

# ENRAF SMARTRADAR FLEXLINE.

Precise, reliable, safe tank measurement.



**Honeywell**

# GLOBAL EXPERIENCE LOCALLY APPLIED.

The SmartRadar FlexLine automatic tank gauge (ATG) combines innovative software algorithms with our proven planar antenna technology for the precision you need in custody transfer and inventory applications.

It provides consistent accuracy even under the toughest operating conditions, whether on domed roofs, bad stilling wells or when installed close to the tank shell. With the wireless option you can use it in the ISA100 wireless (IEC 62734) universal mesh network, seamlessly integrate it into any supervisory system, for better productivity, reliability, safety, security, and regulatory compliance. SmartRadar FlexLine is TÜV certified for use in safety rated loops up to SIL 3 as per IEC 61508, meets major recommendations such as API 2350 and is widely used in overfill protection loops to prevent overfill accidents.

With a modular build, SmartRadar FlexLine, provides flexibility, letting you add options easily. Supporting multiple functions, it covers all tank gauging needs. The base Radar module measures the product level by the microwave unit and antenna. In addition six optional modules can be housed in the SmartRadar Flexline, to meet various I/O requirements of tank gauging including HART and TRL/2 communication protocols.

FlexLine offers best in class accuracies with no drift from ambient temperature effects. Xtreme Performance and High Performance models are certified as per OIML R85:2008 recommendations and can be used for country specific legal metrology approvals within all OIML member states. The Advanced Performance SmartRadar FlexLine is for use in inventory control measurement requirements as per API MPMS Ch. 3.1B recommendations.



# MODULAR SYSTEM

The SmartRadar FlexLine series includes numerous options. By simply adding option modules you can easily adjust FlexLine to meet any future requirements.

## ENRAF FIELD BUS-INTERFACING HOST

### Robust and proven communications that go the distance

With hardly any special requirements on cable quality, the Bi-Phase Mark (BPM) is the current industry standard in tank gauging systems. The 2-wire BPM allows for cable lengths of at least 10 km (6 miles) and can be run over almost any existing cabling. It is suitable for communication between various models of tank gauges and Honeywell Enraf's Tank Inventory Management system and other supervisory systems through Communication Interface Units (CIUs). A high level of isolation is offered through a specially developed isolation transformer employed on both ends of the communication line.

#### Advantages:

- Uses existing infrastructure
- Robust (unique lightning protection)
- The de facto standard in tank farm automation
- Covers long distances (more than 10 km/6 miles)

## TRL/2 COMMUNICATION PROTOCOL

### Easy Expansion and Upgrades of obsolete tank gauging systems.

Obsolete tank gauges and inventory systems are a common challenge. Poor performance or failures, challenges sourcing spares and lack of experienced maintenance can undermine efficiency, compliance efforts and safety.

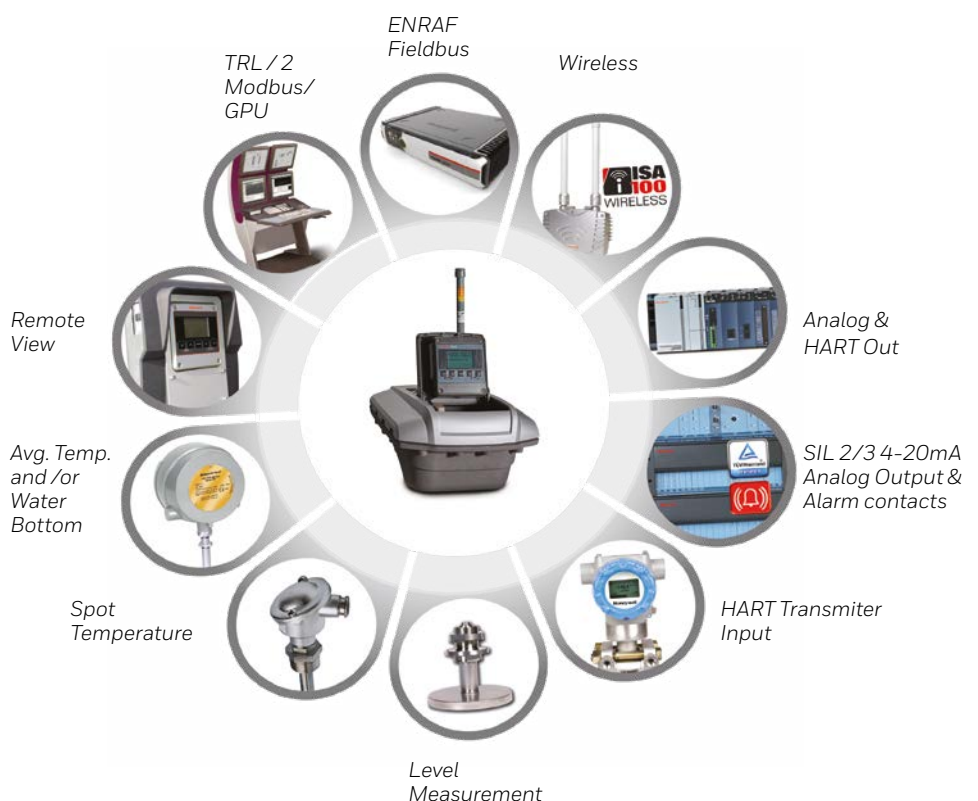
Honeywell's Enraf automatic tank gauges offer a cost effective solution to replace obsolete, underperforming gauges and systems without disruption to the process or existing infrastructure, by matching the historic TRL/2 Communication Protocol.

Honeywell's Enraf SmartRadar FlexLine easily fit existing gauges' TRL/2 communication field bus, regardless of the gauge's manufacturer. With no need to replace the TRL/2 cabling, they also seamlessly integrate with the existing control room interfaces.

#### Advantages:

- No rip-and-replace for Upgrade projects
- No hot work required
- Keep existing accessories like temperature sensors and HART™ based pressure transmitters
- Use existing power and signal cabling to seamlessly integrate with existing field communication units

## MODULAR SYSTEM AROUND FLEXLINE



## HART® AND ANALOG INPUT CONNECTIVITY MASTER

### Seamless integration of HART® devices

SmartRadar FlexLine supports all I.S. HART® compliant devices with a maximum of five connected devices per interface. When used in analogue mode, one process value (PV) can be measured. In combination with a capable HART® pressure transmitter, it can be used for HART® hybrid inventory measuring systems (HIMS). The HART® connectivity can also be used for other tank application such as water bottom detection, temperature measurement and density. The module also supports roof immersion compensation with connected HART® sensors.

