

# MANUAL

## 6500 Purge and Pressurization System



**With regard to the supply of products, the current issue of the following document is applicable:**

**The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship".**

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# 1 Safety

## 1.1 Introduction

### 1.1.1 Contents

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

**Note!**

Failure to follow these instructions may impair the safety protection and function of the equipment.

**Note!**

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EC-type of examination
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

### 1.1.2 Target group, personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

### 1.1.3 Symbols used

This document contains symbols for the identification of warning messages and of informative messages.

#### **Warning messages**

You will find warning messages in instances, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damages.

Depending on the risk level, the warning messages are displayed in descending order as follows:



#### ***Danger!***

This symbol indicates an imminent danger.  
Non-observance will result in personal injury or death.



#### ***Warning!***

This symbol indicates a possible fault or danger.  
Non-observance may cause personal injury or serious property damage.



#### ***Caution!***

This symbol indicates a possible fault.  
Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure

#### **Informative symbols**



#### ***Note!***

This symbol brings important information to your attention.



#### ***Action***

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

### 1.1.4 Pertinent laws, standards, directives, and further documentation

Laws, standards, or directives applicable to the intended use must be observed. In relation to hazardous areas, Directive 1999/92/EC must be observed.

The corresponding data sheets, declarations of conformity, EC Type-examination certificates, certificates and control drawings if applicable (see data sheet) are an integral part of this document. You can find this information under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

### 1.1.5 Declaration of conformity

All products were developed and manufactured under observance of the applicable European standards and guidelines.



#### ***Note!***

A declaration of conformity is included with these set of instructions and can be requested from the manufacturer or obtained on line at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

## 1.1.6 Markings / Certifications

## Markings for the 6500 control unit: 6500-01-EXT1-...

## ATEX UL/Demko 16 ATEX 1640X

II 2 G Ex eb ib q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib tb [ib pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex eb ib q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib tb [ib pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

## IECEX UL 16.0003X

Ex eb ib q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib tb [ib pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex eb ib q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib tb [ib pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

**PEPPERL+FUCHS**  
 68307 Mannheim, Germany www.pepperl-fuchs.com

**Model 6500-01-EXT1-PNO-LNO**  
 450 CF / 12.75 CM Max. Encl. Volume

Ex px, py

IP66

CE 0539

Ex

IECEX UL 16.0003X  
 Ex eb ib q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib tb [ib pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex eb ib q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib tb [ib pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

ATEX UL/DEMKO 16 ATEX 1640X  
 II 2 G Ex eb ib q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex eb ib q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

Supply voltage: 20 to 30 VDC, 0.6 amps or 100 to 250 VAC, 50/60Hz, 0.2 Amps  
 Enclosure relays: 20 to 30 VDC or 100 to 250 VAC, 8 A to 60 °C / 5 A to 70 °C  
 Auxiliary relay: 20 to 30 VDC or 100 to 250 VAC, 2 A  
 See manual for other connection information  
 This device is factory sealed. Consult manual for repair instructions.  
 Cable glands and cables used for applications at 70 °C require further consideration. See operation manual.  
 WARNING: DO NOT OPEN WHEN ENERGIZED  
 WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

## Markings for the 6500-01-PM01-.... and 6500-01-PM02-....

## ATEX UL/Demko 16 ATEX 1640X

II 2 G Ex eb q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pxb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex eb q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pyb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)

## IECEX UL 16.0003X

Ex eb q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex tb [ib pxb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex eb q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex tb [ib pyb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)

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Ex

IECEX UL 16.0003X  
 Ex eb q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex tb [ib pxb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex eb q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex tb [ib pyb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)

ATEX UL/DEMKO 16 ATEX 1640X  
 II 2 G Ex eb q [ib pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pxb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex eb q [ib pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex tb [ib pyb] IIIC T90 °C Db (-20 °C ≤ Ta ≤ 70 °C)

Supply voltage: 20 to 30 VDC, 0.6 amps or 100 to 250 VAC, 50/60Hz, 0.2 Amps  
 Enclosure relays: 20 to 30 VDC or 100 to 250 VAC, 8 A to 60 °C / 5 A to 70 °C  
 Auxiliary relay: 20 to 30 VDC or 100 to 250 VAC, 2 A  
 See manual for other connection information  
 This device is factory sealed. Consult manual for repair instructions.  
 Cable glands and cables used for applications at 70 °C require further consideration. See operation manual.  
 WARNING: DO NOT OPEN WHEN ENERGIZED  
 WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

## Markings for the 6500 user-interface (UIC) for panel mount version

## Part of ATEX UL/Demko 16 ATEX 1640X

II 2 G Ex ib [pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib [pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex ib [pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib [pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

## Part of IECEX UL 16.0003X

Ex ib [pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

**PEPPERL+FUCHS**  
 68307 Mannheim, Germany www.pepperl-fuchs.com

**Model 6500-01-UIC-PM0**

Part of ATEX UL/DEMKO 16 ATEX 1640X  
 II 2 G Ex ib [pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib [pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 G Ex ib [pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 II 2 D Ex ib [pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

Part of IECEX UL 16.0003X  
 Ex ib [pxb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pxb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pyb] IIC T4 Gb (-20 °C ≤ Ta ≤ 70 °C)  
 Ex ib [pyb] IIIC T135 °C Db (-20 °C ≤ Ta ≤ 70 °C)

CE 0539

Ex

IP66

## Markings for the EPV-6500 pressure relief vent

## DEMKO 15 ATEX 1622 X

II 2 G Ex ib [pxb] IIC T4 Gb  
 II 2 D Ex ib [pxb] IIIC T135 °C Db  
 II 2 G Ex ib [pyb] IIC T4 Gb  
 II 2 D Ex ib [pyb] IIIC T135 °C Db  
 -20 °C ≤ Ta ≤ 70 °C

## IECEX UL 15.0147X

Ex ib [pxb] IIC T4 Gb  
 Ex ib [pxb] IIIC T135 °C Db  
 Ex ib [pyb] IIC T4 Gb  
 Ex ib [pyb] IIIC T135 °C Db  
 -20 °C ≤ Ta ≤ 70 °C

**PEPPERL+FUCHS**  
 68307 Mannheim, Germany www.pepperl-fuchs.com

**Model EPV-6500-AA-01**  
 450 CF / 12.75 CM Max. Encl. Volume

DEMKO 15 ATEX 1622 X  
 II 2 G Ex ib [pxb] IIC T4 Gb  
 II 2 D Ex ib [pxb] IIIC T135 °C Db  
 II 2 G Ex ib [pyb] IIC T4 Gb  
 II 2 D Ex ib [pyb] IIIC T135 °C Db  
 -20 °C ≤ Ta ≤ 70 °C

IECEX UL 15.0147X  
 Ex ib [pxb] IIC T4 Gb  
 Ex ib [pxb] IIIC T135 °C Db  
 Ex ib [pyb] IIC T4 Gb  
 Ex ib [pyb] IIIC T135 °C Db  
 -20 °C ≤ Ta ≤ 70 °C

CE 0539

Ex

IP66



### 1.1.7 Responsibility of the operator and/or installer (include cable gland, mounting, operation of unit, purge supply requirement)

The operator and/or installer undertake to ensure that only specialist, trained personnel work on the 6500 purge/pressurization system and that they:

- Are familiar with the occupational safety and accident prevention regulations and have been briefed regarding handling of the unit
- Have additional knowledge of explosion protection that is required for the work on explosion protected components.
- Are familiar with the relevant rules and regulations for the installation, operation and maintenance of explosion-protected systems.

The operator and/or installer must also ensure that:

- The 2-wire RTD for temperature measurement is suitable for the area classification, Zone 1 or Zone 21, and maximum length of 3 meters
- The bypass switch, if used, is suitable for the area classification, Zone 1 or 21
- Cable glands must be suitable for the area classification, Zone 1, or 21, and IP ratings required.

### 1.1.8 General information on the ignition protection class – purging/pressurization system

Purging and pressuring systems are one of the most versatile ignition protection classes. They are based on the principle that in Zone 1 (gas) the gas mixture in the ambient atmosphere, which may ignite under certain circumstances, is removed from the housing by an initial purge process. After the purge phase, sufficient compressed air is supplied to compensate for leaks in the housing and any installed equipment. This permanent overpressure, achieved using compressed air, prevents any potentially explosive atmosphere in the ambient air from entering the housing.

During the purge phase an internal pressure is achieved.

Any hotspots that may occur on individual components within the control cabinet should be monitored by temperature sensors and switched off safely if necessary. This ensures that no unacceptably high surface temperatures can reach the exterior.

For applications in Zone 21 (dust) the purge process is omitted because purging would raise explosive dust. Instead of pre-purging, the interior of the housing is inspected for dust and cleaned manually if dust is present.

When dealing with containment systems and dilution applications, refer to the applicable standards for the requirements. In some cases, dilution with compressed air is not possible and Nitrogen or some other type inert gas is required.



**Note!**

When using an inert gas like nitrogen, an asphyxiation hazard can exist.

The purge and pressurizing system is particular suitable for installed equipment that is not approved for the use in hazardous areas. It can then be used in the hazardous area when properly installed.



**Note!**

EN60079-2 and IEC 60079-2 do not cover both gas- and dust-hazardous atmospheres. The 6500 system provides a solution for both at the same time but would have to be evaluated by the certification bodies for approval.



**1.1.9 Conditions of safe use*****Danger!***

Non-observance of conditions of safe use will result in personal injury or death.

**6500 control unit**

1. The purge control unit has an operating temperature class of 135 °C (T4 temperature class). This temperature shall be considered when mounted to an enclosure.
2. When the purge control unit is mounted to an enclosure, the complete unit shall be evaluated to IEC/EN 60079-2. See appropriate certificate for appropriate edition of this standard.
3. Intrinsically safe cables extending from the main enclosure must be provided with at least 0.25 mm insulation thickness per conductive core to maintain segregation between intrinsically safe circuits.
4. The nonmetallic touchpad and display does not pose an electrostatic discharge hazard under normal use conditions. Use only water damp cloth and allow to air dry for cleaning device. Do not use or install in high charge areas. See IEC 60079-32-1 for further information.
5. In hazardous dust environment, regularly remove dust from the control unit enclosure and EPV vent to prevent excessive temperature rise. See certificate for full information.
6. Cable glands and/or blanking elements used with this system shall be properly ATEX/IECEx rated for the environment they are being used in, with the proper temperature ratings. Only the cable gland size identified for a particular hole shall be fitted to the hole.
7. For systems that incorporate the UIC in the lid of the enclosure, system shall not be mounted such that the UIC is facing up.
8. Attention: The maximum cable length between the vent or UIC and the control unit is 245 ft (74.6 m). This is based on worst-case cable capacitance ( $C_{\text{cable}}$ ) of 60 pf/ft (197 pf/m) and worst-case cable inductance of 0.2  $\mu\text{H}/\text{ft}$  (0.66  $\mu\text{H}/\text{m}$ ). Further operational reductions may apply. See manual.
9. The relay contact circuits shall be externally fused at installation. Each circuit shall have a fuse that is rated for the voltage type being used (AC or DC) with a breaking capacity of at least 1500 A. The rating of the fuse for the enclosure power connections shall not exceed 11 A. for the Aux relay, it shall not exceed 3 A.

**EPV-6500 pressure relief vent**

1. The EPV vent has an operating temperature class of 135 °C (T4 temperature class). This temperature shall be considered when mounted to an enclosure.
2. When the purge control unit is mounted to an enclosure, the complete unit shall be evaluated to IEC/EN 60079-2: 2014 (Ed. 6).
3. Cables used to connect to an EPV- vent must be provided with at least 0.25 mm insulation thickness per conductive core to maintain segregation between intrinsically safe circuits.
4. In hazardous dust environment, regularly remove dust from the EPV vent to prevent excessive temperature rise. See certificate for full information.
5. In hazardous dust environment, the connector end of the vent shall be protected from direct exposure of a UV light source. See certificate for full information.
6. Only EPV-6000-xx-xx vents can be connected to any certified Model 6000 control system.
7. Only EPV-6500-xx-xx vents can be connected to any certified 6500 control system.

## 2 The 6500 purge and pressurization system – general explanation of the system

The Pepperl+Fuchs 6500 purge and pressurization controller allows for general purpose equipment to operate in a Zone 1/21 hazardous area to achieve an Ex px rating, or Zone 2/22 rated equipment mounted in an enclosure in a Zone 1/21 hazardous area to achieve an Ex py rating. The 6500 control unit and EPV-6500 vent is certified for Ex px or Ex py applications.



### 2.1 Standard vs. dilution applications

The 6500 purge and pressurization system can be set up for standard or dilution applications. Standard applications are pressurizing enclosures that have equipment within the pressurized enclosure that does not contain any hazardous gas.

Dilution applications are enclosure systems that do not have a containment system within the enclosure. Containment systems in this context are usually used in analyzer applications where a small stream of hazardous gas enters the pressurized enclosure and is analyzed for its content. This containment, (within the pressurized enclosure), is the piping, enclosure, and any other device that can hold the hazardous gas, which has the potential to leak within the enclosure. Depending on the leakage rate and if it is normal or abnormal potential will demand the type of purging required and the equipment needed.



**Note!**

If the leakage rate cannot be determined or it is unlimited, then inert gas is required and dilution cannot be used.

## 2.2 The 6500 system

The 6500 purge/pressurization system consists of the following devices:

- 6500 control unit: The control unit provides all the functions including user-defined functions. The 6500 controls the actions for the system and supplies the supporting devices.



- EPV-6500 vent: The EPV-6500 vent provides pressure relief to the pressurized enclosure and feedback to the 6500 control unit with pressure and flow information. The EPV-6500 vent is intrinsically safe with I.S. power and signal protection from the 6500 control unit. There are two families of vents that are selected at the time of ordering and can provide standard application parameters or are specific to dilution applications.



- 6500 MAN-DV manifold system (optional): The 6500-MAN manifold has a digital valve that is activated by the 6500 control system for purging and cooling and pressure control. It is intrinsically safe and has a needle valve for adjusting the pressure in the enclosure after purging or pressurization.





**Warning!**

When using other customer provided electrical valves, please follow the entity parameters of the valve and the output of the 6500 control unit.

6500-MAN-PV proportional valve (optional): This valve is used for dilution applications when the EPV-6500 continuous vent is used. It can also be used for standard applications. The EPV-6500-MAN-PV is activated by the 6500 control system and is intrinsically safe.



**Warning!**

When using other customer provided electrical valves, please follow the entity parameters of the valve and the output of the 6500 control unit.

6500-CBLG cable glands: The 6500 control system does not come with cable glands. Customers can supply their own approved cable glands or order the power and I.S. cable glands from Pepperl+Fuchs.



**Warning!**

When using customer supplied cable glands, check for the required certification and installation of selected cable glands for proper installation.

## 2.3 6500 control unit

The 6500 control unit is the control of the pressurized system and is suitable for zone 1 and 12, Ex pxb and Ex pyb applications.

The 6500 control unit can be ordered for different mounting configuration for different applications. This unit does not come with cable glands, which allows customers to select the type or brand of cable glands to use but they must be approved for the area and application. Approved cable glands are available through Pepperl+Fuchs.



Cable glands not included

The features of the 6500 control unit are:

- User selectable for pxb or pyb applications
- User-interface is intrinsically safe touch that can be ordered for remote mounting
- Universal power requirement, 20 to 30 VDC / 100 to 240 VAC
- 316L stainless steel housing with IP66 ratings
- External, Internal, UIC remote mounting options
- Input for 2-wire PT100 RTD for automatic temperature control/monitoring
- Automatic pressure control
  - Digital manifold with min/max set points for pressurization
  - Proportional valve using user configured set points
- Automatic flow control for dilution applications with the proportional valve and EPV-6500 continuous vent
- User selectable input functions
  - Door switch (for immediate shutdown)
  - Bypass control with maintenance or commissioning selections
  - Enclosure contacts
  - Auxiliary contacts for alarms, low/max pressures, control valve
- RS485 com port w/HART protocol available through PACTware or other AMS systems, DTM/DD/EDDLs available
- Bluetooth connectivity with APP programs available

## 2.4 Technical specifications

<b>General specifications</b>	
Operating mode	User programmable
Number of volume exchanges	5 to 19
Hazardous environment	Gas, dust, gas and dust <i>Note:</i> Gas and dust are not covered by the 60079-2 standard
<b>Electrical specifications</b>	
Supply	
Rated power requirement	Universal AC/DC power requirement 100 to 240 VAC / 50 to 60 Hz / 200 mA 20 to 30 VDC / 600 mA Um = 250 V
<b>Connections</b>	
EPCU	Terminal blocks and grounding screw
UIC	4-pin micro connector and cable (provided), for the 6500-01-PM02, cable length is 5 meters.
Input type	Intrinsically safe, maximum cable 60 meters at 50 pf/ft and 0.2μH/ft
<b>Inputs</b>	
Input 1	Voltage free contact or namur proximity sensor
Input type	Intrinsically safe Switch input (IS) Uo = 9.56 V Io = 19.4 mA Co = 3.6 μF Lo = 90 mH Po = 46 mW
Input RTD	(1) 2-wire, PT100 RTD RTD input (IS) Uo = 5.88 V Io = 3.34 mA Co = 43 μF Lo = 100 mH Po = 5 mW
Input type	Intrinsically safe, Ex ib
<b>Output</b>	
AUX output	
Output type	Voltage free contact outputs, SPDT configuration
Inrush current	2 A
Contact loading	2 A @ 240 VAC, resistive, 2 A @ 24 VDC <i>Note:</i> External fusing is required at 3 AC or DC / 1500 A breaking current, Um = 250 V
<b>Enclosure output</b>	
Output type	Voltage free contact outputs, 2 N.O. configuration
Inrush current	8 A

