

SEELEVEL IV™

Pump Stroke Counter



MODEL 927 MANUAL

IMPORTANT OPERATOR INFORMATION

DATE INSTALLED: _____

PUMP ID: _____

VOLUME PER STROKE: _____

GEAR REDUCTION: _____

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Congratulations on purchasing the Garnet Instruments Model 927 SEELEVEL IV™ Pump Stroke Counter. The SEELEVEL IV™ represents the latest in state of the art monitoring equipment. The Pump Stroke Counter uses an inductive proximity sensor to count pump strokes and accurately calculates strokes per minute, liters per minute, total strokes, and total volume based on the pump strokes that have been detected. The Pump Stroke Counter can operate over a wide temperature range from -40°C to +90°C (-40°F to +194°F).

The SEELEVEL IV™ components are weatherproof to allow installation in any environment. The LCD displays are backlit so they can be continuously seen in the daytime or night. All functions on the gauge, including calibration and security, can be programmed with the built in keypad.

The SeeLevel IV consists of a Pump Stroke Counter display and requires an inductive proximity sensor. The display shows the total strokes, strokes per minute, liters per minute, and total volume.

The Inductive Proximity Sensor: The inductive proximity sensor used with the Pump Stroke Counter is made of Ni-Brass and has a sensing range of 5mm. Care must be taken when mounting the sensor so it can safely detect the movement of the metal mass moving past the sensor.

Display LCDs: The display has 4 separate LCDs to show information. These LCDs have excellent daytime visibility and are back-light for night viewing as well.

The lower left LCD shows the total strokes sensed by the inductive proximity sensor after applying the gear reduction ratio. When a gear reduction ratio has been set, the total stroke LCD will not be incremented until a complete stroke has occurred. The total volume LCD will also not be updated until the total stroke has incremented. With a gear reduction ratio of "**2.000**", each stroke sensed by the inductive proximity sensor would be counted as two strokes on the LCD display. A gear reduction ratio of "**0.500**" would require two strokes sensed by the inductive proximity sensor to be counted as one stroke on the LCD display. When total strokes reaches 99,999 "**toohi**" is displayed and the RESET button must be pressed to return to zero.

The lower right LCD shows the total volume. This value is calculated by multiplying the total strokes LCD value by the volume per stroke set in the calibration menu. Depending on the Volume Per Stroke that has been set, the decimal place can indicate either a decimal place or a comma to show thousands.

The upper left LCD shows the strokes per minute after the gear reduction ratio has been applied. With a gear reduction ratio of "**1.000**", if the strokes per minute are lower than 3.5, "**tooLo**" is displayed and if the strokes per minute are above 511, "**toohi**" is displayed. The strokes per minute are updated each time the inductive proximity sensor received a sensor reading.

The upper right LCD shows the volume per minute based on the strokes per minute. This value is calculated by multiplying the strokes per minute by the volume per stroke set in the calibration menu. The volume per minute are updated each time the inductive proximity sensor received a sensor reading.

When the MENU button is pressed, the display will show the condition of the voltage level driving the display. The voltage conditions can be "**Good**", "**FAIR**", or "**Poor**". If the voltage is FAIR, the sensor will still operate but, if the voltage is POOR, the Pump Stroke Counter may not function properly and the input voltage level should be checked immediately.

The LCDs take on different roles during programming, but this is covered in the next chapter.

Display Keypad: The keypad consists of the 16 buttons on the front of the display. The keypad is used for the following functions:

- RESET the Total Strokes counted.
- Enter a PRESET value for Total Strokes counted.
- Enter the security codes which control access to the gauge calibration settings.
- Enter the "Volume Per Stroke" calibration value.
- Enter the "Gear Reduction Ratio" calibration value.

Display Enclosure: The entire display is enclosed in a weather-proof fiberglass enclosure with a hinged cover. This provides all weather operation and easy access to the internal terminal blocks. The enclosure must always be kept tightly closed to prevent water damage to the electronics. Never open the display enclosure when rain or water could enter the box.

The keypad consists of the 16 buttons on the front of the display, and is used for the following functions:

1. RESET the Total Strokes counted.
2. Enter a PRESET value for Total Strokes counted.
3. Enter the "Volume Per Stroke" calibration value.
4. Enter the "Gear Reduction Ratio" calibration value.
5. Enter the 6 digit long user code to set the "Volume per Stroke" and the "Gear Reduction Ratio" calibration values.
6. Enter the 8 digit master code which permits authorized personnel to set the user code.

Since the operation of the gauge can be severely compromised by improper keypad use, there are security features incorporated into the gauge.

There are two levels of security, as indicated by two different access codes:

1. **User Code:** this is a six digit code used by the customer to set the "Volume Per Stroke" and the "Gear Reduction Ratio" calibration values. The initial code out the door is "123456", this can be changed with the master code.
2. **Master Code:** this is an eight digit code used by management and the installer to set the user codes. It cannot be changed, it is coded into the microprocessor permanent memory. The Master code is available upon request. **This code should not be revealed to anyone who does not need to know.**

The following are instructions for accessing and programming various gauge menus and functions.

To RESET the Total Strokes counted:

1. Press the RESET button on the display to reset the Total Strokes LCD and the Total Volume LCD to zero.

To enter a PRESET value for the Total Strokes counted:

1. When the Pump Stroke Counter is first turned on, the Total Strokes and Total Volume LCDs read zero. The preset menu al-

lows the operator to set a new Total Strokes value to return to the value prior to power loss. Press the PRESET button on the display to enter the "**PrESet**" menu.

