Smartpro™

Wireless RF

Grease Oil Sediment Monitor

Owner's Manual

ZURN®

GreenTurtle

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Smartpro™
Oil, Grease and Solids
Radio Frequency Remote Monitoring System
OWNER'S MANUAL

(Version 2.0)

Description

The Smartpro™ Wireless RF is a unique radio frequency monitor and alarm system that assists in managing oil, grease and sediment levels inside commercial oil and grease interceptors. The battery operated sensor mounted inside the interceptor detects oil, grease and solids levels and communicates wirelessly to the control panel mounted in the facility manager's office or work area. The control panel can be connected to a Building Automation System for remote monitoring.

Components and Operation

The Smartpro Wireless RF is a stand-alone radio frequency remote monitoring system. It is supplied with: ❶ NEMA 4 control box with 3.6V lithium battery ❷ RF antenna with waterproof wire ❸ ultrasonic sensor probe ❹ mounting bracket ❺110 volt control and monitoring panel with plug-in adapter ❻ waterproof Scotchlok wire connectors

The Sensor and Control Box:

A) Control box mounts inside the interceptor extension collar (riser) with provided mounting bracket and mounting bolts.

B) The sensor is attached to the control box with ¾" PVC pipe supplied by installer.

C) The control box antenna is attached to the control box and secured into ground surface near the manway cover with clear silicone supplied by installer.

The Control Panel:

A) Typically installed inside the facility building

B) Mounted inside supervisor's or Manager's office for easy access

C) Connects to 110 V outlet with supplied power supply

D) Equipped with Building Automation System connectivity – see picture below.

Operation:

Oil or grease level as well as bottom solids level is monitored throughout the day. Levels are transmitted wirelessly via a radio frequency signal to the control panel inside the building.

The control panel can be programmed to read and report levels in inches or as percent of interceptor capacity.

When a predetermined level of oil, grease, and solids is reached, the control panel is programmed to visually alarm and notify facility manager that it is time to pump out the interceptor.

Installation Overview - Components

1. Install control panel on office wall as close to grease interceptor as possible, plug power connector into standard 110V outlet
2. Attach mounting bracket to extension collar with mounting bolts (provided) – drill mounting holes approximately 15" from top of riser
3. Cut ¾" SCH40 PVC pipe to length (A + ½ B) – see Figure 1

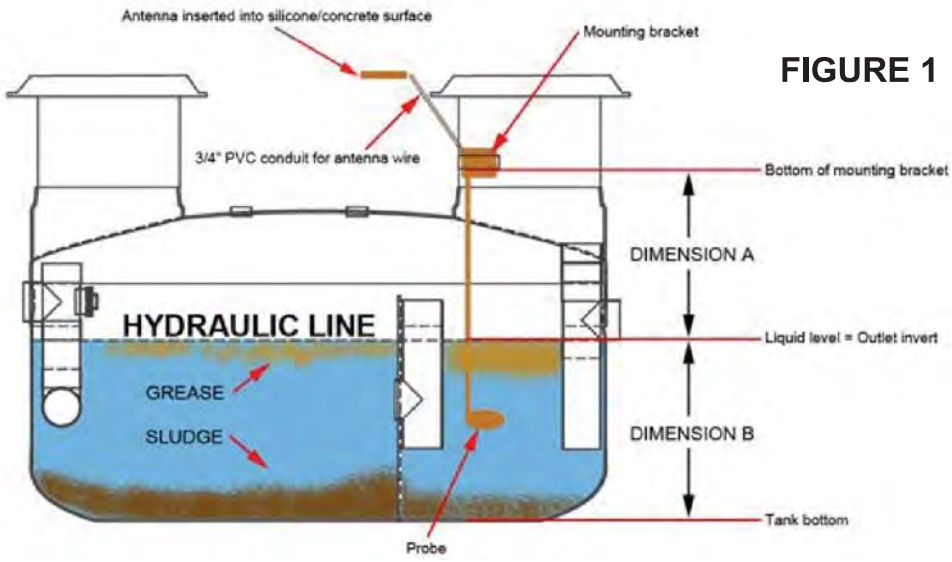
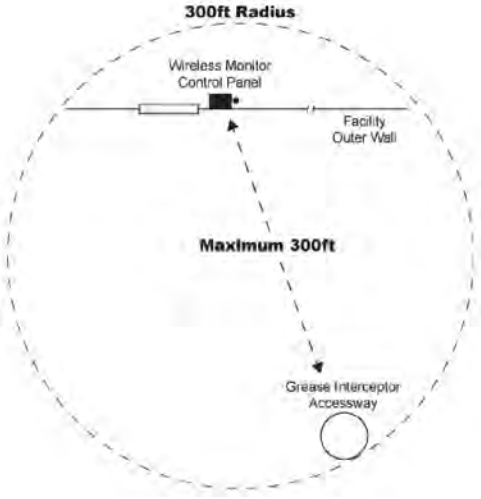


