

Installation and Instruction Manual

V510 Series

Pressure Reducing Valve (Tank Blanketing System)

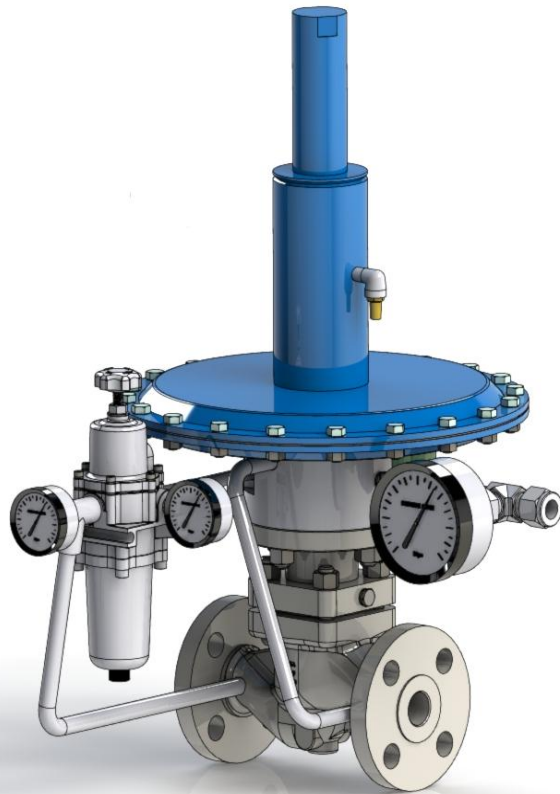


Table of Contents

1. Introduction

- 1-1 General
- 1-2 Personnel qualification

2. Product Description

3. Operation

4. Installation

5. Piping Considerations

- 5-1 Inlet Piping
- 5-2 Outlet Piping
- 5-3 Sensing Line
- 5-4 Gauges and Shutoff Valve

6. Startup

7. Adjustment

9. Maintenance

10. Disassembly

11. Diagnostics

12. Specification

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 (tank blanketing System) 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 tank blanketing valves are self-contained, balanced, pilot operated, and used for accurate pressure control on gas blanketing systems. These valves maintain a positive pressure and thereby reduce the possibility of tank wall collapse during pump out operations, in addition to preventing liquid from vaporizing into the atmosphere.

3. Operation

V510 Series tank blanketing valves are pilot operated, activated by the diaphragm, and control the vapor space pressure over a stored liquid. The unit is controlled by a very large diaphragm actuator. When a storage tank cools and tank vapors condense, V510 Series valves replace the condensing vapors with an inert gas to prevent internal tank pressure from decreasing. Positive tank pressure prevents outside air from contaminating the product and reduces the possibility of atmospheric pressure collapsing the tank. As demand is satisfied, the valve closes.

V510 Series tank blanketing valves respond to slight decreases in internal tank pressure by opening and increasing the flow rate of inert gas into the tank. When the tank's liquid level has been lowered to the desired point and the vapor pressure set point is re-established, the valve closes.