Continued on next page

## 2.4 Technical specifications (continued)

Contact loading	8A @ 100-250 VAC resistive to 60 °C 5A @ 100-250 VAC resistive to 70 °C 8A @ 20-30 VDC resistive to 60 °C 5A @ 20-30 VDC resistive to 70 °C Note: External fusing is required at no more than 11 amps / 1500 A breaking current, Um = 250 V
COM output	HART Com via RS485, DTM through PACTware, Um = 250 V
<b>Digital valve</b>	When used with the 6500-MAN-DV-01, intrinsically safe
Internal resistance	280 Ω
Limit	Supply current Supply voltage Digital valve output (IS) Uo = 27.72 V Io = 109 mA Co = 84 nF Lo = 3 mH Po = 756 mW
Open loop voltage	24 VDC
<b>Proportional valve</b>	When used with the 6500-MAN-PV-01, intrinsically safe Proportional valve output (IS) Uo = 19.11 V Io = 70 mA Co = 251 nF Lo = 7.2 mH Po = 345 mW
Current	4 to 20 mA
Max. load	300 Ω
<b>Indicators</b>	
LED indicators	<ul style="list-style-type: none"> <li>• Safe pressure / BLUE – safe enclosure pressure is achieved</li> <li>• Enclosure power / GREEN – enclosure power is on / RED – power is off</li> <li>• Rapid exchange / BLUE – rapid exchange is active</li> <li>• System bypass / AMBER – Warning, system bypass is active</li> <li>• Alarm / Fault / RED blinking – Alarm is detected / RED solid – fault is detected</li> <li>• Key / Green – a button on the capacitive touch display has been activated. Momentary indication.</li> </ul>

Continued on next page



## 2.4 Technical specifications (continued)

Display	2x20 LCD for configuration, monitoring, and status of the 6500 system with back light and contrast selecting
<b>Pneumatic parameters</b>	
Protective gas supply	Instrument grade air or inert gas
Pressure requirement	For 6500-MAN-DV: 1.4 to 8.3 bar (20 to 120 psig) - regulated. For 6500-MAN-PV: 3.5 to 6.9 bar (50 to 100 psig) -regulated. <b>Note:</b> max pressure will depend on the vent model used.
Safe pressure	Gas: 0.88 mbar (0.35" wc) Dust: 0.88 mbar (0.35" wc) Gas+Dust: 0.88 mbar (0.35" wc) <i>Note:</i> Gas and dust are not covered by the 60079-2 standard
<b>Valve flows</b>	
EPV-6500-__-01, 03, 05	Standard vent series Readout on display from 56 to 850 l/min (2 to 30 scfm) in increments of 28 l/min (1 scfm). Minimum and maximum reading depend on type of vent and supply pressure. See data sheet for EPV-6500 series vent.
EPV-6500-__-07, 08	Continuous (dilution) vent series Readout on display is from 17 to 226 l/min (0.6 to 8 scfm) continuous reading. Maximum reading depends on type of vent and supply pressure. See data sheet for EPV-6500 series vent.
<b>Communication output</b>	RS485, (PACTware available)
<b>Ambient conditions</b>	
Ambient temperature	-20 °C to +70 °C
Storage temperature	-40 °C to +70 °C
Relative humidity	5 ... 85%, noncondensing
Vibration resistance	5 ... 100 Hz, 1g, 12 m/s <sup>2</sup> , all axes
Impact resistance	30 g, 11 ms, all axes
<b>Mechanical specifications</b>	
Connection types	See mounting and cable gland requirements
Degree of protection	IP66

Continued on next page

## 2.4 Technical specifications (continued)

Materials	
UIC display	Makrolon FI cover, A380 aluminum anodized casing
Housing	316L stainless steel
Hardware	316L stainless steel
Mass	Approximately 5.0 kg (11.0 lbs)
Cable gland requirements	For the 6500-CBLG requirements, please see data sheets available at <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a>
I.S. cable glands	Requires (5) M12-approved cable glands (see accessories section for approved cable glands)
Power cable glands	Requires (2) M20 and (2) M12 approved cable glands (see accessories section for approved cable glands)
Terminal connections requirements	
Grounding bonding wire	2.5 mm <sup>2</sup>
Internal and external ground screw	Torque is 14 in-lb (1.5 NM). Wire should terminate under the screw with a ring or fork lug.
I.S. and power terminals	
Wire strip length	9 mm
Minimum wire strand in stranded wire	0.1 mm or greater
Type of wire	Copper only, rated at 90 °C
Tightening torque, min/max	0.4 Nm / 0.5 Nm
Conductor cross section solid min/max	0.2 mm <sup>2</sup> / 2.5 mm <sup>2</sup>
Conductor cross section stranded min/max	0.2 mm <sup>2</sup> / 2.5 mm <sup>2</sup>
Conductor cross section stranded with ferrule <i>without</i> plastic sleeve min/max	0.25 mm <sup>2</sup> / 1.5 mm <sup>2</sup>
Conductor cross section stranded with ferrule <i>with</i> plastic sleeve min/max	0.25 mm <sup>2</sup> / 1.5 mm <sup>2</sup>
Conductor cross section stranded AWG/kcmil min/max	24 / 14
Wire insulation	0.25 mm minimum thickness
2 conductors with same cross section, <i>solid</i> min/max	0.2 mm <sup>2</sup> / .75 mm <sup>2</sup>
2 conductors with same cross section, <i>stranded</i> min/max	0.2 mm <sup>2</sup> / .75 mm <sup>2</sup>
2 conductors with same cross section, stranded, ferrules without plastic sleeve min/max	0.25 mm <sup>2</sup> / .34 mm <sup>2</sup>

**Warning!**

The Intrinsic safety entities listed in the table above are subject to the following considerations.

The parameters are valid when one of the two conditions below is given:

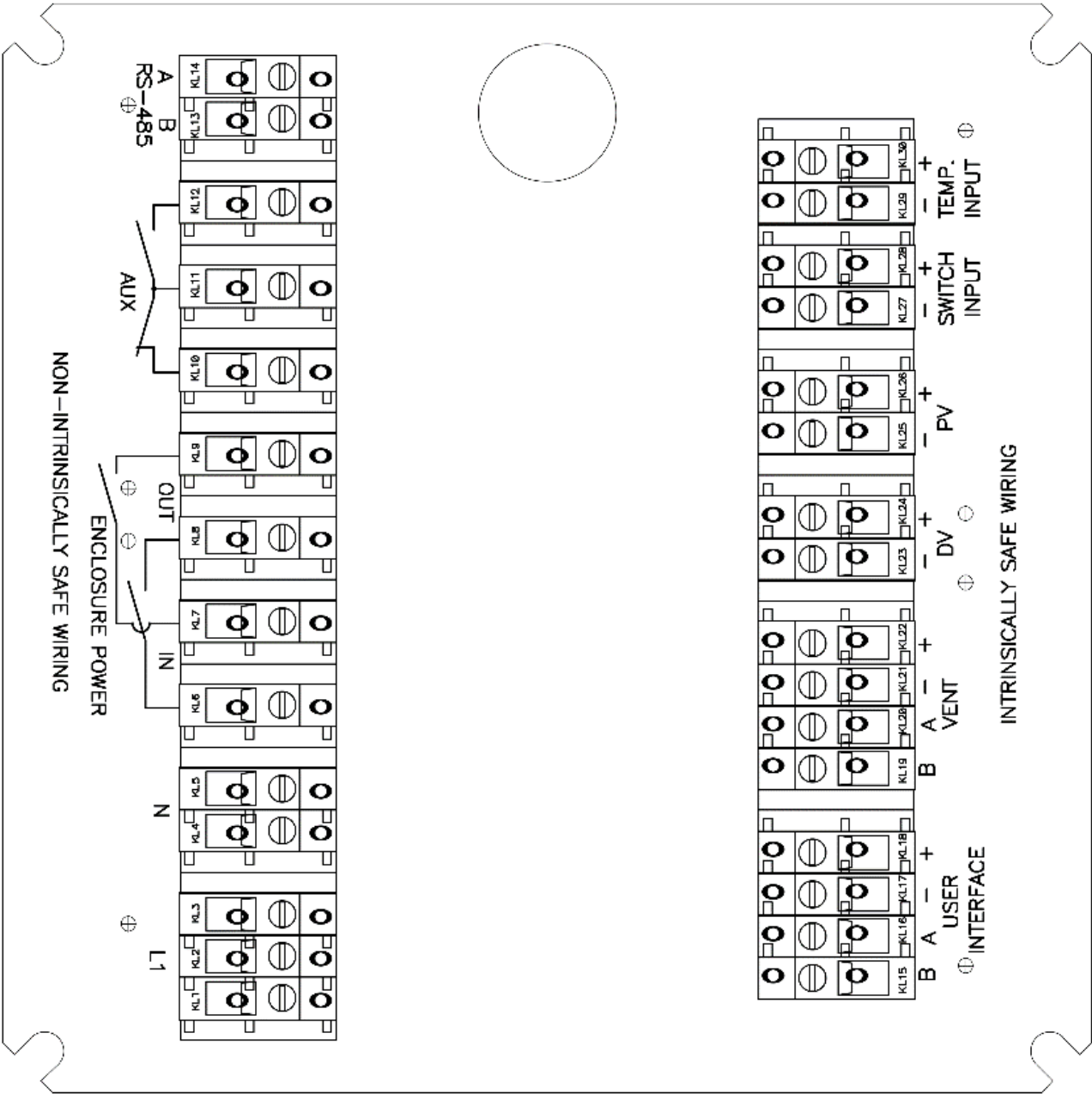
- The total Li of the external circuit (excluding the cable) is < 1% of the Lo value or
- The total Ci of the external circuit (excluding the cable) is < 1% of the Co value.

The parameters are reduced by 50% when both of the two conditions below are given:

- The total Li of the external circuit (excluding the cable) is > 1% of the Lo value and
- The total Ci of the external circuit (excluding the cable) is > 1% of the Co value.

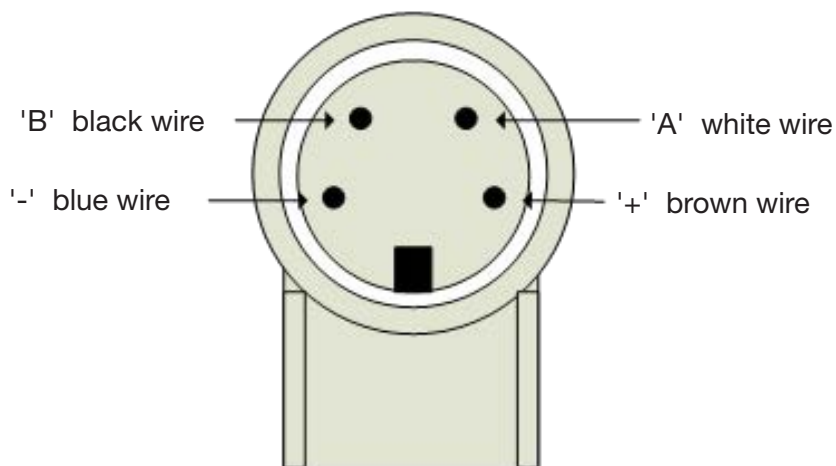
2.5 Electrical connections

In the 6500 control unit terminal housing



## 2.5 Electrical connections (continued)

6500 UIC cable connector



**Note!**

Grounding points internal and external will be identified with a ground symbol.



**Warning!**

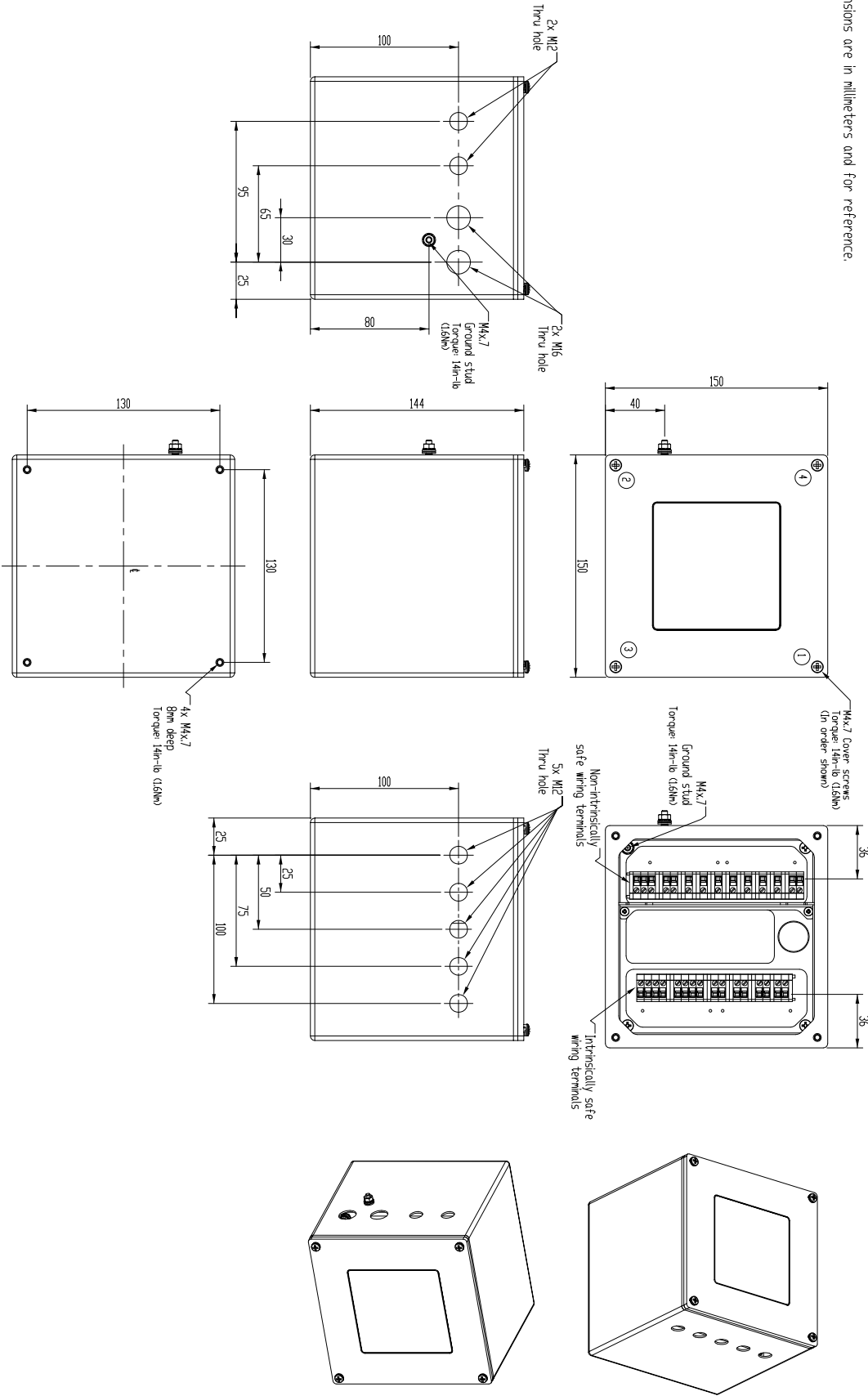
There is a metal divider for the I.S. and Non I.S. wiring terminals that shall not be removed.

2.6

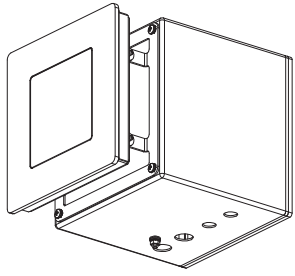
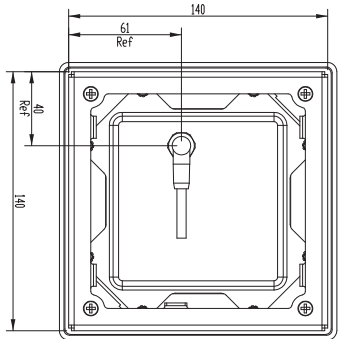
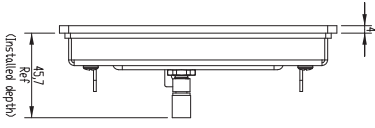
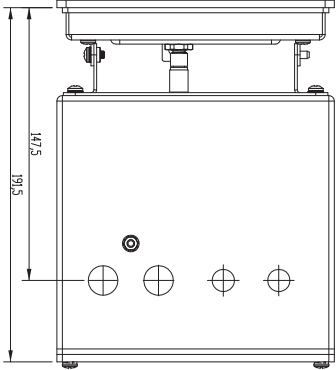
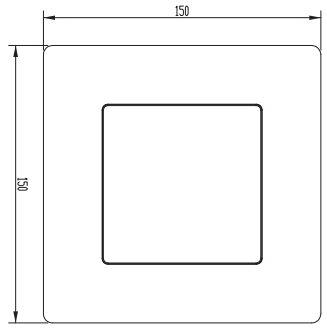
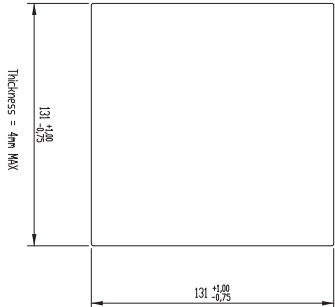
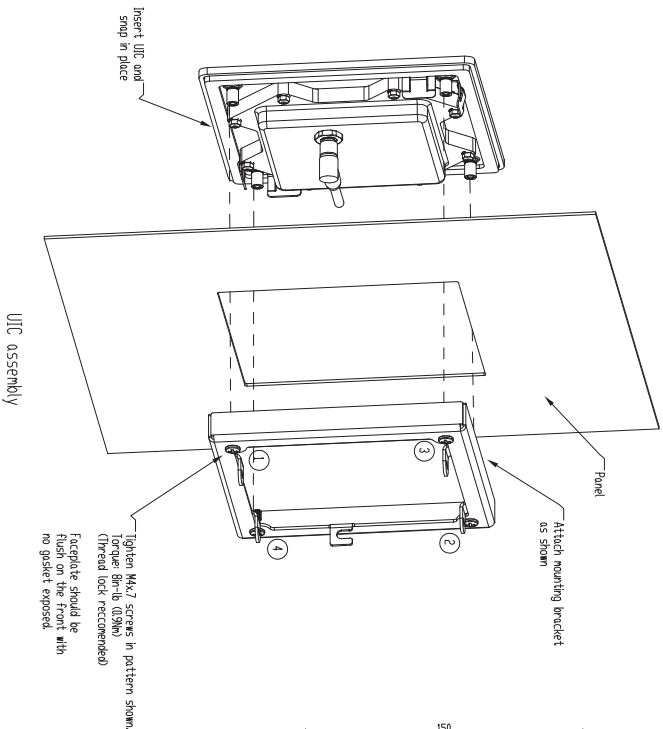
Dimensions

