# NB-IoT/CAT-M1 Logger Exi-WT822

With flexible sensor/meter connection options, the battery powered Intrinsically safe LPG logger is suitable for monitoring fuel tanks levels and flow rate.

## Applications

- LPG/Propane tank dial-gauge position measurement
  - Rochester R3D/Twinsite Senior/Junior
- Pressure sensor based vented tank liquid level monitoring
  - Kerosene, Diesel, Gasoline
  - Oils/Waste Oils
  - Other hazardous/non hazardous
- Utility meters/Flow meters
  - Pulse output accumulation and reporting
- Tanks
  - Fixed or mobile
  - Vented or pressurised
  - Underground
  - Tank size limited only by the capability of the sensor connected
- Spot and continuous inventory measurement
- Configurable reporting schedule and alarms

## Benefits

- Accurate, reliable tank level reporting to server monitoring application
- Highly configurable server reporting interval from hourly to once per month
- 28 slot logger with configurable logging interval
- Optimise delivery or collections
- Programmable Alarms
  - High level
  - Low levels
  - Rate of level change (fill or drain)
- Reports local temperature, RSSI, and battery level
- External antenna option for underground locations
- Remote re-configurability
- Plug and play installation
- Mounting/attachment options – wall/pole
- CE Conformance and ROHS Compliant

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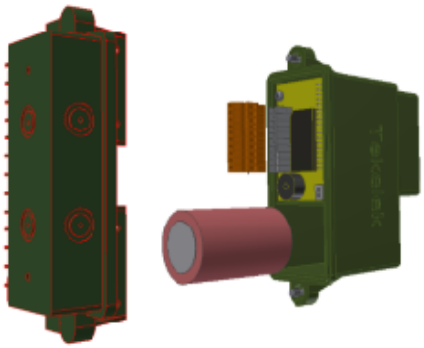
**WEEE Reg. 00232**
Patents granted

| Characteristic | LPG logger 4G NB-IoT/CAT-M1 |
|---|---|
| Dimensions<br>Weight | 130mm x 125mm x 61mm / 5.1" x 4.9" x 2.4" (excluding cable gland/external connector)<br>Weight 350g/0.77lbs |
| Housing Material | Moulded plastic, 2-part, material Glass Reinforced Polyamide, UV resistant. |
| Operating Temperature | -30°C to +55°C / -22°F to 131°F |
| Storage Temperature | 0°C to 30°C / 32°F to 86°F |
| Humidity | 0 – 100% RH |
| Environmental Protection | IP68 |
| Communication | LTE CAT-M1 or NB-IoT<br>With GPS. |
| Pressure sensor | Pressure sensors from various manufacturers operating from 5V supply may be connected.<br>0V to 5V ratiometric with programmable scaling |
| Dial-gauges | 5V Rochester Senior/Junior Twinsite/R3D (Rochester DS-1318.pdf compatible as standard) |
| Accuracy/resolution | 10-bit A/D resolution, Accuracy is dependent on the gauge used |
| 2 x Pulse counter inputs option | 2 x volt free switch inputs with pull up resistors to 5V |
| Loop current measurement option | 120 ohm internal load. 4-20mA measurement possible with external energising source. |
| Serial data | Serial data support is possible – Contact factory |
| Power requirements | Battery pack with standard cell sizes connected with a 2 wire harness included |
| Battery technology | 3.6V Lithium Thionyl Chloride Exi “Bobbin type” construction |
| Battery life | Up to 10 years* |
| Safety | ATEX Zone II 1 G-Ex ia IIB T4 Ga [-30 < Ta < +55°C / -22°F to 131°F ] and IECeX/Hazloc equivalents (Excludes D Cell) |
| Conformance | CE, IECeX, RoHs, RED |
| Manual Activation | Magnetically activated reed switch / Audible buzzer / Internal LED |
| Installation | Plug and play installation. Shipped pre-configured with customer supplied SIM card and Rochester gauge installed |

* Based on 1 communication per day and good network coverage

## Configuration/Specification Options

| | |
|---|---|
| External connection | IP68 Cable gland (side or bottom) / IP68 bulkhead connector |
| Server radio communications | PTCRB (AT&T) & Verizon approvals. FCC, RED, CE approvals. |
| Antenna | Internal with option for antenna coupler with SMA connector to allow connection of an external GSM antenna |
| Battery size | Several options up to a D cell size are available |
| Data Communications | Tekelek proprietary protocol |
| Fixing/Mounting | Screw mounts (4), tie wrap, & pole mount features are standard. |



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# Ultrasonic 4G NB-IoT/CAT-M1-WT811

Our Ultrasonic 4G NB-IoT/CAT-M1 is a flexible and configurable battery operated liquid level sensor with an integrated Cellular modem supporting GSM (2G), LTE-CAT M1 & NB-IoT networks and GPS.

