



## SmartRadar FlexLine







### **Flexibility – the basic principle**

The ever increasing requirements on tank gauging systems are placing a premium on flexibility, expandability and quality. Quick installation, seamless communication, reliable measuring under all conditions, trouble-free service and operation are concepts that are now being taken for granted. But how often does one tank level measuring system satisfy these requirements effectively and in addition, combine security, reliability and unprecedented levels of accuracy? Then there is the issue of considering current and future expectations.

The development of Honeywell Enraf's SmartRadar FlexLine tank gauging system successfully addresses all these requirements and guarantees cost control, smooth operation, environmental management and security.

### **SmartRadar FlexLine**

SmartRadar FlexLine is the latest and most technically advanced tank gauging system from Honeywell Enraf. Its modular design and accessories enables integration with existing tank inventory managements systems, thereby assuring customisation to satisfy each client's requirements and optimising tank gauging flexibility. These highly sought after capabilities are provided by

Honeywell Enraf's new FlexConn architecture, which enables the tank gauging system to synchronise with application environments and each customer's specific requirements. In developing SmartRadar FlexLine, consideration has been given to end-users' future requirements, with FlexConn architecture enabling gauging systems to be extended or adjusted simply and efficiently. Furthermore, the advantages of the FlexConn technology can be utilised across all applications, from installation and operation through to service and maintenance.

SmartRadar FlexLine is a complete set of products and accessories for tank gauging which utilise cutting-edge radar technology and state-of-the-art signal equipment. Quite simply, SmartRadar Flexline provides all that is required of a level measuring system. Advanced digital signal processing technology, optimum connectivity and compact, innovative planar antennae make the SmartRadar Flexline series the ultimate measuring system for all areas and all circumstances. Within the world of tank storage and transshipment it is the perfect solution for stock management and administration, customs transfer, quality control, processing and operation.

### **Honeywell Enraf – solid, reliable, hi-tech**

Solid, reliable and hi-tech – this is how SmartRadar Flexline series defines itself. These characteristics are synonymous with Honeywell Enraf. For more than 50 years we have specialised in the development, production, sales and service of products and systems for level measurement in storage tanks. Honeywell Enraf products and systems have proved themselves worldwide year after year, offering the flexibility and capabilities to meet customers' specific needs and demands under all circumstances.

The SmartRadar Flexline series continues this pattern of excellence, using proven and trusted components exploited by the latest state of the art technology. It is this combination which guarantees the highest quality and reliability and ensures that installation, maintenance and servicing can be carried out rapidly and easily. And the future? This has already been incorporated within the design of the SmartRadar. By simply adding module cards you can easily adjust the SmartRadar FlexLine to your future requirements and needs.



## SmartRadar FlexLine – always precise



Products from the SmartRadar Flexline series offer numerous functionalities, enabling each measuring application to achieve the optimum result. SmartRadar FlexLine is characterised by the basic functions which have been categorised on separate modules suitable for installation as a PCB on a DIN-rail. With these far reaching standardised PCB's, SmartRadar FlexLine can be configured according to your requirements and needs. Communication between the separate PCB's is realised via an internal bus system based on CAN-bus technology.

### Safety at all levels

The housing for the SmartRadar FlexLine is designed around the DIN-rails and PCB's. The measuring system itself is airtight and the integrated display is intrinsically safe, with all basic functions being instantly available via the fold-out display on the top of the unit. As well as basic parameters, 24-hour trends can also be shown on the display, making the implementation of services greatly simplified. In addition to the standard display, an extra display can easily be connected to the SmartRadar FlexLine.

### Practical advantages

Part of the practical advantage of the SmartRadar series is its compact design and light weight, which greatly simplifies the installation. Furthermore, the lack of any moving parts and the modular and flexible construction keep maintenance to a minimum. The hot-swappable display-connector even enables the SmartRadar FlexLine to be fitted on the antenna when in operating mode. SmartRadar FlexLine level measuring systems can be supplied with a junction box containing 4 - 6 cable glands, thereby offering plenty of space for cables and cable connection.





## SmartRadar FlexLine for all areas



SmartRadar FlexLine tank gauging systems are supplied in three versions: SmartRadar FlexLine Xtreme Performance, SmartRadar FlexLine High Performance and SmartRadar FlexLine Advanced Performance.

Selecting the most appropriate SmartRadar version depends on the application area and the requirements which, for example, have to be met by the Weights and Measures' accuracy.

Whereas for interim storage the SmartRadar FlexLine Advanced Performance would suffice, for applications which have to be approved by Weights and Measures the SmartRadar FlexLine Xtreme Performance is the solution.

Also, the area in which the measuring systems are located can determine the choice of your SmartRadar and to accommodate such requirements, Honeywell Enraf supplies special versions for high pressure or high temperatures areas.

