

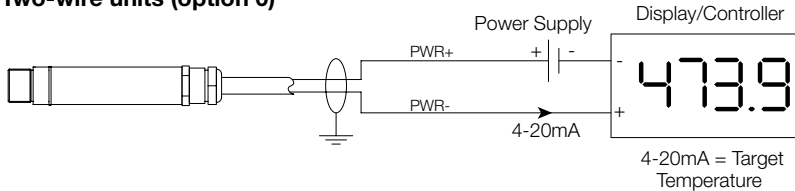
# PyroCouple

## Compact Non-Contact Temperature Sensor with optional Dual Output

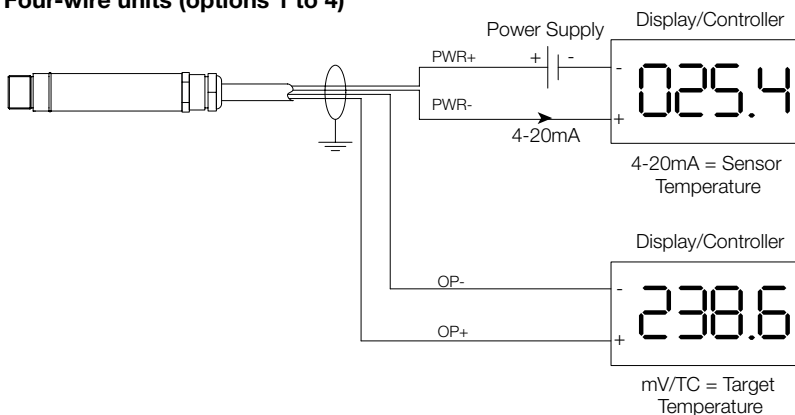


- Temperature range: -20°C to 500°C
- Emissivity setting: fixed at 0.95
- Two-wire 4-20 mA output or four-wire voltage/thermocouple output
- Four-wire unit also provides internal sensor temperature
- Field of view: 2:1, 15:1, 30:1 or close focus
- Fast response with high stability
- Stainless steel housing, sealed to IP65
- Quick and easy installation
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets

### Two-wire units (option 0)



### Four-wire units (options 1 to 4)



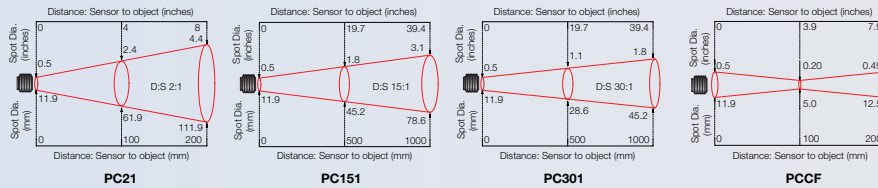
The PyroCouple Series is a range of high quality, low cost, compact sensors which measure the temperature of inaccessible or moving objects and materials. They measure temperatures from -20°C to 500°C, accurately and consistently, with an outstanding response time of 240 ms.

PyroCouple sensors are available as either two-wire or four-wire units.

Two-wire PyroCouple sensors transmit the target temperature as a 4-20 mA output and offer a simple solution for most non-contact temperature measurement applications.

Four-wire PyroCouple sensors transmit the target temperature as a 0-50 mV or thermocouple output (type J, K or T) plus the internal sensor temperature as a 4-20 mA output. This second output can be used to ensure that the sensor is being operated within the correct ambient temperature limits and prevent damage caused by overheating or overcooling. It can also be used to give an approximate indication of the air temperature surrounding the sensor.

## DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD



## GENERAL SPECIFICATIONS

Temperature Range vs Field-of-View table

Field of View	-20°C to 100°C	0°C to 250°C	0°C to 500°C
2:1	PC21LT-X	PC21MT-X	-
15:1	PC151LT-X	PC151MT-X	PC151HT-X
30:1	PC301LT-X	PC301MT-X	PC301HT-X
ø5mm @ 100mm	PCCFLT-X	PCCFMT-X	PCCFHT-X

Output table

Model-X	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

e.g. Model PC151HT-4 has a 15:1 field of view and provides 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**

<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</b>	Fixed at 0.95
<b>Response Time, <math>t_{90}</math></b>	240 ms (90% response)
<b>Spectral Range</b>	8 to 14 $\mu$ m
<b>Supply Voltage</b>	24 V DC (28 V DC max.)
<b>Min. Sensor Voltage</b>	6 V DC
<b>Max. Loop Impedance</b>	900 $\Omega$ (4-20 mA output)
<b>Output Impedance</b>	56 $\Omega$ (voltage/thermocouple output)

## 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

All PyroCouple sensors are fitted with precision Germanium lenses for accurate optics. Model PC21 has 2:1 optics making it suitable for most applications where the sensor can be mounted close to the target. Model PC151 is designed for small or distant targets and has an optical resolution of 15:1. Model PC301 is designed for very small or distant targets and has an optical resolution of 30:1. Model PCCF is designed for targets as small as ø5mm at a distance of 100mm from the sensor.

## ACCESSORIES



### FIXED MOUNTING BRACKET

The L-shaped fixed mounting bracket offers a rigid support for the sensor and allows fine adjustment in a single plane.



### ADJUSTABLE MOUNTING BRACKET

The adjustable mounting bracket consists of a fixed mounting bracket plus another L-shaped bracket. When assembled as shown the adjustable mounting bracket offers a rigid support for the sensor and allows fine adjustment in two planes.



### AIR PURGE COLLAR

The air purge collar is used to keep dust, fumes, moisture and other contaminants away from the lens. Air flows into the fitting on the side and out of the aperture at the front.



### AIR/WATER COOLED HOUSING

The air/water cooled housing allows the sensor to withstand ambient temperatures which exceed the normal 70°C limit. Air or water (depending on the degree of cooling required) flows into one of the fittings on the side and out of the other. To prevent condensation forming on the lens, the air/water cooled housing is supplied complete with an air purge collar. Please note, the air/water cooled housing must be ordered with the sensor and cannot be fitted by the user.



### LASER SIGHTING TOOL

The Laser Sighting Tool screws onto the front of the sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

# PyroUSB PC Configurable Non-Contact Temperature Sensor with 4 to 20 mA Output

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The PyroUSB Series is a range of high performance, compact sensors which measure the temperature of inaccessible or moving objects and materials.

- Configurable temperature range, emissivity setting etc. from a PC via CalexSoft software and USB cable (supplied)
- Features max; min; average and instantaneous readings; peak or valley hold; reflected energy compensation
- OPC Server capabilities
- Temperature range -40 to 1000°C
- Emissivity: 0.1 to 1.0
- Response time: 240 ms to 90%
- Stainless steel housing, sealed to IP65
- Field of view: 15:1, 30:1 or Close Focus
- 4 to 20 mA output
- Quick and easy installation
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets



GENERAL SPECIFICATIONS

Temperature Range	-40°C to 1000°C
Field-of-View	15:1 (PyroUSB-151) 30:1 (PyroUSB-301) ø5mm @ 100mm (PyroUSB-CF)
Output	4 to 20 mA (linear with temperature)
Configuration	Via PC port conforming to USB 2.0
Accuracy	±1% of reading or ±1°C whichever is greater
Repeatability	±0.5% of reading or ±0.5°C whichever is greater
Emissivity	0.1 to 1.0
Response Time, t90	240 ms (90% response)
Spectral Range	8 to 14 µm
Supply Voltage	24 V DC (28Vdc max)
Sensor Voltage	6 V DC min
Maximum Loop Impedance	900 Ω
Maximum Span	1000°C
Minimum Span	100°C

MECHANICAL

Construction	Stainless Steel
Dimensions	25 mm diameter x 106.5 mm long
Thread mounting	M20 x 1 mm pitch
Weight with Output Cable	175 g
Output Cable Length	1 m
USB Cable Length	1 m

ENVIRONMENTAL

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

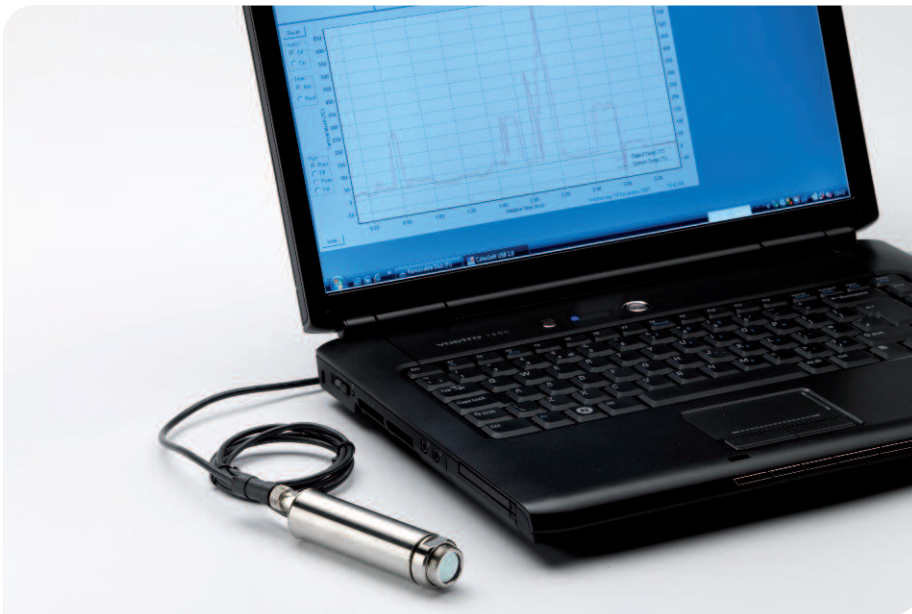




The PyroUSB Series measures temperatures from  $-40^{\circ}\text{C}$  to  $1000^{\circ}\text{C}$  accurately and consistently, with an outstanding response time of 240 ms. The 4 to 20 mA output is compatible with almost any indicator, controller, recorder, data logger etc. without the need for special interfacing or signal conditioning.

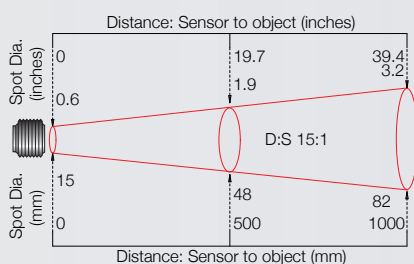
PyroUSB-151 has 15:1 optics making it suitable for most applications. PyroUSB-301 is specially designed for distant targets and has an optical resolution of 30:1. PyroUSB-CF is designed for small targets and measures a spot size of  $\varnothing 5\text{mm}$  at 100mm distance.

All PyroUSB Series sensors are fully configurable from a PC using the CalexSoft software and USB cable supplied. This user friendly software enables the user to set the range and emissivity, compensate for reflected energy; apply filtering; select max, min, average or instantaneous readings; and peak or valley hold processing. These features can also be monitored and adjusted by an OPC Client. Other features include Data Acquisition, Alarms and a Scrolling Graphical Display.

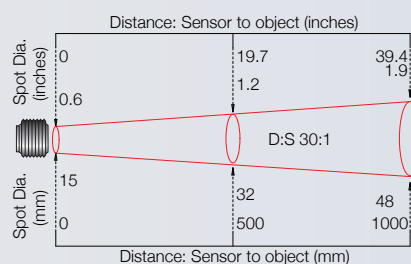


The sensor will operate with either the 4 to 20 mA cable connected, the USB cable connected, or both. The USB cable has an IP65 connector at the sensor end. An IP65 cap protects the sensor when the USB cable is not connected.

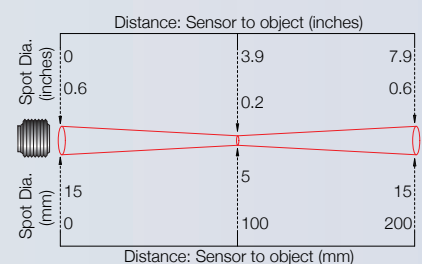
## DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD



**PyroUSB-151**



**PyroUSB-301**



**PyroUSB-CF**

All PyroUSB Series Sensors are supplied with a stainless steel mounting nut and are easy to install.

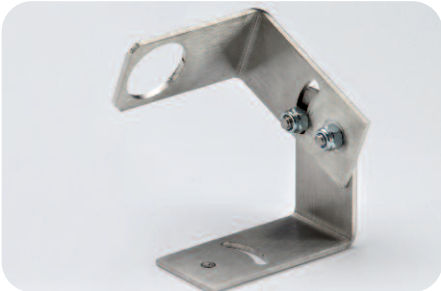
Standard sensors will operate in ambient temperatures up to 70°C. For more hostile environments or difficult mounting conditions a wide range of accessories is available.