2. Enter the new preset value for the Total Strokes counted using the number keys (0-99999). Press ESC to exit the programming mode without changing the Total Strokes value.
3. Press ENTER to store the new Total Strokes counted value and recalculate the Total Volume.

To show the input voltage condition:

1. Press the MENU button on the display to show the input voltage condition for a few seconds. The voltage conditions can be "**Good**", "**FAIr**", or "**Poor**". If the voltage is FAIR, the sensor will still operate but, if the voltage is POOR, the Pump Stroke Counter may not function properly and the input voltage level should be checked immediately.

To access the User Code menu to set the VOLUME PER STROKE and the GEAR REDUCTION RATIO calibration values:

1. Press and hold ENTER until "**SECUR CODE**" appears (this will take approximately 5 seconds).
2. Enter the 6 digit user security code (it will be shown as you enter it) and press ENTER. If the code is incorrect, the gauge will exit programming mode.
3. **VOLUME PER STROKE MENU:** If the code is correct, the volume per stroke calibration menu will be accessed. The display will show the current volume per stroke calibration in the lower left LCD, "**LitEr**" in the lower right LCD, and "**Stro**" "**CALib**" in the upper LCDs. Enter the new volume per stroke calibration value in the lower left LCD using the decimal and number keys. The volume per stroke value must be entered in the "**n.nnn**" or "**nn.nn**" format to be a valid entry.
4. Press ENTER to store the new volume per stroke calibration, "**StorE**" will be shown momentarily. If an invalid value has been entered, "**dEC1**" will momentarily appear and the volume per stroke LCD will return to the original value.
5. **GEAR REDUCTION RATIO MENU:** Press MENU to access the gear reduction ratio calibration menu. The display will show the current gear reduction ratio in the lower left LCD, "**n.nnn**" or "**nn.nn**" in the lower right LCD and "**GEAr rEdUC**" in the up-

per LCDs. Enter the new gear reduction ratio calibration value using the decimal and number keys. The gear reduction ratio must use the "n.nnn" or "nn.nn" format to be a valid entry.

6. Press ENTER to store the new gear reduction ratio calibration value, "**Store**" will be shown momentarily. If an invalid value has been entered, "**dEC1**" will momentarily appear and the gear reduction ratio LCD will return to its original value.
7. **EXIT MENU:** To exit the programming mode, press ESC to exit the calibration menus, the display will show "**Prog donE**" momentarily and the gauge will return to normal operation.
8. If a menu is left without pressing ENTER, any change to that menu item will NOT be stored. If no button is pressed for 3 minutes then the gauge will exit programming mode and any changes which have not been stored will be ignored.

To access the Master Code menu (volume calibration, user code, and copy mode):

1. Press and hold ENTER until "**SECUR CODE**" appears (this will take approximately 5 seconds).
2. Enter the 8 digit master security code (it will be shown as you enter it) and press ENTER. If the code is incorrect, the gauge will exit programming mode.
3. **USER CODE MENU:** If the master code is correct then the user code menu will be accessed, the display will show "USER Code XXXX XX", which is the existing user code.
4. Press the number buttons to enter the new six digit code, the existing code will disappear from the appropriate display and the new value will be shown. Once six digits are entered press ENTER to store the new user code, "**Store**" will be shown momentarily. If exactly six digits are not entered, then "Err" is shown momentarily and the previous code reappears.
5. **EXIT MENU:** To exit the programming mode, press MENU until the exit menu is accessed. The display will show "**CALib donE**" and the software release number will also be shown, for example "**rEL 2.06**". Press ENTER to exit. "**Prog donE**" will be shown momentarily and the gauge will return to normal operation.
6. If a menu is left without pressing ENTER, any change to that menu item will NOT be stored. If no button is pressed for 3 minutes then the gauge will exit programming mode and any changes which have not been stored will be ignored.

The standard inductive proximity sensor supplied uses the following color codes:

Brown Wire	SENS PWR
Blue Wire	SENS GND
Black Wire	SENS SIG
White Wire	Not Connected

Since installation details can vary widely with application, contact Garnet Instruments Ltd. for installation details.

There are only 2 serviceable components: the display and the inductive proximity sensor.

To test a display:

1. Check that the backlight on the display is on. If the backlight is not on verify the power supply wiring.
2. Verify the supply voltage level to the display. Press the MENU button on the display to show the input voltage condition for a few seconds. The voltage conditions should be "**Good**" or "**Fair**". If the voltage is "**Poor**", the input voltage level should be checked immediately.

To test the inductive proximity sensor:

1. Ensure the inductive proximity sensor is wired correctly. Set the gear reduction ratio to "1.000" as described in the previous section. Move a piece of metal past the sensor and verify that the display increments the total strokes LCD.

CHAPTER 6 - SPECIFICATIONS

Display enclosure:	NEMA 4 rated fiberglass molded enclosure, 6 inches wide by 8 inches high by 4 inches deep.
Display type:	Four LCD displays, 0.50 inch character height, backlit for night viewing.
Display keypad:	16 button pad for calibration entry, alarm setting, remote communications programming, security code entry, gauge on/off control, and backlight activation.
Max Input Frequency:	3000 RPM
Raw Strokes Per Minute:	8.8-511
Total Strokes Max:	99,999
Volume / Strokes:	0.001 - 99.99
Gear Reduction Ratio:	0.001 - 9.999

CHAPTER 7 - SERVICE & WARRANTY INFORMATION

The warranty will only apply if the warranty has been registered online from the Garnet Instruments registration web page.

Go online to seelevelsupport.com/ and select "Register Warranty".

DISCLAIMER OF WARRANTY ON HARDWARE

Garnet Instruments 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, 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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