PyroUSB

USB Configurable Infrared Temperature Sensors with 4-20 mA Output

- Temperature ranges from -40°C to 2000°C
- 2-wire 4-20 mA output
- Fully configurable via USB using Modbus protocol
- Cable and software included
- Specialised models for measuring metals, high-temperature objects or glass surfaces
- General-purpose models for most other applications
- Peak and valley hold mode allows easy measurement of objects on conveyors
- Stainless steel housing, sealed to IP65
- Quick and easy installation

PyroUSB Series infrared pyrometers measure temperatures from -40°C to 2000°C accurately and consistently, with an outstanding response time of 200 ms. The 4 to 20 mA output is compatible with almost any indicator, controller, recorder or data logger, without the need for special interfacing or signal conditioning.

A choice of measurement wavelengths is available to suit a range of applications.

**General-purpose** PUA8 (8-14 µm) models can measure from -40°C to 1000°C. They are suitable for measuring high-emissivity materials such as paper, thick plastics, food, pharmaceuticals, rubber, asphalt and painted surfaces. These models are capable of measuring very low temperatures, so they are ideal for sub-zero measurements in the food, logistics and storage industries.

**Short-wavelength** PUA2 (2.2 µm) models have a choice of temperature ranges from 45°C to 2000°C. They provide a more accurate reading when measuring low-emissivity materials such as many reflective metals. They are also capable of measuring through glass viewports.

**Glass** PUA5 (5 µm) models have a choice of temperature ranges from 50°C to 1650°C. They are filtered at a wavelength where glass is least reflective, making them an ideal pyrometer for glass surface temperature measurement.

All models have USB communications. A USB cable is included and free software is available to download from the Calex website.

Data is transmitted via Modbus, so it is also easy to configure and read temperatures from the sensor using third-party software.

The USB cable has an IP65 connector at the sensor end, and an IP65 cap protects the sensor when the USB cable is not connected.

**CONNECTIONS**
The sensor will operate with either the 4 to 20 mA cable connected, the USB cable connected, or both.
The sensor can be configured using the included USB cable and a choice of Windows software. It is also possible to take temperature readings, see temperature charts and log data via USB in real time.

CalexConfig and CalexSoft 2 are available to download free of charge at www.calex.co.uk/software.

**SOFTWARE**

**CALEXCONFIG**

Simple, touch-friendly software for one sensor.

**CALEXSOFT 2**

Multi-channel software for Calex sensors with digital communications.

**FEATURES (CALEXCONFIG AND CALEXSOFT 2)**

- Temperature display (°C or °F)
- Scrolling temperature chart
- Data logging to comma-separated text file, Excel-compatible
- PyroUSB sensor configuration:
  - Emissivity setting
  - Averaging
  - Peak/valley hold processing
  - Reflected energy compensation
  - 4-20 mA output temperature scale

**THIRD-PARTY SOFTWARE**

The PyroUSB can also be used with third-party Modbus software. Modbus protocol information is provided in the Operator's Guide, available to download at www.calex.co.uk and supplied with each sensor.

**DIMENSIONS**

All dimensions in mm

Mounting nut (included)

Thread: M20 x 1 mm

USB cable socket

4-20 mA output cable 1 metre (as standard)

Ø 27.6
### OPTICS

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

Note: The sensor will measure longer distances than shown, with a larger measured spot size.