## Applications

- Liquid level monitoring
  - Fuel – Oil, Kerosene, Diesel
  - Lubricants
  - Additives
  - DEF / AdBlue
  - Coolants
  - Water
  - Waste Oil
  - Wastewater
  - Chemicals - **This product may not be suitable for monitoring of certain corrosive and hazardous chemicals. List of product compatible chemicals to be verified with a Tekelek representative.*
- Fixed or portable tanks
- Ensure continued supply
- Optimise delivery or collections
- Spot and continuous inventory measurement
- Programmable alarms
  - Full alert
  - Empty alert
  - Spill alert (bunded tanks)
  - Low and High levels
- 24/7 monitoring


## Benefits

- Accurate, reliable tank level monitoring
- Spot and continuous inventory management
- Programmable data reporting interval
- Remote configurability
- Easy to install
- Minimum 1 year warranty
- CE Conformance, ROHS and PTCRB Compliant
- International Approvals

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## Specification

| Characteristic | Transmitter |
|---|---|
| Dimensions | 101mm (W) x 93mm (L) x 150mm (H) ±1mm / 4”(W) x 3.66”(L) x 5.9”(H) ±0.04” |
| Weight | 530g/1.17lbs including 4 x C size batteries - 290g/0.2lbs without batteries |
| Housing Material | UV Stabilized Polypropylene (compatible with Oil) |
| Operating Temperature | -20°C to 50°C / -4°F to 122°C **(Note 1)** |
| Storage Temperature | -30°C to 60°C / -22°F to 140°F **(Note 1)** |
| Altitude Range | <2Km/1.25miles above sea level |
| Environmental Protection | IP67 – Outdoors |
| Radio Frequency: | Cat M1/Cat NB1:<br>LTE FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28<br>LTE TDD: B39 (For Cat M1 Only)<br>EGPRS: 850/900/1800/1900MHz |
| Gauge Type | Ultrasonic |
| Ultrasonic Range | >12cm to <4m / >4.7” to 157” **(Note 2)** |
| Ultrasonic Signal Diversion | 30° **(Note 3)** |
| Ultrasonic Resolution | ±1cm / ±0.04” |
| Accuracy | Typically ±2cm from 12cm to 3m / ±0.78” from 4.7” to 118” |
| Material compatibility | **(Note 4)** |
| Power requirements | 4 of Type C LR14 Alkaline 1.5V (fitted) |
| Battery life | 5 Years **(Note 5)** |
| GPS | Included |
| Humidity range | 15% - 95% |

## Accessories

| | |
|---|---|
| SIM Card | Options available |
| Tank mounting options | Fit directly into 1 ¼”, 1 ½” or 2” BSP existing tank connection |
| Bund switch option | Can be supplied with Bund switch for double skinned tanks – 3m / 118” cable |

| Conformity | |
|---|---|
| EMC directive 2014/30/EU | The Electromagnetic Compatibility (EMC) Directive ensures that electrical and electronic equipment does not generate, or is not affected by, electromagnetic disturbance. |
| LVD directive 2014/35/EU | The Low Voltage Directive (LVD) ensures that electrical equipment within certain voltage limits provides a high level of protection for European citizens, and benefits fully from the Single Market. |
| RED directive 2014/53/EU | The Radio Equipment Directive ensures a Single Market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility, and the efficient use of the radio spectrum. |
| RoHs directive 2011/65/EU | This Directive lays down rules on the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) with a view to contributing to the protection of human health and the environment, including the environmentally sound recovery and disposal of waste EEE. |
| CE compliance | Yes |

**Note 1**: Storage and operation above 20°C / 68 °F may reduce battery life. Minimum distance measured is derated with temperatures <0°C / 32°F
**Note 2:** Based on a measurement to a flat liquid target of size 30cm$^2$ / 4.7”$^2$
**Note 3:** The maximum spatial diversion of the ultrasonic signal will be < +/-15° from the central axis of the transducer.
**Note 4:** Suitable for use in tanks for the storage of water diesel fuel, kerosene, gas oil types A2,C1,C2 and D as defined by BS2869.
**Note 5:** Based on one data drop per day in standard configuration at a location with adequate CAT-M1/NB-IoT coverage.


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# NB-IoT/CAT-M1/2G Intrinsically safe ultrasonic level sensor- WT871

With an ultrasonic level sensor, the battery powered Intrinsically Safe Liquid Level logger is suitable for monitoring tanks levels.