FIGURE 1

4. Thread probe wire through PVC pipe
5. Solvent weld probe to bottom of PVC pipe with primer and PVC cement to make waterproof seal
6. Connect probe wires to control box with waterproof connectors provided
7. Secure pipe to control box with silicon rubber and screw provided
8. Drill 1" conduit hole for antenna at 45 degree angle from concrete surface to top of mounting bracket area inside extension collar and run conduit through hole
9. Run antenna from mounting bracket area through conduit to surface
10. Create 1" wide x 9" long x 1" deep groove in concrete surface for antenna
11. Insert antenna in groove and fill to cover and seal with clear silicone caulk
12. Proceed to calibration procedure

Step-By-Step Installation Instructions



Install wireless monitor control panel inside facility, keeping it (1) near enough to 110V outlet to plug it in and (2) on or near an outside wall closest to the grease interceptor (3) within a 300ft radius in relation to the grease interceptor.

Identify the location of grease interceptor, remove the manway access cover to reveal the **OUTLET** side of the interceptor.

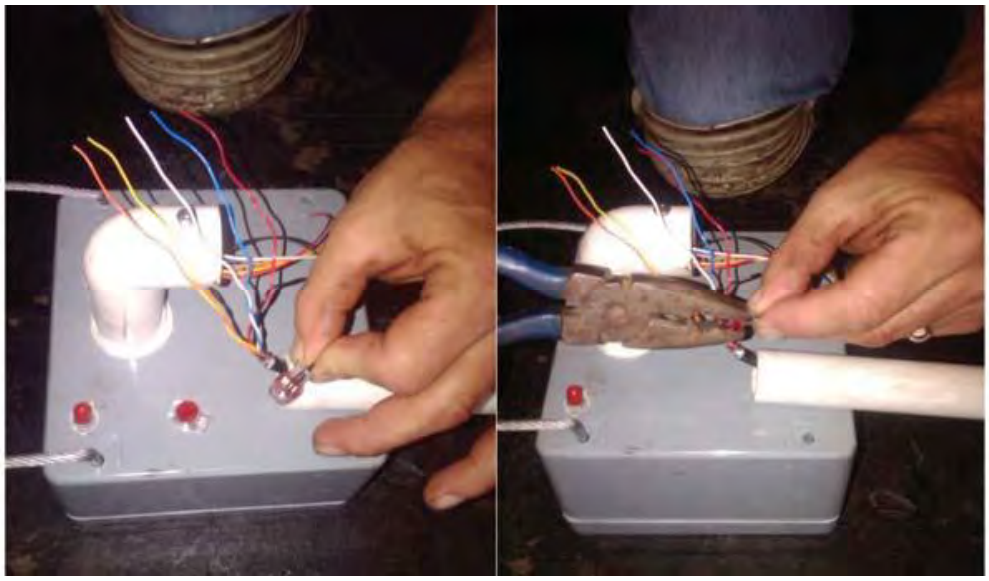
Install U-bracket level in manway riser with 2 mounting bolts provided. Bolt holes should be drilled into the riser approximately 15" from grade in a position where underwater probe does not have obstructions and the manway cover will not interfere or damage the control box.

