

# Instruction Manual

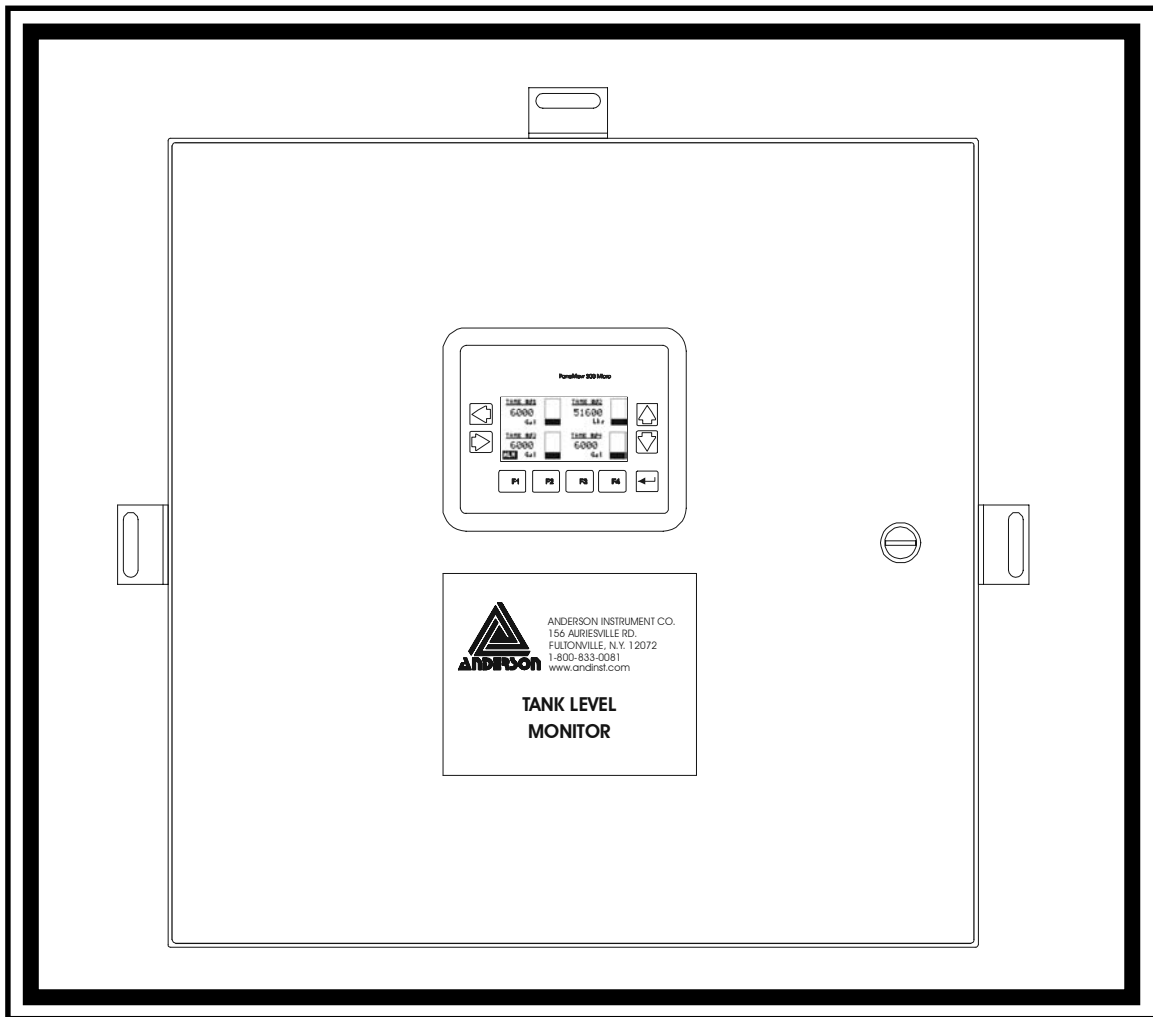


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Instrument Model Number \_\_\_\_\_

Instrument Serial Number \_\_\_\_\_



## **LT - Liqui-Track 800 Tank Level Monitor**

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## **Section 1 - General**

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### **1.1 Introduction**

The Anderson Liqui-Track 800 Tank Monitoring System provides display for up to 8 vessels per system. These vessels may be linear or nonlinear, and may be utilized to hold various weight products. The Liqui-Track Monitor can accept custom configuration tables so that accurate liquid level readings may be obtained from virtually any style vessel. A user screen is provided to enter specific gravity values for up to 50 individual products. These values may then be assigned to each of the vessels as products change. Scaling is done by the computer to maintain an accurate volumetric reading given changes in product specific gravity. Each of the 8 tanks have three alarms associated with them. The alarms are individually user configurable to be either active below setpoint, or active above setpoint. If configured with relay output modules, up to 28 relay output signals become assignable to any of the alarms. They may be used for switching or alarming conditions. Included on each system is an Allen-Bradley Programmable Logic Controller (PLC). A data table has been included showing associated memory locations where data exists. This data may be used to construct remote display screens, forward Liqui-Track data throughout the facility, or switch alarms based on the Liqui-Track's virtual alarm system.

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### **1.2 Features**

- Linear, Horizontal, and Custom tank types. (100 point table)
- Wet calibrations up to 100 points
- Multiple (50) products. 8 char. names, select from list
- Programming parameters easily accessible via keypad/display.
- RS-232 port available for custom table download
- Individually fused analog inputs.
- Display in Volume or Weight, Lbs/Gal or Ltr/Kgm (programmable)
- Three alarm setpoints per tank SP1, SP2, SP3
- Continuous, simultaneous indication of 4 tanks at a time.
- Alarm indicators on display
- Detailed view of each individual channel available.

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## 1.3 Specifications

### Electrical

Operating Voltage	100-240 VAC
Power Supplies	24 VDC at 250 mA standard with 4 channel unit 24 VDC at 1.6 A supplied with 8 channel, and Radar capable units
Inputs	4 (standard) or 8 (optional) 4-20mA current loops
Accuracy	±0.3% of full scale
Outputs	Twelve (12) normally open relay contacts standard Additional sixteen (16) normally open contacts optional
Display	PanelView 300 Micro terminal display (Allen-Bradley)
Communications	Standard RS-232 with optional Ethernet, DH485 or Devicenet modules

### Mechanical

Material	304 Stainless Steel Enclosure
Ratings	NEMA 4X/IP65, 3A Authorized Enclosure
Mounting	Wall mount standard, panel mount optional
Dimensions	16" H x 16" W x 6" D (4064mm x 4064mm x 1524mm)
Penetrations	Seven 7/8" penetrations in bottom supplied with rubber grommets
Weight	less than 30 lbs

### Environmental

Operating Temperature Range	32° to 122°F (0° to 50°C)
Relative Humidity	5% to 95% non condensing

