GARNET

INSTRUMENTS LTD.

SeeLevel II™ Tester

Model 900M Manual

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SEELEVEL II™ Tester

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CHAPTER 1
OVERVIEW and SYSTEM DESCRIPTION

Congratulations on purchasing the Garnet Instruments Model 900M SeeLeveL II™ Tester. The tester is a complete system to aid in the installation and troubleshooting of the Model 900 SeeLeveL II™ Fluid Monitor for Tanks. It will test the sender bar and display batteries and can simulate a sender bar or a display to allow troubleshooting of the complete Fluid Monitor.

These are the specific functions of the tester:

1. Tests the sender bar battery under actual load conditions of service.
2. Tests the display batteries under actual load conditions of service.
3. Tests its own battery (self diagnostic).
4. Functions as a simplified display to test the sender bar for proper operation of both level and temperature.
5. Functions as a simplified sender bar to test the gauge display for proper operation of level, volume, temperature, alarm outputs, and remote communication outputs.
6. Copies the programming from a display, with the ability to store up to 3 different programs. Programs a display from a copied program. This allows multiple gauge displays to be programmed from one original without having to manually enter the calibration on each gauge. During servicing, it also allows easy transferring of the calibration program from the defective or damaged display to the new replacement display.

CHAPTER 2
OPERATING INSTRUCTIONS

Caution: For all of the tests involving optical fibre, make sure that sunlight is not shining on the optical inputs or outputs, as this can corrupt or block the optical signal.

Note: It is possible for the tester to turn on by itself if it is subjected to a shock or static discharge. This is not a problem since the tester will automatically shut itself off again in one minute. The battery will last for over 6 months with the tester being on continually, so the occasional extra minute of being on will not significantly affect long term battery life. However, do not leave the tester on in any other mode besides battery test, since the automatic power shut off only works in the battery test mode. The battery test mode is the default mode when the tester is first turned on.

1. *To test the sender battery:*
    1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
    2. The tester will start in the battery test mode, this can be confirmed by holding down the **MODE** button, the tester will show “bAtt”. The tester will read “ .00” with the **MODE** button released.
    3. Unplug the sender battery from the sender bar and plug the battery connector into the tester socket.
    4. If the battery is good, the tester LED should flash and the tester should read at least 3.4 volts for a 3.6 volt battery, and at least 2.8 volts for a 3 volt battery.
    5. The tester checks both circuits from the battery module and loads the battery like the sender would, so if the battery module passes this test it will work in a sender. If the battery module fails *either* test (LED flashing or voltage) it will need to be replaced.
    6. Hold down the **MODE** button and press the **DOWN** button once, the tester will show “OFF”. Release the **MODE** button to turn the tester off. If the tester is left in the battery test mode with no voltage input it will automatically power off in 1 minute. If voltage is applied by leaving the battery module plugged in, the tester will NOT automatically power off.

2. *To test the display D cell battery pack:*
    1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.

2. The tester will start in the battery test mode, this can be confirmed by holding down the **MODE** button, the tester will show “bAtt”. The tester will read “ .00” with the **MODE** button released.
3. Put the black lead from the tester on the negative side of the display battery pack, and the red lead on the positive side of the battery pack.
4. If the battery pack is good, the tester should read at least 4.5 volts.
5. To test individual batteries, put the black lead on the negative side of the battery and the red lead on the positive side. The tester should read at least 1.1 volts for a good battery.
6. The battery pack can be tested with all batteries in place, or individual batteries can be removed for testing. The test is most valid with the batteries in place and the back light turned on to fully load the batteries.
7. Hold down the **MODE** button and press the **DOWN** button once, the tester will show “OFF”. Release the **MODE** button to turn the tester off. If the tester is left in the battery test mode with no voltage input it will automatically power off in 1 minute. If voltage is applied by leaving the leads connected to the display battery pack, the tester will NOT automatically power off.
8. The maximum input voltage that the tester will measure is 7.4 volts. Consequently, it can be used to test any 1.5 volt, 3 volt, or 6 volt battery, but cannot test 9 volt or 12 volt batteries.

