

**MANUAL**

# ENVIRO-LINE™ ENVIRONMENTAL PRESSURIZATION SYSTEM



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## Purpose and Description

### Purpose

Pepperl+Fuchs' Enviro-Line pressurized system is designed to pressurize standard Type 4 or Type 12 enclosures in order to prevent the outside atmosphere from getting into the pressurized enclosure. It can be used to prevent corrosive gas or dust from getting into equipment that is mounted and operated within the pressurized enclosure. The Enviro-Line can also be used to prevent overheating and moisture contamination. The Enviro-Line is NOT intended to be used for hazardous protection of enclosure. It does NOT meet, nor is it designed to meet NFPA 496 or any other hazardous location protection method. For hazardous location protection, please go to [www.bebcoeps.com](http://www.bebcoeps.com) for information on certified purge/pressurization systems used for hazardous location protection.

### Description

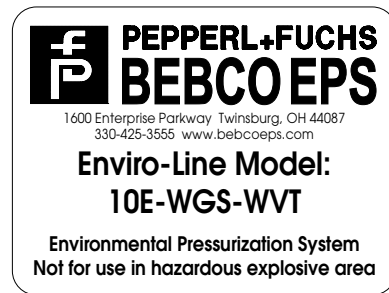
The Enviro-Line, 10E-... pressurization system is designed to pressurize enclosures that will prevent the ingress of gas or dust within the enclosure. The Enviro-Line is not intended for hazardous area protection, so purging is not required. The enclosure is pressurized by using a low-pressure regulator to maintain the pressure within the enclosure. A differential pressure gauge indicates the pressure; an optional pressure switch can give an alarm output at low pressure, and an optional vent or redundant regulator is available for a pressure relief /overpressure condition. One model number comprises

a complete kit with all the necessary fittings, tubing, and hardware to mount the panel/vent to the enclosure. No additional fittings are required for easy installation.

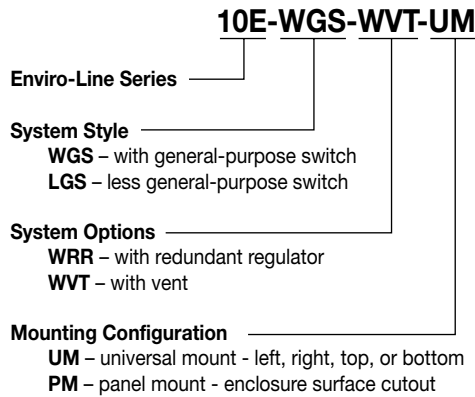
### Important notes

The Enviro-Line is intended to pressurize enclosures in general-purpose locations. The Enviro-Line is not intended for hazardous location protection based on NFPA496 or any other standard for hazardous location protection. However, certain parameters for pressurized enclosures must be followed, and NFPA 496 may be used as a basis for these requirements. Certain precautions must be followed to prevent pressure build-up. Relief vents or redundant pressure regulators must still be used to meet these criteria. The Enviro-Line pressurized system is designed to meet these pressure reducing requirements.

## Identifying Your System



### Model Number Designation



The mounting configuration is available in the 'UM', universal mount and the 'PM', panel mount configuration. All fittings, tubing and mounting hardware are included with each series system. A redundant regulator is NOT available with the 'PM' type panel.

## Parts List

The following model numbers include the parts listed below. Components with part numbers are available as spare parts and can be purchased individually.

### 10E-WGS-WRR-...

- (1) Stainless steel panel
- (1) Differential pressure gauge, 0-2" H<sub>2</sub>O range, color-coded for optional operation
- (1) Panel mount regulator, range from 0-25 psig,
- (1) General-purpose pressure switch set to 0.5" H<sub>2</sub>O; redundant regulator set to 5 psi for limiting pressure
- (1) 0-30 psi gauge for redundant pressure regulator
- (1) Hardware\*

### 10E-LGS-WRR-...

- (1) Stainless steel panel
- (1) Differential pressure gauge, 0-2" H<sub>2</sub>O range, color-coded for optional operation
- (1) Panel mount regulator, range from 0-25 psig; redundant regulator set to 5 psi for limiting pressure
- (1) 0-30 psi gauge for redundant pressure regulator
- (1) Hardware\*

### 10E-WGS-WVT-...

- (1) Stainless steel panel
- (1) Differential pressure gauge, 0-2" H<sub>2</sub>O range, color-coded for optional operation
- (1) Panel mount regulator, range from 0-25 psig,
- (1) General-purpose pressure switch set to 0.5" H<sub>2</sub>O
- (1) EPV-3-GP-00/90 pressure relief vent for top or side mount
- (1) Hardware\*