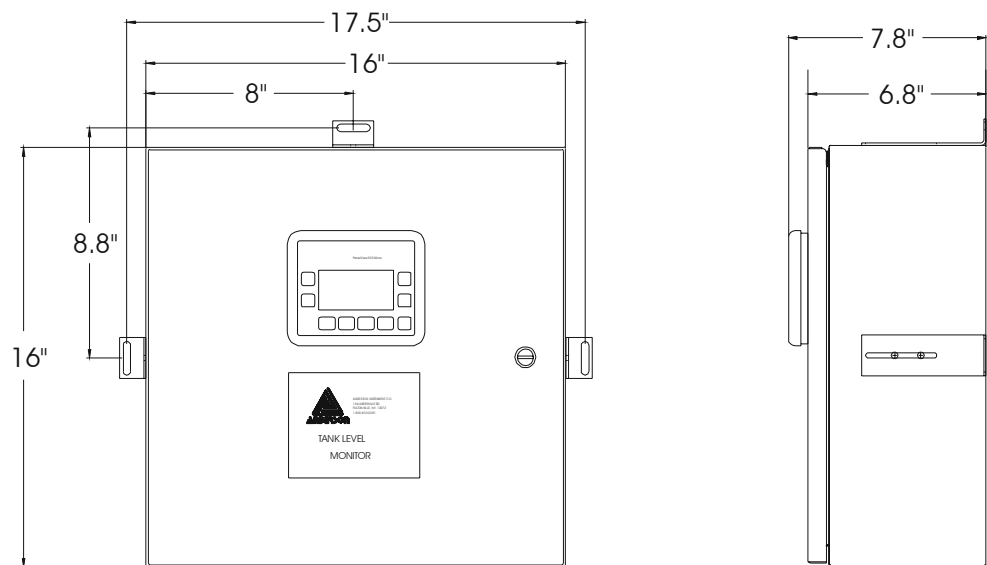
## Section 2 - Physical Installation

The Liqui-Track enclosure should be mounted in a relatively clean environment where it will not be subject to excessive moisture, dust, oil or vibration. Do not subject the instrument to operating temperatures outside of the 32° to 122°F (0° to 50°C) range. The display should be located at eye level and within an arms reach to facilitate ease of use.

### 2.1 Wall Mounting (LT\_1\_ \_ \_)

The enclosure is provided with three mounting brackets as shown below. Figure 2-1 shows the enclosure dimensions and wall mount bracket hole locations.

FIGURE 2-1 Wall Mounting (LT\_1\_ \_ \_)

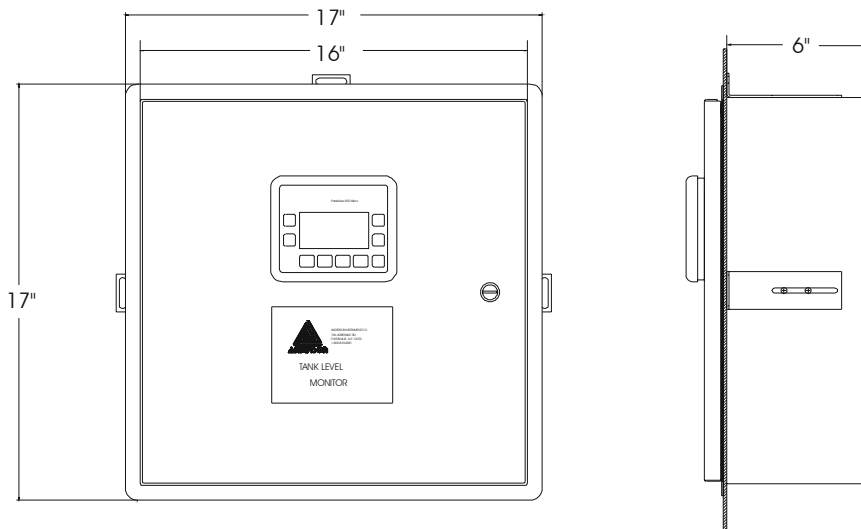


## 2.2 Panel Mounting (LT\_2\_ \_ \_)

The enclosure is mounted with a flange and three mounting brackets as shown in Figure 2-2 below.

1. Cut hole in panel.
2. Remove the three mounting brackets.
3. Apply closed cell foam gasket material (not included), or silicone adhesive to back side of flange.
4. With an assistant, place enclosure into panel opening and retain by reversing and installing the three supplied mounting brackets.

FIGURE 2-2 Panel Mounting (LT\_2\_ \_ \_)



## Section 2 - Electrical Wiring

Be sure to read these instructions before proceeding with wiring of the Liqui-Track 800. All electrical code requirements apply, and proper safety standards should be observed. Power supply wiring should be performed by a qualified electrician, followed by start-up of the instrument by qualified personnel.

### 2.1 Pre-Wiring Precautions

Electrical noise is a phenomenon typical of industrial environments. The following guidelines should be observed to minimize the effect of noise upon any instrumentation.

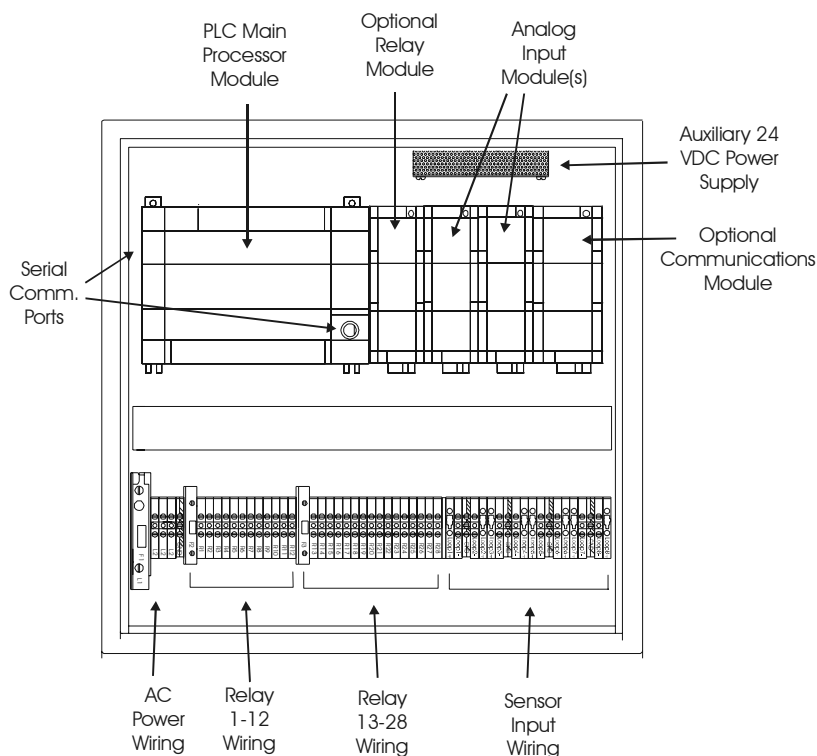
Below are some common sources for noise in the industrial environment:

- Ignition Transformers
- Arc Welders
- Mechanical Contact Relays
- Electric Solenoids

Before using any instrument near devices listed, the following guidelines should be followed:

1. If the instrument is to be mounted in the same panel as any of the above devices, separate them by the largest distance possible.
2. If possible, eliminate mechanical contact relays and replace with solid state relays. If a mechanical relay being powered by an instrument output device cannot be replaced, a solid state relay may be used to isolate the device.
3. A separate isolation transformer to feed only instrumentation should be considered. The transformer can isolate the instrument from noise found on the AC power input.
4. If the instrument is being installed on existing equipment, the wiring are should be checked to insure that good wiring practices have been followed.

