

# Pressure / or Vacuum Relief Valve

## INSTRUCTION MANUAL



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- ◆ General Description
- ◆ Operation
- ◆ Shop / Job Site Testing
- ◆ Installation
- ◆ Maintenance

### K.S.P.C

488-1 Wolha-ro, Tongjin-eup, Gimpo-si, Gyeonggi-Do, Korea

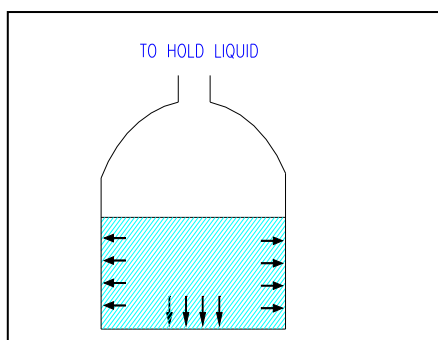
Tel : +82-31-998-3825~7

Fax: +82-31-998-3828

Web Site : [www.ikspc.com](http://www.ikspc.com)

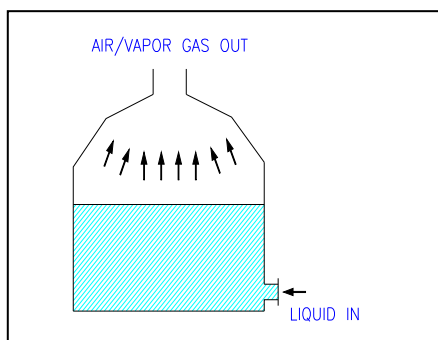
## Section 1. General Description

- 1-1 According to API 2000 code, the PVRV are designed, manufactured and tested.
- 1-2 The Pressure Vacuum Relief Valves are used on liquid storage Tanks which designed by API 520/API 650 and Others process vessels or systems to prevent structural damage due to excess internal pressure or vacuum.
- 1-3 This valve has functions to intake the air under constant pressure during unloading and rising Temperature, and to discharge the overpressure generated during pouring the liquid and falling Temperature on storage tank. This is the safe valve to control the deflation(vacuum) and inflation(pressure) of several storage tanks.



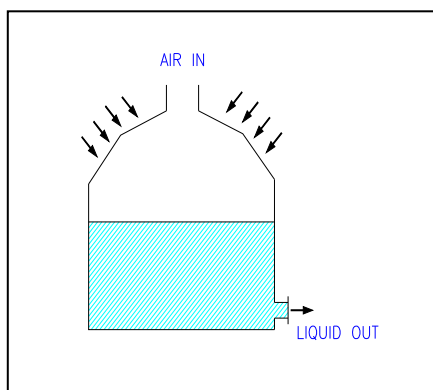
The function of prevention of natural evaporation of fluids

- ★ The effect of energy reduction  
In case of gasoline, to minimize the natural evaporation of stores saves 98 m<sup>3</sup> per year. (Based on the tank diameter : 30.4m x tank capacity 8690m)



The function of protection of over-pressure

- ★ The effect of prevention of exploration  
With the exception of influx and efflux of stores, it is Kept always closed to prevent the diffusion of exploration Into tank.



The function of protection Of under pressure.

- ★ The effect of prevention of corrosion (The effect of extension of life)  
To keep the stabilization of constant gas pressure Generated pressure generated inside tank, prevents inside of the tank from corrosion by the temperature of gas.

## Section 2. Installation

- 2-1 Inspect the unit for indications of physical damage or internal contamination for all equipment before installation. The PVRV should be installed on the tank nozzle flange vertically.
- 2-2 First bleeding all pressure from the Tanks or Vessels before installation and replacement.
- 2-3 Inspect the flange surface of Tank / PVRV nozzle flange. It must be clean, free of scratches, corrosion, and flat.
- 2-4 Aluminum valves are furnished with flat face flanges and should match flat face flange with a full faced gasket.
- 2-5 Make sure the gasket that the material is suitable for the application.
- 2-6 Set the valve carefully on the nozzle. Install the studs and tighten nuts hand tight. Make sure that the flanges are not distorted and that the gasket is evenly compressed.
- 2-7 For the installation of tank nozzle, in case of draw up a purchase requirement should be description, use stud bolts and nuts supply whether or not and technical specification.

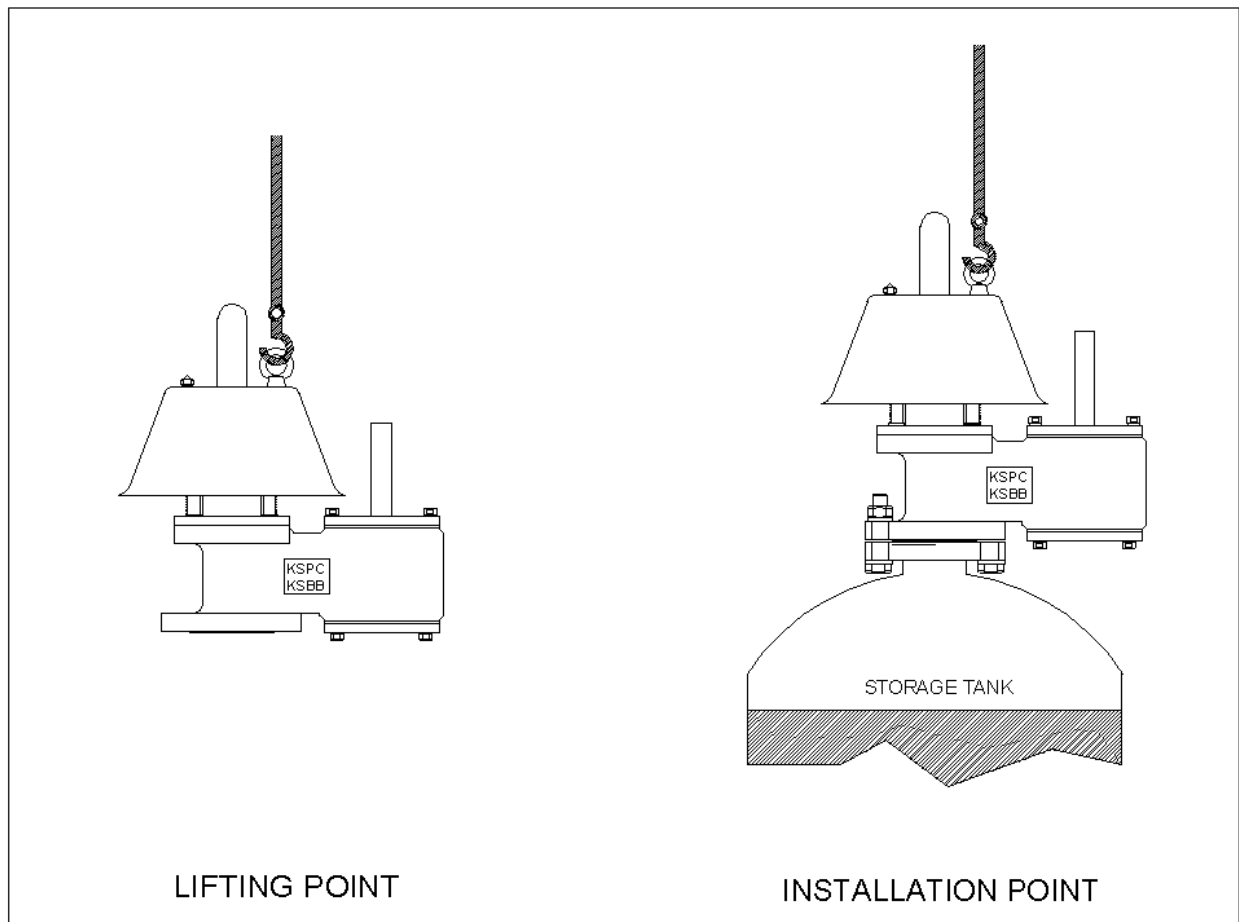


Figure 1.

