Important Note:
It is essential for safety that the installer and user of the Expo system follow these instructions.
Please refer to the applicable standards for principles and definition. These instructions apply only to the ventilation system. It is the responsibility of the manufacturer of the machine to provide instructions for the enclosure.
Section 1: Pre-Start Ventilation System - General Specification

Note: This equipment provides ONLY Pre-Start Ventilation, it is not a Purge and Pressurization system

<table>
<thead>
<tr>
<th>PV Sizes - Capacity</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PV 500 to 1500 NI/min</td>
<td>-0 +20%</td>
</tr>
<tr>
<td>5PV 2000 to 6000 NI/min</td>
<td>-0 +20%</td>
</tr>
<tr>
<td>7PV 7000 to 14000 NI/min</td>
<td>-0 +20%</td>
</tr>
</tbody>
</table>

Construction material: ss 316 Stainless Steel

Starting mode:
- LS Local Start: via External Push Button
- RS Remote Start: via Solenoid Valve Ex

Air Inlet Connection:

<table>
<thead>
<tr>
<th>N= NPT (F)</th>
<th>Air Outlet to Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PV 3/4&quot; 1&quot; 2&quot;</td>
<td>3PV 3/4&quot; 1&quot; 2&quot;</td>
</tr>
<tr>
<td>5PV 1&quot; N/A</td>
<td>5PV 1&quot; N/A</td>
</tr>
<tr>
<td>7PV 2&quot;</td>
<td>7PV 1&quot; N/A</td>
</tr>
</tbody>
</table>

Reference points and signals: 1/8" NPT(F)

Output Signals:
- IS Suitable for IS circuits
- PA "Ex" switches built-in, with "Ex" junction box
- PO Pneumatic Output signals

Timing Method: ET Electronic Timer

Option Codes (Added if applicable):
- CV Continuous Ventilation
- HS High Supply Pressure (4 to 16 barg)
- OV Pneumatically Operated Outlet Valve
- HP High Pressure

Hazardous Area Classification:

For all options covered in this manual, (Except Pneumatic Output /PO and LT options):
- EUROPE: SIRA 13ATEX1083X
- EN60079-0, EN60079-7
- Ex ia II G EEx IIC T4 Gb
- Tamb -20°C to +60°C
- IECEx - IECEx SIR13.0030X
- IEC 60079-0, IEC60079-7
- Ex ia IIC T5 Gb
- Tamb -20°C to +59°C

For all options (Including Pneumatic Output /PO):
- EUROPE: EXPO 13MDOC1314
- Suitable for use with Ex e & Ex n electrical rotating machines
- IECEx: EXPO 13MDOC 1313
- Suitable for use with Ex e & Ex n electrical rotating machines

Special Conditions for Safe Use / Conditions of Certificate:

- The intended use of this equipment is as a pre-start ventilation system. It is the user responsibility to ensure the correct functionality of the equipment when in use.
- When the equipment is provided with an intrinsically safe solenoid valve, the user must ensure that any associated line inductance is within the parameters of the solenoid valve certificate.
Ventilation Control Unit Data

Ventilated Machine Enclosure: Ex e, Ex n Rotating Electrical Machines.

Enclosure Test Pressure: Maximum working = Outlet Valve opening pressure x 1.5.

Ventilation Time: User selectable up to 99 minutes (Tolerance: -0 + 3s).

Ventilation Initiation:
- Remote Start (RS): Ex Solenoid Valve: 24V DC, 110V AC or 230V AC.

Optional:
- Ex Solenoid Valve: 24V DC, 110V AC or 230V AC.

Indicators:
- Black / Flashing Yellow: System Ventilating
- Red / Green: Ventilation Complete.

Pneumatic Signals:
- System Ventilating: 4.0 barg (60 psig) 1/8" NPT (F), plug fitted.
- Ventilation Complete: 4.0 barg (60 psig) 1/8" NPT (F), plug fitted.

Ventilation in Progress & Ventilation Complete Contacts:
- SPNO electrical switch, certified Ex db IIC T6,
- Contact ratings 250 Vac 4 Amps, AC15.

Temperature Limits:
- -20°C to +60°C (T4).
- -20°C to +59°C (T5).

Ventilation Flow Sensors:
- “Ventilation Flow OK” factory set to match ventilation flow rate required.

Supply Pressure:
- 4 to 10 barg (60 to 145 psig).

High Supply Pressure (Optional): 4 - 16 barg (60 - 232 psig) for 5PV and 7PV system.

Compressed Air Supply:
- Clean, Dry Oil Free Air or inert Gas. Refer to Air Supply Quality section in Installation of the System.

Logic Regulator & Gauge:
- Factory set to 4 barg (60 psig).

Air Consumption:
- 0 - 10 NI/min when not in ventilation mode.

Mounting Method
- Wall mounting straps & spacers. Fix holes as per drawing.

Signal Junction Box:
- ATEX & IECEx certified terminal box.

Weight (unpacked):
- 3PV: 16.5kg (36.3lb)
- 5PV: 20.6kg (45.4lb)
- 7PV: 43kg (154lb)

Outlet Valve with Integral Spark Arrestor (contains overpressure Relief Valve).

Default type:
- 3PV: RLV052/ss/PV
- 5PV: RLV104/ss/PV
- 7PV: RLV200/ss/PV/OV
NOTE: A Solenoid Valve (Optional) may be fitted to allow remote start. Please ensure that one of the solenoid valve options is selected when ordering. See General Specification for Remote Start Options, and Section 10 for the Recommended Spares.

### Outlet Valve lift off pressure:
- **3PV:** 15 mbar (5”wg)
- **5PV:** 15 mbar (6”wg)
- **7PV:** Pneumatically Operated

<table>
<thead>
<tr>
<th>Tolerance:</th>
<th>+0,-20%</th>
</tr>
</thead>
</table>

### Overpressure Relief

#### Valve Lift-Off Pressure:
- **Min:** 20 mbar (8.0”wg)
- **Max:** 50 mbar (20”wg)
- **Default:** 30 mbar (12”wg)

<table>
<thead>
<tr>
<th>Tolerance:</th>
<th>+0, - 20%</th>
</tr>
</thead>
</table>

### Weight:
- **3PV:** 4kg (8.8lb)
- **5PV:** 7kg (15.4lb)
- **7PV:** 25kg (50.6lb)

### Available Ventilation Flow Rate
- **3PV:**
  - 500 NI/min
  - 1000 NI/min
  - 1500 NI/min
  - 2000 NI/min
  - 4000 NI/min
  - 5000 NI/min
  - 6000 NI/min

- **5PV:**
  - 7000 NI/min
  - 8000 NI/min
  - 10000 NI/min
  - 12000 NI/min
  - 14000 NI/min

- **7PV:**
  - 12000 NI/min
  - 14000 NI/min

<table>
<thead>
<tr>
<th>Default:</th>
<th>1000 NI/min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Tolerance:</th>
<th>-0, +20%</th>
</tr>
</thead>
</table>

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*ML513 | v11*

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Section 2: Quick User Guide

Operation of the System

Once the system is installed correctly, turn on the air supply. Refer to the “Commissioning” on section 7 for commissioning instructions.

Note: User must start the system ventilation cycle by either, pressing the Local Start Push Button or energizing the Solenoid Valve for Remote Start (optional). Ventilation cycle will NOT start just by turning on the air supply.

Please refer to relevant drawing number for illustration:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Colour</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Ventilating</td>
<td>Black</td>
<td>Not in Ventilation</td>
</tr>
<tr>
<td>Ventilation Complete</td>
<td>Red</td>
<td>Power Off</td>
</tr>
</tbody>
</table>

**Local Start: To start the ventilation cycle**

- Push and hold the Local Start Push Button until flow is achieved. The “System Ventilating” LED’s will start to flash once air flow is achieved through the machine enclosure system.

**Remote Start (Optional)**

The remote start option will require an Expo approved Solenoid Valve which can be purchased with the PV.

- Energize the Remote Start Solenoid Valve until flow is achieved in the PV. The “System Ventilating” LED’s will start to flash once air flow is achieved through the machine enclosure system.

- Ventilation cycle will start for the selected ventilation time.

- During the ventilation cycle the ventilation gas will exit the enclosure through the spark arrestor in the Outlet Valve.

- Once the sufficient number of volume changes have completed (defined by the length of the ventilation time period) the system will cease to supply ventilation gas to the enclosure.

- The system will show “Ventilation Complete” signal when the ventilation cycle is completed.

**Note the running time of the ventilation cycle.**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Colour</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Ventilating</td>
<td>Yellow</td>
<td>Ventilation in progress (Flashing)</td>
</tr>
<tr>
<td>Ventilation Complete</td>
<td>Red</td>
<td>Power Off (power to the electrical machine should be off)</td>
</tr>
</tbody>
</table>

**NOTE: If ventilation cycle fails to start, Open the Ventilation Flow Restrictor until the “System Ventilating” indicator start to flash.**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Colour</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Ventilating</td>
<td>Black</td>
<td>Not in Ventilation</td>
</tr>
<tr>
<td>Ventilation Complete</td>
<td>Green</td>
<td>Ventilation Cycle Successful (safe to apply power to the electrical machine)</td>
</tr>
</tbody>
</table>
• Check that the ventilation time noted is greater or equal to the required ventilation time.

• The Pre-Start Ventilation will remain in “Ventilation Complete” mode until either the air supply falls below the minimum supply pressure or the ventilation cycle is reset or re-started either locally or remotely.

• To reset the “Ventilation Complete” signal, push the Local Start Push Button or energize the Remote Start Solenoid Valve for one second.

If the Local Start Push Button is pushed or the Remote Start Solenoid Valve is energized for more than one second, the PV system will start a new ventilation cycle after resetting.

If the system fails to work as expected, refer back to the “Installation of the System” in section 6.

If the problem continues, Refer to the “Fault Finding” in section 9.

If all checks have been done and the system still fails to operate as expected, please contact your local distributor or Expo Technologies.

Section 3: Application Suitability

The Pre-Start Ventilation systems designed to protect rotating electrical machines, are certified for use in hazardous locations, where the hazardous location is non-mining (above ground) and the hazard is caused by flammable gases, or vapours. The rotating electrical machines must be rated for use in (with the respective markings clearly displayed):

• Ex e rated rotating electrical machines - ATEX & IECEx Zone 1 or Zone 2 environment.

• Ex n rated rotating electrical machines - ATEX & IECEx Zone 2 environment.

Some High Voltage Ex e and Non Incendive Ex n machines, although certified to “Non-Incendive” methods of protection can create incendive sparking. These sparks and “hot spots” are more likely to occur during machine start-up due to the increased loading. The additional hazard that flammable gas may have entered the machine casing is the principle reason for fitting the Pre-Start Ventilation system. See applicable standards such as IEC / EN60079-15 and IEC / EN60079-7.

