

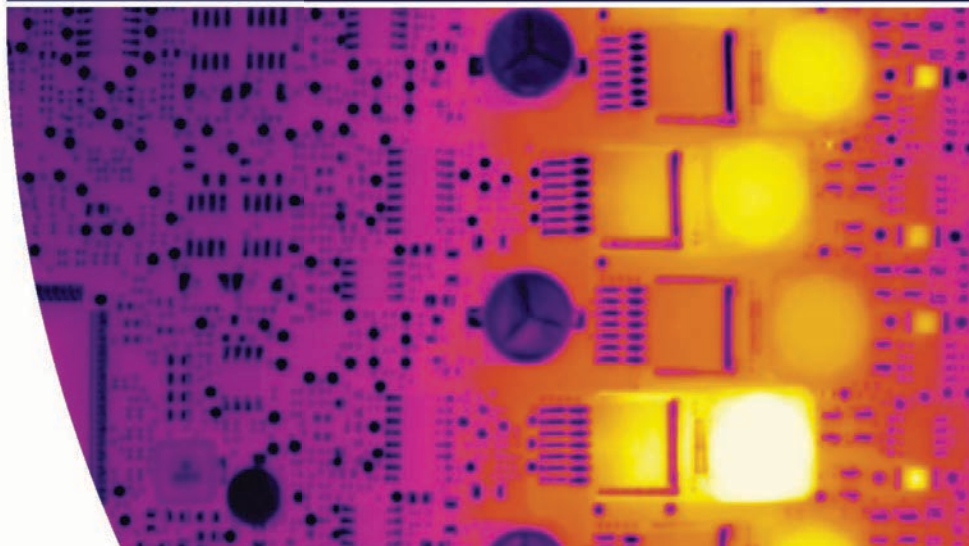
# STEK



## PTI 1M

The smallest measuring  
VGA infrared camera worldwide

innovative infrared technology



## Ultra compact infrared camera for the metal industry



- Highly flexible CMOS detector with an optical resolution of up to 764 x 480 pixels
- Very large temperature measurement range (without sub-ranges) of 450 °C to 1800 °C
- Frame rates of up to 1 kHz for fast processes
- Real-time output of middle pixel at a set-up time of 1 ms
- Includes license-free analysis software and full SDK

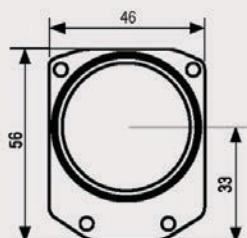
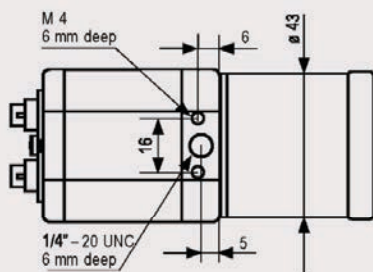
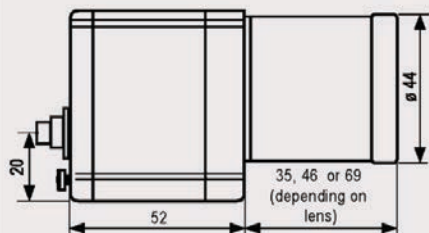
### Intelligent temperature measurement – innovative and quick

The new **STEK 1M** IR camera is specially suited for measuring the temperature of metals, as these exhibit a distinctly higher emissivity at the short measurement wavelength of 1  $\mu\text{m}$  than at measurements in the previously conventional wavelength range of 8–14  $\mu\text{m}$ .

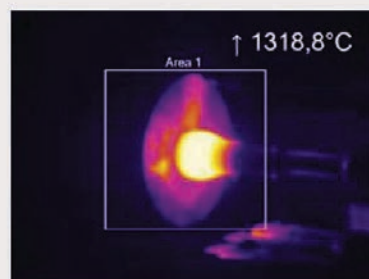
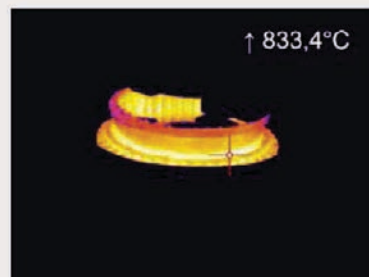
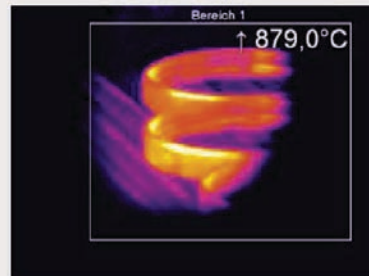
The advantage of temperature measurements with the new infrared camera lies in the large amount of information in an IR picture/IR video and the short reaction time of 1 ms for the output of temperature information of freely selectable individual pixels.

