

44-5800 Series

44-5800E Series Electrically Heated Vaporizing Regulator



Do not attempt to select, install, use
or maintain this product until you have
read and fully understood this manual.

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Section 1: Symbols

WARNING

Paragraphs highlighted by the **WARNING** icon contain information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

CAUTION


Paragraphs highlighted by the **CAUTION** icon contain information that must be followed to maintain a safe and successful operating environment.

Section 2: Safety Precautions and Repair

2.1 44-5800E Series Regulator Safety

WARNING

Although the 44-5800 Series product design meets the design standards required by the approval agencies, a circuit board failure could occur during the life of the product potentially causing the regulator's surface temperature to exceed the ATEX T1 temperature class limit of 450°C. As a result, 44-5800 Series regulators should not be used in an enclosed environment without an external temperature control device to interrupt power to the regulator. Redundant safety and monitoring devices are recommended for safe system use in any application environment to protect against the risk of fire or explosion in the event of overheating of the regulator due to circuit board failure.

 Do not attempt to select, install, use or maintain this regulator until you have read and fully understood these instructions. Do not permit untrained persons to install, use or maintain this regulator.

The 44-5800E Series regulator should not be installed in an enclosure that is heated above the regulator's maximum rated ambient temperature.

Be sure this information reaches the operator and stays with the product after installation.

Improper selection, improper installation, improper maintenance, misuse or abuse of regulator can cause death, serious injury and property damage.

Possible consequences include but are not limited to:

- High velocity fluid (gas or liquid) discharge
- Parts ejected at high speed
- Contact with fluids that may be hot, cold, toxic or otherwise injurious
- Explosion or burning of the fluid
- Lines/hoses whipping dangerously
- Damage or destruction to other components or equipment in the system

▲ CAUTION

Safety Precautions

1. Inspect the regulator before each use.
2. Never connect regulators to a supply source having a pressure greater than the maximum rated pressure of the regulator, valve or accessory.
3. Refer to product label (model specific) for maximum inlet pressures. If this rated pressure cannot be found, contact your local TESCO representative for the rated pressure prior to installation and use. Verify the designed pressure rating of all equipment (e.g., supply lines, fittings, connections, filters, valves, gauges, etc.) in your system. All must be capable of handling the supply and operating pressure.
4. Clearly establish flow direction of the fluid before installation of regulators, valves and accessories. It is the responsibility of the user to install the equipment in the correct direction.
5. Remove pressure from the system before tightening fittings, gauges or components.
6. Never turn regulator or valve body. Instead hold regulator or valve body and turn fitting nut.
7. If a regulator or valve leaks or malfunctions, take it out of service immediately.
8. Do not modify equipment or add attachments not approved by the manufacturer.
9. For pressure reducing regulators, it is highly recommended that the control knob or adjusting screw be turned fully counterclockwise before applying inlet pressure.
10. Apply pressure to the system gradually, avoiding a sudden surge of fluid or pressure shock to the equipment in the system.
11. Regulators are not shut-off devices. Install a pressure relief device downstream of the regulator to protect the process equipment from overpressure conditions. Shut off the supply pressure when the regulator is not in use.
12. Periodic inspection and scheduled maintenance of your equipment is required for continued safe operation.
13. The frequency of servicing is the responsibility of the user based on the application. Never allow problems or lack of maintenance to go unreported.
14. Read and follow precautions on compressed gas cylinder labels.
15. It is important that you analyze all aspects of your application and review all available information concerning the product or system. Obtain, read and understand the Material Safety Data Sheet (MSDS) for each fluid used in your system.
16. Never use materials for regulators, valves or accessories that are not compatible with the fluids being used.
17. Users must test components for material compatibility with the system operating conditions prior to use in the system.
18. Vent fluids to a safe environment and in an area away from personnel. Be sure that venting and disposal methods are in accordance with Federal, State and Local requirements. Locate and construct vent lines to prevent condensation or gas accumulation. Make sure the vent outlet is not obstructed by rain, snow, ice, vegetation, insects, birds, etc. Do not interconnect vent lines; use separate lines if more than one vent is needed.

