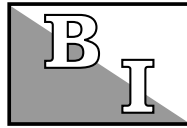


**CLASS I APPLICATIONS
75 Cubic Feet Maximum**



MODEL 2003

TYPE X

RAPID EXCHANGE® PURGING SYSTEM INSTALLATION & OPERATION MANUAL

EPS® DIVISION CONTROL DOCUMENT 2003-IOM-R1.0

06/95



**STD Style
(Standard)**



**FA Style
(Fully Automatic)**



CSA Approval applies to
Electrical Power Control
Unit Only

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Purpose

The Bebcu Enclosure Protection System's purpose is to allow the use of general purpose or non-rated electrical or electronic devices, with exception to devices which produce excessive heat, utilize combustible gas, or expose arcing contacts to the hazardous atmosphere, in NEMA (National Electrical Manufacturers Association) 4 or 12 enclosures in the place of explosion proof NEMA 7 enclosures.

Description

Model 2003 Rapid Exchange® purging system operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure of sealed (protected) enclosure(s), in order to rapidly remove and prevent flammable vapor accumulation within the enclosure(s). The system is designed to accomplish four air exchanges and maintain a "safe" (0.25") pressure on one or more enclosures not exceeding a total volume of seventy five cubic feet. A Bebcu Model EPV-3 Enclosure Protection Vent is required for proper operation. In addition, the system includes an electrical power control unit (EPCU) that monitors system operation and controls enclosure power. All start-up requirements must be satisfied before the EPCU will energize power to the enclosure(s). This process reduces the Hazardous (Classified) Area Rating within the enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA ds12.4.

Page 32 Systems Identification & Application Information

Important Notes

One (1) permanent file copy and one (1) operations copy of this Manual must be studied and retained by the operator of this System. User's Agents are responsible for transferring this Manual to the user, prior to start-up.

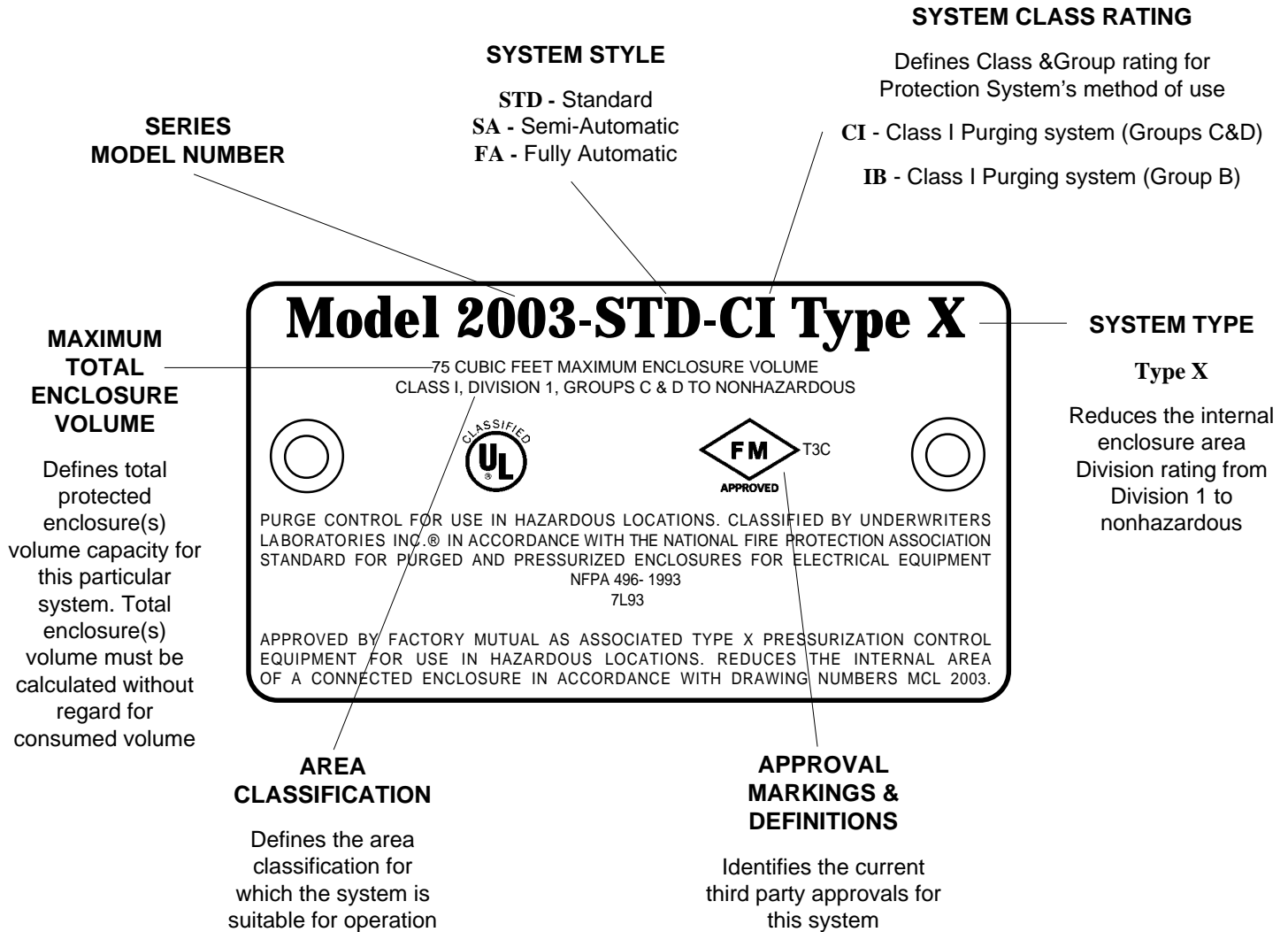
The contents of this manual have been arranged to allow the use of this product as a stand-alone device on equipment and enclosures supplied by the user or its agents. The Manual's parameters encompass both National Fire Protection Association (NFPA) requirements and Bebcu Industries, Inc. requirements. Bebcu therefore acknowledges the use of NFPA 496 as a guideline, that we have enhanced certain NFPA requirements and that additional information has been compiled to complete this document. The Manual is intended as a complete guide and must be considered, unless specifically stated otherwise, that all directives contained herein are Bebcu requirements for safe, practical and efficient use of this product.

This System is not intended for use to protect enclosures or devices which contain ignitable concentrations of gases or vapors. This exclusion generally applies to process or product analyzing systems equipment.

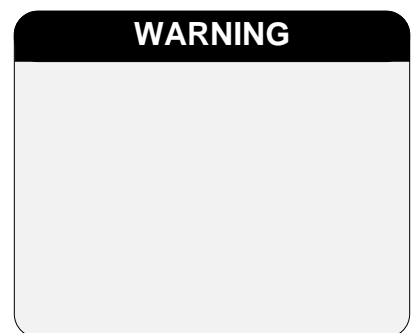
All specifications are subject to change without notice.

Identifying Your System

This Enclosure Protection System is offered in various styles. For proper installation and operation, examine the System Model Number Nameplate to identify the System Style, Area Classification, and Type, as noted below.



To assist you through the installation and operation of your Rapid Exchange® purge system, BebcO Industries, Incorporated has provided the following information boxes throughout this manual. This information is intended to clarify certain differences between the model styles and configurations and to warn the user / installer of potential dangers of electrical shock or enclosure over pressurization.



General Information

System Specifications

System Dimensions:	See Pages 10 & 11
Shipping Weight (Lbs.):	STD - 45 / SA & FA - 47
Operating Temp. Range:	-20° F - 120° F
Supply Pressure Range:	80 - 120 PSI max.
Capacity & Filtration:	3.8 Oz. @ 40 Microns
Supply Requirements:	Clean Air or Inert Gas
Safe Press. Setpoint:	0.25" @ Safe Press.
Safe Press. Flowrate:	* 0.1 - 3.5 SCFH / Cubic Ft.
Exchange Pressure:	3" - 5"
Exchange Flowrate:	** 10 SCFM / 600 SCFH
Exchange Time:	1 Minute / 2.5 Cubic Ft.
System Supply Port:	3/8" FPT
Enclosure Supply Fitting:	3/8" Tube Fitting
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	220 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	*** 12-48 VDC
EPCU Power Consumption:	500 ma
Power Relay Contacts:	20 Amps @ 220 VAC
	20 Amps @ 28 VDC
	*** 20 Amps @ 48 VDC
Alarm Relay N.O. Contact:	20 Amps @ 220 VAC
	20 Amps @ 28 VDC
Alarm Relay N.C. Contact:	10 Amps @ 220 VAC
	10 Amps @ 28 VDC

- * Enclosure integrity determines actual flow rate
- ** With regulator set to 60 PSI min. during exchange
- *** Optional 12-48 VDC Power Module Specifications

Material Specifications

Filter Regulator Body:	Zinc w/ Enamel Finish
Regulator Handle & Bowl:	Polycarbonate
Enclosure Pressure Gauge:	Alum. w/ Enamel Finish
Rapid Exchange Gauge:	Poly Case & Brass Tube
Rapid Exchange Solenoid:	Brass w/ Enamel Finish
Tube Fittings & Valves:	316 SS Forged Body
Tubing:	316 SS 1/4" & 3/8" .035 Welded
System Nameplates:	Silkscreened Lexan® & SS
Fastener Hardware:	SS Screws & Bolts
Mounting Plate:	316 14 Ga #3 Brush SS
EPCU Enclosure Body:	Bead Blast Cast Alum.
Conduit & Fittings (SA & FA):	Galvanized Steel
Enclosure Warning Nameplate:	Silkscreened SS

Lexan® is a registered trademark of the General Electric Corporation

Recommended Spare Parts

Qty	Description	Part Number
1	Enclosure Pressure Indicator	001000
1	3/8" Filter Regulator	002090
1	Enclosure Pressure Control Valve	003660
1	Rapid Exchange® Valve Body (STD Style)	003680
1	3/8" Solenoid Valve Body (SA & FA Style)	002230
1	Safe Pressure Switch	005200
1	Rapid Exchange® Pressure Switch	005210
1	Series 2000 Logic Module-Ver. 2.0	005000
1	Series 2000 VAC Power Module	005020
1	Series 2000 VDC Power Module	005021
1	Installation & Operation Manual	IOM 2003
1	Enclosure Warning Nameplate-CI	EWN-1

Reference Bebcos Part number above for current spare parts pricing. Immediate pricing is available to all confirmed customers.

Installation Tools & Testing Equipment

- 1/2" chuck drill
- Complete set of drill bits
- 1/2" & 1" conduit knockout punch or 1.375" hole saw
- Complete set of tubing, conduit bending, instrument fitting and electrical craftsman hand tools
- 0 - 5" differential pressure gauge or manometer (connected to the protected enclosure to measure maximum pressure)

Model 2003 System Accessories

Enclosure Protection Vents

ONE REQUIRED WITH EACH SYSTEM

EPV-3-SA-00	Straight w/ Spark Arrestor
EPV-3-SA-90	Rt Angle w/ Spark Arrestor

Additional Items

SMK-3 or -10	System Mounting Kit
RAH	Div. 1 Remote Alarm Horn
RAB-1	Div. 1 Remote Alarm Beacon
LCK	L Fitting Conduit Kit
TCK	T Fitting Conduit Kit
PIAD	Purgeable Instrument Access Door
SRM-2000	Switch Resistor Module
PD-2000	Proximity Detector

Factory Installed Items

ISB-A	Channel A Barrier
ISB-B	Channel B Barrier
ISB-C	Channel C Barrier
RSPS	Redundant Safe Pressure Switch
RRES	Redundant Rapid Exchange® Pressure Switch
KLA	Key Lock Assembly

Enclosure & Device Design

Enclosure Design Requirements

1. All windows must be shatterproof and sized as small as possible.
2. All NFPA 496 required markings must be placed on or near **all** enclosure doors and covers.
3. The enclosure must withstand an internal pressure of five (5) inches of water without sustaining permanent deformation and resist all corrosive elements in the surrounding atmosphere.
4. All lightweight objects in the enclosure, such as paper or insulation, must be firmly secured.
5. The enclosure should be constructed from materials such as metal or anti-static polycarbonate to meet or exceed NEMA 4 or 12 performance requirements, but does not require third party approval.
6. The installation of obstructions or other barriers which block or impede the flow of protective gas must be avoided.
7. The creation of air pockets or other areas which trap flammable gases within the enclosure or devices must be avoided.
8. The enclosure should be located in an area where impact hazards are minimal.
9. If the enclosure is nonmetallic and contains equipment which utilizes or switches power loads greater than 2500 VA, it must be constructed from substantially noncombustible materials, such as materials designed to meet or exceed ANSI/UL94 ratings of 94 V-0 or 94 5V.

Adjacent Enclosures

1. Adjacent enclosures must be protected by one of the following means:
 - a) purged or pressurized in series with the protected enclosure;
 - b) purged or pressurized separately; or
 - c) protected by other means; e.g. explosion proof enclosures, hermetically sealed devices or intrinsic safe circuits.
2. Adjacent purged or pressurized enclosures must be designed to meet all construction requirements above.

Total Volume Calculation

1. The total volume of all pressurized enclosures, devices and wireways must be considered.
2. All enclosure, device and wireway volumes must be calculated without consideration of internally consumed space.

Device Ventilation

1. Enclosed devices within the protected enclosure which do not exceed 1.22 cubic inches of free volume do not require ventilation to the protected enclosure.
2. If the free volume of an internal device exceeds 1.22 cubic inches it must be protected by one of the following means:
 - a) ventilated on the top and bottom sides with one (1) square inch of opening for each four hundred (400) cubic inches of volume within the internal protected enclosure, at a minimum diameter of one (1) quarter inch;
 - b) purged in series with the protected enclosure or be purged separately; or
 - c) protected by other means; e.g. explosion proof devices, hermetically sealed housings or intrinsic safe circuits.