## Applications

- Liquid Level Ultrasonic level sensor
  - Kerosene, Diesel, Gasoline
  - Oils/Waste Oils
  - Other hazardous/non hazardous
  - DEF / Adblue
  - Water
- Tanks
  - Fixed or mobile
  - Underground
- Spot and continuous inventory measurement

## Benefits

- Accurate, reliable tank level reporting to server monitoring application
- Highly configurable server reporting interval from hourly to once per month
- 28 slot logger with configurable logging interval
- Accuracy to +/-2cm (0.78")
- Optimise delivery or collections
- Programmable Alarms
  - High level
  - Low levels
  - Rate of level change (fill or drain)
- Reports local temperature, radio signal strength, and battery level
- External antenna option for underground locations
- Remote re-configurability from the cloud
- Plug and play installation
- Mounting/attachment options – wall/pole
- International compliance.

**WEEE Reg. 00232**
Patents granted

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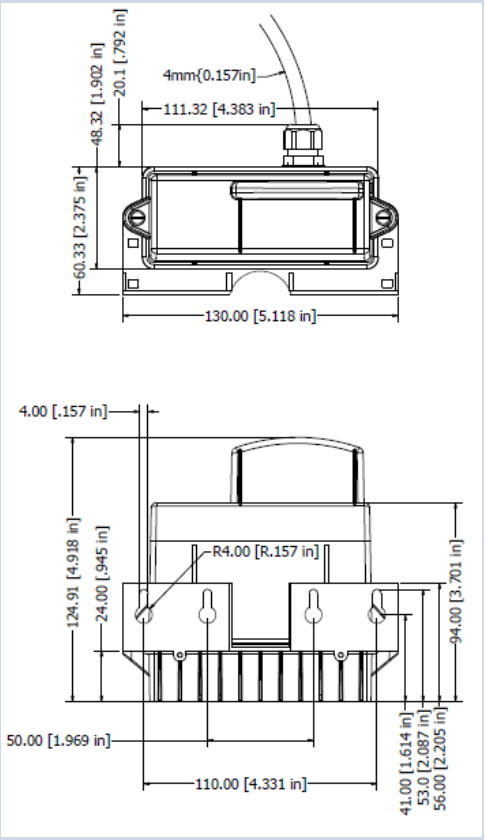
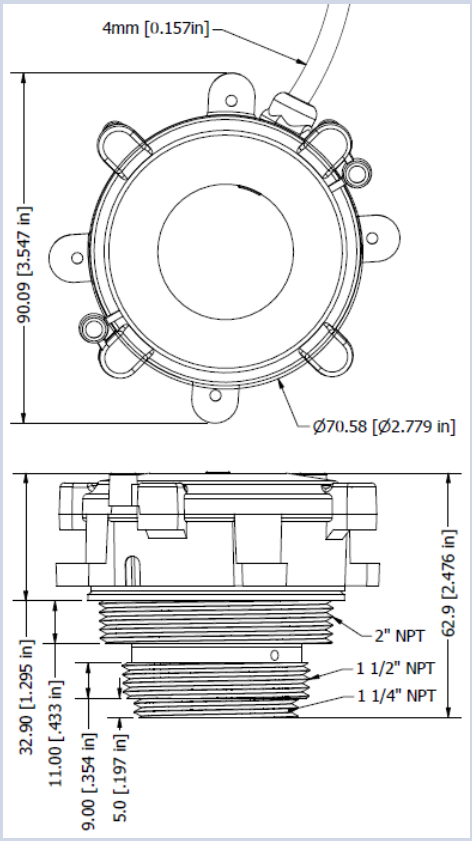
| Characteristics | Liquid Level logger 4G NB-IoT/CAT-M1 /2G | Ultrasonic level sensor Exi |
|---|---|---|
| Dimensions |  |  |
| Safety | Class I, Div 1, Gr C D CSA.16.70011285<br>Class I Zone 0 AEx ia IIB T4 Ga<br>Complies with UL 913<br>II 1 G-Ex ia IIB T4 Ga<br>SIRA15ATEX2103 X IECEx CSA 15.0006X | Class 1, Div 1, Group A,B,C & D T4<br>Class I, Zone 0 AEx ia IIC T4 Ga<br>Complies with UL 913<br>SGSNA/20/CA/00003X<br>SGS20ATEX0009X IECEx BAS 20.0005X |
| Housing Material | Moulded plastic, 2-part, material Glass Reinforced Polyamide, UV resistant. | Moulded plastic, 3- Part, UV Stabilized Polypropylene |
| Weight | Weight 350g/12oz<br>(excluding cable & gland/external connectors) | 140g/5oz<br>(excluding cable & gland/external connectors) |
| Conformance | ATEX/Hazloc/IECEx,<br>PTCRB (AT&T) & Verizon approvals,<br>RED, FCC, CE, RoHS. | ATEX/Hazloc/IECEx,<br>CE, RoHS. |
| Manual Activation | Magnetically activated reed switch / Audible buzzer | N/A |



