



# More Precision.

**thermoIMAGER TIM**  
Compact Thermal Imager



# thermoIMAGER TIM 400/450



## thermoIMAGER TIM 400/450

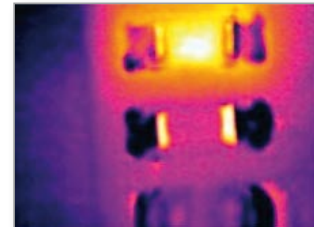
Miniaturised real time thermal imager with high resolution

- **NEW:** Detector with 382 x 288 pixels
- Fast real-time thermal imager with up to 80Hz
- Very high thermal sensitivity with 80mK (TIM 400) and 40mK (TIM 450)
- Smallest camera in its class (46 x 56 x 90mm<sup>3</sup>)
- Lightweight (320g incl. optics)
- Exchangeable lenses & industrial accessories
- Software TIMConnect included in the scope of delivery
- Including Software Developer Kit and LabView Interface

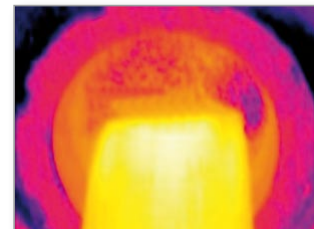
## Software

- Representation of the thermal image in real time (80Hz) with record function (video, snapshots)
- Complete set up of parameters and remote control of the camera
- Detailed analysis of fast thermodynamic processes
- Output of analogue temperature or alert values via the process interface
- Digital communication via RS232 or DLL for software integration