3. To test the tester’s own battery:

1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
2. Hold down the **MODE** button and press the UP button once, the tester will show “SELF”.
3. Release the **MODE** button and the tester will read its own battery voltage. It should be at least 2.8 volts. If it reads less, the battery must be replaced. The tester will need to be returned to the factory for battery replacement, since the battery is soldered in place. The battery should last at least five years under normal use.
4. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows “OFF”. Release the **MODE** button to turn the tester off. The tester will NOT automatically power off in the self test mode. Pressing the **UP** and **DOWN** buttons at the same time will reset the tester to the battery test mode, which will allow the tester to automatically power off.

4. *To test the sender bar:*
    1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
    2. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows “bAr”. Release the **MODE** button, the tester should show “no L” within a few seconds. Press the **UP** button to select Fahrenheit temperature display, or the **DOWN** button to select Celsius display. The tester will show “C” or “F” after the temperature.
    3. With the sender battery pack plugged into the bar, connect a piece of fibre from the sender optical connector to the tester optical input (the black one on the left). Alternatively, remove the fibre from the display optical input and plug it into the tester optical input instead.
    4. If the bar is not sending any signal, the tester will continue to show “no L”. If the bar is sending a bad or weak signal, the tester will show “bd L”. Note that it is possible for the tester to show “bd L” if a button is pressed while the tester is receiving data from a bar.
    5. If the bar is working, the tester will read the inch output from the bar when the bar is sending level, and will flash the temperature sensor number (e.g. “t 5”) followed by the temperature when the bar is sending temperature. Note that if the temperature probe is above the fluid level it will read “OFF”, and if the temperature sensor cannot be read it will show “bAd”.
    6. The float can be moved up and down and the level observed on the tester to check for proper operation over the whole bar.
    7. To check for the optical power output of the bar, pull the fibre about 1/8” out of the tester optical input, the tester should continue to show the bar reading.
    8. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows “OFF”. Release the **MODE** button to turn the tester off. The tester will NOT automatically power off in the bar test mode. Pressing the **UP** and **DOWN** buttons at the same time will reset the tester to the battery test mode, which will allow the tester to automatically power off.

5. *To test the display:*
    1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
    2. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows “dISP”. Release the **MODE** button, the tester should read a value from 0.0 to 255.0 inches.

3. Press the **UP** or **DOWN** button to select the desired inch value to send to the display. Holding down the button will make the inch value scroll continuously. The temperature outputs are fixed from 70°F to 79°F (21°C to 26°C).
4. To test the display, the fibre connecting the bar to the display must be removed from the display optical input. The display should show "no L" after the fibre is removed (make sure that sunlight is not shining on the optical input).
5. Connect a piece of fibre from the tester optical output (the grey one on the right) to the display optical input.
6. The display should read some inch and volume values, and the average temperature should read 75°F (24°C) after a minute or so. The actual inch value reading will depend on the inch setting of the tester and the offset programmed into the display. The volume values will depend on the inch setting of the tester, the offset in the display, and the calibration programmed into the display.
7. To test the alarms and 4-20 mA outputs, the **UP** and **DOWN** buttons can be used to change the inch output of the tester. For example, to test an alarm trip point the tester output can be incremented until the alarm trips, with the inch and volume readings on the display indicating the alarm trip point. To test the range of the 4-20 output, the tester can be used to simulate different fluid levels and the 4-20 output can be verified at these levels. The temperature 4-20 mA output should be fixed at 11.20 mA, corresponding to 75°F (24°C).
8. To check the optical sensitivity of the display, pull the fibre about 1/8" out of the tester optical output (or the display optical input), the display should continue to operate.
9. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows "OFF". Release the **MODE** button to turn the tester off. The tester will NOT automatically power off in the display test mode. Pressing the **UP** and **DOWN** buttons at the same time will reset the tester to the battery test mode, which will allow the tester to automatically power off.

