

Type 25E Electric Pilot Operated Valve

(for Steam or Air Service)

Safety Information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.

- i) The products have been specifically designed for use on steam, air or water/condensate. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures in excess of 300°C (572°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

1.16 Returning products

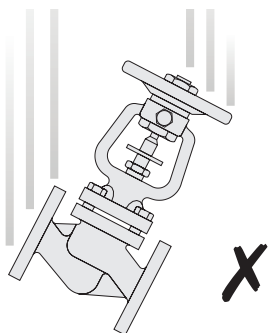
Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

1.17 Working safely with cast iron products on steam

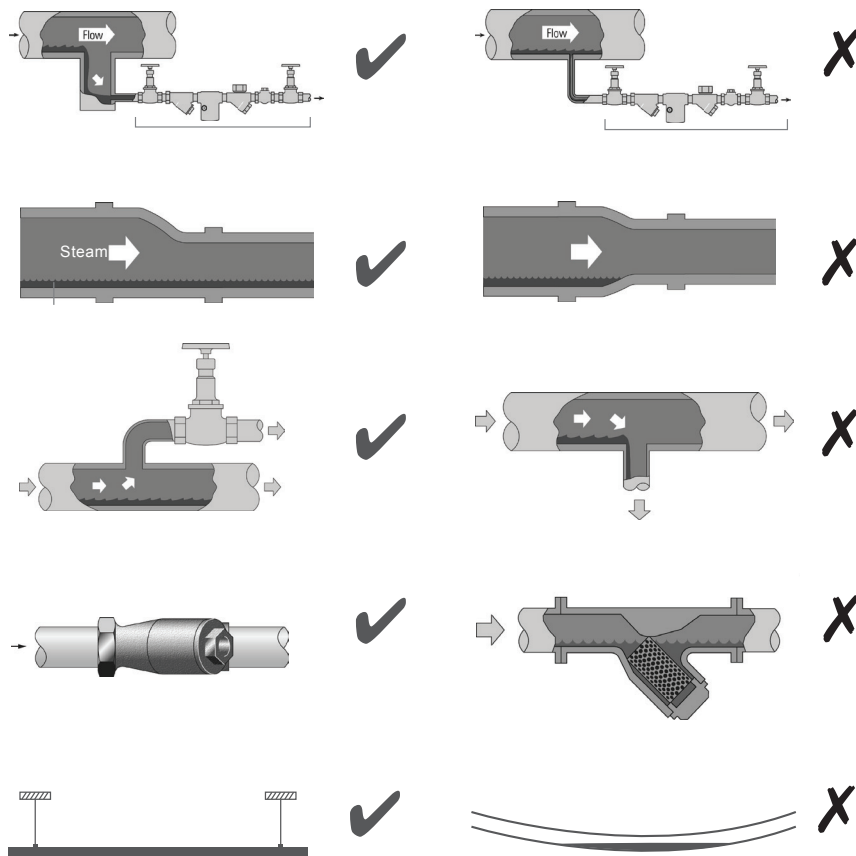
Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe. However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel. The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

Safe Handling

Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.



Steam Mains - Do's and Don't's:



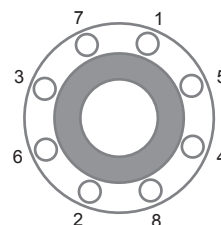
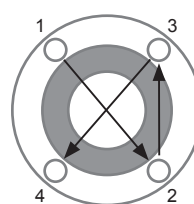
Prevention of tensile stressing

Pipe misalignment:

Installing products or re-assembling after maintenance:



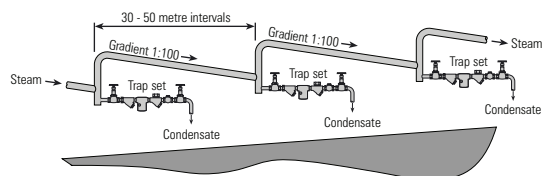
Do not over tighten.
Use correct torque figures.



Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

Prevention of water hammer

Steam trapping on steam mains:



Thermal expansion:

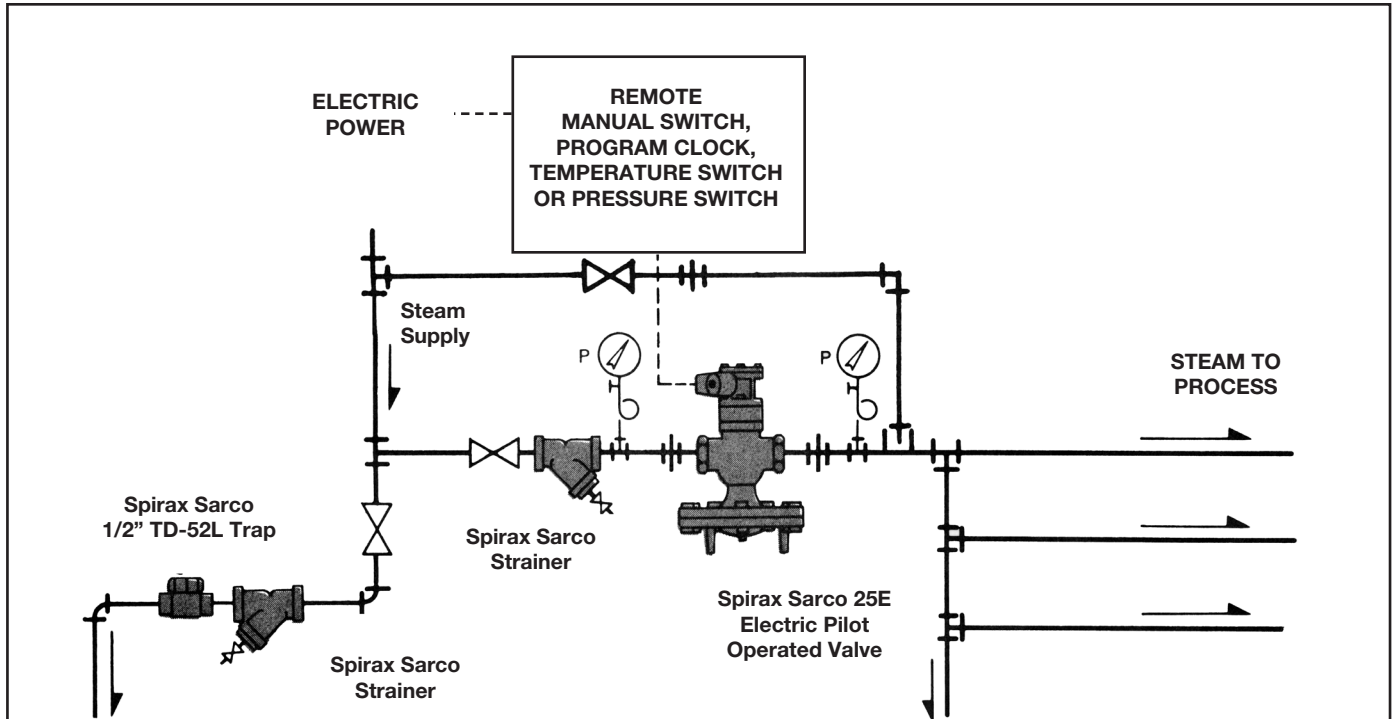
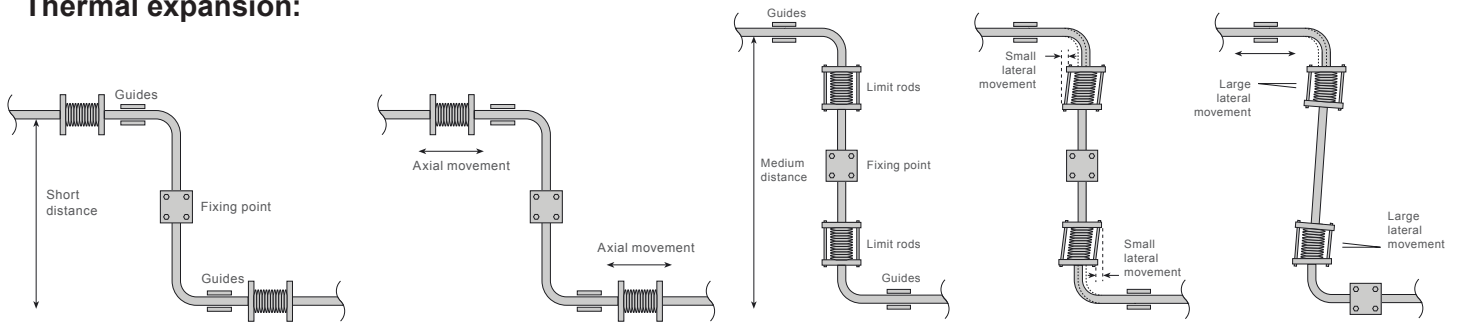


