MICRO-EPSILON

# More Precision

## thermoMETER // Non-contact infrared temperature sensors

# High-performance industrial pyrometer
# thermoMETER UC

- Temperature measuring range from -50 to +1100 °C
- High temperature resolution of 50 mK
- Analog and digital interfaces
- Powerful alarm relays with 400 mA
- No cooling required for ambient temperatures up to 180 °C
- Powerful industrial controller


**Versatility and robustness meet highest performance**

With the thermoMETER UC, Micro-Epsilon offers an extremely powerful system with a wide range of functions and a modern design. It is used for non-contact temperature measurement of objects in machine building and machine design, in production and for quality assurance.

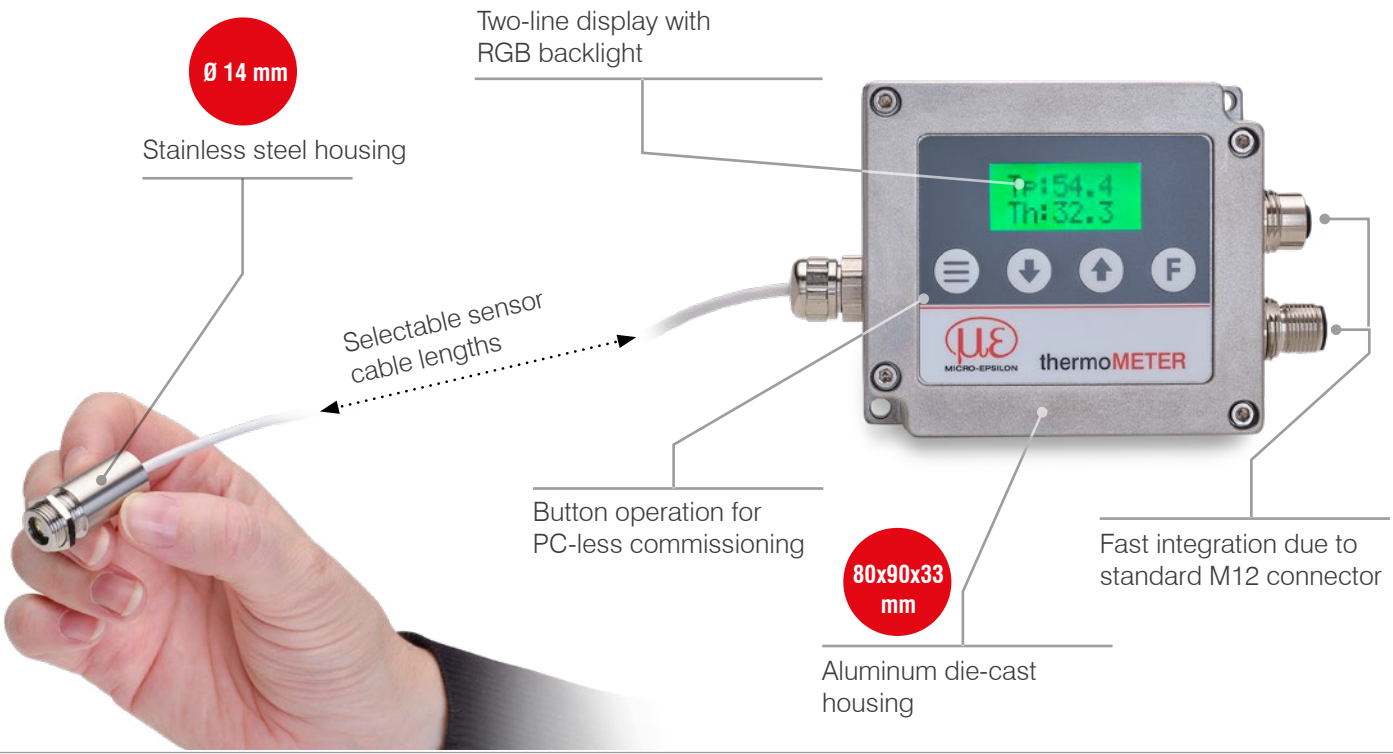
An extremely compact sensor and an industrial-grade controller in an aluminum die-cast housing with IP65 locally separate measurement and evaluation from each other. The sensor can therefore also be used at high temperatures up to 180 °C; and can be installed in a very space-saving manner. In addition, the thermoMETER UC is particularly suitable when measured values are to be processed digitally, e.g. via industrial interfaces.

