



IR Cameras in the IC Series

The compact MultiMeasure infrared cameras in the Trotec IC Series deliver a convincing performance with precise thermographic measurements in real-time, an expansive with an amazingly low price which offers unbeatable value for money.



The construction basis of the IC Series is one of the most widely sold camera platforms in the world. Benefit during your daily measuring operations from a series of instruments which leaves nothing to be desired.

Features like fully-radiometric temperature measurements with real-time image repetition frequency, a high geometric resolution of 1.1 mrad, a large, generously-sized image sensor with 110,592 individual measuring spots, a built-in digital camera for combined real images and patented individual measuring spots, a built-in digital camera for combined real images and patented picture-in-picture Duo-Vision images, uncooled microbolometer technology for maintenance-free operation, dynamic four-point measurements, automatic temperature tracking...the list goes on. Seven different cameras and three application-specific series guarantee that your own individual applications and needs.

BENEFITS IN PRACTICE:
Fully radiometric IR camera made in the EU
Real-time measurement and real-time image display guarantee clear, high-quality thermal images
High thermal sensitivity
High geometric resolution
Digital camera for real images
Ergonomic and robust (IP54)
Maintenance-free operation due to uncooled microbolometer technology
Pivotable 3.5" LCD colour monitor
Image recording with a refresh rate of up to 50/60 Hz
DuoVision function for picture-in-picture display
Integrated laser pointer
Larger memory
A variety of measuring functions
Data transmission via USB
Easy handling
Intelligent power management
Highly-sophisticated analysis software included in the scope of delivery

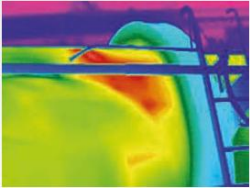


The infrared cameras are designed to meet the requirements you would put first: comprehensive standard equipment or numerous expandable options – the infrared cameras in the IC-Series leave nothing to be desired!

IC – Intelligent and Clever...

IC cameras have everything that you would expect from a professional thermal imaging camera whilst at the same time being surprisingly inexpensive to buy. Clever electronics and functions, intelligent power management and mobility concept:

High precision even at high temperatures...



A geometric resolution of up to 1,1 mrad, the high thermal sensitivity and an image repetition frequency of 50/60 Hz enable precise thermograms to be made in real-time in every possible measuring situation in a measuring range between -20°C and +1500°C depending on the type of model.

We don't do things by halves:

Always in the picture thanks to real-time display

The IC thermal imaging camera's highly developed sensor system constantly determines even the smallest temperature changes.

As many as 110,592 autarkic temperature measuring points measure the current values close to 60 times a second and transfer this information to an LCD display. The high image repetition frequency guarantees that not a single image – i.e. valuable thermographic information – is left out and that the infrared image is displayed in real-time.

Without real-time, half is missing...

Only a high image refresh rate of 50/60 Hz guarantees working without fatigue and exact measurements, even in the case of moving objects.

You won't miss a thing – with DuoVision...

The IC cameras in the V and LV Series are equipped with an additional digital camera for real images and an integrated photo lamp to light up dark areas.

The infrared camera's patented DuoVision technology enables either infrared or real images to be displayed exclusively or a combination of overlapping images in varying degrees of transparency in freely-selectable areas.

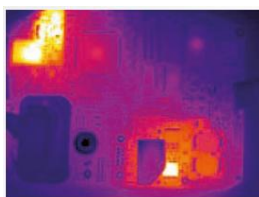
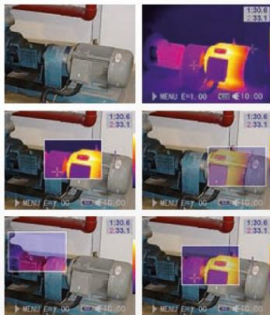
This allows any damage or defects to be detected much more easily.

Regardless which of the display options you use, both the real image and the infrared image information is stored separately so that the measuring data can be fully retrieved when needed.

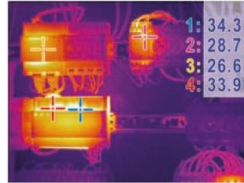
The IC gets to the point...

The integrated laser pointer makes it easy to locate problem areas quickly and the integrated hot spot/cold spot detection saves you having to search for the hottest or coldest point in the image.

Due to the short minimum focusing distance of just 10 cm, even close-up objects can be examined with pin-point accuracy.



