**Product Data Sheet**
October 2014
00813-0100-2410, Rev AB

# Rosemount 2410 Tank Hub

## for tank gauging systems


- Collect and transfer data from one or several tanks to the control room
- Save installation cost by using the bus powered intrinsically safe 2-wire Tankbus
- Choose between several control room communication possibilities, including Modbus, IEC 62591 (*Wireless*HART) and emulation of other vendors' protocols
- Calculate average temperature, observed density and strapping table based volume
- Simplify start-up with tank device auto-configuration
- Get two configurable output relays, and one independent SIL safety relay for level alarm

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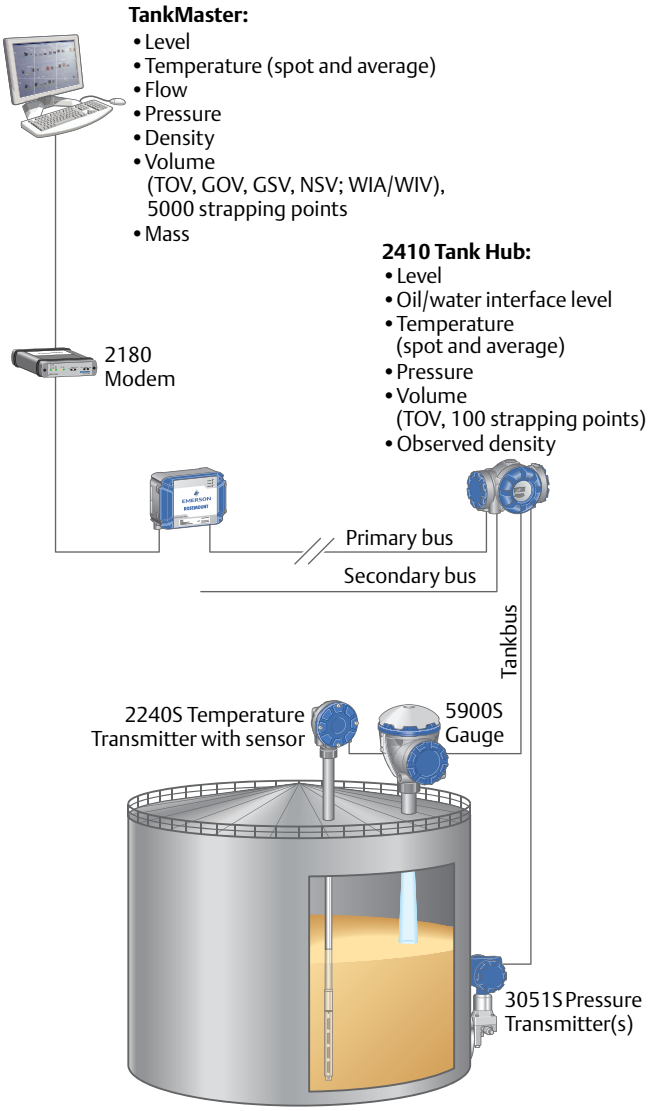
# Rosemount 2410 Tank Hub, for single or multiple tanks

## Efficient communication between tanks and control room

Rosemount 2410 handles communication between the field devices and the control room, and it is available in two versions, for single or multiple tanks.




### Tankbus communication

The 2410 Tank Hub communicates with and powers the devices on one or several tanks via the intrinsically safe Tankbus. The Tankbus complies with FISCO (Field bus Intrinsically Safe Concept) FOUNDATION™ fieldbus.

By using FISCO, there is no need to take entity parameters into consideration. This makes interconnection of devices easy. In addition, the available power from a FISCO power supply is higher compared to a conventional entity power supply. This enables connection of more devices on the Tankbus.

### Autoconfigure tank devices

The 2410 supports autoconfiguration of the Tankbus devices within the Rosemount Tank Gauging System. It acts as a FOUNDATION™ fieldbus master on the Tankbus, which means it identifies and auto-addresses field devices in the network, manages communication, and supervises the status of all connected devices. It also includes extensive built-in diagnostics.

### Data handling and calculation

Rosemount 2410 collects measurement values, such as level, temperature, and pressure.

It calculates average temperature, observed density and strapping table based volume.

Such data can be presented on the optional integrated back-lit display, a separate 2230 display, or be sent to TankMaster or a host system.

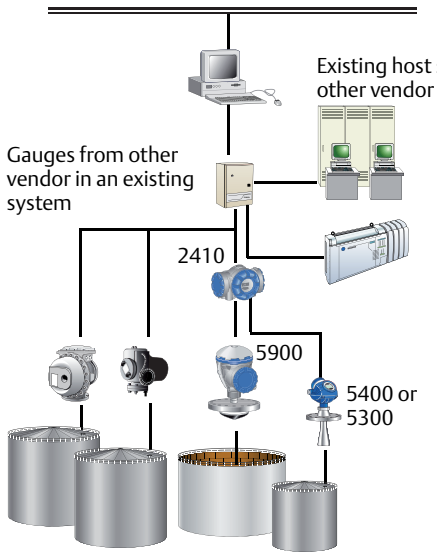
### Improve data security

All tank hubs have a software write protection function. In addition, the Rosemount 2410 with display option is equipped with a hardware write protection switch.

## Contents

### Control room communication

Rosemount 2410 has slots for two independent communication boards (primary and secondary field bus) for TRL2 Modbus, RS485 Modbus, emulation and wireless communication.




Emulation: The Tank Hub enables replacement of old mechanical/servo gauges with 5900 level gauges, or 5300/5400 transmitters using the existing tank openings, field cabling, and control system.

## Power supply with built-in cable terminator

Rosemount 2410 supplies power to the units on the Tankbus. It is equipped with an integrated FISCO-certified IS barrier, has power conditioner functionality, and built-in electronics for bus termination. A terminator at each end of the Tankbus ensures that the field bus network has proper signal levels.

