We measure it. testo

Industrial thermography

Simply see more with the thermal imagers from Testo.

Simply see more without contact.

Testo thermal imagers quickly and reliably detect anomalies, weak spots and damage in industrial maintenance, production monitoring, and in Research and Development. Materials and components are tested completely without damage thanks to an image creation process. Problem zones are identified without contact before a malfunction or a fire risk occurs. Whereas with other methods, cable or pipeline systems must be exposed over a large area, with a Testo thermal imager, a single glance is enough.

Testo thermal imagers for industrial thermography:

- prevent damage and save money
- stand out thanks to high resolution images
- ensure fast and comprehensive analysis
- have intuitive operation
- guarantee a large image section thanks to the light wide-angle lens

Optimum image resolution, high-value system components and quality “made in Germany”: simply better thermography with Testo and the experience of more than 50 years’ measurement technology!

For daily use in industrial surroundings

Thanks to excellent detector and lens quality, as well as intelligent system solutions, no detail is missed: this applies to large-scale panorama images just as well as to small details of the measurement object. In addition to the intuititve menu, the PC software IRSoft in particular also guarantees fast and professional analysis of the image data.
Even the smallest temperature differences can be identified with the outstanding temperature resolution of the Testo thermal imagers. Industrial thermography with Testo thermal imagers saves time, energy and money – for more security, less damage and more efficiency.

Optimum image quality and innovative technology

Testo offers the right thermal imager for every application in industrial thermography. With high-quality Germanium optics and the best detector quality, the Testo thermal imagers guarantee optimum image quality for every thermographic application. With the patent-pending SuperResolution technology, the geometric resolution of each thermal image is improved by a factor of 1.6 – with four times more pixels. This means that extremely high-resolution thermal images up to a megapixel quality of 1280 960 pixels can be recorded.

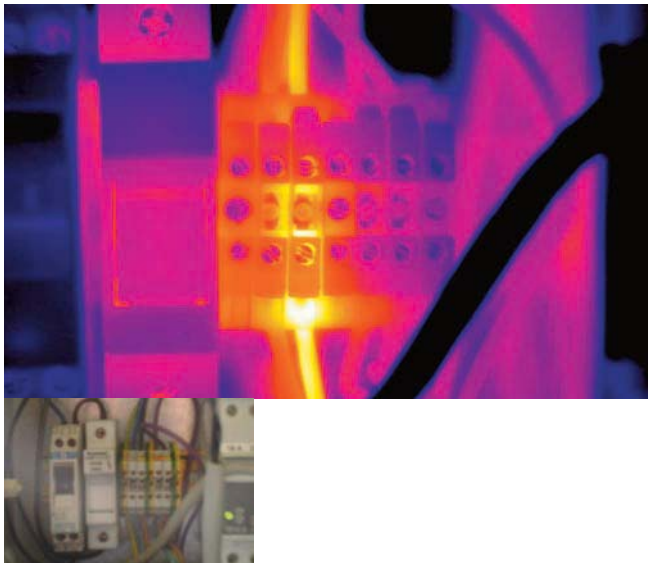
High-performance, intuitive and safe

The intuitive operation and the user-friendly handling offer security and flexibility in every situation. The high-performance PC software IRSoft offers extensive functions for the professional analysis of your thermal images: It allows sophisticated image analysis, provides templates for convenient report creation and with TwinPix, offers image overlay of the real and the thermal images. The information from these two images can thus be presented together in one image on a PC.

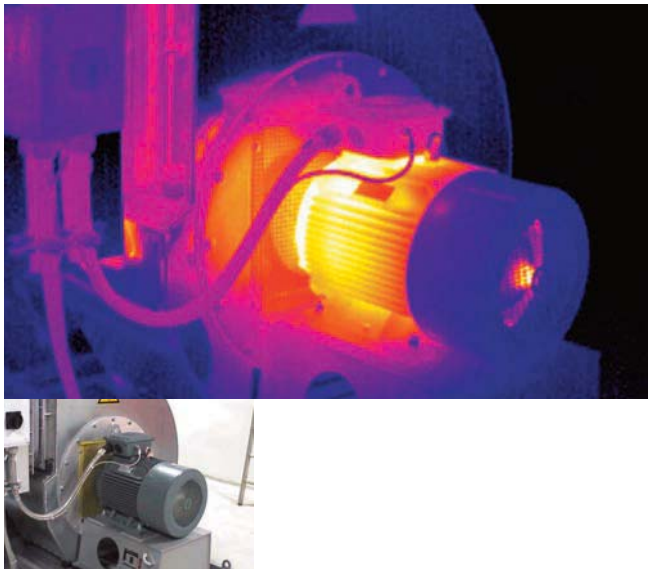
What is thermography?
All objects which are warmer than minus 273 degrees centigrade (absolute zero), emit infrared heat radiation. Infrared radiation cannot be seen by the human eye. Thermal imagers, however, can convert this infrared radiation into electrical signals, and present them as a thermal image. The heat radiation is thus made visible for the human eye.

Testo thermal imagers in industrial thermography.

Thermography has proven its worth as a tool for preventive maintenance, in order to monitor mechanical and electrical systems or production processes. In the field of research and development, Testo thermal imagers are also used to examine microelectronic components.



