

Tankpro® Series

Continuous Level Transmitter with LCD Display Operating Manual



Table of Contents

Safety Information 03

Technological Progress 03

Product Description 03

Technical Specifications 05

Understanding Level Measurement 06

Application Details 06

Getting Started 07

Calculating Max Range of Sensor 08

Correct Sensor Position Installation 09

Wiring Diagram 09

Connection Power Wire 10

Programming Display 11

Troubleshooting 12

Warranty, Returns & Limitations 13



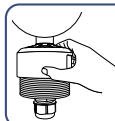
**Corrosion-Free
Instrumentation Equipment**

Safety Information



Warning | Caution | Danger

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



Hand Tighten Only

Overtightening may permanently damage product threads and lead to failure of the retaining nut.



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.

- ❑ 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

All operations described in this instruction manual have to be carried out only by trained personnel or an accredited person. Warranty and post warranty service must be exclusively carried out by the manufacturer.

Improper use, installation or set-up of the level meter can result in crashes in the application (overfilling of the tank or damage of system components).

The manufacturer is not responsible for improper use, losses of work caused by either direct or indirect damage, and for expenses incurred during installation or use of the level meter.

Technological Progress

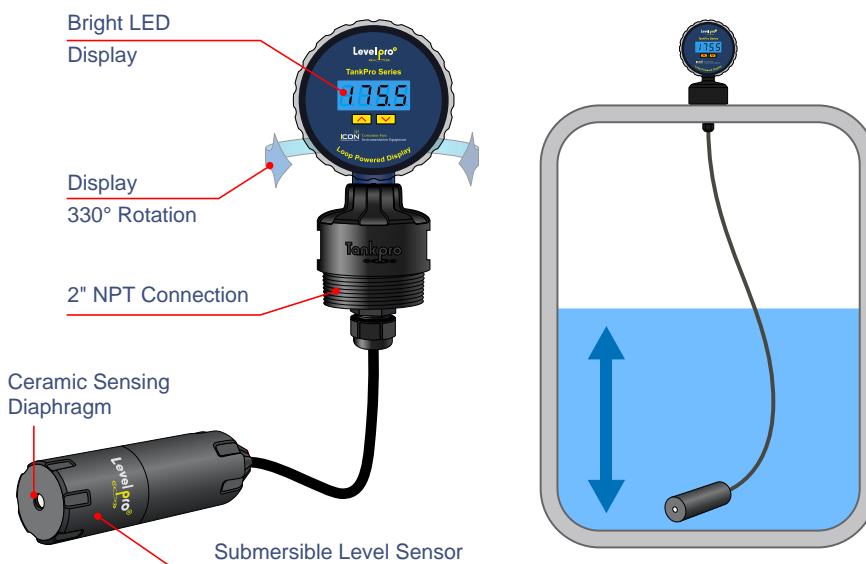
The manufacturer reserves the right to revise, alter, or modify the flow meter to the most current technology without special prior notice. Further information about the latest updates and potential additions to these operating instructions are available from www.iconprocon.com

Product Description

The **TankPro®** Submersible Level Sensor provides continuous level measurement for both corrosive and non-corrosive liquids. These submersible hydrostatic transmitters have been designed for the toughest industrial applications. Unlike ultrasonic level transmitters, our liquid level sensors are completely unaffected by any foam, vapor, turbulence or condensate in the tank.

The **TankPro®** Level Transmitter comes equipped with a local LED Display that screws into the top of the tank with a 1" or 2" NPT connection.

The **TankPro® Series** comes in **PVC, PP, PVDF** or **PTFE Teflon®**, making them the perfect level sensor for your chemical tank application.



100 Series Submersible Level Sensor



The **100 Series** Transmitter is designed for Continuous Level Measurement of Aggressive Liquid Media

Features

- ✓ Higher Accuracy: $\pm 0.5\%$
- ✓ Superior Chemical/Corrosion Resistance
- ✓ PVC | PP | PVDF | 316 SS | PTFE Teflon®
- ✓ Teflon® Jacketed Cable
- ✓ Kalrez® O-Ring Seal
- ✓ Works on Foam | Vapor | Turbulence | Condensate
- ✓ Integrally Molded Internal Weight | No Floating
- ✓ IP68 | NEMA 4X Enclosure

⚠ The Solution to Tough Applications Where Ultrasonic Sensors Simply DO NOT WORK!

