

## **INSTALLATION, OPERATION AND MAINTENANCE MANUAL PRESSURE REGULATING VALVE UPSTREAM (SERIES - 720)**

<b>Section</b>	<b>Description / Contents</b>	<b>Page.</b>
1	General / Warning / Safety Precaution	2
2	Planning & Responsibilities / Handling	3
3	Pre-Installation / Installation	4
4	Flanged Ends / Butt-Welding Ends	5
5	Technical Information / Tightening Sequence	6
6	Maintenance	7-8
7	Fitting Actuator To Valve	9
8	Troubleshooting	10

## 1. GENERAL

This manual describes the instructions for handling, storage, installation, maintenance, and operation of the Self Operated PRV - Series 720.

Instructions not detailed in this document shall be performed in accordance with standard and safe acceptable practices as may be required by local codes, specifications and or regulations.

The instruction contained within this manual must be read before undertaking any work on the equipment supplied and if there are any questions please contact Pneucon Valves Pvt. Ltd. or its agent.

**When ordering any spares please specify the unique valve serial number detailed on the equipment nameplate.**

## 2. WARNINGS / SAFETY PRECAUTION

- a) In order to avoid possible injury to personnel or damage to any equipment any 'WARNING and CAUTION' notes must be strictly adhered to. Modification of this product, substitution of non-approved components and use of maintenance procedures other than those detailed within this document could drastically affect the performance, nullify any warranty and be hazardous to personnel and equipment.
- b) Personal injury, equipment damage, leakage due to escaping gas or failure of pressure containing component may result if the valve or ancillaries are over pressured or installed where service condition exceed the limits detailed in the manufacturer's specification or on the valve nameplate. To avoid such injury or damage a relief valve for over pressure protection should be provide as required by industry and sound engineering practices or applicable safety codes.
- c) Due to the possibility of both elevated and low temperatures occurring on exposed surfaces of the valve assembly during operation, adequate safety precautions must be taken. This may involve insulating the valve assembly or the provision of safety clothing and equipment to avoid personal injury.
- d) It is a requirement of PER 1999 that both the maximum working pressure and temperature of the valve are detailed on the nameplate. The stated values must be adhered to separately and in isolation. Attention must be paid to the combined pressure and temperature characteristics of the appropriate valve pressure containment material group as stated in ASME / ANSI B 16.34.
- e) When purchased each valve / trim configuration and construction materials are specifically selected to satisfy the particular application, conditions of flow, temperature, pressure drop and controlled fluid conditions for corrosion and erosion. Included within the Pneucon Valve selection process is the consideration of the amount of power conversion allowed to reduce vibration levels within the valve and also the materials of construction are specifically selected for each application. The valve must not be used on any other application, without a review by Pneucon Valve.
- f) The valve is not suitable for fire safe service and is not certified for this application or duty. Unless otherwise detailed in the quotation and order documentation the valve will not have been designed to deal with excessive seismic activity or bending moments resulting from misaligned pipe work.
- g) For cage guided valve, use of strainer is recommended to remove line debris to protect any damage to valve internal so as to have smooth movement of plug in cage.

### 3. PLANNING & RESPONSIBILITIES

#### When installing or maintaining valves

- a. Conduct a risk assessment and eliminate or reduce hazards to an acceptable level.
- b. Work in accordance with health and safety rules of work site.
- c. Never use a valve on a application which exceeds its prescribed operating parameters.
- d. The valve shall not be subjected to frequently occurring disturbances.
- e. End user to ensure there are no external disturbances (e.g. Shocks, Vibrations, Electromagnetic fields etc.)
- f. Misuse of valves / valve components shall be avoided.
- g. Maximum surface temperature of the equipment will be same as the line media temperature. The end user must take account of the line media temperature.
- h. If the process or environment where in the valves are used in are likely to cause temperatures (high or low) that may cause injury to personnel if touched, then adequate insulation / protection must be fitted.
- i. All exposed parts shall be cleaned to prevent dust deposit or insulation is needed similar to pipe line.
- j. Valves shall be protected by other devices to prevent over-pressurisation. (i.e. caused by temperature, fire etc.)