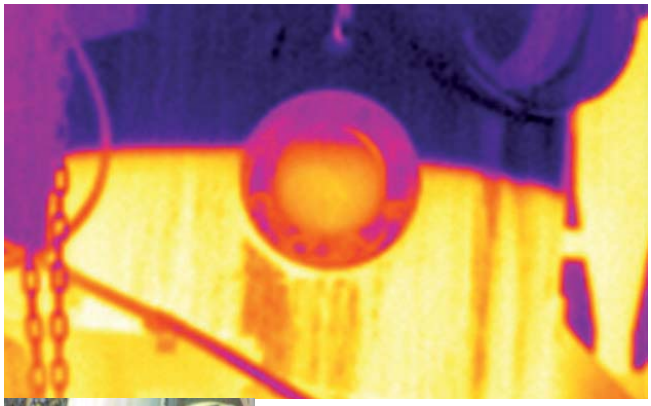
1. Regular checks in electrical maintenance
Testo thermal imagers allow an evaluation of the heat status of low, medium and high voltage systems. Thermographic images lead to early recognition of defective components, so that the required targeted preventive steps can be taken. This minimizes the dangerous risk of fire and avoids costly production downtimes.



2. Support in preventive mechanical maintenance
A reliable early recognition of threatening damage to process-relevant system components is necessary in order to guarantee the security and reliability of the machines. A high level of heat emissions, especially from mechanical components, may indicate an elevated level of stress. This is caused, for example, by friction due to faulty adjustment, component tolerances or a lack of lubricant. With their high temperature resolution, Testo thermal imagers provide an exact diagnosis. Critical heating conditions can be directly detected with the alarm or isotherm function, and counter-measures can be introduced.

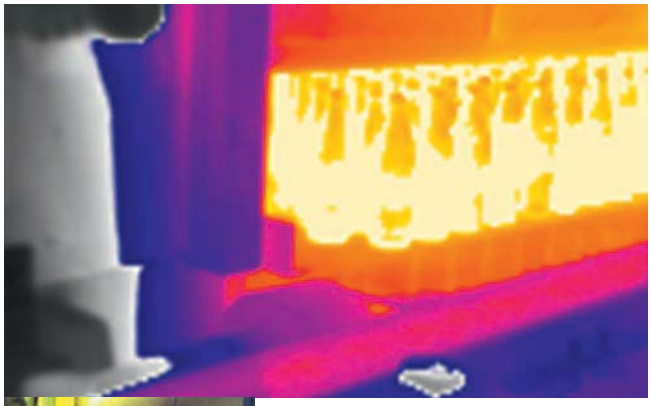
3. Quick, easy filling level checks

Level control in sealed fluid tanks has proved to be a useful method for avoiding machine damage and therefore production losses. If, for example, the fluid in coolant tanks falls to a dangerously low level, machines are no longer cooled correctly. They run hot and may fail. Often, an automatic level control regulates the level of the refrigerant and issues an alarm when the filling level is too low. However, the automatic control can also fail. In this case, a regular look through a thermal imager will also help.



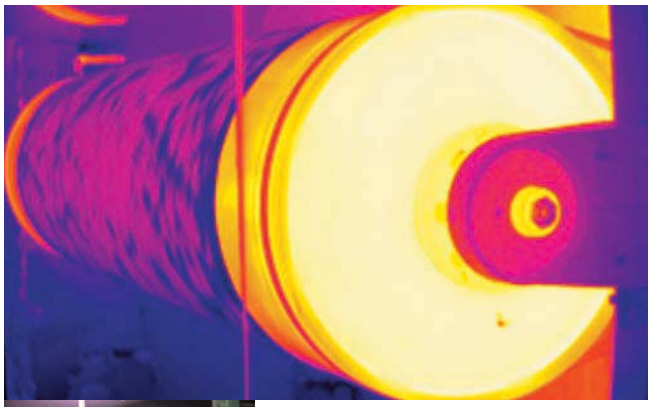
4. Safe high temperature measurement

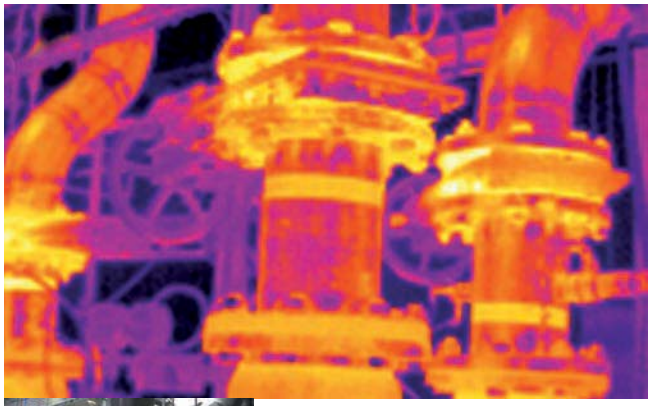
In applications with high scene temperatures the Testo thermal imagers are adaptable to the requirements. With the high temperature option, the measuring range can be flexibly extended to up to 1200 °C. The high-contrast representation in the display takes place using the high-temperature colour display Iron HT or the special histogram compensation.



5. More reliability in quality assurance and production monitoring

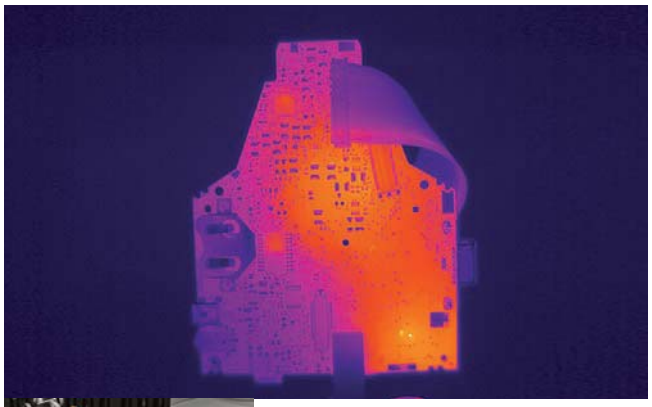
The thermal imagers from Testo ensure precise situation analysis, thus supporting process monitoring and product quality assurance. In addition to foreign bodies in production processes, anomalies in the heat distribution of components are also recognized at a glance, quickly and without contact.