## ACCESSORIES



### FIXED MOUNTING BRACKET

The L-shaped fixed mounting bracket offers a rigid support for the sensor and allows fine adjustment in a single plane.



### ADJUSTABLE MOUNTING BRACKET

The adjustable mounting bracket consists of a fixed mounting bracket plus another L-shaped bracket. When assembled as shown the adjustable mounting bracket offers a rigid support for the sensor and allows fine adjustment in two planes.



### AIR PURGE COLLAR

The air purge collar is used to keep dust, fumes, moisture and other contaminants away from the lens. Air flows into the fitting on the side and out of the aperture at the front.



### AIR/WATER COOLED HOUSING

The air/water cooled housing allows the sensor to withstand ambient temperatures which exceed the normal 70°C limit. Air or water (depending on the degree of cooling required) flows into one of the fittings on the side and out of the other. To prevent condensation forming on the lens, the air/water cooled housing is supplied complete with an air purge collar. Please note, the air/water cooled housing must be ordered with the sensor and cannot be fitted by the user.



### LASER SIGHTING TOOL

The Laser Sighting Tool screws onto the front of the sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

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## OPTIONS

Longer output cable (3 m max.)  
Certificate of calibration

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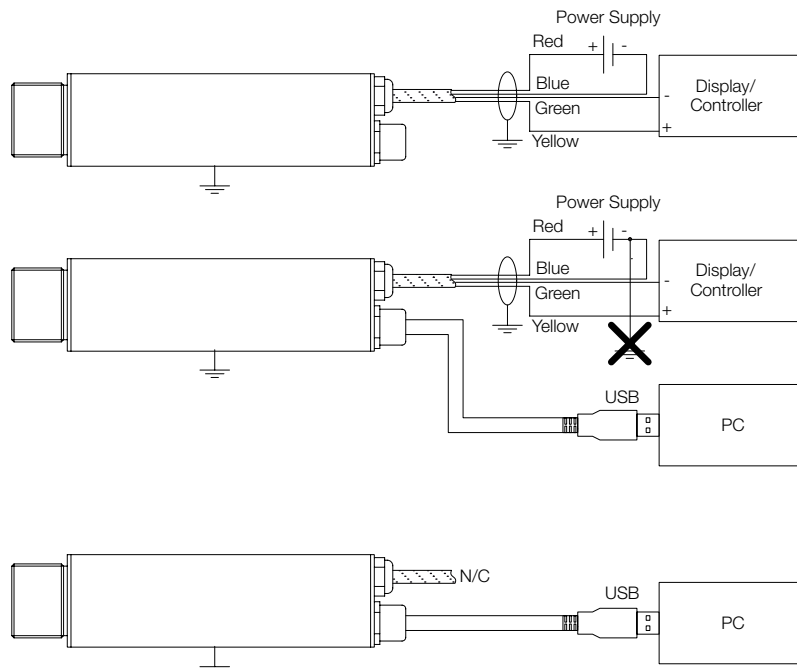
# PyroUSB 2.2

## PC Configurable Infrared Temperature Sensor for Demanding Applications



- Short-wavelength measurement for low-emissivity targets such as steel rollers and other metal surfaces, even at low temperatures
- Configurable temperature range, emissivity setting etc. from a PC via CalexSoft software and USB cable (supplied)
- Features max, min, average and instantaneous readings; peak or valley hold; reflected energy compensation
- OPC Server capabilities
- Temperature ranges from 45°C to 2000°C
- Emissivity: 0.1 to 1.0
- Stainless steel housing, sealed to IP65
- Field of view: 15:1, 25:1, 75:1 or Close Focus
- Selectable 0 to 20 mA or 4 to 20 mA output
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets

### SENSOR CONNECTION



**Note:** The sensor must be grounded at only one point, either the cable shield or the sensor housing.

The PyroUSB 2.2 Series of infrared pyrometers measures temperatures from 45°C to 2000°C accurately and consistently, with an outstanding response time.

The selectable 0 to 20 mA or 4 to 20 mA output is compatible with almost any indicator, controller, recorder, data logger etc. without the need for special interfacing or signal conditioning.

Models with temperature range 45°C to 300°C, or 100°C to 400°C have 15:1 optics.

For models with temperature range 250°C to 1000°C, or 450°C to 2000°C, a choice of optics is available:

PU251-2.2 models have 25:1 optics and are suitable for most target sizes and distances.

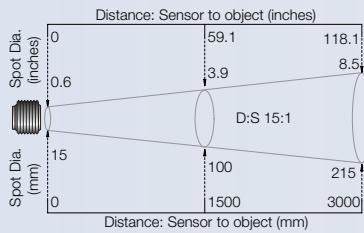
PU751-2.2 models are specially designed for distant targets and have an optical resolution of 75:1.

PUCF-2.2 models are designed for small targets and measure a spot size of  $\varnothing 7.5$  mm at 500 mm distance.

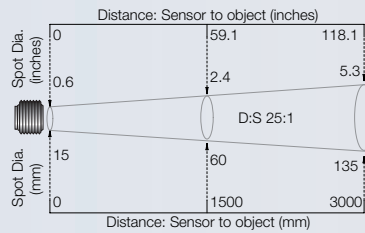
All PyroUSB 2.2 Series sensors are fully configurable from a PC using the CalexSoft software and USB cable supplied. This user-friendly software enables the user to set the temperature range and emissivity setting, compensate for reflected energy; apply filtering; select max, min, average or instantaneous readings; and configure peak or valley hold processing. These features can also be monitored and adjusted by an OPC Client. Other features include data acquisition, alarms and a scrolling graphical display.

The sensor will operate with either the 4 to 20 mA cable connected, the USB cable connected, or both. The USB cable has an IP65 connector at the sensor end. An IP65 cap protects the sensor when the USB cable is not connected.

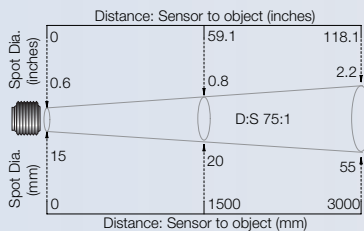
## DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD (90% ENERGY)



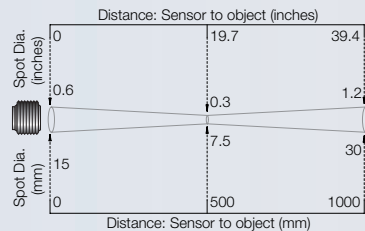
PyroUSB 2.2-151



PyroUSB 2.2-251



PyroUSB 2.2-751



PyroUSB 2.2-CF

## ACCESSORIES



### FIXED AND ADJUSTABLE MOUNTING BRACKETS



### AIR PURGE COLLAR

The air purge collar is used to keep dust, fumes, moisture and other contaminants away from the lens.



### AIR/WATER COOLED HOUSING

The air/water cooled housing allows the sensor to withstand ambient temperatures which exceed the normal 70°C limit. Air or water (depending on the degree of cooling required) flows into one of the fittings on the side and out of the other.

To prevent condensation forming on the lens, the air/water cooled housing is supplied complete with an air purge collar. Please note, the air/water cooled housing must be ordered with the sensor and cannot be fitted by the user.

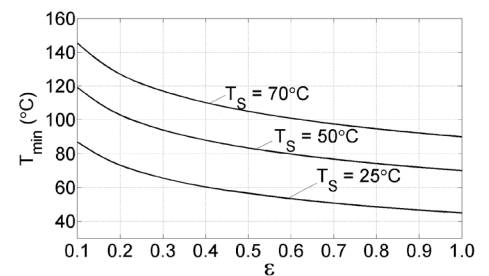


### LASER SIGHTING TOOL

The Laser Sighting Tool screws onto the front of the sensor during installation and

indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

## MINIMUM MEASURABLE TEMPERATURE (PU151LT2.2 only)



Graph showing the minimum measurable object temperature ( $T_{min}$ ), determined by surface emissivity ( $\epsilon$ ) and sensor temperature ( $T_s$ ).

## MODEL NUMBERS

### PUxxx xx 2.2 xx

- Cooling**
  - (blank) = Uncooled sensor
  - WJ = Air/water cooled jacket with air purge collar
- Temperature range**
  - LT = 45 to 300 °C (model PU151LT2.2 only)
  - PT = 100 to 400 °C (model PU151PT2.2 only)
  - MT = 250 to 1000 °C
  - HT = 450 to 2000 °C
- Field of view**
  - 151 = 15:1 divergent optics (model PU151LT or PT)
  - 251 = 25:1 divergent optics (model PU251MT or HT)
  - 751 = 75:1 divergent optics (model PU751MT or HT)
  - CF = Close-focus optics (focal spot size 7.5 mm at 500 mm distance) (model PUCFMT or HT)

## GENERAL SPECIFICATIONS

<b>Temperature Range</b>	LT: 45°C* to 300°C (PU151LT2.2 only) PT: 100°C to 400°C (PU151PT2.2 only) MT: 250°C to 1000°C HT: 450°C to 2000°C
<b>Field-of-View</b>	15:1 (PU151LT or PT) 25:1 (PU251MT or HT) 75:1 (PU751MT or HT) ø7.5mm @ 500mm (PUCFMT or HT)
<b>Output</b>	Selectable 4 to 20 mA or 0 to 20 mA (linear with temperature)
<b>Configuration</b>	Via PC port conforming to USB 2.0
<b>Accuracy *</b>	±1% of reading or ±2°C, whichever is greater
<b>Repeatability *</b>	±0.5% of reading or ±0.5°C, whichever is greater
<b>Emissivity Setting</b>	0.1 to 1.0
<b>Response Time, <math>t_{90}</math></b>	≥240 ms (90% response)
<b>Spectral Range</b>	2.0 to 2.4 $\mu$ m
<b>Supply Voltage</b>	24 V DC (26 V DC max)
<b>Sensor Voltage</b>	11 V DC min
<b>Max Loop Impedance</b>	900 $\Omega$ @ 24 V DC
<b>Maximum Span</b>	Full temperature range (up to 1550°C)
<b>Minimum Span</b>	100°C

\* Object temperature >  $T_{min}$  (see graph of Minimum Measurable Temperature)

## MECHANICAL

<b>Construction</b>	Stainless Steel
<b>Dimensions</b>	25 mm diameter x 106.5 mm long
<b>Thread mounting</b>	M20 x 1 mm pitch
<b>Weight with Output Cable</b>	175 g
<b>Output Cable Length</b>	1 m (longer cable available to order)
<b>USB Cable Length</b>	1 m

## ENVIRONMENTAL

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

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Issue H - Oct 11  
Specifications subject to change without notice



# PyroSight Series

## Industrial Infrared Thermometers



PyroSight Series with  
Line-of-Sight or Integrated  
Laser Aiming Alignment

The PyroSight series of non-contact infrared thermometers provides accurate and reliable measurements for a wide range of industrial applications.

- Temperature ranges up to 2475°C
- Traditional or fibre-optic versions
- Optional laser sighting or aiming light
- Built-in digital display and controls
- Optional interface module
- Adjustable range, emissivity and signal processing
- Precision optics
- Rugged stainless steel enclosure

PyroSight series sensors feature a variety of input, output, and alarm options to enable advanced process monitoring and control. Each sensor can be configured to operate as a stand alone sensor or with a remote Interface Module.

The sensor can be set to an analogue (A) configuration for operation with a digital indicator, PID Controller, or PLC. In addition to providing an analogue output, the sensor may be configured for an alarm relay output (default) or a remote analogue input for adjustment of the sensor's alarm set-point or emissivity.

Alternatively the sensor can be set to a digital (D) configuration (RS485) for operation with the Interface Module, a PC or a PLC. The 1/4 DIN Interface Module includes an RS232 connector for interface with the PyroSight PC Software.

