

# SP2-Px-ss SmartPurge Manual

ML 484





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# Section 1: System Specification

## SmartPurge Control Unit Data

### Model Number

SP2 – ab – c

a = **P** for Purge and Pressurize Control Unit  
**F** for Fan Control Unit

b= **M** for Mains Universal Voltage  
**L** for Low Voltage

c = **ss** for Stainless Steel

Purge Flow Range

Leakage Compensation: 110 - 540 NI/min

Continuous FLow 10 - 540 NI/min

Purge Time

1-99 minutes

Low Pressure Trip Options

Immediate Trip, Alarm Only, Delay Trip (Up to 99 mins)

Enclosure Pressure

0.8 - 7 mbarg after purge

Environmental Protection

IP64 316 Stainless Steel Enclosure

Mounting Position

May be mounted in any position external to pressurized enclosure

Control Unit Dimensions

Stainless steel = 187 x 139 x 107 mm (7.3" x 5.3" x 4.2")

Temperature

-20°C to +60°C

Approvals

### IECEX

IEC 60079-0 : 2017  
 IEC 60079-11 : 2011  
 IEC 60079-18 : 2017  
 IEC 60079-2 : 2014-07  
 IEC 60079-31 : 2013  
 IEC 60079-7 : 2017

IECEX FME11.0006X  
 Ex eb ib mb [ib Gb] [p] IIC T4 Gb  
 Ex tb [p] IIIC T135°C Db  
 -20°C to +60°C

### ATEX

2813   II 2 (2) GD 

EN IEC 60079-0 : 2018  
 EN 60079-2 : 2014  
 EN 60079-7 : 2015+A1:2018  
 EN 60079-11 : 2012  
 EN 60079-18 : 2015 + A1:2017  
 EN 60079-31 : 2014  
 EN 60529 : 1991 + A1:2000 + A2:2013

FM11ATEX0060X  
 Ex eb ib mb [ib Gb] [p] IIC T4 Gb  
 Ex tb [p] IIIC T135°C Db  
 -20°C to +60°C

## USA

ANSI/ISA 60079-0  
 ANSI/ISA 60079-11  
 ANSI/ISA 60079-18  
 ANSI/ISA 60079-2  
 ANSI/ISA 60079-31  
 ANSI/ISA 60079-7  
 ANSI/IEC 60529  
 Class I, Zone 1  
 AEx e ib mb [p] IIC T4 IP64  
 Class I, Zone 21  
 AEx tb [pD] IIIC 135°C IP64  
 -20°C to +60°C

## Canada

CAN/CSAE 60079-0  
 CAN/CSAE 60079-11  
 CAN/CSAE 60079-18  
 CAN/CSAE 60079-2  
 Ex e ib m [p] IIC T4 Gb IP64  
 -20°C to +60°C

Safety Integrity Level

ESC: A127\_CT001\_(2.0)

Weight

4.2kg (9.3lb)

## Electrical Ratings

### SmartPurge Control Unit

Power Supply	(Terminals 1, 2):	90 - 254 Vac: Universal Voltage 11 - 28 Vdc: Low Voltage	Um = 254 Vac
Alarm Contact Ratings:	(Terminals 5, 6 and 7, 8) (Terminals 9, 10)	240 V, 1 A Fuse type (see <i>Installation of the System</i> section for details)	500 mA (low voltage)
Power Switching	2 pole	6 A 250 V AC1 * 5 A 30 V DC1 *	

**\* Note: The rated current of power contact is for resistive load ONLY. The max transient current of power contact is 15A, exceeding the value would significantly shorten the life of power contact or cause instant damage.**

Energy limitation parameters:

	Terminal TB1	U <sub>o</sub> (Vdc)	I <sub>o</sub> (mA)	C <sub>o</sub> (μF)	L <sub>o</sub> (mH)	P <sub>o</sub> (W)
SOV	1, 2	23.58	165.5	0.091	2.9	0.975
IP	3,4	23.58	165.5	0.091	2.9	0.975
Remote Output	9, 10, 11, 12	8.465	405.1	5.145	0.48	0.857
External Alarm	5, 6	5.88	5.9	negligible	0	0.009
Override	7, 8	5.88	5.9	negligible	0	0.009

Remote Panel, energy limitation parameters

U <sub>i</sub> (Vdc)	I <sub>i</sub> (mA)	C <sub>i</sub> (μF)	L <sub>i</sub> (mH)	P <sub>i</sub> (W)
8.465	405.1	5.145	0.48	0.857

## Section 2: Quick User Guide

### Installation

The SmartPurge system must be installed by a competent engineer, in accordance with relevant standards, such as IEC / EN 60079-14 and any local codes or practice.

- Fit the appropriate orifice plate to the system if required
- Mount the purge system in accordance with the hook-up drawing.
- Ensure the system has been installed according to the full instructions in the *Installation of the System* section of this manual.
- All piping must be clean and free of dirt, condensation and debris prior to connection to the purge system or pressurized enclosure.

#### Note:

**It is essential for safety that the installer and user of the Expo system follow these instructions.**

### Operation of the System

Once installed correctly follow the directions below to make the system operational.

This *Quick User Guide* is the minimum necessary for the system to operate. Detailed information about system set up can be found in the *Configuration* section.

When first switched on the system will display the serial number. Check that this corresponds with the system documentation.

The **Purge System Status** menu will be displayed and it is possible to use  and  to scroll through the menu to view the current system status, action on alarm and the current pressure sensor readings.

Follow directions on the next page to set up purge parameters.

Once the parameter entry has been completed, switch the air supply on. Slowly increase the pressure inside the pressurized enclosure using the LC valve. When the required minimum pressure is reached, the SmartPurge will initiate the purge cycle.

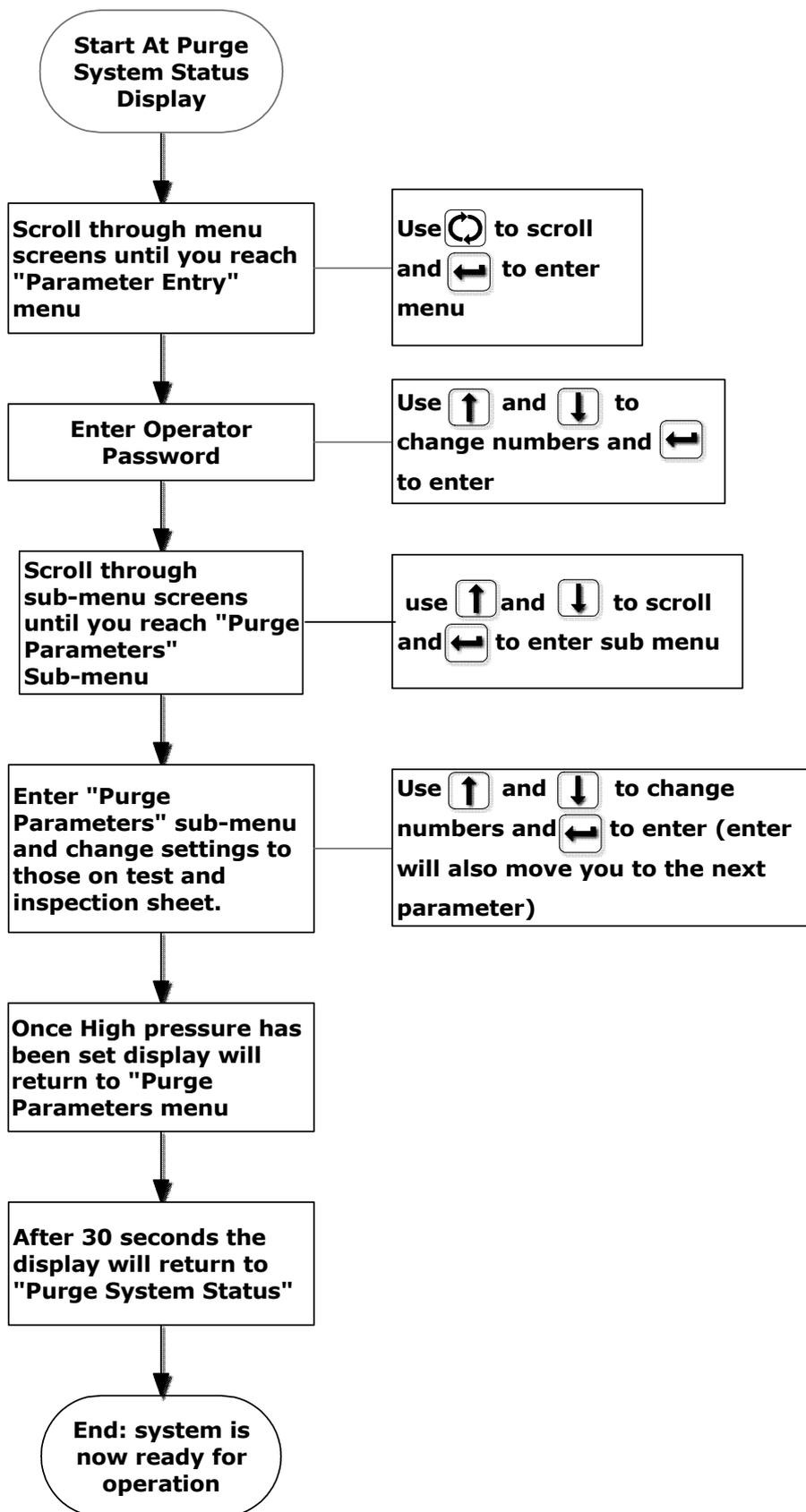
The elapsed purge time will be shown in the display, once a successful cycle had completed, the power to the electrical equipment in the pressurized enclosure will be connected.

If the system has not performed as expected, check the installation thoroughly and consult the *System Configuration and Operation of the System* sections.

If an obvious problem has not been highlighted and corrected, follow the procedures in the *Fault Finding* section.

If all checks have been carried out and the system still does not perform as expected, contact your local distributor or Expo Technologies.

## Purge Parameter Setup



## Section 3: Application Suitability

SmartPurge systems are certified for use in hazardous locations, where the hazardous location is non-mining (above ground) and the hazard is caused by flammable gasses, vapours or dust. The system may be used in IECEx and ATEX Zone 1(21) and Zone 2(22) - Categories 2 and 3 respectively.

Installations in the United State shall comply with the relevant requirements of the National Electrical code® (ANSI/NFPA-70 NEC).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical code (CSA C22.1).

SmartPurge systems may be used for hazards of any gas or dust group. Apparatus associated with the SmartPurge system, such as intrinsically safe signalling circuits and flameproof enclosures containing switching devices may be limited in their gas group. The certification documentation supplied with any such devices must be checked to ensure their suitability.

This system is primarily designed for use with compressed air. Where other inert compressed gasses are used (Nitrogen, for example) the user must take suitable precautions so that the build up of the inert gas does not present a hazard to health. Consult the Control of Substances Hazardous to Health (COSHH) data sheet for the gas used. Where a risk of asphyxiation exists, a warning label must be fitted to the pressurized enclosure.

The following materials are used in the construction of SmartPurge systems. If substances that will adversely affect any of these materials are present in the surrounding environment, please consult Expo Technologies Ltd for further guidance.

Materials of Construction		
Stainless Steel	Nylon	Acetal
Mild (Carbon) Steel	Acrylic	Silicone Foam
Brass	Polyurethane	PVC Foam
Aluminium	Polycarbonate	

## Section 4: Description and Principle of Operation

Purge and pressurization is a method of protection used in Zone 1 (21) and Zone 2 (22) hazardous locations to ensure that the interior of an enclosure is free of flammable gas. Addition of a SmartPurge system allows the electrical equipment within the enclosure to be used safely in a hazardous location.

The principle of purge and pressurization is as follows:

- Clean compressed air or inert gas is drawn from a non-hazardous location.
- The interior of the pressurized enclosure is flushed to remove any hazardous gas or dust.
- This is introduced into the pressurized enclosure to keep the internal pressure at least 0.5 mbarg above the external pressure.
- Whilst pressurized, flammable gas cannot enter the enclosure from the environment.

Prior to switching on the power to the electrical equipment, the enclosure must be purged to remove any flammable gas that might have entered the enclosure before pressurization. Purging is the process of removal contaminated air and replacement with air (or inert gas) known to be free from flammable gas. The duration of this purge process is normally ascertained by performing a purge test.

The SmartPurge system controls the release of purge air, drawn from a non hazardous location, into the enclosure containing electrical equipment. After the purging cycle, the system connects the power to the equipment to be protected. It then monitors the enclosure pressure to ensure that an overpressure is maintained.

The system is fully automatic in operation, and can be configured by the user to meet the application requirements. If the pressure inside the protected enclosure drops below the minimum threshold the system will either shut down the electrical apparatus and / or give an alarm signal depending on the configuration. The default setting is immediate disconnect of the power.

## Section 5: Main Components

### SmartPurge Controller

The SmartPurge Control Unit is an electronic unit designed to be used in the hazardous location, it provides the following functions:



- Microprocessor controlled purge and delay timing
- Isolation to equipment (2 pole rated 6A @ 230V AC1 duty)
- 2 Status / Alarm contacts (user configurable)
- System status indication via LCD
- Delay isolation option
- Monitoring and control of purge flow
- Monitoring and control of enclosure pressurization
- Optional Remote Control Panel duplicates the front panel display and keypad

### Air Supply Unit

The SmartPurge controls the flow of protective gas into the pressurized enclosure through the Air Supply Unit. There are three varieties of unit:

#### Solenoid Digital Valve for Manual Leakage Compensation – SP2-DV

This is designed for leakage compensation purging applications. The flow of gas through the pressurized enclosure is controlled by the SmartPurge Controller. This allows switching between the purging and leakage compensation phases of the purge and pressurization cycle.



#### Continuous Flow Control Valve – SP2-CF

This is designed for continuous flow purging applications. The air flow through the pressurized enclosure is controlled by a needle valve. Suitable for low flow rate applications, applications where a continuous flow of air is required for cooling or when the dilution of hazardous gases generated inside the enclosure is required.

## Accessories

### Remote Control Panel – SP2-RP

This allows the SmartPurge system to be controlled from a remote location. It is an Intrinsically Safe device that duplicates the display and 4 control buttons on the front of the main SmartPurge Unit. The Remote Control Panel is connected to the main unit by means of a shielded 2 twisted pair cable. The cable should not be longer than 50 metres, and have a cross sectional area of at least 0.75 mm<sup>2</sup>.

It is not possible to perform operations at both keypads simultaneously. The keypad that is in use will “lock-out” operation at the other keypad until the data entry is complete or the display times out and returns to the Purge System Status Display.



An error message is displayed if a key is pressed while another display is being used.

When entering passwords, the password being entered will only show on the control terminal display which is in use. The other display will show “0000” during password entry.

### Cable Gland Kit – SP2-GK

An Expo recommended set of cable glands for field wiring. M16 Gland for cable of outer diameter **4 – 8.4 mm** and M20 Gland for cable of outer diameter **7.2 – 11.7 mm**

### Remote LED – SP2-RL

Tri-colour remote indication of purge systems status.

### Override Switch – SP2-OS

A panel mounting, key operating switch that bypasses the SmartPurge Controller output signal.

### Splash Cover – SP2-SC

A cover to protect the outlet valve from direct water jets.

### SmartPurge Interface Unit – SIU

A flameproof interface used for switching higher loads or additional signals.

## Section 6: Installation of the System

The SmartPurge is designed for use under normal industrial conditions of ambient temperature, humidity and vibration. Please consult Expo before installing this equipment in conditions that may cause stresses beyond normal industrial conditions.

The SmartPurge system must be installed by a competent person in accordance with relevant standards, such as EN 60079-14, and any local Codes of Practice that are in force.

The SmartPurge control unit should be installed either directly on, or close to the pressurized enclosure. It should be installed such that the system display and certification labels are in view. The system should not be subject to vibration. If to be mounted on a surface that may transmit vibrations it is recommend that the SmartPurge control unit is first mounted onto a chassis plate which is mounted via Anti-Vibration (AV) mounts.

### General Safety Warnings

The Expo SmartPurge purge and pressurization system must only be used in accordance with the instructions in this manual and for the purpose described earlier.

Failure to comply with the instructions in the manual during operation, installation, commissioning and maintenance may lead to personal injury, damage to property or voiding of the warranty and/or certification of the SmartPurge system.

The use of a certified purge and pressurization system does not guarantee or imply the compliance of the complete enclosure with ATEX or IECEx standards. Such compliance can only be endorsed by an EU Notified Body.

Installation must be carried out in accordance with these instructions in conjunction with any applicable local Codes of Practice or standards. The units should be configured prior to installation using the following guidelines.

### Electrical Safety

The system control unit contains components which may be live when powered. Always isolate power from supply to the SmartPurge and the enclosure before opening.

#### Torque for electrical terminals

Intrinsically safe terminals: 0.22 - 0.25 Nm

Non-intrinsically safe terminals: 0.4 - 0.5 Nm

### Compressed Air

The system uses compressed air.

- Take precautions when connecting or disconnecting compressed air supplies.
- Ensure all flexible pipes used are well secured.
- Never block compressed air pipes with any part of the body.
- Ensure that equipment is maintained in good condition.
- The system exhausts air from the compressed air supply into the atmosphere so a clean supply must be used. Do not allow the exhaust air to be breathed.

## Hazardous area safety

The system is designed for use in hazardous areas; correct installation and maintenance are critical for safe operation. Installation and maintenance must only be carried out by qualified and authorized personnel in accordance with local and site regulations.

No unauthorised modifications to the equipment should be made. Purging should be done in accordance with the relevant standard.

## Air Supply Quality

The SmartPurge system should be connected to a protective gas supply, which is suitable for purging and pressurization.

The supply pipe connection to the SmartPurge must be appropriate for the maximum input flow rate for the application.

The air supply must be regulated at a pressure less than the maximum stated inlet pressure.

The air supply must be: clean, non-flammable and from a non-hazardous location. The air should be of Instrument Air Quality. Although the purge control system will operate with lower air quality, its operational life will be adversely affected. The equipment that is being protected by the SmartPurge may also suffer because of poor air quality.

With reference to BS ISO 8573-1: 2010, Instrument Air is typically specified as:

### *Particle Class 1*

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 to 0.5 micron size range, 400 particles in the 0.5 to 1 micron size range and 10 particles in the 1 to 5 micron size range.

### *Humidity or pressure dew point*

The dew point, at line pressure, shall be at least 10 °C below the minimum local recorded ambient temperature at the plant site. In no case, should the dew point at line pressure exceed +3 °C.

### *Oil Class 2*

In each cubic metre of compressed air, not more than 0.1mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

When an inert gas is being used to supply the purge system, risk of asphyxiation exists. Refer to Application Suitability section.

Before connection of the air supply to the purge system, the supply pipe work should be flushed through with instrument quality air to remove any debris that may remain in the pipes. This must be carried out for at least 10 seconds for every meter of supply pipe.

Unless a supply shut-off valve has been fitted to the SmartPurge system, an external shut-off valve with the same, or larger, thread size as the Control Unit inlet fitting should be fitted by the installer to prevent any restriction of purge flow.

The purge air from the SmartPurge Control Unit should be piped within the pressurized enclosure to ensure purging of potential dead air spots.

The purge system is fitted with an internal regulator factory set to 3 bar feeding the logic.

## Purge Outlet Unit

The Purge Outlet Unit is housed within the SmartPurge enclosure and measures flow across an orifice. It is preset to open at an enclosure pressure of 8 - 10 mbarg.

A Spark Arrestor is added to the exhaust point of the Purge Outlet Unit to prevent the emission of arcs, sparks and incandescent particles produced within the pressurized enclosure.

## SmartPurge Controller Unit

SmartPurge has four M5 mounting points for mounting the unit to a flat surface on the pressurized enclosure, refer to appropriate General Arrangement drawing and connected in accordance with the Hook-Up drawing.

