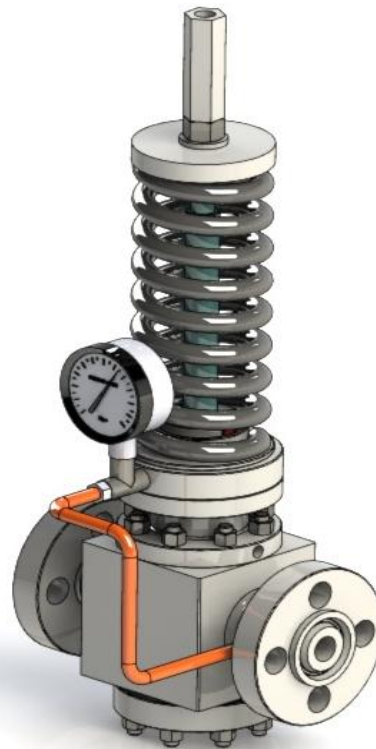


# Installation and Instruction Manual

V510 Series

Pressure Reducing Valve (High Pressure)



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## Safety Information

### Important – Please Read Before Installation

UNICON V510 Series Valve instructions contain **Danger**, **Warning** and **Caution** labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully before installing and maintaining your control valve. **Danger** and **Warning** hazards are related to personal injury. **Caution** hazards involve equipment or property damage. Operation of damaged equipment can, under certain operational conditions, result in degraded process system performance that can read to injury or death. Total compliance with all **Danger**, **Warning** and **Caution** notices is required for safe operation.

The safety terms **Danger**, **Warning**, **Caution** and **Note** have used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

**Danger** : indicates that death , severe personal injury and/or substantial property damage will occur if proper precaution is not taken.

**Warning** : indicates that death, severe personal injury and/or substantial property damage can occur if proper precaution is not taken.

**Caution** : indicates that minor personal injury and/or property damage can occur if proper precaution is not taken.

**Note** : indicates and provides additional technical information which may not be obvious, even to qualified personnel.

## 1. Introduction

### 1-1 General

This instruction manual provides installation, startup, and maintenance procedures for the V510 Series Type valves.

### 1-2 Personnel qualification

Transport, installation, commissioning, maintenance or repair must only be performed by trained or instructed personnel.

#### **Warning**

*In order to ensure successful and safe operation of our valves the entire operation manual must have been read through and understood prior to installation and commissioning. Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death. If you have any questions about problems arise, contact UNICON office.*

## 2. Product Description

Pressure Reducing valves automatically reduce a high initial pressure to a lower delivery pressure, and maintain that lower pressure, depending on the specific design selected, within reasonably close limits. Pressure Reducing valve is single seated, self-acting, diaphragm type regulators. V510 series valve offers various modifications of the pressure regulating valve.

## 3. Operation

Pressure Reducing valves maintain a differential pressure between the loading supply pressure and the downstream pressure of the regulator. (Refer to Figure 1, 2)

The design of the valve isolates the piston and pressure response chamber from the main flow stream. The downstream pressure (outlet pressure) is registered upper the piston through the sensing tube. If the downstream pressure increases, upper the piston pressure also increases. This force overcomes the spring compression and loading supply pressure, allowing the stem to rise.

The valve plug spring force is it to close the valve. Flow through the valve is reduced so that downstream pressure returns to the desired differential level.

When the downstream pressure decreases, the opposite action takes place. upper the piston Pressure decreases. The valve stem pushes the valve plug downward, opening the flow stream and increasing the flow through the regulator. Downstream pressure rises back to the desired differential level.