PyroSight F Series  
Fibre Optic with Optional  
Integrated Aim Light



	Stand Alone Sensor (A)	Sensor with Interface Module (D)
Analogue Output(s)	One	Two
Relay Alarm(s)	One	Two
Analogue Input	One	One
Digital Interface	RS485	RS485 & RS232
Input Power	24 V DC	90-260 V AC

## GENERAL SPECIFICATIONS

PyroSight Series Sensors without fibre-optic sensing head					
			Field of View		
Model	Spectral Response (microns)	Temperature Range	Standard Resolution Optics	Minimum Focal Distance with Line of Sight Aiming	Minimum Focal Distance with Laser Aiming
Short-Wavelength Sensors					
PS100-LT-0.9	0.9 μm	540 to 1375°C	D/100	25 cm	25 cm
PS100-MT-0.9	0.9 μm	650 to 1750°C	D/100	25 cm	25 cm
PS100-HT-0.9	0.9 μm	760 to 2475°C	D/100	25 cm	25 cm
PS50-LT-1.6	1.6 μm	260 to 1150°C	D/50	25 cm	25 cm
PS100-MT-1.6	1.6 μm	315 to 1375°C	D/100	25 cm	25 cm
PS100-HT-1.6	1.6 μm	375 to 1750°C	D/100	25 cm	25 cm
PS50-MT-2.2	2.2 μm	150 to 1100°C	D/50	25 cm	25 cm
PS100-HT-2.2	2.2 μm	200 to 1375°C	D/100	25 cm	25 cm
Specialty-Wavelength Sensors					
PS20-LT-5.0	5 μm	95 to 540°C	D/20	25 cm	10 cm
PS20-HT-5.0	5 μm	200 to 800°C	D/20	25 cm	10 cm
PS20-LT-7.9	7.9 μm	30 to 315°C	D/20	25 cm	10 cm
PS20-HT-7.9	7.9 μm	100 to 600°C	D/20	25 cm	10 cm
PS40-HT-7.9	7.9 μm	260 to 1375°C	D/40	25 cm	25 cm
Long-Wavelength Sensors					
PS40-LT-14	8 to 14 μm	0 to 260°C	D/40	25 cm	25 cm
PS40-HT-14	8 to 14 μm	0 to 550°C	D/40	25 cm	25 cm

## GENERAL SPECIFICATIONS continued

PyroSight F Series Sensors with fibre-optic sensing head							
Model	Spectral Response (microns)	Temperature Range	Field of View			Fibre Cable	
			Wide Angle Optics	Standard Resolution Optics	Minimum Focal Distance	Type of Cable	Max. Length
Short-Wavelength Sensors							
PSF.75-LT-0.9	0.9 μm	540 to 1375°C	D/.75	-	0 cm	Glass	3ft/ 91cm
PSF35-LT-0.9	0.9 μm	540 to 1375°C	-	D/35	5.1 cm	Glass	3ft/ 91cm
PSF35-MT-0.9	0.9 μm	650 to 1750°C	n/a	D/35	5.1 cm	Glass	10ft / 3m
PSF50-HT-0.9	0.9 μm	760 to 2475°C	n/a	D/50	5.1 cm	Glass	30ft / 9.1m
PSF2-LT-1.6	1.6 μm	260 to 1150°C	D/2	-	0 cm	Quartz	10ft / 3m
PSF15-LT-1.6	1.6 μm	260 to 1150°C	-	D/15	5.1 cm	Quartz	10ft / 3m
PSF2-MT-1.6	1.6 μm	315 to 1375°C	D/2	-	0 cm	Quartz	30ft / 9.1m
PSF15-MT-1.6	1.6 μm	315 to 1375°C	-	D/15	5.1 cm	Quartz	30ft / 9.1m
PSF35-HT-1.6	1.6 μm	375 to 1750°C	n/a	D/35	5.1 cm	Glass	30ft / 9.1m
PSF2-LT-2.2	2.2 μm	150 to 1100°C	D/2	-	0 cm	Quartz	30ft / 9.1m
PSF15-LT-2.2	2.2 μm	150 to 1100°C	-	D/15	5.1 cm	Quartz	30ft / 9.1m
PSF2-HT-2.2	2.2 μm	200 to 1375°C	D/2	-	0 cm	Quartz	30ft / 9.1m
PSF35-HT-2.2	2.2 μm	200 to 1375°C	-	D/35	5.1 cm	Quartz	30ft / 9.1m

### Temperature Limits

-45 to 2500°C (actual sensor ranges vary by model)

### Spectral Response

Complete Range of Short, Long, and Speciality Wavelengths

### Optical Resolution

Range of Optics with Nominal Spot Size based on 90% of Energy

### Accuracy

Short Wavelength Models: 0.25% of Reading or 2°C whichever is greater  
All other Models: 0.5% of Reading or 2°C whichever is greater

### Repeatability

Better than 1°C

### Emissivity

0.010 to 1.500

### Response and Update Time

Short Wavelength Models: 5 ms (95% of Response) with 5 ms Update Time  
All other Models: 75 ms (95% of Response) with 5 ms Update Time  
Interface Module: 100 ms Update Time  
4 to 20 mA or 0 to 20 mA output (maximum impedance 1000 Ω)

### Analogue Outputs

### Alarms

Sensor: SPST relay rated 2 A @ 24 V  
Interface Module: Two SPDT relays rated 2 A @110 V AC

### Analogue Input

Sensor: 4 to 20 mA or 0 to 20 mA input (impedance 250 Ω)  
Interface Module: 4 to 20 mA or 0 to 20 mA input (impedance 237.5 Ω)

### Digital Interface

Bi-Directional RS485 and RS232 communications

### Operator Interface

Built-in Menu System with Access to Averaging, Peak/Valley Hold (Time or Temp Reset),

Programmable Outputs and Alarms

### Measured Parameters

Filtered and Unfiltered Temperature, Ambient Temperature & Rate of Change

### Input Power

Sensor: 24 V DC (300 mA); Interface Module: 90 to 260 V AC 50/60 Hz

### Ambient Temperature Limits

Sensor: -17 to 60°C, with Water Cooling limit is 175°C (varies with water rate and temp)

Fibre Optic Cable & Lens Barrel: 200°C

Interface Module: -17 to 50°C

### Enclosure Rating

Sensor: Stainless Steel Enclosure with IP65 Rating. Optional NEMA 7 and ATEX enclosures are available

Interface Module: IP52 Front Panel with Anodized Aluminium Enclosure

Sensor: 1.3 kg; Interface Module: 1 kg

### Weight

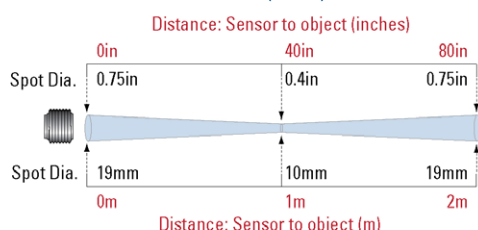
### Dimensions

Sensor: 197 mm x 51 mm x 79 mm  
Interface Module: 178 mm x 96 mm x 96 mm

### CE Certification

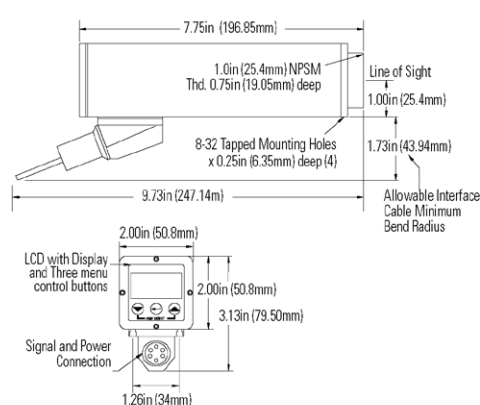
EMI/ RFI for heavy industry; LVD ( Low Voltage Directive)

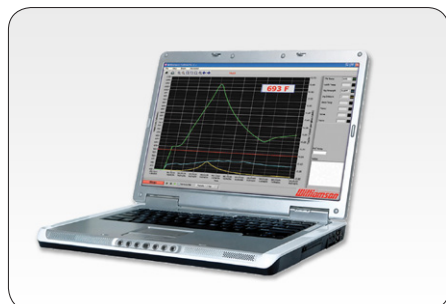
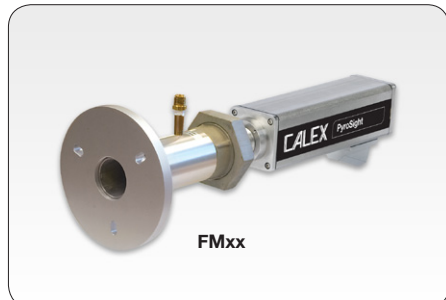
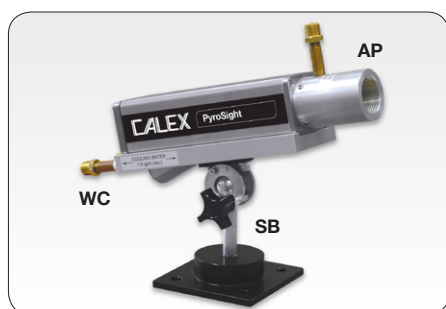
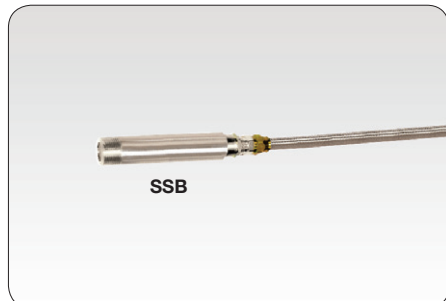
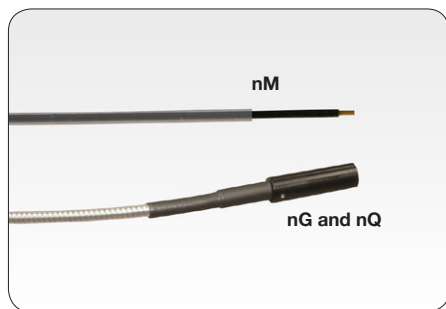
## SAMPLE FIELD OF VIEW (FOV)



PyroSight sensors may be used at any distance as long as the measured target fills the sensor's viewing area. The diameter (d) of the viewing area is calculated as  $d = D/F$  where D is the focal distance of the sensor from the target and F is the optical resolution factor of the sensor. The part number for the sample FOV below is FOV1m/100 where the focal distance D is 1 m, the optical resolution factor F is 100, and the diameter of the viewing area is 10 mm.

## PYROSIGHT DIMENSIONS





## OPTIONS

ProSight Series	
LA	Laser Aiming
PyroSight F Series	
The standard fibre optic cables (nG and nQ) are sealed with a Teflon jacket over a stainless steel sheath and are available in lengths of 1 m to 9 m. The cable diameter is 6.5 mm with a lens assembly that is 77 mm x 14 mm diameter.	
For added protection, the flexible, lightweight Stainless Steel Braid (SSB) is available with a built in air purge and a stainless steel sight tube with a 1 inch pipe thread.	
For applications with very confined access and the potential for electromagnetic interference, the mono-filament fibre cables (nM) with a Teflon sheathing and Teflon outer jacket offer a smaller diameter of 1.3 mm and non-conductive packaging.	
nG	Teflon Sealed Glass Fibre Optic Cable (n=length in feet)
nQ	Teflon Sealed Quartz Fibre Optic Cable (n=length in feet)
nM	Mono-filament Fibre Cable with Teflon sheathing and Teflon outer jacket (does not include lens and offers D/2 optics)
SSB	Stainless Steel Braided Conduit includes flexible, lightweight conduit, air purge and a stainless steel sight tube
AL	Built in Aim Light
3QT	Non-conductive Ceramic Quartz Tip, 83 mm Long, threads onto end of fibre cable
ATEX	ATEX Enclosure

Sensor Cable	
OC	Sensor Connector Kit (no Cable)
nCF	Sensor Cable. Lengths (n) ordered in increments of 10 feet
nCM	Sensor Cable. Lengths (n) ordered in increments of 3 meters
R	Reverse Orientation of Connector 180°
nPT	Sensor Cable is Pigtail/Hard-wired. Lengths (n) ordered in increments of 10 ft./3m, 20 ft./6m, 30 ft./12m

N.B. The standard fibre optic cable lengths (n) are 3ft/0.9m, 6ft/1.8m, 10ft/3m, 15ft/4.6m, 20ft/6.1m, 25ft/7.6m, and 30ft/9.1m. Consult Calex for custom lengths, cables with vacuum bushings and right angle bends.