The use of these new image sensors allows a large dynamic range for temperature measurement so that the previously necessary use of relatively **many and narrowly defined sub-ranges** is no longer required. Intelligent measuring with a pyrometer is now possible thanks to the two-dimensional temperature recording of the **STEK 1M**.

Thanks to the large measurement temperature range of 450–1800 °C, the **STEK 1M** IR camera satisfies practically all demands in the fields of metal production and processing.



Dimensions in mm





PI 450 G7	PI 640	PI 1M
<b>IR</b>	<b>IR</b>	<b>IR</b>
FPA, uncooled (25 µm x 25 µm)	FPA, uncooled (17 µm x 17 µm)	CMOS (15 µm x 15 µm)
382 x 288 pixels	640 x 480 pixels VGA	764 x 480 pixels @ 32 Hz 382 x 288 pixels @ 80 Hz (switchable to 27 Hz) 72 x 56 pixels @ 1 kHz
7.9 µm	7.5 – 13 µm	0.92 – 1.1 µm
200 ... 1500 °C	–20 ... 100 °C, 0 ... 250 °C, 150 ... 900 °C	450 ... 1800 °C (32 Hz and 27 Hz mode) 500 ... 1800 °C (80 Hz mode) 600 ... 1800 °C (1 kHz mode)
80 Hz / switchable to 27 Hz	32 Hz	Up to 1 kHz
38° x 29° / f = 15 mm 62° x 49° / f = 8 mm	33° x 25° / f = 19 mm 60° x 45° / f = 10 mm 90° x 66° / f = 7 mm	<b>FOV @ 764 x 480 px:</b> 87° x 62° (f = 6 mm) 51° x 33° (f = 12 mm) 39° x 25° (f = 16 mm) 26° x 16° (f = 25 mm) 13° x 8° (f = 50 mm) 9° x 5° (f = 75 mm) <b>FOV @ 382 x 288 px:</b> 51° x 40° (f = 6 mm) 27° x 20° (f = 12 mm) 20° x 15° (f = 16 mm) 13° x 10° (f = 25 mm) 7° x 5° (f = 50 mm) 4° x 3° (f = 75 mm)
130 mK	75 mK	< 1 K (700 °C) < 2 K (1000 °C)
–	–	–
±2 °C or ±2 %, whichever is greater	±2 °C or ±2 %, whichever is greater	±2% of reading (object temperature <1500 °C)
USB 2.0	USB 2.0	USB 2.0
0 – 10 V input, digital input (max. 24 V), 0 – 10 V output	0 – 10 V input, digital input (max. 24 V), 0 – 10 V output	0 – 10 V input, digital input (max. 24 V), 0 – 10 V output
2 x 0 – 10 V inputs, digital input (max. 24 V), 3 x 0 – 10 V outputs, 3 x relays (0 – 30 V / 400 mA), fail-safe relays	2 x 0 – 10 V inputs, digital input (max. 24 V), 3 x 0 – 10 V outputs, 3 x relays (0 – 30 V / 400 mA), fail-safe relays	2 x 0 – 10 V inputs, digital input (max. 24 V), 3 x 0 – 10 V outputs, 3 x relays (0 – 30 V / 400 mA), fail-safe relays
0 ... 70 °C	0 ... 50 °C	0 ... 50 °C
–40 ... 85 °C	–40 ... 70 °C	–40 ... 70 °C
20 – 80 %, non-condensing	20 – 80 %, non-condensing	20 – 80 %, non-condensing
46 mm x 56 mm x 90 mm / IP 67 (NEMA 4)	46 mm x 56 mm x 90 mm / IP 67 (NEMA 4)	46 mm x 56 mm x 90 mm / IP 67 (NEMA 4)
320 g, incl. lens	320 g, incl. lens	320 g, incl. lens
Shock: IEC 60068-2-27 (25 g und 50 g) Vibration: IEC 60068-2-6 (sinus-shaped)/ IEC 60068-2-64 (broadband noise)	Shock: IEC 60068-2-27 (25 g und 50 g) Vibration: IEC 60068-2-6 (sinus-shaped)/ IEC 60068-2-64 (broadband noise)	Shock: IEC 60068-2-27 (25 g und 50 g) Vibration: IEC 60068-2-6 (sinus-shaped)/ IEC 60068-2-64 (broadband noise)
1/4 - 20 UNC	1/4 - 20 UNC	1/4 - 20 UNC
via USB	via USB	via USB
<ul style="list-style-type: none"> <li>• USB camera with 1 lens</li> <li>• USB cable (1 m)</li> <li>• Table-top tripod</li> <li>• PIF cable with connecting terminal strip (1 m)</li> <li>• <b>STEK</b> Connect software package</li> <li>• Robust hard shell case</li> </ul>	<ul style="list-style-type: none"> <li>• USB camera with 1 lens</li> <li>• USB cable (1 m)</li> <li>• Table-top tripod</li> <li>• PIF cable with connecting terminal strip (1 m)</li> <li>• <b>STEK</b> Connect software package</li> <li>• Robust hard shell case</li> </ul>	<ul style="list-style-type: none"> <li>• USB camera with 1 lens</li> <li>• Lens cap incl. protective window</li> <li>• USB cable (1 m)</li> <li>• Table-top tripod</li> <li>• PIF cable with connecting terminal strip (1 m)</li> <li>• <b>STEK</b> Connect software package</li> <li>• Aluminium case</li> <li>• Optional: CoolingJacket, high temperature cable</li> </ul>

