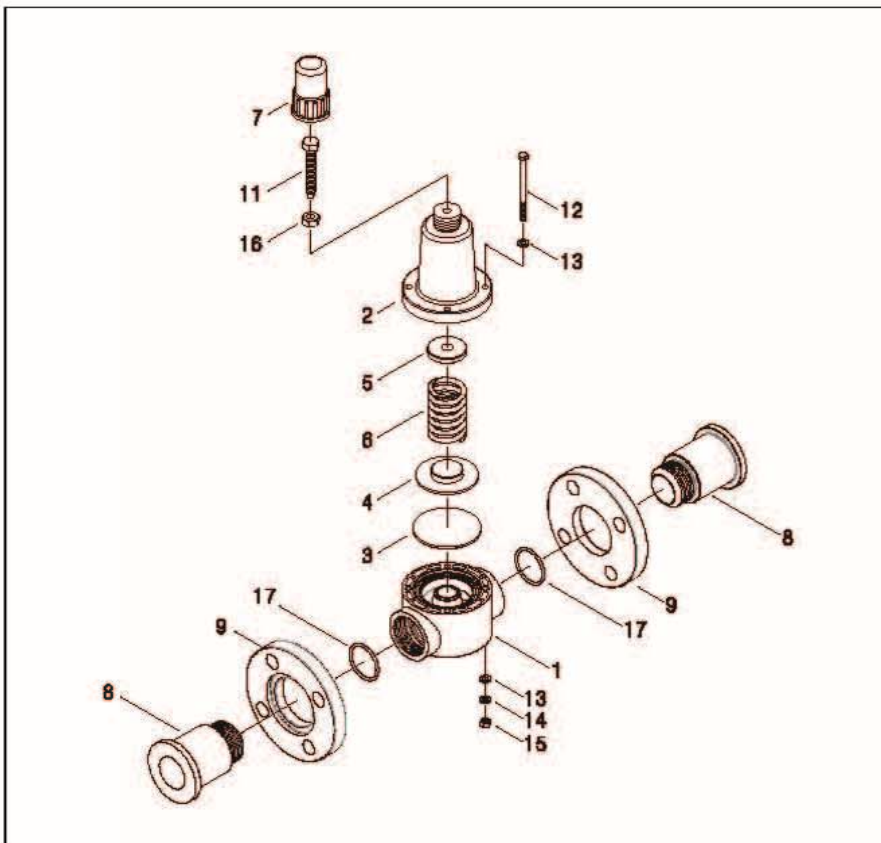
## 11-2 Valve

1] Model : BV·RV-V15A,V20A-F



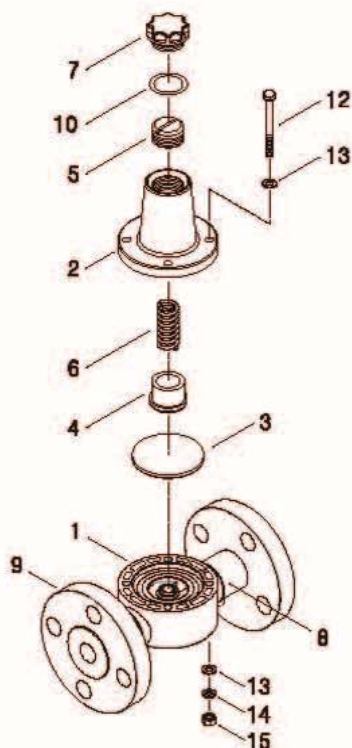
No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
8	Joint Pipe	2
9	Flange	2
10	O-ring	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4
17	O-ring	2

2] Model : BV·RV-V25A~V50A-F



No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
8	Joint Pipe	2
9	Flange	2
11	Control Bolt(Hex.)	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4
16	Nut(Hex.)	1
17	O-ring	2

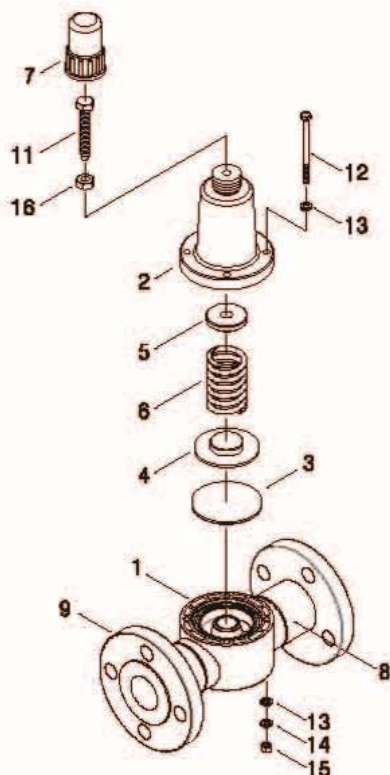
③ Model : BV・RV-F15A, F20A-F



No	Part Name	Q'ty
(1)	Main Body	(1)
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
(8)	Joint Pipe	(2)
(9)	Flange	(2)
10	O-ring	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4

※ In case of '(No.)', it is all-in-one struction.