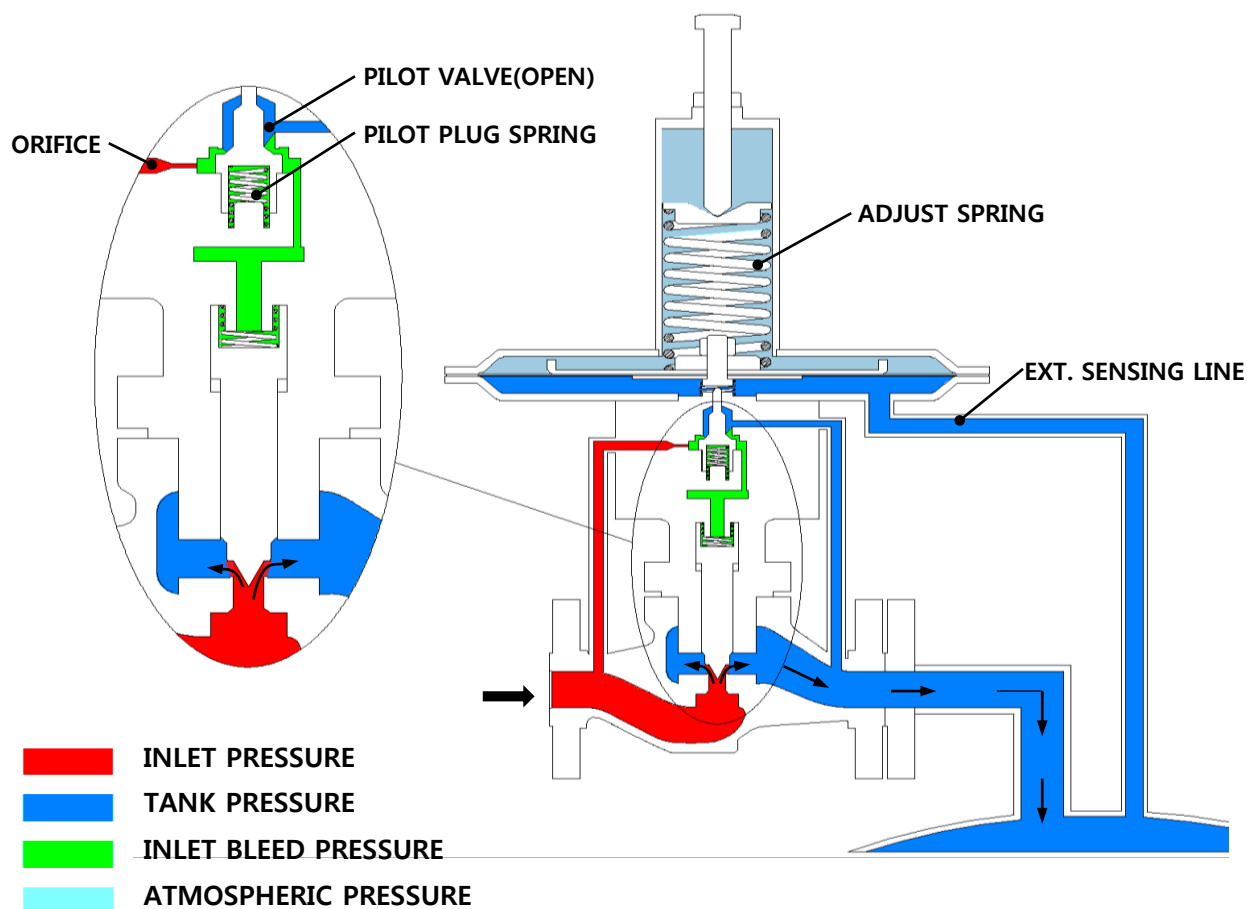


Figure 1. Operational Schematic(valve open)

4. Installation

Warning

Personal injury, equipment damage, or leakage due to escaping accumulated gas or bursting of pressure-containing parts may result if this gas blanketing system is over pressured or installed where service conditions could exceed the limits given in the Specifications section and on the appropriate nameplate, or where conditions exceed any ratings of the adjacent piping or piping connections.

Additionally, physical damage to the tank blanketing system could result in personal injury and property damage due to escaping accumulated gas. To avoid such injury and damage, install the tank blanketing valve in a safe location.

This V510 Series tank blanketing valve was assembled and preset to the customer specified pressure and set point. The control pressure range of the valve is stamped on the nameplate fastened to the upper actuator case. The gas blanketing set point is the only adjustable feature on this unit.

1. Use qualified personnel when installing, operating and maintaining valves. Before installing, inspect the valve and tubing for any shipment damage or foreign material that may have collected. Make certain the body interior is clean and the pipelines are free of foreign material. Apply pipe compound only to the male pipe threads with a threaded body, or use suitable line gaskets and good bolting practices with a flanged body.
2. Inspect the nameplate on the upper actuator case. It displays the model number, serial number, a blanketing gas supply set pressure. These must agree with the system that you are blanketing.
3. Clean the gas blanketing supply lines of all dirt and foreign material before connecting them to the 510 Series tank blanketing valve.
4. The valve must be mounted so the actuator case is horizontal. The valve should be mounted above the tank.
Three connections are required :
 - a) blanketing gas supply to valve
 - b) valve outlet to tank
 - c) sensing line to tank.

5. Piping Considerations

Caution

Undersized piping may inadequately deliver blanketing gas at the specified inlet pressure under full flow conditions. This may result in unacceptable performance under high demand conditions.

Unnecessarily long or restricted outlet piping may result in poor set point control.