### 4. HANDLING

1. The weight of the valve assembly can cause serious injury if it is not handled correctly, using the necessary protective clothing and safety equipment. Adequate lifting equipment must be used and properly attached. Where lifting eyes are provided with the equipment these should be used to enable safe handling of the valve actuator or assembly. All lifting equipments should be used within its defined limitations., applicable codes and safe industrial practices including (but not limited to ) the following :
  - Slings to be free of kinks.
  - Lifting hooks to be positioned directly over the load to avoid any severe swinging when lifted.
  - The operator shall ensure that the load is safe and well secured.
2. When lifting the equipment ensure that any slings or hoists are positioned to avoid any damage to the accessories or tubing mounted on the valve.
3. All eyebolts should have a shoulder, which butts against the tapped hole. Use American Drill Bushing CO ADB2300 series safety hoist rings or equivalent should be used. The following table details the safety hoist thread size and the appropriate safe loading that can be applied.

Safety Hoist Ring	Thread Size UNC	Rated Load lbf
ADB-23004	½" 13 x 0.75	2500
ADB-23002	5/8" 11x1	4000
ADB-23007	¾" 10 x 1	5000
ADB-23101	7/8" 9 x 1	8000
ADB-23105	1" 8 x 1.25	10000

## 5. PRE - INSTALLATION

- a) The assembly should be inspected on receipt to ensure that it has not been damaged during transit. This inspection should be undertaken in a safe and controlled manner as valve equipment can be heavy and have sharp edges. Any damage found should be immediately reported.
- b) If a valve assembly is required to be stored for a significant period prior to installation it must be stored in a fire resistant, clean, dry and ventilated environment to avoid damage to the valve, actuator or accessories.
- c) The end caps or other protection devices should not be removed from the equipment until the time of installation, in order to help avoid any damage to the flanges and also prevent the ingress of dirt or foreign particles.
- d) The adjacent pipework must be free of dirt, pipe scale, welding slag and all other foreign objects. Safe operation of the valve could be impaired by the ingress of line debris or foreign matter. It may be necessary to remove the valve or internals if the pipework is to be flushed prior to or during the commissioning period.
- e) Sufficient clearance above and around the valve and actuator should be provided for access and maintenance purposes.

## 6. INSTALLATION

- a) The valve is supplied with a flow direction arrow either cast on to the body or detailed on the nameplate. It is very important that the valve is installed into the pipework with the correct flow direction.
- b) Install the valve using accepted piping practices and preferably with suitable lengths of straight pipework both upstream and downstream.
- c) The preferred orientation is for the actuator to be vertically upright. If a valve is required to be installed in any other orientation the valve and actuator must be adequately supported.
- d) If a normalising bonnet is provided for a high temperature application and the pipework is thermally lagged the lagging must be terminated at the bonnet to body flange interface.
- e) Prior to installing any valve with butt weld end connections all components containing or manufactured from PTFE should be removed.
- f) Following installation of the valve an input signal should be applied to the valve actuator in order to check and confirm correct calibration of the assembly.
- g) All pneumatic air connections should be checked for leaks. During functional testing of the actuator, the assembly would be subject to a pressure test at 3.4 barg.
- h) The gland nuts are factory adjusted and following commissioning further adjustment could be required to stop any stem leakage. It should be pointed out that excessive tightening of the gland studs could result in packing wear or excessive friction.

## 7. FLANGED ENDS

- a) Refer (**Page No - 09**) for applicable standards.
- b) Clean valve flanges and companion flanges and remove protective grease from the valve flanges. Clean the valve interiors adjacent piping prior to mounting of the valve pipe joint.
- c) Align the bolt holes of the valve end flanges and pipe flanges.
- d) Fasteners shall be well lubricated for ease of installation.
- e) Insert the gasket (not supplied with valve) and tighten the fasteners. Flange fasteners shall be tightened evenly, using suitable device in cross rotation to prevent damage to the flange.
- f) For sequence of tightening fasteners, refer (**Page No - 09**).

