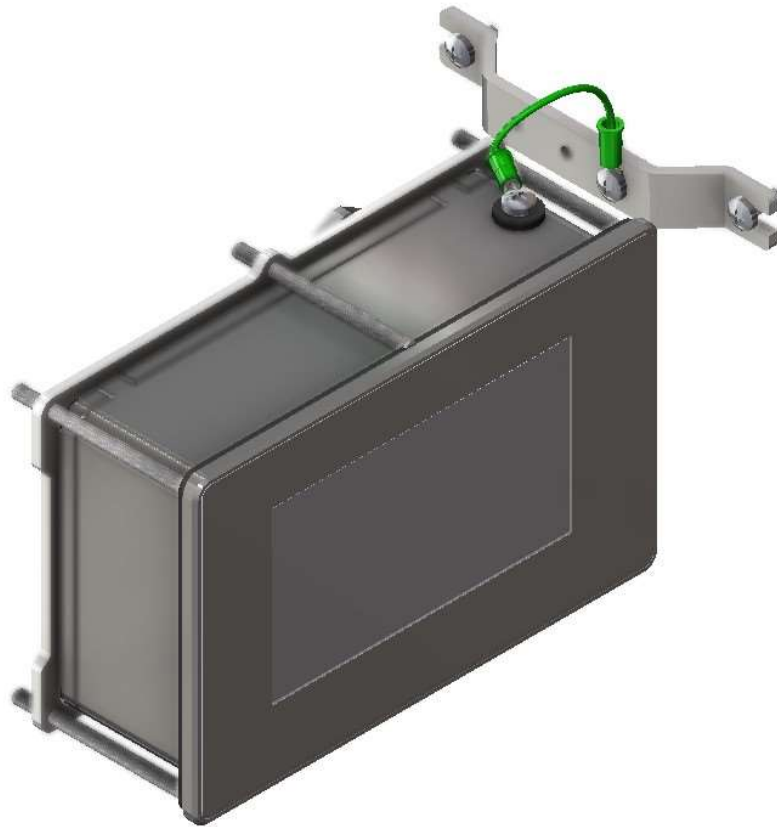


# User Manual

## Purge Controller

MEX-PZC00



M2I Corporation

## **Preface**

We are pleased that you have chosen a quality product from M2I Corporation.

## **Information on This Manual**

Knowledge of the basic safety regulations and additional training and experience in the area of explosion protection are essential for the safe handling and failure-free operation of the series purge and pressurization system.

These operating instructions contain important data and information to ensure the safe use of the MEX-Products in hazardous areas and to meet the requirements of Directive 2014/34/EU. This manual, particularly the safety information, must be followed by all personnel who work on the system.

## **Responsibility of the Operator and/or Installer**

The operator and/or installer undertake to ensure that only specialist, trained personnel work on the MEX series purge and 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 the additional knowledge of explosion protection that is required for work on explosion protected components.

are familiar with the relevant rules and regulations for the installation, operation, and maintenance of explosion-protected systems.

have read the safety section and warnings in this manual.

# Safety

## Contents

This document contains information that you need 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 and disposal

## Warning!

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

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

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

- EU declaration of conformity
- Certificates
- Control drawings
- Additional documents

## General Information on Purge and Pressurization

Purge and pressurization is one of the most versatile ignition protection classes. Purge and pressurization systems are based on the principle that in Zone 2/Class I, 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, sufficiently compressed inert gas, usually air, is supplied to compensate for leaks in the housing and any installed equipment. This permanent overpressure prevents any potentially explosive atmosphere in the ambient air from entering the housing. During the purge phase, an internal pressure is achieved.

Purge and pressurization systems are particularly suitable for installed equipment that is not approved for use in hazardous areas. The equipment can then be used directly in the hazardous area.

