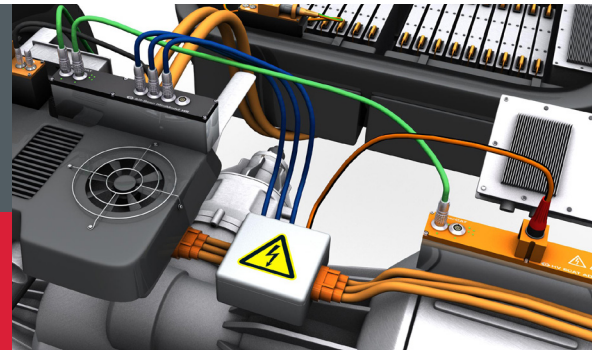


High-Voltage Power Measurements with High-Speed

Case Study CDHK, Tongji University



The Customer

The Chinese-German School for Postgraduate Studies (CDHK, Tongji University) has been established as a shared facility of the German Academic Exchange Service (DAAD) and Tongji University. Being a unique example of a successful cooperation between academia and industry, more than 20 renowned 'Fortune 500 companies' are sponsoring the endowed chairs in CDHK. The sponsoring results in excellent working conditions in a first class environment of laboratories, libraries and classrooms.

The Challenge

Modern electric vehicle development represents a new challenge for data acquisition

The use of conventional measurement devices can be potentially hazardous when working in a high-voltage environment. The speed of the proven CAN measurement technology is no longer sufficient for recording the data necessary for CDHK's Motor Control Unit (MCU) development. Synchronizing high-speed data acquisition with MCU parameters and in-vehicle network signals is also critical.

The Solution

A perfectly tuned tool chain consisting of measurement modules and software tools for synchronized online acquisition of measurement data and data analysis

- > CSM EtherCAT measurement module for high voltage applications (HV AD4 XW1000) can measure continuous voltage up to 1,000 V with up to 1 MHz sampling rate per channel.
- > Hall effect-based CSM LEM sensor packages enable high threshold frequencies to measure current up to 1000 A. In addition, the galvanic isolation between test setup and measurement equipment is ensured when using these sensors.
- > The XCP-Gateway converts signals into the standard protocol XCP-on-Ethernet which allows the acquisition of measurement signals via vMeasure exp or CANape.
- > vMeasure exp and CANape perfectly synchronize measurement data, MCU parameters and in-vehicle network signals.

The Advantages

Measuring quickly, precisely and flexibly with mobile and extremely rugged measurement modules

- > Measurement modules and sensor cables with reinforced insulation according to EN 61010-1 assure safety for the complete system from sensor to user in a high-voltage environment.
- > IP67 protection class and -40°C to +100°C operating temperature range plus robust and compact aluminium housings make it possible to mount measurement modules close to the points of measurements.
- > 1 µs accuracy of measurement signal time stamps enables CDHK to monitor and record all three phases of motor input voltage and current synchronously.
- > The ability to over-sample the sensor eliminates aliasing effects and also means that the power curve can be calculated based on the voltage and current measurements. E-Motor function library of vMeasure exp makes the calculations even easier.
- > CSM CAN bus measurement modules can be easily connected and synchronized with EtherCAT measurement modules so that CDHK can extend the test setup supporting more complicated MCU development and verification tasks.

