Process Interfaces
- Intrinsically Safe Barriers
- Signal Conditioners
- Fieldbus Infrastructure
- Remote I/O Systems
- HART Interface Solutions
- Wireless Solutions
- Level Measurement
- Purge and Pressurization Systems
- Industrial Monitors and HMI Solutions
- Explosion Protection Equipment
- Solutions with Process Interfaces

Industrial Sensors
- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- AS-Interface
- Identification Systems
- Logic Control Units
Defining the need
The need to place general-purpose equipment in hazardous (classified) locations is not new, yet in the last three decades the need has intensified dramatically. This is primarily due to the following facts:

• Process control, measuring and recording equipment that was once primarily pneumatic is now primarily general-purpose electronic equipment.
• Motors and switchgears now use electronic accessories to satisfy the needs for position, speed or process control and energy efficiency, which often renders the equipment unsuitable for use in hazardous locations.
• Newly developed equipment, such as robotic manipulators, CNCs, batch weigh/count and filling systems, analyzers, programmable controllers and CRT work stations are rapidly becoming more prevalent in the industrial work environment.

While the demand for these new devices continues to grow, most of them cannot be economically installed in a hazardous location by using explosion-proof enclosures or intrinsic safety barriers, alone. Most modern electronic equipment is expensive and delicate. For this reason, it requires environmental protection that cannot be provided by explosion-proof enclosures or intrinsic safety barriers. Therefore, the need for an alternative to explosion-proof enclosures and intrinsic safety barriers has become extremely critical.

The alternative is purge and pressurization. As you learn more about purge and pressurization, it will become apparent that this technology is exactly what you require. It will then become obvious that this technology offers the safest and most economical means of installing electrical equipment in a hazardous location. In addition, this technology will undoubtedly impress you as the only definitive way to enhance your equipment’s performance and access, while increasing the life expectancy of delicate instruments. Finally, you’ll learn the most important point of all: The answer to your need is Pepperl+Fuchs.
Table of Contents

Introduction 1
Type Y and Z Systems (1000 Series) 25
Type Z Systems (1000 Series) 41
Type Y, Z and Ex [pz] Systems (3000 Series) 45
Type X Systems (2000 Series) 63
Type X and Ex [px] Systems (6000 Series) 91
Enviro-Line 103
Custom Cabinet Solutions 105
Accessories 111
Examining the Solutions

**Explosion-proof Enclosures**

**Intent**
These enclosures are designed to contain an explosion if an electrical device ignites flammable substances within the enclosure, thus preventing ignition of the surrounding atmosphere. These enclosures are commonly used for circuit breakers, mechanical switchgears and high-powered equipment. The failure to properly tighten all bolts and screw covers on these enclosures is the greatest problem facing end users.

**Advantages**
- Explosion Containment
- Requires Low Maintenance
- High-Powered Equipment
- No Electronics
- No Moving Parts

**Disadvantages**
- Cannot Indicate Failure of Containment Capability
- Danger to Equipment After Explosions
- Possibility of Installation/Maintenance Errors
- Cost of Protection per ft³ Increases with Enclosure Size
- Windows Are Limited
- Promotes Condensation
- Cumbersome, Limited Access
- Causes Harmful Heat Build up
- Limited Sizes
- Bulky Designs
- Excessive Weight
- Cumbersome, Limited Access

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**Intrinsic Safety Barriers**

**Intent**
These devices are designed to limit the current and voltage conducted through a device’s power or signal wiring. This limitation prevents shorting and arcing of the wires or device, thus preventing ignition of the surrounding atmosphere. They are commonly used for protection of instruments that operate at extremely low power levels and are suitable for exposure to the environment.

**Advantages**
- The Only Protection Allowed for Zone 0
- Eliminates Possibility of Explosion
- Requires Low Maintenance
- Ideal for Low-Power Devices
- No Hot Permits
- No Special Cables
- Limits Energy to Device

**Disadvantages**
- Requires Documentation of I.S. Circuits and Installation
- Can be Used Only with Low-Power Devices
Enclosure Protection Systems

Intent

Pepperl+Fuchs products are designed to supply one or more protected enclosures with clean instrument air or inert gas. This process removes flammable gases or prevents the accumulation of ignitable dusts within the protected enclosure(s). This method of protection is not limited by the quantity, configuration, power requirements, or location of the protected equipment. These systems are commonly used for all applications involving basic electronics, electrical equipment, motors and switchgear.

In addition, these systems can also meet the demands of rack mounted instrumentation, video displays, programmable controllers, computers, printers, recorders, measurement devices, gas analyzers and calibration equipment.

One of the best benefits is the slow but continuous flow of protective gas, which can be specifically used to eliminate problems like heat, moisture, dust and corrosion. And unlike explosion-proof enclosures, failure of a Pepperl+Fuchs Bebco Enclosure Protection System does not create an immediate danger.

Advantages

• Reduces Heat Build up
• Inhibits Metal Corrosion
• Requires Low Maintenance
• Increases Equipment Longevity
• No Special Enclosures Required
• Allows Fast Access to Equipment
• Reduces Moisture & Dust Build up
• Reduces Classification within the Enclosure
• Continuous System Status Indication
• Protects Enclosures up to 450 ft³
• Allows use of any Enclosure Shape
• Cost of Protection per ft³ Decreases with Enclosure Size

Disadvantages

• Contains Moving Parts
• Requires Instrument Air Supply
• Some Systems Require Electronics
• Hot Permits Required

Purge and Pressurization is the only technology that meets the demand for general-purpose equipment with standard enclosures inside hazardous locations.
Defining Hazardous Areas

Hazardous Area Definition

Hazardous (classified) locations are those areas in an industrial complex where the atmosphere contains flammable concentrations of gases or vapors by leakage, or ignitable concentrations of dusts or fibers by suspension or dispersion.

The National Fire Protection Association

The National Fire Protection Association (NFPA), formed in 1896, is a nonprofit organization devoted to fire safety standards and codes. It currently retains over 40,000 members who work to determine safe practices and establish standards for all areas of commercial, industrial and residential construction. They publish many documents including NFPA 70 - better known as the National Electric Code and NFPA 496 - the document that specifies recommended practices for pressurization and purging.

Area Classification Methods

The NFPA establishes area classifications using three factors. Identified as Classes, Groups and Divisions, these factors are combined to define conditions of specific areas.

Important Notes:

Division 1 areas must be surrounded by Division 2 areas.
What is purging?

Purging is the process of supplying enclosures with compressed air or inert gas at the proper flow and pressure in order to reduce the hazardous gas inside the enclosure to a safe level. Pressurization is the process of bringing compressed air or inert gas within an enclosure to a pressure where there is no ingress of hazardous gasses or combustible gas. Both purging and pressurization are required in a Class I, gas atmosphere. Only pressurization is required in a Class II, dust atmosphere.

What is used to purge/pressurize?

The most common and practical protective gas is compressed instrument quality air that contains no more than trace amounts of combustible vapor. Inert gases, such as nitrogen or argon are acceptable. Although they are usually expensive and impractical, they may be required for some gas analysis applications.

What is the pressure requirement?

Most purging applications require a minimum enclosure pressure of 0.10 inches (2.5 mm) of water. One psi is equal to 27.7 inches of water. In some circumstances, a minimum enclosure pressure of 0.50 inches (12.7 mm) of water is required to protect against ignitable dust. But in all cases, a higher enclosure pressure should be maintained to create a reasonable safety factor. In rare circumstances, enclosure pressures as high as 2.5 inches (63.5 mm) of water may be required to offset sudden atmospheric pressure fluctuations, such as those created near missile launching or off-shore drilling platforms.

How much purging gas is used?

Average protective gas consumption during pressurization at a 0.10 inch (2.5 mm) enclosure pressure should fall somewhere between 0.1 to 3.5 SCFH per cubic foot (2.83 to 99.11 l/hr) of enclosure volume. However, use will depend on the protected enclosure's integrity and normal pressure setting. Use is also dependent on the quantity and size of covers and doors as well as devices which penetrate the surface. Advanced forms of protection such as cooling or dilution may require continuous flow rates of 30 to 100 SCFH (849.38 to 2831.26 l/m). Purging requires a much higher flow rate than pressurization, but only for a short period of time.

What kinds of enclosures can be purged?

Any enclosure can be purged, but enclosures featuring gasketing and multiple door fasteners are ideal. Therefore, in the absence of official construction requirements for purged enclosures, Pepperl+Fuchs Bebco recommends enclosures which meet or exceed the National Electrical Manufacturer’s Association rating of NEMA 4 or NEMA 12.

What kinds of devices can be purged?

Virtually any basic electrical device can be purged, if all "live" or energized components can be isolated from the surrounding environment. Devices such as pushbuttons, relays, timers and programmable controllers only need to be installed in a sealed enclosure. Motors only require a totally enclosed housing.

Common Questions

How can the equipment be accessed?

Equipment mounted in the protected enclosure can be accessed if the area is known to be nonhazardous, or if all power to the protected equipment has been de-energized. In other words, internal equipment should be treated as if located in an explosion-proof enclosure. However, a cooling period may be required before accessing hot components, such as transformers or variable speed drives, which would otherwise be unacceptable for use in the hazardous location.

Equipment mounted through the surface of a protected enclosure may require a sealed access door if the equipment is not suitable for exposure to the surrounding atmosphere. Advanced pressurization systems, like Pepperl+Fuchs Bebco Rapid Exchange™ Purging Systems can maintain a positive pressure, by increasing the flow of protective gas while the access door is open.

In this application, a stainless steel enclosure features an access door for control adjustments and maintenance, along with a very unique audible and visual alarm system.
Purge and Pressurization Systems Technology Review

NFPA & ISA Design Standards

Pressurization Standards

Committee SP12 of the Instrument Society of America (ISA) established the first Design Standard in 1966, entitled "ISA s12.4 - Instrument Purging For Reduction Of Hazardous Area Classification." In 1967, the NFPA Technical Committee on Electrical Equipment in Chemical Atmospheres established recommended practices, entitled "NFPA 496 - Purged and Pressurized Enclosures for Electrical Equipment." Since then, the NFPA has expanded their document by adding recommendations for enclosure ventilation and dilution.

The NFPA document is the American standard for the design, marking and performance of enclosures and pressurization systems. The ISA document addresses construction, installation and testing of protected enclosures and pressurization systems.

Pressurization "Types"

The NFPA and ISA define "Types" of pressurization based on the Division rating of a hazardous location and electrical ratings of the protected equipment. General-purpose and Division 2 rated electrical equipment require different means of protection, depending on their location.

Type "X"
Protects general-purpose equipment in Division 1 Areas

This system reduces the classification within protected enclosures from Division 1 to nonhazardous. It is required to automatically control electrical power to all protected equipment.

Type "Y"
Protects Division 2 rated equipment in Division 1 Areas

This system reduces the classification within protected enclosures from Division 1 to Division 2. All protected equipment must be rated for Division 2. Automatic power control disconnects are not required, but visual and/or audible alarms must be initiated when there is loss of pressure.

Type "Z"
Protects general-purpose equipment in Division 2 Areas

This system reduces the classification within protected enclosures from Division 2 to nonclassified. Automatic power control disconnects are not required, but visual and/or audible alarms must be initiated when there is loss of pressure.

Purging and Pressurizing Methods

The NFPA and ISA define several techniques for protecting equipment. Most equipment requires only basic pressurization in Class II areas or purging in Class I areas. Ventilation and dilution are advanced protection methods for heat producing or flammable gas analyzing equipment.

Purging

Common equipment in Class I Areas

As strictly defined by NFPA 496, this method is a start-up process of Class I area pressurizing which removes flammable vapors from a protected enclosure. This is accomplished by exchanging a known volume of protective gas, while maintaining a minimum positive enclosure pressure of 0.10 inches (2.5 mm) of water. The 2003 edition of NFPA 496 recommends 4 volume exchanges for all enclosures and 10 volume exchanges for all motors.

Pressurization

Common equipment in Class I & II Areas

This method prevents the entrance of flammable gas or combustible dust into protected enclosures. In Class II areas, this is accomplished by manually removing any dust and then applying a protective gas supply to maintain a positive enclosure pressure of 0.50 inches (12.7 mm) of water. In Class I areas, this is accomplished by "purging" as defined below, and by then maintaining a minimum positive enclosure pressure of 0.10 inches (2.5 mm) of water. Power can then be applied to the protected equipment under conditions established by the Division rating.

Ventilation

Hot equipment in Class I & II Areas

This method provides protection as outlined above and also removes or dissipates heat from electrical devices within a protected enclosure. This method is commonly used to cool equipment or reduce enclosure surface temperatures. Ventilation requires high air flow and is commonly performed with blowers for high voltage switchgear devices.

Dilution

Analytical equipment in Class I Areas

This method provides protection as outlined above and also continuously removes or dissipates flammable gases within a protected enclosure. Dilution may require the use of nitrogen to blanket the enclosure. Otherwise, a higher flow of instrument air will likely be required.
Pressurization System Designs

Choosing a System

There are four primary factors that determine which purge system is appropriate for your application:

- Classification of the area.
- Ratings of the equipment inside the enclosure.
- Enclosure size, position of doors, windows and any accessories.
- Power requirement to the enclosure (Type X systems).

Area Classification

The area classification determines the type of purge system needed. For Division 1 areas, the equipment inside the enclosure determines whether a Type X system (equipment rated for general-purpose) or a Type Y system (equipment rated for Division 2) can be used.

Equipment Ratings

The rating on the equipment inside the enclosure becomes important in evaluating which purge system to use in a Division 1 area. If the Division 1 area contains at least one general-purpose component, a Type X system is required. If all devices in the enclosure are rated for Division 2, then a Type Y system can be used. Special conditions exist for enclosures such as gas analyzers and chromatographs that contain a flammable gas. Refer to NFPA 496 2003 for more information.

Enclosure Size

The size of the enclosure determines the size of the purge system. How the system is mounted depends on the position of doors, windows and cable entrances.

Power Requirement

For Type X systems, the control unit operates the power disconnect to the enclosure. If the power requirement for the enclosure exceeds the contact ratings on the control unit, a control relay must be added. If the control relay is located in the hazardous area, it must be rated for that hazardous location. As power increases inside the enclosure, high temperatures become a problem. Refer to NFPA 496 2003 for more information.

Requirements for Alarms

For Type Y and Z purge systems, audible alarms or visual indicators must be used to notify operators that pressure inside the enclosure is below the NFPA minimum.

Alarms are connected directly to the enclosure and monitor the differential air pressure between the enclosure and the environment outside it. These alarms are activated by the reduction in flow or pressure within the protective enclosure and have a direct connection to the enclosure, eliminating the need for an alarm on the protective gas supply.

- The alarm must be located where the operator can see it easily.
- The alarm must take its measurement from the enclosure only.
- Alarms located in the hazardous area must be rated for the area.
- Valves cannot be connected between the alarm and the enclosure.

These pressurization system diagrams represent the basic designs of modern pneumatic systems.
Typical Enclosure Connections

**Single Enclosures**

**General Recommendations**

1. The pressurizing system should be located immediately adjacent to the protected enclosure(s) when possible.
2. The pressurizing system should be installed at eye level, in a prominent location, for convenient viewing.
3. No valves should be installed between the pressurizing system and the protected enclosure(s).
4. The reference connection from the protected enclosure(s) should be installed in a location which is not directly affected by air flow through the protected enclosure(s).
5. All tubing, piping and connection fittings should be suitable for the location in which they are installed and should be protected against mechanical damage.

**Multiple Enclosures**

**Multiple Enclosure Recommendations**

1. Protected enclosures should be connected from the smallest to largest enclosure in series.
2. Connections should be sized to allow proper operation of the pressurization system.
3. Conduit or wireways may be utilized as protected enclosures or as connections between protected enclosures.*
4. All pressurized conduit and wireways should be sized to allow proper protective gas flow through the protected enclosures.

* The NFPA recognizes the use of electrical conduit or wireways as a part of an "approved system". The NFPA term "approved system" refers to a complete purged assembly that has been approved by the authority having jurisdiction.

**Class I Area Recommendations**

If flammable gases are lighter than air, the supply connection to each enclosure should enter near a bottom corner and the connection for an optional vent or piping to the next protected enclosure should exit near an extreme opposite top corner.

If flammable gases are heavier than air, connections should be reversed.

In addition, these Class I area recommendations exceed the requirements of NFPA 496. They are presented by Pepperl+Fuchs Bebco as a method to enhance the removal of flammable gases by the use of gravity.

These Class I area recommendations only apply to enclosure volumes exceeding two cubic feet.
Indicators, Alarms & Cutoffs

Requirements for Indicators

Indicators can be used when there is an alarm for the protective gas supply and the enclosure is isolated with a valve immediately adjacent to the enclosure. The valve must have an appropriate warning label and can be used only for the enclosure. Refer to NFPA 496 2003, section 4.8.4 for more information.

- The indicator must be located where the operator can see it easily.
- The indicator must show either pressure or flow.
- The indicator cannot be installed between the enclosure and protective gas supply.
- No valves shall be connected between the indicator and the enclosure.
- The protective gas supply shall have an alarm located in a constantly attended area and fulfill requirements in 4.3.2.

Requirements for Disconnects

The disconnect switch immediately cuts off power to the enclosure when pressure drops below a safe level. This switching is required for Type X systems and can also used in Type Y and Z systems.

There are exceptions to the disconnect rule for Type X systems, because in some instances, a power loss represents a greater hazard than operating the system under low pressure. An alarm is acceptable in those circumstances, but only for a short time and special requirements may be necessary.

Requirements for disconnect switches:

- Must be actuated by either the protective gas flow rate or the differential pressure inside the enclosure.
- Must be approved for its location.
- No valves shall be connected between the disconnect switch and the enclosure.
- Shall take its signal from the protected enclosure and shall not be installed between the enclosure and the protective gas supply. Refer to NFPA 496, section 4.10.1 for more information.

Protected Enclosure Device Details

Single Enclosure Applications

PROTECTIVE GAS SUPPLY  PROTECTED ENCLOSURE  INDICATOR, ALARM OR CUTOFF SWITCH

Multiple Enclosure Applications

PROTECTIVE GAS SUPPLY  PROTECTED ENCLOSURE(S)  INDICATOR, ALARM OR CUTOFF SWITCH

Protected Gas Supply Alarm Details

Upstream Alarm Application

PROTECTIVE GAS SUPPLY  ALARM  VALVE  PROTECTED ENCLOSURE(S)

POSITION & LABEL CRITICAL (SEE ABOVE)

Downstream Alarm Application

PROTECTIVE GAS SUPPLY  VALVE  PROTECTED ENCLOSURE(S)  ALARM

POSITION NOT CRITICAL
Enclosure Marking & Wiring

Enclosure Marking Requirements

**Sections 4.11 & 6.3** of the 2003 NFPA 496 require markings on all protected enclosures with a "permanent label," located in a "prominent location," near all doors and access covers. The labels must include the following or equivalent statements:

**Class I Locations:**
- "WARNING - PRESSURIZED ENCLOSURE"
- "This enclosure shall not be opened unless the area is known to be free of flammable materials or unless all devices have been de-energized."

**Class II Locations:**
- "WARNING - PRESSURIZED ENCLOSURE"
- "Power shall not be restored after the enclosure has been opened until combustible dust has been removed and the enclosure repressurized."

**Section 5.3** requires the following or equivalent statement in addition to the statement required by Section 4.11 above.
- "Power shall not be restored after enclosure has been opened until enclosure has been purged for _ minutes at a flow rate of _."  

A **Note to Section 5.3** permits the use of minimum pressure in place of flow rate if the pressure can positively indicate a known flow rate.

An **Exception to Section 5.3** allows placement of the start-up instructions on the pressurizing system, if they are referenced by the permanent label on the protected enclosure.

In addition, all permanent labels must include three other markings:

- **Section 4.11:** Class, Group and Division of surrounding area
- **Section 4.11:** NFPA pressurization Type X, Y, or Z
- **Section 4.11:** T Code (temperature identification number): see NFPA 70, The National Electric Code, Article 500, Table 500-3(d)

**Exception No. 1** allows omission of the T Code marking if the hottest temperature does not exceed 100°C.

**Exception No. 2** allows omission of the T Code marking for equipment which is marked for specific use in gas or dust atmospheres and does not exceed 80% of the flammable or ignitable atmosphere’s ignition temperature.

**Special Marking Requirements**

Exceptions to Section 4.5 require enclosures to be marked with the following or equivalent statement if they house equipment which can exceed the T-Code rating, to comply with Section 4.11.4:

- "WARNING - HOT INTERNAL PARTS"
  - "This enclosure shall not be opened unless the area is known to be nonflammable or unless all equipment within has been de-energized for _ minutes."

An Exception to Section 4.8.2 permits the use of an indicator on the protected enclosure if all isolation valves are adjacent to the enclosure (see page 11) and marked to comply with Section 4.11.5:

- "WARNING - PROTECTIVE GAS SUPPLY VALVE"
  - "This valve must be kept open unless the area is known to be nonflammable or unless all equipment within the protected enclosure is de-energized."

Typical Enclosure Wiring Methods

In a general sense, protected enclosures should be wired similarly to explosion-proof enclosures, in accordance with Article 500 of the National Electric Code - NFPA 70.

Single conductor wiring should 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 requires the use of approved seals on all pressurized enclosure conduit wiring entries, in accordance with NFPA 70. 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. Other methods of sealed cable entries that are suitable for hazardous locations can be used, such as compression glands.

In conclusion, there are two primary goals. First, the installer should ensure that all associated wiring and cable is protected by pressurization or other means, such as explosion-proof conduit or intrinsic safety barriers. Secondly, the installer should ensure that 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 Connection
Basic Operating Procedures

Class II, Div. 1 Pressure System

Start-Up Conditions
Protection Method: Type "X" Purge/Pressurization System
Powering Method: Automatic Power Control Unit or Local Disconnect Switch
System Status: Protected Equipment De-energized, Alarm System and Air Supply On

Operating Procedures
1. Remove hazardous substance from the protected enclosure. A vacuum device is the preferred tool for dust removal.
2. Check operation of enclosure pressure relief device (if utilized) and seal the protected enclosure.
3. Pressurize the protected enclosure to set and maintain a positive pressure of 0.50 inches (12.7 mm) of water.
4. System will apply power automatically when pressure is set and maintained at a positive pressure of 0.50 inches (12.7 mm) of water.
5. Loss of pressurization must automatically de-energize protected equipment power immediately. **Exception:** Automatic power control is not required if the enclosure is designed to prevent the entrance of dust and the pressurization system activates an audible or visual alarm in a constantly attended location.
6. Equipment that may overload or overheat, such as motors or transformers, require thermal overload cutoff switches or alarms.

Class II, Div. 2 Pressure System

Start-Up Conditions
Protection Method: Type "Z" Purge/Pressurization System
Powering Method: Local Disconnect Switch
System Status: Protected Equipment De-energized, Alarm System and Air Supply On

Operating Procedures
1. Remove hazardous substance from the protected enclosure. A vacuum device is the preferred tool for dust removal.
2. Check operation of enclosure pressure relief device (if utilized) and seal the protected enclosure.
3. Pressurize the protected enclosure to set and maintain a positive pressure of 0.50 inches (12.7 mm) of water.
4. Energize the protected equipment power manually with a disconnect switch or breaker rated for the hazardous location.
5. Loss of pressurization requires immediate attention or the manual de-energizing of protected equipment power.
6. Excessively hot equipment must be isolated in a separate protected enclosure, unless the enclosure is marked with a warning which indicates a required cool-down time period before access.

Class I, Div. 1 Purge and pressurization

Start-Up Conditions
Protection Method: Type "X" Purge/Pressurization System
Powering Method: Automatic Power Control Unit
System Status: Protected Equipment De-energized, Alarm System and Air Supply On

Operating Procedures
1. Check operation of enclosure pressure relief device (if utilized) and seal the protected enclosure.
2. Pressurize the protected enclosure to set and maintain a minimum positive pressure of 0.10 inches (2.5 mm) of water.
3. Exchange the recommended volumes of purging gas.
4. System will deny power automatically until recommended volume exchange is complete and pressure is set and maintained at a minimum positive pressure of 0.10 inches (2.5 mm) of water.
5. Loss of pressurization must automatically de-energize protected equipment power immediately. **Exception:** Power may be maintained for a short period if immediate loss of power would result in a more hazardous condition and if the system activates both audible and visual alarms in a constantly attended location.
6. Equipment that may overload or overheat, such as motors or transformers, require thermal overload cutoff switches or alarms.

Class I, Div. 2 Purge and pressurization

Start-Up Conditions
Protection Method: Type "Z" Purge/Pressurization System
Powering Method: Local Disconnect Switch
System Status: Protected Equipment De-energized, Alarm System and Air Supply On

Operating Procedures
1. Check operation of enclosure pressure relief device (if utilized) and seal the protected enclosure.
2. Pressurize the protected enclosure to set and maintain a minimum positive pressure of 0.10 inches (2.5 mm) of water.
3. Exchange the recommended volumes of purging gas. **Exception:** Power may be energized immediately if the protected enclosure atmosphere is known to be nonflammable.
4. Energize the protected equipment power manually with a disconnect switch or breaker rated for the hazardous location.
5. Loss of pressurization requires immediate attention or the manual de-energizing of protected equipment power.
6. Excessively hot equipment must be isolated in a separate protected enclosure, unless the enclosure is marked with a warning which indicates a required cool-down time period before access.
Enclosure Design Considerations

Protected Enclosures

1. All windows should be shatterproof and sized as small as possible.
2. All NFPA 496 required markings should be placed on or near all doors and covers, and should be easily visible.
3. The enclosure should 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, should be firmly secured.
5. The enclosure should be constructed from materials such as metal or polycarbonate to meet 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 should be avoided.
7. The creation of air pockets or other areas which trap flammable gases within the enclosure should be avoided.
8. The enclosure should be located in an area where impact hazards are minimal.
9. A pressure relief device should be used if it is required to protect the enclosure against pressurization system control failure or to allow proper purging system operation.
10. If the enclosure is non-metallic and contains equipment which utilizes or switches power loads greater than 2500 VA, it should be constructed from substantially non-combustible materials, such as materials designed to meet or exceed ANSI/UL94 ratings of 94 V-0 or 94 5V.
11. The enclosure should have no surface area that exceeds 80% of the flammable or ignitable substance's auto-ignition temperature.
12. If the enclosure is protected by a Type X System and can be opened without the use of a tool or key, the door should be equipped with a Division 1-rated power interlock switch to de-energize all equipment that is not suitable for Division 1 areas.

Adjacent & Internal Enclosures

All internal enclosures (within the protected enclosure) should be protected by one of the following means, if the free volume of the internal enclosure exceeds 1.22 cubic inches (20 cm³).

a. Internal enclosures should be ventilated on the top and bottom sides with at least one (1) square inch (6.5 cm²) of opening for each four hundred (400) cubic inches (6560 cm³) of volume within the internal protected enclosure, with a minimum size of one quarter (1/4) inch diameter (6.3 mm); or,

b. Adjacent and internal enclosures should be purged in series with the protected enclosure or be purged separately; or,

c. Equipment within adjacent and internal enclosures should be protected by other means; e.g., explosion-proof enclosures, hermetically sealed housings or intrinsic safety barriers.

Pressure Relief Devices

1. All pressure relief devices should be designed to minimize air leakage, unless intended for dilution or ventilation.
2. All pressure relief devices should be constructed from flame-, shatter- and ignition-proof substances. In addition, they should be designed to prevent the escape of sparks and burning materials.

Calculation of Enclosure and Device Volumes

1. The total volume of all pressurized enclosures, devices and wireways should be considered.
2. All enclosure, device and wireway volumes should be calculated without consideration of internally consumed space. Exceptions: motor starters, rotors, field coils, etc.
3. Cubical device volumes should be calculated as follows:
   \[ \text{Height} \times \text{Width} \times \text{Depth} = \text{ft}^3 \]
   \[ \text{in inches} \div 1728 = \text{ft}^3 \]
   \[ \text{in feet} = \text{ft}^3 \]
4. Cylindrical device volumes may be calculated as follows:
   \[ \pi r^2 \times \text{Cylinder Length} = \text{ft}^3 \]
   \[ \text{in inches} \div 1728 = \text{ft}^3 \]
   \[ \text{in feet} = \text{ft}^3 \]
Most custom and standard enclosures are suitable for purging and pressurization if requirements meet or exceed Type 4 or 12 requirements. However, the use of multiple door fasteners provides a well-sealed enclosure that allows conservation of protective gas.

In this application, a custom-built stainless steel enclosure is fitted with several Pepperl+Fuchs Bebo products, including a Rapid Exchange™ Purging System and an Enclosure Protection Vent.

In this application, a dual pressurization system is mounted above two identical devices that are separately protected to allow independent access. Both devices feature TYPE 4 cases, which makes them suitable for purging as is.

Device Use Considerations

Preface

Device use considerations are based mainly upon common sense and sound engineering practices because while the NFPA and ISA have addressed many other purge factors already discussed, device use is mostly unregulated. Therefore, while the following considerations are based on applications that have been installed and proven, many are presented in the absence of standards. In addition, this section does not address analytical equipment. Remember, the ultimate responsibility for installation approval, regardless of current regulations, lies with the authority having jurisdiction.

Protruding Devices

The use of devices that penetrate the surface of a protected enclosure must be carefully scrutinized. Protruding devices will likely contain electrical components that could either be exposed to the hazardous location or be isolated from the flow of protective gas. Conventional wisdom suggests that a protruding device should be acceptable if it is (1) explosion-proof, (2) intrinsically safe, (3) proven to emit insufficient energy to ignite the surrounding atmosphere (applicable for Division 2 locations only), (4) constructed so that all electronics within its face are suitably sealed from the surrounding environment and properly ventilated to the protected enclosure, or (5) isolated from the surrounding atmosphere by a sealed window or access door that is properly ventilated to the protected enclosure.

Controllers, Indicators & Recorders

Today’s panel-mounted instrumentation is almost strictly electronic. The protruding face of these instruments normally contains LEDs, LCDs and incandescent or florescent lights. Therefore, it is extremely important to isolate all instrumentation from the surrounding atmosphere, unless the face is sealed and all electronics are properly ventilated to the protected enclosure.
Device Use Considerations

Due to the limitations established above, most instruments will require isolation through the use of a sealed access door (see pages 12-13). However, while the instruments are then normally inaccessible, some end users permit "limited access" while maintaining a positive pressure, to perform maintenance, calibration and adjustment. The process of limited access may be accomplished by using Pepperl+Fuchs Bebco Rapid Exchange™ Purging Systems. Special door labeling or purging system automation may also be required. 

**NOTE:** These designs should be reviewed by all parties, especially the authority having jurisdiction, prior to engineering or fabrication commitments.

---

**Peripheral Devices & Instrument Keypads**

Technically speaking, it is impossible to pressurize many peripheral devices, even if they are Type 4 rated. First, most barcoders and wand devices feature no internal cavity. Secondly, the membrane assembly of most peripheral keyboards isolates key contacts from the protected gas. Therefore, all peripheral devices not suitable for pressurization should be protected by intrinsic safety barriers. Furthermore, the barriers and all intrinsically safe wiring should be mechanically isolated from all other devices and wiring in the protected enclosure. Most peripheral devices can be easily modified with intrinsic safety barriers; however, it is very impractical to modify panel mounted instrument keypads. Accepting this fact, such instruments should be located behind a sealed access door that is properly ventilated to the protected enclosure.

**NOTE:** Some end users allow the use of these devices in Division 2 areas without barriers, assuming the normally low energy to these devices will not ignite the surrounding atmosphere. However, the possibility of a ground fault or current overload will always exist without barrier protection.

---

**Operators**

Panel mounted operators such as pushbuttons and selector switches should be Type 4 rated or oil-tight and should not contain illumination devices such as incandescent bulbs, unless they are protected as noted below.

**NOTE:** A majority of end users permit the use of general-purpose illuminated operators in Division 2 areas, if they are isolated from impact with guards.

---

**Pilot Lights**

A pilot light is normally unacceptable unless rated for use in the hazardous location. However, some authorities having jurisdiction permit the use of LED clusters and VDC bulbs, after determining they have insufficient power to ignite the surrounding atmosphere. Other concerns should include impact resistance and potential power dissipation, unless the pilot light is protected as noted.

---

**Internal Devices**

Relays, timers, counters, power supplies and other internally mounted electrical equipment should be ventilated or protected in accordance with the considerations for adjacent and internal enclosures (see page 12). In addition, no devices should exceed 80% of the flammable or ignitable substance auto-ignition temperature, unless (1) it can be shown by testing that the device will not ignite the surrounding atmosphere, (2) the device is enclosed in a hermetically sealed chamber, (3) the protected enclosure is equipped with a temperature warning nameplate, or (4) the device is separately housed and pressurized.

---

**Printers**

In addition to considerations for internal equipment, special attention must be given to printing devices. First, in order to dispense the printed material, protected enclosures may require a “chute” to guide it outward. Second, a “slot” must be incorporated to dispense the printed material, while minimizing the leakage of protective gas. Finally, if the slot dispenses printed material through the top of the protected enclosure, or if printed material is only dispensed periodically, the protected enclosure may also require a cover or a sealed access door to prevent enclosure contamination.

---

**Motors**

Totally enclosed motors, with NEMA ratings such as TENV, TEFC or TEAO, are best suited for pressurization, but the following factors should also be considered. (1) All motors should have sufficient cavities and openings to permit the flow of protective gas around the windings. (2) The gas connections for the supply and return of protective gas should be located at extreme opposite ends of the motor. (3) Peripheral devices such as electrical connections, optical encoders and brakes may require a separate housing, purged in series with the motor. (4) Pressure within the motor should not exceed the minimum requirement, because excessive pressure will force grease out of shaft bearing seals. Finally, Class I motors require 10 volume exchanges before energizing power.
Typical Applications

Cameras & Monitors

Security surveillance is possible in hazardous areas with a P+F purge and pressurization system. Often used for surveillance on unmanned, offshore oil rigs and local refineries, a camera is encased in a Videoalarm Pressure Dome™ and purged with nitrogen using P+F’s 1000 series, Type Y purge system, which allows general-purpose rated equipment to be operated in a Division 2 location. The system regulates and monitors the pressure within the enclosure in order to remove and prevent flammable gas or vapor accumulations. These systems are also used by Homeland Security.

Videoalarm Pressure Dome™ is a trademark of Videoalarm.

Spirax Steam Trap Monitoring

A 1000 series, Type Y purge system enables an existing steam trap monitoring system to be placed in a Division 1 location. Automatic trap monitors enable up to 16 steam traps to be monitored continuously and ensures that the steam system is working at optimum efficiency with a minimum impact on the environment.

Pharmaceuticals

Pharmaceutical companies are able to change from a PLC control to a PC-based control, even if the PC is located in a hazardous location, Class I, Division 1. An explosion-proof box is big, expensive, and won’t allow accessibility to the PC. Pepperl+Fuchs has the solution. With simple modifications, Pepperl+Fuchs can integrate a purge & pressurization system into a stainless steel enclosure so that an industrial visualization unit can be mounted in a hazardous area. This way, general-purpose and hazardous location visualization systems look and feel the same to their workforce.
Typical Applications

Complete Cabinet Solutions

Pepperl+Fuchs is also able to integrate our full line of products into a cabinet that reduces your commissioning time, and most importantly, reduces your upfront costs. Our purge & pressurization units, together with our intrinsic safety, fieldbus, power supply and HART interface products, can be combined into a complete project solution to meet the exact requirements of your application.

