BEBCO EPS® PURGE AND PRESSURIZATION SYSTEMS

ENGINEER'S GUIDE

Your automation, our passion.

PEPPERL+FUCHS

Automation Is Our World.
A Perfect Application Solution Is Our Goal.

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.

Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@ste[illegible]m - www.stevenengineering.com

Table of Contents

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 ft^3 Increases with Enclosure Size
- Windows Are Limited
- Promotes Condensation
- Cumbersome, Limited Access
- Causes Harmful Heat Build up
- Limited Sizes
- Bulky Designs
- Excessive Weight

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

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Pepperl+Fuchs

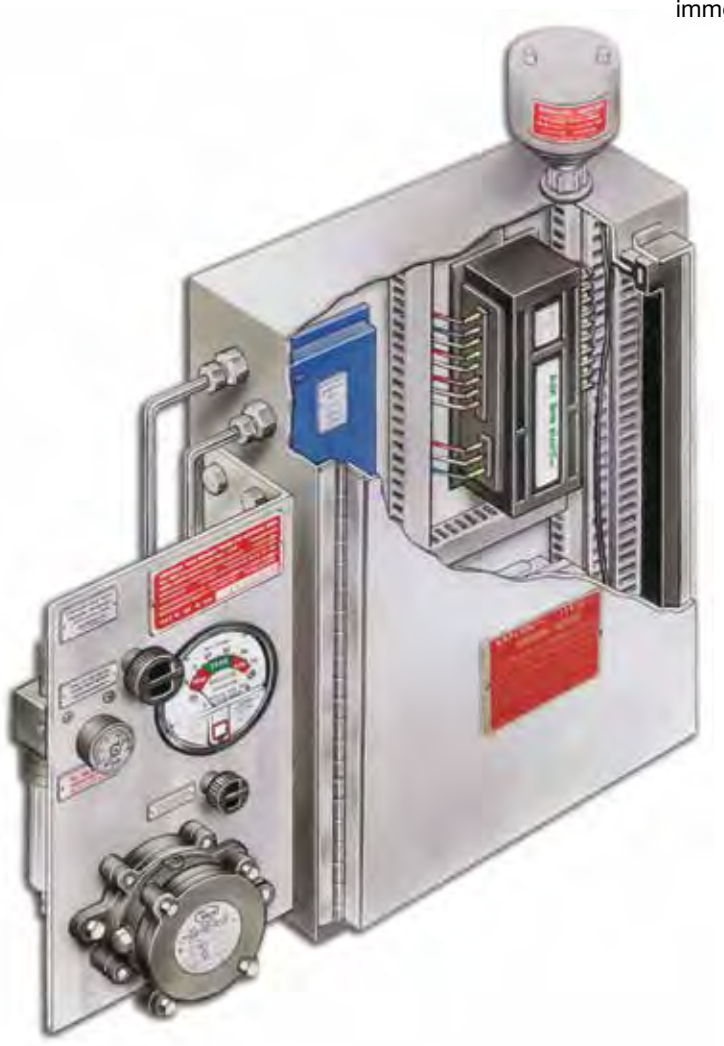
Enclosure Protection Systems

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 ft^3
- Allows use of any Enclosure Shape
- Cost of Protection per ft^3 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

STUDY GUIDE

Defining Hazardous Areas

Today's modern refineries and manufacturing complexes often contain both flammable gases and ignitable dusts, making area classification of Division 1 and Division 2 locations an important but tricky task.

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.

Class Ratings

Classes are used to define the explosive or ignitable substances that are present in the atmosphere.

Class I - Flammable gases or liquid vapors

Class II - Ignitable metal, carbon or organic dusts

Class III - Ignitable fibrous materials

Group Ratings

Groups are used to define substances by rating their explosive or ignitable nature, in relation to other known substances.

TYPICAL CLASS I SUBSTANCES

Group A - Acetylene

Group B - Hydrogen or > 30% Hydrogen by Volume

Group C - Ethyl Ether & Ethylene

Group D - Acetone, Ammonia, Benzene & Gasoline

TYPICAL CLASS II SUBSTANCES

Group E - Aluminum, Magnesium & Alloys

Group F - Carbon, Coke & Coal

Group G - Flour, Grain, Wood, Plastic & Chemicals

Division Ratings

Divisions are used to define the degree of hazard by determining the explosive or ignitable substance's expected concentration in the atmosphere.

Division 1 - Contains substances under normal conditions

Division 2 - Contains substances under abnormal conditions

Zone Ratings

Zones are used to define the degree of hazard by determining the explosive or ignitable substance's expected concentration in the atmosphere.

Zone 0 - Contains substances under normal conditions (Continuously)

Zone 1 - Contains substances under normal conditions (Intermittently)

Zone 2 - Contains substances under abnormal conditions

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Common Questions

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.

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.

STUDY GUIDE

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

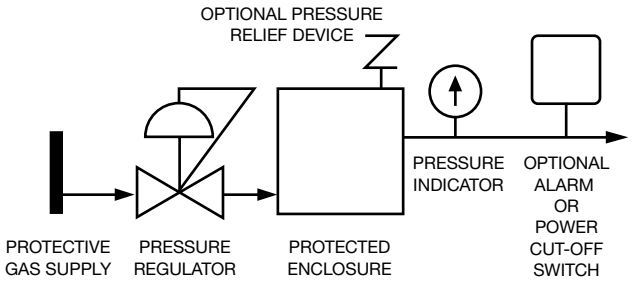
For Type X systems, the control unit operates the power disconnect to the enclosure. If the power requirement for the enclosure exceeds the contact ratings on the control unit, a control relay must be added. If the control relay is located in the hazardous area, it must be rated for that hazardous location.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

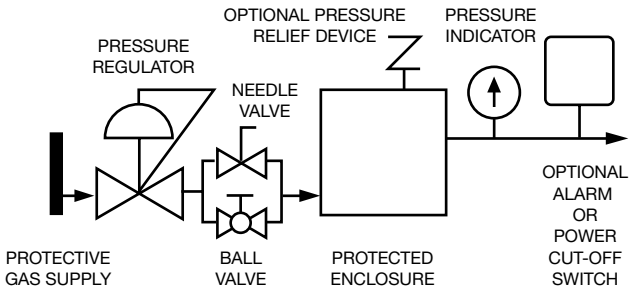
Requirements for Alarms

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.

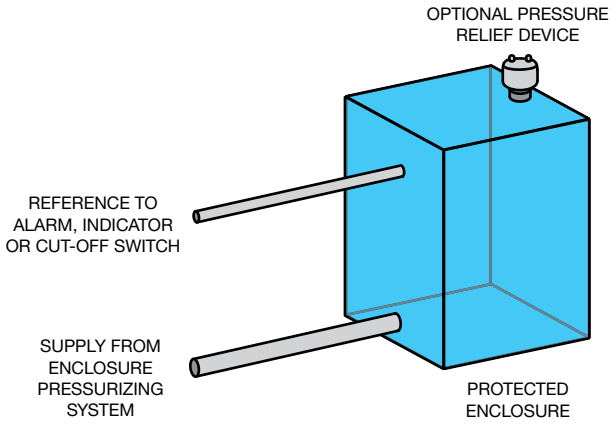
STUDY GUIDE

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.

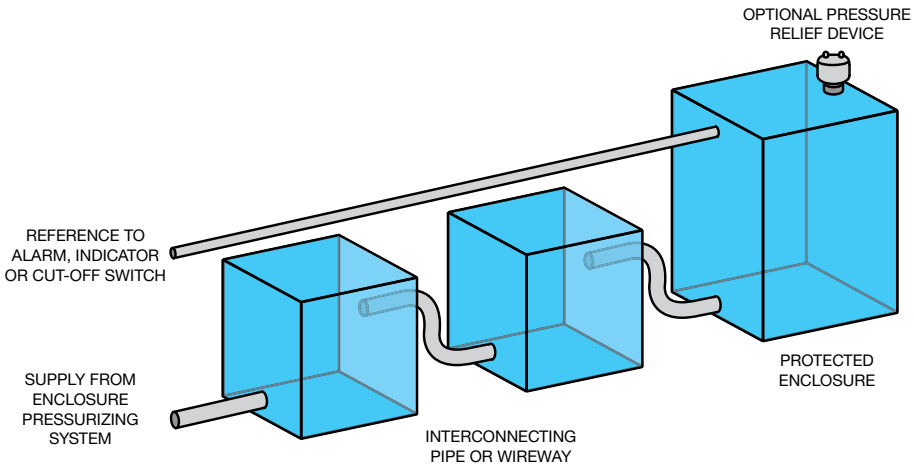


Multiple Enclosures

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.

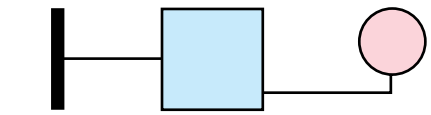
There are exceptions to the disconnect rule for Type X systems, because in some instances, a power loss represents a greater hazard than operating the system under low pressure. An alarm is acceptable in those circumstances, but only for a short time and special requirements may be necessary.

Requirements for disconnect switches:

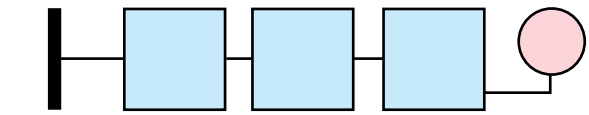
- Must be actuated by either the protective gas flow rate or the differential pressure inside the enclosure.
- Must be approved for its location.
- No valves shall be connected between the disconnect switch and the enclosure.
- Shall take its signal from the protected enclosure and shall not be installed 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

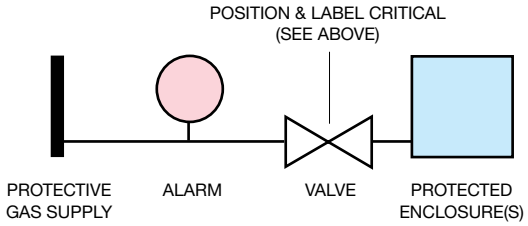


Multiple Enclosure Applications

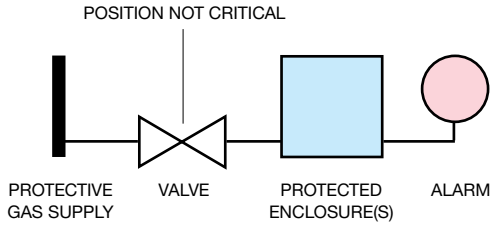


Protective Gas Supply Alarm Details

Upstream Alarm Application



Downstream Alarm Application



DESIGN GUIDE

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

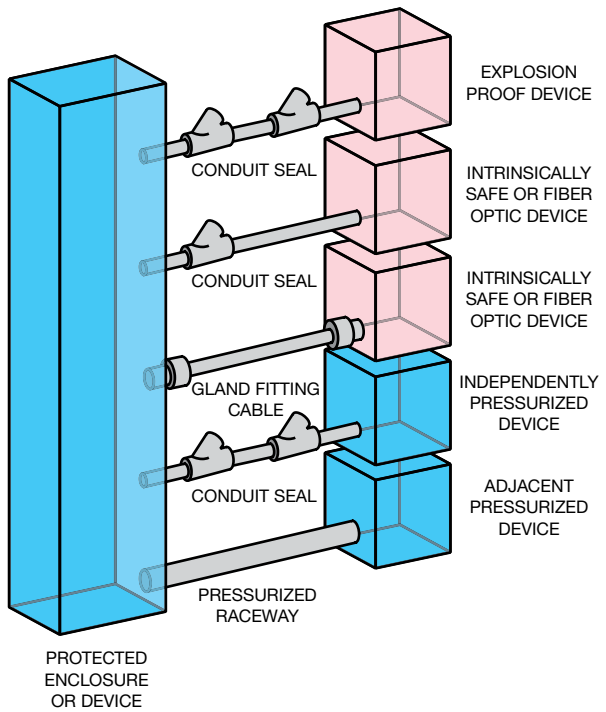
In a general sense, protected enclosures should be wired similarly to explosion-proof enclosures, in accordance with Article 500 of the National Electric Code - **NFPA 70.**

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



DESIGN GUIDE

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Basic Operating Procedures

Class II, Div. 1 Pressurization

Start-Up Conditions

Protection Method: Type "X" 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 Pressurization

Start-Up Conditions

Protection Method: Type "Z" 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.

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:

   Height x Width x Depth - in inches ÷ 1728 = ft^3

   - in feet = ft^3
4. Cylindrical device volumes may be calculated as follows:

   πr^2 x Cylinder Length - in inches ÷ 1728 = ft^3

   - in feet = ft^3

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 cm^3).

a. Internal enclosures should be ventilated on the top and bottom sides with at least one (1) square inch (6.5 cm^3) of opening for each four hundred (400) cubic inches (6560 cm^3) of volume within the internal protected enclosure, with a minimum size of one quarter (1/4) inch diameter (6.3 mm); or,

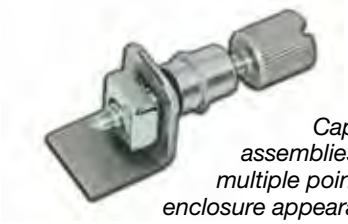
b. Adjacent and internal enclosures should be purged in series with the protected enclosure or be purged separately; or,

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.

Typical Fastening and Gasketing Methods



Captive screw and cage nut assemblies can be used to provide multiple point fasteners, and improve enclosure appearance and pressure seals.

Some enclosure manufacturers utilize clamping fasteners to meet TYPE 4 performance requirements.

All design considerations presented on this page are intended for basic applications only.

APPLICATION GUIDE

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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.

This enclosure features a removable gasketing trim, which features a high profile with exceptional memory.

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.

Both assemblies pictured are suitable for Class I, Group C & D, Division 2 hazardous locations.

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

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 wands 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.

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EPS® Div. Quick Start* System & Vent Selection Guide

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

SYSTEM SELECTION

APPLICATION INFORMATION Type	Div.	Group	Equipment	MAXIMUM ENCLOSURE VOLUME 2 Cubic Feet	15 Cubic Feet	75 Cubic Feet	90 Cubic Feet (2.54 m³)	200 Cubic Feet	250 Cubic Feet (7.08 m³)	450 Cubic Feet
Z	2	A-D	General Purpose	1001A-LPS-CI 1001A-WPSA-CI 1011-CI 11-LPS-CI	1002-LPS-CI 1002-WPSA-CI 1012-CI	1003-LPS-CI 1003-WPSA-CI 1012-CI	***3003-LPS-CI*** ***3003-WPSA-CI***	1004-LPS-CI 1004-WPSA-CI	***3004-LPS-CI*** ***3004-WPSA-CI***	1005-LPS-CI 1005-WPSA-CI
		C & D	General Purpose	1001A-WPS-CI 11-WPS-CI	1002-WPS-CI	1003-WPS-CI	***3003-WPS-CI***	1004-WPS-CI	***3004-WPS-CI***	1005-WPS-CI
X	1	B-D	General Purpose	2001A-STD-IB	2002-STD-IB	2003-STD-IB	–	2004-STD-IB	–	2005-STD-IB
				6000 Series						
		C & D	General Purpose	2001A-STD-CI	2002-STD-CI 2002-SA-CI 2002-FA-CI	2003-STD-CI 2003-SA-CI 2003-FA-CI	–	2004-STD-CI 2004-SA-CI 2004-FA-CI	–	2005-STD-CI 2005-SA-CI 2005-FA-CI
				6000 Series						
Y	1	A-D	Div. 2	1001A-LPS-CI 1011-CI 11-LPS-CI	1002-LPS-CI 1002-WPSA-CI 1012-CI	1003-LPS-CI 1003-WPSA-CI	***3003-LPS-CI*** ***3003-WPSA-CI***	1004-LPS-CI 1004-WPSA-CI	***3004-LPS-CI*** ***3004-WPSA-CI***	1005-LPS-CI 1005-WPSA-CI
		C & D	Div. 2	1001A-WPS-CI 11-WPS-CI	1002-WPS-CI	1003-WPS-CI	***3003-WPS-CI***	1004-WPS-CI	***3004-WPS-CI***	1005-WPS-CI

CLASS II APPLICATIONS per NFPA 496

SYSTEM SELECTION

APPLICATION INFORMATION Type	Div.	Group	Equipment	MAXIMUM ENCLOSURE VOLUME 10 Cubic Feet	50 Cubic Feet	250 Cubic Feet
Z	2	E-G	General Purpose	1001A-LPS-CII 1001A-WPS-CII 1011-CII 11-LPS-CII 11-WPS-CII	1001B-LPS-CII 1001B-WPS-CII	1001C-LPS-CII 1001C-WPS-CII
X	1	E-G	General Purpose	2001A-STD-CII	2001B-STD-CII	2001C-STD-CII
			6000 Series			
Y	1	E-G	Div. 2	1001A-LPS-CII 1001A-WPS-CII 11-LPS-CII 11-WPS-CII	1001B-LPS-CII 1001B-WPS-CII	1001C-LPS-CII 1001C-WPS-CII

VENT COMPATIBILITY & FLOW RATE

SYSTEM SELECTION

SYSTEM MODEL # Vent Required*	Vent Optional**	Vent Model	SCFH (l /hr) Normal	SCFH (l /hr) Max
	11, 1011, 1001A & 2001A	**EPV-1**	**568**	**1044**
1012, 1002 & 2002		**EPV-2**	**685**	**1202**
1003, 2003 & 3003	**1001B & 2001B**	**EPV-3**	**1143 (32370)**	**1971 (55819)**
1004, 2004 & 3004	**1001C & 2001C**	**EPV-4**	**2510 (71083)**	**4387 (124240)**
6000 Series		**EPV-6000**	**2510 (71083)**	**4387 (124240)**
1005 & 2005		**EPV-5**	**4280**	**4479**

NOTES

APPLICATION INFORMATION
Div. & Group columns indicate rating of surrounding atmosphere. Equipment column indicates rating of equipment to be protected.

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.

TYPE Y & Z SYSTEM MODEL NUMBERS:
LPS indicates Less Pressure Switch
WPS indicates With Pressure Switch
WPSA indicates With Pressure Switch Gr. A-D

TYPE X SYSTEM MODEL NUMBERS:
STD indicates Standard
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

SYSTEM SELECTION

ZONE		MAXIMUM ENCLOSURE VOLUME 2.54 m³ (90 Cubic Feet)				MAXIMUM ENCLOSURE VOLUME 7.08 m³ (250 Cubic Feet)			
		MODEL NUMBERS	VENT MODEL	FLOW RATE l /hr (SCFH)		MODEL NUMBERS	VENT MODEL	FLOW RATE l /hr (SCFH)	
				Normal	Max			Normal	Max
ZONE 1 Group IIC Ex [px]		–	–	32370 (1143)	55819 (1971)	6000 SERIES	EPV-6000	71083 (2510)	124240 (4387)
ZONE 2 Ex [pz]	Group IIC	3003 - LPS	EPV-3	32370 (1143)	55819 (1971)	3004 - LPS	EPV-4		124240 (4387)
	Group IIB+H_2	3003-WPSA	EPV-3	32370 (1143)	55819 (1971)	3004 - WPSA	EPV-4	71083 (2510)	124240 (4387)

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.

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Introduction

For Class I/Zone 2 and Class II Hazardous Areas

Type Y, Z and Ex [nP] Purge and pressurization Systems

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.

(3000 Series Only)

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 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. This unit is offered in an explosion-proof model mounted to the panel or purchased separately. A general-purpose model is also available and is sold separately.

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 0.1" water pressure. The contact output is used to drive an alarm for pressure loss inside the enclosure.

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 0.5" 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.

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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.

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)

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. (CI/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:	¼" tube fitting
Switch Setting (CI/CII, Decr):	0.15"/0.5" ± 0.02"
Switch Conduit Port Size:	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.

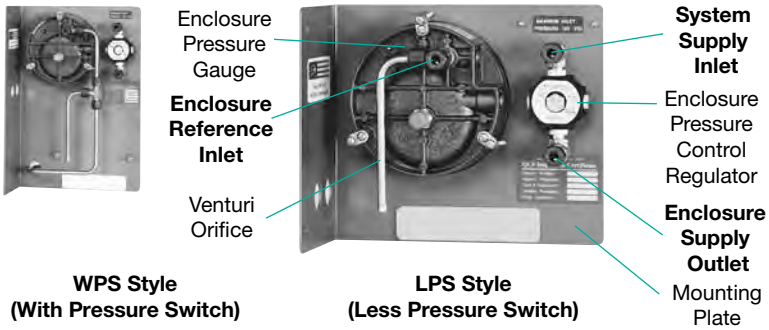
** Enclosure integrity determines actual flow rate

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

For wiring schematic see page 118

Standard Model Applications

Model Number: 1001A-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 **WPSA Style** UL & FM Certified: Cl. I, Div. 1, Group A-D Rating Reduction: Div. 1 to Div. 2	**Model Number: 1001A-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 **WPSA Style** UL & FM Certified: Cl. I, Div. 2, Group A-D Rating Reduction: Div. 2 to Nonhazardous
Model Number: 1001A-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: 1001A-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



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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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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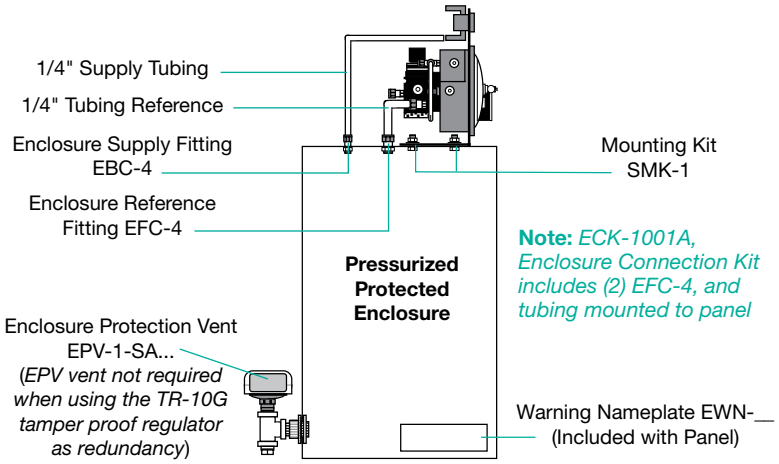
System Accessories Diagram



Model Number Designations

1001A - LPS - CI - YZ - LH - ##

Series Model Number

System Style
- **LPS** - less pressure switch
- **WPS** - with pressure switch
- **WPSA** - 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 hand	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(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

ECK-1001A	Enclosure Connection Kit

CONNECTION FITTINGS

EFC-4	1/4" Flush Connector
EBC-4	1/4" Bulkhead Connector
EPC-10	1/2" Pipe Connector

ADDITIONAL ITEMS

ILF-4	1/4" Filter
SMK-1, -4 or -6	System Mounting Kit
EPSK-1 or -2	Explosion Proof Switch Kit
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

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

WARNING NAMEPLATES

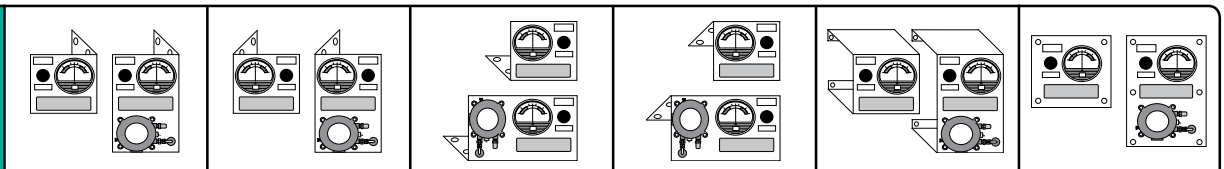
EWN-1	Class I Enclosure Warning
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0197	Inst. & Operation Manual

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

Overall System Dimensions



LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM & PM** - surface
Height	7 / 12	7 / 12	7 / 8	7 / 8	7 / 12	9 / 14
Width	8 / 8	8 / 8	8 / 13.375	8 / 13.375	8 / 8	10 / 10
Depth	5.5 / 7.25	5.5 / 7.25	5.5 / 7.25	5.5 / 7.25	7.5 / 9.25	5 / 6.5

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.

Class II (≤ 50 ft³)

Model 1001B

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.

LPS Style
(Less Pressure Switch)

WPS Style
(With Pressure Switch)

FM APPROVED

CLASSIFIED C UL US

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

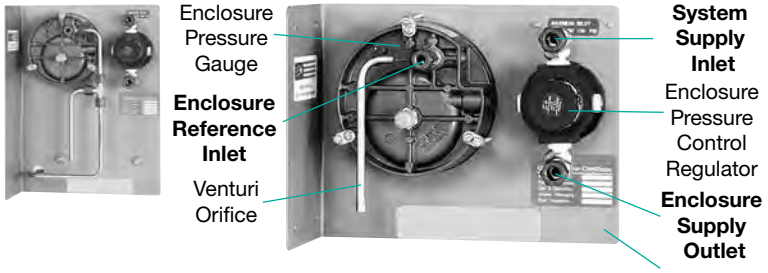
* With EPV-3 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.

** Enclosure integrity determines actual flow rate

For wiring schematic see page 118

Standard Model Applications

Model Number: 1001B-CII Type Y	**Model Number: 1001B-CII Type Z**
Designation: Pressurization System	Designation: Pressurization System
Enclosure Volume: 50 ft³ max.	Enclosure Volume: 50 ft³ max.
LPS Style	**LPS Style**
UL & FM Certified: Cl. II, Div. 1, Group F&G	UL & FM Certified: Cl. II, Div. 2, Group F&G
Rating Reduction: Div.1 to Div. 2	Rating Reduction: Div. 2 to Nonhazardous
WPS Style	**WPS Style**
UL & FM Certified: Cl. II, Div.1, Group F&G	UL & FM Certified: Cl. II, Div. 2, Group F&G
Rating Reduction: Div.1 to Div. 2	Rating Reduction: Div. 2 to Nonhazardous



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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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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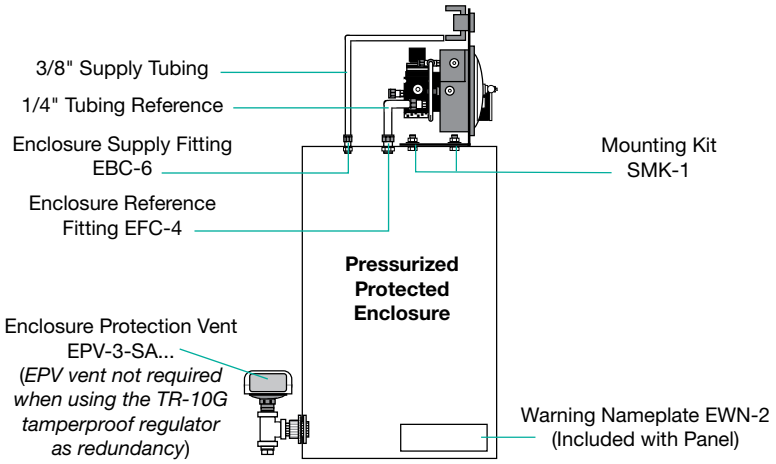
System Accessories Diagram



Model Number Designations

1001B - LPS - CII - YZ - LH - ##

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

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

CONNECTION FITTINGS & FILTER

EFC-4	1/4" Flush Connector
EFC-6	3/8" Flush Connector
EBC-6	3/8" Bulkhead Connector
EPC-13	1" Pipe Connector
ILF-6	3/8" Filter w/Clear Bowl

ADDITIONAL ITEMS

ILF-6	3/8" Filter
SMK-1, -4 or -6	System Mounting Kit
EPSK-2	Explosion Proof Switch Kit
GPSK-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

OPTIONAL ENCLOSURE PROTECTION VENTS

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

OPTIONAL HEX KEY REGULATOR HANDLE

TR-10G	Tamperproof Regulator

WARNING NAMEPLATES

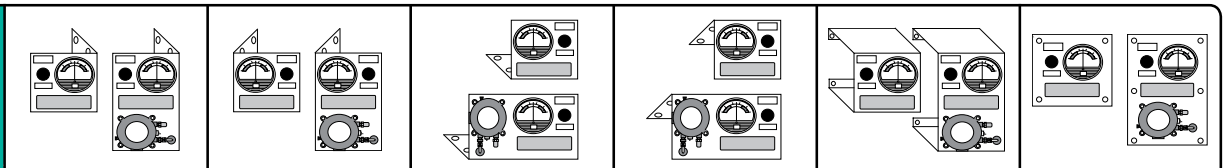
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0201	Inst. & Operation Manual

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

Overall System Dimensions



LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM & PM** - surface
Height	7 / 12	7 / 12	7 / 8	7 / 8	7 / 12	9 / 14
Width	8.875 / 8.875	8.875 / 8.875	8.75 / 14.25	8.75 / 14.25	8.875 / 8.875	10.875 / 10.875
Depth	6 / 7.25	6 / 7.25	6 / 7.25	6 / 7.25	7.5 / 9.25	4.75 / 6.5

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.

PEPPERL+FUCHS
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USA: 330 486 0002 pa-info@us.pepperl-fuchs.com
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Class II (≤ 250 ft³)

Model 1001C

Description

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.

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.

LPS Style
(Less Pressure Switch)

WPS Style
(With Pressure Switch)

FM APPROVED

CLASSIFIED C UL US

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

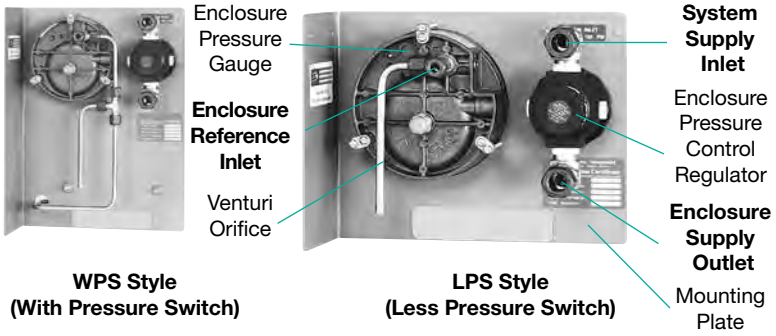
* With EPV-4 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with redundant regulator set to 5 psi max.

** Enclosure integrity determines actual flow rate

For wiring schematic see page 118

Standard Model Applications

Model Number: 1001C-CII Type Y	**Model Number: 1001C-CII Type Z**
Designation: Pressurization System	Designation: Pressurization System
Enclosure Volume: 250 ft³ max.	Enclosure Volume: 250 ft³ max.
LPS Style	**LPS Style**
UL & FM Certified: Cl. II, Div. 1, Group F&G	UL & FM Certified: Cl. II, Div. 2, Group F&G
Rating Reduction: Div.1 to Div. 2	Rating Reduction: Div. 2 to Nonhazardous
WPS Style	**WPS Style**
UL & FM Certified: Cl. II, Div. 1, Group F&G	UL & FM Certified: Cl. II, Div. 2, Group F&G
Rating Reduction: Div.1 to Div. 2	Rating Reduction: Div. 2 to Nonhazardous



WPS Style (With Pressure Switch)

LPS Style (Less Pressure Switch)

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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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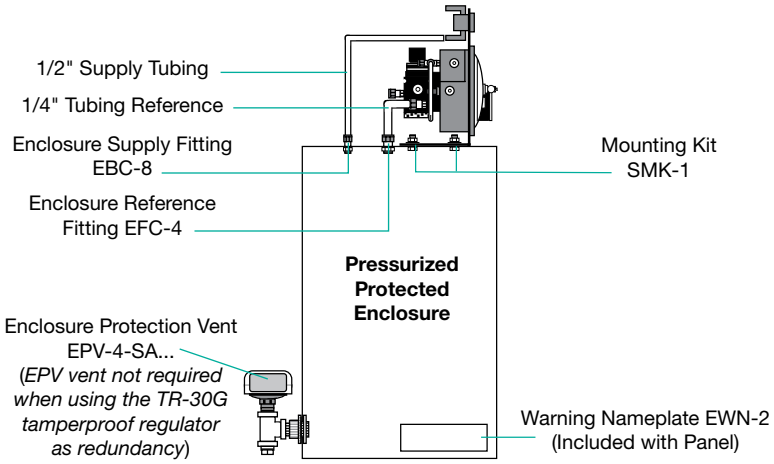
System Accessories Diagram



Model Number Designations

1001C - LPS - CII - YZ - LH - ##

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

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

CONNECTION FITTINGS & FILTER

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
ILF-8	1/2" Filter w/Clear Bowl

ADDITIONAL ITEMS

ILF-8	1/2" Filter
SMK-1, -4 or -6	System Mounting Kit
EPSK-2	Explosion Proof Switch Kit
GPSK-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

OPTIONAL ENCLOSURE PROTECTION VENTS

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

OPTIONAL HEX KEY REGULATOR HANDLE

TR-30G	Tamperproof Regulator

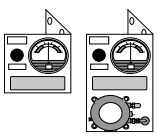
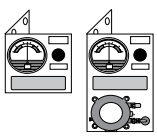
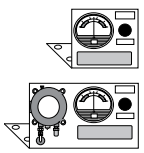
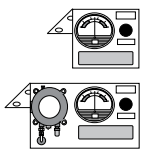
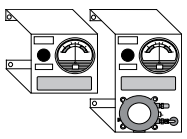
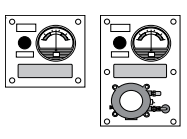
WARNING NAMEPLATES

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						
LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM & PM** - surface
Height	7 / 12	7 / 12	7 / 8	7 / 8	7 / 12	9 / 14
Width	8.875 / 8.875	8.875 / 8.875	8.75 / 14.25	8.75 / 14.25	8.875 / 8.875	10.875 / 10.875
Depth	6 / 7.25	6 / 7.25	6 / 7.25	6 / 7.25	7.5 / 9.25	4.75 / 6.5

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.

Class I (≤ 15 ft³)

Model 1002

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.

