talkline

04 Electronic DP Solves problems for Lucite International

08 Calibration offer Flowmeter calibration for £149

12 Choose Liquiphant FailSafe

for safety-critical applications



People for Process Automation

4 Improved accuracy

The engineers at Lucite International found a better way to measure level in a separator vessel

8 Calibration offer

State-of-the-art flow calibration at a discounted price

12 Level monitoring

Liquiphant FailSafe offers functional safety up to SIL3 in a single device







Features

- 3 CompEx training
- 4 Case study: Electronic DP
- 8 Quality calibration

- 10 Don't get stuck in the Stone Age!
- 15 Density profiling
- 23 Bespoke UK-based engineering
- 26 Automation expertise

Product Focus

- 12 Safe and reliable level monitoring
- 14 High pressure, high precision flow metering
- 18 Revolutionary gas analysis
- 20 Two-wire technology

Imprint

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

Editors Chris Nolan, Lisa Rothwell, Helen White

Date of publication September 2015

Reprint Any printing, even in parts, is forbidden without prior permission. This document remains the property of the company.



CompEx training from the process safety experts



Endress+Hauser is now an accredited and licensed CompEx centre. CompEx is a training and assessment scheme for engineers, managers and technical operatives working in explosive atmospheres. Successful candidates are awarded a certificate of competency.





Electronic DP improves accuracy, installation and maintenance

Lucite International is a global leader in the design, development and manufacture of acrylic-based products. Since being acquired by Mitsubishi Rayon Group in 2009 the company has further strengthened its position as the world's largest supplier of methyl methacrylate (MMA), the essential building block for all acrylics. Lucite International has one of the most diverse asset portfolios of any major acrylics producer with 22 plants at 14 manufacturing sites worldwide.



"I chose electronic DP because of its accuracy in measurement and reliability, as well as the benefits of easy installation and maintenance."

Tony Kydonakis I/E Asset Engineer Lucite International



Lucite International manufactures acrylic-based products

New technology solves problems for Lucite International

The challenge The engineers at Lucite International's Cassel Works in Billingham wanted a better way of measuring the level in a separator vessel. The vessel keeps the chemical Bisphenol A (BPA) under vacuum and at high temperature in order to separate off the volatile organics and reuse them, improving yield and plant efficiency. It's important that the BPA itself doesn't enter the downstream process due to its viscosity and high sulfuric acid content, which carries a risk of corrosion.

The previous level monitoring system in the vessel was a high level alarm and trip, which had the desired effect of preventing overfill but gave no pre-warning of any problems. The obvious solution was to install a differential pressure device – mounting sensors at the top and bottom of the vessel in place of existing sight glasses – in order to monitor the level more closely.

Yet there were concerns over accuracy and speed of response with a traditional differential pressure measurement system using oil-filled capillaries. Due to the height of the vessel, capillaries of up to 10 metres in length would have been needed. Changes in the ambient temperature would have affected the volume of the oil in the long capillaries, potentially reducing the measurement accuracy. Installation of a traditional device would also have been difficult as it would have required feeding the capillaries through the floor of the plant in order to mount the transmitters at the top and bottom of the vessel, using the existing tapping points. There were also maintenance considerations as Lucite's I/E Asset Engineer, Tony Kydonakis, explains: "If a diaphragm seal fails we would have to erect a very large scaffold to remove the complete assembly. The process would stop for the duration of the repair thereby incurring significant efficiency losses to the business."

The solution It was decided to install Endress+Hauser's electronic differential pressure system, Deltabar FMD72. Electronic DP is up to 10 times more reliable and up to 10 times faster in response times than traditional capillary systems, as it is independent of changing ambient conditions.

Unlike other electronic DP systems, Deltabar FMD72 consists of just one transmitter, with two sensor modules. Either sensor can be operated as the high or low pressure sensor. Due to the acidity of the BPA in the vessel, the device was supplied with tantalum diaphragm seals to avoid corrosion. Endress+Hauser also supplied Lucite International with a HART splitter, which divides the HART signal into two and enables them to measure the vapour pressure at the top of the vessel as an additional parameter. Additionally, Lucite purchased the Endress+Hauser Start-Up package, which includes commissioning of the instrument by a qualified service engineer as well as 12 months' extended warranty and six months' on-site support. "We were able to sit with the engineer when he came to do the commissioning and ask any questions," says Tony Kydonakis.



