

Quick Start Manual



LevelPro®

Read the user's manual carefully before starting to use the unit.
Producer reserves the right to implement changes without prior notice.

Safety Information

- De-pressurize and vent system prior to installation or removal
- Confirm chemical compatibility before use
- **DO NOT** exceed maximum temperature or pressure specifications
- **ALWAYS** wear safety goggles or face-shield during installation and/or service
- **DO NOT** alter product construction



Warning | Caution | Danger

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, or failure, injury, or death.



Hand Tighten Only

Over tightening may damage product thread.



Note | Technical Notes

Highlights additional information or detailed procedure.



Do Not Use Tools

Use of tool(s) may damage product beyond repair and potentially void product warranty.

Intended Use

It is the operator's responsibility to check and verify the suitability of the device for the intended application. If any doubts remain, please contact our technical department in order to ensure proper usage and compatibility.

LevelPro® is not liable for any incorrect selections and their effects!

Permissible media are liquids (no solids or frozen media), specified in the data sheet. In addition it has to be ensured, that this medium is compatible with the any wetted parts of the level sensor.

The technical data listed in the current data sheet are engaging and must be complied with. If the data sheet is not available, please download it from our website (www.iconprocon.com).

Personnel for Installation, Commissioning, and Operation

All operations described in this instruction manual must be carried out only by trained personnel or an accredited person. The qualified personnel must have read and understood the operating instructions in this manual and must follow said instructions accordingly.

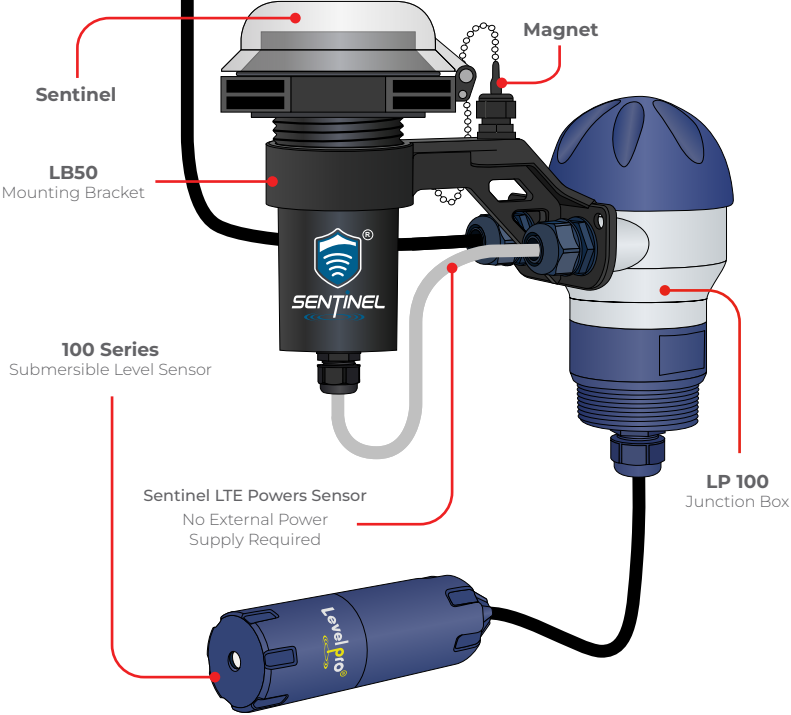
LevelPro® — Sentinel Series LT

Remote Tank Monitoring

Product Description



ITC-250B
Battery Powered
Level Display



The LevelPro® Sentinel® Series is a Battery Operated Remote Tank Level Monitoring system that delivers reliable daily measurements that are both scheduled and event driven. Remote tank level monitoring with the Sentinel® is exceptionally flexible, eliminating the hassles of network infrastructures and internet service. The Sentinel connects via a wireless signal to local cellular networks and transmits level, alarms, battery status, rate of consumption history, critical high or low level alerts and signal strength, all of which are available through the Sentinel® Cloud Based Website.

The Sentinel® Remote Tank Level Monitoring unit provides you with important data readily at your fingertips on your computer, tablet or smart phone. It's the perfect solution for bulk chemical companies and large tank farms to save money on their logistics costs.

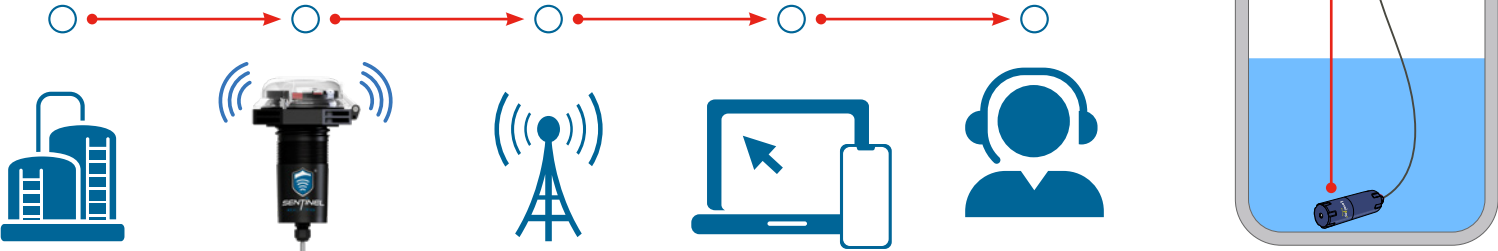
- ✓ Battery Operated
- ✓ Remote Tank Monitoring via Cellular Networks
- ✓ E-mail | Text Reporting Alarms
- ✓ 24/7 access to data through Cloud
- ✓ Battery powered up to 5 years (3 calls/day)
- ✓ Variety of Trigger Points
- ✓ Mobile Ready Access

Technical Specifications

Wireless Communication	GSM Digital Wireless Radio
RF Approval	FCC part 15B Approved
Frequency Bands	GSM 850 900 MHz WLAN
Output Voltage	Nominally 14 24VDC
Output Current	4-20mA
Enclosure	NEMA 4X UL Approved
Lithium Battery	Replaceable Lithium Ion Batteries
Body Material	PP PC
Operating Temperature	-13°F to 158°F -25°C to 70°C



How It Works



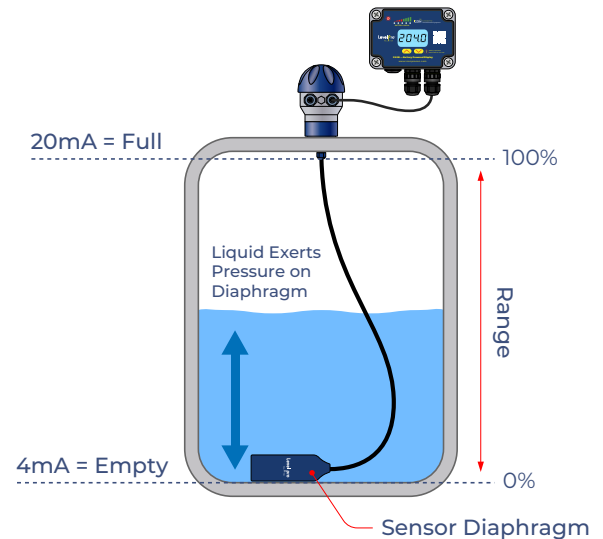
Optional PVC | PP | PVDF | 316 SS
Chemical Resistant 100 Series
Submersible Level Sensor

Understanding Level Measurement

Submersible Level Sensor

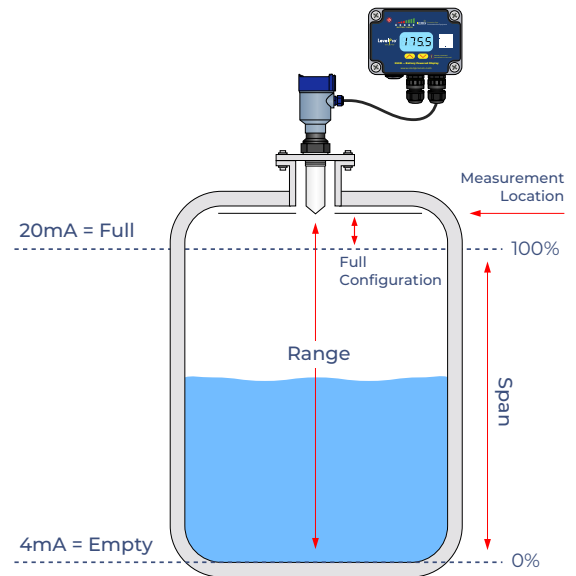
All Submersible Sensors have a calibrated range that is based on H₂O that has a Specific Gravity or Density = 1

- Range Value** : the Overall Measuring Distance that the Sensor has been calibrated to by the Factory.
 - The Range will be on the Sensor Body.
- Empty** : the Pressure being exerted on from the sensor diaphragm at **Lowest Point**.
 - Normally this is when the Tank is Empty.
 Tank Empty = 4mA setting.
- Full** : the Pressure being exerted on the sensor's diaphragm at the highest point.
 - Tank Full = 20mA setting.



ProScan® 8000 Radar Level Sensor

- Range Value** : the Distance from the Sensor's measurement point to the bottom of the Tank.
- Empty** : the distance from the sensor to the **Lowest** or **Empty Point** within the Tank.
 - The Range and Empty Configuration values are normally the same for Flat Bottom Tanks
 Empty Configuration = 4mA setting.
- Full** : the Distance from the sensor's measurement point to the **Highest Liquid Level** in the Tank.
 - Full Configuration = 20mA setting.

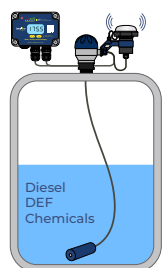


When Using the ProScan® 2 Radar, the Uplink Must be Set to 60 Second Start Time.

