

Successful Tank Farm and Terminal Management

It starts with safety, efficiency and simplicity



Keep your tank farm running safe, smooth and successful. Now and in the future.

Maintain the highest levels of safety for your employees, plant and business compliance requirements.

Good business decisions require reliable and trusted information, from sensor to business system. Our tank and terminal inventory management solutions support you to overcome the challenges.

Safety by choice, not by chance Protect your staff, plant and environment with instruments and systems designed to the highest international standards of safety.

Perfect fit high accuracy instruments Our industry-leading field instrumentation ensures highest reliability and accuracy in your processes - from custody transfer level and flow measurement to temperature transmitters and liquid and gas analysis.

Increased productivity Reduce inventory costs and increase productivity with complete inventory visibility -24/7. Our integration capabilities and inventory management software solutions enable collaboration and business decisions among different stakeholders.

Compliance with regulations Our pre-certified system solutions enables you to streamline your plant certification process and run in accordance to laws and regulations.

Services and engineering Our commitment to you is to support, to service and to optimize your process. Whatever your location or your industry, our global service force of over 1000 experts is strategically located worldwide ensuring active local presence to help you reach your goals.



Inventory Monitoring ensures up-to-date information for the daily operation

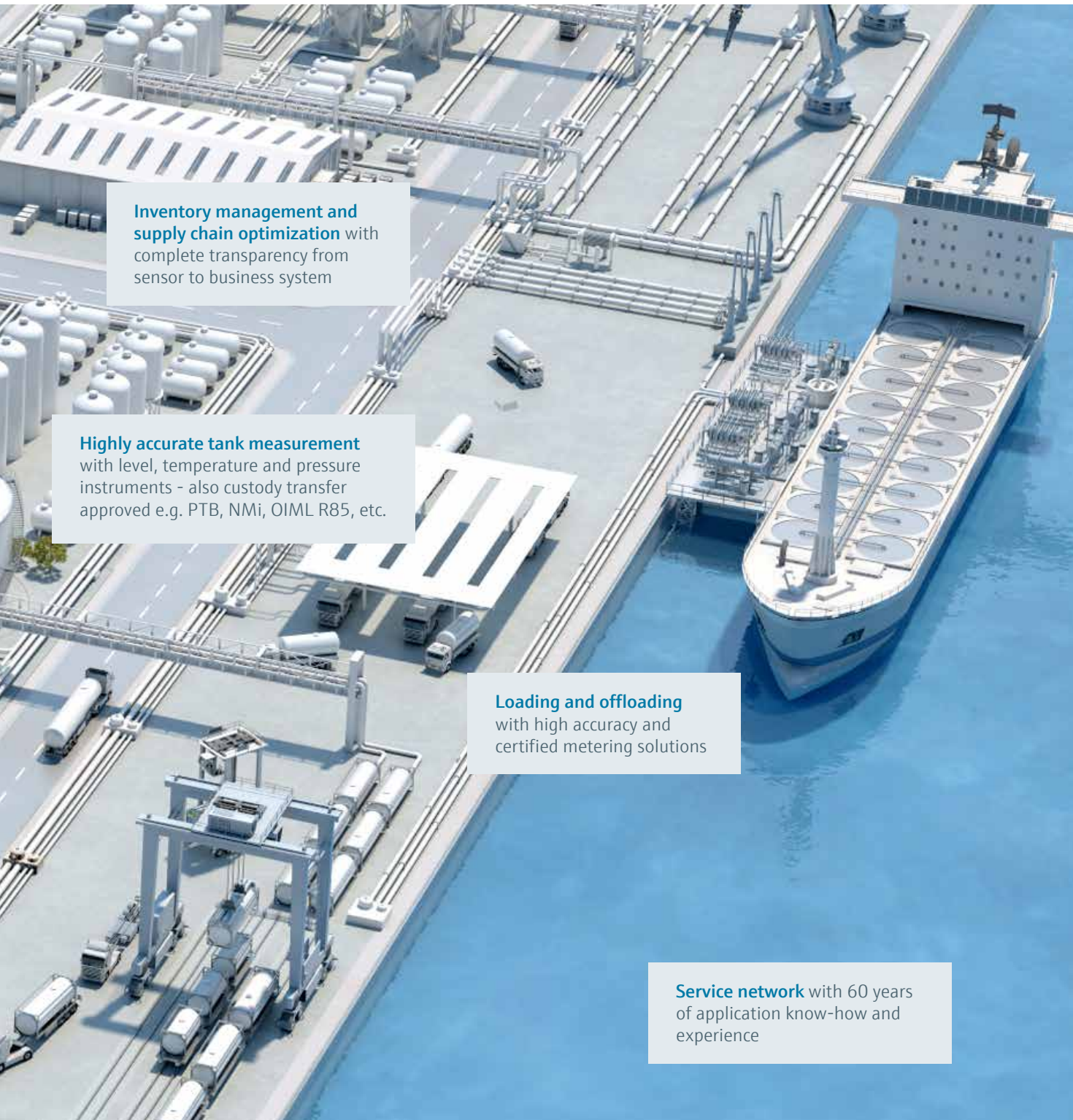
Safety management with best-in-class overfill prevention systems, leakage detection solutions and instruments developed to fulfill highest SIL levels