## Section 3. Operation

- 3-1 When tank is unloading phenomena and the pressure is above the setting (operational fixing pressure), the PVRV operates automatically to protect the storage tank from the deflation or malformation.
- 3-2 The Model, KSBB/KSBG/KSBD/KSPR/KSVR which the weight loaded type are designed to provide tank protections for both pressure and/or vacuum of set point to max 75/-43 mbarg. Over above set point till 900/-900 mbarg, consider to be installed spring loaded type, KSBS/KSBBJS/KSGS/KSDS/KSPS. The safety relief valve is not used in controlling the extra setting of pressure and consider Emergency vent For External fire and Rupture case.
- 3.3 The set point of PVRV is fixed by the customer's order or Project's Specification. but it is designed to adjust the pressure/vacuum setting in case. The way of change adds additional counter weight for Weight loaded type. The way of change for spring loaded as follow, To increase the setting pressure turns the press. adjusting screw clockwise. To decrease the setting pressure turns the press. adjusting screw counter-clockwise. Before change set point of disc a'ssy, should be consulting the factory or our local representative.

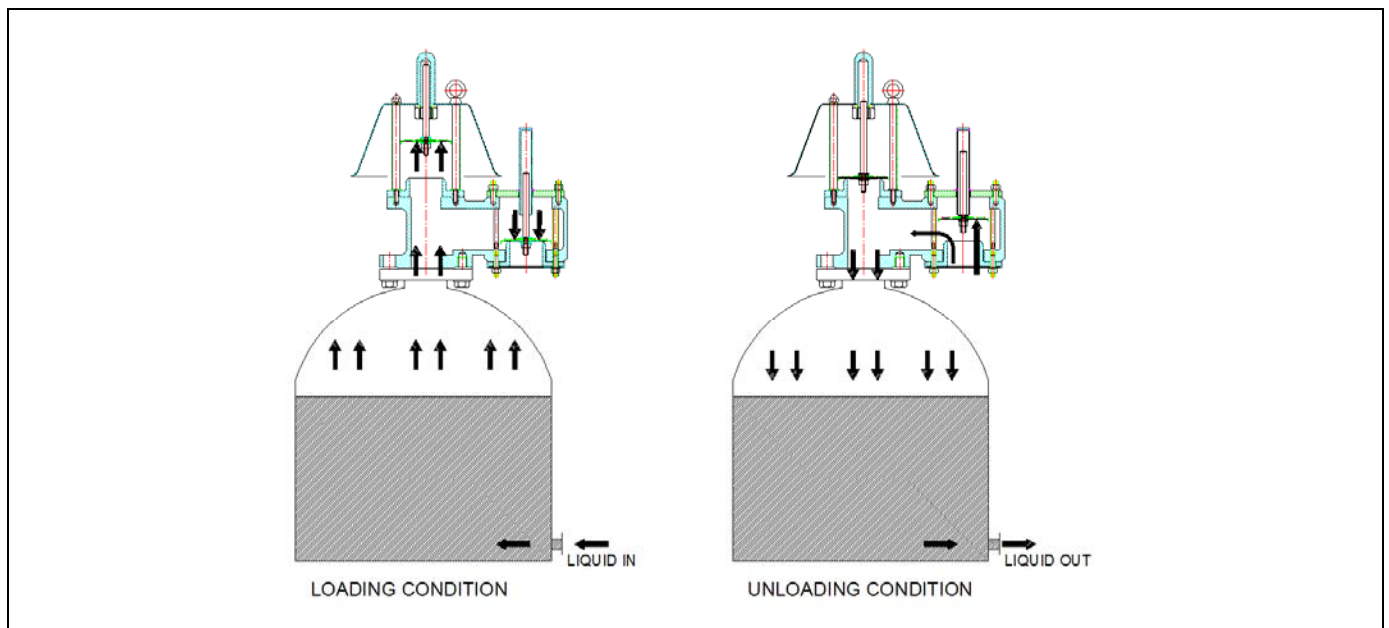


Figure 1 (KSBB/KSBS TYPE).

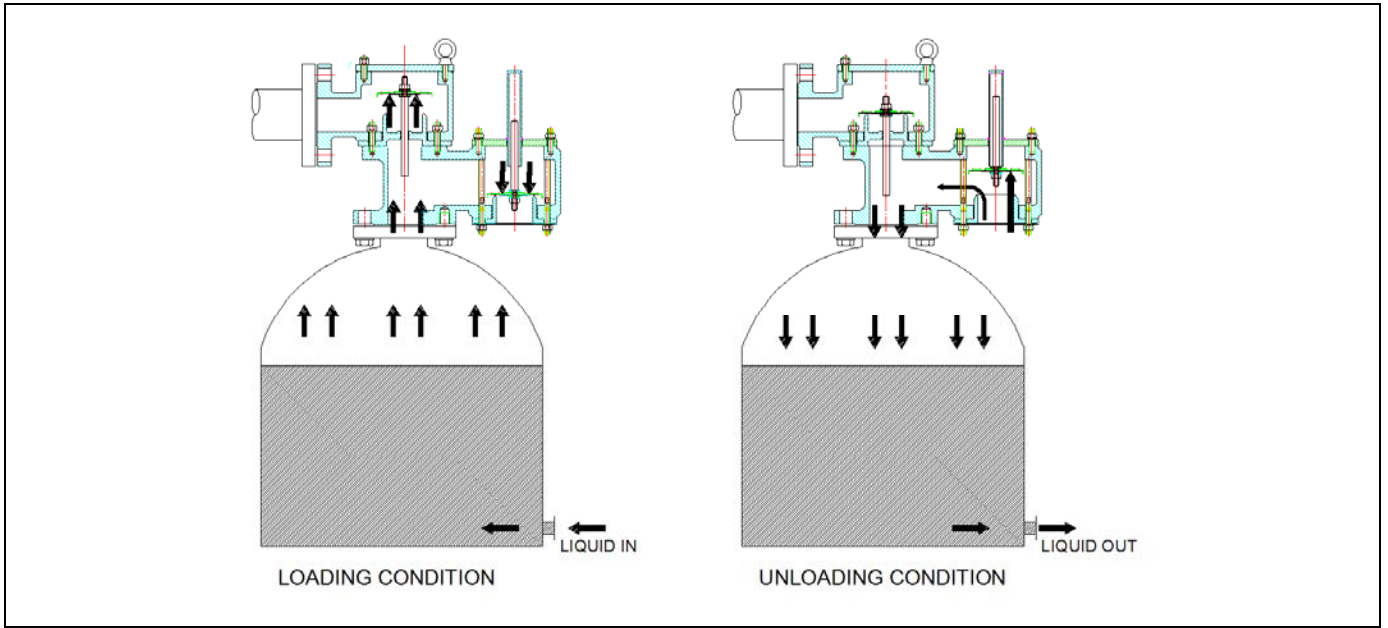


Figure 1 (KSBG/KSGS TYPE).