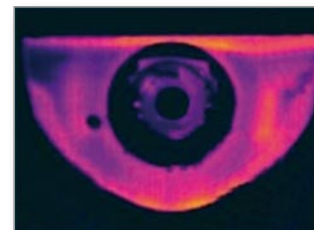
## Applications - Examples



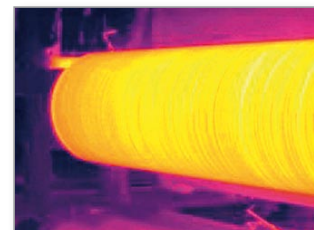
R&D electronic



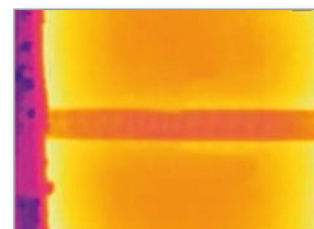
Process control extrusion



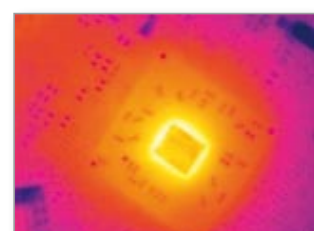
R&D mechanical components



Process control calendaring



Production of solar panels



R&D electronic devices

## Technical data

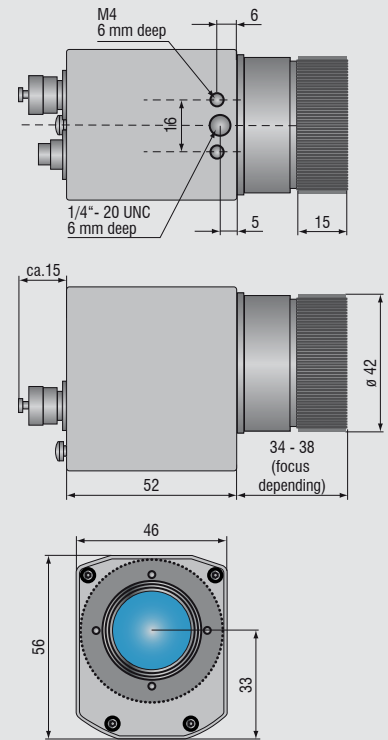
| Modell                                       | TIM 400  | TIM 450  |
|--|--|--|
| Detector                                     | FPA, uncooled (25µm x 25µm)  |  |
| Optical resolution                           | 382 x 288 pixel  |  |
| Temperature ranges                           | -20°C...100°C, 0°C...250°C, 150°C...900°C,<br>additional range: 200°C...1500°C (Option only for TIM 400) |  |
| Spectral range                               | 7.5 - 13µm   |  |
| Frame rate                                   | 80Hz   |  |
| System accuracy                              | ±2% or ±2°C  |  |
| Lenses                                       | 30° x 23° FOV / f = 17 mm <u>or</u> 13° x 10° FOV / f = 40 mm  |  |
| Thermal Sensitivity                          | <b>0.08K</b> with 30° x 23° FOV / F = 0.7<br><b>0.1K</b> with 13° x 10° FOV / F = 1.0                    | <b>0.04K</b> with 30° x 23° FOV / F = 0.7<br><b>0.06K</b> with 13° x 10° FOV / F = 1.0 |
| Outputs/digital                              | USB 2.0  |  |
| Process interface<br>(electrically isolated) | 0-10V output,<br>0-10V input, trigger input  |  |
| Power supply                                 | USB powered  |  |
| Tripod mount                                 | 1/4-20 UNC   |  |
| Environmental rating                         | IP 67  |  |
| Ambient temperature                          | 0°C to 50°C  | 0°C to 70°C  |
| Storage temperature                          | -40°C to 70°C  | -40°C to 85°C  |
| Relative humidity                            | 20 to 80%, non-condensing  |  |
| Vibration                                    | 2G, IEC 68-2-6 11-200Hz each axis  |  |
| Shock  | 25G, IEC 68-2-29 11ms each axis  |  |
| Housing<br>(Dimensions)                      | 46mm x 56mm x 90mm   |  |
| Weight                                       | 320g; incl. lens   |  |

PC requirements: minimum 1.5GHz, 1GB RAM, Windows XP SP2, Windows 7

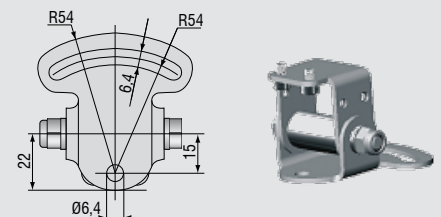
<sup>1)</sup> Caution: at distances below 200mm measurement accuracy can be out of specification

<sup>2)</sup> Caution: at distances below 500mm measurement accuracy can be out of specification

## Dimensions



## Accessories



TM-MB-TIM Mounting base, adjustable

## The right optics for many applications

### thermoIMAGER TIM 160/200

| Objective 80° x 60° wide angle; focal distance 3.1mm; min distance 0.1m |    |      |      |      |      |      |       |       |      |      |       |       |
|---|----|------|------|------|------|------|-------|-------|------|------|-------|-------|
| HFOV  | m  | 0.13 | 0.26 | 0.39 | 0.65 | 1.55 | 2.58  | 5.16  | 7.7  | 12.9 | 38.7  | 129.0 |
| VFOV  | m  | 0.09 | 0.19 | 0.29 | 0.48 | 1.16 | 1.94  | 3.87  | 5.8  | 9.7  | 29.0  | 96.8  |
| IFOV  | mm | 0.81 | 1.61 | 2.42 | 4.03 | 9.68 | 16.13 | 32.26 | 48.4 | 80.7 | 241.9 | 806.5 |
| <i>Distance in m</i>  |    | 0.1  | 0.2  | 0.3  | 0.5  | 1.2  | 2     | 4     | 6    | 10   | 30    | 100   |