Seamless integration with all software and gateways required - wired or wireless



Your benefits

- Protection of your assets
- Highest safety for your staff and environment
- Compliance with regulations
- Increased efficiency and revenue



Inventory management and supply chain optimization with complete transparency from sensor to business system

Highly accurate tank measurement with level, temperature and pressure instruments - also custody transfer approved e.g. PTB, NMI, OIML R85, etc.

Loading and offloading with high accuracy and certified metering solutions

Service network with 60 years of application know-how and experience

Freedom of choice

You want to optimize your tank farm operations, from the precise measurement of various types of liquids to increased tank utilization and logistics accountability. We help you at every step, from selecting the right instrumentation to application and engineering support.

Our new platform of high-performance tank gauging instruments supports both servo and radar technologies, each with a range of sensing elements and process connections to ensure accurate and reliable measurement in almost any process and environmental condition. It is the world's first platform of both typical tank gauging measuring principles designed according to IEC 61508 and certified SIL2/SIL3 capable.

Select the measuring technology and method of your choice, regardless of the application. A variety of open and vendor-specific communication protocols enables integration into any tank gauging system. This opens the way for unlimited future expansion and migration possibilities. The platform also includes the unique Endress+Hauser management and analysis features:

- **HistoROM**® data management concept for fast and easy commissioning, maintenance and diagnostics
- Highest reliability even in the presence of obstructions in the vessel due to new **Multi-Echo Tracking** evaluation

Consider the possibilities for a conceptual change, from the plant full of complex variants to one of simplicity, uniformity and efficiency across all your field instrumentation. Easily migrate your existing instruments and advance your tank farm to the state of the art – step by step, or in one go. Why not release yourself from manufacturer-dependent protocols? Our instruments keep your plant flexible, scalable and in your hands.

Highest accuracy – guaranteed Our tank gauging instrumentation including Micropilot® and Proservo are developed according to international metrology recommendations such as OIML R85 and API MPMS, qualifying the devices to be components of certified systems. Local and country-specific certifications like NMI or PTB are also available to meet your requirements. The Micropilot is the first 80 GHz radar for liquids and assures highest accuracy with smallest beam angles. And with the world's tallest calibration rig for servo technology certified to 131 ft. (40m), we can guarantee the highest accuracies and by that reliability.

The right sensor for any requirement Easily make the right choices that help you stay on schedule, reduce costs and increase productivity. With our integrated high-accuracy system components you can trust that your operation is always under control.



Your benefits

- Higher accuracy and higher safety give you more control
- Common design components reduce complexity, commissioning and spares
- Simplicity, uniformity and efficiency across all field instrumentation



Micropilot NMR81



Free space radar, 80 GHz, drip-off lens antenna, 3° beam angle, free-space installations.