5-1 Inlet Piping

The blanketing gas supply line should be equipped with strainer to remove dirt and pipe scale. Inlet piping must be sized to adequately deliver blanketing gas at the specified inlet pressure under full flow conditions.

5-2 Outlet Piping

This V510 Series tank blanketing valve outlet is piped into the tank vapor space. Outlet piping must be full size and self-draining to the tank. The valve should be situated above and as close as possible to the tank vapor space for best performance.

5-3 External Sensing Line

The sensing line must slope down toward the tank, and should not contain low points that could catch liquid. The sensing line must enter the tank above the liquid level at a point that senses the vapor space pressure and is free from turbulence associated with tank nozzles or vents.

5-4 Gauges and Shutoff Valve

Inlet gas shutoff valves are desirable for servicing. If V510 Series tank blanketing valve was not ordered with an inlet pressure gauge, it is advisable to install a gauge between the inlet shutoff valve and the blanketing valve.

Note!

Safety considerations may dictate full port shutoff valves between the tank and blanketing valve, and at the valve inlet.

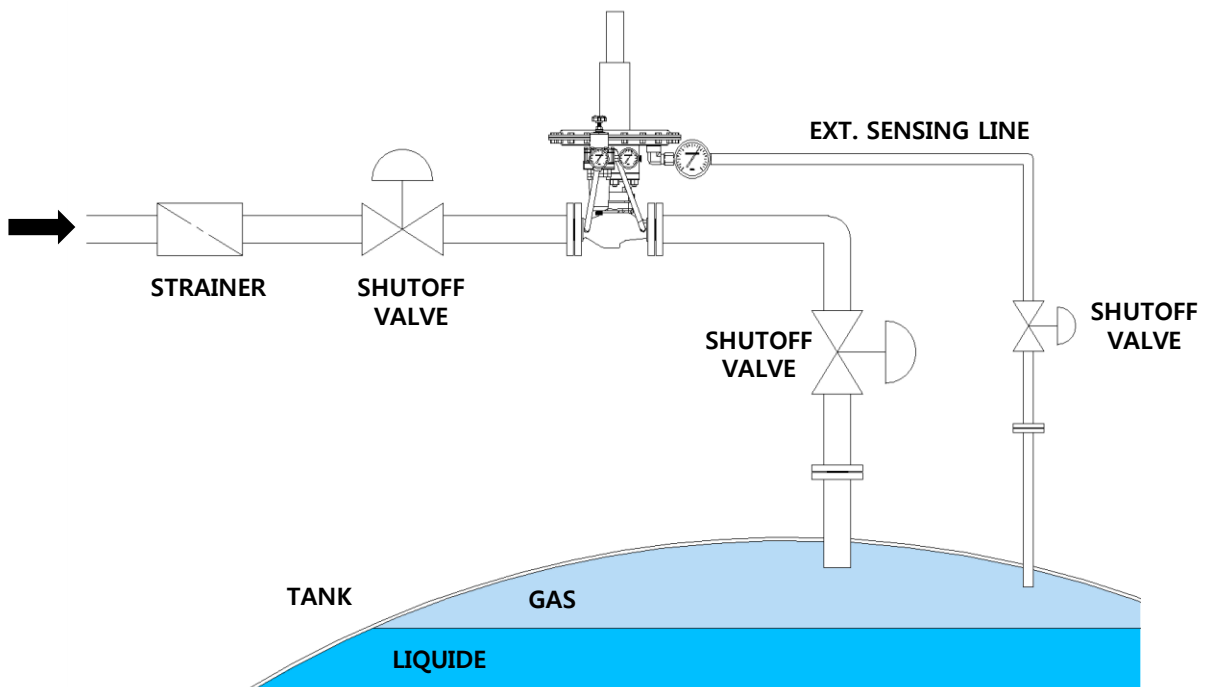


Figure 2. V510Series Tank Blanketing Valve Installation

6. Startup

Note!

Tank vents and safety relief valves must be in place and operating.

Caution

Always open the outlet valve before the inlet valve. Operation in the reverse order could result in inlet pressure being applied to the actuator casing, potentially damaging it.

1. Open shutoff valves between the blanketing valve and the tank (both sensing and outlet). (See Figure 2)
2. Slowly open the supply line shutoff valve (to the blanketing valve) and leave it fully open.
3. Monitor the tank vapor space pressure.

