

# ER5K Kits

## TESCOM Product Manual



Figure 1. Panel Assembly

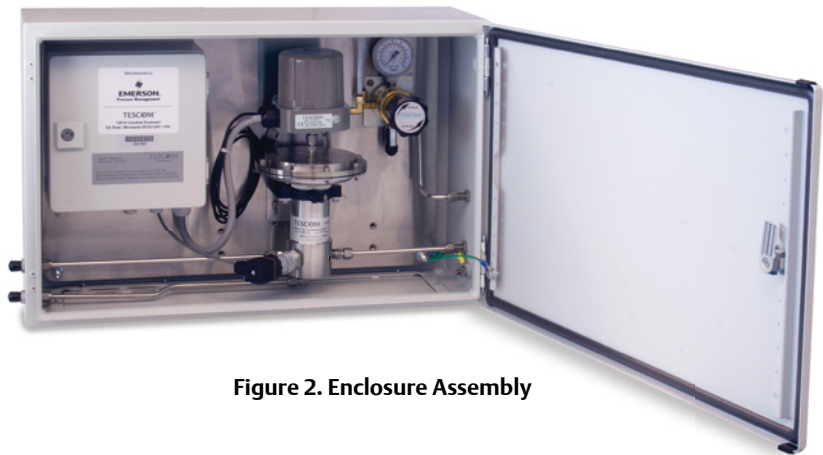


Figure 2. Enclosure Assembly



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# Section 1: Introduction

This manual is valid only for ER5K kits ER5K-XXXX. The instructions for individual components must also be read and followed and are either attached in the appendix or supplied separately.

## Section 2: Before You Begin

### WARNING

This device is not intended for or rated for use in hazardous locations.

1. Please contact your TESCO representative for Explosion Proof options.

2. Avoid personal injury or property damage from sudden release of pressure or bursting parts. Before proceeding with any installation procedures:



- Always wear protective clothing, gloves, and eyewear to prevent personal injury, or property damage.
- Do not remove the ER5000 or any other component of the system while the system is pressurized.
- Disconnect any operating lines providing air pressure, electric power, or a control signal to the ER5000 prior to installation or maintenance.



- Use bypass valves or completely shut off the process to isolate the ER5000 and associated equipment from process pressure prior to installation or maintenance. Relieve process pressure on both sides of the controller and associated equipment.



- Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media dangers.



Do not install, operate, or maintain an ER5000 controller, or any associated equipment, without reading and fully understanding the installation guidelines and operating instructions for every component of your application. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all contents of this Getting Started guide, including all safety cautions and warnings. If you have any questions about these instructions, contact your TESCO sales office before proceeding.

## 2.1 Safety, Installation and Operations Precautions

### 2.1.1 TESCO Electronic Controllers

#### WARNING

Do not attempt to select, install, use, or maintain this controller, or accessory until you have read and fully understood these instructions. Be sure this information reaches the operator and stays with the product after installation. Do not permit untrained personnel to install, use, or maintain this controller, or accessory. Improper selection, installation, maintenance, misuse, or abuse of this controller, or related accessories can cause death, serious injury, and/or property damage. Oxygen service requires special expertise and knowledge of system design and material compatibility in order to minimize the potential for death, serious injury, and/or property damage.

**Possible consequence include but are not limited to:**

- **High velocity fluid (gas or liquid) discharge**
- **⚠ Electrocutation**
- **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**

1. Read and understand the user's manual before operating the controller.
2. Inspect the controller, and accessories before each use.
3. Operate the unit only under specified environmental conditions.
4. Follow instructions in the manuals for proper wiring.
5. Never connect the controller, or accessories to a supply source having a voltage greater than the maximum rated voltage of this controller, or accessory.
6. Never connect the controller, or accessories to a supply source having a pressure greater than the maximum rated pressure of this controller, or accessory.
7. Never use anything but clean dry inert gases or air into the electropneumatic controller.
8. Start up sequence for electropneumatic controllers is:
  - a. Feedback loop must be installed and operational.
  - b. Electrical power should be applied and system setpoint reduced to its lowest pressure output before turning on the pneumatic supply to the controller.
9. Refer to product label (modification specific) for maximum inlet pressures. If this rated pressure cannot be found, contact your local Tescom 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.
10. Clearly establish flow direction of the fluid before installation of controllers, regulators, valves, and accessories. It is the responsibility of the user to install the equipment in the correct direction.
11. Remove pressure from the system before tightening fittings, gauges or components.
12. Never turn controller, regulator or valve body. Instead, hold the controller body and turn fitting nut.
13. If a controller, regulator or valve leaks or malfunctions, take it out of service immediately.
14. Do not modify equipment or add attachments not approved by the manufacturer.
15. Apply pressure to the system gradually, avoiding a sudden surge of fluid or pressure shock to the equipment in the system.
16. Regulators are not shut-off valves. Install a pressure relief device downstream of the regulator to protect the process equipment from operating pressure increases. Shut off the supply pressure when the regulator is not in use.
17. Periodic inspection and scheduled maintenance of your equipment is required for continued safe operation.
18. The frequency of servicing is the responsibility of the user based on the application. Never allow problems or lack of maintenance to go unreported.

19. Read and follow precautions on compressed gas cylinder labels.
20. 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.
21. Never use materials for controllers, regulators, valves, or accessories that are not compatible with the fluids being used.
22. Users must test under normal operating conditions to determine suitability of materials in an application.
23. Vent fluids to a safe environment, and in an area away from employees. 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.
24. Do not locate controllers, regulators, valves, or accessories using flammable fluids near open flames or any other source of ignition. Use of Explosion Proof controllers may be necessary to be in accordance with local electric codes.
25. 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 employees. Provide a device to warn employees of these dangerous conditions.
26. Many gases can cause suffocation. Make certain the area is well ventilated. Provide a device to warn employees of lack of Oxygen.
27. Never use oil or grease on these controllers, regulators, valves, or accessories. Oil and grease are easily ignited and may combine violently with some fluids under pressure.
28. Have emergency equipment in the area if toxic or flammable fluids are used.
29. Upstream filters are recommended for use with all fluids.
30. Do not bleed system by loosening fittings.
31. Prevent icing of the equipment by removing excess moisture from the gas.
32. Always use proper thread lubricants and sealants on tapered pipe threads.

## 2.1.2 Installation

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

### 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.**



**Make sure that the components used in the electronic system are compatible with and have the proper voltage rating.**

## REPAIR SERVICE

If a controller 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.

### WARNING

#### Safe Component Selection

1. Consider the total system design when selecting a component to ensure safe, trouble-free performance.
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.
5. The user is responsible to be in accordance with all the necessary mechanical and electrical codes required for installation and operation of the system. These requirements include but are not limited to all explosion proof controllers.
6. The user is responsible for the selection of the proper model number of the controller that would meet the application's possible hazardous environment or conditions.


### WARNING

Do not modify equipment or add attachments not approved by the manufacturer.

## 2.1.3

## TESCOM Regulators

### WARNING

 Do not attempt to select, install, use, or maintain this regulator, valve, or accessory until you have read and fully understand these instructions.

Be sure this information reaches the operator and stays with the product after installation. Do not permit untrained personnel to install, use, or maintain this regulator, valve or accessory. Improper selection, improper installation, improper maintenance, misuse, or abuse of regulators, valves or related accessories can cause death, serious injury, and/or property damage. Oxygen service requires special expertise and knowledge of system design and material compatibility in order to minimize the potential for death, serious injury, and/or 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**

1. Inspect the regulator, valve, and accessories before each use.
2. Never connect regulators, valves, or accessories 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 Tescom 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. Apply pressure to the system gradually, avoiding a sudden surge of fluid or pressure shock to the equipment in the system.
10. 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.
11. Periodic inspection and scheduled maintenance of your equipment is required for continued safe operation.
12. The frequency of servicing is the responsibility of the user based on the application.
13. 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 employees. 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 employees. Provide a device to warn employees of these dangerous conditions.



21. Many gases can cause suffocation. Make certain the area is well ventilated. Provide a device to warn employees of lack of Oxygen.
22. Never use oil or grease on these regulators, valves, or accessories. 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.

**⚠ 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.

**⚠ 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.**

**Inspect the regulator, valve, and accessories for physical damage and contamination. Do not connect the regulator, valve, or accessory 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.**

**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.

**⚠ 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.

**⚠ 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.**

## Section 3: Product Description

The ER5K Kits are designed to provide a complete pressure control system for the most common pressure reducing and back pressure control applications. All the components are completely assembled, professionally plumbed together and tested for proper operation to save the user time and the inconvenience of not having all the accessories and interconnections needed to get the system up and running. Kits are available with the components mounted on a SST plate or mounted inside an enclosure.

The ER5000 is a unique and flexible electropneumatic, closed loop, PID controller. When combined with a mechanical regulator and pressure transmitter in these kits, the system provides precise control of pressures up to 10,000 psig / 690 bar. The included ERTune software program provides an easy means of setup, tuning and data acquisition.

### 3.1 Kit Benefits

#### 3.1.1 Very high pressure stability

- Pressure is independent of the flow (eliminates droop)
- Pressure is independent of the input pressure (eliminates decaying inlet effect)

#### 3.1.2 Automation

- Pressure can be controlled by a signal from a PC or PLC
- Easy integration into automated test cycles

#### 3.1.3 ERTune™ Program

- Included with every ER5000, provides data acquisition routine
- Setup Wizard loads PID parameters for your regulator series

#### 3.1.4 Items Included

All ER5K kits includes:

- ER5000FI-1 w/ERTune program and Complete User Manual
- Mechanical Regulator (see “Regulator Families” below)
- 4-20 mA Feedback Transducer; 0.125% accuracy
- ER Supply Regulator with relief valve and gauge
- Prewired Electrical Junction Box
- All connections and fittings

### 3.2 Regulator Families

With ER5K kits, the customer has a choice of the most versatile mechanical regulators to cover a wide range of applications, both pressure reducing and back pressure.

Table 1. Pressure Reducing Regulators	
26-2000	High pressure regulator to control various output ranges up to 10,000 psig / 690 bar, segregated captured vent.
DK	Highly accurate and sensitive regulator with captured vent for low pressure (90 psig / 6 bar) or mid range applications (600 psig / 40 bar) requiring significant flow capabilities.
44-5200	Piston sensed, venting regulator for mid-pressure range, low flow applications (600 psig / 40 bar).
Flow booster	Low pressure (90 psig / 6 bar), high flow diaphragm regulator for air or nitrogen service. Zinc body.

Table 2. Back Pressure Regulators	
26-1700	High pressure regulator to control various back-pressure ranges up to 10,000 psig / 690 bar.
54-2100	High pressure regulator to control various back-pressure ranges up to 10,000 psig / 690 bar. Specially designed for hydraulic applications (metal seat).