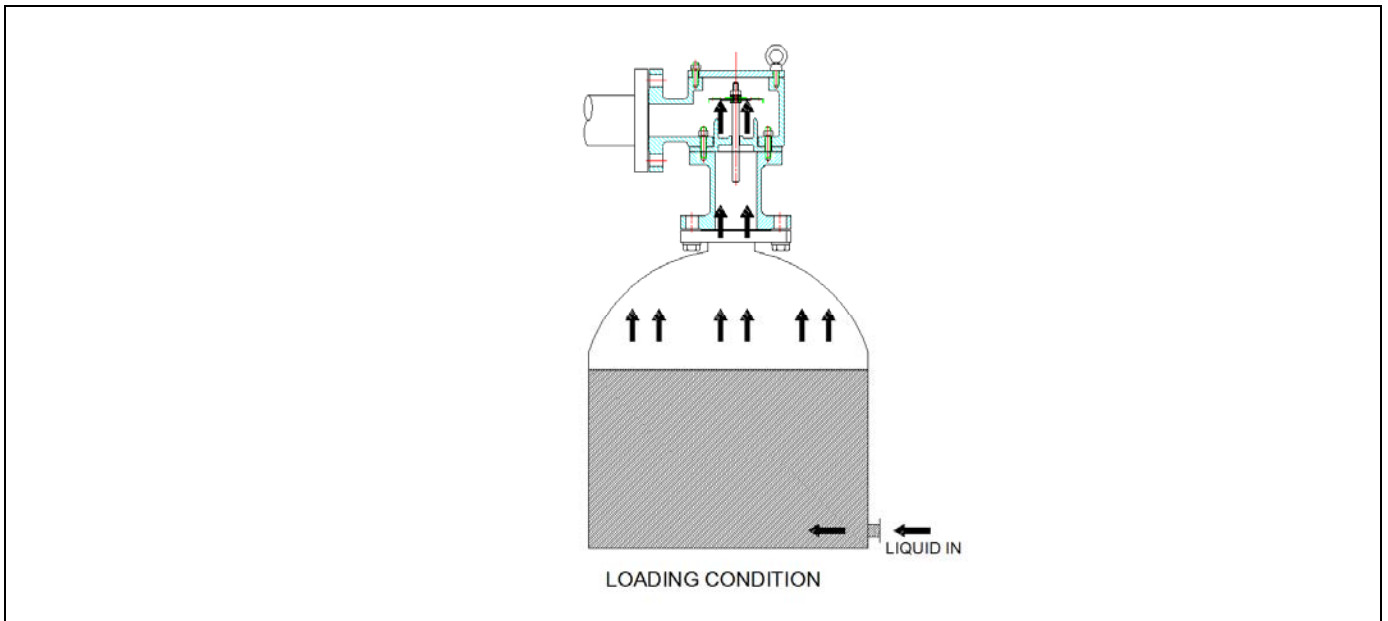


Figure 1 (KSBG/KSGS TYPE).

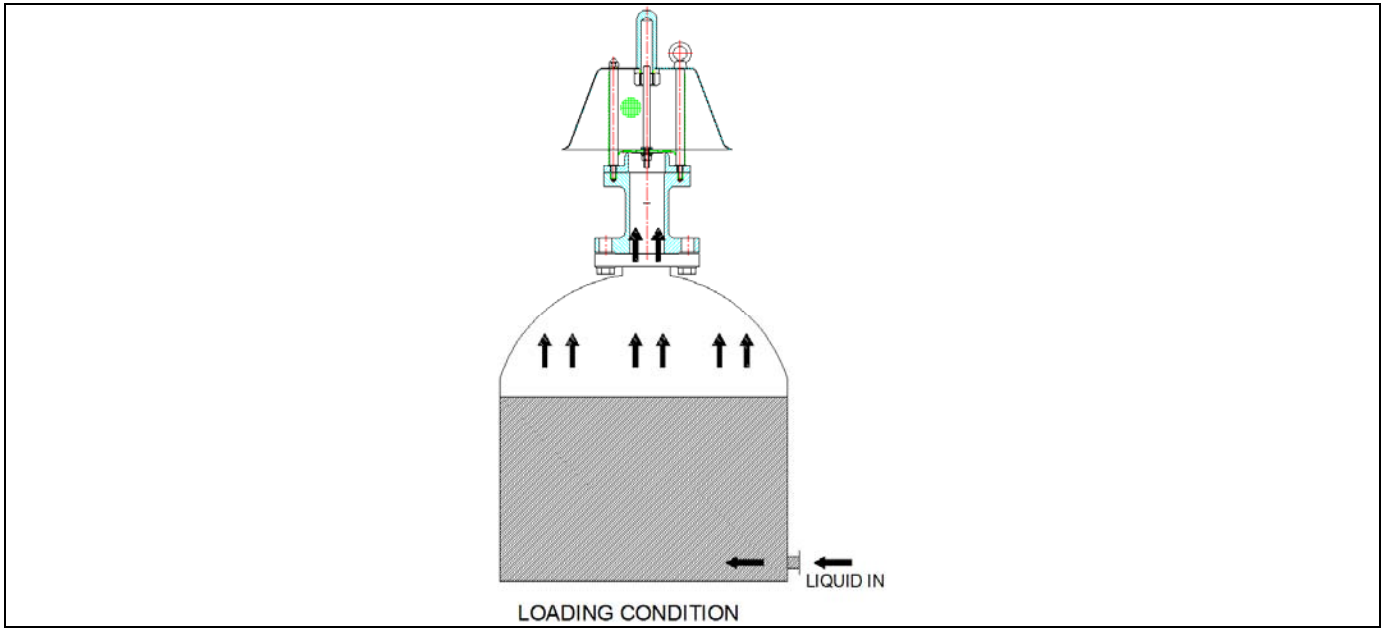


Figure 1 (KSPR/KSPS TYPE).

## **Section 4. Maintenance**

### **4-1 GENERAL**

4.1.1 It is necessary to regularly inspect the diaphragm, guides and seating surfaces to ensure the valve can open Freely.

4-1-2 Thereafter, it should be regularly checked and cleaned in every 6 months at least.

#### **👉 CAUTION**

The regular check-up and cleaning depend on the liquid type, the frequency of unloading and operation condition.

