

X Non-contact thermometry best done with thermal imagers

IVN 780-P

Early detection of failures of electrical, mechanical and industrial equipment



Portable thermal imager for non-contact temperature measurement at higher temperatures up to 1,000°C

Alarm function
Automatic alarm at critical temperature levels

- ◆ 76,800 meas. points (320 x 240 pixels)
- ◆ Fully radiometric detector
- ◆ Meas. ranges between -40 and 1,000°C
- ◆ Automatic adjustment of temperature level and span
- ◆ Tools for analyses within the camera
- ◆ Temperature resolution of 0,1°C
- ◆ Large, flip-up 3.5" LC display
- ◆ Incl. 1 licence of analysis and reporting software
- ◆ Export license free



The **IVN 780-P** is a portable high resolution thermal imager especially designed for the detection of failures in electrical, mechanical and industrial equipment. The camera measures temperatures between -40°C and 500°C with a temperature resolution of 0.1°C. If needed the measurement range can be extended from 500°C to 1,000°C.

Its lightweight (1.2 kg) compact design makes the IVN 780-P ideally suited for

mobile applications. The objects can be examined and analysed on-site on the large 3.5" LC display using different analysing tools. Furthermore, it is possible to use an alarm function for the immediate display of critical temperatures. This leads to the early detection of deficiencies and the prevention of costly damages.

For fast data transfer to the PC the camera features a USB2.0 interface.

Using the software included in the delivery (1 licence), the images can be analysed in detail to prepare damage reports on the PC.

Typical application:

- ◆ Electrical maintenance
- ◆ Mechanical maintenance
- ◆ Check of industrial equipment

Specification

Measurement data	Temperature ranges (switchable ranges):	IVN 780-P -40 ... 120°C 0 ... 500°C	IVN 780-P/HT -40 ... 120°C 0 ... 500°C 200 ... 1.000°C
	Temperature display:	°C or °F	
	Measurement uncertainty :	+/-2°C or +/-2% of reading	
Detector	Type:	Fully radiometric, uncooled focal plane array (UFPA)	
	Spectral range:	8 to 14 µm	
	Pixel H x W:	320 x 240	
	Temperature resolution (NETD):	0.1°C (30 °C, range 1)	
Camera settings	Emissivity control:	0.10 to 1.00 in steps of 0.01	
	Focus:	Manual	
	Laserpointer:	Class 2 (1mW/635nm red)	
Optic	Field of view:	27° x 20° (IFOV: 1.5 mrad)	
	Measuring distance:	Min. 280 mm	
	Measurable object size:	Min. 1.26 x 1.23 mm (3 x 3 pixels)	
Presentation	Display:	Flip-up 3.5" LC display	
	Image update rate:	8.5 frames per second	
	Picture mode:	Run / freeze	
	Data analyses:	Point temperature (movable point with correction of emissivity), 5 movable boxes with temperature display (whole box, max., min.), alarm function	
	Auto features:	Automatic adjustment of temperature level and span	
	Further display:	Battery monitor, temperature span, colour palette, time, date	
	Display colour:	Colour/monochrome, positive/negative (different scales)	
	Colour palette:	Rainbow, brightness, shine, hot-iron, medical, fine	
	Video Out:	Transfer of images from camera to an external display by PAL/NTSC or S-Video Output (using optional adapter)	
Image Storage	Memory:	Internal flash memory for 400 images	
	File format:	.sit	
	Interface:	USB data transfer to PC	
	System software:	Viewer software (freeware), Option: analysis and reporting software	
	Operation system:	Windows 2000, Windows XP	
Environment	Operating temperature:	-10 ... 45°C, humidity: max. 90%	
	Storage temperature:	-40 ... 70°C, humidity: max. 90%	
Power supply	Mains operation:	AC-adaptor: 100 to 240 V AC; 7.2 V DC	
	Battery operation:	Rechargeable battery (operation: 2.5h)	
	Power saving:	Stand-by, auto-shutdown	
Further data	Dimensions:	102 mm x 217 mm x 205 mm	
	Weight:	1.2 kg (camera incl. battery)	
	Protection:	IP54 (IEC 60259)	
	Mounting:	1/4"	
	Shock:	30G (IEC 60068-2-27)	
	Vibration:	3G (IEC 60068-2-6)	
	Warranty:	12 months (Option: extension to 24 months)	

Reference numbers

3 830 310	IVN 780-P, -40 ... 500°C
3 830 320	IVN 780-P/HT, -40 ... 1.000°C (with filter)

Scope of delivery Carrying case, AC charger for 2 batteries, AC adaptor, USB interface cable, Viewer software (Freeware), Analysis and reporting software (1 licence), Wrist strap, Lens cap, Works certificate, Operation manual (German, English)