### 10E-LGS-WVT-...

- (1) Stainless steel panel
- (1) Differential pressure gauge, 0-2" H<sub>2</sub>O range, color-coded for optional operation
- (1) Panel mount regulator, range from 0-25 psig,
- (1) EPV-3-GP-00/90 pressure relief vent for top or side mount
- (1) Hardware\*

\*Hardware includes:

- Stainless steel bolts, lock washers, and nuts to mount panel to enclosure
- Bulkhead fitting for 3/8" supply tubing, GBC-6
- Polyurethane tubing, 3/8" diameter, 4 feet long
- Bulkhead fitting for 1/4" reference tubing, GBC-4
- Polyurethane tubing, 1/4" diameter, 4 feet long
- 'PM' panel mount includes SMK-4
- 'UM' universal mount includes SMK-1

## Replacement Parts

Enclosure supply fitting	GBC-6
Enclosure reference fitting	GBC-4
Differential pressure gauge	513235
Differential pressure switch	GPSK-2
Redundant regulator w/gauge	TR-10G
Control regulator	513653
Vent	EPV-3-GP-90
1/4" tubing (4')	513231
3/8" tubing (4')	513232
Mounting kit—UM	SMK-1
Mounting kit—PM	SMK-4

## Specifications

### System specifications

System dimensions:	See Dimensions
Approx. shipping weight:	
10E-WGS-WRR-___	10 lbs
10E-LGS-WRR-___	7 lbs
10E-WGS-WVT-___	14 lbs
10E-LGS-WVT-___	11 lbs
Operating temperature:	-20 °F to +120 °F
Supply pressure range:	5 to 120 psi max.*
Supply requirement:	Clean air or inert gas
Pressurization pressure:	> 0.5" H <sub>2</sub> O
Pressurization flow rate:	Depends on enclosure sealing
System supply fitting:	GBC-6, 3/8" bulkhead fitting
System supply tubing:	3/8" polyurethane tubing
Reference fitting:	GBC-4, 1/4" bulkhead fitting
Reference tubing:	1/4" polyurethane tubing
WGS:	
Switch contacts:	15 A @ 120 to 480 VAC, 60 Hz resistive 1/8 HP @125 VAC
EPV-3-SA-00/90:	1-1/4" hub size
* With 'WRR' redundant regulator option	5 psi max.
With 'WVT' vent option	20 psi max.

### Material specifications

Regulator body:	Zinc w/enamel finish, brass
Regulator handle:	Polycarbonate
Enclosure pressure gauge:	ABS plastic
Tube fittings, GBC-:	Nickel-plated brass
Tubing:	Nylon or polyethylene
Fastener hardware:	Stainless steel
Mounting plate:	316L, 14 gauge stainless steel
WGS:	Zinc-plated steel
EPV 3-SA-00/90 vent:	Aluminum

## Installation Overview

### Installation tools

WVT models only:	1-1/4" conduit knockout punch
Drill hole size for GBC-4:	1/4" bulkhead fitting 0.400" to 0.440" diameter
Drill hole size for GBC-6:	3/8" bulkhead fitting 0.800" to 0.875" diameter
Drill hole size for SMK-1:	1/4" bolt size