### **4-2 THE SAFETY RULES OF THE MAINTENANCE WORK**

4-2-1 For the maintenance work of the installed PVRV on storage tank, it is necessary to use the spark free tools.

4-2-2 For the maintenance work of the installed storage tank, it is necessary to keep the inside of the tank depressurized and gas freed before the work.

4-2-3 Loosen and remove all nuts and lift off the weather hood and vacuum / or vacuum cover

#### **👉 CAUTION**

For the maintenance work, it is necessary to take the preventive measures against the toxicity and inflammability of the liquid in the tank.

### **4-3 THE PROCEDURE DISASSEMBLY AND ASSEMBLY**

4-3-1 Loosen and remove all nuts and washers.

4-3-2 Lift of the vacuum cover and weather hood.

4-3-3 Remove and lift up the pressure and vacuum disc (=pallet) assemblies.

4-3-4 Carefully inspect all guides and disc Assemblies (disc / Teflon) for corrosion damages.  
If the disc / or Teflon are damaged, it must be replaced new one.

4-3-5 Check the metal seating surface for pitting and corrosion.

If the seats surface are damaged, they must be lapped using a perfectly flat ground metal disc and or sand paper.

4.3-6 Verify that the disc and weight are back in their proper position.

Assemble in reverse order and disc assemblies sit flat n the seat and the stem is not cocked when Weather hood and vacuum cover are installed.

Tighten all wing nuts firmly.

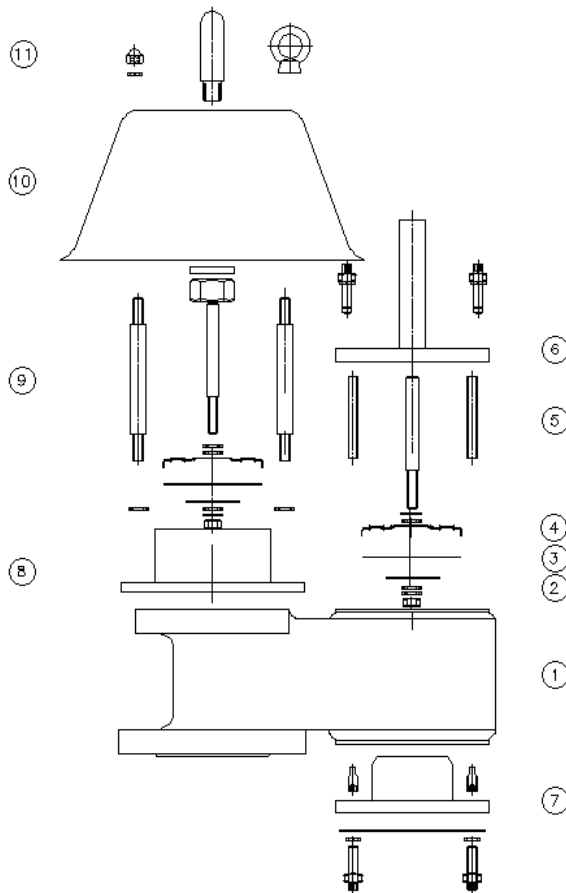
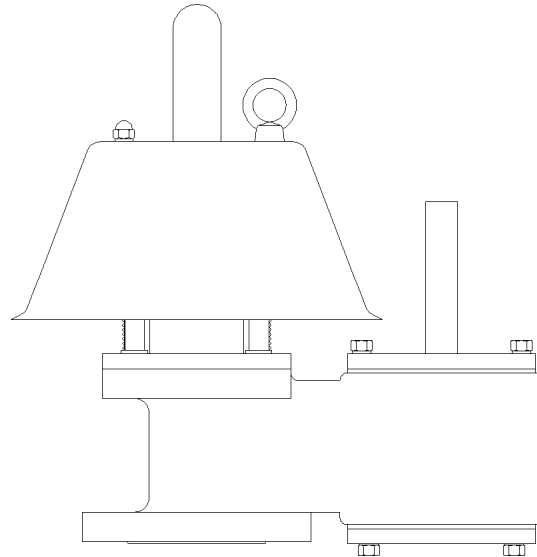
 **CAUTION**

- \* Put the pressure and vacuum pallet assemblies back in their original location and ensure that the stem is Straight and fits into the guide in the vacuum cover, seat guide or weather hood.
- \* Do not mixed pressure/vacuum disc assemblies, the setting will be changed.



● MODEL KSBB TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

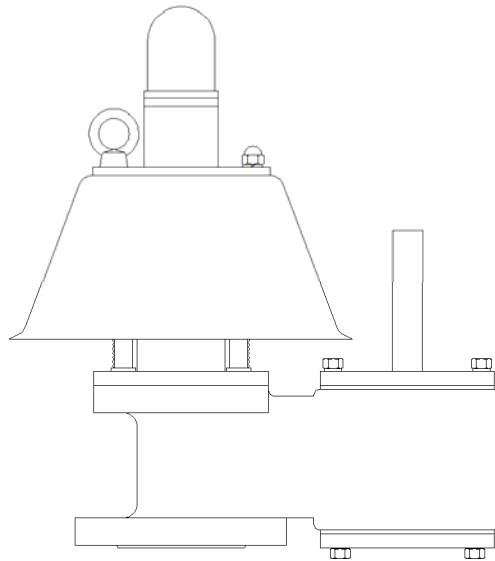


-DISASSEMBLY-

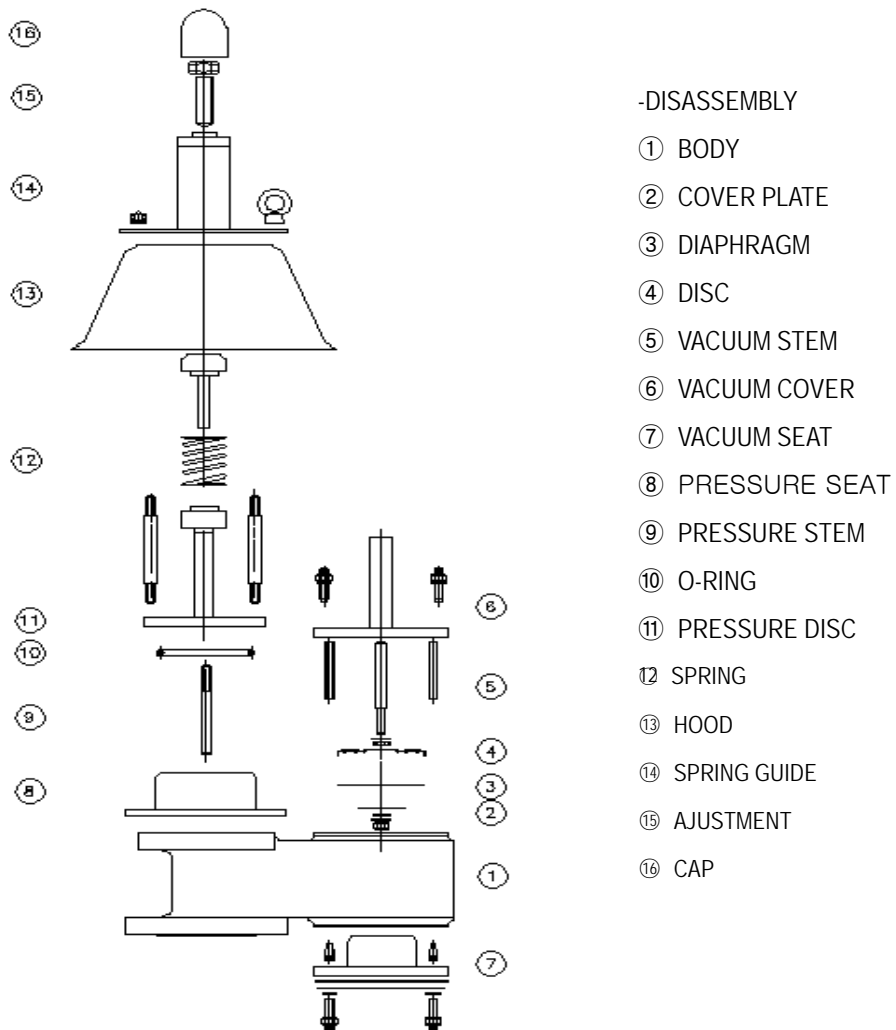
- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ PRESSURE STEM
- ⑩ HOOD
- ⑪ PRESSURE STEM GUIDE