VaporBloc® Technology



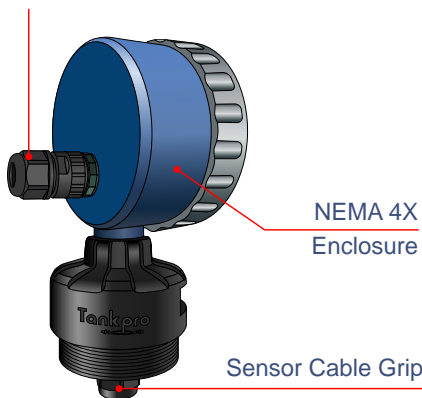
Features

- ✓ New VaporBloc® Technology
- ✓ Easy Calibration
- ✓ Non Clogging Design | Great With Sediment
- ✓ Heavy Duty Rugged Design
- ✓ No Moving Parts
- ✓ Automatic Temperature Compensation
- ✓ 2" NPT Connection
- ✓ 14ft Measuring Range
- ✓ 4-20mA Loop Powered

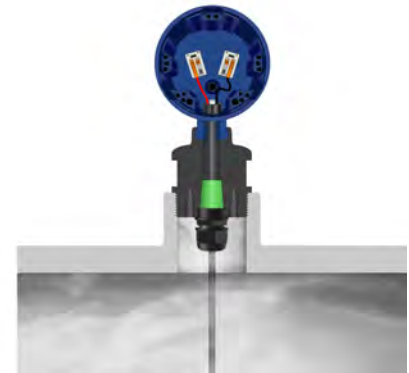
VaporBloc® Technology

- ✓ Blocks out Corrosive Chemical Fumes
- ✓ Pressure Tested to 75 psi
- ✓ Protects Internal Wiring Connections
- ✓ Eliminates Corrosive Fumes Out-gassing into Environment

Quick Connector
Power Cable Grip



No VaporBloc®



VaporBloc®

Technical Specifications

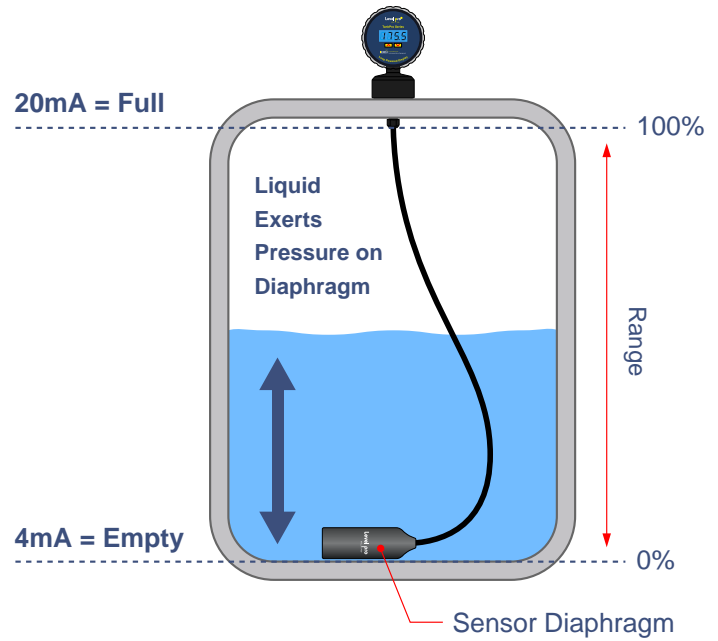
Input Pressure Range	
Level ft/H ₂ O	14
Overpressure psi	210
Burst Pressure > psi	290
Output Signal Supply	
Standard	4-20mA Loop Powered 9-36 VDC
Performance	
Accuracy	<± 0.5% Full Scale or Better
Permissible Load	$R_{max} = [(V_s - V_{smin}) / 0.02 A]$
Influence Effects	Supply : 0.05% Full Scale Load : 0.05% Full Scale
Long Term Stability	<± 0.1% Full Scale Over One Year
Response Time	<10 msec
1Accuracy According to IEC 60770 - Limit Point Adjustment Non-Linearity Hysteresis Repeatability	
Thermal Effects Offset and Span	
Thermal Error	<± 0.2% FSO/K in Compensated Range -25 - 70°C -13 - 158° F
Temperatures	
Operating Temperatures	PVC 32°F - 140°F PP -4° - 178°F PVDF -30 - 178 °F PTFE -10°C - 60°C 316 SS - 30°C - 212°C
Electrical Connection	
Input Voltage	24 VDC
Jacketed Cable	PTFE Teflon® 0 - 200°F
3 Wire Cable with Integrated Air Tube for Atmospheric Pressure Reference	
Materials Wetted	
Housing	PVC PP PVDF
Seals	FFKM - Kalrez®
Diaphragm	Ceramic Al2 O3
Standards and Approvals	
CE FCC	
RoHS Compliant	