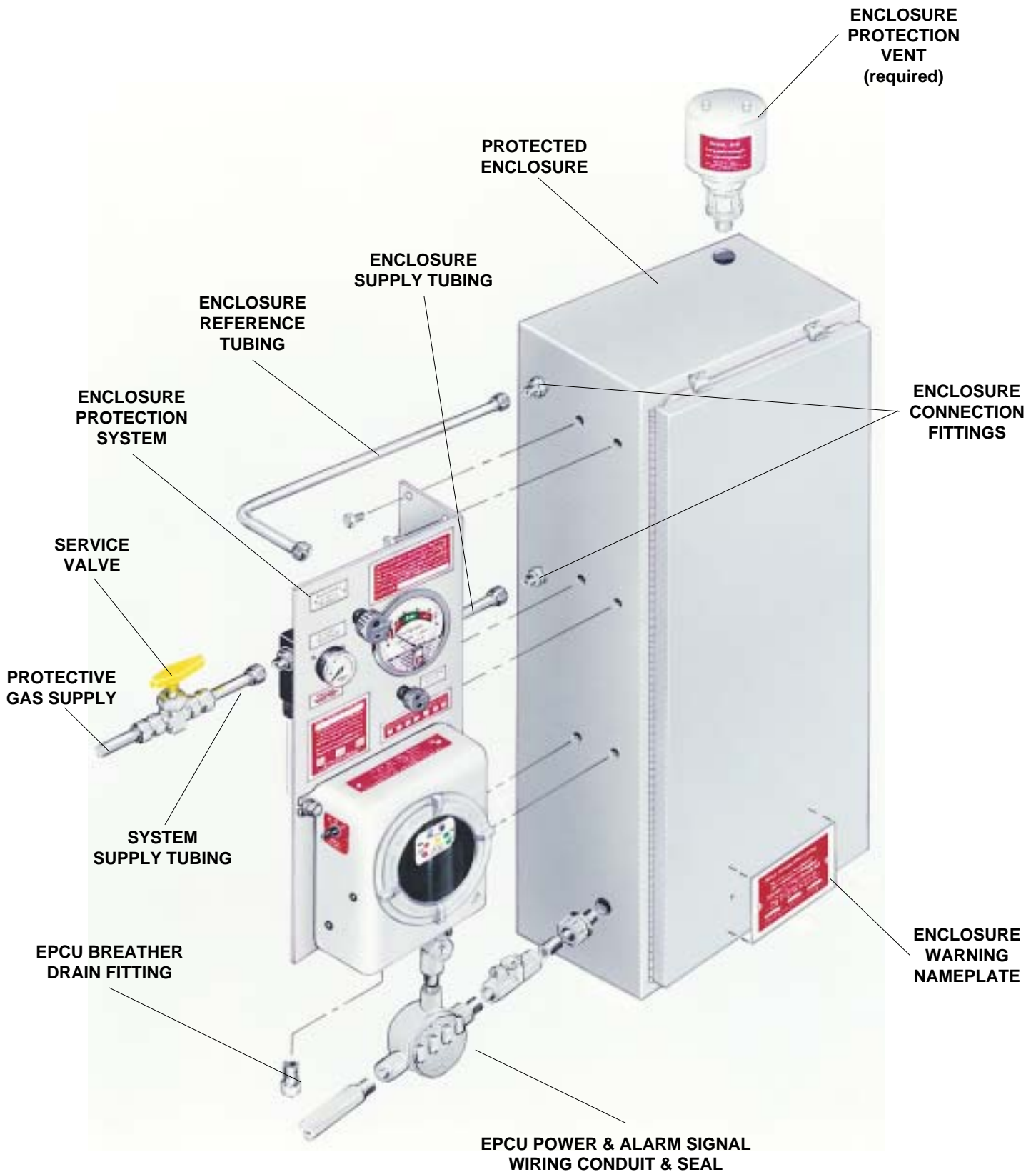
Temperature Limitations

1. The enclosure must have no surface area which exceeds 80 percent of the flammable or ignitable substance's auto-ignition temperature.
2. Internal devices which exceed this temperature must be protected by one of the following manners.
 - a) The device is enclosed in a chamber which is UL, FM or CSA listed as a hermetically sealed device which prohibits the entrance of flammable or ignitable substance, and maintains a surface temperature below temperature limits.
 - b) It can be proven by testing that the devices will not ignite the substance involved.
 - c) The device is purged in a separate enclosure that bears a Bebcos model ETW (Enclosure Temperature Warning Nameplate). Devices may only be accessed after power has been removed and the device has been allowed to cool to safe temperature, or the area is positively known to be nonhazardous.

Installation Overview

Typical Left Hand Configuration Installation Diagram

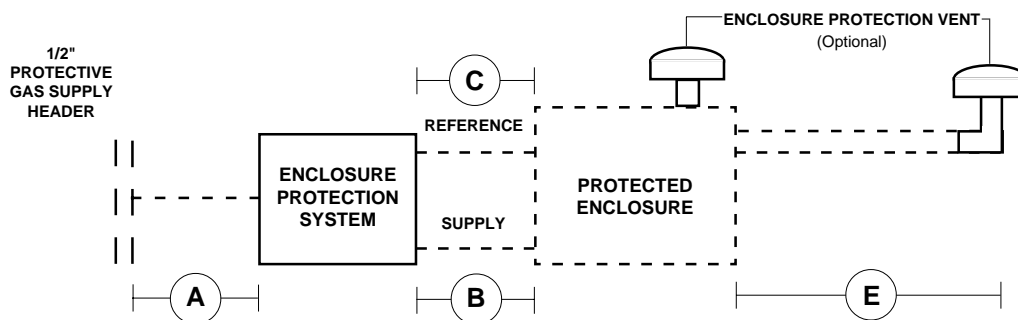
Model 2003-STD-CI-LH Shown



Getting Started

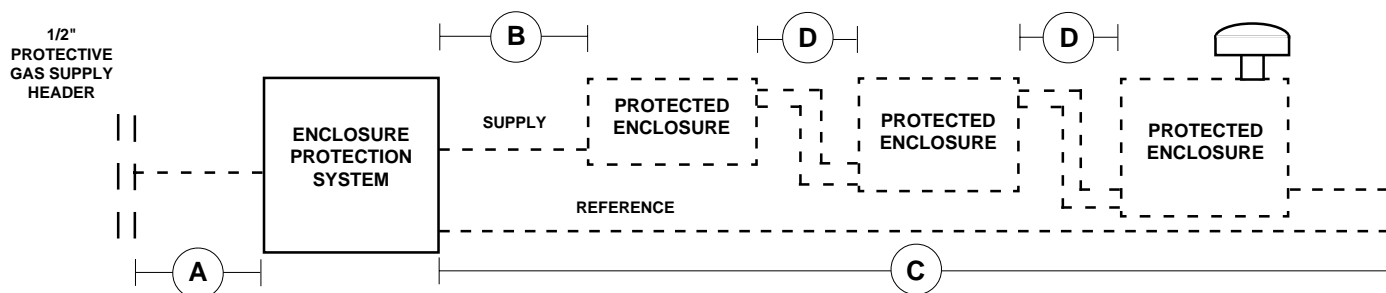
Establishing Connection Sizes, Lengths & Bends

TYPICAL SINGLE PROTECTED ENCLOSURE CONNECTIONS



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 Fully Reamed	3/8" O.D. Tubing Fully Reamed	1/4" O.D. Tubing Fully Reamed	1" I.D. Pipe Fully Reamed	1" I.D. Pipe Fully Reamed
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

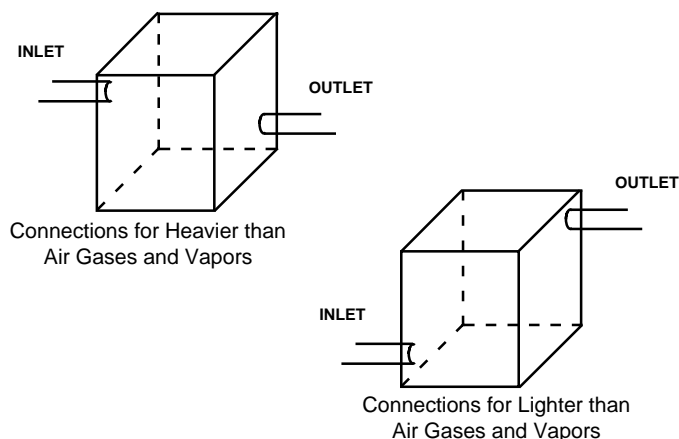
TYPICAL MULTIPLE PROTECTED ENCLOSURE CONNECTIONS



HELPFUL HINTS

To ensure adequate protective gas flow to protected enclosure(s), all piping and tubing must be fully reamed. Precautions must be taken to prevent crimping and other damage to protective gas piping and tubing. When protecting multiple enclosures with a single enclosure protection system, the enclosures must be connected in series from the smallest to the largest to ensure adequate protective gas flow.

Determining Enclosure Inlet & Outlet Connection Locations



HELPFUL HINTS

If flammable gases are lighter than air, the inlet connection to each enclosure must enter near a bottom corner. The outlet connection, for an optional enclosure protection vent or piping to an adjacent protected enclosure, must exit near an extreme opposite top corner. See diagrams to the left. If flammable gases are heavier than air, inlet and outlet connections must be reversed. In all cases, the most prevalent gas must determine the location of inlet and outlet connections.

System Mounting

IMPORTANT NOTES

The system should be mounted at **EYE LEVEL**.

Care must be taken to ensure the system and all protruding components are clear of all enclosure accesses (doors and covers) and conduit, pipe, tubing or cable entries.

LH, RH, TM, BM and WM configurations are intended for mounting adjacent to the protected enclosure.

LH, RH, TM & BM configurations are also suitable for 2" schedule 40 pipe mounting.

Determine the mounting configuration of your system using the diagrams on pages 10 & 11.

Remove and save the manila envelope (containing the enclosure warning nameplate) which may be taped to the outer surface of the mounting flange.

Although all Bebcos systems are factory tested and calibrated, we strongly suggest a bench test of basic functions prior to installation.

Mounting LH, RH, TM, BM & WM Configurations

1. Transfer hole pattern of System mounting plate to intended surface.
2. Check for obstructions hindering bolt fastening, drill and ream the mounting holes before mounting the system.
3. Secure the system to the enclosure, or other mounting surface, using one (1) Bebcos Model SMK-3 or equivalent - six (6) 3/8" x 3/4" stainless steel bolts, nuts and lock washers.

Mounting FM & PM Configurations

HELPFUL HINTS

FM and PM configurations are designed to mount through a panel cutout one (1) inch smaller than the overall height and width of the system mounting plate, using clips and fasteners provided with Bebcos Model SMK-10. This design feature eliminates the need to drill the system mounting bolt holes in the protected enclosure.

FM configurations are intended for mounting adjacent to the protected enclosure.

PM configurations are intended for mounting through a cutout in the protected enclosure surface.

1. Transfer panel cutout pattern to the intended surface.
2. Check for obstructions which could prohibit bolt fastening or system pneumatic and electrical connections.
3. Cut panel cutout pattern on the intended surface.
4. Deburr all cutout surfaces.
5. Secure system to enclosure using Bebcos Model SMK-10, or equivalent - ten (10) 1/4" x 3/4" stainless steel nuts, bolts, mounting clips and lock washers.

Typical Examples of Surface, Pipe, Panel & Frame Mounted Systems



Typical Surface Mounted System
(Model 1002-LPS-LH Type Z shown)



Typical Pipe Mounted System
(Model 1002-LPS-LH Type Z shown)



Typical Panel/Frame Mounted System
(Model 1002-LPS-PM Type Z shown)

Hardware Mounting

Required Enclosure Protection Vent

All configurations must be mounted in a true vertical position.

The vent must be located to provide access for routine testing of the vent's flapper assembly. A minimum 8" clearance is required below the vent opening.

1. Determine the vent's mounting configuration, i.e.; -00 vertical mount or -90 side mount. (See photos below)
2. Determine vent location and layout vent mounting hole on the protected enclosure. (As determined on page 7, "Getting Started")
3. Using a 1.375" hole saw or 1" conduit punch, drill and deburr the enclosure protection vent mounting hole.
4. Remove the hub mounting nut from the vent hub and place the hub, with O-ring intact, through the mounting hole. The O-ring must be on the outside of the protected enclosure.
5. Reinstall the hub mounting nut to the mounting hub from inside the protected enclosure and tighten.



EPV - 3 - SA - 00
Vertical Mount



EPV - 3 - SA - 90
Side Mount

Warning Nameplate(s)

A Bebco EWN (Enclosure Warning Nameplate) must be located in a prominent position on or near **all** enclosure accesses (doors and covers).

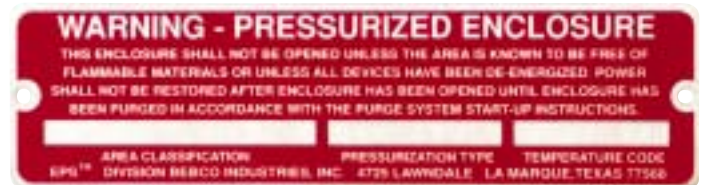
One (1) EWN is provided with each system, located in the manila envelope taped to the mounting flange of the system. Additional EWN's are available from Bebco.

All EWNs provide labeled spaces allowing the customer to mark the protected enclosure with: 1) a T Code (temperature identification number), 2) Class, Group and Division of surrounding area, and 3) NFPA pressurization Type X, Y or Z, as may be required by plant and local codes and is required by NFPA 496 section 2-11.

A Bebco Model ETW (Enclosure Temperature Warning nameplate) must be located in a prominent position on or near all enclosure accesses (doors and covers) when the temperature of an internal component exceeds 80 percent of the ignition temperature of the flammable vapor, gas or dust involved.

A Bebco Model ETW warns the operator to deenergize all equipment for a specified length of time, allowing the protected equipment to cool before opening the protected enclosure. The length of time required is determined by the customer and can be factory or field engraved.

