

# PyroCouple, PyroEpsilon, PyroBus

## Compact Non-Contact Temperature Sensors



shown actual size

- Temperature range: -20°C to 500°C
- Choice of precision optics for large or small targets at short or long distances
- Fast response with high stability
- Stainless steel housing, sealed to IP65
- Quick and easy installation
- Wide range of accessories

The Calex Compact Series is a range of high quality, low cost non-contact sensors that measure the temperature of inaccessible or moving objects and materials. They measure temperatures from -20°C to 500°C, accurately and consistently, with an outstanding response time of 240 ms. All models conform to industrial EMC standards.



PyroCouple with indicator

The **PyroCouple** is a simple infrared temperature sensor with a choice of analogue outputs. No complicated setup is required - just connect a temperature indicator and power supply, and instantly start taking measurements.

- Suitable for non-contact temperature measurement on most non-reflective non-metal surfaces, such as paper, thick plastics, asphalt, painted surfaces, food, rubber and organic materials, among many others.
- Choice of analogue outputs for measured temperature:
  - Two-wire 4-20 mA,
  - Four-wire 0-50 mV,
  - Four-wire Type K, J or T thermocouple
- Additional 4-20 mA sensor body temperature output on the power supply loop of four-wire models: indicates the air temperature around the sensor and helps prevent overheating or overcooling



PyroEpsilon with PyroTune emissivity adjuster

The **PyroEpsilon** is a simple sensor with an adjustable emissivity setting. It is ideal if the target is partially reflective.

- Two-wire 4-20 mA output
- Emissivity adjustment via a separate two-wire 4-20 mA input
- Adjust the emissivity continuously during the process using a variable 4-20 mA source
- Set the emissivity manually with the PyroTune emissivity adjuster
- If you are not sure the emissivity of the target is high, choose the PyroEpsilon instead of the PyroCouple.



PyroBus sensors with PM180 touch screen display

The **PyroBus** is a networkable, fully configurable sensor with RS485 Modbus RTU communications.

- Up to 247 sensors may be connected to a single network.
- Adjustable emissivity setting for use on a wide range of materials
- Averaging function to smooth the temperature output
- Peak and valley hold processing for measuring individual objects on a conveyor
- Reflected energy compensation for accurately measuring the temperature of objects in ovens or chillers, from outside
- Maximum, minimum and instantaneous temperature readings
- Optional 6-channel touch screen terminal for local display, configuration and data logging
- Connect sensors and 6-channel terminals directly to an existing RS485 Modbus system

## GENERAL SPECIFICATIONS - SENSORS

### Output (PyroCouple)

PyroCouple Output Option (see Model Numbers)	Target Temperature Output	Sensor Temperature Output
-0	4-20 mA	Not available
-1	0-50 mV	4-20 mA
-2	Type T thermocouple	4-20 mA
-3	Type J thermocouple	4-20 mA
-4	Type K thermocouple	4-20 mA
-5	0-50 mV (very low current draw: 3.2 mA)	Not available

	PyroCouple	PyroEpsilon	PyroBus
<b>Output</b>	See Above	Two-wire 4-20 mA	RS485 Modbus RTU
<b>Temperature Range</b>	LT = -20 to +100 °C MT = 0 to 250 °C HT = 0 to 500 °C		-20 to 500°C
<b>Accuracy</b>	±1% of reading or ±1°C whichever is greater		
<b>Repeatability</b>	± 0.5% of reading or ± 0.5°C whichever is greater		
<b>Emissivity Setting</b>	Fixed at 0.95	Variable 0.2 to 1.0 via continuous 4-20 mA input	Adjustable 0.2 to 1.0 via RS485 Modbus
<b>Response Time, t<sub>90</sub></b>	240 ms (90% response)		
<b>Spectral Range</b>	8 to 14 μm		
<b>Supply Voltage</b>	24 V DC (28 V DC max.)		12 V DC (13 V DC max.)
<b>Min. Sensor Voltage</b>	6 V DC		
<b>Max. Loop Impedance</b>	900 Ω (4-20 mA output)		-
<b>Output Impedance</b>	56 Ω (voltage/thermocouple output)	-	
<b>Input Impedance</b>	-	50 Ω	-
<b>Current Draw</b>	20 mA max. (PyroCouple -5 models: 3.2 mA @ 24 V DC)		50 mA max
<b>Baud Rate</b>	-		9600 baud*
<b>Format</b>	-		8 data bits, no parity, 1 stop bit *

\* Other configurations available upon request

### MECHANICAL

<b>Construction</b>	Stainless Steel
<b>Dimensions</b>	18 mm diameter x 103 mm long
<b>Thread Mounting</b>	M16 x 1 mm pitch
<b>Cable Length</b>	1m (longer lengths available to order)
<b>Weight with Cable</b>	95 g