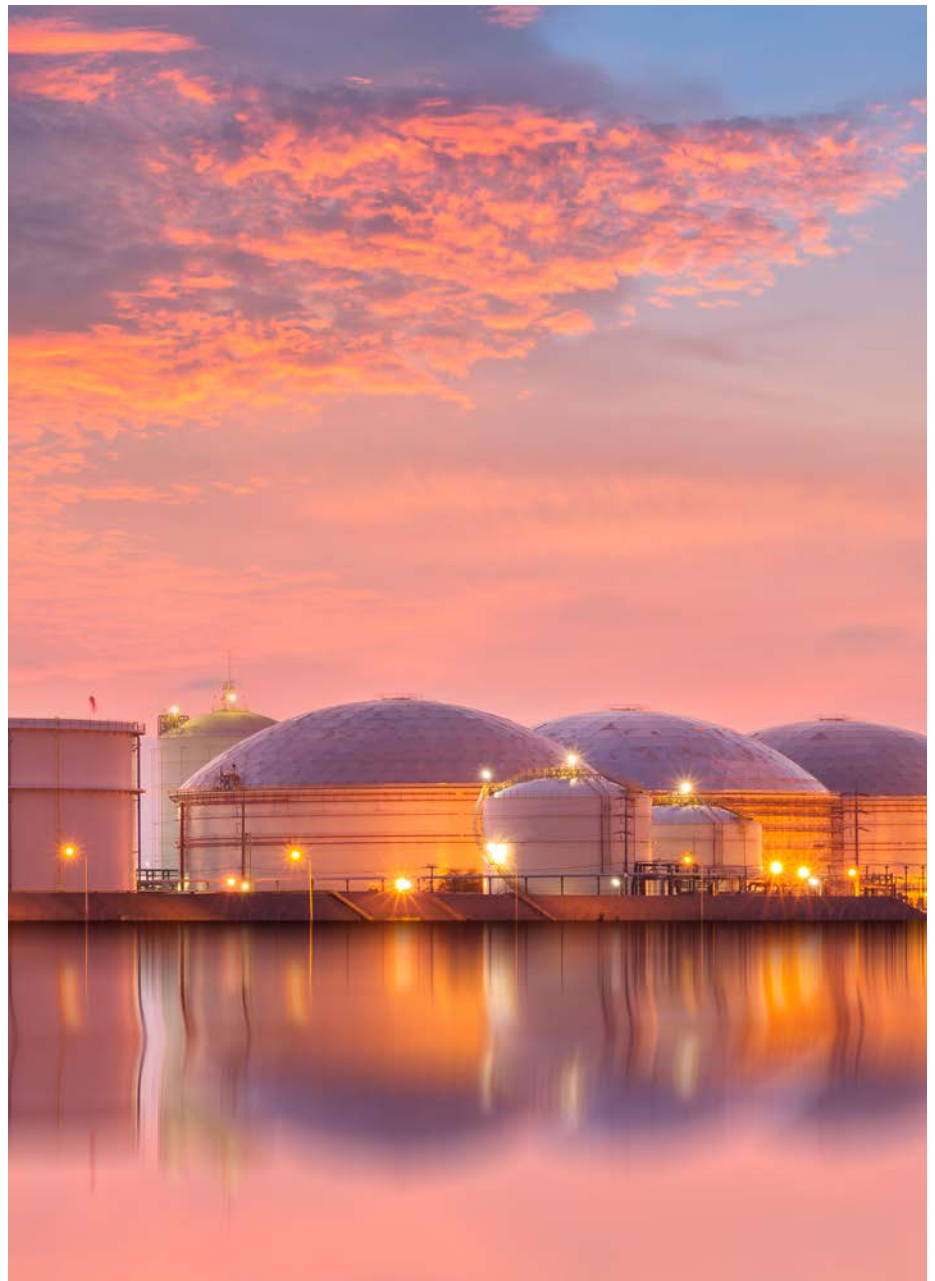
### Advantages:

- Optimize your inventory by integrating temperature and pressure measurements
- Install multiple HART® modules in one FlexLine gauge
- Up to 5 connected HART® devices per interface
- If used in combination with the VITO interface, three additional HART® devices can be connected
- FlexLine can be used as a data-concentrator for other functions such as ambient temperature measurements, Floating roof monitoring (FRM), fire detection and roof immersion compensation.

## WIRELESS CONNECTIVITY

### A new level in flexibility

With the integrated OneWireless solution, Honeywell Enraf gauges use the ISA100 wireless (IEC 62734) OneWireless universal mesh network to seamlessly integrate with any supervisory system, such as Entis, Experion PKS or other DCS. OneWireless helps optimize plant productivity and reliability, improve safety and security, and ensure regulatory compliance. The OneWireless option integrated in the FlexLine is simple to manage and efficient to operate, while the ISA100 wireless infrastructure allows for remote monitoring of installed equipment and supports full diagnostics.



### Advantages:

- FlexLine can function as a “data concentrator” to transfer all tank information, including connected HART® devices, over wireless to the supervisory systems
- Over-the-air key provisioning removing the need to climb on tank tops
- The signal hopping feature within the FlexLine ensures continuous availability and reliability of communication.
- Reduce installation cost by 50% or more through wireless connectivity
- Improve inventory accuracy by migrating to high-precision ATG without the need to run new cabling
- Reduce operational costs by integrating wired and wireless devices in the same tank management software.

## SAFETY FUNCTIONS

### SIL certified protection for safe operation

Certified by the TÜV for use in Safety Integrity Level (SIL) rated loops, FlexLine is a solution to prevent overfill and/or dry run. With a Safe Failure Fraction of 97% it is suitable for use in SIL 2 safety loops and SIL 3 loops when used in redundant configuration. High diagnostic coverage allows the safety proof-test interval to be extended, bringing down operational costs. Dual redundancy with 2oo4D voting of the safety function automatically detects and reports failures in the safety circuitry, while allowing the gauge to continue to function as a safety device without interrupting the process. Higher availability means better efficiency. It's industry best internal diagnostic cycle time of <1 second, allows higher threshold settings, accommodating more storage space with bulk petroleum storage tanks.

### Advantages:

- The device complies with the requirements of the relevant standards (Hardware safety integrity SIL 2 acc. to IEC 61508 and systematic capability SC 3 acc. to IEC 61508) and can be used in applications up to SIL 2 (HFT=0) resp. SIL 3 (HFT=1) acc. to IEC 61508 and IEC 61511 for the safety function maximum filling level detection.
- Proof test interval of >10 years to reduce operational costs
- 2oo4D configuration increases safety as well as availability
- Internal diagnostic cycle time of < 1sec
- SIL certified Digital Outputs.
- SIL certified 4-20ma Analog Output fully compliant with API Std 2350
- Meets critical safety recommendations of having a high integrity, automatic operating overfill prevention system (or a number of such systems, as appropriate) that is physically and electrically separate and independent from the tank gauging system.