Robust carrying case



AC adaptor



AC charger incl. 2 rechargeable batteries

Accessories, Service

3 830 760	Licence: analysis and reporting software
3 829 900	S-Video adapter (external display)
3 829 910	RCA adapter (external display)
3 829 920	Additional battery for IVN 780-P
3 829 960	13° x 10° Telephoto lens
3 829 970	54° x 40° Wide angle lens
3 830 940	Camera inspection
3 830 950	Camera inspection, adjustment (certificate)

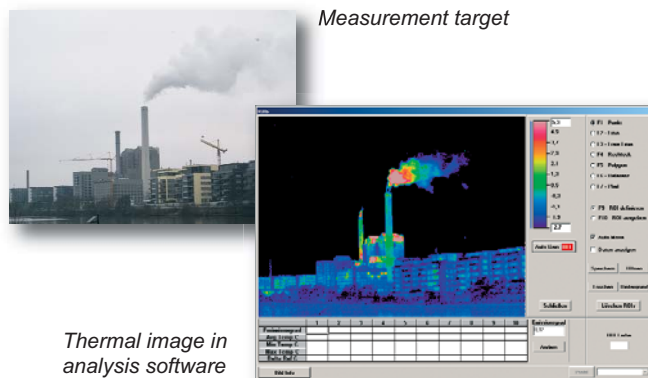
Software

Viewer software

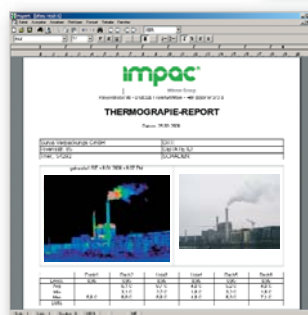
- ◆ Download thermal image from the internal memory to PC via USB
- ◆ Display thermal image thumbnail, thermal image replay, image preview
- ◆ Display of temperature distribution in the thermal image
- ◆ Setup i.e. temperature level and span, sense, colour palette, zoom
- ◆ Saving image in standard format (.bmp or .jpeg)

Option: Analysis and reporting software (1 licence included in the scope of delivery)

- ◆ Thermal image processing and report writing software
- ◆ All functionalities of viewer software
- ◆ Temperature display in specified areas (max, min and average), line profil
- ◆ Temperature difference between 2 points
- ◆ Isothermal display of image
- ◆ Automatic report making with template



Thermal image in analysis software



Individual preparation of reports at the push of a button

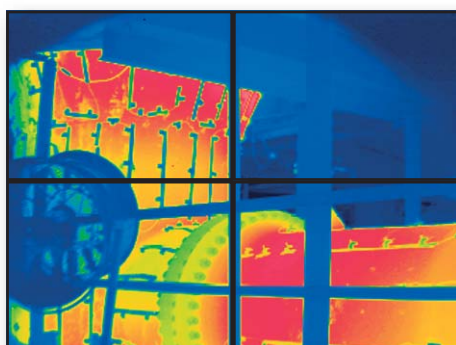
Optics

The IVN 780-P is supplied with a standard lens which is suitable for most applications. For specific applications, different lenses are available (telephoto, wide angle lens).

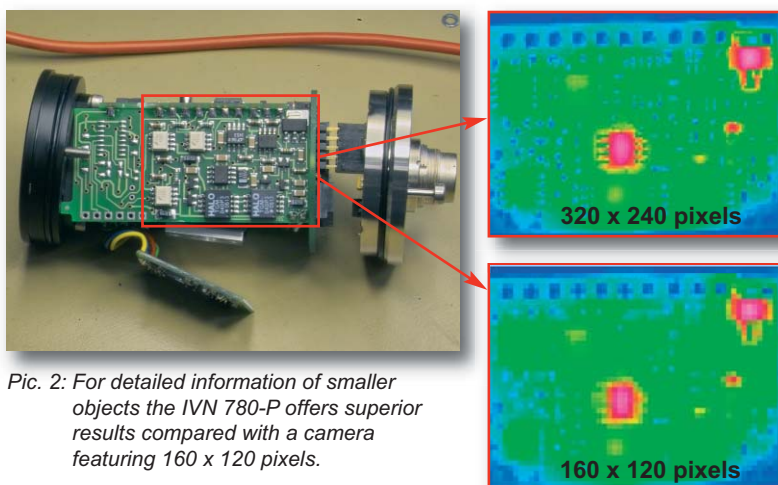
Due to the large amount of measurement data obtained, the camera provides excellent resolution. A high resolution image is of great importance in many applications in order to measure small objects (e.g. in process monitoring) or objects at long distances (e.g. inspection of equipment).