All these features enable easy setup and installation of a Rosemount Tank Gauging system.

## Analog input/output

The 2410 Tank Hub can be ordered with:

- An analog input which can be used for connection of hybrid calculation pressure transmitters or
- An analog output for connection to a host system

## Output relay functionality

Rosemount 2410 can be equipped with two solid state relays which can be configured to be controlled by level, temperature, and water level (Non SIS/SIL in “Rosemount 2410 Tank Hub ordering information on page 5). The output can be connected to an external system for alarm indication or process control. These relays are user configurable for normally open or closed operation.

A third relay is dedicated for SIS/SIL overfill functionality. It is part of a separate SIL alarm channel, which has an independent software function, controlling the relay and providing extensive diagnostics. This relay is activated both if the alarm level is reached and/or if a device malfunction occurs.

It operates in a normally closed mode, and the output can be connected to an emergency shut-down (ESD) system.
The Rosemount Tank Gauging System is certified SIL 2 and SIL 3 capable for overfill prevention according to IEC 61508.

## Wireless communication

The Smart Wireless THUM™ Adapter acts as a wireless data link between the Tank Hub and a Smart Wireless Gateway in a *Wireless*HART field network. All available tank data such as level, temperature etc are transmitted via the wireless THUM.

The 2410 Tank Hub connected to a Smart Wireless THUM™ Adapter Assembly with integrated junction box.

# Ordering Information

## Rosemount 2410 Tank Hub

**Additional information**
Specifications: page 10
Certifications: page 16
Dimensional drawings: page 19

**Table 1. Rosemount 2410 Tank Hub ordering information**

| Model | Product Description |
|---|---|
| 2410 | Tank Hub |
| **Tankbus: Number of Tanks** | |
| S | Single tank |
| M | Multiple tanks (Maximum 5 Rosemount 5300/5400 transmitters can be connected to one Tank Hub) |
| **Tankbus: Power and Communication** | |
| F | Intrinsically safe FOUNDATION™ fieldbus (IEC 61158) power supply |
| **Primary Field Bus** | |
| R | TRL2 Modbus |
| 4 | RS485 Modbus |
| E(1) | Enraf Bi-phase Mark GPU |
| B(2) | Analog Output 4-20 mA/HART, Passive (Non-IS) |
| 7(2) | Analog Input 4-20 mA/HART, Passive (Non-IS) |
| **Secondary Field Bus** | |
| R(3) | TRL2 Modbus |
| E(3) | Enraf Bi-phase Mark GPU |
| W(4) | *Wireless*HART (IEC 62591) connectivity (IS) |
| C(5)(6) | Analog Output 4-20 mA/HART, active (IS) |
| A(5)(6) | Analog Output 4-20 mA/HART, active (Non-IS) |
| D(6) | Analog Output 4-20 mA/HART, passive (IS) |
| B(6) | Analog Output 4-20 mA/HART, passive (Non-IS) |
| 8(5)(7) | Analog Input 4-20 mA/HART, active (IS) |
| 6(5)(7) | Analog Input 4-20 mA/HART, active (Non-IS) |
| 9(7) | Analog Input 4-20 mA/HART, passive (IS) |
| 7(7) | Analog Input 4-20 mA/HART, passive (Non-IS) |
| 0(8) | None |
| F(9) | None, ready for upgrade of secondary bus |

**Table 1. Rosemount 2410 Tank Hub ordering information**

| | |
|---|---|
| **Relay Output (SIS/SIL)** | |
| 3[10][11] | SIL 3-certified output as per IEC 61508 |
| 2[10][12] | SIL 2-certified output as per IEC 61508 |
| F[13] | None, ready for upgrade of safety certification (SIS) |
| 0 | None |
| **Relay Output (Non-SIS/SIL)** | |
| 2 | Two (2xSPST) |
| 1 | One (1xSPST) |
| F | None, ready for upgrade of Relay Output (Non-SIS/SIL) |
| 0 | None |
| **Integral Display** | |
| 1 | LCD |
| 0 | None |
| **Power Supply** | |
| P | Extended input range: 48-240 VAC at 50/60 Hz, and 24-48 VDC |
| **Firmware** | |
| S | Standard |
| **Hazardous Location Certification** | |
| E1 | ATEX Flameproof |
| E2 | Brazil Inmetro Flameproof |
| E5 | FM-US Explosionproof |
| E6 | FM-Canada Explosionproof |
| E7 | IECEx Flameproof |
| K1 | ATEX Flameproof + FM-US Explosionproof (Combination of E1 and E5) |
| K3 | ATEX Flameproof + IECEx Flameproof (Combination of E1 and E7) |
| K4 | FM-US Explosionproof + FM-Canada Explosionproof (Combination of E5 and E6) |
| NA | No hazardous location certification |
| **Custody Transfer Type Approval** | |
| R[14] | OIML R85 E 2008 performance certification |
| 0 | None |
| C[15][16] | PTB (German W&M approval) |
| E[15][16] | TJA (Estonia W&M approval) |
| N[15][16] | NMi (the Netherlands W&M approval) |
| M[14][16] | BMS (Belgium W&M) |
| A[14][16] | CMI (Czech Republic W&M approval) |
| Y[14][16] | Justervesenet (Norway W&M approval) |