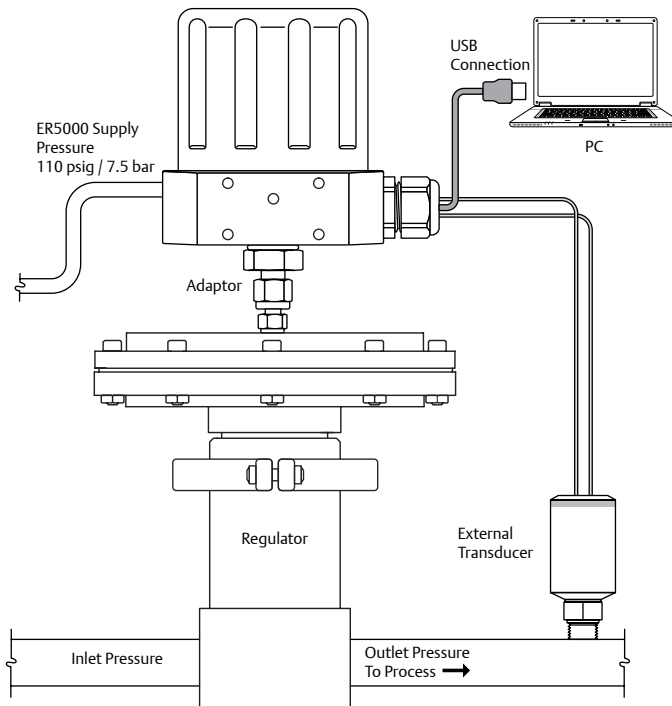


Figure 3. Typical Pressure Reducing Application

### 3.3 Controlling System Pressure

In a typical application, the Outlet Port of the ER5000 connects to the top of a Dome Loaded or Air Actuated pressure reducing Regulator, usually through the included 1/2" SAE x 1/8" NPTF adaptor. This is shown in Figure 4. Supply Pressure of up to 120 psig / 8.2 bar, with 110 psig / 7.5 bar being typical, is provided to the ER5000 by an external source.

The ER5000 increases Pilot Pressure to the air actuator of the regulator by opening the Pulse Width Modulation (PWM) solenoid valve at the Inlet Port and reduces pilot pressure by opening the PWM solenoid valve at the Exhaust Port. Normally, the exhaust vents to atmosphere. The controller, configured in External Feedback mode, senses System Pressure through input from a transducer mounted downstream in the Process Line. Every 25 milliseconds, the controller reads the feedback and compares it to the setpoint, which it receives from an external source or from a Profile in its onboard memory.

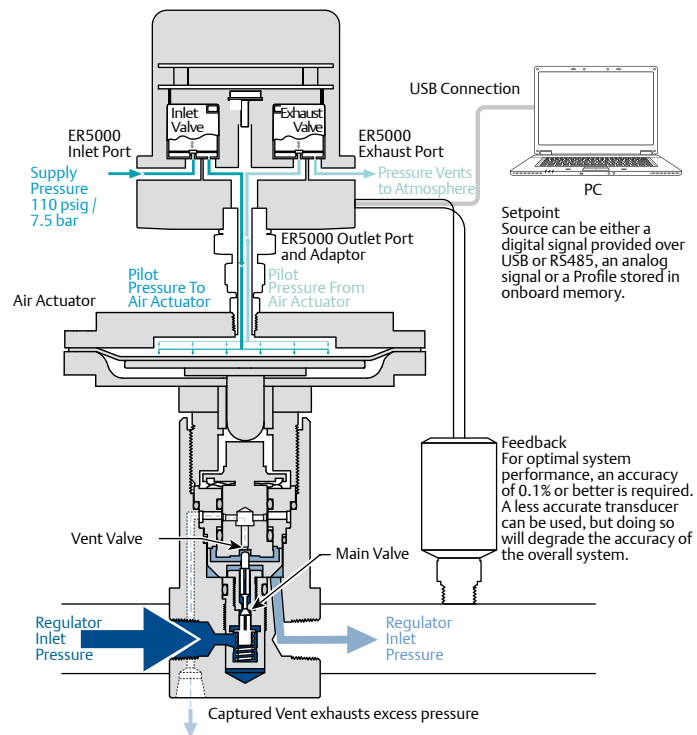


Figure 3. Typical Pressure Reducing Application (continued)

If feedback is lower than setpoint, the ER5000 activates the inlet valve, allowing Pilot Pressure to flow into the actuator of the regulator. This causes the main valve of the regulator to open up, resulting in an increase in downstream System Pressure. The ER5000 will continue to send pilot pressure into the air actuator of the regulator until feedback and setpoint are equal. At that point, the inlet valve closes, stabilizing the system at that pressure.

If feedback is higher than setpoint, the ER5000 activates the exhaust valve, releasing pilot pressure from the regulator. The decrease in pilot pressure causes the main valve of the regulator to close up and also causes the regulator vent to open, exhausting excess system pressure (if your application uses a non-venting regulator, refer to page 36). The result is a decrease in downstream system pressure. The ER5000 will continue to exhaust pilot pressure until the feedback signal is equal to the setpoint. At that point, the exhaust valve closes, stabilizing the system at that pressure. The air actuator, also known as the Ratio Actuator, amplifies the force generated by the ER5000, allowing the pilot pressure to modulate system pressure that may be many times greater, up to 30,000 psig / 2068 bar.

## Section 4: Technical Data

Table 3. ER5K Pressure Reducing and Back Pressure Regulators Technical Data								
Dash Code	Regulator Series	Transducer pressure range psig / bar	Max. Regulator Input Pressure psi / bar	Flow Coefficient C <sub>v</sub>	Body Material	Temperature	Venting	Weight approx. lbs / kg
ER5K-X Pressure Reducing Regulators								
A	Flow Booster	0 - 100 0 - 6	300 / 20.7	C <sub>v</sub> : 1.5	Zinc	40 to 120°F 4 to 48°C	Yes*	1.6 / 0.75
B	Flow Booster	0 - 100 0 - 6		C <sub>v</sub> : 2.2	Zinc	40 to 120°F 4 to 48°C	Yes*	1.6 / 0.75
C	DK, dome loaded	0 - 100 0 - 6	1000 / 69	C <sub>v</sub> : 0.35	SST	-15 to 165°F -20 to 73°C	Yes Captured	3.9 / 1.8
D	DK, air loaded	0 - 600 0 - 40		C <sub>v</sub> : 0.35	SST	-4 to 163°F -26 to 74°C	Yes Captured	6.2 / 2.8
F	26-2000	0 - 1500 0 - 100	SST: 10,000 / 690	C <sub>v</sub> : 0.06	SST	-15 to 165°F -26 to 74°C	Yes Captured	7.7 / 3.5
G	26-2000	0 - 3000 0 - 160		C <sub>v</sub> : 0.06	SST	-15 to 165°F -26 to 74°C	Yes Captured	7.7 / 3.5
H	26-2000	0 - 6000 0 - 400		C <sub>v</sub> : 0.06	SST	-15 to 165°F -26 to 74°C	Yes Captured	7.7 / 3.5
J	26-2000	0 - 10,000 0 - 690		C <sub>v</sub> : 0.06	SST	-15 to 165°F -26 to 74°C	Yes Captured	7.7 / 3.5
ER5K-X Back Pressure Regulators								
K	26-2100	1500 100	10,000 / 690	C <sub>v</sub> : 0.08	SST	-15 to 165 °F -26 to 74°C	NA	7 / 3.2
L	26-2100	3000 160		C <sub>v</sub> : 0.08	SST	-15 to 165°F -26 to 74°C	NA	7 / 3.2
M	26-2100	6000 400		C <sub>v</sub> : 0.08	SST	-15 to 165 °F -26 to 74°C	NA	7 / 3.2
N	26-2100	10,000 600		C <sub>v</sub> : 0.08	SST	-15 to 165°F -26 to 74°C	NA	7 / 3.2
P	26-1700	1500 100		C <sub>v</sub> : 0.14	SST	-40 to 165°F -40 to 74°C	NA	7 / 3.2
R	26-1700	3000 160		C <sub>v</sub> : 0.10	SST	-40 to 165°F -40 to 74°C	NA	7 / 3.2
S	26-1700	6000 400		C <sub>v</sub> : 0.10	SST	-40 to 165°F -40 to 74°C	NA	7 / 3.2
T	26-1700	10,000 690		C <sub>v</sub> : 0.10	SST	-40 to 165°F -40 to 74°C	NA	7 / 3.2

### Operating Parameters

#### Electrical

**Power Requirement**  
90-264 VAC

#### Supply Requirement

**Maximum Inlet Pressures**  
**ER5000 Maximum Supply Pressure:**  
120 psig / 8.3 bar  
**ER Supply Regulator:**  
3500 psig / 241 bar

#### Process Pressure

See specifications for Kit Regulator Type

#### Input Signals

##### Setpoint

USB, RS485, 4-20 mA, 1.5 VDC (0-10 VDC for ER5XX0XV-1), downloaded Profile

##### Feedback (external)

4-20 mA or 1-5 VDC (0-10 VDC for ER5XX0XV-1)

#### Communication Protocol

USB and RS485

## Section 5: Installation

### ⚠ WARNING

Do not attempt to select, install, use or maintain this regulator, valve or accessory until you have read and fully understand these instructions. Be sure this information reaches the operator and stays with the product after installation. Do not permit untrained personnel to install, use or maintain this regulator, valve or accessory.