Aircraft Laser Projector

Pepperl+Fuchs purge & pressurization systems are extremely valuable in the aircraft industry. Laser units can be enclosed in a specially-designed enclosure that enables the laser beam to project through a widow and on to an aircraft. The unit is purged using a P+F purging system mounted directly on the enclosure. These systems are certified for use in Ex [p], Class I, Division 1 / Zone 1 to nonhazardous area applications. Stripes, logos, and text are projected on to the body of an aircraft while it is in the hangar. Robots paint the aircraft body with no taping or stencils. It greatly reduces prep time and safely ensures precise positioning of the text and logos.

Filling & Weighing

Beginning with the controls, protection of a filling or weighing system is simple. Weigh scale platform equipment is usually easy to pressurize, or may be available in intrinsically safe versions. From there, filling equipment, such as solenoids, motors, servos and dribble valves can be protected in a number of ways. Finally, to complete the application, on-site, real-time printouts of tickets, reports or product labels can be obtained by adding custom-built pressurized enclosures for the printing equipment.
### System & Vent Selection Guide

- Introduction to Purge and Pressurization Systems for Types Y, Z and Ex [nP] ........................................... 21
  - Components for Class I/Zone 2 and Class II ................................................................. 22
  - Type Y and Z Table of Contents ......................................................................................... 23

### Type Y and Z Systems (1000 Series)

- 1001A: Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³, WPS Only ............... 25
- 1001B: Class II Enclosure Volumes ≤ 50 ft³ ........................................................................... 27
- 1001C: Class II Enclosure Volumes ≤ 250 ft³ .......................................................................... 29
- 1002: Class I Enclosure Volumes ≤ 15 ft³ ............................................................................. 31
- 1003: Class I Enclosure Volumes ≤ 75 ft³ ............................................................................. 33
- 1004: Class I Enclosure Volumes ≤ 200 ft³ .......................................................................... 35
- 1005: Class I Enclosure Volumes ≤ 450 ft³ .......................................................................... 37
- 11: Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³, WPS and WPSA ....... 39

### Type Z Systems (1000 Series)

- 1011: Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³ ......................... 41
- 1012: Class I Enclosure Volumes ≤ 15 ft³ ............................................................................. 43

### Type Y, Z and Ex [nP] Systems (3000 Series)

- 3003: Class I Enclosure Volumes ≤ 90 ft³ (2.54 m³) ........................................................................ 45
- 3004: Class I Enclosure Volumes ≤ 250 ft³ (7.08 m³) .................................................................... 53

### Introduction to Purge and Pressurization Systems for Types X and Ex [px] .............................................. 61

### Type X Systems (2000 Series)

- 2001A: Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³ ......................... 63
- 2001B: Class II Enclosure Volumes ≤ 50 ft³ ............................................................................. 67
- 2001C: Class II Enclosure Volumes ≤ 250 ft³ .......................................................................... 71
- 2002: Class I Enclosure Volumes ≤ 15 ft³ ............................................................................. 75
- 2003: Class I Enclosure Volumes ≤ 75 ft³ ............................................................................. 79
- 2004: Class I Enclosure Volumes ≤ 200 ft³ .......................................................................... 83
- 2005: Class I Enclosure Volumes ≤ 450 ft³ .......................................................................... 87

### Type X and Ex [px] Systems (6000 Series)

- 6000: Class I & II / Zone I & 21, Enclosure Volumes ≤ 450 ft³ (12.7 m³) ........................................... 91
# Table of Contents

**Introduction to Accessories** ........................................................................................................................... 109

- Accessories Table of Contents .......................................................................................................................... 110
- Cooler Indicator Gauge ........................................................................................................................................ 111
- Enclosure Protection Vents .................................................................................................................................. 112
- Enclosure Warning & Temperature Nameplates .................................................................................................. 114
- In-Line Filter Kits ................................................................................................................................................. 115
- Enclosure Connection Kits & Tamperproof Regulator ......................................................................................... 116
- Explosion Proof & General-purpose Switch Kits ................................................................................................. 117
- "L" & "T" Style Conduit Fitting Kits .................................................................................................................... 119
- Tubing & Pipe Connection Fitting ........................................................................................................................ 120
- Surface Mounting Kits & Pipe Mounting Kits ....................................................................................................... 122
- Universal Mounting Plates .................................................................................................................................... 124
- Intrinsic Safety Barrier .......................................................................................................................................... 126
- Switch Resistor Module ........................................................................................................................................ 126
- NAMUR Proximity Sensor ..................................................................................................................................... 126
- Key Lock Assembly ................................................................................................................................................. 127
- Redundant Pressure Switch .................................................................................................................................... 127
- Remote Alarm Horn & Beacon Devices .................................................................................................................. 128
- Type Y & Z—1000 Series Model Number Guide ................................................................................................. 130
- Type Y & Z—3000 Series Model Number Guide ................................................................................................. 131
- Type X—2000 Series Model Number Guide ......................................................................................................... 132
- Type X—6000 Series Model Number Guide ......................................................................................................... 133

**Appendix** .................................................................................................................................................................. 135

- Warranty Term and Conditions ............................................................................................................................ 136
- Glossary ................................................................................................................................................................ 137
- Purging Times References .................................................................................................................................... 138-139
- Conversion Charts .................................................................................................................................................. 139-140
- Model Number Index ............................................................................................................................................. 143-144
## EPS® Div. Quick Start*  System & Vent Selection Guide

### CLASS I APPLICATIONS per NFPA 496 (3000 Series also European ATEX approved)

<table>
<thead>
<tr>
<th>APPLICATION INFORMATION</th>
<th>MAXIMUM ENCLOSURE VOLUME</th>
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<tbody>
<tr>
<td>Type  Div. Group Equipment</td>
<td>2 Cubic Feet</td>
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<tr>
<td>Z 2 A-D General Purpose</td>
<td>1001A-LPS-CI 1001A-WPSA-CI 1011-CI 11-LPS-CI</td>
</tr>
<tr>
<td>C &amp; D General Purpose</td>
<td>1001A-WPSA-CI 11-WPS-CI</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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<tr>
<td>C &amp; D Div. 2</td>
<td>1001A-WPSA-CI 11-WPS-CI</td>
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### CLASS II APPLICATIONS per NFPA 496

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<thead>
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<th>APPLICATION INFORMATION</th>
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<td>Type  Div. Group Equipment</td>
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### VENT COMPATIBILITY & FLOW RATE

<table>
<thead>
<tr>
<th>VENT MODEL</th>
<th>SYSTEM MODEL #</th>
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<th>VENT Optional**</th>
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<td>4479</td>
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<td></td>
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<tr>
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<td>1004 &amp; 3004</td>
<td>2510</td>
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<td>124240</td>
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<td>EPV-4</td>
<td>1004 &amp; 3004</td>
<td>2510</td>
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<tr>
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<td>685</td>
<td>1202</td>
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### NOTES

- **SYSTEM SELECTION**: Multiple model number listings within single cube indicate range of choices.
- **TYPE Y & Z SYSTEM MODEL NUMBERS**: LPS indicates Less Pressure Switch
- **WPS indicates With Pressure Switch**
- **WPWA indicates With Pressure Switch Gr. A-D**
- **SA indicates Semiautomatic**
- **FA indicates Fully Automatic**
- **VENT SELECTION**: System Model #: locate selected system in “Vent Required” or “Vent Optional” column. Vent Model: indicates required/optional vent for selected system. SCFH: Normal SCFH measured with enclosure pressure @ 3” (76.2 mm) of water. Max SCFH measured @ 7” (177.8 mm) of water.

*REQUIRED USE INDICATES RAPID EXCHANGE® SYSTEMS THAT REQUIRE A VENT FOR PROPER OPERATION

**OPTIONAL USE INDICATES SYSTEMS THAT REQUIRE A VENT OR REDUNDANT TAMPERPROOF SUPPLY REGULATOR
## EPS® Div. Quick Start* System & Vent Selection Guide

### ZONE APPLICATIONS & FLOW RATE

<table>
<thead>
<tr>
<th>ZONE</th>
<th>MAXIMUM ENCLOSURE VOLUME 2.54 m³ (90 Cubic Feet)</th>
<th>MAXIMUM ENCLOSURE VOLUME 7.08 m³ (250 Cubic Feet)</th>
<th>MODEL NUMBERS</th>
<th>VENT MODEL</th>
<th>FLOW RATE l/hr (SCFH)</th>
<th>MODEL NUMBERS</th>
<th>VENT MODEL</th>
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<td>71083 (2510)</td>
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<td>3004 - WPSA</td>
<td>EPV-4</td>
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### NOTES

- **MAXIMUM ENCLOSURE VOLUME**: Columns indicate maximum volume of enclosure(s) to be protected, not excluding any consumed volumes.
- **SYSTEM SELECTION**: Multiple model number listings within single cube indicate range of choices.

**ZONE 1 MODEL NUMBERS:**
- STD indicates Standard
- SA indicates Semiautomatic
- FA indicates Fully Automatic

**ZONE 2 MODEL NUMBERS:**
- LPS indicates Less Pressure Switch
- WPSA indicates With Pressure Switch

**VENT SELECTION**: System Model #: locate selected system. Vent Model: indicates required vent for selected system. SCFH: Normal SCFH measured with enclosure pressure @ 76.2 mm (3") of water. Max SCFH measured @ 177.8 mm (7") of water.

**RAPID EXCHANGE® SYSTEMS REQUIRE A VENT FOR PROPER OPERATION IN ZONES 1 AND 2.**
For Class I/Zone 2 and Class II Hazardous Areas

Pepperl+Fuchs Bebco EPS YZ Purge panel mount purge/pressurized enclosure systems enable general-purpose devices to be used in a hazardous area by creating a safe area within the enclosure. This is accomplished by purging the hazardous gas or by removing the hazardous dusts from the enclosure before the equipment is energized. The gas used to purge the enclosure can be inert or instrument quality air. Positive pressure in the enclosure prevents intrusion of flammable gases.

Features

- Same panel can be used for Type Y, Z and Ex [pz] systems
- Components mounted on stainless steel panel
- General-purpose equipment can be operated in a Division 2/Zone 2 area, and Division 2 rated equipment can be operated in a Division 1 area
- Enclosure size up to 450 cubic feet
- Optional alarm output indicates air lock failure
- Filter-regulator with pressure gauge provides clean, protective gas to the enclosure
- Optional differential pressure switch for Class I, Group A-D, Zone 1 ATEX certified hazardous area locations
- NFPA 496, ISA 12.4, and ATEX standards
- Type Y system certified for Class I and Class II, Division 1 to Division 2. Type Z system certified for Class I and Class II, Division 2 to nonhazardous area
- Type Ex [pz] certification for Zone 2 hazardous locations
- Environmental purge for nonhazardous areas
- The Leaders in Purging Technology®
Components Classification

Components for Class I/Zone 2

Enclosure Volume Less than 2 Cubic Feet
The YZ Purge and pressurization Class I panels provide the basic components to purge and pressurize an enclosure volume less than two cubic feet. This design comes with the following components mounted to the panel:

- **Regulator** provides regulated protective gas to the enclosure.
- **Differential Pressure Gauge** indicates internal pressure. The gauge is only used in verifying internal pressure and is not used as an alarm indicator.
- **Optional Differential Pressure Switch** provides a contact output when the pressure inside the enclosure drops below 0.1” water pressure. The contact output is used to drive an alarm for pressure loss inside the enclosure.

Enclosure Volume Greater than 2 Cubic Feet
These YZ Purge and pressurization Class I panels provide the basic components to purge and pressurize an enclosure volume greater than two cubic feet. This design comes with the following components mounted to the panel:

- **Filter-Regulator (1000 Series)** cleans and regulates the flow of protective gas to the enclosure.
- **Ball Valve (1000 Series)** acts as a switch to allow protective gas into the enclosure.
- **Needle Valve (1000 Series)** allows the user to adjust the air flow into the enclosure to compensate for leakages while maintaining a safe pressure within the enclosure. This safe pressure is indicated on the differential pressure gauge.
- **Pneumatic Manifold Assembly (3000 Series)** includes a regulator, psi gauge, ball valve and a needle valve.
- **Differential Pressure Gauge** indicates internal pressure. The gauge is only used in verifying internal pressure and is not used as an alarm indicator.
- **Optional Differential Pressure Switch** provides a contact output when the pressure inside the enclosure drops below 0.5” water pressure. The contact output is used to drive an alarm for pressure loss inside the enclosure.

All YZ systems are supplied with startup labels for the panel and warning labels for the enclosure. Panels are constructed of 14 gauge, 316 stainless steel. All fittings and tubing are 316 stainless steel. Specify mount type upon ordering.

A pressure relief vent is required for all pressurized systems regardless of the Class and Division of the installation. Sold separately, the EPV 1, 2, 3, 4, 5 pressure relief vent from Pepperl+Fuchs provides an exhaust during the purge cycle and acts as a relief vent during pressurization.

Components for Class II

The YZ Pressurization Class II panels provide the basic components for pressurizing an enclosure. This design comes with the following components mounted to the panel:

- **Regulator** provides regulated protective gas to the enclosure.
- **Differential Pressure Gauge** indicates internal pressure. The gauge is only used in verifying internal pressure and is not used as an alarm indicator.
- **Optional Differential Pressure Switch** provides a contact output when the pressure inside the enclosure drops below 0.1” water pressure. The contact output is used to drive an alarm for pressure loss inside the enclosure.
### Type Y and Z Systems (1000 Series)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001A</td>
<td>Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³, WPS Only</td>
<td>25</td>
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<td>1001B</td>
<td>Class II Enclosure Volumes ≤ 50 ft³</td>
<td>27</td>
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<td>1001C</td>
<td>Class II Enclosure Volumes ≤ 250 ft³</td>
<td>29</td>
</tr>
<tr>
<td>1002</td>
<td>Class I Enclosure Volumes ≤ 15 ft³</td>
<td>31</td>
</tr>
<tr>
<td>1003</td>
<td>Class I Enclosure Volumes ≤ 75 ft³</td>
<td>33</td>
</tr>
<tr>
<td>1004</td>
<td>Class I Enclosure Volumes ≤ 200 ft³</td>
<td>35</td>
</tr>
<tr>
<td>1005</td>
<td>Class I Enclosure Volumes ≤ 450 ft³</td>
<td>37</td>
</tr>
<tr>
<td>11</td>
<td>Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³, WPS and WPSA</td>
<td>39</td>
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### Type Z Systems (1000 Series)

<table>
<thead>
<tr>
<th>Type</th>
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<th>Page</th>
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<tbody>
<tr>
<td>1011</td>
<td>Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³</td>
<td>41</td>
</tr>
<tr>
<td>1012</td>
<td>Class I Enclosure Volumes ≤ 15 ft³</td>
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### Type Y, Z and Ex [pz] Systems (3000 Series)

<table>
<thead>
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<th>Description</th>
<th>Page</th>
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<tr>
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<td>Class I Enclosure Volumes ≤ 90 ft³ (2.54 m³)</td>
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<td>3004</td>
<td>Class I Enclosure Volumes ≤ 250 ft³ (7.08 m³)</td>
<td>53</td>
</tr>
</tbody>
</table>
Class I (≤ 2 ft³) and Class II (≤ 10 ft³)

Model 1001A

Description

Model 1001A is an enclosure pressurization or purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation or remove and prevent flammable gas or vapor accumulations. In Class II areas, the system maintains a "safe" (1.0") pressure. In Class I areas, the system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. These processes reduce the hazardous (classified) area rating within the enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. In Class II areas, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. In Class II areas, power can be energized when safe pressure is stable. In Class I areas, the user must perform an exchange cycle (determined by the safe pressure flow rate—five minutes minimum) before power can be energized. Loss of safe pressure in Class I or II areas requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

System Specifications

System Dimensions: See page 26
Shipping Weight: LPS - 5 lb / WPS - 10 lb
Temp. Range: -20 °F to +120 °F
Supply Pressure Range: * 5 - 120 psi
Supply Requirements: Clean air or inert gas
Safe Press. (Cl/CII): 0.25"/1.0"
Safe Press. Flow Rate: ** 0.1 - 3.5 SCFH
System Supply Fitting: ¼" tube fitting
Enclosure Supply Fitting: ¼" tube fitting
Enclosure Reference Fitting: 0.15"/0.5" ± 0.02"
Switch Setting (Cl/CII, Decr): 1/2" FPT
Switch Contact Rating
WPS Style: 120 VAC @ 15 A
WPSA Style: *** 120 VAC @ 10 A, 125 VDC @ 50 mA
Switch (WPSA) Power Requirement: 24 VDC @ 3 watts
120 VAC @ 4 watts
240 VAC @ 11 watts

* With EPV-1 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.
** Enclosure integrity determines actual flow rate
*** Supply voltages 24 VDC and 240 VAC available upon request. For wiring schematic see page 118

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number: 1001A-CI Type Y</th>
<th>Model Number: 1001A-CII Type Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation: Purging System</td>
<td>Designation: Pressurization System</td>
</tr>
<tr>
<td>Enclosure Volume: 2 ft³ max.</td>
<td>Enclosure Volume: 10 ft³ max.</td>
</tr>
<tr>
<td>LPS Style</td>
<td>LPS Style</td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>UL &amp; FM Certified: Cl. II, Div. 1, Group A-D</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
<tr>
<td>WPS Style</td>
<td>WPS Style</td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group C&amp;D</td>
<td>UL &amp; FM Certified: Cl. II, Div. 1, Group F &amp; G</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
<tr>
<td>WPSA Style</td>
<td>WPSA Style</td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>UL &amp; FM Certified: Cl. II, Div. 1, Group F &amp; G</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
</tbody>
</table>

Class I (≤ 2 ft³) and Class II (≤ 10 ft³)

Model 1001A

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)
**Material Specifications**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulator Body</td>
<td>Zinc w/Enamel Finish</td>
</tr>
<tr>
<td>Regulator Handle</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Enclosure Pressure Gauge</td>
<td>Alum. w/Enamel Finish</td>
</tr>
<tr>
<td>Tube Fittings</td>
<td>316 SS Forged Body</td>
</tr>
<tr>
<td>Tubing</td>
<td>316 SS 1/4&quot; .035 Welded</td>
</tr>
<tr>
<td>System Nameplates</td>
<td>Silk screened Lexan® &amp; SS</td>
</tr>
<tr>
<td>Fastener Hardware</td>
<td>Alum. &amp; Stainless Steel</td>
</tr>
<tr>
<td>Mounting Plate</td>
<td>316 14 Ga #3 Brush SS</td>
</tr>
<tr>
<td>EXP Pressure Switch Body</td>
<td>Anodized Cast Alum.</td>
</tr>
<tr>
<td>ENCLOSURE WARNING NAMEPLATE</td>
<td>Silk screened SS</td>
</tr>
</tbody>
</table>

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**Model Number Designations**

<table>
<thead>
<tr>
<th>1001A</th>
<th>LPS</th>
<th>CI</th>
<th>YZ</th>
<th>LH</th>
<th>##</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Series Model Number**

<table>
<thead>
<tr>
<th>System Style</th>
<th>LPS - less pressure switch</th>
<th>WPS - with pressure switch</th>
<th>WPSA - with pressure switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Classification</td>
<td>CI - Class I Area</td>
<td>CII - Class II Area</td>
<td></td>
</tr>
<tr>
<td>System Type</td>
<td>YZ - Div. 1 to Div. 2, Div. 2 to Nonhazardous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting Configuration</td>
<td>LH - left hand</td>
<td>RH - right hand</td>
<td>TM - top mount</td>
</tr>
</tbody>
</table>

(Not available in WPS Style)

## - See Accessories Page 130 for additional factory installed accessories

**Model 1001A System Accessories**

(See accessories page for complete details)

**FACTORY INSTALLED FITTINGS**

<table>
<thead>
<tr>
<th>ECK-1001A</th>
<th>Enclosure Connection Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFC-4</td>
<td>1/4&quot; Flush Connector</td>
</tr>
<tr>
<td>EBC-4</td>
<td>1/4&quot; Bulkhead Connector</td>
</tr>
<tr>
<td>EPC-10</td>
<td>1/2&quot; Pipe Connector</td>
</tr>
</tbody>
</table>

**ADDITIONAL ITEMS**

| ILF-4 | 1/4" Filter |
| SMK-1 | System Mounting Kit |
| EPSK-1 | Explosion Proof Switch Kit |

**OPTIONAL ENCLOSURE PROTECTION VENTS**

| EPV-1-SA-00 | Straight w/Spark Arrestor |
| EPV-1-SA-90 | Rt Angle w/Spark Arrestor |

**GENERAL ACCESSORIES**

| GPSK-1 or -2 | General-purpose Switch Kit |
| RAH           | Div. 1 Remote Alarm Horn   |
| RAB-1         | Div. 1 Remote Alarm Beacon |
| RAB-2         | Div. 2 Remote Alarm Beacon |
| LCK           | L Fitting Conduit Kit     |
| TCK           | T Fitting Conduit Kit     |

**WARNING NAMEPLATES**

| EWN-1 | Class I Enclosure Warning |
| EWN-2 | Class II Enclosure Warning |

**INSTALLATION & OPERATION MANUAL**

| 129-0197 | Inst. & Operation Manual |

**Overall System Dimensions**

<table>
<thead>
<tr>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM &amp; PM - surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>7 / 12</td>
<td>7 / 12</td>
<td>7 / 8</td>
<td>7 / 8</td>
<td>7 / 12</td>
<td>9 / 14</td>
</tr>
<tr>
<td>Width</td>
<td>8 / 8</td>
<td>8 / 8</td>
<td>8 / 13.375</td>
<td>8 / 13.375</td>
<td>8 / 8</td>
<td>10 / 10</td>
</tr>
<tr>
<td>Depth</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>7.5 / 9.25</td>
<td>5 / 6.5</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 8h x 9w. WPS - 13h x 9w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Type Y & Z

**Description**

Model 1001B is an enclosure pressurization system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation by maintaining a "safe" (1.0") pressure. 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 12.4.

**Operation**

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. Before start-up, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. Power can be energized when safe pressure is stable. Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

**System Specifications**

- **System Dimensions:** See page 28
- **Shipping Weight:** LPS - 7 lb / WPS - 12 lb
- **Temp. Range:** -20 °F to +120 °F
- **Supply Pressure Range:** * 5 - 120 psi
- **Supply Requirements:** clean air or inert gas
- **Safe Press. Setpoint:** 1.0"
- **Safe Press. Flow Rate:** ** 0.1 - 3.5 SCFH
- **System Supply Fitting:** 3/8" tube fitting
- **Enclosure Supply Fitting:** 3/8" tube fitting
- **Enclosure Reference Fitting:** 1/4" tube fitting
- **Switch Setting (Decr):** 0.5" ± 0.02"
- **Switch Conduit Port Size:** 1/2" FPT
- **Switch Contact Rating:** 120 VAC @ 15 A

* With EPV-3 Vent - 120 psi max. to 5 psi min.
  Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.
** Enclosure integrity determines actual flow rate
  For wiring schematic see page 118

---

**Standard Model Applications**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Designation</th>
<th>Enclosure Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001B-CII Type Y</td>
<td>Pressurization System</td>
<td>50 ft³ max.</td>
</tr>
<tr>
<td>1001B-CII Type Z</td>
<td>Pressurization System</td>
<td>50 ft³ max.</td>
</tr>
</tbody>
</table>

**LPS Style**

- UL & FM Certified: Cl. II, Div. 1, Group F&G
- Rating Reduction: Div. 1 to Div. 2

**WPS Style**

- UL & FM Certified: Cl. II, Div. 1, Group F&G
- Rating Reduction: Div. 1 to Div. 2

---

**Model 1001B**

- LPS Style
  - (Less Pressure Switch)
- WPS Style
  - (With Pressure Switch)
**Type Y & Z**

**System Accessories Diagram**

- **3/8” Supply Tubing**
- **1/4” Tubing Reference**
- **Enclosure Supply Fitting EBC-6**
- **Enclosure Reference Fitting EFC-4**
- **Enclosure Protection Vent EPV-3-SA...**
  - (EPV vent not required when using the TR-10G tamperproof regulator as redundancy)
- **Pressurized Protected Enclosure**
- **Warning Nameplate EWN-2** (Included with Panel)

**Model 1001B System Accessories**

**Optional Hex Key Regulator Handle**

- TR-10G Tamperproof Regulator

**Warming Nameplates**

- EWN-2 Class II Enclosure Warning
- ETW Enclosure Temperature Warning

**Installation & Operation Manual**

- 129-0201 Inst. & Operation Manual

**Model Number Designations**

- **Series Model Number**
- **System Style**
  - LPS - less pressure switch
  - WPS - with pressure switch
- **Area Classification**
  - CII - Class II Area
- **System Type**
  - YZ - Div. 1 to Div. 2, Div. 2 to Nonhazardous
- **Mounting Configuration**
  - LH - left hand
  - RH - right hand
  - TM - top mount
  - BM - bottom mount
  - WM - wall mount
  - FM - frame mount
  - PM - panel mount

- **# - See Accessories Page 130 for additional factory installed accessories**

**Material Specifications**

- **Regulator Body**: Zinc w/Enamel Finish
- **Regulator Handle**: Polycarbonate
- **Enclosure Pressure Gauge**: Alum. w/Enamel Finish
- **Tube Fittings**: 316 SS Forged Body
- **Tubing**: 316 SS 1/4”, .035 Welded
- **System Nameplates**: Silk screened Lexan® & SS
- **Fastener Hardware**: Alum. & Stainless Steel
- **Mounting Plate**: 316 14 Ga #3 Brush SS
- **EXP Pressure Switch Body**: Anodized Cast Alum.
- **Enclosure Warning Nameplate**: Silk screened SS

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**System Supplies Inlet**

- **Enclosure Pressure Gauge**
- **Venturi Orifice**

**Dimensions**

- **Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.**

**Overall System Dimensions**

<table>
<thead>
<tr>
<th></th>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM &amp; PM - surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td></td>
<td>7 / 12</td>
<td>7 / 12</td>
<td>7 / 8</td>
<td>7 / 8</td>
<td>7 / 12</td>
<td>9 / 14</td>
</tr>
<tr>
<td>Depth</td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>7.5 / 9.25</td>
<td>4.75 / 6.5</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 8h x 9.875w; WPS - 13h x 9.875w.

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Model 1001C is an enclosure pressurization system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation by maintaining a “safe” (1.0") pressure. 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 12.4.

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. Before start-up, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. Power can be energized when safe pressure is stable. Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form “C” contacts for audible or visual alarm systems.

System Specifications

- System Dimensions: See page 30
- Shipping Weight: LPS - 7 lb / WPS - 12 lb
- Temp. Range: -20 °F to +120 °F
- Supply Pressure Range: * 5 - 120 psi
- Supply Requirements: clean air or inert gas
- Safe Press. Setpoint: 1.0"
- Safe Press. Flow Rate: ** 0.1 - 3.5 SCFH
- System Supply Fitting: 1/2" tube fitting
- Enclosure Supply Fitting: 1/2" tube fitting
- Enclosure Reference Fitting: 1/4" tube fitting
- Switch Setting (Decr): 0.5" ± 0.02"
- Switch Conduit Port Size: 1/2” FPT
- Switch Contact Rating: 120 VAC @ 15 A

* With EPV-4 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.
** Enclosure integrity determines actual flow rate

For wiring schematic see page 118

Model 1001C

- LPS Style (Less Pressure Switch)
- WPS Style (With Pressure Switch)

UL & FM Certified: Cl. II, Div. 1, Group F&G
Rating Reduction: Div.1 to Div. 2

WPS Style

UL & FM Certified: Cl. II, Div. 2, Group F&G
Rating Reduction: Div. 2 to Nonhazardous

Standard Model Applications
**Material Specifications**

- **Regulator Body:** Zinc w/Enamel Finish
- **Regulator Handle:** Polycarbonate
- **Enclosure Pressure Gauge:** Alum. w/Enamel Finish
- **Tubing:** 316 SS 1/4", .035 Welded
- **System Nameplates:** Silk screened Lexan® & SS
- **Fastener Hardware:** Alum. & Stainless Steel
- **Mounting Plate:** 316 14 Ga #3 Brush SS
- **EXP Pressure Switch Body:** Anodized Cast Alum.
- **Enclosure Warning Nameplate:** Silk screened SS

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**Model Number Designations**

- **Series Model Number:** 1001C - LPS - CII - YZ - LH - ##
- **System Style:** LPS - less pressure switch  WPS - with pressure switch
- **Area Classification:** CII - Class II Area
- **System Type:** YZ - Div. 1 to Div. 2, Div. 2 to Nonhazardous
- **Mounting Configuration:** LH - left hand  RH - right hand  TM - top mount  BM - bottom mount  WM - wall mount  FM - frame mount  PM - panel mount

---

**Model 1001C System Accessories** (See accessories page for complete details)

**CONNECTION FITTINGS & FILTER**

- **EFC-4:** 1/4" Flush Connector  1/2" Flush Connector
- **EFC-8:** 1/2" Bulkhead Connector  1 1/2" Pipe Connector
- **EPC-14:** 1 1/2" Filter w/Clear Bowl
- **ILF-8:** 1/2" Filter

**ADDITIONAL ITEMS**

- **ILF-8:** 1/2" Filter  **SMK-1, -4 or -6:** System Mounting Kit

**OPTIONAL HEX KEY REGULATOR HANDLE**

- **TR-30G:** Tamperproof Regulator

**WARNING NAMEPLATES**

- **EWN-2:** Class II Enclosure Warning  **ETW:** Enclosure Temperature Warning

**INSTALLATION & OPERATION MANUAL**

- **129-0202:** Inst. & Operation Manual

---

**ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM**

---

**Overall System Dimensions**

<table>
<thead>
<tr>
<th></th>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM &amp; PM - surface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height</strong></td>
<td></td>
<td>7 / 12</td>
<td>7 / 12</td>
<td>7 / 8</td>
<td>7 / 8</td>
<td>7 / 12</td>
<td>9 / 14</td>
</tr>
<tr>
<td><strong>Depth</strong></td>
<td></td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>6 / 7.25</td>
<td>7.5 / 9.25</td>
<td>4.75 / 6.5</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 8h x 9.875w  WPS - 13h x 9.875w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Type Y & Z

Description

Model 1002 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a “safe” (0.25”) pressure. A Pepperl+Fuchs Model EPV-2 Enclosure Protection Vent is required for proper operation. 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 12.4.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The enclosure pressure control valve is then used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve must be fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve must be disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion-proof differential pressure switch with form “C” contacts for audible or visual alarm systems.

System Specifications

<table>
<thead>
<tr>
<th>System Dimensions:</th>
<th>See page 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Weight:</td>
<td>LPS - 10 lb / WPS - 15 lb</td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
</tr>
<tr>
<td>Supply Pressure Range:</td>
<td>80 - 120 psi</td>
</tr>
<tr>
<td>Capacity &amp; Filtration:</td>
<td>1.5 oz @ 20 Micron</td>
</tr>
<tr>
<td>Supply Requirements:</td>
<td>clean air or inert gas</td>
</tr>
<tr>
<td>Safe Press. Setpoint:</td>
<td>0.25”</td>
</tr>
<tr>
<td>Safe Press. Flow Rate:</td>
<td>* 0.1 - 3.5 SCFH</td>
</tr>
<tr>
<td>Exchange Pressure:</td>
<td>3” - 5”</td>
</tr>
<tr>
<td>Exchange Flow Rate:</td>
<td>** 4 SCFM / 240 SCFH</td>
</tr>
<tr>
<td>Exchange Time:</td>
<td>1 min/ft³</td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>1/4” FPT</td>
</tr>
<tr>
<td>Enclosure Supply Fitting:</td>
<td>1/4” tube fitting</td>
</tr>
<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4” tube fitting</td>
</tr>
<tr>
<td>Switch Setting (Decr):</td>
<td>0.15” ± 0.02”</td>
</tr>
<tr>
<td>Switch Conduit Port Size:</td>
<td>1/2” FPT</td>
</tr>
<tr>
<td>Switch Contact Rating:</td>
<td></td>
</tr>
<tr>
<td>WPS Style:</td>
<td>120 VAC @ 15 A</td>
</tr>
<tr>
<td>WPSA Style:</td>
<td>**” 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA</td>
</tr>
</tbody>
</table>

Switch (WPSA) Power Requirement: 24 / 120 / 240 VDC @ 3/4/11 watts

* Enclosure integrity determines actual flow rate
** With regulator set to 60 psi min. during exchange.
*** Supply voltages 24 VDC and 240 VAC available upon request.

Standard Model Applications

- **LPS Style**
  - UL & FM Certified: Cl. I, Div.1, Group A-D
  - Rating Reduction: Div.1 to Div. 2

- **WPS Style**
  - UL & FM Certified: Cl. I, Div.1, Group C&D
  - Rating Reduction: Div. 1 to Div.2

- **WPSA Style**
  - UL & FM Certified: Cl. I, Div. 1, Group A-D
  - Rating Reduction: Div. 1 to Div. 2

**Class I (≤ 15 ft³)**

WPS/WPSA Style (With Pressure Switch)
## Model 1002 System Accessories (See accessories page for complete details)

**CONNECTION FITTINGS**
- SC-4 or NC-4
- EFC-4
- EBC-4
- EPC-12

**ADDITIONAL ITEMS**
- SMK-2 or -8
- EPSK-1
- GPSK-1

**RAH** Remote Alarm Horn
- RAB-1: Div. 1 Remote Alarm Beacon
- RAB-2: Div. 2 Remote Alarm Beacon
- LCK: L Fitting Conduit Kit
- TCK: T Fitting Conduit Kit

**WARNING NAMEPLATES**
- EWN-1: Class I/II Area Warning
- ETW: Temperature Warning

**ENCLOSURE PROTECTION VENTS**
- EPV-2-SA-00: Straight w/Spark Arrestor
- EPV-2-SA-90: Rt Angle w/Spark Arrestor

### Overall System Dimensions

<table>
<thead>
<tr>
<th></th>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10 / 15</td>
<td>11 / 11</td>
<td>10 / 15</td>
<td>11 / 10</td>
<td>10 / 15</td>
<td>11 / 11</td>
<td>12 / 17</td>
</tr>
<tr>
<td>Depth</td>
<td>6 / 7.5</td>
<td>6 / 7.5</td>
<td>6 / 7</td>
<td>6 / 7.5</td>
<td>7.75 / 9.25</td>
<td>5 / 6.5</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 11x 12; WPS - 16x 12.

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.

