GE
Measurement & Control

On-site Calibration – Doing more with less

Day-to-day activities, such as maintenance, emergency repairs, commissioning new equipment or carrying out on-site checks need to be simplified due to the reduction in personnel and increase in workload. Use of the most advanced on-site instrumentation is imperative in order to maintain and calibrate today's intelligent, high-precision equipment; this aspect applies to all process applications.

Why Calibrate?

- To comply with regulation
- To maximize process performance
- To maintain safety
- For quality control

Calibration of process instrumentation is a necessary function for two main reasons. One, to comply with regulation; and two, to maintain and control process performance and product quality.

Regulation is vital to ensure plant and process safety and calibration is now mandatory throughout the process industry. Regulation is also especially important where traceability is vital to ensure the quality of sensitive products such as in the pharmaceutical sector

Calibration for process and product quality control is something that improves the bottom line. Product quality must be maintained and monitored to eliminate any wastage issues or customer litigation. Process performance must be monitored to ensure efficiency of operation as well as plant safety.

But what is calibration? Basically, calibration involves the comparison of two instruments or measuring devices, one of which is of known accuracy, to establish the accuracy, or otherwise, of the device to be calibrated. Calibration is necessary because all measuring devices drift over time and calibration is carried out to ensure we are measuring to the accuracy required, accuracy set on installation or accuracy set later to some agreed value.

Optimize Your Calibration Regime

When to calibrate is often asked. Some calibrate strictly to manufacturers' recommendations. Some calibrate on a regular frequency basis, such as annual shut-down. Historically, such calibration sometimes involved taking the measuring device out of service and sending it to a calibration lab. Here calibration tests are carried out by instruments which are verified to national standards and labs are audited by national standards authorities.

Today's laboratory calibration equipment offers easy communication with software and can provide 100% automated calibration of pressure transducers and transmitters. However, this is not a perfect solution because, naturally, instruments can drift between these calibration intervals. An obvious answer to this is to calibrate more frequently, but this entails increased time and cost, both in lost production and in calibration resource.

Fortunately, today's calibration management software can analyse collected calibration data and determine the optimum calibration frequency for each instrument or measuring device, based on a set of programmable operating scenarios and safety margins. But more of that later!

Communicate and Calibrate

Commissioning and configuration of instrumentation is a very important part of a plant technician's working life – and this requires communication with the instrument. Most of the instrumentation in today's plants are analogue, operating on a 4-20 mA basis. Many new plants, especially in the Far East, are fieldbus-based and use digital signals. However, most of the analogue-wired plants now use the HART communication protocol for commissioning and configuration. Essentially this converts the digital signal to an analogue output for transmission on the plants 4-20 mA system.

HART enabled instruments have several features that significantly reduce the time required to commission or configure a HART network or loop. HART instruments are tagged and contain configuration data. HART devices also have a loop test feature, to ensure that the device is connected properly to support devices such as indicators, recorders and DCS displays. In addition, the analogue value can be compared with the digital value as a further integrity check.

HART devices can also be calibrated to ensure that the digital value it reads is converted into the correct analogue output. This is an essential step as it is often easy to make the mistake that because a device is measuring, it is in fact measuring correctly. It is also important to remember that just because a device is digital, this does not mean that it doesn't need calibration.

And it is important to realize that a communicator is not a calibrator and a calibrator is not a communicator. Many of the hand-held devices on the market are in fact communicators, without the ability to calibrate. And no communicator has the ability to calibrate pressure.

Automating the Calibration Process

Naturally, calibration is an important aspect of maintenance and if calibration data is analysed correctly, it can help maintain and improve compliance, efficiency, quality and safety. However, managing the calibration of 1000s of plant instruments and then analyzing all the data to a level required for trend evaluation is not a simple task. Even today, a surprising number of organisations still use pen and paper to record calibration results. This can mean that an instrument engineer can spend as much as 50% of his time working on documentation and paperwork, preparing calibration instructions, making notes of calibration results in the field and documenting and archiving data. Apart from the valuable time involved, paper-based recording also brings with it the chances of transcription mistakes.

Today's advanced portable calibrators can store a vast amount of data and can even be used to create and review calibration certificates and custom reports, which can be electronically signed off. This data can subsequently be transferred to a PC when convenient for printing and archiving. Calibration management software is available to automate the calibration process by stepping through the test points, calculating errors and reporting Pass/Fail conditions. Calibration management software can produce reports as mentioned but also schedule work and even analyse device trends.

Our Solution

All of these functions can now be handled with one single portable device! The core of the DPI620 Genii is an advanced, hand-held indicator/calibrator, which can measure and simulate electrical parameters and frequency associated with the parameters of temperature, flow, humidity etc. which are monitored throughout the process and power generating sectors. As such it is a multimeter but is more accurate than a typical multimeter by a factor of between 8 and 16! However, the DPI620 Genii is also modular and its duties can be expanded by the addition of a pressure module carrier. This features three pressure stations so that pressure can be simulated pneumatically up to 20 bar and up to 100 bar and hydraulically up to 1000 bar. This solves the transportation and EHS issues of using gas bottles and regulators, while the 1000 bar capability means that there is no need to prime into open systems, eliminating the mess and wastage of bleeding open systems. The pressure modules themselves are interchangeable and are simply screwed in, with no need for tools, set-up or calibration.

But the DPI 620 Genii is not just a comprehensive portable instrument that allows you to carry out calibration on the majority of instrumentation and measuring devices to be found in a process plant or power station, it also provides all the computing power of a conventional hand-held PC or PDA. As such, it provides standard Windows file management and offers popular Windows features to allow readers to create text documents and view common file types including Excel, Power Point, Word, pdfs and images. This means that technicians can consult user manuals, training presentations, data sheets and installation drawings, etc., while in the field. The Wi-Fi version of the instrument also allows technicians to link with the internet and remote networks in order to access information and transfer data.

Additionally, The DPI 620 platform is a true communicator/calibrator. It offers all the calibration features described and contains a complete library of registered HART device descriptions to support more than 1000 devices. Consequently, it embodies a single tool that can be used to communicate, to commission and configure, and calibrate.

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