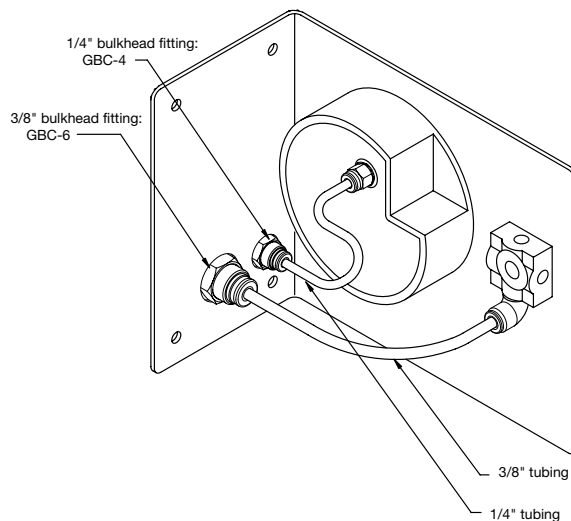
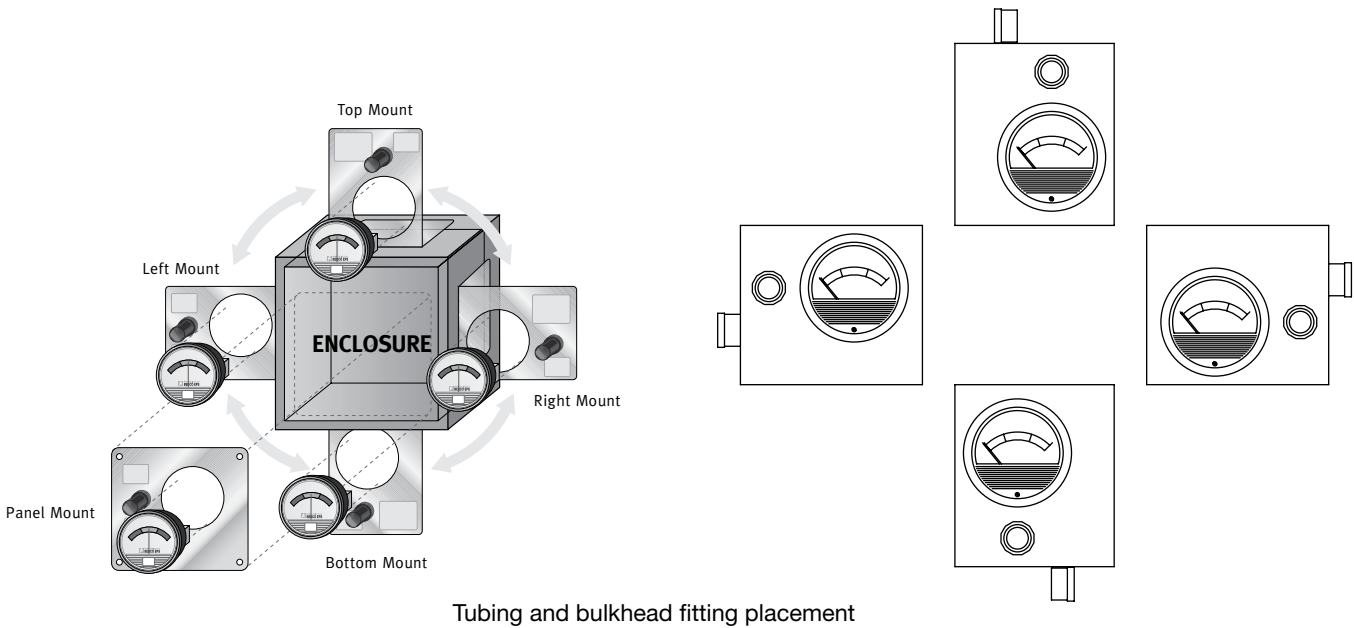
### Enclosure design requirements

- All windows must be shatterproof and sized as small as possible.
- The enclosure must withstand an internal pressure of 10" H<sub>2</sub>O without sustaining permanent deformation.
- All lightweight objects in the enclosure must be firmly secured.

- The enclosure should be constructed from materials such as metal or nonstatic polycarbonate to meet or exceed Type 4 or Type 12 performance requirements. It does not require third-party certification.
- If the enclosure is nonmetallic and contains equipment that utilizes or switches power grids greater than 2500 VA, it must be constructed from substantially noncombustible materials.

### Dimensions and installation overview

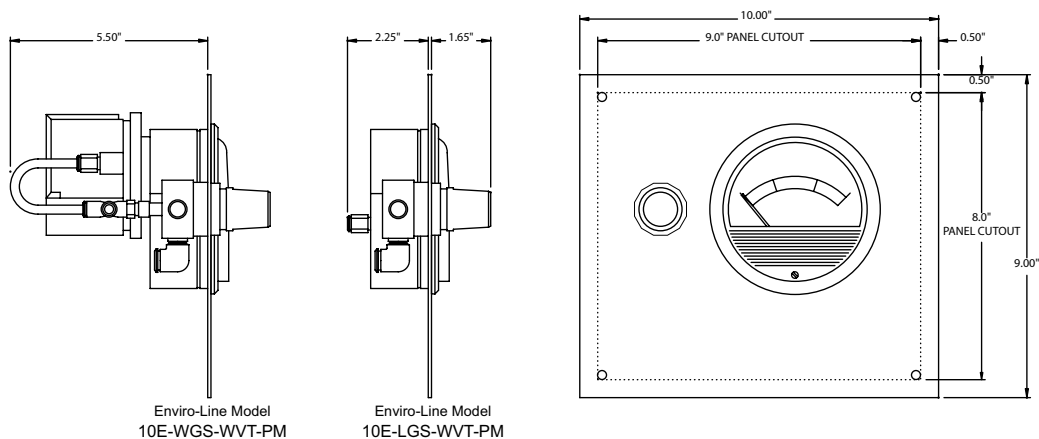
- The 10E-...UM is designed for universal mounting onto the enclosure. It can be mounted to the right, left, top, or bottom of the enclosure.
- For right hand, bottom, top, or panel mount; position the gauge, regulator, and when applicable, the differential pressure switch according to the mounting as shown:



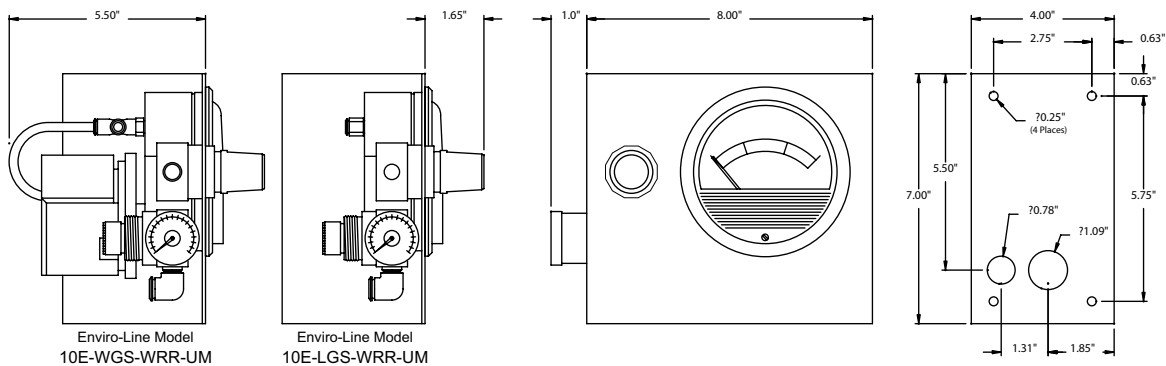


## Dimensions

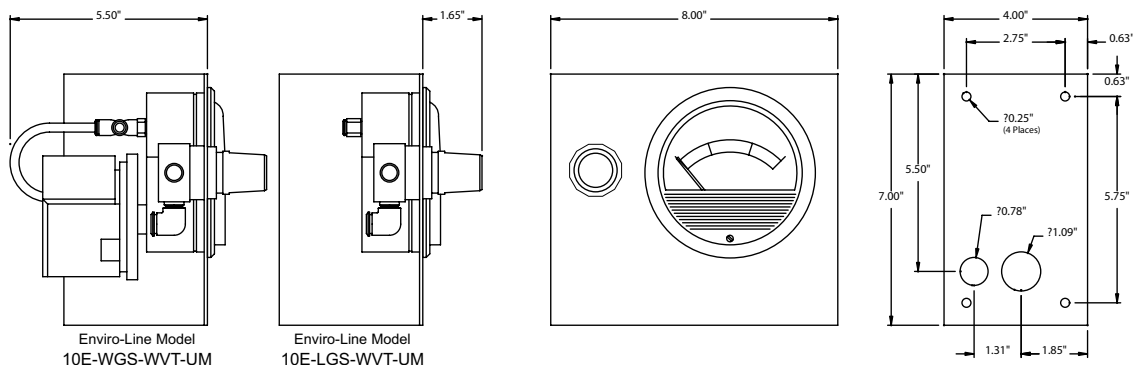
Panel Mount (PM) with vent (WVT)  
without general-purpose switch (LGS)  
with general-purpose switch (WGS)



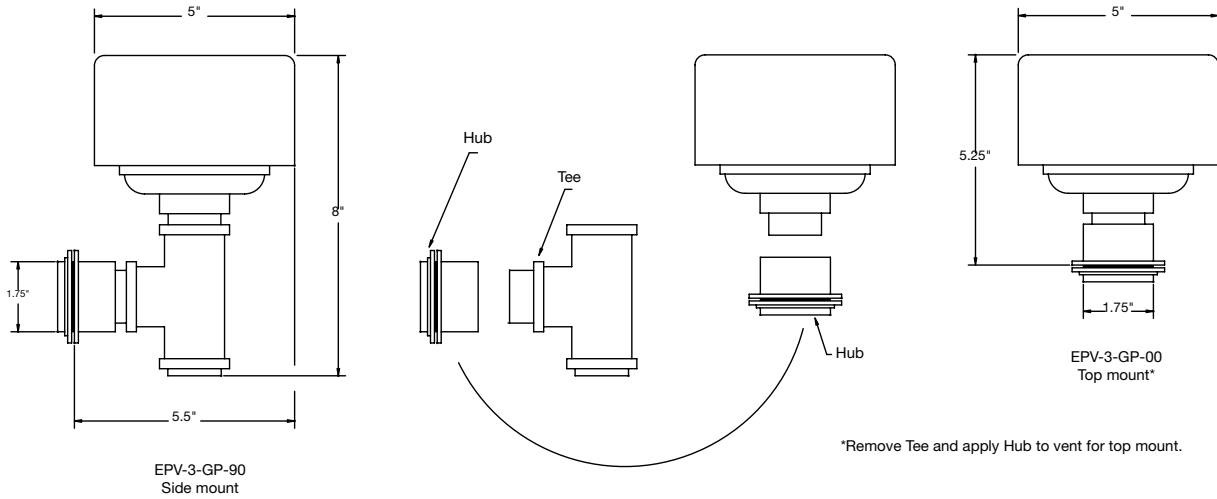
Universal Mount (UM) with redundant regulator (WRR)  
without general-purpose switch (LGS)  
with general-purpose switch (WGS)