All EWNs and ETWs are furnished with an adhesive back, but should also be riveted or screwed to the protected enclosure.



Enclosure Warning Nameplate - Class I



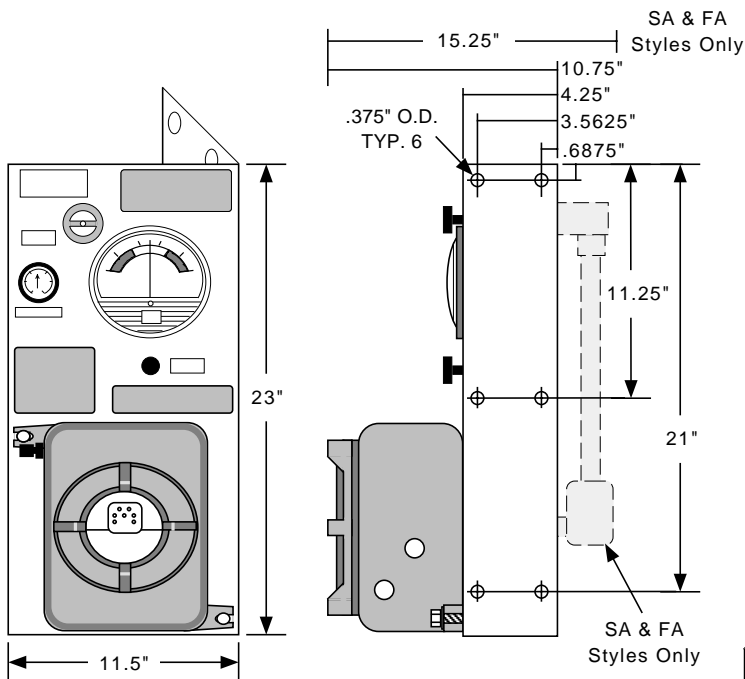
Enclosure Warning Nameplate - Class II



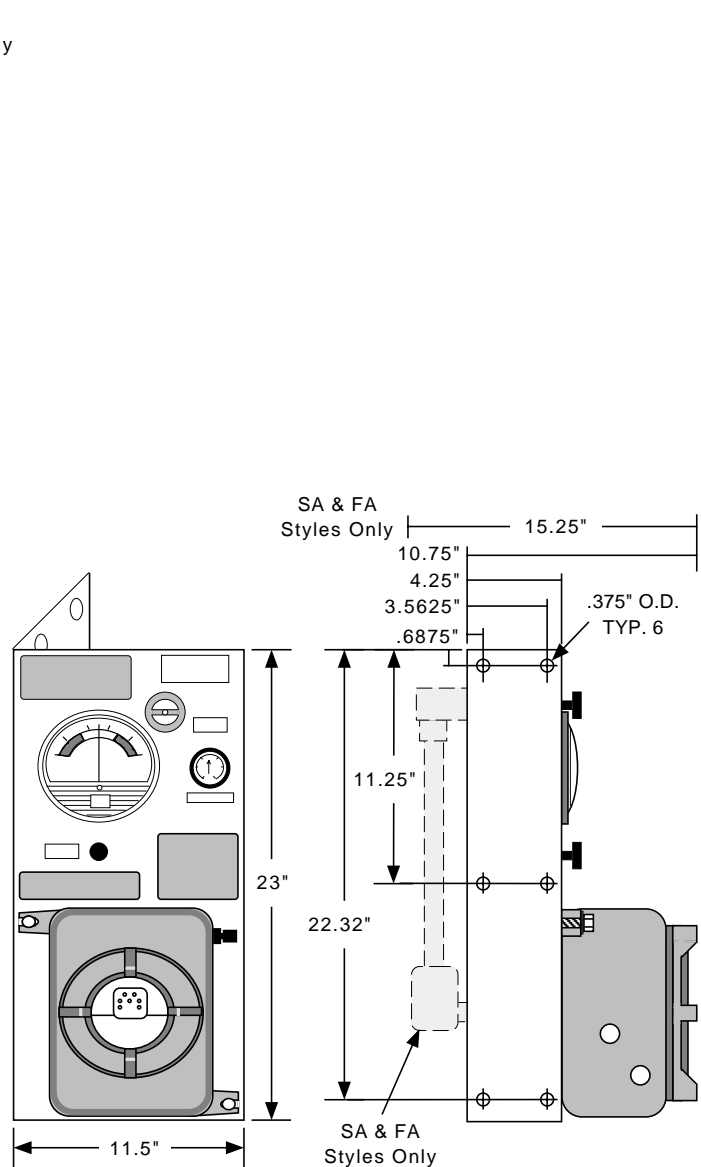
Enclosure Temperature Warning Nameplate

Mounting Plate Dimensions

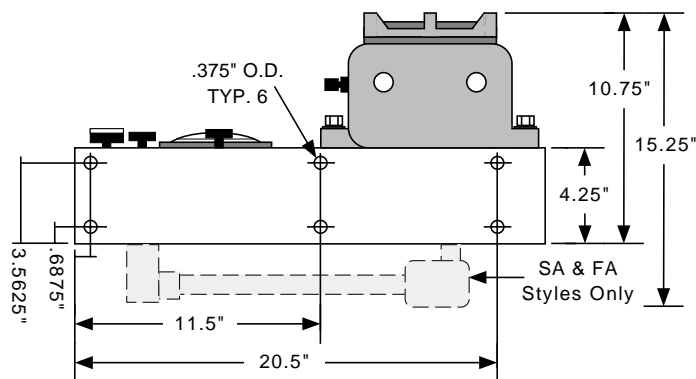
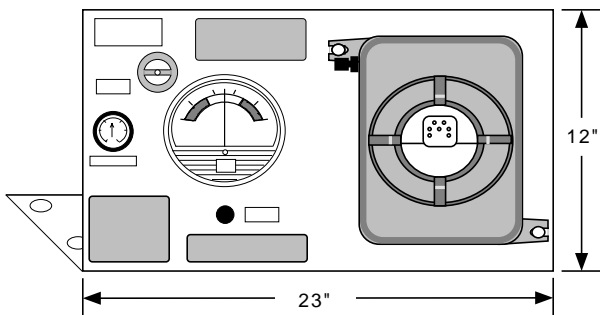
Model 2003



2003-LH
(Left Hand Configuration)



2003-RH
(Right Hand Configuration)



2003-TM
(Top Mount Configuration)

IMPORTANT NOTE

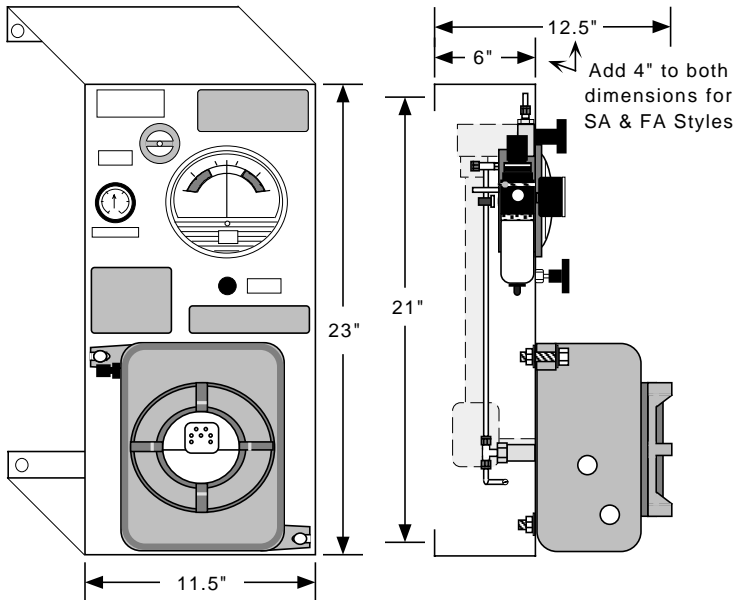
Dimensions DO NOT include Systems ordered with an Area Classification of IB (Class I, Division 1, Group B). Consult factory for mounting plate dimensions.

Mounting Plate Dimensions (cont.)

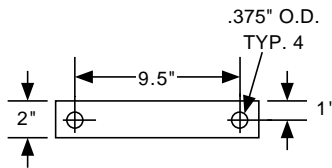
Model 2003

IMPORTANT NOTE

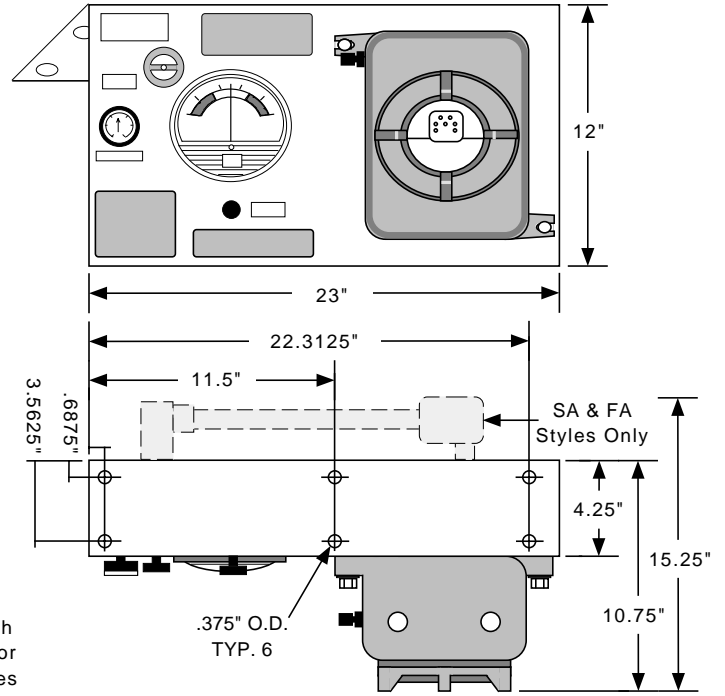
Dimensions DO NOT include Systems ordered with an Area Classification of IB (Class I, Division 1, Group B). Consult factory for mounting plate dimensions.



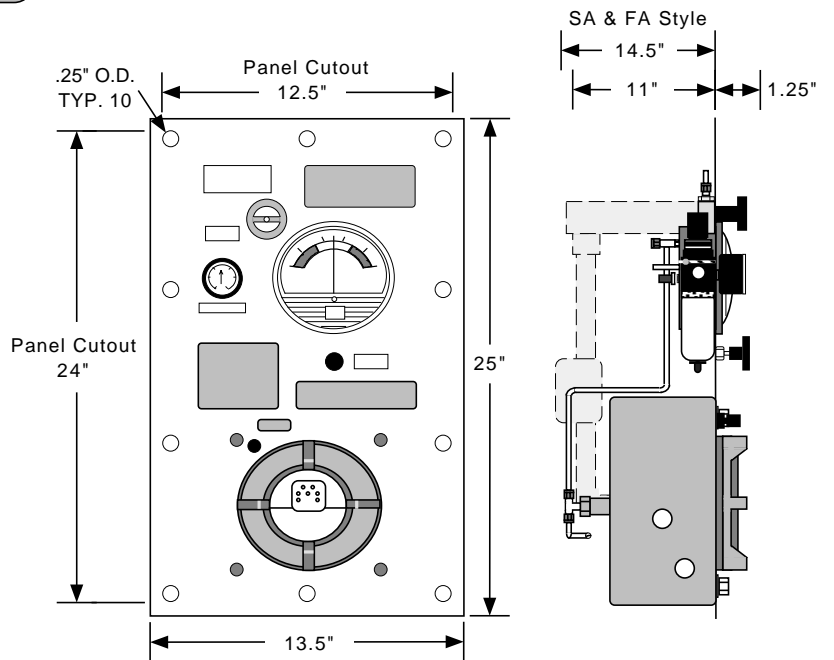
2003-WM
(Wall Mount Configuration)



TYPICAL -WM
MOUNTING FLANGE



2003-BM
(Bottom Mount Configuration)



2003-FM & 2003-PM
(Frame & Panel Mount Configuration)

Pneumatic Tubing Requirements

Protective Gas Supply Requirements

The protective gas supply to the protection system must be a clean, instrument quality compressed air or nitrogen and must contain no more than trace amounts of flammable gas, vapor or dust.

The protective gas supply compressor intake must originate in a nonhazardous location. Suction duct passing through a hazardous location and the protection system tubing and piping must be fabricated from noncombustible materials suitable for prevailing hazards and environmental conditions.

The protective gas supply must originate from a dedicated instrument quality compressed air header (1/2" pipe or larger), no farther than twenty (20) feet from the protection system. Local compressors and gas cylinders should not be used before consulting with BebcO.

The protective gas supply to the protection system must be regulated from 120 psi maximum to 80 psi minimum.



SC-6



NC-6

SYSTEM SUPPLY FITTINGS



EFC-4 & EFC-6



EBC-4 & EBC-6

ENCLOSURE SUPPLY & REFERENCE FITTINGS



EPC-13

MULTIPLE ENCLOSURE CONNECTION FITTING

Pneumatic Connection Requirements

ALL FITTINGS MAY BE CUSTOMER OR BEBCO FURNISHED

1. For system supply, one (1) BebcO Model SC-6 3/8" Male Straight Connector or one (1) BebcO Model NC-6 3/8" Male Elbow Connector or equivalent fitting per system.

One (1) similar fitting which will connect the inert gas supply tubing to the inert gas supply header connection point and one (1) lot of 3/8" O.D., .035" wall thickness, welded or seamless stainless steel tubing.

2. For enclosure supply, one (1) BebcO Model EFC-6 3/8" Flush Connector, or one (1) EBC-6 3/8" Feed-Through Connector or equivalent fitting per system.
3. For enclosure reference, one (1) BebcO Model EFC-4 1/4" Flush Connector, or one (1) EBC-4 1/4" Feed-Through Connector or equivalent fitting per system.
4. One (1) lot of 1/4" O.D., .035" wall thickness, welded or seamless stainless steel tubing.
5. For multiple enclosure connections, two (2) BebcO Model EPC-13 1" Pipe Mounting Hubs or equivalent and 1" 150# rated pipe couplings & unions per interconnection.

