talkline

Effective energy management leads to ISO 50001 award

Endress+Hauser
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Laboratory and on-site calibration of flow, pressure, temperature and analytical devices.

Features

Product Focus

Fast track, quality instruments

Did you know Endress+Hauser has a range of instruments and associated accessories, offering basic functionality without compromising on quality?

Aimed at light duty applications, such as utilities measurements on process plant, the devices are priced competitively and will be delivered to you within 24 hours of ordering.

Download the brochure at www.uk.endress.com/fast-track

Imprint

Publisher Endress+Hauser Ltd, Floats Road, Manchester, M23 9NF

Editors Chris Nolan, Lisa Rothwell, Helen White

Date of publication April 2016

ISO 50001 award for effective energy management

Endress+Hauser opened its first UK sales centre in 1968. Its current UK headquarters in Manchester was expanded in 2007, when a brand new building to accommodate around 200 staff was built in the grounds of the existing sales centre.

The old building has since been repurposed into a state-of-the-art training centre. But despite the expansion and the integration of its compressed air flow rigs from another site, Endress+Hauser UK's energy consumption has remained at the same level as in 2007 and the organisation has been awarded ISO 50001 accreditation for energy management. This was achieved by implementing a solution that Endress+Hauser provides for customers in the process industries.

The problem Concerns were raised that energy usage could rise considerably with the expansion of the site. As well as air-conditioned offices and meeting rooms, a small production centre, new demonstration rigs, calibration facilities and a restaurant all added to the total energy consumption. As a result, a site-wide energy management system was created, encompassing Endress+Hauser instruments, technology and software. "We wanted to be able to monitor our energy usage to see where savings could be made but also to demonstrate the service we can provide to our customers," explains Wes Allen, Endress+Hauser's Energy Solutions Manager. "We were confident that we would be able to manage our energy consumption better, with both financial and environmental benefits."

Continued...

The solution Energy and utility sub metering was installed around the site, including in the main sales centre, the newly developed training centre and the despatch warehouse. Devices including electricity meters, gas meters, water meters and ambient temperature sensors were installed. Meters were either wired or wirelessly connected to Endress+Hauser's data acquisition systems that collect measurements at five-minute intervals and transfer the data to cloud-based software, known as eSight. As Wes Allen explains, "eSight software enables effective targets to be set and provides decision-making support if energy usage exceeds a baseline. That means you don't find out by accident when you look at your next invoice that you're using more energy than expected – you'll be immediately alerted to any changes."

By monitoring compressed air consumption, air quality, electricity and pressure, a plan was developed to reduce energy consumption. A number of potential savings were identified relating to the use of compressed air in the production centre, which accounted for 25% of the site's total energy use. By repairing a compressor drain valve, implementing dew point control and making pressure reductions, the amount of energy consumed by the compressor was reduced by 44%.

In addition to the compressed air energy efficiency improvements, a number of energy-saving measures were identified and implemented both in the new sales centre and in the redeveloped training centre. These included updating lighting, employing virtual servers instead of physical hardware, adjusting heating controls and investing in new machinery for temperature sensor production. Staff were also encouraged to save energy in offices, calibration labs and production facilities by switching off machinery when it wasn't in use.

"ISO 50001 is an important standard for any company wishing to demonstrate they take energy management seriously. Using eSight software is a simple and inexpensive route to ISO 50001 as it provides the automatic and continuous monitoring of performance to baseline targets."

Wes Allen, Endress+Hauser's
Energy Solutions Manager

Meters and sensors monitor energy use

Devices are wired or wirelessly connected to data acquisition systems

eSight software continually checks energy use

A route to ISO 50001 compliance

The benefits Despite the introduction of new equipment, the development of the training centre and overall increased occupancy, the installation of a site-wide energy monitoring solution has helped Endress+Hauser to keep its energy consumption down and achieve ISO 50001 certification. As Wes Allen says, "ISO 50001 is an important standard for any company wishing to demonstrate they take energy management seriously. Using eSight software is a simple and inexpensive route to ISO 50001 as it provides the automatic and continuous monitoring of performance to baseline targets."

Saving energy can realise huge financial benefits for energy-intensive industries such as food & beverage, life sciences, chemical and wastewater. "It's quite unusual for a commercial building with a small production facility like ours to have such a comprehensive energy management system," admits Wes Allen. "But the principle is the same no matter what the scale. Our customers in the process industries have the most to gain from addressing their energy use."