A clear target in view,...or two, or three, or four?



The powerful camera technology allows differential measurements at up to four movable temperature measurement points, of which three can be individually configured.

In addition, temperature limits that you set yourself via an alarm or isotherm function can be displayed by a special colour or by an alarm signal – ideal for **dew point detection** on surfaces.

The IC shows everything as clear as daylight...

The infrared cameras are designed to meet the requirements you would put first: comprehensive standard equipment or numerous expandable options – the infrared cameras in the IC-Series leave nothing to be desired!

The tilting monitor element can be ergonomically adjusted to suit the observer in every recording situation.

Thanks to the folding mechanism, the monitor element can be folded down fully after measurements are completed, thus protecting the LCD display and the operating keypad against dirt.



Rough Shell, clever core...

All interfaces are located centrally and well protected in the vase of the sturdy IP54 housing, which is also suitable for use under the harshest environmental conditions.

Thanks to the intelligent power management, the cameras are ready for use quickly at all times – the advanced camera circuitry places numerous measurement functions at the user's disposal just few seconds after switching on.

Quality is standard...

The software included in the package is not just a simple data transfer or display too – with each IC camera you get a professional, full-value analysis and documentation program with numerous functions for evaluation, organization and documentation of your measurement results.



The software's DuoVision function also offers the option to overlap infrared and real images in varying degrees of intensity.

These DuoVision images can also be stored and they are then not only easier to evaluate but also provide a more professional means of documentation.



Thermography for all...

Benefits in practice come as standard – this is something all the IC models offer:

Function and features	Your Benefit in practice:	IC 080V	IC 120V	IC 080L	IC 120L	IC 080LV	IC 120LV
A high image repetition frequency of 50/60 Hz	The high image repetition frequency guarantees a non-top image representation of the infrared images. Not a single image – which equates into valuable thermographic information – is left out when the images are depicted in real-time.	✓	✓	✓	✓	✓	✓
Fully radiometric infrared images	Precise temperature measurements over the entire image, no interference. The sensor has an autarkic measuring point for each individual pixel which delivers exact temperature values exclusively for this individual pixel. The absolute temperature can be read pixel by pixel.	✓	✓	✓	✓	✓	✓
High thermal sensitivity	Reliable diagnoses even with the smallest of temperature differences. Even the smallest of temperature differences become visible. High sensitivity reduces thermal noise in the infrared image. The smaller the value, the better the quality of the image.	✓	✓	✓	✓	✓	✓
Uncooled microbolometer sensors	No moving sensor parts, extremely resilient, crisp, clear and detailed images. Compact size, low weight, low power consumption, completely maintenance-free.	✓	✓	✓	✓	✓	✓
Pivotable 3.5" LCD colour monitor	Always affords the best possible ergonomic view – no matter what the angle. And when you don't need it you can fold it together to protect both the keypad and the monitor against dirt and grime.	✓	✓	✓	✓	✓	✓
Automatic temperature tracking (Hot-/Cold-Spot)	Cold and hot spots on the measured on real-time and displayed automatically.	✓	✓	✓	✓	✓	✓
Temperature alarm	Acoustic and optical alarm help you to detect critical areas quickly and more easily. Ideal for dew point detection on surfaces.	✓	✓	✓	✓	✓	✓
Protection class IP 54	Robust housing, dust and splashproof – ideal for rough operations in industry and all kinds of weather in case of outdoor measuring.	✓	✓	✓	✓	✓	✓
Integrated laserpointer	Facilitates quick localization of problematic areas and visual targeting in poorly illuminated areas.	✓	✓	✓	✓	✓	✓
Intelligent power management	High rechargeable battery performance, longer non-stop measuring operations.	✓	✓	✓	✓	✓	✓
A variety of measuring and analysis functions	Quick, reliable and accurate results due to dynamic four-point measuring, automatic temperature tracking, difference measurements, isotherm and alarm function.	✓	✓	✓	✓	✓	✓
Professional analysis software	No additional costs for expensive software: Full analysis and documentation program with numerous functions for assessment, organization and documentation already included in the scope of delivery.	✓	✓	✓	✓	✓	✓
Bluetooth (optional)	Wireless connectability for an optional headset	✓	✓	✓	✓	✓	✓
Voice recording (optional)	Add on-scene comments and valuable additional information to your record	✓	✓	✓	✓	✓	✓
Mini-SD interchangeable memory card slot	Quick and easy memory management; room for thousands of images on the mini-SD card included in scope of delivery. Practically endless memory capacity by simply changing cards.	✓	✓	✓	✓	✓	✓
Real-time IR video recordings and USB 2.0	Thermographic real-time video recordings and evaluations on your PC via the speedy USB 2.0 interface connected to your IR camera.	✓	✓	✓	✓	✓	✓

