



CONDITION MONITORING

REV UP YOUR ROIs

OVERCOME AUTOMOTIVE MANUFACTURING
AND VEHICLE MAINTENANCE CHALLENGES
WITH THERMAL IMAGING INSIGHTS

TELEDYNE FLIR **AUTOMOTIVE SOLUTIONS**

Today there are over 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 thermography.

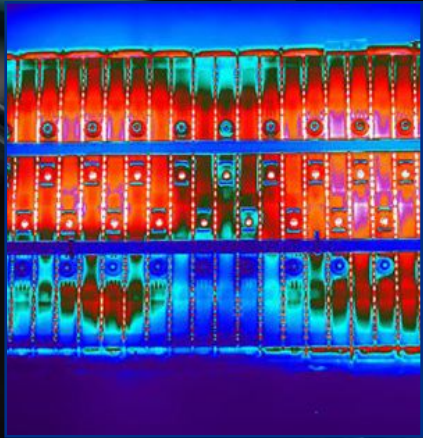


INSTANT DIAGNOSTICS: **Perfect Component Inspection**

Avoid costly mistakes by identifying potential problems before they get worse.

From checking heating systems to ensuring weather seals are completely watertight and determining the precise application of adhesives, the uses of thermal imaging are as extensive as they are insightful.

Diagnosing braking issues, seized thermostats, or engine misfires? Handheld thermal imaging cameras turn hours into minutes with quick, insightful inspection that can instantaneously reveal even the most deep-seated concerns with electrical or mechanical components.



ELITE EV BATTERY **and Electrical Systems Inspection**

The transition to fully electric vehicles is well underway with 14 million EVs sold in 2023 alone. However, with production scaling up, fires associated with EV battery packs are on the rise.

Large companies like TESLA, Tata, and OLA have all experienced this. Electric vehicles consist of three core components, the battery, motor and converter - making the battery production, testing and quality control vital processes that account for the core components in every EV. From cell leakage and uneven heating to unstable discharge and thermal runaway, thermal imaging allows users to detect problems before they become severe - to help prevent and minimise damage potentially caused by faulty components to both vehicles and equipment close by.

Of course, the rise in EVs also entails more and more electrical components are being embedded into chassis but this significantly increases the risk of electrical fires breaking out in individual components. Thermal imaging is ideally suited to inspect electric vehicles as it reveals which components are functionally optimal by identifying excessive heat from components, yielding insights as valuable as the motors they safeguard.



ZERO IN ON HAZARDS:

Mechanics Can Analyse Risk Easily With Thermal Imaging

Hazards are common in garages and workshops but identifying them early can make or break a product rollout.

From crucial diagnostics to catching potential problems in defective or underperforming components through to performing spot checks of your facility and its machinery, thermography allows automotive professionals to see the unseen.

Fixed-Mount Thermal Images

Perfect for observing components as they are elevated in the workstation, mounted imaging cameras clearly allow mechanics to spot heat anomalies through the entire vehicle - whether they are gas-fuelled, electric, or hybrid.

This can reveal a huge number of potential defects, such as seals that are not fully waterproof on doors and windows, electrical circuit functionality on heated windscreens, the adhesion of elements in the chassis - and much more. Critically, this isn't just limited to components that generate heat or electricity; thermal imaging allows mechanical engineers to spot even the most minute problems by observing the heat emissivity of ambient components.





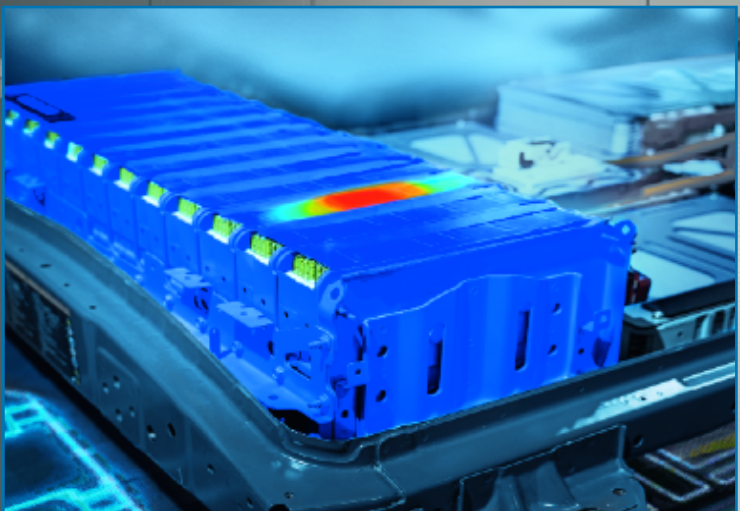
HANDHELD DEVICES FOR MACHINE MAINTENANCE

Mechanical and electrical components can overheat due to wear and tear, misuse or insufficient maintenance, which puts facilities at risk of seemingly spontaneous fires breaking out.