If valve is not cleaned or if cleaning is done after valve installing, cavities may form a natural trap in the piping system. Any impurity not dissolved or washed out by the flushing fluid/line fluid may settle in such cavities and adversely affect valve performance.

## 8. BUTT-WELDING ENDS

- a) The valves provided with butt-welding ends preparation are as standard ASME B16.25 or as per customer requirements. Please refer to the general assembly drawings for the exact butt-welding ends dimensions.
- b) The welding of valves onto the pipeline shall be performed by qualified welders using qualified procedures.
- c) Valves shall be kept in the closed position during welding.
- d) Care shall be taken to avoid weld spatter from falling onto the seating surfaces to prevent damage and maintain sealing effect between the metallic contacts.
- e) Local post weld heat treatment (PWHT) on the weld and heat affected zone (HAZ) shall be carried out if required by the procedure.
- f) It is recommended that the pipeline be flushed again after welding to avoid damage to wedge/disc and seat. The valve shall be kept fully open during flushing.
- g) After flushing is completed, operate the valve three times and ensure that it is smooth. It is recommended to carry out pressure testing of the weld joints.

## 9. TECHNICAL INFORMATION

### Face to Face Dimensions

ASME B16.10 Face-to-Face and End-to-End Dimension of valves.

### End Connections

ASME B16.5 Pipe Flanges and Flanges Fittings (NPS 1/2 through NPS 24)

ASME B16.25 Butt-Welding Ends.

### Testing standard

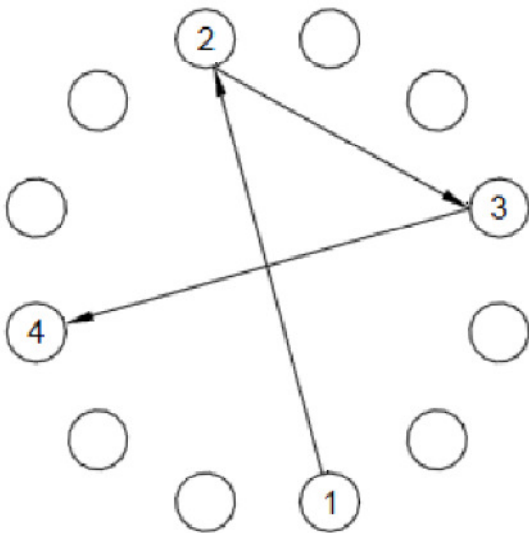
API 598 Valve inspection and testing

EN12266 PART-1 Industrial Valves - Testing of valve.

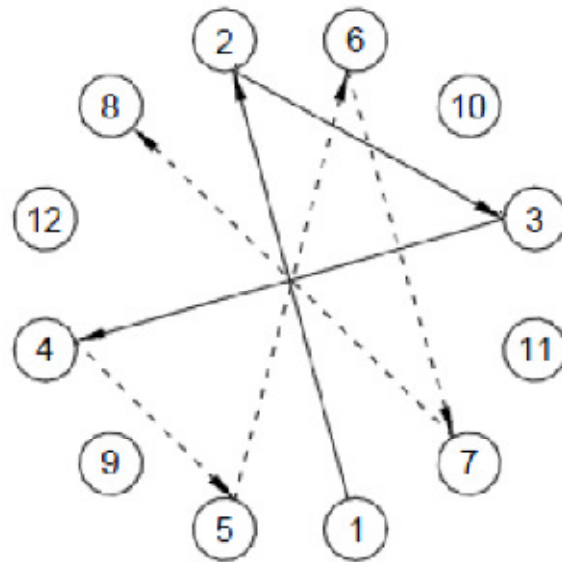
## 10. TIGHTENING SEQUENCE

The tightening sequence for all possible number of bolting, the star logic to be followed is explained below:

1. Tighten the first four nuts in the sequence shown Fig. 01. This helps in correct location of the mating parts.
2. Tighten the other bolts in the sequence shown Fig. 02.
3. The sequence goes clockwise around the bolt.



