❖ GARNET
INSTRUMENTS LTD.

SEELEVEL I™ Tank Indicator

Model 707
Owner's Manual

IMPORTANT OPERATOR INFORMATION

DATE INSTALLED:_____

	Max Signal	
Black Water Tank		
Grey Water Tank		
Fresh Water Tank		

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CHAPTER 1
OVERVIEW

The SeeLeveL 1 Tank Indicator represents a massive leap forward in level measurement technology for the Recreational Vehicle industry. The SeeLeveL has a combination of features, accuracy, reliability, and diagnostic capability that have never been available before.

The SeeLeveL will monitor the water and sewer holding tanks and the LP Gas tank, showing the levels on a color coded LED bar graph with a resolution of 1/8 of the tank. In addition, the system can display the operating characteristics of each of the tank sending units, giving it unsurpassed diagnostic capability.

CHAPTER 2
SYSTEM DESCRIPTION

The SeeLeveL consists of a display unit that mounts inside the RV, and sender panels that stick to the side of the holding tank. Two conductor wiring is used to connect each sender panel to the display.

The Sender: Each sender panel is a flexible self adhesive printed circuit board which is stuck to the side of the holding tank. The sender panel can be cut to length to match the height of the tank, and it auto calibrates itself so that it can read from Empty to Full regardless of the height of the tank. The sender scans the water level through the tank wall using patented digital techniques programmed into the sender microprocessor. When the sender transmits the water level information to the display, it sends a digital code that has built in error detection, making it impossible for the display to read an incorrect level, even if the wiring is bad. In addition to the level, the sender also transmits diagnostic information about it operation. This information can be used to determine if there is buildup of sludge on the inside of the tank, or to determine if the sender is delaminating from the side of the tank. If sludge buildup in the tank becomes extreme the gauge will cease to operate (the tank will always read empty), so by monitoring the signal level the tank can be cleaned before the buildup gets excessive.

The Display: The display receives the information from the three sender panels via two wire cables. When the front panel button for a particular tank is pressed, the display powers up and displays the level for that tank. If the button is pressed and released, the display will show the level for about 5 seconds and then shut down automatically. If another button is pressed before the display shuts down, then the new level will immediately be shown. If the button is held down for more than five seconds, then the display will continue to get level information from the sender and display it for as long as the button is held down. By pressing two buttons at once, the diagnostic functions can be accessed, these are described in detail in the next chapter.

If a sender is operating properly and connected to the display with good wiring, then the display will show the level normally. If the wiring is disconnected or cut, or if the sender panel is dead, then the display will indicate an open circuit by showing two red lights, one on each end of the bar graph. If the wiring is shorted together, or if the signal conductor is

grounded out, then the display will indicate a short circuit by showing a bar of green lights with an orange light at each end. If the display receives corrupted data, then it will indicate an error by showing a red-orange-green pattern illustrated in the following section.

With these diagnostic features and the digital nature of the tank level sensing technology, it is almost impossible for the system to indicate an incorrect water level, and in the very unlikely event it does occur, the user can verify what is happening with the diagnostic information.

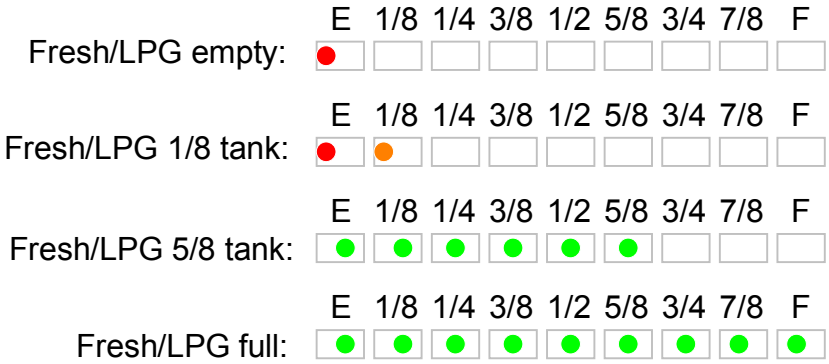
CHAPTER 3
OPERATING INSTRUCTIONS

The display is the only system component that is accessed by the user. All user input to the display is done using the four buttons along the bottom of the display. Operation of the display is as follows:

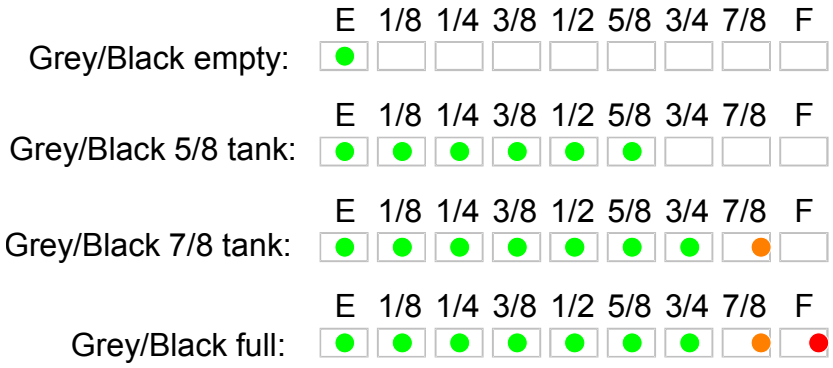
To read a tank level:

1. Press the button corresponding to the tank to be checked and release it, the display will power up and show the level on the bar graph.

   a. If the fresh water or LPG tank is being checked, then the display will show a row of green LEDs, with each LED indicating 1/8 of the tank. For example, if the tank is 5/8 full, then 5 green LEDs will be lit. If the level is down to 1/8 of the tank, then one red and one orange LED will be lit, and if the tank is empty then a single red LED will be lit.



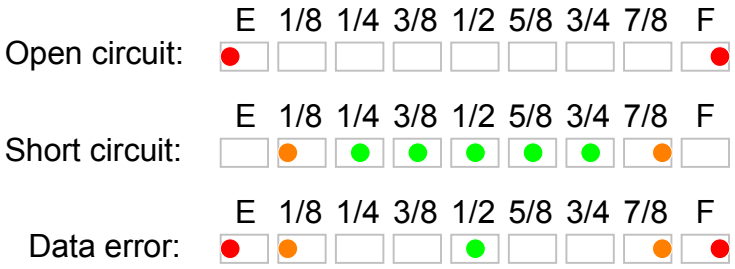
b. If a sewer tank is being checked, then the display will show the same row of green LEDs with each LED indicating 1/8 of the tank, except that the 7/8 LED will be orange and the full LED will be red.



2. If no other button is pressed, then the display will shut itself off after about 5 seconds. If the button is held down, the display will recheck the level once per second and will show the updated level.
3. If another button is pressed before the 5 second time is up for the first button, the display will immediately switch to showing the new tank. The 5 second timeout is restarted every time a button is pressed.
4. If a sender is unresponsive or there is an open circuit in the wiring so that the sender is not connected, the display will indicate an open circuit by showing the E and F LEDs in red.

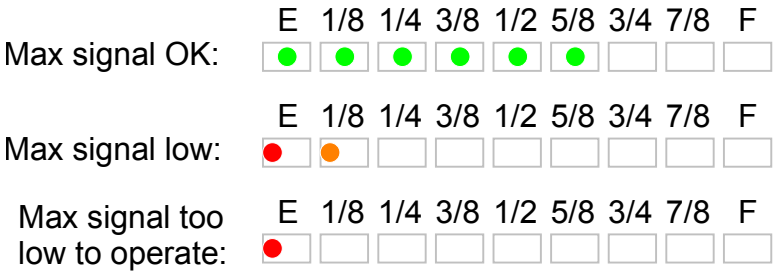
5. If a sender is shorted or there is an short circuit in the wiring, the display will indicate an short circuit by showing the middle 5 LEDs in green and the 1/8 and 7/8 LEDs in orange.

6. If a sender is sending bad data, there is damaged wiring, or if there is electrical interference, the display will indicate a data error as shown below.



To review the sender diagnostics:

1. The sender diagnostics should be reviewed periodically to check for any degradation of the tank senders. If a sender appears to be malfunctioning, reviewing the diagnostic should be the first step. Note that there is no diagnostic for the LPG.
2. Press and hold the button for the tank to be checked, the display will power up and show the level for that tank.
3. While continuing to hold down the button for the tank, press the LPG button. The display will change from showing the level to showing the signal level diagnostic.