Pre-Start Ventilation systems may be used for hazards of any gas group. Apparatus associated with the Pre-Start Ventilation 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 of such devices must be checked to ensure their suitability.

This system is primarily designed for use with compressed air. Where other inert compressed gases are used (Nitrogen, for example) the user must take suitable precautions so that the build up of the inert gas does not present a health hazard. 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 ventilated enclosure.

The following materials are used in the construction of Pre-Start Ventilation Systems. If substances that may adversely affect any of these materials are present in the surrounding environment, please consult Expo Technologies for further guidance.

<table>
<thead>
<tr>
<th>Materials of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Aluminium</td>
</tr>
<tr>
<td>Acrylic</td>
</tr>
<tr>
<td>Mild (Carbon) Steel</td>
</tr>
<tr>
<td>Nylon</td>
</tr>
<tr>
<td>Silicone</td>
</tr>
<tr>
<td>Brass</td>
</tr>
<tr>
<td>Polyurethane</td>
</tr>
<tr>
<td>Neoprene</td>
</tr>
<tr>
<td>ABS</td>
</tr>
<tr>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Polyester (glass filled)</td>
</tr>
</tbody>
</table>
Note: This is NOT an Ex p “Purge & Pressurization” control system and is not designed to maintain an overpressure within the machine casing.

Section 4: Description and Principle of Operation

The Pre-Start Ventilation System applies specifically to electrical machines e.g motors and generators that are already (or in the process of) being certified/approved as increased Safety (Ex e) or Non Incendive Ex n.

Prior to switching on the power (either Locally or Remotely) to the electrical equipment, the machine must be ventilated to remove any flammable gas that might have entered the enclosure machine. Pre-Start Ventilation is the process of removal of contaminated air and replacement with air (or inert gas) known to be free from flammable gas prior to machine start-up. The duration of the ventilation cycle process is normally ascertained by performing a ventilation test.

The air supply can be turned off after the Ventilation Cycle has been completed. No leakage compensation is required.

The principle of Pre-Start Ventilation is as follows:

• Clean compressed air or inert gas is drawn from a non-hazardous location.
• The interior of the machine is pre-ventilated to remove any hazardous gas.
• Measure the flow of “ventilation air” at a defined outlet.
• Positive pressure in the enclosure of the electrical machine prevents the hazardous gas from the environment to enter the enclosure during the ventilation cycle.

Local Operation

Local operation is selected when the remote operation option is either not available, or is de-energized. Turning on the air supply alone will not activate a ventilation cycle. The PV system will not start until the ventilation cycle is activated by operating the Local Start Push Button.

• To start ventilation cycle, push and hold the Local Start Push Button until flow is achieved. The flow in the enclosure will be indicated by the flashing Yellow indicator “System Ventilating” LED’s. The ventilation cycle will then start.
• When the required ventilation flow from the outlet valve level has been attained, visual indicator, visual indicator and volt free (dry) contact will indicate “System Ventilating”.
• The ventilation will continue for the selected ventilation time. At the end of the ventilation time the system will show Green indicator “Ventilation Complete”, pneumatic signal and or another set of volt free (dry) contacts.
• To reset the “Ventilation Complete” signal, push the Local Start Push Button for one second.

If held for longer than one second, the system will start a new ventilation cycle after resetting.

Remote control operation (Optional)

The PV system can be operated remotely to ventilate the rotating electrical machine before use. Note that the PV system will not start the ventilation cycle automatically when the air supply is turned on. User must activate the ventilation cycle by energizing the Remote Start Solenoid Valve.

The appropriate remote control option if selected must be factory fitted to the PV system. For remote control operation:
• Start the ventilation cycle by energizing the Remote Start Solenoid Valve until flow is achieved in the PV system. The flow in the enclosure will be indicated by the flashing Yellow indicator “System Ventilating”.

• When the required ventilation flow from the outlet valve level has been attained, visual indicator, pneumatic signal or a volt free (dry) contact will indicate “System Ventilating”.

• The ventilation will continue for the selected ventilation time. At the end of the ventilation time the system will show Green indicator “Ventilation Complete”, pneumatic signal and or another set of volt free (dry) contacts.

• To reset the “Ventilation Complete” signal, energize the Remote Solenoid Valve for one second.

• If held for longer than one second, the system will start a new ventilation cycle after resetting.

For Local Start or Remote Start operation; when the pressure in the enclosure reaches the liftoff pressure of the Outlet Valve, this opens and allows airflow through the machine casing.

Note: For 7PV Pneumatically Operated Valve, the valve will open as flow enters the machine casing.

The Overpressure Relief Valve can also open during fault conditions if the pressure rises inside the machine to or above the opening pressure.

Two pipes connects the Outlet Valve to a Ventilation Flow Sensor in the PV system to measure the differential pressure across the orifice plate. When the pressure rises above the factory set pressure flow rate, the ventilation Flow Sensor will activate the timing circuit. The timer will operate for the specified ventilation time to ventilate the machine if the air flow rate does not fall below the required flow rate.

When the required ventilation flow level is attained, the visual indicator “System Ventilating” will start flashing Yellow, and the pneumatic output or volt-free contact will be activated.

At the end of the timed ventilation cycle, the air flow to the machine will be turned off by the PV system. The pressure within the machine falls to atmospheric, and the Outlet Valve closes. Within the PV system, the Green “Ventilation Complete” indicator, pneumatic signal & a volt free (dry) contact will close giving permission to start the machine switchgear.

Provided that the air supply to the system is not interrupted, the system will remain in this condition unless the Local Start or Remote Start Solenoid Valve is activated for one second causing the system to reset.
Section 5: Main Components

Refer to section 12 Drawings and Diagrams list for relevant PV system General Arrangement for components numbering.

Air Supply Filter

The unit is provided with a 40-micron water / dust filter element as a precaution but air supply should be to the quality as stated in the Air Supply paragraph found in the Installation of the System section.

Ventilation Flow Regulator

The Ventilation Flow Regulator is a 0-7 barg Pressure Regulator and is “User Adjustable” between 0-4 barg (clockwise to increase flow) to control the total ventilation flow supplied to the enclosure during ventilation. The total ventilation flow is the (Ventilation Flow rate at the Outlet Valve +10%) + the leakage of the machine casing.

Ventilation Control Pilot Operated Regulator

This regulator controls the ventilation air supply to the enclosure according to the supply from the ventilation flow regulator and is automatically closed after the ventilation time has been completed.

Logic Air Supply Regulator

This device provides the system with a stable logic pressure supply for consistent operation. The pressure level of 4.0 barg (60 psig) is factory set and can be verified by means of the integral pressure gauge. It should only be adjusted if the gauge indicates that the regulated pressure is incorrect. This should indicate no more than 4.0 barg (60 psig). During ventilation you may notice the pressure drop down to 3.0 barg (45 psig).
Visual indicators

Visual indicators are fitted to provide local status information to the operator:

**Ventilation in Progress Indicator**

<table>
<thead>
<tr>
<th>Color</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>☺</td>
<td>“Ventilation flow too low” (or not in Ventilation mode)</td>
</tr>
<tr>
<td>Yellow (flashing)</td>
<td>☼</td>
<td>“Ventilation flow above the minimum” (Ventilation in Progress)</td>
</tr>
</tbody>
</table>

**Ventilation Complete Indicator**

<table>
<thead>
<tr>
<th>Color</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>■</td>
<td>Power Off (power to the electrical machine should be off)”</td>
</tr>
<tr>
<td>Green</td>
<td>▶</td>
<td>Ventilation Cycle Successful (safe to apply power to the electrical machine)</td>
</tr>
</tbody>
</table>

**/PA Terminal Box**

Increased Safety

<table>
<thead>
<tr>
<th>Certification</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex e IIC T5 Gb</td>
<td>Tamb -20ºC to +55ºC</td>
</tr>
<tr>
<td>Ex eb IIIC Db</td>
<td>Tamb -55ºC to +60ºC</td>
</tr>
</tbody>
</table>

The Terminal Box is increased safety (Ex e) certified and incorporates the terminal connection points for the switches and solenoid valve (when Remote Start is included). All contacts provided are volt free (dry).

Cable entry methods (for example conduit or cable glands) must be certified to IECEx and ATEX standards. The main requirement is that IP66 (or better) ingress protection must be provided by use of seals or washers.

**/IS Intrinsically Safe (Ex i)**

The output signals “Ventilation in Progress” and “Ventilation Complete” are available as volt-free contacts in blue terminals, for connection to Intrinsically Safe circuits. The terminal box has an isolation partition to keep the separation between I.S. circuits and non-I.S. circuits, when the solenoid valve is not I.S.

**/PO Pneumatic Output Signals**

The output signals “Ventilation in Progress” and “Ventilation Complete” are 4 barg (60 psig) pneumatic signal available for connection to 1/8” NPT Female bulkheads. Connect these signals to external pressure switches.

**Outlet Valve**

This device has several functions:

- The Outlet Valve unit is calibrated to open when the Ventilated Enclosure pressure exceeds the set point.
- It contains a Spark Arrestor designed to prevent the emission of arcs, sparks and incandescent particles produced by normal operation or electrical fault within the machine.
- It measures the differential pressure across the outlet orifice during ventilation flow. The measurement figure indicates when the required flow rate is achieved and timing of the ventilation cycle can start.
- It contains the overpressure Relief Valve.

To achieve effective Ventilation Flow, the point where air enters and exits the machine should normally be at opposite ends of the enclosure. The Outlet Valve unit must be mounted vertically and there should be a minimum clearance of 300 mm (12”) around the spark arrestor. The Outlet Valve have user selectable orifice plates. These allow the flow rate to be selected by the user without modification to the PV system.

It is important that the interior and exterior of the spark arrestor is kept clean and debris is not allowed to accumulate. In particular the exterior of the spark arrestor should not be painted or blocked in any way.
Section 6: Installation of the System

The Pre-Start Ventilation System must be installed by a competent person in accordance with relevant standards, such as IEC/EN 60079-14 and 60079-19. The installation must strictly adhere to the current standards that applies to the installation of Intrinsically Safe, Increased Safety and Type “n” apparatus. Copies of the Current Standard can be purchased from Expo Technologies or B.S.I or relevant local code / Standard.

The Pre-Start Ventilation system should be installed either directly on, or close to the machine. It should be installed such that the system indicators and certification labels are in view.

All parts of the system carry a common serial number. If installing more than one system, ensure that this commonality is maintained within each system installed.

Air Supply Quality

The Pre-Start Ventilation System should be connected to a protective gas supply, which is suitable for ventilation.

