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 ± 3mm 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.

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
	- ATEX II 1/2 GD T 80 °C EEx d IIB T4 or EEx de IIB T4 or
	EEx d [ib/ia] IIB T4 or EEx de [ib/ia] IIB T4
	- Class 1, Division 1, Groups B, C and D, acc. ANSI / NFPA 70 (Factory Mutual)
Materials	
Instrument unit housing	: Aluminum alloy EN AC-AlSi7Mg0.3 EN1706, mat. No. 3.2371
Instrument unit finish	: Chromatized 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 Ω / line, C_{max} = 1 μF, max. lenght 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	: 2x SPDT, galvanically isolated, V_{max} = 50 Vac or 75 Vdc, I_{max} = 3 A
Infrared connector	: Serial communication with Portable Enraf Terminal (PET)

Identification code

Pos 1 Application	
U	API chapter 3.1 B compliant
A	Including individual test report according OIML R85

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
F	Foundation Fieldbus and i.s. output for TSI
O	Foundation Fieldbus and Enraf Bi-phase Mark (BPM) protocol

Pos 3 Pressure version	
A	Atmospheric
M	Medium pressure 6 bar / 600 kPa (87 psi)
H	High pressure up to 40 bar / 4 MPa (580 psi)

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/FCC	USA
	For other approvals please contact your nearest Enraf office	

Pos 9 Alarms	
W	With 2x SPDT alarm output
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 SmartRadar antenna's	
D 0 4	4" ROD antenna, free space
F 0 6	6" PAT, free space
F 0 8	8" PAT, free space
H 0 4	4" CONE, still pipe, High Pressure (40 Bar)
S 0 6	6" PAT, still pipe
S 0 8	8" PAT, still pipe
S 1 0	10" PAT, still pipe
S 1 2	12" PAT, still pipe
T 0 6	6" WALP, free space, hingeable version
W 0 6	6" WALP, free space, fixed version

Pos 14, 15 Stem length / Installation specification	
0 0	0 cm (only if Pos. 11=D)
0 5	5 cm (only if Pos. 11=F, S or W)
3 0	30 cm (only if Pos. 11=F, S or W)
5 0	50 cm (only if Pos. 11=F, S or W)
8 0	80 cm (only if Pos. 11=F, S or W)
B 1	Installation on 6"300 lbs nozzle with 4" Schedule 10 stilling well (only if Pos. 11=H)
B 4	Installation on 4"300 lbs full bore ball valve (only if Pos. 11=H)
N 1	Installation on 6"300 lbs nozzle with 4" Schedule 10 stilling well including 1" full bore ball valve (only if Pos. 11=H)
N 4	Installation on 4"300 lbs Schedule 40 nozzle including 1" full bore ball valve (only if Pos. 11=H)

Pos 16 IR connection	
W	With IR-connector
Z	Without IR-connector

U E A Z 9 7 3 A Z B F 0 8 3 0 W	Typical identification code
U 9 7 3	Your identification code

For SmartRadar antennas see also Product sheet "SmartRadar antennas"

Outputs

Standard : Enraf Bi-Phase Mark communication

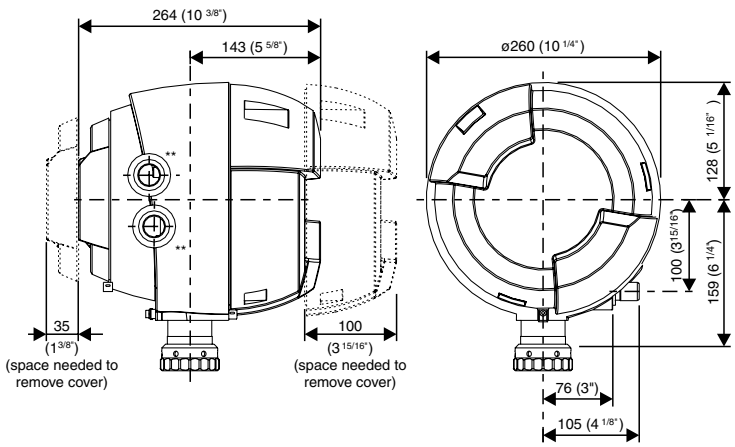
Optional :
- RS-232C or RS-485
- HART & 4 - 20 mA level output

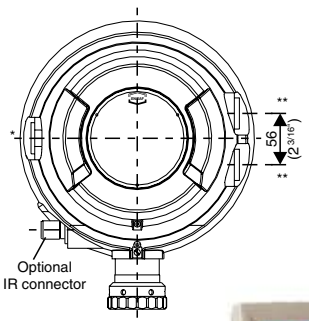
For communication to indicators and systems :
- Intrinsically-safe channel for the Tank Side Indicator
- Relay for hard wire level alarm

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





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

SmartRadar LT

Field interface

Entis Inventory system

We at Enraf are committed to excellence.

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