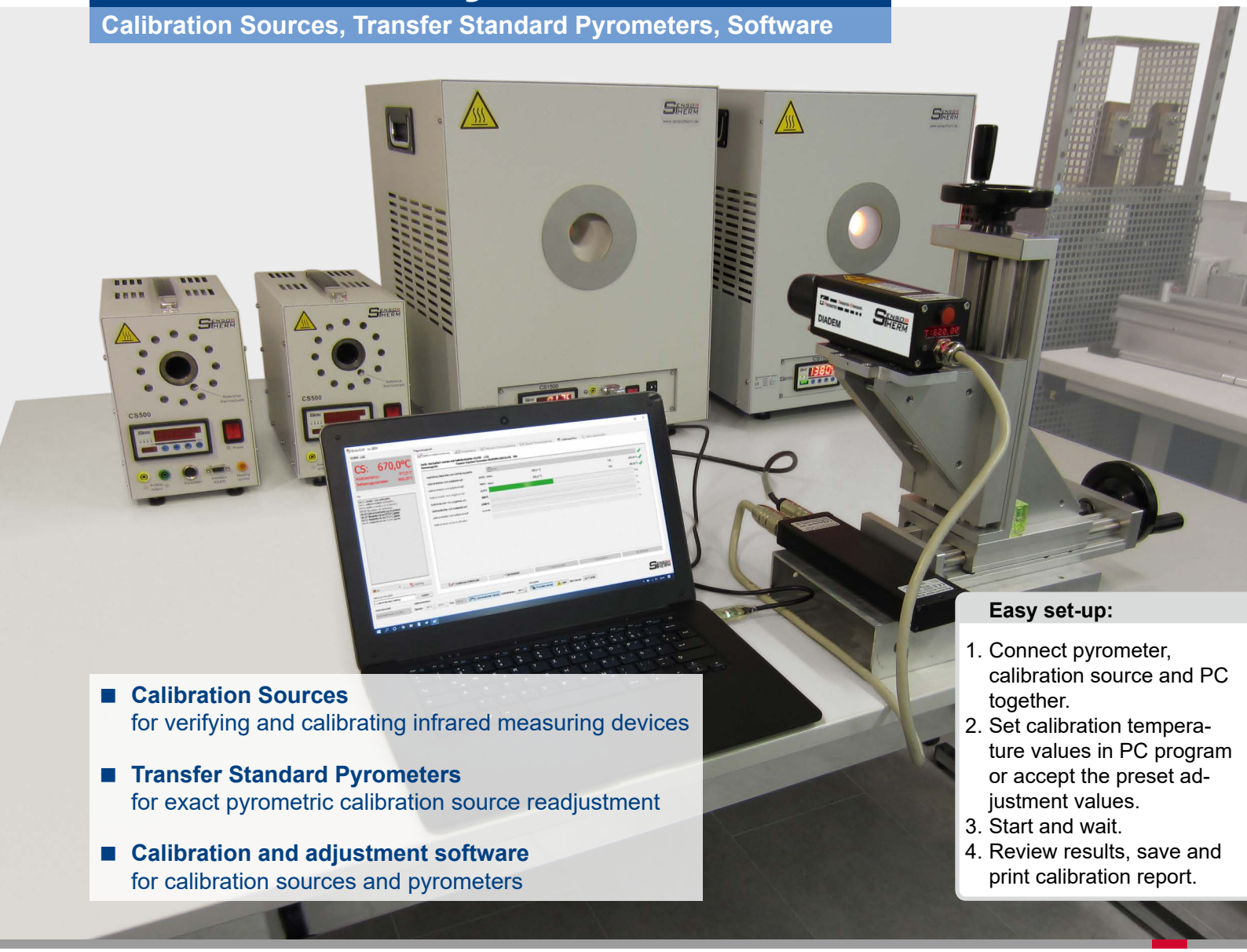
SENSOR THERM
MEMBER OF THE NYNOMIC GROUP

Calibration Systems

Calibration Sources, Transfer Standard Pyrometers, Software



- **Calibration Sources**
  for verifying and calibrating infrared measuring devices
- **Transfer Standard Pyrometers**
  for exact pyrometric calibration source readjustment
- **Calibration and adjustment software**
  for calibration sources and pyrometers

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.

