# Particulate Monitoring Systems

## Advanced Design Electrodynamic Particulate Monitoring for Hazardous Gas and Dust Zones

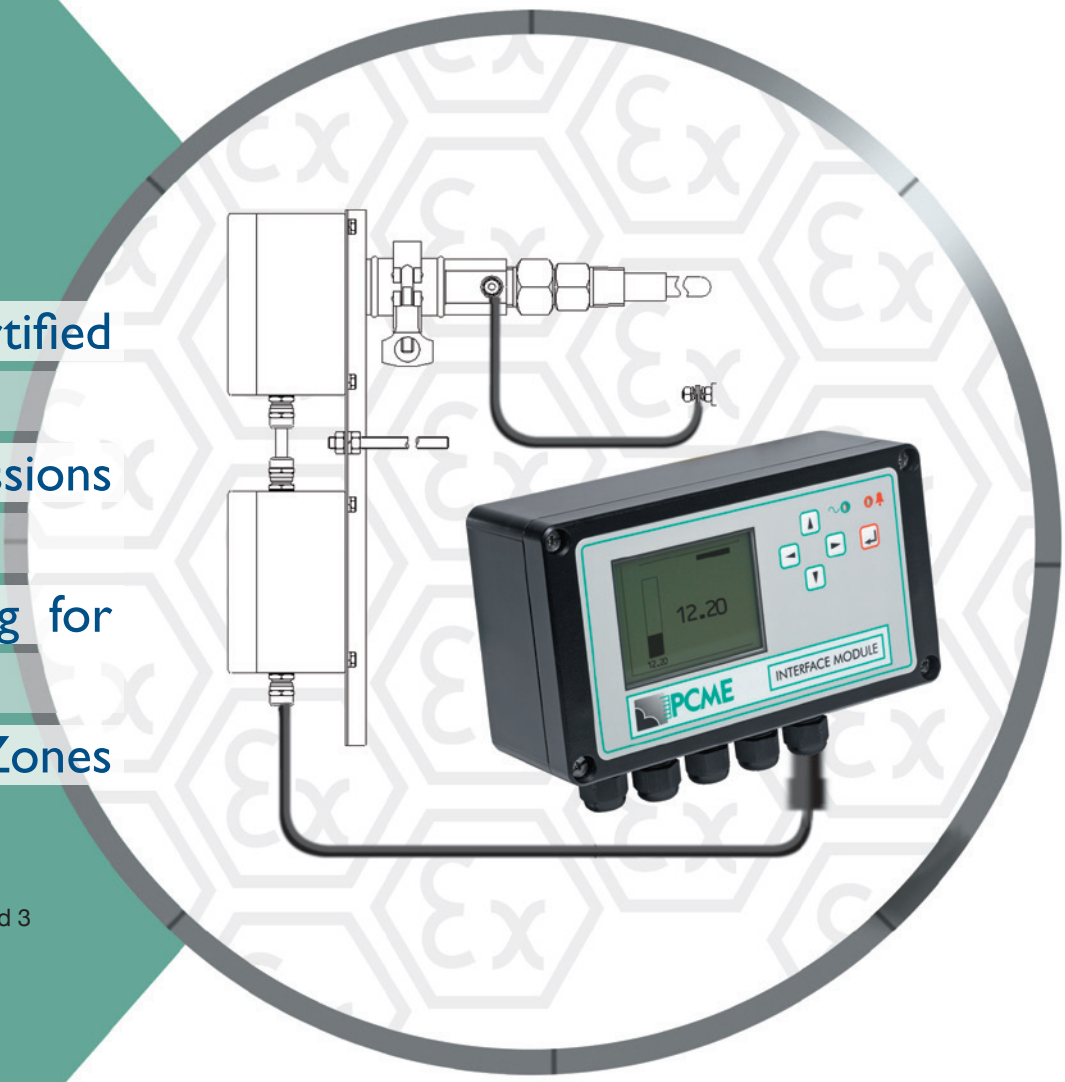
EX (ATEX) certified

Particulate Emissions

Monitoring for

Hazardous Zones

**ATEX**
Category 1, 2 and 3



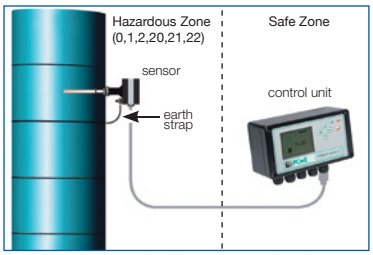

- Certified for EX (ATEX) Gas Zones 0,1 & 2 and Dust Zones 20, 21 & 22
- Intrinsically safe dust sensor with separate advanced user Interface unit
- Certification rating: EXII 1 G EEX ia IIC T4, EX II 1 D(T71$^0$C)
- High Temperature and Pressure Sensor option (DX810) for chemical reactor applications (shown above)
- Galvanic isolation design assists cost-effective installation in hazardous areas

## System Description and Product Range

The DX800 and DX810 are intrinsically safe certified particulate emission monitors suitable for EX gas zones. The instruments are certified as category 1 devices by the Notified Body, SIRA, UK according to the ATEX Directive (94/9 EC). As such they are suitable for use in both hazardous Gas Zones 0, 1, 2 and hazardous Dust Zones 20, 21, 22.