### ENVIRONMENTAL

<b>Environmental Rating</b>	IP65
<b>Ambient Temperature Range</b>	0°C to 70°C
<b>Relative Humidity</b>	95% max. non-condensing

## GENERAL SPECIFICATIONS - PYROTUNE

<b>Output</b>	4-20 mA for emissivity adjustment of PyroEpsilon sensor
<b>Supply Voltage</b>	24 V DC (13 V to 28 V DC)
<b>Display Format</b>	3.5 digit LCD
<b>Display Units</b>	Emissivity (0.2 to 1.0) or current (4 - 20 mA)
<b>Adjustment</b>	Push-buttons (raise/lower/set)

### MECHANICAL

<b>Construction</b>	Polycarbonate with gasket, transparent lid (PC) and quick release screws
<b>Mounting</b>	Surface
<b>Dimensions</b>	65 mm tall x 50 mm wide x 35 mm deep
<b>Weight</b>	72 g

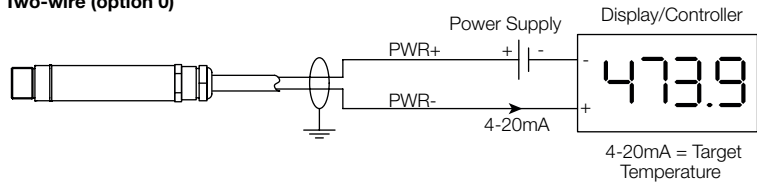
### ENVIRONMENTAL

<b>Environmental Rating</b>	IP65
<b>Ambient Temperature Range</b>	0°C to 70°C
<b>Relative Humidity</b>	95% max. non-condensing

