From Pit Lane to Start Line in No Time

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British load cell manufacturer Novatech spotted the potential for improving the process of measuring centre of gravity and other dynamics for the optimal setup on racing cars. To achieve this, the company developed a wireless wheel setup system using Mantracourt's T24 wireless system in conjuction with a Novatech load cell using Micro-Measurements® strain gauges with Advanced Sensors technology. Micro-Measurements® strain gauges with Advanced Sensors technology offer a tighter resistance tolerance, improved gauge-to-gauge repeatability and better stability than standard strain gauges, while their advanced fabrication process helps to significantly reduce lead times.

Company/Institute: Mantracourt Electronics Ltd
Novatech Measurements Limited

Industry/Application Area: Automotive
Racing

Products Used:

- Mantracourt T24-ACMI-SA, 2.4 GHz Strain Acquisition Module

- Mantracourt T24-BSu, USB Base Station

- Novatech F256, Load Cell

- Micro-Measurements® N2A-06-S5091N-350/E3
  Advanced Sensors Technology Strain Gauge

- Micro-Measurements® N2T-TR-LT02-00225/E3 Bondable Resistor

The Challenge

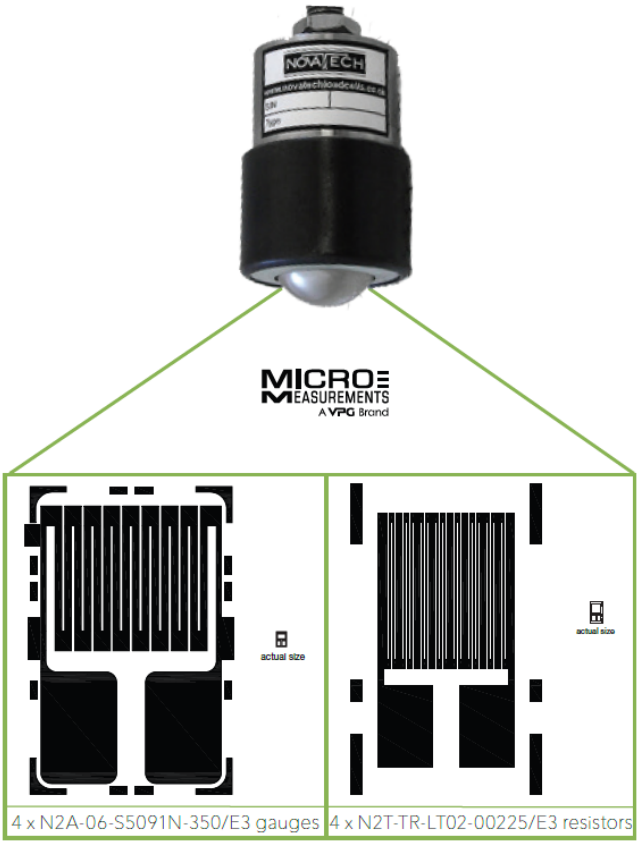
Motor racing teams needed a more convenient way of taking centre of gravity measurements prior to competitions.

Previously, F1 teams needed to walk around the car to take readings from a handheld display from each individual wheel, which added a lot of time to the process. With the increasing complication of vehicles, the testing requirements have also increased. This brought the need for optimisation of existing processes.

Teams wanted to be able to complete a maximum number of measurements without refitting the wheels of the vehicle.

The Solution

With Novatech's setup wheel, teams are able to remove the wheels of the vehicle and quickly use the company's setup wheel load cell, which utilises ball transfer bases to allow the car to be moved easily around the workshop. This is not the only benefit brought by the setup wheel. The ball base also serves as a single point of contact, maintained when the setup frame is tilted. This results in the load cell returning less than 0.25% total error for camber angles up to 3° from vertical. When combined with Mantracourt's T24 Wireless Telemetry System, the channel logging and visualization software (T24LOG100), the setup wheel package allows the user to continue to work uninterrupted on the setup of the car whilst monitoring and logging individual corner weights and various groups, in realtime, using a built-in centre of gravity math calculation. The T24LOG100 software allows the user to create their own graphical user interface and individual data channels can be summed or otherwise manipulated to give front/rear bias, left/right bias, cross-corners (diagonal biases) and the centre of gravity position can be visualised either as an exact percentage from a given position (front/rear and left/right) or by using a colour-coded bar graphic from the theoretical centre point. Data transmission is via license-free 2.4GHz. ID tagging system implemented during synchronisation between transmitters and base stations and ability to set configuration PINs are in place to ensure that the transmission is secure.



The User Explains

The complete package of setup wheel load cells from Novatech and wireless telemetry from Mantracourt provides the user with a simple-to-use system that is both extremely accurate and highly efficient. Teams can implement changes to ride height, toe and camber angles and make adjustments to weight distribution without the need to continuously raise and lower the car or circle around the car taking individual readings.

Due to the 'many to one' functionality of the T24 system, a single workstation can be used to monitor multiple car setups.

The system is assembled using Micro-Measurements® modulus resistors and Advanced Sensors technology strain gauges. The integrity of the measurements is guaranteed by the eight-gauges bridge that self-compensates for off axis forces.

"Micro-Measurements® was selected as a supplier for its unrivalled product quality."

Acknowledgement

Mantracourt Electronics Ltd, based near Exeter in the South-West of England, have an un-paralleled expertise in the field of strain bridge measurement. Their instrumentation is designed and manufactured for load cells, strain gauges, pressure, torque, flow, temperature and other ratio metric sensors. They provide in-

house design and manufacturing capabilities specializing in signal conditioning, display and control using analogue, digital or radio wireless telemetry techniques. They offer product solutions for all levels of project integration from OEM sensor integration to end user solutions. www.mantracourt.com

Novatech Measurements Limited is located in East Sussex in England and has been designing and manufacturing high quality load cells in the UK since 1972. They offer a wide variety of catalogue load cells and design load cells for specific, application-driven requirements.

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