



APPLICATION STORY

Discovering hidden leaks and mechanical faults in time improves productivity and competitiveness in the automotive industry

The automotive industry uses vast amounts of compressed air, industrial gases, and conveyor systems, which makes timely leak and mechanical fault detection vital for cost and energy efficiency as well as operational continuity.

Hidden leaks and mechanical faults are common nuisances in many industries that rely heavily on pneumatic equipment and conveyor systems. Undetected leaks and faults can over time lead to severe issues from energy waste and significant financial losses to unplanned outages and even potential safety hazards. Leaks and mechanical faults can also contribute to problems with system operations, such as fluctuating system pressure, excess compressor capacity, decreased service life, and increased maintenance of supply equipment. Maintaining systems by locating and fixing leaks and mechanical faults in time is therefore one of the most effective ways of saving energy and improving both productivity and competitiveness.

A Challenging Environment Calls for an Advanced Solution

The automotive industry is particularly prone to leaks and mechanical faults as vast amounts of gases and conveyor systems are used both in the production of components and in automotive assembly plants. Especially contributing to the high potential for leakages and mechanical issues is the large size of the manufacturing facilities, where compressed air, gases, and components are transported in vast networks of pipes and conveyor belts over long distances. Furthermore, automotive manufacturing facilities are typically noisy environments, which makes locating leaks and mechanical faults extremely challenging. The complex manufacturing lines consist of multiple processes using



The FLIR Si2-LD acoustic camera for pressurized gas leak and mechanical fault detection.

pneumatic systems with compressed air such as metal casting, metalworking, tool making, CNC machines, assembly robots, sandblasting, and car paint booths, all vulnerable to leaks. In addition to compressed air, automotive manufacturing facilities use various other gases for different purposes, including nitrogen for tire inflation, argon, CO2 for welding processes, and hydrogen for specific manufacturing processes. Leakage can occur in different systems such as pneumatic, welding, cooling, fuel, and others. Common weak points in the equipment include the likes of valves, fittings, gas lines, regulators, coolant lines, heat exchangers, fuel lines, seals, and gaskets, all found in their hundreds in a single plant. Leakage can cause reduced performance, equipment malfunction, decreased product quality, incomplete shielding, tool wear, overheating, fluid contamination, fire hazards, and reduced pressure, as well as considerable extra costs.

Mechanical Faults Affecting the Automotive Industry

The automotive industry, among other industries, uses machinery with roller bearings. The Si2 camera features the Mechanical Mode, which facilitates the detection and location of such issues. Faults in rolling bearings can lead to equipment downtime, decreased productivity, and increased maintenance costs. In an automotive manufacturing plant, especially in conveyor systems, various common rolling bearing faults may occur. Bearing failure can result from different factors such as

fatigue, abrasive wear, adhesive wear, corrosion, overheating, misalignment, and looseness. By promptly detecting and addressing these rolling bearing faults through routine maintenance and condition monitoring, automotive manufacturing plants can minimize downtime, optimize equipment performance, and prolong bearing service life.

An Acoustic Solution that Delivers Results

Enter the acoustic camera, an advanced predictive maintenance solution that scans large areas and pinpoints the exact location of leaks and mechanical faults quickly and accurately. The camera can be introduced at any stage of the maintenance cycle and the inspections can be carried out without halting operations, using a safe, easily operated device that requires minimal training. Using the acoustic camera also helps save costs by detecting industrial gases and ensuring that safety protocols and regulations are met, especially regarding the handling, storage, and usage of these gases within the facility. In addition to identifying minuscule leaks inaudible to the human ear even in noisy industrial surroundings, the accompanying machine learning-powered analytics software shows leak size and cost estimates. The Si2 acoustic camera also features the Mechanical Mode, which makes it easy to locate mechanical faults in conveyor systems and delivers useful information on mechanical faults, such as the crest factor and kurtosis metrics, which help determine the severity of the faults.

Benefits of using the Si2 for pressurized leak and mechanical fault detection

- Saves time, energy, and costs and reduces carbon footprint by locating hidden compressed air leaks in time.
- Provides leak detection, leak rate, and cost quantification for compressed air, hydrocarbons (methane, natural gas), ammonia, helium, and argon to find and prioritize repairs, and maximize return on investment.
- Allows for quick detection and measurement of bearing & other mechanical issues that can lead to costly production disruption or safety hazards.
- Ensures operational continuity by preventing unplanned downtime in critical machinery, such as pneumatic equipment and conveyor systems.
- Scans large areas and pinpoints critical problems accurately, even in noisy industrial environments.
- Requires minimal training and is easy to incorporate into the maintenance cycle.
- Provides real-time results and actionable data for maintenance and repair plans through machine-learning-driven analytics.



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FOR MORE INFORMATION ABOUT ACOUSTIC IMAGING CAMERAS OR ABOUT THIS APPLICATION PLEASE VISIT: WWW.FLIR.COM/PRODUCTS/SI2-LD/

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