## ALARM CONTACTS (DIGITAL OUTPUTS)

### Digital outputs for alarm signaling or control functions

Multiple relay contacts are offered for digital outputs associated with a wide range of common devices, such as relays, contactors, starters and two-position actuators. Contacts can be controlled remotely or switched automatically and linked to measured parameters, such as level, temperature, or pressure. The module provides four relay contacts that can be manually set to be normally open or normally closed and configured to be normally energized or normally de-energized for failsafe behavior.

### Advantages:

- Two different contact ratings
- Two or four relays wired to connecting terminals
- Ultimate flexibility in alarm signaling

## PLANAR ANTENNA TECHNOLOGY (PAT) - FREE SPACE & STILLING WELLS

### Easy to fit on roof nozzles and for all sizes of stilling wells

While the free space planar antenna is ideal in roof nozzles on cone roof tanks or dome roof tanks, Stilling well version of planar antenna are used for stilling well applications.

Together with 6" and 8" free space antennas and different stem lengths, SmartRadar FlexLine provides easy answers for a range of different roof nozzles on cone roof and dome roof tanks. For tanks with stilling wells, the SmartRadar planar antenna comes in different sizes and covers 6", 8", 10", 12", 16", 20" and 24" stilling well sizes.

Planar antennas are suitable for use in process pressure conditions up to 6 bar (87 psi) and can be used in extreme temperature conditions of as low as -200 °C (-328 °F) and up to +250 °C (+482 °F).

## HIGH PRESSURE 4" HORN ANTENNA

### Antenna for pressurized liquids up to 40 bar (580 psi)

This horn antenna is developed for high pressure applications, such as LPG and chemical gasses. It is designed for spheres and bullets equipped with a 4" Sch 10/40 stilling well or a 4" Sch10 insert pipe. Easy verification of radar level measurement is possible using verification pins. The high pressure tank separator provides both an approved and safe process seal. The Horn antenna is offered with an optional 1" ball valve or can also be installed on top of a 4" ball valve.



## TECHNICAL SPECIFICATIONS

### MEASURING PRINCIPLE

Measuring principle	FMCW/Synthesized Reflectometer
Signal processing	Fully digital using Enhanced Performance Signal Processing (EPSP)
Operating frequency	Xband (9.538 GHz to 10.561 GHz) R&TTE, FCC compliant

### MEASURING SPECIFICATIONS

Measuring range	Up to 75 m (246 ft)
Instrument accuracy level	– Xtreme performance SmartRadar $\pm 0.4$ mm ( $\pm 0.016$ " ) *1 *2 *3 *4 – High performance SmartRadar $\pm 1$ mm ( $\pm 0.04$ " ) *1 *2 *3 – Advanced performance SmartRadar $\pm 3$ mm ( $\pm 0.12$ " ) *1
Measuring resolution	0.1 mm (0.001")
Update time	0.1 sec

### MECHANICAL

Dimensions	217 x 319 x 379 mm (8.55" x 12.55" x 14.9") (H x W x L) *5
Weight	$\approx 16$ kg (35 lb), depending on installed options and excluding antenna and tank separator
Cable entries	3 x $\frac{3}{4}$ " NPT *6 or 6 x M20 *7

### PROCESS

Max. process pressure	– Planar (PAT) Antennas: up to 6 bar / 0.6 MPa (87 psi) – Horn Antennas: up to 40 bar / 4 MPa (580 psi)
Process temperature range	-200 °C to +250 °C (-328 °F to +482 °F) *8, *9

### PROCESS WETTED MATERIALS

Tank separator	Stainless steel AISI 316 (material no.: 1.4401) *10
Antenna materials	– Planar (PAT) antennas: SS AISI 316 (mat. no.: 1.4401) and FEP – High pressure horn antennas: SS AISI 316 (mat. no.: 1.4401) and PTFE (in high pressure tank separator) – Ball valve (optional with horn antenna) stainless steel CF8M (mat no.: 1.4408)
O-rings	FPM (in tank separator) *11

### ENCLOSURE MATERIALS

Instrument housing	Cast aluminum alloy according to EN1706; AA A356 EN1706; AC-ALSi7Mg0.3
Finish aluminum parts	Hard anodized according to MIL A8625-E Type III
Cover	Aluminum; coating: Polyurethane
O-rings	NBR 70

### ENVIRONMENTAL

Ambient temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Storage temperature	-50 °C to +75 °C (-58 °F to +167 °F)

### LEGAL METROLOGY

Weights & Measures	NMi, PTB, BRML, UMI, LNE, DZM, ONML, W&M India, PAC, MIGAS, OIML, and several others. Please check with factory for availability of local certificates with selected options.
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### FUNCTIONAL SAFETY AND OVERFILL PREVENTION

SIL certification	TÜV certified for SIL 2 (single configuration, HFT=0) and SIL 3 (redundant configuration, HFT=1), according to IEC 61508 & IEC 61511
Overfill protection	DIBt WHG, Corcon BVBA

### EXPLOSION SAFETY APPROVALS

Explosion safety approvals/certificates	– II 1/2 G Ex d [ia Ga] IIB T6 Ga/Gb; acc. to ATEX KEMA – Ex d [ia Ga] IIB T6 Ga/Gb; acc. to IECEx KEMA – Ex d ia IIB T6; acc. to Kosha certificate – Class I, Division 1, Groups C & D; acc. to FM – Class I, Division 1, Groups C & D; acc. to CSA – Ex d [ia Ga] IIB T6 Ga/Gb; acc. to INMETRO TÜV
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Other approvals/certificates

## TECHNICAL SPECIFICATIONS (CONTINUED)

### EXPLOSION SAFETY APPROVALS (CONTINUED)

Other approvals/certificates Explosion proof: NEPSI, PESO (India), GOST-Rx  
Please check with factory for availability of local certificates with selected options.

Ingress protection IP66/IP67 (NEMA 4X)

For Other explosion safety approvals/certificates and updates, please contact Honeywell representative.

### ELECTRICAL

Power supply Autoselect 65 Vac to 240 Vac (+10% to -15%) 50/60 Hz and/or 24 Vdc to 65 Vdc (+10% to -15%)

Power rating Typical 15 W; max. 23 W with all options

Maximum current (start-up)  $I_{max} = 1.2 \text{ A}$

### DATA COMMUNICATION

#### Enraf Field Bus (BPM)

Baud rate 1200 / 2400 / 4800 bps

Cable characteristics 2 wires, twisted pair,  $R_{max} = 200 \Omega / \text{line}$ ,  $C_{max} = 1 \mu\text{F}$ ; cable length: 10 km (6 miles) or more <sup>\*12</sup>

Isolation voltage > 1500 V

Lightning protection Full galvanic separation using isolation transformers

Common mode rejection > 150 dB

Protocol Standard Enraf Fieldbus (serial, ASCII GPU protocol)

#### Wireless Communications

Wireless communication 2400 to 2483.5 MHz (2.4 GHz) Industrial, Scientific and Medical (ISM) band, Modulation: DSSS – Discrete Sequential Spread Spectrum per FCC 15.247 / IEEE 802.15.4-2006

