

Product sheet

973 SmartRadar LT storage tank measurement

The fit for purpose radar tank gauge for intermediate liquid product storage

Benefits

- Fit for purpose non contact measuring performance
- Modular design for maximum flexibility and ease of installation
- Highest reliability and long term stability
- Wide choice of antennas to suit every application
- Optimised for easy service and diagnostics
- Complies to the major standards and industry practices

Enraf's proven technology and a number of innovative technological developments are combined in the SmartRadar LT to provide accurate and reliable level measurement data for even the most demanding intermediate storage applications.

The non affected absolute accuracy of $\pm 3\text{mm}$ over a measuring range of 40 meters grants an effective use of the available storage capacity, thus enabling the effective use of larger tanks for intermediate storage purposes. To prove this, the SmartRadar LT fully complies with the Worldwide recognised OIML standard and meets the recommended API industry practices for intermediate storage tanks.

The broad range of exchangeable antenna's makes it possible to use this radar under various mounting conditions, from free space to still pipe, hinged or fixed, pressurized or atmospheric, providing a solution for almost every application.

The modular design guarantees the efficient use of the SmartRadar LT together with other members of the Enraf level gauging family, using identical option boards and parts.

For the standard communication, Enraf's own robust and field proven Bi-Phase Mark communication protocol is selected as being the standard in field communication in tank terminals. Advanced communication and service features are incorporated to optimise operations and minimize maintenance efforts.

Direct communication to third party systems can be realised using standardised communication protocols suitable for tank gauging applications, such as HART® and Modbus.



WE THINK TANK

Technical specifications

Measuring specifications

Measuring range	: 0 m to 40 m (0 ft to 131 ft), with RoD antenna 0 m to 18 m (0 ft to 59 ft)
Minimum ullage	: 0.5 m (1.6 ft), with high pressure antenna 0.5 m (1.6 ft) from cone end
Instrument accuracy	: ± 3 mm (0.12")
Measuring resolution	: 0.1 mm (0.004")

Principles

Measuring principle	: FM Synthesized Pulse Reflectometer
Signal processing	: Digital Signal Processing (DSP)
Operating frequency	: X-band (9.5 GHz to 10.6 GHz) (FCC: 9.5 GHz to 10.5 GHz)

Mechanica

Dimensions	: See drawing opposite
Weight	: 10 kg excluding antenna and separator
Cable entries	: 3 pcs 3/4" NPT (Pending on regulations Ex-d cable glands must be used)

Environmental

Ambient temperature	: -40 °C to +60 °C (-40 °F to +140 °F)
Storage temperature	: -50 °C to +85 °C (-58 °F to +185 °F)
Protection class	: IP 67 according to EN 60529 (For U.S. NEMA 4)
Safety	: Explosion-proof <ul style="list-style-type: none">- ATEX II 1/2 GD T 80 °C EEx d IIB T4 or EEx de IIB T4 or EEx d [ib] IIB T4 or EEx de [ib] IIB T4- Class 1, Division 1, Groups B, C and D, acc. ANSI / NFPA 70 (Factory Mutual)
Over voltage protection	: II
Pollution degree	: I

Materials

Instrument unit housing	: Aluminum alloy EN AC-ALS:7Mg0,3 EN1706, mat. No. 3.2371
Instrument unit finish	: Chromated according to MIL-C-5541C
O-rings: Wetted	: Viton
Non-wetted	: Buna NBR70

Electrical

Power supply	: 100 V to 240 Vac, autoselect (+10 % to -15 %) optional 24 Vdc to 64 Vdc, autoselect (+10 % to -15 %)
Frequency variations	: 45 / 65 Hz
Power rating	: Basic 10 VA, 25 VA max. with options
Lightning protection	: Full galvanic separation via isolation transformers

Transmission

Type	: Serial, ASCII coded, Bi-Phase Mark modulated (BPM)
Protocol	: Standard Enraf fieldbus (GPU protocol)
Common mode rejection	: >150 dB
Cabling	: Two conductors, twisted pair, $R_{max} = 200 \Omega / \text{line}$, $C_{max} = 1 \mu\text{F}$, max. length 10 km

Options

i.s. output channel	: For Tank Side Indicator
Communication boards	
Output	: - RS-232C or RS-485, for indoor use or radio modem connection - 4-20 mA with digital communication based on HART protocol, accuracy analog level signal ± 0.1 %, full scale
Alarm relay output	: 1 x SPDT, galvanically isolated, $V_{max} = 240 \text{ Vac}$, $I_{max} = 3 \text{ A}$
Infrared connector	: Serial communication with Portable Enraf Terminal (PET)