Insert control box into the U-bracket as shown. Measure the distance from the ¾" PVC elbow (with 6 wires) to the top of the grease layer/liquid level (Dimension **A**). Then measure the liquid level to the bottom of the tank (Dimension **B**) [See Figure 1]. Tank bottom must have no sediment build-up to insure accurate measurement.

Cut ¾" PVC pipe to length (**A** + ½ **B**) so probe end is positioned in the middle of the interceptor liquid level. Run the black wire from the probe through the PVC pipe. Secure probe to the PVC pipe with PVC cement to create a waterproof seal.

At top end of PVC pipe, cut black wire approximately 6" longer than PVC pipe. Strip black wire shielding to expose wires but do not strip individual wire jacketing.

On newer models a waterproof quick-connect plug is provided for easier connection. Skip next 2 steps.



Pair the 6 wires from the control box with similar colored wires from probe. Use waterproof connectors to splice and connect both sets of wires. DO NOT STRIP the colored wires – the connectors pierce the colored wire shielding to make adequate connections.

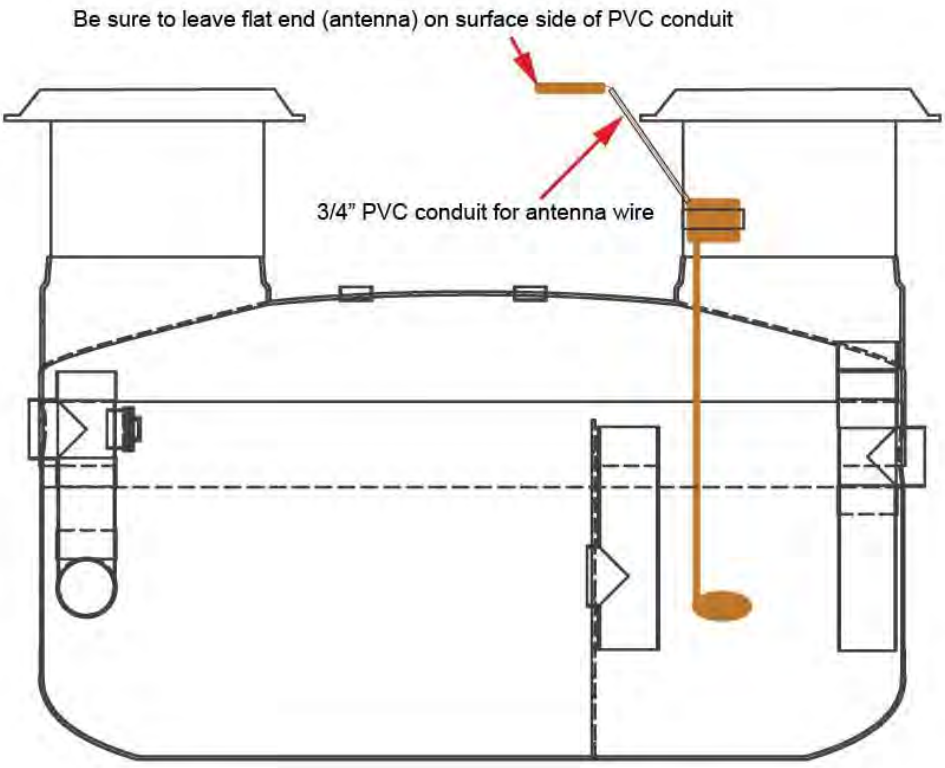
Remove the set screw from the control box elbow and push the connectors down into the ¾" pipe and up into the ¾" elbow. Put a bead of **100% silicone rubber** on the outside end of ¾" pipe and push pipe into the elbow until seated. Rotate the probe end so that when the control box is inserted into the bracket and the probe end is in the tank, the probe end is not facing a wall, pipe or any other obstruction and then install the set screw into the ¾" elbow.