Connections to the SmartPurge must be through the M20 & M16 Ex e cable entries. If cable entries are not going to be used, an Ex e blanking plug must be fitted in place of the cable gland.

## Non-Intrinsically Safe Terminals

### Terminals 1 – 2 and earth: mains input

The unit must be supplied from a separately switched, labelled circuit with over current protection of not greater than 6 Amps.

The protective earth conductor must be securely attached to the protective earth terminal on the SmartPurge terminal cover plate.

The SmartPurge is housed in an increased safety (Ex e) enclosure. This must be earthed using an earth conductor of minimum 4 mm<sup>2</sup>, connected to the earth connection on the outside of the unit.

### Terminals 3 – 4: mains output

The SmartPurge system provides a switched mains voltage output that can be used to power the protected equipment. It can also be used to drive relays and contactors that provide the necessary switching function.

The load connected to the output from the SmartPurge must not exceed 6 A (AC1). For the Low Voltage version, load must not exceed 5A, 28 Vdc.

**Note:** The rated current of power contact is for resistive load ONLY. The max transient current of power contact is 15A, exceeding the value would significantly shorten the life of power contact or cause instant damage.

### Terminals 5 – 6 and 7 – 8: alarms

The SmartPurge system provides two volt-free contacts rated 250 V, 1 A AC1. These provide remote indication of the state of the purge system and for the generate alarm signals.

A fuse or other current limiting device must be placed in the circuit connected to these status contacts to limit the current to below that specified. This must have a breaking capacity of 1500 Amps or greater. The fuse or circuit breaker used must have an "F" characteristic to IEC 127 for a fuse, or type B characteristic for a miniature circuit breaker. Where other types of fuse or circuit breaker are used, the user must verify that the switching contacts have not been welded together by the current flowing in the time taken for the fuse to blow or circuit breaker to trip.

The status / alarm outputs must not be used to control the switching of power to the protected equipment.

## Terminals 9 – 10: fuse

Fuse connection, See *Electrical Ratings* for AC and DC versions

## Intrinsically Safe Terminals

All connections to these terminals must be made from intrinsically safe circuits in accordance with the Hook-Up drawing.

### Terminals 1 – 2: intrinsically safe solenoid valve

1. power supply +
2. power supply -

### Terminals 3 – 4: intrinsically safe I/P converter

4 – 20 mA output:

3. current loop +
4. current loop -

### Terminals 5 – 6 intrinsically safe external alarm

Refer to the wiring diagram for fitting of resistors.

### Terminals 7 – 8 intrinsically safe override keyswitch

Refer to the wiring diagram for fitting of resistors.

### Terminals 9 – 10 – 11 – 12: remote panel (or tristate LED)

5. power supply + (or common cathode)
6. data + (or Anode: Green)
7. data - (or Anode: Red)
8. power supply -

## SmartPurge Interface Unit (SIU) Signal Isolation

The following signals may need to be considered for isolation by the SmartPurge system:

- Video Signals
- Network cables (e.g. Ethernet, ARCNet, MODBUS)
- Current loops
- Status signals
- 3 phase power supplies

**Note: 3 phase and neutral supplies need all 4 wires to be isolated. Earth wires should not be isolated. Take care not to overtighten screws.**

## Mounting the SmartPurge and Air Supply Unit

Before mounting the SmartPurge, it should be configured for the flow range required. To carry out this configuration, choose the appropriate flow rate from Table 1

Locate the appropriate Orifice Plate and Flow Restrictor (where necessary).

Using the 2 screws supplied, fix the orifice plate in position in the air entry into the SmartPurge. Refer to Figure 1 for guidance.

For systems that are using the SDV (solenoid digital valve) option, screw the brass flow restrictor into the outlet from the SDV. A slot for a screwdriver is provided in the restrictor to assist in this operation.

The SmartPurge settings need to be configured to the new orifice size.

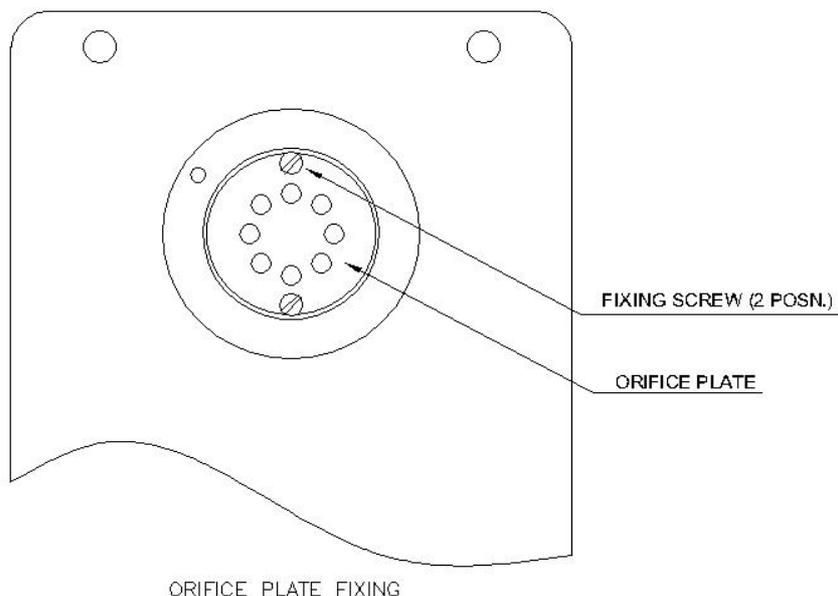
Normally, the SmartPurge and Air Supply Units will be mounted in diagonally opposite corners of the enclosure to be protected. These units may be mounted internally or externally. For internal mounting of the SmartPurge, use an EXPO adaptor plate accessory. Pipe work to and from the air supply unit must be sized to provide adequate airflow with the minimum pressure drop (restrictive pipe fittings should be avoided). The air outlet from the Air Supply Unit should be located or piped to the opposite side of the enclosure to ensure effective purging, unless effective purging can be proved by other means.

It is recommended that all air supply pipe work be a minimum of 10 mm x 1 mm (3/8")

If adequate air pressure regulation and filtration cannot be assured, it is recommended that a filter regulator set is installed at the air inlet.

Remember that the minimum air supply pressure requirements quoted are those needed during purge. Long pipe runs or restrictive pipes and fittings may cause substantial pressure drops.

Figure 1:

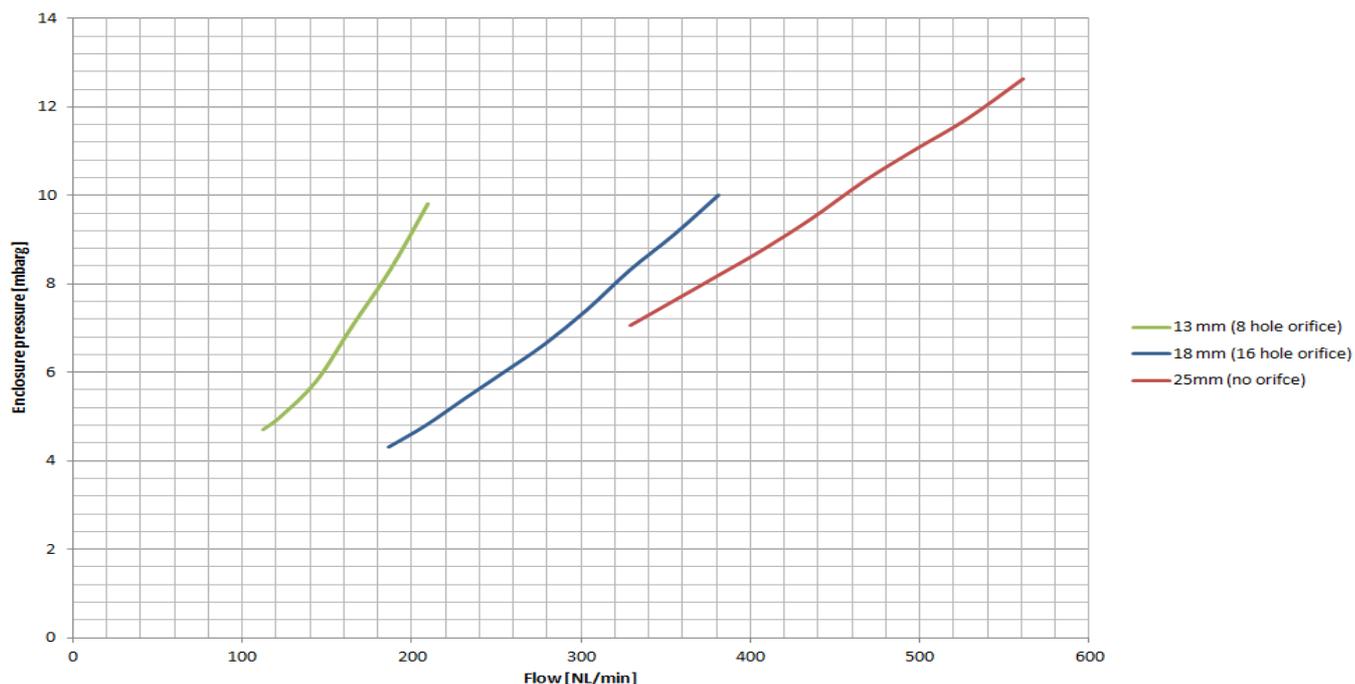


**Table 1: Air Supply Requirements**

Flow Range	Inlet Flow Restrictor (for SDV only)	Outlet orifice	Certified Minimum Flow Rate	Minimum Air Supply Requirement Pressure at Flow	
			Nl/min (scfm)	Bar (psi)	Nl/min (scfm)
A	 Ø2.7mm hole	 8 Hole = 13 mm	150 (5)	3.1 (45)	212 (7.5)
B	 Ø4.2mm hole	 16 Hole = 18mm	300 (10)	3.5 (50)	414 (15)
C	None	None = 25 mm	540 (19)	4.5 (65)	848 (30)

**Note:** The minimum air supply requirements shown in the table above are greater than those shown for the certified minimum flow rate. This is to allow for the additional air required to make up for enclosure leakage and the tolerance of the air flow measurement

Store the orifice plate(s) and flow restrictor(s) which are not used so that the unit may be reconfigured if required at a future date. Record the selections made in the maintenance record of this manual and mark the flow range selected on the label with an indelible marker. If required, it may be possible to use a custom inlet or outlet flow restrictor in order to achieve satisfactory purge operation. Only standard 8 & 16 hole outlet orifices should be used. SmartPurge allows for custom orifice settings. Consult EXPO for further information..



## Remote Control Panel (Optional)

The SmartPurge system may be controlled from a remote location by using the Remote Control Panel.

Refer to the drawings section for the dimensions and connection schematic for the Remote Control Panel.

The case of the Remote Control Panel has an external earth terminal. This must be used to bond the case to earth using a 4mm<sup>2</sup> cable minimum.

The remote terminal and the main unit must be installed in an environment where the equipotential bonding system exists over the entire area of the installation. The keypad and display of the remote terminal is used in exactly the same manner as those on the main unit.

It is not possible to perform operations at both keypads simultaneously. The keypad that is in use will “lock-out” operation at the other keypad until the data entry is complete or the display times out and returns to the Purge System Status Display.

## Tristate LED (Optional)

This is a simple remote indication of purge status.

- Purge Complete: Green
- Purge in Progress: Amber
- Purge Low Flow: Flashing Red / Green
- Pressure Fault: Red

A stainless steel bezel mounts in a 22 mm hole and is connected to terminals 9 – 10 – 11. The maximum cable length between the SmartPurge Control Unit and the Tristate LED is 50 m. This panel can only be used when the remote panel is not present.

# Section 7: Commissioning

## Initial Commissioning

**Note: The system is pre-set and no adjustments (other than those detailed in this document) should be made without consultation with Expo.**

- Ensure the SmartPurge has been correctly installed.
- Ensure that all electrical power to the enclosure being protected is isolated.
- Check all pipe work and wiring is in accordance with appropriate instructions and wiring diagrams.
- Check all doors, inspection covers and other openings in the enclosure are sealed and secure.
- Close the leakage compensation valve fully (where fitted).

## Commissioning

- Turn on the air supply to the Air Supply Unit.
- Turn on the SmartPurge Control Unit.
- For leakage compensation systems, slowly open the leakage compensation needle valve until the enclosure pressure builds up above the lower limit: the **Low Pressure Fault** message will change to

**Purge Flow Low.** Once this happens, the solenoid valve in the Air Supply Unit will turn on the purge air flow. It may take several seconds before the enclosure pressure reaches the required level.

To monitor the pressure on the display panel, press the down arrow once and the pressure in millibars will be shown. Use the pressure display to adjust the setting of the leakage compensation regulator.

Typical enclosure pressures:

Normal Operation:	2.5 mbarg
During Purge:	9 mbarg
Minimum Pressure:	1 mbarg
Maximum Pressure:	14 mbarg

- To verify that sufficient purge air flow is being detected, ensure that the display on the front of the SmartPurge shows **Purge in Progress** and a countdown of the purge time or purge volume. A **Purge Flow Low** or **Purge Flow High** message will be displayed if flow is insufficient. If this happens, increase or decrease the pressure of the air supply to the unit to increase the flow until the **Purge in Progress** message appears.

If the purge flow is high enough to cause an overpressure situation, the system will turn off the purge air flow until the pressure falls below the high pressure setting. If this occurs, reduce the purge flow rate by reducing the supply pressure, and re-start the purge cycle.

- Check that the system continues purging for the correct time or volume. Power will then be connected to the protected equipment.
- To allow for variations in temperature and air supply pressure, open the leakage compensation valve and increase the air supply pressure by approximately 5% of the value. Observe the pressure display to ascertain when the appropriate pressure is reached. This gives sufficient flow to trigger the flow sensor during purge.
- Record the air supply pressure and observed purge time in the maintenance record section of this handbook.
- All the critical settings of the purge parameters are protected from unauthorised modification by means of a password access to the settings areas of the SmartPurge Menu System. Once the system is configured, **change the password** from the default setting of 0000 to prevent modification by unauthorised personnel.
- Check function of alarm contacts when pressure drop below 0.5 mbar occurs.
- If correct operation is not observed refer to the fault finding section of this handbook.

## Section 8: Configuration

### System Configuration

Once the SmartPurge Controller has been installed it must be configured and settings such as the low pressure, purge flow method and orifice diameter must be set up. The SmartPurge controller is configured using the operators and a two-line display. Refer to the icons below for name and description of each button.

	<b>Menu Button</b>	This moves to the next menu item
	<b>Up Button</b>	This allows the user to scroll to the previous menu, confirm Yes, display last parameter or increase digit
	<b>Down Button</b>	This allows the user to scroll to the next menu, confirm No, display next parameter or decrease digit.
	<b>Enter Button</b>	This allows the user to scroll to select menu item or entry.

The Test and Inspection Sheet supplied with the unit will show the factory set parameters.

To aid the user in configuring the system to their requirements the Settings sheet should be completed.

The default screen for the SmartPurge displays **Purge System Status**, which provides information related to the current state of the purge system.

The top line of the display will give a general message, such as **Purge System Status** and the bottom line will give supplementary information, such as an alarm message. Pressing the Up or Down buttons will cycle the bottom line through any supplementary messages that may be relevant.

Only prompts and parameters appropriate to selected purge method are shown on the menu system. Options that cannot be combined will not be shown.

Pressing the menu button enters the menu system. Each press of the menu button moves the system on to the next menu item, until the display returns to the **Purge System Status** display.

To change numbers for passwords or settings use  or  to increase or decrease the flashing number 0-9. Then press  to accept entry.

Once accepted the next digit will be highlighted for change or the complete entry will be accepted.

To scroll through sub-menus use  or  Then press  to choose menu.

Once accepted the next menu will be highlighted for change or the complete entry will be accepted.

Some menus will request confirmation by displaying **Confirm? Y / N**. Press  for Yes and  for No.

**Menu**

**A: Purge System Status \***

- English En
- Français F
- Deutsch
- Español E
- Italiano
- Norsk

**C: Settings Display \***

- Enclosure Volume
- Volume Changes
- Purge Air Volume
- Minimum Flow Rate
- Purge Start
- Purge Time
- Delay Time
- Low Pressure
- Low Pressure Pre-alarm
- Enclosure Target Pressure
- High Pressure
- Trip Function
- Ext Alarm Function
- Purge Flow Method
- Purge Timing Method
- Orifice Diameter
- Alarm 1 Function
- Alarm 2 Function
- Serial Number

**D: Passwords**

- Change Operator Password
- Change Override Password
- Sensor Calibration

- Pressure Zero  
Cal Pressure Zero, Enter key to set
- Pressure 70 mbar  
Cal Pressure 70 mbar, Enter key to set
- Orifice  
13 mm  
18 mm  
25 mm  
Custom  
dp Flow
- Voltage Monitor \*  
M: x.xxV S: x.xxx
- Sensor Full Scale  
70 mbar
- Reset Passwords  
Enter key to set
- Zero Sensors  
Re-zero flow and press Enter key to set

**E: Password Override**

**F: Parameter Entry \***

<b>Purge Timing Method</b>	Elapsed Time Adaptive Flow
<b>Purge Flow Method</b>	Continuous Flow 2-Con Flow (IS DV) 2-Con Flow (I/P conv) Leakage Compensation (IS DV) Leakage Compensation (I/P conv)
<b>Trip Function</b>	Immediate Trip Alarm Only and Re-Purge Delay Trip and Re-Purge Alarm Only Delay Trip
<b>External Alarm</b>	Power Off System Trip Purge Start
<b>Alarm 1 Function</b>	General Alarm Pressure Correct Pressure Not Correct Purge In Progress Low Pressure alarm Ready to Purge
<b>Alarm 2 Function</b>	General Alarm Pressure Correct Pressure Not Correct Purge In Progress Low Pressure alarm Ready to Purge
<b>Purge Parameters</b>	Enclosure Volume Volume Changes Purge Air Volume Orifice Diameter Minimum Flow Rate Maximum Flow Rate Purge Time Delay Time Low Pressure Low Pressure Pre-Alarm High Pressure Enclosure Target Pressure Minimum Dilution Rate
<b>Purge Start</b>	Auto Manual

\* Display only. Only prompts and parameters relevant to the selected purge method are shown.

## A: Purge System Status

This screen is the default display for the system and it shows information about the status of the system. Using the arrow keys to scroll through the menu will display: enclosure pressure, purge flow rate and trip mode.

The bottom line of this display will revert to its default of trip mode after 30 seconds. The display can be fixed on other parameters using the Enter key. After this, the arrow keys can be used to change the display and the 30 second time out will resume.

## B: Language

This menu is used to change the language used to display menu items.

Selection of this display will show the language currently in use. Scroll through the options using the up and down arrow keys and press enter to select once the desired language is displayed.

The operator password will be required to change the language.

Languages available are English (default), French, German, Spanish, Italian and Norwegian.

## C: Settings Display

The Settings Display menu is used to give the operator a view of all the parameters that have been set up for the purge system in its present configuration. This for display only, it is not possible to change settings in this menu.

Press the Enter key to select this menu, then use the Up and Down arrow keys to view the settings.

## D: Passwords

The passwords menu allows the user to change the passwords used by the system to control access to various parts of the system. The system uses 3 passwords:

- The Operator Password: required to access the language menu and to modify any of the purging parameters.
- The Override Password: required to turn on the system override or by-pass function allowing power to be connected to the protected equipment regardless of the state of the purge system.
- The Maintenance Password is fixed by Expo, and is not available to general users, as this password controls access to the pressure sensor and flow rate calibration system.

Passwords consist of a 4-digit number, 0000 to 9999. The default value of the Operator and Override passwords is 0000.

