



More Precision

thermo**METER** Handheld // Portable Laser Thermometer





- Universal device and precision pyrometer
- Laser sighting for accurate readings
- For fast and mobile measurement tasks
- Many versions to suit different applications
- Internal data memory
- Evaluation via USB

Portable laser thermometers for measuring surface temperatures

The portable laser thermometers for non-contact temperature measurement combine modern industrial design with outstanding technical features. High quality precision lenses enable the precise measurement of objects at close or long distances. These flexible industrial portable thermometers can be used for temperature measurements from -35°C to $2,000^{\circ}\text{C}$.

The complete portable pyrometer series is supplied with a USB interface as standard. Temperature profiles can be displayed and recorded on a PC using the IRConnect software.

The portable thermometers from Micro-Epsilon are based on innovative laser sighting concept, i.e. the laser follows the infrared-optical path, marking the exact position and the spot size of the measuring field.

The portable handheld thermoMETER LS comes with a unique, switchable lens, which means that smaller objects can be precisely measured even at medium distances. The thermoMETER LS is equipped with a worldwide patented crosshair laser sighting system that indicates the size of the measuring field at any distance.

The portable thermometer P20 is applied in temperature measurements of hot surfaces. A double laser sighting realises the representation of the measuring field.

The portable thermometers of the thermoMETER MS series use single point laser sighting in order to distinguish the centre of the spot.

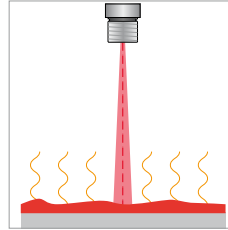
All portable thermometers come with an LCD colour display, which indicates an under-run or over-run of a defined temperature limit by using varying colours on the background of the display.



Multi-purpose flip display:
Measurement of a PCB where the smallest components can be detected due to the extremely small measurement spot size (close focus = 1mm). Data transfer is performed via USB to a PC.

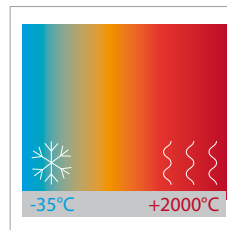
Non-contact measurement of the surface temperature

The portable laser thermometers from Micro-Epsilon combine different technologies that have a common denominator: non-contact temperature measurement. Due to this non-contact technology, measurement objects can be detected precisely and wear-free.



Large temperature measuring range

Laser thermometers from Micro-Epsilon are suitable for use across a wide measuring range. From low temperatures prevalent in cooling chains or laboratories, to the highest temperatures in hot melting materials or blast furnaces - the portable thermoMETER Handheld products measure these temperatures precisely.



Suitable for any temperature

These handheld devices cover a broad measuring range of temperatures. Particular highlights are the portable devices for measuring high temperatures of metallic surfaces.

| Page | Model | Temperature ranges of the portable thermometers over the wavelengths |
|---------|--------------------|--|
| 10 - 11 | thermoMETER MS | -32°C ... 760°C |
| 6 - 7 | thermoMETER LS | -35°C ... 900°C |
| 8 - 9 | thermoMETER P20 | -35°C ... 1300°C |
| 8 - 9 | thermoMETER P20 M2 | 385°C ... 1600°C |
| 8 - 9 | thermoMETER P20 M1 | 650°C ... 1800°C |
| 8 - 9 | thermoMETER P20 M5 | 1000°C ... 2000°C |

-100°C 0°C 200°C 400°C 600°C 800°C 1000°C 1200°C 1400°C 1600°C 1800°C 2000°C

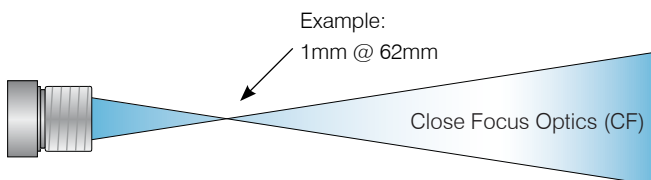
Examples of non-metallic surfaces

- MS Series: Mechanical and electrical maintenance
- LS (SF lens): Mat catalysts in engine test benches
- LS (CF lens): Electronic development in R&D
- P20: Inspecting the lining of melting pots

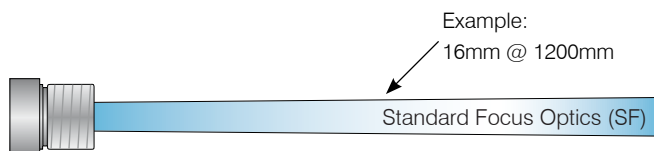
CF, close focus; SF, standard focus

Examples of metallic surfaces (M2; M1; M5)

- P20 M2: Rolling of metal sheet
- P20 M1: Temperature of steel girders
- P20 M5: Molten metal