| Objective 48° x 37° wide angle; focal distance 4.5mm; min distance 0.02m |    |      |      |      |      |      |       |       |      |      |       |       |
|--|----|------|------|------|------|------|-------|-------|------|------|-------|-------|
| HFOV   | m  | 0.09 | 0.18 | 0.27 | 0.44 | 1.07 | 1.78  | 3.56  | 5.3  | 8.9  | 26.7  | 88.9  |
| VFOV   | m  | 0.07 | 0.13 | 0.20 | 0.33 | 0.80 | 1.33  | 2.67  | 4.0  | 6.7  | 20.0  | 66.7  |
| IFOV   | mm | 0.56 | 1.11 | 1.67 | 2.78 | 6.67 | 11.11 | 22.22 | 33.3 | 55.6 | 166.7 | 555.6 |
| <i>Distance in m</i>   |    | 0.1  | 0.2  | 0.3  | 0.5  | 1.2  | 2     | 4     | 6    | 10   | 30    | 100   |

- Standard-, tele- and wide angle lens for different applications
- High quality germanium lenses and a special antireflective coating
- Factory calibrated lenses allowing the easy exchange of optics without recalibration

| Objective 23° x 17° wide angle; focal distance 10mm; min distance 0.02m |    |      |      |      |      |      |      |       |       |       |       |        |
|---|----|------|------|------|------|------|------|-------|-------|-------|-------|--------|
| HFOV  | m  | 0.04 | 0.08 | 0.12 | 0.20 | 0.48 | 0.80 | 1.60  | 2.40  | 4.00  | 12.00 | 40.00  |
| VFOV  | m  | 0.03 | 0.06 | 0.09 | 0.15 | 0.36 | 0.60 | 1.20  | 1.80  | 3.00  | 9.00  | 30.00  |
| IFOV  | mm | 0.25 | 0.50 | 0.75 | 1.25 | 3.00 | 5.00 | 10.00 | 15.00 | 25.00 | 75.00 | 250.00 |
| <i>Distance in m</i>  |    | 0.1  | 0.2  | 0.3  | 0.5  | 1.2  | 2    | 4     | 6     | 10    | 30    | 100    |

| Objective 6° x 5° wide angle; focal distance 35.5mm; min distance 0.5m |    |     |     |     |      |      |      |      |     |     |      |      |
|--|----|-----|-----|-----|------|------|------|------|-----|-----|------|------|
| HFOV   | m  | -   | -   | -   | 0.06 | 0.14 | 0.23 | 0.45 | 0.7 | 1.1 | 3.4  | 11.3 |
| VFOV   | m  | -   | -   | -   | 0.04 | 0.10 | 0.17 | 0.34 | 0.5 | 0.8 | 2.5  | 8.5  |
| IFOV   | mm | -   | -   | -   | 0.35 | 0.85 | 1.41 | 2.82 | 4.2 | 7.0 | 21.1 | 70.4 |
| <i>Distance in m</i>   |    | 0.1 | 0.2 | 0.3 | 0.5  | 1.2  | 2    | 4    | 6   | 10  | 30   | 100  |

FOV = Field of view; HFOV = Horizontal field of view; VFOV = Vertical field of view; IFOV = Indicated field of view

### thermoIMAGER TIM 400/450

| Objective 30° x 23°; focal distance 17mm; min distance 0.2m |    |      |      |      |      |      |      |     |      |      |       |  |
|---|----|------|------|------|------|------|------|-----|------|------|-------|--|
| HFOV  | m  | 0.11 | 0.17 | 0.28 | 0.67 | 1.12 | 1.60 | 3.4 | 5.6  | 16.9 | 56.2  |  |
| VFOV  | m  | 0.08 | 0.13 | 0.21 | 0.51 | 0.84 | 1.20 | 2.5 | 4.2  | 12.7 | 42.4  |  |
| IFOV  | mm | 0.29 | 0.44 | 0.74 | 1.76 | 2.94 | 5.88 | 8.8 | 14.7 | 44.1 | 147.1 |  |
| <i>Distance in m</i>  |    | 0.2  | 0.3  | 0.5  | 1.2  | 2    | 4    | 6   | 10   | 30   | 100   |  |