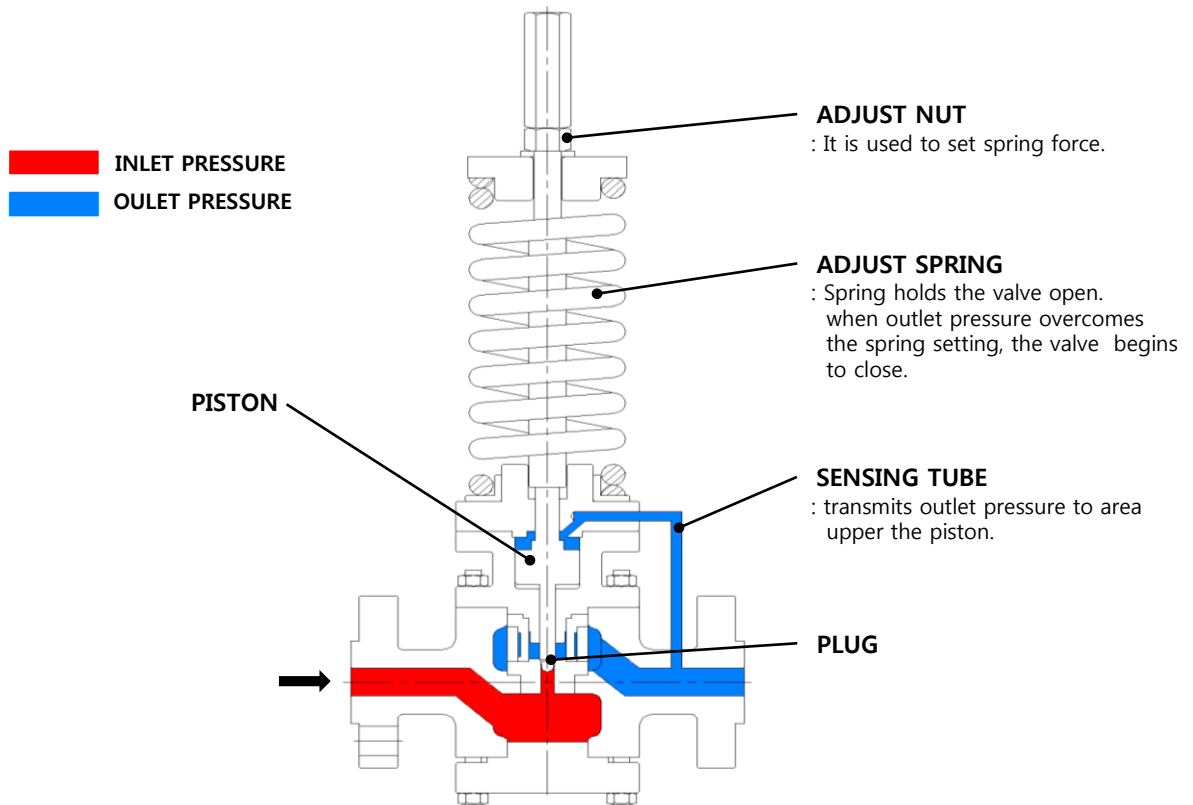


Figure 1. Operational Schematic (Valve Close)

## 4. Installation

Clean out all pipelines before installation of the regulator and check to be sure the regulator has not been damaged or collected foreign material during shipping. Apply pipe compound to the external pipe threads and install the regulator in any position desired, but be sure flow through the body is in the direction indicated by the arrow cast on the body.

### **Warning**

*Only qualified personnel should install or service a valve. Valve should be installed, operated, and maintained in accordance with international and applicable codes and regulations. If a leak develops in the system, it indicates that service is required. Failure to take the valve out of service immediately may create a hazardous condition. Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this valve is over pressured or is installed where service conditions could exceed the limits given in the Specifications section, or where conditions exceed any ratings of the adjacent piping or piping connections. Additionally, physical damage to the valve could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the valve in a safe location.*

## 5. Overpressure Protection

The Pressure Reducing Regulator Valve Types have an outlet pressure rating lower than the inlet pressure rating. The recommended set pressure limitations are stamped on the nameplate. Some type of over pressure protection is needed if the actual inlet pressure exceeds the maximum operating outlet pressure rating. Overpressure protection should also be provided if the regulator inlet pressure is greater than the safe working pressure of downstream equipment.

Some type of external overpressure protection should be provided if inlet pressure will be high enough to damage downstream equipment.

Common methods of external overpressure protection include relief valves, monitoring regulators, shutoff devices, and series regulation.

Regulator operation below the maximum pressure limitations does not preclude the possibility of damage from external sources or from debris in the pipeline.

If the regulator is exposed to an overpressure condition, it should be inspected for any damage that may have occurred.

## 6. Start up

The valve is set at the factory for the set pressure specified on the order, so no initial adjustment should be required to give the desired results. With proper installation completed and valves properly adjusted, slowly open the upstream and downstream shutoff valves.