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)

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 32
Shipping Weight:	LPS - 10 lb / WPS - 15 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	80 - 120 psi
Capacity & Filtration:	1.5 oz @ 20 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:	** 4 SCFM / 240 SCFH
Exchange Time:	1 min/ft³
System Supply Port:	1/4" FPT
Enclosure Supply Fitting:	1/4" 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

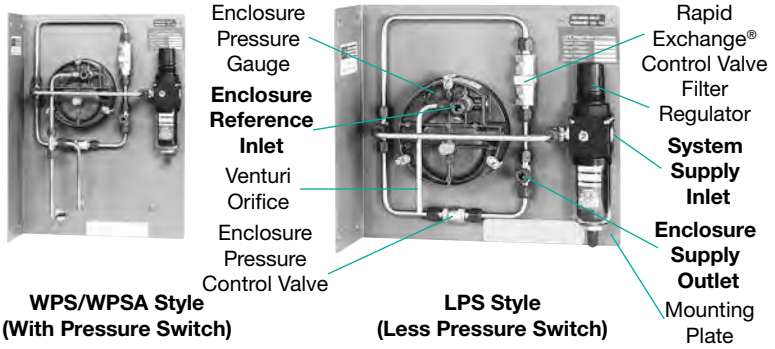
** With regulator set to 60 psi min. during exchange.
Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.

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

For wiring schematic see page 118

Standard Model Applications

Model Number:	**1002 Type Y**	**Model Number:**	**1002 Type Z**
Designation:	Purging System	Designation:	Purging System
Enclosure Volume:	15 ft³ max.	Enclosure Volume:	15 ft³ max.
LPS Style		**LPS Style**	
UL & FM Certified:	Cl. I, Div.1, Group A-D	UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div.1 to Div. 2	Rating Reduction:	Div. 2 to Nonhazardous
WPS Style		**WPS Style**	
UL & FM Certified:	Cl. I, Div.1, Group C&D	UL & FM Certified:	Cl. I, Div. 2, Group C&D
Rating Reduction:	Div. 1 to Div.2	Rating Reduction:	Div.2 to Nonhazardous
WPSA Style		**WPSA Style**	
UL & FM Certified:	Cl. I, Div. 1, Group A-D	UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 1 to Div. 2	Rating Reduction:	Div. 2 to Nonhazardous



WPS/WPSA Style (With Pressure Switch)

LPS Style (Less Pressure Switch)

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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
Tube Fittings & Valves:	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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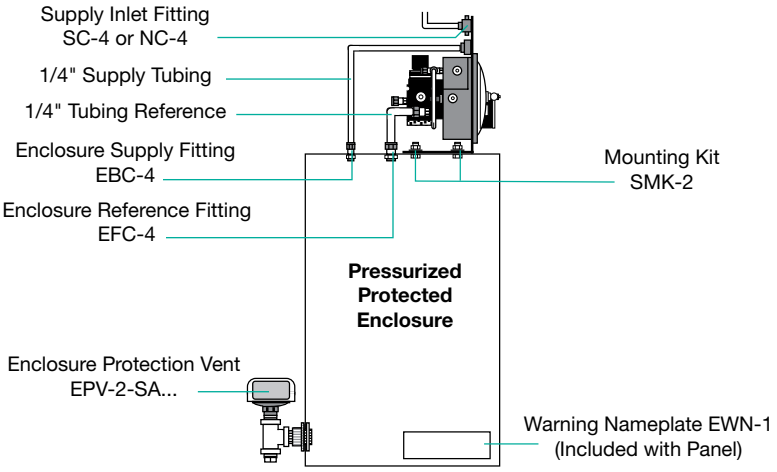
System Accessories Diagram



Model Number Designations

1002 - LPS - CI - YZ - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

Model 1002 System Accessories *(See accessories page for complete details)*

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-2 or -8	System Mounting Kit
EPSK-1	Explosion Proof Switch Kit
GPSK-1	General-purpose 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

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

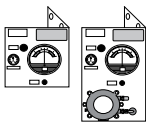
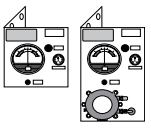
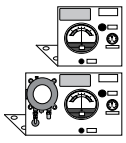
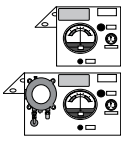
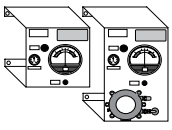
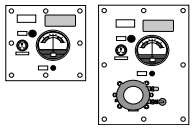
WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0196	Inst. & Operation Manual

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

Overall System Dimensions						
LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	10 / 15	10 / 15	10 / 10	10 / 10	10 / 15	12 / 17
Width	11 / 11	11 / 11	11 / 16	11 / 16	11 / 11	13 / 13
Depth	6 / 7.5	6 / 7.5	6 / 7.5	6 / 7.5	7.75 / 9.25	5 / 6.5

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 11h x 12w WPS - 16h x 12w
Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.

Class I (≤ 75 ft³)

Model 1003

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.

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)

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 34
Shipping Weight:	LPS - 12 lb / WPS - 17 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	80 - 120 psi
Capacity & Filtration:	3.8 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:	** 10 SCFM / 600 SCFH
Exchange Time:	1 min / 2.5 ft³
System Supply Port:	3/8" FPT
Enclosure Supply Fitting:	3/8" 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 60 psi min. during exchange. Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.

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

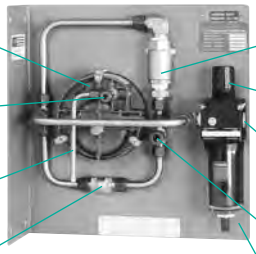
For wiring schematic see page 118

Standard Model Applications

Model Number:	**1003 Type Y**
Designation:	Purging System
Enclosure Volume:	75 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 1, Group A-D
Rating Reduction:	Div. 1 to Div. 2

Model Number:	**1003 Type Z**
Designation:	Purging System
Enclosure Volume:	75 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 2 to Nonhazardous

WPS/WPSA Style
(With Pressure Switch)



LPS Style
(Less Pressure Switch)

Enclosure Pressure Gauge
Enclosure Reference Inlet
Venturi Orifice
Enclosure Pressure Control Valve
Rapid Exchange® Control Valve
Filter Regulator
System Supply Inlet
Enclosure Supply Outlet
Mounting Plate

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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
Tube Fittings & Valves:	316 SS Forged Body
Tubing:	316 SS 1/4" & 3/8" .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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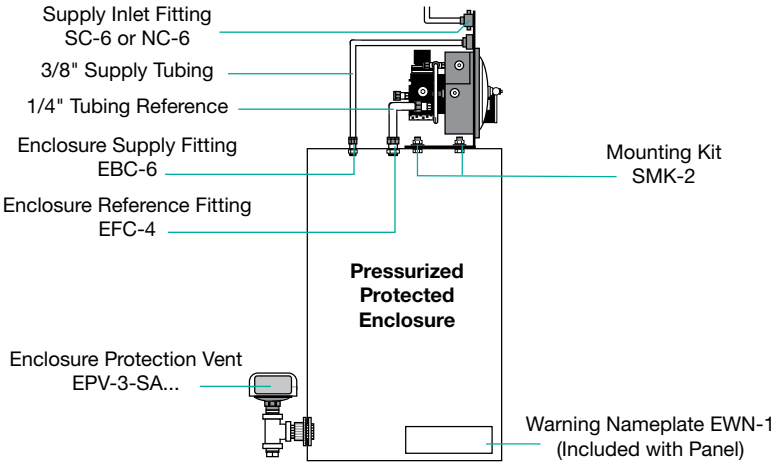
System Accessories Diagram



Model Number Designations

1003 - LPS - CI - YZ - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

Model 1003 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
EBC-6	3/8" Bulkhead Connector
EPC-13	1" Pipe Connector

ADDITIONAL ITEMS

SMK-2 or -8	System Mounting Kit
EPSK-1	Explosion Proof Switch Kit
GPSK-1	General-purpose 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

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

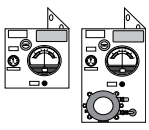
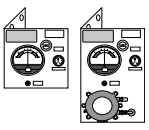
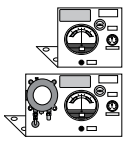
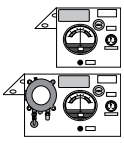
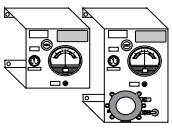
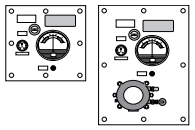
WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0195	Inst. & Operation Manual

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

Overall System Dimensions						
LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	12 / 15	12 / 15	12 / 12	12 / 12	12 / 15	14 / 17
Width	11.5 / 11.5	11.5 / 11.5	11.5 / 15.25	11.5 / 15.25	11.5 / 11.5	13.5 / 13.5
Depth	6 / 7.5	6 / 7.5	6 / 7.5	6 / 7.5	7.75 / 9.25	5.75 / 7.25

Dimensions in inches. Mounting dimensions available upon request. FM & PM panel cutout dimensions: LPS - 13h x 12.5w WPS - 16h x 12.5w
Height & width dimensions reflect mounting plate measurements. Depth dimension reflects overall measurement of system, including components.

Class I (≤ 200 ft³)

Model 1004

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.

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)

FM APPROVED

CLASSIFIED C UL US

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 80 psi min. during exchange. Rapid Exchange® is a Registered Trademark of Pepperl+Fuchs.

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

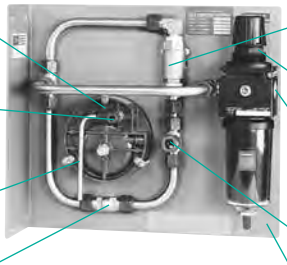
For wiring schematic see page 118

Standard Model Applications

Model Number:	**1004 Type Y**
Designation:	Purging System
Enclosure Volume:	200 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 1, Group A-D
Rating Reduction:	Div. 1 to Div. 2

Model Number:	**1004 Type Z**
Designation:	Purging System
Enclosure Volume:	200 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 2 to Nonhazardous

WPS/WPSA Style
(With Pressure Switch)

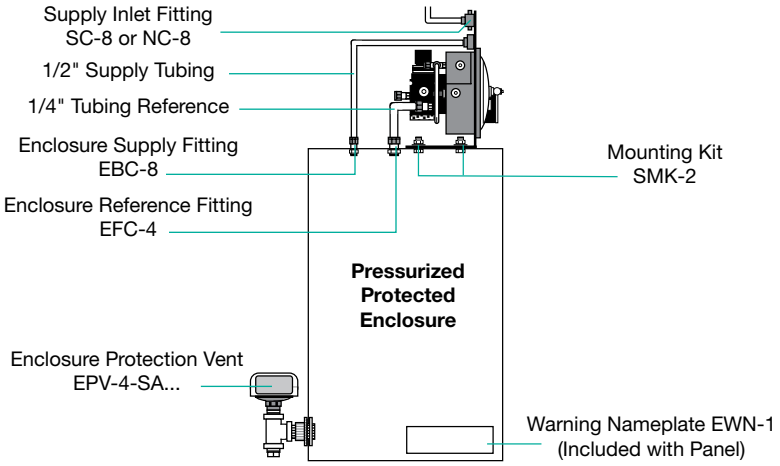


LPS Style
(Less Pressure Switch)

Enclosure Pressure Gauge
Enclosure Reference Inlet
Venturi Orifice
Enclosure Pressure Control Valve
Rapid Exchange® Control Valve
Filter Regulator
System Supply Inlet
Enclosure Supply Outlet
Mounting Plate

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

System Accessories Diagram



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
Tube Fittings & Valves:	316 SS Forged Body
Tubing:	316 SS 1/4" & 1/2" .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

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

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

Model 1004 System Accessories *(See accessories page for complete details)*

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 or 8	System Mounting Kit
EPSK-1	Explosion Proof Switch Kit
GPSK-1	General-purpose 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

ENCLOSURE PROTECTION VENTS

ONE VENT REQUIRED WITH EACH SYSTEM

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

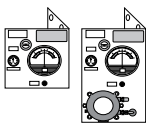
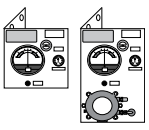
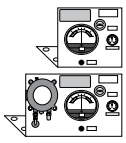
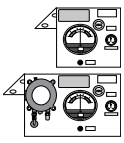
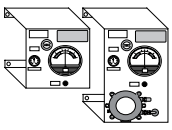
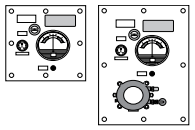
WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0203	Inst. & Operation Manual

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

Overall System Dimensions						
LPS / WPS	LH - left hand	RH - right hand	TM - top mount	BM - bottom mount	WM - wall mount	FM or PM - flat panel
Height	12 / 16.25	12 / 16.25	12 / 12	12 / 12	12 / 15	14 / 18.25
Width	13.5 / 13.5	13.5 / 13.5	13.5 / 16.75	13.5 / 16.75	13.5 / 13.5	15.5 / 15.5
Depth	6.75 / 8.25	6.75 / 8.25	6.75 / 8.25	6.75 / 8.25	7.75 / 9.25	6.75 / 8.25

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.

Class I (≤ 450 ft³)

Model 1005

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.

LPS Style
(Less Pressure Switch)

WPS/WPSA Style
(With Pressure Switch)

FM APPROVED

CLASSIFIED C UL US

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

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

* 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.

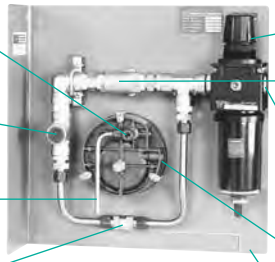
*** Supply voltages 24 VDC and 240 VAC available upon request.

For wiring schematic see page 118

Standard Model Applications

Model Number:	**1005 Type Y**	**Model Number:**	**1005 Type Z**
Designation:	Purging System	Designation:	Purging System
Enclosure Volume:	450 ft³ max.	Enclosure Volume:	450 ft³ max.
LPS Style		**LPS Style**	
UL & FM Certified:	Cl. I, Div. 1, Group A-D	UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 1 to Div. 2	Rating Reduction:	Div. 2 to Nonhazardous
WPS Style		**WPS Style**	
UL & FM Certified:	Cl. I, Div. 1, Group C&D	UL & FM Certified:	Cl. I, Div. 2, Group C&D
Rating Reduction:	Div. 1 to Div. 2	Rating Reduction:	Div. 2 to Nonhazardous
WPSA Style		**WPSA Style**	
UL & FM Certified:	Cl. I, Div. 1, Group A-D	UL & FM Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 1 to Div. 2	Rating Reduction:	Div. 2 to Nonhazardous

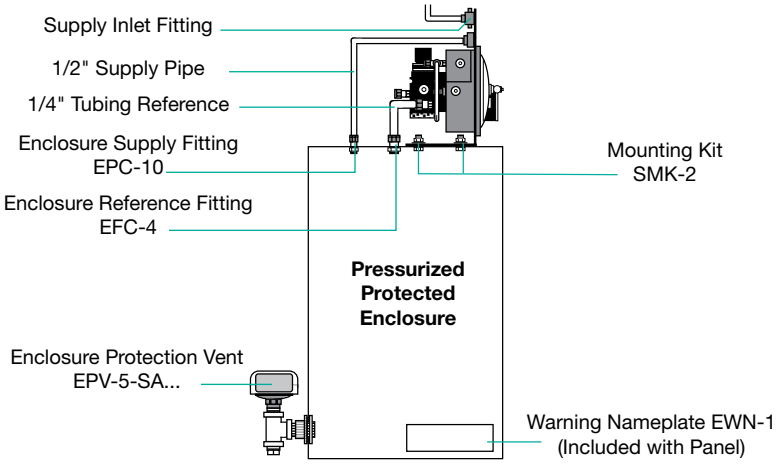
WPS/WPSA Style (With Pressure Switch)



LPS Style (Less Pressure Switch)

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

System Accessories Diagram



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
Tube Fittings & Valves:	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

Lexan® is a registered trademark of the General Electric Company

Model Number Designations

1005 - LPS - CI - YZ - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- See Accessories Page 130 for additional factory installed accessories

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

CONNECTION FITTINGS

EFC-4	1/4" Flush Connector
EPC-10	1/2" Pipe Connector
EPC-15	2" Pipe Connector

ADDITIONAL ITEMS

SMK-2 or -8	System Mounting Kit
EPSK-1	Explosion Proof Switch Kit
GPSK-1	General-purpose 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

ENCLOSURE PROTECTION VENTS

ONE VENT REQUIRED WITH EACH SYSTEM

EPV-5-SA-00	Straight w/Spark Arrestor
EPV-5-SA-90	Rt Angle w/Spark Arrestor

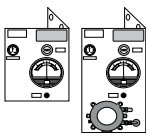
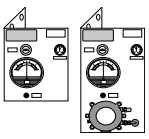
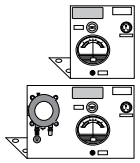
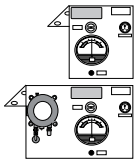
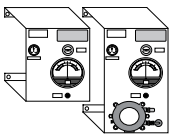
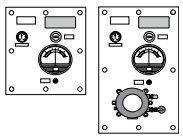
WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

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						
LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	13.5 / 17.75	13.5 / 17.75	14 / 13	14/ 13	15 / 17.75	15.5 / 19.75
Width	13.5 / 13.5	13.5 / 13.5	13.5 / 16.125	13.5 / 16.125	13.5 / 13.5	15.5 / 15.5
Depth	6 / 7.5	6 / 7.5	6 / 7.5	6 / 7.5	7.75 / 9.25	5 / 6.5

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.

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

Model 11

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. (CI/CII):	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 (CI/CII, 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

LPS Style
(Less Pressure Switch)

WPS Style
(With Pressure Switch)

FM APPROVED

CLASSIFIED C UL US

Standard Model Applications

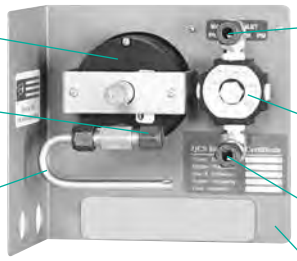
Model Number:	**11-CI Type Y**
Designation:	Purging System
Enclosure Volume:	2 ft³ max.
LPS Style	
UL & FM Certified:	Cl. I, Div. 1, Group A-D
Rating Reduction:	Div. 1 to Div. 2
WPS Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D
Rating Reduction:	Div. 1 to Div. 2

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

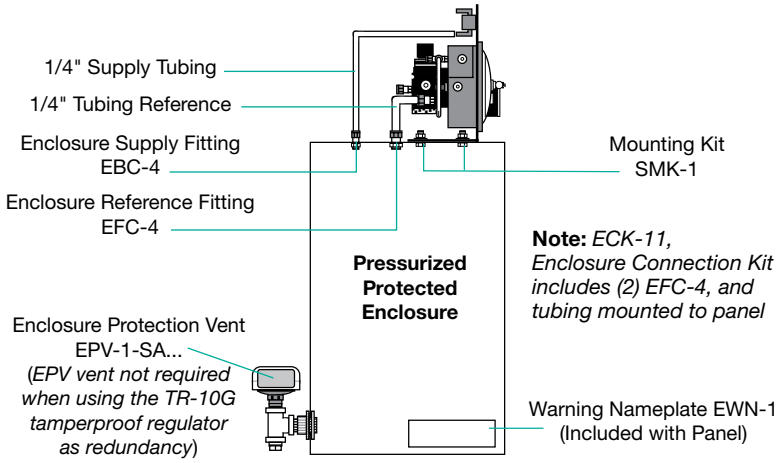
WPS Style (With Pressure Switch)



LPS Style (Less Pressure Switch)

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

System Accessories Diagram



Material Specifications

Regulator Body:	Zinc w/Enamel Finish
Regulator Handle:	Polycarbonate
Enclosure Pressure Gauge:	ABS Plastic
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

Lexan® is a registered trademark of the General Electric Company

Model Number Designations

11 - LPS - CI - YZ - LH - ##

Series Model Number

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 hand	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM	- frame mount	external frame or rack
PM	- panel mount	enclosure surface cutout

(Not available in WPS Style)

- 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

CONNECTION FITTINGS

EFC-4	1/4" Flush Connector
EBC-4	1/4" Bulkhead Connector
EPC-10	1/2" Pipe Connector

ADDITIONAL ITEMS

ILF-4	1/4" Filter
SMK-1, -4 or -6	System Mounting Kit
EPSK-1 or -2	Explosion Proof Switch Kit
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

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

WARNING NAMEPLATES

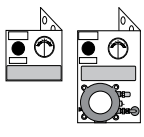
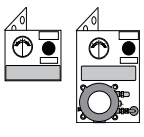
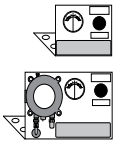
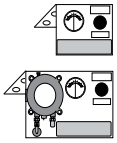
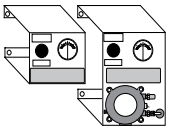
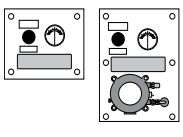
EWN-1	Class I Enclosure Warning
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0207	Inst. & Operation Manual

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

Overall System Dimensions

LPS / WPS	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM & PM** - surface
Height	6.25 / 10.75	6.25 / 10.75	6.25 / 8.5	6.25 / 8.5	6.25 / 10.75	8.25 / 12.75
Width	6 / 7.5	6 / 7.5	7.5 / 13.375	7.5 / 13.375	6 / 7.5	8 / 9.5
Depth	5.5 / 7.25	5.5 / 7.25	5.5 / 7.25	5.5 / 7.25	5.5 / 7.25	4.5 / 7

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.

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

Model 1011

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.

Front View

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

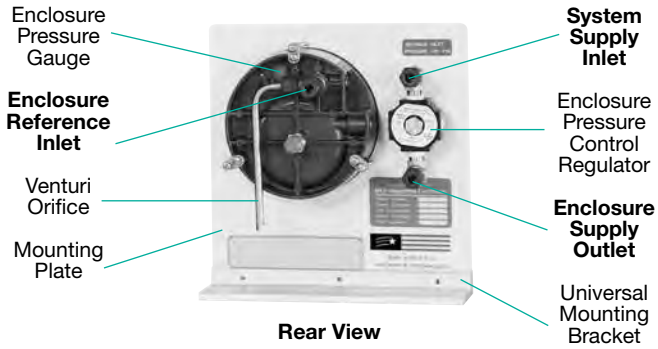
System Dimensions:	See page 42
Shipping Weight:	7 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	* 5 - 120 psi
Supply Requirements:	clean air or inert gas
Safe Press. (CI/CII):	0.25" / 1.0"
Safe Press. Flow Rate:	** 0.1 - 3.5 SCFH
System Supply Fitting:	1/4" tube fitting
Enclosure Supply Fitting:	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**	**Model Number:**	**1011-CII Type Z**
Designation:	Purging System	Designation:	Pressurization System
Enclosure Volume:	2 ft³ max.	Enclosure Volume:	10 ft³ max.
UL Certified:	Cl. I, Div. 2, Group A-D	UL Certified:	Cl. II, Div. 2, Group F&G
Rating Reduction:	Div.2to Nonhazardous	Rating Reduction:	Div. 2 to Nonhazardous



Rear View

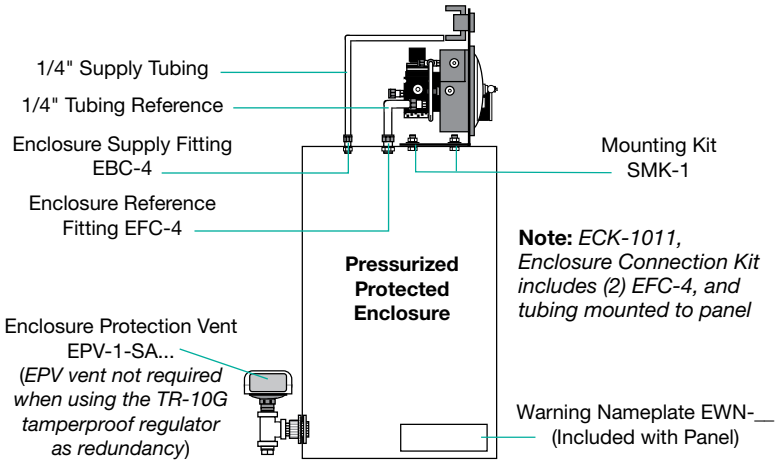
CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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

Lexan® is a registered trademark of the General Electric Company

System Accessories Diagram



Note: *ECK-1011, Enclosure Connection Kit includes (2) EFC-4, and tubing mounted to panel*

Model Number Designations

1011 - CI - Z - UH - ##

Series Model Number

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

System Type
- **Z** - Div. 2 to Nonhazardous

Mounting Configuration
- **UM** - universal mount — external surface
- **FM** - frame mount — external frame or rack
- **PM** - panel mount — enclosure surface cutout

- See Accessories Page 130 for additional factory installed accessories

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

ADDITIONAL ITEMS

ILF-4	1/4" Filter
SMK-1 or -4	System Mounting Kit
EPSK-1 or -2	Explosion Proof Switch Kit
GPSK-1 or -2	General-purpose Switch Kit
RAH	Div. 1 Remote Alarm Horn
RAB-2	Div. 2 Remote Alarm Beacon

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

WARNING NAMEPLATES

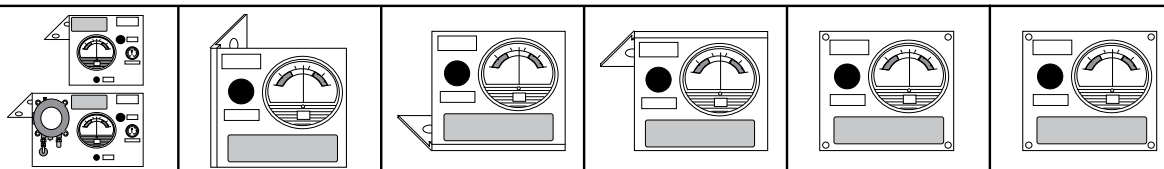
EWN-1	Class I Enclosure Warning
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

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



Configuration	**UM** - left hand	**UM** - right hand	**UM** - top mount	**UM** - bottom mount	- frame mount	**PM** - panel mount
Height	8	8	8.25	8.25	8	8
Width	8.25	8.25	8	8	8	8
Depth	5	5	5	5	5	5

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.

Class I (≤ 15 ft³)

Model 1012

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

System Dimensions:	See page 44
Shipping Weight:	10 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	80 - 120 psi
Capacity & Filtration:	1.5 oz @ 20 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:	** 4 SCFM/240 SCFH
Exchange Time:	1 min/ft³
System Supply Port:	1/4" FPT
Enclosure Supply Fitting:	1/4" tube fitting
Enclosure Reference Fitting:	1/4" tube fitting

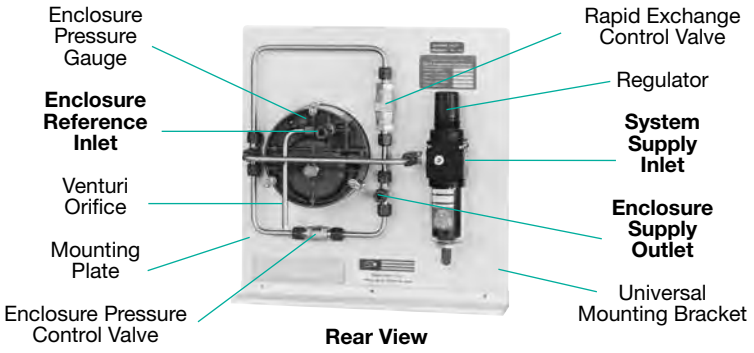
* Enclosure integrity determines actual flow rate

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

Front View

Standard Model Applications

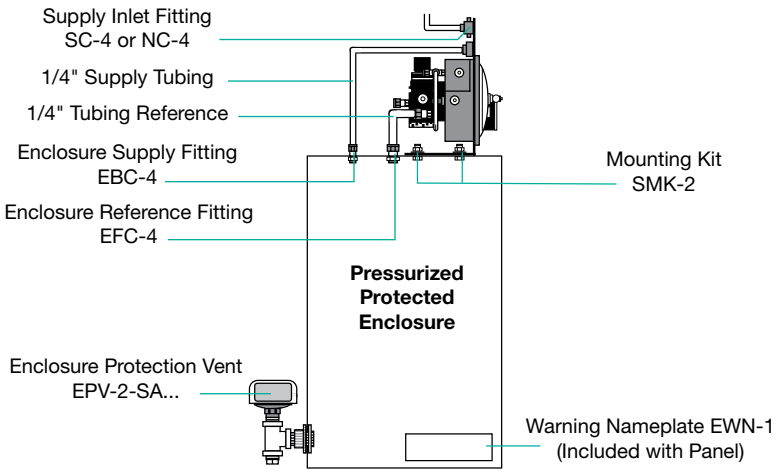
Model Number:	**1012-CI Type Z**
Designation:	Purging System
Enclosure Volume:	15 ft³ max.
UL Certified:	Cl. I, Div. 2, Group A-D
Rating Reduction:	Div. 2 to Nonhazardous



Rear View

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

System Accessories Diagram



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
Tube Fittings & Valves:	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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Model Number Designations

1012 - CI - Z - UH - ##

Series Model Number

Area Classification
CI - Class I Area

System Type
Z - Div. 2 to Nonhazardous

Mounting Configuration
UM - universal mount external surface
FM - frame mount external frame or rack
PM - panel mount enclosure surface cutout

- See Accessories Page 130 for additional factory installed accessories

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

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

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

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

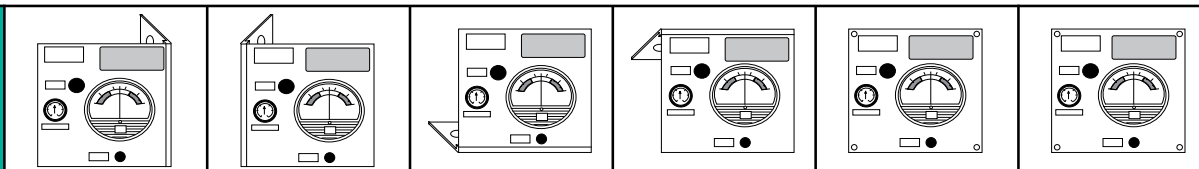
EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

INSTALLATION & OPERATION MANUAL

129-0206	Inst. & Operation Manual

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

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.

PEPPERL+FUCHS
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Singapore: +65 67799091 pa-info@sg.pepperl-fuchs.com

Class I (≤ 90 ft³) and Zone 2 (≤ 2.54 m³)

Model 3003

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 hosedown 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.

Model 3003-LPS-CI-YZ-VML
Vertical Mount Configuration

Model 3003-WPS-CI-YZ-HMT
Horizontal Mount Configuration

Model 3003-LPS-CI-YZ-CK
Component Kit Configuration

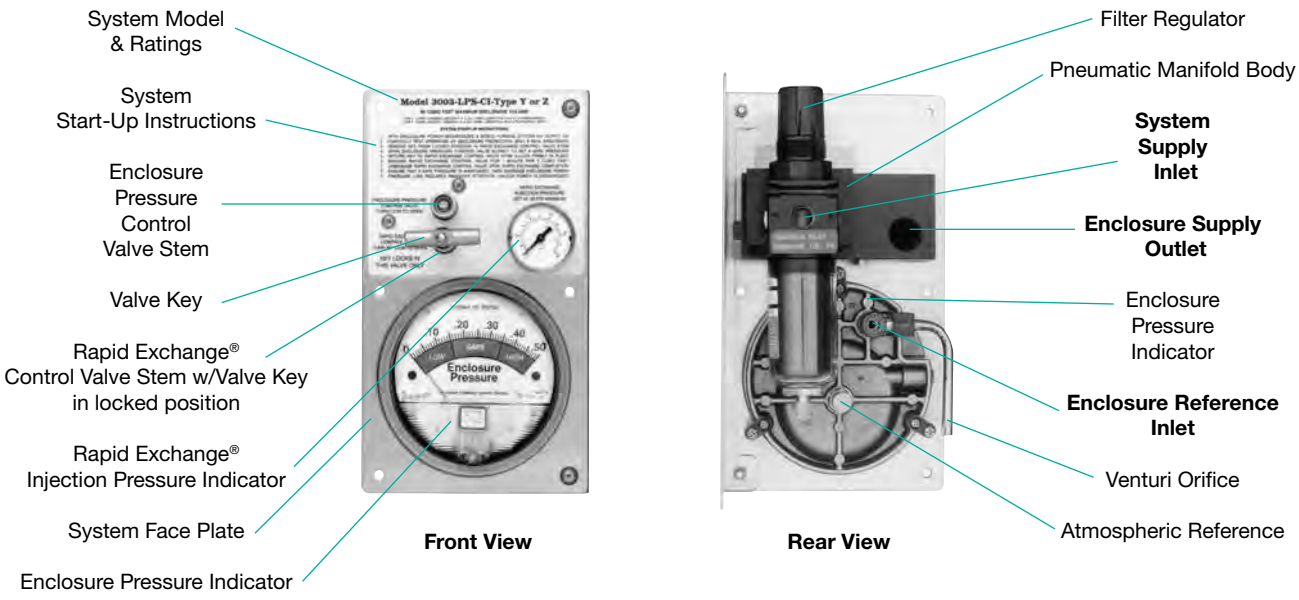
Standard Model Applications

Model Number:	**3003**
	Type Y System
Designation:	Rapid Exchange® Purging
Enclosure Volume:	90 ft³ (2.54 m³) 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 1, Group A-D

Model Number:	**3003**
	Type Z and Ex [pz] System
Designation:	Rapid Exchange® Purging
Enclosure Volume:	90 ft³ (2.54 m³) max.
LPS Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
ATEX 'pz' Certified:	Zone 2, Group IIC
Rating Reduction:	Div.2to Nonhazardous Zone 2 to Nonhazardous
WPS Style	
UL & FM Certified:	Cl. I, Div. 2, Group C-D
Rating Reduction:	Div.2to Nonhazardous
WPSA Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
ATEX 'pz' Certified:	Zone 2, Group IIB+H_2
Rating Reduction:	Div.2to Nonhazardous Zone 2 to Nonhazardous
	II 3G Ex [pz] II

Model 3003 VM Configuration - The Vertical Mount System

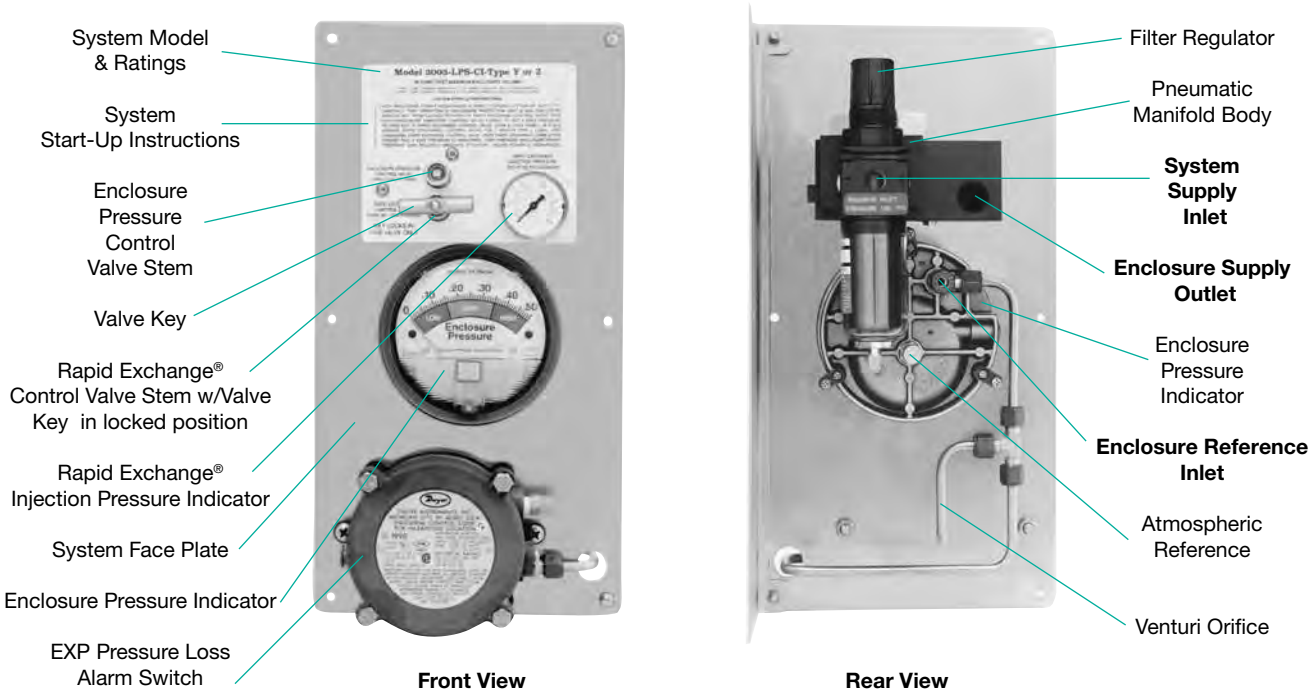
LPS (Less Pressure Switch)



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.