Universal Mount (UM) with vent (WVT)  
without general-purpose switch (LGS)  
with general-purpose switch (WGS)

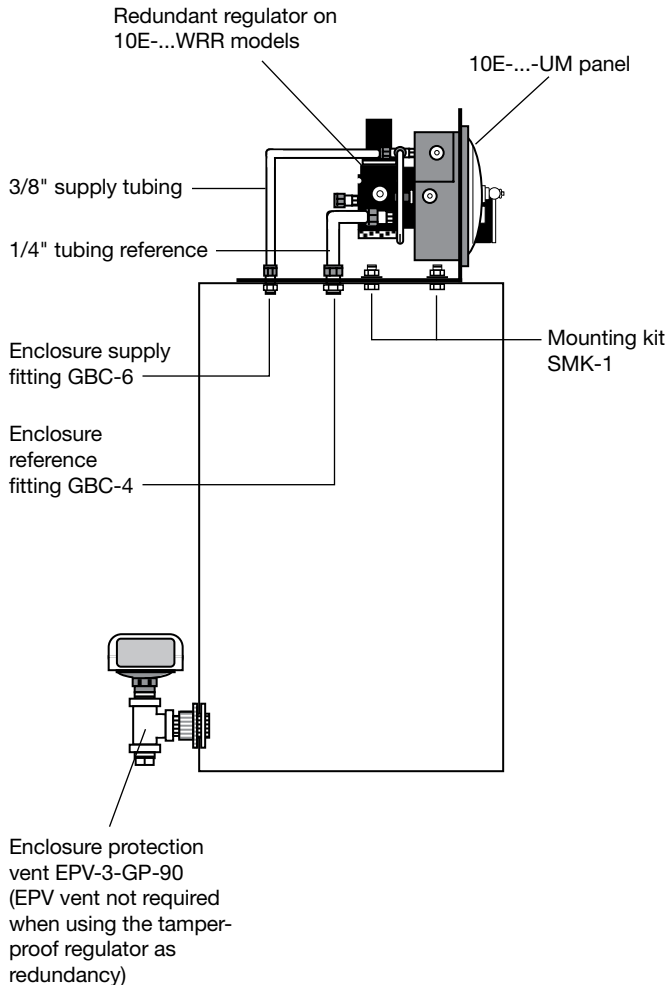


## Dimensions (continued)

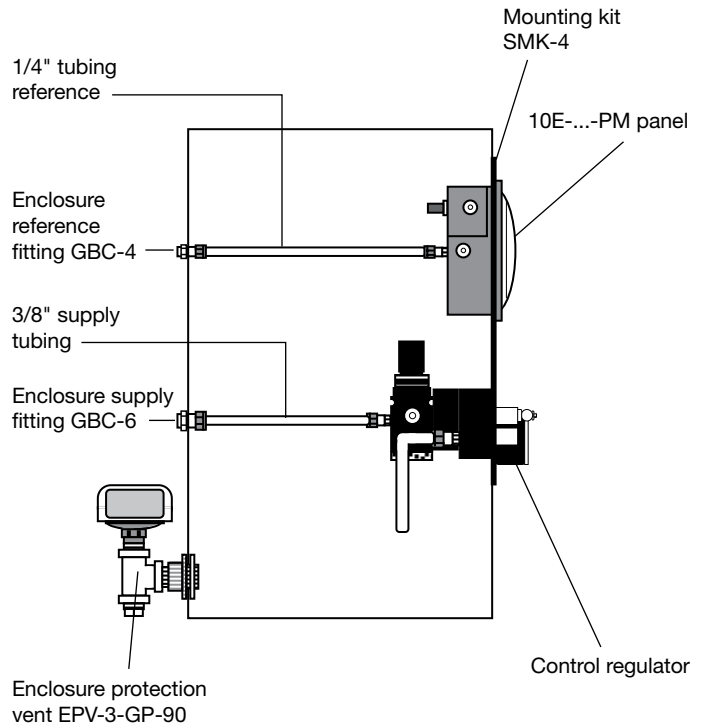


## System Installation Details

### Universal Mount



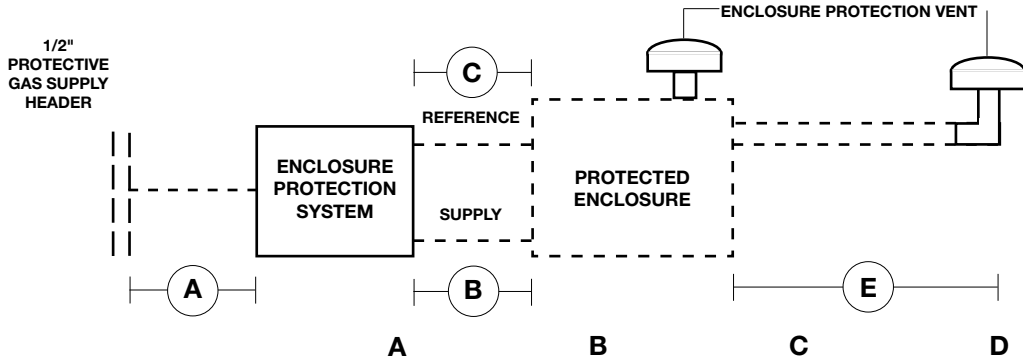
### Panel Mount





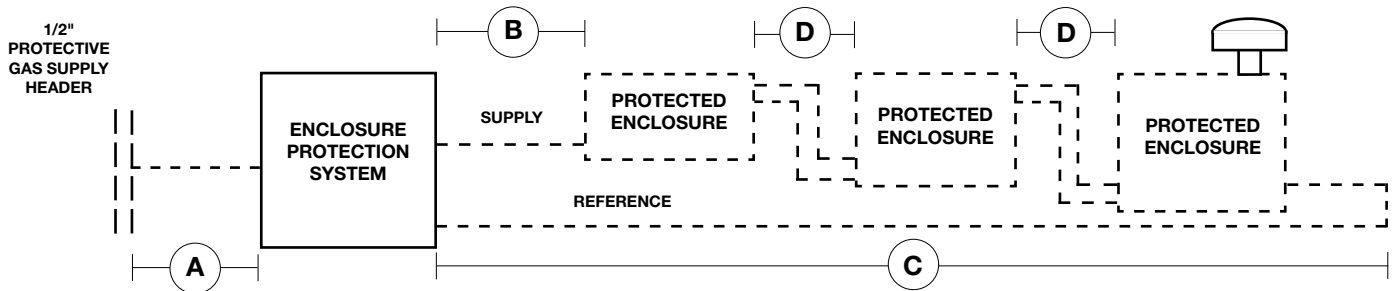
Getting Started

TYPICAL SINGLE PROTECTED ENCLOSURE CONNECTIONS WITH VENT



Description	A	B	C	D	E
	System Supply Tubing	Enclosure Supply	Enclosure Reference	Multi - Enclosure Connections	Optional Remote Venting
*Tubing or Pipe Diameter	3/8" O.D. tubing	3/8" O.D. tubing	1/4" O.D. tubing	1" I.D. pipe	1" I.D. pipe
Maximum Tubing / Pipe Length and Maximum Number of Bends / Elbows	20 feet 10 bends	5 feet 5 bends	20 feet 10 bends	10 feet 5 elbows	30 feet 5 elbows

TYPICAL MULTIPLE PROTECTED ENCLOSURE CONNECTIONS



\*NOTE: Tube and pipe sizes are trade sizes and are not equal in inside diameter. DO NO substitute tube for pipe with same trade size.

## Installation instructions

### Universal Mount, UM

- The 10E series is shipped with the components on the panel for a left-hand mounting configuration. For other configurations—right, top, bottom mounting—the regulator(s) and gauge assemblies can be loosened and rotated to fit the direction of the mounting, as illustrated in the Mounting Overview section in this chapter.
- Verify dimensions of the mounting holes and connection fittings in reference to the applicable drawings in the Dimension section.