**Easy configuration via buttons & display**

The thermoMETER UC has a powerful industrial controller with an integrated LCD display and four input buttons for quick and easy operation. Optionally, the controller can also be conveniently connected to a PC via an industrial USB cable or RS485 and parameterized using the sensorTOOL software.

**Minimum wiring effort**

Standard M12 connectors are available for the power supply and signal connection, eliminating the need to open the controller. The sensor is pre-wired firmly and available with different cable lengths.



| Model | | | UC-SF02 | UC-SF15 | UC-SF22 |
|---|---|---|---|---|---|
| Optical resolution | | | 2:1 | 15:1 | 22:1 |
| Measuring range [1] | | | -50 to 600 °C | | -50 to 900 °C (1000 °C) |
| Spectral range | | | 8 to 14 µm | | |
| System accuracy [2] | | | ±1.0 % or ±1.0 °C | | |
| Repeatability [2] | | | ±0.5 % or ±0.5 °C | | |
| Temperature resolution (NETD) [3] | | | 50 mK | | |
| Response time [4] | | | 20 ms | | 120 ms |
| Emissivity | | | 0.100 to 1.100 | | |
| Transmittance | | | 0.100 to 1.100 | | |
| Signal processing | | | Intelligent averaging, Min/Max, Hold function with threshold/hysteresis (adjustable via software and buttons) | | |
| Supply voltage | | | 5 … 36 VDC | | |
| Max. current consumption | | | < 150 mA | | |
| Digital interface [5] | | | RS485 / USB (3.3V-LVTTL) / Ethernet / EtherCAT / PROFINET / EtherNet/IP | | |
| Analog output [6] | | | 0 (4) ... 20 mA / 0 ... 5 V / 0 ... 10 V (freely scalable within the measuring range) | | |
| Switching output | | | 2x relays for alarm (min/max); 400 mA (short-circuit proof) | | |
| Connection | | Sensor | Integrated cable, standard length 3 m, optional 1 m, 8 m or 15 m possible | | |
| | | Controller [7] | Supply/digital and relay output: 8-pin M12 plug connector (socket)<br>Supply/analog output: 5-pin M12 plug connector (plug) | | |
| Mounting | | Sensor | Direct fastening via integrated M12x1 thread or fastening using the hexagon nut included in the scope of delivery | | |
| Temperature range | Sensor | Storage | -40 ... 85 °C | | |
| | | Operation | -20 ... 120 °C | -20 ... 180 °C | |
| | Controller | Storage | -40 ... 85 °C | | |
| | | Operation | -20 ... 80 °C | | |
| Humidity | | | 10 % RH ... 95 % RH (non-condensing) | | |
| Shock (DIN EN 60068-2-27) | | | 50g, 11 ms, each axis | | |
| Vibration (DIN EN 60068-2-6) | | | 3g / 11 ... 200 Hz, each axis | | |
| Protection class (DIN EN 60529) | | Sensor | IP65 | | |
| | | Controller | IP65 | | |
| Material | | Sensor | Stainless steel (1.4404) | | |
| | | Controller | Aluminum die-cast | | |
| Weight | | Sensor | approx. 20 g | | |
| | | Controller | approx. 280 g | | |
| Control and indicator elements [8] | | | LCD display & membrane keypad for button operation; optional operation via sensorTOOL | | |

[1] Measuring range can optionally be extended to 1000 °C (only SF22)
[2] Valid for object temperatures >0 °C and for an ambient temperature of 24 °C ±2 °C; the greater value applies (ε=1)
[3] With a time constant of 200 ms and an object temperature of 200 °C
[4] 0 - 90 % energy; adjustable via software
[5] Connection via an interface module is required for Ethernet, EtherCAT, PROFINET and EtherNet/IP, USB interface only via USB cable (see accessories)
[6] Depends on supply voltage
[7] The supply via the optional USB cable (VCC = 5 V) and the supply up to 36 V can be connected at the same time; the higher voltage supply is used in each case. When operating without a USB cable, the power supply up to 36 V can be connected to one of the two M12s.
[8] Access with sensorTOOL requires USB adapter (see accessories)