Application Details

- ✓ Chemical _____
- ✓ Concentration _____
- ✓ Specific Gravity _____
- ✓ Temperature _____
- ✓ Solids : Yes ☐ No ☐
- ✓ Out-Gassing or Vapors : Yes ☐ No ☐

- ✓ Tank Dimensions W x H inches:
W = _____ H = _____
- ✓ Vertical : ☐ Horizontal : ☐
- ✓ Flat Bottom : ☐ Conical Bottom : ☐



Submersible Level Sensor Setup

- ✓ Submersible Pressure Sensors are designed to be completely submersed within the liquid. The transmitters can rest along the bottom of the tank or be suspended at any desired level within the tank.
- ✓ Please note that the physical location of the level transmitter will indicate the lowest level of measurement within the tank.
ex : Positioning the transmitter 12" from the bottom of the tank, then the lowest reading of liquid will be 12" from the bottom (see image: b).

When the liquid to be measured is not H₂O, the new Range of the Sensor needs to be determined. To achieve this, simply divide the Range of the Sensor by the Specific Gravity of the Liquid.

$$\text{SENSOR RANGE} / \text{S.G} = \text{NEW RANGE}$$

The Importance of the Liquids S.G (Specified Gravity)

The S.G of a Liquid has a direct effect on the Sensors Output when Measuring the Height of the Liquid.

Liquids with a S.G < 1.0 are **Lighter** than H₂O (e.g. Oil)

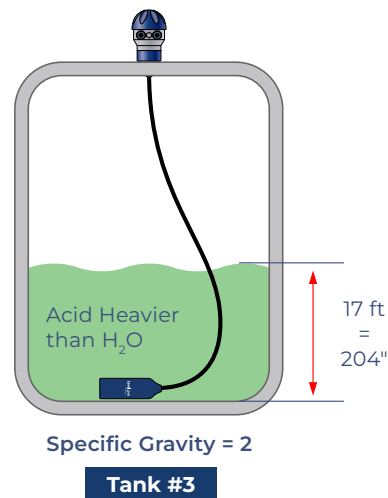
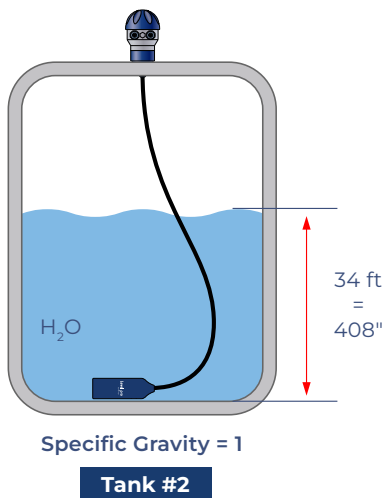
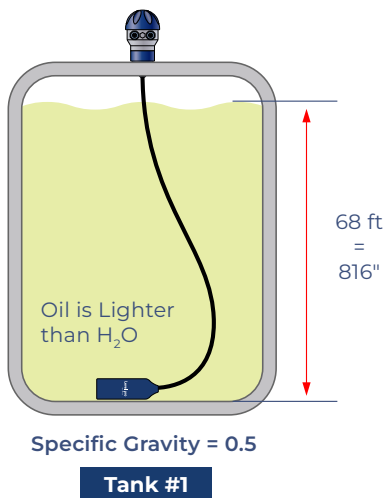
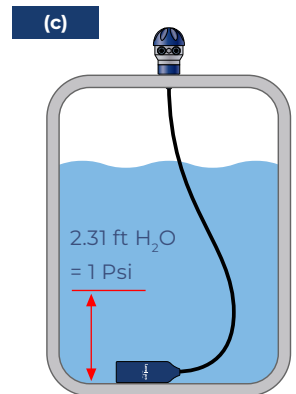
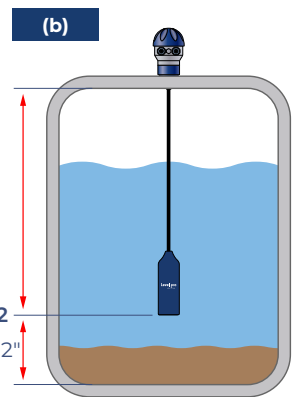
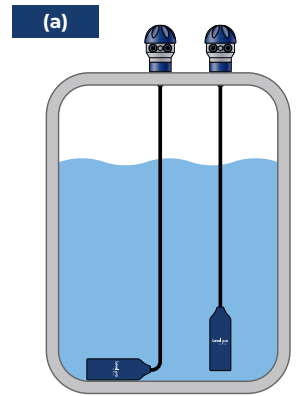
Liquids with a S.G > 1.0 are **Heavier** than H₂O (e.g. Sulfuric Acid)

H₂O has a S.G = 1.0

S.G < 1.0 Requires **More Liquid** to Equal the Same Pressure or Height as with H₂O.

S.G > 1.0 Requires **Less Liquid** to Equal the Same Pressure or Height as with H₂O.

Here are some examples of how the submersible sensor range changes when submersed into liquids with different Specific Gravities ...



Calculating Max. Range of a Sensor

Let's assume a the calibrated range of the submersible sensor is 34" or 408". The range is always referenced H₂O which has a specific gravity S.G or (Density) equal to 1

$\text{Calibrated Range} / \text{S.G} = \text{New Range of the Sensor} \mid 34 / 1 = 34" \text{ or } 408 / 1 = \text{Liquid Level Range} = 408"$

Example 1

The liquid in Tank # 1 has a S.G = 0.5 which is **Lighter** than that of H₂O

To determine the New Range of the sensor, simply divide the H₂O Range (34") by the S.G of the liquid that is going to be in the tank (i.e. S.G = 0.5).

$34 / .5 = 68 \text{ feet or } 816"$

Since the oil is a lighter fluid than H₂O, the new measuring range of the sensor has increased and is now 68" or 816".

Example 2

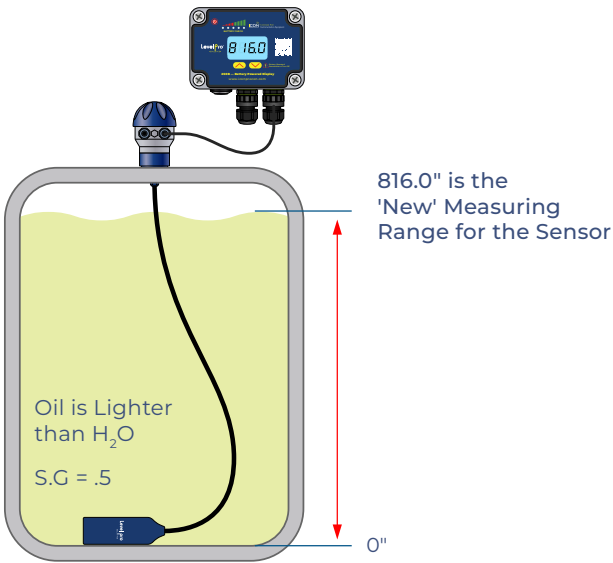
The liquid in Tank # 2 has a S.G. = 2 which is 2x **Heavier** than H₂O

The 34" sensor is now going to be installed into a tank to measure a liquid with a S.G = 2.

$\text{Range} / \text{S.G} = \text{New Range of the Sensor}$

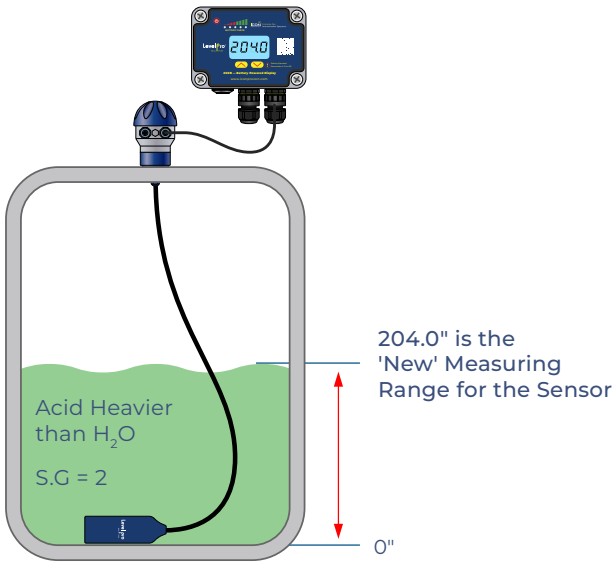
$34 / 2 = 17 \text{ feet or } 204"$

Tank #1



Oil S.G = 0.5	Sensor Signal	Display reading
Tank 1 Low Level	4.0mA	0"
Tank 1 High Level	20.0mA	816"

Tank #2



Acid S.G = 2.0	Sensor Signal	Display reading
Tank 2 Low Level	4.0mA	0"
Tank 2 High Level	20.0mA	204"

LevelPro® — Sentinel Series LT

Remote Tank Monitoring

Correct Sensor Position Installation

The **Submersible Level Sensor** is designed to operate while submerged in the actual application liquid. Avoid installing the level transmitter along the bottom of the tank if materials such as sludge will build up and coat/cover the transmitter. This also includes any debris that will settle along the bottom of the tank.

In these applications, it is best to suspend the transmitter above the highest level of sludge/debris that will occur (see Fig. 1.).

- ✓ **Location :** Select a location where the temperature of the transmitter will be within the specification of the sensor.



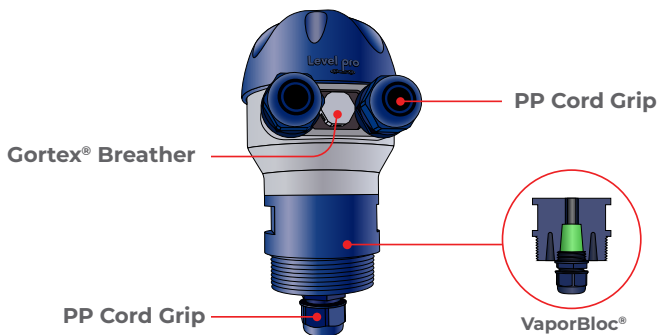
Avoid installations where other tank equipment will cause the transmitter to move or swing.

