



# Pulse<sup>®</sup> Level Cellular Tank Level Monitor

3A8551C

EN

*Measures the distance between the device and the surface of the fluid to determine the volume of fluid within a tank. For use only with Pulse Level. Intended fluids: oil, diesel, waste oil, automatic transmission fluid (ATF), kerosene, anti-freeze, windshield washer solution, waste water, and DEF. For professional use only. Not suitable for tank overfill protection.*

Not approved for use in explosive atmospheres or hazardous (classified) locations.

Model	Description	Radio Approvals
25T461	Pulse Level Cellular North America	FCC, IC
133620	Pulse Level Cellular International	CE, RCM



### Important Safety Instructions

Read all warnings and instructions in this manual and in all related Pulse manuals before using the equipment. Save all instructions.



**WARNING**

<p><b>EQUIPMENT MISUSE HAZARD</b> Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>Use equipment only for its intended purpose. Call your distributor for information.</li> <li>Keep children and animals away from work area.</li> <li>Comply with all applicable safety regulations.</li> </ul> <p><b>PERSONAL PROTECTIVE EQUIPMENT</b> Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, and inhalation of toxic fumes.</p>				

This Tank Level Monitor (TLM) contains FCC ID XMR 201707 BG96. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

# Installation

## Set Up

### NOTICE

- Do not over tighten TLM into tank bung. Over tightening can cause permanent damage and result in inaccurate readings.
- Do not use the TLM with pressurized tanks. Using the TLM in a pressurized tank will damage the TLM.
- Do not use thread sealant or adhesive. Many of these products are chemically incompatible with the ABS plastic.

## Register TLM to Tank in Pulse Level Software

Navigate to URL: [level.gracopulse.com](http://level.gracopulse.com)

This device requires access to a cellular network to work, and can be activated in Pulse Level. Refer to Pulse Level terms of service in the About section of the software.

After creating user, organization, branch and site, navigate to Devices (located in the upper right corner of the screen). Associate the device to your organization by entering the serial number. When you create a tank for the site, the device will be assignable.

Assign the TLM serial number to a tank in Pulse Level.

## Activation

1. Hold the magnet (supplied) to the Hot Spot directly under the LED to activate the device (FIG. 1).



FIG. 1

2. Keep holding the magnet to the Hot Spot. The LED will flash green, and then flash red. Then the red light will stay lit.
3. Remove the magnet.
4. While the red light is illuminated, a series of beeps occur as the device connects.
5. Successfully connecting is indicated by a high/low/high series of beeps that indicate the data is being sent to Pulse Level. The LED turns green after data is successfully sent.
6. Once activated, the device uploads readings at scheduled times, if assigned to a tank in Pulse Level.
  - The device measures the tank liquid level.

### LED Pattern

LED Pattern	Function
	LED Test: when a magnet is held against the hot spot, the LED is briefly green, followed by briefly red, then the LED is off.
Red LED Lit	Modem Busy: registering on the network and sending data.
Green LED Lit	Activated: the server has responded and activated the server.

### Beep Pattern

Beep Pattern	Definition
Low beep once per second	Network registration
High beep once per second	TCP connecting
Low beep once every four (4) seconds	Network / TCP listen for commands
Low beep once every two (2) seconds	Re-establish network / TCP
High /Low combination beep	Incoming data
Low / High combination beep	Outgoing data
Low double beep every four (4) seconds	Network listen (data received and the device is active)

