



Operation Manual

LectroCount® LCRHost™ for Windows®

LIQUID CONTROLS
A Unit of IDEX Corporation

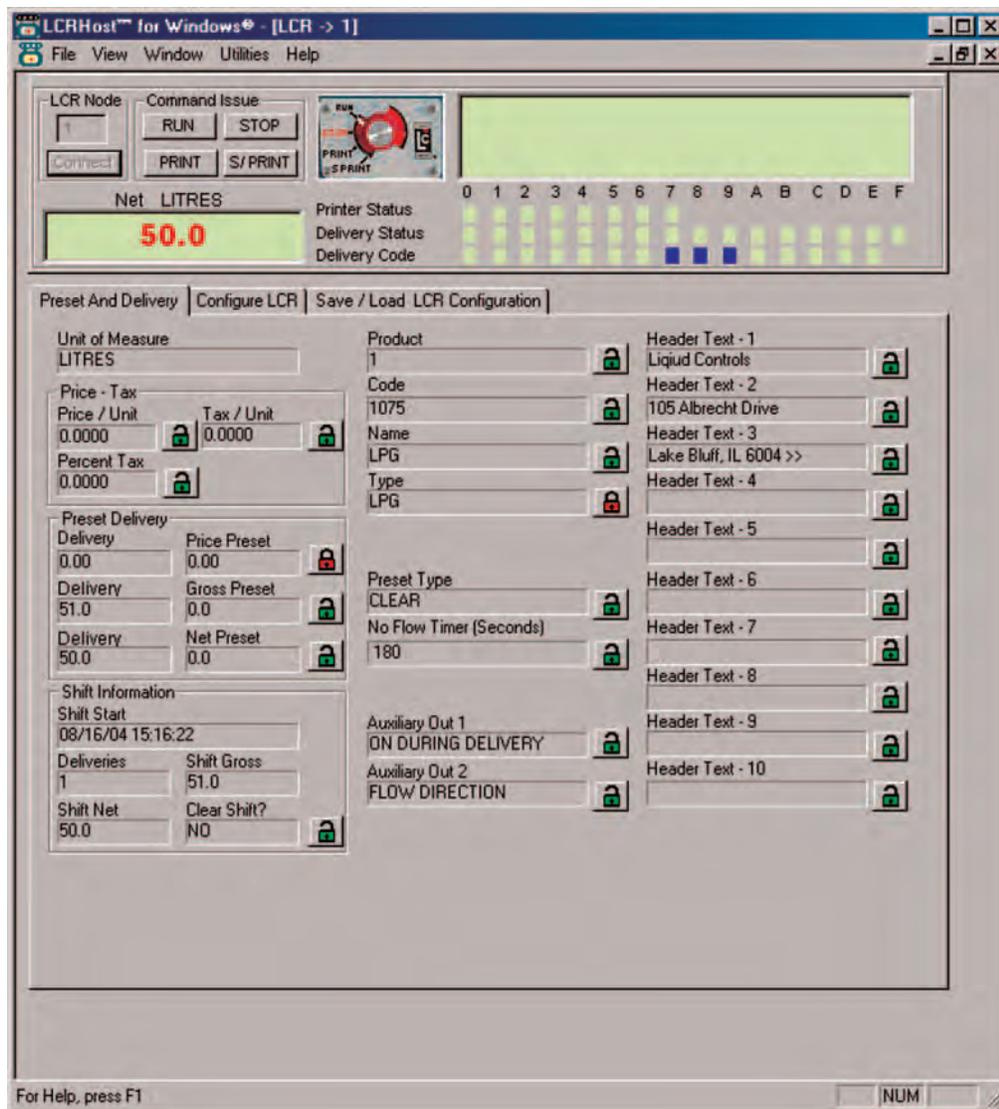


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Introduction

LCRHost™ for Windows is an interface program for use with LectroCount® LCR® or LCR-II® Electronic Registers. **Throughout this manual, LectroCount will be used to designate both the LectroCount LCR and the LectroCount LCR-II Electronic Registers.**

LCRHost allows the user the flexibility of controlling and monitoring **up to 249 meters simultaneously**. When used in conjunction with one or more LectroCount Electronic Registers, LCRHost can be used simply as a single LectroCount controller, or as a complete LectroCount network controller.

When navigating through LCRHost screens, the user will encounter fields that are data entry or fields for display only.

Access to data entry fields depends on:

DATA FIELD TYPE:

Some fields are for display only, and data entry is not necessary (e.g., diagnostics, flow rate).

PASSWORD PROTECTION:

The LectroCount has a user-defined password that allows the system to be locked or unlocked. This field allows management to limit operator data entry only to those fields that are necessary to make preset deliveries.

SELECTOR SWITCH:

The selector position switch on the front of the LectroCount has a calibration position that can only be accessed by removing a Weights & Measures sealable plate. This allows data entry in the metrologically significant fields (e.g. Compensation Type, Temperature, Pulses/Unit).

NAVIGATING LCRHost

List Box Window:

If the prompt is a multiple selection prompt, the user is given a list of available selections.

Field Edit Window:

A field edit window requires either a numeric or an alpha-numeric entry. This type of window is displayed when LCRHost is prompting for an unknown variable. For example, Preset amount, Time/Date, or header information.

Before Getting Started:

- When proving the metering system, follow pre-test and inspection procedures established by Weights and Measures authorities. The primary indicating and recording element on a vehicle-mounted LectroCount is the 6-digit liquid crystal display on top of the register.
- Weights and Measures inspectors are responsible for determining if the truck metering and recording elements of the system are in tolerance.
- The LectroCount is pre-programmed with common values for many of the programmable parameters. These values should be checked to ensure that they fit the specific requirements of a given installation.

Changes cannot be made to metrologically significant data without first removing the switch plate and its associated Weights & Measures seals. Some examples of metrologically significant data are as follows:

PULSES / UNIT : Refers to the actual pulser output per unit of measure (i.e.: Gallons, Liters, etc.) This value is calculated during the flowmeter proving.

COMPENSATION TYPE, COMPENSATION PARAMETER, BASE TEMPERATURE: The values in these fields affect the temperature compensation functions of the LectroCount.

System Components

The system components consist of:

- Laptop Computer, which holds LCRHost™ for Windows.
- LectroCount Electronic Register (LCR or LCR-II)
- Flow Meter and accessories
- Printer.

The flowmeter/electronic register/accessory configuration is application dependent.



LectroCount LCR-II Electronic Register



EPSON Slip Printer



LectroCount LCR Electronic Register



Flowmeter with Accessories



Laptop Computer

Software Installation

System Requirements

Prior to installation, ensure that the Computer which the LCRHost software is being installed meets the following requirements:

- 10 Mbytes free hard drive space (minimum)
- 256 Mbytes RAM (minimum)
- 200 MHz Pentium style processor (or faster)
- Windows NT, 2000, or XP operating system
- CD-ROM Drive
- One available RS232 serial port

Insert the CD-ROM into the CD-ROM Drive of the computer. The setup program should automatically launch. If it does not automatically launch, perform the following steps:

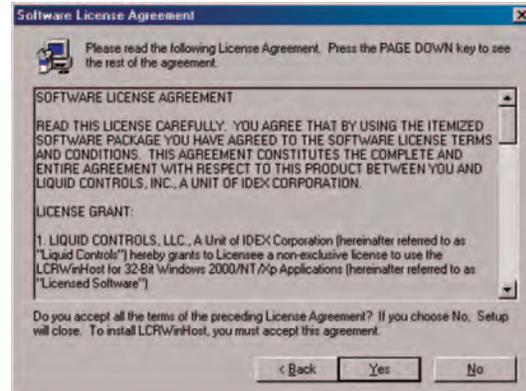
1. Click on Start
2. Click on Run
3. Locate the CD-Rom drive and select Setup.exe
4. Click on OK to start the installation process.

Installation Windows

The first window to appear is the “Welcome” window. Press “Next>” to advance to the second window.



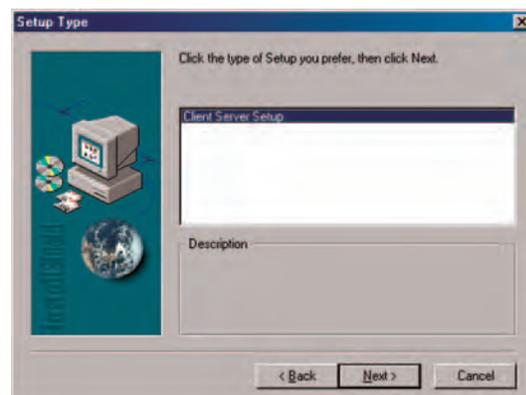
The second window is the “Software License Agreement”. Read the agreement carefully and press “Yes” to continue with the installation.



The third window is used to select the directory in which to install the program and its associated files.



Click on “Next>” to advance to the fourth installation window. This window prompts the user to select which files should be installed along with the program files.

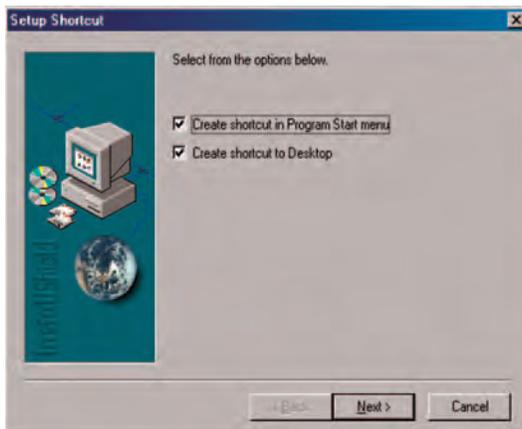


Click “Next>” to advance to the next installation window. This is the “Select Program Folder” window. If a folder

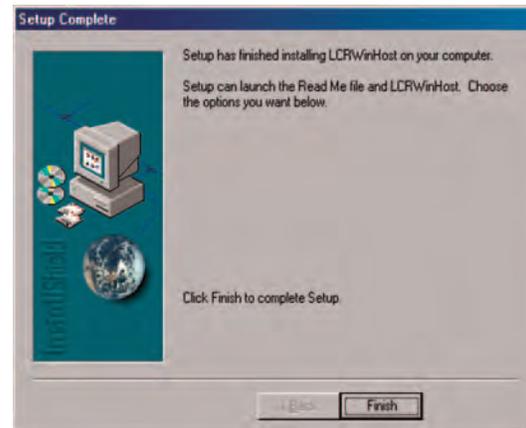
different from the default is required by your back office software program, enter that folder here. Press "Next>" to advance to the next installation window.