A mixer blade could cause the level transmitter to whip around within the tank. An alternative would be to move the transmitter to a more stable section of the tank or to install the Transmitter inside a still well/drop tube. This will minimize the effects created by the mixer.

- ✓ **Position :** The transmitter is not position sensitive.
- ✓ **Mounting :** The transmitter can be mounted via several methods. It can be suspended from the cable, it can be placed resting on the bottom of the tank in either horizontal or vertical orientation, or it can be attached to a pipe or hardwired using the **LP100** conduit box on the top of the housing.
- ✓ **Termination:** The transmitter cable is connected to an LP100 junction box positioned on top of the tank. This cable includes a small vent tube which must be exposed to atmospheric pressure for proper function.

The LP100 features a Gortex® Breather, ensuring accurate atmospheric pressure inside the junction box. This is essential as it provides a reference pressure, matching the atmospheric pressure with the pressure measured by the sensor located at the tank's base.

The inside of the Junction Box must be clean, dry, and free of moisture.



Note: Use caution when connecting the cable within the junction box. A ventilation/reference tube is located within the cable. The purpose of this tube is to provide a comparison between current atmospheric pressure and the pressure that is being exerted on the sensing diaphragm within the tank.

- The reference tube must be open and free to allow air to flow back to the pressure diaphragm.
- Avoid blocking or bending the ventilation tube by compressing the cable.

Fig. 1

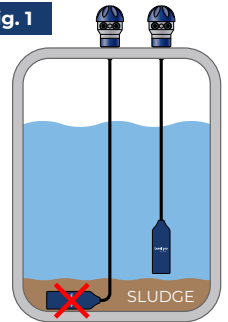


Fig. 2

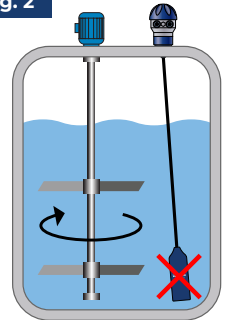
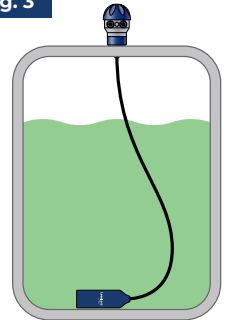
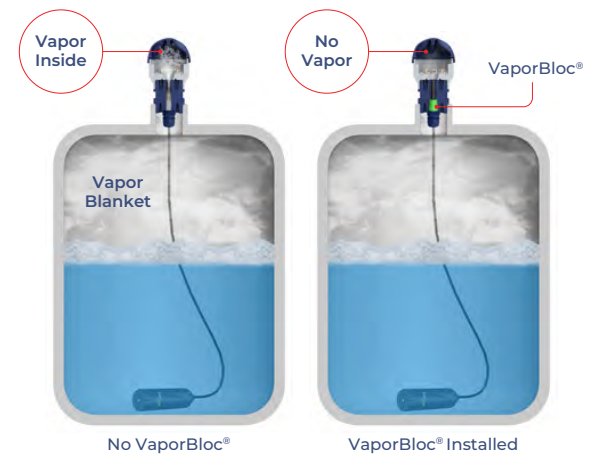


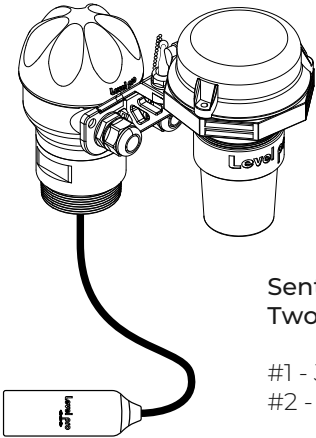
Fig. 3



For Fuming Chemicals

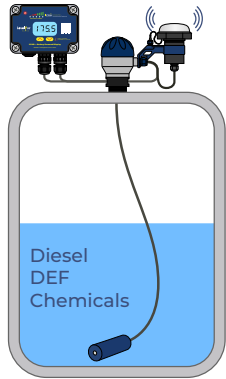


Sentinel LT Installation

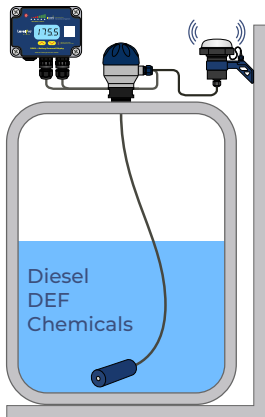


Sentinel Bracket
Two-Way Mounting:

- #1 - Junction Box Bracket Mount
- #2 - Wall Bracket Mount

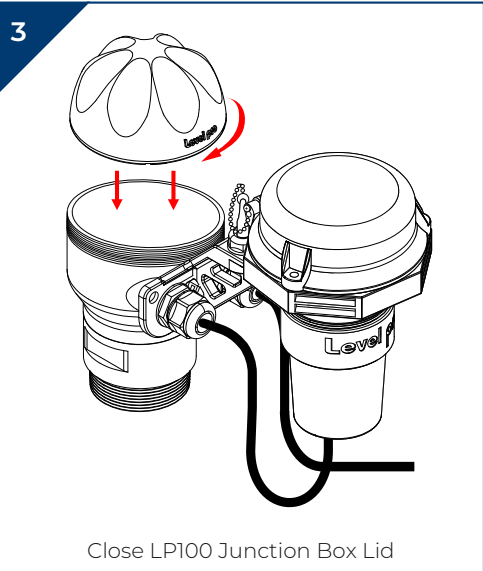
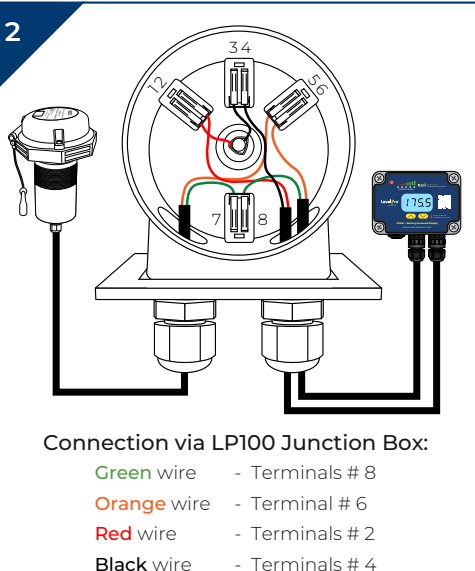
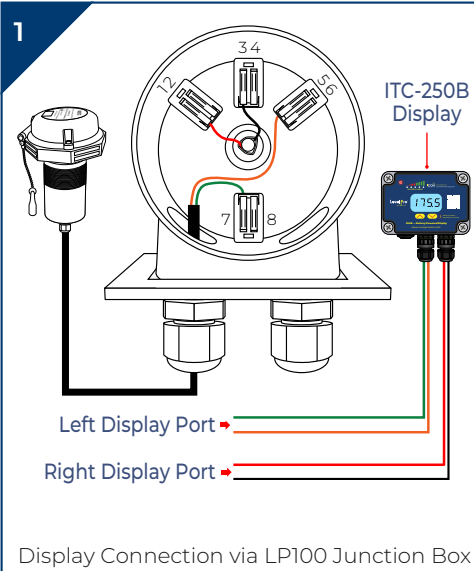


Tank



Wall

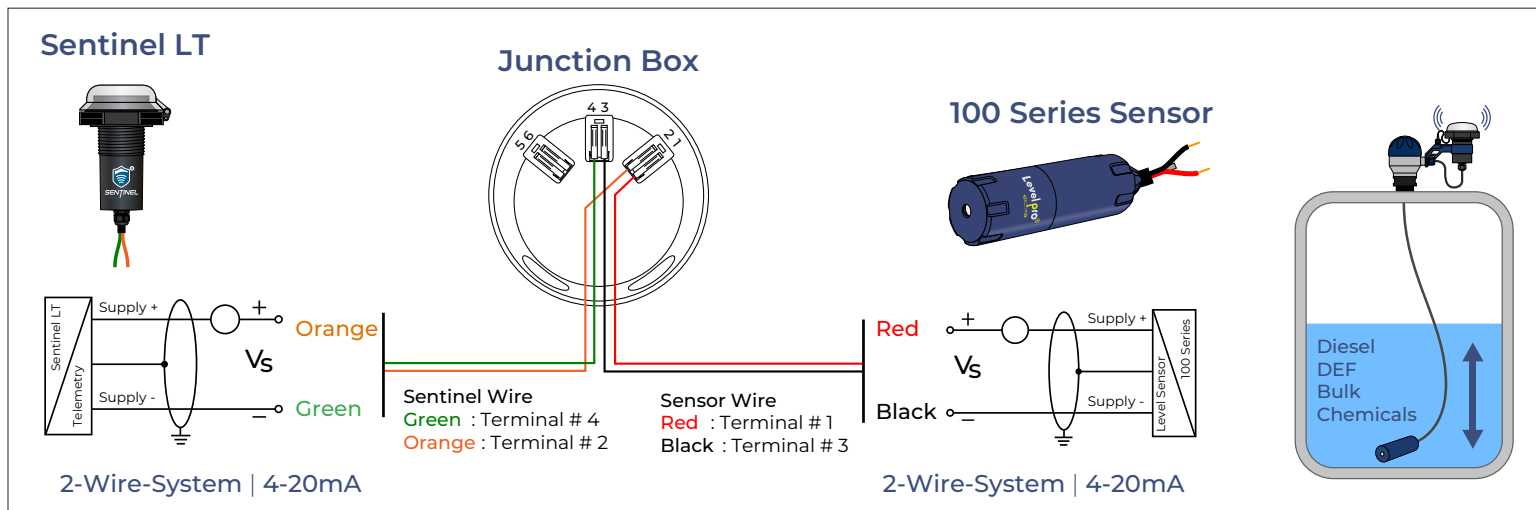
Wire Connection — 250B Display Via Junction Box