Saving energy is now a compulsory requirement for many businesses in the UK. As of 2015, the Energy Savings Opportunity Scheme (ESOS) requires all large businesses to undertake mandatory assessments on energy use every four years. Endress+Hauser consultants delivered ESOS assessments for customers during the first compliance period and are now working with them to develop ISO 50001 energy management systems. As Wes Allen explains, "Any company that has complied with ESOS in 2015 will already have carried out much of the preliminary work required for ISO 50001."

If you're interested in seeking ISO 50001 accreditation or you need help with the second ESOS compliance period, please call us 0161 286 5050

On the level

Endress+Hauser is a market leader in supplying instrumentation to the food & beverage industry. Now we have a simple, low-cost but effective solution for measuring the level of water-based liquids: Liquipoint FTW23.

The Liquipoint FTW23 is a very compact capacitive point level switch for water-based liquids including beer, fruit juices and milk. It can be used permanently in process temperatures up to 100°C and in cleaning and sterilisation processes up to 135°C for one hour, with ingress protection up to IP69K. As the device is designed specifically for the food & beverage industry, not only can it withstand high-pressure CIP and SIP procedures, but it also comes with 3-A and EHEDG certificates and meets FDA requirements.

Plug & play The FTW23 is so easy to operate as no calibration or adjustment for different media is required. Installation is simple thanks to its compact design, even in tight conditions or where access is restricted. It even offers a function check of the switch output with a test magnet. It's a cost-effective, efficient and easy solution from the market leader - available on next day delivery! What are you waiting for?

For more information visit
www.e-direct.endress.com
or call 0161 286 5050

Efficient:
- Cost-effective
- Function check with test magnet

Easy:
- No calibration or adjustment required
- Plug & play without special tools

Smart RFID identification

Quick and safe identification of measuring points is essential to avoid prolonged plant downtime and failures in data acquisition. But this can often be a difficult and time-consuming task as many plants have a large number of measuring points, often with illegible or difficult to access nameplates. The RFID tag harnesses existing technology to provide a solution to the problem.

The RFID tag allows instruments to be identified wirelessly, using the established and robust NFC (Near Field Communication) standard. Devices can be identified even if the nameplate cannot be seen or is no longer readable. The system is suited to even the harshest environments, where vibration or heavy soiling used to make identifying measuring points difficult. There is also a hazardous area version of the tag for use in explosive atmospheres.

Interacting with the free Endress+Hauser Operations app, in conjunction with the latest generation of smart devices, the RFID tag makes technical documentation and information concerning spare parts available for any specific measuring point on site. This makes work easier across the product's entire life cycle, potentially reducing costs of installation, commissioning and maintenance. Hazardous area solutions are available using our Field Xpert handheld tool.

Let us collect your asset data Endress+Hauser's Installed Base Audit (IBA) team can collect your asset data in the shortest time possible with minimal inconvenience to your plant. As part of this IBA we can now fit all Endress+Hauser and third-party devices with tags to enable easy identification and data access.

Radio Frequency Identification (RFID) is the wireless use of electromagnetic fields to transfer data for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically-stored information.

The benefits of Endress+Hauser's RFID tags are:

- Easy identification - devices can be identified even if the nameplate cannot be seen or is no longer readable.
- Easy access - all device documentation can be accessed locally via the Operations app or Field Xpert.
- Open standard - the NFC (Near Field Communication) standard works with most mobile devices.

For more information please call us on 0161 286 5050

Can Heartbeat verification replace calibration?

In the life sciences industry, performing regular, traceable calibrations on process instrumentation is necessary to maintain the accuracy and reliability of process measurements, whilst complying with all necessary legislative and regulatory requirements.

However, calibrations can be costly and usually result in process downtime, with a corresponding impact on manufacturing. Failure to calibrate at the correct intervals can result in errors that affect product quality or safety, with potentially major cost implications. To help end users overcome such issues, Endress+Hauser has introduced flowmeters with Heartbeat, an on-board verification technology offering a real alternative to calibration in regulated industries or any other industry in which regular calibration is required.