### 5.1 Two Mounting Types

Kits are supplied with one of two mounting configurations

1. Panel Version – Open Wall Mount

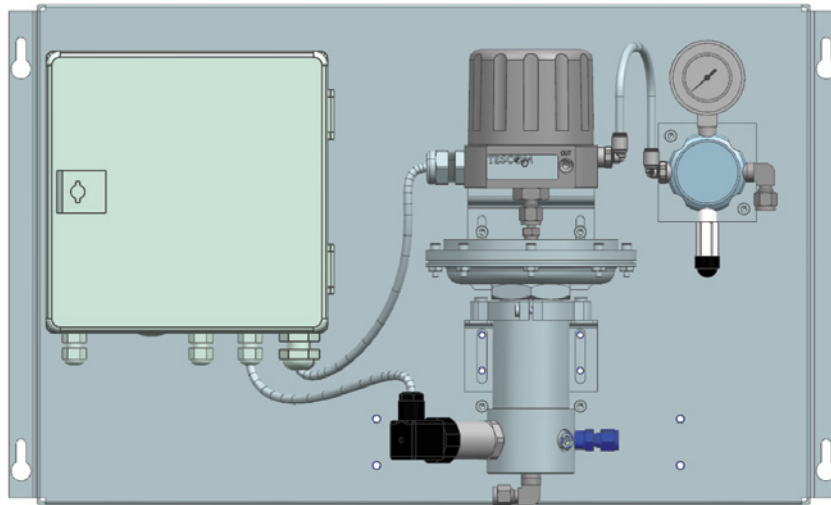


Figure 4. Open Wall Mount Panel

2. Enclosure Version – Enclosed Wall Mount

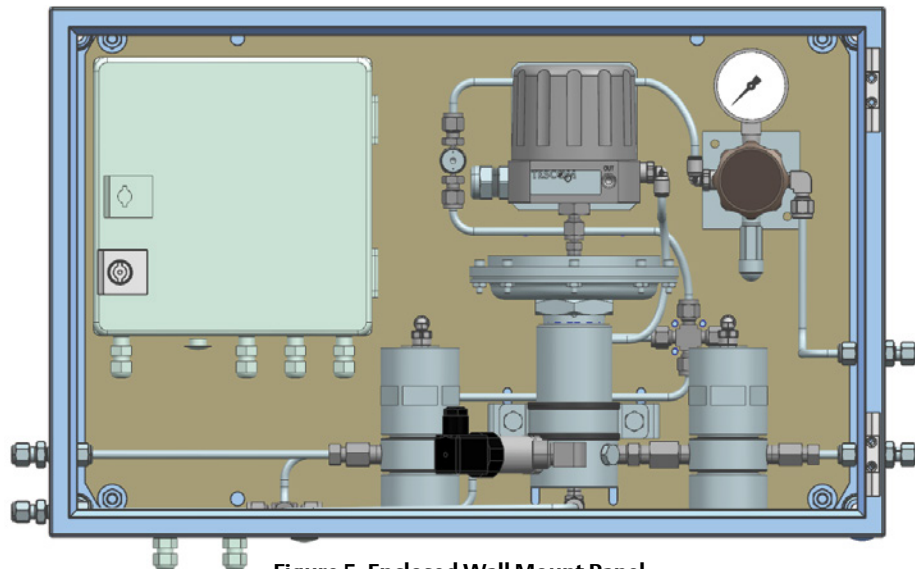
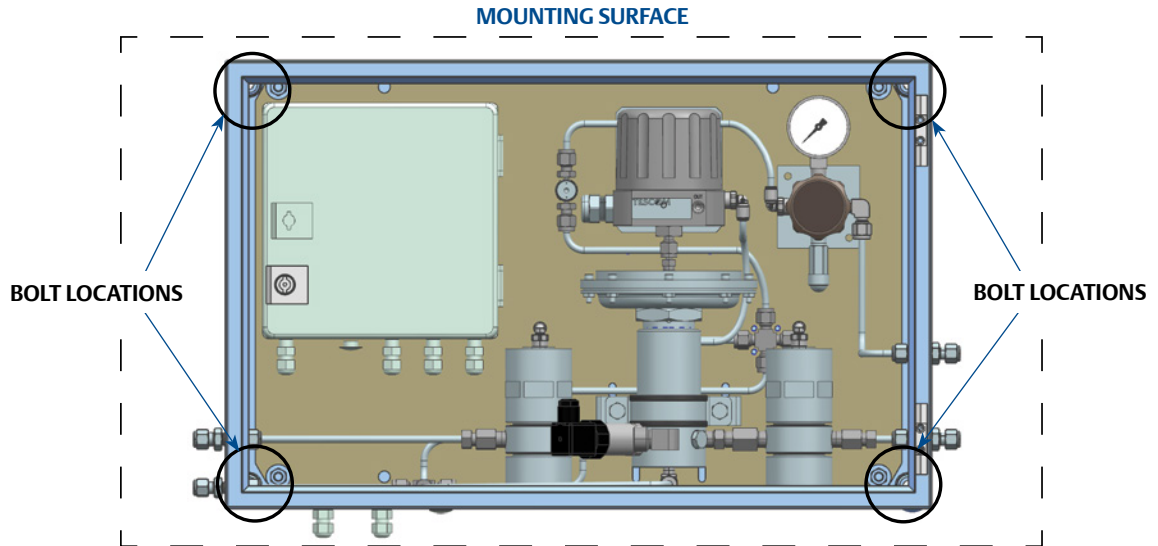
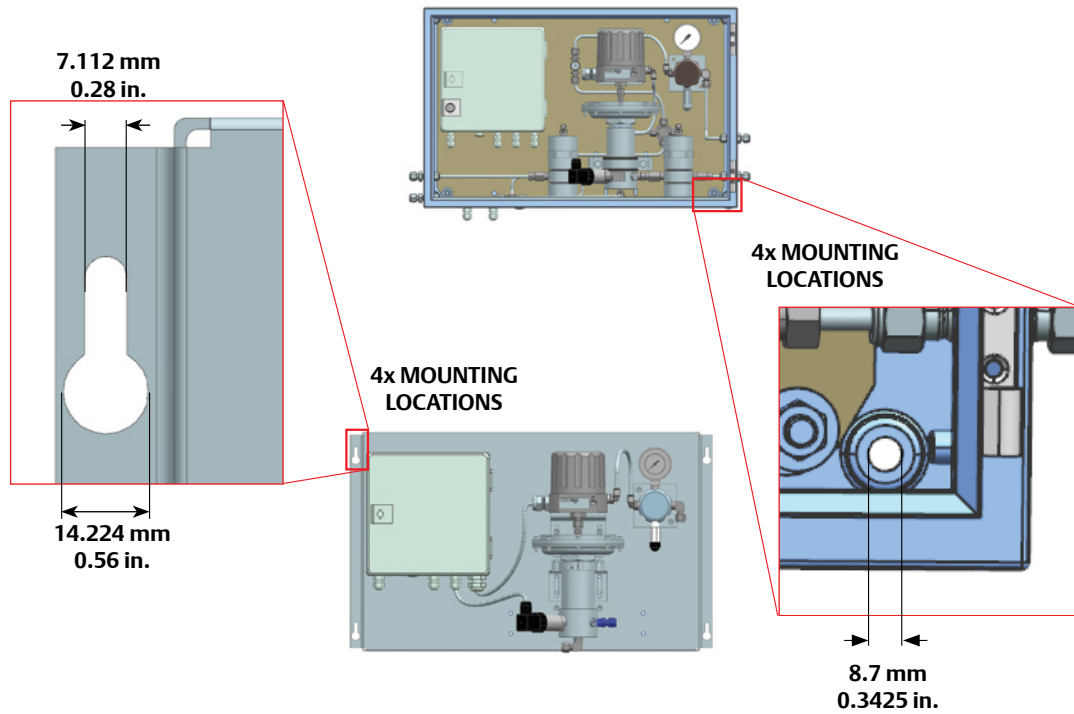


Figure 5. Enclosed Wall Mount Panel

Kits are mounted using 4 bolting locations in each corner



Note: Mounting hardware not included.



Note: maximum diameter available for mounting fasteners.

Figure 6. Wall Mount Installation

Attach up to 3500 psig / 241 bar clean, dry inert gas to the ER Supply Regulator Inlet port. Pressure supplied by the ER Supply Regulator to the ER5000 Inlet Port should not exceed 120 psig / 8.3 bar. Attach Process supply pressure to the Process Inlet port. See specifications for your Kit Regulator Type.

Attach Kit outlet to downstream process piping.

If desired, attach piping to Kit vent port.

\*Note: Piping not included beyond what is already present in the kit

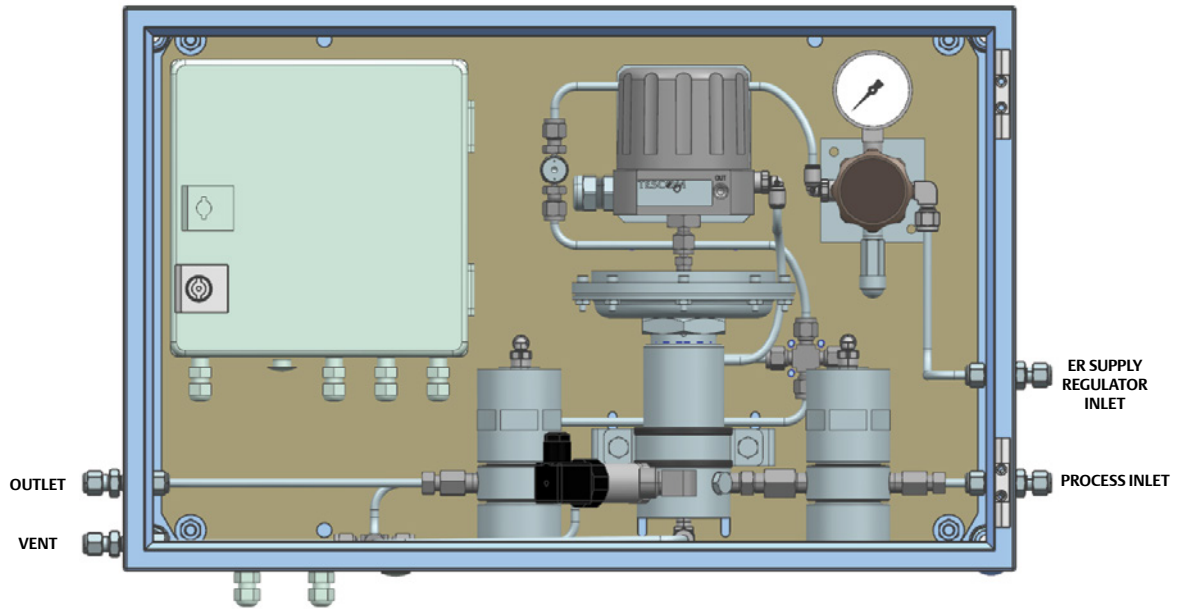


Figure 7. ER5K Piping Installation

Connect power to terminals 1, 2 and 3 (See Section 6. Wiring for details)

\*Note: Power cord is customer supplied.

Plug USB Cable into device which has ERTune™ software installed (software supplied kit)



Figure 8. ERTune™ Software Installation



## 5.2 System Leak Check

After installation of all components and wiring:

- Switch on the ER5000's power supply.
- Slowly apply ER supply pressure and then process pressure. Set the output pressure to a safe value.
- Check all fittings for tightness using leak test fluid. No bubbles should be seen.

## 5.3 ER5000 Tuning

- In many applications, the standard factory settings will work satisfactorily, but to get the best performance, “tuning” of the control loop parameters may be required. When tuning, use conditions similar to the final application (i.e. similar pressures, flow and medium). A tuning procedure is provided in the ER5000 User Manual. There is also “Help” available in the ERTune program itself, available on the “Diagnostic Tools” tab in the ERTune program by clicking the “Tuning Tips” button.