**Table 1. Rosemount 2410 Tank Hub ordering information**

| | |
|---|---|
| W[14][16] | METAS (Switzerland W&M approval) |
| **Housing** | |
| A | Standard enclosure (Polyurethane-covered die-cast aluminum. IP 66/67) |
| **Cable/Conduit Connections** | |
| 1[17] | ½-14 NPT and ¾-14 NPT |
| 2[18] | M20 x 1.5 and M25 x 1.5 adapters |
| G[19] | Metal cable glands (½-14 and ¾-14 NPT) |
| E[20] | Eurofast male, ½-14 NPT and ¾-14 NPT |
| M[20] | Minifast male, ½-14 NPT and ¾-14 NPT |
| **Mechanical Installation** | |
| P | Mounting kit for both wall and pipe installation (1-2 in. vertical or horizontal pipes) |
| W | Mounting kit for wall installation |
| 0 | None |
| **Options - none or multiple selections are possible** | |
| WR3 | Extended Product Warranty: 3-year limited warranty |
| WR5 | Extended Product Warranty: 5-year limited warranty |
| ST | Engraved SST tag plate (tag shall be submitted with order) |
| QT[21] | IEC 61508 certificate and FMEDA data |
| U1[22] | TÜV/DIBt WHG Approval for Overfill protection (at least one relay must be selected) |
| **Typical Model Number: 2410 S F R 0 3 2 1 P S E1 R A 1 P ST** | |

(1) Not available with Secondary Field Bus code R.

(2) Requires Secondary Field Bus code W.

(3) Requires Primary Field Bus code R or 4.

(4) Requires a separate Smart Wireless THUM Adapter (not included, to be ordered as a separate item). Maximum Tankbus (FF) current is reduced to 200 mA.

(5) Power-supply integrated. Maximum Tankbus current reduced to 200 mA.

(6) Requires Primary Field Bus code R, 4 or E. For connection to a 3rd party system.

(7) Requires Primary Field Bus code R, 4 or E. For connection of a 3rd party instrument.

(8) Requires Primary Field Bus code R, 4 or E.

(9) Requires Primary Field Bus code R, 4 or E. Requires Relay Output (SIS/SIL) code F or 0.

(10) Requires Secondary Field Bus code 0 and Tankbus: Number of Tanks code S, or Primary Field Bus code 4 and Secondary Field Bus code W, C, D, 8 or 9.

(11) Requires Rosemount 5900S with Safety Certification (SIS) code 3.

(12) Requires Rosemount 5900 with Safety Certification (SIS) code 2.

(13) Requires Secondary Field Bus, code 0 or F, and Tankbus: Number of Tanks code S.

(14) Sealing kit included.

(15) Approval plate and sealing kit included.

(16) Requires a Rosemount 5900S Radar Level Gauge with corresponding Custody Transfer Type Approval.

(17) Female thread. 3 plugs included.

(18) Female thread. 3 plugs and 3 adapters included.

(19) Min. temperature -20 °C (-4 °F). ATEX / IECEx Exe approved. 3 plugs and 3 glands included.

(20) 3 plugs included.

(21) Requires Relay Output (SIS/SIL) code 2 or 3.

(22) Requires Relay Output (SIS/SIL) code 2 or 3 and/or Relay Output (Non-SIS/SIL) code 1 or 2.

# Rosemount Smart Wireless THUM™ Adapter Assembly


- Wireless output with >99% data reliability delivers data, protected by industry leading security
- Gain access to additional information, such as diagnostics or multivariable data
- Add wireless to almost any measurement point

**Additional information**

Specifications: page 15
Certifications: page 17
Dimensional Drawings: page 19

**Table 2. Rosemount Smart Wireless THUM™ Adapter Assembly ordering information**

| Model | Product Description |
|---|---|
| 775[1] | Smart Wireless THUM Adapter |
| **Output** | |
| X | Wireless |
| **Housing** | |
| D | Polyurethane painted, low-copper aluminum |
| **Mounting Connection** | |
| 2 | M20 conduit adapter |
| **Plantweb functionality** | |
| 1 | HART data |
| **Certification** | |
| NA | No approval |
| I1 | ATEX intrinsically safe |
| I2 | INMETRO intrinsically safe |
| I3 | NEPSI |
| I4 | TIIS |
| I5 | FM intrinsically safe, non-incendive |
| I6 | CSA intrinsically safe |
| I7 | IECEx intrinsically safe |
| N1 | ATEX Type n |
| N2 | INMETRO Type n |
| N7 | IECEx Type n |
| IP | KOSHA intrinsically safe |

**Table 2. Rosemount Smart Wireless THUM™ Adapter Assembly ordering information**

| | |
|---|---|
| IW | CCOE intrinsically safe |
| IM | GOST intrinsically safe |
| **Wireless Transmit Rate** | |
| WA | User configurable burst rate |
| **Operating Frequency and Protocol** | |
| 3 | 2.4 GHz DSSS, IEC 62591 (*Wireless*HART) |
| **Wireless Antenna** | |
| WK | Omnidirectional integral antenna |
| **SmartPower™** | |
| 9 | Power scavening |
| **Device Connection** | |
| T | 2410 Tank Hub connection |
| **Cable / Conduit Connection** | |
| 0 | None |
| J(2) | Metal cable gland M20 x 1.5 |
| F | ½ NPT Adapter (female thread) |
| **Options - none or multiple selections are possible** | |
| PT | Printed tag for unit identification |
| **Typical Model Number: 775 X D 2 1 I1 WA 3 WK 9 T F PT** | |

(1) Requires THUM Connection Box.

(2) Min. temperature -20 °C (-4 °F). ATEX / IECEx.

# Specifications for 2410 Tank Hub

## General specifications

### Single tank version

- Supports one 5900S 2-in-1 gauge or two radar level gauges, type 5300, 5400, or 5900
- Total Observed Volume (TOV) calculation with 100-point strapping table

### Multiple tank version

For a 5300/5400/5900 system configuration:

- The software supports 16 field devices and 10 tanks per hub
- Maximum five gauges, type 5300 or 5400 per hub

The actual number of tanks/instruments a hub supports depends on the configuration, which types of units are connected and how many:

- Hybrid calculations (mass and density) for up to three tanks
- Total Observed Volume (TOV) calculation with 100-point strapping table for one tank

For more information, see Table 5 on page 12.