On newer models a quick-connect waterproof plug is supplied, so no wire connections are needed.

Installing Antenna Into Surface Material

Antenna Installation Part 1

Drill a 1" hole at 45 degree angle from surface to area in the riser/extension collar above the mounting bracket and insert ¾" PVC pipe conduit from hole to surface. Thread antenna wire through PVC pipe with gold female end protruding from pipe nearest control box and mounting bracket. Remove the red cover from the control box and screw the gold female connector from the antenna onto the gold male connector on the control box. Seal the connection with **100% silicone rubber to provide waterproof seal.**



Carry out **Signal Connectivity Check** on next page, and then return to this step to complete antenna installation.

Antenna Installation Part 2 (to be done after Signal Connectivity Check)

Cut a 9" long X 1" wide X 1" deep groove into the surface (concrete or asphalt) to accommodate the antenna. Place antenna in groove and cover and fill groove completely with **100% silicone rubber** to seal. Antenna should be completely encased in silicone. There must be no antenna wire exposed at the surface which could be damaged by traffic.

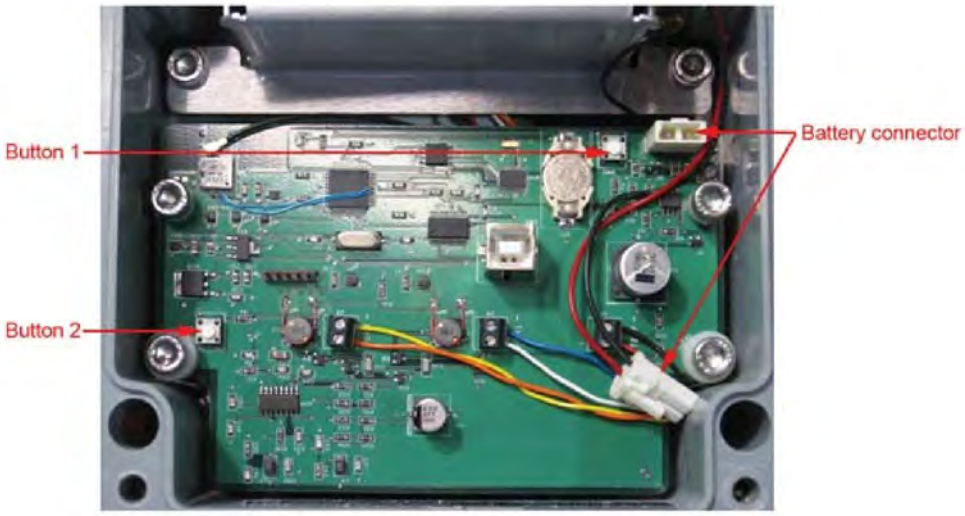
Signal Connectivity Check

Remove cover from back of control box with 4 screws. Place probe through U-bracket and into interceptor until control box elbow rests on bracket (this is actually inserting the probe backwards at this point).

Plug battery into connector.

Press **Button 1** on circuit board next to battery to initiate liquid level reading and connectivity to control panel. Replace cover. Return to previous page to complete **Antenna Installation Part 2**. View monitor panel to ensure connectivity is established. Normal user mode screen should appear.

NOTE: Press **Button 2** at same time as **Button 1** **only** in the event you need to reset the system or as instructed by technical support personnel.



Control box with back cover removed

Calibration Procedure

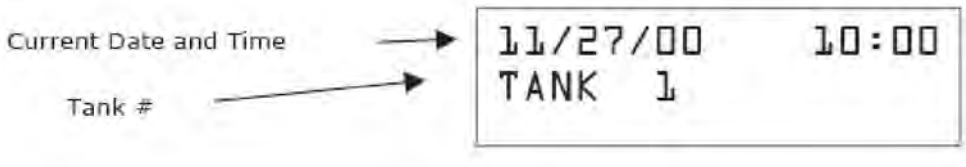
The Smartpro Control Panel has two hidden buttons that are used for initial set-up to instruct the control panel regarding the dimensions of the interceptor and to set up the alarm parameters. The two hidden buttons are found under the letters **S** and **O** in **S**martpr**o**.