Fig 1 Automatic Control Valve Electrically Operated from Remote Station or Stations

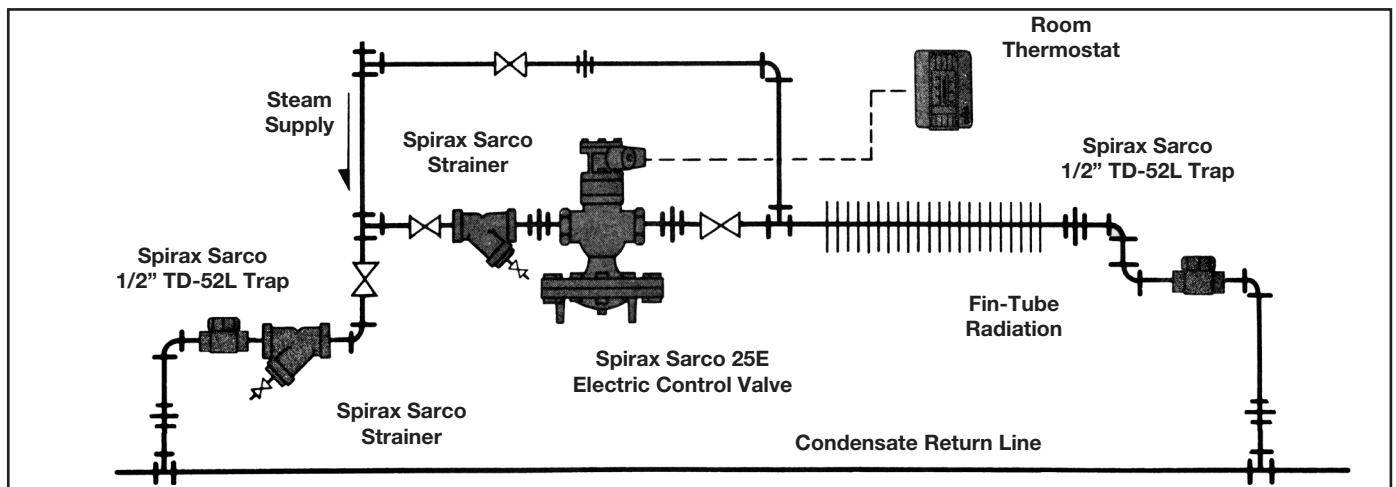


Fig 2 Controlling Temperature of Greenhouse or Other Similar Buildings

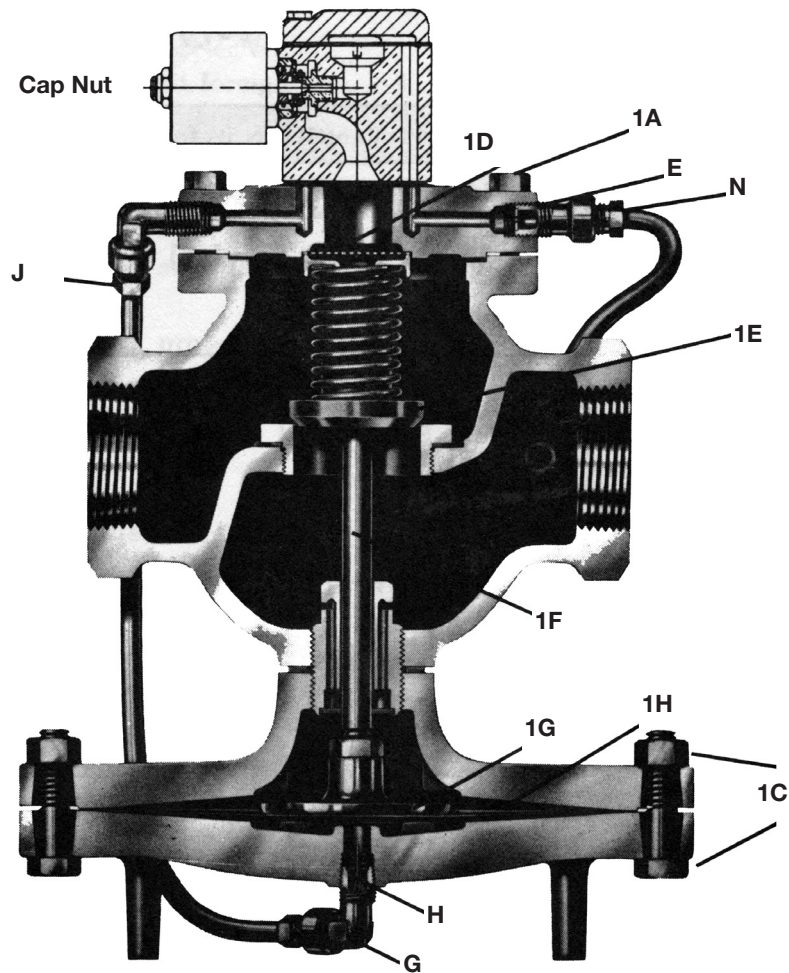


Fig 3
Sizes 1/2" - 2"

INSTALLING THE VALVE

IMPORTANT: Step by step instructions on the following pages should be read carefully before installing the valve.

Unpack Carefully

Do not lift the regulator by the electric pilot. Grasp the body of the valve firmly when lifting.

Piping

1. Typical hookup sketches as shown in Figs. 1 and 2 will aid in planning a correct installation.
2. Before installing the valve make sure the piping is free of foreign material, scale, etc.
3. Make certain the arrow cast on regular valve body is pointing in the direction of flow.
4. Regulating valve should always be installed in a horizontal line. (See Figs. 1 and 2)

Bypass

1. A bypass connection, as shown in Figs. 1 and 2, is recommended so that the valve can be serviced without shutting down the equipment.
2. The bypass valve should be the same size as the regulating valve.

Steam Line Drain Trap

To insure proper operation of the valve and avoid premature wear, it is recommended that on steam applications a steam trap be installed on the same supply line. (See Figs. 1 and 2)

Pipeline Strainers

1. It is strongly recommended that strainers be installed before the regulating valve and steam traps. (Figs. 1 and 2)
2. Make certain adequate clearance is provided for screen removal and blowdown connection between strainer and regulating valve body.