### Examples of connected field devices

Radar Level Gauges (type 5900[(1)], 5300, and 5400), 2240S Multi-input Temperature Transmitter,
644 Temperature Transmitter, Temperature /Water Level Sensors, 3051S Scalable Pressure Transmitter, 2230 Graphical Display

### Start-up time

Less than 30 s

## Communication/Display /Configuration specifications

### Tankbus

The intrinsically safe side of the Rosemount 2410 connects to the Tankbus which communicates with field devices on the tank using FOUNDATION™ fieldbus

### Field bus

**Primary field bus:** Rosemount 2410 communicates with a host or a field communication unit via TRL2 Modbus, RS485 Modbus, Enraf or HART

**Secondary field bus:** TRL2 Modbus, Enraf (other options available soon), *Wireless*HART for Smart Wireless THUM™ Adapter

For combination guidance, see Table 3 on page 11.

### Relay outputs

**SIL safety relay output:** One certified SIL 2/SIL 3 capable relay is available for overfill prevention. This non-intrinsically safe solid state relay is closed/energized during normal operation

Maximum voltage and current: 260 VAC/VDC, 80 mA
Single pole

**Relay outputs (Non-SIL):** Maximum two relays, controlled by 10 independent virtual relay functions which can be configured for different tanks and process variables. The two non-intrinsically safe solid state relays are user configurable for normally energized or de-energized operation.

Maximum voltage and current: 350 VAC/VDC, 80 mA
Single pole

For combination guidance, see Table 3 on page 11.

(1) One Rosemount 5900S with 2-in-1 solution or maximum two Rosemount 5900 gauges installed on separate tanks can be connected to one tank hub. If two Rosemount 5900 gauges are installed on the same tank, two separate tank hubs are required.

**Table 3. Field bus combination matrix**

| Secondary field bus options | Code | Primary field bus options: TRL2 R | RS485 4 | ENRAF E | A_OUT PASSIVE (NON-IS) B | A_IN PASSIVE (NON-IS) 7 |
|---|---|---|---|---|---|---|
| TRL2 | R | Yes | Yes | No | No | No |
| ENRAF | E | Yes | Yes | No | No | No |
| *WIRELESS*HART (IEC62591) | W | Yes | SIL | Yes | Yes | Yes |
| A_OUT ACTIVE (IS) | C | Yes | SIL | Yes | No | No |
| A_OUT ACTIVE (NON-IS) | A | Yes | Yes | Yes | No | No |
| A_OUT PASSIVE (IS) | D | Yes | SIL | Yes | No | No |
| A_OUT PASSIVE (NON-IS) | B | Yes | Yes | Yes | No | No |
| A_IN ACTIVE (IS) | 8 | Yes | SIL | Yes | No | No |
| A_IN ACTIVE (NON-IS) | 6 | Yes | Yes | Yes | No | No |
| A_IN PASSIVE (IS) | 9 | Yes | SIL | Yes | No | No |
| A_IN PASSIVE (NON-IS) | 7 | Yes | Yes | Yes | No | No |
| None | 0 | SIL | SIL | SIL | No | No |
| READY FOR UPGRADE | F | Yes | Yes | Yes | No | No |

*SIL = Primary field bus and secondary field bus can be combined with SIL*

## Analog input/output

### Analog input

Maximum number of input channels: 1
Input Current range: 0-23 mA
Configurable Min and Max alarm limits.

Lift-off voltage (Passive IS and NON-IS): 10.5 V
Max input voltage (Passive IS and NON-IS): 30 V

Output voltage (Active):
Non-IS: 22 ±2.0 V (open loop); 20.8 ±2.0 V @3,75 mA; 14.8 ±2.0 V @21.75 mA
IS: 21 ±2.0 V (open loop); 18.8 ±2.0 V @3,75 mA; 8.2 ±2.0 V @21.75 mA
See “Product certifications” for IS parameters

HART master:
Maximum 5 HART Slave Devices (Passive).
Maximum 3 HART Slave Devices (Active).

### Analog output

Maximum number of output channels: 1
Output range: 3.5-23 mA
Software configurable High and Low Alarm Limits.
Separate software configurable alarms for process and hardware failures.
Low voltage and invalid loop current detection.

Lift-off voltage (Passive IS and NON-IS): 10.5 V
Max input voltage (Passive IS and NON-IS): 30 V

Output voltage (Active):
Non-IS: 22 ±2.0 V (open loop); 22.8 ±2.0 V @3,75 mA; 16.8 ±2.0 V @21.75 mA
IS: 21 ±2.0 V (open loop); 20.8 ±2.0 V @3,75 mA; 10.2 ±2.0 V @21.75 mA

### Integral display output variables

The integral digital read-out display can toggle between: level, level rate, ullage, signal strength, volume (TOV), liquid average temperature, 1-16 spot temperature, vapor average temperature, ambient temperature, free water level, vapor pressure, liquid pressure, air pressure, observed density, reference density, and flow rate.

### Display output units(1)

Level, free water level, and ullage: meter, millimeter, feet, or imperial 1/16
Level rate: meter/second, meter/hour, feet/second, or feet/hour
Flow rate: meter³/hour, liter/minute, barrel/hour, or US gallon/hour
Total Observed Volume (TOV): meter³, liters, barrel, or US gallon
Temperature: °F, °C, or °K
Pressure: psi, psiA, psiG, bar, barA or barG, atm, Pa, or kPa
Density: kg/m³, °API, or 60/60DegF
Signal strength: mV

### Configuration tools

Rosemount TankMaster

### Autoconfiguration support

Yes (Tankbus addressing)

## Electrical specifications

### Power supply (nominal values)

24-48 VDC (-15% to +10%)
48-240 VAC (-15% to +10%), 50/60 Hz

### Power consumption

Max. 20 W depending on configuration

### Tankbus cabling

0.5-1.5 mm² (AWG 22-16), twisted shielded pairs. Recommended cabling is shielded twisted pairs, 0.75 mm² (AWG 18). Tankbus cabling must fulfill FISCO cable and installation requirements, and must also be approved for use in minimum 85 °C (185 °F).