| Objective 13° x 10° Tele; focal distance 40mm; min distance 0.5m |    |  |  |      |      |      |      |     |     |      |      |  |
|--|----|--|--|------|------|------|------|-----|-----|------|------|--|
| HFOV   | m  |  |  | 0.12 | 0.29 | 0.48 | 0.96 | 1.5 | 2.4 | 7.2  | 23.9 |  |
| VFOV   | m  |  |  | 0.09 | 0.22 | 0.36 | 0.72 | 1.1 | 1.8 | 5.4  | 18.0 |  |
| IFOV   | mm |  |  | 0.31 | 0.75 | 1.25 | 2.50 | 3.8 | 6.3 | 18.8 | 62.5 |  |
| <i>Distance in m</i>   |    |  |  | 0.5  | 1.2  | 2    | 4    | 6   | 10  | 30   | 100  |  |

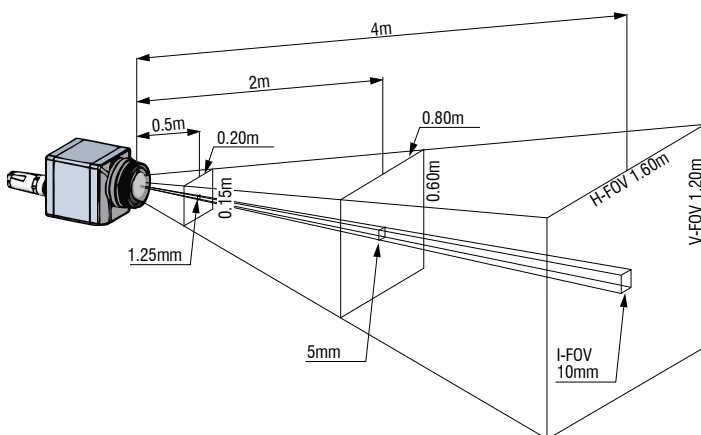
FOV = Field of view; HFOV = Horizontal field of view; VFOV = Vertical field of view; IFOV = Indicated field of view

Note: The accuracy of measurement can be outside of the specifications for distances below 0.2m.

Precise measurement values can be calculated on  
[www.micro-epsilon.com/optikkalkulator](http://www.micro-epsilon.com/optikkalkulator)



Dependence between field of view (FOV) and distance  
 Example: (lens 23° x 17°)



## Scope of supply

### TIM 160/200

- ▶ TIM process camera including one selected lens
- ▶ Operation manual
- ▶ USB cable 1m
- ▶ Processing and analysing software
- ▶ Tripod mount
- ▶ PIF cable 1m

### TIM 160/200 /DK

- ▶ TIM process camera including 6°, 23°, 48° optics
- ▶ Certificate of calibration, matched with the optics
- ▶ Tripod mount 200 to 1000mm
- ▶ Rugged transport case
- ▶ Operation manual
- ▶ USB cable 1m and 10m
- ▶ Processing and analysing software
- ▶ PIF cable 1m

### TIM 400/450

- ▶ TIM process camera including one selected lens
- ▶ USB cable 1m
- ▶ Processing and analysing software
- ▶ Tripod mount
- ▶ PIF cable 1m
- ▶ Aluminium case

## High performance sensors made by Micro-Epsilon



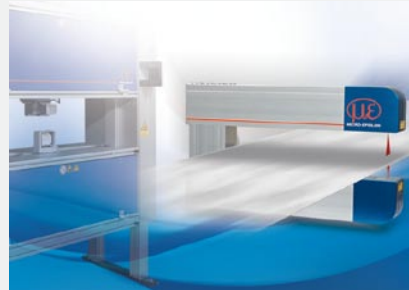
Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Measurement and inspection systems for quality assurance



Optical micrometers, fiber optic sensors and optical fibers



Color recognition sensors, LED analyzers and color online spectrometer



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