## Product identification

| UC- | SF15- | S3 |
|---|---|---|
| | | Cable length: 1m / 3 m (standard) / 8 m / 15 m |
| | Focus: SF02 / SF15 / SF22 | |
| Series: thermoMETER UC | | |

| Standard Focus (in mm) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SF02 | 2:1 | 7 | 53.8 | 102.5 | 151.3 | 200 | 251.3 | 302.5 | 353.8 | 405 | | |
| Distance | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | | |
| SF15 | 15:1 | 7 | 11.5 | 14 | 18 | 23.5 | 29.5 | 35.5 | | | | |
| Distance | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | | | | |
| SF22 | 22:1 | 7 | 14 | 12 | 18.5 | 23 | 28 | 33 | 36.5 | 38.5 | 40 | 41.5 |
| Distance | | 0 | 60 | 110 | 210 | 310 | 410 | 510 | 610 | 710 | 810 | 910 |

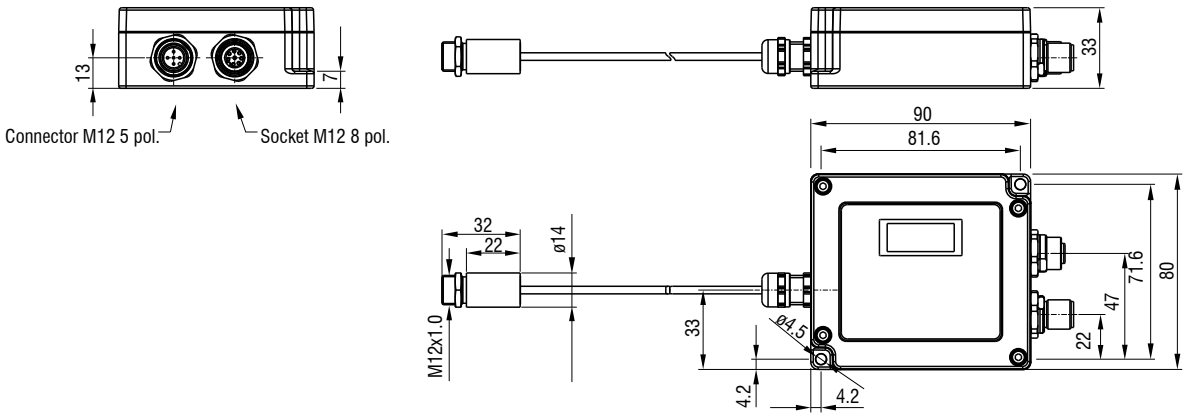
| Close Focus (when using the screwable CF lens, in mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CF02 | 2:1 | 6.5 | 3.9 | 2.8 | 2.5 | 4.8 | 6.4 | 8 |
| Distance | | 0 | 10 | 20 | 25 | 30 | 35 | 40 |
| CF15 | 15:1 | 6.5 | 3.7 | 0.8 | 4.1 | 5 | 6.8 | 8.8 |
| CF22 | 22:1 | 6.5 | 3.4 | 0.6 | 4 | 4.5 | 6.2 | 8 |
| Distance | | 0 | 5 | 10 | 15 | 20 | 25 | 30 |

= smallest spot size / focal point (mm)

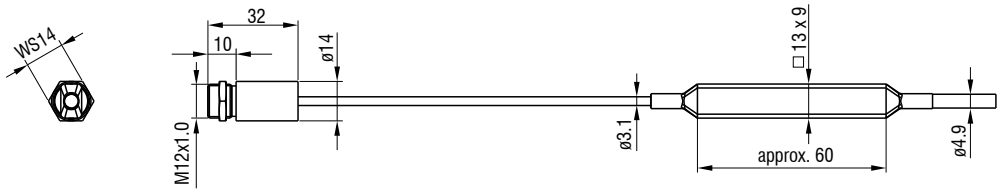
The ratio D:S (example 2:1, see table) describes the ratio Distance (distance from the front edge of the sensor to the measuring object) to Spot size (measurement spot size).

