Innovative calibration systems expand the possibilities of conventional calibration sources.

- Fully automatic, fast and exact calibrations and adjustments, for pyrometers under test and calibration sources using special calibration and adjustment software
- Blackbody connectors for pyrometer under test, pyrometer’s analog output and PC.

Easy set-up:
1. Connect pyrometer, calibration source and PC together.
2. Set calibration temperature values in PC program or accept the preset adjustment values.
3. Start and wait.
4. Review results, save and print calibration report.

Wide temperature ranges
- CS500-N: 25 – 500°C
- CS1500: 250 – 1500°C

Fast heating time
- About 35 min.

Large aperture
- CS500-N: 30 mm
- CS1500: 40 mm

Calibration Sources, Transfer Standard Pyrometers, Software
Scope of delivery: Calibration source, pyrometer connection cable (12-pin, 2.5 m), interface converter RS485-USB (for PC connection), PC software SensorCal3, unlocked for calibration and adjustment of the calibration source as well as single-point pyrometer adjustment, standard adjustment and evaluation software SensorTools.

Models CS500-N and CS1500 calibration sources are precisely controlled, provide a high emissivity and are very stable temperature sources over a wide temperature range.

With a self-developed controller as well as connections for a pyrometer and a PC, a complete calibration system is available enabling even complex calibration and adjustment tasks according to ITS90:

- **Calibration**
  - The precise blackbody temperature specifications ensures that infrared measuring devices are within their specified accuracy.
  - The calibration of digital Sensortherm pyrometers is possible with software support, and the calibration sources themselves can be checked automatically with a reference measuring device.

- **Adjustment**
  - The readjustment of digital Sensortherm pyrometers and our calibration sources is possible via the SensorCal3 software. It sets the pyrometer or calibration source in adjustment mode, defines the necessary adjustment temperatures and monitors the correct operation sequence.
  - A readjustment may be necessary if the accuracy no longer corresponds to it’s original calibration, as thermal properties may have changed after a certain runtime.

- **Documentation**
  - After each calibration or adjustment, the software automatically creates a pdf document with the results and can be saved for quality assurance purposes.

### Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>CS500-N</th>
<th>CS1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Temperature range</td>
<td>25°C to 500°C (setpoint adjustments from 10°C above ambient temperature)</td>
<td>250–1500°C</td>
</tr>
<tr>
<td>Heating-up time</td>
<td>ca. 35 min up to 500°C</td>
<td>ca. 35 min (up to 1000°C), ca. 50 min (&gt; 1000°C)</td>
</tr>
<tr>
<td>Cool down time</td>
<td>Approx. 3.5 hours from 500 to 35°C</td>
<td>Approx. 3.5 hours from 1500 to 250°C</td>
</tr>
<tr>
<td>Aperture</td>
<td>Ø 30 mm</td>
<td>Ø 40 mm</td>
</tr>
<tr>
<td>Temperature-uniform measuring area and homogeneity</td>
<td>10 mm: ±0.5°C, 20 mm: ±1°C</td>
<td>10 mm: ±0.5°C, 24 mm: ±1.5°C</td>
</tr>
<tr>
<td>Stability</td>
<td>&lt; ±0.2K</td>
<td>&lt; ±0.5K for 30 min</td>
</tr>
<tr>
<td>Cavity</td>
<td>Aluminum, depth 150 mm (from front panel)</td>
<td>Silicon carbide, depth 225 mm (from front panel)</td>
</tr>
<tr>
<td>Emissivity (spectral range)</td>
<td>&gt; 0.99 (Spectral range 0.5–14 µm)</td>
<td>0.993 ±0.004 (Spectral range 0.5–3.5 µm)</td>
</tr>
<tr>
<td>Thermocouple measuring opening</td>
<td>Ø 6 mm, depth 160 mm</td>
<td>—</td>
</tr>
<tr>
<td>Method of control</td>
<td>PID controller with thermocouple</td>
<td>PID controller with thermocouple type S</td>
</tr>
<tr>
<td>Display</td>
<td>LED, actual value: 7 segment, H=13 mm / setpoint: dot matrix H=5 mm; display accuracy 0.2% +1K</td>
<td>Indicator lamp, 1°C/F on the device; 0.1°C/F via software</td>
</tr>
<tr>
<td>Display resolution</td>
<td>0.1°C/F</td>
<td>—</td>
</tr>
<tr>
<td>Heating indication</td>
<td>Indicator lamp</td>
<td>—</td>
</tr>
<tr>
<td>Connections</td>
<td>Serial RS-485 interface, pyrometer connector (12-pin) for pyrometers with RS-232 or RS-485 interface (automatic detection), pyrometer analog output</td>
<td>—</td>
</tr>
<tr>
<td>Power supply</td>
<td>200–240 V AC, 50-60 Hz</td>
<td>—</td>
</tr>
<tr>
<td>Power consumption</td>
<td>max. 1 kVA</td>
<td>max. 3 kVA</td>
</tr>
<tr>
<td>Device fuse</td>
<td>Micro-fuse 6.3 A, slow</td>
<td>Automatic fuse 16 A, slow</td>
</tr>
<tr>
<td>Connector</td>
<td>Appliance coupler / two-pin grounded plug</td>
<td>CEE connector (blue)</td>
</tr>
<tr>
<td>Housing</td>
<td>Steel, powder coated</td>
<td>—</td>
</tr>
<tr>
<td>Dimensions</td>
<td>266 x 163 x 334 mm (HxBxT)</td>
<td>534 x 427 x 495 mm (HxBxT)</td>
</tr>
<tr>
<td>Weight</td>
<td>9.4 kg (20.7 lb)</td>
<td>26 kg (57 lb)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0–40°C / 32–104°F (storage -20–50°C)</td>
<td>0–35°C / 32–95°F (storage: -20–50°C)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>Non-condensing conditions</td>
<td>—</td>
</tr>
<tr>
<td>CE label</td>
<td>According to EU directives for electromagnetic immunity</td>
<td>—</td>
</tr>
</tbody>
</table>
Special Features

SensorCal3 for checking and adjusting calibration sources: Externally determined measured values can be transmitted as reference temperatures for readjustment.