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.**

Wide temperature ranges

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

Fast heating time

About 35 min.

Large aperture

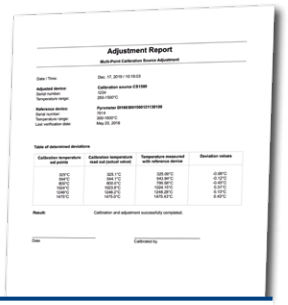
CS500-N: 30 mm
CS1500: 40 mm

Calibration, Adjustment, Documentation

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.


Adjustment Report

Technical Data

Model	CS500-N	CS1500
Image		
Temperature range	25°C to 500°C (min. setpoint adjustment from 10°C above ambient temperature)	250–1500°C
Heating-up time	ca. 35 min up to 500°C	ca. 35 min (up to 1000°C), ca. 50 min (> 1000°C)
Cool down time	Approx. 3.5 hours from 500 to 35°C	Approx. 3.5 hours from 1500 to 250°C
Aperture	Ø 30 mm	Ø 40 mm
Temperature-uniform measuring area and homogeneity	10 mm: ±0.5°C 20 mm: ±1°C	10 mm: ±0.5°C 24 mm: ±1.5°C
Stability	< ±0.2K	< ±0.5K for 30 min
Cavity	Aluminum, depth 150 mm (from front panel)	Silicon carbide, depth 225 mm (from front panel)
Emissivity (spectral range)	> 0.99 (Spectral range 0.5–14 µm)	0.993 ±0.004 (Spectral range 0.5–3.5 µm)
Thermocouple measuring opening	Ø 6 mm, depth 160 mm	–
Method of control	PID controller with thermocouple	PID controller with thermocouple type S
Display	LED, actual value: 7 segment, H=13 mm / setpoint: dot matrix H=5 mm; display accuracy 0.2% +1K	
Display resolution	0.1°C/°F	1°C/°F on the device; 0.1°C/°F via software
Heating indication	Indicator lamp	
Connections	Serial RS-485 interface, pyrometer connector (12-pin) for pyrometers with RS-232 or RS-485 interface (automatic detection), pyrometer analog output	
Power supply	200–240 V AC, 50-60 Hz	
Power consumption	max. 1 kVA	max. 3 kVA
Device fuse	Micro-fuse 6.3 A, slow	Automatic fuse 16 A, slow
Connector	Appliance coupler / two-pin grounded plug	CEE connector (blue)
Housing	Steel, powder coated	
Dimensions	266 x 163 x 334 mm (H x B x T)	534 x 427 x 495 mm (H x B x T)
Weight	9.4 kg (20.7 lb)	37 kg (57 lb)
Ambient temperature	0–40°C / 32–104°F (storage -20–50°C)	0–35°C / 32–95°F (storage: -20–50°C)
Relative humidity	Non-condensing conditions	
CE label	According to EU directives for electromagnetic immunity	

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*.