## 7. Adjustment

The factory setting of the regulator can be varied within the pressure adjustable range. To change the outlet pressure, loosen the locknut and turn the adjusting nut clockwise to increase outlet pressure, or counterclockwise to decrease it. (Refer to figure 3, 4)

Monitor the outlet pressure with a test gauge during the adjustment. Tighten the lock nut to maintain the desired setting.

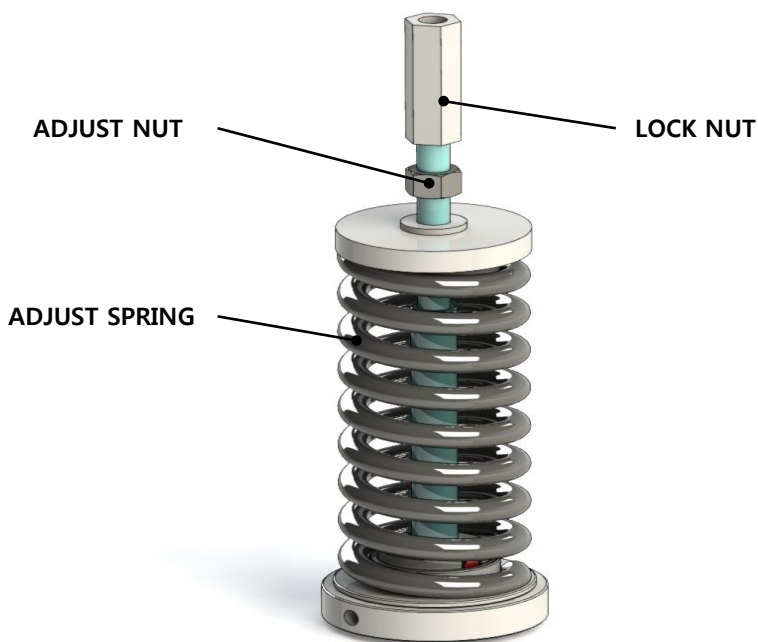


Figure 2. Adjustment

## 8. Maintenance

### Warning

*To avoid personal injury, property damage, or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the valve.*

Due to normal wear that may occur, parts must be periodically inspected and replaced if necessary. The frequency of inspection and replacement depends upon the severity of service conditions or the requirements of state and federal laws.