## ACCESSORIES

PyroSight Series	
To simplify installation and provide additional protection to the sensor, Calex offers a Swivel Bracket (SB) and Water Cooling Air Purge (WCAP) accessories. The recommended air flow is 1.5 to 5 m3/hr and water flow is 2 to 12 l/min.	
AP	Air Purge Assembly
WCAP	Water Cooling Air Purge
SB	Swivel Bracket (includes MP)
FMxx	A Selection of Flange Mounts

PyroSight F Series	
To simplify the installation and alignment of the PyroSight F series sensors, Calex offers a Site Tube Swivel Bracket (STSB) and a Fibre Optic Swivel Bracket (FOSB) that also includes the Air Purge (FOAP) accessory as standard.	
FOAP	Fibre Optic Air Purge Assembly
WC	Water Cooling for Fibre Optic Sensors
FOSB	Fibre Optic Swivel Mounting Bracket (includes FOAP)
STSB	Sight Tube Swivel Bracket (use with SSB)
RAM	Right Angle Mirror for Fibre Optic Systems
FOFMxx	A Selection of Fibre Optic Flange Mounts
STFMxx	A Selection of Sight Tube Flange Mounts (used with SSB)

All Models	
Calex's PyroSight PC Software can be used to adjust sensor settings as well as log and analyse data from the sensor. It requires a Windows XP based PC, an Interface Module, and a USB to RS232 converter with a DB9 male connector.	
IM	Interface Module with Display, Output, and Power Supply
PACS	Purge Air Control/Filter System
VCS	Vortex Cooling System (requires WC)
MP	Mounting Plate
PSS	PyroSight PC Software for Windows XP with USB to RS232 Cable
NIST	NIST Calibration Certificate

## Calex Electronics Limited

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E-mail: info@calex.co.uk Online: <http://www.calex.co.uk>

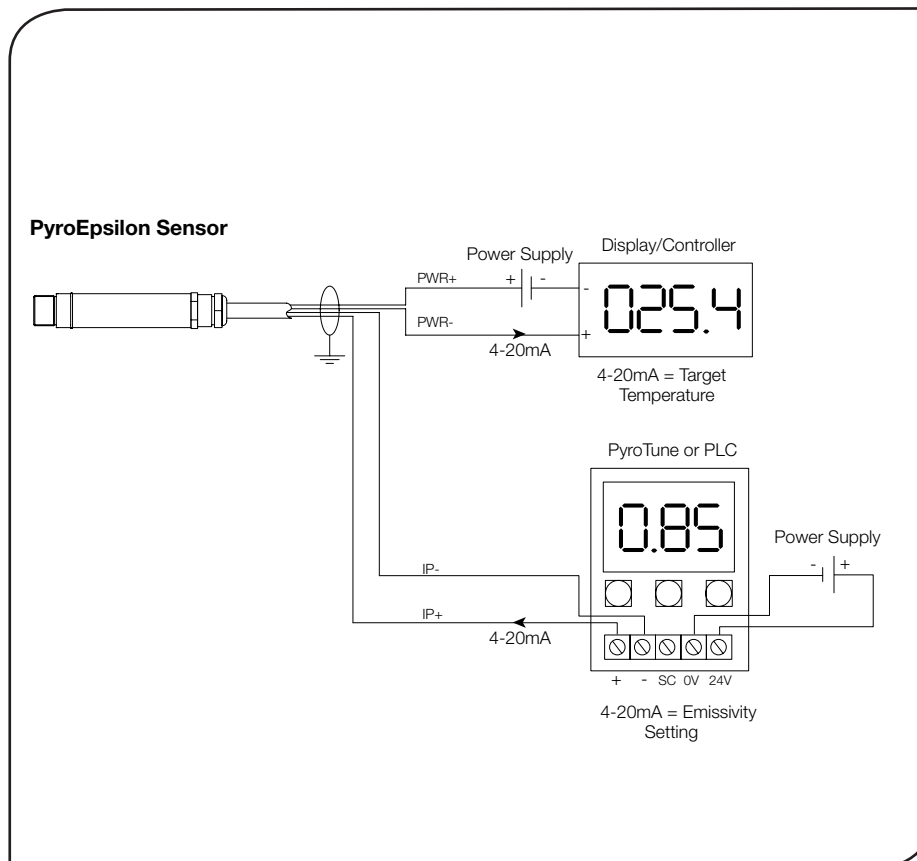


# PyroEpsilon

## Compact Non-Contact Temperature Sensor with Controllable Emissivity Setting



- Temperature range: -20°C to 500°C
- Two-wire 4-20 mA output proportional to target temperature
- 4-20mA input to control emissivity setting
- Optional PyroTune manual emissivity adjuster
- Field of view: 2:1, 15:1, 30:1 or close focus
- Fast response with high stability
- Stainless steel housing, sealed to IP65
- Quick and easy installation
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets

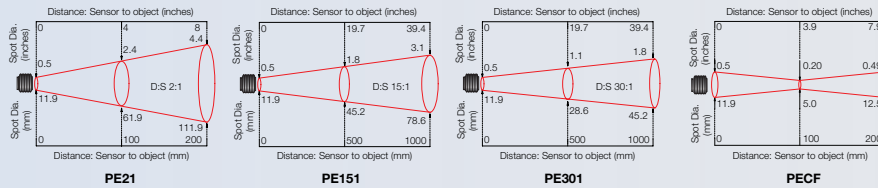


The PyroEpsilon Series is a range of high quality, low cost, compact sensors which measure the temperature of inaccessible or moving objects and materials. They measure temperatures from -20°C to 500°C, accurately and consistently, with an outstanding response time of 240 ms.

PyroEpsilon sensors transmit the target temperature as a 4-20 mA output and offer a simple solution for most non-contact temperature measurement applications.

The sensor's emissivity setting can be adjusted from 0.2 to 1.0 to cope with different target materials and is controlled by a 4-20 mA input. This gives the opportunity to adjust the emissivity setting automatically from a programmable logic controller (PLC). Alternatively the emissivity setting can be adjusted manually using the optional PyroTune module. If the 4-20 mA input is left open or short-circuit the emissivity setting defaults to 0.95.

## DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD



## PYROEPSILON SPECIFICATIONS

Temperature Range vs Field-of-View table

Field of View	-20°C to 100°C	0°C to 250°C	0°C to 500°C
2:1	PE21LT	PE21MT	-
15:1	PE151LT	PE151MT	PE151HT
30:1	PE301LT	PE301MT	PE301HT
ø5mm @ 100mm	PECFLT	PECFMT	PECFHT

<b>Output</b>	4-20mA
<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</b>	0.2 to 1.0 via 4-20mA input
<b>Response Time, <math>t_{90}</math></b>	240 ms (90% response)
<b>Spectral Range</b>	8 to 14 $\mu$ m
<b>Supply Voltage</b>	24 V DC (28 V DC max.)
<b>Min. Sensor Voltage</b>	6 V DC
<b>Max. Loop Impedance</b>	900 $\Omega$ (4-20 mA output)
<b>Input Impedance</b>	50 $\Omega$

## 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

## PYROTUNE SPECIFICATIONS

<b>Output</b>	4-20mA
<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

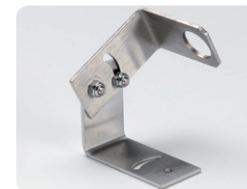
All PyroEpsilon sensors are fitted with precision Germanium lenses for accurate optics. Model PE21 has 2:1 optics making it suitable for most applications where the sensor can be mounted close to the target. Model PE151 is designed for small or distant targets and has an optical resolution of 15:1. Model PE301 is designed for very small or distant targets and has an optical resolution of 30:1. Model PECF is designed for targets as small as ø5 mm at a distance of 100 mm from the sensor

## ACCESSORIES



### FIXED MOUNTING BRACKET

The L-shaped fixed mounting bracket offers a rigid support for the sensor and allows fine adjustment in a single plane.



### ADJUSTABLE MOUNTING BRACKET

The adjustable mounting bracket consists of a fixed mounting bracket plus another L-shaped bracket. When assembled as shown the adjustable mounting bracket offers a rigid support for the sensor and allows fine adjustment in two planes.



### AIR PURGE COLLAR

The air purge collar is used to keep dust, fumes, moisture and other contaminants away from the lens. Air flows into the fitting on the side and out of the aperture at the front.



### AIR/WATER COOLED HOUSING

The air/water cooled housing allows the sensor to withstand ambient temperatures which exceed the normal 70°C limit. Air or water (depending on the degree of cooling required) flows into one of the fittings on the side and out of the other. To prevent condensation forming on the lens, the air/water cooled housing is supplied complete with an air purge collar. Please note, the air/water cooled housing must be ordered with the sensor and cannot be fitted by the user.



### LASER SIGHTING TOOL

The Laser Sighting Tool screws onto the front of the sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

# PyroCouple M

## Two-Piece Non-Contact Temperature Sensor



The PyroCouple M Series is a range of miniature infrared temperature sensors with separate electronics. PyroCouple M sensors are capable of measuring temperatures in the range -20°C to 500°C and are available with either a current, voltage or thermocouple output.

### GENERAL SPECIFICATIONS

#### Temperature Range (other sub ranges to order)

Field of View	-20°C to 100°C	0°C to 250°C	0°C to 500°C
2:1	PCM21LT-X	PCM21MT-X	-
15:1	PCM151LT-X	PCM151MT-X	PCM151HT-X
30:1	PCM301LT-X	PCM301MT-X	PCM301HT-X
Ø 5mm @ 100mm	PCMCLT-X	PCMCFMT-X	PCMCFHT-X

<b>Output</b>	See table
<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</b>	Fixed at 0.95
<b>Response Time, t90</b>	240 ms (90% response)
<b>Spectral Range</b>	8 to 14 µm
<b>Power</b>	24 V DC (13 V DC to 28 V DC max)
<b>Max. Loop Impedance</b>	750 Ω (4-20 mA output)
<b>Output Impedance</b>	56 Ω (voltage/thermocouple output)

### MECHANICAL

<b>Construction</b>	<b>Sensing head</b>	<b>Electronics Module</b>
	Stainless Steel	Die-cast Aluminium
<b>Dimensions</b>	18 mm dia. x 45 mm long	98mm x 64mm x 34mm
<b>Thread Mounting</b>	M16 x 1 mm pitch	
<b>Cable Length</b>	1 m	
<b>Weight with Cable</b>	205 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

Output	Model-X
4-20 mA	-0
0-50 mV	-1
T thermocouple	-2
J thermocouple	-3
K thermocouple	-4
0-5V	-5

The miniature sensing head measures just 18mm diameter x 45mm. It is made of stainless steel, sealed to IP65, and will operate in ambient temperatures up to +70°C without additional cooling. This makes the PyroCouple M Series ideal for applications where there is only a small amount of room available to mount the sensor or the ambient temperature around the sensing head is higher than normal.

The electronics module measures 98mm x 64mm x 34mm. It is made of die-cast aluminium, sealed to IP65, and will operate in ambient temperatures up to +70°C. It is powered from a 24 VDC (28 VDC max) power source.

The emissivity setting is fixed at 0.95, making the PyroCouple M Series suitable for the majority of applications where the target is made of a non-reflective material such as paper, plastic, rubber, cloth, food etc. or it can be used to measure metals that are painted, anodised or oxidised.

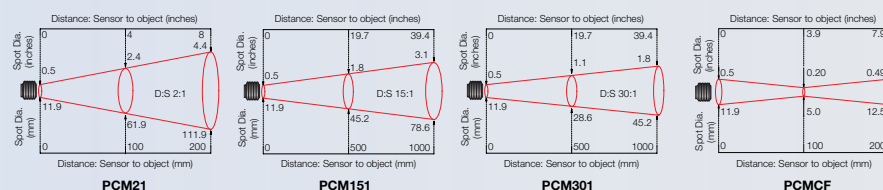
### ACCESSORIES

- Fixed mounting bracket
- Adjustable mounting bracket
- Air purge collar
- Laser sighting tool

### OPTIONS

- Other outputs available upon request
- Longer cable (3 m max.)
- Certificate of calibration

### DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD



### Calex Electronics Limited

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 E-mail: info@calex.co.uk Online: http://www.calex.co.uk

**CALEX**  
ELECTRONICS LIMITED

# PyroBus

## Non-Contact Temperature Sensor with RS485 Modbus Interface



An innovative range of compact infrared  
pyrometers with built-in digital communications for  
easy systems integration



- Wide temperature range from -20°C to 500°C
- Built-in RS485 Modbus RTU Interface
- Configurable emissivity setting and signal processing
- Max; min; average and instantaneous readings; peak or valley hold; reflected energy compensation
- 2:1, 15:1, 30:1 or close focus optics
- Fast response with high stability
- Stainless steel housing, sealed to IP65
- Quick and easy installation
- Optional air/water cooled housing, air purge collar, laser sighting tool and mounting brackets
- Optional PM240 Touch-Screen Terminal for configuring and displaying data from up to eight PyroBus sensors



The PyroBus Series is a range of high quality, low cost, compact sensors which 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.