**FISCO (Field bus Intrinsically Safe Concept):**

*The following cable characteristics are specified for FISCO according to IEC 60079-27.*

**Table 4. FISCO cable characteristics**

| Parameter | Value |
|---|---|
| Loop resistance | 15 Ω/km to 150 Ω/km |
| Loop resistance | 0.4 mH/km to1 mH/km |
| Capacitance | 45 nF/km to 200 nF/km |
| Maximum length of each spur(1) cable | 60 m in gas Group IIC |
| Maximum length of each trunk(2) cable | 1000 m in gas Group IIC, and 1900 m in gas Group IIB |

(1) The spur is an unterminated part of the network. It is allowed to have an up to 60 m long spur. For longer distances, an alternative network configuration should be considered.

(2) The trunk is the part of the network which has terminators at both ends. In the Rosemount Tank Gauging system, a trunk can be the part of the network between the Tank Hub and a segment coupler or the last device in a daisy-chain configuration.

**Table 5. Power budget**

| Field device | Power consumption |
|---|---|
| 5900S or 5900C Radar Level Gauge | 50 mA |
| 5900S Radar Level Gauge, 2-in-1 solution | 100 mA |
| 5300 or 5400 Series Radar Level Transmitter | 21 mA |
| Rosemount 2230 Graphical Field Display | 30 mA |
| Rosemount 2240S Multi-input Temperature Transmitter | 30 mA including 565, 566 and 765 temperature sensors |
| Rosemount 644 Temperature Transmitter | 12 mA |
| Rosemount 3051S, and Rosemount 2051 Pressure Transmitters | 18 mA |

(1) Density, mass, and more volume parameters are calculated in Rosemount TankMaster (GOV, GSV, NSV, WIA/WIV).

**Figure 1. Cable distances**

The total cable distance A+B+C+D must not exceed the values given in Table 6.

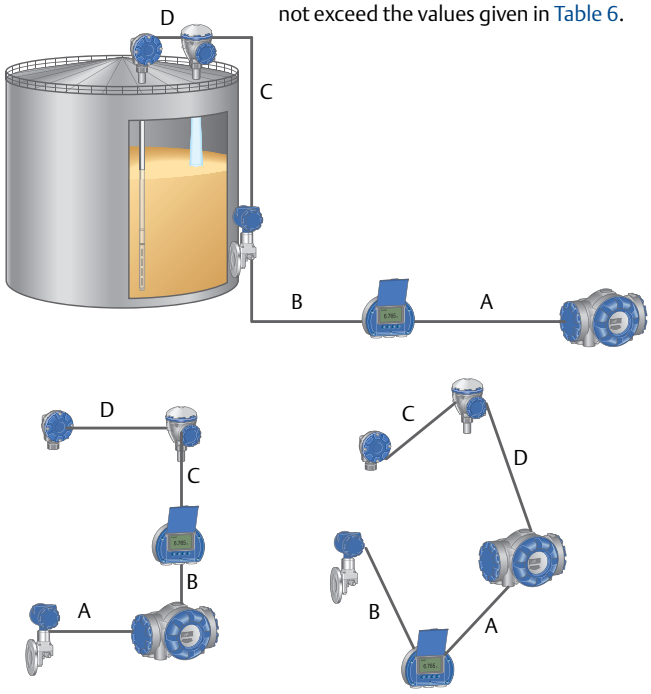



**Table 6. Allowed cabling distances for different system configurations**

| Cable diameter | Loop resistance | Maximum cabling distance from power source to all devices on the tank | | |
|---|---|---|---|---|
| | | with maximum power usage of 250 mA<br><br>Distance in m (ft) | with typical power usage of 128 mA for 5900S, 2240S, 2230, 3051S<br><br>Distance in m (ft) | with typical power usage of 178 mA for 5900S 2-in-1, 2240S, 2230, 3051S<br><br>Distance in m (ft) |
| 20 AWG (0.5 mm²) | 66 Ω/km | 212 (695) | 414 (1358) | 298 (978) |
| 18 AWG (0.75 mm²) | 42 Ω/km | 333 (1092) | 651 (2136) | 468 (1535) |
| 17 AWG (1.0 mm²) | 33 Ω/km | 424 (1391) | 829 (2720) | 596 (1955) |
| 16 AWG (1.5 mm²) | 26 Ω/km | 538 (1765) | 1000 (3281) | 756 (2480) |

The typical cabling distance from the Hub towards the control room is up to 4 km (2.5 miles) depending on which protocol is used.

## Power and relay cabling

0.5-2.5 mm² (AWG 22-14), twisted shielded pairs

## Maximum Tankbus cable lengths

Depends on cable. For details see the Rosemount Raptor Tank Gauging System Data Sheet (704010EN)

## Built-in Tankbus terminator

Yes (to be disconnected if required)

# Mechanical specifications

## Housing material

Polyurethane-covered die-cast aluminum

## Cable entry (connection/glands)

Non-IS side: Two ½ - 14 NPT and Two ¾ - 14 NPT entries for cable glands or conduits
IS side: Two ½ - 14 NPT entries for cable glands or conduits
Three metal plugs to seal any unused ports are included in the delivery
Optional:

- M20 x 1.5 and M25 x 1.5 conduit / cable adapter
- Cable glands in metal (½ - 14 NPT and ¾ - 14 NPT)
- 4-pin male Eurofast connector or A size Mini 4-pin male Minifast connector

## Installation

Can be installed on a 33.4-60.3 mm (1-2 in.) diameter pipe or wall, at ground level close to the tank or on top of the tank using existing cabling.