Thermal imaging offers operators unparalleled insight into the inner workings of even the most heavy-duty machines, including:

Bearings, Brake rotors, Brake callipers, Heater elements, Radiator cores, Exhaust seals, Misfiring cylinders, and more...

Thermal imaging cameras such as the FLIR TG275 give on-the-ground operators acute insights into the inner workings of machinery and components in engine and chassis. In fact, it's designed specifically for automotive maintenance and repair technicians who want to accelerate diagnostic procedures and avoid undetected problems.



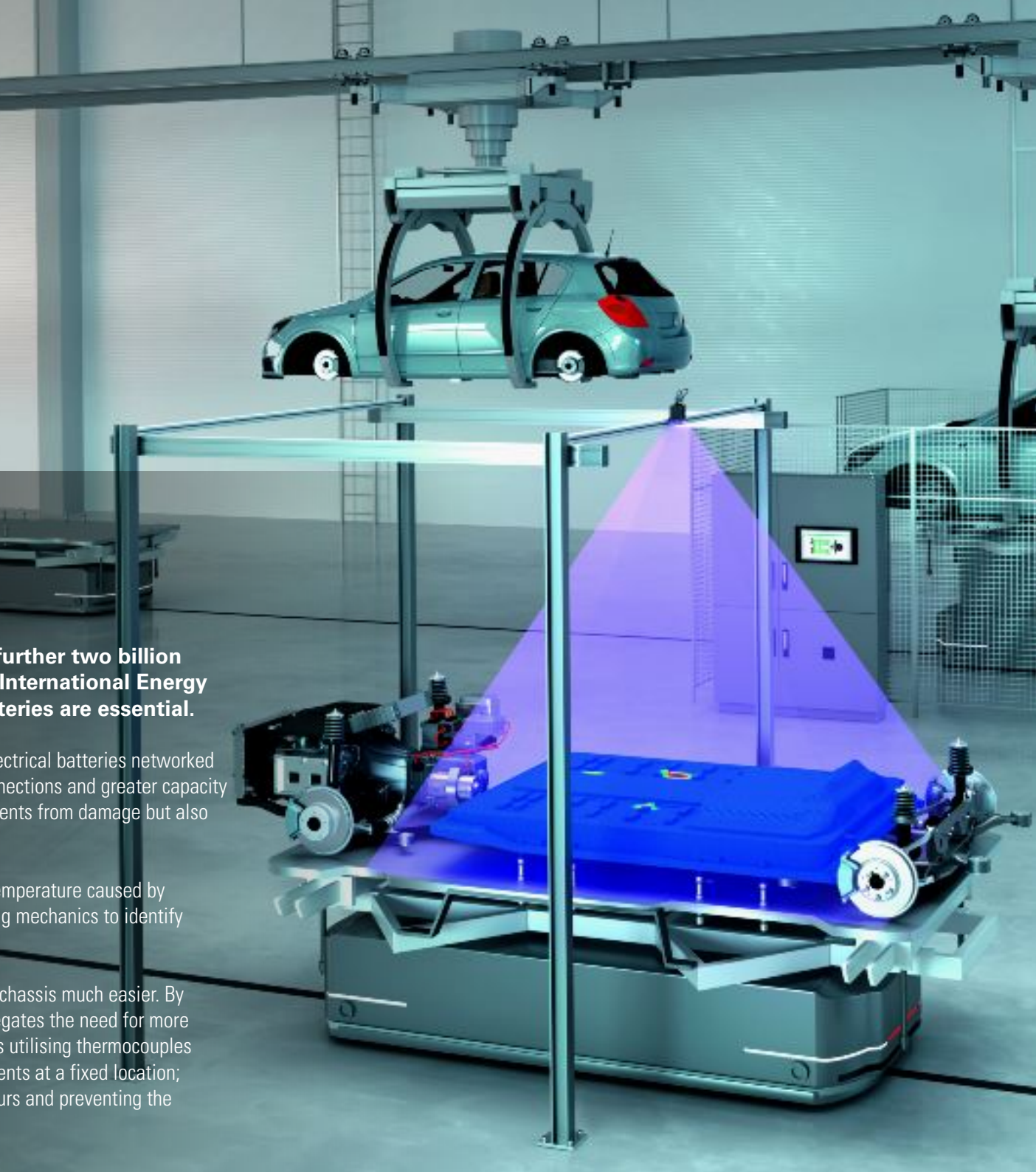
TIME-SAVING TROUBLESHOOTING: Drive Down Downtime In Ev Battery And Electrical Chassis Inspection