### Safety concept

The sensor electronics are certified intrinsically safe (ie safe under two fault conditions) and are, therefore, suitable for installation directly in the hazardous gas and dust zone. The control unit is located in the safe area and is connected to the sensor via a barrier unit which is mounted on the output from the control unit. 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).




### Principle of Measurement

The DX800 & DX810 use unique AC Electrodynamic technology.The DC signal created by particles colliding with a probe inserted in a stack is electronically filtered out, leaving an AC signal resulting from charged particles passing and interacting with the rod. Since the signal includes no DC component, the instrument has minimal cross sensitivity to changing velocity* and has increased stability even with dust build up on the rod sensor. The dust signal is amplified, digitised and processed at the probe, consistent with good signal to noise design techniques. The processed signal is proportional to dust concentration although the exact correlation is application dependent.

**application dependant*

### Applications

The DX800 and DX810 can be used for particulate emission monitoring in a wide range of applications in the Chemical Processing, Steel and Food industries where 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 DX810 is rated for use in temperatures up to 425$^o$C and pressures to 5MN/m$^2$ (50 bar) and 800$^o$C at lower pressures making it suitable for use in reactors and other polymerisation plant.

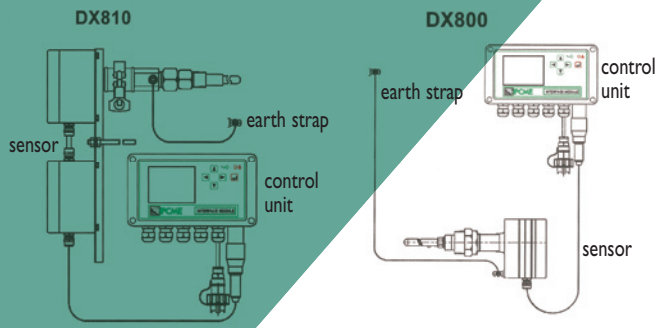
| Product | Max Temperature $^o$C | Max Pressure |
|---|---|---|
| DX800 | 250$^o$C | 200 KN/m$^2$ (2 BAR) |
| DX810 | 425$^o$C<br>800$^o$C | 5 MN/m$^2$ (50 BAR)<br>1 MN/m$^2$ (10 BAR) |

## Specifications

**For specific installation requirements see DX800 and DX810 manuals**

| Sensor | DX800 | DX810 |
|---|---|---|
| Process Temperature (at elevated pressure) | Up to 250$^0$C | Up to 425$^0$C [1] |
| Process Pressure | 200 KN/m$^2$ (2 BAR) | Up to 5M/Nm$^2$ (50 BAR) [1] |
| Connection on Duct | 1½" BSP | ¾" NPT (TAPERED) |
| Sensor Rod Material | 316SS, PTFE Insulator | 316SS, Ceramic Insulator |
| Sensor Length | Up to 1 m | |
| Cable | 4-core screened (outer diameter 6.5 x 7.5 mm, core diameter 2.2 x 0.34 mm$^3$) [2] | |
| Cable Length | 10m Standard, 250m max | |
| Earth Strap Cable Length (sensor to stack) | 2m | |
| EX (ATEX) rating | EXII 1 G EEX ia IIC T4 EX II 1 D(T71'C) | |

Note 1: DX810 suitable for 800$^0$C applications provided pressure less than 1MN/m$^2$
Note 2: For example, Unitronic Li2YCY(TP) made by LAPP cable




| Control Unit | DX800 & DX810 |
|---|---|
| Enclosure Size (mm) | 222w x 125h x 81d |
| Enclosure Rating | IP65 |
| Power Supply | 90/260VAC, 50/60Hz ±10%, 20VA |
| Ambient Temperature | -25$^0$C to +55$^0$C |
| Outputs (Analogue) | 4-20mA (500ohm) Isolated |
| Outputs (Alarm) | Relay SPCO |
| Outputs (Digital) | Modbus RS-485 and RS-232 |
| Display | Graphic trends, Barchart and Alphanumeric |
| Recording | Internal data logger (reporting via optional DustReporter 2 PC software) |

### Measurement Capabilites

| | |
|---|---|
| Minimum detection level | > 0.1 mg/m$^3$ |
| Measurement range | 0 - 1000 mg/m$^3$ |
| Automatic self checks | Short circuit test zero and span |

## 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, velocity 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.


**PCME Ltd**
Clearview Building, 60 Edison Road
St. Ives, Cambs PE27 3GH UK

Tel: Int +44 (0)1480 468200
Fax: Int +44 (0)1480 463400
E-mail: sales@pcme.co.uk


Contact your national or area sales and service office

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