



Terminal Automation Solutions
SmartRadar FlexLine
Global Experience. Locally Applied.



Honeywell Enraf provides an integrated solution to meet all terminal management needs, however large or small.



Since 1925, Honeywell Enraf has been the leading supplier of complete solutions for bulk storage tank gauging and inventory and now has the world's largest installed base of tank gauging equipment.

Whether your tank is spherical or cylindrical, fixed roof or floating roof, storing chemicals or petroleum products, our portfolio covers the solution. With our fast and powerful data acquisition and process software, customers can monitor their complete tank inventory.

Honeywell Enraf's reputation is based on high accuracy, reliability and long-lasting equipment. Our installations have passed the test of time, from the intense heat of the Middle East to the extreme cold of the Arctic.

Our customers' satisfaction made us the worldwide leading provider of high quality instrumentation, systems and service and support for bulk storage management and related operations.

OneWireless

The SmartRadar FlexLine is now also available as part of Honeywell's ISA 100-compliant OneWireless offering for a cost-effective solution that is secure, scalable and open.

The wireless FlexLine is a native OneWireless device that can be seamlessly integrated into the infrastructure. No additional components are needed.

Besides the accurate radar level measurements, other radar measurements can be wirelessly transferred to the operational interface. Via the open OneWireless infrastructure, the FlexLine can be connected with Honeywell's Entis or Experion systems, or to any third-party operational interface. Full configuration can be carried out via the wireless infrastructure.

Existing (wired) infrastructure can easily be migrated to wireless, where both infrastructures can even run in

parallel allowing a smooth transition. The FlexLine integrated with the OneWireless infrastructure is the only available wireless solution today that is Weights and Measures approved.

The comprehensive availability of input/output (I/O) options includes a separate alarm output that enables users to directly transmit any alarms. Field equipment, such as pressure transmitters, HART instrumentation and VITO probes for temperature and/or spot measuring, can therefore be easily connected to the FlexLine. All I/Os are galvanically isolated which also protects your installation in the event of a lightning strike or serious failures in the connected devices.

HART Compatible

The FlexLine series is now available as a HART compatible device. This allows the FlexLine to be connected to any operational interface or other device that supports HART. All level information, parameters and diagnostics can be transferred to the

operator HMI via this interface stack. The HART information can also be routed via the OneWireless infrastructure. Due to the modular architecture of the FlexLine, even multiple HART interfaces can be integrated into one gauge.

Simplicity and Integrity

The FlexLine is a building block that enables end users to upgrade and optimise existing tank gauging systems and to plan for all future eventualities. Honeywell Enraf ensures optimal communication with other instrumentation or systems, fast installation and simplified maintenance.

Honeywell OneWireless

The wireless network infrastructure for your plant:

- Process Instrumentation
- Process Automation Systems
- WiFi Mobile Handheld PCs
- Ethernet LAN/WAN Network
- RFID-tag Tracing
- ATEX Certified



Enhanced Performance Signal Processing

Having radar antennae that can be installed close to the tank wall, Honeywell Enraf's Enhanced Performance Signal Processing makes it possible, even under the most difficult circumstances, to measure the level with extreme precision. Objects and other elements, such as sealants, do not influence the signal processing quality. Any deviation in the diameter of the still-pipe length or clogging is compensated by Honeywell Enraf patented technology.

Due to this extreme accuracy, the SmartRadar FlexLine possesses an unequalled control range, enabling optimum use of the tank volume. The high accuracy provided by the FlexLine allows for customer cost efficiency up to \$15,000 per tank fill.

Maximum Tank Usage

The true flexibility of the FlexLine is demonstrated both with installation and in providing level measuring capability that is unmatched in the marketplace.

This high degree of accuracy also applies to level measuring in close proximity to the radar antenna. Whereas traditional systems require ullage of 0.5 – 1 m (20" – 40"), the FlexLine requires only a minimum ullage of 30 cm (12"). This allows filling a tank to a higher level. Furthermore, where tanks have fixed roofs, the level measuring system can be installed without any special requirements or constraints.

Open Communication

The FlexLine series is equipped with a broad set of communications protocols, including Honeywell Enraf's field-proven Bi-Phase Mark (BPM) communication protocol, which is considered the standard for field communication in tank terminals. With the development of the BPM protocol the integration with storage control systems has been crucial because it is this combination that gives the security of approval by Weights and Measures.