## Weight

4.7 kg (10.4 lbs)

# Environmental specification

## Ambient temperature

-40 to 70 °C (-40 to 158 °F). Minimum start-up temperature is -50 °C (-58 °F).
With LCD display: -25 to 70 °C (-13 to 158 °F)

## Storage temperature

-50 to 85 °C (-58 to 185 °F)
With LCD display: -40 to 85 °C (-40 to 185 °F)

## Humidity

0 - 100% relative humidity

## Ingress protection

IP 66 and IP 67 (Nema 4X)

## Metrology sealing possibility

Yes

## Write protect switch

Yes

## Transient / built-in lightning protection

According to IEC 61000-4-5, level 4 kV line to ground. Complies with IEEE 587 Category B transient protection and IEEE 472 surge protection

# Specifications for Smart Wireless THUM™ Adapter Assembly

## General specifications

The THUM allows WirelessHART communication according to the IEC 62591 standard between the device it is connected to and the Smart Wireless Gateway. The THUM™ is integrated with a connection box.

### Transmission range

Application dependent. Consult factory

## Communication specifications

### Communication protocol

IEC 62591 (*Wireless*HART)

### Radio characteristics

- Standard IEEE 802.15.4 radio
- 2.4 GHz ISM band sliced into 16 radio-channels
- Continually “hop” across channels to avoid interference and increase reliability
- Direct sequence spread spectrum (DSSS) delivers high reliability in challenging radio environment

### Update rate

User selectable, 8 seconds to 60 minutes

## Electrical specifications

### Power supply

Powered by Rosemount 2410 tank hub

### Output cabling

Shielded twisted pair wiring, 0.5-2.5 $mm^2$ (AWG 22-14). Maximum cable length depends on cable characteristics

## Mechanical specifications

### Housing / enclosure

Polyurethane painted, low-copper aluminum housing

### Cable entry (connection/glands)

One M20x1.5 entry for cable gland or conduit adapter

Optional:

- Metal cable gland M20x1.5
- ½ NPT adapter (female thread)

### Installation

The THUM can be installed on a vertical or horizontal 1 to 2-in. pipe, away from the Tank Hub at the best possible tank roof position. It should be positioned approximately 2 m (6 ft) or more from any large structure or conductive surface

### Antenna

Polybutadine terephthalate (PBT) / polycarbonate (PC) integrated omnidirectional antenna

### Weight

Connection box and THUM adapter: 2.0 kg (4.4 lbs.)

## Environmental specifications

### Ambient temperature

-40 to 85 °C (-40 to 185 °F)

### Storage temperature

-40 to 85 °C (-40 to 185 °F)

### Humidity limits

0 - 100% relative humidity

### Ingress protection

IP 66 and NEMA 4X

**Note**
For more information, see the Smart Wireless THUM™ Adapter Product Data Sheet (document number 00813-0100-4075)

# Product Certifications

### OIML R85:2008

The OIML metrology certificate, issued by the SP Technical Research Institute of Sweden, covers the Raptor Tank Gauging system, including the level gauges equipped with different antennas.
Certificate number is R85/2008-SE-11.01.

### SIL certification

The SIL safety certificate, issued by exida in Switzerland, includes the SIL alarm channel within the 5900S radar level gauge and the 2410 Tank Hub. Both units are SIL 2 and SIL 3 capable according to IEC 61508, parts 1-7.
Certificate number is Rosemount 091243 P0017 C001.

### German WHG certification

The certificate for the 5900S radar level gauge and the 2410 Tank Hub is issued by DIBt (Deutsches Institute für Bautechnik) according to the German WHG regulations for overfill prevention. It is based on technical evaluation and testing conducted by TÜV NORD CERT GmbH.
Certificate number is Z-65.16-500.

## Hazardous location certifications for Rosemount 2410

### European ATEX Directive Information

EC-Type Examination Certificate Number: FM10ATEX0012
Control Drawing: 9240040-901

**E1 Flameproof with Intrinsically Safe Output**

**FISCO Power Supply:**

II 2(2) G
Ex de [ib] IIB T4 (-50 °C ≤ $T_a$ ≤ +70 °C)
$U_o$=15 VDC, $I_o$=354 mA, $P_o$=5.32 W
$U_m$=250 VDC

**HART/4-20 mA Entity IS I/O Option:**
Active Current Loop:

II 2(1) G
Ex de [ia IIC] IIB T4 (-50 °C < $T_a$ < +70 °C)
$U_o$=23.1 VDC, $I_o$=95.3 mA, $P_o$=550 mW
Group IIC: $C_o$ ≤ 0.14 µF, $L_o$ ≤ 3.9 mH
Group IIB: $C_o$ ≤ 1.0 µF, $L_o$ ≤ 15 mH
Group IIA: $C_o$ ≤ 3.67 µF, $L_o$ ≤ 33 mH

Passive Current Loop:

II 2(2) G
Ex de [ib IIC] IIB T4 (-50 °C < $T_a$ <+70 °C)
$U_i$=30.0 VDC, $I_i$=300 mA, $C_i$=0 µF, $L_i$ =0 mH

### US Factory Mutual (FM-US) certification

Certificate of Compliance: 3035492

Control Drawing: 9240040-901

**E5 Explosionproof with Intrinsically Safe Output**
Temperature Class T4
Ambient Temperature Limits -50 °C to +70 °C

**FISCO Power Supply**
Explosionproof Class I, Division 1, Groups C, and D
Dust-ignitionproof Class II and III, Division 1, Groups E, F, and G

