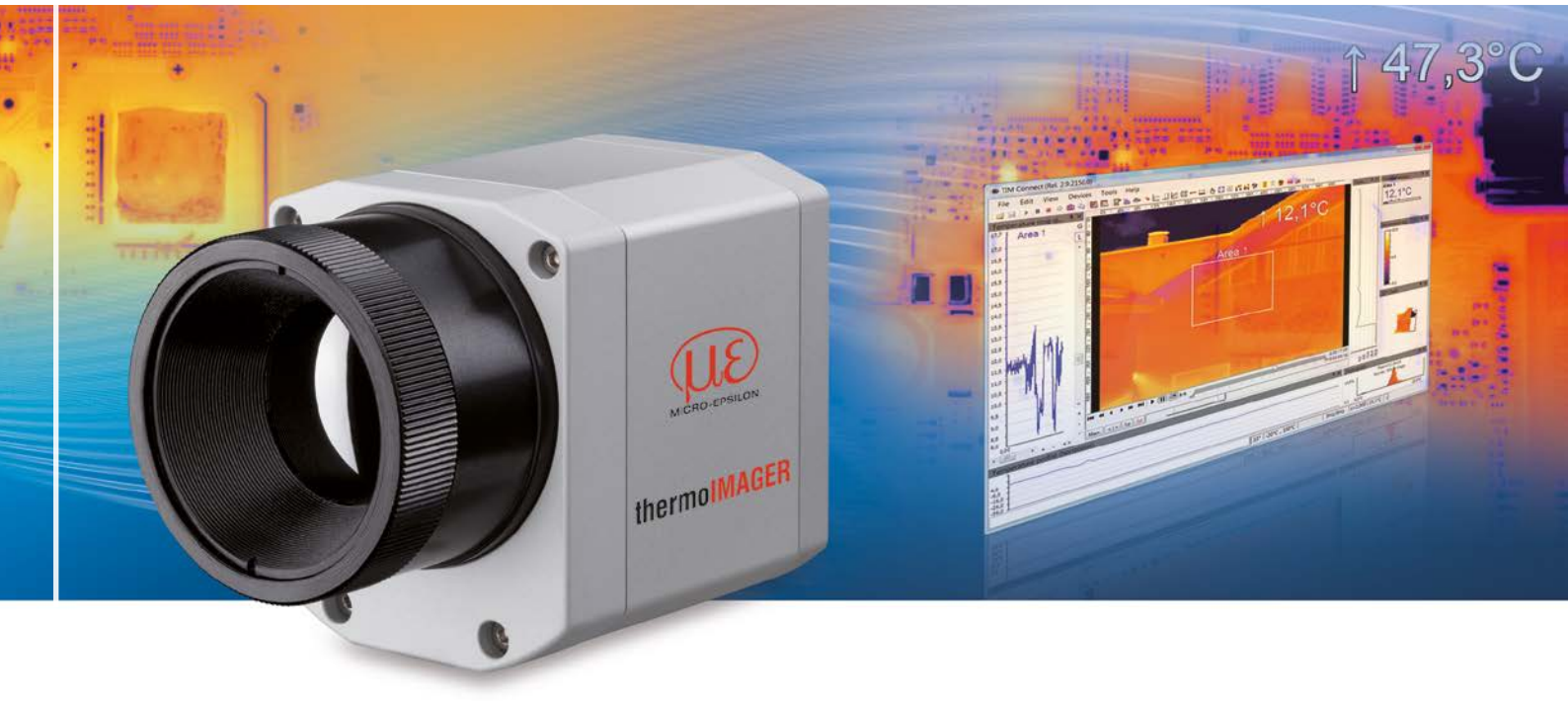
MICRO-EPSILON

More Precision

thermoIMAGER TIM // Compact thermal imaging cameras



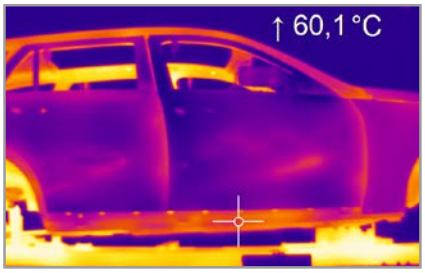
thermoIMAGER TIM 640 VGA

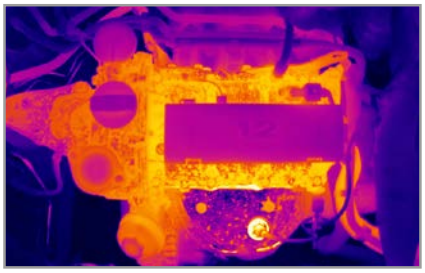
Miniature infrared camera with VGA resolutions