Whilst there are many instruments on the market today with self-diagnostic features that give the user some level of information about the health of the device, most of them fail to provide traceable evidence that the instrument is still operating in accordance to the original manufacturer's specification. Heartbeat Technology overcomes this by providing a continuous healthcheck of the flowmeter, ensuring key device parameters remain within Endress+Hauser's original specification. Any deviation from factory reference values will be displayed in easy-to-understand diagnostic data, highlighting that maintenance is required or a failure has occurred, in accordance with NAMUR NE 107 and NE 44.

Maintenance programmes Regulatory bodies and standards, including GMP and ISO 9001, define the need for process instrumentation to be periodically calibrated or verified against measurement standards that are traceable to national or international standards; it is the end user's responsibility to determine the correct frequency for calibrating each and every process instrument. The decision on when to calibrate a device can be difficult, requiring the end user to find the right balance between saving operational costs (by extending intervals between calibrations) and ensuring the reliability of the process. The aim is always to minimise downtime whilst maximising plant productivity. To date, if an end user decided to extend the period between calibration cycles, they had to do so in the knowledge that the condition of the device in between calibrations could not be easily verified.

Embedded verification An alternative way to fulfil legislative requirements and massively increase confidence in the installed flowmeters is through on-board verification of the device. The device runs an independently verified on-board diagnostics program where all relevant components of the instrument are checked. This allows the user to confirm and document that the instrument still conforms to the original factory reference values. Verification of an instrument equipped with this self-diagnostic capability can be performed without removing the instrument from the process, therefore reducing the potential for process contamination and the risk of damage to the device during the reinstallation process. It may not even be required to interrupt the process as the verification tests can all be performed in the background. Pass or fail results are available immediately after the test, providing the user with clear information on whether the instrument is still operating according to specification.

Verification report

The verification report is generated directly in the flowmeter and provided as a tamper-proof PDF file. The file can be accessed directly via a web server or downloaded remotely through a DCS or asset management control system.

Independent validation TÜV, an internationally respected certification body, has independently validated Endress+Hauser's Heartbeat Technology and has concluded that the result of this on-board verification technology is every bit as valuable as a wet calibration. Utilising devices with Heartbeat allows users to significantly extend calibration cycles, reducing operating expenditure whilst ensuring the process remains fully compliant.

A key benefit of Heartbeat verification is that it can be initiated locally or remotely with minimal effort. The procedure is usually completed within a few minutes, which means that the verification can be easily performed on a daily or batch-by-batch basis, significantly increasing the confidence in the flowmeter and its ability to precisely measure necessary components. Following a Heartbeat verification, the device generates a report that can be downloaded in PDF format for storing or archiving, with the last eight verifications stored inside the flowmeter transmitter.

For more information please call us on 0161 286 5050

Overfill prevention

The introduction of new COMAH regulations in 2015 has once again brought the issue of overfill prevention to the fore. Many smaller firms affected by the rules for the first time and larger companies who are now subject to more comprehensive requirements are taking the opportunity to improve their existing plant.

The Control of Major Accident Hazards (COMAH) 2015 regulations have superseded the legislation that had been in force since 1999. More companies are now required to inform the authorities about the dangerous substances they hold or those that could be generated in the event of an accident. Sites are divided into two categories: top-tier sites (those that hold a greater quantity of dangerous chemicals) and lower-tier sites.

The top-tier sites are dominated by chemical and oil & gas facilities but also include distilleries due to the amount of flammable spirit being held. Overfilling in the distillation process is not only very costly but also dangerous.

As such, systems must be put in place to prevent overfilling the tank. In recent years, industry has moved away from float switches to more reliable devices based on the tuning fork principle, for example the Liquiphant. In its simplest form this device monitors its own condition continually and warns of failure before the level reaches the switch. This self-monitoring has resulted in Liquiphant systems being created to comply with IEC 61508 and to be compatible with SIL systems. The majority of Liquiphant devices conform to SIL 2 (the most common level of SIL required).

Liquiphant FTL80

Nivotester FailSafe FTL825 transmitter

In the distilling industry the Liquiphant is usually used in conjunction with a Nivotester mounted in the safe area panel. The Nivotester provides easy-to-use relays which can be hard wired in the panel, a safe power supply to the Liquiphant in the tank, continuous monitoring of the loop and a convenient place to carry out a proof test. Pressing a button on the Nivotester acts as a system test to prove the reliability of the Liquiphant in preventing overfill.