Understanding Level Measurement

Submersible Level Sensor

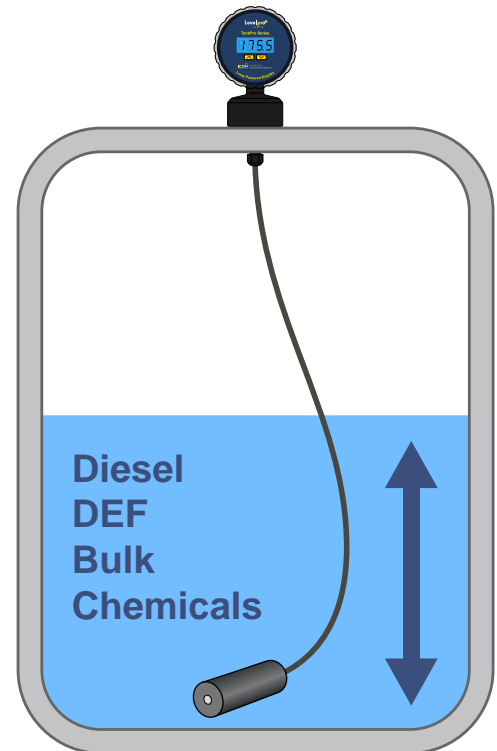
All Submersible Sensors have a Calibrated Range that is Based on H₂O that has a Specific Gravity or Density = 1

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



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 :



Getting Started

- ⊖ Submersible Pressure Sensors are designed to be completely submerged 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.

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 Body by the Specific Gravity of the Liquid

SENSOR RANGE / S.G = NEW RANGE

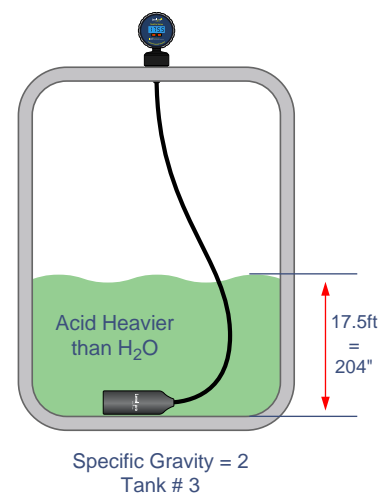
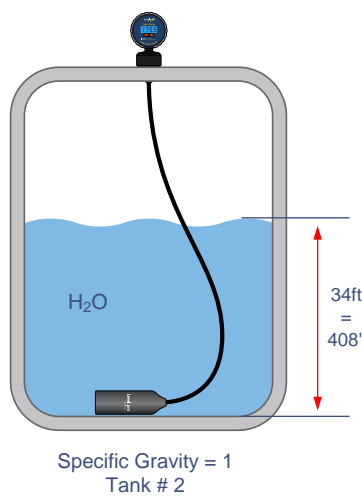
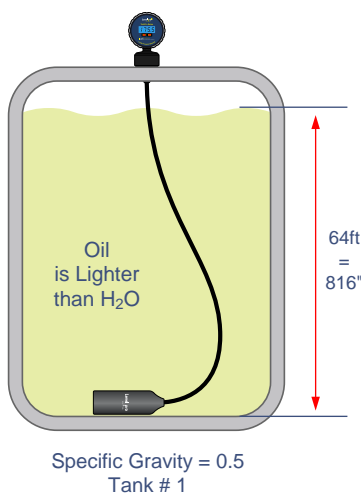
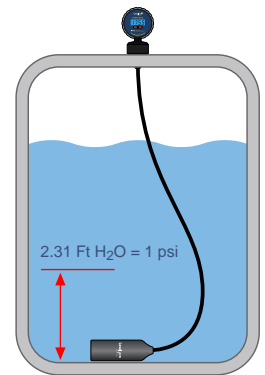
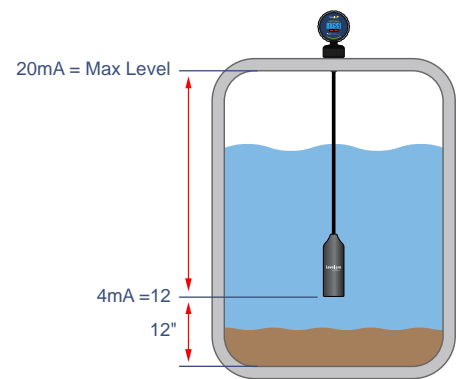
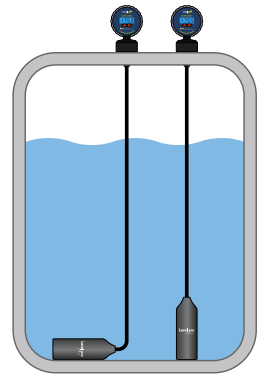
⊖ **The Importance of the Liquids S.G (Specified Gravity)**