DSSS RF Transmitter power <sup>\*13</sup>  
– NA Selection (per FCC/IC): 125 mW (20.9 dBm) maximum transmit power not including antenna, or 400 mW (26.0 dBm) maximum EIRP including antenna, for USA and Canada locations  
– EU Selection (per RTTE/ETSI): 10 mW (10.0 dBm) maximum EIRP including antenna, for EU locations

Signal range (nominal) <sup>\*14</sup>  
– NA Selection (per FCC/IC):  
≈1800 m (5900 ft) with +4 dBi integral antenna  
≈1800 m (5900 ft) with +4 dBi integral antenna  
– EU Selection (per RTTE/ETSI):  
≈600 m (1970 ft) with +4 dBi integral antenna  
≈900 m (3000 ft) with +8 dBi integral antenna

Connectivity  
– Published data: All process values available in the FlexLine  
– Publish Cycle Time: Configurable as 1, 5, 10 or 30 seconds  
– Protocol Tunnels: GPU and FlexConn

Wireless antennas Integral: +4 dBi or +8 dBi omni directional monopole, with or without lightning surge arrestor <sup>\*15</sup>

Wireless compliance IEC62734 (ISA100 Wireless)

#### TRL/2 Communication Protocol TRL/2 Communication Protocol TRL/2 Communication Protocol

Protocol Modbus RTU; Communication: TRL/2 100/90 KHz FSK

Baud rate is 4800(+/-3%), 8 bits and 1 stop bit.

Cable 18 AWG (minimum) with shielded twisted pair, max 4 kms with max 8 multi drop Gauge connections

Physical layer Logic 1 is represented by 100kHz and Logic 0 by 90kHz:(+/-3%)

Voltage levels 3.6V +/- 10%.

Power rating At 12V Nominal current drawn by TRL/2 module alone is 40mA(+/- 10%), [power consumption is 480mW(+/- 10%)]. The worst case current/power drawn with below mentioned conditions is 60mA

#### RS-232 GPU Protocol / Standard Modbus Protocol

Baud rate 1200 / 2400 / 4800 / 9600 / 19200 bps (configurable)



## TECHNICAL SPECIFICATIONS (CONTINUED)

### RS-232 GPU Protocol / Standard Modbus Protocol (CONTINUED)

Isolation voltage	> 600 V
Lightning protection	Opto-isolators
Protocol	Serial ASCII GPU protocol / Standard Modbus protocol (software switchable)
Max. instruments per line	1; point to point
Cable characteristics	3 wires, shielded and twisted, max. cable length: 15 m (50 ft)

### RS-485 GPU Protocol / Standard Modbus Protocol

Baud rate	1200 / 2400 / 4800 / 9600 / 19200 bps (configurable)
Isolation voltage	> 600 V
Lightning protection	Opto-isolators
Protocol	Serial ASCII GPU protocol / Standard Modbus protocol (software switchable)
Max. instruments per line	32, multi point
Cabling	3 wires, shielded, twisted pair, signal ground, $R_{max} = 0.12 \Omega / m$ , $C_{max} = 119 \text{ pF/m}$ , $L_{max} = 1.45 \text{ mH}$ , max. cable length: 1200 m (3900 ft)

### HART® Slave – Multidrop and/or 4–20 mA

Protocol	Communications: HART® 6.2
Analog output loop (non-I.S.)	Active or Passive; selectable by jumper – Active: output voltage: 20V $\pm 5\%$ – Passive: minimum external supply voltage: 11.5 V maximum external supply voltage: 30 V (55 V with serial resistor)
Accuracy	$\pm 0.1\%$ of actual measurement
Burnout value	Low: 0 - 3.6 mA or High: 21 - 25 mA (configurable)
Cable characteristics	2 wires, shielded, twisted pair

### SMARTVIEW DISPLAY – INTEGRATED AND/OR REMOTE

SmartView display	Refer to identification code for display options
Conn. with SmartView	Ex ia IIB $\approx 12 \text{ V}$
Cable characteristics for remote SmartView	4 wires, shielded, $C_{max} = 3 \text{ }^\circ\text{F}$ , $L_{max} = 0.48 \text{ mH}$ , $R_{max} = 8.5 \Omega$ (one SmartView connected) or $R_{max} = 4.7 \Omega$ (two SmartViews connected)

### OPTIONS (APPLIES ONLY IF OPTION SELECTED DURING GAUGE ORDERING)

#### Alarm Contact Options

2 x SPDT contact	0.5 A at 125 Vac or 0.3 A at 110 Vdc, $P_{max} = 30 \text{ W}$
2 x SPDT contact	2 A at 250 Vac or 3 A at 40 Vdc, $P_{max} = 750 \text{ W}$
4 x SPDT contact	2 x SPDT contact, 0.5 A at 125 Vac or 0.3 A at 110 Vdc, $P_{max} = 30 \text{ W}$ and 2 x SPDT contact, 3 A at 250 Vac or 3 A at 40 Vdc, $P_{max} = 750 \text{ W}$
Relay operation	– Normally Open/Normally Closed contact: selectable by jumper – Normally Energized / Normally De-energized: configurable by software setting – PV Monitor (any of the measured parameters, configurable by software setting) – Remote control (configurable by software setting)

#### SIL Safety Options

SIL Digital Output	1x SIL DO contact (1x SPDT contact, 2A at 250 Vac or 2 A at 40 Vdc, $P_{max} = 500 \text{ W}$ ) 2x SIL DO contact (2x SPDT contact, 2A at 250 Vac or 2 A at 40 Vdc, $P_{max} = 500 \text{ W}$ )
SIL Analog Output	SIL AO NAMUR NE43 compliant
SIL Digital Output + SIL Analog Output	SIL AO + 1 SIL DO + 1 SIL DO contact NAMUR NE43 compliant (1x SPDT contact, 2A at 250 Vac or 2 A at 40 Vdc, $P_{max} = 500 \text{ W}$ ) SIL AO + 2 SIL DO NAMUR NE43 compliant (2x SPDT contact, 2A at 250 Vac or 2 A at 40 Vdc, $P_{max} = 500 \text{ W}$ )