SIL 3 in a single device

Some installations, though, are much higher risk and as such require higher integrity systems to SIL 3. The solution to this in the past has been to use two devices in a redundancy system to reduce the probability of an unsafe condition going unnoticed.

However, this has the disadvantage of requiring two process connections and increases the risk of false alarms.

Now the Liquiphant FTL80 series offers SIL 3 levels of protection with a single device and installation point. The system also includes a Nivotester for easy panel work and proof tests. The device is built to the highest integrity standards with redundant components and continuous self-checking and loop-monitoring capabilities. This results in a system that is reliable and easy to proof test, although it offers such reliability that a proof test is not required within its normal working life.

Reliability decreases with age

IEC 61508 and 61511 define an instrument's normal working life as 8 to 12 years. Sites with overfill warning systems older than this should be looking for a replacement to avoid unpredictable performance.

Endress+Hauser's Liquiphant systems provide easy retrofit solutions; in some cases they can even be provided with process connections to replace old float switches.

Of course maintenance of your new system is just as important as its correct installation to ensure continued reliable performance and compliance with regulations, including COMAH. Endress+Hauser offers a range of support throughout your system's life cycle, from commissioning to regular maintenance and record-keeping, to ensure your instrumentation remains both safe and accurate.

For more information please call us on 0161 286 5050

Quality and compliance

New colorimetric analysers have been added to the Liquiline System platform. The CA80 range uses standard ISO methods to ensure accurate, repeatable online measurement of nutrients and metals in water and wastewater, comparable to lab measurements.

The range covers nutrient parameters such as ammonia, orthophosphate and COD, and metals like chromium, iron and aluminium. The analysers are complemented by a new sample preparation range, the CAT8x0 series.

Easier operation thanks to familiar interface

Liquiline Systems share the user-friendly operation that plant personnel already know from Endress+Hauser's other online analysis devices, for example the Liquiline CM44 and CM42, used to measure parameters such as pH and conductivity. The familiar hardware and software interfaces virtually eliminate operating errors.

The CA80 analysers, based on the Liquiline platform, can be easily upgraded to a complete measuring station by connecting up to four Memosens sensors, which reduces the total number of devices in the plant.

For applications where sample preparation is needed, the CAT810/ CAT820 sample preparation systems are available. They are fully controlled by the CA80, speeding up commissioning and operation. The new sample preparation system is flexible with options to sample all critical control points of the wastewater treatment plant, from the inlet via the aeration basin to the final treated effluent or from pressurised pipes.

Low reagent consumption and simplified maintenance

Operating costs of a colorimetric analyser rise and fall with the reagent consumption and the reagent lifetime. To ensure low reagent consumption, Liquiline Systems are designed with highly precise dispensers for reagent dosing and an intelligent cooling system to prolong reagent life while in use. Automatic cleaning and calibration functions ensure that the analyser and sample preparation system work reliably and without manual intervention over a long period of time.

If disturbances should occur, advanced diagnostics with remote access through an optional web server can help plant operators to analyse and remedy them quickly. Regular maintenance measures can be carried out easily without specialised tools, reducing maintenance costs and increasing process uptime. The analysers also feature detailed logbooks that provide continuous recording of the parameter values and enable plant managers to prove compliance to water authorities.

The full CA80 range:

Liquiline System CA80NO
enables users to meet the specified nitrite limits in potable water, mineral water and raw water for food production.

Liquiline System CA80CR
helps water treatment facilities comply with chromium limits and supports managers of electroplating plants or tanneries in achieving environmentally compliant processes.

Liquiline System CA80PH
enables users to precisely measure orthophosphate in all critical control points.

Liquiline System CA80AM
is the colorimetric analysing system for ammonia, fit for all critical control points of water and wastewater treatment where ammonia reduction is required.

For more information please call us on 0161 286 5050

Training by the experts

In today's competitive marketplace, it's vital to have a well-trained and motivated workforce.

Endress+Hauser has developed a suite of courses designed to ensure your staff are knowledgeable and competent to work on your valuable assets. Whether you need training on basic measurement principles, advanced diagnostics or long-term asset management, we have the facilities and the expertise to meet all your requirements. The following courses will be taking place at our state-of-the-art training centre in Manchester this year:

Introduction to Process Measurement & Control
Aimed at apprentices and new starters, this four-day course is designed to provide new engineers with a basic knowledge of process measurement and control. The course has a high degree of practical content and includes assessment.
2016 course dates: 27–30 June, 10–13 October.