The benefits Ease of installation was a big benefit for Lucite International. The system's modular design means that the transmitter, sensors and cable are mounted separately, avoiding having to feed metres of cumbersome capillaries with attached flanges between floors or modify the vessel. It also means that individual components can be replaced separately. "Because the top and bottom sensors are the same, you can keep just one sensor in stores so if it goes wrong for whatever reason you can just quickly replace it," explains Tony Kydonakis. "It's better than having to send the complete capillary system off site for repair or keeping an expensive capillary system in stores." Due to automatic sensor recognition there's no need for recommissioning or recalibration once a sensor is replaced. The FMD72 also uses a standard cable, reducing maintenance and repair costs. The FMD72 also proved to be more cost-effective in terms of capital expenditure. "The Endress+Hauser device was cheaper than a competitor's electronic DP system because it uses just one ATEX certified transmitter module instead of two," says Tony Kydonakis. Lucite International has also benefited by being able to mount the single transmitter in a convenient location for the technician.

Electronic DP has proved to be a good solution to a difficult application in more ways than one. As Tony Kydonakis explains, "I chose electronic DP because of its accuracy in measurement and reliability, as well as the benefits of easy installation and maintenance. It's a lot speedier to respond than capillaries and being able to give the process engineer a vapour pressure measurement is a bonus. It's actually very accurate and we haven't had any problems with build-up on the sensor – the last time I checked it was still nice and clean."

The trial has proved so successful that a second FMD72 is being considered for the site to replace an existing capillary system.

Upper sensor measuring vapour pressure







"It's a lot speedier to respond than capillaries and being able to give the process engineer a vapour pressure measurement is a bonus. It's actually very accurate and we haven't had any problems with build-up on the sensor – the last time I checked it was still nice and clean."

Tony Kydonakis I/E Asset Engineer Lucite International

Lower sensor monitoring hydrostatic level







Quality calibration that won't break the bank!

Keeping your instruments from drifting is key to maintaining the optimum quality and plant yield.

Regular calibration helps to keep your instruments at their best and ensure you dose, measure or store just the right amount. However, we know that you need quality calibration at a price that won't blow your budget. That's why we're offering you the chance to put us to the test with our fantastic price offer.

For a limited period, we're offering calibration of any flowmeter capable of being calibrated at our Manchester facility for just £149 with a fast 5-day turnaround! Simply call 0161 286 5150 and quote 'CAL149' to book your flowmeter in. As soon as the calibration is complete, we'll email you the certificate and get your meter returned to you ASAP. Offer ends 18 December 2015.



Terms and conditions apply visit www.uk.endress.com/CAL149



Don't get stuck in the Stone Age!

Traditional mechanical flow and level transmitters have been superseded by modern transmitters with no moving parts for the majority of applications. Guided wave radar level transmitters, vibronic level switches and the array of modern flow technologies on offer from Endress+Hauser have a number of significant advantages both on new installations and as a direct replacement for equipment on your existing plant, reducing costs while increasing safety.





Time to replace your old turbine,

PD and DP flowmeters? Modern flow technologies offer huge benefits over older mechanical devices, not only from reduced maintenance costs and increased safety but also by providing much more process data to allow more efficient running of your plant. For example, Coriolis meters provide up to 10 process measurements, including mass flow, volume flow, temperature, viscosity, density and concentration.

Diagnosis in a heartbeat With the introduction of Heartbeat Technology on our latest range of flowmeters, you're able to maximise yield and productivity. Heartbeat Technology offers a continuous healthcheck of your flowmeters ensuring key parameters are performing within specification at all times. Deviation from the reference values will trigger warnings as per NAMUR NE107.

As an additional feature, verification and monitoring can be added to the diagnostics to provide trend analysis, live quantitative performance data and on-demand reporting. The verification enables documented proof that the flowmeter is functional and can be used as part of the proof testing procedure for SIL instruments.