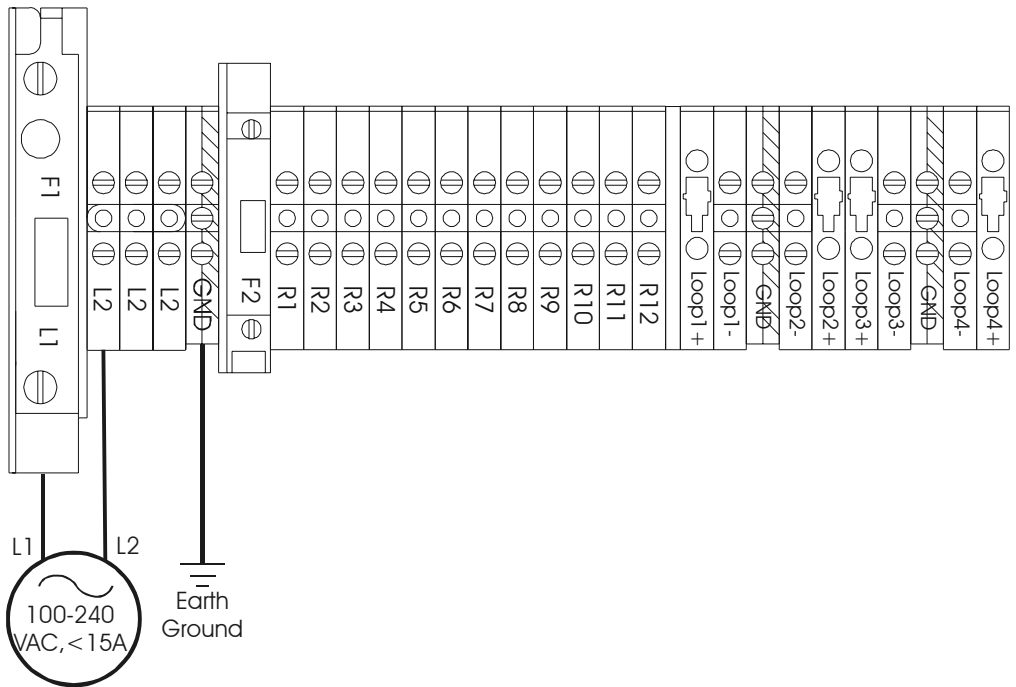
FIGURE 2-1 Wiring Locations



**2.2 AC Power Wiring**

Power wiring should enter the Liqui-Track through the left-most provided 7/8" penetration in the bottom of the enclosure. The unit operates on between 100 and 240 Volts AC, and is fused internally with F1 at 15 amps. This is the main power fuse. Connect AC power to the L1 Fuse and L2 terminals. Connect the GND terminal to Earth ground. See Figure 2-2 for terminal locations.

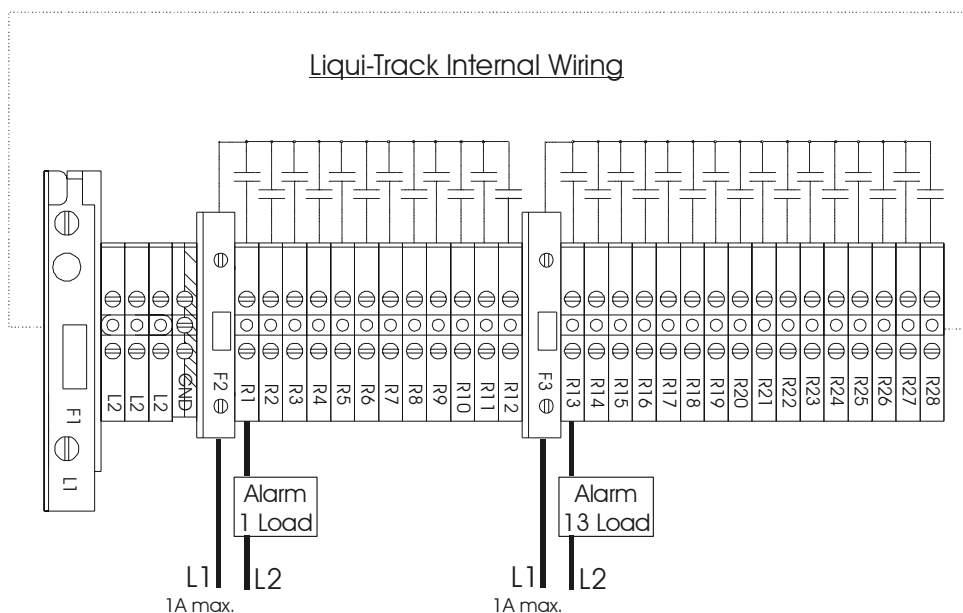
FIGURE 2-2 AC Power Wiring



**2.3 Relay Output Wiring**

Relay output wiring should enter the Liqui-Track through the three left-most provided 7/8" penetrations in the bottom of the enclosure. The unit will have either 12 or 28 relay outputs. Fuse F2 supplies voltage to the common connection of the first 12 relays. Terminals R1 through R12 are wired internally to the Normally Open contacts of Relays 1-12. Likewise, fuse F3 supplies voltage to the common connection of Relays 13 - 28 (if supplied with 28 relays). Terminals R13 through R28 are wired to the NO contacts of Relays 13 - 28. AC voltage from L1 is not connected between the switched side of fuse F1 and the fuses F2 and F3. Therefore, voltage must be field wired to terminals F2 and F3 which be output on terminals R1 - R28 when the setpoints, to which the relays are assigned, are active. The load can be wired across the appropriate 'R' terminal and L2 as shown in Figure 2-3.

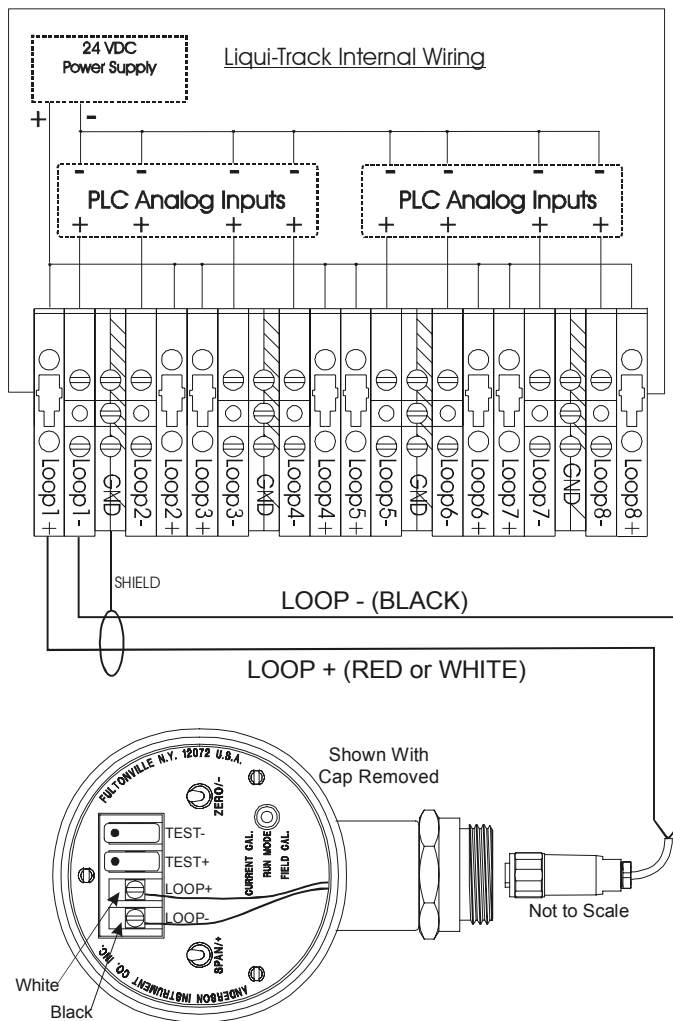
FIGURE 2-3 Relay Output Wiring



**2.4 Analog Input Signal Wiring**

The analog, 4-20 mA signal wiring should enter the Liqui-Track enclosure through two of right-most provided 7/8" penetrations in the bottom of the enclosure. The unit will be equipped with either four or eight analog input channels. The input terminals are labeled LOOP+ and LOOP- and are numbered 1 - 4 and 5 - 8. LOOP+ is the positive 4-20 mA loop input, while LOOP- is the negative input terminal. Each LOOP+ terminal is individually fused and supplies 24 VDC to power a 2-wire transmitter. LOOP- connects through the PLC analog input channel and then to the common of the DC power supply. Therefore, the Liqui-Track will only accept 2-wire, unpowered 4-20 mA signals, and cannot accept powered 4-20mA signals such as those from a 3-wire or 4-wire transmitter. Ground terminals, labeled GND are also provided to facilitate connection of the shield wires to the instruments Earth GND connection. All analog input wiring should utilize shielded cable, and have the shield, (drain) wire connected to the GND terminals in the Liqui-Track. Analog input signal wiring is shown in Figure 2-4.