Basic PID Loop Tuning This two-day course covers the basic principles, structure and terminology of controllers and control elements. Simple tuning is also covered. Those attending will be able to understand, operate and adjust a range of PID controllers to achieve acceptable performance.
2016 course dates: 4–5 July, 5–6 December.

Advanced PID Loop Tuning The two-day advanced controller tuning course will teach you how to optimise the performance of three-term controllers in a range of applications. The course also explores common control problems that are not related to controller tuning but affect performance and stability.
2016 course dates: 4–5 July, 5–6 December.

Certified PROFIBUS Installer An internationally accredited introductory course for PROFIBUS installers and anyone involved with PROFIBUS at a technical level.
2016 course dates: 19 September, 24 October.

PROFIBUS Commissioning & Maintenance This one-day course is an add-on to the Certified PROFIBUS Installer and covers the practical techniques of fault-finding on operational PROFIBUS networks.
2016 course dates: 20 September.

Certified PROFIBUS Engineer This course, covering PROFIBUS network design, commissioning and live fault-finding, is designed for engineers with a thorough basic knowledge of PROFIBUS or other fieldbus systems.
2016 course dates: 21–23 September.

Certified PROFIBUS System Design This is a two-day course covering the optimal design of PROFIBUS automation and control systems. It is a prerequisite for course attendees to have qualified as a Certified PROFIBUS Installer.
2016 course dates: 25–27 October.

For more information email
sophie.cotton@uk.endress.com
or call 0161 286 5193

New CompEx training dates
Endress+Hauser is now an accredited and licensed CompEx centre. The CompEx scheme offers training, validation, assessment and certification for anyone working in explosive atmospheres. Training courses will be running through 2016, including:

Full five-day course, modules Ex01 to Ex04
13–17 June.

Three-day ExF foundation course
9–11 May, 20–22 June.

For more information email
compex@uk.endress.com or call 0161 286 5000

Skilled and reliable support

Quality, reliability and innovation are the hallmarks of Endress+Hauser products and those values are also the foundation of our service business.

We offer a full range of services, from calibration to consultancy, to help you manage your installed base and let you concentrate on your core activities. Our highly trained engineers have the application expertise to help you look after your measurement assets, allowing you to stick to what you do best!

As well as offering regular, planned maintenance of your instruments, we can develop a maintenance strategy for your plant by analysing standardisation, criticality and obsolescence. By creating a clear picture of your installed base we will help you to find the right level of maintenance, ensuring downtime is kept to an absolute minimum. We can then put in place a bespoke Service Agreement, tailored to your exact requirements, as a means to achieving maximum value from your devices.

Qualified people We pride ourselves on the training and personal development offered to our field service engineers, ensuring that when they work on your site they're of a recognised Endress+Hauser standard. As they have followed our comprehensive training structure we know that our engineers are technically proficient, have cross-industry knowledge and are able to comply with national safety standards and regulations. As part of your Service Agreement, you will be assigned a dedicated field service engineer who will get to know you and your plant so they can work independently and competently on your site.