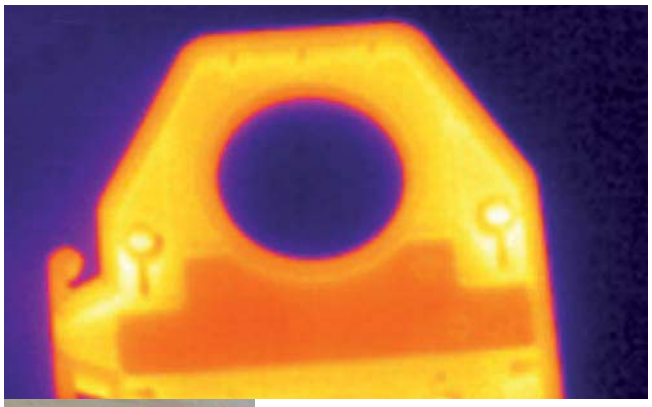
6. Power production guarantee

Energy is an important commodity which must always be available in sufficient quantity. For this reason, power stations and utility companies ensure that no interruptions occur, from energy production to distribution. Testo thermal imagers support the preventive maintenance in of electrical and mechanical components. Developing damage is identified early.



7. Precise visualization of critical temperatures in microelectronics

Electronic components are becoming smaller and smaller, the demands on heat withdrawal are increasing. For optimization purposes, an examination of temperature conditions using a thermal imager is expedient, and the analysis of warming and cooling behaviour over defined time intervals is often required. Only high-quality thermal imagers with the highest geometric resolution and the possiblity of recording fully radiometric video sequences are up to this job.

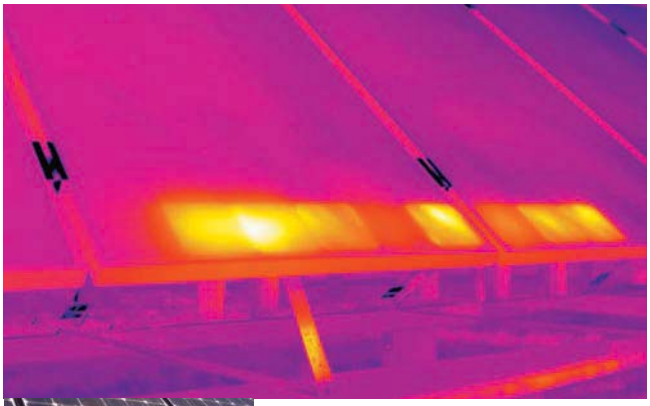


8. Quality control in the production of diecast plastic components

In the development and production of diecast plastic components, the Testo thermal imagers are used for the targeted monitoring of the cooling process. If the diecast components cool very irregularly, differing material densities occur within the diecast components – leading to reduced stability and bad fitting. The cooling process can be monitored and documented using a Testo thermal imager. This allows problematic areas to already be recognized during development, and directly remedied.

9. Monitoring and checking solar energy systems

There are two main reasons for examining solar energy systems: Safety and performance monitoring. Solar energy systems reach top performance in full sunshine. Large and small photovoltaic systems can be monitored without contact, from a distance, and especially efficiently using Testo thermal imagers. Malfunctions are identified, the smooth running of all components guaranteed, and thus the highest level of economic viability achieved. Thanks to the possibility of entering the important measurement parameter, sun irradiation intensity, additional measurement security is gained.



