LUMASENSE®
TECHNOLOGIES

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MIKRON Thermal Imaging Cameras

Compact, short wavelength thermal imaging process camera for non-contact temperature measurement of metallic surfaces, graphite, or ceramics

MCS640

CE

- 640 x 480 pixel detector for high quality images of even the smallest objects

- Accurate to within +/- 0.5% of reading for superior temperature measurement

- Image acquisition of 60 frames per second for dynamic temperature processes

- Gigabit Ethernet Interface for real-time data transfer and remote monitoring over local area network

- Rugged IP65 (NEMA 4) enclosure for protection in harsh industrial environments

- Compact design for easy installation, even in confined spaces

- Wide range of optics for macroscopic and microscopic applications

- Support for I/O module, OPC, and modbus through LumaSpec RT Control Software

- Special configurations for applications involving laser (contact factory)

The MIKRON MCS640 from LumaSense Technologies, Inc., is a short wavelength infrared (SWIR) thermal imager with internal digital signal processing. This imager is designed to accurately measure temperatures between 600 and 3000°C, with minimal interference from temperature reflections on the object. This makes it suitable for applications such as measurements on metallic surfaces, graphite and ceramics, etc.

The compact design of the MCS640 enables the integration of the camera into compact production machines, while the solid and robust housing guarantees reliability even in harshest industrial environments.

LumaSense offers a wide variety of compatible optics for the MCS640,

allowing each instrument to be configured exactly to the measurement needs of the desired scene. Microscopic lenses are also available, allowing accurate measurement of small objects, such as filament temperatures.

The 640 x 460 resolution pixel detector is designed to allow precise targeting of small objects in a wider field of view.

The built-in Gigabit Ethernet interface (GigE) allows the camera to be connected to the network for long data transmission or to LumaSense's application software for further analysis.

Typical Applications:

- Preheating
- Annealing
- Tempering
- Welding
- Forging
- Hardening
- Sintering
- Melting
- Soldering
- Brazing
- Rolling
- Tempering

Technical Data

Configurations	MCS640/I5 Filter (780 to 1080 nm)
	MCS640/I1 Filter (850 nm)
	MCS640/V Filter (650 nm)
	MCS640/I4 Filter (750 nm)
	MCS640/I8 Filter (1080 nm)
Standard Temp.Ranges	600 to 1600 °C (MB16) or 800 to 3000 °C (MB30) in up to 4 sub-ranges
Sub Ranges	MB16: 600 to 850, 700 to 1000, 850 to 1250, 1100 to 1600
	MB30: 800 to 1150,1000 to 1500, 1350 to 2050, 1900 to 3000
Sensitivity / NETD	1° at 600 °C
IR Detector	640 x 480 pixels; Silicon
Image Update Rate	60 Hz (fps; frames per second)
Emissivity	10.0 to 100.0% adjustable via interface in steps of 0.1% (for full frame camera picture)
Transmittance	10 to 100 % (in application software)
Uncertainty (Accuracy)	+/- 0.5% of reading in °K
Repeatability	0.1% of measured value in °K + 1°K
Protection Class	IP65 (IEC 60529); NEMA 4
Shock Resilience	30G (IEC60068-2-29/JIS C 0042)
Vibration Resilience	3G (IEC60068-2-6/JIS C 0040)
Power Supply/Consumption	24V DC, 1A
Power Consulption	10W Typical, 13W Max
Analog Output	None
Digital Interface	Gigabit Ethernet (1000 MBit/s)
Connector	12 pin power connector; RJ45 Ethernet connector
Isolation	Power supply and digital interface are galvanically isolated from each other
Weight	0.7 kg (1.5 lbs)
Ambient Temperature	0 to 50 °C
Storage Temperature	-40 to 70 °C
Relative Humidity	Non condensing conditions
Housing	Aluminium extrusion
CE-label	According to EU directives about electromagnetic immunity

