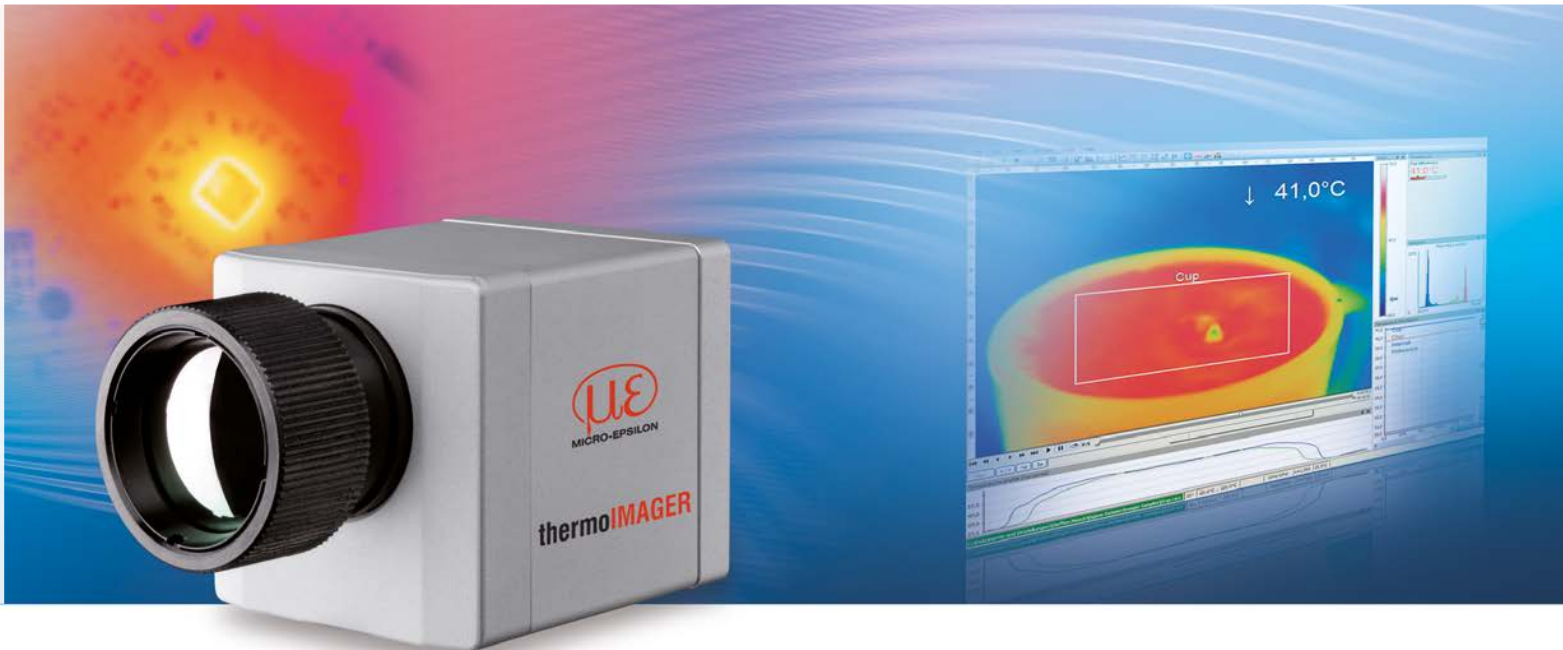




More Precision

thermoIMAGER TIM // Compact thermal imaging cameras





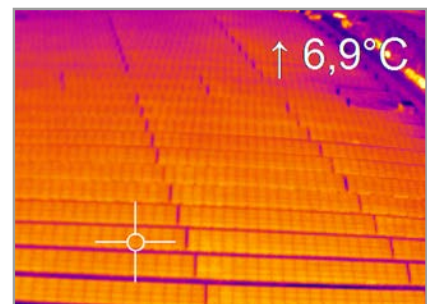
thermoIMAGER TIM 160

Miniaturized thermal imaging camera with USB interface

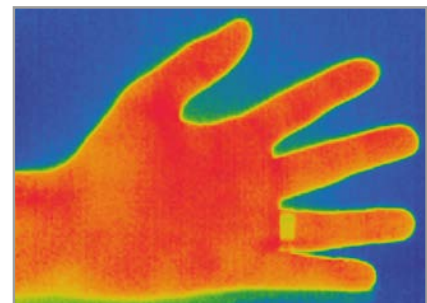
- Measuring range from -20 °C to 900 °C (special edition up to 1500 °C)
- Excellent thermal sensitivity (NEDT) of 0.08 K
- Exchangeable lenses 6°/23°/48°FOV or 72°FOV
- Real-time thermography with 120 Hz frame rate via USB 2.0 interface
- Power supply and data transfer via USB interface
- Extremely lightweight (195 g) and robust (IP67)
- Extremely compact dimensions 45x45x62 mm
- Analog input and output, trigger interface
- Software Developer Kit and LabVIEW examples included

Software

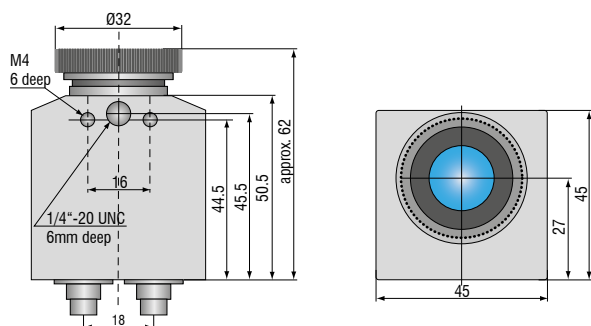
- Display of the thermal image in real time (120 Hz) with recording function (video, snapshot)
- Complete set up of parameters and remote control of the camera
- Detailed analysis of fast, thermodynamic processes
- Output of analog temperature or alarm values via the process interface
- Digital communication via RS232 or DLL for software integration



Surface measurements in industrial applications



Suitable lenses for every measurement distance



| Model | TIM 160 |
|---|---|
| Optical resolution | 160 x 120 pixels |
| Temperature ranges | -20 °C to 100 °C / 0 °C to 250 °C / 150 °C to 900 °C additional range: 200 °C to 1500 °C (option) |