19. Do not locate regulators, valves or accessories controlling flammable fluids near open flames or any other source of ignition.
20. Some fluids when burning do not exhibit a visible flame. Use extreme caution when inspecting and/or servicing systems using flammable fluids to avoid death or serious injury to personnel. Provide a device to warn personnel of these dangerous conditions.
21. Many gases can cause suffocation. Make certain the area is well ventilated. Provide a device to warn personnel of lack of Oxygen.
22. Never use oil or grease on these regulators unless recommended as specified in Operations and Service procedures. Oil and grease are easily ignited and may combine violently with some fluids under pressure.
23. Have emergency equipment in the area if toxic or flammable fluids are used.
24. Upstream filters are recommended for use with all fluids.
25. Do not bleed system by loosening fittings.
26. Prevent icing of the equipment by removing excess moisture from the gas.
27. Always use proper thread lubricants and sealants on tapered pipe threads.

2.2 Repair Service

If a regulator or valve leaks or malfunctions, take it out of service immediately. You must have instructions before doing any maintenance. Do not make any repairs you do not understand. Have qualified personnel make repairs. Return any equipment in need of service to your equipment supplier for evaluation and prompt service. Equipment is restored to the original factory performance specifications, if repairable. There are flat fee repair charges for each standard model. The original equipment warranty applies after a complete overhaul.

Any disassembly and/or reassembly of this unit must be performed in accordance with IEC 60079-19, *Explosive Atmospheres - Part 19: Equipment Repair, Overhaul and Reclamation*.

WARNING

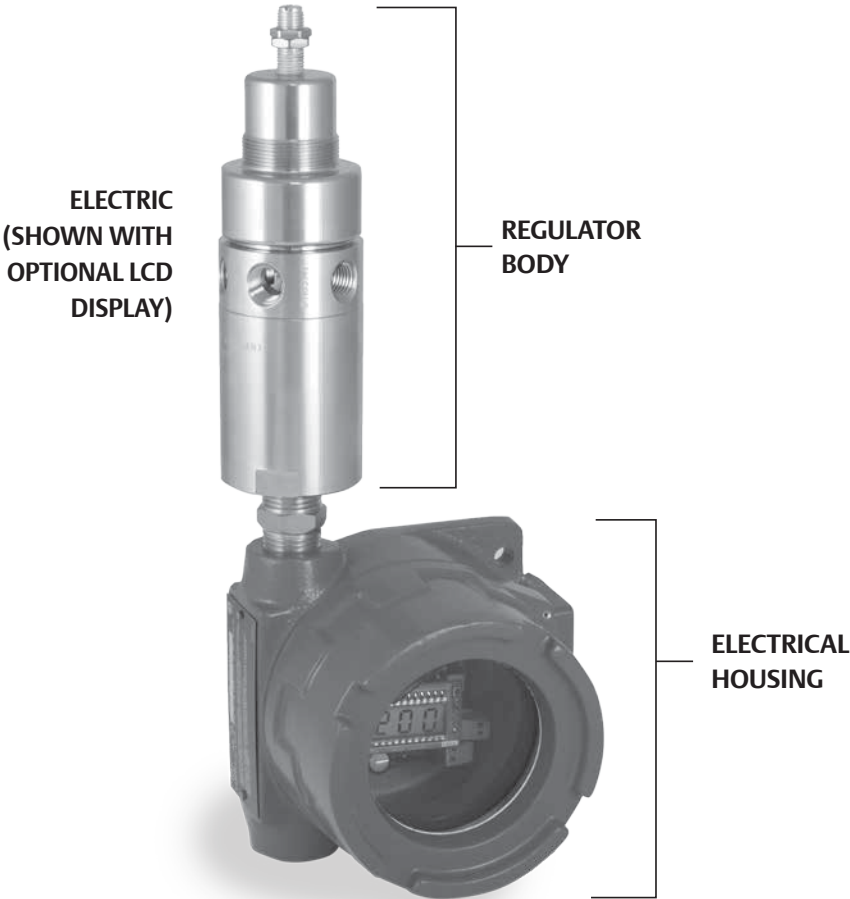
Do not modify equipment or add attachments not approved by the manufacturer. Failure to do so can result in death, serious injury and/or property damage.

