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

**MCS640**

- 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
- 3G (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

<table>
<thead>
<tr>
<th>Lens Length vs. HFOV</th>
<th>Lens Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter code I5 (without filter adaptor)</td>
<td>44 mm</td>
</tr>
<tr>
<td>Filter code I1, I2, I3, I4, I8 and V (including filter adaptor)</td>
<td>44 mm</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Distance of object [m]</th>
<th>Measurement field W x H [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5° x 2.6°</td>
<td>0.06 x 0.05</td>
</tr>
<tr>
<td>5.4° x 4.0°</td>
<td>0.09 x 0.07</td>
</tr>
<tr>
<td>10.8° x 8.1°</td>
<td>0.19 x 0.14</td>
</tr>
<tr>
<td>22.5° x 17.0°</td>
<td>0.40 x 0.30</td>
</tr>
<tr>
<td>33.3° x 25.3°</td>
<td>0.60 x 0.45</td>
</tr>
<tr>
<td>40.4° x 30.9°</td>
<td>0.74 x 0.55</td>
</tr>
<tr>
<td>0.45 x 0.30</td>
<td>0.61 x 0.45</td>
</tr>
<tr>
<td>0.74 x 0.55</td>
<td>0.94 x 0.70</td>
</tr>
<tr>
<td>1.10 x 0.83</td>
<td>1.91 x 1.43</td>
</tr>
<tr>
<td>1.84 x 1.38</td>
<td>3.98 x 2.99</td>
</tr>
<tr>
<td>7.36 x 5.53</td>
<td>5.98 x 4.49</td>
</tr>
</tbody>
</table>

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.

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).

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.

**MCS640 mobile setup**

Additionally, the camera can be used with a desktop PC or with a notebook PC for a mobile measuring system.
### Reference Numbers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>461H1625</td>
<td>standard lens (10.8° x 8.1°), 60 Hz, 600 ... 1600 °C</td>
</tr>
<tr>
<td>461H1608</td>
<td>wide angle lens (33.3° x 25.3°), 60 Hz, 600 ... 1600 °C</td>
</tr>
<tr>
<td>461H1612</td>
<td>wide angle lens (22.5° x 17°), 60 Hz, 600 ... 1600 °C</td>
</tr>
<tr>
<td>461H1650</td>
<td>telephoto lens (5.4° x 4.0°), 60 Hz, 600 ... 1600 °C</td>
</tr>
<tr>
<td>461H1675</td>
<td>telephoto lens (3.5° x 2.6°), 60 Hz, 600 ... 1600 °C</td>
</tr>
<tr>
<td>461H3025</td>
<td>standard lens (10.8° x 8.1°), 60 Hz, 800 ... 3000 °C</td>
</tr>
<tr>
<td>461H3008</td>
<td>wide angle lens (33.3° x 25.3°), 60 Hz, 800 ... 3000 °C</td>
</tr>
<tr>
<td>461H3012</td>
<td>wide angle lens (22.5° x 17°), 60 Hz, 800 ... 3000 °C</td>
</tr>
<tr>
<td>461H3050</td>
<td>telephoto lens (5.4° x 4.0°), 60 Hz, 800 ... 3000 °C</td>
</tr>
<tr>
<td>461H3075</td>
<td>telephoto lens (3.5° x 2.6°), 60 Hz, 800 ... 3000 °C</td>
</tr>
</tbody>
</table>

**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 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 832 950</td>
<td>Lab power supply (24 V DC, 1.25 A)</td>
</tr>
<tr>
<td>3 832 970</td>
<td>DIN rail mounted power supply (24 V DC, 2.5 A)</td>
</tr>
<tr>
<td>3 821 360</td>
<td>Connecting cable, 5 m</td>
</tr>
<tr>
<td>3 821 370</td>
<td>Connecting cable, 10 m</td>
</tr>
<tr>
<td>3 821 380</td>
<td>Connecting cable, 15 m</td>
</tr>
<tr>
<td>3 821 390</td>
<td>Connecting cable, 25 m</td>
</tr>
<tr>
<td>3 829 850</td>
<td>CAT 6 Ethernet cable, 7.5 m</td>
</tr>
<tr>
<td>3 829 860</td>
<td>CAT 6 Ethernet cable, 15 m</td>
</tr>
<tr>
<td>3 829 870</td>
<td>CAT 6 Ethernet cable, 25 m</td>
</tr>
<tr>
<td>3 830 460</td>
<td>ID enclosure for MCS640 (standard, non-HD)</td>
</tr>
<tr>
<td>3 835 490</td>
<td>Adaptor for mounting rail to tripod</td>
</tr>
<tr>
<td>3 834 410</td>
<td>Adjustable mounting support (3 hole)</td>
</tr>
<tr>
<td>3 829 870</td>
<td>remote I/O Blocks (8 analog outputs)</td>
</tr>
<tr>
<td>3 829 870</td>
<td>Remote I/O Blocks (32 analog, 32 alarm outputs)</td>
</tr>
<tr>
<td>3 829 870</td>
<td>Remote I/O Blocks (8 analog inputs)</td>
</tr>
</tbody>
</table>

### 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

### LumaSense Technologies

**Americas and Australia**

**Sales & Service**
Santa Clara, CA
Ph: +1 800 631 0176
Fax: +1 408 727 1677

info@lumasenseinc.com

LumaSense Technologies, Inc., reserves the right to change the information in this publication at any time.

©2015 LumaSense Technologies. All rights reserved.

**Europe, Middle East, Africa**

**Sales & Service**
Frankfurt, Germany
Ph: +49 69 97373 0
Fax: +49 69 97373 167

**Asia**

**India**

**Sales & Support Center**
Mumbai, India
Ph: +91 22 67419203
Fax: +91 22 67419201

www.lumasenseinc.com

©2015 LumaSense Technologies. All rights reserved.

**MCS640_Datasheet-EN - Rev. 09/22/2015**