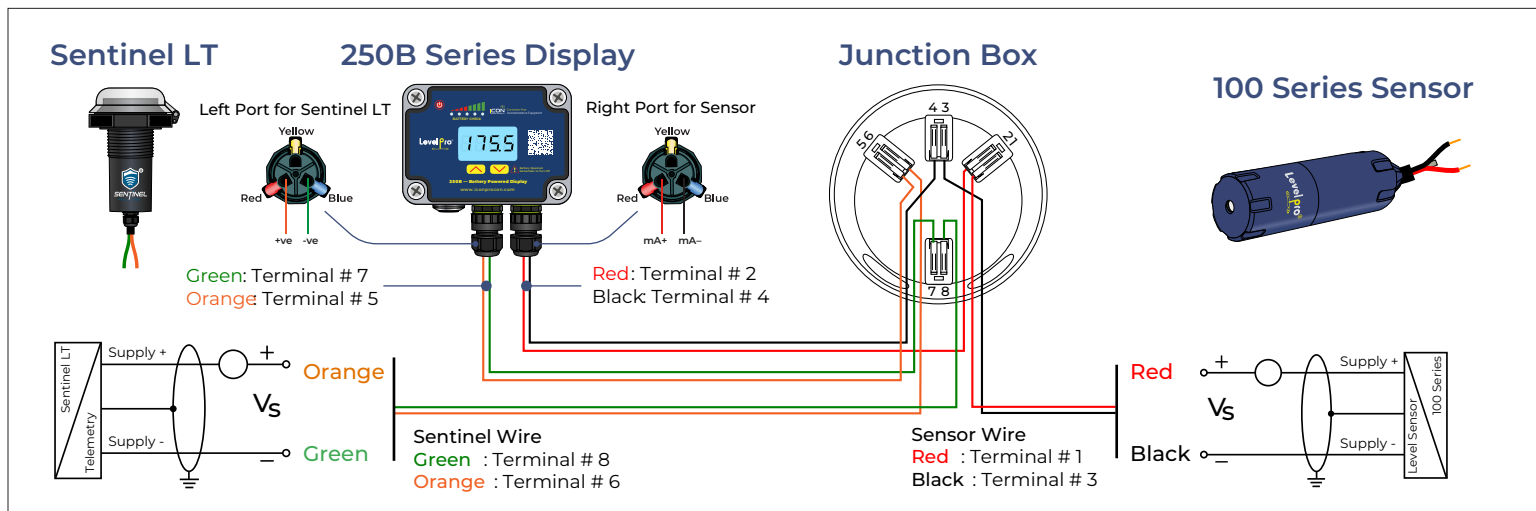
LevelPro® — Sentinel Series LT

Remote Tank Monitoring

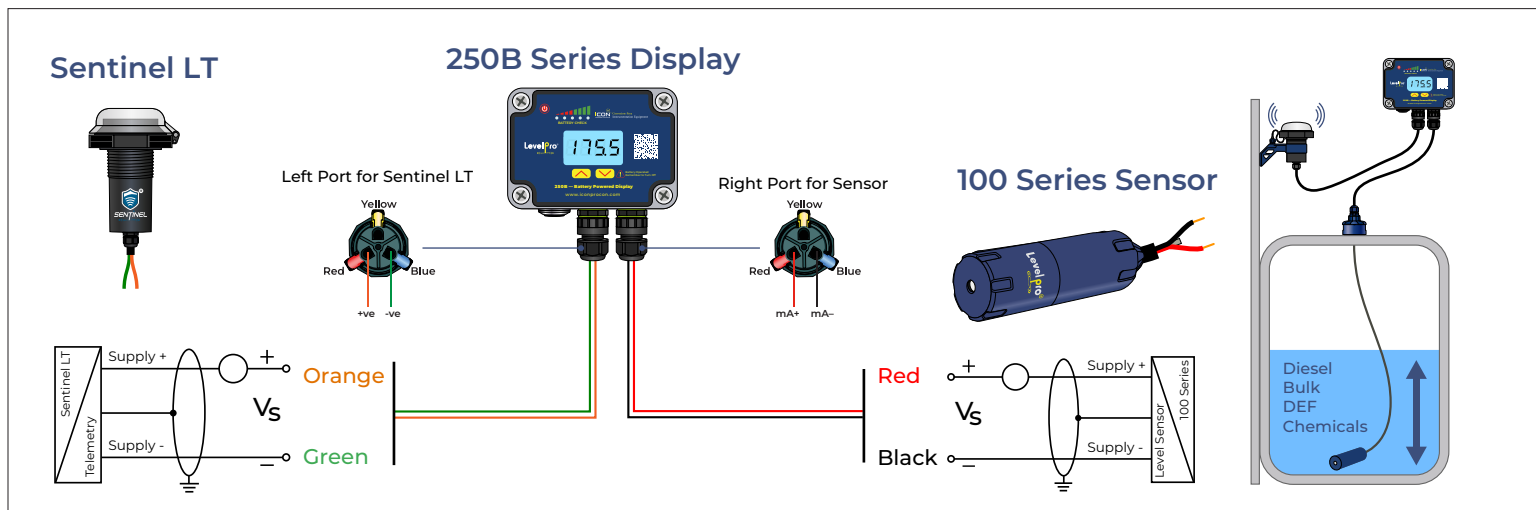
Wiring Diagram — Sentinel + Junction Box + 100 Series Sensor



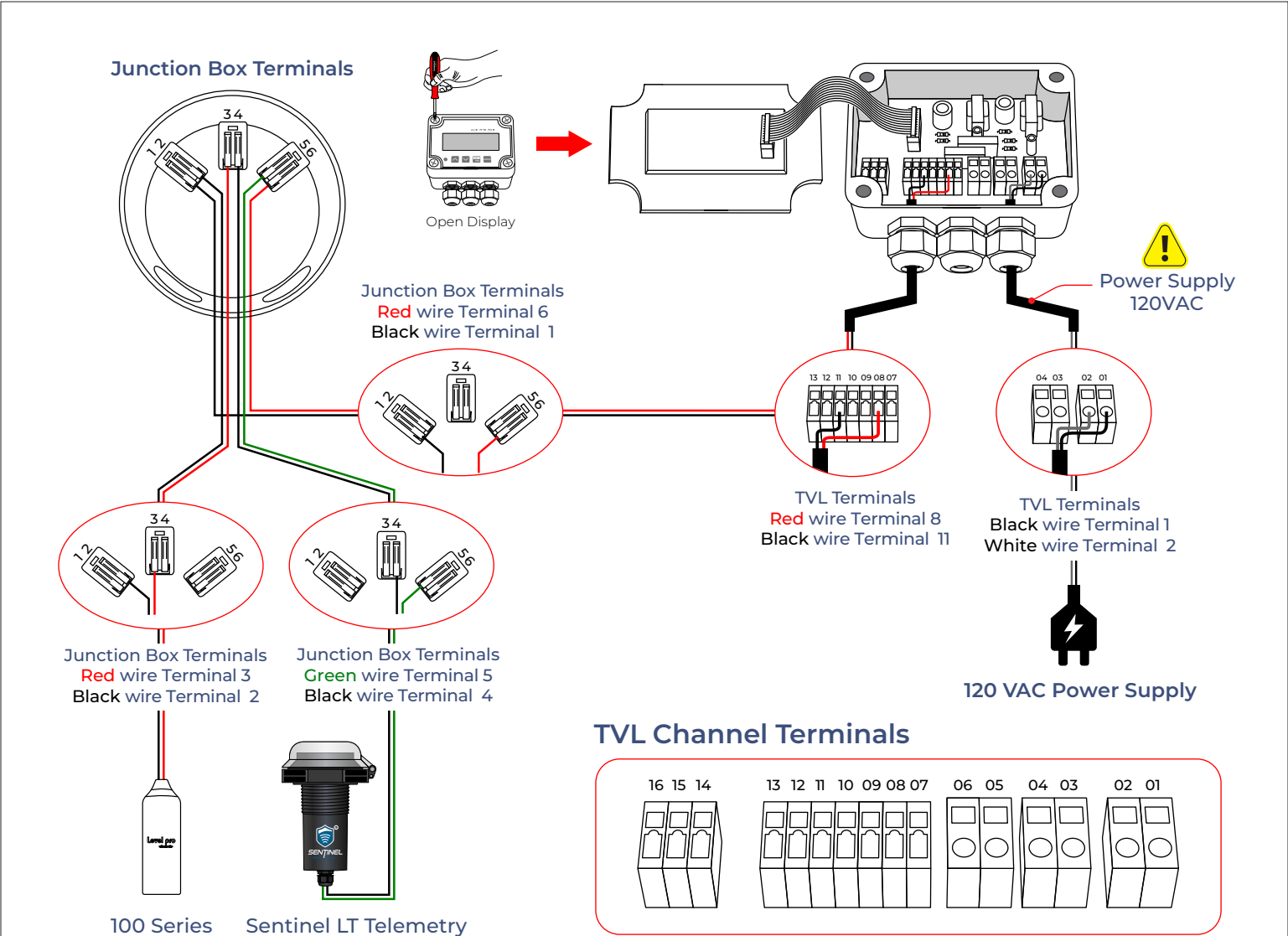
Wiring Diagram — Sentinel + Junction Box + 100 Series Sensor + 250B Display



