



The ultimate in
thermographic evolution



Sensor Systems

Improved visibility. Improved knowledge. More precise work.

Best thermal imaging technology becomes state-of-the-art: Looking ahead with the VarioCAM[®] high resolution.

The new VarioCAM[®] high resolution product line from Jenoptik is a range of high-quality tools for all fields where perfect image quality and measurement precision are crucial to successful work. For the first time, a mass-produced thermal imaging camera can be used to take pin-sharp thermograms in which the finest details can be identified – and this is at a resolution of up to 1.2 megapixels.

- Never be annoyed again about washed-out, out-of-focus or pixelated thermograms.
- In the future, you will also produce large-format printouts without irritating blocks of pixels.
- Avoid the need for expensive and heavy telephoto lenses and macro attachments, thanks to a stepless zoom function up to 8 x.
- Make life easier with simpler operability and ergonomic handling.

Progress with state-of-the-art technology

Combining leading international calibration expertise with camera components manufactured with absolute precision by the Jenoptik team of experts facilitates measurement in the 0–100°C range with 25 % more accuracy. The high dynamic range of 16 bits enables precise digitization and accurate reproduction of the measurements. Features of the VarioCAM[®] high resolution product range also include drift-free temperature measurement which is stable in the long-term due to special detector stabilization and an intelligent non-uniformity correction process.

Made by Jenoptik: Resolution Enhancement technology

Optical Resolution Enhancement technology, or RE for short, is a unique technology worldwide for the static and dynamic resolution quadruplication and improvement of image quality. Developed on the basis of Jenoptik technology from high-end photography and video technology, this process facilitates a new quality of high-resolution thermograms in both mobile and stationary use.

VarioCAM[®] high resolution standard: the premium-snap function

The premium-snap function enables one of the camera's routines to be retrieved when saving the thermogram. It ensures that drift effects are eliminated and an optimal measuring precision with simultaneous image homogeneity and noise freedom of the images as well as the 'pixel-to-pixel' measurement equality are guaranteed.

VarioCAM[®] high resolution – new features for better results.

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Wireless

Wireless data transfer via WLAN facilitates simple and secure integration of the camera into computer networks and remote control operation from a safe neighboring area when working in hazardous environments. Data transfer is therefore no longer restricted to particular cable lengths. This alleviates the problem of tangled cables or incorrect connections and the associated mechanical or electrical malfunctions.

A further option for perfect handling of the VarioCAM[®] high resolution is wireless connection to a laptop computer – this means that, when in frequent use, the camera is no longer reliant on its display but may be reliably and systematically remote controlled by computer.

Ergonomic

When designing the handgrip, all relevant scientific knowledge was taken into account to ensure fatigue-free ergonomic use. The result is that the handgrip specially designed for the VarioCAM[®] high resolution has a special support for the heel of the hand. In addition to giving the user increased grip, it makes it easier to hold the camera level while simultaneously operating the buttons.

Intuitive

The camera's user interface is designed such that it is very easy to learn to use it efficiently. Rapid orientation is aided by a help menu integrated in the user interface and a menu structure with which computer users are familiar. In addition, preselected and freely configurable text comments can be stored on the computer for the simple compiling of reports. They can be individually assigned to the relevant thermograms.

Integral

In addition to thermograms, the integrated 1.3 megapixel video camera with high dynamic range and high light sensitivity enables sharp digital images to be taken in a wide range of ambient conditions. For trouble-shooting and maintenance, the high-resolution digital images can be shown directly in the IR image or overlaid with this ("Image Fusion").

A loudspeaker and microphone are integrated into the camera so that voice recording is possible directly via the microphone or via the headset. The loudspeaker can be used for audio output or for an acoustic alarm when measurements are exceeded.

Wireless or cable connection to a computer is possible: WLAN, IEEE-1394 (FireWire), S-Video, C-Video, VGA, RS-232.

Accurate

With the aid of an optically safe laser, a measuring spot can be displayed directly on the object. Power-saving LED illumination is available for the inspection of poorly lit control cabinets.