When you are prompted to enter a password, a group of 4 0's will appear on the bottom line of the display. The first 0 will be flashing. Use the Up and Down keys to change this character to the appropriate value. Press the Enter key to move on to the next digit. If you make an error, it is possible to "Backspace" by pressing the Up and Down keys simultaneously.

When changing a password, you will first be prompted to enter the current Password.

You will then be prompted to enter the new password. You will then be asked to confirm the new password. If the confirmation succeeds, a confirmation message will be displayed, if it fails, an error message will be displayed, and it will be necessary to repeat the process.

## E: Password Override

This is a software version of a manual override keyswitch. It allows user to switch on the power to the protected equipment, regardless of the status of the purge system.

This must only be used when the area is known to be hazard free, and typically will require the use of a Hot Work Permit or similar. You should follow your local work instructions and regulations for such matters.

If a manual override keyswitch is fitted to the system, this will take precedence over the password override.

- If the password override has been used and the manual override is activated, the override can only be removed manually. It is not possible to use the password in this case.
- All override is cancelled when the Keyswitch override is turned off
- If the Keyswitch override is in use, the password override menu is not available, and a warning message is shown.

Press Enter to select the Password Override menu. A message will be displayed asking whether the override should be turned On or Off, depending on the present state of the override. Use the Up key to respond "Yes" and the Down key to respond "No".

If you are turning the Override On, then you will be prompted to enter the Override Password. Successful entry of the password will turn the override On.

The password is not required to turn the Override Off.

It is possible to remove the Password Override option from the main menu, by setting the Override Password to "9999" in the Passwords menu.

Pressing the Menu key will move the user along to the next menu item.

## F: Parameter Entry

Requires Operator password to be entered before sub-menu can be accessed.

The Parameter Entry menu allows the user to configure the system to the specific application.

### Purge Timing Method

The first sub-menu in the Parameter Entry menu allows the choice of purge timing methods.

Elapsed Time	This option is the traditional timing method. The purge flow is maintained above a minimum for a set period of time measured in minutes. If the flow drops below the minimum, the purge time is reset and the purge time will restart.
Adaptive Flow	This method is a cumulative values of true flow rate measured over time. The system will take into account the time that the flow rate is above the minimum but below the maximum specified flow rate. If the flow rate falls below minimum the accumulation of purge volume will stop but the total is not reset. Flow rate above the maximum is accumulated at the maximum rate. the accumulation is only reset when the pressure exceeds the limits for the low or high pressure alarms.

### Purge Flow Method

The second sub-menu in the Parameter Entry menu allows the choice between how the flow of purge gas is to be controlled.

Continuous Flow:	There is no control by the system over the flow of purge air. After the purge has completed, the system checks for flow above the minimum dilution rate.
------------------	--

Continuous Flow High Purge, IS Digital Valve control	A boost is provided by means of an intrinsically safe solenoid valve to allow a higher flow rate during purging.
Leakage Compensation with IS Digital Valve	The purge flow is controlled by an intrinsically safe solenoid valve, and leakage compensation controlled manually by means of a leakage compensation needle valve.

## Trip Function

The third sub-menu in the Parameter Entry menu allows the choice of action to be taken by the system if the pressure goes out of the specified range.

Immediate Trip	This option will disconnect the power to the protected equipment as soon as the enclosure pressure goes out of bounds.
Alarm Only & Repurge	Alarm Only does not disconnect the power to the protected equipment, but will activate the appropriate alarm signals. It is possible to turn the power to the protected equipment off by pressing the Down button on the keypad. A message will be displayed to ask for confirmation that the power is to be turned off.
Delay Trip & Repurge	Delay Trip will disconnect the power to the protected equipment after a pre-set period of time has elapsed after the enclosure pressure goes out of limits. As with the Alarms Only option, the appropriate alarm signals are activated, and it is possible to manually turn the power to the protected equipment off by pressing the Down button on the keypad.
Alarm Only	This will prevent the enclosure being re-purged once pressure is restored after pressurization failure.
Delay Trip	This will prevent the enclosure being re-purged once pressure is restored after pressurization failure.

## External Alarm

The fourth sub-menu configures the action taken by the system in response to the External Alarm. This is an IS (Intrinsically Safe Circuit),

Power Off	Choosing power off will cause the system to remove power from the protected enclosure when the external alarm input is activated. For example, this option could be used with a thermostat, to prevent over-heating.
System Trip	Choosing system trip will cause the system to act as if a pressure fault had been detected. The system will trip in accordance with the currently selected trip mode. For example, this option would be chosen when the input is used to connect additional pressure switches monitoring the pressurization.
Purge Start	Choosing purge start will inhibit the start of a purge cycle if an external alarm input is present.

The default condition is “Purge Start”

## Alarm 1 & Alarm 2

There are two normally open volt free contacts (Alarm 1 and Alarm 2) that may be configured to give a number of indications

General Alarm	This is the default function of Alarm 1, and is active whenever the enclosure is not in a pressurized condition. The contacts close when the enclosure is purged and pressurized.
Pressure Correct	The status relay is closed when the enclosure pressure is within limits
Pressure NOT Correct	The status relay is closed when the enclosure pressure is NOT within limits.
Purge In Progress	The status contact closes when the purge flow is above the minimum level. This is the default function of Alarm 2.
Low Press Pre-Alarm	The status relay closes when the enclosure pressure falls below the low pressure pre-alarm setting, giving an early warning of impending loss of pressurization.
Ready to Purge	When the External Alarm option Purge Start has been chosen this Alarm contact will close to inform the user that purge has not started. This will either be because the Purge Start signal has not been received or there is insufficient Purge Flow being measured in the purge air exit valve.

## Purge Parameters

The seventh sub-menu will allow the user to enter all the specific details needed to fully configure the SmartPurge System to the application.

To change the setting use  to select number, then press  when number is correct, this will move you onto the next setting. Backspace is achieved by pressing the Up and Down buttons simultaneously.

Once the last setting has been set the display will default back to **Purge Parameters** menu.

Wait 30 seconds or Press  this will return you to the **Purge System Status**.

The user can escape early from the parameter entry menu after the desired item has been changed by pressing . Early escape is only possible provided all the parameters remain consistent with correct operation.

**Note: Not all of the parameters listed below will be relevant to the purging method selected.**

In this section the system will suggest some values based on the parameters entered earlier. Where values are suggested, these values may be adjusted by the user, but only in an upward direction. You cannot use a value smaller than that suggested by the system.

Enclosure Volume	Enter the volume of the purged enclosure. The volume may be between 1 and 99999 litres.
Number of Vol. Changes	Enter the number of times you wish the enclosure volume to be changed. The number of times may be between 1 and 10.  Where the purge air volume has been evaluated by testing, set the number of changes to 1. The default value is 10.
Purge Air Volume	The system will suggest a purge air volume based on the Enclosure Volume x Number of Volume. Changes.  Where the purge air volume has been measured by testing, enter the desired volume here.

Orifice Diameter	<p>It is possible to select 3 different orifice sizes in order to change the range of flow rates measured by the system. The default value for orifice diameter is 25mm, and corresponds to a maximum flow rate during purge of 540 litres per minute.</p> <p>Two smaller orifice plates are supplied, and are fitted over the air entry into the SmartPurge. The orifice is secured by two screws. Refer to Table 1</p> <p>For systems that have been specially factory-configured, an extra orifice diameter may be selected in this menu. Details of the flow rate for this orifice size will be recorded in the project specific information section of the manual. Standard systems will only offer the 3 sizes as detailed in Table 1</p>
Purge Time	Enter the desired purge time, in minutes. A value will be suggested, based on the purge air volume / minimum purge flow rate.
Minimum Flow Rate	Enter the minimum purge flow rate. The default value suggested will depend upon the orifice diameter selected.
Maximum Flow Rate	Enter here the maximum purge flow rate. A default value will be suggested, based on the orifice diameter. (Adaptive Flow Purge Timing only)
Minimum Dilution Rate	Enter here the minimum dilution rate for the purge flow after the main purge has completed. (Continuous Flow High Purge methods only)
Low Pressure	<p>Enter the lowest acceptable pressure within the enclosure.</p> <p>The function of this is to shut power off to the pressurized enclosure due to a loss of pressure that may allow the entry of hazardous gas or particles.</p>
High Pressure	<p>Enter the highest acceptable pressure within the enclosure.</p> <p>Enclosures should have a maximum test pressure and it is advised that the High Pressure is set a below this point.</p> <p>This will warn the user that higher than expected pressure is present inside the enclosure.</p>
Low Pressure Pre-Alarm	Enter the pressure which is above the Low Pressure and below the expected normal operation pressure of the enclosure. The function of this alarm is to warn the user that the enclosure pressure is falling to allow for preventative maintenance to occur.
Enclosure Target Pressure	Where an I/P supply valve is used the Enclosure Target Pressure is maintained by the valve after purge complete.

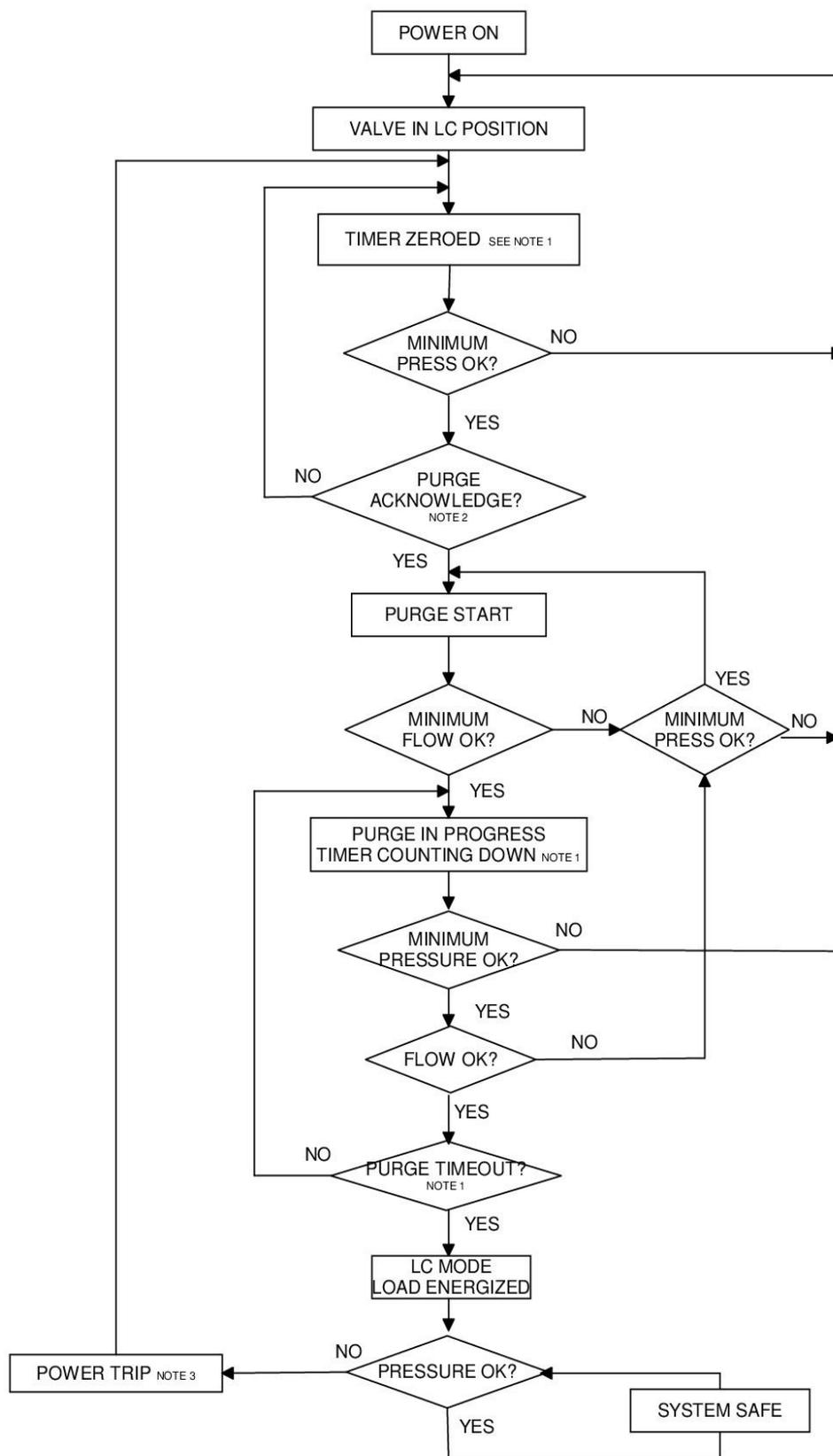
### Notes on air volume and purge time parameters:

- The enclosure volume must be larger than 10 litres and smaller than 99999 litres.
- The number of purge volume changes must be between 1 and 10.
- The Purge Air Volume is automatically calculated by the system as the enclosure volume x number of volume changes.
- The user may amend the Purge Air Volume, but only to a larger volume. The maximum volume is 99999 litres.
- The user may select an orifice size from the 3 standard sizes or from the Custom Size, if one has been configured.
- The minimum flow rate is automatically calculated as 40% of the maximum flow rate available for the selected orifice.

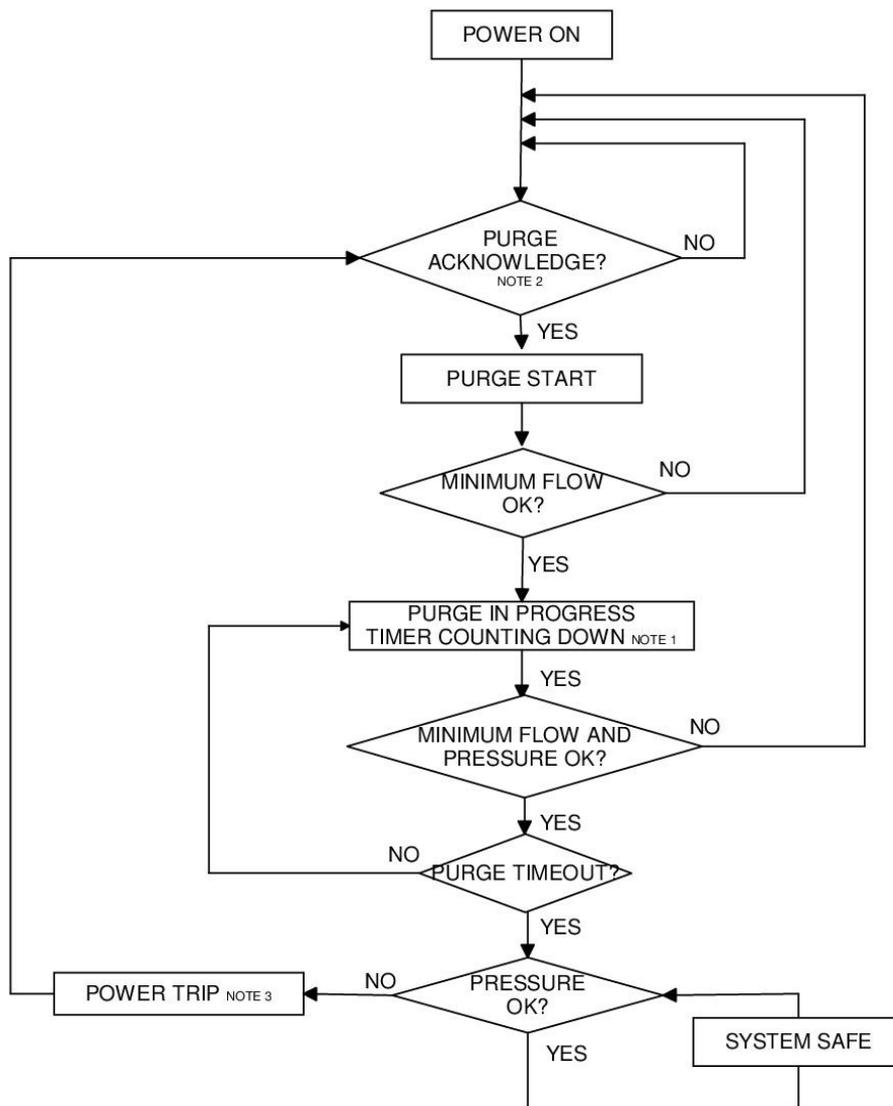
- The maximum flow rate is automatically calculated as 80% of the maximum flow rate available for the selected orifice.
- The user may amend the maximum and minimum flow rates. The system will check that the value for minimum flow rate is always lower than the value for maximum flow rate. The maximum flow rate cannot be larger than the maximum flow rate available for the selected orifice.
- The purge time is automatically calculated by the system by dividing the purge air volume by the minimum flow rate.
- The purge time has a minimum value of 1 minute.

The user can amend the purge time to a larger value than the one calculated by the system.

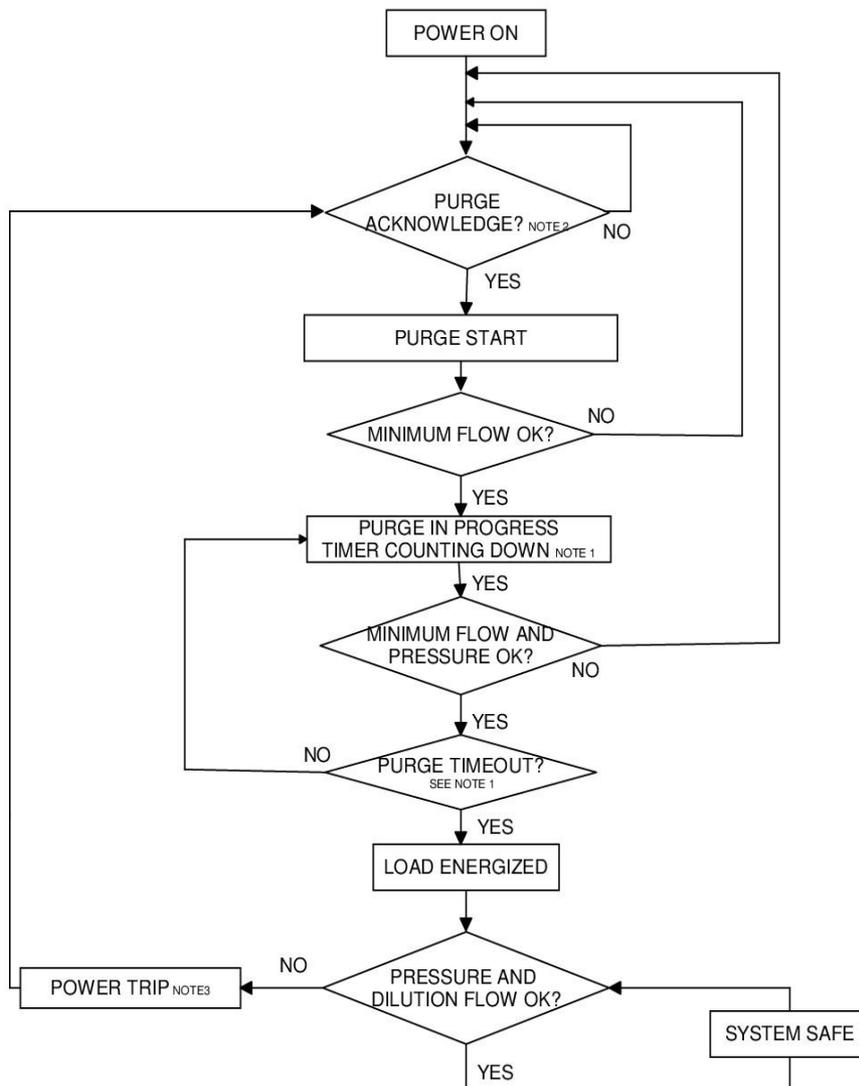
### LEAKAGE COMPENSATION



## CONTINUOUS FLOW



## CONTINUOUS FLOW HIGH PURGE



### Notes:

#### Note 1:

- In elapsed time mode, purge is controlled by the timer
- In adaptive flow mode, purge is controlled by the number of litres of air used

#### Note 2:

- Purge acknowledge only applies when the parameter **Purge Start** is set to manual. This message prompts the user to initiate the purge cycle by pressing the enter button.