# Technical drawings
# thermoMETER

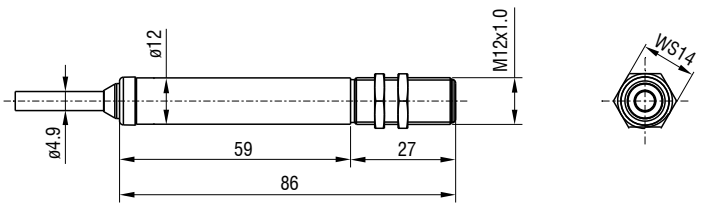
### thermoMETER UC




### thermoMETER SE




### thermoMETER FI




(dimensions in mm, not to scale)

# Connection possibilities
# thermoMETER

| Sensor | Cables | Type |
|---|---|---|
| thermoMETER FI | **Integrated cable**<br>Length 1 m / 3 m / 8 m / 15 m | Open ends<br>(with ferrules) |
|  | | |

| Connection possibilities and accessories | |
|---|---|
| **Connection supply voltage**<br>**PS2020** |  |
| **USB programming adapter for connection to PC**<br>TM-USBA USB adapter with terminal block |  |
| **Interface module for Ethernet and EtherCAT connection**<br>IF1032 |  |
| **Control / machine**<br>Analog output (voltage), open collector |  |

| Sensor | Cables | Type |
|---|---|---|
| thermoMETER SE | **Sensor cable (sensor controller)**<br>Lengths 0.5 m / 3 m / 6 m / 15 m<br>**Connection cable**<br>(Controller - open ends)<br>Lengths 0.5 m / 3 m | Open ends<br>(with ferrules) |
|  | | |

| Connection possibilities and accessories | |
|---|---|
| **Connection supply voltage**<br>**PS2020** |  |
| **USB programming adapter for connection to PC**<br>TM-USBA USB adapter with terminal block |  |
| **Interface module for Ethernet and EtherCAT connection**<br>IF1032 |  |
| **Control / machine**<br>Analog output (current/voltage), open collector |  |

| Sensor | Cables | Type |
|---|---|---|
| thermoMETER UC<br>  | **Digital cable: TM-DC8/x-M12**<br>Lengths 1 m / 5 m | Open ends<br>(with ferrules) |
| | **Digital cable: TM-USBA-M12**<br>Length 1.8 m | USB |
|  | **Analog cable: TM-PC5/x-M12**<br>Lengths 1 m / 5 m | Open ends<br>(with ferrules) |

| Connection possibilities and accessories | |
|---|---|
| **Connection supply voltage**<br>**PS2020** |  |
| **USB programming adapter for connection to PC**<br>TM-USBA USB adapter with terminal block |  |
| **Control / machine**<br>2x alarm relays, RS485 |  |
| **Interface module for Industrial Ethernet connection**<br>IF2035-PROFINET<br>IF2035-EIP<br>IF2035-EtherCAT |  |
| **Connection to PC (sensorTOOL)**<br>Display & parameter setting |  |
| **Interface module for Ethernet and EtherCAT connection**<br>IF1032 |  |
| **Connection supply voltage**<br>**PS2020** |  |
| **Control / machine**<br>Analog output (current/voltage) |  |