Associated Intrinsically Safe Class I, Division 1, Groups C and D

Class I Zone 1 AEx de [ib] IIB
$U_o$=15 VDC, $I_o$=354 mA, $P_o$=5.32 W

**HART/4-20 mA Entity IS I/O Option:**

Active Current Loop:
XP-AIS CL I, DIV. 1 GP C & D

AEx de[ia IIC] IIB
$U_o$=23.1 VDC, $I_o$=95.3 mA, $P_o$=550 mW
Group IIC: $C_o$ ≤ 0.14 µF, $L_o$ ≤ 3.9 mH
Group C, IIB: $C_o$ ≤ 1.0 µF, $L_o$ ≤ 15 mH
Group D, IIA: $C_o$ ≤ 3.67 µF, $L_o$ ≤ 33 mH
Passive Current Loop:
AEx de [ib IIC] IIB
$U_i$=30.0 VDC, $I_i$=300 mA, $C_i$=0 µF, $L_i$ =0 mH

### Canadian Factory Mutual (FM-C) certification

Certificate of Compliance: 3035492C
Control Drawing: 9240040-901

**E6 Explosionproof with Intrinsically Safe Output**

Temperature Class T4
Ambient Temperature Limits -50 °C to +70 °C

**FISCO Power Supply:**
Explosionproof Class I, Division 1, Groups C, and D
Dust-ignitionproof Class II and III, Division 1, Groups E, F, and G

Associated Intrinsically Safe Class I, Division 1, Groups C and D

Class I Zone 1 Ex de[ib] IIB
$U_o$=15 VDC, $I_o$=354 mA, $P_o$=5.32 W

**HART/4-20 mA Entity IS I/O Option:**

Active Current Loop:
XP-AIS CL I, DIV. 1 GP C & D

Ex de[ia IIC] IIB
$U_o$=23.1 VDC, $I_o$=95.3 mA, $P_o$=550 mW
Group IIC: $C_o \leq 0.14$ µF, $L_o \leq 3.9$ mH
Group C, IIB: $C_o \leq 1.0$ µF, $L_o \leq 15$ mH
Group D, IIA: $C_o \leq 3.67$ µF, $L_o \leq 33$ mH
Passive Current Loop:
Ex de [ib IIC] IIB
$U_i$=30.0 VDC, $I_i$=300 mA, $C_i$=0 µF, $L_i$ =0 mH

### IECEx certification

Certification of Conformity Number: IECEx FMG 10.0005
Control Drawing: 9240040-901

**E7 Flameproof with Intrinsically Safe Output (FISCO)**

**FISCO Power Supply:**
Ex de [ib] IIB Gb T4 (-50 °C ≤ $T_a$ ≤ +70 °C)

$U_o$=15 VDC, $I_o$=354 mA, $P_o$=5.32 W, $U_m$=250 VDC

**HART/4-20 mA Entity IS I/O Option:**

Active Current Loop:
Ex de [ia IIC Ga] IIB Gb T4 (-50 °C < $T_a$ <+70 °C)
$U_o$=23.1 VDC, $I_o$=95.3 mA, $P_o$=550 mW
Group IIC: $C_o \leq 0.14$ µF, $L_o \leq 3.9$ mH
Group IIB: $C_o \leq 1.0$ µF, $L_o \leq 15$ mH
Group IIA: $C_o \leq 3.67$ µF, $L_o \leq 33$ mH

Passive Current Loop:
Ex de [ib IIC Gb] IIB Gb T4 (-50 °C < $T_a$ <+70 °C)
$U_i$=30.0 VDC, $I_i$=300 mA, $C_i$=0 µF, $L_i$ =0 mH

### Combination Approvals

K1=E1+E5 (ATEX + FM-US)
K3=E1+E7 (ATEX + IECEx)
K4=E5+E6 (FM-US+FM-C)

For more information on product certificates, refer to the Rosemount 2410 Reference manual (document number 300530EN).

## Hazardous location certifications for Smart Wireless THUM™

***Special conditions for safe use (X), ATEX & IECEX:***

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.
The enclosure is made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0.

### European Directive information

The EC declaration of conformity for all applicable European directives for this product can be found at www.rosemount.com. A hard copy may be obtained by contacting an Emerson Process Management representative.

ATEX DIRECTIVE (94/9/EC)
Emerson Process Management complies with the ATEX Directive.

ELECTROMAGNETIC COMPABILITY (EMC) (2004/108/EC)
Emerson Process Management complies with the EMC Directive.

RADIO AND TELECOMMUNICATIONS TERMINAL EQUIPMENT DIRECTIVE (R&TTE) (1999/5/EC)
Emerson Process Management complies with the R&TTE directive.

### Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

### FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm (8 in.) from all persons.

### Ordinary location certification for FM

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

### European ATEX Directive information

**I1 ATEX Intrinsic Safety**
Certificate No.: Baseefa09ATEX0125X Ex II 1G
Ex ia IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
IP66. $U_i$=30 V, $L_i$=200 mA, $P_i$=1.0 W, $C_i$=0, $L_i$ =0
CE 1180

**N1 ATEX Type n**
Certificate No.: Baseefa09ATEX0131 Ex II 3G
Ex na IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
IP66. $U_i$=45 Vdc max.
CE 1180

### Factory Mutual (FM) Approvals

**I5 FM Intrinsic Safety and Non-incendive**
Intrinsically Safe for Class I/II/III, Division 1,
Groups A, B, C, D, E, F, and G.
Zone Marking: Class I, Zone 0, AEx ia IIC
Temperature Codes T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
Non-incendive for Class I, Division 2, Groups A, B, C, and D.
Intrinsically safe and non-incendive when installed according to Rosemount drawing 9240040-901
Enclosure Type 4X/IP66

### CSA - Canadian Standards Association

**I6 CSA Intrinsic Safety**
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D.
T3C (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
Intrinsically safe when installed according to Rosemount drawing 9240040-901
Suitable for Class I, Division 2, Groups A, B, C, and D

### IECEx certifications

**I7 IECEx Intrinsic Safety**
Certificate No.: IECEx BAS 09.0050X
Ex ia IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
IP66. $U_i$=30 V, $L_i$=200 mA, $P_i$=1.0 W, $C_i$=0, $L_i$ =0

**N7 IECEx Type n**
Certificate No.: IECEx BAS 09.0058
Ex na IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
IP66. $U_i$=45 Vdc max.

