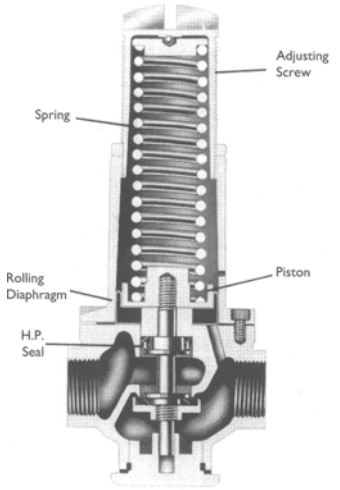
Introduction



The Class T/T LP range of pressure regulating valves are designed for use on installations Which have varying inlet pressures and capacities and which require positive shut-off under No-flow conditions. They are suitable for controlling air, water, oils and other liquids or Gases, which are compatible with the valve materials. The Class T range of valves are fitted with a 'soft' main valve disc to ensure positive shut-off.

Method of Operation

The valve is opened by the adjusting spring load and closed by the reduced pressure acting Against the piston (sealed by a rolling diaphragm or moulded diaphragm, depending on size).
Under working conditions, the balance of the two forces gives the amount of valve opening for the required pressure and flow. The pressure setting is adjusted by turning the adjusting screw. The H.P. seal counterbalances the main valve. This ensures that the set pressure at "no-flow" is unaffected by changes of inlet pressure.

Regulating Accuracy

The valve is spring-actuated valve, and there will be a rise in the flowing outlet pressure, to close the valve under no flowing conditions i.e. dead-end. This rise may be 5 lbf/in^2, 10 lbf/in^2 or 15 lbf/in^2 depending on the capacity factors involved.

Installation

1. Normally mount the valve with a centerline vertical and Adjusting Screw uppermost or inverted.

2. Ensure that the body is adequately supported and not subjected to the pipe strain.

3. Provide adequate headroom for adjustment and space underneath to remove bottom cover and give access for dismantling.

4. Fit pressure gauges upstream and downstream.

5. Isolating valves, relief valves and line strainers are advisable. Relief valve set pressure should be 15% above the dead end setting of the regulator.

6. Flush through newly installed piping to get rid of foreign matter.

7. For air and gases, the outlet piping should be expanded to accommodate the increased volume.

Setting

1. Remove the entire load from Spring (20) by relaxing Adjusting Screw (12).

2. Provide a downstream "dead-end" complete with pressure gauge, by closing a suitable isolating valve.

3. Admit inlet pressure and commence loading valve, by turning the Adjusting Screw (12).

4. Increase outlet pressure to value desired.

5. Open a downstream isolating valve to give a flow through the valve.

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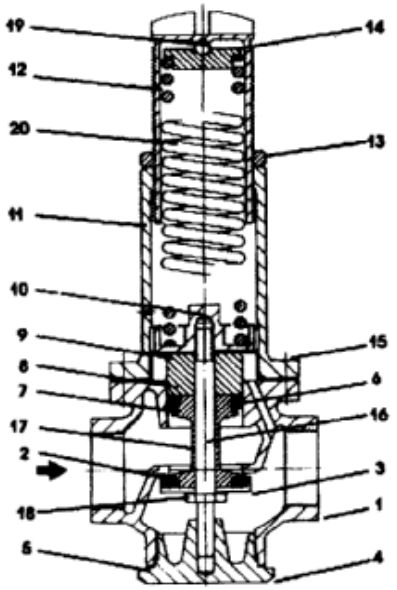
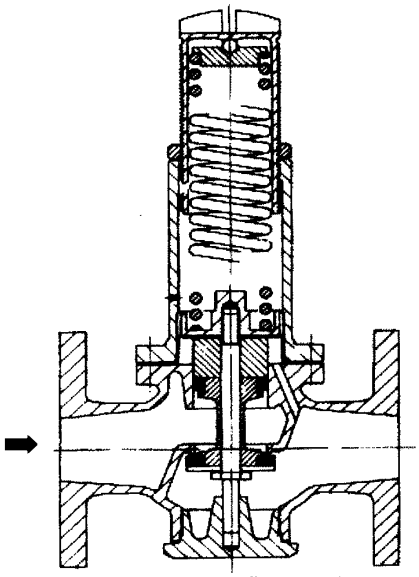
6. If necessary, reset the pressure by turning the Adjusting Screw and then checking the new dead end setting.

Screwed



NOTE: ½", ¾" and 1" valves do not have Valve Stem Sleeves or Valve Stem Joints fitted.

Flanged



NOTE: ½", ¾" and 1" valves do not have Valve Stem Sleeves or Valve Stem Joints fitted.