# Section 6: Wiring

## 6.1 General Wiring

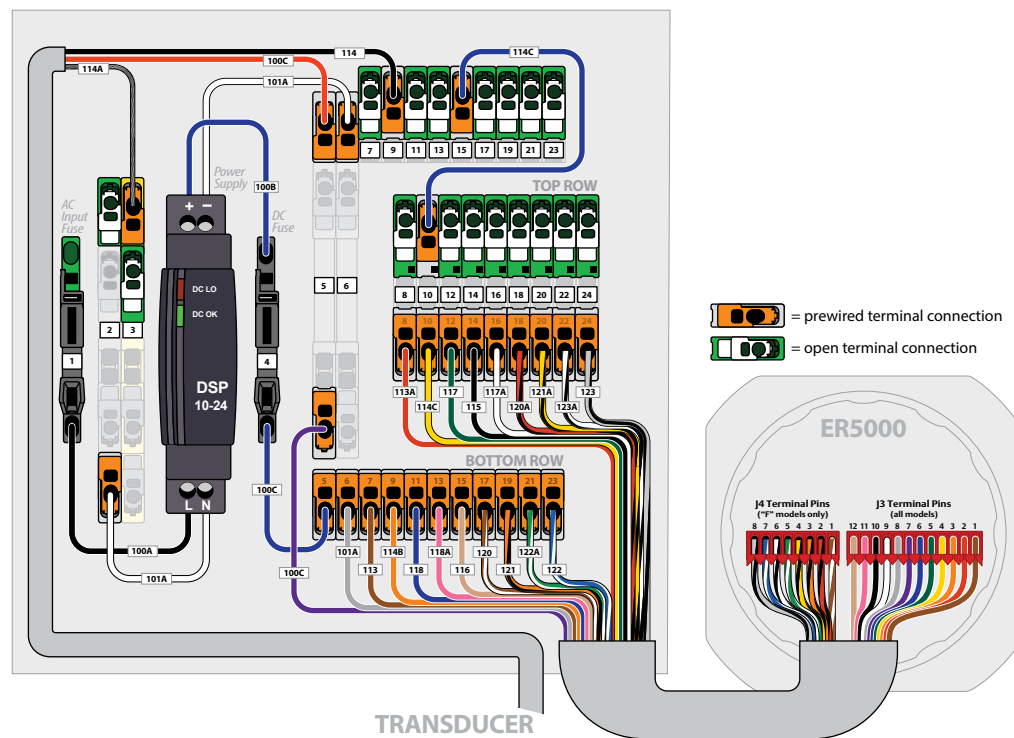


Figure 9. General Wiring

## 6.2 Junction Box Wiring

Junction Box Terminal	Wire	ER5000/Transducer Function
3	114A - braided (transducer)	power ground from transducer
5	100C - red (transducer)	+24V DC power to transducer
5	100C - violet	+24V DC power to ER5000
6	101A - gray	24V return (power ground) from ER5000

Junction Box Terminal	Wire	ER5000/Transducer Function
9	114 - black (transducer)	+feedback input from transducer
9	114B - orange	+feedback input to ER5000
10	114C - yellow	-feedback input from ER5000 (jumped to 15)
15	116 - tan	-feedback input from ER5000 (jumped to 15)

Junction Box Terminal	Wire from 120V Source
1	line feed
2	neutral feed
3	ground

Junction Box Terminal	Wire	ER5000 Function
7	113 - brown	+setpoint input
8	113A - red	-setpoint input
11	118 - blue	+RS485 network connection
12	117	-RS485 network connection
13	118A - pink	analog signal output
14	115 - black	analog signal/board ground
16	117A - white	+5V output (5 mA max.)
17	120 - brown/white	+aux input #1
18	120A - red/black	-aux input #1
19	121 - orange/black	+aux input #2
20	121A - yellow/black	-aux input #2
21	122A - green/white	suspend control
22	123A - black/white	digital output/board ground
23	122 - blue/white	digital output #1
24	123 - gray/black	digital output #2

## Section 7: Maintenance

The maintenance and repair of pressure equipment must only be performed by trained personnel.

Since every application exists under different conditions, the user is responsible for establishing a maintenance program based on their unique situation. Until enough data is collected to set up a schedule, we recommend a 6 to 12 month check of the following, however more frequent inspection and/or maintenance may be necessary.

1. Visual check for damages, especial of the tubing, electrical components and cables
2. Functional check
3. Check for leaks

A periodic calibration of the feedback pressure transducer depends on the user's requirements. Tescom recommends a yearly calibration.

# Section 8: Drawings

The drawings in this manual are for reference only. For most up to date drawings please contact your local TESCOM representative.

## 8.1 Electrical Drawing

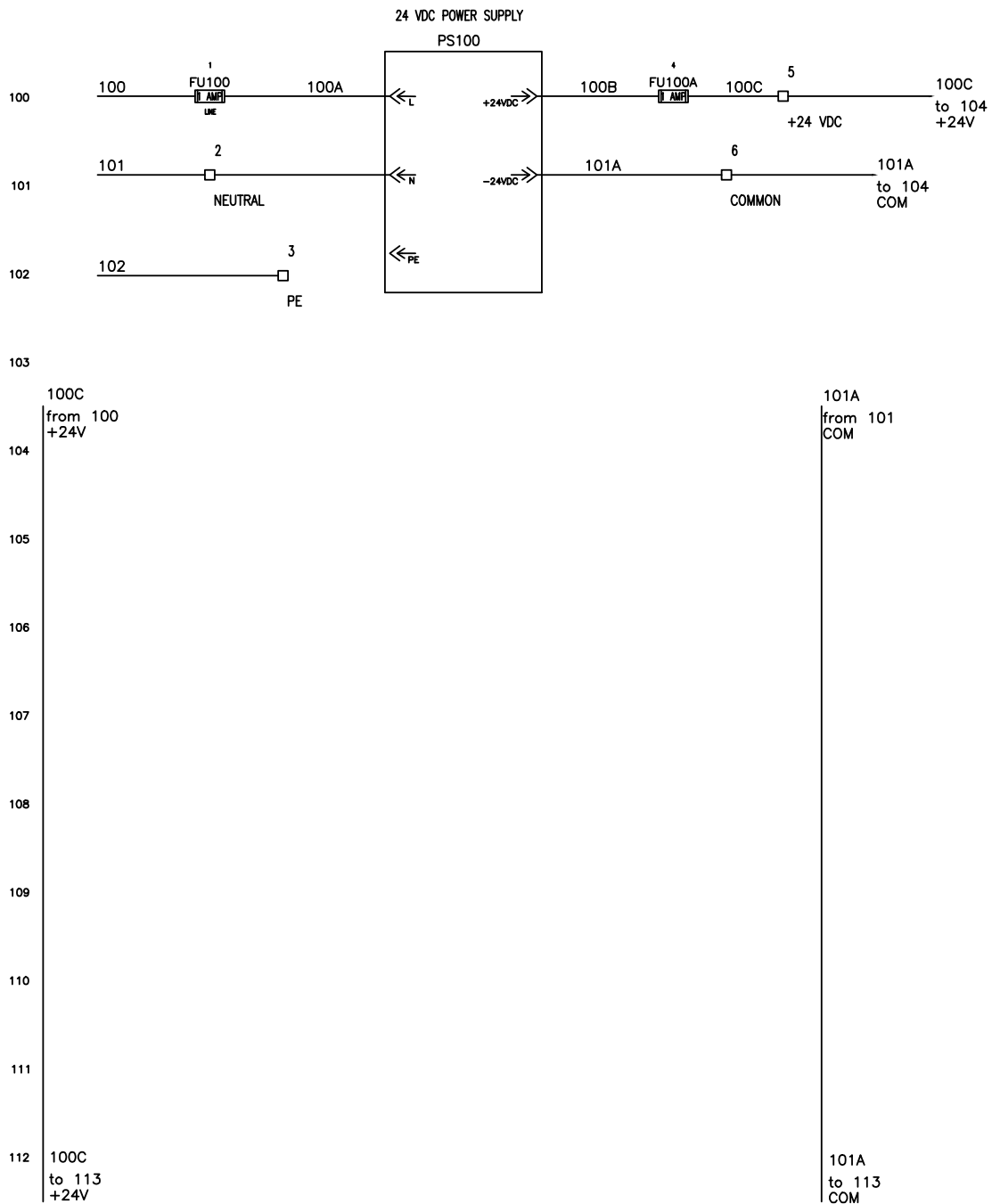


Figure 10. Electrical Drawing

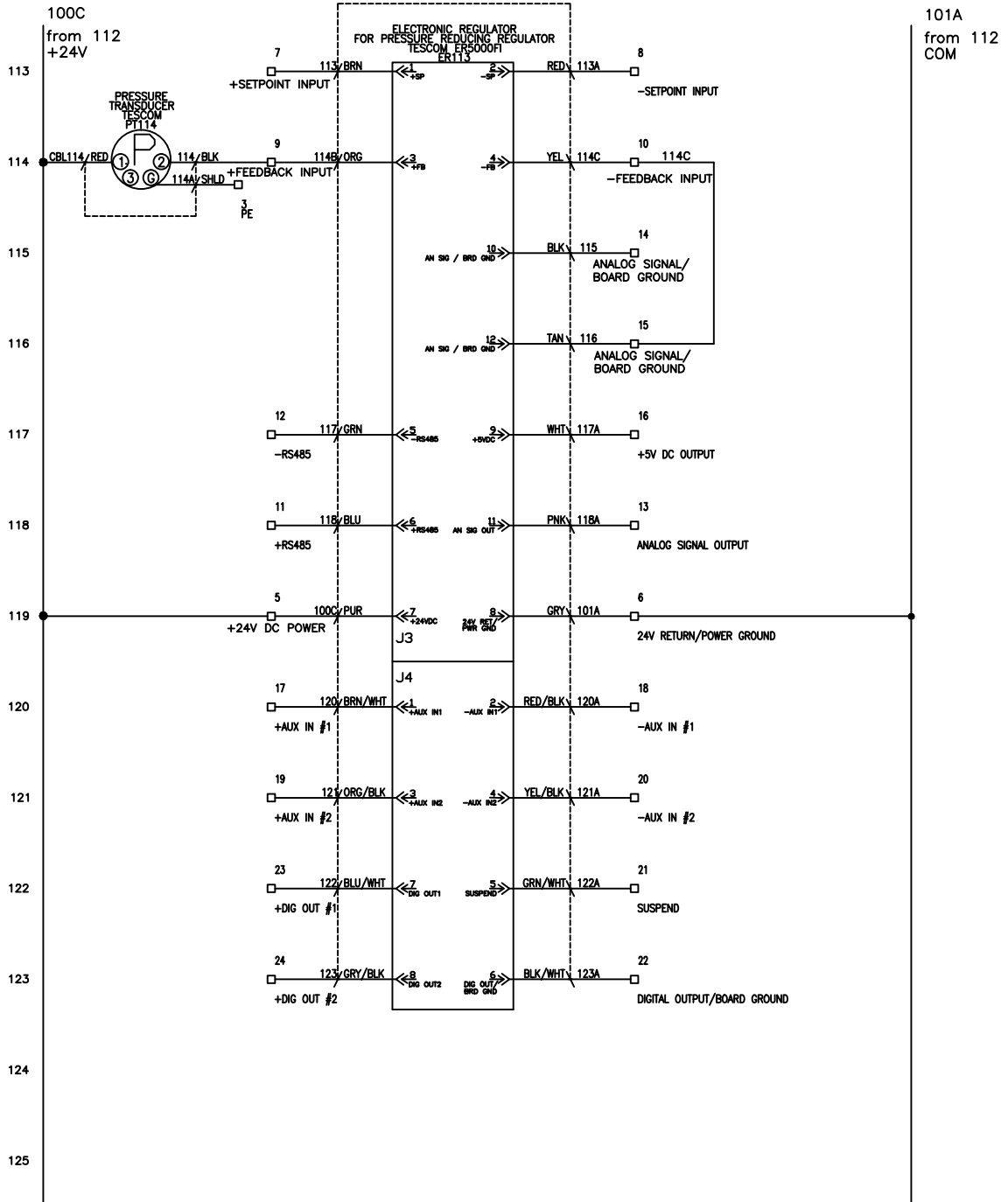


Figure 10. Electrical Drawing (continued)

## 8.2 ER5K Kit Drawing

ER5K - E F T A

DASH NO.	KIT CATEGORY
L	Parts Assembled on Plate
E	Parts in Assembled Enclosure

DASH NO.	PORTING/FITTING SIZE FOR INLET AND OUTLET, TUBING SIZE
A	Metric System
B	Imperial System