| Spectral range | 7.5 to 13 μm |
| Frame rate | 120 Hz |
| System accuracy | ± 2 °C or ± 2 %, whichever is greater |
| Resolution (Display) | 0.1 °C |
| Lenses | 72° / f = 3.3 mm (min. distance 20 mm); 48° / f = 5.7 mm (min. distance 20 mm); 23° / f = 10 mm (min. distance 20 mm); 6° / f = 35.5 mm (min. distance 500 mm) |
| Emissivity | 0.10 to 1.00 adjustable |
| Thermal sensitivity (NETD) | 0.1 K with 48° FOV and 72° FOV ¹⁾ / 0.08 K with 23° FOV ¹⁾ / 0.3 K with 6° FOV ²⁾ |
| Detector | Focal Plane Array (FPA) - uncooled micro bolometer 25x25 μm^2 |
| Measurement mode | Flexible spot with crosshair marking, measuring field with automatic display of maximum-, minimum- or average value |
| Color palettes | Iron, rainbow, black-white, black-white inverted etc. |
| Operation and set up (via menu) | Measurement modes fully automatic or manual, color palettes, emissivity, file management, date/time, °C/°F, language |
| Outputs/digital | USB 2.0 / optional GigE |
| Process interface (electrically isolated) | 0-10 V output, 0-10 V input |
| Digital communication | via RS232 of PC / DLL interface used |
| Cable length | 1 m (standard), 5 m, 10 m, 20 m |
| Power supply | USB powered |
| Tripod mount | 1/4-20 UNC |
| Protection class | IP67 |
| Ambient temperature range | 0 °C to 50 °C (up to 315 °C with cooling jacket) |
| Storage temperature | -40 °C to 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) |
| Weight | 195 g, incl. lens |