## Section 9: Maintenance of the System

The maintenance of the system outlined in this manual should be supplemented with any additional requirements set out in appropriate local codes of practice.

### Routine Maintenance

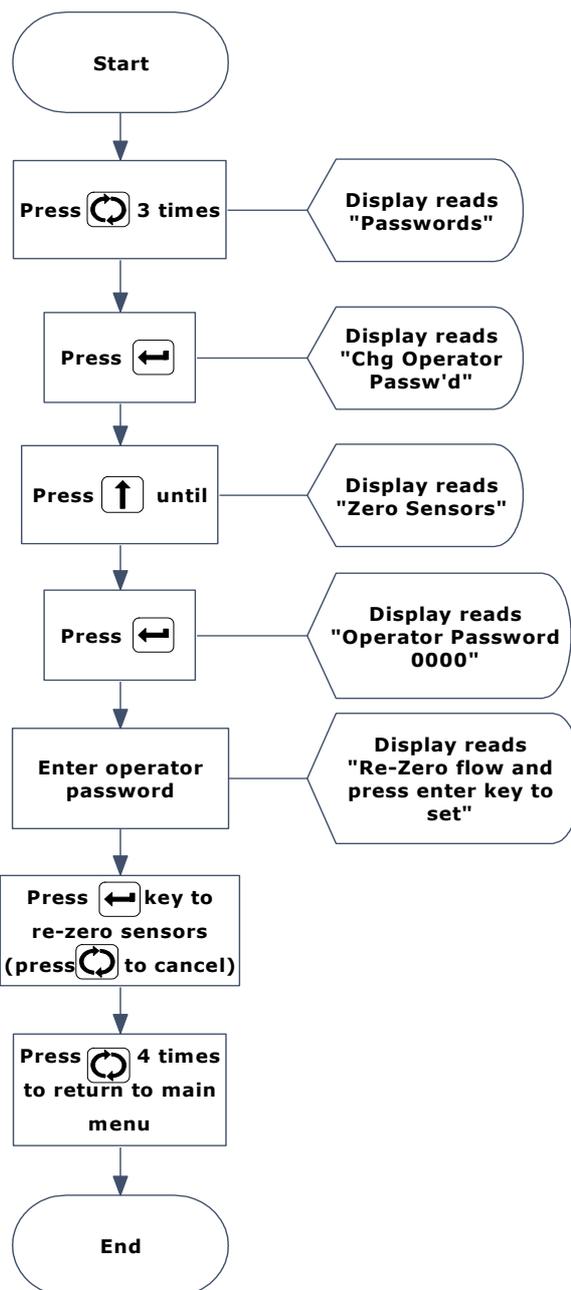
**It is recommended that these tasks are carried out annually.**

- The system should be checked to ensure that the system generates an alarm when the enclosure pressure drops below 0.5 mbar minimum.
- The condition of the connections and cable glands should be checked by suitably qualified personnel. This may be required more frequently depending on environment.
- Re-zeroing of the flow and pressure sensors should be carried out according to the instructions in this manual.

### Re-zeroing of the Flow and Pressure Sensors

If the SmartPurge display shows the error message **Pressure Mismatch** the zero point of the flow and pressure sensors must be reset. It is **essential** to the correct operation of this function that the enclosure is **not pressurized**. It is suggested that the best way to ensure this is to perform this operation with the enclosure door open and the air supply turned off

Carry out re-zeroing as follows:



## Repairs

If the SmartPurge needs repairs, these should be carried out by an Expo Service Person.

## Section 10: Fault Finding

Symptom	Fault	Solution
No display on the Control Unit		<p>Check power to Control Unit.</p> <p>Check fuse in Control Unit.</p> <p>If ambient temperature is below -20°C the display may not be visible.</p>
Low pressure fault. No Pressure OK indication	No air supply	<p>Check air supply is on.</p> <p>Defective wiring between SmartPurge and Air Supply Unit.</p>
	Excessive leakage	<p>Check that all enclosure doors, covers and conduit or cable entries are sealed and that the enclosure is of an airtight construction. Improve sealing using closed cell foam strip or suitable sealant.</p>
	Low air supply pressure	<p>Open leakage compensation valve (where fitted) to provide more leakage compensation air flow</p> <p>Increase the air supply pressure</p> <p>Ensure atmospheric pressure is referenced.</p>
No Purge in Progress indication	Insufficient air supply	<p>Check that when the purge is flowing that the pressure at the air inlet is greater than the value shown in Table 1.</p> <p>Check air supply and piping for correct sizing and excessive restrictions.</p>
	Excessive enclosure leakage during purging	Seal leaks as above
Purge timer does not time out		<p>Elapsed Time Purging:</p> <p>Purge flow drops during purge sequence (the purge timer resets to zero if purge flow is lost at any time during purge). Check air supply capacity. Increase air supply pressure or select a lower minimum flow threshold.</p> <p>Adaptive Flow Purging:</p> <p>The purge accumulation process will stop if the purge flow drops below the minimum setting. Increase the air supply pressure, or select a lower minimum purge flow threshold.</p>
High pressure fault indication	SmartPurge air outlet is restricted or blocked.	Unblock
	Purge flow is too high	Reduce supply pressure.

## Section 11: Recommended Spares List

Part Number	Description
SP2-DV	Intrinsically safe solenoid valve, switches between the purge flow and leakage compensation flow rate.

## Section 12: Drawings and Diagrams

Title	Drawing Number	Sheet Numbers
Control Unit Drawing	XMA-STD0-001	1
External Controller Dimensions		2
Remote Panel Mounting		3
SmartPurge 2 Internal Components		4
Line Fault Detection Connector Assembly		5
SmartPurge 2 Wiring Layout		6
SmartPurge2 SDV Assembly		7
SmartPurge2 SDV Mounting and Cutouts		8
SmartPurge 2 Controller Cutout		9
SmartPurge 2 Hook up		10
SmartPurge 2 Intrinsically Safe Control Drawing USS	SD8112	11
SmartPurge 2 Intrinsically Safety Control Drawing Canada	SD8113	12

## Section 13: Certification

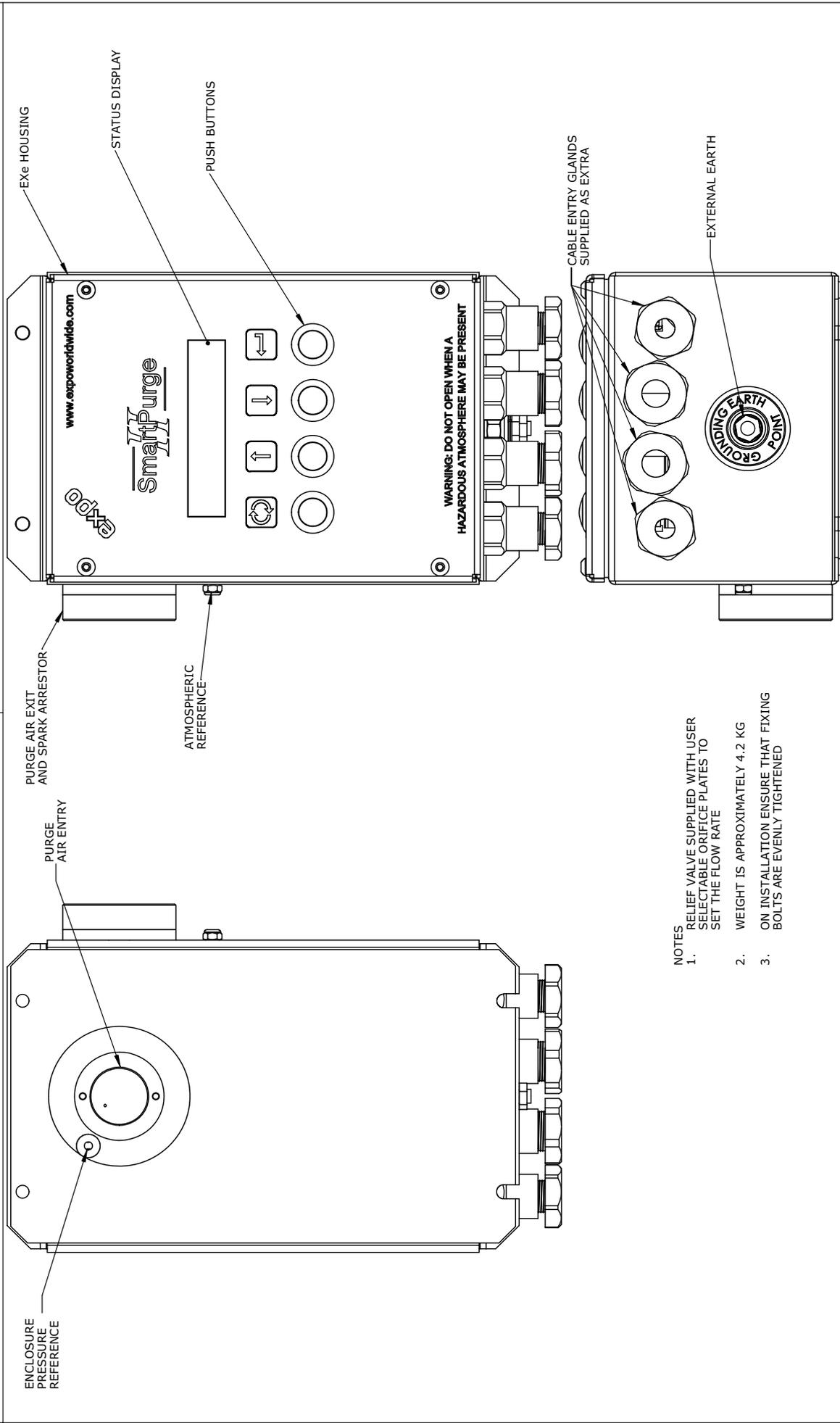
Component	Certificate	Number
SmartPurge Control Unit	IECEX	IECEX FME 11.0006X
	ATEX	FM11ATEX0060X
	FM (USA)	3047764
	FM (Canada)	3047764C
SIL 2 Rating	ESC	A127_CT001_(2.0)
IS SOV	IECEX	IECEX INE 10.0002X
	ATEX	INNERIS 03ATEX0249 X

3rd ANGLE PROJECTION

DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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- NOTES
- RELIEF VALVE SUPPLIED WITH USER SELECTABLE ORIFICE PLATES TO SET THE FLOW RATE
  - WEIGHT IS APPROXIMATELY 4.2 KG
  - ON INSTALLATION ENSURE THAT FIXING BOLTS ARE EVENLY TIGHTENED

REV.	MOD NUMBER	APPROVED DATE	APPROVED	DRAWN DATE:	08/12/2011	MATERIAL	STAINLESS STEEL 316 1.5mm THK			SCALE	NTS	REV:	03
01	DRAWN	03/05/2012	MP	DRAWING STATUS:	production	FINISH	VERTICAL BRUSHED 240 GRIT ALL EXTERNAL WELDS REMOVED			DRAWING No.	XMA-STD0-001		
02	5565	07/08/2012	MP	APP'D	MP	CHK'D	DR'WN	MP	MIN	CONTROL UNIT DRAWING			
03	5873	04/07/2013	MP	MP	SB	MP	MP	MP	MIN	SHEET No. 1 OF 10			

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SURREY KT7 0RH  
UNITED KINGDOM

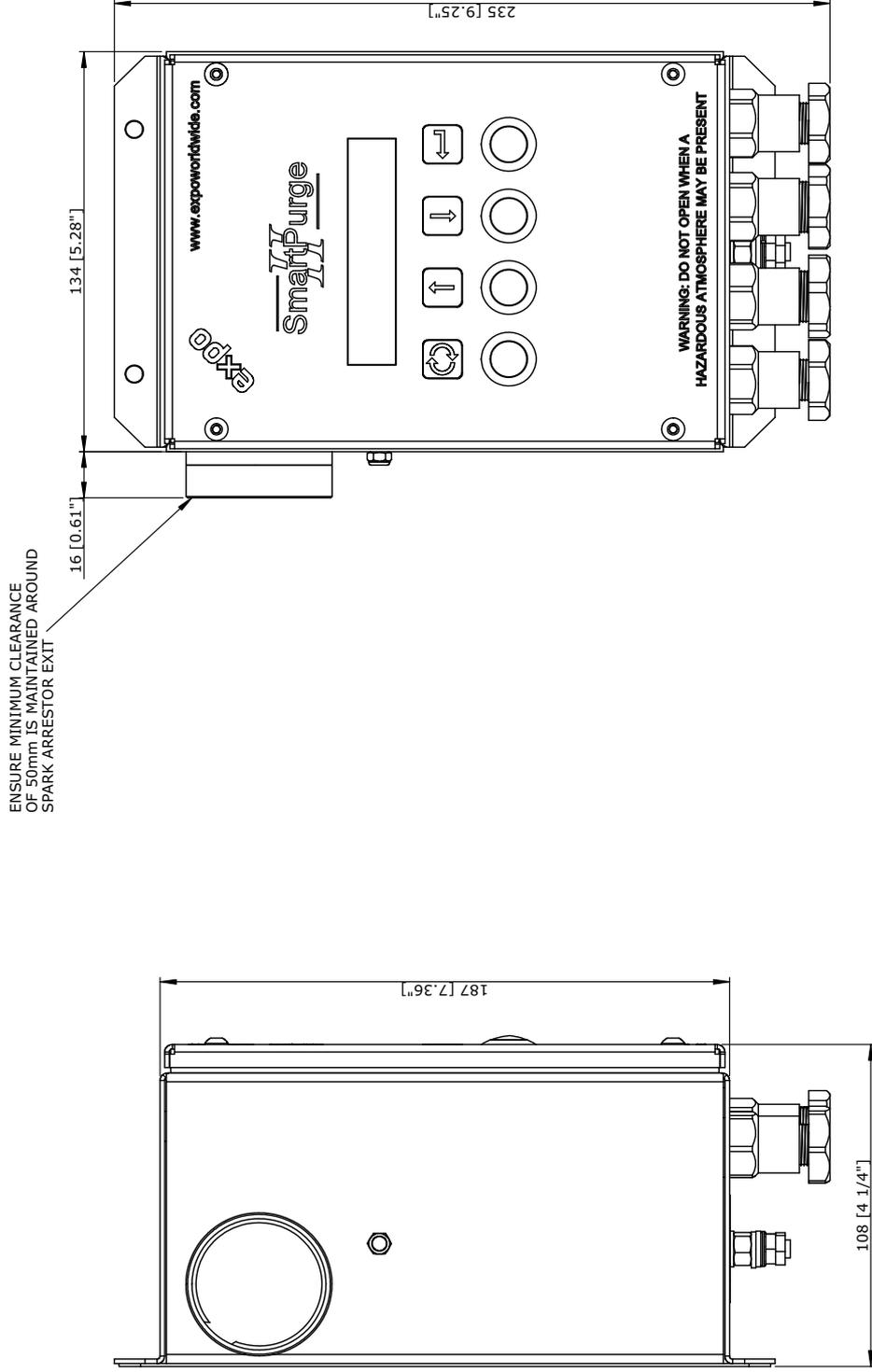
TITLE

3rd ANGLE  
PROJECTION

DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
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DRAWN DATE:	08/12/2011	MATERIAL	STAINLESS STEEL 316 1.5mm THK	SCALE	NTS	REV:	03	
DRAWING STATUS:	production	FINISH	VERTICAL BRUSHED 240 GRIT ALL EXTERNAL WELDS REMOVED	DRAWING No.				XMA-STD0-001
APP'D	CHK'D	DR'WN	MN	TITLE				SHEET No. 2 OF 10
MP	SB			EXTERNAL CONTROLLER DIMENSIONS				



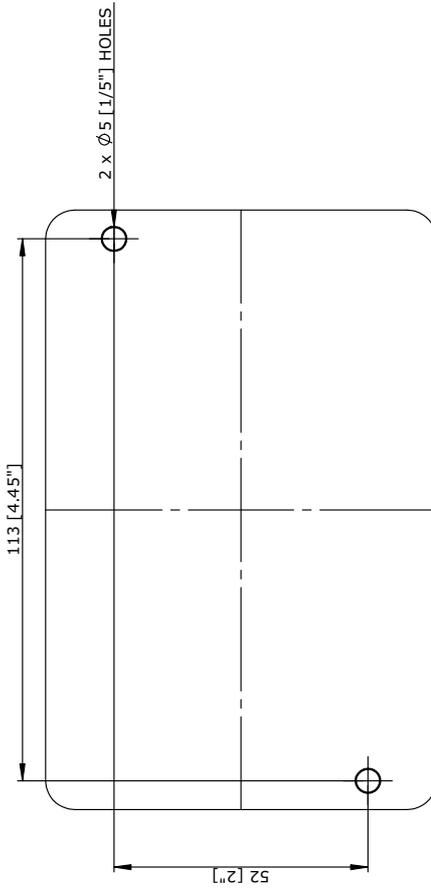
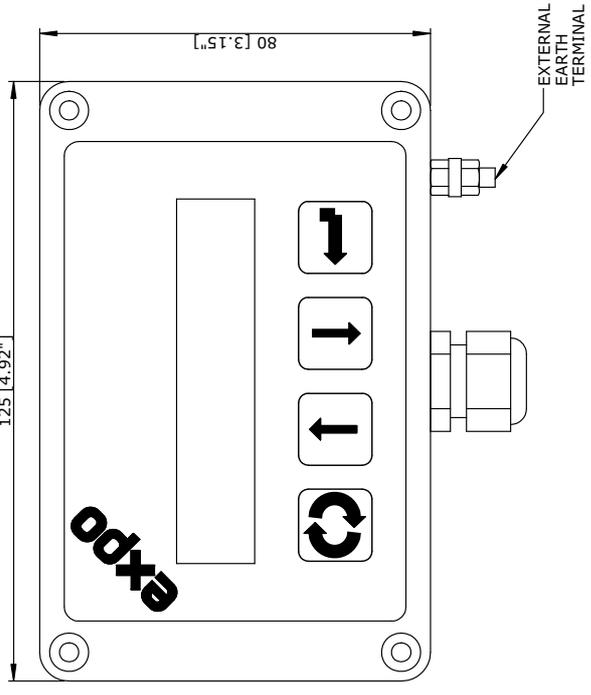
**Expo Technologies Limited** SURREY, KT7 0RH  
UNITED KINGDOM

3rd ANGLE  
PROJECTION

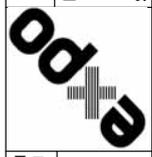
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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DRAWN DATE: 08/12/2011	MATERIAL		SURREY KT7 0RH UNITED KINGDOM	SCALE NTS	REV: 03
	CAST ALUMINIUM				
DRAWING STATUS: production		FINISH	TITLE	DRAWING No. XMA-STD0-001	SHEET No. 3 OF 10
APP'D MP	CHK'D SB				
DR'WN MN					

