



## Particulate Monitoring Systems

Advanced Design Electrodynamical  
Particulate Monitors for Hazardous  
Gas and Dust Zone Emissions

EX (ATEX) certified

Particulate Emissions

Monitoring for

Hazardous Zones



ATEX  
Category 1, 2 and 3



THE QUEEN'S AWARDS  
FOR ENTERPRISE:  
INNOVATION  
2007



Certificate No: 9389



- Certified for EX (ATEX) Gas Zones 0,1 & 2 and Dust Zones 20, 21 & 22
- Intrinsically safe dust sensor with separate advanced control unit, user interface
- Certification rating:  
EXII 1 G EEX ia IIC T4, EX II 1 D (T71°C)
- High Temperature and high Pressure Sensor options available
- Unique isolating spur technology for true intrinsic safety (fail-safe system)

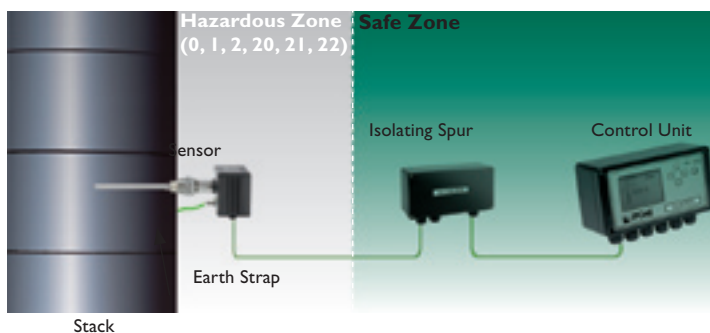
# applications

## System Description and Product Range

The DX800 series 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. In addition, the DX800 is also approved to the IECEx international standard.

## Safety Concept

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 and dust 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).



## Principle of Measurement

The DX800 series uses PCME's unique (US Patent) AC Electrodynamic technology. Any 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. Distributions in the particle stream result in a frequency charge induction response which is proportional to the concentration of particles\*. 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; (unlike DC Triboelectric systems). The dust signal is amplified, digitised and processed at the Sensor, consistent with good signal to noise design techniques and then the signal is sent back to the control unit via the isolating spur. The processed signal is proportional to dust concentration although the exact correlation is application dependent. All sensors are provided with an internal communications check to ensure that there is proper digital communication between the control unit and sensor, ensuring good cable connection and that the sensor's microprocessor is fully operational.

(application dependent\*).

## Applications

The DX800 series can be used for particulate emission monitoring in a wide range of applications in the Chemical Processing, Plastics, 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  $\text{mg}/\text{m}^3$  and/or detect process upsets. Application parameters of each sensor are outlined overleaf. Due to certification limitations, the DX800 series is not suitable for condensing flue gas (wet).

## Features

- Alarms (with configurable delay) based on both rolling average data and instantaneous data for reliable plant failure detection and diagnostics
- In-built datalogger for Environmental, Process control or Broken Bag Mode
- Automatic probe and short circuit check
- Auto-ranging and Dynatrack feature (instrument adjusts the dynamic range to track fast moving dust pulses, typically found after reverse jet baghouses) to ensure good measurement
- Simple calibration after iso-kinetic sample
- Secure data and password protection
- Interlinks to DustReporter 2 reporting and analysis software for on-line control and historical reporting using PC

## Functions

Calibration Mode ( $\text{mg}/\text{m}^3$ )	Computes calibration factors associated with isokinetic test and associated instrument average
Review of Memory	Graphics trend or listing display of stored data
Access Security	Password level to protect unauthorised entry
Data Security	Data stored in non-volatile memory
Configuration and Set-up	On-board screens or PC configuration (Config Wizard)

# specifications

## Memory Capacity (user selectable pulse, short term or long term logger)

Event	Log for emission events (instantaneous or average emission alarms), self-checks and instrument alarms, 500 entries
Pulse Data	From 4 hours (1 channel)

Parameters for Sensor	DX800 Low Pressure	DX820 High Pressure
Maximum Pressure	2 barg max	50 barg max
Maximum Gas temperature (at sensor connection)	250°C	350°C
Sensor connection on duct/stack	1 ½ inch BSP (female)	Flange DN40 PN64
Sensor rod material	316 Stainless Steel	316 Stainless Steel
Sensor rod insulator	PEEK	High grade Ceramic
Sensor rod length	Up to 1000m (length stack dependant, consult PCME Ltd)	Up to 800mm (length stack dependant, consult PCME Ltd)
Stack gas parameter	Non-condensing	Non-condensing
Dust detection range	0.1 to 1000 mg/m <sup>3</sup>	0.1 to 1000 mg/m <sup>3</sup>
Automatic self-checks	Probe rod short circuit, electronic zero and drift	Probe rod short circuit, electronic zero and drift
Enclosure rating	IP65	IP65
Ambient temperature rating	-20°C to +55°C	-20°C to +55°C

## Cable Requirements

Cable lengths (from sensor to Control Unit)	10m supplied as standard, 1000m max
Cable specification (correct cable must be used)	4-core overall screened (specification on request)
Maximum cable length from Control Unit to Isolating Spur	500m max
Maximum cable length from Isolating Spur to Sensor	500m max

