

## Particulate Monitoring Systems

Particulate and Process Stability Monitoring including Polymerisation Reactors

Charge Polarity

and Dust

monitoring in

Hazardous zones



**ATEX**  
Category 1, 2 and 3



- Instruments to improve the control and stability of high pressure polymerisation reactors
- Charge polarity sensor (CX810) detects reaction instability and dust sensor (DX810) detects process and emission upsets
- Sensors customised for polyethylene and chemical reactors (450°C and 5MN/m<sup>2</sup> (50 bar)
- ATEX certified for EX hazardous gas zones 0, 1, & 2
- Separate intrinsically safe sensor, and advanced user interface unit (with galvanic isolation) assist cost-effective installation

# System Description and Product Range

## Applications

The CX810 and DX810 provide critical information on the stability of polymerisation reactors in general and have specific applicability in polyethylene reactors where hazardous zones are present. By monitoring for changes in charge and charge polarity (CX810) and increases in particulate loadings between different parts of the reactor (DX810), an operator can detect process upsets early, avoid costly down time and reduce the production of non-specification product. These measurements can play an important part in reactor control due to the inherent instability of the polymerisation process which occurs under high pressures and temperature conditions.

## Particulate measurement (DX810)

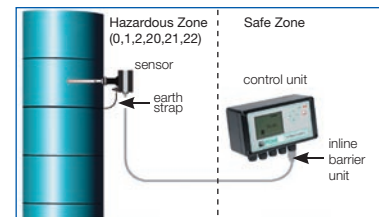
The DX810 uses unique Electrodynamic technology, an advanced triboelectric method. The instrument operates by measuring the small AC current which is induced by the movement of particles past a grounded rod inserted in the duct. Since the signal includes no DC component, the instrument has increased 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 techniques. The instrument can reliably detect changes in particulate loadings to help minimise particle carry over from one stage of the polymerisation reaction to another.

## Charge measurement (CX810)

The CX810 measures the amount of charge conducted from the particles to a rod, which is inserted into the particle stream as a current. Changes in the charge characteristics can be detected directly. These changes may occur by either variation in polymerisation reaction, the onset of a reactor instability causing the particles to become more charged, or the loss of feed of any charge neutralising agent added to the process. The instrument measures both positive and negative currents so that changes in charge polarity may also be detected. The CX810 sensor may be installed directly to the high pressure reactor to monitor changes in the particle charge as soon as they occur.

## Safety concept

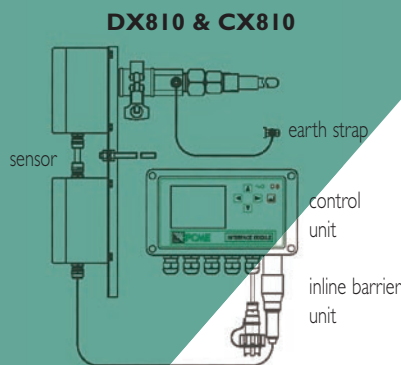
The CX810 and DX810 are intrinsically safe charge polarity and particulate emission monitors suitable for EX gas zones. The instruments are certified as category 1 devices by the notified Body SIRA, UK according to the ATEX directive (94/9 EC). As such they are suitable for use in both hazardous Gas Zones 0, 1 and 2 and Dust Zones 20, 21, 22.



## Specifications

Sensor	DX810 & CX810
Process Temperature (at elevated pressure)	Up to 450°C @ 5NM/m <sup>2</sup> (50 BAR)
Process Temp (at reduced pressure)	Up to 800°C @ 1NM/m <sup>2</sup>
Connection on Duct	¾" NPT
Sensor Rod Material	316SS, Ceramic Insulator
Sensor Length	Up to 1.0 m
Cable	4-core screened (outer diameter 6.5 x 7.5 mm, core diameter 2.2 x 0.34 mm <sup>3</sup> )
Cable Length	10m Standard, 200m max
Earth Strap Cable Length (sensor to stack)	2m
EX (ATEX) rating	EX II I G EEX ia IICT4 EX II I D(T71°C)

Control Unit	DX810 & CX810
Enclosure Size (mm)	222w x 125h x 81d
Enclosure Rating	IP65
Power Supply	90/260VAC, 50/60Hz +10%, 20VA
Ambient Temperature	-20°C to +60°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 Capabilities

	DX810	CX810
Minimum Detection limit	0.1 mg/m <sup>3</sup>	± 100 pA
Measurement Range	0 - 1000 mg/m <sup>3</sup>	± 30,000 pA

## 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.



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