10. Analysis of energy distribution systems

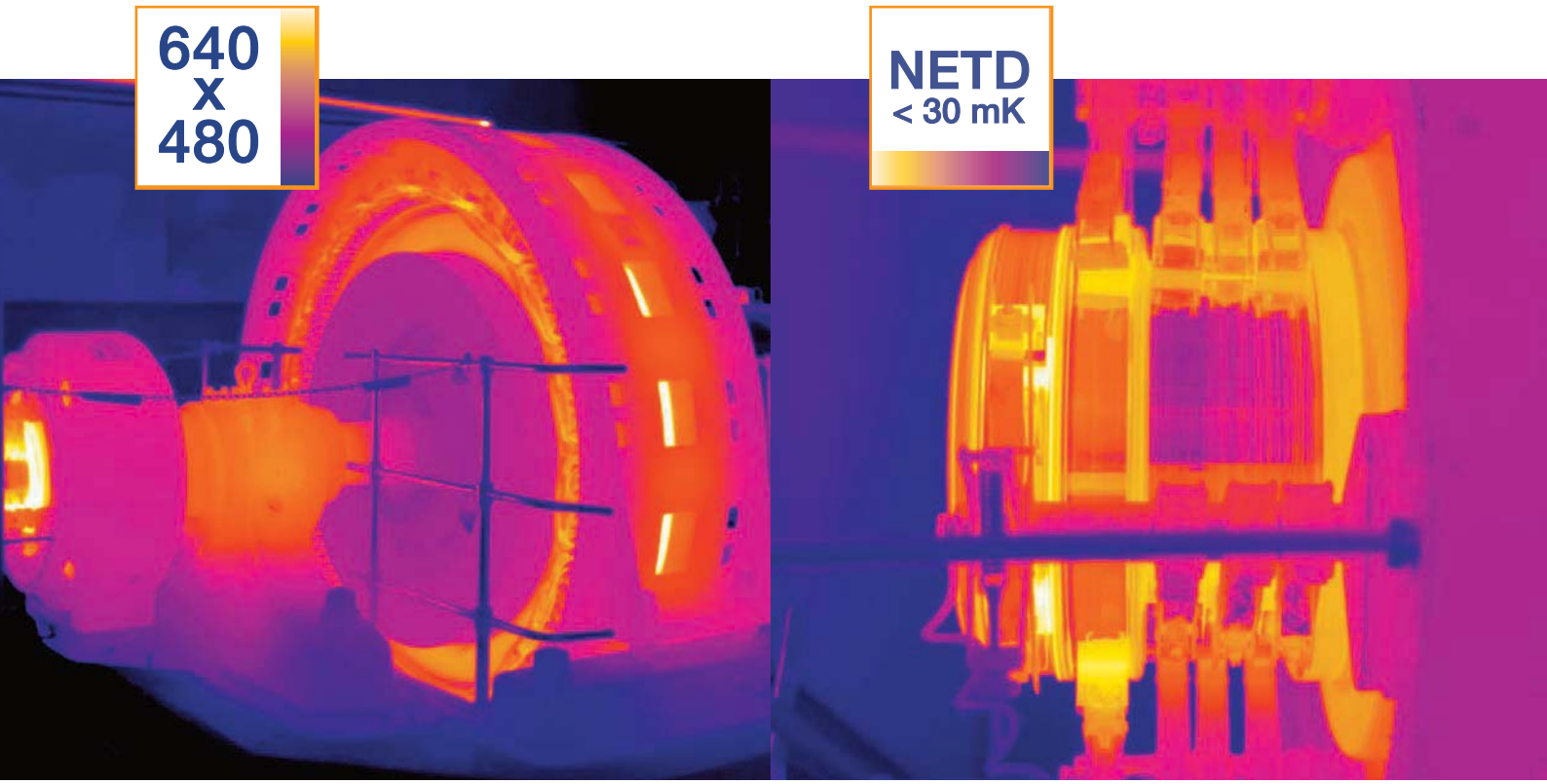
Because of the far-reaching consequences, downtimes in energy distribution systems should be avoided at all costs. In particular, defective connections in high-tension masts can be critical here. These transfer points, which can sometimes be a long way away, can only be clearly recognized with a sufficiently large detector. Because this is the only way to obtain the detail needed to evaluate the thermal image without error.

11. Inspection management in large production systems

The regular inspection of machines and switchboxes in large production systems is time-consuming, but indispensable. During such inspection tours, similar measurement objects often have to be monitored, resulting in many thermal images of the same type. Previously, in order to be able to allocate the measurements clearly to the different measurement sites, complex lists needed to be kept, or a voice comment added to each individual thermal image. With Testo SiteRecognition technology, measurement sites are automatically recognized and the resulting thermal images correctly archived.

Innovative technology – easy to use.

Testo thermal imagers offer optimum image quality and intelligent system components. In order to be able to conduct thermography applications with the highest possible level of security and efficiency, the engineers at Testo have not only developed innovative technologies, but have also adapted them to each other ideally in the thermal imagers. This means that each Testo thermal imager is an intuitively operable, highly developed thermography system.



Excellent image quality

The heart of a thermal imager is the detector. Testo places great value on the highest possible quality. Detectors of 160 x 120 pixels to 640 x 480 pixels are at work in Testo thermal imagers. In combination with the high-quality Germanium optics, this guarantees optimum image resolution in any situation. In addition to this, using the new Testo SuperResolution technology, extremely high-resolution images with up to 1280 x 960 pixels can be recorded.

For the measurement of finest temperature differences, the best possible thermal sensitivity (NETD) is also indispensible. Testo thermal imagers offer an excellent NETD of up to < 30 mK. In combination with a high image resolution, this allows the finest temperature differences in the smallest structures to be made visible.