# Accessories
# thermoMETER

### Mounting accessories / optical accessories / air purge collars

| Art. no. | Name | | FI | SE | UC |
|---|---|---|---|---|---|
| 2970750 | TM-DIN-UC | Rail mount adapter | ⊘ | ⊘ | ✓ |
| 2970751 | TM-MF-UC | Mounting fork | ⊘ | ✓ | ✓ |
| 2970752 | TM-APL | Air purge collar, laminar | ✓ | ✓ | ✓ |
| 2970753 | TM-FB | Mounting bracket | ✓ | ✓ | ✓ |
| 2970754 | TM-AB-UC | Mounting bracket, adjustable in 2 axes | ⊘ | ✓ | ✓ |
| 2970755 | TM-MB-UC | Mounting bolt with M12x1 thread and nut | ⊘ | ✓ | ✓ |
| 2970756 | TM-TA | Pipe adapter | ✓ | ✓ | ✓ |
| 2970757 | TM-T40 | Reflection protection tube, length 40 mm; M12x1 external thread | ✓ | ✓ | ✓ |
| 2970758 | TM-T88 | Reflection protection tube, length 88 mm; M12x1 external thread | ✓ | ✓ | ✓ |
| 2970759 | TM-T20 | Reflection protection tube, length 20 mm; M12x1 external thread | ✓ | ✓ | ✓ |
| 2970760 | TM-MH-UC | Massive housing made from stainless steel | ⊘ | ✓ | ✓ |
| 2970761 | TM-FBMH-UC | Mounting bracket for solid housing | ⊘ | ✓ | ✓ |
| 2970762 | TM-APMH-UC | Air purge collar made from stainless steel for solid housing | ⊘ | ✓ | ✓ |
| 2970763 | TM-CF | Close Focus lens | ✓ | ✓ | ✓ |
| 2970764 | TM-PW | Protective window | ✓ | ✓ | ✓ |
| 2970765 | TM-AP-UC | Air purge collar (stainless steel) for lenses from D/S 15:1 | ⊘ | ⊘ | ✓ |
| 2970766 | TM-AP2-UC | Air purge collar (stainless steel) for lenses with D/S 2:1 | ⊘ | ⊘ | ✓ |
| 2970767 | TM-AP | Air purge collar | ✓ | ✓ | ✓ |
| 2970768 | TM-AP8 | Air purge collar with 8 mm hose connection | ✓ | ✓ | ✓ |
| 2970769 | TM-MI | Right angle mirror | ✓ | ✓ | ✓ |

### Connection cables for pyrometer UC

| | | |
|---|---|---|
| 2904051 | TM-PC5/1-M12 | Analog signal and supply cable 1 m |
| 2904052 | TM-PC5/5-M12 | Analog signal and supply cable 5 m |
| 2904053 | TM-USBA-M12 | Digital signal cable with USB converter, 1.8 m, M12 plug, USB-A plug |
| 2904054 | TM-DC8/1-M12 | Digital signal cable, 1 m, M12 plug, ferrules, pre-assembled |
| 2904055 | TM-DC8/5-M12 | Digital signal cable, 5 m, M12 plug, ferrules, pre-assembled |

### USB adapter for pyrometers UC / FI / SE

| | | |
|---|---|---|
| 2970770 | TM-USBA | USB adapter with terminal block |

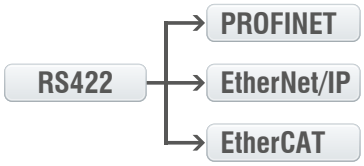
**IF2035: Interface module for Industrial Ethernet connection**

- Connection of RS422 or RS485 interfaces to PROFINET / Ethernet/IP / EtherCAT
- Synchronization output for RS422 sensors
- 2 network connections for different network topologies
- Data rate up to 4 MBaud
- 4-fold oversampling (with EtherCAT)
- Ideal for confined spaces due to a compact housing and DIN rail mounting

EtherCAT

EtherNet/IP

PROFINET




**IF1032: Interface module for Ethernet & EtherCAT connection**

- Connection of analog output or RS485 to Ethernet and EtherCAT
- Web interface for data display and scaling
- CSV export

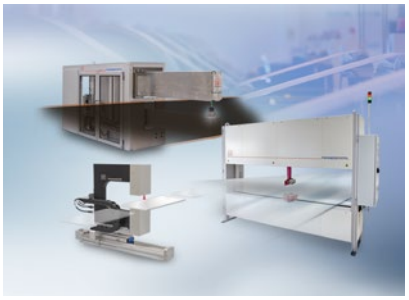
EtherCAT

Ethernet

## Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

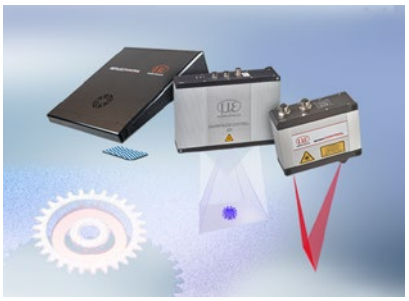
Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for metal strips, plastics and rubber

Optical micrometers and fiber optics, measuring and test amplifiers

Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection



MICRO-EPSILON

MICRO-EPSILON Headquarters
Koenigbacher Str. 15 · 94496 Ortenburg / Germany
Tel. +49 (0) 8542 / 168-0 · Fax +49 (0) 8542 / 168-90
info@micro-epsilon.com · **www.micro-epsilon.com**