Particulate Monitor with Category 1 Ex approvals

- Category 1 certified for Ex (ATEX and IECEx) Gas Zones 0, 1 & 2 and Dust Zones 20, 21 & 22
- Intrinsically safe dust sensor with separate advanced control unit and isolating spur (fail-safe system)
- Unique ElectroDynamic™ dust measurement principle provides robust operation
- High temperature and high pressure sensor version available (PCME VIEW Ex 820)
The PCME VIEW Ex Series instruments are used for particulate emission monitoring where category 1, 2 or 3 Hazardous area certification is required. The instruments are typically used after arrestment plant such as Bagfilters and Cyclones to monitor emissions, quantify particulate loadings in mg/m$^3$ and/or detect process upsets. The PCME VIEW Ex Series is suitable for temperatures and pressures found in most stack conditions, while the PCME VIEW Ex Series can tolerate the elevated pressure and temperatures found in coal gasification and certain combustion applications.

### Ex Approvals and Safety Control

The PCME VIEW Ex Series are intrinsically safe certified particulate emission monitors suitable for Ex Gas and Dust Zones. The instruments are certified as Category 1 devices by the Notified Body, SIRA, UK according to both the ATEX Directive (94/9/EC) and IECEx requirements. As such they are suitable for use in both hazardous Gas Zones 0, 1, 2 and hazardous Dust Zones 20, 21, 22. The sensor electronics are certified intrinsically safe (ie fail-safe under two fault conditions) and are, therefore, suitable for installation directly in the hazardous Gas Zone. The control unit and isolating spur unit are located in the safe area. The sensor is connected via the isolating spur unit to the controller. The system uses galvanic isolation meaning that no independent, intrinsically safe earth is required. An ‘Earth strap’ connection is required between the sensor body and the stack as part of the system safety (see manual for further details).

### System Description

The PCME VIEW Ex Series instruments are used for particulate emission monitoring where category 1, 2 or 3 Hazardous area certification is required. The instruments are typically used after arrestment plant such as Bagfilters and Cyclones to monitor emissions, quantify particulate loadings in mg/m$^3$ and/or detect process upsets. The PCME VIEW Ex Series is suitable for temperatures and pressures found in most stack conditions, while the PCME VIEW Ex Series can tolerate the elevated pressure and temperatures found in coal gasification and certain combustion applications.

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### Certification for Enclosure - Outside Stack

- Ambient temperature range of -20ºC to 55ºC
- Intrinsic safety for Gas Zone 0 (ia) to maximum surface temperature of 135ºC
- Protection by enclosure for Dust Zone 21 (tb) to maximum surface temperature of 80ºC

### Certification for Sensor Rod - Inside Stack

- Probe temperature range of -20ºC to 250ºC (800 sensor) or -20ºC to 400ºC (820 sensor)
- Intrinsic safety for Gas Zone 0 (ia)
- Intrinsic safety for Dust Zone 20 (iaD)

### Process and Application Conditions

- Long term zero drift: <0.1mg/m$^3$
- Measurement capability: 0 - 500mg/m$^3$
- For measurement in non-condensing flue gases
- For stack measurement but not suitable for Electrostatic precipitators or applications with water droplets
- For use in processes with flow of 8m/s-20m/s with no restrictions
- Constant velocity required outside this range
- For stack diameters: 100mm to 6m (flow profile dependent on larger stacks)

### Principles of Operation

The PCME VIEW Ex Series instruments use PCME’s unique and patented ElectroDynamic™ Probe Electrification technology. The sensor electronics measures the current signature created by particles interacting with the grounded sensing rod which protrudes into the stack. The electronics extract a specific frequency band of this signal and electronically filters out the dc current caused by particle collisions. This signal may be correlated to dust concentration by comparison to the results of an iso-kinetic sample for those types of industrial stack applications for which the instrument is designed (see application conditions).