6500-01-EXT1-PNO-LNO External mount

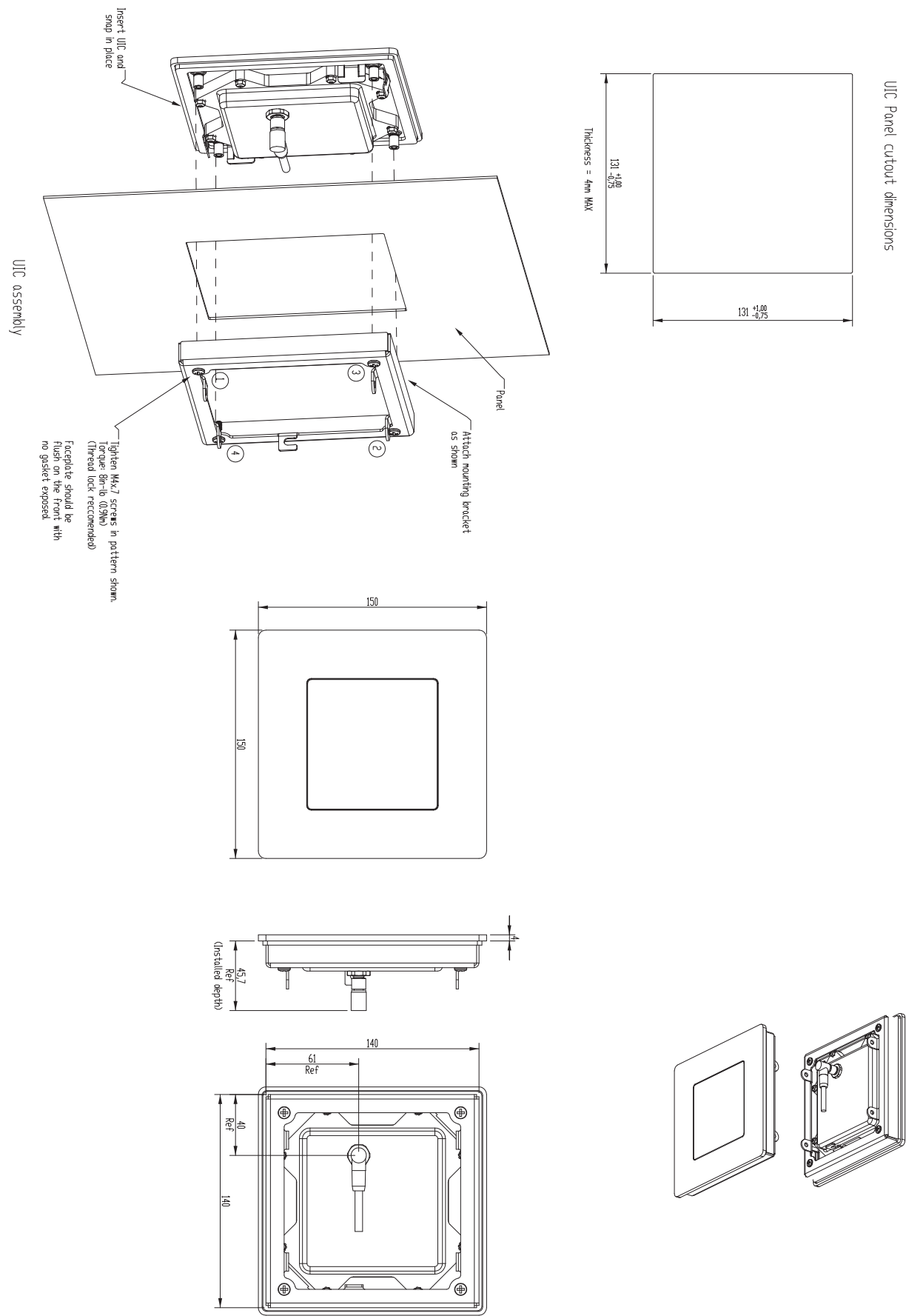
Note:  
All dimensions are in millimeters and for reference.



6500-01-PM01-PNO-LNO Internal mount with UIC attached to EPCU



6500-01-PM02-PNO-LNO Internal mount with UIC remote panel mount





Note:  
All dimensions are in millimeters and for reference



## 2.7 Mounting of the control unit – external, internal, internal with remote UIC mounting



### **Danger!**

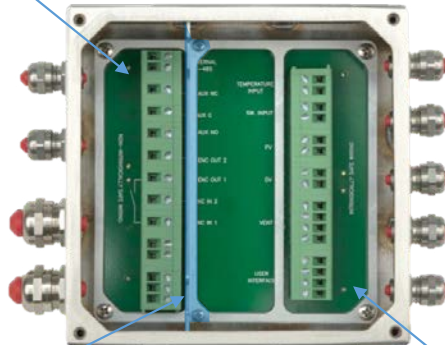
Display can be rotated +90° or -90° as shown. Rotation of display is not allowed when the I.S. cable/connector of the UIC is directly over the non-I.S. wiring terminals.



Non-Intrinsically Safe Wiring



I.S. / Non-I.S. Partition



Intrinsically Safe Wiring

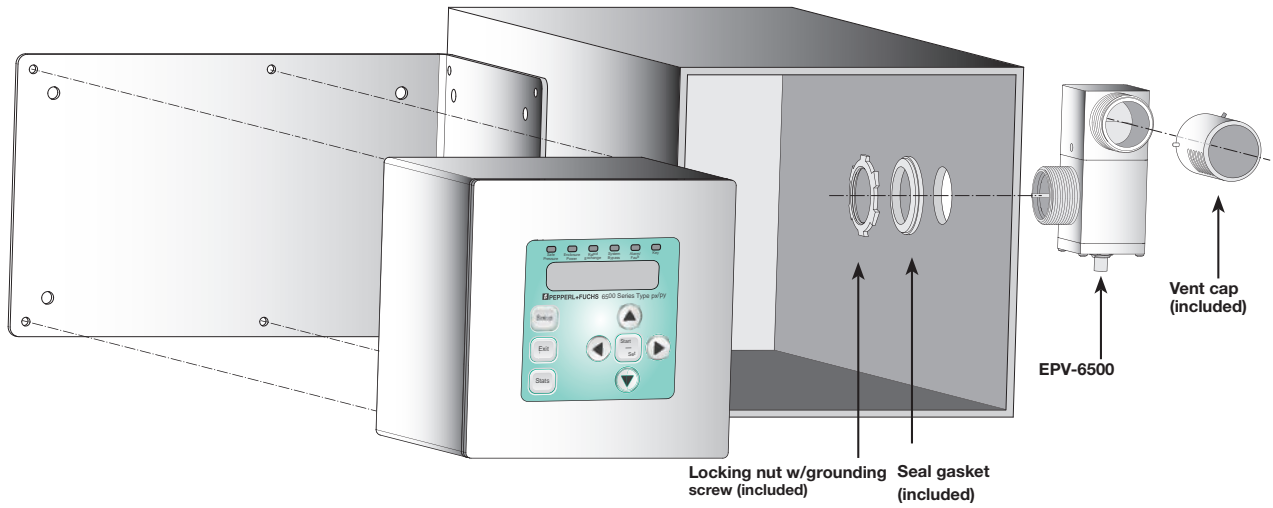


### **Warning!**

6mm screws and washers (4 included)  
Torque specification for UIC screws is 14 in-lb (1.5 Nm)

Control unit flush mount

## 2.7 Mounting of the control unit – external, internal, internal with remote UIC mounting



Side mount

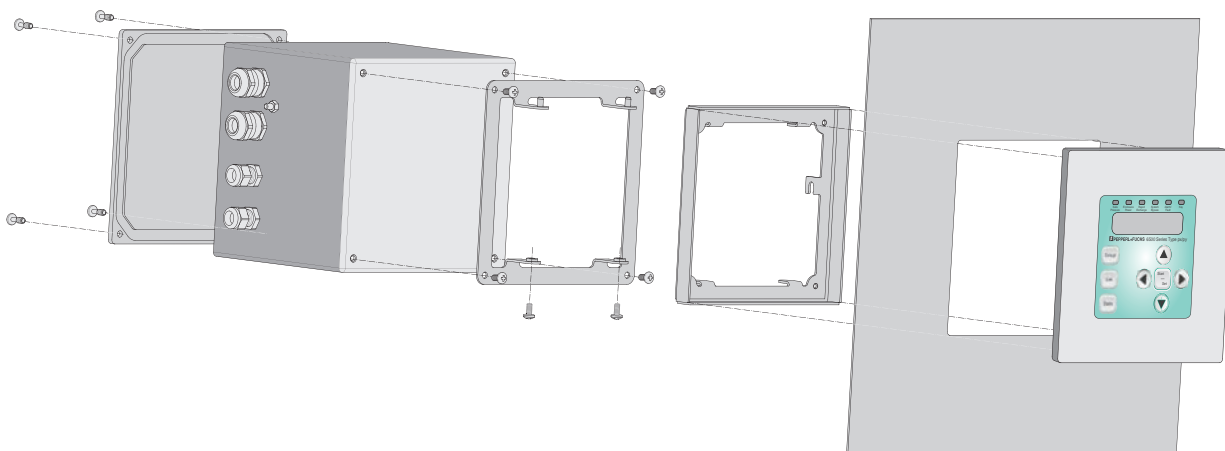


**Danger!**  
Unused cable entries  
will require a properly  
rated HAZLOC plug.

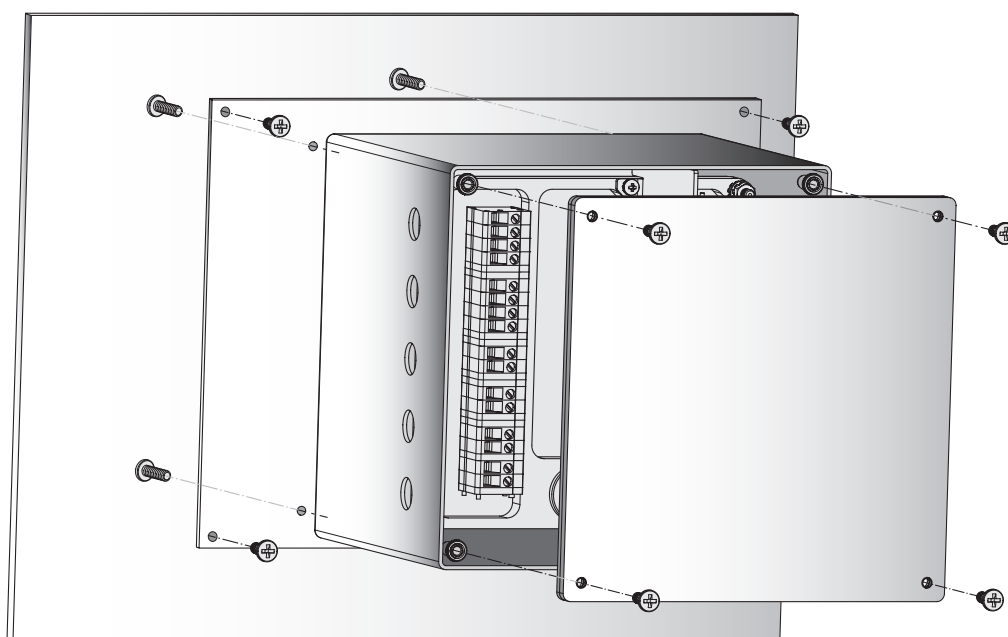


Top mount

## 2.7 Mounting of the control unit – external, internal, internal with remote UIC mounting



PM01 internal mounting



PM02 component kit



### **Warning!**

When mounting the 6500 control unit to a wall, the mounting method should be able to handle 4 times the gross weight of the 6500 unit.

### 3.0 EPV-6500 pressure relief vent

#### 3.1 Introduction

The EPV-6500 vent is required for the 6500 control unit and will provide a functional, certifiable purge and pressurization system for enclosures. As required by all pressurized enclosure systems, the EPV-6500 vent functions as a pressure relief device and allows the purge gas to exit the enclosure, yet provides a seal when the enclosure is pressurized below its pressure relief breaking pressure. The vent also has a spark arrestor as required for hazardous area operation.



The EPV-6500 vent has a pressure sensor for measurement of enclosure pressure and a flow sensor for measuring purging flow and/or dilution flow through the exhaust of the vent.

The two types of vents available are for standard applications (no containment system within the pressurized enclosure) and dilution applications (containment systems within the enclosure – ex: analyzer applications) and within these two groups are selections for different flows and purging pressures.

All vents can be mounted externally or internally to the pressurized enclosure; they are not position oriented. For internal mount only, the vent cap is exposed on the outside of the pressurized enclosure and the reference pressure connection to the vent has to be added for correct pressure and flow measurement. Connection fitting and tubing is included with the stainless steel cap version.

#### Standard Vents:

- EPV-6500-\_\_-01: Normally used with large enclosures for shorter purge times. This vent allows the maximum flow through the enclosure for the minimum enclosure pressures. For large enclosures, this will keep the forces on the enclosure low while having the largest purge flow off all the EPV selections. The vent also has a higher leakage rate after purging (pressurization), but normally on large enclosures the leakage rate is much greater than the vent leakage and does not become a factor. Large enclosure greater than 0.71 cu. m (25 cu. ft.).
- EPV-6500-\_\_-03: Normally used with medium or large enclosures where the leakage rate is critical and a short purging time is required. Because the seal is better than the '-01' model, the back pressure during purging will be higher; however, the leakage rate for pressurization is lower.
- EPV-6500-\_\_-05: Gives the best seal for pressurization but highest back pressure for purging. These vents are extremely useful for pressure supply or bottled pressure sources.

#### Dilution Vent:

- EPV-6500-\_\_-07: The vent has a 8 mm diameter opening and requires a continuous flow to maintain pressure/flow. The flow is measured across this 8 mm orifice plate for greater accuracy. When used with a proportional valve, like the 6500-MAN-PV, the control of flow is between 17 l/min (0.6 scfm) to around 85 l/min (3 scfm).
- EPV-6500-\_\_-08: The vent has a 16 mm diameter opening and requires a continuous flow to maintain pressure/flow. The flow is measured across this 16 mm orifice plate for greater accuracy. When used with a proportional valve, like the 6500-MAN-PV, the control of flow is between 70 l/min (2.5 scfm) to around 226 l/min (8 scfm).

### 3.2 Technical specifications

<b>General Specifications</b>	
Series	EPV-6500
Number of volume exchanges	05 to 19
Hazardous environment	Gas, dust, gas and dust
Minimum purge time	2 minutes
<b>Electrical specifications</b>	
<b>Supply</b>	
Rated power requirement	Intrinsically safe when connected to the 6500 control unit
Signal	BUS back to the 6500 control unit (I.S.)
Connection	M12 connector, 4 pin, cable length 5 meters provided
Maximum cable length	60 meters at 50 pf/ft and 0.2 $\mu$ H/ft
<b>Indicators</b>	
LED indicators	Power: Green
<b>Pneumatic parameters</b>	
Protective gas supply	Instrument grade air or inert gas
Safe pressure	Gas: 0.88 mbar (0.35" wc) Dust: 0.88 mbar (0.35" wc) Gas+dust: 0.88 mbar (0.35" wc)
Max vent pressure	62 mbar (25" wc)
Vent pressure range	0 to 25 mbar (0 to 9.9" wc)
<b>Vent flows</b>	
EPV-6500-__-01, 03, 05	Standard vent series Readout on display is from 56 to 850 l/min (2 to 30 scfm) in increments of 28 l/min (1 scfm). Minimum and maximum reading depended on type of vent and supply pressure.
EPV-6500-__-07, 08	Continuous (dilution) vent series Readout on display is from 17 to 226 l/min (0.6 to 8 scfm) continuous reading. Maximum reading depended on type of vent and supply pressure.
Purge flow rate / enclosure pressure	See graphs
<b>Leakage rate of EPV vents</b>	
EPV-6500-__-01	593 l/hr (21 scfh) @ .63 mbar (0.25" wc) 1640 l/hr (58 scfh) @ 1.9 mbar (0.75" wc)
EPV-6500-__-03	395 l/hr (14 scfh) @ .63 mbar (0.25" wc) 961 l/hr (34 scfh) @ 1.9 mbar (0.75" wc)
EPV-6500-__-05	260 l/hr (9.2 scfh) @ .63 mbar (0.25" wc) 622 l/hr (22 scfh) @ 1.9 mbar (0.75" wc)

