

M9200

Fixed-Installation Thermal Imaging Camera for Industrial and Scientific Applications

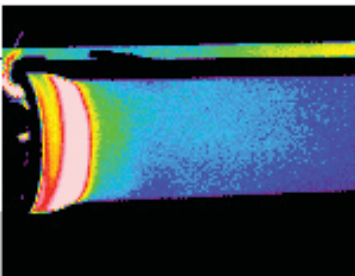
High performance, near-infrared camera with digital image transfer and remote monitoring capabilities for demanding real-time imaging applications



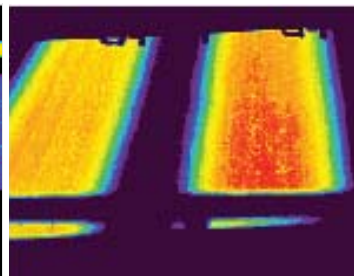
Features:

- Real Time digital image transfer Gigabit Ethernet
- Measures over 300,000 temperature points 60 times a second
- Short wavelength detector is minimally affected by emissivity
- High accuracy $\pm 0.5\%$ or 1°C of reading (whichever is greater)
- Sees through glass or quartz view ports
- Shutter-less operation
- Versatile image processing software
- Remote monitoring via Local Area Network
- Temperature measurement between 600°C and 3000°C
- Ambient temperatures to 100°C (212°F) with optional cooling
- NEMA-4 housing
- Affordable price

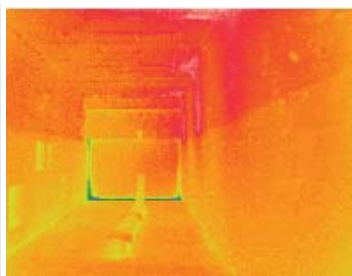
M9200 Sample Images:



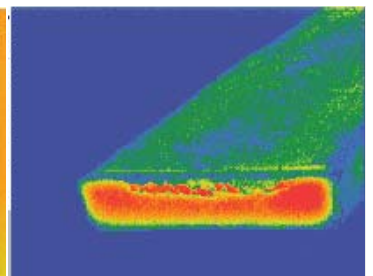
Induction heating of large diameter shaft



Rolling Mill applications



Interior of reheat furnace for uniformity check



Steel slab exiting reheat furnace

M9200 Series (Variations)

The M9200 offers a variety of temperature spectrums and configurations for a host of applications.

Specific M9200 model	Configuration / Temperature Range	Wavelengths	Optics
M9201	600°C to 1600°C in up to 4 customer-specific ranges or 800°C to 3000°C in up to 4 customer-specific ranges	650-1080 nanometers	Different optics are available from 3.5° to 55° HFOV

Why M9200?

When used for high temperature process applications, the conventional thermal imaging system is limited in its accuracy and general usefulness by several factors.

- The system spectral response is normally limited to the mid-to-far infrared part of the usable spectrum, which will result in significant errors due to changes in process surface emissivity. It makes it difficult and costly, sometimes impossible, to measure through view ports.
- Processes which include very hot, and therefore bright areas, can obscure and degrade image quality by “blooming”. This is due to saturation of the detector by the intense energy emitted from such areas.
- With IP-addressability, this camera (or series of cameras) is capable of being mounted remotely and run over a local area network for ease of data capture. This provides added degrees of safety to the operator as they are removed from possible harmful situations.
- General purpose thermal imaging systems usually incorporate far more features than are required or desirable for process use, and this results in a larger than necessary expenditure.

MikroSpec™ Software Multiplies the Value of the M9200

By using one or more Mikron Infrared M9200 cameras connected to MikroSpec™ R/T software, processes can be measured accurately, ensuring production quality in situations in which individual images are insufficient. The MS Windows-compatible software allows the user to view thermal images in real-time, as well as image sequences previously captured and stored.

One camera does the work of 32! By creating up to 32 Regions of Interest (ROIs) in one of ten shapes, the user can retrieve temperature range details within each ROI. The emissivity (key to accurate radiometric imaging) of each ROI can be set individually. Each ROI has a minimum and maximum alarm set point that can be configured to generate software and digital output alarms. MikroSpec™ R/T can then send corresponding signals to a PLC or SCADA system.

Sophisticated graph tools allow the graph creation of real-time image temperature analysis, while the export to Excel™ feature allows analysis of the real-time image temperature data in a numerical context. Other features of the software include multiple color palettes, off-line analysis, image averaging and subtraction, and advanced histogram and charting elements. Data may be exported to Excel and ASCII formats, image sequences to .AVI video files.



The Revolutionary M9200

Mikron Infrared has been an innovative leader in the field of infrared non-contact measurement since 1969. Mikron differentiates itself by offering a true “turn-key” approach to systems integration. Beginning with a well qualified staff of application engineers, we assist customers in choosing the right solution for their specific needs. Once this system is designated,

Mikron offers full engineering and project management to assist customers in the installation and start-up of their system. This includes mechanical enclosures, electrical schematics, software development, complete factory testing, field installation supervision, and start-up assistance.

Today, Mikron provides industrial customers and R&D laboratories with accurate instrumentation ranging from single point temperature measurement devices to convenient portable imaging cameras to complete fixed mount thermal imaging systems.