Replacing the Rolling Diaphragm ½" – 2" Class T
Dismantling

1. Release Adjusting Screw Ring (13).

2. Remove Adjusting Screw (12).

3. Remove the Ball Bearing (19), Top Spring Plate (14) and Spring (20). Take care not to lose the small Ball Bearing.

4. Remove the Spring Chamber (11), by releasing the set screws (15).

5. Remove Bottom Plug (4) and Bottom Plug Joint (5).

6. Grip bottom of Valve Stem (16) with box spanner and unscrew Piston (10) and remove Rolling Diaphragm.

Re-Assembly

7. Hold Valve Stem Assembly (16) in position with box spanner. Place Rolling Diaphragm (9), as shown in Diagram 1, onto Valve Stem (16) and resting on Distance Piece (8). **IMPORTANT** – see note below

8. Screw the Piston (10) onto the Valve Stem (16) and tighten sufficiently to ensure that a pressure seal is formed between the surfaces of the Piston (10) and the Rolling Diaphragm (9) and the Distance Piece (8).

9. Replace the Bottom Plug Joint (5) and Bottom Plug (4). Ensure that the valve stem (16) is properly located in the Bottom Plug Guide Hole (4).

10. Press the Piston (10) downwards so that the valve assembly is now in the wide open position. Revolve the spindle assembly until the cut outs in the edge of the Rolling Diaphragm align with the fixing screw holes.

11. Place Spring Chamber (11) carefully into position over the Rolling Diaphragm (9) ensuring that the diaphragm convolution fits snugly between the inside diameter of the Spring Chamber (11) and the outside diameter of the Piston (10). Replace Set Screws (15) and tighten evenly.

12. Replace Spring (20), Top Spring Plate (14) and Ball Bearing (19). Note: - Failure to fit the Ball Bearing (19) may result in the internal assembly unscrewing and the diaphragm "twisting" when the Adjusting Screw is rotated.

IMPORTANT NOTE

Care must be taken when replacing the rolling diaphragm. Failure can occur at quite low pressure if it is fitted incorrectly.

Rolling diaphragms are supplied in the "as moulded" condition. Which has the shape of a top hat (see Diagram 2). The outside surface of the diaphragm is fabric reinforced, and the inside is rubberized.

The fabric reinforced side is marked "this way up" and must always be fitted so that it faces upwards towards the spring. The rubberized side should face the distance piece.

Before fitting the rolling diaphragm to the valve, the crown has to be rolled inwards in the shape shown in diagram 1, forming a convolution. This convolution **must** fit snugly into position as described above.

Failure to comply with these instructions may result in failure of the rolling diaphragm.

Class T LP $2^1/_2$" – 6" (DN65 – DN150) Pressure Reducing Valve.
Dismantling

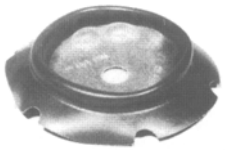
1. Remove Top Cap (14).

2. Release load on Adjusting Screw (15).

3. Remove Spring Chamber (3) by taking out the bolts.

4. Remove Spring (25) and Top Spring Plate (20).

DIAGRAM 1
Crown Rolled Inwards Forming a Convolution



Rubberised Surface (Pressure Side)

DIAGRAM 2
Fabric Reinforced Surface marked "this side up"

'TOP HAT' Configuration

5. Remove Bottom Cover (2) – this is necessary to enable internal assembly to be loosened.

6. Dismantle the assembly by holding the hexagon nut located directly below Disc Holder (6) and loosen the Spindle Nut (19) above the Bottom Spring Plate (18). Retaining the nut below the Disc holder so that the Spindle (11) does not fall out, remove the Spindle Nut (19), the Spindle Nut Washer (22), the brass 'O' Ring Plate (24) and the 'O' Ring (23).

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7. The Diaphragm (17), can then be removed and the spindle (11) maybe removed through the bottom cover (2), complete with the Disc Holder (6) and Disc (7).

8. Remove the piston assembly from the top. Clean all the parts and check the Piston Liner (9) in the Body – it should be clean and free from any score marks.

9. Check Piston Seal (10) and Disc (7). Replace if damaged.

10. Check Body Seat Face, which should be free from marks.

Re-Assembly
1. Re-assemble in reverse order: fit Piston assembly back into Body, fit Disc (7) and Disc Holder (6) onto Spindle (11) and then pass it through the Piston Assembly until the Disc (7) is on the Seat. Hold in this position and fit the Diaphragm (17), Bottom Spring Plate (18), 'O' Ring (23), 'O' Ring Plate (24), Spindle Nut Washer (22) and then the Spindle Nut (19). Hold the hexagon nut just below the Disc Holder (6) and tighten down on the Spindle Nut (19) until the assembly is tight.