④ Model : BV・RV-F25A~F50A-F

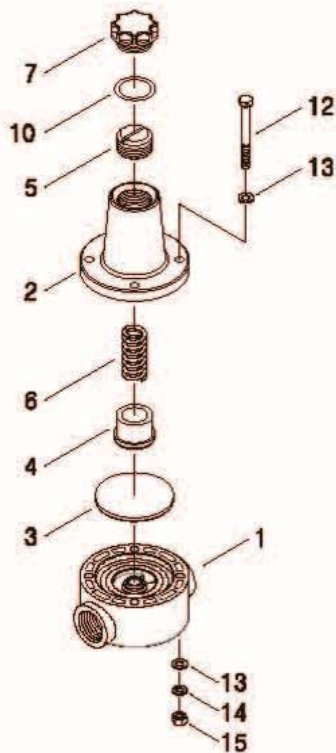


No	Part Name	Q'ty
(1)	Main Body	(1)
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
(8)	Joint Pipe	(2)
(9)	Flange	(2)
11	Control Bolt(Hex.)	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4
16	Nut(Hex.)	1

※ In case of '(No.)', it is all-in-one struction.

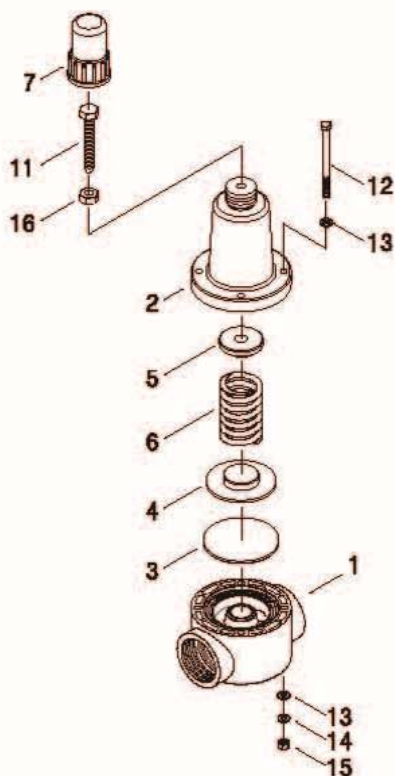


5 Model : BV -RV-V(F)15A, V(F)20A-T



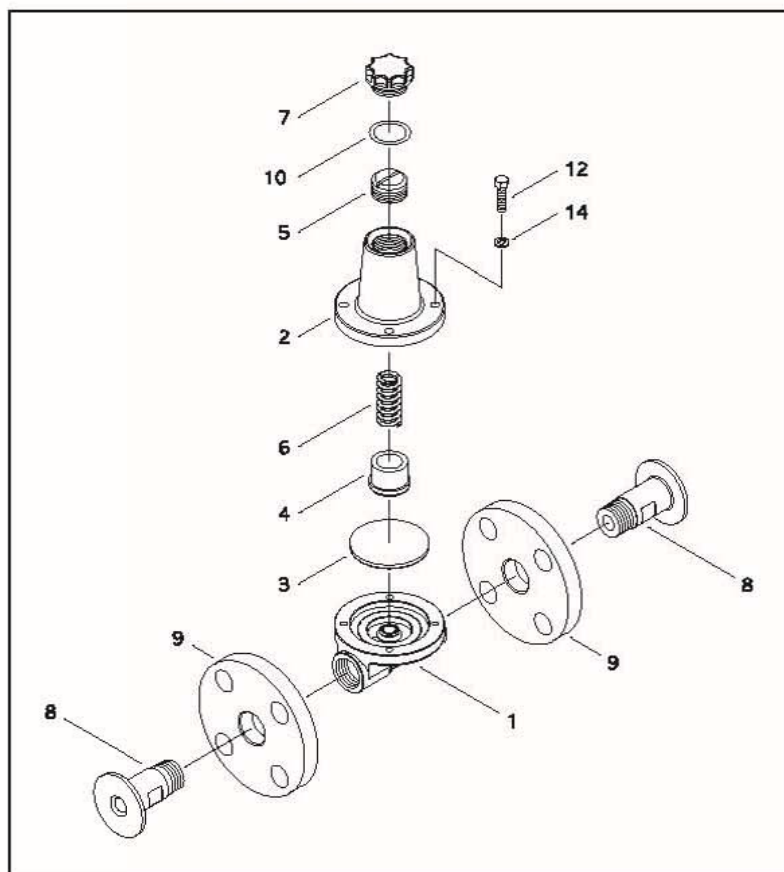
No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
10	O-ring	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4