Two-way digital communications via a built-in RS485 Modbus RTU interface enables the user to adjust the emissivity setting; compensate for reflected energy; apply filtering; select maximum, minimum, average or instantaneous readings; and peak or valley hold processing. Up to thirty two sensors can be installed on a single multidrop network.

All PyroBus sensors are fitted with precision Germanium lenses for accurate optics. Model PB21 has 2:1 optics making it suitable for most applications where the sensor can be mounted close to the target. Model PB151 is designed for small or distant targets and has an optical resolution of 15:1. Model PB301 is designed for very small or distant targets and has an optical resolution of 30:1. Model PBCF is designed for targets as small as  $\varnothing 5\text{mm}$  at a distance of 100mm from the sensor.

These compact sensors are small enough to fit almost anywhere and their rugged stainless steel housings make them ideal for applications where cleanliness and hygiene are paramount.

## GENERAL SPECIFICATIONS

<b>Temperature Range</b>	-20°C to 500°C
<b>Interface</b>	RS485 Modbus RTU
<b>Accuracy</b>	$\pm 1\%$ of reading or $\pm 1^\circ\text{C}$ whichever is greater
<b>Repeatability</b>	$\pm 0.5\%$ of reading or $\pm 0.5^\circ\text{C}$ whichever is greater
<b>Emissivity</b>	0.2 to 1.0
<b>Response Time, <math>t_{90}</math></b>	240 ms (90% response)
<b>Spectral Range</b>	8 to 14 $\mu\text{m}$
<b>Supply Voltage</b>	12 V DC nominal (6 - 13 V DC)
<b>Supply Current</b>	50 mA max.
<b>Baud Rate</b>	9600 baud *
<b>Format</b>	8 data bits, no parity, 1 stop bit *

## MECHANICAL

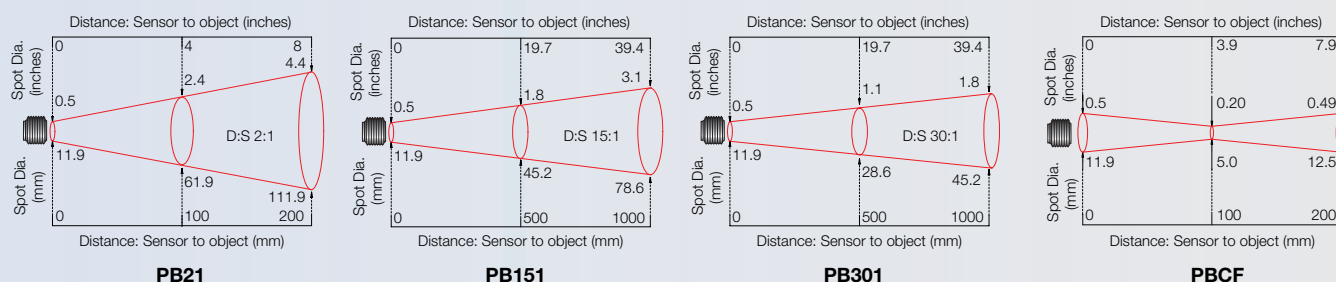
<b>Construction</b>	Stainless Steel
<b>Dimensions</b>	18 mm diameter x 103 mm long
<b>Thread Mounting</b>	M16 x 1 mm pitch
<b>Cable Length</b>	1m (longer lengths available to order)
<b>Weight with Cable</b>	95 g

## ENVIRONMENTAL

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

\* Other configurations available upon request

## DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD





The PM240 is a 320x240 pixel touch-screen terminal with a 3.5" colour TFT display. It allows the user to display data from up to eight PyroBus sensors and configure each sensor individually. The configuration parameters include emissivity setting, signal averaging, peak or valley hold processing and reflected energy compensation.

There are two versions available. Each one provides all of the features above, however, the enhanced PM240E also provides analogue transmission for up to four sensors, plus two adjustable alarm outputs per sensor for all eight sensors.

## PM240 SPECIFICATIONS

### Display

LCD type TFT 320 x 240, 3.5" touch screen  
Resistive

### Supply Voltage

12 to 24 V DC

### Power Consumption

8 W

### Ambient Temperature Range

0°C to 45°C

### Relative Humidity

35% to 95%, non-condensing

### Environmental Rating

IP54 (front), IP30 (housing)

### Dimensions

140mm wide x 100mm tall x 44mm deep (PM240)  
140mm wide x 100mm tall x 65mm deep (PM240E)

### Outputs (PM240E only)

4 analogue outputs, 0 to 10 V DC,  
16 programmable alarm outputs, 12/24 V DC,  
700 mA, (3 A max. per block of 8 outputs).

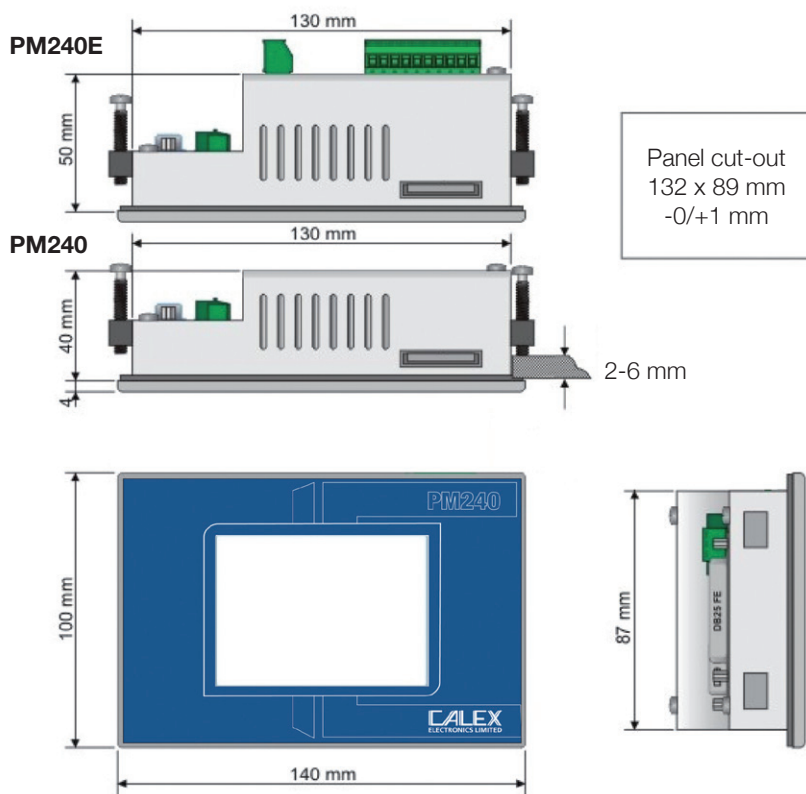
## HARDWARE AND SOFTWARE DATA

### Serial port EXP1

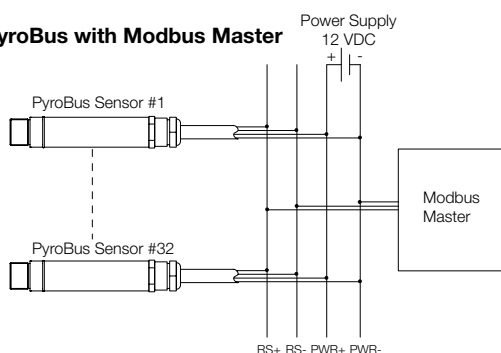
RS485 Modbus RTU interface for PyroBus sensors

### Serial port COM2

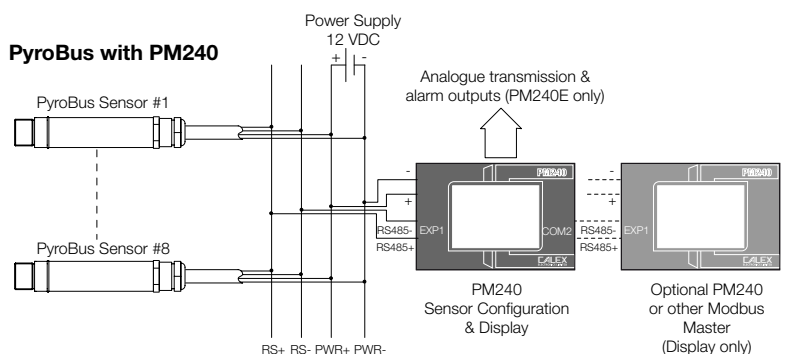
RS485 / RS232 interface for second display  
(read only)



### PyroBus with Modbus Master



### PyroBus with PM240



All PyroBus Series Sensors are supplied with a stainless steel mounting nut and are easy to install.

Standard sensors will operate in ambient temperatures up to 70°C. For more hostile environments or difficult mounting conditions a wide range of accessories is available.

## ACCESSORIES



### FIXED MOUNTING BRACKET

The L-shaped fixed mounting bracket offers a rigid support for the sensor and allows fine adjustment in a single plane.



### ADJUSTABLE MOUNTING BRACKET

The adjustable mounting bracket consists of a fixed mounting bracket plus another L-shaped bracket. When assembled as shown the adjustable mounting bracket offers a rigid support for the sensor and allows fine adjustment in two planes.



### AIR PURGE COLLAR

The air purge collar is used to keep dust, fumes, moisture and other contaminants away from the lens. Air flows into the fitting on the side and out of the aperture at the front.



### AIR/WATER COOLED HOUSING

The air/water cooled housing allows the sensor to withstand ambient temperatures which exceed the normal 70°C limit. Air or water (depending on the degree of cooling required) flows into one of the fittings on the side and out of the other. To prevent condensation forming on the lens, the air/water cooled housing is supplied complete with an air purge collar. Please note, the air/water cooled housing must be ordered with the sensor and cannot be fitted by the user.



### LASER SIGHTING TOOL

The Laser Sighting Tool screws onto the front of the sensor during installation and indicates precisely where the sensor is aiming. Once the sensor has been aimed at the centre of the target and locked in position the Laser Sighting Tool can be removed. The laser is activated by means of a push button on the front of the tool which has a latching mechanism.

# PRO 100 and 200 Series

## Multi-Wavelength Infrared Temperature Sensors



Unit shown is a PRO 200 series with  
Fibre Optic Sensing Head

- Wide temperature range from 150 to 2475°C
- Industry leading signal dilution capability
- Revolutionary ESP algorithms provide 'aim and read' capability for applications where single and dual wavelength sensors cannot take readings
- Views through obstructions like steam, smoke, plasma, dirty optics, dust and most common window materials
- Can be used in applications with a partially filled field of view caused by mechanical obstructions and a small or wandering target

### GENERAL SPECIFICATIONS

PRO 100 SERIES – Visual Aiming, Multi-Wavelength (Mλ) Sensors						
PRO Model	Nominal Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW		SIGNAL DILUTION	
			Standard or Wide Angle Optics	High Resolution Optics	Exceeds 20:1 Above	Maximum
120-05	2 μm	150 to 475 °C	D/17	n/a	190°C	1800:1
120-20	2 μm	200 to 600 °C	D/25 or D/17	D/50	275°C	2400:1
120-36	2 μm	300 to 1040 °C	D/75 or D/50	D/100	400°C	1950:1
120-40	2 μm	475 to 1475 °C	D/75	D/100	550°C	2400:1
110-10	1.5 μm	375 to 1150 °C	D2 or D/35	D/50	500°C	6000:1
110-15	1.5 μm	400 to 1375 °C	D2 or D/35	D/50	500°C	6000:1
110-20	1.5 μm	475 to 1750 °C	D/2 or D/35	D/50 or D/100	660°C	6000:1
110-30	1.5 μm	550 to 2200 °C	D/2 or D/35	D/50 or D/100	720°C	6000:1
110-40	1 μm	600 to 1100 °C	D/30 or D/17	n/a	720°C	2350:1
110-50	1 μm	700 to 1375 °C	D/75 or D/17	n/a	860°C	2350:1
110-65	1 μm	875 to 1750 °C	D/100 or D/25	D/150	1040°C	2350:1
110-70	1 μm	925 to 2475 °C	D/100 or D/25	D/150	1300°C	2350:1