\*\*\* The following options can be set:

Option 1 (IR with 96 Hz at 160 x 120 px; VIS with 32 Hz at 640 x 480 px)

Option 2 (IR mit 128 Hz at 160 x 120 px; VIS with 32 Hz at 596 x 447 px)



# USB Server Gigabit

## SIMPLE CABLE EXTENSION

### Simple cable extension for the **STEK** series

- Fully compatible with USB 2.0, Data transfer rate 1.5 / 12 / 480 mbps, USB transfer modes: control, bulk, interrupt, isochronous
- Network connection via Gigabit Ethernet
- For all models in the optris® PI series
- Full TCP/IP support incl. routing and DNS
- Two independent USB connections
- Power via PoE or external voltage supply at 24 – 48 V DC
- Galvanic isolation 500 V<sub>RMS</sub> (network connection)
- Remote configuration via web-based management
- Certified technology from Wiesemann & Theis



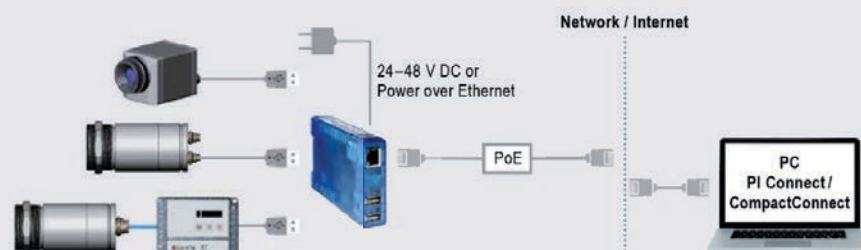
#### Technical data

USB connections	2 x USB A Port
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 (+/-10 %)
Power consumption	External power supply (24 V DC) without USB devices: typ. 120 m A External power supply (24 V DC) with 2 USB devices each 2.5 W : typ. 420 mA
Ambient temperature	Storage: - 40 ... 85 °C In operation, individually assembled: 0 ... 50 °C
Permissible relative humidity	0 – 95 % (non-condensing)
Casing	Compact plastic casing for DIN rail mount, 105 x 75 x 22 mm
Weight	200 g
Contents	<ul style="list-style-type: none"> <li>• 1 x USB-Server Gigabit</li> <li>• 24 V DC wall plug transformer</li> <li>• Quick guide*</li> </ul> <p>* included on PI Connect CD or Compact Connect CD:                      – USB-Redirector                      – WuTility Management Tool                      – Operating instructions (DE / EN)</p>

#### Protocols

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

#### Connection options



# Industrial Process Interface

## WITH FAIL-SAFE MONITORING

### Camera and process control for use in an industrial environment

- Industrial Process Interface with 3 analog / alarm outputs, 2 analog inputs, 1 digital input, 3 alarm relays
- 500 V AC<sub>RMS</sub> isolation voltage between camera and process
- Separate fail-safe relay output
- The PI hardware with all cable connections and the PI Connect software are permanently monitored during operation



