

The Changing Face of Instrumentation

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Abstract

Continual improvements in measurement and control technology allow the development of instruments that measure faster and more accurately than ever before. Improvements in embedded controllers and software allow user customization at all levels. Measurement system developers now pick and choose off the shelf measurement I/O and controller capability to create a custom instrument that does not require custom hardware.

Like any measurement system these new instruments eventually need calibration. If you typically service bench top and hand held devices you may be surprised at the hardware and software requirements to calibrate these instruments. From your customers point of view they are just a combination of standard off the shelf measurement technology. From the laboratories point of view they can be an intimidating mix of vendor hardware, communication protocols and connectivity challenges.

This paper presents a look at the world of modular measurements. It describes the hardware and software often seen in Programmable Automation Controllers (PACs), PXI, cPCI, PXI express, USB, Ethernet and embedded measurements systems. Specifically covered are the needs of the metrology laboratory when it comes to interfacing with and calibrating these instruments. The paper examines device changes in several measurement disciplines and the resulting calibration challenges that have emerged. It will explore a number of approaches to satisfying calibration requirements and the decision making process used to identify which solution is right for your organization. Considerations such as level of support, software options, measurement data collection requirements, anticipated equipment volume, calibration cost, hardware necessities and personnel training are highlighted. The changing face of instrumentation demands a fresh look at the calibration process. By utilizing consistent evaluation criteria, organizations can arrive at decisions that support their needs, as well as the needs of their customers.