7. Adjustment

The set point of this unit is factory set. If an adjustment is to be made, it should be done so in small increments while the unit is supplying gas to the tank. To change the set point :

1. Unscrew and remove the actuator cap from the top of the spring case. (See Figure 3)
2. Loosen the lock nut and turn the adjust bolt clockwise to raise the set point. (Turning the bolt counter-clockwise lowers the set point.)
3. Observe the effects of the change.
4. When the adjustment is complete, tighten the lock nut and replace the cap.

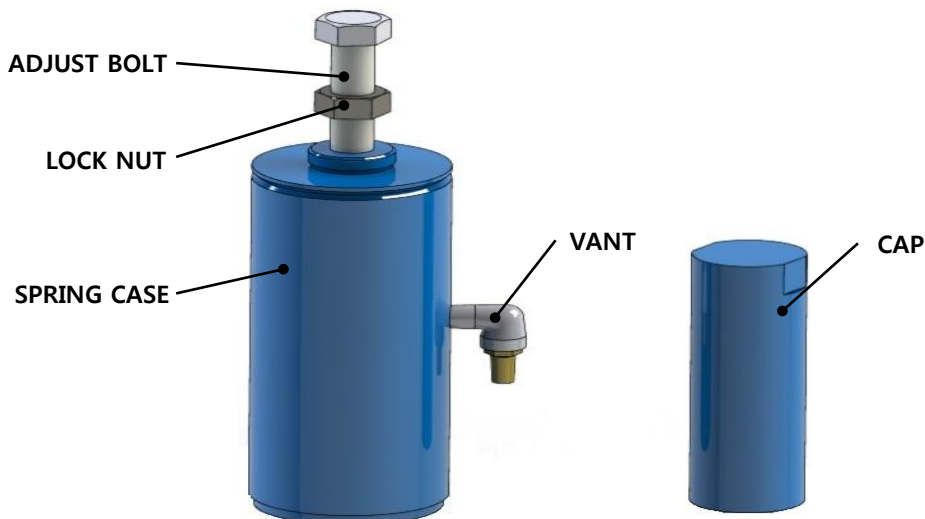


Figure 3. Spring Case, Adjust Bolt, and Cap

8. Shutdown

Installation arrangements is vary, but in any installation it is important to open and close valves slowly and to close the upstream shutoff valve first when shutting down the system.

9. Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends on the severity of service conditions and the requirements of local, state, and federal regulations. Due to the care UNICON takes in meeting all manufacturing requirements, use only replacement parts manufactured or furnished by UNICON.

Be certain that nameplates are updated to accurately indicate any field changes in equipment, materials, service conditions, or pressure settings.

Monthly Maintenance

1. Visually inspect the unit to ensure tight connections, and safe operation.
2. Observe the blanketing pressure.
3. Inspect the inlet pressure for the proper pressure range (stamped on the valve nameplate).

Annual Maintenance

1. Visually inspect the unit to ensure tight connections, tight seals, and safe operation.
2. Observe the blanketing pressure.
3. Inspect the inlet pressure for the proper pressure range (stamped on the valve nameplate).
4. Visually inspect valve for any external wear.
5. If there is evidence of leakage or unstable internal motion, a rebuild with equipment replacement may be in order.

10. Disassembly

Caution

Before removing the valve from the line, ensure that it is isolated from the gas supply pressure and that all pressure has been released from the valve. (The drain on the inlet filter is convenient to bleed off gas.)

All tank connections must be closed or sealed in accordance with your plant's operations and safety procedures. If installed, electrical connections to the explosion proof switch must be deactivated before opening the enclosure or disconnecting the wiring (in accordance with codes and safety practices).

It is recommended that all seals and diaphragms be replaced as a matter of good practice whenever a valve is disassembled and re-assembled. If you are performing disassembly and assembly operations on a pressure reducing tank blanketing valve, refer to the Parts Ordering and see Figure 4.

Note!

Valve information is on the nameplate (on the upper actuator case).

10-1 Disassembly

Warning

To avoid personal injury resulting from sudden release of pressure, isolate the valve from all pressure and cautiously release trapped pressure from the pilot or valve before attempting disassembly.