## Conditions of Safe Use

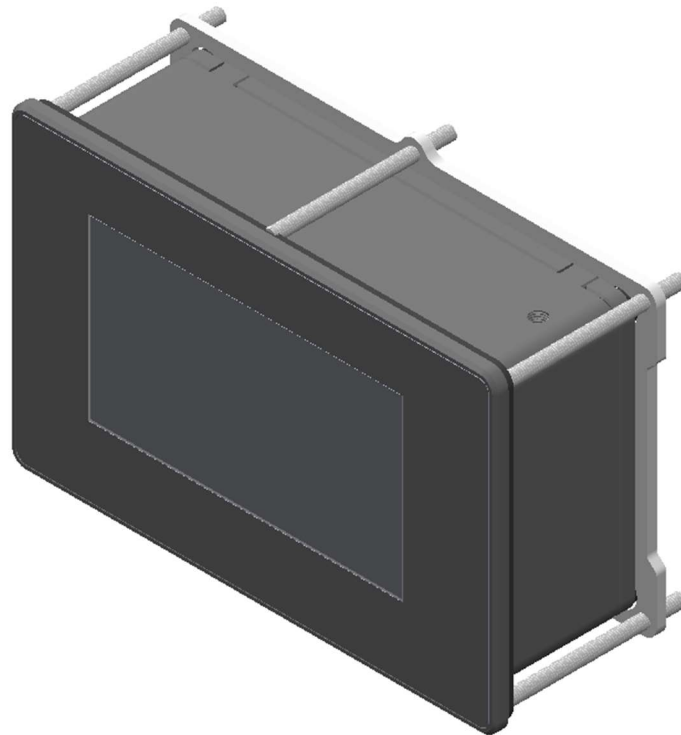
1. The main control unit and the EPV vent are the only parts that have been evaluated for the system's certifications.
2. All unused entry points to the control unit shall be closed with a properly certified IECEx, ATEX, or cULus device that is suitable for the installation location and has the necessary ingress protection.
3. When the MEX series purge and pressurization system is mounted to an enclosure, the complete installation shall be evaluated to the appropriate standards and regulations that are applicable for the final installation location. These include, but are not limited to IEC 60079-2, and IEC 60079-14. These standards shall be available at the site of installation. See certificates for applicable editions.
4. The purge control unit has a temperature class (T6, T5 or T4) that is dependent on ambient temperature. This temperature shall be considered when mounted to an enclosure, or inside of an enclosure. See details on the certificate.
5. The bypass function shall only be enabled when the area is known to be non-hazardous.



### **USER'S GUIDE**

**This device is a device that has been tested for suitability for use in a business environment, and there is a risk of radio interference when used in a home environment.**

## Unit Information



The unit is a control device for Type Z & Ex pz purge systems and is suitable for purge time and pressure monitoring in Class I or II, Zone 2 or 22. It controls the volume of purge gas flowing into the explosion-protected control cabinet, and it maintains and monitors an overpressure relative to the ambient air when purging is complete.

## Components

Base Unit

Mount Bracket, gasket, screws

## General Specifications

Equipment architecture	max. enclosure size 10 m <sup>3</sup>
Operating mode	fully automatic (FA)
Series	MEX-PZC00
Hazardous environment	gas
Supply Rated voltage	24V DC at 0.2 A 220 V AC, 60 Hz at 0.1 A without solenoid valve Supply voltage can be line-to-line or line-to-neutral, single phase OVC II

Power consumption	max. 2.7 W / 7.3 VA without valve
Accuracy	pressure readings: $\pm 3 \%$ timers: $\pm 2 \%$
Connection	screw terminals—see manual
Output	K1: terminals, 1 x NO, enclosure power contacts, 0.5 A at 24 V DC, relays must be externally fused inrush current: 50 A K2: terminals, 1 x NO, alarm and control contacts, 0.5 A at 24 V DC, relays must be externally fused inrush current: 50 A SV1: terminals, L1 powered contact, solenoid manifold, contact, 0.5 A at 250 V AC , 0.5 A at 24 V DC, relays must be externally fused. M1 / M2 : terminals, L1 powered contact, solenoid manifold, contact, 5 A at 250 V AC
Protective gas supply	Compressed air or inert gas, 5 $\mu\text{m}$ filter, free from oil
Pressure requirement	Supply pressure: 30 ... 1K Pas
Safe pressure	95 Pascal for gas