PC requirements: minimum 1.5GHz, 1GB RAM, Windows XP SP 2 or Windows 7

¹⁾ Please note: measurement accuracy can be out of specification with distances below 200 mm

²⁾ Please note: measurement accuracy can be out of specification with distances below 500 mm

Scope of supply

TIM 160

- TIM process camera
incl. a selectable lens
- Instruction Manual
- USB cable 1 m
- Software for real-time processing
and analyzing thermal images
- Tripod mount
- PIF cable 1 m
- Transport case

TIM 160/DK

- TIM process camera
incl. three lenses 6°, 23°, 48°
- Certificate of calibration,
adjusted to the included lenses
- Tripod mount 200 to 1000 mm
- Transport case
- Instruction Manual
- USB cable 1 m and 10 m
- Software for real-time processing
and analyzing thermal images
- PIF cable 1 m

thermoIMAGER TIM NetPC / NetPCQ PC solution for thermoIMAGER TIM applications

TIM NetPC is a professional, embedded industrial PC solution with passive cooling (fanless) for thermoIMAGER applications and is suitable for top hat rail mounting. The NetPC and the TIM camera can be operated in combination as stand-alone system. Remote maintenance via Ethernet is possible. Data provided by the TIM camera can be stored directly on the NetPC where customer-specific software can also be installed. A recovery-stick is included in the scope of delivery.

- Supports all thermoIMAGER TIM models
- Supports 120 Hz (TIM 160), up to 80 Hz (TIM 4x0), up to 32 Hz (TIM 640) frame rates
- Including TIMConnect software
- Monitor via VGA (analog)
- Integrated watchdog feature
- Optional: up to 20 m USB cable, high temperature USB cable, extendable up to 100 m Ethernet cable



thermoIMAGER TIM NetPC

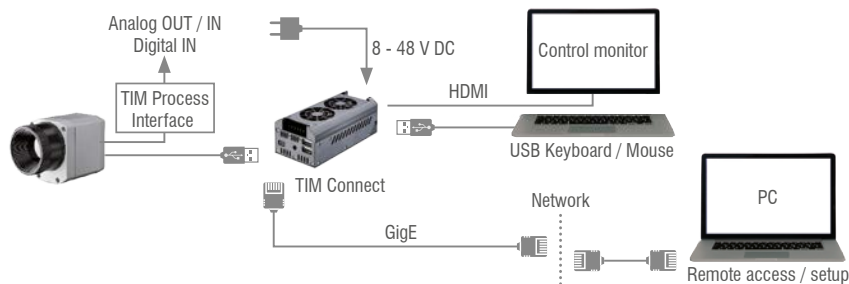
| Model | TIM NetPC | TIM NetPCQ |
|---------------------------|---|--|
| Ambient temperature range | 0 °C to 50 °C | |
| Storage temperature | -20 °C to 60 °C | |
| Relative humidity | 10 to 95 %, non-condensing | |
| Dimensions | 165 x 65 x 130 mm (W x H x D) | |
| Material (housing) | Anodized aluminum | |
| Weight | 1000 g | |
| Vibration | IEC-2-6: 3 G, 11 - 200 Hz, each axis | |
| Shock | IEC-2-27: 50 G, 11 ms, each axis | |
| Operating system | Windows 7 embedded | |
| Power supply | 12 - 24 V DC | |
| Power consumption | approx. 9.5 W without TIM [0.76 A with 12 V] | |
| Cooling | passive cooling (fanless) | |
| Processor | Intel® Atom™ 2600 @ 2x1.6 GHz Dual | Intel® Atom™ J1900 @ 4x2.4 GHz |
| Hard drive | integrated 64 GB SSD | |
| RAM | 2 GB DDR3 RAM 800 MHz | |
| Ports | 1 Gbit/s (GigE), 2 x RS 232, 4 x USB 2.0, VGA | 1 GigE, 2 x RS232 / 485, 3 x USB 2.0, 1 x USB 3.0, VGA |
| Additional functions | 1x status LED | |