Core features of the ElectroDynamic™ Probe Electrification technology are that the signal generated is:

- Unaffected by contamination on the sensor rod (which may cause signal drift issues for other systems).
- Not affected by velocity variations within typical bagfilter velocity ranges (see separate TUV approvals for PCME Ltd technology).
- Reliable and stable in the target applications for the instrument (see Process Conditions). Identical PCME technology to this is used in the PCME QAL 991 instrument which was the first ever probe electrification instrument to become TUV and MCERTS approved against the exacting standards of EN 15267-3 for QAL1.

### Technology Comparisons and Benefits

Compared to other types of AC systems, ElectroDynamic™ systems have the following added benefit:

- An optimised frequency spectrum to extend the velocity range over which the system has no cross sensitivity to changing velocity (see TUV approvals).
- Protected probes or insulated rods are not permitted in hazardous zone applications.

Compared to DC triboelectric systems and ‘induction sensing and protected probe systems’, ElectroDynamic™ systems have the following added benefits:

- Tolerance to contamination on the rod.
- Stable results and calibrations (protected probes are not necessary in dry applications and therefore drift caused by electrostatic charging effects is avoided).
- Reduced sensitivity to the effects of changing velocity.
The **PCME VIEW Ex Series** instruments include an advanced level of automatic functionality checks to provide high quality assurance:

- A probe rod short circuit check – enables the operator to know when the sensing rod may be electrically shorted to the stack and avoid associated errors.
- Automatic electronic zero and drift checks - improves measurement reliability and ensures that the instrument is working correctly.

These checks are done in the sensor to ensure the major part of the instrument is challenged during these tests.

The system includes advanced signal processing and diagnostics to permit a plant operator to locate the position of leaking bags as well as improve the quality of emission measurement:

- Rapid dynamic ranging of 10,000:1 permitting bag cleaning pulses to be accurately monitored while maintaining high accuracy in background emission measurement. Sufficient dynamic range is provided to follow “on-line” and “off-line” bag cleaning cycles for predictive filter failure and faulty bag location detection.
- Rolling digital average calculations for accurate emission measurement.

### System Layout

The **Standard** version of the instrument allows a single sensor to be installed and set-up remotely.

The **PLUS** version of the instrument permits up to 16 sensors to be connected to a single central control unit. The control unit provides power for the sensors (additional Power Supply Units (PSU) required on larger systems) and industry standard outputs (4-20mA, RS232/RS485 Modbus) are provided for easy connection to plant control systems. The Control Unit also comprises a powerful data logging capability to permit process and regulatory reporting. In addition, other PCME Modbus sensors can be connected to the Control Unit. An isolating spur is required for all sensors.