---

**System Accessories Diagram**

- Supply Inlet Fitting: SC-4 or NC-4
- 1/4" Supply Tubing
- 1/4" Tubing Reference
- Enclosure Supply Fitting: EBC-4
- Enclosure Reference Fitting: EFC-4
- Enclosure Protection Vent: EPV-2-SA...
- Pressurized Protected Enclosure
- Warning Nameplate EWN-1 (Included with Panel)

**Model Number Designations**

- Series Model Number: 1002 - LPS - CI - YZ - LH - ##
- System Style: LPS - less pressure switch, WPS - with pressure switch, WPSA - with pressure switch
- Area Classification: CI - Class I Area
- System Type: YZ - Div. 1 to Div. 2, Div. 2 to Nonhazardous
- Mounting Configuration: LH - left hand, RH - right hand, TM - top mount, BM - bottom mount, WM - wall mount, FM - frame mount, PM - panel mount

**Material Specifications**

- Filter Regulator Body: Zinc w/Enamel Finish
- Regulator Handle & Bowl: Polycarbonate
- Enclosure Pressure Gauge: Alum. w/Enamel Finish
- Rapid Exchange® Control Valve: Poly Case & Brass Tube
- Tubing: 316 SS 1/4" .035 Welded
- System Nameplates: Silk screened Lexan® & SS
- Fastener Hardware: Alum. & Stainless Steel
- Mounting Plate: 316 SS 1/4 #3 Brush SS
- EXP Pressure Switch Body: Anodized Cast Alum.
- Enclosure Warning Nameplate: Silk screened SS

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**Installation & Operation Manual**


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**Pepperl + Fuchs Group**

- Singapore: +65 67799091
- USA: 330 486 0002

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**PEPPERL+FUCHS**

- www.pepperl-fuchs.com
**Description**

Model 1003 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a *safe* (0.25") pressure. A Pepperl+Fuchs Model EPV-3 Enclosure Protection Vent is required for proper operation. 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 12.4.

**Operation**

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The enclosure pressure control valve is then used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve must be fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve must be disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

**System Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>LPS Style (Less Pressure Switch)</th>
<th>WPS/WPSA Style (With Pressure Switch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Dimensions:</td>
<td>See page 34</td>
<td></td>
</tr>
<tr>
<td>Shipping Weight:</td>
<td>LPS - 12 lb / WPS - 17 lb</td>
<td></td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
<td></td>
</tr>
<tr>
<td>Supply Pressure Range:</td>
<td>80 - 120 psi</td>
<td></td>
</tr>
<tr>
<td>Capacity &amp; Filtration:</td>
<td>3.8 oz @ 40 Micron</td>
<td></td>
</tr>
<tr>
<td>Supply Requirements:</td>
<td>clean air or inert gas</td>
<td></td>
</tr>
<tr>
<td>Safe Press. Setpoint:</td>
<td>0.25&quot;</td>
<td></td>
</tr>
<tr>
<td>Safe Press. Flow Rate:</td>
<td>* 0.1 - 3.5 SCFH</td>
<td></td>
</tr>
<tr>
<td>Exchange Pressure:</td>
<td>** 3&quot; - 5&quot;</td>
<td></td>
</tr>
<tr>
<td>Exchange Flow Rate:</td>
<td>** 10 SCFM / 600 SCFH</td>
<td></td>
</tr>
<tr>
<td>Exchange Time:</td>
<td>1 min / 2.5 ft²</td>
<td></td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>3/8&quot; FPT</td>
<td></td>
</tr>
<tr>
<td>Enclosure Supply Fitting:</td>
<td>3/8&quot; tube fitting</td>
<td></td>
</tr>
<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4&quot; tube fitting</td>
<td></td>
</tr>
<tr>
<td>Switch Setting (Decr):</td>
<td>0.15&quot; ± 0.02&quot;</td>
<td></td>
</tr>
<tr>
<td>Switch Conduit Port Size:</td>
<td>1/2&quot; FPT</td>
<td></td>
</tr>
<tr>
<td>Switch Contact Rating</td>
<td>WPS: 120 VAC @ 15 A</td>
<td>WPSA: 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA</td>
</tr>
<tr>
<td>WPSA Style:</td>
<td>&quot;* 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA</td>
<td></td>
</tr>
<tr>
<td>(WPSA) Power Requirement:</td>
<td>24 / 120 / 240 VDC @ 3 / 4 /11 watts</td>
<td></td>
</tr>
</tbody>
</table>

* Enclosure integrity determines actual flow rate

**Standard Model Applications**

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>1003 Type Y</th>
<th>1003 Type Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation:</td>
<td>Purging System</td>
<td>Purging System</td>
</tr>
<tr>
<td>Enclosure Volume:</td>
<td>75 ft³ max.</td>
<td>75 ft³ max.</td>
</tr>
</tbody>
</table>

**LPS Style**

| UL & FM Certified: | Cl. I, Div. 1, Group A-D |
| Rating Reduction: | Div. 1 to Div. 2 |

**WPS Style**

| UL & FM Certified: | Cl. I, Div. 1, Group C&D |
| Rating Reduction: | Div. 1 to Div. 2 |

**WPSA Style**

| UL & FM Certified: | Cl. I, Div. 1, Group A-D |
| Rating Reduction: | Div. 1 to Div. 2 |

*With regulator set to 60 psi min. during exchange. Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.

***Supply voltages 24 VDC and 240 VAC available upon request.

For wiring schematic see page 118
### Description

Model 1004 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. A Pepperl+Fuchs Model EPV-4 Enclosure Protection Vent is required for proper operation. 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 12.4.

### Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The enclosure pressure control valve is then used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve must be fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve must be disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

### System Specifications

**System Dimensions:**
- See page 36
**Shipping Weight:**
- LPS - 15 lb / WPS - 23 lb
**Temp. Range:**
- -20 °F to +120 °F
**Supply Pressure Range:**
- 80 - 120 psi
**Capacity & Filtration:**
- 8.5oz @ 40 Micron
**Supply Requirements:**
- clean air or inert gas
**Safe Press. Setpoint:**
- 0.25"
**Safe Press. Flow Rate:**
- * 0.1 - 3.5 SCFH
**Exchange Pressure:**
- 3" - 5"
**Exchange Flow Rate:**
- ** 30 SCFM /1800 SCFH
**Exchange Time:**
- 1 min / 7.5 ft³
**System Supply Port:**
- 1/2" FPT
**Enclosure Supply Fitting:**
- 1/2" tube fitting
**Enclosure Reference Fitting:**
- 1/4" tube fitting
**Switch Setting (Decr):**
- 0.15" ± 0.02"
**Switch Conduit Port Size:**
- 1/2" FPT
**Switch Contact Rating:**
- WPS Style: 120 VAC @ 15 A
- WPSA Style: *** 120/220 VAC, 24 VDC @ 10 A, 125 VDC @ 50 mA
**Switch (WPSA) Power Requirement:**
- 24 / 120 / 240 VDC @ 3 /4 /11 watts

* Enclosure integrity determines actual flow rate
** With regulator set to 80psimin during exchange. Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.
*** Supply voltages 24 VDC and 240 VAC available upon request.

For wiring schematic see page 118

### Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number: 1004 Type Y</th>
<th>1004 Type Z</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Purging System</td>
<td>Purging System</td>
</tr>
<tr>
<td><strong>Enclosure Volume:</strong> 200 ft³ max.</td>
<td>200 ft³ max.</td>
</tr>
<tr>
<td><strong>LPS Style</strong></td>
<td><strong>LPS Style</strong></td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group A-D</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td><strong>WPS Style</strong></td>
<td><strong>WPS Style</strong></td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group C&amp;D</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group C&amp;D</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td><strong>WPSA Style</strong></td>
<td><strong>WPSA Style</strong></td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group A-D</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Div. 2</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
</tbody>
</table>
**Model 1004 System Accessories** (See accessories page for complete details)

<table>
<thead>
<tr>
<th>CONNECTION FITTINGS</th>
<th>WARNING NAMEPLATES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NC-8</strong> 1/2&quot; Ninety Connector</td>
<td><strong>GPSK-1</strong> General-purpose Switch Kit</td>
</tr>
<tr>
<td><strong>SC-8</strong> 1/2&quot; Straight Connector</td>
<td><strong>RAH</strong> Remote Alarm Horn</td>
</tr>
<tr>
<td><strong>EFC-4</strong> 1/4&quot; Flush Connector</td>
<td><strong>RAB-1</strong> Div. 1 Remote Alarm Beacon</td>
</tr>
<tr>
<td><strong>EFC-8</strong> 1/2&quot; Flush Connector</td>
<td><strong>RAB-2</strong> Div. 2 Remote Alarm Beacon</td>
</tr>
<tr>
<td><strong>EBC-8</strong> 1/2&quot; Bulkhead Connector</td>
<td><strong>LCK</strong> L Fitting Conduit Kit</td>
</tr>
<tr>
<td><strong>EPC-14</strong> 1 1/2&quot; Pipe Connector</td>
<td><strong>TCK</strong> T Fitting Conduit Kit</td>
</tr>
<tr>
<td><strong>SMK-2 or 8</strong> System Mounting Kit</td>
<td><strong>ENCLOSURE PROTECTION VENTS</strong></td>
</tr>
<tr>
<td><strong>EPSK-1</strong> Explosion Proof Switch Kit</td>
<td><strong>ONE VENT REQUIRED WITH EACH SYSTEM</strong></td>
</tr>
<tr>
<td><strong>EPV-4-SA-00</strong> Straight w/Sparke Arrestor</td>
<td><strong>EPV-4-SA-90</strong> Rt Angle w/Sparke Arrestor</td>
</tr>
</tbody>
</table>

---

**Model Number Designations**

- **1004 - LPS - CI - YZ - LH - ##**

**System Type**
- **YZ** - Div. 1 to Div. 2, Div. 2 to Nonhazardous

**Mounting Configuration**
- **LH** - left hand
- **RH** - right hand
- **TM** - top mount
- **BM** - bottom mount
- **WM** - wall mount
- **FM** - frame mount
- **PM** - panel mount

**Area Classification**
- **CI** - Class I Area

---

**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
- **System Nameplates:** Silkscreened Lexan® & SS
- **Fastener Hardware:** Alum. & Stainless Steel
- **EXP Pressure Switch Body:** Anodized Cast Alum.
- **Enclosure Warning Nameplate:** Silkscreened SS

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**System Accessories Diagram**

- **Connection Points Shown Above in Bold Text on System Diagram**

---

**Overall System Dimensions**

<table>
<thead>
<tr>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>12 / 16.25</td>
<td>12 / 16.25</td>
<td>12 / 12</td>
<td>12 / 12</td>
<td>12 / 15</td>
<td>14 / 18.25</td>
</tr>
<tr>
<td>Width</td>
<td>13.5 / 13.5</td>
<td>13.5 / 13.5</td>
<td>13.5 / 16.75</td>
<td>13.5 / 16.75</td>
<td>13.5 / 13.5</td>
<td>15.5 / 15.5</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 13h x 14.5w WPS - 17.25h x 14.5w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

Model 1005 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. A Pepperl+Fuchs Model EPV-5 Enclosure Protection Vent is required for proper operation. 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 12.4.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The enclosure pressure control valve is then used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve must be fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve must be disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

System Specifications

System Dimensions: See page 38
Shipping Weight: LPS - 15 lb / WPS - 25 lb
Temp. Range: -20 °F to +120 °F
Supply Pressure Range: 80 - 120 psi
Capacity & Filtration: 8.5 oz @ 40 Micron
Supply Requirements: clean air or inert gas
Safe Press. Setpoint: 0.25*
Safe Press. Flow Rate: * 0.1 - 3.5 SCFH
Exchange Pressure: 3" - 5"
Exchange Flow Rate: ** 60 SCFM / 3600 SCFH
Exchange Time: 1 min / 15 ft³
System Supply Port: 1/2" FPT
Enclosure Supply Fitting: 1/2" FPT
Enclosure Reference Fitting: 1/4" tube fitting
Switch Setting (Decr): 0.15° ± 0.02°
Switch Conduit Port Size: 1/2" FPT
Switch Contact Rating: WPS Style: 120 VAC @ 15 A
WPSA Style: ** 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA
WPS Style: *** 120/220 VAC, 24 VDC @ 3/4/11 watts

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number: 1005 Type Y</th>
<th>Designation: Purging System</th>
<th>Enclosure Volume: 450 ft³ max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPS Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
<tr>
<td>WPS Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group C&amp;D</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
<tr>
<td>WPSA Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group A-D</td>
<td>Rating Reduction: Div. 1 to Div. 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Number: 1005 Type Z</th>
<th>Designation: Purging System</th>
<th>Enclosure Volume: 450 ft³ max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPS Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group A-D</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td>WPS Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group C&amp;D</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td>WPSA Style</td>
<td>UL &amp; FM Certified: Cl. I, Div. 2, Group A-D</td>
<td>Rating Reduction: Div. 2 to Nonhazardous</td>
</tr>
</tbody>
</table>

* Enclosure integrity determines actual flow rate
** With regulator set to 80 psi min. during exchange Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs, Inc.
*** Supply voltages 24 VDC and 240 VAC available upon request.

For wiring schematic see page 118
Type Y & Z

WPS/WPSA Style
(With Pressure Switch)

LPS Style
(less Pressure Switch)

Connection Points Shown Above In Bold Text On System Diagram

System Accessories Diagram

Supply Inlet Fitting
1/2" Supply Pipe
1/4" Tubing Reference
Enclosure Supply Fitting
EPC-10
Enclosure Reference Fitting
EFC-4
Enclosure Protection Vent
EPV-5-SA...

Pressurized Protected Enclosure

Warning Nameplate EWN-1
(Included with Panel)

ENCLOSURE PROTECTION VENTS
ONE VENT REQUIRED WITH EACH SYSTEM

Table: Model 1005 System Accessories

- EFC-4: 1/4" Flush Connector
- EPC-10: 1/2" Pipe Connector
- EPC-15: 2" Pipe Connector
- SMK-2 or -8: System Mounting Kit
- EPSK-1: Explosion Proof Switch Kit
- GSK-1: General-purposes Switch Kit
- RAH: Remote Alarm Horn
- RAB-1: Div. 1 Remote Alarm Beacon
- RAB-2: Div. 2 Remote Alarm Beacon
- LCK: L Fitting Conduit Kit
- TCK: T Fitting Conduit Kit
- EPV-5-SA-00: Straight w/Sparke Arrestor
- EPV-5-SA-90: Rt Angle w/Sparke Arrestor
- EWN-1: Class I Enclosure Warning
- ETW: Enclosure Temperature Warning

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
- Tubing: 316 SS 1/4"-.035 Welded
- System Nameplates: Silk screen Lexan® & SS
- Fastener Hardware: Alum. & Stainless Steel
- Mounting Plate: 316 14 Ga #3 Brush SS
- EXP Pressure Switch Body: Anodized Cast Alum.
- Enclosure Warning Nameplate: Silk screen SS

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Model Number Designations

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>System Style</th>
<th>Area Classification</th>
<th>Mounting Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1005 - LPS - CI - YZ - LH - ##</td>
<td>LPS - less pressure switch</td>
<td>CI - Class I Area</td>
<td>LH - left hand, left side of enclosure</td>
</tr>
<tr>
<td></td>
<td>WPS - with pressure switch</td>
<td></td>
<td>RH - right hand, right side of enclosure</td>
</tr>
<tr>
<td></td>
<td>WPSA - with pressure switch</td>
<td></td>
<td>TM - top mount, top of enclosure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BM - bottom mount, bottom of enclosure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WM - wall mount, wall surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FM - frame mount, external frame or rack</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PM - panel mount, enclosure surface cutout</td>
</tr>
</tbody>
</table>

## - See Accessories Page 130 for additional factory installed accessories

Model 1005 System Accessories (See accessories page for complete details)

<table>
<thead>
<tr>
<th>CONNECTION FITTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFC-4: 1/4&quot; Flush Connector</td>
</tr>
<tr>
<td>EPC-10: 1/2&quot; Pipe Connector</td>
</tr>
<tr>
<td>EPC-15: 2&quot; Pipe Connector</td>
</tr>
<tr>
<td>SMK-2 or -8: System Mounting Kit</td>
</tr>
<tr>
<td>EPSK-1: Explosion Proof Switch Kit</td>
</tr>
<tr>
<td>GSK-1: General-purposes Switch Kit</td>
</tr>
<tr>
<td>RAH: Remote Alarm Horn</td>
</tr>
<tr>
<td>RAB-1: Div. 1 Remote Alarm Beacon</td>
</tr>
<tr>
<td>RAB-2: Div. 2 Remote Alarm Beacon</td>
</tr>
<tr>
<td>LCK: L Fitting Conduit Kit</td>
</tr>
<tr>
<td>TCK: T Fitting Conduit Kit</td>
</tr>
<tr>
<td>EPV-5-SA-00: Straight w/Sparke Arrestor</td>
</tr>
<tr>
<td>EPV-5-SA-90: Rt Angle w/Sparke Arrestor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING NAMEPLATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWN-1: Class I Enclosure Warning</td>
</tr>
<tr>
<td>ETW: Enclosure Temperature Warning</td>
</tr>
</tbody>
</table>

INSTALLATION & OPERATION MANUAL

129-0204 Inst. & Operation Manual

ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM

Overall System Dimensions

<table>
<thead>
<tr>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>13.5 / 17.75</td>
<td>13.5 / 17.75</td>
<td>14 / 13</td>
<td>14 / 13</td>
<td>15 / 17.75</td>
<td>15.5 / 19.75</td>
</tr>
<tr>
<td>Depth</td>
<td>6 / 7.5</td>
<td>6 / 7.5</td>
<td>6 / 7.5</td>
<td>6 / 7.5</td>
<td>7.75 / 9.25</td>
<td>5 / 6.5</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 14.5h x 14.5w WPS - 18.75h x 14.5w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.

Lexan® is a registered trademark of the General Electric Company.
Description

Model 11 is an enclosure pressurization or purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation or remove and prevent flammable gas or vapor accumulations. In Class II areas, the system maintains a "safe" (1.0") pressure. In Class I areas, the system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. These processes reduce the hazardous (classified) area rating within the enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. In Class II areas, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. In Class II areas, power can be energized when safe pressure is stable. In Class I areas, the user must perform an exchange cycle (determined by the safe pressure flow rate—five minutes minimum) before power can be energized. Loss of safe pressure in Class I or II areas requires immediate attention, unless power is deenergized. WPS style systems include an explosion proof differential pressure switch with form "C" contacts for audible or visual alarm systems.

Specifications

| System Dimensions: | See page 40 |
| Shipping Weight: | LPS - 5 lb / WPS - 10 lb |
| Temp. Range: | 40°F to +120°F |
| Supply Pressure Range: | * 5 - 120 psi |
| Supply Requirements: | clean air or inert gas |
| Safe Press. (Cl/Cll): | 0.25" / 1.0" |
| Safe Press. Flow Rate: | ** 0.1 - 3.5 SCFH |
| System Supply Fitting: | 1/4" tube fitting |
| Enclosure Supply Fitting: | 1/4" tube fitting |
| Enclosure Reference Fitting: | 1/4" tube fitting |
| Switch Setting (Cl/Cll, Decr): | 0.15" / 0.5" ± 0.02" |
| Switch Conduit Port Size: | 1/2" FPT |
| Switch Contact Rating: | 120 VAC @ 15 A |

* With EPV-1 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.
** Enclosure integrity determines actual flow rate

For wiring schematic see page 118

Standard Model Applications

| Model Number: 11-CI Type Y | Designation: Purging System |
| Enclosure Volume: 2 ft³ max. |
| **LPS Style** | UL & FM Certified: Cl. I, Div. 1, Group A-D |
| Rating Reduction: Div. 1 to Div. 2 |
| **WPS Style** | UL & FM Certified: Cl. I, Div. 1, Group C&D |
| Rating Reduction: Div. 1 to Div. 2 |

| Model Number: 11-CI Type Z | Designation: Purging System |
| Enclosure Volume: 2 ft³ max. |
| **LPS Style** | UL & FM Certified: Cl. I, Div. 2, Group A-D |
| Rating Reduction: Div. 2 to Nonhazardous |
| **WPS Style** | UL & FM Certified: Cl. I, Div. 2, Group C&D |
| Rating Reduction: Div. 2 to Nonhazardous |

| Model Number: 11-CII Type Y | Designation: Pressurization System |
| Enclosure Volume: 10 ft³ max. |
| **LPS Style** | UL & FM Certified: Cl. II, Div. 1, Group F&G |
| Rating Reduction: Div. 1 to Div. 2 |
| **WPS Style** | UL & FM Certified: Cl. II, Div. 1, Group F&G |
| Rating Reduction: Div. 1 to Div. 2 |

| Model Number: 11-CII Type Z | Designation: Pressurization System |
| Enclosure Volume: 10 ft³ max. |
| **LPS Style** | UL & FM Certified: Cl. II, Div. 2, Group F&G |
| Rating Reduction: Div. 2 to Nonhazardous |
| **WPS Style** | UL & FM Certified: Cl. II, Div. 2, Group F&G |
| Rating Reduction: Div. 2 to Nonhazardous |
**Material Specifications**

- **Regulator Body:** Zinc w/Enamel Finish
- **Regulator Handle:** Polycarbonate
- **Enclosure Pressure Gauge:** 316 SS Forged Body
- **Tube Fittings:** 316 SS 1/4" O.D. Welded
- **System Nameplates:** Silk screened Lexan® & SS
- **Fastener Hardware:** Alum. & Stainless Steel
- **Mounting Plate:** 316 14 Ga #3 Brush SS
- **EXP Pressure Switch Body:** Anodized Cast Alum.
- **Enclosure Warning Nameplate:** Silk screened SS

Lexan® is a registered trademark of the General Electric Company.

**Model Number Designations**

- **Series Model Number**
  - 11 - LPS - CI - YZ - LH - ##

- **System Style**
  - LPS - less pressure switch
  - WPS - with pressure switch

- **Area Classification**
  - CI - Class I Area
  - CII - Class II Area

- **System Type**
  - YZ - Div. 1 to Div. 2, Div. 2 to Nonhazardous

- **Mounting Configuration**
  - LH - left side of enclosure
  - RH - right side of enclosure
  - TM - top mount
  - BM - bottom mount
  - WM - wall mount
  - FM - frame mount
  - PM - panel mount

- **## - See Accessories Page 130 for additional factory installed accessories**

**Model 11 System Accessories** *(See accessories page for complete details)*

- **FACTORY INSTALLED FITTINGS & FILTER**
  - ECK-11 - Enclosure Connection Kit
  - EPSK-1 or -2 - Explosion Proof Switch Kit
  - RAH - Div. 1 Remote Alarm Horn
  - RAB-1 - Div. 1 Remote Alarm Beacon
  - RAB-2 - Div. 2 Remote Alarm Beacon
  - LCK - L Fitting Conduit Kit
  - TCK - T Fitting Conduit Kit

- **OPTIONAL HEX KEY REGULATOR HANDLE**
  - TR-10G - Tamperproof Regulator

- **WARNING NAMEPLATES**
  - EWN-1 - Class I Enclosure Warning
  - EWN-2 - Class II Enclosure Warning
  - ETW - Enclosure Temperature Warning

- **INSTALLATION & OPERATION MANUAL**

**ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM**

<table>
<thead>
<tr>
<th>Overall System Dimensions</th>
<th>LPS / WPS</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM &amp; PM - surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>6.25 / 10.75</td>
<td>6.25 / 10.75</td>
<td>6.25 / 8.5</td>
<td>6.25 / 8.5</td>
<td>6.25 / 10.75</td>
<td>8.25 / 12.75</td>
<td>8 / 9.5</td>
</tr>
<tr>
<td>Width</td>
<td>6 / 7.5</td>
<td>6 / 7.5</td>
<td>7.5 / 13.375</td>
<td>7.5 / 13.375</td>
<td>6 / 7.5</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
</tr>
<tr>
<td>Depth</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>5.5 / 7.25</td>
<td>4.5 / 7</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 7.25h x 7w  WPS - 11.75h x 8.5w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.

**Connection Points Shown Above in Bold Text on System Diagram**
Type Z

Description

Model 1011 is an enclosure pressurization or purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosures, in order to prevent combustible dust accumulation or remove and prevent flammable gas or vapor accumulations. In Class II areas, the system maintains a “safe” (1.0”) pressure. In Class I areas, the system accomplishes four air exchanges and maintains a “safe” (0.25”) pressure. These processes reduce the hazardous (classified) area rating within the enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. In Class II areas, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. In Class II areas, power can be energized when safe pressure is stable. In Class I areas, the user must perform an exchange cycle (determined by the safe pressure flow rate—five minutes minimum), before power can be energized. Loss of safe pressure in Class I or II areas requires immediate attention, unless power is deenergized.

System installation may be enhanced with a stand-alone Pepperl+Fuchs Model EPSK explosion proof switch kit to provide form “C” contacts for audible or visual alarm systems.

System Specifications

| System Dimensions: | See page 42 |
| Shipping Weight: | 7 lb |
| Temp. Range: | -20 °F to +120 °F |
| Supply Pressure Range: | * 5 - 120 psi |
| Supply Requirements: | clean air or inert gas |
| Safe Press. (Cl/Cli): | 0.25” / 1.0” |
| Safe Press. Flow Rate: | ** 0.1 - 3.5 SCFH |
| System Supply Fitting: | 1/4” tube fitting |
| Enclosure Supply Fitting: | 1/4” tube fitting |
| Enclosure Reference Fitting: | 1/4” tube fitting |

* With EPV-1 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.
** Enclosure integrity determines actual flow rate

Standard Model Applications

| Model Number: | 1011-CI Type Z |
| Designation: | Purging System |
| Enclosure Volume: | 2 ft³ max. |
| UL Certified: | Cl. I, Div. 2, Group A-D |
| Rating Reduction: | Div.2to Nonhazardous |

| Model Number: | 1011-CII Type Z |
| Designation: | Pressurization System |
| Enclosure Volume: | 10 ft³ max. |
| UL Certified: | Cl. II, Div. 2, Group F&G |
| Rating Reduction: | Div. 2 to Nonhazardous |
## Material Specifications

- **Regulator Body:** Brass, Zinc w/Enamel Finish
- **Regulator Handle:** Polycarbonate
- **Enclosure Pressure Gauge:** Alum. w/Enamel Finish
- **Tube Fittings:** 316 SS Forged Body
- **Tubing:** 316 SS 1/4˝ .035 Welded
- **System Nameplates:** Silkscreen & Lexan®
- **Fastener Hardware:** Alum. & Stainless Steel
- **Mounting Plate & Bracket:** Anodized Aluminum
- **Enclosure Warning Nameplate:** Silk screened SS

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## System Accessories Diagram

- **1/4˝ Supply Tubing**
- **1/4˝ Tubing Reference**
- **Enclosure Supply Fitting EBC-4**
- **Enclosure Reference Fitting EFC-4**
- **Enclosure Protection Vent EPV-1-SA**
- **Warning Nameplate EWN-__** (Included with Panel)

---

## Model Number Designations

<table>
<thead>
<tr>
<th>1011 - CI - Z - UH - ##</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series Model Number</strong></td>
</tr>
<tr>
<td><strong>Area Classification</strong></td>
</tr>
<tr>
<td>CI - Class I Area</td>
</tr>
<tr>
<td>CII - Class II Area</td>
</tr>
<tr>
<td><strong>System Type</strong></td>
</tr>
<tr>
<td>Z - Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td><strong>Mounting Configuration</strong></td>
</tr>
<tr>
<td>UM - universal mount</td>
</tr>
<tr>
<td>FM - frame mount</td>
</tr>
<tr>
<td>PM - panel mount</td>
</tr>
<tr>
<td><strong>## - See Accessories Page 130 for additional factory installed accessories</strong></td>
</tr>
</tbody>
</table>

FM & PM configuration mounting plates include four (4) 1/4˝ mounting holes at each corner, on 5/16˝ centers.

---

## Model 1011 System Accessories (See accessories page for complete details)

### CONNECTION FITTINGS
- EFC-4 1/4˝ Flush Connector
- EBC-4 1/4˝ Bulkhead Connector
- EPC-10 1/2˝ Pipe Connector
- ILF-4 1/4˝ Filter

### ADDITIONAL ITEMS
- SMK-1 or -4 System Mounting Kit
- EPSK-1 or -2 Explosion Proof Switch Kit

### GENERAL PURPOSE SWITCH KIT
- GPSK-1 or -2 General-purpose Switch Kit
- RAH Div. 1 Remote Alarm Horn
- RAB-2 Div. 2 Remote Alarm Beacon
- EPV-1-SA-00 Straight w/Spark Arrester
- EPV-1-SA-90 Rt Angle w/Spark Arrester

### OPTIONAL ENCLOSURE PROTECTION VENTS
- EVC-1
- ECV-1-SA-90 Right Angle Spark Arrester

### OPTIONAL HEX KEY REGULATOR HANDLE
- TR-10G Tamperproof Regulator

### WARNING NAMEPLATES
- EWN-1 Class I Enclosure Warning
- EWN-2 Class II Enclosure Warning
- ETW Temperature Warning

### INSTALLATION & OPERATION MANUAL
- 129-0205 Inst. & Operation Manual

---

**ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM**

---

## Overall System Dimensions

<table>
<thead>
<tr>
<th>Configuration</th>
<th>UM - left hand</th>
<th>UM - right hand</th>
<th>UM - top mount</th>
<th>UM - bottom mount</th>
<th>- frame mount</th>
<th>PM - panel mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>8</td>
<td>8</td>
<td>8.25</td>
<td>8.25</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Width</td>
<td>8.25</td>
<td>8.25</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Depth</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 7.625h x 7.625w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
**Description**

Model 1012 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. A Pepperl+Fuchs Model EPV-2 Enclosure Protection Vent is required for proper operation. 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 12.4.

**Operation**

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The enclosure pressure control valve is then used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve must be fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve must be disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power is deenergized. System installation may be enhanced with a stand-alone Pepperl+Fuchs Model EPSK explosion proof switch kit to provide form "C" contacts for audible or visual alarm systems.

**System Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Dimensions:</td>
<td>See page 44</td>
</tr>
<tr>
<td>Shipping Weight:</td>
<td>10 lb</td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
</tr>
<tr>
<td>Supply Pressure Range:</td>
<td>80 - 120 psi</td>
</tr>
<tr>
<td>Capacity &amp; Filtration:</td>
<td>1.5 oz @ 20 Micron</td>
</tr>
<tr>
<td>Supply Requirements:</td>
<td>clean air or inert gas</td>
</tr>
<tr>
<td>Safe Press. Setpoint:</td>
<td>0.25&quot;</td>
</tr>
<tr>
<td>Safe Press. Flow Rate:</td>
<td>* 0.1 - 3.5 SCFH</td>
</tr>
<tr>
<td>Exchange Pressure:</td>
<td>3&quot; - 5&quot;</td>
</tr>
<tr>
<td>Exchange Flow Rate:</td>
<td>** 4 SCFM/240 SCFH</td>
</tr>
<tr>
<td>Exchange Time:</td>
<td>1 min/ft³</td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>1/4&quot; FPT</td>
</tr>
<tr>
<td>Enclosure Supply Fitting:</td>
<td>1/4&quot; tube fitting</td>
</tr>
<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4&quot; tube fitting</td>
</tr>
</tbody>
</table>

* Enclosure integrity determines actual flow rate
** With regulator set to 60 psi min. during exchange. Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.
**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
- **Tubing:** 316 SS 1/4" .035 Welded
- **System Nameplates:** Silkscreen & Lexan®
- **Fastener Hardware:** Alum. & Stainless Steel
- **Mounting Plate & Bracket:** Anodized Aluminum
- **Enclosure Warning Nameplate:** Silk screened SS

Lexan® is a registered trademark of the General Electric Company.

---

**System Accessories Diagram**

- **Connection Fittings**
  - NC-4: 1/4" Ninety Connector
  - SC-4: 1/4" Straight Connector
  - EFC-4: 1/4" Flush Connector
  - EBC-4: 1/4" Bulkhead Connector
  - EPC-12: 3/4" Pipe Connector

- **Additional Items**
  - SMK-1 or -4: System Mounting Kit
  - EPSK-1: Explosion Proof Switch Kit

- **GPSK-1**: General-purpose Switch Kit
- **RAH**: Remote Alarm Horn
- **RAB-2**: Div. 2 Remote Alarm Beacon

---

**Model 1012 System Accessories** *(See accessories page for complete details)*

- **Connection Points:** Shown above in bold text on system diagram.

---

**Model Number Designations**

- **Series Model Number**
  - **Area Classification**
    - CI: Class I Area
  - **System Type**
    - **Z**: Div. 2 to Nonhazardous
  - **Mounting Configuration**
    - **UM**: universal mount
    - **FM**: frame mount
    - **PM**: panel mount

---

**Dimensions**

- **Overall System Dimensions**
  - **Configuration**: UM - left hand / UM - right hand / UM - top mount / UM - bottom mount / FM - frame mount / PM - panel mount
  - **Height**: 12 / 12 / 12.25 / 12.25 / 12 / 12
  - **Width**: 12.25 / 12.25 / 12 / 12 / 12 / 12
  - **Depth**: 5 / 5 / 5 / 5 / 5 / 5

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 11.625h x 11.625w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
**Description**

Model 3003 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed protected enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The Model 3003 consists of three major components: (1) a pneumatic manifold assembly, (2) a differential enclosure pressure indicator and (3) a stainless steel face plate with mounting flange, or a Lexan® system start up instruction nameplate. Model 3003 is offered in three distinct variations, identified as “VM” (Vertical Mount), “HM” (Horizontal Mount), both available in WPS & WPSA styles, and “CK” (Component Kit) mounting configurations. The VM configuration features a filter regulator and face plate with a flange for mounting to a vertical surface. The HM configuration features a regulator and face plate with a flange for mounting on a horizontal surface. Finally, the CK configuration is a kit of parts including the pneumatic manifold assembly, the enclosure pressure indicator and a start-up instruction nameplate. The VM and HM configurations are intended for flange or frame mounting to a solid surface on or near the protected enclosure(s), while the CK configuration is intended for frame mounting through cutouts in a panel on or near the enclosure(s). With the addition of a Model GCK gauge conversion kit, all configurations can be mounted through the surface of a protected enclosure. The CK configuration provides a seal that withstands Type 4 hosesdown testing. Model 3003 accomplishes the required volume exchanges and maintains a safe pressure. Pepperl+Fuchs Model EPV-3 enclosure protection vent is required for proper operation. This process reduces the hazardous (classified) area rating within protected enclosure(s), in accordance with the NEC - NFPA 70, NFPA 496, ISA 12.4 and IEC 600 79-15 EN 50021.

**Operation**

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and enclosure(s) must be sealed. After transferring the valve key, locked into the pneumatic manifold’s Rapid Exchange® control valve stem, the enclosure pressure control valve is used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the valve key is transferred and locked into the Rapid Exchange control valve stem and the Rapid Exchange control valve is then fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve is disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power to the protected enclosure(s) is deenergized. WPS and WPSA style systems include an explosion proof differential pressure switch with form “C” contacts for audible or visual alarm systems.

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Model 3003 VM Configuration - The Vertical Mount System

Important Notes

1) The VM configuration is supplied with a mounting flange for right-angled attachment to a vertical surface external to the protected enclosure.
2) The VM configuration can also be frame mounted external to the protected enclosure through a 5" (127 mm) W x 9" (229 mm) H cutout in a suitable mounting surface.
3) Model GCK gauge conversion kit is required to panel mount the VM configuration through a 5" (127 mm) W x 9" (229 mm) H cutout in the protected enclosure surface.
4) See page 52 for Model GCK kit description and conversion procedure.