Press and hold the **S** button for 5 seconds to enter calibration mode.

Press and hold the **O** button for 5 seconds to determine status of probe, such as battery life and signal strength.

Press the **S** button any time to return to normal or user mode.

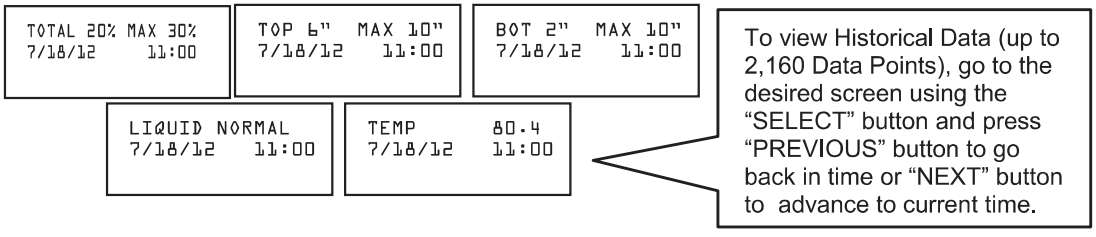
Main Screen



The remaining buttons on the control panel are as follows:

SELECT	Scroll through different screens In Calibration, acknowledges setting value and advances through various menu items
PREVIOUS	Go back in time to view historical settings In Calibration, changes setting to lower value
NEXT	Go forward to view historical settings In Calibration, change setting to higher value
ALARM OFF	Resets alarm, stops alarm flashing

Once Control panel is calibrated, simply press the SELECT button to scroll through various screens to "view" contents of interceptor.



Control Panel Settings

Press and hold the **S** button for 5 seconds to enter calibration mode. Press **SELECT** button to begin setting date and clock.	ENTERING SET-UP
Press **NEXT** or **PREVIOUS** buttons to change value. Once correct Month is entered, press **SELECT** to advance to next screen setting.	CHANGE MONTH? 7 MONTH 11
Press **NEXT** or **PREVIOUS** buttons to change value. Once correct Date is entered, press **SELECT** to advance to next setting.	CHANGE DATE? 20 DATE 17
Press **NEXT** or **PREVIOUS** buttons to change value. Once correct Year is entered, press **SELECT** to advance to next setting.	CHANGE YEAR? 2000 YEAR 2012
Press **NEXT** or **PREVIOUS** buttons to change value. Once correct hour is entered, press **SELECT** to advance to next setting.	CHANGE HOUR? 11 HOUR 23
Press **NEXT** or **PREVIOUS** buttons to change value. Once correct minute is entered, press **SELECT** to advance to next setting.	CHANGE MINUTES? 35 MINUTES 39
Interceptor Tank Calibration. Use **PREVIOUS** and **NEXT** buttons to enter the values measured per the "**Installation Overview Components Diagram**" [Figure 1]	