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 i.e. Oil
- Liquids with a S.G > 1.0 are **Heavier** than H₂O i.e. 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 submerged into liquids with different Specific Gravities



Calculating Max Range of Sensor

Lets 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

Calibrated Range/S.G = Liquid Level Measurement Range $34/1 = 34'$ 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. $S.G = 0.5$
 $34/.5 = 64$ feet or 816 inches

Since the oil is a lighter fluid than H₂O the new measuring range of the sensor has increased and is now 64' or 816"

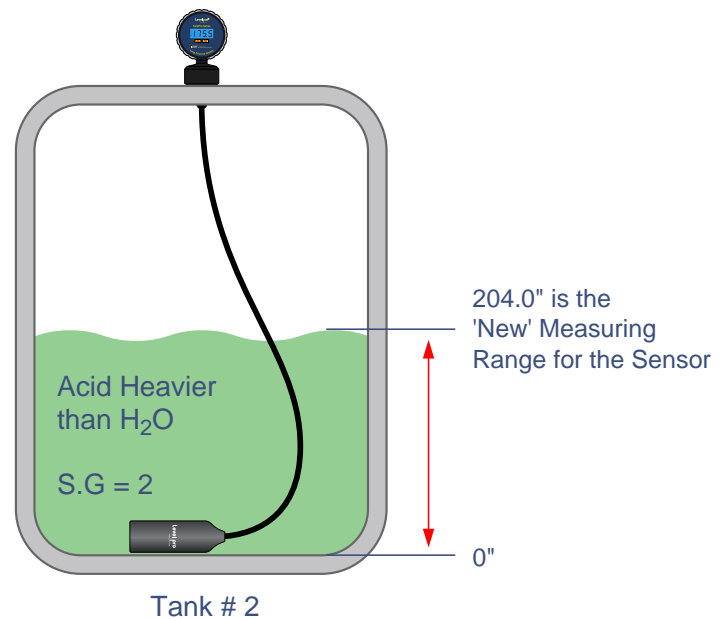
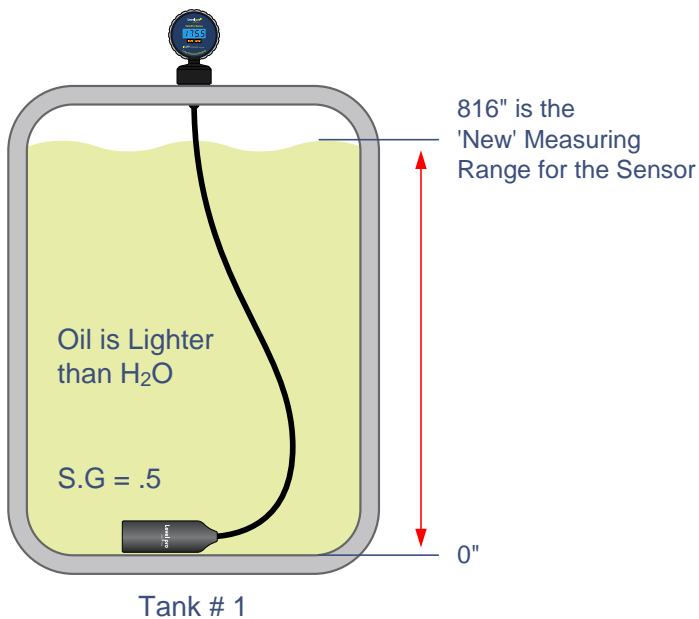
Example 2