The next window is for setting up the shortcuts desired. Select the options desired and press "Next>" to advance to the last window.



The last installation window indicates that the setup is complete. Click on "Finish" to complete the installation process and exit the setup program. The CD ROM may now be removed from the computer drive.



To launch the program, double click on the LCRHost Icon on the computer's desktop.



If the icon does not exist on the desktop:

1. Click on "Start"
2. Click on "Run"
3. Click on "Browse" and search for the folder:
"C:\Program Files\Liquid Controls\LCRLCRHost"
4. Click on "LCRLCRHost.EXE" and click on "Open"
5. Click on "OK" to launch the program

LCRHost™ Program Launch

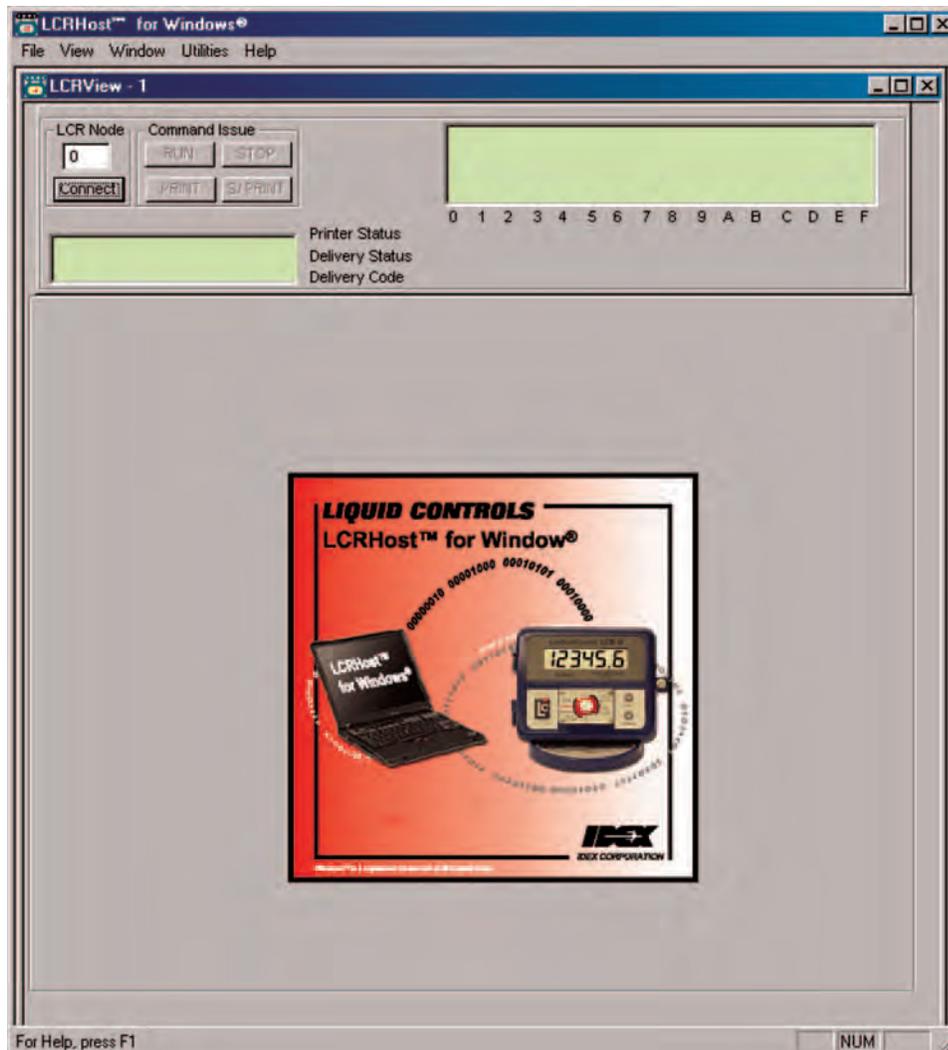
Locate the LCRLCRHost shortcut icon on the computer desktop.



Double click on the Icon to launch the program. If this Icon is not on the computer desktop, follow these steps:

1. Click on "Start"
2. Click on "Run"
3. Click on "Browse" and search for folder "C:\Program Files\Liquid Controls\LCRLCRHost"
4. Click on "LCRLCRHost.exe" and click "Open"
5. Click on "OK" to launch the program.

If the software was successfully installed, the program will open to the default start window shown below.



Utilities

Comm Port

Port Parameters

Prior to connecting to a LectroCount electronic register, the communication port must be configured.

Select **Comm Port** from the **Utilities** drop-down menu. This opens the **Port Parameters** configuration window shown to the right.

Port:

Select the communication port from which the laptop computer will be communicating. The options for this setting are **COM1** through **COM8**.

Tx Enable:

Tx Enable Bit" is the Transmit Enable Bit for the laptop computer being used. The "!" is to be interpreted as "NOT" defining the option "!DTR" as "NOT DTR". The available options are:

None
!RTS
RTS
!DTR
DTR
!RTS!DTR
RTSDTR

If there is a single register connected to the laptop, this can be set to **None**. For a system with two or more registers, this needs to be set to **RTSDTR**.

Baud Sync:

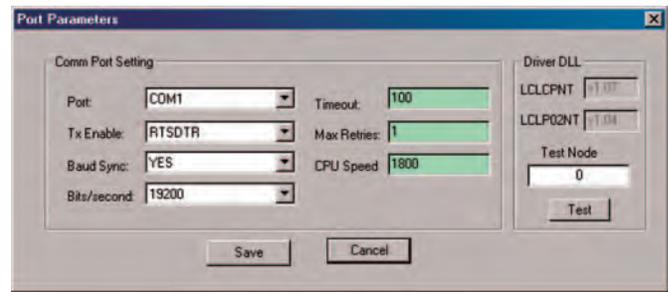
The options for Baud Sync are **Yes** and **No**. When **Yes** is selected, the program will search for the correct baud rate with which to communicate. When **No** is selected, the system will use the base rate set in the **Bits/second** field. Select **Yes** from the List Box Window.

Bits/second:

Select the baud rate from the List Box Window at which the laptop computer will communicate with the LectroCount register. The options are:

2400
4800
9600
19200
57600
115200

Select a maximum baud rate of 19200 for systems with a printer connected. Select a maximum of 57600 for systems without a printer connected.



Timeout:

This value represents the amount of time the program will attempt to communicate with a LectroCount register before returning a communication error. This value is represented in milliseconds. A typical value for this is 100.

Max Retries:

This value represents the number of times the program will attempt to communicate with a LectroCount register if the first attempt fails. A typical value for this is 1.

CPU Speed:

This value represents the processor speed of the laptop computer. To find this value, right-click on the **My Computer** desktop icon and select **Properties** from the menu. The display should contain the CPU speed of the laptop computer. This value is entered in megahertz (MHz). The value entered in the example above is "1800" MHz which is equivalent to 1.80 gigahertz (GHz).

Driver DLL

LCLCPNT and **LCLCP02NT** represent the version numbers of the dynamic library links. This information may be useful when phoning the factory for assistance.

Test Node

This feature allows the user to test the setup to confirm successful communication with the connected LectroCount register. With the values entered in the fields for Port Parameters, click on **Save** to write the values. Enter a numeric value in the **Test Node** field, such as 250, and click on **Test**. If this is a new installation, the LectroCount register is shipped from the factory with a node address of 250. If the node address is not 250 and it is known, enter the correct node address in this field and click on **Test**. If the node address is not known, a search will need to be performed for the node address. This function is covered on Page 12.

If the node is correct and the parameter settings are correct, the program will return a message indicating that the LectroCount with the entered node address has been found.

LCR Utilities

Issue Command

The Issue Command section of LCR Utilities allows the user to send a command or view the status of the selected LectroCount register.

LCR Node

Enter the node address of the LectroCount register.

Command

Select a command from the List Box Window. This command will be sent to the LectroCount register when the operator clicks on Issue. The options from this List Box Window are:

RUN
STOP
PRINT
S/PRINT

Issue

After selecting the desired command, click on **Issue** to send the command to the LectroCount.

LCR Status

Click on LCR Status to open the status window of the LectroCount register.

Change Node Address

This section allows the operator to change the node address of the LectroCount register. All new registers from the factory have a default node address of 250.

Old

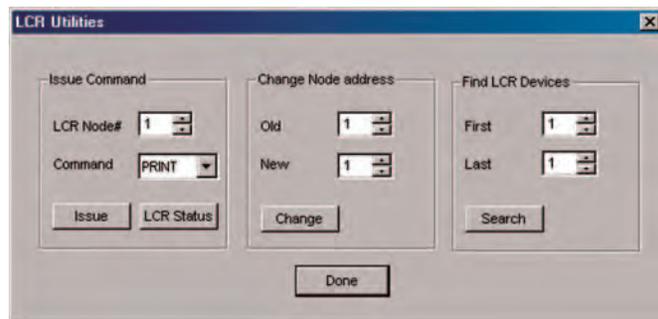
Enter the current node address of the LectroCount register.

New

Enter the new node address for the LectroCount register.

Change Node Address

Click on Change Node Address to change the node address for the LectroCount register from the **Old** address to the **New** address.