<b>VITO Input for Temperature and Water Probe</b>	
Communications	Proprietary HART® (Ex-i)
Cable characteristics	2 wires, shielded, twisted pair, Cmax = 1 µF, Lmax = 9 mH, Rmax = 25 Ω / line
Accuracy	– Temperature measurement: ±0.1 °C (±0.18 °F) <sup>*17, *18</sup> – Water level measurement: ±2 mm (0.078") <sup>*17</sup>
Resolution	– Temperature measurement: 0.01 °C (0.01 °F) – Water level measurement: 0.1 mm (0.01")
<b>Spot RTD Input</b>	
Configurations	– 3 wire or 4 wire RTD, one element or two elements <sup>*19</sup> – MPT or MRT up to 6 elements with 2 common ground wires <sup>*19</sup>
Cable characteristics	Shielded, Rmax = 100 Ω / line, Cmax = 1 µF, Lmax = 10.5 mH
Accuracy	±0.1 °C (±0.18 °F)
Resolution	0.01 °C (0.01 °F)
<b>HART® Input</b>	
Configuration	Options – 5 HART® inputs and / or HIMS density calculation – VITO sensors and / or 3 HART® inputs – 3 HART® input, HIMS density calculation and VITO Sensors
Max. instrument per module	5 (digital) or 1 (analog)
Communications	HART® (revision 4)
Cable Characteristics	2 wires, shielded, twisted pair, Cmax - 1 µF, Lmax -9 mH, Rmax -25 Ω / line
<b>Other Options</b>	
Flange or adapter plates	Adapter plates or flanges for different antennas are available

**Notes:**

<sup>\*1</sup> Under reference conditions

<sup>\*2</sup> Certified as per OIML R85:2008

<sup>\*3</sup> Legal Metrology (W&M) and Custody Transfer Applications

<sup>\*4</sup> Selection "X" is additionally certified as per legal metrology requirements of Netherlands, France, Germany, Croatia, Bulgaria, Belgium, and for witness verification specify the authority (selection "X" in identification code)

<sup>\*5</sup> Refer to the dimensional drawing shown in this document. HART® is a registered trademark of the HART Communications Foundation

<sup>\*6</sup> Exd only

<sup>\*7</sup> Exe only

<sup>\*8</sup> The temperature measured at process connection (Flange).

<sup>\*9</sup> For cryogenic applications, the antenna is installed in the stilling well, above the tank roof, in an area with ambient temperature conditions. For cone roof / dome roof free space applications with a vapor temperature above +100 °C (+212 °F), the planar antenna shall be installed inside the roof nozzle above the tank roof.

<sup>\*10</sup> Tank separators are available in free space (low pressure) and high pressure versions.

<sup>\*11</sup> Special O-rings (Perlast®) available for demanding chemical applications, part no.: U0990005.

<sup>\*12</sup> Distances of more than 10 km possible depending on amount of field instruments and cabling topology.

<sup>\*13</sup> For other countries and/or geographical areas refer to local and national radio legislations.

<sup>\*14</sup> Specified distance are between field transmitter and infrastructure unit (Repeaters or Gateways), with clear line of sight.  
Actual radio distances may be affected by local building and obstruction density closeness.

<sup>\*15</sup> Lightning surge arrestors are recommended for lightning prone regions.

<sup>\*16</sup> Depending upon the other options used and availability of slots for additional module, a twin safety function is possible offering independent relay contacts for prevention of overfill and dry run (contact Honeywell representative.).

<sup>\*17</sup> Under reference conditions.

<sup>\*18</sup> With VITO temperature probe or Spot (Pt100)

<sup>\*19</sup> Various generally available types of elements (RTD, MRT) can be selected.

# IDENTIFICATION CODE

i.s. non slots  
term. i.s. term.  
\*2) \*3) \*4)

## Pos 1 Device selection

<b>R</b>	SmartRadar FlexLine	-	-	1
<b>M</b>	Migration kit SmartRadar FlexLine (Note *7)	-	-	1
<b>S</b>	SmartRadar FlexLine - Special	-	-	1

## Pos 2 Type of gauge

- X** Xtreme Performance, W&M type approved with OIML R85 report and sealing facilities \*6)
- Y** Xtreme Performance, W&M type approved
- I** High Performance, for custody transfer acc. to OIML R85, API 3.1B and ISO 4266 (1 & 3) with OIML R85 report
- H** High Performance, for custody transfer acc. to OIML R85, API 3.1B and ISO 4266 (1 & 3)
- U** Advanced Performance, for inventory control acc. to API 3.1B and ISO 4266 (1 & 3) with factory calibration report
- A** Advanced Performance, for inventory control acc. to API 3.1B and ISO 4266 (1 & 3)

## Pos 3 Display NOTE \*1) \*2) \*4) (only recommended for replacing existing ATGs)

<b>Z</b>	(Only if pos. 4, 6 or 7 = B, G, I or W) (with portable 4wire-SmartView connectivity)			1
<b>I</b>	Integrated 4wire-SmartView and Portable 4wire-SmartView connectivity			1
<b>V</b>	With i.s. terminals for stand-alone 4wire-SmartView and portable 4wire-SmartView connectivity	4		1
<b>B</b>	With integrated 4wire-SmartView, i.s. terminals for stand-alone 4wire-SmartView and portable 4wire-SmartView connectivity	4		1

## Pos 3 Display NOTE \*1) \*2) \*4) (selection for HartSmartView (HSV) display options, recommended for all new installations)stallations)

<b>K</b>	With integrated HART SmartView and portable HART SmartView connectivity			1
<b>M</b>	With I.S. terminals for stand-alone HART SmartView and portable HART SmartView connectivity	2		1
<b>N</b>	With integrated HART SmartView, I.S. terminals for stand-alone HART SmartView and portable HART SmartView connectivity	2		1
<b>P</b>	Integrated HART SmartView and portable HART SmartView connectivity + VITO	2		1
<b>T</b>	With I.S. terminals for stand-alone HART SmartView and portable HART SmartView connectivity + VITO	4		1
<b>U</b>	With integrated HART SmartView, I.S. terminals for stand-alone HART SmartView and portable HART SmartView connectivity + VITO	4		1

## Pos 4 Data transmission NOTE \*1) \*3) \*4) \*10)

<b>B</b>	Enraf Fieldbus Bi-phase Mark (BPM) GPU protocol		2	1
<b>G</b>	RS-232, GPU / Modbus protocol		3	1
<b>H</b>	HART or 4-20 mA output		2	1
<b>L</b>	TRL/2 communication protocol		2	1
<b>I</b>	OneWireless (ISA100)			1
<b>W</b>	RS-485, GPU / Modbus protocol		3	1

## Pos 5 I/O options NOTE \*1) \*2) \*3) \*4) \*10)

<b>D</b>	VITO temperature and/or water sensor and 3 HART inputs	4		1
<b>E</b>	VITO temperature and/or water sensor and 3 HART inputs and HIMS Density Calculations	4		1
<b>Q</b>	HART input (5x)	2		1
<b>R</b>	HART input (5x) and HIMS Density calculations	2		1
<b>C</b>	Hardware alarms (2x SPDT) 125 VAC, 0,5 A (110 VDC, 0,3 A)		4	1
<b>N</b>	Hardware alarms (2x SPDT) 250 VAC, 3 A (40 VDC, 3 A)		8	1
<b>S</b>	RTD one spot element 3 wire	3		1
<b>T</b>	RTD one spot element 4 wire	4		1
<b>U</b>	RTD two spot elements 3 wire	6		1
<b>X</b>	RTD two spot elements 4 wire	8		1
<b>2</b>	RTD 2 elements MRT / MPT	4		1
<b>3</b>	RTD 3 elements MRT / MPT	5		1
<b>4</b>	RTD 4 elements MRT / MPT	6		1
<b>5</b>	RTD 5 elements MRT / MPT	7		1
<b>6</b>	RTD 6 elements MRT / MPT	8		1