### INMETRO certifications

**I2 INMETRO Intrinsic Safety**
BR-Ex ia IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C) Ga

**N2 INMETRO Type n**
BR-Ex na IIC T4 Gc(-50 °C ≤ $T_{amb}$ ≤ +70 °C)

### China (NEPSI) certifications

**I3 China (NEPSI) Intrinsic Safety**
Ex ia IIC T4

### CCoE certifications

**IW Intrinsic Safety**
Ex ia IIC T4

### KOSHA certifications

**IP Intrinsic Safety**
Ex ia IIC T4

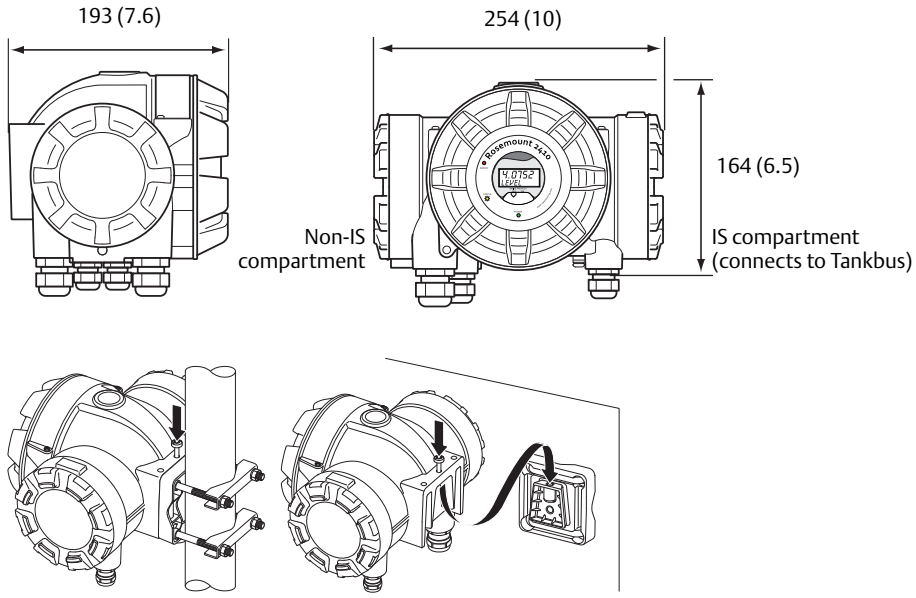
### GOST certifications

**IM Intrinsically Safe**
Ex ia IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
Ex na IIC T4 (-50 °C ≤ $T_{amb}$ ≤ +70 °C)
IP66

For more information, see the Smart Wireless THUM™ Adapter Product Data Sheet (document number 00813-0100-4075)

# Dimensional Drawings

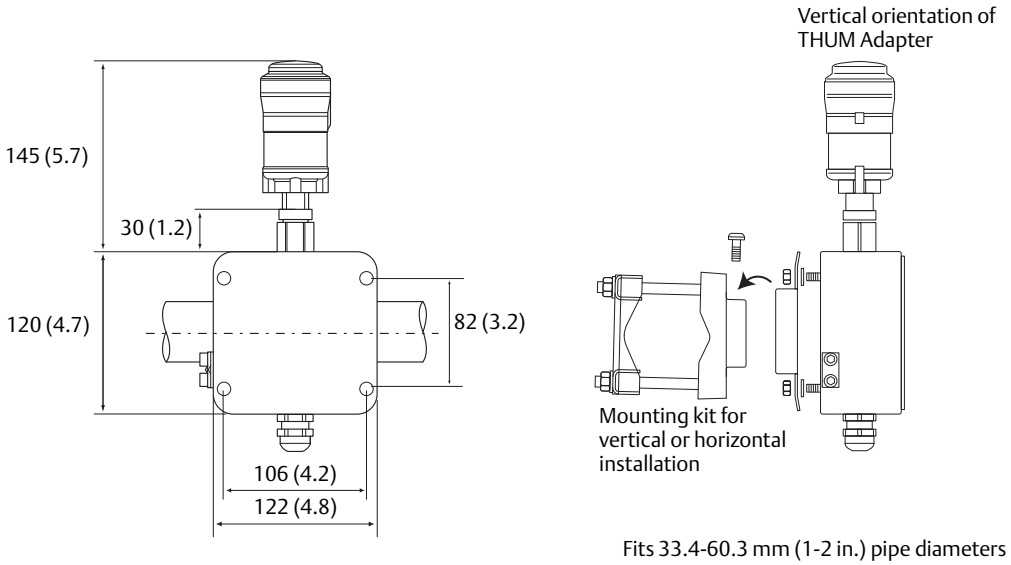
**Figure 2. Rosemount 2410 Tank Hub dimensions**




Rosemount 2410 can be mounted on a wall or a pipe with 33.4-60.3 mm (1-2 in.) diameter

Dimensions are in millimeters (inches)

**Figure 3. Smart Wireless THUM™ Adapter Assembly dimensions**




Fits 33.4-60.3 mm (1-2 in.) pipe diameters

Dimensions are in millimeters (inches)

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