WPS / WPSA (With Pressure Switch)

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM
Model 3003 HM Configuration - The Horizontal Mount System

LPS (Less Pressure Switch)

System Start-Up Instructions

System Model & Ratings

Regulator

Pneumatic Manifold Body

Enclosure Pressure Indicator

Enclosure Reference Inlet

Atmospheric Reference

Front View

Rapid Exchange®
Control Valve Stem

w/Valve Key in
locked position

Valve Key

Rapid Exchange®
Injection Pressure
Indicator

Rear View

System Supply
Inlet

Enclosure Supply
Outlet

Important Notes

1) The HM configuration is supplied with a mounting flange for right-angled attachment to a horizontal surface external to the protected enclosure.

2) The HM configuration can also be frame mounted external to the protected enclosure through a 10.25" (260mm) W x 5" (127mm) H cutout in a suitable mounting surface.

3) Model GCK gauge conversion kit is required to panel mount the HM configuration through a 10.25" (260mm) W x 5" (127mm) H cutout in the protected enclosure surface.

4) See page 52 for Model GCK kit description and conversion procedure.

WPS / WPSA (With Pressure Switch)

Enclosure Pressure Indicator

System Start-Up Instructions

System Model & Ratings

Regulator

Pneumatic Manifold Body

Enclosure Pressure Indicator

Enclosure Reference Inlet

Atmospheric Reference

Front View

System Face Plate

Enclosure Pressure
Indicator

Rapid Exchange®
Control Valve Stem

w/Valve Key in
locked position

Valve Key

Rapid Exchange®
Injection Pressure
Indicator

Rear View

System Supply
Inlet

Enclosure Supply
Outlet

VENTURI ORIFICE

SYSTEM MODEL & RATINGS

CONNECTION POINTS ShOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM
Important Notes

1) The CK configuration is four discrete parts suitable for mounting through a set of cutouts in a vertical surface external to the protected enclosure.
2) A Model GCK gauge conversion kit is required to panel mount the CK configuration through a set of cutouts in the protected enclosure surface.
3) See page 52 for Model GCK kit description and conversion procedure.

**CK Configuration System & Optional Remote Cube Filter Dimensions in Inches (mm)**

**Pneumatic Manifold**

**Enclosure Pressure Gauge**

**Side View Model RCF-4**

**Note:** Two optional Enclosure Pressure Gauge positions are shown on the Model 3003 CK System Panel Cutout Pattern to the left. The optional positions center gauge to the right or bottom side of System Nameplate.

Cut only one 4.5” (114.3 mm) Ø hole in panel.
### Model 3003 WPS VM Configuration & Flange Dimensions in Inches (mm)

#### LPS (Less Pressure Switch)

- **Panel Cutout:** 5.5 (139.7)
- **Panel Cutout:** 5 (127)
- **9.5 (241.3)
- **4.0 (101.6)
- **3.38 (85.7)
- **0.63 (15.9)
- **5.0 (127)
- **3.5 (88.9)
- **14 (356)
- **13 (330)
- **1.0 (25.4)
- **0.63 (15.9)
- **3.38 (85.7)
- **0.25 (6.4) O.D.
- **Typ 4

#### WPS/WPSA (With Pressure Switch)

- **Panel Cutout:** 14.25 (356)
- **14.5 (368.3)
- **8 (203.2)
- **5.5 (139.7)
- **15.25 (387.4)
- **10.75 (273.05)
- **4.0 (101.6)
- **3.38 (85.7)
- **0.63 (15.9)
- **3.38 (85.7)
- **0.25 (6.4) O.D.
- **Typ 4

### Model 3003 HM Configuration & Flange Dimensions in Inches (mm)

#### LPS (Less Pressure Switch)

- **Panel Cutout:** 10.25 (260.4)
- **5 (127)
- **9.5 (241.3)
- **4.0 (101.6)
- **3.38 (85.7)
- **0.63 (15.9)
- **3.38 (85.7)
- **0.25 (6.4) O.D.
- **Typ 4

#### WPS/WPSA (With Pressure Switch)

- **Panel Cutout:** 14.5 (368.3)
- **8 (203.2)
- **7.5 (190.5)
- **15 (381)
- **4.0 (101.6)
- **3.38 (85.7)
- **0.63 (15.9)
- **3.38 (85.7)
- **0.25 (6.4) O.D.
- **Typ 4

---

For more information, visit the Pepperl+Fuchs website at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).
Typical Model 3003 System Installation Details

**External to the Protected Enclosure**

- **Flange Mount HM Configuration**
  - with Model SMK-1 Fastener Kit

- Enclosure Reference Tubing, Customer Supplied
- System Supply Inlet Fitting SC-6-4 or NC-6-4
- Enclosure Supply Inlet Fitting SC-6-8 or NC-6-8
- System Supply Tubing, Customer Supplied
- Enclosure Reference Fitting EFC-4
- Enclosure Supply Fitting EFC-6
- System Mounting Kit SMK-1
- Required Enclosure Protection Vent EPV-3

**Internal to the Protected Enclosure**

- **Panel Mount CK Configuration**
  - with Model RCF-4 Remote Cube Filter
  - & Model GCK Gauge Conversion Kit

- Required Enclosure Protection Vent EPV-3
- System Supply Inlet Fitting SC-6-4 or NC-6-4
- Optional Accessory Remote Cube Filter
  - Model RCF-4 shown mounted to the Protected Enclosure
- System Supply Tubing, Customer Supplied
- Optional Enclosure Supply Outlet Fitting SC-6-8 or NC-6-8

**Standard and Panel Mount Pneumatic Installation Diagram**

See panel mounting conversion procedure on page 52

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**Standard Pneumatic Installation Diagram**

- **Enclosure**
- Required Enclosure Protection Vent
- System Supply Flow
- Sintered Vent
- Rapid Exchange® Control Valve
- Pressure Gauge
- Supply
- Control Valve
- Enclosure Pressure Control Valve

**Panel Mount Installation Diagram**

- System Supply Flow
- WPS Style EXP Pressure Switch
- Sintered Vent
- Rapid Exchange® Pressure Gauge
- Reference
- Warning Nameplate
- Sintered Vent
- Rapid Exchange® Control Valve
- Supply
- Enclosure Pressure Control Valve
- Enclosure
- Required Enclosure Protection Vent

---
VM Configuration Mounting Options

Model 3003-LPS-CI-YZ-VML
Flange Mounted to
Flat Vertical Surface with
Model SMK-1 Fastener Kit

Model 3003-LPS-CI-YZ-VML
Flange Mounted to
Vertical 2" Pipe Stand with
Model PMK-1 Fastener Kit

Model 3003-LPS-CI-YZ-VM
Frame or Panel* Mounted
Through Cutout in Suitable Surface
with Model SMK-6m Fastener Kit

HM Configuration Mounting Options

Model 3003-LPS-CI-YZ-HMT
Flange Mounted to
Flat Horizontal Surface with
Model SMK-1 Fastener Kit

Model 3003-LPS-CI-YZ-HMB
Flange Mounted to
Horizontal 2" Pipe Stand with
Model PMK-1 Fastener Kit

Model 3003-LPS-CI-YZ-HM
Frame or Panel* Mounted
Through Cutout in Suitable Surface
with Model SMK-6m Fastener Kit

CK Configuration Mounting Options

Model 3003-LPS-CI-YZ-CK
Rear View of Frame or Panel* Mount
Through Cutout in Suitable Surface with supplied fasteners

* PANEL MOUNTED SYSTEMS REQUIRE A PEPPERL+FUCHS MODEL GCK FOR PROPER OPERATION - SEE PAGE 52
Model 3003 Panel Mount Conversion

- Secure one Model GCK Conversion Kit. Kit includes a PRB-4 & SC-2 Fitting & Enclosure Pressure Gauge gasket.
- Remove venturi orifice and run tee from the high port of the gauge and discard.
- Remove sintered vent from low port.
- Reinstall sintered vent into high port.
- Install Model SC-2 fitting into low port.
- Install Gauge gasket between gauge & mounting surface.
- Install Model PRB-4 fitting through enclosure surface (vent end out) and connect tubing (customer supplied) between SC-2 & PRB-4.

Material Specifications

| Regulator Body: | Zinc w/Enamel Finish |
| Fastener Hardware: | Polycarbonate |
| System Face Plate: | Alum. w/Enamel Finish |
| System Mounting Flange: | Poly & Nickel Plated |
| Manifold Body: | 316 SS Forged Body |
| Manifold Valves: | 316 SS 1/4" .035 Welded |
| Enclosure Warning Nameplate: | Alum. & Stainless Steel |
| EXP Pressure Switch Body: | 316 14 Ga #3 Brush SS |
| EXP Pressure Switch Body: | 316 SS Tumble Finish |
| Exp. Pressure Switch Body: | Anodized Aluminum |
| EXP Pressure Switch Body: | Anodized Cast Aluminum |

System Specifications

| System Dimensions: | See pages 48-49 |
| Shipping Weight: | LPS - 10 lb (4.5 kg) / WPS - 15 lb (6.8 kg) |
| Temp. Range: | -20 °F to +120 °F (-29ºC to +49ºC) |
| Supply Pressure Range: | 80 - 120 psi (5.5 - 8.3 bar) |
| Capacity & Filtration: | 1.5 oz @ 20 Micron |
| Supply Requirements: | clean dry or inert gas |
| Safe Press. Setpoint: | 0.25" (6.35mm) |
| Safe Press. Flow Rate: | * 0.1 - 3.5 SCFH (2.8 - 99 / hr) |
| Exchange Pressure: | " 3" - 5" (76.2 mm - 127 mm) |
| Exchange Flow Rate: | ** 12 SCFM /720 SCFH (340 l / m / 20390 / hr) |
| Exchange Time: | 4 Volume Exchange Rate: 1 min / 3.0 ft³ (85 / min) |
| | 5 Volume Exchange Rate: 1 min / 2.4 ft³ (68 / min) |
| System Supply Port: | 1/4" FPT |
| Enclosure Supply Port: | 1/2" FPT |
| Enclosure Reference Fitting: | 1/4" Tube |
| Switch Setting (WPS & WPSA Only): | 0.15" ± 0.02" |
| Switch Contact Ratings: | 1/2"FPT |
| WPS Style: | 120 VAC @ 15 A |
| WPSA Style: | ** 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA |
| Switch (WPSA) Power Requirement: | 24 / 120 / 240 VDC @ 3 / 4 /11 watts |
| Enclosure integrity determines actual flow rate |
| WPS - with pressure switch |
| WPSA - with pressure switch |
| Classification: | Class I Area |
| System Type: | Div. 1 to Div. 2 |
| Mounting Configuration: | 1.5 o |
| VML - vertical mount left |
| VRM - vertical right |
| HMT - horizontal mount top |
| HMB - horizontal mount bottom |
| CK - Component Kit - LPS style only |
| ** - See Accessories Page 131 for additional factory installed accessories |
| *** Supply voltages 24 VDC and 240 VAC available upon request. |

Model Number Designations

- Series Model Number: 3003 - LPS - CI - YZ - VM - ##
- System Style: LPS - less pressure switch |
- WPS - with pressure switch |
- WPSA - with pressure switch |
- Area Classification: Class I Area |
- System Type: YZ - Div. 1 to Div. 2 |
- Mounting Configuration: 1.5 o |
- VML - vertical mount left |
- VRM - vertical right |
- HMT - horizontal mount top |
- HMB - horizontal mount bottom |
- CK - Component Kit - LPS style only |
- ** - See Accessories Page 131 for additional factory installed accessories |
- WPSA - with pressure switch |
- WPS - with pressure switch |
- Classification: Class I Area |
- System Type: YZ - Div. 1 to Div. 2 |
- Mounting Configuration: 1.5 o |
- VML - vertical mount left |
- VRM - vertical right |
- HMT - horizontal mount top |
- HMB - horizontal mount bottom |
- CK - Component Kit - LPS style only |
- ** - See Accessories Page 131 for additional factory installed accessories |
- *** Supply voltages 24 VDC and 240 VAC available upon request. |

Model 3003 System Accessories (See accessories page for complete details)

- RAH - Remote Alarm Horn |
- RAB - Remote Alarm Beacon |
- Remote Alarm Beacon |
- RAH - Remote Alarm Beacon |
- ENCLOSEMENT PROTECTION VENTS |
- ONE VENT REQUIRED WITH EACH SYSTEM |
- EPV-3-SA-00 - Straight w/Spark Arrestor |
- EPV-3-SA-90 - Rt Angle w/Spark Arrestor |
- WARNING NAMEPLATES |
- EWN - Class I Enclosure Warning |
- ETW - Enclosure Temperature Warning |
- INSTALLATION & OPERATION MANUAL |
- 129-0198 - Inst. & Operation Manual |

ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM
Description

Model 3004 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed protected enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The Model 3004 consists of three major components: (1) a pneumatic manifold assembly, (2) a differential enclosure pressure indicator and (3) a stainless steel face plate with mounting flange, or a Lexan® system start up instruction nameplate. Model 3003 is offered in three distinct variations, identified as “VM” (Vertical Mount), “HM” (Horizontal Mount), both available in WPS & WPSA styles, and “CK” (Component Kit) mounting configurations. The VM configuration features a filter regulator and face plate with a flange for mounting to a vertical surface. The HM configuration features a regulator and face plate with a flange for mounting on a horizontal surface. Finally, the CK configuration is a kit of parts including the pneumatic manifold assembly, the enclosure pressure indicator and a start-up instruction nameplate. The VM and HM configurations are intended for flange or frame mounting to a solid surface on or near the protected enclosure(s), while the CK configuration is intended for frame mounting through cutouts in a panel on or near the enclosure(s). With the addition of a Model GCK gauge conversion kit, all configurations can be mounted through the surface of a protected enclosure. The CK configuration provides a seal that withstands Type 4 hosedown testing. Model 3004 accomplishes the required volume exchanges and maintains a safe pressure. Pepperl+Fuchs Model EPV-3 enclosure protection vent is required for proper operation. This process reduces the hazardous (classified) area rating within protected enclosure(s), in accordance with the NEC - NFPA 70, NFPA 496, ISA 12.4 and IEC 600 79-15 EN 50021.

Operation

In accordance with system instructions, start-up requires air supply to be engaged and enclosure power to be deenergized. The enclosure protection vent must be tested and enclosure(s) must be sealed. After transferring the valve key, locked into the pneumatic manifold’s Rapid Exchange control valve stem, the enclosure pressure control valve is used to set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the valve key is transferred and locked into the Rapid Exchange control valve stem and the Rapid Exchange control valve is then fully engaged. Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve is disengaged to return to a safe enclosure pressure. Power can then be energized to the protected enclosure(s). Loss of safe pressure requires immediate attention, unless power to the protected enclosure(s) is deenergized. WPS and WPSA style systems include an explosion proof differential pressure switch with form “C” contacts for audible or visual alarm systems.

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Lexan® is a registered trademark of the General Electric Company.
Model 3004 VM Configuration - The Vertical Mount System

Important Notes

1) The VM configuration is supplied with a mounting flange for right angle-attachment to a vertical surface external to the protected enclosure.

2) The VM configuration can also be frame mounted external to the protected enclosure through a 5" (127 mm) W x 10.75" (273 mm) H cutout in a suitable mounting surface.

3) Model GCK gauge conversion kit is required to panel mount the VM configuration through a 5" (127 mm) W x 10.75" (273 mm) H cutout in the protected enclosure surface.

4) See page 60 for Model GCK kit description and conversion procedure.
Important Notes

1) The HM configuration is supplied with a mounting flange for right-angled attachment to a horizontal surface external to the protected enclosure.

2) The HM configuration can also be frame mounted external to the protected enclosure through a 10.25" (260 mm) W x 5.5" (140 mm) H cutout in a suitable mounting surface.

3) Model GCK gauge conversion kit is required to panel mount the HM configuration through a 10.25" (260 mm) W x 5.5" (140 mm) H cutout in the protected enclosure surface.

4) See page 60 for Model GCK kit description and conversion procedure.

WPS / WPSA (With Pressure Switch)
Model 3004 CK Configuration - The Component Kit System

Part #1
Enclosure Pressure Indicator

Part #2
Pneumatic Manifold Assembly

Part #3
Rapid Exchange® Injection Pressure Indicator

Helpful Hint

Note: Two optional Enclosure Pressure Gauge positions are shown on the Model 3004 CK System Panel Cutout Pattern to the left. The optional positions center gauge to the right or bottom side of System Nameplate. Cut only one 4.5" (114.3 mm) Ø hole in panel.

Important Notes
1) The CK Configuration is four discrete parts suitable for mounting through a set of cutouts in a vertical surface external to the protected enclosure.
2) A Model GCK gauge conversion kit is required to panel mount the CK configuration through a set of cutouts in the protected enclosure surface.
3) See page 60 for Model GCK kit description and conversion procedure.

CK Configuration System & Optional Remote Cube Filter Dimensions in Inches (mm)
Typical Model 3004 System Installation Details

**External to the Protected Enclosure**

- **Flange Mount HM Configuration with Model SMK-1 Fastener Kit**
  - Enclosure Reference Tubing, Customer Supplied
  - System Supply Inlet Fitting SC-8 or NC-8
  - Enclosure Supply Inlet Fitting SC-8 or NC-8
  - System Supply Tubing, Customer Supplied
  - Enclosure Reference Fitting EFC-4
  - Enclosure Supply Fitting EFC-8
  - System Mounting Kit SMK-1
  - Required Enclosure Protection Vent EPV-4

**Internal to the Protected Enclosure**

- **Panel Mount CK Configuration with Model RCF-8 Remote Cube Filter & Model GCK Gauge Conversion Kit**
  - Required Enclosure Protection Vent EPV-4
  - Enclosure Pressure Indicator w/GCK Installed
  - Start-up Instruction Nameplate
  - System Pneumatic Manifold
  - Optional Enclosure Supply Outlet Fitting SC-8 or NC-8
  - Enclosure Supply Tubing, customer supplied, used to direct protective gas to the extreme opposite corner from the enclosure protection vent

---

**Standard and Panel Mount Pneumatic Installation Diagram**

**Standard Pneumatic Installation Diagram**

- Required Enclosure Protection Vent
- System Supply
- Inlet

**Panel Mount Installation Diagram**

- System Supply
- Inlet
- Venturi Orifice
- WPS Style EXP Pressure Switch
- Sintered Vent
- Sintered Vent
- Reference
- Rapid Exchange® Pressure Gauge
- Rapid Exchange® Control Valve
- Enclosure Pressure Gauge
- Enclosure Pressure Control Valve
- Warning Nameplate
- Required Enclosure Protection Vent
**VM Configuration Mounting Options**

Model 3004-LPS-CI-YZ-VML
Flange Mounted to Flat Vertical Surface with Model SMK-1 Fastener Kit

Model 3004-LPS-CI-YZ-VML
Flange Mounted to Vertical 2" Pipe Stand with Model PMK-1 Fastener Kit

Model 3004-LPS-CI-YZ-VM
Frame or Panel* Mounted Through Cutout in Suitable Surface with Model SMK-6m Fastener Kit

**HM Configuration Mounting Options**

Model 3004-LPS-CI-YZ-HMT
Flange Mounted to Flat Horizontal Surface with Model SMK-1 Fastener Kit

Model 3004-LPS-CI-YZ-HMB
Flange Mounted to Horizontal 2" Pipe Stand with Model PMK-1 Fastener Kit

Model 3004-LPS-CI-YZ-HM
Frame or Panel* Mounted Through Cutout in Suitable Surface with Model SMK-6m Fastener Kit

**CK Configuration Mounting Options**

Model 3004-LPS-CI-YZ-CK
Rear View of Frame or Panel* Mount Through Cutout in Suitable Surface with supplied fasteners

* PANEL MOUNTED SYSTEMS REQUIRE A PEPPERL+FUCHS MODEL GCK FOR PROPER OPERATION - SEE PAGE 60
Model 3004 Panel Mount Conversion

**Standard Configuration (prior to conversion)**

- Venturi Orifice
- Run Tee
- High Port
- Sintered Vent

**Panel Mount Configuration (after conversion)**

- PRB-4
- SC-2

1. Secure one Model GCK Conversion Kit, kit includes a PRB-4 & SC-2 Fitting & Enclosure Pressure Gauge gasket.
2. Remove venturi orifice and run tee from the high port of the gauge and discard.
3. Remove sintered vent from high port.
4. Reinstall sintered vent into high port.
5. Install Model SC-2 fitting into low port.
6. Install Gauge gasket between gauge & mounting surface.
7. Install Model PRB-4 fitting through enclosure surface (vent end out) and connect tubing (customer supplied) between SC-2 & PRB-4.

---

**Material Specifications**

- **Regulator Body:**
  - Regulator Handle & Bowl*: Anodized Aluminum
  - Enclosure Pressure Gauge: Polycarbonate
  - Rapid Exchange® Gauge: Alum. w / Enamel Finish
  - Tube Fitting: Poly & Nickel Plated
  - Tubing: 316 SS Forged Body
  - Fastener Hardware: 316 SS 1/4” .035 Welded
  - System Face Plate: Alum. & Stainless Steel
  - System Mounting Flange: 316 14 Ga #3 Brush SS
  - Manifold Body: 316 SS Tumble Finish
  - Manifold Valves: Anodized Aluminum
  - Enclosure Pressure Switch Body: Sintered Stainless Steel
  - EXP Pressure Switch Body: Silkscreen Lexan®
  - EXP Fitting: Silk screened SS

- **Zinc w/Enamel Finish**
- **Polycarbonate**
- **Alum. w / Enamel Finish**
- **Poly & Nickel Plated**
- **316 SS Forged Body**
- **316 SS 1/4” .035 Welded**
- **Alum. & Stainless Steel**
- **316 14 Ga #3 Brush SS**
- **316 SS Tumble Finish**
- **Anodized Aluminum**
- **Sintered Stainless Steel**
- **Silkscreen Lexan®**
- **Silk screened SS**
- **Anodized Cast Aluminum**

**System Specifications**

- **System Dimensions:** See pages 56-57
- **Shipping Weight:**
  - LPS-12 lb (5.4 kg)
  - WPS-17 lb (7.7 kg)
- **Temp. Range:** -20 °F to +120 °F (-29 ºC to +49 ºC)
- **Supply Pressure Range:** 80 - 120 psi (5.5 -8.3 bar)
- **Capacity & Filtration:** 8.5 oz @ 40 Micron
- **Supply Requirements:** clean air or inert gas
- **Safe Press. Setpoint:** 0.25” (6.35 mm)
- **Safe Press. Flow Rate:** * 0.1 - 3.5 SCFH (2.8 - 99 / hr)
- **Exchange Pressure:** ** 30 SCFM /1800 SCFH (850 / in / 50976 / hr)
- **Exchange Flow Rate:**
- **Ex: 4 Volume Exchange Rate:** 1 min / 7.5 ft³ (212.4 / l / m)
- **Ex: 5 Volume Exchange Rate:** 1 min / 6.0 ft³ (169.9 / l / m)
- **System Supply Port:** 1/2” FPT
- **Enclosure Supply Port:** 1/2” FPT
- **Enclosure Reference Fitting:** 1/4” Tube
- **Switch Setting (WPS & WPSA Only):** 0.15” ± 0.02” (3.81 mm ± 0.51 mm)
- **Switch Conduit Port Size:** 1/2”FPT
- **Switch Contact Ratings:**
  - WPS Style: 120 VAC @ 15 A
  - WPSA Style: *** 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA
  - * Switch (WPSA) Power Requirement:24 / 120 / 240 VDC @ 3/4 /11 watts
  - ** Enclosure integrity determines actual flow rate
  - ** With regulator set to 60 psi min. during exchange
  - *** Supply voltages 24 VDC and 240 VAC available upon request.

**Model Number Designations**

**Series Model Number**

- **LPS - less pressure switch**
- **WPS - with pressure switch**
- **WPSA - with pressure switch**

**Area Classification**

- **CI - Class I Area**

**System Type**

- **YZ - Div. 1 to Div. 2**
  - Div. 2 / Zone 2 to Nonhazardous

**Mounting Configuration**

- **VML - vertical mount left**
  - left of enclosure
- **VMR - vertical mount right**
  - right of enclosure
- **HMT - horizontal mount top**
  - top of enclosure
- **HMB - horizontal mount bottom**
  - bottom of enclosure
- **CK - Component Kit - LPS style only**

**## - See Accessories Page 131 for additional factory installed accessories**

* Does not have ATEX certification

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**Model 3004 System Accessories (See accessories page for complete details)**

**Connection Fittings**

- NC-8 1/2” T x 1/2” P Ninety Connector
- SC-8 1/2” T x 1/2” P Straight Connector
- EFC-4 1/4” Flush Connector
- EBC-4 1/4” Bulkhead Connector
- EFC-8 1/2” Flush Connector
- EBC-8 1/2” Bulkhead Connector
- EPC-14 1 1/2” Pipe Connector

**Additional Items**

- SMK-1 System Mounting Kit - Flange
- SMK-6m System Mounting Kit - Frame/Panel
- PMK-1 Pipe Mounting Kit
- GCK Gauge Conversion Kit
- ILF-8 1/2” In-Line Filter Kit
- ROF-8 1/2” Remote Cube Filter
- EPSK-1 Explosion Proof Switch Kit (GRP C, D)
- EPSK-1A Explosion Switch Kit (GRP A-D)
- GPSK-1 General-purpose Switch Kit
- RAH Remote Alarm Horn
- RAB-1 Div. 1 Remote Alarm Beacon
- RAB-2 Div. 2 Remote Alarm Beacon

**Enclosure Protection Vents**

**One Vent Required With Each System**

- EPV-4-SA-00 Straight w/Spark Arrester
- EPV-4-SA-90 Rt Angle w/Spark Arrester

**Warning Nameplates**

- EWN-1 Class I Enclosure Warning
- ETW Enclosure Temperature Warning

**Installation & Operation Manual**

129-0216 Inst. & Operation Manual
For Class I/Zone 1 and Class II Hazardous Areas

Type X, Ex [px] systems change a Division 1 hazardous area to nonhazardous, enabling general-purpose equipment to be used in a hazardous area. Pepperl+Fuchs Bebco EPS Type X, Ex [px] systems are operating systems that allow full control of the purging, pressurization and monitoring of the pressure before and after purging. This eliminates the guesswork of purging and operation of the system.

Type X, Ex [px] systems operate by forcing air or an inert gas through the enclosure for a specified time until all of the hazardous gas is removed. This creates a positive pressure which is maintained by either a continuous or compensating flow of air through the enclosure. The positive pressure keeps the hazardous gas outside the enclosure. If the pressure inside the enclosure drops below a minimum value, the power switches off and the purge sequence begins again.

For more information on purge and pressurization regulations, refer to NFPA 496 Purged and Pressurized Enclosures for Electrical Equipment Edition and ISA-12.4 Instrument Purgung for Reduction of Hazardous Area Classification.

Class I/Zone 1

During startup, the pressure within the enclosure is at atmospheric pressure and contains hazardous gases. This hazardous atmosphere must be purged with air or an inert gas for at least 4 times the volume (5 times for ATEX requirements) of the enclosure (a motor must be purged ten times its volume) while maintaining a pressure of at least 0.2" water column. Pepperl+Fuchs Type X, Ex [px] systems exceed the NFPA minimum standards by maintaining 0.25" water column for ATEX requirements when applicable. After purging, the differential pressure must be at least 0.2" water column. The equipment cannot be energized until these conditions are met. Power automatically shuts off if the differential pressure inside the enclosure falls below 0.2". The system reenergizes only when the integrity of the air lock is restored and the purging cycle is successfully completed.

Class II/Zone 21 Applications

The hazard in a Class II/Zone 21 application is potentially flammable dust. During startup, the area inside the enclosure is at atmospheric pressure and is considered flammable. After the dust is removed and the enclosure is sealed, a protective gas pressurizes the enclosure to at least 0.5" water column. At this point, the enclosure is safe and equipment inside can be energized. Type X systems must deenergize power to the enclosure when the differential pressure falls below the minimum requirement.

Features

- Certified for Class I and Class II, Division I; Zone 1 / Zone 21 to nonhazardous
- LED display indicators programmable via user-interface
- Enclosure size up to 450 cubic feet
- EPCU (electronic power control unit) monitors system operation and controls enclosure power
- EPCU logic module can accommodate intrinsic safety barrier (standard on 6000 series, optional on 2000 series)
- NFPA standard 496, ISA standard 12.4 and, on 6000 series only, certified to the ATEX standards, IEC 61508 SIL 2 with SIL 3 option
Table of Contents

Type X Systems (2000 Series)
  2001A: Class I Enclosure Volumes ≤ 2 ft³ and Class II Enclosure Volumes ≤ 10 ft³ .................................................. 63
  2001B: Class II Enclosure Volumes ≤ 50 ft³ ............................................................................................................. 67
  2001C: Class II Enclosure Volumes ≤ 250 ft³ ............................................................................................................. 71
  2002: Class I Enclosure Volumes ≤ 15 ft³ .................................................................................................................. 75
  2003: Class I Enclosure Volumes ≤ 75 ft³ .................................................................................................................. 79
  2004: Class I Enclosure Volumes ≤ 200 ft³ .............................................................................................................. 83
  2005: Class I Enclosure Volumes ≤ 450 ft³ .............................................................................................................. 87

Type X, Ex [px] Systems (6000 Series)
  6000 Series: Class I & II Enclosure Volumes ≤ 250 ft³ (7.1 m³) .............................................................................. 91
Description

Model 2001A is a pressurization or purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation or remove and prevent flammable gas or vapor accumulations. In Class II areas, the system maintains a “safe” (1.0”) pressure. In Class I areas, the system accomplishes four air exchanges and maintains a “safe” (0.25”) pressure. 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). These processes reduce the hazardous (classified) area rating within the enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

Basic Operation

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. In Class II areas, all dust must be removed from the enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control regulator is then used to set a safe reading on the enclosure pressure gauge. In Class II areas, power will energize shortly after safe pressure is stable. In Class I areas, the system must perform an exchange cycle (determined by the safe pressure flow rate—five minutes minimum) before power can be energized. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). All systems include form “C” contacts for audible or visual alarm systems.

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number: 2001A-CI Type X</th>
<th>Model Number: 2001A-CII Type X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation: Purging System</td>
<td>Designation: Pressurization System</td>
</tr>
<tr>
<td>Enclosure Volume: 2 ft³ max.</td>
<td>Enclosure Volume: 10 ft³ max.</td>
</tr>
<tr>
<td>UL &amp; FM Certified: Cl. I, Div. 1, Group C&amp;D*</td>
<td>UL &amp; FM Certified: Cl. II, Div. 1, Group E-G</td>
</tr>
<tr>
<td>Rating Reduction: Div. 1 to Nonhazardous</td>
<td>Rating Reduction: Div. 1 to Nonhazardous</td>
</tr>
</tbody>
</table>

*Only FM Certified Group B System Available


**Material Specifications**

- **Regulator Body:** Zinc w/Enamel Finish
- **Enclosure Pressure Gauge:** Polycarbonate
- **Tube Fittings:** Alum. w/Enamel Finish
- **System Nameplates:** 316 SS Forged Body
- **Fastener Hardware:** 316 SS F FITTING
- **Mounting Plate:** 316 SS F FITTING
- **EPCU Enclosure Body:** Sillkscreened Lexan® & SS
- **Enclosure Warning Nameplate:** SS Screws & Bolts
- **Regulator Handle:** 316 14 Ga #3 Brush SS
- **Venturi Orifice:** Bead Blast Cast SS
- **Lexan®** is a registered trademark of the General Electric Corporation

**Simplified EPCU Redundant Logic Diagram**

**OPERATION**

Signal (1) from SPS is sent to µP, GAL and SPCR coil. During start-up, GAL verifies all µP functions. GAL & µP must receive uninterrupted signal from SPS to prevent logic resetting. After GAL verifies all start-up procedures, it sends "power enabled" signal (2) to PER coil. Then, µP sends "power request" signal (3) through the SPCR and PER contacts to EPR coils.

**EPCU Description**

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field-adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

**Basic EPCU Operation**

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class II units must detect a 0.25" pressure to energize the alarm relay. The enclosure power relays energize after a brief delay. Class I units must detect a 0.50" pressure to energize the alarm relay. The enclosure power relays energize after a brief delay. When the cycle stops, the power relays will energize. Loss of safe pressure on either unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).
EPCU Logic Module

Barrier Fault & Active Status Indicators
Primary Microprocessor
Redundant Controller (GAL)
Factory Programming Header
Power Module Cable Header
EDT, SLT & RET Timers
Pressure Switch Calibration Access
LED Status Display

EPCU Pressure Switch Module

Primary Safe Pressure Switch
Space for Optional Redundant Safe Pressure Switch

120/240 VAC EPCU Power Module

Isolated Coil Voltage Transformer
Power Control Switch Cable Header
Voltage Regulators
Pressure Switch Cable Header
Logic Module Cable Header
Redundant Safe Pressure Relay
20 A Alarm Relay
20 A Enclosure Power Relays

Assembled Electrical Power Control Unit

Barrier A Socket
Barrier Wiring Terminal
Barrier B Socket
Barrier C Socket

EPCU Features

LED DISPLAY INDICATORS

Power Off: Red
Power On: Green
Safe Pressure: Blue
Timer Running: Yellow
Alarm Active: Red
Bypass Engaged: Green

Enclosure Power Relays Deenergized
Enclosure Power Relays Energized
Enclosure Pressure > 0.15" or 0.50" w.c.
Exchange Timer Active - Class I Only
Enclosure Pressure < 0.15" or 0.50" w.c.
Control Bypass Active - CB Modes

Class I LED Displays

Alarm Only
Alarm & Bypass

Class II LED Displays

Alarm Only
Alarm & Bypass

FIELD ADJUSTABLE TIMER FUNCTIONS

RET (Rapid Exchange Timer) provides a time delay after safe pressure is detected, to allow four volume exchanges prior to energizing the enclosure power relays. In Class I areas only, if safe pressure is lost during time delay cycle, EPCU will reset.