#### General specifications

Protective rating	IP65 (NEMA-4)
Ambient temperature	-30 °C ... 85 °C
Storage temperature	-30 °C ... 85 °C
Humidity	10–95 %
Vibrational stability	IEC 60068-2-6 (non condensing)/ IEC 60068-2-64 (broadband noise)
Shock stability	IEC 60068-2-27 (25 g and 50 g)
Weight	610 g (with 5 m cable)
Cable lengths	5 m HT cable (standard), optional 10 m and 20 m

#### Electrical specifications

Voltage supply	5–24 V DC
LED indicators	2 green LEDs for voltage and fail safe / 3 red LEDs for alarm relay status
Isolation	500 V AC <sub>RMS</sub> between PI camera and process
Outputs	3 analog / alarm outputs 3 alarm relays <sup>1)</sup>
Inputs	2 analog inputs 1 digital input
Ranges	0–10 V (for AO 1–3) <sup>2)</sup> 0–30 V / 400 mA (for alarm relays DO1–3) 0–10 V (for AI 1–2) 24 V (for DI)

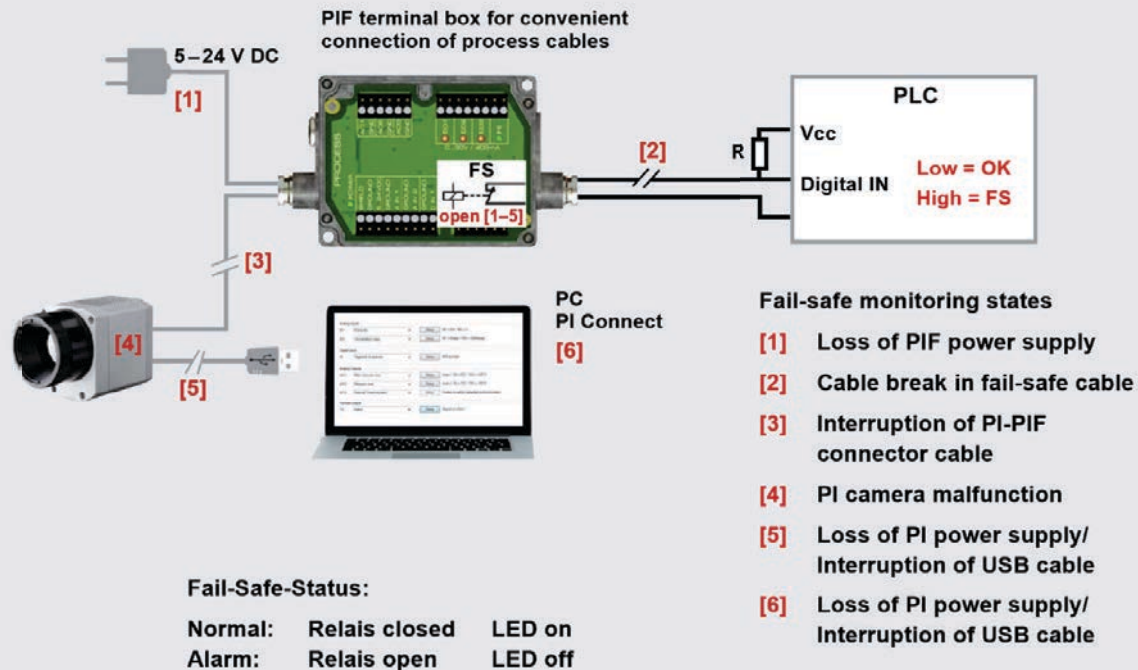
#### Programmable functions

Analog inputs	<ul style="list-style-type: none"> <li>• Emissivity setting</li> <li>• Ambient temperature compensation</li> <li>• Reference temperature</li> <li>• Uncommitted value</li> <li>• Flag control</li> <li>• Triggered snapshots, triggered recordings, triggered line scan camera</li> </ul>
Digital input	<ul style="list-style-type: none"> <li>• Flag control</li> <li>• Triggered snapshots, triggered recordings, triggered line scan camera</li> </ul>
Analog outputs	<ul style="list-style-type: none"> <li>• Main measurement range</li> <li>• Measurement range</li> <li>• Internal temperature</li> <li>• Flag status</li> <li>• Alarm</li> <li>• Frame sync.</li> <li>• Fail-Safe</li> <li>• External communication</li> </ul>