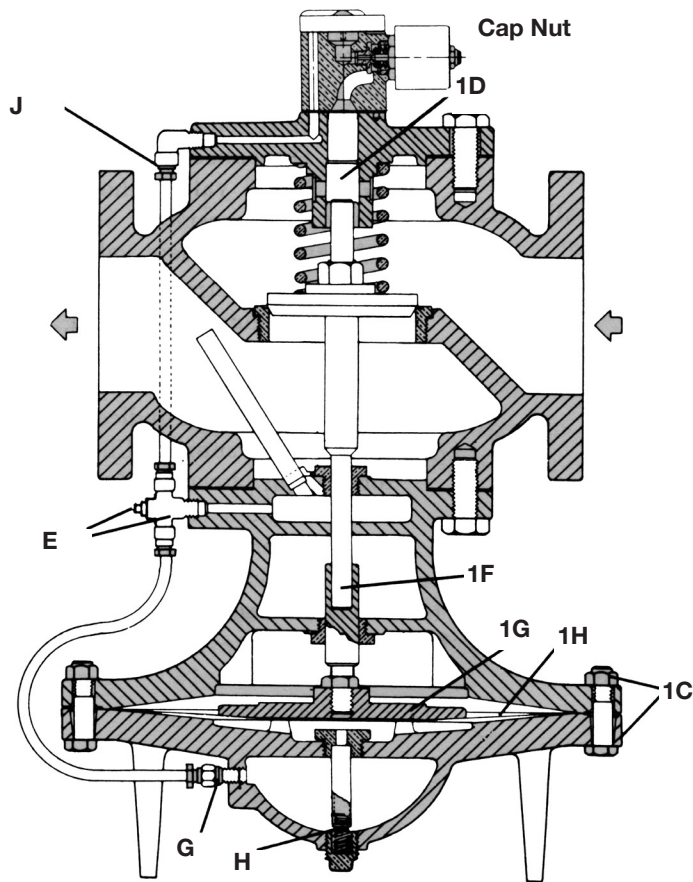


Fig 4
Sizes 2-1/2" - 4"

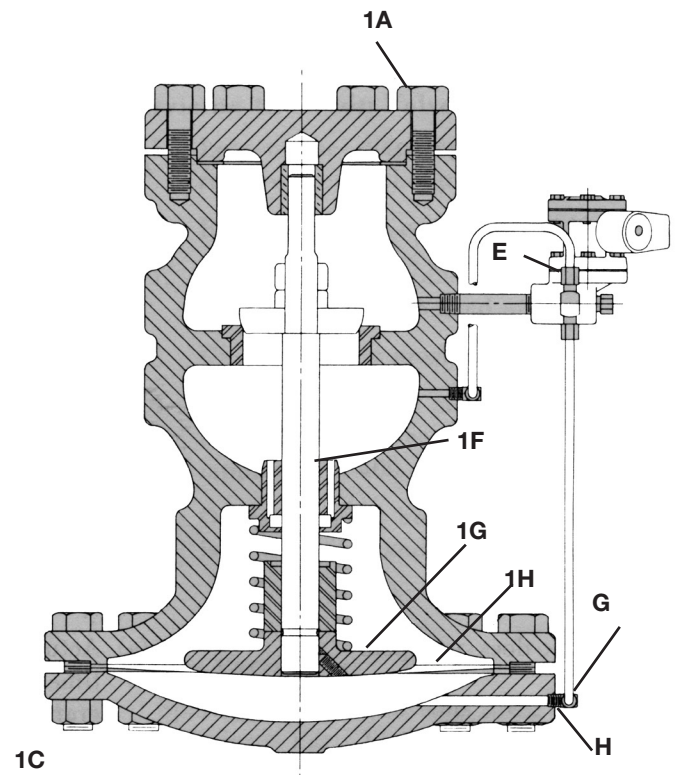


Fig 7
6" Size

Stop Valves

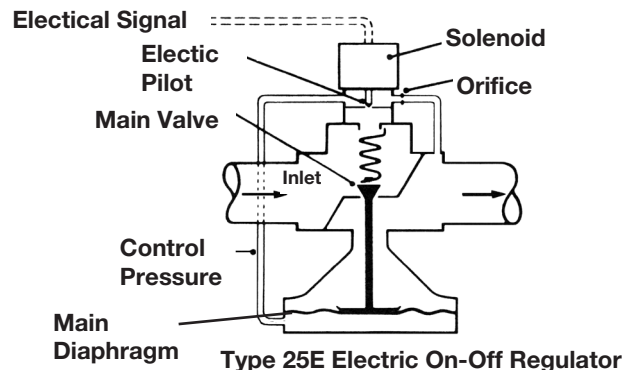
All stop valves on the supply side, as well as on the downstream side of the regulating valve, should be of the gate type so as to insure full rated capacity and good control.