Accuracy: ±0.5mm (1/32in)
 Measuring range: 70m (230ft)
 Custody transfer range: 30m (98ft)
 Process connections:
 2"/DN50 to 4"/DN100

Micropilot NMR84



Stilling well radar, 6GHz, drip-off planar antenna, stilling well applications.

Accuracy: ±0.5mm (1/32in)
 Measuring range: 40m (131ft)
 Custody transfer range: 30m (98ft)
 Process connections:
 4"/DN100 to 12"/DN300

Tank Side Monitor NRF81



Field gateway integrates both Ex d (XP) and Ex i (IS) tank gauging devices for HTG or HTMS calculations, visualization and output to a host system.

Proservo NMS80



Basic servo gauge measures level, interface, density in free-space and stilling well applications.

Accuracy: ±0.4mm (1/32in)
 Measuring range: >36m (118ft)
 Custody transfer range: 36m (118ft)
 Process connections:
 3"/DN80 to 6"/DN150

Proservo NMS81



Premium servo gauge with 316L housing for demanding corrosive applications. Ideal for liquefied gases.

Accuracy: ±0.4mm (1/32in)
 Measuring range: >47m (154ft)
 Custody transfer range: 40m (131ft)
 Process connections:
 3"/DN80 to 6"/DN150

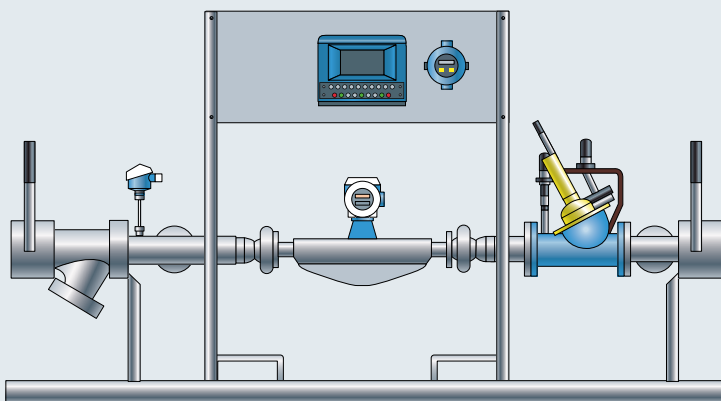
Outputs and Certificates

Common features of platform products:

- Fieldbus: Modbus®, V1, HART®, dual fieldbus output
- Analog I/O for 4 to 20mA SIL, HART, RTD in and 24V power supply
- Digital Ex d (XP) for SIL relay, discrete active/passive
- Metrological certification NMI, PTB, OIML
- Unified SIL concept, developed according to IEC 61508 for SIL2/SIL3
- Device diagnostics according to NE 107

Additional instrumentation and systems

Besides the tank gauging devices we offer process instrumentation and software packages for all the tasks in your tank farm or terminal: Pressure, flow and temperature devices, loading metering skids as well as data interfaces and our inventory management software solutions Tankvision®, Terminalvision® and SupplyCare®. Contact us for more information about the world's largest portfolio of tank farm automation systems and instrumentation.



Loading Metering Skid



Tankvision



Terminalvision



Inventory management – so much more than just a sensor

Reduce inventory costs and increase productivity with complete inventory visibility - 24/7.

Monitoring and control of bulk liquids during processing, transportation and storage is challenging. You need to keep track of how much raw material you have on site and how much storage space you have available. Tank environment and relevant safety considerations are of high importance for your tank farm or terminal.

Precise data from the field are the baseline for inventory and supply chain management. Collection, consolidation and centralization of data becomes more and more important in the interconnected business world.