CAUTION

Proper Component Selection

1. Consider the total system design when selecting a component for use in a system.
2. The user is responsible for assuring all safety and warning requirements of the application are met through his/her own analysis and testing.
3. TESCOM may suggest material for use with specific media upon request. Suggestions are based on technical compatibility resources through associations and manufacturers. TESCOM does NOT guarantee materials to be compatible with specific media -- THIS IS THE RESPONSIBILITY OF THE USER!
4. Component function, adequate ratings, proper installation, operation and maintenance are the responsibilities of the system user.

Figure 1



Section 3: Installation, Operations and Maintenance

Assembly & installation drawings, Bill of Materials, and parts lists for your product may be obtained by contacting TESCOM. TESCOM will provide these by email, fax or mail. Your local TESCOM representative can provide additional assistance. Be sure to have your complete model number ready. See back page for contact information for the TESCOM location closest to you.

3.1 General Information

TESCOM 44-5800E Series Electrically Heated Vaporizing diaphragm-sensed pressure reducing regulators are specifically engineered for applications requiring dependable pressure regulation. These regulators are especially appropriate for installations where high system pressures (up to 6000 psi) must be reduced to levels suitable for actuating low pressure (0 psig/0 bar to 500 psig/35 bar) instruments and related equipment.

In addition, the 44-5800E Series “Vaporizing” regulator is designed to offset the effects of the Joule-Thompson cooling effect that occurs when there is a pressure drop in a gas. It can also be used to vaporize a liquid into a gas in some applications.

The electrical board inside the housing powers an electrical heater that indirectly heats the process media. This heater is regulated by the electrical board for temperatures up to 572°F / 300°C and limited by a feedback thermocouple.

3.1.1 Operating Parameters/Special Conditions For Safe Use

Maximum Inlet Pressure:

6000 psig / 414 bar / 41,370 kPa

Maximum Outlet Pressure:

500 psig / 34.5 bar / 3448 kPa

Outlet Pressure Ranges:

0-25, 0-50, 0-100, 0-250, 0-500 psig
0-1.7, 0-3.4, 0-6.9, 0-17.2, 0-34.5 bar
0-172, 0-345, 0-690, 0-1724, 0-3448 kPa

Design Proof Pressure

150% maximum rated

Leakage

Internal: Bubble-tight

External: Designed to meet $\leq 2 \times 10^{-8}$ atm cc/sec He

Voltage

90-115 VAC / 190-230 VAC, 50/60 Hz, 500 watts maximum

Flow Capacity:

$C_v = 0.02$

Refer to catalog and part number for options.

Supply Voltage (VAC)	Heater Watts (W)	Max. Ambient Temperature
115	12.5	149°F/65°C
	25	
	50	
	100	
	200	122°F / 50°C
230	50	149°F / 65°C
	100	
	200	
	400	122°F / 50°C

⚠ CAUTION

Product approvals and maximum ambient temperature ratings are based on both the electrical housing and the regulator body being in the same ambient environment not exceeding the maximum temperatures in the table above.

All cables and conductors used in association with this equipment must be suitably certified and must be capable of maintaining an ingress protection of IP56 at 75°C.

3.2 Installation

3.2.1 Installation Precautions

⚠ WARNING

Make sure that the components and materials used in the fluid handling system are compatible with the fluid and have the proper pressure rating. Failure to do so can result in death, serious injury and/or property damage.

A regulator is not intended to be used as a shutoff device. When the regulator is not in use, the inlet supply should be turned off. As a safety precaution, a pressure relief device should be installed downstream of the regulator

⚠ CAUTION

Do not open packaging until ready for installation or in a clean environment. Product is cleaned in accordance with CGA 4.1 and ASTM G93, Verification Type 1, Test 1 and Test 2. With periodic verification of cleaning process to MIL-STD-1330D.

Inspect the regulator for physical damage and contamination. Do not connect the regulator if you detect oil, grease or damaged parts. If the regulator, valve or accessory is damaged, contact your local TESCOM representative to have the regulator cleaned or repaired.