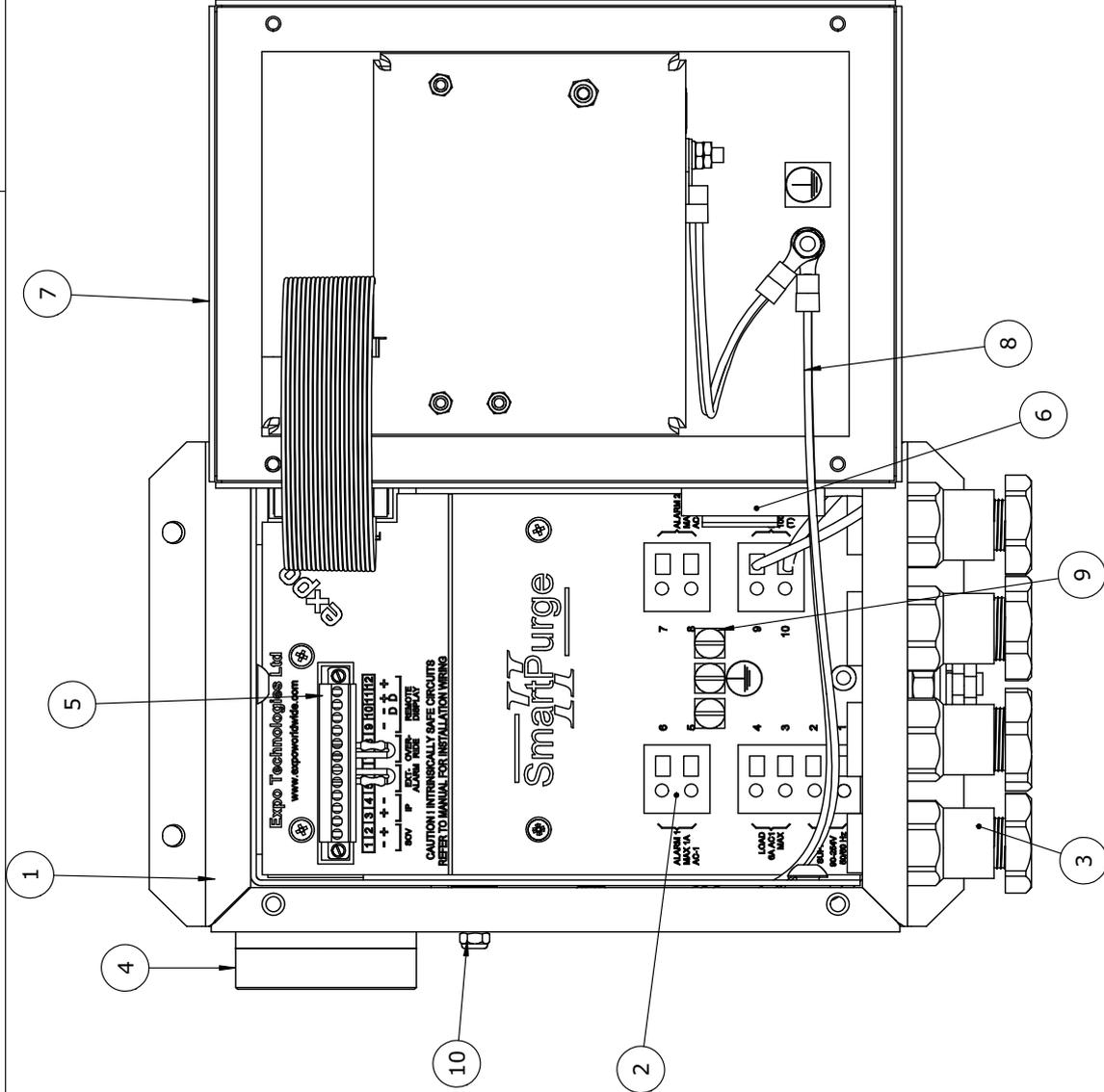


3rd ANGLE  
PROJECTION

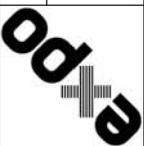
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE  $\pm 0.5$   
TOLERANCES 1 DEC PLACE  $\pm 0.2$   
2 DEC PLACE  $\pm 0.1$   
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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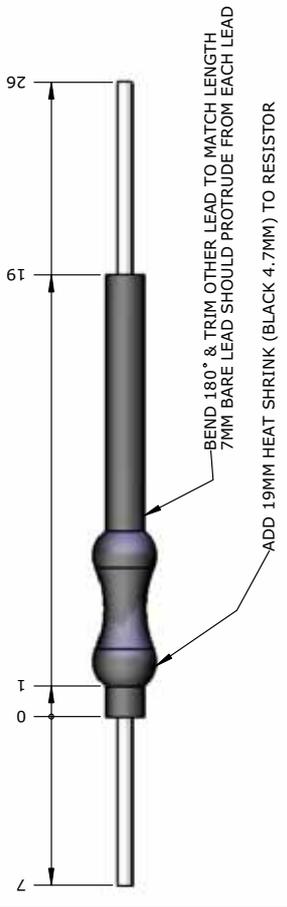
ITEM NO.	DESCRIPTION	QTY
1	SMARTPURGE 2 PURGE ENCLOSURE	1
2	POWER TERMINALS	1
3	CABLE GLANDS (SUPPLIED SEPERATELY)	4
4	PURGE AIR EXIT SPARK ARRESTOR	1
5	TERMINALS FOR INTRINSICALLY SAFE CIRCUITS	1
6	POTTED EXE FUSE FOR SP2	1
7	SMARTPURGE 2 SS HOUSING LID	1
8	LID TO ENCLOSURE EARTH CABLE	1
9	EARTH TERMINAL MANTLE	3
10	BRASS SILENCER FOR ATMOSPHERIC REFERENCE	1

DRAWN DATE: 08/12/2011	MATERIAL: STAINLESS STEEL 316 1.5mm THK	SCALE: 1:5	REV: 03
DRAWING STATUS: production	FINISH: VERTICAL BRUSHED 240 GRIT ALL EXTERNAL WELDS REMOVED	DRAWING No. XMA-STD0-001	
APP'D: MP	DR'WN: SB	SHEET No. 4 OF 10	
CHK'D: MN		TITLE: SMARTPURGE 2 INTERNAL COMPONENTS	
			
<b>Expo Technologies Limited</b> SURREY KT7 0RH UNITED KINGDOM			

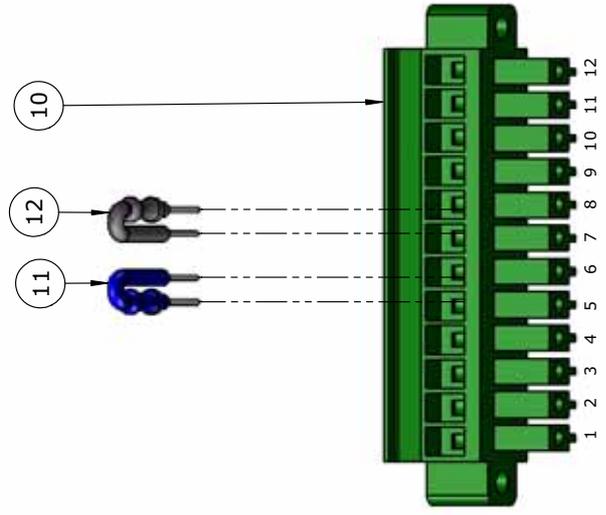
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UNSPECIFIED NO DEC PLACE ±0.5 TOLERANCES  
 1 DEC PLACE ±0.2  
 2 DEC PLACE ±0.1  
 FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

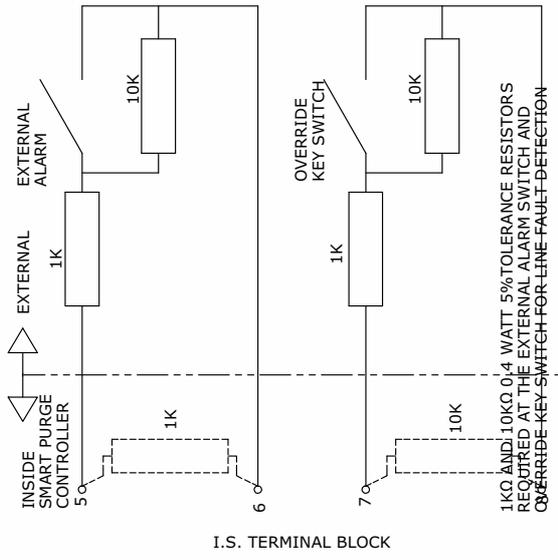
ITEM NO.	DESCRIPTION	QTY.
10	PLUG 12WAY CABLE MOUNT 3.5mm PHOENIX CONTACT	1
11	RESISTOR 1K 0.4W MFR4	1
12	RESISTOR 10K 0.4W MFR4	1



**REPEAT PROCEDURE FOR EACH RESISTOR**



**NOTE**  
 OVERRIDE AND EXTERNAL ALARM WIRING



I.S. TERMINAL BLOCK

1KΩ AND 10KΩ 0.4 WATT 5% TOLERANCE RESISTORS REQUIRED AT THE EXTERNAL ALARM SWITCH AND OVERRIDE KEY SWITCH FOR LINE FAULT DETECTION  
 WHEN THE EXTERNAL ALARM OR OVERRIDE KEY SWITCH ARE NOT REQUIRED, FIT RESISTORS AS SHOWN (DOTTED) INSIDE IN THE SMART PURGE UNIT.

DRAWN DATE: 08/12/2011 DRAWING STATUS: production APP'D: MP CHK'D: SB DR'WN: MN FINISH:	MATERIAL:	TITLE:	
		LINE FAULT DETECTION CONNECTOR ASSY	
5-6=1K 7-8=10K	DRAWN DATE: 08/12/2011 DRAWING STATUS: production APP'D: MP CHK'D: SB DR'WN: MN FINISH:	Expo Technologies Limited SURREY KT7 0RH UNITED KINGDOM	SCALE: NTS REV: 03 DRAWING No. XMA-STD0-001 SHEET No. 5 OF 10

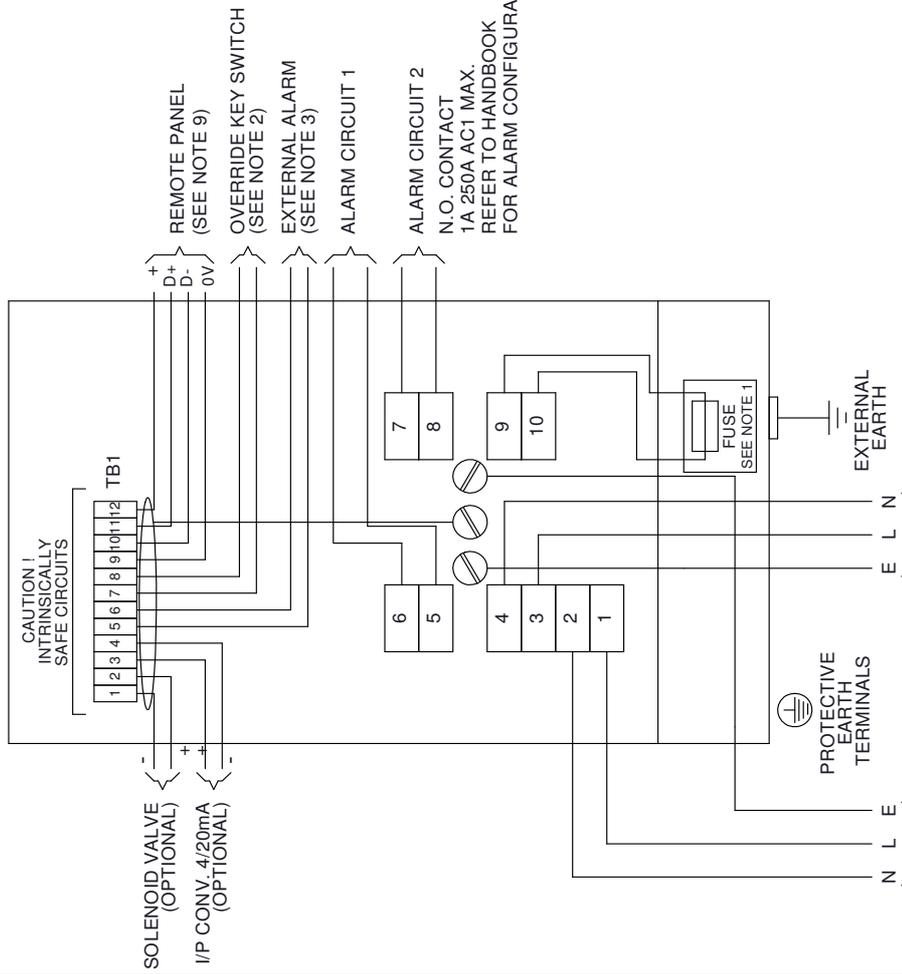
3rd ANGLE PROJECTION

DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED TOLERANCES  
NO DEC PLACE ±0.5  
1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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SMART PURGE CONTROL UNIT



POWER SUPPLY  
90 - 254 Vac 50 - 60 Hz  
OR  
11-28 Vdc

POWER TO PROTECTED EQUIPMENT :  
6A AC1 MAX. LOAD FOR 90 - 254Vac SUPPLY  
5A MAX FOR 11-28Vdc SUPPLY

NOTES:-

- FUSE RATING:  
AC SUPPLY: 100 mA  
DC SUPPLY 500mA
- FIT 10K 0.25W RESISTOR IN PLACE OF OVERRIDE SWITCH WHEN NOT REQUIRED.
- FIT 1K 0.25W RESISTOR IN PLACE OF EXTERNAL ALARM WHEN NOT REQUIRED.
- CONDUCTORS OF INTRINSICALLY SAFE CIRCUITS SHALL NOT BE CARRIED IN THE SAME CABLE AS CONDUCTORS OF CIRCUITS WHICH ARE NOT INTRINSICALLY SAFE.
- THE RADIAL THICKNESS OF THE CONDUCTOR INSULATION SHALL BE APPROPRIATE TO THE CONDUCTOR DIAMETER AND THE NATURE OF THE INSULATION. THE MINIMUM RADIAL THICKNESS SHALL BE 0.2 mm.
- THE CONDUCTOR INSULATION SHALL BE SUCH THAT IT WILL BE CAPABLE OF WITHSTANDING AN R.M.S. A.C. TEST VOLTAGE OF TWICE THE NOMINAL VOLTAGE OF THE INTRINSICALLY SAFE CIRCUIT WITH A MINIMUM OF 500 V.
- THE DISTANCE BETWEEN THE CONDUCTORS OF ANY CORE OF AN INTRINSICALLY SAFE CIRCUIT AND THAT OF ANY CORE OF A NON-INTRINSICALLY SAFE CIRCUIT SHALL BE IN ACCORDANCE WITH IEC 60079-11 TABLE 5 COLUMN 4 (FOR 375V THIS WILL BE 1.0 mm) EXCEPT WHEN ONE OF THE FOLLOWING APPLY:  
- THE CORES OF EITHER THE INTRINSICALLY SAFE OR THE NON-INTRINSICALLY SAFE CIRCUIT ARE ENCLOSED IN AN EARTH SCREEN, OR  
- THE INSULATION OF THE INTRINSICALLY SAFE CORES IS CAPABLE OF WITHSTANDING AN R.M.S. A.C. TEST VOLTAGE OF 2000 V
- TERMINAL BLOCKS TERMINAL TIGHTENING TORQUES:  
NON INTRINSICALLY SAFE: 0.4 - 0.5 Nm  
INTRINSICALLY SAFE TB1: 0.22 - 0.25 Nm
- REMOTE PANEL CAN BE REPLACED BY SMART PURGE 2 REMOTE LED ASSEMBLY. REF DRAWING SD7997 THE ELECTRICAL CONNECTIONS ARE DETAILED ON THIS DRAWING

DRAWN DATE:	08/12/2011	MATERIAL
DRAWING STATUS:	production	
APP'D	CHK'D	DR'WN
MP	SB	MIN
		FINISH

**Expo Technologies Limited** SURREY KT7 0RH  
UNITED KINGDOM

TITLE  
**SMART PURGE 2 WIRING LAYOUT**

SCALE **1:1** REV: **03**  
DRAWING No.  
**XMA-STD0-001**  
SHEET No. **8** OF **10**

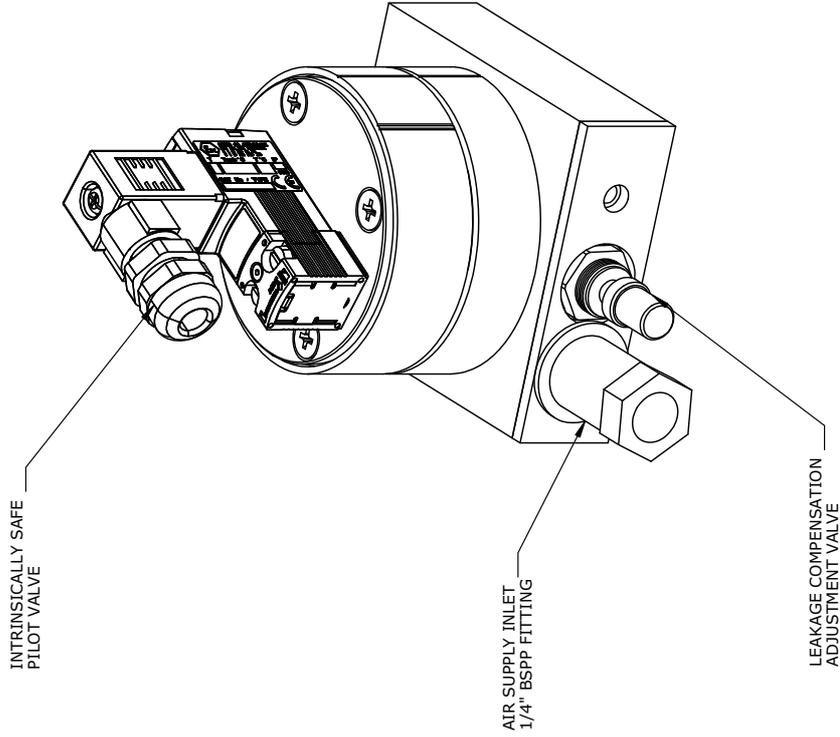
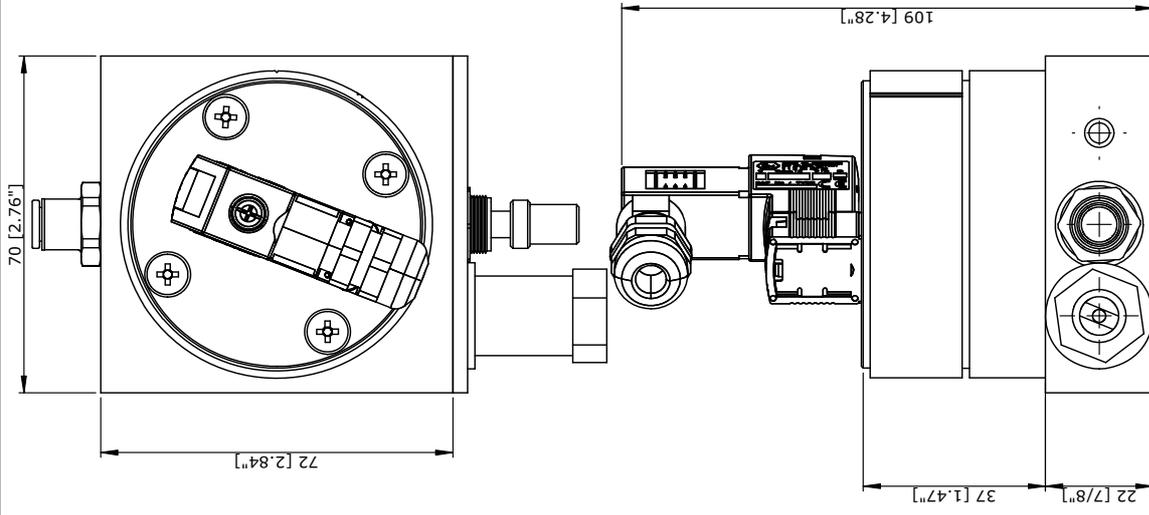
3rd ANGLE  
PROJECTION



