LUMASENSE™ TECHNOLOGIES

MIKRON Infrared Temperature Sensors

Automated, Continuous Thermal and Visual Imaging to Identify Thermal Abnormalities within Electrical Substations and Other Process Control Systems

MIKRON ThermalSpection™ 724

- Enables Thermography 24/7
- Early and Remote Fault Detection
- Immediate Analysis of Dynamic Conditions
- Continuous Monitoring without Manpower Constraints
- Remotely Monitor Multiple, Distant Substations from One Central Controller
- Additional Security with both Infrared and Optional Visual Camera
- Integrates into Existing Network

The ThermalSpection™724 Remote Thermal Monitoring System represents another milestone in innovative infrared thermometry. With its multiple camera system functionality, it is the first system to allow remote monitoring of temperatures in real time via image data obtained from one or more cameras and sent to a single central controller.

Designed with advanced maintenance-free electronics and industrial protective packaging, the ThermalSpection 724 system offers unparalleled accuracy for demanding industrial and electric utility settings while quickly measuring temperature without contact in even the most adverse environments.

Each imager is mounted in a sealed environmental enclosure with an IR transparent window and continuous cooling from a thermoelectric cooling system. Positive pressure inside the enclosure prevents dirt or dust from entering, even in the harshest conditions. With an optional cold weather package, heaters are added to the system to allow operation down to -40 C.

When combined with MikroSpec™ software, each camera is capable of monitoring up to 32 Regions of Interest and performing an automated "tour" of the substation with unique alarms checked at each tour stop. Frames can be captured at scheduled intervals rather than continuously. Capture can also be triggered remotely or by temperature alarms tied to individual Regions of Interest.

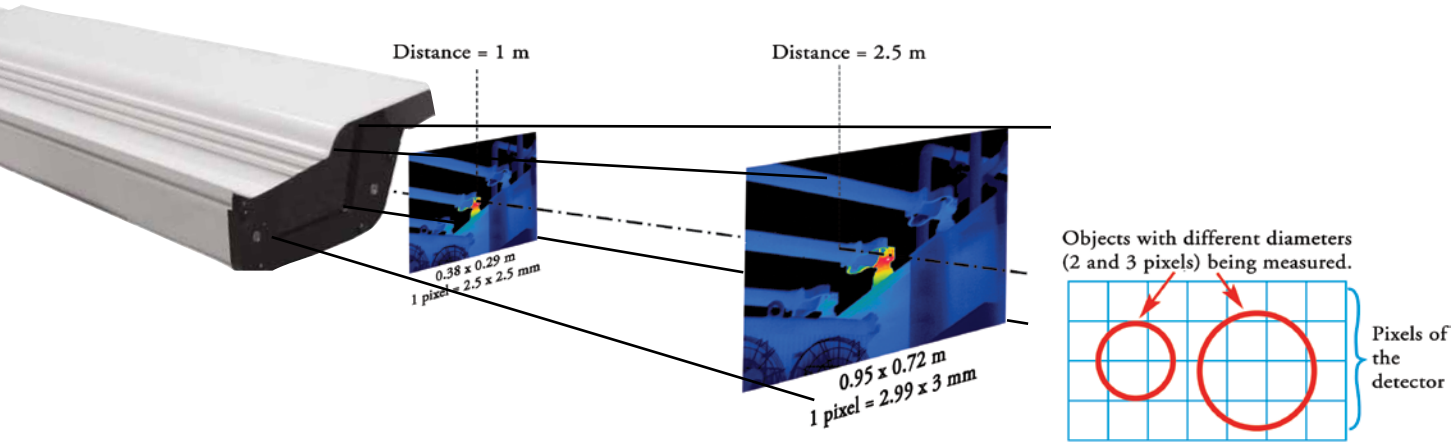
Key Features:

- Real-Time, Remote Monitoring/ Control with Full Range Pan-and-Tilt Capability
- High Resolution Readings of 0.08°C at up to 30 measurements per second
- Temperature Measurement Between -10°C and 500°C
- Alarm Communication via OPC/ Modbus or Standard Alarm Feedback (Relay, 4-20mA, 0-10V, etc.)
- Multi-Spot Temperature Measurement with Independent Emissivity Settings at Each "Tour" Location

Measurement Field and Pixel Resolution

Thermal imagers come equipped with optical ranges suitable for most applications. For specific applications, alternative built-in lenses are available. 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]		
	21.6° x 16.3°	11° x 8°	53° x 40°
0.30	0.11 x 0.09	-	0.30 x 0.22
0.60	0.23 x 0.17	-	0.60 x 0.44
1.00	0.38 x 0.29	-	1.0 x 0.73
1.50	0.57 x 0.43	-	1.5 x 1.09
2.50	0.95 x 0.72	0.48 x 0.35	2.49 x 1.82
10.00	3.82 x 2.86	1.9 x 1.4	9.97 x 7.28



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).