4. The diagnostic display will remain on for 5 seconds. The display must time out for the 5 seconds before it will respond to another button.

To calibrate the LPG sender:

1. The LPG tank must be full when the sender is calibrated, otherwise the calibration will be invalid.
2. Make sure that the 12V RV power to the display is turned off. Hold down the LP button and turn on the 12V power to the display. Continue to hold down the button for 5 seconds until the display shows full (all green LEDs on). If the button is released before the five seconds are up, the calibration will not be done.
3. Release the button, the calibration is done. The display will now shut down. The LPG can be recalibrated as many times as desired.

CHAPTER 4
TROUBLESHOOTING GUIDE

THIS SECTION PENDING

CHAPTER 5
SERVICE AND WARRANTY INFORMATION

The warranty will apply only if the warranty card shipped with the equipment has been returned to Garnet Instruments Ltd.

Garnet Instruments Ltd. warrants equipment manufactured by Garnet to be free from defects in material and workmanship under normal use and service for a period of one year from the date of sale from Garnet or an Authorized Dealer. The warranty period will start from the date of purchase or installation as indicated on the warranty card. Under these warranties, Garnet shall be responsible only for actual loss or damage suffered and then only to the extent of Garnet's invoiced price of the product. Garnet shall not be liable in any case for labor charges for indirect, special, or consequential damages. Garnet shall not be liable in any case for the removal and/or reinstallation of defective Garnet equipment. These warranties shall not apply to any defects or other damages to any Garnet equipment that has been altered or tampered with by anyone other than Garnet factory representatives. In all cases, Garnet will warrant only Garnet products which are being used for applications acceptable to Garnet and within the technical specifications of the particular product. In addition, Garnet will warrant only those products which have been installed and maintained according to Garnet factory specifications.

LIMITATION ON WARRANTIES

These warranties are the only warranties, expressed or implied, upon which products are sold by Garnet and Garnet makes no warranty of merchantability or fitness for any particular purpose in respect to the products sold. Garnet products or parts thereof assumed to be defective by the purchaser within the stipulated warranty period should be returned to the seller, local distributor, or directly to Garnet for evaluation and service. Whenever direct factory evaluation, service or replacement is necessary, the customer must first, by either letter or phone, obtain a Returned Material Authorization (RMA) from Garnet Instruments directly. No material may be returned to Garnet without an RMA number assigned to it or without proper factory authorization. Any returns must be returned freight prepaid to: Garnet Instruments Ltd, 284 Kaska Road, Sherwood Park, Alberta, T8A 4G7. Returned warranted items will be repaired or replaced at the discretion of Garnet Instruments. Any Garnet items under the Garnet Warranty Policy that are deemed irreparable by Garnet Instruments will be replaced at no charge or a credit will be issued for that item subject to the customer's request.

If you do have a warranty claim or if the equipment needs to be serviced, contact the installation dealer. If you do need to contact Garnet, we can be reached as follows:

Garnet Instruments Ltd.
284 Kaska Road
Sherwood Park, Alberta
Canada T8A 4G7
Email: service@rvgauge.com

CHAPTER 6
SPECIFICATIONS

Resolution:	1/4 inch (6 mm) or 1/8 tank, whichever is greater
Accuracy:	+/- 5% or better from the senders, display shows every 1/8 tank
Operating temperature range:	+32 to +140 ^{o}F (0 to + 60°C)
Sender materials:	0.008” thick glass epoxy circuit board with conformal coating for circuit protection. Laminated on the back with 3M 300LSE Bonding Adhesive.
Display mounting panel:	Black panel, approximately 5 3/4"” wide by 3 3/4” high by 1” thick (146mm wide X 95mm high X 25mm deep). Panel screws to wall.
System power requirements:	Display requires 12 volts from the RV battery, the system will function from 11 volts to 16 volts. Current drain is less than 200mA.
Wiring:	Two wire conductor required from the display to each sender. 12 V power and ground required for display. Single wire required for LPG sender if sender grounded at tank.
LPG sender characteristics:	Display will work with an LPG sender maximum resistance of 50 ohms to 500 ohms. Display shows increasing level as resistance increases. System must be calibrated with the LP tank full.