One (1) lot 150# rating 1" galvanized or aluminum pipe and fittings, fully reamed and unrestricted.

PM Pneumatic Connection Requirements

In addition to item numbers 1, 4 and 5 above, the following fittings are required for all PM configurations.

1. For system supply on PM configurations, one (1) additional BebcO Model EBC-6 or equivalent 3/8" Through Bulkhead Fitting per system is required.
2. For atmospheric reference, one (1) BebcO Model PRB-4 or equivalent 1/4" female bulkhead fitting and stainless steel sintered element is required.

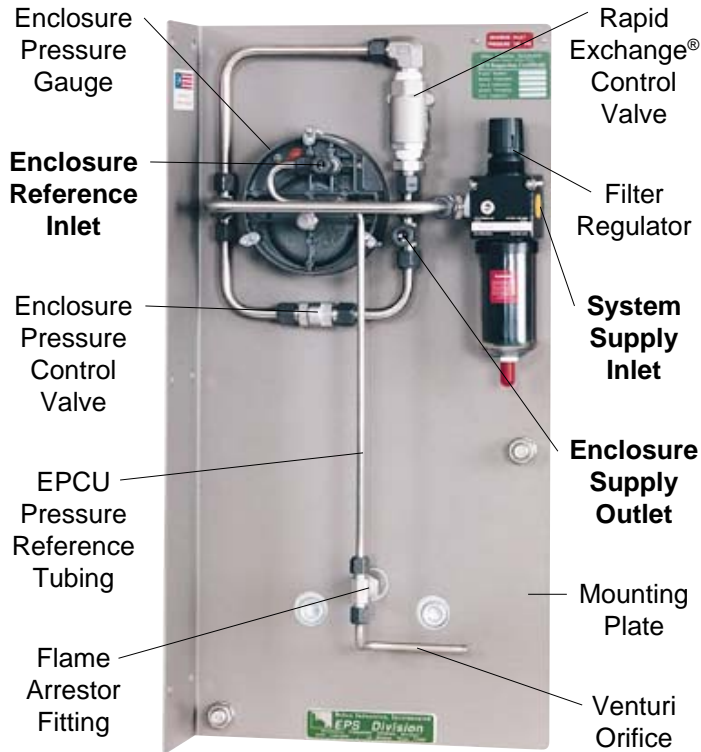


PRB-4

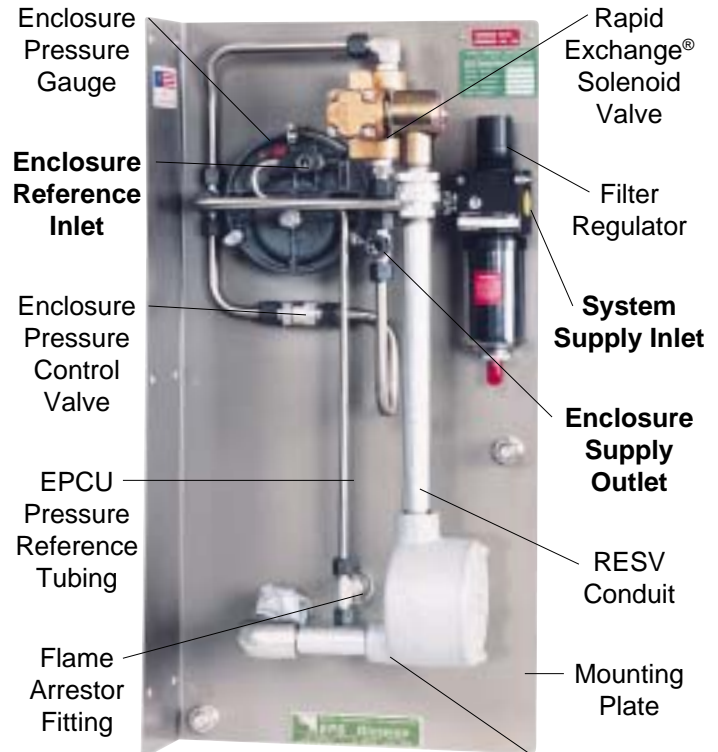
SYSTEM ATMOSPHERIC REFERENCE FITTING

Tubing Connection Points

LH, RH, TM, BM, WM & FM Configuration Connection Points

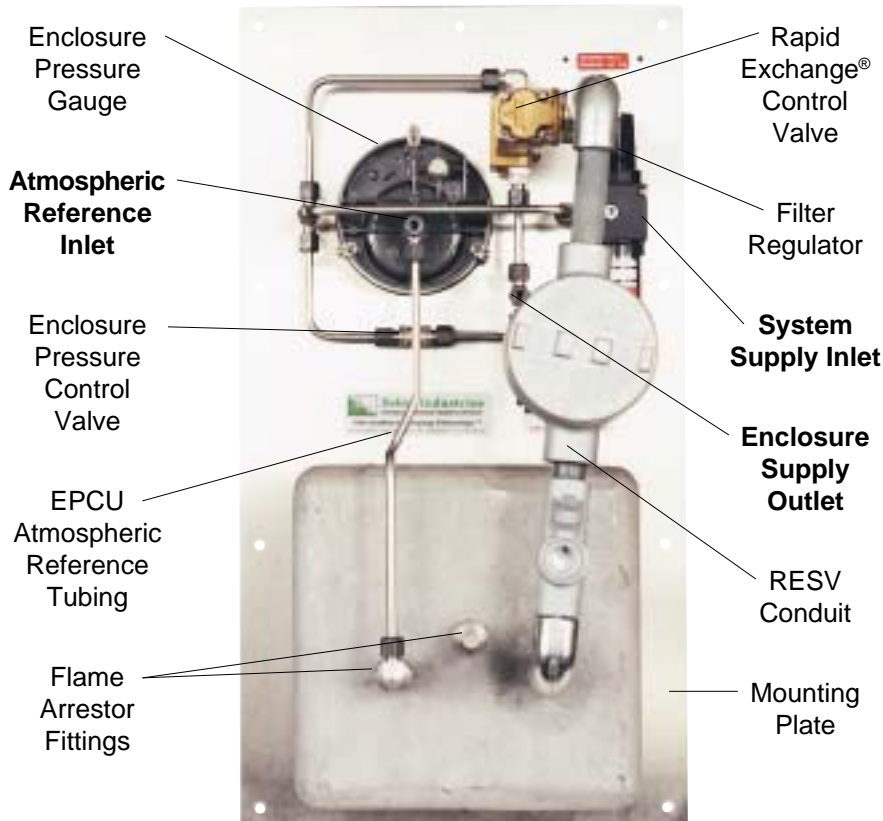


STD Style



**SA & FA Style
(with Rapid Exchange®
Solenoid Valve)**

PM Configuration Connection Points



HELPFUL HINT

**Pneumatic Connections
are bolded.**

Tubing Installation

HELPFUL HINTS

All work must be performed by technicians qualified in pneumatic tubing and electrical conduit installation.

Bebco recommends the use of .035" wall thickness, welded or seamless stainless steel tubing. If flexible tubing is used, it must be installed in a manner which will protect it from damage and corrosion.

Tubing LH, RH, TM, BM, WM & FM Configurations

System Supply Connections

1. Select or install a protective gas supply header tap, fitted with the proper tube size fitting and located within twenty (20) feet of the enclosure protection system.
2. If a service valve is placed between the protective gas supply header and the enclosure protection system, it must be installed in close proximity of the protected enclosure and be labeled in accordance with section 2-11.4 of the NFPA 496, 1993 edition.
3. Select the appropriate fittings required to connect the protective gas supply to the protection system regulator as determined on page 12, "Pneumatic Tubing Requirements".
4. Determine appropriate tubing route from the protective gas supply header to the protection system regulator.
5. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings. Fully ream all tubing ends.
6. Install tubing and tighten all fittings to fitting manufacturer's specifications. Secure tubing to appropriate structural supports as required.

Enclosure Supply & Reference Connections

1. Choose location for the enclosure supply connection(s) based on the requirements on page 7, "Getting Started".
2. Place the enclosure reference connection fitting directly behind the enclosure protection system whenever possible. For systems protecting multiple enclosures in series, the enclosure reference connection fitting must be placed on the last enclosure in the series. (See page 7, "Getting Started")
3. Drill and deburr enclosure supply and reference fitting holes on the protected enclosure. Mount the fittings.
4. Determine appropriate route for the enclosure supply and reference tubing.
5. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings. Fully ream all tubing ends.
6. Install tubing and tighten all fittings to fitting manufacturer's specifications. Secure tubing to appropriate structural supports as required.

Tubing PM Configurations

Enclosure Bulkhead Fittings

1. Select the fittings required to install the System Supply, System Supply Bulkhead Fitting and Atmospheric Reference Bulkhead Fitting, (see page 12, "Pneumatic Tubing Requirements").
2. Choose location for the system supply bulkhead fitting. This fitting allows the protective gas supply to pass through the wall of a protected enclosure to the protection system's regulator supply inlet connection.
3. Choose location for the atmospheric reference bulkhead fitting. This fitting allows the enclosure pressure gauge and Electrical Power Control Unit (EPCU) to reference atmospheric pressure.
4. Drill and deburr system supply and reference bulkhead fitting holes in the protected enclosure. Mount the fittings.

System Supply & Reference Connections

1. Select or install a protective gas supply header tap, fitted with the proper tube size fitting and located within twenty (20) feet of the enclosure protection system.
2. If a service valve is placed between the protective gas supply header and the protection system, it must be in close proximity of the protected enclosure and labeled in accordance with section 2-11.4 of the NFPA 496.
3. Determine appropriate tubing route from the protective gas supply header to the system supply bulkhead fitting.
4. Determine appropriate tubing route from the system supply bulkhead fitting to the protection system regulator.
5. Determine appropriate tubing route from the atmospheric reference bulkhead fitting to the enclosure pressure gauge's reference inlet connection.
6. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings. Fully ream all tubing ends.
7. Install tubing and tighten all fittings to fitting manufacturer's specifications. Secure tubing as required.

Electrical Supply Requirements

General Wiring Requirements

WARNING

THIS DEVICE CONTAINS ELECTRICAL PARTS WHICH CAN CAUSE SHOCK OR INJURY

All electrical connections, conduit and fittings on the protected enclosure must be suitable for the hazardous location in which they are installed. In addition, all conduit and wire must be installed in accordance with NEC articles 500-1, 500-2 or 500-3 as required and all relevant plant and local codes.

Conduit seals must be utilized on all electrical conduit connections and poured with an approved compound prior to operation of the protection system.

Exception: Do not use seals on conduit used as a protected "wireway" to supply protective gas to adjacent protected enclosures. The same conduit can be utilized for both electrical and pneumatic service to an adjacent protected enclosure(s), provided the conduit is oversized to allow a minimum free clearance equal to or larger than the pipe size required between multiple enclosures as stated on page 7, "Getting Started".

HELPFUL HINT

Bebco recognizes it may be impractical to pour all electrical conduit seals prior to installation in the field. However, all conduit connections must be sealed for proper testing and operation of the Enclosure Protection System. Therefore, Bebco recommends the use of temporary seals such as duct seal or masking tape for bench or shop testing, prior to final field installation.

EPCU Power Requirements

The Electrical Power Control Unit's (EPCU) electrical power source must originate from a circuit breaker or fused disconnect suitable for the hazardous location in which it is installed. The power source should be uninterrupted and the switch must be located within fifty (50) feet of the protected enclosure(s) and the enclosure protection system and be properly marked. For EPCU power specifications see page 4, "System's Specifications".

Alarm Signal Requirements

Bebco strongly recommends use of the optional alarm system contacts of the EPCU, connected to an alarm system located in a constantly attended location to indicate the failure of the enclosure protection system. For EPCU alarm signal specifications see page 4, "System's Specifications".

Typical Enclosure Wiring Methods

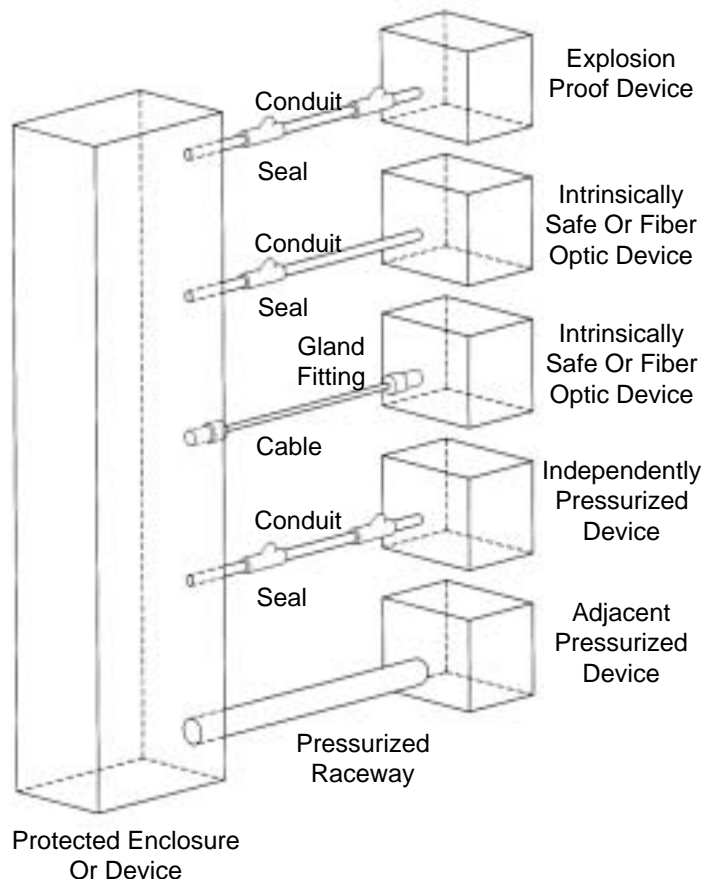
Protected enclosures must be wired similar to explosion proof enclosures, in accordance with **Article 501-504** of the 1993 National Electric Code - **NFPA 70**.

