

Pyrofiber® Model E10

MEASURE MATERIAL EMISSIVITY

STATE-OF-THE-ART ON-LINE MATERIAL EMISSIVITY MEASUREMENTS



FEATURES

- Measures Emissivity on Hot or Cold Materials
- Emissivity Range: 1 to 100% (0.01 to 1.00)
- Selectable Wavelength Models Available
- Selectable Data Acquisition Rates: 1ms to 2000ms
- Analog & Digital Outputs, Opto Isolation Available
- PC Interface & Internal Data Notebook
- Industrial Process Control Solutions

DESCRIPTION

As a complement to the Pyrofiber® II infrared thermometer, the Pyrofiber® Model E10 is a rugged industrial reflectometer based instrument which can be used to measure the emissivity of solid target materials. When coupled with the Pyrofiber® II, this emissivity can be used in an on-line material monitoring or control process to calculate the precise emissivity corrected infrared temperature measurement. The Pyrofiber® E10 is suitable for production applications including hot or cold, stationary or moving targets and various surface conditions.

APPLICATIONS

On-Line Material Emissivity Measurements in

- Production Steel & SS Annealing Furnaces
- Production Copper Furnaces
- Induction Heating & Forging
- Ceramic & Graphite Production
- Material Surface & Non Destructive Testing
- Industrial Temperature Accuracy Applications
- Industrial/Laboratory Material Testing

The Pyrofiber® E10 system consists of three main components: an Electronic Unit, an Optical Sensor Head, and Fiber Optic Cable. The Electronic Unit houses the electronics and microprocessor control unit, LCD digital display, membrane keypad, power supply and analog or digital output connections. The Optical sensor head is used to transmit and collect the reflectance light source to determine the target emissivity. The sensor head assembly is connected to the Pyrofiber® electronic unit using armored fiber optic cables. Since there are no electronics in the sensor, it is immune to electrical noise, radiation fields, harsh environments and vibration.

OPERATION

The Pyrofiber® E10 offers ease of operation with two modes of operation, AUTOMATIC Mode for continuous on-line process control and off-line mode for various single control operations, setup and system controls. The Pyrofiber® E10 may be operated locally or remotely and easily interfaces into any control system using standard analog or digital outputs.

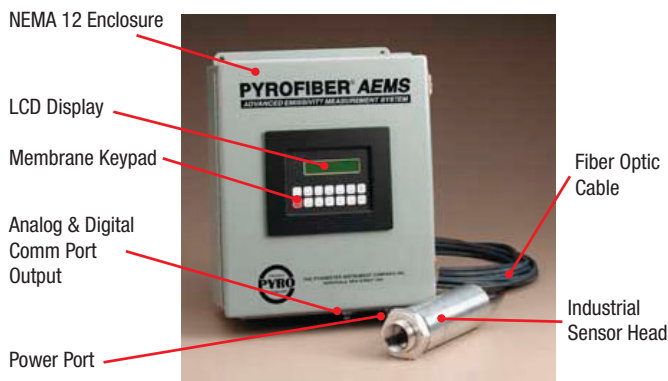


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Pyrofiber® Model E10

Pyrofiber® Model E10 Specifications



TECHNOLOGY

While the infrared thermometers have been used for many years in industrial applications, the measurement of temperature utilizing this technology has been restricted due to inherent weaknesses. The greatest deficiency is quite fundamental; infrared pyrometers measure radiance received from a target; i.e., one variable, while use of Planck's radiation law governing the relationship between the radiance and temperature requires knowledge of a second variable, the target surface emissivity. Emissivity varies with surface condition, temperature, wavelength and time.

The Pyrofiber® E10 solves this problem by measuring the target emissivity. When coupled to the Pyrofiber® II infrared thermometer at the same wavelength, this emissivity can be used to calculate the precise Emissivity Corrected Temperature (Te).

Emissivity Measurement

The Pyrofiber® E10 uses a patented laser based infrared technology to measure the target spectral reflectivity over a narrow band. The laser energy is directed to an opaque target. The returning energy from the laser is used to measure the diffuse reflection from the target. This reflectivity measurement is used to determine the target emissivity. The Pyrofiber® E10 will also eliminate any radiation from hot targets.

Effective Wavelength:	
Models:	PF E10-905 0.905 μ m \pm 0.015
	PF E10-950 0.950 μ m \pm 0.015
	PF E10-980 0.980 μ m \pm 0.015
	PF E10-1550 1.550 μ m \pm 0.015
Bandwidth:	0.030 μ m
Emissivity range:	0.01-1.0 (1 to 100%)
Accuracy:	\pm 0.01 (1%)
Resolution:	0.01
Repeatability:	0.01
LCD Display 40 Digit Readout	Target Emissivity Value (E%)
Operating Modes: On-Line:	
Off-Line:	
AUTOmatic Mode:	E% Emissivity
Single Mode:	Single readings (output/notebook)
Interval Mode:	Time Sequenced readings
High Speed Mode:	30 readings/second Notebook Storage: 720 readings (off-line only)
High Speed Xmit Mode:	70 readings/second via host PC
Acquisition Time:	1ms to 2000ms Selectable
Standard Target Distance:	Sensor head can be arranged for fixed focus to accommodate any distance from 1.0' (0.3m) to 10.0' (3.0m) standard. Special heads and probes can be designed to accommodate most target distances.
Standard Target Sizes Available:	Target sizes are subject to target distance limitations.
Special Target Sizes:	Special sensor heads and probes can be designed to accommodate most target sizes to as low as 0.01" (0.25mm)
Sample Rate:	1, 2, 4, 8, 21, 23, 37 Readings/sec Selectable
Maximum Equipment Operating Temperatures:	Electronic Enclosure: 32°F (0°C) - 100°F (40°C) Sensor Head: 32°F (0°C) - 480°F (250°C) Fiber Optic Cables: 32°F (0°C) - 250°F (125°C)
Extended Operating Temperatures Available Upon Request	
Instrument Enclosure:	Nema-12 Electronic Box Enclosure Optional Nema 4X, 19" Rack Mount
Auxiliary Output:	Analog Output: 0-20mA 4-20mA, optional Opto Isolation. Digital Output RS232C, optional Opto Isolated RS485.
Power Supply:	115vac/60Hz or 230vac/50Hz

Consult factory for:
Custom wavelengths to match a specific IR Thermometer
Sensor Head configurations for specific applications

PYRO'S AUTHORIZED REPRESENTATIVE

PYROFIBER® MODEL E10 COMES COMPLETE WITH

- Nema 12 Electronic Box
- Keypad, Digital Display
- Electronics Unit
- Operating Software
- Analog Output: 0-20mA or 4-20mA
- Digital Output: RS232
- Industrial Sensor Head & Fiber Optic Cable
Target Distance: To Suit Application
Target Spot Size: To Suit Application
- Instruction Manual
- Consult Factory for Additional Options