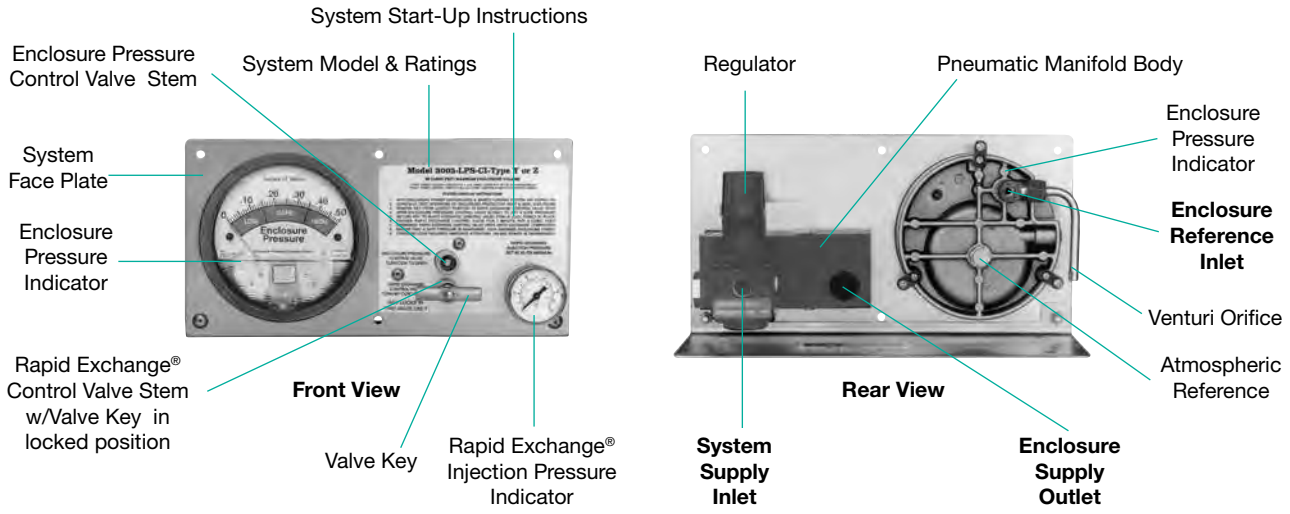
WPS / WPSA (With Pressure Switch)



CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Model 3003 HM Configuration - The Horizontal Mount System

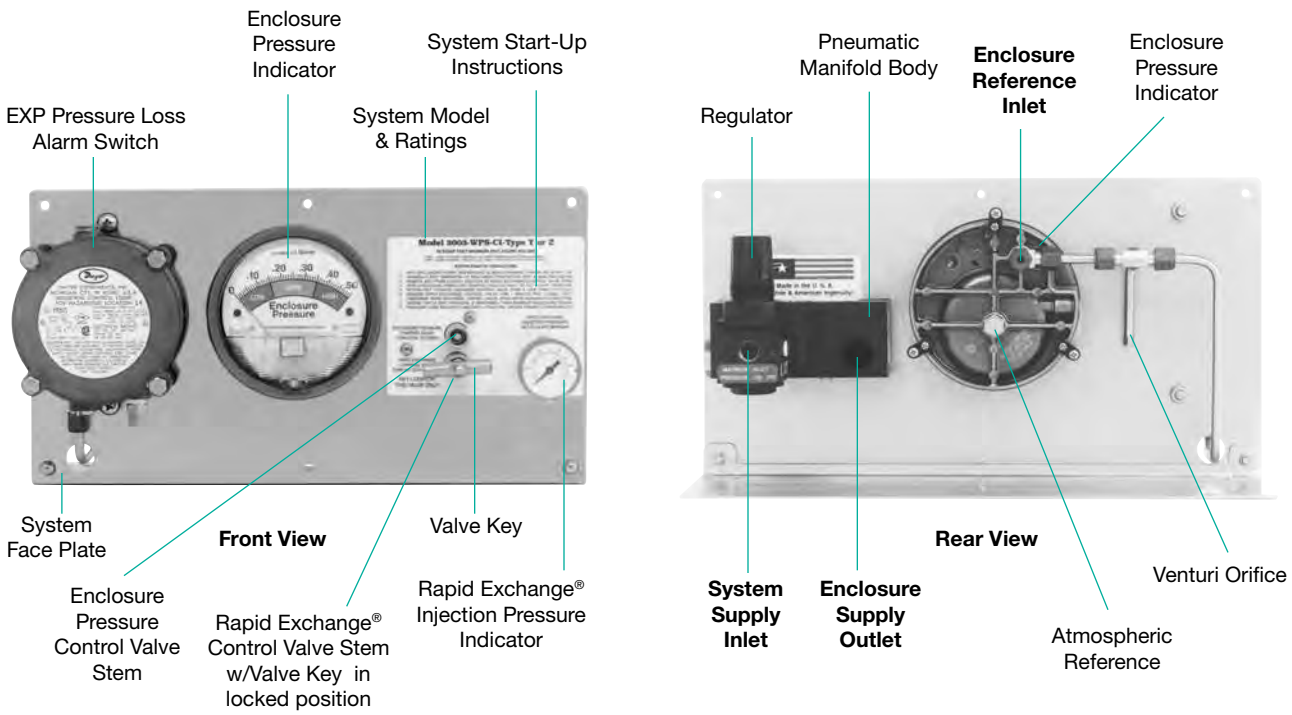
LPS (Less Pressure Switch)



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)



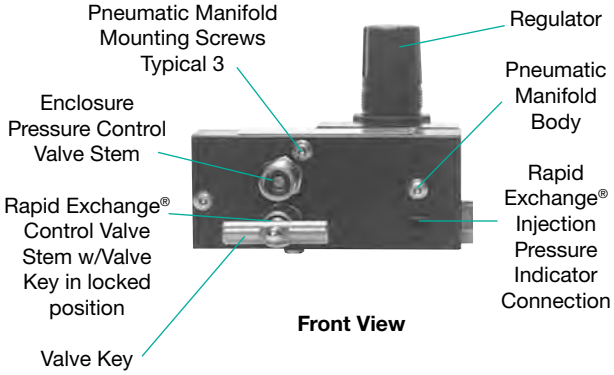
CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Model 3003 CK Configuration - The Component Kit System

Part #1
Enclosure Pressure Indicator

Front View

Part #2
Pneumatic Manifold Assembly

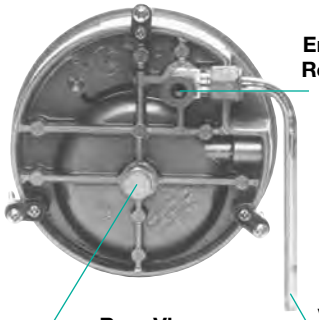


Front View

Part #3
Rapid Exchange® Injection Pressure Indicator

Front View

Side View

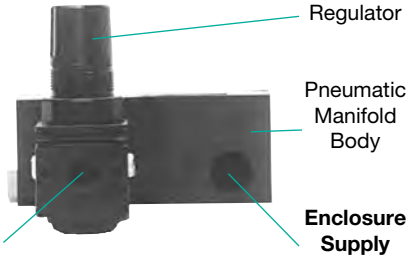


Enclosure Reference Inlet

Rear View

Venturi Orifice

Atmospheric Reference



Rear View

Part #4
Start Up Instruction Nameplate

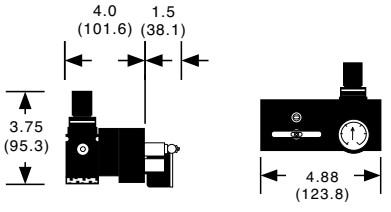
CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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.

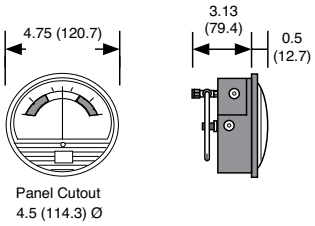
CK Configuration System & Optional Remote Cube Filter Dimensions in Inches (mm)

Pneumatic Manifold



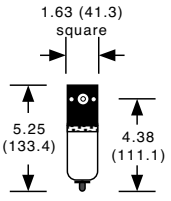
Side View **Front View**

Enclosure Pressure Gauge

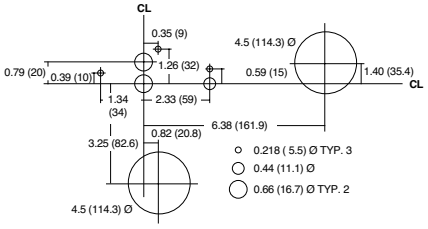


Front View **Side View**

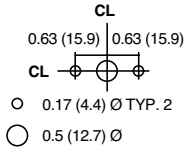
Side View
Model RCF-4



Model 3003 CK System Panel Cutout Pattern



Model RCF-4 Panel Cutout Pattern



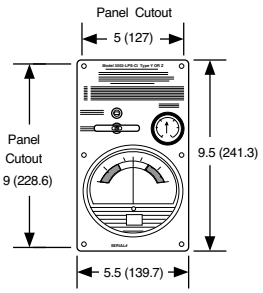
Helpful Hint

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.

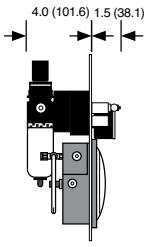
Cut only one 4.5" (114.3 mm) Ø hole in panel.

Model 3003 WPS VM Configuration & Flange Dimensions in Inches (mm)

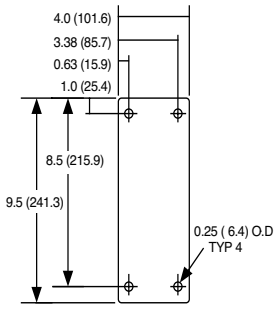
LPS (Less Pressure Switch)



VM Configuration
Front View

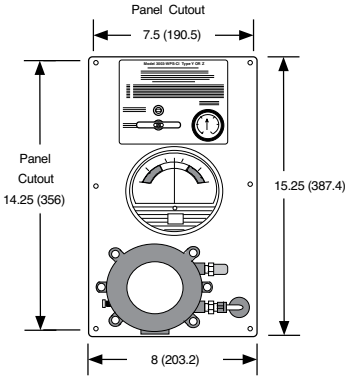


VM Configuration
Side View

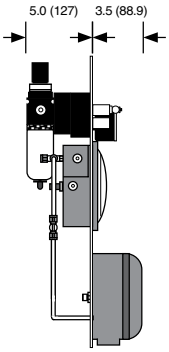


Vertical Mount Flange
Front View

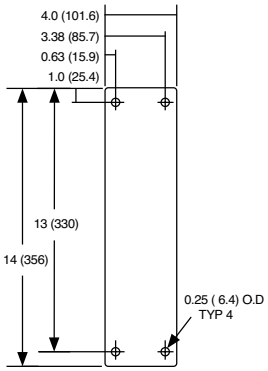
WPS/WPSA (With Pressure Switch)



WPS/WPSA VM Configuration
Front View



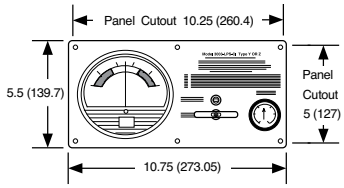
WPS/WPSA VM Configuration
Side View



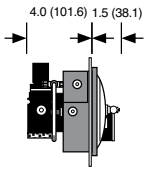
WPS/WPSA Vertical Mount Flange
Front View

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

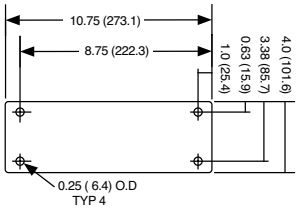
LPS (Less Pressure Switch)



LPS HM Configuration
Front View

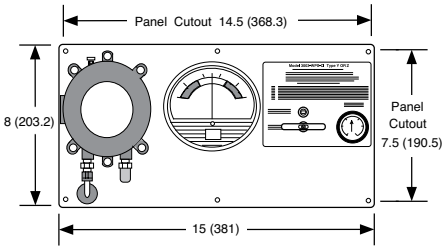


LPS HM Configuration
Side View

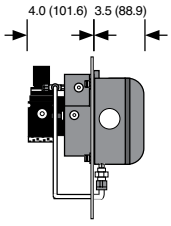


LPS Horizontal Mount Flange
Front View

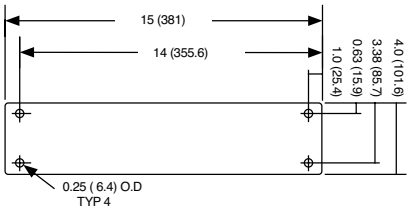
WPS/WPSA (With Pressure Switch)



WPS/WPSA HM Configuration
Front View



WPS/WPSA HM Configuration
Side View

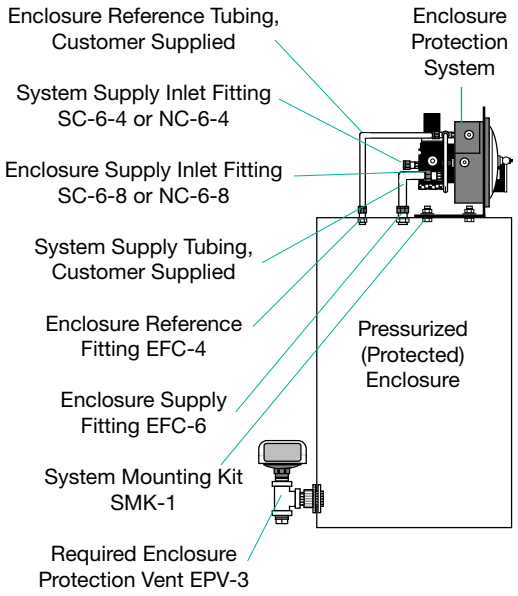


WPS/WPSA Horizontal Mount
Flange Front View

Typical Model 3003 System Installation Details

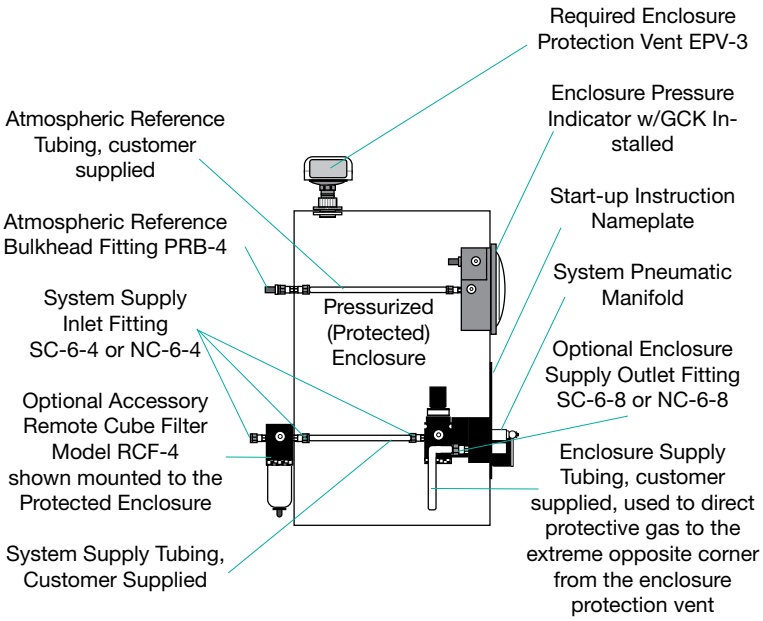
External to the Protected Enclosure

Flange Mount HM Configuration with Model SMK-1 Fastener Kit



Internal to the Protected Enclosure

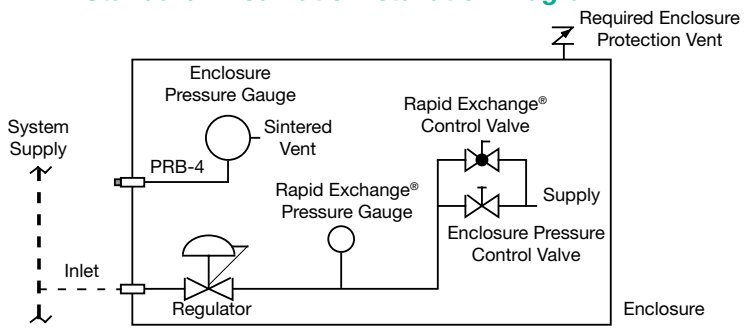
Panel Mount CK Configuration with Model RCF-4 Remote Cube Filter & Model GCK Gauge Conversion Kit



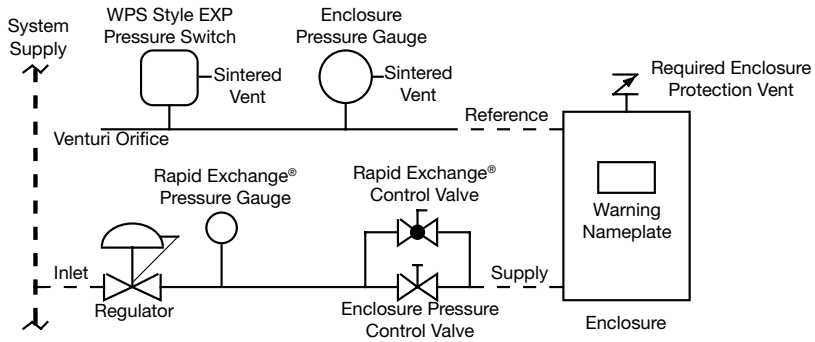
Standard and Panel Mount Pneumatic Installation Diagram

Standard Pneumatic Installation Diagram

See panel mounting conversion procedure on page 52



Panel Mount Installation Diagram



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VM Configuration Mounting Options

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

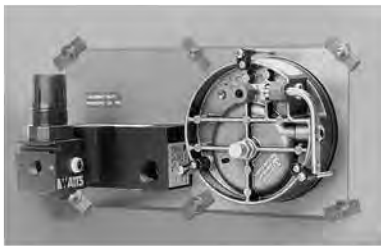
Model 3003-LPS-CI-YZ-VML
Flange Mounted to
Vertical 2" Pipe Stand with
Model PMK-1 Fastener Kit

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

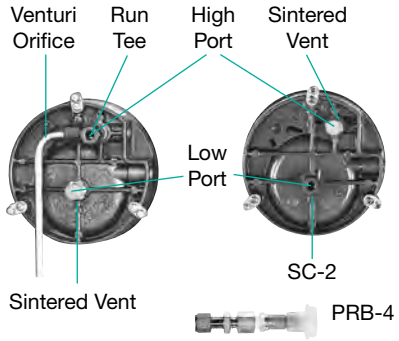
Front View

Rear View

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



Standard Configuration (prior to conversion)

Panel Mount Configuration (after conversion)

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

* Refers to filter bowl supplied with VM mounting configuration

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 (-29°C to +49°C)
Supply Pressure Range:	80 - 120 psi (5.5 - 8.3 bar)
Capacity & Filtration:	1.5 oz @ 20 Micron
Supply Requirements:	clean air 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 / /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" 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

3003 - LPS - CI - YZ - VM - ##

Series Model Number

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 / 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

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

CONNECTION FITTINGS

NC-6-4	3/8" T x 1/4" P Ninety Connector
SC-6-4	3/8" T x 1/4" P Straight Connector
NC-6-8	3/8" T x 1/2" P Ninety Connector
SC-6-8	3/8" T x 1/2" P Straight Connector
EFC-4	1/4" Flush Connector
EBC-4	1/4" Bulkhead Connector
EFC-6	3/8" Flush Connector
EBC-6	3/8" Bulkhead Connector
EPC-13	1 1/4" 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-4	1/4" In-Line Filter Kit
RCF-4	1/4" Remote Cube Filter
EPSK-1	Explosion Proof Switch Kit (GRP C, D)
EPSK-1A	Explosion Proof 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-3-SA-00	Straight w/Spark Arrestor
EPV-3-SA-90	Rt Angle w/Spark Arrestor

WARNING NAMEPLATES

EWN-1	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

Class I (≤ 250 ft³) and Zone 2 (≤ 7.08 m³)

Model 3004

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.

Model 3004-LPS-CI-YZ-VML
Vertical Mount Configuration

Model 3004-WPS-CI-YZ-HMT
Horizontal Mount Configuration

Model 3004-LPS-CI-YZ-CK
Component Kit Configuration

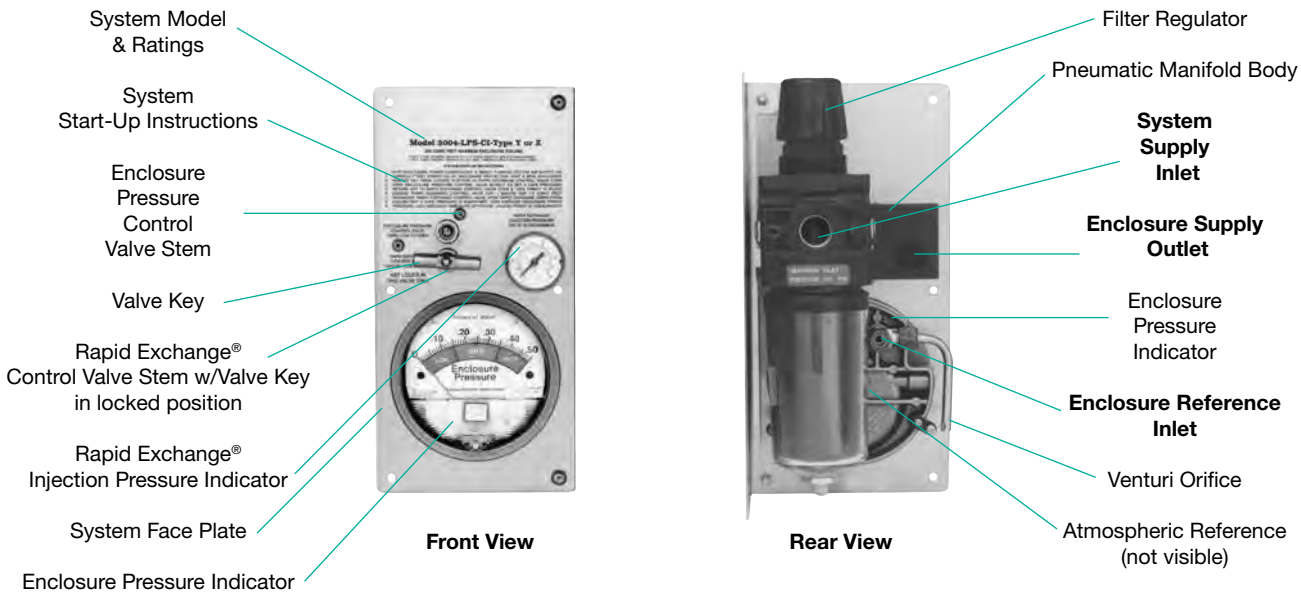
Standard Model Applications

Model Number:	**3004**
	Type Y System
Designation:	Rapid Exchange® Purging
Enclosure Volume:	250 ft³ (7.08 m³) 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
WPSA Style	
UL & FM Certified:	Cl. I, Div. 1, Group A-D
Rating Reduction:	Div. 1 to Div. 2

Model Number:	**3004**
	Type Z and Ex [pz] System
Designation:	Rapid Exchange® Purging
Enclosure Volume:	250 ft³ (7.08 m³) max.
LPS Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
ATEX 'pz' Certified:	Zone 2, Group IIC
Rating Reduction:	Div. 2 to Nonhazardous Zone 2 to Nonhazardous
WPS Style	
UL & FM Certified:	Cl. I, Div. 2, Group C-D
Rating Reduction:	Div.2to Nonhazardous
WPSA Style	
UL & FM Certified:	Cl. I, Div. 2, Group A-D
ATEX 'pz' Certified:	Zone 2, Group IIB+H_2
Rating Reduction:	Div.2to Nonhazardous Zone 2 to Nonhazardous
	II 3G Ex [pz] II

Model 3004 VM Configuration - The Vertical Mount System

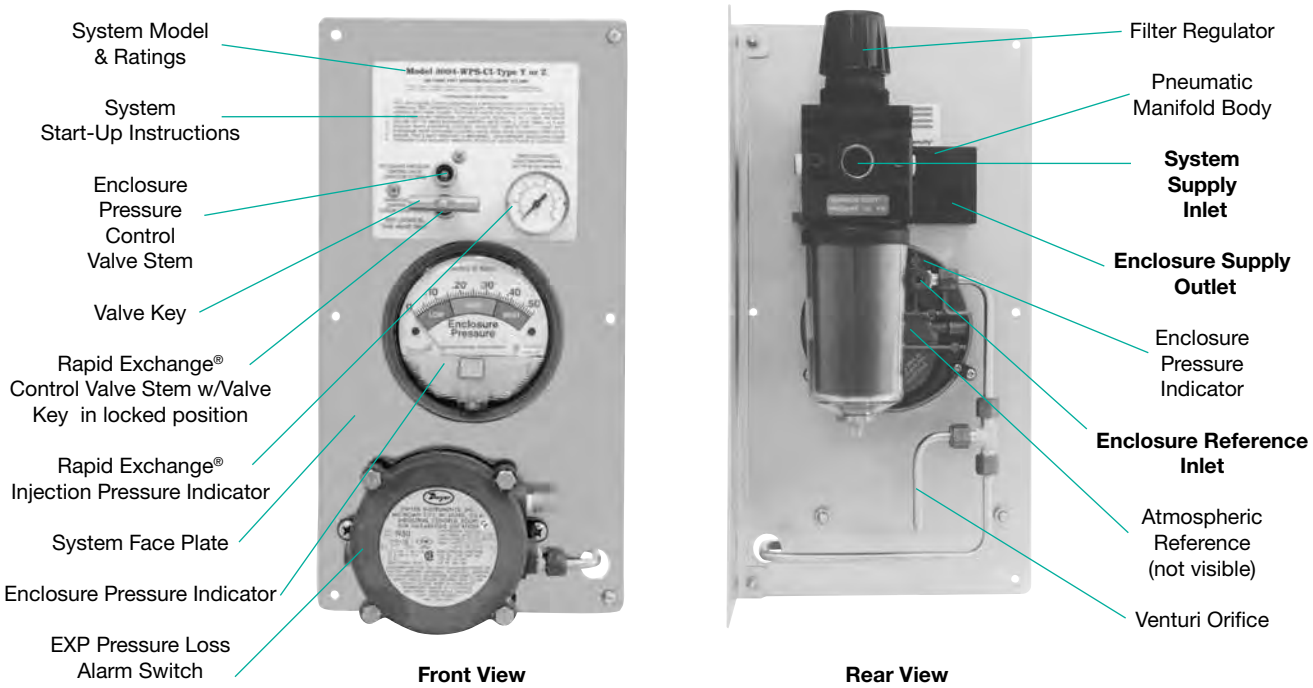
LPS (Less Pressure Switch)



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.

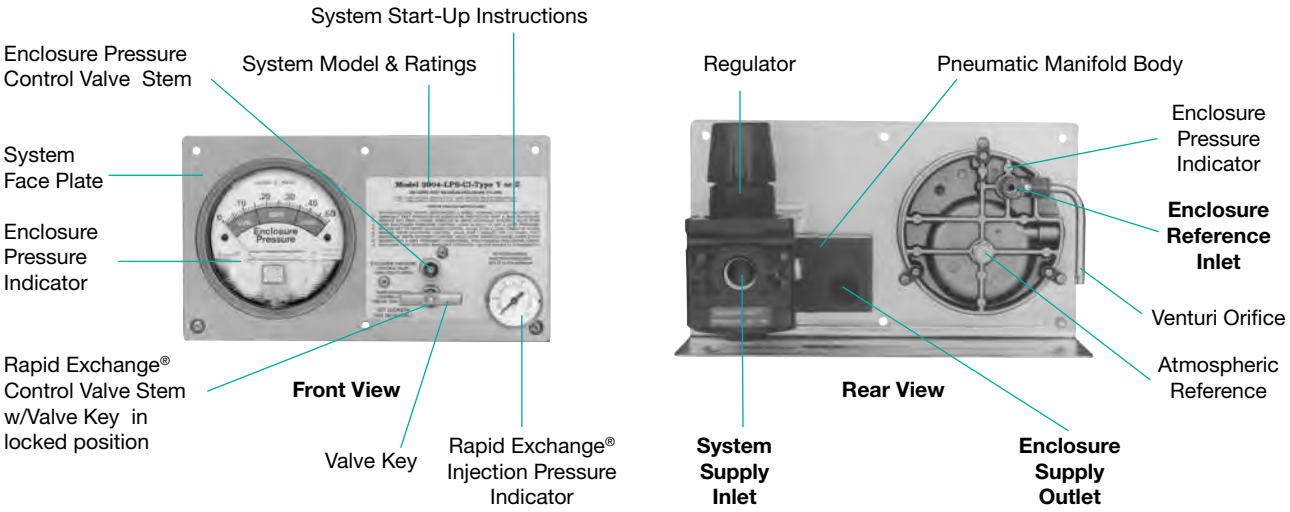
WPS / WPSA (With Pressure Switch)



CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Model 3004 HM Configuration - The Horizontal Mount System

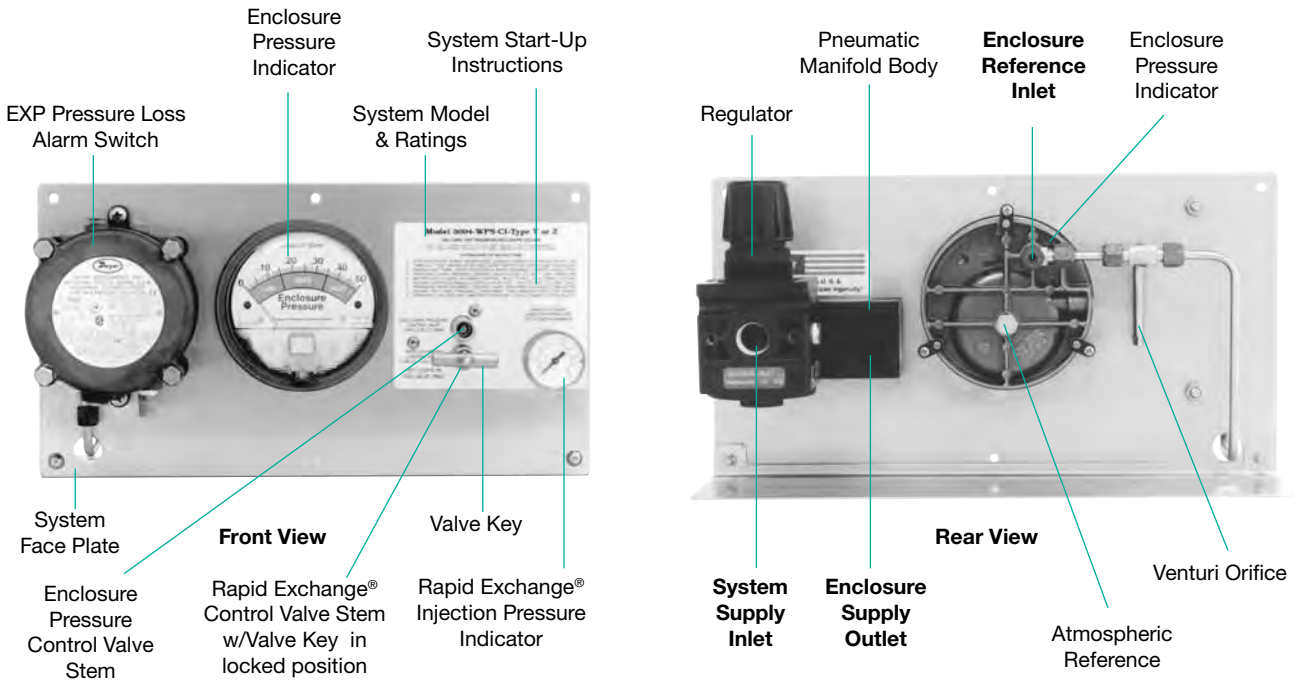
LPS (Less Pressure Switch)



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)



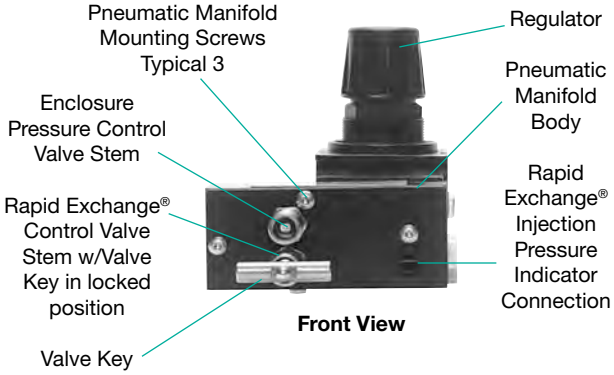
CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Model 3004 CK Configuration - The Component Kit System

Part #1
Enclosure Pressure Indicator

Front View

Part #2
Pneumatic Manifold Assembly

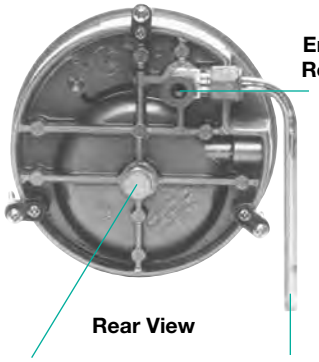


Front View

Part #3
Rapid Exchange® Injection Pressure Indicator

Front View

Side View

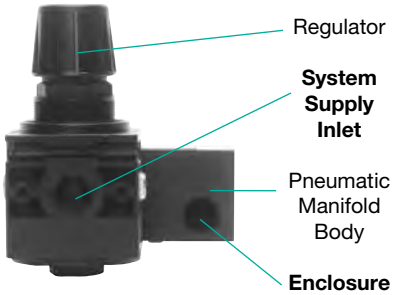


Enclosure Reference Inlet

Rear View

Atmospheric Reference

Venturi Orifice



Rear View

Part #4
Start Up Instruction Nameplate

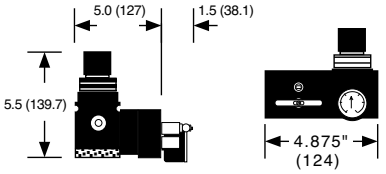
CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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 60 for Model GCK kit description and conversion procedure.