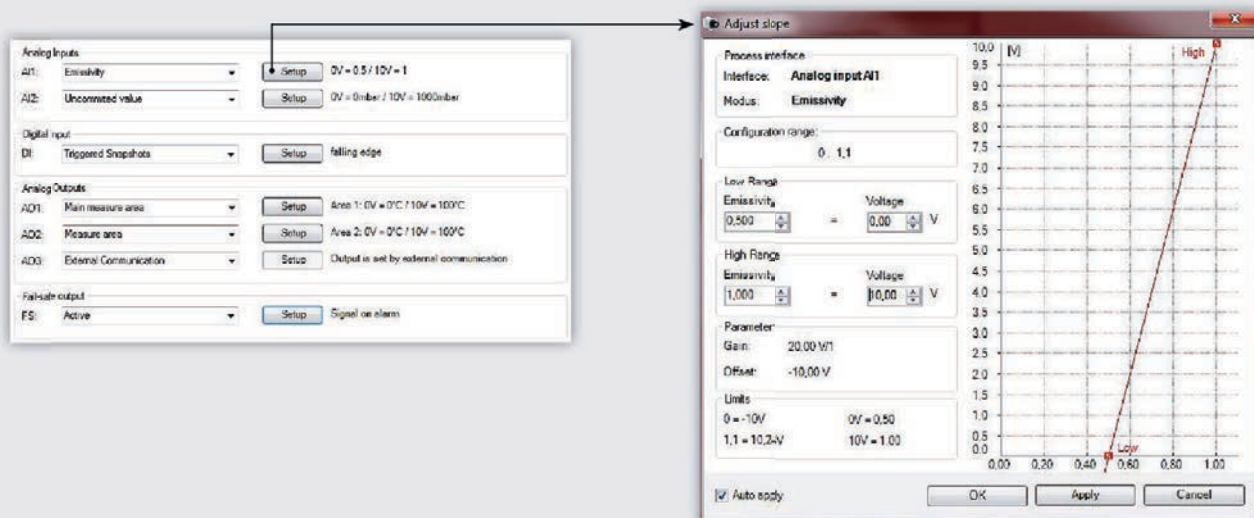
<sup>1)</sup> active when AO1, 2 or 3 is / are programmed as alarm output

<sup>2)</sup> dependent on supply voltage

## Example of fail-safe monitoring of the PI camera with connected PLC



## Overview of programmable functions





# PI Connect

## LINE SCAN CAMERA SOFTWARE MODE

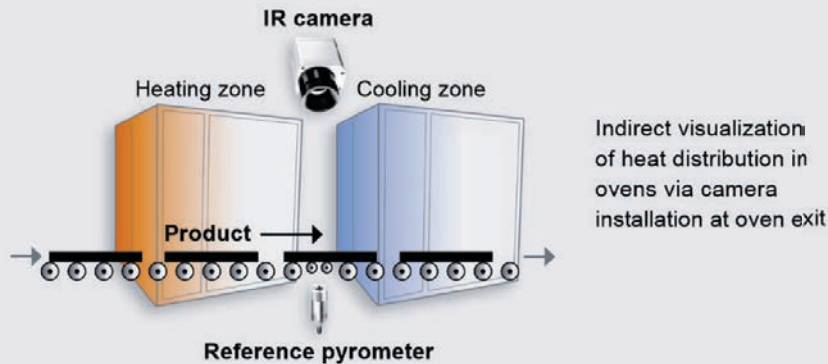
### For the measurement of moving objects

The optris® PI Connect software is equipped with a line scan camera function. The line scanner is primarily used for processes involving moving measurement objects, like rotary kiln measurements or large quantities on conveyor belts (batch process).



### The advantages

Simple monitoring of processes with limited visual access



### Only 3 steps to initialize the function

#### Step 1

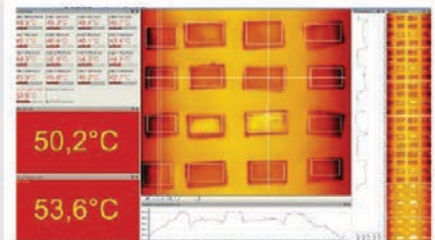
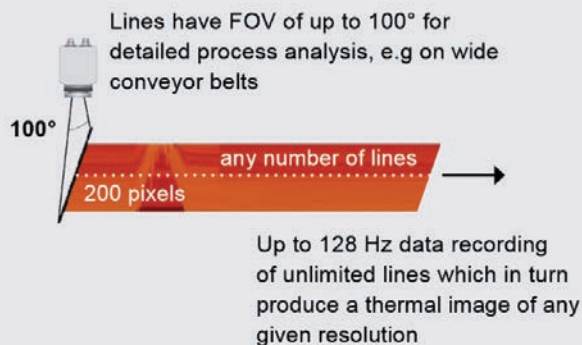
Activation of the line scan camera function and definition of the position of the lines in the thermal image. For this the camera itself serves as an orientation aid.