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

Range / S.G = New Range of the Sensor

$34/2 = 17.5$ feet or 204"



Oil S.G = 0.5	Sensor Signal	Display Reading
Tank 1 Empty	4.0mA	0"
Tank 1 Full	20.0mA	816"

Acid S.G = 2.0	Sensor Signal	Display Reading
Tank 2 Empty	4.0mA	0"
Tank 2 Full	20.0mA	204"

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 A.

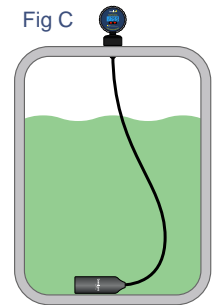
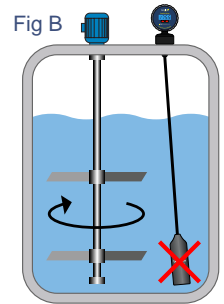
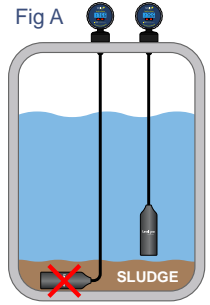
- ⊗ **Location** : Select a location where the temperature of the transmitter will be within the specification of the sensor.



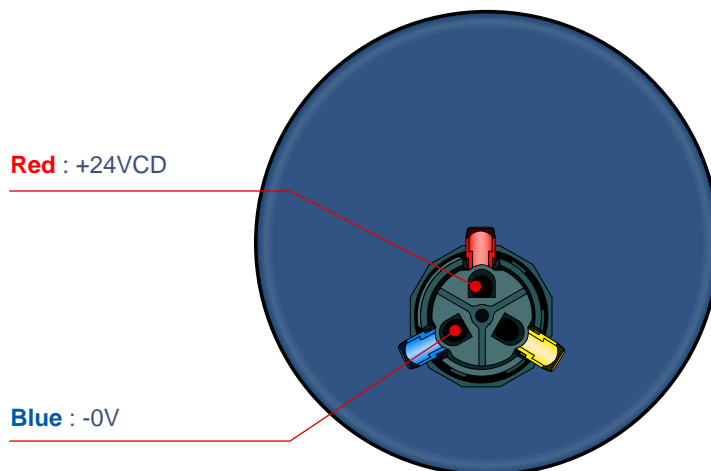
Installations where other tank requirements will cause the transmitter to move or swing.

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 **TankPro®** on the top of the housing.
- ⊗ **Avoid** : installations where other tank requirements will cause the transmitter to move or swing.
Ex: 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.