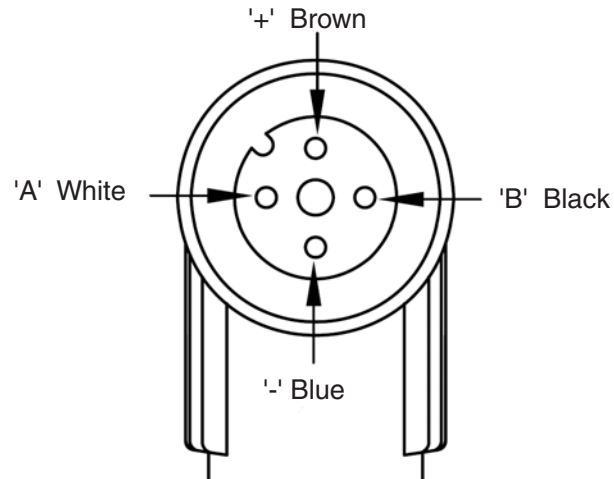
Continued on next page

## 3.2 Technical specifications (continued)

EPV-6500-__-07	n/a
EPV-6500-__-08	n/a
Breaking pressure	
EPV-6500-__-01	2.0 mbar (0.8" wc)
EPV-6500-__-03	3.5 mbar (1.4" wc)
EPV-6500-__-05	3.8 mbar (1.5" wc)
EPV-6500-__-07	n/a
EPV-6500-__-08	n/a
Accuracy	
Pressure reading	
EPV-6500-__-01, 03, 05, 07, 08	
At 25 °C	± 0.025 mbar (± 0.01" wc)
Full temperature range	± 0.125 mbar (± 0.05" wc)
Flow reading	
EPV-6500-__-01, 03, 05	Standard vent, ± 28 l/min (± 1 scfm)
EPV-6500-__-07, 08	Continuous vent, ± 2.6 l/min (± .1 scfm)
<b>Ambient conditions</b>	
Ambient temperature	-20 °C to +70 °C
Storage temperature	-40 °C to +70 °C
Relative humidity	5 ... 90%, noncondensing
Vibration resistance	5 ... 100 Hz, 1g, 12 m/s <sup>2</sup> , all axes
Impact resistance	30g, 11ms, all axes
<b>Mechanical specifications</b>	
Degree of protection	IP66 for the EPV-6500 vent, Type 4x for the mounting to the enclosure
Materials	
EPV-6500-AA-__	Body: 6000 series, aluminum anodized Cap: 5000 series, aluminum anodized
EPV-6500-SS-__	Body: 6000 series, aluminum anodized Cap: 316L stainless steel
Spark arrestor	304 stainless steel
Mass	Approx. 1.4 kg (3.1 lb)
Dimensions	127 x 146 x 83 mm (5.0" x 5.8" x 3.3")
Mounting	1½" NPT knockout (50.8 mm (2") hole) with seal nut included



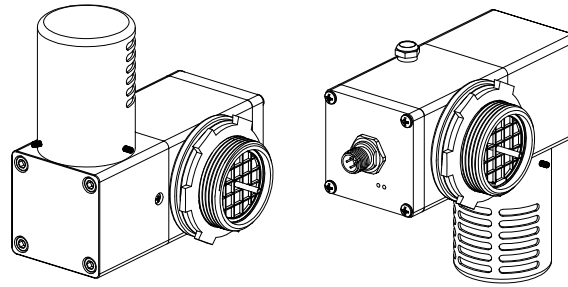
## 3.3 Electrical connections



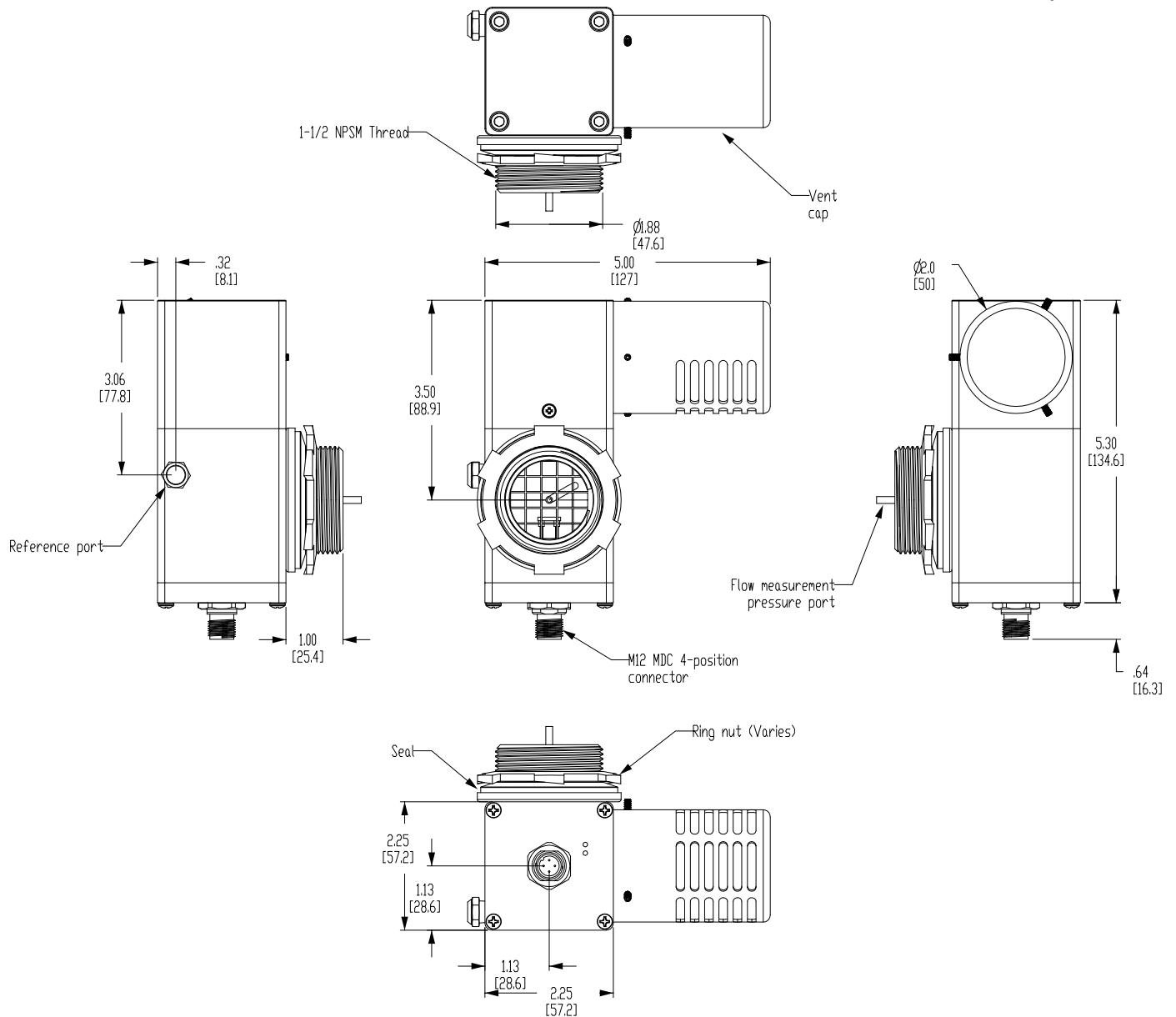
Male receptacle on EPV-6500 vent  
(mating cable included with EPV-6500 vent)

## 3.4 Dimensions

The following dimensions are for all the standard and continuous EPV-6500 vents.



*Note: Dimensions are in inches and for reference only.*



### 3.5 Flow rate curves

Standard vent pressure/flow curves:

The enclosure pressure vs. flow rate curves represent the EPV-6500-\_\_-01, 03, 05, vents. This corresponds to the enclosure pressure and is independent of the valve used, provided it can deliver the flow rate required.

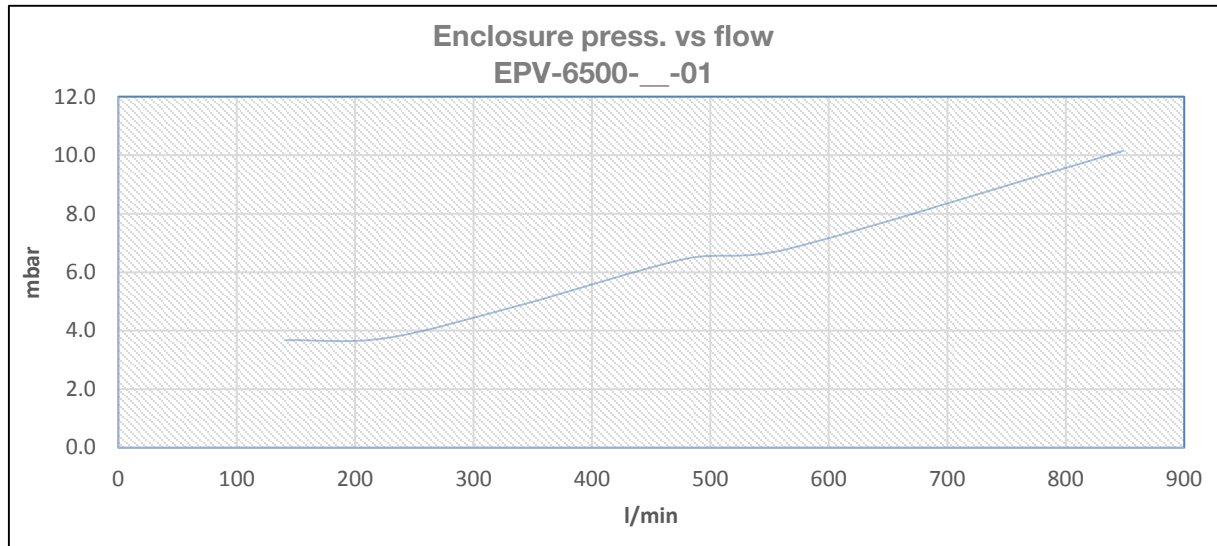
These curves represent a completely sealed enclosure, which may not be representative of the customer's enclosure. The flow in these curves are measured at the vent that represents the exhaust of the system. More flow may be required to reach the enclosure pressure due to leakages from gaskets, seals, windows, etc.

**Note!**

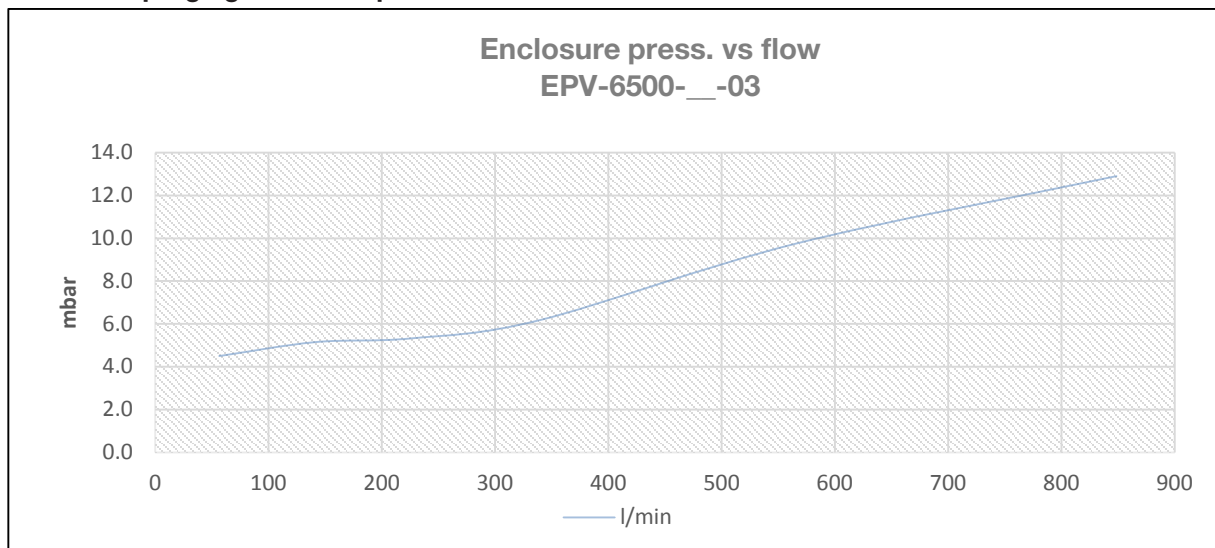


These graphs should only be used for representation of flow and pressure through each type of vent and not used for calculating purge time. They can be used for estimating purge time but the actual purge time will be automatically calculated by the 6500 control unit. These graphs are used to determine which vent type will be best suited for the application.

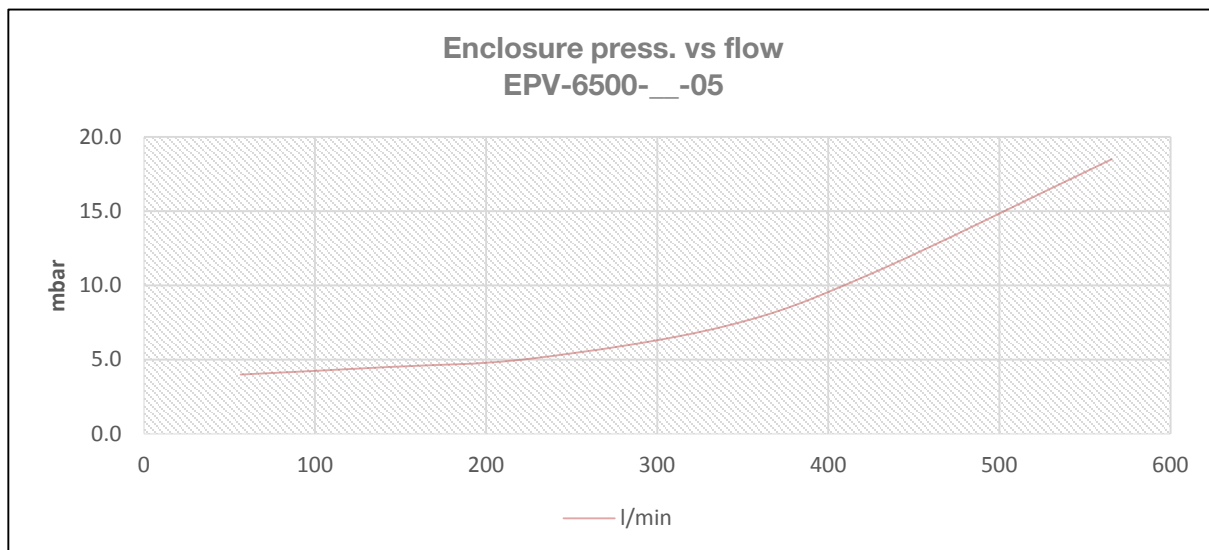
**EPV-6500-\_\_-01: Normally used for large enclosures for shorter purge times.**



**EPV-6500-\_\_-03: Normally used for medium or large enclosures where the leakage rate is critical and a short purging time is required.**



**EPV-6500-\_\_-5:** Gives the best seal for pressurization but highest back pressure for purging.

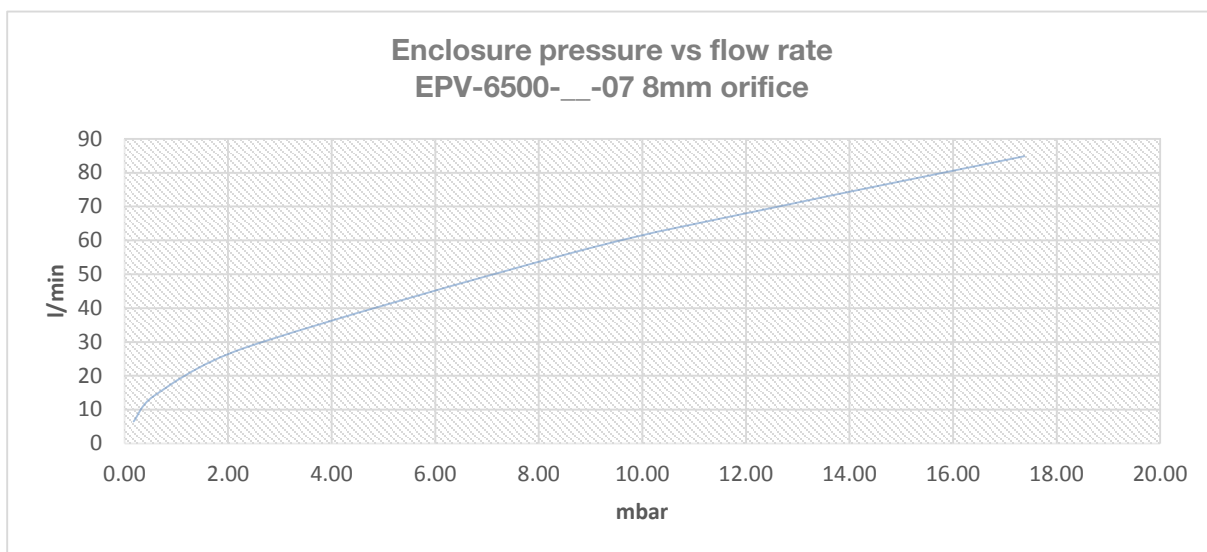


#### Continuous vent pressure/flow curves

The enclosure pressure vs. flow rate curves represent the EPV-6500-\_\_-01, 03, 05, vents. This corresponds to the enclosure pressure and is independent of the valve used, provided it can deliver the flow rate required.

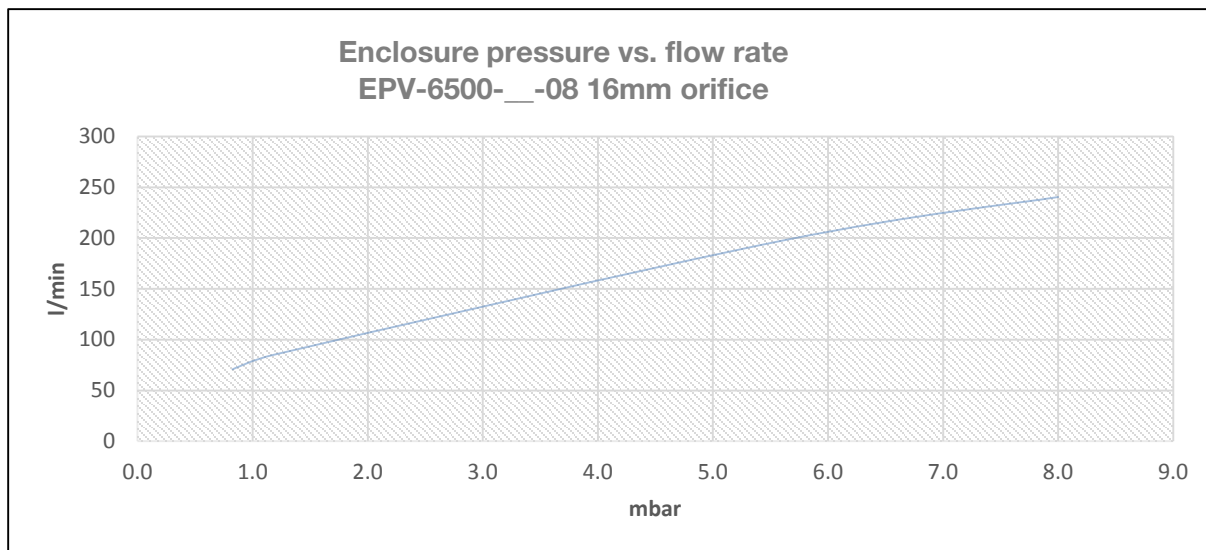
These curves represent a completely sealed enclosure which may not be representative of the customer's enclosure. The flow in these curves are measured at the vent which represents the exhaust of the system. More flow may be required to reach the enclosure pressure due to leakages from gaskets, seals, windows, etc.