Exactly the right equipment for each individual requirement – Model-specific differences:

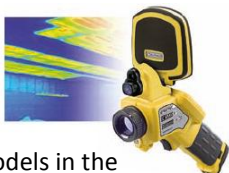
Function and features	Your Benefit in practice:	IC 080V	IC 120V	IC 080L	IC 120L	IC 080LV	IC 120LV
Image sensor with 160 x 120 measuring points	19,200 autarkic temperature measuring points measure even the smallest of temperature differences in real-time. Optimal resolution for a whole host of applications.	✓	✓				
Image sensor with 384 x 288 measuring points	Highest precision in measuring due to 110,592 autarkic temperature measuring points. You can be twice as far from the target with this detector than with a 160 x 120 detector and still carry out measurements with the same accuracy.			✓	✓	✓	✓
High geometric resolution of 2.2 mrad	Defines the solid angle measurement for the smallest detectable measuring point. The smaller the value, the more accurate the measuring point of each thermal pixel principally has a diameter of 2.2 mm when measured from a distance of 1 m from the object.	✓	✓				
Very high geometric resolution of 1.1 mrad	Defines the solid angle measurement for smallest detectable measuring point. The smaller the value, the more accurate the measuring point of each thermal pixel principally has a diameter of 1.1 mm when measured from a distance of 1 m from the object.			✓	✓	✓	✓
Integrated digital camera	Quicker and easier object inspection due to simultaneous display and recording of infrared and real images.	✓	✓			✓	✓
Integrated photo lamp	Better photo results due to improved illumination of darker target regions when performing real image recording.	✓	✓			✓	✓
DuoVision picture-in-picture display	Real time depiction of overlapping infrared and real images with different depiction options. For easier orientation and localization during measuring.	✓	✓			✓	✓
DuoVision software function	The software not only stores both the infrared and the real image but allows an overlapping depiction of both images in varying degrees of intensity for better assessment and more professional documentation.	✓	✓			✓	✓

Two camera models, three different versions, an infinite number of possibilities...

Each of our IC models comes standard-equipped with a variety of different extras.

Two individual measuring ranges and three individual versions guarantee that your infrared thermal imaging camera is equipped with exactly the functions and features that you need to meet your individual requirements.

V for more Variety



The V-models in the IC-Series are well-equipped to take on any one of your measuring tasks. In addition to the standard equipment extras, the extremely versatile IC080V and the equally flexible IC120V are also equipped with a built-in camera for real images, a photo lamp, optional DuoVision Display mode and matching DuoVision software functions.

L for lots more to see!



The models in the L-Series are all equipped with a 384 x 288 infrared sensor with 110,592 autarkic temperature measuring spots which, when combined with an extremely high geometric resolution of 1.1 mrad, provides the highest level of precision for the highest of demands.

LV – complete and extremely precise...



The IC080LV and the IC120LV unite the benefits of the L-Series with the benefits of the V-Series. The result is a camera with real image and DuoVision options plus an extra-large 384 x 288 infrared sensor and a very high geometric resolution. These combined benefits make the LV models just the right cameras for the job.

For all those who like just that little bit more... More flexibility?

More mobility?

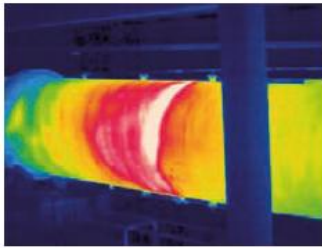
The standard scope of accessories leaves nothing to be desired. But should you want just that little bit more, then we have an extensive range of accessories designed to suit your needs: Tele lenses, wide-angle lenses – a total of eight different interchangeable lenses are optionally available. And besides that a car charger cable, further software packages and even more!