CONNECTIONS

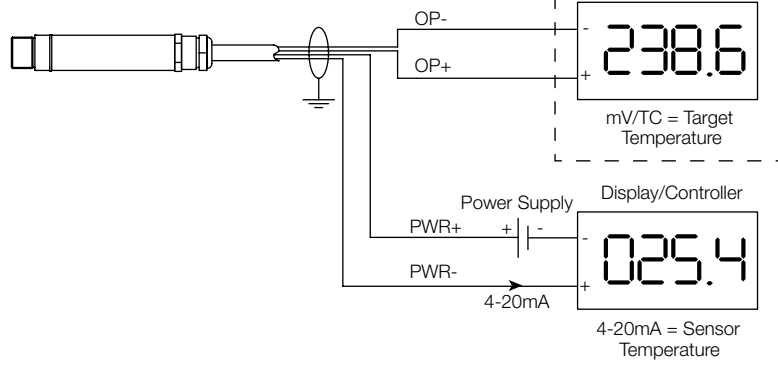
**PYROCOUPLE**

**Two-wire (option 0)**

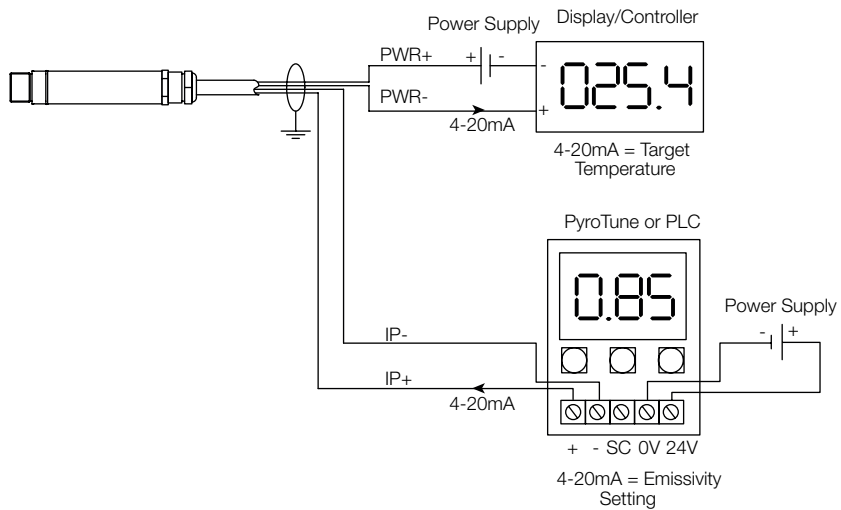


**Output types 1 to 4 only (optional)**

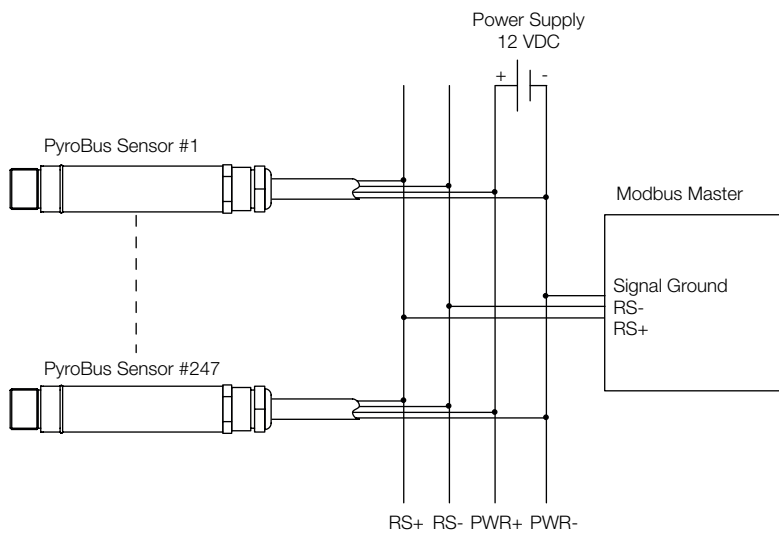
**Four-wire (options 1 to 5)**



**PYROEPSILON**

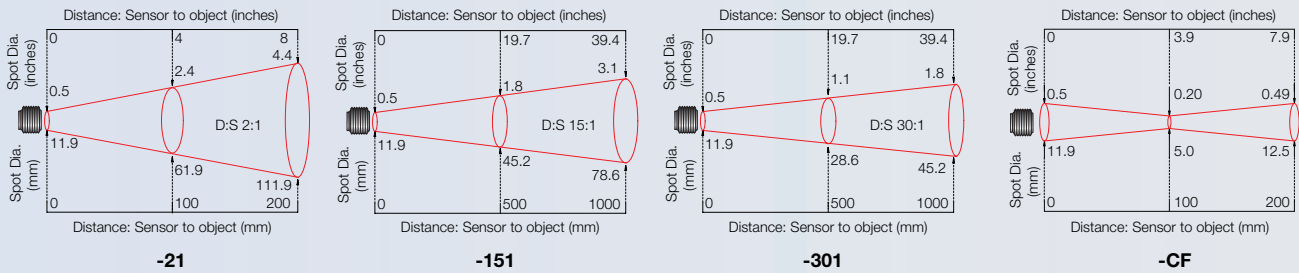


**PYROBUS**



## OPTICS

Diameter of target spot measured versus distance from sensing head (90% energy)



## ACCESSORIES



Fixed mounting bracket **FBS**



Air purge collar for 2:1 optics **APSW**  
or for all other optics (shown above) **APSN**



Laser sighting tool **LSTS**



Adjustable mounting bracket **ABS**



Air or water cooled jacket with air purge collar **WJ**  
(see Model Numbers)



Dual laser sighting bracket, adjustable **DLSBAS**  
or fixed **DLSBFS**



PyroTune emissivity adjuster **PT**  
(for PyroEpsilon only)



6-channel touch screen interface for temperature display, configuration and data logging (PyroBus only) **PM180**



Protective plastic window with stainless steel holder **PWS**  
(PyroEpsilon and PyroBus only)

## MODEL NUMBERS



**PC** | **151** | **MT** | **0** | **WJ**

**Cooling**  
(blank) = Sensor without cooling  
**WJ** = Air/water cooled jacket with air purge collar

**Output option (PyroCouple only)**

- 0** = 2-wire, 4-20mA
- 1** = 4-wire, 0-50mV (target temp.), 4-20mA (sensor temp.)
- 2** = 4-wire, T Thermocouple (target temp.), 4-20mA (sensor temp.)
- 3** = 4-wire, J Thermocouple (target temp.), 4-20mA (sensor temp.)
- 4** = 4-wire, K Thermocouple (target temp.), 4-20mA (sensor temp.)
- 5** = 4-wire, 0-50 mV (target temp.), very low current draw

e.g. Model PC151HT-4 has a type K thermocouple output representing target temperatures of 0°C to 500°C plus a 4-20 mA output proportional to internal sensor temperature. For simplicity, the sensor temperature range is always set the same as the target temperature range

**Temperature range (PyroCouple and PyroEpsilon only)**

- LT** = -20 to +100 °C
- MT** = 0 to 250 °C
- HT** = 0 to 500 °C (not normally available on PC21 models)

**Field of view**

- 21** = 2:1 divergent optics
- 151** = 15:1 divergent optics
- 301** = 30:1 divergent optics
- CF** = Close-focus optics (focal spot size 5 mm at 100mm distance)

**Series**

- PC** = PyroCouple: fixed emissivity, choice of analogue outputs
- PE** = PyroEpsilon: adjustable emissivity, 4-20 mA output
- PB** = PyroBus: fully configurable, RS485 Modbus communications

**Example Model Numbers:** PC151MT-0, PE151MT, PB151

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