FIGURE 2-4 Analog Input Signal Wiring



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## Section 3 - Start-Up & Commissioning

This section of the manual is intended to guide the installer through a successful start-up.

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### 3.1 Preparation

Before the start-up actually begins, it helps to verify that the physical installation has been properly completed, and all of the instrumentation has been properly specified. Walk the job site and look for the following things:

- 1 Liqui-Track 800 enclosure has been securely mounted, in a location where it will be easy to use, and will not be subjected to extreme moisture, vibration, dirt, or temperature.
- 2 Absolutely no penetrations have been made in the top side of the enclosure. All wiring should enter the enclosure through the seven provided penetrations in the bottom of the enclosure.
- 3 Conduit and all signal cables should be installed between the Liqui-Track and the individual vessels. They may not be wired at this time.
- 4 Remove all Fuses from the Loop+ input wiring terminals. This will prevent DC voltage from going out to cables that may not be terminated to the sensors yet.
- 5 AC power wiring should be connected to the L1, L2 and GND terminals. It may not be energized yet. If properly wired, have the electrician energize the circuit. You can open the F1 fuse holder to discontinue power to the instrument.
- 6 Any relay wiring should be installed although it may not be terminated at this time. Again, verify that all wiring enters the enclosure through the bottom of the enclosure.
- 7 Next locate the individual vessels to be installed on the system, and verify that the vessel names, shapes, and level shell fittings match the Liqui-Track System Summary Sheet that was provided with the unit (if it was preprogrammed).
- 8 At each tank, locate the cable that you will wire to the sensor, and verify that its installation is acceptable.
- 9 Next locate the sensors, and identify the sensor for each vessel. Confirm that it is the correct model for each tank. Specifically, note that the fitting and the range.
- 10 Confirm with the appropriate people that you are installing a tank level gauging system, and that you will need each tank empty at some point during the start-up.
- 11 If any item above was not correct, now is the time to take action to have it corrected.

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## **3.2 Sensor Installation and Wiring**

- 1 If any vessel is empty now, that will not be empty later, install and wire that sensor first. Refer to the sensor manual or Quick-Start Guide for specific details.
- 2 Begin by terminating the sensor wiring as instructed in Section 2.4 or in the instructions for the sensor.
- 3 Next terminate that channel in the Liqui-Track enclosure. Refer to Section 2.4. Once wired, you can install the fuse for that channel.
- 4 Check the sensor by connecting a Digital Multi-Meter across the sensor Testpoints to verify that the sensor is operating. Perform a sensor Rezero now, while the tank is empty. Refer to the Quick-Start Guide for specific instructions.
- 5 Proceed to install each of the sensors and terminating the sensor wiring. We suggest powering up each sensor one at a time, so you are certain that the sensors are wired to the correct channel. Each sensor must be Rezeroed upon installation.

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## **3.3 Configuration Verification**

Typically, the Liqui-Track will be configured at the factory before the unit ships. The Liqui-Track System Summary Sheet will show how the system was configured. If any changes need to be made, to the Tank, Product, or Setpoint configuration values, this can be done now. Be sure to keep a written record of any changes made. The factory will update its records with your changes, if the changes are sent back to the Technical Services Department. Section 4 describes how to view the configuration data, while Section 5 describes how to modify it.

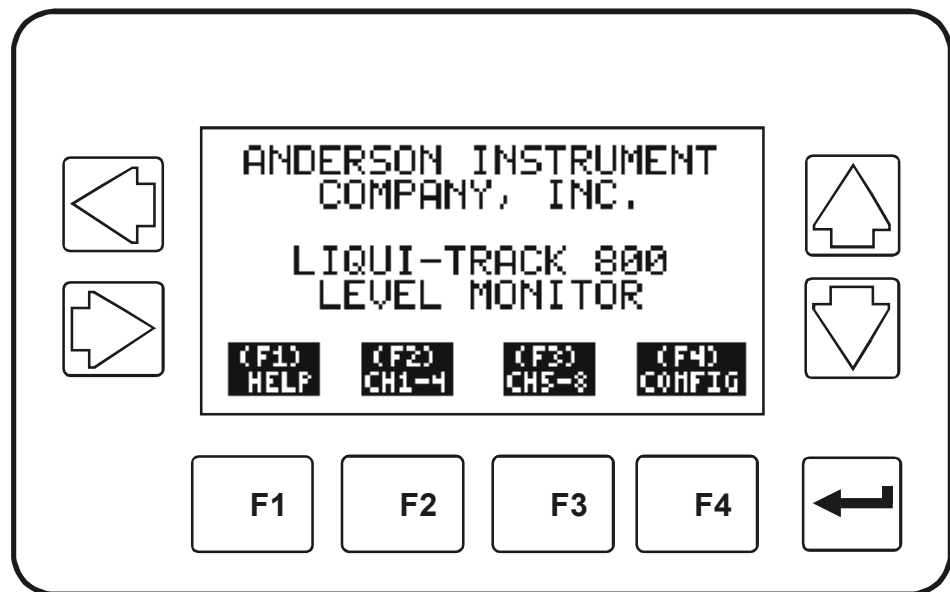
## Section 4 - Operation / Screen Navigation

The Liqui-Track 800 consists of a small PLC with either four or eight analog inputs which are digitized, scaled and displayed as a level reading on a small backlit LCD operator interface. The Liqui-Track may be equipped with optional communication modules which will allow the level readings to be communicated with other plant computers.

### 4.1 Main Screen

The Main screen will appear upon power-up, and may be accessed by pressing [F4] from most other screens. From the Main screen, one can access the Help screen, the tank levels, or the Configuration screen, which requires a password.

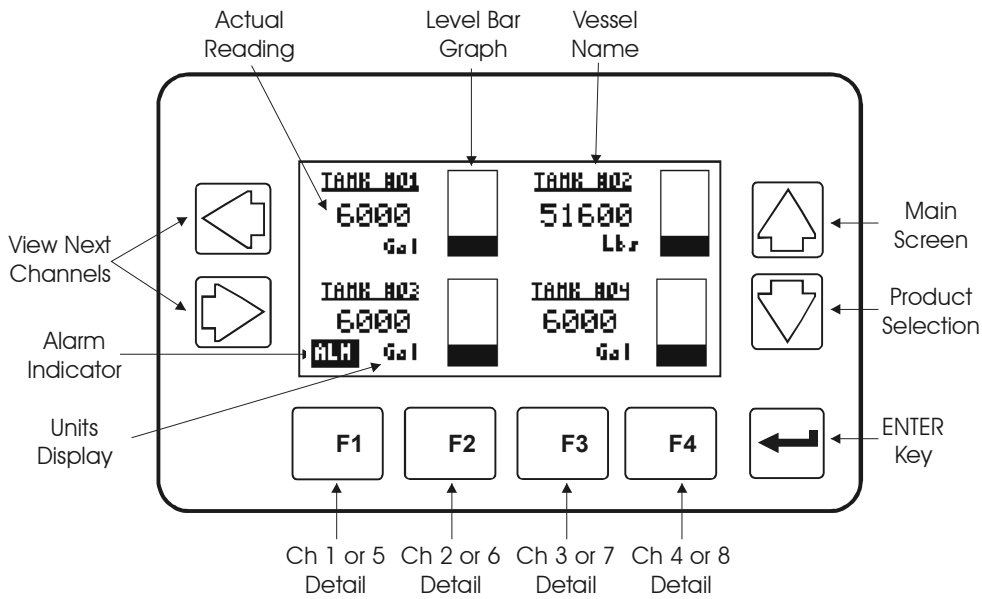
FIGURE 4-1 Main Screen



**4.2 Four Channel Overview**

This screen provides an overview of either channels 1 - 4, or 5 - 9 with a bar graph and numeric readout for each channel. Alarm and units annunciators are also included. Pressing either the [LEFT] or [RIGHT] key will toggle between the screens. Pressing the individual [F#] Keys will display the individual channel detailed displays. These are the only screens where pressing [F4] will not return you to the MAIN screen. Instead, press the [UP] key to access the MAIN screen. Pressing [DOWN] enters the Product Selection Screen.