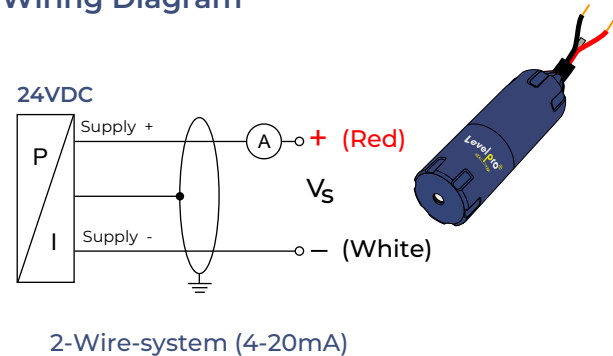
Wiring Diagram — Sentinel + 100 Series Sensor + 250B Display



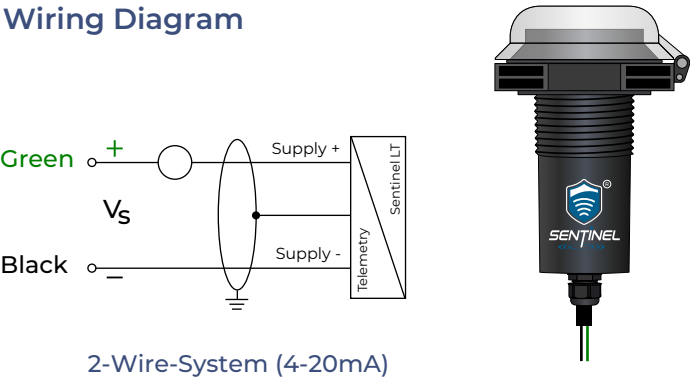
Connection Diagram — Sentinel + 100 Series Sensor + Junction Box + TVL Display



100 Series Wiring Diagram

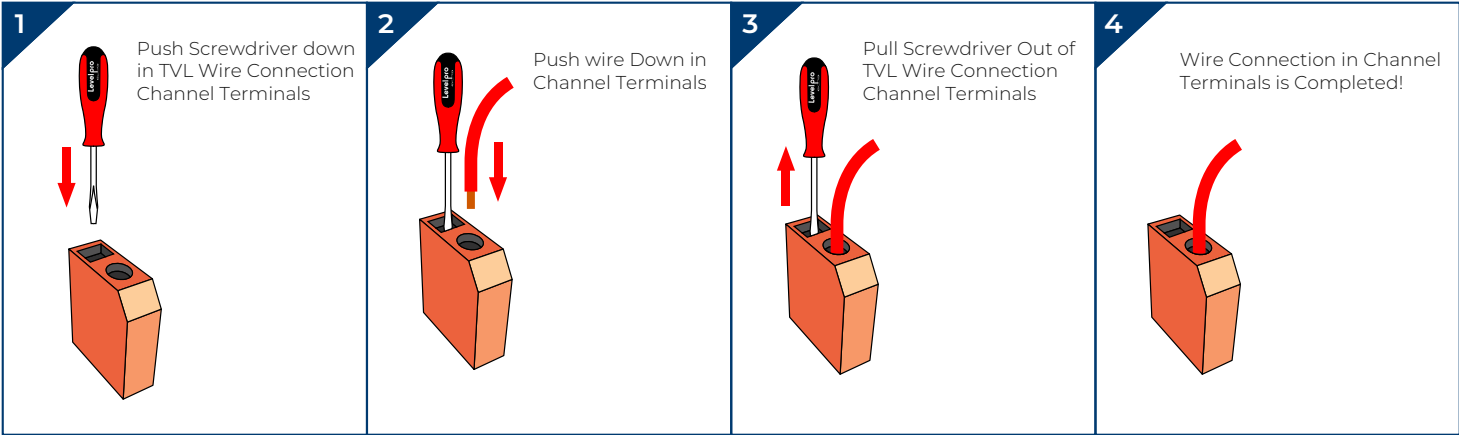


Sentinel LT Series Wiring Diagram

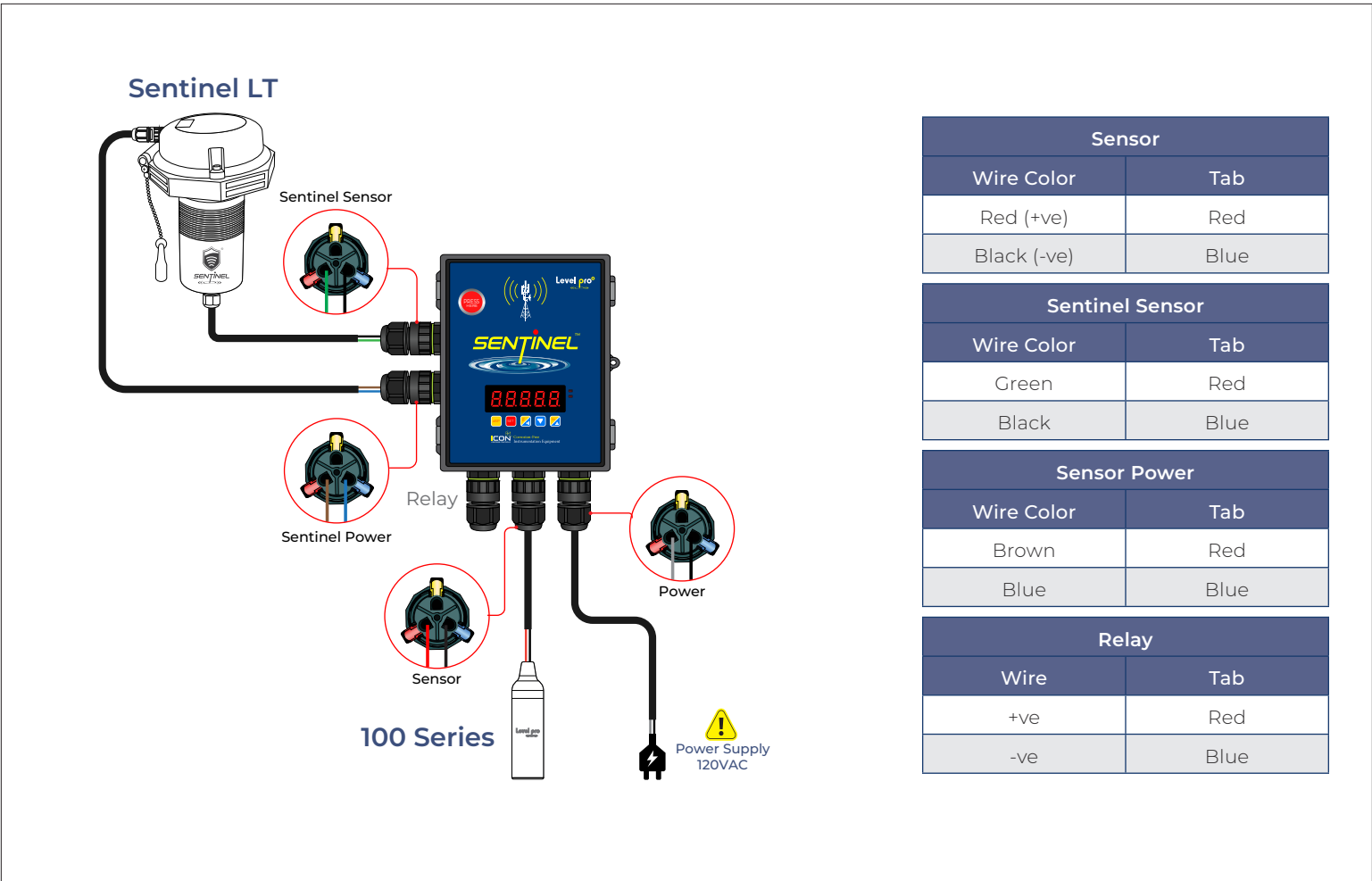


See Wire Connection via TVL Channel Terminals on the Following Page!

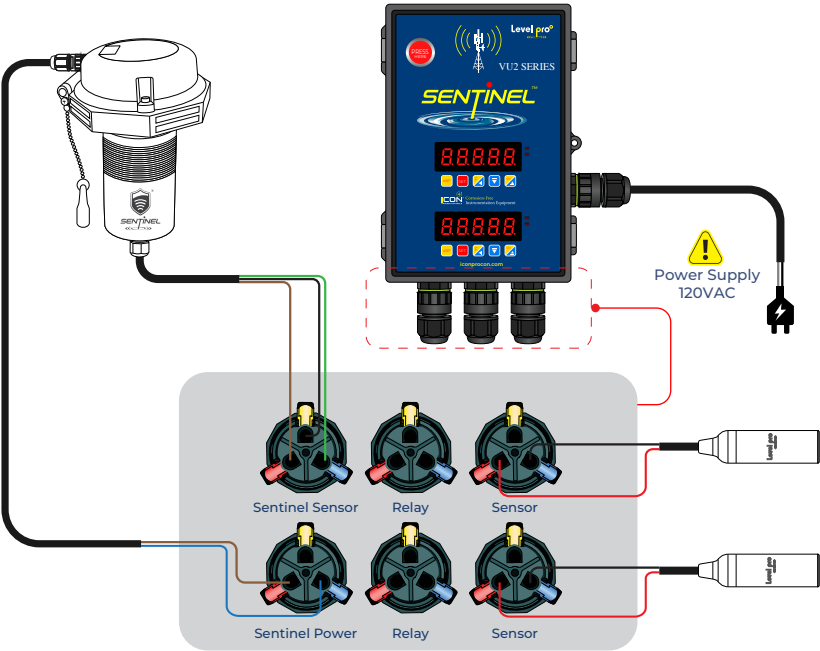
Wire Connection via TVL Channel Terminals



