Infrared Analysis Software and CSI 9830 Machinery Health™ Imager

Effectively manage your thermal imaging program with AMS Machinery Manager and the route-on-board capability of the CSI 9830.

- Route-based thermal imaging linked to a vibration analysis program provides a more accurate picture of machinery health

- Diagnostic Fault Tree in AMS Suite: Machinery Health Manager simplifies diagnostics and documentation of thermal scans

- Integrates state-of-the-art infrared imaging technology in a 640x480 resolution camera

Introduction

For many years, maintenance departments across industries have used thermal imaging to acquire valuable information on mechanical assets and electrical systems in the plant; yet thermal image analysis is often at odds with the rest of the maintenance program. Thermal imaging programs have operated mostly outside of the route-based vibration programs and machinery health database, particularly if collected by an outside service.

Even if the data had been uploaded to the database and tied to the appropriate assets, the ability to use that data was extremely limited. The ability to manage and analyze thermal image data in the same database with vibration and oil analysis data simply was not available ... until now.

Emerson offers a complete solution with the features your maintenance program needs to manage a thermal imaging program alongside your vibration and oil analysis programs. The integrated Infrared Analysis module in AMS Machinery Manager establishes a solid foundation for your thermal imaging program.

The Infrared Analysis module allows you to execute the program setup, plan equipment routes, perform accurate analysis of the data, organize information, and report on inspection findings. You can also download routes to and upload data from the CSI 9830. Now you can run your thermal imaging program with the same efficiency and flexibility as your vibration and oil analysis program.

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Infrared Analysis in AMS Machinery Manager

A successful and efficient thermal imaging program uses more than just an infrared camera. With AMS Machinery Manager, you can set-up and execute a well-planned thermal imaging program that mirrors the structure of your vibration analysis program from set-up to route-based collection and reporting.

The route mode automatically manages the images after they are assigned to measurement point. Upload a route back to AMS Machinery Manager and it automatically assigns the images and field annotations to the correct measurement locations in the database. The route list also ensures accurate documentation for all scanned equipment. For off-route images, simply drag-and-drop image files onto the desired measurement points in the database tree.

The Infrared Analysis module features a Diagnostic Fault Tree that contains a log of equipment types, fault types, and recommended actions for those faults. Rather than simply annotating thermal images, you can create a detailed fault analysis of the image. The Fault Diagnostic Tree reduces the time needed to analyze and report on images and provides standard, consistent analysis of anomalies, even between different thermographers.

Once images are downloaded to the AMS Machinery Manager database, the Infrared Analysis module provides a complete set of post scan analysis tools, such as:

- Spot meter placement indicates specific location temperatures

- Temperature profile plot indicates temperature change along a line

- Temperature histogram plot shows the distribution of temperature ranges within a designated area

- A full array of color palettes

- Isotherm function identifies points of an indicated temperature on an image

- Custom reports using any combination of analysis tools, in-field notes, annotations and fault analysis indication of the machine health

Because the database seamlessly integrates thermal
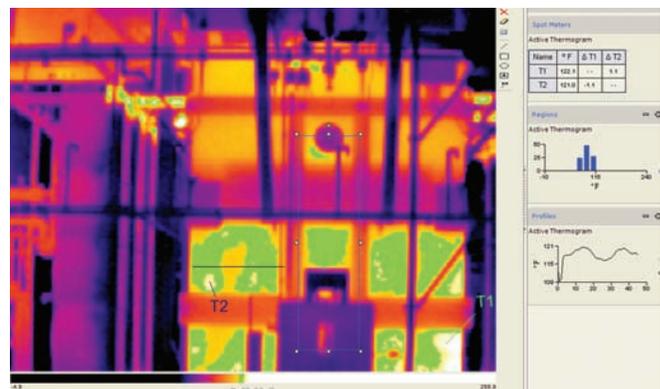
AMS Machinery Manager offers a full selection of thermal imaging analysis and annotation tools.

analysis with other machinery health technologies, reports generated from AMS Machinery Manager are powerful cross-technology tools for verifying the fault and severity of machinery problems. When that data is shared across plant networks, information is available for quick decision-making.

CSI 9830 Machinery Health Image

The CSI 9830 offers advanced technology and the highest available image resolution. The combination of simplified image interpretation and high quality reports make it ideal for machinery health management programs. Industry-leading thermal sensitivity allows for earlier problem detection. The accuracy of a 500:1 spot size results in an increased range on all inspections.

The touch-sensitive LCD screen displays the image, temperature analysis, camera settings and status indicators. The icon-based menu displays all key controls simultaneously to eliminate complex pull-down menus. The intuitive interface will have you using the camera in minutes.

When combined with AMS Machinery Manager, the CSI 9830 features on-board route capability for highly-organized repeatable scans, reporting, and analysis. Drag and drop individual images or entire routes of images to AMS Machinery Manager through the USB cable or memory card reader.

Comprehensive Measurement Tools

A comprehensive set of measurement tools enhance the CSI 9830's fully radiometric images. Five spot meters, an area box, and a thermal line profile provide additional image data. An accuracy of ±2% allows for precise readings even at significant distances for increased safety and flexibility when scanning electrical or power transmission assets. The CSI 9830 also features an integrated 1.3 megapixel flash/torch lighted camera.

Picture-In-Picture and Image Overlay

The CSI 9830's built-in visual camera works together with the infrared camera to speed component identification and improve accuracy. Touch the on-screen icon to switch from a visual image to an infrared image. Then view a live visual image within the live infrared image or vice versa. Image Overlay mode superimposes a thermal image over the visible image in areas that meet a user-defined temperature. This advanced image technology helps you to quickly locate objects during a scan.