Identification code

Pos 1 Application															
U	API chapter 3.1 B compliant														
Pos 2 Data transmission															
E	Enraf Bi-phase mark protocol (standard)														
I	i.s. output for Tank Side Indicator (TSI) and Enraf Bi-phase Mark (BPM) protocol														
H	HART and 4-20 mA output and Enraf BPM protocol														
K	HART and 4-20 mA output, i.s. output for TSI and Enraf Bi-phase Mark (BPM) protocol														
R	RS-232C GPU protocol														
S	RS-485 GPU protocol														
T	RS-232C GPU protocol and i.s. output for TSI														
U	RS-485 GPU protocol and i.s. output for TSI														
V	RS-232C standard Modbus														
W	RS-485 standard Modbus														
X	RS-232C standard Modbus and i.s. output for TSI														
Y	RS-485 standard Modbus and i.s. output for TSI														
Pos 3 Pressure version															
A	Atmospheric														
M	Medium pressure 6 bar / 600 kPa (87 psi)														
H	High pressure 40 bar / 4 Mpa (580 psi) (pos. 11 = H)														
Pos 4 I/O options															
B	Spot temperature Pt100														
C	VITO temperature and/or water probe														
J	VITO temperature and/or water probe + HART device(s)														
U	Spot temperature Pt100 + HART device(s)														
Y	Spot temperature Pt 100 + VITO temperature and/or water probe + HART device(s)														
Z	None														
Pos 5, 6, 7 Instrument designation															
9	7	3	SmartRadar LT												
Pos 8 Safety approvals															
A	ATEX Europe														
F	FM USA														
P	FM/FCC USA														
Pos 9 Alarms															
W	With programmable SPDT level alarm relay														
Z	None														
Pos 10 Mains supply															
B	110 Vac - 240 Vac (+10% / -20%), 45 / 65 Hz														
D	24 Vdc - 64 Vdc (+10% / -20%)														
Pos 11, 12, 13, 14, 15 See product sheet "SmartRadar antenna's"															
Pos 16 IR connection															
W	With IR-connector														
Z	Without IR-connector														
U	E	A	Z	9	7	3	A	Z	B					W	Typical identification code
U				9	7	3									Your identification code

To achieve a complete identification code, combine the **Instrument identification code** and the **Antenna identification code** from the SmartRadar LT antenna's product sheet

Outputs

- Standard : Enraf Bi-Phase Mark communication
 Optional : • RS-232C or RS-485
 • HART & 4 - 20 mA level output

For communication to indicators and systems

- : • Intrinsically-safe channel for the Tank Side Indicator
 • Relay for hard wire level alarm

Inputs

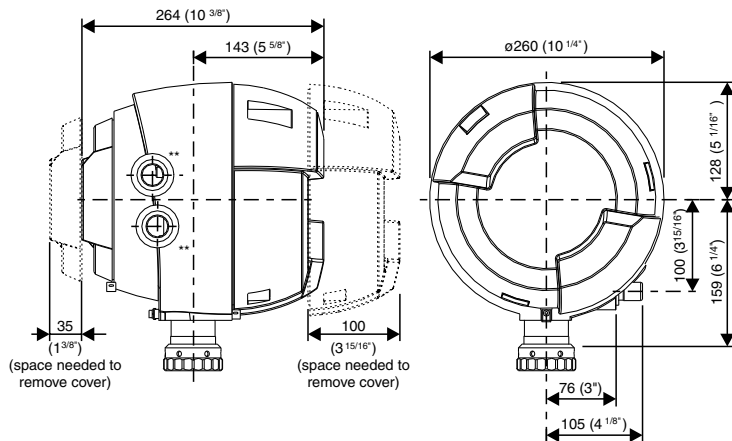
- HART pressure transmitters
- Spot temperature element
- Average temperature element
- Interface probe

Configuration

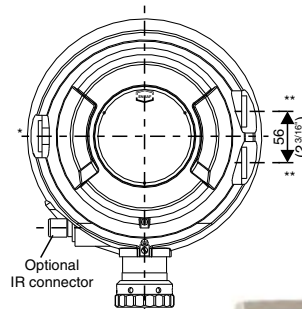
- Ensite configuration program for use with a PC or laptop using Enraf Bi-Phase Mark communication, RS-232C, RS-485, HART interface
- Portable Enraf Terminal using infra-red connector

Display (optional)

- Field Display Interface and Control Panel Indicator using Enraf Bi-Phase Mark communication
- Tank Side Indicator using intrinsically-safe connection



SmartRadar LT



* Cable entry 3/4" NPT, Ex-i (1x)
 ** Cable entry 3/4" NPT (2x)



Field interface



Entis Inventory system

We at Enraf are committed to excellence.

Enraf B.V.

Röntgenweg 1, 2624 BD Delft
 P.O. Box 812, 2600 AV Delft, The Netherlands
 Tel.: +31 (0)15 269 86 00, Fax: +31 (0)15 261 95 74
 Email: info@enraf.nl, http://www.enraf.com

China: Enraf B.V. (Shanghai Rep. Office)

18G, International Shipping & Finance Center
 720 Pudong Avenue, Shanghai 200120
 Tel.: +86 21 50367000, Fax: +86 21 50367111

France: ENRAF S.a.r.l.

ZAC les Beaudottes, 15 rue Paul Langevin
 93270 SEVRAN
 Tel.: +33 (0)1 49 36 20 80, Fax: +33 (0)1 43 85 26 48

Germany: Enraf GmbH

Obere Dammstrasse 10, 42653 Solingen
 Postfach 101023, 42648 Solingen
 Tel.: +49 (0)212 58 750, Fax: +49 (0)212 58 7549

Russia: Enraf B.V. (Moscow Rep. Office)

21, Dostoevskogo street
 103030 Moscow
 Tel. / Fax: +7 (0)95 788 0713
 Tel. / Fax: +7 (0)95 788 0691

Singapore: Enraf Singapore Pte Ltd

Lam Soon Industrial Building
 63 Hillview Avenue, # 07- 04, Singapore 669569
 Tel.: +65 676 94 857, Fax: +65 683 67 496

United Kingdom: Enraf Ltd.

Unit D2, Melville Court, Spilsby Road
 Harold Hill, Romford, Essex RM3 8SB
 Tel.: +44 (0)1708 346 333, Fax: +44 (0)1708 370 670

USA: ENRAF Inc.

4333 West Sam Houston Parkway North, Suite 190
 Houston, TX 77043
 Tel.: +1 832 467 3422, Fax: +1 832 467 3441



WE THINK TANK

Information in this publication is subject to change without notice.

® Enraf is a registered trademark © Enraf B.V. The Netherlands