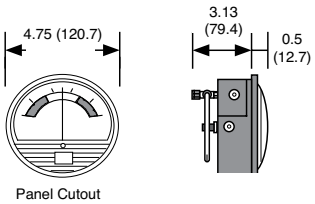
CK Configuration System & Optional Remote Cube Filter Dimensions in Inches (mm)

Pneumatic Manifold



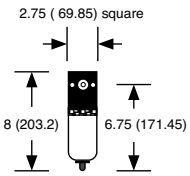
Side View **Front View**

Enclosure Pressure Gauge

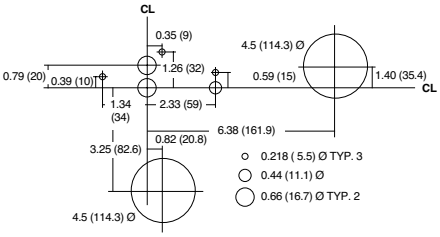


Front View **Side View**

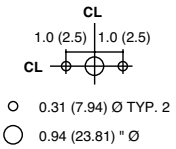
Side View Model RCF-8



Model 3004 CK System Panel Cutout Pattern



Model RCF-8 Panel Cutout Pattern



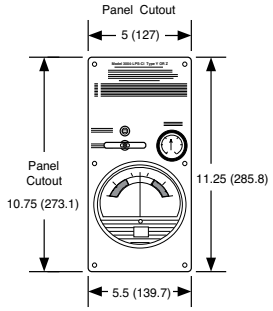
Helpful Hint

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.

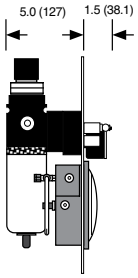
Cut only one 4.5" (114.3 mm) Ø hole in panel.

Model 3004 WPS VM Configuration & Flange Dimensions in Inches (mm)

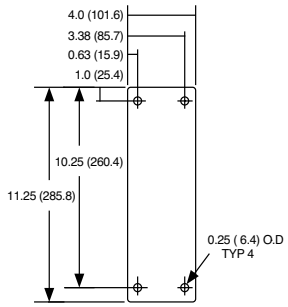
LPS (Less Pressure Switch)



VM Configuration Front View

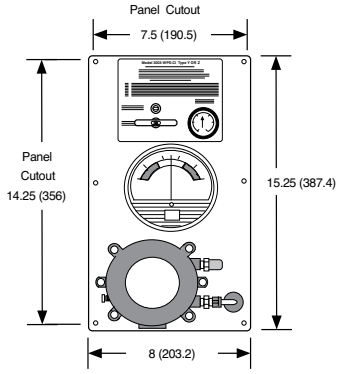


VM Configuration Side View

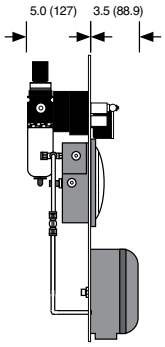


Vertical Mount Flange Front View

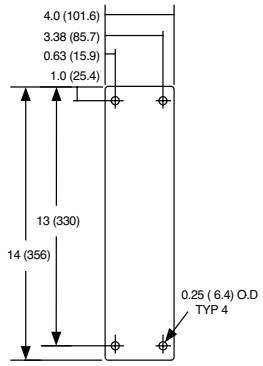
WPS/WPSA (With Pressure Switch)



WPS/WPSA VM Configuration Front View



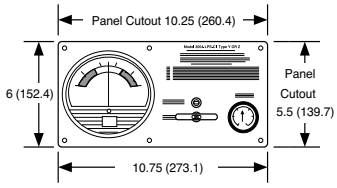
WPS/WPSA VM Configuration Side View



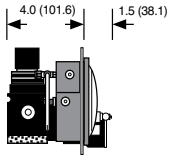
WPS/WPSA Vertical Mount Flange Front View

Model 3004 HM Configuration & Flange Dimensions in Inches (mm)

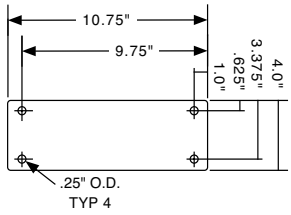
LPS (Less Pressure Switch)



LPS HM Configuration Front View

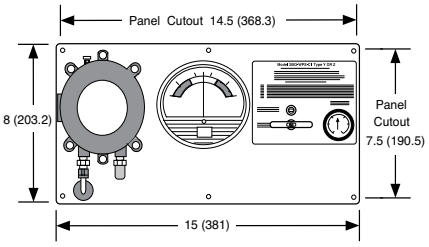


LPS HM Configuration Side View

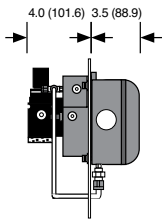


LPS Horizontal Mount Flange Front View

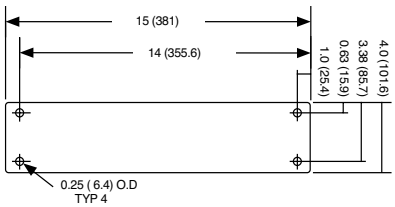
WPS/WPSA (With Pressure Switch)



WPS/WPSA HM Configuration Front View



WPS/WPSA HM Configuration Side View

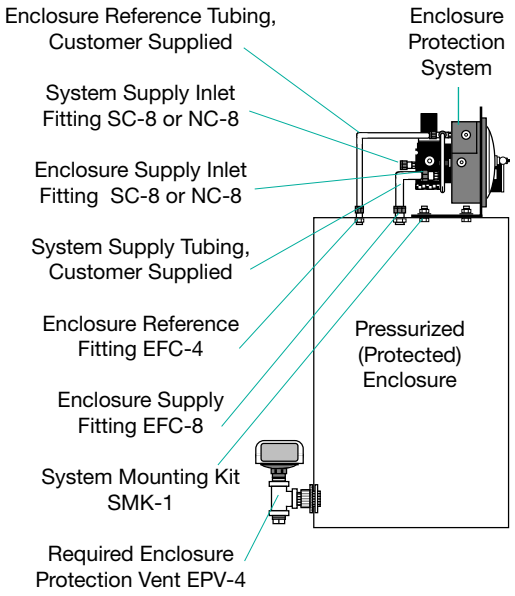


WPS/WPSA Horizontal Mount Flange Front View

Typical Model 3004 System Installation Details

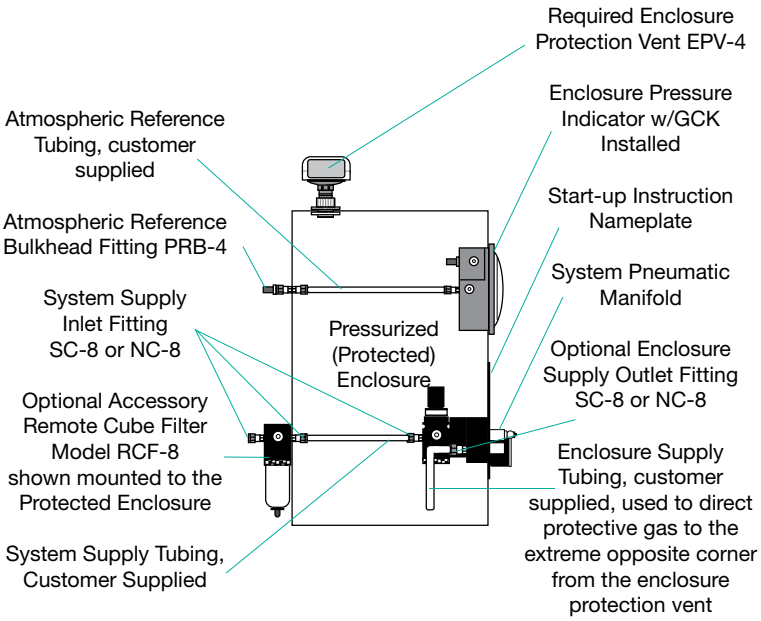
External to the Protected Enclosure

Flange Mount HM Configuration with Model SMK-1 Fastener Kit



Internal to the Protected Enclosure

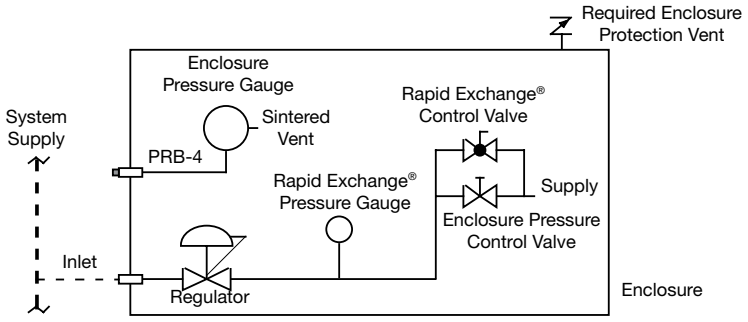
Panel Mount CK Configuration with Model RCF-8 Remote Cube Filter & Model GCK Gauge Conversion Kit



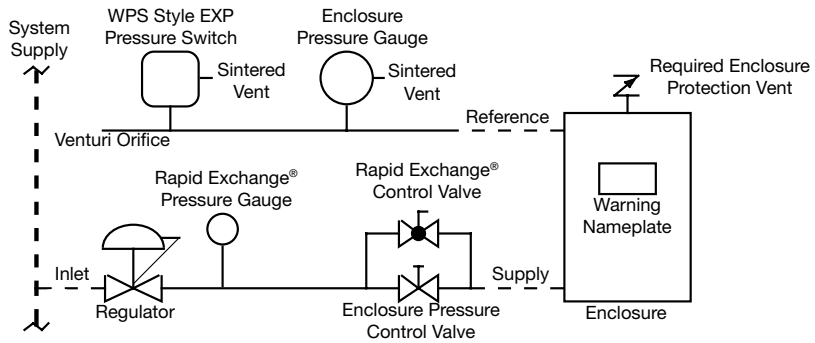
Standard and Panel Mount Pneumatic Installation Diagram

See panel mounting conversion procedure on page 60

Standard Pneumatic Installation Diagram



Panel Mount Installation Diagram



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VM Configuration Mounting Options

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

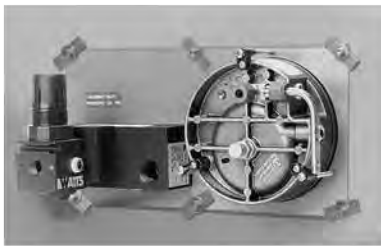
Model 3004-LPS-CI-YZ-VML
Flange Mounted to
Vertical 2" Pipe Stand with
Model PMK-1 Fastener Kit

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

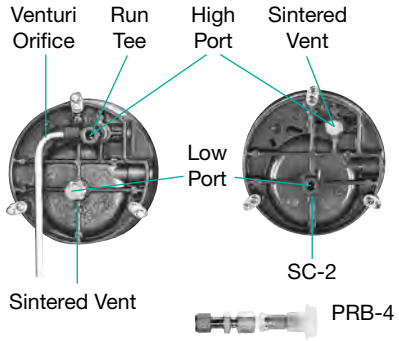
Front View

Rear View

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)

Panel Mount Configuration (after conversion)

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

* Refers to filter bowl supplied with VM mounting configuration.

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 °C to +49 °C)
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 l /hr)
Exchange Pressure:	* 3" - 5" (76.2mm - 127 mm)
Exchange Flow Rate:	** 30 SCFM /1800 SCFH
	(850 l /m / 50976 l /hr)
Exchange Time:	
4 Volume Exchange Rate:	1 min / 7.5 ft³ (212.4 l /m)
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

3004 - LPS - CI - YZ - VM - ##

Series Model Number

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 / 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

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
RCF-8	1/2" Remote Cube Filter
EPSK-1	Explosion Proof Switch Kit (GRP C, D)
EPSK-1A	Explosion Proof 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 Arrestor
EPV-4-SA-90	Rt Angle w/Spark Arrestor

WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

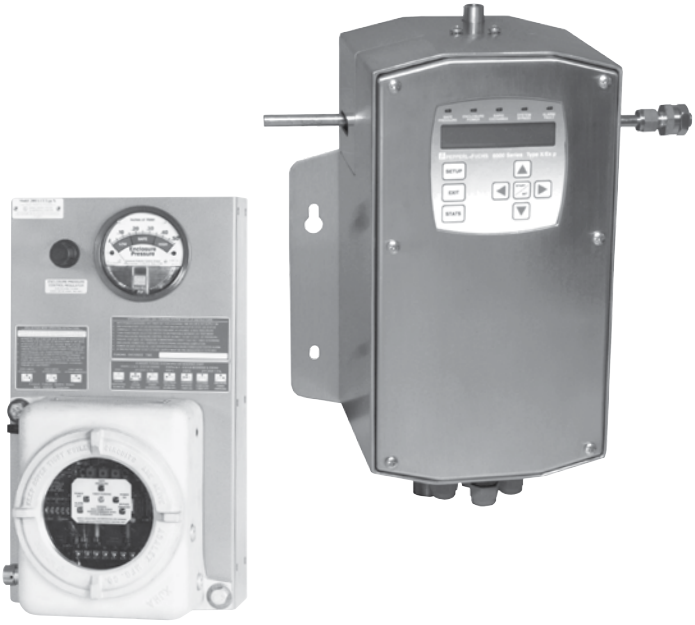
INSTALLATION & OPERATION MANUAL

129-0216	Inst. & Operation Manual

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

Introduction

Type X, Ex [px]
Purge and pressurization Systems



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 Purging 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**

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

Model 2001A

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.

STD Style (Standard)

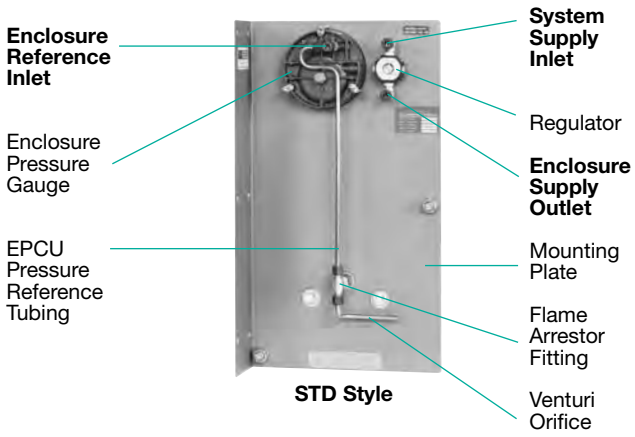
FM APPROVED

CLASSIFIED C UL US

Standard Model Applications

Model Number:	**2001A-CI Type X**	**Model Number:**	**2001A-CII Type X**
Designation:	Purging System	Designation:	Pressurization System
Enclosure Volume:	2 ft³ max.	Enclosure Volume:	10 ft³ max.
UL & FM Certified:	Cl. I, Div. 1, Group C&D*	UL & FM Certified:	Cl. II, Div. 1, Group E-G
Rating Reduction:	Div.1to Nonhazardous	Rating Reduction:	Div. 1 to Nonhazardous

***Only FM Certified Group B System Available**



STD Style

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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:	Silkscreened Lexan® & SS
Fastener Hardware:	SS Screws & Bolts
Mounting Plate:	316 14 Ga #3 Brush SS
EPCU Enclosure Body:	Bead Blast Cast Alum.
Enclosure Warning Nameplate:	Silkscreened SS

Lexan® is a registered trademark of the General Electric Corporation

System Specifications

System Dimensions:	See Page 66
Shipping Weight:	38 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	* 5 - 120 psi max.
Supply Requirements:	Clean air or inert gas
Safe Press. Setpoint (CI/CII):	0.25"/1.0"
Safe Press. Flow Rate:	** 0.1 - 3.5 SCFH
Class I Exchange Time:	*** As required
System Supply Port:	1/4" Tube Fitting
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 1Ø
(European 240 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	**** 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 @ 2 VDC

* With EPV-1 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with tamperproof regulator set to 5 psi max.

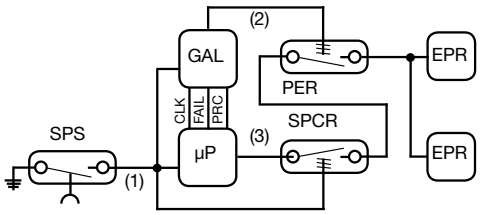
** Enclosure integrity determines actual flow rate

*** Time required to exchange 4 volumes within the enclosure(s), based on actual measured safe pressure flow rate or 5 minutes, whichever is greater

Simplified EPCU Redundant Logic Diagram

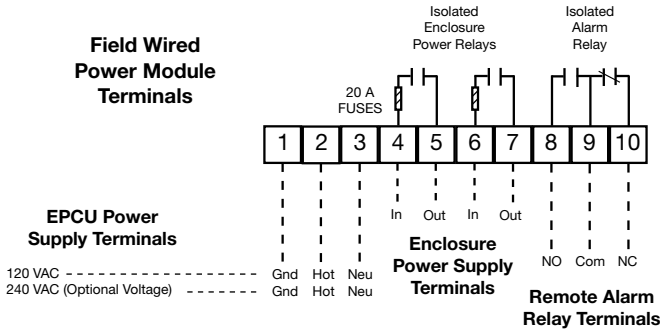
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



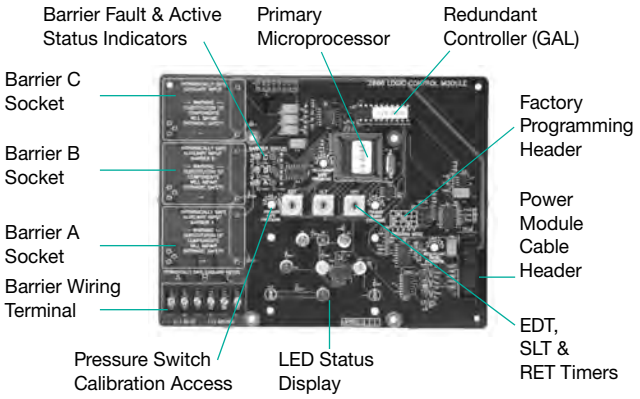
EPCU Description

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.

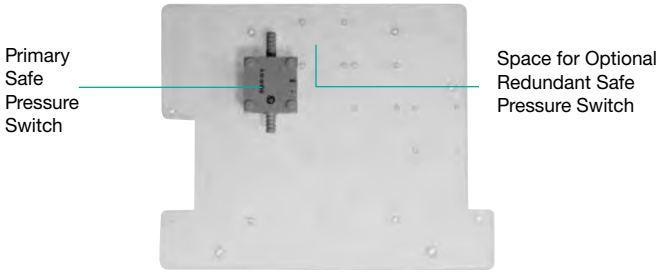
Basic EPCU Operation

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" pressure to energize the alarm relay. The enclosure power relays energize after a brief delay. 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).

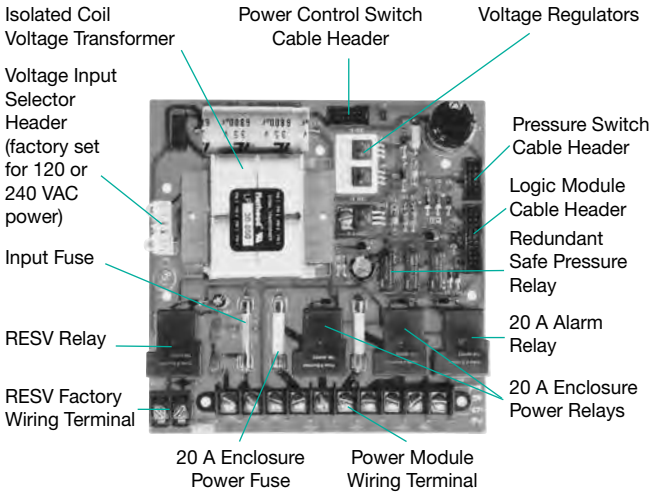
EPCU Logic Module



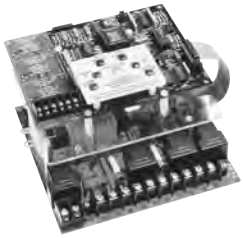
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit



EPCU Features

LED DISPLAY INDICATORS

Power Off: Red	Enclosure Power Relays Deenergized
Power On: Green	Enclosure Power Relays Energized
Safe Pressure: Blue	Enclosure Pressure > 0.15" or 0.50" w.c.
Timer Running: Yellow	Exchange Timer Active - Class I Only
Alarm Active: Red	Enclosure Pressure < 0.15" or 0.50" w.c.
Bypass Engaged: Green	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

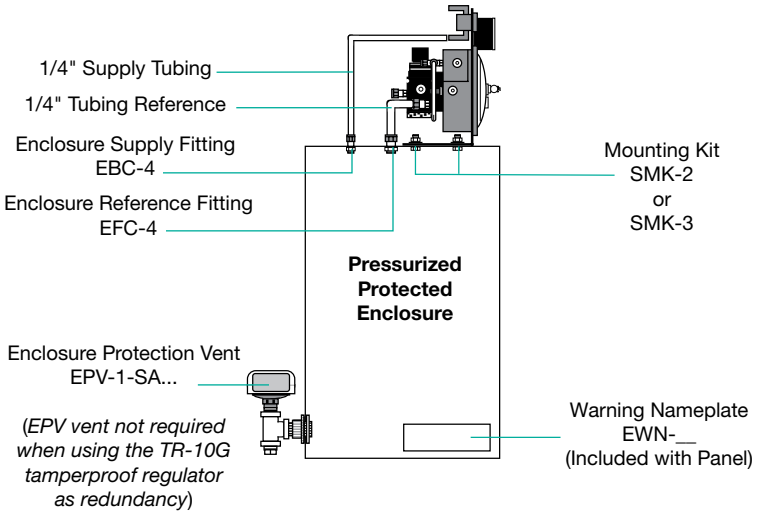
NORMAL RUNNING (NR) MODE

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.

System Accessories Diagram



Model Number Designations

2001A - STD - CI - NR - LH - ##

Series Model Number

System Style
- **STD** - Standard

Area Classification
- **CI** - Class I, Group C & D Area
- **CII** - Class II, Group E, F & G Area
- **IB** - Class I, Group B Area

Power Control Mode
- **NR** - Normal Running
- **CB** - Conditional Bypass

Mounting Configuration

LH	- left hand	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

- See Accessories Page 132 for additional factory installed accessories

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

EFC-4	1/4" Flush Connector
EBC-4	1/4" Bulkhead Connector
EPC-10	1/2" Pipe Connector

ADDITIONAL ITEMS

LLF	1/4" Filter
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

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

WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

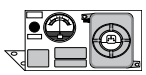
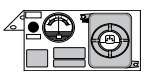
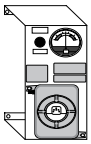
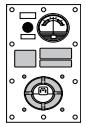
FACTORY INSTALLED ACCESSORIES

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



STD	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	20	20	10.50	10.50	20	22
Width	11	11	20.75	20.75	11	13
Depth	10.50	10.50	10.50	10.50	12.50	11.25

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.

Class II (≤ 50 ft³)

Model 2001B

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.

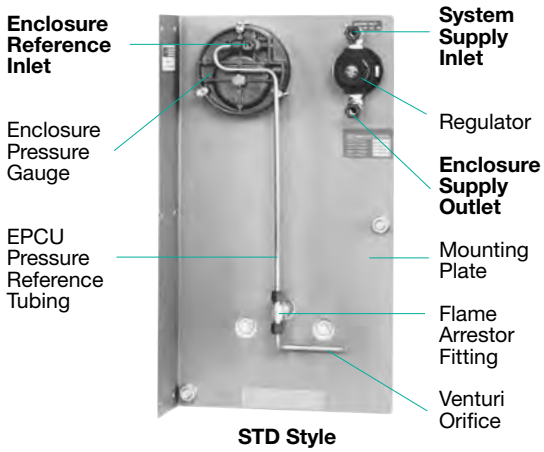
STD Style (Standard)

FM APPROVED

CLASSIFIED C UL US

Standard Model Applications

Model Number:	**2001B-CII Type X**
Designation:	Pressurization System
Enclosure Volume:	50 ft³ max.
UL & FM Certified:	Cl. II, Div. 1, Group E-G
Rating Reduction:	Div. 1 to Nonhazardous



STD Style

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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:	Silkscreened Lexan® & SS
Fastener Hardware:	SS Screws & Bolts
Mounting Plate:	316 14 Ga #3 Brush SS
EPCU Enclosure Body:	Bead Blast Cast Alum.
Enclosure Warning Nameplate:	Silkscreened SS

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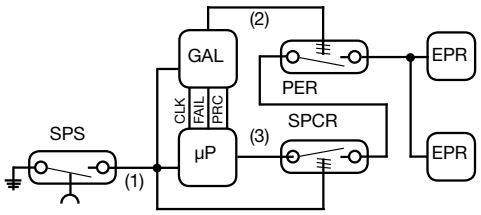
Simplified EPCU Redundant Logic Diagram

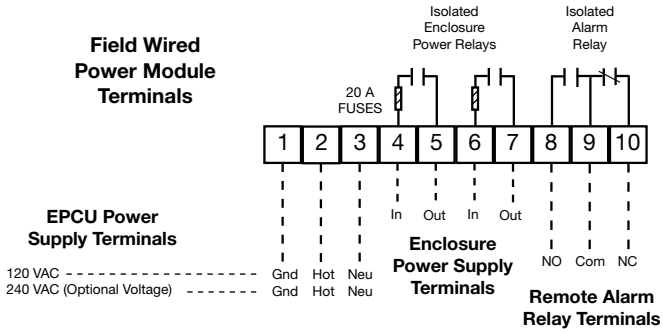
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



System Specifications

System Dimensions:	See Page 70
Shipping Weight:	38 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	* 5 - 120 psi max.
Supply Requirements:	Clean air or inert gas
Safe Press. Setpoint:	1.0" @ Safe Press.
Safe Press. Flow Rate:	** 0.1 - 3.5 SCFH
System Supply Port:	3/8" Tube Fitting
Enclosure Supply Fitting:	3/8" Tube Fitting
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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

* With EPV-3 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

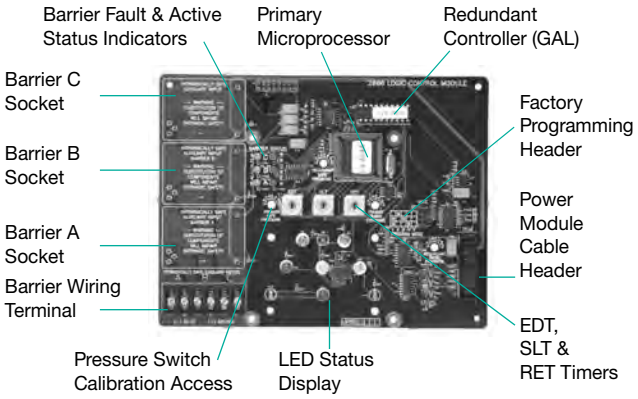
EPCU Description

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.

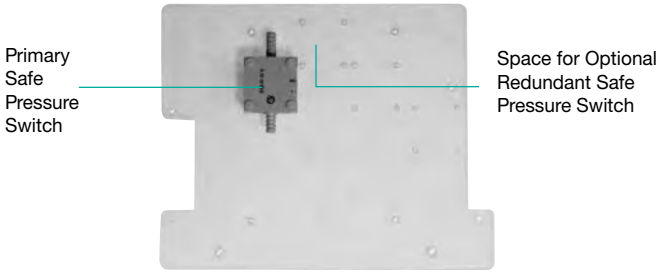
Basic EPCU Operation

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" 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).

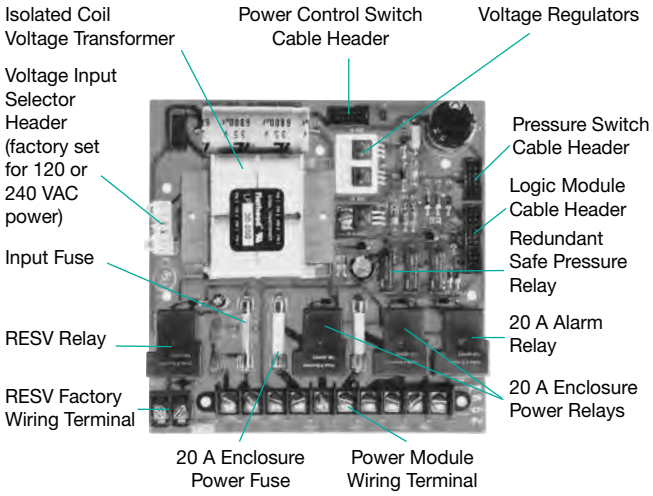
EPCU Logic Module



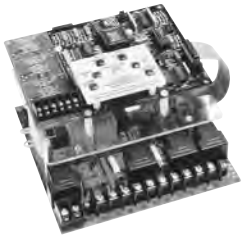
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit



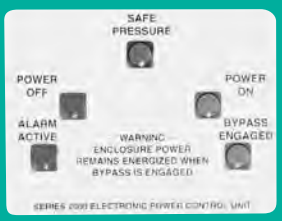
EPCU Features

LED DISPLAY INDICATORS

Power Off: Red	Enclosure Power Relays Deenergized
Power On: Green	Enclosure Power Relays Energized
Safe Pressure: Blue	Enclosure Pressure > 0.50" w.c.
Alarm Active: Red	Enclosure Pressure < 0.50" w.c.
Bypass Engaged: Green	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

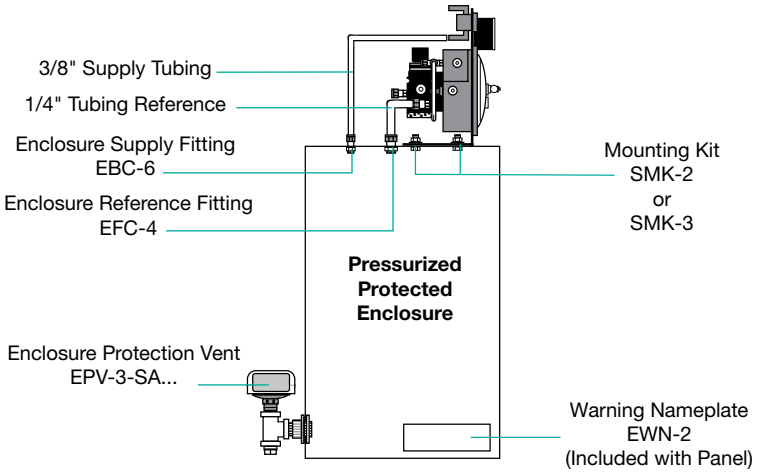
NORMAL RUNNING (NR) MODE

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 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

2001B - STD - CII - NR - LH - ##

Series Model Number

System Style
STD - Standard

Area Classification
CII - Class II, Group E, F & G Area

Power Control Mode
NR - Normal Running
CB - Conditional Bypass

Mounting Configuration

LH	- left hand	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU.*

- See Accessories Page 132 for additional factory installed accessories

2000 SERIES

Type X

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 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
SRM-4000	Switch Resistor Module
NJ...	P+F Namur Sensor

INSTALLATION & OPERATION MANUAL

129-0209	Inst. & Operation Manual

OPTIONAL ENCLOSURE PROTECTION VENTS

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

WARNING NAMEPLATES

EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

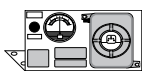
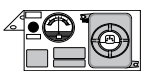
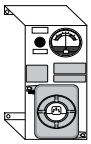
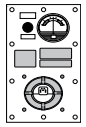
FACTORY INSTALLED ACCESSORIES

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



STD	LH - left hand	RH - right hand	TM - top mount	BM - bottom mount	WM - wall mount	FM or PM - flat panel
Height	20	20	10.50	10.50	20	22
Width	11	11	20.75	20.75	11	13
Depth	10.75	10.75	10.75	10.75	12.50	11.50

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.

Class II (≤ 250 ft³)

Model 2001C

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.