Our inventory management solutions support you:

- Highest transparency of product gain or loss balance by reconciliation of stock and in- and outflows in the plant or headquarters
- Increase customer satisfaction by improving delivery performance and avoiding product run-outs or emergency deliveries
- React fast and efficient to supply chain volatilities thanks to the optimization of the company's supply and value chain

- Lower inventory management costs by integrating data in your systems, facilitating fast and effective data exchange with your partners and systems
- Increase productivity with higher accuracy of your inventory monitoring and better planning capabilities



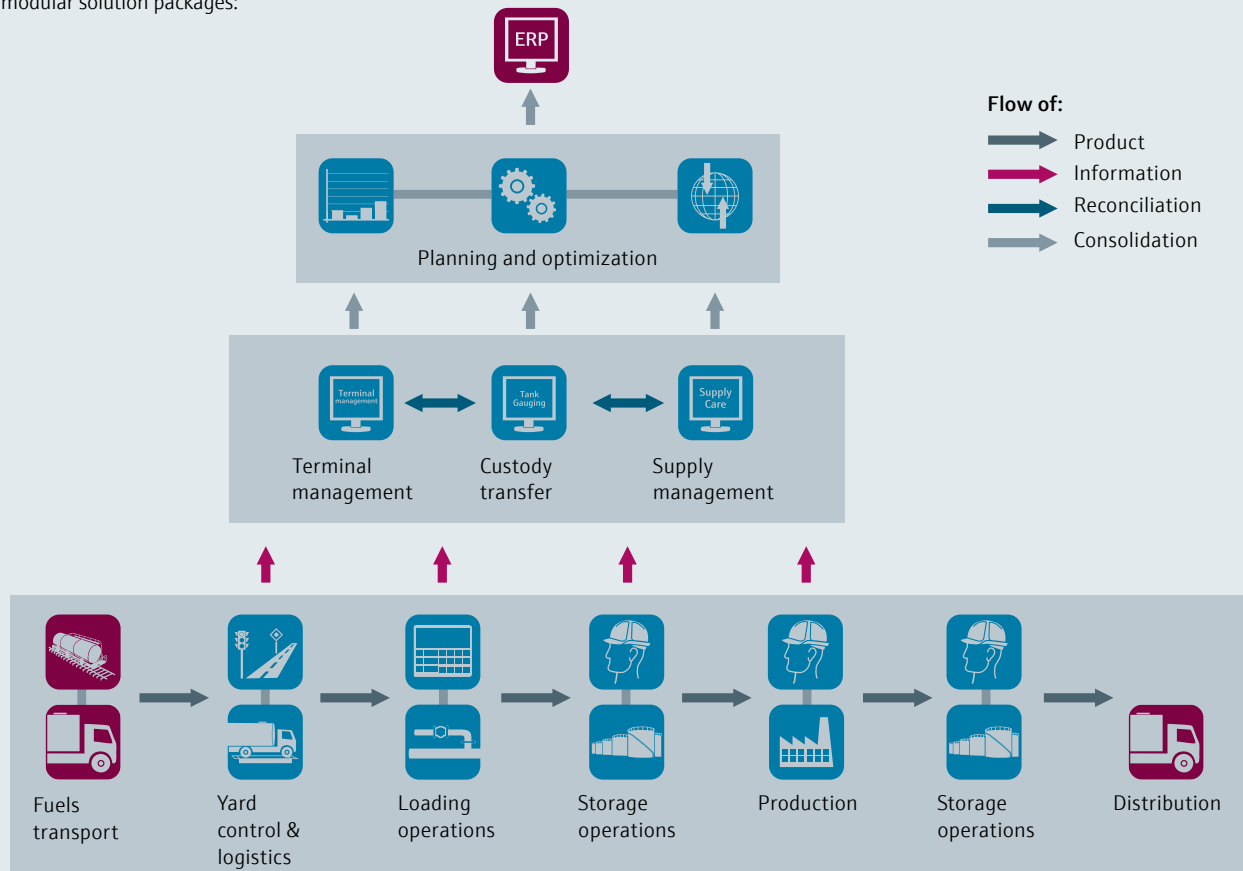
Your benefits

- Precise calculated inventory
- Optimized gain/loss balance
- Inventory cost saving



Solution packages

We developed standardized inventory management solutions to meet the evolving demands of the industries to use precise and reliable data for business decisions. The inventory management solutions incorporate field devices, scalable system designs - including custody transfer approved systems - as well as centralized supply chain management systems with data integration into ERP (Enterprise Resource Planning) business systems. We support you completely with project consultants and life cycle services. Example of scope of modular solution packages:



Boost your efficiency

Intelligent field instruments increase safety and decrease costs.