## Mechanical Specifications

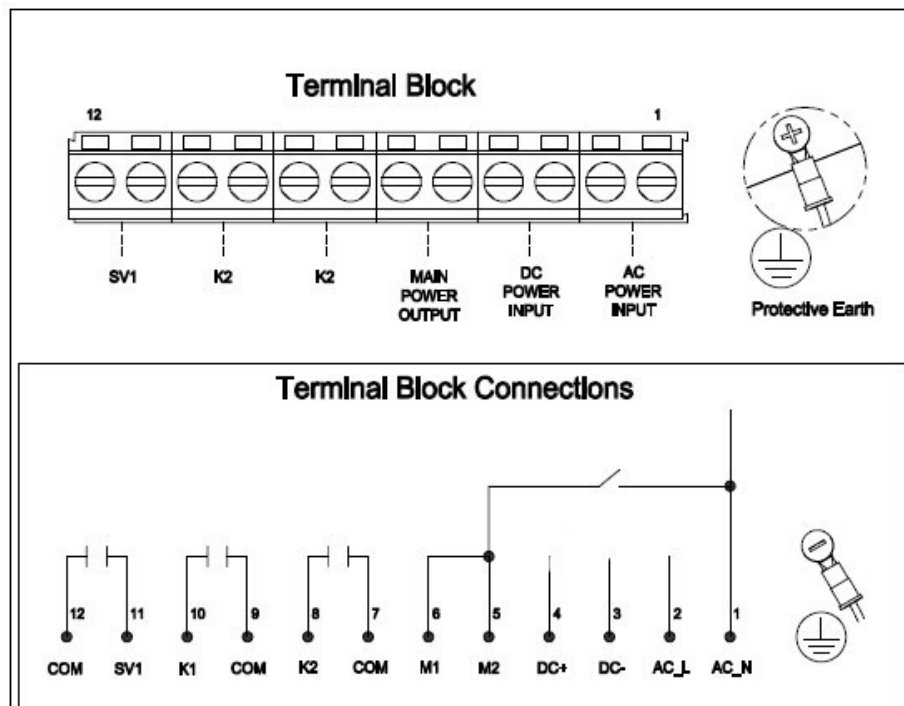
Connection type	electrical: 2 x 1/2 inch NPTF (open from factory) 1 x M12 opening (plugged from factory) pneumatic: high-pressure port - 1/8 in NPTF, low-pressure port - 1/8 in NPTF
Protection grade	<b>Type 4X, IP54</b>
Material	Screws: AISI 316 (1.4401), 304, or 18-8 stainless steel Housing: Aluminum alloy ingots for die casting, ALDC12 Mounting gasket: KCC SH0130U silicone mounting Front sheet : KTO300AH, Indium-tin-oxide coated PET
Mass	0.7Kg
Dimension	Unit : 150 x 100 x 50 mm Panel Cut : 137mm x 85mm