### Control Unit Options

<table>
<thead>
<tr>
<th>Controller Type</th>
<th>Standard System</th>
<th>PLUS System</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Sensor Channels</td>
<td>1</td>
<td>1-16</td>
</tr>
<tr>
<td>ICON Driven Multilingual Menus</td>
<td>Emission and Alarm levels</td>
<td>Emission and Alarm levels</td>
</tr>
<tr>
<td></td>
<td>Quality Assurance results</td>
<td>Quality Assurance results</td>
</tr>
<tr>
<td></td>
<td>Calibration screens</td>
<td>Calibration screens</td>
</tr>
<tr>
<td></td>
<td>Review data logs</td>
<td>Review data logs</td>
</tr>
<tr>
<td></td>
<td>Show graph and bar chart</td>
<td>Show graphs and multi bar charts</td>
</tr>
<tr>
<td></td>
<td>Set up and password</td>
<td>Set up and password</td>
</tr>
<tr>
<td></td>
<td>Advanced calculations (Mass, normalisation)</td>
<td>Advanced calculations (Mass, normalisation)</td>
</tr>
<tr>
<td>Bagfilter Optimisation Diagnostics</td>
<td>Pulse log review for diagnosing location of leaking bags</td>
<td>Pulse log review for diagnosing location of leaking bags</td>
</tr>
<tr>
<td>Emission Data Logs</td>
<td>Capacity stated for 1 sensor</td>
<td>Capacity stated for 4 sensors</td>
</tr>
<tr>
<td>(Long, averages for reporting)</td>
<td>12 months @ 15 minutes</td>
<td>12 months @ 15 minutes</td>
</tr>
<tr>
<td></td>
<td>7 days @ 1 minute</td>
<td>7 days @ 1 minute</td>
</tr>
<tr>
<td></td>
<td>2 hours @ 1 second</td>
<td>2 hour @ 1 second</td>
</tr>
<tr>
<td></td>
<td>500 entries</td>
<td>500 entries</td>
</tr>
<tr>
<td>Ethernet Enabled Option</td>
<td>None</td>
<td>Ethernet (Modbus TCP) (optional)</td>
</tr>
<tr>
<td>Outputs</td>
<td>1 x RS485 (Modbus RTU)</td>
<td>1 x RS485 (Modbus RTU)</td>
</tr>
<tr>
<td></td>
<td>1 x 4-20mA (500 ohm)</td>
<td>4 x 4-20mA (500 ohm)</td>
</tr>
<tr>
<td></td>
<td>2 x Relay (2A@250V, user selectable)</td>
<td>4 x Relay (2A@250V, user selectable)</td>
</tr>
<tr>
<td>Inputs</td>
<td>1 input for plant off indication, bag cleaning reference and multiple calibrations</td>
<td>4 inputs for plant off indication, bag cleaning reference and multiple calibrations</td>
</tr>
<tr>
<td>Enclosure Size (mm)</td>
<td>220 W x 123 H x 80 D</td>
<td>263 W x 160 H x 91 D</td>
</tr>
<tr>
<td>Power Supply</td>
<td>90 to 260 VAC (50/60Hz), 1A</td>
<td>90 to 260 VAC (50/60Hz), 1A</td>
</tr>
</tbody>
</table>

### Cable Requirements

- **Cable specification (correct cable must be used)**: 4-core overall screened (specification on request)
- **Maximum cable length from Control Unit to Isolating Spur**: 500m
- **Maximum cable length from Isolating Spur to Sensor**: 500m

### Isolating Spur (must be located in "safe area")

- **Enclosure size**: 220 W x 124 H x 81 D
- **Enclosure rating**: IP65
- **Power requirements**: 24VDC (supplied via cable from Control Unit)
- **Ambient temperature**: -20°C to +55°C
- **Maximum cable length from Control Unit**: 500m

### Added Value Features

- **Control Unit Options**
  - **Standard System**
    - MultiController
  - **PLUS System**
    - MultiController

- **Enclosure size**: 220 W x 123 H x 80 D
- **Enclosure rating**: IP65
- **Power requirements**: 24VDC (supplied via cable from Control Unit)
- **Ambient temperature**: -20°C to +55°C
- **Maximum cable length from Control Unit**: 500m

- **Cable specification**: 4-core overall screened (specification on request)
- **Maximum cable length from Control Unit to Isolating Spur**: 500m
- **Maximum cable length from Isolating Spur to Sensor**: 500m

- **Bagfilter Optimisation Diagnostics**
  - Pulse log review for diagnosing location of leaking bags

- **Emission Data Logs**
  - Capacity stated for 1 sensor
    - 12 months @ 15 minutes
    - 7 days @ 1 minute
    - 2 hours @ 1 second
    - 500 entries
  - Capacity stated for 4 sensors
    - 12 months @ 15 minutes
    - 7 days @ 1 minute
    - 2 hour @ 1 second
    - 500 entries

- **Ethernet Enabled Option**
  - None
  - Ethernet (Modbus TCP) (optional)

- **Outputs**
  - 1 x RS485 (Modbus RTU)
  - 1 x 4-20mA (500 ohm)
  - 2 x Relay (2A@250V, user selectable)

- **Inputs**
  - 1 input for plant off indication, bag cleaning reference and multiple calibrations