Special Features

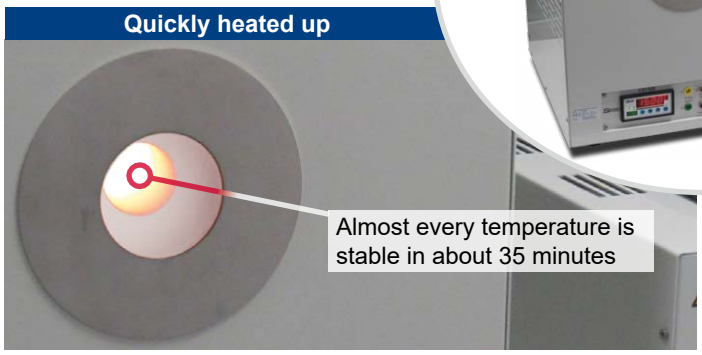
Connections

- Pyrometer connector
- PC connector
- Pyrometer analog output

Sensortherm precision controller

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

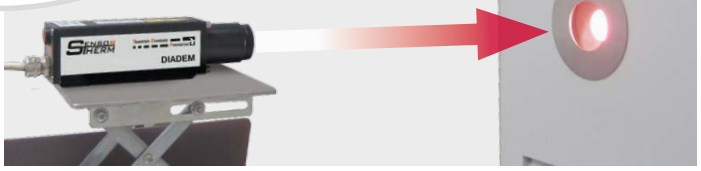
Quickly heated up



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



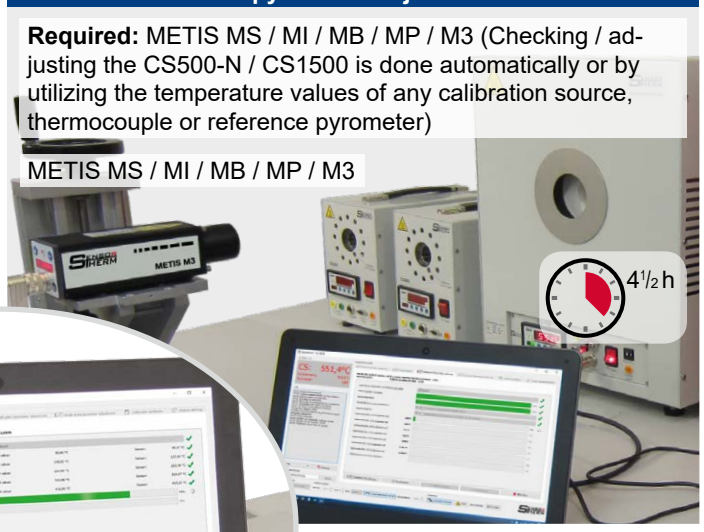
Software *SensorCal3*

CS1500 verification / adjustment

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

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)



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)

Features

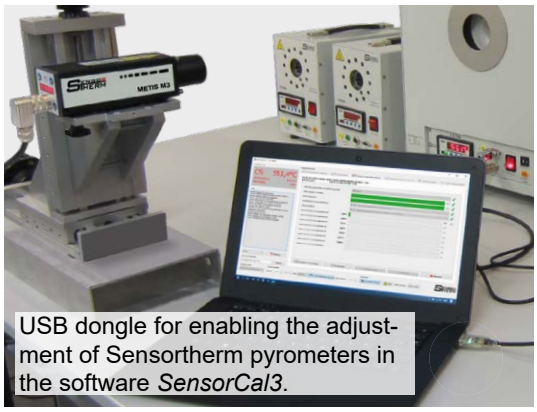
- **Automatic pyrometer complete backup** for device recovery in the event of a fault.
- **Multiple start:** Software can be started several times to check on several calibration sources at the same time.
- **Single point pyrometer adjustment:** to adapt to a typical measuring temperature, e.g. for automatic 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

Pyrometers	Transfer Standard Pyrometers DIADEM	
	DS09	DI16
Image		
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_{90}	5 ms, adjustable up to 10 s	
Uncertainty ($\varepsilon = 1$, $t_{90} = 1$ s, $T_A = 20$-26°C)	0.15% of reading in °C + 1K	
Temperature coefficient	32 ppm/°C ambient temperature change in a range of 10 to 40°C	
Repeatability ($\varepsilon = 1$, $t_{90} = 1$ s, $T_A = 20$-26°C)	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 kBaud, 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	

	Thermocouple USB-RTD-PT100
	
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*.

Wiring-Box: Power supply with pyrometer / PC connection cables, e.g. for the warm-up time of additional pyrometers under test.
Fully assembled according to specifications.

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. Temperature range 250–1400°C or 300–1500°C, spectral range 1.45–1.8 µm, optics OD09-A0 with a: 600 mm, M: 1.6 mm (the required model is to be selected with the temperature range and sighting method laser targeting light or through lens sighting).
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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