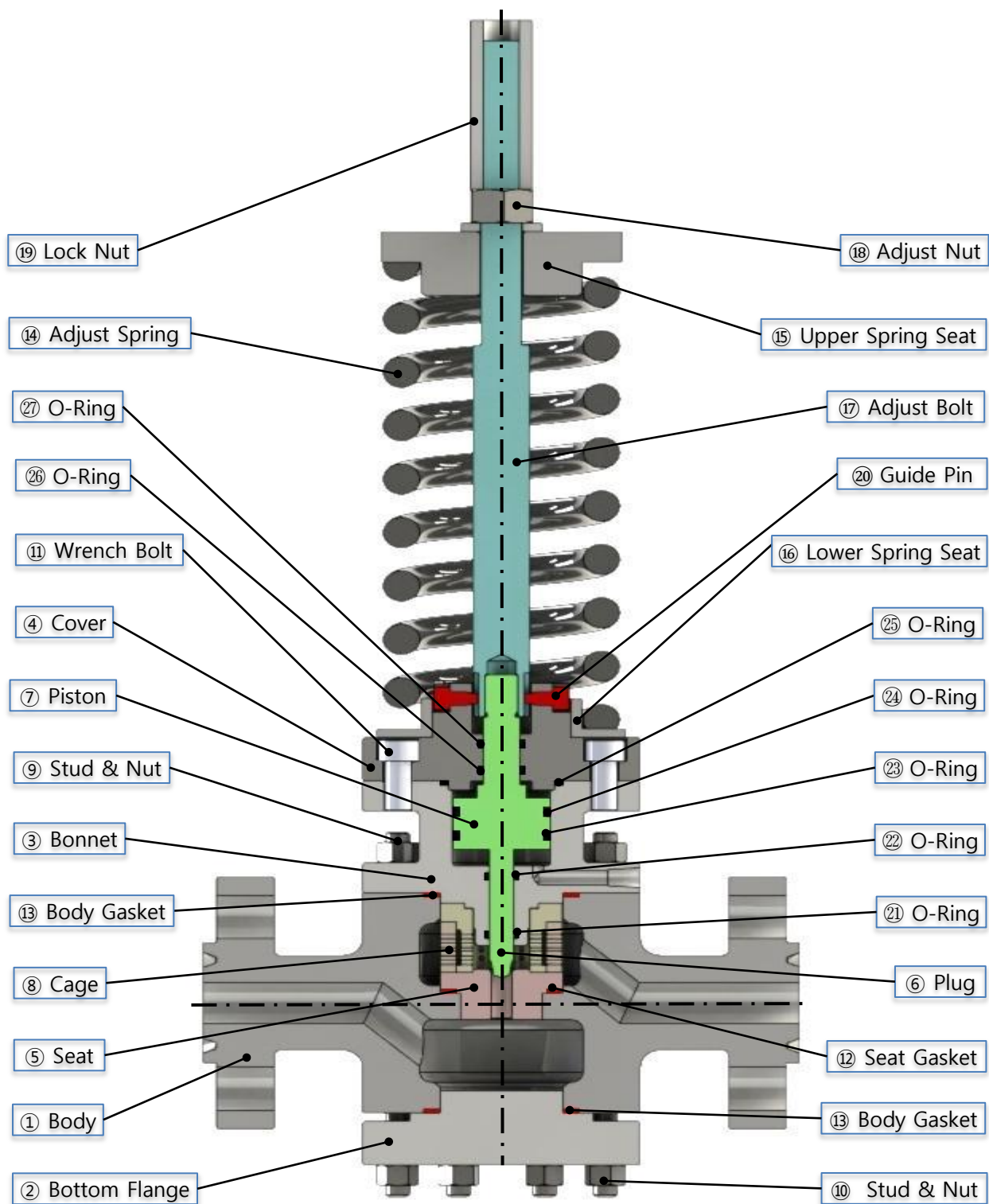
This section includes instructions for disassembly and replacement of parts. All key numbers refer to Figure 3.

If the valve is leaking, the piston may be ruptured or the seating surfaces nicked or scratched. Proceed as follows to replace or repair the piston, seat and valve plug.

1. Loosen the lock nut and turn the adjust bolt to remove all spring compression. Remove the lock nut, adjust nut
2. Remove the upper spring seat, adjust spring, lower spring seat and guide pin.
3. Unscrew the wrench bolt (key11) and remove cover.
4. Adjust bolt, piston and plug are assembled as one part. Disassemble Adjust bolt, piston and plug sequentially and check surface damage of piston & plug. Replace if damage is verified.
5. Remove stud/nut (key 9) and lift off the bonnet.
6. After separating the cage and seat, inspect the seating surface of the valve plug, make sure that the polished metal surface of the valve plug is not damaged. Replace if damage is verified.
7. If no further maintenance is required, reassemble the valve in the reverse of the above steps.

**Caution**

*New gasket must be applied when trim parts are changed. (maintenance purpose)*



**Figure 3. Assembly Drawing (Sectional)**



## 9. Trouble shooting Guide

TROUBLE	SYMPTOM POSSIBLE CAUSE	CORRECTIVE ACTION
The desired pressure cannot be obtained.	The inlet pressure is too low or high.	Change the pressure to the appropriate level.
	The sensing port of the outlet pressure is clogged with foreign matter.	Disassemble and clean the sensing port.
	The valve size is smaller than what is required.	Change the valve size to the appropriate one
	The adjustment is not appropriate.	Readjust according to the adjustment procedure.
	The inlet strainer is clogged by foreign substance.	Disassemble and clean the strainer
	The pressure gauge is not functioning properly.	Replace the pressure gauge.
The outlet pressure rises higher than the specified pressure.	The valve or valve seat is contaminated by foreign substance.	Disassemble and clean the valve or the seat.
	The by-pass valve is leaking.	Repair or replace the by-pass valve
Abnormal noise is heard.	The reducing ratio is excessively large.	Reduce pressure by staging with second PRV.
	There is a fast closing valve near the PRV.	Provide as long a distance as possible between the two valves

