



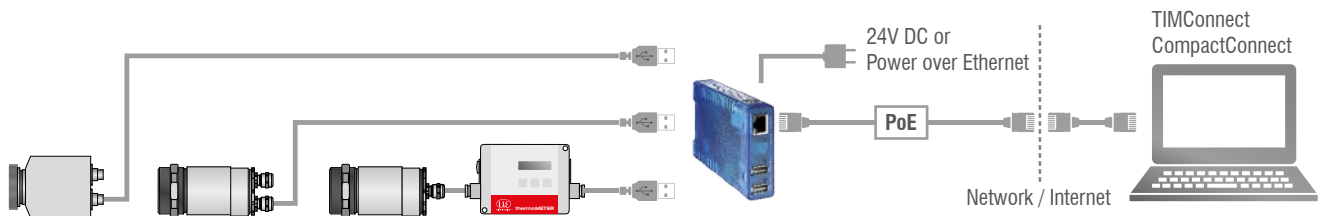
More Precision

thermoIMAGER TIM // Compact thermal imaging cameras



thermoIMAGER TIM USB Server Gigabit**Simple cable extension for the thermoIMAGER TIM series and pyrometers**

- Fully compatible with USB 2.0, data transfer rate 1.5/ 12/ 480mbps,
USB transfer modes: Control, Bulk, Interrupt, Isochronous
- For all models in the thermoIMAGER TIM series 1x TIM640, 1x TIM4xx, 2x TIM160, 1x TIM200
- Full TCP/IP support incl. routing and DNS
- Two independent USB ports
- Galvanic isolation 500V_{RMS} (network connection)
- Remote configuration via web-based management



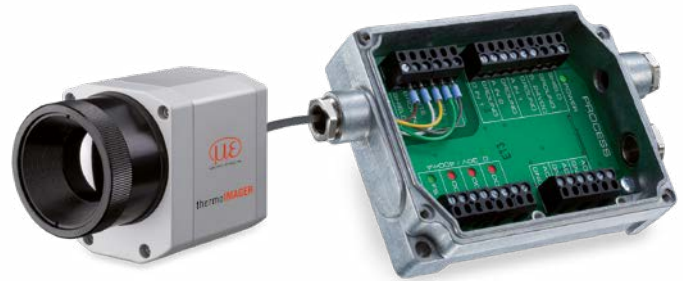
Model	TIM USB Server Gigabit
USB ports	Two independent USB ports
USB speed	480 Mbit/s
Network	10/100/1000 BaseT (max. 1000 Mbit/s)
Power supply	Power over Ethernet (PoE) class 3 (6.49 - 12.95 W) or via screw terminal DC 24 V ... 48 V ($\pm 10\%$)
Power consumption	External power supply (24 V DC) without USB devices: typ. 120 mA External power supply (24 V DC) with 2 USB devices each 2.5 W: typ. 420 mA
Ambient temperature range	Storage: -40 ... 85 °C In operation, individually assembled: 0 ... 50 °C
Permissible relative humidity	0 - 95 % (non-condensing)
Housing	Compact plastic housing for DIN rail mount, 105 x 75 x 22 mm
Weight	200 g
Scope of supply	1 x USB Server Gigabit 24 V DC power supply unit Quick guide ¹⁾
USB protocols	USB 1.0 / 1.1 / 2.0 Control / Bulk / Interrupt / Isochronous
Protocols for direct network connection	TCP/IP: Socket Auxiliary protocols: ARP, DHCP, HTTP, PING Inventory keeping, group management

¹⁾ TIMConnect CD or Compact Connect CD: USB redirector | WuTility Management Tool | Operating instructions (DE/EN)