FlexLine's range of communications protocols including (redundant) Modbus link effortlessly with Honeywell's Terminal Manager or any third-party tank gauging systems, DCS or MMI.

RTD

New to the FlexLine offering is the support of RTD temperature sensor

equipment. As all available options, this is an integrated solution where the sensors can be connected directly without any additional equipment needed. The RTD offering is the most accurate temperature measurement available. Accurate measurement can increase cost efficiency up to \$15,000 per tank fill.

The high diagnostic coverage allows automatic compensation in case one of the temperature sensors fails. The RTD option is fully Weights and Measures compliant and conforms to applicable API standards.

The RTD interface in the FlexLine is compatible with all temperature sensors available on the market today. Migration from existing level measurements to the FlexLine therefore is easy, straightforward and cost-effective.



A Flexible and Efficient Solution

The SmartRadar FlexLine series perpetuates Honeywell Enraf's tradition of excellence, using proven and trusted components with the latest technology.

Honeywell Enraf's FlexLine radar gauge allows ISA100-compatible connectivity integrated with Honeywell's OneWireless™ solution. The ISA 100-compatible OneWireless platform has been adopted by major refineries and tank storage companies as the solution for the future.

Within the world of tank storage and trans-shipment the FlexLine wireless radar gauge is the perfect solution for stock management and administration, custody transfer, quality control, processing and operation.

FlexLine wireless improves flexibility and considerably reduces installation costs. The ever increasing requirements on

tank gauging systems are putting high demands on flexibility, reliability and quality. Honeywell Enraf can meet customer requirements for quick installation, easy migration, seamless communication, reliable measurements under all conditions, and trouble-free service and operation, as well as security and unprecedented levels of accuracy.

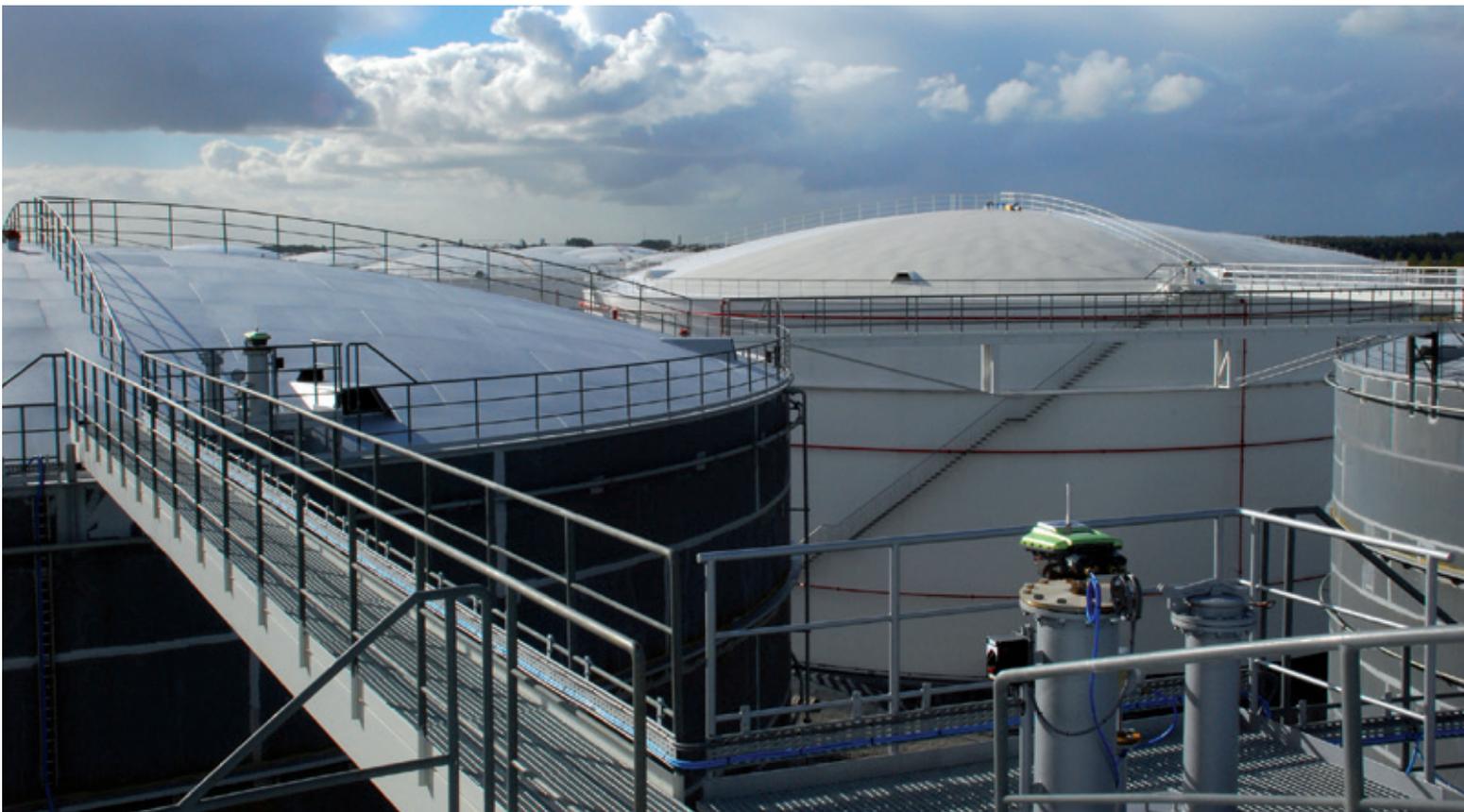
FlexLine is Honeywell Enraf's latest and most technically advanced tank gauging solution. Its modular design and accessories enable integration with existing tank inventory management systems, thereby optimising tank gauging solutions. These highly sought-after capabilities are provided by Honeywell Enraf's new FlexConn architecture, which allows the tank gauging system to synchronize with multiple third-party application environments and cover all customer-specific requirements.