- Thermography in VGA resolution
- 640 x 480 pixels
- Measuring range from -20 °C to 900 °C (special model up to 1500 °C)
- Radiometric video recording with 32 Hz, 125 Hz in the subframe mode (640 x 120 pixels)
- Compact design (46 mm x 56 mm x 76 - 100 mm) with USB interface
- Lightweight (269 - 340 g, incl. lens)
- Exchangeable lenses & industrial accessories
- TIMConnect software delivered with Software Developer Kit

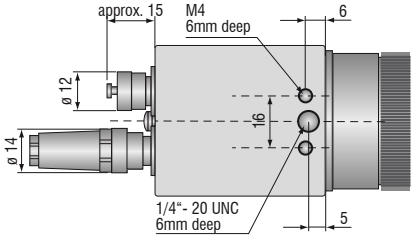
Software

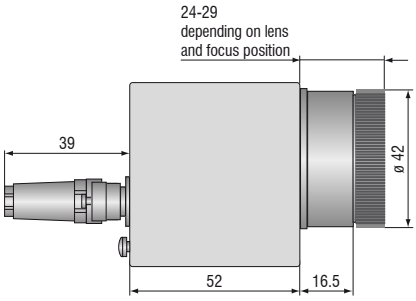
- Display of the thermal image in real time (32 Hz) with recording function (video, snapshot)
- Complete set up of parameters and remote control of the camera
- Detailed analysis of fast, thermodynamic processes
- Output of analog temperature or alarm values via the process interface
- Digital communication via RS232 or DLL for software integration

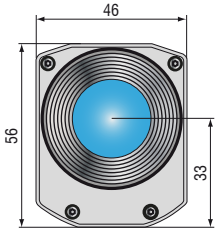




Razor-sharp infrared pictures and videos for process optimization, e.g., in the automotive industry







Model	TIM 640 VGA
Optical resolution	640 x 480 pixels
Temperature ranges	-20 ... 100 °C, 0 … 250 °C, (20) 150 ... 900 °C [1] additional temperature range: 200 ... 1500 °C (optional)
Spectral range	8 to 14 µm
Frame rate	32 Hz / 125 Hz in the subframe mode (640 x 120 pixels)
System accuracy	±2 °C or ±2 %, whichever is greater
Lenses	15° x 11° FOV / f = 41.5 mm or 33° x 25° FOV / f = 18.7 mm or 60° x 45° FOV / f = 10.5 mm or 90° x 64° FOV / f = 7.7 mm
Thermal sensitivity (NETD)	75 mK with 33°, 60° and 90° 85 mK with 15°
Detector	FPA, uncooled (17 µm x 17 µm)
Outputs/digital	USB 2.0 / optional interface USB to GigE (PoE)
Standard process interface (PIF)	0 - 10 V input, digital input (max. 24 V), 0 - 10 V output
Industry process interface (PIF)	2x 0 - 10 V inputs, digital input (max. 24 V), 3x 0(4) - 20 mA outputs, 3x relays (0 - 30 V/ 400 mA), fail-safe relay
Cable length (USB)	1 m (standard), 5 m, 10 m 5 m and 10 m also available as high temperature USB cable (180 °C or 250 °C)
Power supply	USB powered
Tripod mount	¼-20 UNC
Protection class	IP67
Ambient temperature	0 ... 50 °C
Storage temperature	-40 ... 70 °C
Relative humidity	20 to 80 %, non-condensing
Vibration	IEC 60068-2-6 (sinus-shaped) / IEC 60068-2-64 (broadband noise)
Shock	IEC 60068-2-27 (25 g and 50 g)
Housing (size)	46 mm x 56 mm x 76 - 100 mm (depending on lens and focus position)
Weight	269 - 340 g

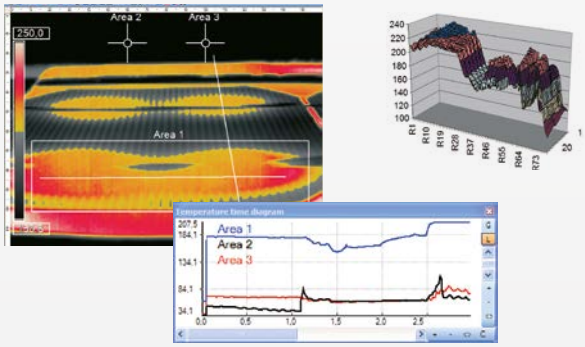
[1] For the range (20)150 up to 900 °C, the accuracy specification applies from 150 °C