FIGURE 4-2 Four Channel Overview

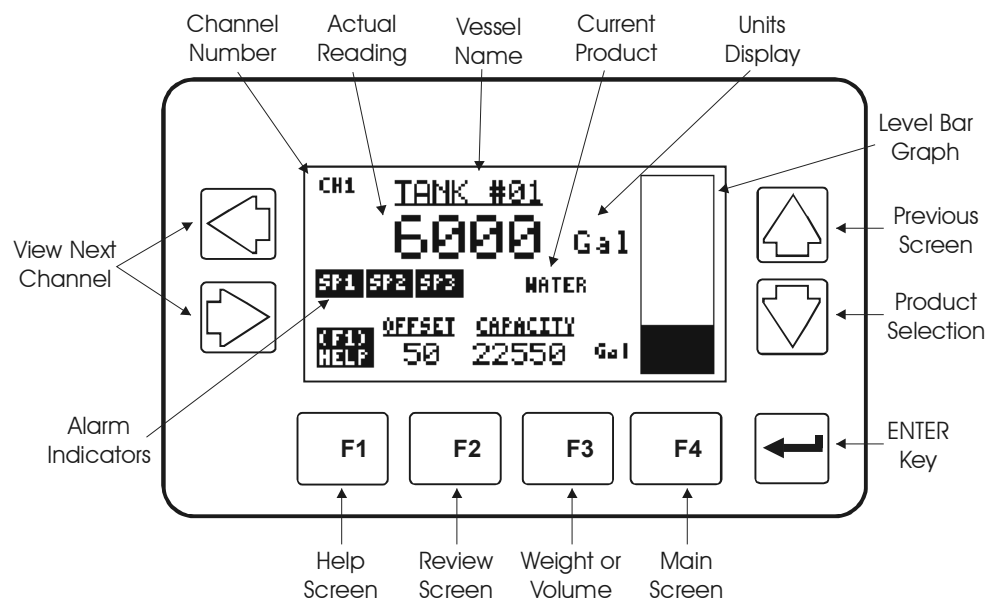


**4.3 Single Channel Detail**

The Single Channel Detail screen provides a detailed display of a single channel. It includes a bar graph, numeric readout, and units display as well as individual alarm status indicators, selected product indication, and tank Offset and Capacity displays.

From this screen, [F2] enters the Configuration Review screen, [F3] allows for toggling the display between volumetric and weight units and pressing [DOWN] enters the Product Selection screen.

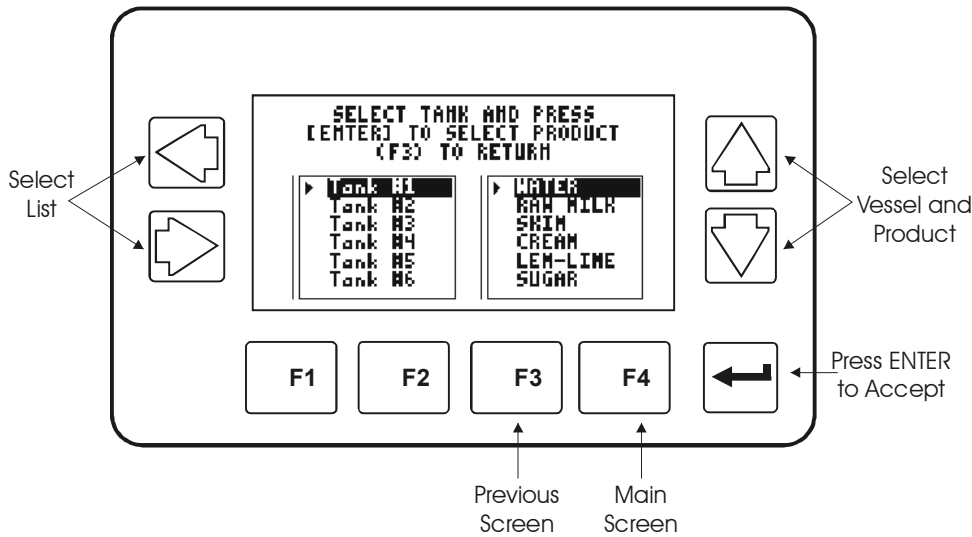
FIGURE 4-3 Single Channel Detail



**4.4 Product Selection**

This screen consists of two scrolling lists, which are utilized to select which product, from the list of 50, is contained in each tank. The accuracy of the system is directly dependant on the correct product being selected for each channel. A step by step procedure for selecting products is described below and can be photocopied and posted near the display for the operators.

FIGURE 4-4 Product Selection

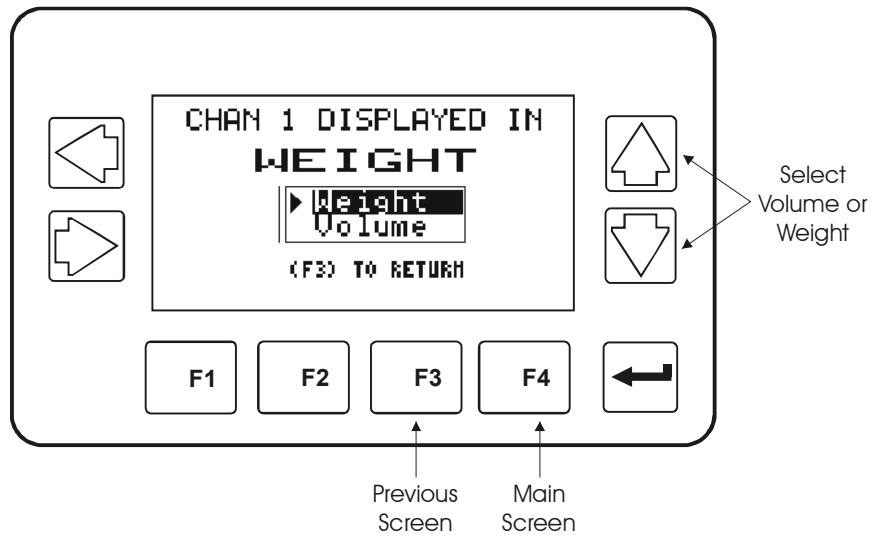


- 1 Begin at either the Single Channel Detail, or Four Channel Summary screen.
- 2 Press the [DOWN] arrow key.
- 3 Use the [LEFT] arrow key to select the TANKS list.
- 4 Use the [UP] and [DOWN] keys to scroll to the desired tank.
- 5 Press the [ENTER] key.
- 6 Use the [RIGHT] arrow key to select the PRODUCTS list.
- 7 Use the [UP] and [DOWN] keys to scroll to the desired product.
- 8 Press the [ENTER] key.
- 9 Press [F3] to return to the previous screen.

**4.5 Volume / Weight Units Selection**

Individual tank levels may be displayed in either volumetric (gallons or liters) or weight (pounds or kilograms) units. This is easily user selectable from the Single Channel Detail screen by simply pressing the [F3] key, scrolling to either WEIGHT or VOLUME, and pressing [F3] again to return to the previous screen. Pressing [F4] will return the display to the MAIN screen.

FIGURE 4-5 Volume / Weight Units Selection



**4.6 Review Configuration Menu**

The Review Configuration screens allows for reviewing and verifying the Liqui-Track configuration values, without the ability to modify these values. The Review Configuration Menu provides access to Tank information by pressing [F2] or Product information by pressing [F3]. Pressing [F4] will return the display to the MAIN screen.