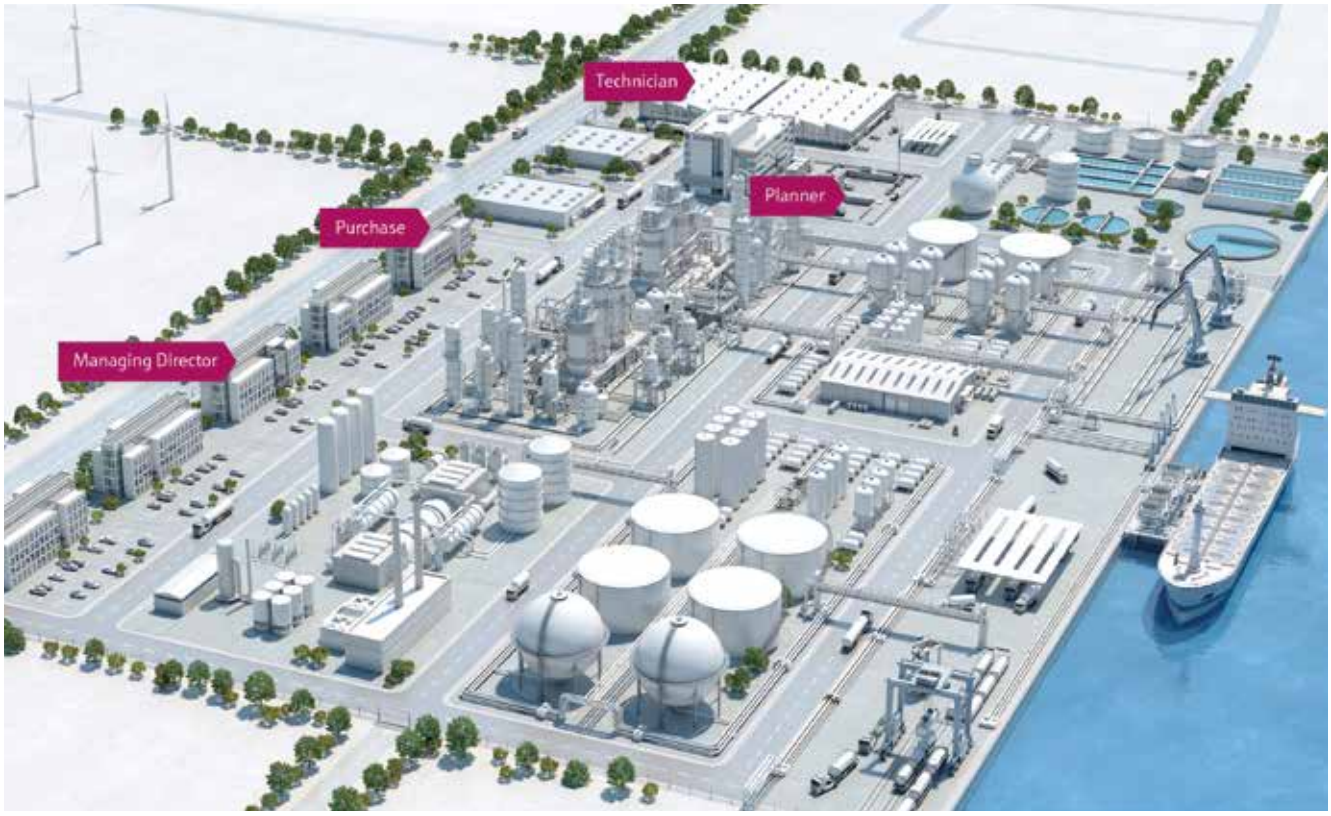
Certified and traceable documentation All process industries require access to device information and documentation, whether it's to comply with audits or to aid predictive maintenance and optimisation. Endress+Hauser's unique Web-enabled Asset Management (W@M) Portal is accessible worldwide from any computer with internet access via a secure login. The platform offers quick and ready access to documentation such as calibration certificates, operating manuals and spare part lists. If Endress+Hauser repairs or calibrates an instrument, this event is logged automatically. And thanks to the online connection to Endress+Hauser's product database, you automatically benefit from up-to-date information on your instruments such as product availability and obsolescence.

For more information please call us on 0161 286 5150

Tank gauging innovation

Managing a tank farm is a balancing act between the need to increase plant efficiency and revenue, comply with regulations and protect people, assets and the environment.

Below: Optimise your tank farm operations



Endress+Hauser's inventory management solutions have been designed to meet these challenges. Our new platform of high-performance tank gauging instruments supports both servo and radar technologies to ensure accurate and reliable measurement in almost any process and environmental condition.

Our new platform is the world's first to incorporate both radar and servo measuring principles designed according to IEC 61508 and certified up to SIL 3. The modular design means major components, such as power supplies and input and output modules, are interchangeable across the platform, reducing the cost of holding spare parts. All instruments, whether they use radar or servo technology, are operated uniformly via the same displays, menus and software. This simplifies operation for technicians and reduces the need for additional training. The platform can also be configured using Endress+Hauser's universal Fieldcare software.

For more information please call us on 0161 286 5050

Safe and accurate Our tank gauging instrumentation including Micropilot, Proservo and Prothermo is developed according to international metrology recommendations such as OIML R85 and API MPMS, qualifying the devices to be components of certified systems. The Micropilot is the first 79 GHz radar for liquids, which assures highest accuracy in shortest beam angles. This reduces the requirement to take the tank out of service for modifications. But the innovation doesn't stop there, as the Proservo is the first of its kind to be custody transfer certified to a range of 40m, to maximise the efficiency of the storage facility.