Find LCR Devices

If the node address of the connected LCR is not known, a search for the node address will need to be done. The wider the search range, the longer it will take the program to complete its search. It is recommended to first try the default value of 250 for new LectroCount registers. If this is not found, begin with small ranges.

First

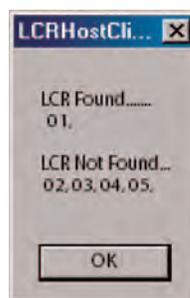
Enter the value at which to begin the node search.

Last

Enter the value at which to end the node search.

Search

Click on search to begin the search for the node address across the range from First to Last. When the search is complete, a window will display all LCR nodes found within the specified range.



The wider the entered range, the longer it will take for the program to perform the search.

Utilities

Password

The Password option can be set to lock out portions of the program. This may be set before or after connecting to a LectroCount register. If a password is set, the correct password must be entered to access advanced options in the program.

If the password lock is enabled, the operator will have access to the Preset and Delivery menu, but not the Calibration or Save/Load LCR Configuration menus.

From the Utilities drop down menu, click on Password to open the Password window. When the password is correctly entered, the OK and Change Password buttons become activated as shown to the right. From here, click on OK to access all available menus.



Change Password

If it is desired to change the password, click on Change Password to open a new window. Enter the New Password and press Change Password to accept the change. Click on Cancel to close the window.

Each time the program is launched, the password will need to be entered to access all available menus. To disable automatic password protection each time the program is launched, enter a blank password.



Secure

Secure works in conjunction with Password. Secure is used to turn the password lock on while the program is still open. Located under the Utilities menu, the user clicks on Secure to enable the password lock. The password will now need to be entered to gain access to the locked menus.

Secure will work even if a blank password was entered. If this is the case, when the password window opens, enter any character and then hit Backspace on the keyboard to remove that character. The OK and Change Password buttons become active as before.

Secure is often used when the operator will be away from the laptop computer or when no further access to the Calibration and Save/Load LCR Configuration menus is required, as is often the case for normal daily deliveries.

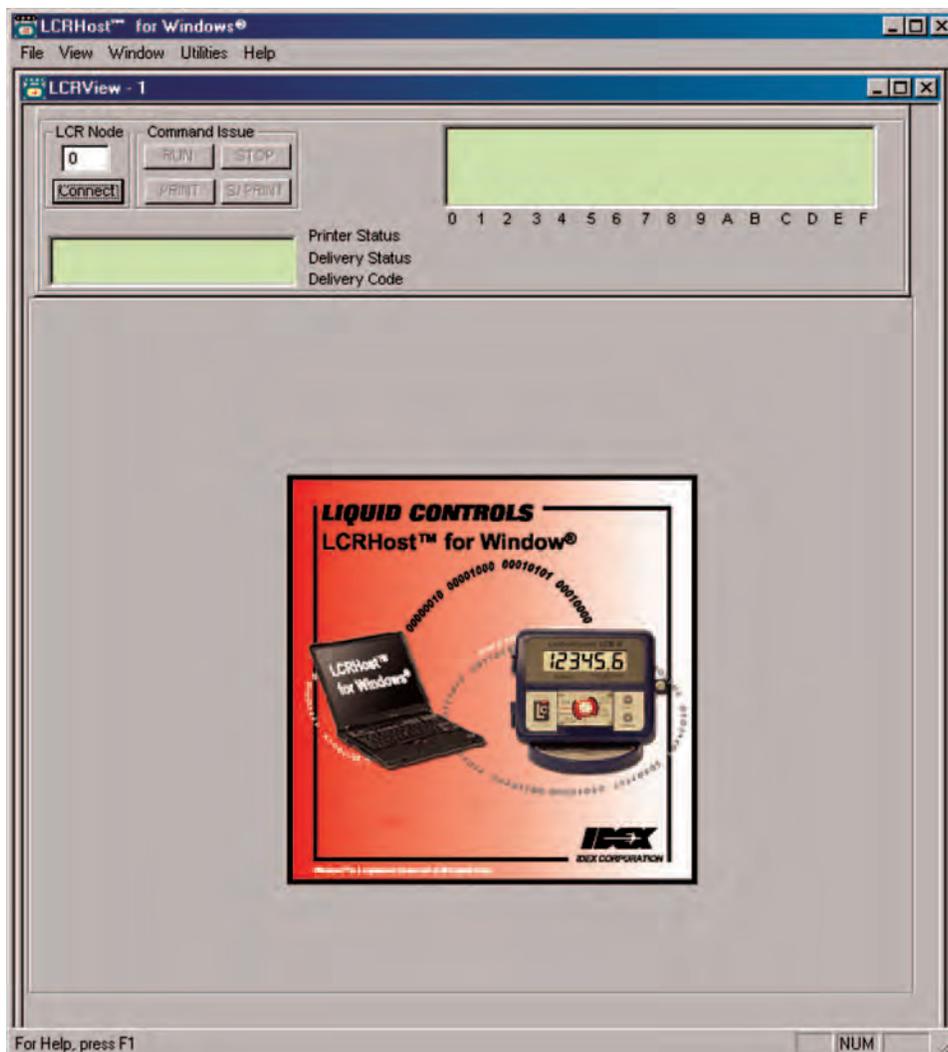
LCR Connection

Once the communications port and the node address of the LectroCount register is established, enter the LectroCount node address in the window below LCR Node. Then, click on Connect below the window. This will establish communication with the LectroCount register. The heading on the window will change from LCRView - 1 to LCR -> N, where N is the node address of the connected LectroCount register.

If more than one LectroCount is connected in the network, click on File - New, to open a second window which has the title LCRView - 2. Enter the node address for this LectroCount register and press Connect to establish the link.

When a LectroCount register connection is established, the display updates as shown on Page 15.

If the node address entered does not match any LectroCount node address in the network, the following error is displayed on the status screen.



Navigating the Display

The window below is displayed when a LectroCount connection is successfully established. This is the main window that an operator would utilize if a laptop computer is used on a daily basis for deliveries.

Each of the fields will have a green, red, or yellow indicator next to it. These are interpreted as:



Field has not been updated. This will appear after initial connection to a LectroCount register and then be replaced by one of the other two indicators.



Field has been updated and is editable given the current switch position of LectroCount register.



Field has been updated and is not editable given the current switch position of the LectroCount register. Some fields are never editable regardless of the LectroCount switch position.

The screenshot shows the LCRHost software interface with the following components labeled:

- LectroCount Commands:** Buttons for RUN, STOP, PRINT, and S/PRINT.
- Selector Switch Position:** A red indicator on the printer status icon.
- Status Messages:** A green display area at the top right.
- LCR Node Address:** A field containing the value '1'.
- LectroCount Display Indicator:** A green display showing '50.0' under 'Net LITRES'.
- Menus:** A row of menu items: Preset And Delivery, Configure LCR, Save / Load LCR Configuration.
- Status Indicators:** A row of 16 small colored squares (0-9, A-F) at the bottom right.
- Locked Field:** A field with a red padlock icon, such as 'Price Preset'.
- Unlocked Field:** A field with a green padlock icon, such as 'Net Preset'.
- Field Title:** Labels for 'Header Text - 1' through 'Header Text - 10'.
- Field Value:** Labels for 'Liquid Controls', '105 Albrecht Drive', and 'Lake Bluff, IL 6004 >>'.

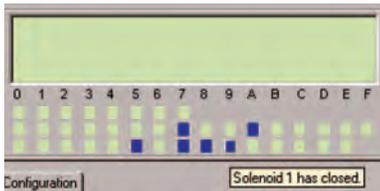
LCR Node

This is an indication of the node address of the connected LectroCount register. The display indicator represents what is currently displayed on the LectroCount register's display. This updates once per second.

Command Issue

This contains four commands that may be sent to the LectroCount register. These commands may not function depending on the position of the LectroCount switch. For instance, if the LectroCount register switch is in the STOP position, issuing a RUN command will not work and the program will indicate that the switch is in the STOP position. The selector switch position is indicated in the window, but cannot be changed in the window. The switch position on LectroCount register must be physically changed. If a laptop will be used for daily operations, the selector switch on the LectroCount register may remain in the RUN position.

The status screen to the right of the selector switch indicator displays information about the status of the LectroCount register. Directly below are the status indicators. The color of the square indicates the condition of the component it identifies. Holding the mouse cursor over the square will bring up a temporary indicator as to what the square represents as in the example below.



The information contained in these indicators is repeated in the Diagnostics window under the Configure LCR tab. However, this screen is not accessible if the password lock is enabled.

There are three menus indicated by the tabs.

- Preset and Delivery
- Configure LCR
- Save/Load LCR Configuration

Preset and Delivery

This is the only menu which remains unlocked regardless of the password status. From here the operator can perform all of the necessary functions required for daily operation.

This section is covered in detail beginning on Page XX.

Configure LCR

This menu is not accessible if the password lock is enabled. Configure LCR has five sub-menus.

- General Setup
- System Calibration
- Product Calibration
- Diagnostics
- Security

Configure LCR is used to set up meter, register and product calibration. This section is covered in detail beginning on Page XX.

Save/Load LCR Configuration

As the name indicates, this section is used to store and recall LectroCount configurations. This section is covered in detail beginning on Page XX.

If a field has a green lock indicator located directly to the right, it may be edited. These fields are edited by clicking once on the green lock indicator. This will open a List Box Window or a Field Edit Window. List Box Windows contain a selection of options which the operator chooses from. The Field Edit Window requires operator input. If a red lock indicator appears next to a field, clicking on it may or may not open a window, but the operator will not be allowed to change the current information contained in the window.

Some locks change between red and green depending on the position of the LectroCount selector switch and the current status of the LectroCount register.

Preset and Delivery

The Preset and Delivery menu contains information the operator might use on a daily basis for deliveries. This program provides more flexibility in making deliveries than the operator would have using the LectroCount register as a stand alone, pump-and-print device.