Scope of supply

TIM 640 VGA

- TIM process camera
  incl. a selectable lens
- Operating instructions
- USB cable 1 m
- Software for real-time processing
  and analyzing thermal images
- Tripod mount
- PIF cable incl. terminal block (1 m)
- Transport case
- Test certificate

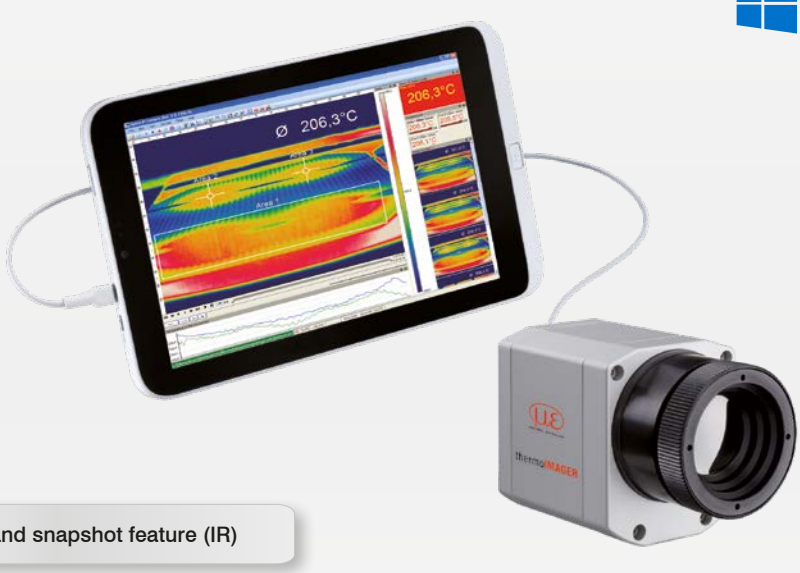
TIMConnect SOFTWARE FEATURES



Comprehensive IR camera software

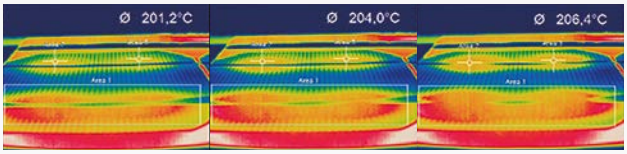
- License-free analysis software and complete SDK included
- Intuitive user interface
- Camera remote control via software
- Displays several camera images in different windows
- Compatible with Windows 7, 8 and 10
- Data output via PIF hardware interface using up to 3 analog channels

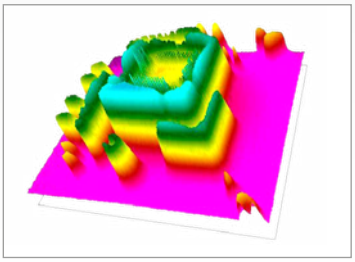
Windows 10



Video recording and snapshot feature (IR)

- Recording of video sequences and individual images for later analysis or documentation
- Adjustable frame rate to reduce data volume
- Display of snapshot process for direct analysis





Online and offline data analysis

- Real-time temperature information (°C or °F) in main window, as digital display or graphic display
- Detailed analysis using measuring fields, automatic hotspot/coldspot search
- Logical linking of temperature information
- Slow-motion replay without connected camera
- Various layout functions and color palettes to highlight thermal contrasts

Temperature data analysis and documentation

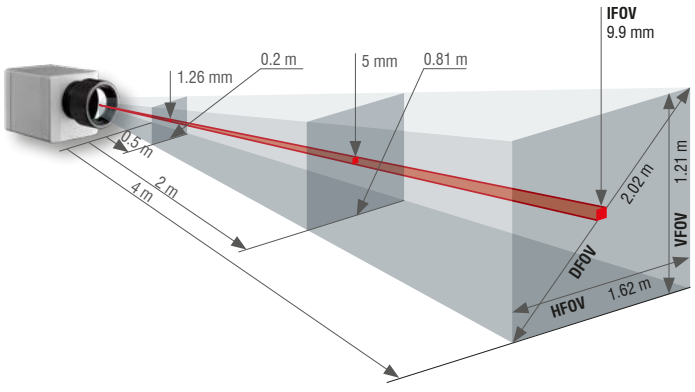
- Triggered data collection
- Radiometric video sequences (*.ravi) and snapshots (*.tiff)
- Thermal images as *.tiff or *.csv, *.dat text files incl. complete temperature information
- Data transfer in real time to other software programs via DLL or COM port interfaces