PRO 200 SERIES – Fibre Optic, Multi-Wavelength (Mλ) Sensors								
PRO Model	Nominal Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW		FIBRE CABLE		SIGNAL DILUTION	
			Standard Resolution Optics	High Resolution Optics	Max. Length	Type of Cable	Exceeds 20:1 Above	Maximum
220-20	2 μm	200 to 600 °C	D/2 or D/16	n/a	90 cm	Quartz	240°C	550:1
220-25	2 μm	260 to 600 °C	D/2 or D/12	D/35	1.2 m	Quartz	275°C	1500:1
220-36	2 μm	300 to 1040 °C	D/2 or D/35	D/50	1.8 m	Quartz	400°C	1500:1
220-40	2 μm	475 to 1475 °C	D/16 or D/50	D/100	1.8 m	Quartz	550°C	1500:1
210-10	1.5 μm	375 to 1150 °C	D/2 or D/12	D/35	9.1 m	Quartz	500°C	6000:1
210-15	1.5 μm	400 to 1375 °C	D/75 or D/12	D/35	9.1 m	Glass	540°C	6000:1
210-20	1.5 μm	475 to 1750 °C	D/75 or D/12	D/50	9.1 m	Glass	660°C	6000:1
210-30	1.5 μm	550 to 2200 °C	D/75 or D/12	D/50	9.1 m	Glass	720°C	6000:1
210-40	1 μm	600 to 1100 °C	D/75 or D/16	n/a	6 m	Glass	720°C	2250:1
210-50	1 μm	700 to 1375 °C	D/75 or D/35	D/50	9.1 m	Glass	860°C	2250:1
210-65	1 μm	875 to 1750 °C	D/75 or D/50	D/100	9.1 m	Glass	1040°C	2250:1
210-70	1 μm	925 to 2475 °C	D/75 or D/50	D/100	9.1 m	Glass	1300°C	2250:1

(i) FOV Selection: d=D/F, where d=Measured Target Diameter, D=Working Distance, F=Optical Resolution Factor  
(ii) Fibre Cables are available in the following lengths: 91cm, 1.8m, 3m, 6m, 7.6m, 9.1m

The PRO 100 and 200 series multi-wavelength infrared temperature sensors are designed to accurately measure non-greybody materials in applications where single and dual wavelength sensors cannot. These include aluminium extrusion and molten aluminium streams, iron and steel streams, galvanised and stainless steel production.

These sensor's industry leading signal dilution factor allows them to measure very small and wandering targets, and tolerate misalignment, dirty lenses and partially filled fields of view, while still giving accurate readings.

Their intuitive text based configuration system makes the PRO series simple and quick to programme for even the most demanding application, while advanced ESP algorithms and signal processing ensure that these sensors always provide valid readings, or hold the last valid reading until another can be taken. This further removes errors from poor alignment and transient process conditions that could cause unnecessary errors in other systems.

Fibre-optic and traditional camera style versions of the PRO multi-wavelength sensors are available to suit all mounting conditions. Either laser or through lens sighting is available on all camera style models. Aim light sighting is available on all fibre-optic style modules. All come with bi-directional RS-485 communications for configuration and measurement readings.

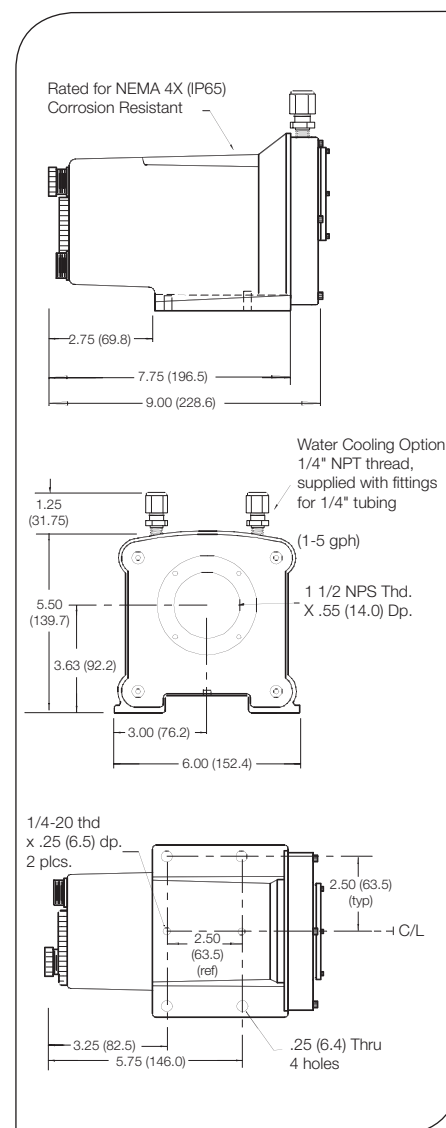


## GENERAL SPECIFICATIONS - Continued

<b>Accuracy</b>	0.25% to 0.5% of Reading or 2°C (varies by model)
<b>Repeatability</b>	Better than 1°C
<b>Response Time</b>	
<b>Constant Target:</b>	50 ms (sensor); 100 ms (interface module)
<b>Intermittent Target:</b>	200 ms (98% of Reading - 4τ)
<b>CE Certification</b>	EMI / RFI for heavy industry; LVD (Low Voltage Directive)
<b>Ambient Temperature Limits</b>	
<b>Sensor Head:</b>	-17 to 60°C
<b>Interface Module:</b>	50°C
<b>Sensor w/ Water Cooling:</b>	95-175°C (varies with water rate and temperature)
<b>Fibre Optic Assembly:</b>	200°C
<b>Input Power</b>	
<b>Stand-alone Sensor:</b>	24 V DC (300 mA);
<b>With Interface Module:</b>	90-260 V AC, 50/60 Hz
<b>Input and Output Signals</b>	
<b>Stand-alone Configuration:</b>	
<b>Analogue Mode</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance. Shunt resistors produce voltage outputs.)</li> <li>• TTL Alarm with 2 mA at 5 V DC rating</li> <li>• External Peak Hold Reset</li> <li>• Select parameter, scale, &amp; range of output &amp; alarm</li> </ul>
<b>Digital Mode</b>	<ul style="list-style-type: none"> <li>• Bi-directional RS485 communications</li> <li>• RS232 with a converter</li> <li>• Used to connect to the Interface Module</li> </ul>
<b>System Configuration with Interface Module:</b>	
<b>2 Programmable Analogue Outputs</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance. Shunt resistors produce voltage outputs.)</li> <li>• Select parameter, scale, and range</li> </ul>
<b>3 Analogue Inputs</b>	<ul style="list-style-type: none"> <li>• Sample and Hold</li> <li>• External Peak Hold Reset</li> <li>• Analogue input for remote parameter adjustments</li> </ul>
<b>Bi-directional Serial Communications</b>	<ul style="list-style-type: none"> <li>• RS232 and RS485 simultaneously</li> </ul>
<b>2 Programmable Relay Alarms</b>	<ul style="list-style-type: none"> <li>• Form C (4 A at 250 V AC or 2.5 A at 30 V DC)</li> <li>• Select alarm parameter and set point</li> <li>• TTL rating is 2 mA at 5 V DC</li> <li>• Select alarm parameter and set point</li> </ul>
<b>1 Programmable TTL Alarm</b>	<ul style="list-style-type: none"> <li>• Filtered Temperature, Unfiltered Temperature, Ambient Temperature, Signal Dilution, and Signal Strength / Emissivity</li> </ul>
<b>Programmable Output and Alarm Parameters</b>	
<b>Signal Conditioning</b>	Average Time, Peak Hold Delay, Temperature Scale (°F/°C) Adjustment, ESP Offset, ESP Selection
<b>Status Messages</b>	Out of Range, Ambient Warning, Check Sensor Cable, and Aiming System Status (optional)
<b>Diagnostics</b>	System Test, Analogue Output Tests, Alarm Tests, Menu Access/Security
<b>Enclosure Rating</b>	
<b>Sensor:</b>	IP65 - Coated Aluminium Casting
<b>Interface Module:</b>	IP52 front panel - Anodised Aluminium Housing
<b>Dimensions</b>	
<b>Sensor:</b>	229 mm x 140 mm x 152 mm
<b>Interface Module:</b>	178 mm x 96 mm x 96 mm
<b>Weight</b>	
<b>Sensor:</b>	3.4 kg
<b>Interface Module:</b>	1 kg

## PRO SERIES OPTIONS AND ACCESSORIES

IM	Programmable Interface Module (see above)
25/25S/25RS	PID Controllers with Power Supply, 4-20 mA Output, and Signal Conditioning Options
PS	Power Supply for Stand Alone Sensors 24 V DC (700 mA) to 90-260 V AC (50/60 Hz)
AP	Air Purge
WCAP	Water Cooling Air Purge
SB	Swivel Bracket
LA	Laser Aiming (For PRO 100 Series only)
AL	Aim Light (For PRO 200 Series only)
Cable Sheathings	Armour Guard (AG), Stainless Steel Braid (SSB), Gooseneck (GN) (for PRO 200 Series only)



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Issue B - Jan 10  
Specifications subject to change without notice

# PRO 80 and 90 Series

## Dual-Wavelength Infrared Temperature Sensors



Unit shown with optional Air Purge and Programmable Interface Module

- Wide temperature range from 150°C to 2475°C
- A signal dilution capability as much as 50 times greater than other two-colour technology allows the PRO series sensor to view smaller hot spots, through greater obstructions, with better accuracy.
- Views through optical obstructions such as scale, heavy steam, smoke, water spray, dirty optics, and mechanical obstruction.
- ESP Filtering provides advanced emissivity and signal dilution based signal conditioning and qualification.
- Single-detector design assures long-term calibration stability.
- Self-aligning to the hottest temperature viewed.
- Views through common window materials.

### GENERAL SPECIFICATIONS

PRO 80 SERIES – Visual Aiming, Dual-Wavelength (2λ) Sensors						
PRO Model	Nominal Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW		SIGNAL DILUTION	
			Standard or Wide Angle Optics	High Resolution Optics	Exceeds 20:1 Above	Maximum
82-05	2 μm	150 to 475 °C	D/17	n/a	190°C	1800:1
82-20	2 μm	200 to 600 °C	D/25 or D/17	D/50	220°C	2400:1
82-36	2 μm	300 to 1040 °C	D/25 or D/50	D/75	400°C	1950:1
82-40	2 μm	475 to 1475 °C	D/25, D/50 or D/75	D/100	525°C	2400:1
81-10	1.5 μm	375 to 1150 °C	D/50	D/75	500°C	6000:1
81-15	1.5 μm	400 to 1375 °C	D/100 or D/25	D/150	540°C	6000:1
81-20	1.5 μm	475 to 1750 °C	D/100 or D/25	D/120	660°C	6000:1
81-30	1.5 μm	550 to 2200 °C	D/100 or D/25	D/120	720°C	6000:1
81-40	1 μm	600 to 1100 °C	D/30 or D/17	n/a	700°C	2350:1
81-50	1 μm	700 to 1375 °C	D/75 or D/17	n/a	815°C	2350:1
81-65	1 μm	875 to 1750 °C	D/100 or D/25	D/150	980°C	2350:1
81-70	1 μm	925 to 2475 °C	D/100 or D/25	D/150	1250°C	2350:1

PRO 90 SERIES – Fibre Optic, Dual-Wavelength (2λ) Sensors								
PRO Model	Nominal Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW		FIBRE CABLE		SIGNAL DILUTION	
			Standard Resolution Optics	High Resolution Optics	Max. Length	Type of Cable	Exceeds 20:1 Above	Maximum
92-20	2 μm	200 to 600 °C	D/2 or D/16	n/a	90 cm	Quartz	275°C	550:1
92-25	2 μm	260 to 600 °C	D/2 or D/16	D/35	1.2 m	Quartz	275°C	1500:1
92-36	2 μm	300 to 1040 °C	D/2 or D/35	D/50	1.8 m	Quartz	400°C	1500:1
92-40	2 μm	475 to 1475 °C	D/16 or D/50	D/100	1.8 m	Quartz	550°C	1500:1
91-10	1.5 μm	375 to 1150 °C	D/2 or D/35	D/50	9.1 m	Quartz	500°C	6000:1
91-15	1.5 μm	400 to 1375 °C	D/2 or D/35	D/50	9.1 m	Quartz	500°C	6000:1
91-20	1.5 μm	475 to 1750 °C	D/2 or D/35	D/50 or D/100	9.1 m	Quartz	660°C	6000:1
91-30	1.5 μm	550 to 2200 °C	D/2 or D/35	D/50 or D/100	9.1 m	Quartz	720°C	6000:1
91-40	1 μm	600 to 1100 °C	D/75 or D/16	n/a	6 m	Glass	700°C	2250:1
91-50	1 μm	700 to 1375 °C	D/75 or D/35	D/50	9.1 m	Glass	815°C	2250:1
91-65	1 μm	875 to 1750 °C	D/75 or D/50	D/100	9.1 m	Glass	980°C	2250:1
91-70	1 μm	925 to 2475 °C	D/75 or D/50	D/100	9.1 m	Glass	1250°C	2250:1

- (i) Temperature Range Selection: The temperature units (°F/°C) can be selected in the sensor or display menu.  
(ii) FOV Selection:  $d=D/F$ , where  $d$ =Measured Target Diameter,  $D$ =Working Distance,  $F$ =Optical Resolution Factor  
(iii) Fibre Cables are available in the following lengths: 91cm, 1.8m, 3m, 6m, 7.6m, 9.1m

The PRO 80 and 90 series dual-wavelength infrared thermometers have been designed specifically with hostile operating conditions and low and variable target emissivity in mind. They are highly recommended for the measurement of low- or variable-emissivity materials, for measurement through optical obstructions, and for measurement of small or wandering targets.

