

PCE-TC 30

Favourable Maintenance Tool (80 x 80 Px)

- 3 x zoom
- mini-USB interface for data transfer to a PC and charging the internal battery
- 4 GB SD memory card



Applications:

- electrical testing and diagnosis
- building inspection and diagnosis
- maintenance in mechanical and plant engineering
- manufacturing
- maintenance in petrochemical industry



TECHNICAL SPECIFICATIONS

Measurement range	0 ... +250 °C
Resolution	80 x 80
Lens	Ø 8 mm
Field of view (FOV)	18.5° x 18.5°
Sampling rate	50 Hz
Thermal sensitivity	80 mK (NETD)
Display	3.5" colour LCD, adjustable brightness, 320 x 240 pixels
Digital zoom	3 x
No. of colour pallettes	4
Functions	temperature measurement at the centre, MIN and MAX value, measurement in a certain area
Power supply	Li-Ion-battery, life of approx. 4 hours, can be charged when in the camera or via optional charger
Interface	mini USB
Emissivity	adjustable
Protection class	IP43
Operating conditions	0 ... +50 °C
Dimensions	258 x 103 x 98 mm
Weight	755 g

INCLUDES

IR camera, USB cable (1 m), SD card, carrying strap, lens cleaning cloth, batteries, charger (incl. adaptor for different countries), instruction manual

ITEM NO.	ITEM
K-PCE-TC 30	IR camera, up to +250 °C
OPTIONAL ACCESSORIES	
K-PCE-SB1	spare rechargeable battery



For Maintenance

"See things before they happen"

Thermographic cameras are not only used for detecting problems in insulation or for other building measurements, they are also very useful for the control and maintenance of machines.

A thermal camera is the perfect tool for obtaining descriptive and useful measurement results depicting the condition of machines, equipment and technological systems.

It is particularly advantageous that these tests and measurements can be carried out during operation without any problems.

This makes it possible to detect faults before they cause production downtime.

When a machine in an industrial company breaks down, there can be downtime costs of € 1000 / h or more which could have been prevented by using thermal cameras.

Amortisation of a thermal camera can therefore be achieved within one single day.

Formula examples

$$\text{Formula: } t_{\text{pay-off}} = \frac{C_{\text{pay-off}}}{C_{\text{fault/breakdown}} / h}$$

Examples:

$$\text{Electrical engineer.: } t_{\text{pay-off}} = \frac{€ 1,395}{€ 80 / h} \approx 18 h$$

$$\text{Mechanical engin.: } t_{\text{pay-off}} = \frac{€ 1,395}{€ 230 / h} \approx 6 h$$

$$\text{Wood industry: } t_{\text{pay-off}} = \frac{€ 1,395}{€ 3,000 / h} \approx 28 \text{ min.}$$

$$\text{Metal industry.: } t_{\text{pay-off}} = \frac{€ 1,395}{€ 50,000 / h} \approx 2 \text{ min.}$$

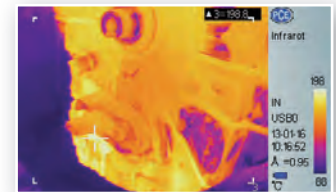
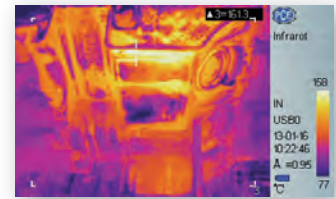
The examples above show that purchasing a thermal camera is an investment that will pay off soon, not only in large companies of the metal industry but also in small and medium sized-enterprises.



PCE-TC 9

High-Resolution Thermographic Camera (384 x 288 pixels)

- digital camera with 3.0 megapixels
- thermal fusion / 3.5" colour display, 270 ° rotation possible
- motor-operated auto focus
- 4 adjustable measuring points
- 3 measurement ranges: MIN, MAX and MEAN
- includes software for analysis and reporting
- transfers from camera to PC in RT