## Pos 6, 7 Additional data transmission or I/O options NOTE \*1) \*2) \*3) \*4) \*9) \*10)

- Select code from pos. 4 and 5
- Select code from pos. 4 and 5

## Pos 8 SIL or I/O options NOTE \*1) \*2) \*3) \*4) \*9) \*10)

<b>-</b>	Select code from pos. 5			
<b>F</b>	1 x SIL DO contact (1 x SPDT contact, 2 A at 250 VAC or 2 A at 40 VDC, Pmax = 500 W)	2		1
<b>M</b>	2 x SIL DO contact (2 x SPDT contact, 2 A at 250 VAC or 2 A at 40 VDC, Pmax = 500 W)	4		1
<b>A</b>	SIL AO NAMUR NE43 compliant	3		1
<b>K</b>	SIL AO + 1 SIL DO contact NAMUR NE43 compliant (1 x SPDT contact, 2 A at 250 VAC or 2 A at 40 VDC, Pmax = 500 W)	5		1
<b>P</b>	SIL AO + 2 SIL DO contacts NAMUR NE43 compliant (2 x SPDT contact, 2 A at 250 VAC or 2 A at 40 VDC, Pmax = 500 W)	7		1

# IDENTIFICATION CODE (CONTINUED)

R	X	I	B	V	-	-	-	A	E	F	O	8	3	0	-	-	-	Z
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Pos 9 Safety approvals

<b>A</b>	ATEX / IECEx	Global	
<b>F</b>	FM (only if pos. 10 = C)	USA	(not if Pos1 = M or S)
<b>C</b>	CSA (only if pos. 10 = C)	Canada	(not if Pos1 = S)
<b>I</b>	INMETRO	Brazil	

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Pos 10 Cable entries

<b>E</b>	6 x M20 EExe (only if pos. 9 = A or I)
<b>G</b>	3 x 3/4" NPT Exd / XP

---

Pos 11, 12, 13 Process antenna

<b>F</b>	<b>O</b>	<b>6</b>	6" PAT, Free space
<b>F</b>	<b>O</b>	<b>8</b>	8" PAT, Free space
<b>M</b>	<b>F</b>	<b>8</b>	8" PAT, Free space (only if Pos 1 = M) - for calibration purpose only
<b>S</b>	<b>O</b>	<b>6</b>	6" PAT, Stilling well
<b>M</b>	<b>S</b>	<b>6</b>	6" PAT, Stilling well (only if Pos 1 = M) - for calibration purpose only
<b>S</b>	<b>O</b>	<b>8</b>	8" PAT, Stilling well
<b>M</b>	<b>S</b>	<b>8</b>	8" PAT, Stilling well (only if Pos 1 = M) - for calibration purpose only
<b>S</b>	<b>1</b>	<b>0</b>	10" PAT, Stilling well
<b>M</b>	<b>S</b>	<b>1</b>	10" PAT, Stilling well (only if Pos 1 = M) - for calibration purpose only
<b>S</b>	<b>1</b>	<b>2</b>	12" PAT, Stilling well
<b>M</b>	<b>S</b>	<b>2</b>	12" PAT, Stilling well (only if Pos 1 = M) - for calibration purpose only
<b>H</b>	<b>O</b>	<b>4</b>	4" Horn, High pressure, Stilling well
<b>M</b>	<b>H</b>	<b>4</b>	4" Horn, High pressure, Stilling well (only if Pos 1 = M) - for calibration purpose only

---

Pos 14, 15 Antenna stem length (Not if pos 11 = H or pos 12 = H)

<b>0</b>	<b>5</b>	50 mm
<b>3</b>	<b>0</b>	300 mm
<b>5</b>	<b>0</b>	500 mm
<b>8</b>	<b>0</b>	800 mm

---

Installation type (Only if pos 11 = H or pos 12 = H)

<b>B</b>	<b>1</b>	Installation on oversized nozzle with 4" SCH 10 S Stilling well
<b>B</b>	<b>4</b>	Installation on 4" Class 300 full bore ball valve Ball valve not included
<b>N</b>	<b>1</b>	Installation on oversized nozzle with 4" SCH 10 S Stilling well including 1" full bore ball valve
<b>N</b>	<b>4</b>	Installation on oversized nozzle with 4" SCH 40 S STD Including 1" full bore ball valve

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Pos 16 Wireless communication antenna

<b>-</b>	None (not if pos. 4, 6 or 7 = I)
<b>A</b>	4 dBi antenna (only if pos. 4, 6 or 7 = I)
<b>B</b>	8 dBi antenna (only if pos. 4, 6 or 7 = I)
<b>D</b>	8 dBi antenna (only if pos. 4, 6 or 7 = I) no lightning arrester

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Pos 17 Tag plate

<b>Z</b>	None
<b>T</b>	Tag plate (Material: CuNi alloy)