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| Characteristics | Liquid Level logger 4G NB-IoT/CAT-M1 - Ultrasonic sensor Exi |
|---|---|
| Ultrasonic Resolution | ±1cm / ±0.4” |
| Accuracy | ±2cm / ±0.78” |
| Communication | LTE CAT-M1 or NB-IoT or 2G with GPS |
| Signal Divergence | See polar plot for the sonic profile included on this datasheet |
| Battery life | Up to 10 years **(Note 2)** |
| Battery technology | 3.6V Lithium Thionyl Chloride Exi “Bobbin type” construction |
| Power requirements | Battery pack with standard cell sizes connected with a 2 wire harness included |
| Humidity | 0 – 100% RH |
| Operating Temperature | -4°F to 131°F (-20°C to 55°C) |
| Storage Temperature | 32°F to 86°F (0°C to 30°C) |
| Environmental Protection | IP68 - Outdoors |
| Installation | Plug and play installation |

## Operation

The Intrinsically Safe Exi ultrasonic sensor is suitable for Monitoring Liquid levels up to 4m / 13 ft depth. It has a 3m / 10 ft cable with an IP68 connector to facilitate mounting.

The Ultrasonic Exi sensor communicates to the logger via UART serial bidirectional communications TTL 3.3V level 1200 baud, no parity, 8 data bits.

## Configuration/Specification Options

| | |
|---|---|
| External connection | IP68 Cable gland / IP68 bulkhead connector |
| Antenna | Internal with option for antenna coupler with SMA connector to allow connection of an external GSM antenna |
| Data Communications | Makes a TCP connection to the server over 2G, NB-IoT or CAT-M1 cellular network and delivers its payload using a proprietary Tekelek binary |
| Fixing/Mounting | Screw mounts (4), tie wrap, & pole mount features are standard. |

**Note 1:** Note: range de-rates to 8”/20cm < 0°C
**Note 2:** Based on 1 communication per day and good network coverage


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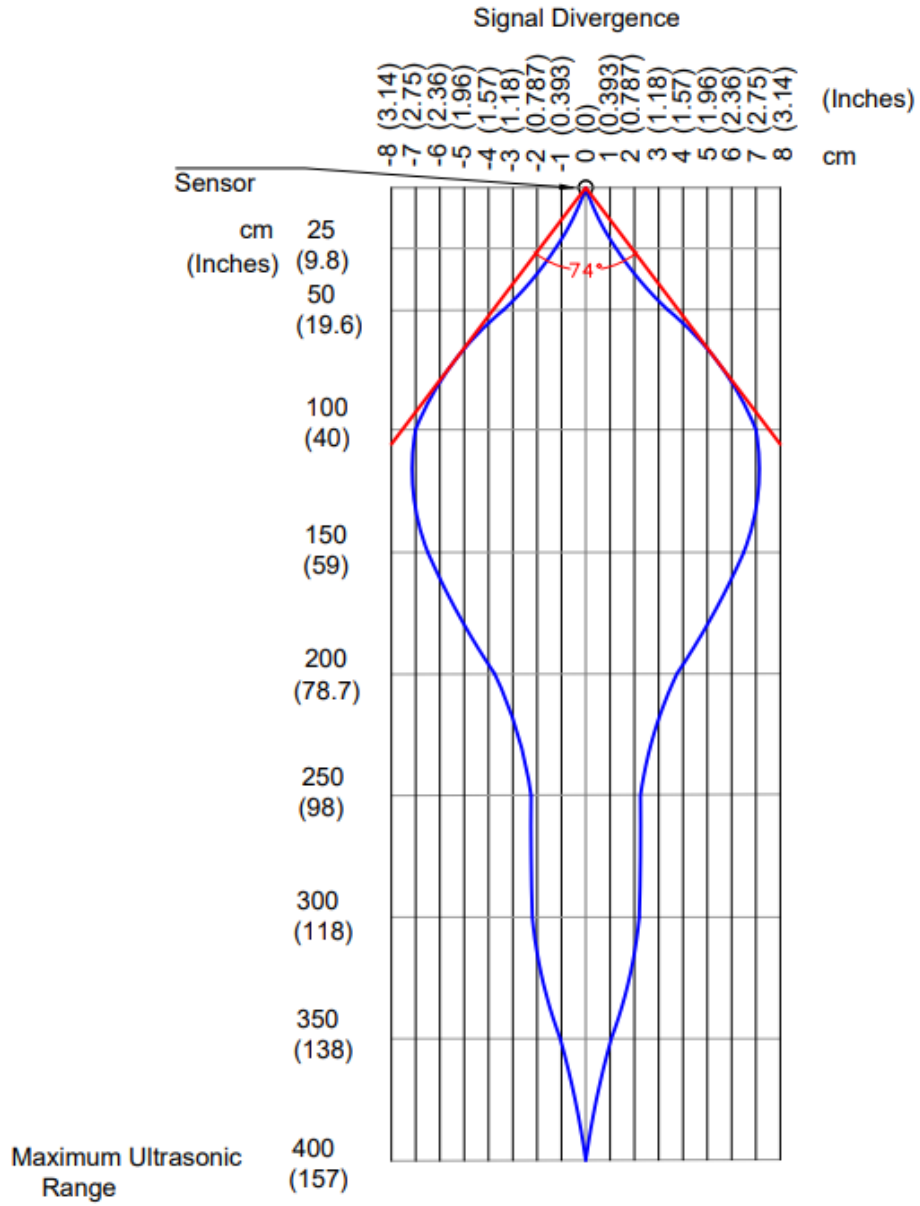
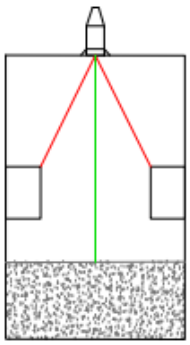
# Signal Divergence Plot