thermoIMAGER TIM NetBox Miniature PC for thermoIMAGER TIM series

- Can be integrated into CoolingJacket Advanced Extended
- Miniature PC for TIM 160/ 4x0 standalone mode for cable extension
- Supports 120 Hz (TIM 160 up to 70 Hz (TIM 4x0) frame rate, 32 Hz (TIM 640)
- Integrated hardware and software watchdog
- Optional: up to 20 m USB cable, high temperature USB cable, extendable up to 100 m Ethernet cable (PoE)

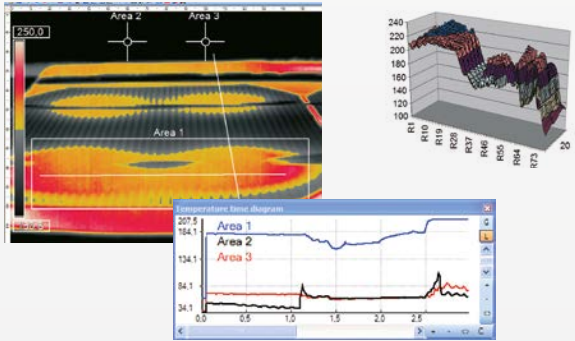


thermoIMAGER TIM NetBox



| Model | TIM NetBox |
|-----------------------|--|
| Operating temperature | 0 °C up to 50 °C |
| Storage temperature | -20 °C to 75 °C |
| Relative humidity | 10 to 95 %, non-condensing |
| Material (housing) | Anodized aluminum |
| Dimensions | 113 x 57 x 47 mm |
| Weight | 385 g |
| Vibration | IEC 60068-2-6 (sinus-shaped) / IEC 60068-2-64 (broadband noise) |
| Shock | IEC 60068-2-27 (25 g and 50 g) |
| Operating system | Windows 7 Professional |
| Power supply | 8 ... 48 VDC or Power over Ethernet (PoE/ 1000BASE-T) |
| Power consumption | 7.5 W (+ additional 2.5 W for TIM camera) |
| Cooling | Active via two integrated fans |
| Board | COM Express® mini embedded board |
| Processor | Intel® E3845 Quad Core, 1.91 GHz |
| Hard drive | 16 GB SSD |
| RAM | 2 GB (DDR2, 533MHz) |
| Ports | 2x USB 2.0, 1x USB 3.0, 1x Mini-USB 2.0, Micro-HDMI, Ethernet (Gigabit Ethernet) |
| Extensions | micro SDHC / SDXC card |
| Additional functions | 4x status LEDs |

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 and Linux (Ubuntu)
- Data output via PIF hardware interface using up to 3 analog channels



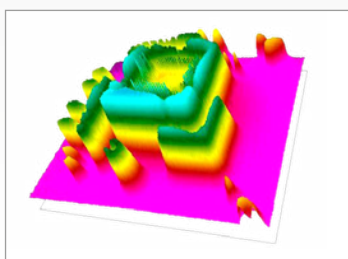
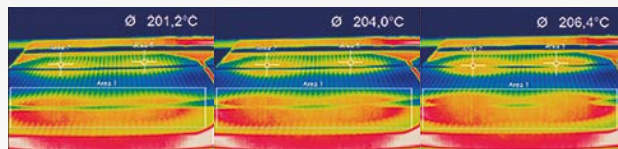
Windows 7

Windows 10



Video recording and snapshot feature (IR or BI-SPECTRAL)

- 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 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 text files *.csv, *.dat incl. complete temperature information
- Data transfer in real time to other software programs via DLL or COM port interfaces

