OPC UA in measurement technology and test engineering

Measurement technology and test engineering require the linking of ICA systems, sensors and actuators to enable the transfer of measurement and configuration data as well as control commands. The financial cost for such linking can however be more than the actual cost of the ICA systems. OPC UA is becoming increasingly established and now offers the option to have harmonised as well as complex communications, e.g. by using measurement devices with integrated OPC UA interfaces.

Laboratory components were in the past connected via IEEE interfaces or other serial/parallel bus systems. In recent years, Ethernet has become more or less the standard. In process and manufacturing automation, a multitude of different field buses have become established for a range of different applications. All these different systems have however one thing in common: the different communication protocols can usually only be connected with each other through a gateway that generally requires complex configuration. It is also generally the case that not all functions available from a fieldbus system, can be fully transmitted via the Gateway.

The OPC UA standard

The OPC idea was developed years ago. After several evolutionary steps, a OPC UA standard is now available which has the potential to overcome communication barriers between different systems. OPC UA has developed into the universal language of automation and measurement technology. It is already being used widely in automation engineering with many products being fully equipped with an OPC UA interface. These range from controllers and frequency converters through to regulators and cameras. In measurement and sensor technology, the opportunities provided by OPC UA have been recognized so that the first products with OPC UA interfaces are already available. The Expert series with the Expert Logger (data logger), Expert Vibro (vibration measurement) and Expert Transient (data recorder) are already equipped with OPC UA server and client interfaces. The Logger series offer a range of design types which, with 16 to 46 analog inputs, are ideal for independent data acquisition and test stand automation. Every device is equipped with an internal data storage capacity so that data loss will not occur in the event of a break in the cloud connection. Monitoring functions are performed independently within the device. Measurement data and threshold violations can be immediately transmitted to subsystems via OPC UA.

Communicative data logging

The 400 Expert Logger is equipped with 16 differential analog inputs for measuring mV and mA signals and any type of thermocouple. 24-bit precision and a maximum rate of 1,000 measurements per second will meet any user requirement. The Expert Logger also has the option of measuring Pt100(0) sensors or DMS. The device has a total of 24 switchable digital inputs/outputs, can record edge and fault events at microsecond precision, and output alerts. A total of six analog outputs enable the operation of regulation and control elements. As an interface to HMI, i.e. via PCs, tablets or smartphones, the Expert Logger device is optionally equipped with a WLAN or LTE connection in addition to USB and LAN interfaces. In combination with OPC UA, this gives users flexibility and security in meeting future needs.