



SEELEVEL™
817 TRUCK PROGRAMMER

**For All Garnet Gauges Using the 14 Pin
Programming Connector**

MODEL 817 PROGRAMMER USER MANUAL

REVISION 1

 **GARNET INSTRUMENTS LTD.**

SEELEVEL™ 817 TRUCK PROGRAMMER

For All Garnet Gauges Using the 14 Pin Programming Connector

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CHAPTER 1 817 TRUCK PROGRAMMER DESCRIPTION

The 817 Truck Programmer is used to program all SeeLevel gauge displays to show either inches or volume (such as cubic metres or barrels) and to set the alarms. The calibration can be entered on the keypad, or transferred from a computer via an RS-232 serial port. The 817 can also diagnose bars and displays, and measure optical power.

The 817 operates from four user replaceable AA cells which should operate the programmer for approximately 300 hours without the display backlight, and approximately 30 hours with the backlight on. The programmer is turned on and off with a recessed toggle switch, and will NOT automatically shut off, however all calibrations, inch values, and offset values are retained even when the power is turned off.

Description of Displays (see the diagram on the preceding page):

NUM BITS: This shows the number of bits being received by the optical input on the 817. Bars for the 808/810 series in 1/3" mode should send 8 bits. Bars for the 808/810 series in 1/6" mode and the 806 series should send 11 bits.

OPT PWR: This shows the optical power being received by the optical input on the 817. The display corresponds to the 805 optical power meter in that each light on the 805 is equivalent to about 10 on the 817 display. Consequently, 110 is equivalent to top green, and bottom yellow is equivalent to 40. The meter has a range of 10 to about 140.

INCH MODE: This shows which type of inch increment the programmer is set for. The options are 1/3", 1/4", 1/6", and 806 (which is always 1/4"). The inch mode must be set to match the sender bar and display being used.

MEM LOC: This shows which memory location is being used. There are 8 memories numbered 1 to 8, each memory can store a complete calibration including alarms.

BATT COND: This shows the battery condition, when the batteries are new it should show 99%. When the battery condition gets down to 35%-40%, the backlight will stop working but the rest of the functions will still work. At 0% the batteries are pretty much dead.

ALARM DISPLAYS (MIDDLE TWO LINES OF THE DISPLAY)

These 4 displays show the settings of the 4 alarms. They always read the calibrated value of the alarm, not the inch value. If the alarm has been cleared, the display will be blank. The last two characters show the polarity of the alarm, su (start up) means that the alarm turns on as the level rises past the alarm point, and sd (shut down) means that the alarm turns off as the level rises past the alarm point.

INCHES: This shows the equivalent inch value of the calibration, the bar produces 0 to 85 inches. It always goes from 0.00 to 85.00 in steps of 0.33 (.00/.33/.66) for the 1/3" mode; from 0.00 to 85.16 in steps of 0.16 (.00/.16/.33/.50/.66/.83) for the 1/6" mode; and from 0.00 to 127.75 in steps of 0.25 (.00/.25/.50/.75) for the 1/4" mode.

OFFSET: This shows whether the offset value is 0, positive, or negative. For virtually all applications, the offset should be 0 or negative (-). This is shown for convenience so that you know if there is an offset or not.

CALIBRATION: This shows the display calibration that corresponds to the inch value shown on the INCHES display. This is what will be seen on the gauge display.

Description of Keypad Buttons:

BACK ← button: This is used to exit various menus and to delete the most recent calibration digit entered.

BAR button: This is used to change the INCHES and CALIBRATION displays to what is received from the sender bar via the optical input connector or the programming plug. Only one reading is received each time the button is pressed. This button is used when setting the bottom reading of the gauge.

BAR TST button (SHIFT - BAR): This is used to continually update the INCHES and CALIBRATION displays to what is being received from the sender bar via the optical input connector or the programming plug. This button is used when testing sender bars. To leave bar test mode press the BACK button.