Single conductor wiring must be placed in rigid metal conduit, seal-flex conduit or other mediums approved for use in the hazardous location surrounding the protected enclosure. Additionally, **NFPA 496 Section 2-2.2** requires the use of approved seals on all pressurized enclosure conduit wiring entries, in accordance with **NFPA 70, Section 501-4**. Furthermore, the use of an approved seal is simply the most practical way to prevent excessive leakage through conduit connections.

However, while explosion proof enclosures require conduit seals on all cable entries, in accordance with **NFPA 70, Sections 501-5**, protected enclosure cable entries can be sealed in accordance with **Section 501-5** which permits the use of compression gland fittings or other sealed cable entry fittings, as opposed to approved conduit seals, if the wiring method is otherwise suitable for the hazardous location.

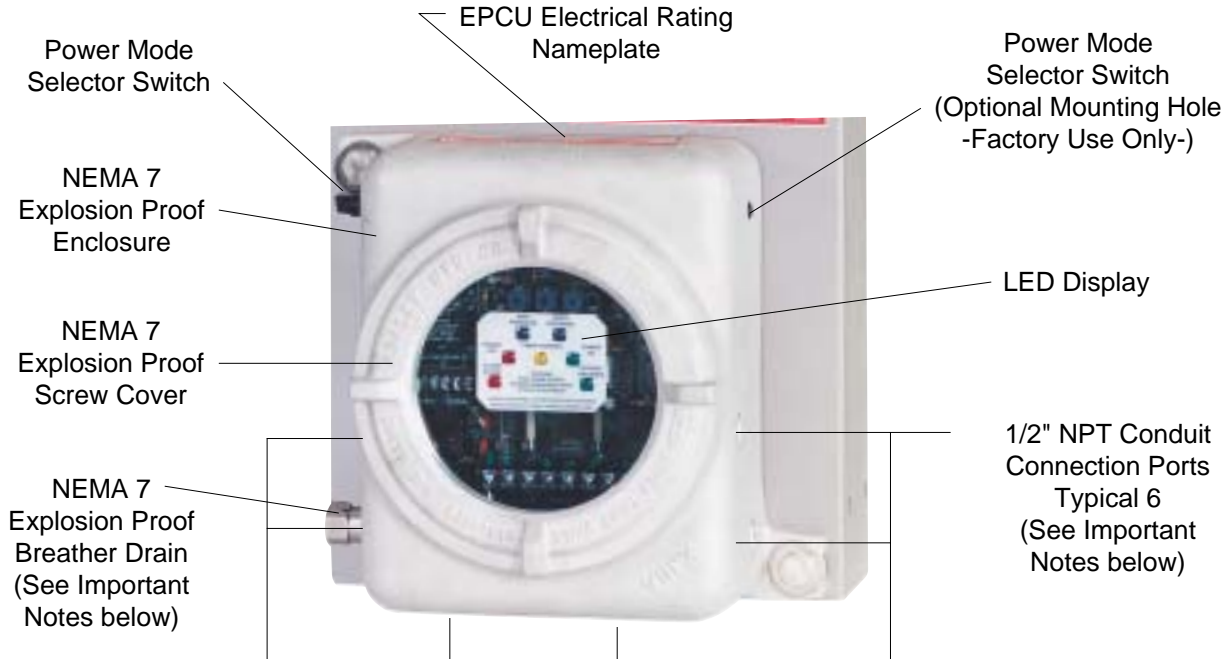
In conclusion, there are two primary goals. First, the installer should ensure all associated wiring and cable is protected by pressurization or other means, such as explosion proof conduit or intrinsic safety barriers. Secondly, the installer must ensure all associated conduit and wireways are sealed to conserve protective gas, unless they are used to supply protective gas to other enclosures or devices.

Typical Enclosure Wiring Connections



Electrical Power Control Unit

General Layout & Electrical Conduit Connections



IMPORTANT NOTES

For proper moisture drainage of the NEMA 7 enclosure, the installer must 1) move the NEMA 7 breather drain to one of the bottom conduit entrances or 2) use drain seals on all conduit connected to the bottom two conduit entrances.

The NEMA 7 breather drain is not provided or required with PM configurations.

Top two conduit entrances will be dedicated for Intrinsic Safe wiring ONLY when the EPCU is supplied with Bebcos optional ISB Intrinsic Safety Barriers.

EPCU LED Displays



Alarm Only



Alarm & Bypass



Alarm & Power Latch

EPCU Power Rating

EPCU Electrical Power Rating Nameplate

The EPCU (Electrical Power Control Unit) of this Bebcos Type "X" Rapid Exchange® purging system is offered in various styles. For proper installation and operation, begin by examining the EPCU Electrical Rating Nameplate to identify the System Input voltage and power requirements, enclosure power and alarm contact ratings and third party approval markings. Next, match the LED display of your EPCU with one of the displays shown on page 16. The EPCU LED Display will help identify the options featured on your system e.g. Normal Running mode, Conditional Bypass, Unconditional Bypass or Power Latching.

EPCU SERIAL NUMBER

REQUIRED WARNING STATEMENTS

THIRD PARTY APPROVAL MARKINGS

CSA Approval applies to Electrical Power Control Unit Only

BEBCO MODEL 2000 ELECTRICAL POWER CONTROL UNIT
CAUTION: OPEN CIRCUIT BEFORE REMOVING COVER
ATTENTION: OUVRIR LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE

SERIAL NO.	XXXXXX	INPUT VOLTAGE & POWER REQUIREMENTS
<p>CSA Encl. 3 CLASS I, DIV. 1, Gr C&D CLASS II, DIV. 1, Gr E, F, G HAS UL & FM APPROVALS ONLY</p>		<p>ENCL POWER & ALARM CONTACTS ARE RATED 120/220 VAC, 20 AMPS</p> <ul style="list-style-type: none"> ■ 120 SINGLE PHASE, 60 CYCLE, 1 AMP ■ 220 SINGLE PHASE, 50 CYCLE, 1 AMP