**Table 1. V510Series Pressure Reducing Valve Trouble shooting**

## 10. Specification

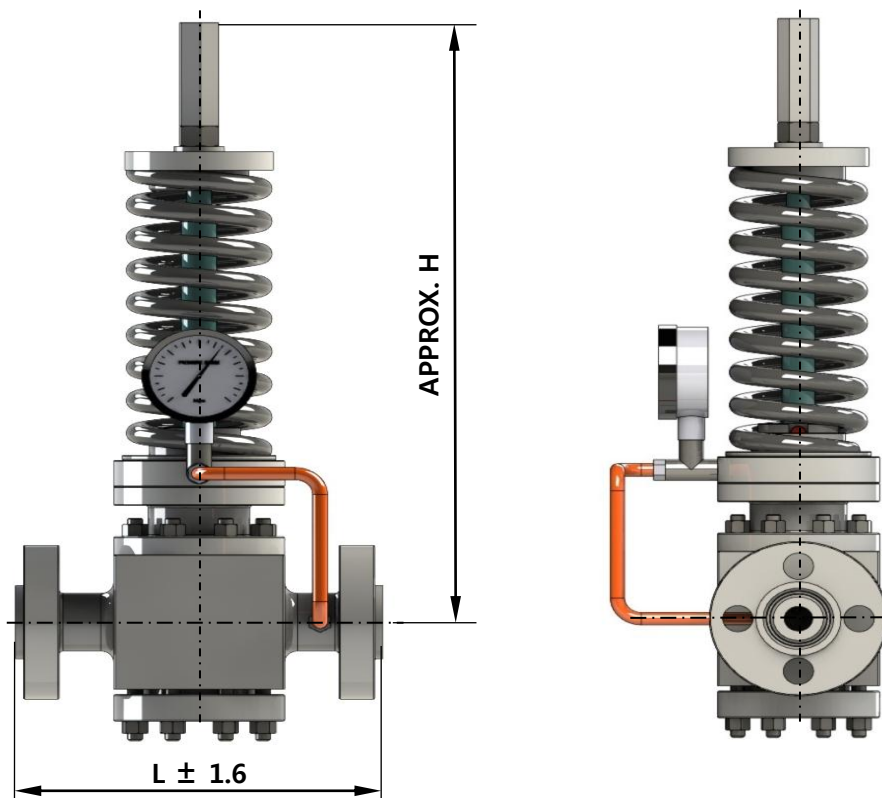
**Maximum Operating Inlet Pressure**  
120BarG