Wiring

1. Check name plate on electric pilot for correct voltage and service conditions.
2. Wiring must comply with local and national electrical codes.
3. Solenoid enclosure is provided with hole to accommodate standard 1/2 inch conduit connection.
4. The solenoid enclosure can be rotated to facilitate wiring by loosening the cap nut (See Fig. 6).

HOW IT WORKS

Normally, the main valve and electric pilot valve are closed. When the electric pilot is energized, pilot valve will open allowing steam or air to pressurize main valve diaphragm chamber which opens main valve fully. When electric pilot is de-energized, pilot valve closes and diaphragm chamber pressure is relieved through control orifice. Main valve will close tight by the force of head spring and steam or air pressure acting on valve head.



MAINTENANCE

General Inspection

While a program of planned maintenance is always to be recommended, the 25E Regulator will give long and trouble-free service is correctly selected, installed and kept reasonably free of dirt and foreign matter. Dirt and foreign matter are most likely to collect during installation and later trouble can be avoided by inspecting the installation a few days later. Check the following: Refer Fig. No. 3, 4, and 7.

1. Clean all pipeline strainers (remove screens to clean).
2. Check the main valve seat and protective screen (1D).
3. Inspect and clean orifices (E) and (H).
4. Check all joints for leakage.

Electric Pilot, Inspection of Solenoid and Internal Parts (Refer to Fig.6)

1. Shut off steam supply to valve and turn off electrical power.
2. Unscrew solenoid housing nut and remove housing, coil, and housing base plate.
3. Base assembly (4J) is now accessible for removal with hexagon or adjustable open end wrench.
4. Valve head, spring and seat are now accessible for inspection, cleaning and replacement, if necessary. When replacing seat use compound on threads (remove excess). Tighten to 75 in.-lb. torque.

Valve Sizes 1/2" thru 4".

Inspecting and Replacing Main Valve Head and Seat (Refer to Figs. 3 and 4)

1. Unscrew copper tubing connection at (J) and (N).
2. Remove main valve cover cap screws (1A).
3. Remove main valve cover, strainer, screen, and head spring.
4. Head can then be removed by simply withdrawing with pliers or similar tool.
5. Inspection should then be made to determine if scale or other foreign material prevented tight closure of the head and seat.
6. If the head or seat shows signs of wear this can be corrected by grinding, using a fine grinding compound (400 grit) providing the wear is not severe. Check for body erosion.
7. If it is necessary to replace the valve seat, this can be removed from the valve body using a standard hexagon socket. (Valve sizes 1/2" to 2"). When replacing the valve seat, a new gasket should be used to insure a tight joint. 2-1/2" thru 6" valves contain raised lugs for removal and seal metal-to-metal without a gasket. Replacement heads and seats should be lapped in.