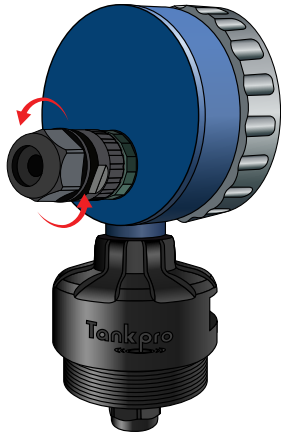


Wiring Diagram



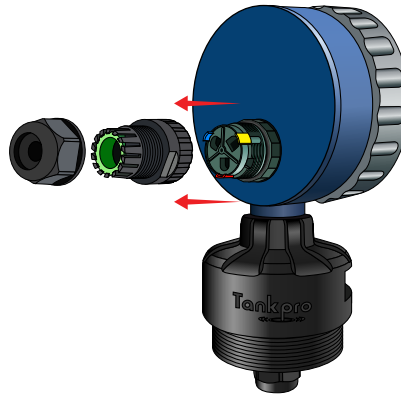
Connection Power Wire

01



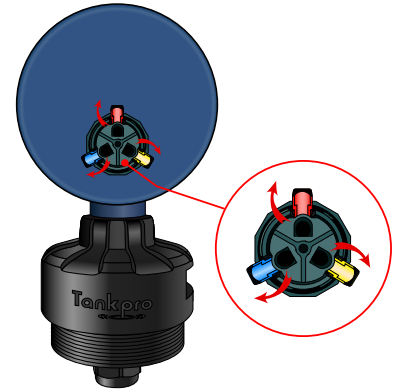
Turn Cable Grip Nut Counter-Clockwise

02



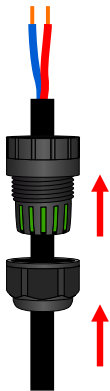
Remove Nut and Cable Grip

03



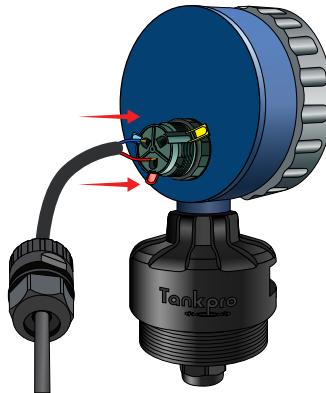
Wire Clamp Open

04



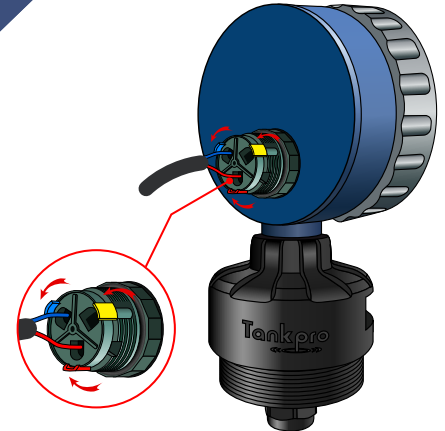
Insert Wire in Cable Grip Nut

05



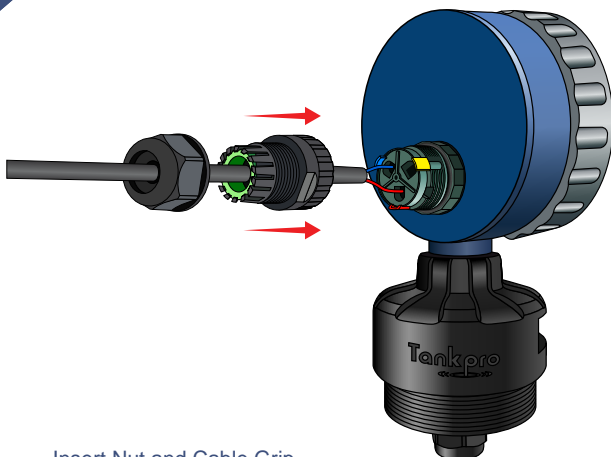
Insert **+24VDC** into **Red** Terminals and **-0V** into **Blue** Terminals