Unit

This field indicates the current, selected unit of measure for deliveries. This field cannot be edited from this location. Unit can be modified from the System Calibration or Product Calibration sub-menus of the Configure LCR menu when the selector switch is in the calibration position.

Price - Tax

This section is used to establish pricing information for the product to be delivered. It contains editable fields for **Price/Unit**, **Tax/Unit**, and **Percent Tax**. Click once on the green lock indicator next to Price/Unit to open the Field Edit Window:

Enter a value for the price per unit of measure and then click on Write to LCR. The Field Edit Window will close and the display field will update with the new information. Entering a value in Price/Unit enables editing of the Price Preset field. If no value is entered in the Price/Unit field, the Price Preset field remains locked.

Enter values for Tax/Unit and Percent Tax in the same way as was entered for Price/Unit. Click on the green lock indicator to open a Field Edit Window and enter the values desired. Tax/Unit is entered as a whole dollar amount (e.g. a value of .34 indicates a tax of \$0.34 per unit volume). Percent Tax is entered as a percentage value (e.g. a value of 12.49 indicates a tax percentage of 12.49%).

Preset Delivery

The Preset Delivery section contains fields for entering preset values and for monitoring the current delivery status of a preset delivery. Presets can be entered based on Price, Gross volume, or Net volume. If temperature compensation is not enabled for deliveries, Net Preset values will be disabled.

Click on the green lock indicator to open a Field Edit Window for the desired preset type. Enter a preset value and click on Set for Price Preset, or Write to LCR for Gross and Net Preset. When using Price Preset, the value entered is used to calculate the required volume to reach that preset price. This volume is written to the LectroCount in either the Net Preset or Gross Preset fields.

To the left of the preset fields are three status fields with the heading Delivery. These fields update based on the current status of the delivery. When a delivery begins, the Gross and Net Preset delivery fields will indicate the remaining volume to be delivered. If a value of 500 is entered for a Gross or Net Preset volume, the field will count down from 500 to 0 and temporarily change the field heading from Delivery to Remaining. Once the delivery is complete, these fields will show the amount delivered.

The Price Preset counts up from zero to the total delivery price at the end of the delivery. If a Price Preset has not been entered, but a Price/Unit has been entered, this field will update based on the current delivery status though it will not effect the Gross or Net Preset delivery volume.

Shift Information

This section contains information regarding the operator's shift.

Shift Start indicates the date and time that an operator's shift began. Deliveries indicates the total number of deliveries that occurred during the shift. Shift Gross and Shift Net are indicators of the total Gross and Net volumes delivered during the shift.

Clear Shift is the only selectable field. Click on the green lock indicator to open a List Box Window. Select YES or NO from the drop down menu. Selecting YES and clicking on Write to LCR will cause a shift ticket to print. Once the ticket is printed, all shift information is reset to zero. The Shift Start field will not update until...

If NO is selected from the drop down menu, the shift information will not be reset.

The center column of the Preset and Delivery menu is separated into three sections. The top section of four fields contains information regarding the product being delivered. The next two fields contain information regarding presetting. The final two fields contain information regarding the two auxiliary outputs.

Product

Product indicates the product number currently selected for the delivery. Up to four products can be calibrated and therefore, up to four products can be selected.

Click on the green lock indicator to open a List Box Window and select the product number desired. Click on Write to LCR.

Code

Code indicates the code to be associated with the selected Product. This is a code assigned by the operator for information purposes only.

Click on the green lock indicator to open a Field Edit Window. Enter the desired alpha-numeric product code and click on Write to LCR. This code may be up to five characters in length.

Name

Name indicates the descriptive name associated with Product and Code. This name is assigned by the operator for information purposes only.

Click on the green lock indicator to open a Field Edit Window. Enter the desired alpha-numeric name and click on Write to LCR. This name may be up to 18 alpha-numeric characters in length.

Type

Type indicates the type of product being delivered.

Click on the red lock indicator to open the List Box Window containing the options: AMMONIA, AVIATION, DISTILLATE, GASOLINE, METHANOL, LPG, LUBE OIL, and NO PRODUCT. This field can only be edited when the register's selector switch is in the Calibration position.

Preset and Delivery

Preset Type

Preset Type is used to define what happens to a preset value after a delivery is complete.

Click on the green lock indicator to open a List Box Window. There are three options for Preset Type: **CLEAR**, **MULTIPLE**, **RETAIN**, and **INVENTORY**.

Select **CLEAR** to reset the preset values to zero after the current delivery is complete.

Select **MULTIPLE** to allow more than one preset to be run before a delivery ticket is printed. Printing must be initiated by clicking on PRINT under Command Issue, or by turning the red selector switch to the PRINT position.

Select **RETAIN** to maintain the preset values to be used again on the next delivery and all subsequent deliveries.

Select **INVENTORY** to have the preset represent the amount of fluid remaining on board. This value will decrement after each delivery. Printing must be initiated by clicking on PRINT under Command Issue, or by turning the red selector switch to the PRINT position.

No-Flow Timer (Seconds)

The No-Flow Timer is used to set the amount of time allowable from the end of a delivery before a delivery ticket is automatically printed. If a delivery is stopped or the register does not sense flow, the timer begins. If the No-Flow Timer reaches its defined limit, a delivery ticket automatically prints. If the delivery commences prior to the timer defined limit, the timer resets and the delivery continues.

Click on the green lock indicator to open a Field Edit Window. Enter a value in seconds between 0 and 3600. If 0 is entered, the No-Flow Timer is disabled.

Auxiliary Out 1

The LectroCount auxiliary outputs provide a means to activate external devices such as a pumps, additive injections, valves, alarms, etc. There are two available auxiliary outputs from the LectroCount.

Auxiliary Out 1 has three options: ON DURING DELIVERY, OFF, ON, and MONITOR FLOWRATE.

Click on the green lock indicator to open a List Box Window. Select **“ON DURING DELIVERY”** to enable the output during an actual delivery. Whenever a delivery is terminated, the output will turn off.

Select **OFF** to disable Auxiliary Out 1 regardless of delivery status.

Select **ON** to enable Aux 1 output regardless of delivery status.

Select **“MONITOR FLOW RATE”** to activate Auxiliary Out 1 before each delivery. If the flow rate meets or exceeds 40 units per time base, Auxiliary Out 1 deactivates. If the flow rate does not meet or exceed this value, the output remains active.

Auxiliary Out 2

Auxiliary Out 2 has four options: FLOW DIRECTION, ON DURING DELIVERY, OFF, and ON.

Select **“FLOW DIRECTION”** to activate or deactivate the output depending on the direction of flow.

Select **“ON DURING DELIVERY”** to enable the output during an actual delivery. Whenever a delivery is terminated, the output will turn off.

Select **“OFF”** to disable Aux 2 regardless of delivery status.

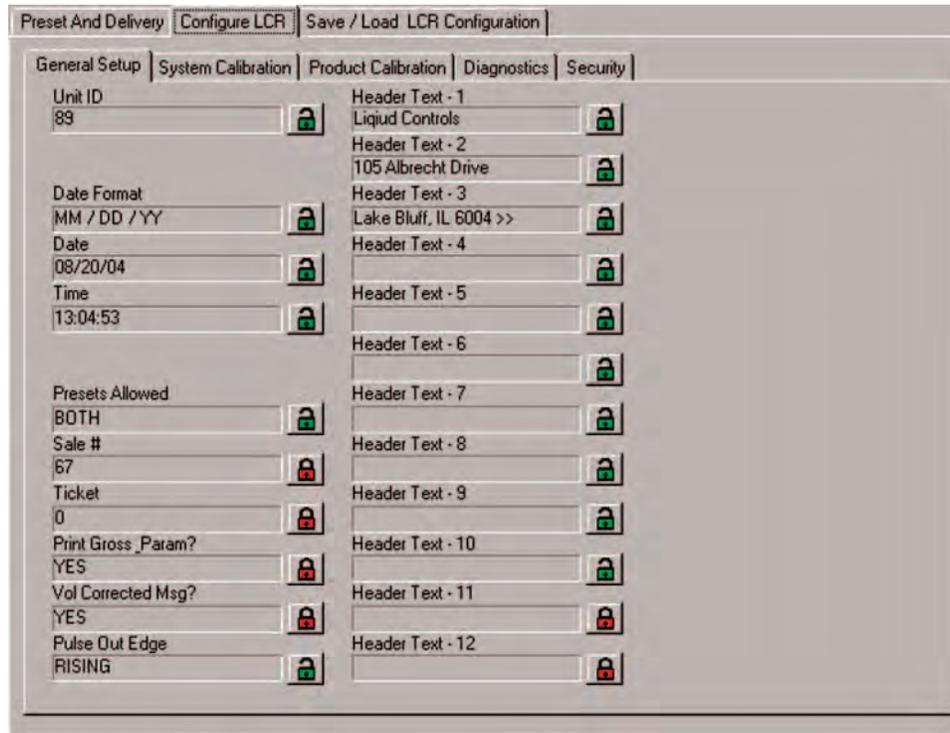
Select **“ON”** to enable Aux 2 output regardless of delivery status.

Header Text - 1 through - 10

The header text is text that will appear on the printed at the top of a ticket. This information usually contains the delivery company name, address, contact information, and any other desired text.

Click the green lock indicator next to Header Text - 1 to open a Field Edit Window. Enter up to 35 alpha-numeric characters and then click on Write to LCR. Continue with this same procedure for Header Text - 2 through Header Text - 10. Not all header text fields must contain information. This field may also be left blank which often is the case for companies using preprinted headers on delivery tickets.

If more information is entered than can be displayed on the Preset and Delivery screen, the program adds “»” to indicate that this is the case. However, all information entered will appear on the printed ticket.



The Configure LCR Menu is broken down into five submenus. These are General Setup, System Calibration, Product Calibration, Diagnostics, and Security. These will be covered in the order that they appear.