**Typical Identification Code**

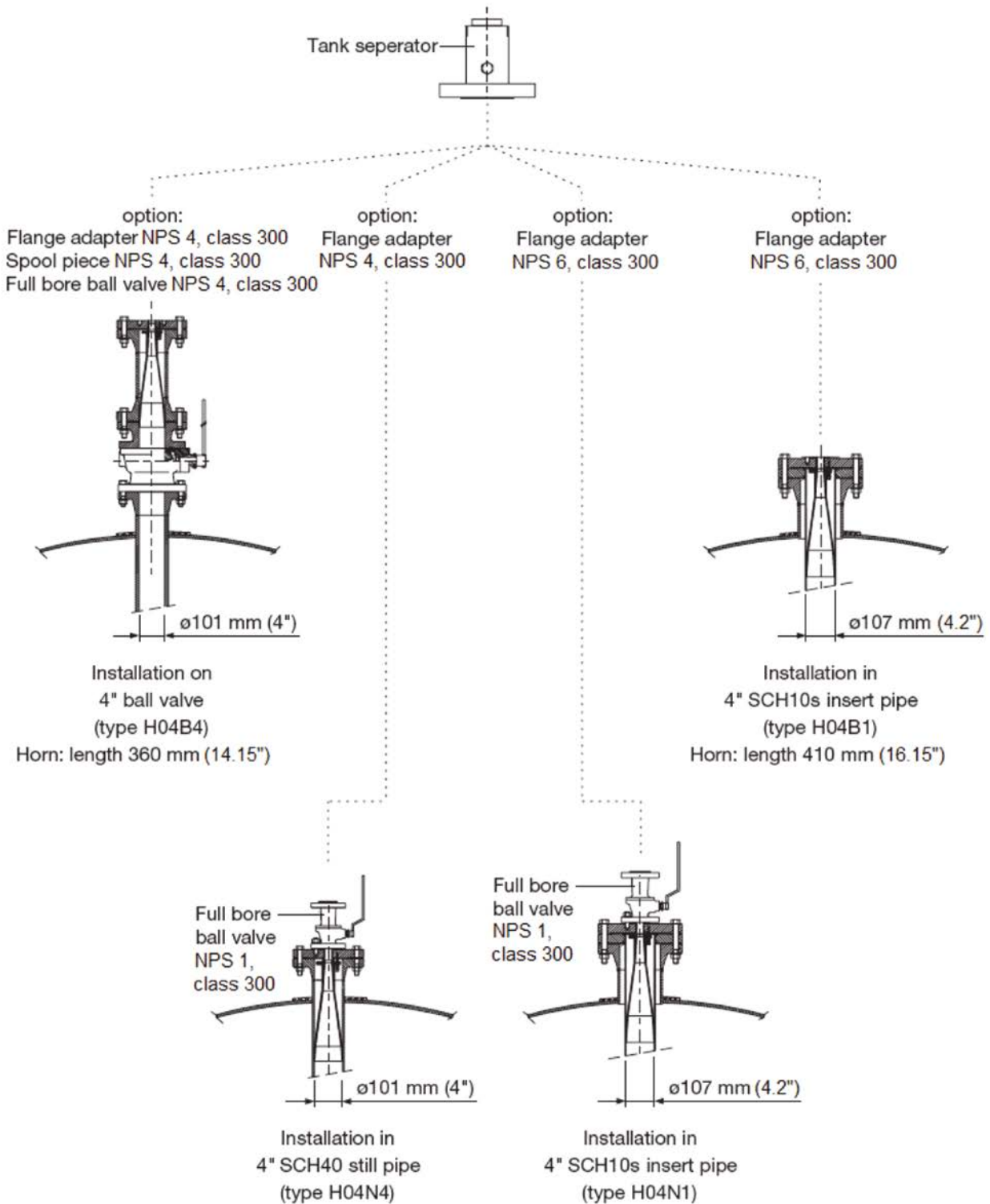
**Notes:**

- Dark grey positions: Normal delivery
- Light grey positions: For lead time please consult factory or contact your local sales office
- <sup>1</sup> Add terminal count per choice.
- <sup>2</sup> Maximum sum of i.s. terminals = 10
- <sup>3</sup> Maximum sum of non i.s. terminals = 16
- <sup>4</sup> Maximum sum of slots = 7
- <sup>5</sup> Please make sure the wireless SmartRadar complies to local radio regulations
- <sup>6</sup> For witnessed verification please specify authority. Additional costs not included.
- <sup>7</sup> Migration Version is delivered without Antenna and Tank Separator
- <sup>8</sup> Position 6/7/8 if not used, use selection "None".
- <sup>9</sup> In pos 4, 5, 6, 7: each board type can only be selected twice except the RTD which can only be selected once. RS232 and RS485 counts as one type. VITO and HART counts as one type.

# DIMENSIONAL DRAWING

Installation Drawings

High pressure horn type H04

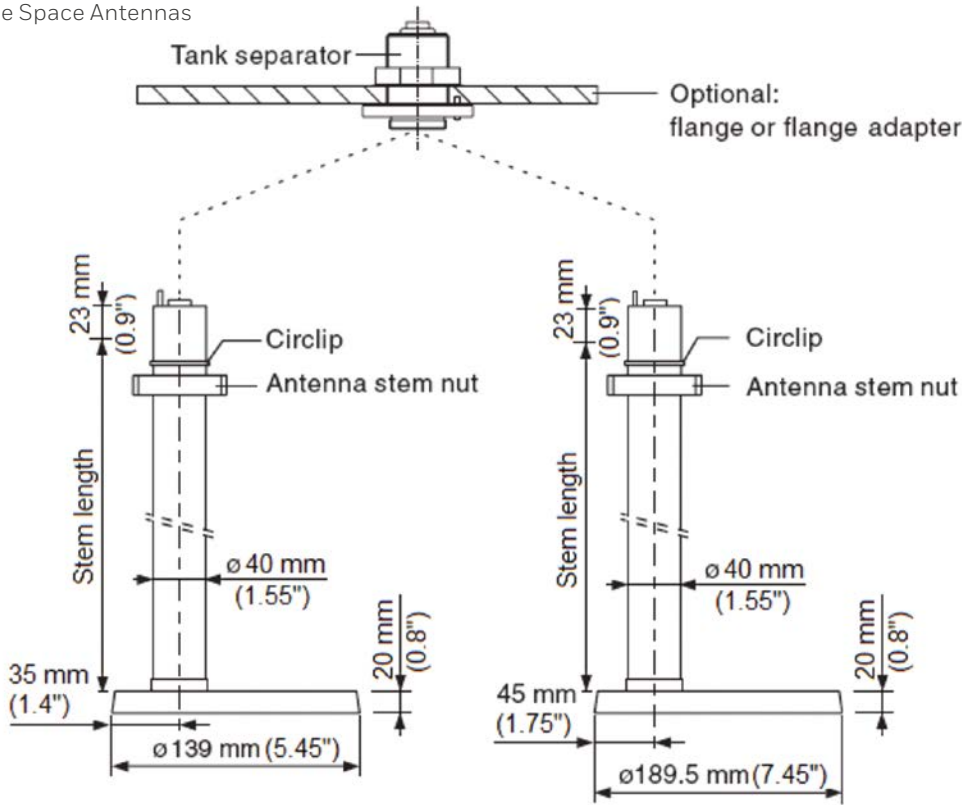


**Notes:**

- H04 antenna is used for high pressure applications such as LPG and chemical gases.
- Measuring range: up to 75 m (246 ft) (for longer range contact factory).
- Min. process temperature: -200 °C (-328 °F).
- Max. process temperature: +250 °C (+482 °F).
- Max. process pressure: 40 bar / 4 MPa (580 psi).