Diaphragm Disassembly

1. Remove the cap and the spring load by unthreading the adjust bolt. See Figure 3.
2. Unthread the bolt & nut (keys 35) from the upper Diaphragm cases. Lift the upper actuator case, spring case from the lower actuator case. Remove the upper spring seat and adjust spring.
3. Disassemble the diaphragm, lower spring seat, diaphragm plate, diaphragm holder by unthreading the diaphragm lock nut from the diaphragm connector (key28).
4. Remove the balance spring.
5. Remove the cap screws (keys 36) that attach the lower actuator case to the bonnet. Remove the lower actuator case.
6. If no further maintenance is required, reassemble the valve in the reverse of the above steps.

Pilot Body Disassembly

1. Remove the bolt & nut (key 9). Lift the pilot body.
2. If you remove the snap ring (key47), you can remove the Pilot Plug Spring and Pilot Spring Seat from the pilot body.
3. Unthread the Pilot Seat from the pilot body. Lift the Pilot Plug, Pilot Seat gasket from the pilot body.
4. If no further maintenance is required, reassemble the valve in the reverse of the above steps

Caution

When reassembling the pilot body, you must first assemble the Pilot Seat with Pilot Plug. Damage to the Pilot Plug Spring may result. If spring damaged, valve may not work properly.

Main Valve Disassembly

1. Remove the bolt & nut (key 8). Lift the bonnet.
2. If you remove the snap ring (key46), you can remove the Pilot Spring Seat, Body Spring, plug from the bonnet.
3. inspect the seating surface of the valve plug, make sure that the elastomer or polished metal surface of the valve plug is not damaged. Replace if damage is verified.
4. After separating the cage and seat, inspect the seating edge of the seat. If damage is verified. remove the seat and replace it with a new part.
5. If no further maintenance is required, reassemble the valve in the reverse of the above steps.

Caution

Please note as guide pin is not broken at the time of assembly or disassembly of the cage and the plug.