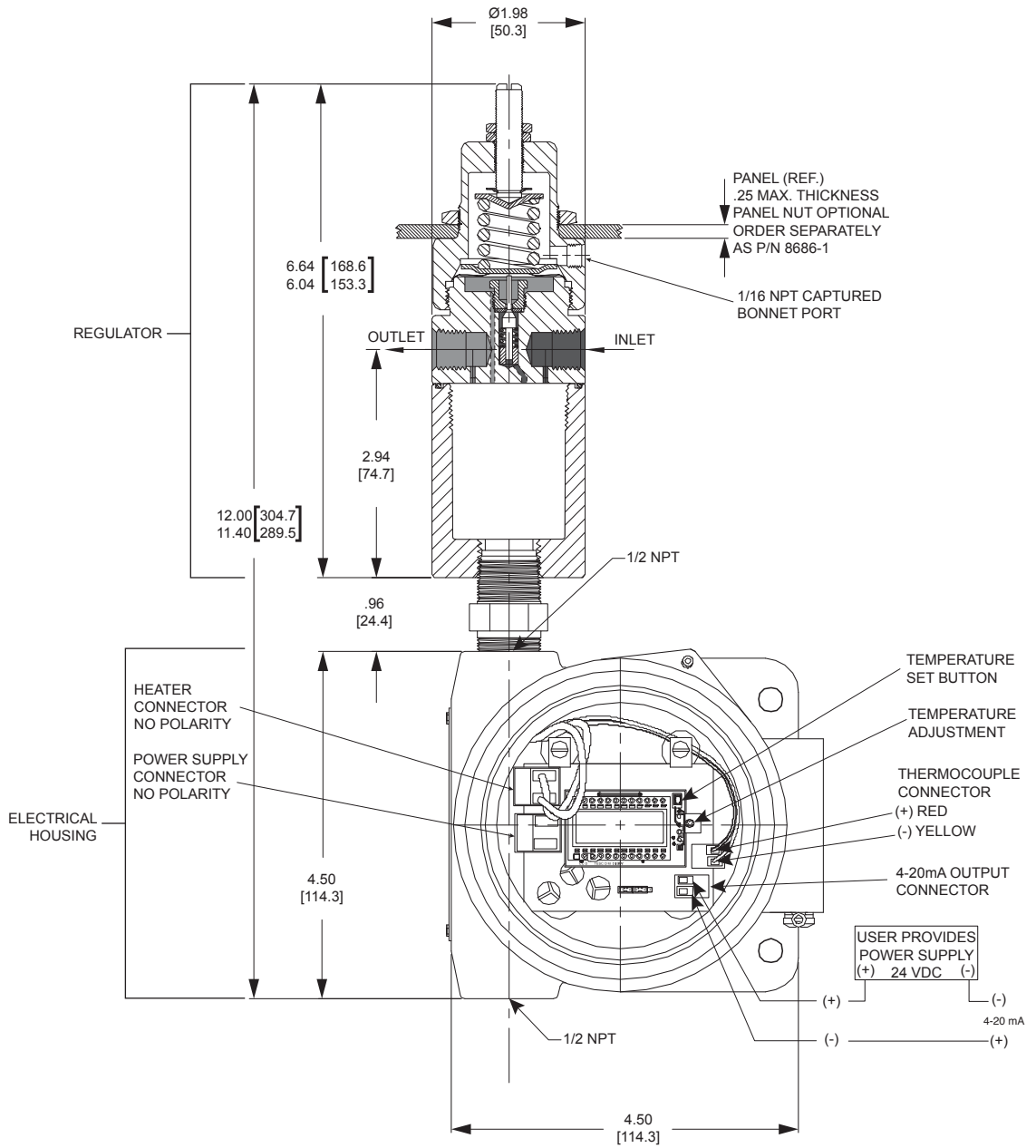
3.2.2 Installation Instructions

⚠ CAUTION

Follow all laws, regulations and industry requirements for electrical wiring.

1. Make sure the regulator and electrical housing is mounted securely.
2. Make sure the electrical power is turned off and locked out.
3. Connect external ground if required to electrical housing.
4. Remove electrical housing cover.
5. Remove power supply connector and (if used) the 4-20 mA output connector from the electrical board. See Figure 2.
6. Feed power supply wires and (if used) the 4-20 mA output wires through the 1/2" NPT port. See Figure 2.
7. Screw the power supply and (if used) 4-20 mA output wires to the connectors and internal ground. See Figure 2.