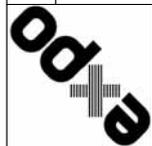
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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DRAWN DATE: 08/12/2011		MATERIAL		SURREY KT7 0RH UNITED KINGDOM		SCALE NTS	REV: 03
DRAWING STATUS: production		FINISH		TITLE		DRAWING No. XMA-STD0-001	
APPD	CHK'D	DRWN	MIN	SMART PURGE 2 SDV ASSEMBLY			
MP	SB	MP	MIN	SHEET No. 6 OF 10			



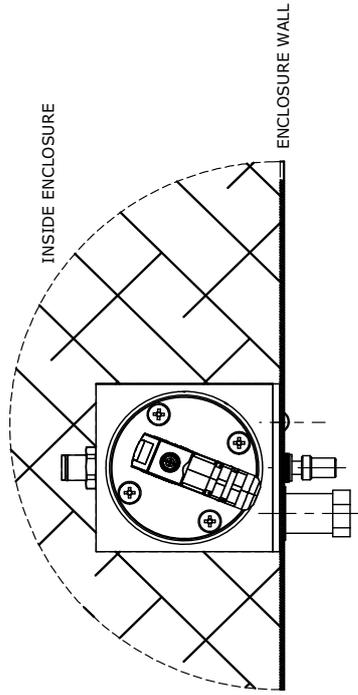
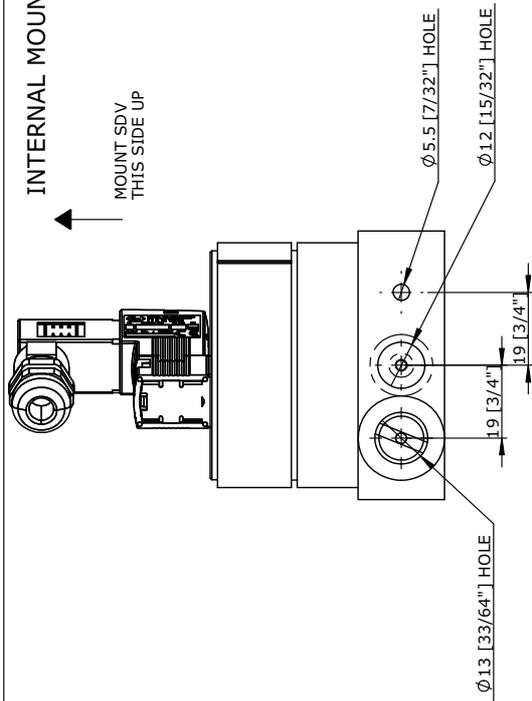
3rd ANGLE PROJECTION

DIMENSIONS IN mm DO NOT SCALE

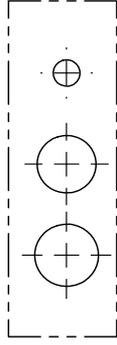
UNSPECIFIED NO DEC PLACE ±0.5 TOLERANCES  
 1 DEC PLACE ±0.2  
 2 DEC PLACE ±0.1  
 FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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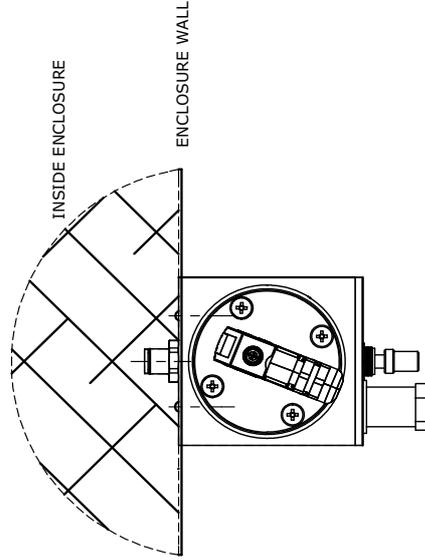
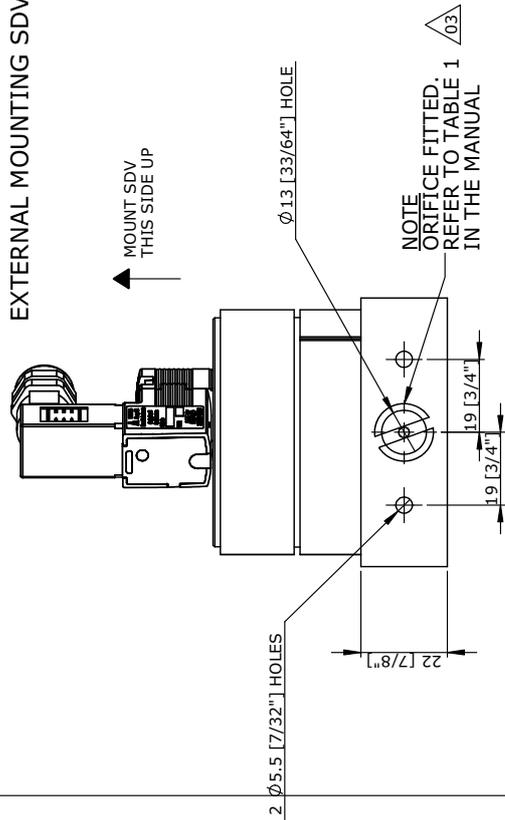
### INTERNAL MOUNTING SDV DIMENSIONS



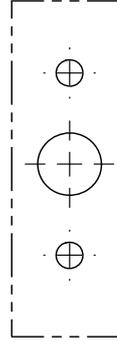
SDV INTERNAL MOUNTING CUT-OUT



### EXTERNAL MOUNTING SDV DIMENSIONS



SDV EXTERNAL MOUNTING CUT-OUT



DRAWN DATE: 08/12/2011 MATERIAL

**Expo Technologies Limited** SURREY KT7 0RH UNITED KINGDOM

SCALE N.T.S. REV: 03



DRAWING STATUS: production

TITLE SMART PURGE 2 SDV MOUNTING AND CUT OUTS

DRAWING No. XMA-STD0-001

APP'D MP SB MN FINISH

SHEET No. 7 OF 10

3rd ANGLE  
PROJECTION



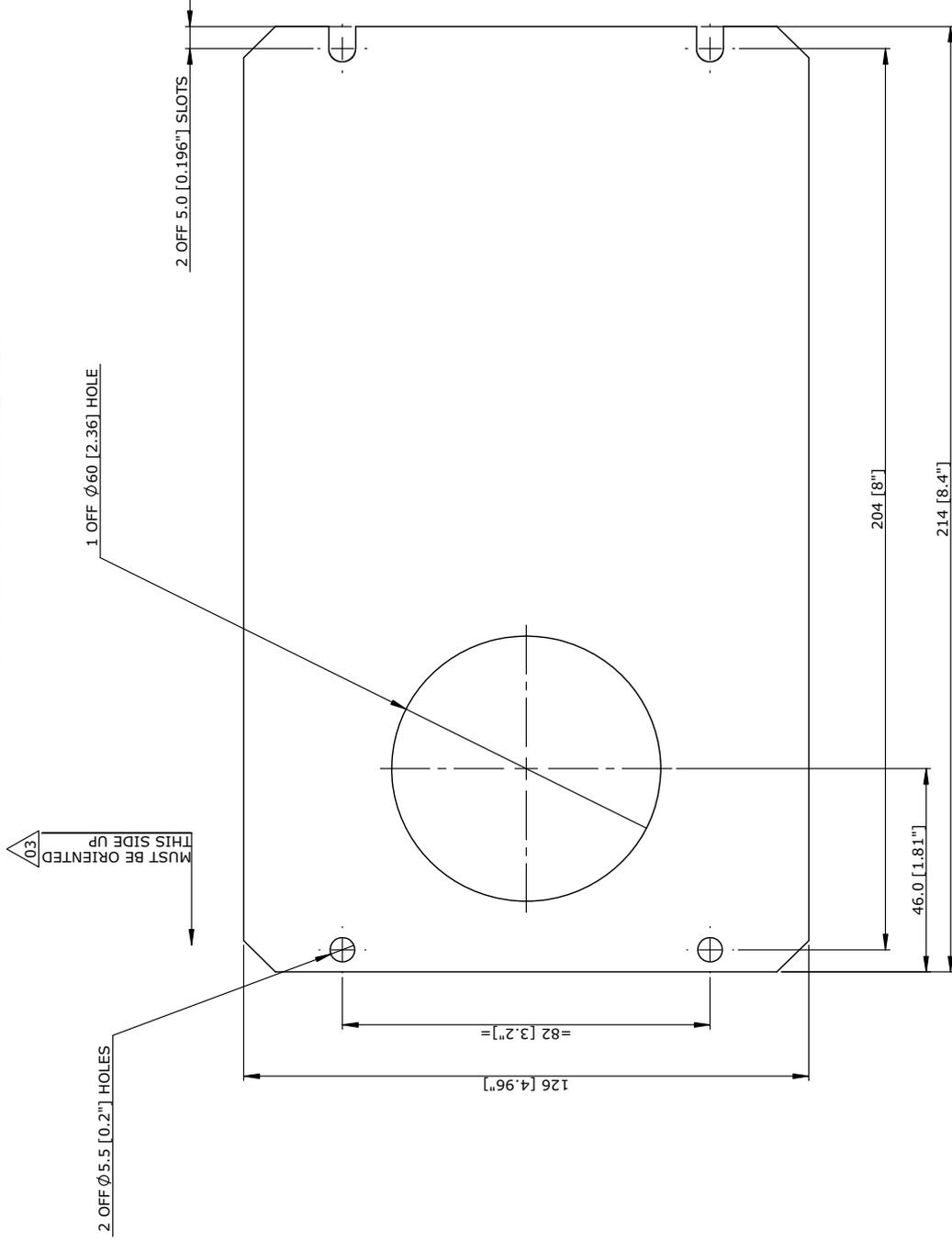
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE  $\pm 0.5$   
TOLERANCES 1 DEC PLACE  $\pm 0.2$   
2 DEC PLACE  $\pm 0.1$   
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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NOTE

FOR SDV CUT-OUT DIMENSIONS SEE PAGE 07



DRAWN DATE:	08/12/2011		
DRAWING STATUS:	production		
APP'D	CHK'D	DR'WN	MN
MP	SB		

MATERIAL  
BLK PVC FOAM  
3mm THK 3509

FINISH  
SAB

**Expo Technologies Limited**  
SURREY KT7 0RH  
UNITED KINGDOM

TITLE  
SP2 CONTROLLER  
CUTOUT

SCALE  
1:1

REV:  
03

DRAWING No.

XMA-STD0-001

SHEET No. 9 OF 10

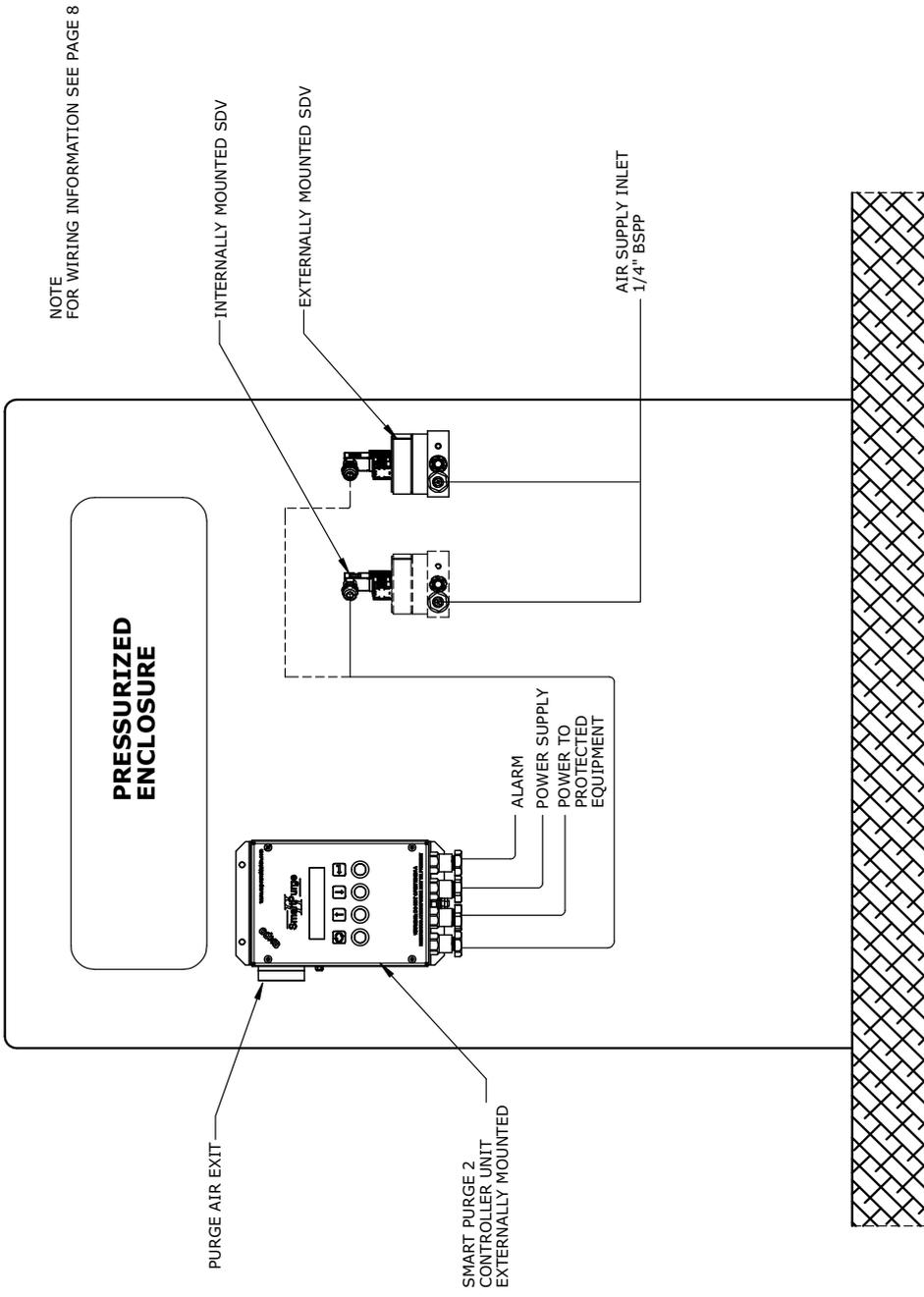


3rd ANGLE  
PROJECTION

DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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NOTE  
FOR WIRING INFORMATION SEE PAGE 8

DRAWN DATE: 08/12/2011		MATERIAL: STAINLESS STEEL 316 1.5mm THK		SURREY KT7 0RH UNITED KINGDOM		SCALE: N.T.S.	REV: 03
DRAWING STATUS: production		FINISH: VERTICAL BRUSHED 240 GRIT ALL EXTERNAL WELDS REMOVED		TITLE: SMARTPURGE 2 HOOK-UP		DRAWING No. XMA-STD0-001	
APP'D: MP	CHK'D: SB	DR'WN: MN			SHEET No. 10 OF 10		





3rd ANGLE PROJECTION  
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED TOLERANCES  
NO DEC PLACE ±0.5  
1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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## HAZARDOUS (CLASSIFIED) LOCATION CLASS I ZONE 1 AS PER NEC 505

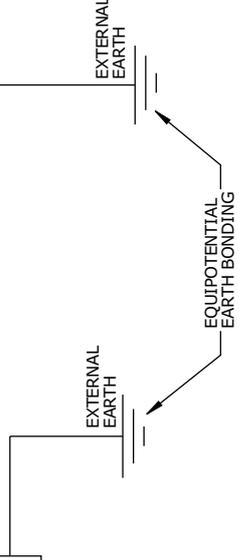
### SMART PURGE 2 CONTROL UNIT ENERGY LIMITATION PARAMETERS SP2-XX-XX

TERMINAL	SOV	IP	EXTERNAL ALARM	OVER-RIDE	REMOUIT OUTPUT
TB1	1,2	3,4	5,6	7,8	9,10,11,12
Uo (Vdc)	23.58	23.58	5.88	5.88	8.465
Io (mA)	165.5	165.5	5.9	5.9	405.1
Co (µF)	0.091	0.091	NEGLIGIBLE	NEGLIGIBLE	5.145
Lo (mH)	2.9	2.9	0	0	0.48
Po (W)	0.975	0.975	0.009	0.009	0.857

2 TWISTED PAIRS OVER SHIELDED  
0.75mm<sup>2</sup> MIN CONDUCTOR SIZE  
MAX LOOP IMPEDENCE 15Ω  
SHIELD CONNECTED TO GROUND  
AT BOTH ENDS OF CABLE  
CABLE MAXIMUM LENGTH IS 50 METRES

### SMART PURGE 2 REMOTE PANEL ENERGY LIMITATION PARAMETERS SP2-RP FOR REMOTE PANEL TERMINALS 1, 2, 3 AND 4

Ui (Vdc)	Ii (mA)	Ci (µF)	Li (mH)	Pi (W)
8.465	405.1	5.145	0.48	0.857



- $V_{max}$  or  $U_i > V_t$ ;  $I_{max}$  or  $I_i > I_t$ ;  $C_i$  of all loops or  $C_{cable} < C_a$  or  $C_o$ ;  $L_i$  of all loops +  $L_{cable} < L_a$  or  $L_o$ ;  $P_{max}$  or  $P_i > P_o$
- The configuration of associated Apparatus must be FM Approved under Entity Concept.
- I.S. Equipment must be FM Approved.
- I.S. Equipment may be installed within the Hazardous (Classified) location for which it is approved.
- I.S. Barrier or Equipment and hazardous location loop apparatus manufacturer's control drawings must be followed when installing a system.
- Control equipment connected to the Associated Apparatus must not generate more than 250 Vrms or Vdc.
- Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically safe systems for Hazardous (Classified) Locations" and the National Electrical Code®(ANSI/NFPA 70)
- No revision to this drawing is permitted without FM Approval.
- AEx 'ib' is suitable only for connecting to Class I Zone 1 Hazardous (Classified) Locations.
- Zone 0, or Class I, Division 1 Hazardous (Classified) Locations.
- All Equipment installed in Class I Zone 1 hazardous area.
- The cores of the intrinsically safe circuits are either in an earth screen or the insulation of the intrinsically safe cores is capable of withstanding an R.M.S.A.C. test voltage of 2000 V
- User supplied equipment shall be FM approved.