#### Step 2

Configuration of line scan function, e.g. number of lines displayed or set trigger for automatic saving of images.

#### Step 3

Definition of individual layouts, e.g. display of saved images in the snapshot process.



Layout example for display of line scan camera function

## Precise measuring at various distances

A choice of lenses makes it possible for you to precisely measure objects at various distances, from close and standard distances right up to large distances.

With infrared cameras there are various parameters which display the relationship between the distance from the measuring object and the size of the pixel on the object plane. In choosing the correct lens, the following should be taken into account:

### HFOV

Horizontal expansion of the total measuring field on the object plane.

### VFOV

Vertical expansion of the total measuring field on the object plane

### IFOV

Size of individual pixels on the object plane

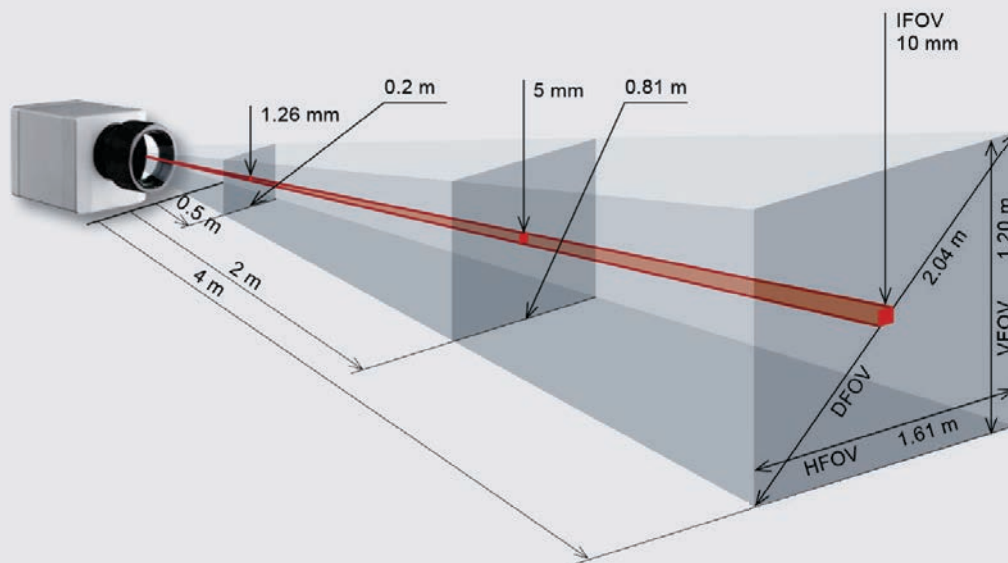
### DFOV

Diagonal expansion of the total measuring field on the object plane

### MFOV

Recommended, smallest measuring object size of 3 x 3 pixels

Measuring field of optris® PI infrared camera using a 23° x 17° lens







New

## Outdoor protective housing

Universal protective housing for the  
infrared cameras of the **STEK** PI series

innovative infrared technology

**Universal outdoor protection for infrared cameras of the optris® PI series**

**Features:**

- Environmental rating IP 66
- Additional air purge collar allows for a continuous operation in dusty and humid conditions
- Heating element and built-in fan enable for a 24/7 operation from -40 °C
- Installation of USB Server Gigabit possible for integration into control systems over large outdoor distances



**Specifications**

Environmental rating	IP 66
Temperature range	-40 °C ... +50 °C
Heating	PTC heater (automatically starting at T<15 °C) / fan for homogeneous temperature distribution
Power supply	24 V DC
Power	70 W
Protective window	Germanium (Ge), zinc sulfide (ZnS), Borofloat or foil
Air purge collar	Integrated
Integrable additional components	USB-Server Gigabit Industrial Process interface (PIF)
Max. FOV	90° (HFOV)
Accessories	Optional wall mount bracket



**Dimensions**