- Upon confirmation of dimensions and orientation of components, transfer the mounting-hole pattern from the drawing to the intended surface.
- Check for any internal obstructions that could hinder mounting of the panel to the enclosure. The two large holes on the same side as the mounting holes can be used for mounting the bulkhead fittings. The larger hole is for the 3/8" and smaller for the 1/4" fittings. Other locations can be used if desired. NOTE: Plastic tubing is used. Take care to ensure that the plastic tubing has enough bend radius as not to crimp when attached.
- After the holes are drilled, install the panel using the (4) stainless steel bolts, nuts, and lock washers. Bulkhead fittings can be installed at this time.
- The vent for the 'WVT' version can be installed on top of the enclosure or on the side. For top mount, remove the 1 1/4" tee and hub, and reinstall the hub on the bottom of the vent. The connection is now set for a top-mount vent. NOTE: The vent should always be mounted upright because the pressure relief is gravity sensitive.
- Cut tubing to fit connection from panel to bulkhead fittings. Make sure there is enough bend radius so not to crimp the tubing when installed.
- The connection to the redundant or standard regulator is a 1/4"NPTF connection. For a larger enclosure, a larger supply line is required to meet the demands of pressurization. This will depend on the amount of leakage from the enclosure. The minimum size should be 3/8" tube or 1/4" pipe.