The supply pipe connections to the Pre-Start Ventilation System are:

<table>
<thead>
<tr>
<th>3PV</th>
<th>5PV</th>
<th>7PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2” NPT (F)</td>
<td>1” NPT (F)</td>
<td>2” NPT (F)</td>
</tr>
</tbody>
</table>

The size of the input pipe should be appropriate for the maximum input ventilation 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. It must comply with BS ISO 8573-1: 2001 Class 2.2.1 or equivalent local standards. This is typically referred to as Instrument Air Quality. Although equipment will operate with lower air quality, the operational life of the system will be adversely affected. The equipment that is being protected by the Pre-Start Ventilation may also suffer because of poor air quality.

Instrument Air Quality

| Solid Particles | 0.5 μm < particle size ≤ 1 μm, maximum 1000 particles / m³ |
| Residual Water  | 1μm maximum density, +3°C* pressure dewpoint          |
| Oil Content    | ≤ 0.01 mg / m³ concentration total oil                |

* For applications where T_{amb} ≤ 0°C, the air supply should be Class 2.1.1 with humidity of -70°C pressure dewpoint.

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

Before connecting the air supply to the Pre-Start Ventilation 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 metre of supply pipe.

The ventilation air from the Pre-Started Ventilation system should be piped within the machine to ensure ventilation of potential dead air spots.

Warning: The system is fitted with an internal regulator factory set to 4 barg (60 psig) feeding the logic air supply regulator. The correct logic supply pressure is vital to the reliability and calibration of the Pre-Start Ventilation System, therefore should NOT be adjusted.
Pipe Work

If the Pre-Start Ventilation is not connected directly to the machine enclosure, pipe work and fittings used to connect the PV system to the machine enclosure should be either metallic or appropriate to the environment into which the system is installed. No valve may be fitted in any signal pipe connecting the PV system to the machine enclosure. This pipe work must be fitted in accordance with local codes of practice where relevant.

Multiple Enclosures

This system is suitable for the ventilation of the primary enclosure and its associated terminal boxes.

Power Supplies and their Isolation

All power entering the rotating electrical machine must have a means of isolation. This requirement also applies to any external power sources that are connected to the equipment such as volt-free (dry) contacts within the rotating electrical machine. The electrical installation must conform to the local codes of practice.

Exception

Power to Intrinsically Safe apparatus, or apparatus that is already suitable for use in hazardous locations need not be isolated by the Pre-Start Ventilation System.

In all cases the user must control the application and the isolation of power to the rotating electrical machine after the Pre-Start Ventilation System shows the “Ventilation Complete” Green signal.

Section 7: Commissioning

Commissioning the System

Refer to the General Arrangement (GA) drawing for the Pre-Start Ventilation system option.

If, after commissioning, the system does not perform as expected, refer to the Fault Finding Section.

Follow these steps:

1. Disconnect the air supply pipe from the inlet to the PV System.
2. Flush the pipe through with instrument quality air to remove any debris. This must be carried out for at least 10 seconds for every metre of supply pipe.
3. Check all connections between the PV system and the Outlet Valve. The Outlet Valve Unit must be fitted correctly with clear path to the ventilation exhaust.
4. Close and re-open the internal shut off valve. See No. 5 in the GA drawing.
5. Check that the internal logic pressure gauge reads 4.0 barg (60 psig). See No. 4 in the GA drawing.
6. Start the ventilation cycle by pushing the Local Start Push Button momentarily until flow is achieved. Or use the Remote Start facility where fitted.
7. The ventilation timer will start as soon as the “System Ventilating” indicator turn from Black to flashing Yellow.
8. Check the time delay between the “System Ventilating” indicator start flashing Yellow, and the “Ventilation Complete” indicator turning from Red to Green. Ventilation time should not be less than the minimum required. Times in excess of the minimum are permitted.
9. If the “System Ventilating” indicator does not flash Yellow, this indicates low ventilation flow. This can happen with a machine housing with greater than expected leakage.

Increase the ventilation pressure.

10. To correct this, push and hold the Local Start Push Button.

11. Very slowly, open (clockwise) the Ventilation Flow Regulator (See No. 8 in the GA drawing), until the indicator flashes Yellow.

DO NOT open too quickly as this can allow too much air and over pressurize the enclosure.

12. If after the flow regulator is fully open (the pressure gauge read 4mbar), and the “Ventilation in Progress” indicator does not flash Yellow, refer to next page on “Procedure for increasing air flow”.

When a full ventilation cycle is successfully completed, the “System Ventilating” indicator will turn from flashing Yellow to Black.

At the same time the “Ventilation Complete” indicator will turn from Red to Green. The appropriate pneumatic or electrical signals will coincide with the changes of indicator status.

Once the ventilation time is completed, the ventilation air flow to the machine will stop and the “Ventilation Complete” signal will activate.

The system will remain in this mode until the system is either reset or re-started, or the air supply to the system is isolated.

To reset the “Ventilation Complete” signal, push the Local Start Push Button or energise the Remote Start Solenoid Valve for one second.

To re-start a ventilation cycle again, push and hold the Local Start Push Button or the Remote Start facility until the “System Ventilating” LED’s begin to flash.

Procedure for increasing air flow

It is possible for the enclosure of the rotating electrical machine to have a higher leakage rate than expected, which may affect the PV system’s ability to achieve sufficient air flow to start the ventilation cycle.

See table below to identify if the PV system require the below procedure for removing the fitted restrictor to increase air flow through the system.

Note: This procedure should be carried out by a competent engineer.

<table>
<thead>
<tr>
<th>System</th>
<th>Orifice in system Outlet Valve (required flow)</th>
<th>Remove Restrictor (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PV</td>
<td>1500 NI/min</td>
<td>Yes (If unable to achieve sufficient flow to start electronic timer).</td>
</tr>
<tr>
<td>5PV</td>
<td>6000 NI/min</td>
<td>Yes</td>
</tr>
<tr>
<td>7PV</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Components

<table>
<thead>
<tr>
<th>Locknut</th>
<th>3PV</th>
<th>5PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>32mm</td>
<td></td>
<td>42mm</td>
</tr>
</tbody>
</table>
Use the spanner (wrench) to loosen the locknut. It should go back 15 - 20mm.

Loosen the union nut and move it back towards the locknut as shown.

Pull back the right hand half of the union 5 - 10mm. The orifice restrictor is in the middle.

Remove the restrictor.

Wind back the right hand union half towards the left union half.

Note: It is very important to fit the two halves together tightly to avoid leakage.

Lock the two union halves together with the union nut. Wind back the locknut to its former position.

<table>
<thead>
<tr>
<th>Components</th>
<th>3PV</th>
<th>5PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union Nut</td>
<td>40mm</td>
<td>54mm</td>
</tr>
<tr>
<td>Union</td>
<td>26mm</td>
<td>39mm</td>
</tr>
</tbody>
</table>
Section 8: Maintenance of the System

General maintenance

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

The following checks should be carried out every 6 – 36 months dependent on environment according to IEC / EN 60079-17

- Tests outlined in the Detailed Commissioning section.
- Ensure that the Outlet Valve Unit is free from contamination prior to making any adjustment. To do this:
  - Remove large cover plate using a 10 mm spanner (wrench).
  - Check that the interior and all components are clean and free from contamination.
  - Replace large cover plate.
- Check the condition of the air supply filter element. Clean or replace as necessary.

The following additional checks are recommended at least every 3 years:

Check that:
- Apparatus is suitable for use in the hazardous location.
- There are no unauthorised modifications.
- The air supply is not contaminated.
- The “System Ventilating” and “System Ventilation Complete” signals function correctly.
- Approval labels are legible and not damaged.
- Adequate spares are carried.
- The action on pressure failure is correct.

Maintenance of Electronic Timer

This must be carried out every 3 years.

- The intrinsically safe battery pack associated with the electronic timer should be replaced and the commissioning tests repeated.
- After the timing phase has elapsed, the battery may be hot-swapped in the hazardous location without affecting the operation of the Pre-Start Ventilation System.
Section 9: Fault Finding

General Information

If there are any problems that cannot be corrected using one of the methods described, please call Expo or your supplier for further assistance. If the system is less than 12 months old, parts under warranty should be returned to Expo for investigation. A full report of the fault and the system serial number should accompany the parts.

It is common for problems with the Pre-Start Ventilation System to be caused by contamination of the air supply with oil, water or dirt. To prevent these problems, the air supply must contain a dust filter and a water filter. This will ensure that the air is instrument quality and protect both the ventilation system and the equipment being ventilated. This filtration system is not provided by Expo and must be sourced separately.

Contamination can enter the system from a number of sources. To prevent this, it is essential that the procedures described in the Installation section are carried out prior to first use of the system. These procedures should also be carried out following any disconnection and re-connection of the pipe work. Failure to perform these procedures may cause damage to the system that will not be covered by the warranty.

The system has been designed for ease of fault finding and the many of the components fitted are plug-in or chassis mounted. Check components by substitution only after establishing that such action is necessary.

Before carrying out the fault finding procedures, ensure that:

- Both the main air pressure to the system and the regulated pressure to the logic manifold are as specified on the settings sheet.
- Air pressure does not drop below the minimum supply pressure during ventilation; the majority of faults reported are due to insufficient air supply during the ventilation cycle.

### Pre-Start Ventilation System has sufficient flow but no “System Ventilating” signal.

<table>
<thead>
<tr>
<th>Fault Location</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Pack.</td>
<td>The battery pack is discharged.</td>
<td>• Battery needs replacement. Consult Expo Technologies.</td>
</tr>
<tr>
<td>“System Ventilating” switch</td>
<td>• Stroke actuator faulty.</td>
<td>• Check the actuation of switch by the “Short Stroke Actuator for Ex d Switch”. Refer to relevant General Arrangement (GA) drawing.</td>
</tr>
<tr>
<td></td>
<td>• Ex d system ventilating switch is faulty.</td>
<td>• If Stroke Actuator is not moving while the system is ventilating, the actuator may require replacement. Consult Expo Technologies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If Stroke Actuator is working, check that the switch is closing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If it is not closing, it needs to be replaced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If it is closing but no signal is present, the switch needs replacement. Consult Expo Technologies</td>
</tr>
<tr>
<td>Electronic Timer</td>
<td>The Electronic Timer is faulty</td>
<td>• Needs replacement. Consult Expo. This should be done by a competent Service Engineer.</td>
</tr>
</tbody>
</table>
### Ventilation does not start or fails to complete

This is common due to the smaller pipe diameter or smaller compressor.