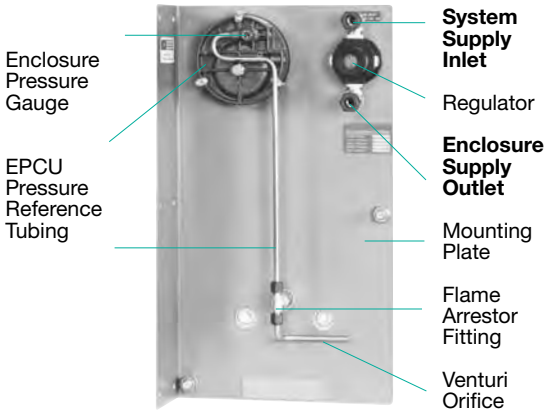
STD Style (Standard)

FM APPROVED

CLASSIFIED C UL US

Standard Model Applications

Model Number:	**2001C-CII Type X**
Designation:	Pressurization System
Enclosure Volume:	250 ft³ max.
UL & FM Certified:	Cl. II, Div. 1, Group E-G
Rating Reduction:	Div. 1 to Nonhazardous



STD Style

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

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:	Silkscreened Lexan® & SS
Fastener Hardware:	SS Screws & Bolts
Mounting Plate:	316 14 Ga #3 Brush SS
EPCU Enclosure Body:	Bead Blast Cast Alum.
Enclosure Warning Nameplate:	Silkscreened SS

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System Specifications

System Dimensions:	See Page 74
Shipping Weight:	38 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	* 5 - 120 psi max.
Supply Requirements:	Clean air or inert gas
Safe Press. Setpoint:	1.0" @ Safe Press.
Safe Press. Flow Rate:	** 0.1 - 3.5 SCFH
System Supply Port:	1/2" Tube Fitting
Enclosure Supply Fitting:	1/2" Tube Fitting
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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

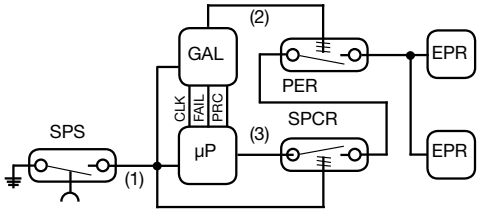
* With EPV-4 Vent - 120 psi max. to 5 psi min. Systems installed without Vent must be equipped with tamperproof regulator set to 5 psi max.

** Enclosure integrity determines actual flow rate

Simplified EPCU Redundant Logic Diagram

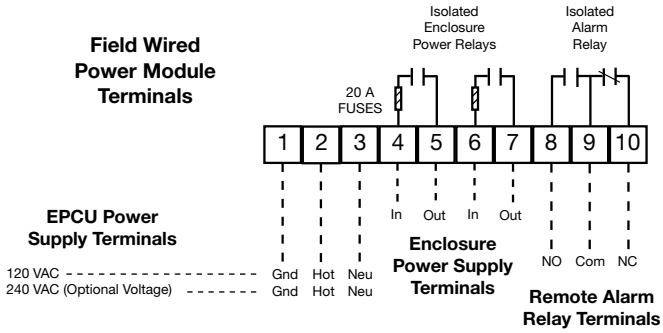
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



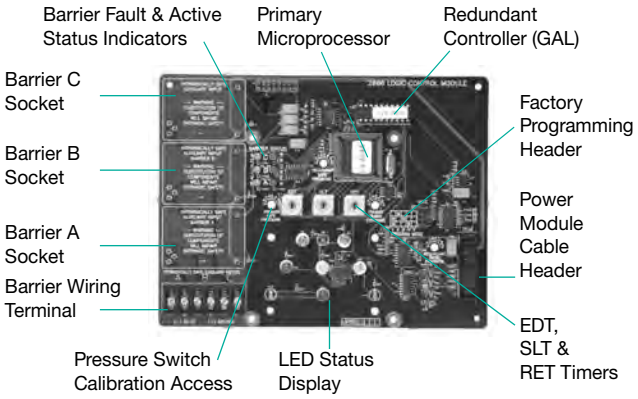
EPCU Description

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.

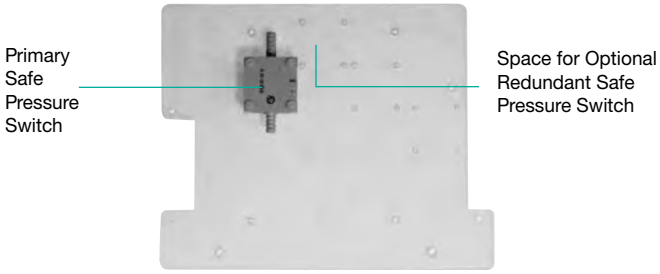
Basic EPCU Operation

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" 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).

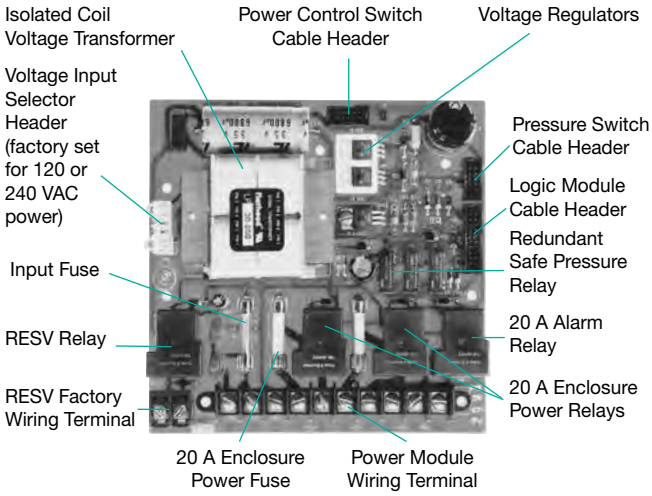
EPCU Logic Module



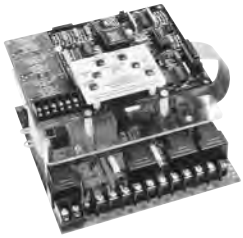
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit



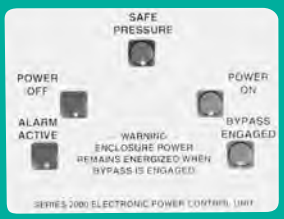
EPCU Features

LED DISPLAY INDICATORS

Power Off: Red	Enclosure Power Relays Deenergized
Power On: Green	Enclosure Power Relays Energized
Safe Pressure: Blue	Enclosure Pressure > 0.50" w.c.
Alarm Active: Red	Enclosure Pressure < 0.50" w.c.
Bypass Engaged: Green	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

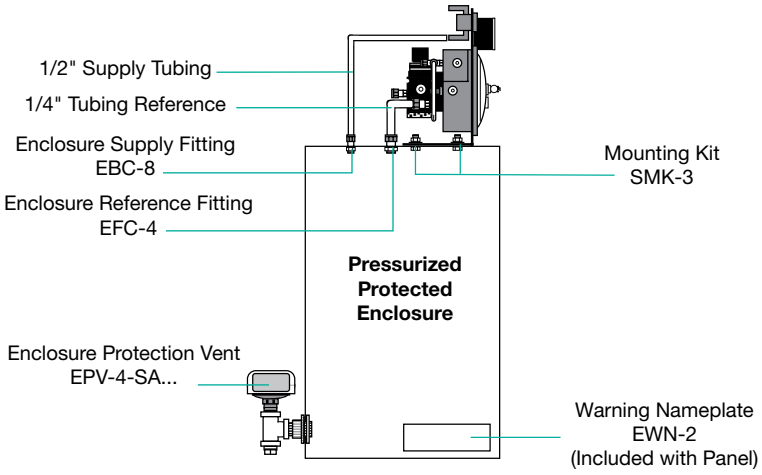
NORMAL RUNNING (NR) MODE

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 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

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

Series Model Number

System Style
STD - Standard

Area Classification
CII - Class II, Group E, F & G Area

Power Control Mode
NR - Normal Running
CB - Conditional Bypass

Mounting Configuration

LH	- left hand	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU.*

- See Accessories Page 132 for additional factory installed accessories

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

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
SRM-4000	Switch Resistor Module
NJ...	P+F Namur Senor

INSTALLATION & OPERATION MANUAL

129-0210	Inst. & Operation Manual

OPTIONAL ENCLOSURE PROTECTION VENTS

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

WARNING NAMEPLATES

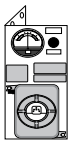
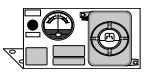
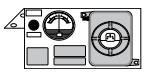
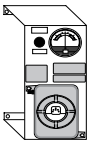
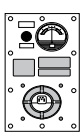
EWN-2	Class II Enclosure Warning
ETW	Enclosure Temperature Warning

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

STD	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	20	20	10.50	10.50	20	22
Width	11	11	20.75	20.75	11	13
Depth	10.75	10.75	10.75	10.75	12.50	11.50

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.

Class I (≤ 15 ft³)

Model 2002

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.

STD Style (Standard)

FA/SA Style (Fully Automatic/Semiautomatic)

FM APPROVED

CLASSIFIED C UL US

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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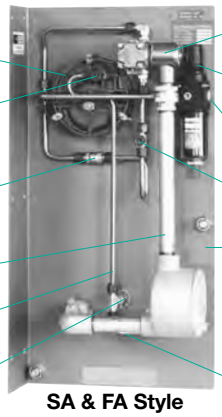
Standard Model Applications

Model Number:	**2002 Type X**
Designation:	Purging System
Enclosure Volume:	15 ft³ max.
STD (Standard) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D*
Rating Reduction:	Div. 1 to Nonhazardous

SA (Semiautomatic) Style		FA (Fully Automatic) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D	UL & FM Certified:	Cl. I, Div. 1, Group C&D
Rating Reduction:	Div. 1 to Nonhazardous	Rating Reduction:	Div. 1 to Nonhazardous

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



Enclosure Pressure Gauge

Enclosure Reference Inlet

Enclosure Pressure Control Valve

RESV Conduit

EPCU Pressure Reference Tubing

Flame Arrestor Fitting

Rapid Exchange® Solenoid Valve

Filter Regulator

System Supply Inlet

Enclosure Supply Outlet

Mounting Plate

Venturi Orifice (not visible)

STD Style

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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Material Specifications

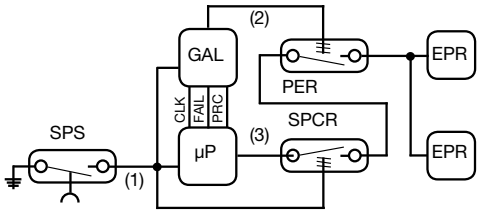
Filter Regulator Body:	Zinc w/Enamel Finish
Regulator Handle & Bowl:	Polycarbonate
Enclosure Pressure Gauge:	Alum. w/Enamel Finish
Rapid Exchange Gauge:	Poly Case & Brass Tube
Rapid Exchange Solenoid:	Brass w/Enamel Finish
Tube Fittings & Valves:	316 SS Forged Body
Tubing:	316 SS 1/4" .035 Welded
System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

Lexan® is a registered trademark of the General Electric Corporation

Simplified EPCU Redundant Logic Diagram

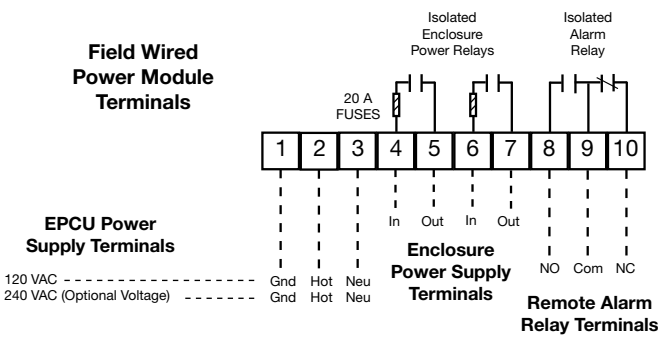
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



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/ft^3
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 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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

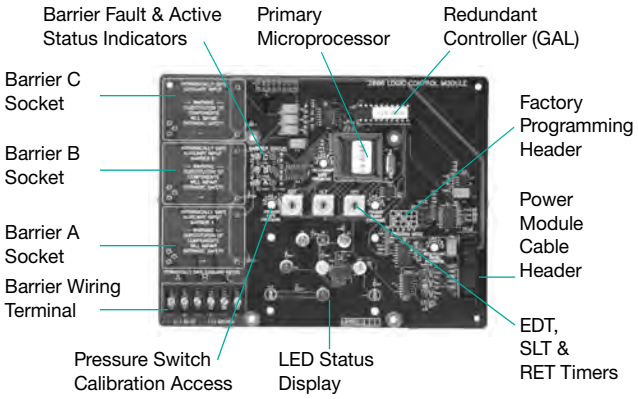
EPCU Description

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.

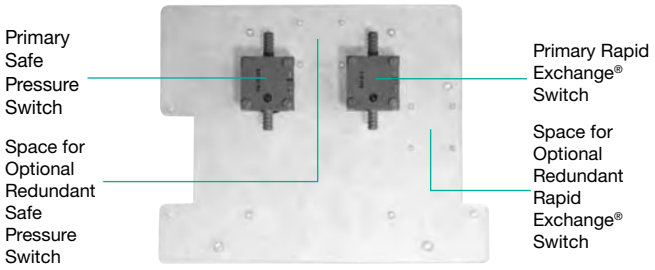
Basic EPCU Operation

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).

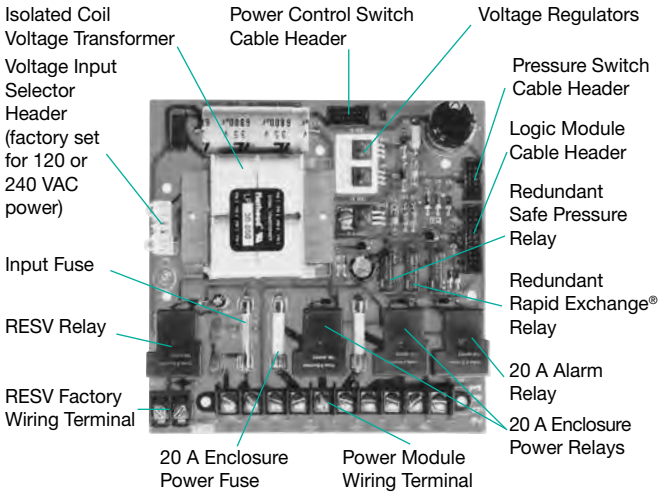
EPCU Logic Module



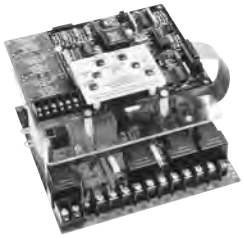
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit



EPCU Features

LED DISPLAY INDICATORS

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

FIELD ADJUSTABLE TIMER FUNCTIONS

Alarm Only

Alarm & Bypass

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

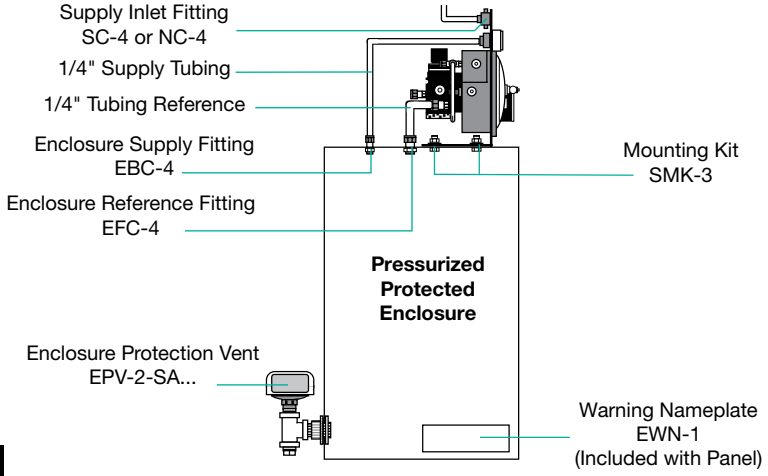
NORMAL RUNNING (NR) MODE

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

2002 - STD - CI - NR - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

- See Accessories Page 132 for additional factory installed accessories

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 2002 System Accessories *(See accessories page for complete details)*

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-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

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

FACTORY INSTALLED ACCESSORIES

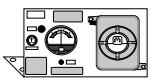
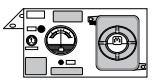
IS1	Channel A Barrier
IS2*	Channel B Barrier
IS3*	Channel C Barrier
RP1	Redundant Safe Pressure Switch
RP2	Redundant Rapid Exchange Switch
L	Power Switch Key Lock Assembly

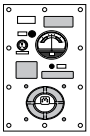
*Requires custom programming information

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

Overall System Dimensions





STD / SA & FA	LH - left hand	RH - right hand	TM - top mount	BM - bottom mount	WM - wall mount	FM or PM - flat panel
Height	22	22	12	12	22	24
Width	11	11	23	23	11	13
Depth	10.75 / 13.75	10.75 / 13.75	10.75 / 13.75	10.75 / 13.75	12.50 / 14.50	11.50 / 14.50

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.

Class I (≤ 75 ft³)

Model 2003

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.

STD Style (Standard)

FA/SA Style (Fully Automatic/Semiautomatic)

FM APPROVED

CLASSIFIED C UL US

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

Model Number:	**2003 Type X**
Designation:	Purging System
Enclosure Volume:	75 ft³ max.
STD (Standard) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D*
Rating Reduction:	Div. 1 to Nonhazardous

SA (Semiautomatic) Style		FA (Fully Automatic) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D	UL & FM Certified:	Cl. I, Div. 1, Group C&D
Rating Reduction:	Div. 1 to Nonhazardous	Rating Reduction:	Div. 1 to Nonhazardous

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

STD Style

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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Material Specifications

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

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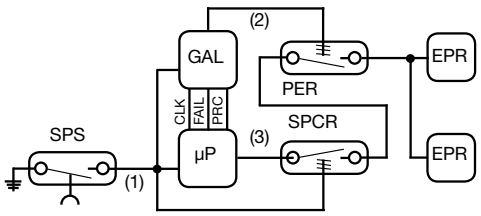
Simplified EPCU Redundant Logic Diagram

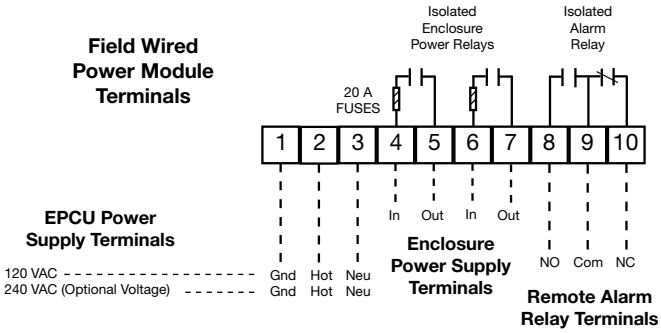
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



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
Exchange Pressure:	3" - 5"
Exchange Flow Rate:	** 10 SCFM / 600 SCFH
Exchange Time:	1 Minute / 2.5 ft^3
System Supply Port:	3/8" FPT
Enclosure Supply Fitting:	3/8" Tube Fitting
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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

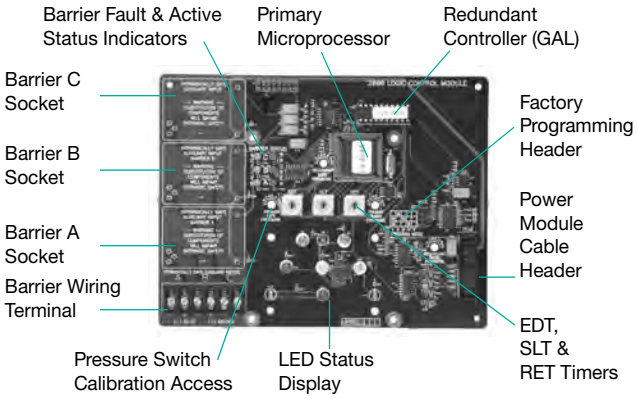
EPCU Description

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.

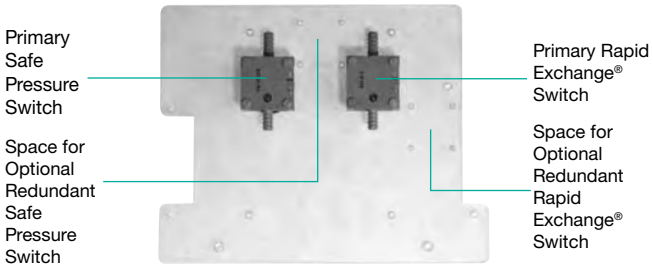
Basic EPCU Operation

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).

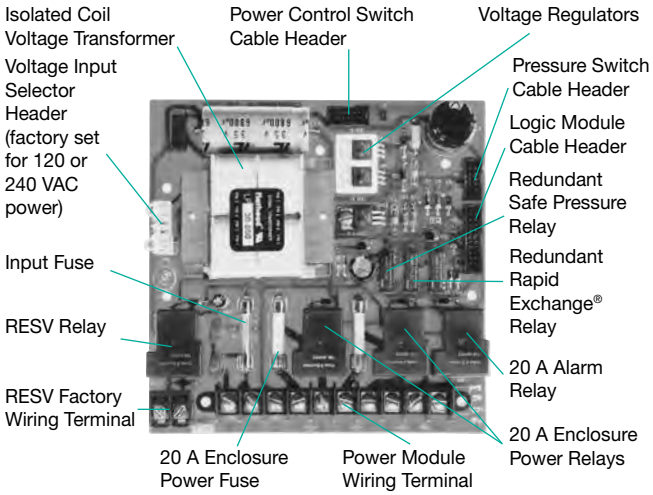
EPCU Logic Module



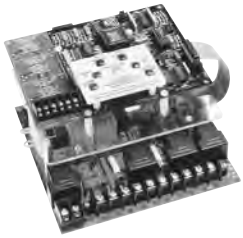
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit

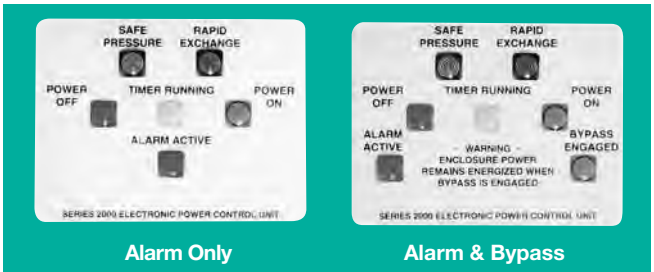


EPCU Features

LED DISPLAY INDICATORS

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

FIELD ADJUSTABLE TIMER FUNCTIONS



Alarm Only **Alarm & Bypass**

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

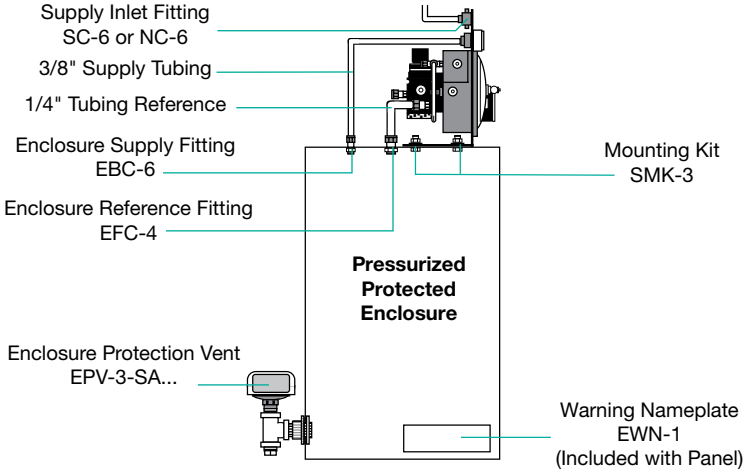
NORMAL RUNNING (NR) MODE

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

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

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

- See Accessories Page 132 for additional factory installed accessories

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 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
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
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
ETW	Enclosure Temperature Warning

FACTORY INSTALLED ACCESSORIES

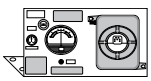
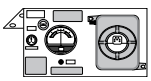
IS1	Channel A Barrier
IS2*	Channel B Barrier
IS3*	Channel C Barrier
RP1	Redundant Safe Pressure Switch
RP2	Redundant Rapid Exchange Switch
L	Power Switch Key Lock Assembly

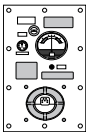
*Requires custom programming information

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

Overall System Dimensions





STD / SA & FA	LH - left hand	RH - right hand	TM - top mount	BM - bottom mount	WM - wall mount	FM or PM - flat panel
Height	23	23	12	12	23	25
Width	11.50	11.50	23	23	11.50	13.50
Depth	10.75 / 15.25	10.75 / 15.25	10.75 / 15.25	10.75 / 15.25	12.50 / 16.50	12.25 / 15.75

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.

Class I (≤ 200 ft³)

Model 2004

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.

STD Style (Standard)

FA/SA Style (Fully Automatic/Semiautomatic)

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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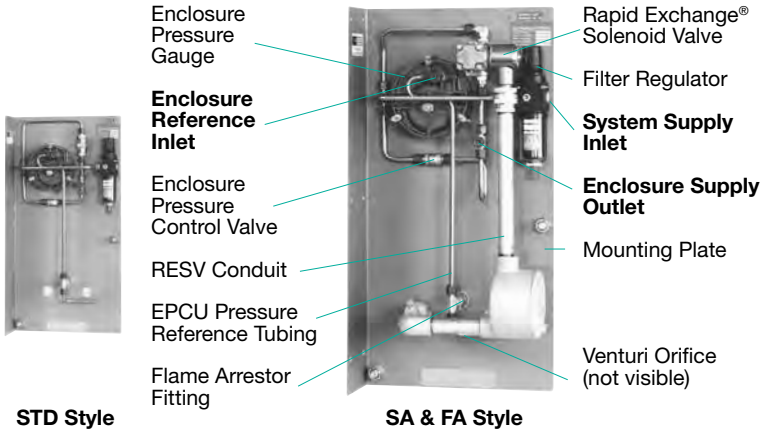
Standard Model Applications

Model Number:	**2004 Type X**
Designation:	Purging System
Enclosure Volume:	200 ft³ max.
STD (Standard) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D*
Rating Reduction:	Div. 1 to Nonhazardous

SA (Semiautomatic) Style		FA (Fully Automatic) Style	
UL & FM Certified:	Cl. I, Div.1, Group C&D	UL & FM Certified:	Cl. I, Div. 1, Group C&D
Rating Reduction:	Div.1 to Nonhazardous	Rating Reduction:	Div. 1 to Nonhazardous

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



STD Style

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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Material Specifications

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

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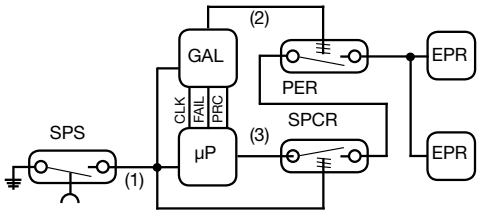
Simplified EPCU Redundant Logic Diagram

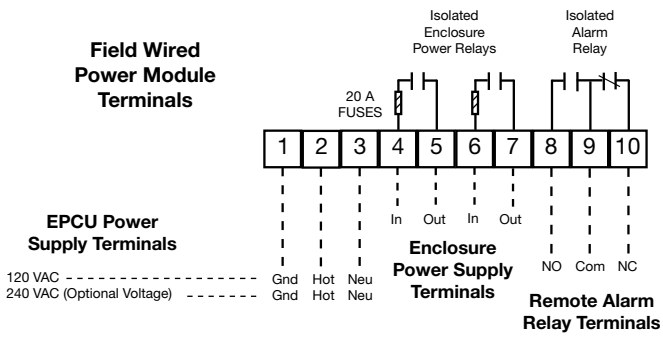
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



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 - 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 ft^3
System Supply Port:	1/2" FPT
Enclosure Supply Fitting:	1/2" Tube Fitting
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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 80 psi min. during exchange

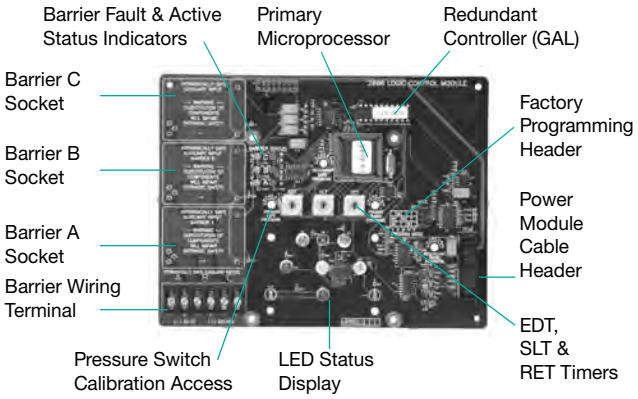
EPCU Description

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 stacked in the EPCU enclosure on standoffs.

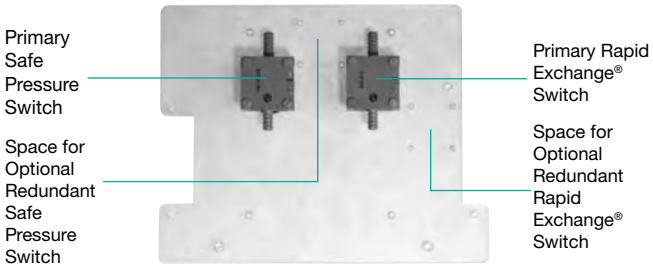
Basic EPCU Operation

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).

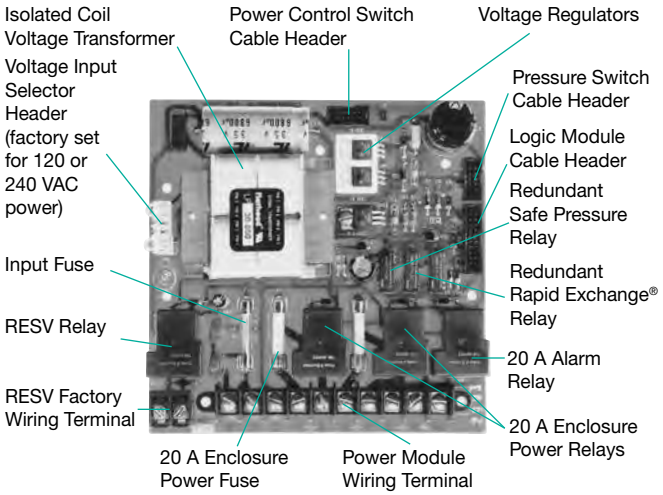
EPCU Logic Module



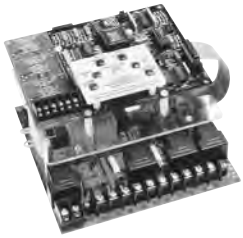
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit

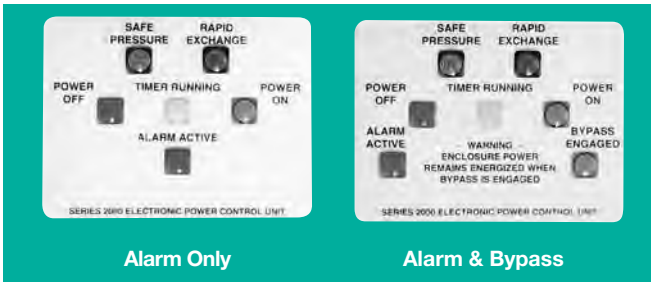


EPCU Features

LED DISPLAY INDICATORS

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

FIELD ADJUSTABLE TIMER FUNCTIONS



Alarm Only **Alarm & Bypass**

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

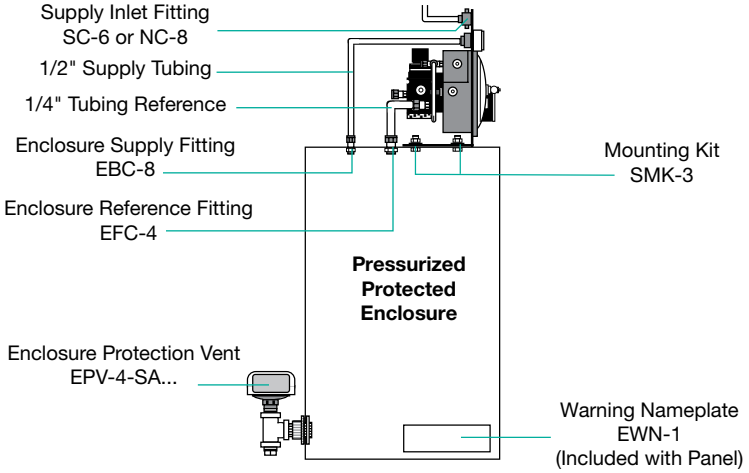
NORMAL RUNNING (NR) MODE

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

2004 - STD - CI - NR - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

- See Accessories Page 132 for additional factory installed accessories

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 2004 System Accessories *(See accessories page for complete details)*

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

INSTALLATION & OPERATION MANUAL

129-0213	Inst. & Operation Manual

ENCLOSURE PROTECTION VENTS
ONE VENT REQUIRED WITH EACH SYSTEM

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

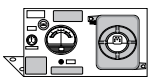
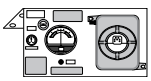
IS1	Channel A Barrier
IS2*	Channel B Barrier
IS3*	Channel C Barrier
RP1	Redundant Safe Pressure Switch
RP2	Redundant Rapid Exchange Switch
L	Power Switch Key Lock Assembly

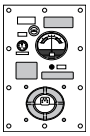
*Requires custom programming information

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

Overall System Dimensions





STD / SA & FA	LH - left hand	RH - right hand	TM - top mount	BM - bottom mount	WM - wall mount	FM or PM - flat panel
Height	24	24	14	14	24	26
Width	13.50	13.50	24	24	13.50	15.50
Depth	11.75 / 15.25	11.75 / 15.25	11.75 / 15.25	11.75 / 15.25	12.50 / 16.50	11.50 / 15.75

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.

Class I (≤ 450 ft³)

Model 2005

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.