General Setup

This menu contains fields for general operating parameters.

Unit ID

This field represents an ID code that can be used to uniquely identify the driver, location, or truck to which the LectroCount is associated.

Click on the green lock indicator to open a Field Edit Window. Enter an alpha-numeric code up to 10 characters in length. Click on Write to LCR.

Date Format

This field defines the date format. Click on the green lock indicator to open a List Box Window which contains the options: MM/DD/YY and DD/MM/YY. Select the desired option and click on Write to LCR.

MM/DD/YY = Month/Day/Year
DD/MM/YY = Day/Month/Year

Date

This field indicates the current date. Click on the green lock indicator to open a Field Edit Window. Use the up and down arrows for hour, minutes, and seconds to set the current time of day. Click on Write to LCR when the time has been set.

Presets Allowed

This field indicates which type of preset will be allowed. Click on the green lock indicator to open a List Box Window with the options: NONE, GROSS, NET, and BOTH.

NONE = No presets are allowed.
GROSS = Gross presets are allowed.
NET = Net presets are allowed.
BOTH = Gross and net presets are allowed.

Select the desired option and click on Write to LCR.

NOTE: If the preset feature is to be used, ensure that the "S1 CLOSE" field (Page 47) is set for a preset value to work properly.

Configure LCR - General Setup

Sale

This field indicates the current sale number. The Sale # is used to track the number of transactions the LectroCount processes. This number will increment each time a delivery is started. Click on the green lock indicator to open a Field Edit Window.

Enter the starting number for Sale # and click on Write to LCR. The LectroCount will use this as the starting value for Sale # and increment by 1 each time a delivery is started. Once Sale # reaches 999999, it will return the count to zero and resume counting from 1.

NOTE: This field can only be adjusted when the LectroCount selector switch is in the calibration position.

Ticket

Ticket is similar to the Sale #. Ticket will increment each time the LectroCount prints a ticket. If multiple or duplicate tickets are used for transactions, the ticket number will increment more than the Sales #.

Click on the green lock indicator to open a Field Edit Window. Enter the starting number for Ticket and click on Write to LCR. The LectroCount will use this as the starting value for Ticket and increment by 1 each time a delivery ticket is printed. Once Ticket reaches 999999, it will return the count to one and resume counting from 1.

NOTE: If zero is entered for Ticket, it will not print on the delivery ticket and it will not increment. This field can only be adjusted when the LectroCount selector switch is in the calibration position.

Print Gross Param?

Print Gross Param? is used to enable or disable the printing of gross volume and compensation parameter on the ticket if the product is temperature compensated. In many applications this is required. Check local Weights & Measures requirements.

Click on the green lock indicator to open a List Box Window. Select "NO" if it is not desired to print the gross volume and compensation parameter on the ticket. Select "YES" if it is desired to print the gross volume and compensation parameter on the ticket. Click on Write to LCR to accept the selection.

NOTE: This field can only be adjusted when the LectroCount selector switch is in the calibration position.

Vol Corrected Msg?

Vol Corrected Msg? is used to enable or disable the printing of the base temperature of net deliveries on the delivery ticket. In many applications, this is required. Check local Weights & Measurements requirements.

Click on the green lock indicator to open a List Box Window. Select "NO" if the volume corrected message is NOT to be printed on the delivery ticket. Select "YES" to have the volume corrected message printed on the delivery ticket. If "YES" is selected, the LectroCount will print a message on the delivery ticket indicating that the delivery volume has been corrected to a specified base temperature.

If the base temperature is in °C, the message will read: **"TEMPERATURE VOLUME CORRECTED TO 15 °C"**

If the base temperature is in °F, the message will read: **"TEMPERATURE VOLUME CORRECTED TO 60 °F"**

NOTE: The base temperature for Linear C and Linear F can be set to a value other than 15 or 60. This field can only be adjusted when the LectroCount selector switch is in the calibration position.

Pulse Out Edge

All LectroCount registers feature a calibrated pulse output which cycles once per least significant unit of delivery. The Pulse Out Edge field allows the LectroCount to synchronize the calibrated pulse output waveform with the requirements of an external counter. Depending on the manufacturer, some counters may increment on the rising pulse edge of the waveform, some on the falling pulse edge. Refer to the manufacturer's manual to determine the specific requirements.

Click on the green lock indicator to open a List Box Window. Select "RISING" for the rising edge of the pulse output. Select "FALLING" for the falling edge of the pulse output. Click on Write to LCR.

NOTE: This field can only be adjusted when the LectroCount selector switch is in the calibration position.

Header Text - 1 through 12

Header Text is information printed at the beginning of a delivery ticket. These fields may be left blank or they may contain information specified by the user.

Click on the green lock indicator to open a Field Edit Window for each Header Text location. Use the alphanumeric keys to enter information to be printed that line of the ticket header. Each line can contain up to 35 characters, including spaces.

When viewing the Header Text display, only 19 characters will be displayed per line. If a header line contains more than 19 characters, “»” will be shown to indicate there are more characters in that line.

NOTE: Header Text Lines 11 & 12 are reserved for use with optional Auxiliary Outputs 1 & 2. Refer to **SCREEN 23 - “PRESET AND DELIVERY”** (Page 80) for information on programming auxiliary outputs.

Configure LCR - System Calibration

| Field Name | Value | Lock Icon |
|---------------------|-------------------|-----------|
| Meter ID | 123456789 | Green |
| Flow Direction | =====> | Green |
| Ticket Required? | NO | Green |
| Temperature | 75.77 | Green |
| Printer | Epson 295 Slip | Green |
| Temperature Offset | 0.00 | Green |
| Units Of Measure | GALLONS | Green |
| Temp | DEG. F | Green |
| Rate Base | MINUTES | Green |
| RTD Slope | 0.024770 | Green |
| Decimals | TENTH | Green |
| RTD Offset | 2.470 | Red |
| Residual | ROUND | Green |
| Calibration | 03/10/00 03:28:32 | Red |
| Pulses / Dist | 2.000000 | Red |
| Calibration Number | 7 | Red |
| Calib Distance | 0.0 | Red |
| Calibration Event | 55 | Red |
| Odometer | 0.0 | Red |
| Configuration Event | 71 | Red |

The System Calibration section of General Setup is used to set parameters associated with system. These fields will not be active unless the LectroCount selector switch is in the calibration position. Some fields are not editable even when the switch is in the calibration position.

Meter ID

This field allows the user to uniquely identify a LectroCount/Meter combination in systems where the LectroCount is part of a multiple meter system. It is important that this is a unique number. It is recommended that the meter serial number be entered. This number will print on all calibration and diagnostic tickets for future reference.

Click on the green lock indicator to open a Field Edit Window. Enter up to 10 alpha-numeric characters click on Write to LCR to accept the value. This field may be left blank.

Ticket Required?

This field allows the user to decide whether a delivery ticket will be required for each delivery. Most Weights & Measures governed truck applications will require a ticket.

Click on the green lock indicator to open a List Box Window. If "NO" is selected, the system will not require a ticket to be printed after each delivery. If "YES" is selected, the LectroCount will not allow deliveries to be made unless a ticket is in the printer and the printer is operational. It will also require a ticket be printed before another delivery can be started. Click on Write to LCR once a selection has been made.

NOTE: Selecting NO will still allow a ticket to be printed if the printer is connected, loaded with paper, and ready to print.

Configure LCR - System Calibration

Printer

“Printer” is used to select the printer model with which the LectroCount will be communicating. Selection of the wrong printer model may result in miscommunication between the printer and the LectroCount.

Click on the green lock indicator to open a List Box Window with the following printer options:

- **EPSON NewFontB** (select for use with EPSON 200 Roll and EPSON 220 Roll)
- **EPSON NewFontA** (select for use with EPSON TM-T88iii)
- **EPSON OldFontB** (select for use with EPSON 300 Roll)
- **EPSON OldFontA** (select for use with EPSON 290 Slip and EPSON 295 Slip)
- **Okidata ML184T** (select for use with Okidata ML184T)
- **BLASTER** (select for use with Cognitive Solutions Thermal Printer).

Select the desired printer and click on Write to LCR.

Units of Measure

This field allows the user to decide the units of measure to be used for the application. Click on the green lock indicator to open a List Box Window with the options:

GALLONS, LITRES, CUBIC METER, POUND, KILOGRAM, BARREL, and OTHER. Make a selection and click on Write to LCR.

Rate Base

Rate Base is used to select the time unit for the measurement on the flow rate display.

Click on the green lock indicator to open a List Box Window with the options: SECOND, MINUTE, and HOUR. The rate base should be selected relative to the size of the meter and the rate base desired. For larger meters, it may be more appropriate to show “UNITS/HOUR”. For smaller meters, it may be more appropriate to show “UNIT/SECOND”.

Select the desired rate base and click on Write to LCR.

Decimals

This field allows the user to decide the least significant digit shown on the display. Click on the green lock indicator to open a List Box Window with the options: **HUNDRETHS**, **TENTHS**, and **WHOLE**. Select the desired option and click on Write to LCR.

Residual

Residual is used to select what happens to the least significant digit when a fraction of that volume has been read by the meter. Click on the green lock indicator to open a List Box Window.

Select **ROUND** if the fraction should be rounded up or down to the next unit of measure. In this example, “150.7” will become “151”. Select **TRUNCATE** to discard the fraction. In this example, “150.7” will become “150”.

Select the desired option and click on Write to LCR.