Able to measure temperature, emissivity, and signal dilution, dual-wavelength sensors are available in a camera style or fibre optic configuration. The fibre optic sensors are available with a wide range of fibre cable sheathings ranging from the 1.3 mm diameter monofilament to the 44.5 mm diameter Armour Guard system.

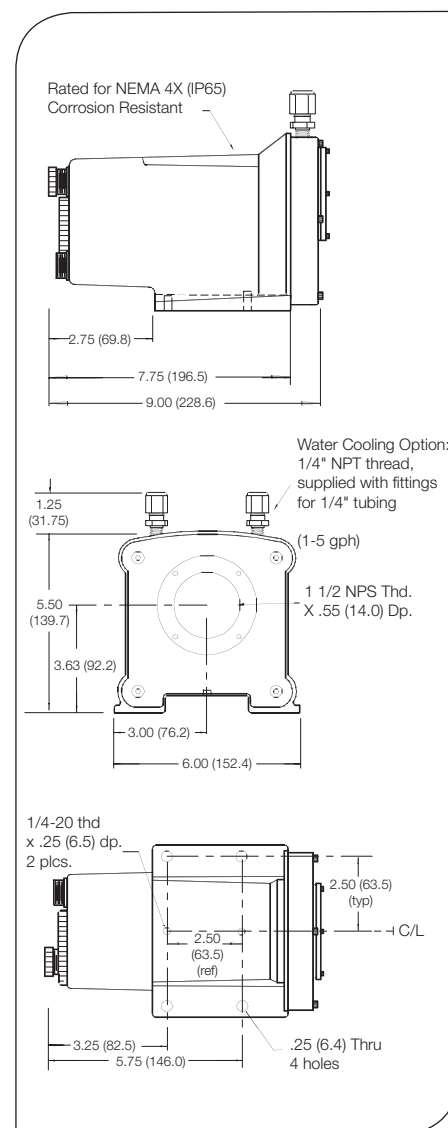
Perhaps the most significant technical features associated with the PRO series dual-wavelength sensors are the industry-leading signal dilution capability and the ability to measure and utilise emissivity and signal dilution values through advanced signal conditioning. These features allow the PRO sensors to provide unequalled performance and functionality over a broad range of applications.

## GENERAL SPECIFICATIONS - Continued

<b>Accuracy</b>	0.25% to 0.5% of Reading or 2°C (varies by model)
<b>Repeatability</b>	Better than 1°C
<b>Response Time</b>	
<b>Constant Target:</b>	50 ms (sensor); 100 ms (interface module)
<b>Intermittent Target:</b>	200 ms (98% of Reading - 4τ)
<b>CE Certification</b>	EMI / RFI for heavy industry; LVD (Low Voltage Directive)
<b>Ambient Temperature Limits</b>	
<b>Sensor Head:</b>	PRO 81 & 91: -17 to 60°C PRO 82 & 92: -17 to 50°C
<b>Interface Module:</b>	50°C
<b>Sensor w/ Water Cooling:</b>	95-175°C (varies with water rate and temperature)
<b>Fibre Optic Assembly:</b>	200°C
<b>Input Power</b>	
<b>Stand-alone Sensor:</b>	24 V DC (300 mA);
<b>With Interface Module:</b>	90-260 V AC, 50/60 Hz
<b>Input and Output Signals</b>	
<b>Stand-alone Configuration:</b>	
<b>Analogue Mode</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance. Shunt resistors produce voltage outputs.)</li> <li>• TTL Alarm with 2 mA at 5 V DC rating</li> <li>• External Peak Hold Reset</li> <li>• Select parameter, scale, &amp; range of output &amp; alarm</li> <li>• Bi-directional RS485 communications</li> <li>• RS232 with a converter</li> <li>• Used to connect to the Interface Module</li> </ul>
<b>Digital Mode</b>	
<b>System Configuration with Interface Module:</b>	
<b>2 Programmable Analogue Outputs</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance. Shunt resistors produce voltage outputs.)</li> <li>• Select parameter, scale, and range</li> </ul>
<b>3 Analogue Inputs</b>	<ul style="list-style-type: none"> <li>• Sample and Hold</li> <li>• External Peak Hold Reset</li> <li>• Analogue input for remote parameter adjustments</li> </ul>
<b>Bi-directional Serial Communications</b>	<ul style="list-style-type: none"> <li>• RS232 and RS485 simultaneously</li> </ul>
<b>2 Programmable Relay Alarms</b>	<ul style="list-style-type: none"> <li>• Form C (4 A at 250 V AC or 2.5 A at 30 V DC)</li> <li>• Select alarm parameter and set point</li> <li>• TTL rating is 2 mA at 5 V DC</li> <li>• Select alarm parameter and set point</li> </ul>
<b>1 Programmable TTL Alarm</b>	
<b>Programmable Output and Alarm Parameters</b>	Filtered Temperature, Unfiltered Temperature, Ambient Temperature, Signal Dilution, and Signal Strength / Emissivity
<b>Signal Conditioning</b>	Average Time, Peak Hold Delay, Temperature Scale (°F/°C) Adjustment, Slope Adjustment
<b>Status Messages</b>	Out of Range, Ambient Warning, Check Sensor Cable, and Aiming System Status (optional)
<b>Diagnostics</b>	System Test, Analogue Output Tests, Alarm Tests, Menu Access/Security
<b>Enclosure Rating</b>	
<b>Sensor:</b>	IP65 - Coated Aluminium Casting
<b>Interface Module:</b>	IP52 front panel - Anodised Aluminium Housing
<b>Dimensions</b>	
<b>Sensor:</b>	229 mm x 140 mm x 152 mm
<b>Interface Module:</b>	178 mm x 96 mm x 96 mm
<b>Weight</b>	
<b>Sensor:</b>	3.4 kg
<b>Interface Module:</b>	1 kg

## PRO SERIES OPTIONS AND ACCESSORIES

IM	Programmable Interface Module (see above)
25/25S/25RS	PID Controllers with Power Supply, 4-20 mA Output, and Signal Conditioning Options
PS	Power Supply for Stand Alone Sensors 24 V DC (700 mA) to 90-260 V AC (50/60 Hz)
AP	Air Purge
WCAP	Water Cooling Air Purge
SB	Swivel Bracket
LA	Laser Aiming (For PRO 80 Series only)
AL	Aim Light (For PRO 90 Series only)
Cable Sheathings	Armour Guard (AG), Stainless Steel Braid (SSB), Gooseneck (GN) (For PRO 90 Series only)



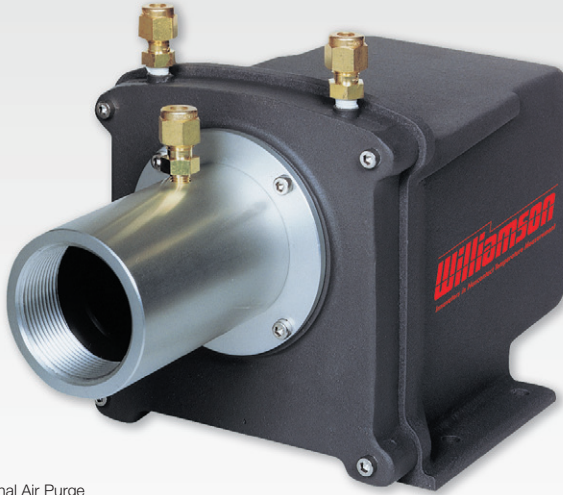
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# PRO 40 and 50 Series

## Single-Wavelength Infrared Temperature Sensors



Unit shown with optional Air Purge

- Temperature ranges to 2475°C
- Fully configurable for range, emissivity, peak hold, averaging, alarm parameters and set points via RS232/RS485 communications
- Accuracy to 0.25% of reading
- Different spectral ranges to suit many applications
- Precision optics.
- Visual aiming or fibre-optic versions
- Short wavelength operation dramatically reduces sensitivity to emissivity variation
- Views through common window materials.
- As much as ten times more accurate than long-wavelength sensors when measuring low-emissivity materials such as aluminium, chrome, stainless steel, tin and zinc.

### GENERAL SPECIFICATIONS

#### PRO 40 SERIES – Visual Aiming, Single-Wavelength (1 $\lambda$ ) Sensors

PRO Model	Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW
42-08	2.8 to 3.3 $\mu\text{m}$	40 to 425 °C	D/35
42-20	2.8 to 3.3 $\mu\text{m}$	65 to 425 °C	D/100
42-30	2.0 to 2.4 $\mu\text{m}$	65 to 425 °C	D/50
42-36	2.0 to 2.4 $\mu\text{m}$	150 to 1100 °C	D/50
42-40	2.0 to 2.4 $\mu\text{m}$	200 to 1375 °C	D/100
41-20	1.5 to 1.65 $\mu\text{m}$	260 to 1150 °C	D/100
41-25	1.5 to 1.65 $\mu\text{m}$	300 to 1375 °C	D/100
41-30	1.5 to 1.65 $\mu\text{m}$	375 to 1750 °C	D/100
41-50	0.8 to 1.0 $\mu\text{m}$	540 to 1375 °C	D/100
41-60	0.8 to 1.0 $\mu\text{m}$	650 to 1750 °C	D/100
41-70	0.8 to 1.0 $\mu\text{m}$	760 to 2475 °C	D/150

#### PRO 50 SERIES – Fibre Optic, Single-Wavelength (1 $\lambda$ ) Sensors

PRO Model	Spectral Response (microns)	TEMPERATURE RANGE	FIELD OF VIEW		FIBRE CABLE	
			Standard Resolution Optics	High Resolution Optics	Max. Length	Type of Cable
52-30	2.0 to 2.4 $\mu\text{m}$	65 to 425 °C	D/2 or D/12	n/a	91 cm	Quartz
52-35	2.0 to 2.4 $\mu\text{m}$	95 to 425 °C	D/2 or D/16	n/a	2 m	Quartz
52-40	2.0 to 2.4 $\mu\text{m}$	230 to 1375 °C	D/2, D/16 or D/35	D/50	9.1 m	Quartz
51-20	1.5 to 1.65 $\mu\text{m}$	260 to 1150 °C	D/2, D/16 or D/35	D/50	7 m	Quartz
51-25	1.5 to 1.65 $\mu\text{m}$	300 to 1375 °C	D/2, D/16 or D/35	D/50	9.1 m	Quartz
51-30	1.5 to 1.65 $\mu\text{m}$	375 to 1750 °C	D/35 or D/50	D/75 or D/100	9.1 m	Glass
51-50	0.8 to 1.0 $\mu\text{m}$	540 to 1375 °C	D/75 or D/16	n/a	91 cm	Glass
51-60	0.8 to 1.0 $\mu\text{m}$	650 to 1750 °C	D/35 or D/50	D/75	3 m	Glass
51-70	0.8 to 1.0 $\mu\text{m}$	760 to 2475 °C	D/35 or D/50	D/75 or D/100	9.1 m	Glass

- (i) Temperature Range Selection: The temperature units (°F/°C) can be selected in the sensor or display menu.  
(ii) FOV Selection:  $d=D/F$ , where  $d$ =Measured Target Diameter,  $D$ =Working Distance,  $F$ =Optical Resolution Factor  
(iii) Fibre Cables are available in the following lengths: 91cm, 1.8m, 3m, 6m, 7.6m, 9.1m

The PRO 40 and 50 series of advanced infrared temperature sensors are ideal for use with targets with low emissivities at high and low temperatures. By operating at short wavelengths they are able to reduce the errors from changing and very low emissivity.