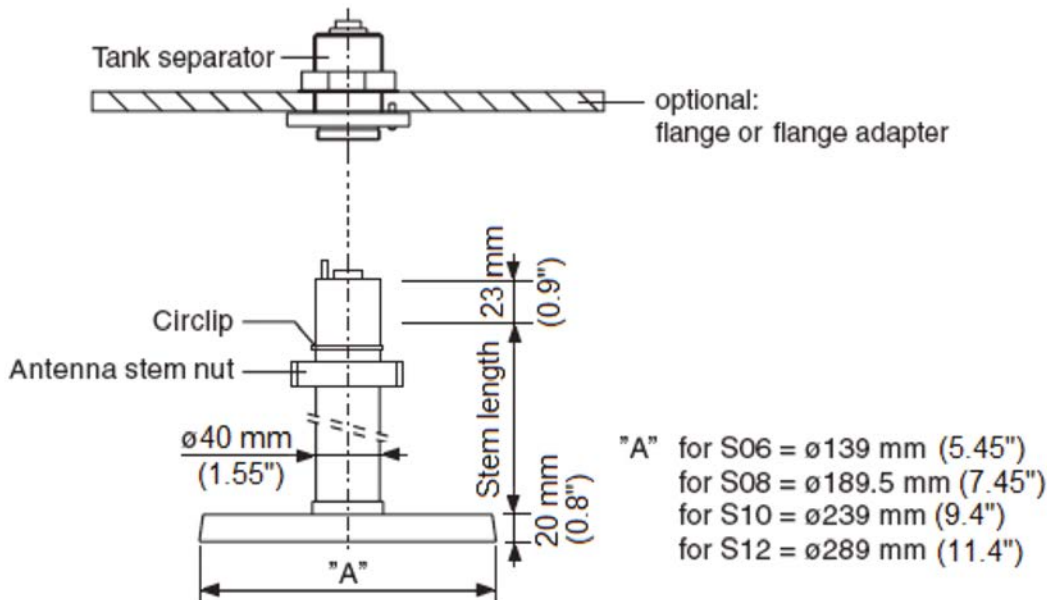
## DIMENSIONAL DRAWING

Installation Drawings  
Free Space Antennas



## DIMENSIONAL DRAWING

Installation Drawings  
Stilling Well Antennas



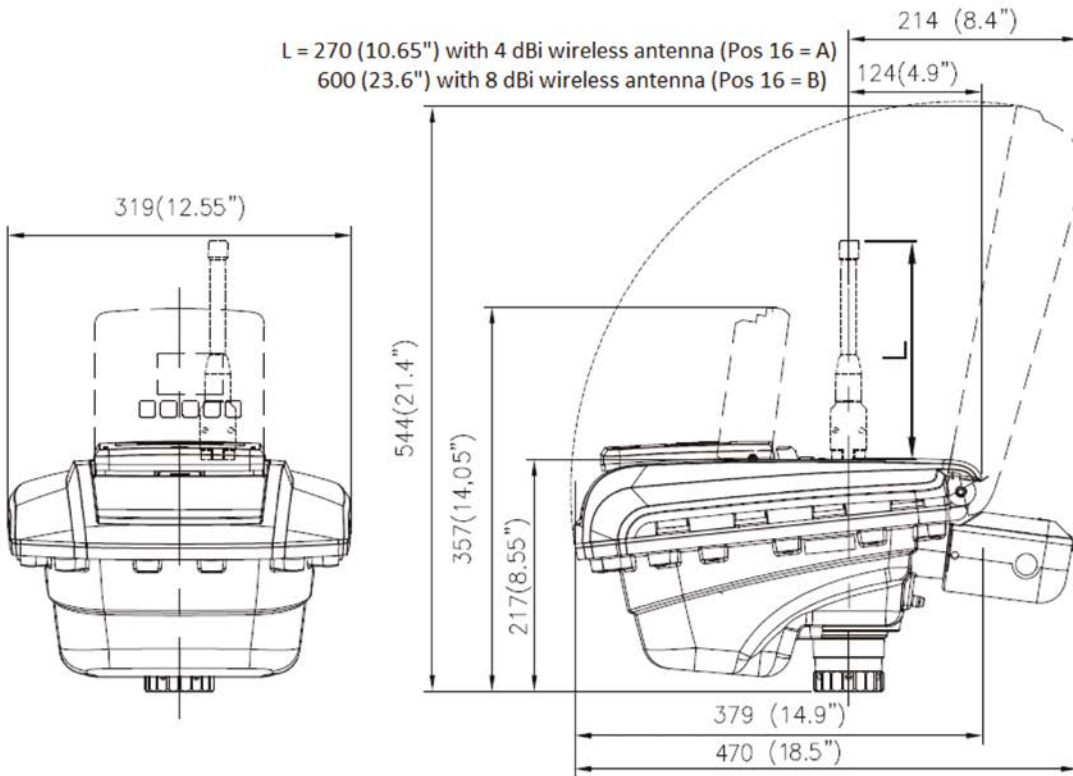
### Notes:

- Planar antennas are the best solution for most radar applications.
- Antennas for free space applications are type F06 (for  $\geq 6''$  roof nozzle) and type F08 (for  $\geq 8''$  roof nozzle).
- Antennas for applications on stilling wells are the types S06, S08, S10 and S12.
- Measuring range: up to 75 m (246 ft) (for longer ranges contact factory).
- Process temperature:  $-200\text{ }^{\circ}\text{C}$  ( $-328\text{ }^{\circ}\text{F}$ ) to  $+250\text{ }^{\circ}\text{C}$  ( $+482\text{ }^{\circ}\text{F}$ ). (For high temperature and cryogenic applications, easy installation method is described in installation guides. For temperatures above  $+250\text{ }^{\circ}\text{C}$  ( $+482\text{ }^{\circ}\text{F}$ ), consult your Honeywell representative.)
- Max. process pressure: 6 bar / 0.6 MPa (87 psi).
- Stilling well sizes: 6", 8", 10", 12", 14"(S12), 16"(S08), 20"(S10), 24"(S12).
- Stem lengths: 50 mm (1.95"); 300 mm (11.8"); 500 mm (19.7"); 800 mm (31.5").
- For adapter plates or flanges contact your Honeywell representative.

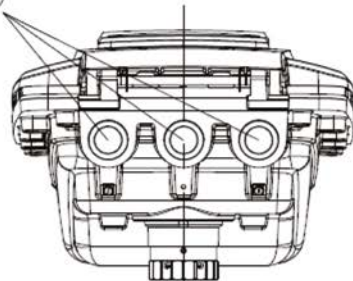
# DIMENSIONAL DRAWING

FlexLine Housing

Dimensions are in mm (in.)

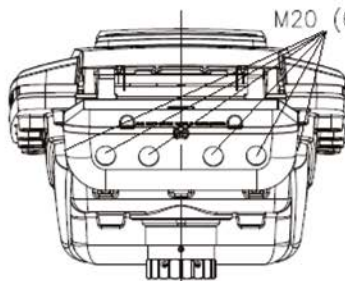


Cable Entries  
3/4" NPT (3x)



Rear View without SmartConn

Cable Entries via  
SmartConn EX-e  
Junction box  
M20 (6x)



Rear View with SmartConn

### **For more information**

To learn more about Honeywell's SmartRadar Flexline, visit [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell account manager.

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