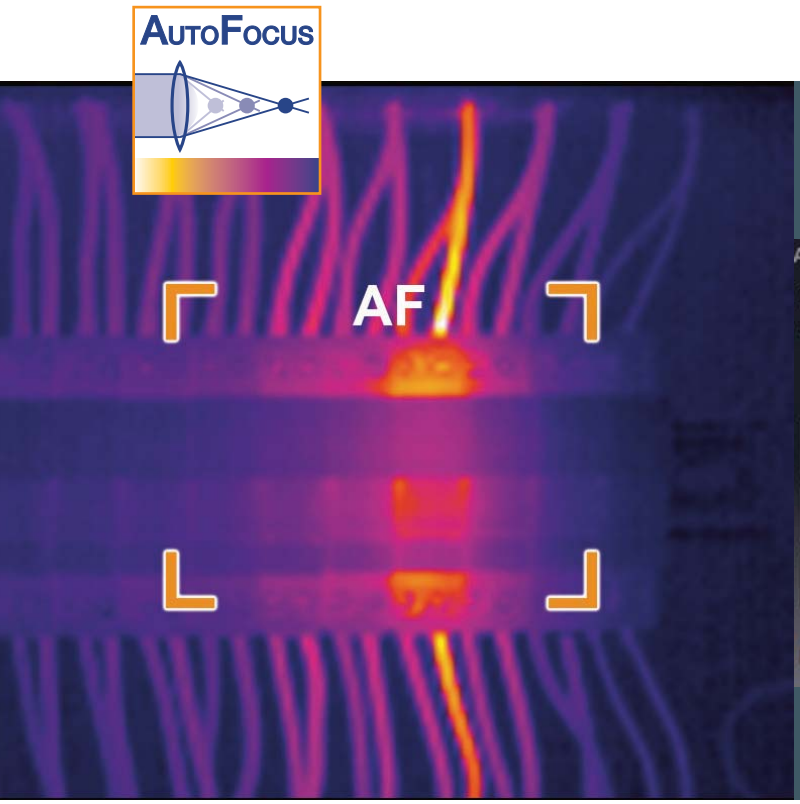
Ideal ergonomics

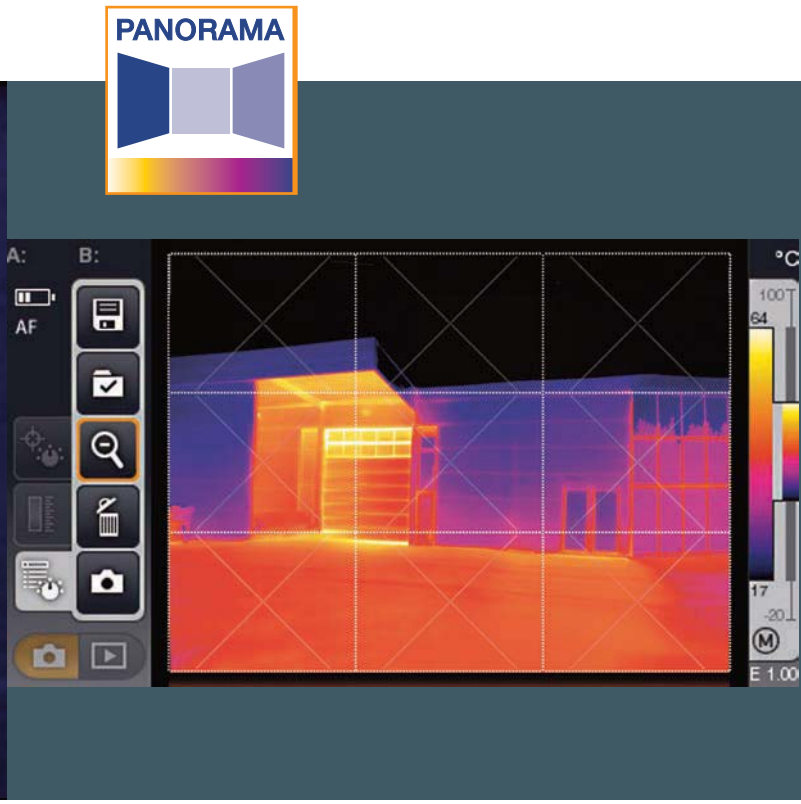
In order to be able to use the thermal imager safely and efficiently in industrial applications, Testo offers sophisticated ergonomics. In addition to the proven and practical pistol design, there are also Testo thermal imagers in camcorder design. These have a fold-out, rotatable display, allowing images to be recorded above the user's head. The ergonomic rotatable handle additionally allows secure handling in difficult-to-access places (such as at floor level).

Intuitive operation

The intuitive operability of the Testo thermal imagers was always in focus in the development of the product. The different camera types (pistol design or camcorder design) can be used very easily and safely in any situation. With the newly developed hybrid operation, graphic input directly on a touchscreen can be selected in addition to the proven joystick operation.

In order to always have a hand free (e.g. for safety reasons), all Testo thermal imagers offer the possibility of one-hand operation, with which all functions of the camera can be reliably called up.





The right focus

The prerequisite for any thermographic measurement is a properly focussed measurement object. With Testo thermal imagers, focussing can be carried out according to personal preference: whether manually, with the motor focus or by auto focus – the user has the choice.

Practical panorama image assistant

Conductung thermography on very large objects is a great challenge to the user. He is always faced with the conflict between attention to detail and the most complete object coverage as possible. In order not to have to administer, view and compare several images, but to be able to analyze and document the entire object at a glance, there is now the Testo panorama image assistant. It simply stitches several individual images together to one total view. This creates a total image with a high level of attention to detail.

Versatile exchangeable lenses and special lens protection glass

Testo thermal imagers can, thanks to the possibility of using several lenses, be flexibly adapted to different measurement requirements. As standard, a light wide-angle lens is provided, allowing fast work. If the application requires the resolution of small structures, or if images from a greater distance are necessary, telephoto lenses are available.
In order to save the valuable Germanium lenses from damage, the Testo thermal imagers offer a special glass for the optimum safeguarding from scratching or dust.

Built-in digital camera with power LED's

Testo thermal imagers have an integrated digital camera, with which a real image of the measurement object can be recorded parallel to the thermal image. This means that for every thermal image, the corresponding real image is also available. The power LED's guarantee optimum illumination of dark areas when recording real images.

Efficient SiteRecognition technology

The Testo SiteRecognition technology saves time and nerves. The measurement site recognition with measurement site management carries out the recognition, storage and management work for the thermal images after a measurement series. Periodical inspection tours can be conducted efficiently and all thermal images then precisely analyzed on a PC. The various measurement sites are simply identified with markers on the measurement object, and the imager does the rest.

Fully radiometric video measurement

Heat development over time can be recorded in real time with Testo thermal imagers. Via the USB 2.0 inerface, all data from the thermographic recording are directly transferred to the PC, and can be stopped and analyzed at any point. In addition to this, a logger function allows the recording of several individual images at defined time intervals or after certain events, such as limit value violations, for example.