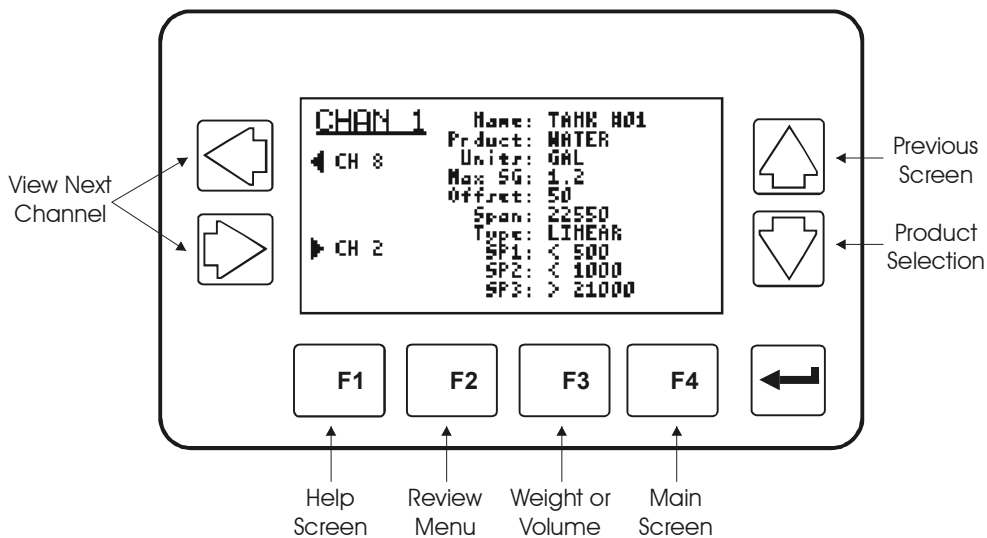
FIGURE 4-6 Review Menu



**Review Tank Information**

All of the tank and alarm configuration data for each channel will be displayed on the screen at once. Use the [LEFT] and [RIGHT] keys to scroll through the eight channels. Pressing [F3] allows the selection of volume or weight units, and pressing [DOWN] allows product selection. Press [F3] to return to the Review Menu or [F4] to return the display to the MAIN screen.

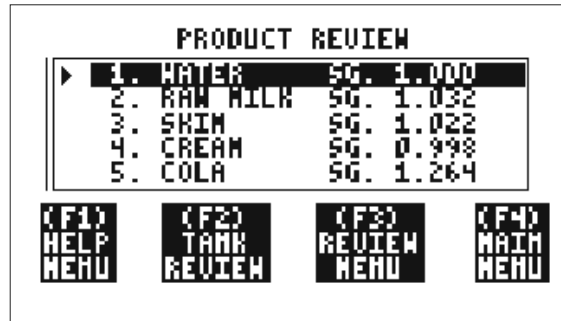
FIGURE 4-7 Review Tank Information



**Review Product Information**

A scrolling list of all 50 product names and specific gravities is displayed. Use the [UP] and [DOWN] keys to scroll through the list. Press [F3] to return to the Review menu. Pressing [F4] will return the display to the MAIN screen.

FIGURE 4-8 Review Product Information



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## **Section 5 - Configuration (password required)**

The Liqui-Track 800 configuration will normally be completed by the factory before the unit ships. The configuration values are determined at the factory based on specific application data collected at the time of order. The Liqui-Track performs math which calculates actual vessel volume or weight, based in the input from a level sensor. Most of the values used during the calculations are stored in the memory of the processor. It is imperative that the values be correct for each vessel in the application, or the resulting level readings will not be correct. The configuration values are carefully determined based on specific tank dimensions, sensor locations, and product densities. If any one of these values is not correct, the resulting level readings may be in error. Configuration values should not be modified in the field, unless the effect of the modification is thoroughly understood. The factory may be contacted for assistance.

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### **5.1 Configuration Menu**

From the MAIN screen, pressing [F4] will attempt to access the Configuration Menu and ask for a password. The default password is "1234".

#### **User Password**

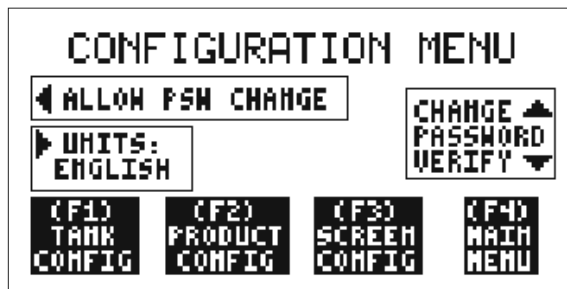
The default password is "1234". The password may be changed from this screen if desired. The new password must be entered once by pressing the [UP] key and then verified by pressing the [DOWN] key. If the password change is not allowed, press the [LEFT] key once and try again. If the password is forgotten, you will need to contact the factory for assistance.

#### **English or Metric Units**

The Liqui-Track may be configured to read in either English (Gallons / Pounds) or Metric (Liters / Kilograms) by pressing the [RIGHT] key. This parameter only affects the multiplier used to convert from volume to weight, it does not convert all values to the new type, therefore, it must be set before the Tank configuration values are entered. It does not affect the Product configuration values. If a system is converted from English to Metric units, the Tank configuration parameters will need to be reentered.

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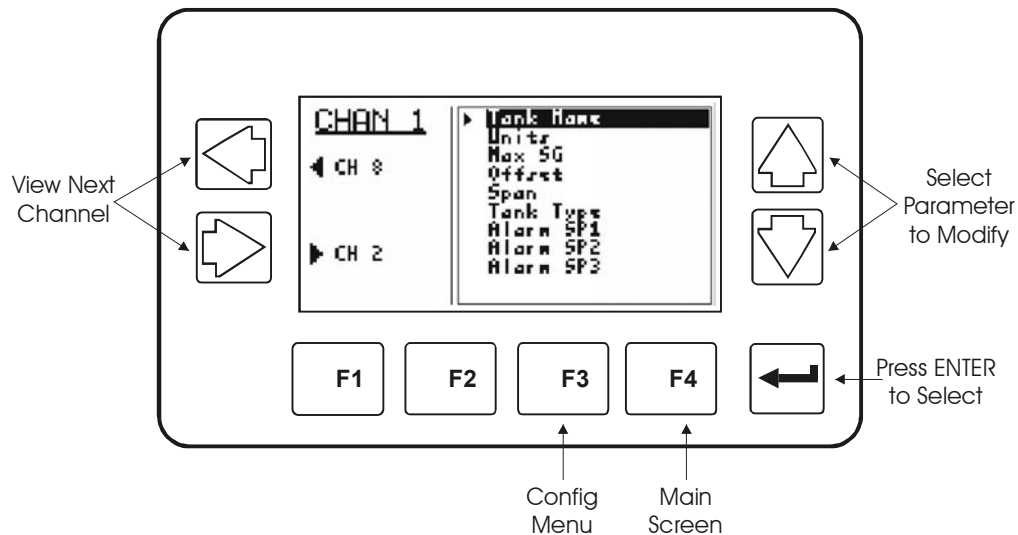
FIGURE 5-1 Configuration Menu



**5.2 Tank Configuration**

All vessel configuration and setpoint data is accessible via this screen. Simply scroll [LEFT] and [RIGHT] through the channels, then Scroll [UP] and [DOWN] to the desired parameter, and press [ENTER] to select. The selected value will appear for editing.

FIGURE 5-2 Tank Configuration



**5.3 Alarm Setpoint Configuration**

There are three alarm setpoints for each channel. The Liqui-Track will be equipped with either 12 or 28 relay outputs which are individually assignable to any of the 12 or 24 setpoints. From the Tank configuration screen for a particular channel, select the desired alarm setpoint to configure. The Alarm Setpoint configuration editor will appear.