NOTE: EDT & SLT timers not functional on Series 2001 Systems

Power Control Options

NORMAL RUNNING (NR) MODE

EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

CONDITIONAL BYPASS (CB) MODE

EPCU features an off-on-bypass 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 programmed to deenergize when bypass is engaged, if specified at time of order.
OPTIONAL INTRINSIC SAFETY BARRIERS

DESCRIPTION & OPERATION

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

BARRIER PROGRAMMING OPTIONS

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
Not programmed - custom applications only
Barrier C Function - when switch closes
Energizes RESV relay - custom applications only

Model 2001A System Accessories

(See accessories page for complete details)

CONNECTION FITTINGS

<table>
<thead>
<tr>
<th>EFC-4</th>
<th>1/4&quot; Flush Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBC-4</td>
<td>1/4&quot; Bulkhead Connector</td>
</tr>
<tr>
<td>EPC-10</td>
<td>1/2&quot; Pipe Connector</td>
</tr>
</tbody>
</table>

ADDITIONAL ITEMS

<table>
<thead>
<tr>
<th>LLF</th>
<th>1/4&quot; Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMK-2,-3 or -10</td>
<td>System Mounting Kit</td>
</tr>
<tr>
<td>RAH</td>
<td>Remote Alarm Horn</td>
</tr>
<tr>
<td>RAB-1</td>
<td>Div. 1 Remote Alarm Beacon</td>
</tr>
<tr>
<td>LCK</td>
<td>L Fitting Conduit Kit</td>
</tr>
<tr>
<td>TCK</td>
<td>T Fitting Conduit Kit</td>
</tr>
</tbody>
</table>

SRM-4000 Switch Resistor Module

INSTALLATION & OPERATION MANUAL

129-0208 Inst. & Operation Manual

OPTIONAL ENCLOSURE PROTECTION VENTS

EPV-1-SA-00 Straight w/Spark Arrestor

EPV-1-SA-90 Rt Angle w/Spark Arrestor

OPTIONAL HEX KEY REGULATOR HANDLE

TR-10G Tamperproof Regulator

EWN--- Warning Nameplate (Included with Panel)

WARNING NAMEPLATES

EWN-1 Class I Enclosure Warning

EWN-2 Class II Enclosure Warning

ETW Enclosure Temperature Warning

FACTORY INSTALLED ACCESSORIES

IS1 Channel A Barrier

IS2 Channel B Barrier

IS3 Channel C Barrier

RP1 Redundant Safe Pressure Switch

L Power Switch Key Lock Assembly

ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM

Overall System Dimensions

<table>
<thead>
<tr>
<th></th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
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<tr>
<td>Height</td>
<td>20</td>
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<td>20.75</td>
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<tr>
<td>Depth</td>
<td>10.50</td>
<td>10.50</td>
<td>10.50</td>
<td>10.50</td>
<td>12.50</td>
<td>11.25</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 21h x 12w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

Model 2001B is a pressurization system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation. Intended exclusively for Class II areas, the system is designed to maintain a "safe" (1.0") pressure. 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 12.4.

Basic Operation

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The operator is then required to remove all dust from the protected enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control regulator is used to set a safe reading on the enclosure pressure gauge. The enclosure power will energize after a brief pause, when safe pressure is stable. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). The system includes form "C" contacts for audible or visual alarm systems.

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number: 2001B-CII Type X</th>
<th>STD Style (Standard)</th>
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</thead>
<tbody>
<tr>
<td>Designation:</td>
<td>Pressurization System</td>
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<tr>
<td>Enclosure Volume:</td>
<td>50 ft³ max.</td>
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<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. II, Div. 1, Group E-G</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
</tr>
</tbody>
</table>
**Material Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulator Body</td>
<td>Zinc w/Enamel Finish Polycarbonate</td>
</tr>
<tr>
<td>Regulator Handle</td>
<td>Alum. w/Enamel Finish</td>
</tr>
<tr>
<td>Enclosure Pressure Gauge</td>
<td>316 SS Forged Body</td>
</tr>
<tr>
<td>Tube Fittings</td>
<td>316 SS 1/4” .035 Welded</td>
</tr>
<tr>
<td>System Nameplates</td>
<td>Silkscreened Lexan® &amp; SS</td>
</tr>
<tr>
<td>Fastener Hardware</td>
<td>SS Screws &amp; Bolts</td>
</tr>
<tr>
<td>Mounting Plate</td>
<td>316 14 Ga #3 Brush SS</td>
</tr>
<tr>
<td>EPCU Enclosure Body</td>
<td>Bead Blast Cast Alum.</td>
</tr>
<tr>
<td>Enclosure Warning Nameplate</td>
<td>Silkscreened SS</td>
</tr>
</tbody>
</table>

Lexan® is a registered trademark of the General Electric Corporation.

**Simplified EPCU Redundant Logic Diagram**

**OPERATION**

Signal (1) from SPS is sent to µP, GAL and SPCR coil. During start-up, GAL verifies all µP functions. GAL & µP must receive uninterrupted signal from SPS to prevent logic resetting. After GAL verifies all start-up procedures, it sends “power enabled” signal (2) to PER coil. Then, µP sends “power request” signal (3) through the SPCR and PER contacts to EPR coils.

**Electrical Wiring Diagram**

**System Specifications**

<table>
<thead>
<tr>
<th>System Dimensions:</th>
<th>See Page 70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Weight:</td>
<td>38 lb</td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
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<tr>
<td>Supply Pressure Range:</td>
<td>* 5 - 120 psi max.</td>
</tr>
<tr>
<td>Supply Requirements:</td>
<td>Clean air or inert gas</td>
</tr>
<tr>
<td>Safe Press. Setpoint:</td>
<td>1.0” @ Safe Press.</td>
</tr>
<tr>
<td>Safe Press. Flow Rate:</td>
<td>** 0.1 - 3.5 SCFH</td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>3/8” Tube Fitting</td>
</tr>
<tr>
<td>Enclosure Supply Fitting:</td>
<td>3/8” Tube Fitting</td>
</tr>
<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4” Tube Fitting</td>
</tr>
<tr>
<td>EPCU Power Requirements:</td>
<td>120 VAC 60 Hz 10</td>
</tr>
<tr>
<td>(European 220 voltage only)</td>
<td>240 VAC 50 Hz 10</td>
</tr>
<tr>
<td>EPCU Power Consumption:</td>
<td>500 mA</td>
</tr>
<tr>
<td>Power Relay Contacts:</td>
<td>20 A @ 240 V</td>
</tr>
<tr>
<td>Alarm Relay N.O. Contact:</td>
<td>20 A @ 240 V</td>
</tr>
<tr>
<td>Alarm Relay N.C. Contact:</td>
<td>15 A @ 240 V</td>
</tr>
<tr>
<td>Power Consumption:</td>
<td>500 mA</td>
</tr>
<tr>
<td>Power Relay Contacts:</td>
<td>20 A @ 240 V</td>
</tr>
<tr>
<td>** 20 A @ 48 VDC</td>
<td></td>
</tr>
<tr>
<td>Alarm Relay N.O. Contact:</td>
<td>20 A @ 240 V</td>
</tr>
<tr>
<td>Alarm Relay N.C. Contact:</td>
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</table>

**EPCU Description**

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

**Basic EPCU Operation**

When power is “off”, the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched “on”, the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class II units must detect a 0.50” orifice regulator set to 5 psi max. with tamperproof regulator set to 5 psi max.

With EPV-3 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with a self-test of LED display and logic functions. The unit will then start-up. Class II units must detect a 0.50” orifice regulator set to 5 psi max. with tamperproof regulator set to 5 psi max.

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**EPCU Features**

**LED DISPLAY INDICATORS**
- Power Off: Red
- Power On: Green
- Safe Pressure: Blue
- Alarm Active: Red
- Bypass Engaged: Green

**Enclosure Power Relays**
- Deenergized
- Energized
- Enclosure Pressure > 0.50" w.c.
- Enclosure Pressure < 0.50" w.c.
- Control Bypass Active - CB Modes

**Class II LED Displays**
- Alarm Only
- Alarm & Bypass

**FIELD ADJUSTABLE TIMER FUNCTIONS**
- RET, EDT & SLT timers not functional on Model 2001B Systems

**Power Control Options**

**NORMAL RUNNING (NR) MODE**
- EPCU features an off-on pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

**CONDITIONAL BYPASS (CB) MODE**
- EPCU features an off-on-bypass 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
**System Accessories Diagram**

<table>
<thead>
<tr>
<th>Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; Supply Tubing</td>
<td>-</td>
</tr>
<tr>
<td>1/4&quot; Tubing Reference</td>
<td>-</td>
</tr>
<tr>
<td>Enclosure Supply Fitting</td>
<td>EBC-6</td>
</tr>
<tr>
<td>Enclosure Reference Fitting</td>
<td>EFC-4</td>
</tr>
<tr>
<td>Enclosure Protection Vent</td>
<td>EPV-3-SA...</td>
</tr>
<tr>
<td>Mounting Kit</td>
<td>SMK-2 or SMK-3</td>
</tr>
<tr>
<td>Warning Nameplate</td>
<td>EWN-2 (Included with Panel)</td>
</tr>
</tbody>
</table>

**Model Number Designations**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001B STD CII NR LH #</td>
<td>Overview of features and options</td>
</tr>
</tbody>
</table>

**OPTIONAL INTRINSIC SAFETY BARRIERS**

**DESCRIPTION & OPERATION**

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 Pepperl+Fuchs-furnished resistor network cable, or a Pepperl+Fuchs-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 status, and by a red LED to show faulted (line breakage) status. All barriers can be reprogrammed to duplicate other barrier functions as required, upon specific request.

**BARRIER PROGRAMMING OPTIONS**

- **Barrier A Function - when switch opens**
  - Enables start-up cycle
  - Deenergizes enclosure power and alarm relay
- **Barrier B Function - when switch opens**
  - Functions parallel to safe pressure switch
- **Barrier C Function - when switch closes**
  - Energizes RESV relay - custom applications only

**Model 2001B System Accessories**

(See accessories page for complete details)

**CONNECTION FITTINGS**

- EFC-4 1/4" Flush Connector
- EFC-6 3/8" Flush Connector
- EBC-6 3/8" Bulkhead Connector
- EPC-13 1" Pipe Connector

**ADDITIONAL ITEMS**

- SMK-2, -3 or -10 System Mounting Kit
- RAH Remote Alarm Horn
- RAB-1 Div. 1 Remote Alarm Beacon
- LCK L Fitting Conduit Kit
- TCK T Fitting Conduit Kit

**FACTORY INSTALLED ACCESSORIES**

- IS1 Channel A Barrier
- IS2 Channel B Barrier
- IS3 Channel C Barrier
- RP1 Redundant Safe Pressure Switch
- L Power Switch Key Lock Assembly

**SYSTEM ACCESSORIES**

- SRM-4000 Switch Resistor Module
- NJ+ F Namur Sensor
- EPV-3-SA-00 Straight w/Spark Arrestor
- EPV-3-SA-90 Rt Angle w/Spark Arrestor
- EWN-2 Class II Enclosure Warning
- ETW Enclosure Temperature Warning

**ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM**

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<td>10.75</td>
<td>12.50</td>
<td>11.50</td>
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</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 21h x 12w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

Model 2001C is a pressurization system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to prevent combustible dust accumulation. Intended exclusively for Class II areas, the system is designed to maintain a "safe" (1.0") pressure. 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 12.4.

Basic Operation

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The operator is then required to remove all dust from the protected enclosure(s). The enclosure protection vent (if used) must be tested and enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control regulator is used to set a safe reading on the enclosure pressure gauge. The enclosure power will energize after a brief pause, when safe pressure is stable. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). The system includes form "C" contacts for audible or visual alarm systems.

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>2001C-CII Type X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation:</td>
<td>Pressurization System</td>
</tr>
<tr>
<td>Enclosure Volume:</td>
<td>250 ft³ max.</td>
</tr>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. II, Div. 1, Group E-G</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
</tr>
</tbody>
</table>
## System Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Dimensions:</td>
<td>See Page 74</td>
</tr>
<tr>
<td>Shipping Weight:</td>
<td>38 lb</td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
</tr>
<tr>
<td>Supply Pressure Range:</td>
<td>5 - 120 psi max.</td>
</tr>
<tr>
<td>Supply Requirements:</td>
<td>Clean air or inert gas</td>
</tr>
<tr>
<td>Safe Press. Setpoint:</td>
<td>1.0″ @ Safe Press.</td>
</tr>
<tr>
<td>Safe Press. Flow Rate:</td>
<td>** 0.1 - 3.5 SCFH</td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>1/2″ Tube Fitting</td>
</tr>
<tr>
<td>Enclosure Supply Fitting:</td>
<td>1/2″ Tube Fitting</td>
</tr>
<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4″ Tube Fitting</td>
</tr>
<tr>
<td>EPCU Power Requirements:</td>
<td>240 VAC 60 Hz 10</td>
</tr>
<tr>
<td>(European 220 voltage only)</td>
<td>240 VAC 50 Hz 10</td>
</tr>
<tr>
<td>(All voltage ratings are factory set)</td>
<td></td>
</tr>
<tr>
<td>EPCU Power Consumption:</td>
<td>500 mA</td>
</tr>
<tr>
<td>Power Relay Contacts:</td>
<td>20 A @ 240 VAC</td>
</tr>
<tr>
<td></td>
<td>20 A @ 28 VDC</td>
</tr>
<tr>
<td>Alarm Relay N.O. Contact:</td>
<td>20 A @ 240 VAC</td>
</tr>
<tr>
<td></td>
<td>20 A @ 28 VDC</td>
</tr>
<tr>
<td>Alarm Relay N.C. Contact:</td>
<td>15 A @ 240 VAC</td>
</tr>
<tr>
<td></td>
<td>10 A @ 28 VDC</td>
</tr>
</tbody>
</table>

* With EPV-4 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with tamperproof regulator set to 5 psi max.

** Enclosure integrity determines actual flow rate

---

## EPCU Description

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

---

## Basic EPCU Operation

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class II units must detect a 0.50" gas pressure to energize the alarm relay. The enclosure power relays energize after a brief delay. Loss of safe pressure on the unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).

---

## Simplified EPCU Redundant Logic Diagram

**OPERATION**

Signal (1) from SPS is sent to µP, GAL and SPCR coil. During start-up, GAL verifies all µP functions. GAL & µP must receive uninterrupted signal from SPS to prevent logic resetting. After GAL verifies all start-up procedures, it sends “power enabled” signal (2) to PER coil. Then, µP sends “power request” signal (3) through the SPCR and PER contacts to EPR coils.

---

## Electrical Wiring Diagram

- **Field Wired Power Module Terminals**
  - 20 A FUSES
  - 120 VAC
  - 240 VAC (Optional Voltage)

- **EPCU Power Supply Terminals**
  - Gnd
  - Hot
  - Neu

- **Enclosure Power Supply Terminals**
  - NO
  - Com
  - NC

- **Remote Alarm Relay Terminals**

---

Lexan® is a registered trademark of the General Electric Corporation.
EPCU Features

LED DISPLAY INDICATORS

- Power Off: Red
- Power On: Green
- Safe Pressure: Blue
- Alarm Active: Red
- Bypass Engaged: Green

Enclosure Power Relays Deenergized
Enclosure Pressure > 0.50" w.c.
Enclosure Pressure < 0.50" w.c.
Control Bypass Active - CB Modes

Class II LED Displays

Alarm Only
Alarm & Bypass

FIELD ADJUSTABLE TIMER FUNCTIONS

RET, EDT & SLT timers not functional on Model 2001B Systems

Power Control Options

NORMAL RUNNING (NR) MODE

EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

CONDITIONAL BYPASS (CB) MODE

EPCU features an on-off-bypass 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
**System Accessories Diagram**

- 1/2" Supply Tubing
- 1/4" Tubing Reference
- Enclosure Supply Fitting EBC-8
- Enclosure Reference Fitting EFC-4

**Pressurized Protected Enclosure**

- SMK-3 Mounting Kit
- Warning Nameplate EWN-2

**Model Number Designations**

| 2001C - STD - CII - NR - LH - ## |

- **Series Model Number**
- **System Style**
- **Area Classification**
- **Power Control Mode**
- **Mounting Configuration**

**OPTIONAL INTRINSIC SAFETY BARRIERS**

**DESCRIPTION & OPERATION**

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

**BARRIER PROGRAMMING OPTIONS**

- **Barrier A Function - when switch opens**
  - Disables start-up cycle
  - Deenergizes enclosure power and alarm relay

- **Barrier B Function - when switch opens**
  - Functions parallel to safe pressure switch

- **Barrier C Function - when switch closes**
  - Energizes RESV relay - custom applications only

**OPTIONAL ENCLOSURE PROTECTION VENTS**

- **EPC-14**
- **EBC-8**
- **EFC-4**

**CONNECTION FITTINGS**

- **EFC-4** 1/4" Flush Connector
- **EFC-8** 1/2" Flush Connector
- **EBC-8** 1/2" Bulkhead Connector
- **EPC-14** 1-1/2" Pipe Connector

**ADDITIONAL ITEMS**

- **SMK-2,-3 or -10** System Mounting Kit
- **RAH** Remote Alarm Horn
- **RAB-1** Div. 1 Remote Alarm Beacon
- **LCK** L Fitting Conduit Kit
- **TCK** T Fitting Conduit Kit

**FACTORY INSTALLED ACCESSORIES**

- **SRM-4000** Switch Resistor Module
- **INSTALLATION & OPERATION MANUAL**
- **129-0210** Inst. & Operation Manual
- **EPV-4-SA-00** Straight w/Spark Arrestor
- **EPV-4-SA-90** Rt Angle w/Spark Arrestor
- **EWN-2** Class II Enclosure Warning
- **ETW** Enclosure Temperature Warning
- **IS1** Channel A Barrier
- **IS2** Channel B Barrier
- **IS3** Channel C Barrier
- **RP1** Redundant Safe Pressure Switch
- **L** Power Switch Key Lock Assembly

**Model 2001C System Accessories (See accessories page for complete details)**

**OVERALL SYSTEM DIMENSIONS**

<table>
<thead>
<tr>
<th>Overall System Dimensions</th>
<th>STD</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
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</thead>
<tbody>
<tr>
<td><strong>Height</strong></td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>10.50</td>
<td>10.50</td>
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<td>22</td>
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<tr>
<td><strong>Width</strong></td>
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<td>11</td>
<td>20.75</td>
<td>20.75</td>
<td>11</td>
<td>13</td>
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<tr>
<td><strong>Depth</strong></td>
<td>10.75</td>
<td>10.75</td>
<td>10.75</td>
<td>10.75</td>
<td>10.75</td>
<td>12.50</td>
<td>11.50</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 21h x 12w. Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
**Description**

Model 2002 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a “safe” (0.25”) pressure. A Pepperl+Fuchs Model EPV-2 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 12.4.

**Basic Operation**

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control valve is used to manually set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve is fully engaged by manual or automatic means (dependent on System Style, see below). Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve disengages manually or automatically. Pressure returns to the safe setting and enclosure power is energized by the EPCU. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). All systems include form “C” contacts for audible or visual alarm systems.

**Style Variances**

**STD (Standard) Style** systems require manual operation of the Rapid Exchange control valve.

**SA (Semiautomatic) Style** systems require manual engagement of the Rapid Exchange control valve to initiate the exchange cycle, but automatically disengages the valve upon completion of the cycle. Loss of safe pressure requires an operator to manually restart both systems above.

**FA (Fully Automatic) Style** systems engage and disengage the Rapid Exchange control valve automatically, after an operator manually sets a safe pressure. In addition, FA Style systems restart automatically after a power or air pressure failure.

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**Standard Model Applications**

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>2002 Type X</th>
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<tbody>
<tr>
<td>Designation:</td>
<td>Purging System</td>
</tr>
<tr>
<td>Enclosure Volume:</td>
<td>15 ft³ max.</td>
</tr>
</tbody>
</table>

**STD (Standard) Style**

| UL & FM Certified: | Cl. I, Div. 1, Group C&D* |
| Rating Reduction: | Div. 1 to Nonhazardous |

**SA (Semiautomatic) Style**

| UL & FM Certified: | Cl. I, Div. 1, Group C&D |
| Rating Reduction: | Div. 1 to Nonhazardous |

**FA (Fully Automatic) Style**

| UL & FM Certified: | Cl. I, Div. 1, Group C&D |
| Rating Reduction: | Div. 1 to Nonhazardous |

*Only FM Certified Group B System Available in STD Style*
Type X

System Specifications

- **System Dimensions:** See Page 78
- **Shipping Weight (lb):** STD - 45 / SA & FA - 47
- **Temp. Range:** -20 °F to +120 °F
- **Supply Pressure Range:** 80 - 120 psi max.
- **Capacity & Filtration:** 1.5 oz @ 20 Microns
- **Supply Requirements:** Clean air or inert gas
- **Safe Press. Setpoint:** 0.25" @ Safe Press.
- **Safe Press. Flow Rate:** * 0.1 - 3.5 SCFH
- **Exchange Pressure:** 3" - 5"
- **Exchange Flow Rate:** ** 4 SCFM / 240 SCFH
- **Exchange Time:** 1 Minute/ft³
- **System Supply Port:** 1/4" FPT
- **Enclosure Supply Fitting:** 1/4" Tube Fitting
- **Enclosure Reference Fitting:** 1/4" Tube Fitting
- **EPCU Conduit Port Size:** 1/2" FPT
- **EPCU Power Requirements:** 120 VAC 60 Hz 10
  (European 220 voltage only) 240 VAC 50 Hz 10
- **EPCU Power Consumption:** 500 mA
- **Power Relay Contacts:** 20 A @ 240 VAC
- ***** 20 A @ 48 VDC**
- **Alarm Relay N.O. Contact:** 20 A @ 240 VAC
- **20 A @ 28 VDC**
- **Alarm Relay N.C. Contact:** 15 A @ 240 VAC
- **10 A @ 28 VDC**

* Enclosure integrity determines actual flow rate
** With regulator set to 60 psi min. during exchange

EPCU Description

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

Basic EPCU Operation

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class I units must detect a 0.25" pressure to energize the alarm relay and begin an exchange cycle. When the cycle stops, the power relays will energize. Loss of safe pressure on either unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).
Type X

EPCU Logic Module

Barrier Fault & Active Status Indicators
Primary Microprocessor
Redundant Controller (GAL)

Barrier C Socket
Barrier B Socket
Barrier A Socket
Barrier Wiring Terminal

Pressure Switch Calibration Access
LED Status Display

Primary Rapid Exchange® Switch
Space for Optional Redundant Safe Pressure Switch

EPCU Pressure Switch Module

Isolated Coil Voltage Transformer
Power Control Switch Cable Header
Voltage Regulators
Pressure Switch Cable Header
Logic Module Cable Header
Redundant Safe Pressure Relay
Redundant Rapid Exchange® Relay
20 A Alarm Relay
20 A Enclosure Power Fuses
Power Module Wiring Terminal

EDT, SLT & RET Timers

120/240 VAC EPCU Power Module

20 A Enclosure Power Fuses
Power Module Wiring Terminal

Assembled Electrical Power Control Unit


type X

EPCU Features

LED DISPLAY INDICATORS
Power Off: Red Power On: Green Safe Pressure: Blue Rapid Exchange: Blue Timer Running: Yellow Alarm Active: Red Bypass Engaged: Green Enclosure Power Relays Deenergized Enclosure Power Relays Energized Enclosure Pressure > 0.15” w.c. Enclosure Pressure > 2.0” w.c. Rapid Exchange® Timer Active Enclosure Pressure < 0.15” w.c. Control Bypass Active - CB

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 exchange pressure is detected. If the pressure is not detected, the EPCU will reset.

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

Power Control Options
NORMAL RUNNING (NR) MODE
EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

CONDITIONAL BYPASS (CB) MODE
EPCU features an off-on-bypass 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
OPTIONAL INTRINSIC SAFETY BARRIERS

DESCRIPTION & OPERATION

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

BARRIER PROGRAMMING OPTIONS

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
Not programmed - custom applications only
Barrier C Function - when switch closes
Energizes RESV relay - custom applications only

BARREL PROGRAMMING OPTIONS

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
Not programmed - custom applications only
Barrier C Function - when switch closes
Energizes RESV relay - custom applications only

FACTORY INSTALLED ACCESSORIES

EPCU Logic Module - includes a flush mount enclosure and mounting hardware, unless specified otherwise. Programming of barriers is available at the factory.

INSTALLATION & OPERATION MANUAL

129-0211 Inst. & Operation Manual

ENCLOSURE PROTECTION VENTS

ONE VENT REQUIRED WITH EACH SYSTEM

EPV-2-SA-00 Straight w/Spark Arrestor
EPV-2-SA-90 Rt Angle w/Spark Arrestor

WARNING NAMEPLATES

EWN-1 Class I Enclosure Warning
ETW Enclosure Temperature Warning
F Factory Installation Accessories

ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 23h x 12w
Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

Model 2003 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. A Pepperl+Fuchs 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 12.4.

Basic Operation

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control valve is used to manually set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve is fully engaged by manual or automatic means (dependent on System Style, see below). Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve disengages manually or automatically. Pressure returns to the safe setting and enclosure power is energized by the EPCU. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). All systems include form "C" contacts for audible or visual alarm systems.

Style Variances

STD (Standard) Style systems require manual operation of the Rapid Exchange control valve.

SA (Semiautomatic) Style systems require manual engagement of the Rapid Exchange control valve to initiate the exchange cycle, but automatically disengages the valve upon completion of the cycle. Loss of safe pressure requires an operator to manually restart both systems above.

FA (Fully Automatic) Style systems engage and disengage the Rapid Exchange control valve automatically, after an operator manually sets a safe pressure. In addition, FA Style systems restart automatically after a power or air pressure failure.

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Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>2003 Type X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation:</td>
<td>Purging System</td>
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<tr>
<td>Enclosure Volume:</td>
<td>75 ft³ max.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STD (Standard) Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
</tr>
<tr>
<td>Rating Reduction:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SA (Semiautomatic) Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
</tr>
<tr>
<td>Rating Reduction:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FA (Fully Automatic) Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
</tr>
<tr>
<td>Rating Reduction:</td>
</tr>
</tbody>
</table>

*Only FM Certified Group B System Available in STD Style
**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
- **Tubing:** Brass w/Enamel Finish
- **System Nameplates:** 316 SS 1/4" & 3/8" .035 Welded
- **Fastener Hardware:** Silkscreened Lexan® & SS Screws & Bolts
- **Mounting Plate:** 316 SS 14 Ga #3 Brush SS
- **EPCU Enclosure Body:** Galvanized Steel
- **Conduit & Fittings (SA & FA):** Silkscreened SS
- **Enclosure Warning Nameplate:** Lexan®

*Lexan® is a registered trademark of the General Electric Corporation*

**System Specifications**

- **System Dimensions:** See Page 82
- **Shipping Weight:** STD - 45 lb / SA & FA - 47 lb
- **Temp. Range:** -20 °F to +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. Flow Rate:** 0.1 - 3.5 SCFH
- **Exchanger Pressure:** 3" - 5"
- **Exchange Flow Rate:** **10 SCFM / 600 SCFH**
- **Exchange Time:** 1 Minute / 2.5 ft³
- **System Supply Port:** 3/8" FPT
- **Enclosure Supply Fitting:** 3/8" Tube Fitting
- **Enclosure Reference Fitting:** 1/4" Tube Fitting
- **EPCU Power Requirements:** 120 VAC 60 Hz 10 (European 220 volt only) 240 VAC 50 Hz 10
- **(All voltage ratings are factory set)**
- **EPCU Power Consumption:** 500 mA
- **Power Relay Contacts:** 20 A @ 240 VAC
- **Alarm Relay N.O. Contact:** 20 A @ 240 VAC
- **Alarm Relay N.C. Contact:** 15 A @ 240 VAC

*Enclosure integrity determines actual flow rate
**With regulator set to 60 psi min. during exchange*

**EPCU Description**

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

**Basic EPCU Operation**

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class I units must detect a 0.25" pressure to energize the alarm relay and begin an exchange cycle. When the cycle stops, the power relays will energize. Loss of safe pressure on either unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).
EPCU Features

**LED DISPLAY INDICATORS**

- **Power Off:** Red
- **Power On:** Green
- **Safe Pressure:** Blue
- **Rapid Exchange:** Blue
- **Timer Running:** Yellow
- **Alarm Active:** Red
- **Bypass Engaged:** Green

**Enclosure Power Relays Deenergized**
- Enclosure Power Relays Energized
- Enclosure Pressure > 0.15” w.c.
- Enclosure Pressure > 2.0” w.c.
- Rapid Exchange® Timer Active
- Control Bypass Active - CB

**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 exchange pressure is detected. If the pressure is not detected, the EPCU will reset.
- **RET (Rapid Exchange Timer):**
  - Provides a time delay after Rapid Exchange pressure is detected, to allow four volume exchanges prior to energizing the enclosure power relays. If safe pressure or Rapid Exchange pressure is lost or interrupted during time delay cycle, the EPCU will reset.

**Power Control Options**

**NORMAL RUNNING (NR) MODE**

EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

**CONDITIONAL BYPASS (CB) MODE**

EPCU features an off-on-bypass 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
OPTIONAL INTRINSIC SAFETY BARRIERS

DESCRIPTION & OPERATION

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

BARRIER PROGRAMMING OPTIONS

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
Not programmed - custom applications only

Barrier C Function - when switch closes
Energizes RESV relay - custom applications only

WARNING NAMEPLATES

ETW Enclosure Temperature Warning

FACTORY INSTALLED ACCESSORIES

IS1 Channel A Barrier
IS2* Channel B Barrier
IS3* Channel C Barrier
RP1 Redundant Safe Pressure Switch
RP2 Redundant Rapid Exchange Switch
L Power Switch Key Lock Assembly

*Requires custom programming information

ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM

Model 2003 System Accessories (See accessories page for complete details)

CONNECTION FITTINGS

NC-6 3/8” Ninety Connector
SC-6 3/8” Straight Connector
EFC-4 1/4” Flush Connector
EFC-6 3/8” Flush Connector
EB-6 3/8” Bulkhead Connector
EPC-13 1” Pipe Connector

ADDITIONAL ITEMS

SMK-2, -3 or -10 System Mounting Kit
RAH Remote Alarm Horn
RAB-1 Div. 1 Remote Alarm Beacon

PRODUCTS & ACCESSORIES

LCK L Fitting Conduit Kit
TCK T Fitting Conduit Kit
SRM-4000 Switch Resistor Module
NJ... P+F Namur Sensor

INSTALLATION & OPERATION MANUAL

129-0212 Inst. & Operation Manual

ENCLOSURE PROTECTION VENTS

ONE VENT REQUIRED WITH EACH SYSTEM
EPV-3-SA-00 Straight w/Spark Arrestor
EPV-3-SA-90 Rt Angle w/Spark Arrestor

WARNING NAMEPLATES

EWN-1 Class I Enclosure Warning

2003 - STD - CI - NR - LH - ##

Model Number Designations

Series Model Number

Type X

System Style

STD - Standard
SA - Semiautomatic
FA - Fully Automatic

Area Classification

CI - Class I, Group C & D Area
IB - Class I, Group B Area (STD Only)

Power Control Mode

NR - Normal Running
CB - Conditional Bypass

Mounting Configuration

LH - left hand
RH - right hand
TM - top mount
BM - bottom mount
WM - wall mount
FM* - frame mount
PM* - panel mount

## - See Accessories Page 132 for additional factory installed accessories

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 24h x 12.50w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

Model 2004 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a “safe” (0.25”) pressure. A Pepperl+Fuchs Model EPV-4 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 12.4.

Basic Operation

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control valve is used to manually set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve is fully engaged by manual or automatic means (dependent on System Style, see below). Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve disengages manually or automatically. Pressure returns to the safe setting and enclosure power is energized by the EPCU. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). All systems include form “C” contacts for audible or visual alarm systems.

Style Variances

STD (Standard) Style systems require manual operation of the Rapid Exchange control valve.

SA (Semiautomatic) Style systems require manual engagement of the Rapid Exchange control valve to initiate the exchange cycle, but automatically disengages the valve upon completion of the cycle. Loss of safe pressure requires an operator to manually restart both systems above.

FA (Fully Automatic) Style systems engage and disengage the Rapid Exchange control valve automatically, after an operator manually sets a safe pressure. In addition, FA Style systems restart automatically after a power or air pressure failure.

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Model 2004

STD Style (Standard)

FA/SA Style (Fully Automatic/Semiautomatic)

Standard Model Applications

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>2004 Type X</th>
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<tbody>
<tr>
<td>Designation:</td>
<td>Purging System</td>
</tr>
<tr>
<td>Enclosure Volume:</td>
<td>200 ft³ max.</td>
</tr>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. I, Div. 1, Group C&amp;D*</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SA (Semiautomatic) Style</th>
<th>FA (Fully Automatic) Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. I, Div. 1, Group C&amp;D</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
</tr>
</tbody>
</table>

* Only FM Certified Group B System Available in STD Style
**System Specifications**

- **System Dimensions:** See Page 86
- **Shipping Weight:** STD - 49 lb / SA & FA - 51 lb
- **Temp. Range:** -20 °F to +120 °F
- **Supply Pressure Range:** 80 to 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. Flow Rate:** * 0.1 - 3.5 SCFH
- **Exchange Pressure:** 3" - 5"
- **Exchange Flow Rate:** ** 30 SCFM/1800 SCFH
- **Exchange Time:** 1 Minute/7.5 ft³

**System Supply Port:**
- Enclosure Supply Fitting: 1/2" Tube Fitting
- Enclosure Reference Fitting: 1/4" Tube Fitting
- EPCU Conduit Port Size: 1-1/2" FPT
- EPCU Power Requirements: 120 VAC 60 Hz 10 (European 220 voltage only) 240 VAC 50 Hz 10

**System Dimensions:**
- (All voltage ratings are factor set)
- EPCU Power Consumption: 500 mA
- Power Relay Contacts: 20 A @ 240 VAC
- ** 20 A @ 28 VDC
- Alarm Relay N.O. Contact: 20 A @ 240 VAC
- Alarm Relay N.C. Contact: 15 A @ 240 VAC
- 10 A @ 28 VDC

**EPCU Description**

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stacked in the EPCU enclosure on standoffs.

**Basic EPCU Operation**

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class I units must detect a 0.25" pressure to energize the alarm relay and begin an exchange cycle. When the cycle stops, the power relays will energize. Loss of safe pressure on either unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).
EPCU Features

**LED DISPLAY INDICATORS**

- **Power Off**: Red
- **Power On**: Green
- **Safe Pressure**: Blue
- **Rapid Exchange**: Blue
- **Timer Running**: Yellow
- **Alarm Active**: Red
- **Bypass Active**: Green

Enclosure Power Relays Deenergized
Enclosure Power Relays Energized
Enclosure Pressure > 0.15" w.c.
Enclosure Pressure > 2.0" w.c.
Rapid Exchange® Timer Active
Control Bypass Active - CB

**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 exchange pressure is detected. If the pressure is not detected, the EPCU will reset.