The sensitivity to emissivity variation is one quarter (high emissivity targets) to one tenth (low emissivity targets) that of a long wavelength sensor. For this reason, the PRO series 40 and 50 infrared thermometers are able to provide an accurate and reliable temperature reading where others fail.

Narrow fields of view allow very small targets to be accurately measured, and visual or laser aiming is available on all models to ensure that their alignment is correct.

The fibre-optic PRO 50 models allow the sealed sensing head to be positioned near the target, while the electronics are mounted in a more convenient position. Heavy armour is available for the fibre-optic cable to ensure it is safe even in hazardous locations.

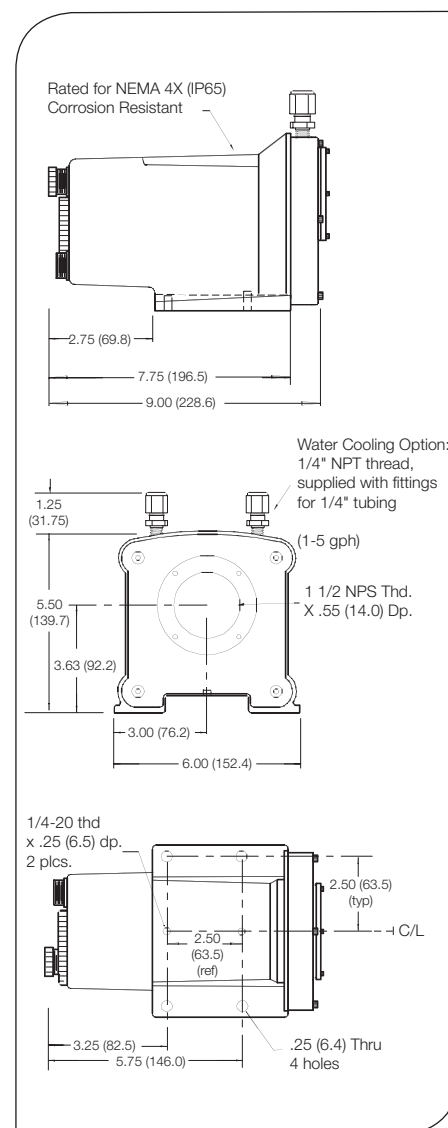


## GENERAL SPECIFICATIONS - Continued

<b>Accuracy</b>	0.25% to 0.5% of Reading or 2°C (varies by model)
<b>Repeatability</b>	Better than 1°C
<b>Response Time</b>	
<b>Constant Target:</b>	PRO 41 & 51: 5 ms; PRO 42 & 52: 50 ms (update time)
<b>Intermittent Target:</b>	PRO 41 & 51: 5 ms; PRO 42 & 52: 150 ms (98% of Reading - 4τ)
<b>CE Certification</b>	EMI / RFI for heavy industry; LVD (Low Voltage Directive)
<b>Ambient Temperature Limits</b>	
<b>Sensor Head:</b>	PRO 41 & 51: -17 to 60°C PRO 42 & 52: -17 to 50°C
<b>Interface Module:</b>	50°C
<b>Sensor w/ Water Cooling:</b>	95-175°C (varies with water rate and temperature)
<b>Fibre Optic Assembly:</b>	200°C
<b>Input Power</b>	
<b>Stand-alone Sensor:</b>	24 V DC (300 mA);
<b>With Interface Module:</b>	90-260 V AC, 50/60 Hz
<b>Input and Output Signals</b>	
<b>Stand-alone Configuration:</b>	
<b>Analogue Mode</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance Shunt resistors produce voltage outputs.)</li> <li>• TTL Alarm with 2 mA at 5 V DC rating</li> <li>• External peak hold reset</li> <li>• Select parameter, scale, &amp; range of output &amp; alarm</li> </ul>
<b>Digital Mode</b>	<ul style="list-style-type: none"> <li>• Bi-directional RS485 communications</li> <li>• RS232 with a converter</li> <li>• Used to connect to the Interface Module</li> </ul>
<b>System Configuration with Interface Module:</b>	
<b>2 Programmable Analogue Outputs</b>	<ul style="list-style-type: none"> <li>• 4-20 mA or 0-20 mA (1000 Ω max. impedance. Shunt resistors produce voltage outputs.)</li> <li>• Select parameter, scale, and range</li> </ul>
<b>3 Analogue Inputs</b>	<ul style="list-style-type: none"> <li>• Sample and Hold</li> <li>• External peak hold reset</li> <li>• Analogue input for remote parameter adjustments</li> </ul>
<b>Bi-directional Serial Comms</b>	<ul style="list-style-type: none"> <li>• RS232 and RS485 simultaneously</li> </ul>
<b>2 Programmable Relay Alarms</b>	<ul style="list-style-type: none"> <li>• Form C (4 A at 250 V AC or 2.5 A at 30 V DC)</li> <li>• Select alarm parameter and set point</li> <li>• TTL rating is 2 mA at 5 V DC</li> <li>• Select alarm parameter and set point</li> </ul>
<b>1 Programmable TTL Alarm</b>	<ul style="list-style-type: none"> <li>• Filtered Temperature, Unfiltered Temperature, Ambient Temperature, and Cell Strength (PRO 42 &amp; 52 only)</li> </ul>
<b>Programmable Output and Alarm Parameters</b>	Average Time, Peak Hold Delay, Temperature Scale (°F/°C) Adjustment, Emissivity Adjustment
<b>Signal Conditioning</b>	Out of Range, Ambient Warning, Establishing Communications, and Aiming System Status (optional)
<b>Status Messages</b>	System Test, Analogue Output Tests, Alarm Tests, Menu Access/Security
<b>Diagnostics</b>	
<b>Enclosure Rating</b>	
<b>Sensor:</b>	IP65 - Coated Aluminium Casting
<b>Interface Module:</b>	IP52 front panel - Anodised Aluminium Housing
<b>Dimensions</b>	
<b>Sensor:</b>	229 mm x 140 mm x 152 mm
<b>Interface Module:</b>	178 mm x 96 mm x 96 mm
<b>Weight</b>	
<b>Sensor:</b>	3.4 kg
<b>Interface Module:</b>	1 kg

## PRO SERIES OPTIONS AND ACCESSORIES

IM	Programmable Interface Module (see above)
25/25S/25RS	PID Controllers with Power Supply, 4-20 mA Output, and Signal Conditioning Options
PS	Power Supply for Stand Alone Sensors 24 V DC (700 mA) to 90-260 V AC (50/60 Hz)
AP	Air Purge
WCAP	Water Cooling Air Purge
SB	Swivel Bracket
LA	Laser Aiming (visual and fibre optic sensors)
AL	Aim Light (For PRO 50 Series only)
Cable Sheathings	Armour Guard (AG), Stainless Steel Braid (SSB), Gooseneck (GN) (For PRO 50 Series only)



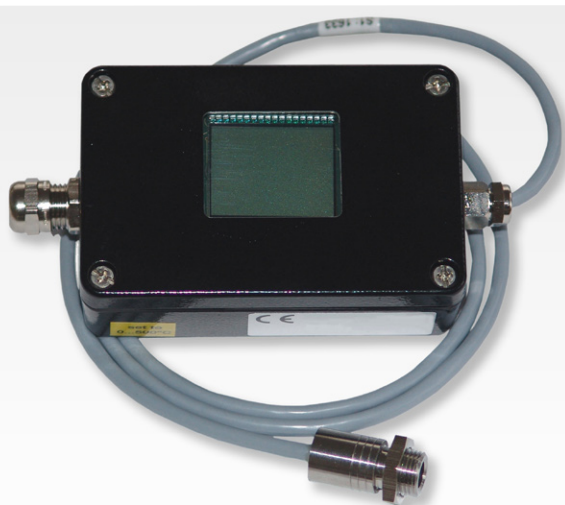
## Calex Electronics Limited

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 Specifications subject to change without notice

# VLSeries

## Configurable Two-Piece Non-Contact Temperature Sensor



- -40°C to 700°C Measurement Range
- Adjustable Emissivity From 0.1 to 1.00
- Choice of 0/4 to 20 mA, 0 to 5 V and Type J or K Thermocouple Outputs
- Backlit LCD Display
- Miniature Sensing Head
- RS-485 Interface
- Configurable Relay Output

### GENERAL SPECIFICATIONS

<b>Temperature Range</b>	-40°C to 700°C
<b>Spectral Range</b>	8 to 14 $\mu$ m
<b>Accuracy</b>	$\pm 1^\circ\text{C}$ or $\pm 1\%$ , whichever is the greater
<b>Repeatability</b>	$\pm 0.5^\circ\text{C}$ or $\pm 0.5\%$ , whichever is the greater
<b>Response Time t90</b>	180 ms, switchable to 0.5 s, 1 s, 2 s, 5 s, 10 s or 30 s
<b>Emissivity Adjustable</b>	0.10 to 1.0
<b>Field Of View</b>	10:1
<b>Output</b>	0/4 to 20 mA, 0 to 5 V or thermocouple type J or K
<b>Additional Output</b>	10 mV/°C for sensing head temperature
<b>Relay Contact</b>	Isolated relay contact, 50 V DC, 0.2 A, temperature and hysteresis adjustable
<b>Digital Interface</b>	RS-485 using UPP® (Universal Pyrometer Protocol)
<b>MAX/MIN Value Hold</b>	Maximum/minimum value hold, set to either OFF, every 0.1 s, 0.25 s, 0.5 s, 1 s, 5 s, or 25 s
<b>Temperature Display</b>	Backlit LCD, 4-digit, 3 values per second
<b>Resolution</b>	0.1°C, 0.1°F from -40 to 999.9°F, 1°F above 1000°F
<b>Power Supply</b>	10 to 30 V DC, maximum ripple 500 mV, power consumption 60 mA maximum
<b>Load Maximum</b>	700 Ohm at 24 V with current output Output Impedance 100 Ohm for thermocouple and voltage outputs

### MECHANICAL

<b>Construction</b>	<b>Sensing head</b>	<b>Electronics Module</b>
<b>Dimensions</b>	Stainless Steel	Aluminium
<b>Mounting Thread</b>	14 mm diameter x 28 mm	98 mm x 64 mm x 34 mm
<b>Cable Length</b>	M12 x 1 mm pitch	
<b>Weight</b>	3 m	
	320 g	

### ENVIRONMENTAL

<b>Environmental Rating</b>	IP65
<b>Ambient Temperature Range</b>	VL700 Sensing head 0 to 85°C (200°C with air-cooling and purging accessories), VL700-HA Sensing head 0 to 180°C without cooling. Electronics Module 0 to 65°C
<b>Relative Humidity</b>	10 to 95%

The VL miniature infrared temperature sensor from Calex Electronics is designed to offer maximum flexibility in the smallest possible package.

The VL can measure temperatures from -40°C to 700°C with a response time of just 180ms. It has a narrow 10:1 field of view, and adjustable emissivity, so it can be configured to measure most materials. Each unit offers a choice of either 0/4 to 20mA, 0 to 5V or type J or K thermocouple outputs and can therefore be used with virtually all process control instrumentation.

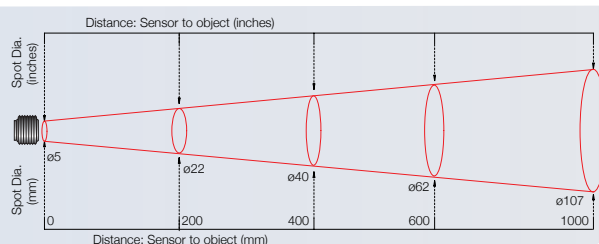
Under the lid of the electronics enclosure are buttons which are used to adjust the configuration parameters of the sensor and set the temperature range, response time and output. From here the analogue outputs can also be configured and maximum/minimum readings switched on or off.

To compliment the analogue outputs the VL also provides a digital relay output, the alarm level and hysteresis of which can be adjusted with the electronics module. The VL also has an RS-485 interface for connection to a PC, and can be interrogated using the UPP® (Universal Pyrometer Protocol).

The compact sensing head of the VL is made of stainless steel and is sealed to IP65. It can operate in ambient temperatures up to 85°C without cooling, or 200°C with air-cooling and purging accessories. If cooling is impractical, a special model designated VL700-HA can withstand ambient temperatures up to 180°C without cooling.

### DIAMETER OF TARGET SPOT MEASURED VERSUS DISTANCE FROM SENSING HEAD

NB: With a close-focus lens fitted the sensor will measure a  $\phi 2\text{mm}$  spot at 17mm distance



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