Parallax-free laser marker

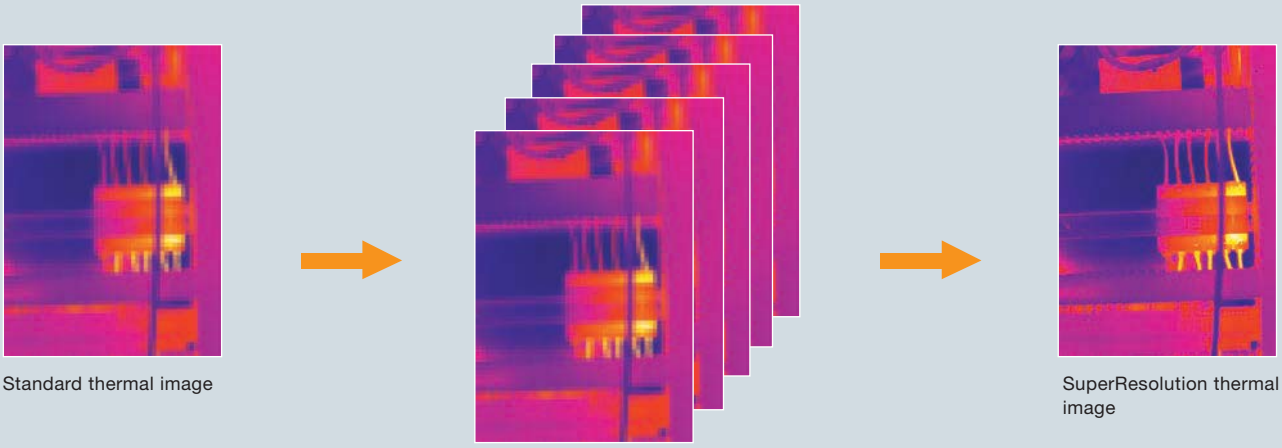
In order to keep the overview in complicated measurement situations, the laser marker is shown in the display of the Testo thermal imagers. This orientation point exactly mirrors the measurement spot which is targeted by the laser on the measurement object. The temperature at the exact spot at which the laser is pointing is displayed.

Variable high temperature measurement

In some industrial applications, very high temperatures need to be measured. In Testo thermal imagers, the temperature measuring range can be flexibly extended to up to 1200°C. This means that the right measuring range is available for every application. The high-contrast representation takes place using the high-temperature colour display Iron HT or the special histogram compensation.

The SuperResolution technology.

High-resolution thermal images
Optimum thermography is basically quite easy: The better the image resolution and the more pixels, the better the attention to detail and the clearer the presentation of the measurement object. And just when one cannot approach the measurement object closely, or when one needs to identify the finest structures, a high-resolution image quality is essential. Because the more you can see in the thermal image, the better is the analysis.



Simply see more with one upgrade
With the SuperResolution technology, the image quality of the Testo thermal imagers is improved by one class, i.e. by four times more pixels, and a geometric resolution which is better by a factor of 1.6. For example, 160 x 120 pixels are turned into 320 x 240 pixels at once, or 640 x 480 pixels become 1280 x 960 pixels. And all this simply by software upgrade in all current Testo thermal imagers.
The patent-pending innovation from Testo uses the natural movement of the hand, and records several slightly offset images very quickly one after the other. These are then calculated into one image using an algorithm. The result: Four times more pixels and a considerably better geometric resolution of the thermal image. The SuperResolution technology provides extremely high-resolution thermal images with up to 1280 x 960 pixels These considerably more meaningful thermal images can be easily called up in the PC software, and analyzed.

SUPER RESOLUTION 4x MORE PIXELS

The PC software IRSoft.

IRSoft – the high-performance PC software for professional thermography analysis from Testo. The IRSoft allows comprehensive analysis of thermal images on a PC. It stands out thanks to its clear structure and high user-friendliness. All analysis functions are explained using easily comprehensible symbols. So-called tool tips additionally provide explanations of each function by mouseover. This assistance simplifies image processing and allows intuitive operation. A fully functional version of the PC software IRSoft is included with all Testo thermal imagers.

IRSoft – Precise analysis of thermal images

Infrared images can be conveniently processed and analyzed on a PC using the IRSoft. Extensive functions are available for professional image analysis. For example, the different emissivities of the various materials for image areas can be corrected afterwards, right up to individual pixels. The histogram function shows the temperature distribution of an image area. Up to five profile lines can be used to analyse temperature curves. In order to visualize critical temperatures in an image, limit value violations as well as pixels in specific temperature range can be emphasized. In addition to this, unlimited measurement points can be set, hot/cold spots determined, and comments on the analysis made.

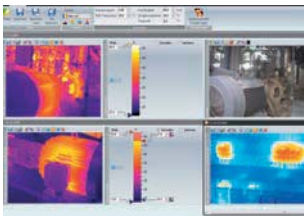
Easy creation of professional thermography reports

Infrared and real images are displayed in the screen already during analysis, and automatically taken over into the report. This makes easy and professional documentation of the measurement results possible.

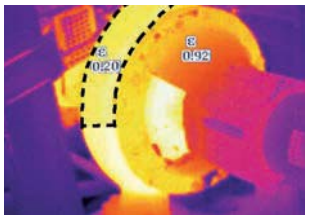
The report assistant guides step by step to a complete and clear report. Different templates are available not only for short and quick reports, but also for more comprehensive documentation. The templates contain all relelvant information on measurement site, measurement task and examination results. In addition to this, the report designer can be used to create user-defined templates for individual reports.

IRSoft – all important information at a glance

Several infrared images can be opened and analyzed parallel to each other. All analyses in the images are visible at a glance and comparable to each other. Alterations to settings can be carried out either for the whole infrared image or for individual image sections. It is additionally possible to transfer current image corrections to all opened infrared images with a mouse click.



Simultaneous evaluation and comparison of several images



Change of emissivity by area for exact temperature analysis.