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

**Power Control Options**

**NORMAL RUNNING (NR) MODE**

EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

**CONDITIONAL BYPASS (CB) MODE**

EPCU features an off-on-bypass 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
**System Accessories Diagram**

**Model Number Designations**

<table>
<thead>
<tr>
<th>2004 - STD</th>
<th>CI</th>
<th>NR</th>
<th>LH</th>
<th>##</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Model Number</td>
<td>System Style</td>
<td>Area Classification</td>
<td>Power Control Mode</td>
<td>Mounting Configuration</td>
</tr>
<tr>
<td>STD - Standard</td>
<td>Class I, Group C &amp; D Area</td>
<td>NR - Normal Running</td>
<td>LH - left hand</td>
<td></td>
</tr>
<tr>
<td>SA - Semiautomatic</td>
<td>IB - Class I, Group B Area (STD Only)</td>
<td>CB - Conditional Bypass</td>
<td>RH - right hand</td>
<td></td>
</tr>
<tr>
<td>FA - Fully Automatic</td>
<td>WM - wall mount</td>
<td>TM - top mount</td>
<td>WM - wall mount</td>
<td></td>
</tr>
<tr>
<td>CI</td>
<td>CI</td>
<td>TM</td>
<td>TM</td>
<td></td>
</tr>
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<td>FA</td>
<td>BM</td>
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<tr>
<td>LH</td>
<td>LH</td>
<td>TM</td>
<td>TM</td>
<td></td>
</tr>
</tbody>
</table>

## - See Accessories Page 132 for additional factory installed accessories

### Optional Intrinsic Safety Barriers

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

### BARRIER PROGRAMMING OPTIONS

- **Barrier A Function** - when switch opens
- **Barrier B Function** - when switch opens
- **Barrier C Function** - when switch closes

### Connection Fittings

- **NC-8**
  - 1/2" Ninety Connector
- **SC-8**
  - 1/2" Straight Connector
- **EFC-4**
  - 1/4" Flush Connector
- **EFC-8**
  - 1/2" Flush Connector
- **EBC-8**
  - 1/2" Bulkhead Connector
- **EPC-14**
  - 1-1/2" Pipe Connector

### Additional Items

- **SMK-2, -3 or -10** System Mounting Kit
- **RAH** Remote Alarm Horn
- **RAB-1** Div. 1 Remote Alarm Beacon

### Installation & Operation Manual

- **129-0213** Inst. & Operation Manual

### Enclosure Protection Vents

- **EPV-4-SA-00** Straight w/Spark Arrestor
- **EPV-4-SA-90** Rt Angle w/Spark Arrestor

### Warning Nameplates

- **EWN-1** Class I Enclosure Warning
- **ETW** Enclosure Temperature Warning

### Factory Installed Accessories

- **IS1** Channel A Barrier
- **IS2** Channel B Barrier
- **IS3** Channel C Barrier
- **RP1** Redundant Safe Pressure Switch
- **RP2** Redundant Rapid Exchange Switch
- **L** Power Switch Key Lock Assembly

*Requires custom programming information

### Model 2004 System Accessories (See accessories page for complete details)

### Overall System Dimensions

<table>
<thead>
<tr>
<th>STD / SA &amp; FA</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
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</thead>
<tbody>
<tr>
<td>Height</td>
<td>24</td>
<td>24</td>
<td>14</td>
<td>14</td>
<td>24</td>
<td>26</td>
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<td>Width</td>
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<td>13.50</td>
<td>24</td>
<td>13.50</td>
<td>15.00</td>
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<tr>
<td>Depth</td>
<td>11.75 / 15.25</td>
<td>11.75 / 15.25</td>
<td>11.75 / 15.25</td>
<td>11.75 / 15.25</td>
<td>12.50 / 16.50</td>
<td>11.50 / 15.75</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 25h x 14.50w

Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
**Description**

Model 2005 is a Rapid Exchange® purging system that operates on a supply of compressed instrument air or inert gas. It regulates and monitors pressure within sealed (protected) enclosure(s), in order to remove and prevent flammable gas or vapor accumulations. The system accomplishes four air exchanges and maintains a "safe" (0.25") pressure. A Pepperl+Fuchs Model EPV-5 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 12.4.

**Basic Operation**

In accordance with system instructions, start-up requires the air supply to be engaged and EPCU power to be energized. The enclosure protection vent must be tested and the enclosure(s) must be sealed. The EPCU power control switch must be activated and the system will self-test. The enclosure pressure control valve is used to manually set a safe reading on the enclosure pressure indicator. When safe pressure is stable, the Rapid Exchange control valve is fully engaged by manual or automatic means (dependent on System Style, see below). Upon completion of the Rapid Exchange cycle, (five minutes minimum) the Rapid Exchange control valve disengages manually or automatically. Pressure returns to the safe setting and enclosure power is energized by the EPCU. Loss of safe pressure causes the EPCU to deenergize power to the protected enclosure(s). All systems include form "C" contacts for audible or visual alarm systems.

**Style Variances**

STD (Standard) Style systems require manual operation of the Rapid Exchange control valve. 

SA (Semiautomatic) Style systems require manual engagement of the Rapid Exchange control valve to initiate the exchange cycle, but automatically disengages the valve upon completion of the cycle. Loss of safe pressure requires an operator to manually restart both systems above.

FA (Fully Automatic) Style systems engage and disengage the Rapid Exchange control valve automatically, after an operator manually sets a safe pressure. In addition, FA Style systems restart automatically after a power or air pressure failure.

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**Model 2005**

![STD Style (Standard)](image1)

![FA/SA Style (Fully Automatic/Semiautomatic)](image2)

**Standard Model Applications**

<table>
<thead>
<tr>
<th>Model Number:</th>
<th>2005 Type X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation:</td>
<td>Purging System</td>
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<tr>
<td>Enclosure Volume:</td>
<td>450 ft³ max.</td>
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</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>2005 Type X</th>
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</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. I, Div. 1, Group C&amp;D*</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
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</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>2005 Type X</th>
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</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. I, Div. 1, Group C&amp;D</td>
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<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
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</table>

<table>
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<tr>
<th>Model</th>
<th>2005 Type X</th>
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</thead>
<tbody>
<tr>
<td>UL &amp; FM Certified:</td>
<td>Cl. I, Div. 1, Group C&amp;D</td>
</tr>
<tr>
<td>Rating Reduction:</td>
<td>Div. 1 to Nonhazardous</td>
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</tbody>
</table>

*Only FM Certified Group B System Available in STD Style*
**System Specifications**

<table>
<thead>
<tr>
<th>System Dimensions:</th>
<th>See Page 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Weight:</td>
<td>STD - 51 lb / SA &amp; FA - 53 lb</td>
</tr>
<tr>
<td>Temp. Range:</td>
<td>-20 °F to +120 °F</td>
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<tr>
<td>Supply Pressure Range:</td>
<td>80 - 120 psi max.</td>
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<tr>
<td>Capacity &amp; Filtration:</td>
<td>8.5 oz @ 40 Microns</td>
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<tr>
<td>Supply Requirements:</td>
<td>Clean air or inert gas</td>
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<tr>
<td>Safe Press. Setpoint:</td>
<td>0.25&quot; @ Safe Press.</td>
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<tr>
<td>Safe Press. Flow Rate:</td>
<td>* 0.1 - 3.5 SCFH</td>
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<tr>
<td>Exchange Pressure:</td>
<td>3&quot; - 5&quot;</td>
</tr>
<tr>
<td>Exchange Flow Rate:</td>
<td>** 60 SCFM/3600 SCFH</td>
</tr>
<tr>
<td>Exchange Time:</td>
<td>1 Minute/15 ft³</td>
</tr>
<tr>
<td>System Supply Port:</td>
<td>1/2&quot; FPT</td>
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<tr>
<td>Enclosure Supply Fitting:</td>
<td>1/2&quot; FPT</td>
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<tr>
<td>Enclosure Reference Fitting:</td>
<td>1/4&quot; Tube Fitting</td>
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<tr>
<td>EPCU Conduit Port Size:</td>
<td>1/2&quot; FPT</td>
</tr>
<tr>
<td>EPCU Power Requirements:</td>
<td>120 VAC 60 Hz 10</td>
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<tr>
<td></td>
<td>(European 220 voltage only)</td>
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<tr>
<td></td>
<td>240 VAC 50 Hz 10</td>
</tr>
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</table>

(Opposite 220 voltage only)

* All voltage ratings are factory set
** With regulator set to 80 psi min. during exchange

**EPCU Description**

The Pepperl+Fuchs 2000 Series EPCU is a factory programmed, field adjustable, microprocessor controlled unit featuring full status indication, redundant gate array logic and electromechanical relays. The EPCU is constructed from four major items: (1) a power module, (2) a pressure switch module, (3) a logic module and (4) a power mode selector switch. The sections are linked with polarized cable, and the boards are stocked in the EPCU enclosure on standoffs.

**Basic EPCU Operation**

When power is "off", the EPCU is at rest, alarm and power relays are deenergized, and the LED display is off. When power is switched "on", the EPCU performs a self-test of LED display and logic functions. The unit will then start-up. Class I units must detect a 0.25" pressure to energize the alarm relay and begin an exchange cycle. When the cycle stops, the power relays will energize. Loss of safe pressure on either unit causes alarm and power relays to deenergize (see power control options for more information regarding EPCU operation).
**EPCU Features**

**LED DISPLAY INDICATORS**
- **Power Off**: Red
- **Power On**: Green
- **Safe Pressure**: Blue
- **Rapid Exchange**: Blue
- **Timer Running**: Yellow
- **Alarm Active**: Red
- **Bypass Engaged**: Green

**Enclosure Power Relays**
- Deenergized
- Energized
- Deenergized
- Energized
- Active
- Active

**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 exchange pressure is detected. If the pressure is not detected, the EPCU will reset.
- **RET (Rapid Exchange Timer)** provides a time delay after Rapid Exchange pressure is detected, to allow four volume exchanges prior to energizing the enclosure power relays. If safe pressure or Rapid Exchange pressure is lost or interrupted during time delay cycle, the EPCU will reset.

**Power Control Options**

**NORMAL RUNNING (NR) MODE**
- EPCU features an on-off pushbutton power control switch to activate control functions. Switch must be depressed to initiate start-up. After completion of start-up, safe pressure must be lost or switch must be depressed to deenergize enclosure power relays.

**CONDITIONAL BYPASS (CB) MODE**
- EPCU features an off-on-bypass 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 relay.
- 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 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 programmed to deenergize when bypass is engaged, if specified at time of order.
## System Accessories Diagram

- **Supply Inlet Fitting**
- **1/2" Supply Pipe**
- **1/4" Tubing Reference**
- **Enclosure Supply Fitting** (EPC-10)
- **Enclosure Reference Fitting** (EFC-4)
- **Enclosure Protection Vent** (EPV-5-SA...)
- **Mounting Kit** (SMK-3)
- **Pressurized Protected Enclosure**
- **Warning Nameplate** (EWN-1)

## Model 2005 System Accessories (See accessories page for complete details)

### CONNECTION FITTINGS
- EFC-4: 1/4" Flush Connector
- EPC-10: 1/2" Pipe Connector

### ADDITIONAL ITEMS
- SMK-2, -3 or -10: System Mounting Kit
- RAH: Remote Alarm Horn
- RAB-1: Div. 1 Remote Alarm Beacon
- LCK: L Fitting Conduit Kit
- TCK: T Fitting Conduit Kit
- SRM-4000: Switch Resistor Module
- NJ...: P+F Namur Sensor

### INSTALLATION & OPERATION MANUAL

### ENCLOSURE PROTECTION VENTS
- **ONE VENT REQUIRED WITH EACH SYSTEM**
  - EPV-5-SA-00: Straight w/Spark Arrester
  - EPV-5-SA-90: Rt Angle w/Spark Arrester

### WARNING NAMEPLATES
- EWN-1: Class I Enclosure Warning
- ETW: Enclosure Temperature Warning

### FACTORY INSTALLED ACCESSORIES
- IS1: Channel A Barrier
- IS2*: Channel B Barrier
- IS3*: Channel C Barrier
- RP1: Redundant Safe Pressure Switch
- RP2: Redundant Rapid Exchange Switch
- L: Power Switch Key Lock Assembly

*Requires custom programming information

## Model Number Designations

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>System Style</th>
<th>Area Classification</th>
<th>Power Control Mode</th>
<th>Mounting Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA - Semiautomatic</td>
<td></td>
<td></td>
<td>Right hand</td>
</tr>
<tr>
<td></td>
<td>FA - Fully Automatic</td>
<td></td>
<td></td>
<td>Top of enclosure</td>
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<td>Bottom of enclosure</td>
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<td>External frame or rack</td>
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<td>Enclosure surface cutout</td>
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<tr>
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<td></td>
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<td></td>
<td>Flush mount EPCU is not suitable for Group B Area</td>
</tr>
</tbody>
</table>

# Optional Intrinsinc Safety Barriers

**DESCRIPTION & OPERATION**

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 Pepperl+Fuchs furnished resistor network cable, or a Pepperl+Fuchs 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.

**BARRIER PROGRAMMING OPTIONS**

- **Barrier A Function** - when switch opens
- **Barrier B Function** - when switch opens
- **Barrier C Function** - when switch closes

Disables start-up cycle
Deenergizes enclosure power and alarm relay
Functions parallel to safe pressure switch
Not programmed - custom applications only
Energizes RESV relay - custom applications only

## Model 2005 System Accessories

- **ONE (1) ENCLOSURE WARNING NAMEPLATE & ONE (1) INSTALLATION & OPERATION MANUAL ARE PROVIDED WITH EACH SYSTEM**

### Overall System Dimensions

<table>
<thead>
<tr>
<th>Overall System Dimensions</th>
<th>STD / SA &amp; FA</th>
<th>LH - left hand</th>
<th>RH - right hand</th>
<th>TM - top mount</th>
<th>BM - bottom mount</th>
<th>WM - wall mount</th>
<th>FM or PM - flat panel</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Height</strong></td>
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<td>14</td>
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<td>10.75 / 15.25</td>
<td>12.50 / 16.50</td>
<td>15.00</td>
<td>11.25 / 15.75</td>
</tr>
</tbody>
</table>

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: 26h x 14.50w
Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.
Description

The 6000 series Type X, Ex ‘px’ purge pressurization system protects general-purpose equipment mounted in a standard enclosure so that it can be located and operated in a hazardous area. The hazardous area classification can be Class I and/or Class II, Division 1/Zone 1 and/or Zone 21. The 6000 series operates by controlling and monitoring compressed instrument air or inert gas through the protected enclosure(s) to remove and prevent the accumulation of flammable gas, vapors, or dust.

The 6000 series system features these main parts:
- Electronic processor (EPCU) housed in an explosion/flameproof enclosure
- Intrinsically safe electrical/pneumatic manifold assembly
- Input/output connections and controls for operation
- I.S. user interface for programming and monitoring the system
- 316L stainless steel type 4X enclosure for EPCU and connections
- Pressure relief vent with flow and pressure monitoring at the exhaust

The user interface allows programming of up to 4 switch inputs, temperature modules, enclosure power contacts, 2 auxiliary outputs, and various operational functions. Also, the user interface screen allows monitoring and easy setup of configurable variables. With the user interface menus, configuration of the standard information for setup and operation of a system such as purge time, flow rates, pressures, and enclosure size are easily programmable. Additional features allow Class I and Class II operation, inputs for system bypass, enclosure power on/off, temperature overload and activation of Rapid Exchange flow for cooling or auxiliary relay for separate cooling source, delay power shutdown, and much more. The two auxiliary contact outputs can be configured to activate on most of the input switches or any of the configured alarm states for pressure, flows, and temperature.

The power for the solenoid valve on the manifold unit, inputs, and EPV-6000 vent are provided by the EPCU through the internal, galvanically isolated intrinsic barrier. No additional intrinsic safety barriers are required for annunciation.

The adjustable mounting brackets and the universally mounted vent make the 6000 system easy to install horizontally or vertically onto the enclosure. Component kits are available at a cost savings for custom installation requirements.

The 6000 series provides a complete system for purging and pressurizing enclosures for hazardous location operation.

The 6000 series system can be set up for Class I/Division 1 (Zone 1), Class II/Division 1 (Zone 21), or both Class I & Class II/Division 1 (Zone 1 & Zone 21) applications in accordance with the NEC-NFPA 70, NFPA496, ISA 12.4, IEC61241-4, and EN60079-2. This system also complies with IEC61508, SIL 2 level of integrity.

6000 Series

Class I & Class II, (≤ 250 ft³) Zone I & Zone 21 (7.1 m³)

Model EPV-6000-AA-01

Model 6000-DV-S2-UN-WH-AC

Component Kit (model 6000-DV-S2-UN-CK-AC)

Control unit w/ Ex enclosure

User-interface

Manifold with solenoid

Standard Model Applications

Model Numbers: 6000 Type X & Ex px
Designation: Rapid Exchange® purging systems
Enclosure Volume: 7.1 m³ / 250 ft³ max.
Approvals: See our website

Suitable for Class I and II, Division 1 / Zone 1 and Zone 21 to non-hazardous area applications according to:

- North American NFPA 496
- European ATEX
- International IECEx approvals
Series 6000 Identification of Components

6000 Control Unit

- Easy connection to protective gas supply
- 1 ½" NPT knockout with seal lock nut
- MTGR-6000 Vent
- Movable vent cap
- 1 ¼" NPT knockout with seal lock nut
- Connector for I.S. connection back to control unit
- Spark arrester
- User interface module for easy programming with display
- Type 4X (IP66) fittings for flow
- 316L stainless steel Type 4x (IP66) ratings
- Cable glands for I.S. inputs/outputs
- ¾" conduit for power connections, easy to add poured seals
- Display rotates for Horizontal or Vertical Mounting
- Removable electronics
- Removable connector for power connections
- Seals or Ex de cable glands for conduit entry. Customer provides standard poured seals.
- Ex d, explosion-proof enclosure
- I.S. wiring terminals
- Manifold for purging and pressurization

Type X & Ex [px] 6000 SERIES

PEPPERL+FUCHS
Series 6000 Component Kit

User-Interface w/cable and V31 connector

- **Enclosure Power LED** (Green) ON - When power relay is energized.
- **Rapid Exchange® LED** (Blue) ON - When Rapid Exchange flow is above min.
- **System Bypass LED** (Yellow) ON - When bypass is initiated.
- **Safe Pressure LED** (Blue) ON > 0.25” (6.4 mm) w.c.
- **Setup** To enter setup mode.
- **Exit** To exit a menu screen.
- **Stats** History and current.
- **Alarm Fault LED** (Red) - Blinking - any alarm input detected. Solid - 6000 series system fault.
- **Display** - 2 x 20 LCD with backlight screen.
- **Arrow keys** Scrolling through the menus.
- **Start / Set** Menu entry selection.

**Control unit and explosion / flameproof enclosure**

**Optional pneumatic manifold w/solenoid**

---

*Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs Inc.*
Operation of 6000 series

The 6000 series consists of the control unit and user interface mounted in a 316L stainless steel Type 4X (IP66) enclosure with the pneumatic solenoid valve mounted on the unit. A proportional valve can be ordered in place of the solenoid valve for continuous control of flow and pressure to the enclosure. The EPV-6000 series relief vent is separate and is mounted to the enclosure. The 6000 series control unit is also available in a kit form that consists of the key components of the system, the control unit, and the user interface. It does not include the enclosure and manifold. The user interface includes a panel-mount bracket so that it can be panel mounted to the customer’s enclosure. The pneumatic valve for the protective gas can be supplied by the customer, or the 6000 series manifold or proportional valve can be purchased separately. The EPV-6000 relief vent is still required.

The components of the 6000 series control unit are listed below:

- EPCU mounted in an explosion/flameproof enclosure
- I.S. user-interface with display and cable
- I.S. termination board (does not come with ‘CK’ kit version)
- Manifold with I.S. solenoid valve (does not come with ‘CK’ kit version)
- Flush mount Type 4X IP66 fitting for protective gas supply to enclosure with tube attached
- Type 4X cable glands for I.S. wiring to I.S. inputs, vents, and temperature modules
- 316L stainless steel pipe nipples for power wires
- 316L stainless steel Type 4X enclosure for the 6000 series controller

The components of the EPV-6000 vent:

- EPV-6000 vent with spark arrester screen
- ½” sealing nut with gasket for attachment of vent to customer’s enclosure
- A 5 meter, quick disconnect cable; blue (denoting I.S.), for connection to I.S. termination board inside 6000 series control unit

The 6000 series control unit and vent can be universally mounted to the customer enclosure. Top, bottom, right-, or left-side mounting can be completed with only one control unit and vent. Mounting configuration does not need to be designated when ordering. One unit is used for enclosure sizes up to 450 ft³ (12.7 m³).

Electronic Power Control Unit – EPCU

The EPCU houses the redundant microprocessors, enclosure power contacts, (2) auxiliary contacts, power supply module, galvanically isolated barriers for the inputs, vent(s), and temperature modules; all stackable and easy to remove and install into the explosion-proof enclosure that houses them. The power supply module is available in 24 VDC or 100-250 VAC units. The enclosure power contacts are forced-guided safety relays. The auxiliary contacts can be user configured for different functions depending on user requirements.

User-Interface Controller - UIC

The 6000 series is user programmable for many of the configurable options available. This is done with the intrinsically safe user-interface on the face of the unit, which can also be remote mounted. The user-interface is a 2 x 20 LCD that is programmed through a set of buttons on the menu driven unit. All configuration and options are programmed through this unit. There are also (5) LEDs for easy visual indication of operation:

- Safe Pressure – This turns on (blue) when safe pressure is achieved inside the enclosure.
- Enclosure power – This is (red) when the enclosure power is off, and (green) when enclosure power is on. The enclosure power can be on only after a successful purge and a safe pressure is achieved. Bypass option allows power to remain on if safe pressure is lost.
- Rapid Exchange® – The Rapid Exchange or purging flow rate turns on (blue) when the flow rate is measuring proper flow.
- System Bypass – This turns on (yellow) when the system bypass is active. This should be used only when the area around the enclosure is known to be safe.
- Alarm Fault – The (red) LED blinks when any alarm input is detected and is solid when there is an internal system fault.

Pneumatic Manifold with I.S. Solenoid

- Manifold with I.S. solenoid valve: The manifold system is mounted on the 6000 control unit providing a needle valve to set enclosure pressure and an I.S. solenoid valve that is used for purging (Rapid Exchange). Power for the I.S. solenoid valve is provided by the EPCU and is galvanically isolated. Regulated instrument-grade air or nitrogen is required.

The 6000 series unit can be ordered without the manifold so that customers can use their own method or valves for purging and pressurization. If a third-party electronic valve is used, the valve must be certified and installed in accordance with the hazardous location where it is operating. The use of the 6000 series manifold unit allows easy and correct installation of the system.

Requirements for Purging/Pressurization

Certifications allow the 6000 series to be used on enclosures in a gas, dust, or both gas and dust hazardous atmospheres. Gas atmospheres require the purging of the enclosure. Dust atmospheres require the physical removal of all the dust that collects inside. Both gas and dust atmospheres require the following: 1) removing the dust, 2) sealing the enclosure, and then 3) purging the enclosure. After these sequences, the pressure within the enclosure is above the minimum level. The equipment within the enclosure can be energized.
Operation of 6000 series

Purge Timing
When using the 6000 series in a gas or gas and dust location, the time for purging an enclosure can be based either on a known purge rate and time (fixed purge time), or based on the flow rate being measured from the vent (dynamic purge time). Both methods base the time on the flow measurement at the vent, and complete the process in steps. The EPCU will take the readings from the vent and use the appropriate reading (listed below) as the useable flow rate. For example, if the flow rate measurement from the EPV-6000 vent is 7 SCFM, the EPCU will use 5 SCFM as the flow rate for evaluation. The flow rate measurement steps and corresponding enclosure pressures are as follows:

- 5 SCFM @ 1.3” w.c., (141 l/min @ 33 mm w.c.)
- 12 SCFM @ 2.5” w.c., (340 l/min @ 64 mm w.c.)
- 20 SCFM @ 3.1” w.c., (565 l/min @ 77 mm w.c.)
- 30 SCFM @ 3.4” w.c., (850 l/min @ 86 mm w.c.)

Fixed Purge Time
If the purge time must be held to a specific time, then the time is based on the known enclosure volume, number of volume exchanges, and flow rate through the vent. If the flow rate is below the required minimum, then the purging cycle will reset and will not start until the flow rate is above the selected rate. This set up does not allow purge flow to go below the value required and will not recalculate the time for purging if it goes above the required purge rate. This measurement method is the same type as was used in our previous system, the 4000 series.

Dynamic Purge Time
Dynamic purge time allows the purge time to be updated to the purge flow through the vent. This method is not dependent on a constant flow from the protective gas source. It bases the purge time on the measured flow and not a set flow. This is very useful when the protective gas supply pressure varies throughout the purging cycle or when it may vary from one installation to another.

The following parameters must be entered for the dynamic purge time:
- Enclosure volume
- Number of exchanges

The purge time will be based on the measurement of the vent and evaluation of this measurement from the EPCU. This allows recalculation of the time based on this measurement. During the dynamic purge time, the user-interface will display the purge time in a percentage starting with 0% and ending with 100% (purge time complete).

Purging Modes
Purging start-up can be set up in 4 different modes, which are explained below:

- STD – Standard mode requires the operator to engage the manifold solenoid valve manually when purging and manually disengage when a successful purging is complete.
- SA – Semiautomatic mode requires the operator to engage the manifold solenoid valve manually when purging. The EPCU will automatically disengage when a successful purging is complete.
- FA – Fully-automatic mode will automatically engage the manifold solenoid valve when safe pressure is detected and will automatically disengage when a successful purging is complete.

Inputs
There are (4) intrinsic safety inputs for activation of various outputs and actions by the EPCU. These inputs accept only a dry contact for activation and are supplied by the EPCU’s galvanically isolated barrier. The assignments of the inputs for various actions are achieved through the user-interface controller. Only one function can operate an input. These inputs can bypass the system for live maintenance on the enclosure. The intrinsic safety inputs activate the auxiliary relays, energize the Rapid Exchange valve, de-energize the enclosure contacts, and shut the system down, in addition to many more actions and outputs.

Outputs
There are (2) normally open dry contacts for the enclosure power that can be energized only after a successful purging and a minimum enclosure pressure is maintained. Loss of pressure will cause the contacts to de-energize unless the shutdown timer is active or bypass mode is implemented. Also available are the Auxiliary 1 and Auxiliary 2, SPDT dry contact outputs. The auxiliary outputs can be user configured using the user-interface controller and are controlled by various inputs or various conditions such as low pressure, loss of pressure, bypass implemented, Rapid Exchange valve on, enclosure above maximum pressure setting, and many more. Both enclosure contacts and auxiliary contacts are forced-guided safety relays for functional safety.

EPV-6000 I.S. Relief Vent
The EPV-6000 vent exhausts excess pressure from the enclosure if the pressure with in the enclosure is above 1.0” w.c. and measures flow and pressure during operation. The 6000 series vent has a pressure transducer and thermal flow sensor that is connected to the 6000 EPCU and is intrinsically safe through the galvanic isolation barrier within the EPCU. Because measurement of the flow is always at the exhaust of the pressurized enclosure, the vent is located on the enclosure(s) such that it is venting to the atmosphere. The vent is connected to the I.S. termination board using the V1 connector and cable that comes with the vent. The EPV-6000 vent can be mounted vertically or horizontally and is not gravity dependent. For corrosive environments, the EPV-6000 has an optional stainless steel cap so that the body of the vent is mounted in the enclosure with just the stainless steel cap exposed to the outside environment.
Electrical Wiring Diagrams

The I.S. termination board is mounted inside the Type 4X (IP66) stainless steel enclosure and does not require any lead seals to the EPCU enclosure. Wiring from the EPCU to this I.S. termination board is provided.

The power connection for enclosure power, auxiliary outputs and power to the EPCU is completed within the explosion-proof enclosure that houses the EPCU. A stainless steel ¾" conduit extends to the outside of the Type 4X, IP66 stainless steel enclosure for easy connection of the lead seals. Lead seals or Ex de cable glands are not provided, but are available as an option. Any certified lead seal or Ex de cable glands can be used. No special seals are required.

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*Does not come with the component kit.
**Model 6000 System Accessories**

**Connection Fittings**
- US-EXDE-3/4
- LCK, TOK
- EFC-6-SS (included with unit)
- CG-8
- Ex de cable gland
- Conduit fitting kits
- Flush mount connector
- Cable gland

**Additional Items**
- HR-SW00  Key switch (removable in one position)
- HR-SW01  Pushbutton switch (on/off)
- US-B75-02-WJC  3/8” filter regulator (40 micron filter)
- SMK-6000  Mounting bolts and hardware
- SMK-6000-CK  Mounting bolts and hardware for component kit
- 6000-RUI-KIT-00  Kit for remote mounting user-interface unit
- 6000-MAN-DV-01  I.S. solenoid valve
- 6000-MAN-PV-01  I.S. proportional valve

**Installation and Operation Manual**
- TDOCT-1372AENG  Installation and Operation Manual

**Warning Nameplates**
- ETW-15  Temperature warning metal tag

---

**Dimensions**

**6000 Control unit with housing**

- Needle Valve
- Protective gas supply
- Solenoid Valve, 2/2 way

**Pneumatic Diagram**

- Supply to enclosure
- Plug

---

**Model 6000**

- Clear space for 9/16 - 18 hardware
- 3 holes
- Air outlet
- Bottom position
- Air inlet
- Top position

**Type X & Ex**

- PEPPERL+FUCHS Group
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- Germany: +49 621 776 2222
- pa-info@de.pepperl-fuchs.com
- Singapore: +65 67790991
- pa-info@sg.pepperl-fuchs.com
Dimensions

EPV-6000 Vent

User Interface with Mounting Bracket

User Interface without Mounting Bracket
Dimensions

6000 EPCU control unit with explosion / flameproof enclosure

- 69.85 mm (2.75")
- 120.65 mm (4.75")
- 171.5 mm (6.75")
- 85.85 mm (3.38")
- 52.3 mm (2.06")
- 139.95 mm (5.51")
- 60.5 mm (2.38")
- 25.4 mm (1.00")
- 50.8 mm (2.00")
- 3/4" NPT thread
- #5/16-18 mounting hardware

3/4" NPT thd
#5/16-18 mounting hardware
General Specifications

Enclosure Volume: 450 ft³ (12.7 m³)
Number of volume exchange: 4 to 19
Hazardous environment: Gas, Dust, Gas + Dust

Operation mode for Purging (Rapid Exchange valve)

STD: Manually engage and disengage
SA: Manually engage, automatically disengage
FA: Automatically engage and disengage

6000 Series control unit

Power requirement:
- AC Version: 100 to 250 VAC / 50-60Hz / 200 mA
- DC Version: 20 to 30VDC / 600 mA

Outputs:
- Enclosure contact output: 8 A @ 240 VAC
  (Dry contacts (2) SPST N.O.)
- Auxiliary 1 contact output: 2 A @ 240 VAC
  (Dry contacts, SPDT)
- Auxiliary 2 contact outputs: 2 A @ 240 VAC
  (Dry contacts, SPDT)

Inputs:
- Contact inputs 1,2,3,4: 2.5 VDC @ 2 mA, I.S.
- Temperature inputs: 6000-TEMP-, I.S.
- Vent(s) EPV6000: I.S. connection via connector
  Up to 2 vents can be connected

User Interface module:
- I.S. connection via M8 (V31) provided
  LCD for menu driven set-up and operation

LED indication
- Safe Pressure: BLUE – Safe pressure is achieved
- Enclosure Power: GREEN- power on, RED – power off
- Rapid Exchange: BLUE – when purging is running
- System Bypass: YELLOW – when bypass is activated
- Alarm Fault: RED blinking - any alarm input detected
  RED solid – 6000 series system fault

Electrical Parameters

Pneumatic Parameters

Protective gas requirement: Instrument grade air or inert gas
Pressure requirement: 20 to 120 psig (Filter + Regulator not provided)
Safe pressure minimum:
- Gas: 0.25" w.c. (6.4 mm w.c.)
- Dust: 0.65" w.c. (16.5 mm w.c.)
- Gas+Dust: 0.65" w.c. (16.5 mm w.c.)

Purging flow rate increment and enclosure pressures at flow rate:
- 5 SCFM @ 1.3" w.c., (141 l/min @ 33 mm w.c.)
- 12 SCFM @ 2.5" w.c., (340 l/min @ 64 mm w.c.)
- 20 SCFM @ 3.1" w.c., (565 l/min @ 77 mm w.c.)
- 30 SCFM @ 3.4" w.c., (850 l/min @ 86 mm w.c.)

Flow rate (pressurization):
0.3 SCFM (9 l/min) and up
(depending on enclosure seal and the vent used)

Inlet fitting to Manifold: 3/8" NPT female
Outlet fitting from Manifold: 3/8" bulkhead fitting provided

6000 Control unit

Protection class (for all electronics): Type 4X, IP66
Weight: 25 lb
Power Connections: ¾” NPT male pipe (explosion proof seals required)
I.S. Input connections: Terminal connection inside 6000 series unit
Material: Enclosure: 316L (UNS31603) Stainless Steel
Manifold valve: Anodized 6082 Aluminum
Fittings: 316L (UNS31603) Stainless Steel

EPV6000 Relief Vent
Flow rate measurement
Flow rate is measured in increments, 5, 12, 20, 30 SCFM, (141 l/min,
340 l/min, 565 l/min, 850 l/min)

Protection Class:
Mounting fitting Type 4X, IP66
Weight: 2 lb
Power connections: M12 (V1) pin connector (mating connector
with cable comes with vent for
connection to the control unit); Intrinsically safe
Mounting:
Mounting can be any orientation
Not dependent on gravity
Mounting hole: 1 ¼” NPT knockout hole, mounting with sealed nut
Material:
EPV-6000-AA: 6063 T6 Anodized Aluminum
EPV-6000-SS: 303 (UNS30300) Stainless Steel cap

Sparking arrestor assembly:
Protected with 304
(UNS31603) Stainless Steel Screen
Movable so that opening can be
positioned downwards

Mechanical Specifications

6000 Series

Model Number Designations

Control Unit

Valve Type
- DV - digital solenoid valve
- NV - no valve

Safety Integrity Level
- S2 - Standard

Connection Style
- WH - with stainless steel housing
- CK - component kit
- XD - w/Ex de couplers

Power Supply
- AC - 100-250 VAC
- DC - 20-30 VDC

Vent
- EPV - 6000 - AA - 1

Body Type
- AA - anodized aluminum std.
- SS - stainless steel cap
Description

The Enviro-Line series is an environmental pressurization system designed for nonhazardous areas that contain dusty, dirty, and corrosive atmospheres. It operates on a supply of compressed instrument air or inert gas to regulate and monitor the pressure within the sealed enclosure. This prevents the accumulation of damaging and caustic gases and dusts. The elimination of these gases and dusts extends the life of the enclosure’s expensive electrical equipment and instrumentation. Due to higher pressures inside the electrical enclosure, corrosive environments remain outside. The system maintains a constant 0.5" (1.25 mbar) water pressure inside the enclosure. The Enviro-Line offers a complete environmental pressurization system including a regulator or vent, depending on your application. It is designed for enclosures up to 250 ft³ (7.1 m³).

Nonhazardous pressurization

An Enviro-Line pressurization system includes a stainless steel panel, adaptable mounting plate, enclosure pressure gauge, tubing, fittings and fastening hardware—a complete kit, down to the nuts and bolts!