EPS® DIVISION BEBCO INDUSTRIES, INC. 4725 LAWDALE LA MARQUE, TEXAS 77568

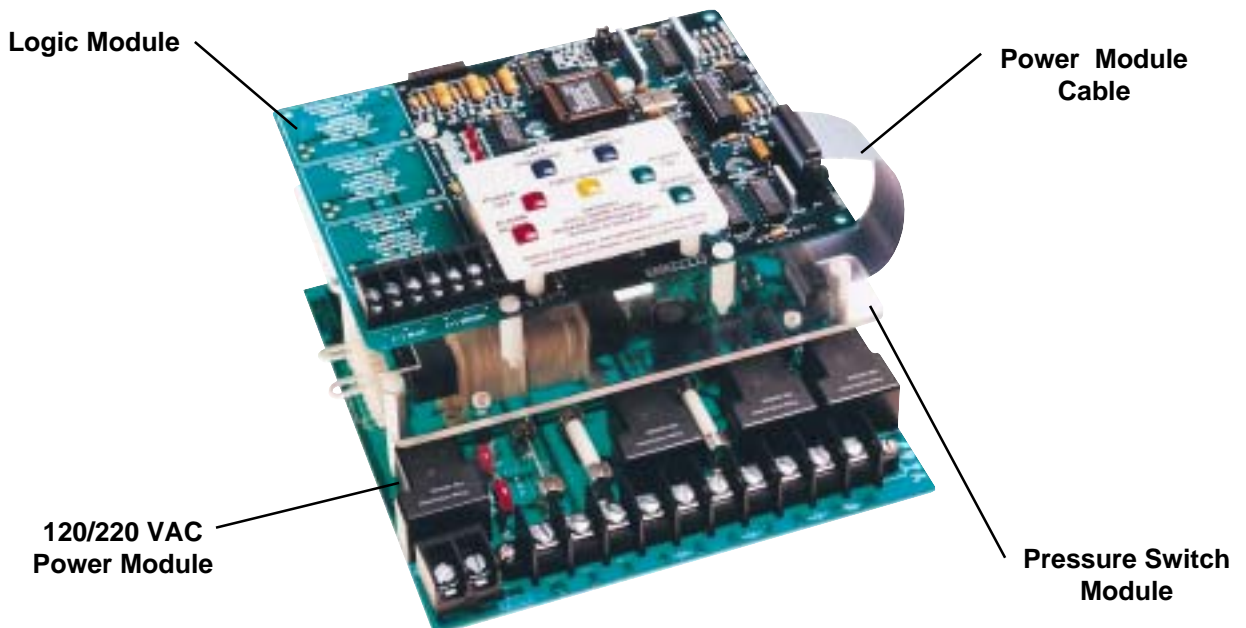
AREA CLASSIFICATION

Defines the area classifications for which the EPCU is suitable for operation

EPCU INPUT POWER REQUIREMENTS

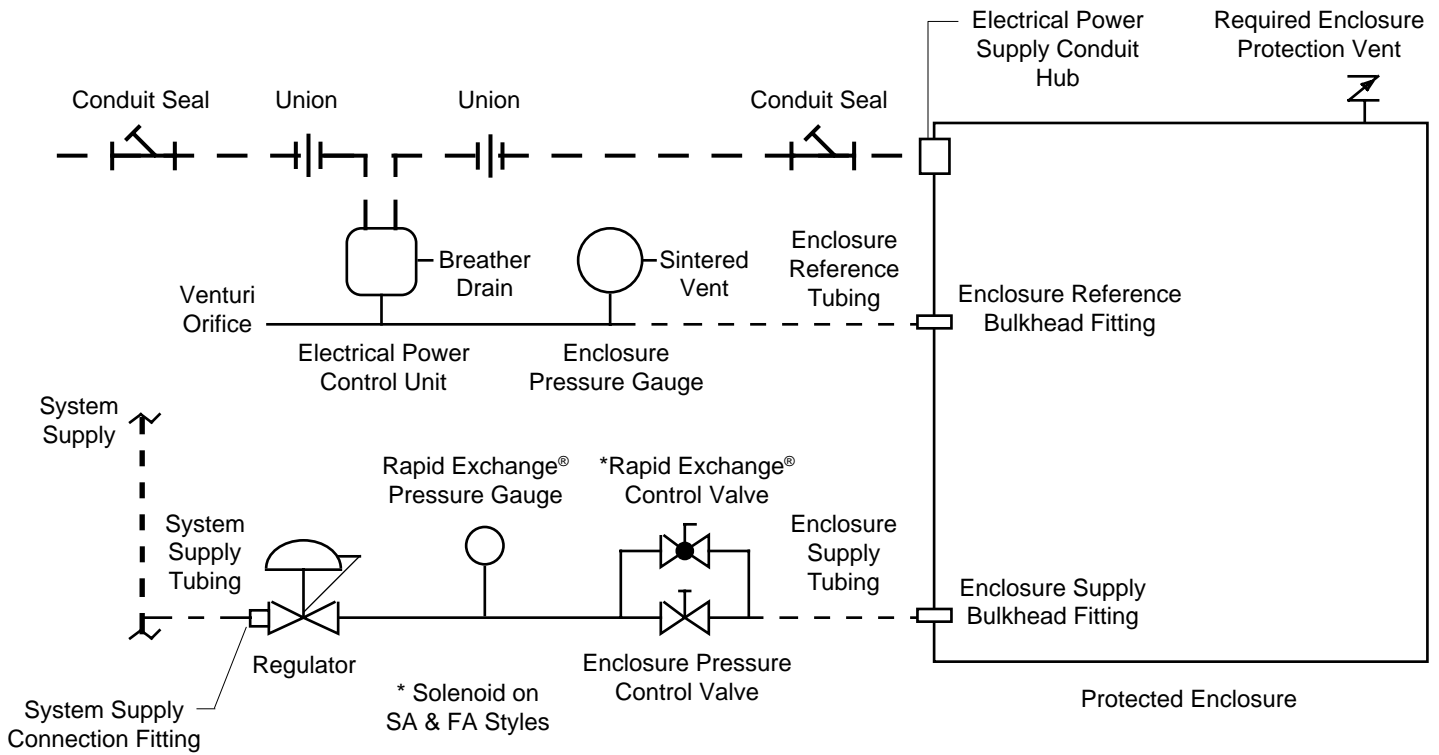
Factory set at time of order

Assembled EPCU Electronics Module

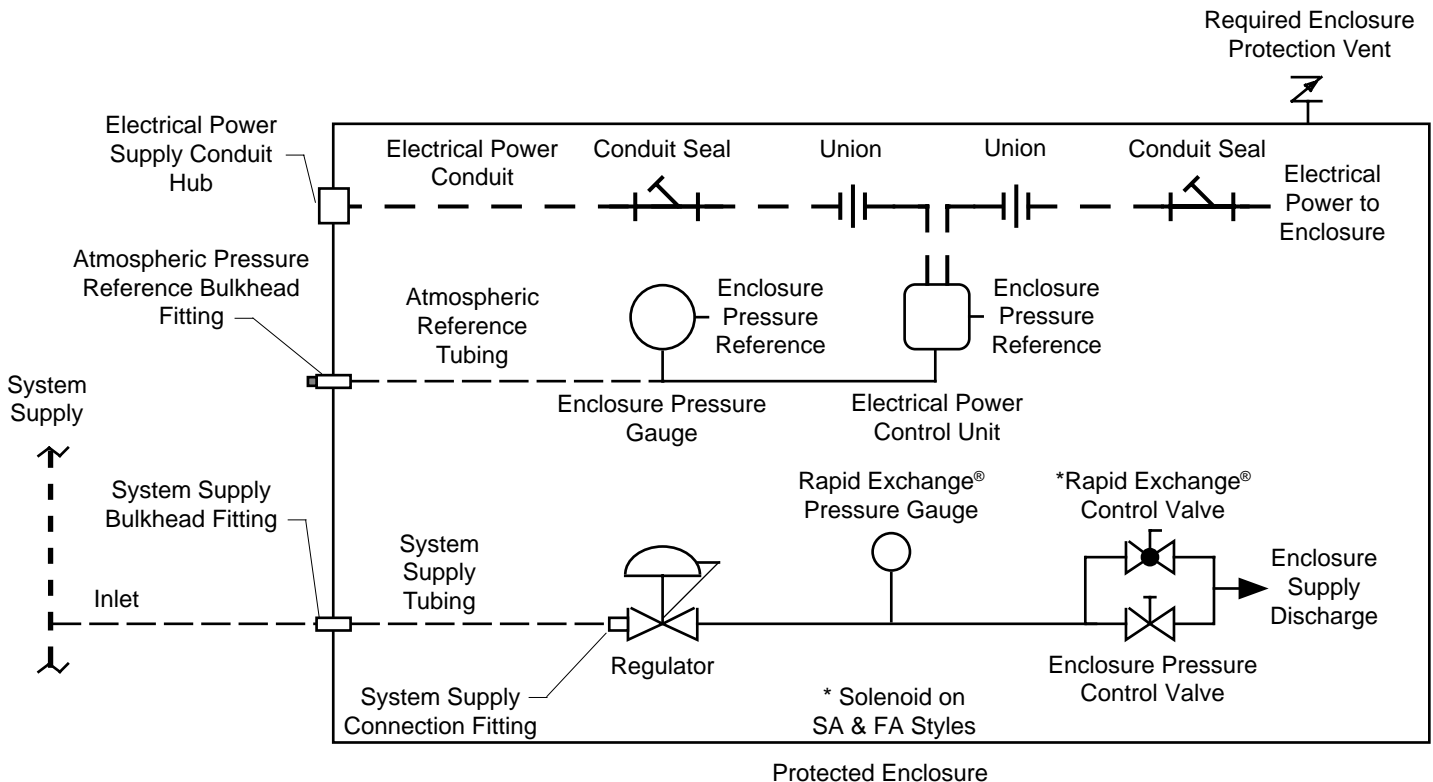


Electrical & Pneumatic Diagrams

LH, RH, TM, BM, WM & FM Configurations



PM Configurations



Conduit Installation

EPCU Electrical Conduit

Unplug the four unlabeled conduit entrances located on the sides and bottom of the EPCU enclosure (See page 16, "EPCU Layout" for conduit entrance layout).

The installer must mount the NEMA 7 drain fitting supplied with the system (except for PM configurations) in one of the bottom conduit entrances of the EPCU, or utilize drain seals on all conduit connected to the bottom two (2) conduit entrances of the EPCU.

Following the instructions listed below, install all conduit, fittings and seals (or drain seals if utilized) between the EPCU, alarm system (if utilized) and the protected enclosure(s). Plug all remaining EPCU conduit entrances.

1. Choose the location for the enclosure's electrical conduit connection(s) based on the requirements on page 15, "Electrical Supply Requirements".
2. Drill and deburr enclosure conduit fitting holes in the protected enclosure. Mount the fittings.
3. Determine appropriate route for the enclosure electrical enclosure and alarm signal conduit.
4. Measure, cut and thread conduit, check conduit fit to insure proper seating. Fully ream all conduit.
5. Install conduit and tighten all fittings to fitting manufacturers specifications. Secure conduit to appropriate structural supports as required.
6. Seal all conduit with an approved compound prior to operation of the protection system.

Optional Intrinsic Safety Barrier Conduit

Systems supplied with optional Intrinsic Safety Barriers (ISB) will be supplied with clearly labeled isolated conduit entries, a solid body wireway with snap cover and plexiglass wiring partitions. These accessories provide a fully isolated wiring path to the barrier wiring terminal located on the lower left corner of the EPCU Logic Module. All IS wiring must be isolated.

1. Choose the location for the enclosure's IS conduit connection(s) based on the requirements on page 15, "Electrical Supply Requirements".
2. Drill and deburr enclosure conduit fitting holes in the protected enclosure. Mount the fittings.
3. Determine appropriate route for the IS conduit.
4. Measure, cut and thread conduit, check conduit fit to insure proper seating. Fully ream all conduit.
5. Install conduit and tighten all fittings to fitting manufacturers specifications. Secure conduit to appropriate structural supports as required.
6. Seal all conduit with an approved compound prior to operation of the protection system.

EPCU Conduit Connection Parts

Fitting Kits Can Be Bebcu Furnished

1. To connect enclosure power from the Bebcu EPCU to the protected enclosure, one (1) Bebcu Model LCK (L fitting Conduit Kit) or equivalent conduit elbow, coupling and seal fittings.
2. For EPCU to enclosure wiring connection with one (1) additional conduit connection path, one (1) Bebcu Model TCK (T fitting Conduit Kit) or equivalent conduit tee, coupling and seal fittings.

IMPORTANT NOTE

Model LCK & TCK are offered primarily to OEM's attempting to achieve a "field ready" installation. In all cases, limited pipe fitting skills will be required. Pre-cut 150# galvanized steel pipe nipples can be acquired from local plumbing shops, but a hole saw or punch and wrenches are required to install kits.



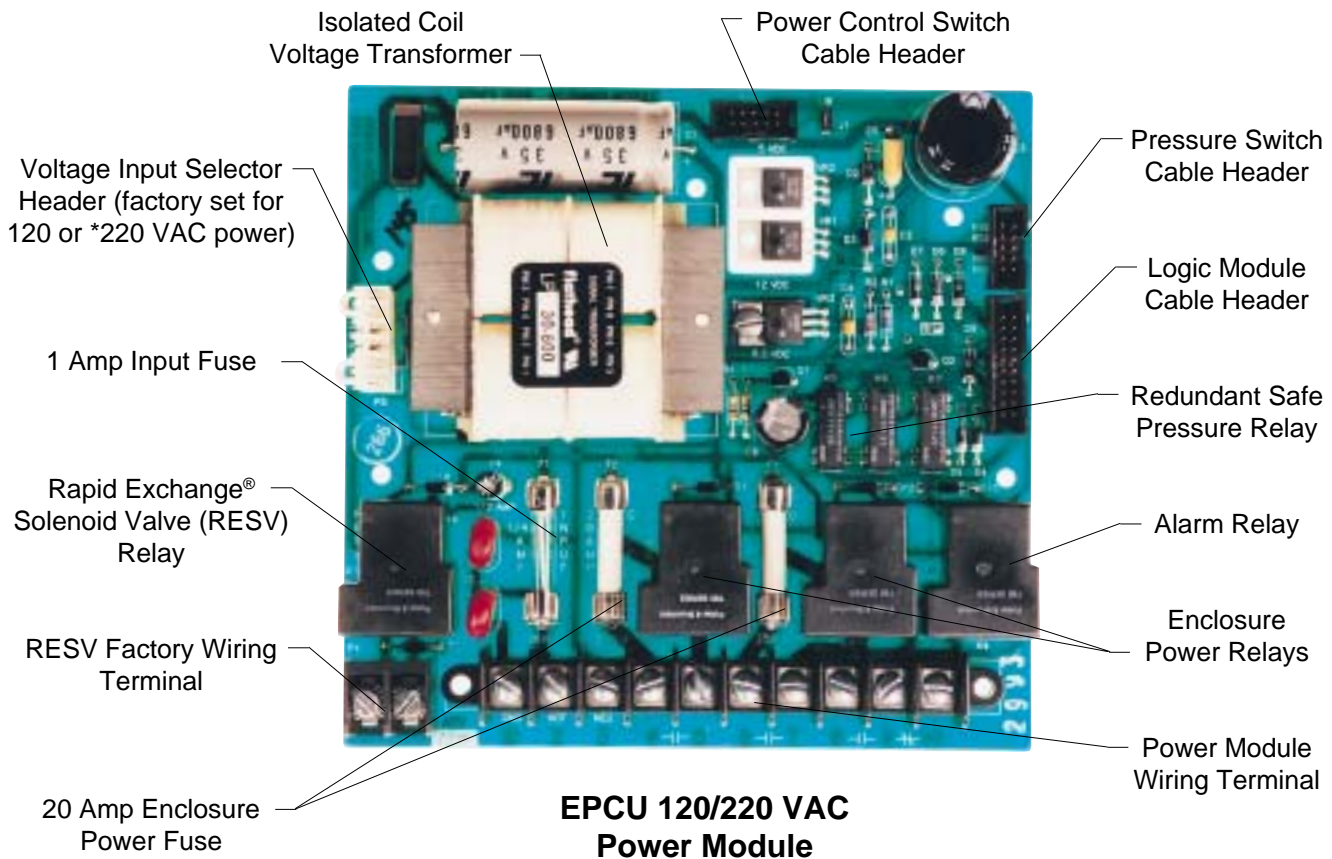
**TCK "T" Fitting
Conduit Kit**



**LCK "L" Fitting
Conduit Kit**

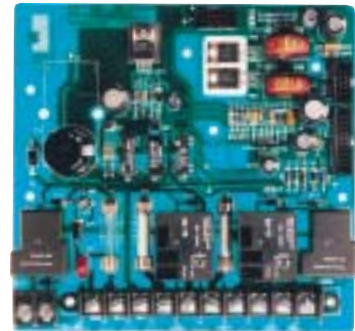
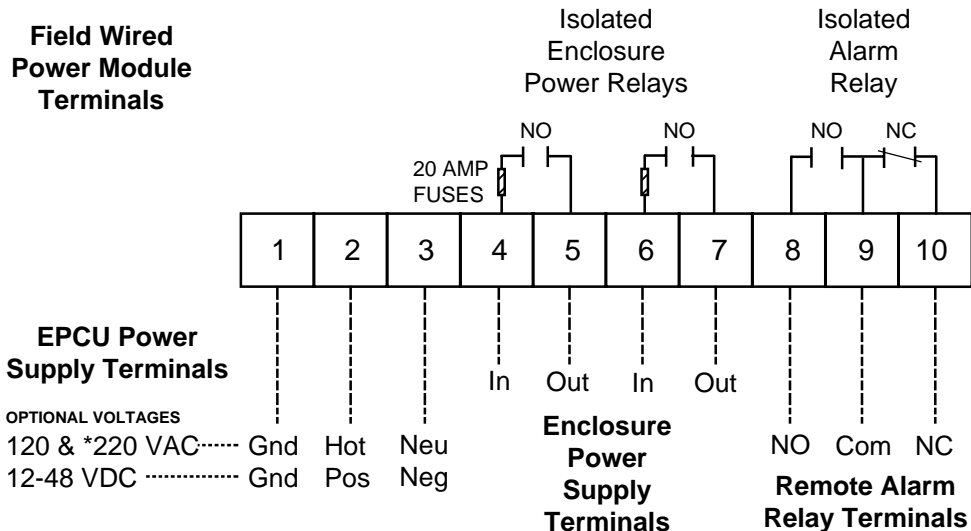
Power Modules & Wiring Diagram

EPCU 120/220 VAC Power Module Layout



VAC & VDC Power Module Electrical Wiring Diagram

Field Wired Power Module Terminals



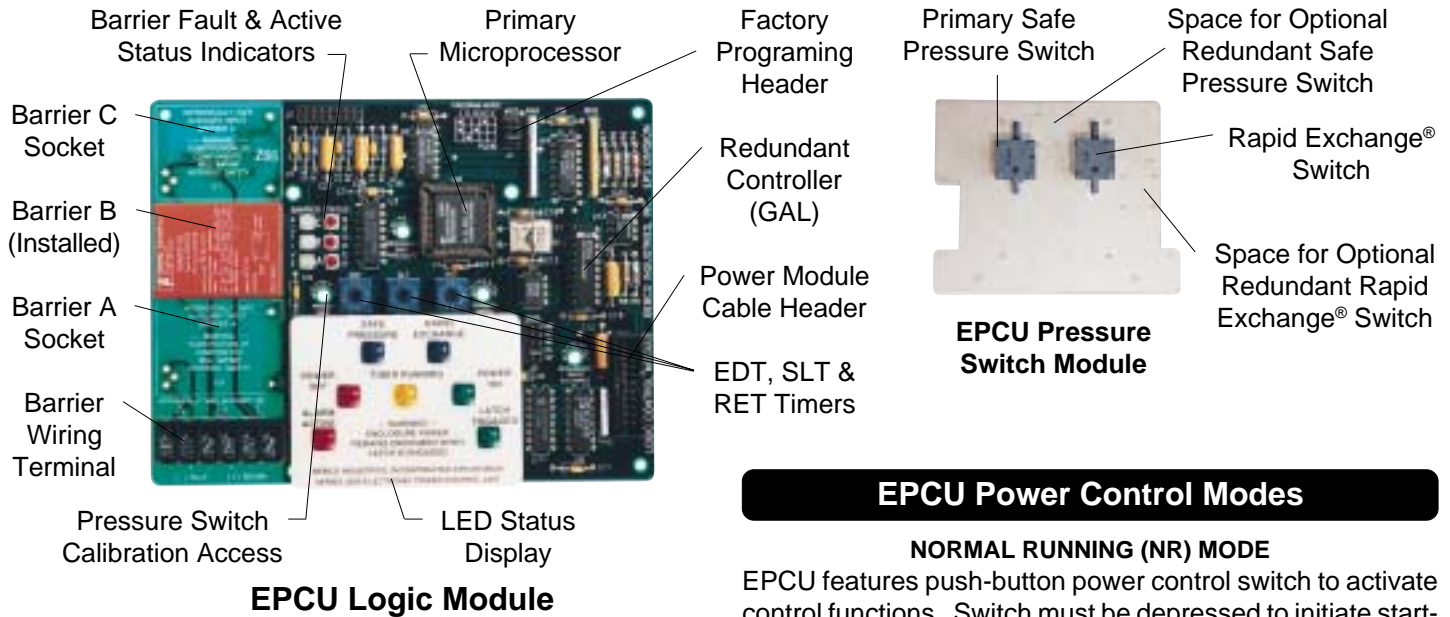
Optional 24-48 VDC EPCU Power Module

* European Single Phase 220 VAC only.
 Power and alarm terminals are feed-thru dry switch contacts.
 Caution should be exercised to ensure that the EPCU wiring is properly connected.
 All terminal connections to the EPCU should be wired with spade or round lugs.