6 Model : BV -RV-V(F)25A~V(F)50A-T



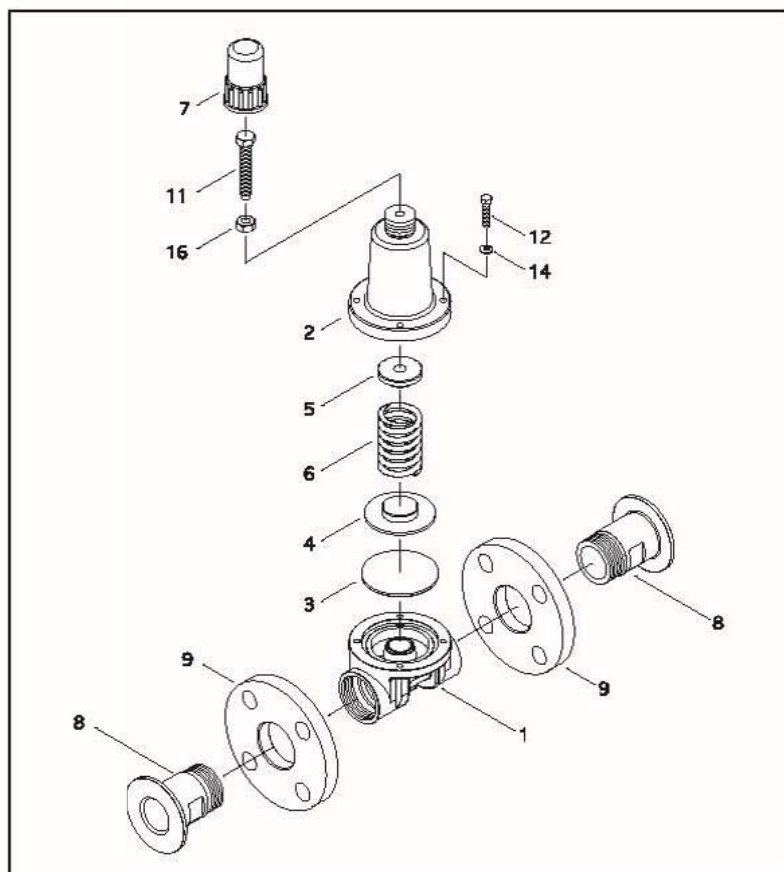
No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
11	Control Bolt(Hex.)	1
12	Bolt(Hex.)	4
13	Washer(Flat)	8
14	Washer(Spring)	4
15	Nut(Hex.)	4
16	Nut(Hex.)	1

