1-channel pyrometers for non-contact temperature measurement in the short wavelength range, primarily for measurements on metals, bare and shiny materials, ceramics and graphite.

- 2 wavelength ranges available for temperature ranges from 250 or 550°C
- Temperature sub range adjustable in order to increase the accuracy of the analog output
- Full digital signal processing with low uncertainty
- Fast data acquisition with a response time of only 5 ms
- Different optics selectable with small spot sizes from 1.3 mm
- Laser target marking for precise alignment to the measuring object
- Green LED power indicator
- Switchable analog output 0 / 4-20 mA and serial interface RS232 or RS485
- Easy device configuration via interface using the supplied software
Small, Easy to Install, Short-Wave

The pyrometers of series Sirius offers an extensive equipment combined with a high-quality internal side, despite its small size. The fully digital signal processing ensures the highest accuracy even at low emissivity levels, the adjustment to different measuring distances allows to find the smallest spot size or the optimum installation location.

The models SS09 and SI16 differ in their spectral ranges and thus to their measuring ranges. With their short-wave spectral ranges preferably very good measurements at high emissivity of metals, ceramics or graphite can be done. For metal measurements, the shortest possible spectral range for a precise measurement is advantageous. Due to technical reasons the beginning of a temperature range may be limited, to a higher starting temperature therefore a model must be selected with a slightly higher spectral range, e.g. longer wavelength.

<table>
<thead>
<tr>
<th>Model</th>
<th>Temperature ranges</th>
<th>Temp. sub ranges</th>
<th>Spectral range</th>
<th>Detector</th>
<th>Response time $t_{90}$</th>
<th>Exposure time</th>
<th>Uncertainty ($\epsilon = 1, t_{90} = 1s, T_a = 23^\circ$C)</th>
<th>Repeatability ($\epsilon = 1, t_{90} = 1s, T_a = 23^\circ$C)</th>
<th>Emissivity $\epsilon$</th>
<th>Analog output</th>
<th>Serial interface</th>
<th>Peak picker</th>
<th>Parameter settings</th>
<th>Power requirement</th>
<th>Isolation</th>
<th>Sighting</th>
<th>Ambient temperature</th>
<th>Storage temperature</th>
<th>Relative humidity</th>
<th>Housing / protection class</th>
<th>Weight</th>
<th>CE label</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS09</td>
<td>550 – 1400°C</td>
<td>Any temperature sub-range adjustable within the temperature range (minimum span 50°C)</td>
<td>0.7–1.1 µm</td>
<td>Silicon</td>
<td>5 ms, adjustable up to 10 s</td>
<td>2.5 ms</td>
<td>0.5% of reading in °C + 1°C</td>
<td>0.1% of reading in °C + 1 K</td>
<td>20–100%</td>
<td>0/4–20 mA, switchable, isolated, max. load: 500 Ω.</td>
<td>Optional RS232 or RS485 (addressable), baud rate 1.2 up to 57.6 kBD, Resolution 0.1°C or 0.1°F</td>
<td>Via serial interface and PC software SensorTools or via self-compiled communication program: Emissivity, temperature sub range, settings for peak picker, device address (with RS485), baud rate, response time, selecting analog output 0/4–20 mA, °C/°F.</td>
<td>24 V DC (12–30 V DC), max. 1 VA</td>
<td>Voltage supply, analog output and serial interface are galvanically isolated from each other</td>
<td>Laser targeting light (red, $\lambda=650$ nm, $P&lt; 1$ mW, class II to IEC 60825-1)</td>
<td>0–70°C (The laser targeting light is deactivated at a device temperature from 60°C to prevent its overheating)</td>
<td>-20–85°C</td>
<td>No condensing conditions</td>
<td>Stainless steel, IP65 to DIN 40 050 with connector</td>
<td>650 g</td>
<td>According to EU directives for electromagnetic immunity</td>
<td></td>
</tr>
</tbody>
</table>

SI16  | 250 – 1000°C      | 1.45–1.8 µm     | 1.45–1.8 µm | InGaAs    | 1.2–2 s, adjustable up to 10 s | 2.5 ms       | 0.5% of reading in °C + 1°C                             | 0.1% of reading in °C + 1 K                           | 20–100%          | 0/4–20 mA, switchable, isolated, max. load: 500 Ω. | Optional RS232 or RS485 (addressable), baud rate 1.2 up to 57.6 kBD, Resolution 0.1°C or 0.1°F | Via serial interface and PC software SensorTools or via self-compiled communication program: Emissivity, temperature sub range, settings for peak picker, device address (with RS485), baud rate, response time, selecting analog output 0/4–20 mA, °C/°F. | 250 – 1000°C | Voltage supply, analog output and serial interface are galvanically isolated from each other | Laser targeting light (red, $\lambda=650$ nm, $P< 1$ mW, class II to IEC 60825-1) | 0–70°C (The laser targeting light is deactivated at a device temperature from 60°C to prevent its overheating) | -20–85°C | No condensing conditions | Stainless steel, IP65 to DIN 40 050 with connector | 650 g | According to EU directives for electromagnetic immunity |

Sighting Method Laser Targeting Light

Sighting is used to pinpoint the location of the measured target.

Laser targeting uses a red laser dot showing the center of the measuring field. At the focus point, the laser dot is the smallest and provides the sharpest image, so that the measuring distance for the smallest spot size can be easily determined.

Reference Numbers

SS09; SI16: Specify with temperature range, serial interface RS23 or RS485 and optics A0, B0 or C0

Note: SensorTools software is included in scope of delivery, connection cables are not included in scope of delivery and have to be ordered separately.
The following tables show the optical data of the different device types. For reliable measurement the measurement object should be at least as large as the spot size.