Find a position for the sensor which respects a clear path for the ultrasonic signal.

# Ultrasonic 4G NB-IoT/CAT-M1 Long Range-WT900

Our Ultrasonic 4G NB-IoT/CAT-M1 is a flexible and configurable battery operated liquid level sensor with an integrated Cellular modem supporting GSM (2G), LTE-CAT M1 & NB-IoT networks and GPS.

## Applications

- Liquid level monitoring
  - Fuel – Oil, Kerosene, Diesel
  - Lubricants
  - Additives
  - DEF / AdBlue
  - Coolants
  - Water
  - Waste Oil
  - Wastewater
  - Chemicals - **This product may not be suitable for monitoring of certain corrosive and hazardous chemicals. List of product compatible chemicals to be verified with a Tekelek representative.*
- Fixed or portable tanks
- Ensure continued supply
- Optimise delivery or collections
- Spot and continuous inventory measurement


## Benefits

- Accurate, reliable tank level monitoring
- Programmable data reporting interval
- Remote configurability
- Easy to install
- Minimum 1 year warranty
- CE Conformance, ROHS and PTCRB Compliant
- International Approvals
- Programmable alarms
  - Full alert
  - Empty alert
  - Spill alert (bunded tanks)
  - Fill alert
  - Low and High levels
  - 24/7 monitoring

**WEEE Reg. 00232**
Patents granted

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## Specification

| Characteristic | Transmitter |
|---|---|
| Dimensions | 101mm (W) x 93mm (L) x 197mm (H) ±1mm / 4”(W) x 3.66”(L) x 7.5”(H) ±0.04” |
| Weight | 530g/1.17lbs including 4 x C size batteries - 290g/0.6lbs without batteries |
| Housing Material | UV Stabilized Polypropylene (compatible with Oil) |
| Operating Temperature | -20°C to 50°C / -4°F to 122°F **(Note 1)** |
| Storage Temperature | -30°C to 60°C / -22°F to 140°F **(Note 1)** |
| Altitude Range | <2Km/1.25miles above sea level |
| Environmental Protection | IP67 – Outdoors |
| Radio Frequency: | Cat M1/NB1:<br>LTE FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28<br>LTE TDD: B39 (For Cat M1 Only)<br>EGPRS: 850/900/1800/1900MHz |
| Gauge Type | Ultrasonic |
| Ultrasonic Range | >12cm to <8m / >4.7” to 315” at -20°C (-4°F) **(Note 2)**<br>>12cm to <10m / >4.7” to 394” at 20°C (68°F) |
| Ultrasonic Signal Diversion | See polar plot included on this datasheet **(Note3)** |
| Ultrasonic Resolution | ±1cm / ±0.04” |
| Accuracy | Typically ±2cm from 12cm to 10m / ±0.78” from 4.7” to 394” |
| Software features | Includes Tekelek’s advanced sonics with quality parameters |
| Material compatibility | **(Note 4)** |
| Power requirements | 4 of Type C LR14 Alkaline 1.5V (fitted) |
| Battery life | 5 Years **(Note 5)** |
| GNSS (GPS) | GPS, GLONASS, BeiDou/Compass, Galileo, QZSS |
| Mounting Option | 2” NPT or BSP existing female tank connection |