6. To copy from a display:

1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
2. Hold down the MODE button and press the **UP** or **DOWN** button until the tester shows "CorP" (for copy or program). Release the **MODE** button, the tester should show anywhere from "P1" to "P3", indicating which program memory is currently selected.

3. Press the **UP** or **DOWN** button to select the desired program memory. Note that the memory location is changed when the button is released, not when it is first pressed. Do not hold the button down for more than ½ second.
4. To copy from a display, first access the gauge display programming and select the "COPY" function (see the manual for the gauge, under Chapter 3, "***To allow the memory to be copied or programmed remotely:***"). Plug the tester plug into the programming jack in the gauge display (the plug is a 1/8" stereo headphone style jack mounted on the display circuit board just to the left of the 4-20mA circuit boards). Do not attempt to plug in the programmer unless the gauge display is in "COPY" mode!
5. Press and hold the **UP** button until the tester shows "COPY" (about one second). Release the button, the tester will continue to show "COPY" during the copying procedure and will return to showing the memory location when copying is complete, which will take about 4 minutes. The gauge display will remain in copy mode for about 5 minutes, this timer can be reset by pressing any number key on the display keypad. If the plug is not connected to the display, or if the display is not in copy mode, the tester will revert back to showing " .00" in the battery test mode within a few seconds. If you want to abort the procedure before copying is complete, press the **UP** and **DOWN** buttons at the same time to reset the tester to battery test mode.
6. When copying is complete, unplug the connector from the display.
7. Hold down the **MODE** button and press the UP or DOWN button until the tester shows "OFF". Release the **MODE** button to turn the tester off. The tester will NOT automatically power off in the copy or program mode. Pressing the **UP** and **DOWN** buttons at the same time will reset the tester to the battery test mode, which will allow the tester to automatically power off.

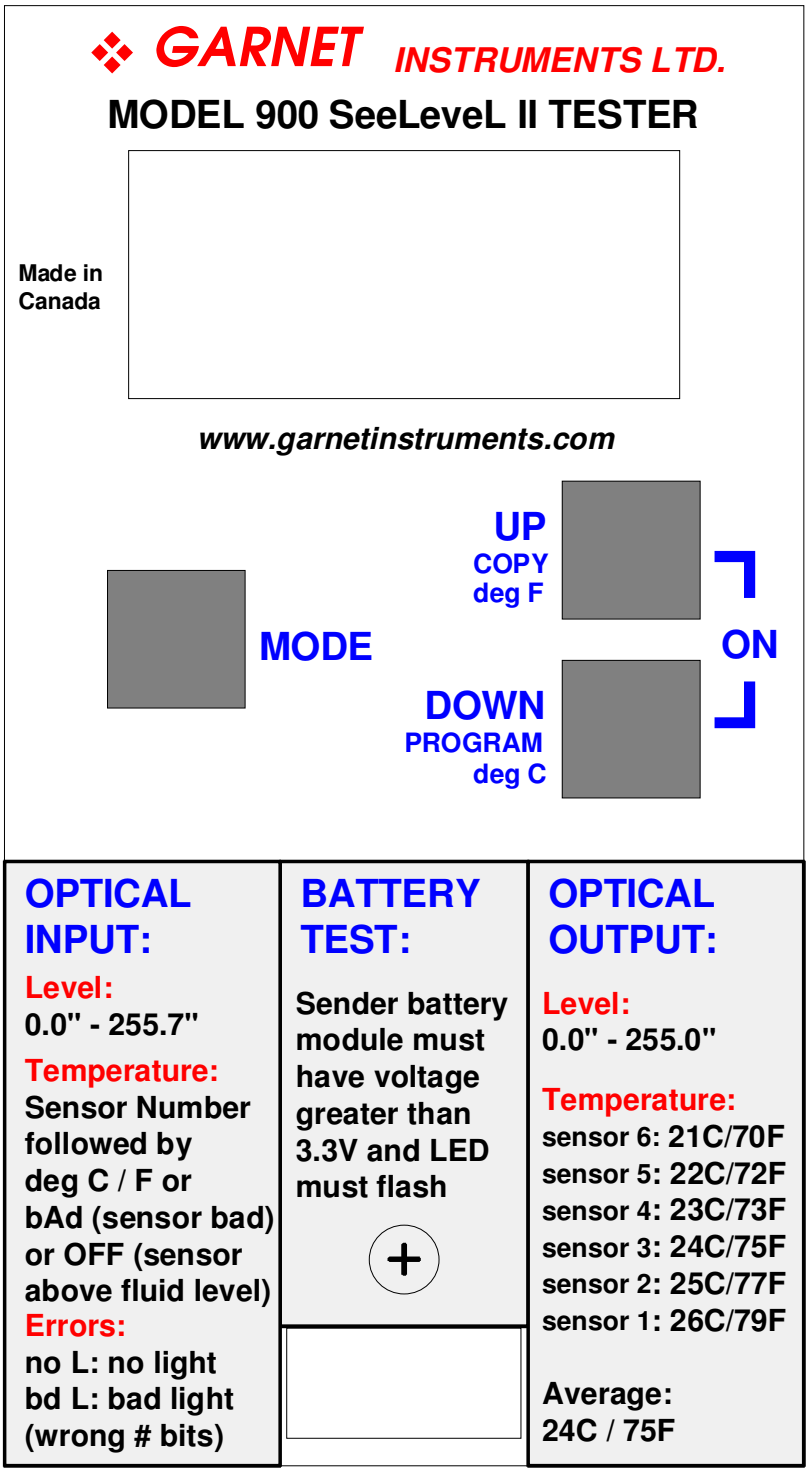
7. To program a display:

1. Press the **UP** and **DOWN** buttons at the same time to turn on the tester.
2. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows "CorP" (for copy or program). Release the **MODE** button, the tester should show anywhere from "P1" to "P3", indicating which program memory is currently selected.
3. Press the **UP** or **DOWN** button to select the desired program memory. Note that the memory location is changed when the

button is released, not when it is first pressed. Do not hold the button down for more than ½ second.

4. To program a display, first access the gauge display program and select the "COPY" function (see the manual for the gauge, under Chapter 3, "***To allow the memory to be copied or programmed remotely:***"). Plug the tester plug into the programming jack in the gauge display (the plug is a 1/8" stereo headphone style jack mounted on the display circuit board just to the left of the 4-20mA circuit boards). Do not attempt to plug in the programmer unless the gauge display is in "COPY" mode!
5. Press and hold the **DOWN** button until the tester shows "prog" (about one second). Release the button, the tester will continue to show "prog" during the programming procedure and will return to showing the memory location when programming is complete, which will take about 4 minutes. The gauge display will remain in copy mode for about 5 minutes, this timer can be reset by pressing any number key on the display keypad. If the plug is not connected to the display, or if the display is not in copy mode, the tester will revert back to showing " .00" in the battery test mode within a few seconds. If you want to abort the procedure before programming is complete, press the **UP** and **DOWN** buttons at the same time to reset the tester to battery test mode.
6. When programming is complete, unplug the connector from the display.
7. Hold down the **MODE** button and press the **UP** or **DOWN** button until the tester shows "OFF". Release the **MODE** button to turn the tester off. The tester will NOT automatically power off in the copy or program mode. Pressing the **UP** and **DOWN** buttons at the same time will reset the tester to the battery test mode, which will allow the tester to automatically power off.

CHAPTER 3
TESTER FRONT PANEL ILLUSTRATION



Tester Front Panel

CHAPTER 4
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, 286 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:

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286 Kaska Road
Sherwood Park, Alberta
Canada T8A 4G7
Email: tstalker@garnetinstruments.com