### Typical Installation

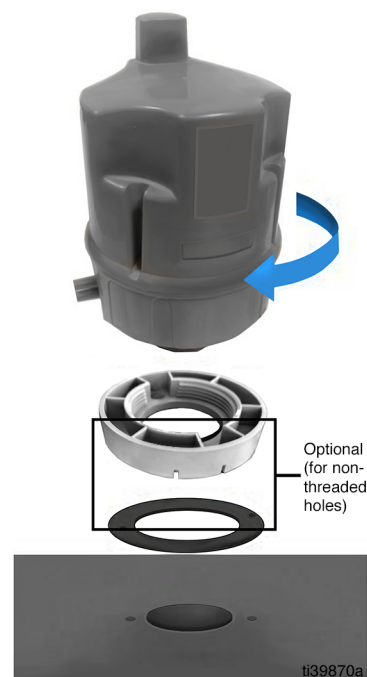


FIG. 2

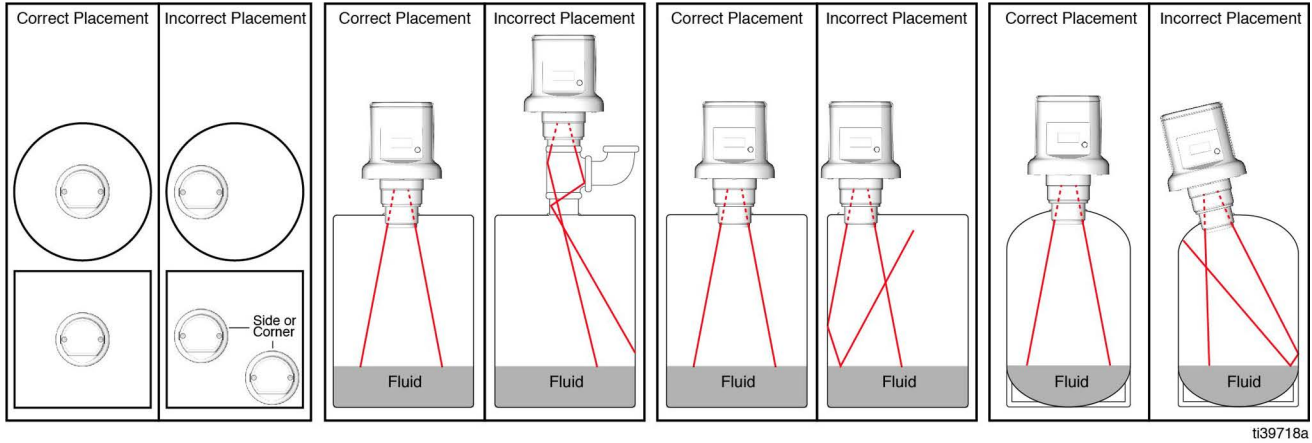
### Mount Options

Identify a threaded opening on the top of the tank for the device to be installed. The location should be vertical with a clear path to the contents of the tank. There should be no obstructions that could interfere with the signal. Insert the threaded device by screwing it into the opening. Do not over tighten.

1. If the hole is not threaded, place the foam gasket (included with kit) over the opening.
2. Place the mounting adapter (included with kit) on top of the foam gasket.
3. Use the two (2) stainless steel self-tapping, counter-sunk screws (included with kit) to attach the adapter to the tank. Do not over tighten.
4. Attach the device to the adapter. To form a secure seal, make sure that the device is vertical on the tank, that it is secured correctly to the base, and that the threads have not crossed.

NOTE: If the tank does not contain a suitably positioned opening at the top of the tank, reference **Drilling**, page 4.

## Installation Examples



**FIG. 3**

### Drilling

If the tank does not contain a suitable positioned opening at the top of the tank, it will be necessary to manually drill into the top of the tank.

1. Select a flat area on the top of the tank located towards the center (FIG. 3).
2. Drill a 1.5 in. bsp hole at the selected area using a 45.5 mm tapping drill.
3. Continue with **Activation**.

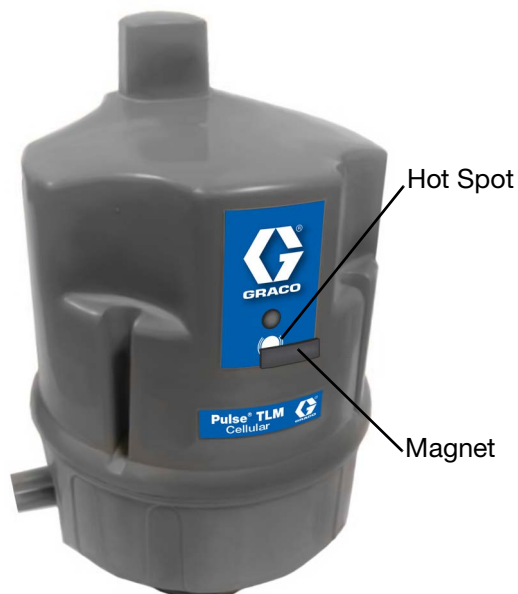
# Operation

## View Data

The TLM is configurable with Pulse Level ([level.gracopulse.com](http://level.gracopulse.com)) to take readings at predefined times.

