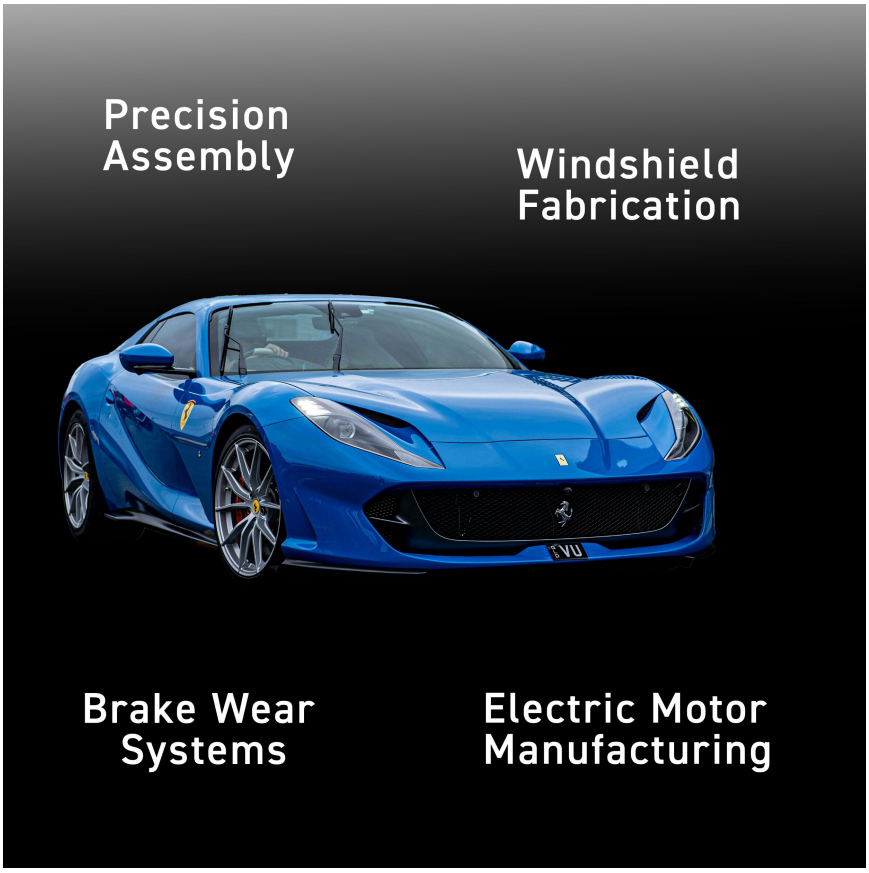
Capacitec® Gapman® Solutions

This issue is focused on Automotive Application in light of the Automotive Test Expo taking place this week in Novi, MI.



NON CONTACT DISPLACEMENT SENSORS IN AUTOMOTIVE MANUFACTURING

Advances in noncontact displacement sensors are bringing new levels of quality and efficiency to the research labs and in manufacturing of automakers worldwide.

Over the past decade, breakthroughs in sensor technology have improved the automobile both inside and out. Most consumers are aware of the benefits that sensors have contributed to automotive subsystems such as automatic braking systems, muffler noise reduction, and load leveling systems. Today's capacitive gap sensing technology is deployed in Braking and suspension system testing used for cars and trucks, high temperature windshield forming, electric motor alignment, and hidden air gap measurement in chassis assembly.

Gap Measurement: Precision Coating for EV Battery Manufacturing and Electric Motor Production

Capacitive gap sensors are pivotal in the design and manufacture of precision electric motors for use in electric vehicles (EVs) of all types. Gap measurement solutions using non-contact and contact (spring contact gap wands) measurement techniques to enhance accuracy and reliability are deployed throughout the design and production of EV motors.

Capacitec's non-contact sensors operate on the principle of capacitance, measuring gaps between conductive surfaces to provide gap monitoring which is crucial for both Slot Die and roll-to-roll quality control. Coater gaps achieve resolutions as low as one micro-inch in the width of the slot gap to control the thickness of the coating material, it is critical for manufacturers to set a very uniform gap along the full length of the coater die.

EV Battery performance consistency depends significantly on the uniformity of electrode layers produced using these coating techniques. Battery electrodes require precise uniform thickness to optimize electrochemical reactions which ensures consistent ion diffusion rates. Uniformity in coating thickness is essential for meeting regulatory standards for safety, durability, cycle-life performance criteria.

The Gapman Gen4 and the GPD-1.5SW(.004)-A-150 will be formally launched at the Automotive Testing Expo North America October 22 – 24. Make plans to visit us at Booth # 6044! Click Here to Register for a free pass.

Braking Systems (Disc and Truck Drum)

The rugged modular electronics in Capacitec's new line of disc brake wear analysis sensors can measure high-temperature (1200°F, 648°C) displacement for dynamic brake system motions both in laboratory dynamometers and on the vehicles at test track facilities. By measuring displacement variables on a brake rotor in motion, data can be collected and analyzed to show a myriad of characteristics, such as: Rotor runout (TIR), Rotor thickness variation (DTV), Rotor coning, Thermal expansion, Plate-to-plate orientation (V-ing, barreling), Wobble, and Ovality.

Rotor Stator Gap Physics

Today's EV applications place increasing demands on electric motor efficiency. The air gap plays a vital role in the magnetic interaction between the rotor and the stator. A smaller air gap typically enhances the magnetic force, as magnetic force is inversely related to the square of the distance between the rotor and stator. Conversely, an increased air gap weakens the magnetic field strength, leading to reduced operational efficiency. For optimal performance, it is generally advantageous to minimize the air gap to enhance torque generation and reduce hysteresis losses within the stator and rotor.

Assembly of Electric Motors – Concentric Alignment

In the context of electric motor manufacturing for EVs, capacitive gap sensors are used by designers, engineers and production personnel to accurately center the rotor assembly, which is critical for optimizing performance and minimizing performance losses. Capacitec's gap sensors ensure that the spacing between the stator and rotor is uniform, and remains within specified tolerances, thereby enhancing the motor's efficiency and reliability. By incorporating capacitive gap sensors, manufacturers can implement more rigorous quality control measures, leading to higher quality, more efficient electric motors that meet the demanding requirements of modern EV applications.

Get in Touch

To learn more about how Capacitec’s gap measurement technology and Gapman's portable features can benefit your projects, visit our **Website**, or reach out to our application engineers. We're here to assist you in harnessing the power of our advanced sensing solutions and optimizing your operations. Contact Us and discover the difference a Gapman can make.

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