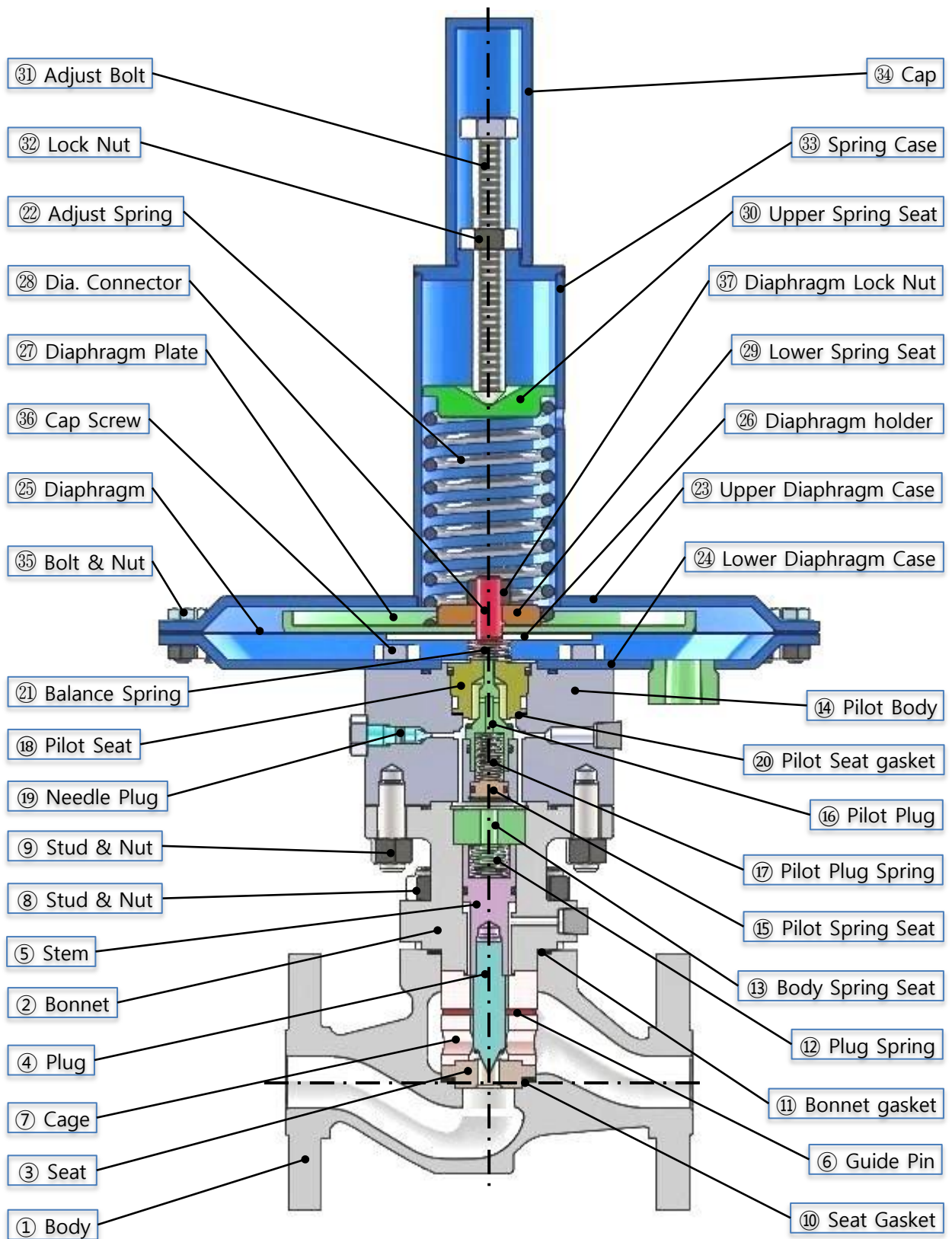


Figure 4. Assembly Drawing (Sectional)