After configuring the TLM using the Pulse Level, apply the magnet to the hot spot until a solid red light appears, creating a connection between the TLM and the Pulse Level to load the configuration (FIG. 4).

NOTE: Frequent measurements results in shorter battery life.



**FIG. 4**

## Manual Measurement

1. Hold the magnet (supplied) to the Hot Spot directly under the LED to activate the device (FIG. 1).



**FIG. 5**

2. Keep holding the magnet to the Hot Spot. The LED will flash green, and then flash red. Then the red light will stay lit.
3. Remove the magnet.

# Recycling and Disposal

## End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Remove batteries, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of batteries or electronic components with household or commercial waste.



- Deliver remaining product to a recycling facility.



# Troubleshooting

Problem	Cause	Solution
Device is not reporting scheduled readings.	Out of RF range. RF obstruction.	Consider implementing a WiFi network and using Graco's WiFi TLM.  Ensure that the TLM is not encased in metal, since this would obstruct the signal.
	Weak or dead batteries.	Replace batteries. See <b>Replace Batteries</b> , page 8.
	Tank Level Monitor was not associated with a tank in software.	Assign TLM serial number to tank.
	Reading is scheduled when pump is operating.	Ensure readings are scheduled during times that the pump is not operating.
LED will not turn on.	Magnet removed too soon.	Hold magnet to device hot spot for a longer period of time.  Try using a stronger magnet.
	Weak or dead batteries.	Replace batteries. See <b>Replace Batteries</b> , page 8.

# Service

After the TLM has been installed, the only additional maintenance or service necessary is changing the batteries.

## Replace Batteries

 <span style="font-size: 2em; font-weight: bold; margin-left: 10px;">WARNING</span>				
				
<p><b>Fire and Explosion Hazard</b></p> <p>Sparking can occur when changing batteries. Only replace the batteries in a non-hazardous location away from flammable fluids and fumes.</p>				

NOTE: After battery placement, activate the TLM with a magnet (see **Activation**, page 2), to synchronize the TLM internal clock to maintain scheduled TLM readings.

1. Remove the TLM from the tank by unscrewing it from the opening.
2. Remove the four (4) screws that keep the case together (FIG. 6).



FIG. 6

3. Verify that the device is right side up before opening to prevent the batteries from falling out (FIG. 7).



FIG. 7

4. Replace the four (4) C-cell Alkaline batteries (FIG. 8).

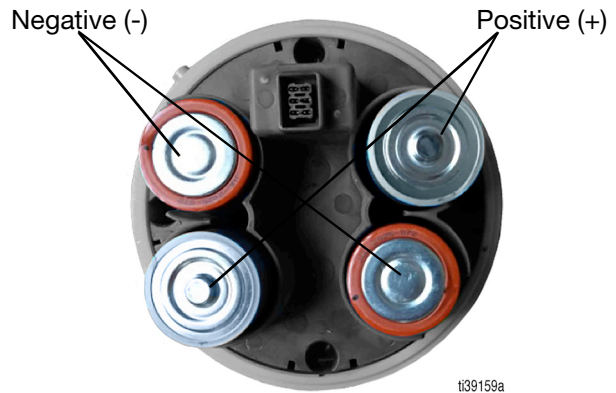


FIG. 8



5. Make sure that the gasket is placed correctly (FIG. 9).



**FIG. 9**

6. Reconnect the two halves, then replace the four (4) screws.
7. Re-install the TLM back into the tank opening.
8. Take a manual measurement to verify the TLM is activated.

# Dimensions - Tank Specifications

## Vertical Tank:

- Maximum Volume - 999,999 gallons or liters.
- Tank walls must be uniformly vertical from empty level to full.