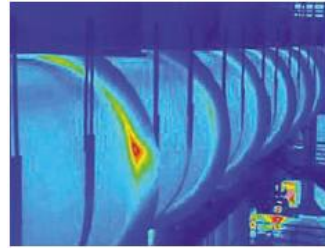
Possible applications...

The IC thermal imaging cameras are very easy to operate and are suitable for numerous areas of application, for example:

Production checking and plant maintenance in industry



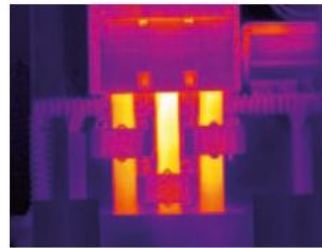
Use the thermal imaging cameras for monitoring and maintenance tasks in industrial plants; for example, for checking combustion processes or monitoring temperature controlled processes.



The inspection of thermal insulation on machines and plants is also a typical area of use of the IC cameras, as is preventative maintenance.

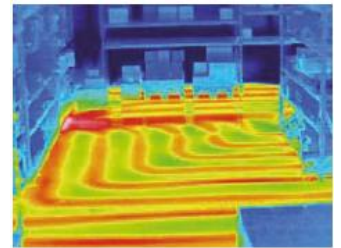
For example, "hot spots" in drive systems can point to the start of bearing damage.

Electrothermography



Whether control cabinets, electric motors or other current conducting systems - with IC cameras you can detect dilapidated components or damaged connections at an early stage and rectify faults, preventing costly interruptions in production and reducing the risks of fire.

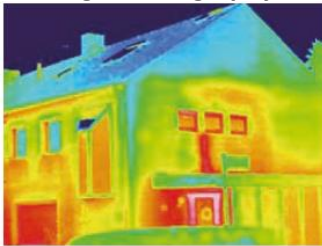
Leak detection



The infrared cameras from the IC series enable fast, precise localisation of an actual leak, usually invisible to the human eye, in inaccessible or concealed piping, for example in under-floor heating.

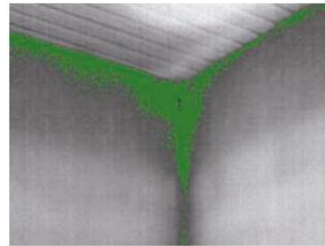
The costs and damage incurred by repair work can thus be minimised.

Building thermography



Whether the building shell or the entire structure - the examination for missing thermal insulation and the detection of physical building defects or concealed structural elements are all possible by means of thermographic measurements with IC cameras, even during the construction phase.

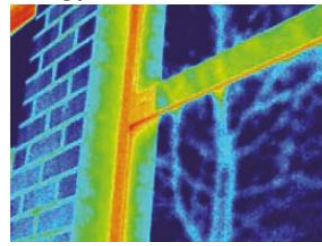
As a result, warranty claims can be asserted at an early stage and energy costs saved. In the run-up to modernisations, thermographic measurements also represent a reliable basis for the planning of conversion work for the elimination of energy losses.



It is similarly possible to take stock of the interior climate with IC thermal imaging cameras.

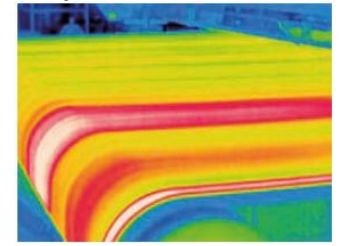
This is a quick, simple way to localise dew-point-endangered places in the building where mould, which may be toxic or cause allergies, could grow if structural countermeasures are not taken.

Energy consultation



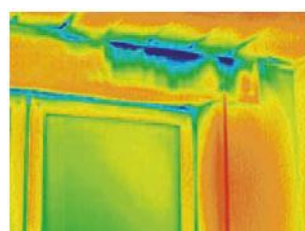
The IC cameras are extremely well suited to the detection and documentation of energy losses through exterior windows, exterior doors, roller shutter boxes, radiator niches, the roof structure and the entire building shell, for example due to missing or faulty insulation, and are the optimum measuring tools for comprehensive diagnostic and maintenance use in connection with energy consultation.

Many further areas of use



Due to the indisputable advantages of this method, thermographic measurements have been established in many areas of application for some time now.

The cameras in the innovative IC Series offer unbeatable value for money and make thermal imagery attractive for a whole variety of crafts and trades and application scenarios for which the use of contact-free and non-destructive thermography was too expensive and for a whole host of different users for whom such an acquisition was up to now quite simply unaffordable.