Pan and Tilt Housing

The positioning unit features a Germanium window which transmits in the thermal imager's responsive range of 8 to 14µm. Coupled with the high-performance MIKRON thermal imager, the system is ideal for a wide range of applications, such as electrical substation monitoring, environment monitoring, fire monitoring and rescue, public safety, intruder monitoring, night vision security surveillance and flare stack monitoring.

- Made of Aluminum and Polycarbonate
- Germanium Window Glass
- IP66 Rated
- Easy Installation On-Site
- Horizontal Continuous Rotation
- Variable Speed: 0.1-100°/s Pan; 0.1-40°/s Tilt
- Autopan, Preset, Patrol
- Controlled Remotely through MikroSpec TS724 Software
- Measurement Locations can be Identified and Memorized as "Tour" Stops, with Individual Regions of Interest and Alarm Set-Points
- Full Manual Control Mode Available through the Software, Minimizing the Need for Multiple System Controls

Technical Data

Performance	
Temperature Range	-10 to 120°C and 0 to 500°C (standard)
Measurement Accuracy	±2°C or 2% of reading
Field of View	21.6° x 16.3° (optional 11° x 8° telephoto, 53° x 40° wide angle)
Focus Range	3m to infinity
Instantaneous FOV/ Spatial Resolution	1.2 mrad
Image Update Rate	Variable depending on operational mode (tour, alarm, intruder). Maximum 30Hz (30 frames per second)
Resolution	0.08°C
Thermal Image Size	320 x 240 Pixels
Spectral Band	Long wave to avoid solar reflections and fog avoidance

Environmental Specifications	
Operating Temperature	-15 to 50°C, -40° to 50°C for standard enclosure with thermal-electric cooling
Ambient Temperature	-40°C to 75°C with optional enclosure heater
Storage Temperature	-40°C to 75°C

Electrical	
Power Input	Universal AC

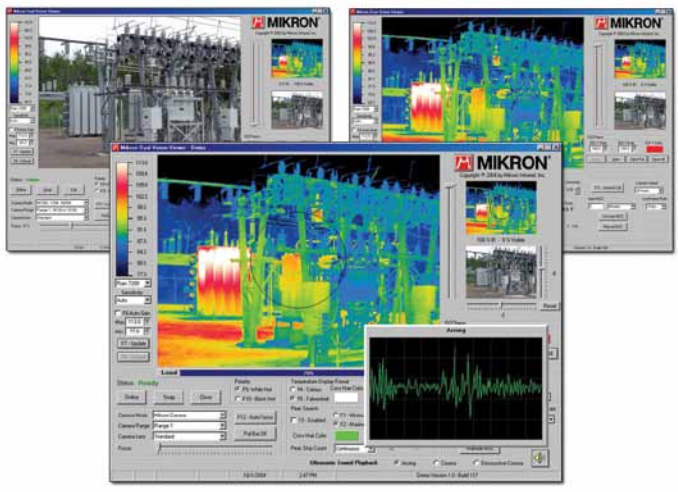
Measurement	
Measuring Functions	Run/Freeze, Auto Level/ Sense, Level Trace, Auto Gain Control
S/N Improvement	Σ2, Σ8, Σ16
Emissivity Correction	Provided
Environmental Temperature Correction	Provided
Background Compensation	Provided

Interface	
Remote PC Operation	Ethernet Interface
Pan and Tilt (Optional)	Pan-Axis Range: 435° rotation Tilt-Axis Range: 180° (±90°) tilt Repeatability: 0.05°
Software	Remote control, real-time image analysis, definition of regions of interest (ROIs), alarms, and many other standard features