The following table illustrates examples of Round and Truncate options.

| Internal LCR Volume | Round Whole | Truncate Whole | Round Tenths | Truncate Tenths | Round Hundr. | Truncate Hundr. |
|---------------------|-------------|----------------|--------------|-----------------|--------------|-----------------|
| 4.689 | 5 | 4 | 4.7 | 4.6 | 4.69 | 4.68 |
| 4.314 | 4 | 4 | 4.3 | 4.3 | 4.31 | 4.31 |

Pulses/Distance

Pulses/Distance represents the number of pulses from an odometer pulser that the LectroCount LCR counts per unit of distance (miles or kilometers). For initial calibration of the odometer, enter 4000 as a starting point. The frequency of the odometer pulser must be no more than 25 pulses per second or inaccuracies will result.

If the odometer feature is not being used, this number must be set to 2.

If the LCR odometer input terminals are being used for the optional START/STOP feature, Pulses/Distance must be set to 0.

The fields of Pulses/Distance, Calib Distance, and Odometer are used to calibrate and use the odometer if an odometer input is being used with the LCR.

NOTE: The LectroCount LCR-II does not have an odometer input option. If an odometer input is required, use the LectroCount LCR.

Configure LCR - System Calibration

Calib Distance

This field is used to calibrate the odometer.

To begin odometer calibration, click on the green lock indicator to open a Field Edit Window. Enter 0 for Calib Distance. Drive the vehicle a known distance (minimum of 5 miles recommended) using the truck's odometer for reference. Enter the actual distance traveled in the Calib Distance field. This will automatically adjust Pulses/Distance to reflect the corrected number.

NOTE: The LectroCount LCR-II does not have an odometer input option. If an odometer input is required, use the LectroCount LCR.

Odometer

This field represents the truck's odometer once the odometer function has been calibrated.

Click on the green lock indicator to open a Field Edit Window. Enter the truck's current odometer reading and click on Write to LCR.

NOTE: The LectroCount LCR-II does not have an odometer input option. If an odometer input is required, use the LectroCount LCR.

Flow Direction

Because meter applications are different, it may be necessary to configure the LectroCount flow direction to the meter's pulse output signal. If the LectroCount display counts in reverse (decreasing numbers) after the unit is initially installed, it will be necessary to select the opposite Flow Direction.

Click on the green lock indicator to open a List Box Window with the options:

----->
<-----

Select the desired option and click on Write to LCR.

Temperature

This field displays the current reading from the temperature probe. If the LectroCount is not equipped with a temperature probe, the display will show dashes. This field allows entry from a Weights & Measures calibrated thermometer.

Run enough product through the meter to allow the temperature to stabilize. Compare the Temperature reading with the current Weights & Measures thermometer reading. If the readings do not match, click on the green lock indicator to open a Field Edit Window and enter the Weights & Measures reading. This value will overwrite the previous value and the Temperature Offset field will be recalculated by the LectroCount .

Temperature Offset adjustments are limited to $\pm 0.3^{\circ}\text{C}$ ($\pm 0.54^{\circ}\text{F}$). Adjustments greater than these offset values require replacement of the RTD Probe.

Temperature Offset

This field represents the difference between the official Weights & Measures temperature reading and the LectroCount probe's temperature reading. The temperature offset is automatically calculated if an entry is made in the Temperature field. If a temperature probe is not present, this field will show dashes.

If a Weights & Measures temperature reading was not entered in Temperature, subtract the Temperature value from the Weights & Measures temperature reading. Click on the green lock indicator to open a Field Edit Window and enter this value Temperature Offset. If the difference is a negative number, enter "-" before the value.

Temperature Offset adjustments are limited to $\pm 0.3^{\circ}\text{C}$ ($\pm 0.54^{\circ}\text{F}$). Adjustments greater than these offset values require replacement of the RTD Probe.

Temp

This field is used to select the temperature unit to be used for the application. Click on the green lock indicator to open a List Box window with the options:

DEG. C (degrees Celsius)
DEG. F (degrees Fahrenheit).

Select the desired option and click on Write to LCR.

RTD Slope, RTD Offset, Last Calibration, Calibration Number, Calibration Event, Configuration Event

RTD Slope and **RTD Offset** are used for factory calibration of the LectroCount and are not editable.

The calibration information fields of **Calib**, **Calib Number**, **Calib Event**, and **Config Event** are for metrology use and are not editable.

Last Calibration: Displays the date and time of the last calibration.

Calibration Number: Displays the number of times the LectroCount has been placed in the calibration mode using the red selector switch.

Calibration Event: Displays the number of times the calibration information has been changed.

Configuration Event: Displays the number of times the configuration has been changed.

Configure LCR - Product Calibration

| Field Name | Value |
|-------------------------------|-------------|
| Product | 1 |
| Code | 1075 |
| Name | LPG |
| Type | LPG |
| Compensation Type | TABLE 24 |
| Compensation Parameter | 0.505000 |
| Base Temperature | 60.000000 |
| S1 Close | 5.0 |
| Auxiliary Multiplier | 0.000000 |
| Auxiliary Quantity | 0.0 |
| Auxiliary Units | OTHER |
| Pulse / Unit | 1882.179565 |
| Prover Quantity | ----- |
| Gross Quantity | 117.4 |
| Gross Preset | 0.0 |
| Remaining | ----- |
| Temperature (DEG. F) | 75.86 |
| Net Quantity | 114.3 |
| Units | GALLONS |
| Linearization | SETUP |
| Point Number | 1 |
| Flow Rate (GALLONS / MINUTES) | 0.00 |
| Percent Error | 0.000 |
| Linear Prover Quantity | ----- |
| Gross Total | 11144.2 |
| Net Total | 10878.4 |

Product Calibration fields are used to adjust individual calibration factors for each of the product codes for the LectroCount.

Product

The product number will correspond to one of the product types/calibrations that can be set up in the LectroCount. At least one product must be calibrated to allow for deliveries.

Click on the green lock indicator to open a List Box Window with the four product options. Select the desired product number and click on Write to LCR.

Code

This field corresponds to Product. Code can also be entered in the Preset And Delivery menu. Click on the green lock indicator to open a Field Edit Window. Type in the desired Code and click on Write to LCR.

Name

This field contains a description of the product that will appear on the delivery ticket. Click on the green lock indicator to open a Field Edit Window and enter up to 18 alpha-numeric characters. Click on Write to LCR.

Type

This field is used to specify the type of product that will be delivered with the current Product Calibration being set up. Click on the green lock indicator to open a List Box Window with the options: AMMONIA, AVIATION, DISTILLATE, GASOLINE, METHANOL, LPG, LUBE OIL, and NO PRODUCT.

Select the desired option and click on Write to LCR.

Compensation Type

If a temperature probe is being used for the application, the type of temperature volume compensation must be selected for the Product. It is necessary to make a selection for proper Net (temperature compensated) calculations.

There are ten options for Compensation Type. Click on the green lock indicator to open a List Box Window and select the desired type.

NOTE: If "NONE" is selected, deliveries can only be made in gross (non-compensated) quantities.

Refer to the Compensation Types & Parameters table (Page 27) to assist in making the correct selection.

Configure LCR - Product Calibration

Compensation Type & Parameters

| Product | VCF Type | Scale | Parameter | Range | Tbase | Tmin | Thold | Tmax |
|---------------------------------------------------------------------|------------------|-------|-----------------------------------|-------------------------|-------|------|-------|------|
| General | Linear | C | Linear/degree | 0 to 0.003 | 15 | -90 | N/A | +100 |
| General | Linear | F | Linear/degree | 0 to 0.005 | 60 | -130 | N/A | +212 |
| LPG (USA) | API Table 24 | F | Base Specific Gravity | 0.5 to 0.550 | 60 | -50 | -50 | +140 |
| LPG (Europe & Canada) | API Table 54 | C | Base Density Kg/L | 0.5 to 0.600 | 15 | -46 | -46 | +60 |
| Refined Petroleum Products (Europe & Canada) | API Table 54B | C | Base Density Kg/m ³ | 653.0 to 1075.0 | 15 | -50 | -40 | +95 |
| Refined Petroleum Products (USA) | API Table 6B | F | Base API Gravity | 0 to 85 | 60 | -50 | -40 | +200 |
| General | API Table 54C | C | Coefficient | 0.000486 to 0.001674 | 15 | -50 | -40 | +95 |
| Lube Oil (Europe & Canada) | API Table 54D | C | Base Density Kg/m ³ | 800 to 1164 | 15 | -50 | -40 | +95 |
| Ammonia (Canada) | NH ₃ | C | N/A | N/A | 15 | -30 | -30 | +40 |

Configure LCR - Product Calibration

Compensation Parameter

This field contains the coefficient of expansion per degree, the base temperature density, API gravity, or the base temperature specific gravity that will be used with the Compensation Type selected.

Click on the green lock indicator to open a Field Edit Window. Enter the compensation parameter and click on Write to LCR.

Base Temperature

If Compensation Type is either LINEAR C, or LINEAR F, this field is used to set the base temperature for temperature compensated deliveries.

If LINEAR C is selected for Compensation Type, this value will default to 15.0 for 15°C. If Comp Type is set to LINEAR F, this default value is 60.0 for 60°F.

Click on the green lock indicator to open a Field Edit Window. Enter a whole number in this field and click on Write to LCR.

S1 Close

This field represents the number of measurement units remaining on a preset delivery before the valve is placed in a bypass, trickle, or dwell mode. This field is only used when a two-stage valve is used in the application and is connected to the LectroCount. An S1 Close value is needed for each product.

When the S1 Close value is reached, Solenoid 1 is deactivated and Solenoid 2 is activated.

For example: If the value entered is 5 and the preset delivery is set to 100, then S1 will close and S2 will open when the register reaches 95. This reduces the delivery flow rate, slowing down the flow of product through the meter.

Click on the green lock indicator to open a Field Edit Window. Enter the desired S1 Close value and click on Write to LCR.

Auxiliary Multiplier

This field is used to convert the quantity delivered to an alternate volume or inferred mass. In order for this to be valid, the operator must furnish the applicable conversion factor. For example: To convert from **GALLONS** of water to **LBS** of water, the Auxiliary Multiplier value is 8.345.