By simply adding option modules cards you can easily adjust FlexLine to meet any future requirements.

SmartRadar FlexLine is a complete set of products and accessories for tank gauging which utilizes cutting edge radar technology and state-of-the-art signal equipment.

The FlexLine series includes numerous options. It is characterized by the basic functions which have been categorized on separate optional modules. With these options, the FlexLine can be configured according to customer requirements and needs.

Communication between the separate option modules is realised via an internal bus system based on the automotive CAN-bus technology.



Safety at All Levels

The housing for the FlexLine is airtight and is C1D2 compliant. The integrated display is intrinsically safe with all basic functions instantly available via the foldout display on the top of the unit. As well as basic parameters, 24-hour trends can be shown on the display that allows easy and simple service.

A separate handheld display can be included as an option. It can be connected to the FlexLine at any time during operation, also in hazardous areas.

Versions to Meet Your Needs

Honeywell Enraf has a solution for different types of liquid and gas transfers. The FlexLine comes in three versions: Xtreme Performance, High Performance and Advanced Performance, depending on the accuracy requirements of the application and the approvals needed.

FlexLine Xtreme Performance

With an accuracy of ± 0.4 mm (± 0.016 ") the FlexLine Xtreme Performance offers precision radar technology that ensures the highest levels of accuracy available. The advanced digital signal processing technology forms the basis for the most reliable measurements, even in the most difficult circumstances. FlexLine Xtreme Performance is in compliance with all essential standards for tank level measurements, including API, ISO, OIML and NMI. The tank gauging system lends itself to custody transfer in accordance with the regulations of all national Weights and Measures. Having a measuring range up to a maximum of 75 m (246 ft), it is unique as a Weights and Measures approved instrument.



Application	
Custody transfer, Weights and Measures-approved	SmartRadar FlexLine XP
Custody transfer, in accordance with API	SmartRadar FlexLine HP
Intermediate storage, in accordance with API	SmartRadar FlexLine AP

FlexLine High Performance

With an accuracy of ± 1 mm (± 0.04 "), the FlexLine High Performance offers all the necessary functions for tank gauging within large bulk storage tanks. This high level of accuracy makes the FlexLine High Performance suitable for custody transfer and provides very reliable measurement. The FlexLine High Performance has a measuring range of 75 m (246 ft) and satisfies all essential standards for tank level measuring, including API, ISO, OIML and others.

FlexLine Advanced Performance

With an accuracy of ± 3 mm (± 0.12 "), FlexLine Advanced Performance lends itself predominantly to trans-shipment tanks. This level measuring system accommodates Honeywell Enraf's leading and proven radar technology and satisfies OIML R85 and API recommended practices. The flexible and modular design, characterizing all SmartRadar versions, offers the SmartRadar FlexLine Advanced Performance the flexibility that is required from a tank gauging system. Depending on the antenna type, the measuring range of the FlexLine Advanced Performance is up to 75 m (246 ft).