#### General Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PUA2</th>
<th>PUA5</th>
<th>PUA8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral Response</td>
<td>2.2 µm</td>
<td>5 µm</td>
<td>8 to 14 µm</td>
</tr>
<tr>
<td>Application</td>
<td>Ferrous metals and high-temperature targets</td>
<td>Glass</td>
<td>General purpose</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Choice of ranges from 45°C to 2000°C</td>
<td>Choice of ranges from 50°C to 1650°C</td>
<td>-40°C to 1000°C</td>
</tr>
<tr>
<td>Response time</td>
<td>200 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>2-wire, 4-20 mA, linear with measured temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>USB 2.0 (removable USB cable and software included) using the Modbus protocol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optics</td>
<td>Choice of optics for small or large targets at short or long distances (see Optics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>±2°C or 1% of reading, whichever is greater</td>
<td>±1°C or 1% of reading, whichever is greater</td>
<td></td>
</tr>
<tr>
<td>Emissivity Setting</td>
<td>±0.5°C or 0.5% of reading, whichever is greater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Span (4-20 mA output)</td>
<td>Full temperature range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Span (4-20 mA output)</td>
<td>100°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Electrical

| Supply Voltage | 24 V DC (28 V DC max) |
| Sensor Voltage (minimum) | 6 V DC |
| Maximum Loop Impedance | 900 Ω @ 24 V DC |

#### Mechanical

| Construction | Stainless Steel |
| Dimensions   | Ø27.6 x length 61 mm including cable glands |
| Thread mounting | M20 x 1 mm pitch, length 15 mm |
| 4-20 mA Output Cable Length | 1 m (standard), up to 30 m (optional) |
| Weight with 1 m Output Cable | 155 g |
| USB Cable Length | 1.8 m |
| Relative Humidity | 95% max. non-condensing |

#### Environmental

| Environmental Rating | IP65 |
| Ambient (Operating) Temperature | 0°C to 70°C (cooled models are available for higher temperatures) |

#### MINIMUM MEASURABLE TEMPERATURE

(PUA2-151-LT only)

Graph showing the minimum measurable object temperature ($T_{\text{min}}$), determined by surface emissivity ($\varepsilon$) and sensor temperature ($T_S$).
# MODEL NUMBERS

<table>
<thead>
<tr>
<th>Short Wavelength</th>
<th>PUA2</th>
<th>251</th>
<th>MT</th>
<th>Wj</th>
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<tbody>
<tr>
<td>Glass</td>
<td>PUA5</td>
<td>251</td>
<td>GHT</td>
<td>Wj</td>
</tr>
<tr>
<td>General Purpose</td>
<td>PUA8</td>
<td>301</td>
<td></td>
<td>Wj</td>
</tr>
</tbody>
</table>

## ACCESSORIES

### ACCESSORIES ALSO AVAILABLE

- **Fixed mounting bracket** FBL
- **Extended 4-20 mA output cable** PUACE
  - for PyroUSB models without cooling
  - for PyroUSB WJ models PUACEHT
  (Maximum factory-fitted cable length: 30 m)
- **Calibration certificate, UKAS traceable**, 3 standard temperature points CALCERTA

### ACCESSORIES

- **Laser sighting tool** LSTL
- **Adjustable mounting bracket** ABL
- **Air/water cooled housing** WJ
- **Air purge collar** APL
- **Dual laser sighting bracket** DLSBFL, DLSBAl
- **Protective plastic window (for PUA8)** PWL

### Temperature range

**PUA2**

- **LT**: 45°C to 300°C (151 models only)
- **PT**: 100°C to 400°C (151 models only)
- **MT**: 250°C to 1000°C
- **HT**: 450°C to 2000°C

**PUA5**

- **GLT**: 50°C to 1000°C
- **GHT**: 200°C to 1650°C

**PUA8**

- (blank) All models: -40°C to 1000°C

### Field of view

**PUA2**

- **151**: 15:1 divergent optics (LT & PT models only)
- **251**: 25:1 divergent optics
- **751**: 75:1 divergent optics

**PUA5**

- **251**: 25:1 divergent optics

**PUA8**

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

### Spectral response

**PUA2**: 2.2 µm, for measuring reflective metals and high-temperature objects

**PUA5**: 5 µm, for measuring glass surface temperature

**PUA8**: 8 to 14 µm, general-purpose, for non-reflective non-metals, painted metal surfaces and most other applications

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Specifications subject to change without notice