BAR and BAR TEST Notes:

- If no light is received, the INCHES display shows "no L" and the inch and calibration values are not changed. If poor light is received, or the # bits does not match the mode, the INCHES display shows "bad L" and the inch and calibration values are not changed.
- If the programmer is being used outside in bright sunlight, the sunlight may penetrate right through the black optical input connector housing and overwhelm the optical input. If this happens the programmer will appear to not respond to pressing the **BAR** or **BAR TST** button. Shading the connector with your hand should restore proper operation.

LIGHT button: This turns the display backlight on and off. The backlight always turns on momentarily when the programmer is turned on, and then turns off. Battery power consumption is increased by approximately 10 times when the backlight is on.

C-LINK button (SHIFT - LIGHT): This puts the programmer into the computer link mode so that calibrations can be sent between the computer and the programmer. Exit this mode with the BACK button.

0 to 9, decimal, E, F, L, U, BL buttons (E,F,L,U,BL require the SHIFT button): These are used for entering a calibration. The BL button is used for entering blanks.

PROG button: This causes the programmer to transfer the calibration table from the currently selected memory into the gauge. The button must be held down for one second to activate, this is to prevent unintentional erasure of calibrations. The programming plug must be plugged into the gauge for the programming process to work.

COPY button: This causes the programmer to transfer the calibration table from the gauge into the currently selected memory. The button must be held down for one second to activate, this is to prevent unintentional erasure of calibrations. The programming plug must be plugged into the gauge or zeros will be copied.

ALARM SHUT DN and ALARM ST UP (uses SHIFT) buttons: These set the alarm point to the value currently shown on the calibration display. The programmer will prompt for the alarm number after the button is pressed. **SHUT DN** causes the alarm to turn off (shut down) as the level rises past the alarm point, and **ST UP** causes the alarm to turn on (start up) as the level rises past the alarm point

INCHES ↑ and INCHES ↓ buttons: These buttons are used to change the value of the INCHES display. If either one is held down for one second the INCHES display changes quickly. If they are both held down at the same time the INCHES display is reset to zero. If **SHIFT – INCHES** is pressed then the INCHES display goes up or down by 10 inches.

OFFSET ↑ and OFFSET ↓ buttons: These buttons are used to change the value of the offset between the INCHES display and CALIBRATION display for setting the correct bottom reading of the gauge. If either one is held down for one second the offset changes quickly. If they are both held down at the same time the offset is reset to zero. If **SHIFT – OFFSET** is pressed then the offset goes up or down by 10 inches.

INCH MEM button (SHIFT – 1): This button puts an inch calibration into the currently selected memory. The inches will correspond to the inch mode selected.

CLEAR MEM button (SHIFT – 0): This button erases the calibration in the currently selected memory. The other memory locations are not affected.

MEM LOC button (SHIFT – decimal): This button is used to select which memory location is to be used, from 1 to 8. The programmer will prompt for the memory number after the button is pressed.

MEM LABEL button (SHIFT – 2): This button is used to display the 16 character memory label, which is useful for keeping track of which calibration is which. The memory label can only be entered on the computer.

INCH MODE button (SHIFT – 3): This button is used to set the inch mode to 1/3", 1/4", 1/6" or 806 mode. The programmer will prompt for the inch mode desired after the button is pressed. The 806 mode is 1/4" as well, but the signal format from the bar is different, which is why there is a separate 806 mode from the optical 1/4" mode.

ENTER button: This button stores the calibration just entered on the keypad into programmer memory. The INCHES display will increase by one increment so that the next calibration point can be entered.

SHIFT button: This button is used to select the button functions printed in red. SHIFT must be held down while pressing the other button.

OPTO ↓: This is the black optical input connector used to obtain the reading from a bar, and is used when setting a bottom reading or testing a sender bar for proper operation. It is also used to show the number of bits and optical power. When setting a bottom reading, the optical power and sender bar mode (1/3" or 1/6") can be verified at the same time.