| Accessories | |
|---|---|
| SIM Card | Options available |

## Conformity

| | |
|---|---|
| EMC directive 2014/30/EU | The Electromagnetic Compatibility (EMC) Directive ensures that electrical and electronic equipment does not generate, or is not affected by, electromagnetic disturbance. |
| LVD directive 2014/35/EU | The Low Voltage Directive (LVD) ensures that electrical equipment within certain voltage limits provides a high level of protection for European citizens, and benefits fully from the Single Market. |
| RED directive 2014/53/EU | The Radio Equipment Directive ensures a Single Market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility, and the efficient use of the radio spectrum. |
| RoHs directive 2011/65/EU | This Directive lays down rules on the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) with a view to contributing to the protection of human health and the environment, including the environmentally sound recovery and disposal of waste EEE. |
| CE compliance | Yes |

**Note 1**: Storage and operation above 20°C / 68 °F may reduce battery life. Minimum distance measured is de-rated to 20cm with temperatures <0°C / 32°F
**Note 2:** Based on a measurement to a flat liquid target of size 30cm$^2$ / 4.7”$^2$ Max range is 10m, however, this is reduced to 8m at temperatures of -20 °C/ - 4 °F
**Note 3:** The ultrasonic signal diversion is shown on a polar plot, included on this datasheet.
**Note 4:** Suitable for use in tanks for the storage of water diesel fuel, kerosene, gas oil types A2,C1,C2 and D as defined by BS2869.
**Note 5:** Based on one data drop per day in standard configuration at a location with adequate CAT-M1/NB-IoT coverage.


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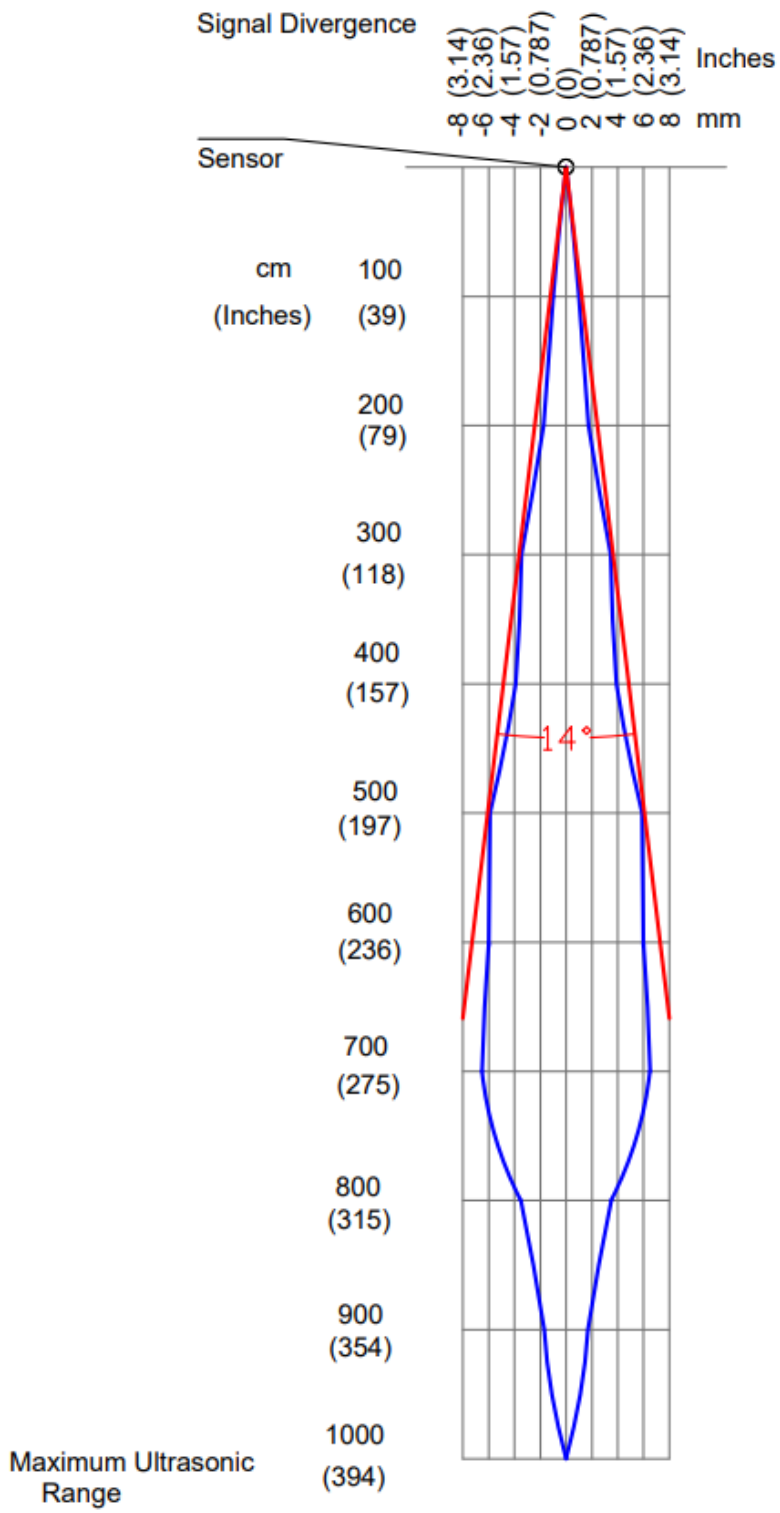
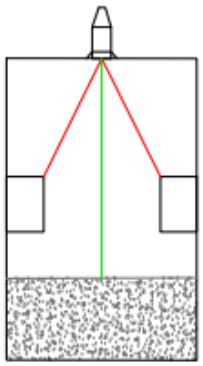
# Ultrasonic Signal Divergence