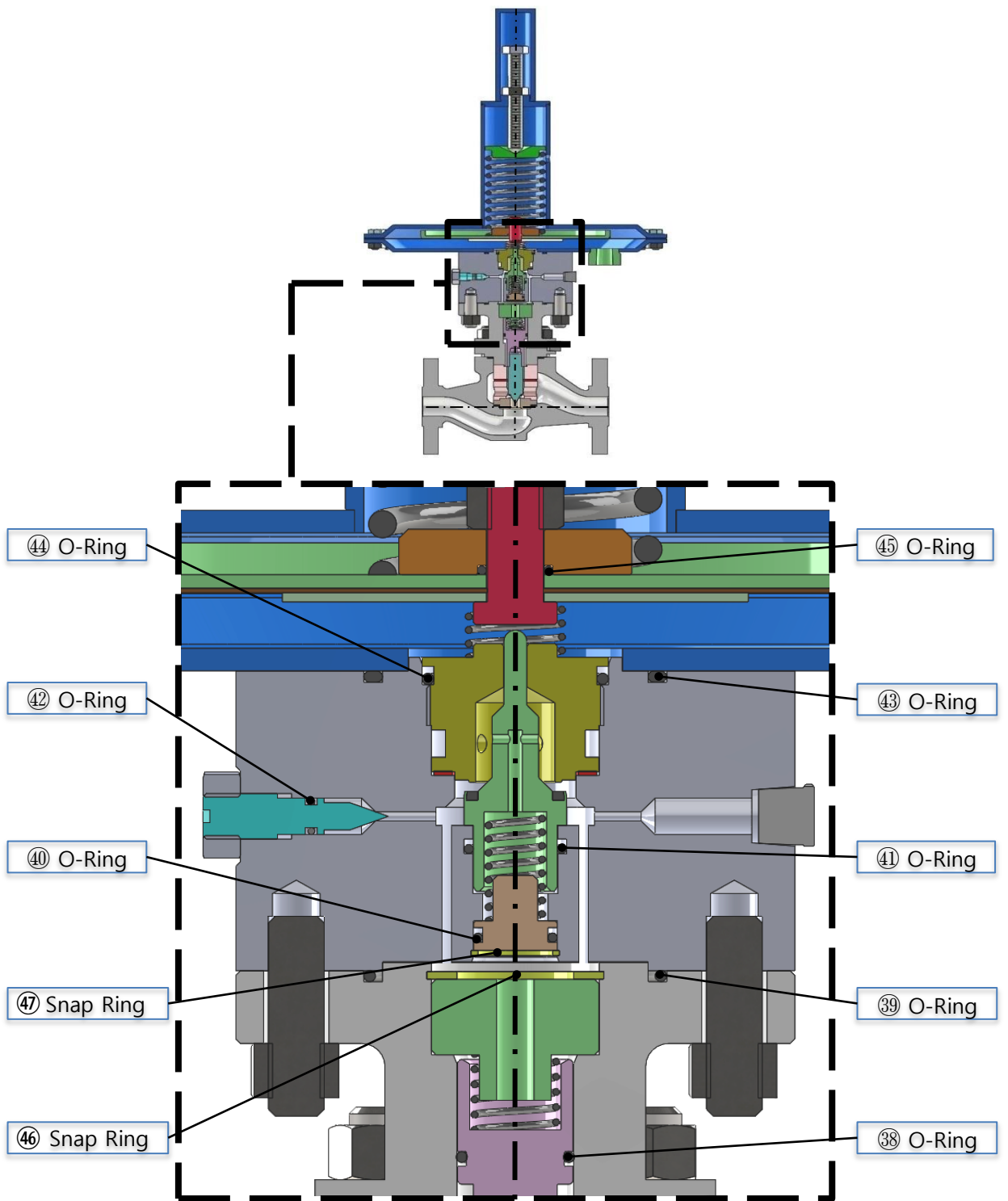


Figure 4-1. Assembly Drawing (Sectional)

11. Diagnostics

Note!

If a diagnostics pressure gauge was not ordered with the unit, a pressure gauge must be installed in the diagnostic port to perform diagnostic analysis.

Diagnostics are an optional feature of V510Series Tank Blanketing valves that aid in evaluating valve operation. The diagnostic analysis relies on the relationship of pressure in the main valve chambers (see Figure 1). The basic relationships are as follows:

- In order to evaluate a valve, examine the valve nameplate to determine the Cv and set pressure adjustable spring.
- Determine the actual valve operating set pressure of the table 2.
- Determine the set pressure for the start to close pressure of the main valve and pilot.

Table 1. Diagnostic Analysis Pressure Ranges

Diagnostic	Status
below set pressure	Pilot and main valves are both supplying gas to the tank
above set pressure	Pilot and main valves are closed

Table 2. V510Series Tank Blanketing Control Pressure Range

Set Pressure (Bar)	Control Pressure Range (Bar)	Valve Tag No.	Adjustable Spring Wire Diameter, mm (inch)	Adjustable Spring Free Length, mm (inch)	Spring Material
0.05 ~ 0.08	0.04~0.1	1085-PCV-0274 1086-PCV-0274	6 (0.23)	180 (7.08)	Spring Steel
0.1	0.08~0.15	1021-PCV-0106 1021-PCV-0131 1211-PCV-0063			
0.015 ~ 0.025	0.01~0.03	1461-PCV-0011 1461-PCV-0021 1461-PCV-0031	4(0.16)	200(7.87)	
0.02	0.01~0.03	1211-PCV-0092 1431- PCV-0011			

12. Specification

Maximum Operating Inlet Pressure
14BarG

Maximum Emergency Outlet Pressure
1.5BarG (Diaphragm Casing)

Maximum Operating Outlet Pressure
1.2BarG

Control Pressure Ranges
0.01 ~ 0.15BarG (Refer to Table.2)