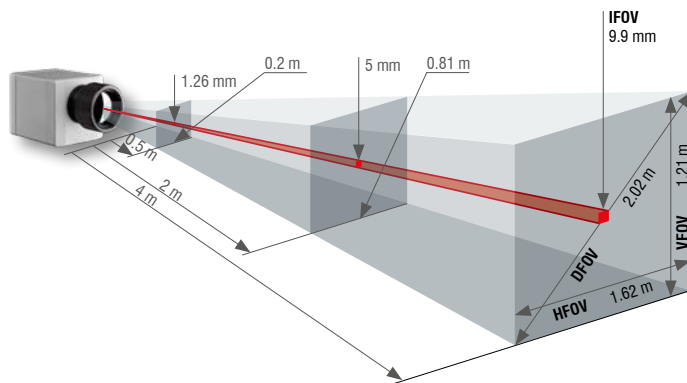
| TIM 160 / 200 | | Focal length [mm] | Angle | Minimum measurement distance* | Distance to measurement object [m] | | | | | | | | | | | |
|------------------------|------|--------------------------------|-------|-------------------------------------|------------------------------------|-------|------|------|------|------|------|------|-------|------|-------|-------|
| 160 x 120 px | | | | | 0.02 | 0.1 | 0.2 | 0.3 | 0.5 | 1 | 2 | 4 | 6 | 10 | 30 | 100 |
| 23° Standard lens | 10 | 23° 17° 29° 2.48 mrad | 0.2 m | HFOV [m] | 0.012 | 0.043 | 0.08 | 0.12 | 0.21 | 0.41 | 0.81 | 1.62 | 2.44 | 4.1 | 12.2 | 40.6 |
| | | | | VFOV [m] | 0.009 | 0.032 | 0.06 | 0.09 | 0.15 | 0.30 | 0.60 | 1.21 | 1.81 | 3.0 | 9.0 | 30.1 |
| | | | | DFOV [m] | 0.015 | 0.054 | 0.10 | 0.16 | 0.26 | 0.51 | 1.01 | 2.02 | 3.03 | 5.1 | 15.2 | 50.5 |
| | | | | IFOV [mm] | 0.1 | 0.3 | 0.5 | 0.8 | 1.3 | 2.5 | 5.0 | 9.9 | 14.9 | 24.8 | 74.4 | 248.0 |
| 6° Telephoto lens | 35.5 | 6° 5° 8° 0.70 mrad | 0.5 m | HFOV [m] | | | | | 0.06 | 0.11 | 0.23 | 0.45 | 0.68 | 1.1 | 3.4 | 11.3 |
| | | | | VFOV [m] | | | | | 0.04 | 0.09 | 0.17 | 0.34 | 0.51 | 0.8 | 2.5 | 8.5 |
| | | | | DFOV [m] | | | | | 0.07 | 0.14 | 0.28 | 0.57 | 0.85 | 1.4 | 4.2 | 14.2 |
| | | | | IFOV [mm] | | | | | 0.4 | 0.7 | 1.4 | 2.8 | 4.2 | 7.0 | 21.1 | 70.4 |
| 48° Wide angle lens | 5.7 | 41° 31° 51° 4.39 mrad | 0.2 m | HFOV [m] | 0.022 | 0.082 | 0.16 | 0.23 | 0.38 | 0.76 | 1.51 | 3.00 | 4.50 | 7.5 | 22.5 | 74.9 |
| | | | | VFOV [m] | 0.016 | 0.059 | 0.11 | 0.17 | 0.28 | 0.55 | 1.10 | 2.19 | 3.28 | 5.5 | 16.4 | 54.5 |
| | | | | DFOV [m] | 0.027 | 0.101 | 0.19 | 0.29 | 0.47 | 0.94 | 1.86 | 3.72 | 5.57 | 9.3 | 27.8 | 92.7 |
| | | | | IFOV [mm] | 0.1 | 0.4 | 0.9 | 1.3 | 2.2 | 4.4 | 8.8 | 17.5 | 26.3 | 43.9 | 131.6 | 438.6 |
| 72° Wide angle lens | 3.3 | 72° 52° 89° 7.51 mrad | 0.2 m | HFOV [m] | 0.039 | 0.152 | 0.29 | 0.43 | 0.72 | 1.42 | 2.84 | 5.66 | 8.49 | 14.1 | 42.4 | 141.4 |
| | | | | VFOV [m] | 0.027 | 0.106 | 0.20 | 0.30 | 0.50 | 0.99 | 1.98 | 3.95 | 5.92 | 9.9 | 29.6 | 98.6 |
| | | | | DFOV [m] | 0.048 | 0.186 | 0.36 | 0.53 | 0.87 | 1.74 | 3.46 | 6.91 | 10.35 | 17.2 | 51.7 | 172.3 |
| | | | | IFOV [mm] | 0.2 | 0.8 | 1.5 | 2.3 | 3.8 | 7.5 | 15.0 | 30.0 | 45.0 | 75.1 | 225.2 | 750.8 |