Standard Model Applications

P+F makes it simple. Mounting plates are adaptable for every configuration with the Enviro-Line kit. Simply attach the mounting plate to best fit your application, align the pressure gauge, and the Enviro-Line is ready to go!
Using the Enviro-Line pressurization unit is uncomplicated and straightforward. The Enviro-Line pressurization unit is delivered as a complete kit and installs easily with all connection and mounting accessories included. Since the unit is designed for use in nonhazardous areas, power to the enclosure can be energized prior to engaging the air supply. The redundant regulator is used to keep incoming enclosure pressure at a maximum of 5 psi. The enclosure pressure control regulator is used to set a safe reading on the enclosure pressure gauge after the enclosure has been sealed. The Enviro-Line pressurization unit:

- Ensures longer electrical equipment life
- Keeps caustic/corrosive environment outside the enclosure
- Avoids corroding electrical instrumentation

**Material Specifications**

- **Regulator Body:** Zinc w/Enamel Finish
- **Regulator Handle:** Polycarbonate
- **Enclosure Pressure Gauge:** Alum. w/Enamel Finish
- **Tube Fittings:** Nickel Plated Brass Forged Body
- **Tubing:** Nylon or Polyethylene .035
- **System Nameplates:** Silk screened Lexan® & SS
- **Fastener Hardware:** Alum. & Stainless Steel
- **Mounting Plate:** 316 14 Ga #3 Brush SS
- **General-purpose Switch Body:** Anodized Cast Alum.
- **Enclosure Warning Nameplate:** Silk screened SS

Lexan® is a registered trademark of the General Electric Company

**Model Number Designations**

**Series Model Number**

| 10E - WGS - WRR - UM |

**System Style**

- **WGS** - with general-purpose switch
- **LGS** - less general-purpose switch

**System Options**

- **WRR** - with redundant regulator
- **WVT** - with vent

**Mounting Configuration**

- **UM** - universal mount - left, right, top or bottom
- **PM** - panel mount - enclosure surface cutout
(PM not available with redundant regulator - WRR configuration)

**System Accessories**

- **EPC-10**
- **1/2" Pipe Connector**
- **ILF-4**
- **1/4" Filter**
- **129-0251** Additional Installation & Operation Manual

**System Dimensions**

Universal mount

- 17.8 mm (0.70")
- 203.2 mm (8.0")
- 224.6 mm (8.8")

Panel mount

- 152.4 mm (6.0")
- 254 mm (10.0")
- 152.4 mm (6.0")

**System Specifications**

- **Shipping Weight:** WGS - 6 lb (2.7 kg) / LGS - 5 lb (2.3 kg)
- **Temperature Range:** -20 °F to +120 °F (-29 °C to +49 °C)
- **Supply Pressure Range:** * 5 - 120 psi
- **Supply Requirements:** Clean air or inert gas
- **Safe Pressure:** 0.5" water
- **Safe Pressure Flow Rate:** 0.1 - 3.5 SCFH
- **System Supply Fitting:** ¾" tube fitting
- **Enclosure Supply Fitting:** 3/8" tube fitting
- **Enclosure Reference Fitting:** 1/4" tube fitting

* With EPV-3 vent - 120 psi max. to 5 psi min.

**With general-purpose switch**

**With redundant regulator, with gauge**

**WGS** - 6 lb (2.7 kg) / LGS - 5 lb (2.3 kg)

**WVT** - with vent

**Fittings & Connections (included)**

- 1/4" stainless steel hex bolts & nuts
- 3/8" supply tubing, 1/4" reference tubing
- 3/8" & 1/4" connection fittings

**Note:** special configurations available upon request.

**Down to the nuts & bolts...**

*Everything you need for pressurization in nonhazardous dusty, dirty or corrosive areas in ONE SIMPLE KIT!*
Custom Cabinet Solutions

Capabilities

Pepperl+Fuchs can now build your industrial control panel based on your specific needs. From the initial concept to start-up and commissioning, P+F will provide you with professional service and unmatched performance.

Services

- Complete engineering for customer and industry specific solutions
- Able to integrate our full line of P+F products into a cabinet that reduces your time, effort, and costs

INITIAL CONCEPT

BASIC DESIGN

DETAILED DESIGN

FACTORY/SITE ACCEPTANCE TESTING

START-UP & COMMISSIONING

Custom Cabinet Solutions

Purged Cabinet

Field Junction Box

Intrinsic Safety Barrier Cabinet
Your Single Source for Purged Cabinets

As a global leader in the field of purge and pressurization, Pepperl+Fuchs can assist you in the installation and implementation of a complete system, whatever your needs may be. We can design and build an enclosure based on your specification, and install the necessary purge equipment for you, taking the guesswork out of your application.

Pepperl+Fuchs products are used throughout the world in applications involving industrial, hazardous and corrosive environments. By engineering a complete solution at our own facility, Pepperl+Fuchs is able to offer its world-class products in a variety of panels and enclosures designed and built according to your needs.

Enclosure Features

- Stainless steel, aluminum, or glass reinforced plastic enclosures (other materials available upon request)
- Enclosure sizes up to 450 ft³ (12.7 m³)
- Purge system pre-assembled to enclosure for easy customer installation
- UL 698 system certification
- Type 4X/IP66 enclosure rating
- Customer specific solutions available
Customize Your Cabinets

Select Your Purge System
Type X, Y, Z, or Enviro-Line

Other Accessories Available
Terminal blocks, glands, fittings, wire ducts, grounding bar, and mounting kits

Select Your Vent
Top mount or side mount available

Choose Your Cabinet Material

Choose Enclosure Sizes
up to 450 ft³ (12.7 m³)

Add other P+F Products
Intrinsic safety barriers, power supplies, Fieldconnex fieldbus, remote I/O, and surge protection
Introduction

Your Single Source for Purge and Pressurization Equipment

Pepperl+Fuchs is your single source supplier for your entire purge and pressurization system. We have all of the accessories you’ll need to get your system up and running quickly and efficiently. P+F accessories simplify installation. The right part at the right time increases uptime, productivity and profitability. Don’t jeopardize the integrity of your purge and pressurization system. Get the parts you need at Pepperl+Fuchs.

Features

- Provides easy installation for purge and pressurization systems
- Provides equipment for specific applications
- Quality equipment to provide reliable performance
<table>
<thead>
<tr>
<th>Accessory</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooler Indicator Gauge</td>
<td>111</td>
</tr>
<tr>
<td>Enclosure Protection Vents</td>
<td>112</td>
</tr>
<tr>
<td>Enclosure Warning &amp; Temperature Nameplates</td>
<td>114</td>
</tr>
<tr>
<td>In-Line Filter Kits</td>
<td>115</td>
</tr>
<tr>
<td>Enclosure Connection Kits &amp; Tamperproof Regulator</td>
<td>116</td>
</tr>
<tr>
<td>Explosion Proof &amp; General-purpose Switch Kits</td>
<td>117</td>
</tr>
<tr>
<td>&quot;L&quot; &amp; &quot;T&quot; Style Conduit Fitting Kits</td>
<td>119</td>
</tr>
<tr>
<td>Tubing &amp; Pipe Connection Fitting</td>
<td>120</td>
</tr>
<tr>
<td>Surface Mounting Kits &amp; Pipe Mounting Kits</td>
<td>122</td>
</tr>
<tr>
<td>Universal Mounting Plates</td>
<td>124</td>
</tr>
<tr>
<td>Intrinsic Safety Barrier</td>
<td>126</td>
</tr>
<tr>
<td>Switch Resistor Module</td>
<td>126</td>
</tr>
<tr>
<td>NAMUR Proximity Sensor</td>
<td>126</td>
</tr>
<tr>
<td>Key Lock Assembly</td>
<td>127</td>
</tr>
<tr>
<td>Redundant Pressure Switch</td>
<td>127</td>
</tr>
<tr>
<td>Remote Alarm Horn &amp; Beacon Devices</td>
<td>128</td>
</tr>
<tr>
<td>Type Y &amp; Z—1000 Series Model Number Guide</td>
<td>130</td>
</tr>
<tr>
<td>Type Y &amp; Z—3000 Series Model Number Guide</td>
<td>131</td>
</tr>
<tr>
<td>Type X—2000 Series Model Number Guide</td>
<td>132</td>
</tr>
<tr>
<td>Type X—6000 Series Model Number Guide</td>
<td>133</td>
</tr>
</tbody>
</table>
**Description**

The cooler indicator gauge, sometimes called the Vortex indicator gauge, is used on systems where there is cooling required after purging. Normally after the purging cycle, there is a small flow of protective gas required to compensate for leakages, and to keep a constant pressure within the enclosure so that the ingress of hazardous atmosphere cannot get inside the enclosure. This is known as pressurization. If the equipment inside the pressurized enclosure requires cooling, either a higher flow rate of protective gas is required through the pressurization valve, or a second source of cooling gas is introduced into the enclosure. The standard differential pressure gauge will indicate pressurization only up to 0.5 inches (13 mm) water, which may not be enough for cooling indication. The cooler indicator gauge is installed onto the pressurization/purge panel, and allows monitoring of the system during normal operation of the purge and pressurization system.

**Special Note**

TO ORDER PURGE AND PRESSURIZATION UNITS EQUIPPED WITH A COOLER INDICATION GAUGE, SPECIFY 'VX' IN THE MODEL NUMBER DESIGNATION.

**Specifications**

**OPERATING RANGE**

- Full range: 0 to 5" (0 to 127 mm) water
- Low range red: 0 to 0.5" (0 to 13 mm) water
- Safe range green: 0.5 to 1.5" (13 to 38 mm) water
- Cooler/Rapid exchange range yellow: 1.5 to 4.5" (38 to 114 mm) water
- High range red: 4.5 to 5" (114 to 127 mm) water

**BODY COMPONENTS**

- Cover: Acrylic
- Housing: Die cast aluminum coated to withstand 168 hour salt spray corrosion test

**TECHNICAL DATA**

- Maximum overload pressure: 15 psig
- Accuracy: ± 2% of full scale
- Weight: 1.2 lb (510 g)
- Process connection: 1/8" Female NPT duplicate high and low pressure taps, one pair side, one pair back
Model EPV enclosure protection vents are self-seating gravity controlled, low pressure relief valves designed to ventilate excessive enclosure pressures that are created by the Rapid Exchange® process, or the failure of the enclosure pressure control devices. Each vent features a seamless cap, a spark arresting (SA) style exhaust element, a friction-free valve assembly, a base and a mounting hub. The mounting hub, along with associated pipe fittings, permits direct mounting through a round cutout on the top or side of a protected enclosure. This device functions in conjunction with Pepperl+Fuchs enclosure protection systems, to reduce the hazardous (classified) area rating within protected enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

In addition, this device protects enclosures from all limited sources of pressure relief, regardless of source - i.e. unrelated pneumatic equipment, such as analyzers or other process control or measurement instrumentation.

Pepperl+Fuchs enclosure protection vents operate in a manner similar to a self-closing swing-check valve, and must, therefore, be installed in a true vertical position. They begin operation when pressure within the protected enclosure exceeds 0.65 inches (16.5 mm) of water ± 0.1 inch (2.5 mm). When the valve seat cracks, pressure is immediately released, and the effects of gravity begin yielding to the forces of enclosure back-pressure. Each vent is designed to operate in specific conjunction with a cross-section of Pepperl+Fuchs Rapid Exchange and pressurization/purging systems that exhibit similar flow characteristics, in order to ventilate their maximum (total failure condition) flow rate, while maintaining no more than 5 to 7 inches (127 mm to 177 mm) of water pressure within the protected enclosure(s).*

* Vent, Enclosure Protection System and protective gas supply must be sized, installed and operated in strict accordance with all related start-up instructions on the system, and with all related directives of the Installation and Operation Manual provided with the Enclosure Protection System.
**FRICION-FREE VALVE ASSEMBLY**

Pepperl+Fuchs Enclosure Protection Vent Valve Assemblies are constructed from three major parts: the valve base, valve hinge and valve seat disc. The valve base is a machine ported flat plate which rests between the vent body base and exhaust element. The valve hinge is rivet fastened to the base and its effector extends over the valve port. The valve seat disc is screw fastened to the effector, under controlled, hand-fitted conditions, to obtain optimum valve seating characteristics.

<table>
<thead>
<tr>
<th>Vent Compatibility &amp; Flow Rate Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vent Model</strong></td>
</tr>
<tr>
<td>EPV-1-SA</td>
</tr>
<tr>
<td>EPV-2-SA</td>
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<tr>
<td>EPV-3-SA</td>
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<tr>
<td>EPV-4-SA</td>
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<tr>
<td>EPV-5-SA</td>
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</tbody>
</table>

Normal SCFH measured with enclosure pressure @ 3" (76.2 mm) of water. Max SCFH measured @ 7" (177.8 mm)

**Classification Notes**

UL CLASSIFICATION & FM CERTIFIED APPLIES TO SPARK ARRESTING VENTS FOR USE IN CLASS I, DIVISION 1, GROUP A-D LOCATIONS, AS SPARK ARRESTING DEVICES.

FM CERTIFIED APPLIES TO SA STYLE VENTS FOR USE AS ENCLOSURE OVER PRESSURIZATION PROTECTION DEVICES.

UL CLASSIFICATION & FM CERTIFIED APPLIES TO SPARK ARRESTING VENTS, WITHOUT VENT VALVE ASSEMBLIES, FOR USE IN DILUTION APPLICATIONS.
# Enclosure Warning & Temperature Nameplates

## Model EWN & ETW

**Model EWN-1**

![Model EWN-1](image)

**Model EWN-2**

![Model EWN-2](image)

**Model ETW-15**

![Model ETW-15](image)

**NAMEPLATES ARE SHOWN SMALLER THAN ACTUAL SIZE**

## Specifications

<table>
<thead>
<tr>
<th></th>
<th>EWN-1 &amp; -2 Dimensions:</th>
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<tbody>
<tr>
<td></td>
<td>5.5” W x 1.5” H</td>
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<table>
<thead>
<tr>
<th></th>
<th>ETW Dimensions:</th>
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<tbody>
<tr>
<td></td>
<td>4.5” W x 2” H</td>
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<table>
<thead>
<tr>
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<th>Mounting Hole:</th>
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<thead>
<tr>
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<th>Adhesive Backing:</th>
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<table>
<thead>
<tr>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Red Silkscreen</td>
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<table>
<thead>
<tr>
<th></th>
<th>EWN Inscriptions:</th>
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<tbody>
<tr>
<td></td>
<td>Class, Group, Div. &amp; Zones</td>
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<table>
<thead>
<tr>
<th></th>
<th>ETW Inscriptions:</th>
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<tbody>
<tr>
<td></td>
<td>Pressurization Type</td>
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<table>
<thead>
<tr>
<th></th>
<th>Temperature Code</th>
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<tbody>
<tr>
<td></td>
<td>Time in Minutes</td>
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</tbody>
</table>

## Description

Model EWN Warning Nameplates are attached to enclosures that utilize Pepperl+Fuchs Enclosure Protection Systems. Model EWN-1, for use in Class I (Zone 1) areas, warns against opening the enclosure unless the area is free of flammable vapors or unless all devices within the enclosure have been de-energized. It also warns against energizing devices within the enclosure until it is purged in accordance with protection system instructions. Model EWN-2, for Class II (Zone 2) areas, provides the same warnings indicated above. In addition, it requires removal of hazardous dusts within the enclosure, before it is repurified. Both nameplates provide locations for Pepperl+Fuchs or user inscribed markings. The markings indicate the area classification (Class, Division, Group & Zones), the pressurization type (X, Y or Z) and the temperature code of the protected enclosure. At time of order, the user may specify or decline the marking inscriptions. These nameplates function in conjunction with Pepperl+Fuchs Enclosure Protection Systems, to reduce the hazardous (classified) area rating within protected enclosure(s), in accordance with the NEC - NFPA 70, Article 500, NFPA 496 and ISA 12.4.

## ETW Description

Model ETW warning nameplates are attached to enclosures that contain devices with a surface temperature that exceeds 80% of the auto-ignition temperature for the hazardous substance in the surrounding atmosphere. The wording clearly warns personnel against opening the protected enclosure until all devices within the enclosure have been de-energized for a specific time period to permit necessary cooling of all hot devices. The time period appears as a Pepperl+Fuchs or user inscribed marking. At time of order, user may specify or decline a time period marking inscription.

## Important Note

IN ACCORDANCE WITH NFPA 496 REQUIREMENTS, MODEL EWN & ETW NAMEPLATES MUST BE PLACED PROMINENTLY NEAR ANY DOOR OR COVER THAT MAY BE OPENED TO EXPOSE THE PROTECTED DEVICES WITHIN AN ENCLOSURE TO THE SURROUNDING ATMOSPHERE.

## Special Note

ONE (1) PLATE IS FURNISHED WITH EACH P+F ENCLOSURE PROTECTION SYSTEM. ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

## REQUIRED ACCESSORIES

For Protected Enclosure
Description

Model ILF In-Line Filters are loose shipped accessories that enhance Enclosure Protection System Models 11 and 1011, Models 1001A, B & C and Models 2001A, B & C. The filters ensure that the protective gas supply to the above listed models is essentially free of moisture and dirt particles, and should be located in a prominent location where they will receive normal maintenance considerations. As indicated below, these filters can be adapted with fittings to be attached directly to the above listed models, in a proper, vertical position.

ILFK Description

Model ILFK In-Line Filter Kits are ready to be installed filters that are shipped as part of the above listed Enclosure Protection System Models. The filter can be mounted directly to the enclosure protection system regulator using a male tube stub adaptor fitting, and can be positioned “inboard” (concealed behind the system) or “outboard” (exposed beside the system).

The filter will accept a model SC straight connector or NC ninety connector to accommodate standard 1/4", 3/8" or 1/2" diameter, 0.035" seamless or welded wall stainless steel tubing.

NOTE: For shipping purposes, filters are shipped loose with the purge panel.

Important Note

ILFK FILTERS CAN BE INSTALLED SO THAT A TIGHTENING MOTION OF THE REGULATOR INLET FITTING ACHIEVES THE ALTERNATE FILTER POSITION (INBOARD OR OUTBOARD).

FOR EXAMPLE, A LEFT HAND CONFIGURED ENCLOSURE PROTECTION SYSTEM WOULD BE FITTED WITH THE ILFK IN THE OUTBOARD POSITION. THE USER COULD THEN TIGHTEN THE REGULATOR FITTING TO OBTAIN THE INBOARD FILTER POSITION IF DESIRED, WITHOUT BEING FORCED TO REMOVE THE REGULATOR FROM THE MOUNTING PLATE (SEE PHOTOS ABOVE).

THIS FEATURE IS INCORPORATED TO PREVENT THE INLET FITTING FROM BEING LOOSENED DURING INSTALLATION.

Special Note

MODEL ILF FILTERS ARE ALSO IDEAL PRE-FILTERS FOR RAPID EXCHANGE® PURGING SYSTEMS. PLEASE CONSULT A FACTORY SALES REPRESENTATIVE FOR MORE INFORMATION.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Filter & Filter Kit Specifications

General Specifications
- Max. Supply Pressure: 120 psi
- -20 °F to +120 °F
- Bowl Material: Clear Polycarbonate
- Drain Valve: Brass Pet Cock w/Cap
- ILFK Tube Fittings: 316 SS
- Body Material: Anodized Alum.
- ILF-4 Shipping Weight: 2 lb
- ILF-4 Dimensions: 4.159 H x 1.625 Diam.

Models ILF-4 & ILFK-4
- Connection Size: 1/4" FPT
- Compatible Models: 11, 1011, 1001A & 2001A
- Capacity & Filtration: 1 oz. @ 20 Micron
- Body Material: Anodized Alum.
- ILF-4 Shipping Weight: 2 lb
- ILF-4 Dimensions: 4.159 H x 1.625 Diam.

Models ILF-6 & ILFK-6
- Connection Size: 3/8" FPT
- Compatible Models: 1001B & 2001B
- Capacity & Filtration: 5 oz. @ 40 Micron
- Body Material: Alum. w/Enamel Finish
- Bowl Guard: Black ABS
- ILF-6 Shipping Weight: 3 lb
- ILF-6 Dimensions: 6.316 H x 2.875 Diam.

Models ILF-8 & ILFK-8
- Connection Size: 1/2" FPT
- Compatible Models: 1001C & 2001C
- Capacity & Filtration: 8 oz. @ 40 Micron
- Body Material: Alum. w/Enamel Finish
- Bowl Guard: Black ABS
- ILF-8 Shipping Weight: 4 lb

NOTE: For shipping purposes, filters are shipped loose with the purge panel.
**Model ECK & TR**

**Model ECK Description**

Model ECK-11 & ECK-1001A enclosure connection kits are factory installed tubing kits that enhance enclosure protection system Models 11 and 1001A in flange mounted (LH, RH, TM & BM) configurations. Model ECK eliminates the requirement for tubing skills, thus allowing OEM installers to quickly and effortlessly adapt a Model 11 or 1001A to their existing product, utilizing only basic hand tools and drills. The kit terminates at flush connector fittings which penetrate the system’s mounting flange, for a tight, compact installation. This feature is limited to Model 11 & 1001A systems, because they cover broad application ranges and are intended for a single, small enclosure, where this connection method is considered practical and safe under all conditions. Installation of systems equipped with this kit requires the addition of two holes to the normal mounting hole pattern. Must be ordered at time of ordering the panel.

**Model TR Description**

The tamperproof regulators feature a mounting ring, removable cap and hex key adjustment stem. These regulators have a 0-30 psi gauge, and are intended for use as a redundant, tamperproof regulator for enclosure protection system models, Class I, < 2 ft³ and Class II systems, when the systems are installed without an enclosure protection vent. The tamperproof regulator is intended to prevent tampering, while allowing a more stable setpoint to be achieved. As an enhancement, it is designed to offset the possible need for more costly, precision low flow regulators (please consult factory for more information).

**Specifications**

**Model ECK-11 & ECK-1001A**
- Tube Fittings: 316 SS
- Lock Nuts: 316 SS
- O Ring: Neoprene
- Mounting Hole: 0.453"

**Model TR-10 & TR-10G**
- Supply Pressure: 120 psi max.
- Supply Connection: 1/4" FPT
- Gauge Connection: 1/8" FPT
- Range: 0-30 psi
- Body: Zinc w/Enamel Finish
- Handle: Polycarbonate
- Hex Key Size: 5/64"
- Gauge: Steel Case & Brass Tube

**Model TR-30 & TR-30G**
- Supply Pressure: 120 psi max.
- Supply Connection: 1/2" FPT
- Gauge Connection: 1/4" FPT
- Range: 0-30 psi
- Body: Zinc w/Enamel Finish
- Handle: Polycarbonate
- Hex Key Size: 5/64"
- Gauge: Steel Case & Brass Tube

**Special Note**

A 5/64" HEX KEY OR ALLEN WRENCH IS REQUIRED TO OPERATE. THE TAMPERPROOF REGULATOR

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
**EPSK Description**

Model EPSK-1 and EPSK-2 explosion proof switch kits are loose accessories that provide electrical contacts for audible or visual alarm devices that signal a loss of protected enclosure pressure. Model EPSK-1 is calibrated to alarm at 0.15" for Class I applications. Model EPSK-2 is calibrated to 0.50" for Class II applications. The kits consist of a pre-fitted explosion proof differential pressure switch, an enclosure pressure reference bulkhead union w/vent and mounting bolts for the switch. The switches feature an atmospheric reference vent in the low port and an enclosure pressure reference tube fitting in the high port. The switches are, therefore, intended to mount outside the protected enclosure and are suitable for hazardous (classified) outdoor locations. The installer must first mount the pressure switch and bulkhead union, then install tubing between the switch's enclosure pressure reference tube fitting and the bulkhead union. Wiring must be installed with a seal and conduit fittings that are suitable for the location. Alarm circuit power may be derived from the protected enclosure power source or an intrinsically safe alarm signal source. However, all associated alarm devices must be protected by suitable means (explosion proof, purged or intrinsically safe).

**GPSK Description**

Model GPSK-1 and GPSK-2 general-purpose switch kits are similar to Model EPSK-1 and EPSK-2 above, but are not rated for hazardous outdoor locations and are intended for mounting inside the protected enclosure. Therefore, the switch connections are reversed so that the high port references enclosure pressure with a vent, and the low port references atmospheric pressure with tubing to the bulkhead union. The switches must be wired with an intrinsically safe alarm signal circuit, or be considered as protected devices that can be deenergized along with all similar devices before the protected enclosure is opened. Alarm devices may be protected by other suitable means (such as an explosion proof beacon or horn, mounted externally, with a conduit seal).

**Material Specifications**

<table>
<thead>
<tr>
<th>Model EPSK</th>
<th></th>
<th>Model GPSK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Body:</td>
<td>Anodized Cast Alum.</td>
<td>Zinc Plated Steel</td>
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<tr>
<td>Diaphragm:</td>
<td>Fluorosilicone Rubber</td>
<td>Molded Silicone Rubber</td>
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<tr>
<td>Calibration Spring:</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
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<tr>
<td>Fasteners &amp; Fittings:</td>
<td>316 SS</td>
<td>316 SS</td>
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</tr>
</tbody>
</table>

**EPSK Specifications**

- **CALIBRATION & OPERATING RANGE**
  - Model EPSK-1: (Decr) 0.15″ ± 0.02″
  - Model EPSK-1A: (Decr) 0.15″ ± 0.02″
  - Model EPSK-2: (Decr) 0.50″ ± 0.02″

- **GENERAL INFORMATION**
  - Switch Dimensions: 3.50" H x 4.25" Diam.
  - Shipping Weight: 5 lb
  - Temp. Range: -40 °F to +140 °F
  - Maximum Surge Pressure: 10 psi
  - Reference Tube Fitting Size: 1/4"/4
  - Switch Conduit Port Size: 1/2" FPT
  - Switch Contact Type: Form C
  - Switch Contact Rating:
    - WPS: 120 VAC, 15 A
    - WPSA: *** 120/220 VAC, 24 VDC @ 10 A; 125 VDC @ 50 mA
  - UL Listing
    - Model EPSK-1: Cl. I & II, Div. 1, Gr. C-G
    - Model EPSK-1A: Cl. I & II, Div. 1, Gr. A-G
  - Installation Position: Diaphragm Vertical
  - Life of Contacts: 6000 Cycles

- * Supply voltages 24 VDC and 240 VAC available upon request.

**GPSK Specifications**

- **CALIBRATION & OPERATING RANGE**
  - Model GPSK-1: (Decr) 0.15″ ± 0.02″
  - Model GPSK-2: (Decr) 0.50″ ± 0.02″

- **OPERATING RANGE**
  - Operating Range (for Class I applications): 0.07" - 0.15"
  - Operating Range (for Class II applications): 0.40" - 1.60"

- **GENERAL INFORMATION**
  - Switch Dimensions: 2.50" H x 3.50" Diam.
  - Shipping Weight: 3 lb
  - Temp. Range: -30 °F to +180 °F
  - Maximum Surge Pressure: 10 psi
  - Reference Tube Fitting Size: 1/4"
  - Switch Conduit Port Size: 1/2" Knockout
  - Switch Contact Type: Form C
  - Switch Contact Rating: 120 VAC, 15 A
  - U.L. Listing:
    - Gen. Purpose / Type 1
  - Installation Position: Diaphragm Vertical

**Model EPSK & GPSK**

![EPSK & GPSK Image](image-url)
Explosion Proof & General-Purpose Switch Kits

## Typical EPSK Installation

Model EPSK with Cover removed

- **Model EPSK**
  - Mounting Hole Diameter: 0.265" (29/64")
  - Mounting Hole Centers: 4.875"
- **Electrical Switch Contacts**
  - Low Port Vent
  - High Port Vent
- **Wiring**
  - Mounting Hole Diameter: 0.156" (not visible)
  - Mounting Hole Centers: 4.250"
- **Grounding Screw**
  - 1/2" Conduit Port
- **Cover Bolt Hole**
- **Switch Body**
- **Switch Mounting Bolt Hole**
- **Set-Point Calibration Screw**
- **1/2" Conduit Port**
- **Bulkhead Union Mounting Hole**: 0.4531" (29/64")
- **EPSK Screws**: 1/4-20 x 3/4"  
  **GPSK Screws**: 8/32 x 1/2"

### Important Note

MODEL EPSK AND GPSK KITS FUNCTION IN CONJUNCTION WITH P+F LPS STYLE TYPE Y & Z ENCLOSURE PROTECTION SYSTEMS, TO PROVIDE AN ALARM TO INDICATE LOSS OF PROTECTED ENCLOSURE PRESSURE, IN ACCORDANCE WITH THE NEC - NFPA 70, ARTICLE 500, NFPA 496 AND ISA 12.4.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.

## Typical GPSK Installation

Model GPSK with Cover removed

- **Model GPSK**
  - High Port Vent
  - Low Port Vent
- **Bulblead Union**
- **Wiring**
  - ALARM WIRING FROM INTRINSICALLY SAFE ALARM CIRCUIT, OR PROTECTED ENCLOSURE POWER THAT IS DEENERGIZED BEFORE PROTECTED ENCLOSURE CAN BE OPENED

### Terminal Block Connections

#### GPSK, EPSK & WPS Terminal Block Connections

- **COM**
- **N.O.**
- **N.C.**
- **Alarm Switching**
  - Alarm Normally Closed
  - Alarm Normally Open
  - Alarm Common
- **Pressure Switch**
  - **N.O.**
  - Local Alarm Horn or Beacon

#### EPSK-1A & WPSA Terminal Block Connections

- **COM**
- **N.O.**
- **N.C.**
- **Pressure Switch**
  - **N.C.**
  - Local Alarm Horn or Beacon

#### EPSK-1A & WPSA “Normally Closed” Wiring Configuration

- **120 VAC Power Supply**
  - Supply voltages 24 VDC and 240 VAC available upon request

**Important Note**

MODEL EPSK AND GPSK KITS FUNCTION IN CONJUNCTION WITH P+F LPS STYLE TYPE Y & Z ENCLOSURE PROTECTION SYSTEMS, TO PROVIDE AN ALARM TO INDICATE LOSS OF PROTECTED ENCLOSURE PRESSURE, IN ACCORDANCE WITH THE NEC - NFPA 70, ARTICLE 500, NFPA 496 AND ISA 12.4.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.
"L" & "T" Style Conduit Fitting Kits

LCK Description

Model LCK is a kit of loosely shipped conduit fittings that initiate the basic conduit installation between an enclosure protection system and the protected enclosure, for power and/or alarm wiring connections. The kit consists of a conduit union, two close nipples, a conduit seal, an elbow or "L" conduit fitting, and an enclosure mounting hub. When utilized with WPS style Type Y or Z systems, the kit is used to carry alarm signal wiring to the protected enclosure. The wire is then routed to its final destination, such as a remote annunciator, or a beacon on top of the enclosure. When utilized with Type X systems, the kit is normally used to carry power wiring to the protected enclosure. In both cases, basic installation requires punching a 1/2" conduit knockout in the enclosure, cutting one (1) 1/2" pipe nipple to length, and installing the kit between the system and protected enclosure.

TCK Description

Model TCK is a kit of loose shipped fittings that accomplishes the same function as Model LCK above, but includes a tee or "T" fitting for a third connection point, along with an additional seal and close nipple. This kit, therefore, not only initiates the basic conduit installation between an enclosure protection system and the protected enclosure, but also provides for a third wiring connection path to another device, such as a power switch or local alarm.

Custom Conduit Kits

In addition to the kits above, Pepperl+Fuchs can produce any conduit assembly for repeat OEM orders. These custom assemblies can include, but are not limited to, pre-fitted conduit and pigtailing wiring or MI cable assemblies. Customer must provide a detailed installation drawing with precise dimensions to receive an accurate quotation. Please consult a factory sales representative for more information.

Kit Specifications

Model LCK & TCK

Shipping Weight: LCK - 5 lb / TCK - 6 lb
UL Listing: Cl. I & II, Div. 1, Gr. B-G
Connection Size: 1/2" Trade Conduit
Union Fitting: Anodized Alum.
Pipe Nipples: 150# Galvanized Pipe
Seal, L & T Fittings: Cast Alum.
Enclosure Hub: Zinc Plated Steel
Hub O Ring: Neoprene
Wire Guard Insert: G.E. Lexan®

Lexan® is a registered trademark of the General Electric Company

Important Note

MODEL LCK & TCK ARE OFFERED PRIMARILY TO OEMS 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.

Special Note

ALL SEALS MUST BE POURED UPON FINAL INSTALLATION WITH AN APPROVED COMPOUND FROM THE SEAL MANUFACTURER. A TWO (2.0) OUNCE PACKET OF APPROVED SEALING COMPOUND AND A ONE-FIFTH (0.2) OUNCE PACKET OF SEAL PACKING FIBER ARE PROVIDED WITH EACH KIT, AND MUST BE FORWARDED TO THE FINAL INSTALLATION SITE IF NOT UTILIZED DURING KIT INSTALLATION. ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
Model SC, NC, EBC, EFC & EPC

**SC & NC Fittings**

Model SC Straight Connector and NC Ninety Connector fittings provide a standard tubing connection for the female regulator port of most Rapid Exchange® Purging Systems. When these systems are outfitted with Model SC or NC fittings, they can be connected to the protective gas supply with standard 1/4", 3/8" or 1/2" diameter, 0.035" wall stainless steel tubing. Model 1005 & 2005 systems are not accommodated because they require a direct 1/2" pipe connection to the protective gas supply for proper operation.

**EFC Fittings**

Model EFC enclosure flush connector fittings provide a standard tubing connection on the protected enclosure(s). Because these fittings feature a neoprene O ring and short body, they form an exceptional seal, requiring the smallest possible amount of interior clearance. They are intended for the tubing supply connection on the first enclosure of any installation, and are compatible with all systems, except Models 1005 & 2005. In addition, Model EFC-4 fittings provide the enclosure pressure reference connection on any enclosure for any Pepperl+Fuchs enclosure protection system, because all Pepperl+Fuchs systems feature a 1/4" tube fitting on the enclosure pressure reference port.

**EBC Fittings**

Model EBC enclosure bulkhead connector fittings provide a standard bulkhead tubing connection on a protected enclosure. The fitting features tubing nuts on both ends, to permit tubing to continue through the surface of an enclosure. They are suitable for the enclosure supply connection on any system, with exception to Models 1005 & 2005. These fittings are often used to increase the outward aesthetic appearance of an installation, because they can be mounted directly behind a system and be connected by a short piece of tubing. Then, another piece of tubing can be routed inside the enclosure to the desired point of supply discharge. This method of installation conceals the supply tube, and leaves the outside surface of the enclosure free of obstructions.