Lenses thermoIMAGER TIM 640 VGA / TIM VGA-G7

TIM 640 VGA / TIM VGA-G7 640 x 480 px	Focal length [mm]	Angle	Minimum measurement distance*		Distance to measurement object [m]										
					0.1	0.2	0.3	0.5	1	2	4	6	10	30	100
33° Standard lens	18.7	33° 25° 41° 0.91 mrad	0.2 m	HFOV [m] VFOV [m] DFOV [m] IFOV [mm]	0.068 0.051 0.085 0.1	0.13 0.09 0.16 0.2	0.19 0.14 0.23 0.3	0.31 0.23 0.38 0.5	0.60 0.45 0.75 0.9	1.20 0.89 1.49 1.8	2.38 1.77 2.97 3.6	3.57 2.65 4.45 5.5	5.9 4.4 7.4 9.1	17.8 13.2 22.2 27.3	59.3 44.2 74.0 90.9
15° Telephoto lens	41.5	15° 11° 19° 0.41 mrad	0.5 m	HFOV [m] VFOV [m] DFOV [m] IFOV [mm]				0.13 0.10 0.17 0.2	0.26 0.20 0.33 0.4	0.52 0.39 0.66 0.8	1.05 0.79 1.31 1.6	1.57 1.18 1.96 2.5	2.6 2.0 3.3 4.1	7.8 5.9 9.8 12.3	26.1 19.6 32.7 41.0
60° Wide angle lens	10.5	60° 45° 75° 1.62 mrad	0.2 m	HFOV [m] VFOV [m] DFOV [m] IFOV [mm]	0.128 0.091 0.157 0.2	0.25 0.18 0.30 0.3	0.36 0.26 0.44 0.5	0.59 0.42 0.72 0.8	1.17 0.83 1.43 1.6	2.32 1.66 2.85 3.2	4.63 3.31 5.69 6.5	6.94 4.96 8.52 9.7	11.6 8.3 14.2 16.2	34.6 24.7 42.6 48.6	115.4 82.4 141.8 161.9
90° Super wide angle lens	7.7	90° 64° 111° 2.21 mrad	0.2 m	HFOV [m] VFOV [m] DFOV [m] IFOV [mm]	0.220 0.138 0.260 0.2	0.43 0.27 0.50 0.4	0.63 0.39 0.73 0.7	1.03 0.64 1.21 1.1	2.03 1.27 2.39 2.2	4.04 2.53 4.76 4.4	8.06 5.05 9.50 8.8	12.07 7.57 14.24 13.2	20.1 12.6 23.7 22.1	60.3 37.8 71.1 66.2	200.8 125.9 237.0 220.8

FOV = Field of view; HFOV = Horizontal field of view; VFOV = Vertical field of view; DFOV = Diagonal dimension of the total measuring field at the object level; IFOV = Indicated field of view
Table with examples showing which measuring field sizes and pixel sizes are reached at which distance. Various lenses are available for optimal configuration of the camera.
Wide angle lenses have radial distortion due to the angle of their aperture. The TIMConnect software has an algorithm which corrects this distortion.

* Please note: The measurement accuracy of the camera may lie outside of the specifications for distances below the defined minimum measurement distance.



- Standard-, telephoto- and wide angle lenses for optimal adaptation to different applications
- High quality germanium lenses and special anti-reflective coating for excellent optics
- Factory-calibrated lenses for easy exchange of optical system without recalibration

Measuring field sizes can be calculated online at www.micro-epsilon.com/optikkalkulator.

thermoIMAGER Microscope lens

High resolution thermal imagers with microscope lens

Precise temperature measurement of very small parts

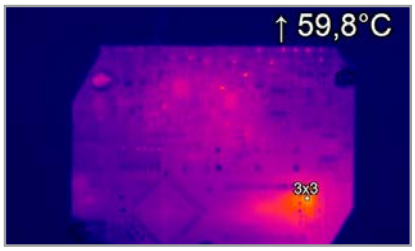
In order to recognize the slightest of temperature differences, the TIM 640 VGA thermal imaging camera is available with a microscope lens. In addition to overall images and videos, even detailed macro shooting of individual components is possible. The scope of supply includes a thermal imaging camera (TIM 640 VGA), a suitable microscope lens, PIF and USB connection cables and a high quality tripod. Comprehensive evaluation software is also provided, offering numerous features such as analysis and display of rapidly changing temperatures and recording of radiometric images and videos (up to 125 Hz). The data can be exported and evaluated with other programs.