TROTEC



Technical Data:

Technical Data		IC090EX	IC080V	IC120V	IC080L	IC120L	IC080LV	IC120LV	
Measurement	Temperature range	-20°C to +250°C	-20°C to +600°C	-20°C to +250°C	-20°C to +250°C	-20°C to +250°C	-20°C to +250°C	-20°C to +250°C	
	Accuracy	±2°C or 2% of the measured value							
Image output radiometric	Detector type	Focal Plane Array (FPA), uncooled microbolometer							
	Detector resolution	160 x 120 pixels			384 x 288 pixels				
	Spectral range	7.5 to 14 µm	8 to 14 µm		7.5 to 14 µm				
	Field Of View (FOV)	38° x 28.5°	20° x 15°		24° x 21°				
	Geometric resolution	4.4 mrad	2.2 mrad		1.1 mrad				
	Thermal sensitivity	0.1°C at 30°C			0.08°C at 30°C				
	Image refresh rate	50/60 Hz							
	Focus	Manual							
Image performance visual	Min. focusing distance	0.10m							
	Digital photo camera	-	Colour depiction 680 x 480 Pixel, integrated photo lamp		-		Colour depiction 680 x 480 Pixel, integrated photo lamp		
Image representation	Video norm	-	PAL		-		PAL		
	Display	2.5 Zoll LCD	3.5 inch LCD, 320 x 240 Pixel						
	Image display	Pseudo colours, 6 colour palettes							
Measuring Functions	Image display options	IR image	IR image, real image, different DuoVision options for combined display of IR and real imaged			-		IR image, real image, different DuoVision options for combined display of IR and real imaged	
	Measurement point	Up to four movable measuring points (3 x manual and 1 x automatic)							
Image storage	Isotherm	Yes (between the upper and lower limit values)							
	Emission factor	Variably adjustable from 0.01 to 1.0							
	Measurement correction	Automatic on the basis of user-defined specifications for environmental temperature, distance, relative humidity							
System status indicator	Storage medium	Integrated flash memory card for approx. 1000 images	Interchangeable memory card slot for mini-SD card						
	Data format radiometric	14-bit radiometric IR format							
	Data format visual	-	CCD		-		CCD		
	Voice Recording	-	Comments can be stored with each IR image (optional Bluetooth expansion kit and Bluetooth headset necessary)						
Laser	Status display	LCD status display	-						
	Type	Semiconductor AlGaInP Diode Laser, 1 mw/635 nm red							
Power supply	Classification	Class 2							
	Battery type	Rechargeable standard lithium-ion battery, replaceable							
	Operating time	% ≈ 2.5 h							
	Mains operation	8 – 11V DC							
Ambient Conditions	Energy Saving Mode	User-defined							
	Operating temperature	0°C to +40°C	-15°C to +50°C						
	Storage temperature	-40°C to +70°C							
	Air Humidity	10% to 95% r.H. (non-condensing)							
	Protection class	IP 54 IEC 529							
Physical parameters	Shockproof to	25G IEC 68-2-29							
	Vibration-proof to	2G IEC 68-2-6							
	Dimensions	211 x 80 x 195 mm	230 x 80 x 195 mm		211 x 80 x 195 mm		230 x 80 x 195 mm		
Interfaces	Weight	500g	650g		500g		650g		
	Standard mounting	1/4-inch - 20							
	PC	USB 1.1	USB 2.0 (Optional)						
Package contents	Video output	Composite Video							
	Standard lens	38° x 28.5°	20° x 15°		24° x 21°				
	Standard Equipment	Camera with standard lens, LCD monitor and laser, 110/230 volt battery charger (IC090 Ex-protected) with charging status, Li-ion battery (IC090 two Ex-protected special rechargeable batteries), video cable, USB cable for image downloading to PC (only IC090Ex), user's manual, carry case, software package, temperature test certificate, mini SD memory card (not for IC090Ex)							
	Optional interchangeable lenses	-	38°, 28°, 14°, 12,9°, 6,4°, 4,8°, 3,5°-lens			48°, 12°-lens			
Optional accessories	On request	Tripod attachment, power supply unit, 12V cigarette lighter adapter, additional battery, leather holster, Bluetooth expansion pack and Bluetooth headset, real-time upgrade for thermographic video recordings and evaluations in real-time, further software packages on request							