The pyrometer can be used at distances other than its focal distance, however the spot size is generally larger and therefore the target size must be larger. The aperture in this case indicates the size of the measuring field next to the optics’ lens.

### Optics

**Adjustable optics** for smallest possible spot size diameter:
- **SS09 and SI16**: continuously focusable within the optics limits

The pyrometer must be properly aligned to the measurement object to detect the temperature correctly. In the focus point of the lens (focal distance) the spot size diameter is smallest. Measurements out of the focus distance are also possible (in front of or behind the focus distance) to determine the average temperature of a bigger spot.

### Optics Tables

<table>
<thead>
<tr>
<th>Optics</th>
<th>Measuring distance [mm]</th>
<th>Spot size M [mm]</th>
<th>Aperture Ø D [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SI16 250–1000°C</td>
<td>SS09 and SI16 all other temp. ranges</td>
<td></td>
</tr>
<tr>
<td>OP09-A0</td>
<td>170 mm</td>
<td>1.7 mm</td>
<td>1.3 mm</td>
</tr>
<tr>
<td></td>
<td>200 mm</td>
<td>1.9 mm</td>
<td>1.4 mm</td>
</tr>
<tr>
<td></td>
<td>245 mm</td>
<td>2 mm</td>
<td>1.5 mm</td>
</tr>
<tr>
<td>OP09-B0</td>
<td>260 mm</td>
<td>2.1 mm</td>
<td>1.6 mm</td>
</tr>
<tr>
<td></td>
<td>400 mm</td>
<td>3.3 mm</td>
<td>2.5 mm</td>
</tr>
<tr>
<td></td>
<td>500 mm</td>
<td>4.3 mm</td>
<td>3.2 mm</td>
</tr>
<tr>
<td>OP09-C0</td>
<td>480 mm</td>
<td>4 mm</td>
<td>3 mm</td>
</tr>
<tr>
<td></td>
<td>1000 mm</td>
<td>8 mm</td>
<td>6 mm</td>
</tr>
<tr>
<td></td>
<td>2000 mm</td>
<td>14.5 mm</td>
<td>11 mm</td>
</tr>
</tbody>
</table>

### Focusable Optics

1. Loosen locking screws
2. Adjust measuring distance
3. Fix locking screws

---

**Stainless steel housing:**
- Small, round 40 mm housing for easy installation

**LED:**
- Power Indicator

**Laser targeting light:**
- Laser target marking for easy alignment to the measuring object

**Digital and analog output:**
- Serial interface up to 57.6 kBD
- Switchable standard analog output 0/4-20 mA

**Features**

- **Optics:**
  - Adjustable measuring distance

- **Laser targeting light:**
  - Laser target marking for easy alignment to the measuring object

- **LED:**
  - Power Indicator

- **Digital and analog output:**
  - Serial interface up to 57.6 kBD
  - Switchable standard analog output 0/4-20 mA

- **Stainless steel housing:**
  - Small, round 40 mm housing for easy installation

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**Optics**

The following tables show the optical data of the different device types. For reliable measurement the measurement object should be at least as large as the spot size.

The pyrometer can be used at distances other than its focal distance, however the spot size is generally larger and therefore the target size must be larger. The aperture in this case indicates the size of the measuring field next to the optics’ lens.
**SensorTools Software**

The PC software SensorTools is our standard software for:

- Measurement display
- Measured value recording
- Processing the results
- Display devices inside temperature
- Changing pyrometer parameters

Program functions:

- Change pyrometer parameters
- Direct measurement data playback
- Adapt recording mode to computer performance
- Export measured values in csv files
- Record interval setting for adapted data size
- External start and stop of recording measured values (via control input on the pyrometer)
- Switch laser targeting light on and off
- Back time recording of measured values after control pulse or extend recording at recording stop
- Create a service file or parameter file with all device and software settings for remote diagnostics

**Recommended Accessories**

<table>
<thead>
<tr>
<th>Part Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA11</td>
<td>Adjustable mounting bracket (stainless steel)</td>
</tr>
<tr>
<td>KG60-01</td>
<td>Aluminum water cooling jacket</td>
</tr>
<tr>
<td>HA10</td>
<td>Adjustable mounting bracket for cooling jacket</td>
</tr>
<tr>
<td>HA22</td>
<td>Ball and socket swivel mount for cooling jacket</td>
</tr>
<tr>
<td>BL11</td>
<td>Air purge</td>
</tr>
<tr>
<td>AL11 / AL43</td>
<td>Connection cable, 14-wire (available in 5 m steps) with right angle connector / straight connector</td>
</tr>
<tr>
<td>AL10</td>
<td>Connection cable, 14-wire (available in 5 m steps) with right angle connector and laser targeting light button</td>
</tr>
<tr>
<td>AU11 / AU10 / AU43</td>
<td>Connection cable with interface converter RS232&lt;-&gt;USB with right angle connector / laser targeting light button / straight connector</td>
</tr>
<tr>
<td>AV11 / AV10 / AV43</td>
<td>Connection cable with interface converter RS485&lt;-&gt;USB with right angle connector / laser targeting light button / straight connector</td>
</tr>
<tr>
<td>IF00-00</td>
<td>LED digital indicator for remote adjustment of IR sensor parameters</td>
</tr>
<tr>
<td>Regulus RD / RF</td>
<td>PID program controller as bench top model / for panel mounting</td>
</tr>
<tr>
<td>NG12 / 20</td>
<td>Power supplies 24 VDC: DIN rail power supply 1.3 A / desktop power supply 2.5 A</td>
</tr>
</tbody>
</table>

**Dimensions**

![Dimensions Diagram]

Sensortherm reserves the right to make changes in scope of technical progress or further developments.

Sensortherm-Datasheet_Sirius_SS09_SI16 (July 23, 2015)

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