## Terminal wiring

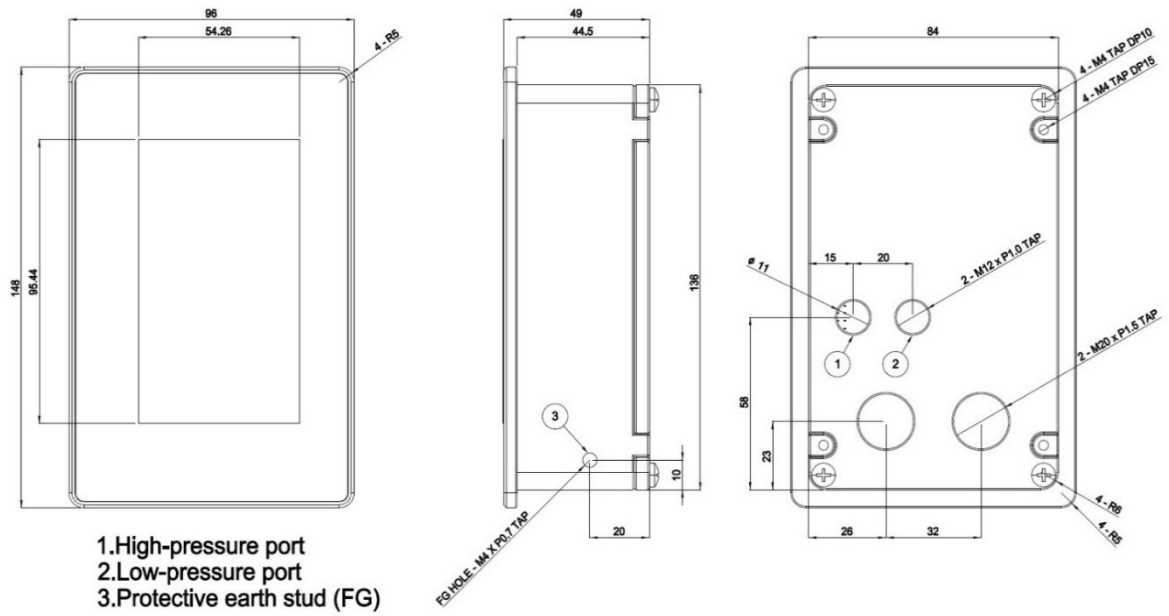
### Requirements

1. All applicable local and national wiring codes must be followed when wiring the system.  
See IEC 60079-14 for more information.
2. The power supply to this device shall have a separate disconnect. If placed in the hazardous area, it shall be rated for the area in which it is being installed. Placing the disconnect into the purged enclosure is not a SAFE area since power needs to be applied to the control unit before the purge cycle is complete.
3. The protective earth wire must be the same size as largest wire used to bring power into the enclosure. Terminate using a ring lug that is properly crimped at the protective earth stud in the bottom of the enclosure. The protective earth terminal torque is 12 in lb (1.36 Nm).
4. All wire shall be copper only, rated at a minimum of 80 °C.
5. The wire strip length into the fixed terminal block is 8 mm.
6. The terminal torque is 0.5 Nm to 0.6 Nm.
7. There shall be only one wire per terminal.
8. It is recommended to leave a bit of extra wire loop in the housing.