## Control Unit (must be located in "safe" area)

Enclosure size	220w x 124h x 81d
Enclosure rating	IP65 CE rated
Power supply	90 – 260Vac, 50/60 Hz +/- 10%, 20VA
Ambient temperature	-20°C to +55°C
Outputs	1 x isolated 4-20mA (500 ohm), 2 x SPCO relays
Displayed parameters	Dust level, fault parameters, alarm status, alarm history, set-up parameters, 4-20mA and alarm settings, all visible on large 80 x 60mm LCD graphical display with back light
Inputs	Plant start/stop signal, Bagfilter cleaning sequence start

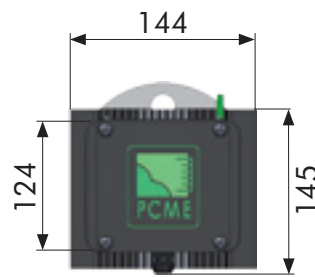
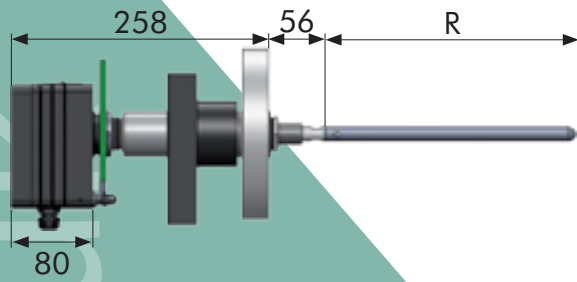
## Isolating Spur (must be located in "safe" area)

Enclosure size	220w x 124h x 81d
Enclosure rating	IP65
Power requirement	24v dc (supplied via cable from control unit)
Ambient temperature	-20°C to +55°C
Maximum cable length from control unit	500m

# specifications

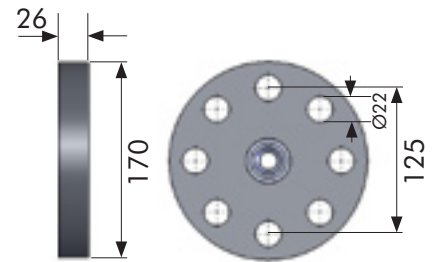
## Physical Dimensions & Order Codes

### DX820 Sensor

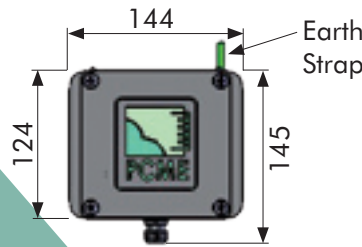
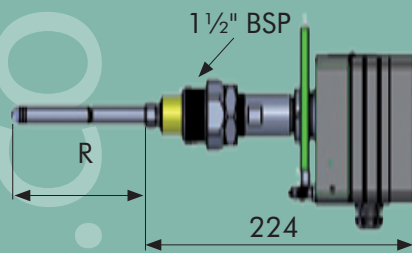


### DN40 PN64 Flange

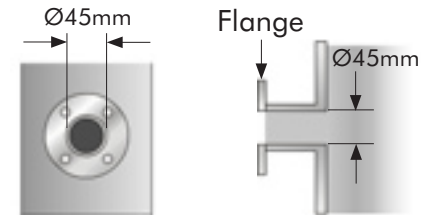
(NB This is an option for the DX800 style sensor)



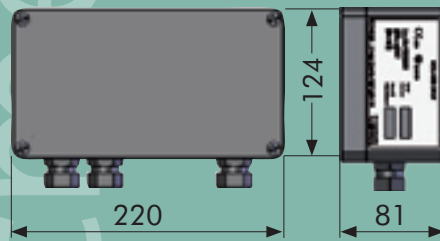
### DX800 Sensor



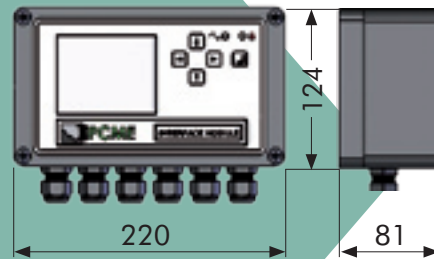
### DX820 Stack Connection



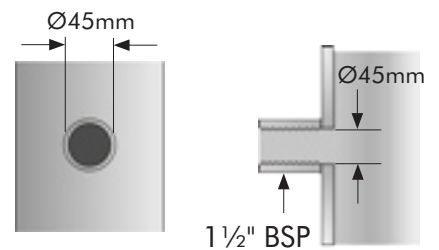
### ISOLATING SPUR



### INTERFACE MODULE



### DX800 Stack Connection



### Sensor Order Codes

	Description	Option	Code
1	Hazardous Zone Regulation	ATEX IECEX	ATEX IEC*
2	Pressure	< 2 bar < 50 bar	2 50
3	Stack Temperature	<250°C <350°C	250 350
4	Rod Length	Specify length	0100, 0200, 0300, 0400, 0500, 0600, 0800, 1000*

\*DX800 only

prefix      1      2      3      4  
 DX - [ ] - [ ] - [ ] - [ ] - [ ]      e.g. DX - 800 - ATEX - 2 - 250 - 0500

### Table of Prefix Numbers

	2 bar	50 bar
250°C	800*	820
350°C	820	820

\*IECEX version available

## 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.



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