- **Enclosure Size (mm)**
  - 220 W x 123 H x 80 D
  - 263 W x 160 H x 91 D

- **Power Supply**
  - 90 to 260 VAC (50/60Hz), 1A
  - 90 to 260 VAC (50/60Hz), 1A

- **Cable specification**
  - 4-core overall screened (specification on request)

- **Maximum cable length from Control Unit to Isolating Spur**: 500m

- **Maximum cable length from Isolating Spur to Sensor**: 500m

- **Enclosure size**: 220 W x 124 H x 81 D

- **Enclosure rating**: IP65

- **Power requirements**: 24VDC (supplied via cable from Control Unit)

- **Ambient temperature**: -20°C to +55°C

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- **Cable specification**: 4-core overall screened (specification on request)

- **Maximum cable length from Control Unit to Isolating Spur**: 500m

- **Maximum cable length from Isolating Spur to Sensor**: 500m
### Specifications

#### Dimensions

**800 Type Sensor (0-250°C)**

![Diagram of 800 Type Sensor (0-250°C)]

**820 Type Sensor (0-400°C, 50 bar)**

![Diagram of 820 Type Sensor (0-400°C, 50 bar)]

**Isolating Spur Unit**

![Diagram of Isolating Spur Unit]

**800 Stack Connection (1½" BSP)**

![Diagram of 800 Stack Connection (1½" BSP)]

**820 Stack Connection (DN40 PN64)**

![Diagram of 820 Stack Connection (DN40 PN64)]

### Order Codes

**PCME VIEW Ex 8xx**

**Sensor Options**

<table>
<thead>
<tr>
<th>1</th>
<th>Hazardous Zone Regulation</th>
<th>ATEX</th>
<th>ATEX</th>
<th>IECEx</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Pressure</td>
<td>&lt; 2 bar</td>
<td>&lt; 50 bar</td>
<td>2</td>
<td>50*</td>
</tr>
<tr>
<td>3</td>
<td>Stack Temperature</td>
<td>&lt;250°C</td>
<td>&lt;400°C</td>
<td>250</td>
<td>400*</td>
</tr>
<tr>
<td>4</td>
<td>Rod Length</td>
<td>Specify Length</td>
<td>0100, 0200, 0300, 0400, 0500, 0600, 0800, 1000**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*820 only, **800 only

Example: SEN 8xx ATEX 2 250 500

NOTE: An isolating spur is provided with each sensor

**Control Unit Options**

<table>
<thead>
<tr>
<th>1</th>
<th>Controller</th>
<th>PLUS version (MultiController)</th>
<th>Standard version (Interface Module)</th>
<th>M</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ethernet</td>
<td>None</td>
<td>Ethernet fitted (PLUS version only)</td>
<td>0</td>
<td>ET</td>
</tr>
</tbody>
</table>

Example: CON 8xx M ET

**System Options**

- 4-core Cable (ATEX) Specify length required (10m per sensor included as standard)
- Power Supply/Repeater Voltage and signal boost for extended cabling runs with multiple sensors
- Analogue Input Module (AIM) 4 x 4-20mA inputs 4 x Digital inputs
- Analogue Output Module (AOM) 8 x 4-20mA (500 Ohm)
- Alarm Output Module (ROM) 8 x Relay (1A @ 250V)
- Isolating Spur (intrinsically safe) Required for Ex

**PC Software Options PC-ME Dust Tools (RS232 required)**

- Configuration Options System Set
- Real-time Data Options On-line Predict
- Historical Data Options Data Downloader Data Viewer Data Reporter Predict View

### About PCME Ltd

As a progressive environmental Company, PCME specialises in particulate measurement for industrial processes. With a worldwide reputation for reliability, innovation and technological excellence, the Company produces equipment for concentration and mass monitoring for regulatory, environmental and process control requirements. A dedicated team of qualified application and sales engineers is always on hand and should be consulted in the selection and usage of the most suitable equipment for any particulate application.