OPTO ↑: This is the grey optical output connector which produces an optical signal like a bar to test displays. The output corresponds to the reading on the INCHES display, and is in the inch mode that is selected. If the calibration in the programmer memory is the same as in the display, the CALIBRATION display and gauge display should match. This output is used for testing displays for proper operation, checking the calibration in displays, and checking alarm operation without having to access the float. During bar test (**BAR TST** button) or when taking a reading from a bar (**BAR** button) the optical output is still enabled, so a piece of fibre can be tested by plugging it into both connectors.

CHAPTER 2 PRECAUTIONS FOR USE

The programmer has a metal case to help avoid errors due to interference and static electricity. Even so, it is a good idea to avoid the use of two way radios and cell phones when using the programmer. Do not program in the immediate vicinity of arc welding.

The programmer is designed for use in dry, moderate temperature locations. Do not expose the programmer to rain or water, and avoid storing the programmer in cold locations since condensation will occur when it is brought into a warm location. If it is necessary to bring it in from a cold to a warm location, let it sit for an hour or two to dry out before using it. If any damage is visible to the cable or plug, or if the plug appear to be loose, replace them immediately to avoid programming errors.

Some operations take significant time, for example programming a gauge, copying a gauge, programming an alarm point, writing inches in the memory, and clearing the memory. During this time the programmer display will show the progress of the operation. When this progress indicator goes out, the programmer has finished with that operation. Do not disconnect the programmer plug or the serial cable, or turn off the power until the operation is complete.

If the programmer is being used outside in bright sunlight, the sunlight may penetrate right through the black optical input connector housing and overwhelm the optical input. If this happens the programmer will appear to not respond to pressing the **BAR** or **BAR TST** button. Shading the connector with your hand should restore proper operation.

CHAPTER 3 TRUCK GAUGE PROGRAMMING INSTRUCTIONS

When the programming plug is connected to the gauge, the gauge display will show “prog” within a couple of seconds. Do not start programming the gauge until “prog” is shown.

Program the gauge display into inches:

1. Turn on the programmer.
2. Make sure the inch mode is correct.
3. Select a memory location with **MEM LOC**.
4. Press the **INCH MEM (SHIFT – 1)** button to put inches into the memory. If the inches are already in memory from a previous calibration, it is not necessary to do it again, but make sure that they are the correct inches (1/3 or 1/6).
5. To program the alarm points, determine the level that they should be set at and whether they should be start up or shut down. The start up mode turns the alarm **on** as the tank level rises past the alarm point (i.e., the alarm is on at the top of the tank, and off at the bottom). The shut down mode turns the alarm **off** as the tank level rises past the alarm point (i.e., the alarm is on at the bottom of the tank, and off at the top).
6. If the automatic alarm (the purple wire) is to be used, program Alarm 4 as shut down at the point where the horn is to come on, and program Alarm 3 as shut down a few inches above where the float will sit at the bottom of the tank. The automatic alarm is a special output so that even though Alarm 4 is programmed as shut down, the horn will be turned on when the level rises above the Alarm 4 point, and then will turn off when the alarm is silenced. When the fluid level goes below the Alarm 3 point, the alarm will be re-armed so it will sound the next time the level goes above Alarm 4.
7. To set Alarm 1, use the **INCHES** buttons to obtain the desired set point on the CALIBRATION display, then press the **ALARM SHUT DN** or **SHIFT-ALARM ST UP** button followed by the **1** button. When the operation is complete, repeat this procedure for the other alarms, pressing **2**, **3**, and then **4** after the **ALARM** button. If an alarm is not used it does not need to be programmed.
8. Make sure that the fibre from the sender bar is connected to the gauge display, and plug the programmer plug into the gauge display. Press the **BAR** button. The INCHES display should show some inch reading, if it shows “no L” or “bad L” check the fibre connection and the bar mode (1/3 or 1/6 inch). NOTE: The black fibre optic cable connector MUST be shaded from direct sunlight. See the information in the **Description of Keypad Buttons** section for further information.
9. Measure the distance from the bottom of the tank to the middle of the float, this is the bottom reading. Use the **OFFSET** buttons to obtain this reading on the CALIBRATION display.
10. Press the **PROG** button to transfer the calibration to the gauge.
11. When the operation is complete, unplug the programmer from the gauge and verify gauge operation.