Using 12 gauge maximum to 16 gauge minimum wire only, check EPCU power requirements (See page 15) and wire to the EPCU power source and alarm system (if utilized). Then route power source(s) through the EPCU power in and out terminals to all non-rated devices within the protected enclosure(s).

Logic Module & Barrier Wiring

EPCU Logic Module & Pressure Switch Module



EPCU Logic Module

EPCU Pressure Switch Module

EPCU Power Control Modes

NORMAL RUNNING (NR) MODE

EPCU features push-button power control switch to activate control functions. Switch must be depressed to initiate start-up. After start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

CONDITIONAL BYPASS (CB) MODE

EPCU features a three position power control switch to activate control functions. Switch must be set to on position to initiate start-up. After enclosure power is energized, safe pressure must be lost or switch must be set to off position to deenergize enclosure power. After enclosure power is energized, switch may be set to bypass position, to temporarily latch enclosure power relays. A flashing LED then indicates bypass engaged, and the enclosure can then be accessed without deenergizing power (performed under specific conditions). Following access, safe pressure must be reestablished to resume normal operation. At that time, the switch may be reset to the on position, without disruption of enclosure power. Alarm relay normally deenergizes only upon loss of safe pressure, but can be factory programmed to deenergize when bypass is engaged.

UNCONDITIONAL BYPASS (UB) MODE *

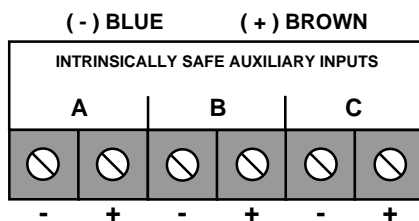
Bypass position energizes enclosure power relays instantly by overriding EPCU controls, before or after power is energized safely. In addition, alarm relay deenergizes when unconditional bypass is engaged, regardless of safe pressure status.

POWER LATCHING (PL) MODE *

EPCU features push-button switch and latches enclosure power relays after completion of a safe start-up. Enclosure power relays then remain energized regardless of any condition, including loss of safe pressure and complete EPCU logic module failure. When safe pressure is lost, the power relays remain energized, the alarm relay deenergizes and a flashing LED indicates that the latch is engaged, until safe pressure is restored. Power control switch must be depressed to deenergize enclosure power.

*** UB & PL MODES ARE NOT THIRD PARTY APPROVED AND ARE ONLY INTENDED FOR SPECIAL APPLICATIONS**

Optional ISB Wiring Requirements



All optional intrinsic safety (IS) wiring must be isolated from all other electrical wiring using the dedicated IS conduit entrances and wireway of the EPCU, (See "Optional ISB Conduit Installation" on page 19 for more details). In addition, all wiring must be installed in accordance with the NEC and all relevant local and plant codes.

The Bebcu Model ISB Intrinsic Safety Barriers are designed to function in conjunction with a customer furnished switch and Bebcu Model SRM-2000 Switch Resistor Module, or a Bebcu Model PD-2000 Proximity Detector. The customer supplied switch must have dry contacts which contain no inductance or capacitance.

The Bebcu Model SRM-2000 Switch Resistor Module and the Bebcu Model PD-2000 Proximity Detector are supplied with approximately ten (10) feet of wiring. Using 16 to 18 gauge shielded wire, the cable lengths can be extended to a maximum of 100 feet.

In all applications, the module of the Switch Resistor Module Cable must be installed as close to the customer supplied switch as possible for proper operation.

Wiring lugs are not recommended for Intrinsic Safety Barrier wiring connections.

See page 22 for barrier operation and factory programming.

Barriers & Field Adjustments

Optional Intrinsic Safety Barriers Description

The EPCU Logic Module can accommodate up to three intrinsic safety barriers, to interact with remote devices and affect operation of the EPCU. The barriers are installed and programmed by the factory at time of order, and they are designed to function either in conjunction with a customer furnished switch and a Bebcu furnished resistor network cable, or a Bebcu furnished proximity detector. Each barrier develops a low power signal, to create a two wire closed loop circuit. Operational status of each barrier is indicated by a green LED to show active (closed switch) status, and by a red LED to show faulted (line breakage) cable status. All barriers can be reprogrammed to duplicate other barrier functions as required, upon specific request.

Optional ISB Factory Programing

Barrier A Function - when switch opens

Disables start-up cycle
Deenergizes enclosure power and alarm relay
Functions parallel to safe pressure switch

Barrier B Function - when switch opens

Disables Rapid Exchange® cycle
Functions parallel to Rapid Exchange® pressure switch

Barrier C Function - when switch closes

Energizes Rapid Exchange® solenoid valve relay

LED Display Indicators

Power Off: Enclosure Power Relays Deenergized
Power On: Enclosure Power Relays Energized
Safe Pressure: Enclosure Pressure > 0.15" or 0.50" w.c.
Rapid Exchange: Enclosure Pressure > 2.0" w.c.
Timer Running: Rapid Exchange® Timer Active
Alarm Active: Enclosure Pressure < 0.15" w.c.
Bypass Engaged: Control Bypass Active - CB & UB Modes
Latch Engaged: Power Relay Latch Active - PL Mode

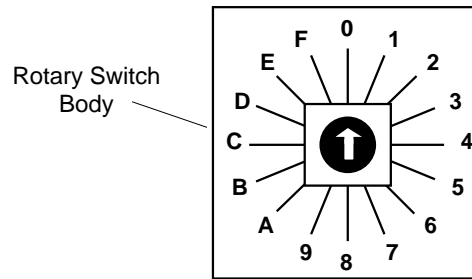
Field Adjustable Timer Functions

EDT (Exchange Delay Timer) (FA Style only) provides a time delay to prevent Rapid Exchange® solenoid valve from energizing until safe pressure can be stabilized.

SLT (Solenoid Latching Timer) (FA Style only) provides a time delay to keep the Rapid Exchange® solenoid valve energized until Rapid Exchange® pressure is detected. If the pressure is not detected by completion of the time cycle, the EPCU will reset.

RET (Rapid Exchange® Timer) provides a time delay after Rapid Exchange® pressure is detected, to allow four volume exchanges (ten volumes for motors) prior to energizing the enclosure power relays. If Rapid Exchange® pressure is lost or interrupted during time delay cycle, the EPCU will reset.

EDT, SLT & RET Timer Settings



EDT & SLT Timer		RET Timer	
POSITION	TIME IN SECONDS	POSITION	TIME IN MINUTES
0	5	0	5
1	10	1	10
2	15	2	15
3	20	3	20
4	25	4	25
5	30	5	30
6	35	6	35
7	40	7	40
8	45	8	45
9	50	9	50
A	55	A	55
B	60	B	60
C	65	C	65
D	70	D	70
E	75	E	75
F	80	F	80

NOTE: Power must be removed from the EPCU via the local disconnect for approximately 10 seconds for timer adjustments to reset.

Set-up Procedure

IMPORTANT NOTES

Regardless of any condition, the Bebcos Type X Rapid Exchange® System is designed to automatically withhold power to the protected enclosure while inducing Rapid Exchange®, for at least five (5) minutes. Normal exchange times should be doubled if large obstructions block inert gas flow.

To test the vent's operation, gently prod the vent flapper open with a soft pointed object, (example: eraser end of a pencil) ensuring that the vent valve works freely. On vertically configured vents, this can be accomplished from within the protected enclosure. Side mounted -90 configured vents can be tested by removing the pipe plug at the bottom of the mounting tee. Multiple operations require only one test per day if enclosure is not opened or left unattended.

The volume exchange rate is based on a four (4) enclosure volume exchange. Multiply the required exchange time by 2.5 for applications requiring a ten (10) volume exchange (motors).

The Start-Up Instruction Nameplate Exchange Time Slot will feature the standard factor for this system "ONE MINUTE PER 2.5 CUBIC FOOT", but the unit may feature a set of direct factor nameplates with self-adhesive backing such as "TEN MINUTES", for application to the start-up instructions, dependent on how the system was specified and purchased. Field modification of this nameplate, to show a direct factor, is acceptable as noted above if the method used to mark the nameplate does not deface the instructions listed. Materials used for the marking must be indelible and withstand prevailing environmental conditions.

Model 2003 Rapid Exchange® Purging Set-up

1. Close the Enclosure Pressure Control Valve (all Styles) and Rapid Exchange® Control Valve (STD Style only) fully by turning clockwise (CW).
2. Connect the inert gas supply to the System Supply Inlet and set the Rapid Exchange® Pressure Gauge to 60 psi.
3. Temporarily connect a 0-5 inch water column pressure gauge or manometer to the protected enclosure.
4. Check operation of Enclosure Protection Vent as detailed above. (see "Important Notes")
5. Seal enclosure(s) and adjust Enclosure Pressure Control Valve by opening slowly counterclockwise (CCW) to set a "Safe" pressure on the Enclosure Pressure Gauge.
Note: If pressure setting is difficult to stabilize or set, (see page 26, "Trouble-Shooting Procedures").
6. **STD Styles** - Open Rapid Exchange® Control Valve fully by turning 90° CCW and quickly ensure the Enclosure Protection Vent opens.
SA & FA Styles - With the aid of an assistant having two 1/2" combination wrenches on hand, place left hand on system mounting plate and pull Rapid Exchange® Manual Operator firmly with right hand and quickly ensure the Enclosure Protection Vent opens. If Enclosure Protection Vent operates properly, have assistant carefully place the open end of both wrenches behind handle to hold the manual operator in the out position temporarily.
Note: The Enclosure Pressure Gauge should move quickly off scale to the right, this is normal for all Rapid Exchange® purging systems.
7. Readjust the regulator to 60 psi minimum, while inducing Rapid Exchange®, the test gauge should then read approximately 2 inches of pressure and should not fluctuate. (insufficient enclosure pressure will cause the Enclosure Protection Vent to "shuttle") **DO NOT** exceed 5 inches of pressure within the protected enclosure.
8. Close Enclosure Pressure Control Valve and Rapid Exchange® Control Valve (STD Styles) or Remove the two 1/2" combination wrenches from behind the handle.
Note: The Rapid Exchange® Pressure Gauge may now indicate a higher set pressure than was originally set, this is normal for all Rapid Exchange® purging systems.
9. Set RET timer (see page 21 for timer location and settings) for required exchange time based on System exchange rate of ONE MINUTE PER 2.5 CUBIC FEET, five (5) minute minimum.
10. Install and tighten cover of EPCU. Ensure the conduit is sealed with approved compounds.
11. Depress the On-Off push-button (NR & PL modes) or turn selector switch to the On position (CB & UB modes). Each LED should illuminate fully for two seconds (self test), then all LED's should turn off except Power Off (solid red) and Alarm Activated (flashing red) LEDs.
12. Turn Enclosure Pressure Control Valve slowly CW to set the Enclosure Pressure Indicator to a "Safe" 0.25 inch pressure. The Safe Pressure LED should be on, the Alarm Active LED should turn off. Check for a 0.10 to 0.15 inch trip point by slowly stroking the indicator from 0.10 to 0.25 inch readings. The Safe Pressure and Alarm Active LEDs should turn on and off when the indicator reads between 0.10 and 0.15 inches.
Note: FA Style only - Rapid Exchange® Solenoid Valve will engage automatically upon time out of the EDT Timer. Should the operator require additional time to set a stable Safe Pressure on the enclosure pressure indicator, reset the EDT timer setting as described on page 22.

Set-up Procedure continued on page 24.

Set-up Procedure (cont.)