**EPV-6500-\_\_-07:** The vent has a 8 mm diameter opening and requires a continuous flow to maintain pressure/flow.



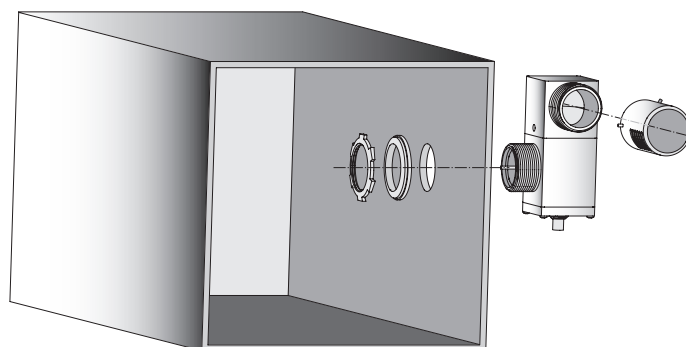
8 mm orifice

EPV-6500-\_\_-08: The vent has a 16 mm diameter opening and requires a continuous flow to maintain pressure/flow.

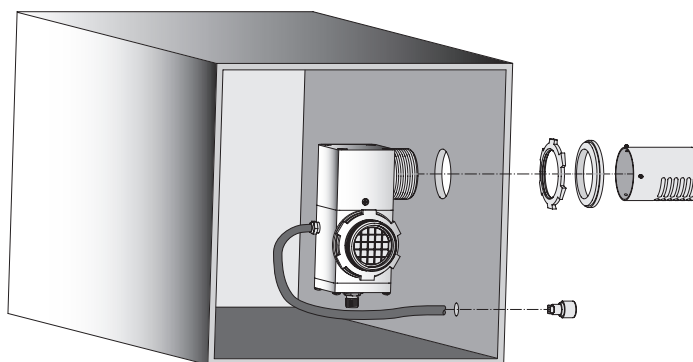


16 mm orifice

### 3.6 Mounting the EPV-6500 vent – inside and outside



External vent



Internal vent

*(Reference hardware included with EPV-6500-SS vent)*

## 4.0 Manifold valves

The 6500 system requires a purge/pressurization supply source. This flow/pressure is usually supplied by electrical valve(s) or manual valves. Pepperl+Fuchs offers optional valves for operation with the 6500 system for both standard (digital valves) and dilutions (PV) applications.

### 4.1 6500-MAN-DV

The 6500-MAN-DV-... is used for standard applications and consists of a digital (solenoid) valve and needle valve in one compact design. The valve comes with mounting hardware for inside or outside of the pressurized enclosure installation. The pneumatic ports on the unit are stainless steel 10 m tube compression fittings.

This valve is used in standard applications where dilution is not required and meets the I.S. requirements.

Data sheets for the 6500-MAN-DV valves are available at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

**Warning!**

For customer supplied electrical valves, please consult the 6500 control unit entity parameters.

### 4.2 6500-MAN-PV

The 6500-MAN-PV is usually used for dilution applications, but it could be used for standard applications for better control of pressure and flow after purging (pressurization). The valve comes with mounting hardware. The pneumatic ports on the unit are stainless steel 10 m tube compression fittings.

Data sheets for the 6500-MAN-DV valves are available at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

**Warning!**

For customer supplied electrical valves, please consult the 6500 control unit entity parameters.

## 5.0 Cable glands 6500-CBLG....

It was noted that the 6500-01 control unit does not come with cable glands. These can be supplied by the customer or can be purchased from Pepperl+Fuchs as a kit. Pepperl+Fuchs offers cable glands in several different materials and in the power side and the I.S. side (low power side).



The 'P' power side of the 6500 control unit requires (2) M16 cable glands, usually for power to the 6500 unit and enclosure power (contact output), and (2) M12 cable glands for auxiliary contact output and Ethernet. The cable glands are available in stainless steel, nickel-plated brass, or plastic. All types are certified and matched to the 6500 certifications. Each cable gland also includes the approved blanking plug for the cable gland selected. Lock nut is also included.

Customer supplied cable glands are allowed by the certification of the 6500 and has to meet the area classification certification. The termination of the cable glands to the 6500 housing will require a locking washer because the housing is not threaded.

The 'L' Intrinsic safe side of the 6500 control unit requires (5) M12 cable glands for I.S. field devices to and from the 6500 control unit. The cable glands are available in stainless steel, nickel-plated brass, or plastic. All types are certified and matched to the 6500 certifications. Each cable gland also includes the approved blanking plug for the cable gland selected. Lock nut is also included.

**Warning!**

Customer supplied cable glands and blanking plugs must be certified for the area classification.

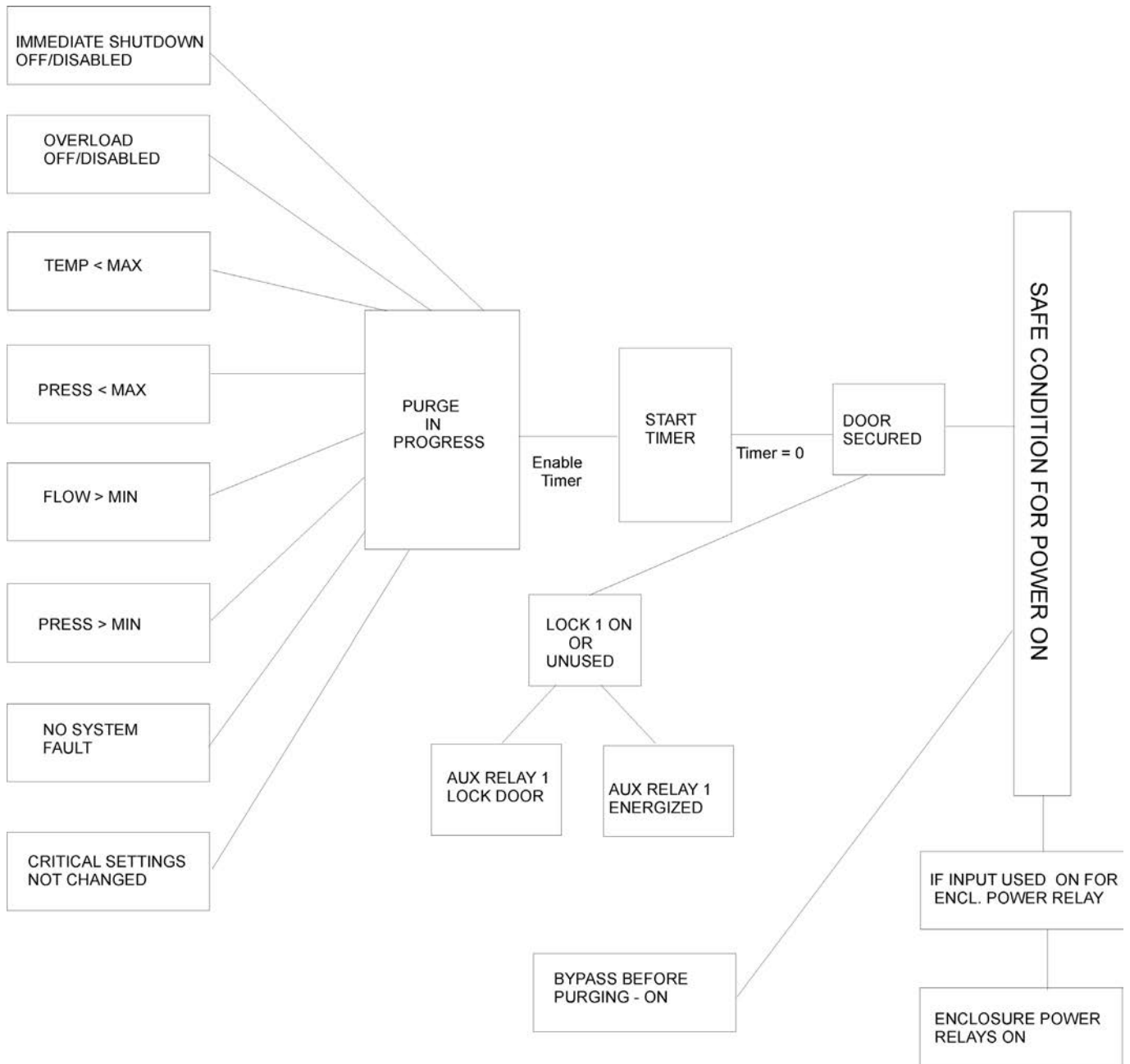
**Note!**

Special consideration may be required if ambient temperatures are above 60 °C; entries into the control unit can exceed 70 °C. Consult EN/IEC 60079-14 and other local and national codes.



## 6.0 Sequence of events

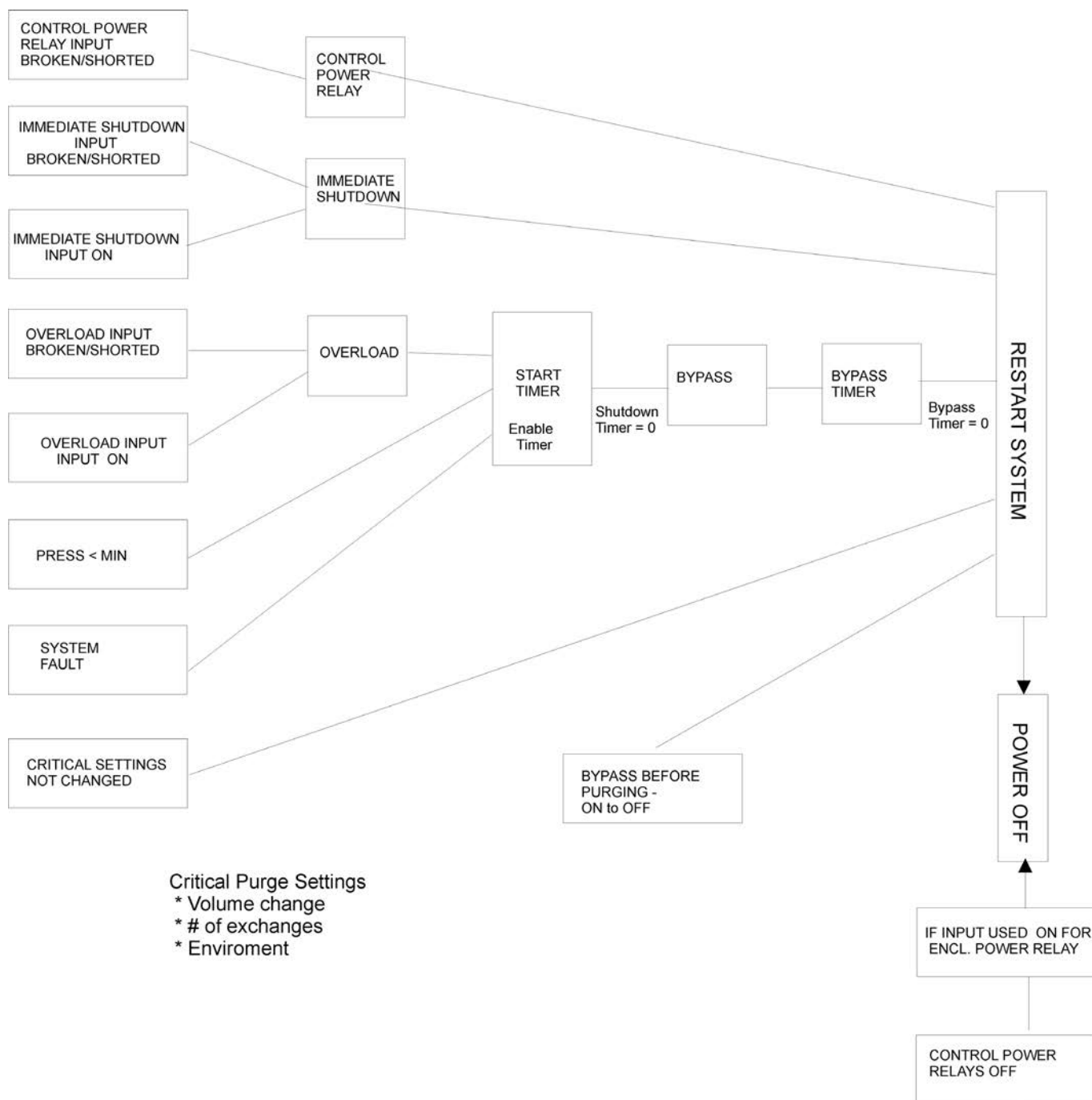
### 6.1 Turning on enclosure power



**Critical Purge Settings**

- \* Volume change
- \* # of exchanges
- \* Environment
- \* Min overpressure

## 6.2 Turning off enclosure power



## 7.0 Installation and operation - the 6500 purge and pressurization system

The 6500 control unit, EPV6500 vent, and manifold can be universally mounted to the customer's enclosure to produce a certifiable system.

### 7.1 The 'pxb' and 'pyb' systems

The 6500 allows the user to configure the system for a 'pyb' or 'pxb' system.

For 'pyb' systems, all electrical equipment within the pressurized enclosure must be rated Zone 2 or 22, if applicable, and the enclosure contacts do not have to be de-energized when loss of pressure, but an alarm has to be activated. In the 'pyb' mode, the AUX contacts will energize when the pressure drops below the minimum overpressure set point. Because the AUX is automatically mapped to this alarm, one output function can be assigned to the AUX contacts.



#### **Note!**

The AUX contacts will energize on either function. For applications where the enclosure contacts have to be de-energized when loss of pressure in a 'pyb' classification, choose the 'pxb' mode.

### 7.2 For gas atmospheres

In order to make sure an enclosure does not have hazardous gas trapped inside, purging is required. This is done any time the enclosure is below the minimum overpressure in the hazardous area. For purging, a protective gas is introduced into the enclosure so that the pressure builds up and the flow is exhausted through the enclosure. The measurement of this flow is achieved through the vent which feeds back to the control unit pressure and flow. The enclosure must be purged at least 5 times its volume (10 times for motors) before it is purged of hazardous gas. The enclosure then must maintain a minimum pressure to prevent the hazardous atmosphere from entering into the enclosure which power to the enclosure then can be energized. After purging, the flow into the enclosure can be reduced to hold the pressure due to leakages. The vent will feed back the pressure to the control unit to alarm, de-energize the enclosure contacts, and control the pressure, if possible.

### 7.3 For dust atmospheres

Purging is not required for dust atmospheres. If the enclosure is located in a dust atmosphere and is below the minimum overpressure set point, the enclosure must be checked and cleaned of all combustible dust, sealed (door and any other access points closed), and then pressurized to prevent combustible dust from getting inside. As long as the minimum overpressure is above the set point, the power to the enclosure can be energized. The vent will feed back the pressure to the control unit to alarm, de-energize the enclosure contacts, and control the pressure, if possible.

### 7.4 For dust and gas atmospheres



#### **Danger!**

EN and IEC 60079-2 standards do not state these requirements. Special consideration is needed and a proper certification body or AHJ will have to be consulted.

### 7.5 Dilution applications

Dilution applications usually deal with gas analyzers that are located inside the pressurized enclosure and are bringing in a stream of the hazardous gas for analysis. Any equipment including piping, that contains this hazardous gas within the pressurized enclosure is called the containment system. The containment system will have the potential to leak under normal and abnormal conditions, with either a known or unknown leakage rate of this hazardous gas. If the leakage rate is known, the 6500 system may be used to dilute the area or specific area within the enclosure to make other equipment safe to operate in the dilution area.



#### **Warning!**

For specific information on dilution requirements and testing, please refer to IEC 60079-2.

Dilution applications can only be considered with the normal and abnormal leakage rates known, which limited release are. Please refer to the 60079-2 to determine if dilution can be considered for your applications. In most cases, explosive liquids are not allowed and unlimited releases may require the protective gas supply to be inert gas only.