Modern level transmitters to replace

mechanical devices Traditional displacer level transmitters and float switches have been superseded by guided wave radar devices for a majority of level measurement applications. While the concept of a displacer or float is simple, the moving parts they rely on make them subject to the same issues that affect all mechanical systems, thereby reducing reliability. Fitting modern level transmitters that have no moving parts gives increased confidence in the measurement by removing the most common causes of failure. With all the production, maintenance and safety improvements to be gained from upgrading your installed base, isn't it time you upgraded?

Benefits

Personnel safety: Little or no mechanical maintenance on modern devices eliminates the need for personnel contact with process fluids.

Plant safety: Reliable measurement and selfdiagnostics ensure a safe process.

Quality measurements:

Precise repeatable measurement gives consistent quality of your end product.

Increased plant availability:

Greater process uptime through reduced maintenance and calibration and the simplest possible SIL proof tests.

Simple: Easy installation with 2-wire loop powered and 4-wire powered devices.





FailSafe protection

When Endress+Hauser invented the vibronic principle nearly 50 years ago, it paved the way to safe and reliable level monitoring.

More than four million Liquiphant point level switches have since been installed worldwide, becoming the number one choice for safety-critical applications. Now Liquiphant FailSafe offers functional safety up to SIL3 in a single device.

Liquiphant's initial advantage over float switches and other passive devices was its ability to sense its own condition by detecting vibrations even when in an uncovered state. This increased safety because it was able to detect failure of the device before the alarm condition was reached.

Later developments expanded on this, allowing the frequency of the tuning fork to be continually monitored. A change in oscillation above or below a permitted variable indicated irregularities of the fork, for example

corrosion damage or product build up. This automatically trigged a safety-oriented switching of the instrument.

As process requirements and legislative changes introduced industry to risk assessments and Safety Integrity Levels, the Liquiphant range was ideally placed to satisfy these requirements. The level switches were qualified to SIL2 for both low level pump protection duties and high level overfill protection.

SIL3 applications Whilst most industrial applications are, by good practice, engineered down to a SIL2 level there are still occasionally high-criticality SIL3 applications. These high risk processes may require a voting system or redundancy system where multiple sensing devices





Nivotester FailSafe FTL825 transmitter

are used to achieve the higher level of confidence. For example, two Liquiphants could be installed at the same point, reducing the probability that an unsafe condition goes unnoticed. However, this results in a need for more signal cabling, more installation points, more system inputs, and an increased possibility of false alarms.

As a result of continuing research and development, Endress+Hauser is now able to offer the Liquiphant 80 series that is qualified to SIL3 for a single device. The product offers the highest functional safety with a Safe Failure Fraction (SFF) greater than 99%.

Simple functional safety The design of the device duplicates components, providing internal redundancy where required to achieve these high levels of reliability. So now you only need one process connection and one set of cabling and system input to achieve SIL3 levels of safety. The output signal also complies with the latest safety standards in accordance with NAMUR NE06 and NE43, giving easy integration with either the separate Nivotester FTL825 or directly connected to a safety PLC.

The evaluation of this system now gives an extended proof test interval of 12 years, reducing testing costs. In many cases this even exceeds the expected plant lifetime. To avoid situations where the microprocessor is locked but is giving a valid output, further outputs are continuously calculated in the form of a low frequency or heartbeat signal superimposed on top of the 4-20mA signal. This output is continuously monitored by the control system or Nivotester, giving further confidence in the signal and eliminating problems from processor lockups indicated by failure of the superimposed signal. This ensures the system is functioning correctly. Documentation to prove the safety of the system is also available.





High pressure, high precision

Endress+Hauser has a continuous development cycle for the instruments, solutions and service we provide. Two of our latest developments for the oil & gas industry are high pressure Coriolis and electromagnetic flowmeters.

These two flowmeters offer the recognised performance and robustness of these well-established flow technologies but also have the capability to withstand pressures up to 420 bar.

Promag 53P is a high-performance electromagnetic flowmeter offering 0.2% precision for electrically conductive fluids. With all the required approvals, certificates, materials and process connections for oil & gas applications, this is an ideal flowmeter for water injection and produced water injection for enhanced oil recovery up to 420 bar (ASME Class 2500). Suitable for process temperatures from -5 to +110°C, hazardous area Zone 1 (Cat 2) and line sizes from 1" to 12", Promag 53P is a very flexible flowmeter for demanding applications. Promass O is Endress+Hauser's Coriolis flowmeter for high pressure

flow applications up to 258 bar (ASME Class 1500) and process temperatures up to 200°C.