### Panel Mount, PM

- The Panel Mount (PM) is designed and connected so that the equipment on the panel can be inside the pressurized enclosure and accessed from the outside of the enclosure. The gauge and pressure switch—when used—are connected for this operation. Bulkhead fittings for the reference and supply lines are provided.
- Verify dimensions of the panel mount cutout.
- Upon confirmation of dimensions, transfer the mounting-hole pattern from the drawing to the intended surface.
- Check for any internal obstructions that could hinder mounting of the panel to the enclosure. Also look for the best location for supply and reference bulkhead fittings. NOTE: Plastic tubing is used. Mount bulkhead fittings away from the panel so that the plastic tubing has enough bend radius as not to crimp when attached.
- After the holes are drilled, install the panel using the (4) stainless steel bolts, nuts, and lock washers. Bulkhead fittings can be installed at this time.
- During installation, a sealing compound or gasket can be added to the cutout of the enclosure for additional sealing. This is not required for the pressurization system because the leakage from this installation is minimal to the system leakage.
- The vent for the 'WVT' version can be installed on top of the enclosure or on the side. For top mount, remove the 1 1/4" tee and hub, and reinstall the hub on the bottom of the vent. The connection is now set for a top-mount vent. NOTE: The vent should always be mounted upright because the pressure relief is gravity sensitive.
- Cut tubing to fit connection from panel to bulkhead fittings. Make sure there is enough bend radius so not to crimp the tubing when installed.
- Access to the redundant or standard regulator is through the 3/8" bulkhead supply fitting.

## Operating Instructions

Every system is supplied with an operation instruction label. This label should be located on the 10E-... series panel.

When using the 'WVT' option, check the vent to ensure that it opens freely. The vent does not start venting until the pressure in the enclosure is above 0.7" H<sub>2</sub>O. The vent is used for cooling or regulator failure. The 'WRR' redundant regulator allows a pressure setting below 5 psig. A vent is not required in this configuration.

The enclosure should be cleaned of all dust particles and sealed. The enclosure can then be pressurized. The regulator is adjusted so that the pressure is above a 'LOW' setting. Below this range, dust could get into the enclosure. Higher pressure can be achieved for cooling purposes. The range on the gauge is merely a guideline.

### Start-up instructions

1. Check one of the items below:
  - a. 'WVT' option: Check vent to make sure that it opens freely for exhaust of pressure
  - b. 'WRR' option: Set the tamperproof regulator no higher than 5 psig
2. Set control regulator above 'LOW' pressure indication
3. Make sure enclosure is sealed



## Troubleshooting

Problem or Fault	Possible Causes	Corrective Action
Enclosure pressure control regulator will not hold a safe pressure	Leakage around gasketing, covers, seams, piping and tubing connections, conduit connections, and electrical seals on the enclosure.	Tighten enclosure latches: Where tightening is feasible, and gasketing materials are not practical, holes or gaps can be closed with a gasketing sealant
Enclosure pressure indicator reading is difficult to stabilize	Insufficient enclosure leakage or opening of the venturi tube is crimped too small.	Remove the orifice, cut off the crimped end. Crimp end as necessary. This will allow easier adjustment of enclosure pressure.
Enclosure pressure indicator drifts up or down from the safe pressure setting	Application involves a small, tightly sealed enclosure and/or a fluctuating protective gas supply.	Pre-regulate the protective gas supply upstream of the enclosure protection system to 5 psi.  For dramatic fluctuations in the protective gas supply, it may be necessary to utilize a self-relieving, low-flow precision regulator to pre-regulate the protective gas supply.
Enclosure pressure alarm 'WGS' does not appear to be working	Pressure switch out of calibration	Calibrate by slowly adjusting counterclockwise to decrease the setpoint, and clockwise to raise the setpoint.
Problems persist	Problems persist	Contact Pepper+Fuchs applications/customer service department at 330-486-0002

This section covers the most common problems documented with this system. Any problems not covered in this section should be addressed directly to our factory. Please address all service needs to:

**Pepperl+Fuchs, Inc.**  
**Customer Service Department**

Pepperl+Fuchs Warranty and Conditions

# Warranty Terms and Conditions

## PEPPERL+FUCHS STANDARD 24-MONTH WARRANTY

1. **Limited Warranty.** Pepperl + Fuchs, Inc. ("P+F") warrants Purge Units and components for Purge Units manufactured by P+F ("Product" or "Products") to be free from defects in material and workmanship under Normal Use for a period of twenty-four (24) months from the date of shipment of such Products from P+F's warehouse or place of manufacture (or from P+F's authorized representative or distributor). Only the original purchaser of such Products (the "Customer") shall be entitled to the benefit of the foregoing Limited Warranty. No representative, agent or salesman of P+F is authorized to give or provide any warranty or make any representation contrary to or in addition to the foregoing Limited Warranty.
2. **Inspection and Claims.** Customer must inspect and test all Products upon receipt. All claims under the Limited Warranty provided herein must be made within thirty (30) days of the discovery of the defect. Customer must obtain shipping instructions from P+F prior to returning any Product, which Product must be returned at Customer's expense in accordance with P+F's instructions.
3. **Limitations and Exclusions.** "Normal Use" shall mean use and operation within rated capacities, at the correct voltage, and with any required maintenance as provided in the applicable P+F Operating Manuals. The Limited Warranty provided herein does not apply to (i) any Products which have been altered or modified in any way or disassembled by the Customer or anyone else, (ii) any Products which have been subject to misuse, negligence or accident, or improperly installed, changed, substituted or replaced, (iii) any part or component not manufactured by P+F, or (iv) any part or component that is subject to wear or consumption. For parts or components not manufactured by P+F, the Customer or any other user or owner shall have only the warranty provided by the manufacturer of such part or component. The Limited Warranty set forth herein is also subject to the following:
  - (1) The Limited Warranty is limited to electronic and mechanical performance only, as expressly detailed in the product specifications, and does not apply to cosmetic appearance;
  - (2) The Limited Warranty shall not apply to any cables attached to, or integrated with, any Products.
  - (3) The Limited Warranty shall not apply to any Products which are stored, or utilized, in harsh environmental or electrical conditions outside P+F's written specifications.

THE LIMITED WARRANTY SET FORTH HEREIN IS THE ONLY WARRANTY MADE BY P+F WITH RESPECT TO THE PRODUCTS. IT IS EXPRESSLY AGREED AND UNDERSTOOD THAT P+F MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. EXCEPT FOR THE LIMITED WARRANTY SET FORTH HEREIN, THERE IS NO OTHER WARRANTY, EXPRESS, IMPLIED OR STATUTORY; AND THERE IS NO AFFIRMATION OF FACT OR PROMISE BY P+F WITH REFERENCE TO THE PRODUCTS. IN NO EVENT SHALL P+F BE LIABLE FOR ACTUAL OR ANTICIPATED LOST PROFITS OR FOR INCIDENTAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES OR FOR DAMAGES RESULTING FROM BUSINESS INTERRUPTION, OR INJURY OR DEATH OF PERSONS, OR INJURY TO PROPERTY. P+F'S LIABILITY ON ANY CLAIM OF ANY KIND ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE DESIGN, MANUFACTURE, SALE, REPAIR OR OPERATION OF A PRODUCT, SHALL NOT EXCEED THE PRICE ALLOCABLE TO THAT PRODUCT OR THE PART THEREOF WHICH GIVES RISE TO THE CLAIM. THE REMEDY SET FORTH IN THIS LIMITED WARRANTY CONSTITUTES THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER. P+F SHALL NOT BE LIABLE FOR PENALTIES OF ANY DESCRIPTION.

4. **Limitation of Remedies.** In the event of P+F's liability, whether on this Limited Warranty or based on contract, tort (including, but not limited to, negligence and strict liability) or otherwise, Customer's sole and exclusive remedy will be limited to, at P+F's option, the repair or replacement (f/o/b P+F's place of manufacture) by P+F of any non-conforming items for which claim is made by Customer in accordance with paragraph 2, or the repayment of the portion of the purchase price paid by Customer attributable to the non-conforming item.
5. **Responsibility of Customer: Safety and Protection Precautions.** P+F takes great care to design and build reliable and dependable Products; however, some Products can fail eventually. Customer must take precautions to design its equipment to prevent property damage and personal injury in the unlikely event of a failure. AS A MATTER OF POLICY, P+F DOES NOT RECOMMEND THE INSTALLATION OF PRODUCTS AS THE SOLE DEVICE FOR THE PROTECTION OF PERSONNEL OR PROPERTY AND, THEREFORE, THE CUSTOMER SHOULD BUILD IN REDUNDANCY OR DUAL CONTROL USING APPROVED SAFETY DEVICES FOR THESE APPLICATIONS.
6. **Conflicts.** In the event there is any conflict between the provisions of this Limited Warranty and any provisions contained in any orders, offers, acceptances or other writings or statements provided or made by Customer to P+F, the provisions of this Limited Warranty shall prevail, and the contract between P+F and the Customer shall be deemed formed only upon the provisions set forth in this Limited Warranty, and any additional or conflicting provision inserted by Customer shall be of no force or effect.



# PROCESS AUTOMATION – PROTECTING YOUR PROCESS



For over a half century, Pepperl+Fuchs has provided new concepts for the world of process automation. Our company sets standards in quality and innovative technology. We develop, produce, and distribute electronic interface modules, Human-Machine Interfaces and hazardous location protection equipment on a global scale, meeting the most demanding needs of industry. Resulting from our world-wide presence and our high flexibility in production and customer service, we are able to offer complete individual solutions – wherever and whenever you need us. We are the recognized experts in our technologies – Pepperl+Fuchs has earned a strong reputation by supplying the world's largest process industry companies with the broadest line of proven components for a diverse range of applications.

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