DASH NO.	O-RING MATERIAL
D	Buna (NBR)
T	Viton® (FKM)
U	Urethane (PUR)
Z	EP (EPDM)

DASH NO.	REGULATOR	TYPE	MATERIAL	MAX CONTROL PRESSURE BY TRANSDUCER		SEAT	C <sub>v</sub>	PORTING/FITTING SIZE	
				bar	psi			Metric	Imperial
A	Flow Booster	Pressure Reducing	Zinc	6	100	Buna	1.5	12	1/2
B	Flow Booster	Pressure Reducing	Zinc	6	100	Buna	2.2	12	1/2
C	DK Dome Load	Pressure Reducing	SST	6	100	PCTFE	0.35	12	1/2
D	DK Air Load	Pressure Reducing	SST	40	600	PCTFE	0.35	12	1/2
F	26-20 Air Load	Pressure Reducing	SST	100	1500	Vespel	0.06	6	1/4
G	26-20 Air Load	Pressure Reducing	SST	160	3000	Vespel	0.06	6	1/4
H	26-20 Air Load	Pressure Reducing	SST	400	6000	Vespel	0.06	6	1/4
J	26-20 Air Load	Pressure Reducing	SST	690	10000	Vespel	0.06	6	1/4
K	54-21 Air Load	Back Pressure	SST	100	1500	17-4 SST	0.08	6	1/4
L	54-21 Air Load	Back Pressure	SST	160	3000	17-4 SST	0.08	6	1/4
M	54-21 Air Load	Back Pressure	SST	400	6000	17-4 SST	0.08	6	1/4
N	54-21 Air Load	Back Pressure	SST	690	10000	17-4 SST	0.08	6	1/4
P	26-17 Air Load	Back Pressure	SST	100	1500	Teflon® (PTFE)	0.14	6	1/4
R	26-17 Air Load	Back Pressure	SST	160	3000	PCTFE	0.1	6	1/4
S	26-17 Air Load	Back Pressure	SST	400	6000	PCTFE	0.1	6	1/4
T	26-17 Air Load	Back Pressure	SST	690	10000	PCTFE	0.1	6	1/4

Notes:

1. Outlet transducer 0.1% accuracy.
2. Junction Box Supply Voltage: AC (100-250V).
3. Junction Box Communication: USB and RS-485.
4. Regulator for ER Supply: 44-5212-241V-003
5. Pressure can be transformed according to the equation: 1 MPa = 10 bar = 145 psig

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

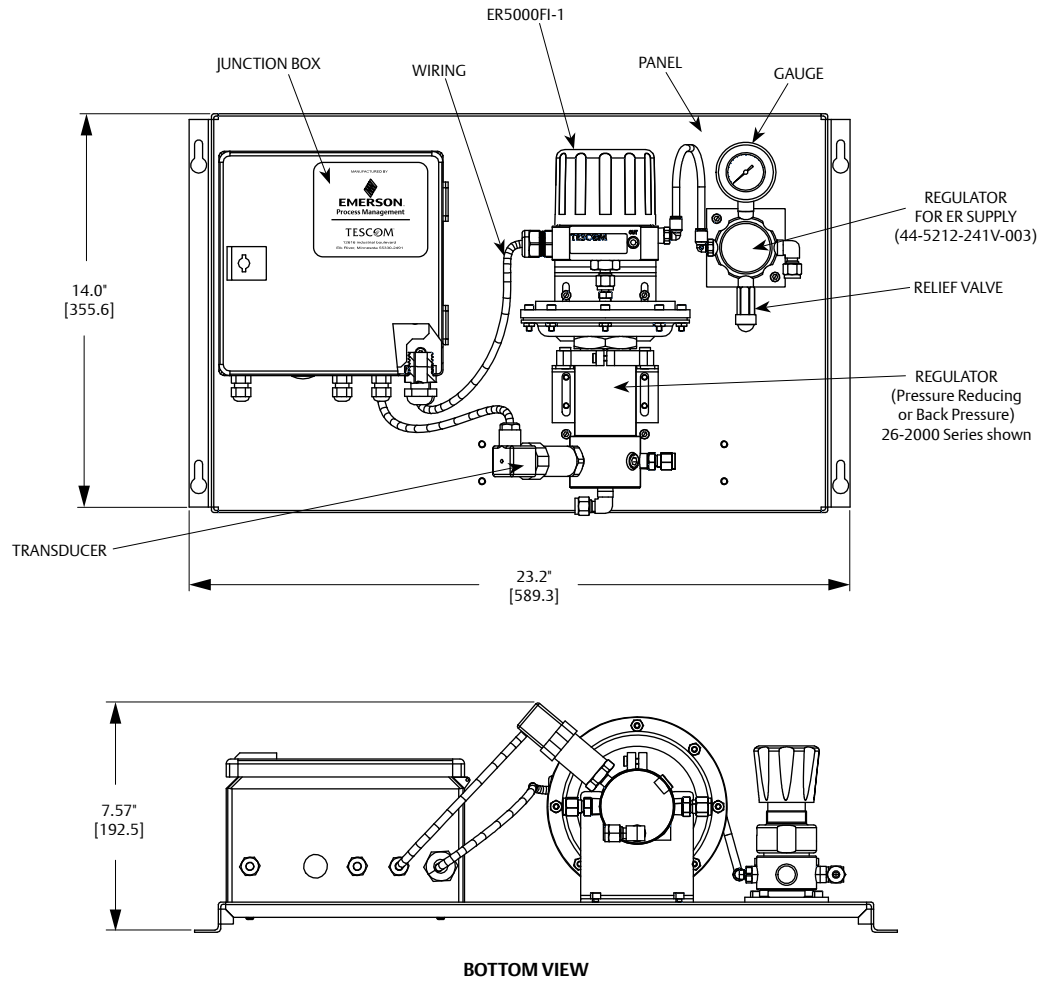


Figure 11. ER5K Series Kit Assembled on Plate

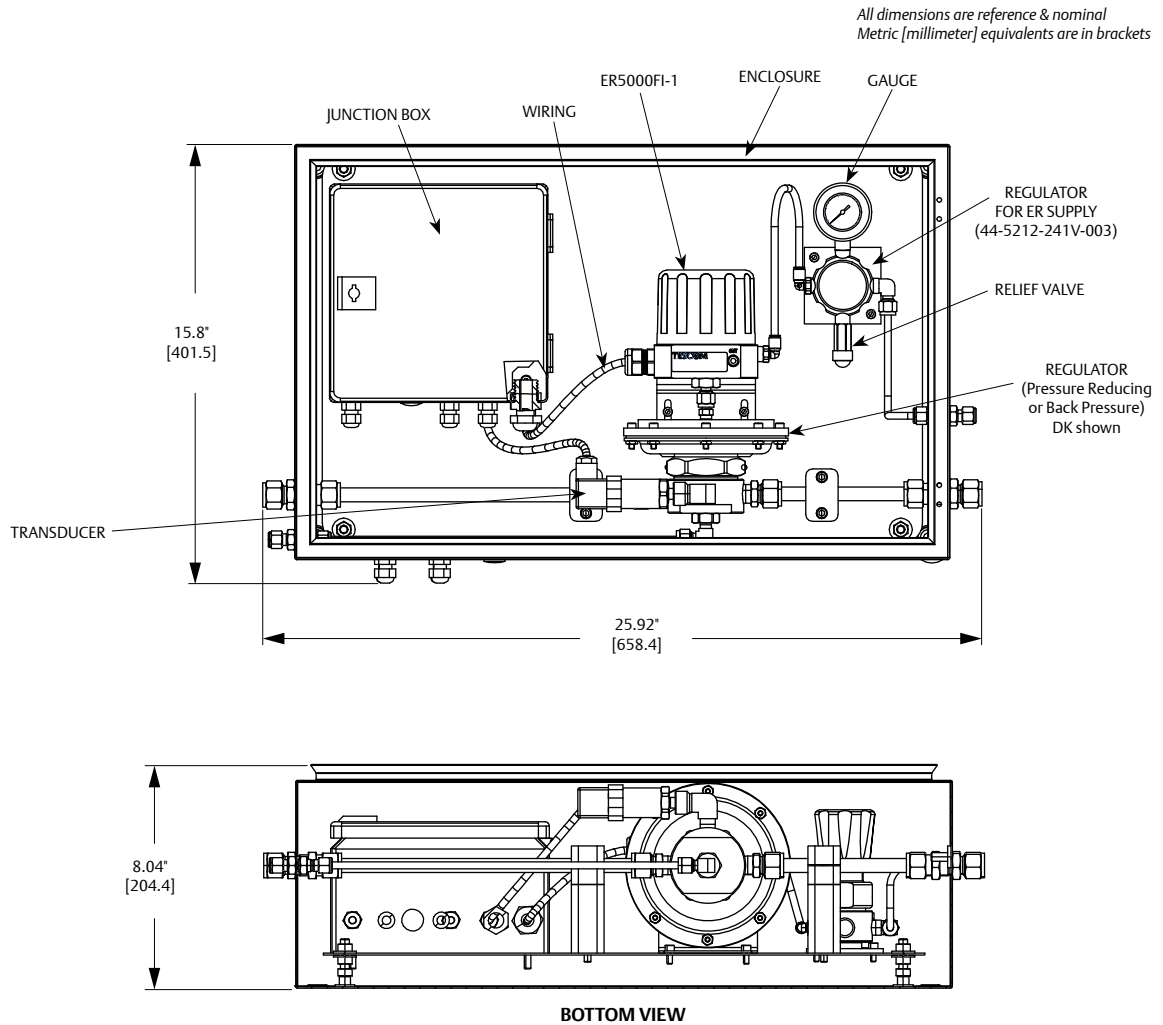


Figure 11. ER5K Series Kit Assembled on Plate (continued)

### Junction Box

The Junction box is internally wired and includes an AC/DC power converter, fuses and wire terminal blocks mounted on a DIN rail.

