PyroCube Series
Infrared Temperature Sensors for Special Applications

• High performance infrared temperature sensors
• Choice of specialised models for demanding applications
• Continuous LED sighting on all models shows position and size of measured spot while readings are being taken
• Current, voltage and alarm outputs
• Digital communications
• Optional touch-screen display with configuration and data logging

PyroCube sensor with optional touch screen interface

PYROCUBE SENSOR SPECIFICATIONS

<table>
<thead>
<tr>
<th>PyroCube Type</th>
<th>S</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>General purpose</td>
<td>Fast response</td>
<td>Glass</td>
</tr>
<tr>
<td>Description</td>
<td>The general-purpose PyroCube S is suitable for measuring most non-reflective non-metals. Advantages over other general-purpose sensors are the built-in LED aiming light, fast response time, and small measured spot size.</td>
<td>The PyroCube F has a lightning-fast response time of 0.001 seconds.</td>
<td>Glass-specific measurement wavelength for improved accuracy when measuring glass surface temperature. G models are ideal for annealing, e.g. light bulb and fluorescent lamp manufacturing. GH models are suitable for high-temperature glass melting, such as in glass-to-metal sealing.</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>0°C - 500°C</td>
<td>50°C - 500°C</td>
<td>100°C - 2000°C</td>
</tr>
<tr>
<td>Measurements below 50°C are possible with reduced stability</td>
<td>Measurements below 100°C are possible with reduced stability</td>
<td>Measurements below 100°C are possible with reduced stability</td>
<td></td>
</tr>
<tr>
<td>Analogue output scale (adjustable via optional touch screen module or RS232)</td>
<td>Factory set: 4 mA = 0°C 20 mA = 500°C</td>
<td>Factory set: 4 mA = 50°C 20 mA = 1200°C</td>
<td>Factory set: 4 mA = 50°C 20 mA = 2400°C</td>
</tr>
<tr>
<td>Response Time (adjustable up to 5 s via averaging function)</td>
<td>10 ms</td>
<td>1 ms</td>
<td>50 ms</td>
</tr>
<tr>
<td>Accuracy of Measurement †</td>
<td>± 3°C or 1%, whichever is greater</td>
<td>± 3.5°C or 1%, whichever is greater</td>
<td>All models: ± 3°C or 1%, whichever is greater -GH models: ± 2% above 1200°C</td>
</tr>
<tr>
<td>Repeatability †</td>
<td>± 0.5°C</td>
<td>± 1°C</td>
<td>± 1°C</td>
</tr>
<tr>
<td>Temperature Resolution †</td>
<td>&lt;0.5°C</td>
<td>&lt;0.7°C</td>
<td>0.5°C</td>
</tr>
<tr>
<td>Spectral Response</td>
<td>2 - 7 µm</td>
<td>2 - 7 µm</td>
<td>2 - 7 µm</td>
</tr>
<tr>
<td>Model No. PCU-</td>
<td>S1.6</td>
<td>S1.6</td>
<td>S5.5</td>
</tr>
<tr>
<td>Focal Spot Diameter (mm)</td>
<td>1.6</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>Focal Distance (mm)</td>
<td>35</td>
<td>70</td>
<td>120</td>
</tr>
<tr>
<td>Maximum Measurement Distance (mm)</td>
<td>150</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Weight (without cable)</td>
<td>85g</td>
<td>85g</td>
<td>190g</td>
</tr>
</tbody>
</table>

† Accuracy and repeatability are tested using a PT1000 temperature sensor.
**PyroCube Type**

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>XS</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Thin film plastics</td>
<td>Very small targets</td>
<td>Metals, low temperature</td>
</tr>
</tbody>
</table>

**Description**

- **PyroCube Type P**
  - Accurately measures the temperature of thin film plastics that cannot be measured with general-purpose sensors.
  - Materials include polyolefins, polyamide, polyethylene, polypropylene, polystyrene, nylon, PVC, acrylic, polyurethane and polycarbonate.