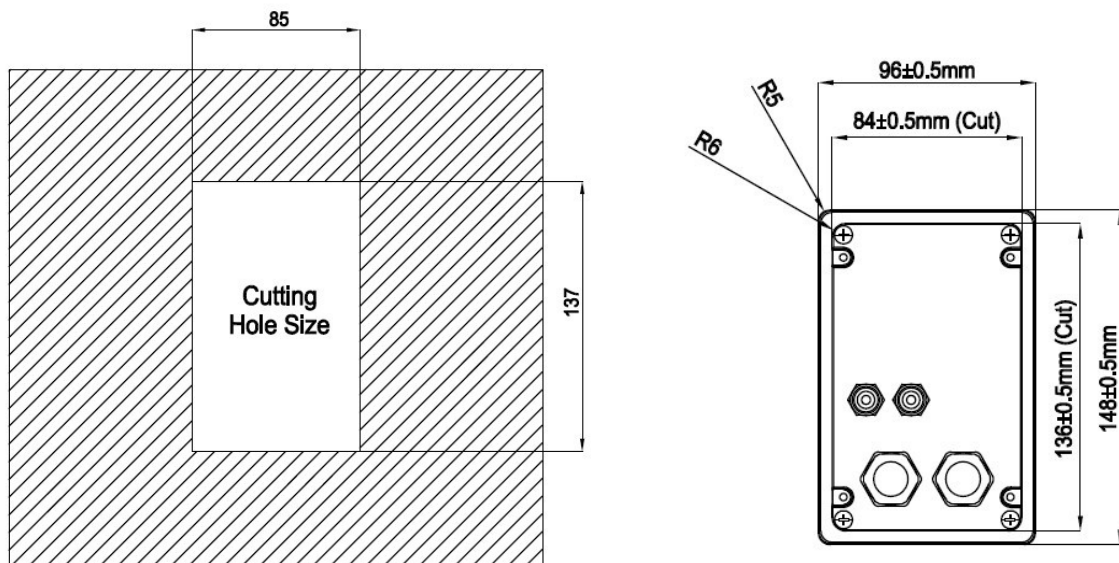
### Connection diagram



## Dimensions



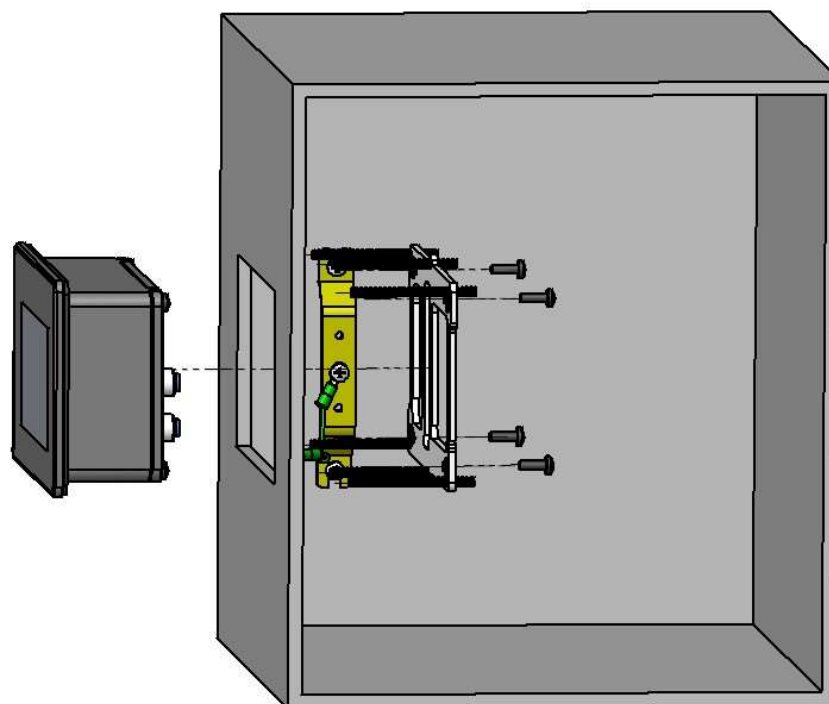
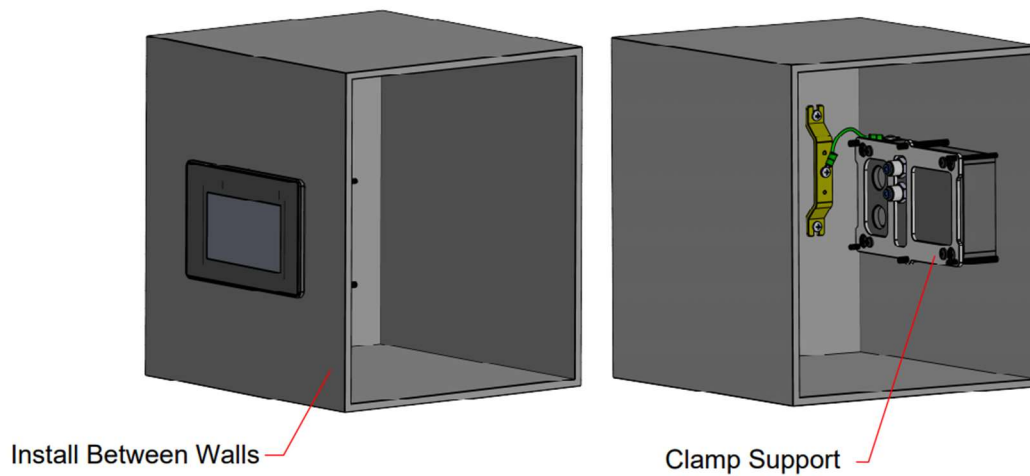
## Panel Cut-Out Dimensions





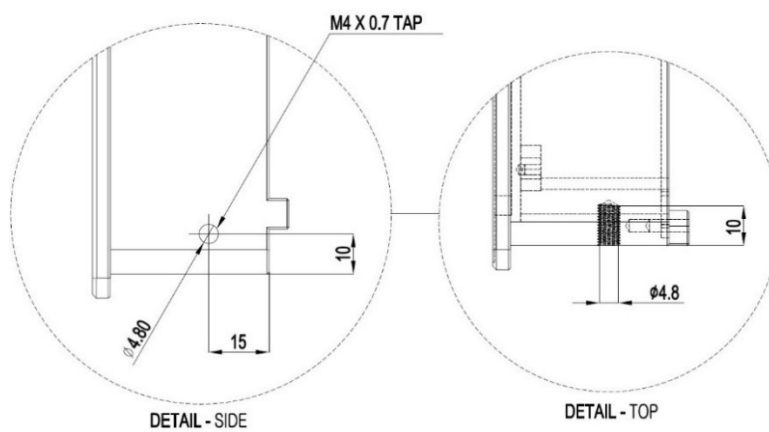
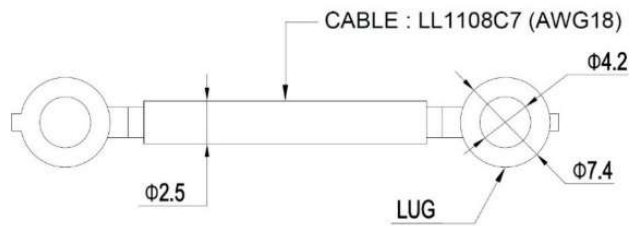
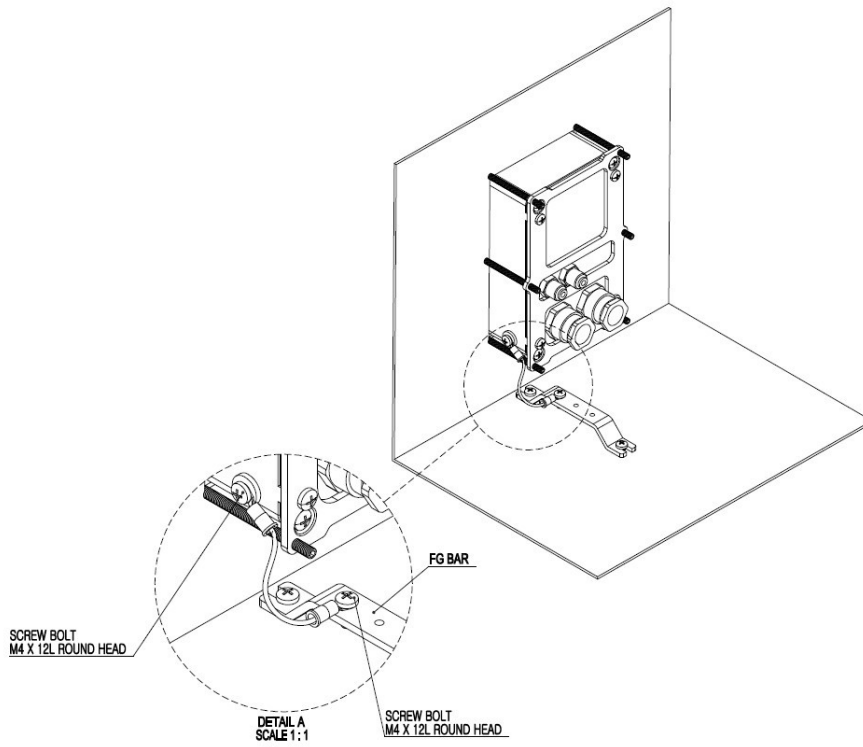
# Installation & Operation

