CONDITION MONITORING SOLUTIONS

FOR THE AUTOMOTIVE INDUSTRY

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FLIR

FLIR AUTOMOTIVE SOLUTIONS

Today there are more than 1.5 billion cars in existence worldwide. The automotive sector, responsible for roughly 3% of total global GDP, is one of the biggest industries on the planet.

Yet the industry is not without its challenges, as volatile energy costs, supply chain issues, new technologies and changing consumer habits all have an impact.

Challenging conditions present an opportunity to adapt and reassess how brands operate. For mechanics and automotive professionals in particular, there is huge scope to streamline quality control processes and diagnostics. Having the right tools to analyze problems quickly and efficiently is a must. With vehicles now being built with increasingly comprehensive electrical and computer systems, FLIR has industry-leading instruments that can diagnose vehicles from the inside out—with vivid images and detailed data.

Ramp up your ROI and drive down operational costs, with FLIR.

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COMPONENT INSPECTION

Automotive components endure extreme conditions, including high temperatures, vibrations, and mechanical stress. Over time, these factors contribute to wear and tear, potentially leading to costly failures. Thermal imaging enables maintenance teams to identify anomalies before components break down, preventing inefficiencies and safety hazards.

Cooling Circuits

Detect radiator blockages, coolant leaks, or failing water pumps by identifying irregular temperature distribution in the cooling system. Ensuring proper heat dissipation prevents overheating and engine failure.

Air Conditioning Units

Diagnose compressor failures, refrigerant leaks, and restricted condenser airflow by visualizing temperature variations. Proper operation is essential for maintaining cabin comfort and preventing strain on HVAC components.

Wheel Bearings

Pinpoint excessive heat in deteriorating wheel bearings, which can lead to increased rolling resistance, premature wear, and possible wheel lock-up or detachment. Early detection reduces downtime and enhances vehicle safety.

FLIR E96™

FLIR T-Series™ with FlexView™ Dual FOV Lens

FLIR Gx320™

FLIR A500f/ A700f™

FLIR Axxx-Series™

FLIR TG275™

ELECTRICAL INSPECTION

Modern vehicles rely on complex electrical systems that must function flawlessly to ensure reliability. High resistance, overheating components, and faulty connections can result in erratic performance or complete failure. Thermal imaging allows technicians to identify these issues quickly and accurately.

High-Resistance Connections

Corrosion or loose terminals cause excessive heat buildup, which can lead to voltage drops, inefficient power delivery, and even electrical fires. Thermal imaging helps pinpoint problem areas before failures occur.

Failing Injectors

Uneven heat distribution in fuel injectors can indicate blockages or alternator malfunctions, leading to misfires, reduced fuel efficiency, and rough engine performance.

Heated Seat Malfunctions

Broken heating elements or poor electrical connections cause inconsistent warmth distribution. Thermal imaging reveals precise locations of failure, ensuring quick and effective repair.

FLIR E54™

FLIR T-Series™ with FlexView™ Dual FOV Lens

FLIR VS80™

FLIR BR450W™

FLIR ONE Edge Pro™

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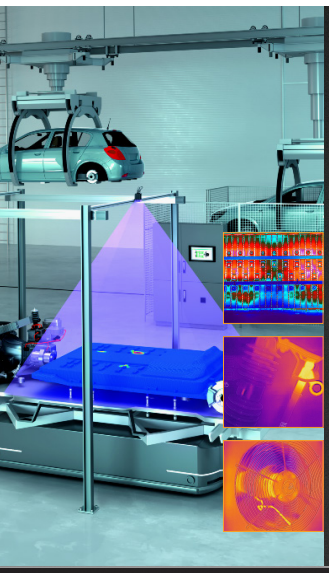


EV BATTERY & VEHICLE INSPECTION

Electric vehicles (EVs) introduce unique thermal management challenges, especially regarding battery performance and cooling systems. Without proper monitoring, overheating cells can lead to energy inefficiencies, shortened battery lifespan, and even safety risks such as thermal runaway. Thermal imaging ensures EV components remain within safe operating temperatures.

Battery Pack Inspection

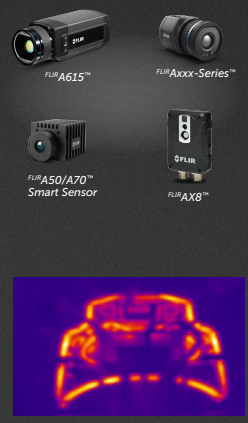
Identify cells generating excessive heat, which may indicate imbalanced charging, failing modules, or potential fire hazards. Detecting these anomalies early prevents battery degradation and safety risks.

Motor Efficiency

Overheated electric motors can indicate excessive current draw, winding failures, or mechanical binding. Early diagnosis helps optimize motor performance and prolong operational life.

Climate Control Performance

Ensure uniform heating and cooling efficiency by analyzing the thermal distribution in HVAC systems, preventing uneven cabin temperatures and energy waste.



This thermal image shows induction heating at work. The metal parts heat up from room temperature to 180 °C in matter of seconds.

APPLICATION STORY: FLIR HELPS TO ENSURE CONSISTENT QUALITY OF FIAT CARS

Challenge

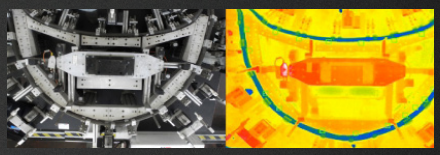
FIAT needed to ensure consistent quality in its car panel bonding process, which relies on induction heating to bond metal and adhesive layers. If temperatures were too high or too low, adhesion could fail, compromising vehicle safety and requiring costly rework or scrap.

Solution

A thermal imaging camera was integrated into the production line to monitor induction heating in real time. The camera detects temperature variations at multiple measurement points and triggers an automatic alarm if temperatures fall outside the required range. The system also stores thermal data for quality traceability.

Results

- Ensured proper adhesion, reducing defects and production waste.
- Improved efficiency by automating temperature monitoring.
- Enabled quick adjustments to maintain optimal production quality.
- Provided a scalable solution adaptable to future car models.



Each green square in this thermal image stands for one of the measurement spots, 19 in this case. The user can define as many measurement spots as needed.

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ABOUT FLIR

FLIR designs, develops, manufactures, markets, and distributes technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life through our thermal imaging, visible-light imaging, video analytics, measurement and diagnostic, and advanced threat detection systems.

FLIR offers a diversified portfolio that serves a number of applications in government & defense, industrial, and commercial markets. Our products help first responders and military personnel protect and save lives, promote efficiency within the trades, and innovate consumer-facing technologies. FLIR strives to strengthen public safety and well-being, increase energy and time efficiency, and contribute to healthy and intelligent communities.

Specifications are subject to change without notice

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