**Fig.01 Initial Tightening**



**Fig.02 Sequence of Tightening**

**11. MAINTENANCE**

**Maintenance such as gland packing or trim replacement can be done without removing the valve from the line.**

**A. REMOVAL OF ACTUATOR FROM VALVE**

1. Lift the valve plug off the seat ring and remove the stem coupling.
2. Unscrew and remove the locking ring from the bonnet threads.
3. Remove the actuator from the valve.

**B. VALVE DISASSEMBLY**

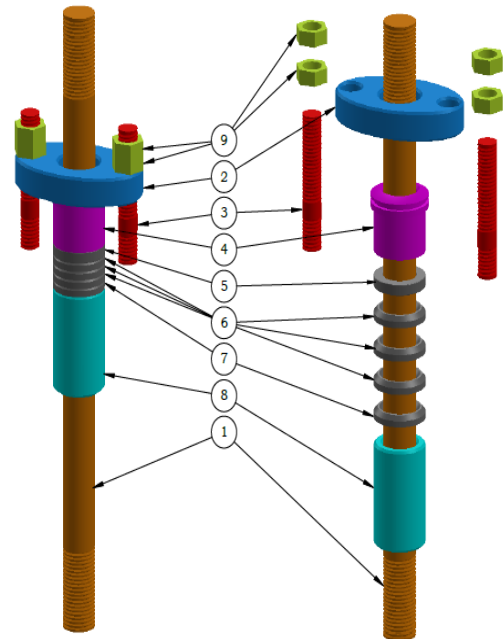
1. Remove the gland nuts, gland flange and gland.
2. Remove the body to bonnet stud nuts and lift the bonnet carefully off the valve body while holding the stem ( to prevent the valve plug assembly dropping out ).
3. For cage guided valves remove the cage from the valve.
4. Remove and discard the body to bonnet gasket(s).
5. Withdraw the Complete Assembly of Cage, Seat & plug and stem assembly out of the Body.
6. Remove the packing set and spacer from the bonnet.
7. All the parts should be cleaned and examined for damage.

**C. VALVE ASSEMBLY**

1. New plugs are normally supplied complete with stems already fitted. If the replacement parts are separate the stem should be screwed into the plug. Drill the plug and stem, countersink the drilled hole, fit the pin and peen. The pin should then be machined flush to the plug.
2. Install the Seat, plug and stem assembly.
3. Place a new gasket on the body and install the cage for cage guided valves.
4. Lower the bonnet carefully over the plug stem and also over the body studs. The bonnet should be centered to ensure that the plug and stem assembly moves freely.
5. Fit the body stud nuts and tighten evenly. The plug and stem assembly should be moved in a linear direction only to ensure that it moves freely.

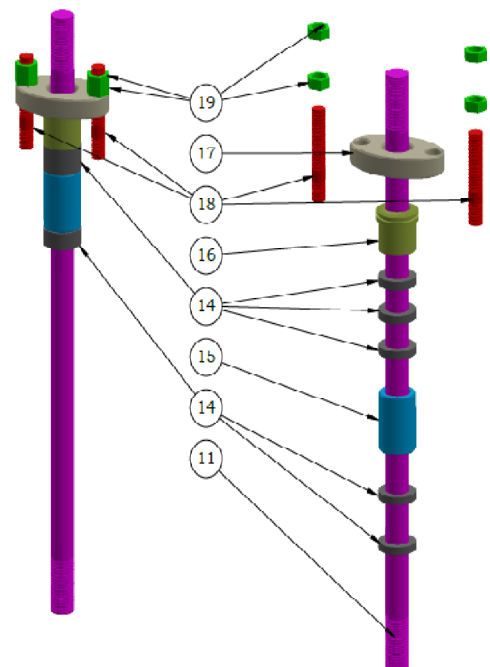
#### D. GLAND PACKING PTFE PACKING BOX ASSEMBLY

1. All the parts should be cleaned and examined for damage before the packing box assembly.
2. Insert first Packing Spacer (**Part No - 08**).
3. Insert Gland Packing PTFE (**Part No - 05,06 & 07**) Total set of ring should be fully installed.
4. Insert Gland (**Part No - 04**).
5. Insert Gland Pusher (**Part No - 02**) and tight with Gland Stud & Gland Stud Nut (**Part No - 03 & 09**)