- **PyroCube Type XS**
  - Extremely small measured spot size.
  - Applications include measuring individual electronic component temperatures on a circuit board, and plastic welding where the seam is very narrow.

- **PyroCube Type M**
  - Short-wavelength sensors for measuring metals as cool as 50°C, with a very fast response time of 0.001 seconds and a very small measured spot size.

**Temperature Range**

<table>
<thead>
<tr>
<th>PyroCube Type</th>
<th>Temperature Range</th>
<th>Measurements below 120°C are possible with reduced stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>120°C - 350°C</td>
<td>50°C - 500°C Measurements below 50°C are possible with reduced stability</td>
</tr>
<tr>
<td>XS</td>
<td>100°C - 500°C</td>
<td>100°C - 500°C Measurements below 100°C are possible with reduced stability</td>
</tr>
<tr>
<td>M</td>
<td>100°C - 600°C</td>
<td>100°C - 600°C Measurements below 100°C are possible with reduced stability</td>
</tr>
</tbody>
</table>

**Analogue Output Scale**

- **PyroCube Type P**
  - Factory set: 4 mA = 80°C
  - 20 mA = 350°C

- **PyroCube Type XS**
  - Factory set: 4 mA = 0°C
  - 20 mA = 500°C

- **PyroCube Type M**
  - Factory set: 4 mA = 50°C
  - 20 mA = 600°C

**Response Time**

- **PyroCube Type P**
  - 10 ms

- **PyroCube Type XS**
  - 10 ms

- **PyroCube Type M**
  - 50 ms

- **PyroCube Type M**
  - 1 ms

**Accuracy of Measurement**

- **PyroCube Type P**
  - ± 4°C

- **PyroCube Type XS**
  - ± 3°C or 1%, whichever is greater

- **PyroCube Type M**
  - ± 5°C

**Repeatability**

- **PyroCube Type P**
  - ± 1°C

- **PyroCube Type XS**
  - ± 1°C

- **PyroCube Type M**
  - ± 2°C

**Temperature Resolution**

- **PyroCube Type P**
  - 0.5°C

- **PyroCube Type XS**
  - 0.5°C

- **PyroCube Type M**
  - 1.5°C

**Spectral Response**

- **PyroCube Type P**
  - 3.4 µm

- **PyroCube Type XS**
  - 5 - 7 µm

- **PyroCube Type M**
  - 2.2 µm

**Model No.**

- **PyroCube Type P**
  - PCU-P12.0
  - XSA0.7
  - XSB1.0
  - MA1.0
  - MA2.0
  - MA3.5
  - MB11.0

**Focal Spot Diameter (mm)**

- **PyroCube Type P**
  - 12

- **PyroCube Type XS**
  - 0.7

- **PyroCube Type M**
  - 1

**Focal Distance (mm)**

- **PyroCube Type P**
  - 200

- **PyroCube Type XS**
  - 40

- **PyroCube Type M**
  - 100

**Maximum Measurement Distance (mm)**

- **PyroCube Type P**
  - 500

- **PyroCube Type XS**
  - 100

- **PyroCube Type M**
  - 200

**Weight (without cable)**

- **PyroCube Type P**
  - 85g

- **PyroCube Type XS**
  - 200g

- **PyroCube Type M**
  - 85g

**Electrical Specifications**

**Outputs**

- 1 analogue output and 1 alarm output

**Analogue Output Type**

- 4-20 mA (set by default), 0-20 mA, mV/°C or voltage, selectable via optional PM030 touch screen interface

**Alarm Output**

- 1 open drain alarm output, rated 27 V DC, 0.2 A

**Digital Communications**

- RS232C Modbus RTU, non-isolated

**Output Cable Connection**

- Hardwired

**Supply Voltage**

- 5 to 27 V DC, 100 mA max

**Analogue Outputs (configurable via touch screen)**

<table>
<thead>
<tr>
<th>Output Type</th>
<th>0 to 1 V DC</th>
<th>mV/°C</th>
<th>0 to 20 mA</th>
<th>4 to 20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective Minimum Output</td>
<td>30 mV</td>
<td>30 mV</td>
<td>0.2 mA</td>
<td>4.0 mA</td>
</tr>
</tbody>
</table>