Close lens (CF, close focus):
Measurement of small objects close to the sensor (thermoMETER LS only)

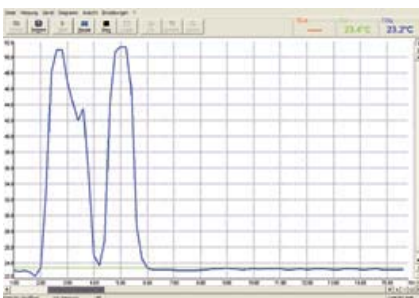


Standard lens (SF, standard focus):
Measurement of small objects at medium distances



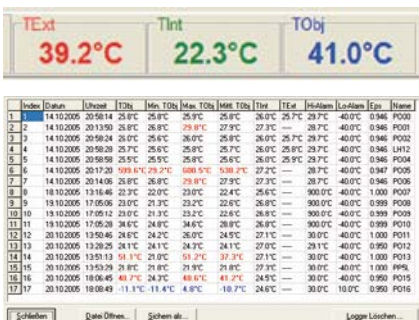
System requirements

- Windows XP / Vista / Windows 7 and 8
- USB 2.0- interface
- Hard disc with at least 30 MB of free disk space
- At least 128 MB of RAM
- CD-ROM drive



Software for evaluation and device settings

- Connection of all portable thermometers via USB interface
- Diverse languages including translation function
- Temperature display in °C or °F
- Easy image-based report function for temperatures

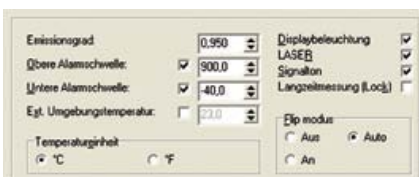


Display and analysis of temperatures

- Representation of temperature values in a temperature-time diagram or as digital display
- Automatic or manual adjustment of the diagram scaling
- Data acquisition for further detailed analysis or documentation
- File storage including complete temperature information for analysis in Excel (*.dat)
- Download of logged data in clearly organised tabular form (displays High alarm in red, Low alarm in blue)

Changing device settings

- Configuration of emissivity enables the measurement of different surfaces
- External compensation of ambient temperature (LS)



Application examples



Preventive maintenance of electronics

Almost every operating equipment that consumes energy turns hot before a breakdown. Temperature monitoring using a thermoMETER LS is an important instrument for preventive maintenance.



Defect analysis of air-conditioning systems

The thermoMETER MS Pro saves time and money during maintenance of heating, ventilators and air conditioning (HVAC) systems. Defect sources, such as leakages or blocked filters, can be pinpointed quickly and unscheduled equipment downtime can be avoided.



Rapid diagnosis in motor vehicle workshops

Car mechanics require precise measurement results in order to quickly detect and repair faults in engines, catalytic converters or braking systems. Therefore, the thermoMETER MS is an important measurement device for many motor vehicle workshops.



Hot working of metals

Narrow temperature limits need to be met during the hot working processes of metals in order to fulfil the quality requirements placed on these materials. The thermoMETER P20 M2 can be used for random control measurements in forging and bending processes.



thermoMETER LS

Innovative infrared thermometer with crosshair laser sighting

- Measuring range from -35° to $+900^{\circ}\text{C}$
- Focusable to 1mm measurement spot for measuring finest structures
- Crosshair laser sighting marks the actual spot size at any distance
- Optical resolution 75:1
- Thermocouple input determines emissivity of the measurement object
- USB interface and graphic software with oscilloscope function for 20 measurements/sec.
- Flip display with changeover to most comfortable viewing position
- Close and remote focus in one device - easy switchover
- Optional calibration certificate (used as reference pyrometer)

Optical specifications thermoMETER LS

□ = smallest spot size (mm)

| Standard Focus optics | | | | | | | |
|-----------------------|---------------|----|------|------|------|------|------|
| SF75 | 75:1 | 20 | 16 | 40 | 70 | 100 | 130 |
| | Distance (mm) | 0 | 1200 | 2000 | 3000 | 4000 | 5000 |
| Close Focus optics | | | | | | | |
| CF75 | 75:1 | 17 | 1 | 123 | 262 | | |
| | Distance (mm) | 0 | 62 | 500 | 1000 | | |

