DATASHEET
LL3 | LL3-D

OTC

Highlights

- Monitor product, interface & temperature using a single Resistive Level Sensor

- Advanced local LCD display interface

- Up to a 10-year battery life[1]

- 1/2" or 1/4" resolution option

- ± 1/8" accuracy on 1/4" sensor (T Version)

- ± 1/4" accuracy on 1/2" sensor

- Flex (PTFE) or rigid (316 SS) sensor option

- "Set it and forget it" one-time calibration

- Installs in minutes: Quick Connect eliminates sensor wiring error and hassle

- Self-contained, rugged design

- IP66, -40 ˚C to 70 ˚C (Transmitter)

- 900 MHz & 2.4 GHz radio option

- Secure AES encryption

- Class I, Division 1 (Zone 0), Intrinsically Safe

CSA C US   CE 0518   Ex II 1G   IEC   IECEx

US Patent #6967589 & #8,763,455 B1

LL3 | LL3-T   **LL3-D | LL3-DT**

The Most Reliable Wireless Tank Level Monitoring System

Ultimate Level Sensing Solution

The OleumTech® WT Series Resistive Transmitter and Level Sensor combination is the superlative wireless tank level monitoring solution. The Resistive Transmitter provides the ability to monitor product, interface, and temperature levels using a single, high precision Resistive Tank Level Sensor.

OleumTech's patented Resistive Sensors are offered in both flexible (PTFE) and rigid (316 SS) materials in various custom lengths.

The 1/4" resolution sensors mate with the LL3-T and LL3-DT Transmitter versions. The 1/2" resolution sensors mate with the LL3 and LL3-D versions.

Get even more functionality out of your Level Transmitter by selecting the discrete inputs version. It is ideal for use with the OleumTech high level switches for spill prevention, and thief hatch switches to meet EPA methane regulatory requirements.

The ultra-low-powered transmitter is powered by a replaceable battery pack that provides up to a 10-year life.[1]

Reliable, Scalable, and Safe

The field-proven wireless level transmitter communicates with an assigned wireless gateway within the OTC Wireless Sensor and I/O Network, creating a highly scalable network, accommodating virtually any I/O requirement.

OleumTech Wireless Level Transmitters are certified for use in Class I, Division 1 (Zone 0) hazardous locations. It is intrinsically safe, designed not to cause a spark and can be serviced without being removed from a process.

LL3 or LL3-T

Instant read push button

Configure device, calibrate sensor and connect to the network without using a PC or another device

Quick Connect eliminates wiring error and gets workers safely off the process faster

Flex (PTFE)
Resistive Sensor

20" coiled diameter only: Easy to transport and easier to install

1/4" or 1/2" resolution option

LL3-D or LL3-DT
w/ a Discrete Input

1x discrete input for integrating a level switch or a thief hatch monitoring switch

Height-adjustable compression fitting

Dual-level monitoring capabilities + temperature

Rigid (316 SS)
Resistive Sensor

Limited lifetime warranty against damage from H2S and paraffin buildup

Sensor supports wide temperature range -40 ˚C to 120 ˚C / -40 ˚F to 248 ˚F

1/4" or 1/2" resolution option

OTC Transmitters   OTC Gateway   Network Infrastructure   Cloud (Analytics)

