



DCEM 2100-Unique Dual Beam Opacity / Dust Monitor

The Ideal Solution for Pollution Monitoring

For over six decades, Forbes Marshall has been building steam engineering and control instrumentation solutions that work for process industry. Today, we have evolved into a leader in process efficiency and energy conservation through technology tie-ups and focused investments in manufacturing and research. Our joint ventures with the world's leading names enable us to deliver quality solutions in 14 countries. Forbes Marshall is probably the only company in the world to have extensive expertise in both steam and control instrumentation. The dual expertise has allowed us to engineer industry specific systems that focus on energy efficiency and utilities management for sectors as diverse as textiles, food processing, paper, power and chemicals.

We have also been adjudged one of India's top "25 Best Places to work - 2008" by Economic Times and the Great Places to Work Institute. Our teams are peopled by some of

DCEM 2100 – Unique Dual Beam opacity/dust density monitor

To measure Smoke Density (Opacity, Extinction, Ringlemann) or Dust Density (mg/m³, mg/Nm³), the universally accepted method is to transmit a beam of light through the gas and measure the reduction in its intensity. The Forbes Marshall CODEL Model DCEM 2100 is a unique twin beam

How The DCEM 2100 Works

The high-intensity light source gets modulated at high frequencies. The detectors are tuned to their transmitter frequency and are, therefore, unaffected by any other light source. Its unique optical arrangement provides continuous measurement of transmissivity of visible light across the flue in opposite directions. This provides not only an accurate average of dust loading within the duct, but a dynamic assessment of any misalignment errors that may occur due to duct movement.

the finest engineers in the land. These highly trained professionals have developed innovative solutions and saved millions of rupees in process costs for our clients. Our business practices and processes have combined into a singular philosophy of being trusted partners who provide innovative solutions. It is a philosophy we are proud to live up to.

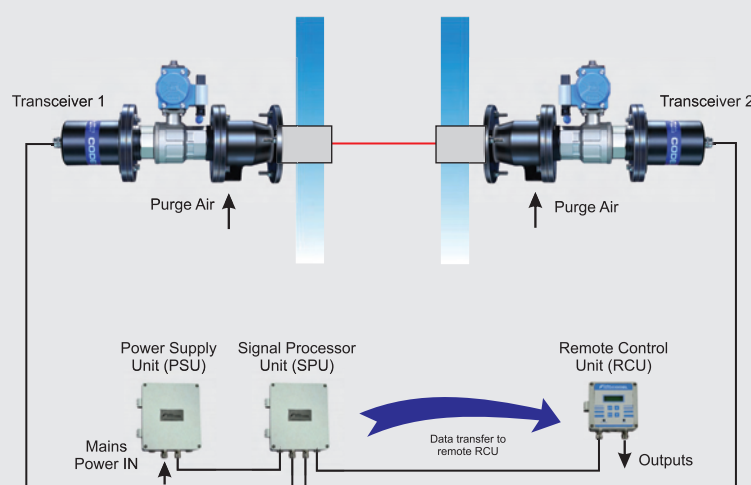
For decades, we have partnered with some of the best names in the control instrumentation industry such as Arca, Codel, Krohne and Shinkawa, to develop, design and supply innovative solutions for measurement and monitoring of process parameters. With a combination of specialist knowledge and the latest technology, we provide products and solutions to achieve optimum efficiency. Our products are a unique combination of hardware and software that make them reliable and accurate.

transmissometer. It combines the simplicity of measurement hardware with sophistication of measurement processing, thus providing unmatched ease. It is specially designed to provide stability of calibration and virtually maintenance-free operation for long-term continuous process.

To protect the transceiver lenses the DCEM 2100 comprises of efficient air purges. These provide a continuous air curtain to avoid contamination on exposed optical surfaces to an absolute minimum. However, a slow build-up of contamination is possible over many months of operation and can produce significant measurement errors. To rectify this, the DCEM 2100 is equipped with a dynamic misalignment check, in addition to the automatic lens contamination correction mechanism, for exposed optical surfaces on both transceivers.