Efficiency and safety are preconditions for operating a terminal or tank farm successfully. We do not only have the right field instruments for each one of your applications, our instruments and automation solutions also facilitate your daily business. Be it in commissioning, maintenance or during running operation, our intelligent instruments and systems support you in saving costs and time, thus, securing maximum plant availability:

- Intuitive, standardized handling: Reduces complexity and lowers costs for training, commissioning, maintenance and operation. Automatic data backup facilitates the easy exchange of electronic systems without any recalibration.
- Modular device concept for spare parts and components: Decrease storage costs by reducing stored spare parts and increase plant availability by exchanging subcomponents flexibly.
- Seamless system integration: Reduced engineering efforts, an array of communication protocols and harmonized software version management safeguard fast integration and stable plant operation.
- Standardized Ex (hazardous area wiring) concept facilitates highest safety at maximum flexibility in global use. Consistent realization of relevant industry standards as well as international metrology specifications guarantees high operational safety.



Your benefits

- Simplified operation and higher efficiency
- Increased productivity through more control
- Reduced costs for maintenance and spares



Data storage concept Simply unforgettable

- Automatic storage of all device and configuration data ensures maximum plant safety
- Integrated event logbook and data logger for quick failure analysis



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W@M® Life Cycle Management

Improved productivity due to comprehensive asset management

- An open and flexible information platform joined with the right services, boosts productivity in every phase of an instrument's life
- Shortens your plants engineering time – e.g. with Applicator® for selecting and sizing instruments – speeds up procurement processes and increases plant uptime
- Improves plant performance by access to critical asset information for optimized maintenance activities



Seamless system integration

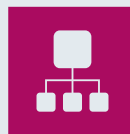
Device integration via fieldbus technology

- A wide range of fieldbuses ensures the most direct and transparent integration of devices
- Risk-free integration through extended host testing and certification ensures perfect interaction between device and host
- Compatibility over the entire product life cycle enables simple device replacement without expert know-how

Operation concept (HMI)

Simplicity through uniformity

- Time-saving Endress+Hauser operating concept: Uniform user interfaces, parameter names, etc.
- Optimal usability through guided parameterization and multi language support
- User-specific menu structures and device access concepts for increased plant safety





Your safety is our mission

Accurate, robust and highly reliable instrumentation increase your productivity. Endress+Hauser stands beside you to protect your plant, people and reputation.

Storage and handling of flammable and toxic substances poses hazards for people and the environment. From time-to-time we are sadly reminded that there is no absolute guarantee of safety. Industrial disasters remind us of the importance of proper safety management. Endress+Hauser is the right partner to help you find the right balance between plant safety, optimizing resources, increasing uptime and reducing costs.

Safety by design Our portfolio of instrumentation is designed to meet the needs of safe and reliable operation in the oil & gas and chemicals industries. Functional Safety requirements according to IEC 61508 and ISA documents are included by design. Proservo, Micropilot and Tank Side Monitor can be used in applications up to SIL3 in homogeneous redundancy.

Overfill prevention Safety instrumentation by Endress+Hauser fulfill the requirements of API 2350 published by the American Petroleum Institute to protect against storage tank overfill in petroleum facilities.

All of our products are designed and qualified in our independently certified laboratories. This includes the development of safety related hardware and software.