| TIM 400 / 450 / G7 | | Focal length [mm] | Angle | Minimum measurement distance* | Distance to measurement object [m] | | | | | | | | | | | |
|--|------|--------------------------------|-------|-------------------------------------|------------------------------------|-------|------|------|------|------|------|------|-------|------|------|-------|
| 382 x 288 px | | | | | 0.02 | 0.1 | 0.2 | 0.3 | 0.5 | 1 | 2 | 4 | 6 | 10 | 30 | 100 |
| 29° Standard lens | 18.7 | 29° 22° 37° 1.34 mrad | 0.2 m | HFOV [m] | | 0.060 | 0.11 | 0.16 | 0.27 | 0.53 | 1.0 | 2.1 | 3.1 | 5.2 | 15.6 | 52.1 |
| | | | | VFOV [m] | | 0.045 | 0.08 | 0.12 | 0.20 | 0.40 | 0.78 | 1.6 | 2.3 | 3.9 | 11.7 | 39.0 |
| | | | | DFOV [m] | | 0.074 | 0.14 | 0.20 | 0.33 | 0.66 | 1.3 | 2.6 | 3.9 | 6.5 | 19.5 | 65.1 |
| | | | | IFOV [mm] | | 0.1 | 0.3 | 0.4 | 0.7 | 1.3 | 2.7 | 5.4 | 8.0 | 13.4 | 40.1 | 133.7 |
| 13° Telephoto lens (except for G7) | 41 | 13° 10° 17° 0.61 mrad | 0.5 m | HFOV [m] | | | | | 0.12 | 0.23 | 0.47 | 0.94 | 1.40 | 2.3 | 7.0 | 23.4 |
| | | | | VFOV [m] | | | | | 0.09 | 0.17 | 0.35 | 0.70 | 1.05 | 1.7 | 5.2 | 17.5 |
| | | | | DFOV [m] | | | | | 0.15 | 0.29 | 0.58 | 1.17 | 1.75 | 2.9 | 8.8 | 29.2 |
| | | | | IFOV [mm] | | | | | 0.3 | 0.6 | 1.2 | 2.5 | 3.7 | 6.1 | 18.4 | 61.2 |
| 53° Wide angle lens | 10.5 | 53° 40° 66° 2.38 mrad | 0.2 m | HFOV [m] | | 0.11 | 0.21 | 0.31 | 0.51 | 1.0 | 2.0 | 4.0 | 6.0 | 9.9 | 29.7 | 99.0 |
| | | | | VFOV [m] | | 0.08 | 0.15 | 0.23 | 0.37 | 0.73 | 1.4 | 2.9 | 4.3 | 7.2 | 21.6 | 71.9 |
| | | | | DFOV [m] | | 0.14 | 0.26 | 0.38 | 0.63 | 1.2 | 2.5 | 4.9 | 7.4 | 12.2 | 36.7 | 122.3 |
| | | | | IFOV [mm] | | 0.2 | 0.5 | 0.7 | 1.2 | 2.4 | 4.8 | 9.5 | 14.3 | 23.8 | 71.5 | 238.4 |
| 80° Wide angle lens | 7.7 | 80° 56° 97° 3.25 mrad | 0.2 m | HFOV [m] | | 0.182 | 0.35 | 0.84 | 0.84 | 1.65 | 3.29 | 6.55 | 9.82 | 16.4 | 49.0 | 163.4 |
| | | | | VFOV [m] | | 0.119 | 0.23 | 0.55 | 0.54 | 1.08 | 2.14 | 4.28 | 6.41 | 10.7 | 32.0 | 106.6 |
| | | | | DFOV [m] | | 0.218 | 0.41 | 1.00 | 1.00 | 1.97 | 3.92 | 7.83 | 11.73 | 19.5 | 58.5 | 195.1 |
| | | | | IFOV [mm] | | 0.3 | 0.7 | 1.6 | 1.6 | 3.3 | 6.5 | 13.0 | 19.5 | 32.5 | 97.4 | 324.7 |