Wiring Diagram — Sentinel VU + Sentinel LT + 100 Series Sensor



Wiring Diagram — Sentinel VU2 + Sentinel LT (Internal Power Supply) + Sensor



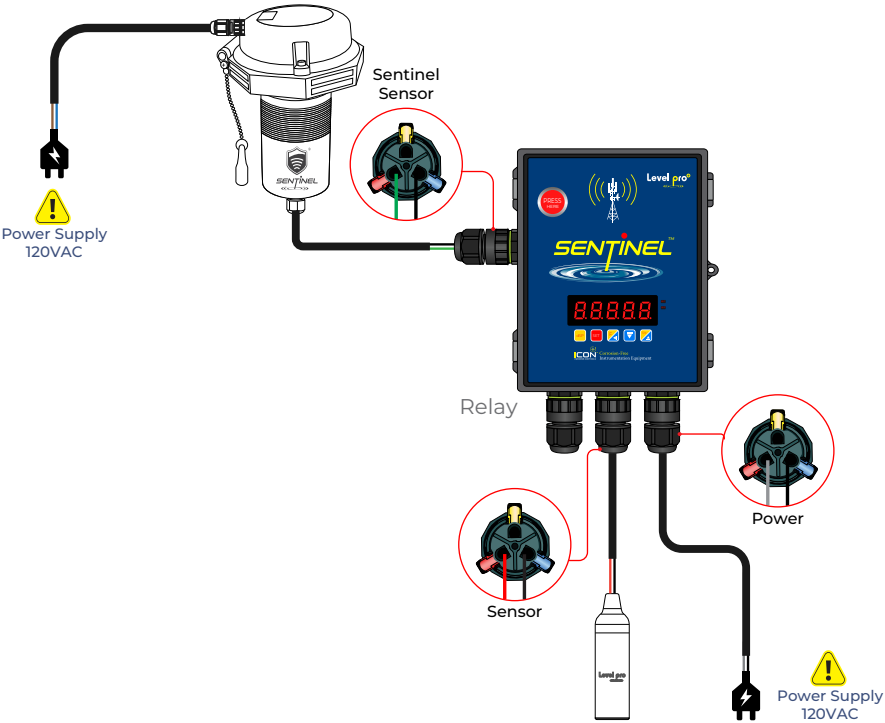
Sensor	
Wire Color	Tab
Red (+ve)	Red
Black (-ve)	Blue