In the race to hit ambitious global net zero targets, a further two billion EVs need to be on the road by 2050, according to the International Energy Agency. To power these green motors, lithium-ion batteries are essential.

EV batteries are actually not one component but a series of smaller electrical batteries networked together to generate increased output. However, this means more connections and greater capacity for malfunction. Being installed into a rigid frame protects the components from damage but also makes it difficult to inspect reliably through conventional methods.

Thermal imaging overcomes this issue with ease, detecting a rise in temperature caused by increased resistance from poor or loose electrical connections, allowing mechanics to identify issues in an instant.

This same insight makes troubleshooting electrical systems in vehicle chassis much easier. By using infrared thermography to pinpoint overheating components, it negates the need for more complex machinery or labour-intensive tests. A great example of this is utilising thermocouples which can only monitor the temperature variance of electrical components at a fixed location; thermal imaging can inspect the entire system at once, saving man hours and preventing the further degradation of failing circuits.



PRODUCT HIGHLIGHTS

FLIR TG275 HANDHELD THERMAL CAMERA POINT AND SHOOT HANDHELD FOR TECHNICIANS

- ERGONOMIC, ONE-HANDED DESIGN
- IP54-RATED ENCLOSURE THAT PROTECTS THE CAMERA FROM DIRT, DUST, AND OIL
- EASY TRIGGER PULL SHUTTER



THE BEST THERMAL CAMERAS FOR MECHANICS AND AUTOMOTIVE PROFESSIONALS

When it comes to automotive inspection, there are a variety of thermal imaging cameras available. The one right for your workshop will depend on the specific use, distance from the object being measured and temperature variance.

On the go, mobile repairs? You'll want a **handheld thermal imaging camera**

For inspections and monitoring components across a breadth of machines, FLIR thermal imaging devices like the FLIR TG275 Thermal Camera for Automotive Diagnostics are a must-have for all operators.

Part of the FLIR T-Series, the TG275 is ideal for automotive maintenance and repair technicians who want to accelerate diagnostic procedures and avoid undetected problems. Featuring IGM™ (Infrared Guided Measurement), this diagnostic tool combines non-contact temperature measurement and thermal imaging to help you troubleshoot repairs, spot potential faults, and record images that will reassure your customer that the problem has been fixed. This affordable thermal imager is ideal for diagnosing problems in relays and switches, parasitic drains on the battery, drive train components, HVAC systems (vents), and much more.

Other options include:

- FLIR ONE® EDGE PRO Thermal Camera with Wireless Connectivity for iOS® and Android™ Smart Devices. *Best for entry-level inspections for truly mobile inspections.*
- FLIR C5 Compact Thermal Camera. *Best for diagnosing high-voltage, hazardous electrical and mechanical failures.*
- FLIR E54 Advanced Thermal Imaging Camera. *Best for improved contrast and quick troubleshooting.*
- FLIR T540 High-Performance Thermal Camera with Viewfinder. *Best for streamlining electrical/mechanical surveys, troubleshooting, and repairs with Inspection Route mode.*



Discover more models at: www.flir.co.uk/browse/professional-tools/thermography-cameras/