Laser Target Highlighter

A patent-pending system for pinpointing objects makes the laser highlighter a standout feature of the CSI 9830. A pair of red visible light lasers are integrated on either side of the camera and set at an angle so that they always intersect at the proper point. A tap on the main screen laser icon projects an X on the object to be scanned — always at the location of the CSI 9830 center spot meter. This new method of targeting accurately simplifies proper targeting and identification regardless of distance.

The CSI 9830 Image Overlay Mode reveals the infrared data together with the visible image.

Ergonomic Design for Viewing Objects at Different Levels

Floor Level[1] Viewing

The unique rotating eyeball of the CSI 9830 allows you the flexibility to crouch, to maintain a perpendicular view, or stand upright. Just rotate the eyeball where you need it — down to view objects at floor level or up for an overhead view.

Strike Zone[1] (belt level) Viewing

Every individual's comfortable stance for using scanning instruments is slightly different. The CSI 9830 eyeball enables you to hold the camera in the most natural position for you and rotate the eyeball to view the object.

Overhead[1] Viewing

When viewing overhead objects, the CSI 9830's articulating eyeball ensures that you maintain line of sight and optimal viewing angle and wrist position.

Viewing Angle[2]

All LCD-type displays are best viewed at a perpendicular angle. The CSI 9830 LCD incorporates enhancements for a wider range of viewing angles.

[1]   Viewing angle and grip angle remain constant for all viewing levels.

[2]   Human Factors Specification Mil-Std 1472f

Even novice thermographers will find the CSI 9830 intuitive and easy-to-use.

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[1]   Viewing angle and grip angle remain constant for all viewing levels.

[2]   Human Factors Specification Mil-Std 1472f

Standard Configuration	
	Emerson A9830
	Lithium-Ion Batteries (2)
	Universal AC Power Supply
	USB Cable - Mini B Jack
	512 MB CF Memory Card
	Hardside Carrying Case
	Battery Charger
	Operator Manual
CSI 9830 Technical Specifications	
Resolution	640x480 pixels
Detector Type	VOx Microbolometer
Sensitivity	50mK (0.05°C)
Field of View / Min. Focus	25°x18° / 0.4m
Spatial Resolution	25°x18° / 0.4m
Frame Rate	0.71 mrad
Focus	30Hz
Electronic Zoom	4X
Visible Camera	1280x1024 pixels, flash, torch
Image Presentation	
Image Modes	IR/PIP/Image Overlay
Display	3.5" 640x480 LCD touchscreen
Color Palettes	7 (4 color, 3 grey)
Measurement	
Temperature Range	-20°C to 500°C (-4ºF to 932ºF)
Accuracy	±2°C (±3.6°F) or ±2%, whichever is greater
Spot Size Ratio	500:1 (standard lens)
Measurement Modes	Point (5) Line, Area (user defined)
Measurement Correction	emissivity, background / transmission / ambient

Image Storage and Camera Functionality	
Digital Media	Digital Media512MB CF card (~600 hi-res images)
Internal Image Capacity	512MB (~600 hi-res images)
Recording Modes	Snapshot/sequence (optional)
Image Annotation	Touchscreen data logger GUI
In-Camera Routing	Included, may require applicable software
Target Marker	Dual laser line target identifier
Classification	Class 2
Menu Controls	Visible Light Camera, Laser Target Locator, Palette, Automatic Gain Control (AGC), Touchup (NUC), Image Export, Image Recall, Object Parameters, Line Profile, Area Tool, Spot Meter, Temperature Range, Mesurement Units, Touch Calibrate, Date and Time, LCD Brightness, File Explore, User Configuration Settings, Information, Help
Power	
Battery Type	Rechargeable Lithum-Ion
Battery Run Time	2.5 hours
Battery Charging	10-16VDC input. Charging status LED
AC Power Supply	100-270 VAC, 50/60 Hz
Environmental	
Operating Temp. Range	-5°C to 50°C (23ºF to 122ºF)
Storage Temp. Range	-30°C to 70°C (-22ºF to 158ºF)
Humidity	10% to 95% IEC 360
Water and Dust	IP-54
Shock / Vibration	25G, IEC 68-2-29 / IEC 68-2-6
Physical	
Weight	2.7 lbs.
Dimensions (WxHxD)	7.5" x 7.5" x 3"
Interfaces	
Real-Time Digital Output	USB 2.0
Image Transfer	USB 2.0, CF card
Video	NTSC

Ordering Information

Model	Description
A9830	CSI 9830 Machinery Health Imager
A9830E	CSI 9830E Machinery Health Imager. Samespecifications as a CSI 9830 without live VGA video output.
A9830E9	CSI 9830 Machinery Health Imager. Same specifications as a CSI 9830 minus live VGA video output. Frame rate is 9Hz versus 30Hz.
A479400	Infrared Analysis Silver Software
A479500	Infrared Analysis Gold Software
A98830-S	CSI 9830 Machinery Health Imager with Infrared Analysis Silver Software
A9830-G	CSI 9830 Machinery Health Imager with Route Based Infrared Analysis Gold Software
A9830E9-G-IN	CSI 9830E9 Machinery Health Imager with Infrared Analysis Gold Software
A9830E9-S-IN	CSI 9830E9 Machinery Health Imager with Infrared Analysis Silver Software
914636	Rechargeable Batteries

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