REV.	MOD NUMBER	APPROVED DATE	APPROVED	DRAWN DATE:	13/08/2013	MATERIAL	<b>Expo Technologies Limited</b> SUPREY TW16 5DB UNITED KINGDOM		SCALE	2:1	REV:	
				DRAWING STATUS: CERTIFIED					DRAWING No.	SD8112	DRAWING No.	01
01	DRAWN	14/10/2013	M/H	APP'D	CHK'D	DRAWN	FINISH	TITLE <b>INTRINSIC SAFETY CONTROL DRAWING</b>		SHEET No. 1 OF 1		
				MH	MH	MN		JOB No: CUSTOMER:				



3rd ANGLE PROJECTION  
DIMENSIONS IN mm  
DO NOT SCALE

UNSPECIFIED NO DEC PLACE ±0.5  
TOLERANCES 1 DEC PLACE ±0.2  
2 DEC PLACE ±0.1  
FLATNESS TO BE LESS THAN 0.4mm OVER ANY 100mm LENGTH

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**HAZARDOUS LOCATION  
CLASS I ZONE 1 AS PER CEC**

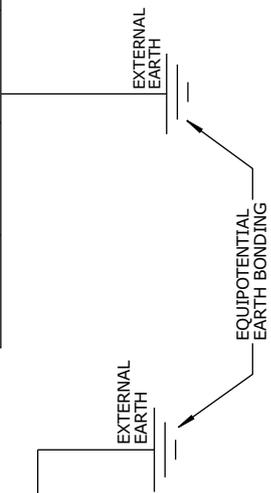
**SMART PURGE 2 CONTROL UNIT  
ENERGY LIMITATION PARAMETERS  
SP2-XX-XX**

SOV	IP	EXTERNAL ALARM	OVER-RIDE	REMOUIT OUTPUT
TERMINAL TB1 1,2	3,4	5,6	7,8	9,10,11,12
Uo (Vdc)	23.58	5.88	5.88	8.465
Io (mA)	165.5	5.9	5.9	405.1
Co (µF)	0.091	NEGLIGIBLE	NEGLIGIBLE	5.145
Lo (mH)	2.9	0	0	0.48
Po (W)	0.975	0.009	0.009	0.857

2 TWISTED PAIRS OVER SHIELDED  
0.75mm<sup>2</sup> MIN CONDUCTOR SIZE  
MAX LOOP IMPEDENCE 15Ω  
SHIELD CONNECTED TO GROUND AT  
BOTH ENDS OF CABLE  
CABLE MAXIMUM LENGTH IS 50METRES

SMART PURGE 2 REMOTE PANEL  
ENERGY LIMITATION PARAMETERS  
SP2-RP FOR REMOTE PANEL  
TERMINALS 1, 2, 3 AND 4

Uj (Vdc)	Ii (mA)	Ci (µF)	Li (mH)	Pi (W)
8.465	405.1	5.145	0.48	0.857



1.  $V_{max}$  or  $U_i > V_t$ ;  $I_{max}$  or  $I_i > I_t$ ;  $C_i$  (of all loops or  $C_{cable}$ )  $< C_a$  or  $C_o$ ;  $L_i$  (of all loops +  $L_{cable}$ )  $< L_a$  or  $L_o$ ;  $P_{max}$  or  $P_i > P_o$
2. The configuration of associated Apparatus must be FM Approved or CSA Certified when installed in Canada under Entity Concept.
3. Smart Purge 2 may be installed within the Hazardous location for which it is approved.
4. Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
5. No revision to this drawing is permitted without FM Approval.
6. I.S. Equipment may be installed within the Hazardous location for which it is approved.
7. I.S. Barrier or Equipment and hazardous location loop apparatus manufacturer's control drawings must be followed when installing a system.
8. All Equipment is installed in Class I Zone 1 hazardous area
9. The cores of the intrinsically safe circuits are either in an earth screen or the insulation of the intrinsically safe cores is capable of withstanding an R.M.S.A.C. test voltage of 2000 V
10. User supplied equipment shall be FM approved or CSA certified

REV.	MOD NUMBER	APPROVED DATE	APPROVED	DRAWN DATE:	24/09/2013	MATERIAL
				DRAWING STATUS:	CERTIFIED	
				APP'D	CHK'D	DRAWN
				MH	MP	MIN

SCALE	2:1	REV:
DRAWING No.	SD8113	E
SHEET No.	1	OF 1



**Expo Technologies Limited**  
SURREY TW16 5DB  
UNITED KINGDOM

TITLE  
**SMART PURGE 2  
INTRINSIC SAFETY CONTROL DRAWING**

JOB No:  
CUSTOMER:



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEX Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEX FME 11.0006X Issue No: 6 Certificate history:  
 Status: **Current** Issue No. 6 (2019-04-08)  
 Date of Issue: **2019-04-08** Issue No. 5 (2019-02-15)  
 Applicant: **Expo Technologies Limited** Issue No. 4 (2017-06-29)  
 Unit 2, The Summit, Hanworthy Road, Issue No. 3 (2016-06-14)  
 Sunbury-on-Thames, Issue No. 2 (2015-06-03)  
 Surrey, TW16 5DB, Issue No. 1 (2013-04-03)  
 United Kingdom Issue No. 0 (2012-03-23)

Equipment: **SmartPurge SP2 and SP2 - Remote Control Panel**  
 Optional accessory:  
 Type of Protection: **Intrinsic safety 'i'; Encapsulation 'm'; Increased safety 's'; Pressurized 'p' & Protection by enclosure 'l'.**

Marking: **Control unit**  
 Ex eb ib mb [ib Gb] [p] IIC T4 Gb -20°C ≤ Ta ≤ 60°C  
 Ex tb [p] IIIC T135°C Db -20°C ≤ Ta ≤ 60°C  
**The Remote Control Terminal**  
 Ex ib IIC T4 Gb -20°C ≤ Ta ≤ 60°C

Approved for issue on behalf of the IECEX Andrew Was  
 Certification Body: Certification Manager  
 Position:  
 Signature: (for printed version)  
 Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEX Website.

Certificate issued by:  
**FM Approvals Ltd**  
**1 Windsor Dials**  
**SL4 1PS Windsor**  
**United Kingdom**  
  
 Member of the FM Global Group



# IECEX Certificate of Conformity

Certificate No.: IECEX FME 11.0006X Issue No: 6  
 Date of Issue: **2019-04-08** Page 2 of 5

Manufacturer: **Expo Technologies Limited**  
 Unit 2, The Summit, Hanworthy Road,  
 Sunbury-on-Thames,  
 Surrey, TW16 5DB,  
 United Kingdom  
**United Kingdom**

Additional Manufacturing location(s):  
 This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended.

**STANDARDS:**  
 The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

- IEC 60079-0 : 2017** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0
- IEC 60079-11 : 2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0
- IEC 60079-18 : 2017** Explosive atmospheres - Part 18: Protection by encapsulation "m"  
Edition:4.1
- IEC 60079-2 : 2014-07** Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"  
Edition:6
- IEC 60079-31 : 2013** Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "p"  
Edition:2
- IEC 60079-7 : 2017** Explosive atmospheres - Part 7: Equipment protection by increased safety "e"  
Edition:3.1

This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

**TEST & ASSESSMENT REPORTS:**  
 A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:  
 GB/FME/EXTR11.0007/00 GB/FME/EXTR11.0007/01 GB/FME/EXTR11.0007/02  
 GB/FME/EXTR11.0007/03 GB/FME/EXTR11.0007/04 GB/FME/EXTR11.0007/05  
 GB/FME/EXTR11.0007/06

Quality Assessment Report:  
 GB/SIR/QAR07.0012/13

Certificate No:

IECEX FME 11.0006X

Issue No: 6

Date of Issue:

2019-04-08

Page 3 of 5

**Schedule**

**EQUIPMENT:**

*Equipment and systems covered by this certificate are as follows:*

The SmartPurge 2 (SP2) is an electronic purge and pressurization control system consisting of a Control Unit containing the following: a power supply and switching module, a flow and pressure measuring unit and an electronic control unit. A display is provided for monitoring the status and for use during set-up.

Two versions of the SmartPurge2 are available, as a purge and pressurize control unit (P) and as a fan control unit (F). Both these versions are available with a universal voltage (M) or a low voltage (L) power supply. The SmartPurge 2 is housed within a stainless steel enclosure with an ingress protection rating of IP64.

The system can be connected to an optional Remote Panel which is housed in an aluminium enclosure.

The maximum service temperature is 60 °C.

**SP2-ab-ss SmartPurge2 Purge Control Unit**

a = P, or F

b = M, or L

**SPECIFIC CONDITIONS OF USE: YES as shown below:**

- The painted surface and window of the SmartPurge 2 may store electrostatic charge and become a source of ignition in applications with a low relative humidity <-30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust, or oil. Guidance on protection against the risk of ignition due to electrostatic discharge can be found in IEC TR60079-32-1. Cleaning of the painted surface should only be done with a damp cloth.

Certificate No:

IECEX FME 11.0006X

Issue No: 6

Date of Issue:

2019-04-08

Page 4 of 5

**EQUIPMENT (continued):**

Power Supply (Terminals 1, 2): 90-254 Vac or 11-28 Vdc U<sub>m</sub> = 254 Vac

Alarm Contact ratings

(Terminals 3-4): 6A at 250 Vac, 5A at 30 Vdc

(Terminals 5, 6 and 7, 8): 250V, 1A Fuse type

(Terminals 9, 10): 100mA (when b = M) or 500mA (when b = L)

**Energy Limitation Parameters**

Terminal TB1	U <sub>o</sub> (Vdc)	I <sub>o</sub> (mA)	C <sub>o</sub> (µF)	L <sub>o</sub> (mH)	P <sub>o</sub> (W)
SOV	23.58	165.5	0.091	2.9	0.975
IP	23.58	165.5	0.091	2.9	0.975
Remote Output	8.465	405.1	5.145	0.48	0.857
External alarm	5.88	5.9	Negligible	0	0.009
Over-ride	5.88	5.9	Negligible	0	0.009

**SmartPurge2 Purge Remote Panel**

**SRP-2 Energy Limitation parameters**

U <sub>i</sub> (Vdc)	I <sub>i</sub> (mA)	C <sub>i</sub> (µF)	L <sub>i</sub> (mH)	P <sub>i</sub> (W)
8.465	405.1	5.145	0.48	0.857



# IECEX Certificate of Conformity

Certificate No:

IECEX FME 11.0006X

Issue No: 6

Date of Issue:

2019-04-08

Page 5 of 5

**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):**

Update to Power Supply Module and update to IEC 60079-18 Ed 4.1



# EU-TYPE EXAMINATION CERTIFICATE

- Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU
- EC-Type Examination Certificate No: FM11ATEX0060X
- SmartPurge2 Purge Control Unit and SmartPurge2 Remote Control Terminal

**Name of Applicant:** Expo Technologies Limited  
**Address of Applicant:** Unit 2, The Summit,  
 Hanworth Road,  
 Sunbury on Thames,  
 Surrey, TW16 5DB,  
 United Kingdom

This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3041589EC dated 23<sup>rd</sup> March 2012

Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-2:2014, EN IEC 60079-7:2015+A1:2018, EN 60079-11:2012, EN 60079-18:2015+A1:2017, EN 60079-31:2014 and EN 60529:1991+A1:2000+A2:2013

If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

The marking of the equipment or protective system shall include:



**SmartPurge2 Purge Control Unit**

II 2 (2) G Ex eb ib mb [ib Gb] [p] IIC T4 Gb  
 -20 °C ≤ Ta ≤ 60 °C  
 II 2 (2) D Ex tb [p] IIC 135°C Db  
 -20 °C ≤ Ta ≤ 60 °C



**SmartPurge 2 Remote Control Terminal**

II 2 G Ex ib IIC T4 Gb  
 -20 °C ≤ Ta ≤ 60 °C



**Richard Zammit**  
**Certification Manager, FM Approvals Europe Ltd.**

Issue date: 12<sup>th</sup> April 2019

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin, Ireland, D02 E440  
 T: +353 (0) 1761 4200 E-mail: [alex@fmapprovals.com](mailto:alex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)



# SCHEDULE

to EU-Type Examination Certificate No. FM11ATEX0060X

13 **Description of Equipment or Protective System:**

The SmartPurge 2 (SP2) is an electronic purge and pressurization control system consisting of a Control Unit containing the following: a power supply and switching module, a flow and pressure measuring unit and an electronic control unit. A display is provided for monitoring the status and for use during set-up.

Two versions of the SmartPurge2 are available, as a purge and pressurize control unit (P) and as a fan control unit (F). Both these versions are available with a universal voltage (U) or a low voltage (L) power supply. The SmartPurge 2 is housed within a stainless steel enclosure with an ingress protection rating of IP64.

The system can be connected to an optional Remote Panel which is housed in an aluminium enclosure.

The maximum service temperature is 60 °C.

**SP2-ab-ss SmartPurge2 Purge Control Unit**

a = P, or F  
 b = M, or L

Power Supply (Terminals 1, 2): 90-254 Vac or 11-28 Vdc;  
 Um = 254 Vac

Alarm Contact ratings (Terminals 5, 6 and 7, 8): 250V, 1A  
 100mA (when b = M)  
 500mA (when b = L)

Power Switching (Terminals 3, 4)  
 6A at 250 Vac  
 5A at 30 Vdc

Energy Limitation Parameters

Terminal TB1	Uo (Vdc)	Io (mA)	Co (µF)	Lo (mH)	Po (W)
SOV 1, 2	23.58	165.5	0.091	2.9	0.975
IP 3, 4	23.58	165.5	0.091	2.9	0.975
Remote Output 9, 10, 11, 12	8.465	405.1	5.145	0.48	0.857
External alarm 5, 6	5.88	5.9	Negligible	0	0.009
Over-ride 7, 8	5.88	5.9	Negligible	0	0.009

**SmartPurge2 Purge Remote Panel**

SP2-RP

Energy Limitation Parameters

UI (Vdc)	II (mA)	CI (µF)	LI (mH)	PI (W)
8.465	405.1	5.145	0.48	0.857

14 **Specific Conditions of Use:**

The painted surface and the non-metallic window of the SmartPurge II may store electrostatic charge and become a source of ignition in applications with a low relative humidity <~30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust, or oil. Guidance on protection against the risk of ignition due to electrostatic discharge can be found in EN TS 60079-32-1. Cleaning of the painted surface should only be done with a damp cloth.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin, Ireland, D02 E440  
 T: +353 (0) 1761 4200 E-mail: [alex@fmapprovals.com](mailto:alex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

## SCHEDULE



to EU-Type Examination Certificate No. FM11ATEX0060X

**15 Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

**16 Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

**17 Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

**18 Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
5 <sup>th</sup> April 2012	Original Issue.
2 <sup>nd</sup> April 2013	Supplement 1: Report Reference: – 3041590rev120910 dated 25 <sup>th</sup> March, 2013. Description of the Change: 1. Address of Applicant change from: Summer Road, Thames Ditton, Surrey, KT7 0RH, UK. Update to Approved drawings due to address change.
3 <sup>rd</sup> June 2015	Supplement 2: Report Reference: RR201328 dated 2 <sup>nd</sup> June 2015 Description of the Change: Minor documentation update.
14 <sup>th</sup> June 2016	Supplement 3: Report Reference: – RR205060 dated 26 <sup>th</sup> May 2016 Description of the Change: Update standards to the latest edition (EN 60079-0: 2009 to 2012 + A11:2013, EN 60079-11: 2007 to 2012), and minor documentation update. Updated to EU certificate.
29 <sup>th</sup> June 2017	Supplement 4: Report Reference: – RR209790 dated 13 <sup>th</sup> June 2017 Description of the Change: Documentation updates.
12 <sup>th</sup> April 2019	Supplement 5: Report Reference: – PR452625 dated 22 <sup>nd</sup> March 2019 Description of the Change: Update to standards used; EN 60079-7, EN 60079-18, EN 60079-31 and EN 60529. Certificate transferred from FM Approvals Ltd., notified body No. 1725, to FM Approvals Europe Ltd., notified body No. 2809.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals Europe Limited, One Georges Quay Plaza, Dublin, Ireland, D02 E440  
T: +353 (0) 1761 4200 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

## **Blueprint Report** *Expo Technologies Ltd (1000002806)*

**Class No 3620**

**Original Project I.D. 3041589**

**Certificate I.D. FM11ATEX0060X**

Drawing No.	Revision Level	Drawing Title	Last Report
BAS01ATEX1278U-3	-	Component Certificate, Opto Couplers	3041590
EPC-BGB0-001	2	SmartPurge2 LV LV PSU PCB Data Files	3041590
EPC-BGB0-002	1	Standard Transducer PCB Data Files	3041590
EPC-BGB0-003	2	Front Panel PCB Data Files	3041590
EPC-BGB0-004	1	Remote Panel PCB Data Files	3041590
EPC-BGB0-006	1	SmartPurge2 PSU LV Daughter PCB Data Files	3041590
EPC-BGB0-008	4	Prime Transducer PCB Data Files	3041590
EPC-BGB0-009	2	Logic PCB Data Files V1	3041590
EPC-BGB0-010	1	Corrected Logic Board EPC-BGB0-010	3041590
EPC-BGB0-011	1	Mod-board Retrofit	3041590
IECEX KEM07.0023U	-	Component Certificate, Terminal Blocks	3041590
PTB Ex 91.C.3123U	-	Component Certificate, Earth Terminal	3041590
SD7272	3	Remote Panel Block Diagram	3041590
SD7273	3	Logic Electronics Block Diagram	3041590
SD7274	3	System Block Diagram	PR452625
SD7306	2	Operational Sequences Document Part 3	3041590
SD7571	2	Transformer, PSU LV	3041590
SD7617	1	Design Document Part 1	3041590
SD7618	2	Design Document Part 2	PR452625
SD7619	5	Certification Labelling	PR452625
SD7616	2	General Assembly - steel	3041590
SD7817	5	Enclosure - steel	PR452625
SD7818	1	Terminal Block Clearances - steel	3041590
SD7819	2	Spark Arrestor	3041590
SD7820	2	Lid: Window & Sealing - steel	3041590
SD7821	2	Lid: Display - steel	RR209790
SD7822	1	LCD Module	3041590
SD7823	2	Flow Sensor Block - steel	PR452625
SD7824	1	Type FN Sensor Block - steel	3041590
SD7825	2	Earth Terminal - steel	3041590
SD7923	1	Transformer, PSU LV	3041590
SD7924	1	PSU Block Diagram	3041590
SD7925	1	External Connections	3041590
SD7926	1	PCB Interconnection	3041590
SD7933	3	SmartPurge2 LV PSU Circuit Diagram	PR452625
SD7934	1	SmartPurge2 LV PSU Daughter / Circuit Diagram	3041590
SD7936	2	SmartPurge2 LV PSU Circuit Diagram	3041590
SD7942	2	UV Fuse Assembly	3041590
SD7943	2	LV Fuse Assembly	3041590
SD7944	4	CERT Label UV Fuse	RR205060
SD7945	3	CERT Label LV Fuse	RR205060
SD7977	2	SmartPurge2 Power Supply Encapsulation Procedure	PR452625
SD7981	3	UV Power Supply Parts List	3041590
SD7983	2	LV Power Supply Parts List	3041590
SD7984	1	SP2 Fuse Assembly Encapsulation Process	3041590
SD7985	2	Logic Assembly / Circuit Diagram	3041590
SD7986	2	Logic Board Parts List	3041590
SD7987	2	Prime Transducer Board PCB / Circuit Diagram	3041590
SD7988	1	Prime Transducer Board Parts List	3041590

SD7989	1	Standard Transducer Board PCB / Circuit Diagram	3041590
SD7990	1	Standard Transducer Board Parts List	3041590
SD7991	2	Front Panel Parts List	3041590
SD7992	2	Front Panel PCB / Circuit Diagram	3041590
SD7993	2	Remote Panel Parts List	PR452625
SD7994	1	Remote Panel PCB / Circuit Diagram	3041590
SD7995	1	LV PSU Daughter Board Parts List	3041590
SD7997	2	SmartPurge2 External Connections (LED)	3041590
SD8009	3	SP2 Retrofit Mod Board for Logic Board	RR209790
SD8374	1	Instruction Manual Extracts	PR452625

# CERTIFICATE OF COMPLIANCE

## HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

### SP2-ab-c SmartPurge2 Purge Control Unit

I/1/AEx e ib mb [p] IIC T4 -20°C ≤ Ta ≤ 60°C; - SD8112; Entity; IP64  
 21/AEx tb [pD] IIC T135°C -20°C ≤ Ta ≤ 60°C; - SD8112; Entity; IP64

a = P or F, System type

b = M or L, Supply voltage

c = ss or al, Enclosure material

#### Entity parameters

Terminal	U <sub>0</sub> (Vdc)	I <sub>0</sub> (mA)	C <sub>0</sub> (µF)	L <sub>0</sub> (mH)	P <sub>0</sub> (W)
TB1	23.58	165.5	0.091	2.9	0.975
SOV	23.58	165.5	0.091	2.9	0.975
IP	23.58	165.5	0.091	2.9	0.975
Remote Output	8.465	405.1	5.145	0.48	0.857
External alarm	5.88	5.9	Negligible	0	0.009
Over-ride	5.88	5.9	Negligible	0	0.009

SP2-RP SmartPurge2 Remote Control Terminal  
 I/1/AEx ib IIC T4 -20°C ≤ Ta ≤ 60°C; - SD8112; Entity

#### Entity parameters

U <sub>i</sub> (Vdc)	I <sub>i</sub> (mA)	C <sub>i</sub> (µF)	L <sub>i</sub> (mH)	P <sub>i</sub> (W)
8.465	405.1	5.145	0.48	0.857

#### Equipment Ratings:

The SmartPurge2 Purge Control Unit is FM Approved for Class I, Zone 1, AEx e ib mb [p] IIC and Zone 21, AEx tb [pD] IIC hazardous (classified) locations. (indoors/outdoors; IP64) for the United States when installed as per control drawing SD8112. The SmartPurge2 Remote Control Terminal is FM Approved for Class I, Zone 1, AEx ib IIC T4 Hazardous (Classified) Locations. (indoors/outdoors; IP64) for the United States when installed as per control drawing SD8112.