Sentinel Sensor	
Wire Color	Tab
Brown	Red
Black	Yellow
Green	Blue

Sensor Power	
Wire Color	Tab
Brown	Red
Blue	Blue

Relay	
Wire	Tab
+ve	Red
-ve	Blue

Wiring Diagram — Sentinel VU + Sentinel LT + Sensor

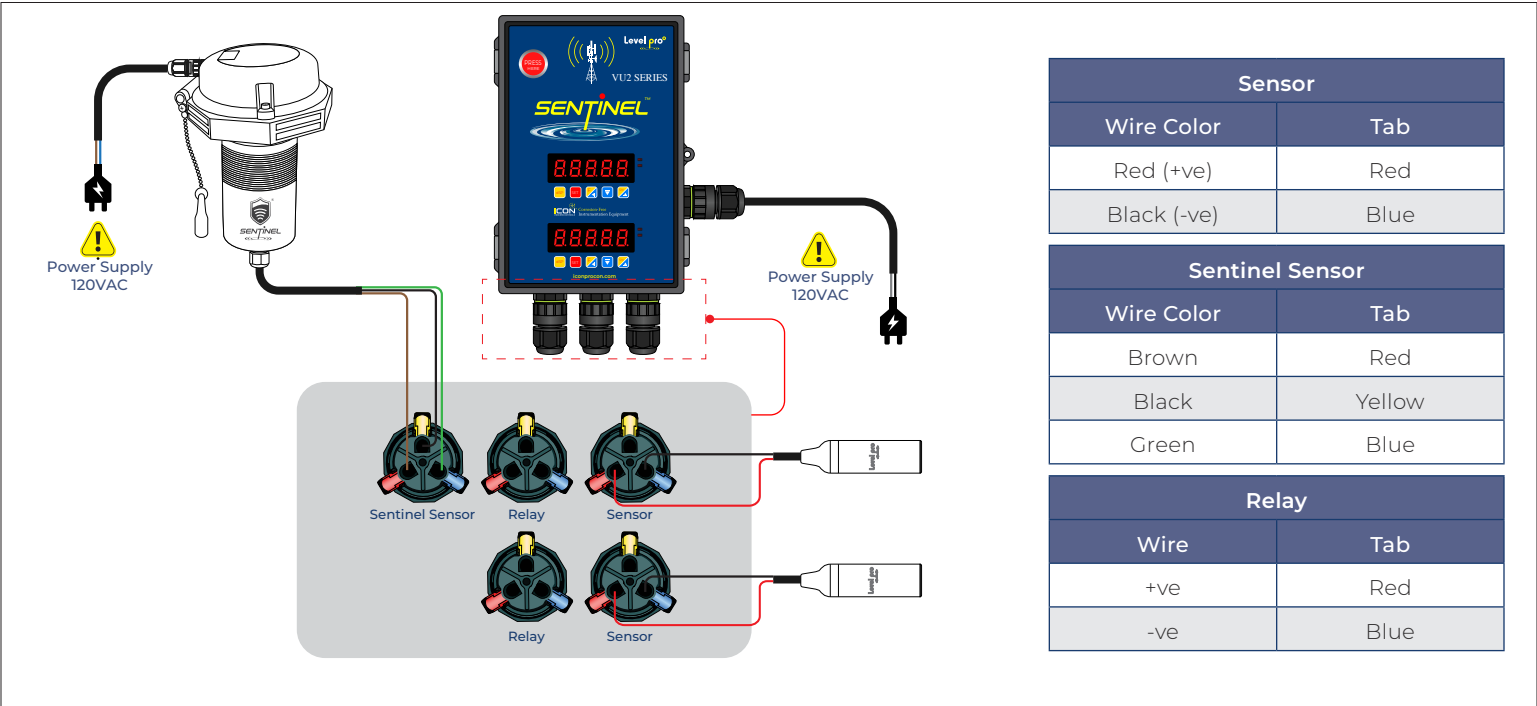


Sensor	
Wire Color	Tab
Red (+ve)	Red
Black (-ve)	Blue

Sentinel Sensor	
Wire Color	Tab
Green	Red
Black	Blue

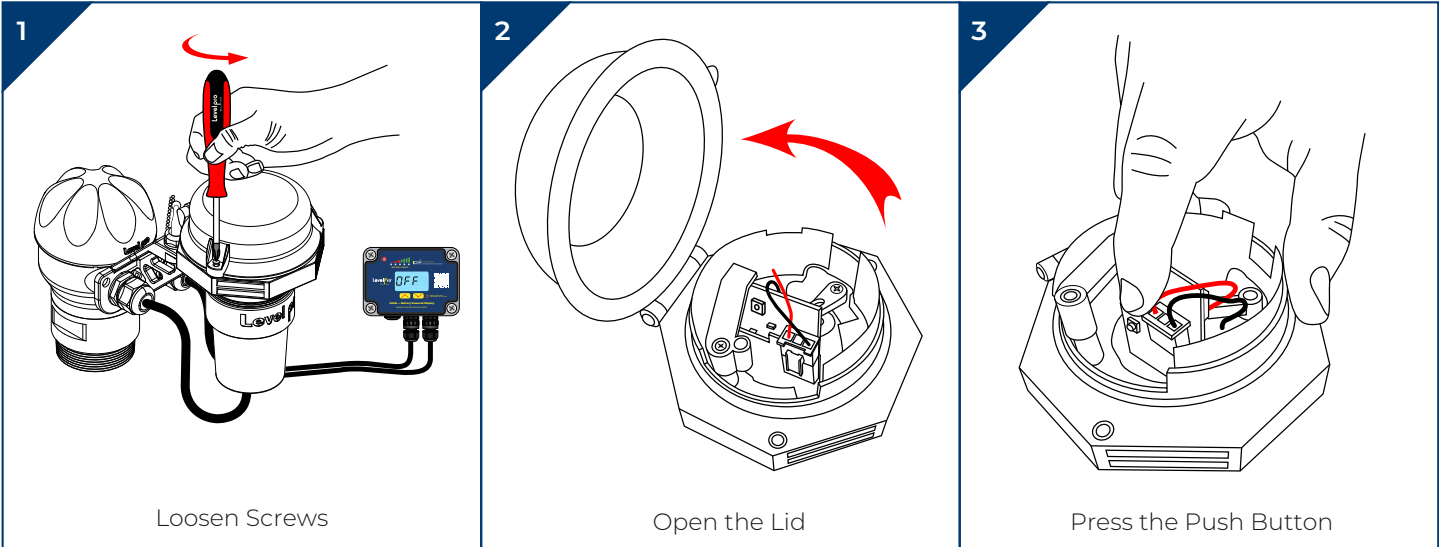
Relay	
Wire	Tab
+ve	Red
-ve	Blue

Wiring Diagram — Sentinel VU2 + Sentinel LT (External Power Supply) + Sensor



Push Button Call-Out

⚠ ENSURE DISPLAY IS OFF BEFORE INITIATING CALL-OUT

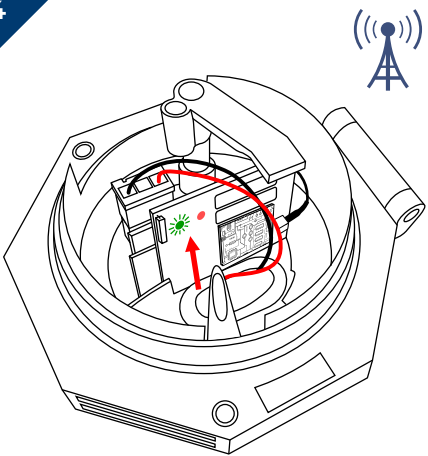
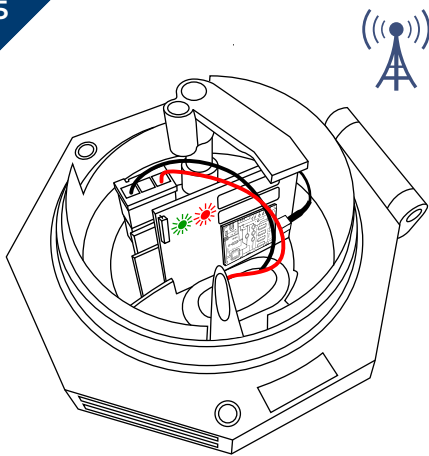
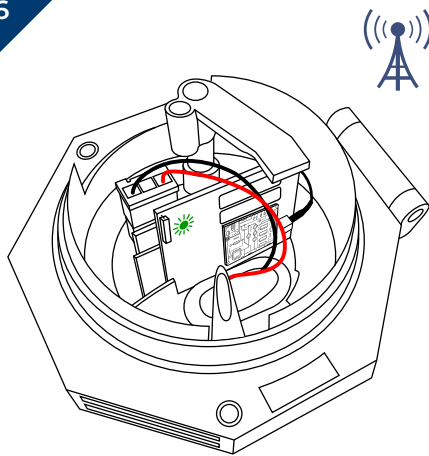
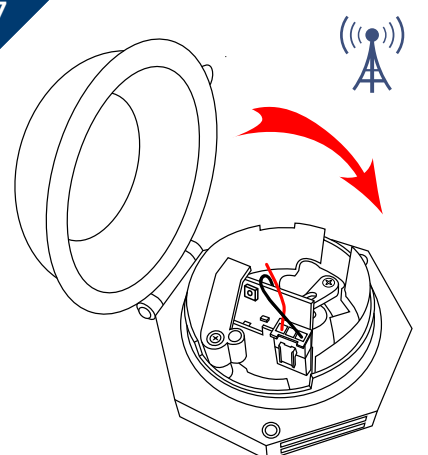
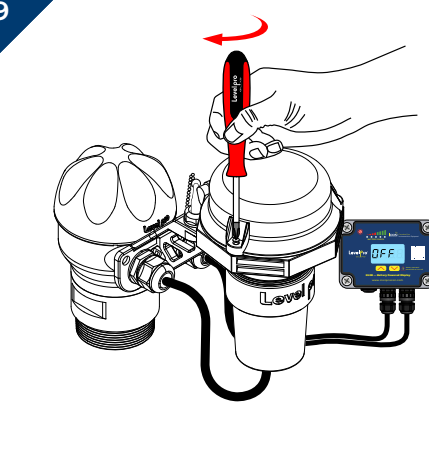
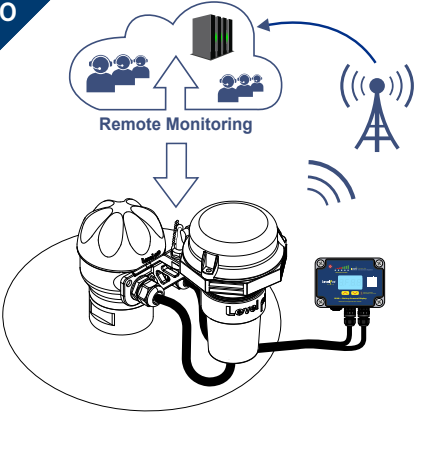
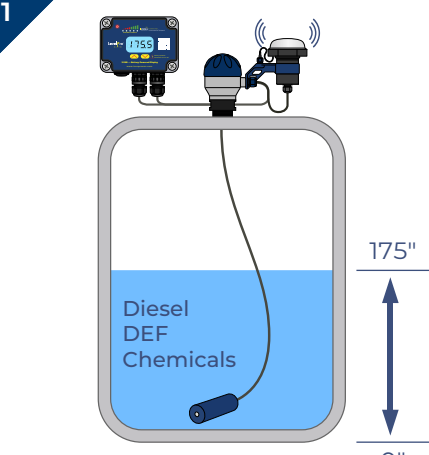
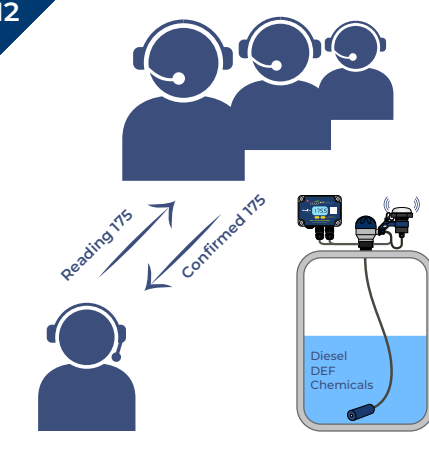


Call-Out Instructions Continued on the Following Page!

LevelPro® — Sentinel Series LT

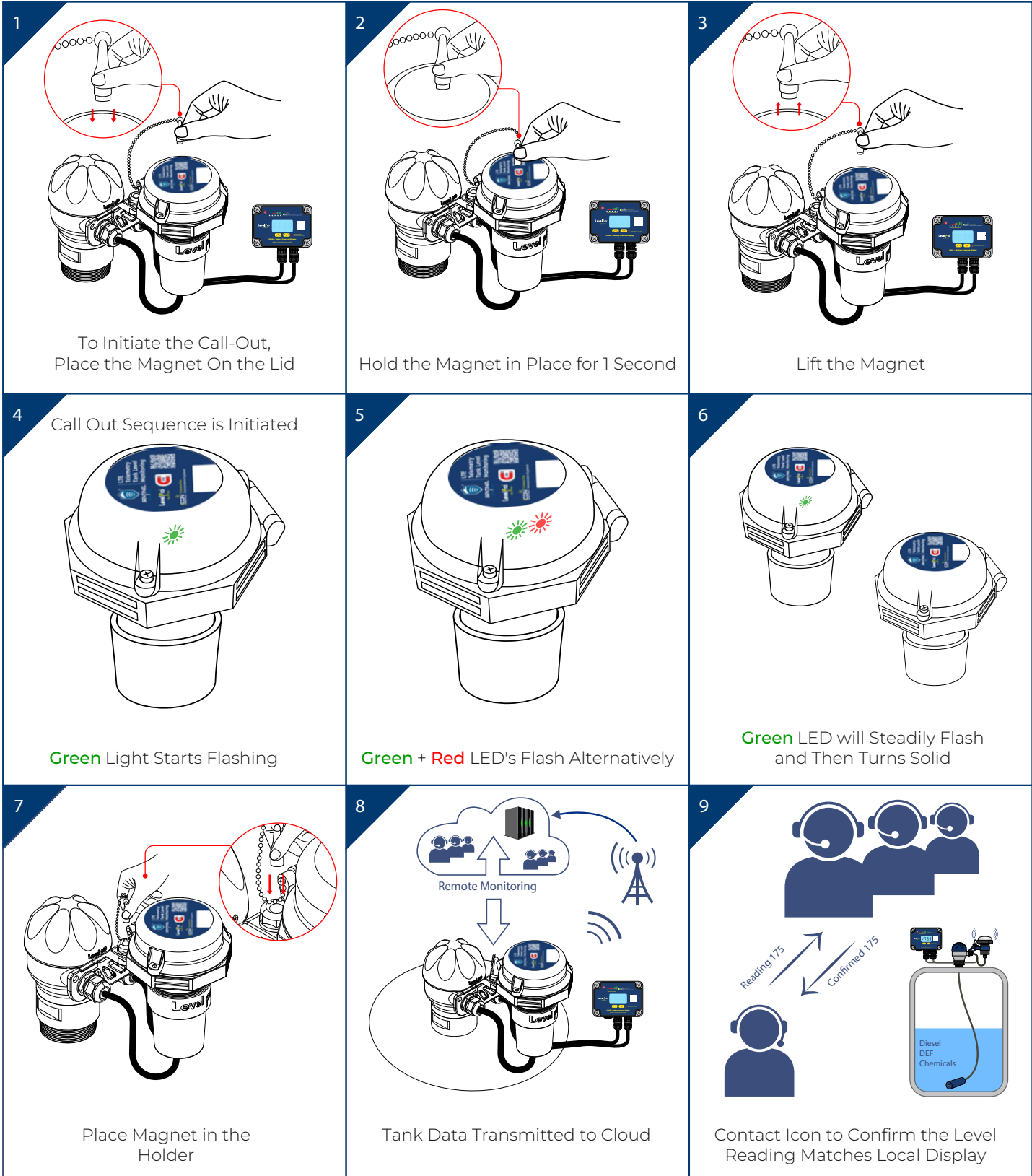
Remote Tank Monitoring

Push Button Call-Out Continued ...