Housing	
Camera Enclosure Protection Rating	IP65
Junction Box Rating	IP65

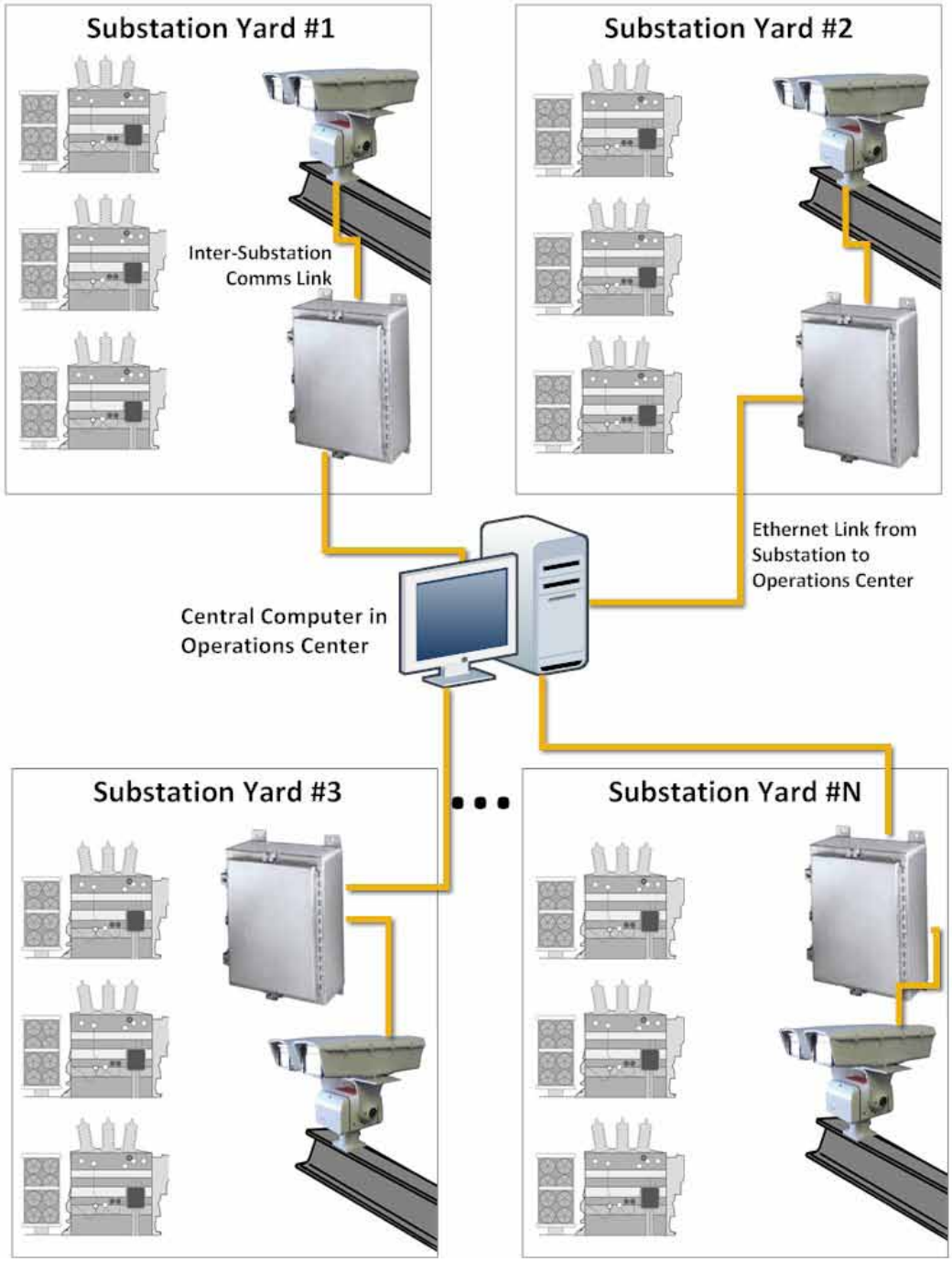
The MikroSpec Software Advantage

- Pan & Tilt Controls for both Automatic and Manual Positioning
- Tour Controls to Save and Reproduce Specific Routes and Angles
- Separate Regions of Interest and Alarm Setpoints for each Tour Stop
- Configurable Palette and Temperature Scale
- Isotherm Overlay to Highlight Desired Temperature Ranges
- Monitor and Alarm Individual Components within the Field of View using ROIs
- Configure Alarms Based on Temperature or Rate of Change



Network Diagram

The ThermalSpection system provides advanced remote monitoring. A communication link runs from each camera to a controller located on-site. This allows quick access to the camera's thermal readings and configuration options. A secondary link runs from each substation controller to a central computer, allowing remote monitoring and configuration of all cameras from miles away.



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