Analysis and maintenance A variety of communication protocols enable integration into any tank gauging system. This opens the door to unlimited future expansion and migration possibilities. The platform also includes the unique Endress+Hauser management and analysis features, including HistoROM data management for fast and easy commissioning, maintenance and diagnostics; multi-echo tracking for highest reliability even in the presence of obstructions in the vessel and Heartbeat Technology to extend calibration intervals.

Count on us for calibration

Your flowmeters and many other measuring instruments require regular calibration to gather information about the current condition of the device. Fluctuating measurements can not only have an impact on process stability and operating costs but potentially have legal and regulatory consequences. Yet the needs of every industry are different. This is why Endress+Hauser offers a full range of calibration services, from laboratory calibration to on-site calibration and verification. Whatever your requirements, you can count on us for calibration.

Calibration services are offered on an individual or contract basis. Both Endress+Hauser and third-party devices can be calibrated at their place of installation (on-site calibration) or at Endress+Hauser facilities (laboratory calibration). The main objective is to check the accuracy of measurements by comparing your device's values with the values of known traceable references. The results of the comparisons are recorded in calibration certificates.

Calibration close to operating conditions On-site calibration is performed by highly trained engineers. Convenient and cost-effective, it removes the need to send instruments off-site as our specialists come to you, keeping downtime to an absolute minimum. It also offers the highest flexibility as calibration can be scheduled according to the needs of your process. Our qualified and experienced field service engineers can perform adjustments, diagnose faults and recalibrate instantly where necessary. Our mobile rigs are fully traceable to national standards.

Highest accuracy Calibration performed in a laboratory offers the best calibration uncertainty and the widest calibration ranges. At our UK headquarters we have invested in water and gas flow rigs incorporating the very latest developments in flow technology to provide high quality calibrations. The facilities are traceable to national standards and meet the requirements of ISO 17025.

Flowmeters from 8-100mm (or up to 80mm for Vortex meters) are calibrated against Endress+Hauser Promass Coriolis dual reference meters. Our flow rig is suitable for any meter with DIN/ANSI flanges, screwed threads or hygienic process connections and flow ranges from 0.2m³/hr to 70m³/hr (200 to 70,000 kg/hr).

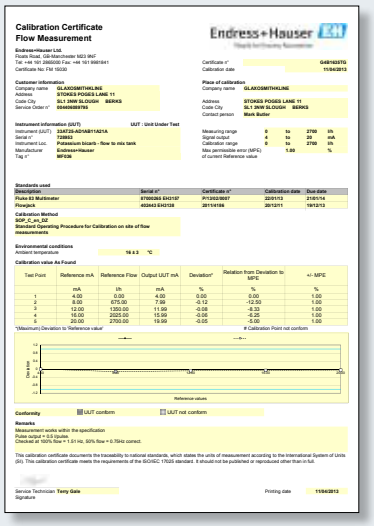
Flowmeters bigger than 100mm in diameter are sent to our primary calibration facilities in Europe, so there's virtually nothing we can't handle. We also calibrate pressure and temperature devices, as well as test and measurement equipment, at our laboratories in Manchester.

On-site analytical calibration
We now offer a calibration service for your Memosens digital sensors. Using the latest advances in offline calibration, we can perform fully documented, traceable calibration of your pH/ORP, conductivity, dissolved oxygen and chlorine Memosens sensors. The final report includes all of the sensor's calibration and operation history, including a chart showing historical slope and zero point – vital aids for predictive maintenance.

Optimised calibration Our service team can help you draw up a calibration contract, defining calibration specifics for the applicable parameters. By relying on us to implement optimum and effective calibration processes, you will enhance productivity, ensure compliance and maintain the quality of your product.

Example of calibration certificate

- Contains all fields required by ISO 17025.
- Contains graph for better visualisation.
- Certificates in PDF format will be supplied on completion of the calibration.
- For laboratory calibration, paper copies will also be sent back with the device.
- Certificates can also be uploaded directly to your asset management system.


Calibration Certificate
Flow Measurement
Endress+Hauser

For more information please call us on 0161 286 5150

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CM01105Z/22/EN/01.16

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