**Setpoint Value**

Press the [LEFT] key to modify the setpoint value. This is the value, in actual units, that will cause the output to energize based on level.

**Hysteresis**

Press the [RIGHT] key to modify the hysteresis value. This value is expressed as percentage of SPAN. It represents the difference in level between the setpoint value and the value which causes that output to de-energize. The allowable range is 0-50.0% of SPAN.

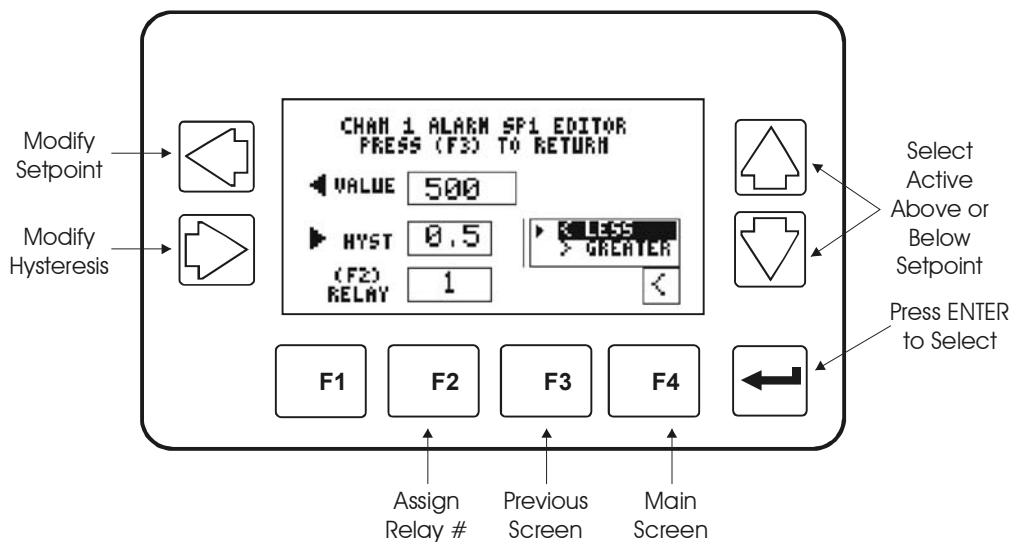
**Relay Assignment**

Press [F2] to modify the relay assignment for the displayed setpoint. The relays are numbered from 1 to 28 in accordance with the relay output wiring shown in Section 2.3. Verify if your unit has 12 or 28 relays before programming. Setting the value to "0" will prevent the setpoint from energizing any relay. If the same relay is assigned to multiple setpoints, than any of those setpoints will cause that relay to energize. It is not possible to assign multiple relays to the same setpoint, but multiple setpoints may be configured to exactly the same values.

**Alarm Setpoint Action**

Select the action of the alarm setpoint by using the [UP], [DOWN], and [ENTER] keys. A "< LESS" indicates that the output will be energized when the level drops below the setpoint value. A "> GREATER" indicates that the output will be energized when the level exceeds the setpoint value. In either case the relay will remain energized until the level value clears the setpoint plus/minus the hysteresis value.

FIGURE 5-3 Alarm Setpoint Configuration



**5.4 Product Configuration**

From the Configuration menu, press [F2] to access the Product Configuration screen. This screen allows the modification or addition of products, their names and specific gravity values. Do not enter a Product Specific Gravity that exceeds the Maximum Specific Gravity for the tank in which it will be contained.

**Product Number**

Pressing the [LEFT] key will allow you to enter a product number (1 - 50) of the product configuration you wish to edit. The current Specific Gravity and Name of the product will appear.

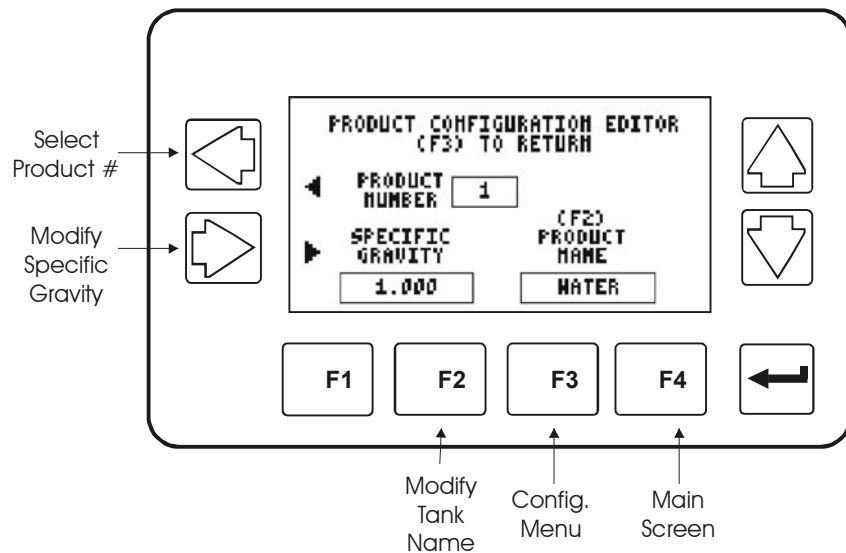
**Specific Gravity**

Press the [RIGHT] key to modify the specific gravity for the displayed product. Specific gravity is the ratio of the density of the product to the density of water. Water has a specific gravity of 1.0, and weighs 8.345 pounds / gallon or 1.0 kilograms / liter. It is important that this value be correct. The difference between 1.0 and 1.01, appears negligible, but it will cause a 1 percent error in the resulting level reading.

**Product Name**

Press [F2] to access the Product Name editor. The names can consist of up to eight alphanumeric characters.

FIGURE 5-4 Product Configuration



Press [F3] to return to the Configuration Menu, or [F4] to return to the Main Screen.

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## **Section 6 - Digital Communication Options**

The Liqui-Track 800 is available with three digital communications options an addition to the standard RS-232 serial port. These include Ethernet, DH-485, or Devicenet. For specific instructions on how to configure the digital communications, please refer to the Allen-Bradley documentation that was shipped with the unit, or available on the web from Allen-Bradley.

*Note: Please contact the factory for specific information on data mapping.*

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## Section 7 - Glossary of Critical Terms

OFFSET	The quantity of product contained by the vessel, but not measures by the sensor because the quantity is entirely below where the sensor can measure. The OFFSET is added to the quantity measured above the sensor to produce the level reading. This value is entered directly when the TANK TYPE is Linear and Custom.
PHYSICAL OFFSET	A value used by the Liqui-Track to determine the quantity of product below the sensor for Horizontal TANK TYPES. Its range is 0-4095 and it is entered as the OFFSET in the Tank Configuration screen. This value is always determined by the factory. It is not an actual quantity, but will result in a displayed OFFSET.
SPAN	The quantity of product which can be contained above the sensor and can be measured by the sensor.
CAPACITY	The total quantity of product the vessel can contain. Is the sum of OFFSET and SPAN.
TANK TYPE	The Liqui-Track 800 calculates level readings for each vessel one of three different ways. The method used is determined by the TANK TYPE.
LINEAR TANK TYPE	Linear TANK TYPE is used when the height versus volume relationship is linear. Therefore the Liqui-Track simply scales the level reading linearly between the OFFSET and CAPACITY values.
CUSTOM TANK TYPE	Custom TANK TYPE is used for non-linear vessels, where a custom look-up table is created to display a particular volume for an associated level. It is used for cone, and dish-bottomed vessels, as well as unusually shaped vessels, or when a "wet calibration" is performed to create the look-up table by metering water into the vessel to accurately define its height vs. volume relationship.
HORIZONTAL TANK TYPE	Horizontal TANK TYPE is used to approximately profile the height vs. volume relationship of a horizontal cylindrical tank. It is used as an alternative to a more accurate "wet calibration".
SPECIFIC GRAVITY (SG)	The relative density of the product, stored in the vessel, with regard to water. Water has a SG of 1.000, and weighs 8.34 pound per gallon, or 1 kilogram per liter. Dividing the weight of the product, by the weight of water yields the SG.
MAXIMUM SPECIFIC GRAVITY (MAX SG)	This is the highest specific gravity (heaviest product) the vessel configuration and sensor are programmed for. The height above the sensor multiplied by the the MAX SG will determine the sensor calibration. Anderson frequently sets this value to an arbitrary number such as 1.1, 1.2 or 1.5, depending on the application.