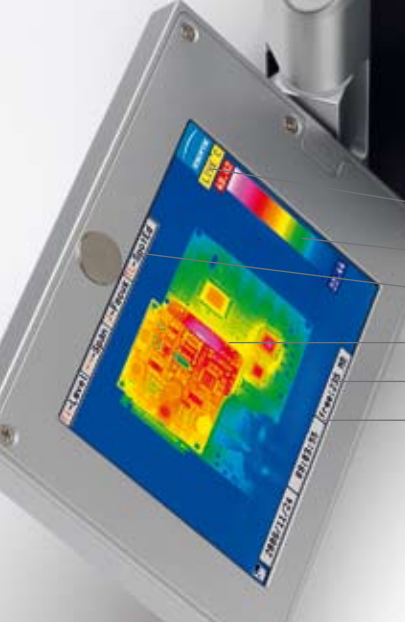
Durable

Each VarioCAM[®] high resolution has an extremely rugged airplane aluminium housing with components which have been thoroughly tested in terms of durability. Combined with the deliberately compact size, this guarantees the durability of all components.

Its impact-resistant lenses also make every VarioCAM[®] high resolution ideal for use in harsh industrial environments.

Flexible

The interchangeable lens with the patented snap-in self-fixing bayonet fitting ensures simple and quick handling. Everyday handling is simplified thanks to the low weight of the small, lightweight interchangeable lens of the VarioCAM[®] high resolution. Other features making life easier are the automatic lens recognition function as well as the flexible use of batteries of different sizes.



- indication of the operating condition
- exact temperature indication
- interactive user guidance
- visualization of the thermal image
- clear result indication
- status configuration

high-resolution color TFT view finder

rechargeable battery (Li-Ion)

joystick with 5 functions

IP 54-safe analogue and digital interfaces



Expandable

A large range of additional accessories is available:

- special lenses
- tripods
- protection windows
- laptop computer for remote control via WLAN
- storage media
- rechargeable batteries and charging units
- cables and adapters
- transport case
- remote control software
- data analysis software packages



Technical data

Detector type	Uncooled microbolometer				
Image format	640 x 480 pixels (Detector format) 1280 x 960 pixels (RE mode)	or	384 x 288 pixels (Detector format) 768 x 576 pixels (RE mode)		
Spectral sensitivity	7.5 ... 14 μm				
Temperature measurement range	-40°C ... +1200°C, optionally > 2000°C (range 1: -40° C ... +120°C, range 2: 0°C ... + 300°C, range 3: +100°C ... + 600°C, range 4: + 400°C ... +1200°C)				
Thermal resolution (at 30° object temperature)	< 70 mK, < 30 mK (filtering)				
Measurement accuracy	± 1.5 K (0°C ... 100°C), otherwise ± 2 % or ± 2 K				
Image rate	50 Hz (PAL), 60 Hz (NTSC)				
Dynamic range	16 bit				
Focus	Autofocus or manual motorized focus				
Zoom	continuous, up to 8 x, digital				
Display/view finder	High-resolution, daylight-suited 3.5" VGA display (170° swivel mount & 270° tilt, very rugged joint), High-resolution color view finder with diopter adaptation				
Single image and sequence storage	SD card, internal 512 MB real-time memory for radiometric sequences IR video, storage via WLAN or FireWire direct on a PC or a laptop computer				
Automatic functions	Autofocus, autoimage, autolevel, autorange, auto NUC, auto lens recognition, alarm sequence storage, image improvement, premium snap, RE technology				
Measurement functions	5 measurement spots and areas, automatic hot/cold spot indication, max. 5 isotherms, temperature profile, temperature difference (local, time)				
Correction functions	Emissivity (from 0.1 to 1.0 in steps of 0.01; material table), distance, transmissivity, ambient temperature				
Interfaces with IP 54 connector	IEEE 1394 (FireWire, radiometric data), S-Video, VGA, C-Video, RS-232, headset				
Wireless interfaces	WLAN for camera remote control, thermogram & video recording				
Camera remote control & data streaming	<ul style="list-style-type: none"> • Direct automatic functions of the camera, • PC/laptop via WLAN/FireWire/RS-232 				
Digital video camera	1.3 megapixel color camera with high dynamic range and high light sensitivity VIS-IR image mix and overlay, Image storage in thermogram file or separate				
Voice recording & playback	Integrated microphone & loudspeaker, headset 30 s voice storage in thermogram file or separate				
Text comments	Individual text inputs				
Measuring target functions:	Optically safe laser pointer, Power-saving LED illumination				
Lenses	Standard	1.0/25 mm	30° x 23°	1.4 mrad	0.3 m (min. spec. focus)
Detector format 384 x 288 pixels	Telephoto 1	1.0/50 mm	15° x 12°	0.7 mrad	2.0 m (min. spec. focus)
	Telephoto 2	1.0/75 mm	10° x 7.7°	0.5 mrad	3.0 m (min. spec. focus)
	Telephoto 3	1.0/130 mm	5.9° x 4.4°	0.27 mrad	5.0 m (min. spec. focus)
	Wide-angle	1.0/12.5 mm	57° x 44°	2.8 mrad	0.2 m (min. spec. focus)
	Microscope	1.0 x	13 x 10 mm ²	35 μm	50 mm*
	Close-up 1	0.17 x	80 x 60 mm ²	208 μm	149 mm*
	Close-up 2	0.5 x	27 x 20 mm ²	70 μm	50 mm*
	Detector format 640 x 480 pixels	Standard	1.0/30 mm	30° x 23°	1.0 mrad
Telephoto 1		1.0/50 mm	18° x 14°	0.5 mrad	2.0 m (min. spec. focus)
Telephoto 2		1.0/75 mm	12° x 9.1°	0.3 mrad	3.0 m (min. spec. focus)
Telephoto 3		1.0/130 mm	7.0° x 5.3°	0.19 mrad	5.0 m (min. spec. focus)
Wide-angel		1.0/12.5 mm	65° x 51°	2.0 mrad	0.2 m (min. spec. focus)
Microscope		1.0 x	16 x 12 mm	25 μm	50 mm*
Close-up 1		0.17 x	95 x 72 mm	150 μm	149 mm*
Close-up 2		0.5 x	32 x 24 mm	50 μm	50 mm*
*) working distance					
Protection rating	IP 54, IEC 529				
Operating temperature range	- 15°C ... + 50°C				
Storage temperature range	- 40°C ... + 70°C				
Humidity	relative humidity 5 % ... 95 %, non-condensing				
Shock	25 G, IEC 68-2-29 (operational, 3000 continual shocks)				
Vibration	2 G, IEC 68-2-6 (operational)				
Power supply	Replaceable quick-charge video camera battery with status indicator and up to 3 h operating time, External power supply 12 V – 24 V, FireWire interface				
Size (L x W x H, without lens)	162 mm x 144 mm x 129 mm				
Weight (incl. standard lens)	1.7 kg				