Copy one gauge display to another:

1. Turn on the programmer.
2. Make sure the inch mode is correct.
3. Select a memory location with **MEM LOC**.
4. Plug the programmer plug into the gauge display to be copied **from**. Press the **COPY** button to copy the gauge calibration into memory.
5. When the operation is complete, unplug the programmer plug from the first gauge and plug it into the gauge display to be copied **to**. Press the **PROG** button to transfer the calibration to the second gauge.
6. When the operation is complete, unplug the programmer from the gauge and verify gauge operation.

Program a gauge display from a table of calibration values:

1. Obtain a table of inches versus volume
2. Turn on the programmer.
3. Make sure the inch mode is correct.
4. Select a memory location with **MEM LOC**.
5. Press the **CLEAR MEM** button to erase any previous calibration.
6. Starting at the 0 inch value of volume calibration, use the **0 to 9, decimal, E, F, L, U, or BL** buttons on the keypad to enter the calibration. Press the **ENTER** button to store the value in memory. When **ENTER** is pressed, the inches will go to the next value. If you make a mistake, use the **BACK** button to erase the entry, or if **ENTER** has already been pressed, use **INCHES ↓** to go back to that inch value and re-enter the correct value. If more than 4 numbers are entered the previous ones will scroll off the left of the display. If **ENTER** is pressed before any numbers, nothing will happen.
7. After the table has been entered, use the **INCHES** buttons to review the table to make sure it is correct. If a calibration value is incorrect, simply re-enter it and press **ENTER**.
8. Continue with the same procedure as in ***Program the gauge display into inches*** from step 5. When setting the bottom reading, use the calibration table to look up the volume corresponding to the distance to the middle of the float. Use the **OFFSET** buttons to obtain this reading on the CALIBRATION display.

Transfer a calibration program between the programmer and a computer:

1. Turn on the programmer.
2. The computer controls the inch mode and memory location of the programmer, so these don't need to be set until the gauge is programmed.
3. Use a standard serial cable to connect the programmer to the computer. If the computer does not have a serial port, a USB to serial converter will be required.
4. Launch the software on the computer. Make sure the inch mode and memory location are correct.
5. Press the **C-LINK** button to put the programmer into the computer communication mode.

6. Click “Check Programmer Version” to verify that the computer is communicating with the programmer.
7. Click the desired button to read or write to the programmer. All commands are done from the computer. The programmer display will show the operations and the progress.
8. Make sure that the operation is complete before doing anything else. Some operations can take up to 30 seconds.
9. The memory label can have up to 16 characters. The label can only be entered on the computer, but can be read on the programmer or the computer. The label is not stored in the gauge.
10. After completion, press the **BACK** button to return the programmer to normal mode.

NOTE on alarm programming: Note that for the 815 SpillStop, all alarms are programmed as shut down. Alarm 1 is the engine shutdown, alarm 2 is the horn alarm, and alarm 3 is the tank empty point. Alarm 4 is available for other uses, if desired.

Programming the 5 Digit Display:

It is important to know how the 5 digit display operates in order to understand how the programming is to be done. The 817 was originally designed for the programming of four digit gauges. Because of this it only has four digit LCD's so in order to program five digits a workaround had to be determined. The fifth digit is only used if the volume (typically in gallons or litres) of a tank is greater than 10,000. During the time that the gauge is showing volumes less than 10,000, four digits are all you need and these volumes are entered into the programmer following the instructions given above. The steps below indicate how to enter volumes of 10,000 and greater. The example in the steps is for entering the number 15,346.