● MODEL KSBS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY



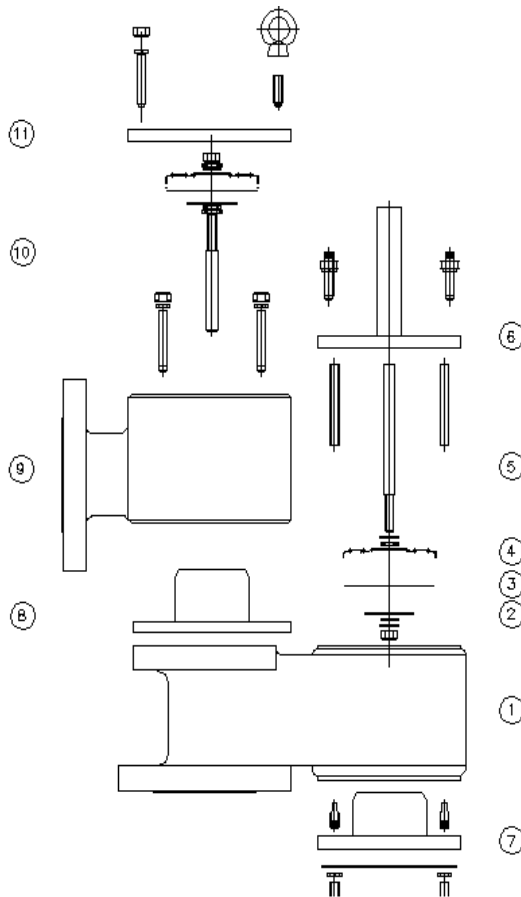
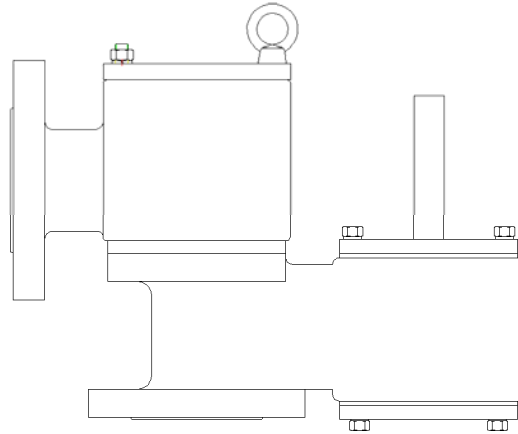
-DISASSEMBLY



- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ VACUUM COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ PRESSURE STEM
- ⑩ O-RING
- ⑪ PRESSURE DISC
- ⑫ SPRING
- ⑬ HOOD
- ⑭ SPRING GUIDE
- ⑮ AJUSTMENT
- ⑯ CAP

● MODEL KSBG TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

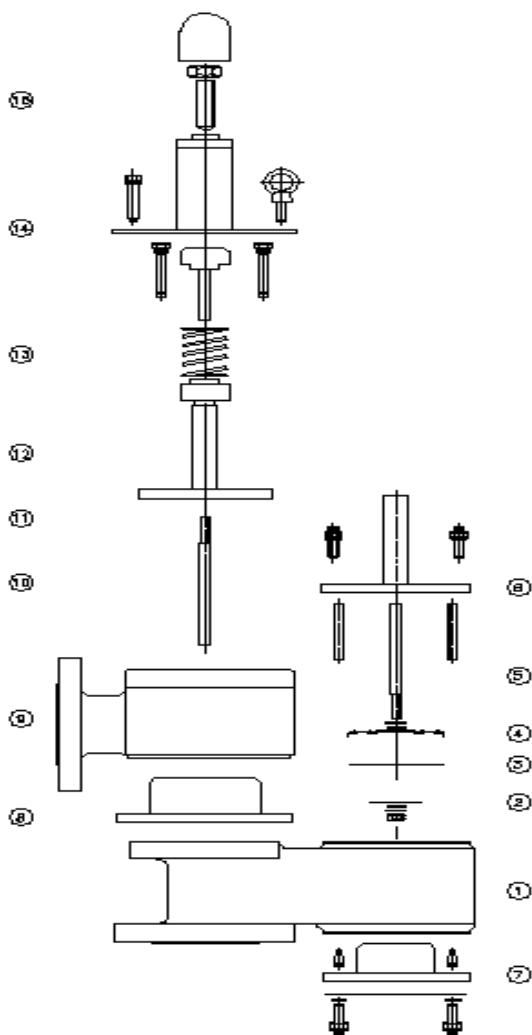
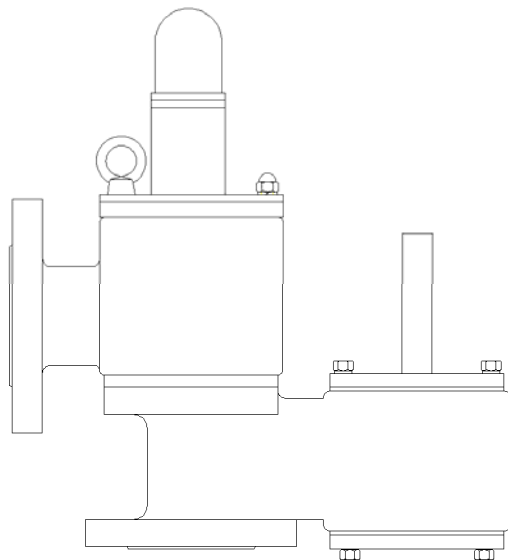


- DISASSEMBLY-

- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ VACUUM COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ BODY 2
- ⑩ PRESSURE STEM
- ⑪ PRESSURE COVER