Footprint: 7.9 x 7.9" [200 x 200]

Height: 4.7" [120]

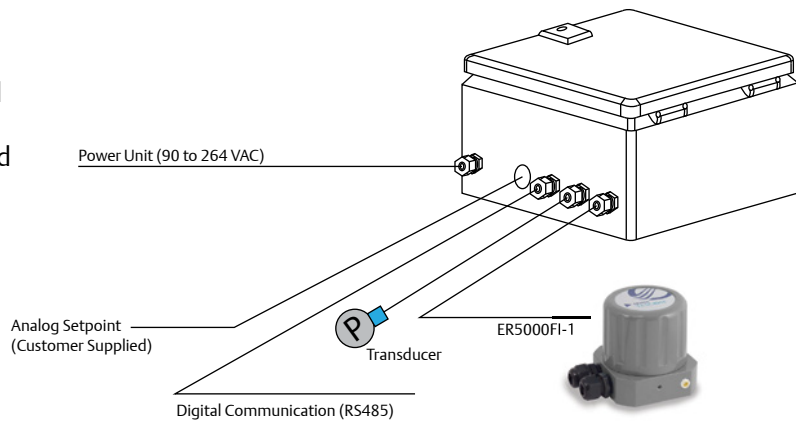
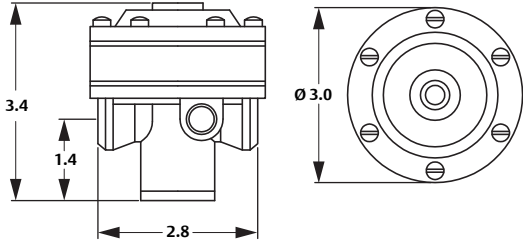


Figure 12. Junction Box



## 8.3 Regulator Drawings

### 8.3.1 Regulator Flow Booster

PART NUMBER	INSTALLATION DIMENSIONS	INLET AND OUTLET PORT SIZE	OUTLET GAUGE PORT SIZE	PILOT PORT SIZE	WEIGHT, LBS	C <sub>v</sub>
269-529-04		1/4 NPT	1/4 NPT	1/8 NPT	1.6	1.5
269-529-06		3/8 NPT				2.2