Pressure Registration
External

Main Valve Flow Characteristic
Linear

Operating Temperature Range
0°C ~ 100 °C

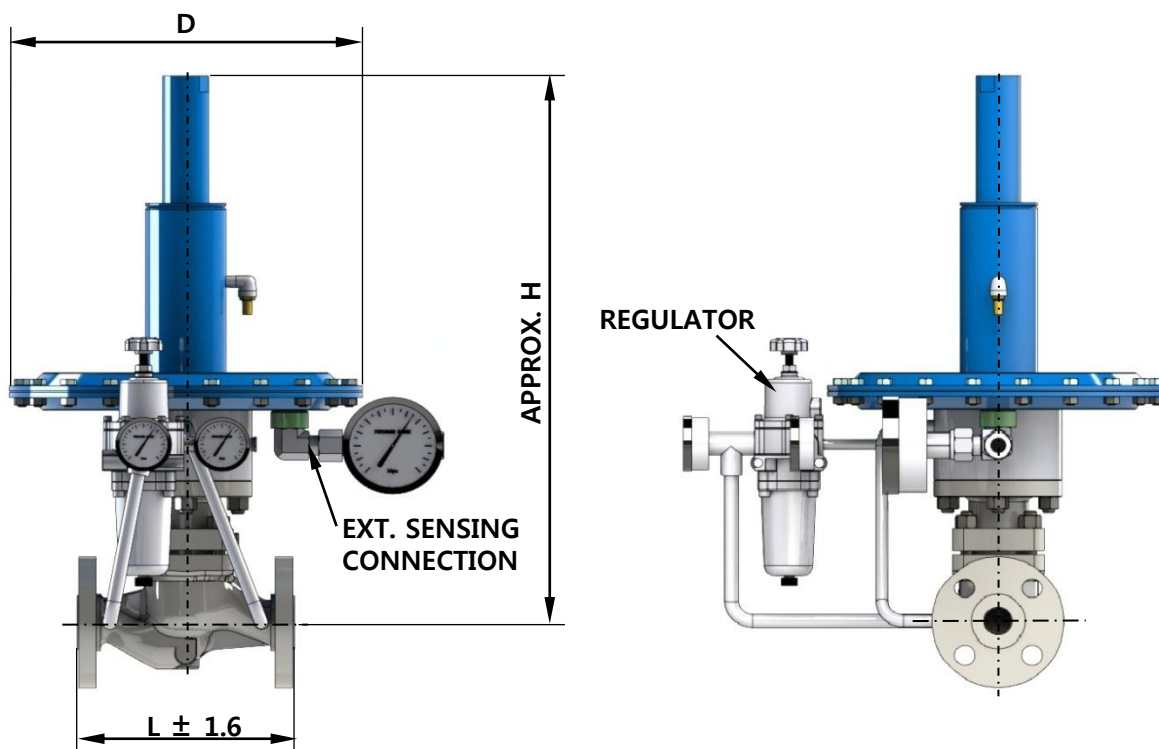


Figure 5. Dimensional Diagrams

Valve Size (300lbs)	L	H	D	Weight
1"(25A)	197	515	320	APPROX. 40Kg
1.5"(40A)	235	535	320	APPROX. 45Kg
2" (50A)	267	540	320	APPROX. 50Kg

***All Dimension Units are mm**

Part Ordering

Key	Description	Material
1	Body	A216 WCB/ A105
2	Bonnet	304 SS
3	Seat	316L SS
4	Plug	316L SS + EPDM
5	Stem	316L SS
6	Guide Pin	304 SS
7	Cage	316L SS
8	Stud & Nut	A193 B7 / A194 2H
9	Stud & Nut	A193 B7 / A194 2H
10	Seat Gasket	316 SS+GRAP. SPIRAL WOUND
11	Bonnet Gasket	316 SS+GRAP. SPIRAL WOUND
12	Plug Spring	304 SS
13	Body Spring Seat	304 SS
14	Pilot Body	304 SS
15	Pilot Spring Seat	304 SS
16	Pilot Plug	316L SS
17	Pilot Plug Spring	304 SS
18	Pilot Seat	316L SS
19	Needle Plug	316L SS
20	Pilot Seat gasket	Teflon
21	Balance Spring	304 SS
22	Adjust Spring	SPRING STEEL
23	Upper Diaphragm Case	304 SS
24	Lower Diaphragm Case	304 SS
25	Diaphragm	EPDM
26	Diaphragm holder	304 SS
27	Diaphragm Plate	304 SS
28	Dia. Connector	304 SS
29	Lower Spring Seat	304 SS
30	Upper Spring Seat	304 SS
31	Adjust Bolt	304 SS
32	Lock Nut	304 SS
33	Spring Case	304 SS
34	Cap	304 SS
35	Bolt & Nut	A193 B7 / A194 2H, A193 B8 / A194 8
36	Cap Screw	STAINLESS STEEL
37	Diaphragm Lock Nut	STAINLESS STEEL
38	O-Ring	NBR, EPDM/FDA, KFM, FFKM
39	O-Ring	NBR, EPDM/FDA, KFM, FFKM
40	O-Ring	NBR, EPDM/FDA, KFM, FFKM
41	O-Ring	NBR, EPDM/FDA, KFM, FFKM
42	O-Ring	NBR, EPDM/FDA, KFM, FFKM
43	O-Ring	NBR, EPDM/FDA, KFM, FFKM
44	O-Ring	NBR, EPDM/FDA, KFM, FFKM
45	O-Ring	NBR, EPDM/FDA, KFM, FFKM
46	Snap Ring	CARBON STEEL
47	Snap Ring	CARBON STEEL