Dimensions
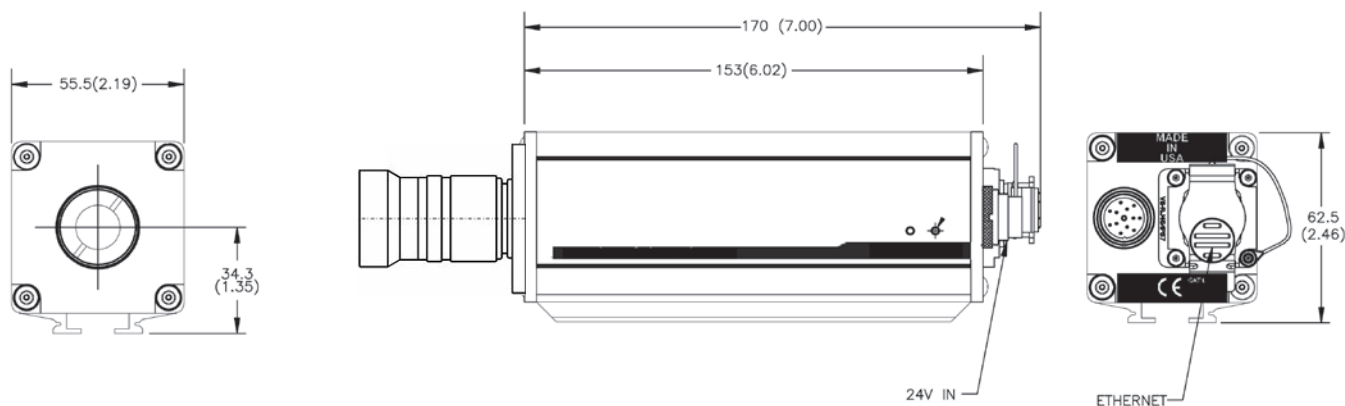
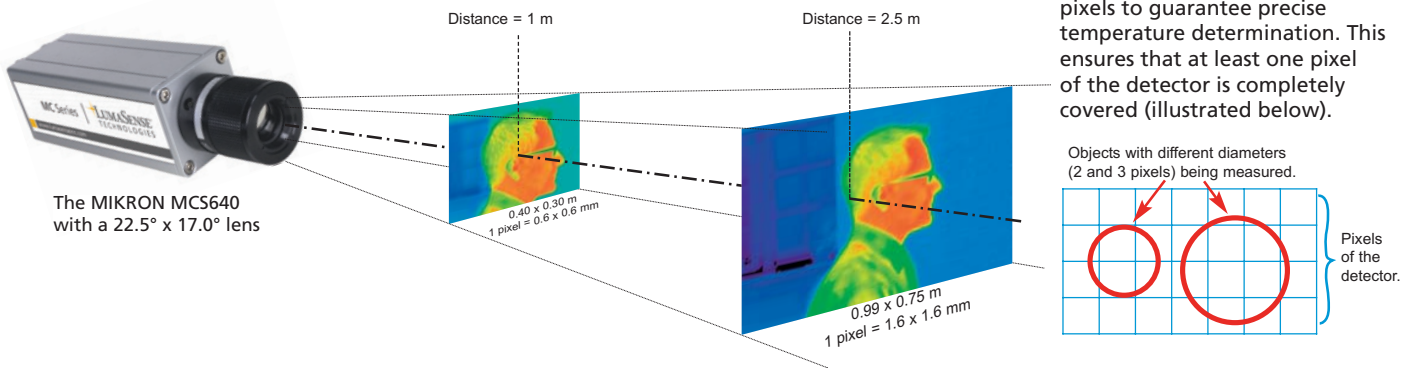| Lens Length vs. HFOV	Lens Diameter	3.5°	5.4°	10.8°	22.5°	33.3°	41.0°
Filter code I5 (without filter adaptor)	44 mm	65.5 mm	38.5 mm	25.5 mm	27.0 mm	27.0 mm	31.5 mm
Filter code I1, I2, I3, I4, I8 and V (including filter adaptor)	44 mm	90.5 mm	63.5 mm	50.5 mm	52.0 mm	52.0 mm	56.5 mm

Optics

A wide range of alternative lenses are available for the MCS640, making the thermal imager suitable for most applications.

The table (right) and picture (below) show the correlation between the measurement distance, different optics, and the size of the measurement fields.

Distance of object [m]	Measurement field W x H [m]					
	3.5° x 2.6°	5.4° x 4.0°	10.8° x 8.1°	22.5° x 17.0°	33.3° x 25.3°	40.4° x 30.9°
1.00	0.06 x 0.05	0.09 x 0.07	0.19 x 0.14	0.40 x 0.30	0.60 x 0.45	0.74 x 0.55
1.50	0.09 x 0.07	0.14 x 0.10	0.28 x 0.21	0.60 x 0.45	0.90 x 0.67	1.10 x 0.83
2.50	0.15 x 0.11	0.24 x 0.17	0.47 x 0.35	0.99 x 0.75	1.50 x 1.12	1.84 x 1.38
10.00	0.61 x 0.45	0.94 x 0.70	1.91 x 1.43	3.98 x 2.99	5.98 x 4.49	7.36 x 5.53

