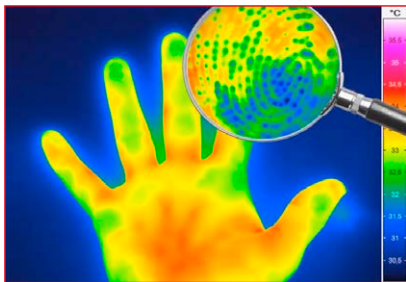




Analysis of an electronic component by lock-in thermography with IRBIS® 3 active software



Thermography with significantly better image quality



ImageIR® 9400

High-end Infrared Camera with HD Image Quality

**1,280
x
1,024**
Detector

Detector Format

Efficient measurement of smallest structures on large-scale objects

5.2
MegaPixel

MicroScan

(2,560 × 2,048) IR pixels by genuine camera hardware

**1,280
x
1,024**
180 Hz

IR-Frame Rate

Analysis of extreme temperature changes and gradients in full frame

**±1
%**

Measurement Accuracy

Highly accurate and repeatable measurements

**10
GigE**

10 GigE Interface

High-speed, long-distance interference proof data transmission

Calibration

HighSense

Flexible setting of temperature measurement ranges/integration times beyond calibration ranges

Focus

Motor Focus

Precise, fast and remotely controllable; including multiple autofocus functions

This camera model is the ideal measurement system for users whose measurement task requires a particularly high geometric resolution. The cooled focal plane array photon detector has (1,280 × 1,024) IR pixels and can increase the image format up to (2,560 × 2,048) IR pixels with the optional opto-mechanical MicroScan. Each single one of these 5.2 Megapixels in the image represents a real temperature measurement value. This allows the finest structures to be recorded and analysed without gaps and simultaneously on large or distant measurement objects.

The ImageIR® 9400 has a very small pitch of 10 µm, making it ideal for microthermography in electronics. In combination with an 8x microscope lens, the finest structures can be precisely resolved down to 1.3 µm. Its modular design enables individual configuration and optimal adaptation to the task at hand. The camera is equipped with numerous innovative functions, such as the HighSense function for the use of additional individual temperature measurement ranges. The integrated trigger interface ensures high-precision, repeatable triggering for fast processes. Multiple configurable digital inputs and outputs allow for camera control and the generation of control signals for external devices. Equipped with a separate filter and aperture wheel each with up to six free positions (30 combinations), the camera enables universal use in measurement tasks with high object temperatures and in the field of spectral thermography. All precision optics of the ImageIR® 9400 can be combined with a motorised focus unit.

Technical Specifications

| | |
|--|--|
| Spectral range | (1.5 ... 5.5) µm |
| Pitch | 10 µm |
| Detector | InSb |
| Detector format (IR pixels) | (1,280 × 1,024) |
| Detector format with opto mechanical MicroScan (IR pixels) | (2,560 × 2,048) |
| Image acquisition | Snapshot |
| Readout mode | ITR/IWR |
| Aperture ratio | f/2.2 or f/3.0 |
| Detector cooling | Stirling cooler |
| Temperature measuring range | (-40 ... 1,500) °C, up to 3,000 °C* |
| Measurement accuracy | ± 1 °C or ± 1 % |
| Temperature resolution @ 30 °C | Better than 0.03 K |
| Frame rate (full / half / quarter / sub frame)* | Up to 180 / 342 / 622 / 2,601 Hz |
| Window mode | Yes |
| Focus | Manual, motorised or automatic* |
| Dynamic range | Up to 16 bit* |
| Integration time | (1 ... 20,000) µs |
| Rotating filter wheel* | Up to 6 positions |
| Rotating aperture wheel* | Up to 5 positions |
| Interfaces | 10 GigE, HDMI*, GigE, CamLink |
| Trigger | 4 IN / 2 OUT, TTL |
| Analogue signals*, IRIG-B* | 3 IN / 2 OUT, yes |
| Tripod adapter | 1/4" and 3/8" photo thread, 2 × M5 |
| Power supply | 24 V DC, wide-range power supply (100 ... 240) V AC |
| Storage and operation temperature | (-40 ... 70) °C, (-20 ... 50) °C |
| Protection degree | IP54, IEC 60529 |
| Dimensions; weight | (241 × 123 × 160) mm*; 4.3 kg (without lens) |
| Further functions | Multi Integration Time*, HighSense* |
| Analysis and evaluation software | IRBIS® 3, IRBIS® 3 view, IRBIS® 3 plus*, IRBIS® 3 professional*, IRBIS® 3 control*, IRBIS® 3 online*, IRBIS® 3 process*, IRBIS® 3 active*, IRBIS® 3 mosaic*, IRBIS® 3 vision* |

* Depending on model

| Lenses | Focal length (mm) | FOV (°) | IFOV (mrad) |
|----------------|-------------------|-------------|-------------|
| Standard lens | 25 | (29 × 23) | 0.4 |
| Telephoto lens | 50 | (15 × 12) | 0.2 |
| Telephoto lens | 100 | (7.3 × 5.9) | 0.1 |
| Telephoto lens | 200 | (3.7 × 2.9) | 0.05 |

| Macro and microscopic lenses | Minimum object distance (mm) | Object size (mm) | Pixel size (µm) |
|------------------------------------|------------------------------|------------------|-----------------|
| Close-up for telephoto lens 50 mm | 300 | (77 × 61) | 60 |
| Close-up for telephoto lens 100 mm | 500 | (64 × 51) | 50 |
| Microscopic lens M=1.0x | 40 | (13 × 10) | 10 |
| Microscopic lens M=2.5x | 14 | (5.1 × 4.1) | 4 |
| Microscopic lens M=8.0x | 14 | (1.6 × 1.3) | 1.3 |

Fields of application:

- Safety engineering
- Stationary microthermography
- Materials testing
- Research and development



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MEL: (03) 9480 4999
SYD: (02) 9705 8059
sales@scitech.com.au
www.scitech.com.au

Phone +49 351 82876-610
Fax +49 351 82876-543
E-mail thermo@InfraTec.de
www.InfraTec.eu

USA office

InfraTec infrared LLC
5048 Tennyson Pkwy.
Plano TX 75024 / USA

Phone +1 844-226-3722 (toll free)
E-mail thermo@InfraTec-infrared.com
www.InfraTec-infrared.com