TECHNICAL SPECIFICATIONS

Measurement ranges	3 adjustable measurement ranges (MAX, MIN and AVG)
Accuracy	± 2 °C or ± 2 %
Field of view (FOV)	21° x 16° / 0.4 m (standard) 11° x 8.5° / 1.2 m, 38° x 28° / 0.3 m (optional)
IR / spatial resolution	384 x 288 pixels / 1.2 mRad (IFOV)
Spectral r. / thermal sens.	8 ... 14 µm / < 0.65 mK at 30 °C
Focal plane array (FPA)	uncooled microbolometer
Functions	IR image, real image, thermal fusion, picture-in-picture
Zoom	digital, 1 ... 8 x (constant)
Digital camera / focus	3.0 MP (fixed instal.) / auto / motor-operated
Sampling rate	50 Hz (PAL) / 60 Hz (NTSC)
Operating conditions	-20 ... +250 °C
Measuring points	4 adjustable measuring points
Line profile	horizontal / vertical
Hot / cold spots	MAX, MIN and AVG temperature
Emissivity / colour	0.01 ... 1.0 / 6 colour palettes (adjustable)
Memory / capacity	SD card (2GB, 5000 images), flash memory (600 images)
Laser pointer type	class II, 1 mW / 35 nm
Power supply	Li-Ion rechargeable battery
Battery life	more than 3 hours when used constantly
Power supply AC	110 ... 240 V AC, 50/60 Hz, output 5 V DC
Power off	adjustable
Operating conditions	-20 ... +50 °C
Storage conditions	-40 ... +70 °C

Case protection class	IP 50
Humidity	< 90%, non-condensing
Impact	25G, IEC60068-2-29
Vibration	2G, IEC60068-2-6
USB	transfer to and from PC
Video output	PAL / NTSC
Audio output	2.5 mm jack
Dimensions	126 x 62 x 154 mm
Weight	393 g with rechargeable battery

INCLUDES

Thermographic camera, standard lens (21° x 16°), charger, 2 rechargeable batteries, SD card, SD card reader, USB cable, PC software, instruction manual

ITEM NO.	ITEM
K-PCE-TC 9	thermographic camera

OPTIONAL ACCESSORIES

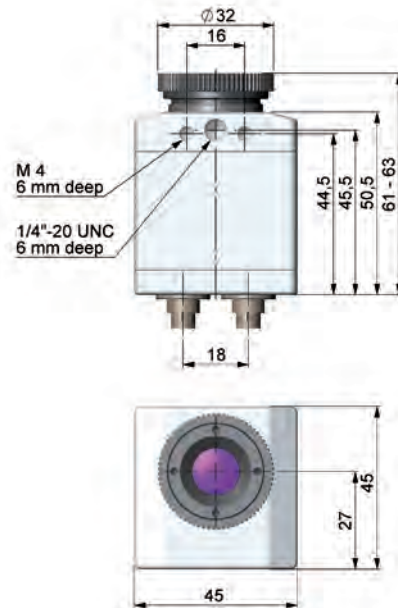
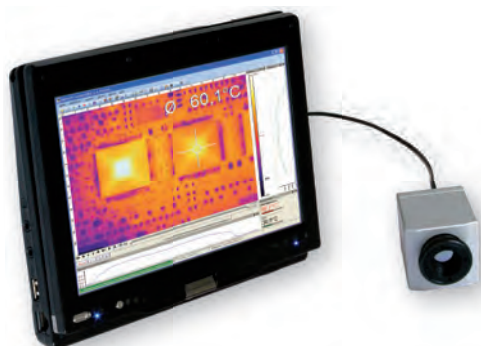
K-CAL-PCE-TC	ISO calibration certificate
K-PCE-WL-TC 9	wide angle lens (38° x 28°)
K-PCE-TL-TC 9	telephoto lens (11° x 8.5°)
K-STAT-TC	large photo tripod
K-STAT-Mini	mini table tripod

Thermal Imager

PCE-PI-160 Series

Infrared Camera with 160 x 120 Pixels and High-Performance Optics for Objects Starting at 1.5 mm

- small and resilient camera
- wide temperature range from -20 °C to +900 °C (optionally up to +1500 °C)
- spectral range: 7.5 ... 13 μm / sampling rate 120 Hz
- shock / vibration protection 25G, IEC 68-2-29 / 2G, IEC 68-2-6
- optical resolution: 160 x 120 pixels
- tripod adaptor 1/4-20 UNC