Note: Distances in the table may not apply to some high-temperature situations. Be sure to consult the Applications Team to determine the proper distance for your application.
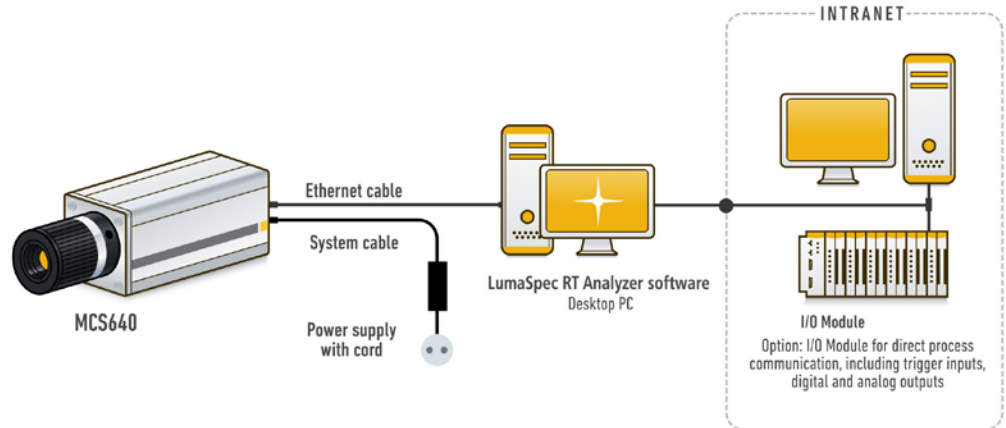

Distance = 1 m

Distance = 2.5 m

The MIKRON MCS640 with a 22.5° x 17.0° lens

0.40 x 0.30 m
1 pixel = 0.6 x 0.6 mm

0.99 x 0.75 m
1 pixel = 1.6 x 1.6 mm

Note: The size of the measured object must be at least 3 x 3 pixels to guarantee precise temperature determination. This ensures that at least one pixel of the detector is completely covered (illustrated below).

Objects with different diameters (2 and 3 pixels) being measured.

Pixels of the detector.

System Configuration

LumaSense's thermal imagers offer several configuration options.

MCS640 over network
The system can be set up by connecting the camera to a network device (switch) or by connecting the camera directly to a dedicated computer using a cross-over Ethernet cable.

INTRANET

Ethernet cable

System cable

Power supply with cord

MCS640

LumaSpec RT Analyzer software
Desktop PC

I/O Module

Option: I/O Module for direct process communication, including trigger inputs, digital and analog outputs

MCS640 mobile setup
Additionally, the camera can be used with a desktop PC or with a notebook PC for a mobile measuring system.

Ethernet cable

System cable

Power supply with cord

MCS640

LumaSpec RT Analyzer Software
Notebook
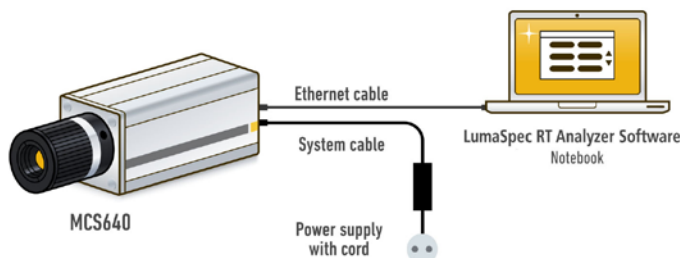
Reference Numbers