1. On the chart of volume versus height, round all volumes 10,000 or greater to the nearest 10. This would give a number of 15,350 in our example.
2. Enter the first four digits only with a decimal point after the first digit. In our example you would press 1, followed by the decimal point then 5,3,5 and then **ENTER**.
3. Enter all of the volumes that are 10,000 or greater the same way.
4. When all numbers have been entered and checked you may enter the alarm points and set the bottom reading as described above and then program the gauge.
5. Verify proper gauge operation.

The fifth digit is always a zero which is why the numbers greater than 10,000 must be rounded to the nearest 10. When the display is programmed it is designed so that when it senses the decimal point after the first digit the zero in the fifth digit position is activated. So in the example, by entering 1.535 on the programmer, the number 15350 will be shown on the gauge display.

CHAPTER 4

USING THE PROGRAMMER TO TROUBLESHOOT GAUGES

To test a sender bar:

1. If the sender is flashing, plug a piece of fibre into the sender optical connector and the other end of the fibre into the black **OPTO** input connector on the 817 programmer. The display shows the number of bits the bar is sending and the optical power. If the optical power is poor (less than 70), then check the fibre, if it is good and fully inserted then the bar output is bad and the bar must be replaced. Ensure that the number of bits is correct (1/3" is 8 bits, 1/6" or 1/4" is 11 bits). If necessary reprogram the truck gauge bar with a magnet (see the bar programming section in the truck gauge manuals) to put it into the correct mode. If the number of bits is not 8 or 11 then the bar is bad and must be replaced.
2. Make sure the programmer inch mode is correct to match the bar. Now press the **BAR TST** button to put the programmer into the bar test mode. The INCHES display will now show what the bar is putting out. Slowly run a float up the bar while watching the INCHES display to verify bar operation. If the bar does not operate correctly then it must be replaced. Note that it is faster to test a truck gauge bar in 1/3" resolution, if it works for 1/3" it will work for 1/6". To return the programmer to normal operation press the **BACK** button.

Note: If the programmer is being used to test a bar outside in bright sunlight, the sunlight may penetrate right through the black optical input connector and overwhelm the optical input. If this happens the programmer will appear to not respond to pressing the **BAR** or **BAR TST** button. It will be necessary to shade the connector with your hand to ensure proper operation.

To test a display:

1. Make sure the programmer inch mode is correct to match the display. Plug a piece of fibre from the grey **OPTO** output connector of the 817 programmer to the optical connector on the display. If the display shows "no L" then it is bad and must be replaced (make sure the end of the fibre going into the display is flashing!).
2. If the display shows some strange reading when the fibre is plugged in, it may need reprogramming. Copy the existing programming into an unused memory on the 817 (just in case) and then program the display in inches or a known good program. The display should show "prog" within a couple of seconds of plugging in the 817 plug, if not it is bad. After the 817 plug is removed the display should match the reading on the 817 calibration display, if it does not then the display is bad.
3. If only the alarms do not work then copy the calibration into the 817 to check if the points are programmed. If they are then connect a fibre from the 817 optical output to the display optical connector. Connect the positive terminal of an ohm meter to the alarm wire, and the negative terminal of the ohm meter to the ground (green) wire. Use the inch up/down buttons on the 817 to run the display up to test the alarms. If

the purple wire is being tested then make sure that both Alarm 3 and Alarm 4 are correctly programmed and run the display from below Alarm 3 to make sure that previous bypassing is cleared.

CHAPTER 5

817 TROUBLESHOOTING GUIDE

The only serviceable components in the programmer are the batteries. Four AA cells are required. To change the batteries, remove the two screws holding on one of the ends and remove the end panel. Slide the keypad out of the lower box to access the batteries.

CHAPTER 6

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, 288 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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