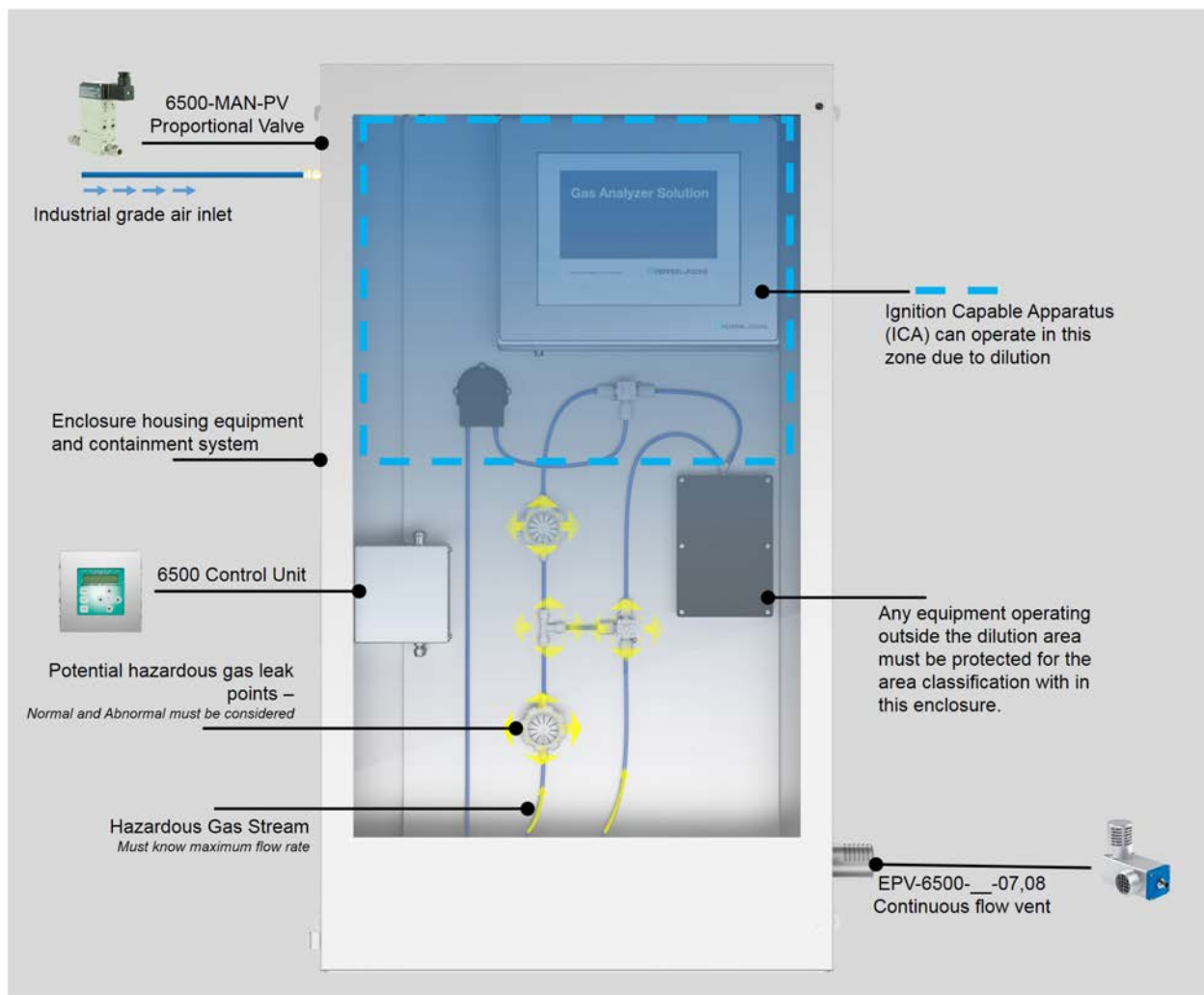
The following example explains the dilution area and how potential leak points in the containment system can affect the positioning of equipment. It is suggested that any equipment that needs to operate in the enclosure that is an ignition capable apparatus (ICA) should be isolated from the leaking containment system. The example below has some partitions to isolate the ICA from the containment system. The protective gas supply is introduced into the enclosure at the location of the ICA and dilutes the area so that the equipment can operate when the system is operating.



### Warning!

Refer to applicable standard for level of dilution required for safe operation of the ICA.

Any equipment operating within the enclosure outside the dilution area would have to be protected for the hazardous area, example Ex e, m, i, etc.



For dilution to properly be applied, the 6500 system would have to use the continuous vent (EPV-6500-\_\_-07 or 08) and a proportional valve like the 6500-MAN-PV. The continuous vent accurately measures the pressure and flow across an open orifice plate inside the vent to give flow vs. pressure curves for setting up the dilution requirement. For the setup, the 6500 will purge the enclosure at a user-set flow rate and after purging, the flow will settle at a user-set dilution flow. From the flow curves for each continuous vent. The 6500 menu also has a MIN FLOW SP (minimum flow set-point) that can be used to alarm the user if the dilution flow is too low. For shutting down the system, from the vent flow/pressure curves, the enclosure pressure for the shutdown flow in the curves can be used for the minimum overpressure value for de-energizing enclosure contacts.

Below is an example of a dilution application. In this example, the user has set up the enclosure for a dilution area as shown above and has calculated the required flow for dilution by knowing the normal and abnormal releases.

Equipment used:

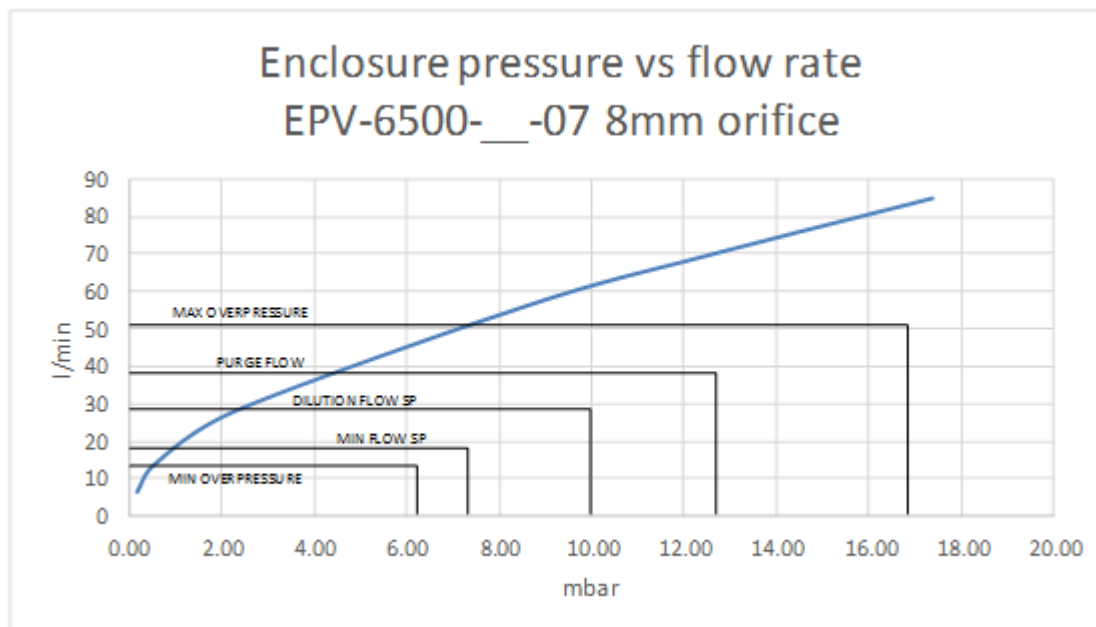
- 6500-01-... control unit
- EPV-6500-AA-07, continuous vent with 8 mm diameter orifice
- 6500-MAN-PV-01 proportional valve
- 6500-CBLG-... cable gland set for 6500 control unit (optional)

Required flow for dilution = 45 l/min

From the 6500 menu for purge settings, the following dilution parameters are selected. All of these parameters and set-points are user selectable.

MENU	PARAMETER	DESCRIPTION
<b>VENT FLOW CONTROL</b>	Dilution	User is going to set up system for dilution
<b>VALVE CONTROL</b>	Proportional	Proportional valve output on the 6500 control unit will be used
<b>DILUTION SETTINGS</b>		Sets up set-points
	Purge Flow	The flow rate for purging the enclosure by the proportional valve
	Dilution Flow SP	The flow rate for dilutions. This value should be higher than the minimum required flow because of variations in line pressure and reaction time of the PV
	Min Flow Sp	If the flow rate drops below this set-point, alarm is generated
<b>PRESSURES</b>	Min Overpressure	The pressure associated with the minimum flow for dilution to shut off the enclosure contacts
	Max Overpressure	Maximum enclosure pressure will adjust PV below this value

If we look at the flow curve for the EPV-6500-\_\_-07 we can see the enclosure pressures for the various flows. From these curves, if it is required to shut power off to the enclosure if flow drops below the minimum flow rate for dilution, then this pressure for the flow is selected for the minimum overpressure value.



PARAMETER	FLOW (L/MIN)	PRESSURE (MBAR)
MAX OVERPRESSURE	82	16.6 (user-select)
PURGE FLOW	70 (user-select)	12.5
DILUTION FLOW SP	60 (user-select)	9.8
MIN FLOW SP	50 (user-select)	7.1
MIN OVERPRESSURE	45	6.0 (user-select)

**Note!**

There will always be a delay in the reaction time of the proportional valve to a change in the line pressure to achieve set-point. The amount of time will depend on size of the enclosure, the amount of change in the line pressure, the speed of the change, and other factors. These factors also affect the over and under shoot of the proportional valve. Reaction times are dependent on the complete system and final adjustments may have to be done while the system is commissioned.

## 7.6 Setup procedures for standard applications:

1. Ensure that electrical, mechanical, and pneumatic connections and requirements are met to operate this system. Please refer to this manual and applicable standards/codes, including current edition of the EN/IEC 60079-14, for explanation of requirements. Electrical supply to the purge system shall be supplied through a switch or circuit-breaker to provide a method of disconnect from the supply source.
2. Do not connect a protective gas supply to the system or turn it off for setup.
3. Apply power to the 6500 system.
4. Define the 6500 system parameters in the menu structure for the application. Refer to 'Programming Menu' for instructions.
5. Set the user-interface on the 6500 control unit to pressure for indication of enclosure pressure.
6. Turn on the protective gas supply. Set the regulator to its lowest setting and then gradually increase pressure. When starting any system, it is best to start slowly to make sure the EPV-6500 vent is connected properly for pressure relief by checking to make sure the purge gas is exhausting from the enclosure. Do not exceed pressure ratings of the system.
7. If the unit is in the 'SA' (semi-automatic mode), then purging will not automatically begin. Beware that if the unit is in 'FA' mode, as soon as the enclosure pressure is greater than the min overpressure, purging will start. The unit is default from factory in 'SA' mode.
8. The system is ready to operate.

For dilution application, the procedures will be the same but the flow rate will be the set-point desired for operation of the system. The user-interface display can be scrolled to show flow rate. Note that the desired flow rate required must be greater than the min overpressure set-point to operate.

## 7.7 Operation for standard applications:

### Gas hazardous location

- Follow setup procedures in this section
- Seal enclosure
- Pressure is set to a value above the minimum overpressure set-point in the user-interface menu for purge settings. This pressure can be set below 0.88 mbar (0.35" wc).
- Depending on how the purging is selected (SA or FA mode), purging the enclosure is required.
- After a successful purging, with the pressure in the enclosure above the minimum overpressure set-point, the enclosure is considered safe, and power to the enclosure can be energized.
- If the enclosure pressure drops below the minimum overpressure set-point, then action is required. For 'pxb,' enclosure contacts have to be de-energized. For 'pyb,' enclosure contacts can remain on but an alarm must be initiated (this is done through the AUX contacts on the 6500 control unit).

### Combustible dust locations

- The pressurized enclosure must be cleaned out of all combustible dust and sealed. Purging cannot be done to clean out the pressurized enclosure.
- Set the enclosure pressure above the minimum overpressure set-point. Minimum pressure is 0.88 mbar (0.35" wc).
- With the enclosure pressure above the minimum overpressure set-point, it is considered safe, and power to the enclosure can be energized.
- If the enclosure pressure drops below the minimum overpressure set-point, then action is required. For 'pxb,' enclosure contacts have to be de-energized. For 'pyb,' enclosure contacts can remain on but an alarm must be initiated (this is done through the AUX contacts on the 6500 control unit).



***Danger!***

**Gas and combustible dust locations**

EN and IEC 60079-2 standards do not state these requirements. Special consideration is needed and a proper certification body or AHJ will have to be consulted.

**Dilution applications**

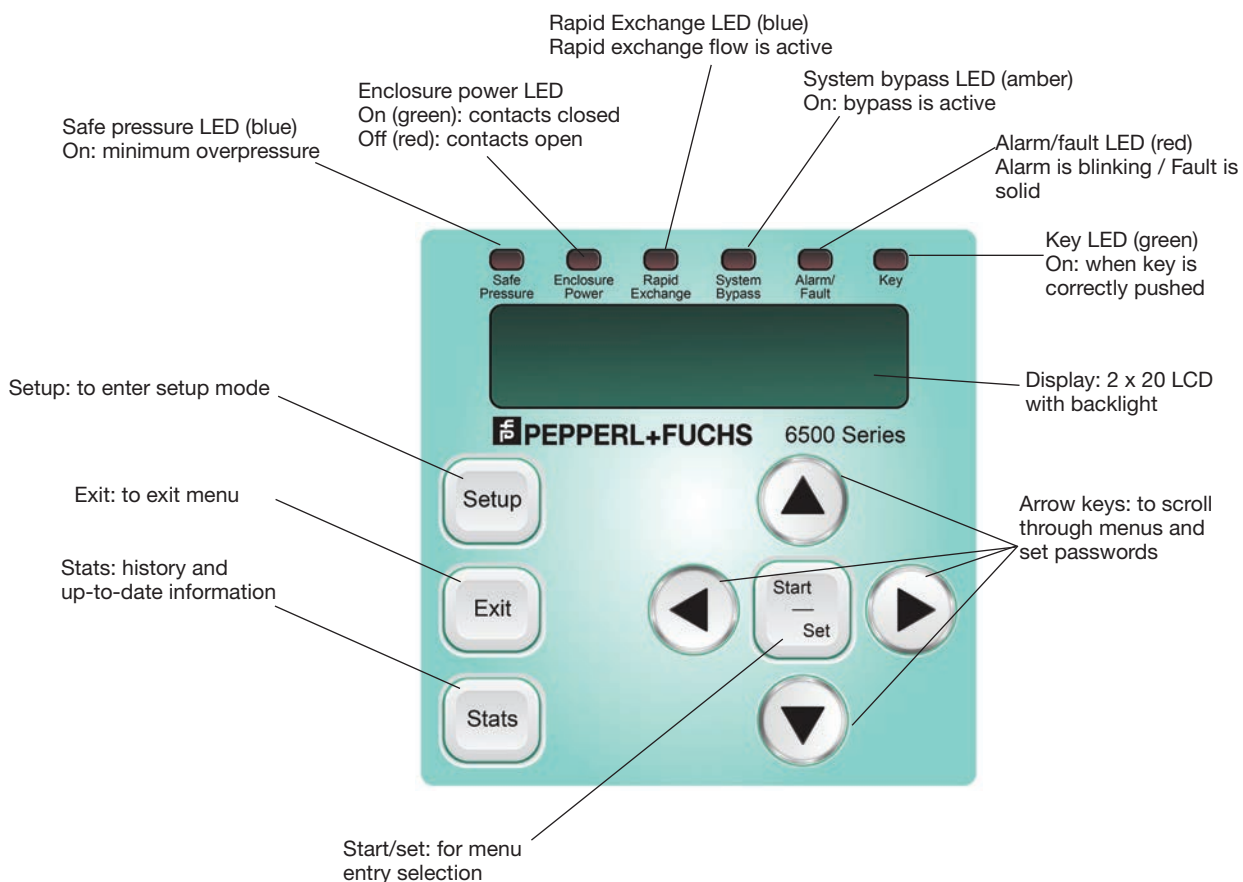
Startup for dilution applications will be the same as the standard, but the conditions for operating the equipment may require action to be taken if the flow rate used for dilution falls below its minimum set-point. An alarm is activated for the minimum flow-point, but for de-energizing the enclosure contacts, the minimum overpressure is used. This can be referenced to a flow from the *Flow vs Enclosure Pressure Cures for Set-Point Value*.



## 8.0 Programming the 6500 purge/pressurization system

- **The user-interface**

The user-interface uses capacitive touch technology to activate the buttons.



**Note!**

To turn on the back light on the 6500 display, push the Right and Left arrow key at the same time. To turn it off, repeat.



**Note!**

To change the contrast in the 6500 display, push the Up and Down arrow keys at the same time then adjust the contrast to the value acceptable.



**Note!**

During setup or STATS, if there are more than 60 seconds between keystrokes, the unit will go back to the operation screen.

- **Programming Menu**

SETUP (BUTTON)	—	PASSWORD	—	PURGE SETTINGS
			—	UNITS
			—	INPUT SETTINGS
			—	OUTPUT SETTINGS
			—	PASSWORDS
			—	LANGUAGE
			—	BYPASS CONTROL
			—	BLUETOOTH SETTINGS
			—	FACTORY RESTORE
			—	BOOTLOADER MODE
			—	SYSTEM RESET
			—	FACTORY RESTORE

- **Purge Settings**

PURGE TYPE	Px or Py
ENCLOSURE VOLUME	USER DEFINED
NUMBER OF EXCHANGES	5 TO 19
ENVIRONMENT	GAS, DUST, BOTH
PRESSURES	MAX, LOW, MINIMUM
TIMERS	SHUTDOWN, UNLOCK
OPERATION MODE	SA, FA
VENT FLOW CONTROL	STANDARD, DILUTION
VALVE CONTROL	DIGITAL, PROPORTIONAL
DILUTION SETTINGS	PURGE FLOW, DILUTION FLOW SP, MIN FLOW SP

**PURGE TYPE** – User-defined. W/O selections allow the system to operate as an ‘Ex px’ (nonhazardous to Zone 1/21) or ‘Ex py (Zone 2/22 to Zone 1/21).

Selection: ‘px’ or ‘py’

Default: ‘px’

**ENCLOSURE VOLUME** – User-defined. For free volume of enclosure to be pressurized.

Selection: 0 to 12.75 cu.m (0 to 450 cu.ft.)

Default: 0 cu.m

**NUMB OF EXCHANGES** – User-defined. Number of exchanges is the amount of enclosure volume changes for purging.

Selection: 5 to 19. 5 is the minimum for the applicable standards

Default: 5

**ENVIRONMENT** – User-defined. The hazardous area classification the pressurized enclosure will be located in. GAS requires purging. DUST requires cleaning out the enclosure before powering. Both require cleaning out the enclosure then purging before enclosure contacts are on.