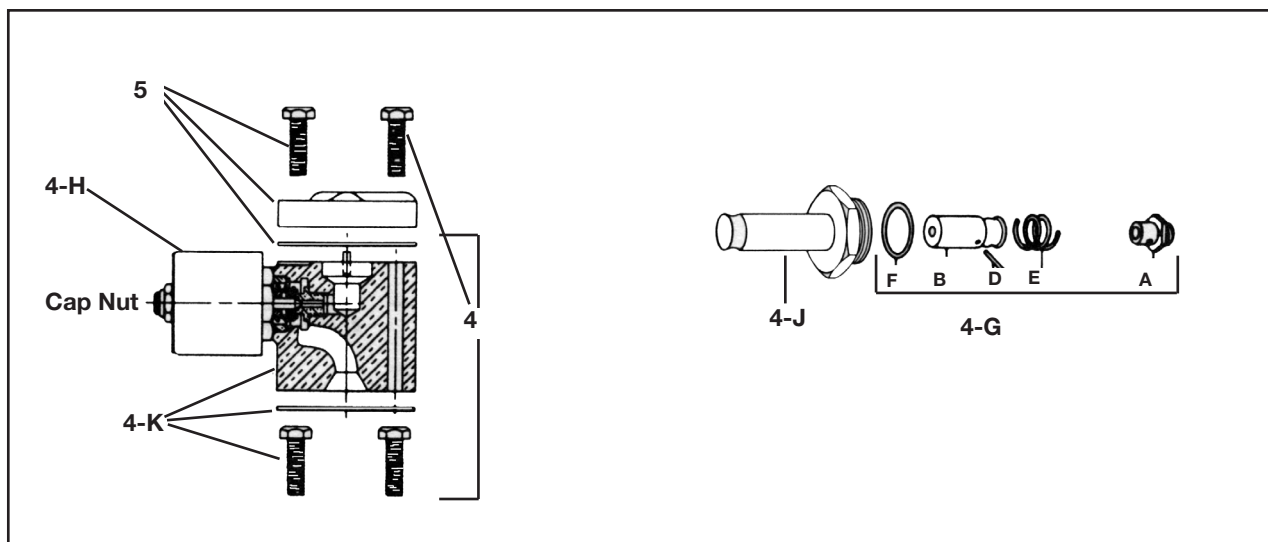


Fig 6

Valves Sizes 1/2" thru 4"

Inspecting and Replacing Main Valve Diaphragms (Refer to Figs. 3 and 4)

1. Unscrew copper tubing connection at (G).
2. Remove main valve diaphragm bolts (1C).
3. This will allow the lower diaphragm case to be removed.
4. The 2 metal diaphragms (1H) should be inspected to insure that they have not become distorted or possibly fractured as a result of abnormal operating conditions.
5. At the same time any accumulation of dirt or foreign material should be removed from the diaphragm case.
6. The valve stem (1F) should also be checked to make sure it is free to move and that there is no scale or foreign material lodged in the guide bushing.
7. **Before reassembling diaphragms in 1/2" thru 4" sizes, main valve head must be in place and held in a closed position with the return spring and main valve cover.**
8. Make certain pressure plate (1G) is set properly. (Refer to Figure 5)
9. Care should be taken in centering the diaphragms properly and equalizing bolt take-up uniformly.

6" VALVE ONLY.

Inspecting and Replacing Main Valve Diaphragms, Seat, and Head Assembly (Refer to Figure 7)

Diaphragms

1. Unscrew copper tubing connections (G) to lower diaphragm chamber.
2. Remove main valve diaphragm bolts (1C) and drop lower diaphragm case.
3. The 2 metal diaphragms (1H) should be inspected and replaced if they have become distorted or fractured.
4. Clean any accumulation of dirt from the diaphragm case and orifice (H).

Servicing the Main Valve Head and Seat.

5. Loosen the diaphragm plate set screw and remove the diaphragm plate (1G).
6. Remove the top cover bolts (1A) and cover.
7. Remove the stem and head assembly from the valve. Inspect the head and seat for wear.
8. Check for body erosion around the seat ring.
9. Replacement seats and heads should be lapped in, and minor wear can also be corrected by lapping with 400 grit compound.
10. On re-assembly be sure diaphragm plate (1G) is set at 27/64" and set screw securely tightened.