**EPC Fittings**

Model EPC (Enclosure Pipe Connector) fittings provide a standard female pipe connection on a protected enclosure to terminate pipe connections between multiple enclosures. The pipe connections may be used solely to transfer protective gas, but may also be used as “pressurized raceways” if adequate precautions are taken to insure an unrestricted flow of protective gas. Model EPC-10 is suitable for the supply connection between an enclosure and a Model 1005 or 2005 system. While these fittings are normally associated with the use of electrical conduits, their strong construction makes them ideally suited for low pressure applications; but they are by no means intended for high pressure pneumatic service.
### Typical System Installation & Fitting Use

- **Model SC or NC**
  - System Supply
  - Enclosure
  - Multiple Enclosure Connection
  - Model EFC, EBC or EPC
  - P+F Enclosure Protection System
  - Protected Enclosure
  - Protected Enclosure

### Model Number Designations

- **Fitting Style**
  - **SC** - Straight Male Tubing Connector
  - **NC** - Ninety Male Tubing Connector
  - **EFC** - Enclosure Tubing Flush Connector w/O Ring & Lock Nut
  - **EBC** - Enclosure Tubing Bulkhead Connector w/Lock Nut
  - **EPC** - Enclosure Pipe Connector w/O Ring & Lock Ring

- **Fitting Connection Size**
  - 4 - 1/4" Tubing / 1/4" Male Pipe Thread
  - 6 - 3/8" Tubing / 1/4" Male Pipe Thread
  - 8 - 1/2" Tubing / 1/4" Male Pipe Thread
  - 10 - 1/2" Female Pipe Thread
  - 12 - 3/4" Female Pipe Thread
  - 13 - 1" Female Pipe Thread
  - 14 - 1 1/2" Female Pipe Thread
  - 15 - 2" Female Pipe Thread

Sizes 4-8 apply to SC, NC, EFC & EBC Style Fittings Sizes 10-15 apply to EPC Style Fittings only

### Material Specifications

- **Model SC, NC & EBC**
  - **Body:** 316 SS
  - **Finish:** Bright Annealed

- **Model EFC**
  - **Body:** 316 SS
  - **Finish:** Bright Annealed
  - **O Ring:** Neoprene

- **Model EPC**
  - **Body:** Steel
  - **Finish:** Zinc Plated
  - **O Ring:** Neoprene
  - **Wire Guard Insert:** G. E. Lexan®

Lexan® is a registered trademark of the General Electric Company

### Special Note

THE DIAGRAM AND CHART SHOWN HERE DO NOT APPLY TO PANEL MOUNT CONFIGURATION SYSTEMS. PLEASE CONSULT FACTORY FOR SPECIFIC INFORMATION.

### Important Notes

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

ALL FITTINGS SOLD AT OR BELOW MANUFACTURER’S LIST PRICE.

WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.

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### Table: Fitting Specification, Compatibility & Use Chart

<table>
<thead>
<tr>
<th>Model</th>
<th>Connections</th>
<th>Compatible Systems</th>
<th>Intended Use</th>
<th>Cutout</th>
</tr>
</thead>
<tbody>
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<td>System Supply</td>
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"T" indicates Tubing Nut & Ferrule Assembly

"MPT" indicates Male Pipe Thread  "FPT" indicates Female Pipe Thread

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**Lexan®** is a registered trademark of the General Wire Guard Insert: O Ring: Finish: Body:

Model EFC, Model EPC, Model EBC, NC & EBC Style Fittings Sizes 10-15 apply to EPC Style Fittings only.
SMK-1, 2, & 3

Models SMK-1, 2, & 3 Surface Mounting Kits are fasteners that permit the attachment of Pepperl+Fuchs Systems featuring LH (left-hand), RH (right-hand), TM (top mount), BM (bottom mount) or WM (wall mount) plate configurations to flat surfaces. These kits include 316 stainless steel, hex-head bolts with flat washers, lock washers, and hex nuts, in quantities and sizes as follows:

- SMK-1: four 1/4”
- SMK-2: four 3/8”
- SMK-3: six 3/8”

SMK-4, 6, 8, & 10

Models SMK-4, 6, 8, & 10 Surface Mounting Kits are fasteners that permit the attachment of Pepperl+Fuchs Systems featuring FM (frame mount) or PM (panel mount) plate configurations through a surface cutout. These kits include 316 stainless steel, phillips-head screws, 14 gauge retainer clips, flat washers, lock washers, and hex nuts, in quantities and sizes as follows:

- SMK-4: four 1/4”
- SMK-6 (m): six 1/4”
- SMK-8 (m): eight 1/4”
- SMK-10: ten 1/4”

PMK-1, 2, & 3

Models PMK-1, 2, & 3 are fasteners that permit the attachment of Pepperl+Fuchs Systems featuring LH (left-hand), RH (right-hand), TM (top mount), or BM (bottom mount) plate configurations to 2” schedule 40 pipe. These kits include 316 stainless steel U-bolts with flat washers, lock washers, and hex nuts, in quantities and sizes as follows:

- PMK-1: two 1/4”
- PMK-2: two 3/8”
- PMK-3: three 3/8”

OPTIONAL ACCESSORIES

For All Pepperl+Fuchs Enclosure Protection Systems
## System/Mounting Kit Compatibility

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SURFACE</th>
<th>PIPE</th>
<th>SURFACE</th>
<th>CUTOUT</th>
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<td>PMK-1</td>
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<td>PMK-1</td>
<td>SMK-3</td>
<td>SMK-8m</td>
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</table>
Description

The Universal Mounting Plate is an alternative to the standard LPS style mounting plates listed on the specification bulletins for Pepperl+Fuchs Model 1001A, 1002, 1003, 1004 & 1005 Type Y & Z enclosure protection systems. The Universal Mounting (UM) Plate is furnished as one (1) face plate containing all system components and one (1) universal flange. The universal flange is furnished with fasteners for attachment to any side of the face plate, allowing the installer to select a left hand (LH), right hand (RH), top mount (TM) or bottom mount (BM) configuration. The face plate for all models is also suitable for a frame mount (FM) configuration. In addition, the face plate for Model 1001A and 1002 Systems is also suitable for a panel mount (PM) configuration, with minor modifications to the enclosure pressure gauge connections. The Universal Mounting Plate is specified by designating the initials "UM" as the Protection System model number’s mounting configuration suffix, as shown in the following example:

Example: 1002-LPS-CI-Z-UM

Optional wall flanges are also available for all models, to allow the installer to mount a UM face plate parallel to a flat surface in a wall mount (WM) configuration. The wall flanges include required fasteners for the UM face plate, and can be ordered as a separate line item by designating the initials "WF", followed by the system model number, as shown in the following example:

Example: WF-1002

Specifications

Dimensions: See Page 127
Material: Brushed 14 Gauge 316 SS
Fasteners: 1/4" SS Hex Bolts & Nuts
Shipping Weight: See System Bulletin

Refer to each individual system specification bulletin for material and performance information on selected enclosure protection systems.

UNIVERSAL MOUNTING
For Model 1001A, 1002, 1003, 1004 & 1005 LPS Systems

Universal & Optional Wall Flange Configurations & Mounting Dimensions

FACE PLATES WITH UNIVERSAL FLANGE

- Left Hand (LH)
- Right Hand (RH)
- Top Mount (TM)
- Bottom Mount (BM)

FACE PLATE WITHOUT UNIVERSAL FLANGE

FACE PLATE WITH WALL FLANGES

* Frame Mount (FM)
Wall Mount (WM)

* Suitable for Panel Mount (PM) on Models 1001A & 1002 only
**Model 1001A & 1002 Panel Mount Conversion**

Perform the following procedure to convert Model 1001A or 1002 to a Panel Mount (PM) configuration:

1. Secure one Model GCK Conversion Kit, including SC-2 orifice and PRB-4 Vent.
2. Remove orifice and run tee from the high port of the venturi and discard.
3. Remove sintered vent from low port.
4. Reinstall sintered vent into PRB-4 high port.
5. Install Model SC-2, fitting into low port.
6. Install Model PRB-4 vent through enclosure surface (vent end out) and connect tubing (customer supplied) between SC-2 & PRB-4.

### Universal Mounting Plate Accessories

**SUPPLY CONNECTION FITTINGS**
- NC-4 1/4" Ninety Connector-1002
- NC-6 3/8" Ninety Connector-1003
- NC-8 1/2" Ninety Connector-1004 & 1005
- 1001A & 1002 PANEL MOUNT CONVERSION GCK 1003, 1004, 1005
- WALL MOUNTING FLANGES
  - WF-1001A Wall Flanges
  - WF-1002 Wall Flanges
  - WF-1003 Wall Flanges

**SYSTEM MOUNTING HARDWARE**
- SMK-1 1001A LH, RH, TM, BM & WM configs.
- SMK-4 1001A & 1002 for FM or PM configs.
- SMK-8 1003-1005 for FM configs.

**PRESSURE LOSS ALARM SWITCHES**
- EPSK-1 Cl. I System Explosion Proof Switch Kit
- EPSK-1A Cl. I System Explosion Proof Switch Kit
- GPSK-1 Cl. I System General-purpose Switch Kit
- EPSK-2 Cl. II System Explosion Proof Switch Kit
- GPSK-2 General-purpose Switch Kit

**Face Plate Dimensions**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>1001A</th>
<th>1002</th>
<th>1003</th>
<th>1004</th>
<th>1005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>14</td>
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<tr>
<td>Width</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>14</td>
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</tr>
<tr>
<td>Depth</td>
<td>5</td>
<td>5</td>
<td>5.75</td>
<td>6.75</td>
<td>5</td>
</tr>
</tbody>
</table>

Dimensions shown in inches. For FM & PM panel cutout dimensions, subtract three quarters (0.75") of an inch from overall system height & width. Height & width dimensions reflect face plate measurements. Depth dimension reflects overall depth of all front and rear mounted components.

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**Important Notes**

All specifications subject to change without notice. Warranty & liability policies available upon request.

**Special Note**

Mounting Hardware such as P+F Model SMK-1 or SMK-2 is required to secure the Universal or Wall Flanges to the protected enclosure for LH, RH, TM, BM and WM configurations. Mounting Hardware such as P+F Model SMK-4 or SMK-8 is required to secure the face plate to the protected enclosure for FM and PM configurations. Refer to the listing of universal mounting plate accessories on the rear cover for more information. A P+F Model NC Ninety Connector or an equivalent fitting is required for the supply inlet on Model 1002, 1003, 1004 & 1005.

Purging systems that are mounted in a Right Hand (RH) configuration.
**Model: ISB, SRM, NJ..., L, RP1 & RP2**

**Model ISB Description**

Model ISB intrinsic safety barriers are factory installed and programmed galvanically isolated transformers that receive remote control signals to operate the EPCU (electrical power control unit) on Type X Systems. The EPCU logic module can accommodate up to three model ISB transformers, known as ISB-1, 2 and 3, located along the left side. The transformers are designed to function in conjunction with a customer furnished switch and Pepperl+Fuchs Model SRM-4000 switch resistor module, or a Pepperl+Fuchs model NJ... Proximity Detector. Each transformer develops an isolated low power signal, to create a two wire closed loop circuit. Operational status of each barrier is indicated by a pair of LEDs positioned to the left of ISB. The green LEDs show active (closed switch) status, and the red LEDs show barrier or wiring fault status. Isolated conduit entries, a solid body wireway with snap cover and Lexan® wiring partitions, provide a fully isolated customer wiring path to a six point terminal strip which provides input and output connections to each barrier. All barriers can be reprogrammed by the factory to duplicate other barrier functions, upon request.

**Model SRM Description**

Model SRM-4000 switch resistor module is an interface device that must be fitted between a customer’s switch and Pepperl+Fuchs ISB barrier, to activate or deactivate the intended barrier. The Module consists of a ten-foot cable, a small plastic case and a 6” two-wire lead that is intended for the switch. When installed correctly, the module allows the ISB transformer to detect three distinct conditions as follows: (1) the switch is open, (2) the switch is closed and (3) the wire is broken. The long cable end of the module is typically installed through a dedicated entry on the side of the EPCU, and is routed to the customer’s switch. The cable can be installed in free air tray or conduit, and must be isolated from all other power sources. The switch or relay contact that provides the switch signal must be fully isolated from all other power sources.

**Model NJ... Sensor Description**

The model NJ... NAMUR proximity sensor is offered as an alternative to using the model SRM-400 switch resistor module and a customer furnished switch. It is an interface sensor that fits directly to the Pepperl+Fuchs ISB barrier and activates and deactivates the intended barrier. When placed within 1/16” of a metallic surface, the sensor closes and activates the intended barrier. As the detector moves away from the metallic surface, the detector opens and the barrier is deactivated.

**NOTE:** It is necessary to reprogram the EPCU when using the NJ...NAMUR proximity sensor.

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**OPTIONAL ACCESSORIES**

For Pepperl+Fuchs Type X Enclosure Power Control Units

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**Model ISB Operation**

**Barrier A (ISB-1) - when customer’s switch opens**
- Disables start-up & Rapid Exchange cycle, deenergizes enclosure power and alarm relays, Functions parallel to safe pressure switch

**Typical Interface Devices**
- Door contact switch, remote pressure switch, emergency shutdown switch, gas detector

**Barrier B (ISB-2) - when customer’s switch opens**
- Disables Rapid Exchange cycle, Functions parallel to Rapid Exchange switch

**Typical Interface Devices**
- Enclosure protection vent flow switch, remote pressure switch

**Barrier C (ISB-3) - when customer’s switch closes**
- Energizes Rapid Exchange solenoid valve

**Typical Interface Devices**
- Purgeable instrument access door switch, gas detector, temperature switch

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**Model: ISB, SRM, NJ..., L, RP1 & RP2**

**Typical EPCU Logic Module (2000 Series Only)**
Model L Description

Model L (keyed alike) key lock assemblies are factory installed anodized key lock operators that modify the power control switch on a Type X System EPCU. The assemblies feature a zinc body locking cam, with a stainless spring cover cap and spring loaded lockout plunger, a precision machined body, mounting base and two keys. The assemblies are most commonly used on an EPCU programmed to operate in CB (conditional bypass) power control modes (see Type X System power control options).

Model L Operation

Design features require the operator to insert the key to travel between the “Off” and “On” positions. When the “On” position is attained, the spring loaded plunger engages and drops to the body surface. In order to travel to the “Off” or “Bypass” positions, the operator must pull the plunger upward with their free hand, before the key will turn. This design performs two very important functions. First, it prevents the EPCU from being placed in bypass unintentionally, while attempting to turn the unit on. Second, it prevents the EPCU from being turned off unintentionally, while attempting to disengage bypass. The key is only removable in the “Off” and “On” positions to prevent or limit the unattended or unauthorized use of the bypass feature. Model L assemblies can also be utilized with EPCUs programmed for NR (Normal Running). In these applications, the bypass position is disabled and the key is removable in the on or off position.

Model RP1 & RP2

Model RP1 redundant safe pressure switches and Model RP2 redundant Rapid Exchange® switches are factory installed differential pressure switches that are wired to operate in series with the switches included with standard EPCUs. In these applications, the primary and redundant switch must be satisfied before the EPCU will initiate or execute start-up functions (see Type X bulletins EPCU operation).

In special applications the redundant switches can be wired parallel to create a dual channel purging or pressurization system, capable of protecting two enclosures separately and simultaneously. Please consult with a factory sales representative for more information.

Ordering Information

Models ISB, L, RP1 & RP2 are factory installed and must be ordered with a system. Please check with model nomenclature for correct order information.

Important Note

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE. WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.
Remote Alarm Horn & Beacon Devices

Model RAH, RAB-1 & RAB-2

RAH Horn Description
Model RAH horns provide an electrically generated audible alarm to indicate the loss of pressure in the protected enclosure. It is formed from cast aluminum, is corrosion resistant and features a vibrating stainless steel diaphragm. The horn should be located in a prominent location where it can attract immediate attention, and is rated for Class I or II, Division 1 or 2, Group C-G hazardous areas. The Model RAH horn requires 120 VAC power and can be controlled by the normally closed pressure loss alarm contacts of “WPS” style Type Y and Z Systems, Model EPSK and GPSK switches and all Type X Systems. The horn can be pendant or surface mounted and features a 3/4” female conduit port. Installation requires the use of seal-flex (Div. 2) or rigid (Div. 1) conduit and a conduit seal. The horn has a 100 decibel output and features an internally mounted volume control for field adjustment.

RAB-2 Description
Model RAB-2 beacons provide an electrically generated flashing visual alarm to indicate loss of protected enclosure pressure. The beacon is formed from cast aluminum, is corrosion resistant and features a flash tube bulb rated for 1,000 hours. It should be located in a prominent location where it can attract immediate attention, and is rated for Class I or II, Division 2, Group A-G hazardous areas. The RAB beacon requires 120 VAC power and can be controlled by the normally closed pressure loss alarm contacts of “WPS” style Type Y and Z Systems and all Type X Systems. The beacon is pendant mountable and features a 3/4” female conduit port. Installation requires the use of rigid conduit and a conduit seal. The light flashes at 80 pulses per minute, it has a 520,000 peak candle power rating and a 165 effective (visible) candle power rating and features a red shatterproof globe.

RAB-1 Description
Model RAB-1 is identical to RAB-2 with exception to the following details: The flash tube bulb’s rated for 2,000 hours. The beacon is rated for Class I or II, Division 1, Group C-G hazardous areas. The beacon has a 2,000,000 peak candle power rating and a 850 effective (visible) candle power rating and features a red fresnel lens and clear shatterproof globe.

OPTIONAL ACCESSORIES
For Pepperl+Fuchs
Enclosure Power Control Units
## Device Specifications

### COMMON SPECIFICATIONS
- **Power Requirements:** 120 VAC @ 50/60 Hz
- **Conduit Connections:** 3/4" FPT
- **Construction Rating:**
  - RAH - Not Rated
  - RAB-1 & RAB-2 - NEMA 4X

### MODEL RAH
- **Dimensions:** 7.625" H x 6.875" Diam. x 6.5" D
- **Mounting Hole Centers:** 6.5" on 45° angle
- **Wiring Method:** 8" 2-Wire Pigtail
- **Shipping Weight:** 12 lb
- **Temp. Range:** -31 °F to +150 °F
- **Power Consumption:** 0.2 A
- **Maximum Sound Level:** 100 Decibels at 10 ft.
- **U.L. Listing:** Class I, Div. 1, Group C-G

### MODEL RAB-1
- **Dimensions:** 15.5" H x 8.75" Diam.
- **Wiring Method:** Screw Terminals
- **Shipping Weight:** 35 lb
- **Temp. Range:** -35 °F to +104 °F
- **Power Consumption:** 0.6 A
- **Flash Rate:** 80/minute
- **PCp / ECp:** *2,000,000 / **850
- **U.L. Listing:** Class I, Div. 1, Group C-G

### MODEL RAB-2
- **Dimensions:** 8.75" H x 5.5" Diam.
- **Wiring Method:** 24" 2-Wire Pigtail
- **Shipping Weight:** 15 lb
- **Temp. Range:** -40 °F to +149 °F
- **Power Consumption:** 0.35 A
- **Flash Rate:** 80/minute
- **PCp / ECp:** *520,000 / **165
- **UL Listing:** Class I, Div. 2, Group A-G

*PCp - Peak (instrument measured) Candle power
**ECp - Effective (visually observed) Candle power

## Material Specifications

### MODEL RAH
- **Body:** Copper-Free Cast Aluminum
- **Finish:** Grey Enamel
- **Grill:** Die Cast Zinc
- **Diaphragm:** 304 Stainless Steel

### MODEL RAB-1 & RAB-2
- **Body:** Copper-Free Cast Aluminum
- **Finish:**
  - RAB-1 Tan Powder Epoxy
  - RAB-2 Black Epoxy
- **Exposed Fasteners:** Stainless Steel
- **Globe:** Shatterproof Glass
- **Fresnel Lens (RAB-1):** Lexan®

Lexan® is a registered trademark of the General Electric Company

## Special Note

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.
Pepperl+Fuchs supplies purge and pressurization systems custom built to your specifications. To ensure the integrity of your system, certain accessory items must be factory installed. The Model Number and Accessories Guide identifies those parts that must be included on your purge and pressurization system order.

### 11/1000 Series — Model Number Designations and Accessories Guide

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>11, 1001A, 1001B, 1001C, 1002, 1003, 1004, 1005, 1011, 1012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Style</strong></td>
<td></td>
</tr>
<tr>
<td>LPS</td>
<td>- Less pressure switch</td>
</tr>
<tr>
<td>WPS</td>
<td>- With pressure switch</td>
</tr>
<tr>
<td>WPSA</td>
<td>- With pressure switch (120 VAC Standard)</td>
</tr>
<tr>
<td><strong>Area Classification</strong></td>
<td></td>
</tr>
<tr>
<td>CI</td>
<td>- Class I Area</td>
</tr>
<tr>
<td>CII</td>
<td>- Class II Area</td>
</tr>
<tr>
<td><strong>System Type</strong></td>
<td></td>
</tr>
<tr>
<td>YZ</td>
<td>- Div. 1 to Div. 2, Div. 2 to Nonhazardous</td>
</tr>
<tr>
<td><strong>Mounting Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>LH</td>
<td>- Left hand (left side of enclosure)</td>
</tr>
<tr>
<td>RH</td>
<td>- Right hand (right side of enclosure)</td>
</tr>
<tr>
<td>TM</td>
<td>- Top mount (top of enclosure)</td>
</tr>
<tr>
<td>BM</td>
<td>- Bottom mount (bottom of enclosure)</td>
</tr>
<tr>
<td>WM</td>
<td>- Wall mount (wall surface)</td>
</tr>
<tr>
<td>FM</td>
<td>- Frame mount (external frame or rack)</td>
</tr>
<tr>
<td>PM</td>
<td>- Panel mount (enclosure surface cutout, not available in WPS or WPSA Style)</td>
</tr>
<tr>
<td><strong>Enclosure Connection Kit</strong></td>
<td></td>
</tr>
<tr>
<td>ECK</td>
<td>- Enclosure connection kit</td>
</tr>
<tr>
<td><strong>Cooler Indicator Gauge</strong> (see page 111)</td>
<td></td>
</tr>
<tr>
<td>VX</td>
<td>- Vortex</td>
</tr>
<tr>
<td><strong>Voltage</strong> (for WPSA switch only)</td>
<td></td>
</tr>
<tr>
<td>24 VDC</td>
<td>- Voltage Direct Currents</td>
</tr>
<tr>
<td>240 VAC</td>
<td>- Voltage Alternating Currents</td>
</tr>
</tbody>
</table>

Type Y & Z

Pepperl+Fuchs supplies purge and pressurization systems custom built to your specifications. To ensure the integrity of your system, certain accessory items must be factory installed. The Model Number and Accessories Guide identifies those parts that must be included on your purge and pressurization system order.
Pepperl+Fuchs supplies purge and pressurization systems custom built to your specifications. To ensure the integrity of your system, certain accessory items must be factory installed.

The Model Number and Accessories Guide identifies those parts that must be included on your purge and pressurization system order.

**3000 Series — Model Number Designations and Accessories Guide**

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>3003 and 3004</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Style</td>
<td></td>
</tr>
<tr>
<td>LPS</td>
<td>- Less pressure switch</td>
</tr>
<tr>
<td>WPS</td>
<td>- With pressure switch (does not have ATEX certification)</td>
</tr>
<tr>
<td>WPSA</td>
<td>- With pressure switch (120 VAC Standard)</td>
</tr>
<tr>
<td>Area Classification</td>
<td></td>
</tr>
<tr>
<td>CI</td>
<td>- Class I / Zone 2 Area</td>
</tr>
<tr>
<td>System Type</td>
<td></td>
</tr>
<tr>
<td>YZ</td>
<td>- Div. 1 to Div. 2 / Div. 2 / Zone 2 to Nonhazardous</td>
</tr>
<tr>
<td>Mounting Configuration</td>
<td></td>
</tr>
<tr>
<td>VML</td>
<td>- Vertical Mount Left</td>
</tr>
<tr>
<td>VMR</td>
<td>- Vertical Mount Right</td>
</tr>
<tr>
<td>HMT</td>
<td>- Horizontal Mount Top</td>
</tr>
<tr>
<td>HMB</td>
<td>- Horizontal Mount Bottom</td>
</tr>
<tr>
<td>CK</td>
<td>- Component Kit - LPS style only</td>
</tr>
<tr>
<td>Cooler Indicator Gauge (see page 111)</td>
<td></td>
</tr>
<tr>
<td>VX</td>
<td>- Vortex</td>
</tr>
<tr>
<td>Voltage (for WPSA switch only)</td>
<td></td>
</tr>
<tr>
<td>24 VDC</td>
<td>- Voltage Direct Currents</td>
</tr>
<tr>
<td>240 VAC</td>
<td>- Voltage Alternating Currents</td>
</tr>
</tbody>
</table>
Pepperl+Fuchs supplies purge and pressurization systems custom built to your specifications. To ensure the integrity of your system, certain accessory items must be factory installed.

The Model Number and Accessories Guide identifies those parts that must be included on your purge and pressurization system order.

2000 Series — Model Number Designations and Accessories Guide

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>System Style</th>
<th>Area Classification</th>
<th>Power Control Mode</th>
<th>Mounting Configuration</th>
<th>Cooler Indicator Gauge</th>
<th>Key Lock Assembly</th>
<th>Redundant Pressure Switches</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA - Semiautomatic</td>
<td>CII - Class II, Group E, F &amp; G Area</td>
<td>CB - Conditional Bypass</td>
<td>RH - Right hand (right side of enclosure)</td>
<td></td>
<td></td>
<td>RP2 - Redundant Rapid Exchange® Pressure Switches</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FA - Fully Automatic</td>
<td>IB - Class I, Group B Area (STD Only)</td>
<td></td>
<td>TM - Top mount (top of enclosure)</td>
<td></td>
<td></td>
<td>RP3 - Both Switches</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BM - Bottom mount (bottom of enclosure)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WM - Wall mount (wall surface)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM* - Frame mount (external frame or rack)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PM* - Panel mount (enclosure surface cutout)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.
Pepperl+Fuchs supplies purge and pressurization systems custom built to your specifications. To ensure the integrity of your system, certain accessory items must be factory installed.

The Model Number and Accessories Guide identifies those parts that must be included on your purge and pressurization system order.

### 6000 Series — Model Number Designations and Accessories Guide

<table>
<thead>
<tr>
<th>Series Model Number</th>
<th>Valve Type</th>
<th>Safety Integrity Level</th>
<th>Connection Style</th>
<th>Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000</td>
<td>DV - Digital solenoid valve</td>
<td>S2 - Standard</td>
<td>WH - With stainless steel housing</td>
<td>AC - 95-220 VAC</td>
</tr>
<tr>
<td></td>
<td>NV - No valve</td>
<td></td>
<td>CK - Component kit</td>
<td>DC - 24 VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XD - W/Ex de cable glands</td>
<td></td>
</tr>
</tbody>
</table>

### Type X

**Series Model Number**
- 6000

**Valve Type**
- DV - Digital solenoid valve
- NV - No valve

**Safety Integrity Level**
- S2 - Standard

**Connection Style**
- WH - With stainless steel housing
- CK - Component kit
- XD - W/Ex de cable glands

**Power Supply**
- AC - 95-220 VAC
- DC - 24 VDC
Appendix

• Warranty Terms and Conditions
• Glossary
• Purging Times References
• Conversion Charts
• Model Number Index
**Alarm** Equipment that generates a visual or audible signal that is intended to attract attention.

**Compensation pressurization** The protective gas that flows through the enclosure (after the area is purged) to compensate for leaks and sustain pressure inside the containment.

**Continuous purging** To continuously purge the enclosure after the initial purging stage is completed. This feature also cools the equipment inside the enclosure.

**Enclosure volume** The volume of an enclosure, measured while it is empty.

**Ignition temperature** The ignition temperature of the hazardous atmosphere.

**Indicator** A device that indicates pressure or flow rate and is periodically checked.

**Power equipment** that requires or switches power greater than 2,500 VA.

**Pressurization** Supplying an enclosure with a protective gas so that the pressure inside the enclosure is greater than the pressure outside of it. This pressure differential prevents the hazardous atmosphere from penetrating the enclosure.

**Protective enclosure** The enclosure protected by purging or pressurization.

**Protective gas** The protective gas used to purge or pressurize the enclosure.

**Protective gas supply** A compressor, blower or compressed gas supply that provides protective gas.

**Purging** Supplying an enclosure with a protective gas at a sufficient flow and positive to reduce the concentration of any flammable gas or vapor initially present to acceptable level.

**Specific particle density** The density of a dust particle.

**Type X pressurizing** Reduces the classification within the protective enclosure from Division 1 to nonhazardous.

**Type Y pressurizing** Reduces the classification within the protective enclosure from Division 1 to Division 2.

**Type Z pressurizing** Reduces the classification within the protective enclosure from Division 2 to nonhazardous.

**Ex ‘px’** Reduces the classification within the protective enclosure from Zone 1 to nonhazardous

**Ex ‘py’** Reduces the classification within the protective enclosure from Zone 1 to Zone 2

**Ex ‘pz’** Reduces the classification within the protective enclosure from Zone 2 to nonhazardous
Selecting the Correct EPV with Vortex Cooling

The Vortex cooler is a mechanical device that separates the cold and hot compressed air supply. Cool air is directed into the enclosure and cools off the equipment. Because the vortex cooler is introducing an extra airflow into the enclosure, the combination of the pressurization flow and vortex flow will increase the enclosure pressure. The additional flow from the Vortex cooler could exceed the flow of the vent.

Two parameters must be determined before sizing the correct vent for the system:
1. Maximum flow rate of the Vortex cooler
2. Maximum pressure allowed for the enclosure

Adding both parameters results in the maximum flow rate of the system. The data sheet for the EPV (pg. 112-113) provides the maximum flow rate for each vent. Choose a vent from the maximum flow rate calculated above for a pressure acceptable for the enclosure.

Example: Customer is using a Vortex cooler and a 3003 panel. The Vortex cooler has a max. flow rate of 30 ft³/min. (1800 ft³/hr). Which vent should be used?

Purge rate of the panel: 12 ft³/min (provided in the 3003 data sheet)
Vortex flow rate: 30 ft³/min
Max. flow rate: 42 ft³/min x 60 = 2520 ft³/hr

<table>
<thead>
<tr>
<th>Vent Compatibility &amp; Flow Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Protection Vent</td>
</tr>
<tr>
<td>EPV-3-SA…</td>
</tr>
<tr>
<td>EPV-4-SA…</td>
</tr>
</tbody>
</table>

The EPV-4-SA… unit is the best choice for this application. When the rapid exchange and vortex cooler is on, the enclosure pressure is around 3" H₂O. This is normal for purging/pressurization systems. When Vortex cooler is used in a purge and pressurization system, the next size EPV is often required for the application.

Conversion Charts

<table>
<thead>
<tr>
<th>Pressure Conversion</th>
<th>Volume Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To convert</strong></td>
<td><strong>multiply by</strong></td>
</tr>
<tr>
<td>Inches water</td>
<td>mm water</td>
</tr>
<tr>
<td>Inches water</td>
<td>psi</td>
</tr>
<tr>
<td>Inches water</td>
<td>mbar</td>
</tr>
<tr>
<td>Inches water</td>
<td>kPa</td>
</tr>
<tr>
<td>mm water</td>
<td>Inches water</td>
</tr>
<tr>
<td>mm water</td>
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Purging Times Reference

Purge Times for Type X, Y and Z Systems

This procedure is used to calculate the time required to purge a Type X, Y or Z system for Class I areas. Purging is required to expel the hazardous atmosphere from the protective enclosure so that equipment within the enclosure can be energized safely. The following information is required to calculate the purge time for a protective enclosure:

- Enclosure volume
- Flow rate
- Motors inside the enclosure
- Purge media

**Enclosure volume** The volume of the protective enclosure when it is empty. The easiest way to obtain this is to take the outside measurements of the enclosure. If several enclosures are pneumatically linked, include the volume of each enclosure and the volume of the tubes linking them. Make sure the tubes are large enough to prevent excess back pressure in the first enclosure.

**Flow rate** The flow rate is determined by the purge system. The flow rate is indicated on the panel under the instruction label for Type Y or Z systems. For Type X systems, the flow rate is stated in the startup manual.

**Motors** If a motor or another enclosure is inside the protective enclosure, the enclosure must be purged at least ten times the enclosure volume. If no motor is present, only four volumes need to be purged. For IEC and EN standards, five volumes must be purged.

**Purge Media** Flow rates, differential pressure gauges and switches are calibrated with air as the protective gas. If another gas is used, use the following density correction factor:

Density correction factor = \( \frac{\text{molecular weight of air}}{\text{molecular weight of protective gas}} \)

**Example:** A Type Z, Class I, Division 2 system has a protective enclosure size of 36” x 36” x 40”. Calculate the time to purge the enclosure with nitrogen (molecular weight 28.01) and with air (molecular weight 28.96).

1. Area of protective enclosure = 36” x 36” x 40” = 51,840 in³
   Since 1 ft³ = 1,728 in³, 51,840 in³ / 1,728 in³ / ft³ = 30.0 ft³.

2. For an enclosure of 30 cu. ft., select 3003 purge panel. The flow rate during purging is 12 cu. ft. per minute as indicated on the label.

3. There is no motor or internal enclosure inside the protective enclosure so four times the volume must be purged.

4. **If the protective gas is air:** 
   \[
   \frac{30 \text{ ft}^3 \times 4 \text{ volume changes}}{12 \text{ ft}^3/\text{min}} = 10 \text{ minutes}
   \]

   **If the protective gas is nitrogen:** 
   \[
   \frac{30 \text{ ft}^3 \times 4 \text{ volume changes}}{12 \text{ ft}^3/\text{min}} = 10 \text{ min.} \times \frac{28.96}{28.01} = 10.3 \text{ minutes}
   \]
## Conversion Charts

### Temperature Conversions

Locate the known temperature in center column. If known temperature is in °C, read °F equivalent in right-hand column. If known temperature is in °F, read °C equivalent in left-hand column.

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## Model Number Index

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## Model Number Index

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<td>Universal Mounting Plates</td>
<td>Alternative To The Standard LPS Style Mounting</td>
<td>124</td>
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At home on all continents

Our customers are at the center of all our activities. Our worldwide network ensures that we provide them with the best possible service and support. Our world headquarters in Mannheim services Europe through a network of more than 40 affiliates. Asia is handled by our office in Singapore, with more than 1,000 employees in manufacturing, service, and sales. And our North American headquarters in Twinsburg, Ohio, is responsible for a comprehensive network of offices and sales partners in the USA, Canada, and Mexico.

No matter where in the world you may be, Pepperl+Fuchs is right nearby – and always there for you.
Defining the need

The need to place general-purpose equipment in hazardous (classified) locations is not new, yet in the last three decades the need has intensified dramatically. This is primarily due to the following facts:

• Process control, measuring and recording equipment that was once primarily pneumatic is now primarily general-purpose electronic equipment.
• Motors and switchgears now use electronic accessories to satisfy the needs for position, speed or process control and energy efficiency, which often renders the equipment unsuitable for use in hazardous locations.
• Newly developed equipment, such as robotic manipulators, CNCs, batch weigh/count and filling systems, analyzers, programmable controllers and CRT work stations are rapidly becoming more prevalent in the industrial work environment.

While the demand for these new devices continues to grow, most of them cannot be economically installed in a hazardous location by using explosion-proof enclosures or intrinsic safety barriers, alone. Most modern electronic equipment is expensive and delicate. For this reason, it requires environmental protection that cannot be provided by explosion-proof enclosures or intrinsic safety barriers. Therefore, the need for an alternative to explosion-proof enclosures and intrinsic safety barriers has become extremely critical.

The alternative is purge and pressurization. As you learn more about purge and pressurization, it will become apparent that this technology is exactly what you require. It will then become obvious that this technology offers the safest and most economical means of installing electrical equipment in a hazardous location. In addition, this technology will undoubtedly impress you as the only definitive way to enhance your equipment’s performance and access, while increasing the life expectancy of delicate instruments. Finally, you’ll learn the most important point of all: The answer to your need is Pepperl+Fuchs.
Your automation, our passion.

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