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

| TIM M1 / TIM M05 ¹⁾ | 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 |
| 382 x 288 px | 16 | 20° 15° 25° 0.94 mrad | 0.2 m | HFOV [m] | | 0.07 | 0.11 | 0.18 | 0.36 | 0.72 | 1.43 | 2.15 | 3.6 | 10.7 | 35.8 |
| | | | | VFOV [m] | | 0.05 | 0.08 | 0.14 | 0.27 | 0.54 | 1.08 | 1.62 | 2.7 | 8.1 | 27.0 |
| | | | | DFOV [m] | | 0.09 | 0.13 | 0.22 | 0.45 | 0.90 | 1.79 | 2.69 | 4.5 | 13.5 | 44.9 |
| | | | | IFOV [mm] | | 0.2 | 0.3 | 0.5 | 0.9 | 1.9 | 3.8 | 5.6 | 9.4 | 28.1 | 93.8 |
| f=25 mm standard lens | 25 | 13° 10° 16° 0.60 mrad | 0.5 m | HFOV [m] | 0.023 | 0.05 | 0.07 | 0.11 | 0.23 | 0.46 | 0.92 | 1.38 | 2.3 | 6.9 | 22.9 |
| | | | | VFOV [m] | 0.017 | 0.03 | 0.05 | 0.09 | 0.17 | 0.35 | 0.69 | 1.04 | 1.7 | 5.2 | 17.3 |
| | | | | DFOV [m] | 0.029 | 0.06 | 0.09 | 0.14 | 0.29 | 0.57 | 1.15 | 1.72 | 2.9 | 8.6 | 28.7 |
| | | | | IFOV [mm] | 0.1 | 0.1 | 0.2 | 0.3 | 0.6 | 1.2 | 2.4 | 3.6 | 6.0 | 18.0 | 60.0 |
| f=50 mm telephoto lens | 50 | 7° 5° 8° 0.30 mrad | 1.5 m | HFOV [m] | | | | 0.06 | 0.11 | 0.23 | 0.46 | 0.69 | 1.1 | 3.4 | 11.5 |
| | | | | VFOV [m] | | | | 0.04 | 0.09 | 0.17 | 0.35 | 0.52 | 0.9 | 2.6 | 8.6 |
| | | | | DFOV [m] | | | | 0.07 | 0.14 | 0.29 | 0.57 | 0.86 | 1.4 | 4.3 | 14.4 |
| | | | | IFOV [mm] | | | | 0.2 | 0.3 | 0.6 | 1.2 | 1.8 | 3.0 | 9.0 | 30.0 |
| f=75 mm Super telephoto lens | 75 | 4° 3° 5° 0.20 mrad | 2.0 m | HFOV [m] | | | | | 0.08 | 0.15 | 0.31 | 0.46 | 0.8 | 2.3 | 7.6 |
| | | | | VFOV [m] | | | | | 0.06 | 0.12 | 0.23 | 0.35 | 0.6 | 1.7 | 5.8 |
| | | | | DFOV [m] | | | | | 0.10 | 0.19 | 0.38 | 0.57 | 1.0 | 2.9 | 9.6 |
| | | | | IFOV [mm] | | | | | 0.2 | 0.4 | 0.8 | 1.2 | 2.0 | 6.0 | 20.0 |