High resolution

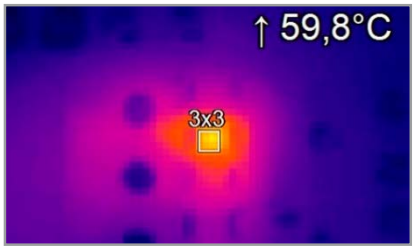
The microscope lens enables macro shooting of individual components based on a spatial resolution of up to 28 µm. The distance between the camera and the object to be measured can be up to 100 mm. Within this range, flexible camera positioning is possible. Due to the large working distance, electrical function tests can be carried out whilst measuring the temperature. The synchronous measurement procedure for electrical parameters is therefore not influenced by the camera position.

Upgrade your thermoIMAGER camera

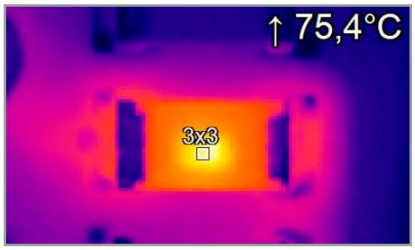
Thermal imaging cameras from Micro-Epsilon are equipped with exchangeable lenses. Therefore, the TIM 640 VGA thermal imaging camera can be upgraded with a microscope lens.



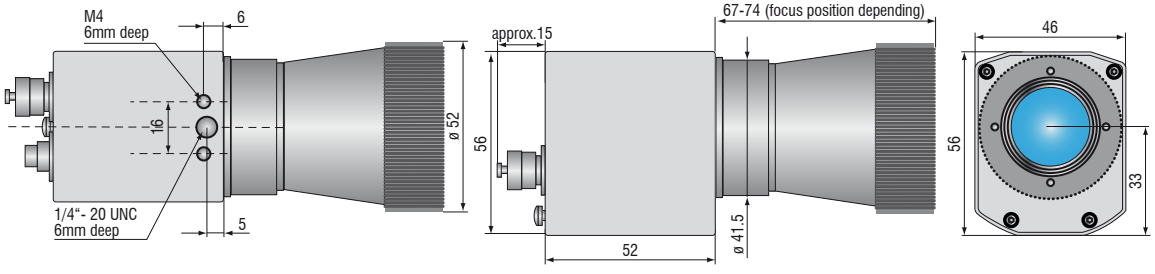
Overall record of a PCB with TIM 640 VGA - standard lens



Individual components, magnified without microscope lens



Individual components, magnified with microscope lens



thermoIMAGER Microscope lens

Model		TIM 640 VGA
Optical resolution		640 x 480 pixels @ 32 Hz 640 x 120 pixels @ 125 Hz
Temperature ranges (scalable)		-20 °C to 100 °C, 0 °C to 250 °C, (20)150 °C to 900 °C [1]
Spectral range		7.5 to 13 µm
Frame rate		32 Hz (switchable to 125 Hz)
System accuracy		±2 °C or ±2 %, whichever is greater
Field of view (FOV)		12° x 9° (F=1.1) / f= 44 mm
Smallest spot size (IFOV)		28 µm
Min. field of view (MFOV)		85 µm [2]
Focus adjustment		80 to 100 mm
Thermal sensitivity (NETD)		120 mK
Detector		FPA - uncooled micro bolometer
Outputs/digital		USB 2.0
Standard process interface (PIF)		0-10 V input, digital input (max. 24 V), 0-10 V output
Industry process interface (PIF)	(option)	2x 0 - 10 V inputs, digital input (max. 24 V), 3x 0(4) - 20 mA outputs, 3x relays (0 - 30 V/ 400 mA), fail-safe relay
Cable length (USB)		1 m (standard), 3 m, 5 m, 10 m, 20 m
Power supply		USB powered
Tripod mount		¼-20 UNC
Protection class		IP67
Ambient temperature range		0 °C to 50 °C
Storage temperature		-40 °C to 70 °C
Relative humidity		20 to 80 %, non-condensing
Shock / Vibration [3]		IEC 60068-2
Dimensions [3]	TIM camera	46 mm x 56 mm x 90 mm
	Microscope lens	52 mm x 74 mm
Emissivity		0.100 … 1.100

[1] For the range (20)150 up to 900 °C, the accuracy specification applies from 150 °C
[2] MFOV on TIM 640 VGA 3 x 3 pixels
[3] For more information see operating instructions

Scope of supply

Standard

- TIM 640 VGA with microscope lens (12° x 9°)
- Tripod mount for fine adjustment of camera focus
- PIF cable incl. terminal block (1 m)
- USB cable 1 m
- TIMConnect Software
- Hard-shell case for camera and accessories

For the TIM 640 VGA camera, an upgrade kit without cameras is optionally available. For optical calibration, please send us the camera.