TECHNICAL SPECIFICATIONS

Temperature range	-20 °C ... +100 °C, 0 °C ... +250 °C, +150 °C ... +900 °C, additional range: +200 °C ... +1500 °C (optional)
Accuracy	± 2 °C or ± 2 %
Sensor	uncooled FPA (25 μm x 25 μm)
Spectral range	7.5 - 13 μm
Sampling rate	120 Hz
Optics (FOV)	23° x 17° FOV, f = 10 mm / 6° x 5° FOV, f = 35.5 mm / 41° x 31° FOV, f = 5.7 mm / 72° x 52° FOV, f = 3.3 mm
Thermal sensitivity (NETD)	0.08 K with 23° x 17° FOV, F = 0.8 / 0.3 K with 6° x 5° FOV, F = 1.6 / 0.1 K with 41° x 31° FOV and 72° x 52° FOV; F = 1
Protection class	IP 67 (NEMA 4)
Optional visual camera	--- (only with BI-SPECTRAL camera)
Interface / power supply	USB 2.0
Process interface (PIF)	0 ... 10 V input, digital input, 0 ... 10 V output
Operating conditions	0 °C ... +50 °C / 20 ... 80 %, non-condensing
Dimensions	45 mm x 45 mm x 62 mm
Weight	195 g, incl. lens

INCLUDES

Camera with 1 lens, USB cable (1 m), table tripod, PIF cable with connecting terminal plate (1 m), software, aluminium case, instruction manual

ITEM NO.	ITEM
K-PCE-PI-160-O23-T900	lens 23° x 17°, temp. -20 ... +900 °C
K-PCE-PI-160-O48-T900	lens 41° x 31°, temp. -20 ... +900 °C
K-PCE-PI-160-O6-T900	lens 6° x 5°, temp. -20 ... +900 °C
K-PCE-PI-160-O72-T900	lens 72° x 52°, temp. -20 ... +900 °C
K-PCE-PI-160-O23-T1500	lens 23° x 17°, temp. -20 ... +1,500 °C
K-PCE-PI-160-O48-T1500	lens 41° x 31°, temp. -20 ... +1,500 °C
K-PCE-PI-160-O6-T1500	lens 6° x 5°, temp. -20 ... +1,500 °C

OPTIONAL ACCESSORIES

For more accessories please see page 23

PI NetBox:

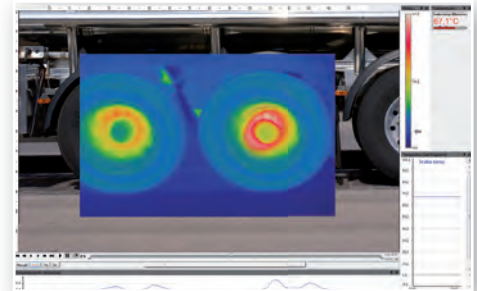
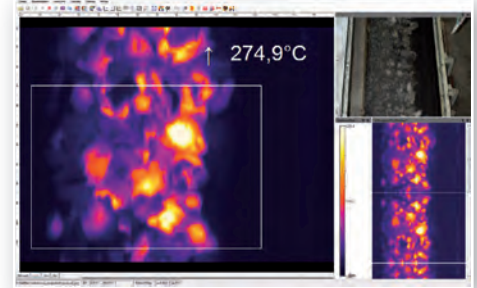
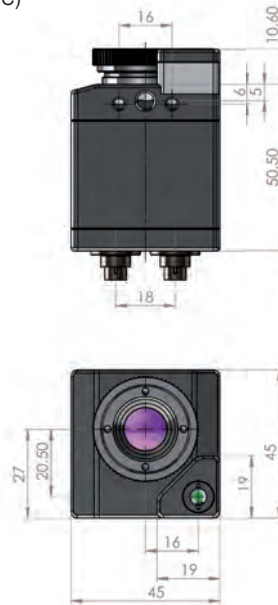
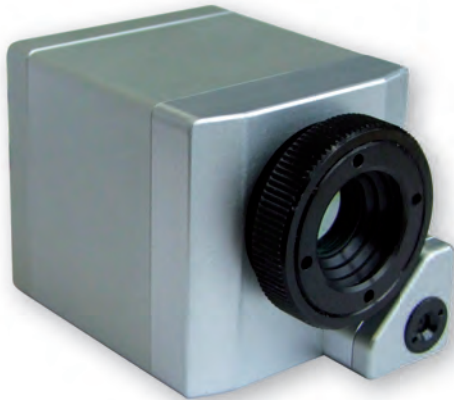
Mini PC (metallic case) with Intel Atom Z530 CPU, 1.6 GHz, 2 GB ROM, 500 MB RAM, 8 ... 4 V or PoE, VGA / TVout, 3 x USB 2.0, operating system Windows XP Professional, SDHC 8 GB card included, 24 VDC mains adaptor, TVout adaptor cable, support rail adaptor, Ethernet cable, USB system recovery pen (2 GB)