PRODUCT SPECIFICATIONS



	FLIR ONE® EDGE PRO	FLIR C5	FLIR E54	FLIR T540
Thermal resolution	160 × 120 (19,200 pixels)	160 × 120 (19,200 pixels)	320 × 240 (640 × 480 pixels)	464 × 348 pixels
Battery life	Approximately 2 hours 30 minutes	4 hours	Approx 2 hours 30 minutes	Approx. 4 hours at 25°C (77°F)
Accuracy	+/- 3°C (+/- 5.4°F)	15 to 35°C (59 to 95°F) and object temp. above 0°C (32°F), 0 to 100°C (32 to 212°F): ±3°C (±5.5°F), 100 to 400°C (212 to 752°F): ±3%	±2°C (±3.6°F) or ±2% of the reading	±2°C (±3.6°F) or ±2% of reading
Operating temperature	-10°C to 50°C (14°F to 122°F), battery charging 0°C to 45°C (32°F to 113°F)	-10° to 50°C (14 to 122°F)	-15°C to 50°C (5°F to 122°F)	-15°C to 50°C (5°F to 122°F)
Object temperature range	-20°C — 120°C (-4°F — 248°F) and 0°C — 400°C (32°F — 752°F)	-20 to 400°C (-4 to 752°F)	-20 to 120°C (-4 to 248°F); 0 to 650°C (32 to 1202°F)	-20°C to 120°C (-4°F to 248°F); 0°C to 650°C (32°F to 1202°F); 300°C to 1500°C (572°F to 2732°F)
Field of View (FOV)	54° ±1° / 42° ±1°	54° × 42°	24° × 18°	24° × 18° 14° Lens with Case (T199588) 24° Lens with Case (T199589) 42° Lens with Case (T199590) f=70 mm (6°) IR lens with case (T300095) FlexView™ Dual Field-of-View Lens (T300587) FLIR Macro Lens 2.0x with Case (T300238) IR lens, f=5 mm (80°), T300805

FIXED-MOUNT THERMAL IMAGING CAMERAS

While handheld cameras are ideal for inspections in garages and service centers, for production lines, fixed-mount cameras offer a superior solution.



Model: A400/A500/A700
Comes in different configurations for easy integration in to your preferred system.



Model: AX8
Thermal Imaging Camera
For Continuous Condition
and Safety Monitoring

High performance mounted thermal imaging cameras include:

- FLIR AXXX-SERIES. *Best for demanding applications where image quality is important.*
- FLIR AXX-Series. *Best for larger installations where a smaller size unit is needed.*
- FLIR AX8. *Best for volume installations where multiple cameras are needed.*

Discover more models at: <https://www.flir.co.uk/browse/industrial/fixed-thermal-cameras/>

PRODUCT SPECIFICATIONS



	FLIR AXXX-SERIES	FLIR AXX-SERIES	FLIR AX8
Thermal resolution	320 x 240 to 640 x 480, depending on base mode	320 x 240 to 640 x 480, depending on base mode	80 x 60 pixels
Battery life	N/A - wired connection	N/A - wired connection	N/A - wired connection
Accuracy	±2°C (±3.6°F) or ±2% of reading, for ambient temperature 15°C–35°C (59°F–95°F) and object temperature above 0°C (32°F)	±2°C (±3.6°F) or ±2% of reading, for ambient temperature 15°C to 35°C (59°F to 95°F) and object temperature above 0°C (32°F)	±2°C (±3.6°F) or ±2% of reading (+10 to +100°C at +10 to +35°C ambient)
Operating temperature	-20°C to 50°C (–4°F to 122°F): • -20°C to 40°C (–4°F to 104°F) (in free air) • 40°C to 50°C (104°F to 122°F) (mounted on cooling plate accessory) Maximum camera case temperature: 65°C (149°F)	-20°C to 50°C (–4°F to 113°F), with included cooling plate, Maximum camera case temperature: 65°C (149°F)	-10°C to +50°C (14°F to +122°F)
Object temperature range	From -20°C to 2000°C (special calibrations higher possible)	From -20°C to 2000°C (special calibrations higher possible)	–10°C to +150°C (14°F to 302°F)
Field of View (FOV)	24° x 18°, 6°, 14°, 24°, 42°, 80°	29° x 22°, 9°, 51°, 95°	48° x 37°

ACCESS YOUR INFRARED TRAINING RESOURCES

While most of FLIR's infrared thermal imaging devices are intuitive and easy to use, operators can benefit from specialist training to optimally explore every function. Sign up for scheduled infrared thermography training courses offered through the Infrared Training Center (ITC).

To learn more, visit <https://www.flir.co.uk/support-center/training/thermography-training/itc/>

ABOUT TELEDYNE FLIR

Teledyne 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.

Teledyne 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. Teledyne 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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www.flir.com/applications/automotive/