**Maximum Operating Outlet Pressure**  
80BarG

**Operating Temperature Range**  
-20°C ~ 100 °C

**Pressure Registration**  
Internal

**Main Valve Flow Characteristic**  
Linear



**Figure 4. Dimensional Diagrams**

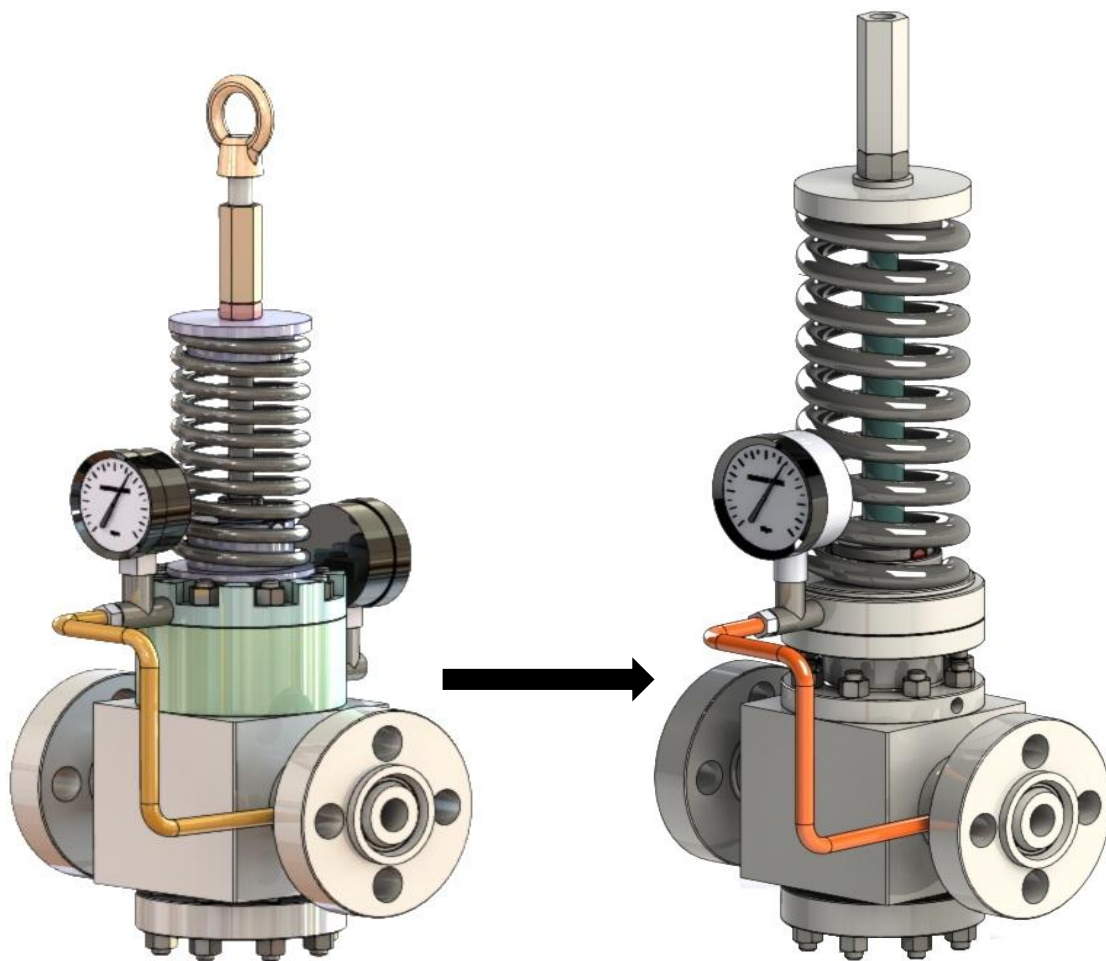
Valve Tag No.	1061/2/3/4/5/6/7-PCV-0011
Valve Size (900lbs)	1"(25A)
Set Pressure (Bar)	73
Control Pressure Range (Bar)	60 ~ 80
Adjustable Spring Wire Diameter, mm (inch)	18 (0.71)
Adjustable Spring Free Length, mm (inch)	370 (14.57)
L (mm)	292
H (mm)	585
Weight	APPROX. 45Kg

**Table 2. V510Series Pressure Reducing Regulator Valve Specification**

## Part Ordering

Key	Description	Material
1	Body	A105
2	Bottom Flange	A105
3	Bonnet	304 SS
4	Cover	304 SS
5	Seat	316L SS
6	Plug	630 SS
7	Piston	630 SS
8	Cage	316L SS
9	Stud & Nut	A193 B7/ A194 2H
10	Stud & Nut	A193 B7/ A194 2H
11	Wrench Bolt	A193 B8
12	Seat Gasket	316 SS+GRAP. SPIRAL WOUND
13	Body Gasket	316 SS+GRAP. SPIRAL WOUND
14	Adjust Spring	SPRING STEEL
15	Upper Spring Seat	304 SS
16	Lower Spring Seat	304 SS
17	Adjust Bolt	316 SS + Cr. Plate
18	Adjust Nut	316 SS + Cr. Plate
19	Lock Nut	304 SS
20	Guide Pin	304 SS
21	O-Ring	NBR, EPDM/FDA, KFM, FFKM
22	O-Ring	NBR, EPDM/FDA, KFM, FFKM
23	O-Ring	NBR, EPDM/FDA, KFM, FFKM
24	O-Ring	NBR, EPDM/FDA, KFM, FFKM
25	O-Ring	NBR, EPDM/FDA, KFM, FFKM
26	O-Ring	NBR, EPDM/FDA, KFM, FFKM
27	O-Ring	NBR, EPDM/FDA, KFM, FFKM