<table>
<thead>
<tr>
<th>Fault Location</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| Air Supply Pressure             | Air supply pressure fall below 4 barg (60 psig). | • Check that the air supply pressure is not below the specified minimum pressure during ventilation.  
• Increase air pressure. The pressure gauge should be above 4 barg (60 psig) during ventilation.  
• or replace main air filter. Consult Expo Technologies. |
| Machine could have a greater leakage rate than expected | Insufficient air supply to rotating electrical machine enclosure. | • Slowly turn the Ventilation Flow Regulator to increase the air flow.  
• Do this until the “Ventilation in Progress” indicator is activated. Indicator should turn from “Black” to “Flashing Yellow”.  
• This indicates correct Ventilation Flow.  
• If the problem is not solved, refer to the “Procedure for increasing air flow” in the Commissioning section. |
| Remote Solenoid Valve           | Not functioning                                  | • Check all connections from the PV system to the Remote Start control, continuity and supply voltage where possible.  
• Make sure all connections are secure and terminated correctly.  
• If all these appear to be correct, then check the operation of the system by using the Local Start Push Button.  
• If the Local Start Push Button successfully starts a ventilation cycle, the Solenoid Valve needs replacement. |

### Ventilation Time Insufficient

This can occur if the Electronic Timer Selector Switches have not been set correctly.

<table>
<thead>
<tr>
<th>Fault Location</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Timer Selector Switch</td>
<td>Not set correctly</td>
<td>• Make sure the Electronic Timer Selector Switch is correct to the required setting.</td>
</tr>
</tbody>
</table>
| Electronic Timer is faulty      |                   | • Replacement necessary                      
• This should be fitted by a competent Service Engineer. |
Flow Sensor Calibration

Contact Expo Technologies for new Ventilation Flow Sensor if the sensor is out of calibration.

Section 10: Recommended Spares List

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF1-A03N-008</td>
<td>Filter kit for HF1-A03N-009 filter - size 3</td>
</tr>
<tr>
<td>HF1-A03N-007</td>
<td>Filter kit for HF1-A03N-006 filter - size 5</td>
</tr>
<tr>
<td>HF1-A03N-002</td>
<td>Filter kit for HF1-A03N-001 filter - size 7</td>
</tr>
<tr>
<td>S0191/025</td>
<td>Ex d II switch SPNO</td>
</tr>
<tr>
<td>S0030/606</td>
<td>Ventilation Flow sensor, must be factory set to the value as stated on the Customer Test and Inspection Sheet</td>
</tr>
<tr>
<td>ETM-IS31-001</td>
<td>IS battery pack for Electronic Timer</td>
</tr>
<tr>
<td>KPV-RS01</td>
<td>24VDC Remote Start Solenoid Kit</td>
</tr>
<tr>
<td>KPV-RS02</td>
<td>110VAC Remote Start Solenoid Kit</td>
</tr>
<tr>
<td>KPV-RS03</td>
<td>230VAC Remote Start Solenoid Kit</td>
</tr>
<tr>
<td>KPV-RS10</td>
<td>12VDC (IS) Remote Start Solenoid Kit</td>
</tr>
<tr>
<td>KPV-RS11</td>
<td>24VDC (IS) Remote Start Solenoid Kit</td>
</tr>
</tbody>
</table>

Section 11: Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>Pre-Start Ventilation system</td>
</tr>
<tr>
<td>ET</td>
<td>Electronic Timer</td>
</tr>
<tr>
<td>LS</td>
<td>Local Start Pushbutton</td>
</tr>
<tr>
<td>RS</td>
<td>Remote Start (Solenoid valve)</td>
</tr>
<tr>
<td>IS</td>
<td>Intrinsically Safe</td>
</tr>
<tr>
<td>PA</td>
<td>Permissive Alarm</td>
</tr>
<tr>
<td>OV</td>
<td>Pneumatically Operated Outlet Valve</td>
</tr>
<tr>
<td>PO</td>
<td>Pneumatic Output</td>
</tr>
</tbody>
</table>
Section 12: Drawings and Diagrams

<table>
<thead>
<tr>
<th>Title</th>
<th>Drawing Number</th>
<th>Number of Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Start Ventilation system 3PV</td>
<td>XBR-1TD0-015</td>
<td>3</td>
</tr>
<tr>
<td>Pre-Start Ventilation system 5PV</td>
<td>XBR-1TD0-014</td>
<td>3</td>
</tr>
<tr>
<td>Pre-Start Ventilation system 7PV</td>
<td>XBR-1TD0-016</td>
<td>3</td>
</tr>
<tr>
<td>3VP and 5PV Typical PV Hook Up</td>
<td>PV-HU</td>
<td>1</td>
</tr>
<tr>
<td>7PV Typical Hook up drawing</td>
<td>7PV-HU</td>
<td>1</td>
</tr>
<tr>
<td>PV P and I Diagram</td>
<td>PV-PI</td>
<td>1</td>
</tr>
<tr>
<td>PV Ex e Terminal Box Layout</td>
<td>AGE-WC00-230</td>
<td>1</td>
</tr>
<tr>
<td>Indicator Displays/Switch Sequence</td>
<td>SD8100</td>
<td>1</td>
</tr>
</tbody>
</table>

Section 13: Certification

Download the certificates at www.expoworldwide.com/downloads/

<table>
<thead>
<tr>
<th>Component</th>
<th>Certificate</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilation System</td>
<td>ATEX Certificate</td>
<td>SIRA 13ATEX1083X</td>
</tr>
<tr>
<td></td>
<td>IECEx Certificate</td>
<td>SIR13.0030X</td>
</tr>
<tr>
<td></td>
<td>EXPO</td>
<td>EXPO 13MDOC1314</td>
</tr>
<tr>
<td></td>
<td>COC</td>
<td>SC024</td>
</tr>
<tr>
<td>MIU/e Ex e Terminal Box</td>
<td>ATEX Certificate</td>
<td>ITS 10ATEX37092X</td>
</tr>
<tr>
<td></td>
<td>IECEx Certificate</td>
<td>IECEx ITS 10.0003X</td>
</tr>
<tr>
<td>Electronic Timer</td>
<td>ATEX Certificate</td>
<td>FM 10 ATEX0003X</td>
</tr>
<tr>
<td></td>
<td>IECEx Certificate</td>
<td>IECEx FME 10.0001X</td>
</tr>
<tr>
<td>Electronic Switch</td>
<td>Ex d limit switch</td>
<td>IECEx EPS 14.0092X</td>
</tr>
<tr>
<td></td>
<td>Ex d limit switch</td>
<td>EPS 14 ATEX 1766 X</td>
</tr>
<tr>
<td>Solenoid Valve</td>
<td>Ex mb RS00/RS01/RS02/RS03</td>
<td>IECEx SIR 06.0109X</td>
</tr>
<tr>
<td></td>
<td>Ex i RS10/RS11</td>
<td>SIRA BAS98ATEX2168X</td>
</tr>
<tr>
<td></td>
<td>Ex d RS20/RS21/RS22</td>
<td>IECEx INE10.0002X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INERIS 03ATEX0249X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LCIE 00ATEX6008X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IECEx LCI 07.0015X</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LIFTING EYE BOLTS</td>
</tr>
<tr>
<td>2</td>
<td>CONICAL FACED MALE-FEMALE</td>
</tr>
<tr>
<td>3</td>
<td>VENTILATION CONTROL PILOT OPERATED REGULATOR</td>
</tr>
<tr>
<td>4</td>
<td>VENTILATION FLOW REGULATOR &amp; GAUGE</td>
</tr>
<tr>
<td>5</td>
<td>SHUT OFF BALL VALVE</td>
</tr>
<tr>
<td>6</td>
<td>REMOTE START MOUNTING BRACKET</td>
</tr>
<tr>
<td>7</td>
<td>REMOTE START Ex CERTIFIED SOLENOID (Ex mb SHOWN)</td>
</tr>
<tr>
<td>8</td>
<td>AIR SUPPLY FILTER</td>
</tr>
<tr>
<td>9</td>
<td>SHORT STROKE ACTUATOR FOR Ex d SWITCHES</td>
</tr>
<tr>
<td>10</td>
<td>Ex d &quot;VENTILATION COMPLETE&quot; SWITCH</td>
</tr>
<tr>
<td>11</td>
<td>FLOW SENSOR</td>
</tr>
<tr>
<td>12</td>
<td>ELECTRONIC TIMER PRESSURE SWITCH</td>
</tr>
<tr>
<td>13</td>
<td>5/3 VALVE FOR SYSTEM LOGIC</td>
</tr>
<tr>
<td>14</td>
<td>LOGIC AIR SUPPLY REGULATOR &amp; GAUGE (FACTORY SET)</td>
</tr>
<tr>
<td>15</td>
<td>LOCAL START PUSH BUTTON</td>
</tr>
<tr>
<td>16</td>
<td>Ex d &quot;SYSTEM VENTILATING&quot; SWITCH</td>
</tr>
<tr>
<td>17</td>
<td>ELECTRONIC TIMING MODULE</td>
</tr>
<tr>
<td>18</td>
<td>IS BATTERY PACK FOR ELECTRONIC TIMER</td>
</tr>
</tbody>
</table>

7PV GENERAL ARRANGEMENT

Expo Technologies Limited
SURREY TW16 5OB
UNITED KINGDOM

DRAWING No.  XBR-1TD0-016

DRAWN: 20/06/2013
MATERIAL: 316 STAINLESS STEEL
FINISH: GRAINED

APP'D
CHK'D
MP        CB
MN

SCALE NTS REV: 04
04
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**NOTES**

1. OUTLET VALVE SUPPLIED WITH USER SELECTABLE ORIFICE PLATES TO SET THE FLOW RATE
2. THE OUTLET VALVE MUST BE MOUNTED IN ORIENTATION SHOWN.
3. WEIGHT IS APPROXIMATELY 25KG
4. PART CODE RLV200/SS/PV
5. ON INSTALLATION ENSURE THAT FIXING BOLTS ARE EVENLY TIGHTENED TO A TORQUE OF 9N.m (44 lb/ft)

**OVER PRESSURE OUTLET ASSEMBLY**

- 10 OFF FIXING POINTS TO SUIT M8

**EXCHANGEABLE ORIFICE PLATE**

**OPEN VENTILATION OUTLET VALVE SIGNAL**

**DIFFERENTIAL FLOW SIGNAL HIGH PRESSURE**

**DIFFERENTIAL FLOW SIGNAL LOW PRESSURE**

**ENCLOSURE TEST POINT (PLUGGED)**

**VENTILATION AIR OUTLET**

**REMOVABLE LARGE COVER FOR CHANGING ORIFICE PLATES**

**VENTILATION AIR OUTLET SPARK ARRESTOR MUST NOT BE OBSTRUCTED**

**DRAWING DETAILS**

- DRAWING DATE: 20/06/2013
- MATERIAL: STAINLESS STEEL 316L 1.5mm THK
- TITLE: 7PV OUTLET VALVE
- SCALE: 1:10
- DRAWER No.: XBR-1TD0-016
- SHEET No.: 3 OF 3
SEE SCHEMATIC DRAWING SD8100

SYSTEM VENTILATING
VENTILATION COMPLETE
REMOTE START SOLENOID VALVE OPTIONAL

BLACK
GREY
BROWN
BLACK
BROWN
BLUE

I.S. ISOLATION PARTITION REQUIRED TO SEPARATE Ex i FROM Ex d SIGNAL SWITCH WHEN Ex i (IIS)
SOLENOID IS USED FOR REMOTE START.