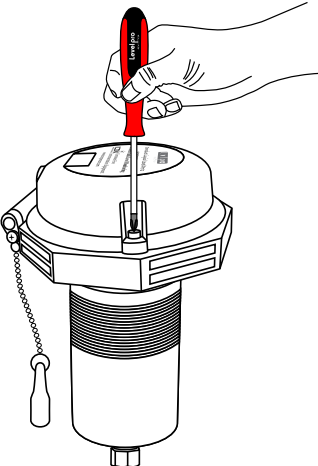
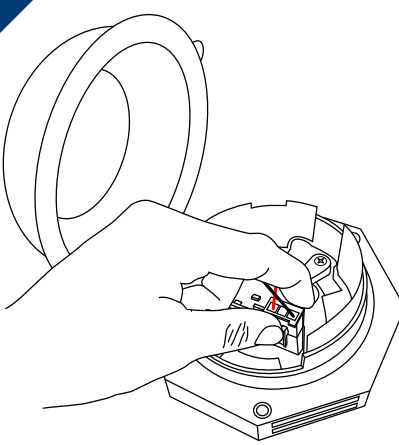
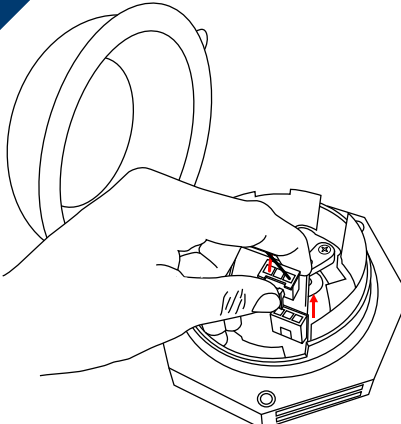
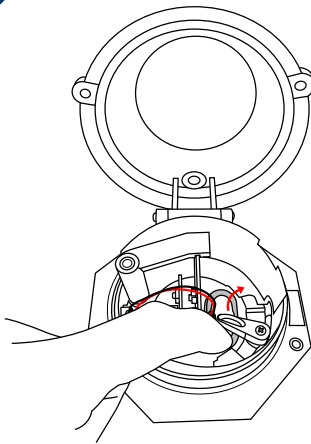
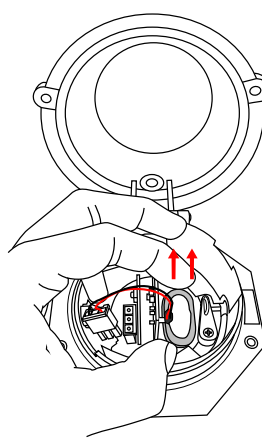
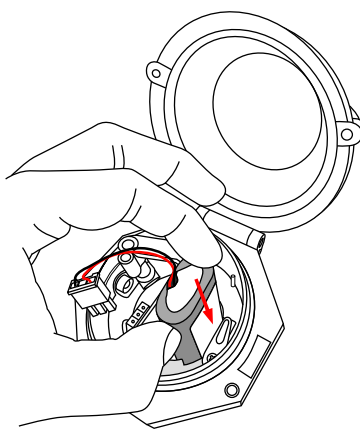
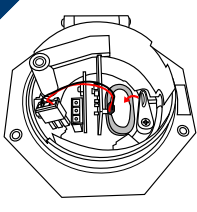
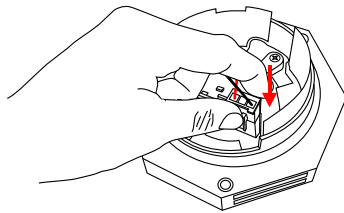
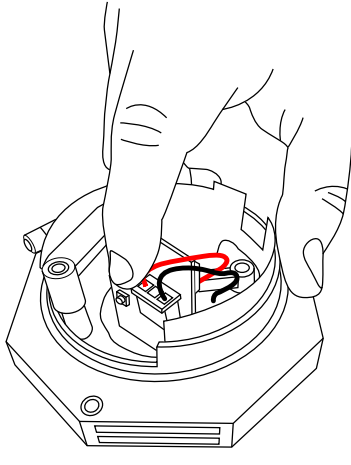
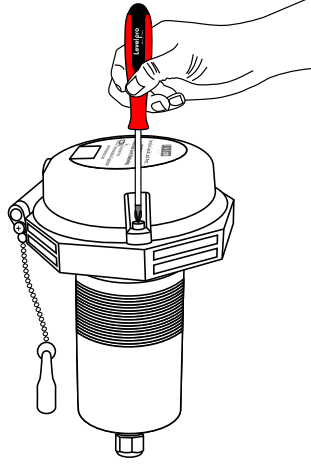
4  Green LED Starts Flashing	5  Green + Red LED's Flash Alternatively	6  Green LED Flashes & Then Turns Solid
7  Close Lid	8  LED Turns OFF	9  Tighten Screws
10  Tank Data Transmitted to Cloud Tank Monitoring Center	11  Turn Display ON After Call-Out	12  Contact Icon to Confirm the Level Reading Matches Local Display

Magnetic Call-Out

⚠️ ENSURE DISPLAY IS OFF BEFORE INITIATING CALL-OUT



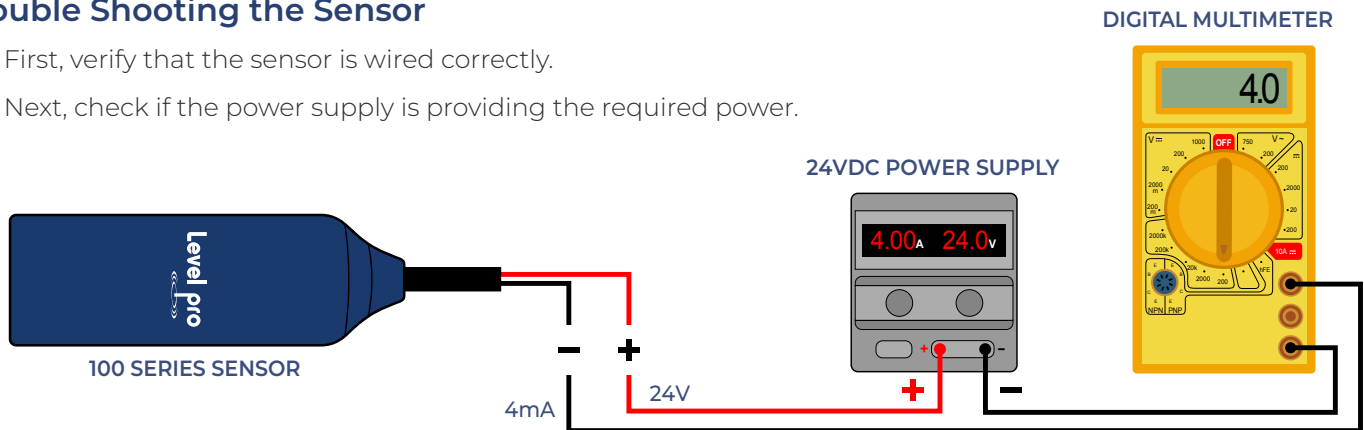
Battery Replacement

1  Remove Screws & Open the Lid	2  Hold the Connector with 2 Fingers	3  Gently Pull the Connector Upwards
4  Gently Slide Retainer Clockwise	5  Gently Pull Out the Battery	6  Insert New Battery
7  Slide Retainer Counter Clockwise Reconnect Plug 	8  Press Push Button to Initiate Call Out	9  Close the Lid

Troubleshooting

Trouble Shooting the Sensor

1. First, verify that the sensor is wired correctly.
2. Next, check if the power supply is providing the required power.



If transmitter is not functioning properly, isolate the transmitter from the system and wire as shown above. Be sure to remove the sensor from the classified area when performing this test. MultiMeter should read 4mA with the transmitter out of liquid.

Display Not Turning On

- ✓ Check Wiring
- ✓ Check Power Supply

Invalid Data Transfer

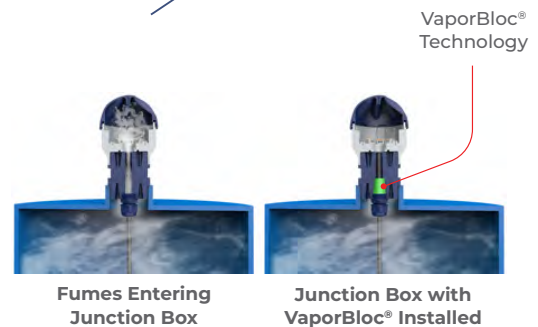
- ✓ Ensure Display is **OFF** when making Call-Out
- ✓ Check Power Supply

Display Indicates LL

- ✓ Check Wiring
- ✓ Check Power Supply

Incorrect Display Reading

- ✓ The reference or capillary tube is fitted with a **Gortex®** Filter. This must remain attached in order to prevent moisture, particulate, or insects from entering. **Do Not Remove.**
 - ✓ Avoid Blocking or Bending the Ventilation Tube.
 - ✓ The LP100 Junction Box is fitted with a **Gortex®** Breather to allow air to pass but not water. Please Ensure this is **Not Blocked.**
- ⚠ **Ensure VaporBloc® has been installed when measuring liquids that Fume, Form Vapor, or Out-Gas.**



Warranty, Returns and Limitations

Warranty

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by Icon Process Controls Ltd for a period of one year from the date of sale of such products. Icon Process Controls Ltd obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which Icon Process Controls Ltd examination determines to its satisfaction to be defective in material or workmanship within the warranty period. Icon Process Controls Ltd must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the one year from the date of replacement.

Returns

Products cannot be returned to Icon Process Controls Ltd without prior authorization. To return a product that is thought to be defective, go to www.iconprocon.com, and submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to Icon Process Controls Ltd must be shipped prepaid and insured. Icon Process Controls Ltd will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which:

1. are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above;
2. have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use;
3. have been modified or altered;
4. anyone other than service personnel authorized by Icon Process Controls Ltd have attempted to repair;
5. have been involved in accidents or natural disasters; or
6. are damaged during return shipment to Icon Process Controls Ltd

Icon Process Controls Ltd reserves the right to unilaterally waive this warranty and dispose of any product returned to Icon Process Controls Ltd where:

1. there is evidence of a potentially hazardous material present with the product;
2. or the product has remained unclaimed at Icon Process Controls Ltd for more than 30 days after Icon Process Controls Ltd has dutifully requested disposition.

This warranty contains the sole express warranty made by Icon Process Controls Ltd in connection with its products. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd. This warranty will be interpreted pursuant to the laws of the province of Ontario, Canada.

If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

For additional product documentation and technical support visit:

www.iconprocon.com | e-mail: sales@iconprocon.com or support@iconprocon.com | Ph: 905.469.9283



by



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