Technical Specifications

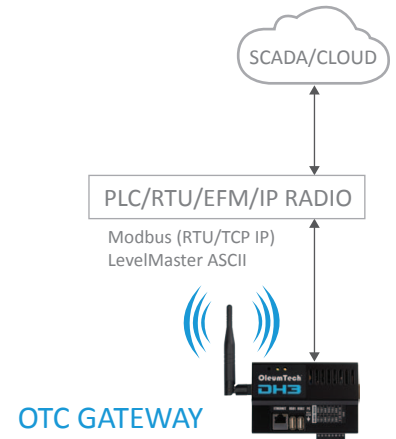| HARDWARE FEATURES	
Device Functionality	· OTC Wireless Transmitter that Supports Resistive Level Sensors
Model Configuration	· LL3: 1/2" Resolution; 3-in-1 Monitoring: Product, Interface and Temperature (6-pin Quick Connect) · LL3-D: 1/2" Resolution, 4-in-1: Discrete Input + Product, Interface and Temperature (6-pin Quick Connect) · LL3-T: 1/4" Resolution; 3-in-1 Monitoring: Product, Interface and Temperature (8-pin Quick Connect) · LL3-DT: 1/4" Resolution, 4-in-1: Discrete Input + Product, Interface and Temperature (8-pin Quick Connect)
Embedded Controller	· Ultra-Low Power RISC Microcontroller with Internal FLASH (Field Upgradeable)
Configuration	· Standard RS232 Serial / BreeZ® Software for PC (v5.5 or higher for 1/4" Resolution Models)
Resolution	· Resolution Depends on Sensor Type: 1/4-inch (6.4 mm) or 1/2-inch (12.7 mm)
Accuracy	· 1/4" Resolution Sensor: ±1/8" Accuracy; 1/2" Resolution Sensor: ±1/4" Accuracy · 6.4 mm Resolution Sensor: ±3.2 mm Accuracy; 12.7 mm Resolution Sensor: ±6.4 mm Accuracy
Power Source	· Self-Contained, Internal 3.6 Vdc Lithium Battery
Internal Battery Life	· Up to 10 Years, Based on User Defined Reporting Intervals[1]
Local LCD Display	· 32-Character Display (16x2 Lines) with 4 Function Keys + Read Button
Instantly Readable Data	· Product / Interface / Temperature / Battery Voltage / RF Status
Local Configuration	· Integral LCD with Four Push Button Interface
Self-Diagnostics	· Contains Comprehensive Self-Checking Software and Hardware for Continuous Monitoring of Operation
WIRELESS COMMUNICATIONS	
Type: 900 MHz / 2.4 GHz	· ISM Band, Spread Spectrum · 900 MHz: FHSS (Frequency Hopping), FSK, AES Encryption 256-bit (900 MHz), 128-bit (915 MHz) · 2.4 GHz: DSSS (Direct-Sequence), AES Encryption 128-bit
Bit Rate	· 900 MHz: 9600 bps / 115.2 kbps ; 2.4 GHz: 250 kbps
Output Power	· 900 MHz: 10 mW; 2.4 GHz: 63 mW
Receiving Sensitivity	· 900 MHz: -110 dBm @ 9600 bps, -100 dBm @ 115.2 kbps / 2.4 GHz: -100 dBm @ 250 kbps
RF Range	· 900 MHz: Up to 7500 Feet (2.3 km) with Clear Line of Sight[2] · 2.4 GHz: Up to 7 km / 4.3 miles with Clear Line of Sight[2]
CERTIFICATIONS & COMPLIANCE	
EMC/EMI	· FCC Part 15 (USA) IC ICES-003 (Canada)
Safety	· Class I, Division 1, Groups A, B, C, D T3C; Ex ia IIC T3 · Class I, Zone 0; AEx ia IIC T3 / Ta = -40 to 158 °F (-40 °C to 70 °C) · ATEX: Sira 13ATEX2142X; Ex ia IIC T3 Ga; II 1 G; -20 °C ≤ Tamb ≤ 70 °C · IECEx: SIR 13.0054X; Ex ia IIC T3 Ga / Ta = -4 to 158 °F (-20 °C to 70 °C)
MECHANICAL SPECIFICATIONS	
Dimensions	· 5.25" (W) x 9" (H) x 4.25" (D) / 134mm (W) x 230mm (H) x 108mm (D)
Package Dimensions	· 10.25" (W) x 14" (H) x 6.5" (D) / 260mm (W) x 356mm (H) x 165mm (D)
Package Weight	· LL3: ~5.5 lbs / 2.5 kg | LL3-D: 7 lbs / 3.2 kg
Connection Fitting	· Quick Connect Adapter to Sensor - No Wiring Required
Enclosure Casing Material	· Type 4X Aluminum; IP66
GENERAL SPECIFICATIONS	
Operating Conditions	· Ambient Temperature (Class I, Division 1): Transmitter -40 °F to 158 °F (-40 °C to 70 °C) LCD Screen -4 °F to 158 °F (-20 °C to 70 °C) · Ambient Temperature (Non-Hazardous Applications): Transmitter -40 °F to 176 °F (-40 °C to 80 °C) LCD Screen -4 °F to 158 °F (-20 °C to 70 °C) · Humidity: 0 to 99 %, Non-Condensing
Warranty	· 2-Year Parts and Labor
Country of Origin	· USA
ORDERING INFORMATION	
Transmitter Model #	· 900 MHz: WT-0900-LL3, WT-0900-LL3-T, WT-0900-LL3-D, WT-0900-LL3-DT · 2.4 GHz: WT-2400-LL3, WT-2400-LL3-T, WT-2400-LL3-D, WT-2400-LL3-DT
Wirelessly Connects To	· OTC Wireless Gateway
Configuration Cable	· SX1000-CC2, 20-ft All-in-One Configuration Cable
Replacement Battery	· Use OleumTech SX1000-BP3 Only
SENSOR COMPATIBILITY	
1/2" Sensor Kits w/Float(s)	1/2" TG-xxx-Fx-x (Flex) and ZG-xxx-Fx-x (Rigid) Works with LL3, LL3-D
1/4" Sensor Kits w/Float(s)	1/4" TH-xxx-Fx-x (Flex) and ZH-xxx-Fx-x (Rigid) Works with LL3-T, LL3-DT
Flex Sensor Part #	Flex 1/2": 60-4101-xxxx; Flex 1/4": 60-4102-xxxx
Rigid Sensor Part #	Rigid 1/2": 60-4001-xxxx; Rigid 1/4": 60-4002-xxxx