06



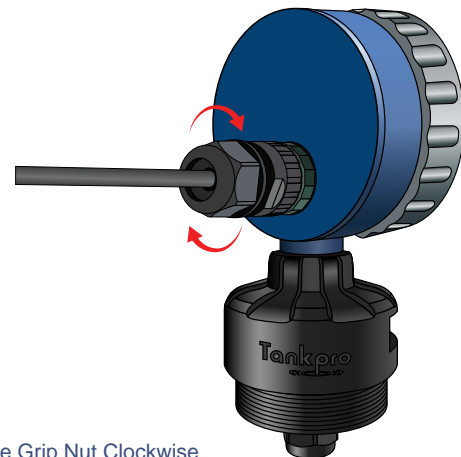
Wire Clamp Close

07





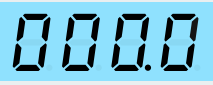



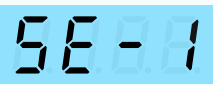

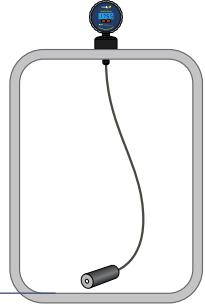

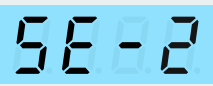

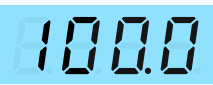



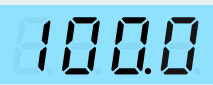

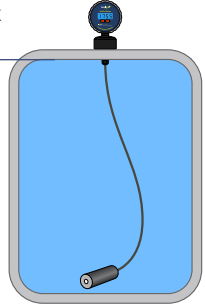





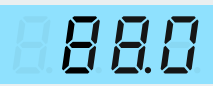
Insert Nut and Cable Grip

08



Turn Cable Grip Nut Clockwise

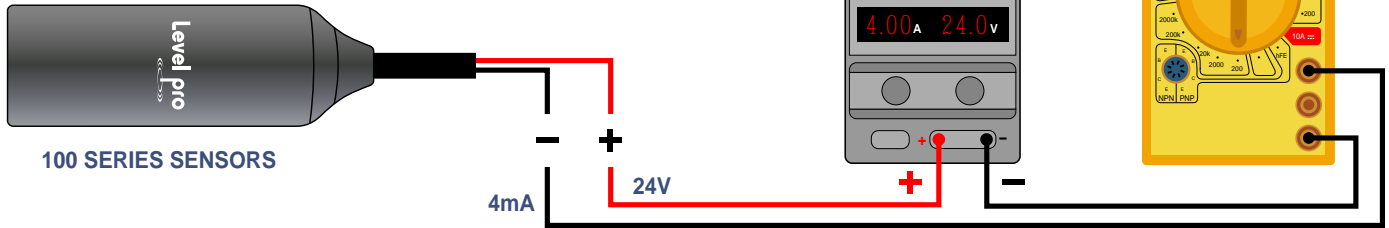
Programming Display

STEPS	DISPLAY	ACTION	
<p>#1</p> <p>Main Display</p> <p>Press  HOLD </p>		<p>1st. Step</p> <p>Press and Hold Both  </p>	<p>SE-1 Default Set to</p>
<p>#2</p> <p>Low Level Value</p> <p>Press 1x </p>	 <p>Low Value - 4mA = 0</p>	<p>2nd. Step</p> <p>Default Preset = 000.0 No need to change</p> <p>Press </p>	 <p>4mA Empty</p>
<p>#3</p> <p>Low Level Value</p> <p>Press  2 sec</p>		<p>3rd Step</p> <p>In this screen press and hold  for 2 sec</p>	
<p>#4</p> <p>High Level Value</p> <p>Enter High Level Value</p>	 <p>Enter Max Tank Value</p>	<p>4th Step</p> <p>  Change number to Desired value (Note: This value is your max tank level) Inches Gallons Liters</p>	
<p>#5</p> <p>High Level Value</p> <p>Press  2 sec to SAVE</p>		<p>5th Step</p> <p>Press  2 sec to SAVE</p>	 <p>Value = Max Fill Height Inches Gal</p>
<p>#6</p> <p>Return to Main Display</p> <p>Press  HOLD </p>		<p>6th Step</p> <p>Press   & Hold Return to Main Display</p>	
<p>#7</p> <p>Main Display</p>	 <p>Current Level Value</p>	<p>Finished</p> <p>Current Tank Level</p>	

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 below. Be sure to remove the sensor from the classified area when performing this test. Multi Meter should read 4 mA with the transmitter out of liquid.

Display Not Turning On

- ✓ Check Wiring
- ✓ Check Power Supply

Display Indicates LL

- ✓ Check Wiring
- ✓ Check Power Supply

Determine 20mA Value to Program SE 2 on Display

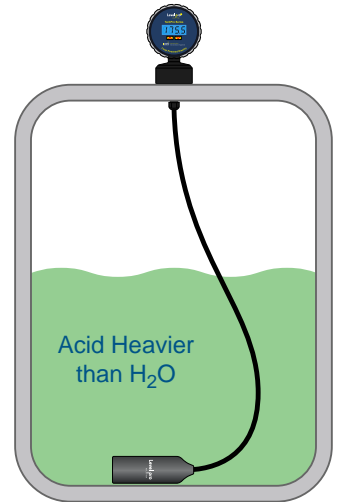
Example : S.G of the Liquid is Heavier than H₂O

The Submersible Sensor Range is 34' is now going to be installed into a tank of Acid

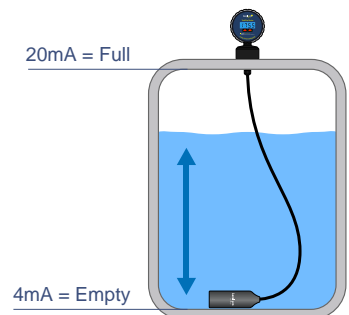
S.G = 2 : Sensor Range = 0-34'

To Calculate the New Range of the Sensor = Range/S.G | 34/2 = 17.5 ft or 204 inches