Figure 2



All dimensions are reference & nominal
Metric [millimeter] equivalents are in brackets



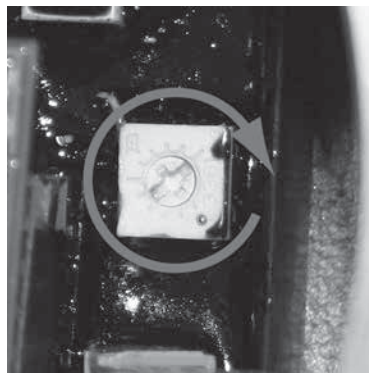
8. Verify all connections before applying power. Make sure the supply power is in working range of unit purchased.
9. If the 4-20 mA output is used, an excitation voltage of 15-45 volts is needed. The 4-20 mA output correlates to a thermocouple temperature reading of 80 to 270°C / 176 to 518°F.

NOTICE

Should the thermocouple fail the analog output would read greater than 25 mA and no electrical power will be supplied to the heating element. Disconnect power and check wiring.

10. Adjust the temperature with the temperature adjustment. The temperature adjustment is located on the electrical board with a 270° turn adjustment. The adjustment range is from 50°C / 122°F (fully counterclockwise position) to 300°C / 572°F (fully clockwise position). See Figure 3.
Temperature signal can be used as a reference to the process media temperature. Actual media temperature should NOT be obtained from this product. Actual media temperature should be taken from a different point.

Figure 3



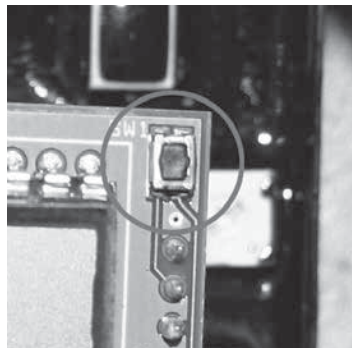
11. Temperature Display (Optional):
The display reads the temperature of the heater in degrees Celsius.

NOTICE

Should the thermocouple fail the temperature display would read greater than 350°C and no heat will be generated. Disconnect power and check wiring.

12. Temperature Set Button (Only with Optional Display):
This button is located on the temperature display. See Figure 4. When pressed down the display will show the heater set temperature.

Figure 4



3.3 Regulator Adjustment

Controlled outlet pressure settings are obtained using TESCO pressure reducing regulators by adjusting the screw. Rotating the adjustment screw clockwise raises the outlet pressure while a counterclockwise rotation coupled with venting of the downstream side of the regulator plumbing lowers the outlet pressure. Final adjustments should be made in the direction of increasing pressure to obtain the most accurate set point.

TESCO regulators will operate with any liquid or gaseous media compatible with the wetted materials.

3.4 Maintenance

3.4.1 Mechanical Pressure Regulator Function

The following procedures are provided to enable the customer to perform all normal maintenance and repair operations. These operations are more easily performed with the regulator removed from the line.

An Assembly Drawing and Bill of Material for the regulator will be needed to complete maintenance procedures. The Assembly Drawing and Bill of Material are separate from this manual and available by contacting TESCO (see back page for TESCO contact information).

▲ 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 regulator.

To avoid personal injury, electrical power must be turned off and locked out prior to attempting any maintenance or disassembly.

Mechanical Disassembly

Circled letters within text indicate component location in Figure 5.

The following steps outline the disassembly of pressure reducing regulators for maintenance and repair:

1. Clamp the regulator in a vise by the side of the regulator body (K).
2. Turn adjusting screw (A) counterclockwise to insure removal of all spring force on the diaphragm.
3. Remove upper portion of regulator bonnet (B).

NOTE: Upper portion of regulator includes spring button (C), load spring (D), back-up plate (E), and diaphragm (F). Review correct drawing to ensure that all parts have been disassembled.

4. The valve parts can now be removed from the regulator body by turning the seat retainer (G) counterclockwise until it is free of the regulator body.

5. Heater tube and fitting assembly (R) can be accessed and removed next by loosening the heat exchanger housing (N) and unscrewing the fittings (L) of the assembly.

Mechanical Reassembly

The regulator is reassembled in the reverse order of disassembly, observing the following precautions. Please reference the Bill of Material and Assembly Drawing for the correct location of replacement parts and correct torque specifications.