Quickly heated up

- Almost every temperature is stable in about 35 minutes.

Readjustable

- SensorCal3 for checking and adjusting calibration sources: Externally determined measured values can be transmitted as reference temperatures for readjustment.

Connections

- Pyrometer connector
- PC connector
- Pyrometer analog output

Sensortherm precision controller

- Setpoint selection
- Data exchange between calibration source, pyrometer and software (via the PC connection)

Software SensorCal3

CS1500 verification / adjustment

- Required: DIADEM Transfer Standard Pyrometer (for fully automatic adjustment)

CS500-N verification / adjustment

- Required: USB RTD PT100 temperature sensor (for fully automatic adjustment) or any thermocouple or reference pyrometer (measured values of the specified temperature setpoints are then simply entered)

Full pyrometer adjustment

- Required: METIS MS / MI / MB / MP / M3 (Checking / adjusting the CS500-N / CS1500 is done automatically or by utilizing the temperature values of any calibration source, thermocouple or reference pyrometer)

Features

- Automatic pyrometer complete backup for device recovery in the event of a fault.
- Multiple start: Software can be started several times to check on several calibration sources at the same time.
- Single point pyrometer adjustment: to adapt to a typical measuring temperature, e.g. for automatic compensation of optical losses when measuring through windows or lenses with an unknown transmittance.
- Everything at a glance: Connected devices, measurement data, current and completed program steps, log window for program activities.
- Manual setpoint specification e.g. for preheating.
- Report details can be added for additional information in pdf
- IEC 17025 calibration data of PT100 taken into account.
### Accessories

<table>
<thead>
<tr>
<th>Pyrometers</th>
<th>Transfer Standard Pyrometers DIADEM</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DI16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Short description**
DIADEM pyrometers are traced back to the international temperature scale ITS90, they are calibrated with PTB calibrated reference devices and then adjusted.

**Temperature ranges**
- 600–1500°C
- 250–1400°C
- 300–1500°C

**Spectral range**
- 0.7–1.1 µm
- 1.45–1.8 µm

**Detector**
- Si
- InGaAs

**Response time t<sub>90</sub>**
5 ms, adjustable up to 10 s

**Uncertainty**
0.15% of reading in °C + 1K

**Temperature coefficient**
32 ppm/°C ambient temperature change in a range of 10 to 40°C

**Repeatability**
0.06% of measured value

**Analog output**
- 0–10 V DC, load > 100 kΩ; Resolution: 16 Bit, corresponds to < 0.007% of temperature range

**Serial interface**
- RS485, half duplex 4.8 to 115.2 kBit/s, resolution via interface: 0.01°C / °F

**Display**
- 10 digit LED display, °C / °F, resolution 0.01°C / °F

**Power requirement**
- 24 V DC (18–30V DC), maximum 20 VA

**Isolation**
- Measurement circuit, analog output, interface and power supply galvanically isolated from each other

**Sightings (optional)**
- Through lens sighting or laser targeting light, red, P < 1 mW, laser class 2 (to IEC 60825-1)

**Optics OD09-A0**
- Focus distance a: 600 mm

**Spot size Ø M (at a)**
- 1.1 mm
- 1.4 mm

**Ambient temperature**
- 0–50°C / 32–122°F (storage: -20–70°C / -4–158°F)

**Relative humidity**
- Non-condensing conditions

**Housing**
- Aluminum

**Protection class**
- IP65 to DIN 40 050 with connector connected

**Weight**
- 1.3 kg (2.8 lb)

**CE label**
- According to EU directives for electromagnetic immunity

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<table>
<thead>
<tr>
<th>Thermocouple</th>
<th>USB-RTD-PT100</th>
<th>Image</th>
</tr>
</thead>
</table>

**Temperature range**
-50–550°C

**Sensor dimensions**
Ø 6 x L 250 mm

**Cable length**
1 m

**USB converter**
- DRACAL USB-RTD200
- ADC resolution: 18 Bit
- Resolution: 0.02°C
- Accuracy: < ±0.06°C
- Interface: USB 2.0

**USB dongle for enabling the adjustment of Sensortherm pyrometers in the software SensorCal3.**

USB dongle for enabling the adjustment of Sensortherm pyrometers in the software SensorCal3.

### Reference Numbers

- **CS0500N** Calibration source CS500-N, 25–500°C
- **CS1500** Calibration source CS1500, 250–1500°C
- **SW3600** SensorCal3 for pyrometers (USB dongle to enable full pyrometer adjustment)
- **DIADEM DI16** Transfer Standard Pyrometer for checking and pyrometric readjustment of the CS1500.
- **USB-RTD-PT100** Pt100 thermocouple with USB converter; for checking and thermometric CS500-N readjustment.
- **AL12-02** 12-pin pyrometer connection cable (2.5 m).
- **WB23-2-1-05** Wiring Box: additional pyrometer supply and PC connection kit, consisting of a connection box with 24 V power supply, 5 m pyrometer connection cable (angled 12-pin connector) and a RS485 interface converter.
- **WB23-1-1-05** As WB23-2-1-05, but with RS-232 to USB interface converter.

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

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