Model 2003 Rapid Exchange® Purging Set-up

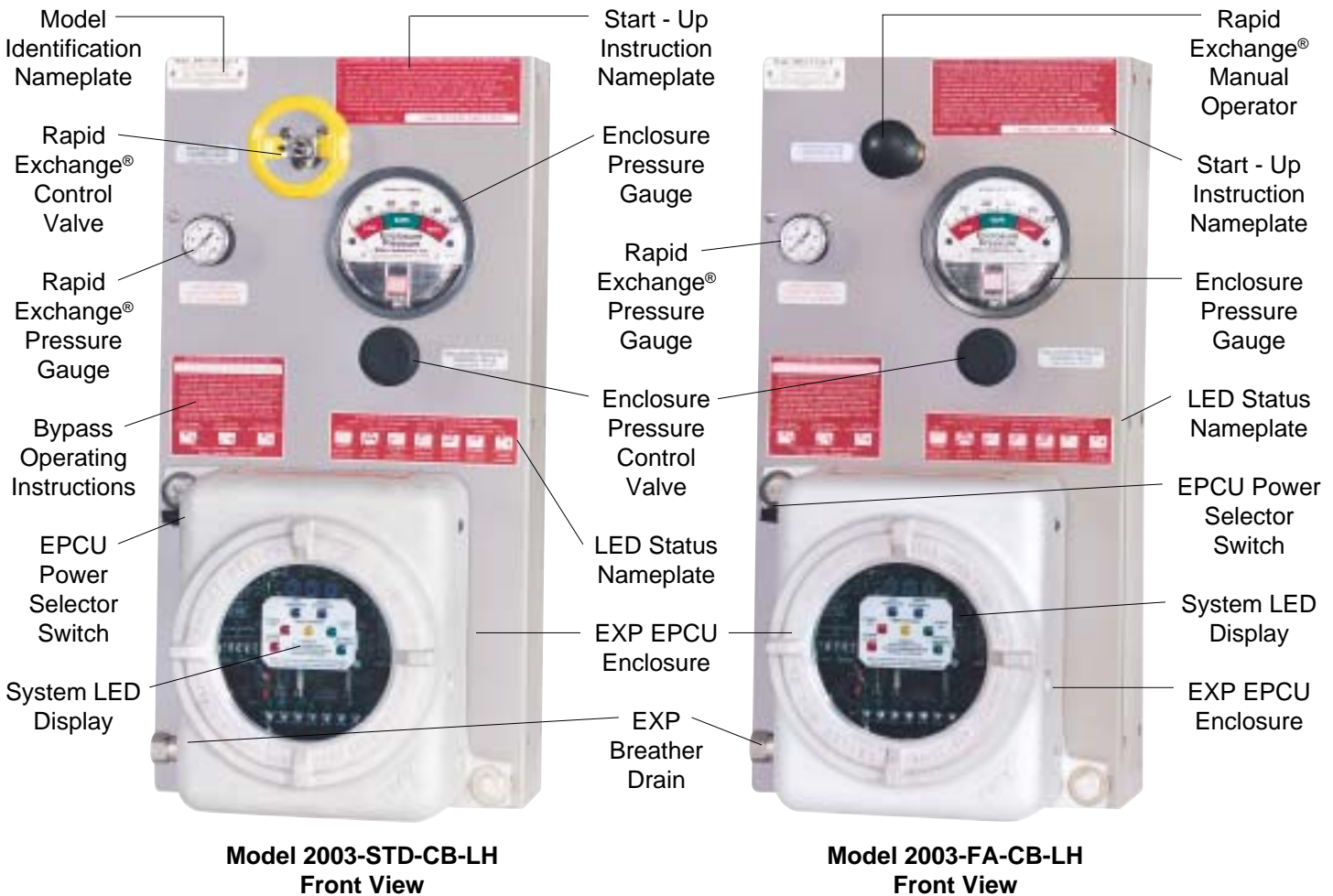
13. **STD Style** - Open Rapid Exchange® Control Valve **fully** by turning 90° CCW and quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should be on. Check for trip point by turning Rapid Exchange® Control Valve on and off. The Rapid Exchange® and Timer Running LEDs should turn on and off as exchange is engaged and disengaged, without disturbing the status of the Safe Pressure LED.

SA Style - Place left hand on system mounting plate and pull Rapid Exchange® Manual Operator firmly with right hand, until solenoid latches (to hold valve open automatically) then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should be on. Check for trip point by turning EPCU power switch off and on (to reset unit). The Rapid Exchange® and Timer Running LEDs should not turn on until valve is more than half open. Allow System to run through RET timer cycle and watch for solenoid to disengage. The valve should be able to shut off without disturbing the status of the Safe Pressure LED.

FA Style - Rapid Exchange® Solenoid Valve will engage automatically upon time out of the EDT Timer, then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should be on and SLT Timer will be running. Check for trip point by turning EPCU power switch off and on (to reset unit). The Rapid Exchange® and Timer Running LEDs should not turn on until valve is more than half open. Starting again, allow System to run through EDT, SLT and RET timer cycles and watch for solenoid to disengage. The valve should be able to shut off without disturbing the status of the Safe Pressure LED.

14. Having ensured that the Safe Pressure and Timer Running LEDs are functioning properly, Operating Procedures located on page 25 may now be followed to step through a complete start up cycle, ensuring that the System functions normally during all phases of operation.

15. Cease testing and remove test equipment .



Operating Sequence

WARNING

Do not exceed a "Safe" pressure with the Enclosure Pressure Control Valve.

Operators must follow step-by-step sequence of the Start-Up Instructions Nameplate on the Protection System.

Do not use the Bypass Modes without first securing a "Hot Work" permit.

Never leave the system unattended in Bypass Modes.

Rapid Exchange® Purging Operation

With the inert gas supply on, RET Timer set properly (STD and SA Styles), EDT, SLT and RET Timers set properly (FA Styles), EPCU power and alarm system energized (if utilized) . .

1. Carefully read Start-Up Instruction Nameplate on system.
2. Check operation of the Enclosure Protection Vent, Bebcos Model EPV-3, opening it manually several times (see page 23, "Helpful Hint").
3. Seal protected enclosure(s).
4. Depress the On-Off push-button (NR & PL modes) or turn selector switch to the On position (CB & UB modes). Each LED should illuminate fully for two seconds as a self test, then all LED's should turn off except Power Off (solid red) and Alarm Activated (flashing red) LEDs.
5. Turn Enclosure Pressure Control Valve slowly CCW to set the Enclosure Pressure Indicator to a "Safe" 0.25 inch pressure. The Safe Pressure LED should be on, the Alarm Active LED should turn off.
6. **STD Style** - Open Rapid Exchange® Control Valve **fully** by turning 90° CCW and quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should turn on.
7. Standby until the EPCU RET Timer completes the timing cycle and energizes enclosure power. Safe Pressure LED should stay on, Timer Running LED should turn off and Power On LED should turn on.
8. **STD Style** - Close Rapid Exchange® Control Valve fully by turning 90° CW. The Rapid Exchange® and Timer Active LEDs should be off.

SA & FA Styles - After completion of the RET timing cycle, Timer Running LED should turn off and Power on LED should turn on. At the same time, the Rapid Exchange® Solenoid Valve should deenergize and the Rapid Exchange® LED should turn off.

9. Ensure the Protection System Enclosure Pressure Indicator maintains a "Safe" 0.25 inch pressure for one (1) minute. Readjust Enclosure Pressure Control Valve if required.
10. If "Safe" 0.25 inch pressure is lost, the EPCU will deenergize enclosure power and activate alarm system (if utilized).

SA Style - Place left hand on system mounting plate and pull Rapid Exchange® Manual Operator firmly with right hand, until solenoid latches (to hold valve open automatically) then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should turn on.

FA Style - Rapid Exchange® Solenoid Valve will engage automatically upon time out of the EDT Timer, then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange® and Timer Active LEDs should be on and SLT Timer will be running.

Note: On all Styles, if the Safe Pressure or Timer Running LEDs blink on and off or "flicker" during this cycle, EPCU will reset RET timer.

Trouble - Shooting Procedures

Problem or Fault	Possible Causes	Corrective Action
Enclosure pressure control valve will not hold a safe .25 inch pressure.	Leakage around gasketing, covers, seams, piping and tubing connections, conduit connections and electrical conduit seals of the enclosure.	Tighten enclosure latches: Where tightening is not feasible, and gasketing materials are not practical, holes or gaps can be closed with silicone sealant applied from inside the protected enclosure.
Enclosure pressure indicator reading is difficult to stabilize.	Insufficient enclosure leakage or opening of the venturi orifice is crimped too small.	Remove the orifice, cut off the crimped end and ream the tube, then recrimp and reinstall the tube to note effect. As tube is shortened, reamed, and recrimped, sensitivity decreases, allowing easier adjustment of setpoint on the enclosure.
Enclosure Protection Vent "Shuttles" or Flutters"	Excessive leakage from protected enclosure. Insufficient protective gas supply header pressure.	Check all points above and verify a minimum 60 psi injection pressure reading on the Rapid Exchange® Pressure Indicator during Rapid Exchange®. With a 0.0" - 5" water column test gauge installed properly (see "Set-Up Procedures" page 23), slowly increase the Rapid Exchange® Injection pressure with the Rapid Exchange® valve engaged until this effect is eliminated. Do not exceed 3 inches of pressure within the protected enclosure.
Enclosure Pressure Indicator reads a "Safe" pressure but the Safe Pressure LED is not illuminated.	Conduit seal between EPCU and protected enclosure is not poured or is leaking pressure back into the EPCU. EPCU breather drain is clogged (all systems except PM configurations). Safe Pressure switch is out of calibration.	With area positively known to be non-hazardous, remove screw cover of the EPCU and attempt a complete start-up procedure. If the system works properly, check enclosure power conduit seal for leakage and the EPCU breather drain for blockage. If the system does not operate properly, calibrate the Safe Pressure switch. Calibrate by slowly adjusting CCW to decrease the setpoint, and CW to raise the setpoint. (Do not attempt to calibrate the switch until all efforts to make the switch respond properly have failed)
Rapid Exchange® LED does not illuminate when Rapid Exchange® is engaged. FA Style only - The Rapid Exchange® solenoid continues to cycle without starting the RET timer.	Conduit seal between EPCU and protected enclosure is not poured or is leaking pressure back into the EPCU. EPCU breather drain is clogged (all systems except PM configurations). Rapid Exchange® Pressure switch is out of calibration.	With area positively known to be non-hazardous, remove screw cover of the EPCU and attempt a complete start-up procedure. If the system works properly, check enclosure power conduit seal for leakage and the EPCU breather drain for blockage. If the system does not operate properly, calibrate the Rapid Exchange® Pressure switch. With Rapid Exchange® engaged, calibrate by slowly adjusting counterclockwise to decrease the setpoint, and clockwise to raise the setpoint. (Do not attempt to calibrate the switch until all efforts to make the switch respond properly have failed)
Problems persists, or if the system does not appear to be operating properly.	Persisting problems.	One year warranty policy, give BebcO Industries, Inc., Enclosure Protection Systems Division a call at (409) 935-5743, our Customer Service Department is standing by to answer any questions you may have.

This section covers the most common problems documented with these systems. Any problems not covered in this section should be addressed directly to our factory. Please address all service needs to BebcO Industries, Inc. - Customer Service Department at (409) 935-5743. For quickest and easiest resolution, please have the system project number (located on green quality control tag affixed to back of system mounting plate) available for the customer service representative.

Warranty & Liability Statements

Important Warranty And Liability Notes

This Enclosure Protection System will comply with or exceed all regulations of the National Fire Protection Association Code 496 if utilized in complete compliance with the criteria of this Manual.

To avoid noncompliance with applicable Codes and the voiding of all Warranties and Limitations to Liabilities, stated, implied, or otherwise, do not, under any circumstance whatsoever, override, modify, change or bypass any electrical or pneumatic control or any mechanical, or structural feature of this Enclosure Protection System.

General Terms & Conditions of Warranty

Bebco Industries, Incorporated hereafter referred to as "Manufacturer" warrants that, for a time period of one (1) year from the date of shipment from Manufacturer's Facility, the Enclosure Protection System Division Product shall meet the performance criteria stated in the Installation, Operation & Maintenance Manual provided with said product and shall be free from defects in materials and workmanship. Deviation from performance criteria or defects in materials and workmanship of the Product must be brought to Manufacturer's attention within ten (10) working days of receipt.

Manufacturer reserves the right to ship replacement parts to the Customer or to request return of the Product for defect cause evaluation. Return of any defective Product must be preceded by an Authorized Material Return (AMR) Number issued by Manufacturer and may be shipped freight collect. Upon authorized return to Manufacturer's facility, Manufacturer reserves the right to replace or repair defective components of the Product, or to substitute a new Product upon its determination that noted defects were not caused by neglect, abuse or misuse by the Customer. If damage occurs in transit, Customer must pursue normal claims against carrier and notify Manufacturer within ten (10) working days of receipt of said damaged Product.

EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH IN WRITING ABOVE, THE MANUFACTURER MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCTS. IN NO EVENT SHALL MANUFACTURER, ITS REPRESENTATIVES, OR OTHER AGENTS ACTING UNDER MANUFACTURER'S DIRECTIVE BE LIABLE FOR SPECIAL INCIDENTAL, OR CONSEQUENTIAL DAMAGES FOR THE BREACH OF ANY WARRANTIES OR FOR BREACH OF ANY OTHER TERM OR CONDITION HEREIN.

Limitations of Liability

WHEREBY Bebco Industries, Incorporated, hereafter referred to as "Manufacturer", is the sole manufacturer of Enclosure Protection Systems, Manufacturer herein states a portion of the limitations of liability incurred due to any sale or use of a Bebco System or Manufacturer produced variations or modifications of a Bebco System, hereafter referred to as "Enclosure Protection System".

Manufacturer accepts no liability for any affects or damages incurred by the installation or operation of any Enclosure Protection System which is used to purge any devices, components or enclosures, or combinations thereof which contain barriers or obstructions to inert gas flow, or which are not constructed in complete accordance with the National Fire Protection Association Code 496, or which are not rated and certified for use within the constraints of oiltight, NEMA 4 or NEMA 12 design standard specifications, or which are not specified as acceptable for use within the constraints of Protected Enclosure and Device Design Considerations information contained within the Manufacturer's Installation, Operation & Maintenance Manual.

Manufacturer and/or its Agents, Representatives, or Sub-Contractors accept no liability for **PERSONAL INJURY, DISMEMBERMENT OR DEATH**, or for any affects or damages incurred to any device, component, enclosure, equipment or area caused by the use of any Enclosure Protection System, unless the Enclosure Protection System is installed, operated and maintained on a regularly scheduled and documented basis as directed by and in complete accordance with the applicable Enclosure Protection System Manual and all Attachments and Addendum included with said Manual.

These Limitations of Liability supersede any and all claims of liability responsibilities claimed by the User and/or its Agents or Subcontractors against Manufacturer and/or its Agents, Representatives, or Sub-Contractors regardless of their Terms of Purchase, surrendered hereto, and shall survive from the date of sale to the date of discontinued use of said Enclosure Protection System. Questions concerning stated and unstated limitations to liability may be referred to the Corporate Management Group at Manufacturer's Corporate Offices located at 600 Gulf Freeway, Texas City, Texas 77591, USA - Phone: (409) 935-5743.

CUSTOMER NOTES

SYSTEMS IDENTIFICATION & APPLICATION INFORMATION

Date of Installation _____

Unit Serial # _____

Item _____

Customer P.O.# _____

Customer Project# _____

Service _____

Type _____

Features _____

Application _____

NOTES: _____

Local Sales Representative

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