#### Pilot Operated Diaphragm Style Regulator

**Max. Inlet Pressure:** 300 psig / 20.4 bar

**Max. Outlet Pressure:** 290 psig / 19.7 bar (100 psig / 6.9 bar when used with ER5000)

**Temperature Range:** 40 to 120°F / 4.4 to 48.9°C

Cast Zinc Body

Constant bleed from pilot pressure to vent for improved control

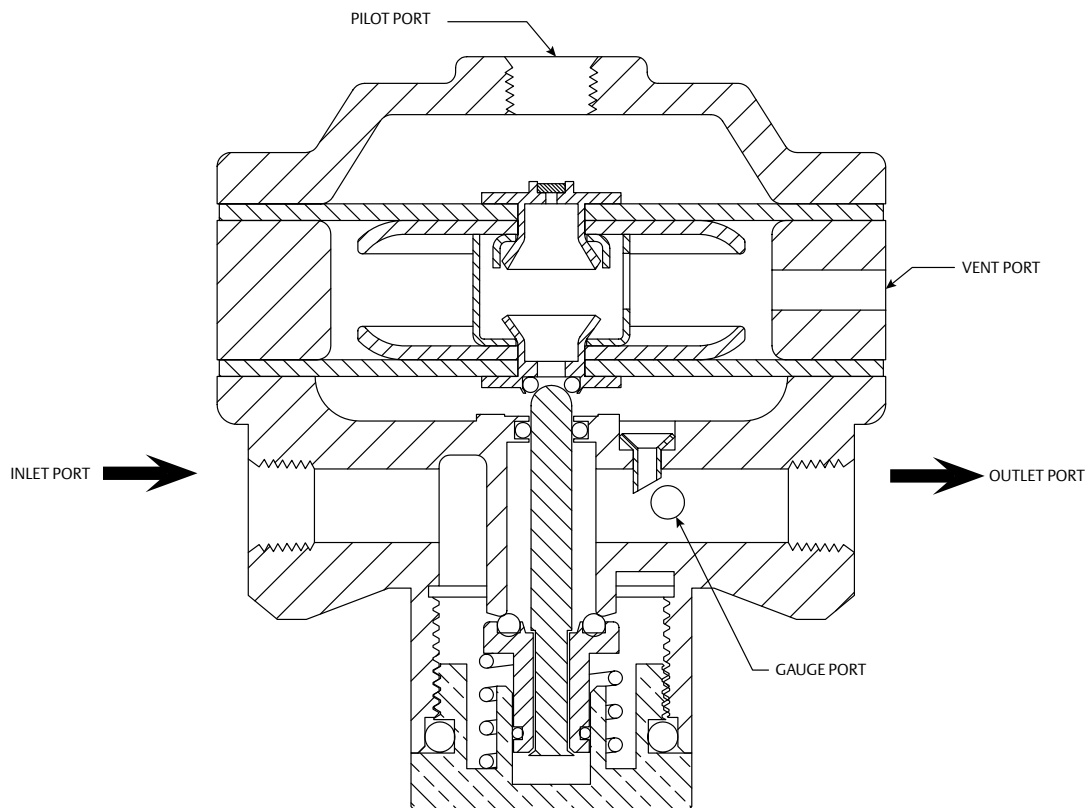


Figure 13. Pilot-Operated Diaphragm Style Regulator

### 8.3.2 Pressure Reducing Regulator DK Series

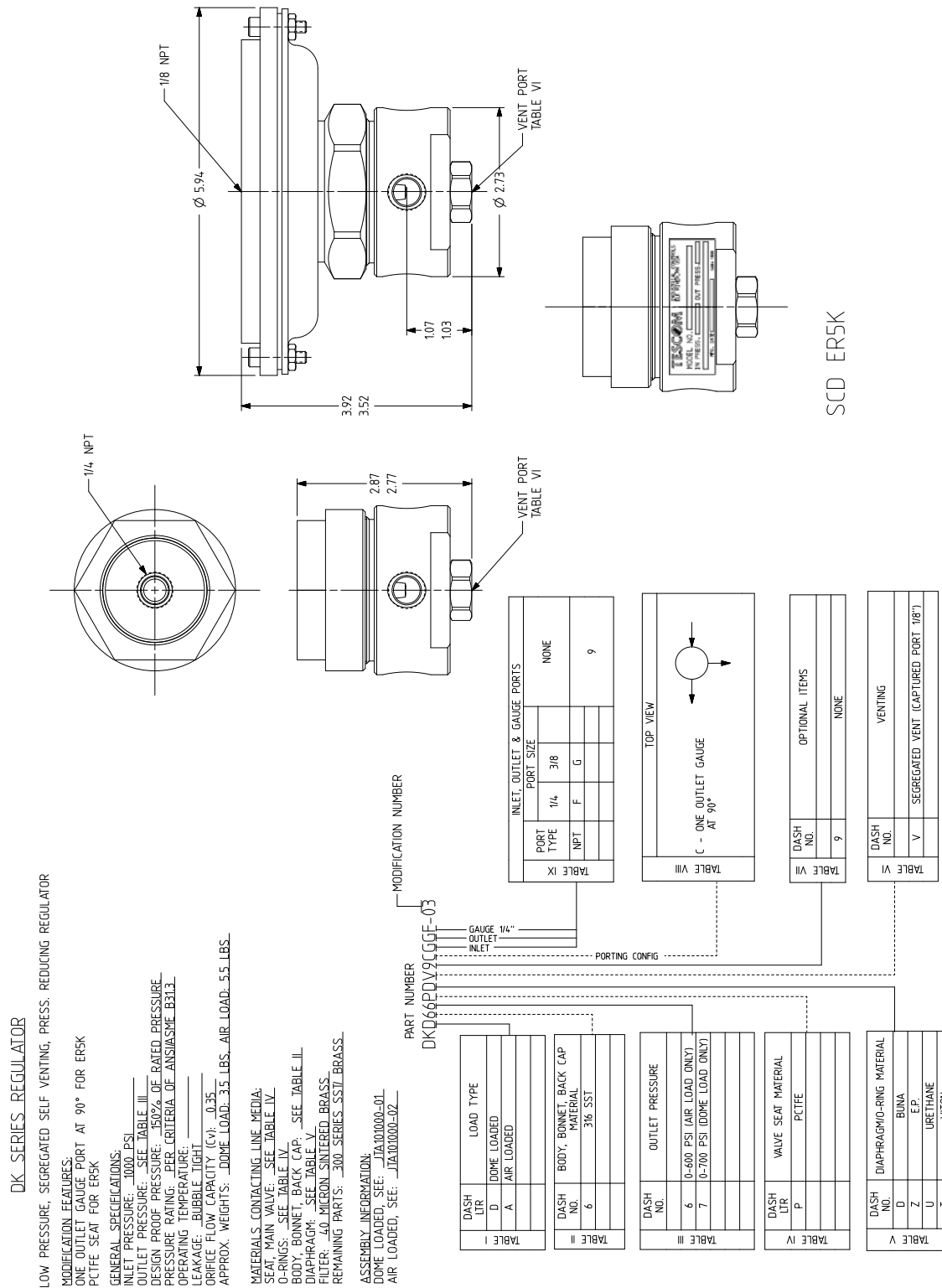


Figure 14. DK Series Regulator

### 8.3.3 Pressure Reducing Regulator 26-2000 Series

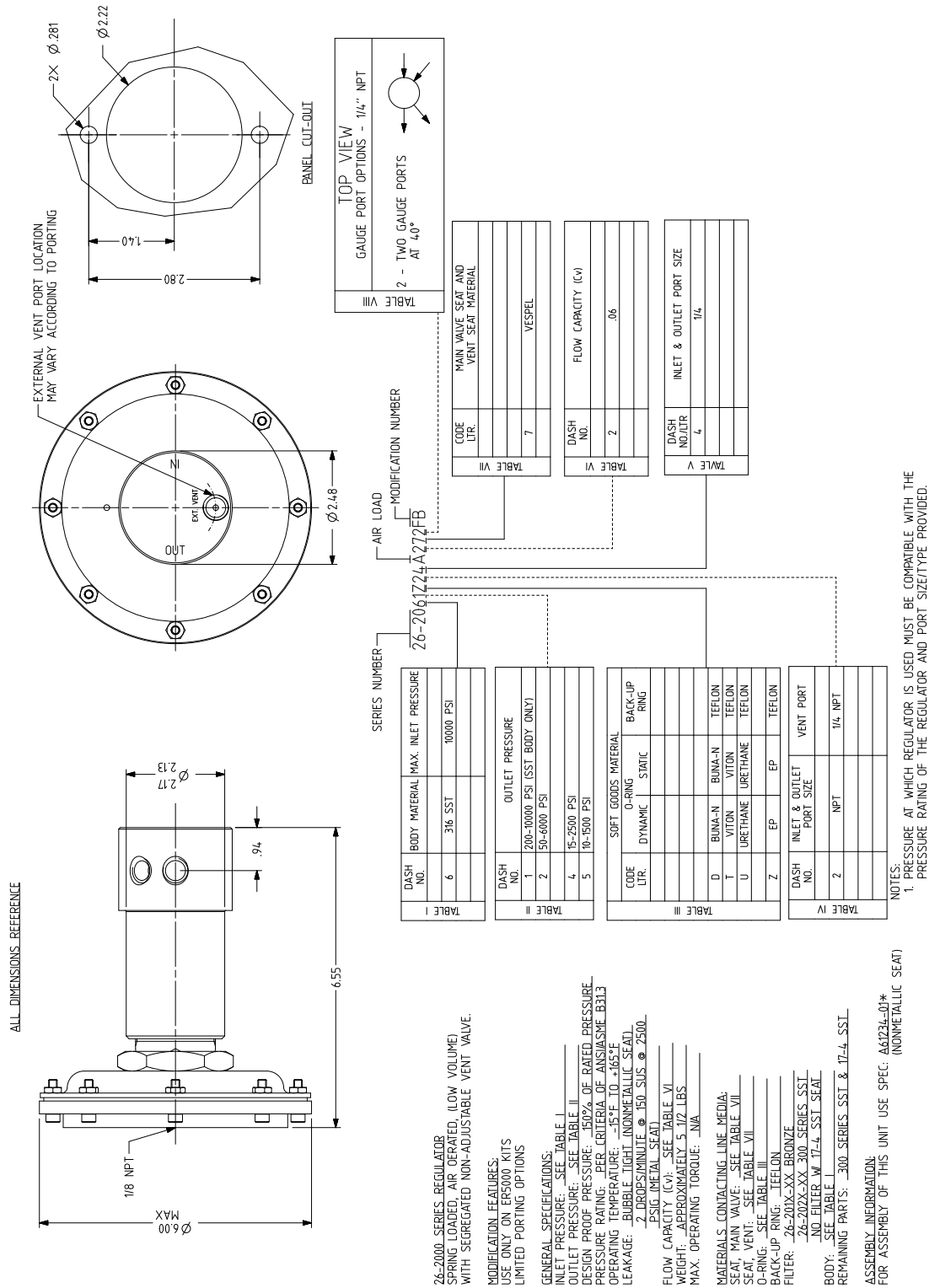


Figure 15. 26-200 Series Regulator

### 8.3.4 Hydraulic Back Pressure Regulator 54-2100 Series

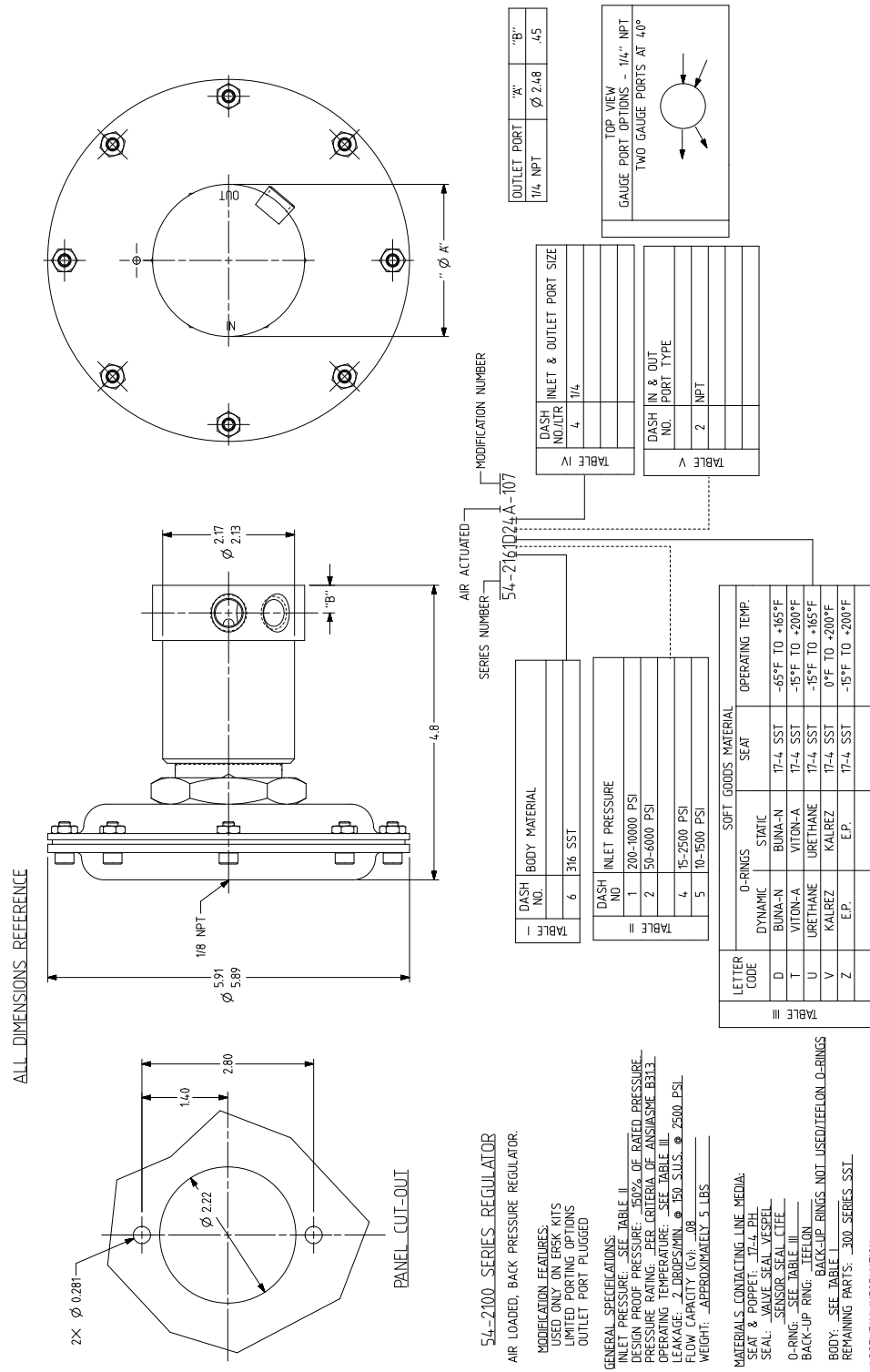


Figure 16. 54-2100 Series Regulator

### 8.3.5 Back Pressure Regulator 26-1700 Series

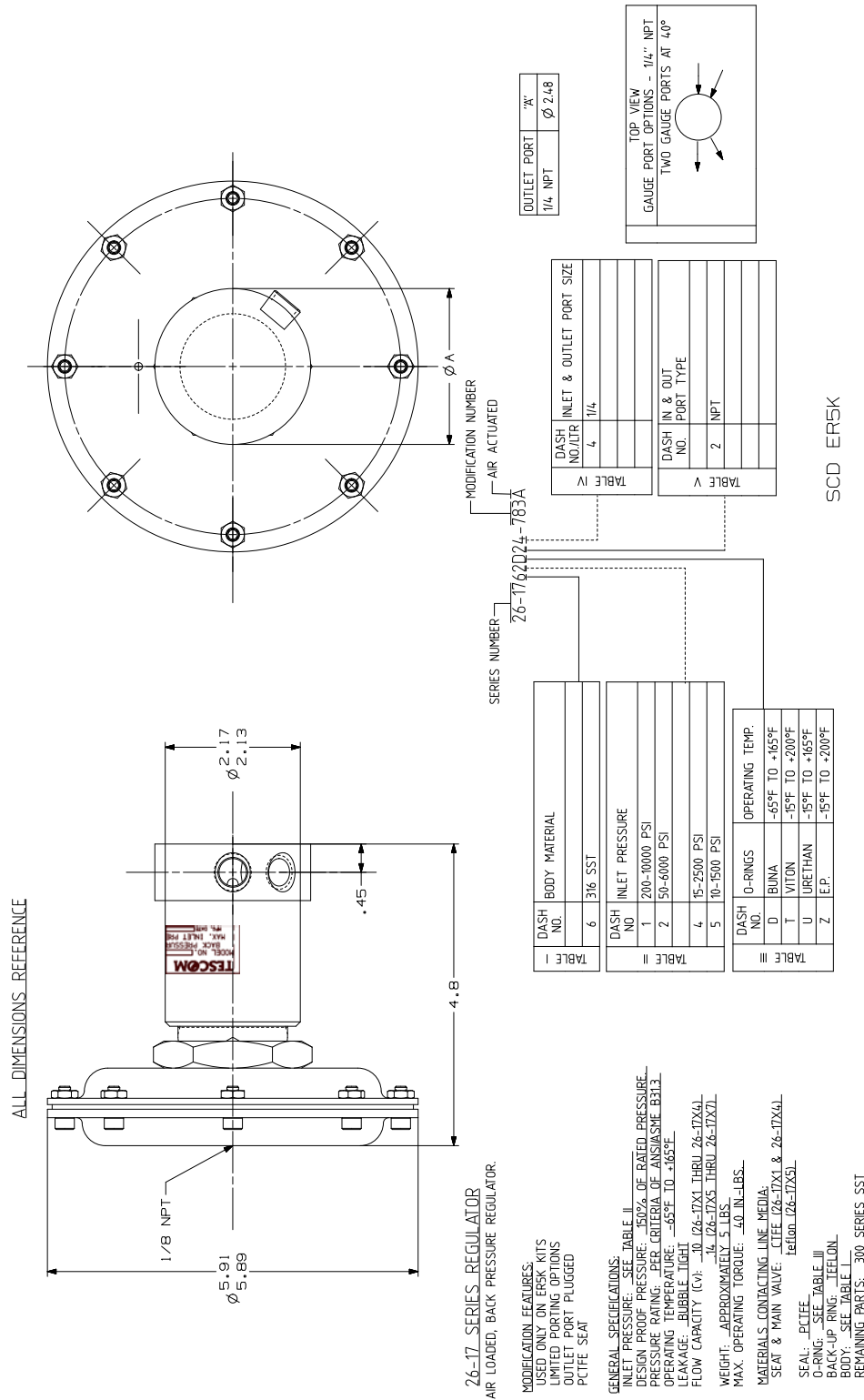


Figure 17. 26-1700 Series Regulator

### 8.3.6 Control Air Regulator 44-5200 Series

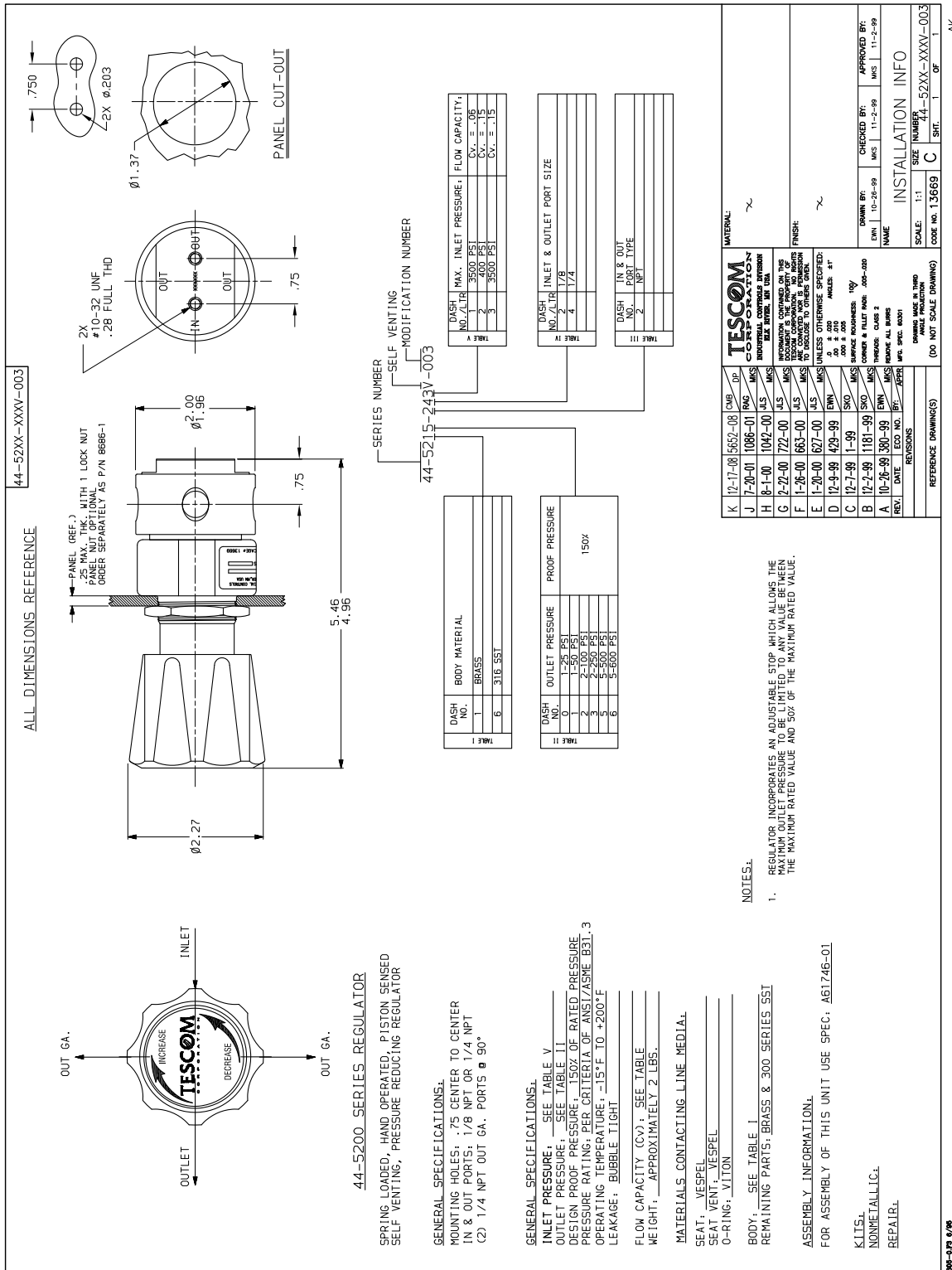


Figure 18. 44-5200 Series Regulator

## 8.4 Pressure Transducer

Table 10. Transducer Pressure Ranges	
AVAILABLE PRESSURE RANGE	
615 (psig)	D51656 (bar)
100	6
600	40
1500	100
3000	160
6000	400
10,000	690



Figure 19. Pressure Transducer

## 8.4.1 Transducer 615 Series (Imperial Versions)

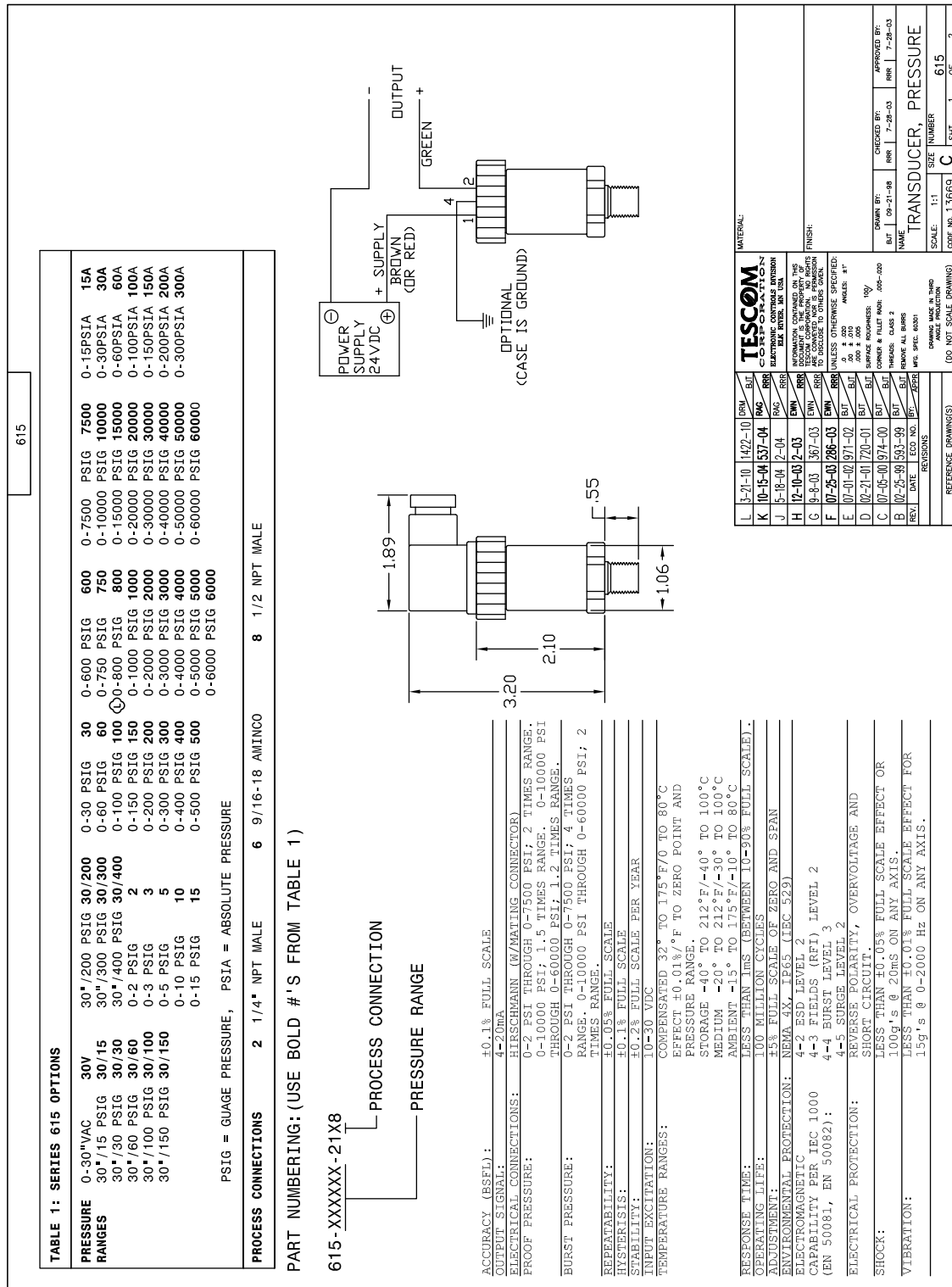


Figure 20. 615 Series Transducer



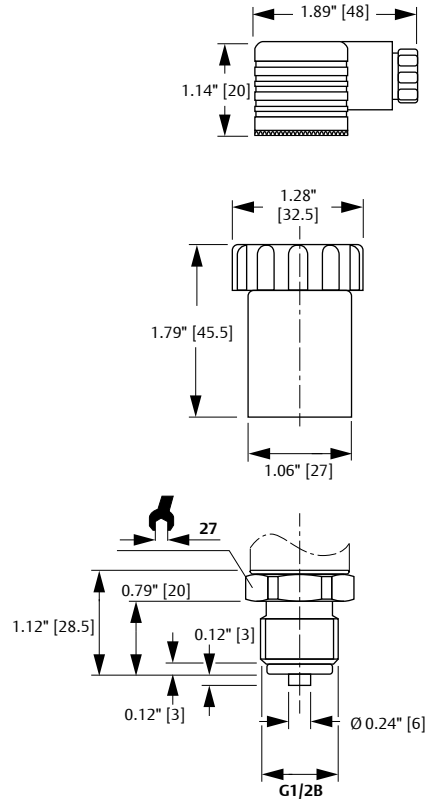
## 8.4.2 Transducer D51656-NB-XXX (Metric Versions)

Table 11. D51656-NB-XXX Technical Data						
Specifications		Model S-10				
Pressure ranges <sup>(1)</sup>	bar	6				
Over pressure safety	bar	35				
Burst pressure	bar	42				
Pressure ranges <sup>(1)</sup>	bar	40	100	160	400	690
Over pressure safety	bar	80	200	320	800	1500
Burst pressure	bar	400	800	1000	1700	3000
Materials						
Wetted parts		Stainless steel				
Model S-10		Stainless steel				
Case		Stainless steel				
Internal transmission fluid <sup>(2)</sup>		Synthetic oil (Halocarbon oil for oxygen applications)				
Power supply U+	U+ in VDC	10 to 30 (14 to 30 with signal output 0 to 10 V)				
Signal output and maximum ohmic load Ra		4 to 20 mA, 2-wire		Ra ≤ (U+ - 10 V) / 0.02 A		
		0 to 20 mA, 3-wire		Ra ≤ (U+ - 3V) / 0.02 A		
		0 to 5 V, 3-wire		Ra > 5 k		
		0 to 10 V, 3-wire		Ra > 10 k		
		(other signal outputs on request)				
Adjustability zero/span	%	± 5 using potentiometers inside the instrument				