Interceptor Tank Settings

Press **PREVIOUS** or **NEXT** buttons to enter DIMENSION B per diagram on page 4. Press **SELECT** to save and advance.	LIQUID LEVEL HEIGHT 50"
Use **NEXT** or **PREVIOUS** buttons to input previously calculated DIMENSION = 1/2B from Page 4. This is the Transducer Height. Press **SELECT** to save and advance.	LL TO XDR DISTANCE 25"
This setting is for COMBINED Grease and Solids that will alarm. eg: for 30% pump rule, setting would be 30%. Use **NEXT** or **PREVIOUS** buttons to input Alarm Levels. *Set to 0 if no alarm is desired.* Press **SELECT** to save and advance.	TANK PUMPED AT 30% OF SOLIDS
Use **NEXT** or **PREVIOUS** buttons to input desired Grease Level that will alarm. If interceptor DIMENSION B from pg. 4 was 50 inches, a typical top grease level for pumping could be 20% of DIMENSION B = 10" Press **SELECT** to save advance.	TANK PUMPED WHEN 10" ON TOP
Use **NEXT** or **PREVIOUS** buttons to input desired Bottom Solids Level that will alarm. EXAMPLE: If interceptor DIMENSION B from pg. 4 was 50 inches, a typical sediment level for pumping could be 10% of DIMENSION B = 5" Press **SELECT** to save and advance.	TANK PUMPED WHEN 5" ON BOT
The LIQUID LEVEL DELTA SCREEN sets sensor to alarm in case a back up on the outlet of the interceptor or other extraordinary occurrence causes the "normal" liquid level (DIMENSION B from Pg. 4) to rise above normal operating level. 6" is a typical setting. Use **NEXT** or **PREVIOUS** buttons to change value. Press **SELECT** to save and advance.	LIQUID LEVEL DELTA 6"
THIS COMPLETES THE CALIBRATION.	11/27/00 10:33 TANK 1

Press the "S" button on the "Smartpro" logo at any time to return to "User Mode" without saving settings.

The Smartpro Control Panel also allows user to view the Raw Data for the Smartpro sensor probe.

To view the Raw Data, press and hold the button hidden under the "O" in the Smartpro logo for 5 seconds, until the following screen appears.

```
LL/SC/SL
50.0/25.0/25.0"
```

LL – The total Liquid Level in the interceptor is 50 inches
SC – The SCum or Grease Layer is measured 25 inches above the sensor
SL – The Sludge Layer or bottom solids layer is measured 25 inches below the sensor

The next screen shows the Smartpro battery charge or Voltage which must be between 3.0 and 3.6V for proper operation. A full strength battery is between 3.5 and 3.6 V.

```
BATTERY VOLTS
3.5 V
```

The next screen shows the Signal Strength communication between the Smartpro sensor antenna and the Control Panel.

```
RSSI -2
LQI -78
```

RSSI – Range is from -50=BAD to 105=GOOD (this example -2 is OK)
LQI – Range is from -45=BAD to -80=GOOD (this example -78 is OK)

Press the "S" button on the "Smartpro" logo at any time to return to "User Mode" without saving settings.

Building Automation Capability

Green: Normally Open
Black: Common
Red: Normally Closed

The Building Automation alarm output is located on top of the control panel next to the antenna jack.

WARRANTY

This warranty is provided by Green Turtle Technologies Ltd. for products sold in Canada, and by Green Turtle Americas Ltd. for products sold in the continental U.S. Although the companies are collectively referred to herein as "Green Turtle," each company only warrants products sold in its respective market. Smartpro monitoring systems (Smartpro) are not intended for residential or consumer use, and may not be purchased or sold for those applications. Green Turtle warrants to the original purchaser that all Smartpro monitoring systems purchased from Green Turtle will be free from defects in materials and workmanship for a period of one (1) year following the date of initial delivery to the purchaser, subject to the terms and conditions below.

Upon submission of a warranty registration card to Green Turtle by the owner in the first thirty (30) days of ownership, Green Turtle further warrants that if the Smartpro is installed, operated, and maintained in accordance with Green Turtle instructions and applicable state/provincial and federal regulatory requirements, the Smartpro devices:

1. Will function for a period of one (1) year from date of initial delivery.

All of the warranties herein are subject to the following conditions:

1. The Smartpro is installed, operated, and maintained in accordance with the Smartpro Installation Instructions and Smartpro Owner's Manual.
2. There are no post-installations or repairs of the original Smartpro.
3. The original installation has been carried out in Canada or the United States.
4. The original installation was performed following the Smartpro installation procedures by a trained contractor with all his/her required registrations, certificates and/or licenses, to complete the installation, repair or alteration in accordance with recognized industry practices and applicable regulatory requirements.
5. The Smartpro has been operated and maintained in accordance with regulatory requirements designed to minimize the possibility of structural failures and releases of regulated substances.
6. The Smartpro shall not be installed or used in any application other than commercial, industrial, or institutional use.
7. If the Smartpro is remanufactured, moved, or removed from the installation for any reason prior to the expiration of this warranty, the structural warranty protections will terminate unless the Smartpro is inspected, repaired (as necessary), and re-certified by Green Turtle and, upon reinstallation, the purchaser continues to satisfy the other conditions of the warranty.