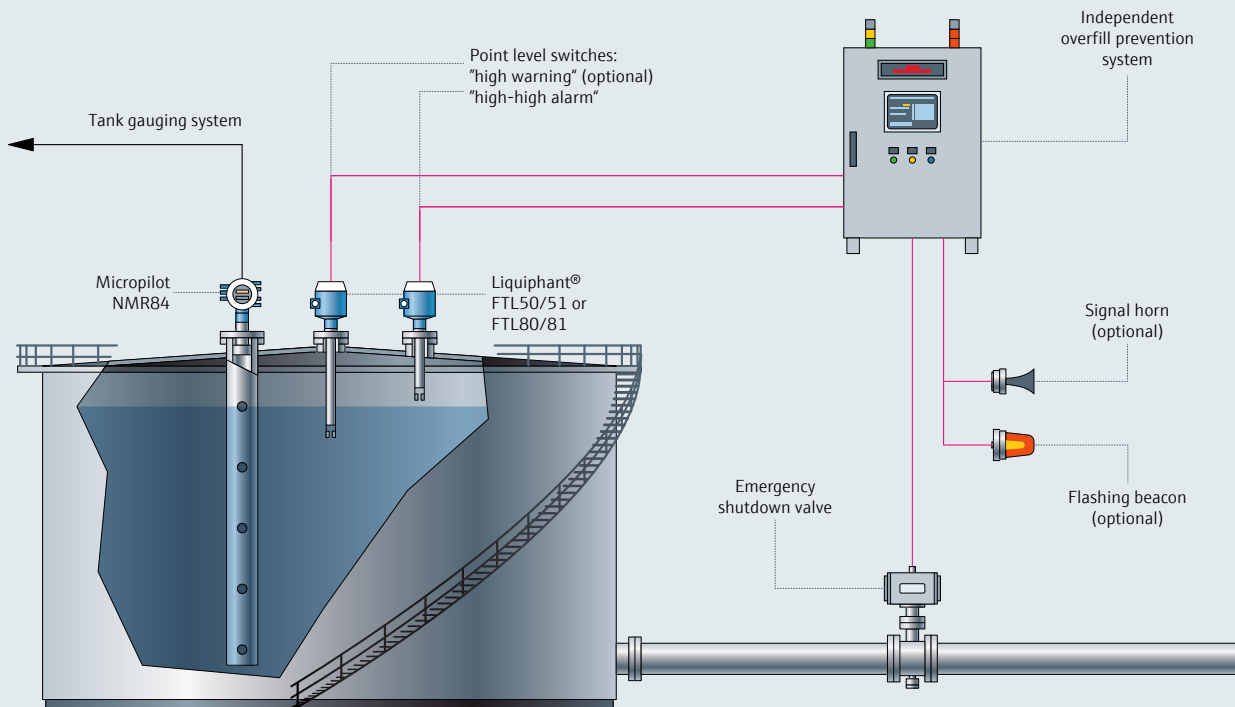
Your benefits

- Higher plant availability
- Increased productivity
- Safety compliance
- Peace of mind



Overfill Prevention System

The role of petroleum and chemical storage tanks is significant and complex. They serve as large containers for powerful and volatile fluids, which if not monitored have the potential to cause immense environmental damage. As a result of recent incidents, systematic overhauls to overfill prevention systems have taken place and industry best practice for managing storage tanks now combines the existing API 2350 prescriptive standards with the IEC 61511 functional safety standards. Our Overfill Prevention System is a pre-configured system helping you to detect, indicate and prevent hazardous overflow levels in a storage tank. Required primarily for chemical and petrochemical tanks, it complements our tank gauging and inventory management solutions.



Committed to your business, for improved plant performance

Calibration Calibration ensures that instrument measurement is accurate and within the limits required to produce a quality product. Endress+Hauser provides both lab & field accredited calibrations.

Support Endress+Hauser's technical support experts ensure your installed base of instruments, software, and/or automated solutions are kept running smoothly over time. The support is tailored to meet your needs and is available worldwide and around the clock to guarantee a fast response time.

Training Endress+Hauser offers a unique training experience that can meet the increasing demands our customers face.

Commissioning Because time, human resources and specific skills become critical factors when a project is nearing completion, utilizing Endress+Hauser's commissioning services bring important benefits. Our expert technicians will ensure that your instruments are commissioned properly. In addition, we also offer a variety of complimentary extended warranty options for customers that utilize our commissioning services.

Maintenance By combining your process competence with Endress+Hauser's automation know-how, we collaborate through a planned and practical approach to improve your maintenance efficiency while achieving compliance with safety, quality and environmental requirements. Our experts can propose improvements that decrease process interruptions and minimize maintenance efforts.



More information at www.us.endress.com/services



Give us your feedback:
www.endresslistens.com



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