* focus distance

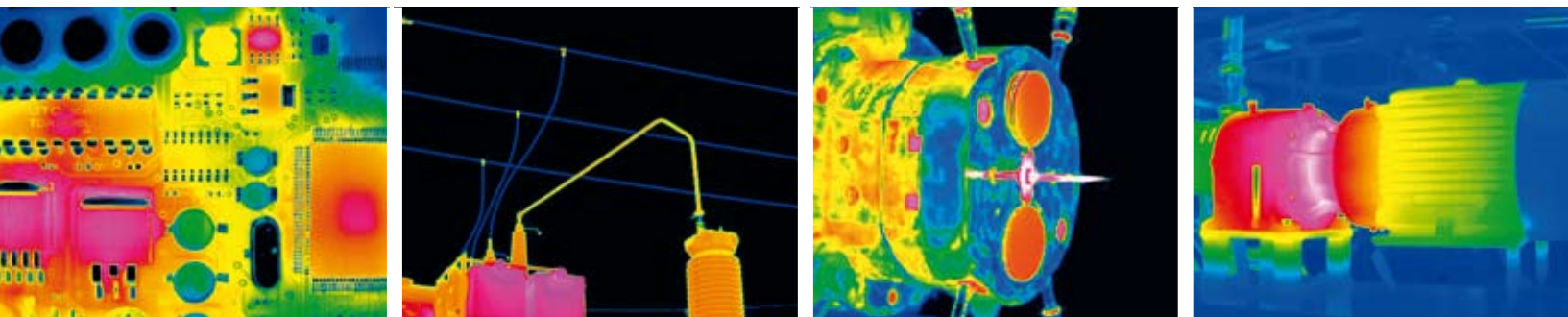
The individual models:

- VarioCAM® high resolution basic 384
- VarioCAM® high resolution inspect 384
- VarioCAM® high resolution inspect 768 (RE technology)
- VarioCAM® high resolution research 1.2 Mega (RE technology)

Fields of application:

- Industrial and scientific research and development
- Electronics manufacture
- Semiconductor industry
- Optimization of electrical devices
- Optimization of manufacturing processes
- Thermal diagnosis, for example of engines, generators, turbines and transformers
- Quality assurance
- Building inspection
- Predictive & preventive maintenance

Working at the peak of thermographic evolution: precision in a new dimension.
See for yourself.



Extracts from thermograms with 384 x 288 pixels, 640 x 480 pixels and 1280 x 960 pixels
(VarioCAM® high resolution with RE technology)



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