Response time (10 to 90%)	ms	≤ 1 (≤ 10 ms at medium temperatures below < -30°C for pressure ranges up to 25 bar or with flush diaphragm)				
Insulation voltage	VDC	500 <sup>(3)</sup>				
Accuracy <sup>(4)</sup>	% of span	≤ 0.5 [0.25] <sup>(5)</sup>				
Non-linearity	% of span	≤ 0.2 (BFSL) according to IEC 61298-2				
Non-repeatability	% of span	≤ 0.1				
1-year stability	% of span	≤ 0.2 (at reference conditions)				
Permissible temperature of						
Medium <sup>(6)</sup>		-30 to 100°C (-4 to 125°C)		-22 to 212°F (-40 to 257°F)		
Ambience <sup>(6)</sup>		-20 to 80°C		-4 to 176°F		
Storage <sup>(6)</sup>		-40 to 100°C		-40 to 212°F		
Rated temperature range		0 to 80°C		32 to 176°F		
Temperature coefficients within rated temperature range						
Mean TC of zero	% of span	≤ 0.2 / 10 K (<0.4 for pressure range ≤ 0.25 bar)				
Mean TC of range	% of span	≤ 0.2 / 10 K				
CE-conformity						
Pressure equipment directive		97/23/EC				
EMC directive		2004/108/EEC, EN 61 326 Emission (Group 1, Class B) and Immunity (Industrial locations)				
Shock resistance	g	1000 according to IEC 60068-2-27		(mechanical shock)		
Vibration resistance	g	20 according to IEC 60068-2-6		(vibration under resonance)		
<p>1. Vacuum, gauge pressure, compound range, absolute pressure, other pressure ranges and units are available.</p> <p>2. Not for Model S-10 with pressure ranges &gt; 25 bar.</p> <p>3. NEC Class O2 power supply (low voltage and low current maximum 100 VA even under fault conditions).</p> <p>4. Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2). Adjusted in vertical mounting with lower pressure connection.</p> <p>5. Accuracy [ ] for pressure ranges ≥ 0.25 bar.</p> <p>6. Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3.</p>						

### 8.4.3 Transducer D51656-NB-XXX (Europe Only)

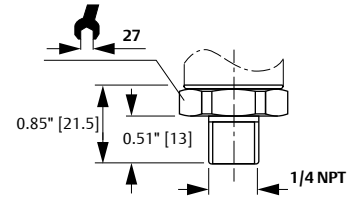
#### Dimensions

DIN 175301-803 A  
L-connector



#### Connection NB

1/4 NPT  
per "Nominal size for US standard tapered pipe thread NPT"



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

#### Electrical Connection

L-connector DIN 175301-803 A			
2-wire	U+ = 1	U- = 2	
3-wire	U+ = 1	U- = 2	S+ = 3
Cable screen			
Wire gauge	up to max. 1.5 mm <sup>2</sup>		
Diameter of cable	6 to 8 mm (ship approval: 10 to 14 mm)		
Ingress protection per IEC 60 529	IP 65		

Figure 21. D51656-NB-XXX Transducer

For Your Own Notes:

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