8. The sole warranty for accessories, including but not limited to batteries, is that they are warranted for a period of one (1) year against defects in materials and workmanship from date of shipment.

9. Consumable parts including but not limited to mounting hardware are excluded from this warranty.

10. Customer assumes the risk of and agrees to indemnify Green Turtle against and hold Green Turtle harmless from all liability relating to (i) assessing the suitability for Customer's intended use of the Smartpro and of any system design or drawing and (ii) determining the compliance of Customer's use of the Smartpro with applicable laws, regulations, codes and standards. For Smartpro resold by Customer, Customer retains and accepts full responsibility for all warranty and other claims relating to, or arising from, Customer's Smartpro system which includes or incorporate Smartpro or components thereof manufactured or supplied by Green Turtle, and Customer is solely responsible for any and all representations and warranties regarding the Smartpro system made or authorized by Customer. Customer will indemnify Green Turtle and hold Green Turtle harmless from any liability, claims, loss, cost or expenses (including reasonable legal fees) attributable to Customer's Smartpro system or representations or warranties concerning same.

11. GREEN TURTLE'S LIABILITY UNDER THIS WARRANTY IS LIMITED, AT GREEN TURTLE'S DISCRETION, TO REPAIR THE DEFECTIVE SMARTPRO, TO REPLACE SMARTPRO IN EXCHANGE FOR THE DEFECTIVE UNIT, OR TO REFUND OF THE ORIGINAL PURCHASE PRICE. GREEN TURTLE IS NOT LIABLE FOR ANY LABOR, SHIPPING, OR OTHER INSTALLATION COSTS, AND SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, PUNITIVE, CONSEQUENTIAL OR OTHER DAMAGES IN CONNECTION WITH SUCH SMARTPRO INCLUDING, WITHOUT LIMITATION, COSTS, EXPENSES, OR LIABILITIES ASSOCIATED WITH ENVIRONMENTAL CONTAMINATION, FINES OR PENALTIES, FIRES, EXPLOSIONS, OR ANY OTHER CONSEQUENCES ALLEGEDLY ATTRIBUTABLE TO A BREACH OF THE WARRANTY OR DAMAGES UNDER DECEPTIVE TRADE PRACTICES OR SIMILAR CONSUMER PROTECTION ACTS. THE FOREGOING CONSTITUTES GREEN TURTLE'S EXCLUSIVE OBLIGATION AND GREEN TURTLE MAKES NO EXPRESS OR IMPLIED REPRESENTATION OR WARRANTY, OR ANY WARRANTY OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSES WHATSOEVER. NO EMPLOYEE OF GREEN TURTLE OR ANY OTHER PARTY IS AUTHORIZED TO MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES OTHER THAN THE WARRANTY SET FORTH HEREIN.

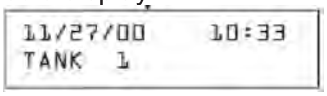
Smartpro Wireless RF Specifications

Materials of Construction:	Corrosion resistant polymers
Control Box:	NEMA 4 rated, waterproof and corrosion resistant
Sensor:	Ultrasonic fully potted transducers
Measurement Accuracy:	+/-1" immersed in minimum 20" of water (10" above and 10" below sensor)
Power Supply:	Sensor – 5 year long-life 3.6V Lithium Battery Control Panel – 110 V AC power converter
RF Signal:	915 MHZ nominal
Signal Frequency:	Every 6 Hours
Antenna:	Tuned RF flat antenna with 10 ft. cable connection
Signal Range:	Maximum 300 ft. from antenna to control panel
Control Panel Display:	LED
Building Automation Capability:	YES (Located on top of control panel) Solids/Sediment Level, Grease/Oil Level, & Temperature, Monitoring and Alarm

