rotronic
MEASUREMENT SOLUTIONS

INDUSTRY 4.0 MONITORING FOR AUTOMOTIVE TESTING

In 2018 the UK automotive sector was valued at £82 billion and employed 823,000 people. In addition, there are over 20 specialist research and development centres in the UK alone. As the trends towards automated, low carbon and electrical vehicles increase the requirements of modern testing and certification are critical. In this application note we explore how one of the UKs largest and most famous automotive test companies is meeting these new challenges helped by the adoption of the cutting edge Rotronic Monitoring System.

Test tracks

Automotive Test and Validation

In 2017 the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) was introduced. This lab test required the assessment of fuel consumption as well as CO_2 and pollutant emissions from cars during

- Test cycles based on real-driving data
- Test cycles based on a variety of driving phases
- Test cycles using both heaviest and lightest powertrain configurations

The above testing is complimented by Real Driving Emissions (RDE) testing using a Portable Emissions Measuring System (PEMS), that collects live data while the car is driving on real roads in a variety of conditions.

Facilities that provide these tests and have access to suitable test tracks are increasingly in high demand. Prior to testing cars must be preconditioned at specific environmental conditions and during lab testing these conditions are replicated.

The Application

In order to meet ongoing quality demands and compliance to the latest Vehicle Emissions Regulations (WLTP), our client required a solution to improve and enhance their monitoring capability in several key test areas. Latest standards required more frequent ambient measurements as well as five-minute rolling averages.

Engine testing is undertaken in multiple soaking areas operating at different temperatures, ranging from -20 °C to +50 °C, requiring numerous temperature and humidity sensors monitoring different parts and areas of the test vehicles.

The Challenge

It is no longer practical to use a range of different monitoring platforms for every specific application. For the automotive industry the growth of the latest 5G and electric car technology provides new validation and testing challenges, a monitoring platform must be able to adapt to meet these

Test cell

new requirements easily. For our client the system had to be centrally managed with all data accessible from anywhere on site. Reporting, alarming and a clear audit trail were vital. Already having experience with a range of hardware and software it was clear that the system had to utilise standard IT infrastructure and software platforms.

Hardware Integration and Standardisation

Investing in a monitoring system traditionally locked customers in to one supplier. Where possible, RMS has been designed to support Industry 4.0 open integration and interoperability. As such, RMS software is built as a standard web service. All data sits on a standard SQL database.

Industrial device interoperability is never easy, RMS provides options via simple APIs for many applications and analogue input modules for existing analogue hardware. When a robust and secure integration solution for digital hardware is required it can be professionally integrated using our RMS-Convertor module.
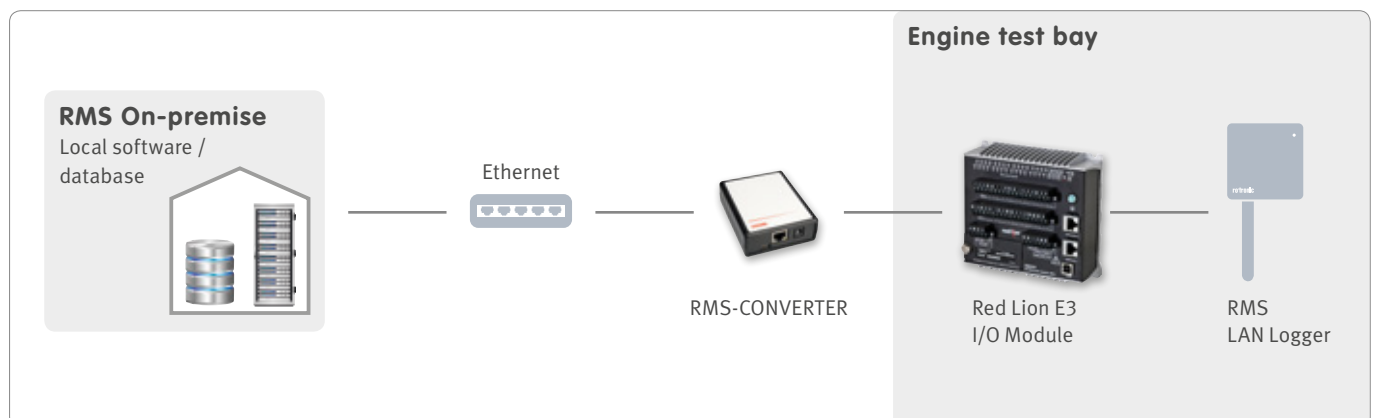
The result is that end users can add supported 3rd party devices with a few clicks. These devices benefit from secure data backup and auto-recovery of data in the event of any system downtime, as well as all the normal charting, reporting and alarming features RMS offers.

Project Overview

Our client engineers favoured Red Lion E3 modules, a proven industrial I/O device from Red Lion Controls. The E3 range includes 16 channel thermocouple devices, ideal for automotive testing. Integration was achieved in partnership with Rotronic R&D. Using a trial Red Lion E3 device Rotronic was able to fully integrate the unit. Final testing was undertaken by the client to confirm that the devices performed as required. A key feature was that the Red Lion E3 modules have the ability to daisy chain Ethernet devices. Therefore, using a single port the 16x channel Red Lion module was networked along with a high accuracy humidity and temperature RMS LAN logger to every engine test cell providing a robust, elegant solution for this industrial application.

Engine test bay

RMS On-premise
Local software / database

Ethernet

RMS-CONVERTER

Engine test bay

Red Lion E3 I/O Module

RMS LAN Logger

Product Focus

Rotronic Monitoring System (RMS)

High accuracy and high frequency multi parameter monitoring including temperature, humidity, pressure and dew point.

- On premise or cloud software solution
- Support for wired and wireless data loggers
- No local end user software required just a web-browser
- Full historic record and summary reporting
- High accuracy and high frequency ambient temperature and humidity monitoring
- Ability to calculate and record 5 minute rolling averages with alarms
- Extensive support for 3rd party devices and data streams

Red Lion E3 Modules

- Wide range of digital communication options
- All metal housing and DIN rail mounting
- Rugged Ethernet enabled I/O measurement devices
- Thermocouple, mA, V, RTD and relay options
- High accuracy at 0.02% full scale with 16 bit A/D resolution
- Dual Ethernet port enables daisy chaining of devices
- Built-in security enables permission-level access and firewall protection.

Clear, customisable and automated reports.

Facts and Figures

- UK automotive sector employs 823,000 people
- 2,367,147 new cars registered in 2018 in the UK alone
- Estimated £74 billion economic benefit from digitisation in UK automotive manufacturing by 2035
- In 2018 CO_2 emissions from cars were down 31.2% vs 2000
- Euro6 emissions limits require ‹0.08g/km NOx emissions

About Rotronic

Founded in 1965, the company is headquartered in Switzerland and provides solutions for measuring and monitoring various parameters. Rotronic began the digital transformation already in the year 2000, investing in automated data transfer (machine-to-machine). With the development and launch of its RMS monitoring software, the PST company further strengthened its position as a key supplier of measurement solutions.

Red Lion

As global experts in communication, monitoring and control for industrial automation and networking, Red Lion has been delivering innovative solutions for over forty years. Our automation, Ethernet and cellular M2M technology enables companies worldwide to gain real-time data visibility that drives productivity and operational excellence.

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