DIN RAIL MOUNTED TERMINALS
SUITABLE FOR CABLES FROM 0.5mm²
TO 2.5mm²

I.S. ISOLATION PARTITION (I.S. REMOTE
START OPTION ONLY TO MAINTAIN 50mm²
CREEPAGE AND CLEARANCE DISTANCES

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and are returnable upon request. They are not to be copied or communicated in part or in whole without written consent
from Expo Technologies Limited, neither are they to be used in any way against our interests.
SWITCH-INDICATOR SEQUENCE DIAGRAM FOR PRESTART VENTILATION SYSTEMS

AIR ON (NO VENTILATING)

REMOTE START SOLENOID VALVE
TERMINAL BOX
1-3 (OPEN)
1-2 (CLOSED)
4-6 (OPEN)
4-5 (CLOSED)

INDICATORS
BLACK GRY BROWN BLACK GRY BROWN BLUE BROWN
1 2 3 4 5 6 7 8

DURING VENTILATION

REMOTE START SOLENOID VALVE
TERMINAL BOX
1-3 (CLOSED)
1-2 (OPEN)
4-6 (OPEN)
4-5 (CLOSED)

INDICATORS
RED YELLOW (FLASHING) BLACK GRY BROWN BLACK GRY BROWN BLUE BROWN
1 2 3 4 5 6 7 8

VENTILATION COMPLETE - NORMAL OPERATION

REMOTE START SOLENOID VALVE
TERMINAL BOX
1-3 (OPEN)
1-2 (CLOSED)
4-6 (CLOSED)
4-5 (OPEN)

INDICATORS
GREEN BLACK BLACK GRY BROWN BLACK GRY BROWN BLUE BROWN
1 2 3 4 5 6 7 8
EC TYPE-EXAMINATION CERTIFICATE

1 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

2 Certificate Number: Sira 13ATEX1083X

3 Issue: 0

4 Equipment: Pre-Start Ventilation System

5 Applicant: Expo Technologies

6 Address: Unit 2, The Summit

Hanworth Road

Sunbury on Thames

Surrey, TW16 5DB

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

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, 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.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012

EN 60079-7:2007

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira’s flexible scope of accreditation, which is available on request.

10 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.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

<table>
<thead>
<tr>
<th>Standard versions</th>
<th>Low temperature versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>II 2 G Ex e IIC T5 Gb (Ta -20°C to +60°C)</td>
<td>Ex d e mb IIC T3 or T4* Gb (Ta -30°C to +60°C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard /ET versions</th>
<th>Low temperature / ET versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>II 2 G Ex e IIC T5 Gb (Ta -20°C to +60°C)</td>
<td>Ex d e mb IIC T3 or T4* Gb (Ta -30°C to +60°C)</td>
</tr>
</tbody>
</table>

* Depending on heater

13 A C Smith Certification Manager

This certificate and its schedules may only be reproduced in its entirety and without change.

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 13ATEX1083X

Issue 0

DESCRIPTION OF EQUIPMENT

The Expo Technologies Pre-Start Ventilation System is intended to provide pre-start ventilation for Ex e motors. The equipment consists of a control unit and a relief valve, which comprise various electrical, mechanical and pneumatic components for the control of ventilation gas to an associated motor (not included in this certification), at a set flow rate and for a predetermined time. Alternative arrangements include the provision of an electronic timer, a solenoid valve and the option for extended or continuous ventilation.

A low temperature version is available which includes a certified heater and thermostat.

Model designation is of the form:

a b c d e

where, a = Size or Capacity

i.e. 1 = Flow rate up to 225 l/min

2 = Flow rate up to 450 l/min

3 = Flow rate up to 1500 l/min

4 = Flow rate up to 3000 l/min

5 = Flow rate up to 6000 l/min

6 = Flow rate up to 9000 l/min

7 = Flow rate up to 14000 l/min

b = Pre-start Ventilation Type

i.e. PV = Pre-start Ventilation

PP = Pre-start Ventilation (alternative)

c = Control Unit Enclosure Material/Mounting Configuration

i.e. al = Aluminium alloy

cs = Mild steel, painted

ss = Stainless steel

bp = Back Plate only

c = Chassis only

pm = Panel mounting

nm = Non-Metallic

d = Start Option

i.e. LS = Local start using start switch on PV/PP system

RS# = Remote start using Ex rated solenoid kit

e = Fitting Option

i.e. A = ANSI flange connection fittings used

D = DIN flange connection fittings used

B = BSP Pipe connection fittings used

N = NPT Pipe connection fittings used

# = letter showing non-certified pipe fitting

This certificate and its schedules may only be reproduced in its entirety and without change.
EC TYPE-EXAMINATION CERTIFICATE
Sira 13ATEX1083X
Issue 0

Option codes (Added only if used)
• PM = Flow Meter(s) fitted on enclosure to indicate ventilation flow
• IS = Internal Switches suitable for Ex i circuits.
• MR = Mechanically Resets ventilation reset signal.
• ER = Electronically Resets ventilation reset signal.
• MT = Mechanical Timing used to time pre-start ventilation cycle
• PT = Pneumatic Timing used to time pre-start ventilation cycle
• ET = Electronic Timing used to time pre-start ventilation cycle
• HP = High Pressure sensor fitted to prevent over pressure.
• OV = Outlet valve, pneumatically operated.
• PA = “Ex” switch(es) built-in, with/without “Ex” junction box.
• SP = Secondary Pre-Ventilation supply options.
• SS = Separate Supply for Protective gas and Logic air.
• TW = Twin (or more) outputs for two or more separate ventilated enclosures ventilated in parallel.
• HS = High Supply Pressure up to 16 Bar.
• CV = Ventilation sustained indefinitely after completion of ventilation cycle
• EV = Ventilation extended for predefined period of time after completion of ventilation cycle
• DXXX = Special design, not certification related options

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings
Refer to Certificate Annexes.

14.2 Associated Sira Reports and Certificate History

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<th>Date</th>
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<td>R29083A/00</td>
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15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

15.1 The intended use of this equipment is as a pre-start ventilation system. It is the user’s responsibility to ensure the correct functionality of the equipment when in use.

15.2 The equipment enclosure may contain RTDs or simple resistive switches. It is the user’s responsibility to ensure that these are connected into suitably certified intrinsically safe circuits.

15.3 The Pre-Start Ventilation System, low temperature version, shall be protected by a safety related system that ensures that it cannot be energised if the temperature of the air inlet or controller unit falls below -20°C. This system shall utilise the RTDs that are fitted to the control unit to provide the appropriate level of safety integrity, i.e. a level of operational safety of Cat 3 according to EN 954-1 for ATEX Category 2 (Zone 1) applications; note that these RTDs have not been assessed as a safety related device in accordance with EHSR 1.5 of Directive 94/9/EC.

15.4 When the equipment is provided with an intrinsically safe solenoid valve, the user must ensure that any associated line inductance is within the parameters of the solenoid valve certificate.

This certificate and its schedule may only be reproduced in its entirety and without change.

SIRA CERTIFICATION
Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

Page 3 of 4
### Certificate Annexe

**Certificate Number:** Sira 13ATEX1083X  
**Equipment:** Pre-Start Ventilation System  
**Applicant:** Expo Technologies

---

**Issue 0**

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<td>System Low Temp. Wiring (Typical)</td>
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This certificate and its schedules may only be reproduced in its entirety and without change.
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

Certificate No.: IECEx SIR 13.0030X
Issue No.: 0
Certificate history...

Status: Current

Date of Issue: 2013-10-22

Applicant: Expo Technologies
Unit 2, The Summit
Hanworth Road
Sunbury on Thames
Surrey, TW19 5DB
United Kingdom

Electrical Apparatus: Pre-Start Ventilation System
Option accessory: 

Type of Protection: Increased Safety

Marking:
- Standard versions
  Ex ia IIC T5 Gb
  (Ta -20°C to +60°C)
- Standard IET versions
  Ex ia IIC T5 Gb
  (Ta -20°C to +60°C)
- Low temperature versions
  Ex d IIC T3 or T4 Gb
  (Ta -50°C to +60°C)
- Low temperature IET versions
  Ex d ia IIC T3 or T4 Gb
  (Ta -50°C to +60°C)

Approved for issue on behalf of the IECEx
Certification Body: A C Smith

Position: Certification Manager

Signature (for printed version):

Date: 2013-10-22

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:
SIRA Certification Service
Rake Lane
Eccleston
Chester
CH6 9JN
United Kingdom

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0030X
Date of Issue: 2013-10-22
Issue No.: 0

Manufacturer: Expo Technologies
Unit 2, The Summit
Hanworth Road
Sunbury on Thames
Surrey, TW19 5DB
United Kingdom

Additional Manufacturing location (s):
The certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard set 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 Qualify system requirements. The certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical 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 O: General requirements
- Edition 6.0
- IEC 60079-7 : 2006-07 Explosive atmospheres - Part 7: Equipment protection by increased safety "a"
- Edition 4

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/115/Ex13.1207/T00
- Quality Assurance Report:
  GS/SIR/007.6011/04
IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0030X
Date of Issue: 2013-10-22
Page 3 of 4

Schedule

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

The Expo Technologies Pre-Start Ventilation System is intended to provide pre-start ventilation for Ex e motors. The equipment consists of a control unit and a relief valve, which comprise various electrical, mechanical and pneumatic components for the control of ventilation gas to an associated motor (not included in this certification), at a set flow rate and for a predetermined time. Alternative arrangements include the provision of an electronic timer, a solenoid valve and the option for extended or continuous ventilation.
A low temperature version is available which includes a certified heater and thermostat. Refer to the Annex for model nomenclature.