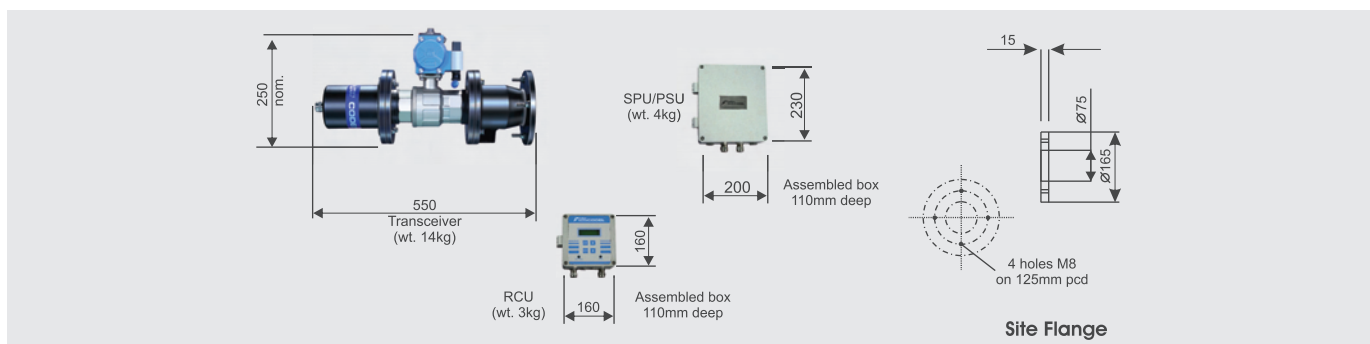
Features

- Dual beam Transmissometer
- Very low maintenance, high reliability
- Automatic lens contamination correction
- Automatic zero & span check
- Dynamic misalignment check
- Data displayed in % opacity, mg/m³, mg/Nm³, Extinction, Ringlemann
- Built-in-fail safe shutter
- Local / remote control unit for two way communication
- Normalised reporting.



DCEM 2100 - Technical Specifications

Model	DCEM 2100
Measurement of	Opacity / Dust Density
Type of Instrument	In-situ Non-contact cross duct type
Operating principle	Dual beam High intensity RED LED transmission & absorption (Also available with Green LED for EPA compliance) and conforming to ASTM D2616 standard
Measuring ranges	Fully selectable ranges: 0 – 100% opacity 0-3.0 extinction 0-999 mg / m ³ (Higher on request) 0-999 mg / Nm ³ (Higher on request) 0-5 Ringlemann
Normalisation	Accepts analog, serial, keypad input for temperature, pressure, moisture & oxygen correction
Response time (T90)	5 seconds
Accuracy	+ / – 0.2% opacity of measurement
Resolution	+ / – 0.1% opacity
Drift	Less than 1% opacity / Month
Linearity	+ / – 0.1% opacity
Repeatability	+ / – 0.1% opacity
Averaging	Selectable from 10 seconds to 30 days
Path length	Suitable for 0.5 to 12 m duct size
Calibration	Period auto zero & span verification check
Flue Gas temperature	Above dew point to 850°C
Ambient temperature	Transceiver unit suitable upto 90°C, Power supply, signal processor & display unit suitable upto 60°C
Power Supply	88 – 264 VAC, 50 – 60 Hz
Power consumption	125 VA
Construction	Corrosion-resistant epoxy-coated aluminum housing sealed to IP66
Total purge air required	1) Clean & dry plant compressed air of 0.25 LPS @ 4 bar pressure 2) Air Blower
Window protection	Automatic pneumatically-operated fail-safe shutter
Cable length between Transceiver units & SCU	10 m Standard (higher on request)
Remote / Local control unit	<ul style="list-style-type: none"> Isolated 2 x 4 – 20 mA, 500 ohms output fully configurable. 3 x volt free SPCO contact rated at 50 vdc 1 Amp. 2 line X 32 character alpha – numeric LCD display with 4 key keypad.
Compliances	<ul style="list-style-type: none"> EMC 89 / 336 / EEC directive compliant. Low Voltage 72/23 / EEC directive complaint. ASTMD 2616 with Green color LED.
Interface Option	RS 232 / RS 485



Your local Forbes Marshall representative would be happy to provide you with any help and advice you might need.



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