Networking Diagram

SCADA/CLOUD

PLC/RTU/EFM/IP RADIO

Modbus (RTU/TCP IP)
LevelMaster ASCII

OTC GATEWAY

OTC TRANSMITTERS
Point-to-Multipoint
"Star Topology"

[1] Ambient temperature and one transmission per 1 min interval without any retries were used to calculate battery life. Actual battery life may vary depending on environmental factors, application, and usage. Use data shown above only as general point of reference. See OleumTech Battery Life Expectancy Chart for predicted battery life based on reporting interval.

[2] The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.
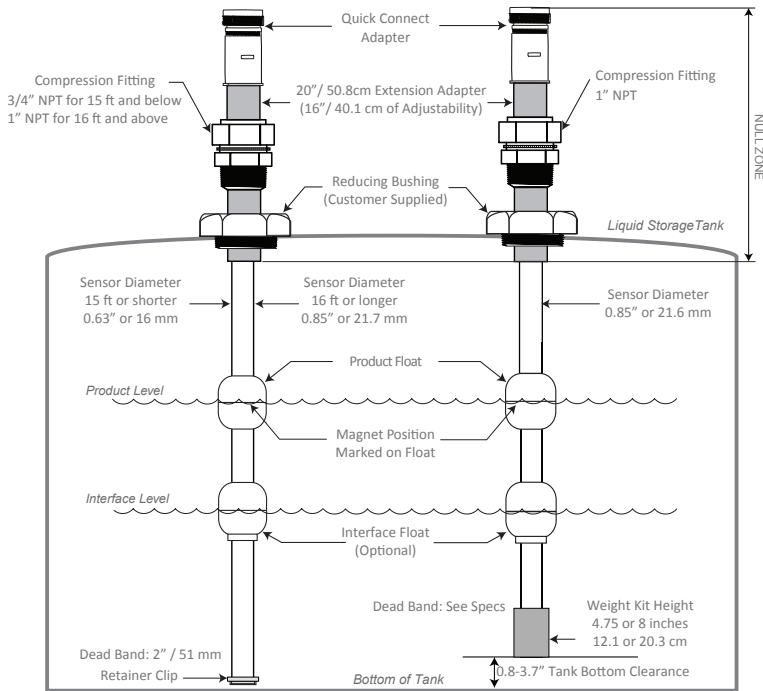
MADE IN USA

RIGID - 316SS

FLEX - PTFE

Quick Connect Adapter

Compression Fitting
3/4" NPT for 15 ft and below
1" NPT for 16 ft and above

20"/ 50.8cm Extension Adapter
(16"/ 40.1 cm of Adjustability)

Compression Fitting
1" NPT

NULL ZONE

Reducing Bushing
(Customer Supplied)

Liquid Storage Tank

Sensor Diameter
15 ft or shorter
0.63" or 16 mm

Sensor Diameter
16 ft or longer
0.85" or 21.7 mm

Sensor Diameter
0.85" or 21.6 mm

Product Level

Product Float

Magnet Position
Marked on Float

Interface Level

Interface Float
(Optional)

Dead Band: See Specs

Weight Kit Height
4.75 or 8 inches
12.1 or 20.3 cm

Dead Band: 2" / 51 mm
Retainer Clip

Bottom of Tank

0.8-3.7" Tank Bottom Clearance

Highlights

- Extremely reliable, accurate & robust performance
- OleumTech's flagship level sensing solution
- Monitor product, interface & temperature levels from a single sensor
- Lifetime limited warranty against H2S damage and paraffin buildup
- 1/2" or 1/4" resolution option
- 1/2" resolution with ±1/4" accuracy
  "TG" & "ZG" resistive sensor kit numbers
- 1/4" resolution with ±1/8" or 2/16" accuracy
  "TH" & "ZH" resistive sensor kit numbers
- "Set it and forget it" one-time calibration
- Quick and easy to install
- Class I, Division 1 (Zone 0), Intrinsically Safe
- Supports wide temperature range -40 °C to 120 °C / -40 °F to 248 °F