| Model | LS |
|-----------------------------------|--|
| Optical resolution | 75:1 |
| Temperature range | -35°C to 900°C |
| Spectral range | 8 to 14µm |
| Temperature coefficient | ±0.05°C or ±0.05% ¹⁾ |
| System accuracy | ±0.75°C or ±0.75% of the measurement value ¹⁾ (with ambient temperatures of 23 ±5°C and temperature range of 20 to 900°C) |
| Response time (95%) | 150ms |
| Reproducibility | ±0.5°C or ±0.5% of the measurement value ¹⁾ |
| Optical resolution (D:S) | 75:1 16mm @ 1200mm (90%) |
| switchable to close focus | 1mm @ 62mm (90%) |
| Smallest spot | 1mm |
| Laser class II | Standard Focus: patented crosshair laser (crosshair size = IR spot size @ any distance) Close Focus: two point laser (laser dot size = IR spot size @ focus distance) |
| Emissivity/Gain | 0.100 to 1.100 (adjustable) |
| Configurations | MAX/MIN/HOLD/DIF/AVG/°C/°F |
| Alarm functions | audible and visible HIGH/LOW alarm |
| Display | LC flip display (controlled by position sensor) |
| Display backlight | green and alarm colours (red, blue) |
| Bar graph display | auto scaling |
| Ambient temperature | 0 to 50°C |
| Storage temperature | -30 to 65°C |
| Relative humidity | 10 to 95% (non-condensing) |
| Weight | 420g |
| EMC | 89/336/EWG |
| Vibration/Shock | IEC 68-2-6: 3 G, 11-200Hz, any axis IEC 68-2-27: 50 G, 11ms duration, any axis |
| Temperature range t/c probe input | -35 to 900°C (-30 to 1650°F) |
| Accuracy t/c probe input | ±0.75°C or ±1% of the measurement value ¹⁾ |
| Interface, data output | USB |
| Data memory and acquisition | 100 measurement protocols with time stamps, 4 digits locations and material names |
| Software | IRConnect oscilloscope software with 20 readings per second |
| Power supply | battery 2xAA Alkaline or via USB |
| Battery life time | 5h with laser on and 50% backlight use; 10h with laser on and w/o backlight; 25h w/o laser and backlight |
| Tripod mount | 1/4-20 UNC |
| Option | certificate of factory calibration or DKD certificate |

¹⁾ whichever is greater

Scope of supply

- thermoMETER LS
- USB cable and software
- t/c type K insertion probe
- Carrying case
- Padded pouch
- Wrist strap
- Operators manual
- Batteries



thermoMETER P20

Handheld thermometers for industrial temperature measurements

- Temperature ranges from 0°C to 2,000°C
- High optical resolution up to 300:1
- Precise aiming with sighting laser and sighting scope
- Adjustable emissivity 0.100 to 1.000
- Different spectral responses for a variety of advanced applications
- MAX/MIN function, audible and visible HIGH/LOW alarm
- USB interface, IRConnect Software
- Data logger for 2000 measured values

Display

- HIGH/LOW alarm
- (3-coloured display)



Non-contact temperature measurement from a safe distance

Measurement specifications thermoMETER P20

□ = smallest spot size (mm)

| Standard Focus optics | | | | | |
|-----------------------|--------------|-----|-----|------|------|
| SF120 | 120:1 | 60 | 80 | 100 | 125 |
| | Distance (m) | 6 | 9 | 12 | 15 |
| SF150 | 150:1 | 22 | 24 | 41 | 62.5 |
| SF300 | 300:1 | 16 | 12 | 24.4 | 40 |
| | Distance (m) | 1.8 | 3.6 | 5 | 6.75 |

| Model | P20 | P20 M-1 | P20 M-2 | P20 M-5 |
|---|--|--|-----------------|------------------|
| Optical resolution | 120:1 | 300:1 | 300:1 | 150:1 |
| Temperature range | 0°C to 1300°C | 650°C to 1800°C | 385°C to 1600°C | 1000°C to 2000°C |
| Spectral range | 8 to 14µm | 1.0µm | 1.6µm | 525nm |
| System accuracy (at $T_{amb} = 23 \pm 5^\circ\text{C}$) | $\pm 1\%$ or $\pm 2^\circ\text{C}^{1)}$ | $\pm (0.3\% \text{ of reading} + 2^\circ\text{C})$ | | |
| Repeatability | $\pm 0.5\%$ or $\pm 1^\circ\text{C}^{1)}$ | $\pm (0.1\% \text{ of reading} + 1^\circ\text{C})$ | | |
| Response time (95%) | 300ms | 100ms | | |
| Sighting | Double laser class II (<1mW) | | | |
| Sighting scope | All models | | | |
| Emissivity/Gain | 0.100 to 1.100 (adjustable) | | | |
| Configurations | MAX/MIN/HOLD/DIF/AVG/°C/°F | | | |
| Alarm functions | Audible and visible HIGH/LOW alarm | | | |
| Display backlight | three-coloured alarm indication, green and alarm colours (red, blue) | | | |
| Ambient temperature | 0 to 50°C | | | |
| Storage temperature | -20 to 60°C (no battery) | | | |
| Relative humidity | 10 to 95% (non-condensing) | | | |
| Size | 264 x 204 x 60mm | | | |
| Weight | 1000g | | | |
| Vibration/Shock | IEC 68-2-6: 3 G, 11-200Hz, any axis IEC 68-2-27: 50 G, 11 ms duration, any axis | | | |
| Interface, data output | USB interface | | | |
| Data memory | 2000 measurement values | | | |
| Software | IRConnect oscilloscope software for 20 measurement values per second | | | |
| Current | Ni-MH rechargeable battery | | | |
| Battery life time | 5h laser and backlight on, 25h without laser and backlight | | | |
| Adapter | 220 VAC, 50/60Hz | | | |
| Option | certificate of factory calibration or DKD certificate | | | |