¹⁾ TIM M05 only available with OF25 lens | Please note: the camera provides 382 x 288 px in the 80 Hz mode

| TIM M1 / M05 with VGA ¹⁾ Resolution | 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 |
| 764 x 480 px | 16 | 39° 25° 46° 0.94 mrad | 0.2 m | HFOV [m] | | 0.14 | 0.21 | 0.36 | 0.72 | 1.43 | 2.87 | 4.30 | 7.2 | 21.5 | 71.6 |
| | | | | VFOV [m] | | 0.09 | 0.14 | 0.23 | 0.45 | 0.90 | 1.80 | 2.70 | 4.5 | 13.5 | 45.0 |
| | | | | DFOV [m] | | 0.17 | 0.25 | 0.42 | 0.85 | 1.69 | 3.38 | 5.08 | 8.5 | 25.4 | 84.6 |
| | | | | IFOV [mm] | | 0.2 | 0.3 | 0.5 | 0.9 | 1.9 | 3.8 | 5.6 | 9.4 | 28.1 | 93.8 |
| f=25 mm standard lens | 25 | 26° 16° 30° 0.60 mrad | 0.5 m | HFOV [m] | 0.046 | 0.09 | 0.14 | 0.23 | 0.46 | 0.92 | 1.83 | 2.75 | 4.6 | 13.8 | 45.8 |
| | | | | VFOV [m] | 0.029 | 0.06 | 0.09 | 0.14 | 0.29 | 0.58 | 1.15 | 1.73 | 2.9 | 8.6 | 28.8 |
| | | | | DFOV [m] | 0.054 | 0.11 | 0.16 | 0.27 | 0.54 | 1.08 | 2.17 | 3.25 | 5.4 | 16.2 | 54.1 |
| | | | | IFOV [mm] | 0.1 | 0.1 | 0.2 | 0.3 | 0.6 | 1.2 | 2.4 | 3.6 | 6.0 | 18.0 | 60.0 |
| f=50 mm telephoto lens | 50 | 13° 8° 15° 0.30 mrad | 1.5 m | HFOV [m] | | | | 0.11 | 0.23 | 0.46 | 0.92 | 1.38 | 2.3 | 6.9 | 22.9 |
| | | | | VFOV [m] | | | | 0.07 | 0.14 | 0.29 | 0.58 | 0.86 | 1.4 | 4.3 | 14.4 |
| | | | | DFOV [m] | | | | 0.14 | 0.27 | 0.54 | 1.08 | 1.62 | 2.7 | 8.1 | 27.1 |
| | | | | IFOV [mm] | | | | 0.2 | 0.3 | 0.6 | 1.2 | 1.8 | 3.0 | 9.0 | 30.0 |
| f=75 mm Super telephoto lens | 75 | 9° 5° 10° 0.20 mrad | 2.0 m | HFOV [m] | | | | | 0.15 | 0.31 | 0.61 | 0.92 | 1.5 | 4.6 | 15.3 |
| | | | | VFOV [m] | | | | | 0.10 | 0.19 | 0.38 | 0.58 | 1.0 | 2.9 | 9.6 |
| | | | | DFOV [m] | | | | | 0.18 | 0.36 | 0.72 | 1.08 | 1.8 | 5.4 | 18.0 |
| | | | | IFOV [mm] | | | | | 0.2 | 0.4 | 0.8 | 1.2 | 2.0 | 6.0 | 20.0 |

¹⁾ TIM M05 is only available with OF25 lens | Please note: the camera provides 764 x 480 px in the 32 Hz mode

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