Find a position for the sensor which respects a clear path for the ultrasonic signal.

# LTE (NB-IoT/CAT-M1) Pressure sensor Logger (ATEX and C1/D1 approvals)

## WT898

Supplied with a pressure level sensor, the battery powered intrinsically safe liquid level logger is suitable for monitoring tank levels.

## Applications

- Liquid Level Pressure level sensor
  - Kerosene, Diesel, Gasoline, Oils/Waste Oils
  - Other hazardous/non hazardous
  - Water
- Tanks
  - Fixed or mobile
  - Underground
- Spot and continuous inventory measurement

## Benefits

- Accurate, reliable tank level reporting to server monitoring application
- Highly configurable server reporting interval from hourly to once per month
- 28 slot logger with configurable logging interval
- Optimise delivery or collections
- Programmable Alarms
  - High level
  - Low levels
  - Rate of level change (fill or drain)
- Reports local temperature, radio signal strength, and battery level
- External antenna option for underground locations
- Remote re-configurability
- Plug and play installation
- Mounting/attachment options – wall/pole
- International compliance.

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Patents granted

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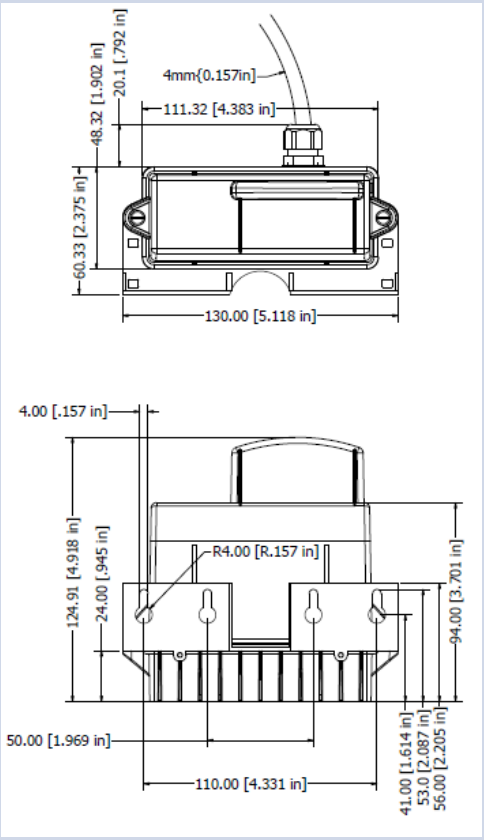
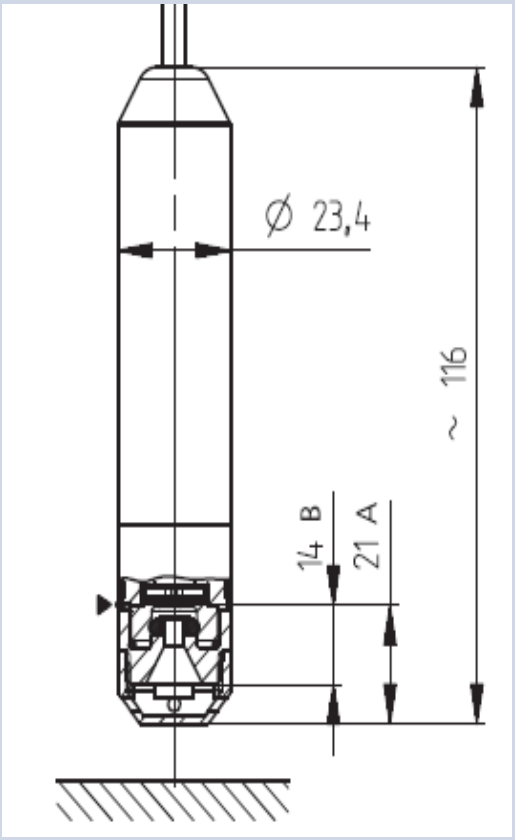
| Characteristics | Liquid level logger 4G LTE-M | Pressure sensor |
|---|---|---|
| Dimensions |  |  |
| Safety IECEX/ATEX | Ex ia IIB T4 Ga Class I zone 0 AEx ia IIB T4 Ga<br>Complies with UL913<br>II 1 G-Ex ia IIB T4 Ga [-30 < Ta < +55°C]<br>SIRA15ATEX2103 X IECEx CSA 15.0006X | SEV 12 ATEX 0138 II 1 G Ex ia IIC T4 Ga<br>IECEx SEV 12.0006 Ex ia IIC T4 Ga<br>Complies with UL913 |
| Operating Temperature | -22°F to 131°F (-30°C to +55°C ) | -4°F to 176°F (-20°C to 80°C) |
| Storage Temperature | 32°F to 86°F / 0°C to 30°C | 32°F to 86°F (0°C to 30°C) |
| Sensor Range | N/A | Standard pressure cable lengths are 5m, 10m, 20m, 30m |
| Environmental Protection | IP68 - Outdoors | IP68 - Outdoors |
| Communication | LTE CAT-M1 or NB-IoT<br>with GPS | Logger analogue measurement. |
| Installation | Plug and play installation. Shipped pre-configured with SIM including connectivity for 3 years | |