PCE-PI-200 / PCE-PI-230 Series

Infrared Camera with 160 x 120 Pixels and Optional Visual Camera That Combines the Two Technologies in One Device

- measurement range from -20 °C to +900 °C (optional up to +1500 °C)
- spectral range 7.5 ... 13 µm / sampling rate 128 Hz
- optical resolution: 160 x 120 pixels
- tripod adaptor 1/4-20 UNC
- shock / vibration protection 25G, IEC 68-2-29 / 2G, IEC 68-2-6



TECHNICAL SPECIFICATIONS

Temperature range	-20 °C ... +100°C, 0 °C ... +250 °C, +150 °C ... +900 °C, additional range: +200 °C ... +1500 °C (optional)
Accuracy	± 2 °C or ± 2 %
Sensor	uncooled FPA (25 µm x 25 µm)
Spectral range	7.5 - 13 µm
Sampling rate	128 Hz
Optics (FOV)	23° x 17° FOV, f = 10 mm 6° x 5° FOV, f = 35.5 mm 41° x 31° FOV, f = 5.7 mm 72° x 52° FOV, f = 3.3 mm
Thermal sensitivity (NETD)	0.08 K with 23° x 17° FOV, F = 0.8 0.3 K with 6° x 5° FOV, F = 1.6 0.1 K with 41° x 31° FOV u. 72° x 52° FOV, F = 1
Protection class	IP 67 (NEMA 4)
Optional visual camera	optical resolution: 640 x 480 pixels sampling rate: 32 Hz optics (FOV): 54° x 40° (PCE-PI-200), 30° x 23° (PCE-PI-230)
Interface	PC: USB 2.0 / process interface (PIF): 0 ... 10 V input, digital input, 0 ... 10 V output USB
Power supply	USB
Operating conditions	0 °C ... +50 °C / 20 ... 80 %, non-condensing
Dimensions	45 mm x 45 mm x 62 mm
Weight	215 g

INCLUDES

USB camera with 1 lens (BI-SPECTRAL technology), USB cable (1 m), table tripod, focusing tools, PIF cable with connecting terminal plate (1 m), software, aluminium case, instruction manual

ITEM NO.	ITEM
K-PCE-PI-200-O23-T900	lens 23° x 17°, temp. -20 ... +900 °C
K-PCE-PI-200-O48-T900	lens 41° x 31°, temp. -20 ... +900 °C
K-PCE-PI-200-O6-T900	lens 6° x 5°, temp. -20 ... +900 °C
K-PCE-PI-200-O72-T900	lens 72° x 52°, temp. -20 ... +900 °C
K-PCE-PI-200-O23-T1500	lens 23° x 17°, temp. -20 ... +1,500 °C
K-PCE-PI-200-O48-T1500	lens 41° x 31°, temp. -20 ... +1,500 °C
K-PCE-PI-200-O6-T1500	lens 6° x 5°, temp. -20 ... +1,500 °C
K-PCE-PI-230-O23-T900	lens 23° x 17°, temp. -20 ... +900 °C
K-PCE-PI-230-O48-T900	lens 41° x 31°, temp. -20 ... +900 °C
K-PCE-PI-230-O6-T900	lens 6° x 5°, temp. -20 ... +900 °C
K-PCE-PI-230-O72-T900	lens 72° x 52°, temp. -20 ... +900 °C
K-PCE-PI-230-O23-T1500	lens 23° x 17°, temp. -20 ... +1,500 °C
K-PCE-PI-230-O48-T1500	lens 41° x 31°, temp. -20 ... +1,500 °C
K-PCE-PI-230-O6-T1500	lens 6° x 5°, temp. -20 ... +1,500 °C