Distance of object [m]	Measurement field W x H [m]		
	27° x 20°	13° x 10°	54° x 40°
0.50	0.24 x 0.18	—	0.51 x 0.36
0.75	0.36 x 0.26	—	0.76 x 0.55
1.00	0.48 x 0.35	—	1.02 x 0.73
2.50	1.20 x 0.88	0.57 x 0.44	2.55 x 1.82
5.00	2.40 x 1.76	1.14 x 0.87	5.10 x 3.64
10.00	4.80 x 3.53	2.28 x 1.75	10.19 x 7.28

To give an example, the temperature distribution of pipe work has to be measured. At a distance of 20 m the IVN 770-P covers a measurement area of 10 x 7 m and a measurement point of 30 x 30 mm. If a camera has just half of the resolution (160 x 120 pixels), it results in a loss of measurement data for the area of interest on the building (please see picture below):



Pic. 1: Compared to IVN 780-P you need to take 4 thermal images with a 160 x 120 resolution camera to get the same temperature information in every pixel.



Pic. 2: For detailed information of smaller objects the IVN 780-P offers superior results compared with a camera featuring 160 x 120 pixels.

Distance of object [m]	0.3	2	8	20	50
Meas. field W x H [m]	0.14 x 0.11	1.0 x 0.7	3.8 x 2.8	9.6 x 7.1	24.0 x 17.6
Pixel size W x H [mm]	0.5 x 0.4	3.0 x 2.9	12.0 x 11.8	30.0 x 29.4	75.0 x 73.5
Min. size of object H x W [mm]	1.4 x 1.3	9.0 x 8.8	36.0 x 35.3	90.0 x 29.4	225.1 x 220.4

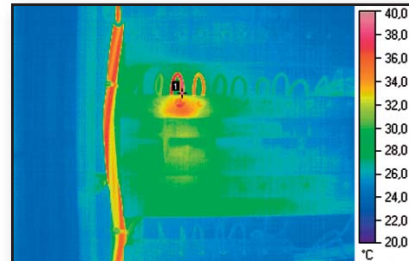
Application

Electrical Maintenance

- ◆ Regular inspections of electrical equipment
- ◆ Detecting potential or existing deficiencies or defects (overheating, fire danger)
- ◆ Identification of faulty components (saving of energy, ensuring of the availability of the equipment)
- ◆ Measurement in fields of low, middle and high voltage (switchboard, clamps, contacts, cable, fuses, transformers etc.)



Search for potential defects of electrical contacts. In worst case this can lead to fire.

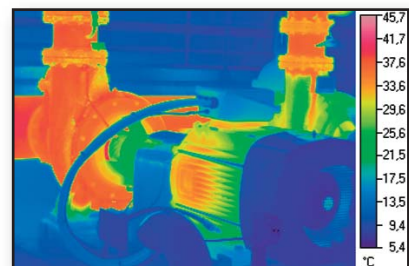


Mechanical Maintenance

- ◆ Fast documentation of the condition of machines during ongoing operation
- ◆ Early detection of defects and too high operating temperatures (prevention of unplanned production stops)
- ◆ Measurement of gears, mills, rotating shafts etc.

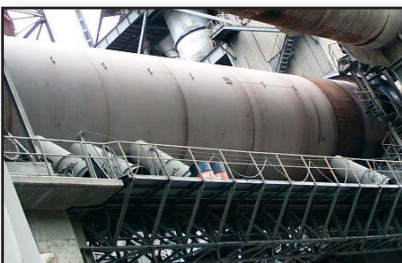


Measurement of temperature distribution of a compressor. By keeping the right operating temperature the life time can be considerably extended.

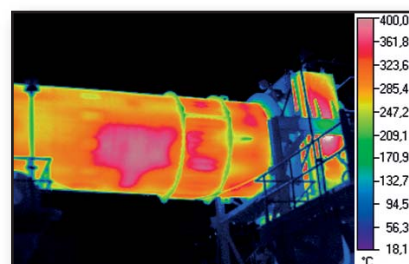


Check of industrial equipment

- ◆ Detection of tank levels, e.g. in chemical industry
- ◆ Check of the effectiveness of insulating materials (prevention of heat losses or insulation breakthroughs)
- ◆ Measurement of pipe work, tanks, reactor, chimneys, pumps etc.



Measurement of temperature distribution of a rotary kiln surface. Due to caking (HotSpots) there can be dangerous explosions.



IMPAC Infrared GmbH
Temperature Measurement

Kleyerstraße 90
D-60326 Frankfurt/Main

Phone: +49(0)69-9 73 73-0
Fax: +49(0)69-9 73 73-167

E-Mail: info@impacinfrared.com
Internet: www.impacinfrared.com

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