7 Model: BV・RV-S15A, S20A-F



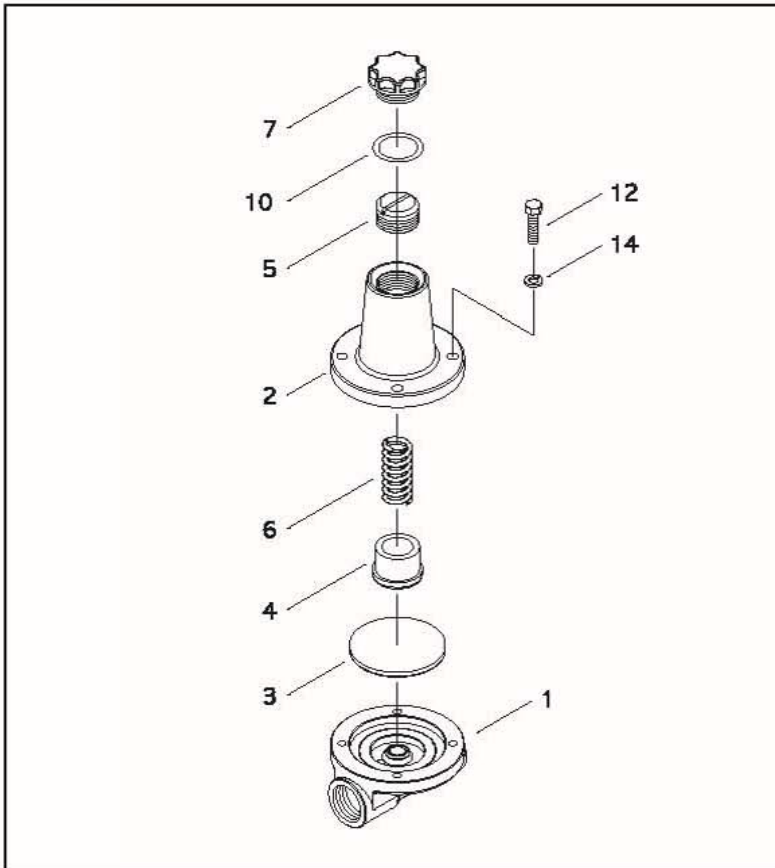
No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
8	Joint Pipe	2
9	Flange	2
10	O-ring	1
12	Bolt(Hex.)	4
14	Washer(Spring)	4

8 Model: BV・RV-S25A~S50A~F



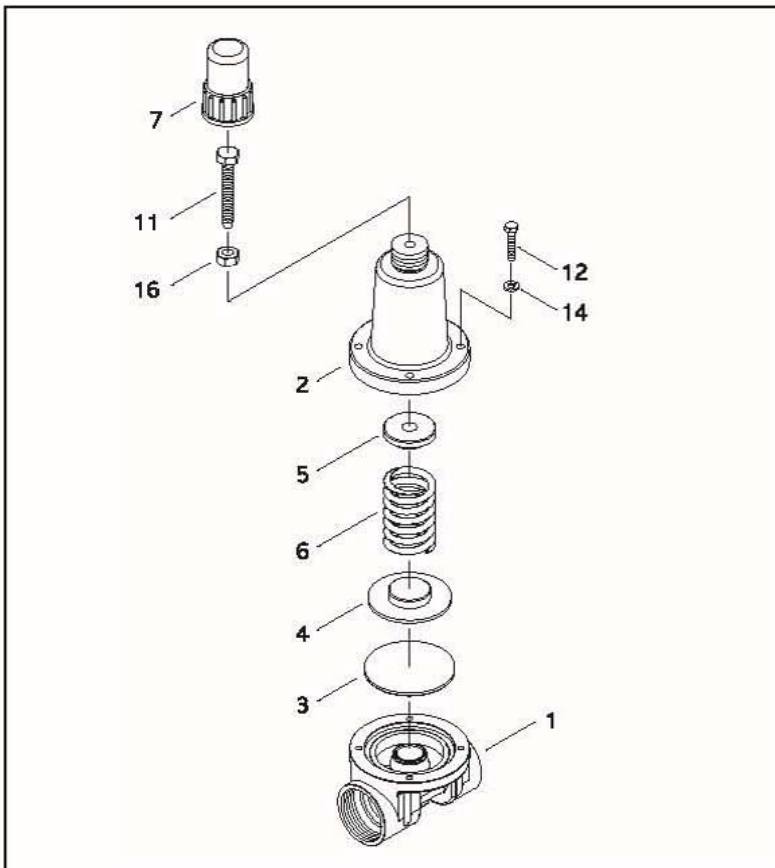
No	Part Name	Q' ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
8	Joint Pipe	2
9	Flange	2
11	Control Bolt(Hex.)	1
12	Bolt(Hex.)	4
14	Washer(Spring)	4
16	Nut(Hex.)	1

㉑ Model: BV・RV-S15A, S20A-T



No	Part Name	Q'ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
10	O-ring	1
12	Bolt(Hex.)	4
14	Washer(Spring)	4

㉒ Model: BV・RV-S25A~S50A~T



No	Part Name	Q'ty
1	Main Body	1
2	Valve Housing	1
3	Diaphragm	1
4	Valve Guide(Front)	1
5	Valve Guide(Rear)	1
6	Spring	1
7	Housing Cap	1
11	Control Bolt(Hex.)	1
12	Bolt(Hex.)	4
14	Washer(Spring)	4
16	Nut(Hex.)	1





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