## 11. Instruction for internal part change



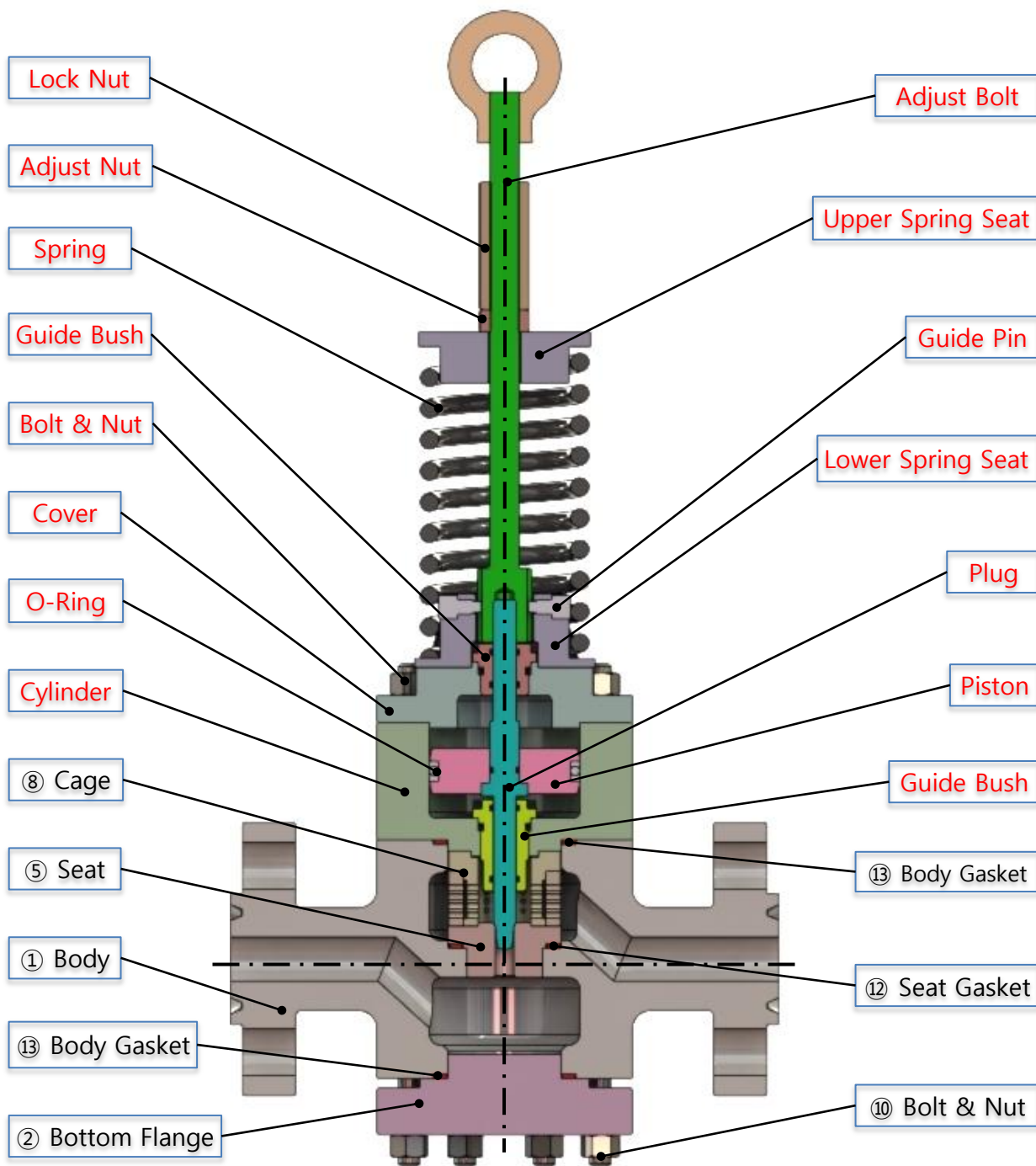
**Figure 5. Change of Valve Internal Parts**

Valve contents have been changed following client's P&ID. Please check assembly method and change parts. (Refer to Figure 6, 7)

**⚠ Warning**

*To avoid personal injury, property damage, or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the valve.*

*Also, wrong assembly may caused of valve damage, personal injury and property damage.*