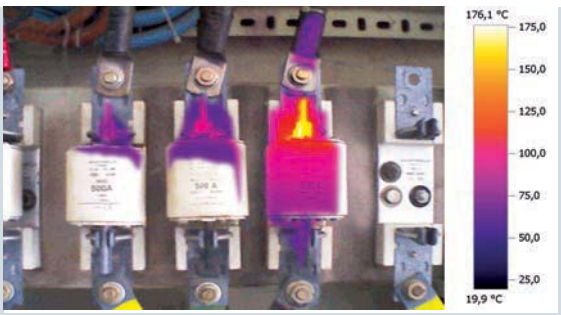
Multi-page reports for complete documentation

With the IRSoft from Testo:

- you analyze thermal images precisely
- you create professional thermography reports quickly and easily
- you can analyze and compare several images simultaneously

TwinPix – thermal and real images in one image.

The thermal imagers from Testo with integrated digital camera automatically store a thermal and a real image simultaneously. With the professional image overlay TwinPix, these two images can be superimposed over each other in the PC software IRSoft. The information from the thermal image and the real image are then displayed together in one image.



See hidden pipelines even in the real image, with TwinPix

Function of the PC software: Image overlay TwinPix

Straight to the perfect result with Testo TwinPix
By setting marking points which correspond in the thermal and the real image, the images are overlaid exactly. Even scenes with measurement objects at different distances can be blended without a problem, and shown simultaneously in one image.

Show what's important, with the professional image overlay from Testo
During the analysis, the image overlay helps orientation in the image and in the exact localization of the damaged area.
Setting the transparency level regulates the intensity of the infrared or the real image component in the overlay. Critical temperature ranges can be marked by inserting infrared limit values and the infrared range. Even in the real image, problem areas can be directly emphasized, and the temperature status of the measurement object displayed plastically. The overlaid image is taken over into the report for documentation purposes.

The thermal imagers from Testo.

testo 875

- Detector size 160 x 120 pixels
- SuperResolution technology (to 320 x 240 pixels)
- Thermal sensitivity < 80 mK
- Large field of view thanks to 32° lens
- Lens protection glass
- Solar mode
- Auto Hot/Cold Spot Recognition

testo 875i

- Detector size 160 x 120 pixels
- SuperResolution technology (to 320 x 240 pixels)
- Thermal sensitivity < 50 mK
- Large field of view thanks to 32° lens
- Exchangeable lenses
- Built-in digital camera with power LEDs
- Laser pointer
- Lens protection glass
- Voice recording using headset
- Min-/Max on area calculation
- Solar mode
- Measuring range up to 550 °C

testo 876

- Detector size 160 x 120 pixels
- SuperResolution technology (to 320 x 240 pixels)
- Flexible fold-out, rotatable display
- Thermal sensitivity < 80 mK
- Large field of view thanks to 32° lens
- Exchangeable lenses
- Integrated digital camera
- Lens protection glass
- Voice recording using headset
- Min-/Max on area calculation
- Solar mode
- Measurement mode for detecting areas with danger of mould

testo 882

- Detector size 320 x 240 pixels
- SuperResolution technology (to 640 x 480 pixels)
- Thermal sensitivity < 50 mK
- Large field of view thanks to 32° lens
- Built-in digital camera with power LEDs
- Laser pointer
- Lens protection glass
- Voice recording using headset
- Min-/Max on area calculation
- Solar mode
- Measuring range up to 550 °C

testo 885

- Detector size 320 x 240 pixels
- SuperResolution technology (to 640 x 480 pixels)
- Flexibility thanks to rotatable handle and fold-out, rotatable display
- Thermal sensitivity < 30 mK
- Large field of view thanks to 30° lens
- Exchangeable lenses
- Built-in digital camera with power LEDs
- Lens protection glass
- Voice recording using headset
- Area measurement (Min/Max & Average)
- Auto focus
- Panorama image assistant
- Parallax-free laser marker
- Solar mode
- Measuring range up to 1200 °C
- SiteRecognition technology
- Fully radiometric video measurement

testo 890

- Detector size 640 x 480 pixels
- SuperResolution technology (to 1280 x 960 pixels)
- Flexibility thanks to rotatable handle and fold-out, rotatable display
- Thermal sensitivity < 40 mK
- Large field of view thanks to 42° lens
- Exchangeable lenses
- Built-in digital camera with power LEDs
- Lens protection glass
- Voice recording using headset
- Area measurement (Min/Max & Average)
- Auto focus
- Panorama image assistant
- Parallax-free laser marker
- Solar mode
- Measuring range up to 1200 °C
- SiteRecognition technology
- Fully radiometric video measurement

Made in Germany

Overview of Testo thermal imagers.