The following table provides an overview of applications and appropriate versions.

### Application

Custody transfer, Weights and Measures-approved

Custody transfer in accordance with API

Intermediate storage, in accordance with API

SmartRadar FlexLine XP

SmartRadar FlexLine HP

SmartRadar FlexLine AP



## SmartRadar FlexLine Series

### SmartRadar FlexLine Xtreme Performance

With an accuracy of  $\pm 0.4$  mm ( $\pm 0.016$ "\*) the innovative SmartRadar FlexLine Xtreme Performance is the top of the range, its precision radar technology ensures the high levels of accuracy. The advanced digital signal processing technology forms the basis for the most reliable measurements, even under the most difficult circumstances. All essential standards for tank level measurements, including API, ISO, OIML and NMI are complied with by the SmartRadar FlexLine Xtreme Performance. The tank gauging system lends itself to customs transfer in accordance with the regulations of the 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.

### SmartRadar FlexLine High Performance

The SmartRadar FlexLine High Performance offers all the necessary functions for tank gauging within large bulk storage tanks. The accuracy of  $\pm 1$  mm ( $\pm 0.04$ "\*) makes the SmartRadar FlexLine High Performance suitable for custody transfer and provides the security of a very reliable measurement. The SmartRadar FlexLine High Performance has a measuring range of 75 m (246 ft) and satisfies all essential standards for tank level measuring, including API, ISO, IML, etc.

### SmartRadar FlexLine Advanced Performance

With an accuracy of  $\pm 3$  mm ( $\pm 0.12$ "\*), the SmartRadar FlexLine Advanced Performance lends itself predominantly to transshipment tanks. This level measuring system accommodates Honeywell Enraf's leading and proven radar technology and satisfies OIML R85 and API's recommended practices. The flexible and modular design, characterising 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 SmartRadar FlexLine Advanced Performance is 75 m (246 ft).

\* under reference conditions



## Antennas for every field of application

### Antennas for every field of application

In order to satisfy every application, the SmartRadar FlexLine series offers a wide range of antennae including traditional horn and rod antennae and flat or planar antennae to provide long term stability and excellent measuring performances.

The practical advantages of these multi-feeder antennae are their small size, the perfect control of the microwave indicator and the measurement of the antenna contamination. The facility for automatic recognition of antenna contamination is essential in order to have trust in the maximum reliability of the measuring equipment at all times.

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

Planar antennae may be used on tanks for level measuring free space or measuring on still pipes. A special hinged version antenna has been developed that allows assembly through a 6 inch opening, thereby enabling measurement close to the tank wall without losing reliability and accuracy.

The provision of Honeywell Enraf's unique tank separator for SmartRadar Flexline products enables easy installation of all antennae.

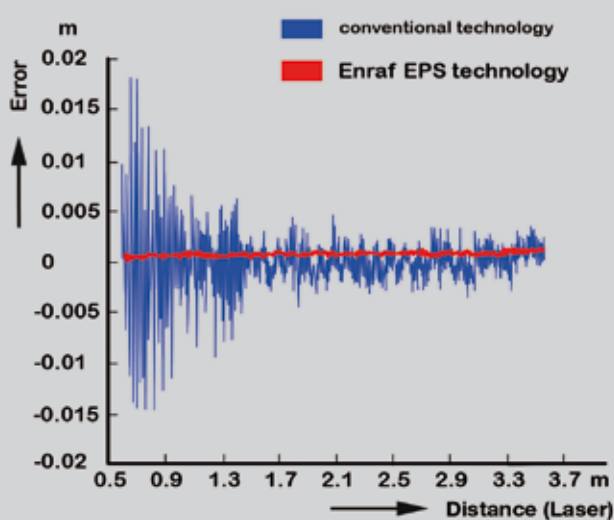
The full programme of components and accessories includes antennae for applications in open spaces, still pipes and in areas of high pressure and high temperatures.



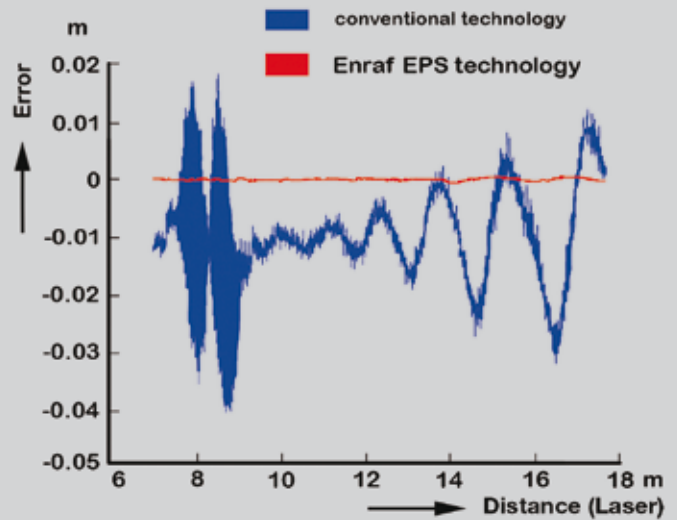
### Complete digital signal processing technology

The SmartRadar Flexline level measuring system employs complete digital signal processing technology, which eliminates the need for regular verification and calibration required by analogue 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. The quality of the measured result is determined by the unprecedented powerful signal processing of the level measuring system.