As with all Endress+Hauser Coriolis flowmeters, this is a true multivariable device offering mass and volume flow, density and temperature measurement. Suitable for measuring gases and liquids under process conditions with varying viscosity, temperature and density, Promass O will perform with very high precision (up to 0.05% for liquids).

Promass sensors are tried and tested in over 100,000 applications and offer the best performance for flow and multivariable measurements in a very compact design. The unique sensor design of the Promass O ensures it is unaffected by vibrations, due to a balanced two-tube measuring system, giving it immunity from external piping forces thanks to its robust tube support/secondary containment. Line sizes are from 3" to 6" with tube materials in Duplex or Super Duplex.





Separation with added transparency

Separating oil, water, gas and sand is a crucial process in oil production, needing careful control. Density profiling offers the most accurate information on the oil/water emulsion layer, resulting in a number of cost-saving and efficiency benefits.



The picture many people have of oil production where a hole is drilled in the ground and crude oil flows or is pumped is a great oversimplification. In reality what is produced from the well is a mixture of crude oil, water, emulsion, gas, sand and finer solids. One of the first stages of the oil production process is to separate out these various elements; this is achieved in a separator where gravity is used with the heavier sand and water dropping to the lower part of the vessel and the lighter crude oil and gas above. If a hydrocarbon–water emulsion forms there is no clear interface and the separation process requires careful control and possibly the addition of demulsifier chemicals. Information about the thickness and position of the emulsion layer can be provided even with a relatively simple nucleonic system, giving a number of benefits:

- Cost savings from reduced emulsifier use as the emulsifier dose rate can be controlled automatically based on the emulsion layer thickness.
- Reduced oil in the water cut as the lower edge of the emulsion can be monitored and kept well above the outlet.
- Downtime will no longer be caused by a high emulsion layer overloading electrostatic coalescing plates.

In addition, monitoring the solids level within the vessel will ensure that reductions in available internal volume – which reduce residence times and hence separation efficiency – can be monitored and action taken as required.



Gamma source container

Emulsion position and thickness For a typical separator, we can provide a simple solution to give both the level and thickness of the emulsion layer. The mounting position and span is selected to cover the full emulsion/interface range in normal operation. Having long measuring path lengths through the liquid increases the accuracy of the individual density measurements and makes the system less prone to the effects of build-up on the vessel wall that would affect the accuracy.

All of the required calculations can easily be carried out in the control system by taking the three inputs from the nucleonic density transmitter. The simplest control philosophy would use the upper emulsion oil boundary to control the water cut and the emulsion thickness to control the rate of demulsifier addition.

A measurement of the solids level in the vessel can also be carried out using a nucleonic transmitter; this can either be part of the emulsion measuring system, using the same single radioactive source, or a separate system mounted at a different location on the vessel, usually near the inlet.



Gammapilot compact transmitter for level and density detection

Profiling The most accurate visualisation of the separation efficiency and of the emulsion distribution within the separator is given by using a full density profiling solution which will give more information and allow better optimisation of the separation process. With our multi detector density profile solution, several detectors are mounted on the tank wall and a single source is inserted into the vessel at the midpoint of the measuring range in a drywell. Multiple systems can be used to give measurement along the length of a separator:

- A first stage mounted near the inlet to measure solids and the initial state of separation.
- A second stage to measure the development of the emulsion layer.
- A third stage near the weir to control the interface level and ensure separation.

The benefits of radiation-based emulsion

measurement Both the systems detailed have the advantage that the only internal parts are the radioactive source and the drywell used to locate it in the correct location inside the vessel. The advantages of this approach are:

- No parts with failure potential are installed internally so there is no possibility of having to isolate the vessel for maintenance or repair.
- The external detectors can easily be exchanged in case of damage or failure.

- The detectors used will all be of the same type, reducing the need to hold individual spares.
- Process connections as small as 1½" can be used for the insertion drywell connection, allowing the possibility of retrofitting to existing vessels.

Increasing the amount of information available for accurate process control will decrease costs and increase process uptime when compared to having a simple interface level measurement. By monitoring both the position and thickness of the emulsion layer, accurate control of the water cut and demulsifier addition is achieved. This improves separation performance and decreases demulsifier use.