## Installation



<Body>

- \* The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1.
- \* The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP 54 in accordance with IEC 60079-0
- \* Use the IECEx Certified Cable gland.



**<FG Cable>**

\* Install the cross section of the power conductor to the cross section of the FG cable.

## Torque Requirements

Torque 12 in lb (1.35Nm)

Hardware	Torque
Main lid	12 in lb (1.36 Nm).
M4 screws for mounting bracket	12 in lb (1.36Nm).
Screws for mounting HUB	12 in lb (1.36 Nm).
M12 plug	15 in lb (1.70 Nm).
Panel mount bracket hardware	Tighten evenly to a uniform gasket thickness of 1.3 mm to 1.7 mm
Set screws to mount control unit in panel	Tighten until control unit is touching metal-to-metal around all edges
Manifold mounting hardware	Tighten hardware until gasket is compressed 0.64 mm to 0.96 mm (use washers provided)

## Operation

### Gas Atmospheres

If the protective enclosure has been opened or has been subjected to the hazardous atmosphere, purging is required to flush out the hazardous gas that may be inside the protective enclosure. A protective gas is introduced into the enclosure so that the pressure builds up and is exhausted through the enclosure. The measurement of flow is achieved by the MEX control unit pressure sensor measuring enclosure pressure and using that pressure for the flow tables of the vent selected and enclosure size. Each vent has an enclosure pressure vs. flow table for enclosure size that can be used to determine flow rate. This flow rate is used to determine the purge time required to make the protective enclosure safe.

### Gas Atmospheres

EN and IEC 60079-2 standards do not state these requirements. Special consideration is needed, and a proper certification body or authority having jurisdiction must be consulted.

### Setting Up

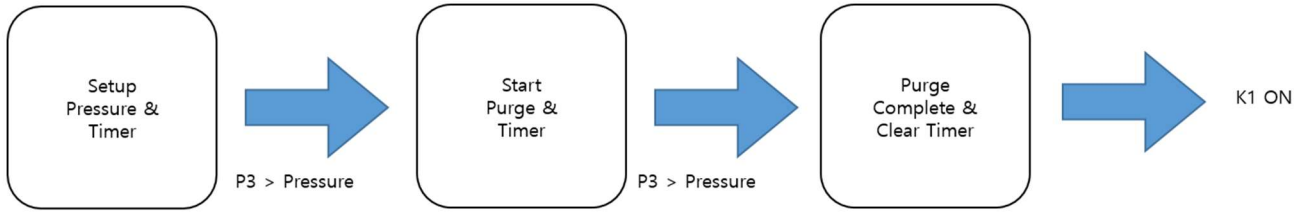
1. Ensure that the system meets all electrical, mechanical, and pneumatic connections before operation. Refer to this manual and standards for explanation of requirements.
2. Apply power to the unit