Selection: GAS, DUST, BOTH

Default: GAS



***Danger!***

EN and IEC 60079-2 standards do not state these requirements. Special consideration is needed and a proper certification body or AHJ will have to be consulted for an environment that is both.

**PRESSURES** – User-defined.

Selection:

**MAX OVERPRESSURE:** The maximum enclosure pressure allowed. If max pressure is reached, the alarm status is on and the DV (digital valve output) will shut off and the PV (proportional valve) will reduce flow until pressure is below the max pressure set-point. Range is from 0.88 mbar (0.35" wc) to 25 mbar (10" wc).

**LOW PRESSURE:** Usually set above the Min Overpressure but above the set-point pressure and acts as an alarm. Range is from 0.88 mbar (0.35" wc) to 25 mbar (10" wc).

**MIN OVERPRESSURE:** The minimum pressure the system can operate properly. Range is from 0.88 mbar (0.35" wc) to 25 mbar (10" wc).

Default: MAX = 10 mbar (4" wc), LOW = 0.88 mbar (0.35" wc), MIN = 0.88 mbar (0.35" wc)

**TIMERS** – User-defined

Selection:

**SHUTDOWN TIMER:** For Ex px applications, enclosure pressure < MIN OVERPRESSURE will de-energize enclosure contacts. Shutdown timer allows the user to select the amount of time to delay de-energizing the enclosure. This is useful when there are short pressure drops in the system. Range is from 0 to 300 seconds

**UNLOCK TIMER** - Unlock timer is used to control the AUX contact output.  
Range is from 0 to 300 minutes

Default: Shutdown Timer = 0 seconds  
Unlock Timer = 0 min

**OPERATION MODE**- User-defined. Selections are SA or FA

**SA** – Semi-automatic. To start a purging min overpressure > set point and the Star/Set button has to be pressed

**FA** – Fully-automatic. Once the min overpressure is achieved, purging will begin

Default: SA

**VENT FLOW** – User-defined. Determines the type of vent that will be used

**STANDARD** – EPV-6500-\_\_-01, 03, 05 vents are used. These are used when the pressurized enclosure does not have a containment system.

**DILUTION** – EPV-6500-\_\_-07, 08 vents are used. This is used in conjunction with a proportional valve and is used for dilution of containment systems within the pressurized enclosure.

Default: STANDARD

**VALVE CONTROL** – User-defined. Determines the type of valve that will be used.

**DIGITAL** – this controls the 'DV' output on the 6500 control unit and will activate a digital valve (solenoid valve) when purging or low pressure alarm is active. Usually used with STANDARD applications. Can be used with the 6500-MAN-DV valve

**PROPORTIONAL** – This controls the 'PV' output on the 6500 control unit and will control flow/pressure within the enclosure at a set-point for purging and dilution. Usually used with the DILUTION valve but could be used with the STANDARD valve for more precise control of protective gas supply.

Default: DIGITAL

**DILUTION SETTINGS** – User-defined. This is only accessible when the vent flow is DILUTION.

PURGE FLOW – The set point for user required flow rate for purging the pressurized enclosure

DILUTION FLOW SP - The set-point for user required flow rate for dilution of the containment system within the enclosure.

MIN FLOW SP – If flow goes below this set-point, the alarm is activated but enclosure contacts still remain on. For de-energizing the enclosure contacts, set MIN OVERPRESSURE to the flow rate of the vent selected for de-energizing.

Default values are as follows:

- PURGE FLOW = 0.0 l/min (0.0 scfm)
- DILUTION FLOW SP = 0.0 l/min (0.0 scfm)
- MIN FLOW SP = 0.0 l/min (0.0 scfm)

• Units

UNITS	—	IMPERIAL
	—	METRIC

PARAMETER	METRIC UNITS	IMPERIAL UNITS
PRESSURE	mbar	Inches of water (" wc)
FLOW	l/min (liters/minute)	scfm (std cubic feet /min)
TEMPERATURE	° C (Celsius)	° F (Fahrenheit)
ENCLOSURE VOLUME	Cu m (cubic meters)	Cu ft (cubic feet)
TIME	Seconds	Seconds

- Input settings

INPUT 1	—	INPUT 1 FUNCTION	—	DISABLED	
				IMMEDIATE SHTDN	
				OVERLOAD	
				CONTROL PWR RELAY	
PRESS AS INPUT	—	PRESS FUNCTION	—	CONTROL OUTPUT 1	
				CONTROL VALVE	
				ON PRESSURE	XX.XX
				OFF PRESSURE	XX.XX
TEMP INPUT	—	TEMP INPUT 1	—	TEMP FUNCTION	
				DISABLED	
				IMMEDIATE SHTDN	
				OVERLOAD	
TEMP INPUT	—	TEMP INPUT 2	—	CONTROL PWR RELAY	
				CONTROL OUTPUT 1	
				CONTROL VALVE	
				ALARM	
TEMP INPUT	—	TEMP INPUT 1	—	ON SET POINT	XX °C or °F
				OFF SET POINT	XX °C or °F
				ON SET POINT	XX °C or °F
				OFF SET POINT	XX °C or °F

Input 1 function – The input terminal on the 6500 control unit can be used to active several functions as listed below in the table

FUNCTION	ACTION
<b>DISABLED</b>	Nothing happens when input is active
<b>IMMEDIATE SHUTDOWN</b>	When active, enclosure contacts immediately de-energize regardless of shutdown time. This acts like a system reset.
<b>OVERLOAD</b>	When active, enclosure contacts de-energize after shutdown time has timed out
<b>CONTROL PWR RELAY</b>	When active, the enclosure contacts energize (but only if in safe condition after purging and enclosure is pressurized
<b>CONTROL OUTPUT</b>	When active, control output contacts energize
<b>CONTROL VALVE</b>	When active, either the DV or PV valve output is active. For the PV, the value will go to 100%.
<b>SYSTEM BYPASS</b>	When active, the system bypass is active. This will only work for 'Bypass after purging' and not before purging. Before purging is only active through the user-interface

Default: DISABLED

INPUT SRM – when using switch inputs, a 6000-SRM (resistance network) can be added at the switch to indicate when the wire going to the switch is short or open. Must be used with the 6000 SRM.

Settings: YES or NO

Default: No

INVERT INPUT? – When selection is 'NO', the input is active when the switch is closed. When selection is 'YES', the input is active when the switch is open.

Selection: YES or NO

Default: NO

PRESSURE AS INPUT – PRESSURE FUNCTION - If the DIGITAL valve is selected, then the function can alarm/control the enclosure pressure between the ON and OFF PRESSURE in this section. If the proportional valve is used, then the ON PRESSURE is used.

FUNCTION	ACTION
<b>DISABLED</b>	Nothing happens when if pressure is below ON PRESSURE
<b>CONTROL OUTPUT</b>	The control output is active when below ON PRESSURE and de-activated when above OFF PRESSURE
<b>CONTROL VALVE</b>	The DV output is active when below ON PRESSURE and de-activated when above OFF PRESSURE

OFF DELAY TIME – If the digital valve is selected, this function will keep the digital valve on for the user-defined time after the off pressure is detected

Settings: 0 to 300 seconds

Default: 0 seconds

TEMP AS INPUT - Used with the 2-wire RTD PT100 sensor, this will take action to control/monitor the temperature between max and min values. This can be used for cooling where the ON temperature is higher than the OFF temperature or heating where the ON temperature is lower than the OFF temperature. The actions of these functions are in the table.

FUNCTION	ACTION
<b>DISABLED</b>	Nothing happens when pressure is below ON PRESSURE
<b>IMMEDIATE SHUTDOWN</b>	When active, enclosure contacts immediately de-energize regardless of shutdown time
<b>OVERLOAD</b>	When active, enclosure contacts de-energize after shutdown time has timed out
<b>CONTROL PWR RELAY</b>	When active, the enclosure contacts energize (but only if in safe condition after purging and enclosure is pressurized)
<b>CONTROL OUTPUT</b>	When active, control output contacts energize
<b>CONTROL VALVE</b>	When active, either the DV or PV valve output is active. For the PV, the value will go to 100%.
<b>ALARM</b>	When active, the LED is on and if the control output is directed to any alarm, the contacts will energize

ON SET POINT – The temperature when the action is activated. Default: 30 °C

OFF SET POINT – The temperature when the action is de-activated. Default: 20 °C

- **Output settings**

— OUTPUT 1 FUNCTION	— DISABLED
	— IMMEDIATE SHUTDOWN ALARM
	— OVERLOAD ALARM
	— MAX PRESSURE ALARM
	— LOW PRESSURE ALARM
	— LOST PRESSURE ALARM
	— ANNOUNCE PURGE
	— ANY ALARM
	— ENCLOSURE DOOR LOCK
	— SYSTEM BYPASS ALARM
— INVERT OUTPUT 1?	— NO, YES

OUTPUT FUNCTION – The Output settings affect the AUX (auxiliary contacts) on the 6500 control unit. The table below shows the different functions that can be directed to this output.

FUNCTION	ACTION
<b>DISABLED</b>	Nothing happens
<b>IMMEDIATE SHUTDOWN</b>	AUX contacts energize when there is an immediate shutdown active
<b>OVERLOAD</b>	AUX contacts energize when there is an overload condition
<b>MAX PRESSURE ALARM</b>	AUX contacts energize when the maximum pressure set point is reached
<b>LOW PRESSURE ALARM</b>	AUX contacts energize when the enclosure pressure drops below low pressure set point
<b>LOST PRESSURE ALARM</b>	AUX contacts energize when the enclosure pressure drops below lost pressure set point
<b>ANNOUNCE PURGE</b>	AUX contacts energize when the system is purging
<b>ANY ALARM</b>	AUX contacts energize when any alarm is active. The STATS menu will indicate the alarm
<b>ENCLOSURE DOOR LOCK</b>	Aux contacts energize and will de-energize after the enclosure unlock timer has counted down
<b>SYSTEM BYPASS ALARM</b>	AUX contacts energize when the bypass is active
<b>TEMP INPUT 1 ALARM</b>	AUX contacts energize when temperature input 1 alarm is active
<b>TEMP INPUT 2 ALARM</b>	AUX contacts energize when temperature input 2 alarm is active

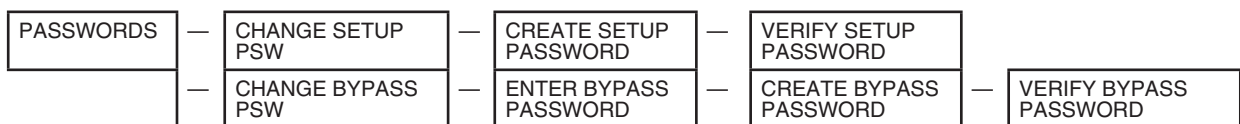
INVERT OUTPUT? - When selection is NO, the output is active when the function is active. When selection is YES, the output is active when the function is not active.

Selection: YES or NO

Default: NO

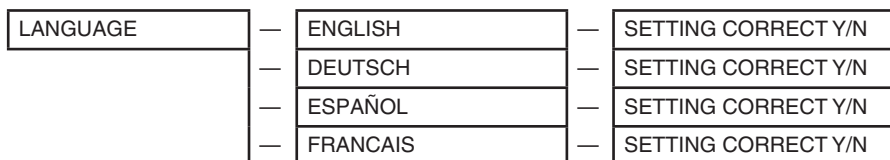
### • Passwords

During the first power up of the 6500 control unit, the setup and bypass passwords are entered in by the user. These passwords can be changed at any time. The passwords are key strokes from the up, down, right, and left keys on the user-interface. The identical consecutive key strokes are not allowed. The setup and bypass password can be the same but it is recommended to keep them different.



### • Language

During the first power up of the 6500 control unit the language is selected and can be changed at any time.





- **Bypass control**

To access the bypass, the bypass password has to be entered.

BYPASS CONTROL	—	PASSWORD	—	BYPASS ENABLE	—	NO, YES * FIXED/YES
				BYPASS ON	—	OFF, ON
				BYPASS BEFORE PURGE	—	OFF, ON

The bypass can be implemented one of two ways. Through the user-interface bypass menu or by a switch input on the 6500 control unit. In either case, the BYPASS ENABLE must be 'ON' to implement the bypass function. Once the ENABLE is ON, then a switch input (mapped to the input function) or by going into the menu and selecting bypass on will activate the bypass.

FUNCTION	ACTION
<b>BYPASS ENABLE</b>	To allow the bypass to function, it must be enabled. <b>NO</b> disables the bypass and cannot enable even if a switch input is on for bypass. <b>YES</b> allows the function to operate but if unit powers down and powers back up, this enable will go back to NO. <b>FIXED/YES</b> allows the function to operate and if the unit powers down and powers back up, the enable will still be yes
<b>AFTER PURGE ON</b>	Once the bypass is enabled, the bypass can only be active after the enclosure has been purged or cleaned and the pressure is above the MIN OVERPRESSURE
<b>BEFORE PURGE ON</b>	Once the bypass is enabled, the bypass can be active before and after the enclosure has been purged or cleaned. This allows users to commission the system during start up when no protective gas supply is present. This should only be done when the area is safe. This function is only available through the menu and not the input switch. If unit powers down and powers back up, this enable will go back to NO.



***Danger!***

This should be done only when the area is safe. Energizing the enclosure contacts before purging/cleaning the enclosure and safe enclosure pressure is dangerous.

- **Bluetooth settings**

BLUETOOTH SETTINGS	—	BLUETOOTH ENABLE	—	NO, YES
	—	BLUETOOTH ID	—	XXXXXXXXXXXXXXXXXXXX

The 6500 control unit is equipped with a Bluetooth chip that allow for wireless communication. Several apps are available on our web site [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).



**Note!**

Compatible with Bluetooth 4.0

- **System reset**

SYSTEM RESET	—	PASSWORD	—	NO, YES
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System Reset – System Reset will disconnect and connect power to the EPCU to start the system. This will not reset any user-defined parameters.

- **Factory restore**

FACTORY RESTORE	—	PASSWORD	—	NO, YES
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To implement the factory restore the bypass password is required. This will restore the 6500 system to the factory settings. After implementing a factory restore, the unit will request to enter setup and bypass passwords.

- **Bootloader load settings**

BOOTLOADER MODE	—	PASSWORD	—	NO, YES
-----------------	---	----------	---	---------

Bootloader mode allows new firmware to be updated into the system. While the system is in bootload it is important to not disconnect power. Bootloader may take up to 20 min to complete.

If the bootloader mode is initiated, and a PC not connected, an error will occur. It can be cleared only by powering the 6500 control unit down and back up.

Instructions for bootloader will be available at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

9.0 Stats

STATISTICS
CURRENT ALARM
LAST ALARM
CURRENT FAULT
LAST FAULT
CLEAR STATISTICS
CLEAR FAULT
P+F 6500 REVISION
SETTINGS

• Statistics

TEMPERATURES
MIN OVER PRESSURE
MAX OVER PRESSURE
MIN PURGE PRESSURE
MAX PURGE PRESSURE
LAST PURGE TIME
MIN PURGE FLOW
MAX PURGE FLOW
XPURGE6500 UP TIME
LAST SHUTDOWN
SHUTDOWN REASON
COM ERRORS

• Alarms and faults

ALARMS

NONE
NO SAFE PRESSURE
MAX PRESSURE
LOW PRESSURE
INPUT 1 BROKE/SHORT
INPUT 2 BROKE/SHORT
py ENCL PWR ALARM
IMMEDIATE SHUTDWN
OVERLOAD SHUTDWN
LOST FLOW
K1 STILL ON
K2 STILL ON
TEMP INPUT 1
TEMP INPUT 2

FAULTS

NONE
CONTROL VALVE
INPUT 1
FLOW READING
CONFIG STORAGE
VENT 1 UPDATE
CRC MISMATCH
VALVE
VENT 1 FLOW UPDATE
TEMPERATURE UPDATE
INTERNAL RAM

• Clear statistics

CLEAR STATISTICS	—	NO, YES	—	SETTING CORRECT Y/N
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- **Clear fault**

CLEAR FAULT	—	NO, YES	—	SETTING CORRECT Y/N
-------------	---	---------	---	---------------------

- **P+F 6500 revision**

P+F 6500 REVISION	—	MAIN UNIT	—	HARDWARE REVISION	—	X.XX
			—	SOFTWARE REVISION	—	X.XX
			—	BOOTLOADER REVISION	—	X.XX
			—	SERIAL NUMBER	—	XXXXXXXXXXXX
			—	DEVICE TYPE	—	XX
			—	DEVICE ADDRESS	—	XX
			—	COM ERRORS TO EPCU	—	XXX
			—	TIME	—	XXXXX HOUR(S)
	—	USER INTERFACE	—	HARDWARE REVISION	—	X.XX
			—	SOFTWARE REVISION	—	X.XX
			—	BOOTLOADER REVISION	—	X.XX
			—	SERIAL NUMBER	—	XXXXXXXXXXXX
			—	DEVICE TYPE	—	XXXXX
			—	DEVICE ADDRESS	—	XXXXX
			—	COM ERRORS TO EPCU	—	XXXXX
			—	BLUETOOTH ID	—	XXXXXXXXXXXX
	—	VENT 1	—	HARDWARE REVISION	—	X.XX
			—	SOFTWARE REVISION	—	X.XX
			—	BOOTLOADER REVISION	—	X.XX
			—	SERIAL NUMBER	—	XXXXXXXXXXXX
			—	LOW PRESS CAL	—	XXXXX
			—	HIGH PRESS CAL	—	XXXXX
			—	LOW FLOW CAL	—	XXXXX
			—	HIGH FLOW CAL	—	XXXXX
			—	DEVICE TYPE	—	XX
			—	DEVICE ADDRESS	—	XX
			—	COM ERRORS TO EPCU	—	XXXXX
			—	SENSOR 1 MIN TEMP	—	XXX °C or °F
			—	SENSOR 1 MAX TEMP	—	XXX°C or °F