Troubleshooting

In case of sensor or control panel malfunction, complete the following steps:

1. Check control panel to confirm that it is plugged in and has power. Main Screen should display.



2. Press the **O** button hidden under the Smartpro logo for 5 seconds to access the system settings.

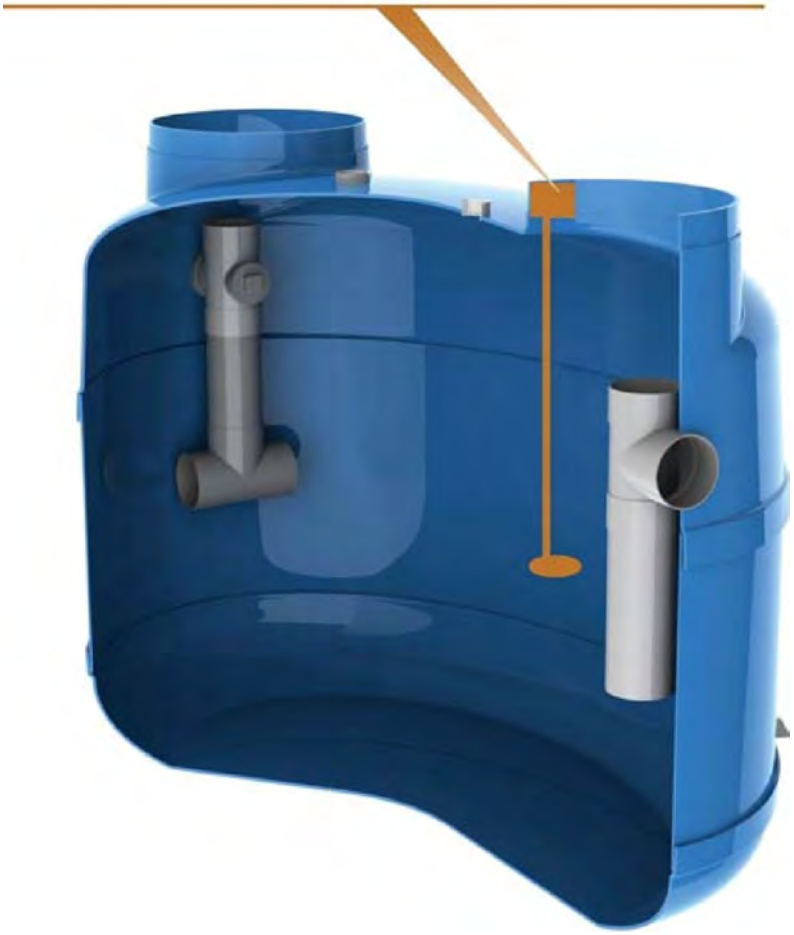
3. Scroll through the system settings using the **SELECT** button to view the following:

   - SIGNAL STRENGTH – two values RSSI and LQI
     - RSSI – range -50:BAD to 105:GOOD
     - LQI – range -45:BAD to -80:GOOD
     - Check control panel antenna to confirm that it is not loose or damaged – tighten or replace if damaged
     - Check control box inside the tank to confirm that the antenna cable is not loose or damaged – tighten or replace if necessary
     - Check antenna embedded in the floor next to the tank to confirm that it is not damaged or crushed – replace if necessary
   - BATTERY - 3.6 Volt
     - if less than 3.0 Volt, replace

4. If above settings are outside of acceptable limits, contact your nearest Green Turtle representative to reach Technical Support:

   - US 1-877-428-8187
   - CAN 1-877-966-9444

Smartpro™ Wireless RF is a perfect complement to **Preceptor™** by Green Turtle



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Family of alarm systems and monitoring packages

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