#### E. GLAND PACKING GRAFOIL PACKING BOX ASSEMBLY

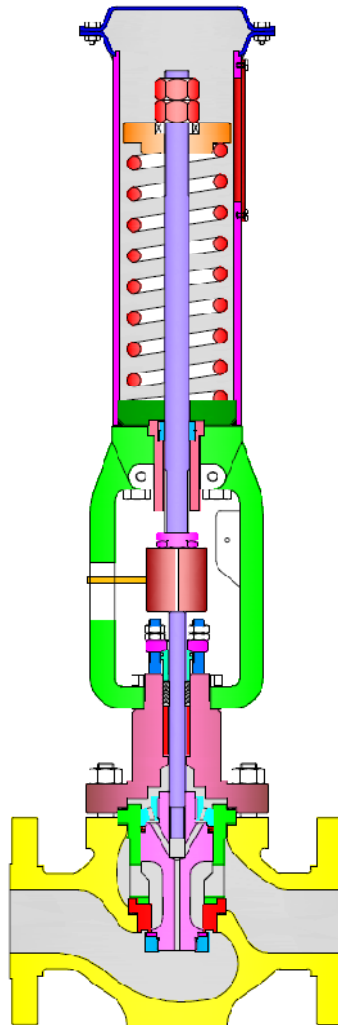
1. All the parts should be cleaned and examined for damage before the packing box assembly.
2. Insert first two Nos of Gland Packing Grafoil one by one and ensure the each ring should be fully installed (**Part No - 14**).
3. Insert Packing Spacer (**Part No - 15**).
4. Insert Gland Packing Grafoil (**Part No - 14**) one by one and ensure the each ring should be fully installed.
5. Insert Gland (**Part No - 16**).
6. Insert Gland Pusher (**Part No - 17**) and tight with Gland Stud & Gland Stud Nut (**Part No - 18 & 19**)





## F. FITTING ACTUATOR TO VALVE

1. Lower the actuator over the plug stem and gland flange to seat squarely on the valve bonnet.
2. Rotate the actuator to the required position, screw the locking ring onto the bonnet and securely tighten.
3. To connect the actuator to the valve stem the valve plug must be on its seat and the actuator in the lowest travel position. Apply one half of the stem coupling to both the valve and actuator stem. Apply the second half of the coupling carefully engaging the threads, then insert the coupling cap screws and hand tighten. The actuator should then be lifted off its seat and the plug stem rotate one full turn in the coupling to provide a seating load. Securely tighten the coupling cap screws.



## 7. TROUBLESHOOTING

PRV normally require seldom attendance, except for routine checks .

SYMPTOMS	PROBABLE CAUSES	CORRECTIVE ACTION
Excessive leakage when valve closed	Worn or damaged seat ring or plug	Disassemble and replace damaged part as detailed in maintenance manual
	Actuator leakage	Check for medium leaks with soapy water. Tighten or replace connection / seals.
Valve operation not smooth	Gland flange over tightened	Loosen gland flange nuts and retighten to finger tight
	Alignment of valve and actuator stem	Check actuator is square and tight on bonnet mounting
Excessive noise	Flashing or cavitations	Check that trim is suitable for the application. Refer to factory
	Loose supports	Tighten the supports sufficiently
	Damaged trim assembly	Replace the trim parts

In order to avoid possible injury to personnel or damage to valve parts, WARNING and CAUTION notes must be strictly adhered to. Modifying this product, substitution non-factory inferior parts, or using maintenance procedure other than outlined could drastically affect performance, void product warranties and be hazardous to personnel and equipment.

**While ordering spares, please indicate 'Valve Serial No.' appearing on Name Plate' fixed on the Actuator.**

The Company's policy is one of Continuous product improvement and the right is reserved to modify the specifications contained here in Without notice



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