OPTIONAL ACCESSORIES



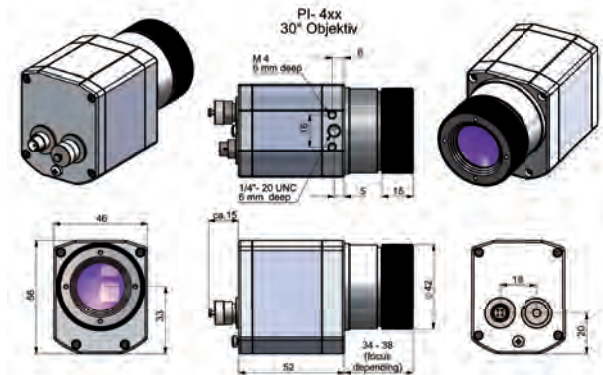
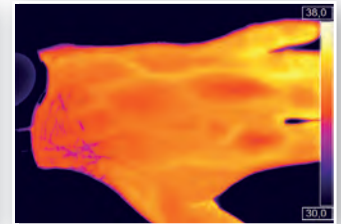
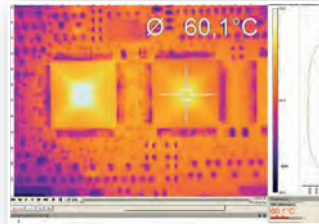
For optional accessories please see page 23

Thermal Imager

PCE-PI-400 / PCE-PI-450 Series

Infrared Camera for Fixed Installation with High Resolution (382 x 288 Pixels) and High Sampling Rate of 80 Hz

- small, resilient thermographic camera
- temperature range: -20 °C ... +900 °C (PI400: optionally up to +1500 °C)
- spectral range: 7.5 ... 13 µm
- sampling rate 80 Hz / optical resolution: 382 x 288 pixels
- shock / vibration protection 25G, IEC 68-2-29 / 2G, IEC 68-2-6
- tripod adaptor 1/4-20 UNC



TECHNICAL SPECIFICATIONS

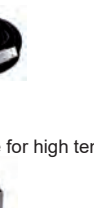
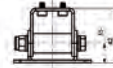
Device	PCE-IP-400	PCE-IP-450
Sensor / optical resolution	uncooled FPA (25 µm x 25 µm) / 382 x 288 pixels	uncooled FPA (25 µm x 25 µm) / 382 x 288 pixels
Spectral range	7.5 - 13 µm	7.5 - 13 µm
Temperature range / accuracy	-20 °C ... +100 °C, 0 °C ... +250 °C, +150 °C ... +900 °C, additional range: +200 °C ... +1500 °C (optional) / ± 2 °C or ± 2 %	-20 °C ... +100 °C, 0 °C ... +250 °C, +150 °C ... +900 °C / ± 2 °C or ± 2 %
Sampling rate	80 Hz	80 Hz
Thermal sensitivity (NETD)	0.08 K with 38° x 29° FOV / F = 0.8 0.08 K with 62° x 49° FOV / F = 0.8 0.1 K with 13° x 10° FOV / F = 1.0	0.04 K with 38° x 29° FOV / F = 0.8 0.04 K with 62° x 49° FOV / F = 0.8 0.06 K with 13° x 10° FOV / F = 1.0
PC interface	USB 2.0 (USB power supply)	USB 2.0 (USB power supply)
Process interface (PIF)	0 ... 10 V input, digital input, 0 ... 10 V output	0 ... 10 V input, digital input, 0 ... 10 V output
Operating conditions	0 ... +50 °C / 20 ... 80 % RH, non-condensing	0 ... +70 °C / 20 ... 80 % RH, non-condensing
Dimensions / protection class / weight	46 x 56 x 90 mm / IP 67 (NEMA 4) / 320 g, lens included	46 x 56 x 90 mm / IP 67 (NEMA 4) / 320 g, lens included
Field of view (all models)	8° x 29° FOV, f = 15 mm / 62° x 49° FOV, f = 8 mm / 13° x 10° FOV, f = 41 mm	

INCLUDES

USB camera with one lens, USB cable (1 m), table tripod, PIF cable with connecting terminal plate (1 m), PI Connect software, aluminium case, instruction manual

ITEM NO.	ITEM	ITEM NO.	ITEM
K-PCE-PI-400-O38-T900	lens 38 ° x 29 °, temp. -20 ...+900 °C	K-PCE-PI-450-O38-T900	lens 38 ° x 29, temp. -20 ...+900 °C
K-PCE-PI-400-O62-T900	lens 62 ° x 49 °, temp. -20 ...+900 °C	K-PCE-PI-450-O62-T900	lens 62 ° x 49 °, temp. -20 ...+900 °C
K-PCE-PI-400-O13-T900	lens 13 ° x 10 °, temp. -20 ...900 °C	K-PCE-PI-450-O13-T900	lens 13 ° x 10 °, temp. -20 ...900 °C
K-PCE-PI-400-O38-T1500	lens 38 ° x 29 °, temp. -20 ...+1.500 °C		
K-PCE-PI-400-O62-T1500	lens 62 ° x 49 °, temp. -20 ...+1.500 °C		
K-PCE-PI-400-O13-T1500	lens 13 ° x 10 °, temp. -20 ...+1.500 °C		