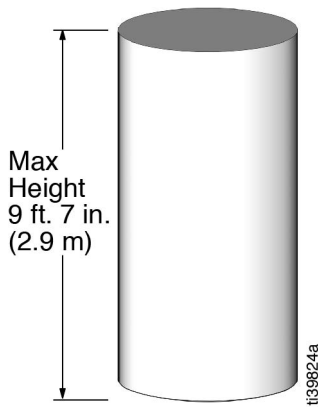


FIG. 10

## Obround Tank:

- Maximum volume = 999,999 gallons or liters.
- Tank end walls must be flat; they cannot be any other shape, including belled.

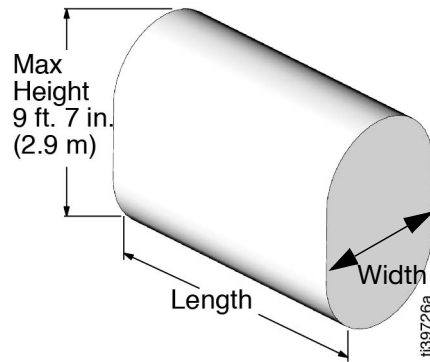


FIG. 12

## Cylindrical Tank:

- Maximum volume = 999,999 gallons or liters.
- Tank end walls must be flat; they cannot be any other shape, including belled.

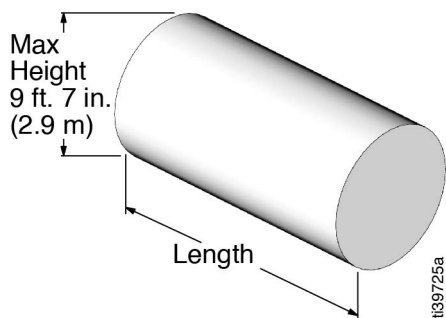


FIG. 11

## Non-Standard Tanks:

- Maximum volume = 999,000 gallons or liters.
- Define strapping table in Pulse Level software.
- Up to 100 strapping table points to correlate tank fluid height to volume.

# Technical Specifications

<b>Tank Level Monitor (TLM)</b>		
	<b>US</b>	<b>Metric</b>
Compatible Fluids	oil, kerosene, diesel, lubricants, additives, DEF/AdBlue <sup>®</sup> , coolants, water, waste oil, waste water, automatic transmission fluid (AFT), anti-freeze, and windshield washer solution	
Ultrasonic Tank Depth Measurement range	5.0 in. to 13 ft.	12 cm (minimum) to 400 cm
Fluid Level Measurement Accuracy	+/- 1.0 in.	+/- 2.0 cm
Mounting	1.5 in and 2.0 in. threaded npt connector	
Clearance: Height above tank for TLM	7.5 in.	19.1 cm
Weight	1.17 lb. with batteries	530.7 g with batteries
RF Frequency Band	LTE CAT-M1	
Operating Temperature Range	0°F to 122°F	-17.8°C to 50°C
Storage Temperature Range	-22°F to 140°F	-30°C to 60°C
Batteries	4 x Alkaline C-cell	
Battery Life	5 years*	
Enclosure (Ingress Protection)	IP67	
Tanks		
Maximum Volume	999,999 gallons	999,999 liters
Maximum Height	13 ft.	400 cm
Altitude	<6,000 ft.	< 2 km
* The battery life is based upon four (4) measurements per day and one (1) Cellular connection per day from a location where the cellular coverage does not require retries, and a normal distribution over the operating temperature range centered at +25°C (77°F).		
All trademarks or registered trademarks are the property of their respective owners.		

## California Proposition 65

### CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# Graco Extended Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twenty four months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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# Graco Information

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

**TO PLACE AN ORDER**, contact your Graco distributor or call to identify the nearest distributor.

**Phone:** 612-623-6928 **or Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

*All written and visual data contained in this document reflects the latest product information available at the time of publication.  
Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM 3A8551

**Graco Headquarters:** Minneapolis

**International Offices:** Belgium, China, Japan, Korea

**GRACO INC. AND SUBSIDIARIES • P.O. BOX 1441 • MINNEAPOLIS MN 55440-1441 • USA**  
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