STD Style (Standard)

FA/SA Style (Fully Automatic/Semiautomatic)

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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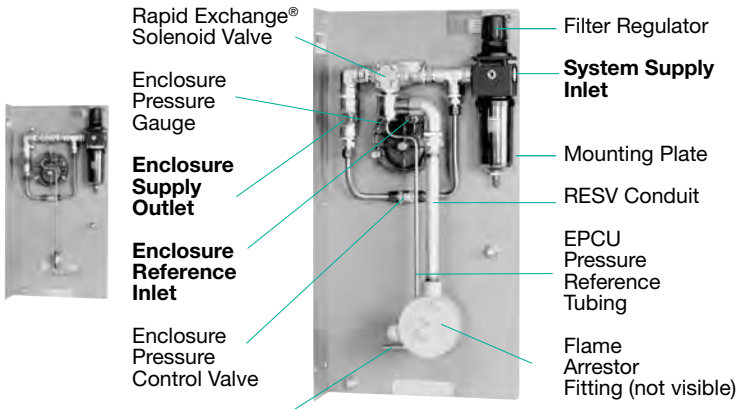
Standard Model Applications

Model Number:	**2005 Type X**
Designation:	Purging System
Enclosure Volume:	450 ft³ max.
STD (Standard) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D*
Rating Reduction:	Div. 1 to Nonhazardous

SA (Semiautomatic) Style		FA (Fully Automatic) Style	
UL & FM Certified:	Cl. I, Div. 1, Group C&D	UL & FM Certified:	Cl. I, Div. 1, Group C&D
Rating Reduction:	Div. 1 to Nonhazardous	Rating Reduction:	Div. 1 to Nonhazardous

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



STD Style

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

CONNECTION POINTS SHOWN ABOVE IN BOLD TEXT ON SYSTEM DIAGRAM

Material Specifications

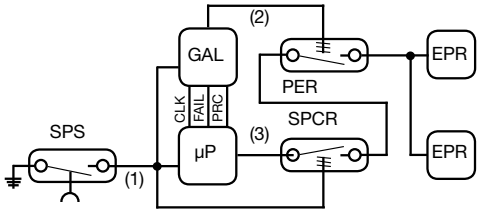
Filter Regulator Body:	Zinc w/Enamel Finish
Regulator Handle & Bowl:	Polycarbonate
Enclosure Pressure Gauge:	Alum. w/Enamel Finish
Rapid Exchange Gauge:	Poly Case & Brass Tube
Rapid Exchange Solenoid:	Brass w/Enamel Finish
Pipe Fittings & Valves:	316 SS Forged Body
Tubing:	316 SS 1/4" .035 Welded
System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

Lexan® is a registered trademark of the General Electric Corporation

Simplified EPCU Redundant Logic Diagram

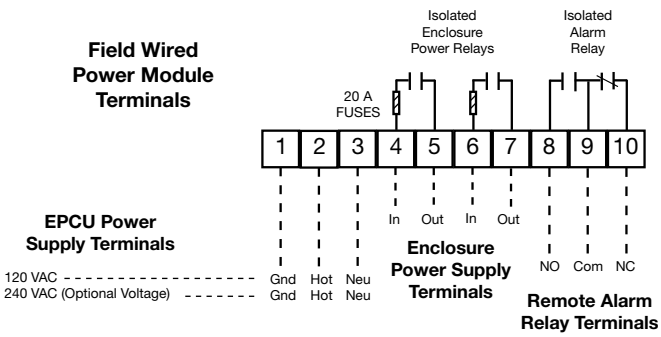
OPERATION

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.



SPS - SAFE PRESSURE SWITCH
GAL - GATE ARRAY LOGIC
µP - MICROPROCESSOR
PER - POWER ENABLED RELAY
SPCR - SAFE PRESSURE CONFIRMATION RELAY
EPR - ENCLOSURE POWER RELAY

Electrical Wiring Diagram



System Specifications

System Dimensions:	See Page 90
Shipping Weight:	STD - 51 lb / SA & FA - 53 lb
Temp. Range:	-20 °F to +120 °F
Supply Pressure Range:	80 - 120 psi max.
Capacity & Filtration:	8.5 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:	** 60 SCFM/3600 SCFH
Exchange Time:	1 Minute/15 ft³
System Supply Port:	1/2" FPT
Enclosure Supply Fitting:	1/2" FPT
Enclosure Reference Fitting:	1/4" Tube Fitting
EPCU Conduit Port Size:	1/2" FPT
EPCU Power Requirements:	120 VAC 60 Hz 1Ø
(European 220 voltage only)	240 VAC 50 Hz 1Ø
(All voltage ratings are factory set)	
EPCU Power Consumption:	500 mA
Power Relay Contacts:	20 A @ 240 VAC
	20 A @ 28 VDC
	*** 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 80 psi min. during exchange

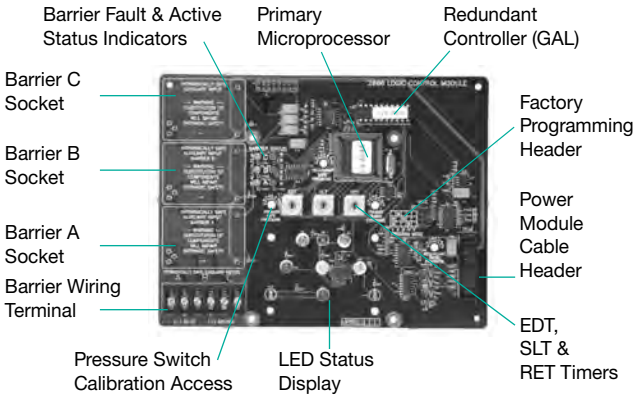
EPCU Description

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 stacked in the EPCU enclosure on standoffs.

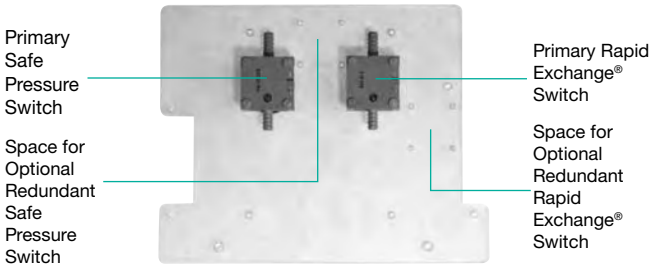
Basic EPCU Operation

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).

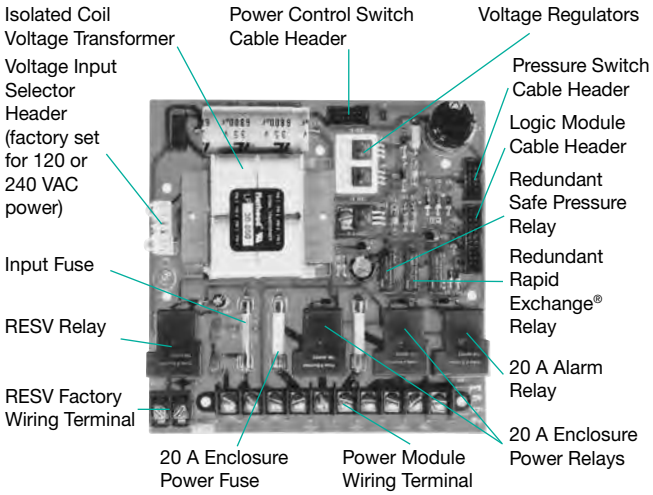
EPCU Logic Module



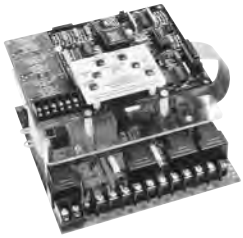
EPCU Pressure Switch Module



120/240 VAC EPCU Power Module



Assembled Electrical Power Control Unit

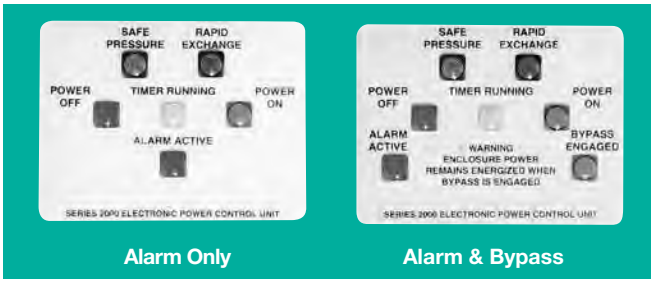


EPCU Features

LED DISPLAY INDICATORS

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

FIELD ADJUSTABLE TIMER FUNCTIONS



Alarm Only **Alarm & Bypass**

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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.

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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

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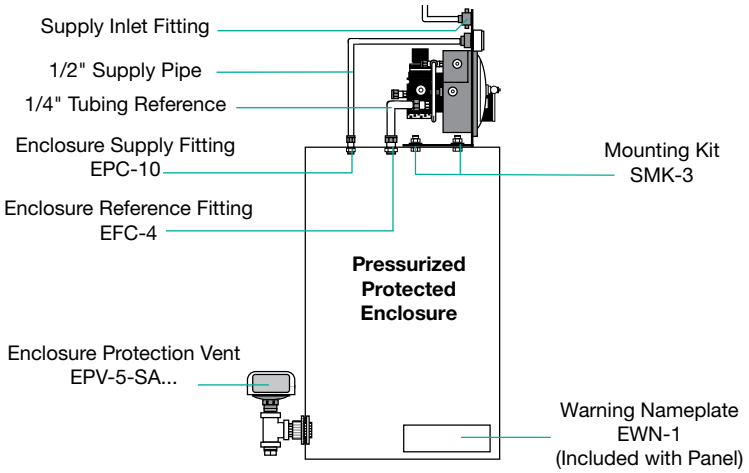
System Accessories Diagram



Model Number Designations

2005 - STD - CI - NR - LH - ##

Series Model Number

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	left side of enclosure
RH	- right hand	right side of enclosure
TM	- top mount	top of enclosure
BM	- bottom mount	bottom of enclosure
WM	- wall mount	wall surface
FM*	- frame mount	external frame or rack
PM*	- panel mount	enclosure surface cutout

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

- See Accessories Page 132 for additional factory installed accessories

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DESCRIPTION & OPERATION

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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 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

129-0214	Inst. & Operation Manual

ENCLOSURE PROTECTION VENTS
ONE VENT REQUIRED WITH EACH SYSTEM

EPV-5-SA-00	Straight w/Spark Arrestor
EPV-5-SA-90	Rt Angle w/Spark Arrestor

WARNING NAMEPLATES

EWN-1	Class I Enclosure Warning
ETW	Enclosure Temperature Warning

FACTORY INSTALLED ACCESSORIES

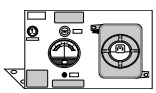
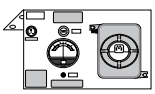
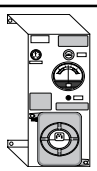
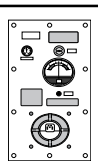
IS1	Channel A Barrier
IS2*	Channel B Barrier
IS3*	Channel C Barrier
RP1	Redundant Safe Pressure Switch
RP2	Redundant Rapid Exchange Switch
L	Power Switch Key Lock Assembly

*Requires custom programming information

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

Overall System Dimensions



STD / SA & FA	**LH** - left hand	**RH** - right hand	**TM** - top mount	**BM** - bottom mount	**WM** - wall mount	**FM or PM** - flat panel
Height	25	25	14	14	25	27
Width	13.50	13.50	25	25	13.50	15.50
Depth	10.75 / 15.25	10.75 / 15.25	10.75 / 15.25	10.75 / 15.25	12.50 / 16.50	11.25 / 15.75

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

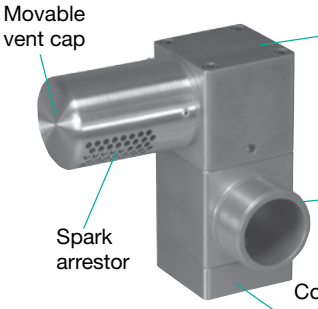
Suitable for Class I and II, Division 1 / Zone 1 and Zone 21 to non-hazardous area applications according to:

- North American NFPA 496
- European ATEX
- International IECEx approvals

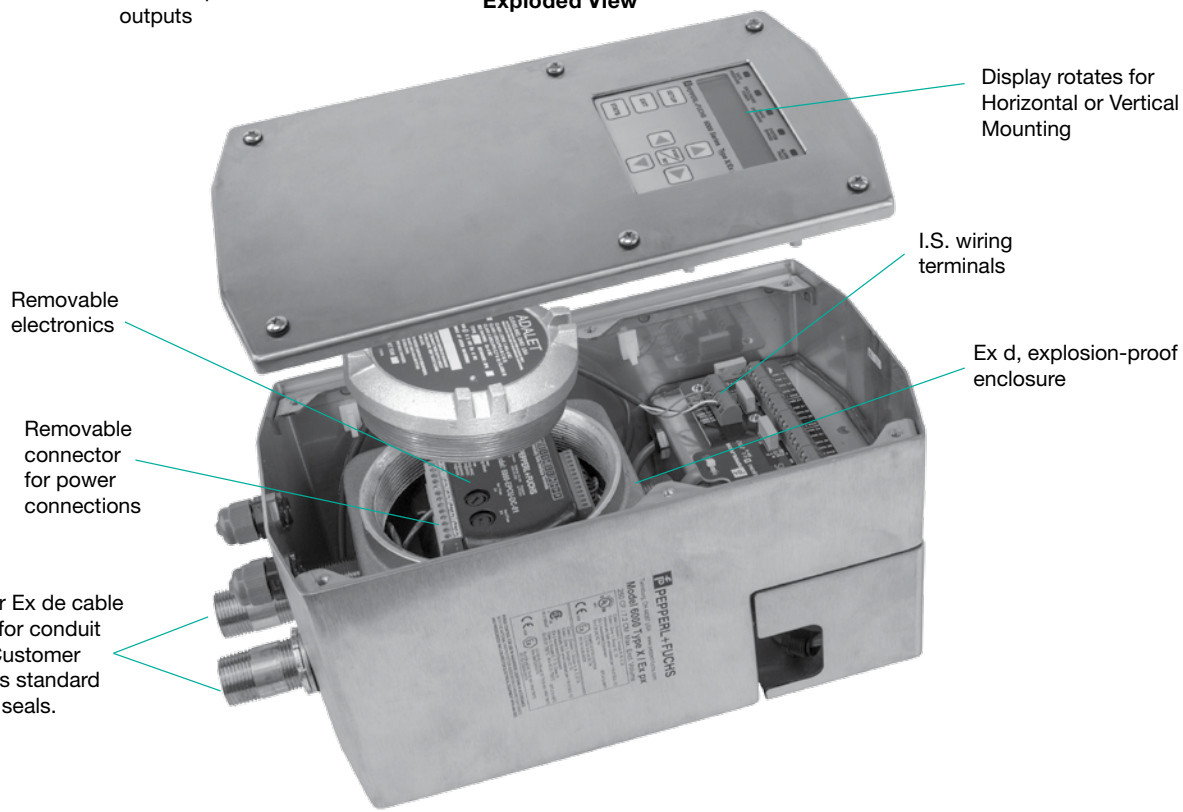
Series 6000 Identification of Components

6000 Control Unit

EPV-6000 Vent



Exploded View



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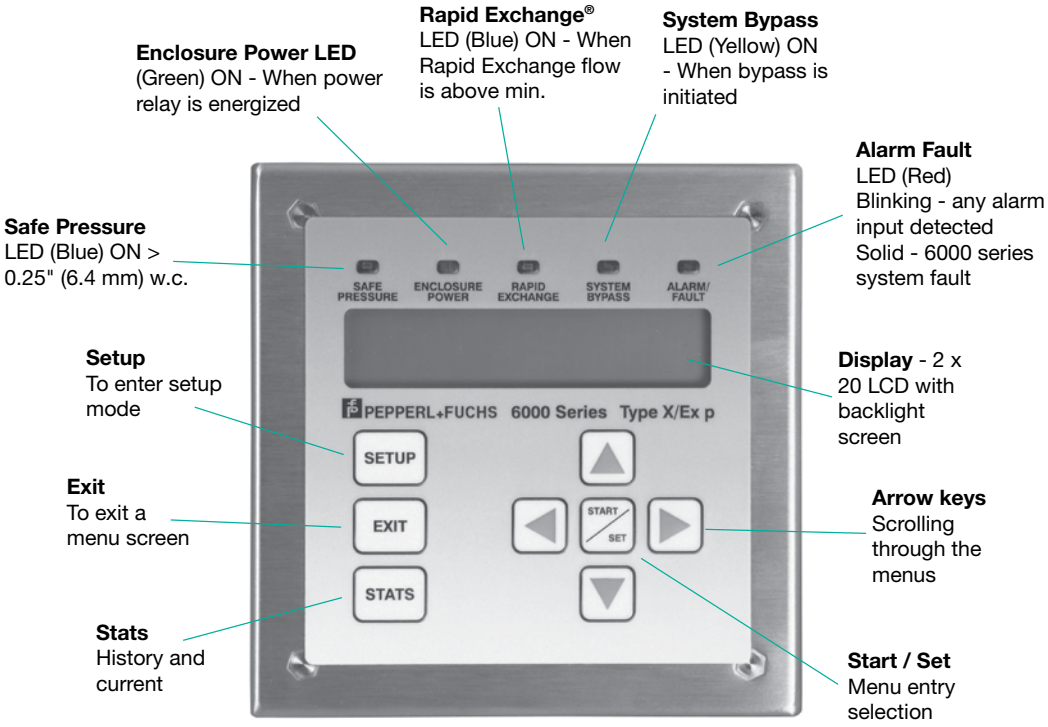
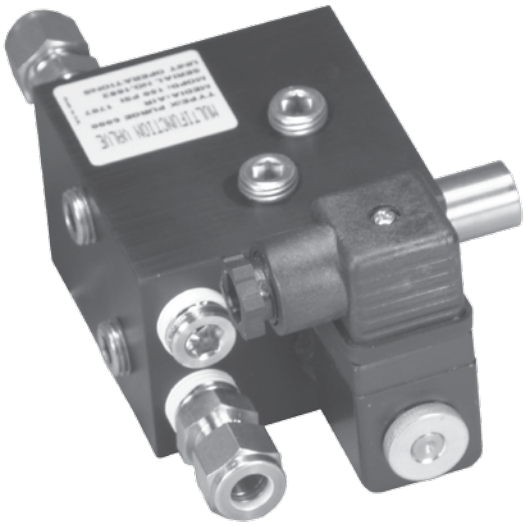
Series 6000 Component Kit

User-Interface w/cable and V31 connector



Control unit and explosion / flameproof enclosure

Optional pneumatic manifold w/solenoid



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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 arrestor screen
- 1½" 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 ft^3 (12.7 m^3).

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 this 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

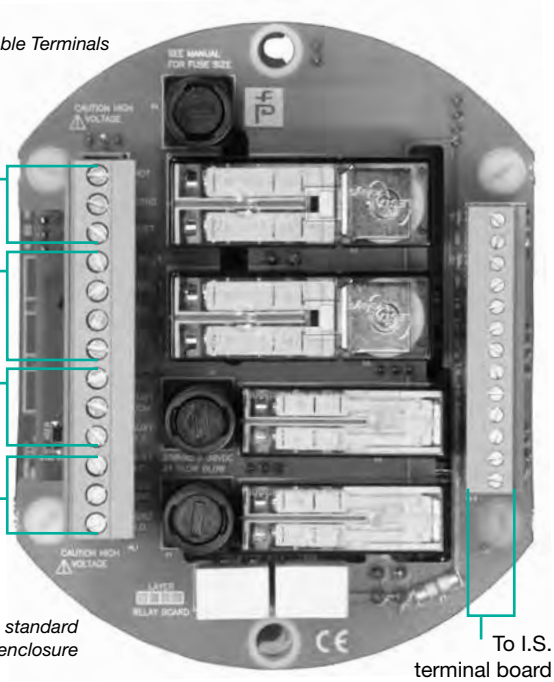
The EPV-6000 vent exhausts excess pressure from the enclosure if the pressure with in the enclosure is above 1.0" w.c. and measures flow and pressure during operation. The 6000 series vent has a pressure transducer and thermal flow sensor that is connected to the 6000 EPCU and is intrinsically safe through 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.

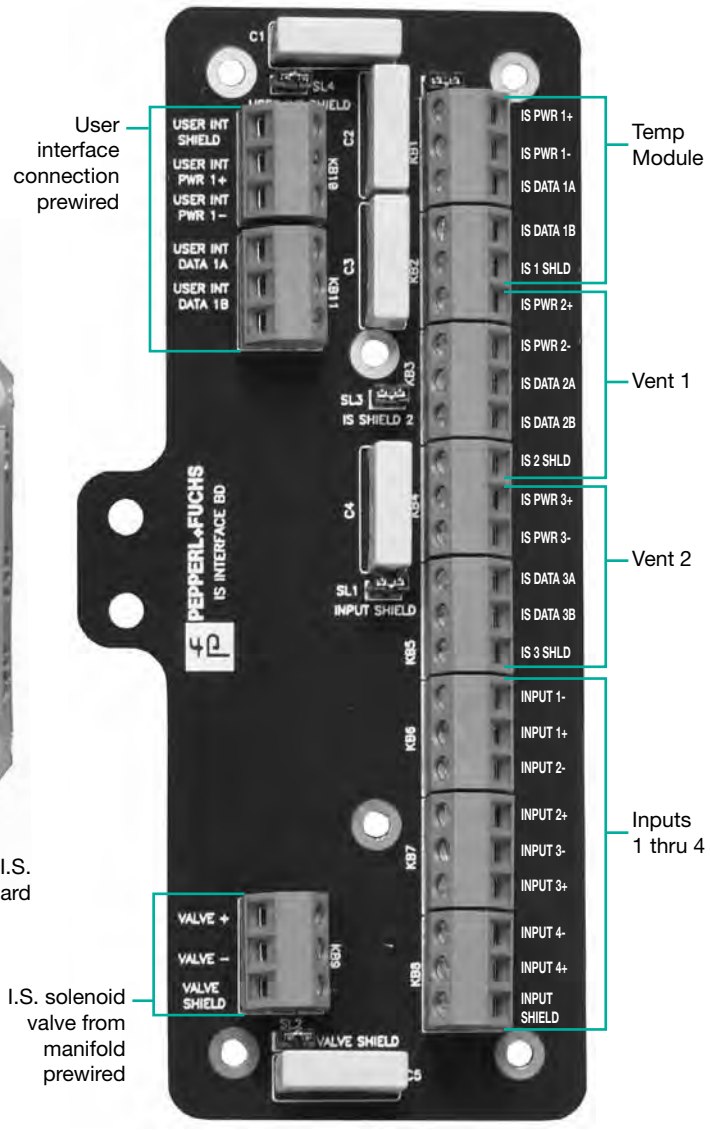
The power connection for enclosure power, auxiliary outputs and power to the EPCU is completed within the explosion-proof enclosure that houses the EPCU. A stainless steel ¾" conduit extends to the outside of the Type 4X, IP66 stainless steel enclosure for easy connection of the lead seals. Lead seals 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.

EPCU Board



Top of EPCU wiring terminals

I.S. Termination Board*



*Does not come with the component kit.

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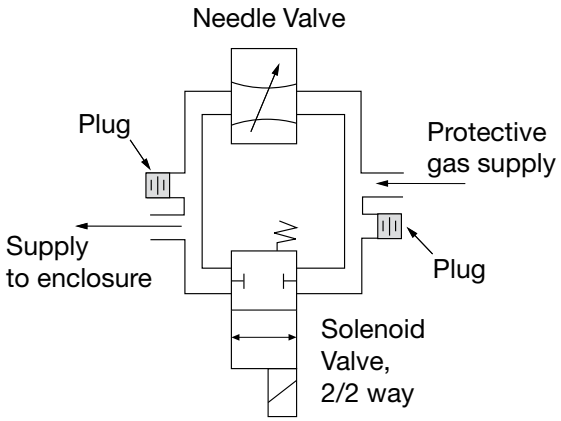
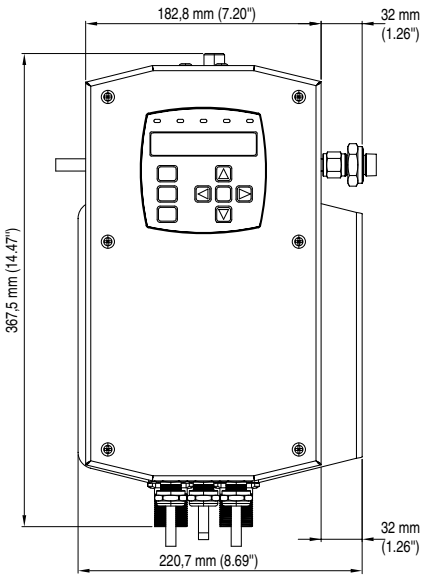
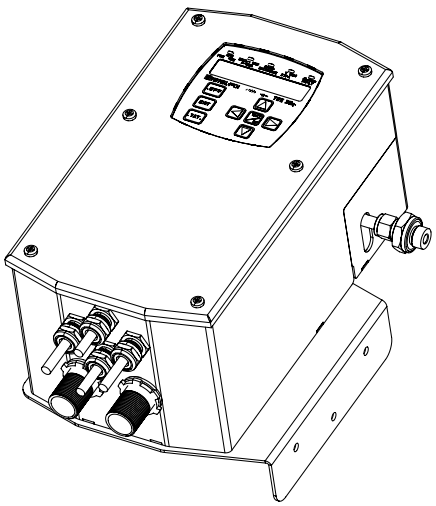
Pneumatic Diagram

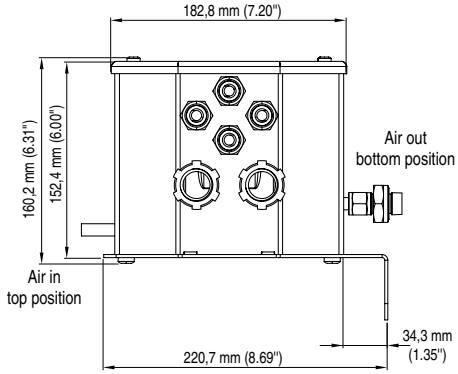


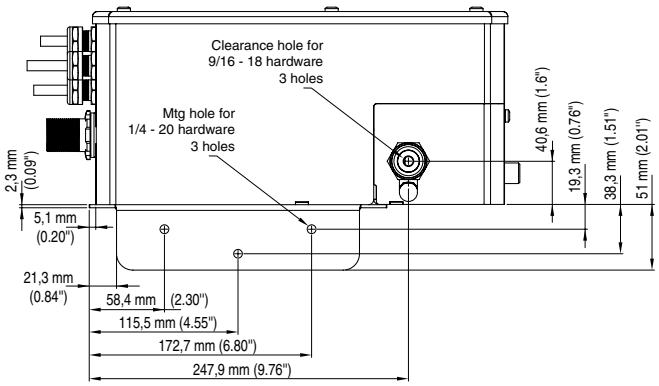
Dimensions

6000 Control unit with housing









Model 6000 System Accessories

Connection Fittings

US-EXDE-3/4	Ex de cable gland
LCK, TCK	Conduit fitting kits
EFC-6-SS (included with unit)	Flush mount connector
CG-8	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	Manifold w/ I.S. solenoid valve
6000-MAN-PV-01	I.S. proportional valve

Installation and Operation Manual

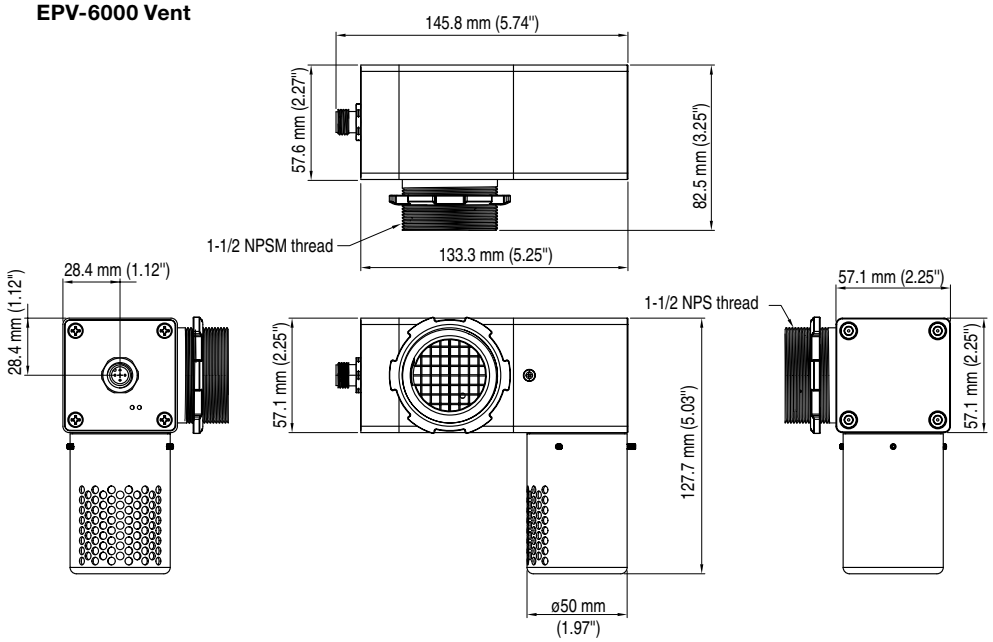
TDOCT-1372AENG	Installation and Operation Manual

Warning Nameplates – (1) EWN tag comes with every system ordered

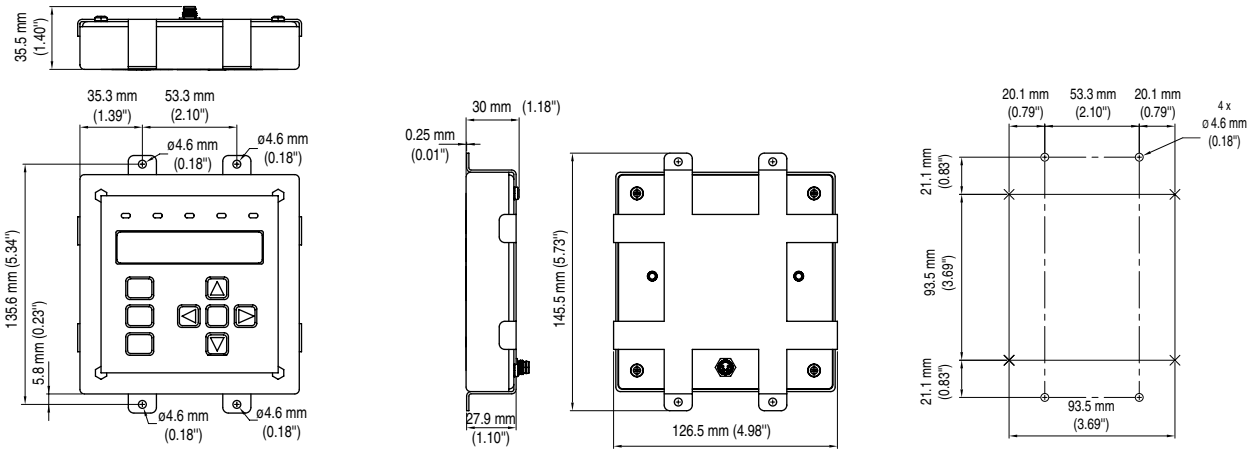
ETW-15	Temperature warning metal tag

Dimensions

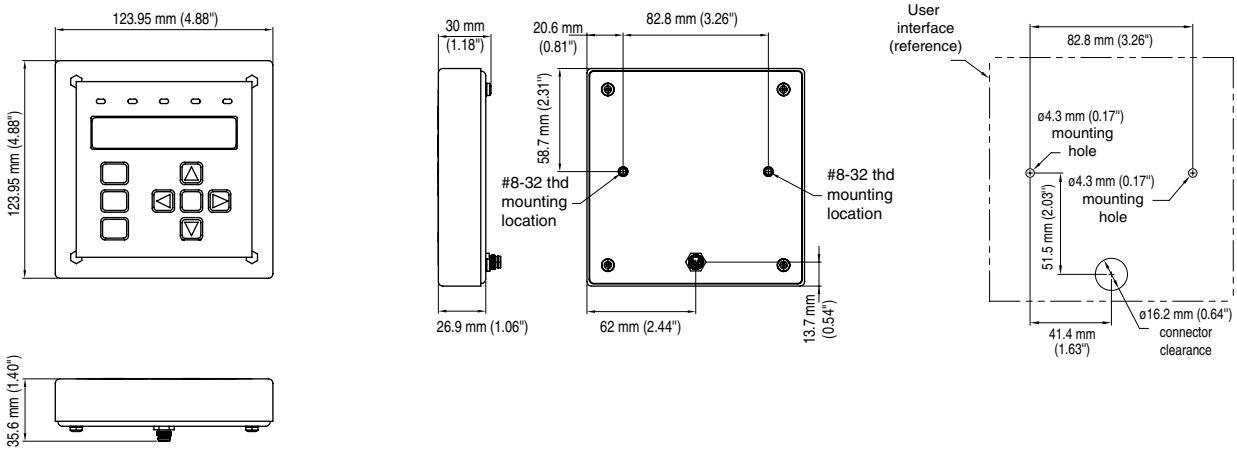
EPV-6000 Vent



User Interface with Mounting Bracket

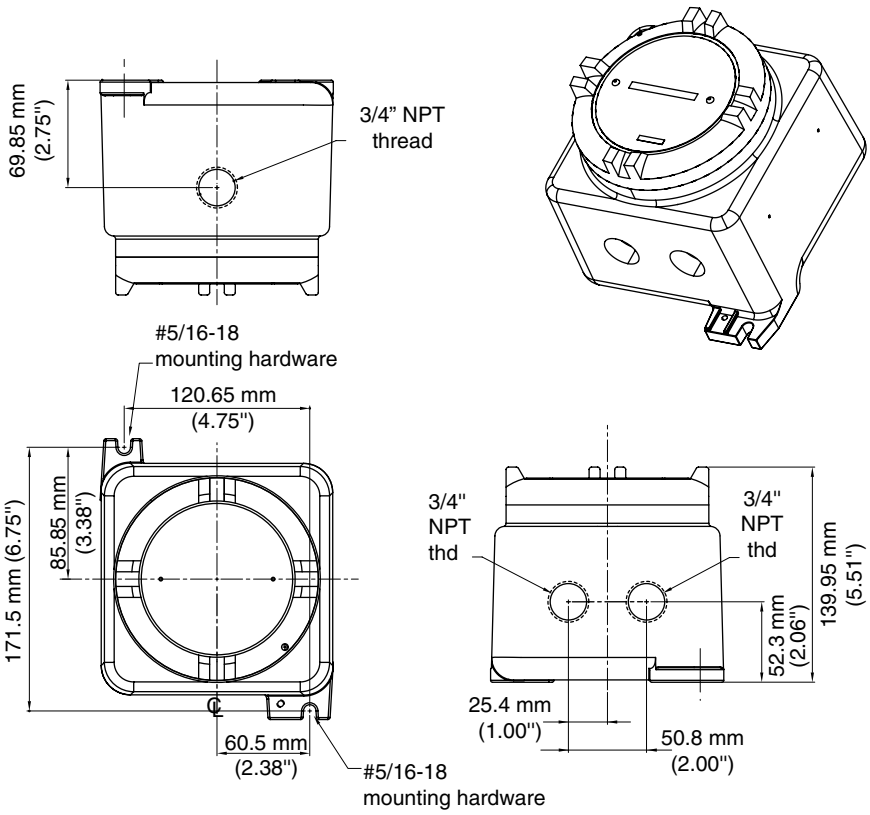


User Interface without Mounting Bracket

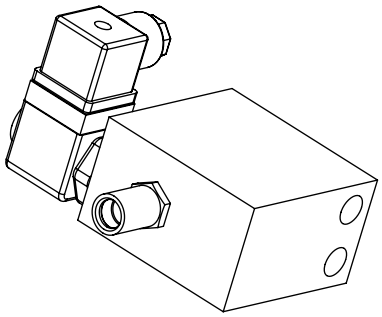


Dimensions

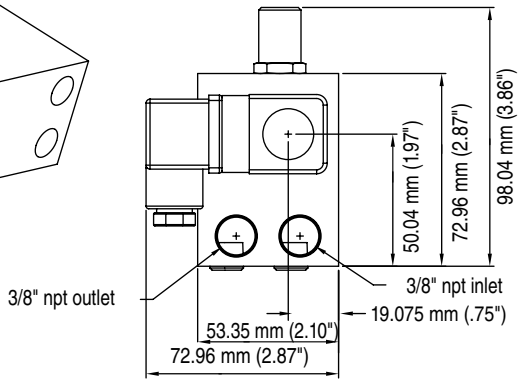
6000 EPCU control unit with explosion / flameproof enclosure