● MODEL KSGS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

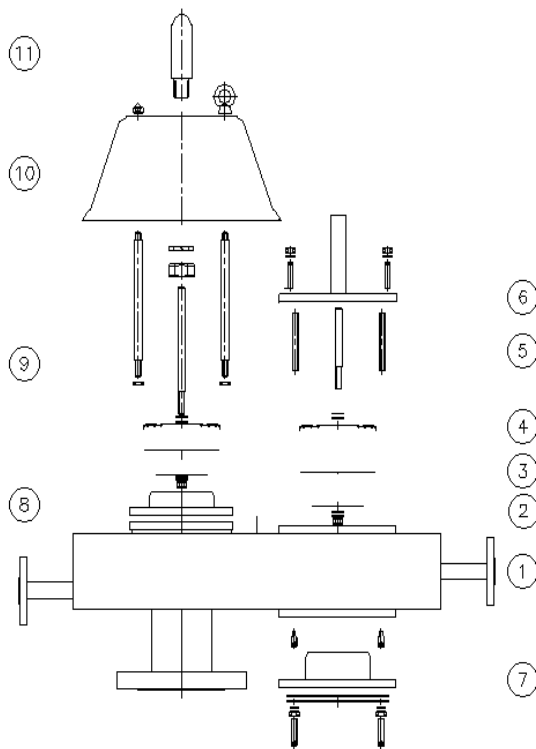
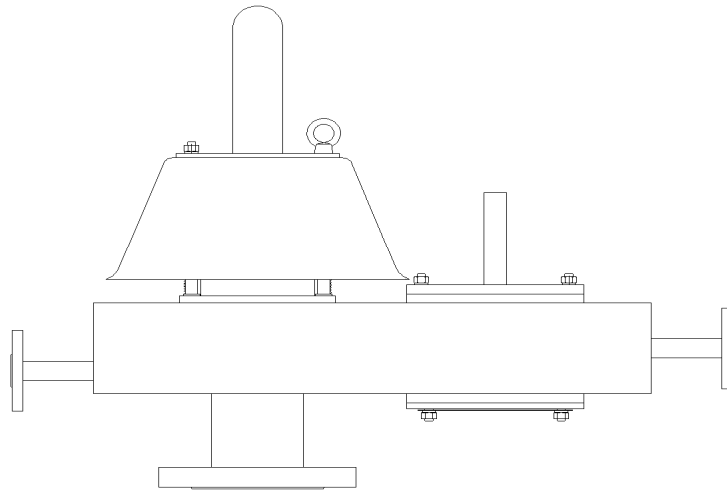


- DISASSEMBLY -

- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ VACUUM COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ BODY 2
- ⑩ PRESSURE STEM
- ⑪ O-RING
- ⑫ PRESSURE DISC
- ⑬ SPRING
- ⑭ PRESSURE COVER
- ⑮ AJUSTMENT

● MODEL KSBBJ TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

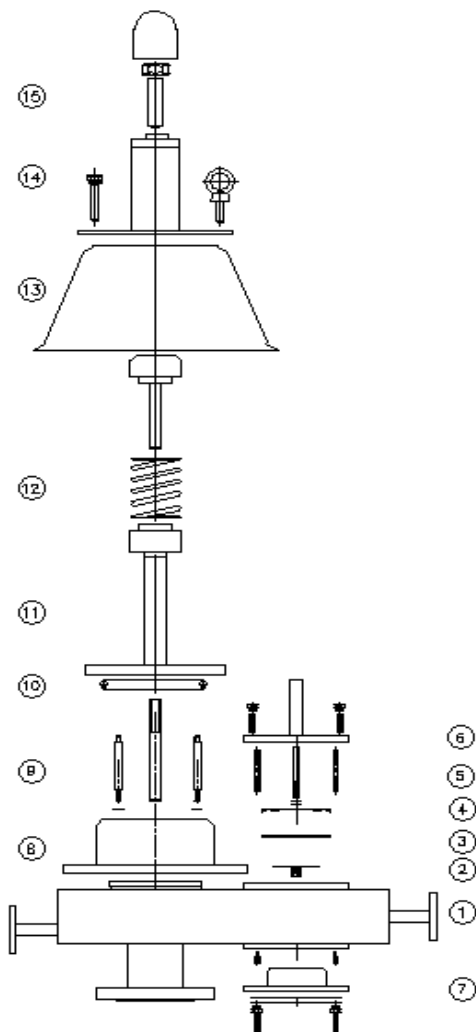
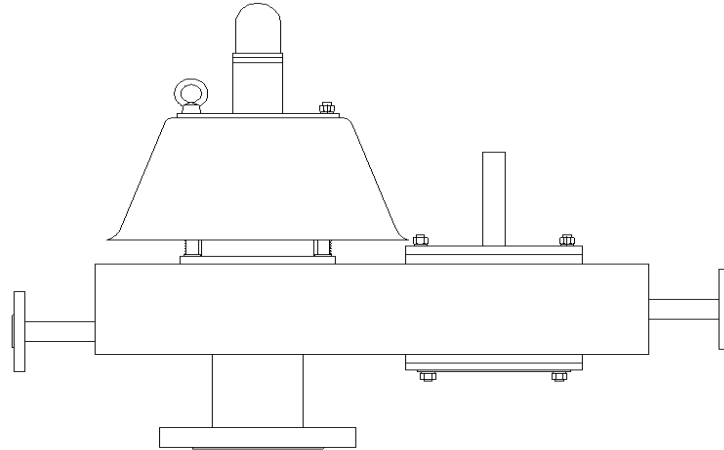


- DISASSEMBLY -

- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ VACUUM COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ PRESSURE STEM
- ⑩ HOOD
- ⑪ STEM GUIDE

● MODEL KSBBJS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

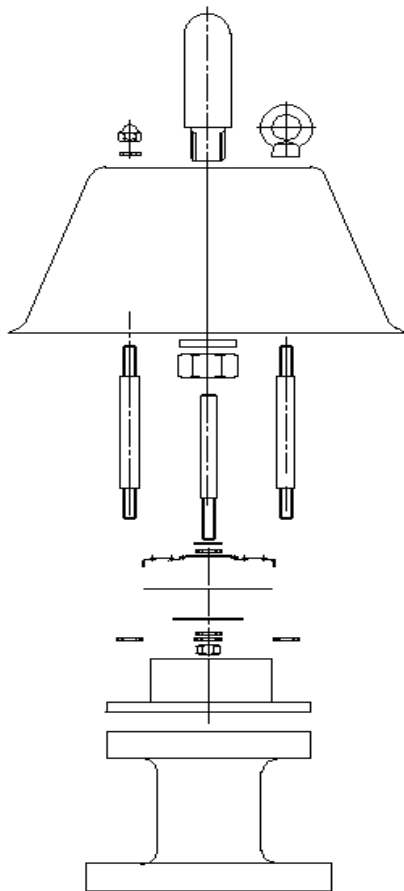
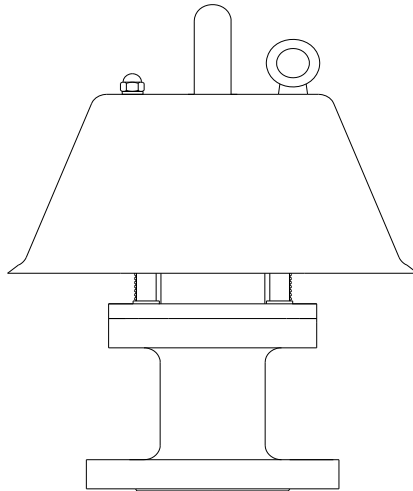