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## **Section 8 - Configuration Worksheets**

### **8.1 Tank and Alarm Setpoint Configuration Data Sheet (default values)**

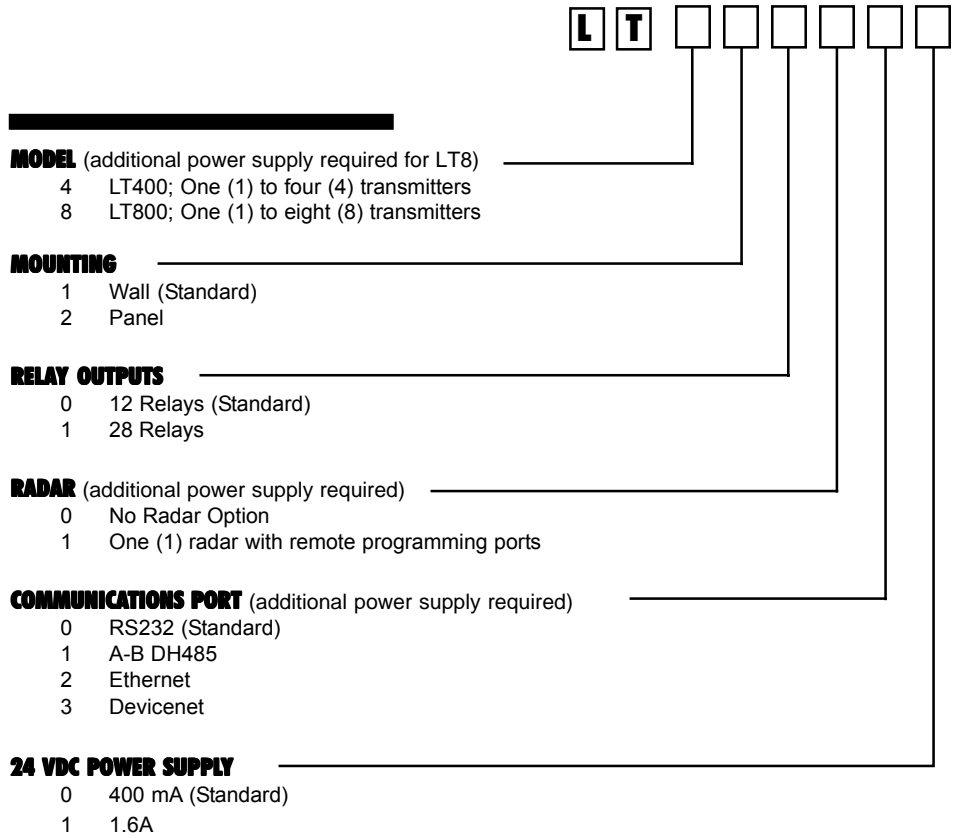
REV 1.0	Tank Name	Tank Offset	Tank Span	Tank Type	Max. S. G.	Alarm SP1 Setpoint	Alarm SP2 Setpoint	Alarm SP3 Setpoint
Ch 01	T1	0	6000	L	1.2000	0	0	90000
Ch 02	T2	0	6000	L	1.2000	0	0	90000
Ch 03	T3	0	6000	L	1.2000	0	0	90000
Ch 04	T4	0	6000	L	1.2000	0	0	90000
Ch 05	T5	0	6000	L	1.2000	0	0	90000
Ch 06	T6	0	6000	L	1.2000	0	0	90000
Ch 07	T7	0	6000	L	1.2000	0	0	90000
Ch 08	T8	0	6000	L	1.2000	0	0	90000
<b>Alarm SP1 Hysteresis</b>								
0.5	0.5	0.5	1	2	3	LO	LO	HI
0.5	0.5	0.5	4	5	6	LO	LO	HI
0.5	0.5	0.5	7	8	9	LO	LO	HI
0.5	0.5	0.5	10	11	12	LO	LO	HI
0.5	0.5	0.5	13	14	15	LO	LO	HI
0.5	0.5	0.5	16	17	18	LO	LO	HI
0.5	0.5	0.5	19	20	21	LO	LO	HI
0.5	0.5	0.5	22	23	24	LO	LO	HI

**8.2 Product Configuration Data Sheet (default values)**

	Product Name	Specific Gravity		Product Name	Specific Gravity	
	Product 01	X	1.0000	Product 26	X	1.0000
	Product 02	X	1.0000	Product 27	X	1.0000
	Product 03	X	1.0000	Product 28	X	1.0000
	Product 04	X	1.0000	Product 29	X	1.0000
	Product 05	X	1.0000	Product 30	X	1.0000
	Product 06	X	1.0000	Product 31	X	1.0000
	Product 07	X	1.0000	Product 32	X	1.0000
	Product 08	X	1.0000	Product 33	X	1.0000
	Product 09	X	1.0000	Product 34	X	1.0000
	Product 10	X	1.0000	Product 35	X	1.0000
	Product 11	X	1.0000	Product 36	X	1.0000
	Product 12	X	1.0000	Product 37	X	1.0000
	Product 13	X	1.0000	Product 38	X	1.0000
	Product 14	X	1.0000	Product 39	X	1.0000
	Product 15	X	1.0000	Product 40	X	1.0000
	Product 16	X	1.0000	Product 41	X	1.0000
	Product 17	X	1.0000	Product 42	X	1.0000
	Product 18	X	1.0000	Product 43	X	1.0000
	Product 19	X	1.0000	Product 44	X	1.0000
	Product 20	X	1.0000	Product 45	X	1.0000
	Product 21	X	1.0000	Product 46	X	1.0000
	Product 22	X	1.0000	Product 47	X	1.0000
	Product 23	X	1.0000	Product 48	X	1.0000
	Product 24	X	1.0000	Product 49	X	1.0000
	Product 25	X	1.0000	Product 50	X	1.0000

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**Section 9 - Ordering Matrix**



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## **Section 10 - Troubleshooting**

*Note: Please contact the factory at 1-800-833-0081 for troubleshooting assistance.*

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## **Section 11- Warranty and Return Statement**

These products are sold by The Anderson Instrument Company (Anderson) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Anderson or from an Anderson distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

### ***Warranty***

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Anderson factory and to conform at that time to the specifications set forth in the relevant Anderson instruction manual or manuals, sheet or sheets, for such products for a period of one year.

**THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. ANDERSON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.**

### ***Limitations***

Anderson shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses excepting only the cost or expense of repair or replacement as described above.

Products must be installed and maintained in accordance with Anderson instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating condition beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies or if the purchaser attempts to repair the product themselves or through a third party without Anderson authorization.

### ***Returns***

Anderson's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at Anderson's option), free of charge, the products which are reported in writing to Anderson at its main office indicated below.

Anderson is to be advised of return requests during normal business hours and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned and Anderson or its representative shall pay for the return of the products to the buyer.

Approved returns should be sent to:      ANDERSON INSTRUMENT COMPANY INC.  
156 AURIESVILLE ROAD  
FULTONVILLE, NY 12072 USA

ATT: REPAIR DEPARTMENT