3. Program the unit using the user-interface display on the front.
4. Make sure the control valve is closed before applying pressure to the system.
5. Use a regulated pressure source to the valve. Set the regulated pressure to 2KPa or lower.  
Do not exceed the maximum pressure for the valve and tubing that is being used.
6. The pressure should be below 95 Pascal. Slowly open the needle valve on the control valve system so that the pressure is above P1.
7. Check the vent to make sure air is coming out of it. If not, check for any obstructions or improper installation
8. The system is ready to operate

### **System operation**

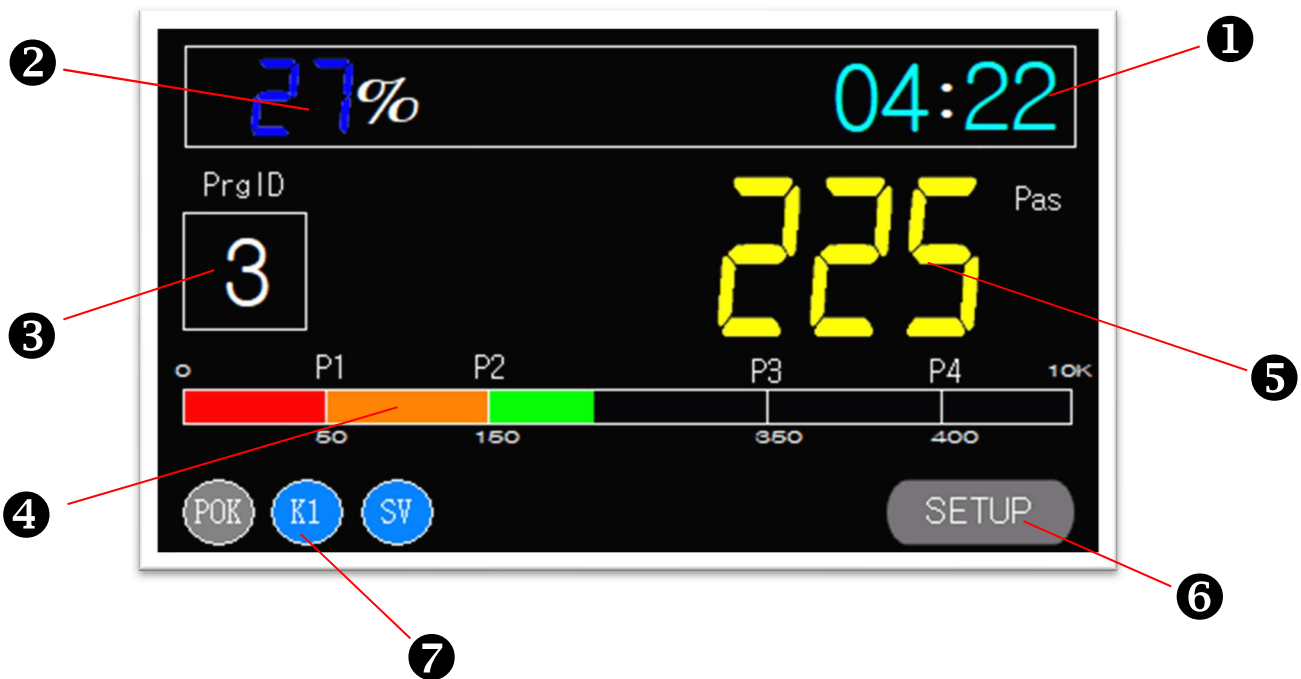
1. Follow the preceding instructions for setting up the system.
2. For Programs 1 through 4 (hazardous gas environments), purging is required.
  - a. Seal the pressurized enclosure.
  - b. Set enclosure pressure to a value above P1.
  - c. When the enclosure pressure is greater than P1, SV1 energizes the solenoid valve for purging.
  - d. Adjust the regulated pressure so that enclosure pressure is above P3 (purging starts).
3. If enclosure pressure is above P1, power to the enclosure will be energized.
4. If enclosure pressure drops below P1, power must be disconnected. If power is to remain on, an alarm must be initiated and located near an operator.
5. To energize the pressurized enclosure again, repeat the above sequence.