1. Inspect all parts and replace those worn or damaged with TESCO replacement parts.
2. All parts should be cleaned to the cleanliness level required for safe operation with the media and system they will be used in. All parts in the flow stream must be free of particles which could prevent proper seating of the main valve (J).
3. Apply a thin uniform coating of fluorocarbon grease to the following parts: Indentation of spring button (C), threaded portion of adjusting screw (A), entire threaded areas of the spring bonnet (B) and heat exchanger housing (N).

▲ WARNING

Do not apply any type of grease to the internal parts of the regulator that contact the process media. Do NOT apply any type of grease to the inlet or outlet connections.

4. Valve seat (H) must be installed with the chamfered side towards the main valve.
5. The body (K) and bonnet are best joined by holding the bonnet assembly open end up and dropping all required items into place one at a time. The last item to be placed in the bonnet will be the diaphragm (F). It can be centered on the seating surface of the bonnet before the body assembly is inverted and screwed into the bonnet firmly – hand tight. Regulator should then be placed in a vise and the bonnet re-torqued to correct specifications. See Assembly Drawing.

3.4.2 Electric Heater Function

The following procedures are provided to enable the customer to perform all normal maintenance and repair operations. These operations are more easily performed with the regulator removed from the line.

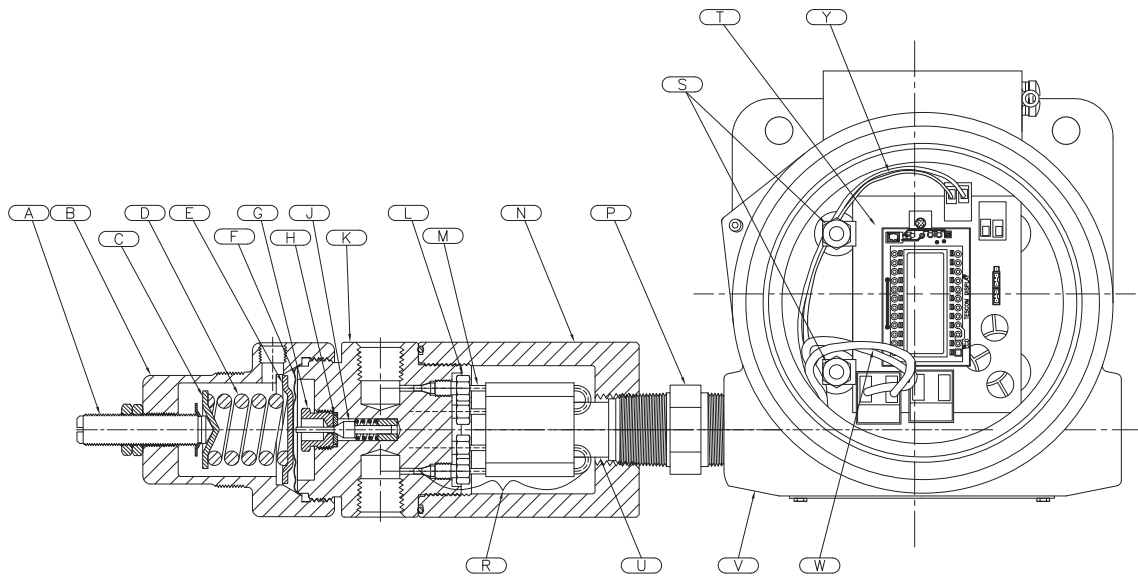
An assembly drawing and bill of materials for the regulator and heater will be needed to complete maintenance producers. The assembly drawing and bill of materials are separate from this manual and available by contacting TESCO (see last page for TESCO contact information).

▲ 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 regulator.

To avoid personal injury, electrical power must be turned off and locked out prior to attempting any maintenance or disassembly.

Figure 5 - Basic Assembly Drawing



Heater Disassembly

The following steps outline the disassembly of the heater element and control board used on the 44-5800 Series electric heated vaporizing regulator for maintenance and repair.