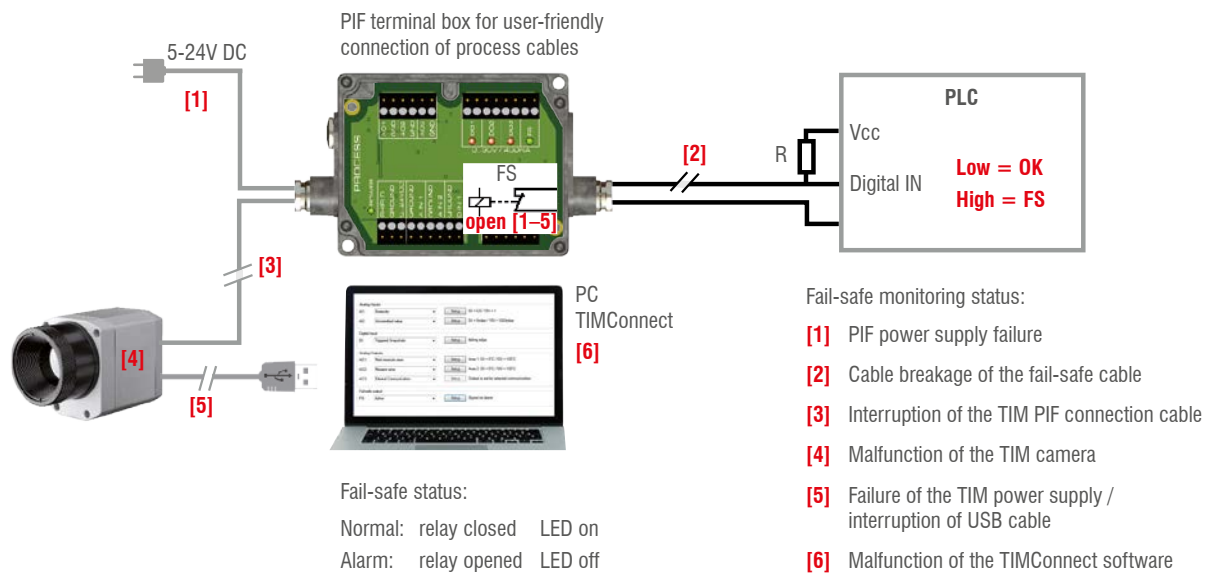
Industrial process interface

Camera and process control for use in industrial environments

- Industrial process interface with 3 analog / alarm outputs, 2 analog inputs, 1 digital input, 3 alarm relays
- 500V AC_{RMS} galvanic isolation between TIM camera and process
- Separate fail-safe relay output
- TIM hardware with all cable connections and the TIMConnect software are permanently monitored during operation



Exemplary fail-safe monitoring of the TIM camera with connected PLC



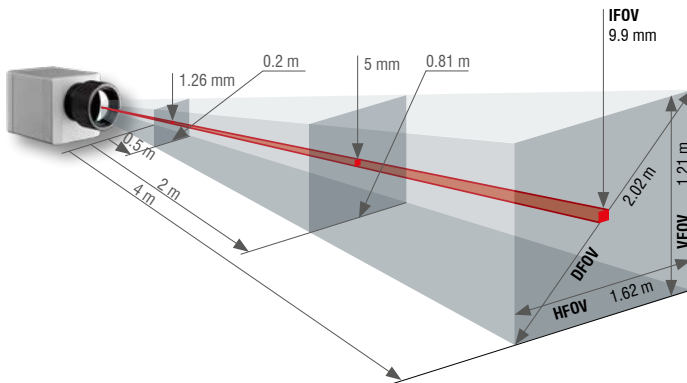
Model	Industrial process interface
Protection class	IP65 (NEMA-4)
Ambient temperature range	-30 °C to 85 °C
Storage temperature	-30 °C to 85 °C
Relative humidity	10 to 95 %, non-condensing
Vibration resistance	IEC 60068-2-6 (non-condensing)/ IEC 60068-2-64 (broadband noise)
Shock	IEC 60068-2-27 (25 g and 50 g)
Weight	610 g (with 5 m cable)
Cable length	5 m, optional 10 m and 20 m or HT cable (180 °C or 250 °C)
Power supply	5 to 24 VDC
LED indicators	2 green LEDs for voltage and fail safe / 3 red LEDs for alarm relay status
Insulation	500V AC _{RMS} between TIM camera and process
Outputs	3 analog / alarm outputs 3 alarm relays ¹⁾
Inputs	2 analog input 1 digital input
Ranges	0/4-20 mA (for AO 1 – 3) ¹⁾ 0 – 30 V / 400 mA (for alarm relays DO 1 – 3) 0 – 10 V (for AI 1 – 2) 24 V (for DI)
Analog inputs	Emissivity setting Ambient temperature compensation Reference temperature Uncommitted value Flag control Triggered snapshots, triggered recordings, triggered line scan camera, triggered event grabber Reset peak-/valley-hold
Digital input	Flag control Triggered snapshots, triggered recordings, triggered line scan camera, triggered event grabber Reset peak-/valley-hold
Analog outputs	Main measuring range Measuring range Internal temperature Flag status Alarm Frame synchronization Fail safe External communication Center pixel (direct output) ²⁾

¹⁾ active when AO1, 2 or 3 is / are programmed as alarm output ²⁾ available only for the models TIM M1 / TIM M05

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																	
f=16 mm wide angle lens	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																	
f=16 mm wide angle lens	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

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, fiber optic sensors and fiber optics



Color recognition sensors, LED analyzers and color inline spectrometer



Measurement and inspection systems