CONDITIONS OF CERTIFICATION: YES as shown below:

1. The intended use of this equipment is as a pre-start ventilation system. It is the user’s responsibility to ensure the correct functionality of the equipment when in use.
2. The equipment enclosure may contain RTDs or simple resistive switches. It is the user’s responsibility to ensure that these are connected into suitably certified intrinsically safe circuits.
3. The Pre-Start Ventilation System, low temperature version, shall be protected by a safety related system that ensures that it cannot be energised if the temperature of the air inlet or controller unit falls below -20°C. The system shall utilise the RTDs that are fitted to the control unit to provide the appropriate level of safety integrity; note that these RTDs have not been assessed as a safety related device.
4. When the equipment is provided with an intrinsically safe solenoid valve, the user must ensure that any associated line inductance is within the parameters of the solenoid valve certificate.

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0030X
Date of Issue: 2013-10-22
Page 4 of 4

EQUIPMENT (continued):

Conditions of manufacture
The Manufacturer shall comply with the following:

1. The following tests shall be performed by the manufacturer:
   a) Verification of Ventilation Failure Protection
   b) An output flow failure shall be simulated whilst the Pre-start Ventilation Control Unit is cycling. It shall be verified that the controller provides the appropriate output and relays.
   c) Verification of Air Supply Failure Protection
   d) An air supply failure shall be simulated whilst the Pre-start Ventilation Control Unit is cycling. It shall be verified that the controller provides the appropriate output and relays.
   e) Verification of Ventilation Overpressure Protection
   Where HP is specified an overpressure shall be simulated whilst the Pre-Start Ventilation Control Unit is cycling. It shall be verified that the controller provides the appropriate output and relays.
Model designation is of the form:

\[ abcde \]

where, \( a \) = Size or Capacity

\( i.e. \)

1 = Flow rate up to 225 l/min
2 = Flow rate up to 450 l/min
3 = Flow rate up to 1500 l/min
4 = Flow rate up to 3000 l/min
5 = Flow rate up to 6000 l/min
6 = Flow rate up to 9000 l/min
7 = Flow rate up to 14000 l/min

\( b \) = Pre-start Ventilation Type

\( i.e. \)

PV = Pre-start Ventilation
PP = Pre-start Ventilation (alternative)

\( c \) = Control Unit Enclosure Material/Mounting Configuration

\( i.e. \)

al = Aluminium alloy
ms = Mild steel, painted
ss = Stainless steel
bp = Back Plate only
cp = Chassis only
pm = Panel mounting
nm = Non-Metallic

\( d \) = Start Option

\( i.e. \)

LS = Local start using start switch on PV/PP system
RS# = Remote start using Ex-rated solenoid kit

\( e \) = Fitting Option

\( i.e. \)

A = ANSI flange connection fittings used
D = DIN range connection fittings used
B = BSP Pipe connection fittings used
N = NPT Pipe connection fittings used
# = Letter showing non-certified pipe fitting

Option codes (Added only if used)

\( i.e. \)

FM = Flow Meter(s) fitted on enclosure to indicate ventilation flow
IS = Integral Switches suitable for Ex circuits
MR = Mechanically resets ventilation reset signal
ER = Electronically resets ventilation reset signal
PR = Pneumatically resets ventilation reset signal
MT = Mechanical Timing used to time pre-start ventilation cycle
PT = Pneumatic Timing used to time pre-start ventilation cycle
ET = Electronic Timing used to time pre-start ventilation cycle
Annex to Declaration of Conformity EXPO 13MDOC1314 Issue 1

(10) Expo Technologies declares that the Pre-Start Ventilation Systems are suitable for use with Ex e rotating electrical machines in accordance with:

EN 60079-7:2015 Clause 5.2.7.3 requires that the rotating electrical machines shall be assessed for possible air gap sparking. This Clause specifies that an alternative for mitigating the risk of ignition during start up is that “the machine shall allow special measures to be applied during starting, to ensure that its enclosure does not contain an explosive gas atmosphere at the time of starting.”

Note 1 to the above Clause on the standard states “Special measures include pre-start ventilation to remove any ignitable accumulation of flammable gases (for example by applying the purging, but not pressurization aspects of IEC 60079-2 in respect of Level of Protection ‘pzc’).”

(11) Given that the standard only refers to special measures, a Pre-Start Ventilation System cannot be certified as apparatus for this purpose.

(12) Outlet Valve

The Pre-Start Ventilation System is supplied with an outlet valve, fitted with a spark arrester and overpressure relief valve. The Outlet Valve shall be fitted to the protected Ex e or Ex n rotating electrical machine, to prevent an internal overpressure above the maximum overpressure rating of the apparatus.

(13) Remote Start

The Pre-Start Ventilation System may be remotely started by means of an Ex certified Solenoid Valve. When a Solenoid Valve is used, the following electrical data may be afforded to the system:

- Power supply: 5, 12-24, 50, 110 or 230V dc / ac 50-60 Hz
- Current Consumption: 8 – 16 mA according to valve type and supply voltage

(14) Low Temperature Option - Ambient temperature range Ta -60ºC to +60ºC

The Pre-Start Ventilation System may be supplied with an additional, heated, stainless steel enclosure to permit it to be used within an ambient temperature down to -50ºC. This enclosure is fitted with an Ex d heater and an Ex e terminal box for connection of the heater leads.

T Class and Gas Group may vary according to the Ex d heater and Ex e or Ex d terminal box classifications, refer to installed apparatus.

(15) Declaration of Conformity History

<table>
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<th>Issue</th>
<th>Date</th>
<th>Comment</th>
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<td>- Update to ambient temperature range for the Low Temperature Option.</td>
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<td>- European Directive updated to 2014/34/EU</td>
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For and on behalf of Expo Technologies Ltd.
Sunbury on Thames, UK

M L Carrillo      J P de Beer Certification Manager     Technical Director
Annex to Declaration of Conformity EXPO 13MDOC1313 Issue 1

(10) Expo Technologies declares that the Pre-Start Ventilation Systems are suitable for use with Ex e rotating electrical machines in accordance with:
IEC 60079-7:2015 Clause 5.2.7.3 requires that the rotating electrical machines shall be assessed for possible air gap sparking. This Clause specifies that an alternative for mitigating the risk of ignition during start up is that "the machine shall allow special measures to be applied during starting, to ensure that its enclosure does not contain an explosive gas atmosphere at the time of starting."

Note 1 to the above Clause on the standard states "Special measures include pre-start ventilation to remove any ignitable accumulation of flammable gases (for example by applying the purging, but not pressurization aspects of IEC 60079-2 in respect of Level of Protection 'pzc')."

(11) Given that the standard only refers to special measures, a Pre-start Ventilation System cannot be certified as apparatus for this purpose.

(12) Outlet Valve
The Expo Pre-Start Ventilation System is supplied with an outlet valve, fitted with a spark arrestor and overpressure relief valve. The Outlet Valve shall be fitted to the protected Ex e or Ex n rotating electrical machine, to prevent an internal overpressure above the maximum overpressure rating of the apparatus.

(13) Remote Start
The Pre-Start Ventilation System may be remotely started by means of an Ex certified Solenoid Valve. When a Solenoid Valve is used, the following electrical data may be afforded to the system:
- Power supply: 5, 12-24, 50, 110 or 230V dc / ac 50-60 Hz
- Current Consumption: 8 – 16 mA according to valve type and supply voltage

(14) Low Temperature Option - Ambient temperature range Ta -60ºC to +60ºC
The Pre-Start Ventilation System may be supplied with an additional, heated, stainless steel enclosure to permit it to be used within an ambient temperature down to -50ºC. This enclosure is fitted with an Ex d heater and an Ex e or Ex d terminal box for connection of the heater leads. T Class and Gas Group may vary according to the Ex d heater and Ex e or Ex d terminal box classifications, refer to installed apparatus.

(15) Declaration of Conformity History

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<tr>
<td></td>
<td></td>
<td>- Update to ambient temperature range for the Low Temperature Option</td>
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</tbody>
</table>
EU-Declaration of Conformity

Expo Technologies Ltd
Unit 2, The Summit, Hanworth Road
Sunbury on Thames TW16 5DB  UK

This is to declares that
Pre-Start Ventilation Systems are manufactured in conformity with the following European Directives and standards:

Electromagnetic Compatibility Directive 2014/30/EU
Pre-Start Ventilation Systems with a /PO suffix in the type number are non-electrical and are outside the scope of the EMC Directive.
Pre-Start Ventilation Systems with suffixes /PA or /IS incorporate one or more volt-free (“dry”) contacts which work in circuits specified by others. In normal operation these circuits are “benign” and no CE mark is appropriate.
Pre-Start Ventilation Systems with Electronic Timer (Option /ET) are designed to conform to the EMC Directive, in compliance with EN 61000-6-4:2007 and EN 61000-6-2:2005 (Intertek Report EM10048000).

Low Voltage Directive 2014/35/EU
Pre-Start Ventilation systems are intended to be used in Hazardous Areas (Explosive Atmospheres) and are therefore excluded from the Low Voltage Directive.

Pressure Equipment Directive 97/23/EC
Pre-Start Ventilation Systems are classified as not higher than category I under Article 9 of this Directive and intended for use in potentially explosive atmospheres (Hazardous Areas) and are therefore excluded from the Pressure Equipment Directive.

ATEX Directive 2014/34/EU
Pre-Start Ventilation systems are designed to conform to the ATEX Directive, in compliance with:
EN 60079-11 : 2012 (Only for /ET & /RS1# options)
EN 60079-18 : 2015 (Only for /RS0# options or when RSK/24V/D is used)


Pre-Start Ventilation Systems are rated and shall be marked as follows:  Ex II 2 G

Pre-Start Ventilation Systems are manufactured under Production Quality Assurance Notification SIRA 99ATEXM043, issued by SIRA Certification Service, Notified Body No. 0518.

Signed                Date 18/05/2016
Managing Director         Confidential Assessment file reference SC024

S:\QUALITY\CERTS\C-OF-C\SC024 Pre-Start CE Issue 6.docx
EC-TYPE EXAMINATION CERTIFICATE

1. Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

2. EC-Type Examination Certificate Number: ITS10ATEX37092X Issue 3

3. Equipment or Protective System: Minipurge Interface Units

4. Manufacturer: EXPO TECHNOLOGIES LIMITED

5. Address: Unit 2, The Bummit, Hanworth Road, Sunbury on Thames, Surrey, TW19 5DB

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

7. Intertek Testing and Certification Limited, notified body number 0359 in accordance with Article 1 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

8. The examination and test results are recorded in confidential Intertek Report Ref 10040294 dated September 2010 and Intertek Report Ref G101279915 dated February 2014.

9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN 60079-0: 2012, EN 60079-7:2007 and EN 60079-31:2009 except in respect of those requirements referred to at item 10 of the Schedule.

10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to 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 quality of this equipment or protective system. These are not covered by this certificate.