Strong-box Design

The M9200 features advanced maintenance-free electronics, and industrial protective packaging. Optional enclosures are available for high-temperature and/or harsh environments.

Software Multiplies Value

Mikron's own MikroSpec™ R/T Software multiplies the value of one or several M9200 cameras. Via Ethernet, a user can control functionality remotely, selecting camera type, mode range, temperature scale and lens. Customizable Regions of Interest (ROIs) allow the user to monitor specific areas—each with independent settings. See page 2 for more information.

Commissioning and Support

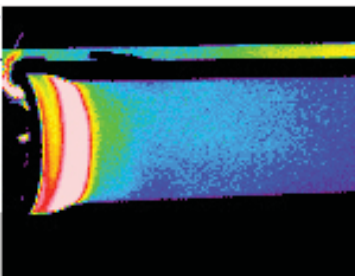
A Mikron technician is available to commission a process control system—installing and configuring the software for use with one or several cameras. Commissioning can also include employee training. In addition, MikroSpec software updates are free for 12 months.

Designed and Built in the United States.

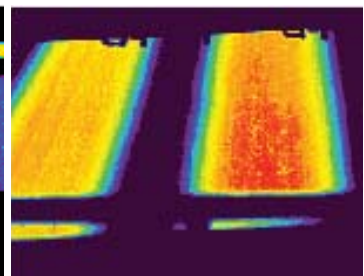
Cameras are designed and built at Mikron's New Jersey location. Engineers, software programmers, and other support staff are available to answer questions, during U.S. business hours.



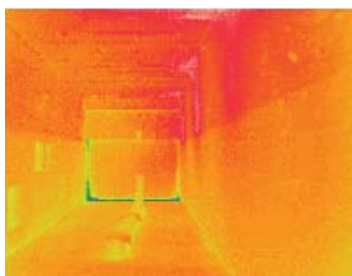
M9200 Sample Images:



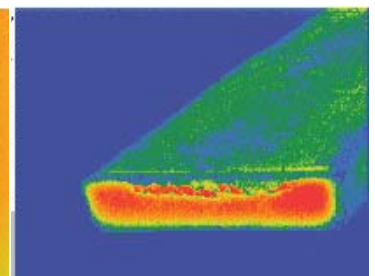
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Technical Data

M9200		
M9200 Detector Unit	Temperature Configurations:	600°C to 1600°C in up to 4 customer-specific ranges or 800°C to 3000°C in up to 4 customer-specific ranges
	Spectral Configurations:	650-1080 nanometers (depending on application)
	Measurement Accuracy:	+/-0.5% or 1°C (whichever is greater)
	Field of View:	3.5° to 55° HFOV
	Focus Range:	30 cm to infinity with 25 mm lens
	Instantaneous FOV:	Depends on Lens
	Detector:	640 x 480 Uncooled Focal Plane Array
	Image Update Rate:	60 Frames/sec
	A/D Resolution:	12 bit
	Ambient Correction:	Provided
	Interface:	Gigabit Ethernet
Environmental	Operating Temperature:	0°C to 50°C
	Storage Temperature:	-40°C to 70°C
	Shock Resilience:	30G (IEC60068-2-29/JIS C 0042)
	Vibration Resilience:	3G (IEC60068-2-6/JIS C 0040)
Electrical	Power Supply:	24V DC 12W (Nominal)
	Power Consumption:	10W (Typical)
Physical Characteristics	Dimensions:	2.2" x 2.4" x 6.3" (56mm x 62mm x 161mm) without lens
	Weight:	1.5 lbs. (excludes any protective housing)
	Remote Camera Control Functionality:	Allows selection of the camera, range and temperature scale. It also allows non-uniformity correction to be performed as well as adjustments to be made for emissivity, ambient compensation, and percentage of transmission loss.
Functionality Available Through On-Line Thermal Image Processing Software	Real-time Image Acquisition:	Allows large amounts of data to be captured at a user-adjustable capture rate of up to 60 frames per second. Live images can be captured with full temperature data and stored to a sequence file. The maximum number of frames is dependent upon the hard drive space available in the computer. Individual snap shot images can also be stored to files with full temperature data for later analysis.
	Object Data (Regions of Interest):	Multiple Regions of Interest (ROIs) allow for processing and computing of the Minimum, Maximum and Average Temperatures for up to 32 ROIs. The ROIs can be resized and moved on the live image display. There are 10 different ROI shapes (Point, Line, Broken Line, Free Line, Circle, Annulus, Rectangle, Rotated Rectangle, Polygon, and Region). A custom formula ROI type is also available which allows temperatures to be computed using typical Excel™ formulas.
	Alarms:	Each ROI has a minimum and a maximum alarm set point that can be configured to generate software and digital output alarms. These alarms can be recorded to a Text or Comma-Delimited log file for later review.
	Display Color:	Multiple Color Palettes offer flexibility for optimal infrared detail.
	Isotherm Overlay:	Provides a visual representation of the temperature breakdown on the image. Three Isotherm channels are offered where temperature ranges can be set to display specific colors on the image display.
	Image Averaging and Subtraction:	Allows comparisons to be made of the current input image to that of a snapped or loaded reference image.
	Running Image Averaging:	Allows up to 16-fold averaging of images for noise reduction.

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Specifications are subject to change without notice