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 pro-active maintenance strategy and contribute to a further simplification of remote service.



*Stillingwell with 5 x 35 cm slots*



*Obstruction and multi-path effects*

### Enhanced Performance Signal Processing

Having radar antennas that can be installed close to the tank wall, Honeywell Enraf's latest Enhanced Performance Signal Processing makes it possible, even under the most difficult circumstances, to measure the level with extreme precision.

SmartRadar FlexLine systems accommodate the necessary technologies that contribute to securing an optimal measuring result, including correction of the amplification factor, automatic amplification monitoring, zone-identification and ullage-correction. As a result, not only can the SmartRadar FlexLine be installed close to the tank wall, but objects and other elements, such as sealants, that can cause disturbances, do not influence the signal processing quality. Even any deviation in the diameter of the still-pipe length or clogging is compensated by Enraf's technology.

### Maximum tank usage

The true flexibility of the SmartRadar FlexLine is demonstrated both on installation and in providing a level measuring capability that is unequalled. Where normally a minimum innage of 30 – 50 cm (12" - 20") has to be maintained for an accurate measurement, the SmartRadar FlexLine possesses a accuracy down to levels of 10 cm (4").

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 SmartRadar FlexLine requires only a minimum ullage of 30 cm (12").

Due to its extreme accuracy, the SmartRadar FlexLine possesses an unequalled long 'control range', enabling optimum use of the tank volume. Furthermore, where tanks have fixed roofs, the level measuring system can be installed without any special requirements.



### Open communication

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

SmartRadar FlexLine's range of communications protocols link effortlessly with third party tank gauging systems, this evidenced by the inclusion of the necessary tooling for service and diagnostics. The comprehensive array 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 SmartRadar FlexLine. All I/Os are galvanically separated which also protects your installation in the event of a lightning strike.

### Simplicity and integrity

SmartRadar FlexLine is a customer orientated building block enabling end-users to upgrade and optimise existing tank gauging systems and to plan for all future eventualities. With this first class product Honeywell Enraf ensures optimal communication with other instrumentation or systems, fast installation and simplified maintenance.

With Honeywell Enraf you have the assurance of a partner who can bring more than 50 years of knowledge and experience in providing the best possible solution for your specific tank gauging requirements.



# We know how to turn this system into a solution for your application

Not one application is the same, especially when installed base has to be taken in consideration and existing equipment has to be integrated. Our long-term experience in tank gauging and inventory management provides the solution.

Consultants are at your service for any advice and to discuss the technical requirements for your system.

Why should you compromise when our solution no longer forces you to do so?

Following installation and commissioning of your systems, we remain at your service to help you operate and optimize your system through its entire lifetime. That's what we call life cycle management and customer dedication.

## We at Honeywell Enraf are committed to excellence



### Before installation

- Site survey
- Consulting
- Functional design specification
- Product selection



### At time of installation

- Hardware and Software supply
- (Supervision on) installation
- Specific application development
- System configuration and integration



### After installation

- Commissioning
- Acceptance testing
- Training
- Systems optimization
- Remote and on site service programs:
  - License support
  - Extended warranty
  - Helpdesk
  - Emergency support



### **About Honeywell Enraf**

Making precision instruments has been a daily task at Honeywell Enraf since 1925. During the last fifty-plus years, we have provided excellent solutions for bulk-storage tank gauging. Whether your tank is spherical or cylindrical, fixed roof or floating-roof, we've got the solution. Whether you're storing petroleum products or chemicals, we've got the inventory system that you can rely on.

Thanks to fast and powerful data-acquisition and process software, our customers can monitor their complete tank farm inventory from a standard PC in the control room.

Why do we build such long-lasting equipment? Because our reputation depends on top quality. Our installations have stood the test of time in both the intense heat of the Middle East and the extreme cold of the Arctic.

But there is more.

Our presence in petroleum tank farms and terminals convinced us we could do a lot more in supplying you with other products and services.

Offerings with just one common goal in mind: to help you manage your tank farm business better. It is our mission to be a worldwide leading provider of high quality instrumentation, software systems and service & support for bulk storage management and related operations to improve your competitiveness.

Worldwide, Honeywell Enraf provides a single source for specifying a complete Tank Inventory Management System and through expertise, experience and organisation, works with numerous customers to provide them with the optimal solution for their needs.



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