Measurement based on gamma radiation has a reputation for being difficult to design, build, install and operate. Yet, nearly 60 years after the technique was first introduced, there are still measurement challenges in oil and gas production and refining that can only be reliably solved by the use of a radiation-based solution. With over five decades of involvement with nucleonic devices coupled with extensive application experience, Endress+Hauser can make the implementation of radiation-based measurements as simple as possible.









SS2100i-1 process gas analyser

Benefits of laser-based gas analysers

- Simple operationVirtually maintenance free
- No drift or interference from contaminants
- Accurate, real-time measurements
- Reliable in harsh environments
- No support or carrier gases required
- NIST-traceable factory calibration
- Field calibration not required

Groundbreaking gas analysis

The acquisition of SpectraSensors has strengthened Endress+Hauser's analysis business – and given access to revolutionary laser technology. We can now offer precise measurement of substances that can have a devastating effect on the integrity of gas pipelines.

Moisture and hydrogen sulphide can cause internal corrosion in natural gas pipelines. Therefore, in order to avoid pipeline ruptures and to comply with quality specifications, gas companies must measure such parameters. Yet traditional infrared analysers can suffer from false positives or crossinterferences from other contaminants present in natural gas streams.

SpectraSensors SS2100i-1 process gas analysers are exceptionally reliable for measuring trace gas components using tunable diode laser (TDL) technology. TDL absorption spectroscopy is a high-resolution infrared technique that enables the measurement of specific gases with precision while avoiding interferences. With ATEX and IECEx approval, the analysers are ideal for use at custody transfer points to measure moisture and hydrogen sulfide on export metering packages, as well as in natural gas processing plants to measure hydrogen sulfide on amine scrubber outlets or moisture on desiccant dryer outlets.

Proven reliability Tunable diode laser absorption spectroscopy was introduced to hydrocarbon applications by SpectraSensors more than a decade ago. The rugged nature of these laserbased analysers has allowed them to be used in natural gas pipelines with very little maintenance, no interference and with no detrimental effects from contaminants such as glycol, methanol, amine or moisture slugs. Since its inception, this technology has demonstrated its reliability in thousands of installations worldwide.

Validation SpectraSensors TDL analysers require no calibration in the field and the factory calibration is stable for the life of the analyser. However, a process operator will want to check that the analyser is performing in the field. To enable this the analyser systems are equipped with validation gas connections to accept gas blends of moisture or hydrogen sulfide. Additionally, automated validation options are available for triggering validations on a routine basis.





Two wires are the answer for the chemical industry

Round-the-clock operational safety and plant availability are important in all process industries, but none more so than in the chemical industry.

Our new range of two-wire flowmeters has been designed with the chemical industry in mind to offer accurate, reliable and safe flow measurement in the toughest of applications. Whether you want to measure mass or volume of a liquid, steam or gas, we have a true two-wire flowmeter for the job.

Operators in the chemical industry have to balance a number of, sometimes conflicting, requirements including plant performance, flexibility and cost-effectiveness. They are also confronted with a growing diversity of measuring tasks and device types. This complexity can only be managed by standardisation of field instrumentation. Two-wire technology is well-established in the chemical industry and has revolutionised many of the available measurement technologies. Now Endress+Hauser's range of Proline 200 flowmeters offers the efficiency of two wires for all flow measurement tasks, whether your application demands Coriolis, vortex or electromagnetic technology. And, as the hardware and software was developed completely in accordance with SIL (IEC 61508), the range is ideally suited for use in safety systems. **Two-wire Coriolis meter** Promass 200 is the world's first Coriolis flowmeter with genuine, industry-compliant two-wire technology (4–20mA). It enables the device to be seamlessly integrated into existing infrastructures and control systems due to a familiar and uniform installation procedure. It also offers high operational safety in hazardous areas thanks to an intrinsically safe design (Ex ia) and costs less than traditional flowmeters to install and wire.

Efficiency through uniformity Proline 200 flowmeters are based on a uniform concept that significantly reduces complexity for the end user. The new concept standardises operation, menu structures, function designations, software, interfaces, data management, system integration, display of errors, documentation and even product structure. These innovations create long-term benefits over the entire lifecycle of a plant.