Spare Parts Kits

Spare parts kits and coils are available. Refer to

TIS 3.027 for 1/2" to 4" Main Valve

TIS 3.029 for 6" Main Valve

TIS 3.0271 for Pilot Valves

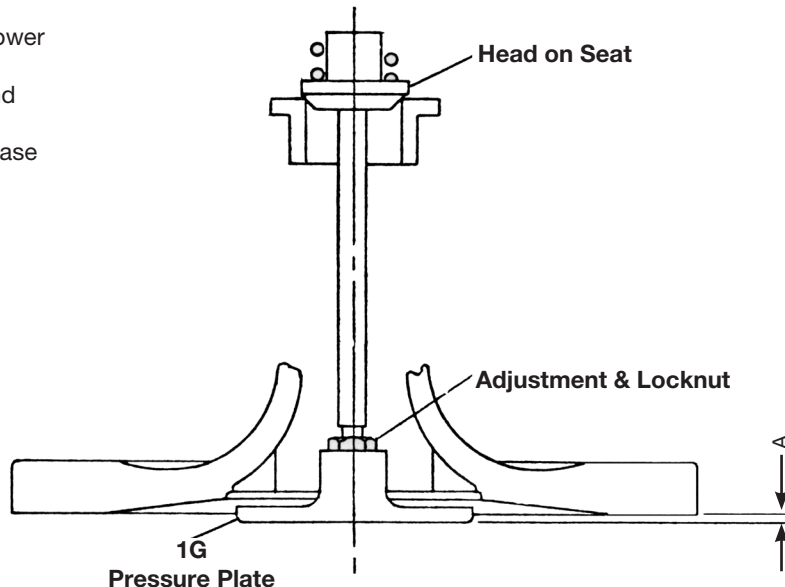


Fig 5

NOTE: In 1/2" thru 4" sizes, top of valve must be completely assembled and head must be on seat when measuring dimensions "A" and when reassembling diaphragms.

Size	1/2" & 3/4"	1"	1-1/4" & 1-1/2"	2"	2-1/2"	3"	4"	6"
Dim.A	1/16"	5/64"	3/32"	1/8"	13/64"	13/64"	1/4"	27/64"

TROUBLESHOOTING CHART — TYPE 25E

Symptom	Cause	Check and Cure
1. Valve does not close.	<p>1. (a) Dirt under pilot valve head or seat.</p> <p>(b) Dirt in orifices (E) or (H).</p> <p>(c) Dirt or foreign material under main valve head (1E).</p> <p>(d) Faulty control circuit.</p> <p>(e) Actuating device, that is, timer, thermostat or programmer may be defective.</p> <p>(f) Bypass valve leaking</p>	<p>1. (a) Remove and, if necessary, replace or clean. See Figure 6, Page 4.</p> <p>(b) Inspect and clean.</p> <p>(c) De-energize solenoid to close pilot. Disconnect tubing at (G). Main valve should close, if not, remove bolts (1A) and clean main valve.</p> <p>(d) Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is open. Absence of the click indicates loss of power supply. Check for loose or blown out fuses, open circuited or grounded coil, broken lead wires or splice connections.</p> <p>(e) Check and correct.</p> <p>(f) Check and correct</p>
2. Valve does not open.	<p>2. (a) Actuating device, that is, timer, thermostat or programmer may be faulty.</p> <p>(b) Main Valve diaphragm (1H) cracked.</p> <p>(c) Orifice at (H) blocked.</p> <p>(d) Valve strainer (1D) blocked.</p> <p>(e) Steam or air pressure too low.</p> <p>(f) Line strainer partially or completely blocked.</p> <p>(g) Faulty control circuit.</p> <p>(h) On steam applications, steam trap draining equipment may not be functioning properly.</p>	<p>2. (a) Check and correct.</p> <p>(b) Check and correct. Remove copper tubing at (G) and crack bypass valve. If steam or air blows from diaphragm case at (G) connection, replace diaphragm.</p> <p>(c) Check and correct. Remove copper tubing at fitting. Inspect and clean.</p> <p>(d) Check and correct. Remove bolts (1A). Inspect strainer and clean.</p> <p>(e) Check and correct.</p> <p>(f) Check and correct. Inspect and clean.</p> <p>(g) Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is open. Absence of the click indicates the loss of power supply. Check for loose or blown out fuses, open circuited or grounded coil, broken lead wires or splice connections.</p> <p>(h) Check and repair, if necessary.</p>

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