The liquid is Heavier than H₂O so the Overall Sensor Range Has been reduced to 14.5 ft or 204 inches The 204 is Entered



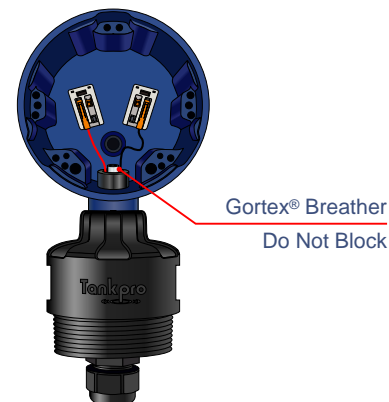
	<p>20mA = Full Level Value Default = 100 Refer to Reference Picture</p> <p>20mA = the High Tank Level Value of the sensor. Inches Feet Gallons</p> <p>*This number is determined by dividing the max range of the sensor by the Specific Gravity</p> <p>Display Inches Range / S.G = 34' / S.G = New Full Range of Sensor 20mA</p> <p>Display Gallons Range / S.G x Gal/Inch = Gallons</p>



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 **TankPro®** is fitted with a **Gortex® Breather** to allow air to pass but not water. Please Ensure this **Not Blocked**.
- ✔ Always keep the cable termination clean, dry and free of moisture and prevent liquid from entering the **Vent Tube**.

Confirm Programming Input for for 20mA (SE 2 on Display) is Correct
 Confirm Specific Gravity of Liquid is Correct.



Warranty, Returns & 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 years 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.

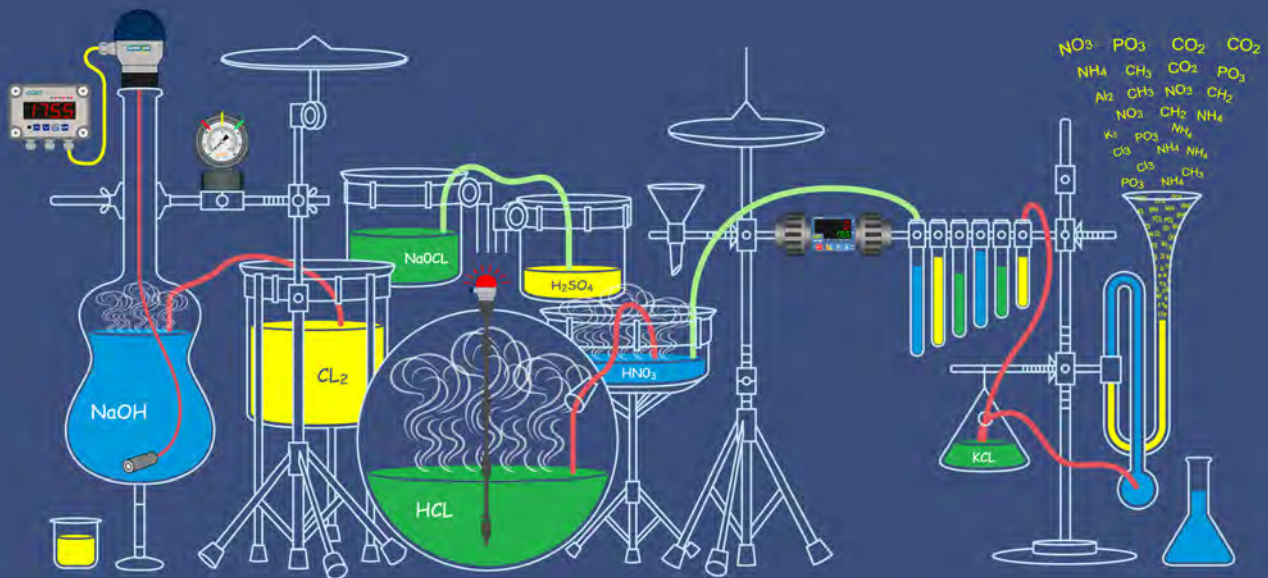
Limitations

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** 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; or 2) 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 support@iconprocon.com | Ph: 905.469.9283

CORROSION



We Measure & Control
All Kinds of Corrosive Liquid S#*o%

*Industry's Most Extensive Line of
Corrosion-Free Instrumentation Equipment*



Corrosion-Free
Instrumentation Equipment