- DISASSEMBLY -

- ① BODY
- ② COVER PLATE
- ③ DIAPHRAGM
- ④ DISC
- ⑤ VACUUM STEM
- ⑥ VACUUM COVER
- ⑦ VACUUM SEAT
- ⑧ PRESSURE SEAT
- ⑨ PRESSURE STEM
- ⑩ O-RING
- ⑪ PRESSURE DISC
- ⑫ SPRING
- ⑬ HOOD
- ⑭ SPRING GUIDE
- ⑮ ADJUSTMENT

● MODEL KSPR TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

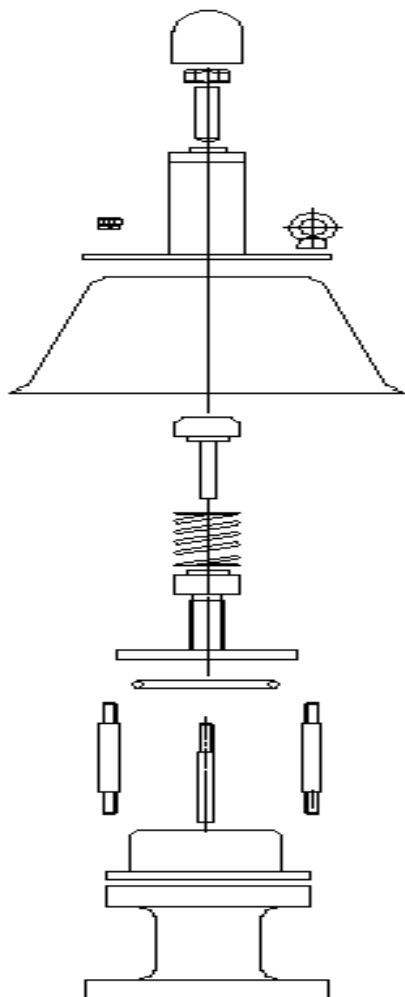
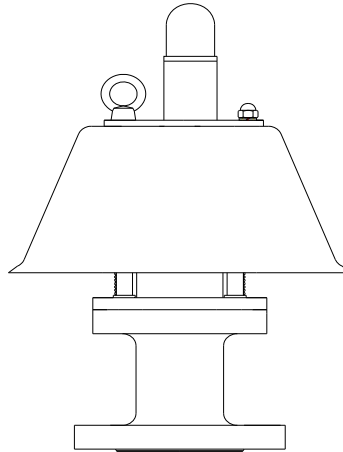


- DISASSEMBLY -

- ① BODY
- ② PRESSURE SEAT
- ③ COVER PLATE
- ④ DIAPHRAGM
- ⑤ DISC
- ⑥ PRESSURE STEM
- ⑦ HOOD
- ⑧ STEM GUIDE

● MODEL KSPS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY



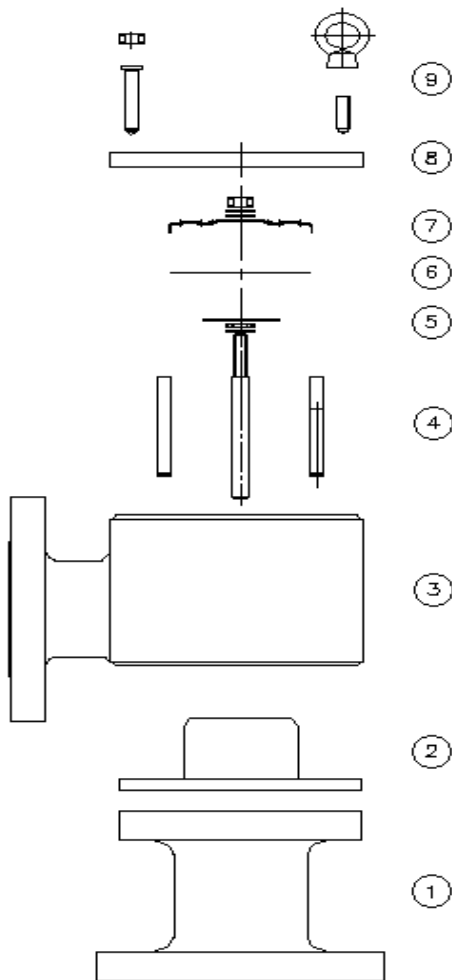
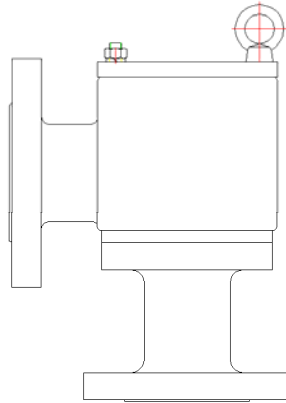
- DISASSEMBLY -

- ① BODY
- ② PRESSURE SEAT
- ③ PRESSURE STEM
- ④ O-RING
- ⑤ PRESSURE DISC
- ⑥ SPRING
- ⑦ HOOD
- ⑧ SPRING GUIDE
- ⑨ AJUSTMENT



● **MODEL KSBD TYPE DISASSEMBLY & ASSEMBLY**

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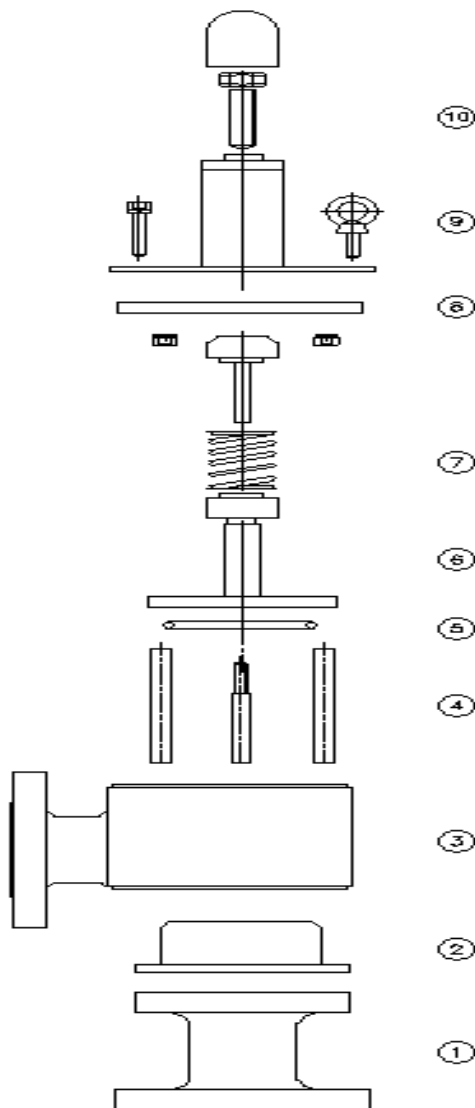
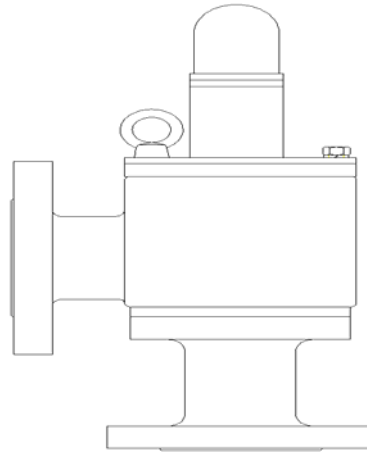