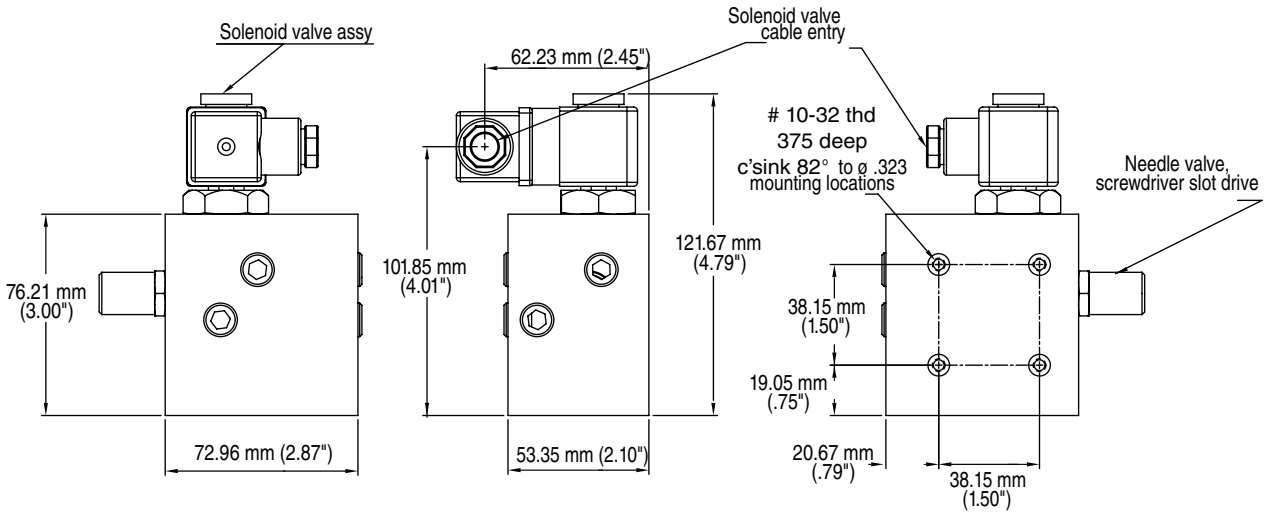


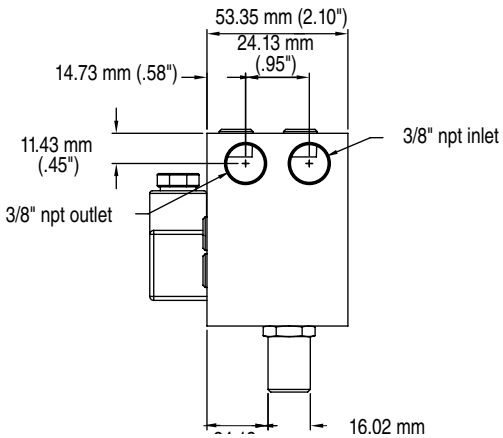
Dimensions



6000 Manifold







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General Specifications

Enclosure Volume:	450 ft³ (12.7 m³)
Number of volume exchange:	4 to 19
Hazardous enviroment:	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

Electrical Parameters

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.)	8 A @ 24 VDC
Auxiliary 1 contact output:	2 A @ 240 VAC
(Dry contacts, SPDT)	2.0 A @ 24 VDC
Auxiliary 2 contact outputs:	2 A @ 240 VAC
(Dry contacts, SPDT)	2.0 A @ 24 VDC

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

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): (depends on enclosure seal and the vent used)	0.3 SCFM (9 l/min) and up
Inlet fitting to Manifold:	3/8" NPT female
Outlet fitting from Manifold:	3/8" bulkhead fitting provided

Operation Conditions

Storage Temp:	-30 °F to +190 °F (-34 °C to +88 °C)
Operating Temp:	
6000 Control unit:	-4 °F to +140 °F (-20 °C to +60 °C)
EPV6000 vent:	-4 °F to +140 °F (-20 °C to +60 °C)

Mechanical Specifications

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 to the enclosure Not dependent on gravity
Mounting hole:	1 ½” NPT knockout hole, mounting with sealed nut
Material:	
EPV-6000-AA:	6063 T6 Anodized Aluminum
EPV-6000-SS:	303 (UNS30300) Stainless Steel cap
Spark arrestor assembly:	Protected with 304 (UNS31603) Stainless Steel Screen Movable so that opening can be positioned downwards

Model Number Designations

Control Unit **6000 - DV - S2 - UN - WH - AC**

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

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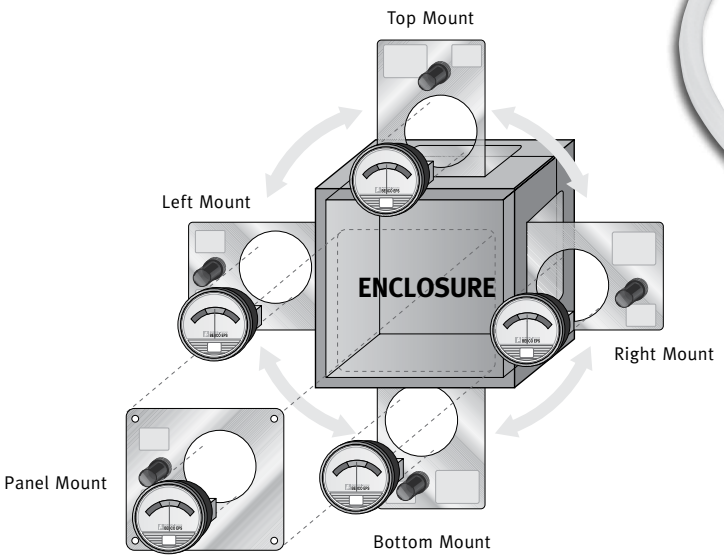
Singapore: +65 67799091 pa-info@sg.pepperl-fuchs.com

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 ft^3 (7.1 m^3).



Enviro-Line™

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!

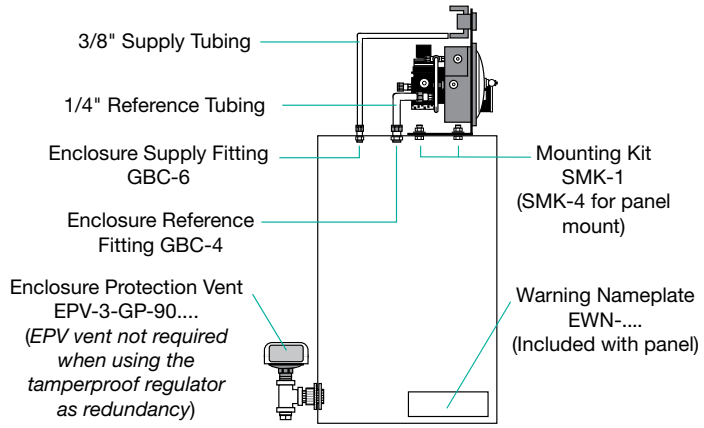
Standard Model Applications

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!

Operation

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

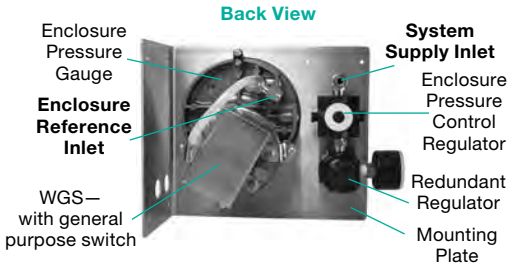


System Specifications

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:	⅜" 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.
Systems installed without vent must be equipped with redundant regulator set to 5 psi max.

Down to the nuts & bolts...
Everything you need for pressurization in nonhazardous dusty, dirty or corrosive areas in ONE SIMPLE KIT!



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

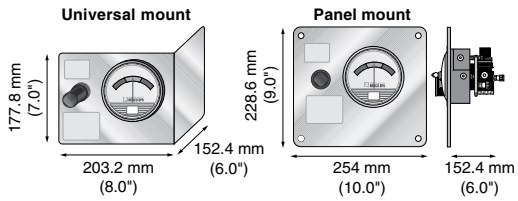
10E - WGS - WRR - UM

Series Model Number
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



MODEL NUMBER Available in universal or panel mount	WGS With general-purpose switch	WRR With redundant regulator, with gauge	WVT With vent EPV-3-SA-00 / 90 for top or side mount	FITTINGS & CONNECTIONS (included)		
				1/4" stainless steel hex bolts & nuts	3/8" supply tubing, 1/4" reference tubing	3/8" & 1/4" connection fittings
10E-WGS-WRR-....	■	■		■	■	■
10E-LGS-WRR-....		■		■	■	■
10E-WGS-WVT-....	■		■	■	■	■
10E-LGS-WVT-....			■	■	■	■

Note: special configurations available upon request.

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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

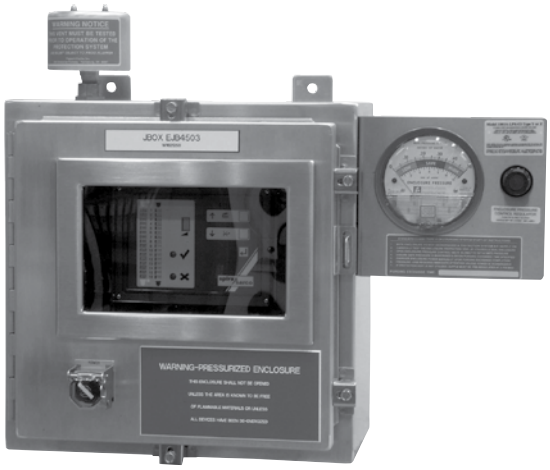
BASIC DESIGN

DETAILED DESIGN

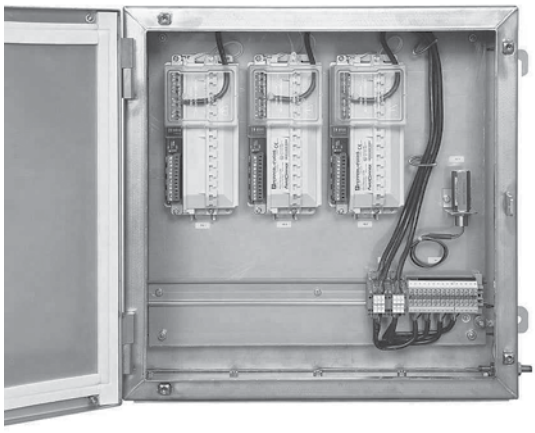
FACTORY/SITE ACCEPTANCE TESTING

START-UP & COMMISSIONING

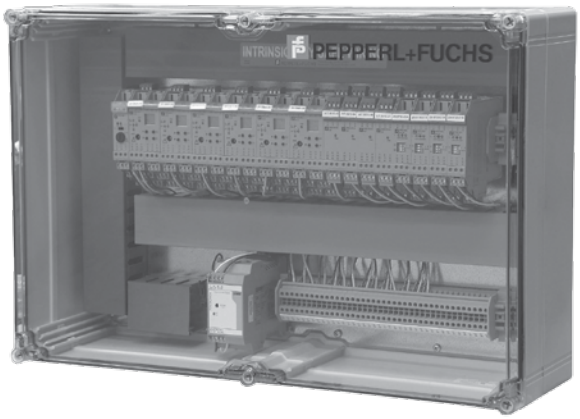
Custom Cabinet Solutions



Purged Cabinet



Field Junction Box



Intrinsic Safety Barrier Cabinet

Your Single Source for Purged Cabinets

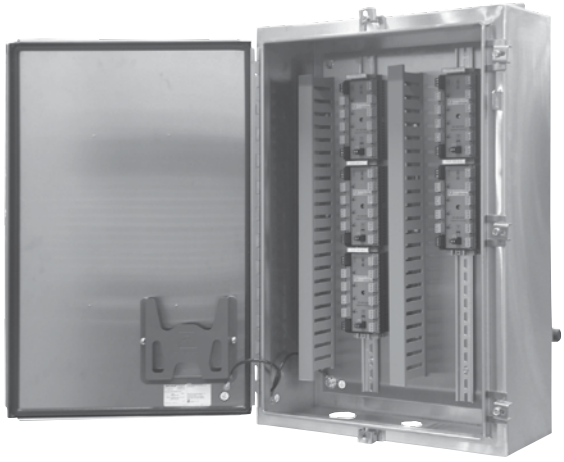
As a global leader in the field of purge and pressurization, Pepperl+Fuchs can assist you in the installation and implementation of a complete system, whatever your needs may be. We can design and build an enclosure based on your specification, and install the necessary purge equipment for you, taking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

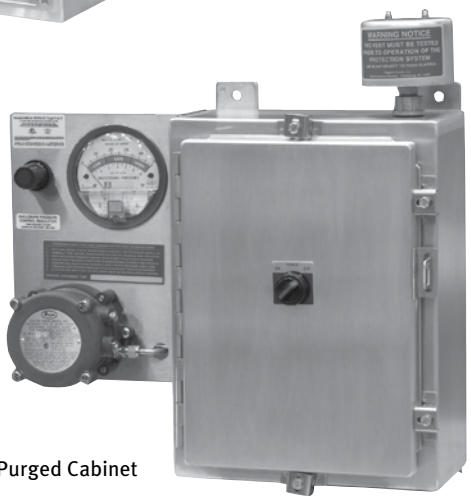
Enclosure Features

- Stainless steel, aluminum, or glass reinforced plastic enclosures (other materials available upon request)
- Enclosure sizes up to 450 ft^3 (12.7 m^3)
- Purge system pre-assembled to enclosure for easy customer installation
- UL 698 system certification
- Type 4X/IP66 enclosure rating
- Customer specific solutions available

Cabinet with Enviro-Purge



Field Junction Box



Purged Cabinet

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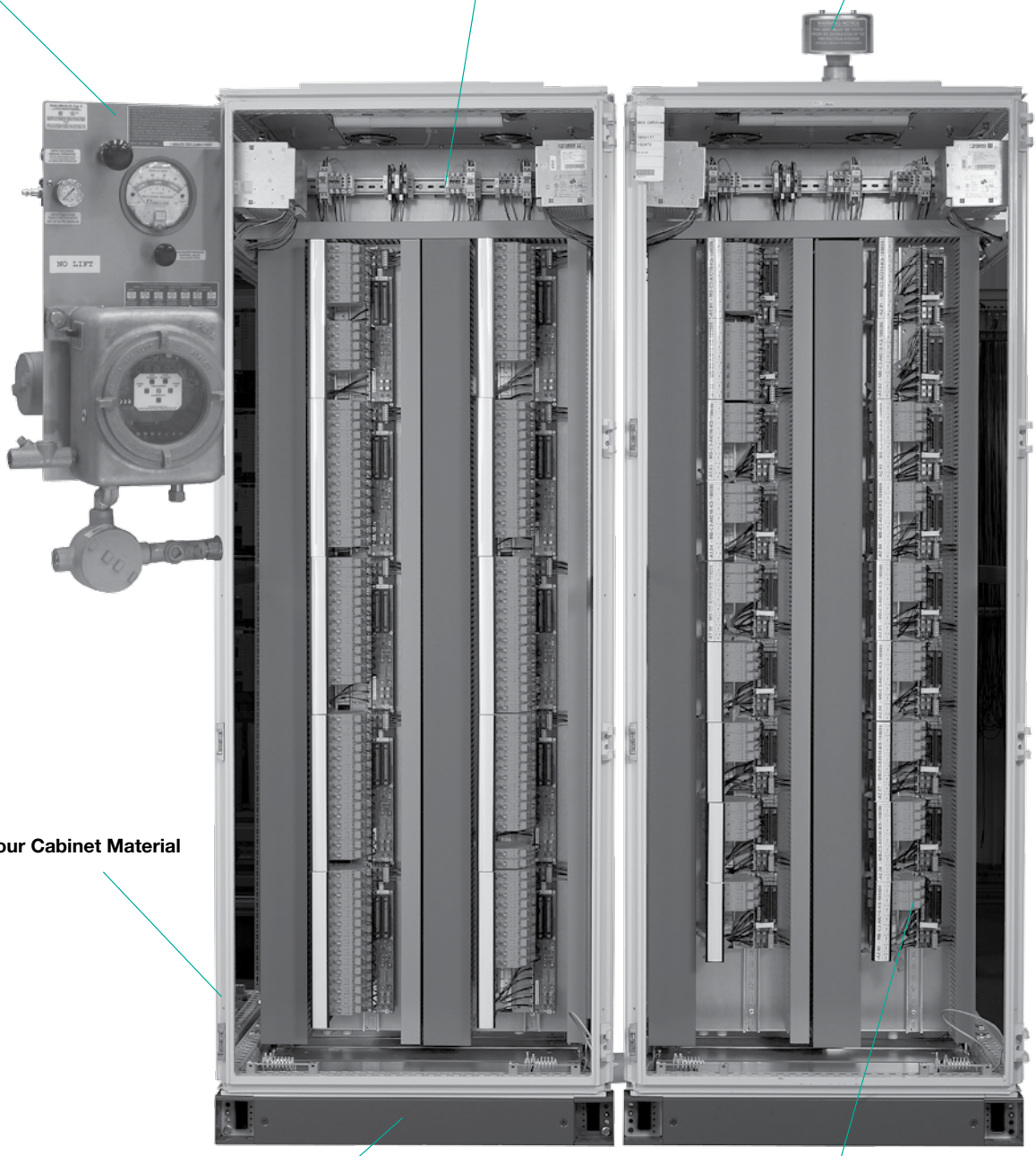
Customize Your Cabinets

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

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Introduction

System Accessories

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**

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Cooler Indicator Gauge

Description

The cooler indicator gauge, sometimes called the Vortex indicator gauge, is used on systems were 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.

Cooler Indicator Gauge
(Vortex Indicator Gauge)

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

Enclosure Protection Vents

Model EPV

Model EPV-1-SA-00
(Top Mount Configuration)

Model EPV-3-SA-90
(Side mount Configuration)

Vent Specifications

Vent Dimensions:		See Page 115	
Shipping Weights lb (kg):		-00	-90
	EPV-1:	3 (1.4)	4 (1.8)
-00: Top Mount	EPV-2:	3 (1.4)	4 (1.8)
-90: Side Mount	EPV-3:	4 (1.8)	5 (2.3)
	EPV-4:	7 (3.2)	9 (4.1)
	EPV-5:	10 (4.5)	12 (5.4)
Temp. Range:		-20 °F to +120 °F (-29 °C to +49 °C)	
Normal Operating Pressure:		* 2" to 5" (50.8 mm to 127 mm) of Water	
Maximum Operating Pressure:		** 5" to 7" (127 mm to 177 mm) of Water	

* Normal operating pressure indicates average enclosure pressure when vent is used with a compatible Rapid Exchange® purging system.

** Maximum operating pressure indicates enclosure pressure when vent is used with compatible enclosure protection systems during simulated failure of all pressure control devices.

Material Specifications

BODY COMPONENTS	
Vent Body Cap:	0.032" 3003 Drawn Alum.
Vent Base:	A.S.E. 306, 308 Cast Alum.
Vent Mounting Hub:	Zinc Plated Steel
Vent Pipe Fittings:	Schedule 40 3003 Alum.
Vent Nameplates:	Lexan®
Fastener Hardware:	316 SS
EXHAUST ELEMENTS	
Spark Arrestor (SA):	0.1" 100 Micron 316 SS
Element Cap:	0.25" 6061 Alum.
VALVE ASSEMBLY	
Valve Base:	14 Ga. Machined 316 SS
Valve Seat Disc:	14 Ga. Machined 316 SS
Valve Hinge:	Zytel® 8018 - 14% Glass Fill
Valve Pin & Rivets:	316 SS
Disc Adhesive:	Urethane Epoxy

Lexan® is a registered trademark of the General Electric Company

Zytel® is a registered trademark of the DuPont Corporation

Description

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.

Operation

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.

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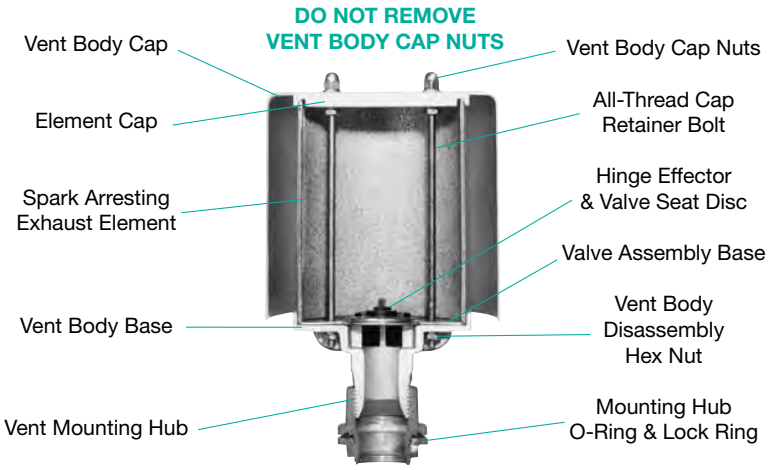


Model EPV-3-SA-00
Cut-Away

Model Number Designations

EPV - 1 - SA - 90

Series Model Number

Vent Size *
- **1** - 1/2"
- **2** - 3/4"
- **3** - 1 1/4"
- **4** - 1 1/2"
- **5** - 2"

Element Style
- **SA** - Spark Arresting

Mounting Configuration
- **00** - Top Mount — top of enclosure
- **90** - Side Mount — side of enclosure

* Vent Size indicates standard trade conduit size.
See Overall Vent Dimensions for actual hub diameter

FRICTION-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.

Special Note

CUSTOM FINISHES ARE AVAILABLE FOR ALL ALUMINUM PARTS UPON REQUEST & INCLUDE, BUT ARE NOT LIMITED TO, EPOXY OR POWDER COATING & CLEAR ANODIZE FINISHES.

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

OPTIONAL USE INDICATES SYSTEMS THAT REQUIRE A VENT OR REDUNDANT SUPPLY REGULATOR

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.

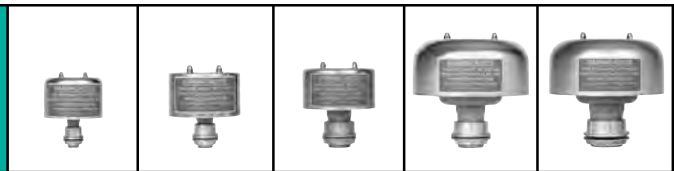
UL CLASSIFICATION & FM CERTIFIED APPLIES TO SPARK ARRESTING VENTS, WITHOUT VENT VALVE ASSEMBLIES, FOR USE IN DILUTION APPLICATIONS.

Vent Compatibility & Flow Rate Chart

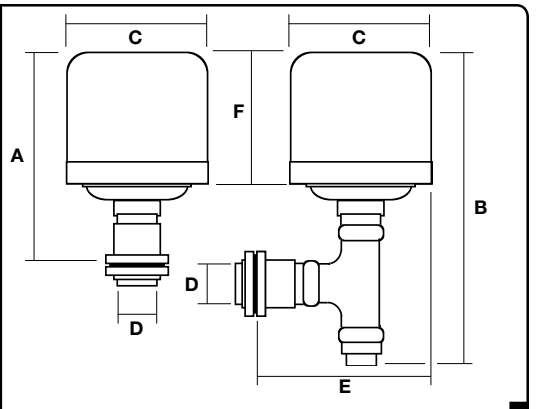
Vent Model	Required Use	Optional Use	SCFH (/)/hr @ 3" (76.2 mm)	SCFH (/)/hr @ 7" (177.8 mm)
EPV-1-SA		11, 1011, 1001A & 2001A	568 (16086)	1044 (29566)
EPV-2-SA	1012, 1002 & 2002		685 (19399)	1202 (34036)
EPV-3-SA	1003,2003 3003 & 4003	1001B & 2001B	1143 (32370)	1971 (55819)
EPV-4-SA	1004,2004 3004 & 4004	1001C & 2001C	2510 (71083)	4387 (124240)
EPV-5-SA	1005 & 2005		4280	4479

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

Overall Vent Dimensions



Vent Model	EPV-1	EPV-2	EPV-3	EPV-4	EPV-5
Hub Size	1/2"	3/4"	1 1/4"	1 1/2"	2"
A - Top Mnt. Hgt.	4.75 (120.7)	4.88 (123.8)	5.25 (133.4)	7 (177.8)	7 (177.8)
B - Side Mnt. Hgt.	7 (177.8)	7.36 (187.3)	8 (203.2)	11 (279.4)	11.5 (292.1)
C - Cap Diameter	4 (101.6)	4.63 (117.5)	5 (127)	8 (203.2)	8 (203.2)
D - Hub Diameter	0.88 (22.2)	1.13 (28.6)	1.75 (44.5)	2 (50.8)	2.5 (63.5)
E - Overall Width	4.25 (108)	5.25 (133.4)	5.5 (139.7)	9 (228.6)	9 (228.6)
F - Cap Length	2.75 (69.9)	2.75 (69.9)	2.75 (69.9)	3.75 (95.3)	3.75 (95.3)



Hub Size indicates standard trade conduit size. All other dimensions indicated in inches (mm). All vents require 4" to 7" (101.6 mm to 177.8 mm) underside clearance for testing.

Enclosure Warning & Temperature Nameplates

Model EWN & ETW

Model EWN-1

Model EWN-2

Model ETW-15

NAMEPLATES ARE SHOWN SMALLER THAN ACTUAL SIZE

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 deenergized. 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 repressurized. 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 deenergized 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.

Specifications

EWN-1 & -2 Dimensions:	5.5" W x 1.5" H
ETW Dimensions:	4.5" W x 2" H
Mounting Hole:	0.125"
Adhesive Backing:	3M
Material:	Polished 316 SS
Finish:	Red Silkscreen
EWN Inscriptions:	Class, Group, Div. & Zones
EWN-__-XX	Pressurization Type
ETW Inscriptions:	Temperature Code
ETW-XX-X	Time in Minutes

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

In-Line Filter

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.

Model ILF

Model ILF-4

Model ILF-6

Model ILF-8

Model ILFK-4
SHOWN IN "OUTBOARD" POSITION

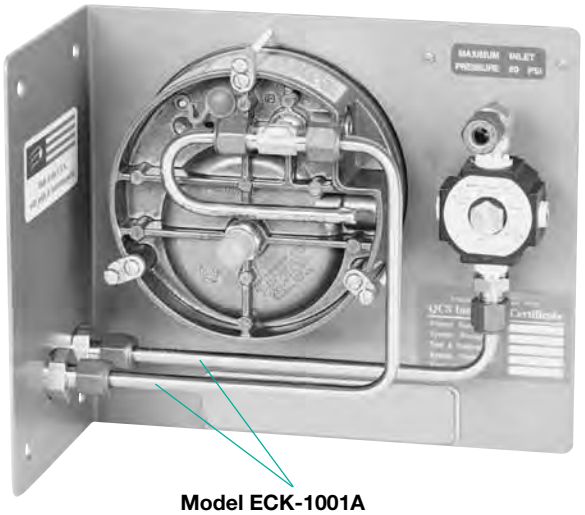
Model ILFK-4
SHOWN IN "INBOARD" POSITION

Filter & Filter Kit Specifications

General Specifications	
Max. Supply Pressure:	120 psi
Temp. Range:	-20 °F to +120 °F
Bowl Material:	Clear Polycarbonate
Drain Valve:	Brass Pet Cock w/Cap
ILFK Tube Fittings:	316 SS
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
ILF-8 Dimensions:	6.875 H x 3.750 Diam.

Enclosure Connection Kits & Tamperproof Regulator

Model ECK & TR



Model ECK-1001A
ENCLOSURE CONNECTION KIT
FITTED ON MODEL 1001A-LPS SYSTEM

Model TR-10/TR-30
TAMPERPROOF
REGULATOR

Model TR-10G/TR-30G
TAMPERPROOF REGULATOR
WITH GAUGE

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

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 ft^3 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).

Special Note

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

ALL SPECIFICATIONS SUBJECT TO CHANGE
WITHOUT NOTICE.

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Singapore: +65 67799091 pa-info@sg.pepperl-fuchs.com

Explosion Proof & General-Purpose Switch Kits

Model EPSK & GPSK

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

Model EPSK	
Body:	Anodized Cast Alum.
Diaphragm:	Fluorosilicone Rubber
Calibration Spring:	Stainless Steel
Fasteners & Fittings:	316 SS
Model GPSK	
Body:	Zinc Plated Steel
Diaphragm:	Molded Silicone Rubber
Diaphragm Plate:	Aluminum
Calibration Spring:	Stainless Steel
Fasteners & Fittings:	316 SS

Model EPSK

Model GPSK

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"
Switch Conduit Port Size:	1/2" FPT
Switch Contact Type:	Form C
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
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

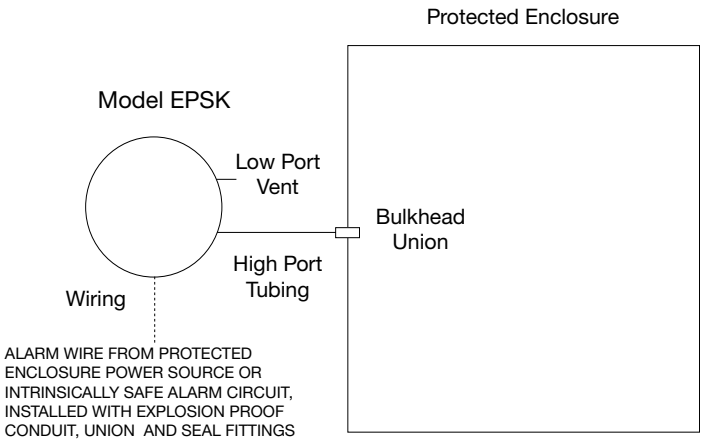
* Supply voltages 24 VDC and 240 VAC available upon request.

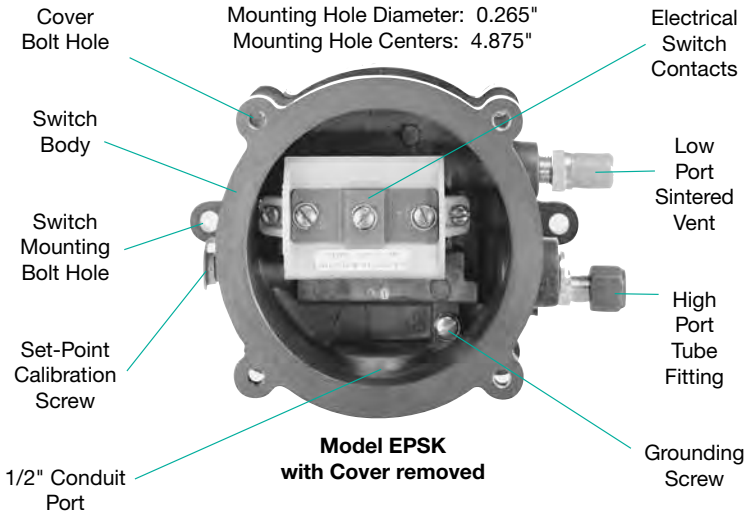
GPSK Specifications

CALIBRATION & OPERATING RANGE	
Model GPSK-1:	(Decr) 0.15" ± 0.02"
Operating Range (for Class I applications):	0.07" - 0.15"
Model GPSK-2:	(Decr) 0.50" ± 0.02"
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

Explosion Proof & General-Purpose Switch Kits

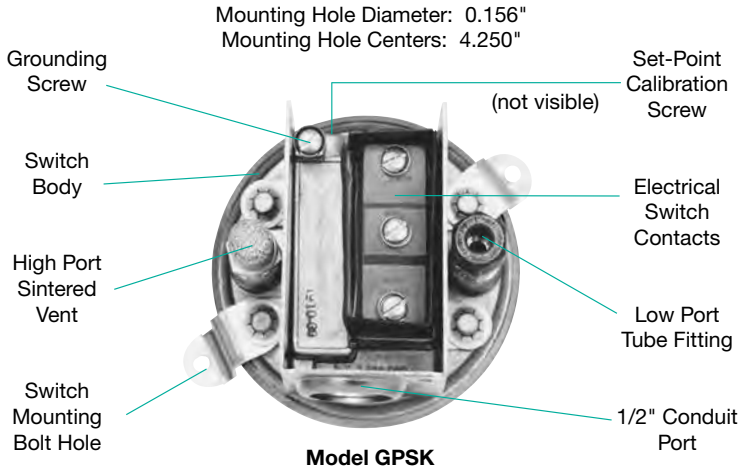
Typical EPSK Installation





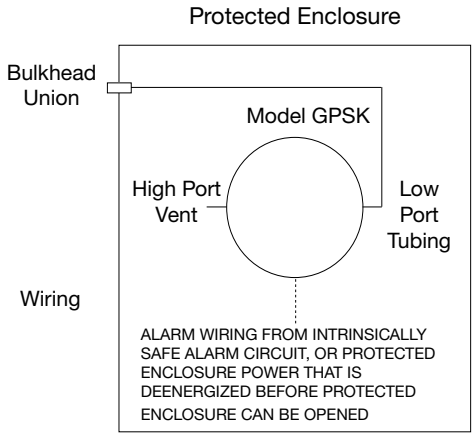
Model EPSK with Cover removed

Bulkhead Union Mounting Hole: 0.4531" (29/64")
EPSK Screws: 1/4-20 x 3/4" GPSK Screws: 8/32 x 1/2"



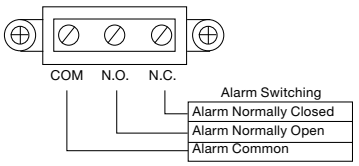
Model GPSK with Cover removed

Typical GPSK Installation

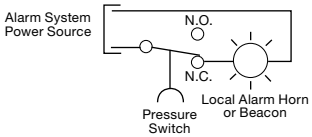


Terminal Block Connections

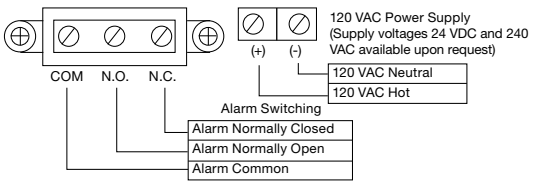
GPSK, EPSK & WPS Terminal Block Connections



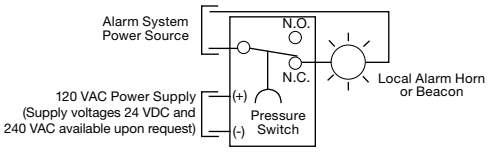
GPSK, EPSK & WPS "Normally Closed" Wiring Configuration



EPSK-1A & WPSA Terminal Block Connections



EPSK-1A & WPSA "Normally Closed" Wiring Configuration



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

Model LCK & TCK

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 pigtail 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.