12. The marking of the equipment or protective system shall include the following:

   MILUX1 and MILUX2

   + II 2 GD Ex e IIC T5 Gb
   Ex de IIC T5 Gb IP66
   -20°C ≤ Ta ≤ +55°C
   ≤90°C ≤ Ta ≤ +60°C

   MILUX1/4MD

   + II 2 GD Ex e IIC T5 Gb
   Ex de IIC T5 Gb IP66
   -20°C ≤ Ta ≤ +55°C

13. Description of Equipment or Protective System

   The Minipurge Interface Units are part of a series of endseals that are used as junction boxes. The construction of the boxes has been assessed under component certificate EEx I T5 Gb 04. A permitted content of the boxes is specified on drawing SD7623. The current rating and maximum voltage for each terminal box is specified on the label and the general assembly drawings. Three types of boxes have been covered by this report:

   MILUX1 – 7A, 400V, assembly drawing SD7651
   MILUX2 – 7A, 400V, assembly drawing SD7653
   MILUX4MD – 2A, 400V, assembly drawing SD7651

14. Report Number


15. Conditions of Certification

   (a) Special Conditions for safety use
   - Cable glands, breathing, drain and plug shall be appropriately ATEX certified types, suitable for the cable and conditions for use and installed in accordance with their manufacturer instructions. They shall maintain the IP65 rating of the enclosure.

   (b) Conditions of Manufacture
   - None

16. Essential Health and Safety Requirements (EHSR's)

   The relevant EHSR's have been identified and assessed in Intertek Report Ref 19040294 dated September 2010.

17. Drawings and Documents

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<th>Drawing No.</th>
<th>Rev. Level</th>
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<td>SD7650</td>
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<td>Minipurge Interface Unit</td>
<td>SD7651</td>
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<td>MILUX with Manual Override</td>
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<td>MILUX Permitted Contents</td>
<td>SD7623</td>
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<td>SD7654</td>
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<td>SD7644</td>
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18. Revisions

Certificate Issue 2 issued May 7, 2013

To permit the following Changes:
- Change of manufacture address

Certificate Issue 3 issued February 6, 2014

To permit the following Changes:
2. To include ambient temperature range -20°C to +40°C for MiniFurge MUI/1 and MUI/2 with temperature class dropped from T5 to T4.
3. Current rating for MUI/1-MO dropped down to 2A from 6A.
4. Changes to appropriate documents to reflect the above changes.

Title | Drawing No. | Rev. Level | Date
--- | --- | --- | ---
MIUIECEx & ATEX Certificate Label (2 Sheets) | SD7641 | 3 | 06/02/14
MIUI User Instructions (2 Sheets) | SD7644 | 2 | 06/02/14
MINIPURGE INTERFACE UNIT | SD7650 | 2 | 10/12/13
MINIPURGE INTERFACE UNIT | SD7651 | 2 | 10/12/13
MUI WITH MANUAL OVERRIDE | SD7650 | 2 | 10/12/13
MUI/1 Exempted Contents | SD7622 | 1 | 02/08/10

This Certificate is for the exclusive use of InterTek's Client and is provided pursuant to the agreement between InterTek and its Client. InterTek's responsibility and liability are limited to the terms and conditions of the agreement. InterTek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the InterTek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by InterTek.

Intertek Testing & Certification Limited
Intertek House, Cleeve Road, Leatherhead, Surrey, KT22 7SB
Tel: +44 (0)1372 372900 Fax: +44 (0)1372 372977
www.intertek.com
Registered No 3272981 Registered Office: Academy Place, 1-6 Brook Street, Brentwood, Essex, CM14 SNQ

This Certificate is the property of InterTek Testing and Certification Ltd and is subject to InterTek Testing and Certification's Conditions for Granting Certification.
IECEx Certificate of Conformity

Certificate No.: IECEx-11S 10.0002X

Date of issue: 2014-03-19
Issue No.: 2
Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The MiniPurge Interface Units are part of a series of enclosures used as junction boxes. The construction of the boxes is as per component certificate IECEx ITS 08.0043U. The content of the terminal boxes is specified on drawing SD7029.

The current rating is specified on the rating label.

MiniPurge Interface Units include three terminal box models:

- MUL1
- MUL2
- MUL3/NO

The terminal boxes are rated with maximum voltage of 400V.

- Maximum number of current carrying terminals inside terminal box: MUL1 is 18
- MUL2 is 33
- MUL3/NO is 33

- Maximum current rating for terminal box (per terminal): MUL1 is 7A
- MUL2 is 7A
- MUL3/NO is 2A

CONDITIONS OF CERTIFICATION:

Cable glands, bUNGERS, drums and plugs shall be appropriately IECEx certified types, suitable for the cable and conditions for use and installed in accordance with their manufacturer’s instructions.

They shall maintain the IP66 rating of the enclosure.
1 EU-TYPE EXAMINATION CERTIFICATE

2 Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU

3 EC-Type Examination Certificate No: FM9ATEX0003X

4 Equipment or protective system: Electronic Timer Module ETM-150-777-3

5 Name of Applicant: Expo Technologies Ltd

6 Address of Applicant: Unit 2, The Summit
Hanworth Road
Sunbury on Thames
TW16 6DE

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

FM Approvals Ltd, notified body number 125 in accordance with Article 1 of Directive 2014/34/EU of 26February 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 obbligatory certificate number: 3036 06 ECDated 12 November 2010

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:

EN600 10-2012 A11 2013, and EN 600 11-2012

10 If the symbol X is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

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

12 The marking of the equipment or protective systems include:

B I G Ex ia II C T 4 Ga
B I D Ex ia IIC T 4a

* See Description

Mick Gower
Certification Manager, FM Approvals Ltd.

Issue Date: 28th November 2016

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY WITHOUT CHANGE

FM Approvals Ltd., 1 Windsor Dials, Windsor, Berks UK SL4 1RS
T: +44 (0) 1 3 0 3 0 0 0 F: +44 (0) 1 3 0 3 0 0 0 E: info@fmapprovals.com
www.fmapprovals.com

FATEX 020 (April 16) Page 1 of 3

SCHEDULE

to EU-Type Examination Certificate No: FM9ATEX0003X

13 Description of Equipment or Protective System:

The ETM-150 is a powered electronic timer module. The Timer module is designed to be supplied from either a self contained battery pack or an identified Power Supply. The battery pack contains a non-rechargeable battery together with current limiting resistors. The timer switches are controlled by two BCD switches located on the main part of the module. Connections from the timer to a solenoid valve and switch are also provided. The solenoid supplied as part of the timer circuit. Four LED's are used to indicate the status of the timer circuit.

The timer module and solenoid valve are designed for installation within an enclosure. The enclosure is a metal box with a door that covers the connections to the timer. The enclosure is provided with a cut-out for the timer module and a cut-out for the solenoid valve. The enclosure is designed to be mounted on a wall.

14 Specific Conditions of Use:

1. The Electronic Timer shall not be used where light or radiation may impair the Electronic Timer System.

2. The Electronic Timer shall be supplied with a Power Supply that provides protection against over current.

3. The enclosure shall be metallic providing a minimum electrical path.

4. For light alloy enclosures, materials shall not contain, by mass, more than 5% of any of magnesium titanium and/or Inconel. Where more than 10% of aluminium, magnesium, titanium and/or Inconel the user shall take special precautions against ignition of the material due to friction or impact with other material.

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 15.

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 safety standards, and assessment of supporting documentation. It does not imply an assessment of the whole production.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY WITHOUT CHANGE

FM Approvals Ltd., 1 Windsor Dials, Windsor, Berks UK SL4 1RS
T: +44 (0) 1 3 0 3 0 0 0 F: +44 (0) 1 3 0 3 0 0 0 E: info@fmapprovals.com
www.fmapprovals.com

FATEX 020 (April 16) Page 2 of 3
## SCHEDULE

**to EU-Type Examination Certificate No. FM10ATEX0003X**

Whilst this certificate may be used in support of manufacturer's claim for CE Marking, FM Approvals 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 Ltd's ATEX Certification Scheme.

### Schedule

**Drawings**

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

### Certificate History

Details of the supplements to this certificate are described below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th November 2013</td>
<td>Original Issue</td>
</tr>
</tbody>
</table>
| 30th January 2013 | Supplement 1:
  - Description of the Change:
    1. Change of address
    2. Addition of 12V power supply option |
| 22nd October 2013 | Supplement 2:
  - Description of the Change: Addition of ETM-5331-50 battery pack module. (This corresponds to a 3. No change to the model code.) |
| 0th December 2014 | Supplement 3:
  - Report Reference: 3036: 0 rev141016 dated 01 December 2014
  - Description of the Change: Change to 12V part number and update of 12V certificate number (DE: RA 11ATEX0224 X1) |
| 20th July 2015 | Supplement 4:
  - Description of the Change: Update to the standard edition |
| 25th November 2016 | Supplement 5:
  - Description of the Change: Change in T-Class due to a national updated certificate to EU format |
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

Certificate No.: IECEx RME 10 001X
Issue No.: 8

Status: Current

Date of issue: 2017-07-24

Applicant: Epoxy Technologies Ltd
Unit 2, The Summit
Hexworthy Road
Sunbury on Thames
TW16 5DL
United Kingdom

Equipment: Electronic Timer Module ETM48

Optional accessor:

Type of Protection: Intrinsically Safe

Marking:

Ex ia II 1 G e T6 Ga Ta ≤ 25°C De TA = -20°C to +60°C
Ex ia II 1 G e T6 Ga Ta ≤ 25°C De TA = -20°C to +55°C
Ex ia II 1 G e T6 Ga Ta ≤ 25°C De TA = -20°C to +55°C
Ex ia II 1 G e T6 Ga Ta ≤ 25°C De TA = -20°C to +60°C

Approved for issue on behalf of the IECEx Certification Body:

Mark Gower

Issue No.: 8

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 IECEx Website.

Certificate issued by:
FM Approvals Ltd
19/21 North Drive
Egham TW20 9JZ
United Kingdom
IECEx Certificate of Conformity

Certificate No: IECEx FME 10.0001X
Issue No: 6
Date of Issue: 2017-07-24
Page 3 of 5

EQUIPMENT:
equipment and systems covered by this certificate are as follows:

The EAL-1 is a battery powered electronic timer module. The timer module is designed to be supplied from a self-contained battery pack or separately certified AS power supply. The battery pack contains a non-rechargeable battery together with current limiting resistors. The timer settings are controlled by two ESD switches located on the main part of the timer. Connections from the timer to a solenoid valve and switch are also provided. The solenoid is supplied as part of the timer circuit. Four LED’s are used to indicate the status of the timer circuit. The timer module and solenoid valve are designed to be installed within another enclosure.