**Figure 6. Assembly Drawing (Sectional)-Before Change**

**Note!**

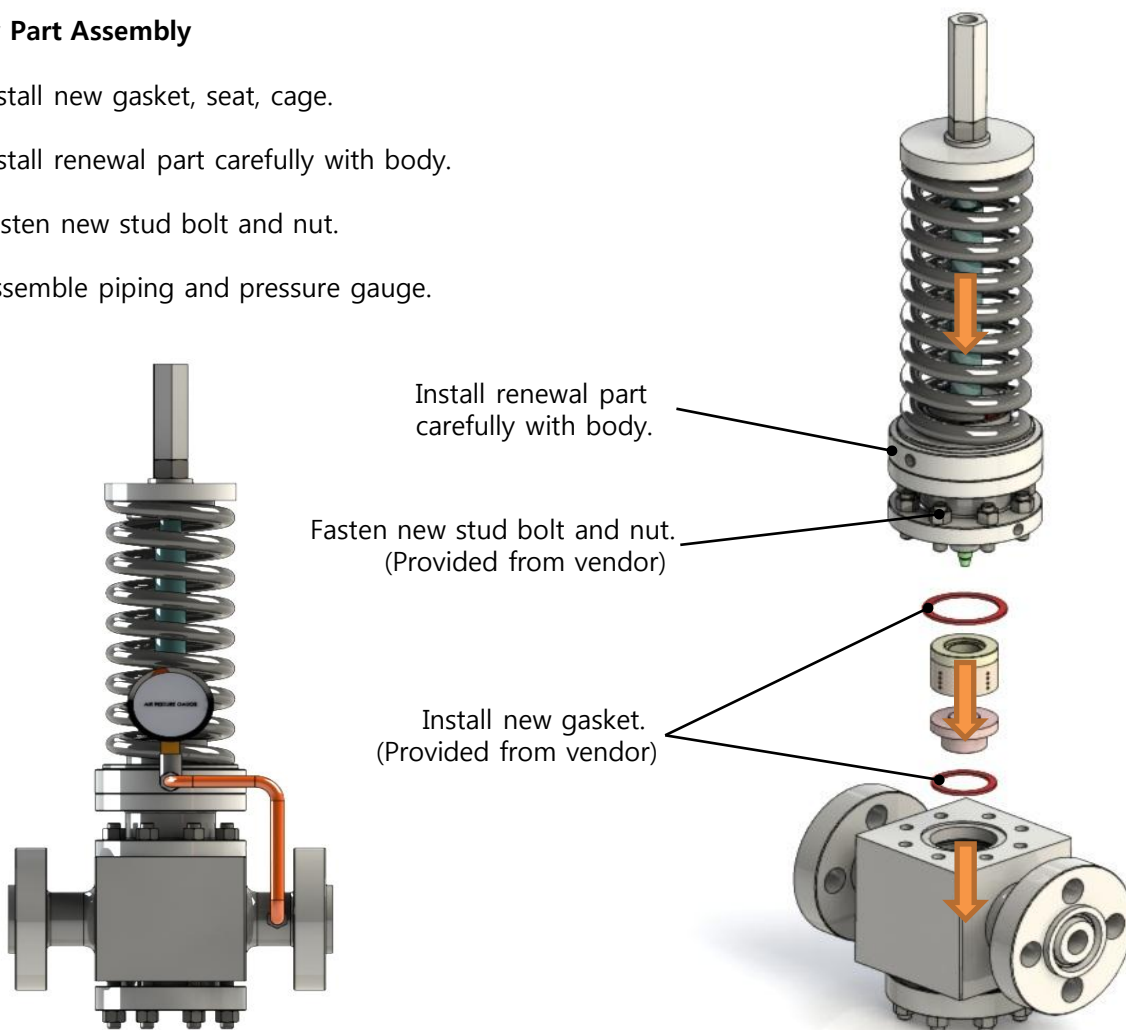
the parts without numbering and red highlighted are need to be changed.

## Disassembly

1. Loosen the lock nut and turn the adjust bolt to remove all spring compression. Remove the lock nut, adjust nut.
2. Remove the upper spring seat, adjust spring, lower spring seat and guide pin.
3. Unscrew the bolt & nut and remove cover.
4. Adjust bolt, piston and plug are assembled as one part. Disassemble Adjust bolt, piston and plug sequentially.
5. Remove the cylinder, Guide bush.
6. After separating the cage and seat.

## New Part Assembly

1. Install new gasket, seat, cage.
2. Install renewal part carefully with body.
3. Fasten new stud bolt and nut.
4. Assemble piping and pressure gauge.



**Figure 7. New Part Assembly**