Optional Accessories for PCE-PI Thermal Cameras

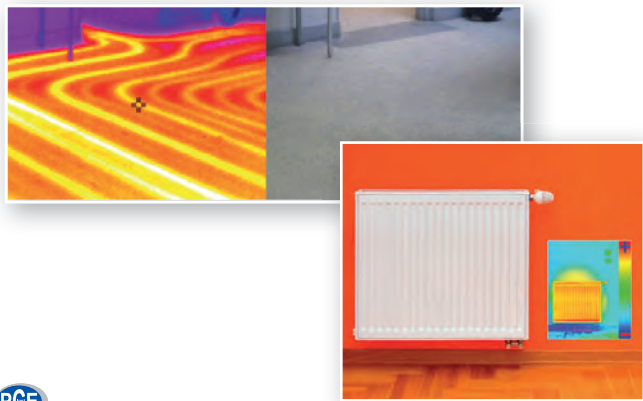
K-OPTPINB	...XP8G	PI NetBox: mini PC (metal case) with Intel Atom Z530 CPU, 1.6 GHz, 2 GB ROM, 500 MB RAM, 8 ... 4 V or PoE, VGA / TVout, 3 x USB 2.0, operating system Windows XP Professional, incl. SDHC 8 GB card, 24 VDC mains adaptor, TVout adaptor cable, support rail adaptor, Ethernet cable, USB system recovery pen (2 GB)	
Interchangeable lenses for -PI-160 / -200 / -230			
K-ACPIO6		6° x 5° lens / f = 35.5 mm	
K-ACPIO23		23° x 17° lens / f = 10 mm	
K-ACPIO48		41° x 31° lens / f = 5.7 mm	
K-ACPIO72		72° x 52° lens / f = 3.3 mm	
Interchangeable lenses for -PI-400 / -PI-450			
K-ACPIO13		13° x 10° lens / f = 41 mm	
K-ACPIO38		38° x 29° lens / f = 15 mm	
K-ACPIO62		62° x 49° lens / f = 8 mm	
Connection cable			
K-ACPIUSB5PCB5		USB cable, 5 m	
K-ACPIUSB5PCB5H		USB cable for high temperatures (180 °C), 5 m	
K-ACPIUSB5PCB10		USB cable, 10 m (not suitable for outdoor use)	
K-ACPIUSB5PCB10H		USB cable for high temperatures (180 °C), 10 m	
K-ACPIUSB5PCB20		USB cable, 20 m (not suitable for outdoor use)	
K-ACPIUSB5PCB20FO		USB cable, 20 m, suitable for drag chain / outdoor use	
Optional		angle plug	
	...RAC	pre-installed cable gland M20 x 1.5 / 2 x 4 for use in cooling jackets	
	...CG	(The process interface can only be used with the cooling jacket when combined with a USB cable for high temperatures)	
Accessories for high-temperature environments			
K-ACCJPI		cooling jacket (stainless steel) for PI	
	...V	cooling jacket preparation (cable gland) for use with Vortex cooler	
K-ACCJPWK		protective window for cooling jacket (sapphire / only for 1M / 2M / 3M)	
K-ACCJPGMS2		protective grid for cooling jacket, mesh size 2 mm	
K-ACCJPGMS3		protective grid for cooling jacket, mesh size 3.15 mm (protective grids are not suitable for PI with 48° lens)	
K-ACCJFB		mounting bracket for cooling jacket, 1 axis adjustable	
K-ACCJAB		mounting bracket for cooling jacket, 2 axes adjustable	
K-ACHAMF		mounting flange, suitable for pipe flanges and cooling jackets	
K-ACHAPF		pipe flange M48, for reflection cover pipes with a M48 x 1.5 thread	
K-ACHAPA		conduit adaptor with internal M48 x 1.5 thread	
K-ACHAST300		reflection cover pipe M48 x 1.5, length: 300 mm	
K-ACHAMA		mounting adaptor: mounting and pipe flange including screws	
Mechanical and electrical accessories			
K-ACPIPH		protective case, stainless steel, including foot mount	
K-ACPIMB		foot mount, stainless steel, 2 axes adjustable	
K-ACPIPIF500V	...CB5H	industrial process interface with connection box (IP65), insulation voltage 500 VAC _{eff} between PI and process, 5 m cable for high temperatures	
	...CB20H	process interface with 20 m cable for high temperatures	
	...CB20	process interface with 20 m cable, standard	
Optional K-ACPIPIF500V	...RAC	angle plug	
K-ACPIUSBSII		USB server Industry Isochron: USB Ethernet adaptor for PI series with 24 VDC mains adaptor	
K-ACPINBPH		protective case for PI NetBox, IP65	
K-ACPIUSBSIIPH		protective case for USB server Industry Isochron, IP65	
	...PS	protective case with industrial mains adaptor	
K-ACPIPOE		PoE injector for PI NetBox or USB server Industry Isochron	
Calibration			
K-ACPICERT		factory inspection certificate for PI series (for one lens)	
K-ACPIHTCERT		factory inspection certificate for PI series up to 1200 °C (for one lens)	
K-ACPICAL		calibration (measurement ranges according to T900) for PI series (one lens)	
K-ACPICALT1500		calibration 200 - 1500 °C for PI series (one lens), (not for PI-450 or combined with 80° lens)	
Replacement parts			
K-ACPIHC		carrying case (aluminium) for PI series	
K-ACLSTRP		table trispod	
K-ACPITRP		tripod (20 ... 63 cm)	
K-ACPIUSBCB1		USB cable, 1 m	
K-ACPIPIF		standard process interface, 1 m cable, electronics integrated in the cable	
Optional K-ACPIUSBCB1	...RAC	angle plug	
	...CG	pre-installed cable gland M20 x 1.5 / 2 x 4 for use in cooling jacket	