- E = sub module 1 = timer module powered by exo battery Pack
- ☐ = Timer module powered by IS power supply
- ☐ = Exo IS Battery Pack
- ☐ = Exo IS remote Battery Pack
- ☐ = Timer module powered by IS P.P.
- ☐ = Mounting Method 1 = Plate mounted
- ☐ = Power mounted
- ☐ = LED connection 1 = LED’s on Timer surface
- ☐ = LED’s on flying leads
- ☐ = Maximum Time 1 = Reference Value 1 to 9
- ☐ = Multiplying dial 1 = 2, 3 or 4

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The Electronic Timer shall not be used where UV light or radiation may impinge the Electronic Timer System.
2. The Electronic Timer shall be installed within an enclosure which provides protection against impact.
3. The Enclosure shall be metallic providing a minimum ingress protection of IP20.
4. For light alloy enclosures, materials shall not contain, by mass, more than 7.5% in total of magnesium, titanium and zirconium. Where more than 5% in total of aluminium, magnesium, titanium and zirconium the user shall take special precautions to avoid ignition hazard due to impact or friction.
### Electronic Timer Module ETM 531-xv-c

<table>
<thead>
<tr>
<th>x in sub mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Timer module powered by Expo Battery Pack</td>
</tr>
<tr>
<td>2</td>
<td>Timer module powered by IS power supply</td>
</tr>
<tr>
<td>3</td>
<td>Expo IS Battery Pack</td>
</tr>
<tr>
<td>4</td>
<td>Expo IS remote Battery Pack</td>
</tr>
<tr>
<td>5</td>
<td>Timer module powered by E P P S</td>
</tr>
</tbody>
</table>

### Mouting Style

<table>
<thead>
<tr>
<th>y in sub mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wall mounted</td>
</tr>
<tr>
<td>2</td>
<td>Panel mounted</td>
</tr>
</tbody>
</table>

### LED connection

<table>
<thead>
<tr>
<th>z in sub mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LED's on Timer surface</td>
</tr>
<tr>
<td>2</td>
<td>LED's on flying leads</td>
</tr>
</tbody>
</table>

### Maximum Time

<table>
<thead>
<tr>
<th>u in sub mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reference Value 1 to 9</td>
</tr>
</tbody>
</table>

### Multiplying digit

<table>
<thead>
<tr>
<th>v in sub mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, or 4</td>
<td></td>
</tr>
<tr>
<td>Certificate No.</td>
<td>IECEx EPS 14.0900X</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------</td>
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<tr>
<td>Status</td>
<td>Current</td>
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<tr>
<td>Date of Issue</td>
<td>2014-03-03</td>
</tr>
<tr>
<td>Electrical Apparatus</td>
<td>UL type 1293V 1990.000 and IEC type 792V 1990.000</td>
</tr>
<tr>
<td>Type of Protection</td>
<td>&quot;PR&quot;</td>
</tr>
<tr>
<td>Marking</td>
<td>Ex d IIA T6 (E) or Ex e IIA T6 (F)</td>
</tr>
<tr>
<td></td>
<td>Ex e IIC T80°C, T90°C</td>
</tr>
<tr>
<td>Approved on behalf of the IECEx</td>
<td>Eikeler Zittmann</td>
</tr>
<tr>
<td>Certification Body:</td>
<td></td>
</tr>
<tr>
<td>Certification manager</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td></td>
</tr>
</tbody>
</table>

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:
Bureau Veritas Consumer Products Services Germany GmbH
60445 Tübingen
Germany

IECEx Certificate

<table>
<thead>
<tr>
<th>Certificate No.</th>
<th>IECEx EPS 14.0900X</th>
<th>Issue No.</th>
<th>0</th>
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</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>SAFTEX GmbH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Eichler Straße 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>57850 Bad Neuenahr</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This certificate is issued as verification that an apparatus, representative of production, was assessed and tested, and found to comply with the IECEx standard set below and that the manufacturer's quality systems, relating to the Ex products covered by this certificate, were 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.

The electrical apparatus and any associated equipment listed are, to the knowledge and belief of the above certificate holder, found to comply with the following standards:

IEC 60079-0:2011
Explosive atmospheres - Part 0: General requirements:
Edition 6.0
IEC 60079-1:2014-08
Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d":
Edition 7.0
IEC 60079-31:2013
Explosive atmosphere - Part 31: Equipment dust ignition protection by enclosures "a":
Edition 5.0

The Certificate holder has assessed and tested the equipment listed and the products covered by this certificate, and has verified that the equipment listed in this certificate is found to comply with the IECEx Scheme Rules, IECEx 02 and operational Documents as amended.

Certification Bodies:
- Bureau Veritas Product Services Deutschland GmbH
- Germanischer Lloyd, Essen
- Germanischer Lloyd, Hamburg
- Germanischer Lloyd, Berlin
- Technischer Überwachungs-Verein, Berlin
- Technischer Überwachungs-Verein, Stuttgart
- Technischer Überwachungs-Verein, Munich
- Technischer Überwachungs-Verein, Hanover
- Technischer Überwachungs-Verein, Luxembourg
- Technischer Überwachungs-Verein, Brussels
- Technischer Überwachungs-Verein, Vienna
- Technischer Überwachungs-Verein, Prague
- Technischer Überwachungs-Verein, Budapest
- Technischer Überwachungs-Verein, Vilnius
- Technischer Überwachungs-Verein, Tallinn
- Technischer Überwachungs-Verein, Riga
- Technischer Überwachungs-Verein, Tallinn
- Technischer Überwachungs-Verein, Riga
- Technischer Überwachungs-Verein, Tallinn
- Technischer Überwachungs-Verein, Riga
IECEx Certificate of Conformity

Certificate No: IECEx EPS 14.0029X

Applicant: BARTEC GmbH

Apparatus: Limit switch Type 07-251.5-**** Position switch Type 07-291.5-****

Schedule

Description of Equipment

The limit switch and position switch shall be used within its operating range and rating according to the manufacturer's instructions and the IEC 60947-6-1 standard.

Installation Conditions

The limit switch and position switch shall be installed in a manner that is consistent with the IEC 60947-6-1 standard.

The specific installation standards and manufacturer's instructions must be respected.

Annex


Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>max. Rated current</th>
<th>max. Rated voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>07-251.5-<strong><strong>, 07-291.5-</strong></strong></td>
<td>AC 2 A</td>
<td>AC 400 V</td>
</tr>
<tr>
<td>07-251-6-<strong><strong>, 07-291-6-</strong></strong></td>
<td>AC 7 A</td>
<td>AC 230 V</td>
</tr>
<tr>
<td>07-251-8-<strong><strong>, 07-291-8-</strong></strong></td>
<td>DC 0.5 A</td>
<td>DC 200 V</td>
</tr>
<tr>
<td>07-251-10-<strong><strong>, 07-291-10-</strong></strong></td>
<td>DC 7 A</td>
<td>DC 30 V</td>
</tr>
</tbody>
</table>

| Number of cable(s): | 1 or 2 |
| Cross section: | 0.5 mm² up to 1.5 mm² |
| Ambient temperature range: | Max. -40 °C < T< +75 °C (76) |

The classification of a specific temperature class depends on ambient temperature, current load, cable type and cross section. These data are defined on the marking plate and are also provided by the manufacturer within the technical documents and instruction manual.
(1) EC-Type Examination Certificate


(3) EC-Type Examination Certificate Number

EPS 14 ATEX 1 766 X

Revision: 0

(4) Equipment:

Limit switch type 07-2511.********
Position switch type 07-2911.********

(5) Manufacturer:

BARTEC GmbH

(6) Address:

Max-Eyth-Straße 16
97865 Bad Mergentheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) Bureau Veritas Consumer Products Services Germany GmbH, Notified Body No. 2004 in accordance with Article 9 of the Council Directive 94/9/EC of March 23rd 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II of the Directive. The examination and test results are recorded in the confidential report 14TH00006.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-8:2012
EN 60079-31:2014
(IEC 60079-14)

(10) 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.

(11) This EC-Type Examination Certificate relates only to the design and the construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacturer and supply of this equipment.

(12) The marking of the equipment shall include the following:

Ex d IIC T6
Ex tb IIC T85°C, T95°C

(13) Annexe

(14) EC-Type Examination Certificate EPS 14 ATEX 1 766 X

Rev. 0

(15) Description of equipment:

The limit switch type 07-2511.******** and 07-2911.******** as well as the position switch type 07-2911.******** is used as equipment or utility power switch for signal and control circuits. The connection is made by cemented hose cables. The position switch is designed with a guard (protective enclosure) which protects against the risk of high mechanical hazards according to the EN 60079-0, Table 15b, group II.

(16) Technical data:

<table>
<thead>
<tr>
<th>Type</th>
<th>max. Rated current(8)</th>
<th>max. Rated voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>07-2511.1********</td>
<td>AC 2 A</td>
<td>AC 400 V</td>
</tr>
<tr>
<td>07-2511.5********</td>
<td>AC 7 A</td>
<td>AC 250 V</td>
</tr>
<tr>
<td>07-2511.7********</td>
<td>DC 0,5 A</td>
<td>DC 250 V</td>
</tr>
<tr>
<td>07-2911.********</td>
<td>DC 7 A</td>
<td>DC 30 V</td>
</tr>
<tr>
<td>07-2511.3********</td>
<td>0,4 A</td>
<td>30 V</td>
</tr>
<tr>
<td>07-2511.6********</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07-2511.9********</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07-2918.********</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07-2919.********</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of hose cables:

1 or 2

Cross section:

0,6 mm² up to 1,5 mm²

Ambient temperature range:

Max. -20 °C ≤ Ta ≤ +75 °C (16),
Max. -60 °C ≤ Ta ≤ +90 °C (15)

(17) Test report: 14TH00006

(18) Certificates without signature are void. This certificate is allowed to be distributed only if not modified.

Examination and test results must be authorized by Bureau Veritas Consumer Products Services Germany GmbH.

Page 2 / 3
EC-Type Examination Certificate EPS 14 ATEX 1 766 X Rev. 0

(17) Special conditions for safe use:
- The limit switch and position switch shall be used within its operating range and rating according to manufacturer's documents and marking.
- The limit switch shall be installed in such a way that it is protected against the risk of high mechanical danger, which meets at least the requirements of IEC 60079-0, Table 13 b), group II. Resistance to high exposure is fulfilled by the housing material according to EN 60079-0.
- The specific installation standards and manufacturer's instructions must be respected.

(18) Essential health and safety requirements:
- Met by standards.
- Certification department of explosion protection
- Nurnberg, 2014-12-03

D. Zoellner