  US Patent 8,763,455 B1

SENSOR	RIGID: 316 Stainless Steel "SS"	FLEX: Polytetrafluoroethylene "PTFE"
Type	Extremely Reliable and Accurate Resistive Reed Switch Technology	
Measurement Capabilities (3-in-1)	Product, Interface, and Temperature	
Lengths Offered in US Units	2 to 21 ft Length in 1 ft Increments	8 to 38 ft Length in 1 ft Increments
Lengths Offered in Metric	0.61 to 6.4 m in 0.31 m increments	2.44 to 11.58 m in 0.31 m increments
Resolution and Accuracy	Option 1: 1/2-inch (12.7 mm) Resolution with ±1/4-inch (±6.4 mm) Accuracy (6-pin Quick Connect)	
	Option 2: 1/4-inch (6.4 mm) Resolution with ±1/8-inch (±3.2 mm) Accuracy (8-pin Quick Connect)	
Sensor to Interface Mating Connection (No Wiring Solution)	316 SS Quick Connect: 6-pin Connection for 1/2" Resolution, 8-pin Connection for 1/4" Resolution	
Tank Mating Connection (Adjustable Compression Fitting)	2-15 ft: 3/4" NPT Male / 16-21 ft: 1" NPT Male	1" NPT Male
Temperature Accuracy	±1 °C	
Sensor Rod/Tubing Diameter	0.63" (16 mm): 2-15 ft Sensor 0.85" (22 mm): 16-21 ft Sensor	0.85" (22 mm)
Anchor Weight Diameter	N/A	2.88" / 73 mm
Height of Anchor Weight	N/A	Up to 26 ft sensor: 4.75" / 121 mm 26 - 38 ft sensor: 8" / 203 mm
Coiled Diameter	N/A	20" (50.8 cm) Coiled Diameter
Minimum Measurement from Bottom (Deadband)	2" (50.8 mm) from Bottom	From Top of Anchor Weight
Sensor Pressure Rating	Float Dependent	Float Dependent
316 Stainless Steel - Standard (Included w/Rigid <=15 ft	440 PSI / 30 Bar	N/A
316 Stainless Steel - Large	363 PSI / 25 Bar	142 PSI / 9.8 Bar
Polypropylene (PP) (Inc. w/Flex and w/Rigid >=16ft	72 PSI / 5 Bar	72 PSI / 5 Bar
Float Options:		
316 Stainless Steel - Standard, 440 PSI/30 Bar	Compatible Only with Rigid Sensor Length up to 15 ft Prod: 0.64 SG, Intf: 0.96 SG, ID 0.72" (18.3 mm) OD 2.05" (52.1 mm), Inner Clearance: 0.1" (2.6 mm)	
316 Stainless Steel - Large, 363 PSI/25 Bar	Product: 0.62 SG, Interface: 0.95 SG, ID 1.1" (27.9 mm), OD 2.76" (70.1 mm), Inner Clearance: 0.5" (12.7 mm)	
Polypropylene (PP), 72 PSI/5 Bar	Product: 0.64 SG, Interface: 0.96 SG, ID 1.1" (27.9 mm), OD 2.91" (73.9 mm), Inner Clearance: 0.5" (12.7 mm)	
Operating Temp. Sensing Area	-40 °F to 248 °F (-40 °C to 120 °C)	
Certifications	Class I, Division 1, Groups C, D T4; Ex ia IIB T4 Ga; Class I, Zone 0, AEx ia IIB T4 Ga, -40 °C ≤ Tamb ≤ 70 °C ATEX: Sira 16ATEX2229X; Ex ia IIB T4 Ga, -40 °C ≤ Tamb ≤ 70 °C IECEx: SIR 16.0079X; Ex ia IIB T4 Ga, -40 °C ≤ Tamb ≤ 70 °C	
Power (Wireless)	SX1000-BP3, 3.6 V Lithium Replaceable Battery Pack, 10-Year Life @ 1 min Read Interval	
Wireless Compatibility	OTC - WT / SM Series Resistive Transmitters and Sigfox-enabled Resistive Transmitters	
Minimum Sensor Read Interval	Down to 5 Seconds	
Model #: 1/2" Resolution with ±1/4-inch Accuracy	60-4001-xxx	60-4101-xxx
Model #:1/4" Resolution with ±1/8-inch Accuracy	60-4101-xxx	60-4102-xxx
Kit #: 1/2" Resolution with Float(s)	ZG-xxx-Fxx	TG-xxx-Fxx
Kit #: 1/4" Resolution with Float(s)	ZH-xxx-Fxx	TH-xxx-Fxx

Certifications: CSA C US | CE 0518 | Ex II 1G | IEC IECEx