**Output Accuracy**

- Additional to Measurement Accuracy

<table>
<thead>
<tr>
<th>±1.5 mV</th>
<th>±1.5 mV</th>
<th>±0.02 mA</th>
<th>±0.02 mA</th>
</tr>
</thead>
</table>

**Environmental Specifications**

<table>
<thead>
<tr>
<th>Environmental rating</th>
<th>IP67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating ambient temperature</td>
<td>0°C to 50°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-15°C to 70°C</td>
</tr>
<tr>
<td>Operating ambient humidity</td>
<td>30% to 85% RH non condensing</td>
</tr>
</tbody>
</table>

* Ambient temperature 23 ± 5°C, emissivity 1.0, averaging time 50 ms
† Voltage can be 0-1, 0-5, or 0-10 V DC, depending on model (see Model Numbers).
PM030 - TOUCH SCREEN INTERFACE FOR PYROCUBE (ALL MODELS)

- Optional wall-mounted display, data logging, configuration and alarm unit for PyroCube sensor

- Read the temperature
  The large, bright backlit temperature display is visible from a distance and turns red in an alarm condition.

- Record the temperature history
  See a graph of the measured temperature, and log more than a year of data to a single MicroSD Card. The data is stored in a simple text format that can be imported easily into Excel.

- Configure the sensor
  All the sensor’s configuration settings can be adjusted via the intuitive touch screen interface.

- Trigger temperature alarms
  Two alarms are individually configurable as high, low, band or error. The screen turns bright red to signal an alarm condition, and the built-in 24 V, 1 A relay outputs can be connected directly to alarm sounders and beacons.

- Accurate measurements, even with reflections of hot objects
  Place the sensor outside an oven or furnace and accurately measure the temperature of objects inside by using the Reflected Energy Compensation feature.

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<table>
<thead>
<tr>
<th>PM030 Specifications</th>
<th>Configurable Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inputs</strong></td>
<td>1 x PyroCube sensor (any model)</td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td>Retransmitted analogue output from PyroCube sensor, plus 2 relays, rated 24 V DC, 1 A</td>
</tr>
<tr>
<td><strong>Display Format</strong></td>
<td>2.83” (72 mm) resistive touch TFT, 320x240 pixels, backlit</td>
</tr>
<tr>
<td><strong>Touch Screen Display Format</strong></td>
<td>2.83” (72 mm) resistive touch TFT, 320 x 240 pixels, backlit</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>MicroSD Card (optional), max. 32 GB, equal to 16 years of data at the fastest sample rate of 1 per second</td>
</tr>
<tr>
<td><strong>Data Logging Interval</strong></td>
<td>1 second to 1 day (configurable)</td>
</tr>
<tr>
<td><strong>Variables Logged</strong></td>
<td>Instantaneous target temperature, hold temperature, alarm events</td>
</tr>
<tr>
<td><strong>File format</strong></td>
<td>.csv</td>
</tr>
<tr>
<td><strong>Configurable Parameters</strong> (Data Logging)</td>
<td>Sample period, Number of samples, Scheduled start</td>
</tr>
<tr>
<td><strong>Configurable Parameters</strong> (Alarm Logging)</td>
<td>Log times when triggered, acknowledged, reset, Log data while triggered</td>
</tr>
</tbody>
</table>

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**SCREENSHOTS (PM030 interface)**

- 23.2°C
- Graph of temperature data
- Settings menu
- Data Logging interface
- Configuration options for sample period, number of samples, scheduled start
- Alarm logging options

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Languages: English, Chinese (simplified), Japanese

Temperature units: °C/°F

Displayed temperature, LED sighting on/off, Password

Date & time (for data logging time stamps), Peak hold period, decay level, Averaging period, Correction (gain/offset), Emissivity setting (with teach function), Reflected energy compensation (with teach function), Output type, Output temperature range, Polarity on error, Alarm mode, levels, hysteresis
PyroCube accuracy specifications are valid up to the maximum distances shown.
DIMENSIONS