Features	testo 875-1	testo 875-1i	testo 875-2i	testo 876	testo 882	testo 885-1	testo 885-2	testo 890-1	testo 890-2
Detector size (in pixels)	160 x 120				320 x 240			640 x 480	
SuperResolution technology (in pixels)	(to 320 x 240)				(to 640 x 480)			(to 1280 x 960)	
Thermal sensitivity (NETD)	< 80 mK	< 50 mK		< 80 mK	< 50 mK	< 30 mK		< 40 mK	
Temperature measuring range	-20 to +280 °C	-20 to +350 °C		-20 to +280 °C	-20 to +350 °C				
Image refresh rate	9 Hz	33 Hz*		9 Hz	33 Hz*				
Standard lens: FOV $IFOV_{geo}$ / $IFOV_{geo\text{-}SR}$	32° x 23° 3.3 / 2.1 mrad				32° x 23° 1.7/1.1 mrad	30° x 23° 1.7 / 1.06 mrad		42° x 32° 1.13 / 0.71 mrad	
Exchangeable telephoto lens: FOV $IFOV_{geo}$ / $IFOV_{geo\text{-}SR}$	–	–	(9° x 7°) (1.0 / 0.6 mrad)		–	–	(11° x 9°) (0.6/0.38 mrad)	–	(15° x 11°) (0.42/0.26 mrad)
Focussing	manual			manual / motor		manual / auto			
Rotatable display	–	–	–	✓	–	✓	✓	✓	✓
Rotatable handle	–	–	–	–	–	✓	✓	✓	✓
Touchscreen	–	–	–	–	–	✓	✓	✓	✓
High temperature measurement	–	–	(up to 550 °C)	–	(up to 550 °C)	–	(up to 1,200 °C)	–	(up to 1,200 °C)
Auto Hot/Cold Spot Recognition	✓	✓	✓	✓	✓	✓	✓	✓	✓
Min-/Max on area calculation	–	–	✓	✓	✓	✓	✓	✓	✓
Isotherm function	–	–	✓	✓	✓	✓	✓	✓	✓
Alarm value function	–	–	–	–	–	✓	✓	✓	✓
Display of surface moisture distribution via manual input	–	–	✓	✓	✓	–	✓	–	✓
Humidity measurement with wireless humidity probe** (automatic measurement value transfer in real time)	–	–	(✓)	–	(✓)	–	(✓)	–	(✓)
Solar mode	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voice recording	–	–	✓	✓	✓	–	✓	–	✓
Integrated digital camera	–	640x480 pixels	640x480 pixels	640x480 pixels	640x480 pixels	3.1 MP	3.1 MP	3.1 MP	3.1 MP
Integrated power LEDs	–	–	✓	–	✓	✓	✓	✓	✓
Panorama image assistant	–	–	–	–	–	✓	✓	✓	✓
SiteRecognition technology	–	–	–	–	–	–	✓	–	✓
Video measurement with up to 3 measurement points (via USB)	–	–	–	–	–	✓	✓	✓	✓
Fully radiometric video measurement incl. logger function (via USB)	–	–	–	–	–	–	(✓)	–	(✓)
Laser***	–	Laser pointer		–	Laser pointer	Laser marker			

(✓) Optional ✓ Standard – not available

* Within the EU and for countries without export restrictions, otherwise 9 Hz

** Wireless humidity probes only in the EU, Norway, Switzerland, Croatia, USA, Canada, Colombia, Turkey, Brazil, Chile, Mexico, New Zealand, Indonesia

Your practical benefit
The detector size indicates the number of temperature measurement points (pixels) with which the thermal imager is equipped. The more pixels, the more detailed and clearer are the measuremente objects presented.
SuperResolution technology improves the image quality by one class, i.e. the resolution of the thermal image is four times higher.
The thermal sensitivity (NETD) displays the smallest temperature difference which can be resolved by the thermal imager. The lower this value is, the smaller the temperature differences which can be measured.
The temperature measuring range of your thermal imager informs up to which temperature your thermal imager is able to record and measure the heat radiation of objects.
The display refresh rate informs as to how frequently the thermal imager is refreshed per second.
The standard lens (light wide-angle lens) quickly records a large image section, and thus allows an ideal overview of the temperature distribution of the measurement object.
The exchangeable telephoto lens assists in the measurement of the smallest details and visualizes them even at greater distances in the thermal image.
The focussing allows the focus of the thermal image to be adjusted exactly. This can be done manually, with motor support, or automatically.
Using the rotatable display, thermography can be conducted safely from many additional positions (e.g. overhead) Undesired reflections on the display are avoided.
The rotatable handle allows secure handling of the thermal imager in difficult-to-access places (such as at floor level).
In addition to joystick control, the thermal imager can be operated via the touchscreen.
With the high temperature option, the measuring range can be flexibly extended. Thanks to a high temperature filter, the measurement of temperatures up 550 °C / 1,200 °C is possible.
The coldest and the hottest spot on the measurement object are automatically indicated in the thermal image in the imager display. Critical heat conditions are identified at a glance.
The minimum and maximum temperatures of an image section are displayed directly on site. Critical heat conditions in this image section are identified at a glance.
The optical colour alarm shows all image points whose temperature values are within a defined range, marked in colour in the thermal image.
The optical colour alarm shows all image points whose temperature values are above or below a defined limit value, marked in colour in the thermal image.
The value of the relative surface moisture is displayed for each measurement point. This is calculated from the externally measured ambient temperature and humidity as well as the measured surface temperature.
The value of the relative surface moisture is displayed for each measurement point. This is calculated from the ambient temperature and humidity automatically transferred in real time by wireless probe, as well as the measured surface temperature.
In solar mode, the value of the sun irradiation can be entered into the thermal imager. Its value is stored with each thermal image and is then available for analysis in the evaluation software.
Localized weak spots can be easily commented using voice recording. Additional information is thus documented directly on site.
Parallel to the thermal image, a real image of each measurement object is also stored. A faster and easier object inspection can be carried out due to the simultaneous display of thermal and real images.
The power LED's guarantee optimum illumination of dark areas when recording real images.
For large measurement objects, the panorama image assistant allows the analysis and documentation of a total image stitched together from many individual images. There is no need to administer, view and compare several images.
The SiteRecognition technology takes care of the recognition, storage and administration of the thermal images for periodic inspection tours with similar measurement objects.
With the video measurement, thermographic video recordings can be directly transferred to a PC. Up to 3 measurement points are available for each individual image, and can be analyzed.
Thanks to the fully radiometric video measurement, thermal processes can be directly transferred to a PC as a video as well as periodic or event-based single images. All temperature measurement points are available for each individual image.
Using the laser pointer, a laser spot can be displayed on the measurement object, for orientation purposes. With the laser marker, this laser point is also shown parallax-free in the display of the thermal imager.

*** exceptingUSA, China and Japan

We measure it. testo

0981 7374/msp/A/08.2012

www.testo.com