The unit of measure was selected in "System Calibration".

Click on the green lock indicator to open a Field Edit Window. Enter the value in the for Auxiliary Multiplier and click on Write to LCR. If this value is set to zero, the Auxiliary Multiplier value will NOT print on the delivery ticket.

Auxiliary Quantity, Auxiliary Units

Auxiliary Quantity is not an editable field. It represents the current quantity of the auxiliary units per the current delivery.

Auxiliary Units is the auxiliary unit of measure that will print on the delivery ticket.

Click on the green lock indicator to open a List Box Window with the options: GALLONS, LITRES, CUBIC METES, LBS, KGS, BARRELS, and OTHER. Select the desired option and click on Write to LCR. This selection, as well as the Auxiliary Quantity will print on the delivery ticket.

Pulse/Unit

This field represents the number of pulse edges that the LectroCount counts per unit of measure. This number is also known as the product's K-factor. This number is used to scale Prover Quantity. Only gross volume applies.

Click on the green lock indicator to open a Field Edit Window and enter a value for Pulses/Unit and click on Write to LCR. Since this will change during calibration, enter a value of 100.

Prover Quantity

Prover Quantity displays the metered volume. When this value is overwritten with the actual Prover Volume read during a calibration run, a new Pulse/Unit will be recalculated automatically. If this is the initial calibration for the meter, enter the rest of the Product Calibration data before entering this field.

Click on the green lock indicator to open a Field Edit Window and enter the actual Prover Quantity measured during a calibration run. Click on Write to LCR.

Configure LCR - Product Calibration

Gross Quantity, Gross Preset

Gross Quantity is a read-only field. It is not editable. The gross quantity of fluid measured by the meter during a product calibration prover run is represented here. This is covered in detail in the sections on Single-Point Calibration and Multi-Point Calibration.

Gross Preset can be used to set a prover run volume. This represents a volume of the liquid to be run through the meter during a proving run. This is covered in detail in the sections on Single-Point and Multi-Point Calibration.

Click on the green lock indicator to open a Field Edit Window and enter the desired Gross Preset volume. Click on Write to LCR.

Remaining, Temperature, Net Quantity

Remaining is active when performing presets. As the delivery is made, this field will show the quantity remaining in the preset delivery. This field is not editable.

Temperature displays the current temperature reading of the probe. This field is not editable.

Net Quantity represents the temperature compensated quantity of the current delivery. This field is not editable.

Units of Measure

This field represents the current unit of measure. Click on the green lock indicator to open a List Box Window with the options: GALLONS, LITRES, CUBIC METER, POUND, KILOGRAM, BARREL, and OTHER. Select the desired option and click on Write to LCR.

Linearization

This field is used to enable multi-point linearization in the LectroCount, or to disable linearization so that the base calibration can be set up.

Click on the green lock indicator to open a List Box Window with two options.

Select **SETUP** for single-point calibration. Select **APPLIED** for multi-point calibration. Always perform the initial calibration in SETUP. Click on Write to LCR.

Single-point and Multi-point Calibration are covered on Pages 58-62.

Point Number

This field represents a point on the calibration curve for Multi-point Calibration. Up to 10 points on a curve may be calibrated for near perfect accuracy. Click on the green lock indicator to open a List Box Window and select the desired point number. Click on Write to LCR.

Flow Rate (Units/Rate Base)

This field is used during calibration to assign a rate of flow to a linearization Point Number. As Point Numbers are selected, a Flow Rate is assigned to that point number. This Flow Rate should be the actual flow rate observed during calibration of the given Point Number.

Click on the green lock indicator to open a Field Edit Window and enter the observed flow rate. Click on Write to LCR. Use a different flow rate for each "Point Number" during calibration.

Percent Error

This field is either calculated automatically during calibration, or it can be entered manually. This field represents the difference between the meter quantity and prover quantity during a calibration run.

$$\text{Delivery Percent Error} = \frac{(\text{Prover Qty} - \text{Meter Qty}) \times 100}{\text{Prover Qty}}$$

Click on the green lock indicator to open a Field Edit Window and enter the calculated value for Percent Error. Click on Write to LCR

More information on Percent Error is covered in the section on Multi-Point Calibration.

Linear Prover Quantity

This field represents the actual amount of product in the Volumetric Prover used for calibration.

Click on the green lock indicator to open a Field Edit Window and enter the Volumetric Prover quantity. Click on Write to LCR. When this value is entered, the actual Percent Error against the base number will be calculated automatically.

Configure LCR - Product Calibration

Gross Total

This field represents the cumulative, gross total for the product that is selected. Click on the green lock indicator to open a Field Edit Window and enter the Gross Total. Click on Write to LCR.

Net Total

This field represents the compensated, net total for the product selected. Click on the green lock indicator to open a Field Edit Window and enter the Net Total. Click on Write to LCR.

Performing Single-point Calibration requires the use of a volumetric prover or other calibrated device with which to compare the meter delivery quantity against a standard.

Since the rest of the Product Calibration information has been entered, this calibration procedure is ready to proceed.

As describe on Page 28, Pulse/Unit represents the number of pulses that the LectroCount counts per unit of volume. Since the unit may not have been previously calibrated, leave the value set to "100.000000", or enter the nominal value of pulses/unit for that meter size. For example, a Liquid Controls M7 with a 1:1 packing gland will produce a nominal 2,200 pulses per unit.

1. With the selector switch in calibration position, click on RUN under Command Issue.
2. Fill a reliable Volumetric Prover. Prover Quantity and Gross Quantity will increment as the product is dispensed into the prover. This reading is based on the existing value for Pulse/Unit.
3. After the prover has been filled, click on PRINT under Command Issue.
4. Enter the exact prover reading in the Prove Quantity field in place of the current value. The Pulse/Unit field will update based on the information entered.
5. Repeat Steps 1 through 3 to verify calibration. If the value read by the meter does not match the volume measured by the prover, re-enter the Prover Quantity value with the new reading and repeat Steps 1 through 3 until the prover quantity and meter quantity are equal.

Multi-Point Calibration

Multi-point Calibration allows a flowmeter to be used over a wide range of flow rates without experiencing a loss in measurement accuracy due to the inherent shape of the meter curve.

After determining the inaccuracy of the meter at a variety of flow rates and entering the information into the LectroCount's multi-point calibration table, accuracy corrections are continuously made by the LectroCount based on the measured flow rate.

There are two ways to obtain multi-point information for a flow meter:

1. Manufacturer's data supplied with the meter can be entered directly.
2. The meter can be field calibrated by proving at various flow rates.

NOTE: It is not required to enter flow rates in descending order. The LectroCount sorts the values internally when it uses the data.

Method 1 - Manufacturer's Data Supplied with the Meter

Move the pointer to "Point Number" and press the ENTER Key to open the List Box Window for "Linearization Point". Move the pointer to "1" and press ENTER to accept that Linearization Point and return to SCREEN 13 - "PRODUCT CALIBRATION".

Move the pointer to "Flow Rate" and press enter to open a Field Edit Window and enter the maximum flow rate shown on the manufacturer's data sheet and press ENTER.

Move the pointer to "Percent Error" and press ENTER to open a Field Edit Window and enter the error percentage corresponding to the highest flow rate shown for the meter on the manufacturer's data sheet.

Select up to nine additional points from the manufacturer's data sheet to characterize the remainder of the meter's accuracy curve and enter this data in the "Flow Rate" and "Percent Error" fields, in descending order by flow rate. To enter a negative "Percent Error", use the "-" key on the keypad.

When "Linearization Points" programming is complete, move the pointer to "Linearization" and press **ENTER** to open the a List Box Window shown below and select **APPLIED**. Press the **ENTER** Key.

This puts the Linearization algorithm into effect. If the error message **ADJACENT POINTS OUT OF 0.25% RANGE** is displayed, **APPLIED** will not take effect. The Linearization Points will need to be re-selected to ensure that no two adjacent points, based on flow rate, are more than 0.25% apart in their corresponding "Percent Error" fields.

Field prove the meter using the method described for Single-point Calibration. Assuming the data provided by the manufacturer is correct, it should be possible to fill a prover at any flow rate within the linearized range and obtain near perfect accuracy.

When **SETUP** is selected for Linearization Status, the algorithm is not activated. **SETUP** should be used during the calibration process. **APPLIED** is used after the calibration process is completed.

Method 2 - Field Proving Technique

In situations where the meter's accuracy curve is not provided by the manufacturer, Multi-point Calibration must be performed by proving the meter at various flow rates.

1. Verify that "Linearization" is set to "SETUP".
2. Start a proving run by pressing the START/RESUME Key on the Laptop keypad. Monitor SCREEN 12 - "PRODUCT CALIBRATION" during this proving run. The meter should be running at the normal high flow rate. The "Flow Rate" field displays the current flow rate of the meter.
3. When the prover is full, press the PRINT/END Key on the keypad.
4. Move the pointer to "Prover Quantity" and press ENTER to open a Field Edit Window to enter the exact quantity shown in the prover.
5. From SCREEN 13 - PRODUCT CALIBRATION, move the pointer to "Point Number" and press the ENTER Key to open a List Box Window and verify that "Linearization Point" is set to "1". Press ENTER.
6. Press START/RESUME to begin a new prover run at the same flow rate as Step 2. Note the maximum flow rate observed during the proving run. When the prover is full, press PRINT/END.
7. Move the pointer to "Prover Quantity" and press ENTER to open a Field Edit Window and enter the exact quantity shown in the prover. When this is entered, the "Percent Error" field will update to show the calculated error for that flow rate.
8. Move the pointer to "Flow Rate" and press ENTER to open a Field Edit Window and enter the maximum flow rate observed during the run. Press ENTER.
9. Move the pointer to "Point Number" and press ENTER to open a List Box Window for "Linearization Point" and select the next point number, "2".
10. Begin a second prover run at a different flow rate. Press START/RESUME and monitor the display for maximum flow rate for the run. When the prover is filled, press PRINT/END.
11. Move the pointer to "Flow Rate" and press ENTER to open a Field Edit Window and enter the maximum flow rate observed during the run. Press ENTER.
12. Continue proving at various flow rate using additional "Point Numbers" and repeat the procedure (return to Step 7) for each additional number. A minimum of three points is recommended (high, medium, and low) to obtain a good fit to the meter's curve.