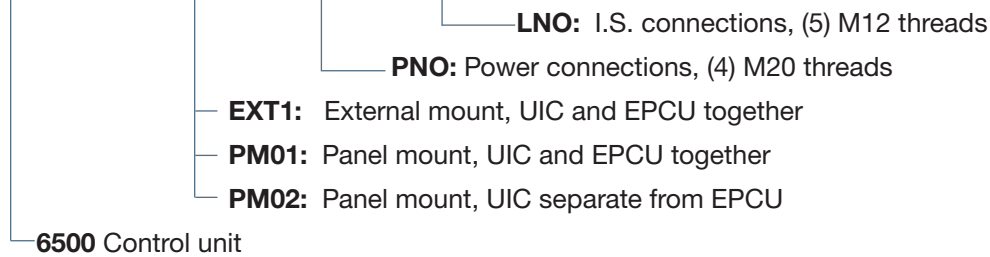
- **Settings**

SETTINGS	—	ENCLOSURE VOLUME
	—	NUMB OF EXCHANGES
	—	VENT FLOW CONTROL
	—	VALVE CONTROL
	—	PURGE FLOW
	—	DILUTION FLOW SP
	—	MIN FLOW SP
	—	ENVIRONMENT
	—	MIN OVER PRESSURE
	—	MAX OVER PRESSURE
	—	SHUTDOWN TIMING
	—	UNLOCK DOOR TIMER
	—	OPERATION MODE

## 10.0 Model number designation

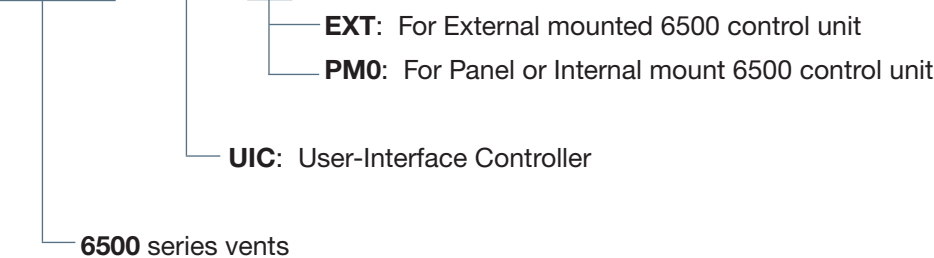
### The 6500 control unit

**6500 - 01 - EXT1 - PNO - LNO**



### The EPV-6500 UIC

**6500 - 01 - UIC - EXT**

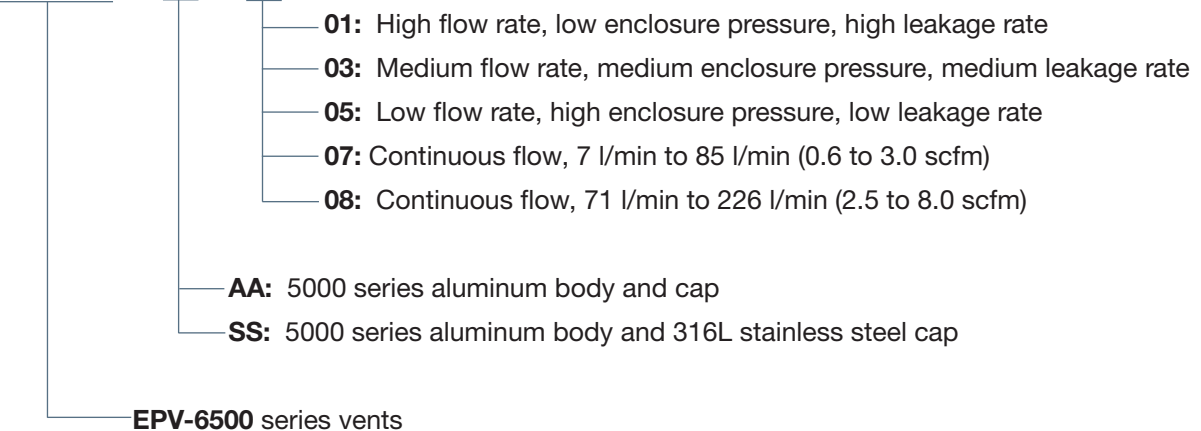


#### **Note!**

6500-01-UIC-... comes with standard 6500-01 control unit. Nomenclature is only used when ordering replacements.

### The EPV-6500 relief vent

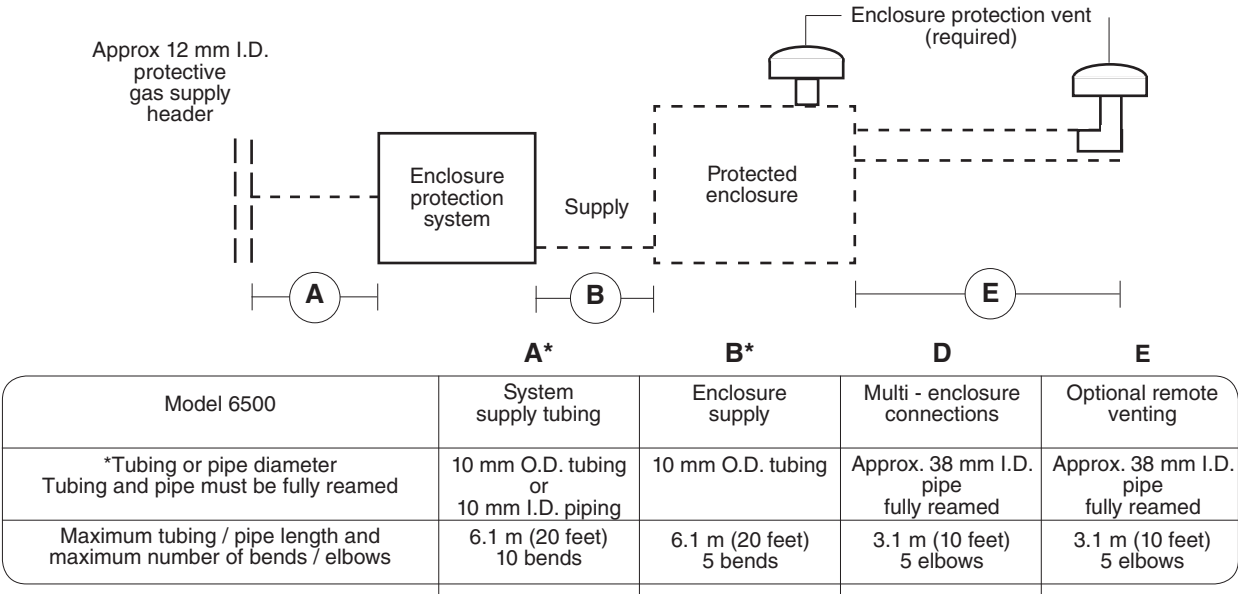
**EPV- 6500 - AA - 01**



11.0 Connection sizes, lengths, and bends

Establishing connection sizes, lengths & bends

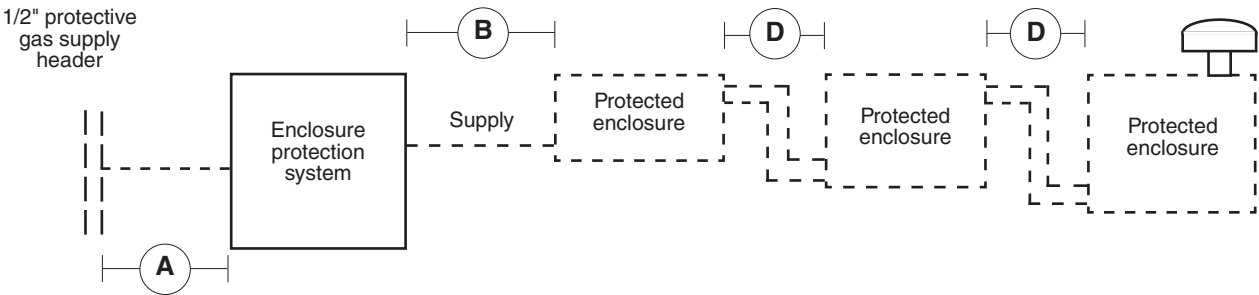
Typical single protected enclosure connections with vent



\*Smaller tubing and longer lengths allowed but flow will be decreased

**NOTE:** Tube and pipe sizes are trade sizes and are NOT equal in inside diameter. **DO NOT** substitute tube for pipe with the same trade size.

Typical multiple protected enclosure connections



Helpful hints

To ensure adequate protective gas flow to the protected enclosure(s), all piping and tubing must be fully reamed.

Precautions must be taken to prevent crimping and other damage to protective gas piping and tubing.

When protecting multiple enclosures with a single enclosure protection system, the enclosures should be connected in series from the smallest to the largest to ensure adequate protective gas flow.



**Note!**

Flow rate will also be dependant on the regulated pressure source

## 12.0 Purge 6500 user-interface programming worksheet

SETUP (button)	PASSWORD	PURGE SETTINGS	PURGE TYPE	Px Py	
			ENCLOSURE VOLUME	USER DEFINED	
			NUMB OF EXCHANGES	4 - 19	
			ENVIRONMENT	GAS DUST BOTH	
			PRESSURES	MAX OVER PRESSURE LOW PRESSURE MIN OVER PRESSURE	
			TIMERS	SHUTDOWN TIME UNLOCK DOOR TIMER	
			OPERATION MODE	SA FA	
			VENT FLOW CONTROL	STANDARD DILUTION	
			VALVE CONTROL	DIGITAL PROPORTION	
			DILUTION SETTINGS	PURGE FLOW DILUTION FLOW SP MIN FLOW SP	
		UNITS	IMPERIAL METRIC	SETTING CORRECT Y/N SETTING CORRECT Y/N	



## 12.0 Purge 6500 user-interface programming worksheet (cont.)

- INPUT SETTINGS	- INPUT 1	- INPUT 1 FUNCTION	- DISABLED	}			
			- IMMEDIATE SHUTDOWN				
			- OVERLOAD				
			- CONTROL PWN RELAY				
			- CONTROL OUTPUT 1				
			- CONTROL VALVE				
			- SYSTEM BYPASS				
			- INPUT 1 SRM	- NO, YES	-		
			- INVERT INPUT 1?	- NO, YES	-		
		- PRESSURE AS INPUT	- PRESSURE FUNCTION		- DISABLED	}	
	- CONTROL OUTPUT 1						
	- CONTROL VALVE						
	- ON PRESSURE			- XX.XX	-		
	- OFF PRESSURE			- XX.XX	-		
	- OFF DELAY TIME			- 0-300 SEC.	-		
- TEMP AS INPUT	- TEMP 1 INPUT			- TEMP FUNCTION	- DISABLED	}	
					- IMMEDIATE SHUTDOWN		
					- OVERLOAD		
					- CONTROL PWN RELAY		
			- CONTROL OUTPUT 1				
			- CONTROL VALVE				
			- ALARM				
			- ON SET POINT	- XX °F or °C	-		
			- OFF SET POINT	- XX °F or °C	-		

## 12.0 Purge 6500 user-interface programming worksheet (cont.)

		TEMP 2 INPUT	TEMP FUNCTION	DISABLED IMMEDIATE SHUTDOWN OVERLOAD CONTROL PWN RELAY CONTROL OUTPUT 1 CONTROL VALVE ALARM		
			ON SET POINT	XX °F or °C		
			OFF SET POINT	XX °F or °C		
OUTPUT SETTINGS	OUTPUT 1 FUNCTION	DISABLED IMMEDIATE SHUTDOWN ALARM OVERLOAD ALARM MAX PRESSURE ALARM LOW PRESSURE ALARM LOST PRESSURE ALARM ANNOUNCE PURGE ANY ALARM ENCLOSURE DOOR LOCK SYSTEM BYPASS ALM				
	INVERT OUTPUT 1	NO, YES				
PASSWORDS	CHANGE SETUP PSW	CREATE SETUP PSW	VERIFY SETUP PSW			
	CHANGE BYPASS PSW	ENTER BYPASS PSW	CREATE BYPASS PSW	VERIFY BYPASS PSW		

## 12.0 Purge 6500 user-interface programming worksheet (cont.)

LANGUAGE	ENGLISH	SETTING CORRECT Y/N	}	
	DEUTSCH	SETTING CORRECT Y/N		
	ESPAÑOL	SETTING CORRECT Y/N		
	FRANÇAIS	SETTING CORRECT Y/N		
BYPASS CONTROL	PASSWORD	BYPASS ENABLE	NO, YES, FIXED/ YES	
		AFTER PURGE ON	OFF, ON	
		BEFORE PURGE ON	OFF, ON	
BLUETOOTH SETTINGS	BLUETOOTH ENABLE	NO, YES		
	BLUETOOTH ID	XXXXXXXXXXXXXXXX		
BOOTLOADER MODE	PASSWORD	NO, YES		
FACTORY RESTORE	PASSWORD	NO, YES		
SYSTEM RESET	PASSWORD	NO, YES		

### 13.0 Maintenance & repair

1. Purge and pressurization system does not require special maintenance except cleaning of pneumatic filters, when used, and normal periodic functional checks, including pressure and flow readings within specifications contained in this manual. When checking whether the pressure and flow measurements of the EPV-6500 are within specifications, use calibrated equipment to determine measurements or contact a P+F representative or the factory to send back the EPV-6500 vent for pressure and flow verification.



**Warning!**

The 6500 control unit EPCU is powder filled and is not user serviceable. This unit must be sent back to the factory for replacement/repair.

2. The 6500 purge and pressurization system, when operated in conjunction with a hazardous area, must not be modified. If there is a defect, the product may need to be replaced. Repairs must be performed only by a Pepperl+Fuchs specialist who is specially trained and authorized to repair the defect.
3. Any replaceable fuses must be replaced with specific fuse ratings and type as written in this manual under specifications.
4. When servicing, installing, and commissioning, the area must be free of all combustible material and/or hazardous explosive gas. Only the terminal compartment of the control unit is accessible to the user. Not under any circumstances shall the control unit, user-interface, or vent be taken apart.
5. Any cable glands that require replacement shall be replaced with the same model or another approved cable gland that meets the area classification.
6. For the 6500-01-EXT1-... control unit, the cable from the user-interface must be placed in the control unit on the I.S. side of the physical barrier.

Contact customer service for an RMA (Return Merchandise Authorization).

### 14.0 Alarm and Fault Conditions

The 6500 purge controller can indicate certain alarm and fault conditions when they happen. The alarm condition is indicated on the display under the Alarm/Fault LED and will blink for alarm and solid for fault. The alarm will not disengage enclosure contacts if they are on but can be directed to the AUX alarm contacts. The fault will disengage enclosure contacts.

Below are the alarm descriptions:

Alarms	Description	Cause
NO SAFE PRESSURE	Enclosure pressure is below minimum safe pressure	- No purge supply - Enclosure leakage too great
MAX PRESSURE	Enclosure pressure is above the maximum pressure allowed	- purge supply pressure too much - EPV-6500 vent is blocked or not installed
LOW PRESSURE	Enclosure pressure is below the alarm pressure but above the min safe press.	- Purge supply capacity is not keeping up - Enclosure is starting to leak more
INPUT 1 BROKE/SHORT	When SRM is selected, then a wire is broke or shorted going to the switch input	- SRM is selected and not installed on the switch input - Broken or shorted wire to switch/ SRM or proximity sensor
Py ENCL PWR ALARM	Activates only when 'py' selected and enclosure pressure drops below minimum safe pressure	- no purge supply - Enclosure leakage too great

IMMEDIATE SHUTDOWN	Immediate shutdown has to be active to indicate an alarm	-Immediate shutdown has been activated
OVERLOAD SHUTDOWN	Overload shutdown has to be active to indicate an alarm	-Overload shutdown has been activated
LOST FLOW	During purging, if EPV-6500 vent detects a flow lower than expected, alarm is activated	-Purge supply capacity is not large enough - During purging, excess leakage is introduced to cause drop in flow
ENCLS PWR RELAY	Enclosure power relays are working properly – two sets of contacts for monitoring condition of contacts	-no power connected to the input of the contacts - Contacts are welded
TEMP INPUT 1	If the temperature input 1 is active	-The temperature of the RTD is outside the limits of the TEMP INPUT 1
TEMP INPUT 2	If the temperature input 2 is active	-The temperature of the RTD is outside the limits of the TEMP INPUT 2

Below are the fault descriptions:

Fault	Description	Cause
INPUT 1	Input 1 is not functioning properly	Power for input is defective – Defective EPCU
FLOW READING	Flow reading from EPV-6500 vent is corrupted or not available	-Flow readings are outside the range of the EPV-6500 vent being used.
CONFIG STORAGE	EPCU fault	EPCU fault – defective EPCU
VENT 1 UPDATED	EPV-6500 vent is not communicating	-No EPV-6500 vent connected to controller - One or more of the connections from EPV-6500 vent to controller is not correct or not connected. -EPV-6500 fault
CRC MISMATCH	EPCU fault	Mismatch of instruction set for controller – defective EPCU
VALVE	No power to the valve output	EPCU fault – defective EPCU
VENT 1 FLOW UPDATE	EPV-6500 is getting power but communication is not correct	- One or more of the connections from EPV-6500 vent to controller is not correct or not connected. -EPV-6500 fault
TEMPERATURE UPDATE	RTD temperature reading is out of spec or not reading	-RTD is defective -No RTD connected to 6500 controller input
INTERNAL RAM	EPCU memory fault	-EPCU fault

## 15.0 Dismantling & decommissioning

Abide by all local and any other code requirements for disposing of electronic equipment. When disposing of any component of the 6500, certification labels shall be marked VOID across such labels.

### 16.0 Notes

## 16.0 Notes

# Your automation, our passion.

## Explosion Protection

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

## Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- AS-Interface
- Identification Systems
- Logic Control Units
- Connectivity