Industry standards Safety requirements and cost pressures compel many branches of industry to meet regulations, standards or recommendations. All Proline 200 flowmeters have been developed in accordance with SIL and NAMUR recommendations (NE 131 and NE 132) to ensure compliance with such regulations and standards. They also meet the requirements for interference immunity, data retention in the event of a power failure, signal level, software, pressure equipment directive, self-monitoring, error display and much more.



Heartbeat Technology Our new generation of Proline flowmeters is fitted with Heartbeat Technology to provide continuous or on-demand diagnostics, monitoring and verification. This ensures your flowmeter is functioning correctly, independent of process and ambient conditions. This unparalleled self-monitoring capability offers complete flexibility to plan proof-testing and other maintenance with minimal effort and exposure of personnel.

Diagnostics allow for a rapid response to a device reaching a critical condition. A warning will be given, in accordance with NAMUR recommendation NE 107, and displayed by the device as a diagnostic event. The user will also be given direct instructions on the correct action to take. Heartbeat Technology also includes comprehensive condition monitoring, making it possible to display temporary, process-specific faults that neither calibration nor verification can detect.

Verification can be used to take and store a snapshot of the device status, in order to demonstrate that the flowmeter meets specific technical requirements defined by the manufacturer or user. During verification, the current conditions of the secondary parameters are compared with their reference values, thereby determining the device status. A traceable and redundant reference, contained in the verification system of the device, is used to ensure the reliability of the results. Verification results produce a report, which includes a qualitative assessment of the checked parameters as well as noting whether the device passed or failed. The report can be used to comply with ISO 9001 or, in safety-related applications, as documentation of the proof test. Up to eight verification reports are stored in the device.

Sensors proven in use Endress+Hauser's flowmeters are proven in use in real-world applications in the chemical industry. In our 60 year history we have successfully installed over three million Coriolis, electromagnetic and vortex flowmeters. And, as all Endress+Hauser flow measuring devices are tested on accredited and traceable calibration facilities (to ISO 17025), you're guaranteed the greatest measuring accuracy and repeatability, even in long-term operation.





Bespoke solutions

Endress+Hauser's production centres manufacture instruments and sensors in 11 countries, including the UK. Our UK Centre of Competence in Manchester supplies tailor-made solutions and bespoke engineering for temperature, flow and level measurement.

Our specialists offer a wealth of knowledge in design, procurement of materials, project management, manufacture and inspection of equipment destined for high-end applications around the globe.

Temperature engineering Our Centre of Competence has been designing and manufacturing temperature assemblies – including solid drilled thermowells and RTD assemblies – for over 35 years. Because of our wealth of experience, Endress+Hauser is considered one of the few competent global suppliers for critical temperature applications. We design and manufacture assemblies with sensors and thermowells to internationally recognised standards in a wide range of materials, including ceramic, hastelloy, titanium, tantalum and all grades of stainless steel. Sensors are available in various configurations; we manufacture units from as small as 0.5mm in diameter up to 30-way multipoint assemblies for reactors and tanks.

Our speciality is the design and manufacture of highly complex bespoke engineered temperature solutions. Our expertise has been widely used for multipoint temperature measurement devices including semi-flexible coaxial multipoint and 3D vessel profile multipoint.





Flow engineering Complementing our existing flow portfolio of electromagnetic, Coriolis, vortex and thermal meters, Endress+Hauser UK manufactures a range of primary devices from orifice plates and orifice carriers to flow nozzles and Venturi tubes – all designed and manufactured in accordance with BS EN ISO 5167. Further to these standardised primary devices, we also offer averaging pitot tubes.

The square-edged orifice plate is one of our most popular low-cost flow measurement solutions. It can be used for general purpose flow measurement and is economical, easy to install and versatile. The scope of supply can include the plate, carrier, flanges, accessories or the full metering run.

Flow nozzles machined from a single forging can be provided for metering high velocities, high temperatures and high pressures, including superheated steam. The Venturi tube, either machined from solid metal or fabricated from rolled plate metal, can be provided for reliable flow measurement with the additional benefit of low pressure loss and minimal upstream piping requirements. It is used extensively in arduous metering applications such as those found in subsea processes, where space and energy conservation is at a premium.