All ten points can be used to obtain optimum results. Any unused points should be left at "0.00" for "Flow Rate" and "0.000" for "Percent Error".
13. When all the required points have been calibrated, move the pointer to "Linearization" and press ENTER to open a List Box Window and select "APPLIED". This puts the Linearization algorithm into effect. If the error message "**ADJACENT POINTS OUT OF 0.25% RANGE**" is displayed, APPLIED will not take effect and more points will need to be added to ensure that no two adjacent points, based on flow rate, are more than 0.25% apart in their corresponding "Percent Error" fields.

Diagnostics

The Diagnostics screen is for viewing only. None of the fields are editable.

Diagnostics

Pulser Faults represents the number of false or missing pulses detected during the last delivery.

Supply Voltage represents the current voltage being supplied to the system. If the supply voltage is greater than 17.7 volts, this reading will be inaccurate.

Flow Rate (Units/Rate Base) indicates the current flow rate through the metering device.

Software indicates the software being used by the LectroCount register.

Language indicates the software language being used by the LectroCount register.

Ticket indicates the ticket software being used by the LectroCount register.

Machine Status

Switch is an indication of the position of the red selector switch on the LectroCount. Changing the switch position will change the display to one of the following: **RUN, STOP, PRINT, SHIFT PRINT, or CALIBRATION.**

LCR State is the current state of the system. It will display one of the following: **Calibrate, End Delivery, etc...**

Printing will display either **YES** or **NO** depending on whether or not there are any printer errors.

Other Errors indicates whether there are other errors detected by the system.

Printer Status

Delivery Ticket? indicates that a Delivery Ticket has been requested.

Shift Ticket? indicates that a Shift Ticket has been requested.

Diagnostic Ticket? indicates that a Diagnostic Ticket has been requested.

Pass-Through Print? indicates that a line of text that will print has been given to the LectroCount from the host computer .

Printer Error? indicates if there is an error detected with the printer.

Printer Busy? indicates that the print processor has begun to print a ticket.

Delivery Status

ROM Check? indicates if a delivery could not be started due to the checksum of the LectroCount program code space failing.

Temperature? indicates if the currently delivery was not started or was terminated due to an error detected with the temperature reading hardware.

Watchdog? indicates if the processor was reset due to a LectroCount watchdog timeout error.

VCF Setup? indicates if there was an error setting up the volume compensation factor for the current product.

VCF Domain? indicates if the temperature of the product being delivered is outside the valid range for the compensation type of the product.

Meter Calibration? indicates if an error occurred while setting up the meter calibration for the current delivery.

Pulser Failure? indicates if the current delivery was terminated due to too many pulser faults.

Preset Stop? indicates if a gross or net preset volume has been reached.

No-Flow Stop? indicates if the current delivery was stopped due to no flow being detected through the meter for a specified amount of time.

Stop/Pause Request? indicates if the STOP command was issued during an active delivery.

Print/End Request? indicates if the PRINT command was issued during an active delivery.

Power Failure? indicates a delivery ended due to a power fail condition for more than 15 seconds.

Preset Error? indicates if a deliver ended due to an error condition while attempting to set up a gross or net preset.

RS-232 Lappad? indicates if the RS-232 Lappad has been disconnected from the LectroCount during an active delivery.

Printer? indicates if the current delivery requires a ticket to be printed and the printer is either off-line or busy.

Data Access? indicates if a data access error occurred during a delivery which was critical to the delivery.

Delivery Code

Delivery Ticket? indicates that a delivery ticket is pending. A new delivery cannot be started until this field is cleared by successfully printing the last delivery ticket.

Shift Ticket? indicates that a shift ticket has been requested and is waiting to be printed.

Flow Active? indicates flow is active during a delivery. The field is turned on and off with the "Delivery Active" field but is also turned off when a delivery is paused and turned back on when it is resumed.

Delivery Active? indicates that a delivery is active. The field is turned on just before the "Delivery Beginning" field is turned off and is turned off at the end of the delivery.

Gross Preset Active? indicates the current delivery is delivering a gross preset quantity. When this quantity is reached the delivery will either end or pause depending on the type of preset being run.

Net Preset Active? indicates the current delivery is delivering a net preset quantity. When this quantity is reached the delivery will either end or pause depending on the type of preset being run.

Stop/Gross Preset? indicates the current delivery has been stopped due to the gross preset value being reached. Depending on the type of preset being run, the delivery will either terminate or pause.

Stop/Net Preset? indicates the current delivery has been stopped due to the net preset value being reached. Depending on the type of preset being run, the delivery will either terminate or pause.

VCF Active? indicates that the current product will be temperature volume compensated during delivery.

S1 Closed? indicates the status of the S1 Solenoid. This is NO at the beginning of a delivery and YES when solenoid 1 is closed due to the remaining gross or net preset value being less than or equal to the value in the S1 Close field.

Delivery Beginning? indicates that a delivery is in the process of being started. Once the delivery has been started successfully, this field is turned off.

New Delivery Queued? indicates that a new delivery has been queued in the LCR. This condition occurs when an "Run" command is issued and the switch is in the STOP, PRINT, or SHIFT PRINT position.

Init Warning? indicates that a 4K Flash data access error occurred during a delivery which was not critical to the delivery but that a default was used in place of the data that was attempting to be read.

Config Event? indicates that a configuration event has occurred. This field is set when one or more of the following fields are changed while in calibration mode:

Auxiliary Multiplier
Auxiliary Unit of Measure
Base Temperature
Compensation Parameter
Compensation Type
Decimal Setting
Flow Direction
Flow Rate Time Scale
Gross Meter Totalizer
Meter ID
Net Meter Totalizer
Print Gross Volume and Compensation Parameter Flag
Print Volume Corrected Message Flag
Printer Type
Product Type
Residual Processing
S1 Close
Sale Number
Temperature Offset
Temperature Scale
Ticket Number
Ticket Required Flag
Unit of Measure

This field is cleared when a Calibration ticket is printed.

Calib Event? indicates that a calibration event has occurred. This field is YES when one or more of the following fields are changed while in calibration mode:

- Enabling or Disabling the Multi-Point Linearization Algorithm
- Flow Rate for a Linearization Point
- Percent Error for a Linearization Point
- Pulses/Unit

This field is NO when a Calibration ticket is printed.

Security

Position the pointer on “User Key” and press ENTER to open a Field Edit Window.

After “User Key” has been programmed, the system can be UNLOCKED by re-entering the “User Key” password.

Move the pointer to “Security” and press ENTER to open a List Box Window with the options LOCKED and UNLOCKED. To lock the system, move select LOCKED and press ENTER. To unlock the system, return to “User Key” and enter the password.

“Factory Key” is for factory use only.

Enter an alpha-numeric code up to ten characters in length and press ENTER. This password will be required in the future to LOCK or UNLOCK the system. The system must be UNLOCKED to gain access to secured data entry fields.

Position the pointer on “Security” and press ENTER to open a List Box Window shown below.

Move the pointer to the desired option and press ENTER to accept. When “LOCKED” is chosen, the system will prevent the following fields from being edited:

- Date Format
- Date
- Time
- Unit ID
- Pulse Out Edge
- Ticket Headers
- Security Field



SAVE CONFIGURATION

SCREEN 1 - "MAIN MENU"

Using the arrow keys, position the pointer on "Save Configuration" and press the ENTER key. This will advance the display to the SCREEN 27 - "SAVE CONFIGURATION".

SCREEN 27 - "SAVE CONFIGURATION" (shown below)

This feature allows the user of LCRHost to save the calibration parameters of a LectroCount in a file on the Laptop Computer. This file can then be used to set up other LectroCount Registers with the same calibration data without having to manually enter the data.

The fields that are saved in the output file are:

| | |
|--------------------|------------------------------|
| DateFormat | For each of the four |
| Decimals | product calibrations: |
| FlowDirection | Aux1 |
| MeterID | Aux2 |
| NoFlowTimer | AuxMult |
| Odometer | AuxUnit |
| PresetsAllowed | BaseTemp |
| PresetType | CompensationParam |
| Printer | CompensationType |
| PrintGrossAndParam | GrossPreset |
| PulseOutputEdge | GrossTotal |
| PulsesPerDistance | Linearize |
| QtyUnits | NetPreset |
| Residual | NetTotal |
| SaleNumber | PercentTax |
| TempScale | PricePerUnit |
| TicketNumber | ProductCode |
| TicketRequired | ProductDescriptor |
| TimeUnit | ProductType |
| UnitID | PulsesPerUnit |
| VolCorrectedMsg | S1Close |
| | TaxPerUnit |

**For each of the 10
linearization points:**
LinearFlowRate
LinearError

**For each of the 12 ticket
header lines:**
TicketHeaderLine

SCREEN 27a - "SAVE CONFIGURATION"

Enter a file name that will reside on the Laptop Computer and contain the calibration data of the LectroCount.

SCREEN 1 - "MAIN MENU"

Using the arrow keys, position the pointer on "Load Configuration" and press the ENTER key. This will advance the display to the SCREEN 28 - "LOAD CONFIGURATION" (Page 90).

LOAD CONFIGURATION

SCREEN 28 - "LOAD CONFIGURATION"

Loads a LectroCount with the calibration data previously saved with the "Save Configuration" option.

SCREEN 28a - "SAVE CONFIGURATION"

Enter a file name that will reside on the Laptop Computer and contain the calibration data of the LectroCount.





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Pub. No. 500XXX
(09/04)