#### FM Approved for:

Expo Technologies Ltd  
 Sunbury on Thames, Surrey United Kingdom



This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

- Class 3620 2011
- Class 3810 2005
- ANSI/ISA 61010-1 2004
- ANSI/IEC 60529 2004
- ANSI/ISA 60079-0 2009
- ANSI/ISA 60079-2 2010
- ANSI/ISA 60079-7 2008
- ANSI/ISA 60079-11 2009
- ANSI/ISA 60079-18 2009
- ANSI/ISA 60079-31 2009

Original Project ID: 3047764 Approval Granted: January 10, 2014

Subsequent Revision Reports / Date Approval Amended  
Report Number Date Report Number Date

FM Approvals LLC

*J.E. Marquardt*  
J.E. Marquardt  
Group Manager, Electrical

10 January 2014  
Date



FM Approvals  
 1151 Boston Providence Turnpike  
 P.O. Box 9102, Norwood, MA 02062 USA  
 T: 781 762 4300 F: 781-762-9375 www.fmapprovals.com



Member of the FM Global Group

**SP2-RP SmartPurge2 Remote Panel**  
 I/1/Ex ib IIC T4 -20°C ≤ Ta ≤ 60°C; SD8113; Entity

Entity parameters

Ui (Vdc)	Ii (mA)	Ci (µF)	Li (mH)	Pi (W)
8.465	405.1	5.145	0.48	0.857

# CERTIFICATE OF COMPLIANCE

## HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

**SP2-ab-c SmartPurge2 Purge Control Unit**

I/1/Ex e ib m [p] IIC T4 -20°C ≤ Ta ≤ 60°C; SD8113; Entity; IP64

a = P or F; System type

b = M or L; Supply voltage

c = ss or al; Enclosure material

Entity parameters

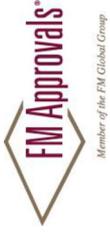
Terminal	Ui (Vdc)	Ii (mA)	Ci (µF)	Li (mH)	Pi (W)
TB1	23.58	165.5	0.091	2.9	0.975
SOV	23.58	165.5	0.091	2.9	0.975
IP	8.465	405.1	5.145	0.48	0.857
Remote Output	5.88	5.9	Negligible	0	0.009
External alarm	5.88	5.9	Negligible	0	0.009
Over-ride	5.88	5.9	Negligible	0	0.009

Equipment Ratings:

The SmartPurge2 Purge Control Unit is FM Approved for Class I, Zone 1, Ex e ib m [p] IIC Hazardous Locations (indoors/outdoors; IP64) for Canada when installed as per control drawing SD8113. The SmartPurge2 Remote Control Terminal is FM Approved for Class I, Zone 1, Ex ib IIC T4 Hazardous Locations for Canada when installed as per control drawing SD8113.

FM Approved for:

Expo Technologies Ltd  
 Sunbury on Thames, Surrey United Kingdom



This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

- CSA C22.2 No.1010-1 2004
- CSA C22.2 No.60529 2010
- CAN/CSA E60079-0 2011
- CAN/CSA E60079-2 2012
- CAN/CSA E60079-7 2012
- CAN/CSA E60079-11 2011
- CAN/CSA E 60079-18 2012

Original Project ID: 3047764C Approval Granted: January 10, 2014

Subsequent Revision Reports / Date Approval Amended  
Report Number Date Report Number Date

FM Approvals LLC

*J.E. Marquardt*  
J.E. Marquardt  
Group Manager, Electrical

10 January 2014  
Date

# Certificate of Conformity to IEC 61508

## Safety Integrity Level (SIL) 2

*Functional Safety of Safety-Related Programmable Electronic Systems*

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**The 'SmartPurge ATEX Certified Intelligent Purge and Pressurise System SP2'**

**Designed and manufactured by**

**Expo Technologies Ltd**  
**Summer Road, Thames Ditton, Surrey, KT7 0RH, UK**

The above system has been assessed and is considered capable for use in a SIL2 high demand safety function. The assessment was based on the assumptions and data provided in:

- ESC Ltd Report No. A127\_SV001\_(2.0)

The system assessed comprises of the following modules in full redundant configuration:

- Pressure Transmitter
- Logic Board
- Relay

With the output normally energised, de-energise to safe state, the estimated frequency of dangerous failure per hour is  $2.2E-7$  (providing a minimum proof test interval of 1 year);

The assessment was carried out to determine compliance with IEC 61508 with regards to:

- Random Hardware Failures;
- Minimum Architecture.



Managing Director: Kenneth G L Simpson  
Member of IEC61508 and IEC 61511 committees  
Assessment Date: August 2011

*[Certificate: A127\_CT001\_(2.0)]*

**Engineering Safety Consultants**  
Collingham House, 10-12 Gladstone Road, Wimbledon, London  
SW19 1QT Telephone: +44 2085422807  
E-Mail: info@esc.uk.net, Website: www.esc.uk.net



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEX Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEX INE 10.0002X Issue No.: 2  
Status: **Current** Certificate history:  
Issue No. 2 (2017-07-28)  
Issue No. 1 (2012-06-19)  
Issue No. 0 (2010-12-01)  
Date of Issue: **2017-07-28** Page 1 of 4

Applicant: **ASCO SAS**  
53, rue de Beauce  
B.P. 17  
F-28111 LUCE CEDEX  
**France**

Equipment: **Electro-valve module type 3021...IA.**  
Optional accessory:

Type of Protection: **ia**  
Marking: Ex ia IIC T6 or T5 or T4 or T3 Ga  
Ex ia IIC T85 °C or T100 °C or T135 °C or T200 °C Da

Approved for issue on behalf of the IECEX Certification Body:  
Thierry HOUËIX  
Ex Certification Officer

Signature:  
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEX Website.

Certificate issued by:

**INERIS**  
Institut National de l'Environnement Industriel  
et des Risques, BP n°2  
Parc Technologique ALATA  
France



# IECEX Certificate of Conformity

Certificate No.: IECEX INE 10.0002X Issue No.: 2  
Date of Issue: **2017-07-28** Page 2 of 4

Manufacturer: **ASCO SAS**  
53, rue de Beauce  
B.P. 17  
F-28111 LUCE CEDEX  
**France**

Additional Manufacturing location(s):  
**ASCO NUMATICS SIRAI S.r.l**  
20060 BUSSERO  
Italy

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended.

### STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

**IEC 60079-0 : 2011** Explosive atmospheres - Part 0: General requirements  
Edition:6.0  
**IEC 60079-11 : 2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

### TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:  
**FRINE/EXTR10.0001/02**  
Quality Assessment Report:  
**NL/DEK/QAR13.0016/02** **FR/LC/QAR07.0006/07**



# IECEX Certificate of Conformity

Certificate No:

IECEX INE 10.0002X

Issue No: 2

Date of Issue:

2017-07-28

Page 3 of 4

## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

The electro-valve module is intended for the command of pneumatic apparatuses. It is composed of a coil, with an electrical device compose of a printed circuits board on which are connected the electronic components.

This material, compounded, is protected by an enclosure made in plastic case.

The connections to the external circuits are realised by a cable and a connector.

There are two versions : version 12V and version 24V, only coil is changed. These two solenoid valve variants may be connected to too differents intrinsic safety power supply

For each version, in option, a power visualization is indicated with LED which is protected by two infallible resistors.

### SPECIFIC CONDITIONS OF USE: YES as shown below:

The maximum input characteristics must be lower or equal to those defined in PARAMETERS RELATING TO THE SAFETY listed in the Annex.

The temperature class for both versions at different ambient temperature is defined in PARAMETERS RELATING TO THE SAFETY in the Annex.

The other conditions of use are stipulated in the instructions.



# IECEX Certificate of Conformity

Certificate No:

IECEX INE 10.0002X

Issue No: 2

Date of Issue:

2017-07-28

Page 4 of 4

## DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

### Issue 1:

Application on IEC 60079-0:2011, IEC 60079-11:2011 and IEC 60079-26:2006 standards

### Issue 2

- Introduction of a new manufacturer plant site

- Introduction of a new supplied electrical parameters for temperature class T4 or T3

### Annex:

[IECEX INE 10.0002X-02\\_Annex.pdf](#)



(2) **Equipment and protective systems intended for use in potentially explosive atmospheres**  
Directive 94/9/EC

### (1) **EC-TYPE EXAMINATION CERTIFICATE**

(3) Number of the EC type examination certificate: **INERIS 03ATEX0249 X**

(4) Equipment or protective system:  
**ELECTRO-VALVE MODULE TYPE 302 1...IA...**

(5) Manufacturer: **ASCO JOUOMATIC**

(6) Address:  
53, rue de Beauce  
B.P 17  
F-28111 LUCE CEDEX

(7) This equipment or protective system and any other acceptable alternative of this one are described in the appendix of this certificate and the descriptive documents quoted in this appendix.

(8) The INERIS, notified body and identified under number 0080, in accordance with article 9 of Council Directive 94/9/EC of the 23<sup>rd</sup> March 1994, certifies that this equipment or protective system fulfils the Essential of Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, described in appendix II of the Directive.

The examinations and the tests are consigned in official report No P49446/03.

(9) The respect of the Essential Health and Safety Requirements is ensured by:

- conformity with:
  - EN 50 014 June 1997 - Amendments 1 and 2
  - EN 50 020 June 2002
  - EN 50 281-1-1 September 1998 - Amendment 1
  - EN 50 284 April 1999

- specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents.

This document must not be reproduced other than in its entirety

Folio 1 / 5

Parc Technologique Alata - BP 2 - F-60550 Verneuil-en-Halatte  
tél +33(0)3 44 55 66 77 fax +33(0)3 44 55 66 99 internet www.ineris.fr

Institut national de l'environnement industriel et des risques

Etablissement public à caractère industriel et commercial - RCS Senlis, B 381 984 921- Siret 381 984 921 00019 - APE 7438

EC-Type Examination Certificate N° INERIS 03ATEX0249 X

(10) Sign X, when it is placed following the Number of the EC type examination certificate, indicates that this equipment and protective system is subjected to the special conditions for safe use, mentioned in the annex of this certificate.

(11) This EC type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system, these are not covered by this certificate.

(12) The marking of the equipment or the protective system will have to contain:



**EEx ia IIC T6/T5/T4**  
**IP6X T85°C/T100°C/T135°C**

Verneuil-en-Halatte, 2003 12 11

T. HOUEIX

Engineer at the Laboratory for Certification  
of ATEX Equipment

B. PIQUETTE

Director of the Certifying Body,  
By delegation  
Deputy manager of Certification



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**ANNEX**

(13)

(14) EC TYPE EXAMINATION CERTIFICATE N° INERIS 03ATEX0249 X

(15) DESCRIPTION OF THE EQUIPMENT OR THE PROTECTIVE SYSTEM

The valve module is intended for the command of pneumatic apparatuses.  
 It is composed of a coil, with an electrical device compose of a printed circuits board on which are connected the electronic components.  
 This material, compounded, is protected by an enclosure made in plastic case.  
 The valve module type 301 1. ...IA.. has a protection degree IP6X according the standard EN 60 529.  
 The connections to the external circuits are realised by a cable and a connector.

PARAMETERS RELATING TO THE SAFETY

Maximum input characteristics to the connecting terminals:

Model type 302 1. ...IA.. :

Reference to the terminals (PWR) / "OV"	Ui (V)	Ii (mA)	Pi (W)	Ci (µF)	Li (µH)
	28	300	1,6	0	0

MARKING

Marking must be readable and indelible; it must comprise the following indications:

- ASCO JOUCOMATIC  
53, rue de Beauce  
F- 28111 LUCE CEDEX
- 302 1. ...IA..
- INERIS 03ATEX0249 X
- (serial number)
- (Year of construction)
-  II 1 GD
- Ex ia IIC T6 / T5 / T4
- IP6X T85°C / T100°C / T135°C
- Tamb. = -40°C à +40°C / +50°C / +90°C

Marking may be reduce to :

- ASCO JOUCOMATIC
- F- 28111 LUCE CEDEX
- 302 1. ...IA..
-  II 1 GD
- Ex ia IIC T6 / T5 / T4
- IP6X T85°C / T100°C / T135°C
- Tamb. = -40°C à +40°C / +50°C / +90°C
- INERIS 03ATEX0249 X

The whole of marking can be carried out in the language of the country of use.

The equipment or protective system must also carry the marking normally envisaged by the standards of construction which relate to it.

ROUTINE EXAMINATIONS AND TESTS

None.

(16) DESCRIPTIVE DOCUMENTS

The report is composed of the documents quoted hereafter, constituting the descriptive file of the apparatus, object of this certificate.

- Technical file n°A61969-N0-B Ed.B (12 pages - 4 items) dated on 03.11.26
- This document were signed on 27 November 2003.

**(17) SPECIAL CONDITIONS FOR SAFE USE**

The voltage source connected to the electro-valve type 302 1. ...IA... must be from a certified type and its output circuit recognised of intrinsic safety.

The maximum characteristics of this voltage source must be lower or equal to those defined in paragraph 15.

In case of using in zone 0 from group IIC, the electro-valve type 302 1. ...IA... must be protected against the air flow in order to avoid all electrostatics charges.

**(18) ESSENTIAL REQUIREMENTS OF SAFETY AND HEALTH**

The respect of the Essential Health and Safety Requirements is ensured by:

- The conformity to the European standards EN 50014 EN 50 020, EN 50 281-1-1 and EN 50 284.
- The whole of the provisions adopted by the manufacturer and described in the descriptive documents.

**ADDITION**

**INERIS 03ATEX0249 X/01**

Electro-valve module TYPE 302 1. ...IA...

Made by ASCO JOUCOMATIC

**(15) - PURPOSE OF THE ADDITION**

Possible use of a version 24 volts of the standard electrovalve module type 302 1. ... IA...

Update of descriptive documents.

**PARAMETERS RELATING TO THE SAFETY**

The parameters relating to the safety indicated in the basic certificate are unchanged.

**MARKING**

For the version of 24 V coil, the marking defined in the basic certificate is modified as follow:

- ASCO JOUCOMATIC  
53, rue de Beauce  
F - 28111 LUCE CEDEX
- 302 1. ...IA...
- INERIS 03ATEX0249 X  
(serial number)
- (Year of construction)
-  II 1 GD
- EEx ia IIC T6 / T5 / T4
- IP6X T85°C / T100°C / T135°C
- Tamb.= -40°C to +40°C / +60°C / +90°C

For the version of 24 V/s coil, the marking may be reduce to:

- ASCO JOUCOMATIC
- F - 28111 LUCE CEDEX
- 302 1. ...IA...
-  II 1 GD
- EEx ia IIC T6 / T5 / T4
- IP6X T85°C / T100°C / T135°C
- Tamb.= -40°C to +40°C / +60°C / +90°C
- INERIS 03ATEX0249 X

**ROUTINE EXAMINATIONS AND TESTS**

The routine examination and tests stipulated by the basic Certificate are unchanged.

**(16) - DESCRIPTIVE DOCUMENTS**

The technical report referred to below, constitute the file describing the modification of the apparatus and forming the subject of the present addition.

- Additive n°01 to the descriptive note (2 pages) dated on 2006.03.23
- Instructions (3 pages) dated on 2006.04.04

These documents are signed on 04.04.2006.

**(17) - SPECIALS CONDITIONS FOR SAFE USE**

Specials conditions defined in the basic certificate are unchanged.

**(18) ESSENTIAL REQUIREMENTS OF SAFETY AND HEALTH**

Requirements needed in the basic certificate are unchanged.

Verneuil-en-Halatte, 2006 05 15



*(Handwritten signature)*  
 Director of the Certifying Body,  
 By delegation  
 B. PIQUETTE  
 Deputy Manager of Certification

*(Handwritten signature)*  
 T. DELBAERE  
 Project Manager at the ATEX Equipment  
 Certification Laboratory

**ADDITION**

**INERIS 03ATEX0249X/02**

**ELECTROVALVE TYPE 3021...IA.**

**Made by ASCO JOUCOMATIC**

**(3)**

**(4)**

**(5)**

**(15) PURPOSE OF THE ADDITION**

- Standards application :
  - EN 60 079-0 : 2006,
  - EN 60 079-11 : 2007,
  - EN 61 241-0 : 2006,
  - EN 61 241-11 : 2006,
  - EN 60 079-26 : 2007.

**PARAMETERS RELATING TO THE SAFETY**

The parameters relating to the safety are unchanged.

**MARKING**

The marking is modified as follow:

ASCO  
28111 LUCE CEDEX

3021...IA.\*



Ex ia IIC T.\*

Ex iaD 20 T..\*C\*

(serial number)

(Year of manufacture)

INERIS 03ATEX0249X

WARNING - POTENTIAL DANGER OF ELECTROSTATIC DISCHARGES

SEE INSTRUCTIONS

The marking may be reduced as:

ASCO  
3021...IA,\*  
 II 1 GD  
Ex ia IIC T,\*  
Ex iaD 20 T,\* °C\*  
(serial number)

(Year of manufacture)  
INERIS 03ATEX0249X  
WARNING - POTENTIAL DANGER OF ELECTROSTATIC DISCHARGES  
SEE INSTRUCTIONS

- \* Dots are replaced by numbers or by letters defining the mechanical, electrical and thermal variant of the apparatus.

**EXAMINATION AND INDIVIDUAL TESTS**

None.

**(16) DESCRIPTIVE DOCUMENTS**

The descriptive documents quoted hereafter constitute the technical documentation describing the modification of the equipment, subject of this present addition.

- Technical file n° A61969\_N0 rev. E comprising 6 rubrics dated on 2010.04.27.
- Instructions notice n° A61969\_N2 rév. D (7 pages) rev.B dated on 2010.04.27.

These documents were signed on 04th october 2010.

**(17) SPECIAL CONDITIONS FOR SAFE USE**

The special conditions are completed as follow:

- According to temperature class, using temperature of the device is comprise in values indicated into the table below :

Electrovalve 3021...IA, in alone device :

Temperature class in gas	Temperature class in dust	Using ambient temperature variant 12 V	Using ambient temperature variant 24 V
T6	T85°C	-40° C to +40° C	-40° C to +40° C
T5	T100° C	-40° C to +50° C	-40° C to +60° C
T4	T135° C	-40° C to +90° C	-40° C to +90° C

Electrovalve 3021...IA, in joined device - variant 12 V or variant 24 V:

Temperature class in gas	Temperature class in dust	Using ambient temperature
T5	T100° C	-40° C to +50° C

The other conditions are defined in the instructions note.

**(18) ESSENTIAL SAFETY AND HEALTH REQUIREMENTS**

The respect of the Essential Health and Safety Requirements is modified, it is ensured by:

- European standard conformity listed in paragraph 15.
- All provisions adopted by the manufacturer and defined in the descriptive documents.

Verneuil-en-Halatte, 2010.11.19



Director of the Certifying Body,  
By delegation  
T. HOUEIX  
Certification Officer  
Certification Division



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