Thermal Imager

Thermographic Camera ThermoCamera-Vision

High-Resolution Thermal Camera for Professional Use in Construction

- large high-resolution colour touch screen 3.5" for direct control and analysis
- infrared sensor with 160 x 120 pixel resolution and focusable interchangeable lens
- infrared high-speed sensor, 50 images / second
- image and video recording with voice recording and text entry
- specific colour palettes can be defined by the user; automatic hot and cold spot signals
- ambient and offset temperature compensation, relative humidity and measurement distance
- advanced real-time analysis, full screen, picture-in-picture, mixed image, isothermal function



TECHNICAL SPECIFICATIONS

Measurement range	-20 °C ... 150 °C / 0 °C ... 400 °C	
Accuracy	± 2 °C or ± 2 %	
Infrared sensor	uncooled microbolometer	8 ... 14 µm
	resolution	160 x 120 pixels
	image frequency	50 frames per second (fps)
Infrared lens	interchangeable germanium lens	
	field of view (FOV)	33° x 24°
	instantaneous FOV	3.33 mrad
	manual focus	0.3 m min
Thermal sensitivity	80 mK NETD	
	resolution	640 x 480 pixels
Digital camera	3.5" TFT colour touch screen	
Display	infrared image, digital image, picture-in-picture, mixed image	
Image modes	1-2x digital zoom, rotation 0° ... 360°, increases in steps of 1°	
Image function	JPEG	
Format	MPEG-4 Standard	640 x 480 pixels, 30 fps
Memory	drive for micro SD cards of up to 16 GB	
Target illumination	white LED	
Laser pointer	laser class 2, <1 mW	
Connections	USB, micro SD, video, audio, headphones, microphone	
Protection class	IP65, 2 m drop, 25G shock (IEC60068-2-29), 2G vibration (IEC60068-2-6)	
Power supply	Li-Ion 7.4 V rechargeable batteries	
Dimensions	243 x 103 x 160 mm	
Weight	920 g (including rechargeable batteries)	

INCLUDES

Infrared camera, carrying case, 2 Li-Ion rechargeable batteries, 4 GB micro SD card, micro SD adaptor, USB cable, video / audio cable, tripod adaptor, headphones, mains adaptor / charger, incl. internal adaptor, external charger stand, software

ITEM NO.	ITEM
K-082.085A	thermographic camera