- DISASSEMBLY -

- ① BODY
- ② PRESSURE SEAT
- ③ BODY 2
- ④ PRESSURE STEM
- ⑤ COVER PLATE
- ⑥ DIAPHRAGM
- ⑦ DISC
- ⑧ PRESSURE CPVER
- ⑨ BOLT/EYE NUT

● MODEL KSDS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY

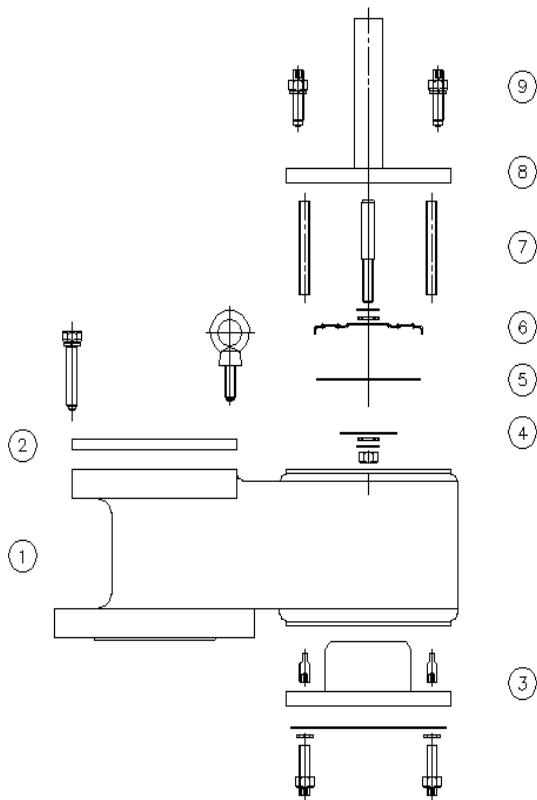
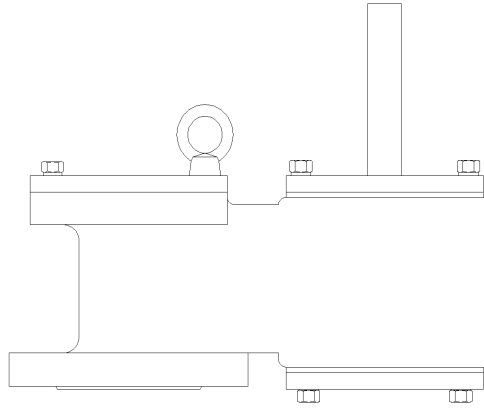


- DISASSEMBLY -

- ① BODY
- ② PRESSURE SEAT
- ③ BODY 2
- ④ PRESSURE STEM
- ⑤ O-RING
- ⑥ PRESSURE DISC
- ⑦ SPRING
- ⑧ SPRING GUIDE
- ⑨ COVER
- ⑩ ADJUSTMENT

● MODEL KSVR TYPE DISASSEMBLY & ASSEMBLY

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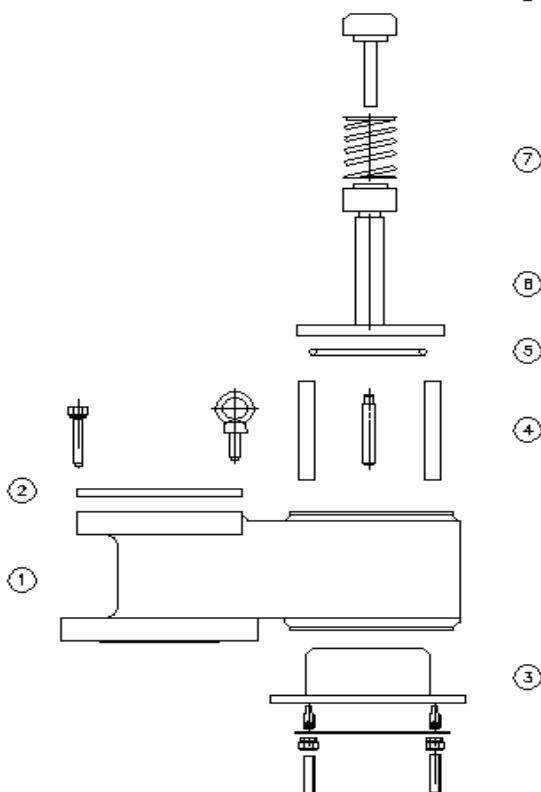
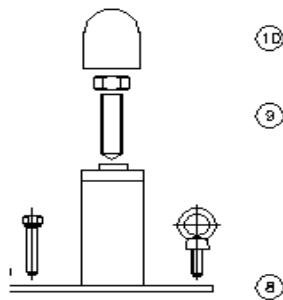
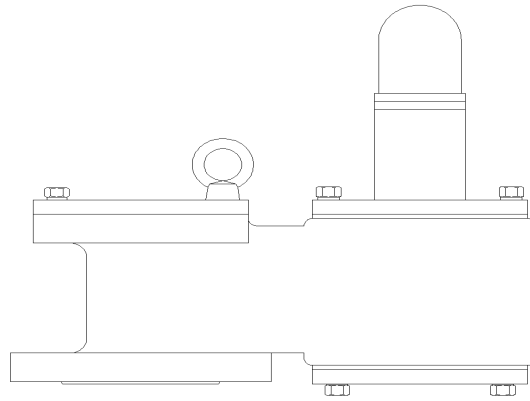


- DISASSEMBLY -

- ① BODY
- ② PRESSURE COVER
- ③ VACUUM SEAT
- ④ COVER PLATE
- ⑤ DIAPHRAGM
- ⑥ DISC
- ⑦ VACUUM STEM
- ⑧ VACUUM COVER
- ⑨ BOLT

● MODEL KSVS TYPE DISASSEMBLY & ASSEMBLY

-ASSEMBLY



- DISASSEMBLY -

- ① BODY
- ② PRESSURE COVER
- ③ VACUUM SEAT
- ④ VACUUM STEM
- ⑤ O-RING
- ⑥ VACUUM DISC
- ⑦ SPRING
- ⑧ VACUUM COVER
- ⑨ ADJUSTMENT
- ⑩ CAP

## Section 5. SHOP TESTING

5-1 According to the "SET PRESSURE VERIFICATION", the API 2000 code 2,6,4, all product should be taken the setting test before shipping.