Antennas for Every Application

In order to satisfy every application, the FlexLine series offers a wide range of antennas including traditional horn and flat or planar antennas to provide long-term stability and excellent measuring performances. The practical advantages of these multi-feeder antennas are their small size and the perfect control of the microwave indicator.

The antennas are further enhanced by the modularity and the absence of mechanical alignment equipment, which characterizes parabola or horn antenna. The result is a reflection signal which ensures a higher degree of accuracy.

Planar antennas may be used on tanks for level measuring free space or measuring on still pipes.

The provision of Honeywell Enraf's unique tank separator for FlexLine products enables easy installation of all antennas.

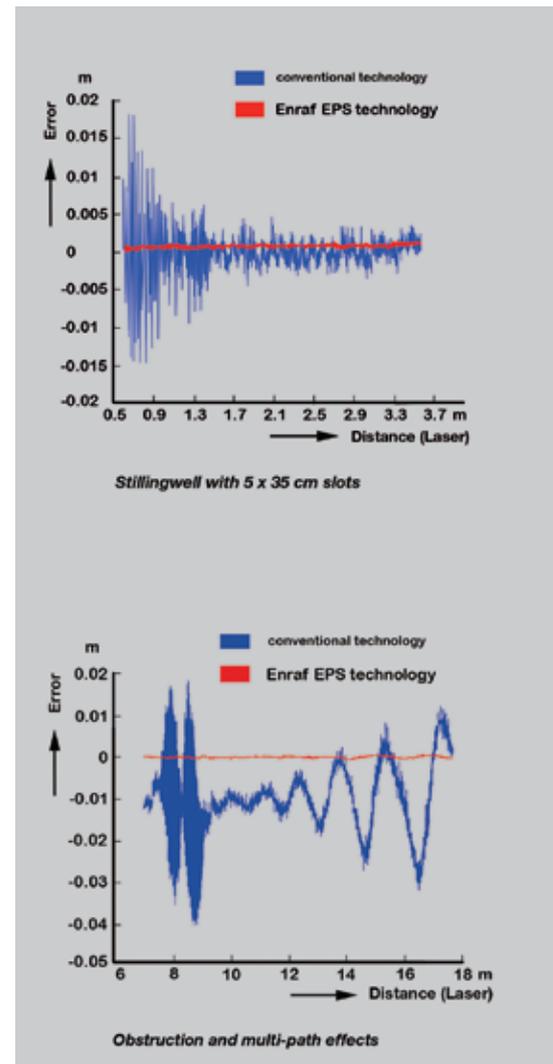
The full program of components and accessories includes antennas for applications in open spaces, still pipes and in areas of high pressure and high temperatures.

Unique in the marketplace is the possibility to use planar antennas even in wide stilling wells (used for crude oil). The FlexLine allows planar antennas to be used in stilling well of 16, 20 and even 24-inch diameter.

Complete Digital Signal Processing Technology

The FlexLine level measuring system employs complete digital signal processing technology, which eliminates the need for regular verification and calibration required by analog components. The added advantage of digital signal processing is that the highest levels of measuring quality and accuracy are attained from the date of installation and maintained over long periods even under extreme conditions.

SmartRadar FlexLine's digital signal processing technology also offers advanced diagnostic functions, including storage of vital components' trend information. Diagnostics take place at parameter level, while the electronics are continually monitored at component level. The diagnostic monitoring functions support a proactive maintenance strategy and contribute to further simplification of remote service.



Service Expertise

All applications are different, especially when existing equipment has to be migrated or integrated. Honeywell's Enraf's experience in tank gauging, inventory management and safety consultancy provides the best solution.

Consultants are available to provide advice and to discuss the technical requirements for your system.

Following installation and commissioning of your system, Honeywell Enraf can help you operate and optimise your system for safe and reliable operations throughout its entire lifetime.



Before Installation

- Wireless site survey
- Safety analysis
- Consulting
- Functional design specification
- Product selection

At Time of Installation

- Hardware and software supply
- Supervision of installation
- Specific application development
- System configuration and integration

After Installation

- Commissioning
- Acceptance testing
- Training
- System optimisation
- Remote and onsite service programs:
 - License support
 - Extended warranty
 - Help desk
 - Emergency support

For More Information

To learn more about Honeywell Enraf's solutions, contact your Honeywell Enraf account manager or visit www.honeywellenraf.com.

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Honeywell Enraf

Your Terminal Operations Partner