## Programming



## User Interface

Display 1 : Main Page



- 1 Remained purge time
- 2 Remained purge percentage
- 3 Selected program id
- 4 Graphic position current pressure
- 5 Current pressure
- 6 Setup
- 7 Output status indicator of (K1,K2,K3)



### Purge Setup

Available Setup Parameters

Parameters	Description	Default	Value boundary
Purge Program	select purge program (1-5)	3	1-5, * Select proper program for each environment. See [Table 2/3]
Purge Time	Timer set to purging	5:00	MIN : 120, SEC : 59
Pressure P1	Minimum pressure of enclosure	50	0~
Pressure P2	Alarm Pressure	150	> P1
Pressure P3	Purging pressure of enclosure	300	> p2
Pressure P4	Maximum pressure of enclosure	400	> P3 and < 10KPas
Leakage	Leakage setting	50	0-99
K2 Usage	The K2 contact output can be programmed for various settings	1	Select one of nine type Refer to [Table-4]
Shutdown Delay	K1 Shutdown Delay	5	0-5
Bypass	The Bypass mode allows power to the enclosure to be energized when the enclosure pressure is below the minimum pressure P1	Disabled	Enabled/Disabled

[Table 1]

Program ID	Atmosphere in	Other condition
Program 1	Hazardous gas	
Program 2	Hazardous gas	
Program 3	Hazardous gas	
Program 4	Hazardous gas	

[Table 2] Program Flow

ProID		1		2		3		4		5	
	Output	K1	PV	K1	PV	K1	PV	K1	PV	K1	PV
During Purging	$p^* > P1$	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
	$P1 < p < P2$	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
	$P2 < p < p3$	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
	$P3 < p < p4$	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
	$p > P4$	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Output	K1	PV	K1	PV	K1	PV	K1	PV	K1	PV
After Purging	$p^* > P1$	ON	ON	ON	ON	OFF	OFF	ON	OFF	ON	OFF
	$P1 < p < P2$	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
	$P2 < p < p3$	ON	OFF	ON	OFF	ON	OFF	ON	ON	ON	OFF
	$P3 < p < p4$	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
	$p > P4$	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
	Output	K1	PV	K1	PV	K1	PV	K1	PV	K1	PV

\* p : current pressure

[Table 3] Program Flow

K1	Switches simultaneously with K1*
P1+	Switches on when pressure exceeds P1
P1-	Switches off when pressure falls below P1
P2+	Switches on when pressure exceeds P2
P2-	Switches off when pressure falls below P2
P3+	Switches on when pressure exceeds P3
P3-	Switches off when pressure falls below P3
P4+	Switches on when pressure exceeds P4
P4-	Switches off when pressure falls below P4
Purging	Switches on when purge timer starts and shuts off at the end of purging
Bypass	Switches on when the bypass function is activated
All Alarms	Comes on when P1-, P4, Bypass

[Table-4] Users-selectable for K2

## Certifications

### IECEX and ATEX: CCC








IEC/EN 60079-0

IEC/EN 60079-2

IEC/EN 60079-7

IEC/EN 60079-15

### Markings

 <b>M2 Corporation</b> Man • Machine • Interface 11-35, Simin-dearo 327beon-gil, dongan-gu, Anyang-si, Gyeonggi-do, 14055, Republic of Korea	ATTENTION Made in Korea	   
DEVICE TYPE / MODEL : AUTO PURGE CONTROLLER / MEX-PZC00		S/N :
EXPLOSION PROOF FORMAT : Ex ec nC [pz] IIC T6 Gc		
PROTECTION RATING : IP54		
AMBIENT TEMPERATURE : $-10^{\circ}\text{C} < T_a < +50^{\circ}\text{C}$		
RATED : DC24V $\equiv$ / 0.2A , AC220V $\sim$ / 0.1A , 50-60Hz		
PROTECT PENETRATION : INSTALL IN A PLACE THAT SATISFIES THE IP4X ON THE FRONT OF THE DEVICE.		
 DO NOT CONNECT OR DISCONNECT ALL CABLES CONNECTED TO THE DEVICE WHILE POWER IS APPLIED.		
 STATIC RISK: PLEASE REFER TO THE MANUAL BEFORE USE.		

## Maintenance and Repair

Do not remove the Front Sheet from the control unit. If the Front Sheet is damaged or removed, the control unit cannot be repaired. A new unit is required.

The only special maintenance required on the unit is cleaning of the pneumatic filters on the overall installation, when used, and periodic function checks. This includes pressure readings within the specifications contained in this manual. When checking pressure measurements of the control unit, use calibrated equipment to determine the measurements, or contact a M2I representative or the factory to send the device back for function verification.