PyroCube Sensor
S, F, G, P, XSB, MB models

48.5
2 x mounting holes Ø 3.5
Counterbore Ø 6, depth 3

17

Cable length 2 m (standard)

24.5

Extended lens housing
F, XSB models only

PyroCube GH, XSA, MA

2 x mounting holes (use M4 CSK screws)

PM030 Touch Screen Interface

Touch screen this side

Connection cable
Ø 7

Output connector set (not supplied if sensor is ordered with touch screen terminal)

Easy-wire connectors for wire sizes 28 to 20 AWG (0.08 to 0.5 mm²)
Max sheath Ø 1.5 mm

PYROCUBE CONNECTIONS - SENSOR ONLY

Analogue output  Minimum supply voltage
0 to 1 V  5 V
0 to 5 V  8 V
0 to 10 V  12 V
mV/°C  5 V
4 to 20 mA  2 V + (0.02 A x loop impedance [Ω])
0 to 20 mA

* See LED SIGHTING AND ALARMS (with Specifications)
**ACCESSORIES**

- Mounting bracket
- Protective lens cover
- Air purge collar
- Airless dust protector
- Right angled mirror
- Water Cooling Jacket
- 5 m extension cable with connectors
- Panel Mounting Kit

**PM030 CONNECTIONS**

![Diagram of PM030 connections]

**Voltage output option**
- 1V = 0 to 1 V DC
- 5V = 0 to 5 V DC
- 10V = 0 to 10 V DC

**Note:** All models also have 0-20 mA, 4-20 mA, and mV/°C outputs as standard.

**Cable length**
- 2M = 2 metres
- 5M = 5 metres
- 10M = 10 metres

**Response time and optics**
- S1.6 = 10 ms response, 1.6 mm spot at 35 mm distance
- S3.0 = 10 ms response, 3.0 mm spot at 70 mm distance
- S5.5 = 10 ms response, 5.5 mm spot at 120 mm distance
- F3.5 = 1 ms response, 3.5 mm spot at 100 mm distance
- F7.0 = 1 ms response, 7.0 mm spot at 200 mm distance

**Application and Optics**

- **General Purpose**
  - S1.6 = 1.6 mm measured spot diameter at 35 mm distance
  - S3.0 = 3 mm measured spot diameter at 70 mm distance
  - S5.5 = 5.5 mm measured spot diameter at 120 mm distance

- **Fast Response**
  - F3.5 = 3.5 mm measured spot diameter at 100 mm distance
  - F7.0 = 7 mm measured spot diameter at 200 mm distance

- **Glass**
  - G7.0 = 7 mm measured spot diameter at 180 mm distance
  - G20.0 = 20 mm measured spot diameter at 500 mm distance
  - GH2.2 = 2.2 mm measured spot diameter at 150 mm distance
  - GH4.5 = 4.5 mm measured spot diameter at 300 mm distance

- **Thin Film Plastics**
  - P12.0 = 12 mm measured spot diameter at 200 mm distance
  - Very Small Measured Spot
    - XS4.0 = 0.7 mm measured spot diameter at 40 mm distance
    - XS8.1 = 1 mm measured spot diameter at 100 mm distance

- **Metals**
  - MA1.0 = 1 mm measured spot diameter at 50 mm distance
  - MA2.0 = 2 mm measured spot diameter at 100 mm distance
  - MA3.5 = 3.5 mm measured spot diameter at 200 mm distance
  - MB11.0 = 11 mm measured spot diameter at 200 mm distance

**Model Numbers**

- **PCU**
  - S1.6 - 2M - 1V
  - Voltage output option
  - 1V = 0 to 1 V DC
  - 5V = 0 to 5 V DC
  - 10V = 0 to 10 V DC

- **PM030**
  - Touch screen interface module for PyroCube sensor (any model)

**Specifications subject to change without notice**