To remove the heater element (U) and control board (T):

1. Clamp the regulator in a vise using wrench flats on the heat exchanger housing (N).
2. Remove the cover of the electrical housing (V).
3. Disconnect the heater and thermocouple wires (W) (Y).
4. Remove the control board nuts and mounting clamps (S).
5. Remove the control board.
6. Remove the heater element by turning the hex nipple (P) counterclockwise between the electrical housing and heat exchanger housing.
7. Remove the heater element by un-threading the hex nipple from the electrical housing.

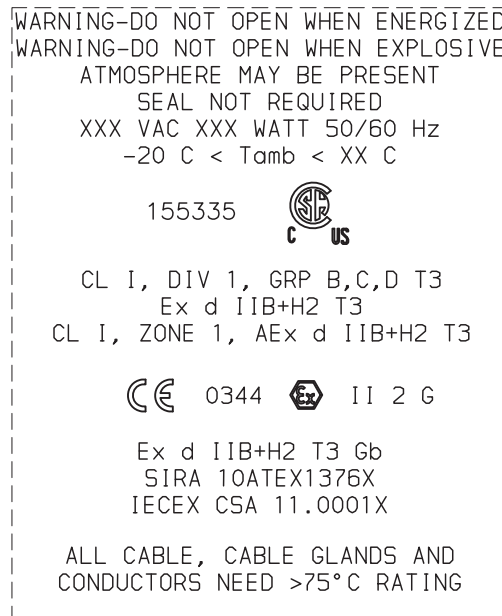
Heater Reassembly

The regulator is reassembled in the reverse order of disassembly, observing the following precautions. Please reference the Bill of Material and Assembly Drawing for the correct location of replacement parts and correct torque specifications.

1. Inspect all parts and replace those worn or damaged with TESCO replacement parts.
2. Re-assemble the unit according to the Assembly Drawing.

Section 4: Certifications and Warranty

4.1 Hazardous Location Ratings



NOTE: Exact voltage, wattage and maximum ambient temperature ratings are marked according to the product model number.

Important!

All currently installed 44-5800E Series electronically heated vaporizing regulators have retroactively been rerated from the T4 (135°C) to the T3 (200°C) temperature class. An additional label, clarifying the product rerating must be placed on the heat exchanger housing. TESCOM will be providing these labels to customers free of charge.

To receive label(s), please place a request for the number of add-on labels you require with TESCOM by either sending an email to 445800@emerson.com or calling 1-800-653-3211 for US customers or +1-763-241-3134 for international customers.

4.2 Declaration of Conformity

EC DECLARATION OF CONFORMITY
ATEX Directive 94/9/EC

Manufacturer's Name: Tescom Corporation

Manufacturer's Address: 12616 Industrial Boulevard
Elk River, Minnesota 55330-2491
United States of America

European Contact: Guido Drissen
TESCOM EUROPE GMBH & CO. KG
An der Trave 23-25
23923 Selmsdorf
Germany
+49 38823 31 211

Product Name: Vaporizing Regulator

Model Number: 44-5800

Applied Standards:

EN 60079-0:2009 EN 60079-1:2007

EC-Type Examination Certificate Number:

SIRA 10ATEX1376X

Approved by the following notified body:

Sira Certification Service (0518)
Rake Lane, Eccleston, Chester, CH4 9JN,
England

Approval: Brian Tutt

Title: Engineering Manager



4.3 Limited Warranty

TESCOM Corporation (“Seller”) warrants that the licensed firmware embodied in the goods will execute the programming instructions provided by Seller, and that the goods manufactured or services provided by Seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller, whichever period expires first. Consumables and services are warranted for a period of 90 days from the date of shipment or completion of the services. Products purchased by Seller from a third party for resale to Buyer (“Resale Products”) shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, correct any errors that are found by Seller in the firmware of services or repair or replace F.O.B. point of manufacture that portion of the goods or firmware found by Seller to be defective, or refund the purchase price of the defective portion of the goods/services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources or environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at buyer’s expense. Seller shall not be obligated to pay any costs or charges incurred by buyer or any other party except as may be agreed upon in writing in advance by Seller. All costs of dismantling, reinstallation and freight and the time and expenses of Seller’s personnel and representatives for site travel and diagnosis under this warranty clause shall be borne by buyer unless accepted in writing by Seller. Goods repaired and parts replaced by Seller during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by Seller. THE WARRANTIES AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOOD OR SERVICES.

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