Model LCK

Model TCK

Kit Specifications

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.

OPTIONAL ACCESSORIES For All Type X Systems & WPS Style Y & Z Systems

Tubing & Pipe Connection Fitting

Model SC, NC, EBC, EFC & EPC

Model SC
STRAIGHT CONNECTOR

Model NC
NINETY CONNECTOR

Model EBC
ENCLOSURE BULKHEAD CONNECTOR

Model EFC
ENCLOSURE FLUSH CONNECTOR

Model EPC
ENCLOSURE PIPE CONNECTOR

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.

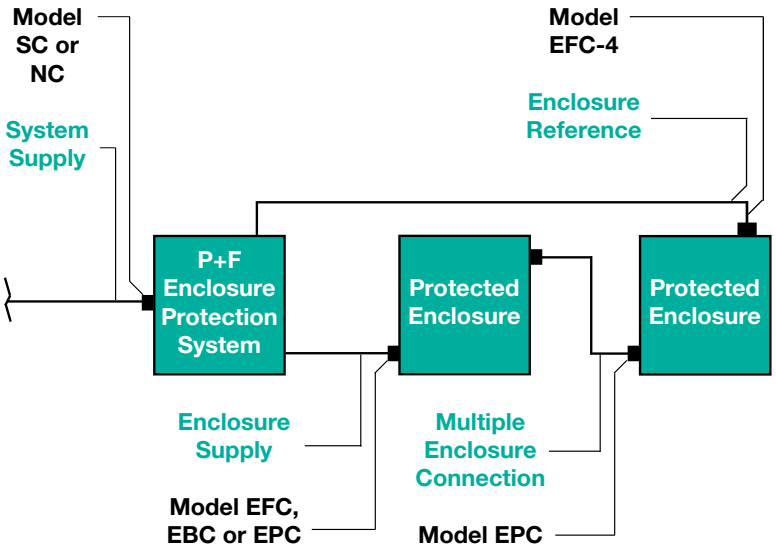
EBC Fittings

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



Fitting Specification, Compatibility & Use Chart

Model	Connections	Compatible Systems	Intended Use	Cutout
NC-4	1/4" T x 1/4" MPT	1012, 1002 & 2002	System Supply	n/a
NC-6-4	3/8" T x 1/4" MPT	3003 & 4003	System Supply	n/a
NC-6	3/8" T x 3/8" MPT	1003 & 2003	System Supply	n/a
SC-6-8	3/8" T x 1/2" MPT	3003 & 4003	Encl. Supply	n/a
NC-8	1/2" T x 1/2" MPT	1004 & 2004	System Supply	n/a
SC-4	1/4" T x 1/4" MPT	1012, 1002 & 2002	System Supply	n/a
SC-6-4	3/8" T x 1/4" MPT	3003 & 4003	System Supply	n/a
SC-6	3/8" T x 3/8" MPT	1003 & 2003	System Supply	n/a
SC-8	1/2" T x 1/2" MPT	1004, 2004, 3004 & 4004	System Supply	n/a
SC-6-8	3/8" T x 1/2" MPT	3003 & 4003	Encl. Supply	n/a
EFC-4	1/4" T	ALL SYSTEMS	Encl. Reference	0.453"
EFC-4	1/4" T	11, 1011 & 1001A	Encl. Supply	0.453"
EFC-4	1/4" T	1012, 1002 & 2002	Encl. Supply	0.453"
EFC-6	3/8" T	1003, 2003, 3004 & 4004	Encl. Supply	0.578"
EFC-8	1/2" T	1004, 2004, 3004 & 4004	Encl. Supply	0.765"
EBC-4	1/4" T x 1/4" T	11, 1011 & 1001A	Encl. Supply	0.453"
EBC-4	1/4" T x 1/4" T	1012, 1002 & 2002	Encl. Supply	0.453"
EBC-6	3/8" T x 3/8" T	1001B, 1003, 2001B, 2003, 3004 & 4004	Encl. Supply	0.578"
EBC-8	1/2" T x 1/2" T	1001C, 1004, 2001C, 2004, 3004 & 4004	Encl. Supply	0.765"
EPC-10	1/2" FPT	1005 & 2005	Encl. Supply	0.750"
EPC-10	1/2" FPT	11, 1011 & 1001A	Mlt. Encl. Conn.	0.750"
EPC-12	3/4" FPT	1012, 1002 & 2002	Mlt. Encl. Conn.	1.125"
EPC-13	1" FPT	1001B, 1003, 2001B, 2003, 3004 & 4004	Mlt. Encl. Conn.	1.375"
EPC-14	1 1/2" FPT	1001C, 1004, 2001C, 2004, 3004 & 4004	Mlt. Encl. Conn.	2.000"
EPC-15	2" FPT	1005 & 2005	Mlt. Encl. Conn.	2.500"

"T" indicates Tubing Nut & Ferrule Assembly
"MPT" indicates Male Pipe Thread "FPT" indicates Female Pipe Thread

Model Number Designations

EFC - 4

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.

Surface Mounting Kits & Pipe Mounting Kits

Model SMK & PMK

SMK-1

SMK-2

SMK-3

SMK-4

SMK-6
SMK-6m

SMK-8
SMK-8m

SMK-10

PMK-1

PMK-2

PMK-3

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

PEPPERL+FUCHS
Pepperl+Fuchs Group www.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
USA: 330 486 0002 pa-info@us.pepperl-fuchs.com
Singapore: +65 67799091 pa-info@sg.pepperl-fuchs.com

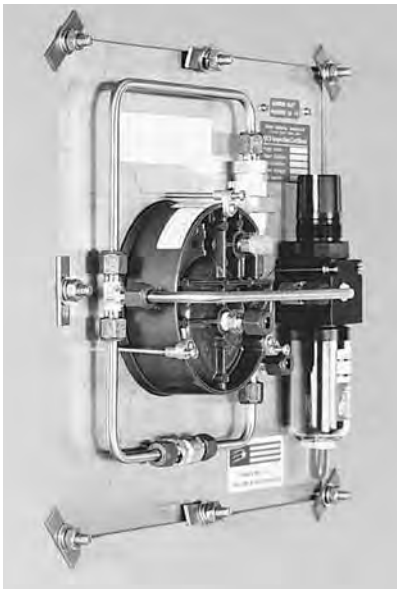
SMK 1, 2 & 3 Application

PMK 1, 2 & 3 Application

System/Mounting Kit Compatibility

	LH, RH, TM, BM, VM & HM		WM	FM & PM
MODEL	SURFACE	PIPE	SURFACE	CUTOUT
1011	SMK-1	N/A	N/A	SMK-4
1012	SMK-1	N/A	N/A	SMK-4
11 LPS	SMK-1	PMK-1	SMK-1	SMK-4
11 WPS	SMK-1	PMK-1	SMK-1	SMK-4
1001A LPS	SMK-1	PMK-1	SMK-1	SMK-4
1001A WPS	SMK-1	PMK-1	SMK-1	SMK-6
1001B LPS	SMK-1	PMK-1	SMK-1	SMK-4
1001B WPS	SMK-1	PMK-1	SMK-1	SMK-6
1001C LPS	SMK-1	PMK-1	SMK-1	SMK-4
1001C WPS	SMK-1	PMK-1	SMK-1	SMK-6
1002 LPS	SMK-2	PMK-2	SMK-2	SMK-8
1002 WPS	SMK-2	PMK-2	SMK-2	SMK-8
1003 LPS	SMK-2	PMK-2	SMK-2	SMK-8
1003 WPS	SMK-2	PMK-2	SMK-2	SMK-8
1004 LPS	SMK-2	PMK-2	SMK-2	SMK-8
1004WPS	SMK-2	PMK-2	SMK-2	SMK-8
1005 LPS	SMK-2	PMK-2	SMK-2	SMK-8
1005 WPS	SMK-2	PMK-2	SMK-2	SMK-8
2001A	SMK-3	PMK-3	SMK-2	SMK-10
2001B	SMK-3	PMK-3	SMK-2	SMK-10
2001C	SMK-3	PMK-3	SMK-2	SMK-10
2002	SMK-3	PMK-3	SMK-2	SMK-10
2003	SMK-3	PMK-3	SMK-2	SMK-10
2004	SMK-3	PMK-3	SMK-2	SMK-10
2005	SMK-3	PMK-3	SMK-2	SMK-10
3000	SMK-1	PMK-1	SMK-1	SMK-6m
4000	SMK-3	PMK-1	SMK-3	SMK-8m

SMK 4, 6, 8 & 10 Application



Important Notes

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.

For Type Y & Z LPS Style System

Universal Mounting Plates

Face Plate

Universal Flange

Optional Wall Flanges

Permits the field selection of multiple mounting configurations for our most popular Type Y & Z Systems

FM APPROVED

CLASSIFIED C UL US

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

* Frame Mount (FM)

FACE PLATE WITH WALL FLANGES

Wall Mount (WM)

* Suitable for Panel Mount (PM) on Models 1001A & 1002 only

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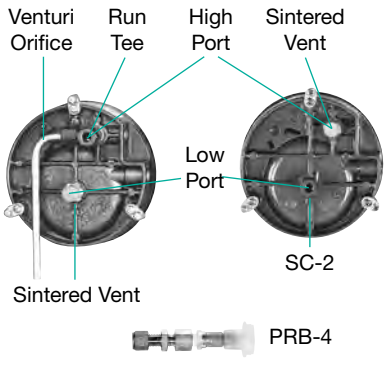
Model 1001A &1002 Panel Mount Conversion



Standard Configuration (prior to conversion)

Panel Mount Configuration (after conversion)

Perform the following procedure to convert Model 1001A or 1002 Enclosure Pressure Gauge for Panel Mount (PM) configuration.

1. Secure one Model GCK Conversion Kit, including SC-2 Fitting & PRB-4 Vent.
2. Remove venturi orifice and run tee from the high port of the gauge 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.

Special Note

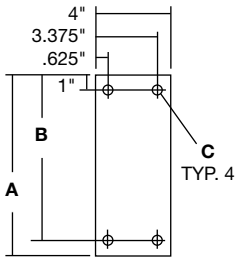
MOUNTING HARDWARE SUCH AS P+F MODEL SMK-1 OR SMK-2 IS REQUIRED TO SECURE THE UNIVERSAL OR WALL FLANGES TO THE PROTECTED ENCLOSURE FOR LH, RH, TM, BM AND WM CONFIGURATIONS. MOUNTING HARDWARE SUCH AS P+F MODEL SMK-4 OR SMK-8 IS REQUIRED TO SECURE THE FACE PLATE TO THE PROTECTED ENCLOSURE FOR FM AND PM 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 REQUIRE FOR THE SUPPLY INLET ON MODEL 1002, 1003, 1004 & 1005 PURGING SYSTEMS THAT ARE MOUNTED IN A RIGHT HAND (RH) CONFIGURATION.

Important Notes

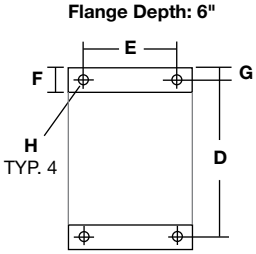
ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.

Universal Flange

Model #	A	B	C
1001A	9"	8"	0.25"
1002	11"	10"	0.375"
1003	13"	12"	0.375"
1004	14"	13"	0.375"
1005	14"	13"	0.375"



Universal Flange Footprint



Wall Flange Footprint

Wall Flange

Model #	D	E	F	G	H
1001A	8"	8"	1"	.5"	0.25"
1002	9"	9"	2"	1"	0.375"
1003	11"	11"	2"	1"	0.375"
1004	12"	12"	2"	1"	0.375"
1005	12"	12"	2"	1"	0.375"

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	Gauge Conversion Kit

WALL MOUNTING FLANGES

WF-1001A	Wall Flanges
WF-1002	Wall Flanges
WF-1003	Wall Flanges
WF-1004	Wall Flanges
WF-1005	Wall Flanges

SYSTEM MOUNTING HARDWARE

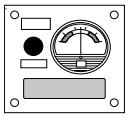
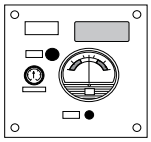
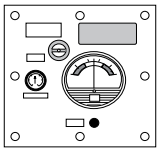
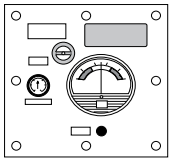
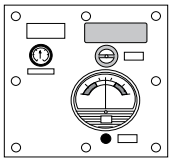
SMK-1	1001A LH, RH, TM, BM & WM configs.
SMK-2	1002-1005 LH, RH, TM, BM & WM configs.
SMK-4	1001A & 1002 for FM or PM configs.
SMK-8	1003-1005 for FM configs.

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	Cl. II System General-purpose Switch Kit

SEE SYSTEM SPECIFICATION BULLETINS FOR ADDITIONAL ACCESSORIES SUCH AS ENCLOSURE CONNECTION FITTINGS, PIPE MOUNTING KITS AND PURGE LOSS ALARM HORNS & BEACONS

Face Plate Dimensions

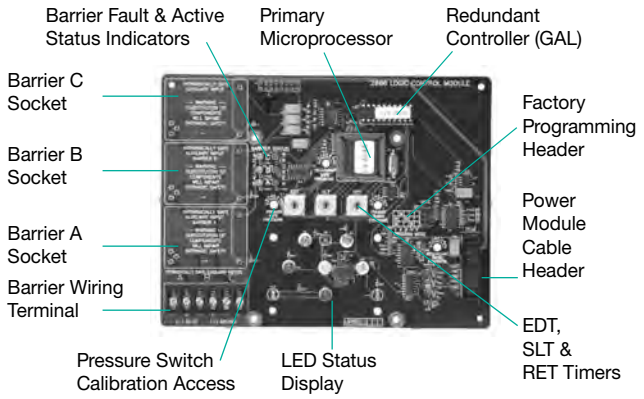






Model Number	1001A	1002	1003	1004	1005
Height	9	11	13	14	14
Width	9	11	13	14	14
Depth	5	5	5.75	6.75	5

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.

Type X EPCU Accessories

Model: ISB, SRM, NJ..., L, RP1 & RP2



Typical EPCU Logic Module (2000 Series Only)

Model SRM-6000
Switch Resistor Module

Model NJ...
NAMUR Proximity Sensor

MODEL ISB
Intrinsic Safety Barrier

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

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.

OPTIONAL ACCESSORIES For Pepperl+Fuchs Type X Enclosure Power Control Units

Type X EPCU Accessories

Model L

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).

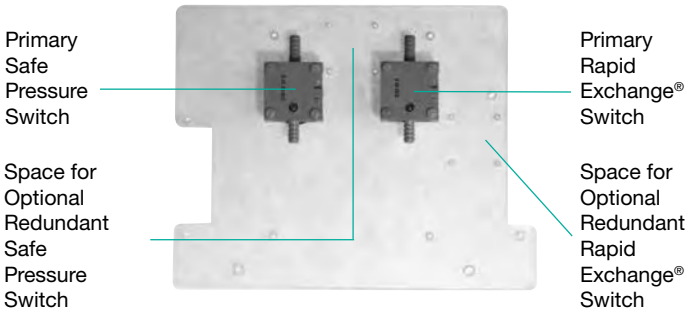
In special applications the redundant switches can be wired parallel to create a dual channel purging or pressurization system, capable of protecting two enclosures separately and simultaneously. Please consult with a factory sales representative for more information.

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.

Model L
Key Lock Assembly

Typical Model L Installation



Typical EPCU Pressure Switch Module

Model RP1 & RP2 Redundant Pressure Switches

Important Note

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WARRANTY & LIABILITY POLICIES AVAILABLE UPON REQUEST.

Remote Alarm Horn & Beacon Devices

Model RAH, RAB-1 & RAB-2

MODEL RAH
Division 1 rated alarm horn

MODEL RAB-1
Division 1 rated flashing alarm beacon

MODEL RAB-2
Division 2 rated flashing alarm beacon

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

Remote Alarm Horn & Beacon Devices

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

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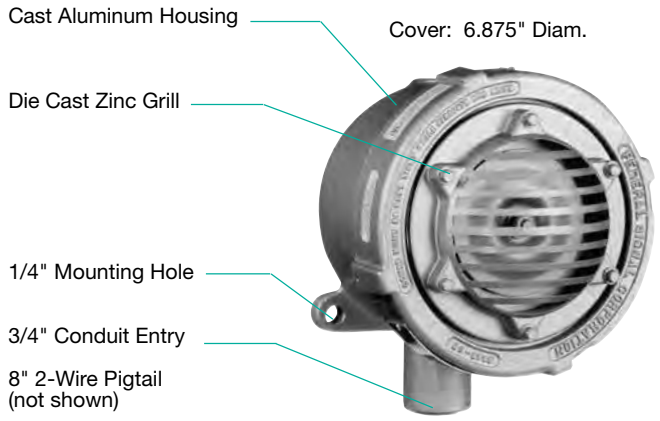
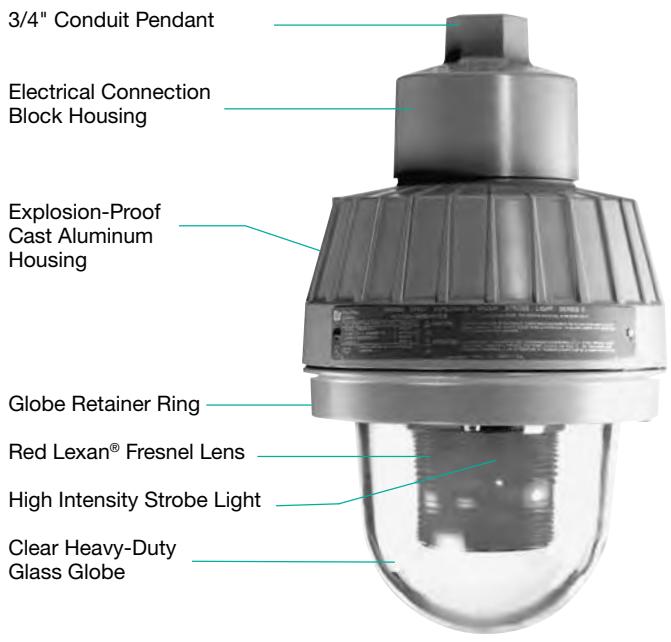
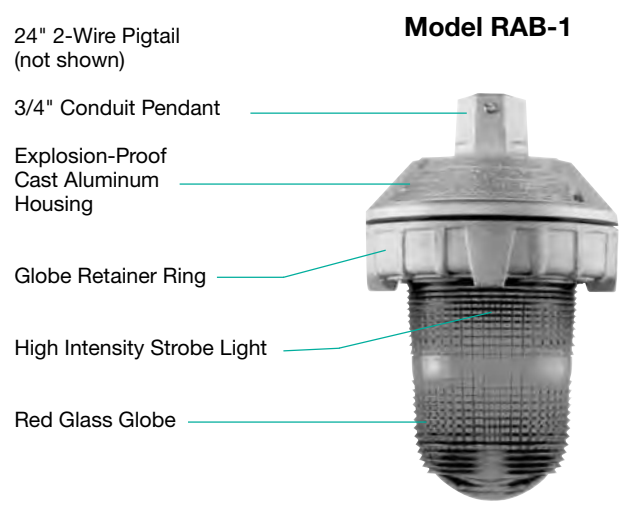


Model RAH



Model RAB-1



Model RAB-2

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.

11/1000 Series — Model Number Designations and Accessories Guide

11/1000 - - - - - - -

Series Model Number
11, 1001A, 1001B, 1001C, 1002, 1003, 1004, 1005, 1011, 1012

System Style
LPS - Less pressure switch
WPS - With pressure switch
WPSA - With pressure switch (120 VAC Standard)

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 hand (left side of enclosure)
RH - Right hand (right side of enclosure)
TM - Top mount (top of enclosure)
BM - Bottom mount (bottom of enclosure)
WM - Wall mount (wall surface)
FM - Frame mount (external frame or rack)
PM - Panel mount (enclosure surface cutout, *not available in WPS or WPSA Style*)

Enclosure Connection Kit
ECK - Enclosure connection kit

Cooler Indicator Gauge (see page 111)
VX - Vortex

Voltage (for WPSA switch only)
24 VDC - Voltage Direct Currents
240 VAC - Voltage Alternating Currents

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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.

3000 Series — Model Number Designations and Accessories Guide

3000 - - - - - - -

Series Model Number
- **3003 and 3004**

System Style
- **LPS** - Less pressure switch
- **WPS** - With pressure switch (does not have ATEX certification)
- **WPSA** - With pressure switch (120 VAC Standard)

Area Classification
- **CI** - Class I / Zone 2 Area

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

Mounting Configuration
- **VML** - Vertical Mount Left
- **VMR** - Vertical Mount Right
- **HMT** - Horizontal Mount Top
- **HMB** - Horizontal Mount Bottom
- **CK** - Component Kit - LPS style only

Cooler Indicator Gauge (see page 111)
- **VX** - Vortex

Voltage (for WPSA switch only)
- **24 VDC** - Voltage Direct Currents
- **240 VAC** - Voltage Alternating Currents

Type X

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

2000 - - - - - - - - - -

Series Model Number
2001A, 2001B, 2001C, 2002, 2003, 2004, 2005

System Style
- **STD** - Standard
- **SA** - Semiautomatic
- **FA** - Fully Automatic

Area Classification
- **CI** - Class I, Group C & D Area
- **CII** - Class II, Group E, F & G Area
- **IB** - Class I, Group B Area (STD Only)

Power Control Mode
- **NR** - Normal Running
- **CB** - Conditional Bypass

Mounting Configuration
- **LH** - Left hand (left side of enclosure)
- **RH** - Right hand (right side of enclosure)
- **TM** - Top mount (top of enclosure)
- **BM** - Bottom mount (bottom of enclosure)
- **WM** - Wall mount (wall surface)
- **FM*** - Frame mount (external frame or rack)
- **PM*** - Panel mount (enclosure surface cutout)

** FM & PM configurations feature flush mount EPCU. Flush mount EPCU is not suitable for Group B Area.*

Cooler Indicator Gauge (see page 111)
- **VX** - Vortex

Key Lock Assembly (see page 127)
- **L** - Key Lock Assembly

Redundant Pressure Switches (see page 127)
- **RP1** - Redundant Safe Pressure Switches
- **RP2** - Redundant Rapid Exchange® Pressure Switches
- **RP3** - Both Switches

Voltage
- **240 VAC** - Voltage Alternating Currents

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Type X

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

6000 - - - - -

Series Model Number
6000

Valve Type
DV - Digital solenoid valve
NV - No valve

Saftey Integrety 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

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Appendix

- Warranty Terms and Conditions
- Glossary
- Purging Times References
- Conversion Charts
- Model Number Index

Glossary

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

Purging Times Reference

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 ft^3/min. (1800 ft^3/hr). Which vent should be used?
Purge rate of the panel: 12 ft^3/min (provided in the 3003 data sheet)
Vortex flow rate: 30 ft^3/min
Max. flow rate: 42 ft^3/min x 60 = 2520 ft^3/hr

Vent Compatibility & Flow Chart

Enclosure Protection Vent	Normal SCFH @ 3”H_2O	Maximum SCFH @ 7”H_2O
EPV-3-SA…	1143	1971
EPV-4-SA…	2510	4387

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” H_2O. 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

Pressure Conversion

To convert	to	Multiply by
Inches water	mm water	25.4
Inches water	psi	0.036
Inches water	mbar	2.49
Inches water	kPa	0.249
mm water	Inches water	0.039
mm water	psi	0.0014
mm water	mbar	0.0979
mm water	kPa	0.00979
psi	Inches water	27.73
psi	mm water	704
psi	mbar	68.95
psi	kPa	6.895
mbar	Inches water	0.402
mbar	mm water	10.21
mbar	psi	0.0145
mbar	kPa	0.100
kpa	Inches water	4.022
kpa	mm water	102.15
kpa	psi	0.145
kpa	mbar	10.00

Volume Conversion

To convert	to	Multiply by
Cubic inches	Cubic feet	5.787x10-4
Cubic inches	Liters	0.0164
Cubic feet	Cubic inches	1,728
Cubic feet	Liters	28.34
Liters	Cubic inches	60.98
Liters	Cubic feet	0.0353

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:

$$\text{Density correction factor} = \frac{\text{molecular weight of air}}{\text{molecular weight of protective gas}}$$

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 in^3
Since 1 ft^3 = 1,728 in^3, 51,840 in. ÷ 1,728 in^3 / ft^3 = 30.0 ft^3.

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:* $\frac{30\ ft^3 \times 4 \text{ volume changes}}{12\ ft^3/min} = 10 \text{ minutes}$

If the protective gas is nitrogen: $\frac{30\ ft^3 \times 4 \text{ volume changes}}{12\ ft^3/min} = 10 \text{ min.} \times \frac{28.96}{28.01} = 10.3 \text{ minutes}$

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.

°C = (°F - 32) x 5/9
°F = (°C x 9/5) +32

Celsius		Fahrenheit
-273	-459.4	
-268	-450	
-262	-440	
-257	-430	
-251	-420	
-246	-410	
-240	-400	
-234	-390	
-229	-380	
-223	-370	
-218	-360	
-212	-350	
-207	-340	
-201	-330	
-196	-320	
-190	-310	
-184	-300	
-179	-290	
-173	-280	
-169	-273	-459.4
-168	-270	-454
-162	-260	-436
-157	-250	-418
-151	-240	-400
-146	-230	-382
-140	-220	-364
-134	-210	-346
-129	-200	-328
-123	-190	-310
-118	-180	-292
-112	-170	-274
-107	-160	-256
-101	-150	-238
-96	-140	-220
-90	-130	-202
-84	-120	-184
-79	-110	-166
-73	-100	-148
-68	-90	-130
-62	-80	-112
-57	-70	-94
-51	-60	-76
-46	-50	-58
-40	-40	-40
-34	-30	-22
-29	-20	-4
-23	-10	14
-17.8	0	32
-17.2	1	33.8
-16.7	2	35.6
-16.1	3	37.4
-15.6	4	39.2
-15.0	5	41.0
-14.4	6	42.8
-13.9	7	44.6

Celsius		Fahrenheit
-13.3	8	46.4
-12.8	9	48.2
-12.2	10	50.0
-11.7	11	51.8
-11.1	12	53.6
-10.6	13	55.4
-10.0	14	57.2
-9.4	15	59.0
-8.9	16	60.8
-8.3	17	62.6
-7.8	18	64.4
-7.2	19	66.2
-6.7	20	68.0
-6.1	21	69.8
-5.6	22	71.6
-5.0	23	73.4
-4.4	24	75.2
-3.9	25	77.0
-3.3	26	78.8
-2.8	27	80.6
-2.2	28	82.4
-1.7	29	84.2
-1.1	30	86.0
-0.6	31	87.8
0.0	32	89.6
0.6	33	91.4
1.1	34	93.2
1.7	35	95.0
2.2	36	96.8
2.8	37	98.6
3.3	38	100.4
3.9	39	102.2
4.4	40	104.0
5.0	41	105.8
5.6	42	107.6
6.1	43	109.4
6.7	44	111.2
7.2	45	113.0
7.8	46	114.8
8.3	47	116.6
8.9	48	118.4
9.4	49	120.2
10.0	50	122.0
10.6	51	123.8
11.1	52	125.6
11.7	53	127.4
12.2	54	129.2
12.8	55	131.0
13.3	56	132.8
13.9	57	134.6
14.4	58	136.4
15.0	59	138.2
15.6	60	140.0
16.1	61	141.8
16.7	62	143.6

Celsius		Fahrenheit
17.2	63	145.4
17.8	64	147.2
18.3	65	149.0
18.9	66	150.8
19.4	67	152.6
20.0	68	154.4
20.6	69	156.2
21.1	70	158.0
21.7	71	159.8
22.2	72	161.6
22.8	73	163.4
23.3	74	165.2
23.9	75	167.0
24.4	76	168.8
25.0	77	170.6
25.6	78	172.4
26.1	79	174.2
26.7	80	176.0
27.2	81	177.8
27.8	82	179.6
28.3	83	181.4
28.9	84	183.2
29.4	85	185.0
30.0	86	186.8
30.6	87	188.6
31.1	88	190.4
31.7	89	192.2
32.2	90	194.0
32.8	91	195.8
33.3	92	197.6
33.9	93	199.4
34.4	94	201.2
35.0	95	203.0
35.6	96	204.8
36.1	97	206.6
36.7	98	208.4
37.2	99	210.2
37.8	100	212.0
43.0	110	230.0
49	120	248
54	130	266
60	140	284
66	150	302
71	160	320
77	170	338
82	180	356
88	190	374
93	200	392
99	210	410
100	212	414

Model Number Index

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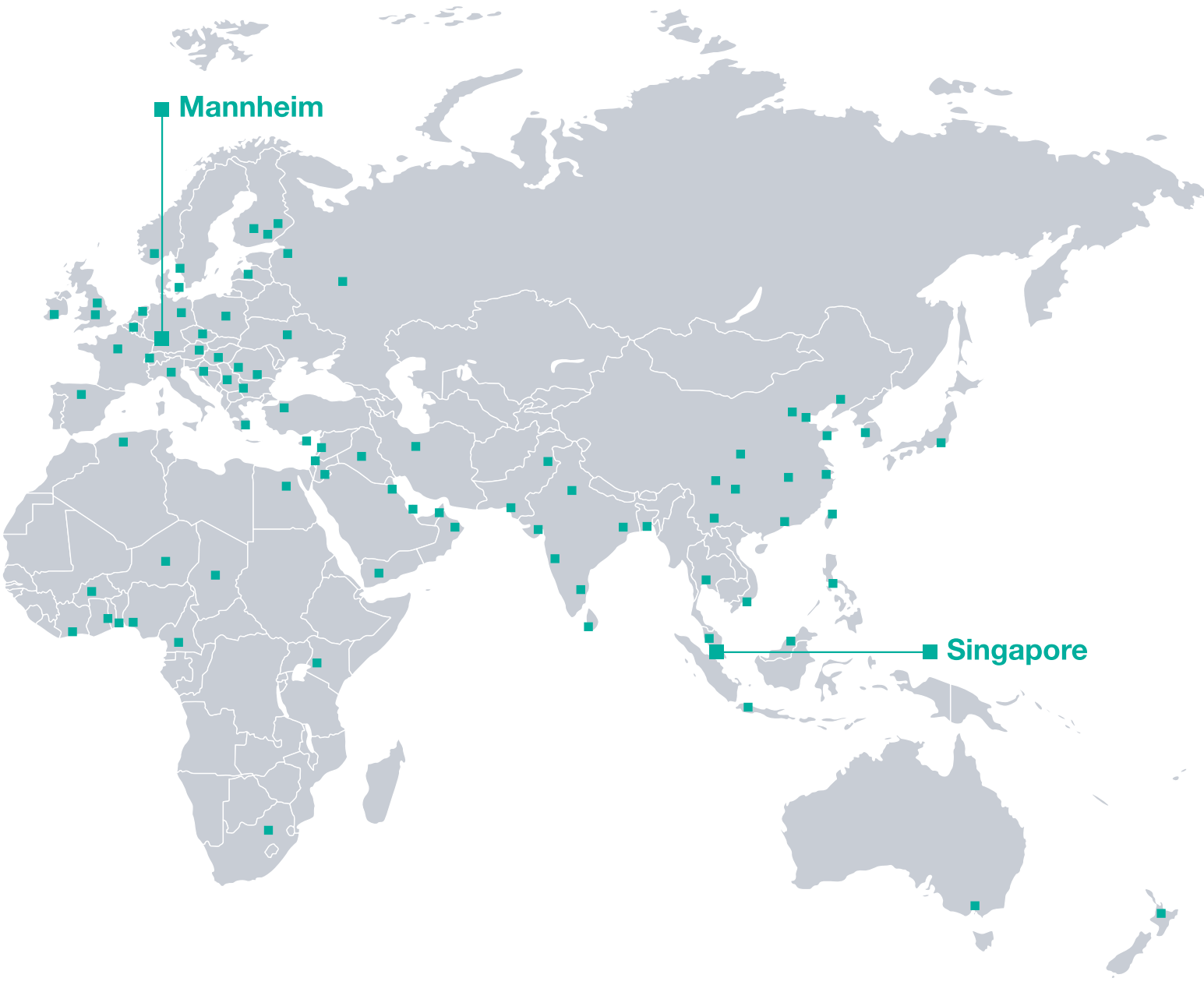

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