Pitot tubes fabricated from tubing can be retrofitted to existing pipelines and ducting, providing a repeatable, cost-effective solution within larger pipe diameters with negligible of pressure loss. Pitot tubes are ideal for applications with short upstream and downstream lengths.

Accessories such as valves, manifolds, condensate pots and panels are available with the differential pressure measuring cell to complete the volumetric flow metering solution. We also offer a mass flow solution by supplying static pressure and temperature measurements together with a flow computer.





Level solutions We offer a bespoke design service using standard or exotic materials to manufacture level accessories such as:

- Bridles
- Stilling wells
- Dry wells
- Bypass chambers

all in accordance with PED and piping requirements.

Our extensive level product range spans a wealth of different technologies to ensure you get the ideal solution for your application. Going above and beyond simple instrument sales, our devices are complemented by a range of mechanical components, designed specifically to suit your application in a variety of materials. Many of our level devices are designed in accordance with IEC 61508/IEC61511-1 for installation and integration into safety systems, conforming to SIL2/3. We also offer CAD design drawings in 2D and 3D.

Panel solutions Our panel solutions service includes the design and build of bespoke panels to house a wide variety of instrumentation including displays, alarms, data collection, process control and liquid analysis equipment. From the simplest indicator panels through to complete tank farm control panels and fully serviced, stand-alone analyser kiosks, Endress+Hauser has the capability to provide panels and enclosures that are designed to complement your project architecture perfectly.

Our design engineers take an intelligent approach to your panel design in order to ensure that it meets your exact specifications. We'll consider the final location of the panel to ensure that the most suitable housing materials are used and will recommend solutions to deal with problems that are particular to your site. We have the capability to deliver panels for hazardous areas and to incorporate safety controls for critical systems. Site and factory acceptance tests (FAT & SAT) will be carried out as and when required.

As an ISO 9001 accredited company, you can rest assured that our quality procedures are followed throughout the complete design and build process.





Automation expertise

Finding a world class supplier of process instrumentation who can also provide the associated control systems engineering is a real challenge. Equally, many system integrators are tied to one systems manufacturer and have little or no instrument experience. Endress+Hauser is uniquely positioned in being able to offer both device and systems engineering expertise.



Since the formation of the company in 1953, Endress+Hauser has become an established supplier of process instrumentation and associated services. But did you know that we also have an experienced group of systems engineers embedded within our solutions delivery team?

Experienced engineers With the introduction of project engineering services to our portfolio over a decade ago, the requirement for systems expertise became apparent. We invested in experienced engineers who have the capability to translate the users' requirements into bespoke control and display systems, utilising PLC or HMI-based hardware and associated SCADA software. If you already have a systems site standard in place, rest assured that our systems engineers have vast knowledge and experience of the most popular automation platforms used in process industries today.

As you have unrivalled knowledge of your own plant, our system engineers will work in close cooperation with you, employing your experience to develop a control philosophy that will automate your process. Our engineers will join the project delivery team headed by one of our experienced project managers and, in line with our quality procedures, produce a Functional Design Specification (FDS) document which is approved by all parties before the system configuration and test begins. They will stay with the project for the on-site commissioning, training and final handover.

Automation projects from beginning

to end The risks involved in implementing an automation project usually increase when many different disciplines are involved. This includes engineering services such as project management and design, applying the correct process measurement devices, installing and commissioning devices and plant networks, or implementing the control and display system. Endress+Hauser has vast experience and capability in all these areas and can bring additional industry-related expertise to the table, all backed by our support network of production centres and partners. We can therefore take full end-to-end responsibility for the project delivery.

We are experienced in delivering a range of automation solutions, including mixing and blending systems, tank inventory monitoring, pump and valve control, chemical dosing skids and fermentation plant control. So why stop at the measurement device? If your requirement extends to control and visualisation, ask us about our systems engineering capability and benefit from our proven track record in delivering automation solutions to industry.



For more information visit www.uk.endress.com/solutions or call 0161 286 5050



Endress+Hauser Ltd Floats Road Manchester M23 9NF Tel: 0161 286 5000 Fax: 0161 998 1841 info@uk.endress.com www.uk.endress.com



1. SANSIE NO