2. Before refitting the Spring Chamber and Spring etc. the valve must be pushed onto its seat so that the plain portion of the moulded Diaphragm enters the machined portion of the Spring Chamber. **IMPORTANT** – see note below.

3. Once this has been done, the bolts can be refitted, taking care not to over-tighten them since this may cause the diaphragm to extrude from between the flanges.

4. Fit a new Bottom Cover Joint (16) if necessary; then fit the Bottom Cover (2) and tighten down.

NOTE.
The diaphragm convolution must be fitted uppermost, care must be taken to ensure that the Cover (3) and Bottom Spring Plate (18) do not trap the convolution on assembly. Before fitting bottom Cover (2) ensure that the assembly is free to move, by moving the Spindle (11) up and down.

To Adjust The Set Pressure.
Clockwise rotation of the Adjusting Screw (15) will increase the downstream set pressure. Anti-clockwise rotation of the Adjusting Screw (15) will decrease the downstream set pressure.
The valve should wherever possible be set on dead-end, i.e. against a closed downstream stop valve.

Replacing the Rolling Diaphragm $2^1/_2$" and 6" Class T LP.
Ensure That: -
1. The diaphragm is fitted the correct way, with the convolution uppermost.

2. With the diaphragm, bottom spring plate, spring and top spring plate in position the valve plug assembly is held up against the body seat when bolting the spring chamber into position. The bottom cover must be removed to facilitate this operation.

3. The spring chamber bolts are tightened evenly. Do **NOT** over tighten, otherwise the diaphragm may extrude from between the flanges resulting in internal stretching and premature failure.

Maintenance and Fault Finding
1. Sluggish Operation:
Usually caused by frictional effects of deposits of foreign matter on working surfaces. Dismantle, clean and replace seals as necessary. Dress out lights score marks or scratches with fine emery paper.

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2. Pressure Build-Up at Dead-End.
Maybe due to: -
(a) Excessive Dirt (see 1 above)
(b) Seat leakage – renew disc.
(c) Internal leakage, due to loose internal assembly (see re-assembly note 12).

3. Leakage Through Vent Hole In Spring Chamber
Indicates: -
(a) Failure of upper Diaphragm or H.P. seal – renew.
(b) Leakage through internal assembly – see 2 (c)

General Notes
It is Desirable to make a routine inspection of the valve at planned intervals, the frequency depending on the valve duty and cleanliness of the flowing medium. An annual examination is desirable but this can be extended with experience.

The rubber components (diaphragms, seals and discs) should be carefully checked for flaws and renewed, if necessary.

If the Body Seat is marked and causing leakage, it should be machined, taking great care to preserve the original profile.

Spares
Spares packs containing Diaphragms, Seals, Discs and Joints for the Class 'T' range are available. One pack should be held for each valve.

1.	**Body.**	**Cast Iron.**
2.	**Bottom Cover**	**Cast Iron.**
3.	**Spring Chamber**	**Cast Iron.**
4.	**Piston**	**Bronze.**
5.	**Valve Seat**	**Bronze.**
6.	**Disc Holder**	**Bronze.**
7.	**Valve Disc**	**Hycar Rubber.**
8.	**Cover Bush**	**Aluminium Bronze.**
9.	**Piston Liner**	**Bronze.**
10.	**Piston Seal**	**Nitrile Rubber.**
11.	**Spindle**	**Phosphor Bronze.**
12.	**Piston Liner Screw**	**Brass.**
13.	**Piston Liner Joint**	**Non Asbestos Fiber.**
14.	**Adj Screw Cap Joint**	**Non Asbestos Fiber.**
15.	**Adjusting Screw**	**Brass.**
16.	**Bottom Cover Joint**	**Non Asbestos Fiber.**
17.	**Diaphragm**	**Synthetic Rubber.**
18.	**Bottom Spring Plate**	**Cast Iron.**
19.	**Spindle Nut**	**Brass.**
20.	**Top Spring Plate**	**Cast Iron.**
21.	**Adj Screw Locknut**	**Brass.**
22.	**Spindle Nut Washer**	**Rubber/Metal Insert.**
23.	**O Ring**	**Synthetic Rubber.**
24.	**O Ring Plate**	**Brass.**
25.	**Spring**	**Plated Carbon Steel.**

Spring Ranges

5 – 30psig.	**0.35 – 2.1bar**	**White & Green colour code.**
31 – 80psig	**2.1 – 5.5bar**	**White & Yellow colour code.**