¹⁾ whichever is greater

Scope of supply

- thermoMETER P20
- USB cable and software
- Carrying case
- Operators manual
- Batteries



thermoMETER MS

Universal infrared thermometer for standard applications

- Measuring range from -32°C to +760°C
- High quality precision optics
- Optical resolution 40:1
- Sighting laser for precise aiming of the measurement object
- Adjustable visual and audible alarm
- USB interface and thermocouple input type K
- Fast 0.3 second scanning
- Extremely lightweight (150g) and user-friendly design

Measurement specifications thermoMETER MS

□ = smallest spot size (mm)

Standard Focus optics

| | | | | | |
|--------------|----------------------|-----|-----|-----|------|
| MS / MS Plus | 20:1 | 13 | 20 | 37 | 50 |
| | <i>Distance (mm)</i> | 140 | 300 | 700 | 1000 |
| MS Pro | 40:1 | 13 | 15 | 22 | 27 |
| | <i>Distance (mm)</i> | 260 | 400 | 800 | 1000 |

| Model | MS | MS Plus | MS Pro |
|--|--|---|---|
| Optical resolution | 20:1 | | 40:1 |
| Temperature range ¹ | -32°C to 420°C | -32°C to 530°C | -32°C to 760°C |
| Spectral range | 8 to 14µm | | |
| System accuracy ^{2,3} | ±1% / ±1°C (from 0°C to 420°C) | ±1% / ±1°C (from 0°C to 530°C) | ±1% / ±1°C (from 0°C to 760°C) |
| | ±1°C / ± 0.07°C/ °C (from 0°C to -32°C) | | |
| Repeatability ^{2,3} | ±0.5% / ±0.7°C (from 0°C to 420°C) | ±0.5% / ±0.7°C (from 0°C to 530°C) | ±0.75% / ±0.75°C (from 0°C to 760°C) |
| | ±0.7°C ± 0.05°C/ °C (from 0°C to -32°C) | | ±0.75°C ±0.07°C/ °C (from 0°C to -32°C) |
| Temperature resolution | 0.2 °C | 0.1°C | |
| Response time | 300ms (95%) | | |
| Ambient temperature | 0°C to 50°C | | |
| Storage temperature | -20°C to 60°C without battery | | |
| Emissivity | fixed: 0.95 | 0.1 – 1.1 (adjustable) | 0.1 – 1.1 (adjustable) |
| Configurations | Min/Max/Hold/°C/°F | Min/Max/Hold/°C/°F/Offset | |
| Alarm functions | - | Visual and acoustic HIGH/LOW alarm | |
| PC Interface, Software, Thermocouple Input | USB interface | USB interface, IRConnect Report software | USB interface, IRConnect Report software, thermocouple element type K |
| Laser | < 1mW laser class IIa, laser beam with 9mm offset | | |
| Weight/Dimensions | 150g; 190 x 38 x 45mm | | 180g; 190 x 38 x 45mm |
| Battery | 9V alkaline battery | | |
| Battery life | 20h with laser and backlight on 50% | | |
| | 40h with laser and backlight off | | |
| Relative humidity | 10 - 95% RH non-condensing, at <30°C ambient temperature | | |
| Standard accessories | - | soft pouch, wrist strap, tripod adapter, rubber protection boot | |
| Option | certificate of factory calibration | | |

¹ adjustable via software

² object temperature >0°C; whichever is greater

³ ± at ambient temperature 23 <5°C

Scope of supply

- thermoMETER MS (from MS Pro)
- USB cable and software
- t/c type K insertion probe
- Carrying case
- Padded pouch
- Wrist strap
- Operators manual
- Batteries

High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



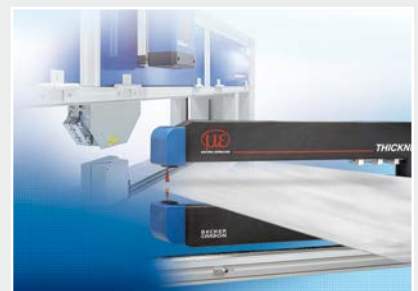
2D/3D profile sensors (laser scanner)



Optical micrometers, fibre optic sensors and fibre optics



Colour recognition sensors, LED analyzers and colour online spectrometer



Measurement and inspection systems