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| Characteristics | Liquid level logger 4G LTE-M | Pressure sensor |
|---|---|---|
| Power requirements | Battery pack installed with a 2 wire harness included. | 5V +/- 10% DC (Powered by Logger) |
| Battery technology | 3.6V Lithium Thionyl Chloride Exi "Bobbin type" construction | N/A |
| Housing Material | Moulded plastic, 2-part, material Glass Reinforced Polyamide, UV resistant. | PD-HD Cable, SS 316L housing, EPDM seal |
| Weight | Weight 350g/12oz<br>(excluding cable & gland/external connectors) | 200g/5oz<br>(excluding cable & gland/external connectors) |
| Resolution | N/A | 0.5% of FS **(Note 1)** |
| Accuracy | N/A | Max : +/- 2% of FS : Typical +/- 1% of FS.<br>-4°F to 122°F (-20°C to 55°C) |
| Battery life | Up to 10 years **(Note 2)** | N/A |
| Manual Activation | Magnetically activated reed switch / Audible buzzer / Internal LED | N/A |
| Humidity | 0 – 100% RH | 0% - 100% RH |
| Certification | PTCRB,<br>(AT&T) & Verizon approvals,<br>RED, FCC, CE, RoHS,<br>ATEX, IECEX, | ATEX, IECEX, CE,<br>EN 61326-2-3,<br>EN 61010-1,<br>EMC directive 2014/30/EU, |

## Operation

The intrinsically safe Exi pressure sensor is suitable for monitoring liquid levels up to 30m / 98 ft depth. It provides a ratiometric output in the range of 0.5V….4.5V for a 5V input. An NPT 1" / 25.4mm adapter with a cable gland cord grip is provided on the cable to facilitate installation of the sensor. Refer to the installation manual for advice on how to install pressure sensor for best performance.

## Configuration/Specification Options

| | |
|---|---|
| External connection | IP68 Cable gland / IP68 bulkhead connector |
| Antenna | Internal with option for antenna coupler with SMA connector to allow connection of an external GSM antenna |
| Data Communications | Customised for efficient binary protocol |
| Fixing/Mounting | Screw mounts (4), tie wrap, & pole mount features are standard. |

**Note 1:** Note: FS (Full scale) is the lead length of the pressure sensor. 10m sensor would have 5cm resolution.
**Note 2:** Based on 1 communication per day and good network coverage


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