MCS640/I5, (780…1080 nm)		MCS640/I1, (850 nm), (clean gas flame furnaces)	
461H1625	standard lens (10.8° x 8.1°), 60 Hz, 600 ... 1600 °C	461J1625	standard lens (10.8° x 8.1°), 60 Hz, 600 ... 1600 °C
461H1608	wide angle lens (33.3° x 25.3°), 60 Hz, 600 ... 1600 °C	461J1608	wide angle lens (33.3° x 25.3°), 60 Hz, 600 ... 1600 °C
461H1612	wide angle lens (22.5° x 17°), 60 Hz, 600 ... 1600 °C	461J1612	wide angle lens (22.5° x 17°), 60 Hz, 600 ... 1600 °C
461H1650	telephoto lens (5.4° x 4.0°), 60 Hz, 600 ... 1600 °C	461J1650	telephoto lens (5.4° x 4.0°), 60 Hz, 600 ... 1600 °C
461H1675	telephoto lens (3.5° x 2.6°), 60 Hz, 600 ... 1600 °C	461J1675	telephoto lens (3.5° x 2.6°), 60 Hz, 600 ... 1600 °C
461H3025	standard lens (10.8° x 8.1°), 60 Hz, 800 ... 3000 °C	461J3025	standard lens (10.8° x 8.1°), 60 Hz, 800 ... 3000 °C
461H3008	wide angle lens (33.3° x 25.3°), 60 Hz, 800 ... 3000 °C	461J3008	wide angle lens (33.3° x 25.3°), 60 Hz, 800 ... 3000 °C
461H3012	wide angle lens (22.5° x 17°), 60 Hz, 800 ... 3000 °C	461J3012	wide angle lens (22.5° x 17°), 60 Hz, 800 ... 3000 °C
461H3050	telephoto lens (5.4° x 4.0°), 60 Hz, 800 ... 3000 °C	461J3050	telephoto lens (5.4° x 4.0°), 60 Hz, 800 ... 3000 °C
461H3075	telephoto lens (3.5° x 2.6°), 60 Hz, 800 ... 3000 °C	461J3075	telephoto lens (3.5° x 2.6°), 60 Hz, 800 ... 3000 °C

Scope of delivery: 2 m Ethernet cable, 2 m power supply cable, power supply unit (100 to 240 VAC, 47 to 63 Hz), mounting adapter, PCI/Gigabit Ethernet card (depending on computer), lens cap, manual (on CD), carrying case, and LumaSpec RT Viewer software.

NOTE: The MCS640 camera is designed to operate on a 32 or 64-bit Windows™ based computer with the following (minimum) components: Dual Core 1.5 GHz or faster processor, 4 GB RAM (running at 1600 MHz), Dedicated Video Card with 1 GB of 900 MHz DDR3 dedicated RAM, 7200 RPM Hard Drive with a 16 MB buffer and using a 3.0 GB/sec SATA bus, Gigabit Ethernet card that supports Jumbo Packets up to 9014 bytes.

Accessories

3 832 950	Lab power supply (24 V DC, 1.25 A)	812 0008 01	Software LumaSpec RT Viewer
3 832 970	DIN rail mounted power supply (24 V DC, 2.5 A)	812 0009 01	Software LumaSpec RT Basic
3 821 360	Connecting cable, 5 m	812 0029 01	Software LumaSpec RT Analyzer
3 821 370	Connecting cable, 10 m	812 0029 06	Software LumaSpec RT Analyzer - Multi 6
3 821 380	Connecting cable, 15 m	57 0013	Industrial Grade Laptop
3 821 390	Connecting cable, 25 m	912 0042 01	Tower Style Controller
3 829 850	CAT 6 Ethernet cable, 7.5 m	912 0014 01	Remote I/O Blocks (8 analog outputs)
3 829 860	CAT 6 Ethernet cable, 15 m	912 0015 01	Remote I/O Blocks (Alarm Kit, 8 Channels, Relay)
3 829 870	CAT 6 Ethernet cable, 25 m	912 0016 01	Remote I/O Blocks (Remote trigger kit)
3 830 460	ID enclosure for MCS640 (standard, non-HD)	912 0017 01	Remote I/O Blocks (8 analog, 8 alarm outputs)
3 835 490	Adaptor for mounting rail to tripod	912 0018 01	Remote I/O Blocks (32 analog, 32 alarm outputs)
3 834 410	Adjustable mounting support (3 hole)	912 0019 01	Remote I/O Blocks (8 analog inputs)

Salient Feature List for MCS640 camera with LumaSpec RT Control Software

- Adjustable emissivity, background, and transmission settings
- Real-time display of thermal images with frame capture and sequence capture
- Includes 19 different color palates
- Auto-Gain available for entire image or ROI
- Multiple types of ROI including point, line, and area with temperature display
- Includes analysis tools like histogram, 3D profile, line profile, and temperature trend
- Alarm generation for entire or ROI image based on minimum, maximum or average temperature
- Support for OPC (OPC DA 2.0) with user-defined scan rate
- Analog and digital output module
- Web server functionality
- Triggered capture based on alarm conditions
- Password controlled user access
- Digital zoom up to 8X
- Data export to text or Microsoft Excel (includes thermal image, ROI table summary/data, image data) or to text
- Modbus TCP/IP available
- Multi-camera configuration with camera auto start feature
- Image subtraction available
- Analyze previously recorded images
- Export captured sequences to AVI
- Image format compatible with LumaSpec Offline Analyzer software for advanced analysis and report writing
- Optional SDK

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